

# Volkswagen Touareg

## Battery

### **Warning!**

***Danger of injury! Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#)***

### **Caution!**

***In order to prevent damage to the battery or vehicle, observe battery type descriptions and notes ⇒ [27-1, Battery types](#) .***

## General information

The battery is one of the most important electrical components in the modern automobile. A battery that provides trouble-free service has a great influence on customer satisfaction. To ensure trouble-free service and optimum service life, batteries must be checked, serviced and maintained as per the instructions in this Manual.

Apart from starting the engine, the battery has other tasks. It acts as a buffer and also supplies electrical energy to the complete vehicle electrical system. In addition, the cyclical and capacity demands on the battery have increased due to additional safety and convenience features (electrical consumers) being installed.

The automobile battery has undergone many technical changes and improvements, and development of new battery technologies continues.

A new generation of maintenance free batteries uses physically and constructively optimized, lead-calcium coated positive electrodes. Advantages include minimal electrolyte consumption and servicing requirements, as well as improved charge stability over a longer period of time. Simplified checking of these batteries is also achieved with the charge indicator (magic eye).

Several different types of battery may be installed on Touareg vehicles. Each requires specific servicing.

Depending on engine, two different battery systems are used

### **Single battery system:**

consists of a conventional lead-acid battery with charge indicator (magic eye, no cell plugs) located under the

drivers seat.

### **Dual battery system:**

consists of a conventional lead-acid battery with charge indicator (magic eye, no cell plugs) located under the drivers seat. In addition, an Absorbent Glass Mat (AGM) sealed battery is located in the luggage compartment spare tire well.

#### **Note:**

- *The factory-installed AGM battery in the luggage compartment has a predetermined electrolyte level, is leak proof, has a very good life cycle and is considered maintenance free.*
  
- *AGM batteries are more resistant to influences of weather and vibration than normal lead-acid batteries and are less likely to leak or be damaged when tilted.*
  
- *The procedures described here apply to all battery types.*

#### **Note:**

- *Additional information:*

⇒ *Self Study Program - Course Number 89E303 "The Touareg"*

⇒ *Self Study Program - Course Number 89J303 "The Touareg Electrical System Design and Function"*

⇒ *Wiring Diagrams Component Locations*

### **Battery types**

#### **Low maintenance battery**

#### **Low Maintenance Batteries: Batteries with electrolyte, lead-antimony coated electrodes and removable cell caps**

A low maintenance battery is characterized as a lead-acid battery that, during normal operation, requires regular inspection and topping-up of distilled water as necessary. Cell caps may be covered with foil.

A low maintenance battery may or may not be equipped

with a charge indicator ("magic eye") that displays electrolyte level and charge condition.

#### **Maintenance-free battery**

#### **Maintenance Free Batteries: Batteries with electrolyte, lead-calcium coated electrodes and cells that are permanently sealed after initial filling**

A maintenance free battery is characterized as a permanently sealed lead-acid battery that, during normal operation, does not require regular inspection and topping-up of distilled water.

A maintenance free battery is always equipped with a charge indicator (magic eye) that displays electrolyte level and charge condition.

#### ***Caution!***

***Under no circumstances should the cell cover (seal) on a maintenance free battery be removed. Battery will be damaged and become unusable.***

#### **Absorbent Glass Mat (AGM) battery**

#### **Absorbent Glass Mat (AGM) Batteries: Batteries with electrolyte immobilized in fiberglass mat, lead coated electrodes and cells that are permanently sealed after initial filling.**

AGM Batteries are considered maintenance free and do not require regular inspection and topping-up of distilled water.

AGM battery is installed in luggage compartment spare tire well on vehicles with dual-battery system.

#### **Note:**

- *The work procedure for testing and charging conventional and AGM batteries is the same.*
  
- *When replacing an AGM battery, another AGM battery must be installed.*

#### **Warnings and Safety Measures for lead-acid batteries**

##### **Safe interaction with vehicle batteries**

##### **Recognizing and preventing risks**

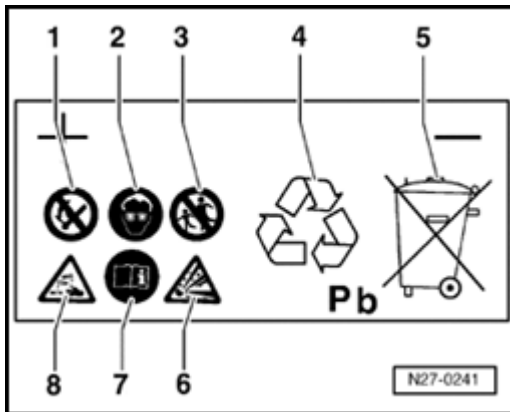
Batteries possess risks. These risks are prevented when

the warnings on the battery label, owners manual and in this Repair Manual are observed.

**Warning!**

- ***Personnel instructed in protection, such as e. g. a trainee or apprentice, may only perform work on vehicle batteries under supervision of technical personnel such as e. g. a master automotive mechanic or a master automotive electrician.***
  
- ***Acid has strong corrosive properties. If batteries are handled inappropriately, there is a risk that personal injury may result from exposure to harmful electrolyte influences. Therefore, suitable remedies for acid damage must be kept readily available. Suitable remedy is e.g. soap solution.***
  
- ***If electrolyte drips out from the battery, skin can be acid-burned, and the vehicle may be affected by acid erosion and corrosion. It is a possibility that safety-related vehicle components can be damaged.***
  
- ***When charging and when resting after charging, explosive gas is present. In extreme cases, if battery is handled inappropriately, the emitted gases may cause the battery to explode.***
  
- ***Generating sparks by sanding, welding, separating work and open flame, e.g. smoking in vicinity of the battery, is prohibited. Producing sparks through electrostatic discharge must also be avoided. Always touch the vehicle body before touching the battery.***
  
- ***Only perform battery procedures in suitable and well-ventilated rooms.***

**Battery safety labels, understanding and prevention**



Battery safety label

### **Warning!**

**1 - Keep open flames and sparks away and DO NOT smoke near batteries! Avoid sparks when working with cables and electrical units. Always reinstall battery positive (B+) or negative (-) terminal covers if removed during servicing.**

- **Avoid sparks when working with cables and electrical units.**
- **Always reinstall battery positive (B+) or negative (-) terminal covers if removed during servicing.**

**2 - Always wear eye protection when working with electrolyte!**

- **If electrolyte gets into eyes, flush with large quantities of water. Seek medical attention immediately!**

**3 - Keep children away from batteries!**

**4 - Dispose of batteries properly!**

- **Waste batteries must only be disposed of in appropriate waste disposal sites. Refer to local regulations pertaining to battery disposal.**

**5 - Never dispose of batteries in household waste!**

**6 - Danger of explosion!**

- **Batteries produce explosive gasses while being**

**charged.**

- **Keep open flames and sparks away and DO NOT smoke near batteries.**
- **The battery charger MUST be turned off when connecting or disconnecting the cables at the battery.**
- **Battery cell caps must NOT be removed while charging.**
- **Ensure that battery is charged in a well ventilated area.**
- **Avoid short circuits. Always reinstall battery positive (B+) or negative (-) terminal covers if removed during servicing.**

**7 - Read and follow all instructions on battery, contained in Repair Manual, Electrical Equipment, and in Owners Manual!**

**8 - Battery acid can cause severe burns!**

- **When working with electrolyte always wear eye protection, rubber gloves and a suitable apron. If electrolyte is spilled on eyes, skin, clothing (or painted surfaces), flush at once with large quantities of water.**
- **Never tip a battery on edge. Electrolyte can spill from the ventilation openings.**

**Battery post/terminal, handling instructions**

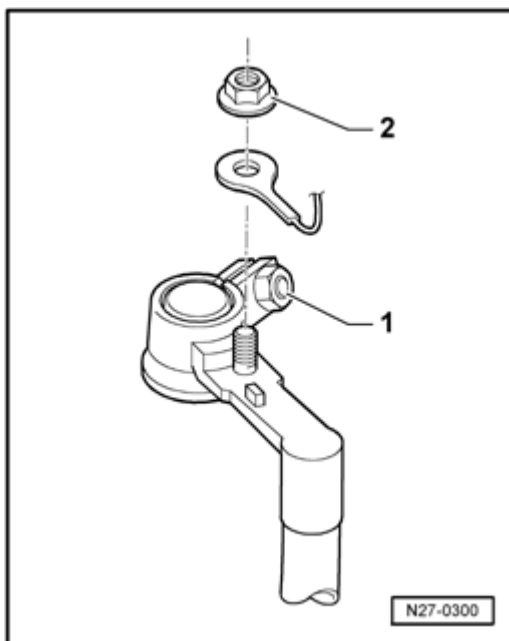
**Caution!**

**In order to prevent damage to the battery terminals and battery posts, observe the following:**

- **Battery terminals must only be placed on battery posts without using force (by hand only).**
- **Do not apply grease to battery terminals or**

**posts.**

- **Battery terminals must be securely and fully seated on the battery post before tightening (battery post flush with terminal or protruding slightly from terminal).**
- **Battery terminals that are torqued to specification must NOT be tightened any further. Terminal damage will result.**
- **Observe work procedure and Notes for disconnecting and reconnecting battery terminals ⇒ [27-4, Battery, disconnecting and reconnecting](#) .**



Battery terminal - 1 - and additional terminal - 2 -  
tightening torques ⇒ [27-8, Battery, tightening torques](#)



## Battery, checking

### **Warning!**

***Danger of injury! Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#)***

### **Caution!**

***In order to prevent damage to the battery or vehicle, observe battery type descriptions and notes ⇒ [27-1, Battery types](#) .***

## Battery, checking procedure

### **Perform battery checks in the following sequence:**

- Visual check ⇒ [27-2, Visual check](#) .
- Battery with charge indicator (magic eye), checking ⇒ [27-2, Batteries with charge indicator \(magic eye\), checking](#) or low-maintenance battery, checking ⇒ [27-2, Low-maintenance battery, checking](#) .
- No load voltage, checking ⇒ [27-2, No load voltage, checking](#) .
- Battery, testing ⇒ [27-2, Battery, testing](#) .

## Visual check

### **Warning!**

***Danger of injury! Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#)***

Prior to performing any measurements or tests, perform a visual check of the battery condition, battery terminals and secure mounting of battery.

### **Caution!**

- ***An improperly secured battery can lead to damage.***
- ***Excessive vibration due to an improperly secured battery will reduce the battery service life, and the battery hold-down bracket could***



***damage the battery housing and lead to electrolyte leakage.***

- ***Check battery for secure mounting. Always tighten battery hold-down bracket bolt to specified*** ⇒ [27-8, Battery, tightening torques](#) .

**By performing visual inspection, it can be determined:**

- If the battery case is damaged. Acid can leak out if the case is damaged. Battery acid that has leaked out can cause severe damage to the vehicle. Acid that has leaked onto any part of the vehicle should be immediately treated with acid neutralizer or soap solution.
- If the battery terminals (battery wiring connections) are damaged. If battery terminals are damaged, contact with battery terminal clamps cannot be guaranteed. Ensure that all battery terminal connections are securely connected and tightened to the specified torque. If the battery post clamps are not correctly installed and secured, the wiring may burn. Substantial malfunctions to the electrical system are a consequence. Safe operation of the vehicle can no longer be guaranteed.

**Batteries with charge indicator (magic eye), checking**

***Warning!***

***Danger of injury! Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries*** ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#)

The charge indicator (magic eye) provides information concerning the level of the electrolyte and the charge state of the battery.

Batteries with charge indicator (magic eye) are available in two variations:

- Low maintenance ⇒ [27-1, Low maintenance battery](#)
- Maintenance free ⇒ [27-1, Maintenance-free battery](#)

**Note:**

- *As the charge indicator is located in a single cell, the indication is only valid for that cell. An exact assessment of battery condition should always be confirmed by performing battery test ⇒ [27-2, Battery, testing](#) .*

- To obtain an accurate reading, gently tap the charge indicator with a screwdriver handle or rock vehicle slightly.

By doing this, the air bubbles that occur normally during battery charging (even during vehicle operation) that adversely affect charge indicator reading will be displaced. Thereby, the color indicator of the magic eye is more accurate.

**Note:**

- *Especially when a battery is charged, including when the battery is charged while driving, air bubbles can form under the charge indicator. These bubbles may cause color indicator of the magic eye to read inaccurately.*
- *The charge indicator can be installed at various locations on top of battery.*

There are three possible color indications:

- "Green" : Battery is sufficiently charged.
- "Black" : Insufficiently charged 65 % or discharged.
- "Colorless or yellow" : Replacing battery.

Battery, charging ⇒ [27-3, Battery, charging](#)

**Low-maintenance battery, checking****Warning!**

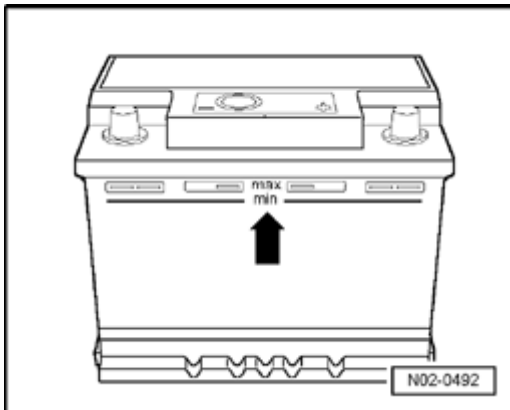
***Danger of injury! Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#)***

This battery is "low maintenance" , which means the electrolyte level must be checked and topped up with

distilled water, if necessary.

### Electrolyte level, checking

#### Check electrolyte level on battery case:



- Check the electrolyte level using the - **min. / max.** - markings on the battery case.

The electrolyte level is OK when the level is aligned with the max. marking.

If the electrolyte level is below - **max.** - marking: Marking:

- Top up with distilled water ⇒ [27-2, Topping up with distilled water](#) .

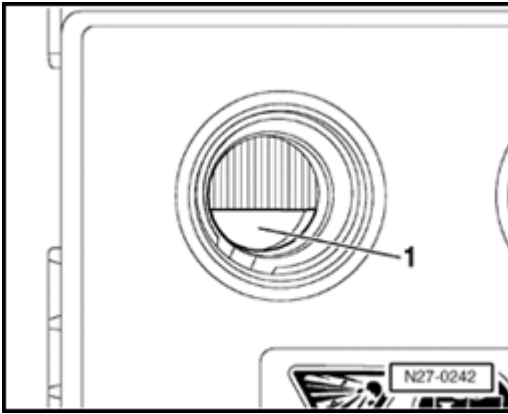
#### Checking electrolyte level in the cells:

- Turn off the ignition and all electrical consumers.
- If equipped, pull the protective foil off from over the cell caps.

#### **Note:**

- *The foil with Warning notes must remain on battery.*

- Remove cell caps.
- Check electrolyte level in battery cells.



Electrolyte level must align with the internal electrolyte level indicator (lip) - 1 - .

**Note:**

- *The level indicator lip equates to the external "maximum" marking on the battery case.*

If electrolyte level is OK:

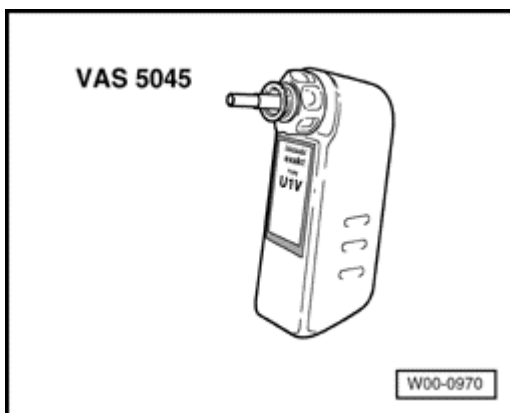
- Check cell caps and O-ring seals for damage. Damaged parts must be replaced.
- Close cells with cell caps.

If electrolyte level is below indicator lip:

- Top up with distilled water ⇒ [27-2, Topping up with distilled water](#) .

**Topping up with distilled water**

**Special tools, testers and auxiliary items required**



- Battery Fill Bottle VAS5045

**Caution!**

- ***The battery will be damaged if topping up with water that is not distilled or with battery acid. Top up with distilled water only.***
  
- ***The battery can be damaged by overfilling the cells. To top up, use the Battery Fill Bottle VAS5045 exclusively. The construction of the filler nozzle prevents the cell from being overfilled.***

- Check battery electrolyte level ⇒ [27-2, Electrolyte level, checking](#) .
- Turn off the ignition and all electrical consumers.
- If equipped, pull the protective foil off from over the cell caps.

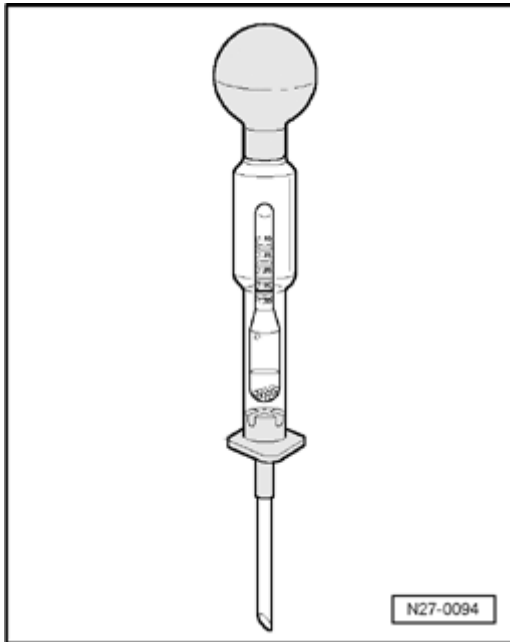
**Note:**

- *The foil with Warning notes must remain on battery.*

- Remove cell caps.
- Add distilled water using Battery Fill Bottle VAS5045 . Once the maximum fill level has been reached, the flow stops automatically.
- Check cell caps and O-ring seals for damage. Damaged parts must be replaced.
- Close cells with cell caps.
- Check no load voltage ⇒ [27-2, No load voltage, checking](#) .
- Test battery ⇒ [27-2, Battery, testing](#) .

**Specific gravity, checking**

**Special tools, testers and auxiliary items required**



- Commercially available electrolyte hydrometer

- Check battery electrolyte level ⇒ [27-2, Electrolyte level, checking](#) .

- Turn off the ignition and all electrical consumers.

- If equipped, pull the protective foil off from over the cell caps.

**Note:**

- *The foil with Warning notes must remain on battery.*

- Remove cell caps.

- Extract enough electrolyte out of one cell with the hydrometer, until the floater floats freely.

The specific gravity of the electrolyte is determined by how deep the floater sets in the electrolyte. The value can be read from the scale on the floater.

Specific gravity of electrolyte	Charge status	Voltage
1.28 g/cm <sup>3</sup>	100 %	12.7 V
1.21 g/cm <sup>3</sup>	60 %	12.3 V
1.18 g/cm <sup>3</sup>	40 %	12.1 V
1.10 g/cm <sup>3</sup>	0 %	11.7 V

**Note:**

- *If testing the specific gravity of electrolyte immediately after topping up with distilled water, the measured values will be incorrect. Test the specific gravity of the electrolyte after the battery has been charged.*

- Check cell caps and O-ring seals for damage. Damaged parts must be replaced.
- Close cells with cell caps.

### No load voltage, checking

#### **Warning!**

***Danger of injury! Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#)***

The no load voltage test determines the performance capacity of the battery.

#### **Note:**

- *Battery to be tested must not have been charged or discharged for at least 2 hours before testing. Charging or discharging within two hours prior to performing test will result in erroneous results.*

No load voltage	Charge condition	Battery condition
11.70 V	0 %	Discharged. Performance capacity diminished completely. Charging totally discharged batteries ⇒ <a href="#">27-3, Totally discharged batteries, charging</a>
12.20 V	50 %	Battery will begin to sulfate over time. Initial sulfating can be reversed by charging battery. Batteries allowed to sulfate for long periods of time become damaged internally.
12.35 V	65 %	<ul style="list-style-type: none"> <li>▪ Batteries with charge indicator: Indication changes from green to black.</li> <li>▪ On new/inventory vehicles, battery should be charged.</li> </ul>
12.70 V	100 %	Battery at full performance capacity.

### Special tools, testers and auxiliary items required



- Hand-held multimeter V.A.G 1526 B

- Disconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .
- Wait at least 2 hours. Battery must not be either charged or discharged during this time.
- Measure no load voltage of battery with the hand-held multimeter V.A.G 1526 B .

Measured value	Required actions
No load voltage $\geq 12.5$ V	No load voltage OK, perform battery test ⇒ <a href="#">27-2, No load voltage, checking</a> .
No load voltage $12.5$ V	Charge battery ⇒ <a href="#">27-3, Battery, charging</a>

If the battery was charged, based on the result of measuring the no load voltage, proceed as follows:

- Wait at least 2 hours. Battery must not be either charged or discharged during this time.
- Repeat no load voltage measurement using hand-held multimeter V.A.G 1526 B .

Should no load voltage again be  $12.5$  V, replace battery ⇒ [27-5, Battery, removing and installing](#) .

## Battery, testing

### Note:

- *In order to better determine a battery's overall condition, it is recommended to always perform the battery test in conjunction with the electrolyte specific gravity test (where applicable).*



- Always follow the battery tester operating instructions.
- It is not necessary to remove battery from vehicle or disconnect battery terminals.

#### Battery, testing with Midtronics Mcr340V Batt. Tester MCR340V

##### **Warning!**

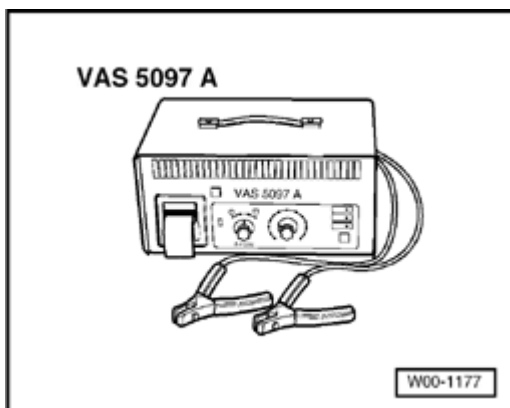
**Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries for lead-acid batteries ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#) !**

- **Dispose of electrolyte (sulfuric acid/water mixture) properly! Waste electrolyte must only be disposed of in appropriate waste disposal sites. Refer to local regulations pertaining to electrolyte disposal.**
- **DO NOT battery test batteries which are gassing. Otherwise there is a risk of explosion.**
- **The following notes and procedures must be followed to ensure correct measurements.**

##### **Caution!**

**In order to prevent damage to the battery or vehicle, observe battery type descriptions and notes ⇒ [27-1, Battery types](#) .**

#### Special tools, testers and auxiliary items required



- Midtronics Mcr340V Batt. Tester MCR340V (VAG

tester illustrated here for reference only).

### **Caution!**

#### **Before beginning repairs on electrical system**

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

- Check no-load voltage ⇒ [27-2, No load voltage, checking](#) .
- Connect tester cable clamps to battery terminal MCR 340V Instruction Manual Tester leads must be securely fastened and make proper contact with the battery posts.
- Select test mode "IN-VEHICLE" or "OUT-OF-VEHICLE" ⇒ *MCR 340V Instruction Manual* .
- Select battery type (AGM or conventional) ⇒ *MCR 340V Instruction Manual*
- Set tester to "Warranty Test" ⇒ *MCR 340V Instruction Manual* .
- Perform battery test by setting load current on tester according to battery (DIN) capacity ⇒ *MCR 340V Instruction Manual* .

#### **Note:**

- *Use print function of MCR 340V where test results are required for warranty claims.*

#### **Battery test results:**

Battery Tester Display / Printout	Required action
Good Battery	None
Good - Recharge	Charge battery where necessary ⇒ <a href="#">27-3, Battery, charging</a>
Use inCHARGE	Charge battery ⇒ <a href="#">27-3, Battery, charging</a>
Replacing Battery	Replacing battery under drivers seat ⇒ <a href="#">27-5, Battery under drivers seat, removing and installing</a> or replace battery in luggage compartment ⇒ <a href="#">27-5, Battery in luggage compartment, removing and installing</a>
Bad Cell - Replacing	Replacing battery under drivers seat ⇒ <a href="#">27-5, Battery under drivers seat, removing and installing</a> or replace battery in luggage compartment ⇒ <a href="#">27-5, Battery in luggage compartment, removing and installing</a>



## Battery, charging

### **Warning!**

**Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries for lead-acid batteries**  
⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#) !

### **Caution!**

**In order to prevent damage to the battery or vehicle, observe battery type descriptions and notes** ⇒ [27-1, Battery types](#) .

## Battery charger, connecting

### **Warning!**

#### **Danger of explosion!**

- **Batteries produce explosive gasses while being charged.**
- **Keep open flames and sparks away and DO NOT smoke near batteries.**
- **The battery charger MUST be turned off when connecting or disconnecting the cables at the battery.**
- **Battery cell caps must NOT be removed while charging.**
- **"Boosting" a sulfated battery a high charging rate can cause an explosion.**
- **Ensure that battery is charged in a well ventilated area.**
- **Precision tools must not be kept in the same room where batteries are being charged. Tools may corrode due to chemical reaction.**

**Special tools, testers and auxiliary items required**

- Midtronics Inc-940 Batt. Charg. Str. INC-940 .

**Note:**

- *Before charging, battery must have a minimum temperature of 10 degrees Celsius (50 degrees Fahrenheit).*
- *It is not necessary to remove battery from vehicle or disconnect battery terminals.*
- *Charging voltage must not exceed 14.4V.*
- *Always follow the battery charger operating instructions.*
- *After charging, confirm battery no load voltage and electrolyte specific gravity before reuse in vehicle.*

**Caution!****Before beginning repairs on electrical system**

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

**Warning!****If battery begins gassing (boiling) violently when charging, REDUCE charging rate immediately.**

- Connect battery charger to battery, positive to positive ( + ), negative to negative ( - ).
- Switch on battery charger.
- Adjust charging rate according to battery capacity (refer to charger instructions).

**Totally discharged batteries, charging****Warning!**

**Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries for lead-acid batteries**  
⇒ **[27-1, Warnings and Safety Measures for lead-acid](#)**

## **batteries !**

Batteries that have not been used for long periods of time begin to self discharge (e.g. vehicles in storage). Under these conditions, the battery begins to sulfate and the surface area of the battery plates hardens. A battery is considered to be discharged when the no-load voltage is less than or equal to 11.7 V. No load voltage, checking ⇒ [27-2, No load voltage, checking](#)

On discharged batteries, the electrolyte (sulfuric acid/water mixture) is almost all water. When these batteries are exposed to freezing temperatures, permanent damage to the battery plates (and housing) results.

If a totally discharged battery is charged quickly ( "quick charged" or "boost charged" ), only a surface charge is accepted (if at all). The battery may even test OK immediately after charging. However, in this case the sulfating process continues inside the battery. Once a battery begins to sulfate, its ability to further accept a routine charge (from the Generator) and provide adequate load and reserve performance will diminish until the battery malfunctions.

Totally discharged batteries must only be slow charged and retested.

- Apply a maximum charge current that is no more than 10% of battery capacity, e.g.: for a 60Ah battery, max. charge current = 6 amps.
- Charge a totally discharged battery for a minimum of 24 hours.

### **Caution!**

- ***Discharged batteries freeze prematurely.***
- ***Frozen batteries or batteries that have been frozen and subsequently hawed must no longer be used.***
- ***Never "quick charge" a totally discharged battery. Effective charging will not take place, despite what appears to be a sufficient voltage applied. Batteries loaded in this manner may be incorrectly evaluated as OK and battery damage may result.***



## Battery, disconnecting and reconnecting

### **Warning!**

***Danger of injury! Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#)***

### **Caution!**

***In order to prevent damage to the battery or vehicle, observe battery type descriptions and notes ⇒ [27-1, Battery types](#) .***

**Battery - single battery system, disconnecting and reconnecting ⇒ [27-4, Battery - single battery system, disconnecting and reconnecting](#)**

**Battery - dual battery system, disconnecting and reconnecting ⇒ [27-4, Batteries - dual battery system, disconnecting and reconnecting](#)**

**Battery - single battery system, disconnecting and reconnecting**

Battery - dual battery system, disconnecting and reconnecting ⇒ [27-4, Batteries - dual battery system, disconnecting and reconnecting](#) .

A conventional maintenance-free battery with charge indicator is installed under the drivers seat.

### **Caution!**

- ***Always ensure the vehicle electrical system is protected by disconnecting the battery negative ( - ) terminal (interrupted current flow to ground) prior to servicing key areas of the electrical system as specified in this Repair Manual.***
  
- ***Do not loosen or remove ground strap from body. Disconnect terminal from battery only.***
  
- ***Disconnecting the battery positive ( B+) terminal must only be performed as required to remove battery from vehicle, and must only be carried out after the negative ( - ) terminal is disconnected.***

- **When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual.**

### Battery, disconnecting:

#### Note:

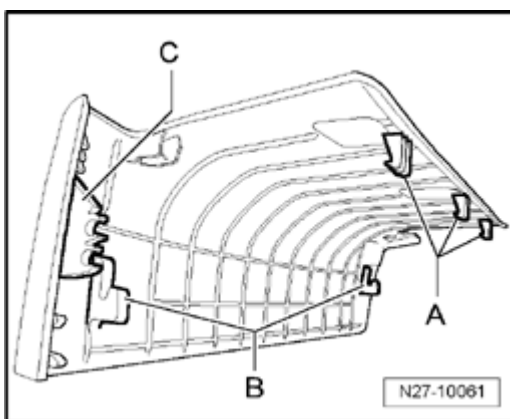
- *Anti-theft alarm system must be deactivated prior to disconnecting battery ⇒ [96-10, Anti-theft alarm system, activating and deactivating](#) .*

### Drivers seat lower trim, removing

#### Caution!

- **In order to prevent damaging the trim panel under the drivers seat during removal, it is absolutely critical that the location of trim panel locking/locating tabs - A - , - B - and - C - be observed as illustrated here.**
- **Release of trim panel locking tabs MUST be performed using the following step-by-step procedure, in the sequence given.**

#### Note:

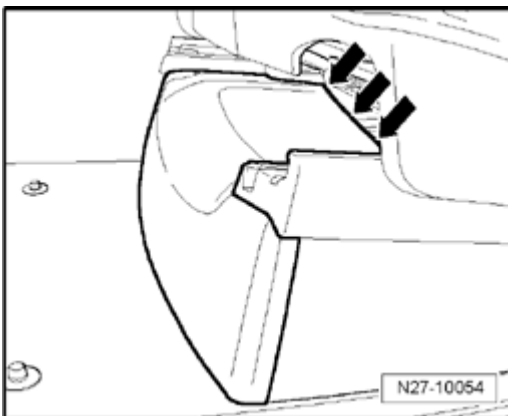


- *Locking tabs - A - are engaged into a transverse member under seat. Release locking tabs by simultaneously pressing down and rearward on rear edge of trim panel. To disengage, hold trim firmly in this position and then pull upward in area of locking tabs - A - .*

- *Locking tabs - **B** - engage in slots located ahead of seat. These must be released by pressing downward and pulling toward front.*
- *Retaining tabs - **C** - are clipped into side trim of seat and must be unclipped by pulling toward front.*

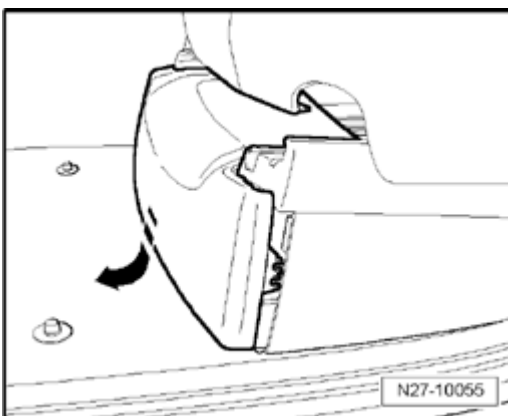
- Move drivers seat to rear and highest position.

