Description of work

Turbocharger, lubricate servo-motor linkage

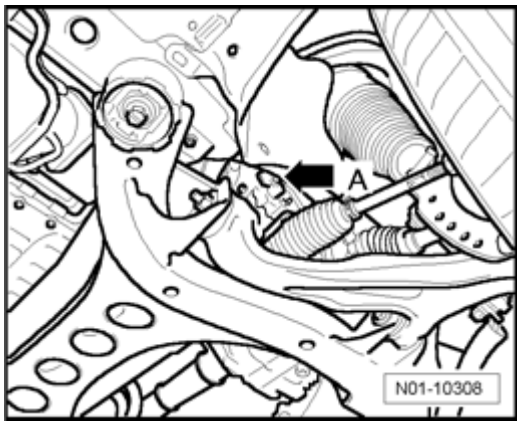
Lubricating the servo-motor linkage applies to:

1. - The Turbocharger (TC) 1 Servo-Motor V280 for cylinder bank 1 (right engine side).

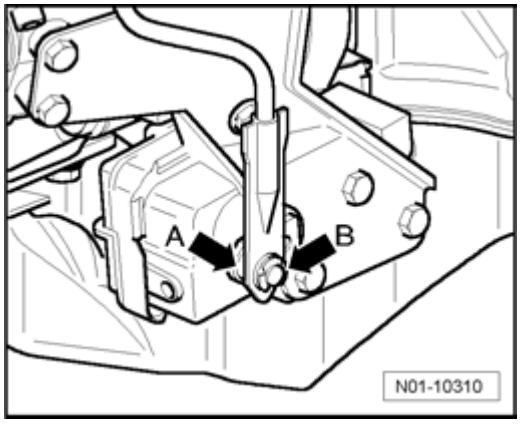
2. - The Turbocharger (TC) 2 Servo-Motor V281 for cylinder bank 2 (left engine side).

- Remove engine cover (Lower) (noise insulation) ⇒ 01-4, Lower engine cover (noise insulation tray), removing and installing .

1. Lubricating linkage: Turbocharger (TC) 1 Servo-Motor V280 -right engine side-



Installed location: Wheel housing, front right, above the steering boot, between the front longitudinal member and engine block **- arrow A -** .



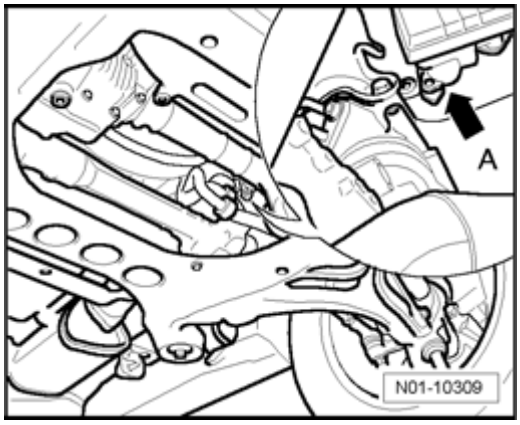
- Lubricate the pivot of the servo motor shaft and linkage **- arrows A -** and **- B -** by hand.

Only use Hot Bolt Paste G 052 112 A3 .

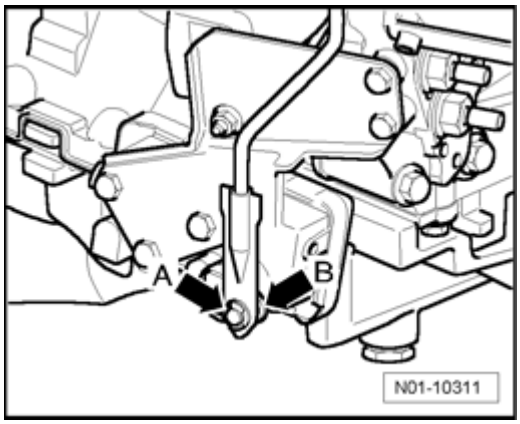
Note:

- *Part numbers are for reference only. Always check with your Parts Department for the latest part number information*

2. Lubricate linkage: Turbocharger (TC) 2 Servo-Motor V281 -left engine side-



Installed location: Front left, between the steering and housing of front final drive, above the coolant hoses **- arrow A -** .



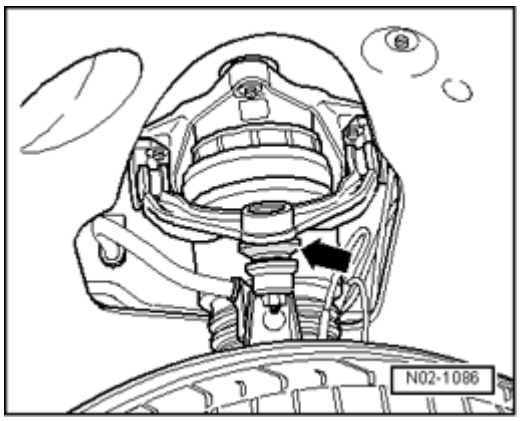
- Lubricate the pivot of the servo motor shaft and linkage **- arrows A -** and **- B -** by hand.

Only use Hot Bolt Paste G 052 112 A3 .

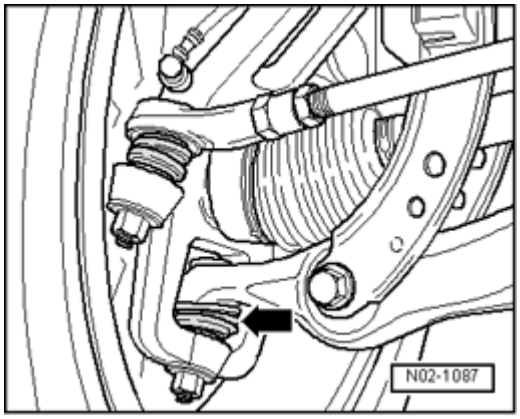
Note:

- *Part numbers are for reference only. Always check with your Parts Department for the latest part number information*

Ball joints, visual inspection



- Check joint boots **- arrow -** of upper ball joints for leaks and damage.



- Check joint boots **- arrow -** of lower ball joints for leaks and damage.

Automatic transmission, ATF level, checking

- Work procedure:

⇒ *Repair Manual, 6 Spd. Automatic Transmission 09D All Wheel Drive, Repair Group 37,*

Battery disconnect relay, removing

- The battery disconnect relay protects the battery from discharging through unnecessary electrical components while transporting from manufacturing factory to dealer.

- The battery disconnect relay must be removed during the delivery inspection.

- Collect the removed battery disconnect relays and

send them back to the manufacturer.

Work procedure:

The battery disconnect relay is located in the footwell, in front of the driver seat.

The battery disconnect relay is fastened to the ground connection for the battery negative terminal, in front of the driver seat.

Note:

- *The battery under the driver seat is equipped with a battery isolation system. Observe safety measures when working on battery isolation system, removing and installing battery disconnect relay*

⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

.

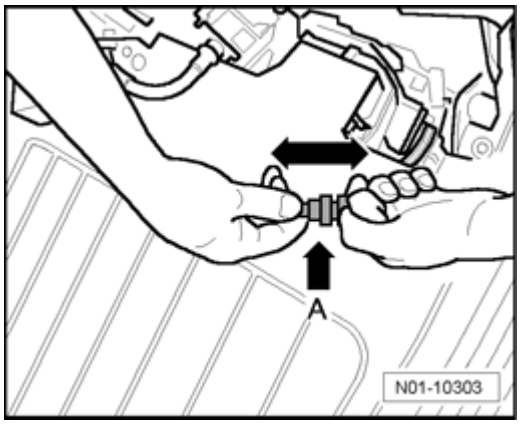
- Switch off ignition and all electrical components and remove ignition key.

If the trim under the driver seat has not yet been removed:

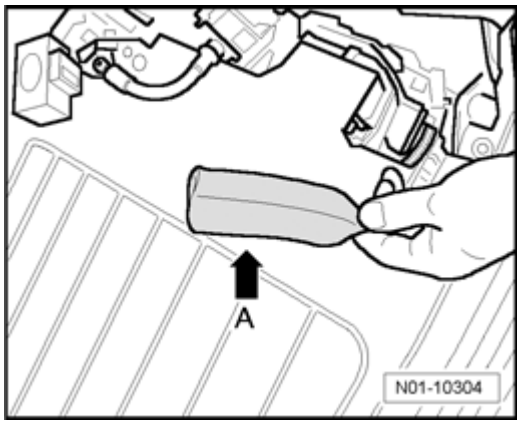
- Remove trim under drivers seat in order to disconnect battery

⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

.

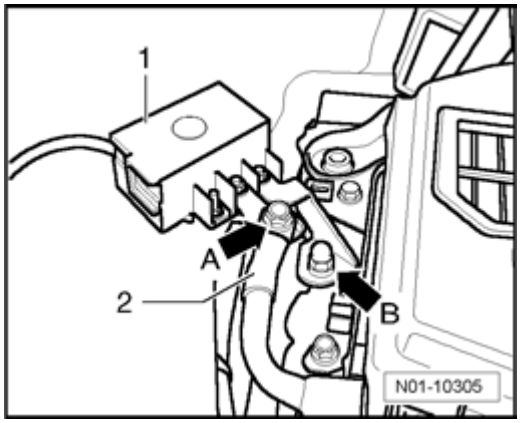


- Disconnect the connection **- A -** from the relay cable.

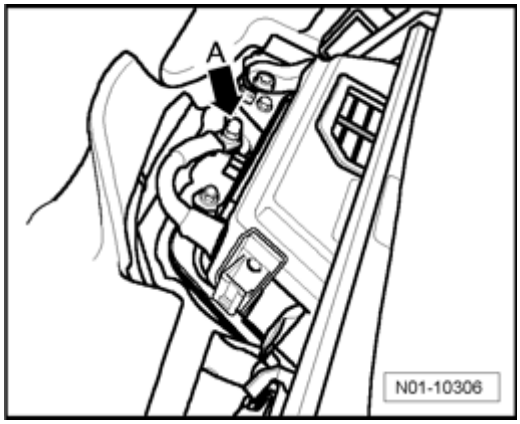


- Pull a foam covering **- A -** over the connection of the relay cable.

- Secure the foam covering with adhesive tape.



- Unfasten the ground cable **- 2 -** from the battery disconnect relay **- 1 -** .



- Unfasten the battery disconnect relay retainer from the ground connection **- B -** .

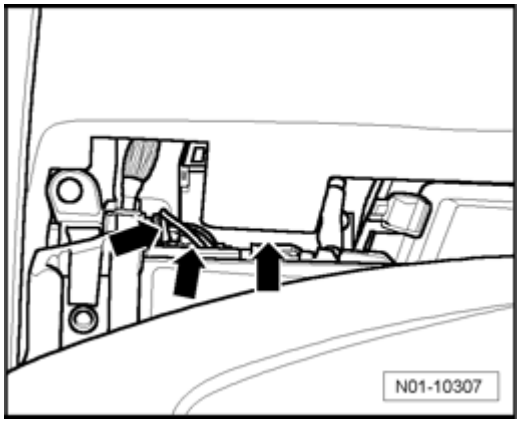
- Set the ground cable onto the ground connection **- A -** and fasten the ground connection to 20 Nm.

Note:

- *Once the ground cable for the battery is reconnected:*

⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

.



- Route the connector with relay cable, to the indicated point **- arrows -** .

- Reinstall the trim under the driver seat.

Observe the work steps after connecting the battery,

⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

.

- Perform a vehicle system test ⇒ 01-4, Vehicle system test, perform .

Battery, check battery terminals for secure seating

There are two different battery concepts with this vehicle:

Battery concepts

⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

.

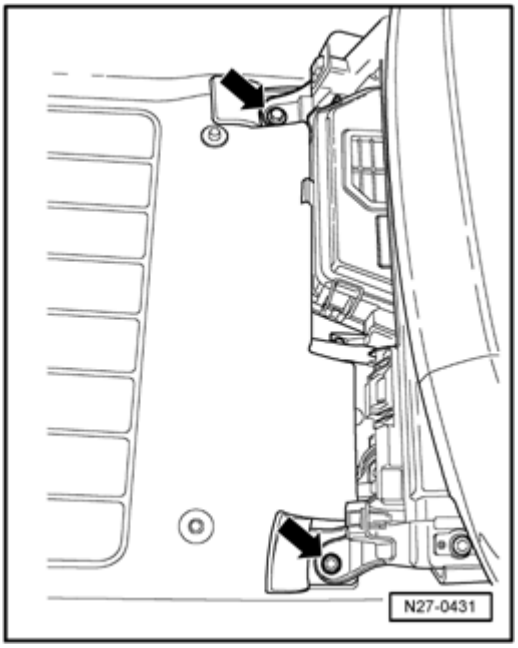
Battery under front left seat: Check battery terminals for secure seating

- Switch off ignition and all electrical components and

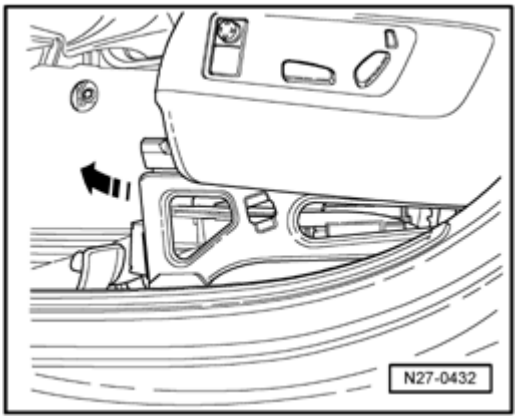
remove ignition key.

After waiting 60 seconds:

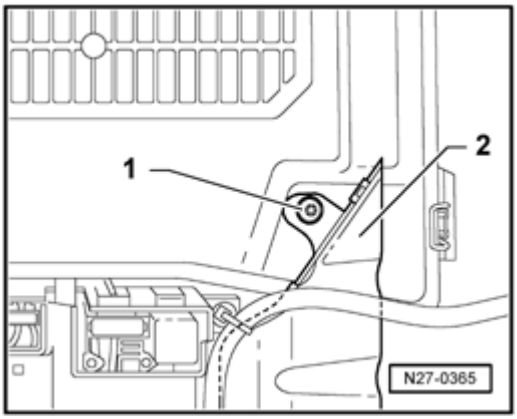
- Remove front and side trim on front left seat frame.
- Remove seat spindle covers.
- Remove seat slide rail cover caps.



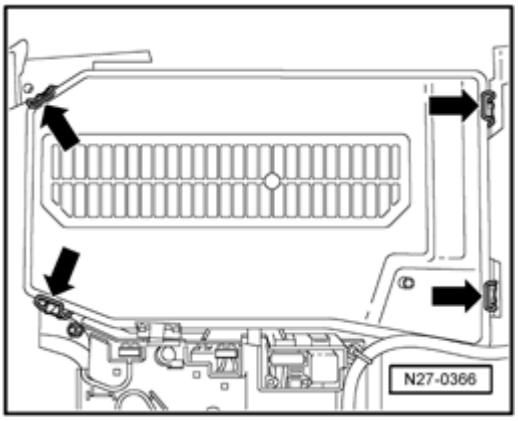
- Remove bolts **- arrows -** .



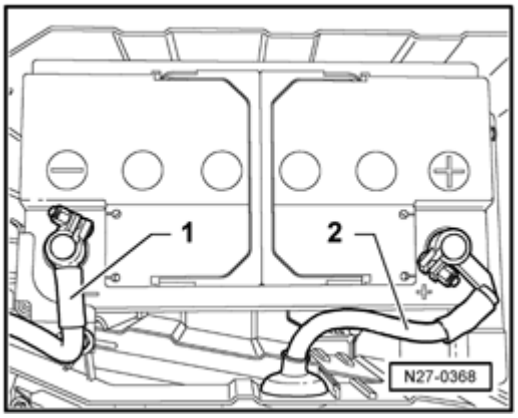
- Tilt seat frame and seat to rear **- arrow -** .



- Remove bolt - **1** - and remove air duct - **2** - .



- Open battery box clips - **arrows** - and remove cover.



- Check battery terminal clamps are seated securely on the battery terminals by moving the battery positive wire - **2** - and the battery Ground (GND) wire - **1** - back and forth by hand.

Warning!

If the battery clamp is not seated securely on the positive terminal, disconnect battery Ground (GND) clamp on battery negative terminal first, to prevent possible accidents.

If the battery clamp on positive terminal is not seated securely:

The following procedure must be strictly followed!

Battery under front left seat: Disconnecting

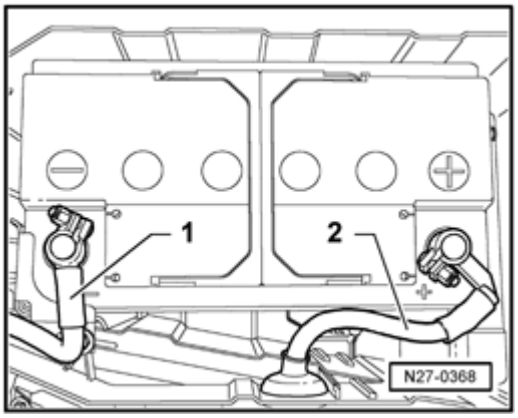
Warning!

To increase crash safety, the battery under front left seat is equipped with a battery isolator. In an accident, the airbag control module triggers a charge disconnecting the voltage supply wire to the starter. Battery isolation is performed pyrotechnically, with a very small explosive charge. To avoid accidentally triggering the charge when working on the battery or the battery isolator, you must absolutely first disconnect the battery Ground (GND) on the negative terminal of the battery.

Note:

- *The battery under the front left seat is equipped with a battery isolation system. Observe safety precautions when working on the battery isolation system*

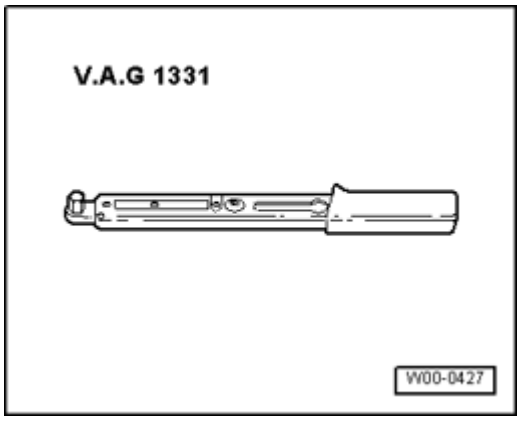
  ⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*



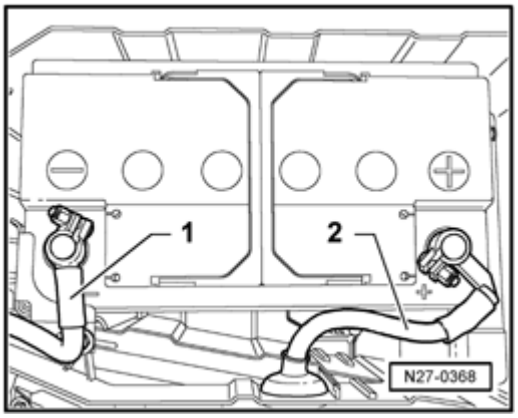
- Disconnect battery Ground (GND) wire **- 1 -** from battery Ground (GND) terminal.

Battery under front left seat: Connecting

Special tools, testers and auxiliary items required



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

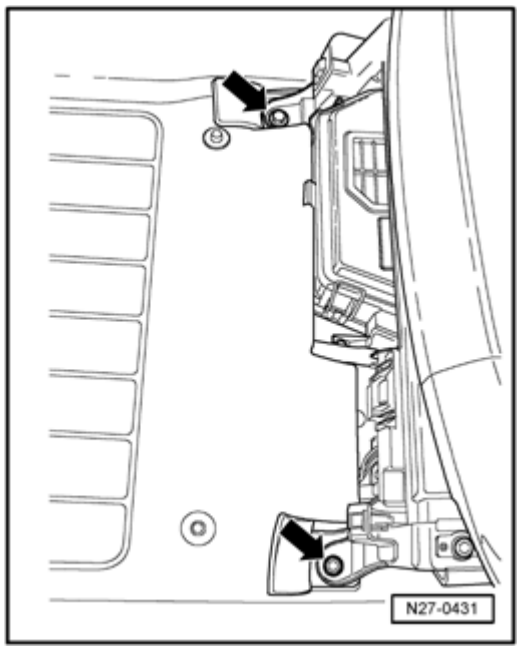


- Tighten securing bolt of battery positive terminal clamp to 9 Nm.

- Only after securing positive terminal clamp **- 2 -** , connect negative wire **- 1 -** terminal clamp to negative terminal on battery.

- Tighten securing bolt of battery negative terminal clamp to 9 Nm.

- Reinstall cover.



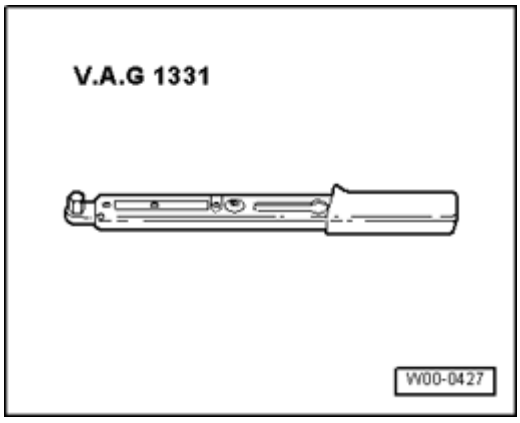
- Replace seat frame mounting bolts **- arrows -** and tighten them to a torque of 45 Nm.

Note:

- *Once the battery is reconnected:*

⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

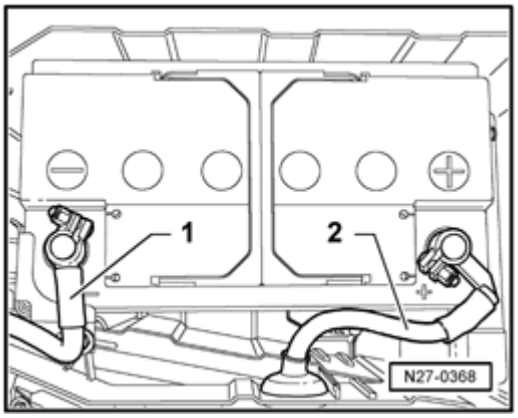
If the battery clamp on negative terminal is not seated securely:



Battery under front left seat: Tightening battery terminal on negative terminal

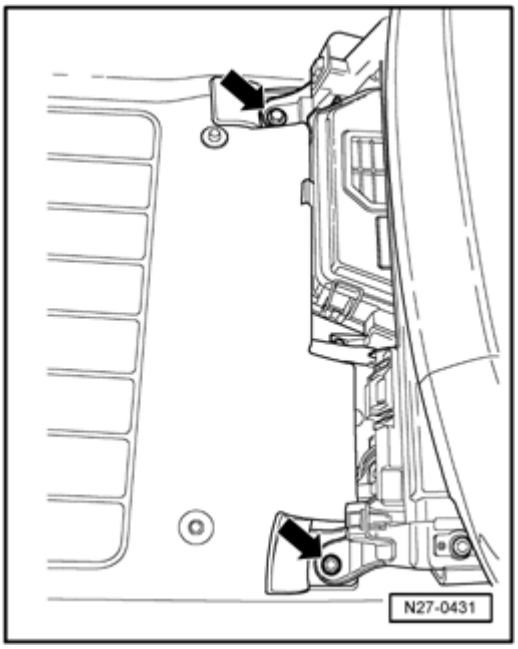
Special tools, testers and auxiliary items required

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



- Tighten ground connection **- 1 -** on battery to 9 Nm.

- Reinstall cover.



- Replace seat frame mounting bolts **- arrows -** and tighten them to a torque of 45 Nm.

