

Audi A8 1994 ➤

Electrical system 02.99 ➤

Edition 05.2002

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Repair GroupsList of Workshop Manual Repair Groups

Audi A8 1994 ➤

Electrical system 02.99 >

Repair Group

27 - Starter, Current supply

90 - Gauges, Instruments

92 - Windscreen wipe and wash system

94 - Lights, Lamps, Switches - exterior

96 - Lights, Lamps, Switches - interior

97 - Wiring



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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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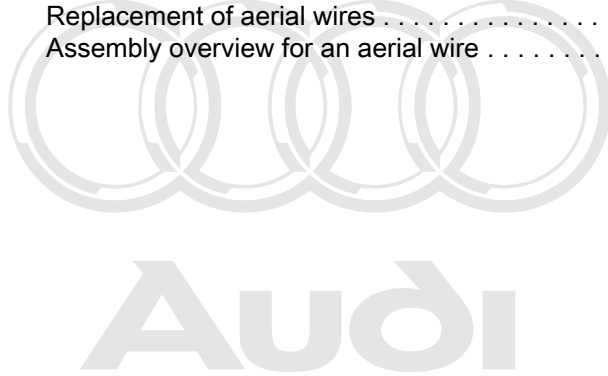
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27 - Starter, Current supply

1 - Battery

1.1 - Battery

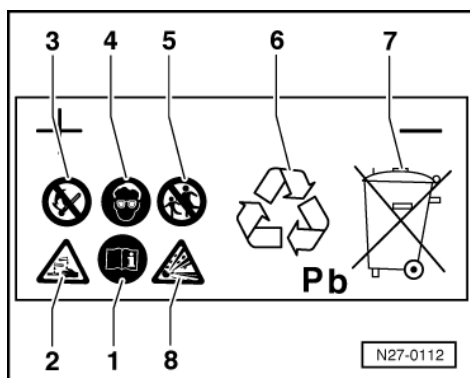
The battery is one of the most important electrical components in a vehicle. A trouble-free battery has a great influence on customer satisfaction. To ensure a long service life, the battery must be checked, serviced and maintained according to the instructions in this Manual.

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

1.2 - Notes on handling batteries

- ◆ Battery terminals must not 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 8 Nm.

Warning and safety procedures when handling lead-acid batteries



- -> Follow the instructions given on the battery and in the Workshop Manual (Electrical system) and Owner's Manual.

2 - Danger from acid burns:

Battery acid is very caustic, therefore wear gloves and eye protection.

Do not tilt battery. Acid can leak out of the 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.



Batteries with central gas venting

Warning!

It is essential that batteries of the 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:

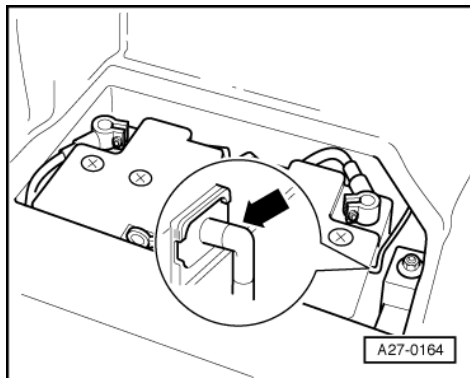
- ♦ Batteries with hose and hose connection for central gas venting
- ♦ Batteries without hose and hose connection for central gas venting

Notes on the function of the central gas venting

- ♦ 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 the top of the battery cover. The flame trap which prevents the flammable gasses in the battery from igniting is also located at this point.

The fine-mesh flame trap comprises of 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 the gasses produced in the battery to vent.



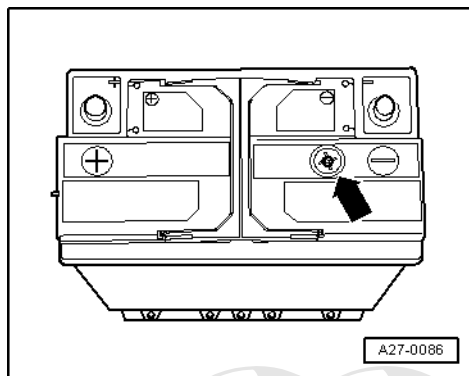
- ♦ If the battery has a hose/pipe connected to the central gas venting, check that the hose does not become kinked. This is essential to allow the battery to vent.
- ♦ -> If the battery does not have a hose/pipe connected to the central gas venting, check that the opening in the top of the battery cover -arrow- is not obstructed.

Checking battery is seated securely

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

- Shortened service life caused by vibration damage.
- The cells in the battery will be damaged if the battery is not secured correctly.
- Damage to battery housing by clamping bracket (possibility of acid leaking, therefore subsequent higher costs).
- Poor crash safety.
- It is essential that the sealing plugs supplied with the battery be used to ensure that the battery is properly sealed.
- Only use genuine sealing plugs of same type if lost or damaged.
- The sealing plugs must be fitted with an O-ring seal.

1.3 - Battery with condition indicator



-> Identification

- ◆ These batteries have a condition indicator.
- ◆ The condition indicator -arrow- provides information concerning the electrolyte level and charge condition of the battery to be tested.

Three different colours indicate the condition of the battery:

- Green =>the battery is charged sufficiently.
- Black => uncharged or insufficiently charged.
- Colourless or yellow =>the critical electrolyte level has been reached. It is absolutely necessary to top up with distilled water. Then perform battery discharge test =>Page 9 .

Batteries which are older than five years, where the condition indicator has a light or yellow-coloured appearance, must be replaced after consulting the customer.

If the battery is recharged, i.e. even if the battery is charged during driving, air bubbles may form under the condition indicator. This falsifies the colour displayed by the condition indicator.

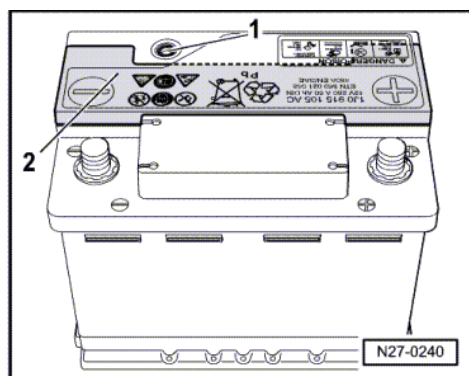
If batteries are equipped with sealing plugs for reasons of production, these are covered with a plastic film.

- Before a visual check is performed, tap the condition indicator lightly and carefully with the handle of a screwdriver.

This causes the air bubbles to disperse.

- Read the colour display of the condition indicator.

1.4 - Battery with condition indicator and without sealing plugs





-> You can identify these batteries by the condition indicator -1- and a cover -2- (as illustrated).

Warning!

The cover -2- is only for filling during production. The cover must not be removed under any circumstances, or the battery will be damaged. The battery will be rendered unusable.

Thanks to changes in design, it has been possible to produce a new generation of maintenance-free batteries. The current state of the battery can be checked via the condition indicator -1-.

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1.5 - Visual check

Warning!

The battery plugs must be screwed in tightly when charging, measuring voltage or performing load tests.

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

Performing this test establishes:

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

1.6 - Checking electrolyte level

Warning

When using battery electrolyte it is absolutely necessary to adhere to the accident prevention procedures. Suitable protective clothing must be worn.

Only use a battery-powered lamp to illuminate the inside of the battery housing.

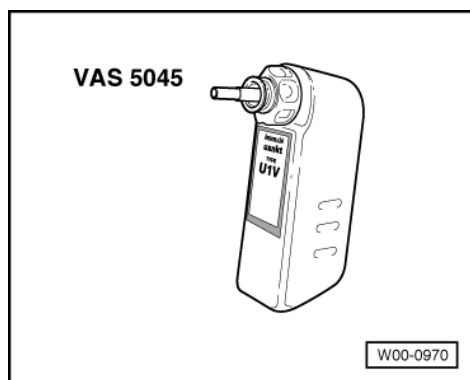
Never illuminate the inside of a battery housing with an open flame.

Never work with an open flame or burning cigarette in the vicinity of a battery.

Ensure the legislation for the disposal of batteries and sulphuric acid is observed when disposing of batteries.

It is essential that sealing plugs supplied with the battery be used to ensure that differing battery cover systems are sealed correctly. Only use genuine sealing plugs of same type if lost or damaged.

The plugs must be fitted with an O-ring seal.



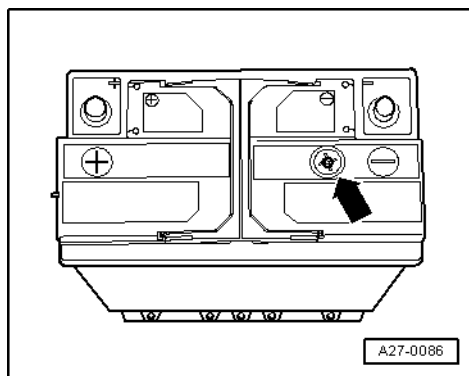
Special tools and workshop equipment required

- ♦ Battery filler bottle VAS 5045

- ♦ Commercially available hydrometer

Notes:

- ♦ The correct battery electrolyte level is an important factor in ensuring the long life of the battery.
- ♦ Batteries with visible min. and max. markings require only a visual check of electrolyte level from the battery exterior.
- ♦ The electrolyte level must be above the minimum marking but not exceed the max. marking.
- ♦ The sealing plugs must be unscrewed on batteries if the exterior min. and max. marking are difficult to recognize, or the electrolyte level is not visible due to the opaqueness of the battery housing. It is then possible to check the electrolyte level by performing a visual check of the inner battery.
- ♦ The electrolyte level must align with the internal electrolyte level marking (horizontal ridge. This equates to the outer max. marking.

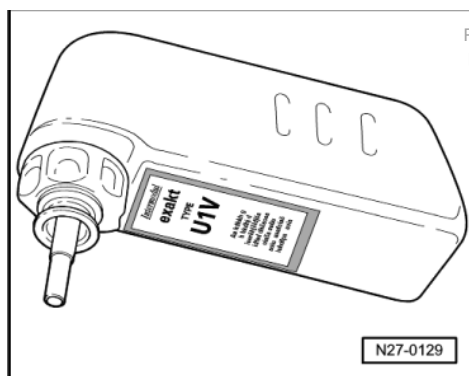


- ♦ -> On batteries with a condition indicator -arrow-, the electrolyte level can be checked via the colour display
=> Test sequence, Page 3.

Electrolyte level too low

Note:

If the electrolyte level is too low, the cell plates will dry out and the battery will lose power. The cell plates must be fully covered by the electrolyte (sulphuric acid) in order to prevent corrosion of the plates, plate bridges and cell connectors. Corrosion of these parts will make the battery unreliable and ultimately unusable.



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- -> If the electrolyte level is too low, top up with distilled water using battery filler bottle VAS 5045 until the "Max." marking is reached.

Notes:

- ♦ The neck of filler bottle VAS 5045 is designed to prevent overfilling of the battery cells, which would cause the electrolyte to overflow. When the "Max." level is reached, the flow of distilled water into the battery cell is cut off.
- ♦ Use distilled water only, this prevents contamination of the battery electrolyte and the therefore associated increased self discharge.
- Screw sealing plugs into battery cells

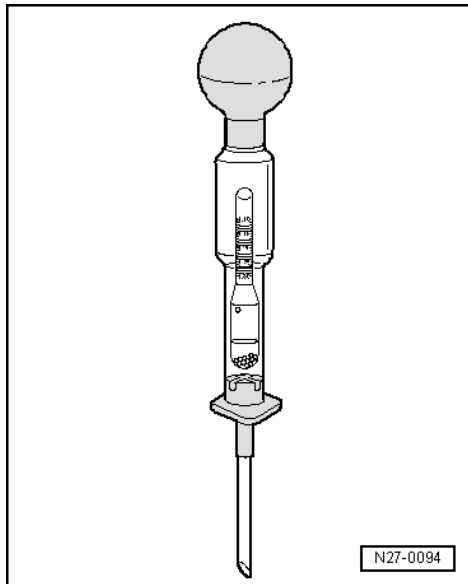


=> Page 2 , Batteries with central gas venting

Electrolyte level too high

Note:

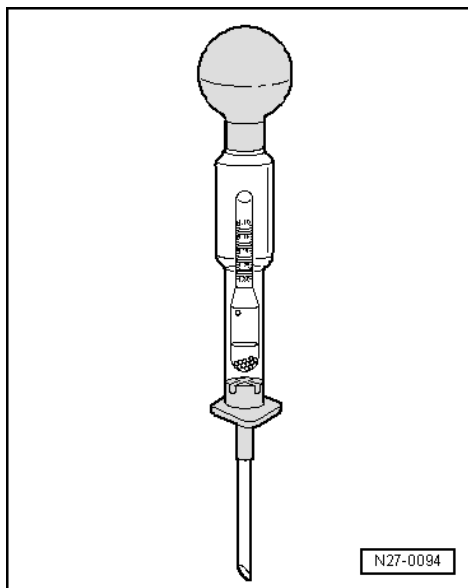
If the electrolyte level is too high the leaking electrolyte (sulphuric acid/water mixture) will cause damage outside the battery, i.e. to components in engine compartment.



- -> If the electrolyte level is too high (i.e. above the plastic indicator bar inside the battery or above the "Max." marking on the outside), the excess fluid must be extracted. This is done using a commercially available hydrometer.
 - Extract the electrolyte using the hydrometer until the electrolyte level reaches the plastic bar or the max. marking.
 - Screw sealing plugs into battery cells
- => Page 2 , Batteries with central gas venting

1.7 - Checking specific gravity of all cells

Special tools and workshop equipment required



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- ♦ Commercially available hydrometer

Warning!

When using sulphuric acid it is absolutely necessary that the accident prevention procedures are observed. Suitable protective clothing must be worn. When disposing batteries it is absolutely necessary that the disposal procedures for batteries and sulphuric acid are observed.

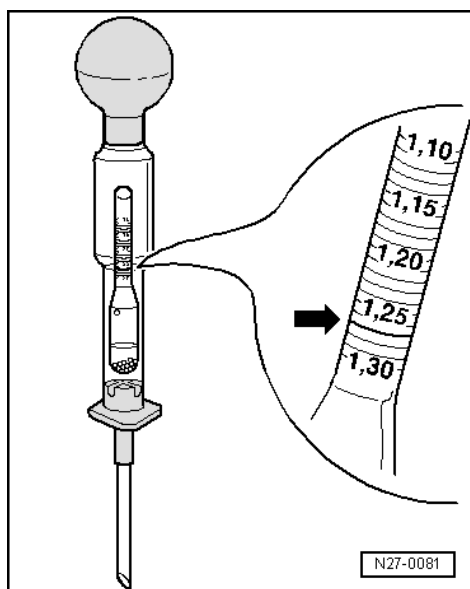
Notes:

- ♦ In conjunction with the "voltage under load" test, the electrolyte density test gives a good indication of the battery condition.
- ♦ The temperature of the electrolyte in the battery must be at least 10 °C.
- ♦ The electrolyte density can be checked immediately after charging battery.

Test sequence

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



- -> Immerse end of hydrometer in a cell and extract sufficient electrolyte so that float swims free in the electrolyte.
 - The greater the specific gravity of the extracted electrolyte, the more the float rises.
 - The electrolyte density (in kg/dm³) can be read off the scale of the hydrometer (specific density of electrolyte).
- Read off measured value on hydrometer and compare with table:

Charge condition in normal climates	Electrolyte density in kg/dm ³
Discharged	1.12
Half charged	1.20
Well charged	1.28

Charge condition in tropical climates	Electrolyte density in kg/dm ³
Discharged	1.08
Half charged	1.16
Well charged	1.23



In countries with normal climates the electrolyte density must be at least 1.24 kg/dm³.

- If the electrolyte density is too low in all battery cells, charge the battery.
- After charging the battery, repeat the electrolyte density test.
- If the specifications are not obtained, renew battery.

Note:

The electrolyte density readings for the individual battery cells must not differ by more than 0.03 kg/dm³. Otherwise replace battery.

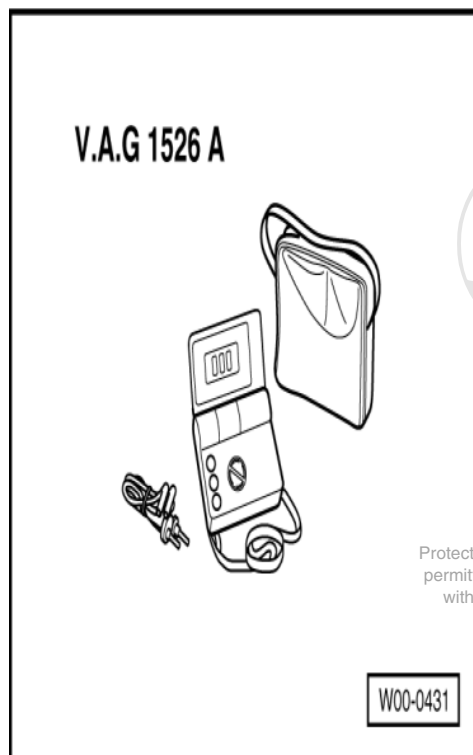
Bat- tery cell:	1	2	3	4	5	6
Electrolyte density per cell in kg/dm ³						
Exam- ple 1:	1.24	1.25	1.25	1.10	1.24	1.25
Result: The electrolyte density in cell 4 is too low (de- viation is greater than 0.03 kg/dm ³)						
Exam- ple 2:	1.26	1.26	1.25	1.14	1.18	1.24
Result: The electrolyte density in cells 4 and 5 is too low (deviation is greater than 0.03 kg/dm ³)						

- If the specifications are obtained, screw plugs in again.

Caution

To ensure effective sealing of the various battery cover systems, it is important to use the correct type of battery sealing plugs. If plugs are lost or damaged, always fit new plugs of the same type as originally fitted. Each plug must be fitted with an O-ring seal.

1.8 - No load voltage measurement



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Special tools and workshop equipment required

- ♦ V.A.G 1526 A or B

Warning!

The battery plugs must be screwed in tightly when charging, measuring voltage or performing load tests. Ensure that following notes are observed otherwise correct measurements can not be guaranteed.

Notes:

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

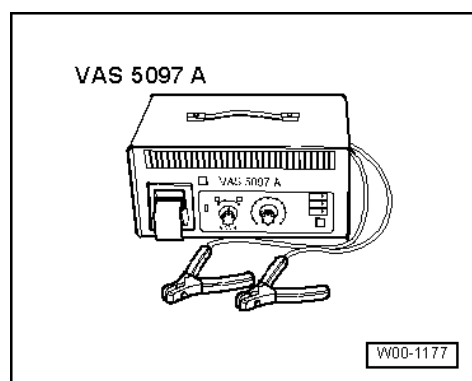
Work sequence

- With the ignition switched off disconnect the battery earth strap.
- Test voltage between battery terminals.
 - If the tester reads 12.5 Volt or above, the battery is OK.
 - The battery no-load voltage must at no time drop below 12.5 Volt. If this is the case, recharge battery immediately => Page 11
- Test voltage between battery terminals again.
 - The battery no-load voltage must not drop below 12.5 Volt.
- If the battery no-load voltage is not as specified, install a new battery.

Install in reverse sequence; note the following points:

- Connect battery. Procedures required => Page 13 .

1.9 - Checking voltage under load



Special tools and workshop equipment required

- ♦ Battery tester VAS 5097 A or VAS 5097

Note:

Using the battery tester:

=> Operating instructions

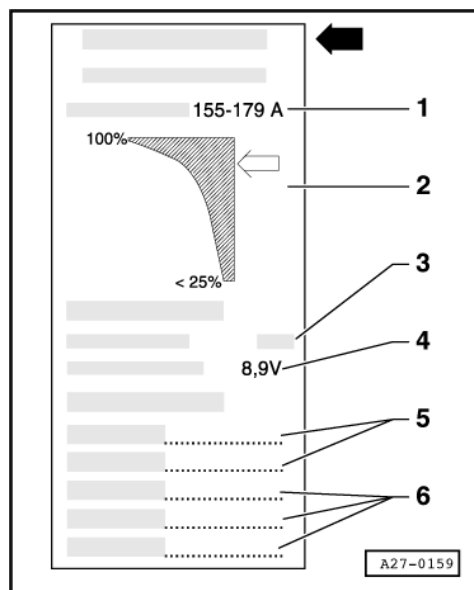
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Warning
 Observe accident prevention procedures, wear protective clothing i.e. eye protection and leather gloves.

Test sequence

- Switch off ignition.
- Connect clamps to battery terminals as described in the operating instructions for the tester. The clamps must make proper contact with the battery terminals.
- The load current will vary depending on the battery capacity, and must be set on the tester accordingly.

=> Operating instructions for battery tester



- Perform battery load test as described in the operating instructions.
- -> Compare test printout with the table below.

Test printout data:

- 1 - Set measurement range
- 2 - Battery status diagram (charge level)
- 3 - Test result
- 4 - Voltage value for battery during load test (minimum voltage)
- 5 - Vehicle data
- 6 - Tester data

Note:

This test printout is required for warranty processing.

Table of test values:

Printout item 3	Result/Measures
Starting performance very good	Battery OK
Starting performance good	Battery OK
Starting performance adequate	Recharge battery 1)
Starting performance inferior	Recharge battery 1)
Starting performance very poor	Recharge battery 1)

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Printout item 3	Result/Measures
Cannot be tested	Battery defective, replace

1) The load test must be repeated after recharging. If again "Starting performance adequate" to "Cannot be tested" is printed out, the battery must be replaced.

Explanation of battery load check:

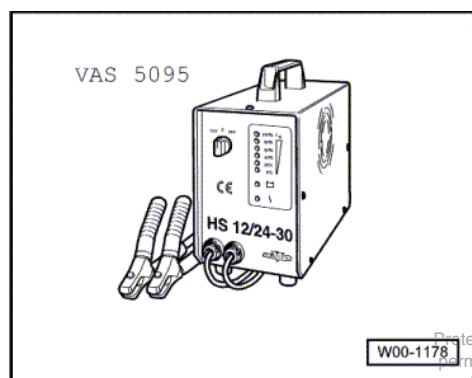
Because of the high load on the battery during this test (a high current flows) the battery voltage lowers.

If the battery is OK the voltage value only lowers to the minimum voltage.

If the battery is defective or has a low charge the battery voltage quickly drops below the minimum voltage.

This low voltage value remains over a long period and the voltage only increases again slowly after the test has been completed.

1.10 - Battery charging



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Special tools and workshop equipment required

- ◆ VAS 5095 Battery charger

The battery charger VAS 5095 charges without current and voltage peaks. Data acquisition, engine control, airbag and telephone are not influenced. The battery can remain in the vehicle during charging and must not be disconnected.

If using other battery chargers, the battery should be disconnected.

Warning!

The battery plugs must be screwed in tightly when charging, measuring voltage or performing load tests. Rooms in which batteries are charged must not be entered with a naked light/flame or whilst smoking. The reason for this is during the battery charging process gasses are formed which are easily ignited.

Notes:

- ◆ The battery temperature must be at least 10 °C.
- ◆ The charging voltage of max 14.4 Volt should not be exceeded.

Work sequence

- Observe notes => Page 12 .
- Switch off ignition.
- Switch off battery charging unit.
- Connect battery to charging unit, positive to positive, negative to negative.



- Charge the battery as described in the battery charger operating instructions.

Notes on totally discharged batteries:

Warning!

Totally discharged batteries freeze prematurely.
Frozen batteries must not be used further.

Batteries that have not been used for a long time e.g. vehicles that have been stored, self-discharge.

A battery is totally discharged when the no load voltage has dropped to below 11.6 V.

Measuring no load voltage => Page **8**

In a totally discharged battery the electrolyte (sulphuric acid/water mixture) is almost all water. The sulphuric acid content is heavily reduced.

Totally discharged batteries will sulphate, i.e. the surfaces of the battery plates harden. The electrolyte becomes cloudy and slightly white in colour.

If a totally discharged battery is charged again shortly after it has lost its charge, the sulphation will dissipate.

If these batteries are not recharged, the plates continue to harden and the battery will not accept a charge so readily. This results in reduced power output.

Totally discharged batteries that are sulphated must be charged with a low charge current as follows:

- Set charge current to about 5 % of the battery capacity. For example, for a 60 Ah battery, set the charge current to about 3 A.

Charge the battery => Page **11**.

The charge period must be at least 24 hours.

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1.11 - Removing and installing battery

Warning

Before working on the electrical system disconnect the battery earth strap.

Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

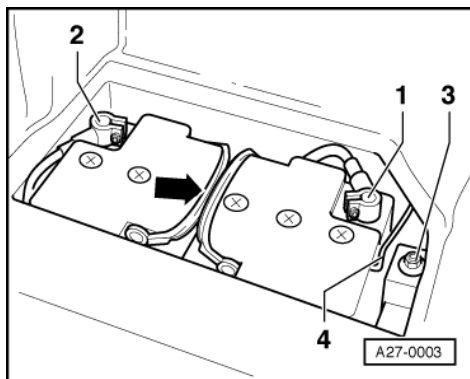
Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

Removing

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

- Remove side storage compartment partition and floor panel secured by Velcro fastener.
- Disconnect battery earth strap at floor panel.



- ➔ Disconnect earth strap -1- from battery negative terminal and battery positive cable -2- from battery positive terminal.
- Detach hose connection -4- at battery.
- Loosen hexagon bolt -3- and then remove clamping bracket.
- Lift battery out of luggage compartment using both handles -arrow-.

Installing

- Installation is performed in the reverse sequence.
- When the battery is reconnected, please ensure that the electrical equipment (radio, radio/navigation system, clock, electric windows) is activated as described in the Owner's Manual.
- De-activate the service mode of the Telematics control unit.

⇒ Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

Tightening torques

Component	Nm
Battery cable clamp to battery terminal	8
Bolt on retainer plate	22

1.12 - Quick charging/starting boost

Notes:

- ◆ Batteries should only be quick charged in exceptional circumstances.
- ◆ Batteries are damaged by quick charging.
- ◆ Starter/charger unit V.A.G 1472 can also be used for boost starting.
- ◆ Battery-powered starter VAS 1992 is a portable unit (independent of the mains power supply) for boost-starting vehicles with flat or heavily discharged batteries. The unit can be used between 15 and 30 times depending on the outside temperature and the battery capacity.

2 - Removing and installing alternator

2.1 - Removing and installing alternator

Warning!
Before working on the electrical system disconnect the battery earth strap.

Notes:

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

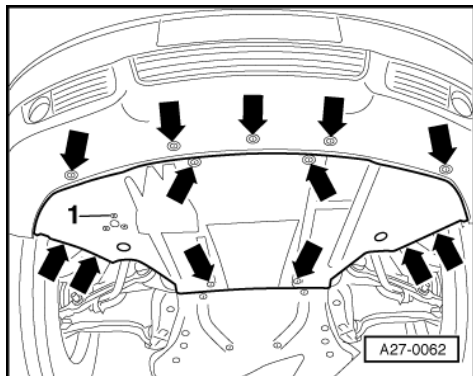
Important note:

To avoid contact corrosion only use approved bolts, nuts and washers etc. For legal 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.

These feature a special surface coating and can be recognised by their greenish colour.

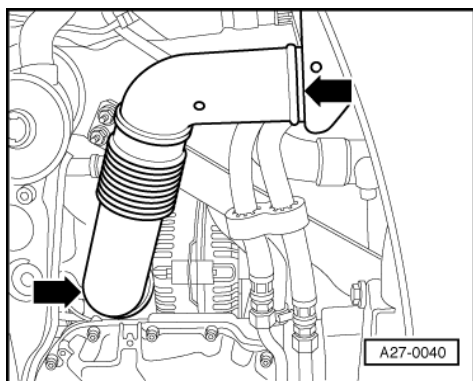
These bolts are to be stored separately.

2.2 - Vehicles with V6 petrol engine

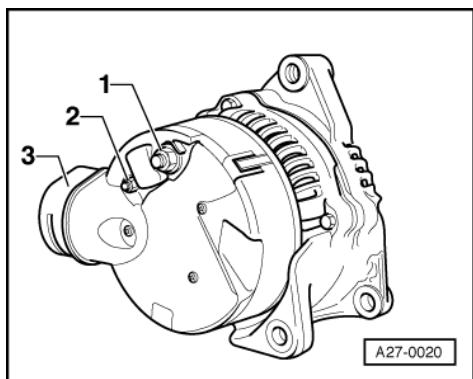


Removing

- -> Remove noise insulation -arrows-.
- If fitted, unscrew three bolts -1- of exhaust system for auxiliary heater.



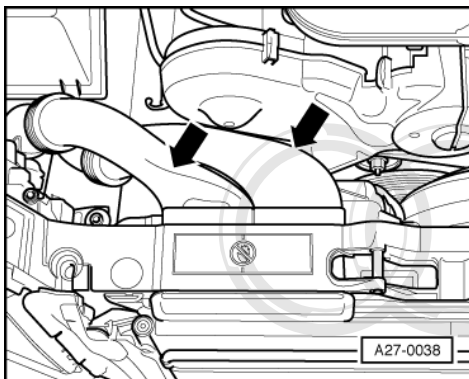
- -> Detach intake hose of alternator -arrows-.



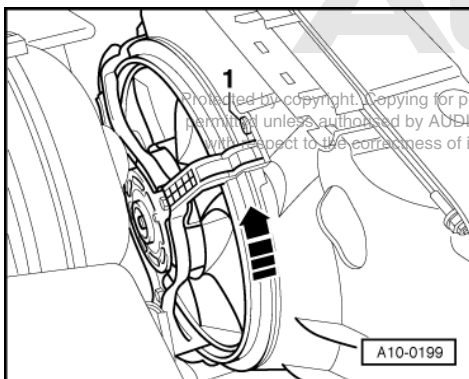
- -> Disconnect wire from terminal 30/B+ -1- on alternator (13 mm A/F).
Tightening torque: 16 Nm
- Disconnect D+ terminal -2- (8 mm A/F).
Tightening torque: 4 Nm



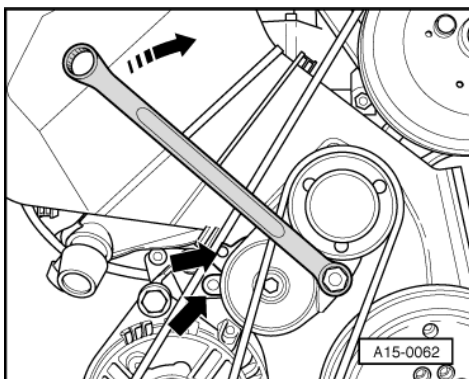
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- Detach both intake air ducts -arrows-.



- -> Remove electric fan; this involves pushing out pin -1- and removing clip.
- Move wire for electric fan clear.
- Turn electric fan in direction of arrow and move clear to one side.



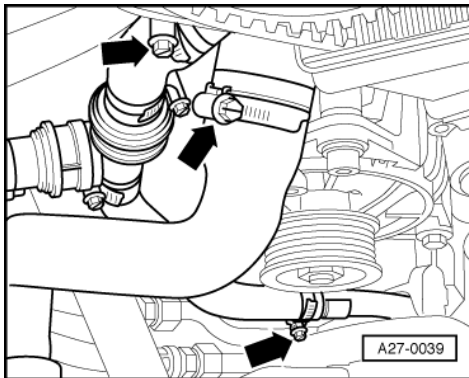
- -> To slacken off ribbed belt, turn tensioner clockwise using a 17 mm ring spanner until the two holes are aligned -arrows- and secure with locking pin 3204.

Note:

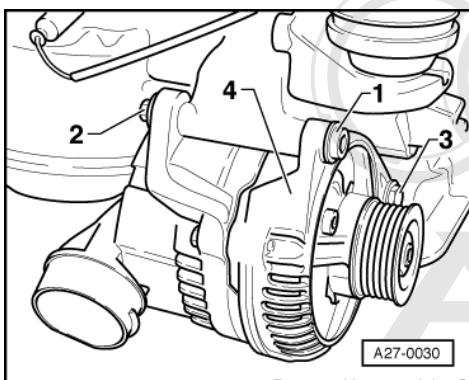
Mark direction of rotation of ribbed belt for re-installation. The belt may break if it runs in opposite direction when refitted.

- Detach ribbed belt from alternator.
- Drain coolant.

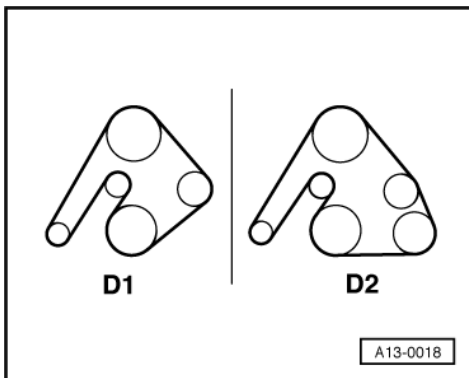
=> 6-cylinder engine, Mechanics; Repair group 19; Cooling system; Draining coolant and topping up Cooling system Draining coolant and topping up



- -> Disengage hose clips -arrows- and detach coolant hoses.
- Move hoses clear to one side.



- -> Remove hexagon 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
- Lift out alternator -4-.



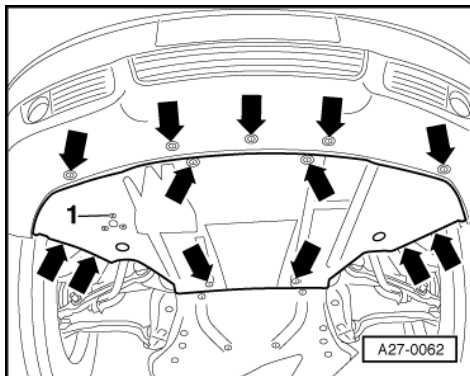
Installing

- Installation is performed in the reverse sequence.
- -> Ensure that ribbed belt is correctly routed and properly seated.

Routing of ribbed belt

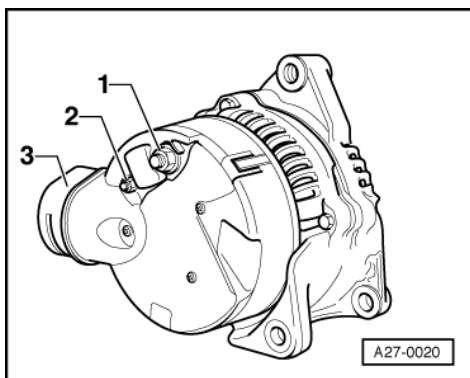
- D1 - vehicles without air conditioner
- D2 - vehicles with air conditioner

2.3 - Vehicles with V8 petrol engine (3.7 ltr. and 4.2 ltr.)

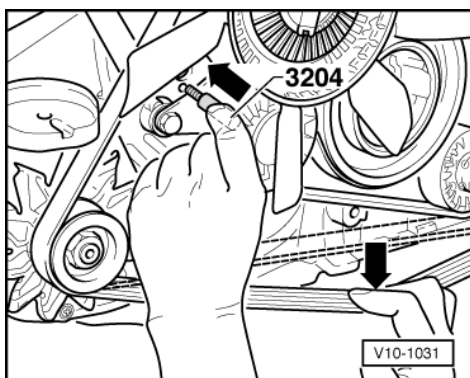


Removing

- -> Remove noise insulation -arrows-.
- If fitted, unscrew three bolts -1- of exhaust system for auxiliary heater.
- Detach intake hose from alternator.



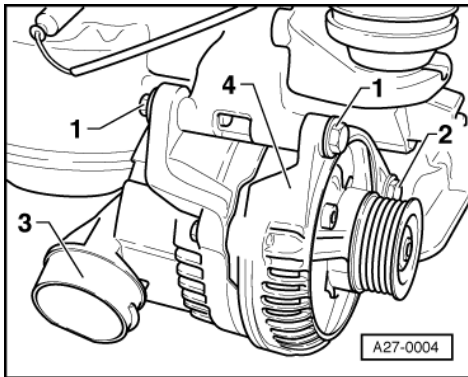
- -> Disconnect wire from terminal 30/B+ -1- on alternator (13 mm A/F).
Tightening torque: 16 Nm
- Disconnect D+ terminal (8 mm A/F) -2-
Tightening torque: 4 Nm



- -> Slacken off ribbed belt by pulling belt by hand downwards from below and insert locking pin 3204.
- Take off belt from alternator.

Note:

Mark direction of rotation of ribbed belt. The belt can break if it runs in the opposite direction when refitted.



- ➔ Unscrew securing bolts -1- (2 x SW 16 A/F) - 45 Nm.
- For better access to rear bolt -1-, remove air cleaner and unscrew bolt from above.
- Unscrew bolt -2- (13 mm A/F) - 20 Nm.
- Remove alternator -3- from engine compartment from below.

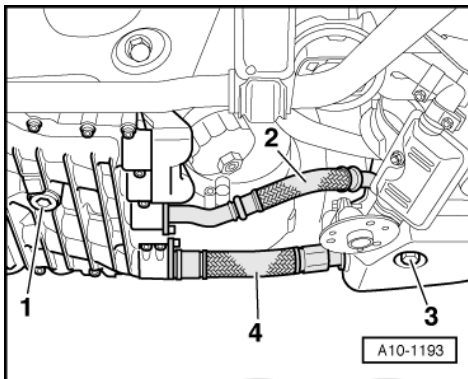
Installing

- Installation is performed in the reverse sequence.

2.4 - Vehicles with W12 petrol engine

Special tools and workshop equipment required

- ♦ Drip tray



Removing

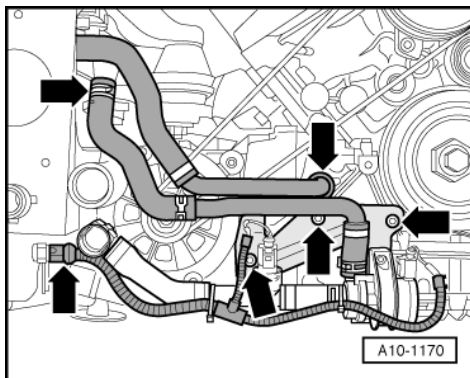
- Drain cooling system.

=> Engine Mechanics; Repair group 19

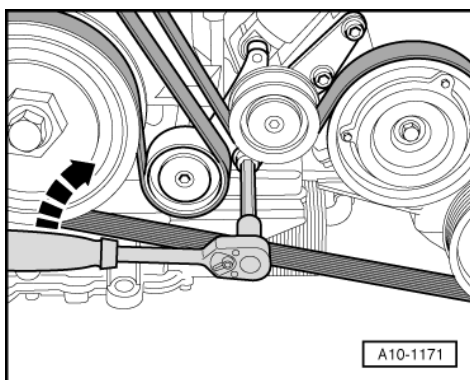
- Place a drip tray underneath.
- ➔ Unscrew oil drain plugs -1- and -3-.
- Remove connection pipes -2- and -4- from oil reservoir.
- Pull lock carrier towards the front

=> Engine Mechanics; Repair group 13

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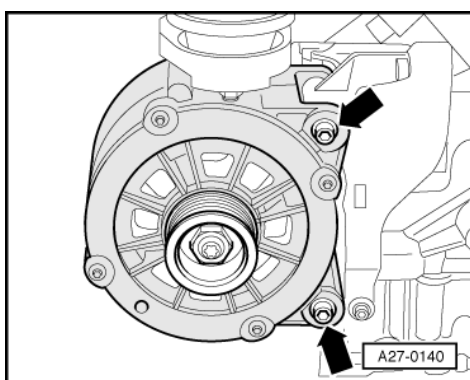
- -> Remove coolant pump with bracket and hose assembly -arrows-, then lift clear to the side and secure in place.



Note:

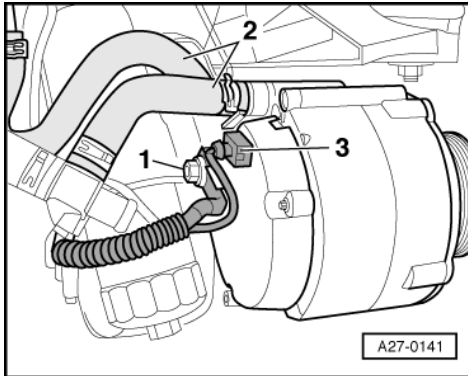
Before removing the ribbed belt, mark the direction of rotation with chalk or a felt pen. If a used belt rotates in the wrong direction when refitted, it can break.

- -> To slacken ribbed belt, turn belt tensioner in direction of arrow.
- Remove ribbed belt from belt pulley on alternator.
- Release tensioning element.



- -> Remove bolts -arrows-.
- Swivel alternator towards the front.

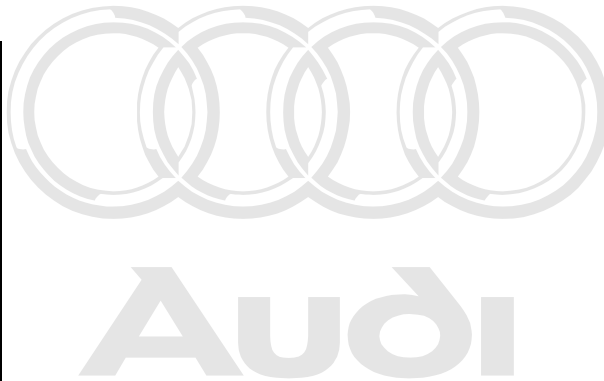
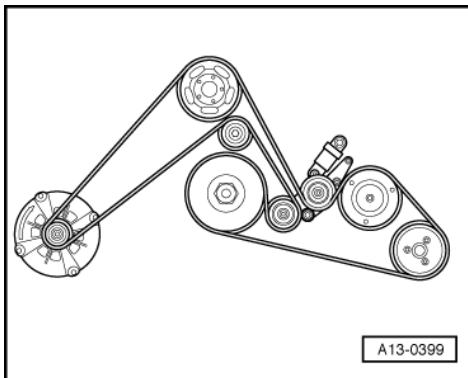
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- -> Unscrew wire -1- from alternator.
- Unplug electrical connector -3-.
- Mark installation position of coolant hoses.
- Detach coolant hoses -2 from alternator.

Warning!
Catch escaping coolant.

- Remove alternator.



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Installing

- Installation is performed in the reverse sequence.

Note:

Replace gaskets and seals.

- To help bring alternator into position, knock back bushes for securing bolts slightly.
- -> Ensure that ribbed belt is correctly routed and properly seated.

- Install lock carrier

=> Engine Mechanics; Repair group 13

- Fill up engine oil.

=> Engine Mechanics; Repair group 17

- Fill up with coolant:

=> Engine Mechanics; Repair group 19

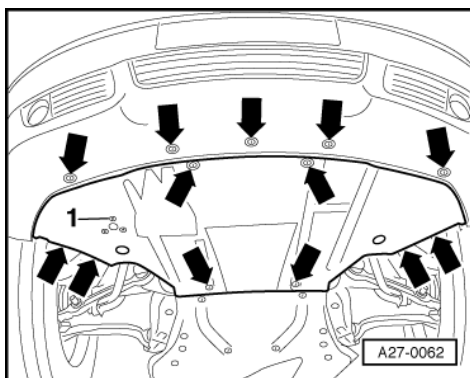
- Start engine and check that belt runs properly.

Tightening torques

Component	Nm
30/B+ terminal on alternator	16
Alternator to engine	23
Coolant pump to engine	20
Pipe connections to sump or oil reservoir	8
Oil drain plug to oil reservoir	25
Oil drain plug to engine	55
Battery clamp to battery terminal	6

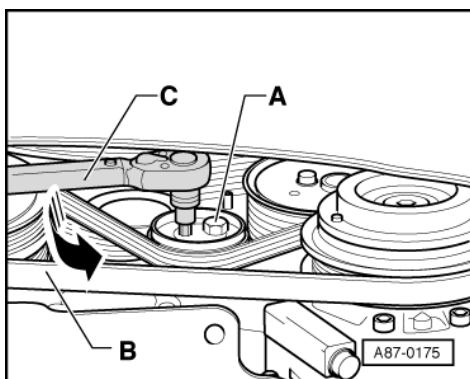
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2.5 - Vehicles with V6 TDI engine



Removing

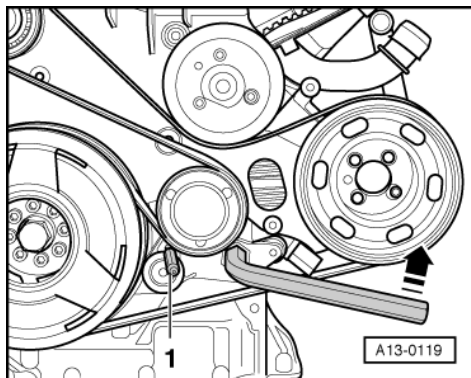
- ➔ Remove front noise insulation by unscrewing securing bolts -arrows-.
- If fitted, unscrew three bolts -1- of exhaust system for auxiliary heater.



- ➔ Slacken bolt -A- on tensioning roller for A/C compressor and remove ribbed belt.

Note:

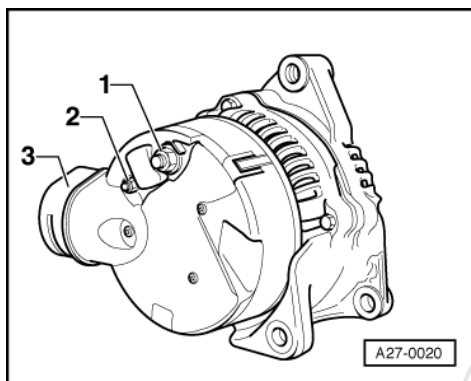
Mark direction of rotation of ribbed belt. The belt may break if it runs in opposite direction when refitted.



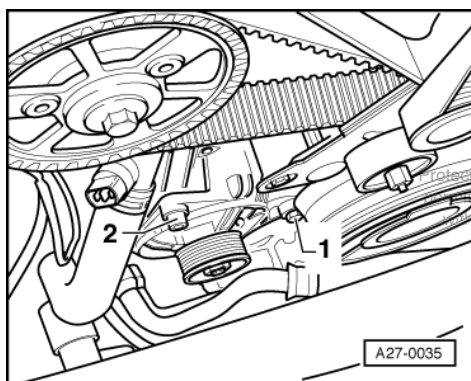
- -> Slacken ribbed belt by turning Allen key (17 mm) in direction of arrow, and insert a 4 mm dia. pin -1- (punch or similar).
- Detach belt from alternator.

Note:

Mark direction of rotation of ribbed belt. The belt may break if it runs in opposite direction when refitted.

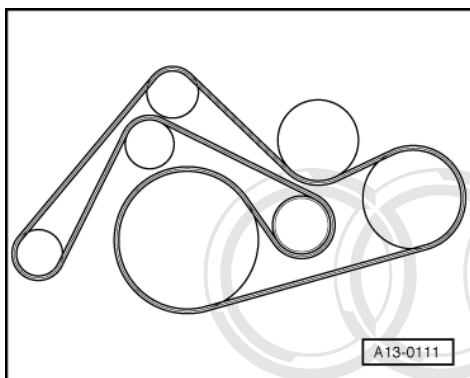


- -> Disconnect wire from terminal 30/B+ -1- on alternator (13 mm A/F).
Tightening torque: 16 Nm
- Disconnect D+ terminal (8 mm A/F) -2-
Tightening torque: 4 Nm



- -> Slacken securing bolts -1- (13 mm A/F)
Tightening torque: 22 Nm
- Slacken socket head bolt -2- (8 mm).
Tightening torque: 45 Nm
- Take out alternator from below.

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Installing

- Installation is performed in the reverse sequence.

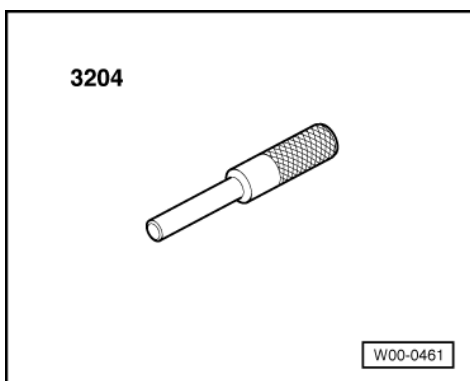
Note:

Screw in securing bolt - 1 - first when installing alternator.

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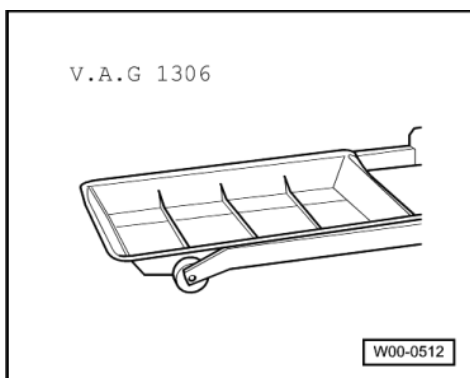
- -> Ensure that ribbed belt is correctly routed and properly seated.

