27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL

BATTERY

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 information.

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. Each requires specific servicing.

Warnings and safety measures for lead-acid batteries

When servicing batteries, Technicians must be aware of, and observe the warnings and safety measures specified in this information.

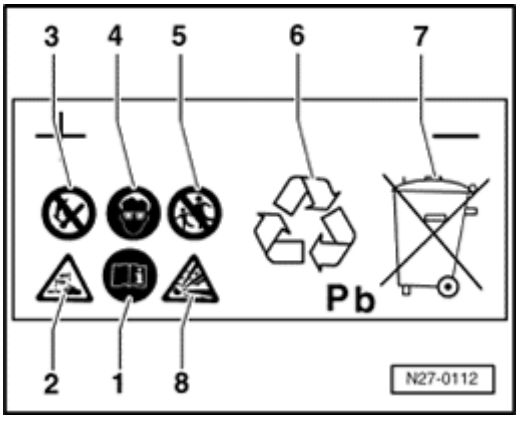

Fig. 1: Warning Symbols On Batteries
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Explanation of WARNING symbols on batteries

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CAUTION: 1 - Read and follow all instructions on battery, contained in Repair Information, Electrical Equipment, and in Owners Manual!

2 - 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.**

3 - 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**

4 - Always wear eye protection when working with electrolyte!

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

5 - Keep children away from batteries!

6 - Dispose of batteries properly!

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

7 - Never dispose of batteries in household waste! Batteries contain lead (Pb), which is toxic.

8 - 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.**

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- **Avoid short circuits. Always reinstall battery positive (B+) or negative (-) terminal covers if removed during servicing.**

Smoking, naked flames, fires and sparks:

CAUTION:

- **Smoking, naked flames and fires are prohibited whilst working; flying sparks must be avoided.**
- **Avoid short circuits and sparks when handling cables and electrical equipment.**

Electrolyte:

CAUTION:

- **Can cause severe injury to the eyes, skin and mucous membranes.**
- **Inhalation can damage the respiratory system.**
- **Swallowing is harmful to the digestive system.**
- **First aid: Rinse eyes and immediately consult first aid station or inform doctor.**
- **Never tilt battery. Acid can leak out of the gas vents.**
- **Soak up spilled electrolyte with binding agent and neutralize any residual electrolyte.**
- **Never allow electrolyte to come into contact with hands.**
- **Avoid contact with skin.**
- **Never touch mouth, nose or eyes with soiled hands.**
- **Immediately change any clothing affected by electrolyte and place in water if necessary.**
- **Do not eat, drink or store foodstuffs at workplace.**
- **Wash thoroughly before breaks and on completion of work.**

Eye protection and protective clothing:

CAUTION:

- **Wear safety goggles and an acid-resistant apron or alternatively electrolyte-proof overalls.**
- **Wear electrolyte-proof gloves.**

Danger of explosion:

CAUTION:

- **Old batteries (in use for 6 months or more) must be treated with an anti-static spray (currently "Neostatic Antistatikum HB 155" or equivalent) prior to handling.**

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- **Sealing plugs must be closed when charging.**
- **Charging of batteries removed from the vehicle is only permitted in vented cubicles with extraction system.**
- **After charging, battery must be left in charging area with extraction system for an appropriate length of time.**

- **Batteries must always be transported in conductive metal containers.**
- **Electrostatically chargeable materials are not to be used for securing purposes.**

Battery handling instructions

NOTE:

- **Battery terminals must no longer be greased**
- **To avoid damaging the battery housing, do not use force when attaching battery terminals; press on by hand only.**

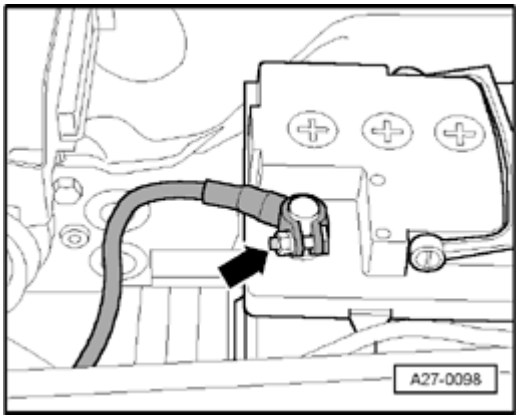

Fig. 2: Identifying Battery Terminal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Battery terminal tightening torque - **arrow** - 7.5 Nm.
- Additional battery terminal tightening torque: 7.5 Nm.

Battery in engine compartment, disconnecting and reconnecting

Should service procedures in this information specify disconnecting and reconnecting the battery, please heed the following CAUTIONS!:

CAUTION: Before beginning repairs on the electrical system:

- **Where applicable, obtain anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch the ignition off and remove ignition key.**

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- **Disconnect negative (-) battery terminal.**
- **On vehicles equipped with Audi Telematics by OnStar (R) , switch-off the emergency (back-up) battery for the Telematic/Telephone Control Module prior to disconnecting vehicle battery --> 91 - COMMUNICATION**
- **After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to Repair Information and/or Owners Manual.**
- **After reconnecting vehicle battery on vehicles equipped with Audi Telematics by OnStar (R) , switch-on the emergency (back-up) battery for the Telematic/Telephone Control Module --> 91 - COMMUNICATION**