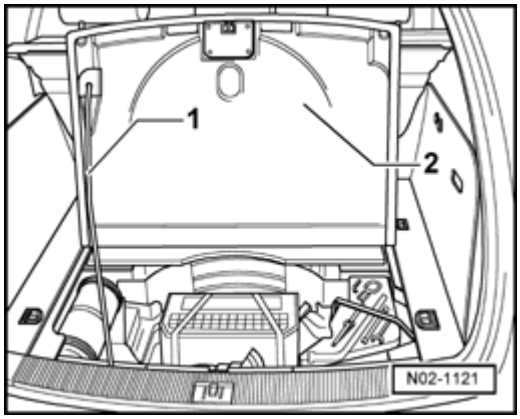
Note:

- *Once the battery is reconnected:*

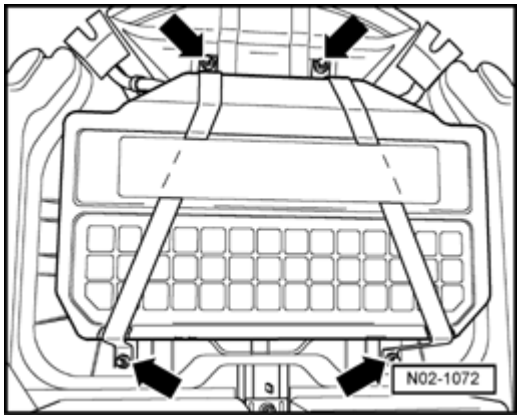
⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

Second battery in luggage compartment: Check battery terminals for secure seating

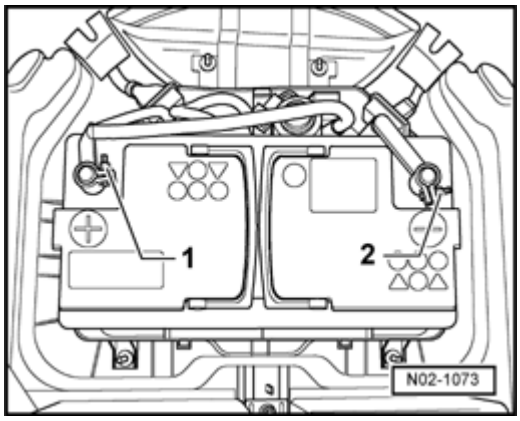
Perform the following work procedure:



- Open luggage compartment floor cover **- 2 -** and secure with prop rod **- 1 -** .



- Remove retaining strap anchors **- arrows -** and remove battery cover along with retaining straps.



- Check battery terminal clamps are seated securely on the battery terminals by moving the battery positive wire **- 1 -** and the battery Ground (GND) wire **- 2 -** back and forth by hand.

Warning!

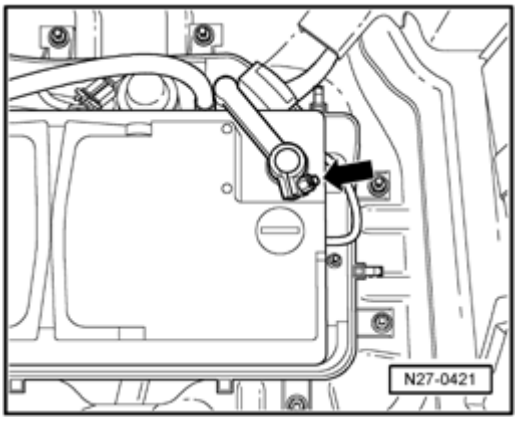
If the battery clamp is not seated securely on the positive terminal, disconnect battery Ground (GND) clamp on battery negative terminal first, to prevent

possible accidents.

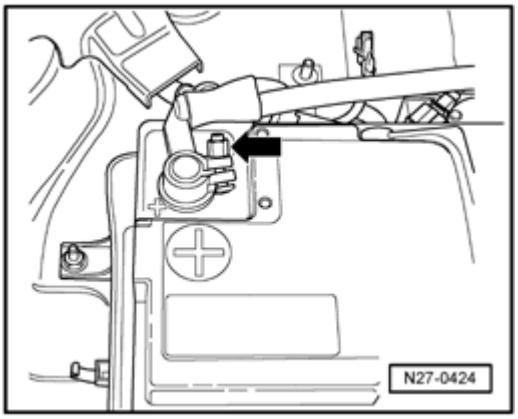
Note:

- *The following procedure must be strictly followed!*
- *If the sequence is not adhered to the pyrotechnical isolation system for the battery may trigger which may damage electrical components in the vehicle.*

If the battery clamp on positive terminal is not seated securely:



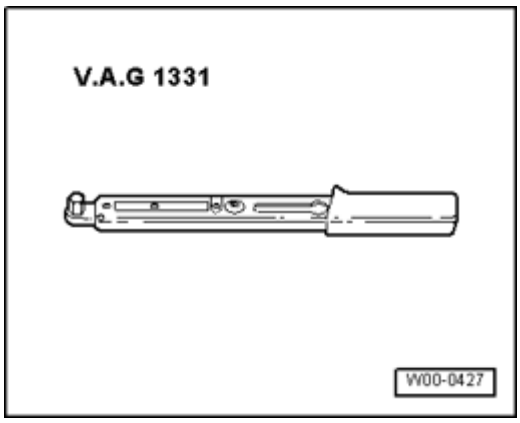
- Disconnect battery ground (GND) strap **- arrow -** at negative terminal first.



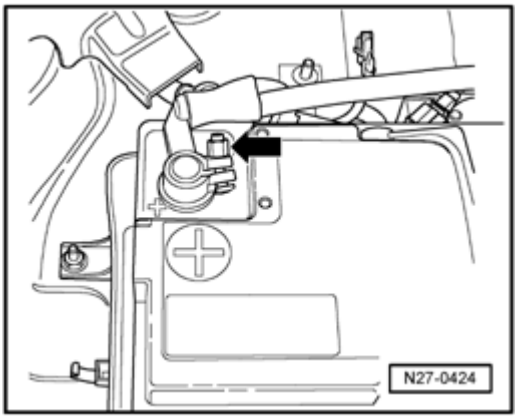
- Then disconnect the battery positive cable **- arrow -** at battery positive terminal.

Second battery in luggage compartment: Connecting

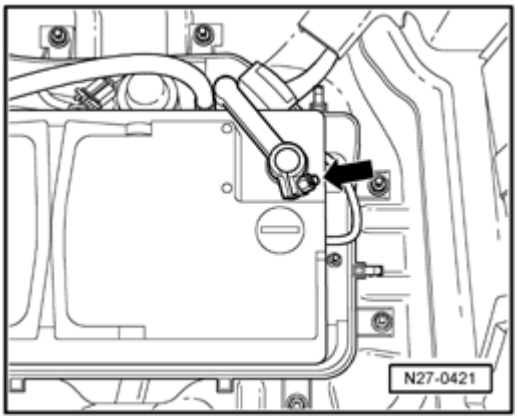
Special tools, testers and auxiliary items required



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



- Tighten mounting bolt of battery positive terminal clamp **- arrow -** to 9 Nm.



- Only after securing positive terminal clamp, fit negative terminal clamp **- arrow -** to negative terminal on battery.

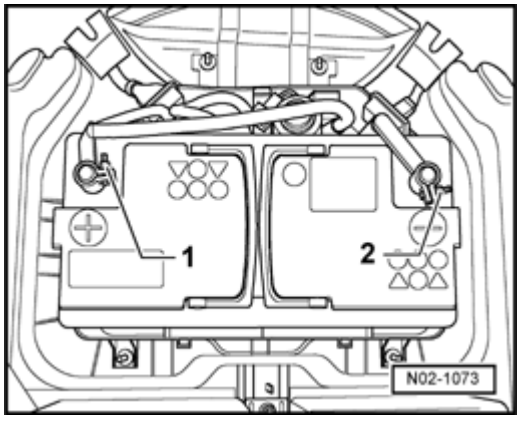
- Tighten mounting bolt of battery negative terminal clamp **- arrow -** to 9 Nm.

Note:

- *Once the battery is reconnected:*

⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

If the battery clamp on negative terminal is not seated securely:



- Tighten ground connection **- 2 -** on battery to 9 Nm.
- Re-install battery cover.
- Close cover in luggage compartment floor.

Note:

- *Once the battery is reconnected:*

⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

Batteries, check

- Check the battery

⇒ *Repair Manual, Electrical Equipment, Repair Group 27,*

.

Check tires, tire condition, wear pattern, inflation pressure and tread depth

Note:

- *On vehicles with tire pressure monitor system (TPMS), the new tire pressures must be adapted* ⇒

01-4, Storing tire pressure values .

Warning!

- ***For reasons of safety only tires of same type and tread pattern should be installed on a vehicle!***

- ***On All Wheel Drive vehicle tires of the same type and tread pattern must be used. Otherwise the center differential may be damaged.***

Tire condition, checking

At the delivery inspection:

- Check tire tread and side walls for damage, if necessary remove any foreign material, such as nails or screws.

Warning!

If damage is discovered, the tire must be examined to determine whether a new one must be installed.

Inspection Service:

- Check tire tread and side walls for damage, if necessary remove any foreign material, such as nails or screws.

- Check tires for scuffing, one sided wear, porous side walls, cuts and fractures.

Warning!

The customer must be informed of malfunctions found.

Checking tire wear pattern

Note:

- *The wear pattern of the front wheels can be used to assess whether a check of the track and camber is necessary:*

Causes

- Feathered edges of the treads may indicate faulty toe adjustment.

- One-sided tread wear is mainly attributed to incorrect camber.

- When wear of this nature is noticed determine cause by performing alignment checks (repair measure).

Depth of tire tread, checking (including spare wheel):

- Check tire tread depth

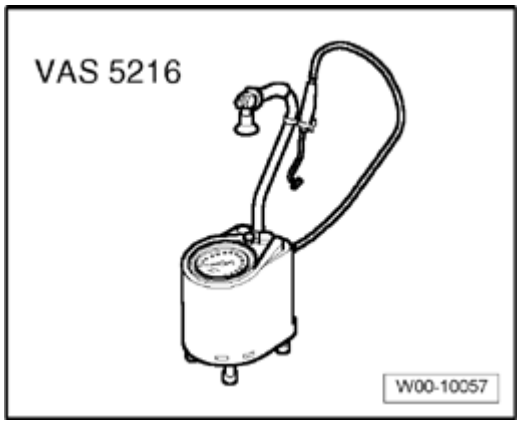
Minimum depth: 1.6 mm

Note:

- *This value may vary for individual countries due to different legislative regulations.*
- *The minimum tread depth is reached when the tires have worn down level with the 1.6 mm high tread wear indicators positioned at intervals around the tire.*
- *If the tread depth is approaching the legal minimum permissible depth, the customer must be informed.*

Tire pressure, check, if necessary correct

Special tools, testers and auxiliary items required



- Tire filling unit VAS 5216

Note:

- *Observe that the inflation pressure specifications refer to the air pressure of cold tires. Do not reduce increased pressures on warm tires.*
- *Important information about recommended winter tires can be found in*

⇒ *Repair Manual, Wheels, tires guide, Repair Group 44,*

.

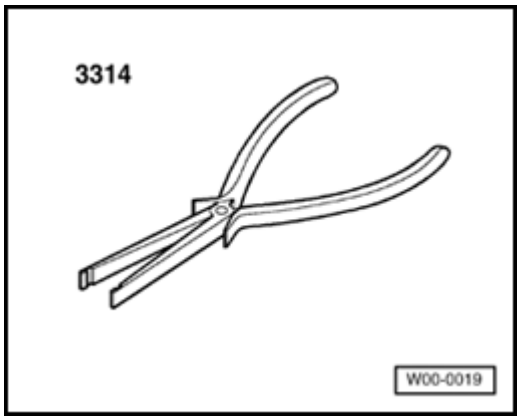
- *Inflation pressure specifications can be found on a sticker located on the driver door at the door jamb.*
- Pressures are indicated in "BAR and PSI" !
- Pressures apply to all factory-installed mounted tire sizes!

- Check the tire size used on the vehicle with the sizes in the table and correct tire pressure regardless of engine type.

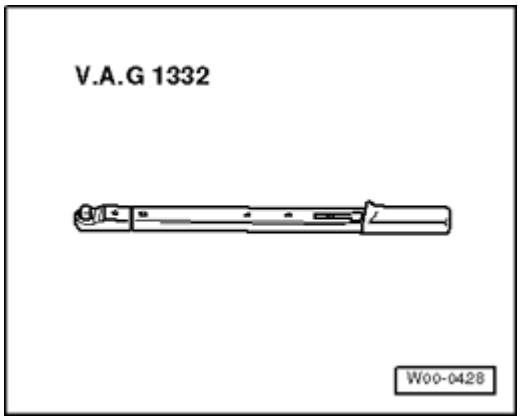
Tire pressure values				
	half load		full load	
Tire sizes	front (bar / psi)	rear (bar / psi)	front (bar / psi)	rear (bar / psi)
235/70 R 16	2.4/34	2.5/36	2.4/34	2.9/42
235/65 R 17	2.5/36	2.6/38	2.6/38	3.0/44
255/60 R 17	2.5/36	2.6/38	2.5/36	3.0/44
235/60 R 18	2.7/39	2.7/39	2.9/42	3.2/46
255/55 R 18	2.6/38	2.9/42	2.8/39	3.1/45
255/50 R 19	2.8/39	3.0/44	3.0/44	3.4/49
275/45 R 19	2.7/39	3.0/44	2.8/39	3.2/46
275/40 R 20	2.8/39	3.0/44	3.0/44	3.4/49
Spare wheel (collapsible spare wheel)				
195/80 17	3.5/51	3.5/51	3.5/51	3.5/51
195/75 18	3.5/51	3.5/51	3.5/51	3.5/51

Brake pads front and rear, checking thickness

Special tools, testers and auxiliary items required



- Pliers 3314



- Torque wrench (40 -200 Nm) V.A.G 1332/

- Electric flashlight and mirror

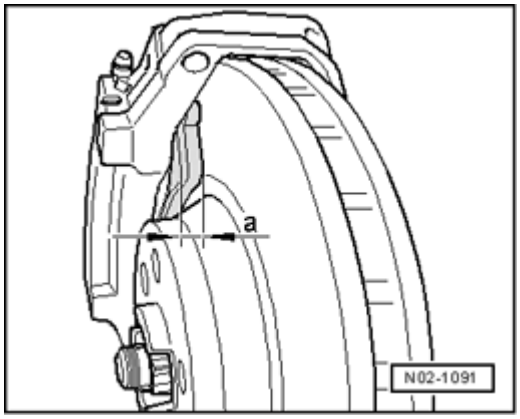
Note:

- *The adapter to loosen/tighten the anti-theft wheel bolts is located with the vehicle tool kit.*

Front disc brake pads:

- For better judgment of remaining pad thickness remove the front wheel on the drivers side.

- Remove wheel bolt caps using Pliers 3314 if necessary.



- Mark position of wheel in relation to brake disc.

- Unbolt wheel securing bolts and remove wheel.

- Measure inner and outer pad thickness.

a - Pad thickness, not including backing plate

Wear limit: 2 mm

With pad thickness (not including backing plate) of 2 mm, the brake pads have reached their wear limit and must be replaced (repair procedure). Inform customer!

Note:

- *When replacing brake pads, it is absolutely necessary to check brake discs for wear!*

- *Checking and if necessary replacing brake discs is a repair measure.*

- Check brake discs for wear

⇒ *Repair Manual, Brake System, Repair Group 46,*

- Install wheel to marked position.

- Tighten wheel securing bolts, using diagonal sequence to following tightening torque:

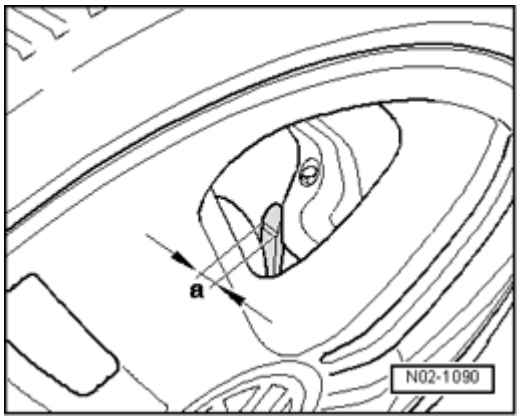
Tightening torque: 160 Nm

- Place adapter with vehicle tool kit after completing work.

- Reinstall wheel bolt covers if necessary.

Rear disc brake pads:

- Illuminate area behind hole in wheel using an electric flashlight.



- Determine thickness of outer pad by checking visually.

- Illuminate inner pad using an electric flashlight and mirror.

- Determine thickness of inner pad by checking visually.

a - Pad thickness inner and outer, not including backing plate

Wear limit: 2 mm

With pad thickness (not including backing plate) of 2 mm, the brake pads have reached their wear limit and must be replaced (repair procedure). Inform customer!

Note:

- *When replacing brake pads, it is absolutely necessary to check brake discs for wear!*

- *Checking and if necessary replacing brake discs is a repair measure.*

- Check brake discs for wear

⇒ *Repair Manual, Brake System, Repair Group 46,*

Brake system, visual check for leaks and damage

Check the following components for leaks and damage:

- Brake master cylinder

- Hydraulic unit
- Brake pressure regulator and
- Brake calipers

- Check that brake hoses are not twisted.

- Turn steering to left stop and to right stop. During this operation no brake hose must touch any vehicle components.

- Check brake hoses are not porous or brittle.

- Check brake hoses and lines for chafing.

- Check brake connections and methods of securing for correct seating, leaks and corrosion.

Warning!

Malfunctions found must be rectified (repair measure).

Brake fluid, changing

Notes on application and safety, ⇒ 01-4, Notes on application and safety precaution .

Specification of brake fluid, ⇒ 01-4, Specification of brake fluid .

Work procedure, changing brake fluid, ⇒ 01-4, Work procedure, changing brake fluid .

Notes on application and safety precaution

Note:

- *From model year 2006, a new brake fluid is introduced.*
- *The new brake fluid can also be used for older vehicles.*
- *New brake fluid can be mixed with previous brake fluid.*

Warning!

- ***Brake fluid must never come into contact with***

fluids containing mineral oils (oil, gas, cleaning solutions). Oils containing minerals damage seals and sleeves on brake systems.

- ***Brake fluid is poisonous. Due to its caustic nature, it must also never be brought into contact with paint.***
- ***Brake fluid is hygroscopic, which means that it absorbs moisture from the air. Always store brake fluid in air-tight containers.***
- ***Wash off brake fluid spillage using plenty of water.***
- ***Do not reuse, (used) extracted brake fluid.***
- ***Observe waste disposal regulations!***

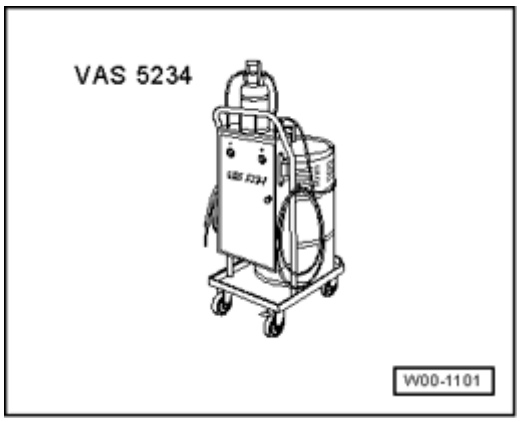
Specification of brake fluid

Permitted brake fluid specifications

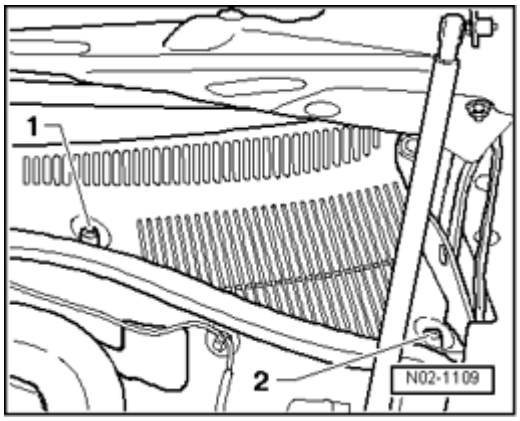
- Brake fluid corresponding to US standard FMVSS 116 DOT 4 (previous brake fluid).
- Brake fluid corresponding to VW standard, VW 501 14 (new brake fluid).

Work procedure, changing brake fluid

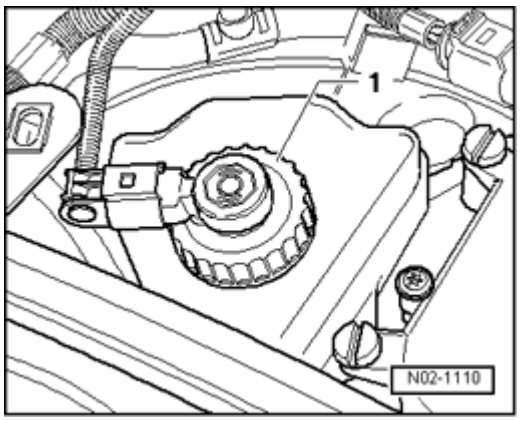
Special tools, testers and auxiliary items required



- Brake charger/bleeder unit VAS 5234



- Release securing bolts **- 1 -** and **- 2 -** and remove cover upward.



- Remove cap from brake fluid reservoir **- 1 -** .

- Extract as much brake fluid as possible using suction hose from brake charger/bleeder unit VAS 5234 or from V.A.G 1869 or using a suction bottle with built-in strainer.

Note:

- *After extracting, observe that no further brake fluid runs into the reservoir (the brake fluid level in the reservoir must align with the lower edge of the strainer).*

Warning!

Do not reuse, (used) extracted brake fluid.

- Brake pedal depressor Install V.A.G 1869/2 between drivers seat and brake pedal and apply tension.

- Screw adapter onto brake fluid reservoir.

- Connect filler hose of VAS 5234 or V.A.G 1869 to

adapter.

- Pull cover caps off bleeder screws of brake calipers.

- Connect bleeder hose of collector bottle to rear bleeder screw) , open bleeder screw, and allow the corresponding quantity to drain out (see table below). Close bleeder screw.

Note:

- *Use a suitable bleed hose. It must seat tightly on bleed screw so that no air can enter brake system.*

) Bleed rear right first.

Repeat work sequence on other side of vehicle at rear.

Note:

- *Front brake calipers with two valves, first connect the inner bleeder valve then connect the outer valve.*

- Connect the collecting bottle bleeder hose to the front bleeder screw) . Open bleeder screw and let the corresponding amount of brake fluid (see table below) flow out. Close bleeder screw.

) Bleed front right first.

Repeat work sequence on other side of vehicle at front.

Table: Sequence/brake fluid quantity

Sequence: Clutch slave cylinder, wheel brake cylinder, brake caliper	Quantity of brake fluid that must flow out:
Clutch slave cylinder bleeder valve	0.15 liter
Right rear	0.25 liter
Left rear	0.25 liter
Right front	0.25 liter
Left front	0.25 liter

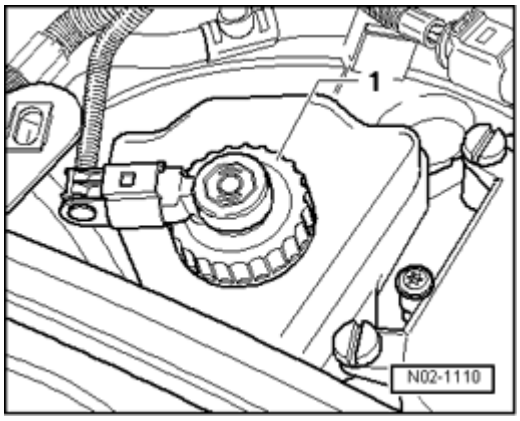
Total quantity: approx. 1.15 liter

- Fit cover caps to brake caliper bleed screws.

- Move filler lever on VAS 5234 or V.A.G 1869 to position **- B -** (see operating instructions).

- Take filler hose off adapter.

- Unscrew adapter from brake fluid reservoir.



- Check brake fluid level and correct if necessary.
- Screw in cap **- 1 -** for brake fluid reservoir.
- Re-install cover.
- Remove brake pedal depressor.
- Check pedal pressure and brake pedal free play. Free play: Max. $^{1}/_{3}$ of pedal travel

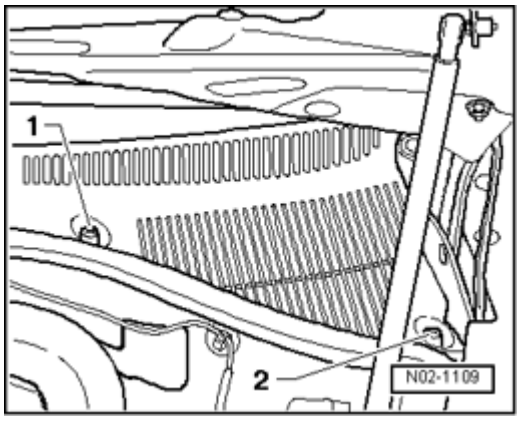
Brake fluid level (depending on brake pad wear), check

Notes on application and safety, ⇒ 01-4, Notes on application and safety precaution .

