

Audi A8 1994 >

Electrical system > 01.99

Edition 01.1999



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Repair GroupsList of Workshop Manual Repair Groups

Audi A8 1994 ➤

Electrical system ➤ 01.99

Repair Group

- 01 - Self-diagnosis
- 27 - Starter, Current supply
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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.

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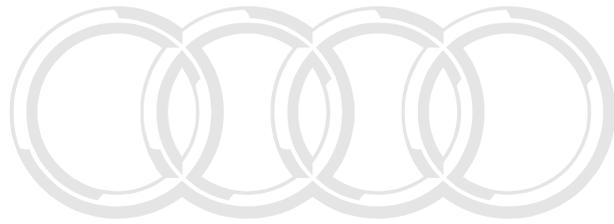
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01 - Self-diagnosis

1 - Self-diagnosis of dash panel insert

1.1 - Self-diagnosis of dash panel insert

1.2 - General information

Technical features of dash panel insert

The dash panel insert in the Audi A8 features an LCD multi-function display.

The multi-function monitor incorporates the following displays:

- ◆ Auto-Check system with radio frequency and telephone data display
- ◆ Ambient temperature display
- ◆ On-board computer display
- ◆ Gear selection indicator for automatic gearbox
- ◆ Navigation (if fitted)

The speedometer has an LCD display incorporating a mileage or kilometre counter, trip recorder and Service Interval Display (SID). AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

The brightness of dash panel insert illumination is regulated automatically as a function of the background brightness

The adjustment range for automatic brightness control can be set individually by plus and minus buttons.

=> Operating instructions

The warning lamps are arranged in three rows beneath the multi-function display.

The dash panel insert is controlled by a microprocessor and has an extensive self-diagnosis capability. If faults occur in any system components, corresponding fault codes are stored in fault memory of dash panel insert. These can then be identified using fault reader V.A.G 1551 or vehicle systems tester V.A.G 1552.

Note:

This Workshop Manual refers solely to the V.A.G 1551 reader.

The following adjustment functions are also available:

- ◆ Adaption of fuel gauge
- ◆ Adapting fuel consumption display
- ◆ Coding of language versions for on-board computer and Auto-Check system
- ◆ Resetting service interval display
- ◆ Setting mileage/kilometre counter when dash panel insert is replaced

Brightness sensor

- ◆ The brightness of dash panel insert illumination is regulated automatically as a function of the background brightness
- ◆ The adjustment range for automatic brightness control can be set individually by plus and minus buttons => Operating instructions.



Fault message "dEF" on trip recorder display

If control unit in dash panel insert detects a fault in the permanent memory, the letters "dEF" will appear on trip recorder display.

- If "dEF" appears on display, replace dash panel insert => Page 106 .

Notes on replacing dash panel insert

- ◆ The dash panel insert must not be dismantled.
- ◆ All indicator lamps which have conventional bulbs can be replaced individually => Page 112 .
- ◆ If necessary, the dash panel insert can be replaced with an exchange unit.
- ◆ Complete damage report and return it together with defective dash panel insert.
- ◆ Defective units must always be returned in their original packing.
- ◆ The mileage/kilometre counter and the service interval display on the replacement dash panel insert can be set using fault reader V.A.G 1551 => Page 12 .

1.3 - Performing self-diagnosis of dash panel insert

Test requirements:

- ◆ Fuse OK (check using current flow diagram)
- ◆ Always check coding of dash panel insert according to coding table => Page 9 .
- ◆ Connect V.A.G 1551 fault reader => Page 78 .
- ◆ Switch on ignition.

Notes:

- ◆ If display remains blank, check voltage supply to V.A.G 1551 according to current flow diagram.
 - ◆ Additional operating instructions can be called up with fault reader HELP key.
 - ◆ The => key is used for continuation of program sequence.
 - ◆ Incorrect entry can be cancelled with the Ckey.
 - ◆ In operating mode 1 "Rapid data transfer" the function 00 "Automatic test sequence" can be carried out. Then all vehicle control units will be interrogated automatically.
- Switch on ignition.
- Switch on printer with the PRINT key (indicator lamp in key lights up).
- Press key 1 for "Rapid data transfer" mode.

-> Display readout:

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

Address word for dash panel insert: 17

- Press keys 1 and 7.

-> Display readout:

```
Rapid data transfer      Q
17 - Dash panel insert
```

- Confirm entry with Q key.

-> This display will appear after about 5 seconds:

```
4D0919033 D2-INSTRUMENT CLUSTER D10
Code 00083      WSC      06812
```

- 4D0919033: Identification No. of dash panel insert (also refer to Parts list)
- D2 INSTRUMENT CLUSTER: Component designation
- D04: Software version installed in dash panel insert ("V01" is also possible)
- Coding 00083: Coding of dash panel insert

- WSC 06812: Workshop code

Note:

Check coding according to coding table =>Page 9 .

- Press => key.

-> If display shows one of the messages shown, run through fault finding procedure as described in diagnosis management fault finding program.

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

=> Current flow diagrams, electrical fault finding and fitting locations

```
Rapid data transfer      HELP
Fault in communication build up
```

```
Rapid data transfer      HELP
K wire not switching to earth
```

```
Rapid data transfer      HELP
K wire not switching to positive
```

-> Display readout:

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

- Press HELP key to obtain a printout of available functions.
- Pressing the => key switches to next step of program sequence.

Self-diagnosis functions

The following functions are possible:

- 02 - Interrogating fault memory => Page 3 .
- 03 - Final control diagnosis=> Page 5 .
- 05 - Erasing fault memory => Page 7 .
- 06 - End output => Page 8 .
- 07 - Coding control unit => Page 8 .
- 08 - Reading measured value block => Page 10 .
- 10 - Adaption=> Page 12 .



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1.4 - Interrogating fault memory

Note:

The displayed fault messages are not constantly updated but only when starting self-diagnosis, or with function 05 "Erase fault memory".

- Switch on printer with the PRINT key (indicator lamp in key lights up).

-> Display readout:



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

- Press keys 0 and 2 (02 selects function "Interrogate fault memory".)

-> Display readout:

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

- Confirm entry with Q key.

-> The number of faults stored will appear on display.

```
X faults recognised!
```

The stored faults are displayed consecutively and printed out.

- Check the printed faults with those in fault table and rectify faults => Page 4 .

-> The display "No fault recognised" causes program to return to original setting after pressing the =>key.

```
No fault recognised
```

-> Display readout:

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

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If something else is displayed:

=> Fault reader operating instructions

- End output (function 06) => Page 8 .
- Switch off ignition and separate diagnostic connections.

1.5 - Fault table for dash panel insert

Notes:

- ♦ The following table lists all faults that can be recognised by dash panel insert and printed out by the V.A.G 1551. The faults are listed in order according to their 5-figure code numbers.
- ♦ Fault codes appear only on print-out.
- ♦ Before replacing a component shown as faulty, check wiring and connections to component as well as earth connections according to current flow diagram.
- ♦ After completing repair and checking function of system, always interrogate fault memory once again with fault reader V.A.G 1551 and erase memory.
- ♦ The fault memory records all static and sporadic faults.
If a fault occurs and persists for at least 2 seconds, it is identified as a static fault. In the case of the ambient temperature display, a fault must persist for at least 60 seconds before it is classified as a static fault; in the case of the coolant temperature sender, static faults are those which persist for at least 30 minutes with engine running. If fault does not occur again it is registered as a sporadic fault. "/SP" appears on right of display.
- ♦ When ignition is switched on, all existing faults are automatically reclassified as sporadic faults and will only register as static faults if they still occur after testing.
- ♦ Sporadic faults which no longer occur after 50 driving cycles (ignition on for at least 5 minutes, road speed of > 30 km/h) are erased automatically.

V.A.G 1551 printout	Possible cause of fault	Fault elimination
00769 Engine outlet coolant temperature sender -G82 - Open/short circuit to positive - Short to earth.	- Open circuit or short circuit between -G82 and dash panel insert - -G82 defective	- Trace fault using current flow diagram Replace -G82
00771 Fuel gauge sender -G - Open/short circuit to positive - Short to earth.	- Open circuit or short circuit between -G, -G169 and dash panel insert - Fuel gauge sender I -G defective - Fuel gauge sender II -G169 defective	- Trace fault using current flow diagram Replace sender I -G Replace sender II -G169

V.A.G 1551 printout	Possible cause of fault	Fault elimination
00667 Ambient temperature signal - Open/short circuit to positive - Short to earth.	Vehicles without air conditioner: - Open circuit or short circuit - Sender -G17 defective Vehicles with air conditioner: - Open circuit or short circuit - Air conditioner operating and display unit -E87 defective	Vehicles without air conditioner: Trace fault using current flow diagram Replace sender -G17 Vehicles with air conditioner: Trace fault using current flow diagram Self-diagnosis of air conditioner => Heating/air conditioner; Repair group 01; Self-diagnosis of air conditioner Self-diagnosis of air conditioner
65535 Control unit faulty	Dash panel insert defective.	- Replace dash panel insert => Page 106 .

1.6 - Final control diagnosis

Notes:

- ◆ The final control diagnosis may only be performed with vehicle stationary and engine not running!
- ◆ The on-board computer should be activated before starting final control diagnosis.
- ◆ If any faults are identified by final control diagnosis, trace faults and if necessary replace dash panel insert.

With final control diagnosis, all control elements in dash panel insert (if fitted and coded) are activated in sequence:

- ◆ Simultaneous activation of all analogue instruments (coolant temperature gauge, rev counter, speedometer, fuel gauge)
- ◆ Activation of seat belt warning lamp
- ◆ Activation of gong (chime)
- ◆ Segment test of multi-function display and LCD display for mileage/kilometre counter
- ◆ Test of dash panel lighting, including dimmer function
- ◆ Overheating test:
Activation of safety coutout and 3rd radiator fan speed

Note:

Depending on country version, display appears in the country-specific units.

Performing final control diagnosis:

- Press keys 0 and 3.

-> Display readout:

Rapid data transfer Q 03 - Final control diagnosis
--



- Confirm entry with Q key.
This will start final control diagnosis for analogue instruments (displays).

-> Display readout:

Final control diagnosis Analogue displays
--

The following tests are carried out simultaneously when the Q key is pressed:

- ◆ Coolant temperature gauge needle moves across full range of scale
- ◆ Rev counter needle moves across full range of scale
- ◆ Speedometer needle moves across full range of scale
- ◆ Fuel gauge needle moves across full range of scale.

When gauge needles have finished moving across scales the following fixed values will be displayed:

Coolant temperature gauge:	90 °C
Rev counter:	3000 rpm
Speedometer:	100 km/h
Fuel gauge:	1/2

Note:

If ignition is switched on and then off again while gauge needles are moving, the needles will return to their starting positions.

- Press ⇒ key.

-> Display readout:

Final control diagnosis Seat belt warning lamp K19
--

The seat belt warning lamp will be activated.

- Press ⇒ key.

-> Display readout:

Final control diagnosis Gong

The gong (chime) will be activated and will sound continuously.

- Press ⇒ key.

-> Display readout:

Final control diagnosis Segment test

Notes:

- ◆ All display points on multi-function display and LCD display for mileage/kilometre counter will be activated.
- ◆ All display segments on multi-function monitor will light up and one line will remain dark.

- Press ⇒ key.

-> Display readout:

Final control diagnosis Lighting/switch and instruments
--



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The dash panel insert illumination is automatically switched twice between light and dark setting and finally to maximum brightness.

- Press => key.

-> Display readout:

```
Final control diagnosis
DANGER fan will be switched on
```

Warning:
 After continuing to next step with key, radiator fan starts up in 3rd speed setting after a time delay!

- Press => key.

-> Display readout:

```
Final control diagnosis
Coolant excess temperature test
```

- ◆ The safety shut-off will be activated after about 5 seconds.

- Press => key.

-> Display readout:

```
Function is unknown or
cannot be carried out at present
```

- Press => key to end final control diagnosis.
- This returns the testing unit to basic function mode.

-> Display readout:

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

1.7 - Erasing fault memory

Note:

If it is not possible to erase fault memory, interrogate it once again and rectify faults.

Prerequisites:

- ◆ Fault memory interrogated =>Page 3.
- ◆ All faults rectified.

After fault memory has been successfully interrogated:

-> Display readout:

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

- Press keys 0 and 5 (05 selects function "Erase fault memory").

-> Display readout:

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

- Confirm entry with Q key.

-> Display readout:



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

The fault memory is now erased.

- Press =>key.

-> Display readout:

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

Notes:

```
Warning!
Fault memory was not interrogated
```

-> This message indicates an error in test sequence:

```
Rapid data transfer
Fault memory was not interrogated
```

-> This message indicates an error in test sequence:

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Adhere exactly to test sequence: First interrogate fault memory, if necessary rectify faults, then erase.

1.8 - End output

-> Display readout:

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

- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

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

- Confirm entry with Q key.

-> Display readout:

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

- Switch off ignition.
- Disconnect fault reader V.A.G 1551.

1.9 - Code control unit

This function is used to code control unit for following features:

- ◆ Optional equipment
- ◆ Type of engine
- ◆ Number of cylinders

- ◆ Export version

Notes:

- ◆ The coding procedure is used to set appropriate configuration for on-board computer according to export version, number of cylinders and engine type.
- ◆ The encoding table only lists possible combinations applying to Audi A8.

Perform coding

-> Display readout:

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

- Press keys 0 and 7 (07 selects function: "Code control unit").
- Confirm entry with Q key.

-> Display readout:

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

- Enter code number according to coding table
=> Page 9. Example: 00083

00	No optional equipment
0	Germany
8	8-cylinder
3	8-cylinder petrol engine

```
Code control unit      Q
Enter code number 00283 (0-32000)
```

- > Display readout:
- Confirm entry with Q key.

-> Display readout:

```
4D0919033 D2 INSTRUMENT CLUSTER
D10
Code 00083 WSC 06812
```

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- Press => key.

-> Display readout:

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

- Press keys 0 and 6

Display readout:

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

- Confirm entry with Q key.

Coding table:

XX	Optional equipment
00	No optional equipment
01	90 l tank with 6-cyl. coding
02	Auxiliary heater
16	Navigation system
X	Country (export version)



0	Germany (D)
1	Europe (EU)
2	USA (US)
3	Canada (CDN)
4	Great Britain (GB)
5	Japan (JP)
6	Saudi Arabia (SA)
7	Australia (AUS)
8	RHD, Europe (EU)
9	RHD, Japan (JP)
X	Number of cylinders
4	4-cylinder
6	6-cylinder
8	8-cylinder
X	Type of engine
0	6-cylinder TDI engine
2	6-cylinder petrol engine
3	8-cylinder petrol engine

Notes:

- ♦ The coding can also be entered for various combinations of optional equipment, according to equipment fitted on vehicle.
- ♦ If the vehicle is fitted with more than one item of optional equipment which needs to be coded, enter sum total of the respective coding numbers.

Examples:

- 90 l tank with 6-cyl. coding and navigation
01 + 16 = 17
- Navigation and auxiliary heater and 90 l tank with 6-cyl. coding
01 + 02 + 16 = 19

1.10 - Reading measured value block

Performing function "Read measured value block"

-> Display readout:

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

- Press keys 0 and 8.

-> Display readout:

```
Rapid data transfer      Q
08 Read measured value block
```

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- Confirm entry with Q key.

-> Display readout:

```
Read measured value block      HELP
Enter display group number XXX
```

- Enter display group number (see table => Page 11) and confirm entry with Q key.

The measured value block which has been selected will appear in standard format.

Summary of display groups:

Display Group No.	Display
001	1 = engine speed rpm 2 = Oil pressure switch 1 < min 3 = Oil pressure switch 2 < min 4 = Road speed km/h
002	1 = Mileage/km counter (km) 2 = Fuel gauge l 4 = Ambient temperature oC
003	1 = Coolant temperature oC

Notes:

- ◆ The display will always show actual values obtained from senders and sensors. The values which appear on dash panel insert are modified and may therefore be different.
- ◆ If actual coolant temperature is between approx. 80 oC and 100 oC, dash panel insert will always show 90 oC.
- ◆ The display groups shown here are the only ones which can appear for dash panel insert.

Measured value block 001

Read measured value block 1			⇒	Display readout
1520 rmin	Oil p1< min	Oil p2< min	50 km/h	
			Road speed ▪ 0 ... 300 km/h	
			Oil pressure switch 2 ▪ Oil p1< min ▪ Oil p1 OK	
			Oil pressure switch 1 ▪ Oil p2< min ▪ Oil p2 OK	
Engine speed ▪ 0 ... 9990 rpm				

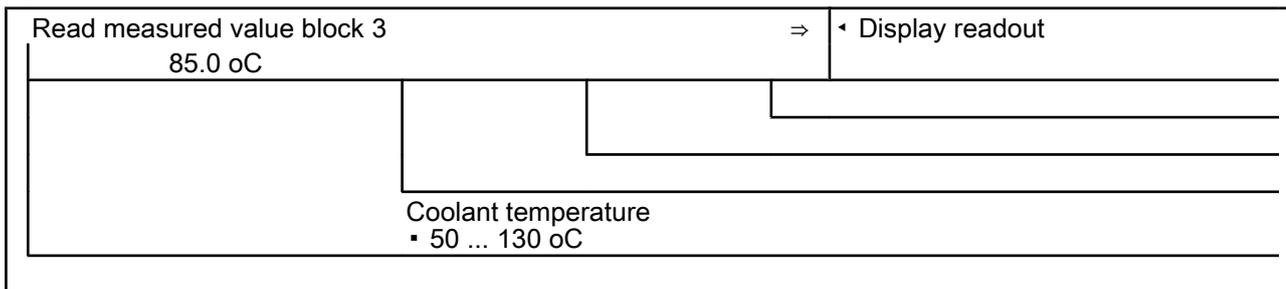
Measured value block 002

Read measured value block 2				⇒	Display readout
2390 km	43 l	12 oC	12:34 h		
			Time ▪ Set time		
			Ambient temperature ▪ -40 ... +70 oC		
			Fuel gauge ▪ 0 ... 100 l		
Mileage/kilometre counter ▪ Mileage/kilometre counter reading					

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Measured value block 003

--



1.11 - Adaption

The adaption function is used to carry out and store following adjustments:

- ♦ Adaption of fuel gauge
- ♦ Coding language version for Auto Check system
- ♦ Resetting Service Interval Display (SID)
- ♦ Setting mileage/kilometre counter when dash panel insert is replaced
- ♦ Adapting fuel gauge sender resistance range

The individual functions are selected by entering appropriate adaption channel number (see adaption table => Page 12).

Adaption table:

Adaption channel	Adaption function
01	Adapting of fuel gauge => Page 13
03	Adapting fuel consumption display => Page 15
04	Language versions for multi-function display => Page 16
05	Service interval display (SID) for Oil Change Service => Page 17
06	Service interval display (SID) for inspection service 1 (distance) => Page 18
07	Service interval display (SID) for inspection service 1 (time) => Page 19
08	Service interval display (SID) for inspection service 2 (time) => Page 20
09	Mileage/kilometre counter => Page 21

Performing adaption (function 10)

-> Display readout:

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

- Press keys 1 and 0 (10 selects function: "Adaption").
- Confirm entry with Q key.

-> Display readout:

```
Rapid data transfer      Q
Adaption
```

- Confirm entry with Q key.

-> Display readout:

```
Adaption      HELP
Feed in channel number  XX
```

- Enter required channel number (see adaption table => Page 12).
- Confirm entry with Q key.

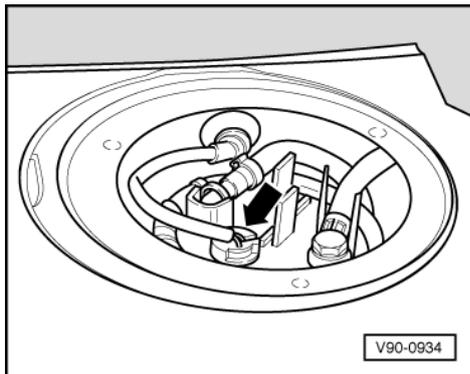
Note:

After adapting one of the displays or exiting a particular channel, the adaption function (function 10) must be selected again before next adaption channel can be entered.

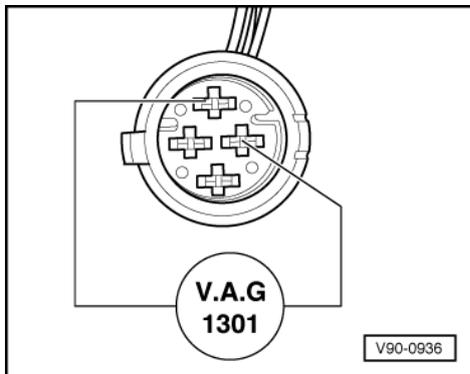
Adaption of fuel gauge

Notes:

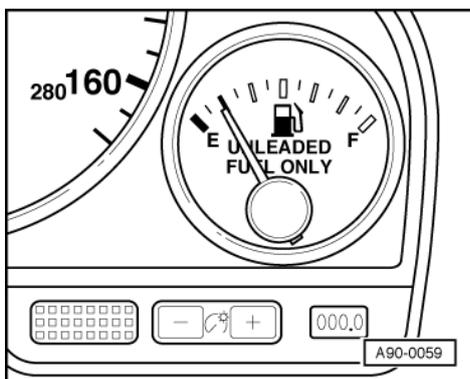
- ◆ The fuel gauge adaption only affects reserve fuel range and has no influence on "full" reading.
- ◆ If display is OK, fuel gauge pointer must be on right-hand red fuel gauge mark.
- ◆ If fault reader V.A.G 1551 is connected and function "Fuel gauge adaption" selected, refuel sensing/damping is automatically deactivated.
- ◆ If only resistance decade V.A.G 1301 is connected, the refuel sensing must be activated for adjustment by switching off ignition for 2 minutes.



- -> Tank sender -arrow- (next to rear seat backrest, beneath boot trim) must be disconnected for fuel gauge adaption.
- Switch off ignition.



- -> Use auxiliary cable to connect tester V.A.G 1301 to tank sender as shown.
- Set value of 470 on tester V.A.G 1301.
- Wait approx. 2 minutes before switching on ignition (refuel sensing) and observe fuel gauge.



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Note:

-> Fuel gauge is OK if pointer is on right-hand red mark (reserve fuel) as shown.

- Press keys 0 and 1.
- Confirm entry with Q key.

```
Channel 1 Adaption 128
(- 1 3-L
```

-> Display readout:

Adaption value can now be gradually or directly entered.

Note:

The "Adaption" function is terminated on entering a value higher than 255, function 10 "Adaption" then has to be restarted.

Entering code in stages:

- Adaption value can be decremented to 0 and incremented to 255 using key 1 or key 3 respectively (example 215).

```
Channel 1 Adaption 215 Q
(- 1 3-L
```

-> Display readout:

- Confirm entry with Q key.

```
Channel 1 Adaption 215 Q
Store changed value?
```

-> Display readout:

- Confirm entry with Q key.

```
Channel 1 Adaption 215
Changed value is stored.
```

-> Display readout:

- Press => key to terminate adaption of fuel gauge.

-> Display readout:

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

Direct input:

- Press => key.

```
Channel 1 Adaption 128
Enter adaption value XXXXX
```

-> Display readout:

- Enter required adaption value via keypad on fault reader, filling in initial spaces with "0".

Example:

Required value: 215

Entry via keypad: 00215

```
Channel 1 Adaption 128 Q
Enter adaption value 00215
```

-> Display readout:

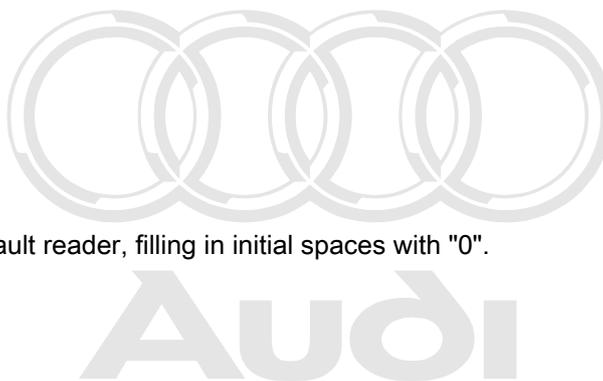
- Confirm entry with Q key.

```
Channel 1 Adaption 215 Q
Store changed value?
```

-> Display readout:

- Confirm entry with Q key.

```
Channel 1 Adaption 215
Changed value is stored
```



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- > Display readout:
- Press => key to terminate adaption of fuel gauge.

-> Display readout:

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

Adapting fuel consumption display

Notes:

- ◆ The value entered must be between 85% and 115%.
- ◆ The value must be entered in steps of 5%.
- Press keys 0 and 3.
- Confirm entry with Q key.

-> Display readout:

```
Channel    3    Adaption    100
□
(- 1      3-L
```

- Press => key.

Note:

The fuel consumption display can only be adapted via direct input.

-> Display readout:

```
Channel    3    Adaption    100
Enter adaption value    XXXXX
```

- Enter required adaption value via keypad on fault reader, filling in initial spaces with "0".

Example:

Required value: 90%

Entry via keypad: 00090

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-> Display readout:

```
Channel    3    Adaption    100    Q
Enter adaption value 00090
```

- Confirm entry with Q key.

-> Display readout:

```
Channel    3    Adaption    90    Q
Store changed value?
```

- Confirm entry with Q key.

-> Display readout:

```
Channel    3    Adaption    90
Changed value is stored
```

- Press => key to terminate adaption of fuel consumption display.

-> Display readout:

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



Note:

If an incorrect entry is made testing unit will switch to function mode.

-> Display readout:

```
Function is unknown or
cannot be carried out at present
```

- Press => key.
- Select adaption function (function 10) and adaption channel 03 again.
- Repeat adaption of fuel consumption display and confirm entry with Q key.

Language versions for multi-function display

- Press keys 0 and 4.
- Confirm entry with Q key.

-> Display readout:

```
Channel      4      Adaption      1
(- 1      3-L
```

Notes:

- ◆ The display will show only last digit of 5-figure language version code (e.g. 1 for German).
- ◆ If an incorrect value is entered adaption function will be terminated and must be restarted by selecting function 10 (Adaption) again.
- ◆ The code can now be entered either directly or in stages via keypad on fault reader.

Coding table:

Code	Language version
00001	German
00002	English
00003	French
00004	Italian
00005	Spanish
00006	Portuguese

Entering code in stages:

- Key 1 can be used to change down to a lower code value, and key 3 can be used to change up to a higher code value (for example, to change to "2" for English).

-> Display readout:

```
Channel      4      Adaption      2      Q
(- 1      3-L
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      4      Adaption      2      Q
Store changed value?
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      4      Adaption      2
Changed value is stored
```

- Press => key to terminate adaption of language version.



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-> Display readout:

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

Direct input:

- Press => key.

-> Display readout:

```
Channel      4      Adaption    1
Enter adaption value      XXXXX
```

- Enter required 5-figure code (=> Page 16) via keypad.

Example:

Code: 2 (English)

Input value: 00002

- Confirm entry with Q key.

-> Display readout:

```
Channel      4      Adaption    1      Q
Enter adaption value 00002
```

- Confirm entry with Q key.

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-> Display readout:

```
Channel      4      Adaption    2      Q
Store changed value?
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      4      Adaption    2
Changed value is stored
```

- Press => key to terminate adaption of language version.

-> Display readout:

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

SID: service interval for oil change service

This function is used to enter distance remaining (in km) before next oil change service is due.

- Press keys 0 and 5.
- Confirm entry with Q key.

-> Display readout:

The display will show number of kilometres remaining before next oil change service is due. In this example, "1" = 1000 km.

```
Channel      5      Adaption    1
(- 1      3-L
```

Notes:

- ◆ The distance must be entered in steps of 1000 km. Accordingly, readout on the display will also be in steps of 1000 km.



- ♦ Even on export versions with speedometers calibrated in miles, value entered must be in kilometres. This means that adaption value has to be converted from miles into kilometres.
- ♦ When replacing dash panel insert, see notes => Page 23.
- ♦ When using keypad on fault reader, number must be entered directly.
- ♦ If an incorrect value is entered adaption function will be terminated and must be restarted.

- Press => key.

-> Display readout:

```
Channel      5      Adaption      1
Enter adaption value      XXXXX
```

- Enter required interval via keypad on fault reader, filling in initial spaces with "0"

Example:

Specification: 15000 km

Input value: 00015

-> Display readout:

```
Channel      5      Adaption      1      Q
Enter adaption value 00015
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      5      Adaption      15      Q
(- 1      3-L
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      5      Adaption      15      Q
Store changed value?
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      5      Adaption      15
Changed value is stored
```

- Press => key to terminate adaption of service interval display SID.

-> Display readout:

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

Service interval display (SID) for inspection service 1 (distance)

This function is used to enter distance remaining (in km) before next inspection service is due.

- Press keys 0 and 6.
- Confirm entry with Q key.

```
Channel      6      Adaption      5
(- 1      3-L
```

-> Display readout:

The display will show number of kilometres remaining before next inspection service is due. In this example, "5" = 5000 km.

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Notes:

- ◆ The distance must be entered in steps of 1000 km. Accordingly, readout on the display will also be in steps of 1000 km.
- ◆ Even on export versions with speedometers calibrated in miles, value entered must be in kilometres. This means that adaption value has to be converted from miles into kilometres.
- ◆ When replacing the dash panel insert, see notes => Page 23 .
- ◆ When using keypad on fault reader, number must be entered directly.

- ◆ If an incorrect value is entered adaption function will be terminated and must be restarted.

- Press => key.

-> Display readout:

```
Channel      6      Adaption  1
Enter adaption value      XXXXX
```

- Enter required value via keypad on fault reader, filling in initial spaces with "0".

Example:

Specification: 30000 km

Input value: 00030

-> Display readout:

```
Channel      6      Adaption  X      Q
Enter adaption value 00030
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      6      Adaption  30      Q
(- 1      3-L
```

- Confirm entry with Q key.

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-> Display readout:

```
Channel      6      Adaption  30      Q
Store changed value?
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      6      Adaption  30
Changed value is stored
```

- Press => key to terminate adaption of service interval display SID.

-> Display readout:

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

Service interval display (SID) for inspection service 1 (time)

This function is used to enter time remaining (in days) before next inspection service is due.

- Press keys 0 and 7.
- Confirm entry with Q key.

```
Channel      7      Adaption  11
(- 1      3-L
```

-> Display readout:



The display will show number of days remaining before next inspection service is due. In this example, "11" = 110 days.

Notes:

- ◆ The number must be entered in steps of 10 days. Accordingly, readout on the display will also be in steps of 10 days.
- ◆ When replacing dash panel insert, see notes => Page 23 .
- ◆ When using keypad on the fault reader, number must be entered directly.
- ◆ If an incorrect value is entered adaption function will be terminated and must be restarted.

- Press => key.

```
Channel 7 Adaption 1
Enter adaption value XXXXX
```

-> Display readout:

- Enter required value via keypad on fault reader, filling in initial spaces with "0".

Example:

Specification: 360 days

Input value: 00036

```
Channel 7 Adaption Q
Enter adaption value 00036
```

-> Display readout:

- Confirm entry with Q key.

```
Channel 7 Adaption 36 Q
(- 1 3-L
```

-> Display readout:

- Confirm entry with Q key.

```
Channel 7 Adaption 36 Q
Store changed value?
```

-> Display readout:

- Confirm entry with Q key.

```
Channel 7 Adaption 36
Changed value is stored
```

-> Display readout:

- Press => key to terminate adaption of service interval display SID.

-> Display readout:

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

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Service interval display (SID) for inspection service 2 (time)

This function is used to enter time remaining (in days) before next inspection service 2 is due.

- Press keys 0 and 8.
- Confirm entry with Q key.

```
Channel 8 Adaption 47
(- 1 3-L
```

-> Display readout:

The display will show number of days remaining before next inspection service is due. In this example, "47" = 470 days.

Notes:

- ◆ The number must be entered in steps of 10 days. Accordingly, readout on the display will also be in steps of 10 days.
- ◆ When replacing dash panel insert, see notes => Page 23 .
- ◆ When using keypad on the fault reader, number must be entered directly.

- ◆ If an incorrect value is entered adaption function will be terminated and must be restarted.

- Press => key.

```
Channel      8      Adaption      1
Enter adaption value      XXXXX
```

-> Display readout:

- Enter required value via keypad on fault reader, filling in initial spaces with "0".

Example:

Specification: 730 days

Input value: 00073

```
Channel      8      Adaption      Q
Enter adaption value 00073
```

-> Display readout:

- Confirm entry with Q key.

```
Channel      8      Adaption      73      Q
(- 1      3-L
```

-> Display readout:

- Confirm entry with Q key.

```
Channel      8      Adaption      73      Q
Store changed value?
```

-> Display readout:

- Confirm entry with Q key.

```
Channel      8      Adaption      73
Changed value is stored
```

-> Display readout:

- Press => key to terminate adaption of service interval display SID.

-> Display readout:

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

Mileage/kilometre counter

This function is used to set correct number of kilometres or miles on counter after replacing dash panel insert.

Notes:

- ◆ The adaption function can only be performed on dash panel inserts with up to 100 km on counter.
- ◆ The adaption procedure can only be performed once on any one dash panel insert.
- ◆ The adaption value entered must be higher than existing value.
- ◆ If an incorrect value is entered and confirmed, it is not possible to change it. If this happens dash panel insert must be replaced.
- ◆ Even on export versions with speedometers calibrated in miles, value entered must be in kilometres. This means that adaption value has to be converted from miles into kilometres.
- ◆ When replacing dash panel insert, see notes => Page 23 .

Select function:

- Press the C key

-> Display readout:

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

- Press keys 1 and 1

-> Display readout:



Rapid data transfer Q
11 - Log-in procedure

- Confirm entry with Q key.

-> Display readout:

Log-in procedure
Enter code number XXXXX

Enter code number 13861.

-> Display readout:

Log-in procedure Q
Enter code number 13861

- Confirm entry with Q key.

-> Display readout:

Rapid data transfer HELP
Select function XX

- Press keys 1 and 0

-> Display readout:

Rapid data transfer Q
10 - Adaption

- Confirm entry with Q key.

-> Display readout:

Adaption
Feed in channel number XX

- Press keys 0 and 9
- Confirm entry with Q key.

-> Display readout:

Channel 9 Adaption 0

Note:

When using keypad on fault reader, number must be entered directly.

- Pressing the => key switches to next step of program sequence.

-> Display readout:

Channel 9 Adaption 0 Q
Enter adaption value XXXXX

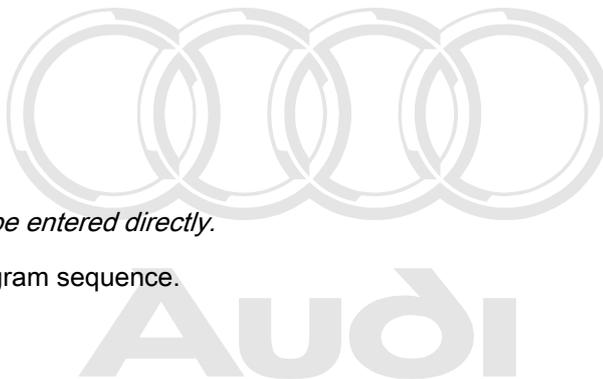
- Enter adaption value via keypad.

Example:

Number of kilometres = 89627 km

Input value: 0 8 9 6 3

0	8	9	6	3	Input value
X					Hundred thousands: 100000 ... 655350 km



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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ten thousands: 10000 ... 90000 km
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Thousands: 1000 ... 9000 km
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Hundreds: 100 ... 900 km
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Tens: 10 ... 90 km
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Units: round up to nearest 10 km

-> Display readout:

```
Channel      9      Adaption      0      Q
Enter adaption value      08963
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      9      Adaption      8963
Q
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      9      Adaption      8963
Q
Store changed value?
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      9      Adaption      8963
□
Changed value is stored
```

- Press ⇒ key to terminate adaption of mileage/kilometre counter.

-> Display readout:

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



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1.12 - Input values when replacing dash panel insert

It is important to note following points when replacing dash panel insert:

Notes:

- ◆ The dash panel insert must always be coded.
- ◆ Before replacing dash panel insert, make a note of values which appear on fault reader V.A.G 1551 in all adaption channels for service interval display and mileage/kilometre counter.
- ◆ The values noted must be programmed into new dash panel insert so that it can count down to when next service is due.
- ◆ Make a note of display on mileage/kilometre counter and enter it as explained.
- ◆ Even on export versions with speedometers calibrated in miles, adaption of mileage counter in service interval display must be made in kilometres. To do this, either convert adaption value from miles into kilometres, or enter adaption value that was noted from old dash panel insert.
- ◆ The following steps must be carried out after replacing dash panel insert:
 - Coding dash panel insert => Page 8
 - and

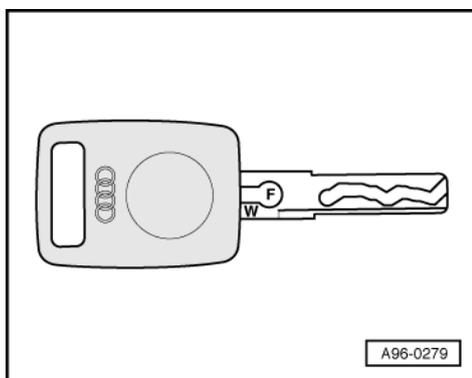
- SID: Entering distance remaining until next oil change service
=> Page 17 .
- SID: Entering distance remaining until next inspection service 1=> Page 18 .
- SID: Entering time remaining until next inspection service 1 => Page 19 .
- SID: Entering time remaining until next inspection service 2 => Page 20 .

and

- Setting mileage/kilometre counter => Page 21 .

2 - Self-diagnosis of immobiliser - fixed code version

2.1 - Self-diagnosis of immobiliser - fixed code version



Note:

-> In future, keys will be marked "W" and "F" if immobiliser has a fixed code. If vehicle has immobiliser with variable code, keys are only marked with a "W".

2.2 - General information

Measures for rectifying commonly occurring faults on particular models

=> Technical service handbook

Function

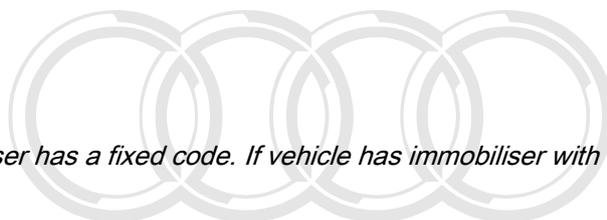
The immobiliser electronics consist of:

- ◆ an immobiliser control unit
- ◆ a warning lamp in dash panel insert,
- ◆ a reader coil on ignition lock,
- ◆ matched ignition keys with electronic components (transponder and response reader memory).

The immobiliser influences engine management via engine control unit, which must be adapted accordingly.

Every time ignition is switched on immobiliser reader coil reads response code from transponder.

When an authorised key is used warning lamp will light up briefly.



Audi

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If an unauthorised key is used, or if there is a system error, warning lamp will flash continuously when ignition is switched on.

The electronic immobiliser has extensive self-diagnosis capability. If malfunctions occur in system components, fault codes are stored in fault memory of control unit. These can then be identified using fault reader V.A.G 1551 or vehicle systems tester V.A.G 1552.

Note:

The following description deals only with fault reader V.A.G 1551.

Notes on use of keys and matching procedure for keys

The engine can only be started using an authorised key, i.e. one which has been matched to immobiliser control unit.

The procedure for matching keys to immobiliser control unit (=> Page 32) must always be carried out on all keys belonging to vehicle, including spare key.

If new or additional keys are required, these must also be matched together with existing keys.

If for any reason not all keys are available for matching (e.g. if one of them has been lost), customer must be informed that adaption procedure will need to be carried out again at a later date with full set of keys.

It is particularly important to re-match remaining keys if one of keys has been lost, so that this key can then no longer be used to start engine.

2.3 - Starting self-diagnosis of immobiliser

Test requirements:

- ◆ Fuse OK (check using current flow diagram)
- ◆ Connecting V.A.G 1551 fault reader => Page 78.
- ◆ Switch off ignition for about 30 seconds, then switch on again.

Notes:

- ◆ If display remains blank, check voltage supply to V.A.G 1551 according to current flow diagram.
 - ◆ Additional operating instructions can be called up with fault reader HELP key.
 - ◆ The → key is used for continuation of program sequence.
 - ◆ Incorrect entry can be cancelled with the C-key.
 - ◆ In operating mode 1 "Rapid data transfer" function 00 "Automatic test sequence" can be carried out. Then all vehicle control units will be interrogated automatically.
- Switch on ignition.
 - Switch on printer with the PRINT key (indicator lamp in key lights up).
 - Press key 1 for "Rapid data transfer" mode.

-> Display readout:

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

Address word for immobiliser: 25

- Press keys 2 and 5.

-> Display readout:

```
Rapid data transfer      Q
25 - immobiliser
```



- Confirm entry with Q key.

-> This display will appear after about 5 seconds:

4A0953234	Immo	AUZ9Z0R2000323D66
Code 00000	WSC	06812

- 4A0953234: Part No. of immobiliser control unit (also refer to Parts list)
- AUZ9Z0R2000323: 14-figure Identification No. for immobiliser control unit
- D66: Software version of immobiliser control unit
- Coding 00000: Coding not required
- WSC 06812: Workshop code

Press => key.

-> If display shows one of messages shown, run through fault finding procedure as described in diagnosis management fault finding program.

Rapid data transfer	HELP
Control unit does not answer!	

=> Current flow diagrams, electrical fault finding and fitting locations

Rapid data transfer	HELP
Fault in communication build up	

Rapid data transfer	HELP
K wire not switching to earth	

Rapid data transfer	HELP
K wire not switching to positive	

-> Display readout:

Rapid data transfer	HELP
Select function XX	

- Press HELP key to obtain a printout of available functions.
- Pressing the => key switches to next step of program sequence.

Self-diagnosis functions

The following functions are possible:

- 01 - Interrogating control unit version => Page 26 .
- 02 - Interrogating fault memory => Page 27 .
- 05 - Erasing fault memory => Page 29 .
- 06 - End output => Page 30 .
- 08 - Reading measured value block => Page 30 .
- 10 - Adaption=> Page 31 .

2.4 - Interrogating control unit version

-> Display readout:

Rapid data transfer	HELP
Select function XX	

- Press keys 0 and 1 (01 selects "Interrogate control unit version" function).

-> Display readout:



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```
Rapid data transfer    Q
01 - Interrogate control unit version
```

- Confirm entry with Q key.

-> This display will appear after about 5 seconds:

```
4A0953234 Immo AUZ9Z0R2000323D66
Code 00000 WSC 06812
```

- 4A0953234: Part No. of immobiliser control unit (also refer to Parts list)
- AUZ9Z0R2000323: 14-figure Identification No. for immobiliser control unit
- D66: Software version of immobiliser control unit
- Coding 00000: Coding not required
- WSC 06812: Workshop code

2.5 - Interrogating fault memory

Note:

The displayed fault information is not constantly updated but only when initiating self-diagnosis or with function 05 "Erase fault memory".

- Switch on printer with PRINT key (indicator lamp in key lights up).

-> Display readout:

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

- Press keys 0 and 2 (02 selects function "Interrogate fault memory".)

-> Display readout:

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

- Confirm entry with Q key.

-> The number of faults stored will appear on display.

```
X faults recognised!
```

The stored faults are displayed consecutively and printed out.

- Check printed faults with those in fault table and rectify faults => Page 28 .

-> If message "No fault recognised" is displayed, program returns to its start position when pressing the =>key.

```
No fault recognised
```

-> Display readout:

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

If something else is displayed:

=> Fault reader operating instructions

- End output (function 06) => Page 30 .
- Switch off ignition and separate diagnostic connections.

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2.6 - Fault table for immobiliser

Notes:

- ♦ The following table lists all faults that can be recognised by immobiliser control unit and printed out by V.A.G. 1551. The faults are listed in order according to their 5-figure code numbers.
- ♦ Fault codes appear only on print-out.
- ♦ Before replacing a component shown as faulty, check wiring and connections to component as well as earth connections according to current flow diagram.
- ♦ After completing repair and checking function of system, always interrogate fault memory once again with fault reader V.A.G 1551 and erase memory.
- ♦ The fault memory records all static and sporadic faults.
If a fault occurs and persists for at least 2 seconds, it is identified as a static fault. If the fault does not occur again it is registered as a sporadic fault. "/SP" appears on right of display.
- ♦ When ignition is switched on, all existing faults are automatically reclassified as sporadic faults and will only register as static faults if they still occur after testing.
- ♦ Sporadic faults which no longer occur after 50 driving cycles (ignition on for at least 5 minutes, road speed of > 30 km/h) are erased automatically.

V.A.G 1551 print-out V.A.G 1551	Possible fault cause	Fault elimination
00750 Fault lamp		
Short to earth/open circuit	Wire damaged or open circuit in wiring	- Test wire using current flow diagram
	Warning lamp -K117 defective	- Replace warning lamp
Short circuit to positive	Wiring damaged.	- Test wire using current flow diagram
01128 immobiliser reader coil -D2	Connector not plugged into control unit or reader coil /wiring defective. immobiliser control unit defective.	- Check reader coil, wiring and connector (visual check); if necessary, replace reader coil => Page 181 . - Erase fault memory, then interrogate again (=> Page 106 .

V.A.G 1551 print-out	Possible fault cause	Fault elimination
01176 Key		
Signal too low	Transponder defective	- Make new key.
Not authorised	Wrong key or key not matched.	- Match all ignition keys again and test =>Page 32
	immobiliser reader coil -D2 defective	- Replace reader coil
01177 Engine control unit Not authorised	Engine control unit not adapted. Open circuit or short circuit in W wire	- Adapt engine control unit => Page 36 . - Test W wire using current flow diagram

V.A.G 1551 print-out	Possible fault cause	Fault elimination
01179 Incorrect key programming	Ignition key not correctly matched.	- Rematch all ignition keys by entering the secret number and check function =>Page 32 .
65535 Control unit		

Defective	immobiliser control unit defective.	- Replace dash panel insert => Page 106 .
-----------	-------------------------------------	---

2.7 - Erasing fault memory

Note:

If fault memory cannot be erased, interrogate fault memory again and rectify faults.

Prerequisites:

- ◆ Fault memory interrogated =>Page **27** .
- ◆ All faults rectified.

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After fault memory has been successfully interrogated.

-> Display readout:

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

- Press keys 0 and 5 (05 selects function "Erase fault memory".)

-> Display readout:

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

- Confirm entry with Q key.

-> Display readout:

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

The fault memory is now erased.

- Press =>key.

-> Display readout:

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

Notes:

```
◆ Warning!
Fault memory was not interrogated
```

-> This message indicates an error in test sequence:

```
◆ Rapid data transfer
Fault memory was not interrogated
```

-> This message indicates an error in test sequence:

Adhere exactly to test sequence: First interrogate fault memory, if necessary rectify faults, then erase.



2.8 - End output

-> Display readout:

Rapid data transfer	HELP
Select function XX	

- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

Rapid data transfer	Q
06 End output	

- Confirm entry with Q key.

-> Display readout:

Rapid data transfer	HELP
Enter address word XX	

- Switch off ignition.
- Disconnect fault reader V.A.G 1551.

2.9 - Reading measured value block

Performing the function "Read measured value block"

-> Display readout:

Rapid data transfer	HELP
Select function XX	

- Press keys 0 and 8 (08 selects function "Read measured value block").

-> Display readout:

Rapid data transfer	Q
08 Read measured value block	

- Confirm entry with Q key.

-> Display readout:

Read measured value block	HELP
Enter display group number XXX	

- Enter display group number (see table => Page 30) and confirm entry with Q key.

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The measured value block which has been selected will appear in standard format.

Summary of display groups:

Display Group No.	Display
001	1 = Engine start enabled 2 = Response from engine control unit 3 = Key OK 4 = Vacant measured value block

Measured value block 001

--

Read measured value block 22			⇒	◀ Display readout
1	1	1	Vacant measured value block	
			Key OK ▪ 1 = yes ▪ 0 = No (i.e. key is not matched or is incorrectly matched, or transponder is defective).	
			Response from engine control unit* ▪ 1 = yes ▪ 0 = no (i.e. fault in engine control unit or in wiring).	
			Engine may be started ▪ 1 = yes ▪ 0 = no (i.e. key is not matched or is incorrectly matched, or engine control unit is incorrectly coded or defective).	

*) Depending on control unit version, measured value block will read "0" (no response from engine control unit) for between 10 and 30 seconds after engine and ignition have been switched off. This indicates that engine control unit is active and there is no fault. Check by performing self-diagnosis again => Page 25 .

Evaluate measured value block

Start Engine control unit Key status
 authorised response OK

yes yes yes
 1 1 1

```
Read measured value block 1
1 1 1
```

no no no
 0 0 0

```
Read measured value block 1
0 0 0
```



Fault evaluation:

- ◆ Engine may not be started:
=>key used is not matched or incorrectly coded.
- ◆ No response from engine control unit:
=>fault in engine control unit or wiring.
- ◆ Key status OK no:
=>key used is defective.

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2.10 - Adaption

The adaption function is used to carry out and store following adjustments:

- ◆ Matching vehicle keys => Page 32 .
- ◆ Adaption after replacing engine control unit => Page 36 .
- ◆ Adaption after replacing immobiliser control unit => Page 37 .



2.11 - Matching the vehicle keys

Notes:

- ♦ If new or additional ignition keys are required they must be matched to immobiliser control unit.
- ♦ When replacing lock set or replacing reader coil or immobiliser control unit, check procedure => Page 181 .
- ♦ The matching procedure must always be carried out for all ignition keys, including existing ones.
- ♦ If not all the keys are available for matching (e.g. if the customer does not live locally), customer must have complete set matched by his local Audi dealer at a later date.
- ♦ The number of keys already matched will be displayed when adaption (matching) function is selected.
- ♦ The matching can be interrupted with the "C" key of V.A.G 1551

Prerequisites:

- ♦ All ignition keys available. If no old ignition key is available see "Lost key procedure", =>Page 36
- ♦ Key fob with covered secret number is available, if not see "Establishing secret number", =>Page 36 .
- Insert old (authorised) ignition key in ignition lock.
- Connect fault reader V.A.G 1551 and enter address word "25" to start self-diagnosis of immobiliser => Page 25 .

After displaying control unit identification:

- Press => key.

-> Display readout:

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

- Press key 1 twice. (11 selects the "Log-in procedure" function).

-> Display readout:

```
Rapid data transfer      Q
11 - Log-in procedure
```

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- Confirm entry with Q key.

-> Display readout:

```
Log-in procedure
Enter code number XXXXX
```

- Enter secret number, when doing this place a 0 before 4-digit number (e.g. 01915).

The secret number is on key fob. To reveal number, carefully rub away covering layer (e.g. with a coin).

Note:

If secret number on the key fob consists of only 2- or 3- digits, remaining spaces must be filled with zeros when entering number. For example, 344 = 00344.

- Confirm entry with Q key.

-> Display readout:

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

Notes:

-> If following display appears briefly:

Tester sends address word 25

- ◆ Secret number is not accepted. Enter again.
- ◆ 2 attempts to enter secret number are possible immediately, the 3rd attempt is only permitted after a minimum of 35 minutes if ignition remains switched on during this time and self-diagnosis is exited via function 06 "End output".

Warning:

-> Display readout:

Function is unknown or
cannot be carried out at present

If this message appears on display during the log-in procedure, this means that secret number has been entered incorrectly several times (or that secret number itself is wrong).

Notes:

- ◆ If secret number is entered incorrectly three times in a row, control unit will be disabled. The word "FAIL" will appear on trip recorder display on dash panel insert.
 - ◆ A further attempt to enter number is only possible after a delay period of at least 10 minutes. During this time ignition must remain switched on and self-diagnosis function must be terminated using function 06 ("End output"). The delay period is doubled after each further series of three attempts to enter secret number.
- Press keys 1 and 0 (10 selects function: "Adaption").

-> Display readout:

Rapid data transfer Q
10 - Adaption

- Confirm entry with Q key.

-> Display readout:

Adaption
Feed in channel number XX

- Press keys 0 and 1 (01 selects Channel 21 for "Matching of vehicle keys").
 - Confirm entry with Q key.

-> If display appears:

Function is unknown or
cannot be carried out at present

- Repeat adaption by entering secret number.

-> Display readout:

Channel 1 Adaption 2

The top line of display shows that 2 ignition keys are matched to system.

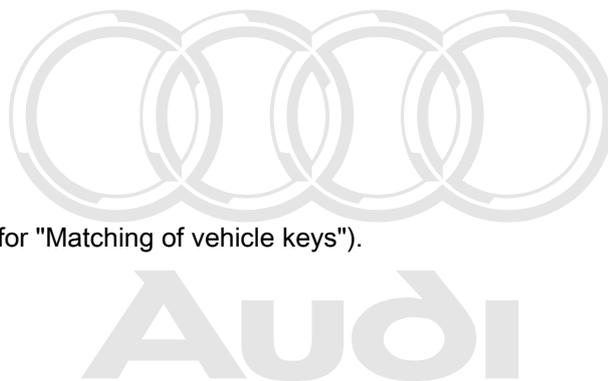
- Press ⇒ key.

-> Display readout:

Channel 1 Adaption 2
Enter adaption value XXXXX

- Press the 0 key four times and then enter number of all ignition keys to be matched, including existing key, (e.g. 00003); max. 8 possible.
 - Confirm entry with Q key.

-> Indicated on display for 3 ignition keys to be matched:



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```
Channel      1      Adaption      3      Q
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      1      Adaption      3      Q
Store changed value?
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      1      Adaption      3
Changed value is stored
```

- Press => key.