- First, release locking tabs "A" .



- Release locking tabs "A" by simultaneously pressing down and rearward on rear edge of trim panel in areas indicated by - **arrows** - .

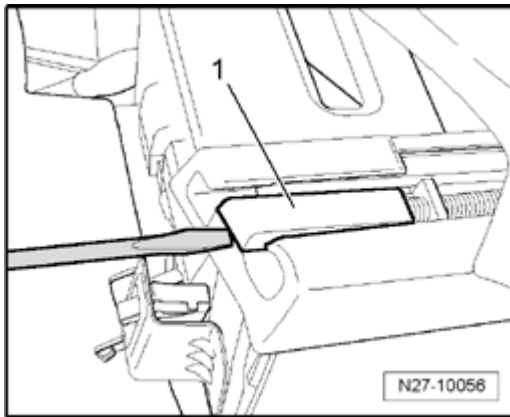
- Next, release locking tabs "B" and locating tabs "C" .



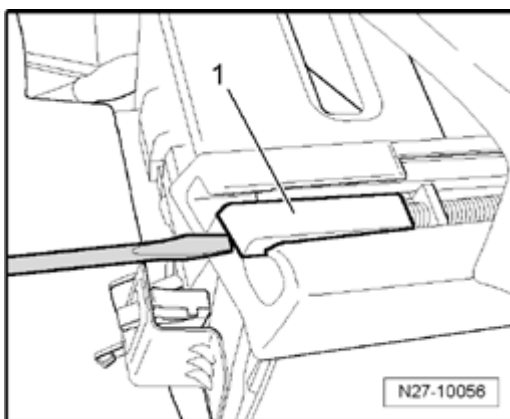
- Release locking tabs "B" and locating tabs "C" by carefully pushing front edge of trim panel downwards and simultaneously pulling panel away from seat mounting frame in direction of - **arrow** - .

**Note:**

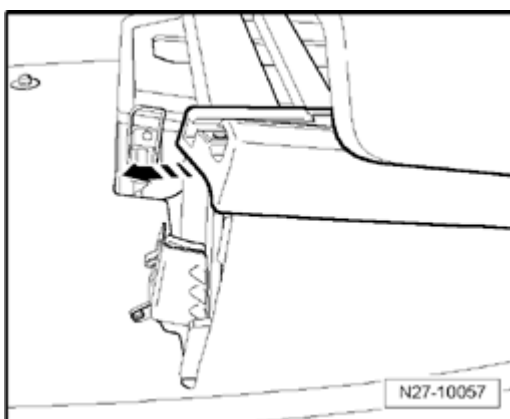




- *Cover - 1 - is installed only on Comfort seats, on vehicles with normal or sport seats the seat spindle trim is simply pulled off.*



- Carefully pry up cover - 1 - and remove from front seat spindle.

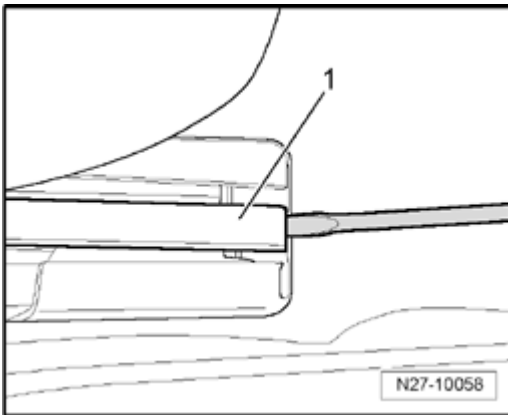


- Pull off front spindle trim from seat track in direction of - **arrow** - .
- Move drivers seat forward and to highest position.

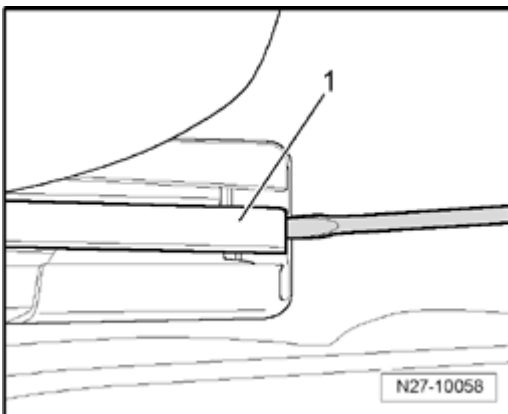
**Note:**

- *Remove trim from both rear seat spindles. Removal*

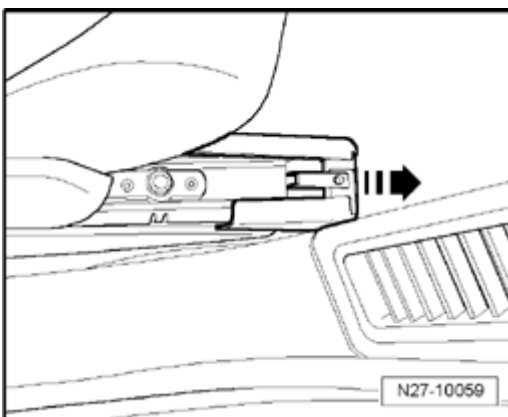
*of one side only is illustrated here.*



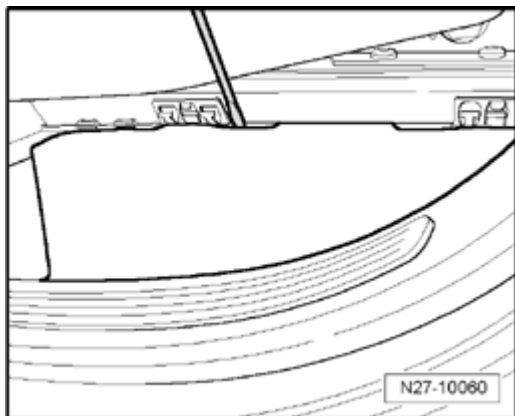
- *Cover - 1 - is installed only on Comfort seats, on vehicles with normal or sport seats the seat spindle trim is simply pulled off.*



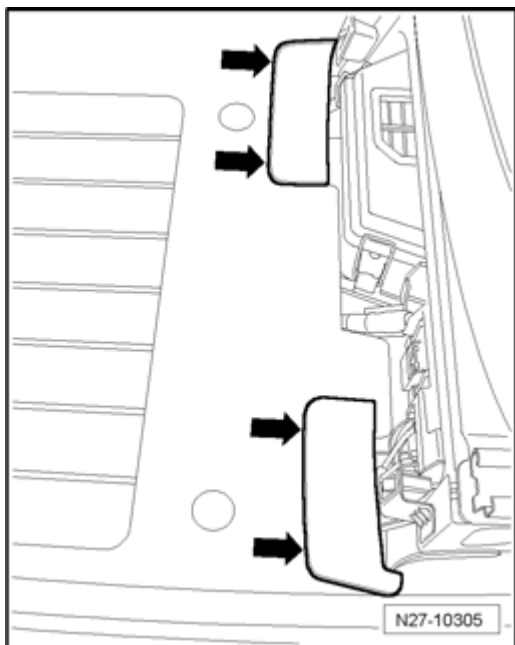
- Carefully pry up cover - 1 - and remove from rear seat spindle.



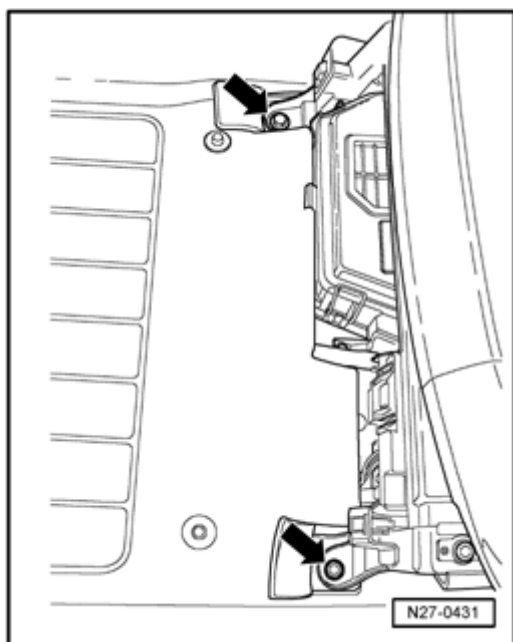
- Pull off rear spindle trim from seat track in direction of - **arrow** - .



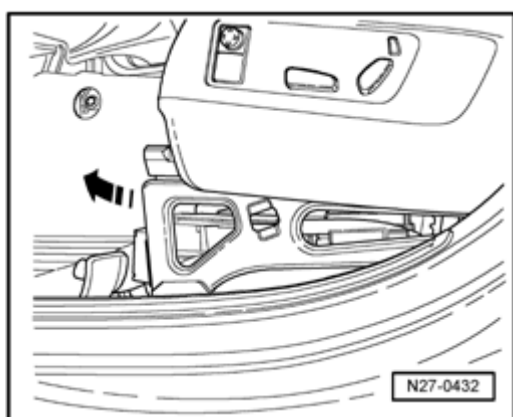
- Carefully pry off seat console side trim, and remove by pulling up.



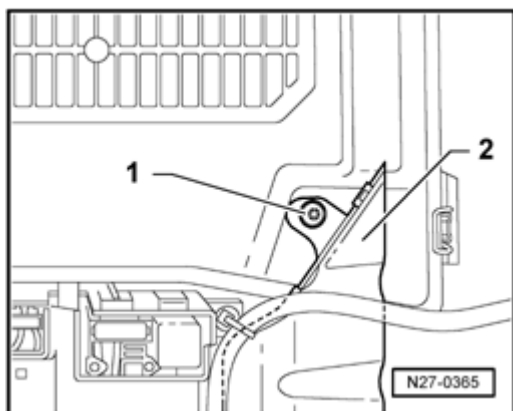
- Fold up cover - **arrows** - .



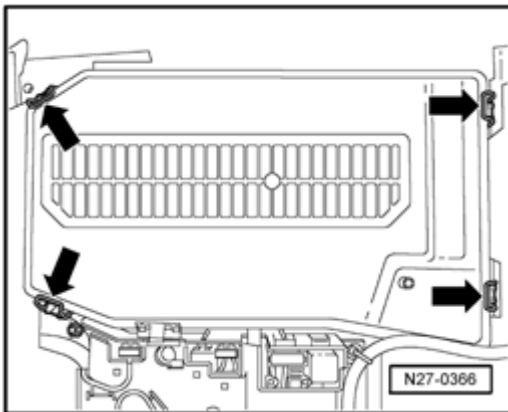
- Remove bolts - **arrows** - .



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



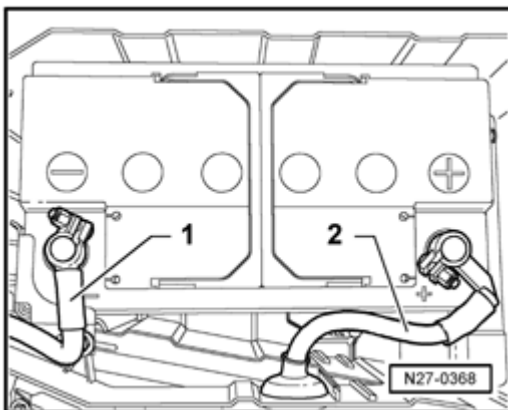
- Remove bolt - **1** - and remove air duct - **2** - .



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

**Caution!**

- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**

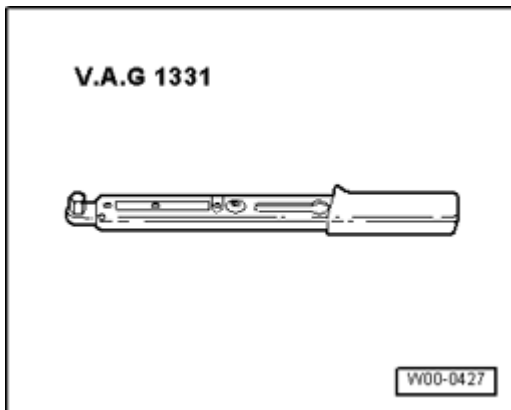


- First, disconnect negative ( - ) terminal - **1** - from battery.

- Then, disconnect positive ( B+ ) terminal - **2** - from battery.

**Battery, reconnecting:**

**Special tools, testers and auxiliary items required**

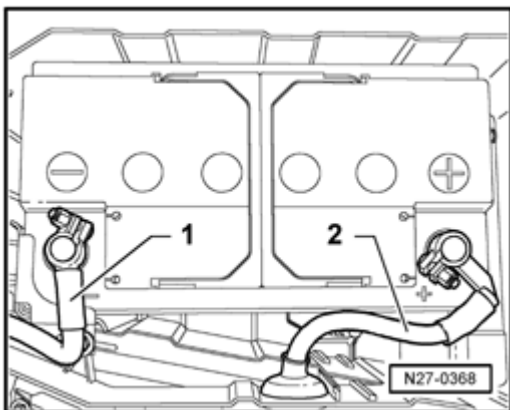


- Torque Wrench 5-50Nm VAG1331 (or 5 - 50 Nm equivalent)

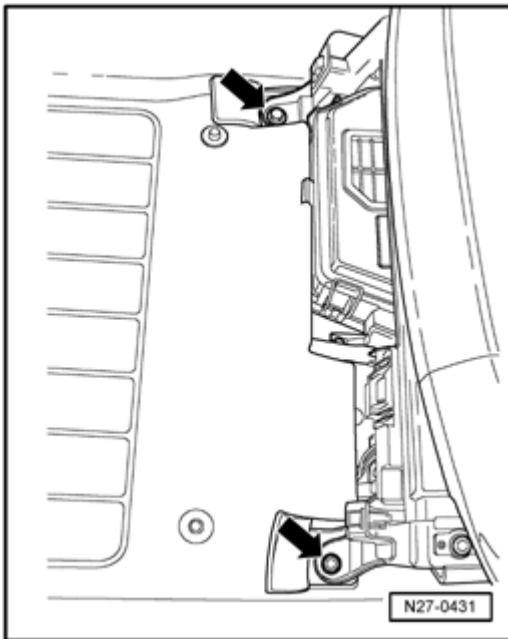
**Caution!**

***In order to prevent damage to the battery housing, battery terminals must be placed on battery posts without using force (by hand only).***

***Battery posts and terminals must not be greased.***



- Refit battery positive ( B+ ) terminal - **2** - on battery positive post.
- Torque positive ( B+ ) terminal fastener according to value in table ⇒ [27-8, Battery, tightening torques](#) .
- Only after the positive ( B+ ) terminal has been secured should negative ( - ) terminal clamp - **1** - be installed.
- Torque negative ( - ) terminal fastener according to value in table ⇒ [27-8, Battery, tightening torques](#) .



- Replacing seat frame bolts - **arrows** - and torque according to value in table ⇒ [27-8, Battery, tightening torques](#) .
- Perform work steps according to table ⇒ [27-4, Work steps required after reconnecting battery](#)

### **Batteries - dual battery system, disconnecting and reconnecting**

A maintenance-free battery with charge indicator (magic eye) is installed under the drivers seat. In addition, an Absorbent Glass Mat (AGM) sealed battery is located in the luggage compartment spare wheel well.

#### **Caution!**

- ***Always ensure the vehicle electrical system is protected by disconnecting the battery negative ( - ) terminal (interrupted current flow to ground) prior to servicing key areas of the electrical system as specified in this Repair Manual.***
- ***Do not loosen or remove ground strap from body. Disconnect terminal from battery only.***
- ***Disconnecting the battery positive ( B+ ) terminal must only be performed as required to remove battery from vehicle, and must only be carried out after the negative ( - ) terminal is disconnected.***

- ***When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual.***

### Battery disconnecting and reconnecting sequence

#### **Caution!**

***Disconnecting and reconnecting batteries on a dual battery system MUST be performed using the following step-by-step procedure, in the sequence given. Failure to adhere to the following procedure will result in the deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.***

- Disconnect battery under drivers seat ⇒ [27-4, Battery under drivers seat, disconnecting](#) .
- Disconnect battery in luggage compartment ⇒ [27-4, Battery in luggage compartment, disconnecting](#) .

### Battery under drivers seat, disconnecting

#### **Note:**

- *Anti-theft alarm system must be deactivated prior to disconnecting battery ⇒ [96-10, Anti-theft alarm system, activating and deactivating](#) .*

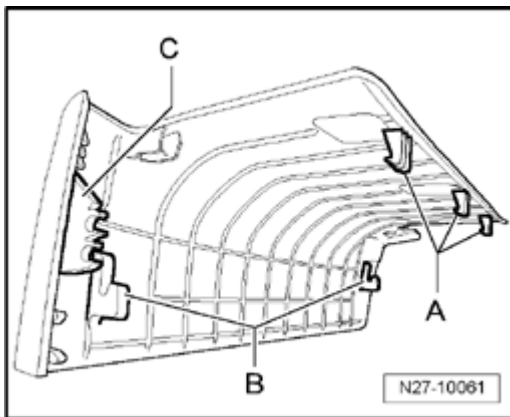
### Drivers seat lower trim, removing

#### **Caution!**

- ***In order to prevent damaging the trim panel under the drivers seat during removal, it is absolutely critical that the location of trim panel locking/locating tabs - A - , - B - and - C - be observed as illustrated here.***
- ***Release of trim panel locking tabs MUST be performed using the following step-by-step procedure, in the sequence given.***

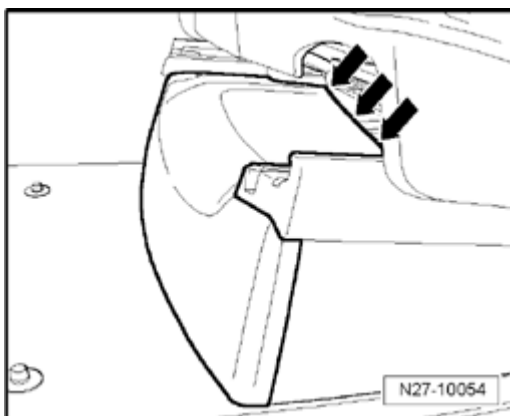
#### **Note:**



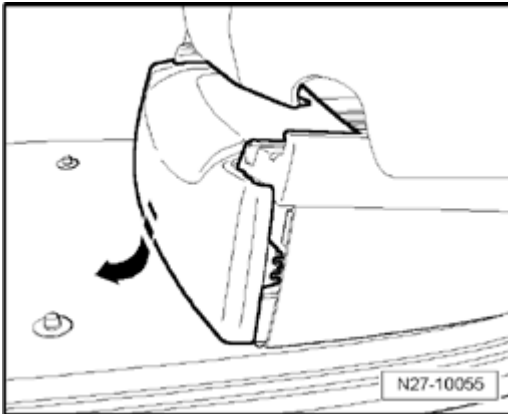


- *Locking tabs - **A** - are engaged into a transverse member under seat. Release locking tabs by simultaneously pressing down and rearward on rear edge of trim panel. To disengage, hold trim firmly in this position and then pull upward in area of locking tabs - **A** - .*
- *Locking tabs - **B** - engage in slots located ahead of seat. These must be released by pressing downward and pulling toward front.*
- *Retaining tabs - **C** - are clipped into side trim of seat and must be unclipped by pulling toward front.*

- Move drivers seat to rear and highest position.
- First, release locking tabs "A" .

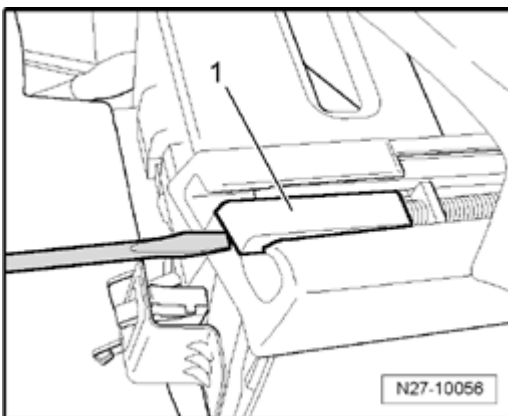


- Release locking tabs "A" by simultaneously pressing down and rearward on rear edge of trim panel in areas indicated by - **arrows** - .
- Next, release locking tabs "B" and locating tabs "C" .

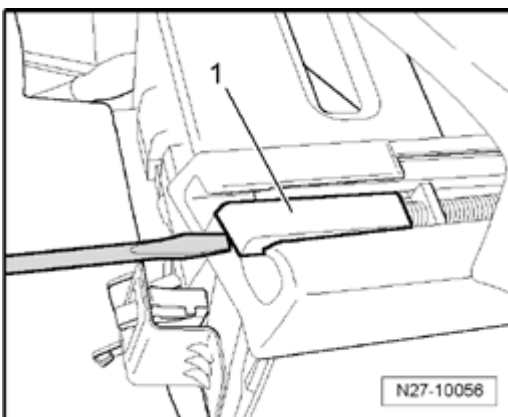


- Release locking tabs "B" and locating tabs "C" by carefully pushing front edge of trim panel downwards and simultaneously pulling panel away from seat mounting frame in direction of - **arrow** - .

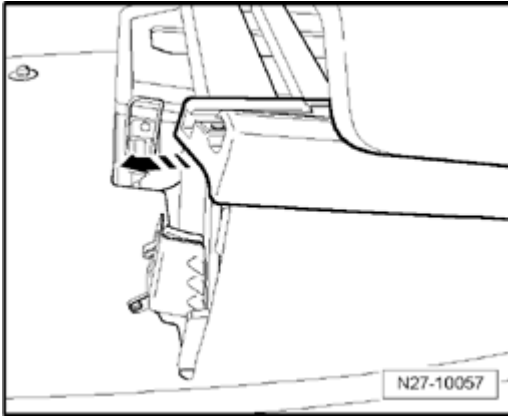
**Note:**



- *Cover - 1 - is installed only on Comfort seats, on vehicles with normal or sport seats the seat spindle trim is simply pulled off.*



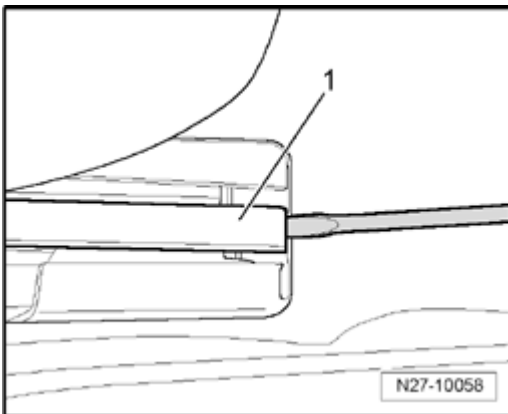
- Carefully pry up cover - **1** - and remove from front seat spindle.



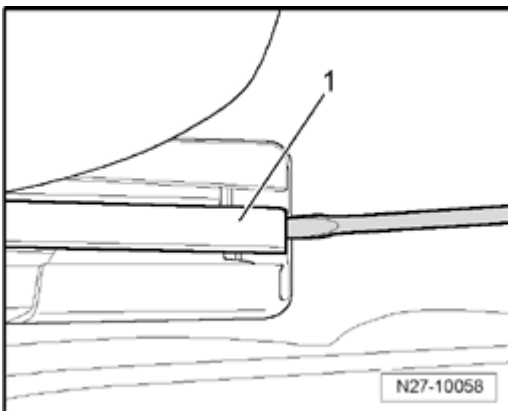
- Pull off front spindle trim from seat track in direction of - **arrow** - .
- Move drivers seat forward and to highest position.

**Note:**

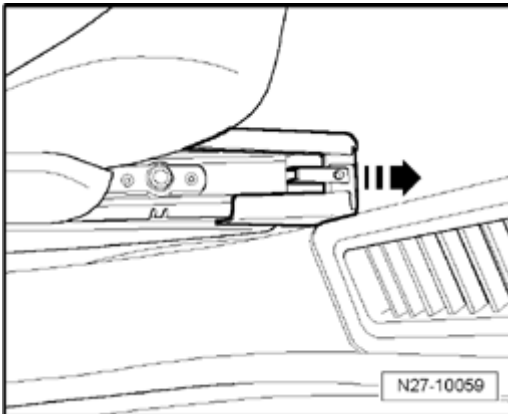
- *Remove trim from both rear seat spindles. Removal of one side only is illustrated here.*



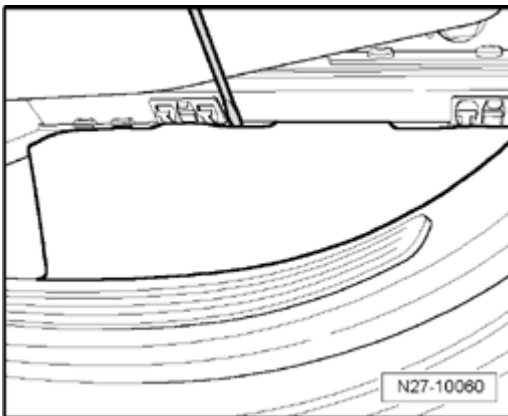
- *Cover - 1 - is installed only on Comfort seats, on vehicles with normal or sport seats the seat spindle trim is simply pulled off.*



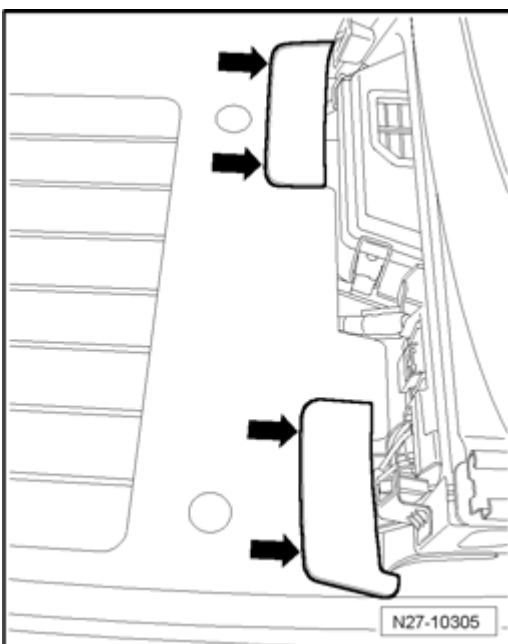
- Carefully pry up cover - **1** - and remove from rear seat spindle.



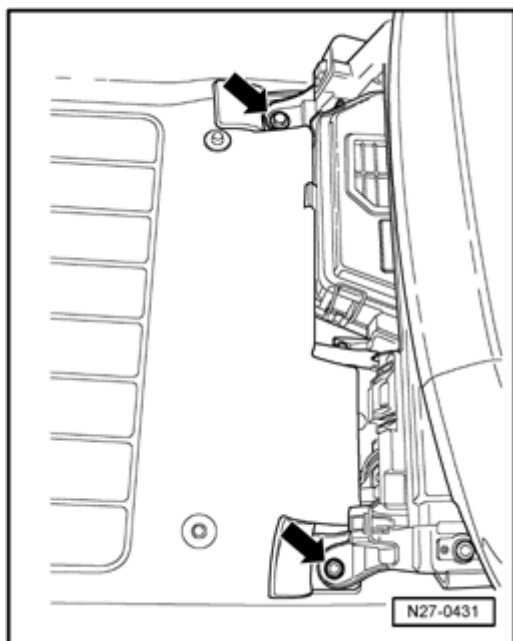
- Pull off rear spindle trim from seat track in direction of - **arrow** - .



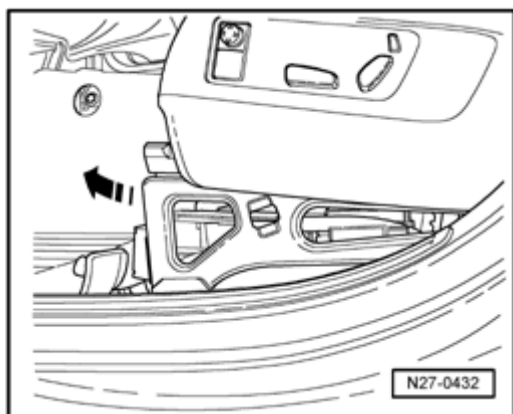
- Carefully pry off seat console side trim, and remove by pulling up.



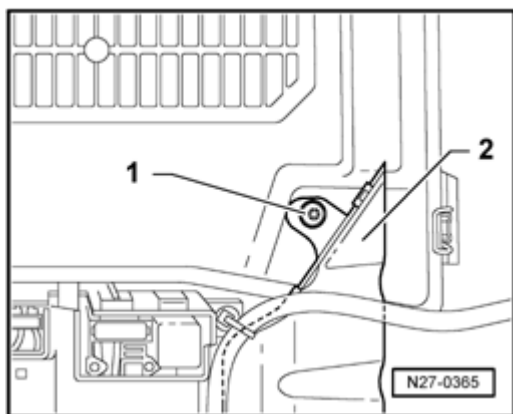
- Fold up cover - **arrows** - .



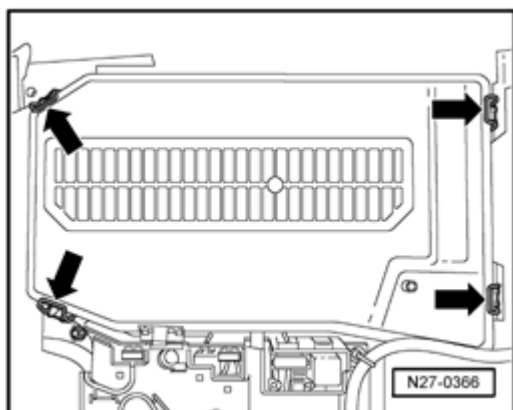
- Remove bolts - **arrows** - .



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



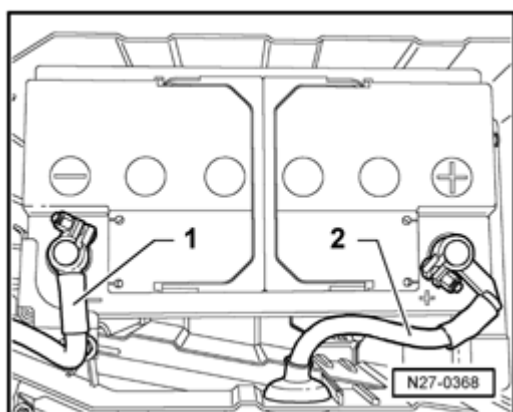
- Remove bolt - **1** - and remove air duct - **2** - .