2.6 - Vehicles with V8 TDI engine

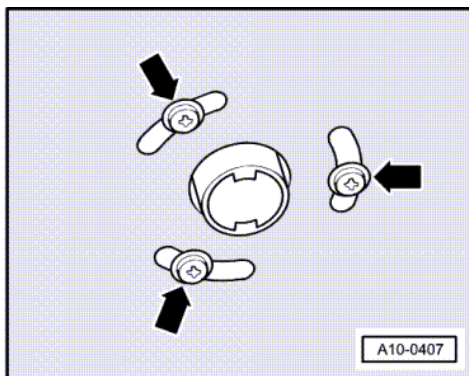


Special tools and workshop equipment required

- ♦ Locking pin 3204



♦ Drip tray V.A.G 1306

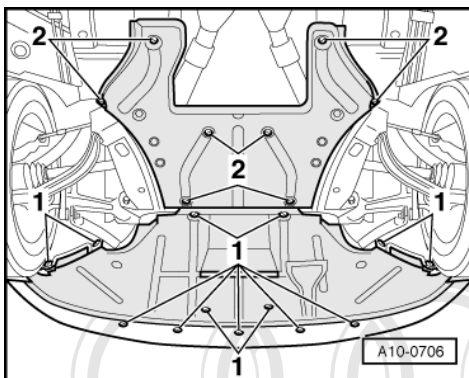


Removing

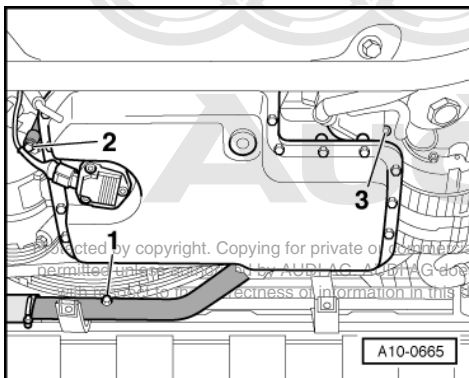
Warning!

Hot steam can escape when the cap on the expansion tank is opened. Cover the cap with a cloth, and open it carefully.

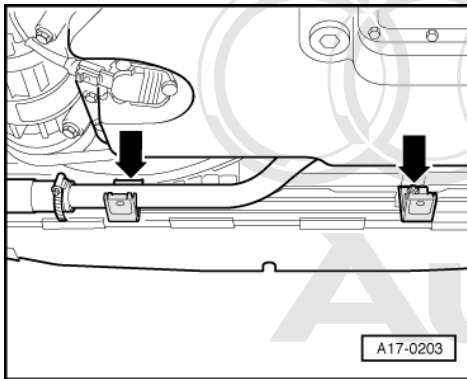
- Open cap on coolant expansion tank.
- -> Remove screws -arrows- securing exhaust pipe of auxiliary/additional heater to noise insulation.



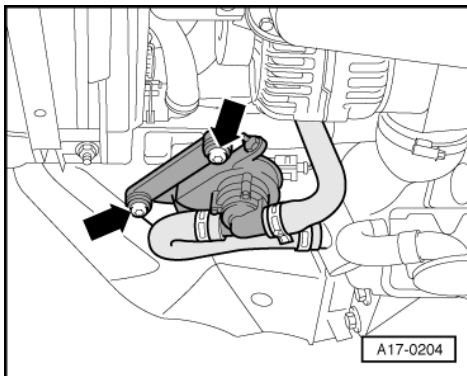
- -> Release quick-fasteners -1- and take off front noise insulation.



- Place drip tray V.A.G 1306 below engine.
- -> Unscrew drain plugs -1 ... 3- and drain coolant.



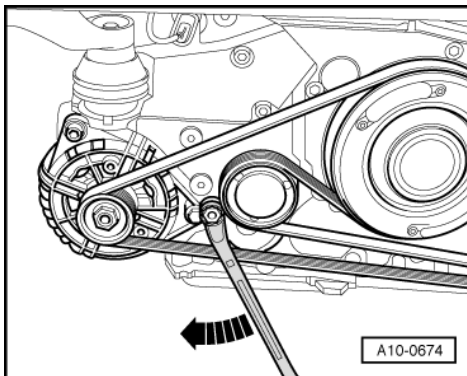
- -> Unbolt brackets for front noise insulation - arrows -
- Remove bottom coolant pipe at lock carrier.



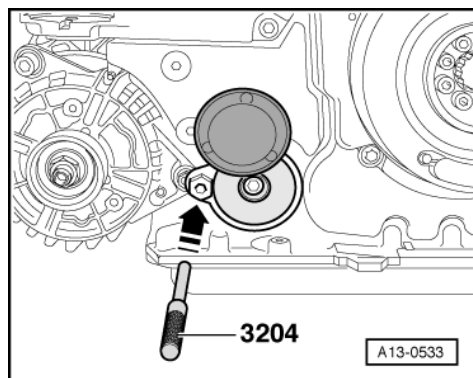
- -> Pull coolant pump for fuel cooling system off from retaining pins.

Note:

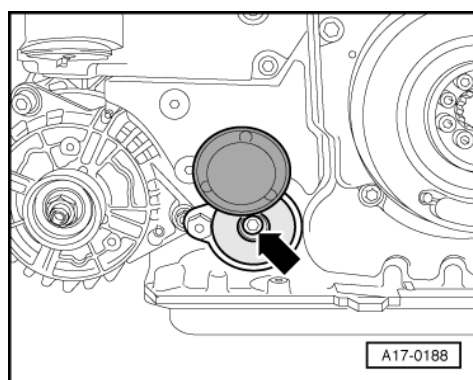
Leave connector and hoses connected.



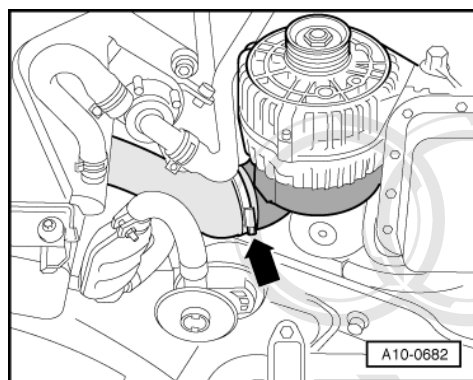
- -> To slacken ribbed belt, swivel ribbed belt tensioner in direction of arrow.



- -> Insert locking pin 3204 into holes -arrow- to lock belt tensioner.
- Remove ribbed belt from alternator pulley only.

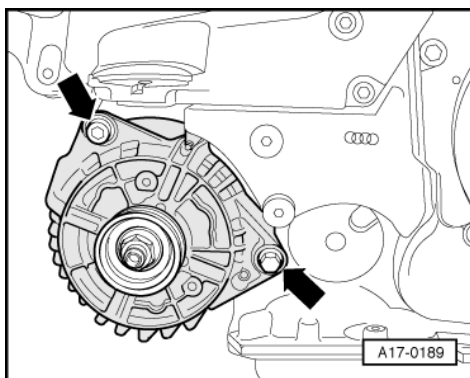


- -> Unbolt ribbed belt tensioning roller -arrow-.
- Remove cover behind tensioning roller.



- -> Remove air duct for alternator -arrow-.
- Disconnect wiring from alternator.

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- -> Unscrew alternator securing bolts -arrows-.
- Remove alternator.

Installing

- Installation is performed in the reverse sequence.
- Fill up with coolant:

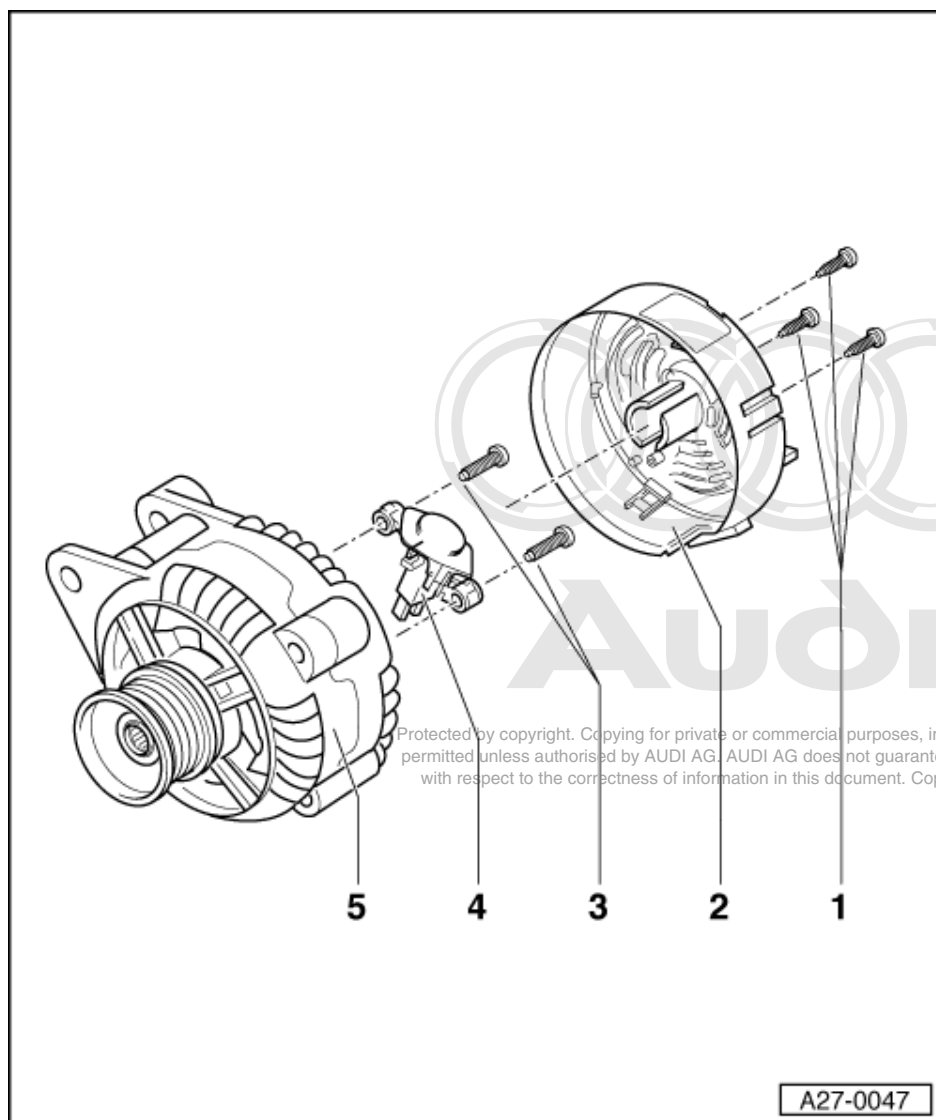
=> Engine Mechanics; Repair group 19

Tightening torques

Component	Nm
Ribbed belt tensioning roller to engine	45
Alternator to M8	22
oil filter bracket M10	45
Hose clamps for coolant hoses	2
Hose clamps for air feeder hoses	3.5

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2.7 - Replacing voltage regulator

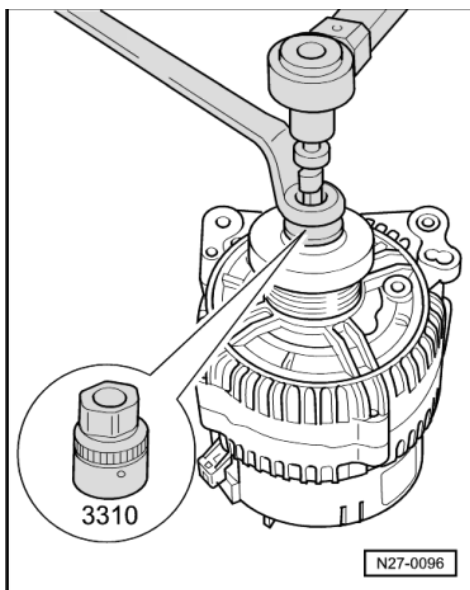


Type: Bosch

- 1 **Fillister head screw with cross-head**
 - ◆ 1 Nm
- 2 **Protective cap**
 - ◆ 3 retainer lugs
- 3 **Fillister head screw with cross-head**
 - ◆ M4 = 2 Nm
- 4 **Voltage regulator**
 - ◆ Removing and installing
=> Items **1**, **2**, **3**
 - ◆ Wear limit of carbon brushes:
5 mm
- 5 **Alternator**

2.8 - Removing and installing ribbed belt pulley without free-wheel

Special tools, testers and auxiliary items



- ♦ Socket 3310

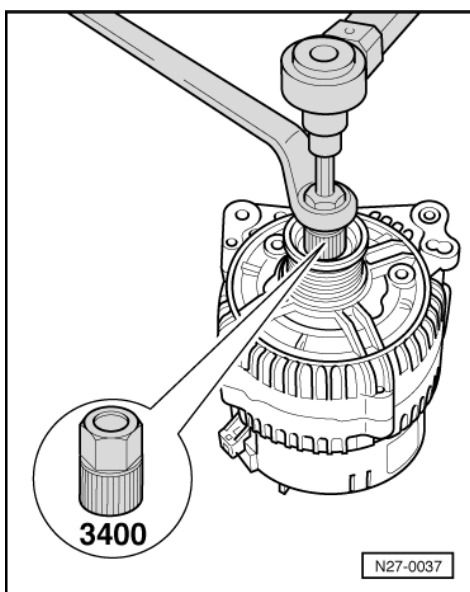
- -> Counterhold securing nut using socket 3310.

To remove, turn alternator shaft clockwise.
To install, turn alternator shaft anticlockwise.
Tightening torque: 65 Nm

2.9 - Removing and installing ribbed belt pulley with free-wheel

Special tools, testers and auxiliary items

- ♦ Adapter 3400





- -> Counterhold pulley using adapter 3400.

To remove, turn alternator shaft clockwise.
To install, turn alternator shaft anticlockwise.
Tightening torque: 80 Nm

- Clip protective cap onto free-wheel pulley.

3 - Removing and installing starter

3.1 - Removing and installing starter

Warning!

Before working on the electrical system disconnect the battery earth strap.

Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ When the battery is reconnected, re-activate electrical equipment (radio, clock, electric windows, engine management) as described in the 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.

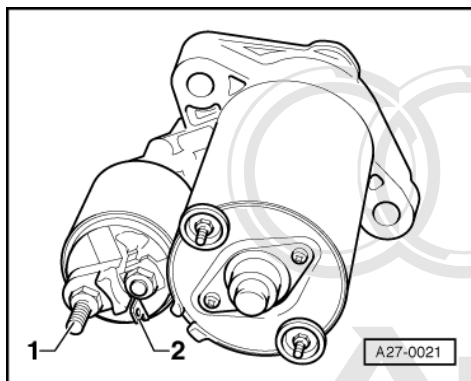
These bolts are to be stored separately.

3.2 - Vehicles with V6 petrol engine

Removing

Note:

Alternator must be removed before removing starter => Page 14 .



- -> Disconnect cable from terminal B+ -1-.
- Tightening torque: 16 Nm
- Unplug connector for terminal 50 -2-.
- Unscrew lower bolt of starter (16 mm A/F) from engine end.
- Tightening torque: 65 Nm
- Unscrew upper bolt of starter (16 mm A/F) from gearbox end.
- Tightening torque: 65 Nm

- Move starter downwards and remove.

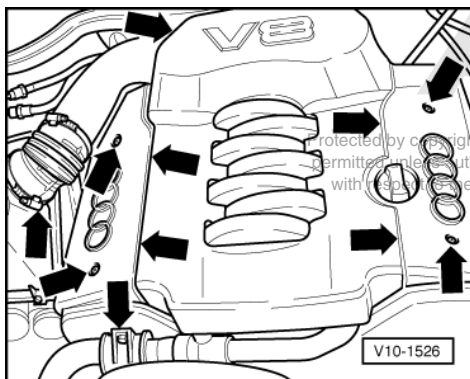
Note:

Lower bolt is used to secure earth wire to engine/gearbox assembly.

Installing

- Installation is performed in the reverse sequence.

3.3 - Vehicles with V8 petrol engine (3.7 ltr. and 4.2 ltr.)

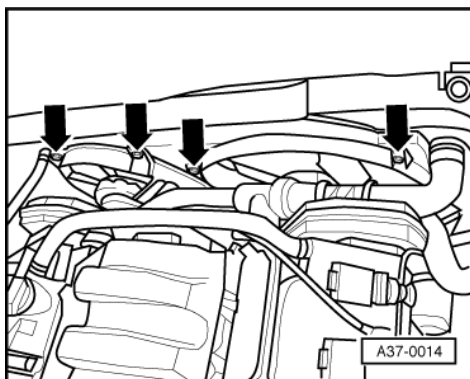


Removing

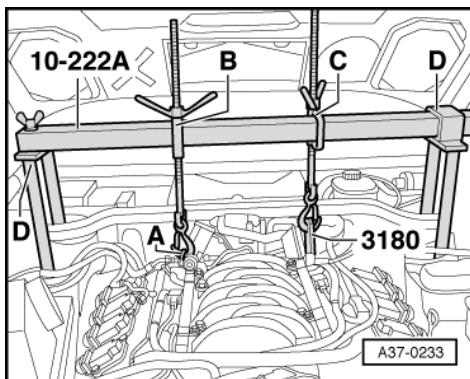
Note:

Alternator must be removed before removing starter => Page 17.

- -> 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. The electric fan can be placed to one side without being disconnected.

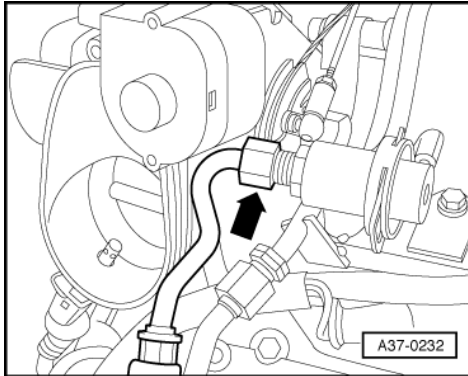




- Detach covers above suspension strut mounting and air cleaner housing.
- ➔ Place support bar 10-222A with adapter for support bar 10-222A/4 -arrow D- onto bolts of suspension strut mounting.

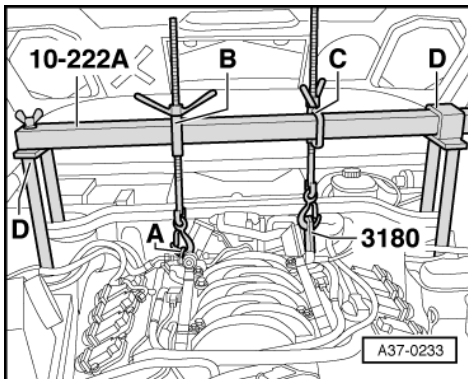
Notes:

- ◆ Threaded spindle -B- must face to the front and threaded spindle -C- must face to the rear.
- ◆ Do not use supports 10-222 A/1.

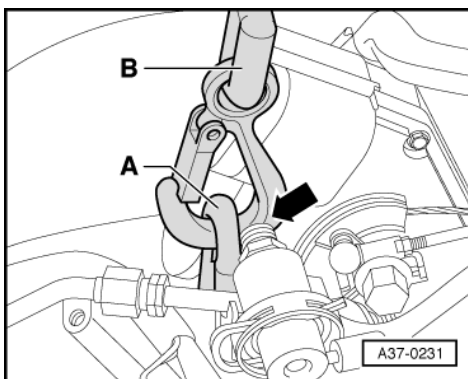


- ➔ Unscrew fuel pipe from pressure regulator -arrow-.

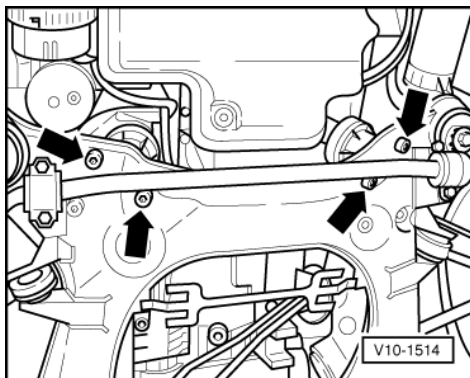
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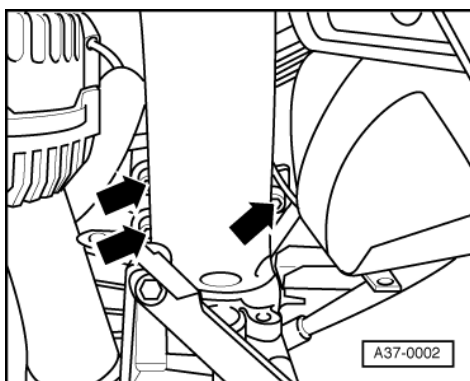
- ➔ Insert support bar 3180 from gearbox end into engine lifting eye and tighten it.
- Insert additional hooks -A- (10-222 A/2) in lifting eye at pressure regulator.
- Pre-tension engine slightly using the two spindles -B- and -C-.



- ➔ When raising or lowering the engine, ensure that neither the hook -B- nor the additional hook -A- is in contact with the pressure regulator -arrow-.



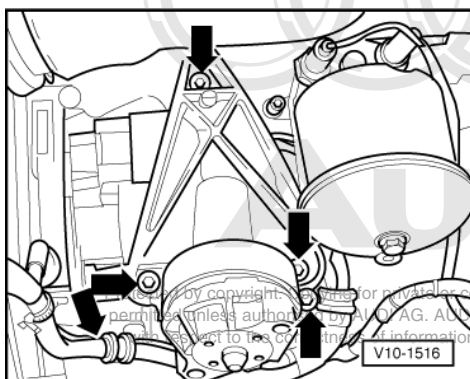
- -> Screw out lower bolts -arrows- at engine mountings.



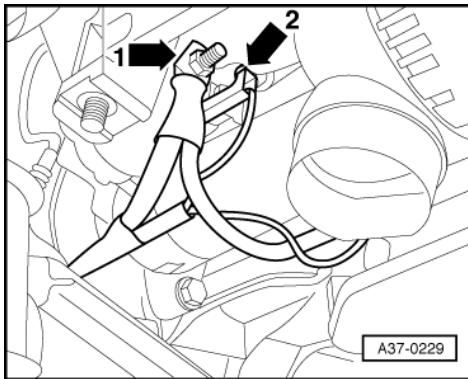
- -> Screw out securing bolts -arrows- at front right torque reaction support.
- Use spindles to lift engine until engine mounting comes out of subframe.

Note:

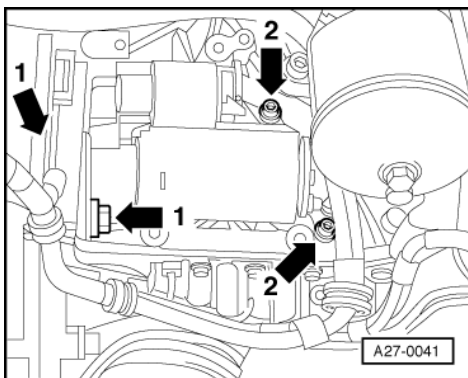
Ensure that the throttle valve unit does not damage the noise insulation mat at the bulkhead.



- -> Unbolt engine support on right and cable clamps -arrows-. Position engine support on subframe.
- Unplug connector at engine mount.
- Dismantle engine support and remove.



- ➔ 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
- Unscrew upper bolt (16 mm A/F) of starter -1- from gearbox end.
- Tightening torque: 65 Nm
- Unscrew socket head bolts -2- (5 mm).
- Move starter downwards and remove.

Installing

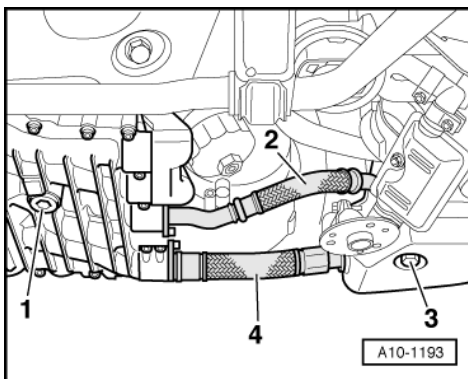
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- Installation is performed in the reverse sequence.

3.4 - Vehicles with W12 petrol engine

Special tools and workshop equipment required

- ♦ Drip tray

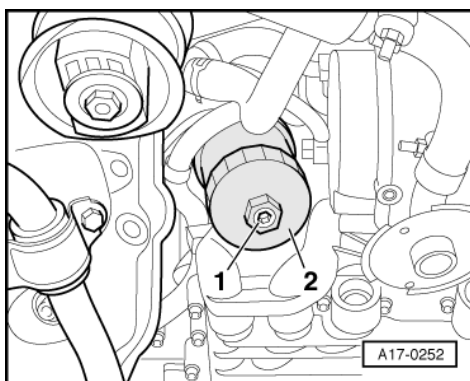


Removing

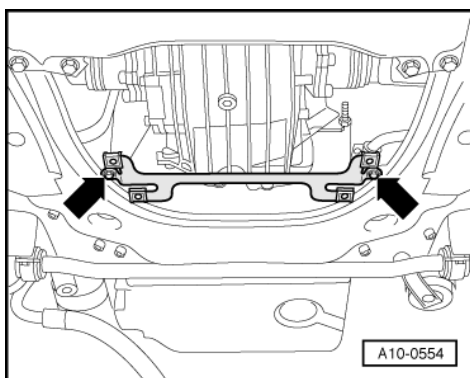
- Drain cooling system.

=> Engine Mechanics; Repair group 19

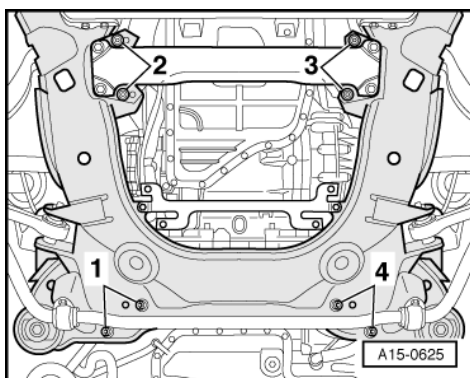
- Place a drip tray underneath.
- -> Unscrew oil drain plugs -1- and -3-.
- Remove connection pipes -2- and -4- from oil reservoir.



- -> Unscrew oil drain plug -1- at oil filter cap -2-.
- Unscrew oil filter cap and remove filter.



- -> Unbolt brackets for noise insulation -arrows-.



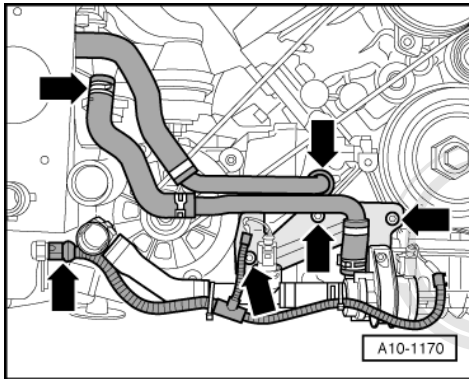
- -> Remove lower securing bolts -1- and -4- at engine mounts.
- Take out lower bolts -2- and -3- at gearbox mounts.
- Remove right front wheel.
- Pull lock carrier to front.



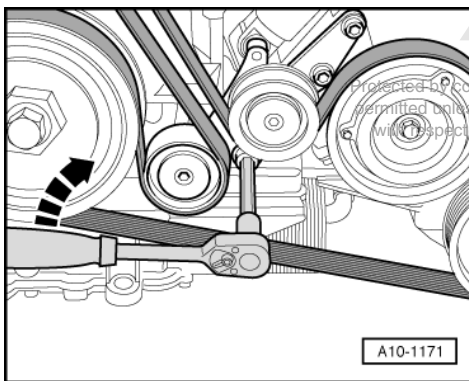
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=> Engine Mechanics; Repair group 13



- -> Remove coolant pump with bracket and hose assembly -arrows- , then move aside and secure in place.

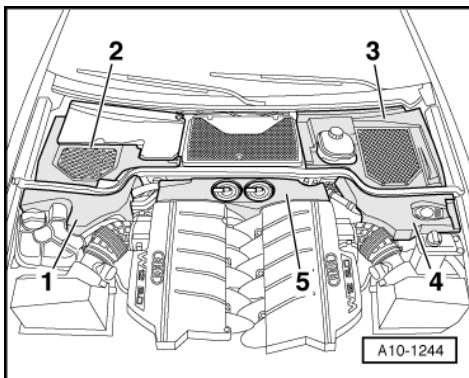


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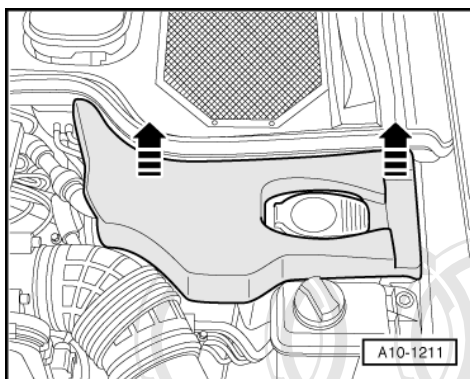
Note:

Before removing the ribbed belt, mark the direction of rotation with chalk or a felt pen. If a used belt rotates in the wrong direction when refitted, it can break.

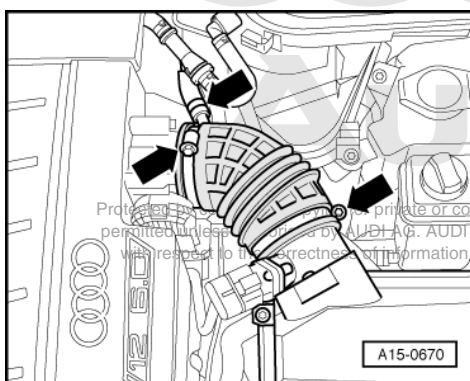
- -> To slacken ribbed belt, turn belt tensioner in direction of arrow.
- Remove ribbed belt from belt pulley on alternator.
- Release tensioning element.



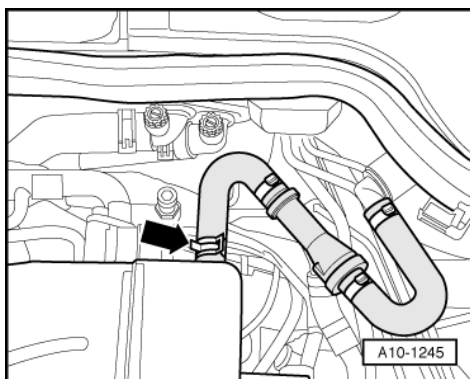
- -> Remove covers -1 ... 5-.



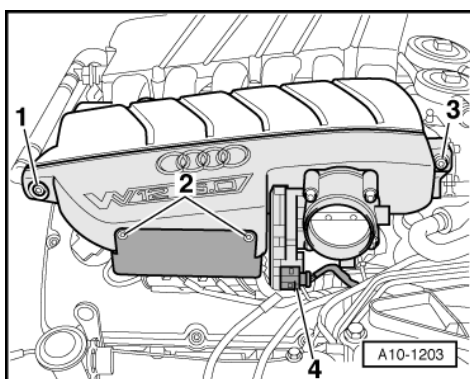
- -> Remove left cover in engine compartment -arrows-.



- -> Remove left air hose -arrows-.



- -> Disconnect vacuum hose -arrow- to brake servo at left side section of intake manifold.

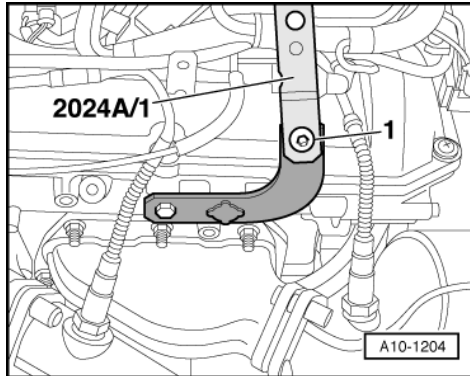


- -> Unplug electrical connector -4-.

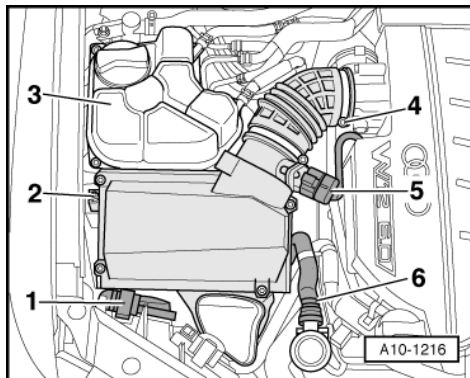
**Note:**

Secure threaded plate from dropping to the ground before unscrewing bolt -1-.

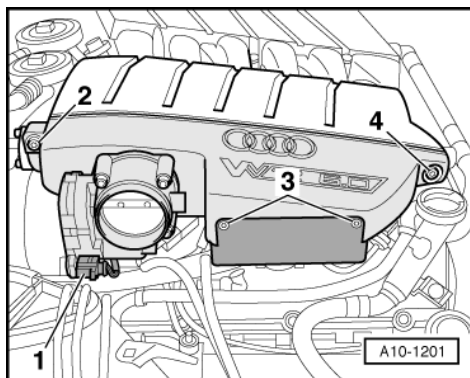
- Unscrew bolts -1 ... 3- and remove left intake manifold.



- -> Fit extension 2024 A/1 at left engine lifting eye with a fillister head bolt M10 -Item 1- (e.g. from gearbox mount) and a flat nut.



- -> Pull off hose -6- at combination valve for secondary air system.
- Unbolt coolant expansion tank -3-.
- Disconnect wiring for coolant shortage indicator switch -F66 at bottom of coolant expansion tank.
- Unplug connector -5- from air mass meter.
- Disconnect air hose -4- from intake manifold.
- Unscrew two nuts -2-.
- Lift air cleaner housing slightly and unplug connector at rear of air cleaner housing.
- Move wiring at air cleaner housing clear.

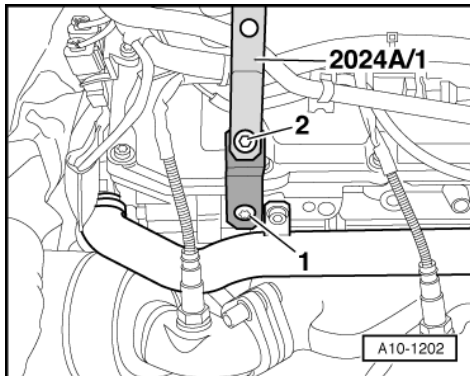


- Unscrew oil filler neck cap.
- -> Unplug electrical connector -1-.

Note:

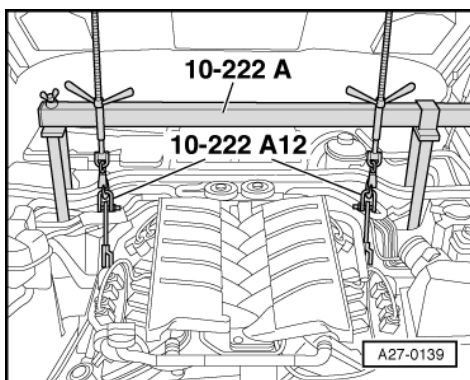
Secure threaded plate from dropping to the ground before unscrewing bolt -4-.

- Unscrew bolts -2 ... 4- and remove right intake manifold.

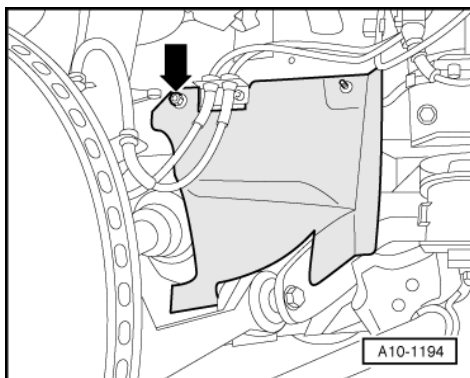


- -> Unscrew bolt -1- for right engine lifting eye and remove lifting eye.
- Secure extension 2024 A/1 to engine lifting eye with a fillister head bolt M10 -Item 2- (e.g. from gearbox mount) and a flat nut.
- Secure engine lifting eye to cylinder head.

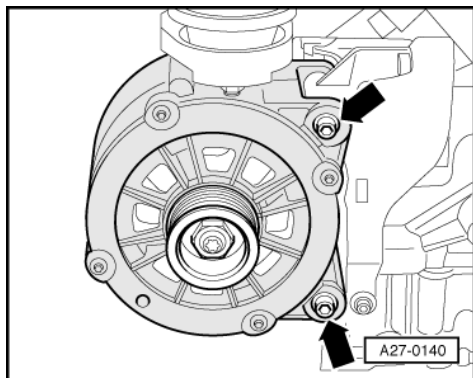
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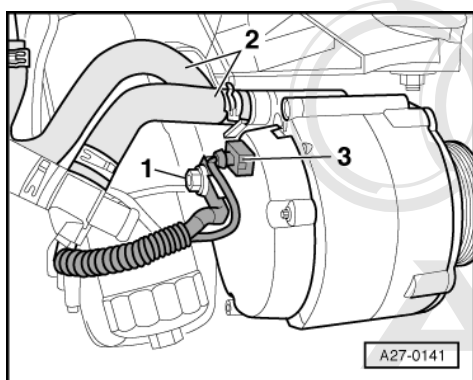
- -> Set up engine support bracket 10-222 A with adapters 10-222 A/4 and spindles.
- The spindles are positioned in front of the engine support bracket.
- Position engine support bracket 10-222 A onto bolts on suspension strut mountings and check stability.
- Fit one shackle 10-222 A12 each to the two extensions 2024 A/1.
- Attach both spindles to shackles 10-222 A12 as shown in this figure.
- Lift engine approx. 30 mm.



- -> Remove noise insulation cover in right wheel housing -arrow-.



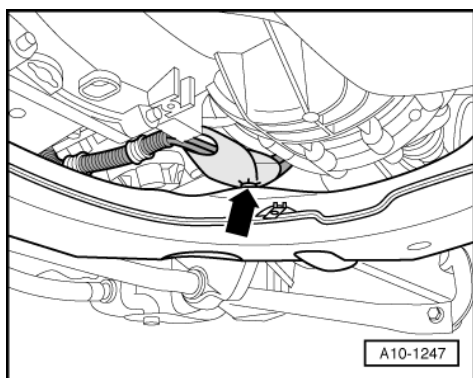
- ➔ Remove bolts -arrows-.
- Swivel alternator to front.



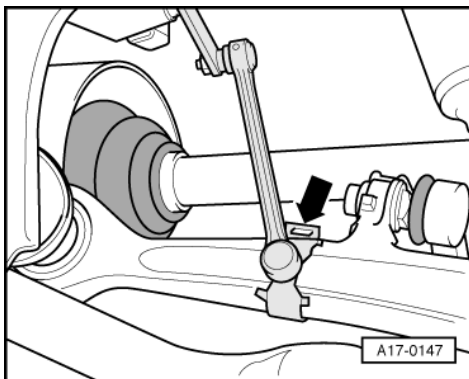
- ➔ Unscrew wire -1- from alternator.
- Unplug electrical connector -3-.
- Mark installation position of coolant hoses.
- Detach coolant hoses -2 at alternator.

Warning!
 Catch escaping coolant.

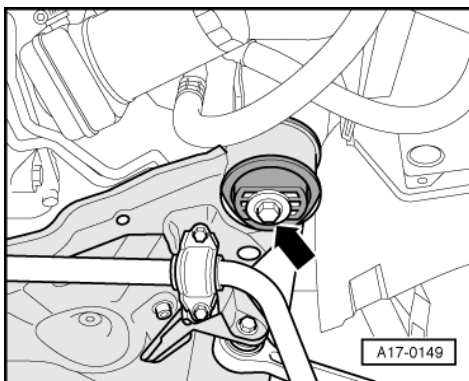
- Remove alternator.



- ➔ Lever off wiring harness from subframe at the location marked with an -arrow-.



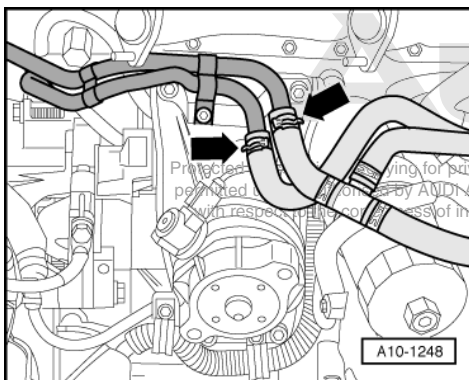
- -> Unclip actuator rod for vehicle levelling sender at bottom suspension link -arrow-.



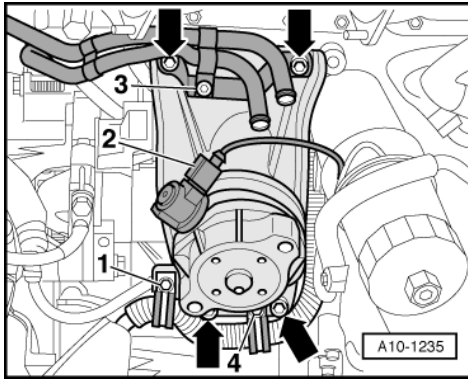
- Support subframe with workshop crane VAS 6100.
- -> Unscrew front subframe bolts on left and right sides -arrow-.

Note:

The subframe should be detached and lowered only at the front, otherwise it will be necessary to check wheel alignment.



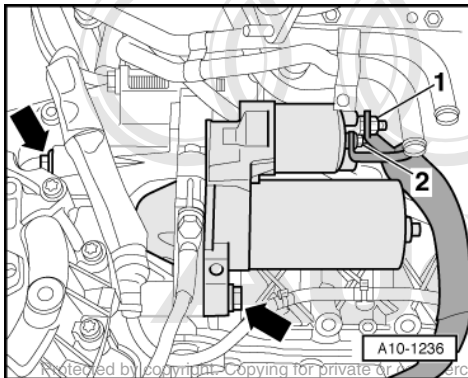
- -> Detach coolant hoses -arrows- from coolant pipes.



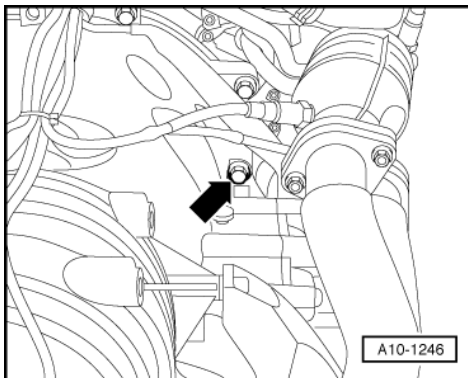
- ➔ Remove heat insulation sleeve from connector -2-.
- Unplug connector -2- at right engine mount.
- Unbolt cable clamps -1- and -4-.
- Unbolt coolant pipes from bracket -3-.
- Remove right engine support -arrows-.

Notes:

- ♦ To unscrew top left bolt at engine support, use a shortened hexagon key.
- ♦ Press subframe down to remove engine support.



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- ➔ Remove bolts -arrows-.
 - Disconnect wires -1- and -2- from starter.
 - Take out starter.



Note:

To get hold of the top starter bolt -arrow-, guide a hexagon key with universal joints and extensions to bolt from rear via exhaust system and gearbox support (shown in illustration with engine/gearbox assembly removed).

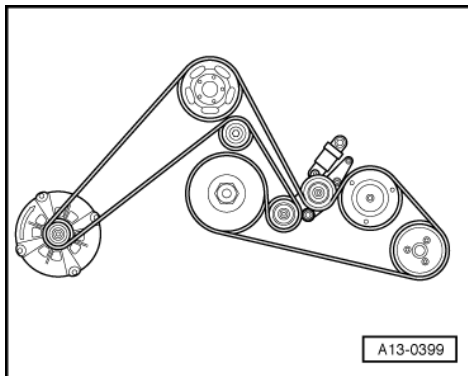
Installing

Install in reverse sequence; note the following points:

Note:

Replace gaskets and seals.

- To help bring alternator into position, knock back bushes for securing bolts slightly.



- -> Ensure that ribbed belt is correctly routed and properly seated.

- Install lock carrier

=> Engine Mechanics; Repair group 13

- Fill with engine oil.

=> Engine Mechanics; Repair group 17

- Fill up with coolant:

=> Engine Mechanics; Repair group 19

- Start engine and check that belt runs properly.

Tightening torques

Component		Nm
Starter to gearbox	M10	65 1)
	M12	65
30/B+ terminal on alternator		16
Alternator to engine		23
Coolant pump to engine		20
Engine mount to subframe		40
Gearbox mount to subframe		40
Gearbox support to gearbox mount		40
Oil drain plug to oil filter cap		9
Connection pipes to sump or oil reservoir		8
Oil drain plug to oil reservoir		25
Oil drain plug to engine		55
Intake manifold side section to top section		22 2)
Bracket for connections to intake manifold side section		8

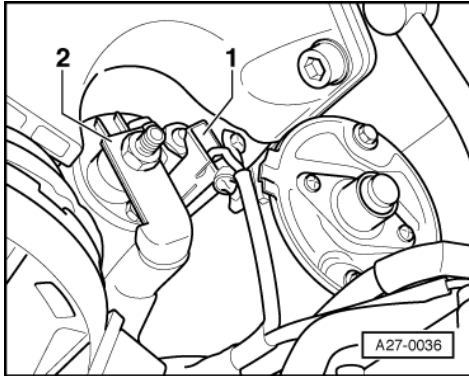
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Battery clamp to battery terminal	6
-----------------------------------	---

- 1) Bolt strength rating 10.9
- 2) No permissible tolerance, adhere strictly to tightening torque specified

3.5 - Vehicles with V6 TDI engine

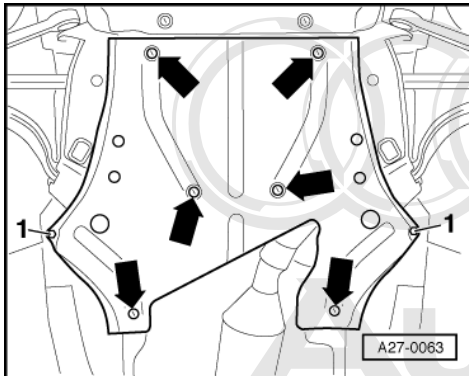


Removing

Note:

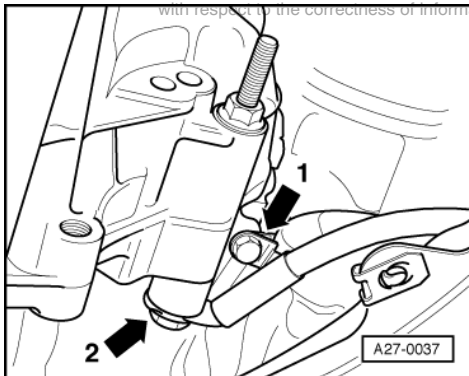
Alternator must be removed before removing starter => Page 21 .

- -> Disconnect cable from terminal B+ -2-.
- Tightening torque: 16 Nm
- Unplug connector for terminal 50 -1-.



- -> Remove rear noise insulation by unfastening securing bolts -arrows- and the two plastic nuts -1- (10 mm A/F).

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- Unscrew upper bolt of starter (16 mm A/F) from gearbox end.
Tightening torque: 65 Nm
- -> Unscrew lower bolt -2- of starter (16 mm A/F) with nut (16 mm A/F).
Tightening torque: 65 Nm
- Move starter downwards and remove.

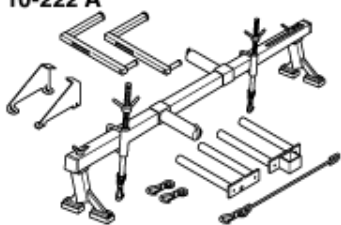
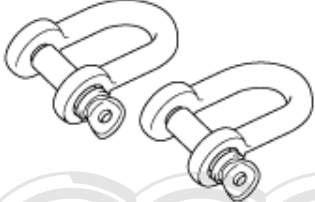
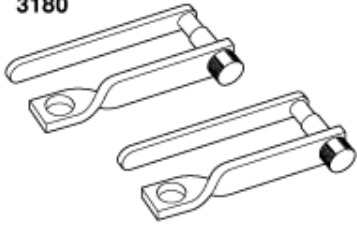
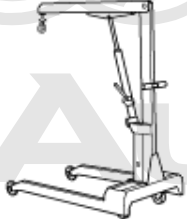
Note:

The lower bolt is used to secure earth cable to engine/gearbox assembly.