Specification of brake fluid, ⇒ 01-4, Specification of brake fluid .

Work procedure, brake fluid level (depending on brake pad wear): Checking ⇒ 01-4, Work procedure, brake fluid level (depending on brake pad wear), check .

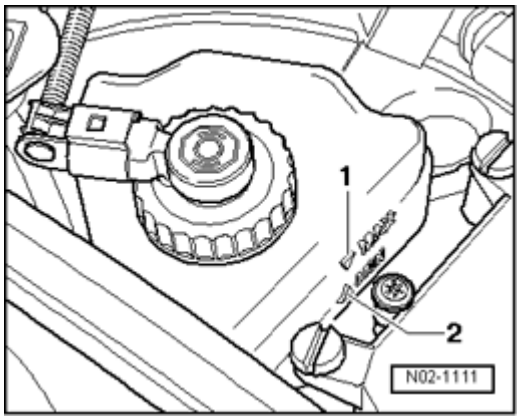
Work procedure, brake fluid level (depending on brake pad wear), check



- Release securing bolts **- 1 -** and **- 2 -** and remove cover

upward.

Note the following:



Brake fluid level at delivery inspection:

- At time of delivery inspection, brake fluid level must be at MAX mark **- 1 -** .

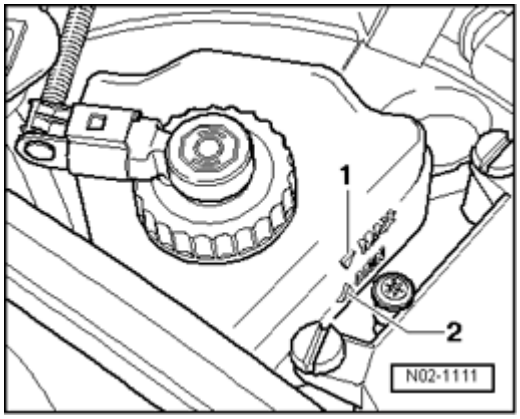
Note:

- *To prevent the brake fluid from overflowing from the reservoir, the level must not be over the MAX mark **- 1 -** .*

Brake fluid level at Inspection Service:

The fluid level must always be judged in conjunction with brake pad wear.

When vehicle is in use, the fluid level tends to drop slightly due to brake pad wear and automatic adjustment.



- Recommended brake fluid level when brake pad wear limit has almost been reached:

"At MIN marking and slightly above" **- 2 -** : "TOPPING OFF NOT NECESSARY" .

- Recommended brake fluid level, if brake pads are new or are far from the brake pad wear limit:

"Between MIN- and MAX-Marking" .

Warning!

If fluid level is below MIN. marking - 2 - , brake system must be checked before brake fluid is added "repair measure" .

Diesel particle filter, replacing

For installed position of the Diesel particle filter, see underside of the vehicle.

- Diesel particle filter, removing and installing

⇒ *Repair Manual, 5.0 Liter V10 2V TDI PD Engine Mechanical, Fuel Injection Glow Plug, Engine Code(s) BKW, BWF, Repair Group 26,*

.

Electric windows, check positioning

Warning!

After disconnecting and connecting the battery (in luggage compartment and / or under front left seat) the excess force limitation of electric windows does not function. This can cause serious injuries if e.g. fingers are caught in the window!

Note:

- *After disconnecting and connecting the vehicle battery (in luggage compartment and /or under front left seat) the automatic opening and closing features for the electric windows do not function.*

- *Therefore, the electric windows must be positioned again immediately, before a new vehicle is delivered.*

- *The vehicle battery must not be disconnected after the electric windows have been positioned.*

Perform the following work sequence to position the electric windows:

Note:

- *The following work sequence is for the front left window. The positioning for the remaining windows is performed in the same manner using the respective switch in the drivers door.*

- Close all doors and windows completely.

- Switch ignition on.

- Open front left side window fully by pressing and holding the button in the drivers door.

- Close the front left side window fully by lifting and holding the button in the drivers door, then release button.

- Lift button again for 1 second. Now when the button is pressed briefly the window will lower fully and when the button is lifted briefly the window will raise fully.

Vehicles with Rear View Camera System, check license plate

Note:

- *In vehicles with Rear View Camera System, it is not permitted to install an additional license plate holder or an additional license plate base. For additional information, see*

  ⇒ *Repair Manual, Electrical Equipment, Repair Group 94.,*

  .

Vehicle system test, perform

- Connect diagnostic tester ⇒ 01-3, Diagnostic testing unit, connecting .

- Switch ignition on.

- Select operating mode "Guided Fault Finding" on the display.

- Then perform vehicle identification on tester.

Program now performs a vehicle system test automatically

and checks for all possible control modules for this vehicle type.

- Press Continue > button.

Now all DTCs will be listed.

Note:

- *At this point it makes sense to switch into operating mode Guided Functions in order to perform further work using VAS 5051 and to prevent a second vehicle identification on the tester.*

- *To do so, press operating mode button and then Guided Functions.*

- *Refer to the corresponding work descriptions for the continued sequence.*

- *In order to return to Guided Fault Finding, press the operating mode button and then Guided Fault Finding.*

Caution!

In any case, the vehicle must be returned to the customer with DTC memory erased.

Static malfunction

If one or more static malfunctions are stored in data memory, it is recommended to arrange with the customer to repair this malfunction via Guided Fault Finding.

Sporadic malfunctions

In the event only sporadic malfunctions or notes are stored in DTC memory and the customer has made registered no complaint in conjunction with an electronic vehicle system, erase DTC memory.

- Press the Continue > button again to enter the test plan.

- End Guided Fault Finding via Go to button and then End.

All DTC memories will be checked now once more.

The window that now appears confirms that all sporadic faults were cleared.

Then the diagnostic protocol is sent "online" or stored on the tester.

Note:

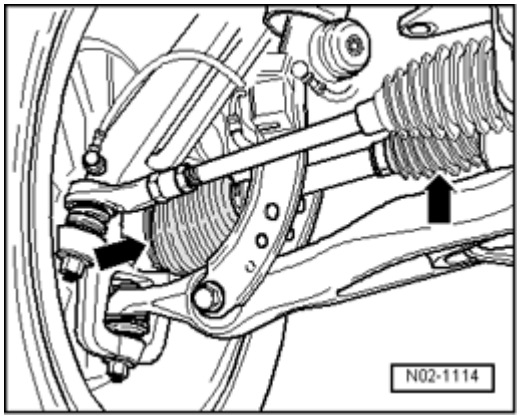
- *If tester is not connected to the network, diagnostic protocol is stored and the transmission follows as soon as tester is connected to the network.*

- *Protocols that have been stored and are older than four days are erased automatically.*

Vehicle system test is completed.

Constant velocity (CV) joint boots, visual inspection

Perform the following work procedure:



- Check outer and inner CV joint boots **- arrows -** for leaks and damage.

Note:

- *Also check the CV joint boots at the rear axle.*

Dust and pollen filter, cleaning housing and replacing filter element

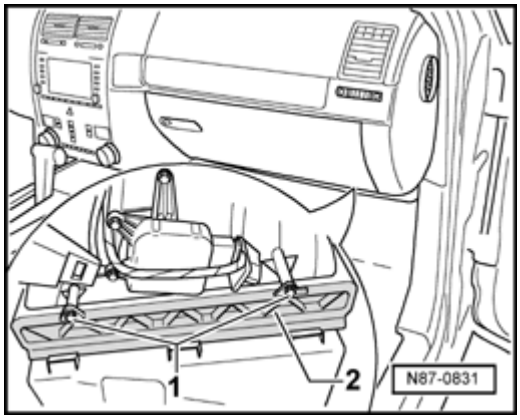
Removing:

Perform the following work procedure:

- Remove cover under glove compartment in passenger footwell

⇒ *Repair Manual, Body Interior, Repair Group 68,*

.



- Remove screws **- 1 -** and take out filter element **- 2 -** downward.

Note:

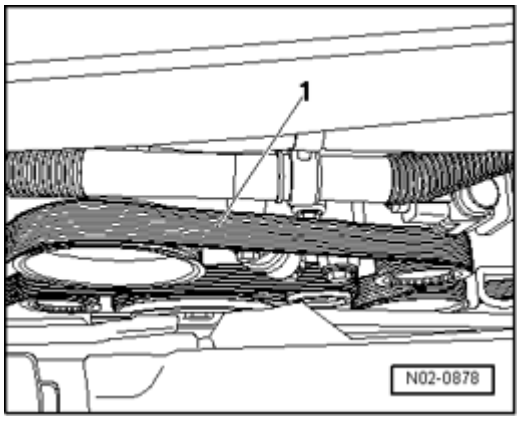
- *Observe installed position of filter element.*
- *Observe waste disposal regulations!*

Installing:

- Insert new filter.
- Re-install cover.

Ribbed belt, checking condition

Perform the following work procedure:



- Check ribbed belt **- 1 -** for:
  - Sub-surface cracks (cracks, core ruptures, cross sectional breaks)
  - Layer separation (top layer, cord strands)

- Base break-up
- Fraying of cord strands
- Flank wear (material wear, frayed flanks, flank brittleness -glassy flanks-, surface cracks)
- Traces of oil and grease

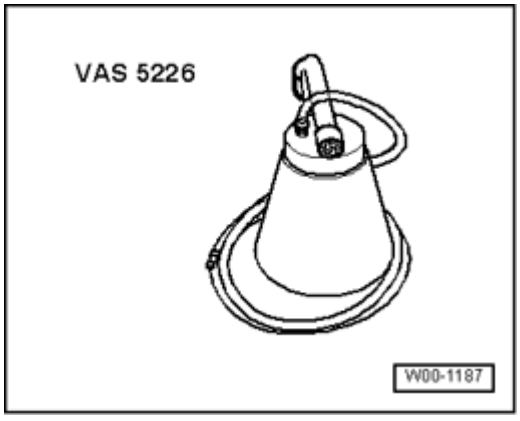
Note:

- *Replace the belt if any damage is found. This will avoid possible break-downs or operating problems. The replacement of a ribbed belt is a repair measure.*

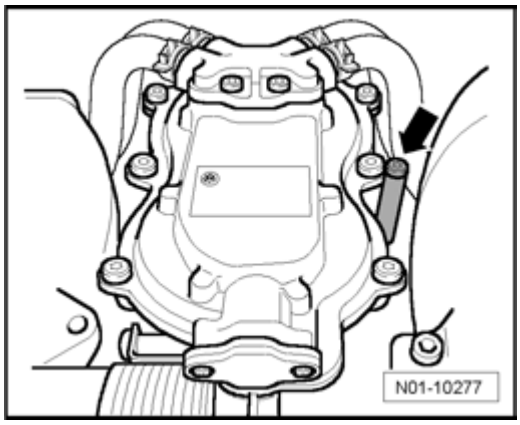
Fuel filter, drain water

Fuel filter, draining water (10-cyl. diesel engines)

Special tools, testers and auxiliary items required



- Suction pump VAS 5226



- Insert hose of suction pump VAS 5226 , with a suitable adapter, into the hole for water extraction **- arrow -** .

- Extract about 100 ml of diesel fuel using the suction pump VAS 5226 .

- Replace the seal of the water extraction plug.

- Tighten water extraction plug to 3 Nm.

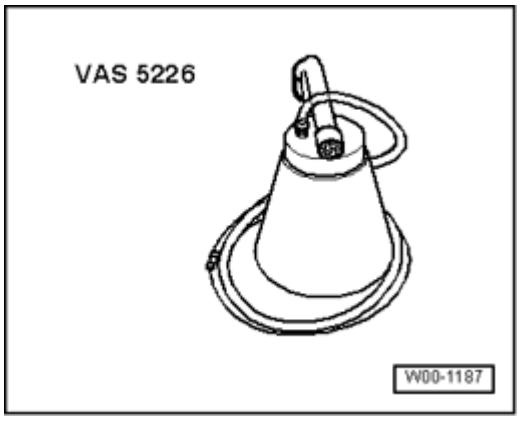
Fuel filter, replacing (diesel engine)

Replace fuel filter, 10-cylinder diesel engines

Note:

- *There are two different fuel filter systems.*
- *In system 1, the fuel filter is located on the engine, under the engine cover.*
- *In system 2, the fuel filter is located to the left in the engine compartment, on the strut tower.*

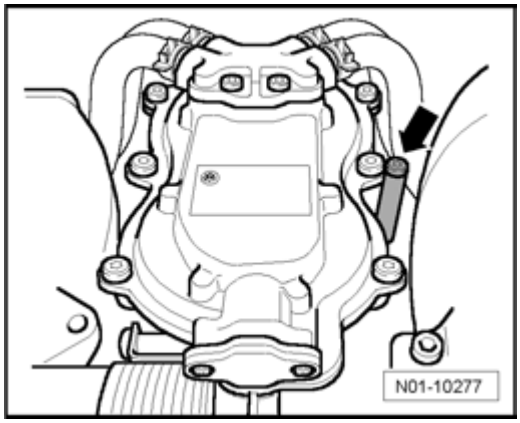
Special tools, testers and auxiliary items required



- Suction pump VAS 5226

Remove engine cover ⇒ 01-4, Upper engine cover, removing and installing .

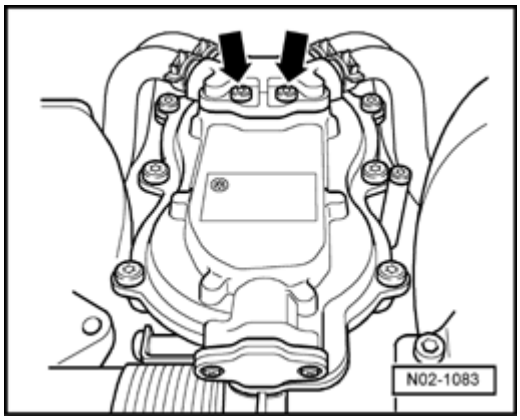
Removing:



- Remove plug **- arrow -** from fuel filter housing water drain connector.

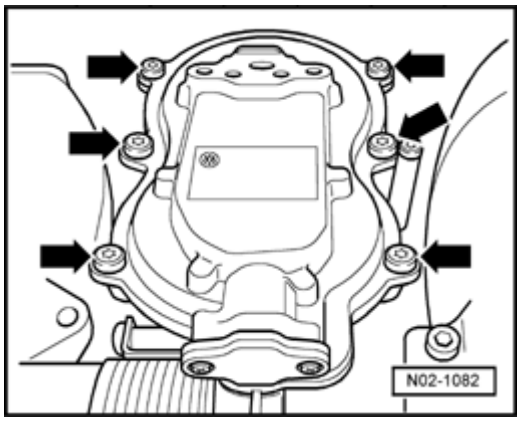
- Extract diesel fuel via water drain connection located on the side of the fuel filter housing **- arrow -** using V.A.G 1390 and V.A.G 1390/1 .

- Seal off oil plug again and tighten to 3 Nm.



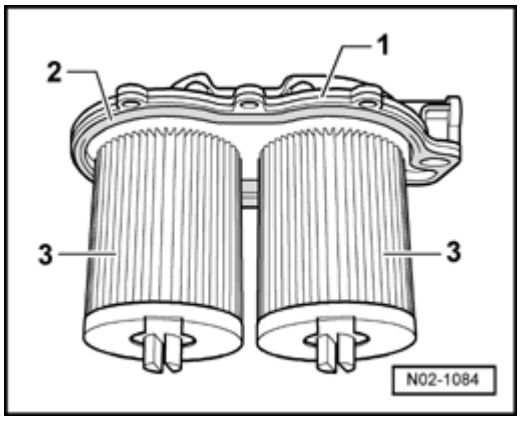
Remove line connectors for fuel lines

- Remove screws **- arrows -** along with connection lines to fuel filter housing



Removing fuel filter cover:

- Remove screws **- arrow -** for fuel filter housing and remove cover

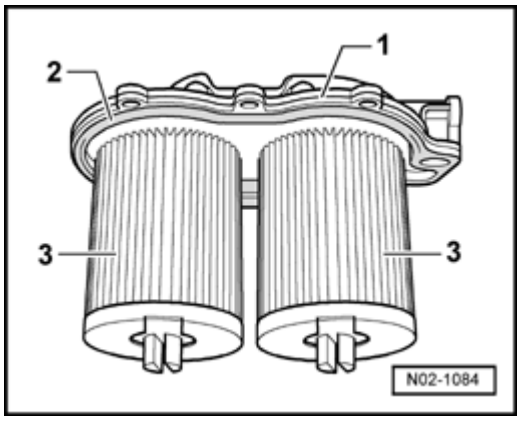


- Remove fuel filters **- 3 -** from cover **- 1 -**

Note:

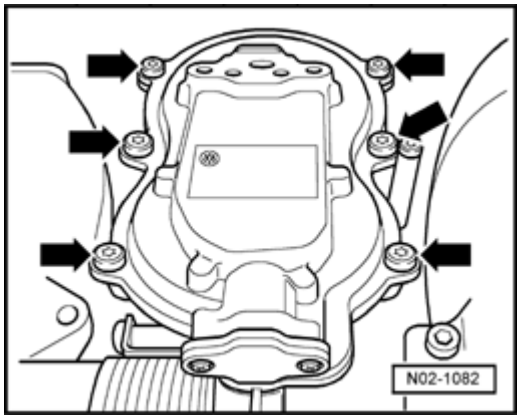
- *Observe waste disposal regulations!*

Installing:

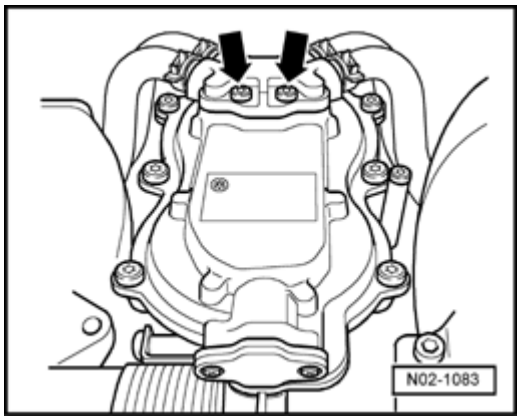


- Install new fuel filters **- 3 -** and replace seal **- 2 -**

- Install fuel filter cover **- 1 -** .



- Tighten screws **- arrows -** for fuel filter cover (8 Nm)



- Install line connectors for fuel lines.

Note:

- *Replace sealing ring between fuel filter covers and line unions for fuel hoses.*

- Tighten bolts **- arrows -** to 8 Nm.

Fuel system, bleeding

In order to ensure engine starts immediately after changing fuel filter, fuel system must be bled with diagnostic tester.

- Connect diagnostic tester ⇒ 01-3, Diagnostic testing unit, connecting .

- Switch ignition on.

- Select "Guided Functions" .

- Perform vehicle identification.

- Select "OBD Capable Systems" / "Diesel direct fuel injection and glow plug system" / "Functions" / "Bleed Fuel System" .

- Follow the instructions on the diagnostic tester.

- After bleeding, exit "Guided Functions" with Go to button.

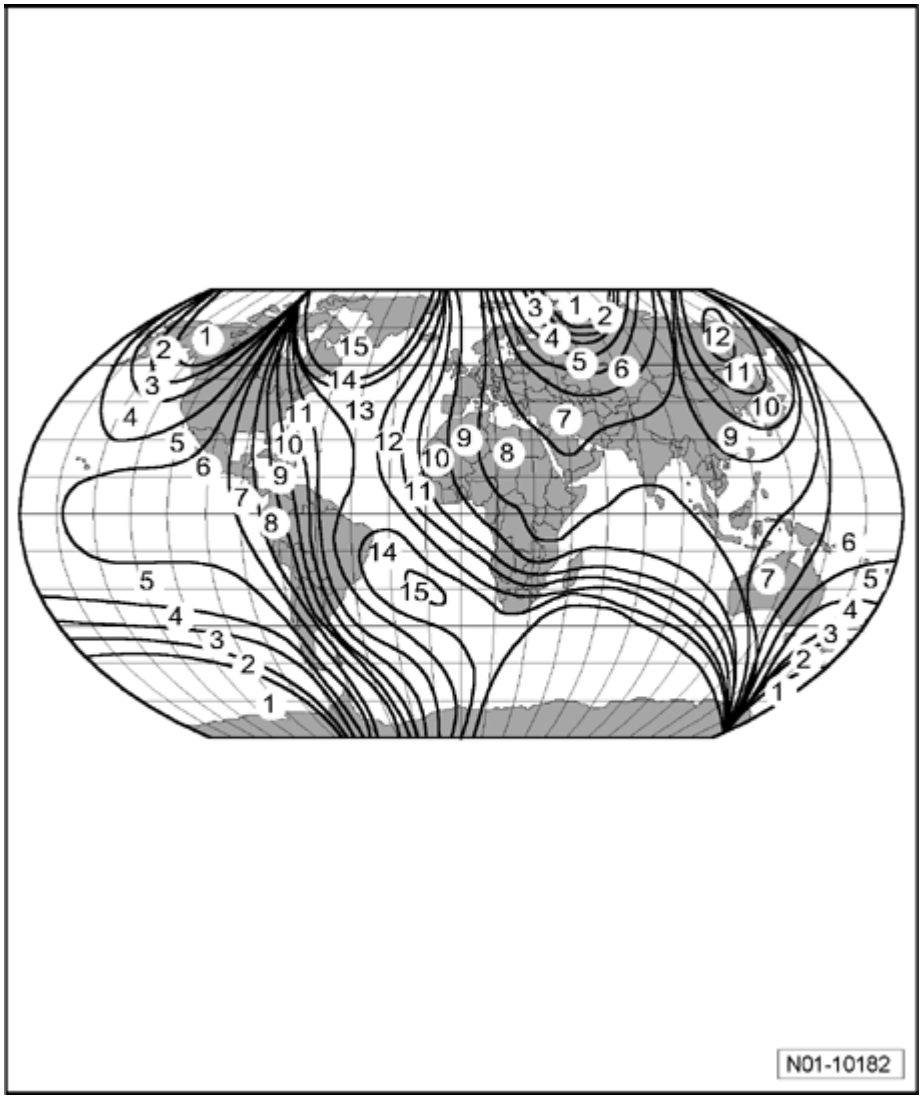
Compass in the roof module, adjust compass zones

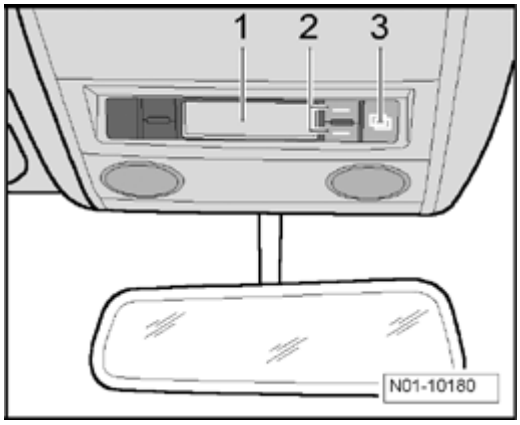
The compass indicates the direction vehicle is facing.

For a correct reading, the correct compass zone must be adjusted.

Adjust compass settings

- Determine your geographical location on the zone map





- With ignition switched on press button **- 3 -**

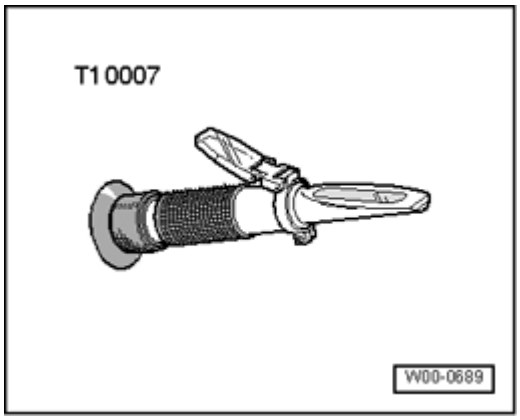
- Select with the function keys **- 2 -** in the display **- 1 -** the symbol "N" and confirm OK

- Select the function keys **- 2 -** the selected zone between "1 and 15" and confirm OK in order to adjust the compass zone.