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

**Caution!**

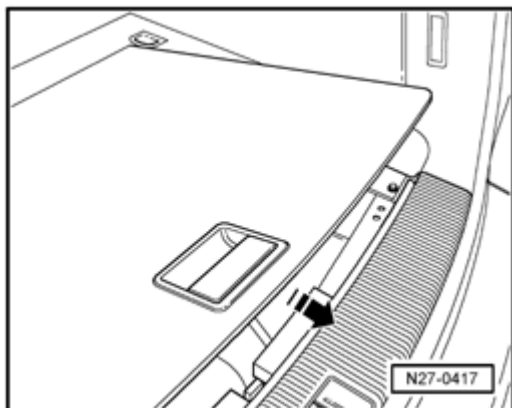
- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**



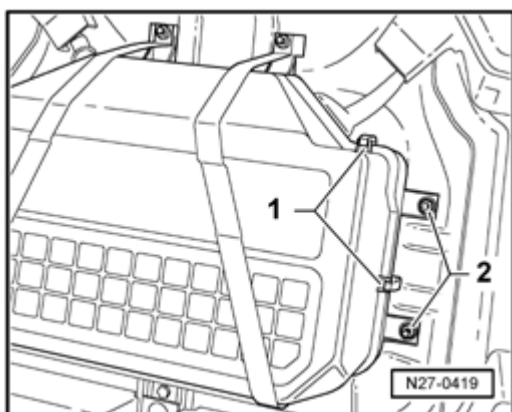
- First, disconnect negative ( - ) terminal - **1** - from battery.

- Then, disconnect positive ( B+ ) terminal - **2** - from battery.

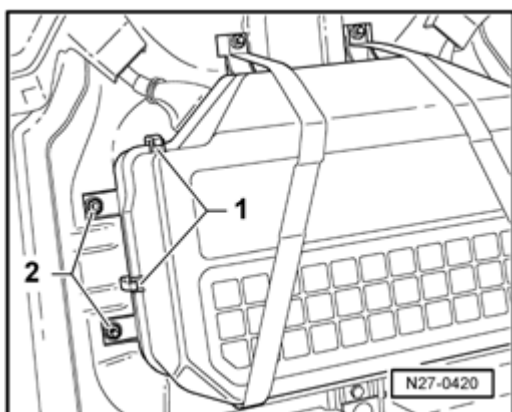
**Battery in luggage compartment, disconnecting**



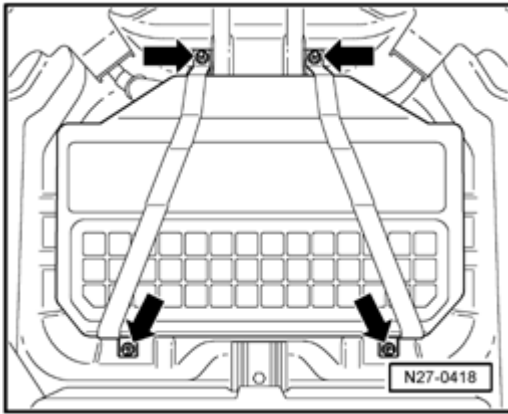
- Lift and remove luggage compartment floor cover - **arrow** - .



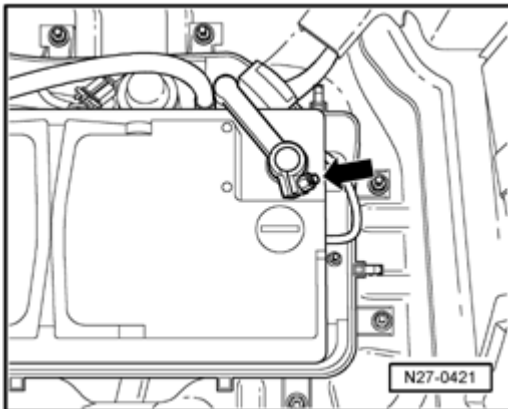
- Open retaining clips - **1** - and remove nuts - **2** - on right side of battery cover.



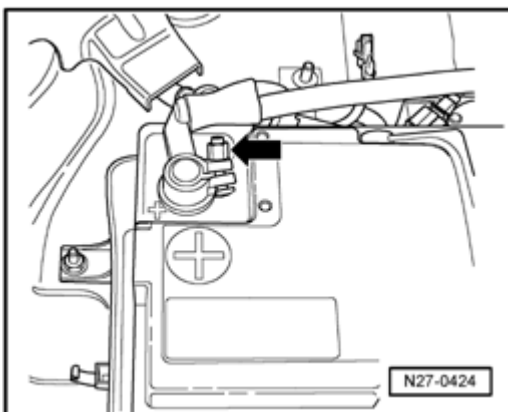
- Open retaining clips - **1** - and remove nuts - **2** - on left side of battery cover.



- Remove nuts - **arrows** - for retaining straps.
- Remove retaining straps.



- First, disconnect negative ( - ) terminal - **arrow** - from battery.



- Then disconnect positive ( B+ ) terminal - **arrow** - from battery.

#### Batteries, reconnecting sequence

#### **Caution!**

- **Disconnecting and reconnecting batteries on a dual battery system MUST be performed using**



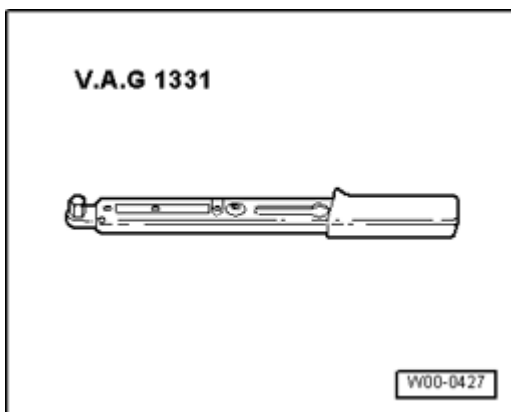
***the following step-by-step procedure, in the sequence given. Failure to adhere to the following procedure will result in the deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.***

- ***Battery posts and terminals must not be greased.***

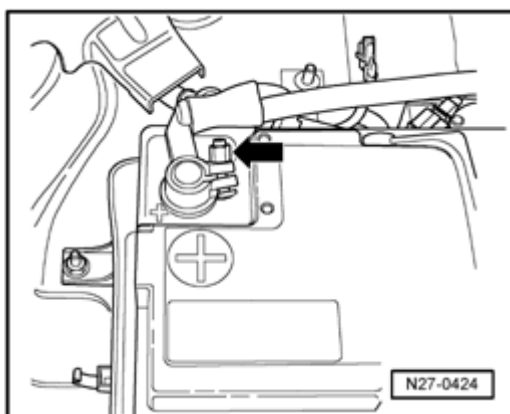
- Reconnect battery in luggage compartment ⇒ [27-4, Battery in luggage compartment, reconnecting](#) .
- Reconnect battery under drivers seat ⇒ [27-4, Battery under drivers seat, reconnecting](#) .

#### Battery in luggage compartment, reconnecting

#### Special tools, testers and auxiliary items required

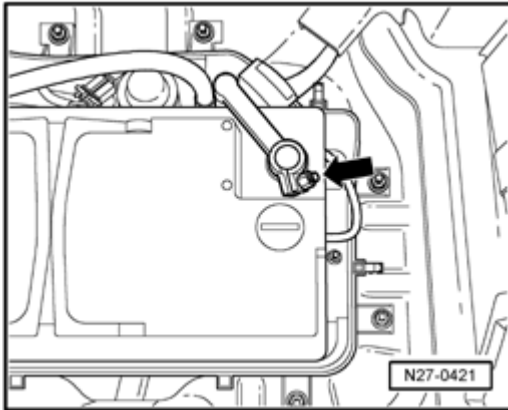


- Torque Wrench 5-50Nm VAG1331 (or 5 - 50 Nm equivalent)



- Refit battery positive ( B+ ) terminal - **arrow** - on battery positive post.

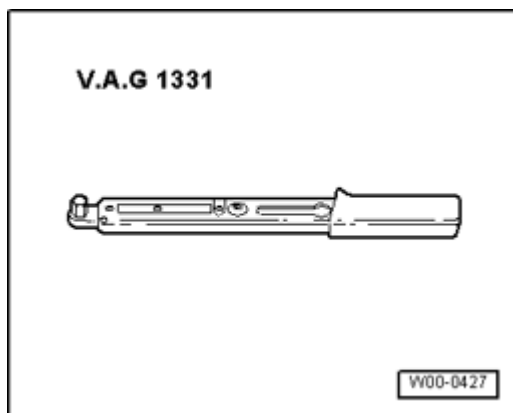
- Torque positive ( B+ ) terminal fastener according to value in table ⇒ [27-8, Battery, tightening torques](#) .



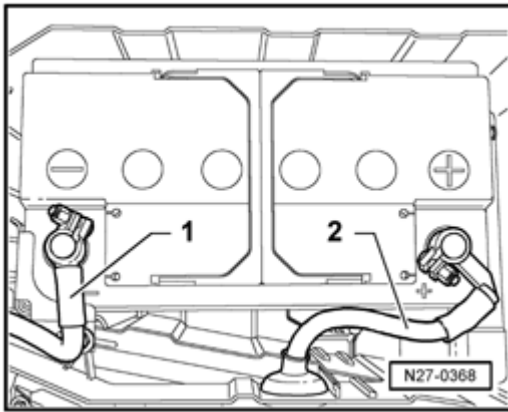
- Only after the positive ( B+ ) terminal has been secured should the negative ( - ) terminal clamp - **arrow** - be installed.
- Torque negative ( - ) terminal fastener according to value in table ⇒ [27-8, Battery, tightening torques](#) .

#### Battery under drivers seat, reconnecting

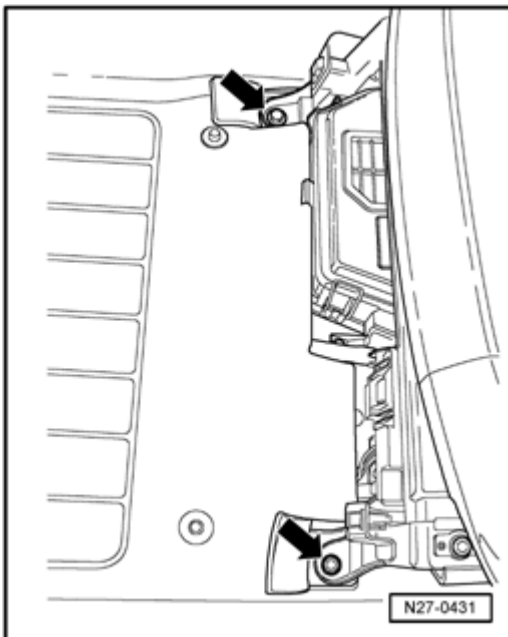
#### Special tools, testers and auxiliary items required



- Torque Wrench 5-50Nm VAG1331 (or 5 - 50 Nm equivalent)



- Refit battery positive ( B+ ) terminal - **2** - on battery positive post.
- Torque positive ( B+ ) terminal fastener according to value in table ⇒ [27-8, Battery, tightening torques](#) .
- Only after the positive ( B+ ) terminal has been secured should the negative ( - ) terminal clamp - **1** - be installed.
- Torque negative ( - ) terminal fastener according to value in table ⇒ [27-8, Battery, tightening torques](#) .



- Replacing seat frame bolts - **arrows** - and torque according to value in table ⇒ [27-8, Battery, tightening torques](#) .
- Perform work steps according to table ⇒ [27-4, Work steps required after reconnecting battery](#) .

#### Work steps required after reconnecting battery

Work steps	Completed?

Switch ignition on, and then off.	
Check DTC memory: Guided Fault Finding using VAS 5051	
Steering Angle Sensor G85 : Perform Basic Setting Guided Fault Finding using VAS 5051/5052	
Clock: Check and reset to local time.	
Power windows: Completely open and close all power windows.	
Perform function test of all electrical consumers.	



## Battery, removing and installing

### **Caution!**

**When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Battery, disconnecting and reconnecting](#) . Not adhering to proper disconnection sequence will result in the deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**

## Battery under drivers seat, removing and installing

### **Warning!**

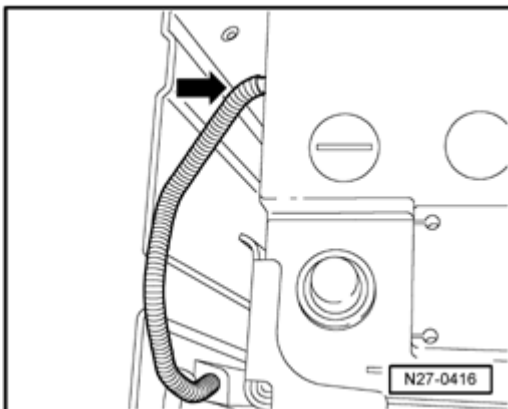
**Danger of injury! Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#)**

## Battery, removing

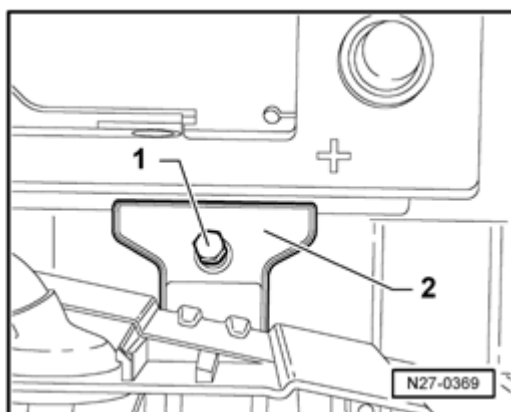
### **Caution!**

**When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Battery disconnecting and reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in the deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**

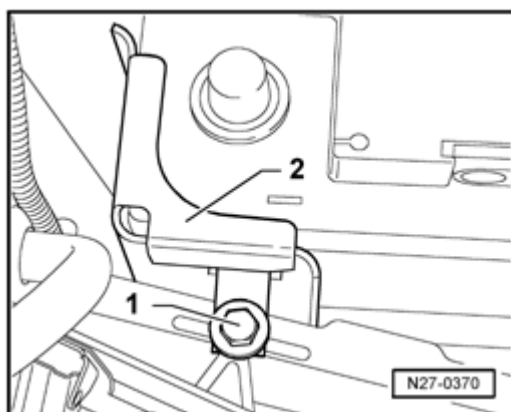
- Disconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .



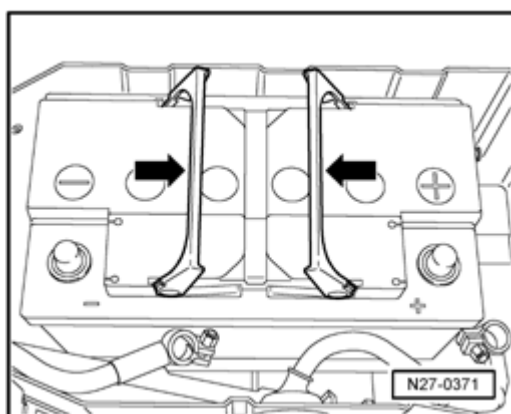
- Disconnect central gas vent hose - **arrow** - from top cover.



- Remove bolt - **1** - and battery hold-down bracket - **2** - .



- Remove bolt - **1** - and retainer bracket - **2** - .



- Fold battery handles - **arrows** - upward.
- Grasp battery by handles and lift from battery box.

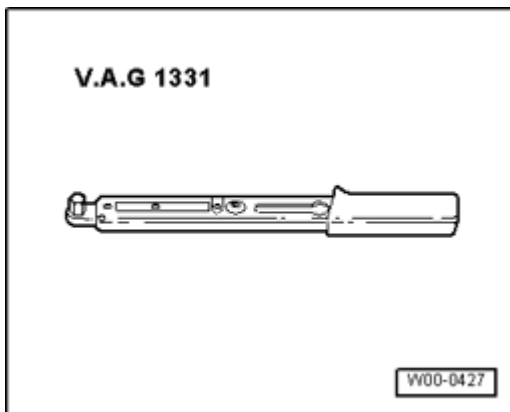
### Battery, installing

#### **Caution!**

***If battery is not secured properly, the following will***

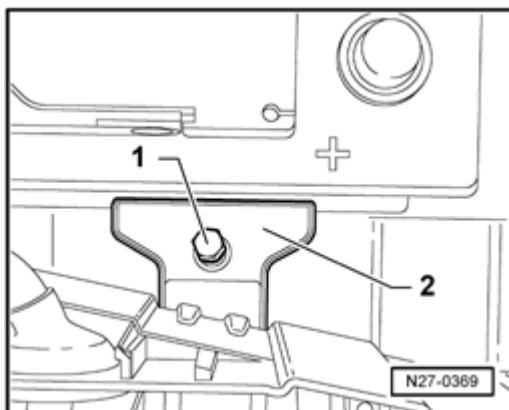
**result:**

- **Shortened battery service life due to vibration damage (explosion hazard).**
- **if battery is not secured properly, the plates within the battery can be damaged.**
- **Damage to battery casing caused by bracket (possible electrolyte leakage, high subsequent costs).**
- **Reduced collision safety.**

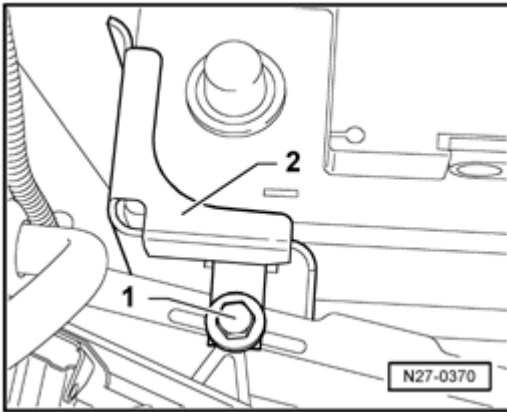
**Special tools, testers and auxiliary items required**

- Torque Wrench 5-50Nm VAG1331 (or 5 - 50 Nm equivalent)

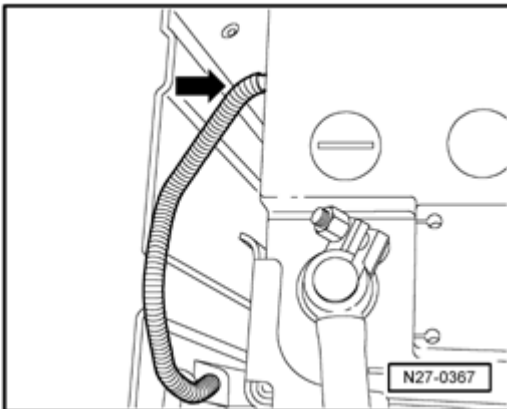
Install in reverse order of removal, noting the following:



- Install battery hold-down bracket - **2** - and torque bolt - **1**
- according to value in table ⇒ [27-8, Battery, tightening torques](#) .



- Install retainer bracket - 2 - and torque bolt - 1 - according to value in table ⇒ [27-8, Battery, tightening torques](#) .



Ensure central breather hose is attached to battery - **arrow** - , and hose is not pinched during installation. Only then can battery be properly vented.

- After installing, verify battery is properly seated.

### **Caution!**

- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Batteries, reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in the deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**
- **Observe battery terminal handling instructions ⇒ [27-1, Battery post/terminal, handling instructions](#) .**



- Reconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .

### Battery in luggage compartment, removing and installing

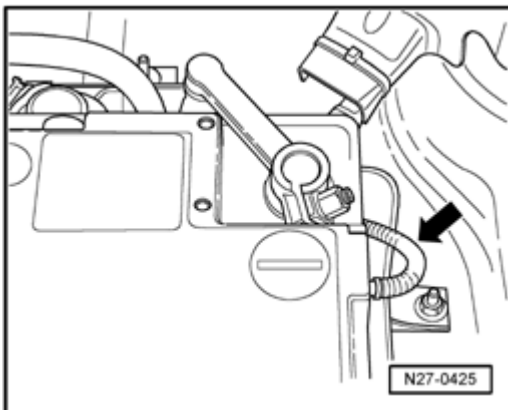
#### **Warning!**

***Danger of injury! Prior to handling or servicing batteries, read, understand and observe the Warnings and Safety Measures for lead-acid batteries ⇒ [27-1, Warnings and Safety Measures for lead-acid batteries](#)***

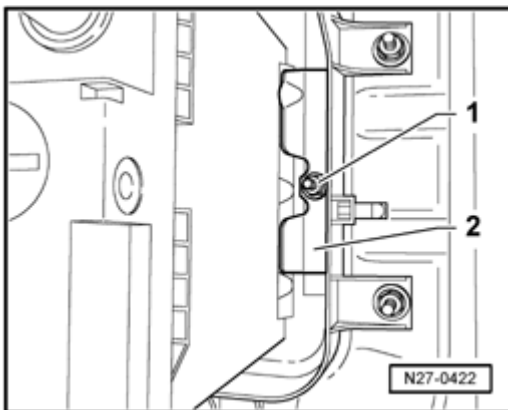
An Absorbed Glass Mat (AGM) battery is installed in luggage compartment in spare wheel well.

#### Battery, removing

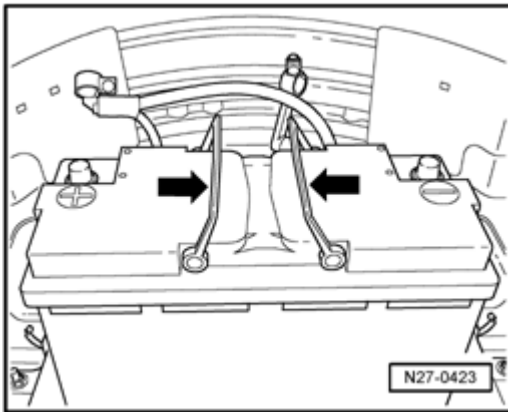
- Disconnect batteries ⇒ [27-4, Battery disconnecting and reconnecting sequence](#) .



- Disconnect central gas vent hose - **arrow** - from top cover.



- Remove nut - **1** - and remove battery hold-down bracket - **2** - .



- Fold battery handles - **arrows** - upward.
- Grasp battery by handles and lift from battery box.

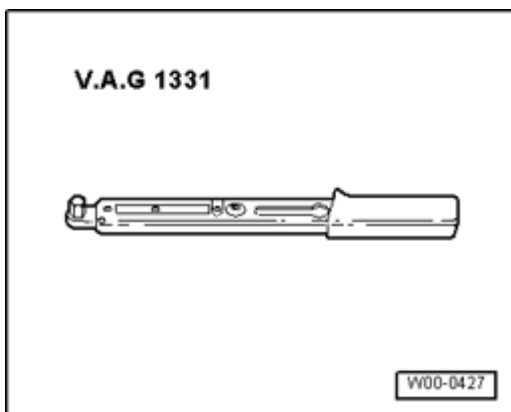
#### Battery, installing

##### **Caution!**

**If battery is not secured properly, the following will result:**

- **Shortened battery service life due to vibration damage (explosion hazard).**
- **if battery is not secured properly, the plates within the battery can be damaged.**
- **Damage to battery casing caused by bracket (possible electrolyte leakage, high subsequent costs).**
- **Reduced collision safety.**

#### Special tools, testers and auxiliary items required

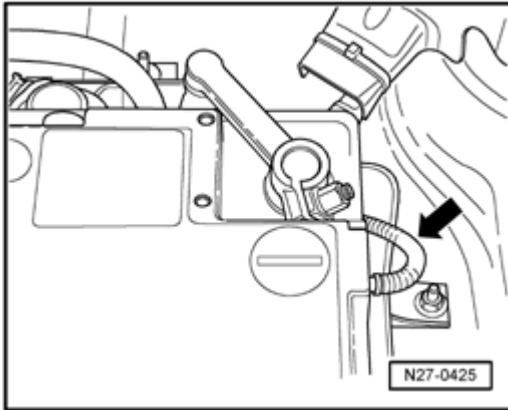


- Torque Wrench 5-50Nm VAG1331 (or 5 - 50 Nm)

equivalent)

Install in reverse order of removal, noting the following:

- Torque battery hold-down bracket nut according to value in table ⇒ [27-8, Battery, tightening torques](#) .



Secure hose for central gas venting - **arrow** - . Ensure hose has not been pinched during installation. Only then can battery be properly vented.

- After installing, verify battery is properly seated.

**Caution!**

- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Batteries, reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in the deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**
- **Observe battery terminal handling instructions ⇒ [27-1, Battery post/terminal, handling instructions](#) .**

- Reconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .



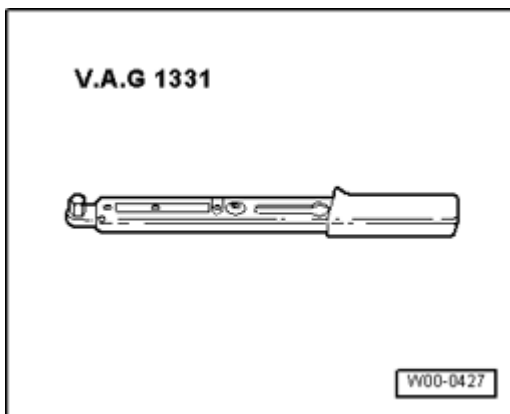
## Battery Isolator

### Note:

- Installation of battery isolator not confirmed for US/CDN market at time of publication.

### Battery isolator, removing and installing

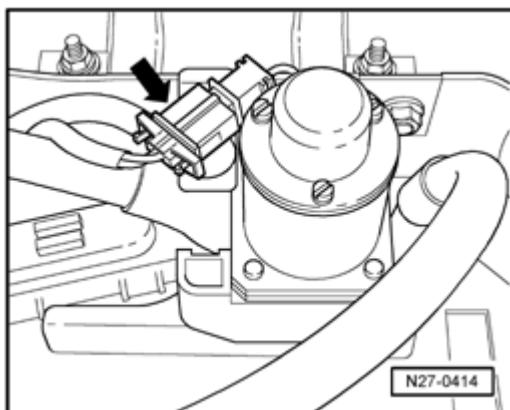
#### Special tools, testers and auxiliary items required



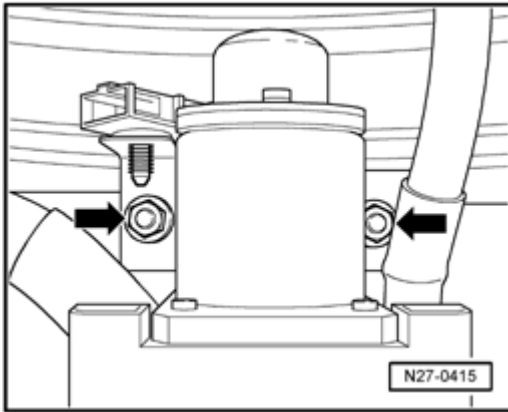
- Torque Wrench 5-50Nm VAG1331 (or 5 - 50 Nm equivalent)

### Removing:

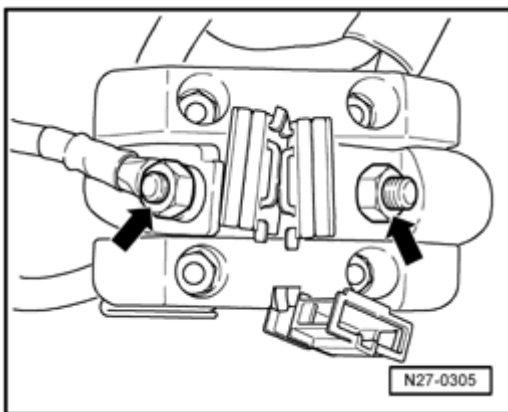
- Disconnect batteries ⇒ [27-4, Battery, disconnecting and reconnecting](#) .
- Remove battery in luggage compartment ⇒ [27-5, Battery in luggage compartment, removing and installing](#) .



- Disconnect battery isolator connection - **arrow** - .



- Remove nuts - **arrows** - and remove battery isolator upward from retainer.
- Remove nuts - **arrows** - .



- Disconnect wires from battery isolator.

### Installing:

Install in reverse order of removal, noting the following:

- Torque nuts and terminals according to values in table ⇒ [27-8, Battery, tightening torques](#) .
- Install battery in luggage compartment ⇒ [27-4, Battery in luggage compartment, reconnecting](#) .

### Caution!

- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Batteries, reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in the deactivation of Main Battery Switch -E74- and subsequent damage to electrical system**

***components.***

- ***Observe battery terminal handling instructions***  
⇒ ***27-1, Battery post/terminal, handling instructions*** .

- Reconnect battery ⇒ ***27-4, Battery, disconnecting and reconnecting*** .



## Main Battery Switch E74

### General information

In the event of a collision, the battery is isolated from the starter circuit by the Main Battery Switch E74 . This prevents a short circuit in the starter wiring and subsequent damage to the electrical system.

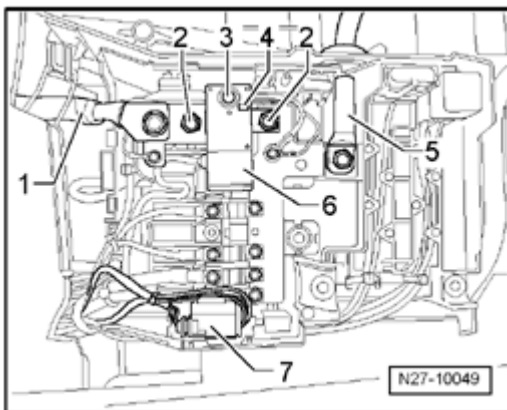
The main battery switch is used on both single and dual battery systems. The main battery switch is always found on the battery located under the drivers seat.

### Note:

- A main battery switch that has been deactivated (battery/starter circuit isolated) can be reset using the reset button on the switch.

### Caution!

**In the event a main battery switch has been deactivated, the starter circuit must be tested for a short circuit prior to resetting.**



### Main Battery Switch E74 , components

- 1 - Starter wire
- 2 - Location / fastener for battery cut-off switch, 20 Nm
- 3 - Reset button
- 4 - Sight glass
- 5 - To battery positive terminal
- 6 - Main battery switch
- 7 - Multi-pin connector

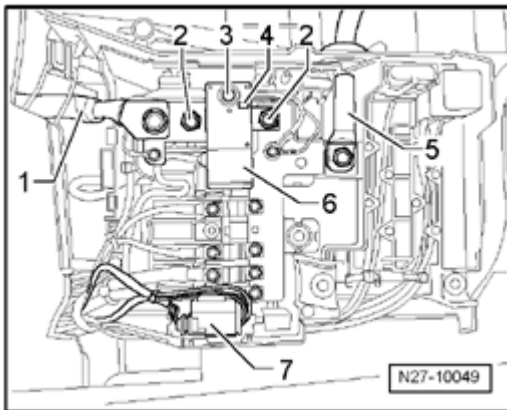
## Deactivation recognition

### Note:

- A main battery switch that has been deactivated (battery/starter circuit isolated) can be reset using the reset button on the switch.