Installing

- Installation is performed in the reverse sequence.

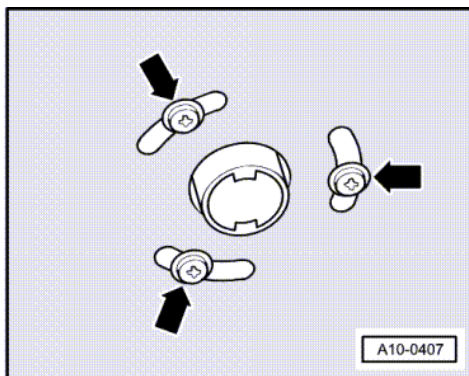
3.6 - Vehicles with V8 TDI engine

<p>10-222 A</p> 	<p>10-222 A/12</p> 
<p>3180</p> 	<p>V.A.G 1202 A</p>  <p>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.</p>
	<p style="text-align: right;">G27-0001</p>

Special tools and workshop equipment required

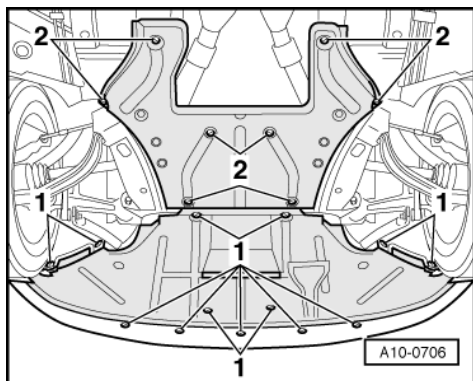
- ◆ Engine support bracket 10-222 A
- ◆ Shackle 10-222 A/12
- ◆ Retainer 3180

- ♦ Workshop crane V.A.G 1202 A

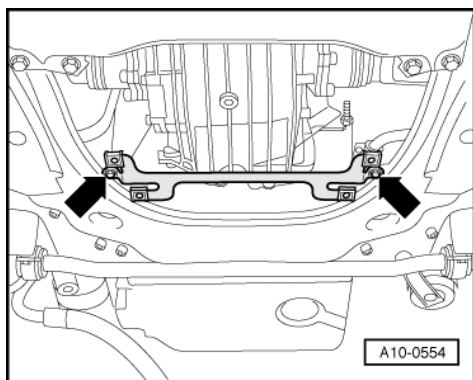


Removing

- Remove right front wheel.
- -> Remove screws -arrows- securing exhaust pipe of auxiliary/additional heater to noise insulation.



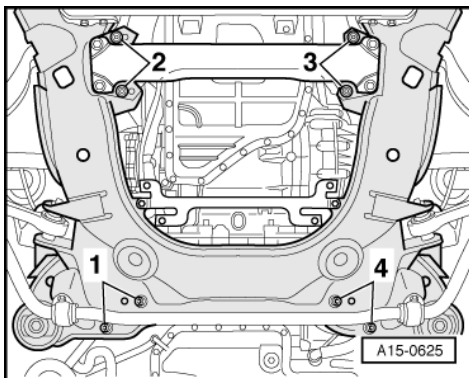
- -> Release quick-fasteners -1- and -2- and take off noise insulation (2 sections).



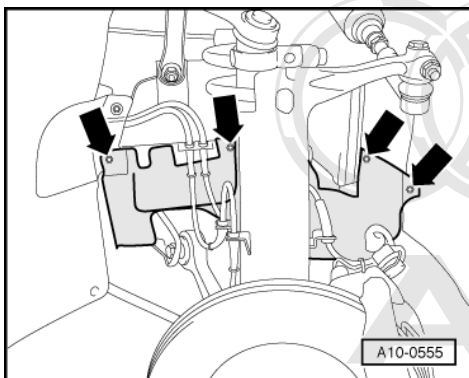
- -> Unbolt brackets for noise insulation -arrows-.



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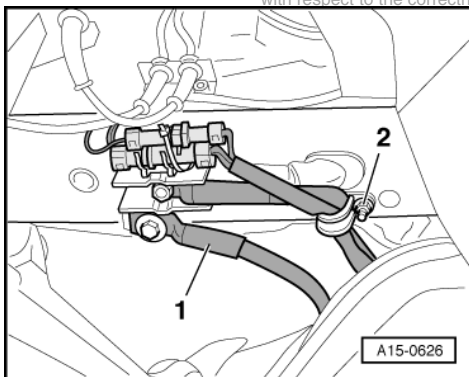


- -> Remove lower securing bolts -1- and -4- at engine mounts.
- Unscrew lower bolts -2- and -3- at gearbox mounts approx. five turns.

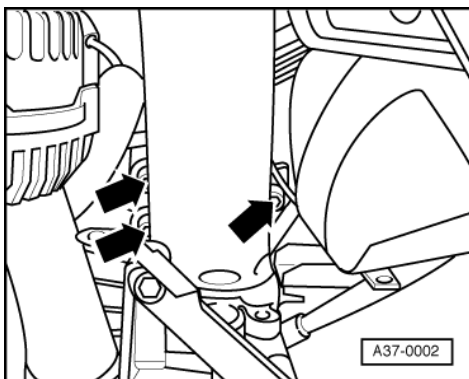


- -> Remove noise insulation cover above right-hand drive shaft -arrows-

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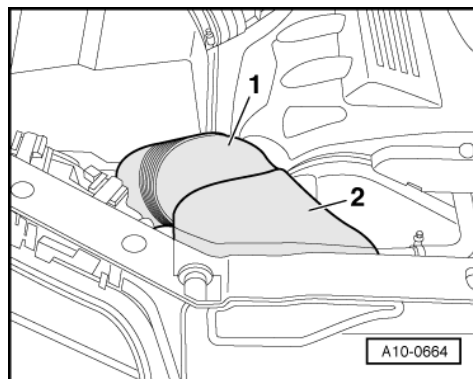
- -> Remove earth cable -1-.
- Unbolt cable clamp -2-.



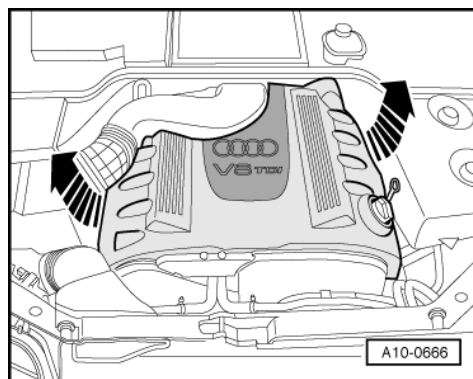
- -> Remove three securing bolts -arrows- at front right torque reaction support.

Note:

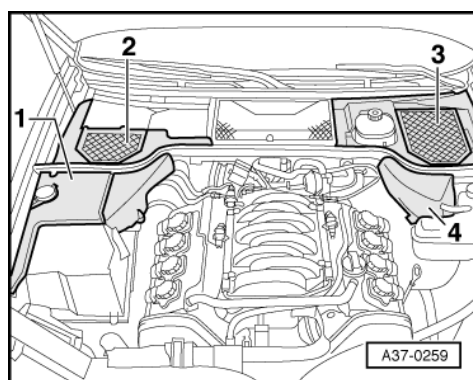
To assist removal, the right-hand bolt can remain screwed in a few turns.



- -> Unclip cover -2- for air duct at lock carrier.
- Remove air duct -1-.



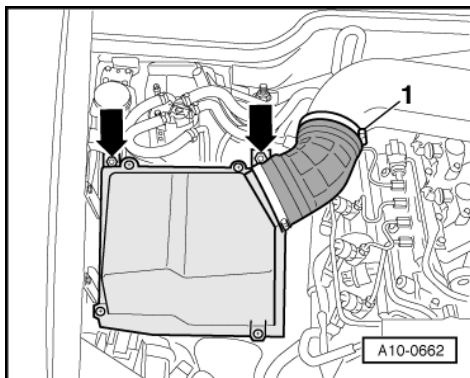
- -> Remove engine cover -arrows-.



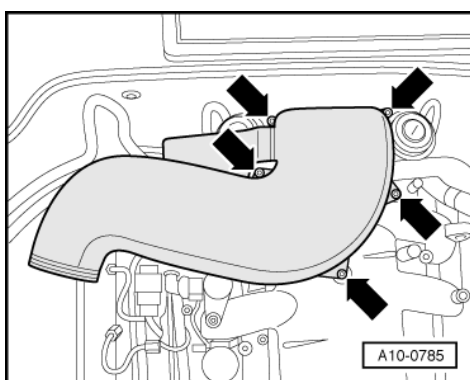
- -> Remove covers 1 - 4.



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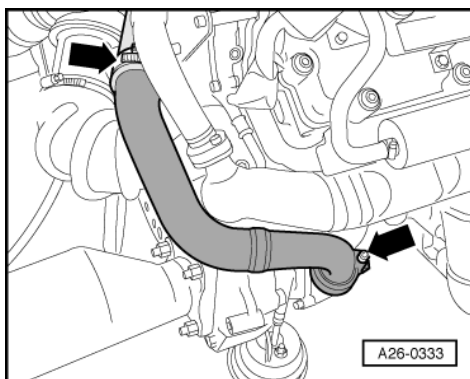
- -> Release hose clamp -1-.
- Remove air cleaner housing -arrows-.



- -> Remove top air pipe -arrows-.

Note:

Seal inlet connection with clean cloth.



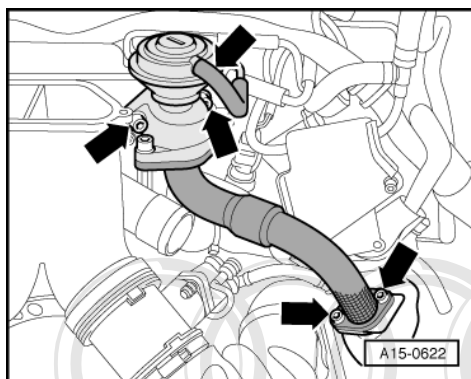
- -> Remove right-hand air pipe -arrows-.

Note:

Shown in illustration with engine removed.



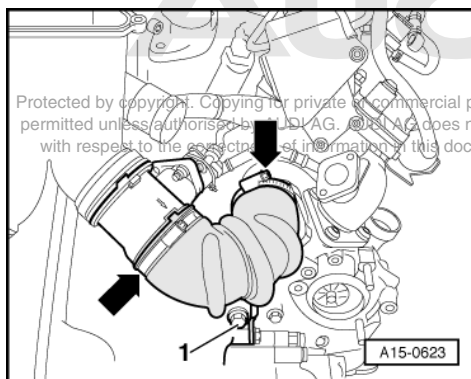
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- -> Remove right-hand connection pipe for exhaust gas recirculation together with exhaust recirculation valve -arrows-.

Note:

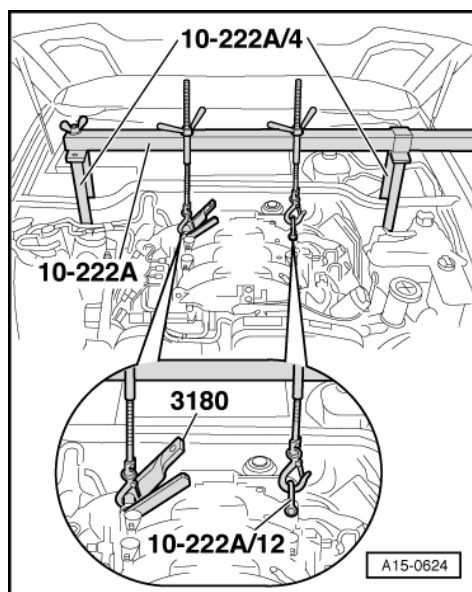
Shown in illustration with engine removed.



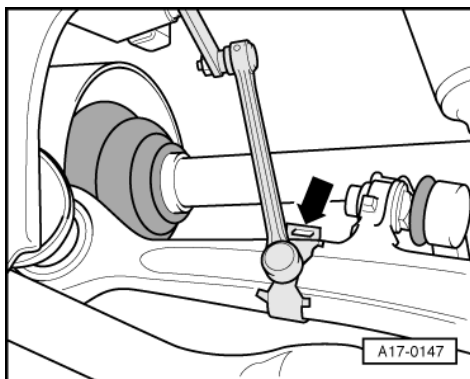
- -> Remove air hose -arrows-.
- Unscrew upper securing bolt -1- for starter.

Note:

Shown in illustration with engine removed.

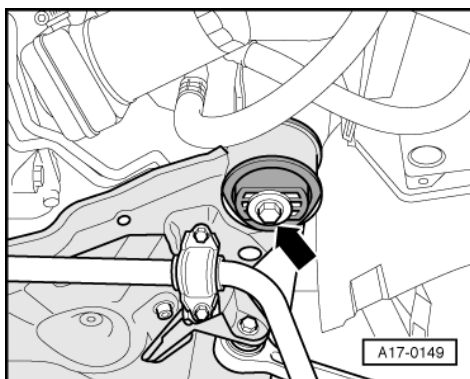


- -> Set up engine support bracket 10-222 A with adapters 10-222 A/4 and spindles.
- The spindles are positioned in front of the engine support bracket.
- Position engine support bracket 10-222 A onto bolts on suspension strut mountings and check stability.
- Fit retainer 3180 onto lifting eye at rear right of intake manifold and hook up spindle of support bracket onto threaded pin of retainer 3180.
- Fit shackle 10-222 A/12 onto lifting eye at rear left of intake manifold and hook up spindle of support bracket.
- Tighten spindles until torque reaction support contacts bottom part of headlight housing.



Vehicles with gas discharge headlights:

- -> Unclip actuator rod for vehicle levelling sender at bottom suspension link -arrow-.

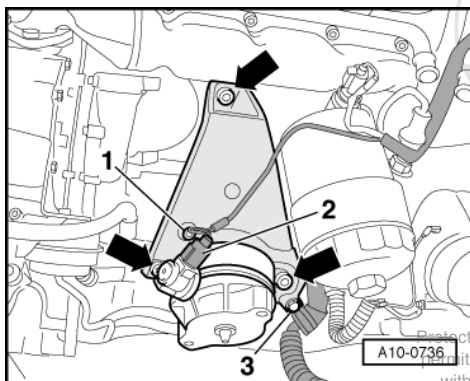


All models

- Support subframe with workshop crane V.A.G 1202 A.
- -> Unscrew front subframe bolts on left and right sides -arrow-.

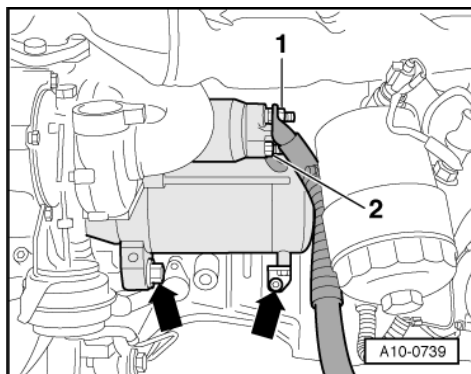
Note:

The subframe should be detached and lowered only at the front, otherwise it will be necessary to check wheel alignment.



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- -> Unplug connector -2- at right-hand engine mount.
- Release cable tie -1- from covering.
- Unbolt cable clamp -3-.
- Remove right engine support -arrows-.



- -> Remove bolts -arrows-.
- Take out starter.
- Disconnect wires -1- and -2- from starter.

Installing

Install in reverse sequence; note the following points:

Note:

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Replace gaskets/seals and O-rings.

- Installing subframe:

=> Running gear, front-wheel drive and four-wheel drive; Repair group 40; Removing and installing subframe
 Removing and installing subframe

Tightening torques

Component	Nm
Starter to engine	65
B+ terminal to starter	16
Starter bracket to engine	10
Engine support to cylinder block	42
Cable clamp to engine support	10
Connection pipe for exhaust gas recirculation to exhaust manifold	10
Mechanical exhaust gas recirculation valve to intake manifold	22

Component	Nm
Air pipe to turbocharger	10
Air pipe, top to	air pipe, rear
	cylinder head
Earth wire to	starter
	body
Engine mount to subframe	40
Gearbox mount to subframe	40
Torque reaction support to longitudinal member	40

Component	Nm
Hose clamps for air feeder hoses	3.5

4 - Cruise control system (CCS) for vehicles with electronic throttle

4.1 - Cruise control system (CCS) for vehicles with electronic throttle

Vehicles with diesel engine

In vehicles with diesel engine the function of the cruise control system is controlled by the engine control unit.
Apart from the CCS operating switch on the left-hand steering column lever there are no additional components.

Vehicles with petrol engine

In vehicles with electronic engine power control (electronic throttle) the function of the cruise control system is controlled by the engine control unit.
Apart from the CCS operating switch on the left-hand steering column lever there are no additional components.

5 - Cruise control system (CCS) for vehicles without electronic throttle (mechanical throttle)

5.1 - Cruise control system (CCS) for vehicles without electronic throttle (mechanical throttle)

5.2 - General notes

Warning
Before working on the electrical system disconnect the battery earth strap.
Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ Activate the service mode of the telematics control unit before disconnecting the battery.
- ◆ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

5.3 - Removing and installing control unit for cruise control system -J213

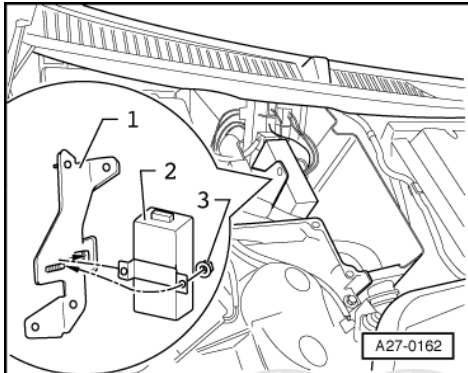
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The cruise control system control unit -J213 is located in the electronics box in the plenum chamber.



Removing

- Open the electronics box => Page 161 .



- -> Unplug connector from control unit -2-.
- Unscrew nuts -3- (5 Nm).
- Remove control unit -2- from bracket -1-.

Installing

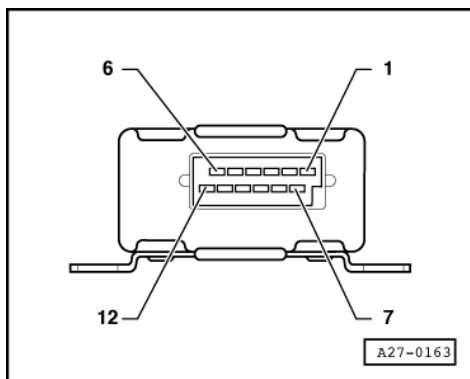
- Installation is performed in the reverse sequence.

5.4 - Contact assignment of 12-pin connector for CCS control unit

Note:

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Contacts which are not listed are vacant/unassigned.



-> Multi-pin connection, 12-pin

- 1 - Earth (terminal 31)
- 4 - CCS switch (PIN 3)
- 5 - Earth (terminal 31)
- 6 - Vacuum pump -V18 (PIN 2)
- 7 - Vacuum pump -V18 (PIN 1)
- 8 - CCS switch (PIN 4)
- 9 - Speed signal
- 10 - CCS switch (PIN 2)
- 11 - CCS switch (PIN 1)
- 12 - Vacuum pump -V18 (PIN 3)

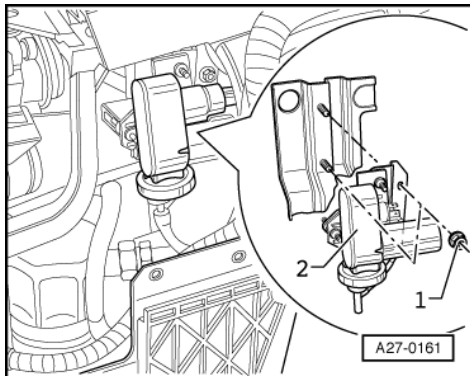
5.5 - Removing and installing vacuum pump for CCS -V18

The vacuum pump is located in the front left wheel housing at the longitudinal member.

Removing

- Remove front left wheel housing liner.

=> General body repairs, Exterior; Repair group 66; Wheel housing liners; Removing and installing front wheel housing liner Wheel housing liners Removing and installing front wheel housing liner



- -> Disconnect vacuum hose and electrical connector from vacuum pump -2-.
- Unscrew nuts -1- (6 Nm) and remove vacuum pump -2- from bracket.

Installing

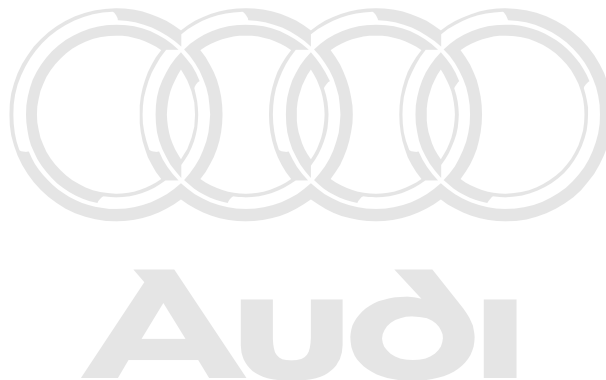
- Installation is performed in the reverse sequence.



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90 - Gauges, Instruments



1 - Dash panel insert

1.1 - Dash panel insert

1.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

Activate the service mode of the Telematics control unit before disconnecting battery. => Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

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Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

1.3 - Fault message "dEF" on trip recorder display

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

- If "dEF" appears on the display, renew the dash panel insert
=> Page 56 .

1.4 - Removing and installing dash panel insert

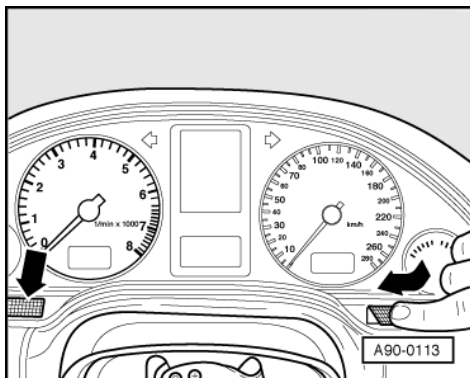
Notes:

- ♦ The dash panel insert must not be dismantled.
- ♦ It is not necessary to remove the steering wheel. For ease of illustration the steering wheel is not shown in the following illustrations.

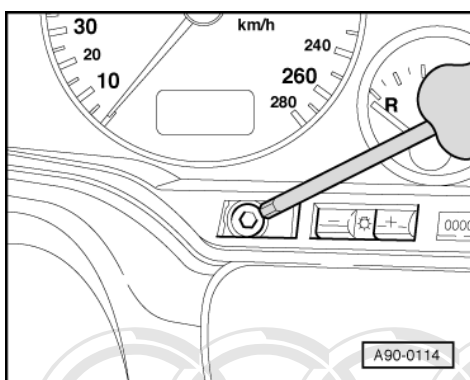
Removing

- Calculate input values for the exchange of the dash panel insert:

=> Electrical system Self-diagnosis 02.99 ä; Repair group 01; Dash panel insert self-diagnosis with service interval extension Dash panel insert self-diagnosis with service interval extension



- Pull steering wheel out as far as it will go and move downwards.
- -> Press in both covers -arrows- and remove covers from dash panel insert.



- -> Unscrew bolts on right and left side (1.5 Nm).
- Pull out dash panel insert to front.
- Cut open cable ties on back of dash panel insert.
- Release retainer catches on connectors and unplug connectors.

Installing

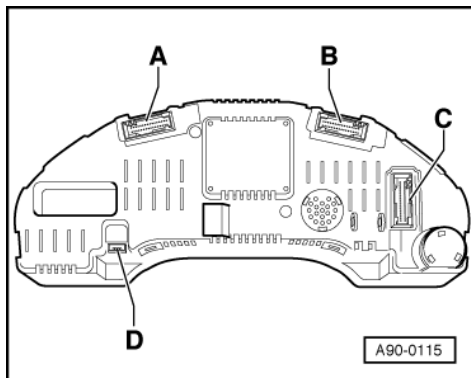
- Plug in electrical connectors and fit wiring harness into clip on back of dash panel insert.
- Installation is performed in the reverse sequence.
- After installing, check operation.
- If operation check is OK enter input values of dash panel insert:

=> Electrical system Self-diagnosis: Repair group 01: Dash panel insert self-diagnosis with service interval extension
 Dash panel insert self-diagnosis with service interval extension
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1.5 - Multi-pin connectors on dash panel insert

Note:

On the Audi A8, all of the indicator/warning lamps are LED lamps. If one of these is defective, the entire dash panel insert must be renewed.



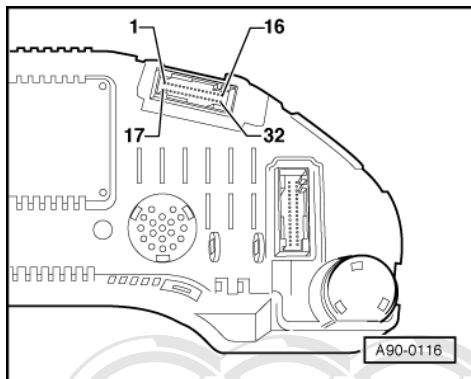
-> Highline dash panel insert

- A - Multi-pin connector
32-pin, green
- B - Multi-pin connector
32-pin, blue
- C - Multi-pin connector
32-pin, grey
- D - Multi-pin connector for radio-controlled clock
4-pin, black

1.6 - Assignment of contacts at multi-pin connectors

Note:

Contacts which are not listed are vacant/unassigned.



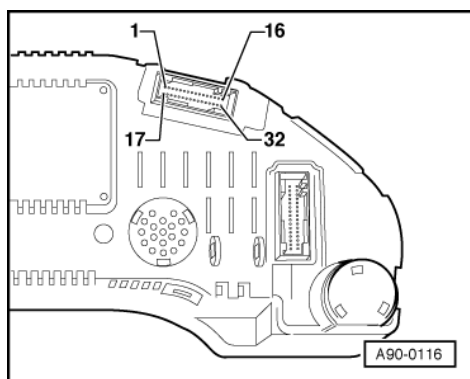
-> Multi-pin connector,

32-pin, blue

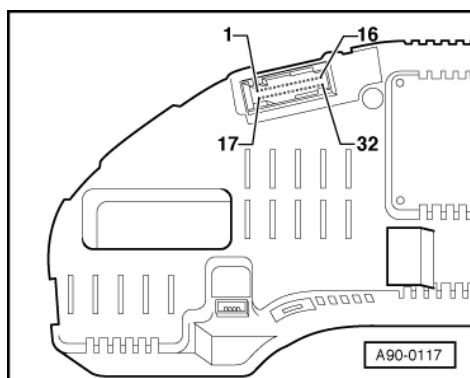
- 1 - Left turn signal
- 2 - Right turn signal
- 3 - Coolant temperature
- 4 - Fuel gauge sender
- 5 - Sensor earth (terminal 31)
- 8 - Fog light
- 9 - Rear fog light
- 10 - Airbag
- 12 - High beam
- 13 - Trailer turn signal
- 14 - Handbrake
- 15 - Terminal 21
- 17 - Brake pad

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- 18 - Brake fluid level
- 19 - Oil pressure switch



- 20 - Belt buckle
- 22 - Headlight range control
- 23 - Brake light
- 24 - Low beam
- 26 - Terminal 15
- 27 - Terminal 15
- 28 - Earth (terminal 31)
- 29 - Earth (terminal 31)
- 30 - Battery + (terminal 30)
- 31 - Battery + (terminal 30)
- 32 - Battery + (terminal 30)



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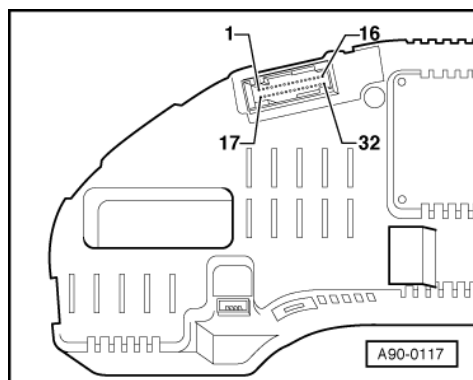
-> Multi-pin connector,

32-pin, green

- 1 - Transponder 1
- 2 - K-wire
- 5 - Ambient temperature sender
- 6 - Terminal 86s
- 7 - Auxiliary heating radio input
- 11 - Oil level
- 12 - Function selection switch (Out B)
- 13 - Function selection switch (Out A)
- 14 - Function selection switch (Enter)
- 15 - On-board computer (left)
- 16 - On-board computer (right)
- 17 - Transponder 2
- 18 - CAN bus Low (drive train)
- 20 - CAN bus High (drive train)
- 21 - CAN bus Low (display)
- 22 - CAN bus High (display)
- 23 - CAN bus High (convenience)
- 24 - CAN bus Low (convenience)



27 - On-board computer (Reset)

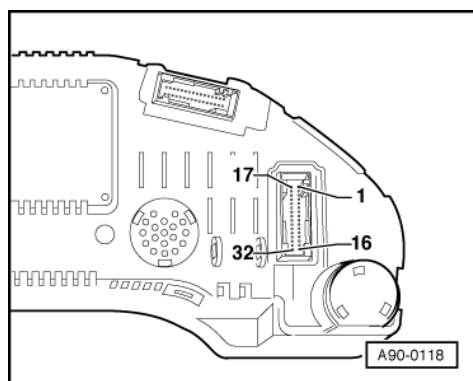


28 - Function selection switch (menu)

31 - Right-hand parking light

32 - Left-hand parking light

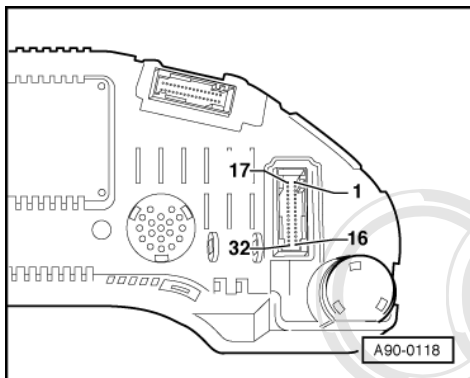
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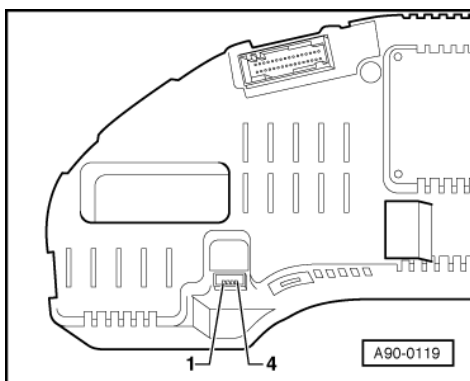
-> Multi-pin connector

32-pin, grey

- 1 - Function selection switch (Telematics)
- 2 - Function selection switch (menu)
- 3 - Function selection switch (menu)
- 4 - Bonnet switch
- 5 - Navigation data (up to MY 2000)
- 7 - Speed signal input
- 8 - Air conditioner output
- 9 - Speed signal output
- 10 - Fan speed 3
- 11 - Boot lid
- 12 - Summer/Winter setting
- 14 - Terminal 58
- 15 - Driver's door
- 16 - "Time parked" output
- 17 - Washer fluid level
- 18 - Coolant level
- 19 - ABS
- 20 - TCS



- 21 - Clock (until MY 2000)
- 22 - Enable (until MY 2000))
- 23 - Terminal 58s
- 24 - Terminal 58s
- 25 - Terminal 58s
- 26 - Terminal 58d
- 27 - Terminal 58d
- 28 - Door lock signal
- 29 - Rear right door
- 30 - Rear left door
- 31 - Front passenger's door
- 32 - Auxiliary heater output



-> Multi-pin connector,

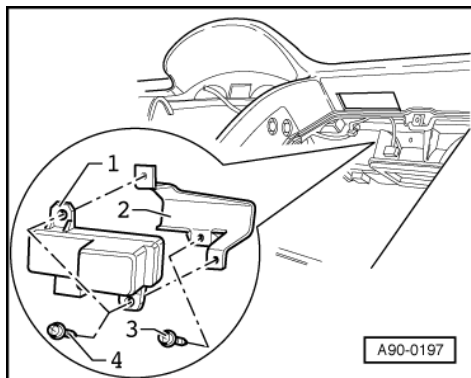
4-pin, black

- 1 - Radio-controlled clock signal (data)
- 2 - Radio-controlled clock, 5V
- 4 - Radio-controlled clock, earth

1.7 - Servicing radio-controlled clock

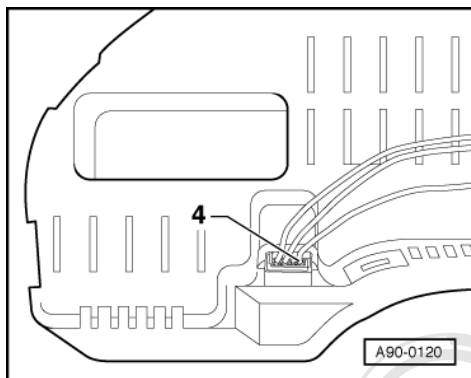
Note:

Can be identified by aerial (antenna) symbol at top left of clock display



Removing

- Remove dash panel insert => Page 56 .
- -> Loosen the two retaining screws -4- (1 Nm) to detach radio-controlled clock -1-.
- If necessary, the bracket for radio clock -2- can be dismantled by loosening screw -3- (0.7 Nm), working through opening for dash panel insert.



- Unplug connector -4- for radio-controlled clock from dash panel insert.

Installing

- Installation is performed in the reverse sequence.

1.8 - Checking vehicle speed signal

If the speedometer display is not correct, check whether a signal is present at the speedometer.

- Connect vehicle diagnostic, testing and information system VAS 5051.

=> Electrical system, Self-diagnosis 02.99 ä; Repair group 01; Connecting vehicle diagnostic, testing and information system VAS 5051 Connecting vehicle diagnostic, testing and information system VAS 5051

- Select "Reading measured value block" (data block).
- Enter display group number 001 and take vehicle for a test drive.

If vehicle speed is displayed on VAS 5051 but not on the speed display of the dash panel insert, the dash panel insert is defective and must be replaced.

If vehicle speed is not displayed on VAS 5051, test signal at multi-pin connector on dash panel insert.

- Remove dash panel insert => Page 56 .

- Connect test box V.A.G 1598 to the grey 32-pin connector using adapter V.A.G 1598/25.
- Use multimeter V.A.G 1526 to test continuity of wiring and sender between contact 7 and vehicle earth (audible test signal).

Test:

Whilst moving the vehicle forwards and backwards slightly (approx. 1m) whistling tone of continuity tester must go off and on several times.

If test is not OK, check wiring to vehicle-speed sender.

- Test wiring according to current flow diagram.

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

Vehicle-speed sender must be replaced if wiring is OK.

1.9 - Testing signal from fuel gauge sender -G

If there is a fault concerning the fuel gauge on the dash panel insert, check whether the signal is present at the dash panel insert.

- Connect vehicle diagnostic, testing and information system VAS 5051.

=> Electrical system, Self-diagnosis 02.99 ä; Repair group 01; Connection vehicle diagnostic, testing and information system VAS 5051 Connection vehicle diagnostic, testing and information system VAS 5051

- Select "Reading measured value block" (data block).
- Select Display Group 002.

If the fuel level is displayed on VAS 5051 but not on the fuel gauge, the dash panel insert is defective and should be replaced.

If the fuel level is not displayed on VAS 5051 as well, test the signal at the multi-pin connector on the dash panel insert.

- Remove dash panel insert => Page 56.
- Connect test box V.A.G 1598 to the blue 32-pin connector using adapter V.A.G 1598/25.
- Use multimeter V.A.G 1526 to measure the resistance between contacts 4 and 5 (sensor earth).

Specifications:

Scale division	Fuel tank 80 ltr.		Fuel tank 90 ltr.	
	Resistance ω	Contents Litres	Resistance ω	Contents Litres
Empty	166 \pm 7	0	166 \pm 7	0
Res. 1 1)	154 \pm 7	12	154 \pm 7	12
1/4	136 \pm 7	20	131 \pm 7	22
1/2	94 \pm 6	39	88 \pm 6	42
1/1 2)	21 \pm 4	79	12 \pm 4	87
1/1 3)	19 \pm 4	84	9 \pm 4	92

- 1) First division of the fuel reserve zone
- 2) Needle is right on the highest scale division



3) Needle is above the highest scale division

- If the readings do not match the specifications, check wiring between dash panel insert and fuel gauge sender -G (front-wheel drive/quattro) or -G169 (quattro) according to current flow diagram.

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

- If there are no open circuits or short circuits, check fuel gauge sender -G (front-wheel drive/quattro) or -G169 (quattro).
- Checking fuel gauge sender.

=> Fuel supply system - Petrol engines; Repair group 20; Fuel supply system - front-wheel drive/Fuel supply system four-wheel drive; Checking fuel gauge sender Fuel supply system - front-wheel drive/Fuel supply system four-wheel drive Checking fuel gauge sender

- If the readings match the specifications, the fault is in the dash panel insert; replace the dash panel insert =>Page 56 .

1.10 - Testing signal from coolant temperature sender -G2

If there is a fault with coolant temperature gauge on dash panel, check whether signal is present at dash panel.

- Connect vehicle diagnostic, testing and information system VAS 5051.

=> Electrical system, Self-diagnosis 02.99 ä; Repair group 01; Connecting vehicle diagnostic, testing and information system VAS 5051 Connecting vehicle diagnostic, testing and information system VAS 5051

- Select "Reading measured value block" (data block)
- Select Display Group 003.

If the coolant temperature is displayed on VAS 5051 but not on the coolant temperature gauge, the dash panel insert is defective and must be replaced.

If coolant temperature is not displayed on VAS 5051, test signal at multi-pin connector on dash panel insert.

- Remove dash panel insert => Page 56 .
- Connect test box V.A.G 1598 to the blue 32-pin connector using adapter V.A.G 1598/25.
- Use multimeter V.A.G 1526 to measure resistance between contacts 3 and 5 (sensor earth).

Specifications:

Coolant temperature 90 °C: approx. 110 Ohm

Coolant temperature 120 °C: approx. 50 Ohm

If the readings do not match the specifications, check wiring connection to coolant temperature sender -G2.

- Check wiring according to current flow diagram.

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

If wiring connection is OK, replace coolant temperature sender -G2.

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1.11 - Testing fuel consumption signal (engine connected to drive train CAN bus)

Note:

- ♦ On the Audi A8 facelift model the consumption signal from the engine control unit is transferred to the dash panel insert via the drive train CAN bus.
- ♦ Faults in the communication between the engine control unit and the dash panel insert can only be detected via the self-diagnosis of the dash panel insert.

Test sequence

- Start engine and take vehicle for a test drive.
- Observe consumption displayed on dash panel insert.

Meaning of display on consumption indicator

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1. Constant reading of 0.0ltr./100 km or constant reading of 51 ltr./100km.

- Interrogate fault memory of dash panel insert to check whether there is a fault in the drive train CAN bus affecting communication between engine control unit and fuel consumption indicator in dash panel insert.

=> Electrical system, Self-diagnosis 02.99 ä; Repair group 01; Self-diagnosis of dash panel insert with service interval extension Self-diagnosis of dash panel insert with service interval extension

- If the fault readout does not indicate "Drive train data bus defective" or "Engine control unit: no communication", check for faults in the control units which are connected to the drive train CAN bus.
- If no fault is detected remove dash panel insert => Page 56 .

2. Fuel consumption indicator does not show plausible figures, or consumption value display fluctuates
=> the fuel consumption indicator does not agree with the actual fuel consumption.

- Perform adaption of fuel consumption indicator.

=> Electrical system, Self-diagnosis 02.99 ä; Repair group 01; Self-diagnosis of dash panel insert with service interval extension Self-diagnosis of dash panel insert with service interval extension



92 - Windscreen wipe and wash system

1 - Servicing windscreen wiper system

1.1 - Servicing windscreen wiper system

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1.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

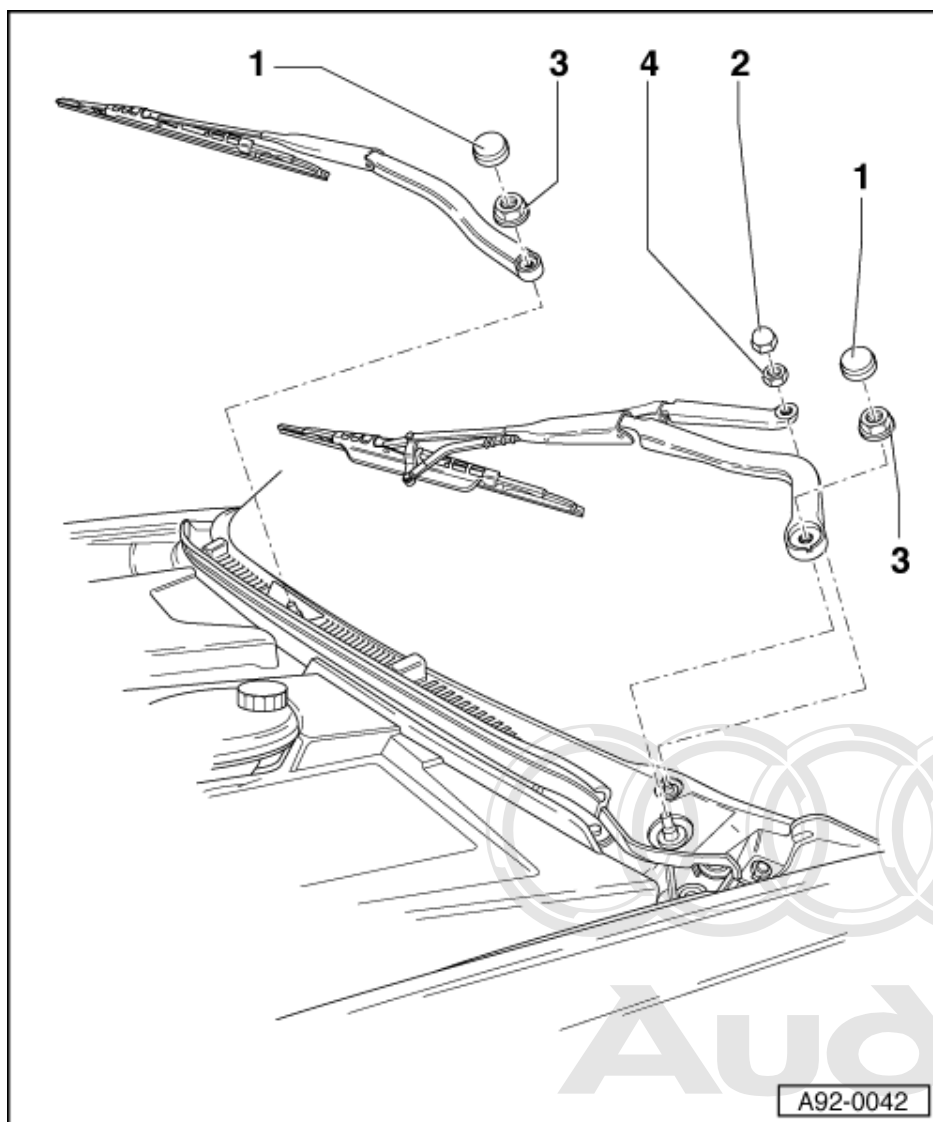
Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

1.3 - Removing and installing windscreen wiper system



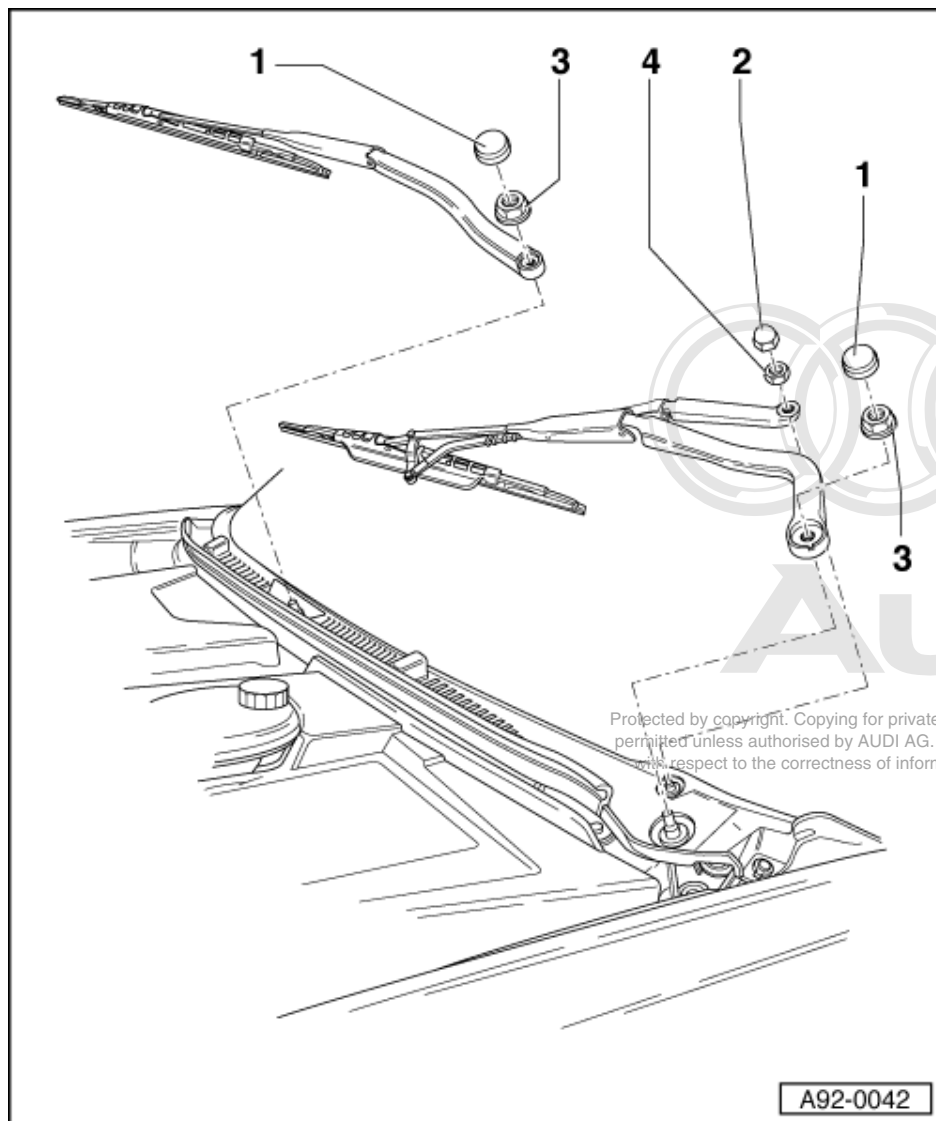
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Special tools and workshop equipment required

- ◆ Puller T10130

Removing wiper arms

- Switch windscreen wipers on and off and ensure that wipers rest in park position.
- Use screwdriver to prise caps -1- off wiper arms or unscrew cap nut -2- on driver's side.
- Remove nuts -3- and -4-.
- Pull wiper arms off pivot shafts using puller T10130.