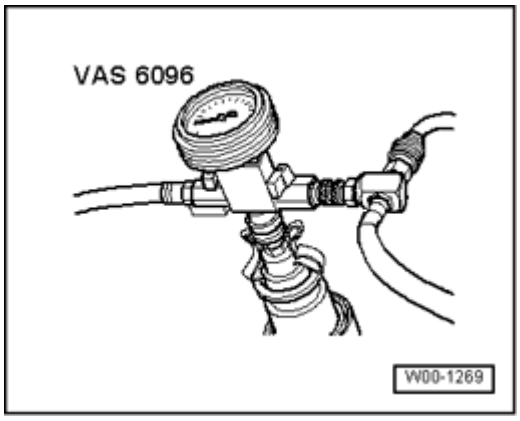
The selected zone is stored, the compass reading appears in the display.

Cooling system, freeze protection and coolant level, checking

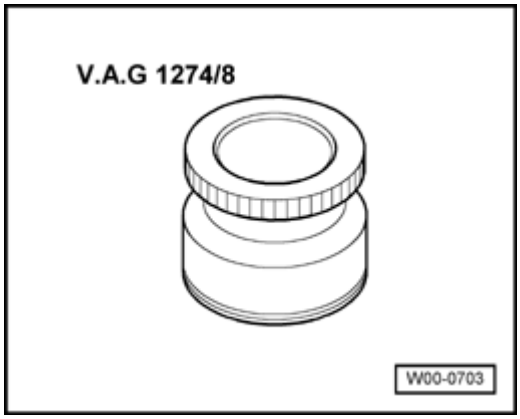
Special tools, testers and auxiliary items required



- Refractometer T10007



- Cooling system charge unit VAS 6096



- Adapter V.A.G 1274/8

Note:

- *All engines are filled with coolant additive G 12 Plus conforming to TL "VW 774 F" (color purple). G 12 Plus can be mixed with the previous coolant additives G 11 and G 12 (red). Ensure that the system is replenished only with G12 Plus (due to its positive properties).*

- *G 12 Plus is suitable as a filled-for-life filling for cast iron and all-aluminum engines and gives optimum protection against frost, corrosion damage, scaling and over-heating.*

- *G 12 Plus increases the boiling point to 275 ° F (135 ° C) and ensures for a better heat dissipation.*

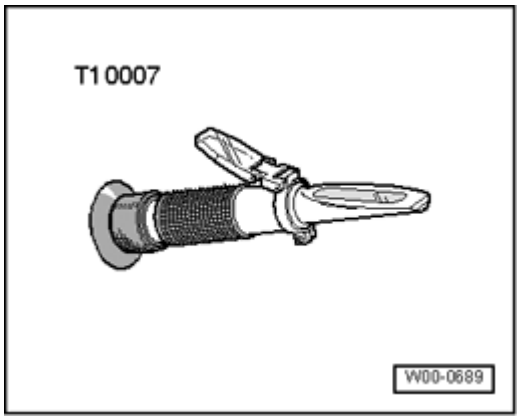
- *The coolant portion of the mixture must amount to at least 40% (freeze protection to -13 ° F [-25 ° C]) and should not exceed 60% (freeze protection to -40*

° F [-40 ° C]). Otherwise the freeze protection will be reduced and the cooling efficiency will be worsened.*

- *Freeze protection must be guaranteed to approx. -13 ° F (approx. -31 ° F (-35 ° C) in countries with an arctic climate).*

Checking freeze protection and adding coolant additive if necessary

Special tools, testers and auxiliary items required



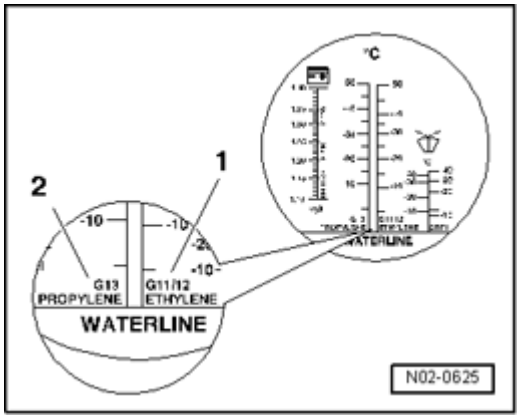
- Refractometer T10007

Check freeze protection:

Note:

- *Read the bright/dark boundary to obtain an accurate reading for the following tests. Place a drop of water on the glass to improve the readability of the bright/dark boundary. The bright/dark boundary can be clearly recognized on the "WATERLINE" .*

- Check the concentration of the coolant additive using refractometer T10007 (operating instructions).



The scale **- 1 -** of the refractometer T10007 refers to the coolant additives -G 12- , -G 12 Plus- and -G 11-.

Scale **- 2 -** refers only to coolant additive G 13. (previously L80)

- If freeze protection ratio is too low, drain listed amount and replace it with coolant additive G 12 Plus conforming to TL "VW 774 F" .

Freeze protection table

Freeze protection to ° C			
Actual value	Specified value	6-cyl. engine	6-cyl. engine 1)
0	-25	4,0	6,0
	-35	4,5	7,5
-5	-25	3,5	5,0
	-35	4,0	6,5
-10	-25	2,5	4,0
	-35	3,5	5,5
-15	-25	2,0	3,0
	-35	3,0	4,5
-20	-25	1,0	2,0
	-35	2,0	3,5
-25	-35	1,5	2,0
-30	-35	1,0	1,5
-35	-40	0,5	1,0

1) Models with 2 heat exchangers

Freeze protection to ° C		Difference amount in liters			
Actual	Specified	8-cyl.	8-cyl. engine	10 cyl.	10 cyl. engine

value	value	engine	1)	engine	1)
0	-25	5,0	8,0	5,0	8,0
	-35	6,0	10,0	6,0	10,0
-5	-25	4,5	7,0	4,5	7,0
	-35	5,5	9,0	5,5	9,0
-10	-25	3,5	6,0	3,5	6,0
	-35	4,5	8,0	4,5	8,0
-15	-25	2,5	4,0	2,5	4,0
	-35	3,5	6,0	3,5	6,0
-20	-25	1,5	3,0	1,5	3,0
	-35	2,5	4,5	2,5	4,5
-25	-35	1,5	2,5	1,5	2,5
-30	-35	1,0	2,0	1,0	2,0
-35	-40	0,5	1,5	0,5	1,5

*) Models with 2 heat exchangers

Mixture ratio:

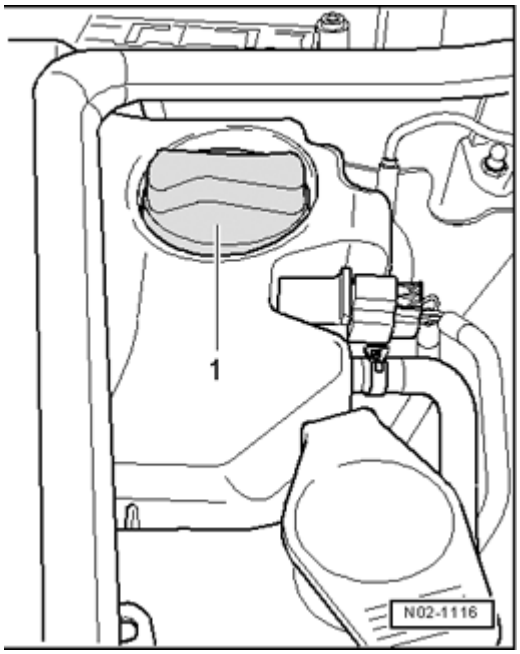
Freeze protection to	Coolant additive G 12 Plus	Water
-25 ° C	approx. 40%	approx. 60 %
-35 ° C	approx. 50 %	approx. 50 %
-40 ° F	approx. 60 %	approx. 40%

Note:

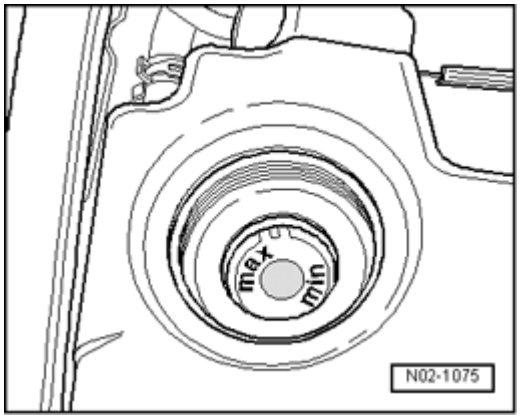
- *Observe waste disposal regulations!*

- Check coolant additive concentration after test drive again.

Checking coolant level and adding coolant if necessary



Check coolant level in expansion tank with engine cold.



- Unscrew cap **- 1 -** from expansion tank.

  - Delivery inspection: Coolant level at max. marking.
  - Inspection service: Coolant level between min. and max. marking.

- If coolant is too low, add required amount according to mixture ratio.

Note:

- *Small quantities of coolant can be refilled When larger quantities of coolant are needed when filling, Cooling system filling equipment VAS 6096 should be used.*

Follow operating instructions for cooling system charge unit

VAS 6096 .

Note:

- *Determine cause of fluid loss which cannot be attributed to normal use and rectify (repair measure).*

- *Checking coolant level and adding coolant if necessary*

Note:

- *Coolant additive -G 12- Plus prevents frost and corrosion damage, scaling and also raises boiling point of coolant. For these reasons, the cooling system must be filled with radiator freeze and corrosion protection fluid all year round.*

- *Especially in countries with tropical climates or when vehicle is driven under heavy load, the coolant improves the engine reliability by its increased boiling point.*

- *The coolant concentration must not be reduced by adding water, even during the warmer season. The coolant additive ratio must be at least 40%.*

Air cleaner, cleaning housing and replacing filter insert

Note:

- *Vehicles with 6 cylinder engines are equipped with an air filter.*

- *Vehicles with 8, 10 cylinder engines have two air filters in the engine compartment.*

Air filter element, removing and installing (10-cyl. diesel engines) ⇒ 01-4, Air filter element, removing and installing (10-cyl. diesel engines) .

Air filter element, removing and installing (6 and 8-cyl. gasoline engines) ⇒ 01-4, Air filter element, removing and installing (6 and 8-cyl. gasoline engines) .

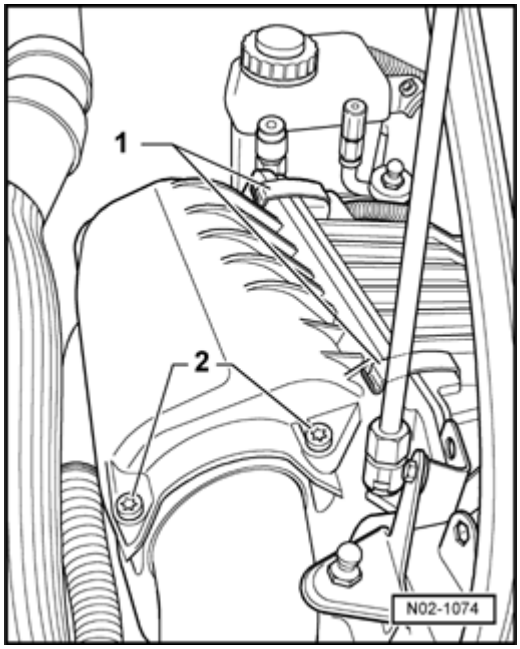
Air filter element, removing and installing (10-cyl. diesel engines)

Remove engine cover ⇒ 01-4, Upper engine cover, removing and installing .

Removing

Note:

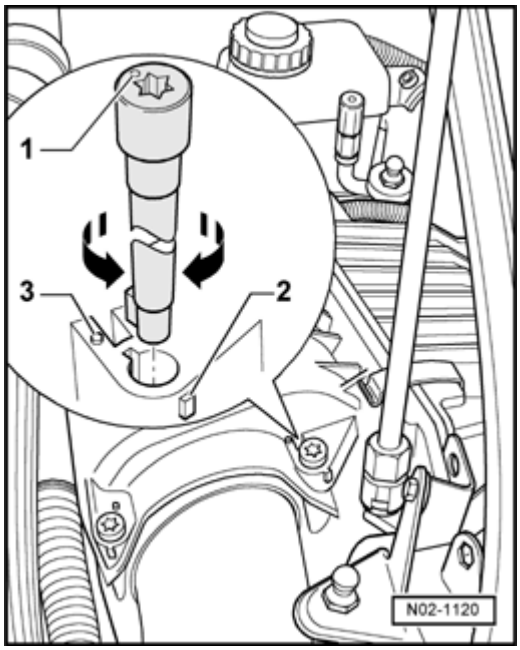
- *The following describes removing and installing the left air filter element. Removing and installing the right air filter element is performed in the same way.*



- Open snap fasteners **- 1 -** .

- Remove intake hose securing pins **- 2 -** .

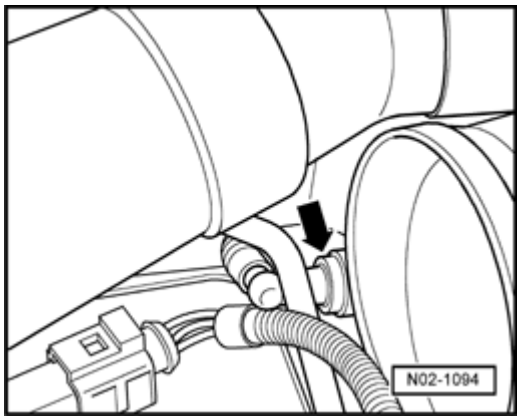
Remove intake hose securing pins:



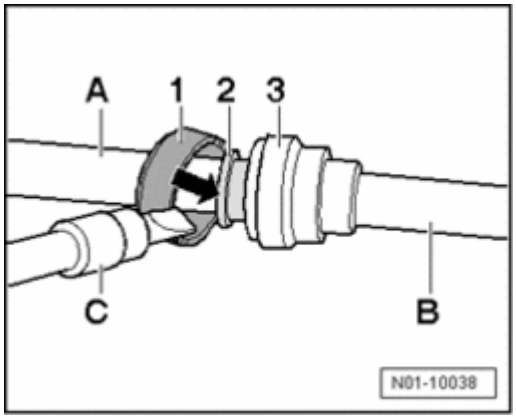
- Turn pin far enough that marking point **- 1 -** aligns with mark on air cleaner housing **- 3 -** .

- Pull out securing pin upward.

- Pull off intake hose.



- Disconnect line connection at air filter housing **- arrow -** as follows:



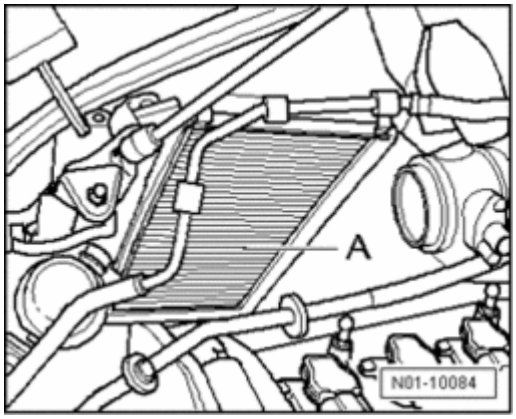
- Press off locking ring **- 1 -** using a screwdriver **- C -** from line flange **- 3 -** .

- Press securing sleeve **- 2 -** in **- direction of arrow -** and at the same time disconnect line **- A -** from line **- B -** .

- Remove upper part of air filter housing upward.

Note:

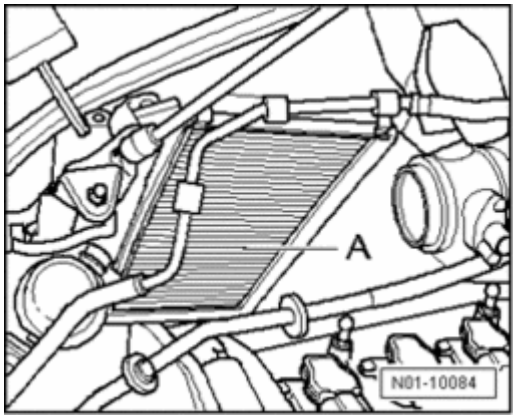
- *Observe installation position of air filter*



- Remove air filter element **- A -** .

- Clean air cleaner housing if necessary using compressed air and install new air filter element.

Installing



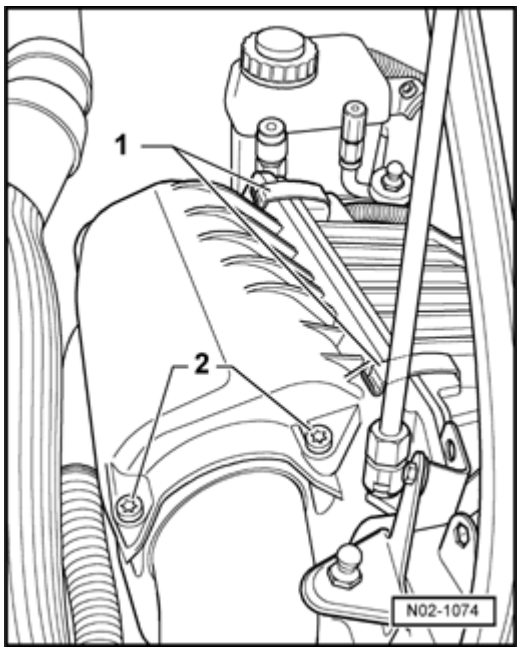
- Insert air filter element **- A -** .

Note:

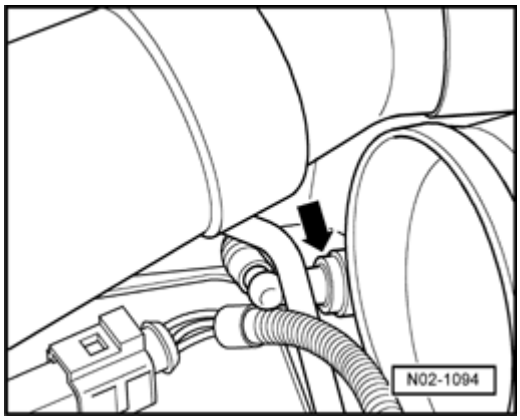
- *Make sure sealing surfaces on air filter housing are correctly positioned.*

- *Make sure that no cables or lines are pinched.*

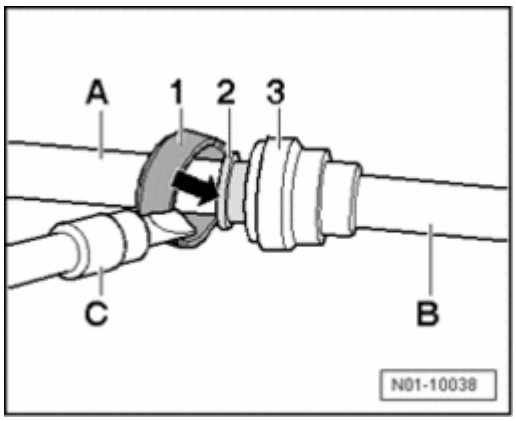
Perform the following work procedure:



- Secure air filter housing again using fasteners **- 1 -** .



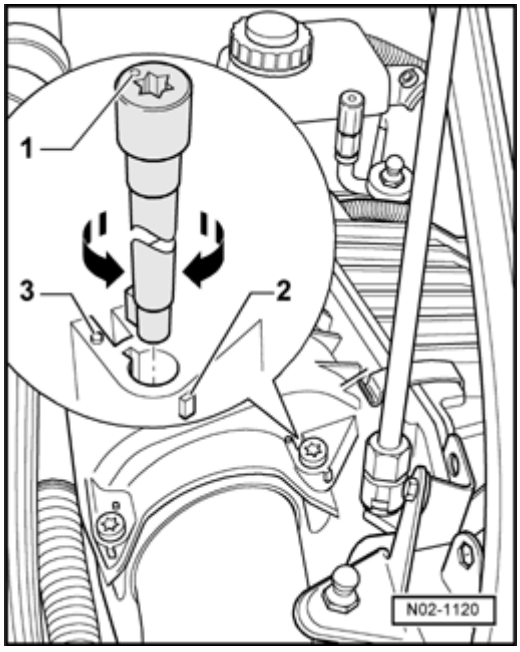
- Reconnect line **- arrow -** .



- Then press locking ring **- 1 -** on line flange **- 3 -** so that it engages audibly.

- Install intake hose.

Install intake hose securing pins as follows:



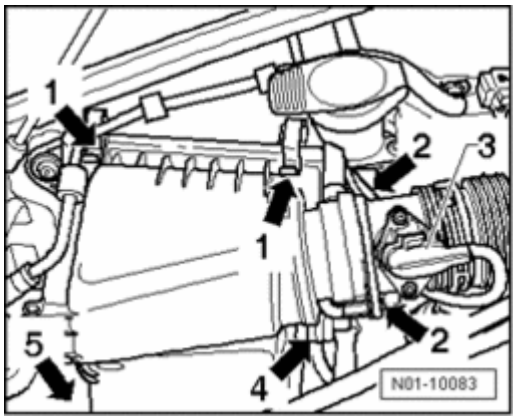
- Insert securing pins so that the mark on the pin **- 1 -** and the mark on the air cleaner housing **- 2 -** align.

- Install engine cover.

Air filter element, removing and installing (6 and 8-cyl. gasoline engines)

Removing

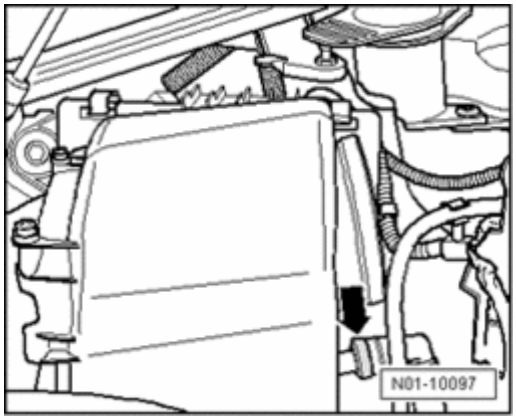
Remove engine cover ⇒ 01-4, Upper engine cover, removing and installing .



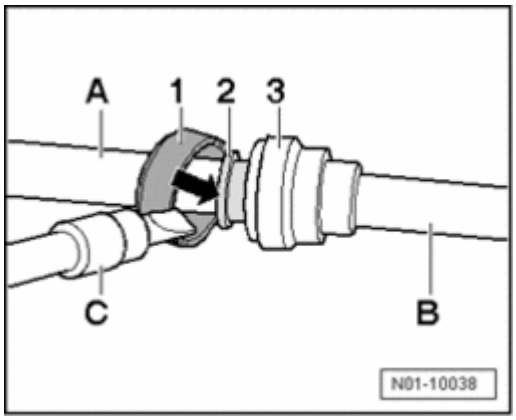
- Open clamps **- 1 -** .

- Disconnect connector **- 3 -** of throttle valve control module.

- Remove bolts **- 2 -** of throttle valve control module.

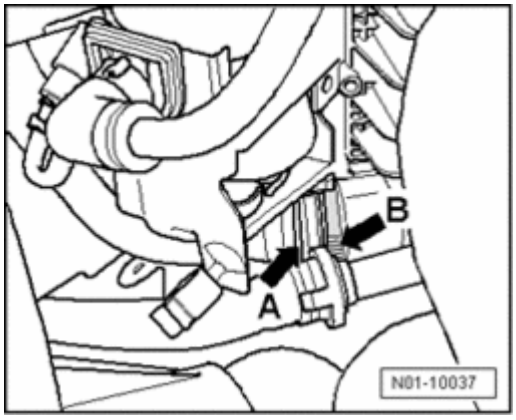


- Disconnect line connections at air filter housing **- arrow -** as follows:



- On the rear line, press off locking ring **- 1 -** using a screwdriver **- C -** from line flange **- 3 -** .

- Press securing sleeve **- 2 -** in **- direction of arrow -** and at the same time disconnect line **- A -** from line **- B -** .