### Caution!

**In the event a main battery switch has been deactivated, the starter circuit must be tested for a short circuit prior to resetting.**



When activated, sight glass appears copper - 4 - . When deactivated, sight glass appears white.

## Resetting

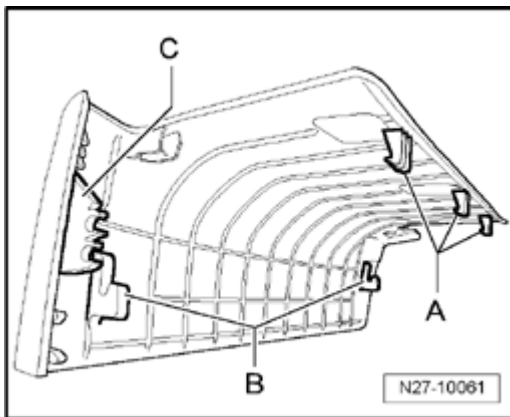
### Drivers seat lower trim, removing

### Caution!

- **In order to prevent damaging the trim panel under the drivers seat during removal, it is absolutely critical that the location of trim panel locking/locating tabs - A - , - B - and - C - be observed as illustrated here.**
- **Release of trim panel locking tabs MUST be performed using the following step-by-step procedure, in the sequence given.**

### Note:

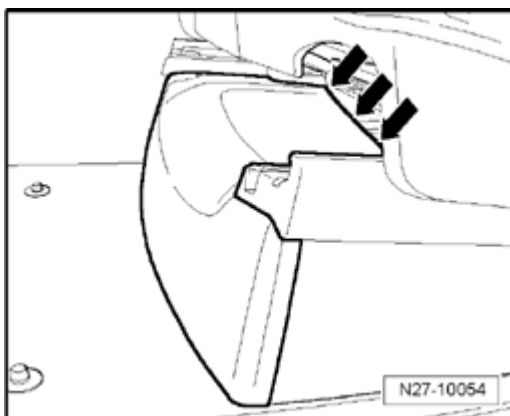




- *Locking tabs - **A** - are engaged into a transverse member under seat. Release locking tabs by simultaneously pressing down and rearward on rear edge of trim panel. To disengage, hold trim firmly in this position and then pull upward in area of locking tabs - **A** - .*
- *Locking tabs - **B** - engage in slots located ahead of seat. These must be released by pressing downward and pulling toward front.*
- *Retaining tabs - **C** - are clipped into side trim of seat and must be unclipped by pulling toward front.*

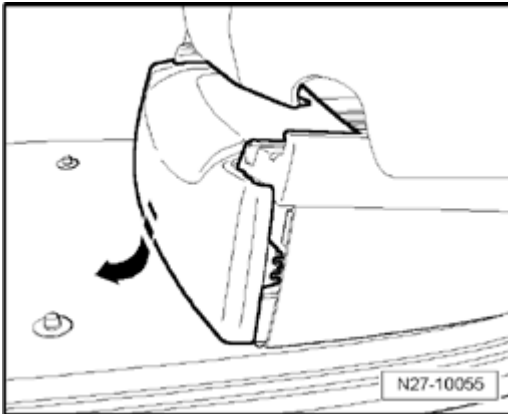
- Move drivers seat to rear and highest position.

- First, release locking tabs "A" .



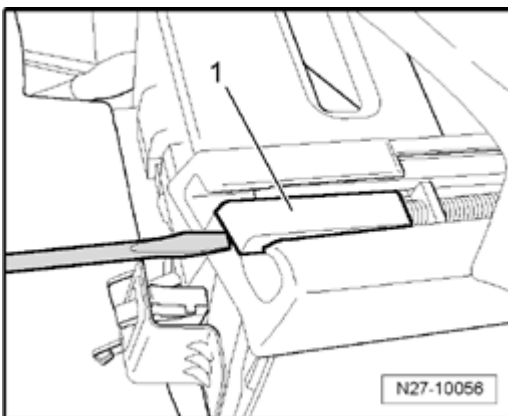
- Release locking tabs "A" by simultaneously pressing down and rearward on rear edge of trim panel in areas indicated by - **arrows** - .

- Next, release locking tabs "B" and locating tabs "C" .

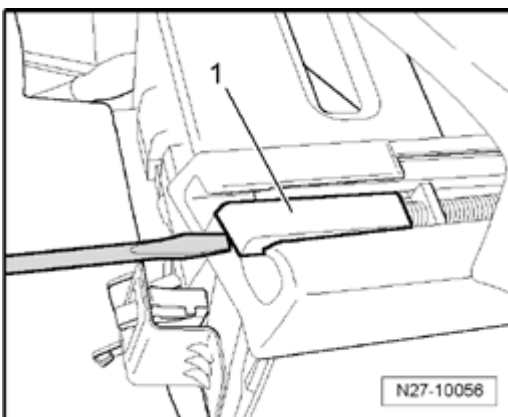


- Release locking tabs "B" and locating tabs "C" by carefully pushing front edge of trim panel downwards and simultaneously pulling panel away from seat mounting frame in direction of - **arrow** - .

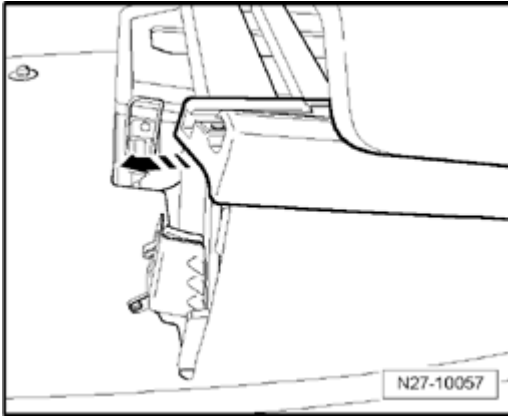
**Note:**



- Cover - **1** - is installed only on Comfort seats, on vehicles with normal or sport seats the seat spindle trim is simply pulled off.



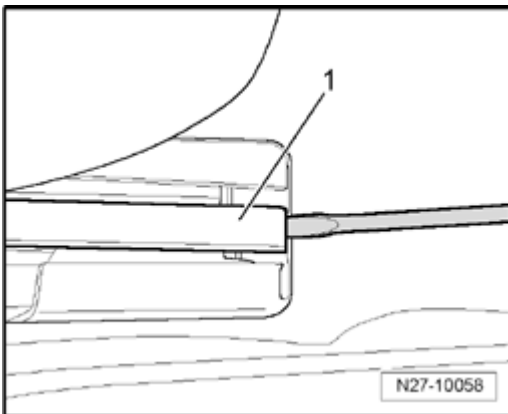
- Carefully pry up cover - **1** - and remove from front seat spindle.



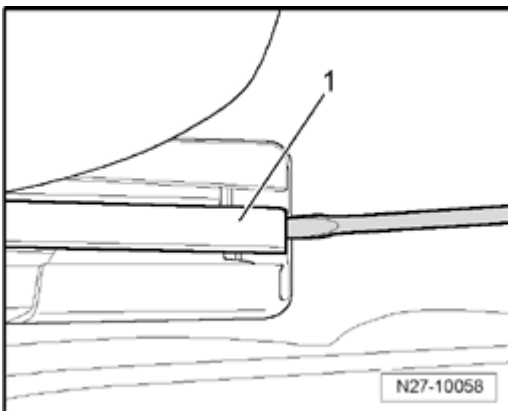
- Pull off front spindle trim from seat track in direction of - **arrow** - .
- Move drivers seat forward and to highest position.

**Note:**

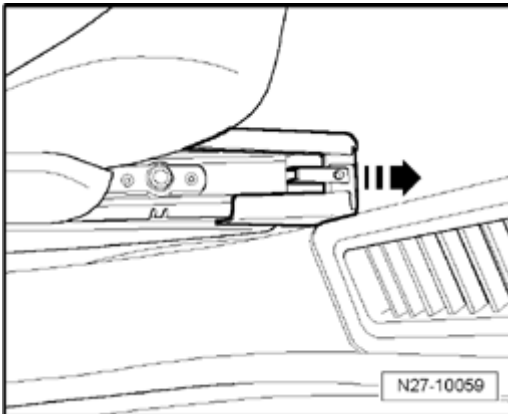
- *Remove trim from both rear seat spindles. Removal of one side only is illustrated here.*



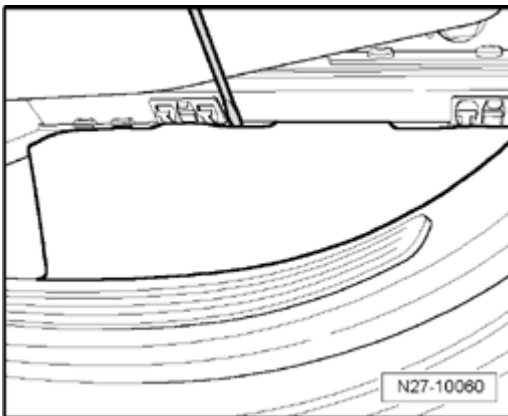
- *Cover - 1 - is installed only on Comfort seats, on vehicles with normal or sport seats the seat spindle trim is simply pulled off.*



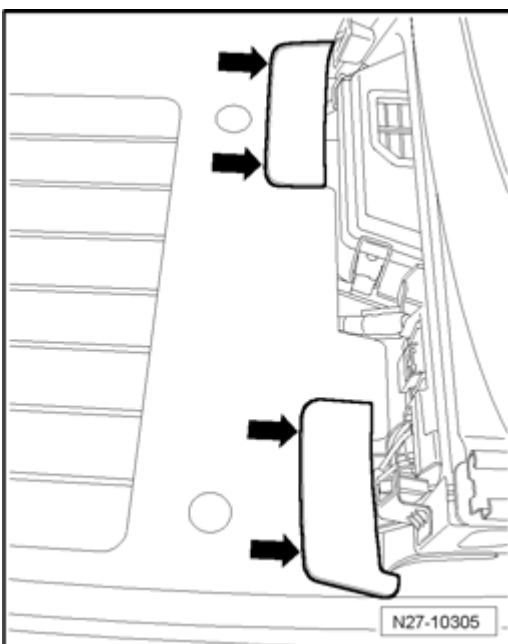
- Carefully pry up cover - **1** - and remove from rear seat spindle.



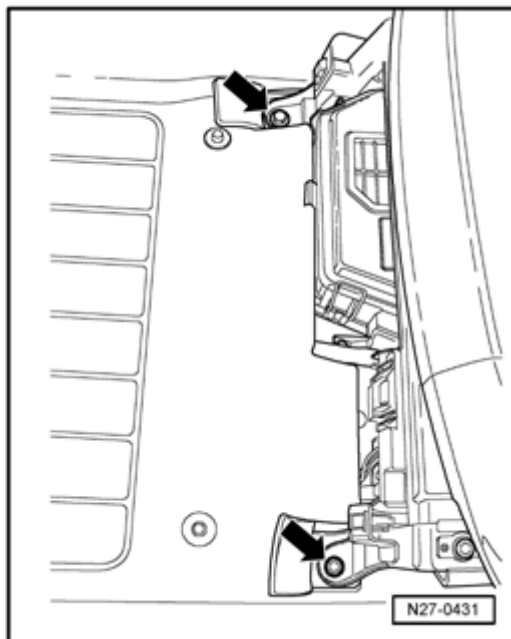
- Pull off rear spindle trim from seat track in direction of - **arrow** - .



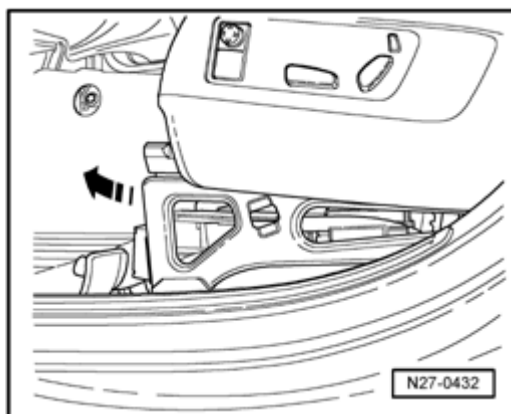
- Carefully pry off seat console side trim, and remove by pulling up.



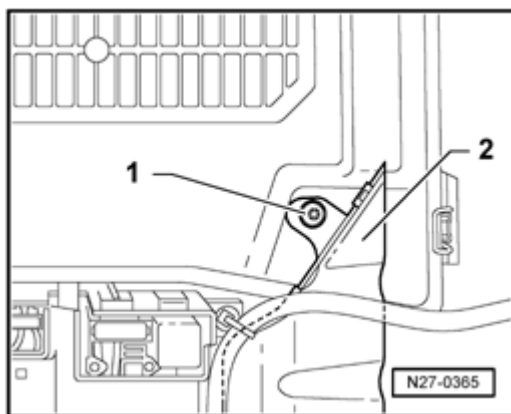
- Fold up cover - **arrows** - .



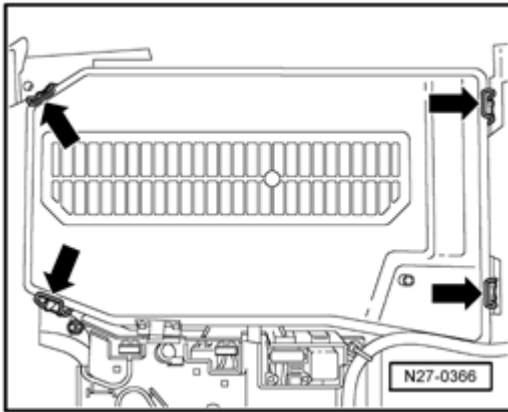
- Remove bolts - **arrows** - .



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



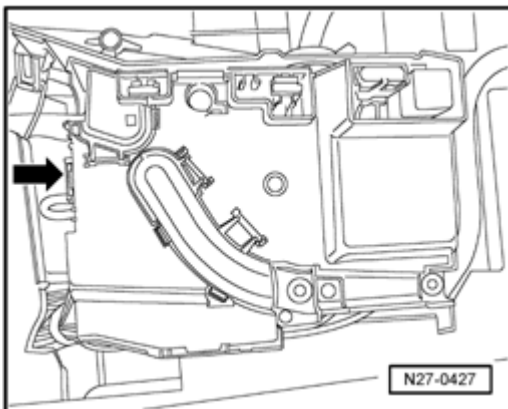
- Remove bolt - **1** - and remove air duct - **2** - .



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

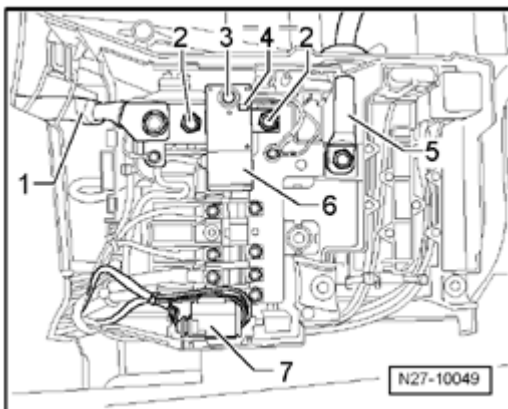
**Caution!**

- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**



- Release retaining tab - **arrow** - and remove cover.

- Check starter wire for short circuit according to wiring diagram. If necessary, repair short circuit.

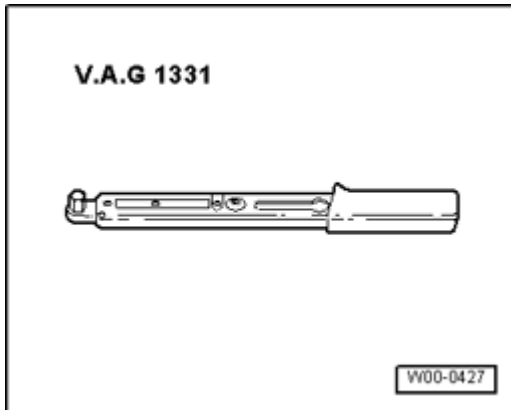


- Press reset button - **3** - to reset main battery switch. A copper coil must be visible in viewing window - **4** - ,

indicating the battery cut-off switch is reset.

## Main Battery Switch E74 , removing and installing

### Special tools, testers and auxiliary items required



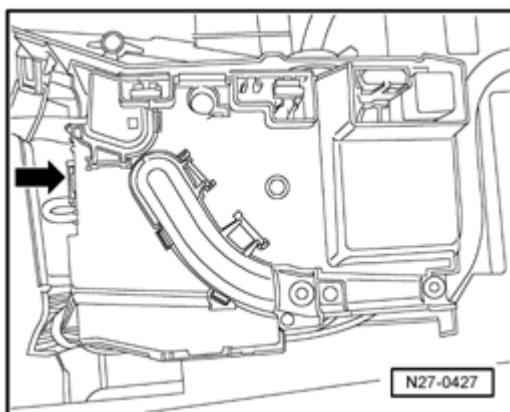
- Torque Wrench 5-50Nm VAG1331 (or 5 - 50 Nm equivalent)

### Removing:

#### **Caution!**

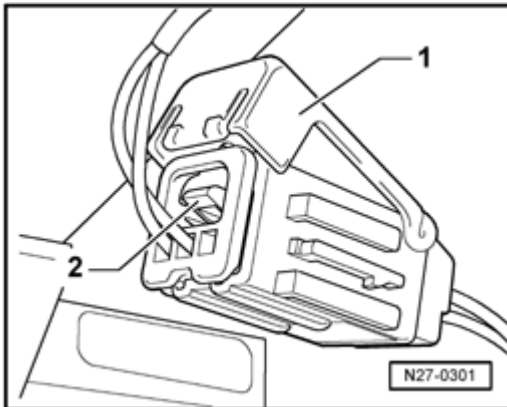
**When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Battery disconnecting and reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in the deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**

- Disconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .

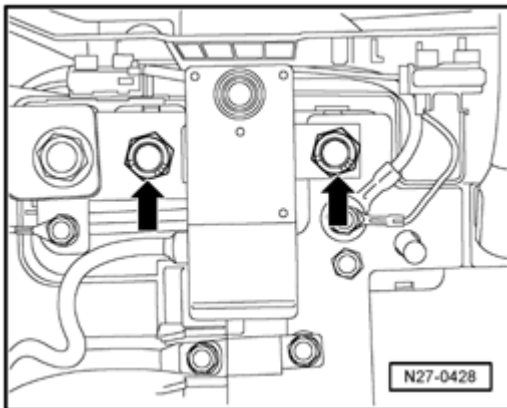


- Release retaining tab - **arrow** - and remove cover.

- If necessary, remove the lead coating on the multi-pin connector.



- Open protective cap - 1 - of electrical connection, disengage retaining tab - 2 - and disconnect electrical connection.



- Remove the M8 nuts - **arrows** - and remove battery isolation system.

### Installing:

Install in reverse order of removal, noting the following:

- Torque fasteners according to value in table ⇒ [27-8, Battery, tightening torques](#) .
- If necessary, replace seal on electrical connection.

### Caution!

- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Batteries, reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in the deactivation of Main Battery Switch -E74- and**



***subsequent damage to electrical system components.***

- ***Observe battery terminal/post handling instructions*** ⇒ [27-1, Battery post/terminal, handling instructions](#) .

- Reconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .

**Battery, tightening torques**

Location / fastener		Tightening torques
Battery terminal clamp on battery post / nut	M6	9 Nm
Additional terminal on battery terminal clamp / nut	M6	9 Nm
Seat frame to body / bolt		45 Nm
Battery hold-down bracket to body / bolt	M8	23 Nm
Battery retainer bracket to body / bolt	M6	9 Nm
Battery in luggage compartment, battery hold-down bracket to body / bolt	M6	14 Nm
Battery isolator to body / bolt	M6	6 Nm
Wiring terminals to battery isolator / nut	M8	20 Nm
Main Battery Switch to body / bolt	M8	20 Nm

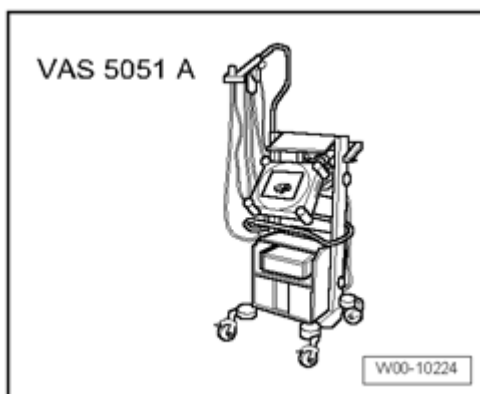
## Starter

### **Caution!**

**When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Battery, disconnecting and reconnecting](#) . Not adhering to proper disconnection sequence will result in the deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**

### Starter B , checking

#### Special tools, testers and auxiliary items required



- Diagnostic Operation System VAS5051A
- Optional: Vehicle Diagnosis Service Syst. VAS5052
- Diagnostic Cable-5 Meters VAS5051/6A

- Connect Diagnostic Operation System VAS5051A ⇒ [97-1, VAS 5051 / 5052](#) .

Select operating mode "Guided Fault Finding" on Diagnostic Operation System VAS5051A .

After the Diagnostic Trouble Code (DTC) memory of all control modules has been checked:

- Using the "Go To" button, select "Functions/Component selection" and the following menu options in sequence:

- Body
  
- Electrical Equipment
  
- 27 - Starter, power supply
  
- Electrical components
  
- Starter -B-

- Follow tester prompts.

- Or, in Diagnostic Operation System VAS5051A , select operating mode "Guided Functions" .

- Body
  
- Electrical Equipment
  
- 27 - Starter, power supply
  
- Electrical components
  
- Starter -B-

- Follow tester prompts.

**Starter - automatic transmission, removing and installing**

***Caution!***

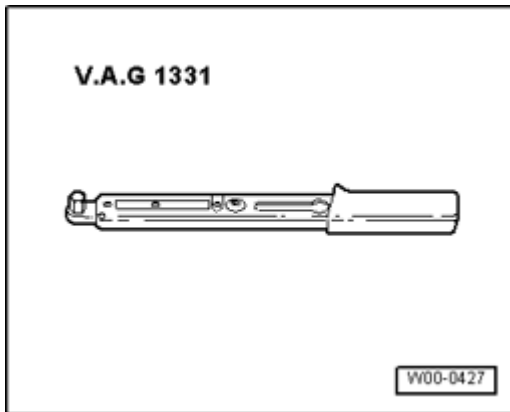
***Before beginning repairs on the electrical system:***

- ***Switch off all electrical consumers.***
  
- ***Switch off ignition and remove ignition key.***
  
- ***Disconnect negative ( - ) battery terminal.***
  
- ***When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system***

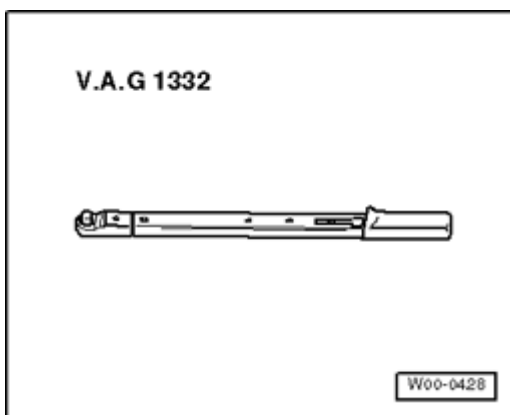
**function checks as specified in this Repair Manual** ⇒ [27-4, Battery, disconnecting and reconnecting](#) .

Starter - 6-cyl. 3.2 L fuel injection engine and 3.6 L FSI engine, automatic transmission, removing and installing

Special tools, testers and auxiliary items required



- Torque Wrench 5-50Nm VAG1331



- Torque Wrench 40-200Nm VAG1332

**Removing:**

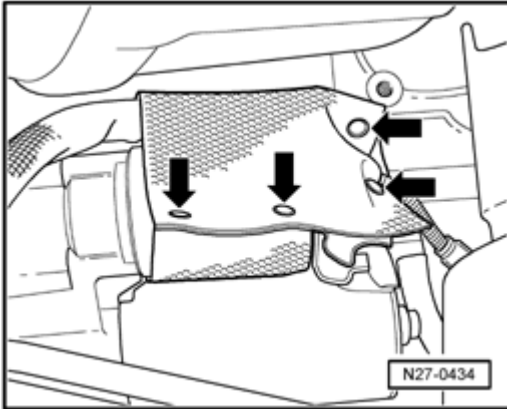
**Caution!**

**When disconnecting battery, the procedure must always be followed as described in the Repair Manual** ⇒ [27-4, Battery disconnecting and reconnecting sequence](#) . **If the sequence is not adhered to, the battery isolation system switch may trigger, which may damage electrical components in the vehicle.**

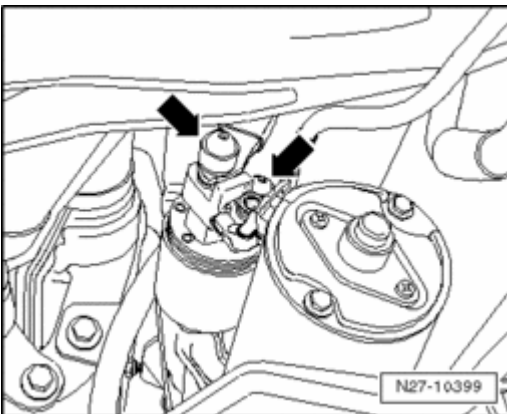
- Disconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .

- Remove noise insulation

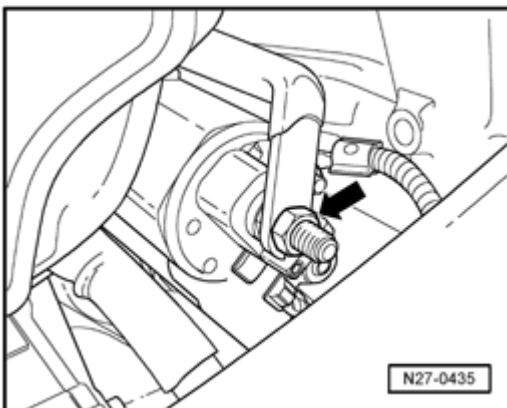
⇒ [Repair Manual, Body Exterior, Repair Group 50, assembly overview of noise insulation](#)



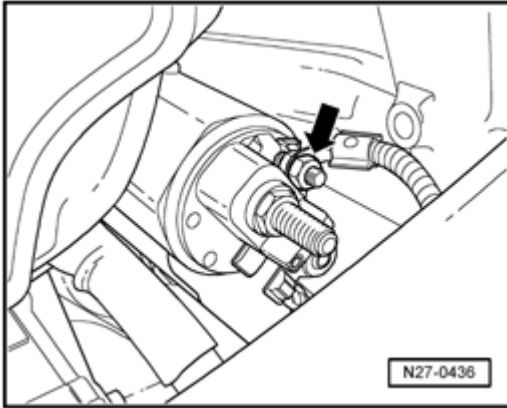
- Open press buttons - **arrows** - and remove heat shield mat for solenoid.



- Pry off protective caps for mounting nuts - **arrows** - .



- Unscrew mounting nut of plus-wire - **arrow** - from starter solenoid.



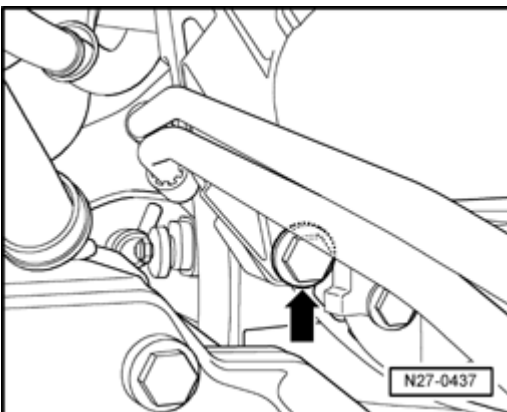
- Unscrew mounting nut of wire terminal 50 - **arrow** - from starter solenoid.

***Caution!***

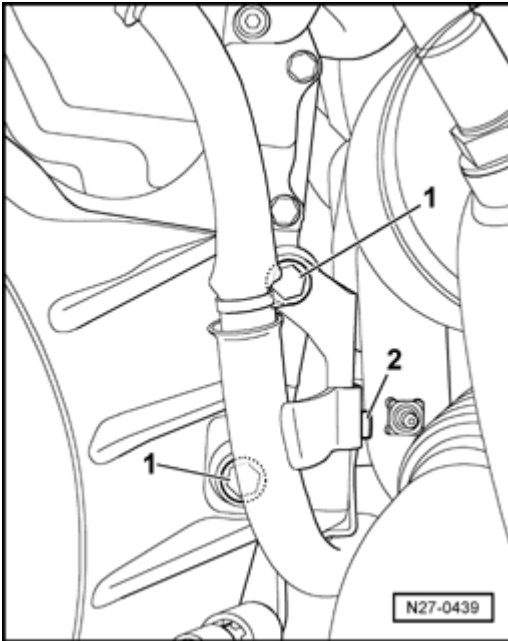
***Screw connections on solenoid can twist.***

***Solenoid can be damaged.***

***When unscrewing and screwing on the plus wire and wire terminal 50, counterhold screw connection at solenoid using an open-end wrench.***

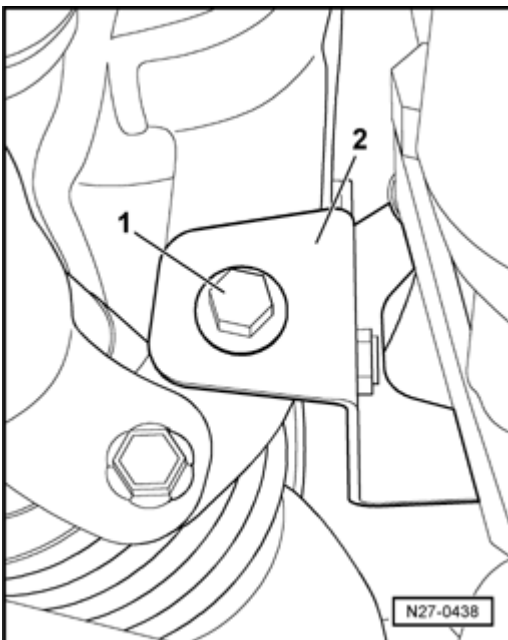


- Unscrew lower mounting bolt for starter M12x60 - **arrow**  
- on engine side.



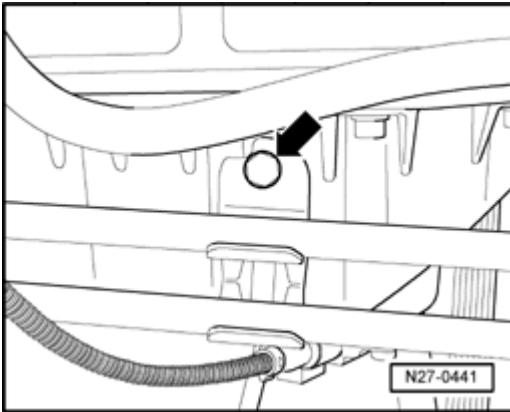
- Unscrew mounting bolt - 2 - of wire retainer and set the wire aside.