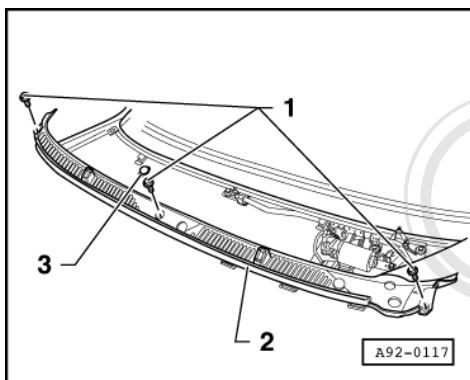


Installing wiper arms:

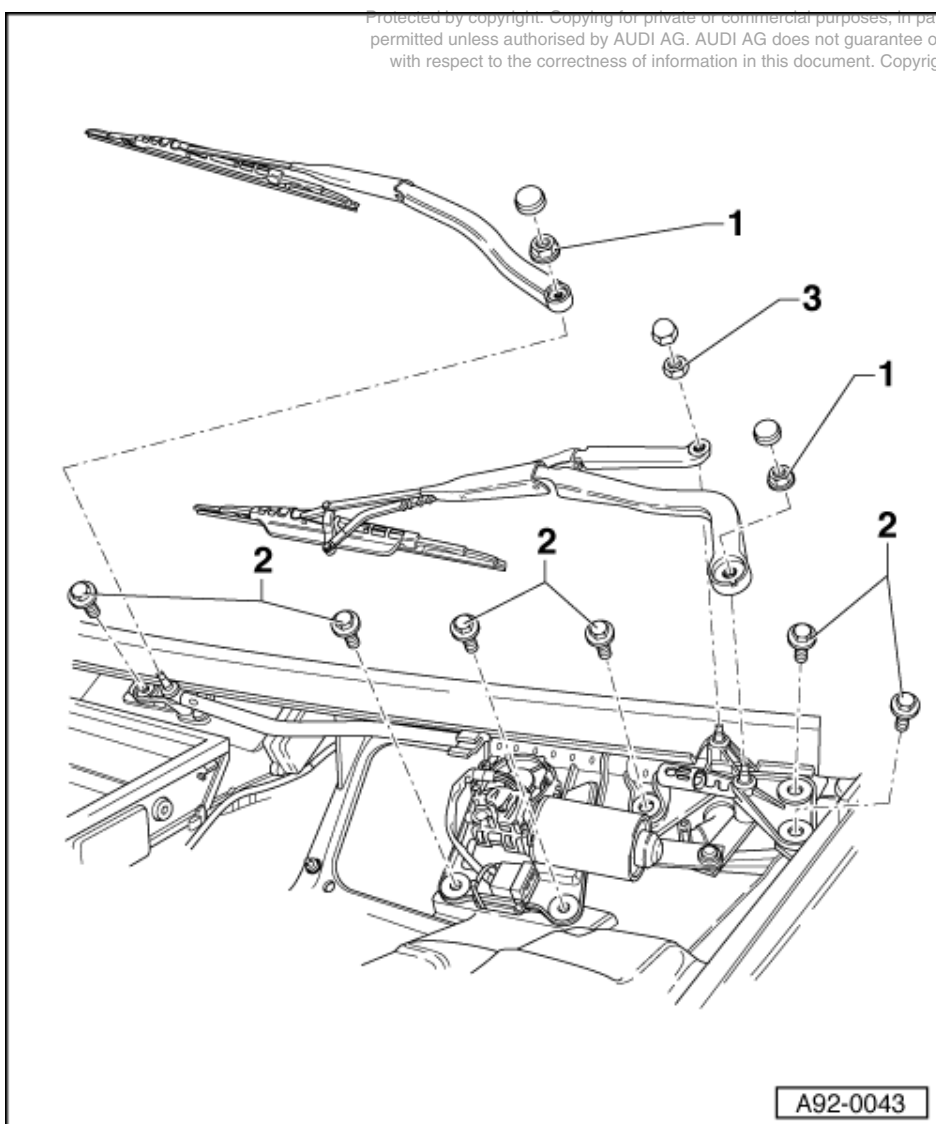
- Mount wiper arms in correct position => Page 70 .
- Tighten nuts -3- to 20 Nm and -4- to 4 Nm.
- Fit caps -1- on wiper arms or screw on cap nut -2- on driver's side.
- Fit wiper blades.

Removing and installing wiper motor and wiper linkage

- Remove wiper arms => Page 68 .
- Remove rubber seal from cowl panel trim.



- -> Unclip screw cap -3-.
- Unscrew three bolts -1- (2 Nm) and pull out cowl panel trim -2-.
- Disconnect hose connection for spray jets and lift off cowl panel trim.



- Unscrew securing bolts -2- (6 x) and remove.
- Unplug electrical connection at wiper motor.
- Remove wiper linkage together with wiper motor from plenum chamber.

Installing

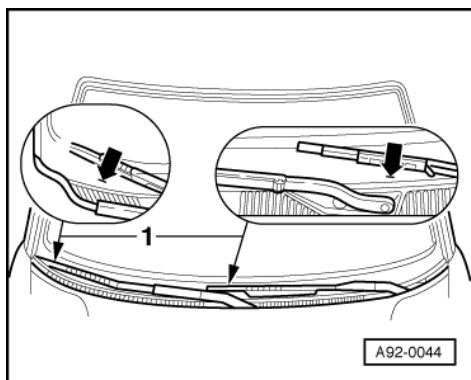


Note:

Install wiper linkage in park position as shown in this illustration.

- Insert wiper linkage together with wiper motor in plenum chamber and plug in electrical connections.
- Tighten securing bolts -2- to 6 Nm.
- Tighten securing bolts -1- to 16 Nm and bolts -3- to 4 Nm.
- Operate touch-wipe and ensure that motor rests in park position.
- Further installation is performed in the reverse sequence.
- Move wiper blades back to park position => Page 70 .

1.4 - Setting wiper blade park position



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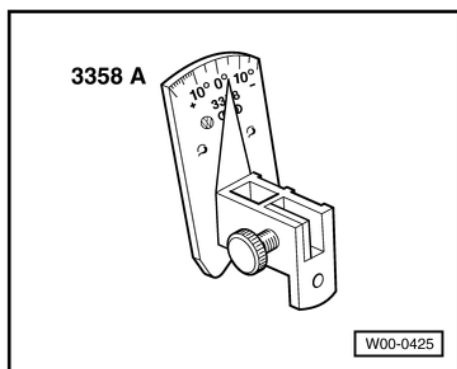
- Operate wiper motor and allow it to return to park position.
- -> Position wiper blades against marking -1- on windshield, align wipers and tighten nuts.
- Operate wipers (brief wipe function).
- If necessary, align wiper arms again and tighten securing nuts (16 Nm).

1.5 - Eliminating wiper blade judder

Possible causes for wiper blade judder:

- ♦ Windscreen scratched
- ♦ Wiper blade rubber is split
- ♦ Wiper arm/blade loose or bent
- ♦ Wiper blades coated with wax or perished

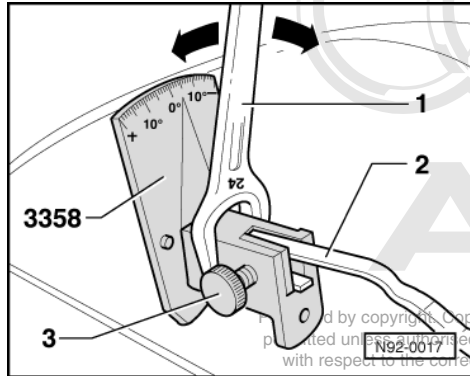
If the wiper blades are juddering and none of the causes listed apply, check and if necessary adjust the angle of the wiper arms before fitting new wiper blades.



-> Special tools, testers and auxiliary equipment required

- ◆ Wiper adjuster 3358

Checking angle of incidence



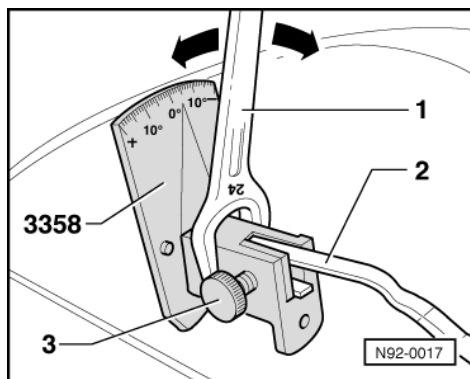
- Move wiper arms to park position.
- Remove wiper blades.
- -> Insert wiper arm -2- in wiper arm adjusting appliance 3358 and secure with locking screw -3-.
- Compare angle indicated with specification in the table

Angle specifications:

Contact angle	Audi A8
Driver's side	- 4°
Passenger's side	- 6°
Tolerance	±2°

Adjusting wiper arms

- Move wiper arms to park position.
- Remove wiper blade.



- -> Insert wiper arm -2- in wiper arm adjusting appliance 3358 and secure with locking screw -3-.
- Place open ended spanner -1- (24 mm A/F) over adjusting appliance and adjust angle of wiper arm -2- (arrows) according to specifications.
Specifications =>Page 71
- Slacken locking screw -3- and remove wiper arm -2- from adjusting appliance.
- Insert wiper arm -2- in wiper arm adjusting appliance 3358 again and secure with locking screw -3-.
- Compare indicated angle with specification
=>Page 71 .
- 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

2.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

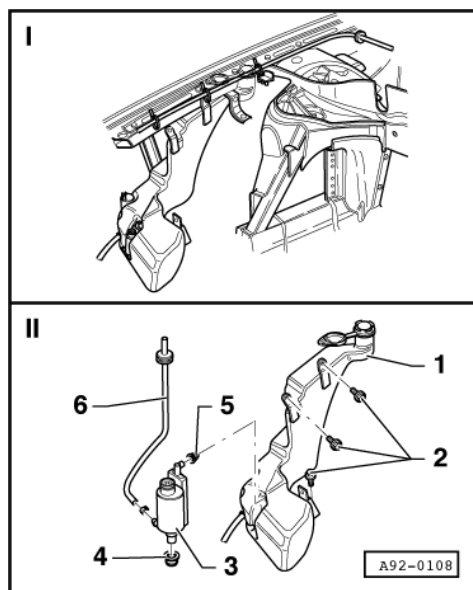
Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

2.3 - General overview (all versions except S8)



-> Figure I

The washer fluid container is located in the engine compartment on the right.

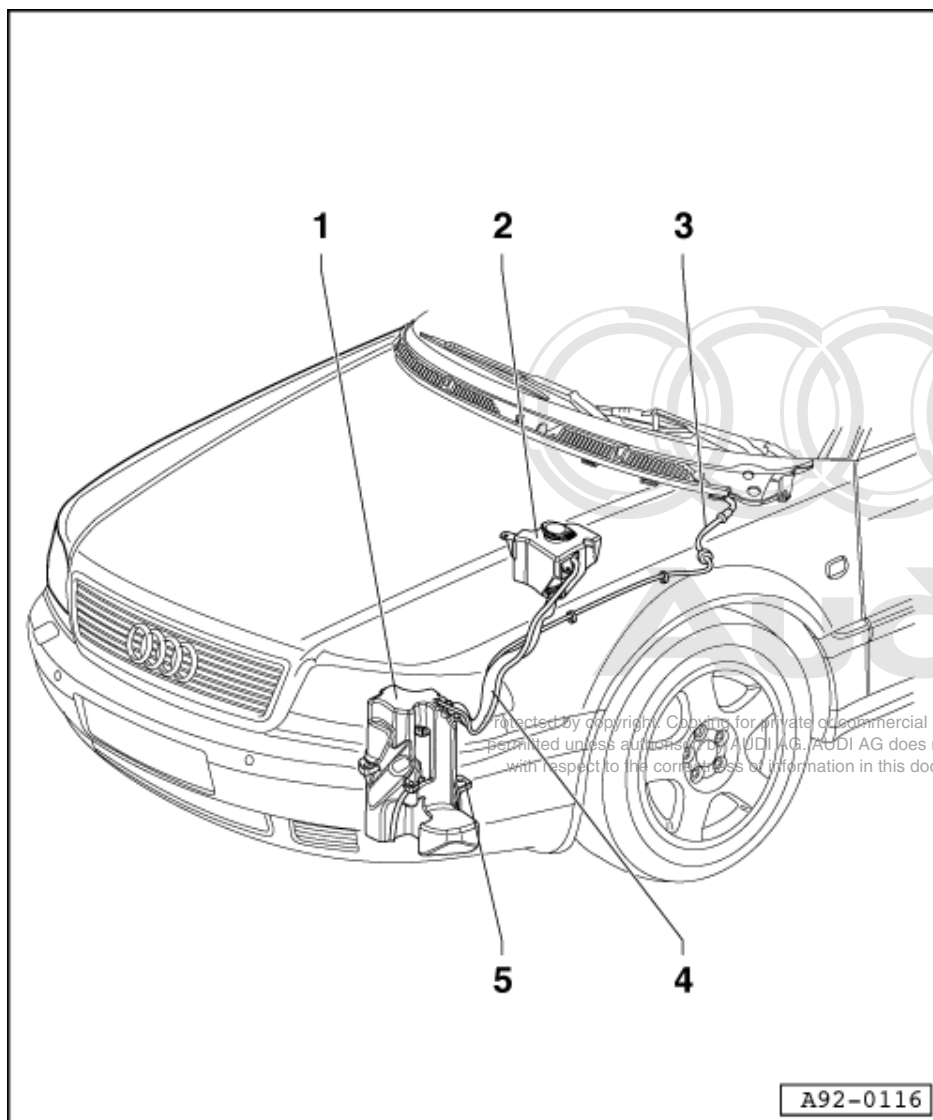
Figure II

- 1 - Washer fluid container
- 2 - Securing bolts, 6 Nm
- 3 - Pump for windscreen washer system
- 4 - Seal
- 5 - Seal

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6 - Hose for jets of windscreen washer system

2.4 - General overview for S8



- 1 Washer fluid container - bottom section
- 2 Washer fluid container - upper section
- 3 Hose to jets of windscreen washer system
- 4 Hose connecting upper section and bottom section of washer fluid container
- 5 Pump for windscreen washer system

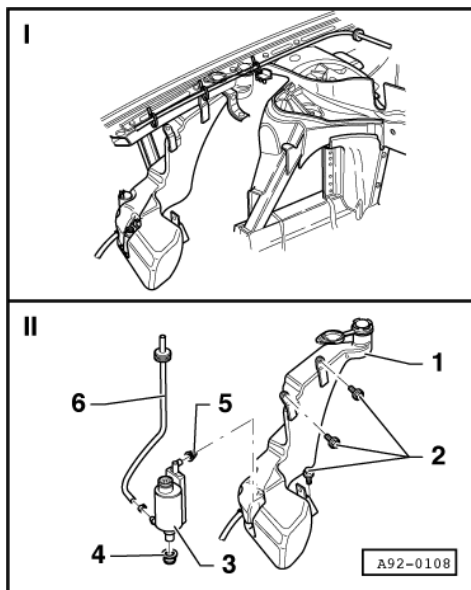
2.5 - Removing and installing washer fluid container (all versions except S8)

Removing

- Remove front right wheel housing liner.



=> General body repairs, Exterior; Repair group 66; Removing and installing front wheel housing liner Removing and installing front wheel housing liner

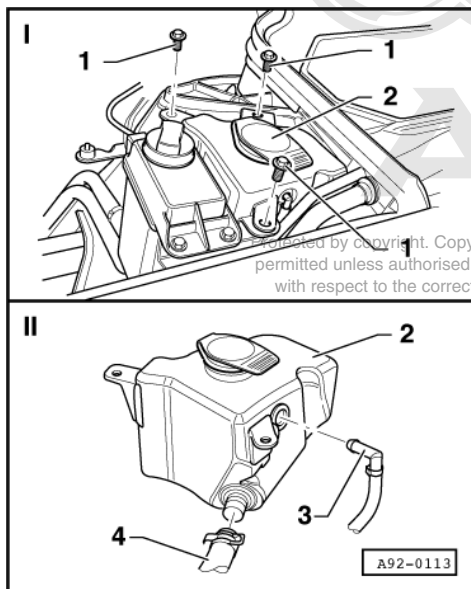


- Remove coverings in engine compartment and air cleaner, if necessary.
- -> Pull off windscreen washer pump -3- from container.
- Unscrew securing bolts -2- (6 Nm).
- Unplug remaining connections.
- Take out washer fluid container from below.

Installing

- Installation is performed in the reverse sequence.

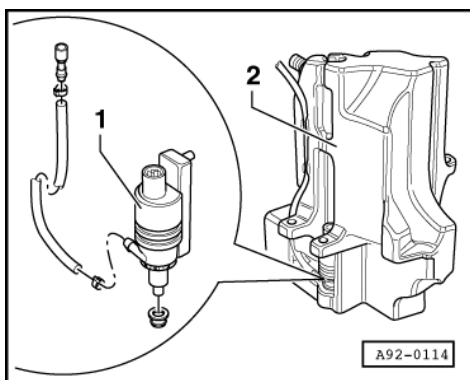
2.6 - Removing and installing washer fluid container on S8



Removing upper section of washer fluid container

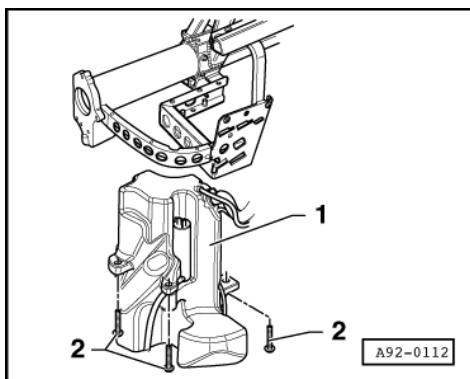
- -> Unscrew bolts -1- (7 Nm).
- Lift container -2- and disconnect hose connections -3- and -4-.

- Lift out upper section of washer fluid container.



Removing bottom section of washer fluid container

- Remove bottom section of engine compartment cover.
- ➔ Pull off windscreen washer pump -1- from container -2-.
- Disconnect hose connections to upper section of container and unplug electrical connections.



- ➔ Remove bolts -2- (7 Nm) and take out container from below.

Installing

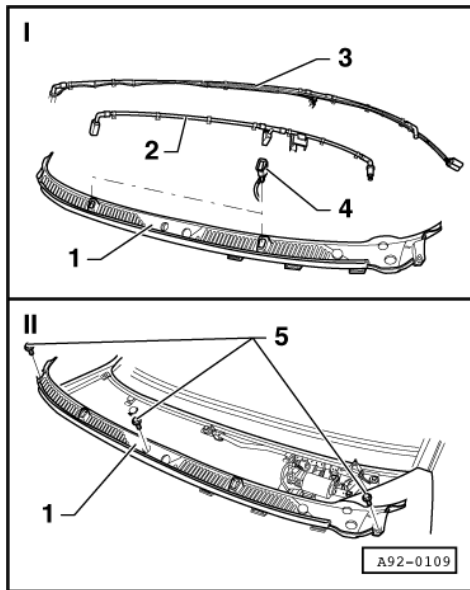
- Installation is performed in the reverse sequence.



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2.7 - Removing and installing spray jets



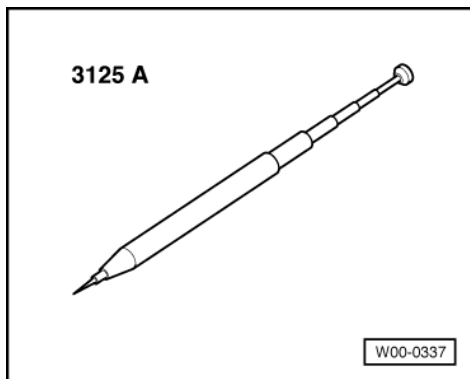
Removing

- Remove wiper arms => Page 68.
- Remove rubber seal from cowl panel trim -1-.
- -> Remove three bolts -5- (2 Nm) and pull cowl panel trim out.
- Detach hose connection -2- for spray jets -4-.
- Unplug connection for spray jet heater -3- and lift off cowl panel trim.
- Pull out spray jet -4- from above.

Installing

- Installation is performed in the reverse sequence.

2.8 - Adjusting jets



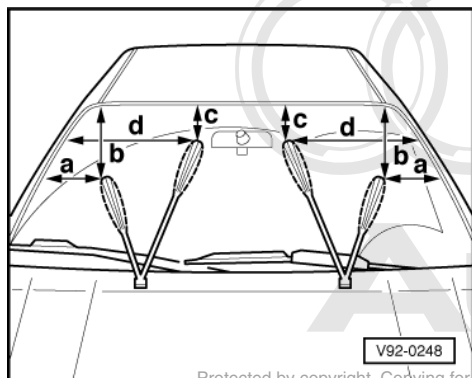
Special tools and workshop equipment required

- ♦ Special tool T10127
- Mark the four points on the windscreen using a non-permanent marker pen.

Notes:

- ♦ The specified distances are measured from the outer edges of the weatherseal around the windscreen.

- ♦ The specified distances are calculated to allow for the motion of the vehicle when driving. When the vehicle is stationary the direction of the jets will be slightly different.



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-> Distances:

a = 150 mm
b = 340 mm
c = 120 mm
d = 590 mm

- Apply the special tool to each jet in turn, and aim them at the points marked.

3 - Servicing headlight washer system

3.1 - Servicing headlight washer system

3.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.
Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

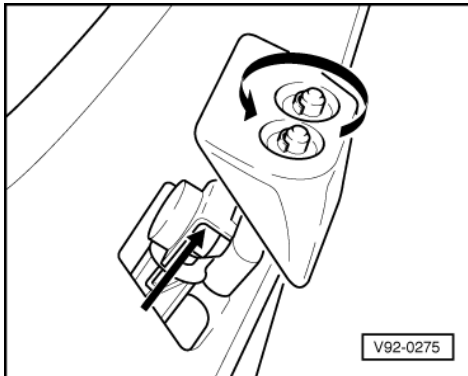
3.3 - Removing and installing headlight washer spray jets

Removing

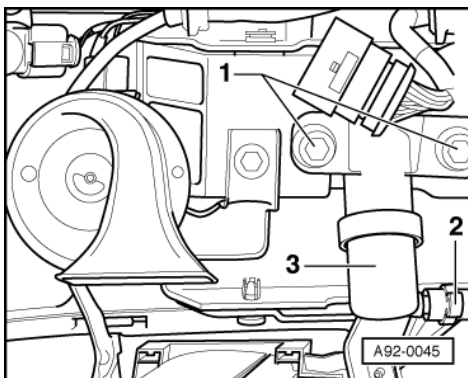
- Remove bumper.



=> General body repairs, Exterior; 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.



- -> Slacken two securing bolts -1- on inside of bumper.
- Detach washer hose connection -2- and remove jet motor -3-.

Note:

The illustration shows the left spray jet. The location of the components to be removed is symmetrically opposite on the right-hand spray jet.

Installing

- Installation is performed in the reverse sequence.

3.4 - Adjusting jets

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Note:

The spray jets are supplied with the correct settings and do not need to be adjusted after installation.

3.5 - Removing and installing washer fluid container

Note:

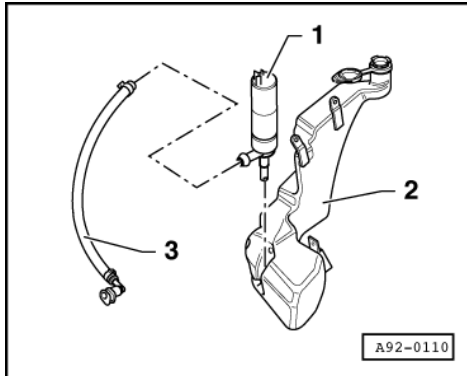
The washer fluid container supplies washer fluid to the front windscreen, rear window and headlight washer system. The container is located at the front of the engine compartment on the right. Removing and installing => Page 73.

3.6 - Removing and installing pump for headlight washer system (all versions except S8)

Removing

- Remove front right wheel housing liner.

=> General body repairs, exterior; Repair group 66; Removing and installing front wheel housing liner Removing and installing front wheel housing liner



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- -> Disconnect hose connection -3- from pump -1-.
- Unplug electrical connection.
- Pull out pump -1- from container -2-.

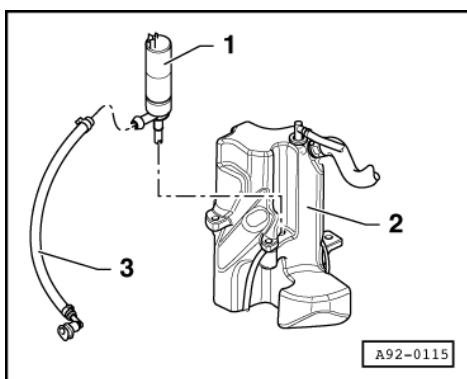
Installing

- Installation is performed in the reverse sequence.

3.7 - Removing and installing pump for headlight washer system on S8

Removing

- Remove bottom engine compartment cover.



- -> Disconnect hose connection -3- from pump -1-.
- Unplug electrical connection.
- Pull out pump -1- from container -2-.

Installing

- Installation is performed in the reverse sequence.



94 - Lights, Lamps, Switches - exterior

1 - Servicing headlights

1.1 - Servicing headlights

1.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

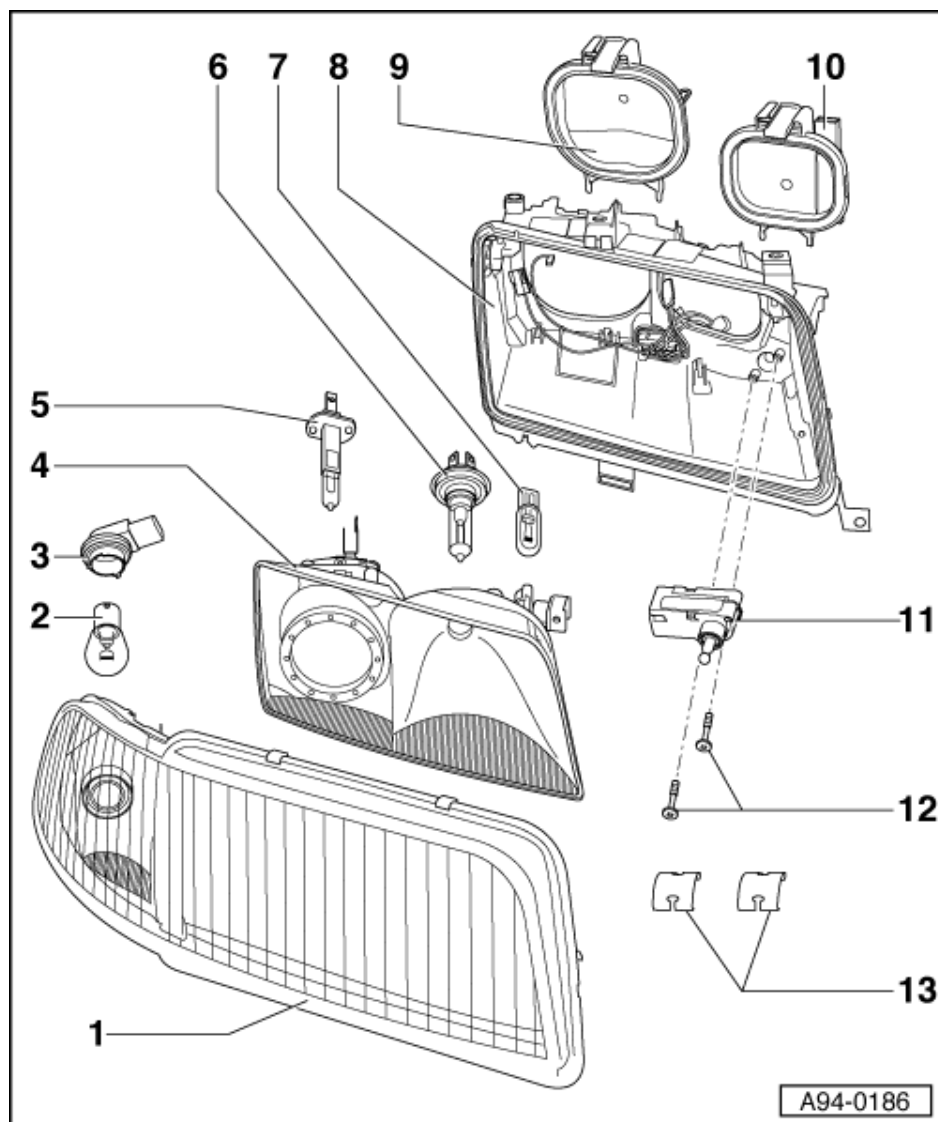
- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption



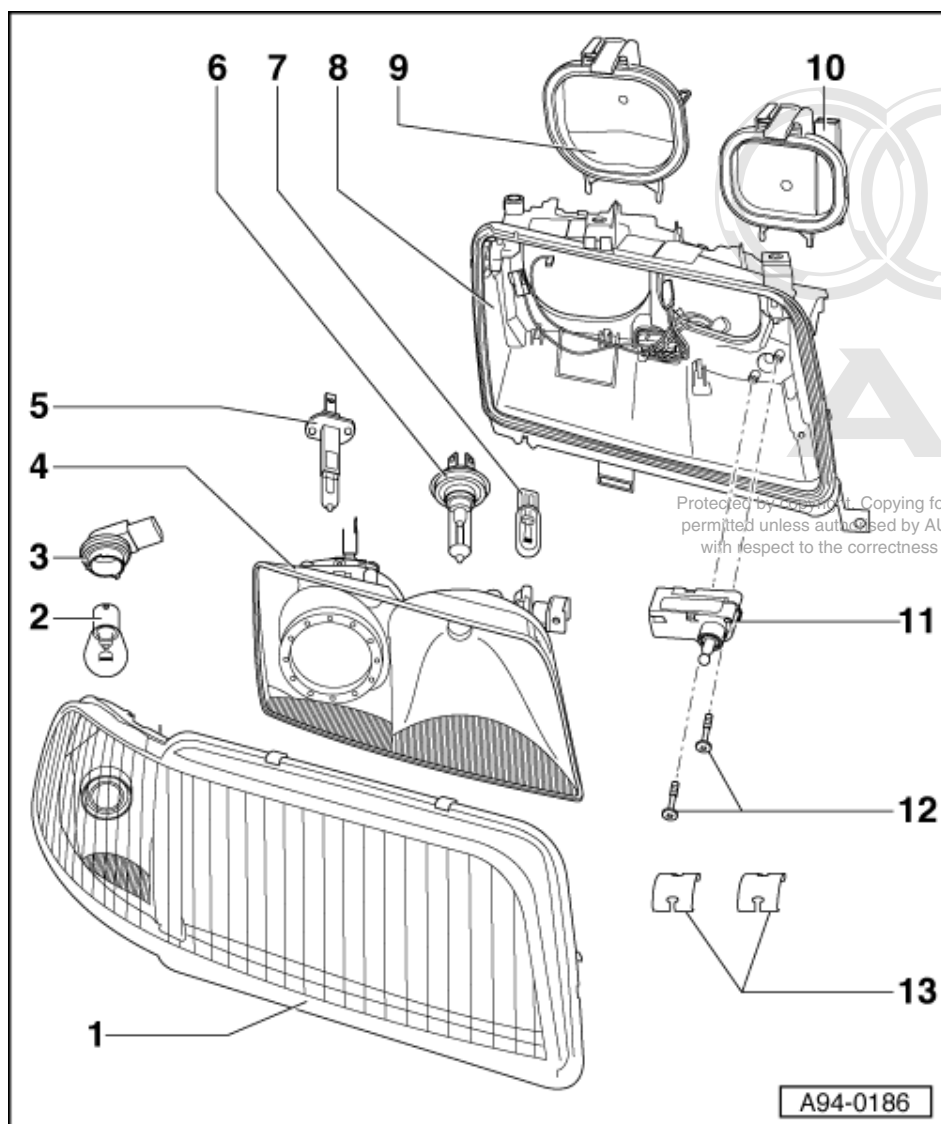
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1.3 - General overview - halogen headlights



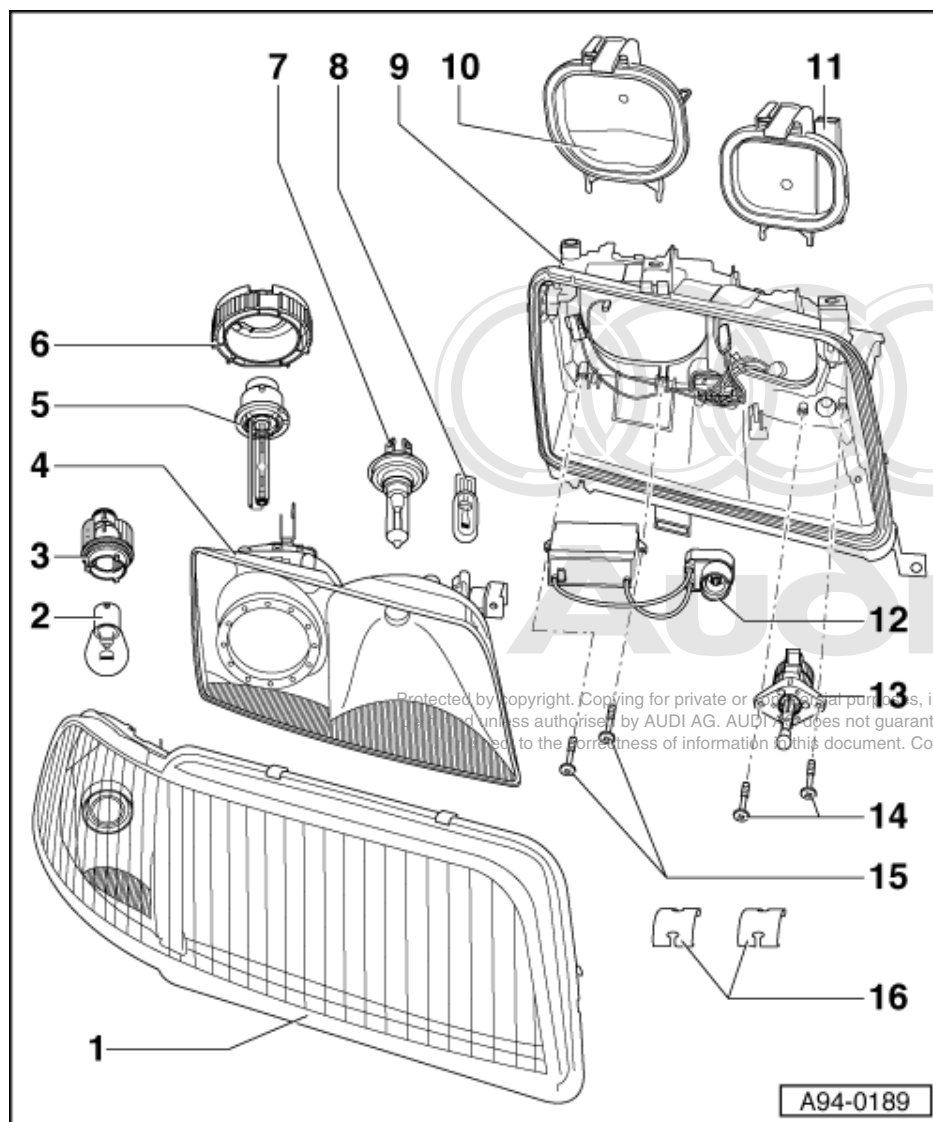
- 1 Lens with integrated turn signal housing**
- 2 Turn signal bulb**
 - ◆ 12 V, 21 W orange
 - ◆ Changing bulb
=> Page **101**
- 3 Bulb holder for turn signal bulb**
- 4 Reflector for dipped beam, main beam and side light**
- 5 Dipped beam bulb**
 - ◆ H1 - 12 V, 55 W
 - ◆ Changing bulb
=> Page **93**
- 6 Main beam bulb**
 - ◆ H7 - 12 V, 55 W
 - ◆ Changing bulb
=> Page **97**

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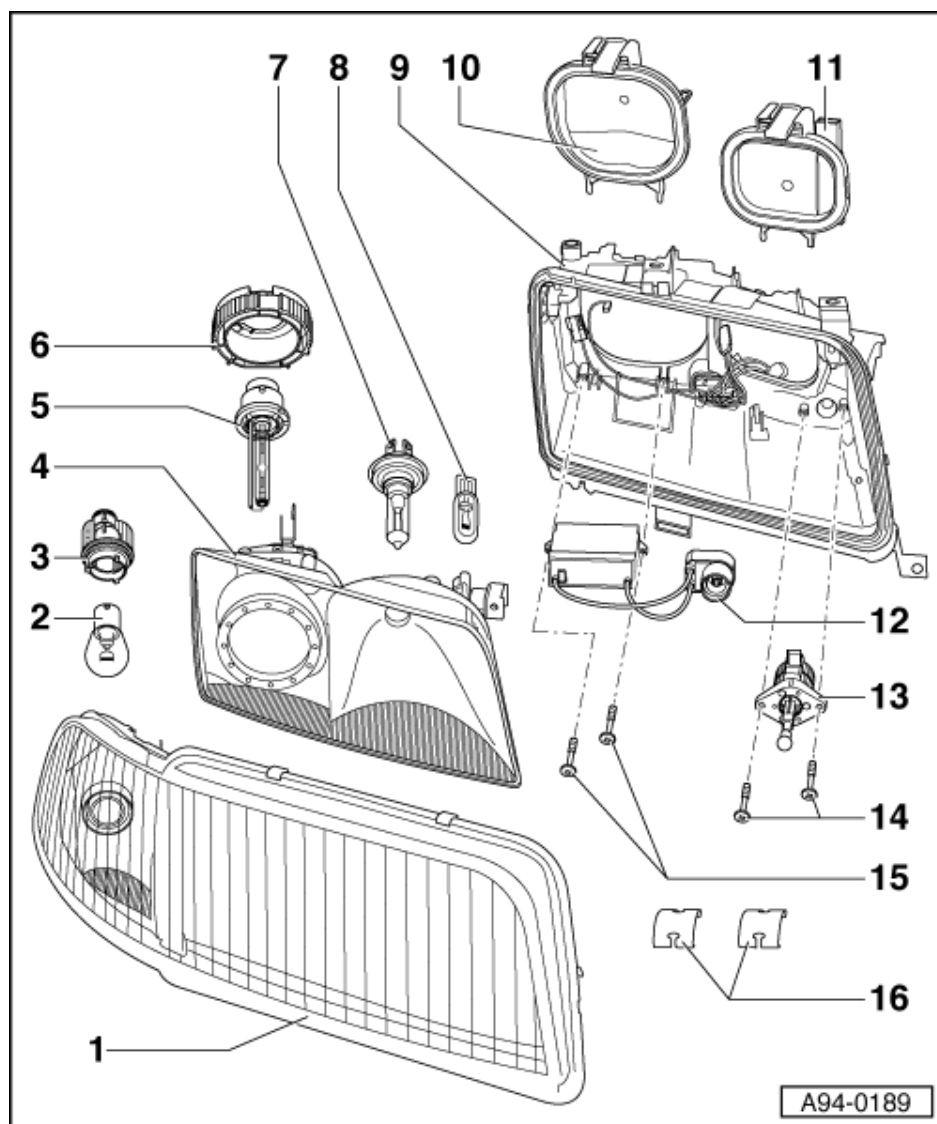


- 7 Side light bulb**
- ♦ 12 V, 5 W
 - ♦ Changing bulb
=> Page **99**
- 8 Headlight housing with all-round seal for lens**
- 9 Housing cover (large)**
- 10 Housing cover (small)**
- 11 Headlight range control positioning motor -V48/V49**
- ♦ Removing and installing
=> Page **103**
- 12 Securing bolt, 1.3 Nm**
- 13 Retaining clip**

1.4 - General overview - gas-discharge headlights



- 1 Lens with integrated turn signal housing
- 2 Turn signal bulb
 - ◆ 12 V, 21 W orange
 - ◆ Changing bulb
=> Page 101
- 3 Bulb holder for turn signal bulb
- 4 Reflector for dipped beam, main beam and side light
- 5 Gas-discharge bulb
 - ◆ 12 V, 35 W
 - ◆ Changing bulb
=> Page 95
- 6 Locking ring (bayonet fastener) for gas-discharge lamp
- 7 Main beam bulb
 - ◆ H7 - 12 V, 55 W
 - ◆ Changing bulb
=> Page 97

**8 Side light bulb**

- ♦ 12 V, 5 W
- ♦ Changing bulb
=> Page 99

9 Headlight housing with seal**10 Housing cover (large)****11 Housing cover (small)****12 Starter unit for gas-discharge bulb -N195**

- ♦ Removing and installing
=> Page 107

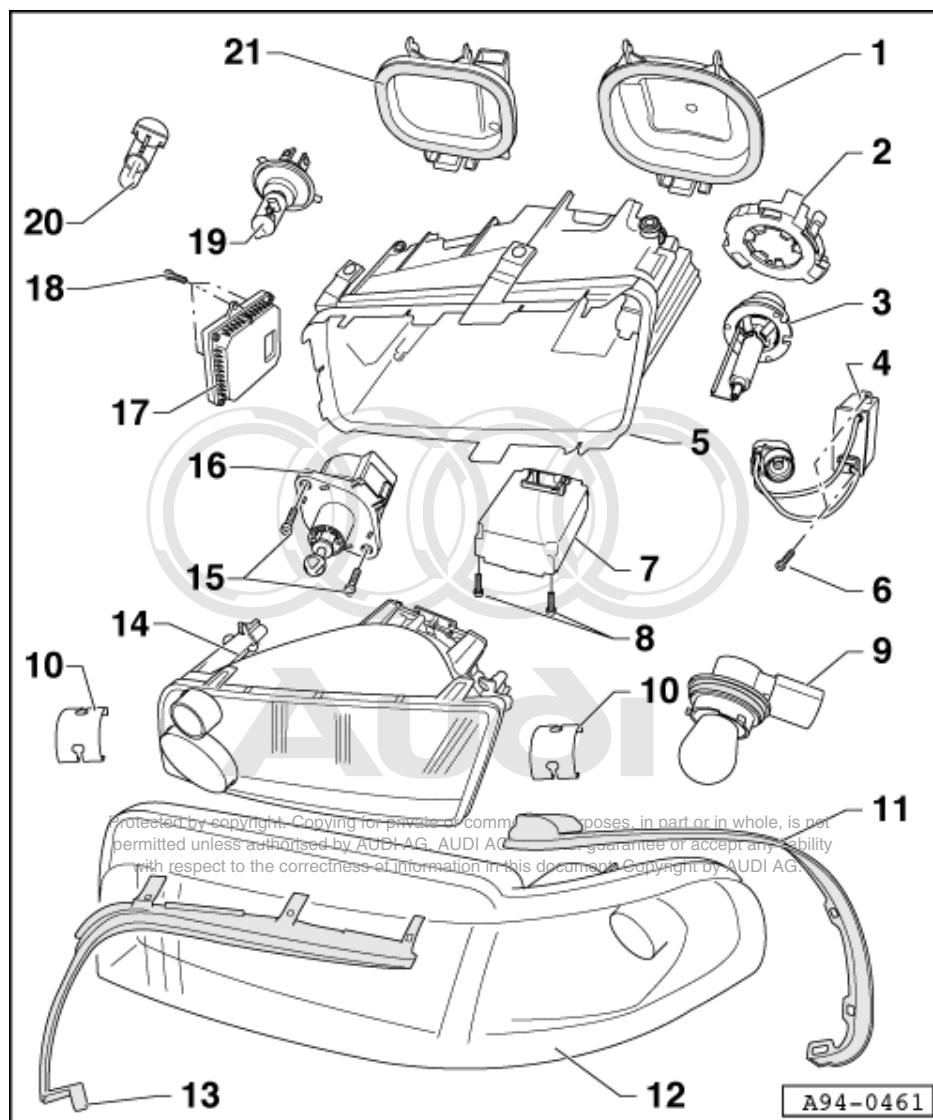
13 Headlight range control positioning motor -V48/V49

- ♦ Removing and installing
=> Page 105

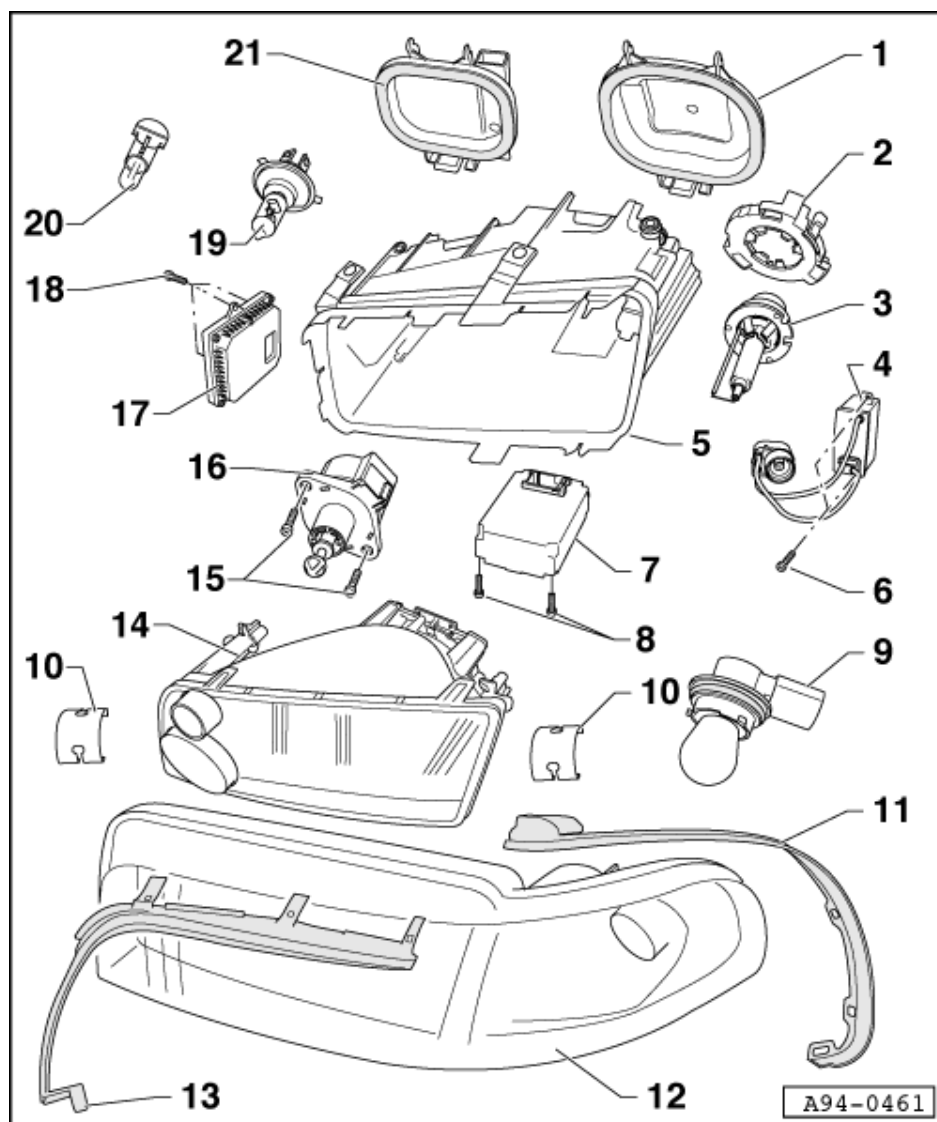
14 Securing bolt, 1.3 Nm**15 Securing bolt, 1.3 Nm****16 Retaining clip**

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1.5 - General overview - gas-discharge headlights (Bi-xenon)



- 1 Housing cover (large)
- 2 Retainer for gas-discharge lamp (bayonet fitting)
- 3 Gas-discharge bulb
 - ♦ 12 V, 35 W
 - ♦ Changing bulb
=> Page 95
- 4 Starter unit for gas-discharge bulb -N195
 - ♦ Removing and installing
=> Page 107
- 5 Headlight housing with all-round seal for lens
- 6 Securing bolts for gas discharge lamp starter unit -N195



7 Control unit for gas discharge lamp - main beam

- ♦ Removing and installing
=> Page **110**

8 Securing bolt

9 Turn signal bulb with bulb holder

- ♦ 12 V, 21 W orange
- ♦ Changing bulb
=> Page **101**

10 Lens fasteners

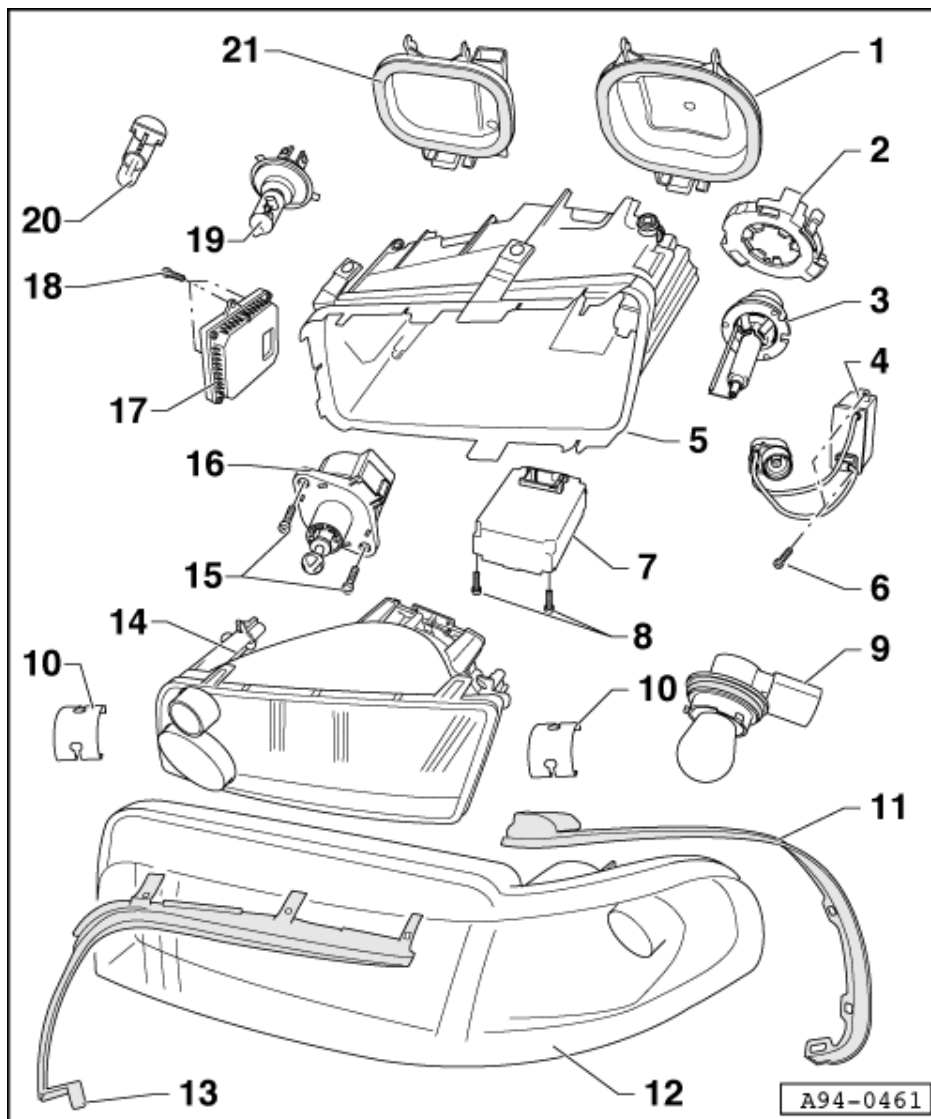
11 Sealing frame

12 Lens with integrated turn signal housing

13 Sealing frame

14 Reflector for dipped beam, main beam and side light

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15 Securing bolts for headlight range control motor
16 Headlight range control positioning motor -V48/V49

- ♦ Removing and installing
 => Page **105**

17 Gas discharge lamp control unit -J343/J344

- ♦ Removing and installing -J343 => Page **108**
- ♦ Removing and installing -J344 => Page **109**

18 Securing bolt

19 Main beam bulb

- ♦ H7 - 12 V, 55 W
- ♦ Changing bulb
 => Page **97**

20 Side light bulb

- ♦ 12 V, 5 W
- ♦ Changing bulb
 => Page **99**

21 Housing cover (small)

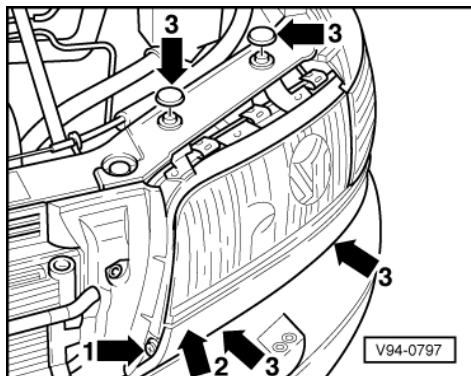
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1.6 - Removing and installing headlights

Removing

Note:

Apply masking tape to bumper in area around headlight to prevent damage to the paintwork.