The warning lamp in dash panel insert will go out; key in the ignition lock is now matched.

Notes:

- ◆ The matching procedure must be completed for all keys within a total period of 30 seconds.
- ◆ The period during which ignition is switched off will not be registered.

-> Display readout:

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

- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

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

- Confirm entry with Q key.

-> Display readout:

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

- Switch off ignition.
- Insert next key in ignition lock and switch on ignition. The warning lamp will come on when ignition is switched on and go out after about 1 second. This confirms that this key has now also been matched.
- Repeat this procedure until all keys are matched.
- Select function 02 "Interrogate fault memory". If no faults are stored, matching of the keys has been successfully completed.

Note:

The immobiliser is deactivated for a period of 10 minutes after every successful log-in function: The operation of the system should not be tested during this period.

Note:

The number of keys to be matched can also be entered using keys 1 (to reduce number) and 3 (to increase number).

-> Display readout:

```
Channel      1      Adaption      2
```



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The top line of display shows that 2 ignition keys are matched to system.

- Press key 1 to reduce, or key 3 to increase number of keys, e.g. to 3.

-> Indicated on display for 3 ignition keys to be matched:

```
Channel      1      Adaption      3      Q
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      1      Adaption      3      Q
Store changed value?
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      1      Adaption      3
Changed value is stored
```

- Press => key.

The warning lamp in dash panel insert will go out; key in the ignition lock is now matched.

Notes:

- ◆ The matching procedure must be completed for all keys within a total period of 30 seconds.
- ◆ The period during which ignition is switched off will not be registered.

-> Display readout:

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

- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

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

- Confirm entry with Q key.

-> Display readout:

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

- Switch off ignition.
- Insert next key in ignition lock and switch on ignition. The warning lamp will come on when ignition is switched on and go out after about 1 second. This confirms that this key has now also been matched.
- Repeat this procedure until all keys are matched.
- Select function 02 "Interrogate fault memory". If no faults are stored, matching of the keys has been successfully completed.

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The immobiliser is deactivated for a period of 10 minutes after every successful log-in function: The operation of system should not be tested during this period.

The following fault messages are created by matching sequence and can be ignored:

- > Display (ignore display).



Fault in data transfer

-> Display (ignore display).

Rapid data transfer Q
Tester transmits address word 25

-> Display (ignore display):

Key not authorised

The fault "Key not authorised" will be indicated during complete matching procedure, because during the matching procedure it is not permitted to start engine.

The matching of ignition keys is automatically terminated when:

- ◆ number of matched keys is reached,
- ◆ an already matched key is used to switch on the ignition again and ignition remains switched on for longer than 1 second (fault is stored),
- ◆ matching procedure for second key is not completed within specified period of 30 seconds after switching on ignition (fault is stored),
- ◆ if during key matching a fault is stored.

2.12 - Lost key procedure

- Manufacture or order replacement ignition key on basis of lock number.
- Matching vehicle keys => Page 32 .
- On vehicles with radio-operated remote control, match all keys to control unit for radio-operated remote control.

=> General body repairs; Repair group 57; Central locking Central locking

Establishing secret number

If 4-digit secret number is not known or key fob with secret number is not available then secret number must be requested from dealership centre or importer responsible using 14 character immobiliser control unit identification number.

The immobiliser control unit identification number is available:

- ◆ as sticker on customer key fob
- ◆ via the self-diagnosis function (see "Interrogating control unit version" => Page 26)
- ◆ on a sticker on dash panel insert, together with Part No.

2.13 - Adaption procedure after replacing engine control unit

Notes:

- ◆ The engine control unit is matched (adapted) to immobiliser control unit. When replacing a component it must be re-matched.
- ◆ If an authorised ignition key is not available but secret number is, ignition keys must be manufactured and matched (adapted).
- ◆ The matching can be interrupted with the "C" key of V.A.G 1551

Prerequisites:

- Insert old (authorised) ignition key in ignition lock.

- Connect fault reader V.A.G 1551 and enter address word "25" to start self-diagnosis of immobiliser => Page 25 .

After displaying control unit identification:

- Press => key.

-> Display readout:

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

- Press keys 1 and 0 (10 selects function: "Adaption").

-> Display readout:

```
Rapid data transfer      Q
10 - Adaption
```

- Confirm entry with Q key.

-> Display readout:

```
Adaption
Feed in channel number XX
```

- Press key 0 twice. (00 selects channel for "Adaption procedure after replacing engine control unit").
- Confirm entry with Q key.

-> Display readout:

```
Adaption      Q
Erase learnt value?
```

- Confirm entry with Q key.

-> Display readout:

```
Adaption
Learnt values have been erased
```

- Press => key.

-> Display readout:

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

Note:

The engine control unit identification will be stored in immobiliser control unit and engine can be started.

2.14 - Adaption procedure after replacing immobiliser control unit

Notes:

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- ◆ The immobiliser control unit is integrated in dash panel insert. This means that when dash panel insert is replaced immobiliser control unit is automatically replaced at the same time. The new immobiliser control unit must also be adapted after installing.
- ◆ The following steps must be carried out after replacing dash panel insert:
 - Adaption procedure after replacing engine control unit => Page 36 .
 - Match vehicle keys => Page 32 .



2.15 - Emergency starting with V.A.G 1551

The emergency starting procedure can be used to start a vehicle which has been rendered inoperative by immobiliser. The vehicle can then be driven to nearest Audi dealer for servicing.

Note:

This emergency starting procedure can also be used to override any delay period which might have been triggered by incorrect use of function "Emergency starting without V.A.G 1551".

Prerequisites:

- ♦ The customer must present vehicle documents and personal identification to prove that he or she is the vehicle owner or is authorised to use it.
- ♦ Fault reader V.A.G 1551/1552.
- ♦ Key fob with covered secret number is available, if not see "Establishing secret number", =>Page 36 .
- Connect fault reader V.A.G 1551 and enter address word "25" to start self-diagnosis of immobiliser => Page 25 .

After displaying control unit identification:

- Press => key.

-> Display readout:

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

- Press key 1 twice. (11 selects "Log-in procedure" function).

-> Display readout:

```
Rapid data transfer      Q
11 - Log-in procedure
```

- Confirm entry with Q key.

-> Display readout:

```
Log-in procedure
Enter code number XXXXX
```

- Enter secret number, when doing this place a 0 before 4-digit number (e.g. 01915).

The secret number is on key fob. To reveal number, carefully rub away covering layer (e.g. with a coin).

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Note:

If secret number on key fob consists of only 2- or 3- digits, remaining spaces must be filled with zeros when entering number. For example, 344 = 00344.

- Confirm entry with Q key.

-> Display readout:

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

Notes:

-> If following display appears briefly:

```
Tester sends address word 25
```

- ◆ Secret number is not accepted. Enter again.
- ◆ 2 attempts to enter secret number are possible immediately, 3rd attempt is only permitted after a minimum of 10 minutes if ignition remains switched on during this time and self-diagnosis is exited via function 06 "End output".

- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

Rapid data transfer Q
06 End output

- Confirm entry with Q key.

-> Display readout:

Rapid data transfer HELP
Select function XX

- Switch off ignition, then start engine.



Notes:

- ◆ When emergency starting procedure has been successfully completed engine can be started as often as required within a period of 45 minutes, as long as S-contact remains closed.
- ◆ If S-contact is opened, i.e. if key is removed from ignition lock, engine can only be started within a period of 10 minutes.

2.16 - Emergency starting without V.A.G 1551

The emergency starting procedure can be used to start a vehicle which has been rendered inoperative by immobiliser. The vehicle can then be driven to the nearest Audi dealer for servicing.

Note:

This emergency starting procedure can also be used to override any delay period which might have been triggered by incorrect use of function "Emergency starting with V.A.G 1551".

Prerequisites:

- ◆ The customer must present vehicle documents and personal identification to prove that he or she is vehicle owner or is authorised to use it.
- ◆ Key fob with covered secret number is available, if not see "Establishing secret number", =>Page 36 .
- Switch on ignition.
- Pull clock adjuster knob on dash panel insert and at the same time press reset button for trip recorder.

The trip recorder display will read:
 "0 0 0 0" and first digit flashes.

The reset button for trip recorder can now be used to set first digit at a value between 0 and 9.

- Press reset button for trip recorder as often as required to set first digit of the secret number, e.g. 5.

The trip recorder display will read:
 "5 0 0 0"

- Pull clock adjuster knob.

The trip recorder display will read:



"5 0 0 0" and second digit flashes.

- Press reset button for trip recorder as often as required to set second digit of secret number, e.g. 3.

The trip recorder display will read:

"5 3 0 0"

- Pull clock adjuster knob.

The trip recorder display will read:

"5 3 0 0" and third digit flashes.

- Press reset button for trip recorder as often as required to set third digit of secret number, e.g. 4.

The trip recorder display will read:

"5 3 4 0"

- Pull clock adjuster knob.

The trip recorder display will read:

"5 3 4 0" and fourth digit flashes.

- Press reset button for trip recorder as often as required to set fourth digit of secret number, e.g. 9.

The trip recorder display will read:

"5 3 4 9"

- Pull clock adjuster knob on dash panel insert and at the same time press reset button for trip recorder.

The trip recorder will revert to its normal display.

When the correct secret number has been entered immobiliser warning lamp will go out.

- Switch off ignition, then start engine.

Notes:

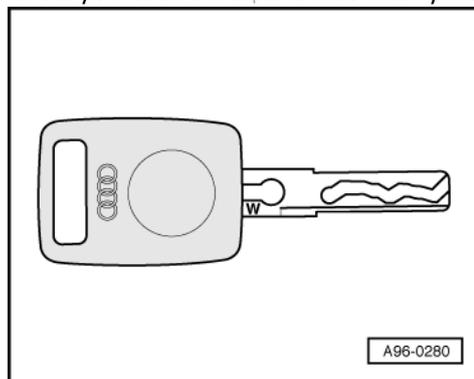
- ♦ If secret number is entered incorrectly three times in a row, control unit will be disabled . The word "FAIL" will appear on trip recorder display on dash panel insert.
- ♦ A further attempt to enter number is only possible after a delay period of at least 10 minutes. During this time the ignition must remain switched on. The delay period is doubled after each further series of three attempts to enter secret number.
- ♦ If input sequence is interrupted for more than 30 seconds (i.e. if no buttons or knobs are operated during this period) emergency starting procedure will be automatically terminated.
- ♦ When emergency starting procedure has been successfully completed engine can be started as often as required within a period of 45 minutes, as long as S-contact remains closed.
- ♦ If S-contact is opened, i.e. if key is removed from ignition lock, engine can only be started within a period of 10 minutes.

3 - Self-diagnosis of immobiliser - variable code version

3.1 - Self-diagnosis of immobiliser - variable code version

Note:

As of week 32/97, the Audi A8 features the new immobiliser with alternating code. immobiliser servicing is same as for previous version and is to be performed as described in Workshop Manual.



-> The keys have a "W" marked on them if vehicle has the new immobiliser with variable code. In future, keys will be marked "W" and "F" if immobiliser has the old fixed code.

3.2 - General information

Measures for rectifying commonly occurring faults on particular models

=> Technical service handbook

Function

The immobiliser electronics consist of:

- ◆ an immobiliser control unit
- ◆ a warning lamp in dash panel insert,
- ◆ a reader coil on ignition lock,
- ◆ matched ignition keys with electronic components (transponder).

The immobiliser system is designed to enable (activate) and disable engine control unit via the W wire.

The transponder code consists of a fixed code (as for previous system) and an additional alternating code. This changes whenever vehicle is started and thus prevents transponder being copied.

Every immobiliser control unit has a different algorithm (code generator) for changing the variable code, and this remains the same over life of system. Any individual key can be identified by means of the fixed code, so it is also possible to disable a key which has been lost. Every time ignition is switched on, immobiliser reader coil reads fixed code and then variable code on transponder in key, and verifies whether key is authorised to start car.

If an authorised key is used, warning lamp will light up briefly (for a maximum of 3 seconds) and then go out.

If an unauthorised key is used, or if there is a system error, warning lamp will flash continuously when ignition is switched on.

When key is being matched to immobiliser control unit, control unit writes this algorithm onto transponder in key and at the same time learns the fixed code of transponder.

The electronic immobiliser has extensive self-diagnosis capability. If malfunctions occur in system components, fault codes are stored in fault memory of control unit. These can then be identified using fault reader V.A.G 1551 or vehicle systems tester V.A.G 1552.

Note:

The following description deals only with fault reader V.A.G 1551.

Notes on use of keys and matching procedure for keys

The engine can only be started using an authorised key, i.e. one which has been matched to immobiliser control unit.

The procedure for matching (adapting) keys to immobiliser control unit (=> Page 32) must always be carried out on all keys belonging to vehicle, including all spare keys.

If new or additional keys are required, these must be matched together with all existing keys.

If for any reason not all keys are available for matching (e.g. if customer does not live locally), advise customer that all keys will need to be re-matched together at a later date.

It is particularly important to re-match remaining keys if one of keys has been lost, so that this key can then no longer be used to start engine.



3.3 - Starting self-diagnosis of immobiliser

Test requirements:

- ◆ Fuse OK (check using current flow diagram)
- ◆ Connect fault reader V.A.G 1551 => Page 78 .

Notes:

- ◆ If display remains blank, check voltage supply to V.A.G 1551 according to current flow diagram.
 - ◆ Additional operating instructions can be called up with fault reader HELP key.
 - ◆ The => key is used for continuation of program sequence.
 - ◆ Incorrect entry can be cancelled with the Ckey.
 - ◆ In operating mode 1 "Rapid data transfer" function 00 "Automatic test sequence" can be carried out. Then all vehicle control units will be interrogated automatically.
- Switch on ignition.
 - Switch on printer with the PRINT key (indicator lamp in key lights up).
 - Press key 1 for "Rapid data transfer" mode.

-> Display readout:

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

Address word for immobiliser: 25

- Press keys 2 and 5.

-> Display readout:

```
Rapid data transfer      Q
25 - immobiliser
```

- Confirm entry with Q key.

-> This display will appear after about 5 seconds:

```
4B0953234      ImmoAUZ9Z0V2000157
D10□
Code 00000      WSC      06812
```

- 4B0953234: Part No. of immobiliser control unit (also refer to Parts list)
 - AUZ9Z0V2000157: 14-figure Identification No. for immobiliser control unit
 - D10: Software version of immobiliser control unit
 - Coding 00000: Coding not required
 - WSC 06812: Workshop code
- Press => key.

-> If display shows one of messages shown, run through fault finding procedure as described in diagnosis management fault finding program.

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

=> Current flow diagrams, electrical fault finding and fitting locations

```
Rapid data transfer      HELP
Fault in communication build up
```

```
Rapid data transfer      HELP
K wire not switching to earth
```

```
Rapid data transfer      HELP
K wire not switching to positive
```

-> Display readout:

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

- Press HELP key to obtain a printout of available functions.
- Pressing the => key switches to next step of program sequence.

Self-diagnosis functions

The following functions are possible:

- 01 - Interrogating control unit version => Page 43 .
- 02 - Interrogating fault memory => Page .
- 05 - Erasing fault memory => Page .
- 06 - End output => Page .
- 08 - Reading measured value block => Page .
- 10 - Adaption=> Page .

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3.4 - Interrogating control unit version

-> Display readout:

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

- Press keys 0 and 1 (01 selects "Interrogate control unit version" function).

-> Display readout:

```
Rapid data transfer      Q
01- Interrogate control unit version
```

- Confirm entry with Q key.

-> This display will appear after about 5 seconds:

```
4B0953234 ImmoAUZ9Z0V2000157 D10
Code 00000 WSC 06812
```

- 4B0953234: Part No. of immobiliser control unit (also refer to Parts list)
- AUZ9Z0V2000157: 14-figure Identification No. for immobiliser control unit
- D10: Software version of immobiliser control unit
- Coding 00000: Coding not required
- WSC 06812: Workshop code

Press => key.

3.5 - Interrogating fault memory

Note:

The displayed fault information is not constantly updated but only when initiating self-diagnosis or with function 05 "Erase fault memory".

- Switch on printer with the PRINT key (indicator lamp in key lights up).

-> Display readout:



Rapid data transfer HELP
Select function XX

- Press keys 0 and 2 (02 selects function "Interrogate fault memory".)

-> Display readout:

Rapid data transfer Q
02 - Interrogate fault memory

- Confirm entry with Q key.

-> The number of faults stored will appear on display.

2 faults recognised!

The stored faults are displayed consecutively and printed out.

- Check printed faults with those in fault table and rectify faults => Page 28 .

-> If message "No fault recognised" is displayed, program returns to its start position when pressing the =>key.

No fault recognised

-> Display readout:

Rapid data transfer HELP
Select function XX

If something else is displayed:

=> Fault reader operating instructions

- End output (function 06) => Page 30 .
- Switch off ignition and separate diagnostic connections.

3.6 - Fault table for immobiliser

Notes:

- ♦ The following table lists all faults that can be recognised by immobiliser control unit and printed out by V.A.G 1551. The faults are listed in order according to their 5-figure code numbers.
- ♦ Fault codes appear only on print-out.
- ♦ Before replacing a component shown as faulty, check wiring and connections to component as well as earth connections according to current flow diagram.
- ♦ Once repairs have been completed, fault memory is always to be interrogated again with fault reader V.A.G 1551 and erased.
- ♦ The fault memory records all static and sporadic faults.
If a fault occurs and persists for at least 2 seconds, it is identified as a static fault. If fault does not occur again it is registered as a sporadic fault. "/SP" appears on right of display.
- ♦ When ignition is switched on, all existing faults are automatically reclassified as sporadic faults and will only register as static faults if they still occur after testing.
- ♦ Sporadic faults which no longer occur after 50 driving cycles (ignition on for at least 5 minutes, road speed of > 30 km/h) are erased automatically.

V.A.G 1551 print-out	Possible fault cause	Fault elimination
01128 immobiliser reader coil-D2	Open circuit in reader coil wiring or connector not attached at control unit.	- Check reader coil, wiring and connector (visual check); if necessary, replace reader coil. => Page

	immobiliser control unit defective.	- Erase fault memory, then interrogate again (=> Page 29); if necessary, replace dash panel insert. => Page
01176 Key Signal too low	Fault in wiring between reader coil and immobiliser control unit (contact resistance/loose contact). Electronic component (transponder) in key missing or not working.	- Check reader coil, wiring and connector (visual check); if necessary, replace reader coil. => Page - If other keys are OK, replace defective ignition key, match all ignition keys again and test => Page 32 .

V.A.G 1551 print-out	Possible fault cause	Fault elimination
01176 Key Not authorised	Ignition key fits in lock but has not been matched.	- Match all ignition keys again and test => Page 32 . This fault is then erased automatically.
01177 Engine control unit Not authorised	Engine control unit not adapted. Open circuit or short circuit in W wire	- Adapt engine control unit => Page 36 . - Test W wire using current flow diagram

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V.A.G 1551 print-out	Possible fault cause	Fault elimination
01179 Incorrect key programming	Fault has occurred during ignition key matching.	- Match all ignition keys again exactly as specified =>Page 32 .
65535 Control unit Defective	immobiliser control unit defective.	- Fit a new immobiliser control unit => Page

3.7 - Erasing fault memory

Note:

After erasing fault memory its contents will automatically be indicated. If fault memory cannot be erased, interrogate fault memory again and rectify faults.

Prerequisites:

- ◆ Fault memory interrogated =>Page 27 .
- ◆ All faults rectified.

After fault memory has been successfully interrogated:

-> Display readout:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 5 (05 selects function "Erase fault memory".)



-> Display readout:

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

- Confirm entry with Q key.

-> Display readout:

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

The fault memory is now erased.

- Press =>key.

-> Display readout:

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

Notes:

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Warning! Fault memory was not interrogated

-> This message indicates an error in test sequence:

```
Rapid data transfer
Fault memory was not interrogated
```

-> This message indicates an error in test sequence:

Adhere exactly to test sequence: First interrogate fault memory, if necessary rectify faults, then erase.

3.8 - End output

- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

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

- Confirm entry with Q key.

-> Display readout:

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

- Switch off ignition.
- Disconnect fault reader V.A.G 1551.

3.9 - Reading measured value block

Performing function "Read measured value block"

-> Display readout:

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

- Press keys 0 and 8 (08 selects function "Read measured value block").

-> Display readout:

```
Rapid data transfer      Q
08 Read measured value block
```

- Confirm entry with Q key.

-> Display readout:

```
Read measured value block      HELP
Enter display group number XXX
```

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- Enter display group number (see table => Page 30) and confirm entry with Q key .

The measured value block which has been selected will appear in standard format.

Summary of display groups:

Display Group No.	Display
022	1 = Engine start enabled 2 = Response from engine control unit 3 = Key OK 4 = No. of keys learnt
023	1 = Authorised variable code 2 = Currently not used 3 = Authorised fixed code 4 = Vacant

Measured value block 022

Read measured value block 22			=>	Display readout
1	1	1	Vacant measured value block	
			Key OK ▪ 1 = yes ▪ 0 = No (i.e. key is not matched or is incorrectly matched, or transponder is defective).	
			Response from engine control unit* ▪ 1 = yes ▪ 0 = no (i.e. fault in engine control unit or in wiring).	
			Engine may be started ▪ 1 = yes ▪ 0 = no (i.e. key is not matched or is incorrectly matched, or engine control unit is incorrectly coded or defective).	

*) Depending on control unit version, measured value block will read "0" (no response from engine control unit) for between 10 and 30 seconds after engine and ignition have been switched off. This indicates that engine control unit is active and there is no fault. Check by performing self-diagnosis again => Page 25 .



Measured value block 023

Read measured value block 23			⇒	◀ Display readout
AU	Z7	Z0	T1	
				Identification No. 7th and 8th digits
				Authorised fixed code <ul style="list-style-type: none"> ▪ 1 = yes ▪ 0 = no (i.e. fixed code in key transponder is not authorised).
				Identification No. 3rd and 4th digits
				Authorised variable code <ul style="list-style-type: none"> ▪ 1 = yes ▪ 0 = no (i.e. variable code is not authorised)

3.10 - Adaption

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The adaption function is used to carry out and store following adjustments.

- ♦ Matching vehicle keys => Page 32 .
- ♦ Adaption after replacing engine control unit => Page 36 .
- ♦ Adaption after replacing immobiliser control unit => Page 37 .

3.11 - Matching vehicle keys

Notes:

- ♦ If new or additional ignition keys are required they must be matched to immobiliser control unit.
- ♦ When replacing lock set or replacing reader coil or immobiliser control unit, check procedure => Page 181 .
- ♦ The matching procedure must always be carried out for all ignition keys, including existing ones.
- ♦ It is particularly important to re-match remaining keys if one of keys has been lost, so that this key can then no longer be used to start engine.
- ♦ If not all keys are available for matching (e.g. if customer does not live locally), customer must have complete set matched by his local Audi dealer at a later date.
- ♦ The number of keys already matched will be displayed when matching (adaption) function is selected.
- ♦ The matching can be interrupted with the "C" key of V.A.G 1551

Prerequisites:

- ♦ All ignition keys available. If no old ignition key is available see "Lost key procedure",=>Page 36
- ♦ Key fob with covered secret number is available, if not see "Establishing secret number",=>Page 36 .
- Insert first key in ignition lock and switch on ignition.
- Connect fault reader V.A.G 1551 and perform self-diagnosis of immobiliser using address word "25" 25

After displaying control unit identification:

- Press ⇒ key.

-> Display readout:

Rapid data transfer	HELP
Select function XX	

- Press key 1 twice. (11 selects "Log-in procedure" function).

-> Display readout:

```
Rapid data transfer      Q
11 - Log-in procedure
```

- Confirm entry with Q key.

-> Display readout:

```
Log-in procedure
Enter code number XXXXX
```

- Enter secret number, when doing this place a 0 before 4-digit number (e.g. 01915).

The secret number is on key fob. To reveal number, carefully rub away covering layer (e.g. with a coin).

Note:

If secret number on key fob consists of only 2- or 3- digits, remaining spaces must be filled with zeros when entering number. For example, 344 = 00344.

- Confirm entry with Q key.

The warning lamp in instrument cluster will now light up continuously.

-> Display readout:

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

Notes:

-> If following display appears briefly:

```
Tester sends address word 25
```

- ◆ Secret number is not accepted. Enter again.

Warning:

-> Display readout:

```
Function is unknown or
cannot be carried out at present
```

If this message appears on display during log-in procedure, this means that secret number has been entered incorrectly several times (or that secret number itself is wrong).

Notes:

- ◆ If secret number is entered incorrectly three times in a row, control unit will be disabled .
- ◆ A further attempt to enter number is only possible after a delay period of at least 10 minutes. During this time ignition must remain switched on and self-diagnosis function must be terminated using function 06 ("End output"). The delay period is doubled after each further series of three attempts to enter secret number.

- Press keys 1 and 0 (10 selects function: "Adaption").

-> Display readout:

```
Rapid data transfer      Q
10 - Adaption
```

- Confirm entry with Q key.

-> Display readout:



```
Adaption
Feed in channel number XX
```

- Press keys 2 and 1 (21 selects Channel 21 for "Adaption of keys").
- Confirm entry with Q key.

-> *If display appears:*

```
Function is unknown or
cannot be carried out at present
```

- Repeat adaption by entering secret number.

-> Display readout:

```
Channel    21    Adaption    2
```

The top line of display shows that 2 ignition keys are matched to system.

Note:

The number of keys to be matched can also be entered using keys 1 (to reduce number) and 3 (to increase number).

- Press => key.

-> Display readout:

```
Channel    21    Adaption    2
Enter adaption value XXXXX
```

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- Press the 0 key four times and then enter number of all ignition keys to be matched, including key in ignition lock, e.g. 00003. (Maximum possible number of keys: 8).
- Confirm entry with Q key.

-> Indicated on display for 3 ignition keys to be matched:

```
Channel    21    Adaption    3    Q
```

- Confirm entry with Q key.

-> Display readout:

```
Channel    21    Adaption    3    Q
Store changed value?
```

Note:

Each key must be matched within 30 seconds, otherwise warning lamp will start flashing at a rate of 2 Hz and entire adaption procedure (log-in procedure and adaption) will have to be repeated.

- Confirm entry with Q key.

-> Display readout:

```
Channel    21    Adaption    3
Changed value is stored
```

- Press => key.

-> Display readout:

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

- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

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

- Confirm entry with Q key.

-> Display readout:

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

The warning lamp in dash panel insert goes out and key in the ignition lock is now matched.

- Insert next key in ignition lock and switch on ignition. The warning lamp will come on when ignition is switched on and go out after about 1 second. This confirms that this key has now also been matched.
- Repeat procedure until all keys have been matched. A brief 0.5 second confirmation signal appears after successfully matching of last key.
- Select function 02 "Interrogate fault memory". If no faults are stored, matching of keys has been successfully completed.

The matching of ignition keys is automatically terminated when:

- ◆ number of matched keys is reached,
- ◆ an already matched key is used to switch on ignition again and ignition remains switched on for longer than 1 second (fault is stored),
- ◆ matching procedure for second key is not completed within specified period of 30 seconds after switching on ignition (fault is stored),
- ◆ if during key matching a fault is stored.

3.12 - Lost key procedure

- Manufacture or order replacement ignition key on basis of lock number.
- Matching vehicle keys => Page **32**.
- On vehicles with radio-operated remote control, match all keys to control unit for radio-operated remote control.

=> General body repairs; Repair group 57; Central locking Central locking

Establishing secret number

If 4-digit secret number is not known or key fob with secret number is not available, dealer must obtain secret number using 14-character identification number of immobiliser control unit via direct system interrogation (as for direct interrogation of radio code). It is also possible to obtain secret number from appropriate regional sales centre or importer.

Warning:

Important: always advise customer of new code number.

The immobiliser control unit identification number is available:

- ◆ as sticker on customer key fob
- ◆ via self-diagnosis function (see "Interrogating control unit version" => Page **26**)

3.13 - Adaption procedure after replacing engine control unit

Notes:

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- ◆ The engine control unit is matched (adapted) to immobiliser control unit. When replacing a component it must be re-matched.
- ◆ If an authorised ignition key is not available but secret number is, new ignition keys must be manufactured and matched (adapted).



- ♦ The matching can be interrupted with the "C" key of V.A.G 1551

Prerequisites:

- Insert old (authorised) ignition key in ignition lock.
- Connect fault reader V.A.G 1551 and enter address word "25" to start self-diagnosis of immobiliser => Page 25 .

After displaying control unit identification:

- Press => key.

-> Display readout:

Rapid data transfer	HELP
Select function XX	

- Press keys 1 and 0 (10 selects function: "Adaption").

-> Display readout:

Rapid data transfer	Q
10 - Adaption	

- Confirm entry with Q key.

-> Display readout:

Adaption	
Feed in channel number XX	

- Press key 0 twice. (Selects channel for adapting engine control unit).
- Confirm entry with Q key.

-> Display readout:

Adaption	Q
Erase learnt value?	

- Confirm entry with Q key.

-> Display readout:

Adaption	
Learnt values have been erased	

- Press => key.

-> Display readout:

Rapid data transfer	HELP
Select function XX	

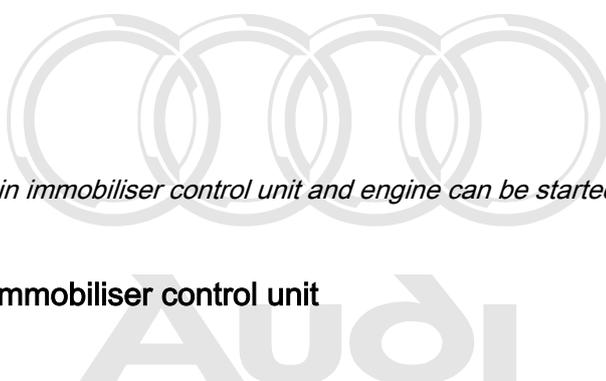
Note:

The engine control unit identification will be stored in immobiliser control unit and engine can be started.

3.14 - Adaption procedure after replacing immobiliser control unit

Notes:

- ♦ The following steps must be carried out after replacing immobiliser control unit:
- Match vehicle keys => Page 32 .
- Replacement control units no longer have a label with concealed code number (rub-off covering); secret code number can only be established via 14-digit identification number of immobiliser control unit (this may



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be possible via direct computer access, as used for obtaining a radio code). It is also possible to obtain secret number from appropriate regional sales centre or importer.

Warning:

Important: always advise customer of new code number.

3.15 - Emergency starting with V.A.G 1551

The emergency starting procedure can be used to start a vehicle which has been rendered inoperative by immobiliser. The vehicle can then be driven to nearest Audi dealer for servicing.

Prerequisites:

- ◆ The customer must present vehicle documents and personal identification to prove that he or she is vehicle owner or is authorised to use it.
- ◆ Fault reader V.A.G. 1551/1552 For private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.
- ◆ Key fob with covered secret number is available, if not see "Establishing secret number", =>Page 36 .
- Connect fault reader V.A.G 1551 and enter address word "25" to start self-diagnosis of immobiliser => Page 25 .

After displaying control unit identification:

- Press => key.

-> Display readout:

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

- Press key 1 twice. (11 selects "Log-in procedure" function).

-> Display readout:

```
Rapid data transfer      Q
11 - Log-in procedure
```

- Confirm entry with Q key.

-> Display readout:

```
Log-in procedure
Enter code number XXXXX
```

- Enter secret number, when doing this place a 0 before 4-digit number (e.g. 01915).

The secret number is on key fob. To reveal number, carefully rub away covering layer (e.g. with a coin).

Note:

If secret number on key fob consists of only 2- or 3- digits, remaining spaces must be filled with zeros when entering number. For example, 344 = 00344.

- Confirm entry with Q key.

-> Display readout:

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

Notes:

-> If following display appears briefly:



Tester sends address word 25

- ◆ Secret number is not accepted. Enter again.
 - ◆ If secret number is entered incorrectly three times in a row, control unit will be disabled .
 - ◆ A further attempt to enter number is only possible after a delay period of at least 10 minutes. During this time ignition must remain switched on and self-diagnosis function must be terminated using function 06 ("End output"). The delay period is doubled after each further series of three attempts to enter secret number.
- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

Rapid data transfer Q
06 End output

- Confirm entry with Q key.

-> Display readout:

Rapid data transfer HELP
Select function XX

- Leave ignition switched on and start engine.

Notes:

- ◆ Once emergency starting procedure has been successfully completed, warning lamp will light up continuously and immobiliser control unit will be enabled (engine will start) as long as ignition remains switched on.

4 - Self-diagnosis of Cruise Control System (CCS)

4.1 - Self-diagnosis of Cruise Control System (CCS)

4.2 - -Diesel engine-

Testing cruise control system (CCS)

The CCS has no components of its own (except for operating switch). All CCS functions are performed by diesel direct injection system.

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-> Display readout:

Rapid data transfer HELP
Enter address word XX

Address word for engine electronics control: 01

Rapid data transfer Q
01 - Engine electronics

-> Press keys 0 and 1 for address word "Engine electronics" and confirm entry by pressing the Q key.

Press => key after display of control unit identification.

-> Display readout:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 8 (08 selects function "Read measured value block").

-> Display readout:

```

Rapid data transfer    Q
Read measured value block
    
```

- Confirm entry with Q key.

-> Display readout:

```

Read measured value block HELP
Enter display group number XXX
    
```

- Enter required display group number and press Q to confirm entry.
- Enter measured value block Display Group 06, engine running at idling speed.

The measured value block which has been selected will appear in standard format.

-> Display readout:

```

Read measured value block 6
  0 km/h  0  0  0  000000
0
    
```

- Check display in display zone 4.

```

Read measured value block 6
  0 km/h  0  0  0  000000  0
    
```

-> Specification: 0

-> If 255 is displayed in display zone 4:

```

Read measured value block 6
 255 km/h  0  0  0
000000  0
    
```

- Activate cruise control system
=> Page 57 .

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Only for vehicles with automatic gearbox:

- Take vehicle for a test drive and go beyond a speed of 30 km/h once. After completing test drive, leave engine running and engage selector lever in position 2, 3 or D.
- Apply handbrake.

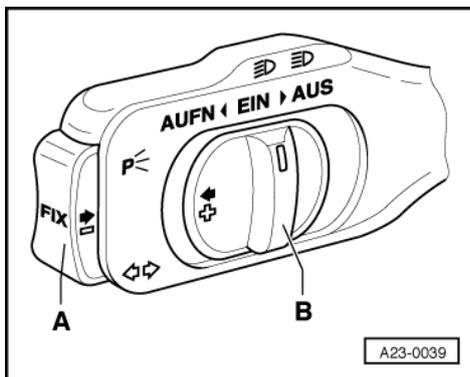
Note:

On vehicles with automatic transmission the voltage supply for the CCS switch is only supplied at speeds above 30 km/h and with selector lever in position 2, 3 or D. The power supply is then retained even when idling, provided that a gear (except 1 or R) is engaged.

```

Read measured value block 6
 0 km/h  0  0  0  000000  0
    
```

-> Check display in display zone 3.



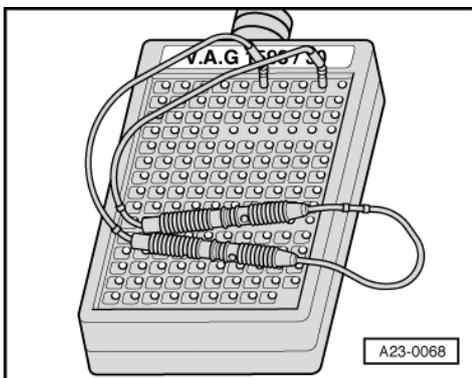


Test conditions	Display zone 3
Switch B engaged in "OFF/AUS" position	000000
Switch B in "OFF" position before engagement point	000001
Switch B at "ON/EIN"	000011
Switch B at "RES/AUFN"	001011
Key A pressed in	000111
Brake depressed	010011
Clutch depressed	100011

If specified values are not obtained:

- Connect V.A.G 1598/30 test box to wiring harness to engine control unit =>Page 56 .

4.3 - Wiring and component testing with test box V.A.G 1598/30



Notes:

- ◆ Use hand multimeter V.A.G 1526 or multimeter V.A.G 1715 and diode test lamp V.A.G 1527 for checks.
- ◆ To connect testers to test box use auxiliary cables from adapter set V.A.G 1594.
- ◆ The contact numbers of plugs and socket numbers in test box are identical.

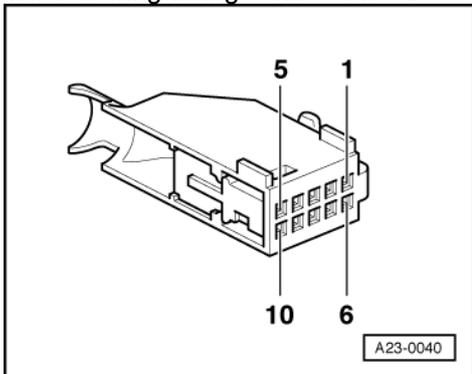
- -> With ignition switched off, unplug connectors from control unit.
- Connect test box to wiring harness connector.
- Carry out test as described in repair instructions.

Warning:

To prevent damage to electronic components, switch to respective measuring range before connecting measuring cable and observe test requirements.

- Unplug connector from CCS switch => Page 154 .

The following wiring connections are to be checked for open circuits and/or short to positive or negative.



10-pin connector on wiring harness, contact	Test box V.A.G 1598/30, socket
2	21
3	10
4	19
5	35
61)	To fuse
62)	To automatic gearbox control unit
7	19

- 1) Vehicles with manual gearbox
- 2) Vehicles with automatic gearbox
 - Rectify short circuit or open circuit if necessary.

Activating cruise control system

- Connect fault reader V.A.G 1551 (V.A.G 1552) => Page **78**.

-> Display readout:

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

Address word for engine electrical system: 01

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```
Rapid data transfer
01 - Engine electronics
```

- > Press keys 0 and 1 for address word "Engine electronics" and confirm entry by pressing the Q key.

Press => key after display of control unit identification.

-> Display readout:

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

- Press the "1" key twice for "Log-in procedure" function and confirm entry with Q key.

-> Display readout:

```
Log-in procedure        HELP
Enter code number XXXXX
```

- Enter code number 11463 and confirm entry with Q key.

5 - Self-diagnosis of parking aid

5.1 - Self-diagnosis of parking aid

5.2 - General information

The parking aid senses distance between rear of vehicle and an obstacle when reversing. It works on the echo-sounder principle.

Four ultra-sonic sensors are installed for this purpose in non-painted part of rear bumper.

The sensors can be activated in a combined transmit/receive mode or purely as receivers.

The sensors are switched off automatically when a trailer is hitched to the vehicle and connector is plugged into trailer socket.

Function:

The parking aid comprises the following components:

- ◆ Parking aid control unit -J446
- ◆ Parking aid sender, rear left -G203
- ◆ Parking aid sender, rear left/centre -G204
- ◆ Parking aid sender, rear right/centre -G205
- ◆ Parking aid sender, rear right -G206
- ◆ Parking aid warning buzzer -H15

The system performs a self-test after ignition is switched on; this is completed in less than one second.

From this point onwards control unit is continuously active, but distance-sensing function only starts when reverse gear is engaged.

A brief signal tone sounds to indicate that parking aid is ready for operation. (time lag of 1 second on vehicles with automatic gearbox on account of P-D shift).

If control unit detects a fault in system during self-test phase, a continuous warning tone sounds for a period of 5 seconds.

When reversing, distance warning function will start at a distance of about 1.50 m from obstacle. The warning consists of audible signals, each with a duration of 75 ms.

The intervals between signals become shorter as distance decreases. At distances of less than 25 cm warning signals merge into a continuous tone. (For adaption of volume and pitch (frequency) of warning signal using V.A.G 1551 => Page 66).

Special situation: Reversing parallel to a wall

Note:

The following description deals only with fault reader V.A.G 1551.

5.3 - Performing self-diagnosis of parking aid

Test requirements:

- ◆ Fuse OK (check using current flow diagram)
- ◆ Connecting V.A.G 1551 fault reader

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=> Page 78 .

Notes:

- ◆ If display remains blank, check voltage supply to V.A.G 1551 according to current flow diagram.
 - ◆ Additional operating instructions can be called up with fault reader HELP key.
 - ◆ The => key is used for continuation of program sequence.
 - ◆ Incorrect entry can be cancelled with the Ckey.
 - ◆ In operating mode 1 "Rapid data transfer" function 00 "Automatic test sequence" can be carried out. Then all vehicle control units will be interrogated automatically.
- Switch on ignition.
 - Switch on printer with the PRINT key (indicator lamp in key lights up).
 - Press key 1 for "Rapid data transfer" mode.

-> Display readout:

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

Address word for parking aid: 76

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- Press keys 7 and 6.

-> Display readout:

```
Rapid data transfer      Q
76 - Parking aid
```

- Confirm entry with Q key.

-> This display will appear after about 5 seconds:

```
4B0919283 Parking system A8RDW      D15
□
Code 01108      WSC      06812
```

- 4B0919283: Part No. of parking aid control unit (also refer to Parts list)
 - D15: Software version of parking aid control unit
 - Coding 01108: Coding of parking aid control unit
 - WSC 06812: Workshop code
- Press => key.

-> If display shows one of messages shown, run through fault finding procedure as described in diagnosis management fault finding program.

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

=> Current flow diagrams, electrical fault finding and fitting locations

```
Rapid data transfer      HELP
Fault in communication build up
```

```
Rapid data transfer      HELP
K wire not switching to earth
```

```
Rapid data transfer      HELP
K wire not switching to positive
```

-> Display readout:

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

- Press HELP key to obtain a printout of available functions.
- Pressing the => key switches to next step of program sequence.



Self-diagnosis functions

The following functions are possible:

- 02 - Interrogating fault memory => Page 60 .
- 05 - Erasing fault memory => Page 62 .
- 06 - End output => Page 63 .
- 07 - Coding control unit => Page 63 .
- 08 - Reading measured value block => Page 64 .
- 10 - Adaption=> Page 66 .

5.4 - Interrogating fault memory

Note:

The displayed fault messages are not constantly updated but only when starting the self-diagnosis, or with function 05 "Erase fault memory".

- Switch on printer with the PRINT key (indicator lamp in key lights up).

-> Display readout:

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

- Press keys 0 and 2 (02 selects function "Interrogate fault memory".)

-> Display readout:

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

- Confirm entry with Q key.

-> The number of faults stored will appear on display.

```
X faults recognised!
```

The stored faults are displayed consecutively and printed out.

- Check printed faults with those in fault table and rectify faults => Page 61 .

-> The display "No fault recognised" causes program to return to original setting after pressing the =>key.

```
No fault recognised
```

-> Display readout:

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

If something else is displayed:

=> Fault reader operating instructions

- End output (function 06) => Page 63 .
- Switch off ignition and separate diagnostic connections.

5.5 - Fault table for parking aid

Notes:

- ◆ The following table lists all faults that can be detected by parking aid control unit and printed out by V.A.G. 1551. The faults are listed according to their 5-figure code numbers.
- ◆ Fault codes appear only on print-out.
- ◆ Before replacing a component shown as faulty, check wiring and connections to component as well as earth connections according to current flow diagram.
- ◆ After completing repair and checking function of system, always interrogate fault memory once again with fault reader V.A.G 1551 and erase memory.
- ◆ The fault memory records all static and sporadic faults.
If a fault occurs and persists for at least 2 seconds, it is identified as a static fault. "/SP" appears on right of display.
- ◆ When ignition is switched on, all existing faults are automatically reclassified as sporadic faults and will only register as static faults if they still occur after testing.
- ◆ Sporadic faults which no longer occur after 50 driving cycles (ignition on for at least 5 minutes, road speed of > 30 km/h) are erased automatically.

V.A.G 1551 print-out	Possible fault cause	Fault elimination
01543 Parking aid warning buzzer -H15 - Short circuit to positive - Open/short circuit to earth	- Open circuit or short between -H15 and control unit - Warning buzzer defective	- Trace fault using current flow diagram Replace H15
01545 Rear left parking aid sender -G203 - Short circuit to positive - Open/short circuit to earth - Defective component - Implausible signal	- Open circuit or short between -G203 and control unit - -G203 defective	- Trace fault using current flow diagram Replace -G203

V.A.G 1551 print-out	Possible fault cause	Fault elimination
01547 Rear right/centre parking aid sender -G205 - Short circuit to positive - Open/short circuit to earth - Implausible signal	- Open circuit or short between -G205 and control unit - -G205 defective	- Trace fault using current flow diagram Replace -G205
01548 Rear right parking aid sender -G206 - Short circuit to positive - Open/short circuit to earth - Implausible signal	- Open circuit or short between -G206 and control unit - -G206 defective	- Trace fault using current flow diagram Replace -G206

V.A.G 1551 print-out	Possible fault cause	Fault elimination
01546 Rear left/centre parking aid sender -G204 - Short circuit to positive - Open/short circuit to earth - Implausible signal	- Open circuit or short between -G204 and control unit - -G204 defective	- Trace fault using current flow diagram Replace -G204
01549 Voltage supply for parking aid senders		



- Short to earth.	- Short to earth between parking aid sender and control unit	- Trace fault using current flow diagram
-------------------	--	--

V.A.G 1551 print-out	Possible fault cause	Fault elimination
01550 Reverse gear signal - Short circuit to positive	- Short to positive between reversing light switch and control unit	- Trace fault using current flow diagram
65535 Control unit faulty	- Parking aid control unit -J446 defective	- Replace control unit

5.6 - Erasing fault memory

Note:

If it is not possible to erase fault memory, interrogate it once again and rectify faults.

Prerequisites:

- ◆ Fault memory interrogated =>Page 60 .
- ◆ All faults rectified.

After fault memory has been successfully interrogated:

-> Display readout:

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

- Press keys 0 and 5 (05 selects function "Erase fault memory".)

-> Display readout:

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

05 Erase fault memory for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Confirm entry with Q key.

-> Display readout:

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

The fault memory is now erased.

- Press =>key.

-> Display readout:

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

Notes:

```
Warning!
Fault memory was not interrogated
```

-> This message indicates an error in test sequence:

Rapid data transfer
 Fault memory was not interrogated

-> This message indicates an error in test sequence:

Adhere exactly to test sequence: First interrogate fault memory, if necessary rectify faults, then erase.

5.7 - End output

-> Display readout:

Rapid data transfer HELP
 Select function XX

- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

Rapid data transfer Q
 06 End output

- Confirm entry with Q key.

-> Display readout:

Rapid data transfer HELP
 Enter address word XX

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- Switch off ignition.
- Disconnect fault reader V.A.G 1551.

5.8 - Code control unit

The parking aid control unit can be coded as follows using this function:

- ◆ Gearbox version: Manual or automatic
- ◆ Audible "ready" signal when reverse gear is engaged: With or without confirmation of function
- ◆ Body version: Saloon or Avant
- ◆ Model: e.g. Audi A8

Notes:

- ◆ The universal parking aid control unit -J446 can be set to suit configuration in a particular vehicle by coding it accordingly.

Perform coding

-> Display readout:

Rapid data transfer HELP
 Select function XX

- Press keys 0 and 7 (The function "Code control unit" is selected with 07).

-> Display readout:

Rapid data transfer Q
 07 - Code control unit

- Confirm entry with Q key.



-> Display readout:

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

- Enter code number according to coding table
=> Page 64 . Example: 01106

0				Currently not used
	1			Automatic gearbox
		1		Ready signal ON
			0	Saloon
			8	Audi A8

-> Display readout:

Code control unit Q
Enter code number 01106 (0-32000)

- Confirm entry with Q key.

-> Display readout:

4B0919283 Parking system A8 RDW
 Code 01108 WSC 06812

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- Press => key to end coding procedure.

Display readout:

Rapid data transfer HELP
Select function XX

Coding table:

0	Currently not used
0	Manual gearbox
1	Automatic gearbox
0	Ready signal OFF
1	Ready signal ON (factory setting)
0	Saloon
1	Avant
8	A8
6	A6
4	A4
3	A3

5.9 - Reading measured value block

Performing function "Read measured value block"

-> Display readout:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 8 (08 selects function "Read measured value block").

-> Display readout:

Rapid data transfer Q
 08 - Read measured value block

- Confirm entry with Q key.

-> Display readout:

Read measured value block HELP
 Enter display group number XXX

- Enter display group number (see table => Page 65) and confirm entry with Q key .

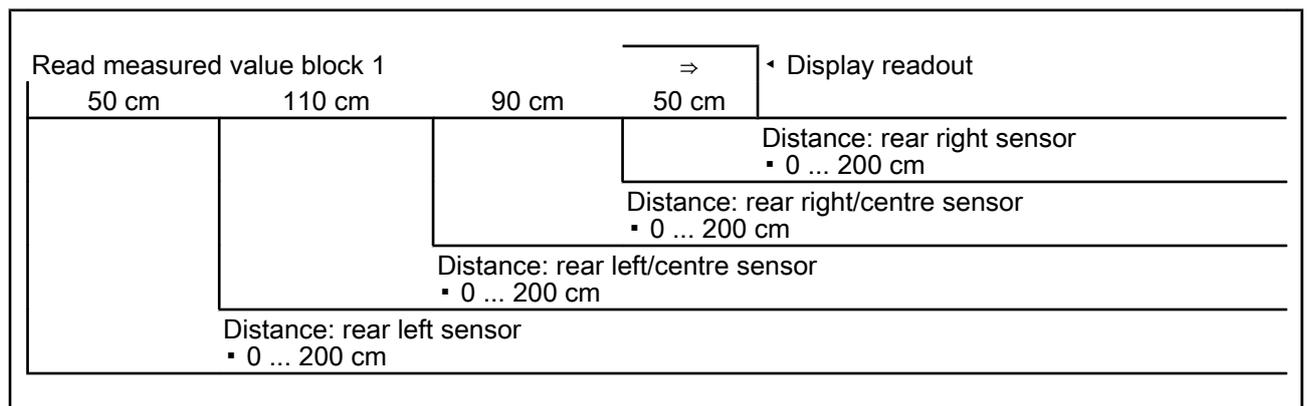
The measured value block which has been selected will appear in standard format.

Summary of display groups:

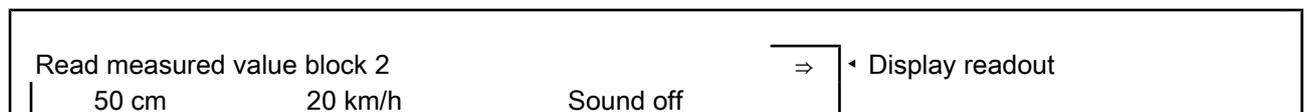
Display Group No.	Display
001	1 = Distance: rear left sensor, cm 2 = Distance: rear left/centre sensor, cm 3 = Distance: rear right/centre sensor, cm 4 = Distance: rear right sensor, cm
002	1 = Shortest distance, cm 2 = Road speed km/h 3 = Warning buzzer
003	1 = Supply voltage V 2 = Reverse gear 3 = Trailer
004	1 = Attenuation time: rear left sensor, ms 2 = Attenuation time: rear left/centre sensor, ms 3 = Attenuation time: rear right/centre sensor, ms 4 = Attenuation time: rear right sensor, ms

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Measured value block 001



Measured value block 002





			Warning buzzer ▪ Sound on ▪ Sound off
		Road speed ▪ 0 ... 300 km/h	
	Shortest distance ▪ Smallest value of four measured distances		

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Measured value block 003

Read measured value block 3			⇒	◀ Display readout
12.0 V	Rev. yes	Trail. no		
				Trailer status display ▪ Trail. yes ▪ Trail. no
				Reverse gear status display ▪ Rev. yes ▪ Rev. no
	Supply voltage of sensors ▪ 0 ... 15 V			

Measured value block 004

Read measured value block 4				⇒	◀ Display readout
1.02 ms	1.00 ms	0.97 ms	1.02 ms		
					Attenuation time, rear right sensor
					Attenuation time, rear right/centre sensor
					Attenuation time, rear left/centre sensor
					Attenuation time, rear left sensor

Note:

If display shows values greater than 4.00 ms when reverse gear is engaged, this means either: one of ultrasonic sensors is defective, or wiring is open circuit.

5.10 - Adaption

The adaption function is used to carry out and store following adjustments:

- ♦ Volume of warning signal
- ♦ Pitch (frequency) of warning signal

Performing adaption (function 10)

-> Display readout:

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

- Press keys 1 and 0. (10 selects "Adaption" function).

-> Display readout:

```
Rapid data transfer      Q
10 - Adaption
```

- Confirm entry with Q key.

-> Display readout:

```
Adaption
Feed in channel number  XX
```

- Press keys 0 and 1.
- Confirm entry with Q key.

-> Display readout:

```
Channel      1      Adaption      6
(- 1      3-L
```

- The adaption value can now be reduced with key 1 or increased with key 3; or press key =>.
- Press =>key.

-> Display readout:

```
Channel      1      Adaption      6
Enter adaption value  XXXXX
```

- Now enter adaption value manually (e.g. 00005).

-> Display readout:

```
Channel      1      Adaption      6      Q
Enter adaption value 00005
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      1      Adaption      5      Q
(- 1      3-L
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      1      Adaption      5      Q
Store changed value?
```

- Confirm entry with Q key.

-> Display readout:

```
Channel      1      Adaption      5
Changed value is stored
```

- Terminate adaption of sensitivity with the =>key.

-> Display readout:

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



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**Adaption table:**

Adaption channel	Adaption function
01	Volume; adjustable in steps from 2 to 7
02	Pitch (frequency); adjustable in steps from 0 to 4 (500 Hz to 2 kHz)

6 - Self-diagnosis of automatic headlamp range control

6.1 - Self-diagnosis of automatic headlamp range control

6.2 - General information

The automatic headlamp range control maintains dipped beams at a constant angle at all times, independent of any changes in attitude of vehicle resulting from varying loads.

Sender units register suspension height at front and rear. The system also employs road speed signal.

The control unit processes these signals and activates servo motors for headlamp range control when dipped beams are switched on.

The automatic headlamp range control is compulsory equipment on vehicles with gas-discharge headlamps.

Function

The automatic headlamp range control system comprises the following components:

- ♦ Control unit for headlamp range control -J431
- ♦ Self levelling sender RL -G76
- ♦ Self levelling sender FL -G78
- ♦ Headlamp range control motor, left -V48
- ♦ Headlamp range control motor, right -V49

When engine is started, required headlamp range setting is determined according to vehicle's attitude and passed on to headlamp range control motors. This initial correction of range setting is only performed once, and is independent of whether dipped beam headlamps are switched on or not.

After that, any necessary adjustments to headlamp range setting are only passed on to control motors when headlamp dipped beams are switched on.

If system detects a change in suspension height due to an altered load (for instance additional passengers getting in) when vehicle is stopped (road speed < 1 km/h), headlamps are then adjusted to suit new load condition.

The automatic headlamp range control system only reacts to changes in vehicle's static load, not in dynamic load (such as braking and accelerating).

Note:

The following description deals only with fault reader V.A.G 1551.

6.3 - Performing self-diagnosis of automatic headlamp range control

Test requirements:

- ◆ Fuse OK (check using current flow diagram)
- ◆ Connecting V.A.G 1551 fault reader
=> Page 78 .

Notes:

- ◆ If display remains blank, check voltage supply to V.A.G 1551 according to current flow diagram.
 - ◆ Additional operating instructions can be called up with fault reader HELP key.
 - ◆ The → key is used for continuation of program sequence.
 - ◆ Incorrect entry can be cancelled with the Ckey.
 - ◆ In operating mode 1 "Rapid data transfer" function 00 "Automatic test sequence" can be carried out. Then all vehicle control units will be interrogated automatically.
- Switch on ignition.
 - Switch on printer with the PRINT key (indicator lamp in key lights up).
 - Press key 1 for "Rapid data transfer" mode.

-> Display readout:

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

Address word for automatic headlamp range control: 55

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- Press keys 5 and 5.

-> Display readout:

```
Rapid data transfer      Q
55 - Beam adjustment
```

- Confirm entry with Q key.

-> This display will appear after about 5 seconds:

```
4B0907357 Beam adjustment   D00
Code 00008      WSC      06812
```

- 4B0907357: Part No. of control unit for automatic headlamp range control (also refer to Parts list).
 - D00: Software version of control unit for automatic headlamp range control.
 - Coding 00008: Coding of control unit for automatic headlamp range control.
 - WSC 06812: Workshop code
- Press→ key.

-> If display shows one of messages shown, run through fault finding procedure as described in diagnosis management fault finding program.

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

=> Current flow diagrams, electrical fault finding and fitting locations

```
Rapid data transfer      HELP
Fault in communication build up
```

```
Rapid data transfer      HELP
K wire not switching to earth
```

```
Rapid data transfer      HELP
K wire not switching to positive
```

-> Display readout:



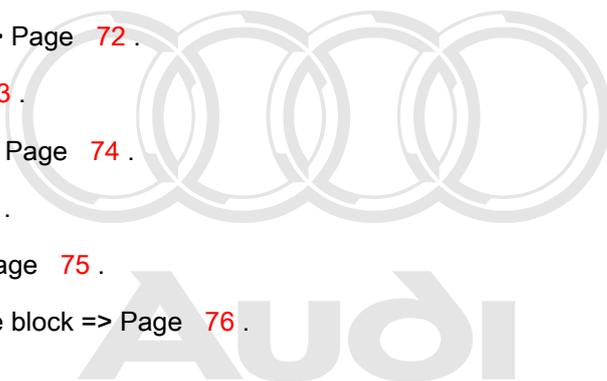
Rapid data transfer HELP
Select function XX

- Press HELP key to obtain a printout of available functions.
- Pressing the => key switches to next step of program sequence.

Self-diagnosis functions

The following functions are possible:

- 02 - Interrogating fault memory => Page 70 .
- 03 - Final control diagnosis=> Page 72 .
- 04 - Basic setting=> Page 73 .
- 05 - Erasing fault memory => Page 74 .
- 06 - End output => Page 75 .
- 07 - Coding control unit => Page 75 .
- 08 - Reading measured value block => Page 76 .



6.4 - Interrogating fault memory

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Note:

The displayed fault messages are not constantly updated but only when starting self-diagnosis, or with function 05 "Erase fault memory".

- Switch on printer with the PRINT key (indicator lamp in key lights up).

-> Display readout:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 2 (02 selects function "Interrogate fault memory".)

-> Display readout:

Rapid data transfer Q
02 - Interrogate fault memory

- Confirm entry with Q key.

-> The number of faults stored will appear on display.

X faults recognised!

The stored faults are displayed consecutively and printed out.

- Check printed faults with those in fault table and rectify faults => Page 71 .

-> The display "No fault recognised" causes program to return to original setting after pressing the =>key.

No fault recognised

-> Display readout:

Rapid data transfer HELP
Select function XX

If something else is displayed:

=> Fault reader operating instructions

- End output (function 06) => Page 75 .
- Switch off ignition and separate diagnostic connections.

6.5 - Fault table for automatic headlamp range control

Notes:

- ◆ The following table lists all faults that can be recognised by automatic headlamp range control system and printed out by V.A.G 1551. The faults are listed in order according to their 5-figure code numbers.
- ◆ Fault codes appear only on print-out.
- ◆ Before replacing a component shown as faulty, check wiring and connections to component as well as earth connections according to current flow diagram.
- ◆ After completing repair and checking function of system, always interrogate fault memory once again with fault reader V.A.G 1551 and erase memory.
- ◆ The fault memory records all static and sporadic faults.
If a fault occurs and persists for at least 2 seconds, it is identified as a static fault. "/SP" appears on right of display.
- ◆ When ignition is switched on, all existing faults are automatically reclassified as sporadic faults and will only register as static faults if they still occur after testing.
- ◆ Sporadic faults which no longer occur after 50 driving cycles (ignition on for at least 5 minutes, road speed of > 30 km/h) are erased automatically.

V.A.G 1551 print-out	Possible fault cause	Fault elimination
00625 Speed signal - Implausible signal	- Open circuit or short in wiring between dash panel insert and control unit	- Trace fault using current flow diagram
00774 Self levelling sender RL -G76 - Short circuit to positive - Open/short circuit to earth	- Open circuit or short in wiring between -G76 and control unit - -G76 defective	- Trace fault using current flow diagram - Replace -G76
00776 Self levelling sender FL -G78 - Short circuit to positive - Open/short circuit to earth	- Open circuit or short in wiring between -G78 and control unit - -G78 defective	- Trace fault using current flow diagram - Replace -G78

V.A.G 1551 print-out	Possible fault cause	Fault elimination
01537 Sender for veh. level/supp. volt. - Short circuit to positive - Open/short circuit to earth	- Open circuit or short to positive/earth in wiring between control unit and vehicle levelling sender	- Trace fault using current flow diagram
01538 Motors for beam adjustment -V48/49 - Short circuit to positive - Short to earth.	- Short to positive or earth between -V48/49 and control unit - -V48/49 defective	- Trace fault using current flow diagram - Replace -V48/49



V.A.G 1551 print-out	Possible fault cause	Fault elimination
01539 Headlamps not set	- Basic setting 2 has not been performed	- Perform complete basic setting => Page 73
65535 Control unit faulty	- Control unit for headlamp range control - J431 defective	- Replace control unit

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6.6 - Final control diagnosis

Notes:

- ◆ The final control diagnosis may only be performed with vehicle stationary.
- ◆ Switch on dipped beam headlamps.
- ◆ If a fault is found when performing final control diagnosis, trace cause of fault and replace defective component.

The following system functions can be activated via final control diagnosis:

- ◆ Lower headlamp beams
- ◆ Raise headlamp beams

Performing final control diagnosis:

- Press keys 0 and 3. (03 selects the "Final control diagnosis" function).

-> Display readout:

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

- Confirm entry with Q key.
This will start final control diagnosis for headlamp range control.

-> Display readout:

```
Final control diagnosis
Headlamps lowered
```

The headlamps are lowered until they reach bottom position or until diagnosis is advanced to next step.

- Press => key.

-> Display readout:

```
Final control diagnosis
Headlamps raised
```

The headlamps are raised until they reach top position or until diagnosis is advanced to next step.

- Press => key.

-> Display readout:

```
Final control diagnosis
END
```

- Press => key.

This returns testing unit to basic function mode.

-> Display readout:

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

6.7 - Basic setting

A basic setting must be performed after replacing a headlamp, vehicle levelling sensor or control unit. Note following points:

- The vehicle must be in an exactly defined load condition.

Note:

The specifications and instructions for obtaining correct vehicle load condition are given in "Maintenance" booklet.

=> Maintenance Manual

Bounce suspension (move shock absorbers up and down several times and let suspension settle).

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Perform basic setting

- Press keys 0 and 4 (04 selects "Basic setting" function).

-> Display readout:

```
Rapid data transfer      Q
04 - Basic setting
```

- Confirm entry with Q key.

-> Display readout:

```
Basic setting
Enter display group number XXX
```

- Enter display group number 001.
- Confirm entry with Q key.

-> Display readout:

```
System in basic setting  1
Wait
```

- The headlamps will now be moved into setting position.

-> Display readout:

```
System in basic setting  1
Adjust headlamps
```

- The headlamps are now in setting position. Adjust headlamps with headlamp aiming device (e.g. VAS 5046). Basic setting function 1 switches off automatic range control and fault "Headlamps not set" will be stored in fault memory.
- Press => key.

-> Display readout:

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

- Press keys 0 and 4 (04 selects "Basic setting" function).

-> Display readout:



```
Rapid data transfer      Q
04 - Basic setting
```

- Confirm entry with Q key.

-> Display readout:

```
Basic setting
Enter display group number XXX
```

- Enter display group number 002.
- Confirm entry with Q key.

-> Display readout:

```
System in basic setting      2
Control. position learnt
```

- The control unit has now learnt this setting. The fault "Headlamps not set" in fault memory will be erased and automatic range control function will be restored.
- Press => key.

-> Display readout:

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

6.8 - Erasing fault memory

Note:

If it is not possible to erase fault memory, interrogate it once again and rectify faults.

Prerequisites:

- ♦ Fault memory interrogated =>Page 70 .
- ♦ All faults rectified.

After fault memory has been successfully interrogated:

-> Display readout:

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

- Press keys 0 and 5 (05 selects the function "Erase fault memory".)

-> Display readout:

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

- Confirm entry with Q key.

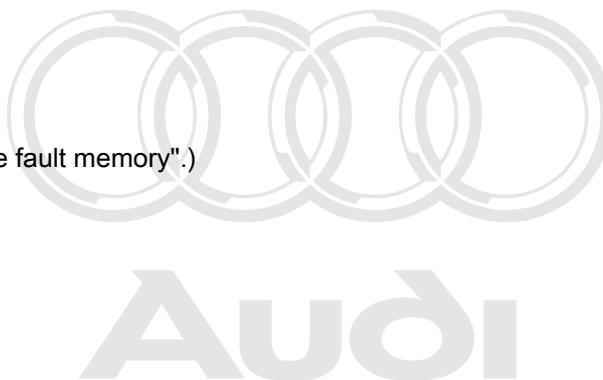
-> Display readout:

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

The fault memory is now erased.

- Press => key.

-> Display readout:



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

Notes:

```
Warning!  
Fault memory was not interrogated
```

-> This message indicates an error in test sequence:

```
Rapid data transfer  
Fault memory was not interrogated
```

-> This message indicates an error in test sequence:

Adhere exactly to test sequence: First interrogate fault memory, if necessary rectify faults, then erase.

6.9 - End output

- Press keys 0 and 6 (06 selects function "End output".)

-> Display readout:

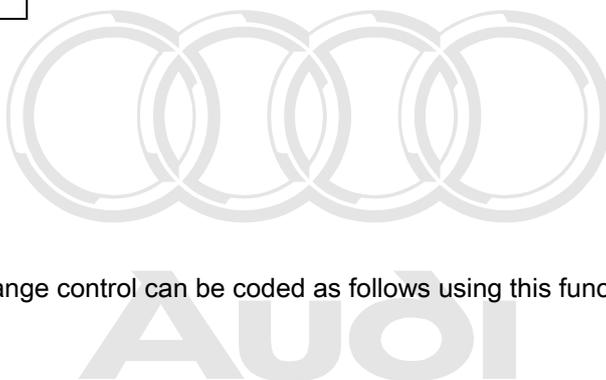
```
Rapid data transfer      Q  
06 End output
```

- Confirm entry with Q key.

-> Display readout:

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

- Switch off ignition.
- Disconnect fault reader V.A.G. 1551.



6.10 - Code control unit

The control unit for automatic headlamp range control can be coded as follows using this function:

- ◆ Vehicle type
- ◆ Front-wheel drive/four-wheel drive

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The various possible combinations can be programmed by entering appropriate coding.

Perform coding

-> Display readout:

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

- Press keys 0 and 7 (The function "Code control unit" is selected with 07).
- Confirm entry with Q key.

-> Display readout:

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

- Enter code number according to coding table
=> Page 76 . Example: 00008

-> Display readout:

```
Code control unit      Q
Enter code number 00008      (0-32000)
```

- Confirm entry with Q key.

-> This display will appear after about 5 seconds:

```
4B0907357 Beam adjustment      D00
Code 00008      WSC      06812
```

- Press => key to terminate coding.

-> Display readout:

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

- Press keys 0 and 6 (06 selects function "End output".)

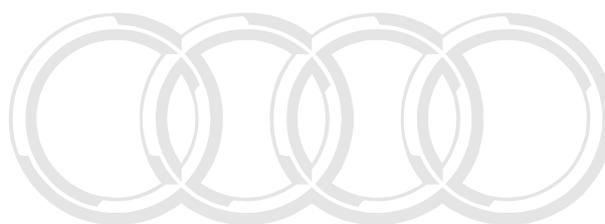
Display readout:

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

- Confirm entry with Q key.

Coding table:

Code	Model, front/four-wheel drive
00001	A3; front-wheel drive
00002	A3/S3; four-wheel drive
00003	A4 saloon/Avant; front wheel-drive
00004	A4/S4 saloon/Avant; four-wheel drive
00005	A6 saloon/Avant; front wheel-drive
00006	A6/S6 saloon/Avant; four-wheel drive
00007	A8; front-wheel drive
00008	A8/S8; four-wheel drive



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6.11 - Reading measured value block

Performing function "Read measured value block"

-> Display readout:

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

- Press keys 0 and 8 (08 selects function "Read measured value block").

-> Display readout:

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```
Rapid data transfer Q
08 Read measured value block
```

- Confirm entry with Q key.

-> Display readout:

```
Read measured value block HELP
Enter display group number XXX
```

- Enter display group number (see table => Page 77) and confirm entry with Q key.

The measured value block which has been selected will appear in standard format.

Summary of display groups:

Display Group No.	Display
001	1 = Supply voltage, terminal 15 V 2 = Voltage at dipped headlamps via terminal 56b V 3 = Road speed km/h
002	1 = Vehicle levelling sender, front V 2 = Vehicle levelling sender, rear V 3 = Activation of servo motors (Adaption)

Measured value block 001

Read measured value block 1			⇒	◀ Display readout
13.5 V	13.5 V	90 km/h		
Power supply terminal 15 ▪ 0 ... 15 V		Road speed ▪ 0 ... 300 km/h		
Voltage at dipped headlamps via terminal 56b ▪ 0 ... 15 V				

Measured value block 002

Read measured value block 2			⇒	◀ Display readout
3.0 V	2.8 V	ADP. OK		
Voltage at vehicle levelling sender, front ▪ 0.5 ... 4.5 V		Activation of servo motors ▪ ADP. runs (variation from required setting is being compensated by servo motors). ▪ ADP. OK (required setting is achieved).		
Voltage at vehicle levelling sender, rear ▪ 0.5 ... 4.5 V				

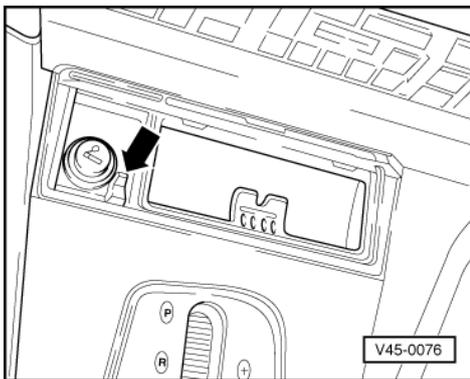
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7 - Connecting fault reader V.A.G 1551

7.1 - Connecting fault reader V.A.G 1551

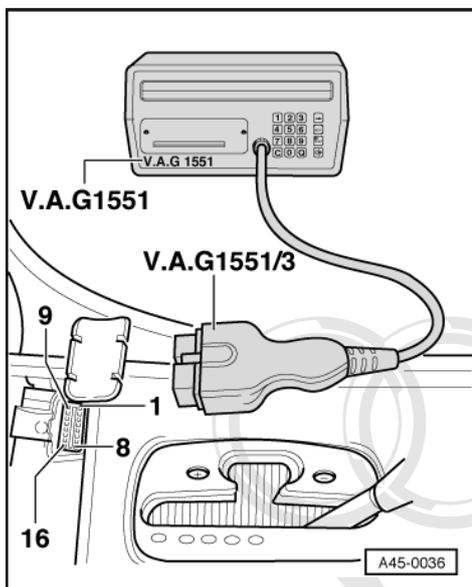
Note:

The vehicle system tester V.A.G 1552 can be used instead of fault reader V.A.G 1551, however a print out is not possible.



Test conditions

- Battery voltage at least 11 V
 - Earth connections on engine and gearbox OK.
 - Fuse OK.
- -> Release ashtray see arrow and remove from centre console.



- -> Connect fault reader V.A.G 1551 or vehicle system tester V.A.G 1552 using cable V.A.G 1551/3.

-> Display readout:

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

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* Appears alternately

Note:

If display remains blank:

=> Fault reader operating instructions

- Switch on ignition
- Switch on printer with the PRINT key (indicator lamp in key lights up).
- Press key 1 for "Rapid data transfer".

-> Display readout:

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

Note:

Address word 00 implements automatic test sequence, i.e. interrogation of fault memory via rapid data transfer for all vehicle systems with a self-diagnosis capability.

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27 - Starter, Current supply

1 - Battery

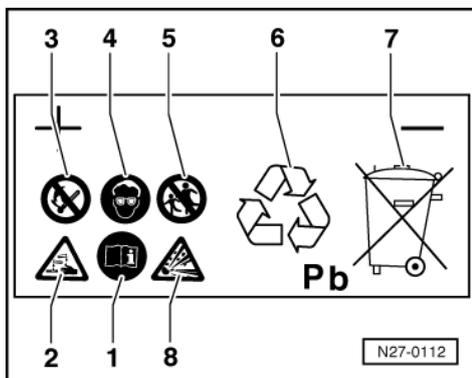
1.1 - Battery

The battery is one of the most important electrical components in a vehicle. A trouble-free battery has a great influence on customer satisfaction. To ensure a long service life, battery must be checked, serviced and maintained according to instructions in this Manual.

Apart from starting engine, the battery also acts as an electrical buffer and supplies power to all parts of vehicle electrical system.

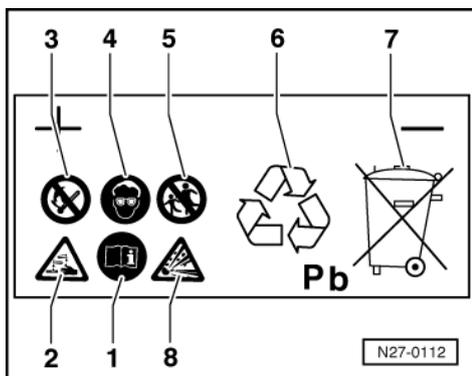
As with other components, battery design is subject to constant improvement and further development will continue. But, in view of physical and chemical limits involved, it is not possible at present to make battery completely maintenance-free

Warning and safety procedures when handling lead-acid batteries



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- Follow instructions on battery, in Electrical System Workshop Manual and in Owner's Manual.
- 2 - Danger of acid burns:
 - Battery acid is very caustic, therefore wear eye protection and gloves.
 - Do not tilt battery. Acid can leak out of gas vents.
- 3 - Fires, sparks, naked lights and smoking prohibited:
 - Avoid sparks when working with cables and electrical units.
 - Avoid short circuits.



- 4 - Wear eye protection
- 5 - Keep children away from acid and batteries.
- 6 - Disposal:
 - Dispose of old batteries at a battery collection point.
- 7 - Never dispose of old batteries in household waste system.
- 8 - Danger of explosion:

- A highly explosive gas is produced when charging batteries.

1.2 - Notes on handling batteries

Notes:

- ◆ Battery terminals must no longer be greased.
- ◆ To avoid damaging battery housing, do not use force when attaching battery clamps; press them on by hand.
- ◆ The tightening torque for battery clamps is 6 Nm.

1.3 - Removing and installing battery

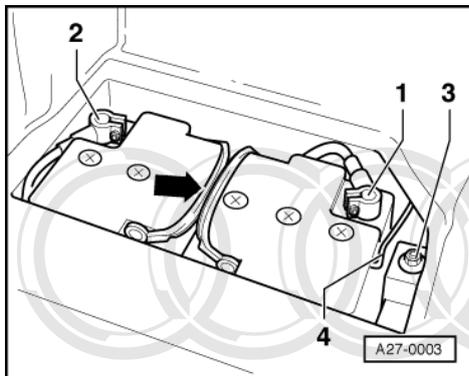
Warning:
 Disconnect battery earth strap before working on electrical system.

Notes:

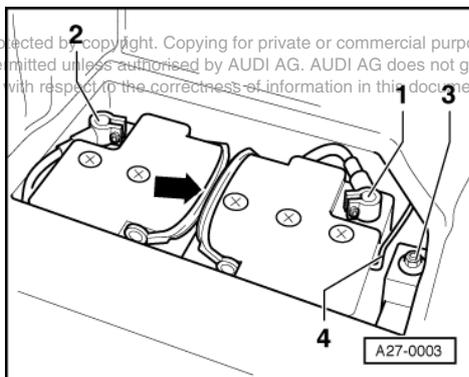
- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

Removing:

The battery is located in rear right of luggage compartment, under side floor panel.



- Remove side stowage compartment partition and floor panel secured by Velcro fastener.
- Disconnect battery earthing strap at floor panel by unfastening hexagon nut (10 mm A/F).
- -> Disconnect battery earth strap from battery negative terminal -1-. Slacken hexagon nut (10 mm A/F) to do this.



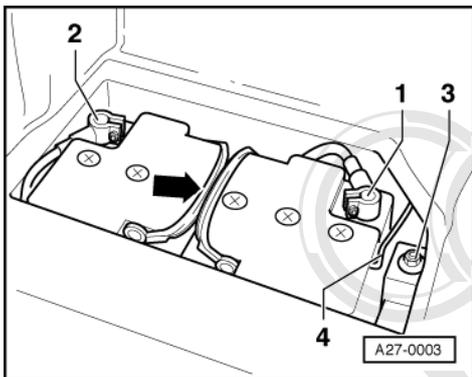
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- -> Disconnect battery positive cable from battery positive terminal -2-. Slacken hexagon nut (10 mm A/F) to do this.
- Detach hose connection -4- at battery.
- Remove hexagon bolt -3- (13 mm A/F) and then remove clamping bracket.
- Lift battery using both handles
-arrow- out of luggage compartment.

Installing:

- Installation is performed in reverse sequence to removal.



- -> Tighten hexagon bolts (13 mm A/F) -3- on securing mount to 20 Nm.

-> Installing battery:

Note:

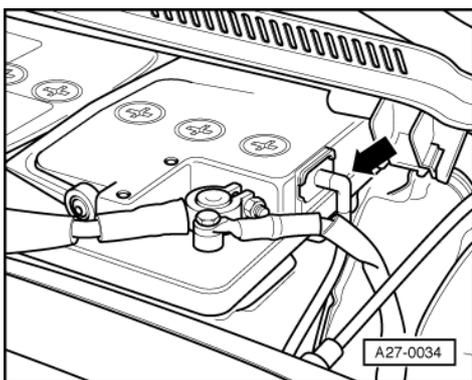
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The latest generation of batteries are equipped with a central gas venting system and a fine-mesh flame trap.

Function: The gases produced during charging escape through a central opening in top of battery cover. The flame trap which prevents flammable gases in battery from igniting is also located at this point.

It is important to ensure that hose attached to central vent does not become disconnected on installation. This is essential to allow battery to vent via fine-mesh flame trap and hose.

The flame trap comprises a small round fibreglass mat, about 15 mm in diameter and 2 mm thick. It has an effect similar to a valve, and thus allows gases produced in battery to vent.



-> If battery has a hose connected to central gas venting system -arrow-, it is very important to check that this hose does not become trapped or obstructed when the battery is installed. This is essential to allow battery to vent via the fine-mesh flame trap and hose. If battery does not have a vent hose, check that opening in top of battery cover is not obstructed.

- Installation is performed in reverse sequence to removal.

Checking battery is seated securely.

There is a danger of the following if battery is not properly secured:

- Shortened service life caused by vibration damage.
- The cells in battery will be damaged if battery is not secured correctly.
- Damage to battery housing by clamping bracket (possibility of acid leaking, therefore subsequent higher costs).
- Poor crash safety

1.4 - Visual check

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Warning:

The battery plugs must be fully tightened when charging, measuring voltage or performing load tests.

Carry out visual check of battery before performing measurements, such as no load voltage, electrolyte specific gravity or battery load test.

Performing this test establishes:

Notes:

- ◆ Whether battery housing is damaged.
Electrolyte can leak out if housing is damaged.
- ◆ Whether battery terminals (battery wire connections) are damaged.
Wiring connector contact cannot be guaranteed if battery terminal is damaged. This may cause a cable to spark/burn which may cause malfunctions in electrical system.

1.5 - Checking electrolyte level

Warning:

It is essential that genuine and proper battery sealing plugs be used to ensure that differing battery cover systems are sealed correctly. Only use genuine sealing plugs of same construction if lost or damaged. The plugs must be fitted with an O-ring seal.

Notes:

- ◆ The correct battery electrolyte level is an important factor in ensuring long life of battery.
- ◆ If batteries are provided with clearly visible "min."- and "max." -marks, it is sufficient to check electrolyte level by a visual inspection of battery.
- ◆ The electrolyte level must be above "min." mark but not exceed "max." mark.
- ◆ If external "min."- and "max." -marks on a battery are not readily visible, or if electrolyte level cannot be checked properly due to an opaque battery casing, battery caps must be unscrewed. It is then possible to check electrolyte level by performing a visual check of inner battery.
- ◆ The electrolyte level must be in line with internal electrolyte level mark/plastic web. This is equivalent to external "max." mark.

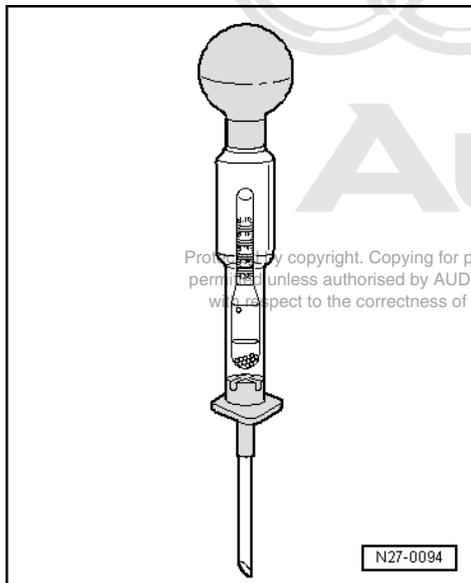
Electrolyte level too low

- ◆ If electrolyte level is too low, cell plates will dry out and battery will lose power. The cell plates must be fully covered by electrolyte (sulphuric acid/water mixture) in order to prevent corrosion of plates, plate bridges and cell connectors. Corrosion of these parts will make battery unreliable and ultimately unusable.
- Use distilled water only, this prevents contamination of battery electrolyte and associated increase in self discharge.

Electrolyte level too high

Special tools, testers and auxiliary items required

- ◆ -> Commercially available hydrometer



Note:

If electrolyte level is too high, leaking electrolyte (sulphuric acid/water mixture) will cause damage outside battery, i.e. to components in engine compartment.

- If electrolyte level is too high (overfilled), i.e. if level is above inside mark (plastic web) or above outer "max." mark, electrolyte must be drawn off using a commercially available hydrometer.
- Extract electrolyte using hydrometer until remaining fluid is level with plastic indicator web or "max." mark.

Batteries with central gas venting

Warning:

It is essential that batteries of latest construction with central gas venting are installed. Always use genuine battery plugs. The plugs must be fitted with an O-ring seal.

There are two different types of battery with central gas venting:

- ◆ Batteries with hose for central gas venting.
- ◆ Batteries without hose for central gas venting.

1.6 - No load voltage measurement

Warning:

The battery plugs must be fully tightened when charging, measuring voltage or performing load tests. Ensure that following notes are observed otherwise correct measurements cannot be guaranteed.

Special tools, testers and auxiliary items required

- ◆ Multimeter V.A.G 1715 or
- ◆ Mini tester V.A.G 1362 or

- ◆ Hand-held multimeter V.A.G 1526 or V.A.G 1526 A

Notes:

- ◆ If no load voltage measurement is carried out with the battery installed in vehicle then it is absolutely necessary to disconnect earth strap.
- ◆ The vehicle must not be started or driven with battery that is to be tested for at least 2 hours before taking measurements.
- ◆ The battery must not be loaded by connected power consumers for at least 2 hours before making measurements.
- ◆ The battery must not be charged for at least 2 hours before making measurements.

Check battery voltage in a no load condition as follows:

- With battery installed and ignition switched off check voltage between terminals with tester.

If measuring instruments read 12.5 V or above, then battery is OK.

The battery no-load voltage must at no time drop below 12.5 V. If this is the case then recharge battery immediately => Page 89 .

1.7 - Checking relative density of electrolyte in all cells

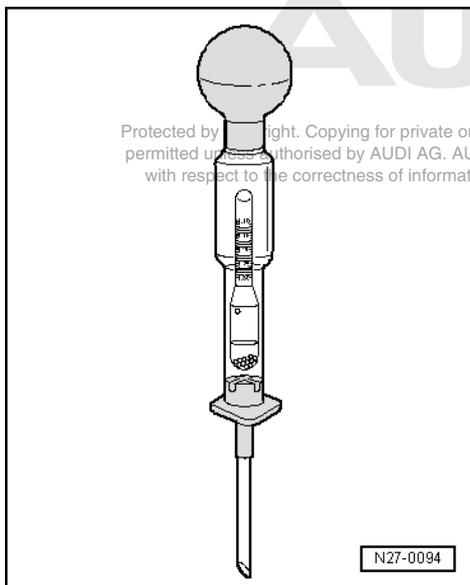
Warning:

When using sulphuric acid it is absolutely necessary that accident prevention procedures are observed. Suitable protective clothing must be worn.

When disposing of batteries it is absolutely necessary that disposal procedures for batteries and sulphuric acid are observed.

Ensure that following notes are observed otherwise correct check cannot be guaranteed.

In conjunction with "voltage under load" test, electrolyte density test gives a good indication of battery condition.



Special tools, testers and auxiliary items required

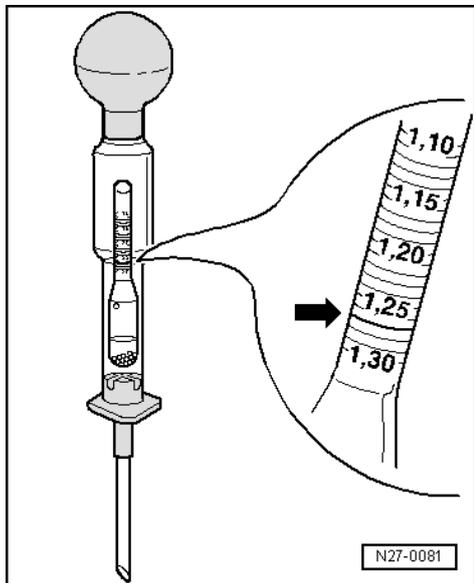
- ◆ -> Commercially available hydrometer
- ◆ Cleaning cloths



Notes:

- ◆ A battery temperature of at least 10 oC is required when carrying out relative density tests.
- ◆ The electrolyte density can be checked immediately after battery charging.

- Remove all battery plugs (battery cell sealing plugs).



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- -> Immerse end of hydrometer in a cell and extract sufficient electrolyte so that float swims free in electrolyte. Repeat this test for all cells.
- The greater the specific gravity (relative density) in kg/dm³ of the extracted electrolyte, the more the float rises. The relative density of electrolyte in kg/dm³ can be read off scale of hydrometer.

Differing relative density readings

Notes:

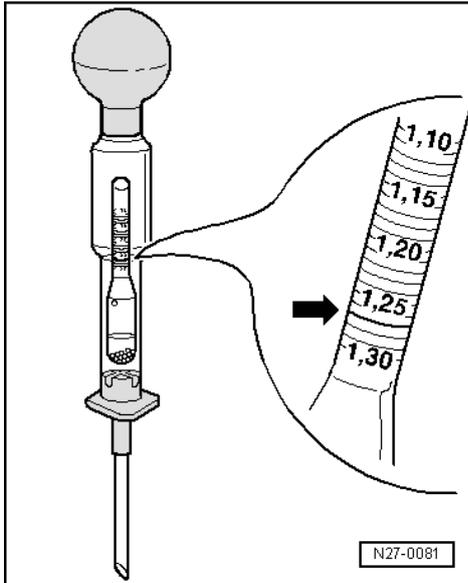
- ◆ The difference between the relative density readings of individual cells must not be more than 0.04 kg/dm³.
- ◆ The electrolyte density must be at least 1.24 kg/dm³.

Example of unacceptable deviations in relative density:

Differences in relative density (in kg/dm ³) between cells						
Example 1:	1.24	1.25	1.25	1.10	1.24	1.25
Example 2:	1.26	1.26	1.25	1.14	1.18	1.24

Relative density deviations in example 1, cell 4 (1.10 kg/dm³), and example 2, cell 4 (1.14 kg/dm³) and cell 5 (1.18 kg/dm³) are not acceptable. The batteries shown in examples are no longer usable and must be disposed of.

The following values must be attained:



Charge condition in normal climatic zones	Relative density (in kg/dm ³)
discharged	1.12
half charged	1.20
well charged	1.28
Charge level in tropical countries	Relative density (in kg/dm ³)
discharged	1.08
half charged	1.16
well charged	1.23

Warning:

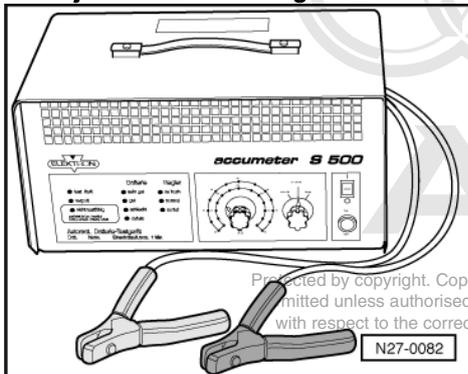
It is essential that genuine and proper battery sealing plugs be used to ensure that differing battery cover systems are sealed correctly. Only use genuine sealing plugs of same construction if lost or damaged. The plugs must be fitted with an O-ring seal.

1.8 - Checking voltage under load

Warning:

Ensure that following notes are observed otherwise correct check cannot be guaranteed. When disposing of batteries it is absolutely necessary that disposal procedures for batteries and sulphuric acid are observed.

In conjunction with "voltage under load" test, electrolyte density test gives a good indication of battery condition.



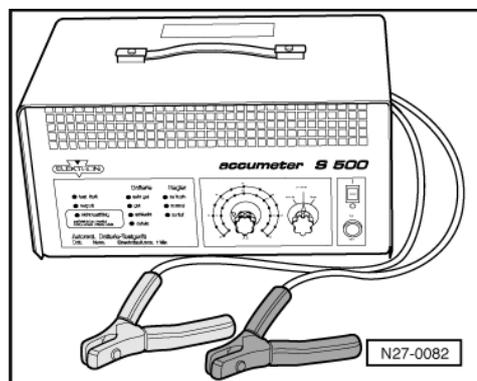
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Special tools, testers and auxiliary items required

- ♦ -> Battery tester VAS 1979 or VAS 5033
- ♦ Observe accident prevention procedures, wear protective clothing i.e. protective goggles and leather gloves.

Note:

The load current will vary depending on battery capacity and must be set on tester accordingly.



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-> Performing battery load test

- The battery load test should be carried out using battery tester VAS 1979 or VAS 5033.
- The battery load test should be carried out using battery tester VAS 1979 or VAS 5033.
- Battery must be removed from vehicle => Page 81 .
- Very important:
 Connect clips to battery terminals as described in operating manual of tester. The clips must make good contact with battery terminals.
- The load current varies depending on battery capacity, and must be set on tester accordingly: =>Operating manual of battery tester.
- The load current can be taken from table below.
- The voltage reading obtained under test must not be less than minimum voltage listed in table below.
- The load current and minimum voltage vary depending on battery capacity.

Table:

Battery capacity	Low temperature test current	Load current	Minimum voltage (limit value)
36 Ah	175 A	100 A	10.0 V
40 Ah	220 A	200 A	9.4 V
50 Ah	265 A	200 A	9.6 V
63 Ah	300 A	200 A	9.5 V
88 Ah	395 A	300 A	9.5 V
92 Ah	450 A	300 A	9.5 V

Characteristics after successfully completing battery load tests

- ♦ The battery voltage lowers (high current flow) caused by high load (resistance) during this test. If a battery is in working order battery voltage will only drop to lowest voltage. This varies, and is dependent upon battery capacity and low temperature test current. Low temperature test current is understood to mean a battery power in colder periods of the year. Batteries with a high low temperature test current are especially important for vehicles with high compression engines.
- ♦ If battery is defective or is in a low charge state, battery voltage will drop quickly "voltage break up", i.e. voltages below 9.0V (Volt). After completing test these low voltage values remain over an extremely long period, voltage increases very slowly again. A usable voltage value (no load voltage) => Page 84 is no longer reached with such a battery.
- ♦ A battery with such faults must be noted as it no longer has the reserves of an undamaged battery.

- ◆ A battery with such a fault must be disposed of.

1.9 - Charging battery

Warning:

The battery plugs must be fully tightened when charging, measuring voltage or performing load tests.

Notes:

- ◆ Rooms in which batteries are charged must not be entered with a naked light/flame or whilst smoking. The reason for this is during battery charging process gases are formed which are easily ignited.
- ◆ Precision tools should also be kept away from such areas. The reason for this is that the charging process affects chemical composition of air in the room, which can promote corrosion.

Special tools, testers and auxiliary items required

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- ◆ Batteries should be charged using a V.A.G battery charging unit e.g. V.A.G 1471, V.A.G 1648 or V.A.G 1974.

Notes:

- ◆ The battery charging unit must always be switched off before connecting a battery to charging unit.
- ◆ Before charging a battery it must have a temperature of at least 10 °C.
- ◆ Batteries should be charged using a V.A.G battery charging unit e.g. V.A.G 1471, V.A.G 1648 or V.A.G 1974.
- ◆ The battery must meet specifications for no-load voltage and electrolyte relative density if it is to be used again in vehicle.

Performing battery charging

- Disconnect battery earth strap and then positive cable from battery.
- Connect battery to charging unit, positive to positive, negative to negative.

Procedures for totally discharged batteries

- ◆ Batteries that have not been used for a long time e.g. vehicles that have been stored, self-discharge. If this occurs batteries become sulphated, i.e. entire plate surfaces harden.
- ◆ If a totally discharged battery is charged again shortly after it has lost its charge, sulphation will dissipate. If these batteries are not recharged, plates continue to harden and ability to accept a charge is reduced. This results in reduced energy reserve.
- ◆ In a totally discharged battery electrolyte (sulphuric acid/water mixture) is almost all water. The sulphuric acid content is heavily reduced. At below-zero temperatures the fluid in these batteries expands and battery casing cracks.
- ◆ If heavily discharged batteries are charged quickly with conventional charging units they do not accept charge current, or are shown too early as fully charged due to so-called "Surface charging". In this condition they are unserviceable. They appear to be OK. Such batteries must be charged with a low charging current as described in following:

Charging requirements for totally discharged batteries

The time required to charge a totally discharged battery (no-load voltage of 11.6V or less) will be at least 24 hours or more. The charge current (I_{max}) must only be a maximum 10% of the battery capacity, i.e. for a 60Ah battery the charge current $I_{max} = 6A$. The charging voltage (U_{max}) must only be a maximum 14.4V.

Totally discharged batteries must never be charged quickly.

1.10 - Quick charging/starting boost

Notes:

- ◆ Batteries should only be rapid-charged in exceptional circumstances.
- ◆ Batteries can be damaged by quick charging.

2 - Removing and installing alternator

2.1 - Removing and installing alternator

Warning:
Disconnect battery earth strap before working on electrical system.

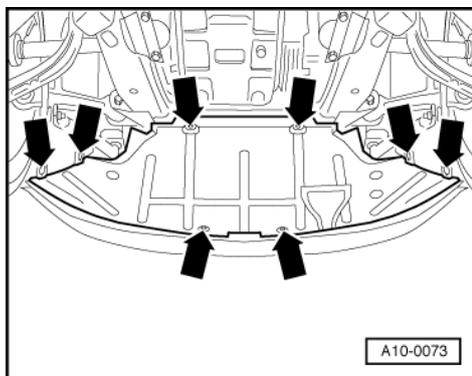
Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

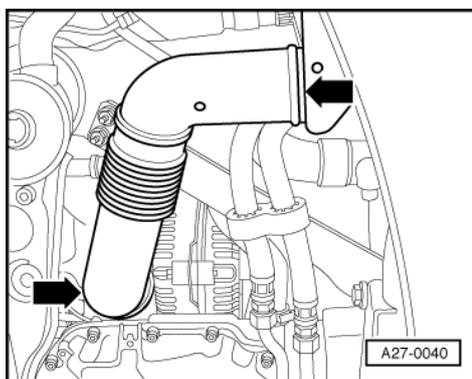
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Vehicles with V6 petrol engine

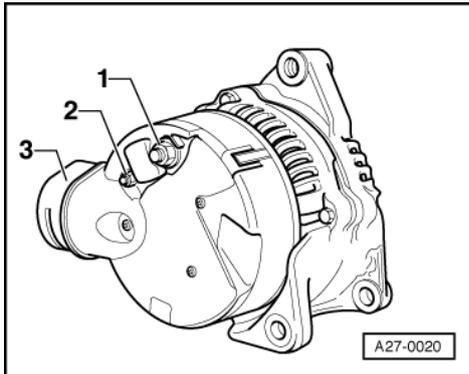
Removal:



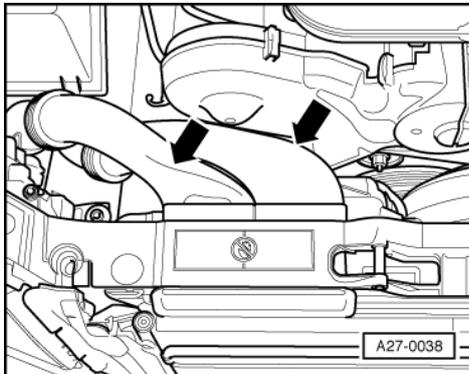
- -> Remove noise insulation -arrows-.



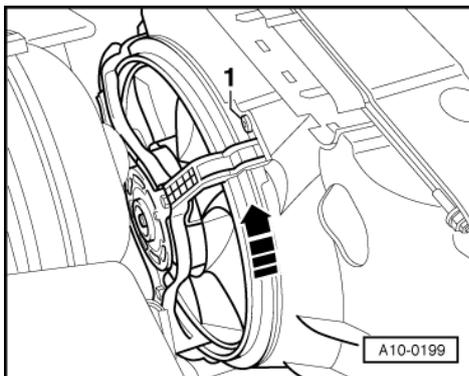
- -> Pull off intake hose of alternator -arrows-.



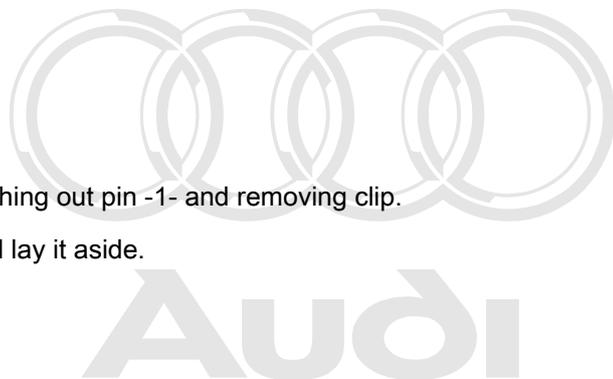
- -> Disconnect cable from terminal 30/B+ -1- on alternator (13 mm A/F).
Tightening torque: 16 Nm
- Disconnect D+ terminal -2- (8 mm A/F).
Tightening torque: 4 Nm



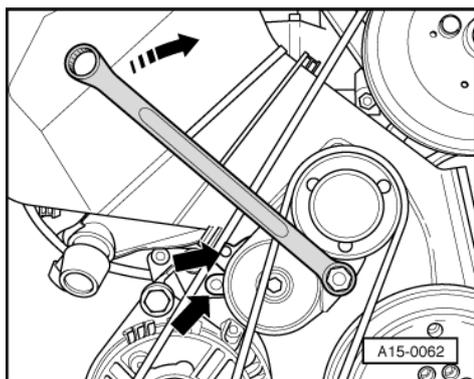
- Pull off both intake air ducts -arrows-.



- -> Remove electric fan; this involves pushing out pin -1- and removing clip.
- Detach cable for electric fan.
- Turn electric fan in direction of arrow and lay it aside.



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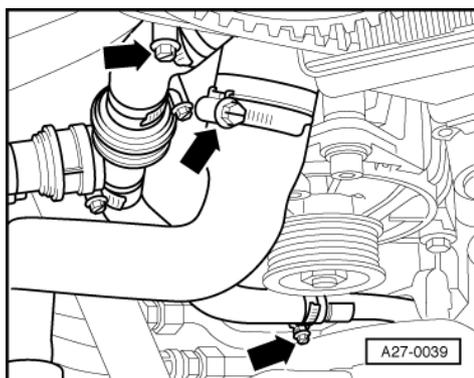
- -> To slacken off ribbed belt, turn tensioner clockwise using 17 mm box wrench until the two holes are aligned -arrows- and secure with setting pin 3204.

Note:

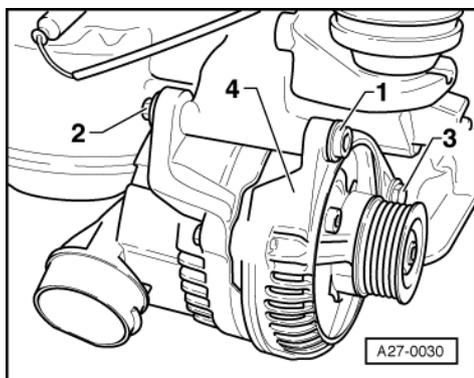
Mark direction of rotation of ribbed belt for re-installation. The belt may break if it runs in opposite direction when refitted.

- Detach ribbed belt from alternator.
- Drain of coolant.

=> 6-cylinder engine Mechanical components; Repair group 19; Cooling system, Draining and topping up coolant Cooling system, Draining and topping up coolant



- -> Disengage hose clips -arrows- and disconnect heater hoses.
- Move hoses aside.



- -> Remove socket head bolt -1- (8 mm); lock nut (15 mm A/F).
Tightening torque: 45 Nm
- Slacken bolt -3- (13 mm A/F).
Tightening torque: 22 Nm

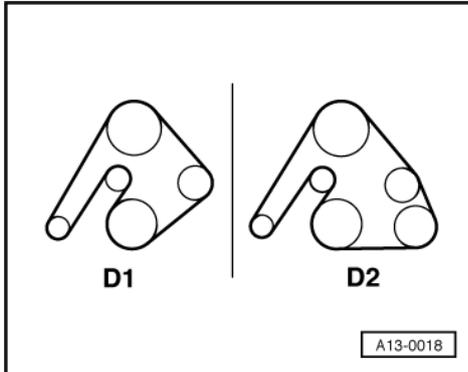


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- Lift out alternator -4-.

Installation:

- Installation is performed in reverse sequence to removal.



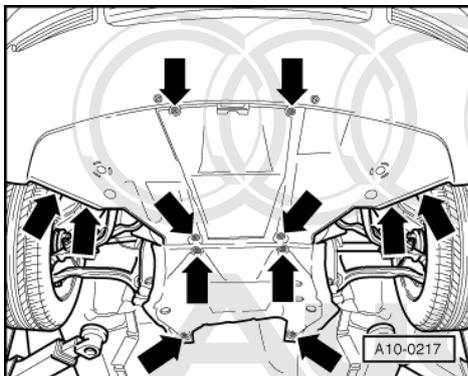
- -> Ensure that ribbed belt is correctly routed and properly seated.