- Unscrew mounting nuts - 1 - .

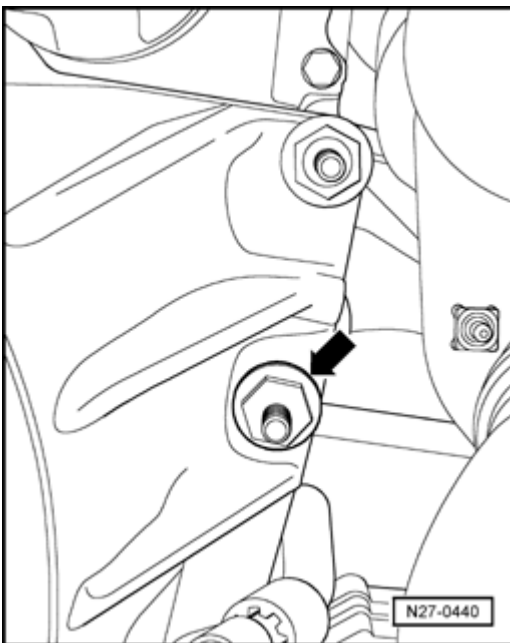


- Unscrew mounting bolt - 1 - of exhaust system holder - 2 - starting at engine side and remove it.





- Unscrew mounting bolt for coolant pipes - **arrow** - at engine oil pan.



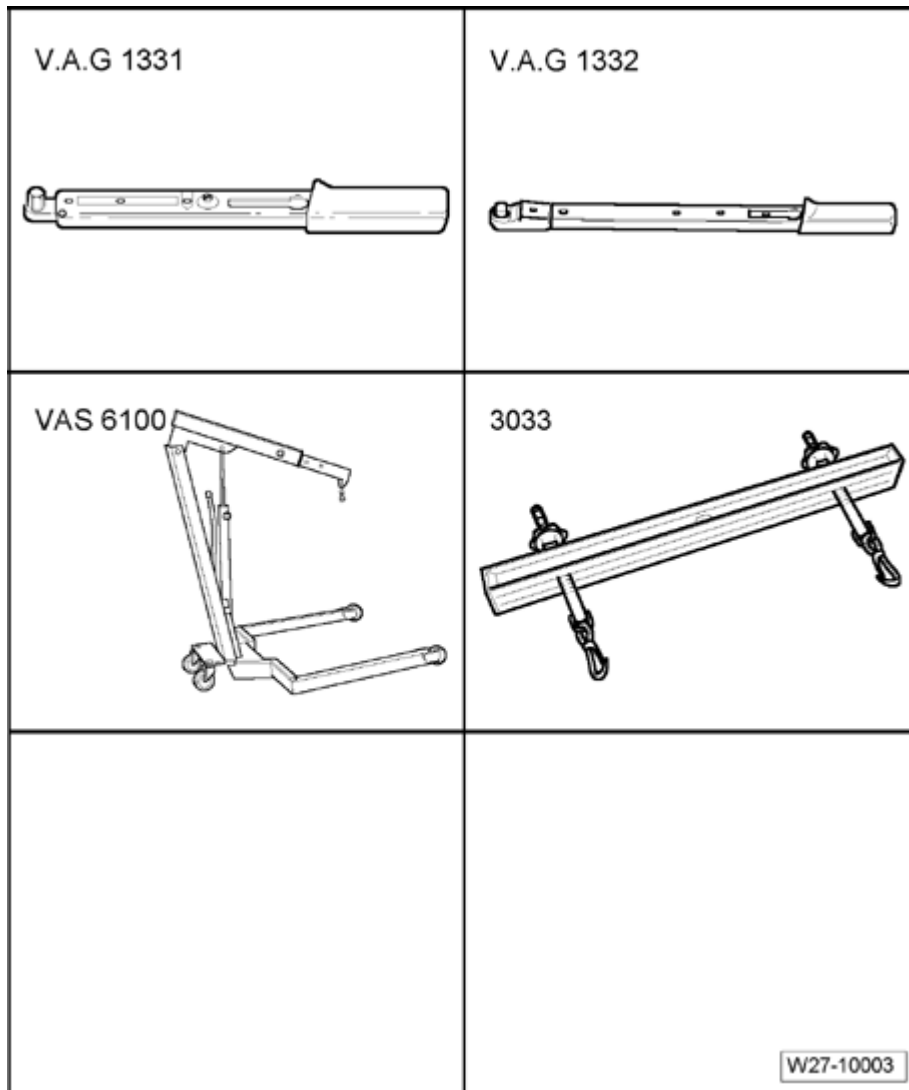
- Unscrew upper mounting bolt for starter - **arrow** - on transmission side.
- Remove starter.

### Installing

Install in reverse order, noting the following:

- Tighten screw connections to specified tightening torque  
⇒ [27-10, Starter, tightening torques](#) .

**Starter - 8 cyl. 4.2 L fuel injection engine, automatic transmission, removing and installing**



### Special tools, testers and auxiliary items required

- Torque Wrench 5-50Nm  
VAG1331
- Torque Wrench 40-200Nm  
VAG1332
- Shop Crane -Load Cap=700-  
1200Kg VAS6100
- Lifting Tackle 3033

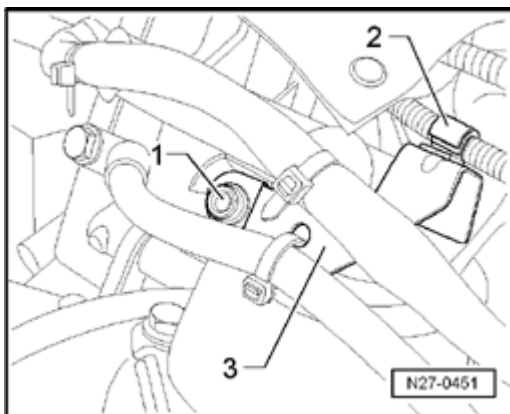
### Removing:

- Remove engine

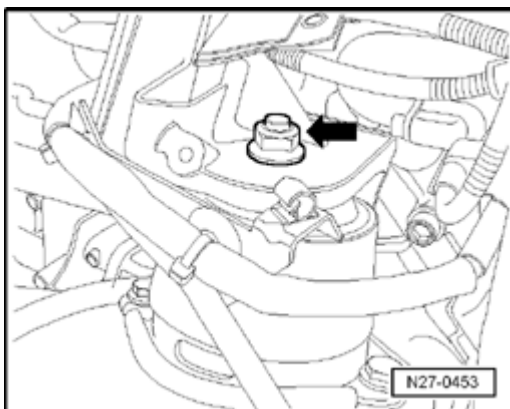
⇒ *Repair Manual, 4.2 Liter V8 5V Engine Mechanical, Fuel Injection Ignition, Engine Code(s): AXQ, BHX, Repair Group 10, removing and installing engine*

- Remove exhaust manifold

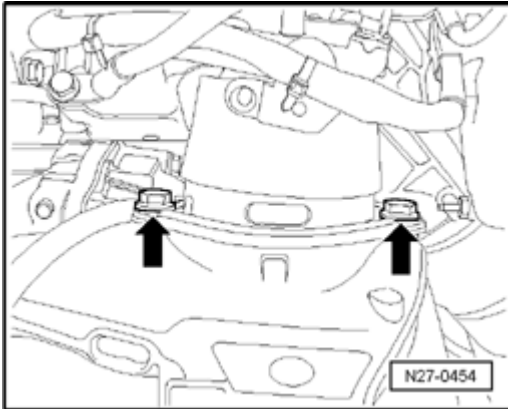
⇒ *Repair Manual, 4.2 Liter V8 5V Engine Mechanical, Fuel Injection Ignition, Engine Code(s): AXQ, BHX, Repair Group 26, removing and installing exhaust manifold and exhaust pipe with primary catalytic converters*



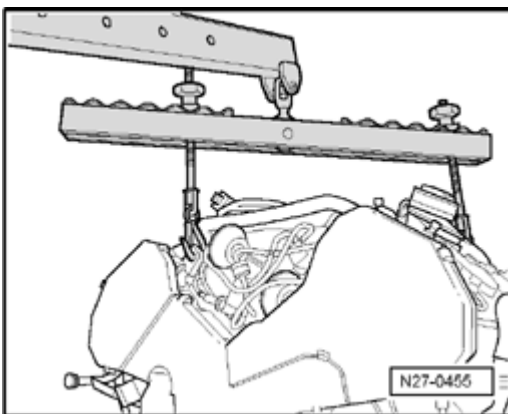
- Unscrew mounting bolt - **1** - .
- Unclip wire - **2** - and remove wire retainer - **3** - from engine bracket.



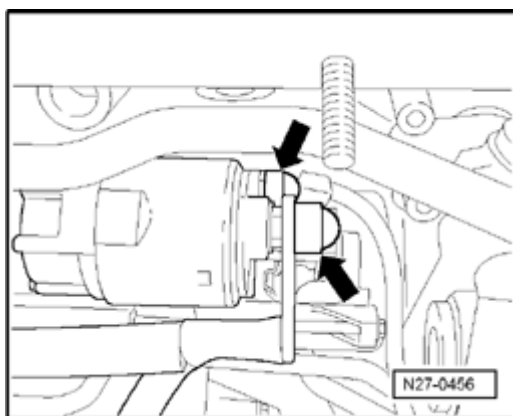
- Unscrew mounting nut from engine mount - **arrow** - .



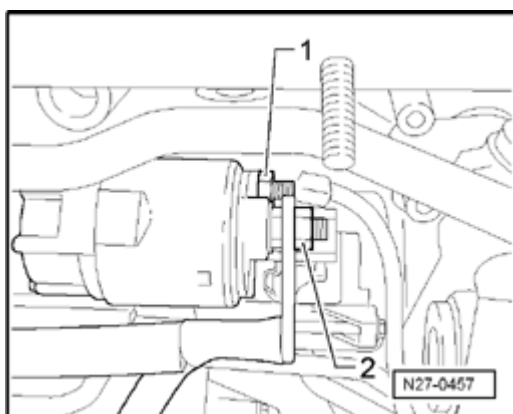
- Remove bolts - **arrows** - .



- Hook the Lifting Tackle 3033 on right cylinder head (toothed belt side) and on left cylinder head (flywheel side).
- Hook Lifting Tackle 3033 in Shop Crane -Load Cap=700-1200Kg VAS6100 .
- Lift engine using Shop Crane -Load Cap=700-1200Kg VAS6100 .
- Remove engine mount.
- Unscrew three mounting bolts of engine bracket at cylinder block.
- Remove engine bracket.



- Remove protective caps - **arrows** - .



- Unscrew mounting nuts of wire terminal 50 - **1** - and plus wire - **2** - from starter solenoid.

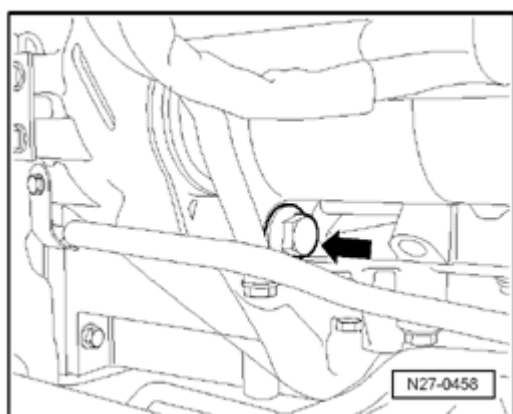
**Caution!**

**Screw connections on solenoid can twist.**

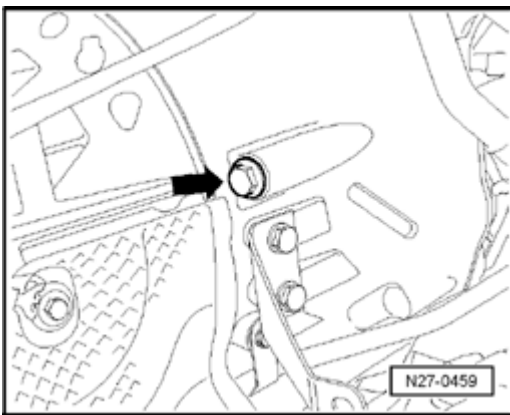
**Solenoid can be damaged.**

**When unscrewing and screwing on the plus wire and wire terminal 50, counterhold screw connection at solenoid using an open-end wrench.**

- Set wires aside.



- Unscrew lower mounting bolt for starter - **arrow** - on engine side.



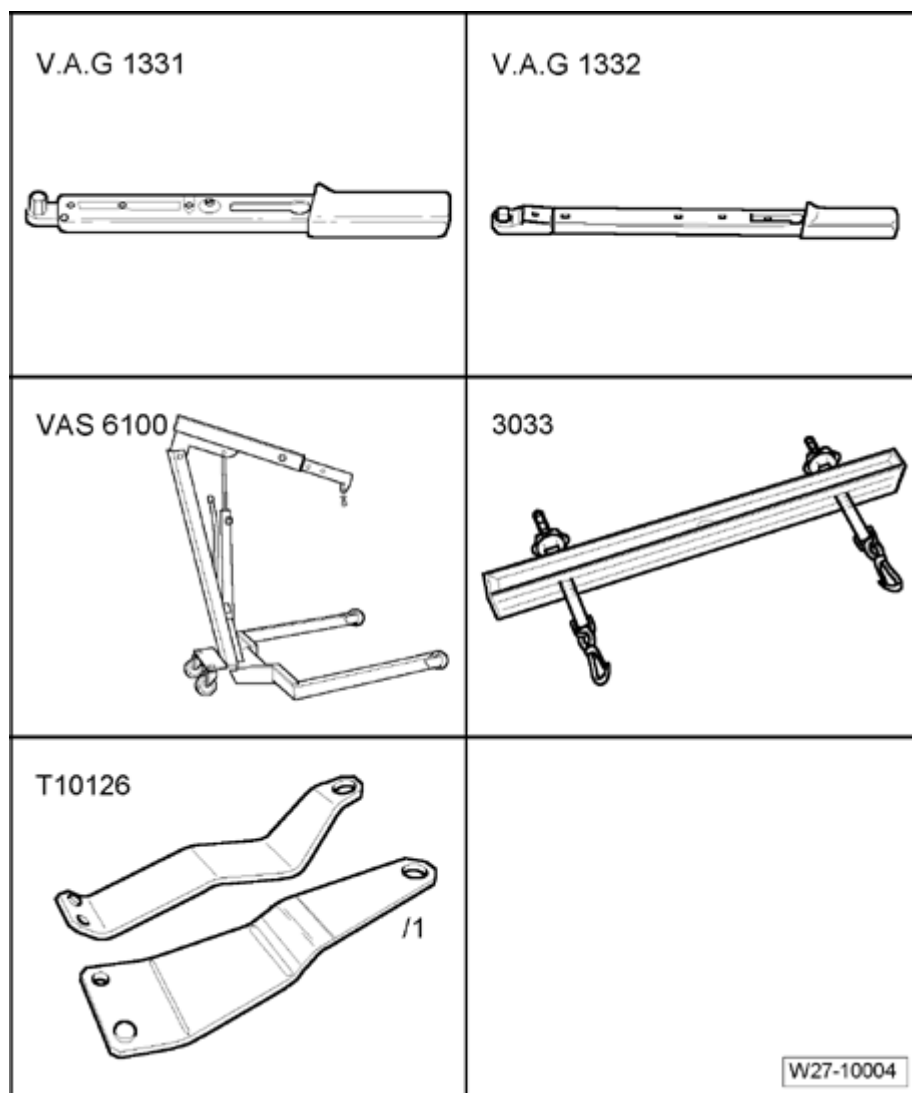
- Unscrew upper mounting bolt for starter - **arrow** - on transmission side.
- Remove starter.

### **Installing:**

Install in reverse order, noting the following:

- Tighten screw connections to specified tightening torque  
⇒ [27-10, Starter, tightening torques](#) .

**Starter - 10 cyl. 4.9 L TDI engine, automatic transmission,  
removing and installing**



### Special tools, testers and auxiliary items required

- Torque Wrench 5-50Nm  
VAG1331
- Torque Wrench 40-200Nm  
VAG1332
- Shop Crane -Load Cap=700-  
1200Kg VAS6100
- Lifting Tackle 3033
- Transportation plates T10126
- Transportation plates T10126/1

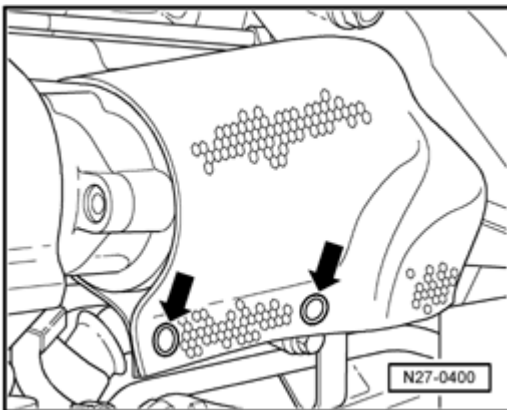
**Removing:**

- Remove engine

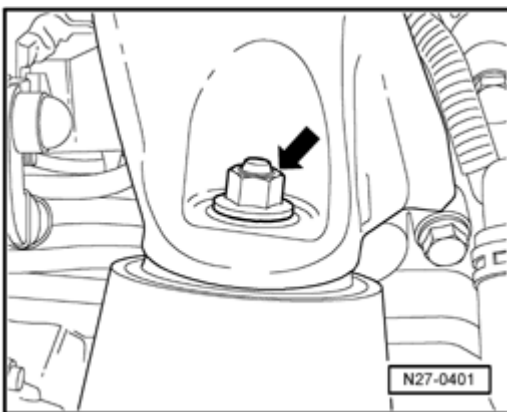
⇒ *Repair Manual, 5.0 Liter V10 2V TDI PD Engine  
Mechanical, Fuel Injection Glow Plug, Engine Code(s):  
BKW, Repair Group 10, removing and installing engine*

- Remove right turbocharger

⇒ *Repair Manual, 5.0 Liter V10 2V TDI PD Engine  
Mechanical, Fuel Injection Glow Plug, Engine Code(s):  
BKW, Repair Group 21, Charge air system with  
turbocharger; removing and installing turbocharger*

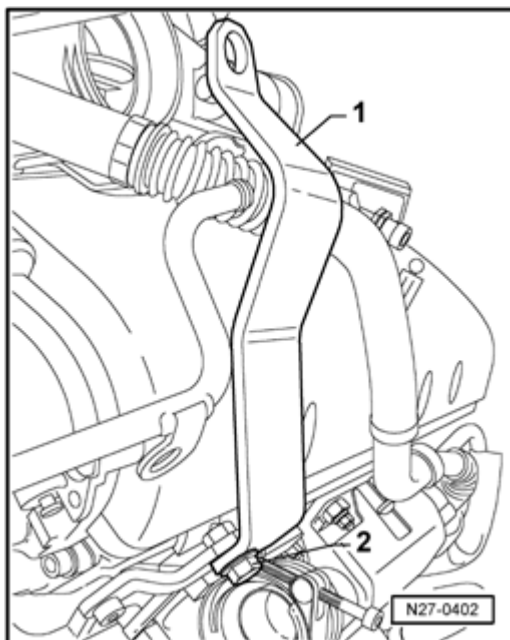


- Open press buttons - **arrows** - and remove heat shield mat for solenoid.



- Unscrew nut from engine bracket - **arrow** - .

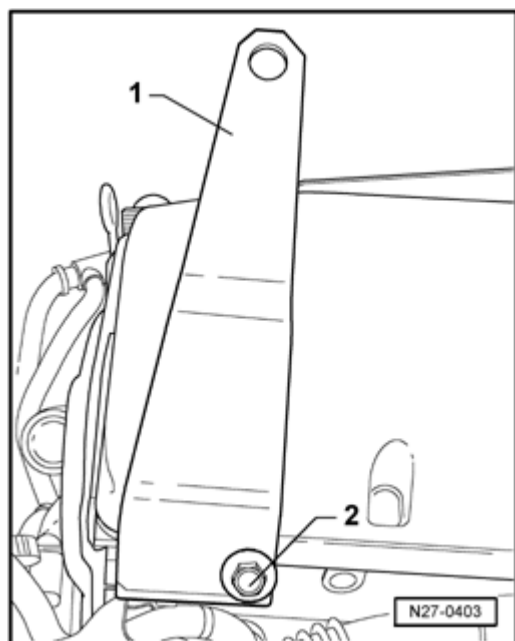




- Bolt transportation plates T10126 - 1 - with a bolt M8x40 - 2 - to right cylinder head at rear.

**Caution!**

**When bolting on, transport strap pin must engage into bore of holder attached on engine side.**



- Bolt transportation plates T10126/1 - 1 - with a bolt M8x40 - 2 - to left cylinder head at front.

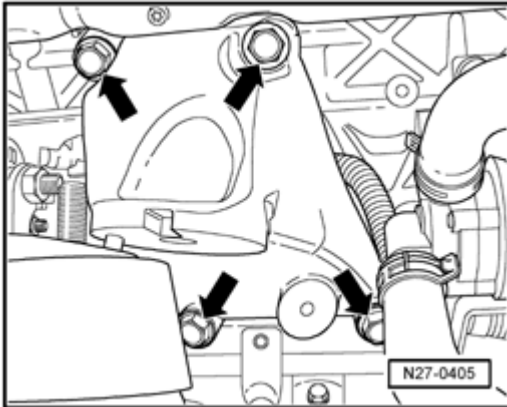
**Caution!**

**When bolting on, transport strap pin must engage into bore of holder attached on engine side.**

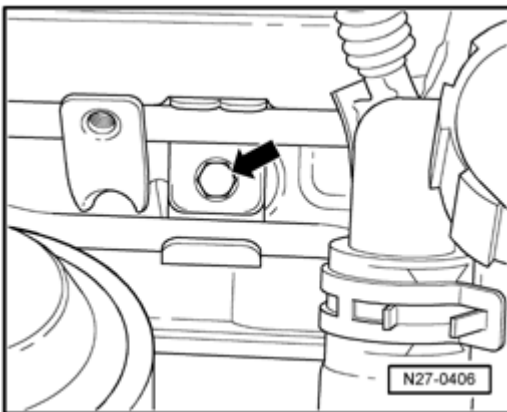
- Hook Lifting Tackle 3033 in Shop Crane -Load Cap=700-1200Kg VAS6100 .

- Hook transportation plates T10126 and T10126/1 onto Lifting Tackle 3033 .

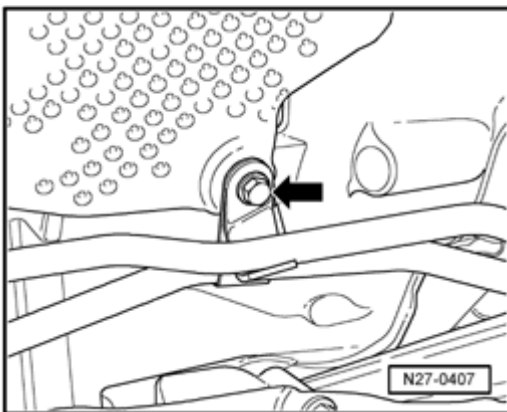
- Lift engine using Shop Crane -Load Cap=700-1200Kg VAS6100 .



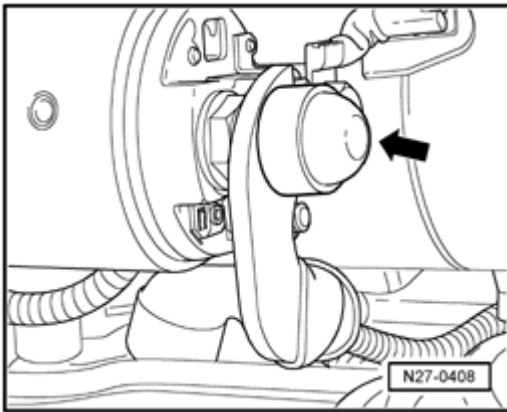
- Unscrew the 4 mounting bolts M10x95 - **arrows** - of right engine support and remove engine support.



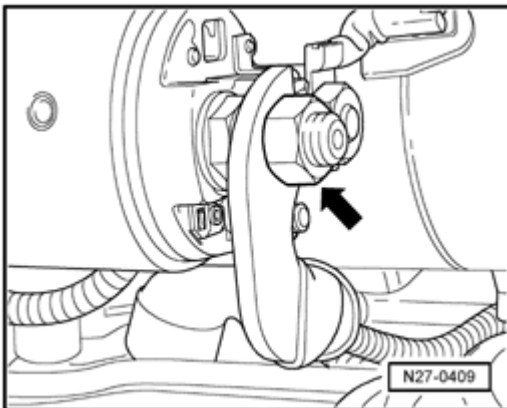
- Unscrew mounting bolt for coolant pipes - **arrow** - at engine block.



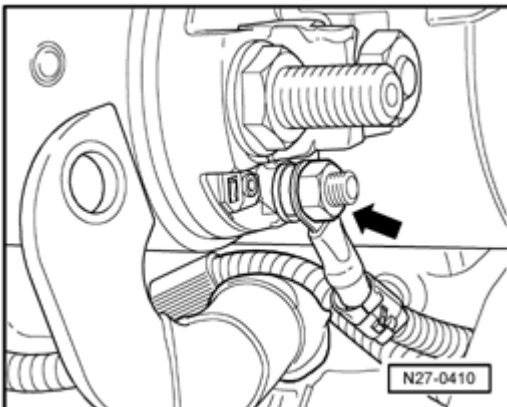
- Unscrew mounting bolt for coolant pipes - **arrow** - at transmission.



- Remove protective cap - **arrow** - from starter solenoid.



- Unscrew mounting nut of plus-wire - **arrow** - from starter solenoid.



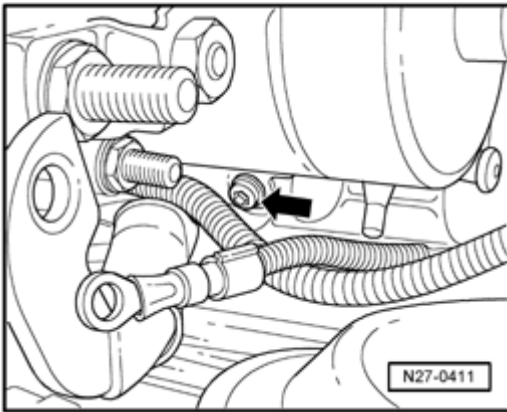
- Unscrew mounting nut of wire terminal 50 - **arrow** - from starter solenoid.

**Caution!**

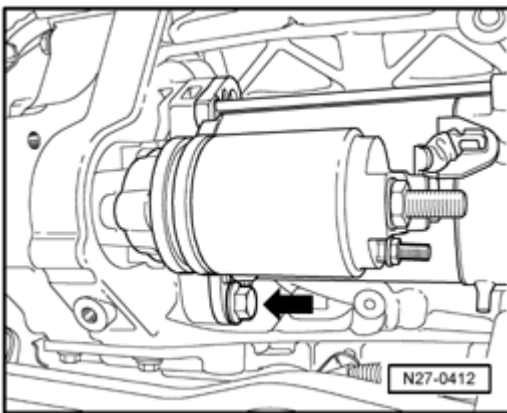
**Screw connections on solenoid can twist.**

**Solenoid can be damaged.**

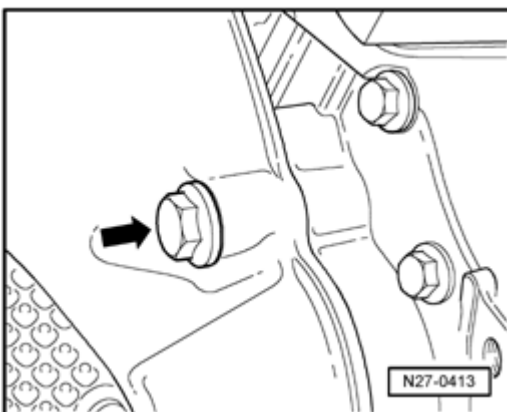
**When unscrewing and screwing on the plus wire and wire terminal 50, counterhold screw connection at solenoid using an open-end wrench.**



- Unscrew mounting bolt of wire retainer - **arrow** - and set the wires aside.



- Unscrew lower mounting bolt for starter M12×165 - **arrow** - on engine side.



- Unscrew upper mounting bolt for starter M12×165 - **arrow** - on transmission side.

- Remove starter.

### Installing:

Install in reverse order, noting the following:

- Tighten screw connections to specified tightening torque  
⇒ [27-10, Starter, tightening torques](#) .