- -> Unscrew bolt -1- (1.5 Nm) and detach trim strip -2-.
- Unscrew the four bolts -3- (top bolts 6 Nm, bottom bolts 3.5 Nm) and then pull headlight slightly forward out of vehicle.
- Detach connectors at headlight.
- Take headlight to front out of vehicle.

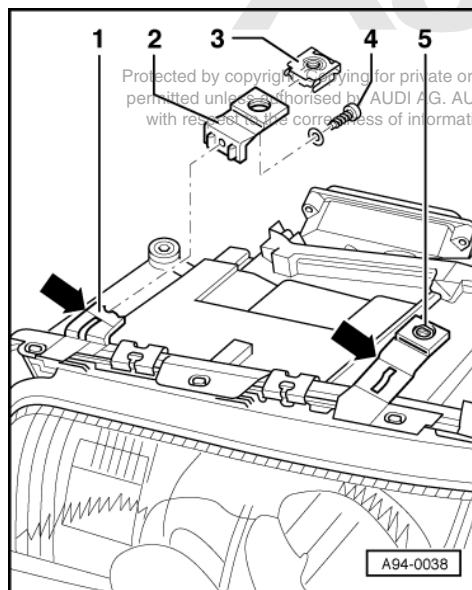
Installing

- Always align headlight flush with contours of body (uniform gap all round), and secure in position.
- Installation is performed in the reverse sequence.
- Adjust headlights after installing => Page 89 .

1.7 - Installing repair kit for headlight housing

Note:

The special repair kit can be used to replace broken retainer tabs on the headlight housing. This avoids having to replace the complete headlight housing.



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- -> Cut off remaining part of broken tab -1- along the line shown in the illustration (left-hand arrow).
- Fit speed nut -3- over replacement retainer tab -2- from repair kit.
- Bolt retainer tab -2- to rear of headlight housing with bolt -4- and washer.

The arrow on the right of the illustration shows the cutting line on an unbroken retainer tab -5-.

Note:

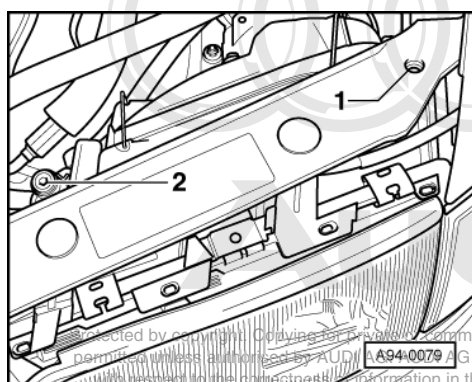
The angled retainers on the bottom of the headlight can also be replaced individually.

1.8 - Adjusting headlights (halogen headlights)

Note:

The requirements and specifications for adjusting particular types of headlight are described in the "Maintenance" booklet.

=> Maintenance booklet



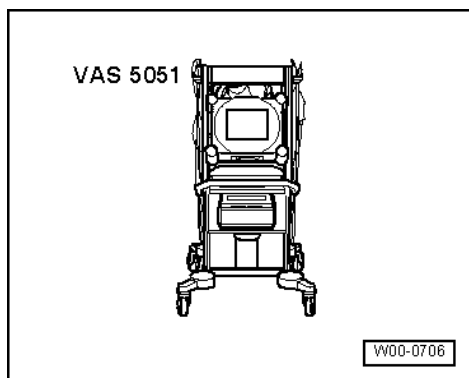
-> Adjustment screws on left headlight

The arrangement on the right-hand headlight is symmetrically opposite.

- 1 - Height adjustment screw
- 2 - Lateral adjustment screw

- For adjusting screw -1- rubber seal must first be folded back and cap removed.
- Use Allen key to adjust the relevant screw.

1.9 - Adjusting headlights (gas-discharge headlights)





Special tools and workshop equipment required

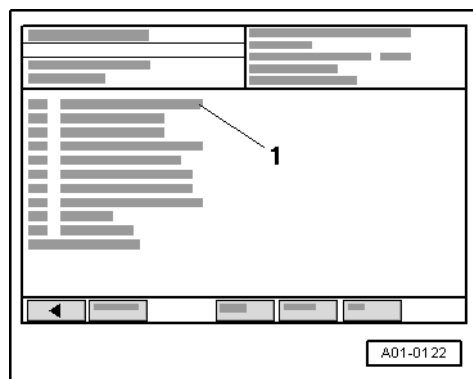
- ♦ VAS 5051 and VAS 5051/1

Note:

Interrogate and erase fault memory in vehicles with gas discharge headlights before manual adjustment of the adjusting bolts and then perform the basic setting

Requirement for test:

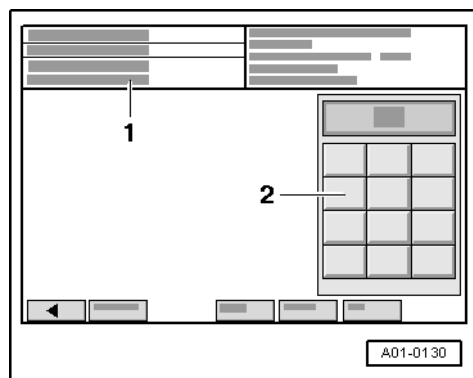
- Vehicle diagnostic, testing and information system VAS 5051 connected, vehicle self-diagnosis and vehicle system "55 - Headlight range control" selected.



Work sequence

-> Display on VAS 5051:

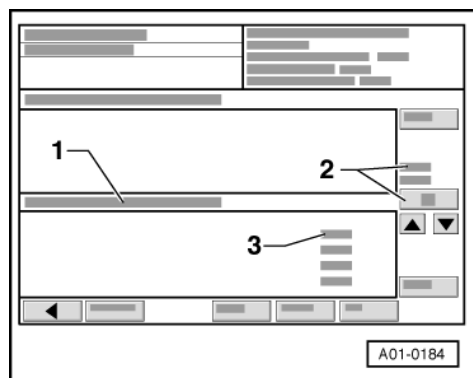
- Select the diagnosis function "04 - Basic settings" from the menu -1-.



-> Display on VAS 5051:

- 1 - Enter display group

- Using the keypad -2-, enter "001" to select Display group 001 and confirm entry with Q key.



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-> Display on VAS 5051:

- 1 - Basic setting
- 2 - Display group 1
- 3 - Wait

◆ The headlights are moved to the adjusting position.

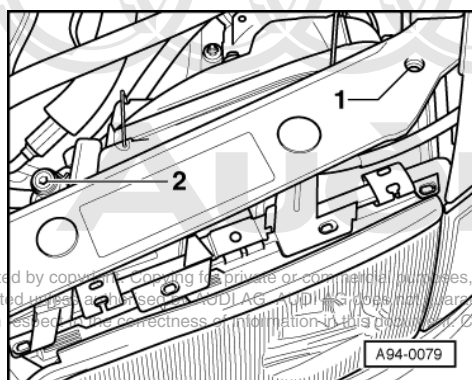
- Wait until the next display appears

- 3 - Adjust headlights

◆ The headlights are now in adjusting position

Note:

Basic setting function 1 switches off automatic range control and fault "Headlights not set" will be stored in the fault memory.

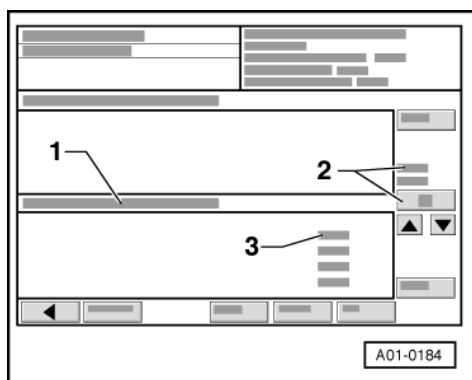


-> Adjustment screws on left-hand headlight

The arrangement on the right-hand headlight is symmetrically opposite.

- 1 - Height adjustment screw
- 2 - Height/lateral adjustment screw

- For height adjustment, turn adjustment screws -1- and -2- the same number of turns.
- For lateral adjustment, turn only adjustment screw -2-.



-> Display on VAS 5051:

- Press the s key to advance to Display group 002.

- 1 - Basic setting
- 2 - Display group 2
- 3 - Control position learnt

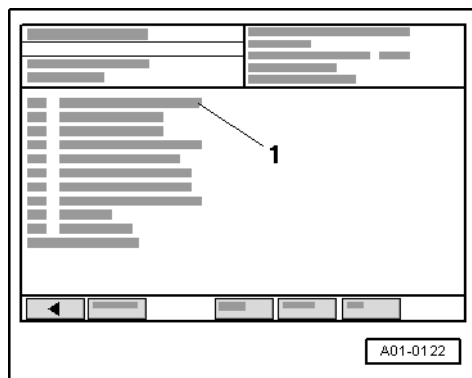


- The control unit has now learnt this position as the control position.

Note:

The fault "Headlights not set" in the fault memory will be erased and automatic range control function will be restored.

- Press the ◀ button to exit from diagnosis function "04 - Basic settings".



-> Display on VAS 5051:

- Select diagnosis function "06 - End output" from the menu -1-.

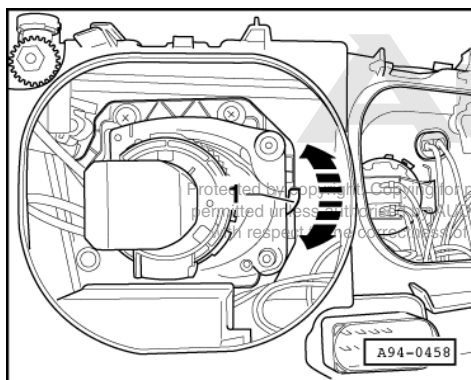
1.10 - Converting headlights for LH or RH traffic

When driving in countries where traffic drives on the side opposite that of the homeland of the vehicle, both headlights must be adjusted so that the asymmetrical dipped beam does not impair other motorists' vision.

Note:

Bi-xenon headlights do not need to be converted.

- Remove large housing cover from headlight housing.



- -> Check the switchover lever position -1- for both headlights.

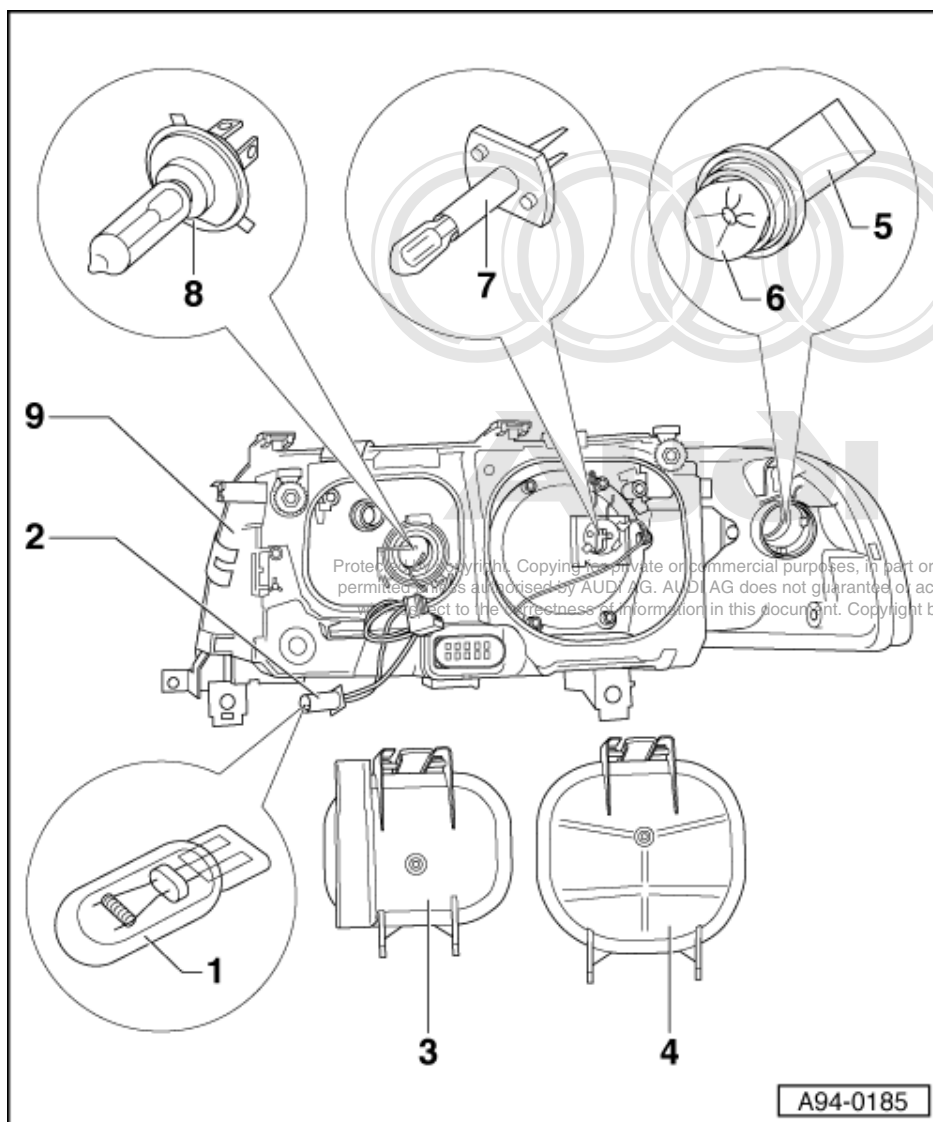
Left headlight:

- Lever down = right-hand traffic
- Lever up = left-hand traffic

Right headlight:

- Lever down = Left-hand traffic
- Lever up = Right-hand traffic
- Move the lever into the desired position as necessary -arrows- until it engages -arrows-.
- Reinstall the housing cover.

1.11 - Changing bulbs in headlight



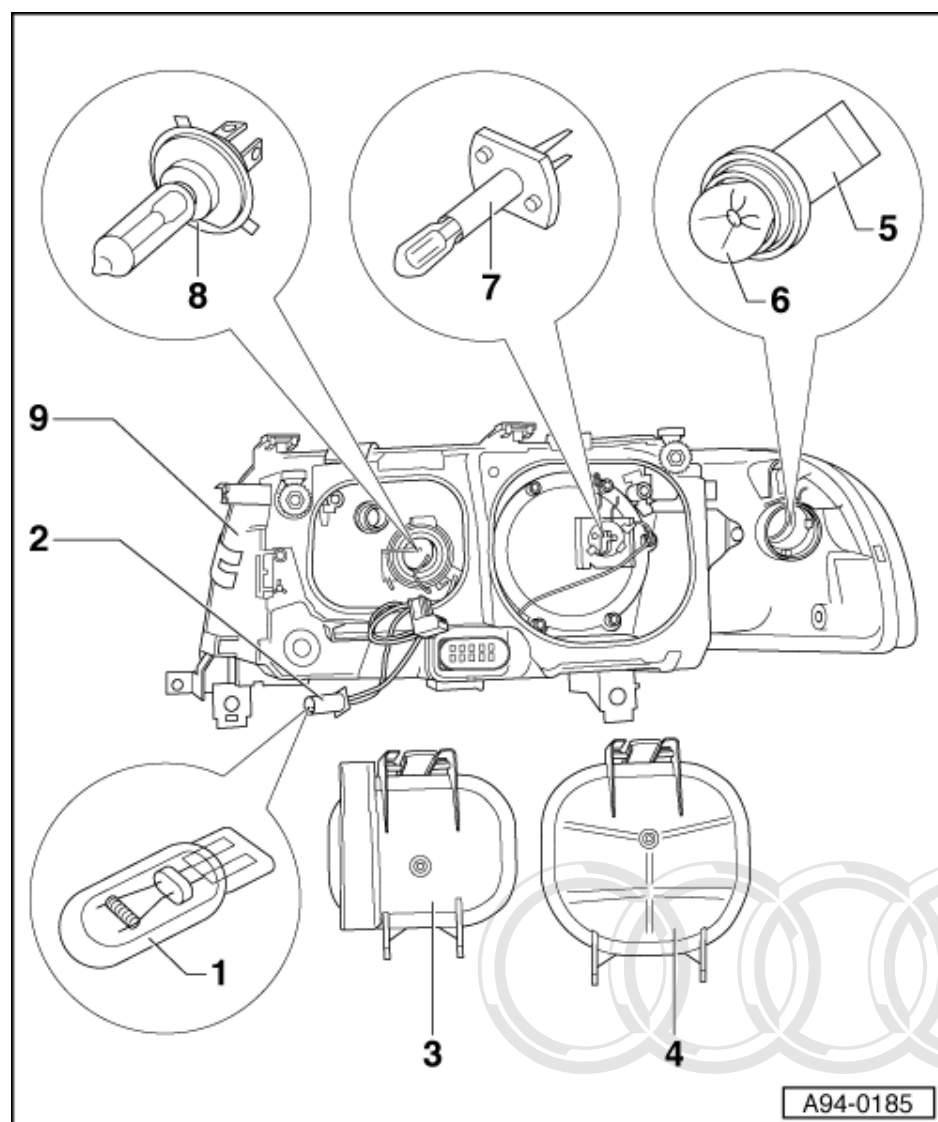
Changing dipped beam bulb (halogen headlights)

Removing

Battery does not have to be disconnected.

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove cover -4- from headlight housing.
- Unplug connector from dipped beam bulb -7-.

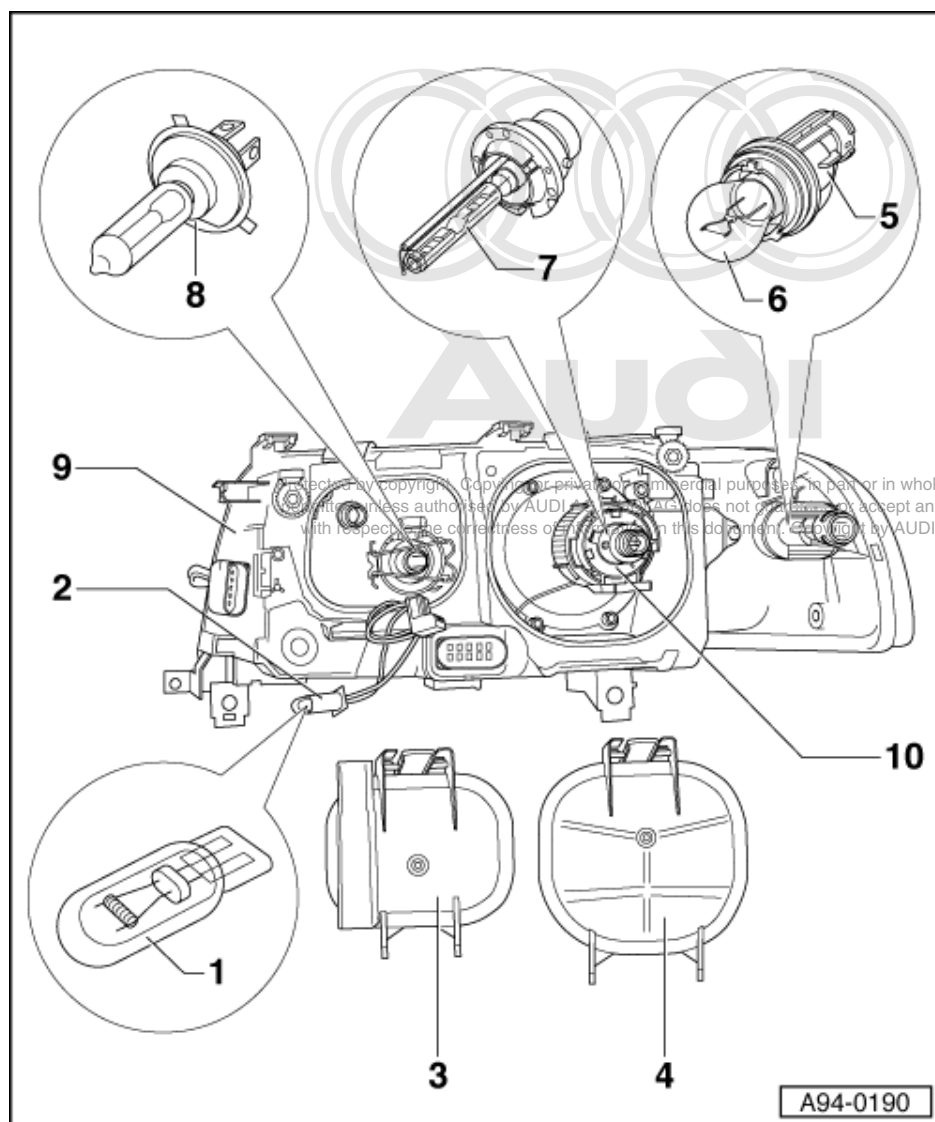
- Disengage wire clip and take bulb out of housing.



Installing

- Fit new bulb in housing; do not touch the glass part of the bulb with bare hands.
- Secure bulb with wire clip.
- Plug in connector and fit cover on headlight housing

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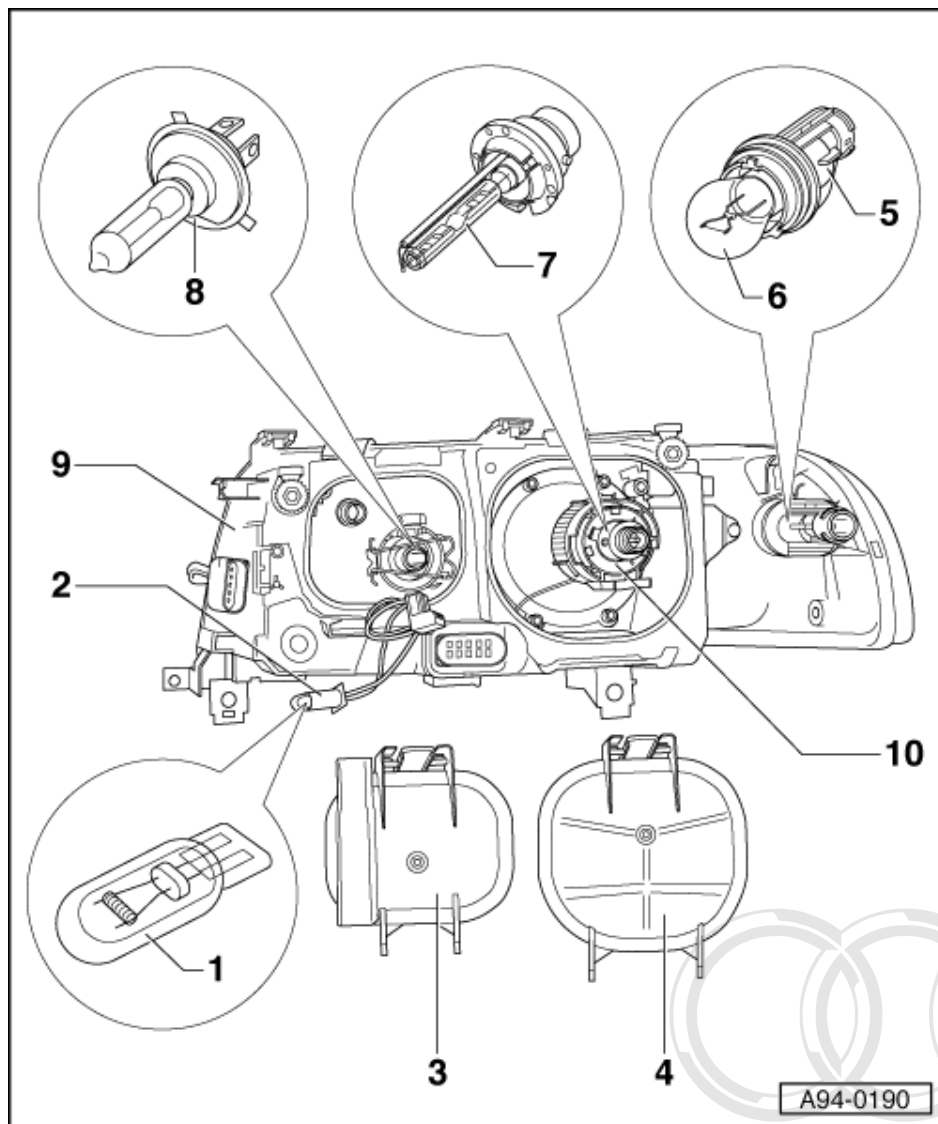


Changing dipped beam bulb (gas discharge headlights)

Warning - High voltage!
 Always disconnect the battery earth strap before working on parts of the gas-discharge headlights marked with yellow high-voltage warning symbols.

Removing

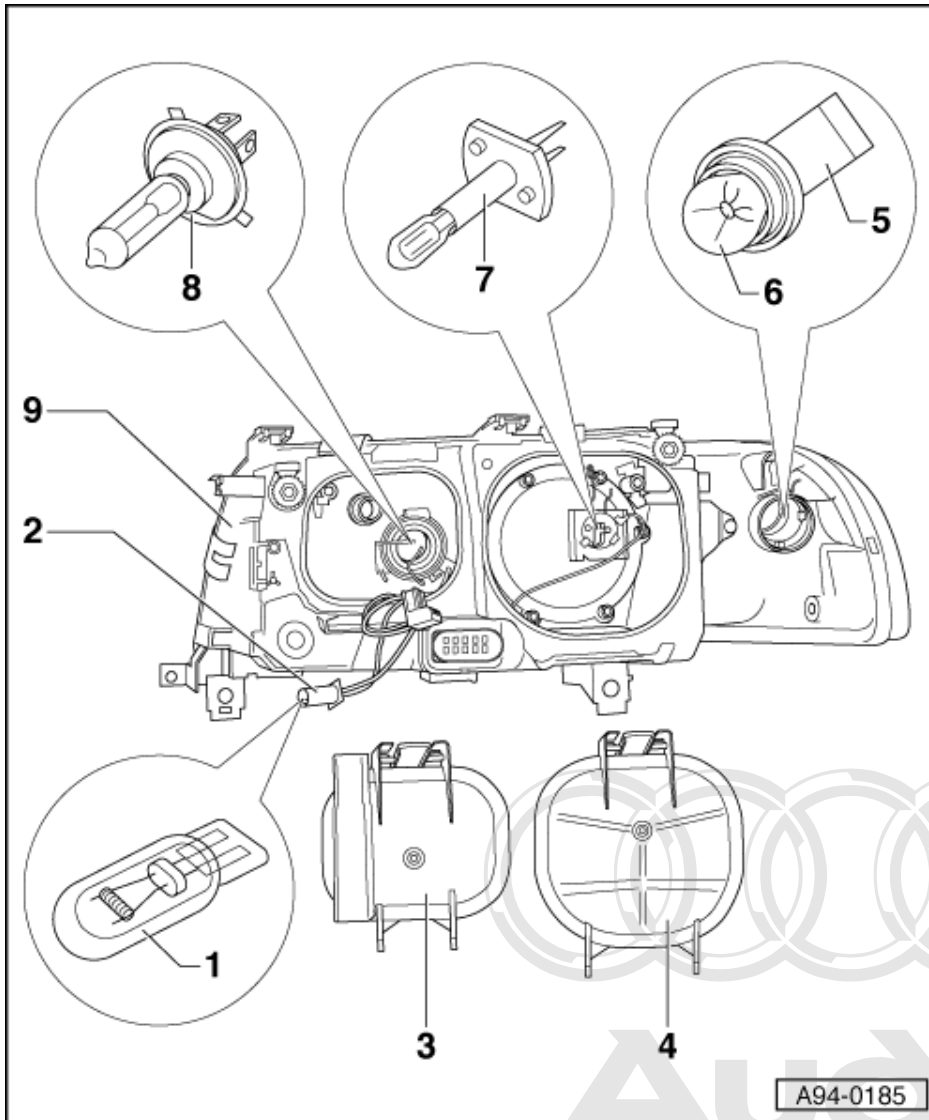
- Remove cover -4- from headlight housing.
- Turn connector at gas discharge lamp -7- anti-clockwise and unplug.
- Turn locking ring for gas-discharge lamp -10- anti-clockwise and take off.
- Take gas discharge lamp out of housing.



Installing

- Fit new gas discharge lamp into housing; do not touch the glass part of the bulb with bare hands.
- Secure gas discharge lamp with locking ring (turn in clockwise direction).
- Attach connector at gas-discharge lamp and secure by turning in clockwise direction.
- Close housing cover -4- again.

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Changing main beam bulb

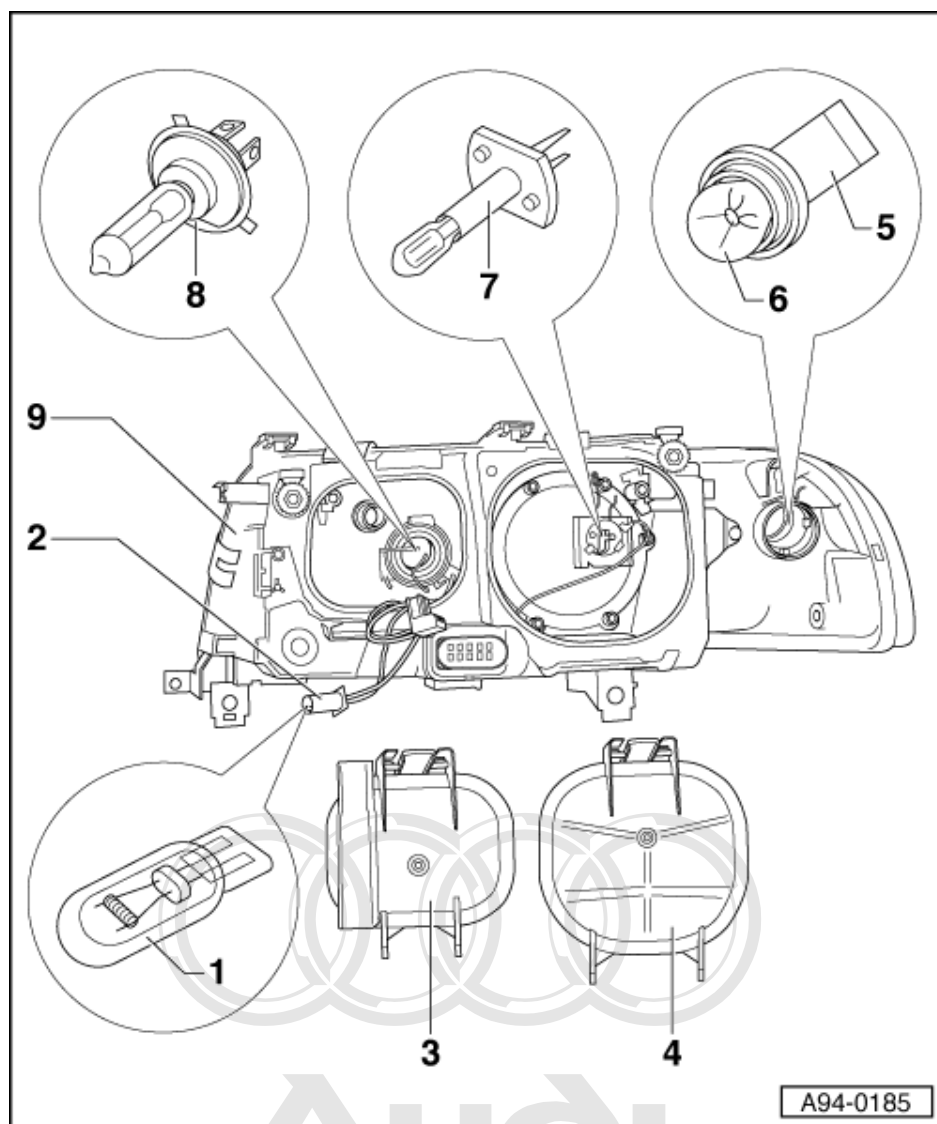
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Removal and installation are the same for both halogen and gas discharge headlights.

Removing

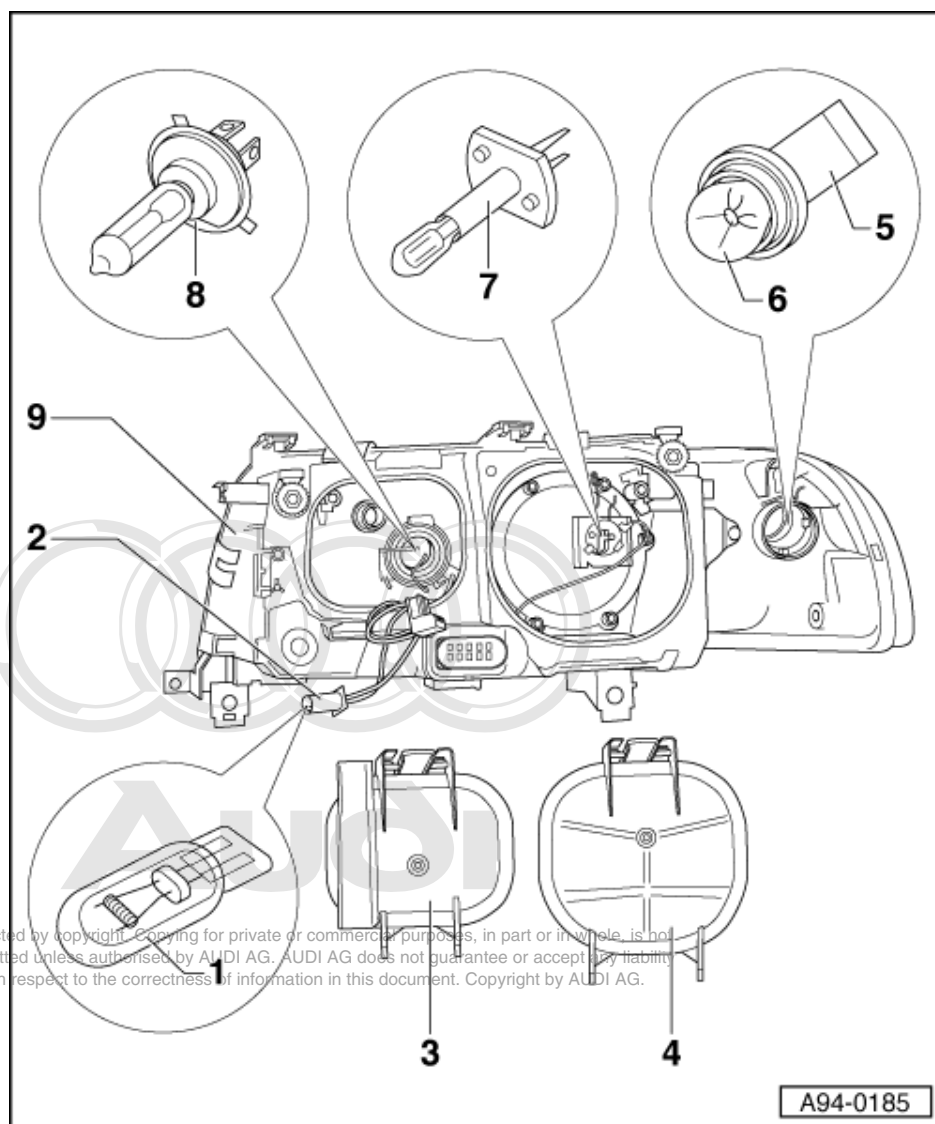
Battery does not have to be disconnected.

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove cover -3- from headlight housing.
- Unplug connector from main beam bulb -8-.
- Disengage wire clip and take bulb out of housing.



Installing

- Fit new bulb in bulb holder; do not touch the glass part of the bulb with bare hands.
- Secure bulb with wire clip.
- Plug in connector and fit cover on headlight housing.



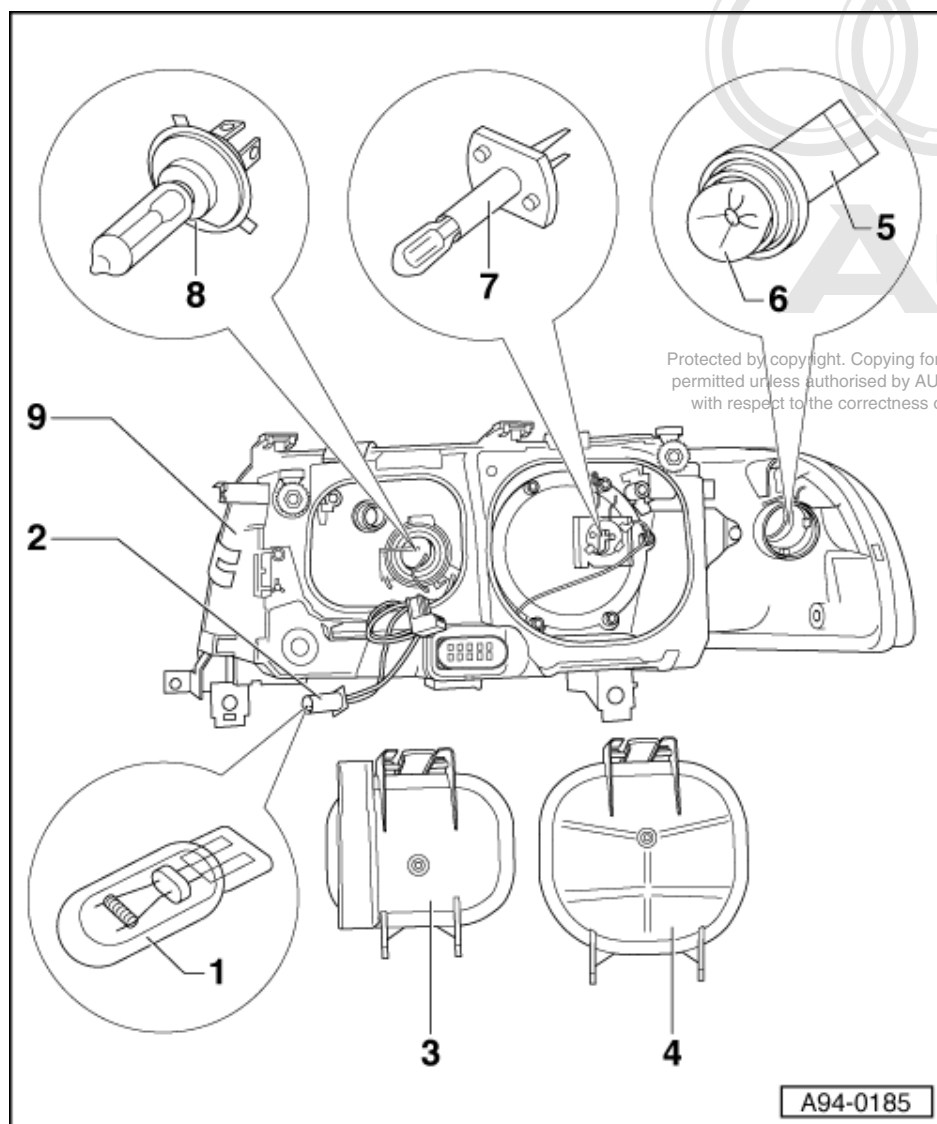
Changing side light bulb

Removal and installation are the same for both halogen and gas discharge headlights

Removing

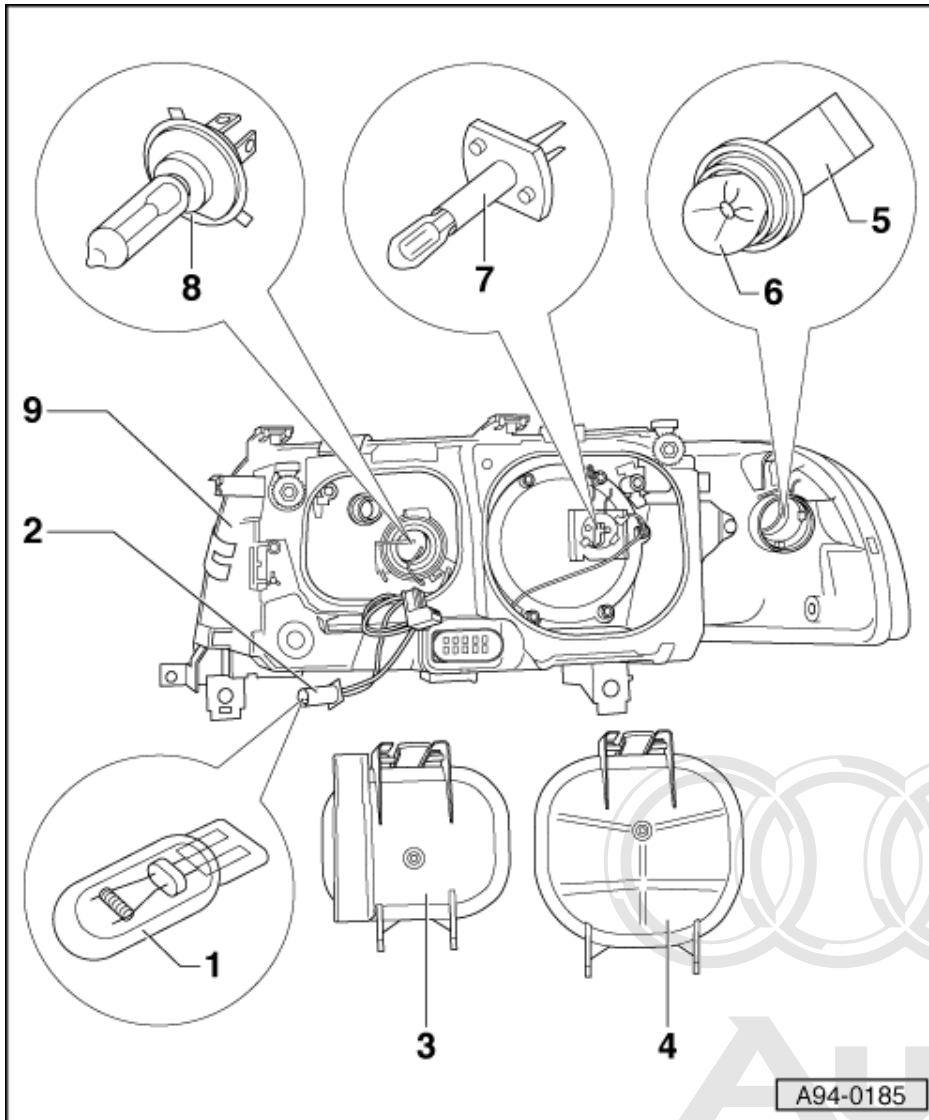
Battery does not have to be disconnected.

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove cover -3- from headlight housing.
- Pull bulb holder -2- out of reflector.
- Pull bulb -1- out of bulb holder -2-.



Installing

- Fit new bulb in bulb holder; do not touch the glass part of the bulb with bare hands.
- Insert bulb holder in reflector.
- Close housing cover -3- again.



Changing turn signal bulb

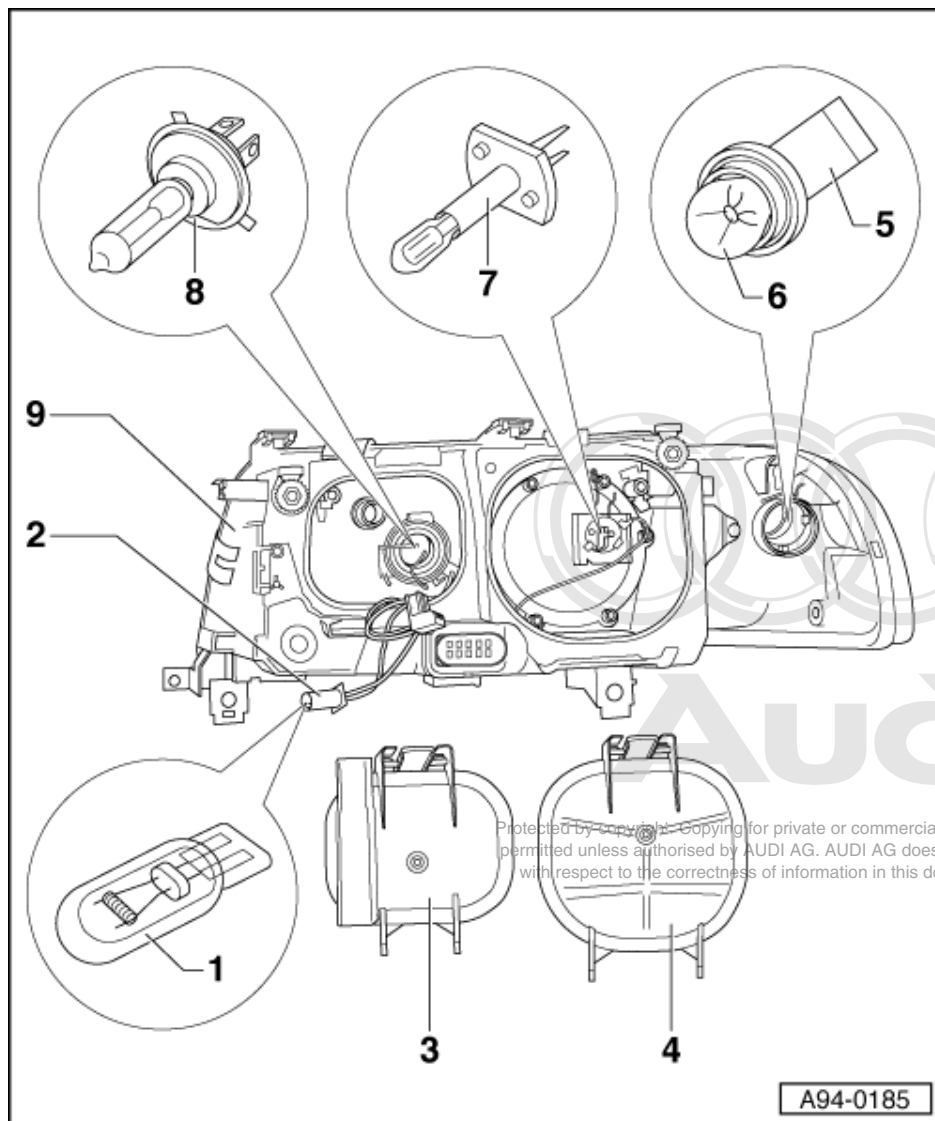
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Removal and installation are the same for both halogen and gas discharge headlights.