Routing of ribbed belt

- D1 - vehicles without air conditioner
- D2 - vehicles with air conditioner

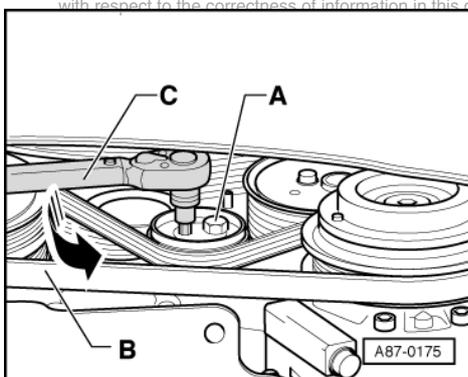
Vehicles with V6 diesel engine

Removal:



- -> Remove noise insulation (2 parts) by unfastening bolts -arrows-.

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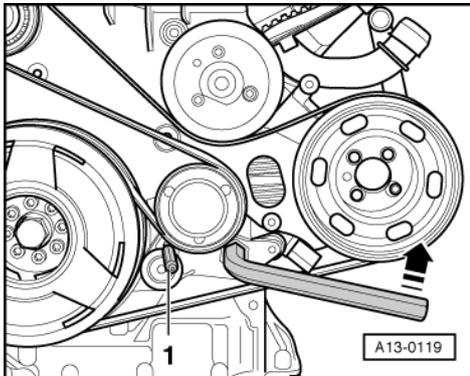




- -> Slacken bolt -A- on tensioning roller for A/C compressor and remove ribbed belt.

Note:

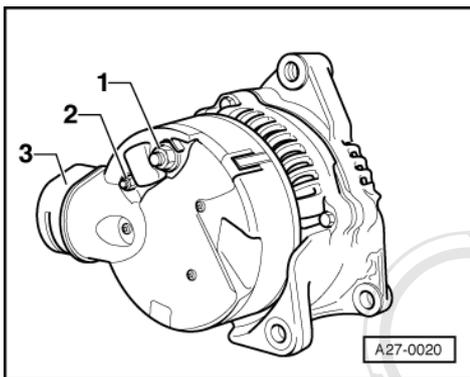
Mark direction of rotation of ribbed belt. The belt may break if it runs in opposite direction when refitted.



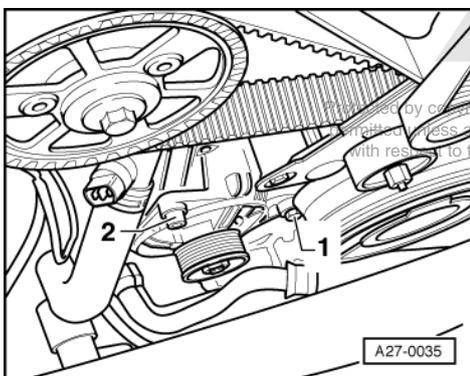
- -> Slacken ribbed belt by turning Allen key (17 mm) in direction of arrow, and insert a 4 mm dia. pin -1- (punch or similar).
- Detach belt from alternator.

Note:

Mark direction of rotation of ribbed belt. The belt may break if it runs in opposite direction when refitted.



- -> Disconnect cable -1- from terminal 30/B+ on alternator (13 mm A/F).
Tightening torque: 16 Nm
- Disconnect D+ terminal -2- (8 mm A/F).
Tightening torque: 4 Nm



- -> Slacken securing bolts -1- (13 mm A/F).
Tightening torque: 22 Nm
- Slacken socket head bolt -2- (8 mm).
Tightening torque: 45 Nm

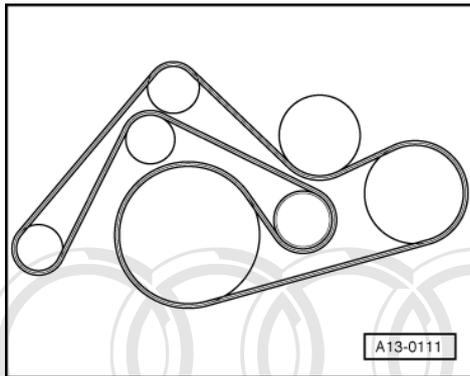
- Remove alternator from below.

Installation:

- Installation is performed in reverse sequence to removal.

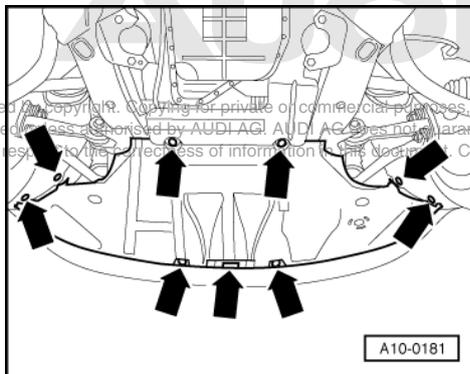
Note:

Screw in securing bolt -1- first when installing alternator.



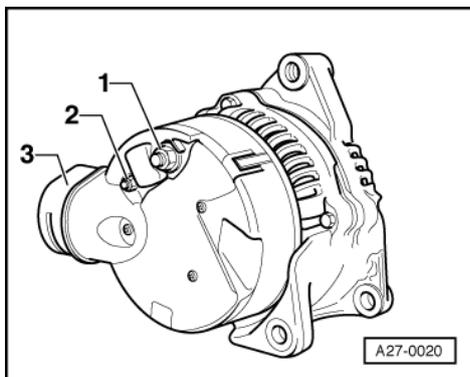
- -> Ensure that ribbed belt is correctly routed and properly seated.

Vehicles with V8 petrol engine (3.7l and 4.2l)



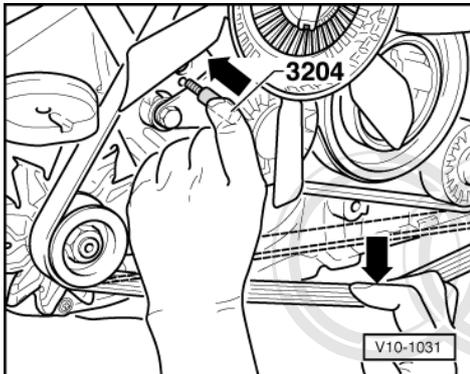
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- -> Remove noise insulation -arrows-.
- Pull off intake hose from alternator.





- -> Disconnect cable -1- from terminal 30/B+ on alternator (13 mm A/F).
Tightening torque: 16 Nm
- Disconnect D+ terminal -2- (8 mm A/F).
Tightening torque: 4 Nm

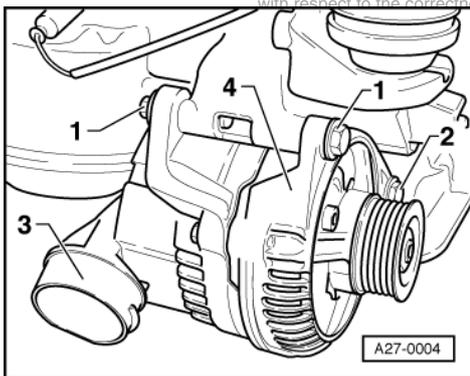


- -> Slacken off ribbed belt; to do so, pull belt by hand downwards from below and insert setting pin 3204.
- Detach belt from alternator.

Note:

Mark direction of rotation of ribbed belt. The belt may break if it runs in opposite direction when refitted.

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- -> Slacken securing bolts -1- (2 x 16 mm A/F) - 45 Nm.
- To provide better access to rear bolt -1- remove air cleaner and unfasten bolt from above.
- Slacken bolt -2- (13 mm A/F) - 20 Nm.
- Remove alternator -4- from engine compartment from below.

Installing:

- Installation is performed in reverse sequence to removal.

3 - Removing and installing starter

3.1 - Removing and installing starter

Warning:
Disconnect battery earth strap before working on electrical system.

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.

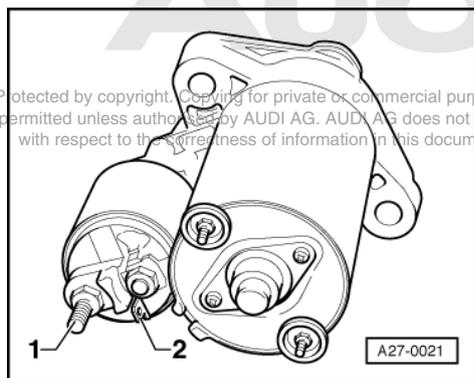
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

Vehicles with V6 petrol engine

Removal:

Note:

Alternator must be removed before removing starter =>Page 90



- -> Disconnect cable from terminal B+ -1-. Tightening torque: 16 Nm.
- Unplug connector for terminal 50 -2-.
- Unfasten lower bolt of starter (16 mm A/F) from engine side. Tightening torque: 65 Nm
- Unfasten upper bolt of starter (16 mm A/F) from gearbox end. Tightening torque: 65 Nm
- Remove starter from below.

Note:

Lower bolt is used to screw on earth cable to engine/gearbox.

Installing:

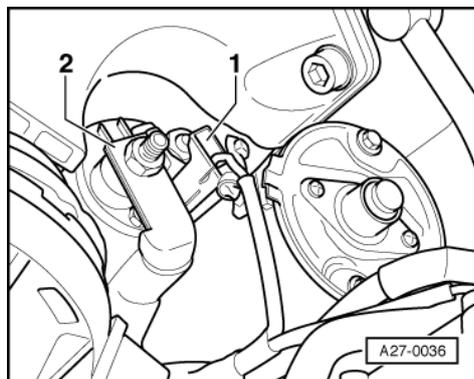
- Installation is performed in reverse sequence to removal.

Vehicles with V6 diesel engine

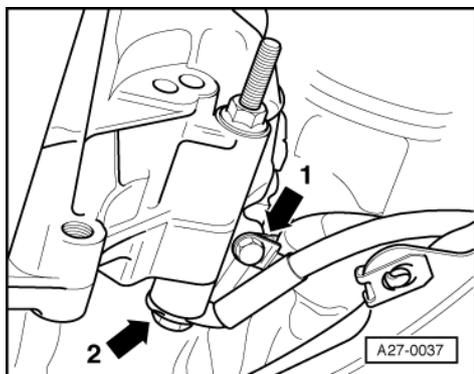
Removal:

Note:

Alternator must be removed before removing starter =>Page 93



- -> Disconnect cable from terminal B+ -2-. Tightening torque: 16 Nm.
- Unplug connector for terminal 50 -1-.
- Unfasten upper bolt of starter (16 mm A/F) from gearbox end.
Tightening torque: 65 Nm



- -> Unfasten lower bolt -2- of starter (16 mm A/F) with nut (16 mm A/F).
Tightening torque: 65 Nm
- Remove starter from below.

Note:

Lower bolt is used to screw on earth cable to engine/gearbox.

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Installing:

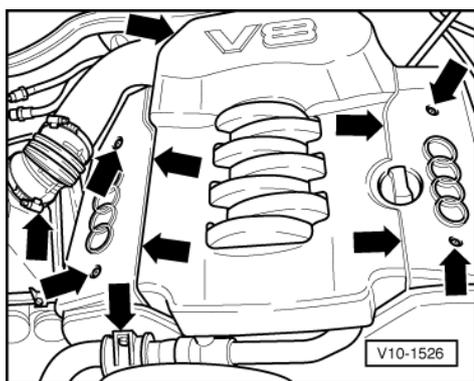
- Installation is performed in reverse sequence to removal.

Vehicles with V8 petrol engine (3.7l and 4.2l)

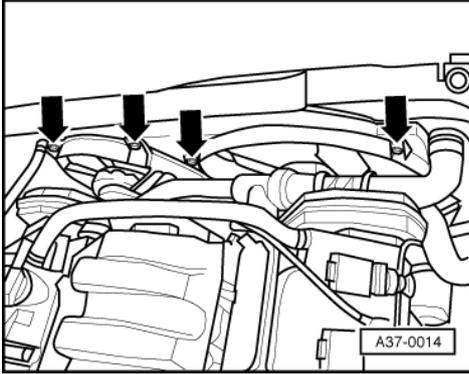
Removal:

Note:

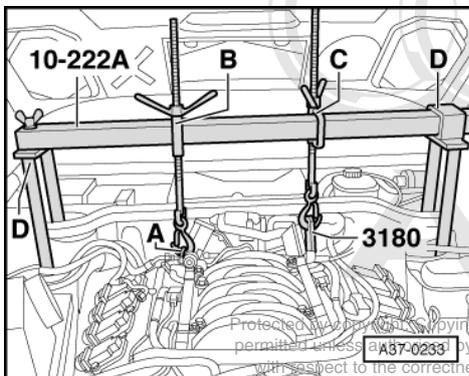
Alternator must be removed before removing starter =>Page 95



- -> Completely remove engine cover.
- Completely remove air intake pipe between air cleaner and throttle valve unit.
- Remove air intake ducts between air cleaner housing and lock carrier.



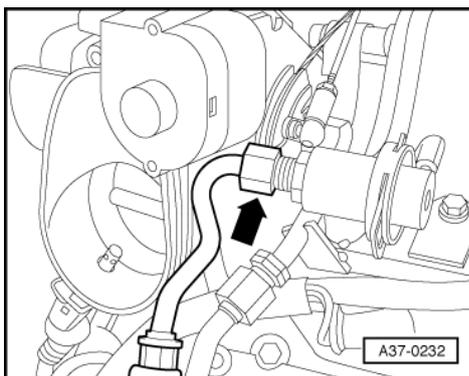
- -> Unfasten bolts -arrows- at radiator cowl and electric fan. Electric fan can be placed to one side without being disconnected.
- Detach covers over suspension strut support and air cleaner housing.



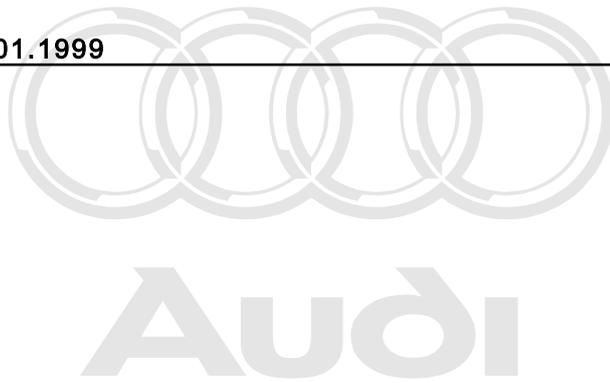
- -> Place support bar 10-222A with adapter for support bar 10-222A/4 -arrow D- onto bolts of suspension strut support.

Notes:

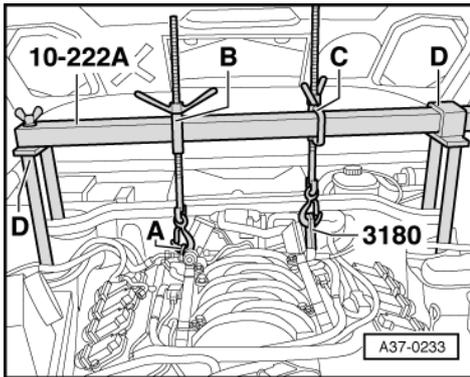
- ◆ The threaded spindle -B- must face front and threaded spindle -C- rear.
- ◆ Do not use supports 10-222 A/1



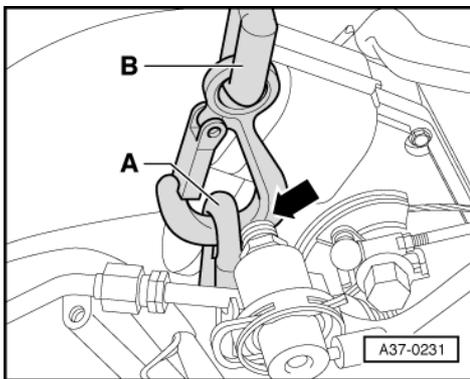
- -> Unscrew fuel pipe from pressure regulator -arrow-.



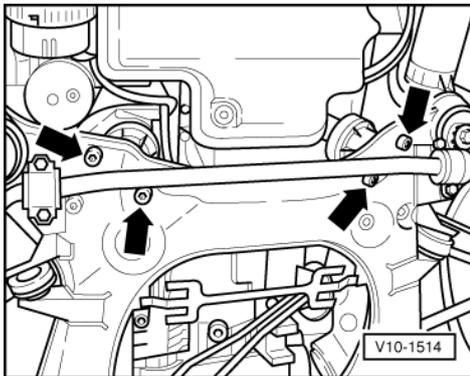
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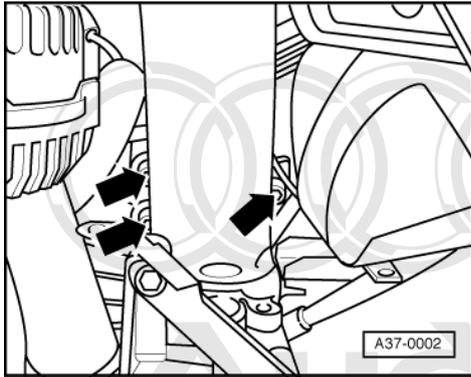
- -> Insert support bar 3180 from gearbox end into engine locating eye and screw it tight.
- Insert additional hook -A- (10-222A/2) in locating eye at pressure regulator.
- Pre-tension engine slightly using the two spindles -B- and -C-.



- -> When raising or lowering engine, ensure that neither hook-B- nor special hook-A- is in contact with pressure controller -arrow-.

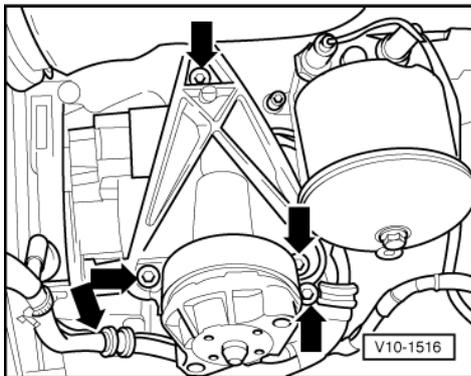


- -> Screw out lower bolts -arrows- at engine mountings.

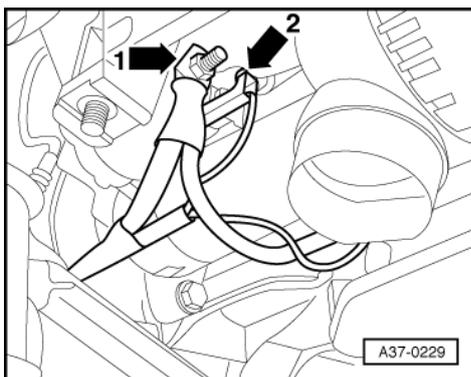


- -> Screw out bolts -arrows- at torque arm, front right.
- Use spindles to lift engine until engine mounting comes out of subframe.

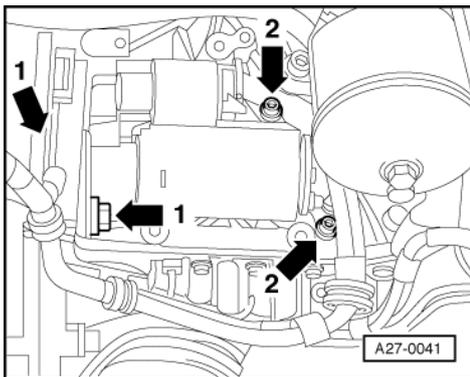
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 Ensure that throttle valve unit does not damage soundproofing mat at bulkhead.



- -> Unscrew engine support bracket on right and cable clamps -arrow-. Position engine support bracket on subframe.



- -> Disconnect cable from terminal B+ -1-. Tightening torque: 16 Nm.
- Unplug connector for terminal 50 -2-.



- Unscrew lower bolt (16 mm A/F) of starter -1- from engine end.
Tightening torque: 65 Nm
- Unfasten upper bolt (16 mm A/F) of starter -1- from gearbox end.
Tightening torque: 65 Nm
- -> Slacken socket head bolts -2- (5 mm).
- Remove starter from below.

Installing:

- Installation is performed in reverse sequence to removal.

4 - Removing and installing Cruise Control System (CCS)

4.1 - Removing and installing Cruise Control System (CCS)

4.2 - Cruise Control System for vehicles with diesel engine

On vehicles with a diesel engine, function of the CCS is controlled by injection control unit.

Apart from CCS operating switch in turn signal lever there are no additional components.

4.3 - Cruise Control System (CCS) for vehicles with 6 or 8-cylinder petrol engine

Warning:
Disconnect battery earth strap before working on electrical system.

Notes:

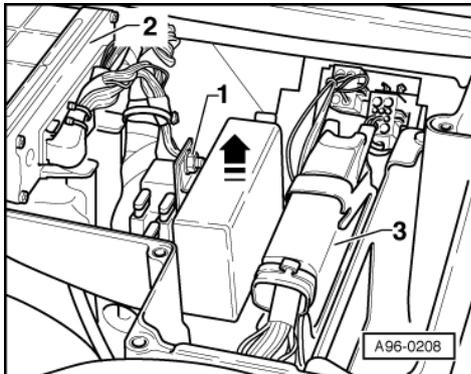
- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

The CCS control unit (J 213) is located in electronics box in plenum chamber.

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4.4 - Removing and installing control unit

Removing:

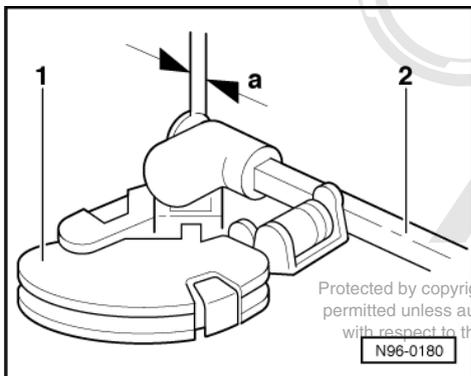


- Slacken plenum chamber cover bolts in engine compartment and remove cover.
- Remove cover of electronics box by slackening four cross-head screws.
- -> Slacken nut (10 mm A/F) -1- and lift control unit out of electronics box.
- Disconnect connector.

Installing:

- Install in reverse sequence to removal.

4.5 - Adjusting rods on positioning element



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-> 6-cylinder engine:

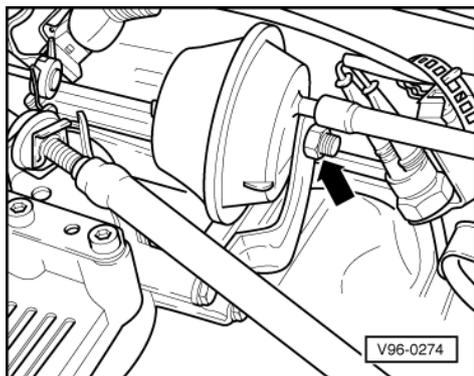
Carry out work sequence as follows:

- Start engine and let it idle (Throttle valve in idling position)
- Turn rod -2- in onto stop and then turn back one turn (360 ± 90).

The play -a- between rod -2- and stop on quadrant -1- must be between 0.5 mm and 1.0 mm.

- Secure rod adjustment (lock-off) on positioning element from moving.

4.6 - Removing positioning element



The installation position of individual positioning elements can vary according to engine from illustration shown.

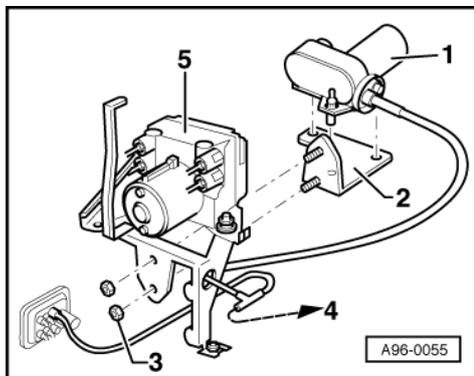
Carry out work sequence as follows:

- Pull off vacuum pipe.
- -> Unbolt or unclip rod.
- Unbolt positioning element from bracket -arrow-. Tightening torque 25 Nm.

4.7 - Removing and installing vacuum pump

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The vacuum pump is located under ABS assembly and can be removed outwards after removing left wheel housing liner.



Carry out work sequence as follows:

- -> Remove securing nuts -3- (5 Nm) and take unit out to left through wheel housing.
- Pull vacuum pump -1- upwards off bracket -2- complete with rubber mountings.

Hose routing to positioning element -4-.

4.8 - Removing and installing steering column switch with control switch for CCS => Page

Removing and installing => Page **154** .

4.9 - Removing and installing vent valves

The procedure for removing and installing vent valves on clutch and brake pedals is the same.

Removing:

Carry out work sequence as follows:

- Remove dash panel trim, driver's side.
- Unplug connector and pull off vacuum pipe.
- Unscrew vent valve from bracket.

Installing:

- Pedal in "rest" position
- Screw vent valve into bracket onto stop.
- Plug in connector and connect vacuum pipe.

4.10 - Checking vacuum system for leaks

Carry out work sequence as follows:

- Pull vacuum pipe off vacuum pump and tightly seal pipe.
- Remove dash panel trim, driver's side.
- Push in positioning element diaphragm, and at the same time press brake pedal down to point of resistance.
- Release brake pedal.

The diaphragm must not move.

Note:

Malfunctions can be caused by an incorrectly adjusted vent valve, leaking positioning elements or through cracks in vacuum hoses.

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90 - Gauges, Instruments

1 - Dash panel insert

1.1 - Dash panel insert

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Warning:
Disconnect battery earth strap before working on electrical system.

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

These bolts are to be stored separately.

1.2 - Fault message "dEF" on trip recorder display

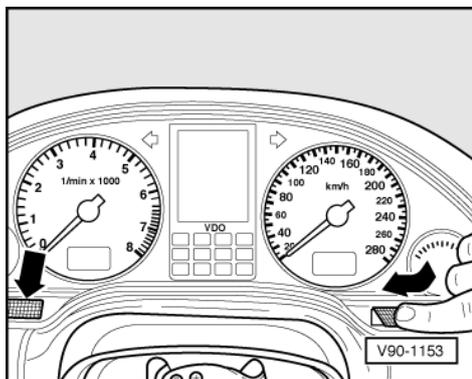
If control unit in dash panel insert detects a fault in permanent memory, letters "dEF" will appear on trip recorder display.

- If "dEF" appears on display, replace dash panel insert => Page 106 .

1.3 - Removing and installing dash panel insert

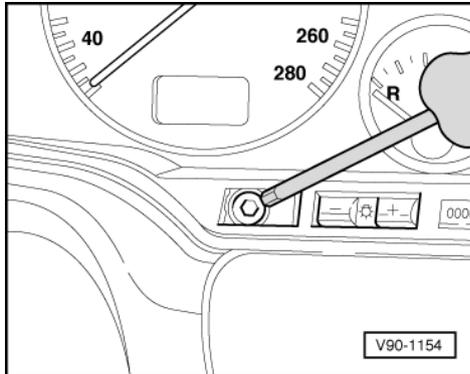
Notes:

- ◆ The dash panel insert must not be dismantled.
- ◆ Steering wheel does not have to be removed.
For ease of illustration steering wheel is not shown in following illustrations.
- ◆ Before removing dash panel insert, interrogate fault memory =>Page 3 .
- ◆ In addition, use fault reader V.A.G 1551 to check service interval display and mileage/kilometre counter (=> Page 12), and make a note of values shown .



Removing:

- Pull steering wheel with adjusting mechanism fully out and move it downwards.
- -> Press in at locations -arrows- and detach trim from dash panel insert.



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- -> Slacken the two socket head bolts (4 mm).
- Pull out dash panel insert to front.
- Cut cable ties at rear of dash panel insert.
- Release retaining catches on connectors and unplug connectors.

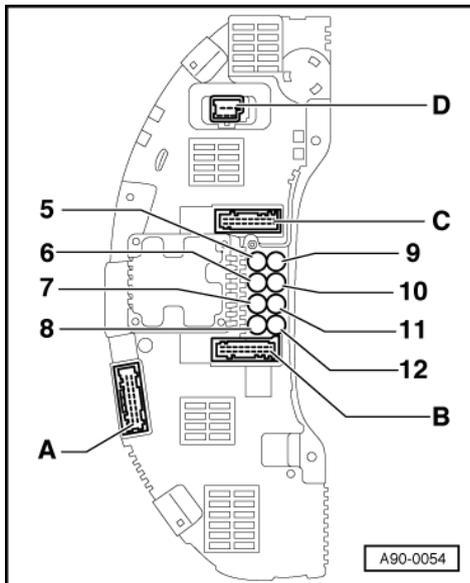
Installing:

- Plug in electrical connectors and secure wiring harness at rear of dash panel insert using cable ties.
- Installation is performed in reverse sequence to removal.
- After installing, check operation.

Note:

Important: when replacing dash panel insert, see notes on => Page 23 .

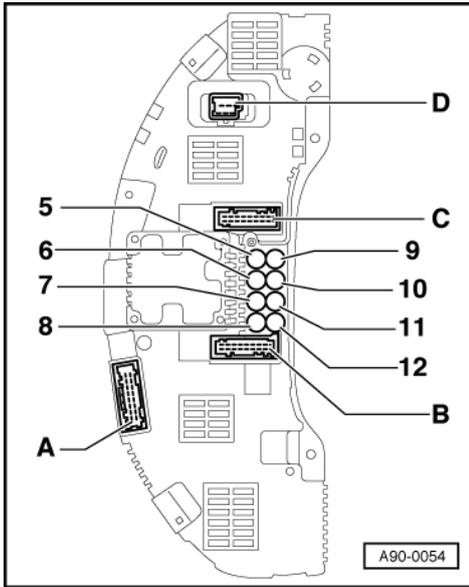
Warning lamp replacement



- Removing dash panel insert => Page 106 .
- -> Release warning lamps 5 12 at rear of dash panel insert by turning anti-clockwise with a small screwdriver and remove.
- Fit new lamp and lock in position again with screwdriver.

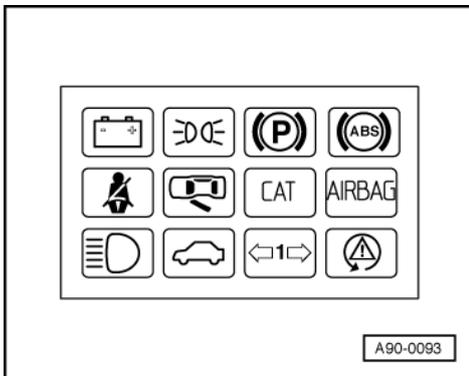


1.4 - Contact assignment on connectors in dash panel insert (vehicles 1995 >)



- A - Multi-pin connector for basic functions, 26-pin, yellow
- B - Multi-pin connector for basic functions, 26-pin, red
- C - Multi-pin connector for basic functions, 26-pin, green
- D - Multi-pin connector for power supply, 6-pin, white

1.5 - Bulb layout on dash panel insert (vehicles 1995 >)



-> Warning lamp block -petrol engine-

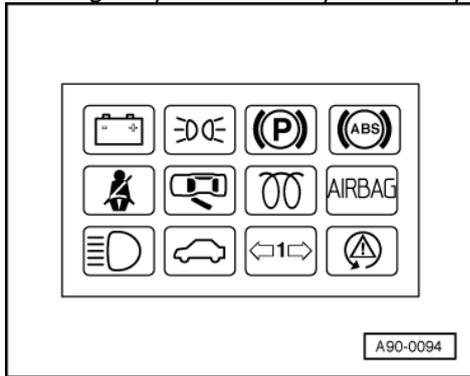
- 1 - Charge warning lamp - LED
- 2 - Side-marker warning lamp - LED
- 3 - Parking-brake warning lamp - LED
- 4 - Anti-lock brakes (ABS) warning lamp - LED
- 5 - Seat-belt warning lamp - 1.1 W
- 6 - Not used prior to model year 97
- 7 - CAT warning lamp - 1.1 W
- 8 - Airbag warning lamp - 1.1 W
- 9 - Main beam warning lamp - 1.1 W
- 10 - Immobilizer warning lamp - 1.1 W
- 11 - Trailer turn-signal indicator warning lamp - 1.1 W
- 12 - Traction control system (TCS) warning lamp/electronic stability program (ESP) warning lamp - 1.1 W



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Note:

Warning lamps 1 4 in top row incorporate light-emitting diodes (LEDs) and cannot be replaced.

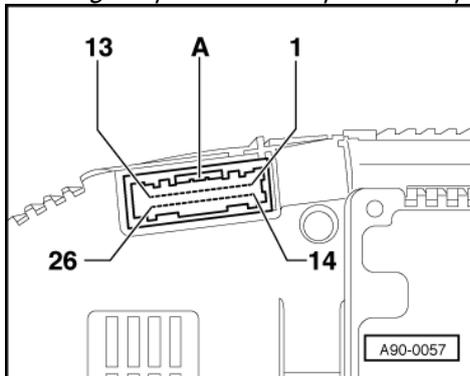


-> **Warning lamp block -diesel engine-**
7 - Diesel warning lamp - 1.1 W

All other warning lamps are the same as for petrol engine

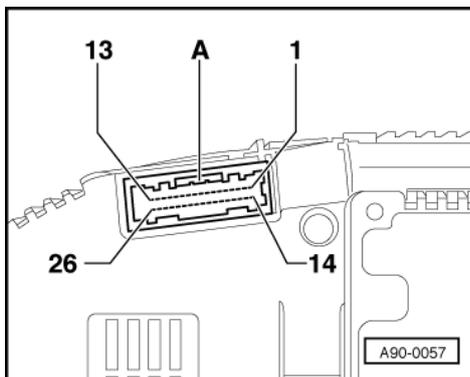
Note:

Warning lamps 1 4 in top row incorporate light-emitting diodes (LEDs) and cannot be replaced.



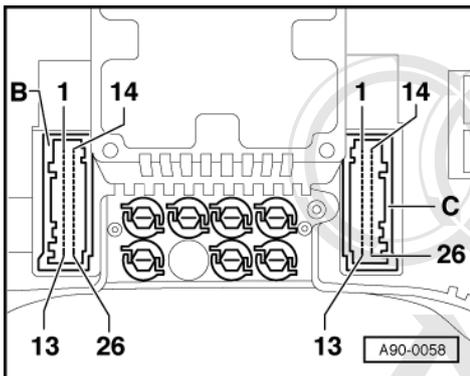
-> **Multi-pin connector for basic functions, 26-pin, yellow - A**

- 1 - Tank sender signal
- 2 - Tank sender earth
- 3 - Door contact, driver's side
- 4 - Ignition key terminal 86s
- 5 - Hydraulik system/brake fluid level
- 6 - Belt switch
- 7 - Washer fluid level
- 8 - Right-hand parking light
- 9 - On-board computer, left rocker
- 10 - On-board computer, right rocker
- 11 - On-board computer reset
- 12 - Temperature sender earth
- 13 - (Temperature switch "ON")





- 14 - Ambient temperature sensor/air conditioner
- 15 - Diesel
- 16 - (Buzzer "ON")
- 17 - Temperature sender
- 18 - Cooling water level
- 19 - Brake light
- 20 - Reversing light/dipped beam
- 21 - Left-hand parking light
- 22 - Fan, speed 3
- 23 - (Brightness sensor output)
- 24 - (Brightness sensor)
- 25 - Ambient temperature sensor earth
- 26 - Air-conditioner compressor "OFF"

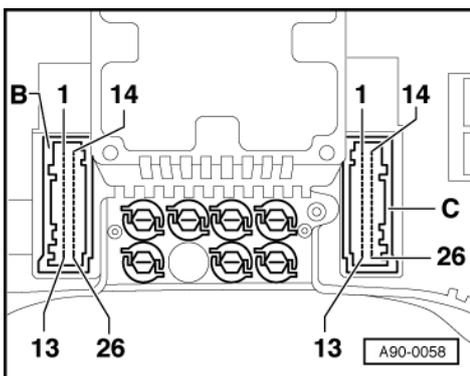


-> Multi-pin connector for basic functions 26-pin, red-B

- 1 - Vacant
- 2 - Vacant
- 3 - Vacant
- 4 - Vacant
- 5 - Vacant
- 6 - Vacant
- 7 - Oil pressure 1.2 bar
- 8 - Vacant
- 9 - Gear indicator
- 10 - Vacant
- 11 - Vacant
- 12 - Hydraulic system pressure
- 13 - Service life signal as of ABS system 5.3

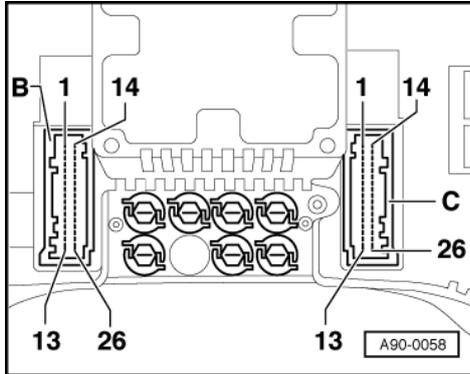
vacant with ABS system 5.0

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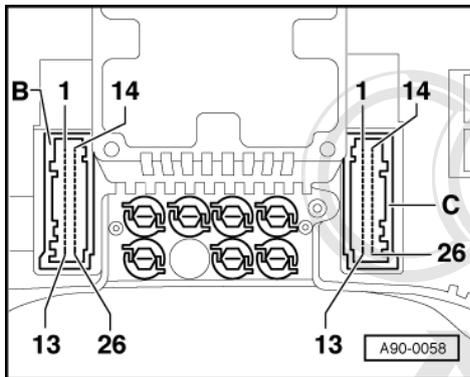
- 14 - Telephone enable
- 15 - Telephone clock
- 16 - Telephone data
- 17 - Vacant
- 18 - Rev counter signal
- 19 - Consumption signal
- 20 - Vacant
- 21 - Vacant

- 22 - Speed signal (output 2)
- 23 - Speed signal (output 1)
- 24 - Speed signal (sender)
- 25 - Brake pad
- 26 - K wire

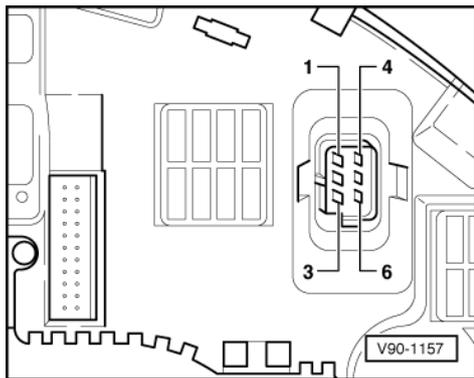


-> Multi-pin connector for basic functions 26-pin, green - C

- 1 - Vacant
- 2 - Vacant
- 3 - Vacant
- 4 - Vacant
- 5 - Vacant
- 6 - Airbag
- 7 - ABS
- 8 - Door lock (output)
- 9 - Left turn signal
- 10 - Vacant
- 11 - Vacant
- 12 - Vacant
- 13 - Vacant



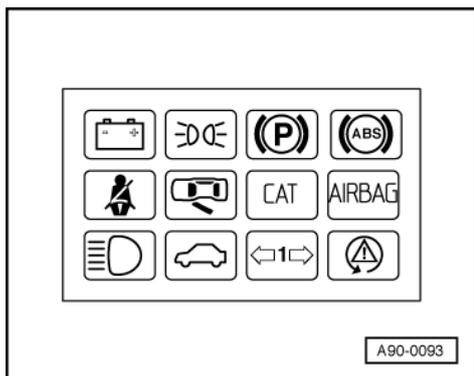
- 14 - Vacant
- 15 - TCS
- 16 - OBD II
- 17 - Trailer turn signal
- 18 - CAT/diesel
- 19 - Main beam
- 20 - Parking brake and brake warning (for brake fluid pressure and level)
- 21 - Charge indicator
- 22 - Right turn signal
- 23 - Vacant
- 24 - Immobilizer
- 25 - Airbag (open circuit in wiring)
- 26 - ABS (open circuit in wiring)



-> Multi-pin connector for power supply, 6-pin, white - D

- 1 - Terminal 30
- 2 - Terminal 31
- 3 - Lighting (3W)
- 4 - Lighting, console (40W)
- 5 - Terminal 58
- 6 - Terminal 15

1.6 - Bulb layout on dash panel insert (vehicles 1997 >)



-> Warning lamp block -petrol engine-

- 1 - Charge warning lamp - LED
- 2 - Side-marker warning lamp - LED
- 3 - Parking-brake warning lamp - LED
- 4 - Anti-lock brakes (ABS) warning lamp - LED
- 5 - Seat-belt warning lamp - 1.1 W
- 6 - Door lock/tailgate warning lamp - 1.1 W
- 7 - CAT warning lamp - 1.1 W
- 8 - Airbag warning lamp - 1.1 W
- 9 - Main beam warning lamp - 1.1 W
- 10 - Immobilizer warning lamp - 1.1 W
- 11 - Trailer turn-signal indicator warning lamp - 1.1 W
- 12 - Traction control system (TCS) warning lamp/electronic stability program (ESP) warning lamp- 1.1 W

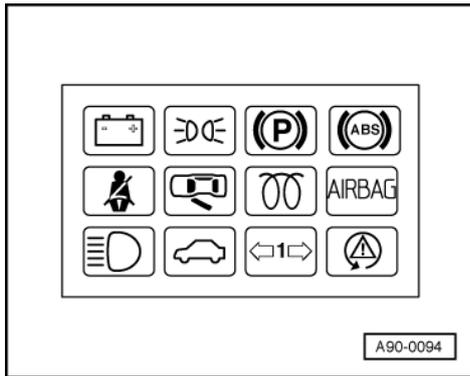
W

Note:

Warning lamps 1 4 in top row incorporate light-emitting diodes (LEDs) and cannot be replaced.



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-> Warning lamp block -diesel engine-

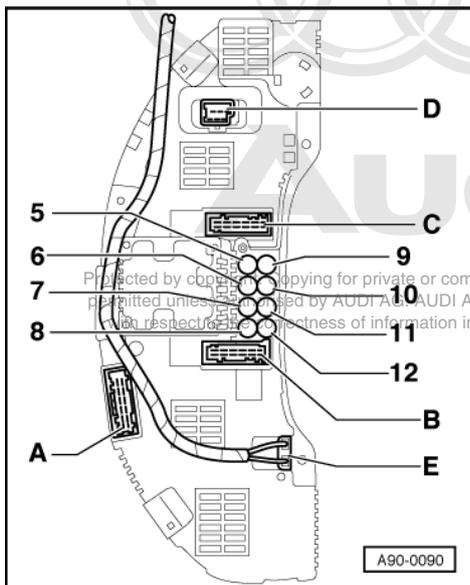
7 - Diesel warning lamp - 1.1 W

All other warning lamps are the same as for petrol engine

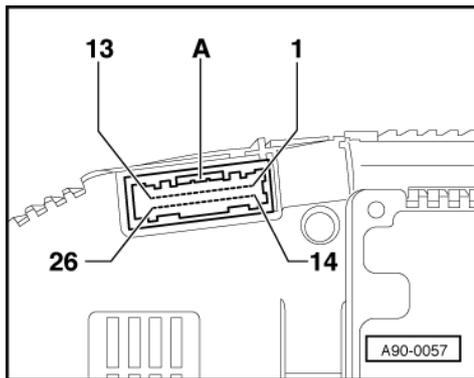
Note:

Warning lamps 1 4 in top row incorporate light-emitting diodes (LEDs) and cannot be replaced.

1.7 - Contact assignment on connectors in dash panel insert (vehicles 1997 >)

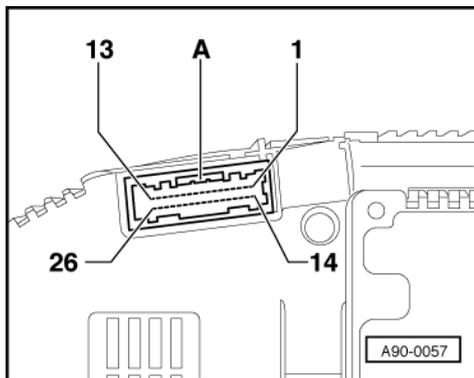


- A - Multi-pin connector for basic functions 26-pin, yellow
- B - Multi-pin connector for basic functions 26-pin, red
- C - Multi-pin connector for basic functions 26-pin, green
- D - Multi-pin connector for power supply, 6-pin, white
- E - Multi-pin connector for radio clock, 4-pin, white

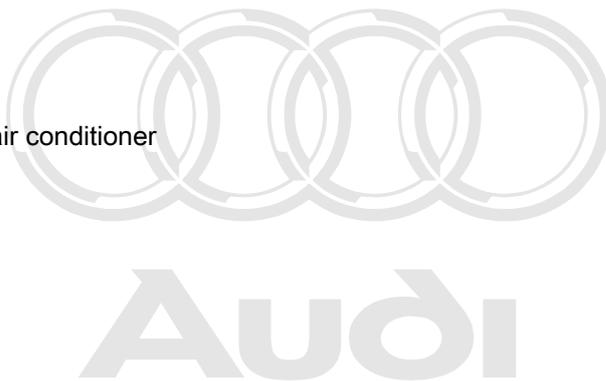


-> Multi-pin connector for basic functions, 26-pin, yellow -A

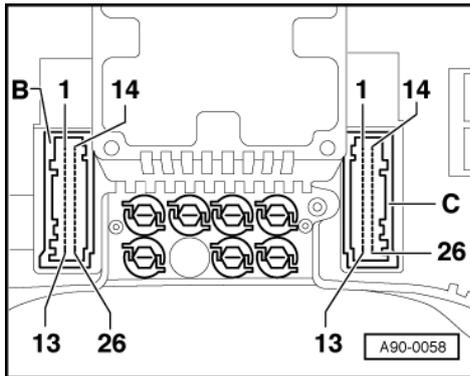
- 1 - Tank sender signal
- 2 - Tank sender earth
- 3 - Door contact, driver's side
- 4 - Ignition key terminal 86s
- 5 - Hydraulic system/brake fluid level
- 6 - Belt switch
- 7 - Washer fluid level
- 8 - Right-hand parking light
- 9 - On-board computer, left rocker
- 10 - On-board computer, right rocker
- 11 - On-board computer reset
- 12 - Temperature sender earth
- 13 - Tank sender (reserve fuel contact)



- 14 - Ambient temperature sensor/air conditioner
- 15 - Diesel (glow plug relay)
- 16 - (Buzzer "ON")
- 17 - Temperature sender
- 18 - Cooling water level
- 19 - Brake light
- 20 - Reversing light/dipped beam
- 21 - Left-hand parking light
- 22 - Fan, speed 3
- 23 - Oil temperature (earth)
- 24 - Oil temperature
- 25 - Ambient temperature sensor earth
- 26 - Air-conditioner compressor "OFF"



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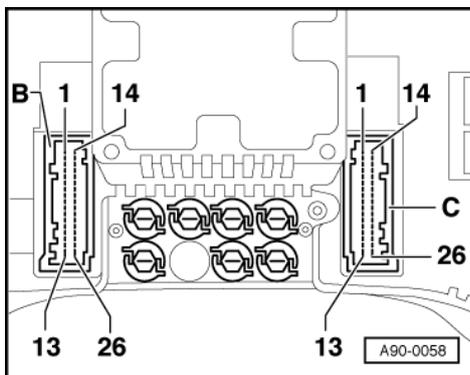
-> Multi-pin connector for basic functions 26-pin, red-B

- 1 - Tailgate
- 2 - Door contact, passenger's side
- 3 - Door contact, rear left
- 4 - Door contact, rear right
- 5 - Tank level (for OBD II)
- 6 - Vacant
- 7 - Oil pressure 1.2 bar
- 8 - Vacant
- 9 - Gear indicator
- 10 - Vacant
- 11 - Auxiliary heater (radio input)
- 12 - Hydraulic system pressure
- 13 - Service life signal as of ABS system 5.3
vacant with ABS system 5.0

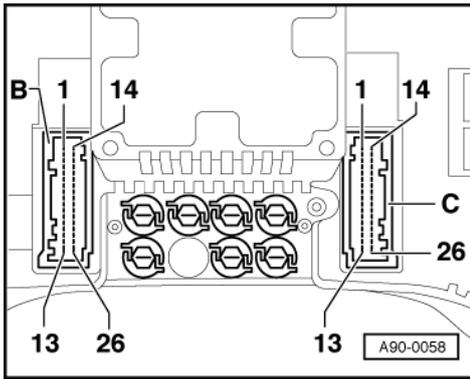


Audi

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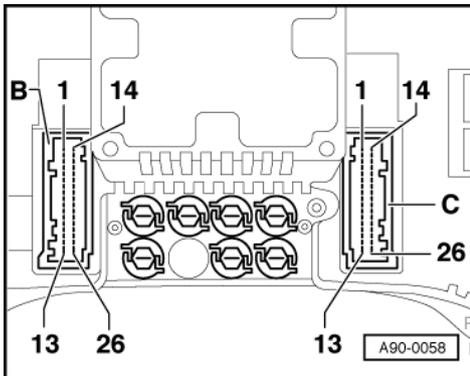


- 14 - Navigation enable
- 15 - Navigation clock
- 16 - Navigation data
- 17 - Summer/winter
- 18 - Rev counter signal
- 19 - Consumption signal
- 20 - Auxiliary heater
- 21 - Vacant
- 22 - Speed signal (output 2)
- 23 - Speed signal (output 1)
- 24 - Speed signal (sender)
- 25 - Brake pad
- 26 - K wire



-> Multi-pin connector for basic functions 26-pin, green - C

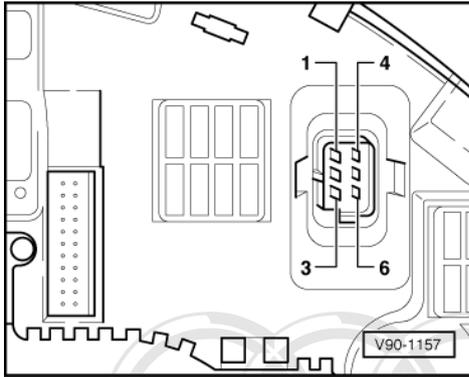
- 1 - Vacant
- 2 - Vacant
- 3 - Vacant
- 4 - Vacant
- 5 - Vacant
- 6 - Airbag
- 7 - ABS
- 8 - Door lock (output)
- 9 - Left turn signal
- 10 - Vacant
- 11 - Vacant
- 12 - Vacant
- 13 - Vacant



- 14 - Vacant
- 15 - TCS
- 16 - OBD II
- 17 - Trailer turn signal
- 18 - CAT/diesel
- 19 - Main beam
- 20 - Parking brake and brake warning (for brake fluid pressure and level)
- 21 - Charge indicator
- 22 - Right turn signal
- 23 - Vacant
- 24 - Immobilizer
- 25 - Airbag (active)
- 26 - ABS (Sila)

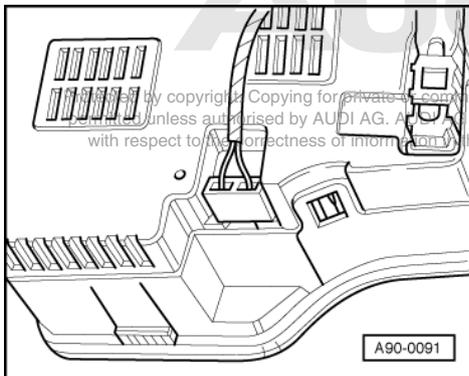


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-> Multi-pin connector for power supply, 6-pin, white - D

- 1 - Terminal 30
- 2 - Terminal 31
- 3 - Lighting (3W)
- 4 - Lighting, console (40W)
- 5 - Terminal 58
- 6 - Terminal 15



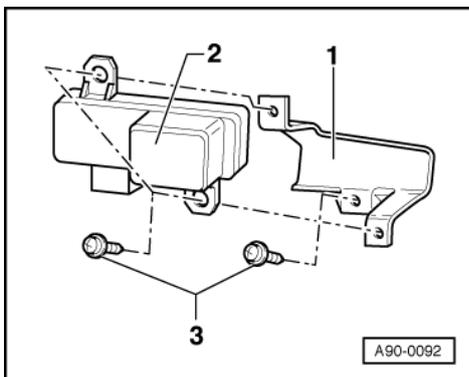
-> Multi-pin connector for radio clock, 4-pin, - E

- 1 - Radio clock signal
- 2 - Radio clock 5V
- 3 - Vacant
- 4 - Radio clock earth

1.8 - Servicing radio clock

Note:

Shown by an antenna symbol at top left of clock display.





- Removing dash panel insert => Page **106**
- Unfasten the two self-tapping screws -3- to remove radio clock -2-.
- If necessary, holder for radio clock -1- behind centre console can be dismantled working from opening for dash panel insert.

1.9 - Testing speed signal

If there is a fault with speed display on speedometer, check whether signal is present at speedometer.

- Connect fault reader V.A.G 1551 => Page **78** .
- Read measured value block => Page **10** .
- Select channel number 001 and perform test drive.