## Starter - manual transmission, removing and installing

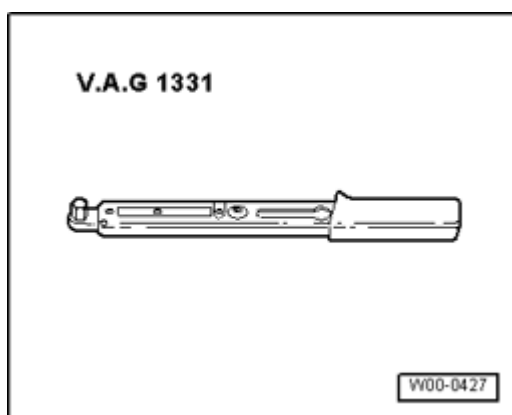
### **Caution!**

#### **Before beginning repairs on the electrical system:**

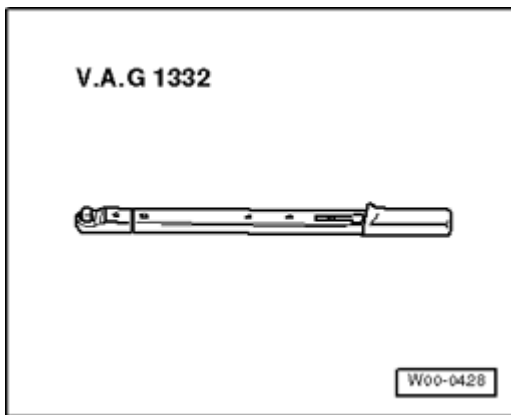
- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**
- **Disconnect negative ( - ) battery terminal.**
- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual ⇒ [27-4, Battery, disconnecting and reconnecting](#) .**

## Starter - 6-cyl. 3.2 L fuel injection engine and 3.6 L FSI engine, manual transmission, removing and installing

### Special tools, testers and auxiliary items required



- Torque Wrench 5-50Nm VAG1331



- Torque Wrench 40-200Nm VAG1332

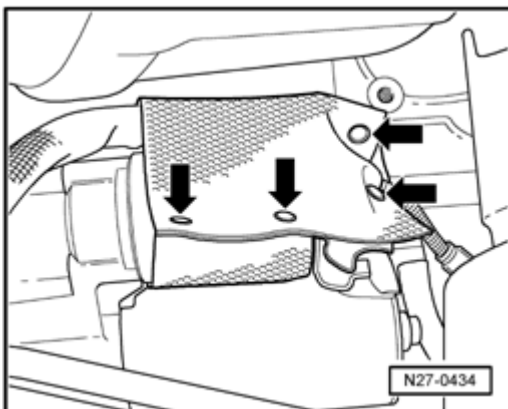
### Removing:

#### **Caution!**

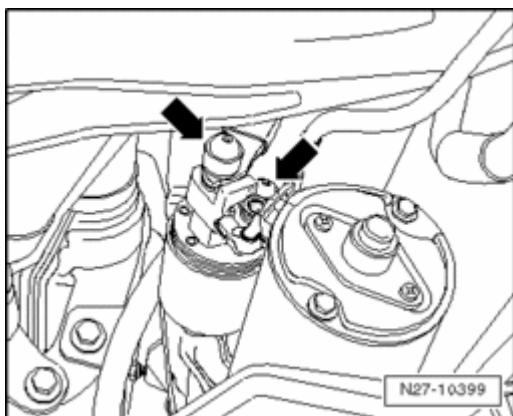
**When disconnecting battery, the procedure must always be followed as described in the Repair Manual ⇒ [27-4, Battery disconnecting and reconnecting sequence](#) . If the sequence is not adhered to, the battery isolation system switch may trigger, which may damage electrical components in the vehicle.**

- Disconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .
- Remove noise insulation

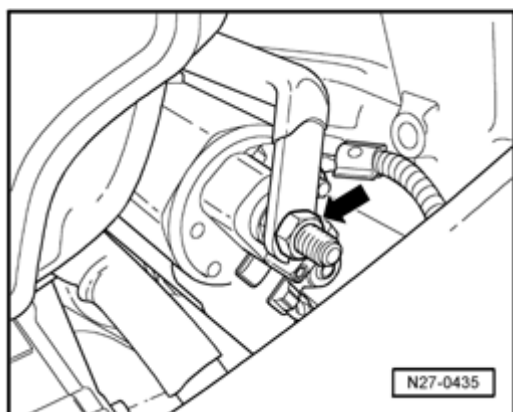
⇒ [Repair Manual, Body Exterior, Repair Group 50, assembly overview of noise insulation](#)



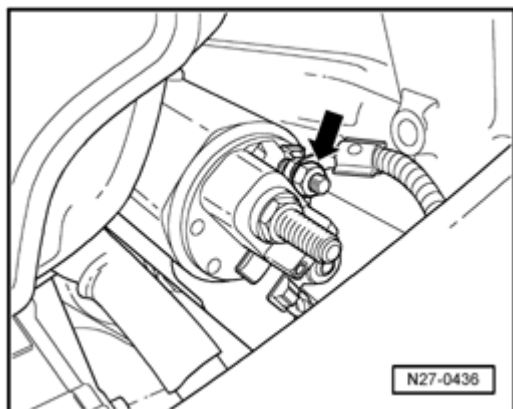
- Open press buttons - **arrows** - and remove heat shield mat for solenoid.



- Pry off protective caps for mounting nuts - **arrows** - .



- Unscrew mounting nut of plus-wire - **arrow** - from starter solenoid.



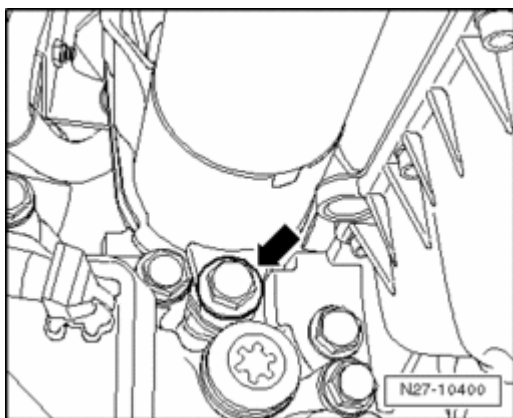
- Unscrew mounting nut of wire terminal 50 - **arrow** - from starter solenoid.

**Caution!**

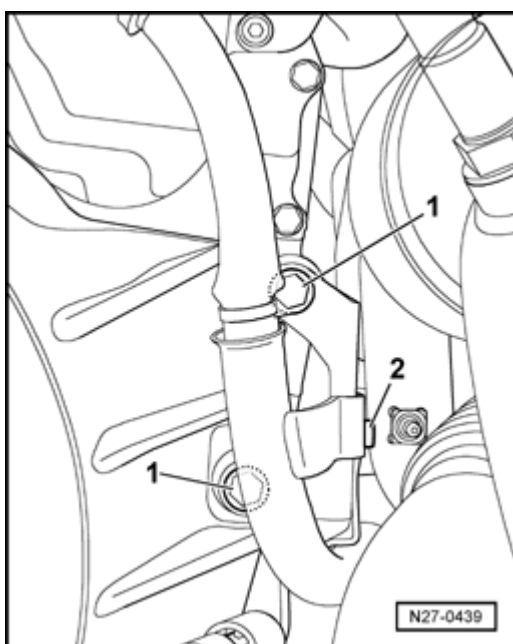
**Screw connections on solenoid can twist.**

**Solenoid can be damaged.**

**When unscrewing and screwing on the plus wire and wire terminal 50, counterhold screw connection at solenoid using an open-end wrench.**



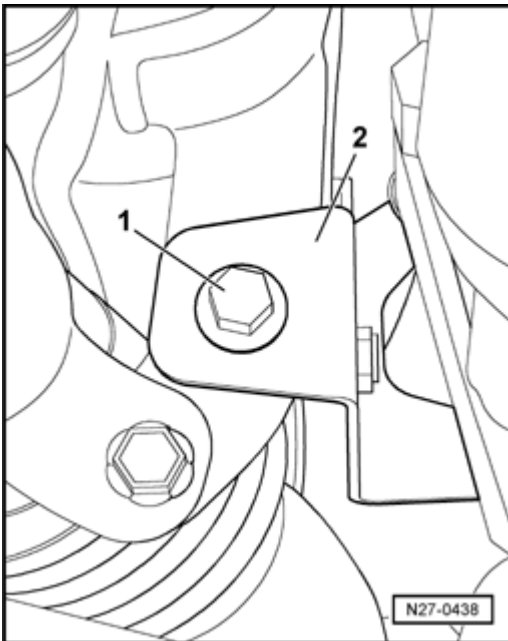
- Unscrew lower mounting bolt for starter - **arrow** - on engine side.



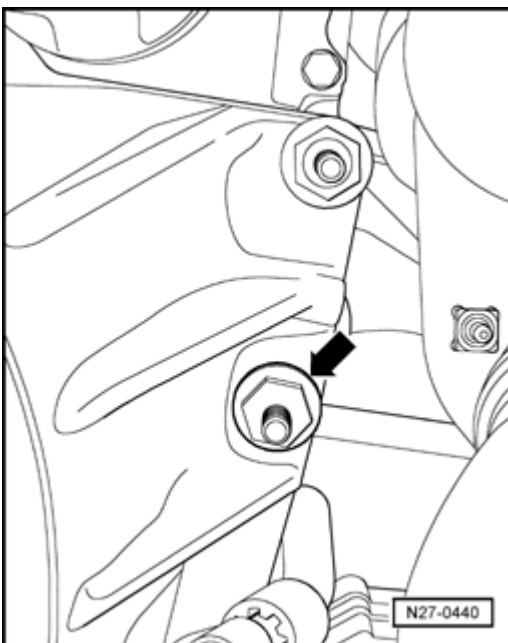
- Unscrew mounting bolt - **2** - of wire retainer and set the wire aside.

- Unscrew mounting nuts - **1** - .





- Unscrew mounting bolt - 1 - of exhaust system holder - 2 - starting at engine side and remove it.

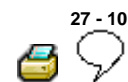


- Unscrew upper mounting bolt for starter - **arrow** - on transmission side.
- Remove starter.

### Installing

Install in reverse order, noting the following:

- Tighten screw connections to specified tightening torque  
⇒ [27-10, Starter, tightening torques](#) .



## Starter, tightening torques

### Starter - 6-cyl. 3.2 L fuel injection engine and 3.6 L FSI engine, tightening torques

Location / fastener		Tightening torques
Starter / bolts to engine - transm.	M12x60	75 Nm
Starter solenoid - terminal 50 / nut		8 Nm
Starter solenoid - terminal B+ / nut		15 Nm

### Starter - 8-cyl. 4.2 L fuel injection engine, tightening torques

Location / fastener		Tightening torques
Starter / bolts to engine - transm.		40 Nm
Starter solenoid - terminal 50 / nut		8 Nm
Starter solenoid terminal B+ / nut		15 Nm
Engine mount bracket to engine block / bolt		60 Nm
Engine mount to engine mount bracket / bolt		75 Nm

### Starter - 10-cyl. TDI engine, tightening torques

Location / fastener		Tightening torques
Starter bolts to engine - transm.	M12x165	65 Nm
Starter solenoid - terminal 50 / nut		8 Nm
Starter solenoid terminal B+ / nut		15 Nm
Engine mount bracket to engine block / bolt	M10x95	60 Nm
Engine mount to engine mount bracket / bolt		75 Nm



## Generator (GEN)

### **Caution!**

***When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Battery, disconnecting and reconnecting](#) . Not adhering to proper disconnection sequence will result in deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.***

### **General information**

Depending on engine, different types of generators are installed.

Generators on 6-cylinder gasoline and TDI engines have the following characteristics:

- Generator driven by a ribbed belt.
- Voltage regulator cannot be serviced separately. If repair is required, generator must be replaced.
- Through model year 2004, Generator is air-cooled
- From model year 2005, Generator is cooled by engine cooling system.

Generators on 8-cyl. fuel injection engines have the following characteristics:

- Generator driven by ribbed belt.
- Voltage regulator cannot be serviced separately. If repair is required, generator must be replaced.
- Generator is cooled by engine cooling system.

Generators on 10-cyl. TDI engines have the following characteristics:

- Generator driven by a drive coupling connected via a

clutch to an engine-driven shaft.

- The generator is cooled by the engine cooling system.
- Voltage regulator cannot be serviced separately. If repair is required, generator must be replaced.

**Note:**

- *Additional information:*

⇒ *Wiring Diagrams Component Locations*

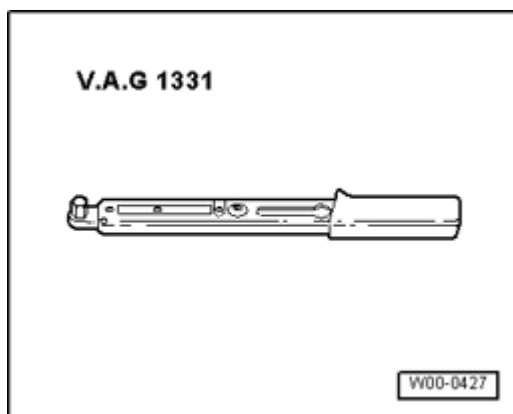
**Generator positive ( B+ ) connection, securing**

**Caution!**

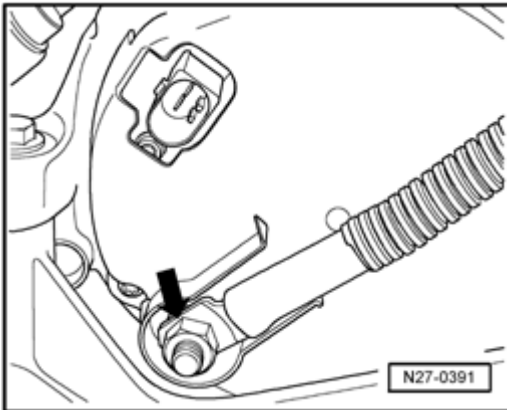
***If B+ terminal nut is not torqued as specified, the following may result:***

- ***Battery will not be completely charged.***
- ***The complete electrical/electronics systems may fail (disabled vehicle).***
- ***Fire hazard due to arcing.***
- ***Damage to electronic components and control modules caused by excessive voltage.***

**Special tools, testers and auxiliary items required**



- Torque Wrench 5-50Nm VAG1331 (or 5 - 50 Nm equivalent)



- Torque generator B+ terminal nut - **arrow** - according to value in table ⇒ [27-12, Generator \(GEN\), tightening torques](#) .

### Ribbed belt, checking

#### **Caution!**

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

- Crank engine at vibration damper on pulley using a socket.

- Check ribbed belt for:

- Cracks in the underside (surface cracks, fragmenting, cross-section breaks)
- Layer separation (outer layer, tension cords)
- Wear-through on the underside
- Fraying of tension cords
- Edge wear (material wear, frayed edges, hardened edges, glazed edges, surface cracks)
- Oil and grease traces

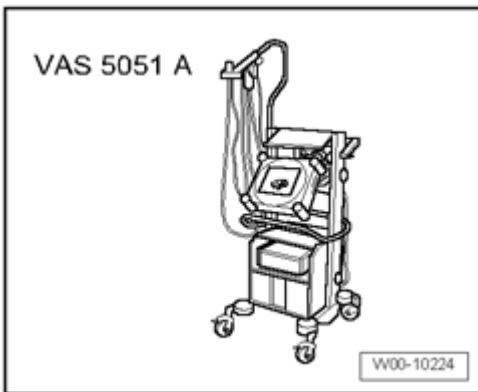
#### **Caution!**

***If ribbed belt is damaged, replace immediately to prevent failure or improper function of driven components.***

## **Generator (GEN), checking**

### **Special tools, testers and auxiliary items required**

- Diagnostic Operation System VAS5051A
  
- Optional: Vehicle Diagnosis Service Syst. VAS5052



- Diagnostic Cable-5 Meters VAS5051/6A

- Connect Diagnostic Operation System VAS5051A ⇒ [97-1, VAS 5051 / 5052](#) .

Select operating mode "Guided Fault Finding" on Vehicle Diagnostic, Testing and Information System VAS 5051 .

After the Diagnostic Trouble Code (DTC) memory of all control modules has been checked:

- Using the "Go To" button, select "Functions/Component selection" and the following menu options in sequence:

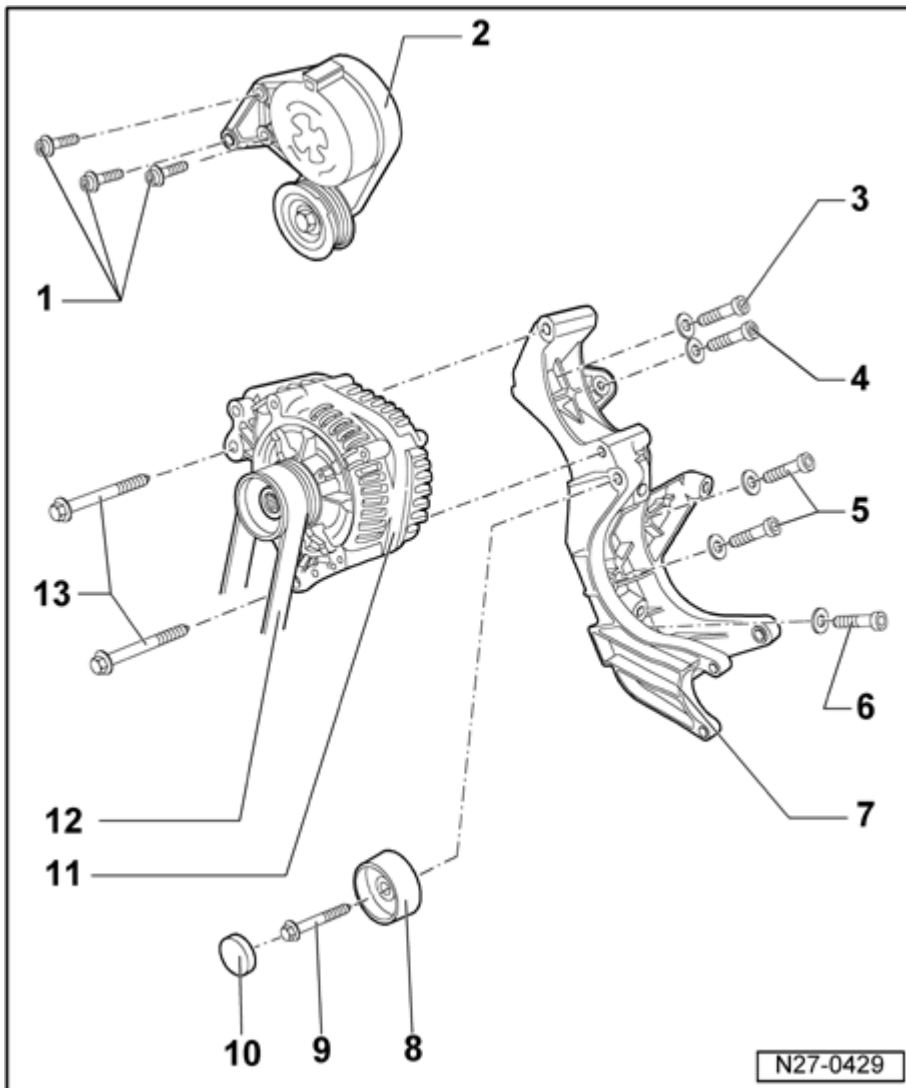
- Body
  
- Electrical Equipment
  
- 27 - Starter, power supply
  
- Electrical components

- Generator (GEN) -C-

- Or, in Vehicle Diagnostic, Testing and Information System VAS 5051 , select operating mode "Guided Functions" .

- Body
- Electrical Equipment
- 27 - Starter, power supply
- Electrical components
- Generator (GEN) -C-

**Air-cooled Generator (GEN) - 6-cyl. fuel injection engine through model year 2004, assembly**



**1 - Socket head bolt with washer**

- M8x30 mm
- 20 Nm

**2 - Tensioner**

**3 - Socket head bolt with washer**

- M8x40 mm
- 20 Nm

**4 - Fitted bolt with washer**

- M8x25 mm
- 20 Nm

**5 - Socket head bolts with washer**

- M8x40 mm



- 20 Nm

#### **6 - Fitted bolt with washer**

- M8x25mm
- 20 Nm

#### **7 - Bracket**

#### **8 - Idler pulley**

#### **9 - Fitted bolt with hex head**

- Part of idler pulley, cannot be replaced separately
- M10x50mm
- 40 Nm

#### **10 - Cover**

#### **11 - Generator (GEN)**

- Securing B+-wire to generator ⇒ [27-11, Generator positive \( B+ \) connection, securing](#)
- Neither the voltage regulator nor the carbon brushes can be replaced individually; if a repair is required, the entire generator must be replaced.
- Generator, removing and installing ⇒ [27-11, Air-cooled Generator \(GEN\) - 6-cyl. fuel injection engine through model year 2004, removing and installing](#)

#### **12 - Ribbed belt**

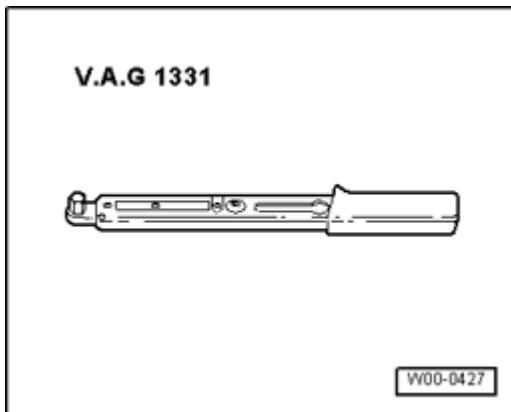
- Ribbed belt, checking ⇒ [27-11, Ribbed belt, checking](#)

#### **13 - Bolts**

- M8x90mm
- 20 Nm

**Air-cooled Generator (GEN) - 6-cyl. fuel injection engine through model year 2004, removing and installing**

### Special tools, testers and auxiliary items required



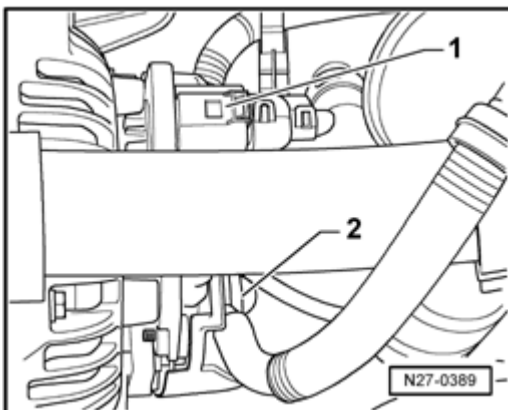
- Torque Wrench 5-50Nm VAG1331
- Hex bolt M8x50 (locally available - used for releasing tensioner)

### Removing:

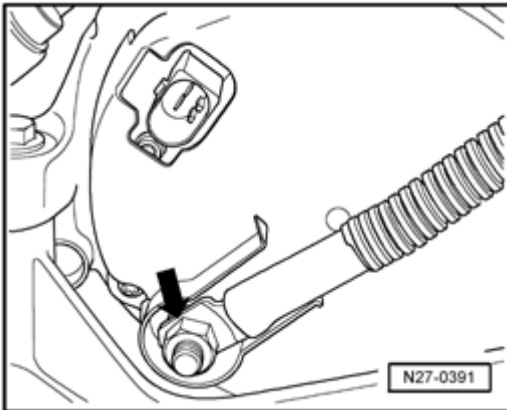
#### **Caution!**

**When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Battery disconnecting and reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**

- Disconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .



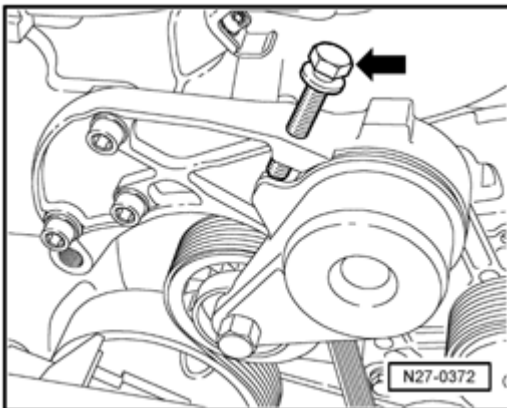
- Disconnect electrical connection for the DF-lead - **1** - and remove cap - **2** - .



- Remove nut at positive ( B+ ) terminal - **arrow** - and remove cable.
- Remove air guide over radiator.

**Caution!**

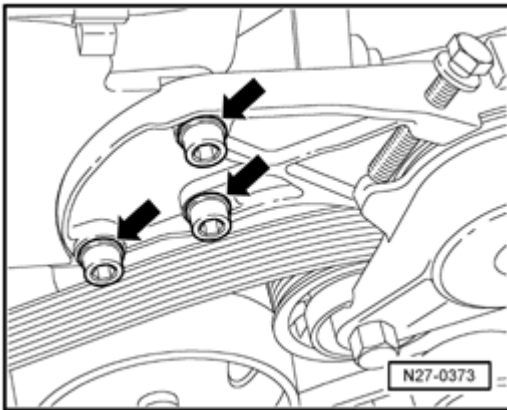
**Before removing ribbed belt, mark direction of rotation. Belt damage will result if not reinstalled in proper direction.**



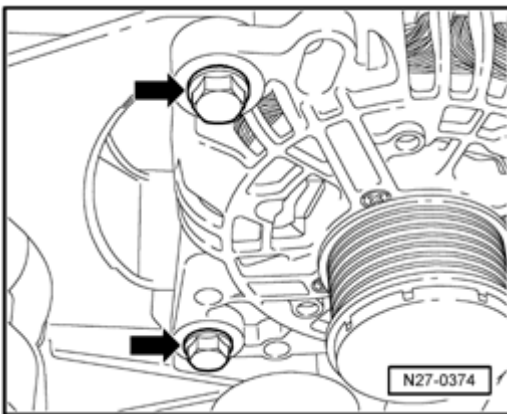
- Screw bolt M8x50 - **arrow** - into threaded hole of tensioner until ribbed belt has enough slack to allow removal of belt.

**Caution!**

**Only screw bolt in far enough to allow removal of belt. If bolt is turned-in too far, tensioning roller damage will result.**



- Remove bolts for tensioner - **arrows** - .
- Remove ribbed belt together with tensioner.



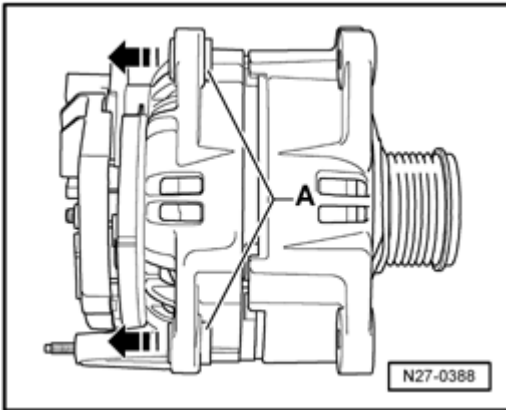
- Remove bolts M8x90 at generator - **arrows** - .
- Remove generator.

### Installing:

#### **Caution!**

- **When installing used ribbed belts observe fitting position and direction of rotation marked on removal.**
- **Before installing ribbed belt, ensure all subassemblies (generator, air conditioner compressor etc.) are tightly mounted.**
- **When installing ribbed belt, ensure belt seats correctly in pulleys.**

Install in reverse order of removal, noting the following:



- Drive threaded sleeves - **A** - out of generator housing approx. 4 mm in direction of arrow.

- Install and torque generator bolts and terminal nuts according to values in table ⇒ [27-12, Generator \(GEN\), tightening torques](#) .

**Caution!**

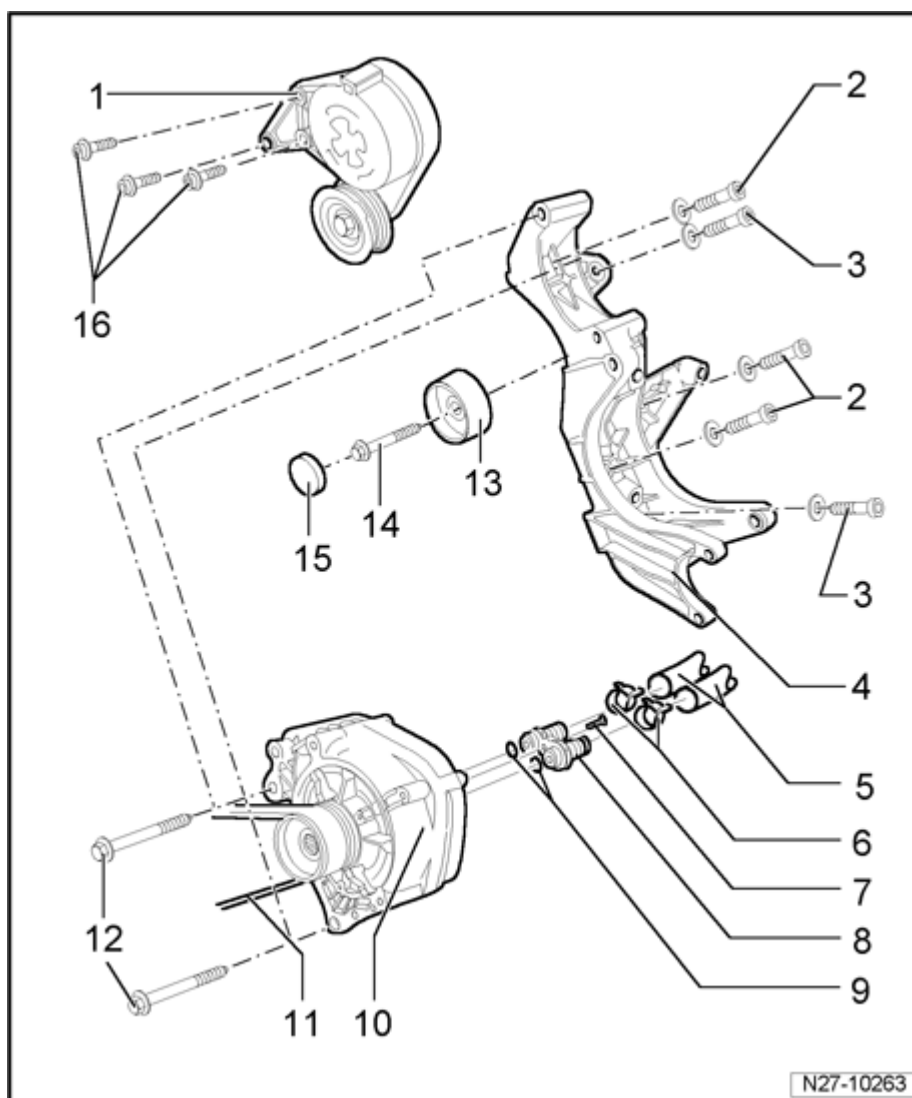
- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Batteries, reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**
- **Observe battery terminal/post handling instructions ⇒ [27-1, Battery post/terminal, handling instructions](#) .**

- Remove M8X50 tensioner bolt.

- Reconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .

- Start the engine and verify belt is running properly.

**Water-cooled Generator (GEN) - 3.2 L 6-cyl. fuel injection engine and 3.6 L FSI engine from model year 2005, assembly**



**1 - Tensioner**

**2 - Socket head bolts**

- M8x30 mm
- 20 Nm

**3 - Bolts**

- M8x28 mm
- 20 Nm

**4 - Bracket**

**5 - Coolant hoses**

- Coolant hose connection diagram

⇒ *Repair Manual, 3.2 Liter V6 4V Engine*

*Mechanical, Fuel Injection Ignition,  
Engine Code(s): BAA, BMX, Repair  
Group 19, Coolant hose connection  
diagram*

## 6 - Clamp

## 7 - Torx-flat head screw

- M6x 16 mm
- 9 Nm

## 8 - Connecting piece

## 9 - O-Ring

- Always replace

## 10 - Generator (GEN)

- B+ lead connection to generator ⇒ [27-11, Generator positive \( B+ \) connection, securing](#)
- Neither the voltage regulator nor the carbon brushes can be replaced individually; if a repair is required, the entire generator must be replaced.
- Generator, removing and installing ⇒ [27-11, Water-cooled Generator \(GEN\) - 3.2 L 6-cyl. fuel injection engine and 3.6 L FSI engine from model year 2005, removing and installing](#)

## 11 - Ribbed belt

- Ribbed belt routing diagram ⇒ [27-11, Ribbed belt routing - 3.2 L 6-cyl. fuel injection engine and 3.6 L FSI engine](#) .
- Ribbed belt, checking ⇒ [27-11, Ribbed belt, checking](#) .