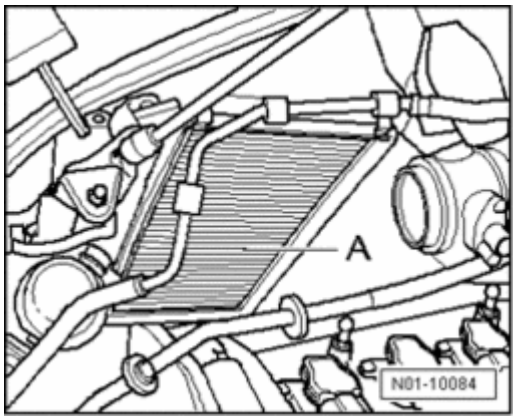


- Compress the securing ring **- B -** at the front line and disconnect line **- A -** from air filter housing.

- Remove air filter housing part upward.

Note:

- *Observe installation position of air filter*



- Remove air filter element **- A -**

- Clean air cleaner housing if necessary using compressed air and install new air filter element.

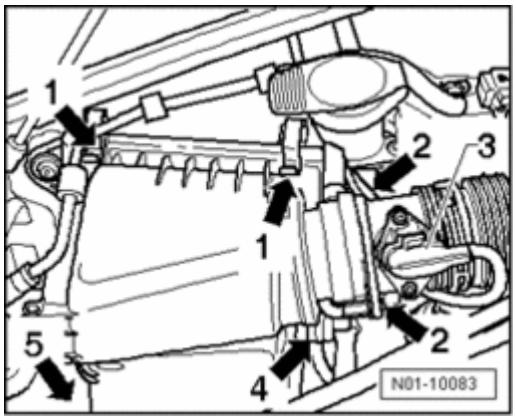
Installing

- Insert air filter element.

Note:

- *Make sure sealing surfaces on air filter housing are correctly positioned.*

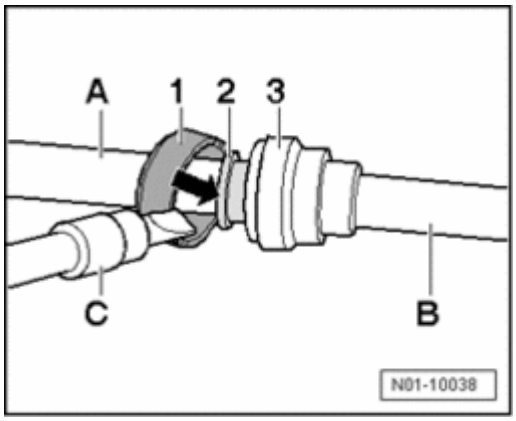
- *Make sure that no cables or lines are pinched.*



- Secure air filter housing again using fasteners **- 1 -** .

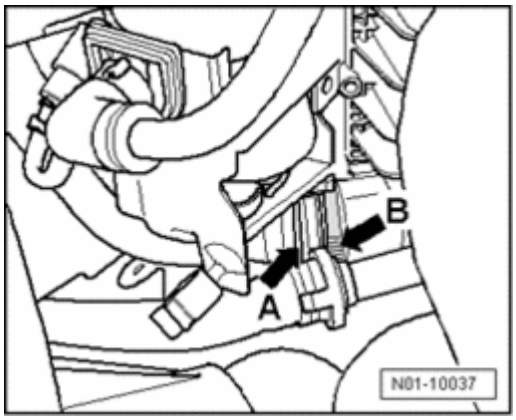
- Bolt on throttle valve control module **- 2 -** again and tighten to 3 Nm.

- Connect connector **- 3 -** .



- Reconnect line **- arrow -** .

- Then press locking ring **- 1 -** on line flange **- 3 -** so that it engages audibly.



- Re-connect line **- A -** until it engages.

- Install engine cover.

Engine oil level, check

Note the following:

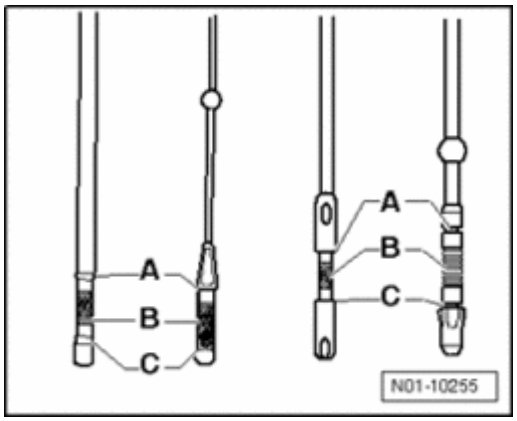
- After stopping engine, wait at least 3 minutes to allow oil to flow back into oil pan.

- Remove dipstick and wipe with clean rag. Replace dipstick and push down to stop.

Note:

- *Observe waste disposal regulations!*

- Pull out dipstick again and read oil level.



If the dipstick appears as illustrated:

- A -	Oil must not be topped off.
- B -	Oil can be topped off. This will cause the oil level to be in area **- A -** .
- C -	Oil must be topped off. It is sufficient when oil level is in area **- B -** (grooved field).

If oil level is above area **- A -** , the catalytic converter can be damaged.

- When oil level is below marking **- C -** , top off with oil to marking **- A -** . For appropriate oil specifications, please refer to Additional information, Fluid Capacity Charts for appropriate Model and Year.

Engine oil, draining or extracting; changing oil filter and filling engine oil

Engine oil capacities:

⇒ *Repair Manual, Engine Mechanical, Fuel Injection Ignition , Repair Group 17,*

or in Fluid Capacity Charts for appropriate Model and Year.

Engine oil, draining or extracting,) ⇒ 01-4, Engine oil, draining or extracting .

Oil filter, replacing ⇒ 01-4, Oil filter, replacing .

Engine oil, filling ⇒ 01-4, Filling engine oil .

) It is not permitted to siphon engine oil from V8-cylinder engine.

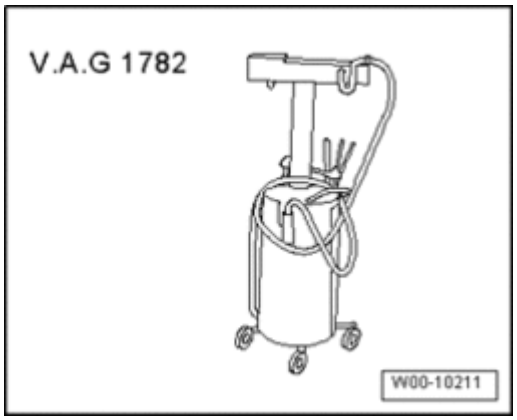
Engine oil, draining or extracting

Caution!

- ***On engines with standing oil filter module, oil filter should be changed before the oil change ⇒ 01-4, Oil filter, replacing . Removing the filter element will open a valve and oil in the filter housing will flow automatically into the crankshaft housing.***

- ***It is not permitted to siphon engine oil from V8-cylinder engine.***

- ***The oil drain plug is equipped with a permanent seal, therefore the oil drain plug must always be replaced.***



- Extract engine oil using old oil collecting and extracting unit V.A.G 1782 .

or

- Remove oil drain plug

- Drain engine oil.

Note:

- *Observe waste disposal regulations!*

- Screw in the new oil drain plug hand-tight and then fasten to the specified torque.

- Fill up with engine oil. For appropriate oil specifications, please refer to Additional information, Fluid Capacity Charts for appropriate Model and Year.

Torque specifications for oil drain plug:

- 6 cylinder gasoline engines: 30 Nm

- 8-cylinder gasoline engines: 50 Nm
- 10 cylinder diesel engines: 30 Nm

Warning!

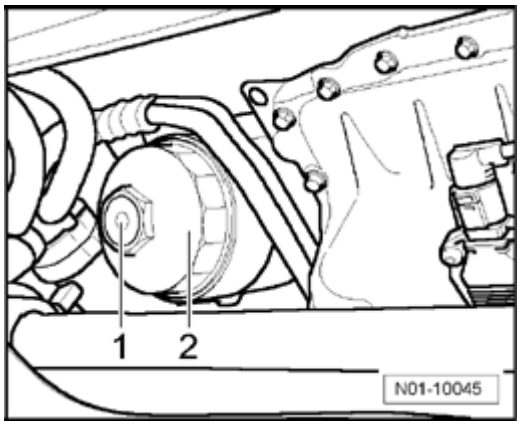
- ***Torque settings must not be exceeded***
- ***A torque figure that is too high may lead to leaks or even damage the oil pan.***

Oil filter, replacing

Oil filter, replacing (6-cyl. gasoline engine) ⇒ 01-4, Oil filter, replacing (6-cyl. gasoline engine) .

Oil filter, replacing (8-cyl. gasoline engine) ⇒ 01-4, Oil filter, replacing (8-cyl. gasoline engine) .

Oil filter, replacing (10-cyl. diesel engine) ⇒ 01-4, Oil filter, replacing (10-cyl. diesel engine) .



Oil filter, replacing (8-cyl. gasoline engine)

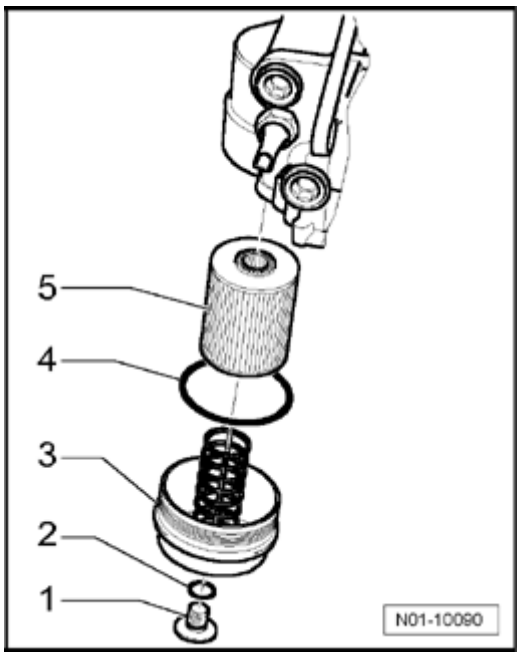
Removing

Note:

- *Observe waste disposal regulations!*
- *Oil new O-rings before installation.*

- Unscrew oil drain plug **- 1 -** of screw cap and drain oil.

- Loosen filter lower part **- 2 -** on hexagon **- 1 -** or on circumference and remove.



- Clean sealing surfaces at cap and at oil filter housing.

- Install oil filter **- 5 -**

Installing

- Install cap **- 3 -** with new O-ring **- 4 -** and tighten to 25 Nm.

- Install new sealing ring **- 2 -** for oil drain plug **- 1 -** and tighten to 10 Nm.

Oil filter, replacing (10-cyl. diesel engine)

Remove engine cover ⇒ 01-4, Upper engine cover, removing and installing .

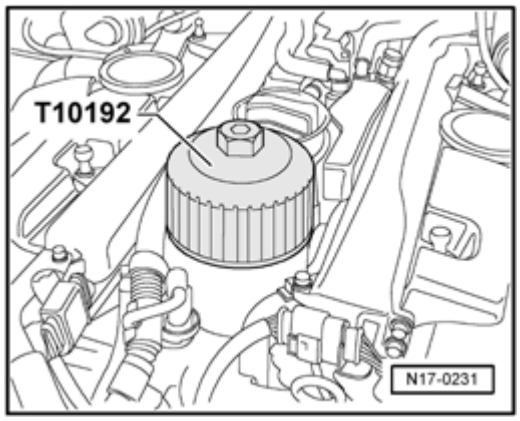
Removing

Note:

- *Observe waste disposal regulations!*

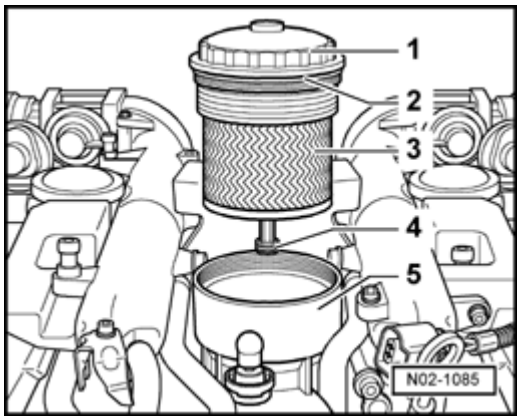
- *Oil new O-rings before installation.*

- Cover engine with a cloth.



- Unscrew oil filter housing cap from filter housing using tool T10192 .

- Clean sealing surfaces at cap and at oil filter housing.



- Install oil filter **- 3 -**

Installing

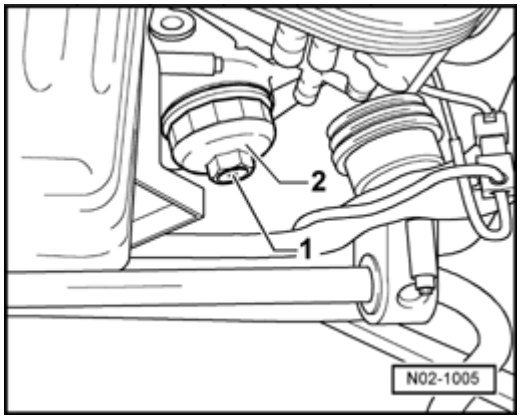
- Install cap **- 1 -** with new O-rings **- 2 -** and **- 4 -** and tighten to 25 Nm.

Oil filter, replacing (6-cyl. gasoline engine)

Note:

- *Observe waste disposal regulations!*
- *Oil new O-rings before installation.*
- *Avoid engine oil drips on components in engine compartment.*

Perform the following work procedure:

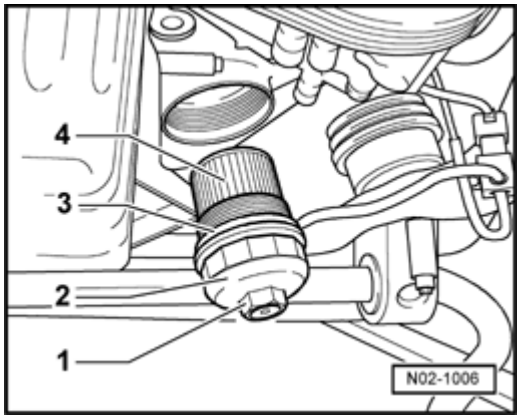


- Unscrew oil drain plug **- 1 -** of screw cap and drain oil.

- Loosen filter lower part **- 2 -** on hexagon **- 1 -** or on circumference and remove.

- Clean sealing surfaces at cap and at oil filter housing.

Installing



- Replace the filter element **- 4 -** and the seal **- 3 -** .

- Install cap **- 2 -** with new O-ring and tighten to 25 Nm.

- Install oil drain plug **- 1 -** with new seal and tighten to 10 Nm.

Filling engine oil

For appropriate oil specifications, please refer to Additional information, Fluid Capacity Charts for appropriate Model and Year.

General notes

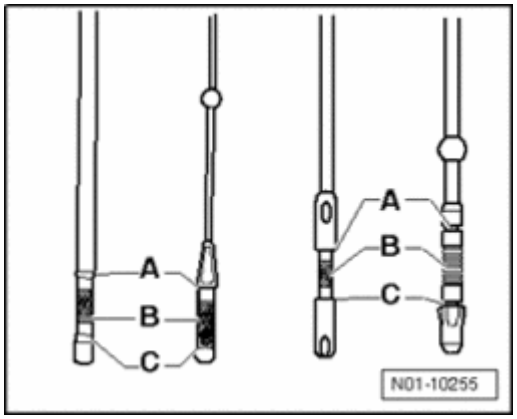
Note:

- *Observe waste disposal regulations!*

- After topping off with oil wait at least 3 minutes then

check oil level.

- Pull out oil dipstick and wipe with clean rag. Replace dipstick and push down to stop.



- Pull out dipstick again and read oil level.

If the dipstick appears as illustrated:

- A -	Oil must not be topped off.
- B -	Oil can be topped off. This will cause the oil level to be in area **- A -** .
- C -	Oil must be topped off. It is sufficient when oil level is in area **- B -** (grooved field).

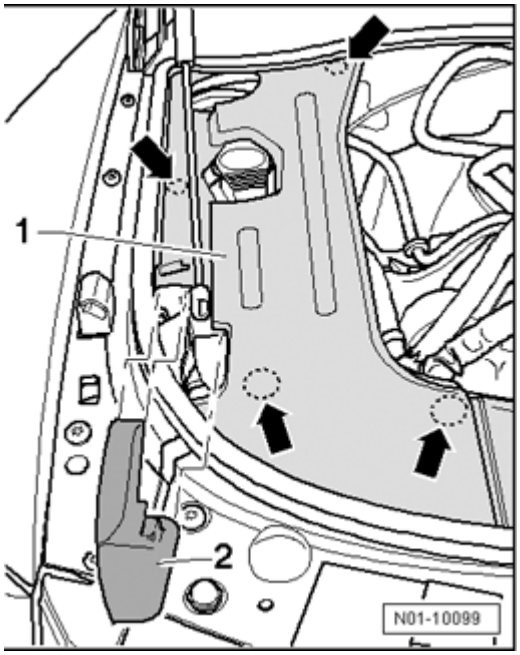
If oil level is above area **- A -** , the catalytic converter can be damaged.

- When oil level is below marking **- C -** , top off with oil to marking **- A -** .

Upper engine cover, removing and installing

Side engine compartment cover

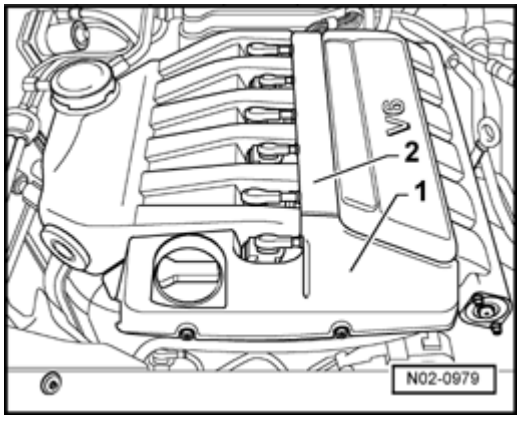
Remove right engine cover as follows:



- Pry off cover **- 2 -** .

- Remove engine cover from catches **- arrows -** and remove it upward.

Middle engine compartment cover for 6-cyl. gasoline engine



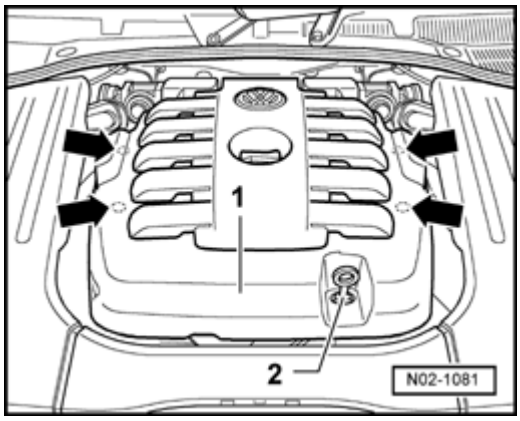
- Unclip engine compartment covers **- 1 -** and **- 2 -** and remove upward and off.

Caution!

- ***To install engine cover or to engage at mounting points, be sure not to strike the engine cover with a fist or tool, danger of damage could occur.***

Middle engine compartment cover for 10-cyl. diesel engine

Removing:



- Remove oil dipstick **- 2 -** .

- Unclip cover **- 1 -** from catches **- arrows -** and remove upward.

Installing:

- Set engine cover **- 1 -** onto fastening points **- arrows -** and press it on, until it engages.

- Do not forget oil dipstick **- 2 -** .

Caution!

- ***Make sure to not strike the engine cover with a fist or a tool when installing the engine cover and engaging the fastening points, there is the risk of damage.***

Lower engine cover (noise insulation tray), removing and installing

Note:

- *On some vehicle equipment versions, the engine compartment is equipped with an additional underbody impact guard from below.*

- *Underbody protection, removing and installing*

  ⇒ *Repair Manual, Body Exterior, Repair Group 50,*

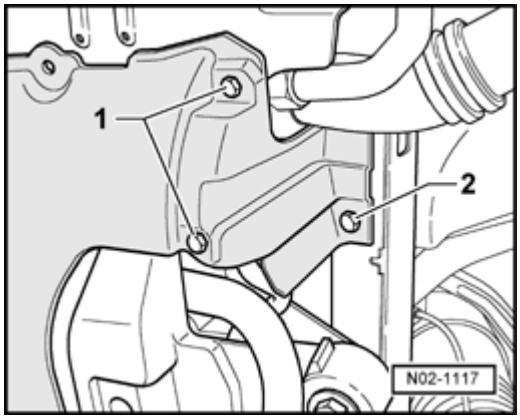
  .

Front noise insulation cover:

Note:

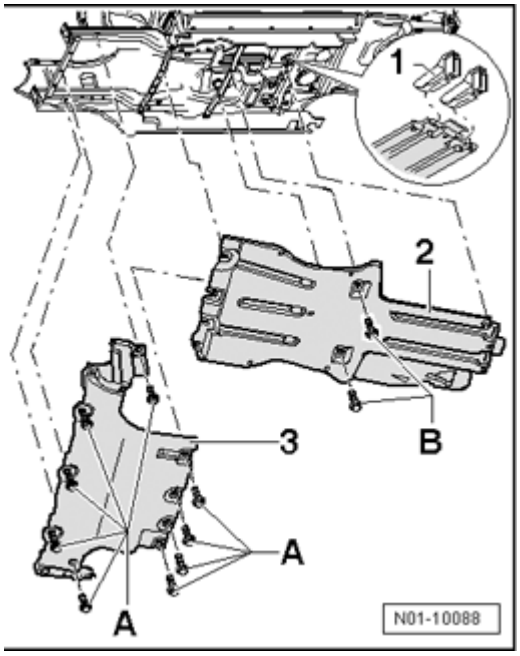
- *In the illustration, the fittings on the left hand side of the noise insulation is located in front. The fittings on the right-hand side are similar.*

- *For removing the noise insulation cover, screws must be removed.*



- Remove screws **- 1 -** and **- 2 -**

Noise insulation, front and rear



- Remove bolts **- A -** .

- First, remove noise insulation **- 3 -**

- Remove screws **- B -** .

- Remove the rear noise insulation **- 2 -** out of the spring latches **- 1 -** .

- Tighten bolts to torque of 8 Nm.

Engine and components in engine compartment (from above and below), visual check for leaks and damage

Perform visual check as follows:

- Check engine and components in engine compartment for leaks and damage.

- Check hoses, lines and connections of

  - Fuel system
  - Cooling and heating system
  - Oil circuit
  - Air conditioning
  - Intake system
  - and brake system

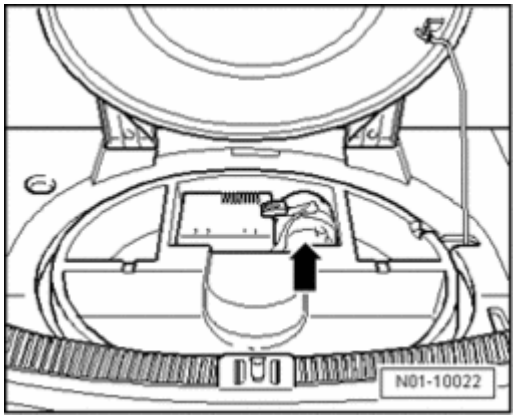
for leaks, abrasions, porosity and brittleness.

Caution!

Ensure that all malfunctions detected are rectified within repair measures.

If fluid losses are greater than can be reasonably expected, determine cause and repair (repair measure)

Break-down kit (tire mobility kit), checking



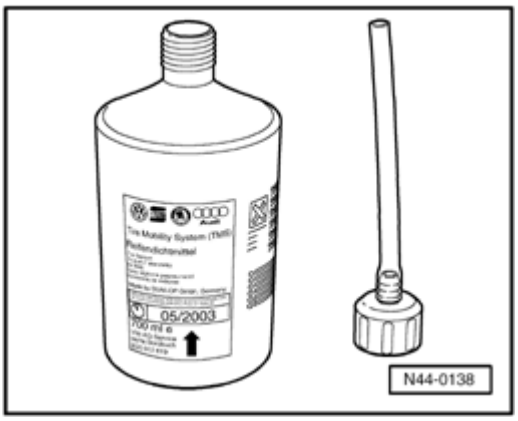
Break-down set is located in spare wheel well **- arrow -** .

Break-down set contains a tire inflation cylinder with

sealant next to the compressor.