If vehicle speed is displayed on fault reader V.A.G 1551, dash panel insert is defective and must be replaced.

If vehicle speed is not displayed on fault reader V.A.G 1551, signal to the multi-pin connector on dash panel insert must be tested.

- Removing dash panel insert => Page **106**
- Connect text box V.A.G 1598 to red 26-pin connector using adapter V.A.G 1598/4.
- Use multimeter V.A.G 1526 to measure voltage between contact 24 and vehicle earth.
- Move vehicle forwards and backwards slightly.

Specifications:

Voltage must increase from 0 V to approx. 12 V and drop off again to 0 V (pulsating DC voltage).

If test is not OK, check wiring to vehicle-speed sender.

- Test wiring using current flow diagram.

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=> Current flow diagrams, Electrical fault finding and fitting locations

Vehicle-speed sender must be replaced if wiring is OK.

1.10 - Testing signal from fuel gauge sender -G

If there is a fault with fuel gauge on dash panel insert, check whether signal is present at dash panel insert.

- Connect fault reader V.A.G 1551 => Page **78** .
- Read measured value block => Page **10** .
- Enter display group number 002.

If fuel level is displayed on fault reader V.A.G 1551, this means that dash panel insert is defective and must be replaced.

If fuel level is not displayed on fault reader V.A.G 1551, signal to multi-pin connector on dash panel insert must be tested.

- Removing dash panel insert => Page **106**
- Connect text box V.A.G 1598 to yellow 26-pin connector using adapter V.A.G 1598/4.
- Use multimeter V.A.G 1526 to measure resistance between contacts 1 and 2 (earth).

Specifications:

Tank full: approx. 21 ohms (80l) or 12 ohms (90l)

Tank half full: approx. 94 Ohm (80l) or 88 ohms (90l)

Needle on reserve fuel: approx. 166 ohms (80l and 90l)

If test is not OK, check wiring connection to fuel gauge sender.

- Test wiring using current flow diagram.

=> Current flow diagrams, Electrical fault finding and fitting locations

If wiring connection is OK, fuel gauge sender must be replaced.

1.11 - Checking consumption signal

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Check signal at multiple connector on dash panel insert.

- Remove dash panel insert => Page 106 and unplug the red 26-pin connector from the dash panel insert.
- Connect text box V.A.G 1598 to red 26-pin connector using adapter V.A.G 1598/4.
- Use multimeter V.A.G 1526 to measure voltage between contact 19 and vehicle earth.
- Start engine and continually vary engine speed between 1000 and 4000 rpm.

Specification for signal from engine control unit:

0.3 ... 7.0 (depending on engine load)

- If specified value is attained replace dash panel insert.
- If value does not match specification, test wiring between engine control unit and dash panel insert using current flow diagram

=> Current flow diagrams, Electrical fault finding and fitting locations

- If no short circuit or open circuit is found, fit a new engine control unit.

1.12 - Checking coolant temperature sender

If there is a fault in coolant temperature gauge on dash panel insert, check whether signal is present at dash panel insert.

- Connect fault reader V.A.G 1551 => Page 78 .
- Read measured value block => Page 10 .
- Enter display group number 003.

If coolant temperature is displayed on fault reader V.A.G 1551, this means that dash panel insert is defective and must be replaced.

If coolant temperature is not displayed on fault reader V.A.G 1551, the signal to the multi-pin connector on dash panel insert must be tested.

- Removing dash panel insert => Page 106
- Connect text box V.A.G 1598 to yellow 26-pin connector using adapter V.A.G 1598/4.
- Use multimeter V.A.G 1526 to measure resistance between contacts 17 and 12 (signal earth).

Specifications:



Coolant temperature 90 oC. approx. 110 ohms

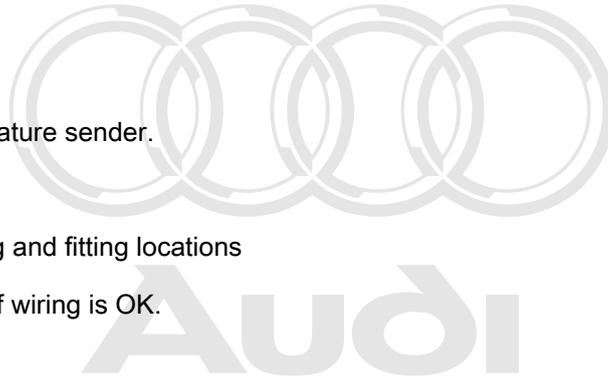
Coolant temperature 120 oC. approx. 50 ohms

If test is not OK, check wiring to coolant temperature sender.

- Test wiring using current flow diagram.

=> Current flow diagrams, Electrical fault finding and fitting locations

Coolant temperature sender must be replaced if wiring is OK.



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92 - Windscreen wiper and wash system

1 - Windscreen wiper system

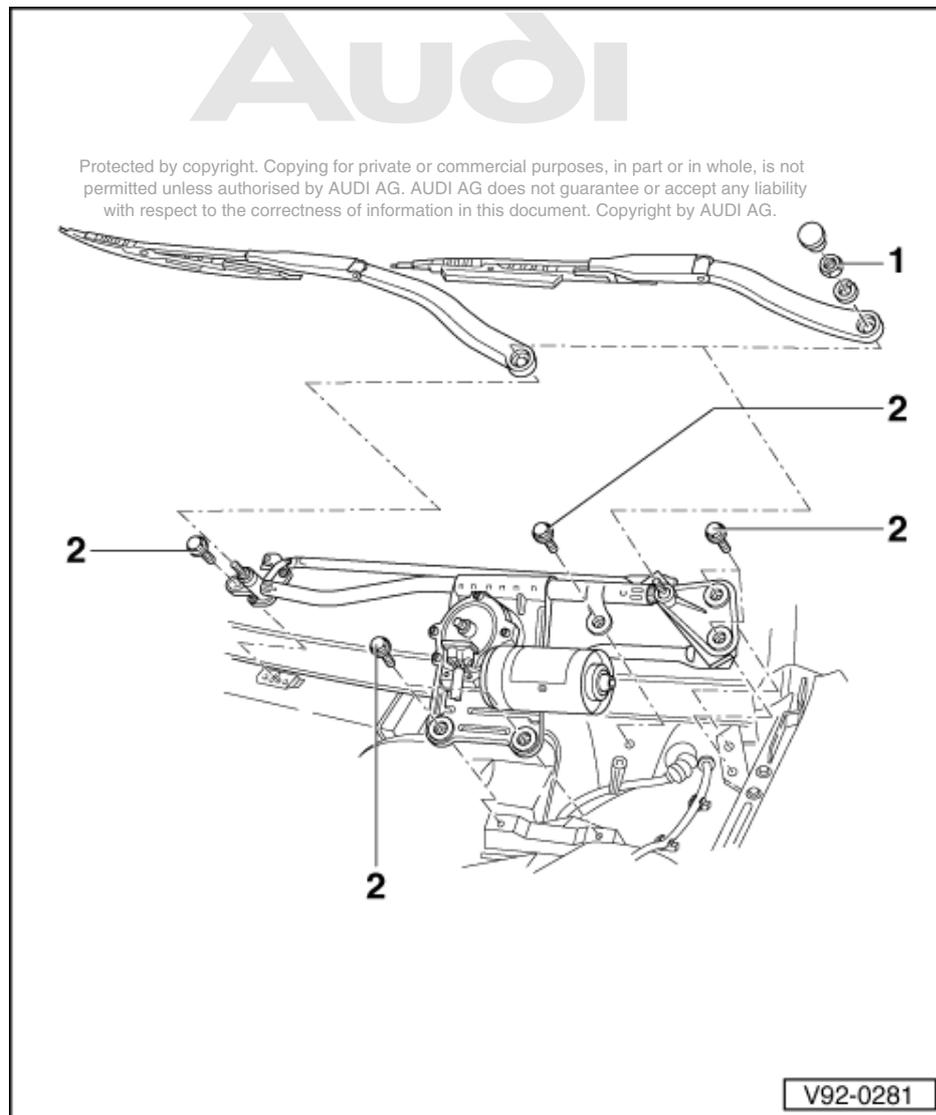
1.1 - Windscreen wiper system

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.
These feature a special surface coating and can be recognised by their greenish colour.
Such bolts are to be stored separately.

Warning:
Disconnect battery earth strap before working on electrical system.

1.2 - Removing and installing windscreen wiper system

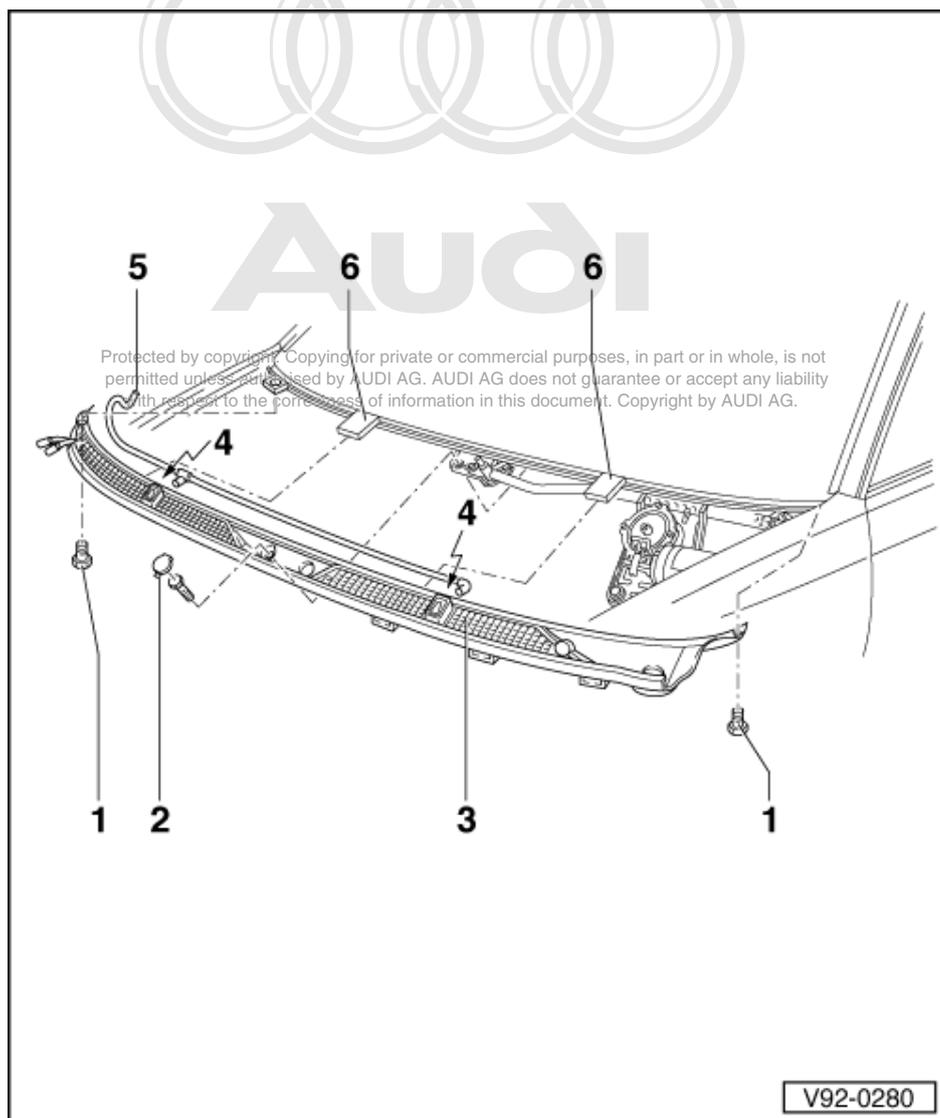


Note:

Before removing wiper arms, ensure that wiper motor is in park position.

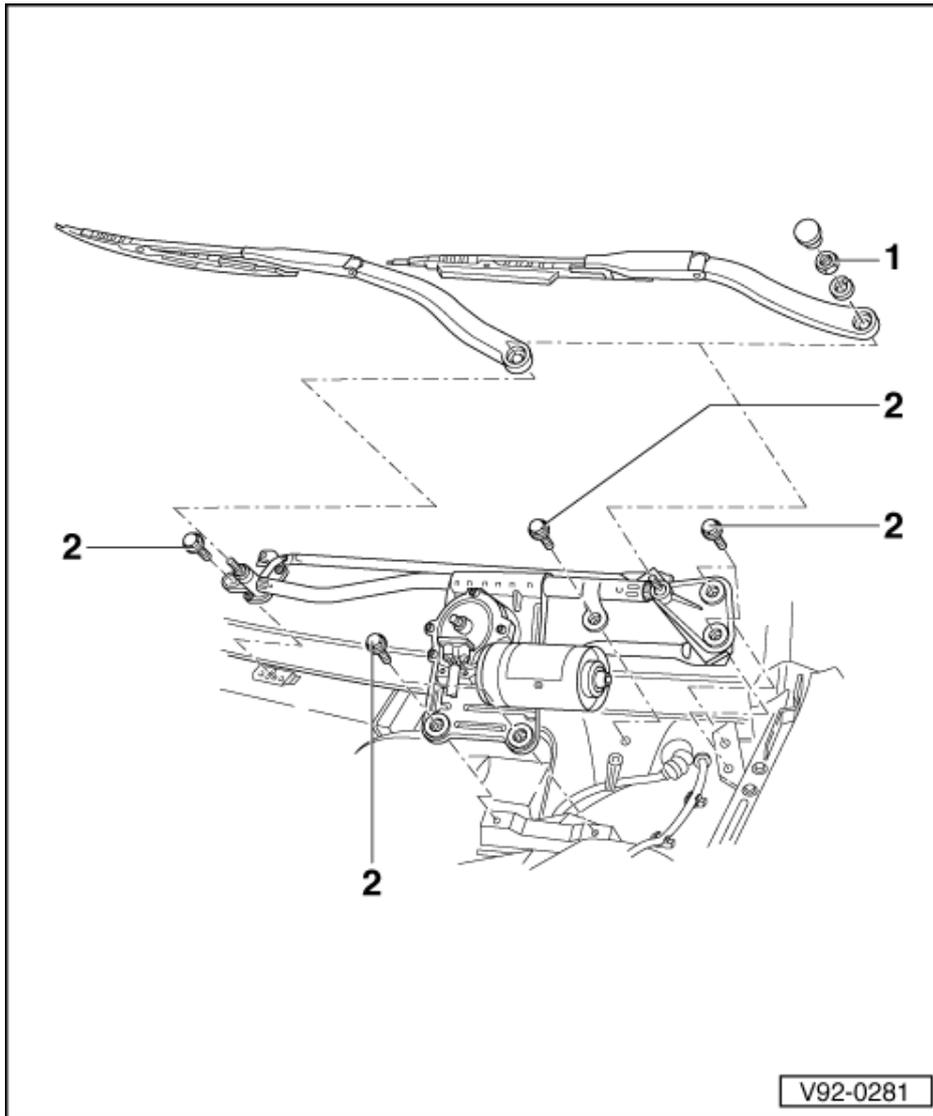
Removing wiper arms:

- Remove wiper blades.
- Lever off cover caps on wiper arms with a screwdriver.
- Loosen hexagon nuts (13 mm A/F) -1-, but do not remove completely.
- Loosen wiper arms by moving them slightly.
- Remove hexagon nuts completely and remove wiper arms.



Removing and installing wiper motor and wiper linkage

- Removing wiper arms => Page [122](#).
- Remove rubber seal from cowl panel trim.
- Remove plastic part above left of wiper motor.
- Remove three hexagon bolts (10 mm A/F) -1 and 2- and pull cowl panel trim out of the two holders -6-.
- Detach hose connection -5- for jets -4- and lift off cowl panel trim.



- Slacken and remove bolts -2- (6 x 10 mm A/F).
- Detach electrical connection at wiper motor.
- Remove wiper linkage together with wiper motor from plenum chamber.

Installing:

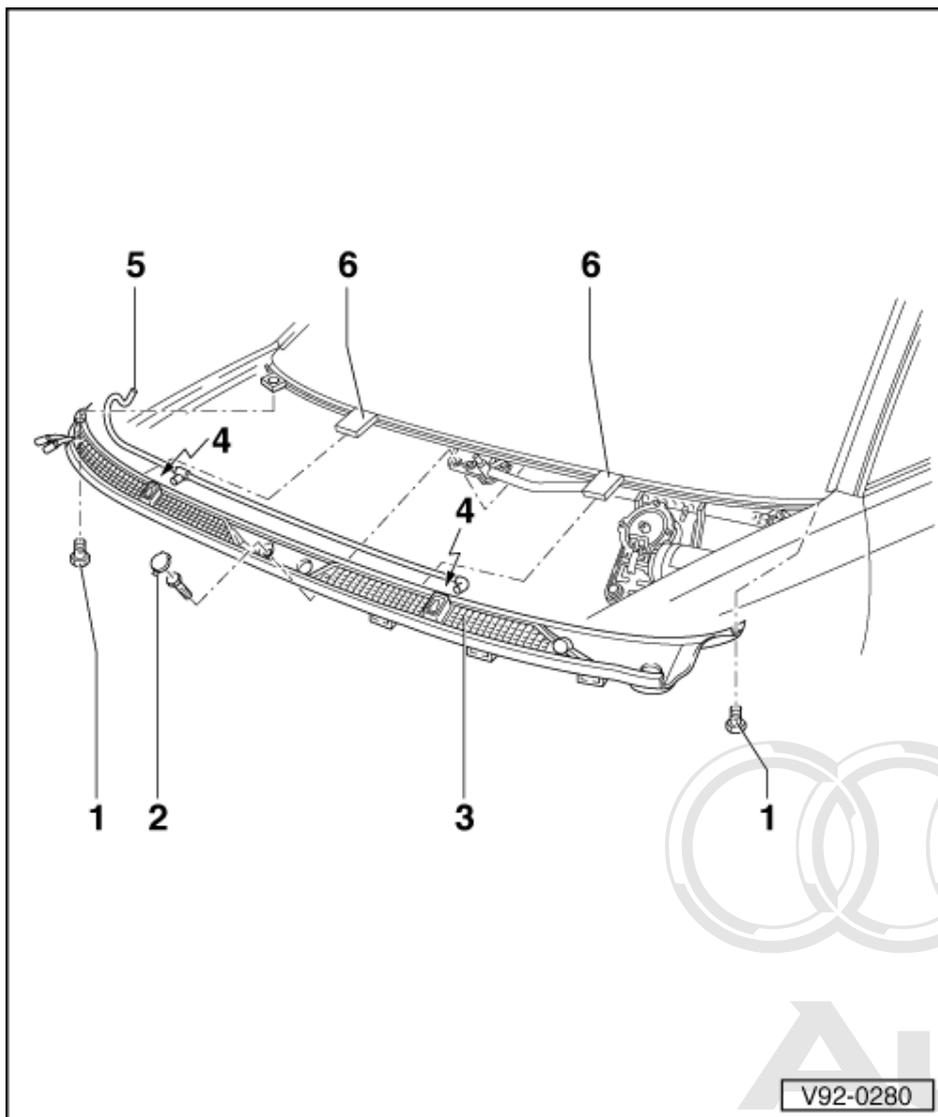
Note:

Install wiper linkage in park position shown.

- Insert wiper linkage together with wiper motor in plenum chamber and make electrical connections.

Audi

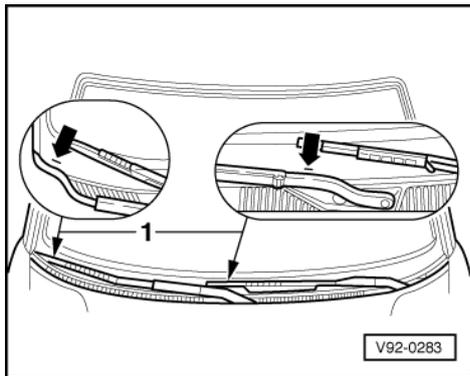
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- Tighten bolts -2- to 6 Nm.
- Connect water hose -5-.
- Fit cowl panel trim and screw on with bolts -1 and 2- with respect to the correctness of information in this document. Copyright by AUDI AG.
- Fit rubber seal at trim.
- Move wiper blades to park position => Page 125 .

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1.3 - Setting wiper blade park position



- Operate wiper motor and allow it to return to park position.
- -> Position wiper blades on mark -1- on windscreen, align and tighten nuts.
- Actuate flick wipe switch.
- If necessary, re-align wiper arms and tighten nuts (16 Nm).

1.4 - Eliminating wiper judder

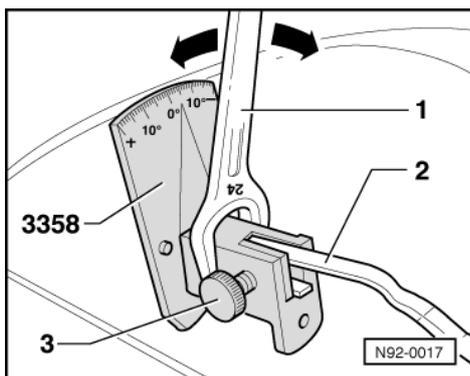
Possible causes for wiper blade judder: Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Windscreen scratched
- ◆ Wiper blade has become detached from retainers or is split.
- ◆ Wiper arm/blade loose or bent
- ◆ Wiper blades coated with wax or warped

If wiper blades are juddering and none of causes listed apply, check and if necessary adjust angle of wiper arms before fitting new wiper blades.

The adjusting tool for wiper arms 3358 is required for this purpose.

Checking adjustment angle

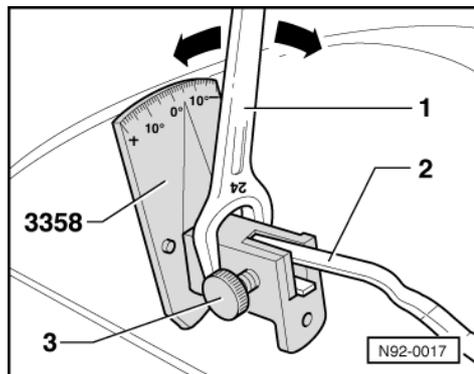


- Move wiper arms to park position.
- Remove wiper blades.
- -> Insert wiper arm -2- in wiper arm adjusting appliance 3358 and secure with locking screw -3-.
- Compare angle displayed to specified value in table.

Adjustment angle	Audi A8
Driver's side	- 6°
Passenger's side	- 6°



Adjustment angle	Audi A8
Tolerance	$\pm 0^{\circ}$



Adjusting wiper arms

- -> Place open ended spanner -1- (24 mm A/F) over adjusting appliance and adjust angle of wiper arm -2- (arrows) according to specifications.
- Loosen locking screw -3- and remove wiper arm -2- from adjusting appliance.
- Place wiper arm -2- in wiper arm adjusting appliance 3358 again and secure again with locking screw -3-.
- Compare angle displayed to specified value in table.
- If necessary, repeat setting and checking procedure until angle is as specified.
- Remove adjusting appliance and fit wiper blade.

2 - Servicing windscreen washer system

2.1 - Servicing windscreen washer system

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

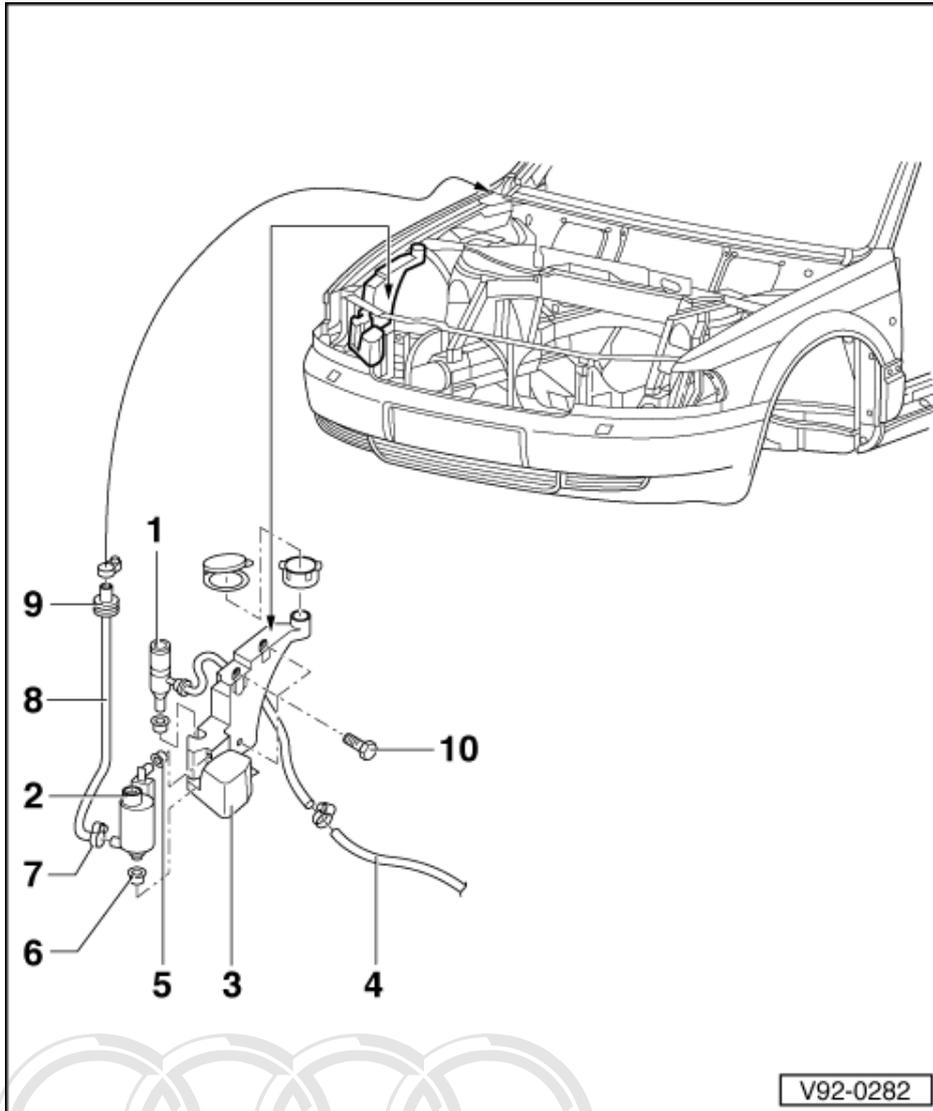
Such bolts are to be stored separately.

Warning:

Disconnect battery earth strap before working on electrical system.

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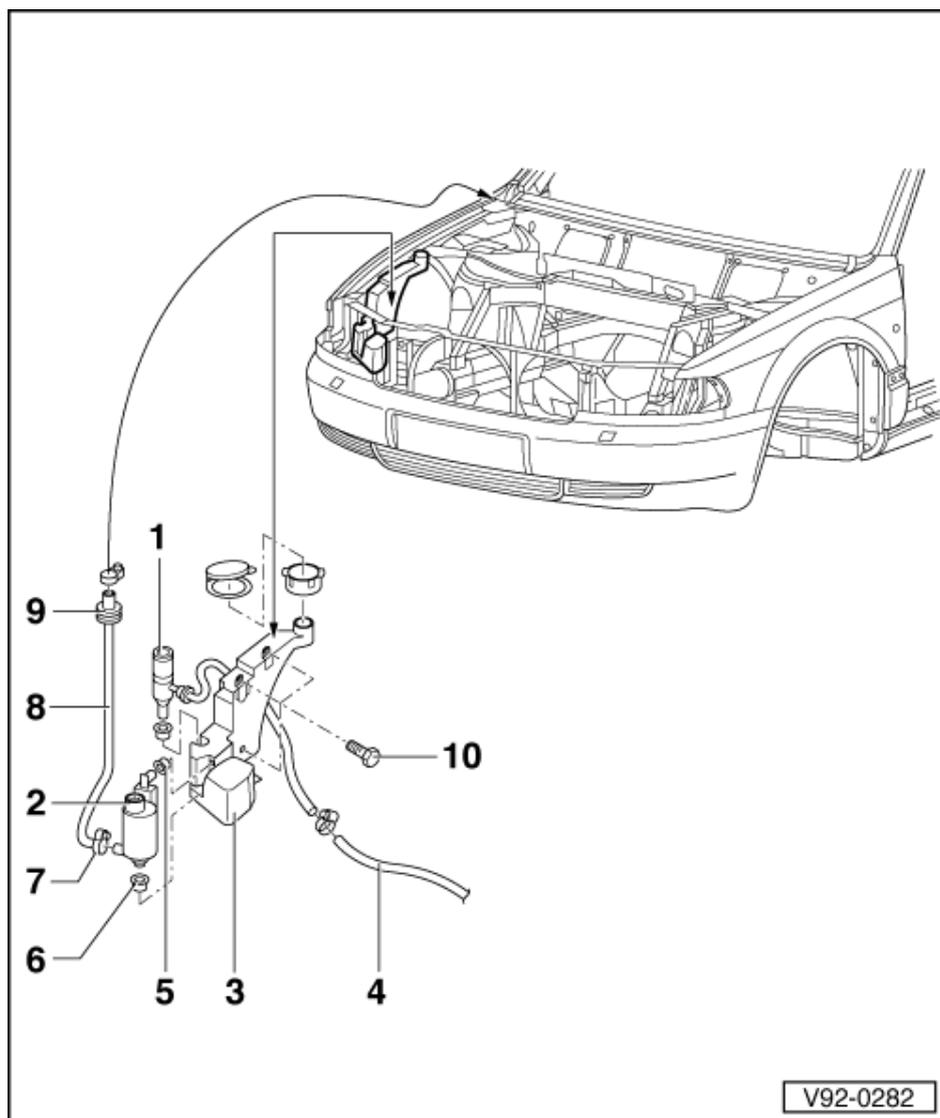
2.2 - Overview



- 1 Pump for headlamp washer system (HWS)
- 2 Pump for windscreen washer system
- 3 Washer fluid container
- 4 Hose to jets of HWS in bumper
- 5 Gasket
- 6 Gasket
- 7 Clamp
- 8 Hose to jets of windscreen washer system
- 9 Sleeve
- 10 Securing bolts

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2.3 - Removing and installing washer fluid container



Note:

The washer fluid container at front right of the engine compartment supplies water for both windscreen washer system and headlamp washer system.

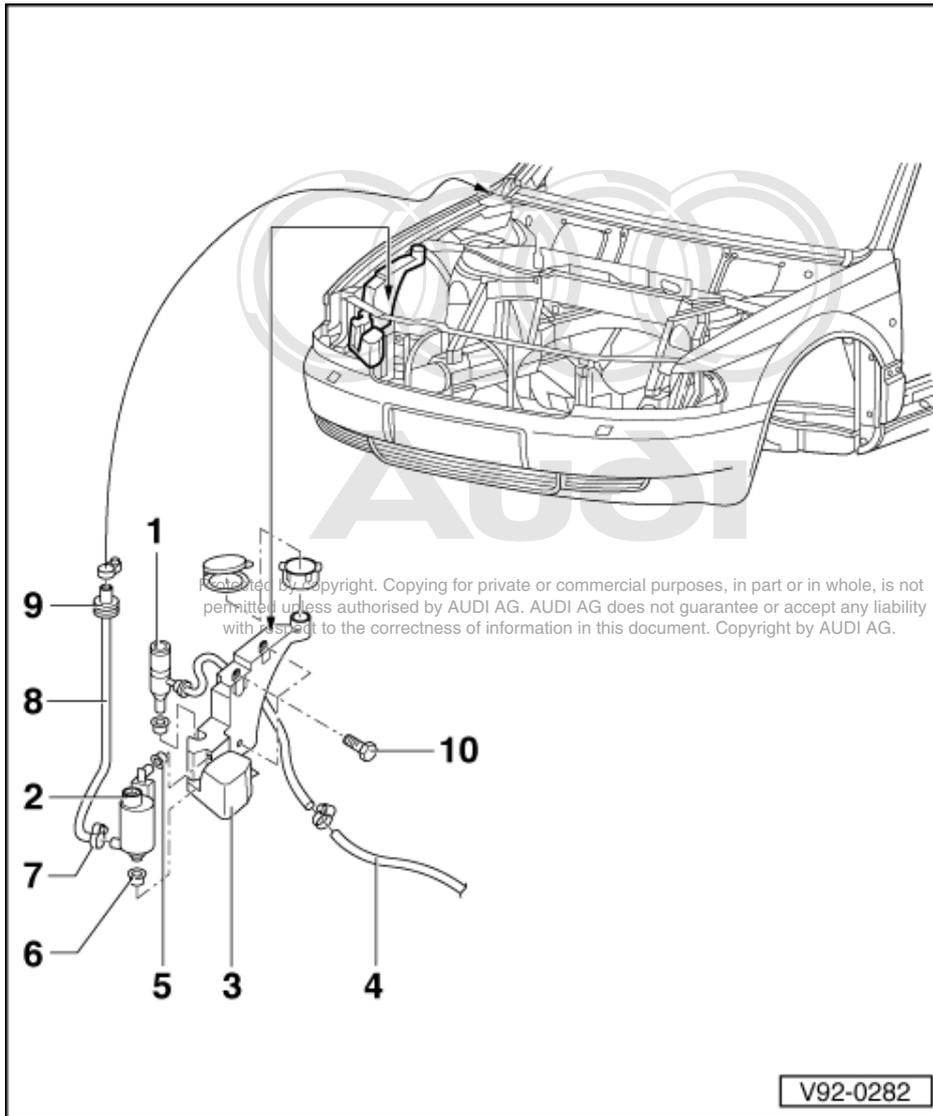
Removing:

- Remove cover over air cleaner in engine compartment and then remove air cleaner.
- Unscrew securing bolts -10- (3 x 10 mm A/F) - 5 Nm.



Audi

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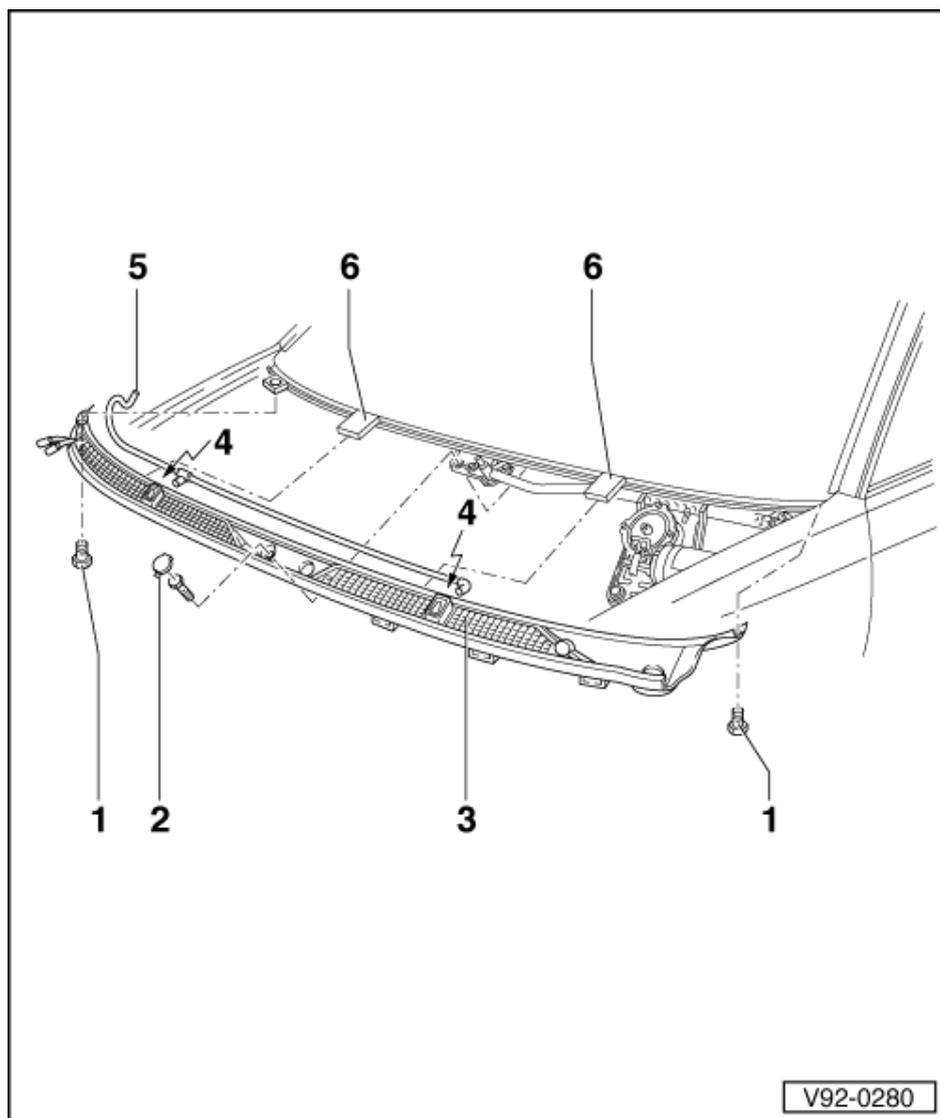


- Detach hose connections and electrical connections at pumps -1 and 2-.
- Remove washer fluid container -3- from engine compartment.

Installing:

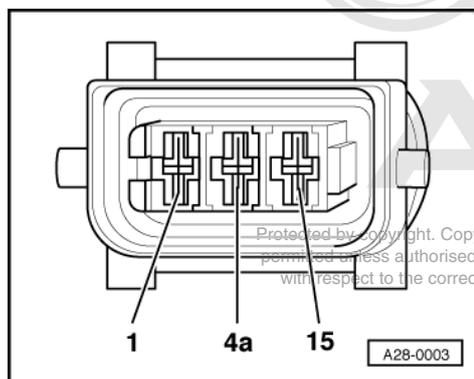
- Install in reverse sequence to removal.

2.4 - Removing and installing jets



Removing:

- Removing wiper arms => Page [122](#).
- Remove rubber seal from cowl panel trim.
- Remove three hexagon bolts (10 mm A/F) -1 and 2- and pull cowl panel trim out of the two holders -6-.
- Detach hose connection -5- for jets -4- and lift off cowl panel trim.



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- -> Using a small screwdriver press back retaining tab -arrow- whilst pressing gently on connection piece.
- Press jet outwards out of cowl panel grille.

Installing:

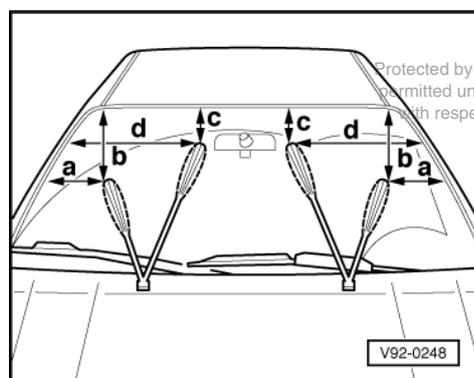
- Install in reverse sequence to removal.

2.5 - Adjusting jets

Adjust jets using special tool 3125.

- Mark four points on windscreen with water-soluble ink.

Notes:



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- ◆ The setting dimensions are calculated from outer edge of the wiper blade rubber.
- ◆ The setting dimensions give values for vehicle when moving, i.e. spray from jets is slightly offset when stationary.

-> Setting dimensions:

a = 150 mm
 b = 340 mm
 c = 120 mm
 d = 590 mm

- Use special tool 3125 to aim individual jets at points marked.

3 - Servicing headlamp washer system

3.1 - Servicing headlamp washer system

Important note:

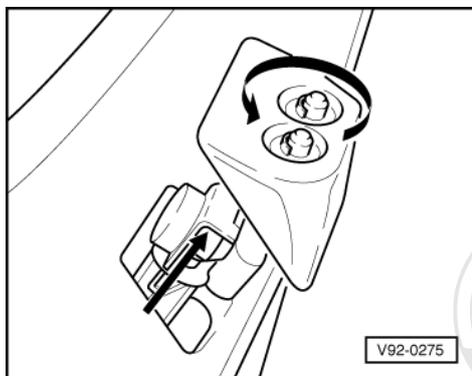
To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

Such bolts are to be stored separately.

Warning:
Disconnect battery earth strap before working on electrical system.

3.2 - Removing and installing headlamp washer system jets



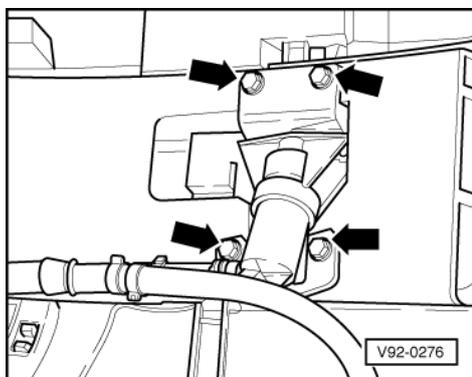
Removing:

- Remove bumper

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

- -> Pull jet holder upwards out of bumper and press out to left.

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- -> Slacken four bolts -arrows- on inside of bumper.
- Detach hose connection for washer fluid and remove jet motor.

Installing:

- Install in reverse sequence to removal.

3.3 - Adjusting jets

Note:

The jets are supplied with correct settings and do not need to be adjusted after installation.

3.4 - Removing and installing washer fluid container

Note:

*The washer fluid container supplies both windscreen and headlamp washer systems, and is located at front right of engine compartment. Removing and installing => Page **128**.*



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94 - Lights, Lamps, Switches - exterior

1 - Servicing headlamps

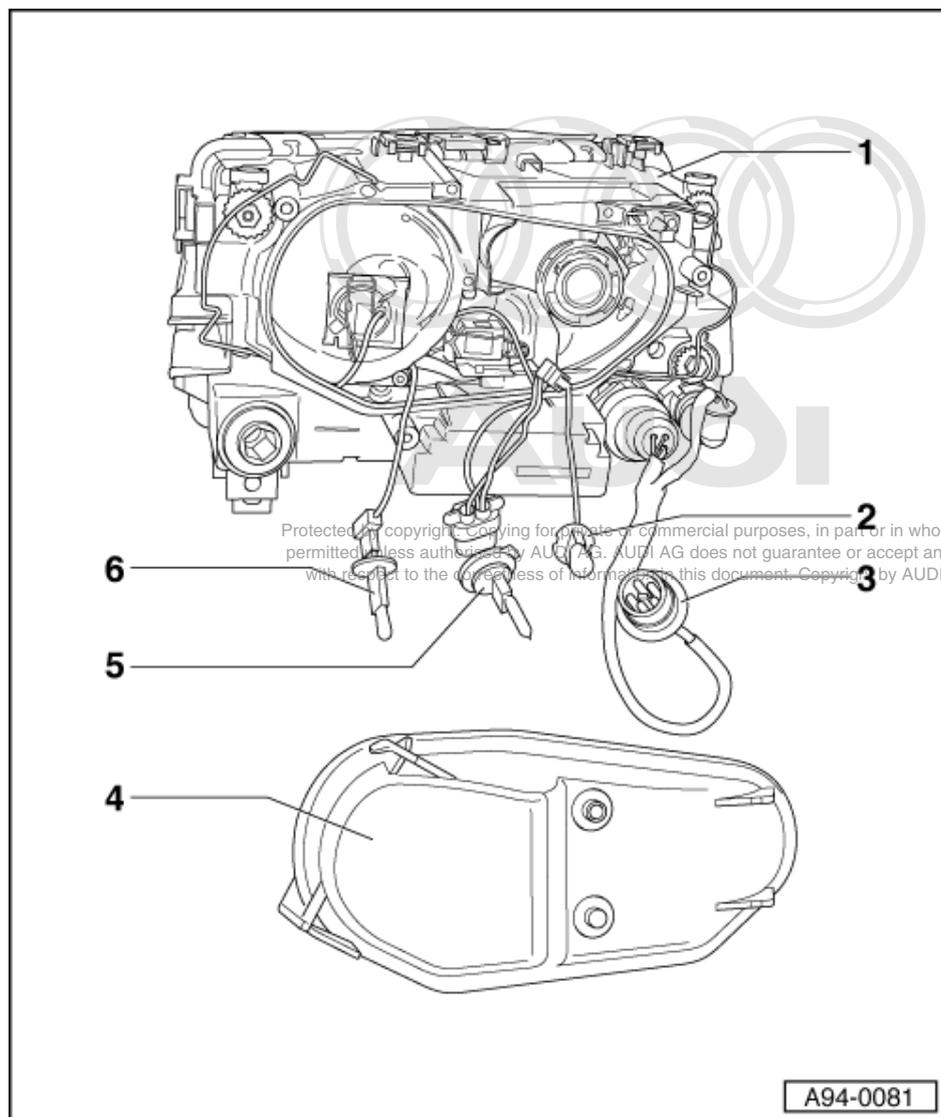
1.1 - Servicing headlamps

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.
These feature a special surface coating and can be recognised by their greenish colour.
Such bolts are to be stored separately.

Warning:
Disconnect battery earth strap before working on electrical system.

1.2 - General overview- halogen headlamps



Warning:
 Always disconnect battery earth strap before working on electrical system.

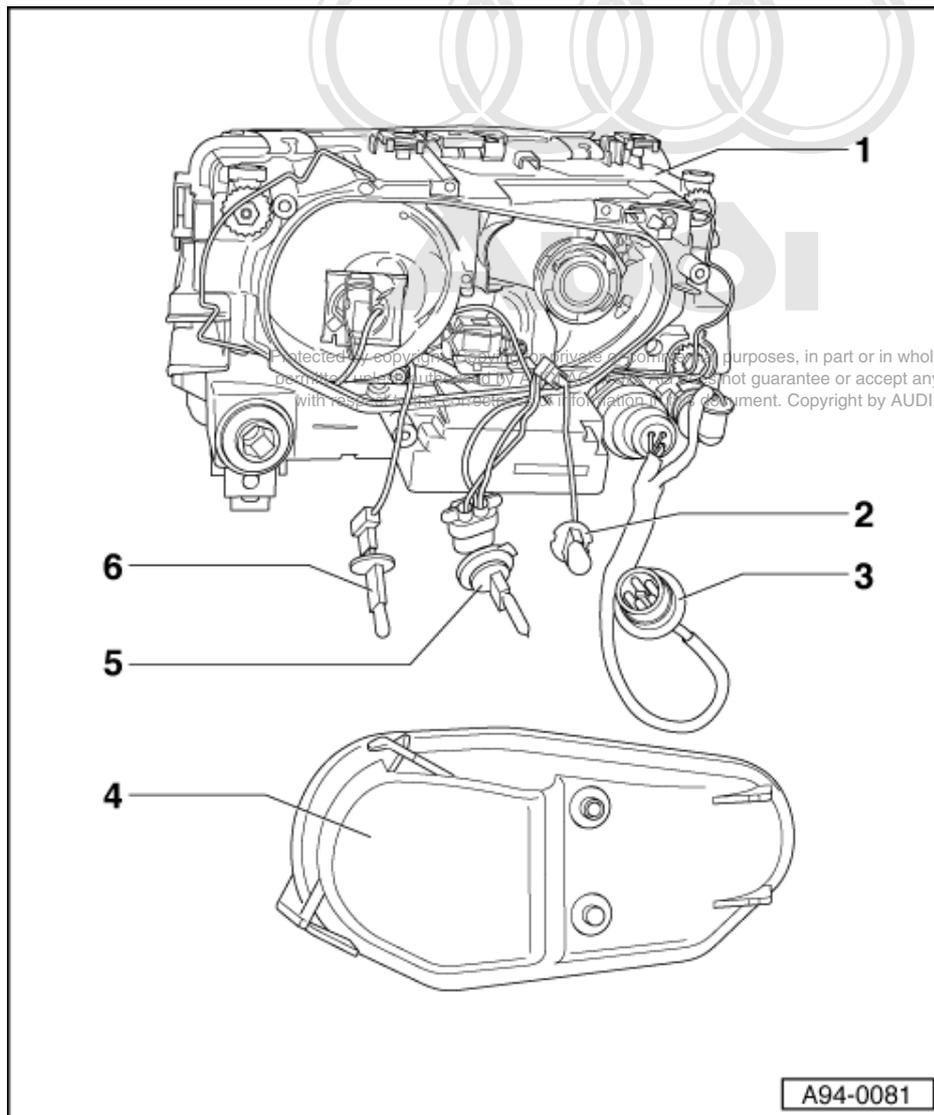
Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.
- ◆ Headlamps must be readjusted after performing measures which could affect their setting.

1 Headlamp housing

2 Fog lamp bulb

- ◆ H3 - 12 V, 55 W
- ◆ Changing bulb
 => Page 143 .



3 5-pin connector to wiring harness

4 Housing cover

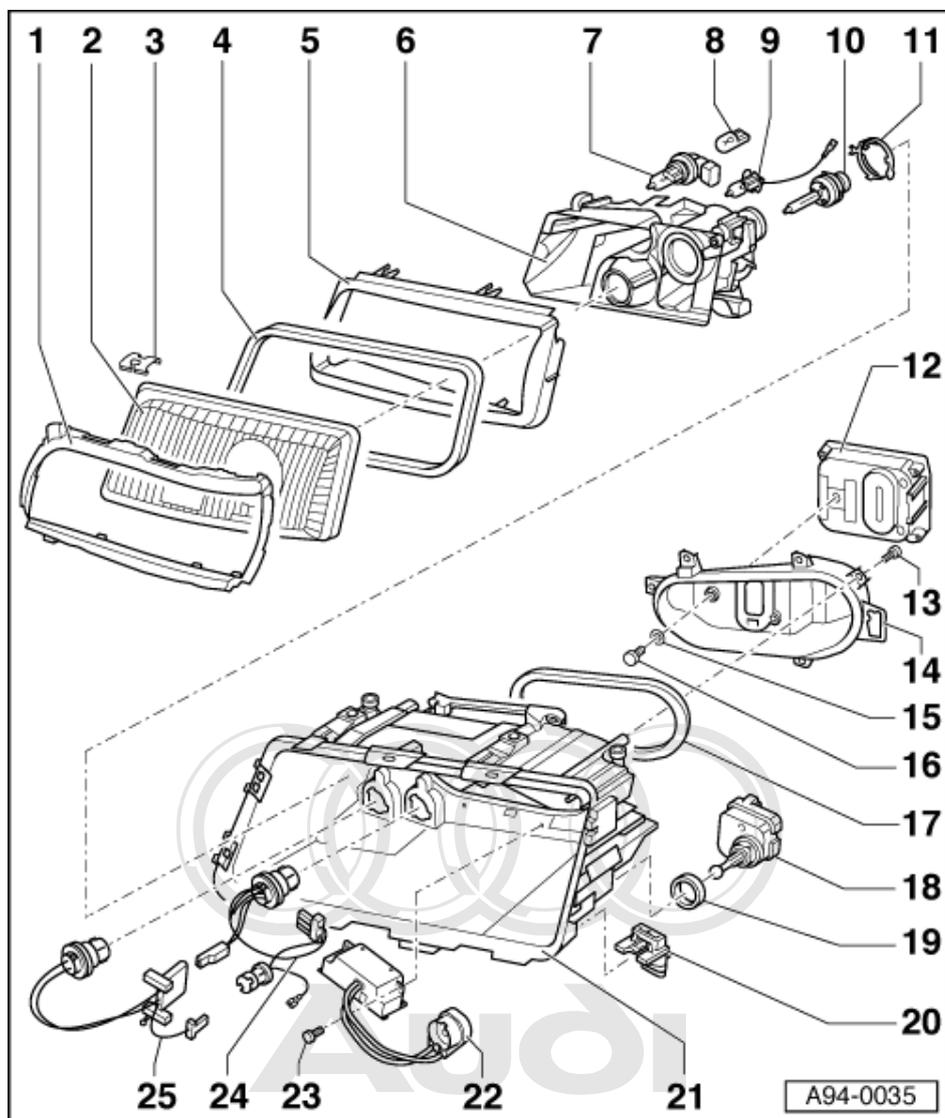
5 Main beam bulb

- ◆ W5W - 12 V, 5 W
- ◆ Changing bulb
 => Page 143 .

6 Dipped beam bulb

- ◆ H1 - 12 V, 55 W
- ◆ Changing bulb
=> Page 143 .