Removing

Battery does not have to be disconnected.

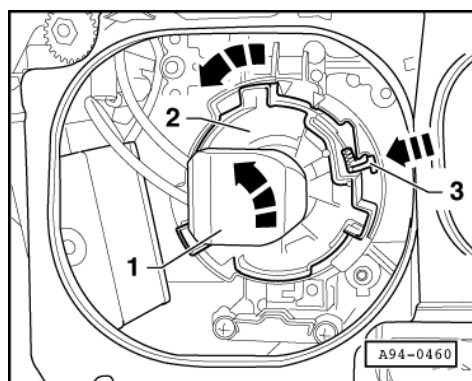
- Switch off ignition and all electrical consumers and pull out ignition key.
- Detach housing cover -4- for access.
- Turn bulb holder -5- anti-clockwise and pull out of housing.
- Only unplug electrical connector if bulb holder -5- has to be replaced.
- Unscrew bulb -6- from bulb holder -5-.



Installing

- Fit new bulb in bulb holder; do not touch the glass part of the bulb with bare hands.
- Install in reverse sequence.

1.12 - Changing gas discharge lamp (Bi-xenon headlight)



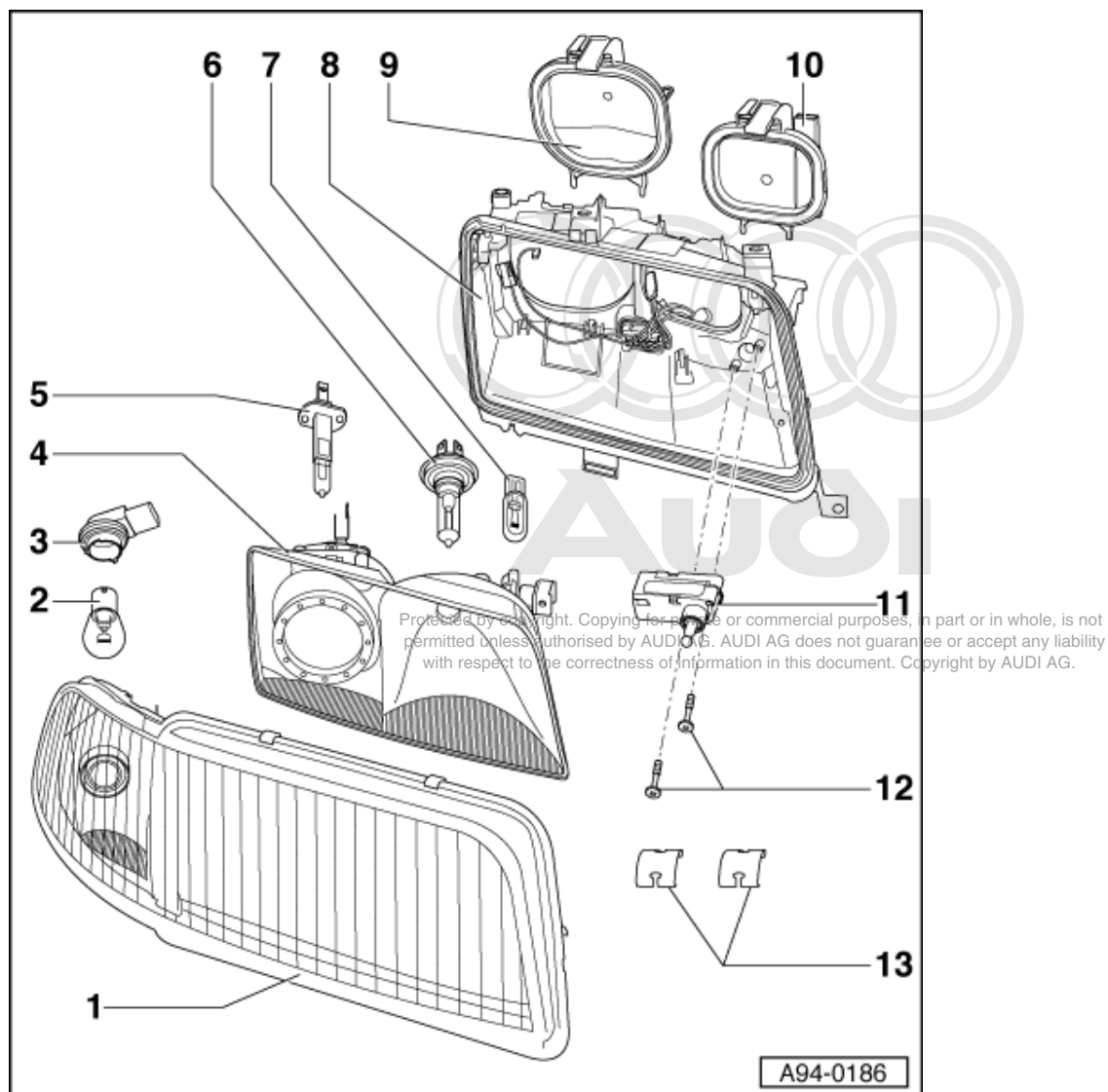
Removing

- Detach large housing cover from headlight housing.
- -> Turn connector -1- in direction of arrow and pull off from gas-discharge lamp
- Press retaining tab -3- in direction of arrow and turn locking ring -2- in direction of arrow.
- Lift off locking ring and take out gas discharge lamp.

Installing

- Installation is performed in the reverse sequence.

1.13 - Removing and installing headlight range control motor - halogen headlights



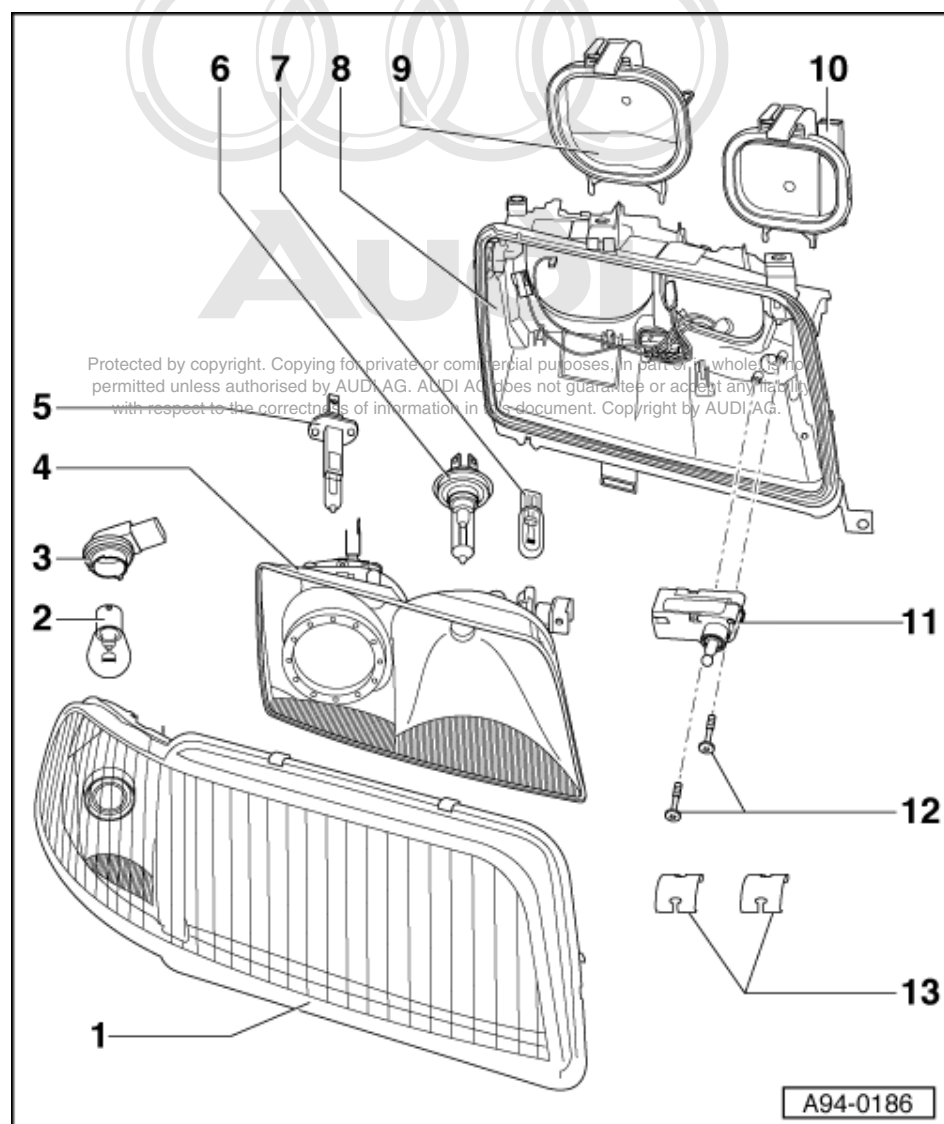
Removing

Battery does not have to be disconnected.

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove headlight
=>Page 88 .
- Detach rubber seal, this involves releasing retaining clip and securing elements.



- Detach lens -1- by releasing the six fasteners -13-.

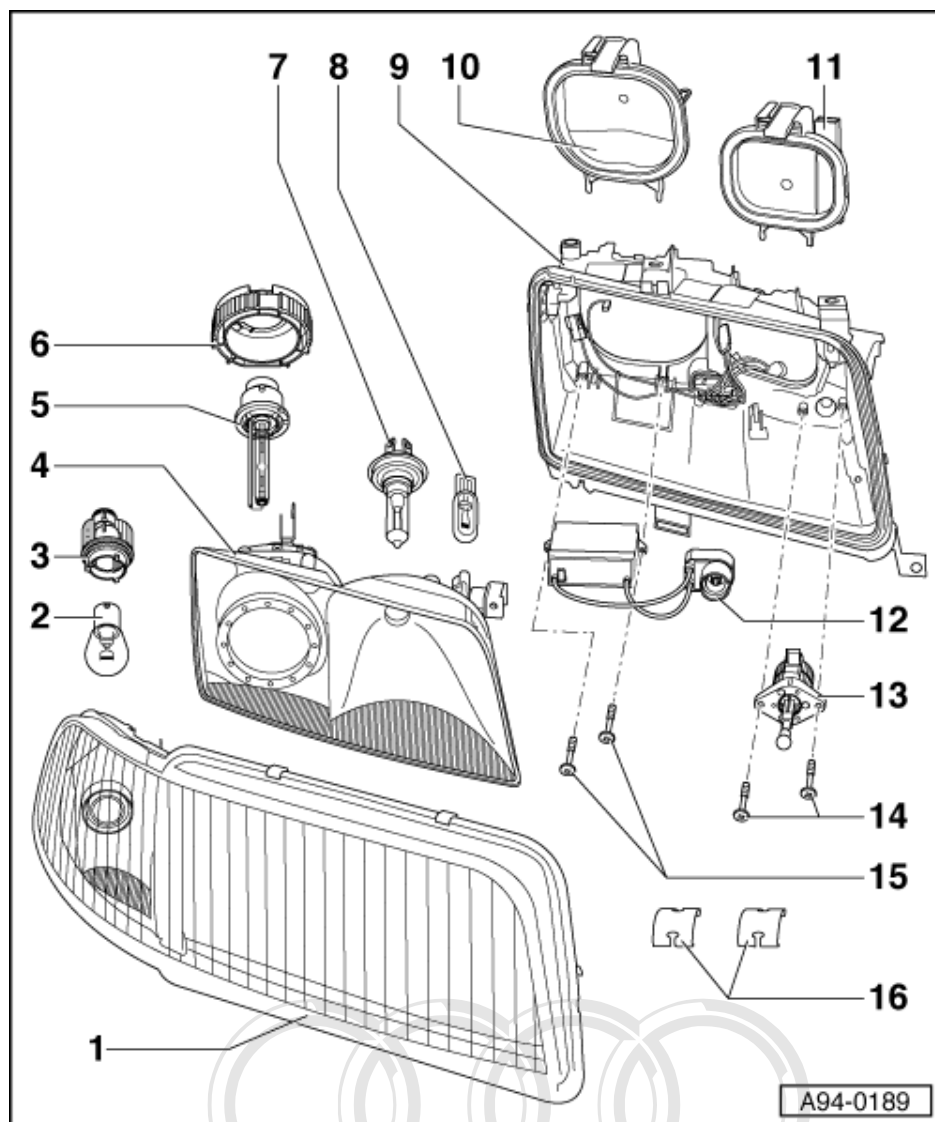


- Pull spherical head of adjuster stem out of mount.
- Remove reflector -4-. Turn screws for height/lateral adjustment until reflector can be taken out.
- Detach connector at headlight range control motor -11- and unfasten the two bolts -12-.
- Take out headlight range control motor.

Installing

- Installation is performed in the reverse sequence.
- Adjust headlight => Page 89 .

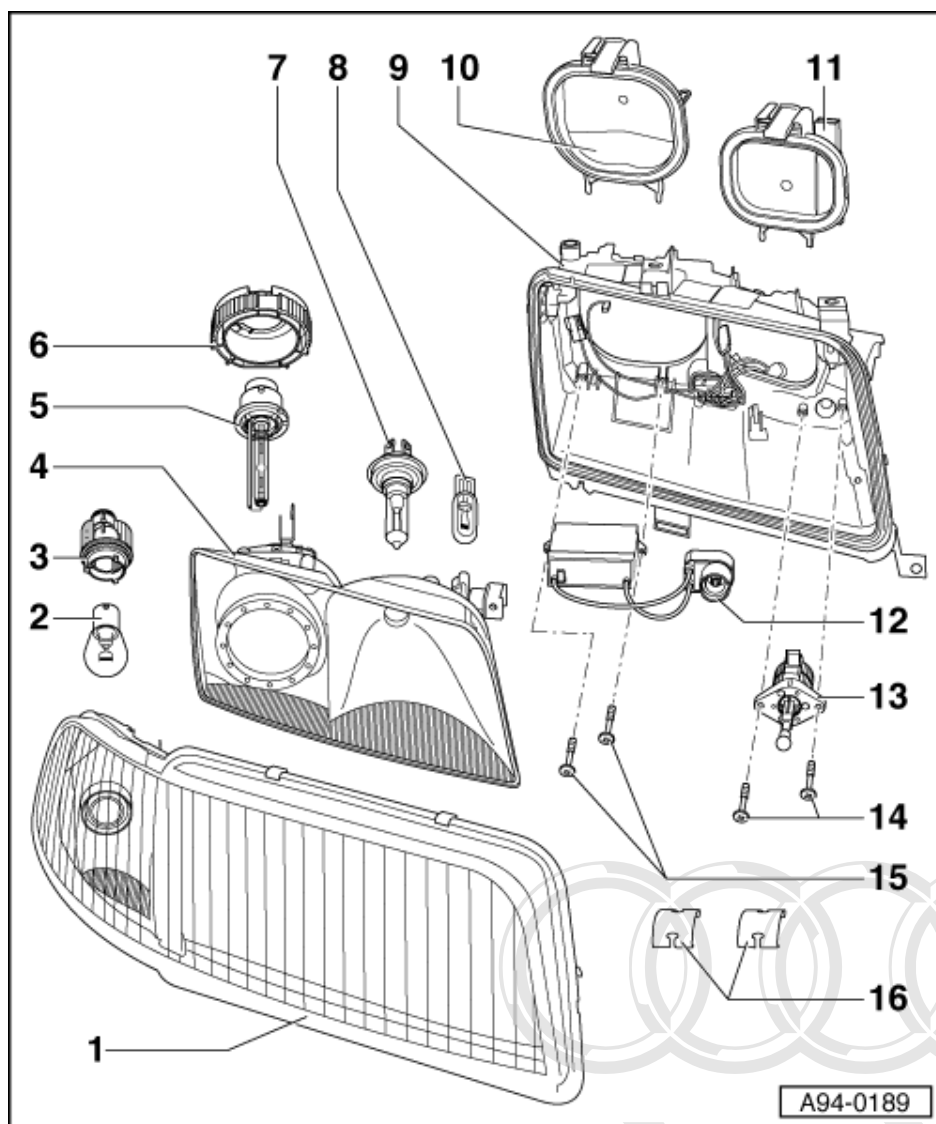
1.14 - Removing and installing headlight range control motor - gas discharge headlights



Removing

- Remove headlight
=>Page 88 .
- Detach rubber seal, this involves releasing retaining clip and securing elements.
- Detach lens -1- by releasing the six fasteners -16-.
- Pull spherical head of adjuster stem out of mount.
- Remove reflector -4-. Turn screws for height/lateral adjustment until reflector can be taken out.

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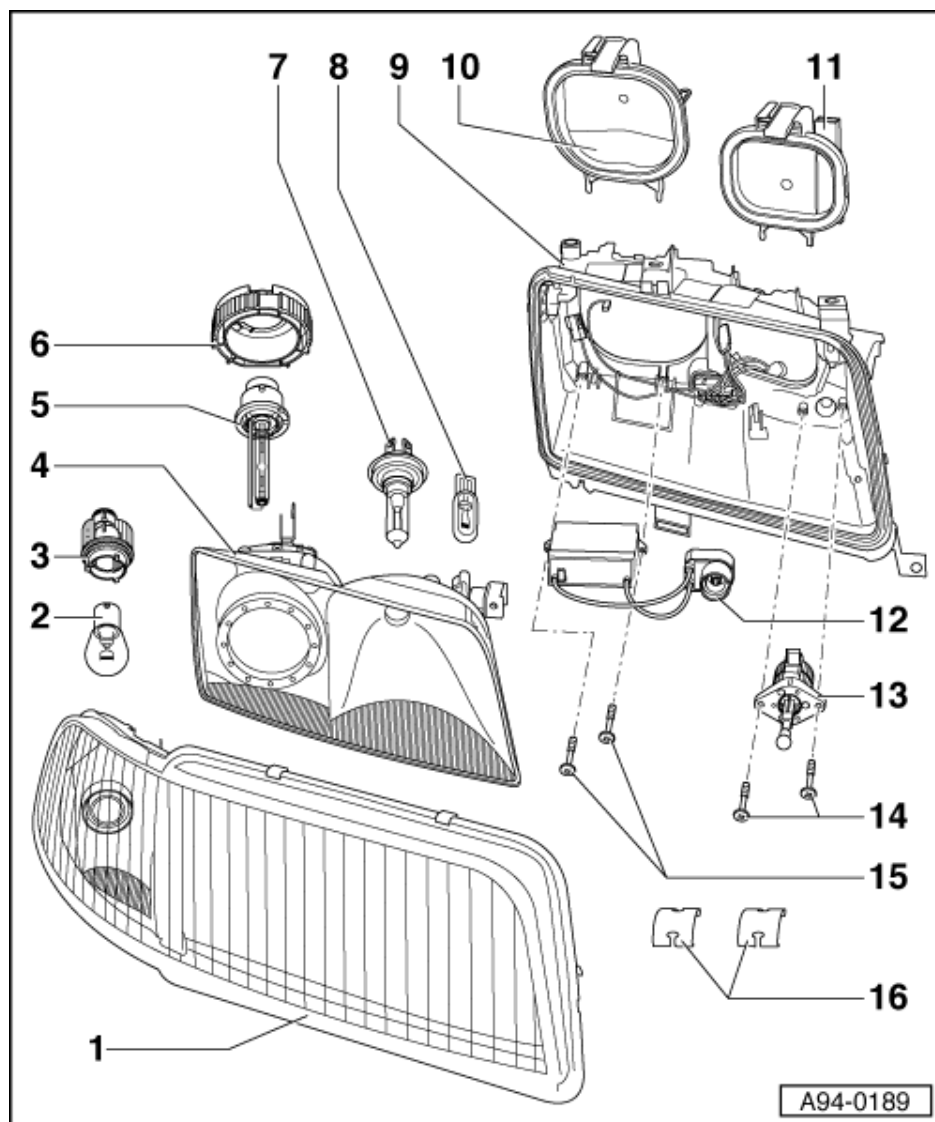
- Detach connector at headlight range control motor -13- and unfasten the two securing bolts -14-.
- Take out headlight range control motor.

Installing

- Installation is performed in the reverse sequence.
- Adjust headlights => Page 89 .

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1.15 - Removing and installing gas-discharge lamp starter unit -N195

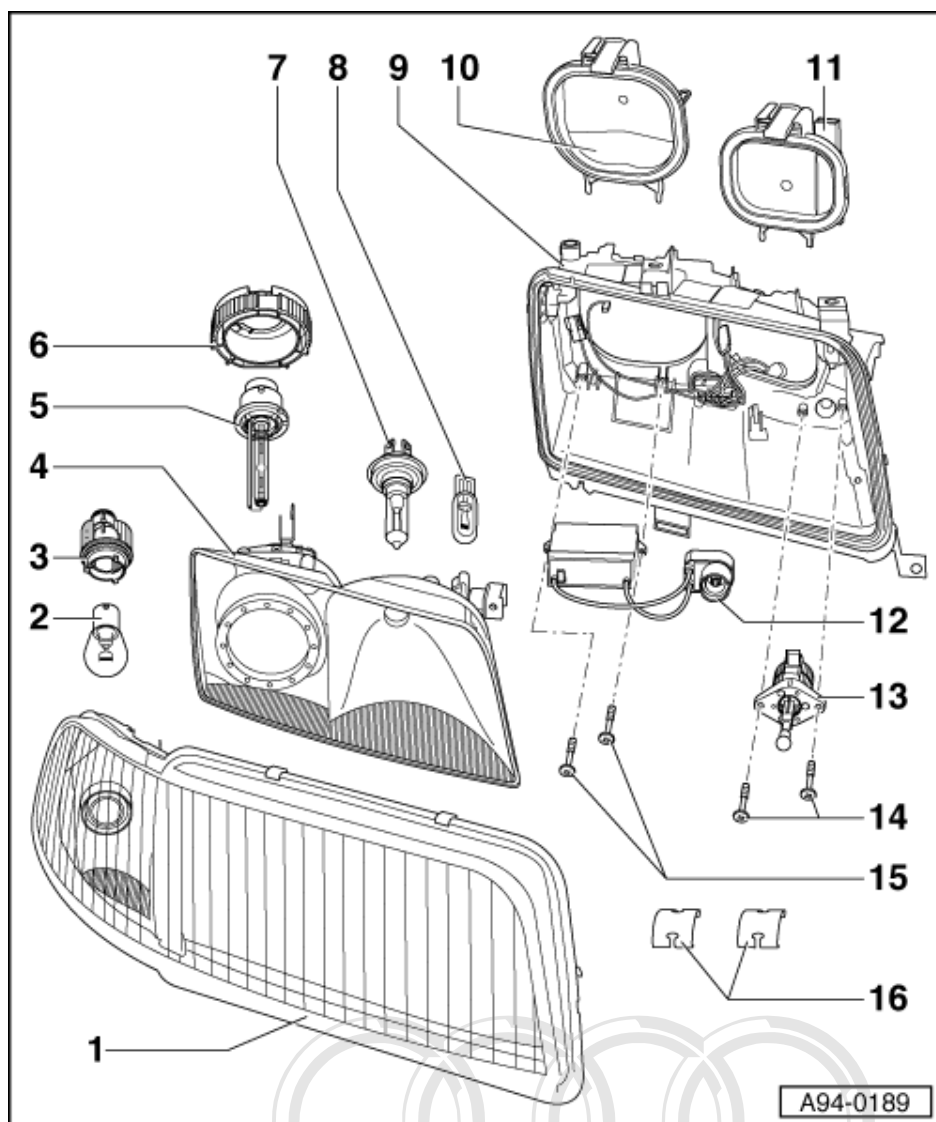


Warning - High voltage!

Always disconnect the battery earth strap before working on parts of the gas-discharge headlights marked with yellow high-voltage warning symbols.

Removing

- Remove headlight
=>Page 88 .
- Detach rubber seal, this involves releasing retaining clip and securing elements.
- Detach lens -1- by releasing the six fasteners -16-.



- Remove reflector -4-. Turn screws for height/lateral adjustment until reflector can be taken out.
- Open housing cover -10- and detach connector at gas discharge lamp by turning it anti-clockwise.
- Unfasten the two screws -15- and take out gas discharge lamp starter unit -12-.

Installing

- Installation is performed in the reverse sequence.
- After installing perform headlight adjustment => Page 89 .

1.16 - Removing and installing gas discharge lamp control unit, left -J343

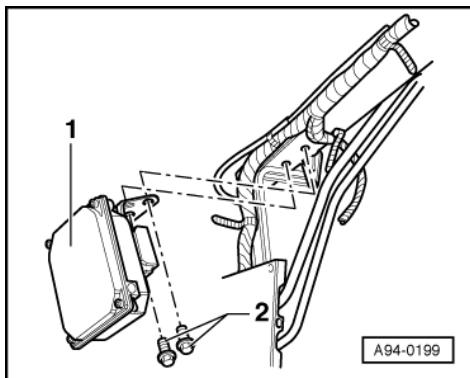
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Removing

- Remove front left wheel housing liner.

=> General body repairs, Exterior; Repair group 66; Wheel housing liners; Removing and installing front wheel housing liner Wheel housing liners Removing and installing front wheel housing liner

- Detach connector of gas discharge lamp control unit -J343 at headlight and release cable fastener (cable tie).



- -> Screw out the two bolts -2- (6 Nm) and take out control unit -1- together with holder.
- Unfasten the three bolts and detach control unit -1- from holder.

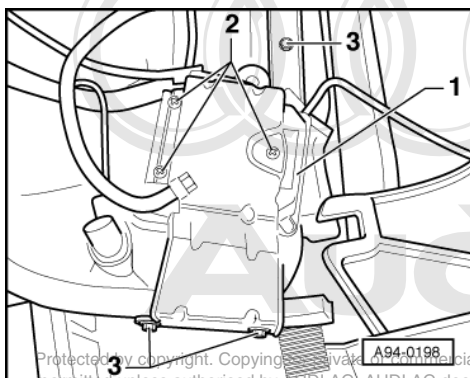
Installing

- Installation is performed in the reverse sequence.

1.17 - Removing and installing gas discharge lamp control unit, right -J344

Removing

- Remove right headlight
=>Page 88 .



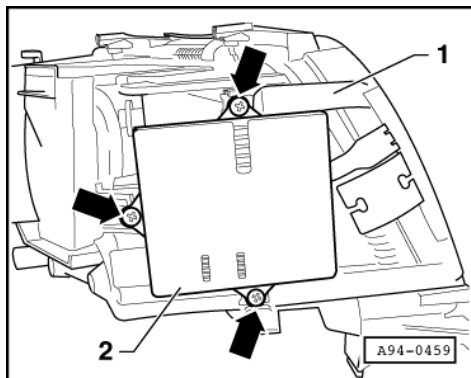
- -> Unfasten the three screws -2- and detach control unit -1- from holder.
- The holder is attached to the vehicle by means of three bolts -3- (6 Nm).

Installing

- Installation is performed in the reverse sequence.

1.18 - Removing and installing gas-discharge headlight control unit from MY 01

With the introduction of the "Litronik 4.0" headlight, the gas-discharge lamp control unit -J343/-J344 is fitted directly to the headlight housing.



Removing

- Remove the relevant headlight => Page 88 .
- -> Unfasten the screws -arrows- (1.5 Nm) on control unit -2- and lift off control unit -2- from headlight housing -1-.

Installing

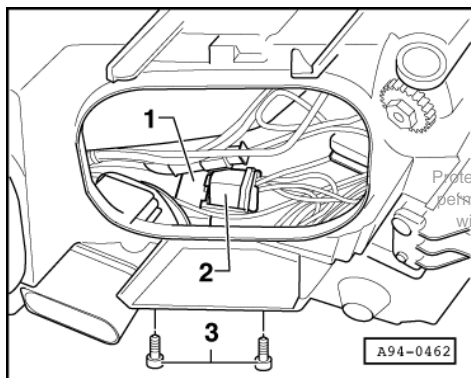
- Installation is performed in the reverse sequence.

1.19 - Removing and installing gas-discharge lamp control unit - main beam

The control unit is located in the headlight housing below the main beam bulb.

Removing

- Remove small housing cover from headlight housing.



- -> Release and unplug connector -2-.
- Unscrew bolts -3- (1.5 Nm).
- Remove control unit -1- from headlight housing.

Installing

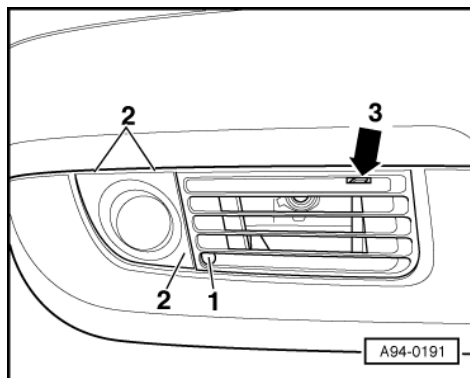
- Installation is performed in the reverse sequence.

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2 - Servicing fog lights

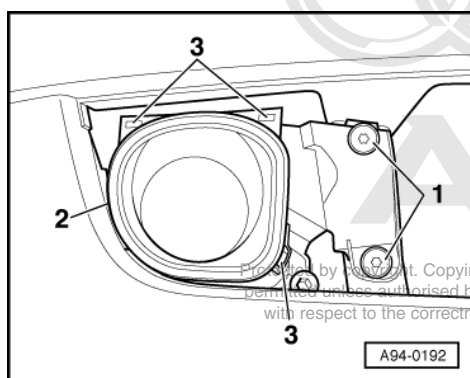
2.1 - Servicing fog lights

2.2 - Removing and installing fog lights



Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- -> Remove air duct grille by pressing retainer tab -3- downwards using a flat screwdriver.
- Detach trim at front fog light from the front. Trim is push-fitted with three retainer tabs -2-.



- -> Trim at front fog light is inserted into guides -3-.
- Remove the two bolts -1- (6 Nm).
- Pull front fog light to front and out of mount -2-.
- Unplug electrical connection.

Installing

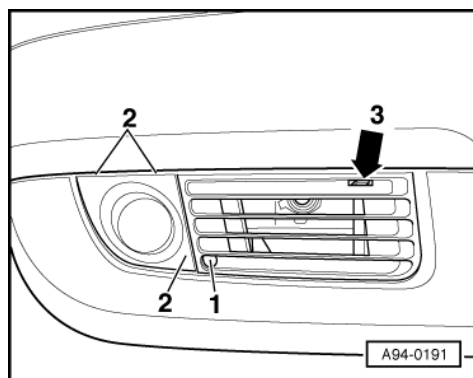
- Install in reverse sequence.
- Adjust fog lights after installing => Page 111 .

2.3 - Adjusting fog lights

For adjustment specifications refer to:

=> Maintenance manual

- Turn the relevant adjustment screw as required using an Allen key (6 mm) or cross-head screwdriver.

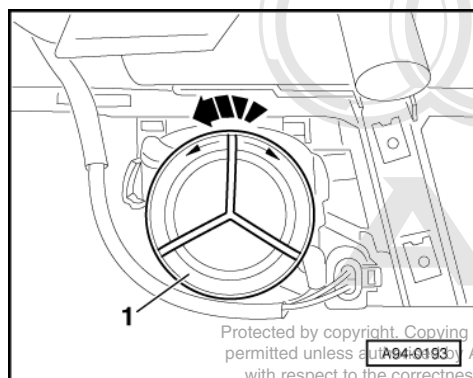


- -> Turn adjusting screw anti-clockwise to reduce range. Screw can be accessed via the recess -1- in the air duct grille. There is no provision for lateral adjustment.

2.4 - Replacing front fog light bulb

Removing

- Remove front fog light
=> Page 111



- -> Turn cover -1- in direction of arrow and detach.
- Unplug connector at bulb.
- Release spring-type wire clip and take out fog light bulb (12V 55W H3)

Installing

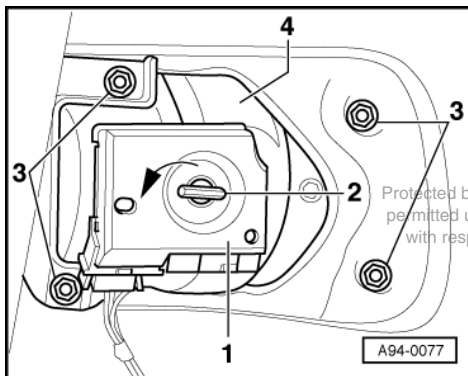
- Installation is performed in the reverse sequence to removal.
- Adjust fog lights after installing => Page 111 .

3 - Servicing rear lights

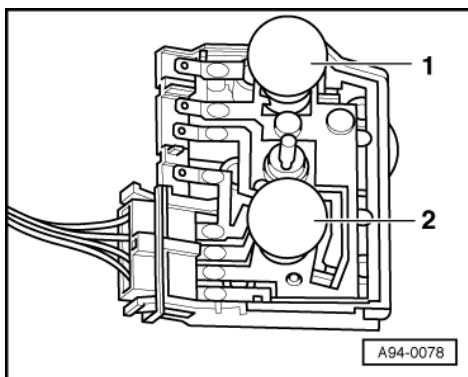
3.1 - Servicing rear lights

3.2 - Removing and installing bulb carrier in side panel

Removing



- Switch off ignition and all electrical consumers and pull out ignition key.
- Open and remove left/right storage compartment cover in luggage compartment.
- Open and remove rear light cover.
- -> Turn -arrow- rotary knob -2- at bulb carrier -1- anti-clockwise and remove.



- -> Unscrew bulbs to remove them from their holders.

- 1 - Turn signal bulb -12 V, 21 W
- 2 - Brake light/reversing light bulb
-12 V, 21/5 W

Installing

- Install in reverse sequence.

3.3 - Removing and installing rear light in side panel

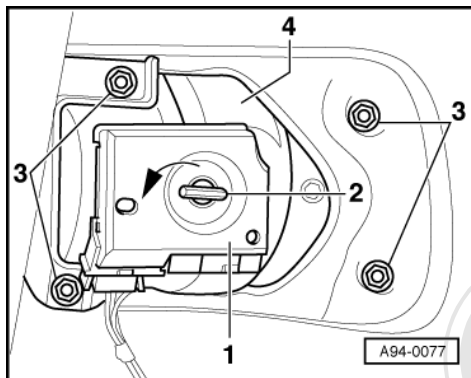
Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Open and remove left/right storage compartment cover in luggage compartment.
- Open and remove rear light cover.



- Remove left/right luggage compartment side trim.

=> General body repairs, Interior; Repair group 70; Trim panels; Removing and installing luggage compartment trim Trim panels Removing and installing luggage compartment trim



- -> Turn rotary knob -2- at bulb carrier -1- anti-clockwise and remove.
- Unscrew hexagon nuts (4 Nm) -3- and remove rear light -4- from outside of vehicle.

Installing

- Install in reverse sequence.

Note:

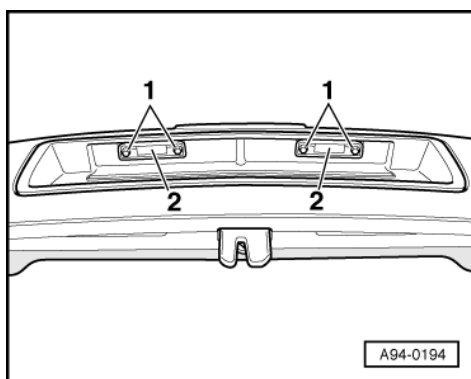
When installing, ensure that seal between body and rear light housing seals properly.

- Before tightening the securing nuts, align the rear light with the contours of the body (uniform gaps all round).

3.4 - Removing and installing number plate lights

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.



- -> Screw out the two securing bolts -1- (4 Nm).
- Take number plate light -2- out of boot lid and replace defective bulb as required.

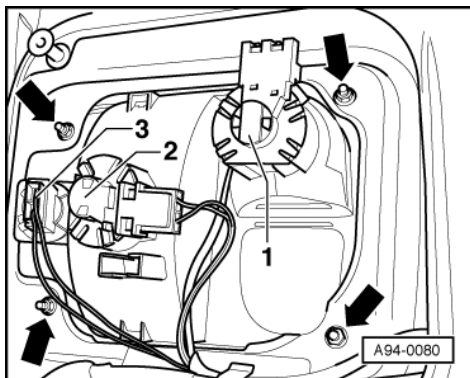
Installing

- Installation is performed in the reverse sequence.

3.5 - Removing and installing rear light bulbs in boot lid

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Open left/right carpet trim in boot lid.



Note:

Illustration shows left-hand rear light in boot lid.

- -> Turn individual bulb holders anti-clockwise or pull off.

- 1 - Reversing light bulb -12 V, 21 W
- 2 - Rear fog light bulb -12 V, 21 W
- 3 - Additional rear light bulb -12 V, 21 W

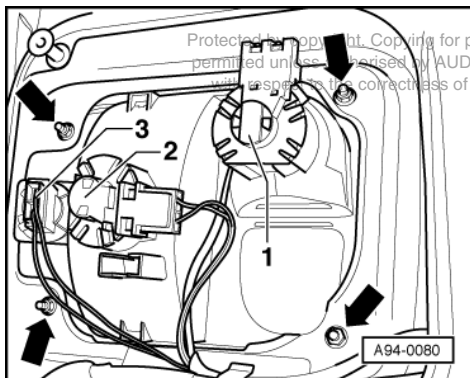
Installing

- Installation is performed in the reverse sequence.

3.6 - Removing and installing rear light in boot lid

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Open left/right carpet trim in boot lid.



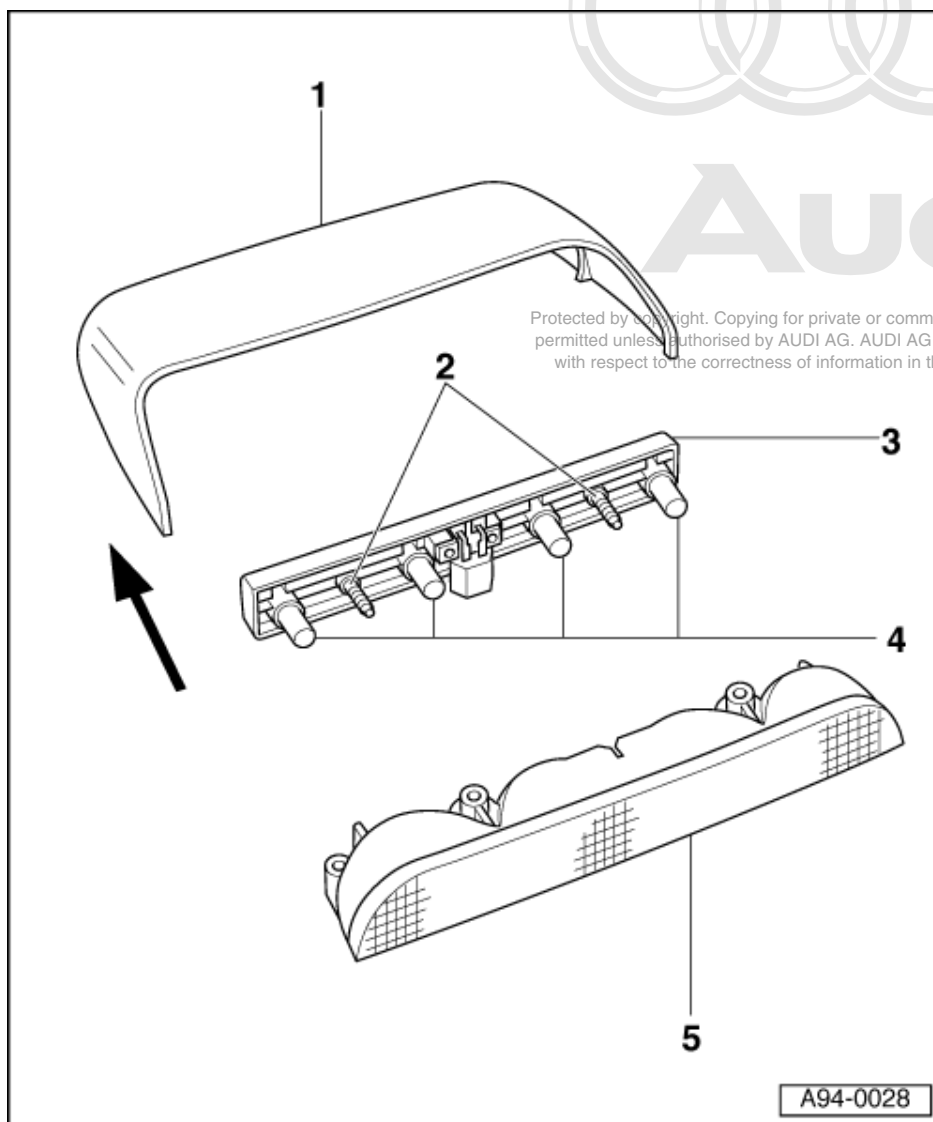
- -> Turn individual bulb carrier - 1, 2, 3- anti-clockwise or pull off.

The high-level brake light is mounted on the rear shelf.

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Pull off housing cover -1- by hand in direction of arrow.
- Unscrew bolts -2- and remove bulb carrier -3- in direction of arrow.
- Unplug electrical connector.

Bulbs -4- (4 x 12 V, 5W) are push-fitted in bulb carrier -3-.



Lens unit -5- is attached to rear shelf from underneath with bolts from luggage compartment.

Installing

- Installation is carried out in the reverse sequence.



5 - Side mounted turn signals

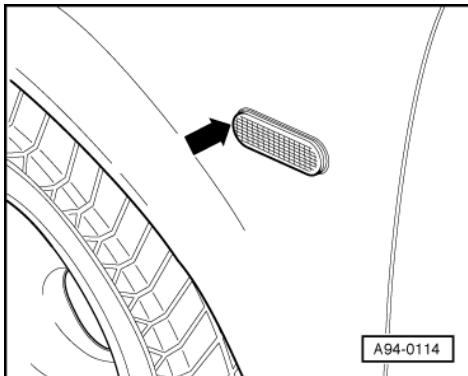
5.1 - Side mounted turn signals

5.2 - Removing and installing side mounted turn signals

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.

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- -> Push turn signal towards rear of vehicle against the retaining tab -arrow- and carefully remove from opening in wing.
- Disconnect connector.

Installing

- Connect connector.
- Insert turn signal in wing.

6 - Servicing steering column switches

6.1 - Servicing steering column switches

6.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

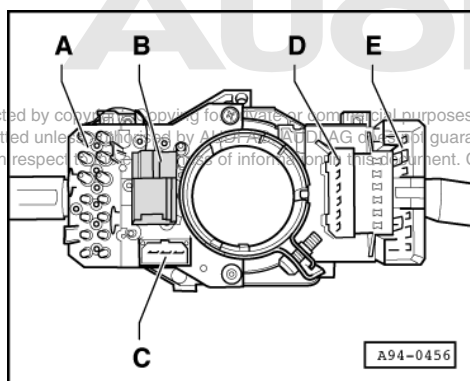
6.3 - Removing and installing steering column switches

=> Running gear, front-wheel drive and four-wheel drive; Repair group 48; Airbag unit on steering wheel; Removing and installing steering wheel with airbag unit and steering column switches Airbag unit on steering wheel Removing and installing steering wheel with airbag unit and steering column switches

6.4 - Wiring connections on steering column switch

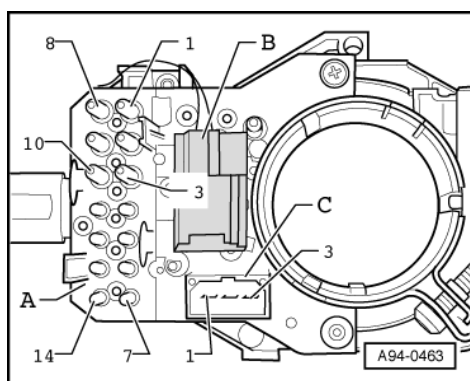
Note:

Contacts which are not listed are vacant/unassigned.



-> Overview

- A - Connector for light switch, manual dipping, headlamp flasher and parking light
- B - Connection for cruise control system
- C - Connection for turn signal switch
- D - Connection for on-board computer and intermittent wipe function
- E - Connection for windscreen wiper switch

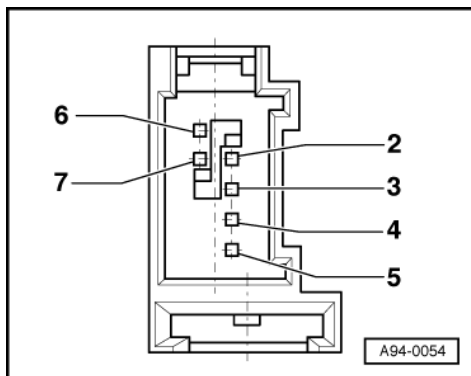


-> A - Identification of connections for light switch, switch for manual dipping, headlamp flasher and parking light

- 2 - Terminal X
- 4 - Terminal PR
- 5 - Terminal PL
- 6 - Terminal 30
- 7 - Terminal 58

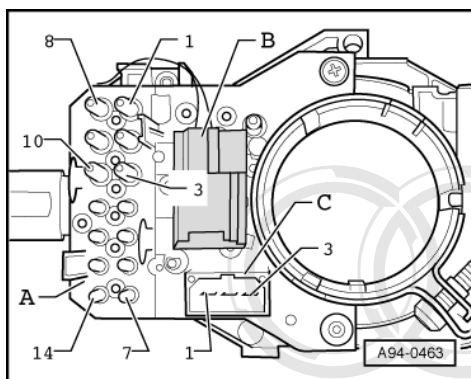


- 8 - Terminal 56
- 9 - Terminal 56a
- 10 - Terminal 56b
- 12 - Terminal P
- 13 - Terminal 30



-> B - Identification of connections for cruise control system (petrol engines with mechanical throttle)

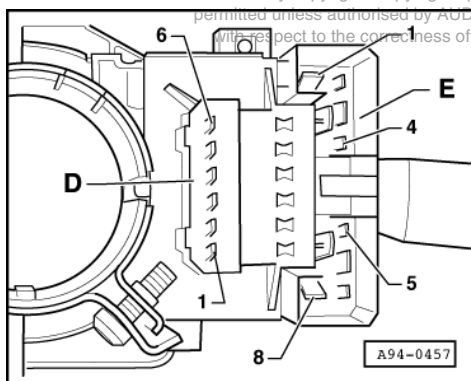
- 1 - CCS control unit, pin 11
- 2 - CCS control unit, pin 10
- 3 - Control unit for cruise control, contact 4
- 4 - CCS control unit, pin 8
- 5 - Terminal 15
- 6 - Clutch pedal/brake pedal switch



-> C - Identification of connections for turn signal switch

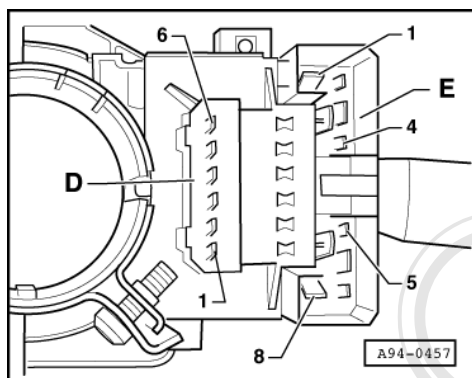
- 1 - Turn signal, left
- 2 - Hazard warning light switch, terminal 49a
- 3 - Turn signal, right

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-> D - Identification of connections for on-board computer and intermittent wipe function

- 1 - Driver information system, right
- 2 - Driver information system, left
- 3 - Terminal 31
- 4 - Driver information system, Reset
- 5 - Intermittent wipe control
- 6 - Intermittent wipe control



-> E - Identification of connections for windscreen wiper switch

- 1 - Terminal 53
- 3 - Terminal 53e
- 4 - Terminal 53c
- 6 - Terminal 53b
- 7 - Intermittent wipe
- 8 - Terminal 53a

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7 - Servicing lock cylinder and ignition/starter switch

7.1 - Servicing lock cylinder and ignition/starter switch

7.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.
Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ Activate the service mode of the telematics control unit before disconnecting the battery.
- ◆ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption



7.3 - Removing and installing lock cylinder

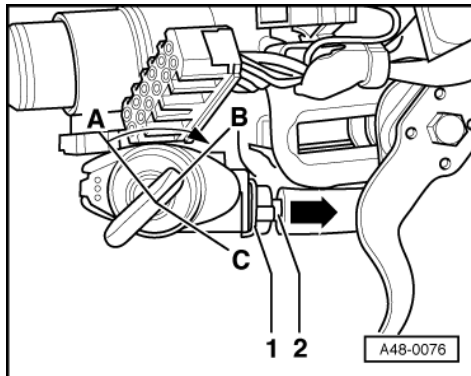
Removing

- Remove steering column switches:

=> Running gear, front-wheel drive and four-wheel drive; Repair group 48; Steering wheel with airbag unit; Removing and installing steering wheel with airbag unit and steering column switches Steering wheel with airbag unit Removing and installing steering wheel with airbag unit and steering column switches

Vehicles with automatic gearbox

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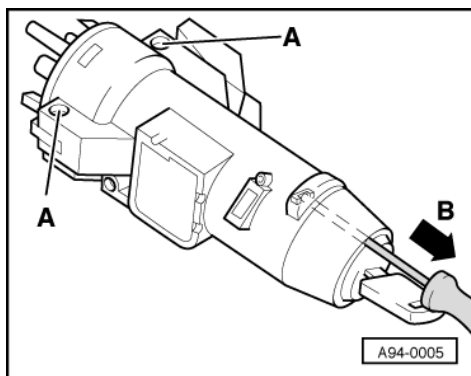


- Shift selector lever into "P" position.
- -> Turn ignition key to position -B- "Ignition on".
- Then lift interlock lever -1- slightly and pull interlock cable -2- out of ignition lock housing.