Note:

- *The tire sealant in the bottle has a limited shelf-life.*
- *Therefore, on the bottle, the expiration date* ***- arrow -*** *is displayed.*



In this example, the expiration date 05/2003 has passed, and the bottle must then be replaced.

- Verify the expiration date.

- Replace tire sealant, if expiration date has been reached.

Caution!

- ***Tire sealant must not be older than 4 years.***
- ***If the bottle was opened, e.g. if a tire went flat, is must be replaced.***

Note:

- *Residual tire sealant or full bottles, which have expired, must be disposed of.*
- *Old tire sealant or remainder of it must not be mixed with other fluids and must be disposed of.*

Perform test drive

To what extent the following can be checked is dependent upon the vehicle equipment and local conditions (urban/country).

The following should be checked by means of a road test:

- Engine: Output, misfiring, idling speed, acceleration

- Gear selection: Ease of operation, shift lever position

- Automatic transmission: Selector lever position, shift lock / ignition key interlock, shift behavior, display in instrument cluster

- Foot brake: Function, free travel and effectiveness, pulling to one side, juddering, squeal

- Parking brake: At most after 5 -7 notches for effective parking on the street. 2 -3 notches of free travel on operating lever before start of braking.

- ABS function: When braking with activated ABS, the brake pedal must pulse noticeably.

- Steering: Function, steering free play, steering wheel centralized when wheels are in straight ahead position

- Sunroof: Function

- Radio, Radio/Navigation system: Function, Reception, GALA, interference

- A/C system: Function

- Vehicle: Moving off line when traveling straight ahead (level road)

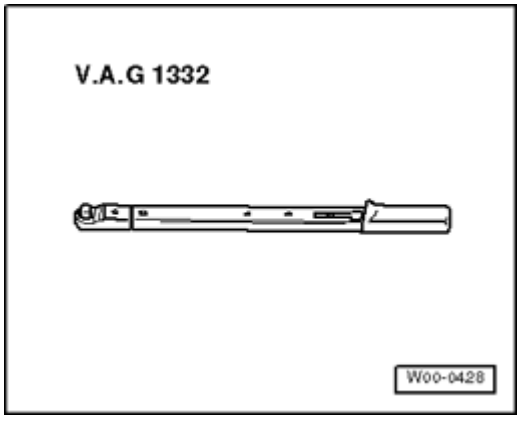
- Imbalance: Wheels, drive shafts, prop shafts

- Wheel bearings: Noises

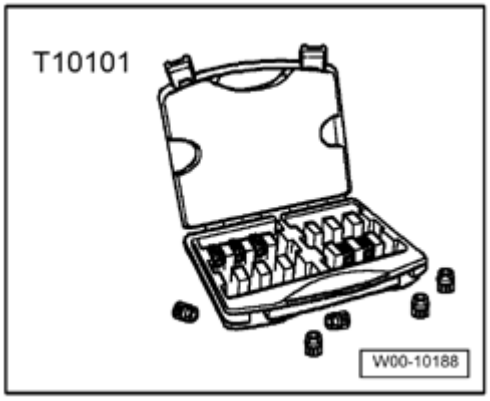
- Engine: Hot starting behavior

Wheel securing bolts, tighten to correct torque setting

Special tools, testers and auxiliary items required



- Torque wrench V.A.G 1332/



- Master wheel bolt key set T10101

The adapter to loosen/tighten the anti-theft wheel bolts is located with the vehicle tool kit.

Note:

- *Be sure to tighten wheel bolts one after the other to the following specified torque:*

Tightening torque: 160 Nm

Tire pressure sensors, replacing

Note:

- *Tire pressure sensor is located on inside of disc wheel or rim.*

- *For removal and installation of tire pressure sensor, wheel and tire must be separated.*

- Work procedure, removing and installing tire pressure sensor

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 44,*

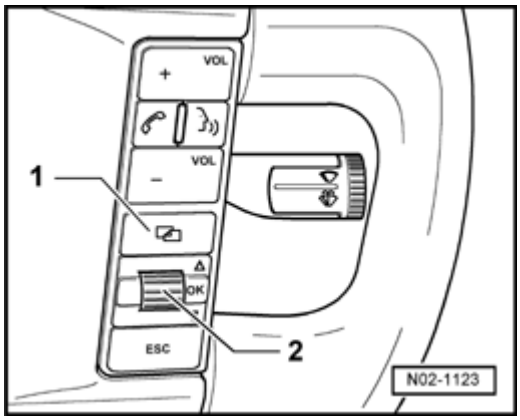
Storing tire pressure values

- Correct tire pressure set ⇒ 01-4, Check tires, tire condition, wear pattern, inflation pressure and tread

depth

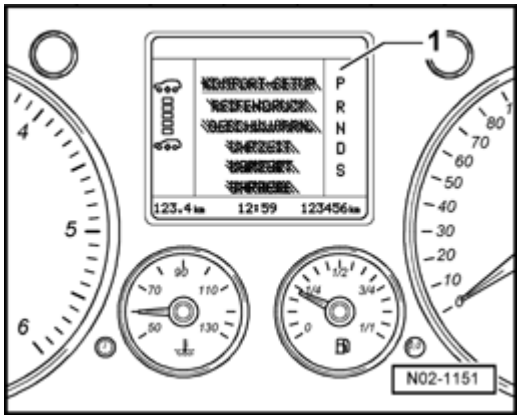
- Tires must be cold

- Switch ignition on.



- Press button **- 1 -** to show menu selection in instrument cluster display.

- Select menu item "tire pressure" using thumb wheel **- 2 -** .



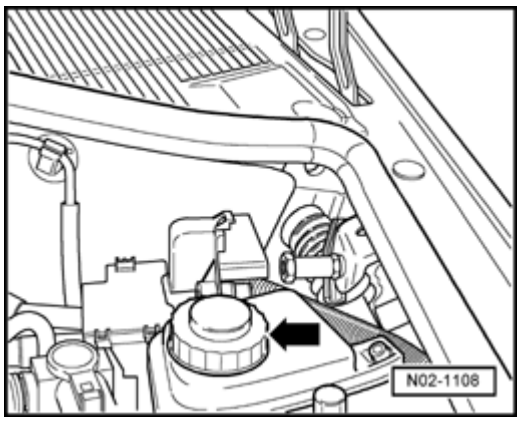
When the menu item "tire pressure" is selected in display **- 1 -** confirm the menu item by pressing the thumb wheel.

- In the sub-menu "Tire pressure monitor" , turn the thumb wheel until the position "Store" is marked on the display **- 1 -** and save the current inflation pressure by pressing the thumb wheel.

- Then drive vehicle continuously for approx. 8-10 minutes.

Power assisted steering, checking fluid level

Fluid, when cold



- With engine not running, move front wheels in straight-ahead position.

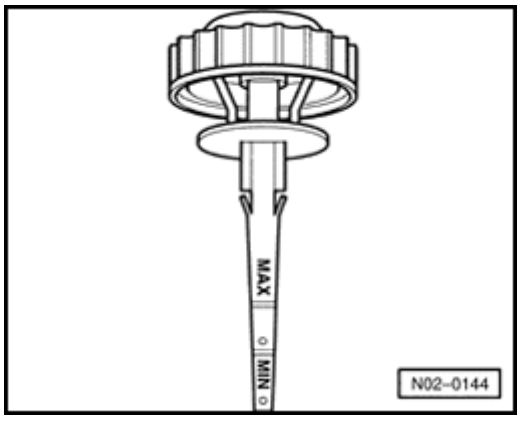
- Remove reservoir cap **- arrow -** with dipstick.

- Clean dipstick with clean cloth.

- Screw cap on hand-tight and remove again.

Caution!

Screw cap fully in to get an accurate fluid level reading.



- Check fluid level: Fluid level must be in area of MIN mark (up to 2 mm above or below mark).

Note:

- *If fluid level is above specified range, fluid must be extracted off.*

- *If the fluid level is below the specified level, check the hydraulic system for leaks (repair measure). It is not enough to simply top off with fluid.*

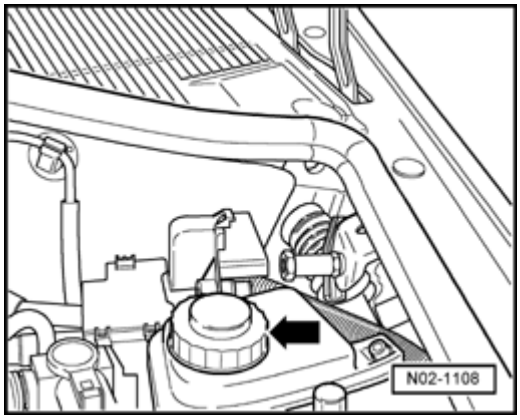
- *If no leaks are detected, top off with hydraulic fluid G 002 000 .*

- *Part numbers are for reference only. Always check with your Parts Department for the latest part number information*

- Screw in cap hand tight.

Warm fluid (at approx. 122 ° F (50 ° C)):

- With engine not running, move front wheels in straight-ahead position.



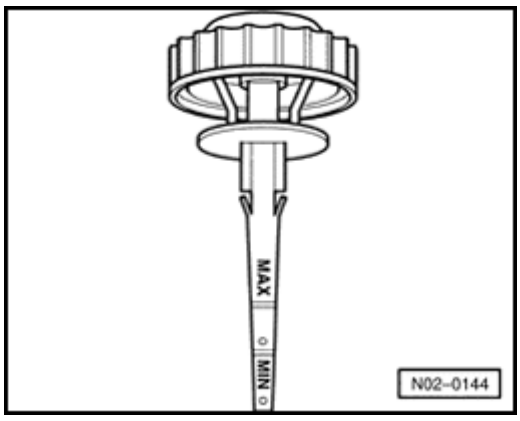
- Unscrew reservoir cap **- arrow -** with fitted dipstick.

- Clean dipstick with clean cloth.

- Screw cap on hand-tight and remove again.

Caution!

Screw cap fully in to get an accurate fluid level reading.



- Check fluid level: Check fluid level. It must be between MIN and MAX markings.

Note:

- *If the fluid level is above the MAX mark, siphon fluid off.*

- *If the fluid level is below the MIN mark, check the hydraulic system for leaks (repair procedure). It is not enough to simply top off with oil. If no leaks are detected, top off with hydraulic fluid G 002 000 .*

- *Part numbers are for reference only. Always check with your Parts Department for the latest part number information*

- Screw in cap hand tight.

Headlight adjustment, check

Test requirements ⇒ 01-4, Test requirements: .

Check headlight adjustment ⇒ 01-4, Headlamp adjustment, checking (with new test screen without 15 adjustment line) .

Headlamps with halogen lamps: adjusting ⇒ 01-4, Headlamps with halogen lamps: adjusting .

Headlamps with gas discharge lamps without cornering light system: adjusting ⇒ 01-4, Headlamps with HID lamps without cornering light system, adjusting .

Headlamps with gas discharge lamps with cornering light system: adjusting ⇒ 01-4, Headlamps with HID lamps and cornering light system: adjusting .

Fog lights and other auxiliary headlamps: adjusting ⇒ 01-4, Adjusting fog lights and other auxiliary lights .

Test requirements:

Test- and adjustment requirements:

- Tire pressure OK.

- Lenses must not be damaged or dirty.

- Reflectors and bulbs OK.

Move vehicle back and forth for 1 meter (3 to 4 feet) or bounce front and rear of vehicle several times up and down to settle suspension.

- Vehicle and headlight adjuster must be on a level surface. ⇒ *User manual for headlight adjuster.*
- Vehicle and headlight adjuster must be aligned.
- Inclination must be set.

In the trim above the headlight, inclination measurements are stamped in "%" . The headlamps must be adjusted according to these measurements. Percentage information is based on a projection distance of 10 meters. For example: inclination of 1.0% converts to approx. 10 cm.

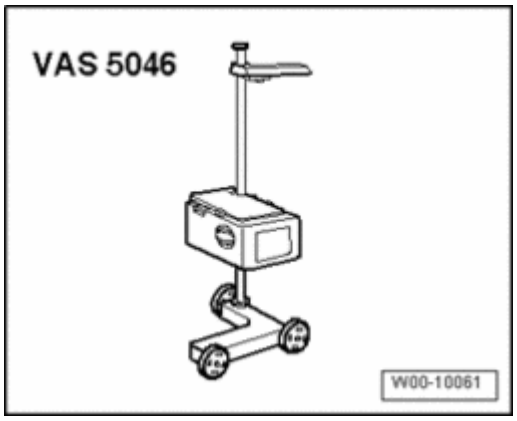
Vehicles with gas discharge lamps with dynamic headlight range adjuster:

Note:

- *On vehicles with high-intensity discharge (HID) headlamps, the basic setting must be performed with diagnostic tester before every headlamp adjustment.*

Headlamp adjustment, checking (with new test screen without 15 ° adjustment line)

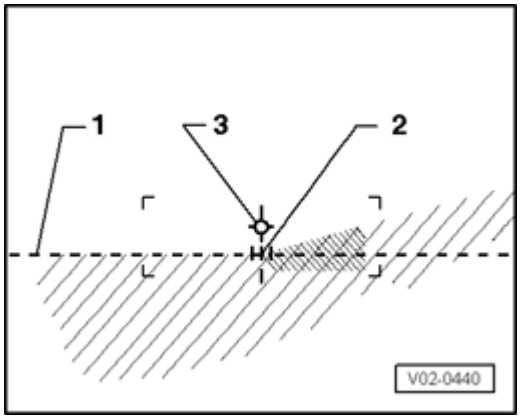
Special tools, testers and auxiliary items required



- Headlight adjuster VAS 5046
- or
- Headlight adjuster VAS 5047

Headlamps:

Check the following:



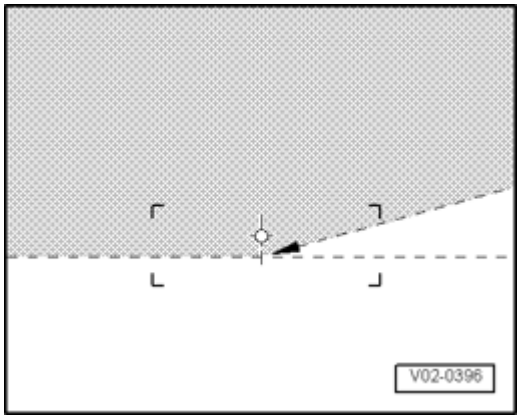
- With the low beam switched on check whether the horizontal light-dark border of the setting line **- 1 -** contacts the test surface.

- Check whether the break-away point **- 2 -** between the left horizontal part and the rising part on the right of the light-dark border runs vertically through the center point **- 3 -** . The bright core of the light beam must be on the right of the vertical line.

Note:

- *To make it easier to find break-away point **- 2 -** cover and uncover left half of headlight (as viewed when looking forward) a few times. Then check low beam again.*

- *After correct adjustment of low beams the center point of the main beam must lie on the center mark **- 3 -** .*



- *For the previous test screens with 15 ° setting line, adjust for new test screen. To avoid incorrect settings, ignore 15 ° setting line.*

Fog lights:

- Check whether the upper light-dark border touches the setting line horizontally over the complete test screen width.

Other additional lights:

Auxiliary light systems must be checked and adjusted according to the guidelines valid for them.

Headlamps with HID lamps without cornering light system, adjusting

Headlamp range control, performing basic setting

- Connect diagnostic tester ⇒ 01-3, Diagnostic testing unit, connecting .

- Switch ignition on.

- Select "Guided Functions" .

- Perform vehicle identification.

- Select vehicle system "Automatic headlamp range control" .

- Mark "Perform basic setting" and confirm with ➢ .

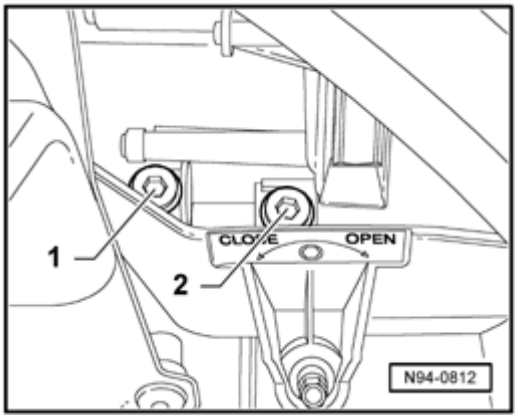
- Now the number of malfunctions is read out and if there are "0" malfunctions, "Complete" can be selected.

- Observe displayed notes and confirm by selecting "Complete" .

- Switch low beams on and confirm with "Complete" .

- Now adjust headlamps as follows:

Left headlamp

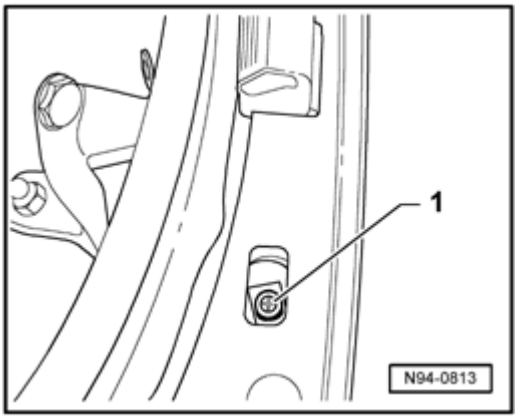


Left headlamp side adjustment

1 - Low beam lateral adjustment

2 - High beam lateral adjustment

- Turn respective lowbeam lateral adjustment screw **- 1 -** and high beam lateral adjustment screw **- 2 -** until the correct settings are achieved.



Left headlamp height adjustment

1 - Low and high beam height adjustment

- Turn the adjustment screw for height adjustment **- 1 -** until the correct setting is achieved.

Adjustment screws for right headlight are arranged symmetrically

- After adjustment, confirm on tester with "Complete" .

- "Guided Functions" can be exited with Go to End .

Headlamps with HID lamps and cornering light system: adjusting

Headlamp range control, performing basic setting

- Connect diagnostic tester ⇒ 01-3, Diagnostic testing unit,

connecting .

- Switch ignition on.

- Select "Guided Functions" .

- Perform vehicle identification.

- Select vehicle system "Automatic headlamp range control cornering light" .

- Mark "Perform basic setting" and confirm with " ➢ " .

- Now the number of malfunctions is read out and if there are "0" malfunctions, "Complete" can be selected.

- Observe displayed notes and confirm by selecting "Complete" .

- Switch low beams on and confirm with "Complete" .

- Now adjust headlamps as follows:

Identification of headlamps with cornering light system:

Note:

- *An additional reflector with halogen lighting for the static cornering light is located between the low-beam headlight and turn signal.*

The headlamps for cornering light system contain 4 lamps.

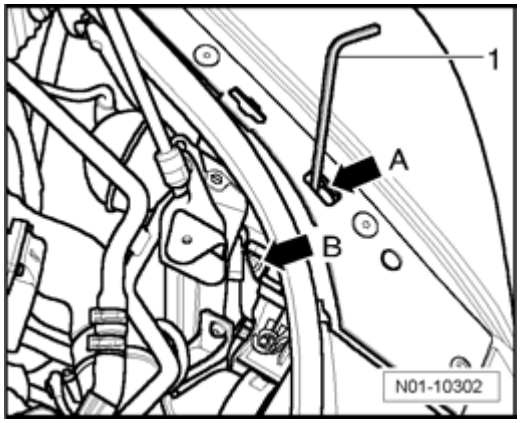
1. - The gas discharge lamp (for low-beam, high-beam and dynamic cornering light)

2. - The lamp for static cornering light

3. - The lamp for turn signal

4. - The lamp for parking light

Adjusting left main headlight



Left headlamp side adjustment

B - Side adjustment for low-beam, high-beam and dynamic cornering light

- Turn the adjustment screw for side adjustment **- B -** until the correct setting is achieved.

Left headlamp height adjustment:

- Adjust adjusting screw with hex head wrench **- 1 -** .

A - Height adjustment for low-beam, high-beam and dynamic cornering light

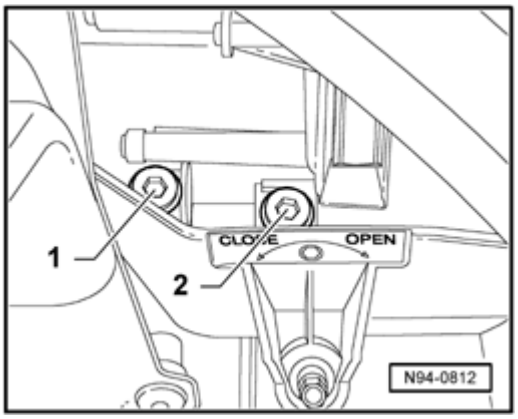
- Turn the adjustment screw for height adjustment **- A -** until the correct setting is achieved.

Adjustment screws for right headlight are arranged symmetrically

- After adjustment, confirm on tester with "Complete" .

- "Guided Functions" can be exited with Go to End

Headlamps with halogen lamps: adjusting

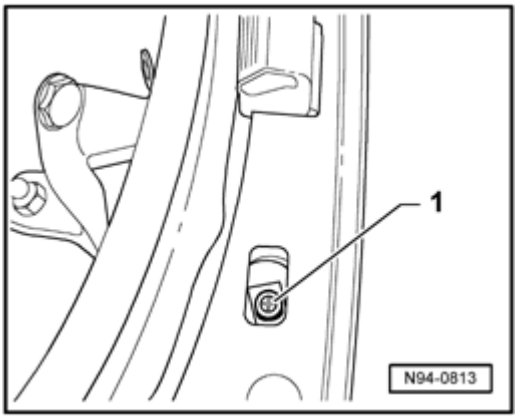


Left headlamp side adjustment:

1 - Low beam lateral adjustment

2 - High beam lateral adjustment

- Turn respective lowbeam lateral adjustment screw **- 1 -** and high beam lateral adjustment screw **- 2 -** until the correct settings are achieved.



Left headlamp height adjustment:

1 - Low and high beam height adjustment

- Turn the adjustment screw for height adjustment **- 1 -** until the correct setting is achieved.

Note:

- *Also check whether both headlamps work evenly when operating the headlight range adjuster.*

Adjustment screws for right headlight are arranged symmetrically

Adjusting fog lights and other auxiliary lights

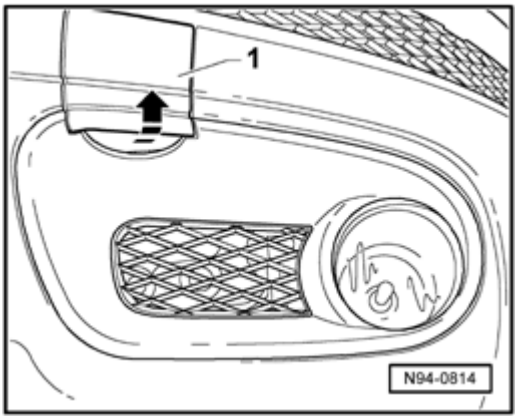
Fog lights in headlamps:

Note:

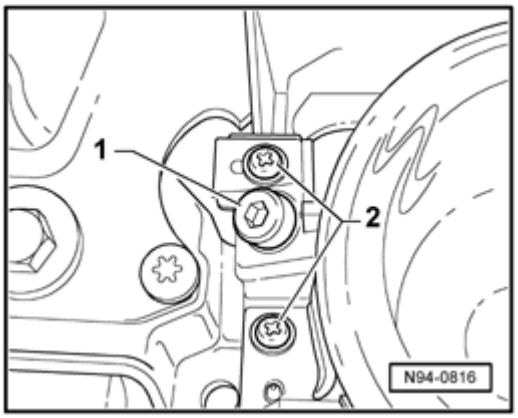
- *The adjustment of fog lights is performed automatically when adjusting headlamps.*

Left fog lamp in bumper:

Adjusting screw on right fog light is arranged symmetrically.



- Release cover caps **- 1 -** from locking devices in **- direction of arrow -** .



- Perform adjustment:

1 - Height adjustment

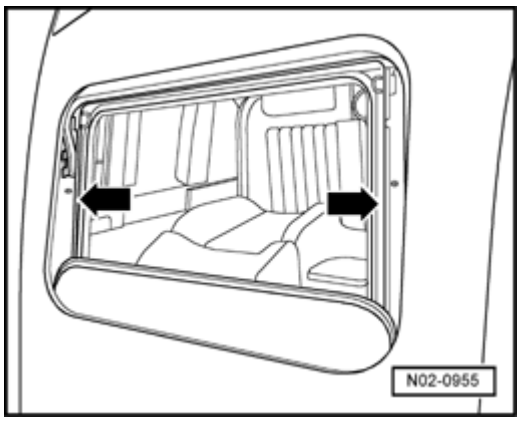
- Turn height adjustment screw **- 1 -** with hex socket head wrench until the correct setting is achieved.