1.3 - General overview-gas-discharge headlamps



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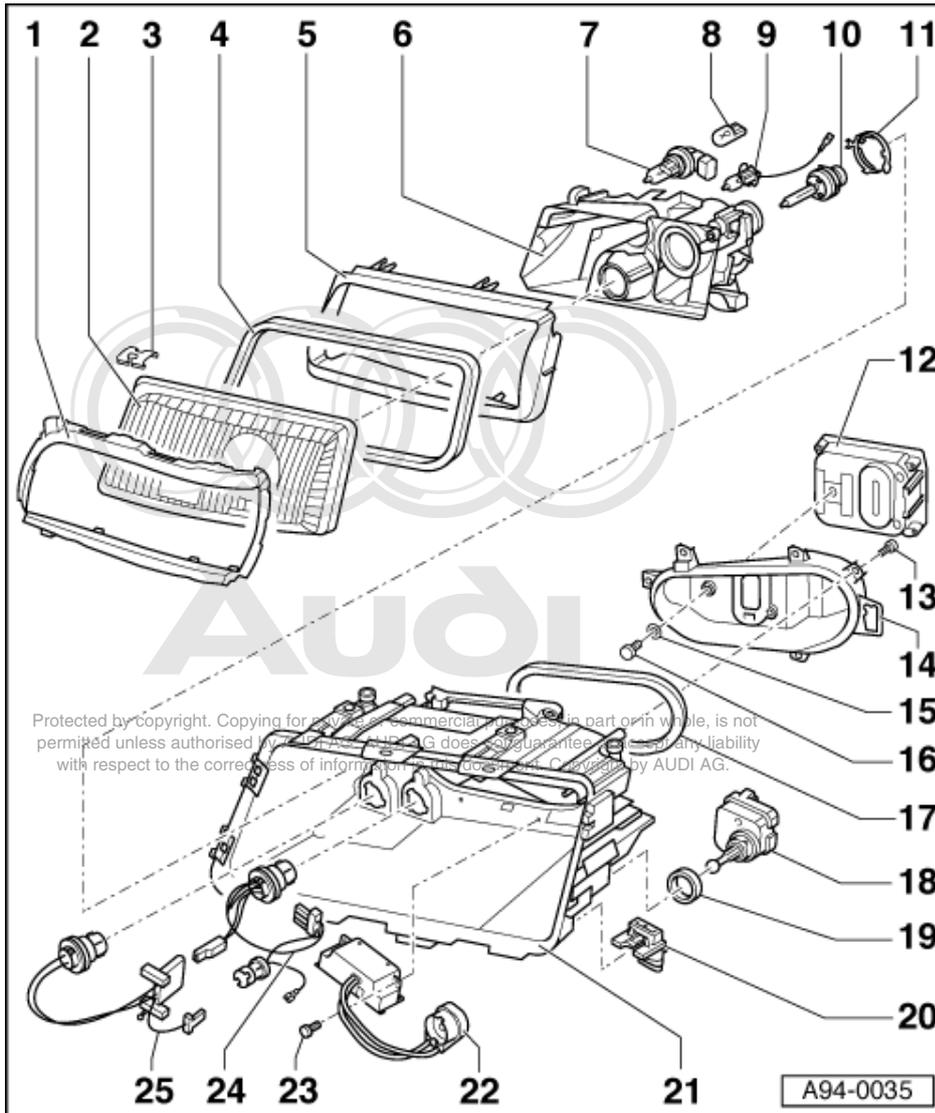
Warning:
 Always disconnect battery earth strap before working on electrical system.

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.
- ◆ Headlamps must be readjusted after performing measures which could affect their setting.

1 Trim (rubber)

- ◆ Insert in all holders at headlamp housing



2 Lens

- ◆ Removal: Pull off trim (rubber) -item 1-, prise off 8 retaining clips -item 3-

3 Retaining clips

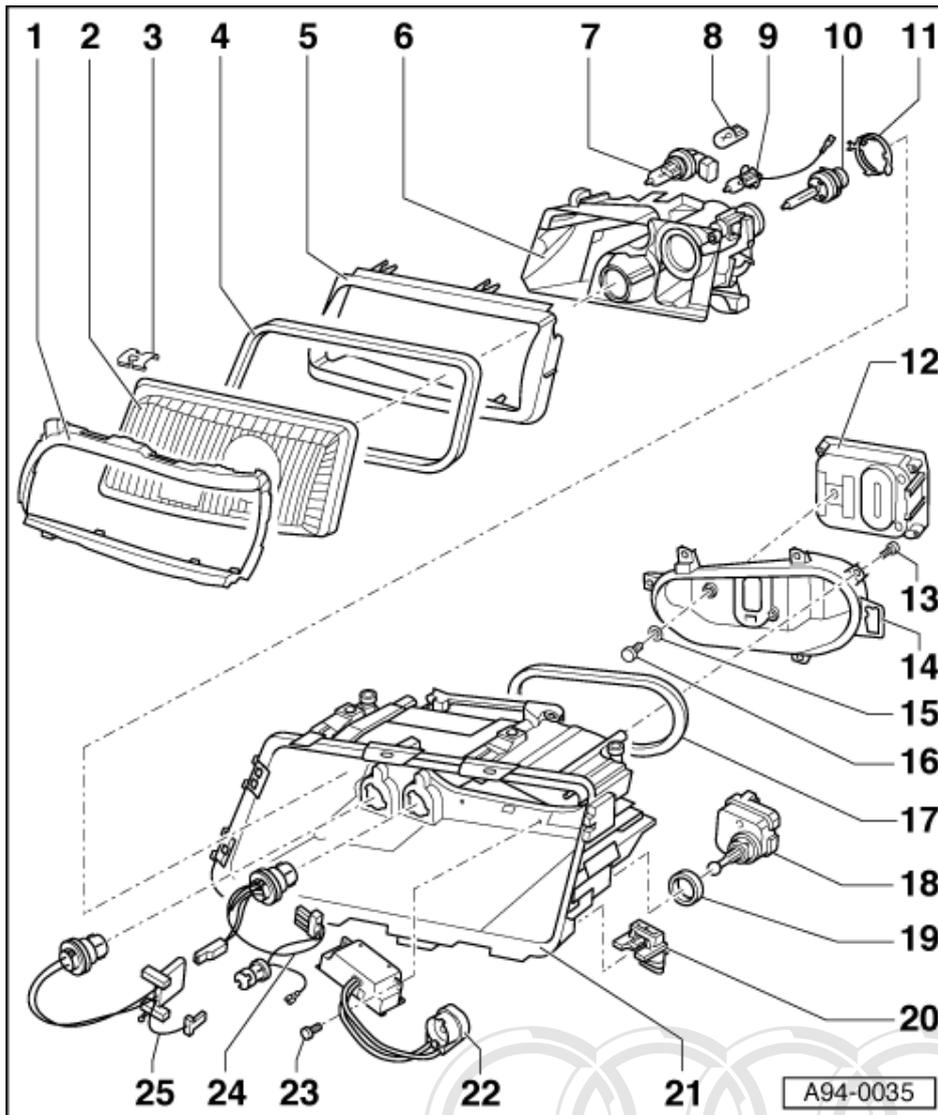
- ◆ Qty. 8
- ◆ Removal: Prise off with screwdriver
- ◆ Installation: Press in clips by hand

4 Gasket

- ◆ Pull off
- ◆ Replace if damaged

5 Reflector frame

- ◆ Press off evenly at top and bottom



6 Reflector

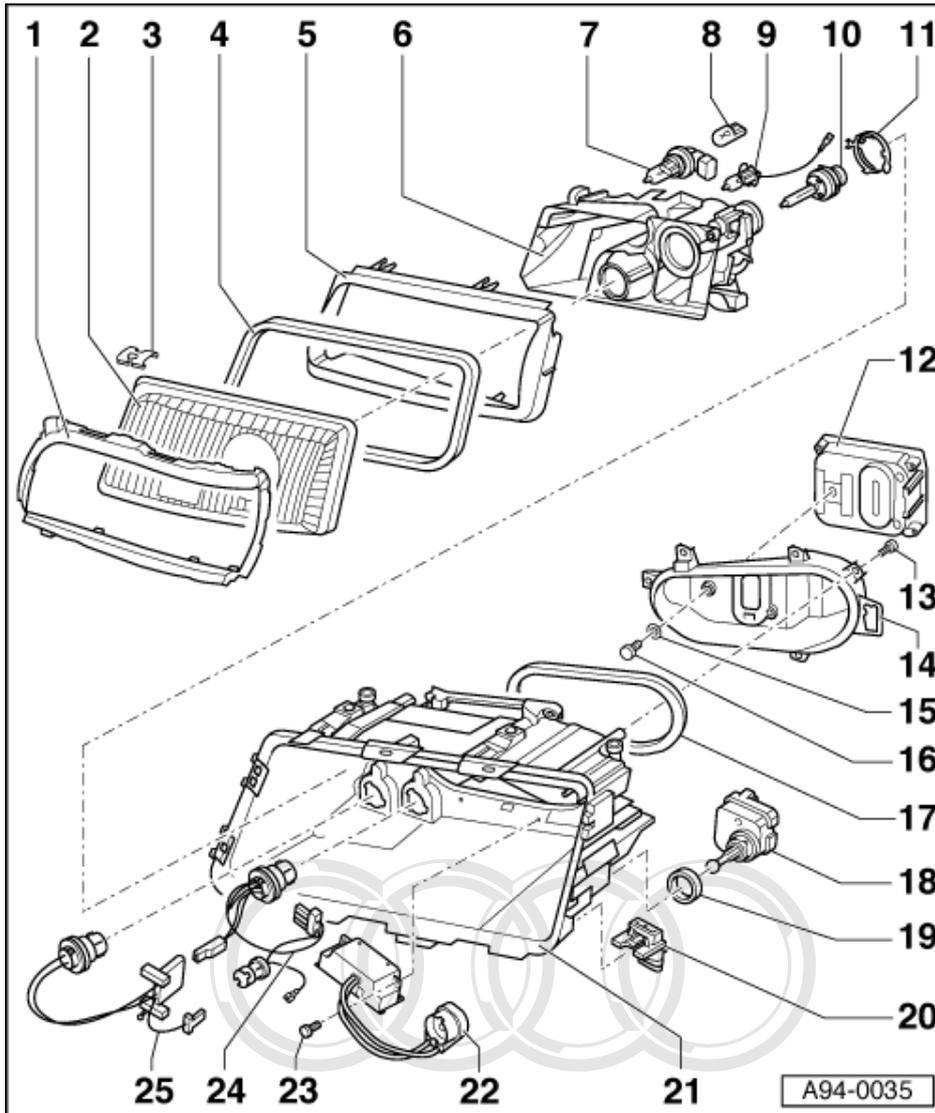
- ◆ With headlamp inserts
- ◆ Has to be removed to remove starter unit for gas-discharge lamp -item 22-
- ◆ Removal with headlamp dismantled:
 - Remove headlamp range control motor -item 18-
 - Unscrew fixed mounts of reflector from headlamp adjusting screws; this involves turning adjusting screws.
 - Release connector for earth cable at wiring harness -item 24- and pull off.
- ◆ Installation: Insert actuator pin for RHD/LHD switching in hole in reflector trim

7 Main beam bulb

- ◆ 12 V, 65 W with bulb carrier
- ◆ Removal: Turn bulb carrier clockwise and pull off to rear
- ◆ Installation: Insert bulb carrier lugs in recesses and turn bulb carrier anti-clockwise

8 Side light bulb

- ◆ 12 V, 5 W



9 Fog lamp bulb

- ◆ 12 V, 55 W

10 Dipped beam bulb (gas-discharge headlamp)

- ◆ 12 V, 35 W

◆ Removal:

- Turn connector anti-clockwise and pull off.
- Press down spring lock washer (item 11) and turn anti-clockwise.

- ◆ Installation: Pay attention to lamp fitting location.

11 Spring retainer

- ◆ For gas-discharge lamp

12 Gas-discharge headlamp control unit, left -J343 / Gasdischarge headlamp control unit, right -J344

13 TORX bolt T 25 H

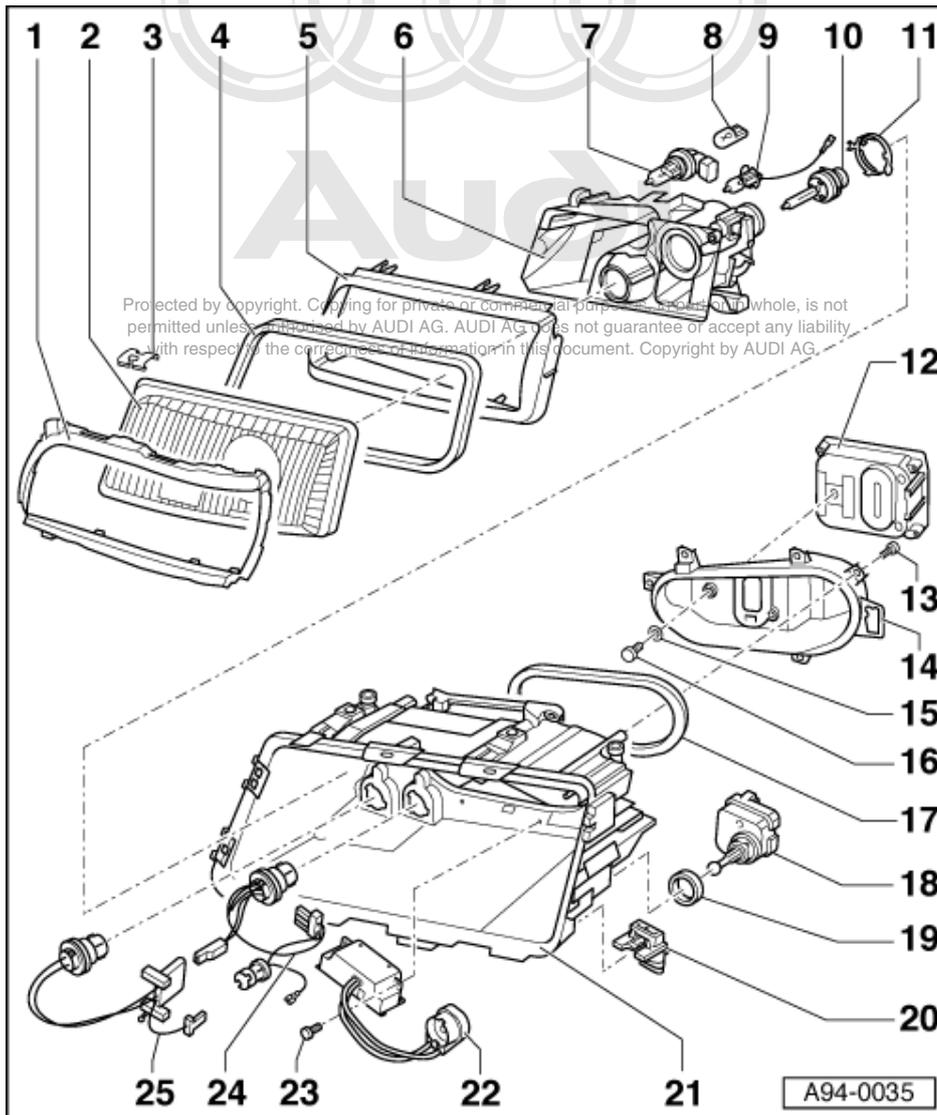
14 Cover

15 Plastic washer

16 Cross head bolt

17 Gasket

- ◆ Check for damage



18 Headlamp range control positioning motor -V48/V49

- ◆ Removal:
 - Swivel control motor housing about its own axis
 - Disengage spherical head downwards from guide at reflector

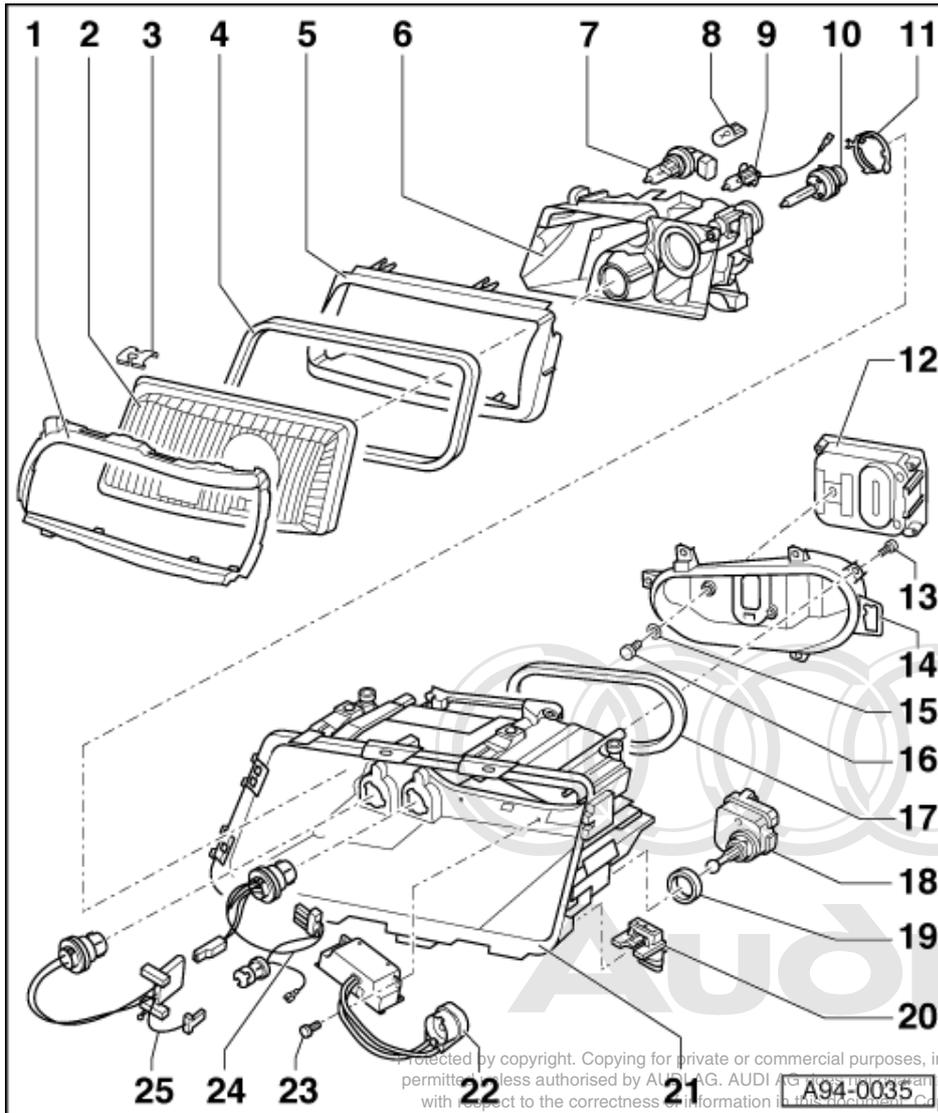
19 Sealing ring

- ◆ Check for damage

20 Retainer bracket

- ◆ Replace if damaged
- ◆ Push home into retainer

21 Headlamp housing



22 Starter unit for gas-discharge bulb -N195

- ◆ Remove, to remove reflector -item 6-
- ◆ Lay wire to gas-discharge lamp in retaining spring

23 Torx bolt

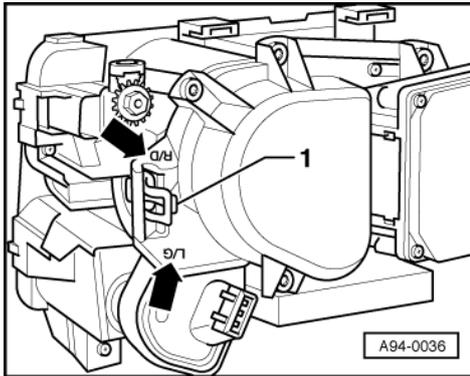
24 Wiring harness

- ◆ With bulb carrier for side light bulb and earth cable

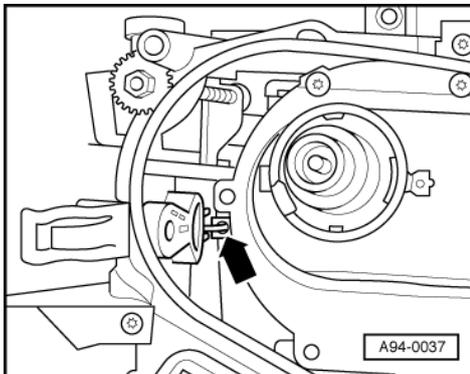
25 Wiring harness

- ◆ For starter unit and control unit

RHD/LHD switching



- -> On gas-discharge headlamps, switching slider -1- is accessible from outside.
- R/D - Position for RHD
- L/G - Position for LHD



- -> On halogen headlamps, switching slider is in headlamp.
- Insert actuator pin in hole -arrow- at reflector.

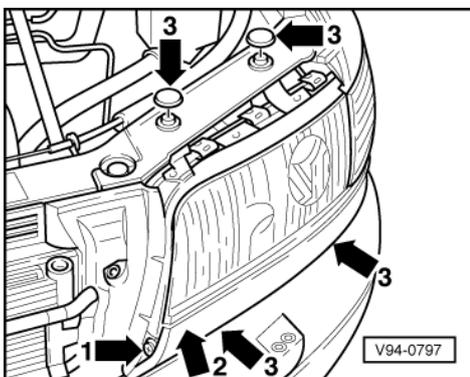
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1.4 - Removing and installing headlamps

Removing:

Note:

Mask bumper around headlamp with adhesive tape so as not to damage paintwork.



- Unfasten bumper mount and pull front bumper approx. 5 ... 10 cm out of bracket.

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

- Removing turn-signal indicators => Page 147
- Detach 5-pin connector at headlamp wiring harness.
- -> Unfasten cross-head bolt -1- and detach trim strip -2-.
- Unfasten four cross-head bolts -3- and then pull headlamp forwards out of vehicle.

Installing:

- Always align headlamp flush with contours of body (uniform gap all round), and secure in position.
- Continue installation in reverse sequence to removal.
- Adjust headlamps after installing => Page 144 .

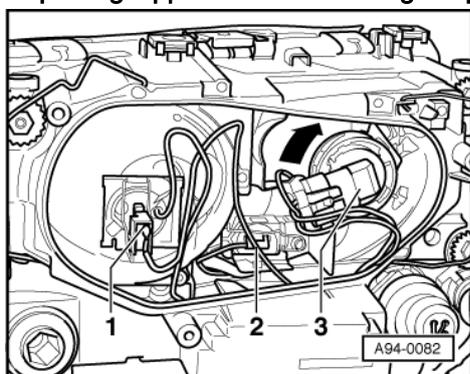
1.5 - Changing bulbs in headlamps

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Note:

Bulb replacement does not require headlamp removal.

Replacing dipped beam and/or fog lamp bulb



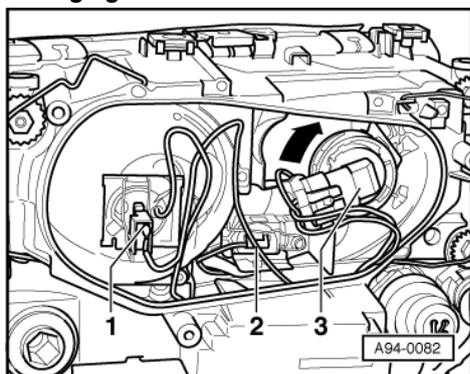
Removing:

- Remove cover from headlamp housing.
- -> Detach connector at dipped beam bulb -1- / fog lamp bulb -2-.
- Disengage wire clip and take bulb out of housing.
- Screw or pull bulb out of bulb carrier.

Installing:

- Screw new bulb into bulb carrier and insert bulb carrier in housing; do not touch glass part of bulb with bare hands.
- Secure base of bulb with wire clip.
- Plug in connector and fit cover on housing.
- Fit housing cover flush and secure with the two wire retainers.
- Check headlamp adjustment after fitting new bulb.

Changing main beam bulb





- Remove cover from headlamp housing.
- -> Turn base of main beam bulb -3- clockwise -arrow- and remove from holder.
- Screw or pull bulb out of bulb carrier.

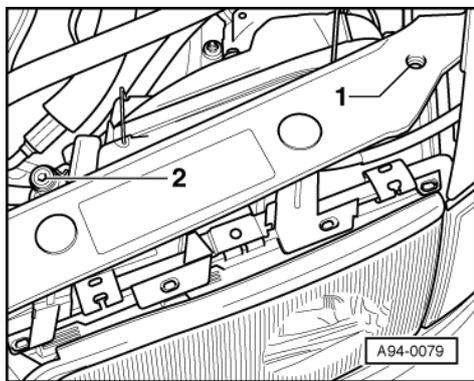
Installing:

- Screw new bulb into bulb carrier, insert bulb carrier in housing and turn anti-clockwise as far as it will go.
- Fit housing cover flush and secure with the two wire retainers.
- Check headlamp adjustment after fitting new bulb.

1.6 - Adjusting headlamps

Note:

The specifications and instructions for headlamp adjustment are given in "Maintenance" booklet.



=> Maintenance Manual

-> Adjustment screws on left hand-headlamp.

The arrangement for right headlamp is symmetrically opposite.

- 1 - Height adjustment screw
- 2 - Lateral adjustment screw

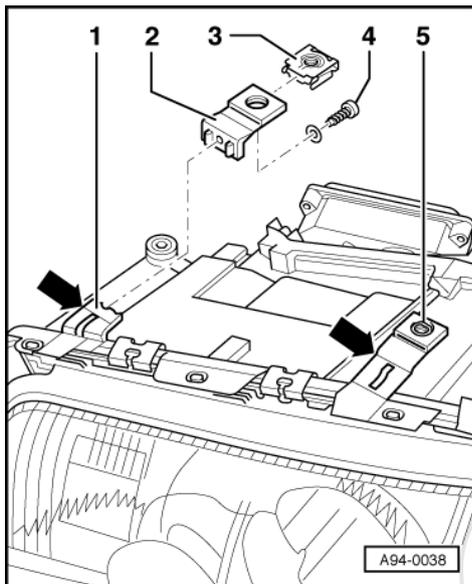
- Use Allen key (6 mm) or Phillips screwdriver to adjust appropriate screw.

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1.7 - Installing repair kit for headlamp housing

Note:

- ◆ Broken-off headlamp securing lugs can be replaced by installing repair kit. Complete headlamp replacement is therefore not necessary.



- -> Remove remnants of broken lug -1- at edge marked with arrow.
- Slip nut -3- into lug -2- from repair kit.
- Attach lug -2- with bolt -4- and washer to headlamp housing from rear.

Right-hand arrow shows parting edge at intact lug -5-.

Note:

The securing brackets for lower headlamp mounting points can also be replaced separately.

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1.8 - Converting headlamp connector on wiring harness

As of model year 1997, only headlamps with a 5-pin connector to wiring harness are available as replacement parts.

Vehicles up to model year 1997 feature a wiring harness with a 3-pin and a 4-pin connector.

Where appropriate, connector must be converted to appropriate 5-pin version.

Note:

Repairs to wiring harness and plug connectors for the Audi A8 may only be performed using repair set VAS 1978.

- Detach both connectors at appropriate headlamp.
- Note down contact assignments of both connectors based on cable colours.
- Use releasing tools from wiring harness repair set VAS 1978 to release the two connectors.

=> Usage instructions for wiring harness repair set VAS 1978; Release and dismantling of connector housings; Socket housings

- Remove the two grommets.
- Detach earth cable from 3-pin connector in vicinity of wiring harness sheathing.
- Detach contact 4 of 4-pin connector and then fit an appropriate yellow repair wire.

=> Usage instructions for wiring harness repair set VAS 1978; Release and dismantling of connector housings; Socket housings

Notes:

- ◆ When selecting repair wire, use corresponding wire thickness and matching plug-in contact to headlamp connector.



- ◆ Prior to connection, shorten wire so that it cannot subsequently become chaffed or trapped.
- ◆ Always use insertion tools from wiring harness repair set VAS 1978 to route contacts/leads through grommet.
- Use insertion tools to guide lead through grommet and then insert contact into receptacle 1 of 5-pin connector.
- Use insertion tools to guide earth cable (contact 3 of 4-pin connector) through grommet and then insert contact into receptacle 2 of 5-pin connector.
- Use insertion tools to guide contact 1 of 3-pin connector through grommet and then insert contact into receptacle 3 of 5-pin connector.
- Use insertion tools to guide contact 2 of 4-pin connector through grommet and then insert contact into receptacle 4 of 5-pin connector.
- Use insertion tools to guide contact 1 of 4-pin connector through grommet and then insert contact into receptacle 5 of 5-pin connector.
- Engage secondary locking at 5-pin connector and then check tightness of contacts.
- Slip grommet fully into connector.

=> Usage instructions for wiring harness repair set VAS 1978; Release and dismantling of connector housings; Installation of socket housings -B-.

Receptacle assignments:1)

	5-pin connector at left headlamp	5-pin connector at right headlamp
3-pin connector		
Receptacle 1	Receptacle T5h/3	Receptacle T5i/3
4-pin connector		
Receptacle 1	Receptacle T5h/5	Receptacle T5i/5
Receptacle 2	Receptacle T5h/4	Receptacle T5i/4
Receptacle 3	Receptacle T5h/2	Receptacle T5i/2
Receptacle 4	Receptacle T5h/1	Receptacle T5i/1

- 1) If necessary, use appropriate current flow diagram to check assignments.

2 - Servicing front turn-signal indicators

2.1 - Servicing front turn-signal indicators

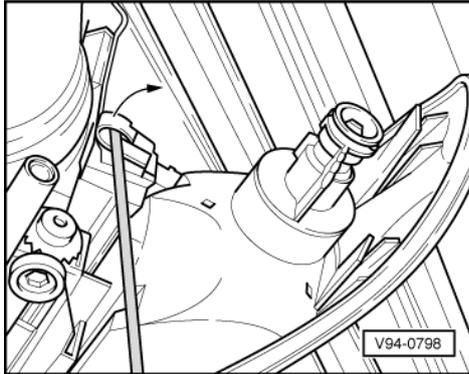
Important note:

To avoid contact corrosion **only use approved bolts, nuts and washers etc.** These feature a special surface coating and can be recognised by their greenish colour.

Such bolts are to be stored separately.

Warning:
Disconnect battery earth strap before working on electrical system.

2.2 - Removing and installing turn-signal indicators

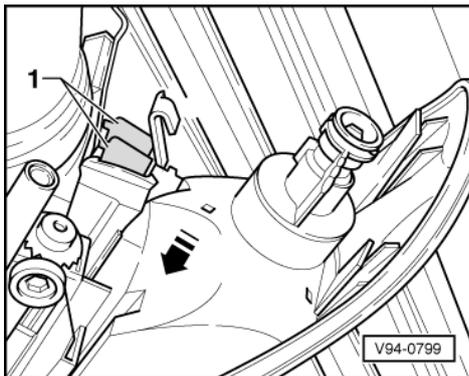


Note:

The turn-signal indicator can be removed without removing headlamp.

Removing:

- -> Use screwdriver to prise locking piece out of catch.

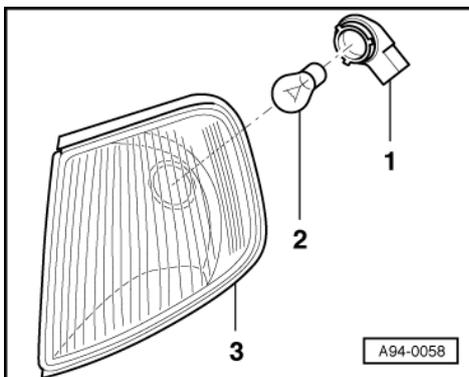


- -> Squeeze catch -1- and press turn-signal indicator in direction of arrow.
- Then pull turn-signal indicator forwards out of vehicle.

Installing:

- Install in reverse sequence to removal.

2.3 - Removing and installing turn-signal indicator bulb



Audi

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Removing:

- -> Turn bulb carrier -1- anti-clockwise and pull out of housing -3-.
- Unscrew bulb -2- from bulb carrier.

Turn signal bulb 12 V, 21 W (yellow)

Installing:

- Install in reverse sequence to removal.

On installation, bulb carrier must be turned until it engages.

3 - Side mounted turn signals

3.1 - Side mounted turn signals

3.2 - Removing and installing side mounted turn signals

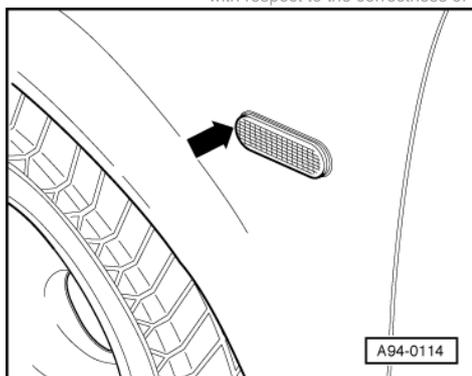
Warning:
Disconnect battery earth strap before working on electrical system.

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

Removing:

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- -> Push turn-signal towards rear of vehicle against retaining tab -arrow- and carefully remove from opening in wing.
- Detach connector.

Installing:

- Connect connector.
- Insert turn signal in wing.

4 - Servicing rear lights

4.1 - Servicing rear lights

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

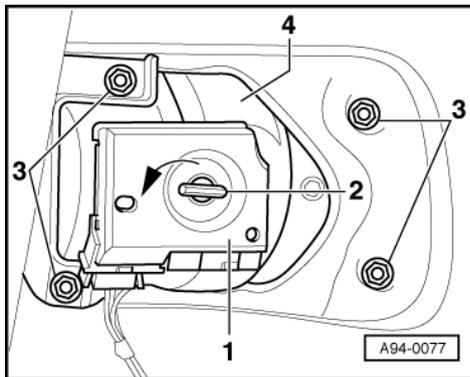
These feature a special surface coating and can be recognised by their greenish colour.

Such bolts are to be stored separately.

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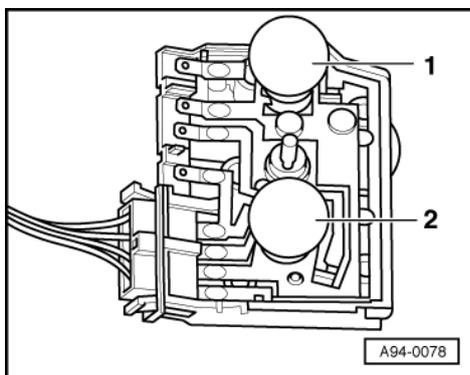
Warning:
Disconnect battery earth strap before working on electrical system.

4.2 - Removing and installing bulb carrier in side panel



Removing:

- Open and remove left/right stowage compartment cover in luggage compartment.
- Open and remove rear light cover.
- -> Turn -arrow- rotary knob -2- at bulb carrier -1- anti-clockwise and remove.



- -> Turn bulbs to remove them from their holders.

- 1 - Turn-signal indicator bulb -12 V, 21 W
- 2 - Brake light/reversing light bulb
-12 V, 21/5 W

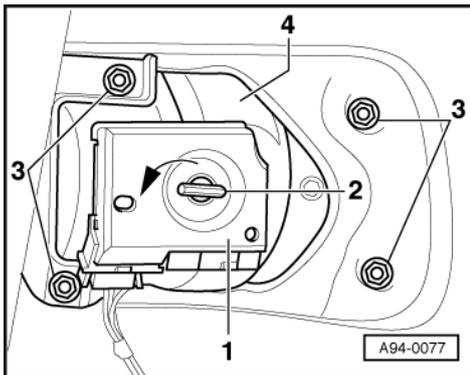
Installing:

- Install in reverse sequence to removal.

4.3 - Removing and installing rear light in side panel

Removing:

- Open and remove left/right stowage compartment cover in luggage compartment.



- Open and remove rear light cover.
- Remove left/right luggage compartment side trim
- -> Turn rotary knob -2- at bulb carrier -1- anti-clockwise and remove.
- Unscrew hexagon nuts (4 x 8 mm A/F) -3- and remove rear light -4- on outside of vehicle.

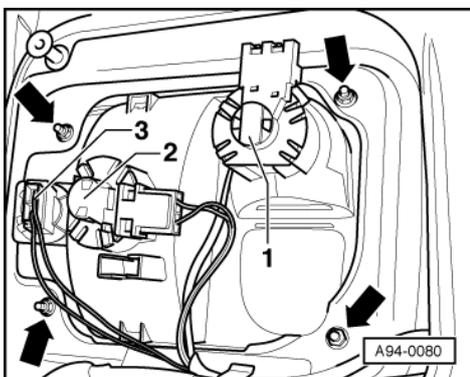
Installing:

Note:

- When installing, ensure that seal between body and rear light housing is properly seated.
- Install in reverse sequence to removal.
- Before tightening securing nuts, align rear light with contours of body (uniform gaps all round).

4.4 - Removing and installing rear light bulbs in boot lid

Removing:



- Open left/right carpet trim in boot lid.

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Note:

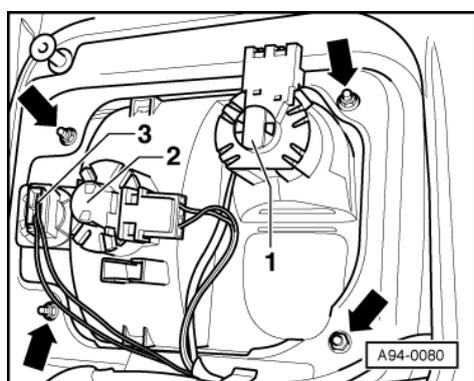
Illustration shows left-hand boot rear light.

- -> Turn individual bulb carriers anti-clockwise/pull off.
 - 1 - Turn-signal indicator bulb -12 V, 21 W
 - 2 - Rear fog light bulb -12 V, 21 W
 - 3 - Additional rear light bulb -12 V, 21 W

Installing:

- Install in reverse sequence to removal.

4.5 - Removing and installing rear light in boot lid



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Removing:

- Open left/right carpet trim in boot lid.
- -> Turn individual bulb carriers -1, 2, 3- anti-clockwise/pull off.

Note:

Illustration shows left-hand boot rear light. Luggage compartment lock must also be removed at right boot rear light.

=> General body repairs; Repair group 55; Boot lid/tailgate; pushbutton lock cylinder for boot lid/tailgate Boot lid/tailgate pushbutton lock cylinder for boot lid/tailgate

- Unfasten four nuts (8 mm A/F) -arrows- and remove housing.

Installing:

Note:

- When installing, ensure that seal between body and rear light housing is properly seated.
- Install in reverse sequence to removal.
- Before tightening securing nuts, align rear light with contours of body (uniform gaps all round).

5 - Removing and installing high-level brake light

5.1 - Removing and installing high-level brake light

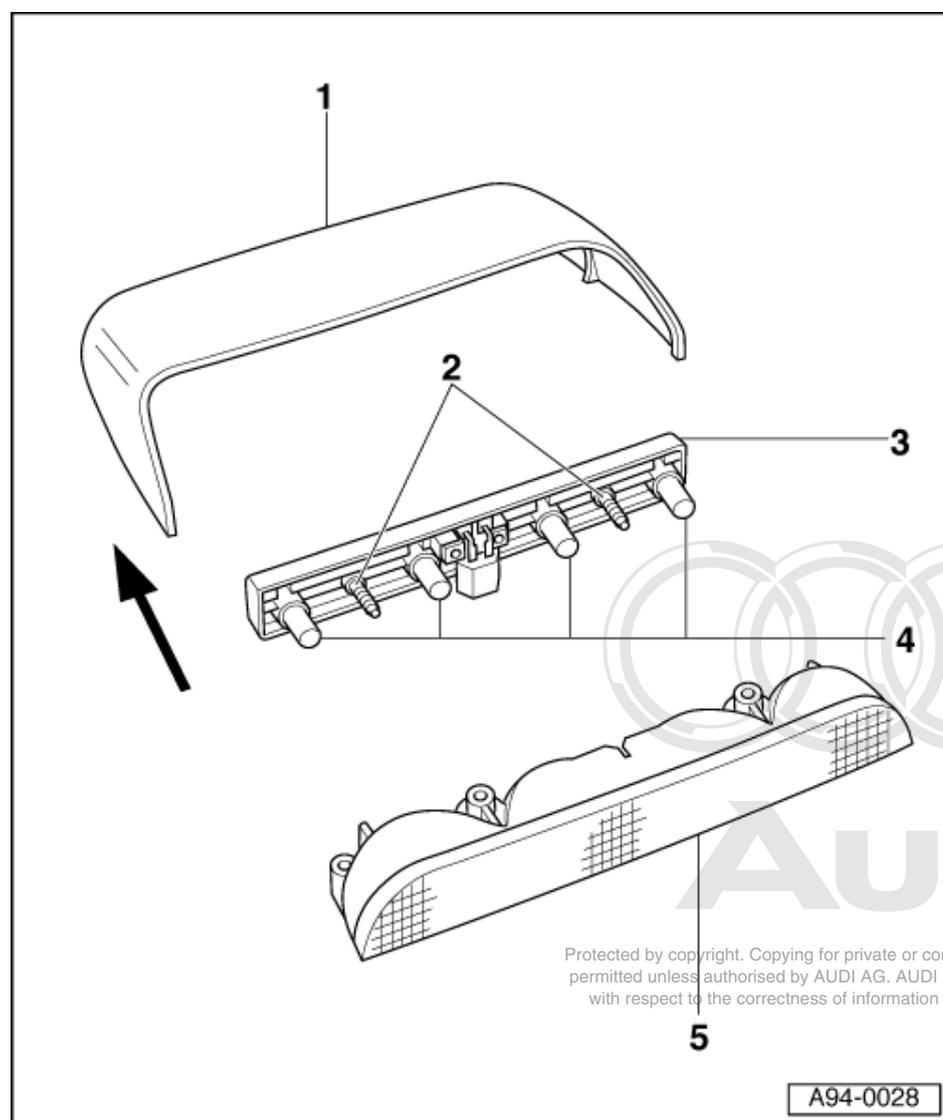
Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

Such bolts are to be stored separately.

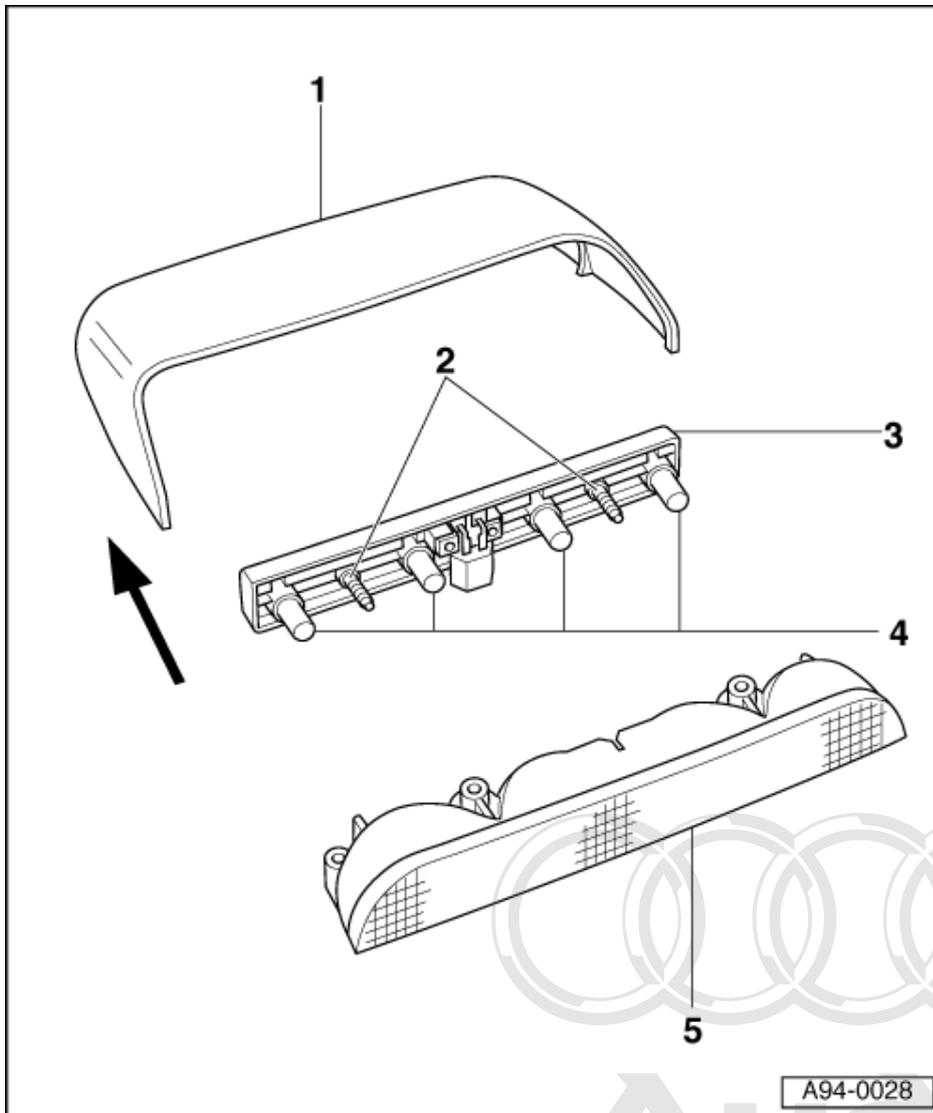
Warning:
Disconnect battery earth strap before working on electrical system.



The high-level brake light is mounted on rear shelf.

Removing:

- Pull off housing cover -1- by hand in direction of arrow.
- Unfasten crosshead bolts -2- and remove bulb carrier -3- in direction of arrow.
- ◆ Bulb -4- (4 x 12V, 5W) are inserted in bulb carrier -3-.
- ◆ 2-pin brake-light connector is located at bulb carrier -3-.



- ◆ Lens unit -5- is attached to rear shelf from underneath with cross-head bolts from luggage compartment.

Installing:

- Install in reverse sequence to removal.

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6 - Servicing steering column switches

6.1 - Servicing steering column switches

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

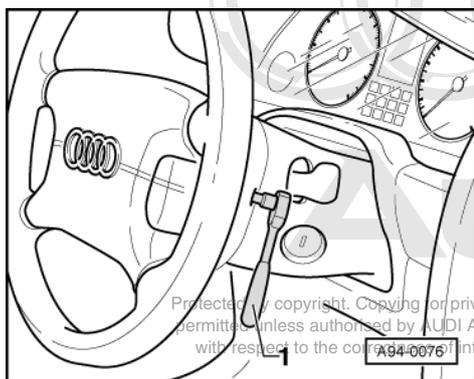
Such bolts are to be stored separately.

Warning:
Disconnect battery earth strap before working on electrical system.

6.2 - Removing and installing steering column switch

Removing:

- Disconnect battery earth strap/cable.
- Move steering wheel to centre position, i.e. wheels straight ahead.
- Move adjustable steering column down as far as it will go and pull out.



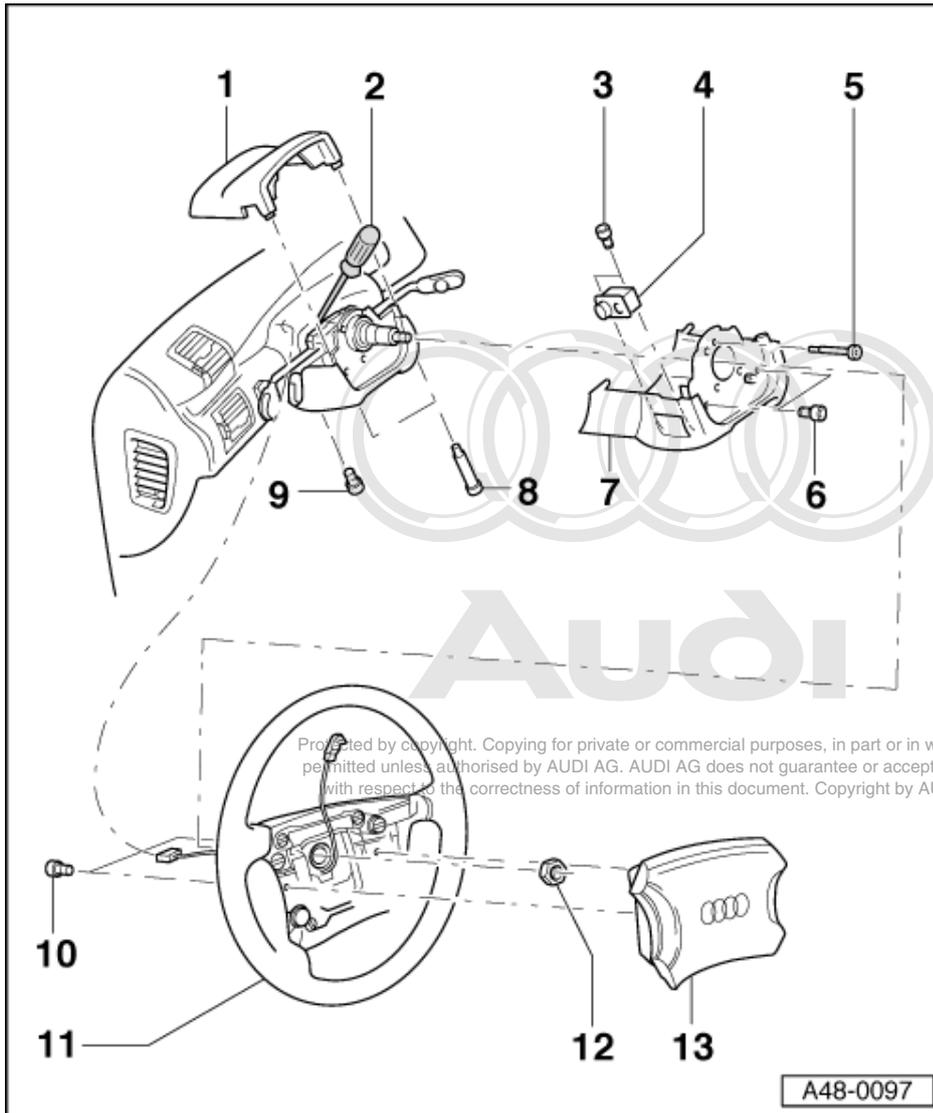
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Note:

Always observe safety regulations for airbag systems when working on airbag system components.

=> General body repairs; Repair group 69; Airbag; Removing and installing driver's airbag Airbag Removing and installing driver's airbag

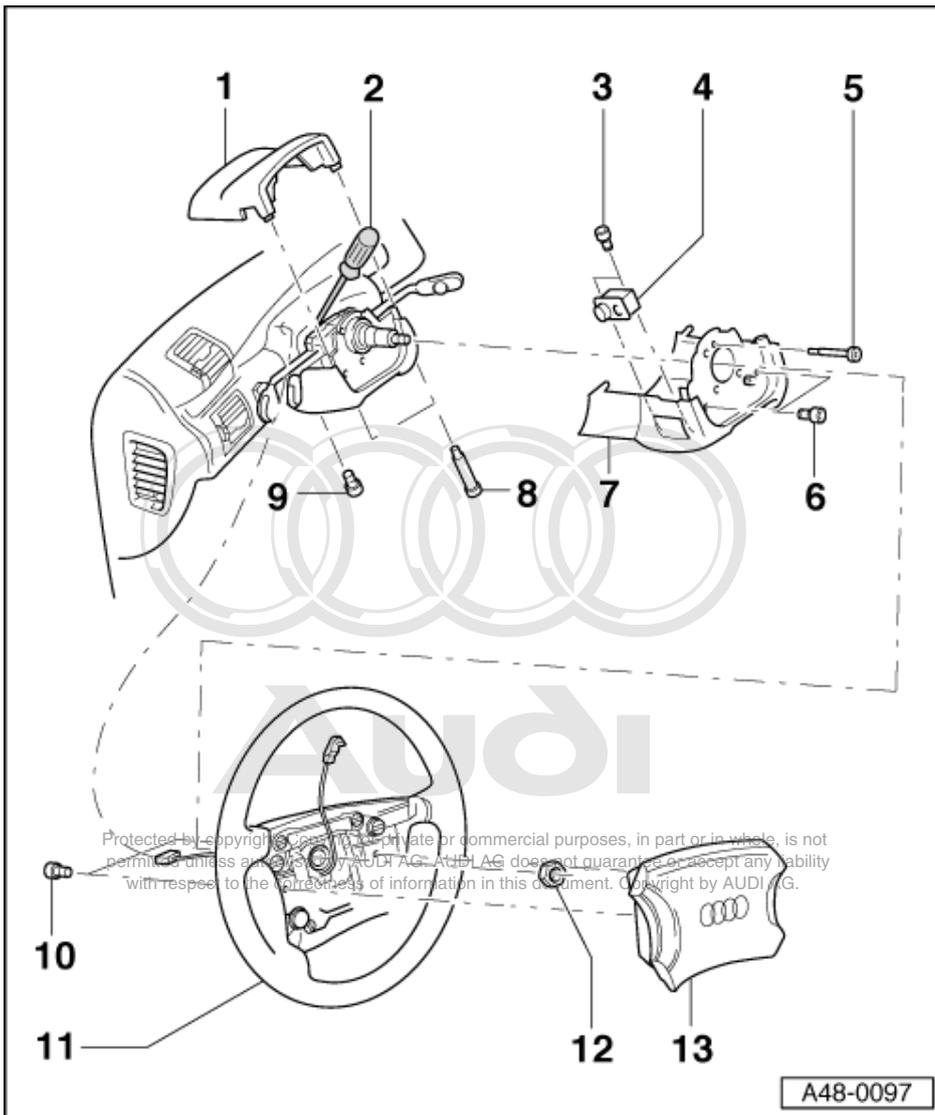
- -> Unscrew (7 Nm) airbag unit on left and right of steering wheel from behind using T30 Torx socket -1-.
- Carefully remove rear airbag unit.
- Plug connector off airbag unit and set down airbag unit with bag facing upwards.