Continued for all vehicles

Note:

The spare key or workshop key is required for removing the 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.



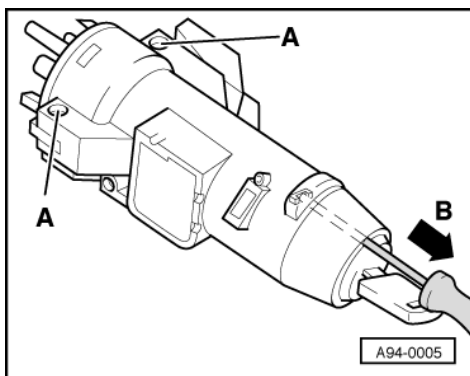
- Insert spare key or workshop key into ignition lock and turn to "Ignition on": an aperture will appear in the front of the lock next to the ignition key slot.
- -> Insert a length of steel wire or a pin (diameter approx 1.5 mm) as far as it will go, as illustrated, and pull the lock cylinder out of the steering lock housing in the direction indicated by arrow -B-.

Installing

- Insert the spare key or workshop key into the ignition lock and turn to "Ignition on". Once again insert the length of steel wire into the aperture in the front of the lock and push it in as far as it will go.
- Push the lock cylinder with ignition key all the way into steering lock housing.
- Then pull out the steel wire and press in the lock cylinder firmly until the catch engages audibly.
- Install steering column switches and steering wheel in reverse sequence => Page 119 .

7.4 - Removing and installing ignition/starter switch

Removing



- Remove steering column switches:

=> Running gear, front-wheel drive and four-wheel drive; Repair group 48; Steering wheel with airbag unit; Removing and installing steering wheel with airbag unit and steering column switches Steering wheel with airbag unit Removing and installing steering wheel with airbag unit and steering column switches

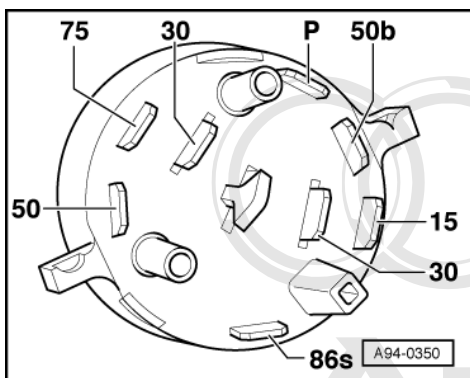
- Unplug connector on ignition/starter switch.
- Remove sealing paint from the two retaining screws -A-.
- Slacken retaining screws -A- slightly and pull ignition/starter switch out of steering lock housing in opposite direction of arrow -B-.

Installing

Notes:

- ♦ The ignition/starter switch and the lock cylinder must be in the same position, e.g. "Ignition on", when installing.
- ♦ Seal the two retaining screws on the steering lock housing with paint again after they are tightened.
- Install in reverse sequence.

7.5 - Wiring connections on ignition/starter switch



- 15 - -> Terminal 15
- 30 - Terminal 30
- 50 - Terminal 50
- 50b- Terminal 50b
- 75 - Terminal 75
- 86s- Terminal 86s

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P - Park position

8 - Servicing acoustic parking system

8.1 - Servicing acoustic parking system

8.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

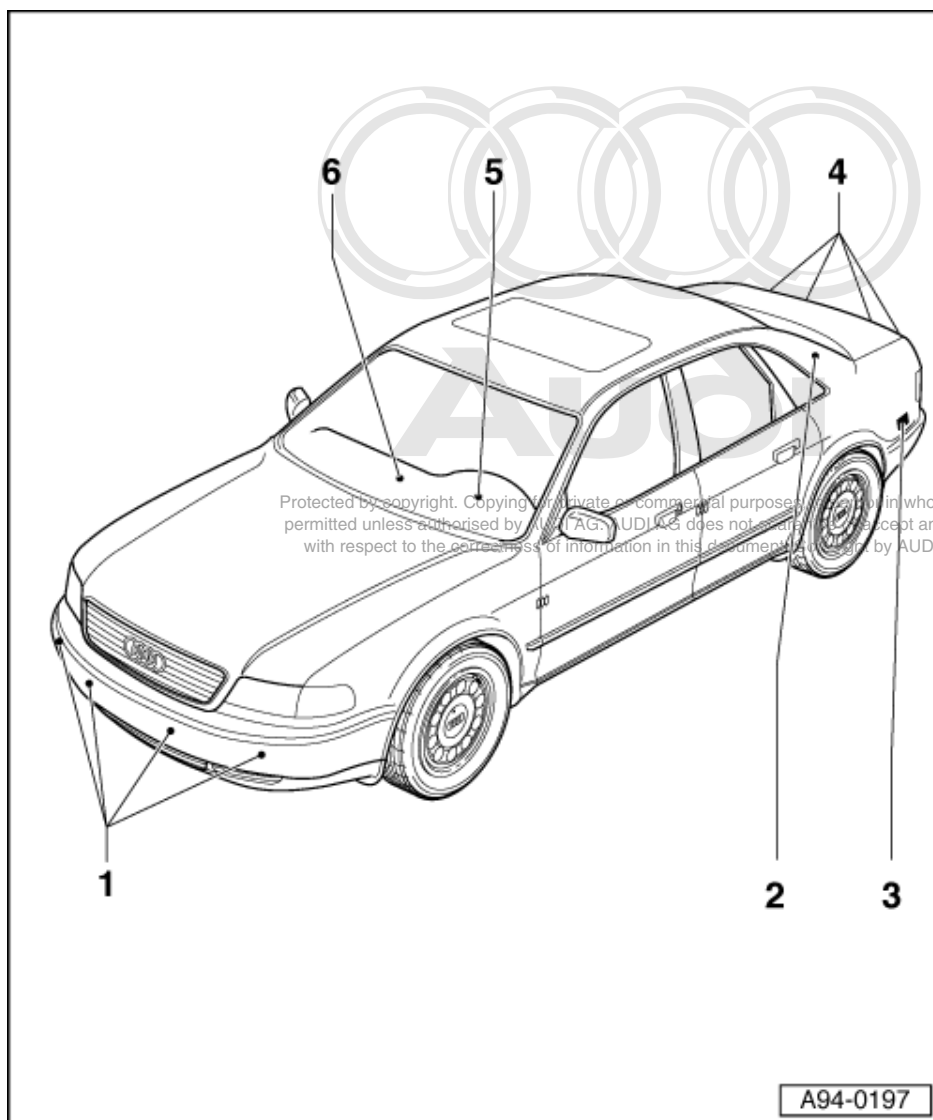
- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption



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8.3 - General overview of parking aid



1 Parking aid senders, front

- ◆ In front bumper
- ◆ Removing and installing
=> Page 128

2 Parking aid warning buzzer -H15

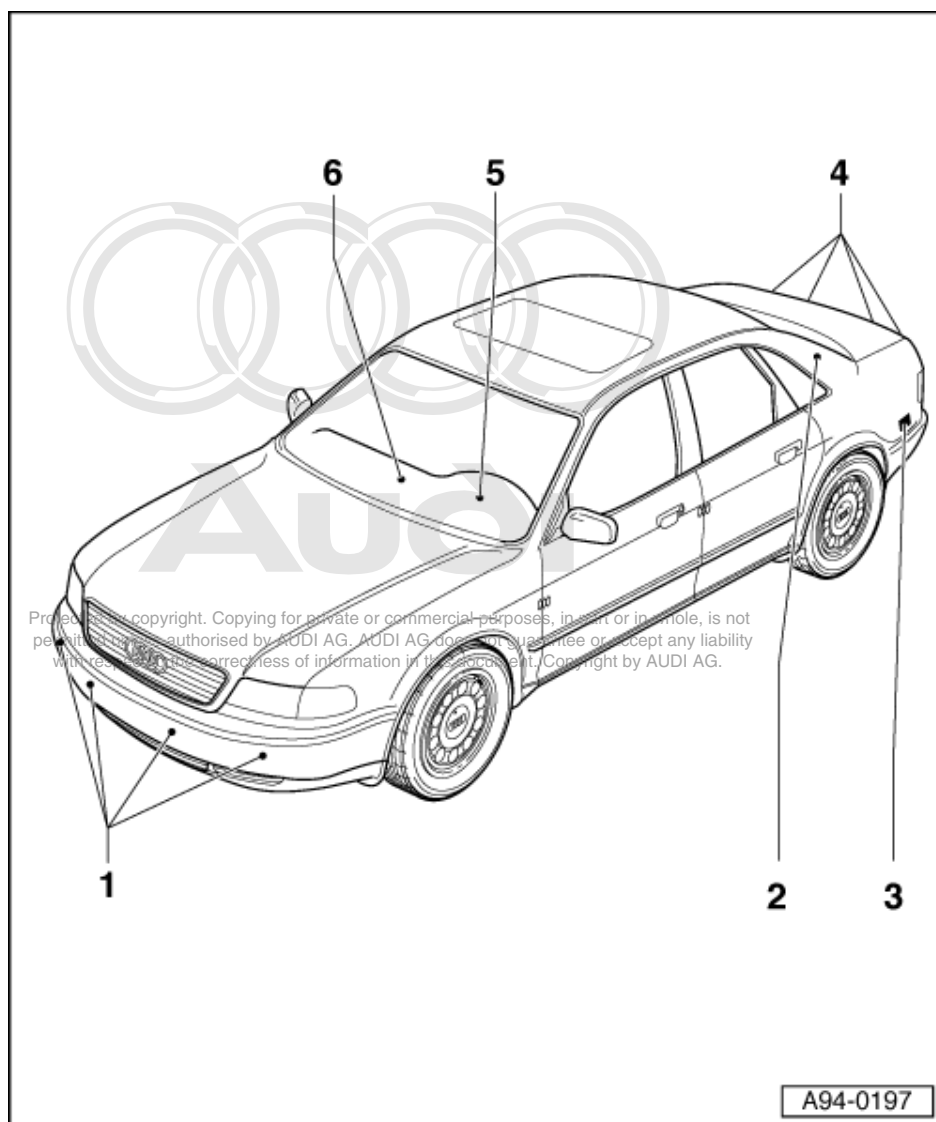
- ◆ Below rear shelf
- ◆ Removing and installing
=> Page 128

3 Parking aid control unit -J446

- ◆ Behind left-hand side trim in luggage compartment
- ◆ Removing and installing
=> Page 126

4 Parking aid senders, rear

- ◆ In rear bumper
- ◆ Removing and installing
=> Page 129



5 Parking aid warning buzzer -H22

- ◆ On right behind dash panel insert
- ◆ Removing and installing
=> Page 127

6 Parking aid button -E266

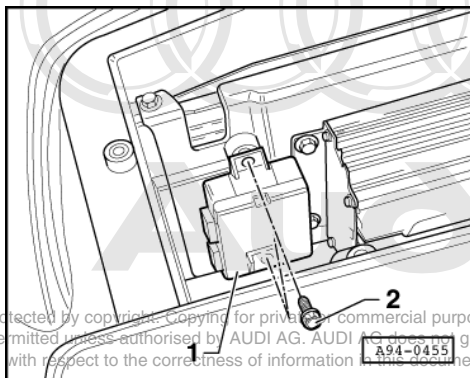
- ◆ In centre console
- ◆ Removing and installing
=> Page 134

8.4 - Removing and installing parking aid control unit -J446

Removing

- Remove trim from left-hand storage compartment in luggage compartment.
- If fitted, detach mounting frame for CD changer.

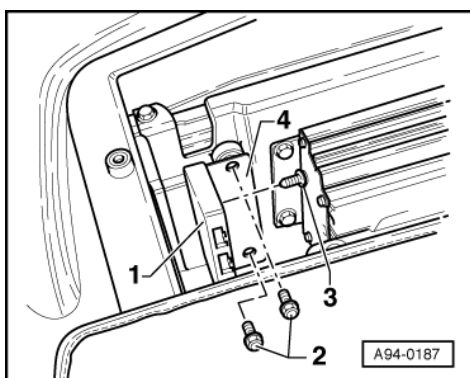
=> Radio, telephone, navigation; Repair group 91; Radio systems; Removing and installing CD changer. Radio systems Removing and installing CD changer.



Up to MY 99:

- -> Unscrew the two bolts -2- (2.5 Nm) and remove control unit -1-.
- Unplug connectors.

From MY 00:



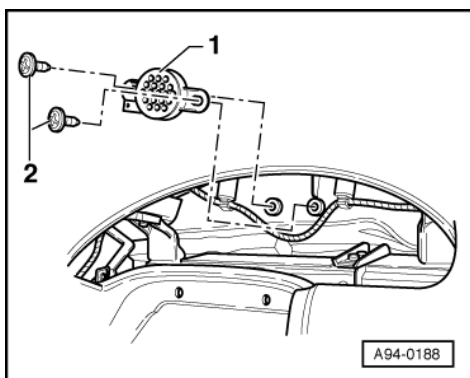
- Unscrew the two bolts -2- (2 Nm) and remove parking aid control unit -1- together with holder -4-.
- Unplug connectors.
- Parking aid control unit -1- is attached to holder -4- by means of two bolts -3- (2.5 Nm).

Installing

- Install in reverse sequence.

8.5 - Removing and installing warning buzzer for front parking aid -H22

Removing





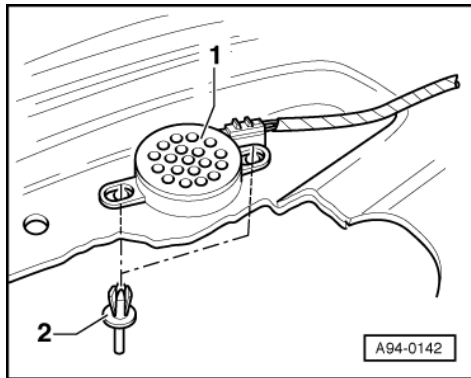
- -> Front parking aid warning buzzer -1- is located behind dash panel insert.
- Remove dash panel insert => Page 56 .
- Unplug connector.
- Unfasten the two retaining screws -2- (1 Nm).
- Take warning buzzer out.

Installing

- Installation is carried out in the reverse sequence.

8.6 - Removing and installing warning buzzer for rear parking aid -H15

Removing:



- -> The warning buzzer for rear parking aid -1- is on the luggage compartment partition, under the rear shelf.
- Remove rear shelf.

=> General body repairs, Interior; Repair group 70; Trims; Removing and installing rear shelf Trims Removing and installing rear shelf

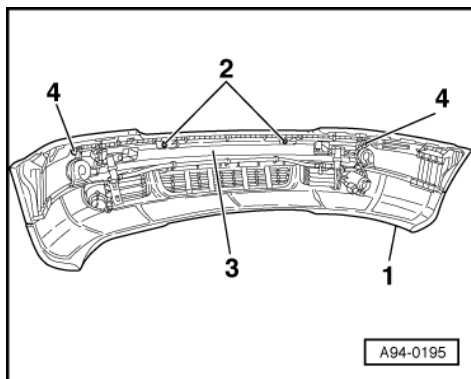
- Unplug connector.
- Remove the two expanding rivets -2-.
- Lift warning buzzer off luggage compartment partition panel.

Installing:

- Installation is carried out in the reverse sequence.

8.7 - Removing and installing front acoustic parking aid senders

Removing:



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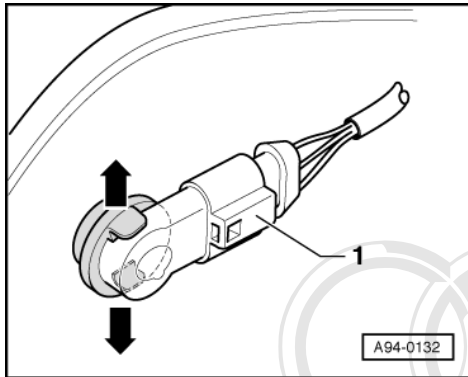
- Remove the front bumper.

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

- -> Take out the bumper bracket -3- to remove the two centre acoustic parking system senders -2-.

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

- Removal of the two outer acoustic parking system senders does not involve further dismantling of the front bumper.



- -> Unplug connector -1- from sender.
- Press apart the two retainer tabs -arrow- and press out sender inwards.

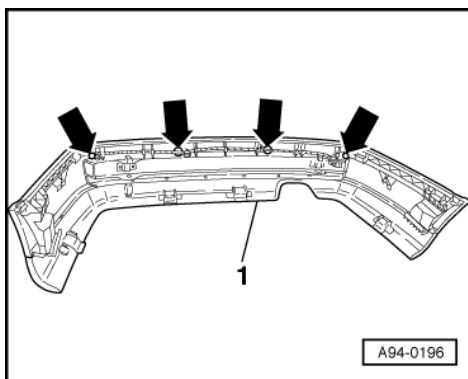
Installing:

- Install in reverse sequence.

8.8 - Removing and installing rear parking aid senders

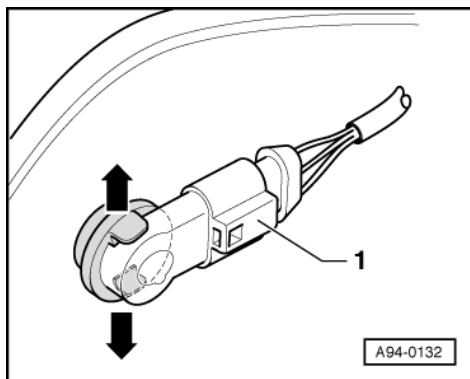
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Removing:



- -> The acoustic parking system senders -arrows- are fitted as shown on the rear bumper -1-.
- Remove the rear bumper.

=> General body repairs, Exterior; Repair group 63; Rear bumper; Removing and installing rear bumper Rear bumper Removing and installing rear bumper



- ➔ Unplug connector -1- from sender.
- Press apart the two retainer tabs -arrow- and press out sender inwards.

Installing:

- Install in reverse sequence.

9 - Servicing automatic headlight range control system

9.1 - Servicing automatic headlight range control system

9.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

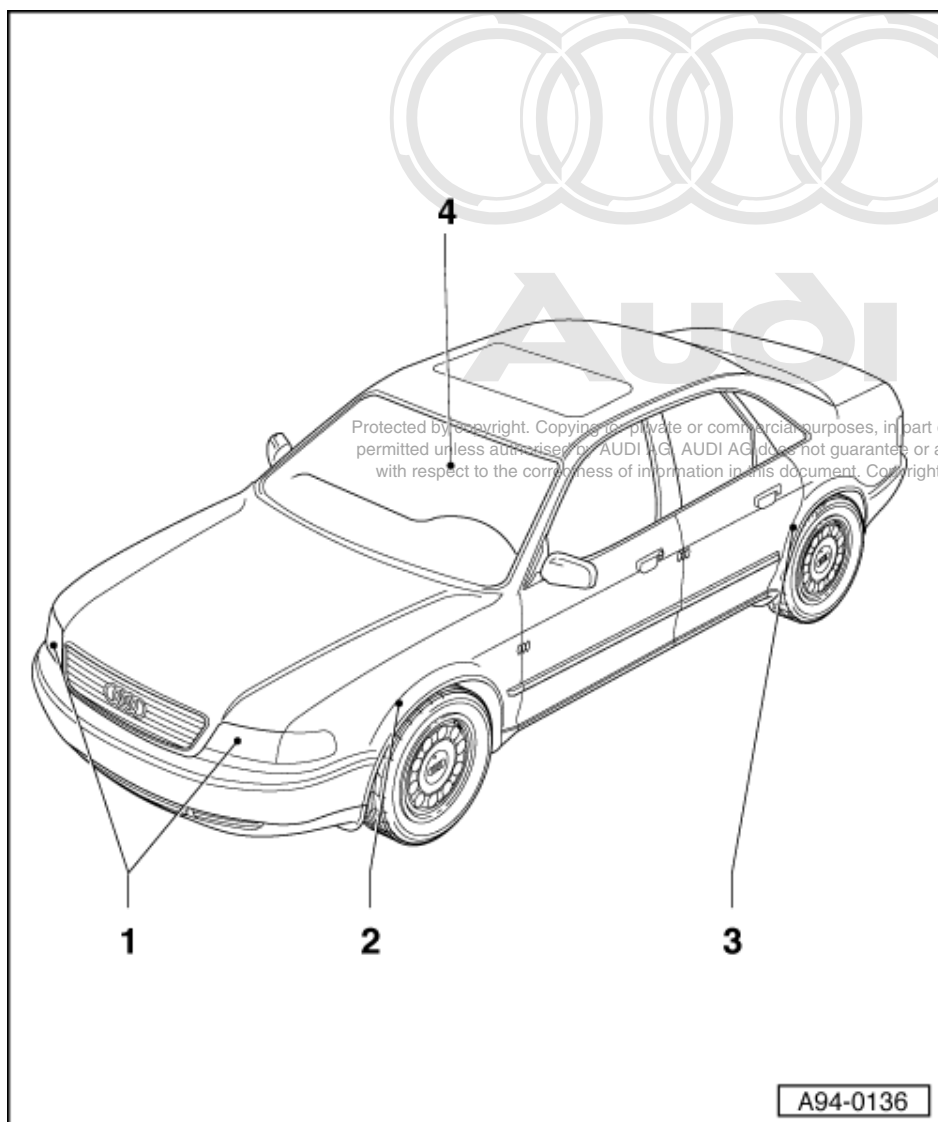
Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

9.3 - General overview of automatic headlight range control



1 Headlight range control positioning motor -V48/V49

2 Vehicle levelling sender, front left -G78

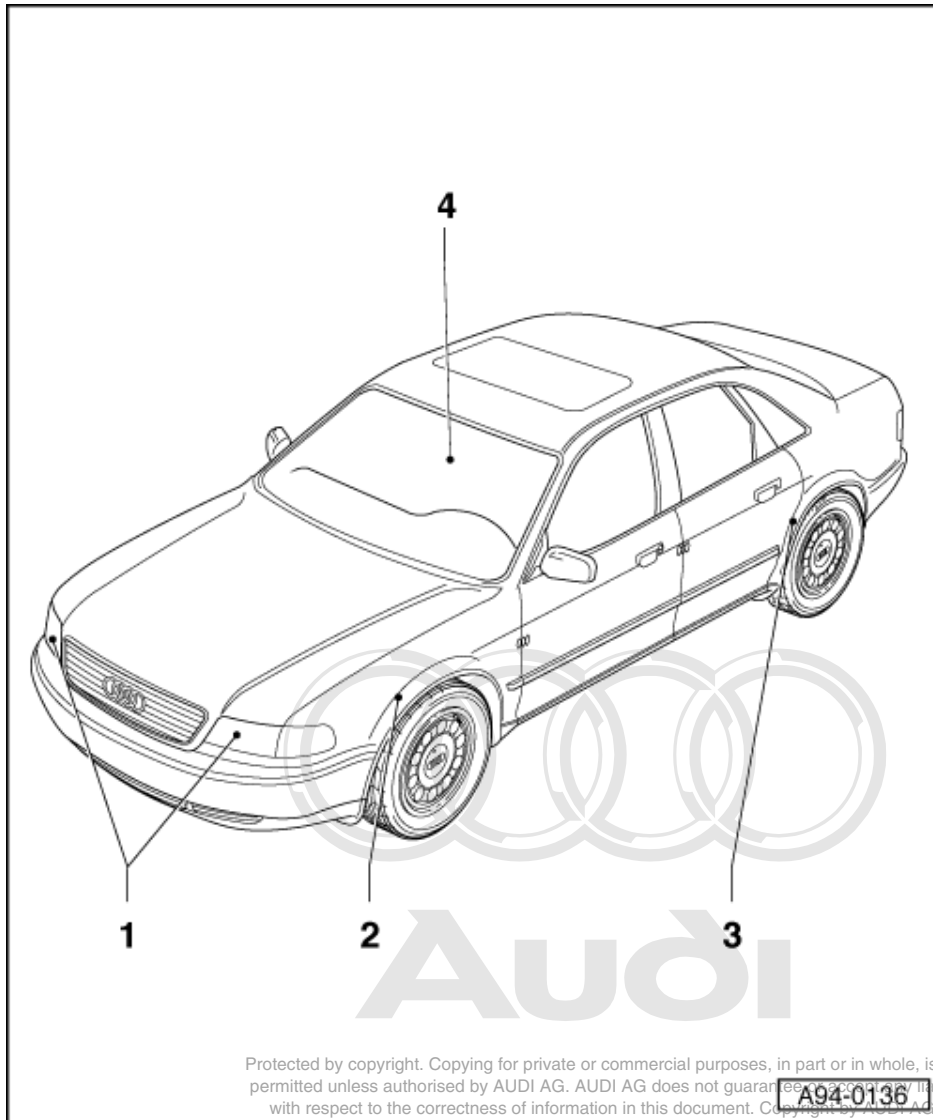
- ♦ On front left track control link
- ♦ Removing and installing:

=> Running gear, Front-wheel drive and four-wheel drive; Repair group 40; Removing and installing track control link Removing and installing track control link

3 Vehicle levelling sender, rear left -G76

- ♦ On rear left wishbone
- ♦ Removing and installing:

=> Running gear, front-wheel drive and four-wheel drive; Repair group 42; Layout of rear axle components
 Layout of rear axle components



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4 Control unit for automatic headlight range control -J431

- ◆ Behind right-hand B-pillar trim
- ◆ Removing and installing

=> Page 132

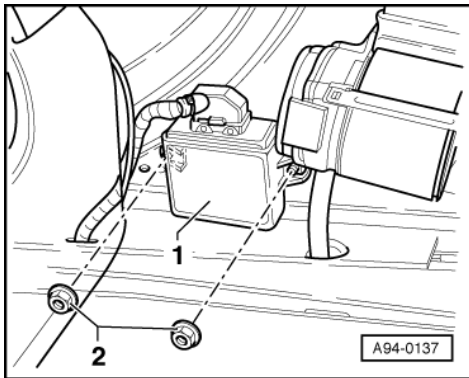
9.4 - Removing and installing control unit for automatic headlight range control -J431

The control unit for headlight range control is fitted behind right-hand lower B-pillar trim.

Removing

- Remove right-hand lower B-pillar trim.

=> General body repairs, Interior; Repair group 70; Trim panels gradually fitted from 10.98 (with interior mirror on headliner); Removing and installing lower B-pillar trim Trim panels gradually fitted from 10.98 (with interior mirror on headliner) Removing and installing lower B-pillar trim



- -> To remove control unit for headlight range control -1-, unscrew the two hexagon nuts -2- (2.5 Nm).
- Unplug connector.

Installing

- Install in reverse sequence.

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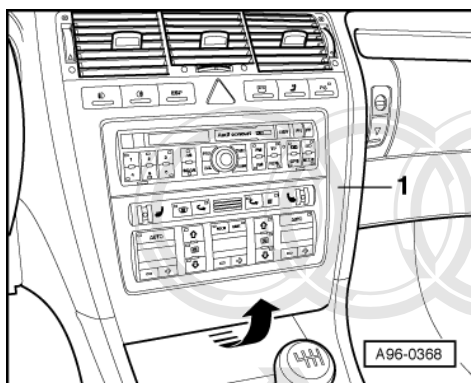
96 - Lights, Lamps, Switches - interior

1 - Servicing switches

1.1 - Servicing switches

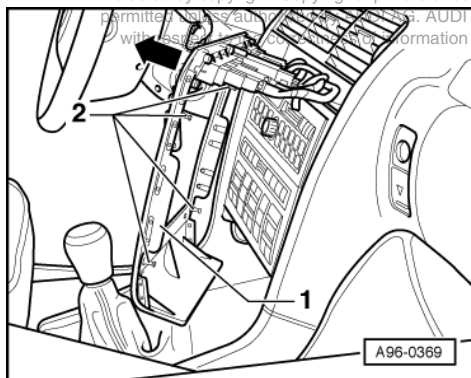
1.2 - Removing and installing switches in centre console

Removing

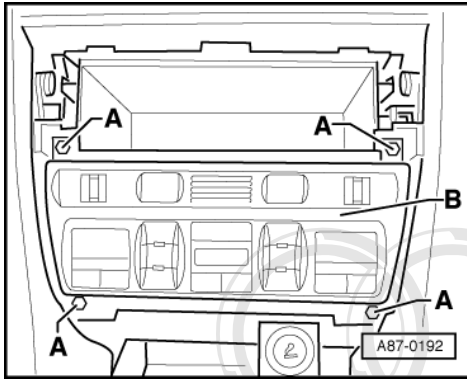


- Switch off ignition and all electrical consumers and pull out ignition key.
- -> Reach between ashtray and trim -1- with palm of hand.
- Pull trim -1- in direction of arrow.

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- -> Carefully detach trim -1-.
- Detach connector of switch to be repaired.
- Push out switch in direction of arrow.



Installing

- Installation is carried out in the reverse sequence.

Note:

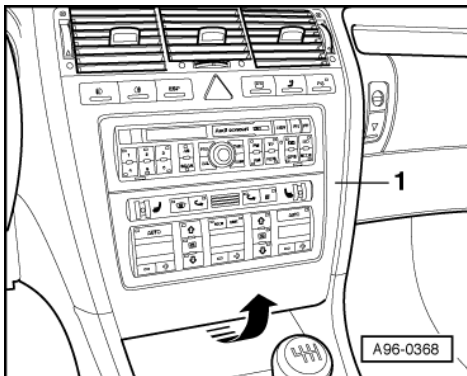
-> On installation make sure that spherical heads -2- are properly positioned on retainers -A- of centre console trim.

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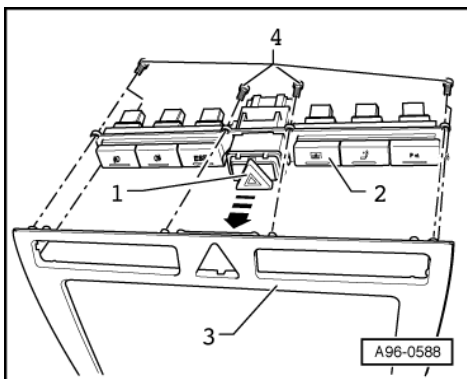
1.3 - Removing and installing hazard warning light switch

Removing

- Observe notes on working on the electrical system => Page 56 .



- Switch off ignition and all electrical consumers and pull out ignition key.
- With the ignition switched off disconnect the battery earth strap.
- -> Reach between ashtray and trim -1- with palm of hand.
- Carefully pull off trim -1- in direction of arrow.
- Unplug connectors.





- -> Unfasten screws -4- and remove switch unit -2- from trim -3-.
- Push hazard warning light switch -1- out of switch unit -2- in direction of arrow.

Installing

- Installation is carried out in the reverse sequence.
- Fit trim exactly into opening.

1.4 - Removing and installing light switch

The light switch can only be removed together with the steering column switch.

Removing and installing => Page **119**

1.5 - Removing and installing electric steering column adjustment switch

=> Running gear, front-wheel drive and four-wheel drive; Repair group 48; Steering wheel with airbag unit; Removing and installing steering wheel with airbag unit and steering column switch Steering wheel with airbag unit Removing and installing steering wheel with airbag unit and steering column switch

1.6 - Removing and installing front seat heating switch

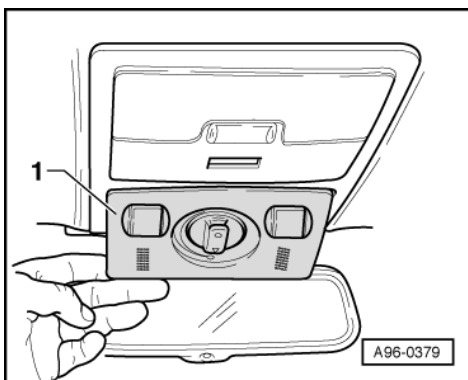
The front seat heating switches are integrated into the operating and display unit for the air conditioner.

=> Air conditioner; Repair group 87; Removing and installing operating and display unit -E87 Removing and installing operating and display unit -E87

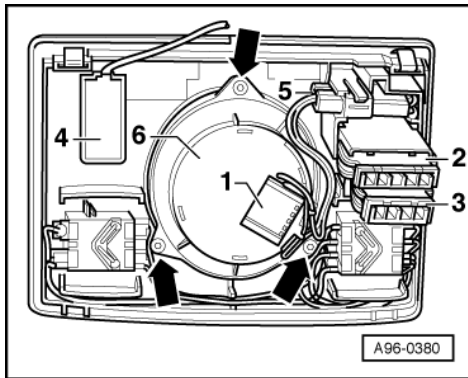
1.7 - Removing and installing sunroof switch

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Removing



- Switch off ignition and all electrical consumers and pull out ignition key.
- -> Carefully lever out reading light section -1- using a flat-bladed screwdriver.



- -> Unplug connectors 1,2 and 3 in order to remove reading light section.
- If fitted, unclip hands-free microphone -4-.
- Unplug connector -5- for sunroof switch -6-.
- Screw out securing bolts (arrows) for sunroof switch.

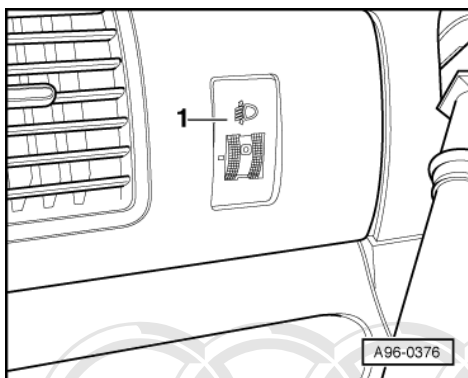
Installing

- Install in reverse sequence.

1.8 - Removing and installing adjuster for headlight range control

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.



- Remove storage compartment on driver's side

=> General body repairs, Interior; Repair group 68; Storage compartments and trim parts; Removing and installing driver's storage compartment Storage compartments and trim parts Removing and installing driver's storage compartment

- Unplug connector.
- -> Press headlight range control adjuster -1- in direction of passenger compartment.

Installing

- Installation is carried out in the reverse sequence.

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1.9 - Removing and installing switch for glove box light

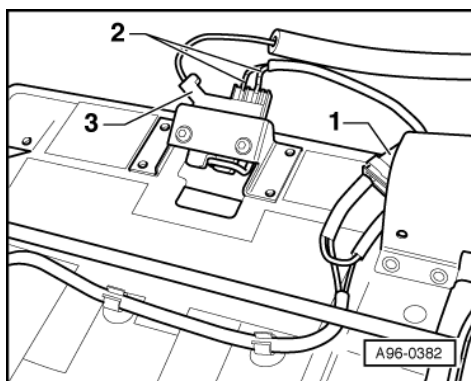
Removing

Notes:

The switch for the glove box light is integrated in the glove box lock.

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove glove compartment and lock -3-.

=> General body repairs, Interior; Repair group 68; Storage compartments and trim parts; Removing and installing glove box Storage compartments and trim parts Removing and installing glove box



- -> Unplug connector -1- and disconnect terminals -2-.

Installing

- Installation is carried out in the reverse sequence.



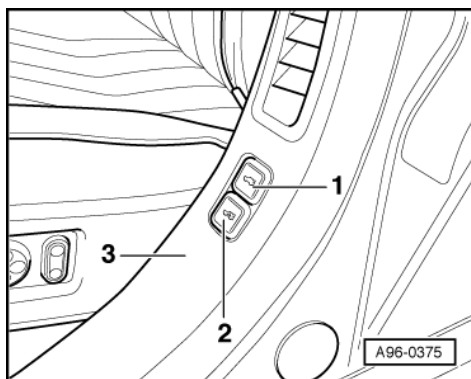
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1.10 - Removing and installing luggage compartment release switch -E164 and interior monitor switch -E183

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove driver's B-pillar trim.

=> General body repairs, Interior; Repair group 70; Trim panels; Removing and installing B-pillar trim Trim panels Removing and installing B-pillar trim



- Detach connector from respective switch.

- -> Use small screwdriver to press in clip on side of switch and press switch -1- (luggage compartment release switch) or -2- (interior monitor switch) to front out of B-pillar trim -3-.

Installing

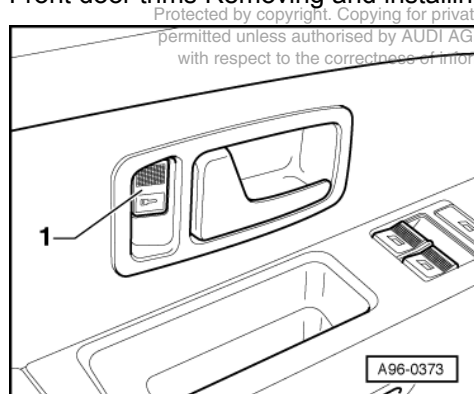
- Installation is carried out in the reverse sequence.

1.11 - Removing and installing interior central locking switch -E150

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove front door trim.

=> General body repairs, Interior; Repair group 70; Front door trims; Removing and installing front door trim
 Front door trims Removing and installing front door trim



- Unplug all electrical connectors and remove door trim.
- -> Use small screwdriver to release catch on side and press switch -1- to front out of door trim.

Installing

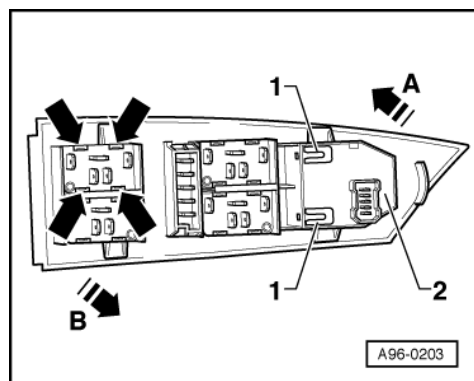
- Installation is carried out in the reverse sequence.

1.12 - Removing and installing mirror adjuster switch

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove upper and lower recessed handle moulding of door trim.

=> General body repairs, Interior; Repair group 70; Front door trims; Removing and installing front door trim
 Front door trims Removing and installing front door trim





- Use plastic wedge to prise out trim for window lifter/mirror adjuster.
- Unplug all connectors from switch.
- -> Move the two catches -1- to the right and at the same time press switch -2- in direction of arrow -A- out of trim.

Installing

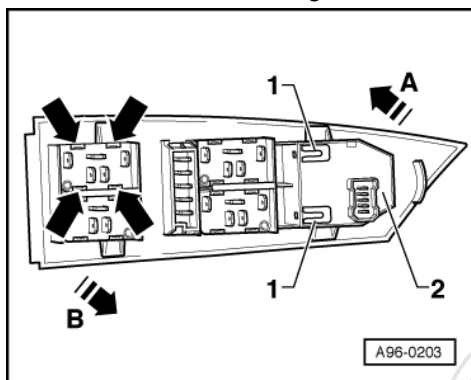
- Install in reverse sequence.

1.13 - Removing and installing front window lifter switches

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove upper and lower recessed handle moulding of door trim.

=> General body repairs, Interior; Repair group 70; Front door trims; Removing and installing front door trim
Front door trims Removing and installing front door trim



- Use plastic wedge to prise out trim for window lifter/mirror adjuster.
- Unplug all connectors from switch.
- -> Use small screwdriver to release the four catches -arrows- on the side and press respective window lifter switch to front in direction of arrow -B- out of trim.

Installing

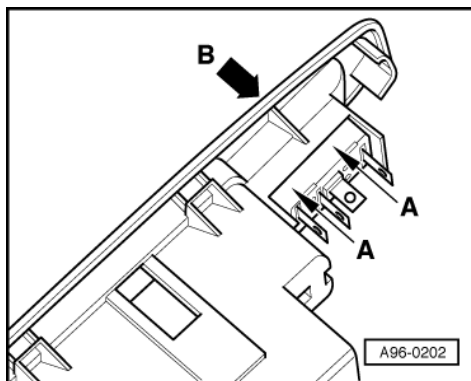
- Install in reverse sequence.

1.14 - Removing and installing rear window lifter switches

Removing

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- Switch off ignition and all electrical consumers and pull out ignition key.
- Lift ashtray insert out of rear door handle trim.
- Use plastic wedge to prise trim half with window lifter switch out of door handle and remove.



- Unplug connector and detach ashtray lighting.
- ➔ Use small screwdriver to release catch -A- on side and at the same time press switch in direction -B- out of trim.

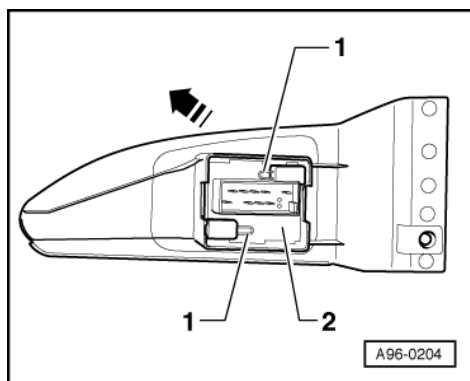
Installing

- Install in reverse sequence.

1.15 - Removing and installing memory operating unit, driver seat -E97

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Unscrew cross-head bolt in driver's door tray and lift out entire switch housing.



- Unplug connector from switch.
- ➔ Release the two catches -1- and at the same time press switch -2- in direction of arrow out of housing.

Installing

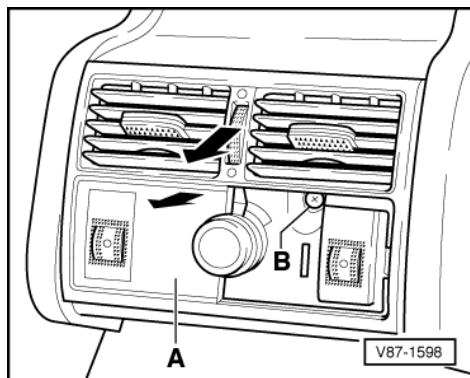
- Installation is carried out in the reverse sequence.

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1.16 - Removing and installing rear seat heating switch

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Pull off fuse -S38 (20 A) on socket 3 of relay and fuse carrier located at the right of the luggage compartment.



- ➔ Carefully prise off trim -A-.
- Unscrew the two cross-head bolts -B- and remove vent.
- Press corresponding switch by hand out of holder from rear through opening.



- Then pull the switch out completely and unplug the connector.

Installing

- Install in reverse sequence.

1.17 - Removing and installing door contact switch

The door contact switch is located in the door lock and cannot be replaced separately in the event of malfunction.

- Removing and installing front door lock

=> General body repairs, Exterior; Repair group 57; Front doors; Removing and installing door locks with mechanical components Front doors Removing and installing door locks with mechanical components

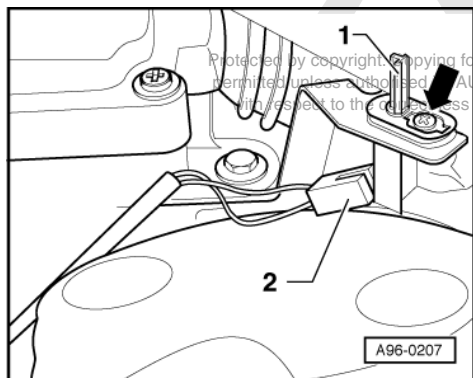
- Removing and installing rear door lock

=> General body repairs, Exterior; Repair group 57; Rear doors; Removing and installing door locks with mechanical components Rear doors Removing and installing door locks with mechanical components

1.18 - Removing and installing bonnet contact switch -F120

Removing

- Switch off ignition and all electrical consumers and pull out ignition key.



- Remove protective sleeve from contact switch.
- -> Unscrew bolt -arrow- at contact switch -1- and remove contact switch.
- Unplug connector -2-.

Installing

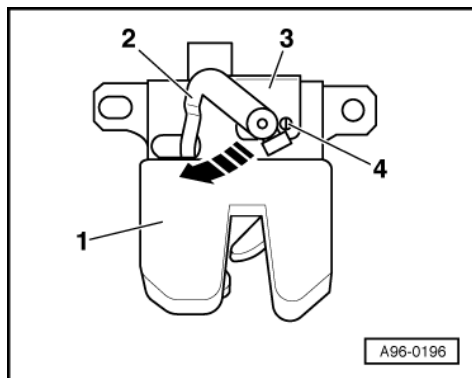
- Installation is carried out in the reverse sequence.

1.19 - Removing and installing boot lid/tailgate contact switch

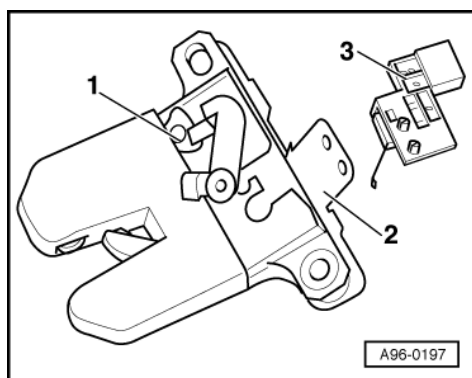
Removing

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove boot lid/tailgate lock

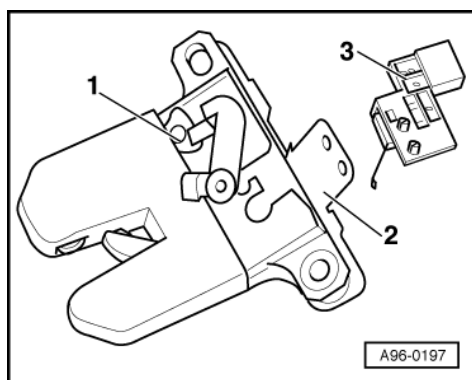
=> General body repairs, Exterior; Repair group 55; Boot lid/tailgate; Removing and installing lock cylinder for boot lock Boot lid/tailgate Removing and installing lock cylinder for boot lock



- Unplug 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 indicated (arrow) and pull back plastic tab -3-.



- -> Carefully remove contact switch -3- from boot lid/tailgate lock -1-.



Installing

- Carefully fit the contact switch in its mounting in the boot lid/tailgate lock.
- Push plastic tab -2- forward into its original position and engage it on the contact switch.
- Push on connector
- Install boot lid/tailgate lock.

=> General body repairs, Exterior; Repair group 55; Boot lid/tailgate; Removing and installing lock cylinder for boot lock. Boot lid/tailgate Removing and installing lock cylinder for boot lock.



2 - Servicing immobilizer

2.1 - Servicing immobilizer

Note:

- ♦ The immobiliser control unit is integrated in the dash panel insert and can only be replaced together with the dash panel insert => Page **56** .

2.2 - Defective transponder and/or lost keys

- ♦ The transponder is integrated in the key.
- ♦ The whole key must be renewed if the transponder is defective or if the key is lost.
- Order the replacement key with integral transponder according to the lock code number.
- Perform adaption of all keys for the vehicle.