## 12 - Bolts

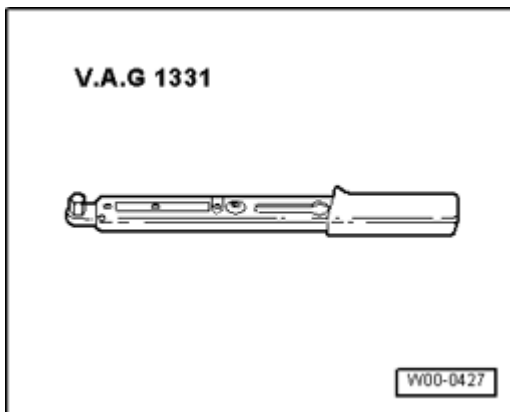
- M8x90 mm
- 20 Nm

**13 - Idler pulley****14 - Bolt**

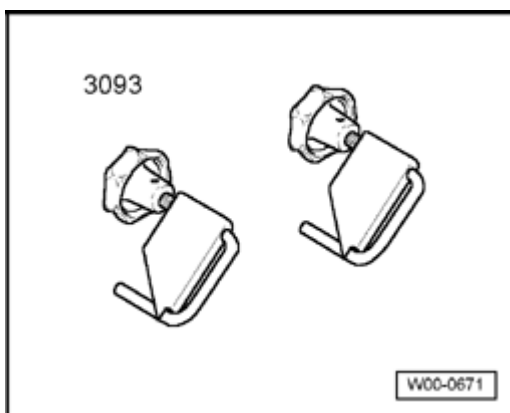
- M10x45 mm
- 20 Nm

**15 - Cover****16 - Socket head bolts**

- M8x30 mm
- 20 Nm

**Water-cooled Generator (GEN) - 3.2 L 6-cyl. fuel injection engine and 3.6 L FSI engine from model year 2005, removing and installing****Special tools, testers and auxiliary items required**

- Torque Wrench 5-50Nm VAG1331



- Hose Clamps, Up to 40 mm. 3093
- Hex bolt M8x50 (locally available - used for releasing)



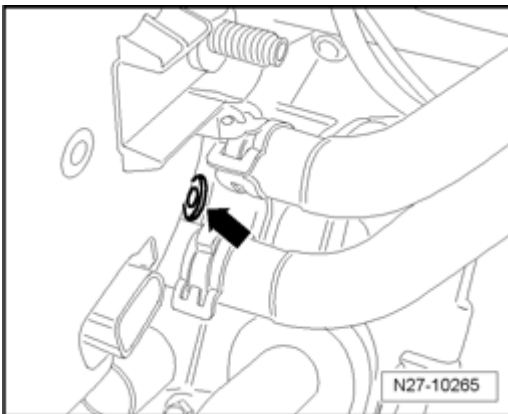
tensioner)

## Removing:

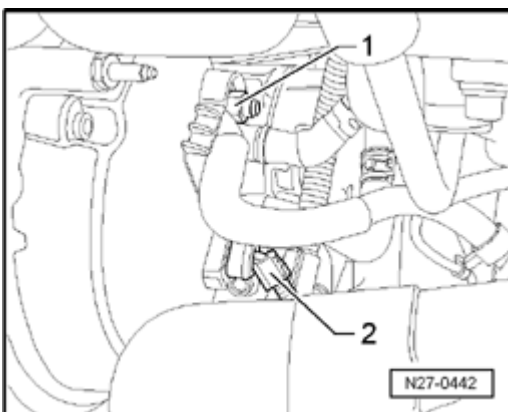
### **Caution!**

**When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Battery, disconnecting and reconnecting](#) . If sequence is not adhered to, pyrotechnic battery cut-off may be triggered, damaging vehicle electrical components.**

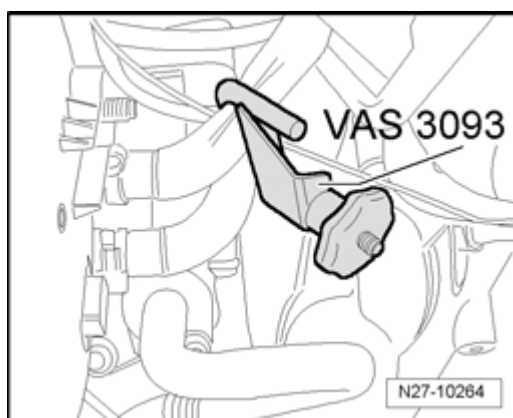
- Disconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .



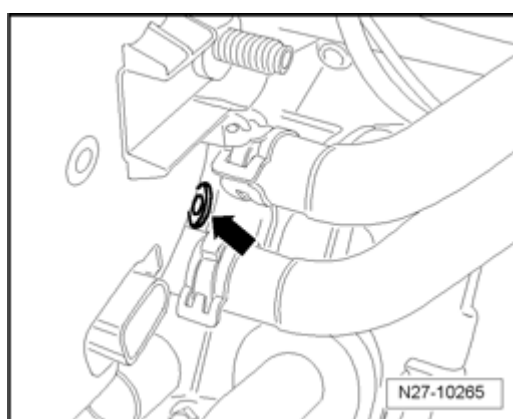
- Remove cap - **arrow** - for B+ terminal.



- Remove nut at positive ( B+ ) terminal - **1** - , remove cable and disconnect connector for DF wire - **2** - .



- Clamp coolant hoses using Hose Clamps, Up to 40 mm. 3093 .



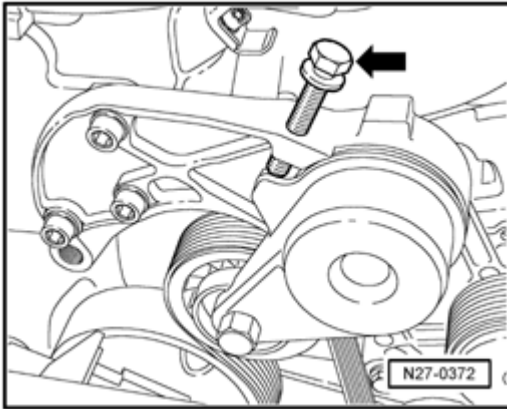
- Remove bolt - **arrow** - .
- Remove coolant pipes from generator.

**Note:**

- *Coolant hoses may remain connected to coolant pipes.*

**Caution!**

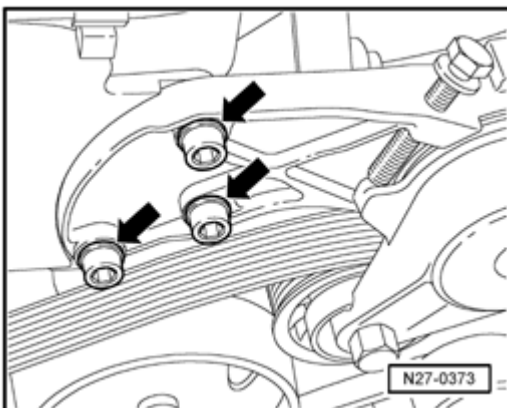
**Before removing ribbed belt, mark direction of rotation. Belt damage will result if not reinstalled in proper direction.**



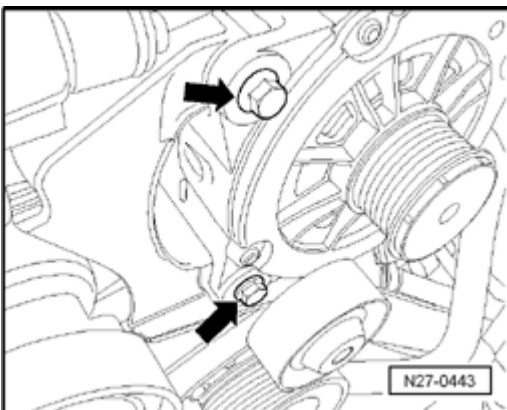
- Screw bolt M8x50 - **arrow** - into threaded hole of tensioner until ribbed belt has enough slack to allow removal of belt.

**Caution!**

**Only screw bolt in far enough to allow removal of belt.  
If bolt is turned-in too far, tensioning roller damage will result.**



- Remove bolts for tensioner - **arrows** - .  
- Remove ribbed belt together with the tensioner.



- Remove bolts M8x90 for generator - **arrows** - .  
- Remove generator from bracket.

**Installing:****Caution!**

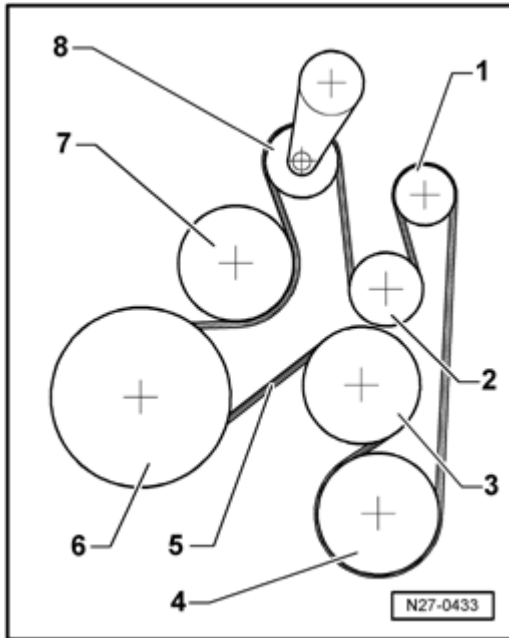
- ***When installing used ribbed belts observe fitting position and direction of rotation marked on removal.***
- ***Before installing ribbed belt, ensure all subassemblies (generator, air conditioner compressor etc.) are tightly mounted.***
- ***When installing ribbed belt, ensure belt seats correctly in pulleys.***
- ***Ensure tensioner bolt is removed.***

Install in reverse order of removal, noting the following:

- Install and torque generator bolts and terminal nuts according to values in table ⇒ [27-12, Generator \(GEN\), tightening torques](#) .
- Remove M8X50 tensioner bolt.
- Check and top up coolant if necessary

⇒ *Repair Manual, 3.2 Liter V6 4V Engine Mechanical, Fuel Injection Ignition, Engine Code(s): BAA, BMX, Repair Group 19, Cooling system components, removing and installing; Cooling system, draining and filling*

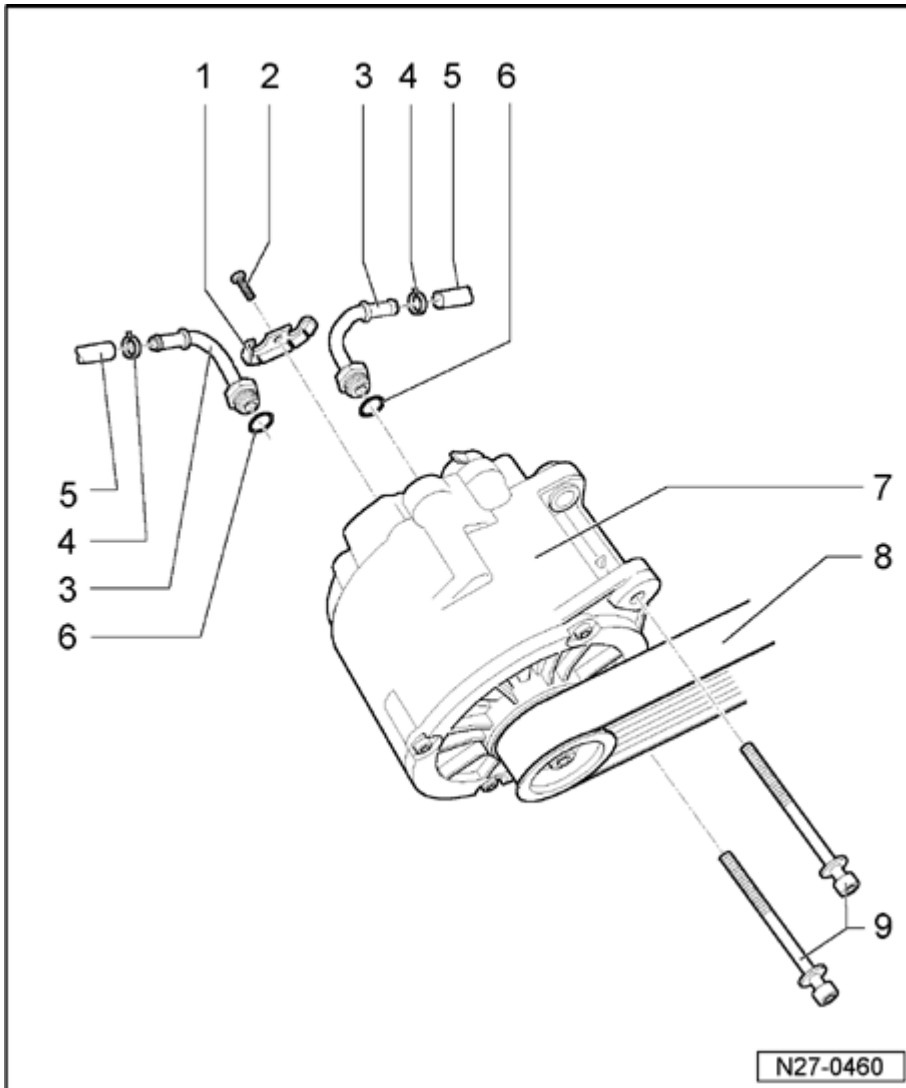
- Reconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .
- Start engine and check belt running.



### Ribbed belt routing - 3.2 L 6-cyl. fuel injection engine and 3.6 L FSI engine

- 1 - Belt pulley - Generator
- 2 - Idler pulley
- 3 - Belt pulley - power steering pump
- 4 - Belt pulley - air conditioner compressor
- 5 - Ribbed belt - generator, idler pulley, air conditioner compressor, power steering pump, crankshaft, coolant pump and tensioner
- 6 - Belt pulley - crankshaft
- 7 - Belt pulley - coolant pump
- 8 - Tensioner roller

### Generator (GEN) - 8-cyl. fuel injection engine, assembly



**1 - Angle bracket**

**2 - Socket head bolts**

- M6x25mm
- 9 Nm

**3 - Coolant pipes**

**4 - Clamp**

**5 - Coolant hose**

- Coolant hose connection diagram

⇒ *Repair Manual, 4.2 Liter V8 5V Engine  
Mechanical, Fuel Injection Ignition,  
Engine Code(s): AXQ, BHX, Repair  
Group 19, Coolant hose connection  
diagram*

## 6 - O-Ring

- Always replace

## 7 - Generator (GEN)

- Securing B+-wire to generator ⇒ [27-11, Generator positive \( B+ \) connection, securing](#)
- Neither the voltage regulator nor the carbon brushes can be replaced individually; if a repair is required, the entire generator must be replaced.
- Generator, removing and installing ⇒ [27-11, Generator \(GEN\) - 8-cyl. fuel injection engine, removing and installing](#)

## 8 - Ribbed belt

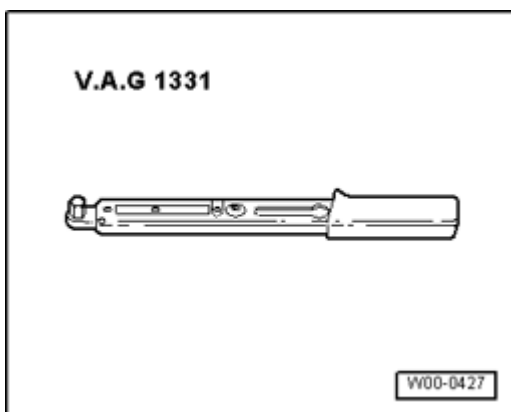
- Ribbed belt, checking ⇒ [27-11, Ribbed belt, checking](#)

## 9 - Socket head bolt with washer

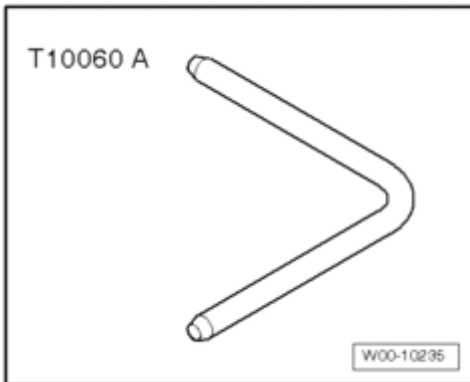
- M8x90mm
- 20 Nm

## Generator (GEN) - 8-cyl. fuel injection engine, removing and installing

### Special tools, testers and auxiliary items required



- Torque Wrench 5-50Nm VAG1331



- Locking Pin T10060A

### Removing:

#### **Caution!**

**When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Battery disconnecting and reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**

- Disconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .
- Remove engine

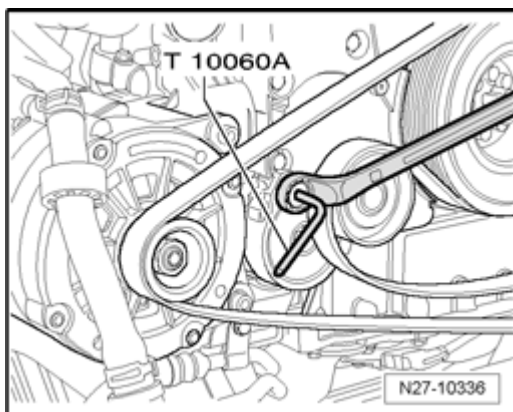
⇒ *Repair Manual, 4.2 Liter V8 5V Engine Mechanical, Fuel Injection Ignition, Engine Code(s): AXQ, BHX, Repair Group 10, Engine, removing and installing*

.

#### **Caution!**

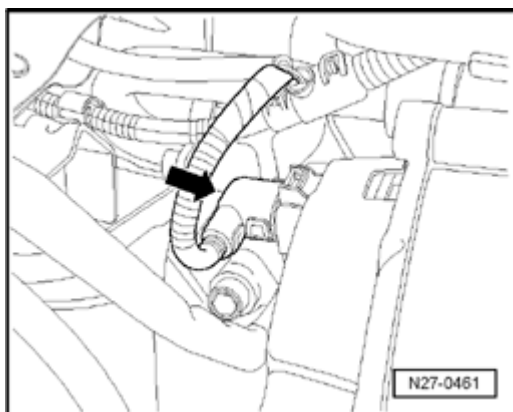
**Before removing ribbed belt, mark direction of rotation. Belt damage will result if not reinstalled in proper direction.**





- Use 19mm wrench to rotate tensioner enough to insert Locking Pin T10060A as illustrated.

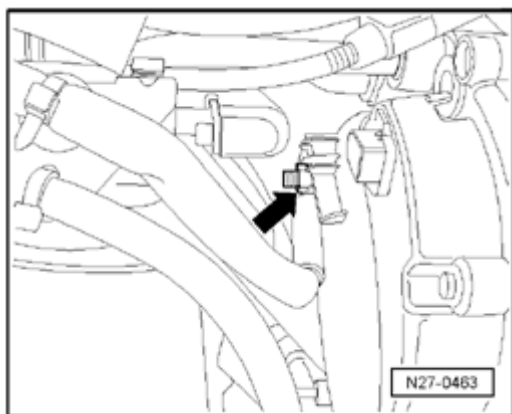
- Remove ribbed belt.



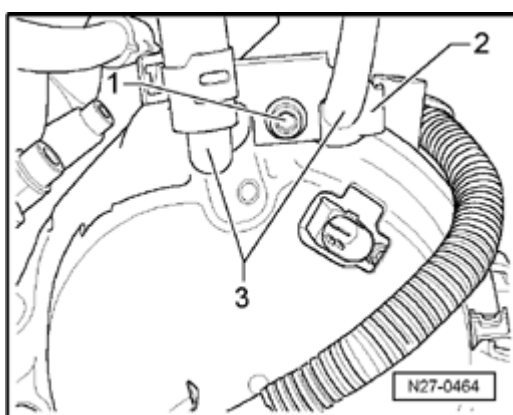
- Disconnect electrical connection for DF-wire - **arrow** - .



- Remove cap - **arrow** - .

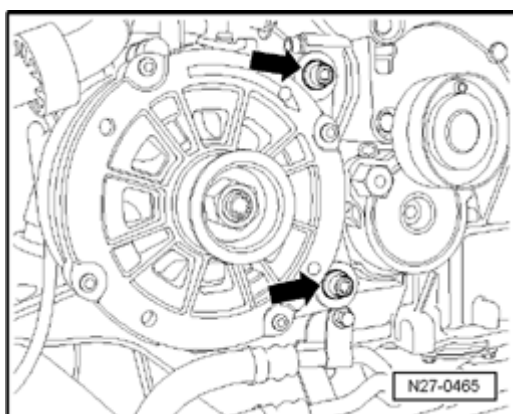


- Remove nut at positive ( B+ ) terminal - **arrow** - and remove cable.



- Remove bolt - **1** - and remove the bracket - **2** - for coolant lines.

- Remove coolant lines - **3** - from generator.



- Remove bolts M8x90 for generator - **arrows** - .

### Installing:

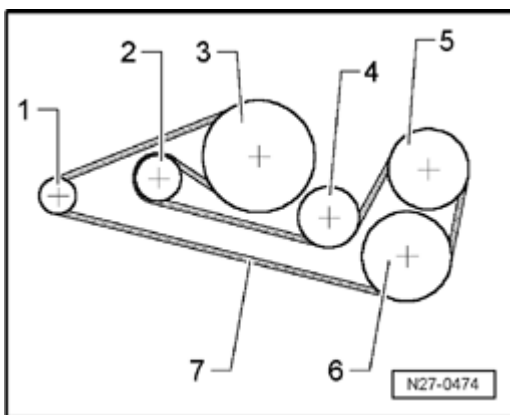
#### **Caution!**

- **When installing used ribbed belts observe fitting position and direction of rotation marked on removal.**

- **Before installing ribbed belt, ensure all subassemblies (generator, air conditioner compressor etc.) are tightly mounted.**
- **When installing ribbed belt, ensure belt seats correctly in pulleys.**
- **Ensure T10060 Mandrel is removed from tensioner.**

Install in reverse order of removal, noting the following:

- Install and torque generator bolts and terminal nuts according to values in table ⇒ [27-12, Generator \(GEN\), tightening torques](#) .
- Replacing coolant pipe O-rings.
- Install ribbed belt.
- Remove T10060 mandrel.
- Reconnect battery ⇒ [27-4, Battery, disconnecting and reconnecting](#) .
- Start engine and check belt running.



#### **Ribbed belt routing - 8-cyl. fuel injection engine**

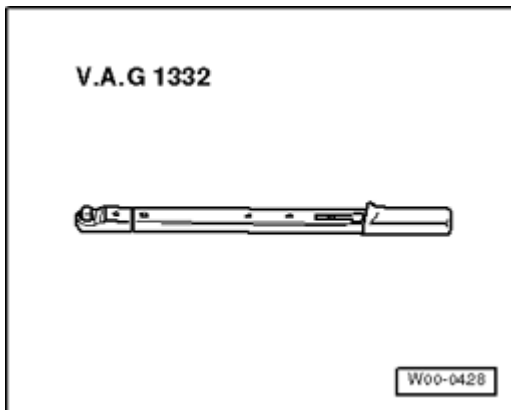
- 1 - Belt pulley - generator
- 2 - Tensioning roller
- 3 - Belt pulley - crankshaft
- 4 - Idler pulley
- 5 - Belt pulley - air conditioner compressor

6 - Belt pulley - power steering pump

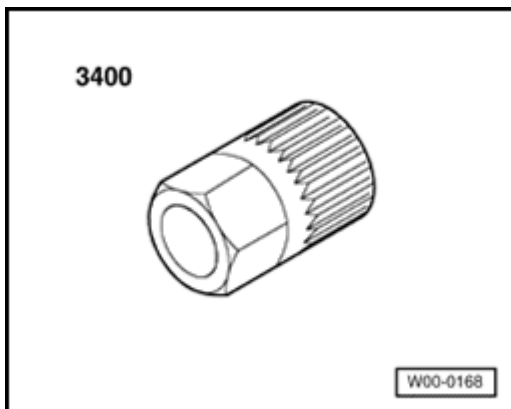
7 - Ribbed belt - generator, idler pulley, air conditioner compressor, power steering pump, crankshaft, coolant pump and tensioner

### Ribbed belt pulley at generator, removing and installing

#### Special tools, testers and auxiliary items required



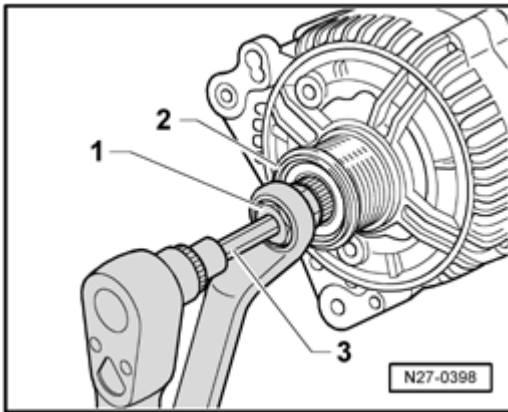
- Torque Wrench 40-200Nm VAG1332



- Multi-Tooth Adapter 3400

#### Removing:

- Remove generator ⇒ [27-11, Air-cooled Generator \(GEN\) - 6-cyl. fuel injection engine through model year 2004, removing and installing](#) .
- Clamp generator at mounting points in a vise.
- Remove protective cap from freewheel pulley.



- Insert multi-point adapter 3400 - **1** - in generator freewheel pulley - **2** - using ring wrench 17 mm. Then, insert a multi-point socket insert M10 - **3** - in generator shaft.

- Loosen threaded connection by turning toward right, counterhold using ring wrench while doing this.

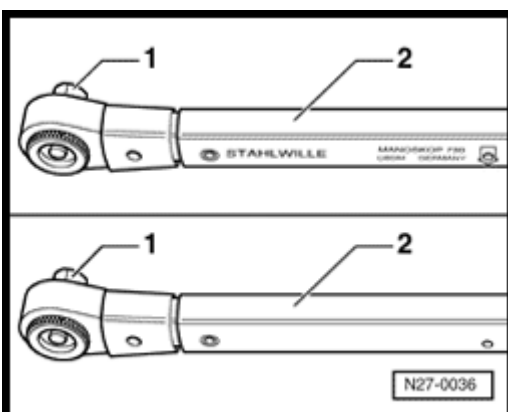
- Hold freewheel pulley in place by hand and turn at generator drive shaft until the freewheel pulley can be removed.

### Installing:

Install in reverse order, noting the following:

- First screw freewheel pulley on generator driveshaft by hand until limit stop.

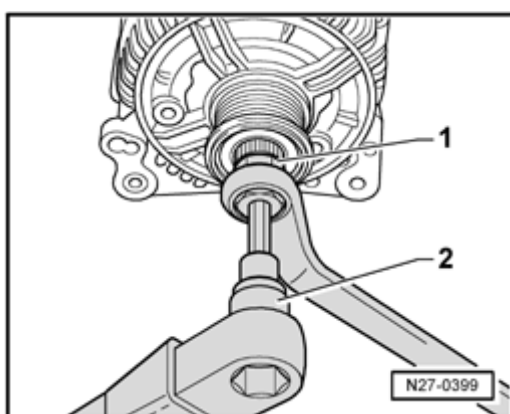
Torque wrench must be re-assembled for installing freewheel pulley as follows:



- Release socket insert - **1** - and pull off from handle part - **2** - .

- Turn handle part - **2** - of torque wrench 180 degrees and re-insert socket insert.

- Set turning direction of torque wrench at socket insert to "left".

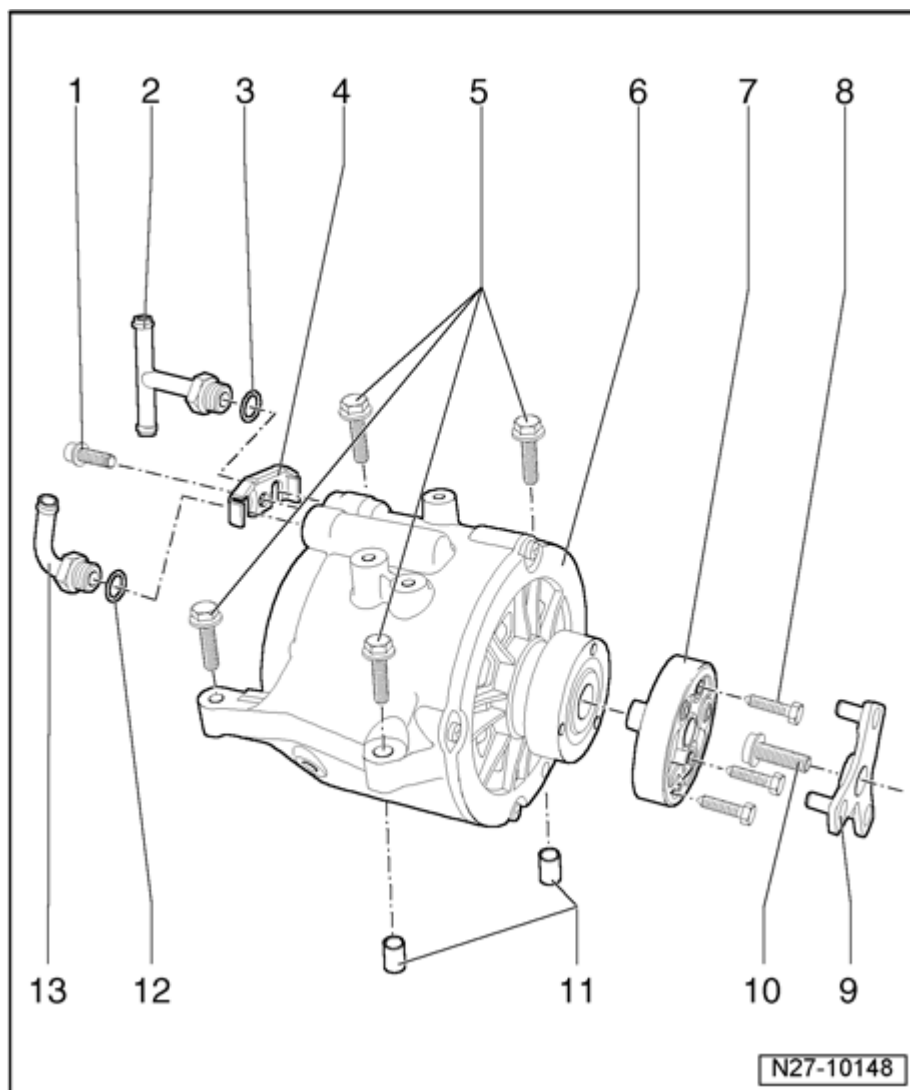


- Counterhold multi-point adapter 3400 - **1** - using ring wrench 17 mm and tighten freewheel pulley by turning generator drive shaft toward left using torque wrench - **2** -  
. Tightening torque is 80 Nm.

- Clip protective cap on freewheel pulley.

### **Generator (GEN) - 10-cyl. TDI engine, assembly**

**Generator with rubber disk coupling - 10-cyl. TDI engine, assembly**

**1 - Socket head bolt with washer**

- M6x20 mm
- 9 Nm
- Application: See Parts Catalog

**2 - Coolant pipe****3 - O-Ring**

- Always replace

**4 - Clamp****5 - Bolts**

- M8x35 mm
- 20 Nm

**6 - Generator (GEN)**

- Securing B+-wire to generator ⇒ [27-11, Generator positive \( B+ \) connection, securing](#)
- Voltage regulator cannot be serviced separately. If repair is required, generator must be replaced.
- Removing and installing ⇒ [27-11, Generator \(GEN\) - 10-cyl. TDI engine, removing and installing](#) .