- Unfasten two cross-head bolts -8- and remove upper steering column switch trim -1-.
- Detach electrical plug of cable to coil connector.
- Unscrew hexagon nut (24 mm A/F) -12- and remove steering wheel -11- from steering column.

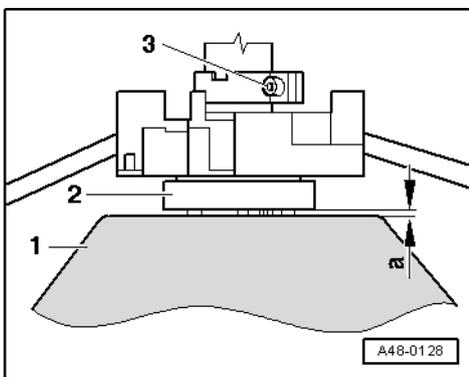
Tightening torque: 50 Nm

Warning:
 Take care not to turn coil connector out of centre position when removing steering wheel.



A48-0097

- Unfasten three cross-head bolts -5 and 6- as well as the Torx bolt (T25) -9- and then remove lower steering column switch trim -7-.
- Detach connector for electrical steering column adjustment.
- Slacken socket head bolt (5 mm) -2- at clamp until steering column switch moves easily.
- Carefully pull connectors off steering column switch.
- Detach steering column switch from steering column and lay aside



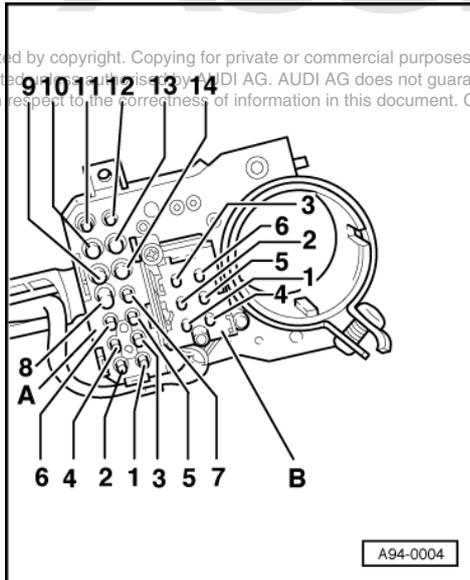
A48-0128

Installing:

- -> Start by using socket head bolt -3- to locate steering column switch -2- on steering column such that distance -a- from steering wheel -1- is 3 mm.
- Remove steering wheel again, then perform further installation in reverse sequence of removal.

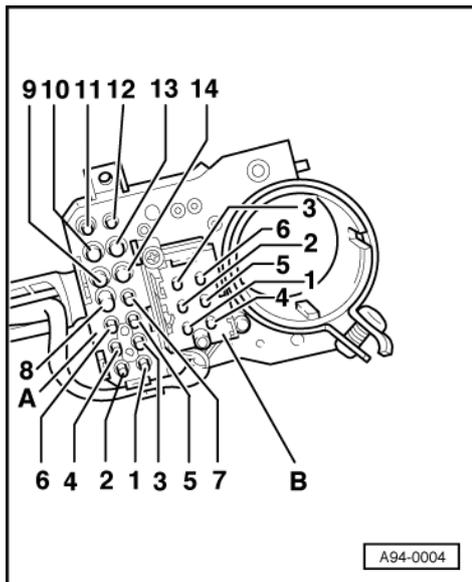
6.3 - Wiring connections on steering column switch

Terminal assignment for light switch, turn-signal indicator switch, switch for manual dipping and headlamp flasher, parking light and cruise control system



-> A - Connector, 14-pin

- 1 - Light switch, terminal 58
- 2 - Switch, terminal 14
- 3 - Light switch and switch for manual dipping and headlamp flasher, terminal 30
- 4 - Light switch and switch for manual dipping and headlamp flasher, terminal 30
- 5 - Parking light switch, terminal PL
- 6 - Parking light switch, terminal P
- 7 - Parking light switch, terminal PR
- 8 - Light switch, contact 11 (daytime/urban setting)
- 9 - Light switch for manual dipping and headlamp flasher, terminal 56 b
- 10 - Light switch for manual dipping and headlamp flasher, terminal 56 a
- 11 - Light switch for manual dipping and headlamp flasher, terminal 56
- 12 - Light switch, contact 1 (daytime/urban setting)

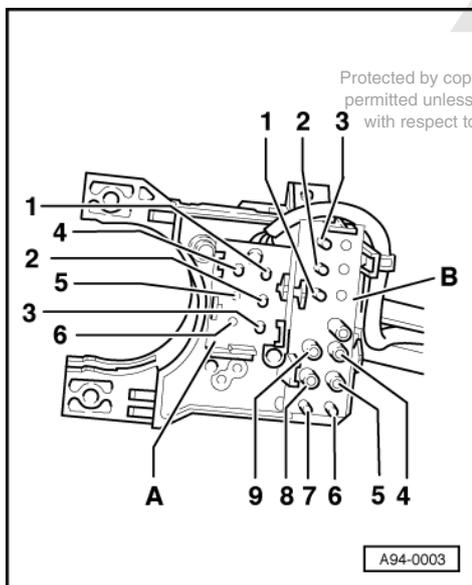


- 13 - -> Light switch, terminal X
- 14 - Light switch, contact 3 (daytime/urban setting)

B - connector, 6-pin

- 1 - On and record -CCS-
- 2 - Record -CCS-
- 3 - Store -CCS-
- 4 - Terminal 15 -CCS-
- 5 - 5-On, record, and off (keyed) -CCS-
- 6 - Input from control unit, contact 3 -CCS-

Terminal assignment for windscreen wiper switch, switch for intensive washer system, headlamp washer system and on-board computer



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-> A - Connector, 6-pin

- 1 - On-board computer reset
- 2 - On-board computer, terminal 31
- 3 - On-board computer, right rocker
- 4 - On-board computer, left rocker
- 5 - Intensive washer system

- 6 - Intensive washer system

B - connector, 13-pin

- 1 - Windscreen wiper switch, terminal J
- 2 - Windscreen wiper switch, terminal 53 c
- 3 - Hazard warning switch, terminal R
- 4 - Windscreen wiper switch, terminal 53 b
- 5 - Windscreen wiper switch, terminal 53 a
- 6 - Hazard warning switch, terminal L
- 7 - Hazard warning switch, terminal 49 a
- 8 - Windscreen wiper switch, terminal 53 e
- 9 - Windscreen wiper switch, terminal 53

7 - Servicing lock cylinder and ignition/starter switch

7.1 - Servicing lock cylinder and ignition/starter switch

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

Such bolts are to be stored separately.

Warning:
 Disconnect battery earth strap before working on electrical system.

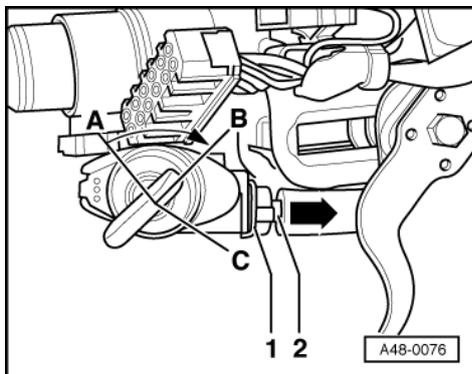
7.2 - Removing and installing lock cylinder

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Removing:

- Removing steering column switch =>Page **154**

On vehicles with automatic gearbox, locking cable must be disengaged:

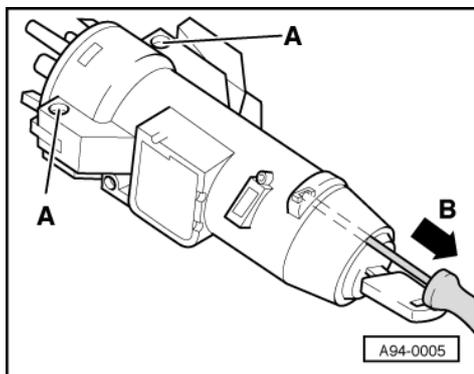


- Move selector lever to "P".
- -> Turn ignition key to position -B- "Ignition on".
- Then lift interlock lever -1- slightly and pull interlock cable -2- out of ignition lock housing.



Note:

The spare key or workshop key is required for removing lock cylinder. The following steps can only be performed with an ignition key which has a flat handle; i.e. a key without a light or remote-control transmitter.



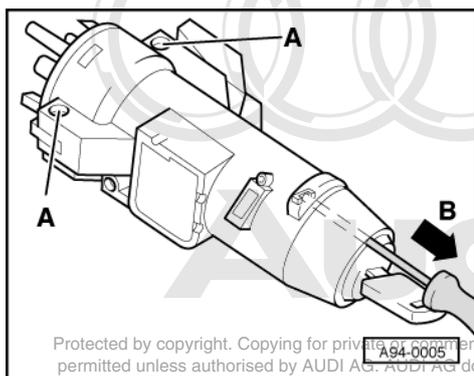
- Insert spare or workshop ignition key and turn to "Ignition on" position; on doing so, hole/opening on end face next to ignition key slot becomes visible.
- -> Insert a length of steel wire or a pin (diameter approx. 1.5 mm) as far as it will go, as illustrated, and pull lock cylinder out of steering lock housing in direction indicated-arrow-.

Installing:

- Insert spare key or workshop key into ignition lock and turn to "Ignition on". Once again insert length of steel wire into aperture in front of lock and push it in as far as it will go.
- Push lock cylinder with ignition key all the way into steering lock housing.
- Then pull out steel wire and press in lock cylinder firmly until catch engages audibly.
- Install steering column switches and steering wheel in reverse sequence to removal => Page 154 .

7.3 - Removing and installing ignition/starter switch

Removing:



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- Removing steering column switch =>Page 154
- Detach connector at ignition/starter switch.
- Remove sealing paint from the two retaining screws -A-.
- -> Slacken retaining screws -A- slightly and pull ignition/starter switch out of steering lock housing in opposite direction of arrow -B-.

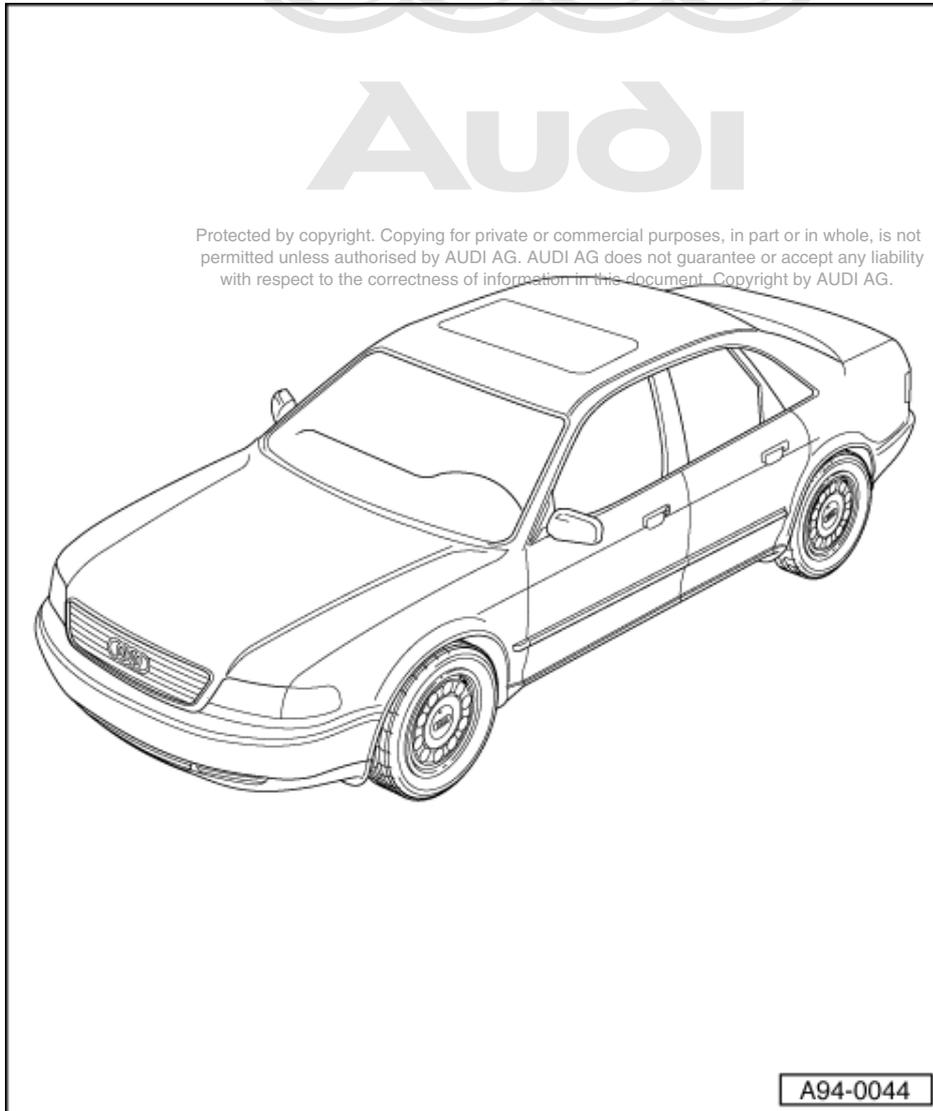
Installing:

Notes:

- ◆ The ignition/starter switch and lock cylinder must be in same position, e.g. "Ignition on", when installing.

- ◆ Seal the two retaining screws on steering lock housing with paint again after they are tightened.
- Install in reverse sequence to removal.

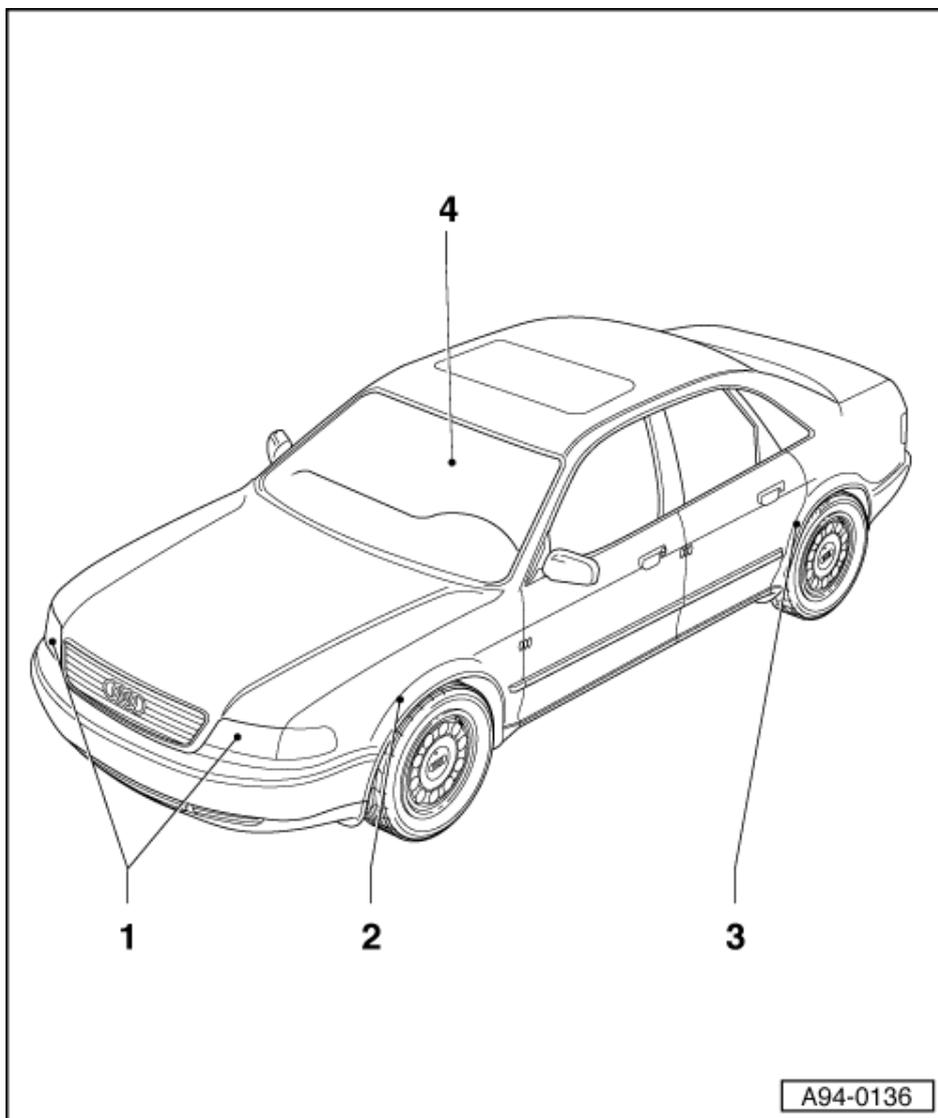
7.4 - Wiring connections on ignition/starter switch



- > 15 - Terminal 15
- 30 - Terminal 30
- 50 - Terminal 50
- 50b-Terminal 50b
- 75 - Terminal 75
- 86s- Terminal 86s
- P - Park position

8 - General overview of automatic headlamp range control

8.1 - General overview of automatic headlamp range control



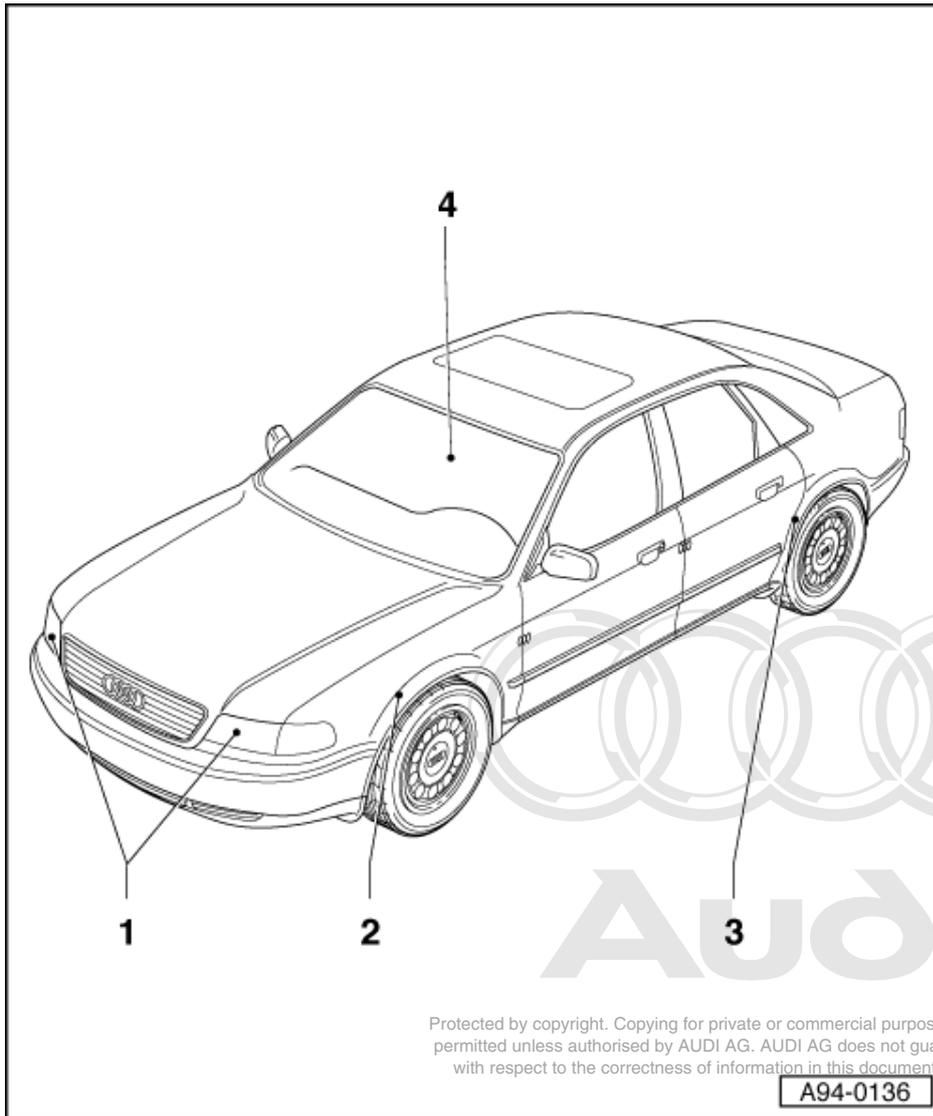
Warning:
Always disconnect battery earth strap before working on electrical system.

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

1 Gas-discharge headlamps with positioning motors for headlamp range control -V48/V49

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A94-0136

2 Self levelling sender FL -G78

- ◆ On front left track control link
- ◆ Removing and installing
=> Page 164 .

3 Self levelling sender RL -G76

- ◆ On rear left wishbone
- ◆ Removing and installing
=> Page 165 .

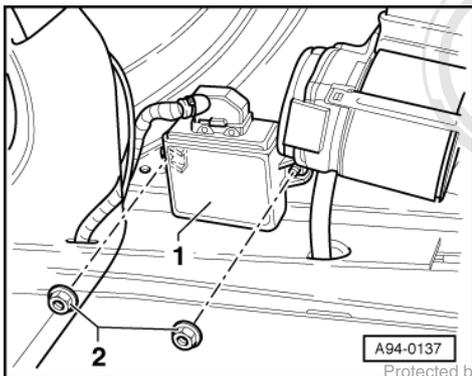
4 Control unit for automatic headlamp range control -J431

- ◆ under right-hand B-pillar trim
- ◆ Removing and installing
=> Page 163 .

8.2 - Removing and installing control unit for automatic headlamp range control -J431

Removing:

- Remove right-hand B-pillar trim



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- -> Control unit for headlamp range control -1- is fitted under right-hand B-pillar trim.
- Pull off connector.
- To remove control unit for automatic range control -1- unscrew the two hexagon nuts -2- (10 mm A/F).

Installing:

- Install in reverse sequence to removal.

8.3 - Removing and installing gas-discharge headlamps

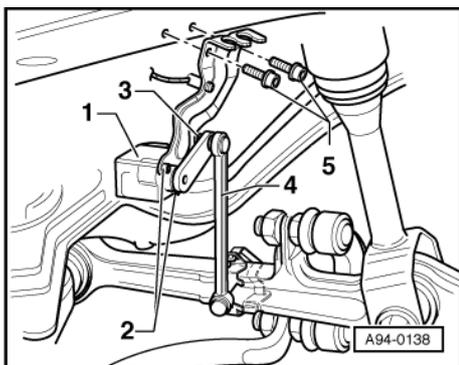
Removing and installing headlamps => Page .

8.4 - Removing and installing headlamp range control positioning motor -V48/V49

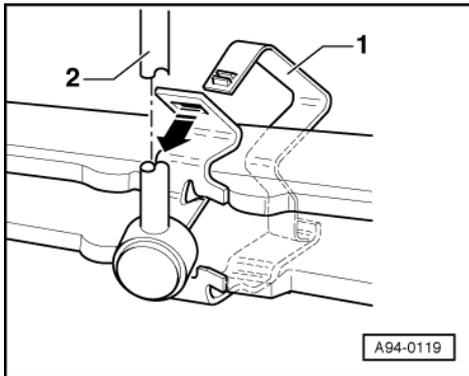
Remove and install headlamp range control positioning motor => Page

8.5 - Removing and installing vehicle levelling sender, front left -G78

Removing:



- -> The front levelling sender -1- is attached on a retaining plate to longitudinal member by the two socket head bolts -5- (5 mm).
- Pull off connector.
- To detach sender from mounting plate and link rod, unscrew hexagon nut -3- (10 mm A/F) and the two socket head bolts -2- (3 mm) on sender.



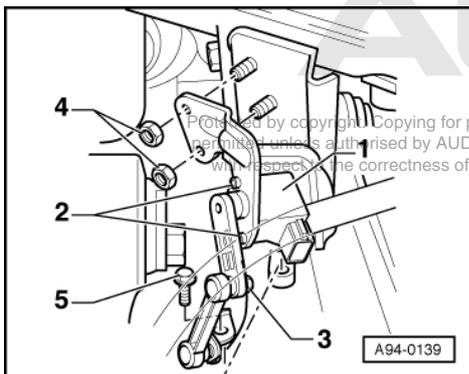
- -> To detach linkage rod -2-, open retainer clamp -1- on track control link by slightly compressing fastener -arrow-.

Installing:

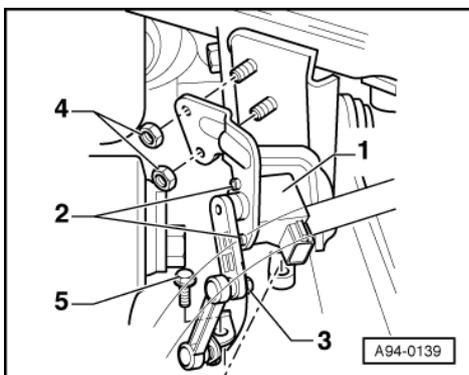
- Install in reverse sequence to removal.

8.6 - Removing and installing vehicle levelling sender, rear left -G76

Removing:



- -> Levelling sender is fastened to rear left link and attached on a retaining plate to subframe by the two hexagon nuts -4- (10 mm A/F).
- Pull off connector.
- To detach sender from mounting plate and link rod, unscrew hexagon nut -3- (10 mm A/F) and the two socket head bolts -2- (3 mm) on sender-1-.



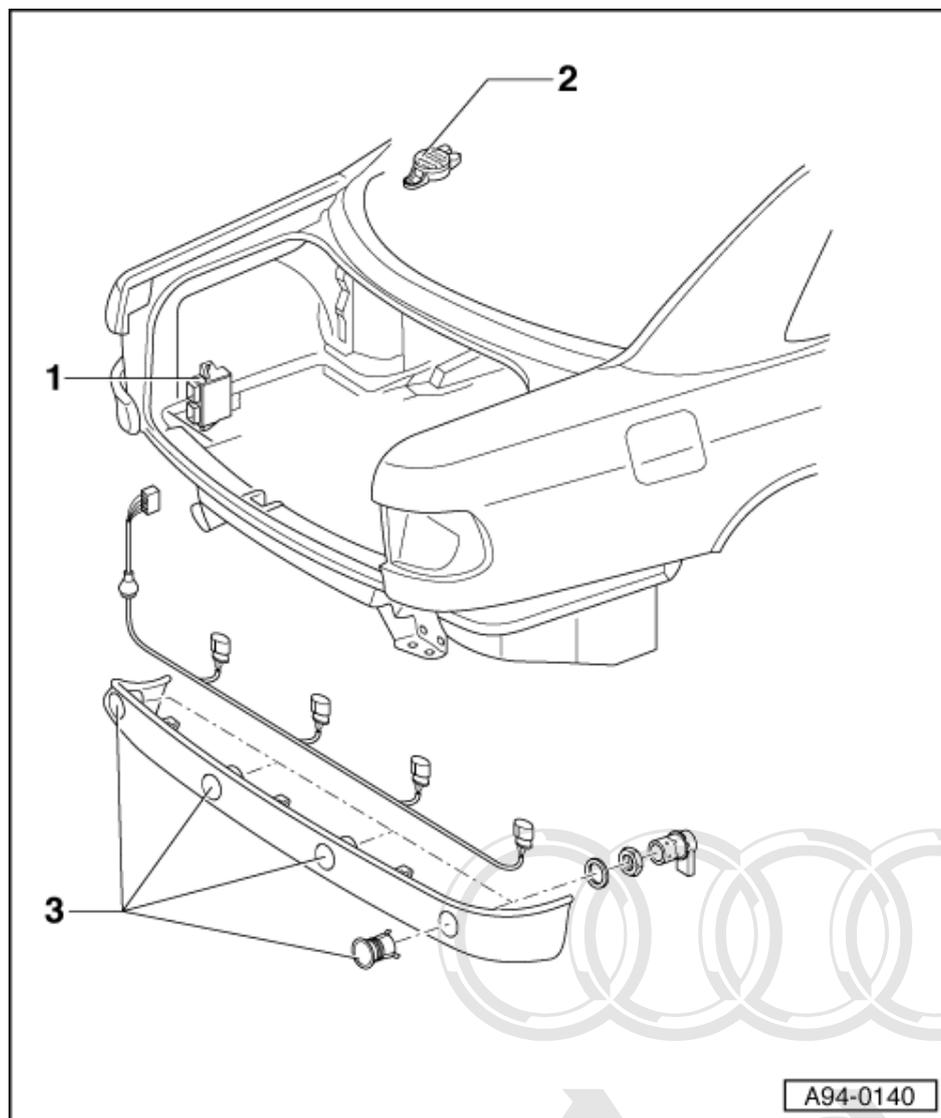
- To detach link rod -4-, unscrew hexagon bolt -5- (10 mm A/F) on wishbone.

Installing:

- Install in reverse sequence to removal.

9 - General overview of parking aid

9.1 - General overview of parking aid



Warning:
Always disconnect battery earth strap before working on electrical system.

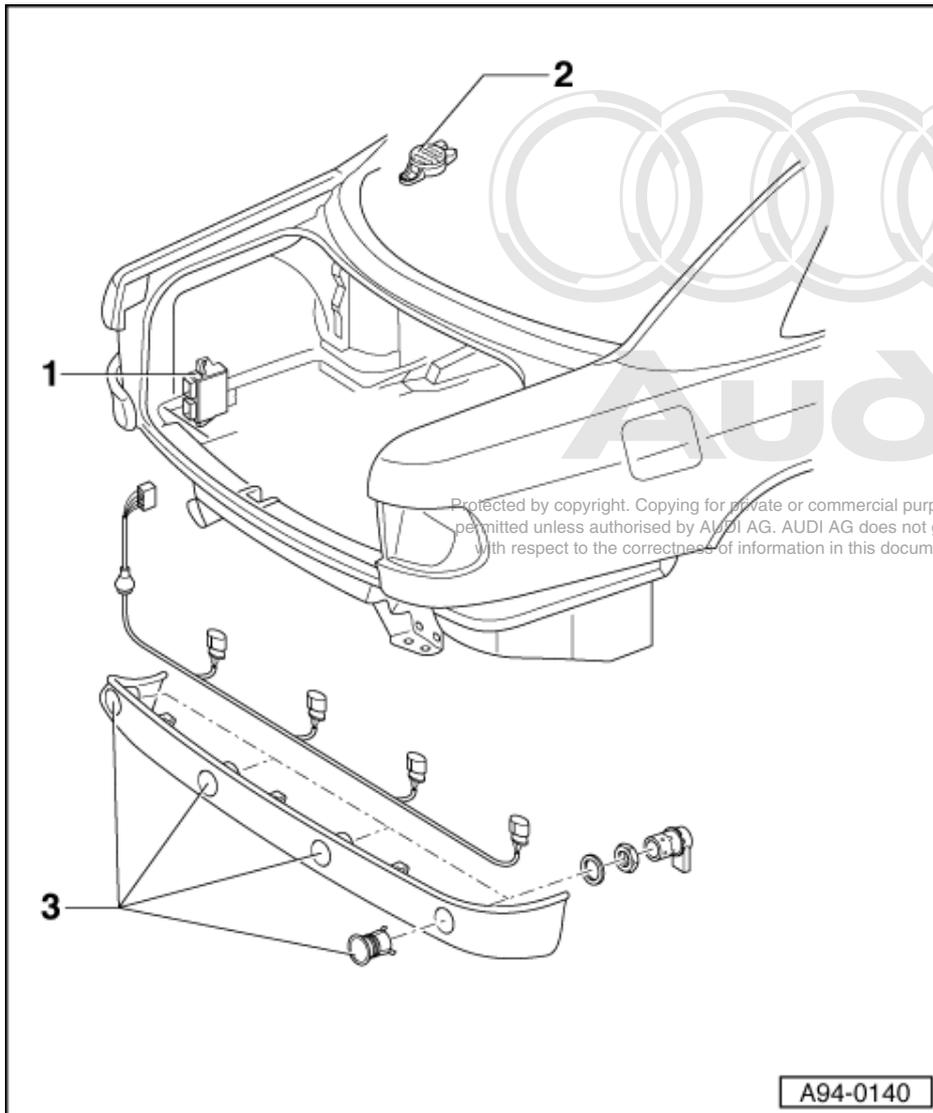
Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

1 Parking aid control unit -J446

- ◆ Behind luggage compartment side trim (left side)
- ◆ Removing and installing

=> Page 167 .



2 Parking aid warning buzzer -H15

- ◆ Below rear shelf
- ◆ Removing and installing
=> Page 168 .

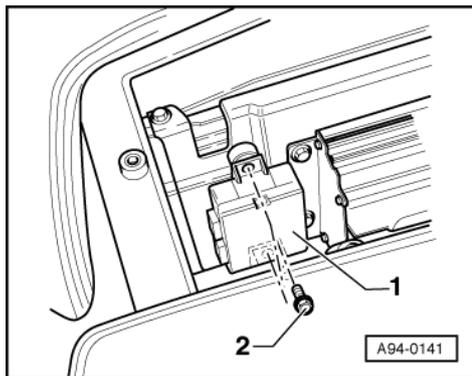
3 Parking aid senders

- ◆ In rear bumper
- ◆ Removing and installing
=> Page 168 .

9.2 - Removing and installing parking aid control unit -J446

Removing:

- Remove trim from left-hand luggage compartment.
- If fitted, detach mounting frame for CD changer.



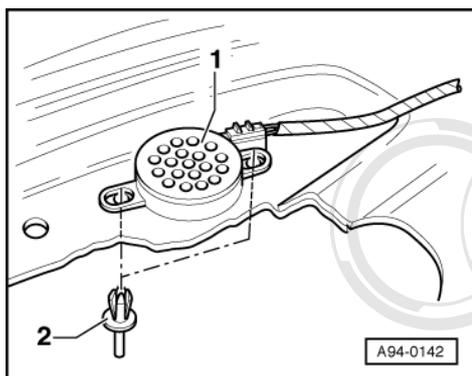
- -> Pull off connector.
- Unscrew the two hexagonal bolts -2- (10 mm A/F) and remove parking aid control unit -1-.

Installing:

- Install in reverse sequence to removal.

9.3 - Removing and installing parking aid warning buzzer -H15

Removing:



- -> The parking aid warning buzzer -1- is below rear shelf on boot partition.
- Remove rear shelf
- Pull off connector.
- Remove the two expanding rivets -2-.
- Lift warning buzzer off luggage compartment partition panel.

Installing:

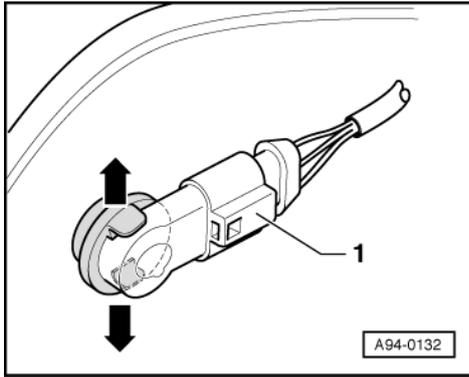
- Installation is carried out in reverse sequence to removal.

9.4 - Removing and installing parking aid senders

Removing:

- Dismantling of ultrasonic sensors involves removal and dismantling of bumper.

=> General body repairs, exterior; Repair group 63; Bumper; Rear bumper, assembly overview Bumper Rear bumper, assembly overview



- -> Unplug connector -1- from sensor.
- Press the two catches outwards -arrows-.
- Push sensor inwards (second mechanic required).
- Remove ultra-sonic sensor from inside bumper.

Installing:

- Install in reverse sequence to removal.



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96 - Lights, Lamps, Switches - interior

1 - Servicing switches

1.1 - Servicing switches

Important note:

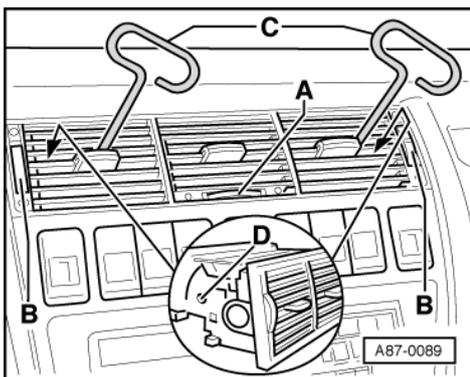
To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

Such bolts are to be stored separately.

Warning:
Disconnect battery earth strap before working on electrical system.

1.2 - Removing and installing switches in centre console

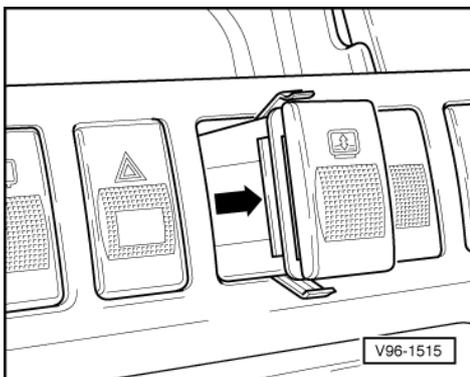


Removing:

- -> Insert auxiliary tools -C- (making tools => Page 171) in holes -D- and pull centre vent evenly out of dash panel insert.

Note:

Auxiliary tools -C- must not be engaged at centre vent slats, as these could break off.

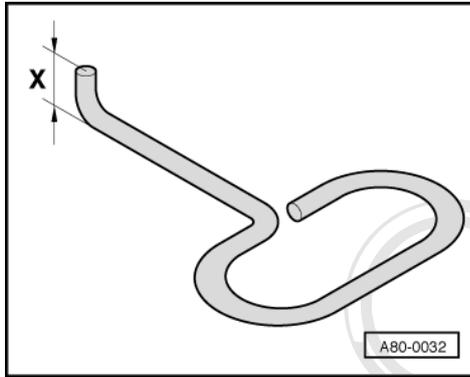


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- -> Press respective switch by hand out of holder from rear through dash panel opening.
- Then pull out switch as far as it will go and detach connector.

Installing:

- Connect connector.
- Push switch into recess in dash panel and ensure it is properly located.
- Insert centre vent in dash panel opening and ensure it is properly located.



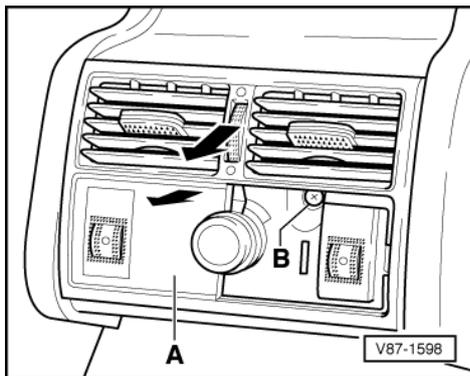
Making auxiliary tool for removal of dash-panel vents

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

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1.3 - Removing and installing rear-seat heating switch

Removing:



- -> Carefully prise off trim -A-.
- Unscrew the two cross-head bolts -B- and remove vent.
- Press respective switch by hand out of holder from rear through opening.
- Then pull out switch as far as it will go and detach connector.

Installing:

- Install in reverse sequence to removal.

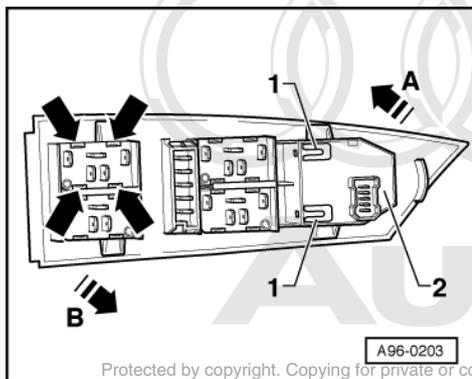


1.4 - Removing and installing mirror adjuster switch

Removing:

- Remove upper and lower recessed handle moulding of door trim.

=> General body repairs; Repair group 70; Door trim; Removing and installing front door trim Door trim Removing and installing front door trim



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- Use plastic wedge to prise out trim for window lifter/mirror adjuster.
- Detach all connectors from switch.
- -> Move the two catches -1- to the right and at the same time press switch -2- in arrow direction -A- out of trim.

Installing:

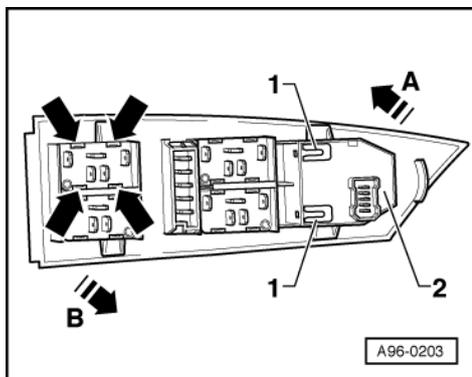
- Install in reverse sequence to removal.

1.5 - Removing and installing front window lifter switches

Removing:

- Remove upper and lower recessed handle moulding of door trim.

=> General body repairs; Repair group 70; Door trim; Removing and installing front door trim Door trim Removing and installing front door trim



- Use plastic wedge to prise out trim for window lifter/mirror adjuster.
- Detach all connectors from switch.
- -> Use small screwdriver to release the four catches -arrows- on the side and press respective window lifter switch forwards in arrow direction -B- out of trim.

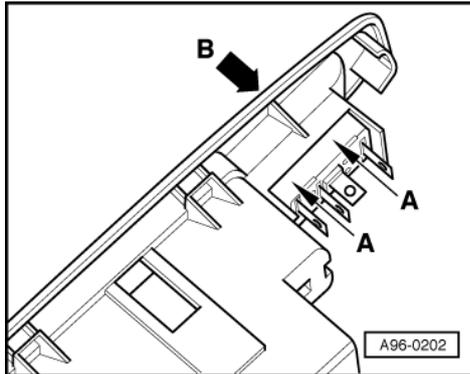
Installing:

- Install in reverse sequence to removal.

1.6 - Removing and installing rear window lifter switches

Removing:

- Pull ashtray insert upwards out of rear door handle trim.

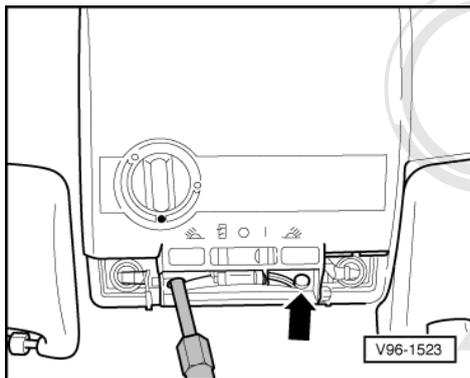


- Use plastic wedge to prise trim half with window lifter switch out of door handle and remove.
- Detach connector and pull off ashtray lighting.
- -> Use small screwdriver to release catch -A- on side and at the same time press switch in arrow direction -B- out of trim.

Installing:

- Install in reverse sequence to removal.

1.7 - Removing and installing sunroof switch



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Note:

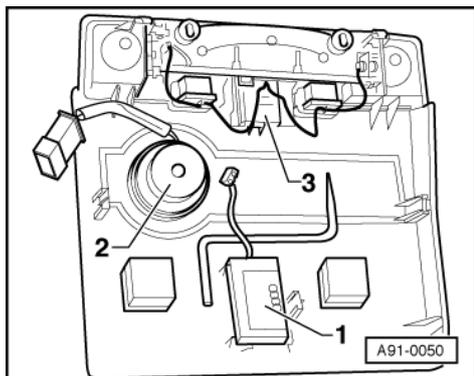
Prior to removal, sunroof must be fully closed/fully open if possible.

Removing:

- Carefully lever off lens using a flat-bladed screwdriver.
- -> Unscrew the two cross-head bolts in area of interior lights -arrow-.



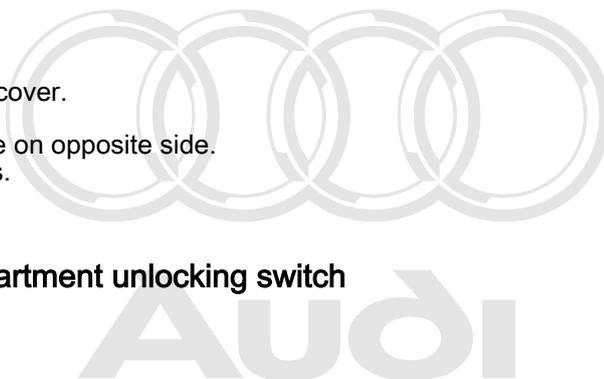
- Use a screwdriver to prise entire interior light cover out of headliner at front and then carefully disengage.



- -> Detach electrical connectors to hands-free microphone -1-, sunroof switch -2- and interior light -3-.
- Remove entire cover and pull sunroof switch forwards off cover.
- Potentiometer can be detached at rear.

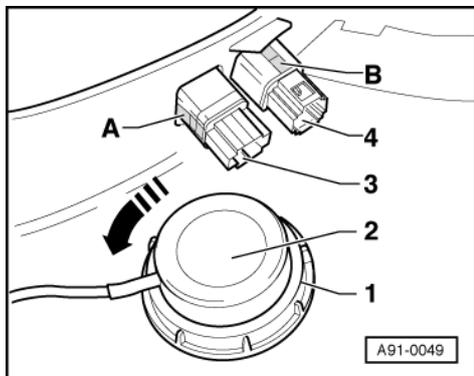
Installing:

- Connect potentiometer and switch at interior light cover.
- Reconnect all electrical plug connectors.
- Fit entire insert in position in headliner and engage on opposite side.
- Screw in the two cross-head bolts and attach lens.



1.8 - Removing and installing luggage compartment unlocking switch

Removing:



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- Remove driver's lower B-pillar trim.

=> General body repairs; Repair group 70; Trim panels; Removing and installing B-pillar trim Trim panels Removing and installing B-pillar trim

- Detach connector from switch.
- -> Use small screwdriver to press in clip -B- on side and press switch -4- forwards out of side trim.

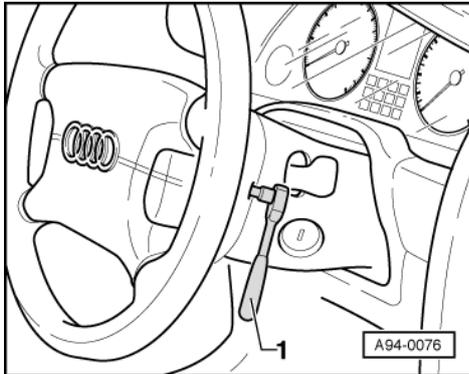
Installing:

- Install in reverse sequence to removal.

1.9 - Removing and installing electric steering column adjustment switch

Removing:

- Disconnect battery earth strap/cable.
- Move steering wheel to centre position, i.e. wheels straight ahead.
- Move adjustable steering column down as far as it will go and pull out.



Note:

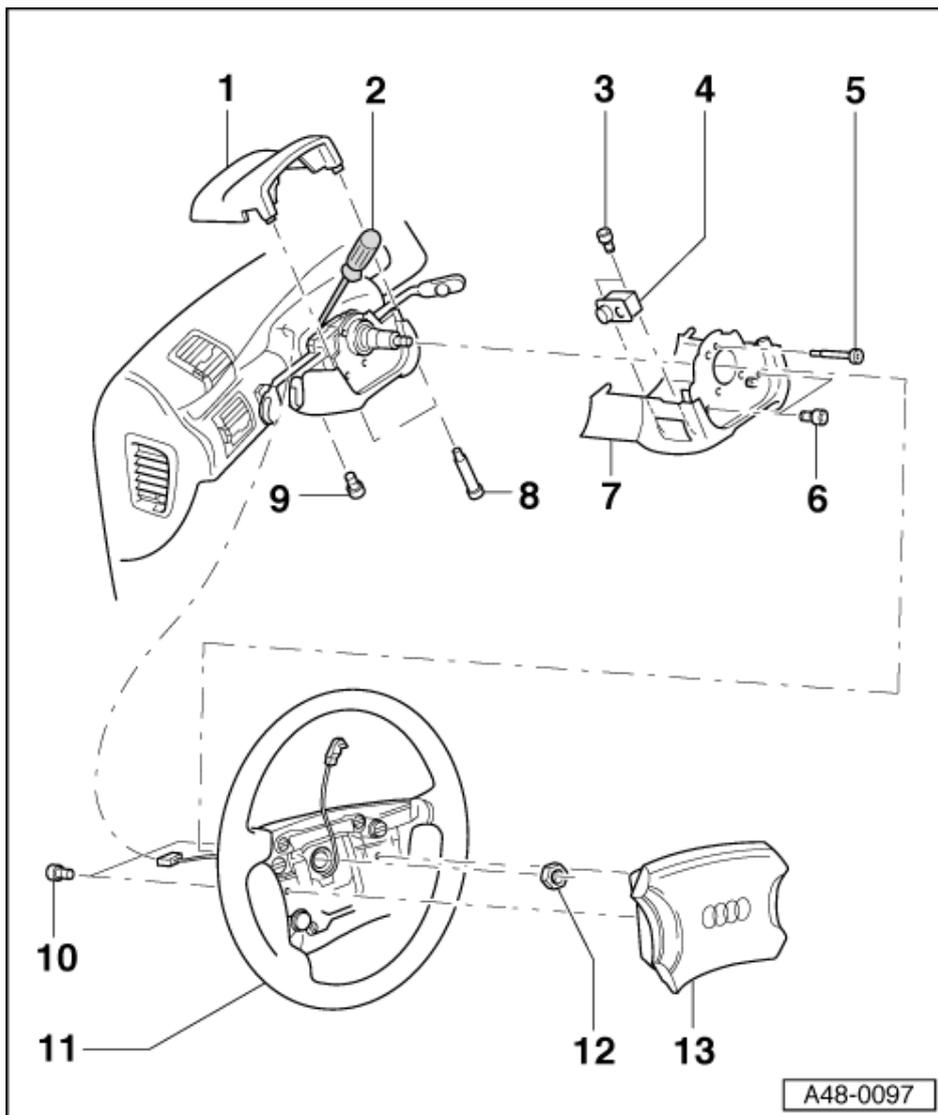
Always observe safety regulations for airbag systems when working on airbag system components.

=> General body repairs; Repair group 69; Airbag; Removing and installing driver's airbag Airbag Removing and installing driver's airbag

- -> Unscrew (7 Nm) airbag unit on left and right of steering wheel from behind using T30 Torx socket -1-.
- Carefully remove rear airbag unit.
- Plug connector off airbag unit and set down airbag unit with bag facing upwards.