Lateral adjustment is not possible.

Other auxiliary lights

Auxiliary light systems must be checked and adjusted according to the guidelines valid for them.

Sunroof, checking function, cleaning and lubricating guide rails



Perform the following work procedure:

- Check function of sunroof.

- Clean guide rails and lubricate with Grease G 000450 02 .

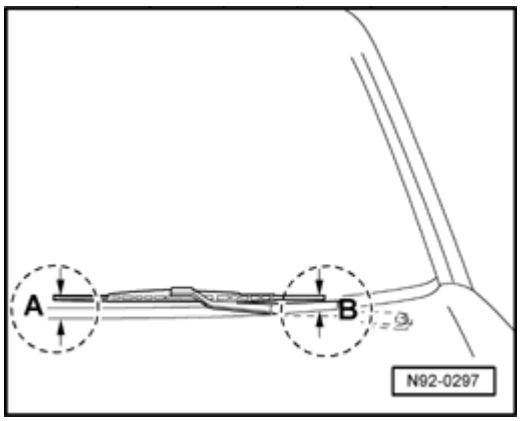
Note:

- *Part numbers are for reference only. Always check with your Parts Department for the latest part number information*

Windshield wiper blades, check park position, adjust if necessary

Windshield (drivers side):

- Check the park position.



The space **- A -** between the wiper rubber and bottom edge of windshield must be 9 mm.

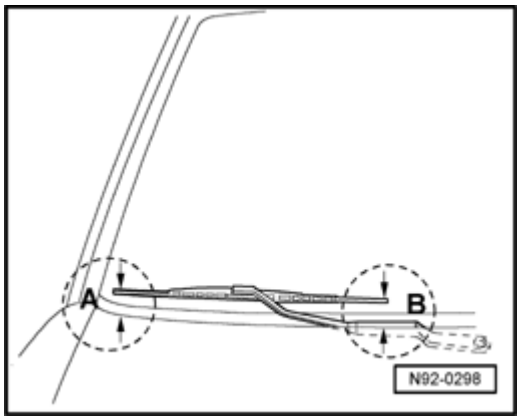
The distance **- B -** between wiper blade and lower edge of windshield must be 12 mm.

- Adjust park position by moving wiper arm if necessary.

Torque wiper arm: 32 Nm

Windshield, (passengers side):

- Check the park position.



The space **- A -** between the wiper rubber and bottom edge of windshield must be 12 mm.

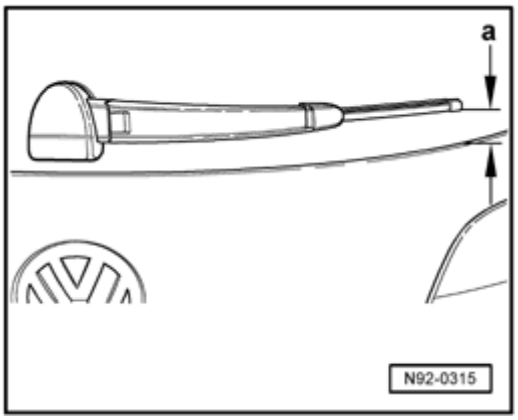
The distance **- B -** between wiper blade and lower edge of windshield must be 44 mm.

- Adjust park position by moving wiper arm if necessary.

Torque wiper arm: 32 Nm

Rear window:

- Check the park position.



The distance **- a -** between wiper blade and lower edge of windshield must be 55 mm (measured from lower edge of glass).

- If necessary, adjust the park position by relocating the wiper arm. Torque wiper arm: 12 Nm

Windshield wash/wipe system and headlight wash system, check for function and damage, top off fluid if necessary

Checking freeze protection concentration of fluid, adding

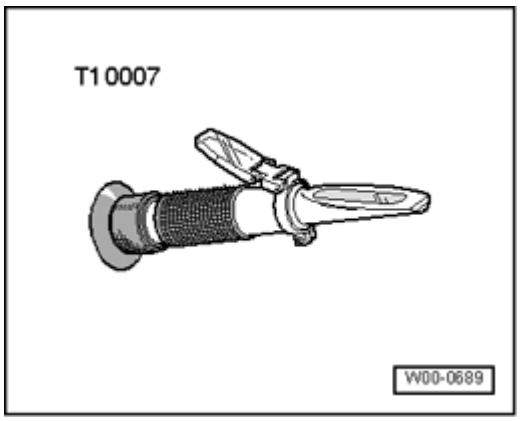
fluid, ⇒ 01-4, Checking freeze protection concentration of fluid, adding fluid .

Windshield wash/wipe system and headlight wash system: Check jet setting, adjust jets if necessary, ⇒ 01-4, Windshield wash/wipe system and headlight wash system, checking nozzle setting, adjusting nozzles if necessary

Checking freeze protection concentration of fluid, adding fluid

Checking freeze protection concentration:

Special tools, testers and auxiliary items required



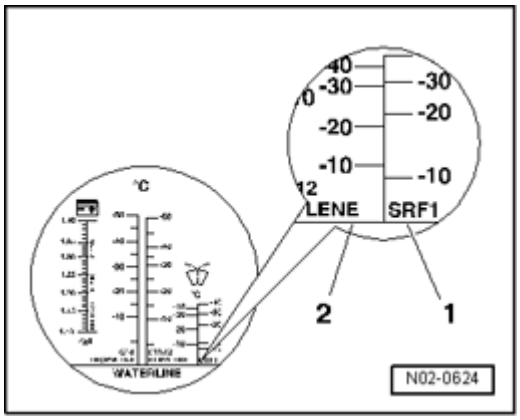
- Refractometer T10007

- Read the bright/dark boundary to obtain an accurate reading for the following tests.

- Place a drop of water on the glass to improve the readability of the bright/dark boundary.

The bright/dark boundary can be clearly recognized on the "WATERLINE" .

- Check the concentration of the anti-freeze additive using the refractometer T10007 (follow the operating instructions).



The scale **- 1 -** of the refractometer T10007 is designed specifically for genuine Volkswagen windshield cleanser G 052 164 .

The scale **- 2 -** is designed for commercially available windshield washer fluid as well as a mixture of commercially available windshield washer fluid and Volkswagen windshield cleanser G 052 164 .

Note:

- *Part numbers are for reference only. Always check with your Parts Department for the latest part number information*

Mixture ratio:

Freeze protection to	Windshield cleaner G 052 164	Water
-17/-18 ° C	1 part	3 parts
-22/-23 ° C	1 part	2 parts
-37/-38 ° C	1 part	1 part

Filling-up with fluid:

The windshield wash/wipe system fluid reservoir must be filled up fully.

Use only genuine Volkswagen windshield cleanser G 052 164 all-year-round when topping off the windshield wash/wipe system.

Note:

- *Genuine Volkswagen windshield cleanser G 052 164 protects the spray jets, fluid reservoir and hoses from freezing.*

- *Vehicles with fan type spray jets must be filled with Volkswagen windshield cleanser G 052 164 as this fluid has a low viscosity at minus temperatures. The complicated spray jet system could otherwise become blocked due to crystallized washer fluid and adversely affect the fan pattern of the spray jet. Volkswagen windshield cleanser G 052 164 assures that the fan type spray jets remain functional even at low temperatures.*

- *Use genuine Volkswagen windshield cleanser G 052 164 in the warmer periods of the year also. The*

powerful cleanser removes wax and oil deposits from the windows.

- *Freeze protection (anti-freeze) must be guaranteed to approx. -13 ° F (-25 ° C) (approx. -31 F ° (-35 ° C) in countries with an arctic climate) in the washer system.*

- *Part numbers are for reference only. Always check with your Parts Department for the latest part number information*

Windshield wash/wipe system and headlight wash system, checking nozzle setting, adjusting nozzles if necessary

Note:

- *In case of an uneven spray field due to dirt in spray nozzles, remove nozzle*

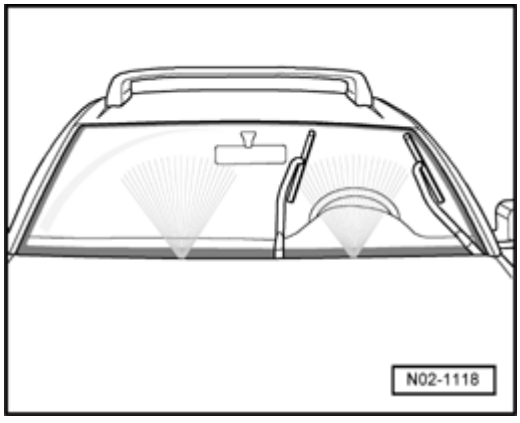
  ⇒ *Repair Manual, Electrical Equipment, Repair Group 92,*

  and flush out with water opposite to spraying direction.

- *Subsequently blowing through in the opposite direction of the spray flow with compressed air is permitted.*

- *Do not use any objects to clean the spray jets!*

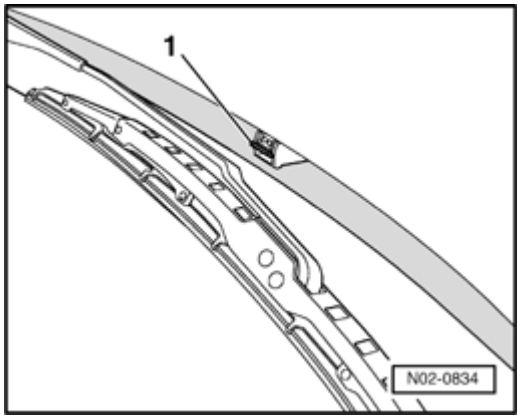
Preset washer jets



The washer nozzles are preset. Small height adjustments

can be made.

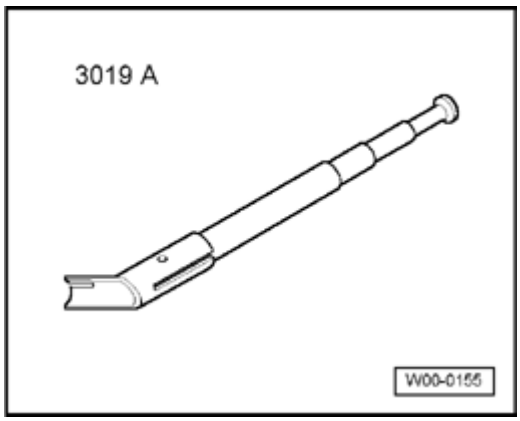
- If both spray fields are not at same height, adjust spray direction upward or downward as follows:



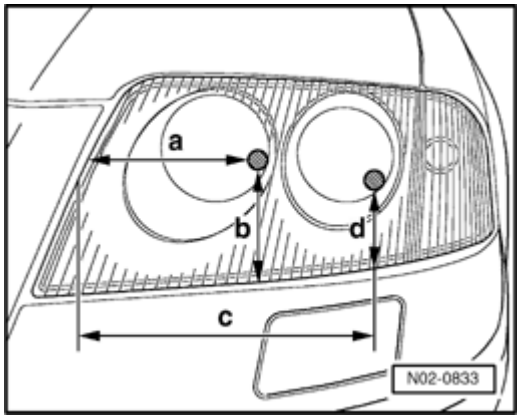
- Adjust spray jet on adjuster **- 1 -** by hand upward or downward.

Headlamp washer nozzle, adjusting

Special tools, testers and auxiliary items required



- Adjustment device 3019A
- or
- Adjustment device T10167



Spray jet adjustment for left headlight (right headlight is identical but reversed):

- Check nozzle adjustment.

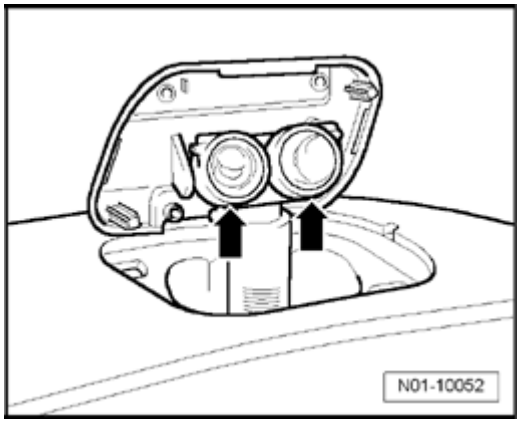
- a - -100 mm

- b - - 75 mm

- c - - 230 mm

- d - - 50 mm

- If necessary, adjust spray jets as follows:



- Switch on headlamps and operate windshield wiper/washer system long enough until spray nozzles for headlight cleaning system are driven out.

- Hold spray nozzle **- arrow -** firmly and pull out up to stop and align to the respective spray points using adjustment tool T10167 .

Adjustment of spray nozzles, rear windshield wipe-/wash system:

Note:

- *Spray nozzle of rear windshield wipe-/wash system is a component of auxiliary brake light and cannot be*

adjusted.

- *If spray nozzle sprays unevenly or does not spray the wiper area, replace the auxiliary brake light with spray nozzle.*

Removing and installing auxiliary brake light,

⇒ *Repair Manual, Electrical Equipment, Repair Group 94,*

Service interval display, reset

Service Reminder Indicator must for

- Vehicle release inspection
- Every service

(adapted)!

- Connect diagnostic tester ⇒ 01-3, Diagnostic testing unit, connecting .

- Switch ignition on.

- Touch button/field on screen. "GUIDED FUNCTIONS" on screen.

If the displays indicated in the work procedure are not indicated on display: ⇒ *Operating instructions for Vehicle Diagnosis, Testing and Information System 5051 or Vehicle Diagnosis Service Syst VAS 5052*

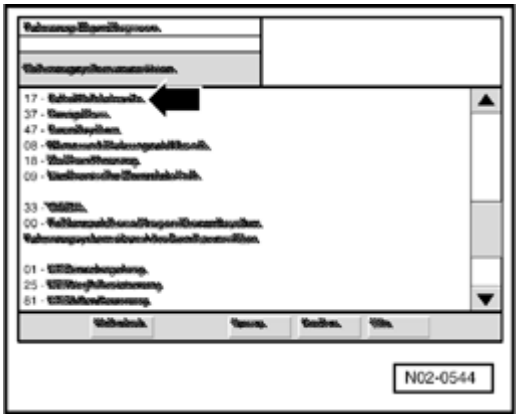
- Press > button to confirm.

- Select in succession:

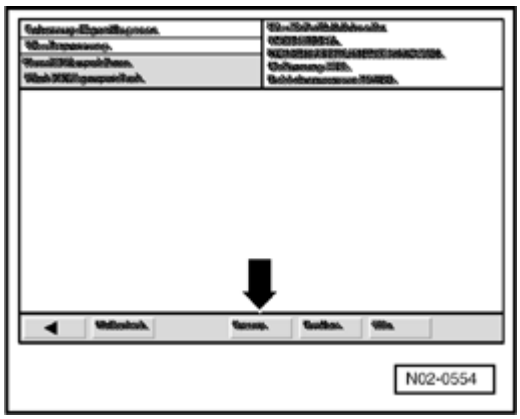
- Brand
- Model
- Model year
- Engine Code

- Confirm vehicle identification.

- Select in succession:



- "Instrument cluster" **- arrow -** .
- "Resetting Service Reminder Indicator (SRI)" .

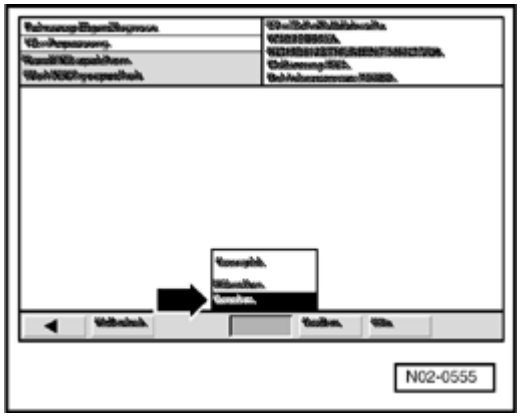


- Perform adaptation according to instructions of "GUIDED FUNCTIONS" .

End Adaptation

Indicated on display:

- Press the Go to button **- arrow -** on display.



Indicated on display:

- Press exit button **- arrow -** on display.

- Press exit button in exit menu.

- Turn off ignition and disconnect diagnostic connection.

- Switch ignition on.

After switching on the ignition, service event is no longer indicated in the odometer display in the instrument panel insert.

Service interval display, adapting

- Connect diagnostic tester ⇒ 01-3, Diagnostic testing unit, connecting .

- Switch ignition on.

- Touch button/field on screen. "GUIDED FUNCTIONS" on screen.

Note:

- *If the displays indicated in the work procedure are not indicated on display: ⇒ Operating instructions for Vehicle diagnosis, testing and information system VAS 5051 or Vehicle diagnosis and service system VAS 5052 .*

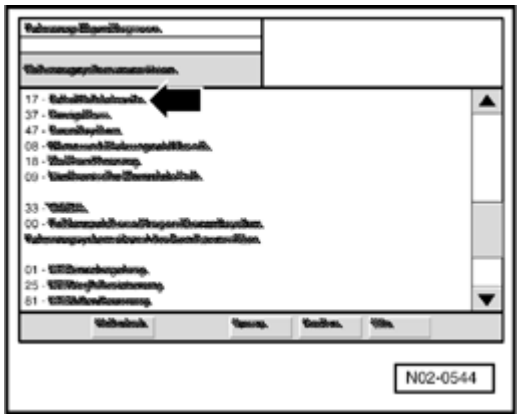
- Select in succession:

  - Brand
  - Model
  - Model year
  - Engine Code

- Confirm vehicle identification.

If the vehicle identification procedure was performed correctly, press > button for confirmation.

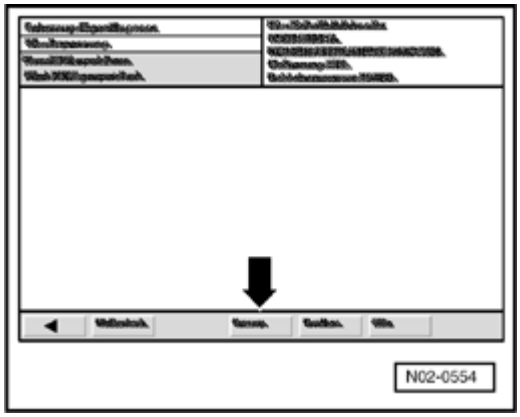
- Select in succession:



- "Instrument cluster" **- arrow -** .
- "Adapt service interval extension" .

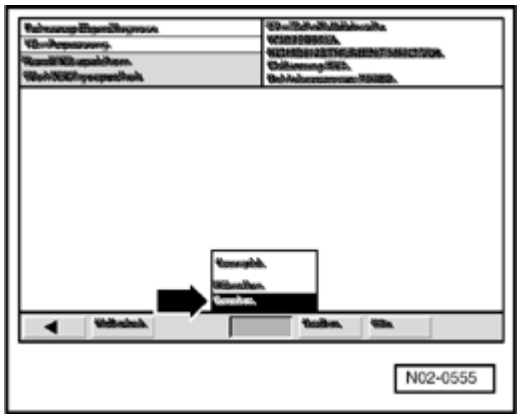
- Perform adaptation according to instructions of "GUIDED FUNCTIONS" .

End Adaptation



Indicated on display:

- Press the Go to button **- arrow -** on display.



Indicated on display:

- Press exit button **- arrow -** on display.

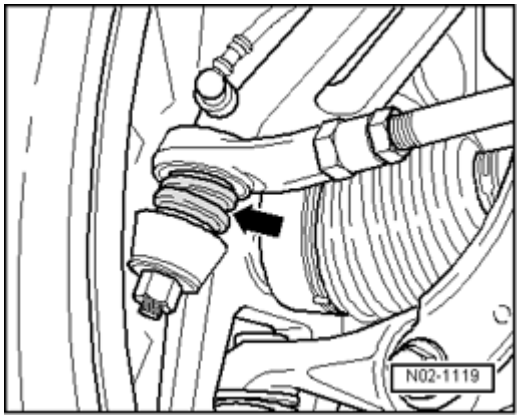
- Press exit button in exit menu.

- Turn off ignition and disconnect diagnostic connection.

Tie rod ends, check play, security and joint boots

Perform the following work procedure:

- With vehicle raised (wheels hanging free), check play by moving tie rods and wheels. Play: zero play

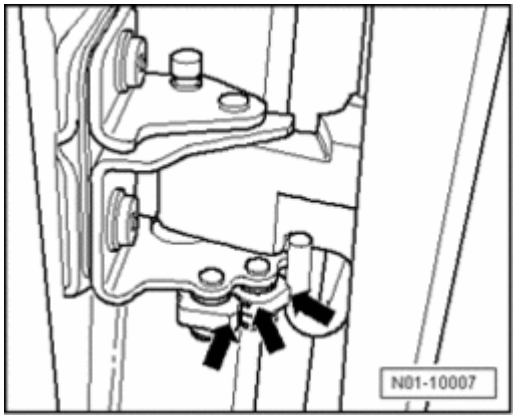


- Check mountings.

- Check tie rod joint boots **- arrow -** for damage and proper seating.

Door arrester, lubricate

Perform the following work procedure:



- Lubricate door arrester at points shown **- arrows -** .

Use lubricant G 000 150 .

Note:

- *Part numbers are for reference only. Always check*

with your Parts Department for the latest part number information

Underbody protection, perform visual check for damage

During visual check, observe floor pan, wheel housings and sills!

Note:

- *Malfunctions found must be rectified (repair measure). This inhibits corrosion and rusting through.*

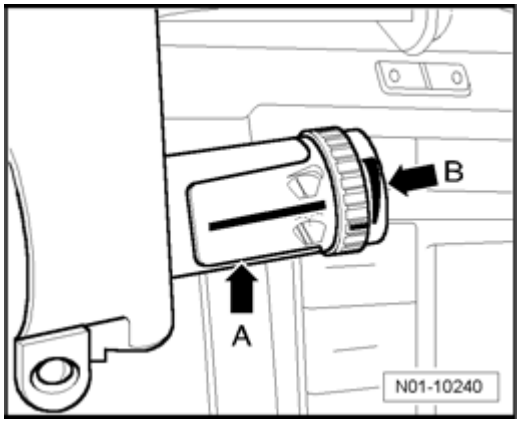
Setting time, language and units, on instrument cluster display

- Time: The time can be set here and can be switched between the 12 and 24 hour display.
- Language: The language of the instrument cluster display can be set here.
- Units: The units for temperature, consumption and pressure can be set here.

Instrument panel cluster, Highline (one-color display):

The menu can be operated using either the control elements in the windshield wiper stalk, or the control elements in the multi-function steering wheel.

1. Operating with windshield wiper stalk:



- Press selector **- B -** longer than 2 seconds, until the main menu is displayed.

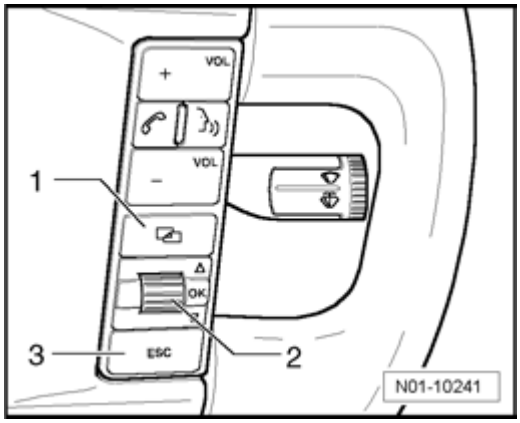
- Press the top or bottom selector, until the menu selection "COMFORT SETUP" is displayed inverted.

The main menu "Comfort setup" has the following functions, e.g. "Light" , "Speed warning" , "Time" , "Comfort" , "Language" , "Units" , "Reset" .

- Press the button **- A -** enough times until the appropriate menu is selected.

Using the button and selector, all of the other instrument cluster menus can be operated.

2. Operating with multi-function steering wheel:



- Touch (press) button **- 1 -** or button **- 3 -** to change menus and use thumb wheel **- 2 -** to make a selection (turn).