=> Electrical System, Self-diagnosis; Repair group 01; Self-diagnosis of immobiliser - Immobiliser II (variable code) Self-diagnosis of immobiliser - Immobiliser II (variable code)

=> Electrical System, Self-diagnosis; Repair group 01; Self-diagnosis of immobiliser - Immobiliser III Self-diagnosis of immobiliser - Immobiliser III

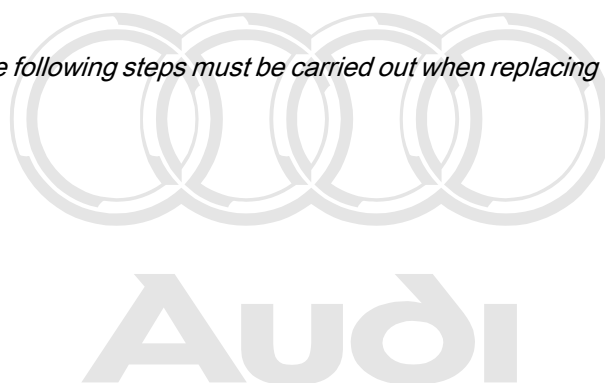
2.3 - Renewing reader coil

- ♦ The reader coil is an integral part of the lock cylinder and cannot be renewed separately.
- ♦ The reader coil must be renewed together with the lock cylinder.
- Order a new lock cylinder with the correct lock code number for the vehicle from Sales Centre or the importer.

2.4 - Procedure when replacing the lock set or the dash panel insert

Note:

To guarantee that the immobilizer can be identified later, the following steps must be carried out when replacing the lock set or the dash panel insert.



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-> 1. Lock set with 2-part sticker

Note:

The sticker on the key tag of the new locking set serves to identify the 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.

2. Immobilizer control unit (integrated in dash panel insert)

For security reasons, the secret number for the immobiliser is encoded. The encoded secret number (PIN = Personal Identification Number) is a 7-digit number.

The PIN can only be used in conjunction with the vehicle diagnostic, testing and information system VAS 5051.

The 7-digit secret number (PIN) must be requested from the responsible sales centre or from the importer, on the basis of the 14-digit identification number of the immobiliser or engine control unit.

The PIN is only valid on the day it is obtained and must be requested again thereafter. The PIN has no validity for the customer or for other dealers.

The PIN has no validity for the customer or for other dealers.

2.5 - Testing the system

- Switch off ignition for at least 5 minutes.
- Cover the reader coil using a metal plate with a slot (for instance by placing a suitable washer over the ignition switch) and insert the ignition key through the slot into the ignition switch.

or

- Disconnect electrical wiring for reader coil at plug connector between ignition/starter switch and immobiliser control unit.
- Start the engine.

The engine should not run and the warning lamp should start flashing.

- Initiate self-diagnosis of immobilizer and interrogate fault memory.

=> Electrical System, Self-diagnosis; Repair group 01; Self-diagnosis of immobiliser - Immobiliser II (variable code) Self-diagnosis of immobiliser - Immobiliser II (variable code)

=> Electrical System, Self-diagnosis; Repair group 01; Self-diagnosis of immobiliser - Immobiliser III Self-diagnosis of immobiliser - Immobiliser III

One of the following two fault messages should appear on the display:

- ◆ Key signal too low or
- ◆ Immobiliser reader coil -D2

-> Indicated on display:

Immobilizer reading spool -D2

- Erase fault memory and end output.

=> Electrical System, Self-diagnosis; Repair group 01; Self-diagnosis of immobiliser - Immobiliser II (variable code) Self-diagnosis of immobiliser - Immobiliser II (variable code)



=> Electrical System, Self-diagnosis; Repair group 01; Self-diagnosis of immobiliser - Immobiliser III Self-diagnosis of immobiliser - Immobiliser III

3 - Servicing interior monitor

3.1 - Servicing interior monitor

3.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

Activate the service mode of the Telematics control unit before disconnecting battery => Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

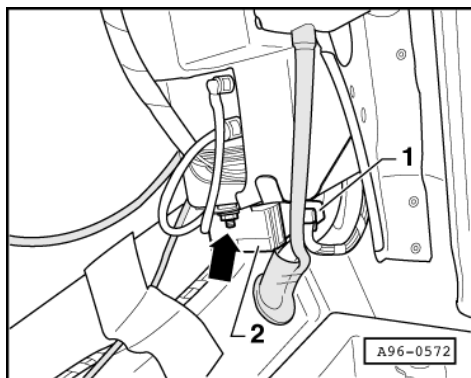
3.3 - Removing and installing control unit for ultrasonic sensors -J347

The control unit is located behind the left luggage compartment side trim.

Removing

- Remove the left luggage compartment side trim.

=> General body repairs, Interior; Repair group 70; Trim; Removing and installing luggage compartment trim
Trim Removing and installing luggage compartment trim



- -> Unplug connector -1-.
- Unscrew securing bolts -arrow- (4 Nm).
- Remove control unit -2-.

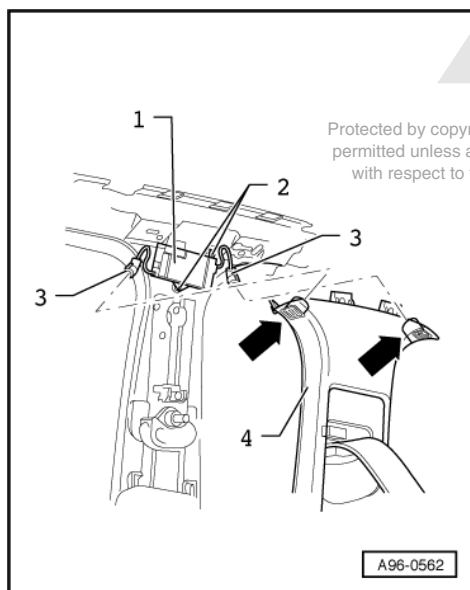
Installing

Installation is performed in the reverse order.

3.4 - Removing and installing ultrasonic sensors -G170/G171

The ultrasonic sensors are installed behind the upper B-pillar trim.

Removing



- Remove upper B-pillar trim.

=> General body repairs, Interior; Repair group 70; Trims gradually fitted from 10.98 (with interior mirror on headlining); Removing and installing upper B-pillar trim Trims gradually fitted from 10.98 (with interior mirror on headlining) Removing and installing upper B-pillar trim

- -> Carefully pull both sensors -3- out of the mountings in the trim -arrows-.
- Unscrew the securing bolts -2- (1.5 Nm).
- Detach the connector and remove the ultrasonic sensor -1-.

Installing

Installation is performed in the reverse order.



4 - Servicing interior lights

4.1 - Servicing interior lights

4.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.
Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

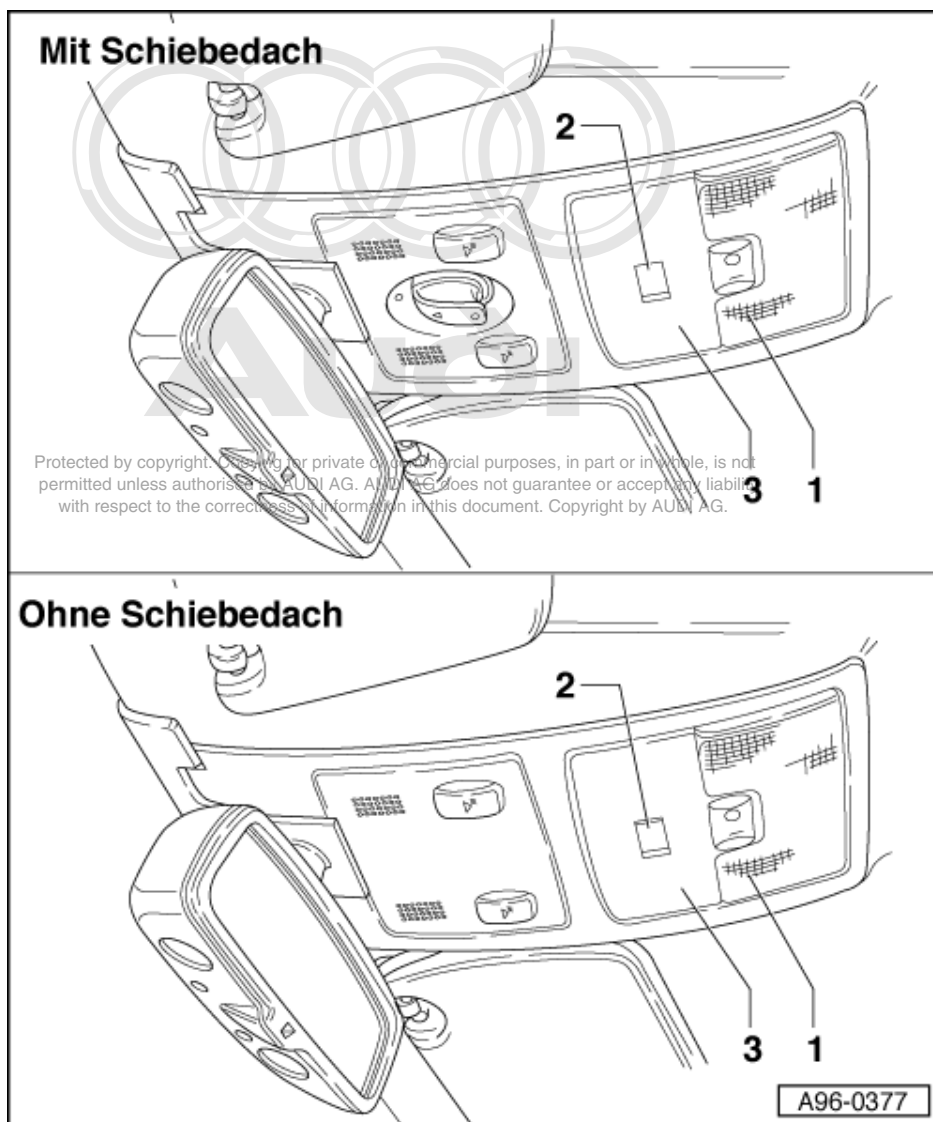
Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

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=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

4.3 - Removing and installing front interior light



Special tools and workshop equipment required

- ◆ Removal wedge VAS 3409

Notes:

- ◆ To change a bulb for the front interior light it is only necessary to lever off lens -1-.
- ◆ Bulb for interior light: 12 V, 10 W.

Removing

- Carefully lever out interior light -3- using VAS 3409.
- Unplug the electrical connectors.

Installing

- Plug in connectors.
- Fit interior light -3- in opening and clip in.

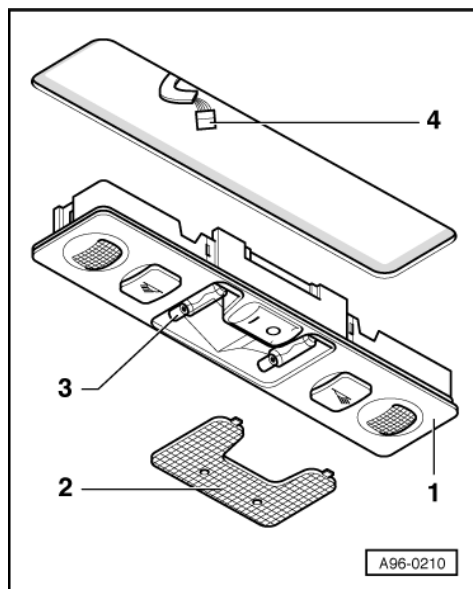


4.4 - Removing and installing rear interior light

Special tools, testers and auxiliary items

- ♦ Plastic filler knife VAS 3409

Notes:



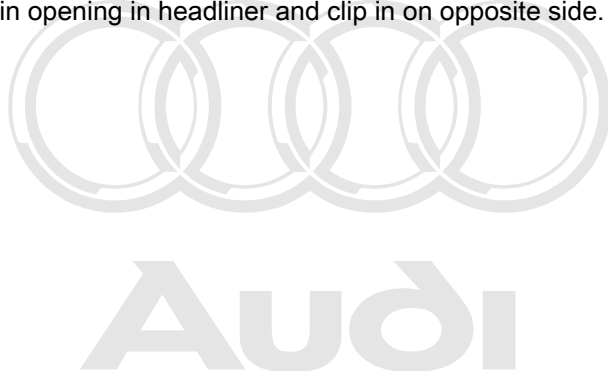
- ♦ -> To change a bulb for the interior light it is only necessary to lever off lens -2-.
- ♦ Bulb -3- for interior light: 12 V, 10 W

Removing

- Carefully lever out interior light -1- using VAS 3409.
- Unplug electrical connector -4-.

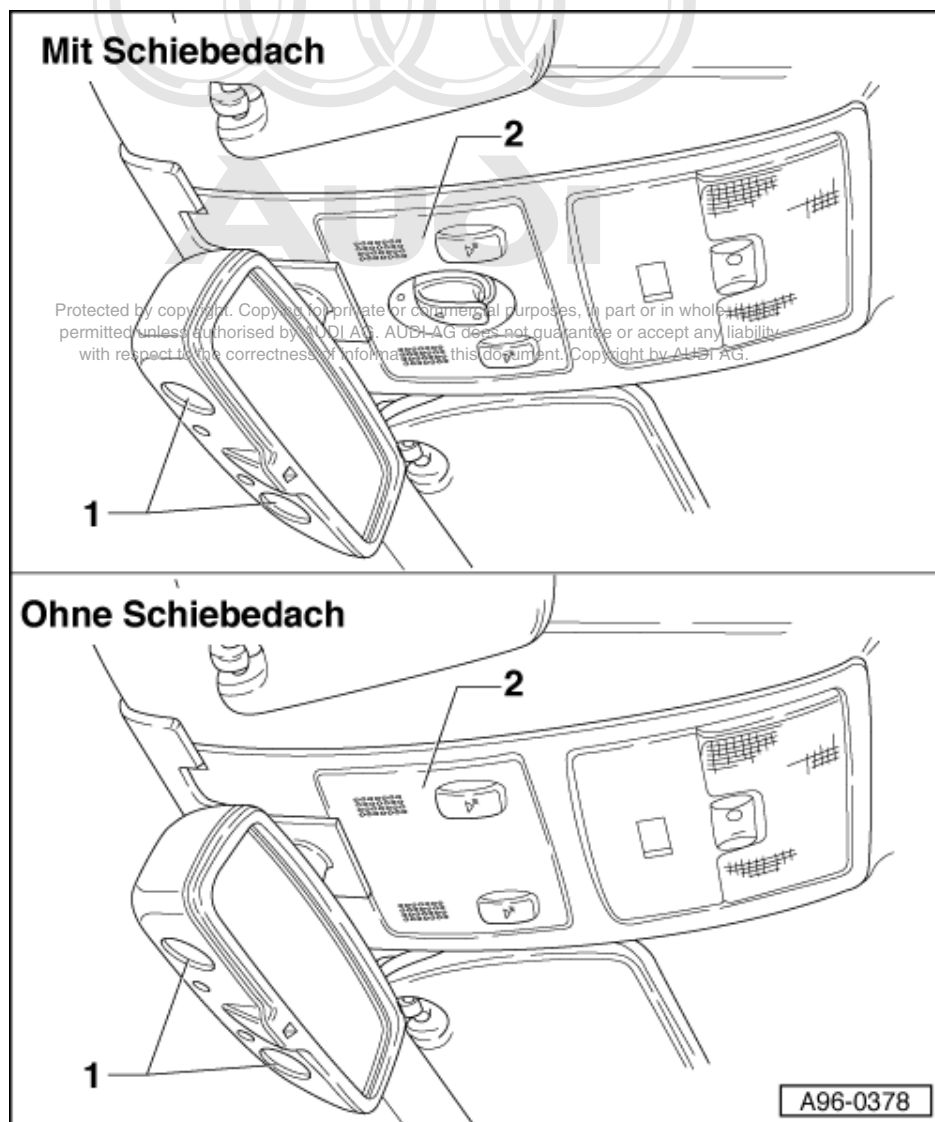
Installing

- Plug in connector -4-.
- Fit interior light -1- in opening in headliner and clip in on opposite side.



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4.5 - Removing and installing front reading light



Special tools and workshop equipment required

- ◆ Removal wedge VAS 3409

Notes:

- ◆ To change a bulb for the reading light it is only necessary to carefully lever off lens -1-.
- ◆ Bulb for reading light: 12 V, 5 W.

Removing

- Carefully lever out interior light -2- using VAS 3409.
- Unplug the electrical connectors.

Installing

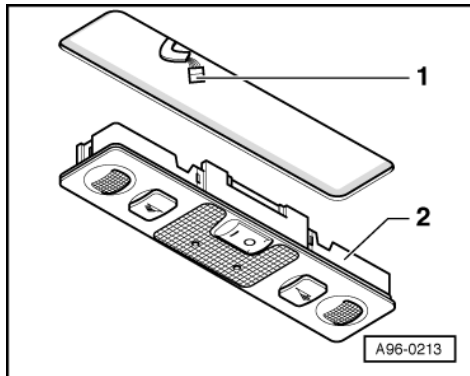
- Plug in connectors.
- Fit interior light -2- in opening and clip in.



4.6 - Removing and installing rear reading light

Special tools, testers and auxiliary items

- ♦ Plastic filler knife VAS 3409

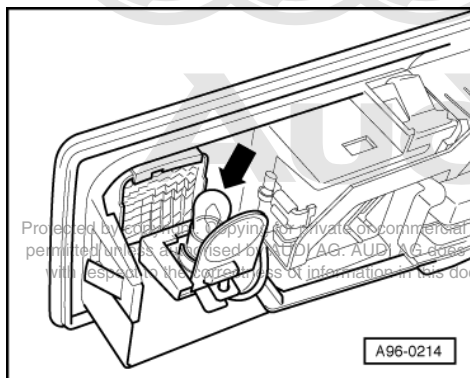


Notes:

- ♦ The rear interior light must be removed in order to change a bulb.
- ♦ Bulb for reading light: 12 V, 5 W

Removing

- -> Carefully lever out interior light -2- using VAS 3409.
- Unplug electrical connector -1-.



- -> Remove reading light bulb -arrow- from its holder on the back of the interior light.

Installing

- Push on connector
- Fit interior light in opening in headliner and clip in on opposite side.

4.7 - Removing and installing light for make-up mirror

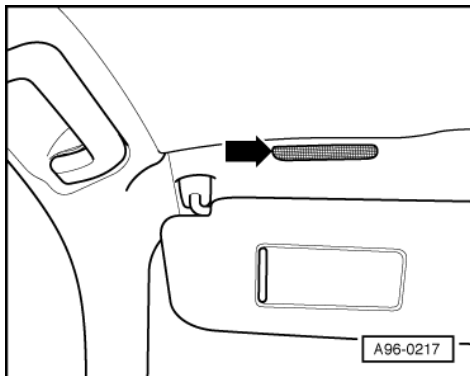
Special tools, testers and auxiliary items

- ♦ Plastic filler knife VAS 3409

Note:

The illustration shows the light for the make-up mirror on the left-hand side. The right-hand side is symmetrically opposite.

Removing



- -> Carefully lever out the light for the make-up mirror using VAS 3409 at the recess provided -arrow-.
- Disconnect connector.
- Fit a new bulb.

Installing

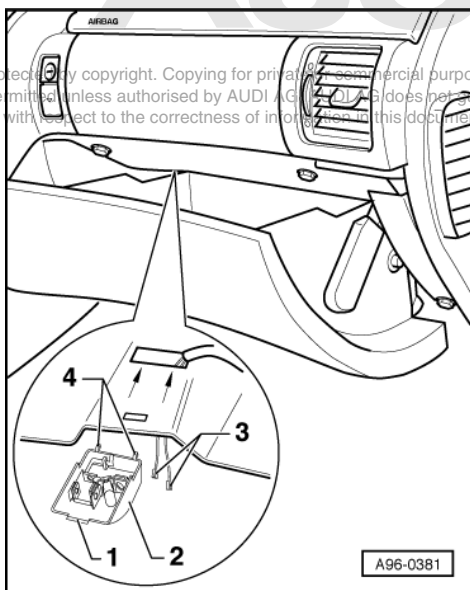
- Install in reverse sequence.

4.8 - Removing and installing glove box light

Special tools, testers and auxiliary items

- ◆ Plastic filler knife VAS 3409

Removing



- -> Using VAS 3409, press in retaining tab -1- and lever out glove box light -2-.
- Unplug electrical connectors -3-.



- Take bulb in glove box light -2- out of bulb holder.

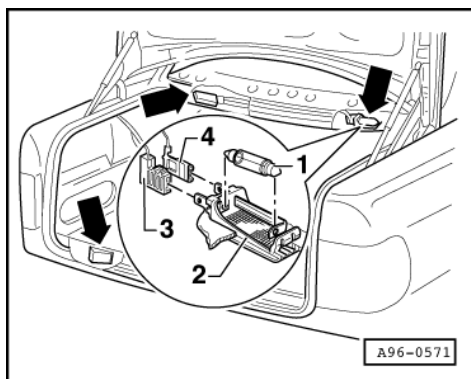
Installing

- First plug in connectors -3-.
- Insert glove box light -2- with the two retainer tabs -4- from underneath in large opening (arrows) and engage on opposite side with -1-.

4.9 - Removing and installing luggage compartment lights

Special tools, testers and auxiliary items

- ♦ Plastic filler knife VAS 3409



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There are two lights at the top of the luggage compartment and one beneath the sill -arrows-.

Removing

- Insert VAS 3409 behind lens of the respective light and carefully lever light -2- out.
- Pull out lens with bulb holder.
- Unplug connectors -3- and -4-.
- Fit a new bulb.

Installing

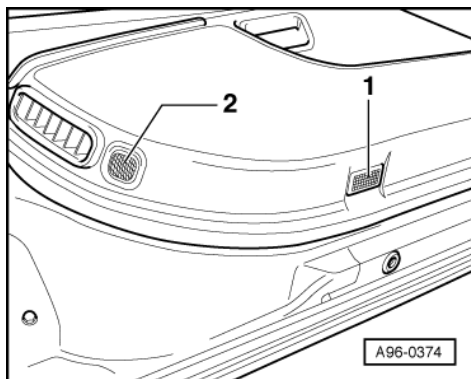
- Insert lens with bulb holder in glove box and clip in.

4.10 - Removing and installing sill courtesy lights and door reflectors

A sill courtesy light -1- and a door reflector -2- are provided in the trim of each door.

Special tools, testers and auxiliary items

- ♦ Plastic filler knife VAS 3409



Removing

- -> Removal and bulb replacement only involves using VAS 3409 to prise lens sideways out of door trim.
- Unclip bulbs from socket.

Installing

- Install in reverse sequence.

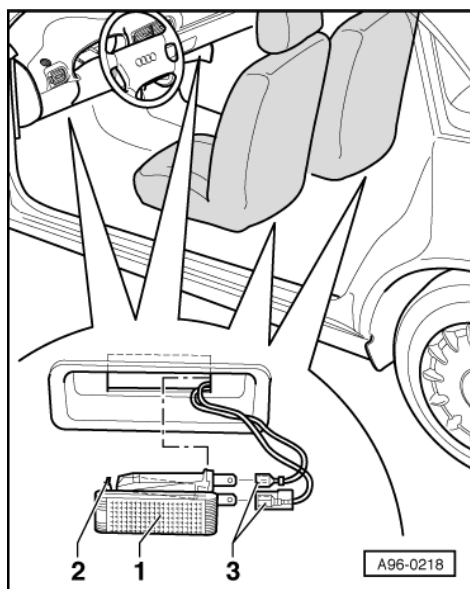
4.11 - Removing and installing footwell lights

Special tools, testers and auxiliary items

- ◆ Plastic filler knife VAS 3409

Notes:

- ◆ The footwell lights must be removed in order to change a bulb.
- ◆ Bulb for footwell light: 12 V, 5 W



Removing

- -> Using VAS 3409, press in retaining tab -2- and lever out footwell light -1-.
- Unplug electrical connectors -3-.
- Remove the bulb from its holder on the back of the footwell light.

Installing

- First plug in connectors -3-.
- Fit footwell light -1- in opening and clip in opposite side.

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5 - Servicing lock cylinder heating

5.1 - Servicing lock cylinder heating

5.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

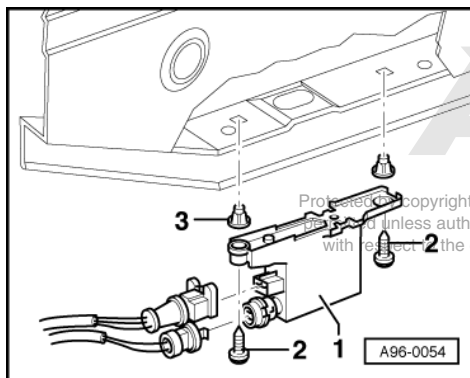
5.3 - Removing and installing control unit for lock cylinder heating

The control unit for the lock cylinder heating is located on the upper side member in the driver's door.

Removing

- Remove door trim.

=> General body repairs, Interior; Repair group 70; Front door trims; Removing and installing front door trim
Front door trims Removing and installing front door trim



- -> Unscrew bolts -2- from nuts -3-.
- Unplug connectors and take off control unit -1-.

Installing

- Install in reverse sequence.

6 - Servicing horn

6.1 - Servicing horn

6.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.
Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

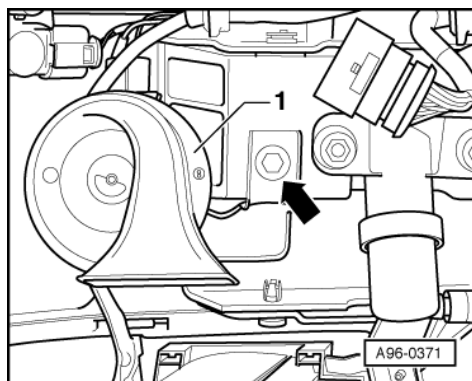
Notes:

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- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ Activate the service mode of the telematics control unit before disconnecting the battery.
- ◆ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

6.3 - Removing and installing horn



Removing

- Remove bumper

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

- -> Unscrew securing nut (12 Nm) -arrow- and detach horn unit -1- from bracket.
- Unplug electrical connector.

Note:

The illustration shows the left-hand horn. The removal of the right-hand horn is symmetrically opposite.

Installing

- Install in reverse sequence.



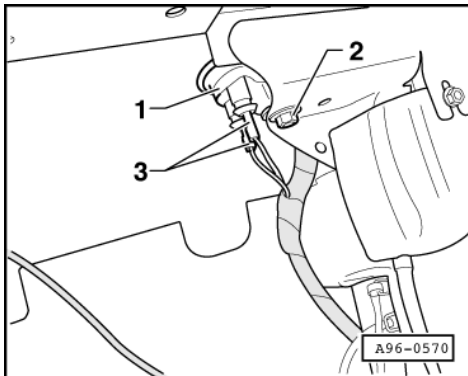
6.4 - Removing and installing horn for anti-theft alarm

The horn for the anti-theft warning system is located on the rear of the left luggage compartment side trim.

Removing

- Remove luggage compartment side trim.

=> General body repairs, Interior; Repair group 70; Trim; Removing and installing luggage compartment trim
Trim Removing and installing luggage compartment trim



- -> Unscrew securing bolt -2- (15 Nm).
- Pull out horn -1- from behind panel.
- Unplug connector -3-.

Installing

Installation is performed in the reverse order.

7 - Heated steering wheel

7.1 - Heated steering wheel

7.2 - Servicing heated steering wheel

The heated steering wheel is available both as standard version and as audio steering wheel.

- Switch off ignition and all electrical consumers and pull out ignition key.
- Remove airbag unit and steering wheel => Page 119 .
- Check wiring according to current flow diagram.

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

Note:

Steering wheel should be replaced if heated steering wheel is defective.

- Installing airbag unit and steering wheel => Page 119 .



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8 - Servicing socket for trailer hitch

8.1 - Servicing socket for trailer hitch

8.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

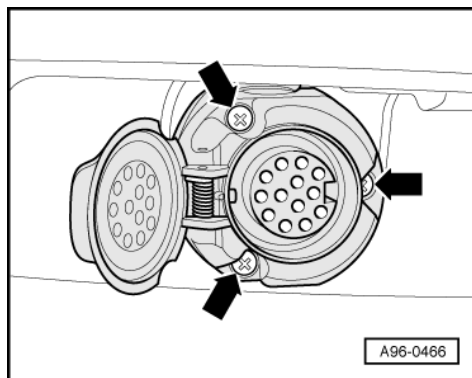
Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ Activate the service mode of the telematics control unit before disconnecting the battery.
- ◆ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated

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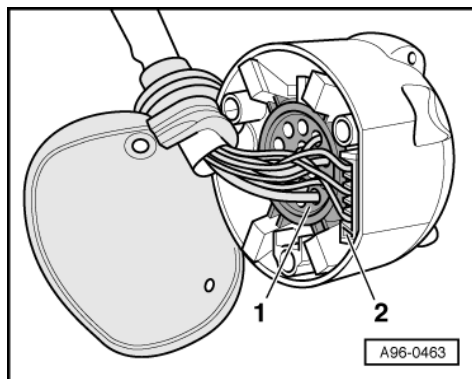
=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

8.3 - Removing and installing trailer hitch socket



Removing

- -> Remove bolts -arrows-.
- Remove the socket from the retaining panel.



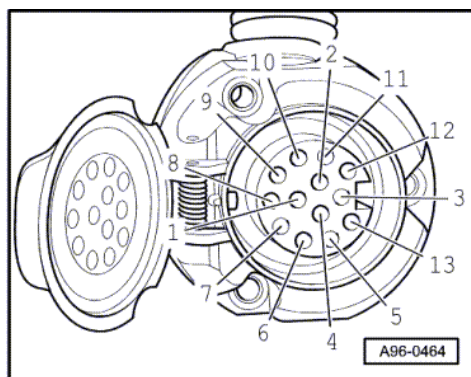


- -> Detach connector -2- for rear fog light cut-out contact switch -F216 and press connector -1- out of the socket.

Installing

Installation is performed in the reverse order.

8.4 - Pin allocation of trailer hitch socket



- 1 - -> Terminal BL (left turn signal)
- 2 - Terminal NSL (rear fog lamp))
- 3 - Terminal 31 (earth)
- 4 - Terminal BR (right turn signal)
- 5 - Terminal 58 R (right tail light)
- 6 - Terminal 54 (brake light)
- 7 - Terminal 58 L (left tail light)
- 8 - Terminal RF (reversing light)
- 9 - Terminal 30 a (battery +)
- 13 - Terminal 31 (earth)



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97 - Wiring

1 - Relay carrier, fuse carrier

1.1 - Relay carrier, fuse carrier

1.2 - General notes

Warning

Before working on the electrical system disconnect the battery earth strap.

Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

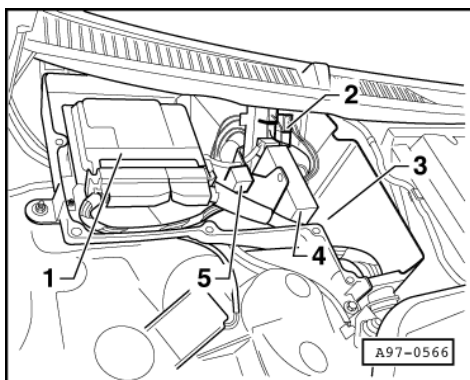
- ♦ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ♦ Activate the service mode of the telematics control unit before disconnecting the battery.
- ♦ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

1.3 - Electronics box in plenum chamber

Removing

- Slacken plenum chamber cover bolts in engine compartment and remove cover.



- Detach cover of electronics box.

- 1 - -> Engine control unit
- 2 - Connector point
- 3 - Automatic gearbox control unit
- 4 - CCS control unit
- 5 - Relay and fuse carrier

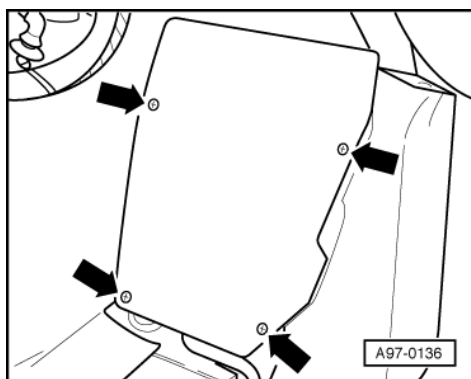
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Installing

- Installation is carried out in the reverse sequence.

1.4 - Electronics box in passenger's footwell

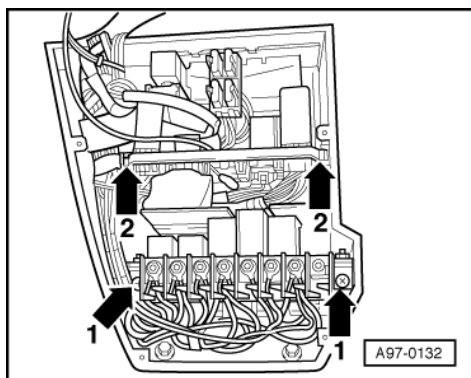
The central electrics unit and an auxiliary relay carrier are integrated into the electronics box in the passenger's footwell.



Removing

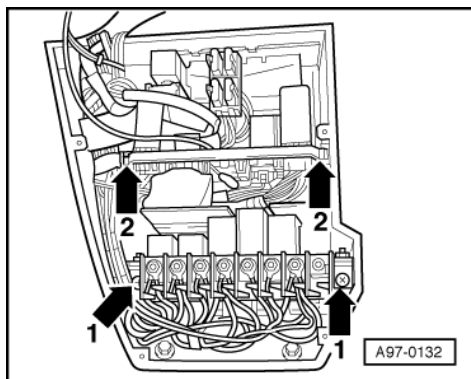
- Remove carpet in passenger's footwell.
- -> Unscrew the four bolts -arrows- (6 Nm) on cover of electronics box and then remove cover.

Removing and installing central electrics unit

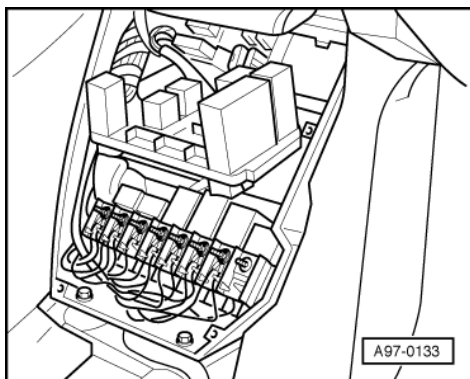


- -> Unscrew the two bolts -1- (3 Nm) and remove central electrics unit.
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Removing and installing auxiliary relay carrier



- -> Push auxiliary relay carrier on left and right out of guide rails -2-.



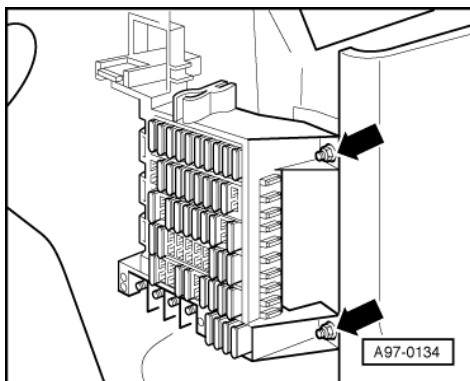
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- -> Remove auxiliary relay carrier from electronics box.

Installing

- Installation is carried out in the reverse sequence.

1.5 - Fuse carrier on right in passenger's footwell



Removing

- Remove cover in passenger's footwell.
- -> Unscrew bolts -arrows- (5 Nm) and then remove fuse carrier.

Installing

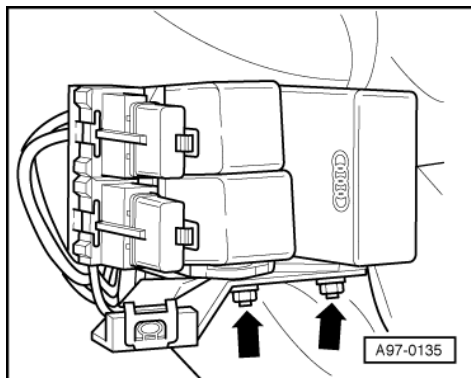
- Installation is carried out in the reverse sequence.

1.6 - Relay carrier below storage compartment on driver's side

Removing

- Remove driver's storage compartment at bottom.

=> General body repairs, Interior; Repair group 68; Storage compartments, covers and trim parts; Removing and installing driver's storage compartment Storage compartments, covers and trim parts Removing and installing driver's storage compartment



- ➔ Unscrew bolts -arrows- (10 Nm) and remove auxiliary relay carrier.

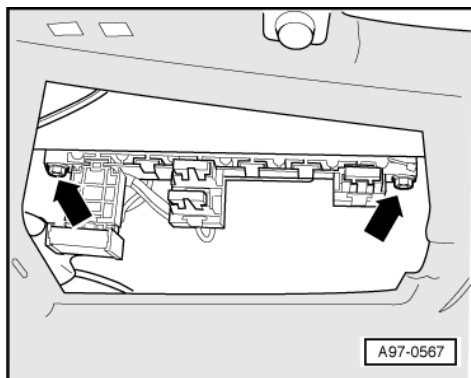
Installing

- Installation is carried out in the reverse sequence.

1.7 - Auxiliary relay carrier at right of luggage compartment

Removing

- Open and remove cover in right luggage compartment side section at bottom.



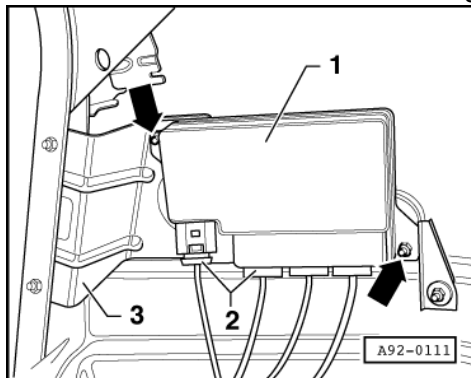
- ➔ Unscrew the two securing nuts -arrows- (4 Nm) and remove relay carrier.

Installing

- Installation is carried out in the reverse sequence.

1.8 - Removing and installing heated windscreen control unit -J505

The control unit is located behind the right-hand luggage compartment side cover.



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Removing

- Open luggage compartment storage box on right side.
- Unplug electrical connections -2-.
- Unscrew nuts -arrows- (10 Nm).
- Remove control unit -1- from bracket -3-.

Installing

- Installation is carried out in the reverse sequence.

2 - Repairing wiring and plug connectors

2.1 - Repairing wiring and plug connectors

2.2 - General notes

Warning

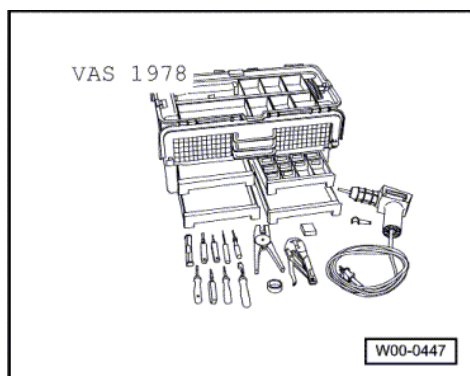
Before working on the electrical system disconnect the battery earth strap.
Activate the service mode of the Telematics control unit before disconnecting battery.=>Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption

Notes:

- ◆ On vehicles with coded radio, obtain anti-theft code before disconnecting battery.
- ◆ Activate the service mode of the telematics control unit before disconnecting the battery.
- ◆ When the battery is reconnected, please ensure that the electrical equipment (radio, clock, electric windows, engine management) is activated as described in the Owner's Manual and the service mode of the Telematics control unit is de-activated.

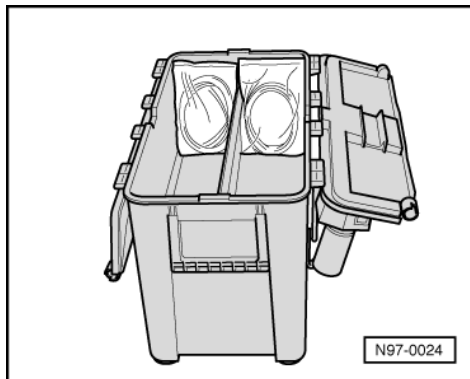
=> Radio, Telephone and Navigation system, Self-diagnosis; Repair group 01; Self-diagnosis of Telematics system; Adaption Self-diagnosis of Telematics system Adaption

2.3 - General notes



Special tools and workshop equipment required

- ◆ Wiring harness repair kit VAS 1978



Note:

Always use repair set VAS 1978 for repairs on wiring harnesses and connectors.

-> Detailed instructions for using VAS 1978 are given in the manual supplied with the repair set.

The manual also gives examples showing how to repair open circuits in wiring and defective plug connectors.

Note:

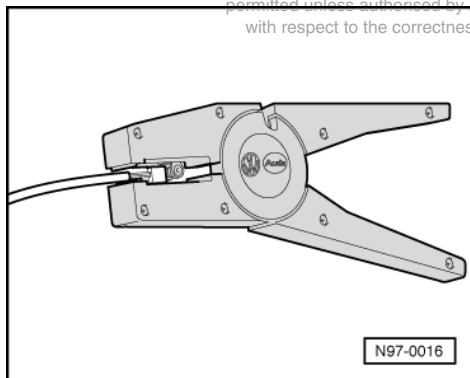
Repairs must not be performed on screened wiring associated with the ABS system.

2.4 - Repairing a 0.35 mm²/0.22mm² wiring connection

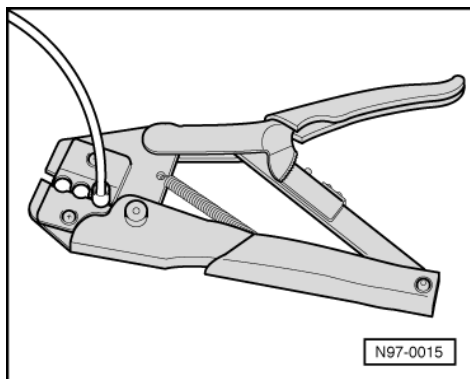
Notes:

- ♦ Repair set VAS 1978 includes repair wires of three different thicknesses (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 mm²/0.22mm² wiring.
- ♦ Perform the repair as follows:

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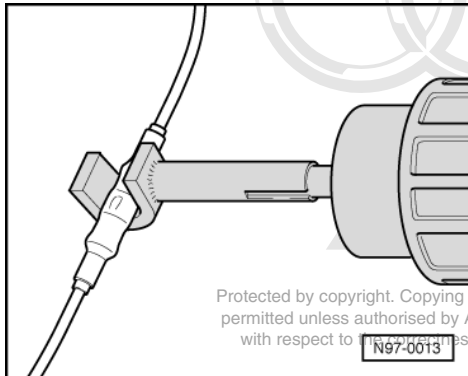


- -> Using wire strippers, strip off the ends of the 0.35 mm²/0.22 mm² wiring so that the length of bare metal is twice as long as the joint required (approx. 12 ... 14 mm).
- Fold back the bare metal to half this length.
- Using wire strippers, strip off the ends of the 0.5 mm² wire (approx. 6 ... 7 mm).



- ➔ Fit crimp connector (No. 111971) on the ends of the wires and crimp on both sides using crimping pliers (VAS 1978/1) with crimp insert (VAS 1978/24).

Do not crimp the insulation on the wires.



- ➔ After crimping the connector, seal it by shrinking with a hot air blower.

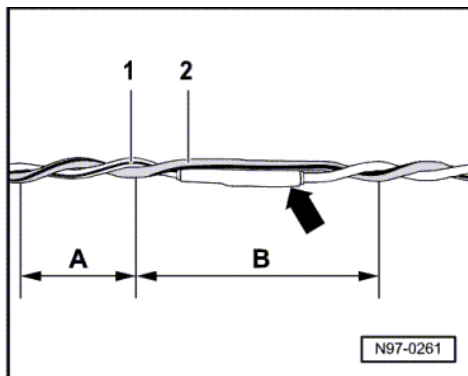
Heat the crimp connector from the centre outwards until it is completely sealed and the adhesive comes out.

Set the hot air blower to the correct temperature (refer to operating manual).

When heating the connector, take care not to damage any other wiring, plastic parts or insulating material with the hot nozzle.

- If the wire was originally taped, wrap it again with yellow insulating tape. If necessary, secure the wiring with new cable ties.

2.5 - Supplementary notes on repair of CAN bus wiring



- ◆ ➔ Unshielded, two-cable wiring -1- and -2- with a cross section of 0.35 mm² or 0.5 mm² is used for the CAN bus wiring.
- ◆ Colour coding of the CAN bus wiring:

Wiring	Colour
CAN high line, drive train	orange/black
CAN high line, convenience	orange/green
CAN high line, display	orange/violet
CAN low line (all)	orange/brown

- ◆ Perform wiring harness repairs only with yellow wires. Mark repair locations with yellow tape.
- ◆ When repairs are performed, both bus wires must have the same length. When the wires -1- and -2- are twisted, the length of each complete twist must be 20 mm (A).



- ♦ No part of the wiring, e.g. in the vicinity of heat-shrink sleeves -arrow-, may be left straight (i.e. without twisting) over a length greater than 50 mm (B).

2.6 - Safety precautions when repairing wiring and plug connectors

Caution

- ♦ **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.).**
- ♦ **Additional information (e.g. for removing and installing components) is listed in the relevant Workshop Manual).**
- ♦ **Only use yellow wires for repairs on wiring harness.**
- ♦ **A yellow wire or a section of wiring wrapped with yellow insulating tape always indicates a previous repair.**
- ♦ **Repairs may not be performed on wiring associated with screened leads (such as wiring for speed senders or knock sensors).**

Caution

- ♦ **Repairs may not be performed on wiring associated with the individual airbag components.**
- ♦ **For safety reasons the relevant airbag components must be replaced if wiring or connectors on the airbag components are damaged.**
- ♦ **Perform repairs only on the airbag wiring harness in the vehicle using wiring harness repair set VAS 1978 and genuine replacement parts (connector housings, contacts) to ensure that the repair standards set by the AUDI AG are maintained.**
- ♦ **The repair work should be recorded in the Audi Service Schedule in**
- ♦ **No warranty claims will be accepted by the AUDI AG if repairs are performed on the airbag wiring harness without using genuine replacement parts and wiring harness repair set VAS 1978.**

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2.7 - Replacement of aerial wires

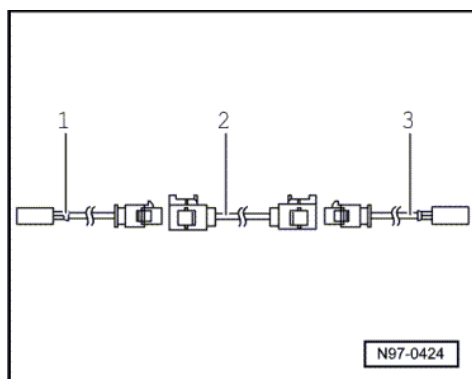
A new repair procedure has been developed for repairing aerial wires (antenna wires). Instead of a complete aerial wire, various adapter wires and connecting wires in different lengths are now available.

The spare parts are listed in the electronic parts catalogue (ETKA): Special catalogue; Electrical connections; Genuine accessories; Sub-group 35 from picture table 035-20.

Notes:

- ♦ Repairs must not be performed on aerial wiring. The wiring must be replaced using the connecting and adapter wires supplied as genuine spare parts.
- ♦ These genuine spare parts are designed for the replacement of all types of aerial wiring and all wiring cross-sections.
- ♦ There is no provision for the replacement of individual defective aerial connectors when carrying out repairs.
- ♦ The replacement wires can be used for all previously fitted aerial wiring cross-sections on all Audi models.
- ♦ All adapters and connector wiring are suited for the full range of transmitter and receiver signals.
- ♦ The repair method can also be used for test purposes and retrofit installations.

2.8 - Assembly overview for an aerial wire



Example:

Aerial wire is defective between radio and aerial.

The wires listed below are required for the repair work:

- 1 - -> Adapter wire, for connection to radio
length: approx. 30 cm
 - 2 - Connection wire
supplied in different lengths
 - 3 - Adapter wire, for connection to aerial
length: approx. 30 cm
- Detach the connectors for the defective aerial wiring from the components.
 - Follow the routing of the defective aerial wiring in the vehicle and measure the full length of the aerial connection in the vehicle to be replaced.
 - The full length of the aerial connection is calculated from the length of the required adapter wiring -1- and -3- plus the connection wiring -2-.
 - Deduct 60 cm from the full length of the aerial connection to obtain the length of the required connection wire.
 - Order the required adapter wires and the connection wire of the calculated length as genuine spare parts according to the parts list.
 - Cut off the connectors of the defective aerial wire.
 - The remnant of the defective aerial wire remains in the vehicle.
 - Connect the adapter wires to the components in the vehicle.
 - Apply a piece of foam plastic hose to the connections to avoid rattling noises.
 - Route and fit the connection wire parallel to the previous aerial wire.

Note:

Aerial wires must not be kinked or excessively bent. The bending radius should not be less than 50 mm.

- Attach the connector wire to the adapter wires.
- Test operation.

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