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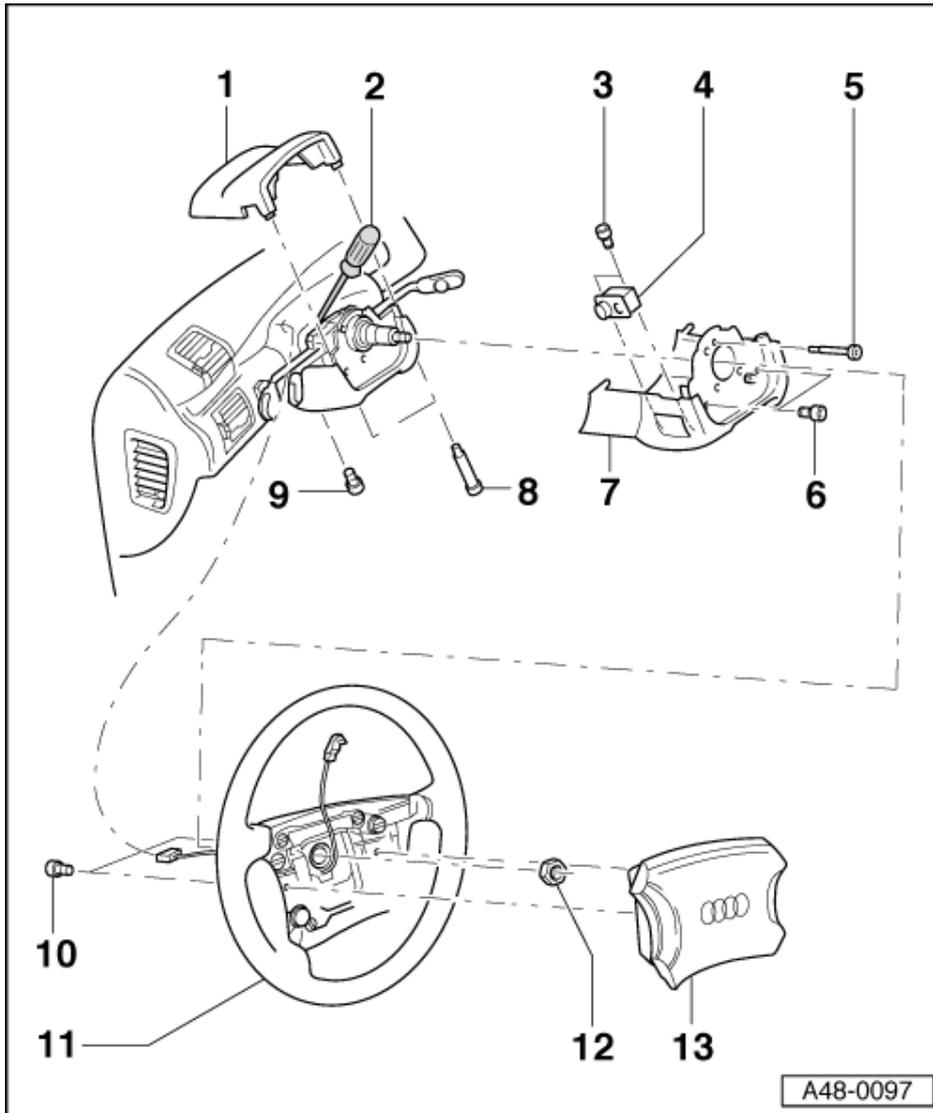
- Unfasten the two cross-head bolts -8- and remove upper steering column switch trim -1-.
- Detach electrical plug to coil connector.
- Unscrew hexagon nut (24 mm A/F) -12- and remove steering wheel -11- from steering column.

Tightening torque: 50 Nm

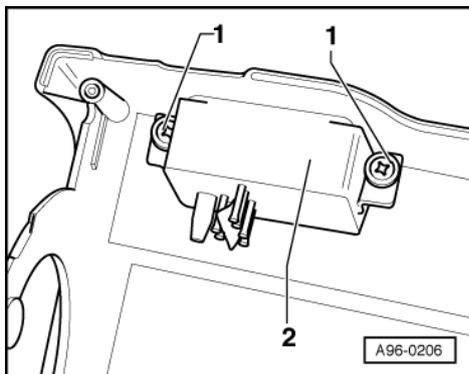
Warning:
Take care not to turn coil connector out of centre position when removing steering wheel.



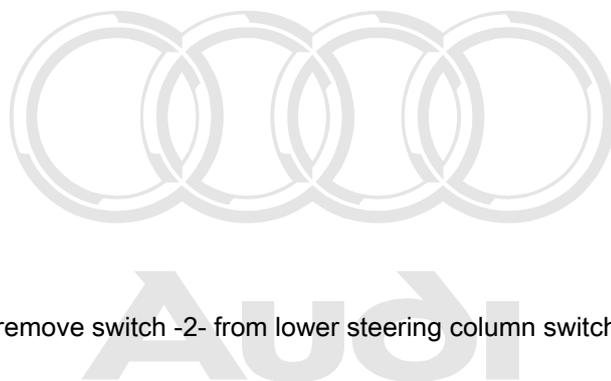
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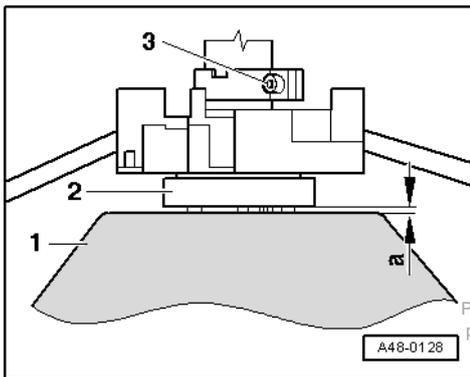
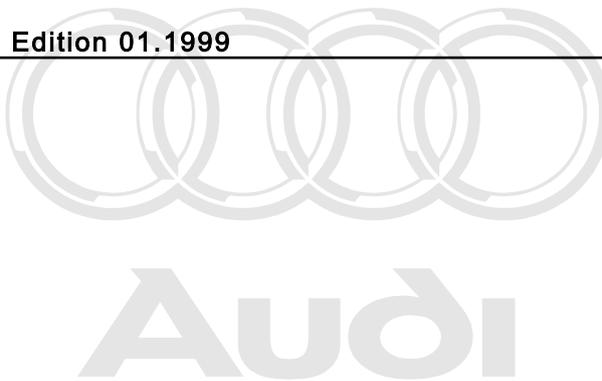
- Unfasten three cross-head bolts -5 and 6- as well as Torx bolt (T25) -9- and then remove lower steering column switch trim.
- Detach connector for electrical steering column adjustment.



- Slacken the two cross-head bolts -1- and remove switch -2- from lower steering column switch trim.



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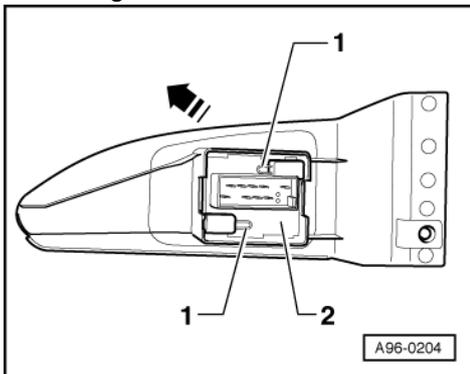
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Installing:

- -> Start by using socket head bolt -3- to locate steering column switch -2- on steering column so that distance -a- from steering wheel -1- is 3 mm.
- Remove steering wheel again, then perform further installation in reverse sequence of removal.

1.10 - Removing and installing driver's seat memory buttons

Removing:



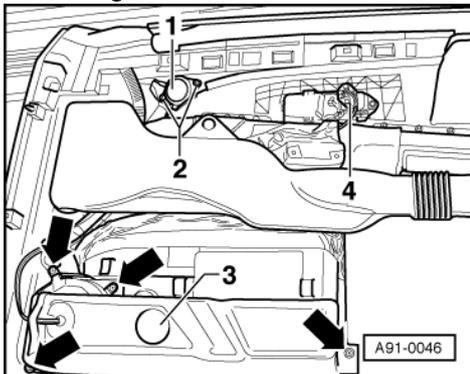
- Unscrew cross-head bolt in driver's door tray and remove entire switch housing upwards.
- Detach connector from switch.
- -> Release the two catches -1- and at the same time press switch -2- in direction of arrow out of housing.

Installing:

- Install in reverse sequence to removal.

1.11 - Removing and installing safety central locking switch

Removing:



- Remove front door trim
- Detach all electrical connectors and remove door trim.
- -> Use small screwdriver to release catch on side and press switch -4- forwards out of door trim.

Installing:

- Install in reverse sequence to removal.

1.12 - Removing and installing door contact switch

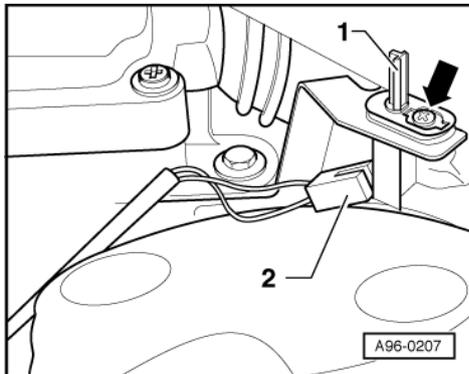
... hole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

The door contact switch is located in door lock and cannot be replaced separately in event of malfunction.

- Removing and installing door lock

=> General body repairs; Repair group 57; Front door; Door lock with mechanical components - assembly overview Front door Door lock with mechanical components - assembly overview

1.13 - Removing and installing bonnet contact switch



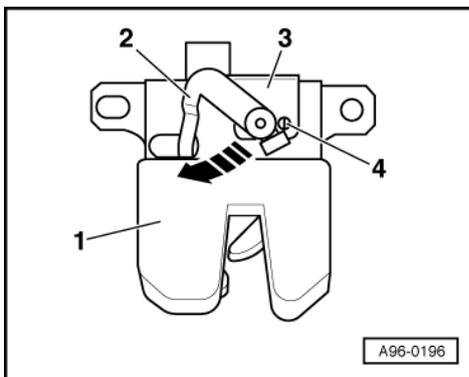
Removing:

- Unfasten three cross-head bolts and remove plenum chamber cover in engine compartment.
- Remove protective sheath from contact switch.
- -> Unfasten cross-head bolt -arrow- at contact switch -1- and remove contact switch.
- Unplug connector -2-.

Installing:

- Install in reverse sequence to removal.

1.14 - Removing and installing boot lid/tailgate contact switch



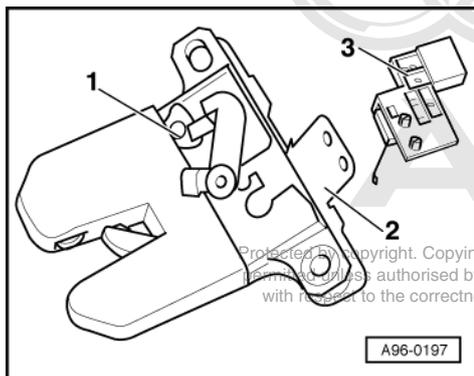


Removing:

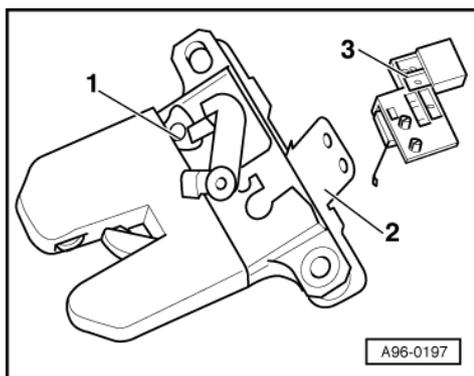
- Remove tailgate lock

=> General body repairs; Repair group 55; Boot lid/tailgate; Removing and installing boot lid/tailgate lock Boot lid/tailgate Removing and installing boot lid/tailgate lock

- Detach connector.
- -> With boot lid/tailgate lock -1- removed, use a flat-bladed screwdriver to release plastic tab -3- at the two rivets -4-.
- Press lever -2- in direction of arrow and pull back plastic tab -3-.



- -> Carefully remove contact switch -3- from boot lid/tailgate lock -1-.



Installing:

- Carefully fit contact switch in its mounting in boot lid/tailgate lock.
- -> Push back plastic tab -2- into its original position and engage it on contact switch.
- Push on connector.
- Install boot lid/tailgate lock

=> General body repairs; Repair group 55; Boot lid/tailgate; Removing and installing boot lid/tailgate lock Boot lid/tailgate Removing and installing boot lid/tailgate lock

2 - Servicing immobiliser

2.1 - Servicing immobiliser

Warning:
Disconnect battery earth strap before working on electrical system.

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

Note:

The immobiliser control unit is integrated in dash panel insert, and can only be replaced together with dash panel insert => Page 106 .

2.2 - Defective transponder and/or lost keys

- ◆ The transponder is integrated in key.
 - ◆ The whole key must be replaced if transponder is defective or if key is lost.
- Make up or order replacement key with integral transponder according to lock code number.
 - Matching all vehicle keys
=> Page 32 .

2.3 - Replace reader coil

- ◆ The reader coil is an integral part of lock cylinder and cannot be replaced separately.
 - ◆ The reader coil must be replaced together with lock cylinder.
 - ◆ In order to get vehicle mobile as quickly as possible, proceed as follows:
- Remove lock cylinder for steering/ignition lock => Page 159 .
 - Install a provisional replacement lock cylinder with any lock code number and do not change the door locks.

Note:

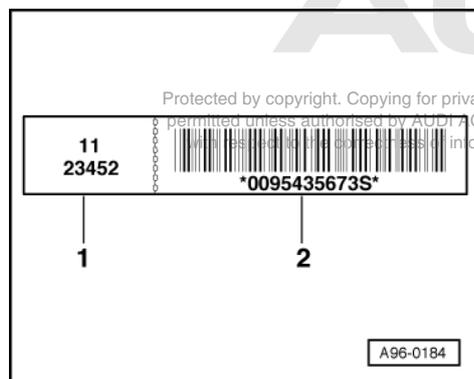
The customer will have to use two different keys for vehicle until new lock cylinder is supplied.

- Order a new lock cylinder with correct lock code number for vehicle from importer (or Sales Centre).
- After delivery, install new lock cylinder with correct lock code number for vehicle in place of replacement lock cylinder fitted earlier.

2.4 - Procedure when replacing lock set or immobiliser control unit

Note:

To guarantee that immobiliser can be identified later, the following steps must be carried out when changing locking set and control unit.



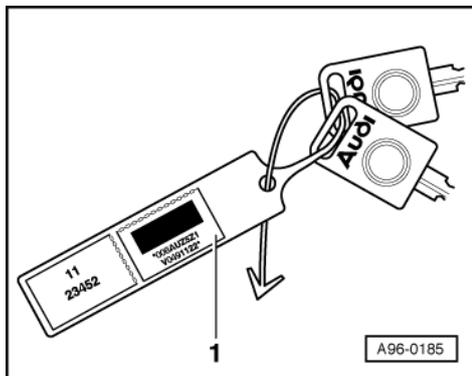


-> 1. Lock set with 2-part sticker

Note:

The sticker on key tag of new locking set serves to identify mechanical locking.

- Pull off right-hand sticker -2- (with bar code) from new lock set key fob and destroy.
- Pull remaining left-hand sticker -1- (without bar code) off new lock set key fob and attach to customer key fob in place of existing left-hand sticker.



-> This updates identification on customer's key fob.

- ◆ Left-hand sticker (new) - mechanical lock code
- ◆ Right-hand sticker -1- - immobiliser control unit

2. immobiliser control unit (integrated in dash panel insert)

- Replacement control units no longer have a label with concealed code number (rub-off covering); secret code number can only be established via 14-digit identification number of immobiliser control unit:
 - ◆ by direct system access (same as direct enquiry for radio code)
 - ◆ via the self-diagnosis function (see "Interrogating control unit version" => Page 26)
- ◆ from sticker on dash panel insert together with new Part No.
- ◆ from importer (or regional sales centre)

Note:

Important: always advise customer of new code number.

2.5 - Testing system

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Note:

The immobiliser is deactivated for a period of 10 minutes after every successful log-in function: The operation of system should not be tested during this period.

- The ignition must be switched off for at least 30 seconds.
- Cover reader coil using a metal plate with a slot (for instance by placing a suitable washer over the ignition switch) and insert ignition key through slot into ignition switch.

or

Disconnect electrical wiring for reader coil at plug connector between ignition/starter switch and immobiliser control unit.

- Start engine.

The engine should not run and warning lamp should start flashing.

- Start self-diagnosis of immobiliser
=> Page 25 .
- Interrogating fault memory => Page 27 .

One of following two fault messages should appear on display:

-> Display readout:

Key
Signal too low

or

-> Display readout:

immobiliser reader coil-D2

- Erasing fault memory => Page 29 .

3 - Servicing interior lights

3.1 - Servicing interior lights

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

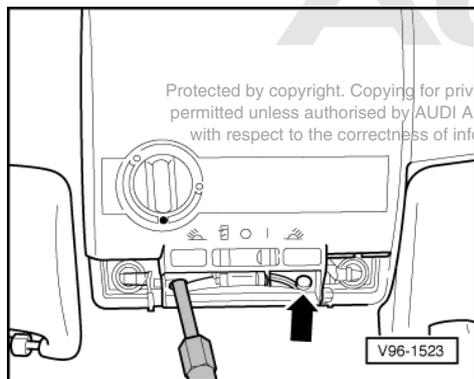
These feature a special surface coating and can be recognised by their greenish colour.

These bolts are to be stored separately.

Warning:
Disconnect battery earth strap before working on electrical system.

3.2 - Removing and installing front interior light

Notes:

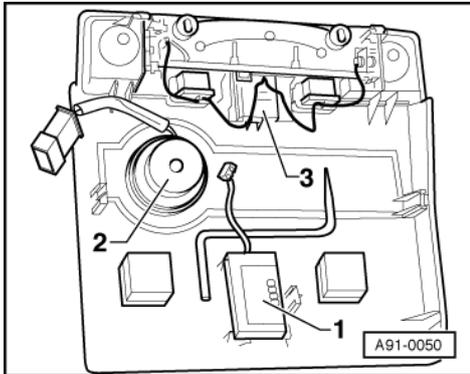




- ◆ Bulb replacement only involves prising off lens.
- ◆ Interior light bulb: 12 V, 10 W
- ◆ Reading light bulb 12 V, 5 W

Removing:

- Carefully lever off lens using a flat-bladed screwdriver.
- -> Unscrew the two cross-head bolts in area of interior lights -arrow-.



- Use a screwdriver to prise entire interior light cover out of headliner at front and then carefully disengage.
- -> Detach electrical connectors to hands free microphone -1-, sunroof switch -2- and interior light -3-.
- Remove entire cover.

Installing:

- Reconnect all electrical plug connectors.
- Fit entire insert in position in headliner and engage on opposite side.
- Screw in the two cross-head bolts and attach lens.

3.3 - Removing and installing rear interior light

Removing:

- Use screwdriver to prise interior light panel out of headliner trim.
- Detach electrical connector.
- To replace, remove the two bulbs (12 V, 5 W) from their holders.

Installing:

- Install in reverse sequence to removal.



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3.4 - Removing and installing luggage compartment lights

Note:

There are two lights at top of luggage compartment and one beneath sill.

Removing:

- Insert Phillips screwdriver behind lens of appropriate light and carefully prise out light.
- Pull out lens with bulb carrier.
- Replace bulb 12 V, 5 W.

Installing:

- Insert lens with bulb carrier in stowage compartment and engage.

3.5 - Removing and installing sill courtesy lights and door reflectors

A sill courtesy light is provided at bottom of each door with a reflector on the side.

- Removal and replacement only involves using a screwdriver to prise lens sideways out of door.
- Unclip/unscrew bulbs from socket.
- ◆ Courtesy light bulb: 12 V, 5 W
- ◆ Door reflector light bulb: 12 V, 3 W

4 - Servicing lock cylinder heating

4.1 - Servicing lock cylinder heating

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Important note:

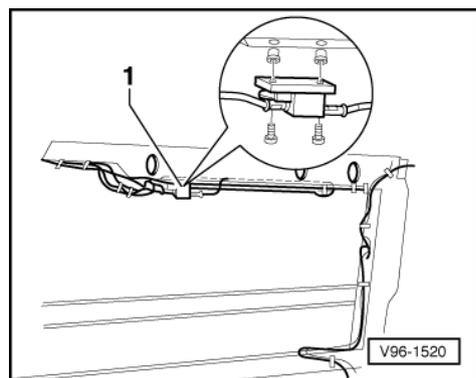
To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

These bolts are to be stored separately.

Warning:
 Disconnect battery earth strap before working on electrical system.

4.2 - Removing and installing control unit for lock cylinder heating



The control unit for lock cylinder heating is located on upper side member in driver's door.

- Remove door trim
- -> Unfasten the two cross-head bolts.
- Unplug connectors and remove control unit -1-.



5 - Cruise Control System (CCS)

5.1 - Cruise Control System (CCS)

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

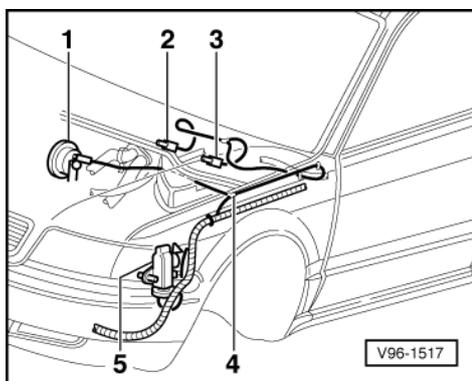
These bolts are to be stored separately.

Warning:

Disconnect battery earth strap before working on electrical system.

5.2 - Design of Cruise Control System:

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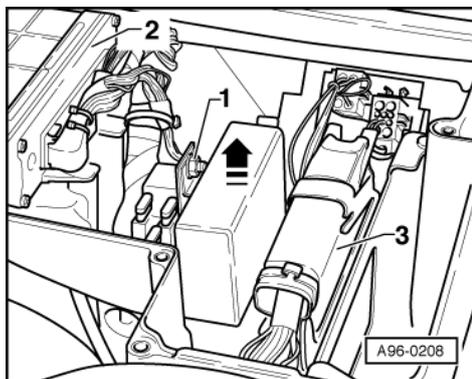
- 1 - Actuator with diaphragm
- 2 - Break vent valve
- 3 - Clutch vent valve (manual gearbox only)
- 4 - Vacuum hose connection (T-piece)
- 5 - Vacuum pump

Notes:

- ♦ The CCS control switch is integrated into turn signal lever.
- ♦ Contact assignment at steering column switch => Page .
- ♦ The CCS control unit is located in electronics box in plenum chamber.

5.3 - Removing and installing control unit

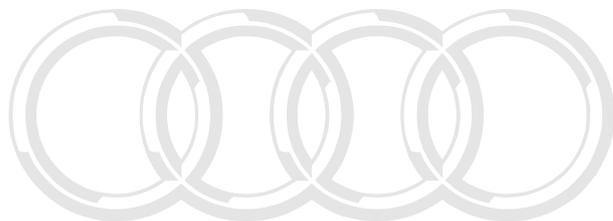
Removing:



- Slacken plenum chamber cover bolts (3 x cross-head) in engine compartment and remove cover.
- Remove cover of electronics box by slackening four cross-head screws.
- -> Slacken nut (10 mm A/F) -1- and lift control unit out of electronics box.
- Disconnect connector.

Installing:

- Install in reverse sequence to removal.



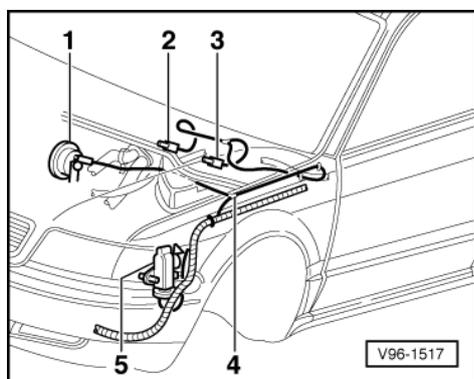
5.4 - Removing and installing vacuum pump

Removing:

- Detach noise insulation on underside of vehicle.

=> 8-cylinder engine, mechanical components; Repair Group 10; Removing and installing engine Removing
 Removing and installing engine Removing

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- Remove bumper:

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

- Unfasten the two nuts (10 mm A/F).
- -> Remove vacuum pump -5- downwards.
- Detach vacuum hose connection and electrical connector.

Installing:

- Install in reverse sequence to removal.

6 - Servicing horn

6.1 - Servicing horn

Important note:

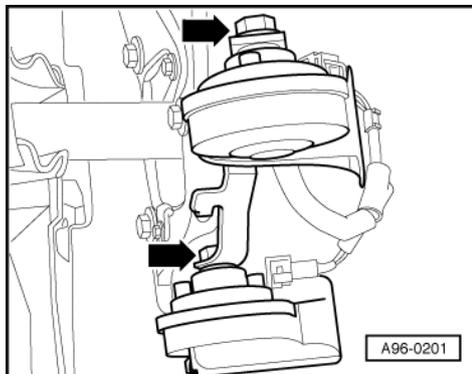
To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

These bolts are to be stored separately.

Warning:
Disconnect battery earth strap before working on electrical system.

6.2 - Removing and installing horn



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Removing:

- Remove bumper

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

- -> Unscrew the two securing nuts (13 mm A/F) -arrows- and remove horns from brackets.
- Detach electrical connectors.

Installing:

- Install in reverse sequence to removal.

7 - Heated steering wheel

7.1 - Heated steering wheel

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

These bolts are to be stored separately.

Warning:
Disconnect battery earth strap before working on electrical system.

7.2 - Servicing heated steering wheel

The heated steering wheel is available both as standard version and as audio steering wheel.

- Removing airbag unit and steering wheel => Page 154 .
- Test wiring using current flow diagram.

=> Current flow diagrams, Electrical fault finding and fitting locations

Note:

Steering wheel must be replaced if heated steering wheel is defective.

- Installing airbag unit and steering wheel => Page 154 .



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97 - Wiring

1 - Relay carrier, fuse carrier

1.1 - Relay carrier, fuse carrier

Warning:
Disconnect battery earth strap before working on electrical system.

Notes:

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- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

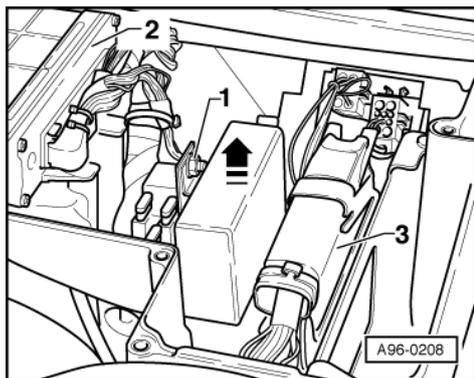
These feature a special surface coating and can be recognised by their greenish colour.

These bolts are to be stored separately.

1.2 - Electronics box in engine compartment

The electronics box in engine compartment contains for example engine control unit, automatic gearbox control unit and control unit for cruise control system.

Removing:



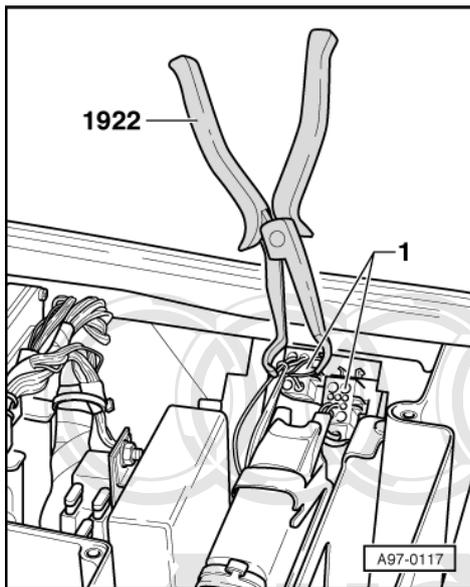
- Slacken plenum chamber cover bolts (3 x cross-head) in engine compartment and remove cover.
- Remove cover of electronics box by slackening four cross-head screws.

- 1 - -> Control unit for cruise control system
- 2 - Engine control unit
- 3 - Automatic gearbox control unit

Installing:

- Install in reverse sequence to removal.

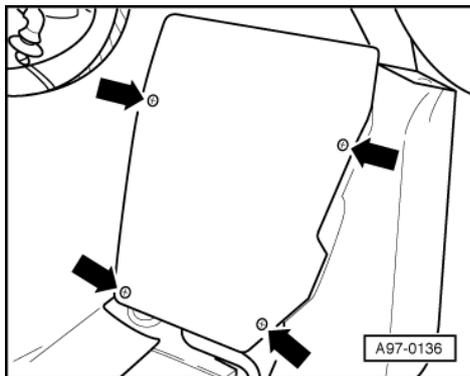
Detaching connectors in electronics box in engine compartment



- -> To detach the two connectors -1-, use special tool 1922 to pull off plugs in electronics box.

1.3 - Electronics box in passenger's footwell

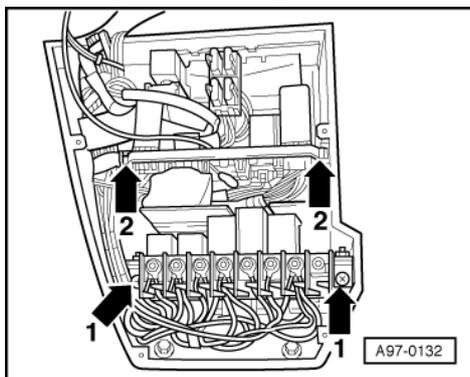
The central electrics and an auxiliary relay carrier are integrated into electronics box in passenger's footwell.



Removing:

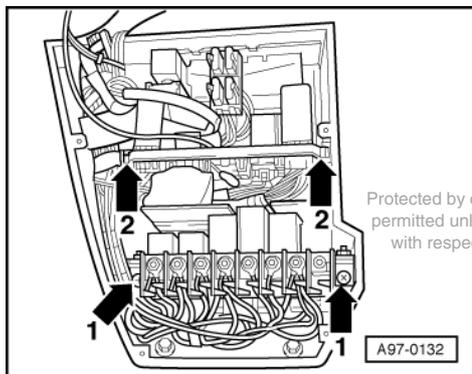
- Remove carpet in passenger's footwell.
- -> Unfasten the four bolts -arrows- at lid of electronics box and then remove lid.

Removing and installing central electrics

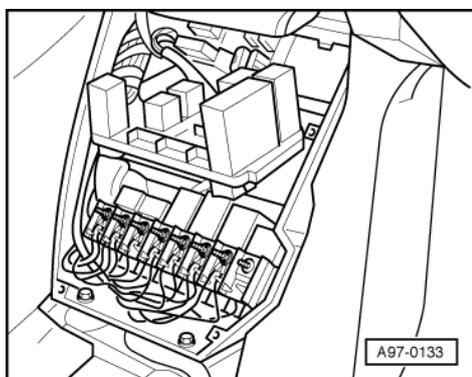


- -> Unfasten the two cross-head bolts -1- and remove central electrics.

Removing and installing auxiliary relay carrier



- -> Push auxiliary relay carrier on left and right out of guide rails -2-.

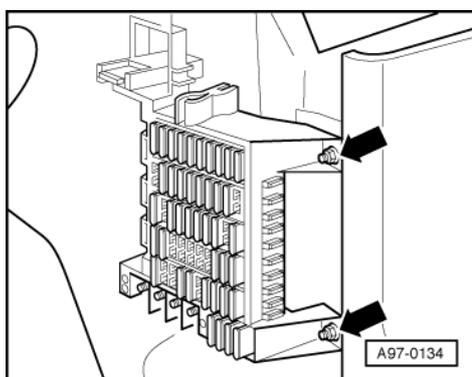


- -> Remove auxiliary relay carrier from electronics box.

Installing:

- Install in reverse sequence to removal.

1.4 - Fuse carrier on right in passenger's footwell



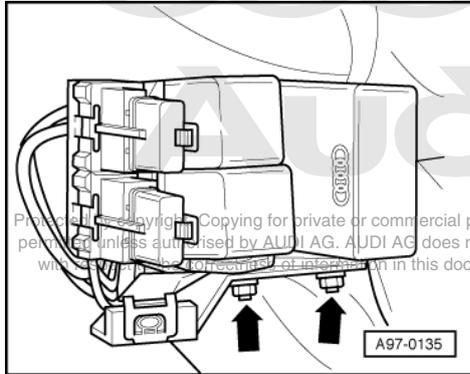
Removing:

- Remove cover in passenger's footwell.
- -> Unfasten bolts -arrows- and then remove fuse carrier.

Installing:

- Install in reverse sequence to removal.

1.5 - Auxiliary relay carrier on left in driver's footwell



The turn-signal indicator/hazard-warning relay is on auxiliary relay carrier.

Removing:

- Remove driver's shelf at bottom.

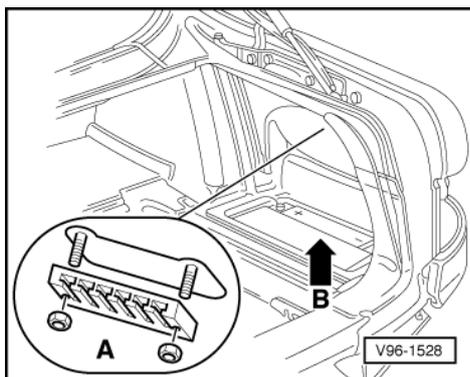
=> General body repairs; Repair group 68; Storage compartments; Removing and installing driver's side storage compartment Storage compartments Removing and installing driver's side storage compartment

- -> Unfasten bolts -arrows- and then remove auxiliary relay carrier.

Installing:

- Install in reverse sequence to removal.

1.6 - Auxiliary relay carrier on left in luggage compartment



Removing:

- Open and remove cover in right side of luggage compartment on underside.
- -> Unfasten the two nuts (10 mm A/F) -A- and remove relay carrier.

Installing:

- Install in reverse sequence to removal.

2 - Fitting locations of control units

2.1 - Fitting locations of control units

Warning:
Disconnect battery earth strap before working on electrical system.

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

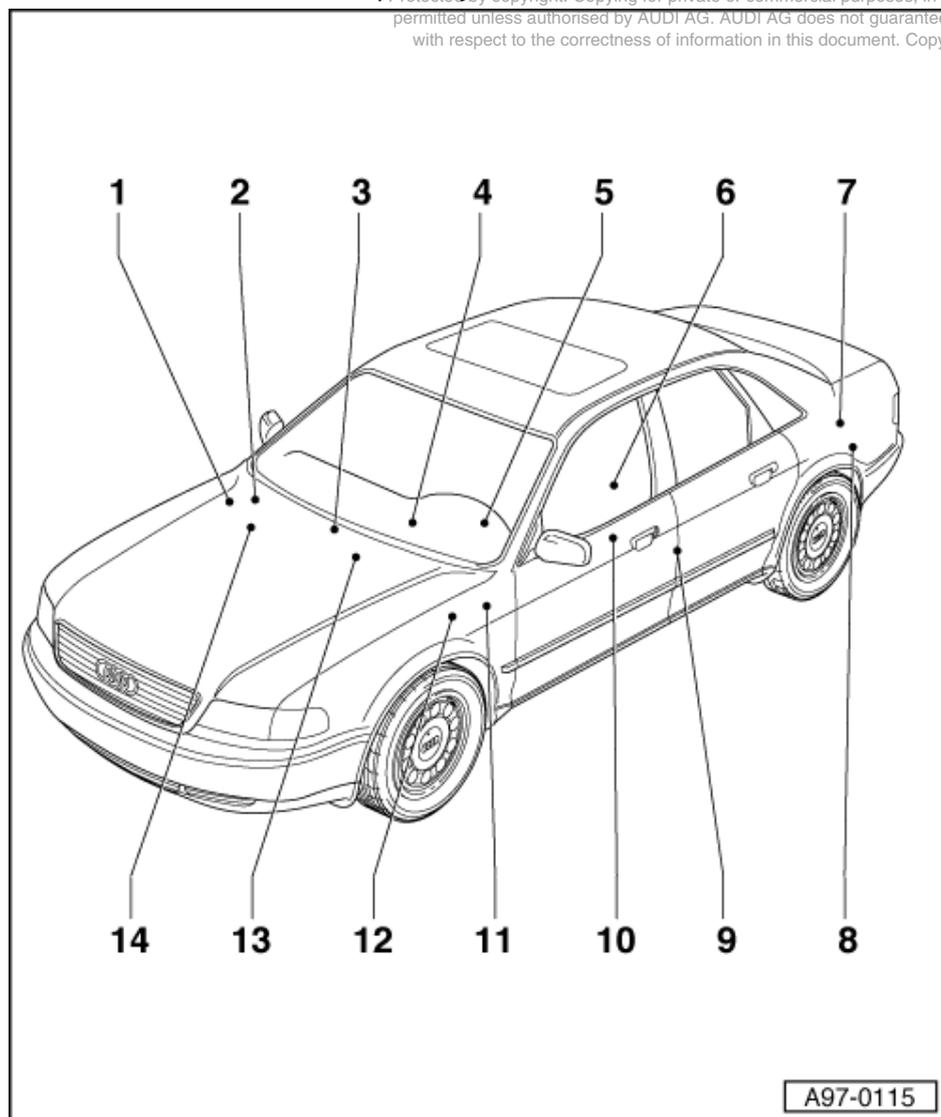
Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.

These feature a special surface coating and can be recognised by their greenish colour.

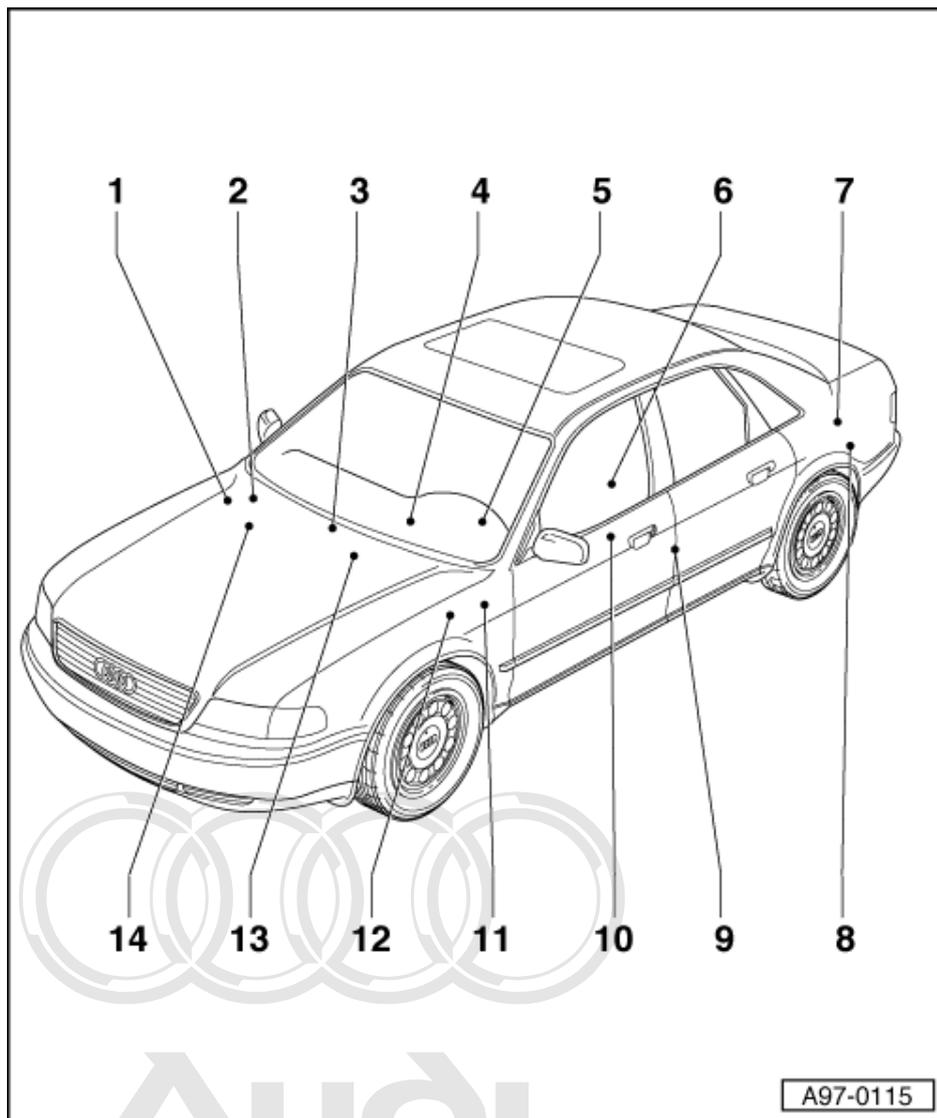
These bolts are to be stored separately.

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The procedure for removing and installing the various components is described in detail in the relevant repair groups.

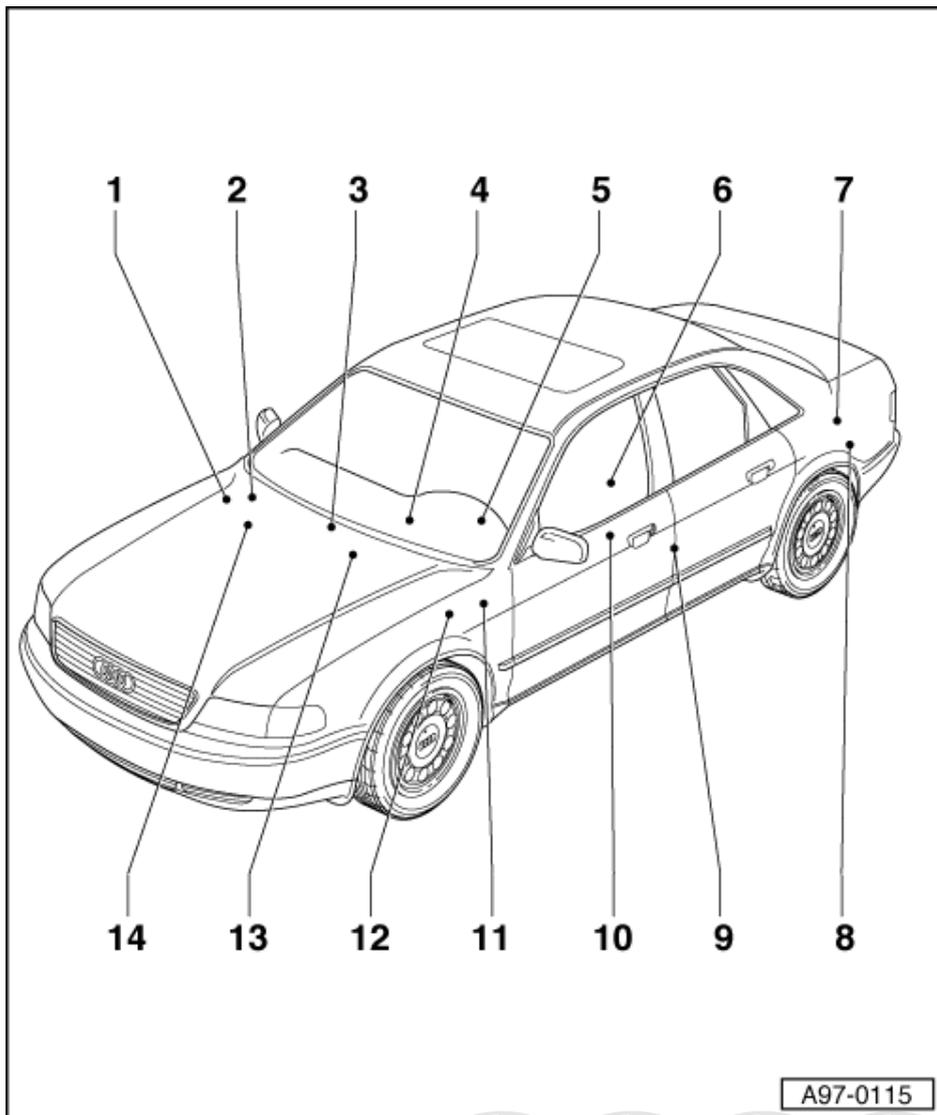
- 1 Engine control unit**
 - ◆ In electronics box in plenum chamber
- 2 Control unit for automatic gearbox -J217**
 - ◆ In electronics box in plenum chamber
- 3 Servotronic control unit -J236**
 - ◆ In electronics box in passenger's footwell
- 4 Operating and display unit for air conditioner -E87**
 - ◆ In centre console



- 5 Combination processor in dash panel insert -J218**
 - ◆ Integrated in dash panel insert
- 6 Steering column/belt height adjustment control unit -J352**
 - ◆ Under driver's seat beneath rear carpet
- 7 Central locking motor with control unit for interior lights switch-off delay and anti-theft alarm system -V94**
 - ◆ Behind luggage compartment side trim (left side)
- 8 Control unit for ultrasound sensors -J347**



- ◆ Behind left-hand luggage compartment side trim beneath central locking control unit



9 Mirror memory control unit -J267

- ◆ Under driver's B-pillar trim

10 Control unit for lock cylinder heating, left -J210

- ◆ On upper cross member in driver's door

11 Relay for 1st and 2nd fan speed

- ◆ Relay carrier beneath driver's shelf

12 Control unit for ABS with EDL -J104

- ◆ Beneath driver's shelf
- ◆ In front left of the engine compartment, (without ESP) ä model year 1997
- ◆ Beneath driver's shelf (with ESP)

13 Airbag control unit -J234

- ◆ Beneath centre console on tunnel

14 Control unit for cruise control system -J213

- ◆ In electronics box in plenum chamber

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3 - Repairing wiring and plug connectors

3.1 - Repairing wiring and plug connectors

Warning:
 Disconnect battery earth strap before working on electrical system.

Notes:

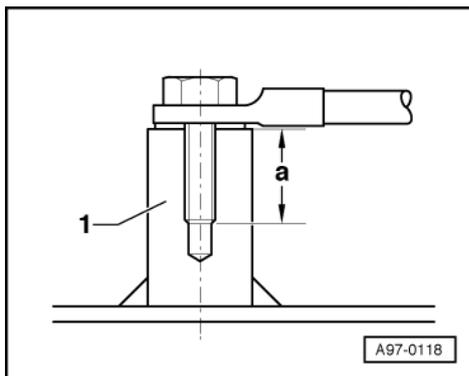
- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ When battery is reconnected, reactivate electrical equipment (radio, clock, electric windows, engine management) as described in Owner's Manual.

Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc.
 These feature a special surface coating and can be recognised by their greenish colour.
 These bolts are to be stored separately.

3.2 - General notes

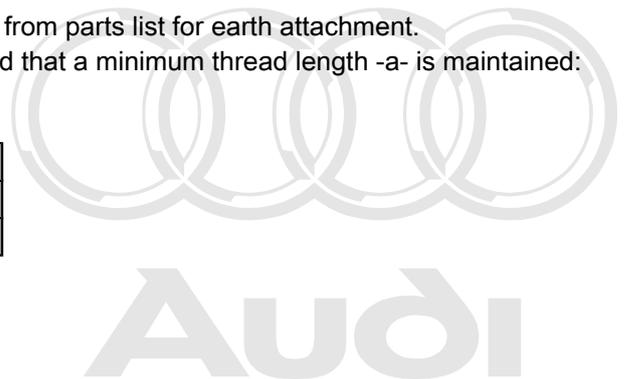
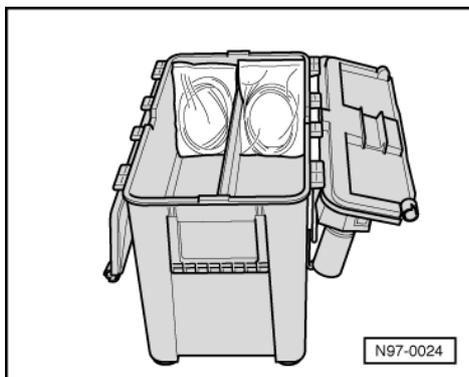
Conventional standard motor vehicle cables may be used for wiring harness repairs.
 Use must be made of the special grommets from the parts list for routing cables/wires through panels.



Exclusive use is to be made of tin-plated earth eyelets from parts list for earth attachment.
 -> Corroded earth blocks -1- can be machined provided that a minimum thread length -a- is maintained:
 $a = 2.5 \times \text{stud OD}$

Earth attachment torques:

Earth attachment	Nm
Stud with M6 thread	9.5 +0.5
Stud with M8 thread	23 +3



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Wiring harness repair set VAS 1978

Repairs to wiring harness and plug connectors for the Audi A8 may only be performed using repair set VAS 1978.

-> Wiring harness repair set VAS 1978

Detailed instructions for using VAS 1978 are given in manual supplied with repair set.

The manual also gives examples showing how to repair open circuits in wiring and defective plug connectors.

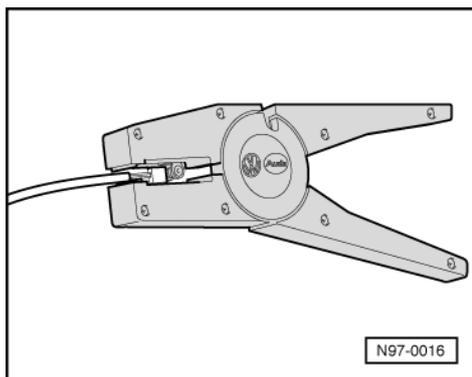
Note:

It is not permissible to perform repairs on screened wiring associated with ABS system.

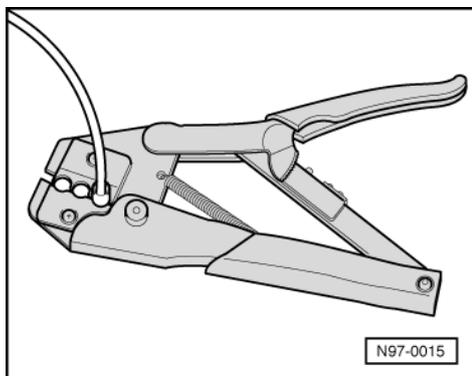
3.3 - Repairing 0.35 mm² wiring

Notes:

- ◆ Repair set VAS 1978 includes repair wires of three different thickness (0.5 mm², 1.5 mm² and 4.0 mm² cross sections), with corresponding crimp connectors.
- ◆ Use 0.5 mm² repair wire to repair 0.35 mm² wiring.
- ◆ Perform repair as follows:

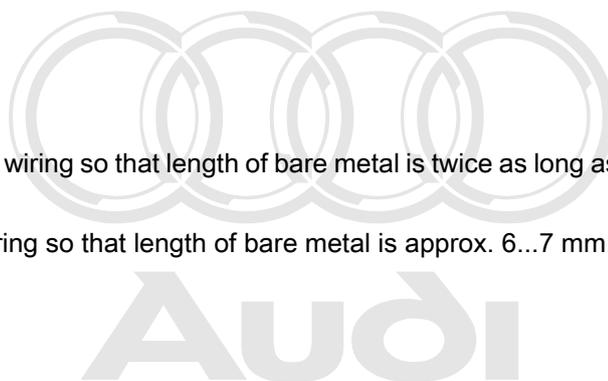


- -> Using special pliers, strip off ends of 0.35 mm² wiring so that length of bare metal is twice as long as joint required (approx. 12...14 mm).
- Fold back bare metal to half this length.
- Using special pliers, strip off ends of 0.5 mm² wiring so that length of bare metal is approx. 6...7 mm.



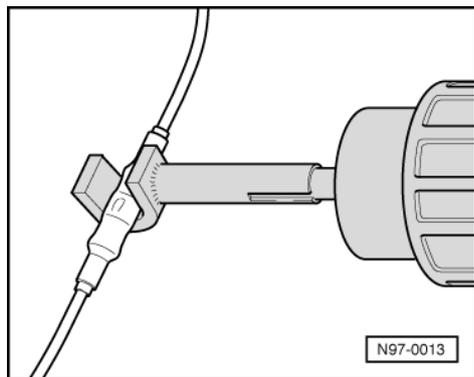
- -> Fit crimp connectors on ends of wires and crimp on both sides with crimping pliers.

Do not crimp insulation on wires.



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Make sure that correct crimping slot is used (red colour code for 0.5 mm² wires).



- -> After crimping connector, seal it by shrinking with a hot air blower.

Heat crimp connector from centre outwards until it is completely sealed and adhesive emerges.

Set hot air blower to correct temperature (refer to operating manual).

When heating connector, take care not to damage any other wiring, plastic parts or insulating material with hot nozzle.

- If wire was originally taped, wrap it again with yellow insulating tape. If necessary, secure wiring with new cable ties.

3.4 - Safety precautions when repairing wiring and plug connectors

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Warning:

Disconnect battery earth strap before working on electrical system.

Before starting a repair, it is important to identify cause of damage (e.g. sharp edges on body panels, defective electrical components, corrosion, etc.).

Repairs may not be performed on wiring associated with the airbag system or screened leads (such as wiring for speed senders or knock sensors).

Additional information (e.g. for removing and installing components) is listed in relevant booklet of Workshop Manual).

Only use yellow wires for repairs to wiring harnesses.

A yellow wire or a section of wiring wrapped with yellow insulating tape always indicates a previous repair.

Check function of components or system affected after every repair; if necessary, interrogate fault memory and reset systems to basic setting.