- Press button **- 1 -** or button **- 3 -** , until the menu selection "COMFORT SETUP" is displayed inverted.

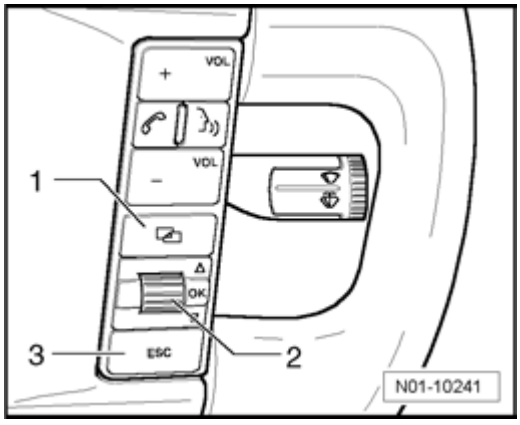
The main menu "Comfort setup" has the following functions, e.g. "Light" , "Speed warning" , "Time" , "Comfort" , "Language" , "Units" , "Reset" .

Turn the thumb wheel **- 2 -** until the desired menu selection is displayed.

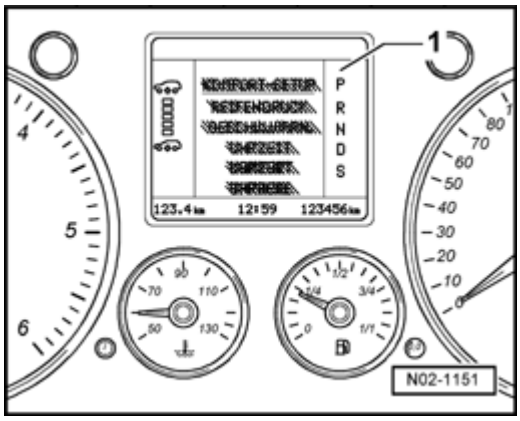
- Press the thumb wheel. The selected menu is displayed.

For example, set clock via multi-function steering wheel:

- Switch ignition on.



- Press button **- 1 -** to activate menu selection in instrument panel cluster display.



- Select the menu option "Clock" with the thumb wheel **- 2 -**

When the menu item "Clock" is selected in display **- 1 -** confirm the menu setting by pressing the thumb wheel.

- Set the time using the thumb wheel as well as the 12/24 hour clock mode settings.

Note:

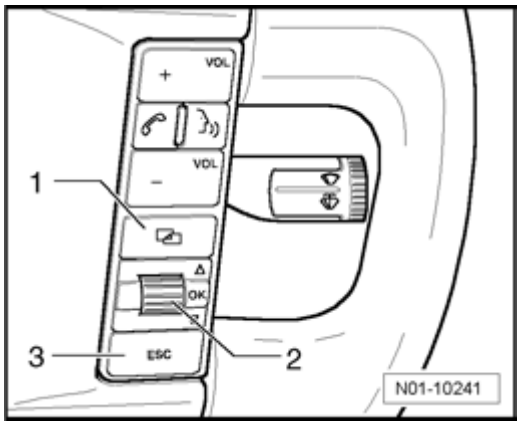
- *If the clock is found in the tachometer, the clock can be set using the adjustment knob below the tachometer.*

Instrument panel cluster, premium (color display)

Note:

- *In the color display, outside temperature, time and mileage are continually displayed.*

Operating with multi-function steering wheel:



- Touch (press) button **- 1 -** or button **- 3 -** to change menus and use thumb wheel **- 2 -** to make a selection (turn).

- Press button **- 1 -** or button **- 3 -** , until the menu selection "COMFORT SETUP" is displayed inverted.

The main menu "Comfort setup" has the following functions, e.g. "Light" , "Speed warning" , "Time" , "Comfort" , "Language" , "Units" , "Reset" .

Turn the thumb wheel **- 2 -** until the desired menu selection is displayed.

- Press the thumb wheel. The selected menu is displayed.

Toothed belt for camshaft drive, replacing (8-cyl. gasoline engine)

- Perform work sequence:

⇒ *Repair Manual, Engine Mechanical, Fuel Injection Ignition , Repair Group 15,*

Spark plugs, replacing

Spark plugs for 6-cyl. engine, replacing ⇒ 01-4, Vehicles with 6-cyl. gasoline engine

Spark plugs for 8-cyl. engine, replacing ⇒ 01-4, Vehicles with 8-cyl. gasoline engine

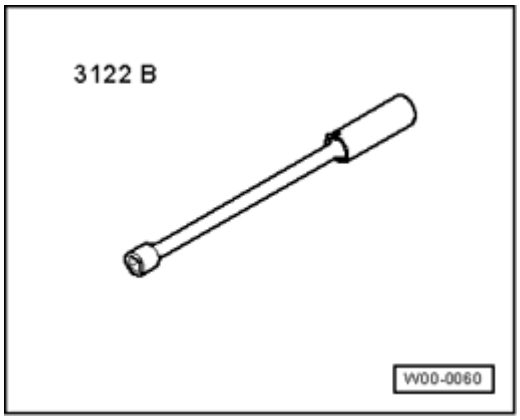
Note:

- *Plug designation and torque specification*

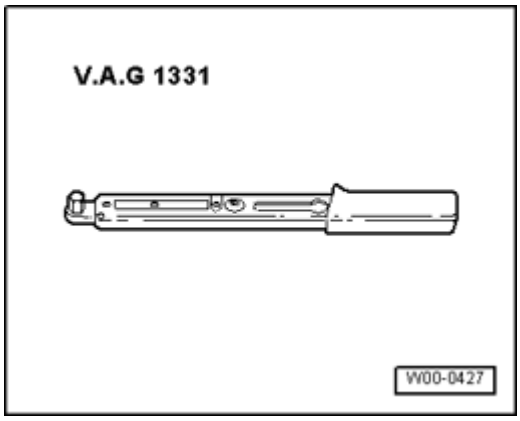
⇒ Repair Manual, Engine Mechanical, Fuel Injection Ignition , Repair Group 28,

- *Observe waste disposal regulations!*

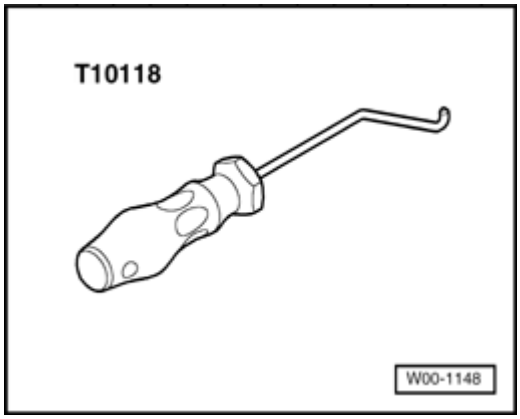
Special tools, testers and auxiliary items required



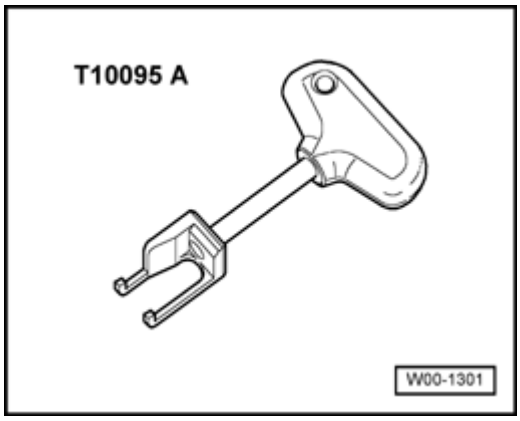
- Spark plug wrench 3122B



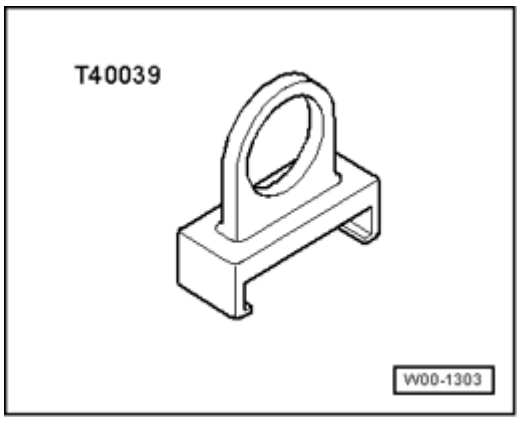
- Torque wrench V.A.G 1331/



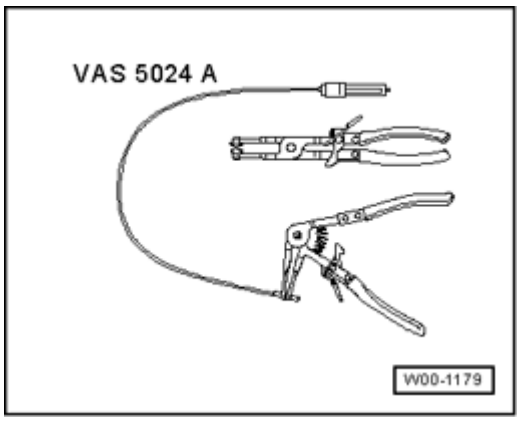
- Removal/installation tool T10118



- Puller T10095 A



- Puller T40039

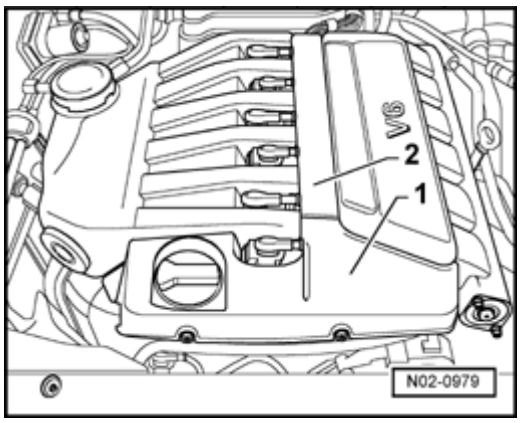


- Spring type clip pliers VAS 5024/

Vehicles with 6-cyl. gasoline engine

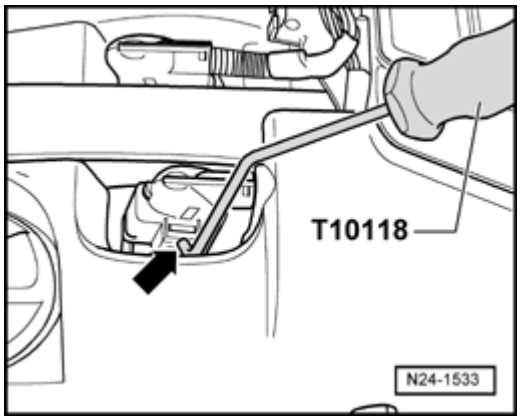
Removing:

Perform the following work procedure:

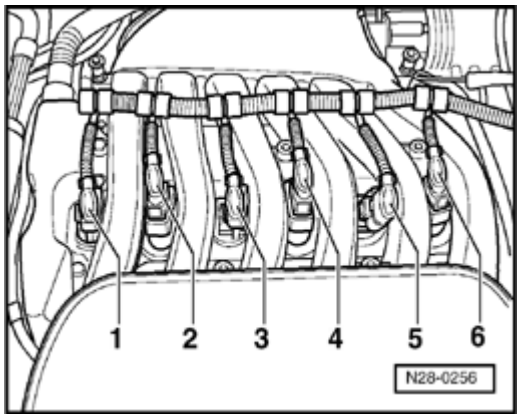


- Remove engine covers **- 1 -** and **- 2 -** upward.

Unlock connector release:



- Insert Removal/installation tool T10118 at the plug resting set **- arrow -** and carefully pull up, until the plug rest releases.

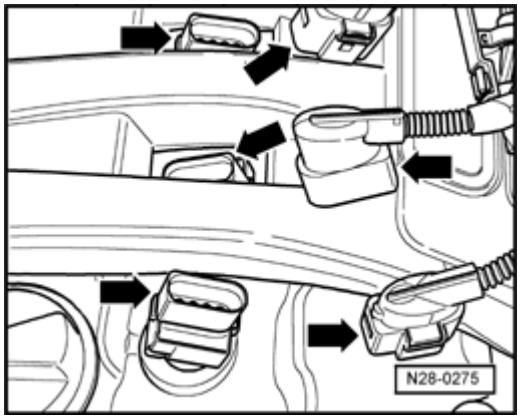


- Remove plugs **- 1 through 6 -** for ignition coils with power-output stages upward.

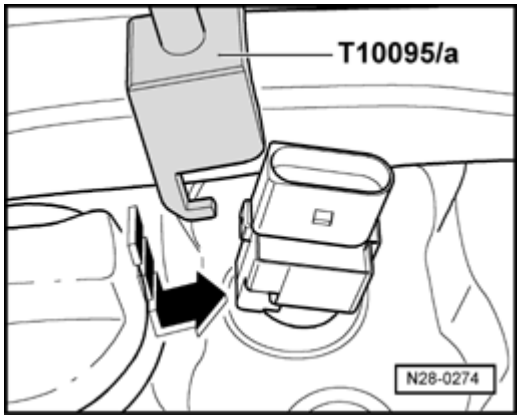
Note:

- *Before removing plugs, note installation position of ignition coils with power-output stages, if necessary,*

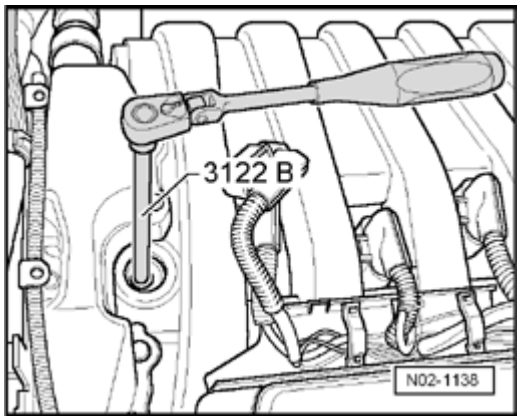
mark installation position of plugs.



The straight side of the connector must fit to the straight side of the ignition coil with power output stage **- arrow -** .



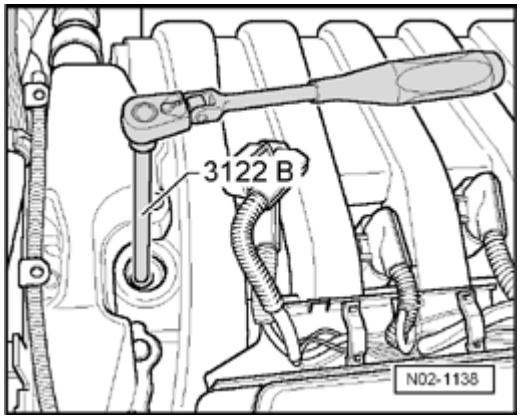
- Push the Puller T10095 A from the straight connector side, in the **- direction of arrow -** , on the ignition coil with power output stage.



- Pull the ignition coil with power output stage up perpendicularly and out.

- Remove spark plugs using spark plug wrench 3122B .

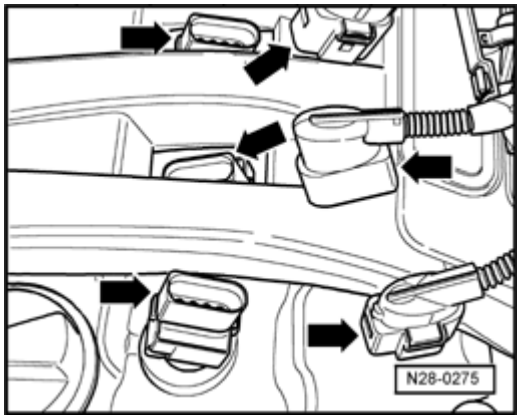
Installing:



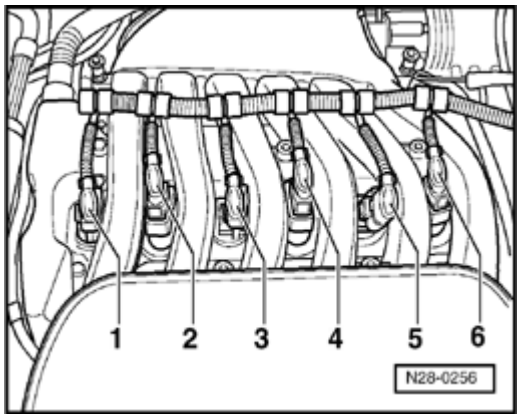
- Screw in new spark plugs using spark plug wrench 3122B .

Note:

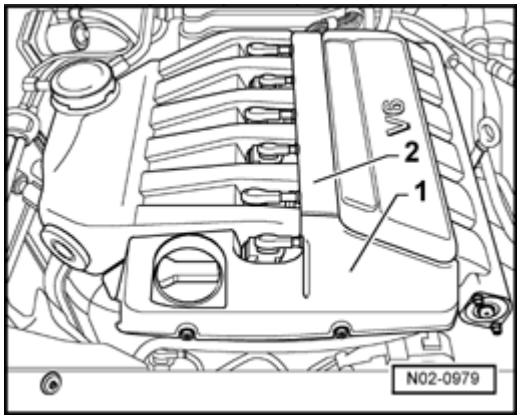
- *Observe torque specification!*



- Carefully insert ignition coils with power output stages on spark plugs by hand so that the straight connector sides fit to each other **- arrows -** .



- Install new spark plugs **- 1 through 6 -** .

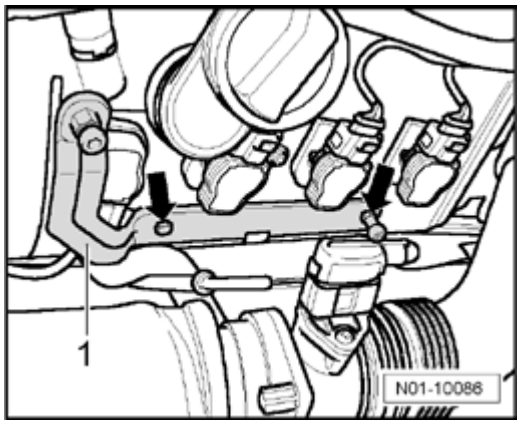


- Install engine covers **- 1 -** and **- 2 -** .

Vehicles with 8-cyl. gasoline engine

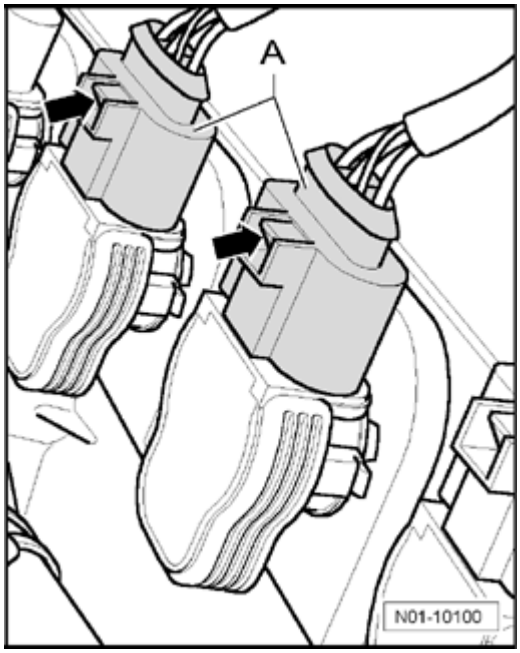
Removing:

- Unclip engine covers and remove upward.



- Remove bracket for left engine cover **- 1 -** .

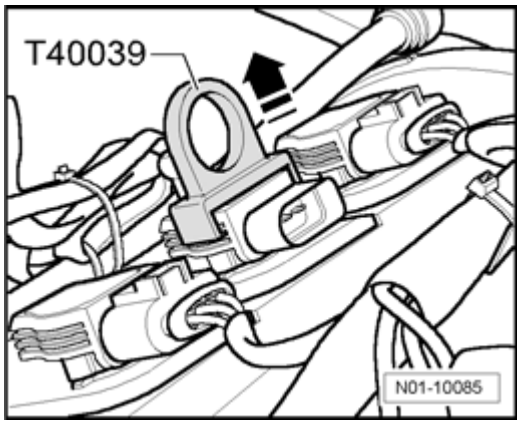
- Unscrew bolt as well as retaining bolts for engine cover **- arrows -** .



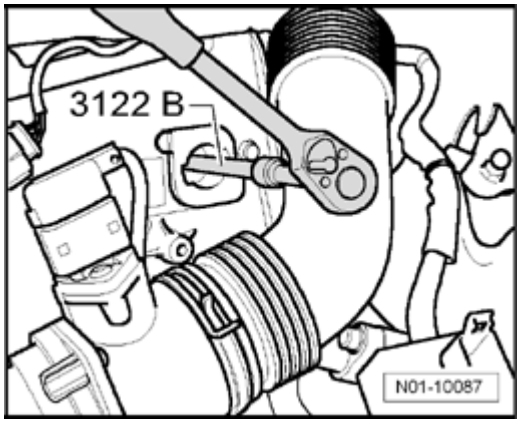
Press connector catches **-** **arrows** **-** in **-** **direction of arrow** **-** and disconnect connectors **-** **A** **-** from ignition coils with power output stages.

Note:

- *Before removing plugs, note installation position of ignition coils with power-output stages, if necessary, mark installation position of plugs.*

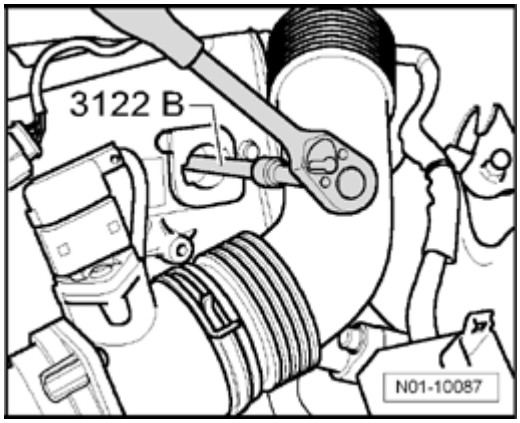


- Remove ignition coils with power-output stages using Puller T40039 in **-** **direction of arrow** **-** .



- Remove spark plugs using spark plug wrench 3122B .

Installing:



- Screw in new spark plugs using spark plug wrench 3122B .

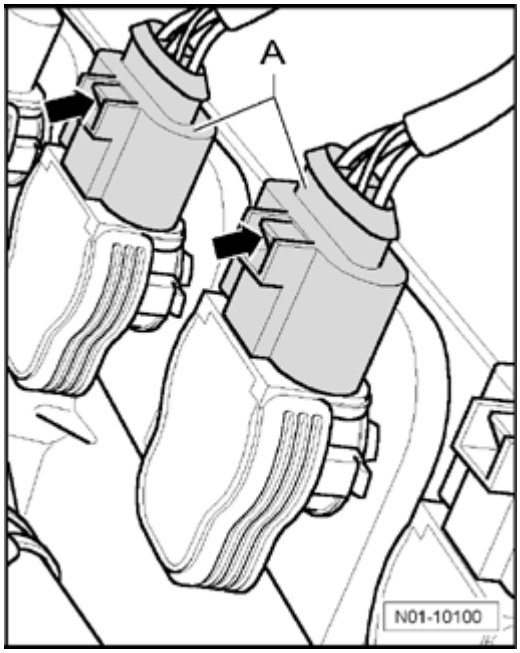
Note:

- *Observe torque specification! Current values*

  ⇒ *Repair Manual, Engine Mechanical, Fuel Injection Ignition , Repair Group 28,*

  .

- Install ignition coils with power output stages while lightly turning. They should noticeably engage.



- Re-connect connectors **- A -** so that they engage.

- Re-install left bracket for engine cover **- 1 -** and tighten it to 10 Nm.

- Install engine covers.

Static cornering lights and automatic headlamps, checking function

Static cornering lights

- Switch ignition and low beams on.

- Turn steering wheel out of center position one turn to the right and check in right headlamp whether cornering light bulb comes on.

- Repeat this step for left side.

Automatic headlamps

- Condition: There must be daylight when testing.

- Turn light switch to automatic headlamps position.

When there is daylight, headlamps must not come on.

- Using your hand or another suitable object, cover Rain and Light Recognition Sensor from outside behind front window in rearview mirror area.

This causes a decrease in light and both headlamps are switched on.