## 7 - Drive coupling hub

### 8 - Bolts

- M6x27 mm
- Application: See Parts Catalog
- 8 Nm

## 9 - Drive coupling hub

### 10 - Bolt

- M10x1 x 30 mm
- Application: See Parts Catalog
- 50 Nm + 90 °

## 11 - Spacers

### **Note :**

- *Confirm application, orientation and reuse of spacers if installed. If spacers are loose, coat with commercially available grease before installing.*

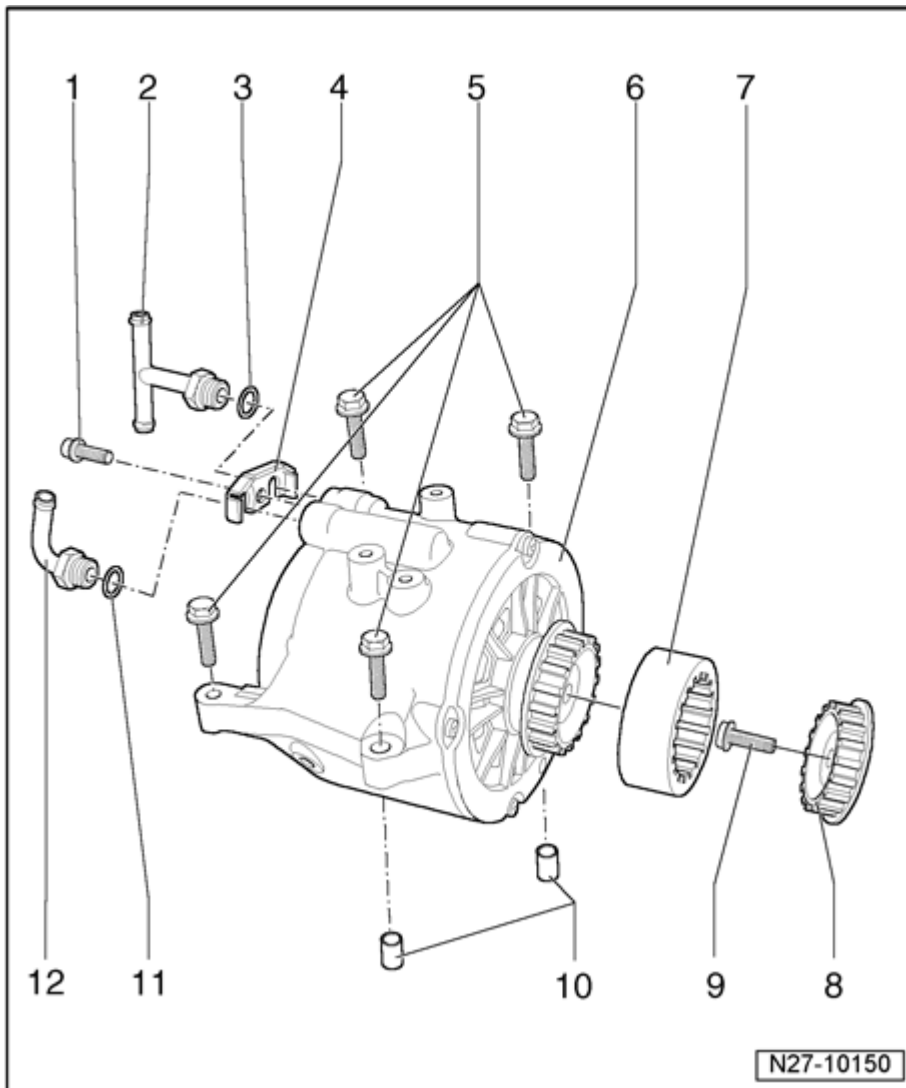
## 12 - O-Ring

- Always replace

## 13 - Coolant pipe

**Generator with torsion-elastic coupling - 10-cyl. TDI engine, assembly**



**1 - Socket head bolt with washer**

- M6x20 mm
- Application: See Parts Catalog

**2 - Coolant pipe****3 - O-Ring**

- Always replace

**4 - Clamp****5 - Bolts**

- M8x35 mm
- 20 Nm

**6 - Generator (GEN)**

- Securing B+-wire to generator ⇒ [27-11, Generator positive \( B+ \)](#)

[connection, securing](#)

- Voltage regulator cannot be serviced separately. If repair is required, generator must be replaced.
- Removing and installing ⇒ [27-11, Generator \(GEN\) - 10-cyl. TDI engine, removing and installing](#) .

**7 - Torsion-elastic clutch****8 - Drive gear****9 - Bolt**

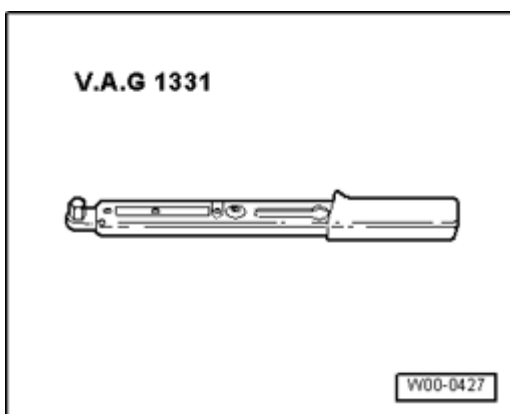
- M10x1 x 30 mm
- Application: See Parts Catalog
- 50 Nm + 90 °

**10 - Spacers**

**Confirm application, orientation and reuse of spacers if installed. If spacers are loose, coat with commercially available grease before installing.**

**11 - O-Ring**

- Always replace

**12 - Coolant pipe****Generator (GEN) - 10-cyl. TDI engine, removing and installing****Special tools, testers and auxiliary items required**

- Torque Wrench 5-50Nm VAG1331

**Removing:****Caution!**

**When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Battery, disconnecting and reconnecting](#) . Not adhering to proper disconnection sequence will result in deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.**

- Disconnect batteries (dual battery system) ⇒ [27-4, Battery, disconnecting and reconnecting](#)

Before removing generator, perform the following work procedures:

- Drain engine coolant

⇒ *Repair Manual, 5.0 Liter V10 2V TDI PD Engine Mechanical, Fuel Injection Glow Plug, Engine Code(s) BKW, BLE, Repair Group 19, Cooling system components, Coolant, draining and filling*

- Remove fuel filter module

⇒ *Repair Manual, 5.0 Liter V10 2V TDI PD Engine Mechanical, Fuel Injection Glow Plug, Engine Code(s) BKW, BLE, Repair Group 20, Fuel supply system components, Fuel Filter, removing and installing*

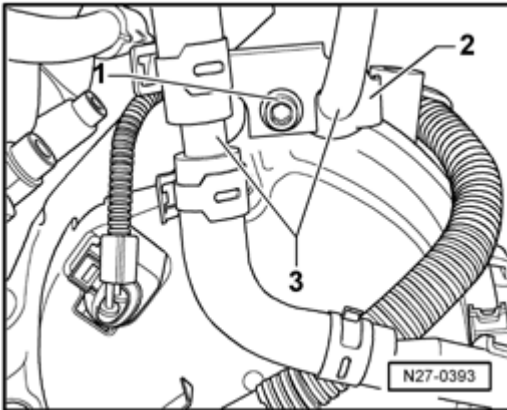
.

- Remove upper portion of oil filter housing

⇒ *Repair Manual, 5.0 Liter V10 2V TDI PD Engine Mechanical, Fuel Injection Glow Plug, Engine Code(s) BKW, BLE, Repair Group 17, Lubrication system components, Oil filter housing, assembly*

- Remove intake pipes

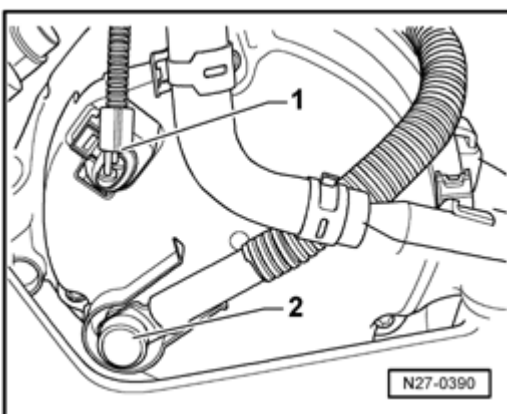
⇒ *Repair Manual, 5.0 Liter V10 2V TDI PD Engine  
Mechanical, Fuel Injection Glow Plug, Engine Code(s)  
BKW, BLE, Repair Group 23,*



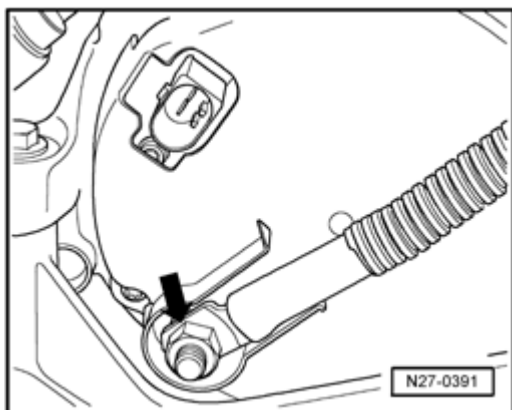
- Remove bolt - **1** - and remove bracket - **2** - for coolant pipe.
- Remove coolant pipes - **3** - from generator.

**Note:**

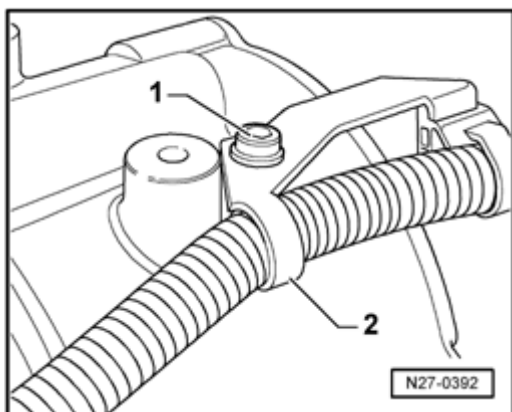
- *Leave coolant hoses attached to coolant pipes.*



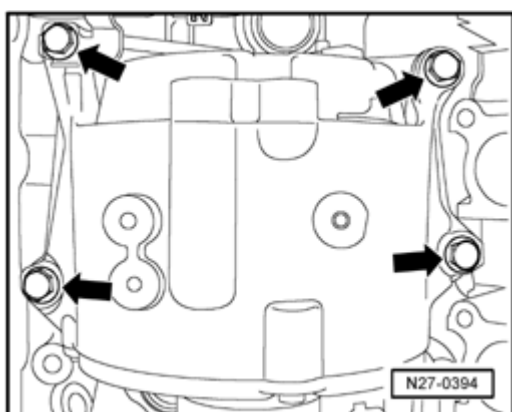
- Disconnect electrical connection for DF-lead - **1** - and remove cap - **2** - .



- Remove nut at positive ( B+ ) terminal - **arrow** - and remove cable.

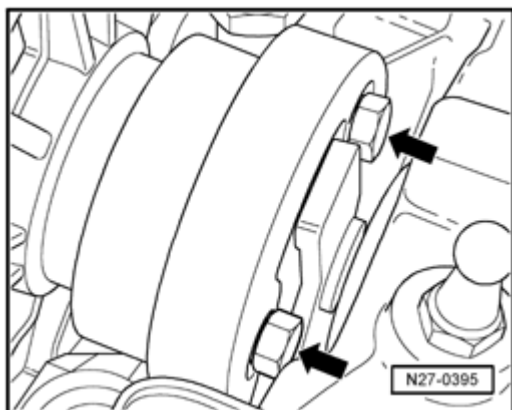


- Remove bolt - **1** - and remove cable retainer - **2** - .



- Remove generator bolts - **arrows** - .

**Generator rubber disc coupling:**



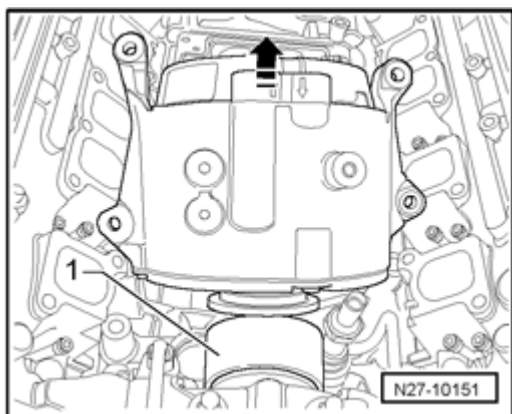
- Remove three drive coupling bolts - **arrows** - .

**Note:**

- Rotate generator shaft to gain access to all coupling bolts.

- Lift out generator with coupling.

**Generator with torsion-elastic coupling:**

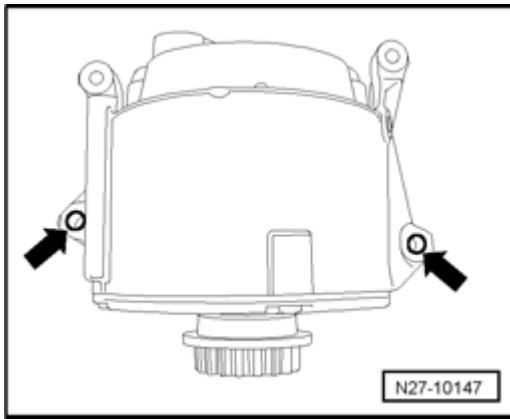


- Remove generator. When doing this, the torsion-elastic clutch - **1** - remains on the drive gear.

**Installing:**

Install in reverse order of removal, noting the following:

**Note:**



- *Confirm application, orientation and reuse of spacers - **arrows** - if installed. To hold spacers in place when installing generator, affix to generator with grease beforehand.*

- Torque all generator bolt and terminal nuts according to value in table ⇒ [27-12, Generator \(GEN\), tightening torques](#) .

- Replacing coolant pipe O-rings.

- Check and top up coolant

⇒ *Repair Manual, 5.0 Liter V10 2V TDI PD Engine Mechanical, Fuel Injection Glow Plug, Engine Code(s) BKW, BLE , Repair Group 19, Cooling system components, draining and filling*

### **Caution!**

- ***When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this Repair Manual. ⇒ [27-4, Batteries, reconnecting sequence](#) . Not adhering to proper disconnection sequence will result in deactivation of Main Battery Switch -E74- and subsequent damage to electrical system components.***
- ***Observe battery terminal/post handling instructions ⇒ [27-1, Battery post/terminal, handling instructions](#) .***

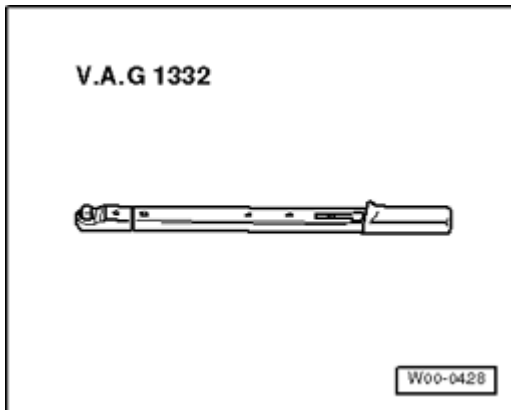
- Reconnect battery ⇒ [27-4, Battery, disconnecting and](#)

[reconnecting](#) .

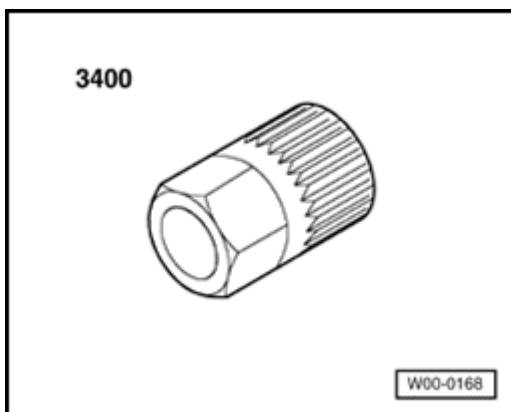
## Generator (GEN) ribbed belt pulley, removing and installing

Generator (GEN) ribbed belt pulley - 6-cyl. fuel injection engine, removing and installing

Special tools, testers and auxiliary items required



- Torque Wrench 40-200Nm VAG1332 (or 40 - 200 Nm equivalent)

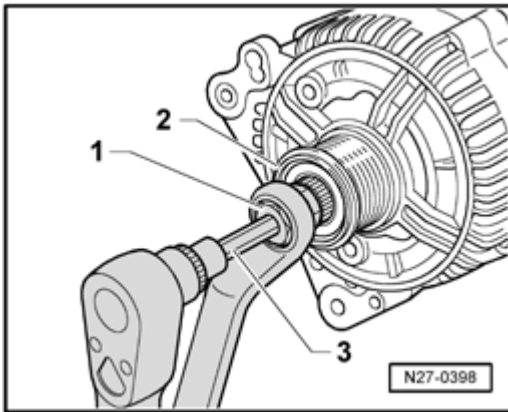


- Multi-Tooth Adapter 3400

### Removing:

- Remove generator ⇒ [27-11, Air-cooled Generator \(GEN\) - 6-cyl. fuel injection engine through model year 2004, removing and installing](#)
- Clamp generator on bracket points in bench vise.
- Remove protective cap from freewheel pulley.





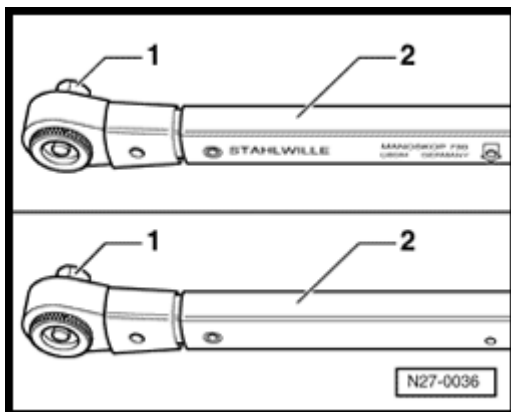
- Insert Multi-tooth adapter 3400 - **1** - with box-end wrench into freewheel pulley - **2** - . Then, insert a Multi-tooth socket insert M10 - **3** - into generator shaft.
- Loosen threaded connection by rotating clockwise, while counterholding with box-end wrench.
- Hold the freewheel pulley firmly by hand and rotate it on the generator drive shaft until the freewheel pulley can be removed.

### Installing:

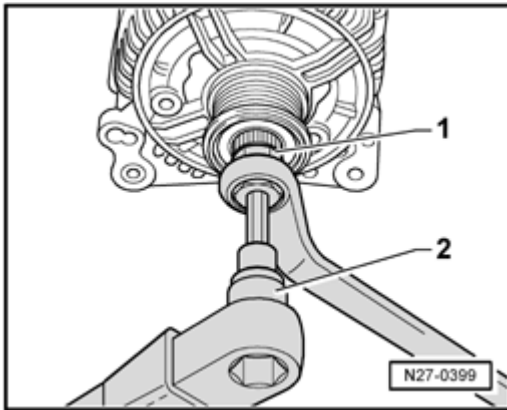
Install in reverse order of removal, noting the following:

- First screw freewheel pulley on generator shaft by hand until limit stop.

The torque wrench must be modified for mounting the freewheel pulley as follows:



- Release the insert - **1** - and pull it from the handle - **2** - .
- Rotate the handle - **2** - of the torque wrench 180 degrees and re-insert the bit.
- Set the rotation direction of the torque wrench bit to "left."

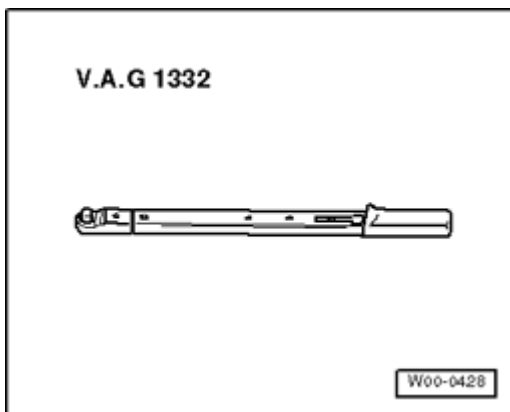


- Counterhold Multi-tooth adapter 3400 - **1** - using ring wrench 17 mm and tighten freewheel pulley by turning generator drive shaft toward left using torque wrench - **2** - (Tightening torque: 80 Nm).

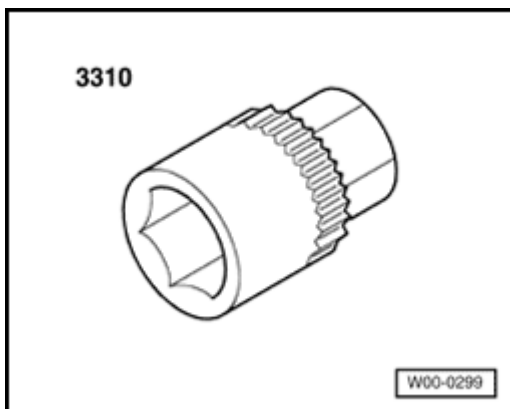
- Clip the protective cap onto freewheel pulley.

**Generator (GEN) ribbed belt pulley - 8-cyl. fuel injection engine, removing and installing**

**Special tools, testers and auxiliary items required**



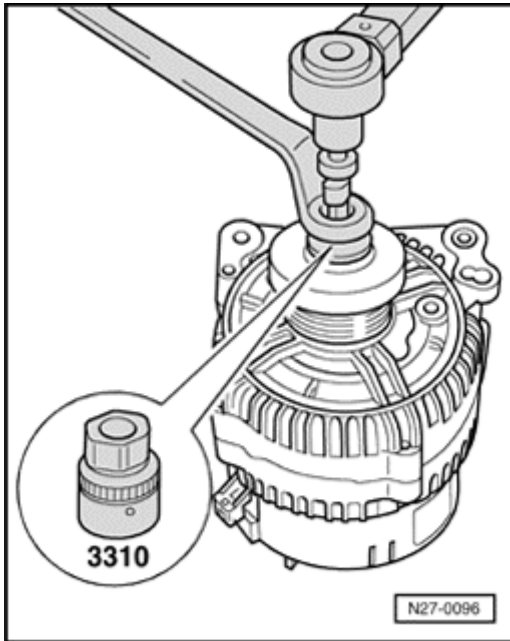
- Torque Wrench 5-50Nm VAG1331 (or 5 - 50 Nm equivalent)



- Socket 3310

### Removing:

- Remove generator ⇒ [27-11, Generator \(GEN\) - 8-cyl. fuel injection engine, removing and installing](#) .
- Clamp generator on bracket points in bench vise.



- Use Socket 3310 to remove nut of freewheel pulley from generator shaft.

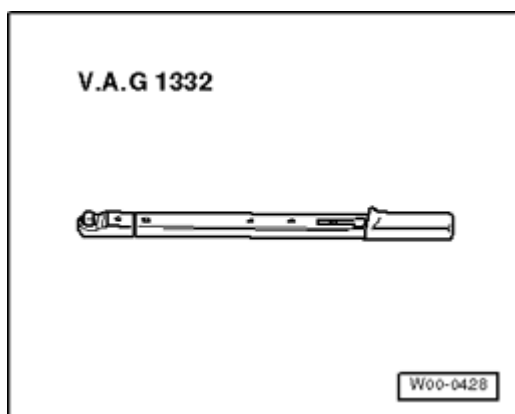
### Installing:

Install in reverse order of removal, noting the following:

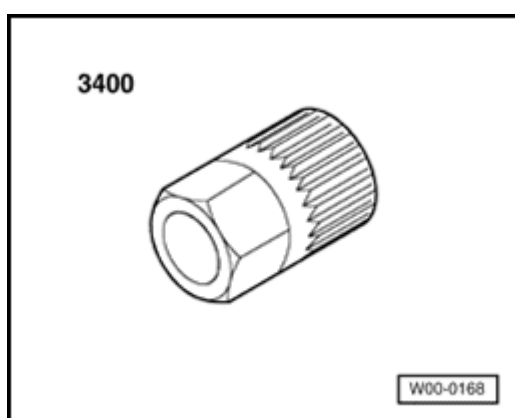
- Install and torque fasteners according to values in table ⇒ [27-12, Generator \(GEN\), tightening torques](#) .

### Generator (GEN) freewheel disc - 10-cyl. TDI engine, removing and installing

**Special tools, testers and auxiliary items required**



- Torque Wrench 40-200Nm VAG1332 (or 40 - 200 Nm equivalent)



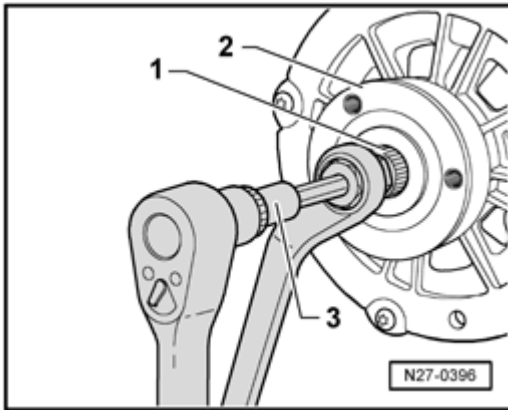
- Multi-Tooth Adapter 3400

### Removing:

- Remove generator ⇒ [27-11, Generator \(GEN\) - 10-cyl. TDI engine, removing and installing](#)
- Clamp generator on bracket points in bench vise.

### Note:

- *Threads on generator shaft are left-handed thread. Rotate clockwise to loosen and counter-clockwise to tighten.*



Insert Multi-Tooth Adapter 3400 - **1** - with a box-end wrench into freewheel disc - **2** - . Then, insert Multi-tooth socket insert M10 - **3** - into the generator shaft.

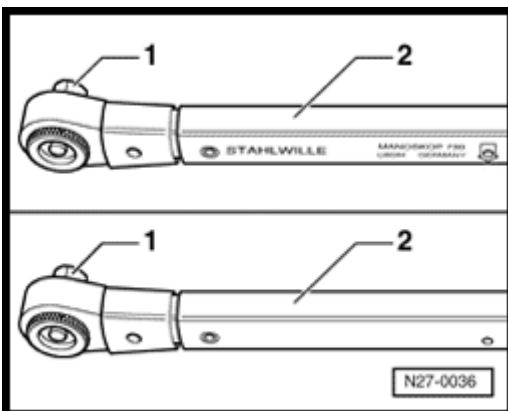
- Loosen the Location / fastener by rotating clockwise, while counter holding with the box-end wrench.
- Hold freewheel disc firmly by hand and rotate it on the generator drive shaft until freewheel disc can be removed.

### Installing:

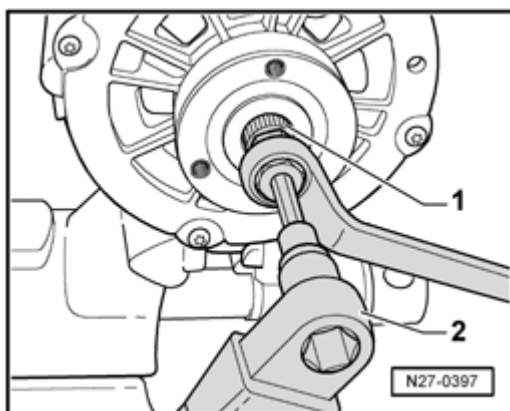
Install in reverse order of removal, noting the following:

- First screw one-way clutch on generator shaft by hand until limit stop.

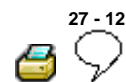
The torque wrench must be modified for mounting the freewheel disc as follows:



- Release the insert - **1** - and pull it from the handle - **2** - .
- Rotate the handle - **2** - of the torque wrench 180 degrees and re-insert the bit.
- Set the rotation direction of the torque wrench bit to "left."



- Counterhold Multi-Tooth Adapter 3400 - **1** - with 17 mm wrench and tighten freewheel disc to 80 Nm by turning Generator (GEN) drive shaft counter-clockwise with torque wrench - **2** - .



## Generator (GEN), tightening torques

### Generator - 6-cyl. 3.2 L fuel injection engine and 3.6 L FSI engine, tightening torques

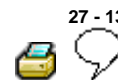
Location / fastener		Tightening torques
Generator - terminal B+ / nut	M8	15 Nm
Tensioner to cylinder head / socket head bolt	M8x30	20 Nm
Generator bracket to engine block / socket head bolt	M8x40	20 Nm
Generator bracket to engine block / socket head bolt	M8x25	20 Nm
Idler to generator bracket	M10x50	40 Nm
Generator to generator bracket / bolt	M8x90	20 Nm
Ribbed belt pulley to generator shaft / nut		80 Nm
Coolant hose connection at Generator	M6x20	9 Nm

### Generator - 8-cyl. 4.2 L fuel injection engine, tightening torques

Location / fastener		Tightening torques
Generator - terminal B+ / nut	M8	15 Nm
Generator to generator bracket / socket head bolt	M8x90	20 Nm
Ribbed belt pulley to generator shaft / nut		65 Nm

### Generator - 10-cyl. 4.9 L TDI engine, tightening torques

Location / fastener		Tightening torques
Generator - terminal B+ / nut	M8	15 Nm
Coolant pipe retainer to generator / socket head bolt	M6x20	9 Nm
Generator to engine block / socket head bolt	M8x35	20 Nm
Drive coupling to generator shaft / socket head bolt	M6x27	8 Nm
Drive coupling hub to drive / bolt	M10x1x30	50 Nm + 90 °
Ribbed belt pulley to generator shaft / nut		80 Nm



## Cruise Control System (CCS)

All cruise control system functions are controlled by the applicable Engine Control Module (ECM).

The processing of electronic engine controls and cruise control functions are integrated in the ECM. Other than the cruise control switches on the multi-function steering wheel, brake pedal switch and related wiring, there are no separate cruise control components to be serviced.

- Servicing multi-function steering wheel system

⇒ [Repair Manual, Communication, Repair Group 91, Multi-function steering wheel](#)

Additional information ⇒ *Wiring Diagrams and Component Locations*

- Cruise Control System (CCS) can be activated or deactivated ⇒ [27-13, Cruise Control System, activating and deactivating](#) .

### On Board Diagnostic, function

As Electronic Power Control (EPC) operations are monitored by Engine Control Module (ECM) OBD, any Diagnostic Trouble Codes (DTC) pertaining to engine electronics that are stored in DTC memory may be relevant to cruise control function. The Steering Column Electronic Systems Control Module J527 will also load CCS DTCs where applicable.

Troubleshoot CCS malfunctions by performing OBD program using VAS 5051/5052 Tester in operating mode "Guided Fault Finding" .

### Cruise Control System, activating and deactivating

- Connect Diagnostic Operation System VAS5051A ⇒ [97-1, VAS 5051 / 5052](#) .
- In Diagnostic Operation System VAS5051A , select operating mode "Guided Fault Finding" .
- Using the "Go To" button, select "Functions/Component selection" and the following menu options in sequence:



- Powertrain
- Engine code
- 01 - On Board Diagnostic (OBD) capable systems
- Engine management system or Diesel Direct Injection Glow Plug System
- Functions
- Cruise Control System, activating and deactivating