Disconnecting

Special tools, testers and auxiliary items required

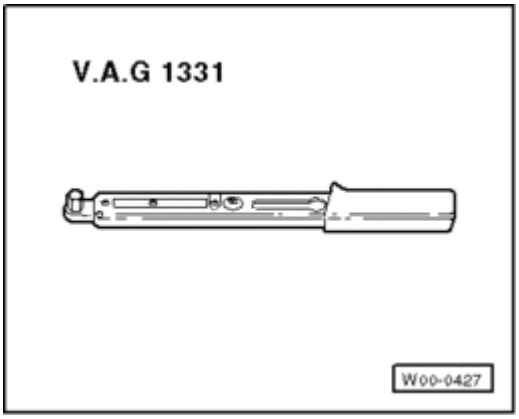

Fig. 3: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Torque wrench VAG 1331 or (equivalent 5 - 50 Nm)
  - Heed CAUTIONS listed above

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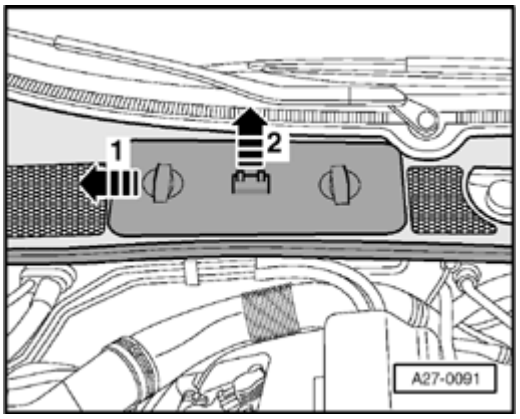

Fig. 4: Pushing Cover Over Battery Toward Right And Removing It Upward
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide battery cover to right - **arrow 1** - and lift off - **arrow 2** - (where applicable).

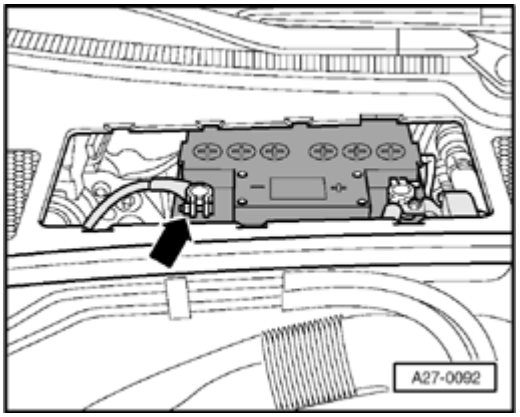

Fig. 5: Locating Battery Ground Strap
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect negative (-) terminal - **arrow** - from battery post.

Reconnecting

- Reconnect negative (-) terminal to battery post and tighten to specified torque.

The following steps are required after reconnecting battery:

NOTE:

- **When reconnecting battery, activate vehicle equipment (radio/radio navigation system, clock, electric window lifters) in accordance with Owners Manual.**
- **On vehicles equipped with Audi Telematics by OnStar (R) , switch on emergency (back-up) battery --> 91 - COMMUNICATION .**
- **Further measures after reconnecting the voltage supply, refer to applicable engine repair information,**

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- **24 MULTIPORT FUEL INJECTION (MFI) for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMB**
- **24 - MULTIPORT FUEL INJECTION (MFI) for 2.0 LITER 4-CYL. 4V TURBO FUEL INJECTION IGNITION, ENGINE CODE(S): BPG, BWT**
- **24 MULTIPORT FUEL INJECTION (MFI) for 3.0 LITER 6-CYL. 5V FUEL INJECTION & IGNITION, ENGINE CODE(S): AVK, BGN**
- **24 - FUEL INJECTION SYSTEM for 3.2 V6 4V FUEL INJECTION IGNITION, ENGINE CODE(S): BKH**
- **24 - MULTIPORT FUEL INJECTION (MFI) for 4.2 LITER V8 4V FUEL INJECTION AND IGNITION, ENGINE CODE(S): BNS**
- **24 MULTIPORT FUEL INJECTION (MFI) for 4.2 LITER V8 5V FUEL INJECTION AND IGNITION, ENGINE CODE(S): BHF**

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- **Check proper function of remote control keys; adapt keys if necessary. Inform customer that all additional keys must also be adapted to ensure that the remote control works properly Owners Manual.**
- **After re-connecting battery, the ESP indicator lamp will go out only after driving a distance of several meters.**

Tightening torque

Component - fastener	Nm
Battery terminal to battery post - nut	7.5

Battery in luggage compartment, disconnecting and connecting

Should service procedures in this information specify disconnecting and reconnecting the battery, please heed the following CAUTIONS!:

CAUTION: Before beginning repairs on the electrical system:

- **Where applicable, obtain anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch the ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**

- **After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to Repair Information and/or Owners Manual.**

Disconnecting

Special tools, testers and auxiliary items required

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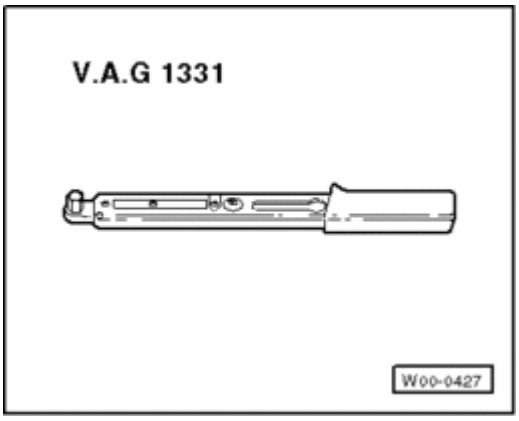

Fig. 6: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Torque wrench VAG 1331 or (equivalent 5 - 50 Nm)
  - Heed CAUTIONS listed above

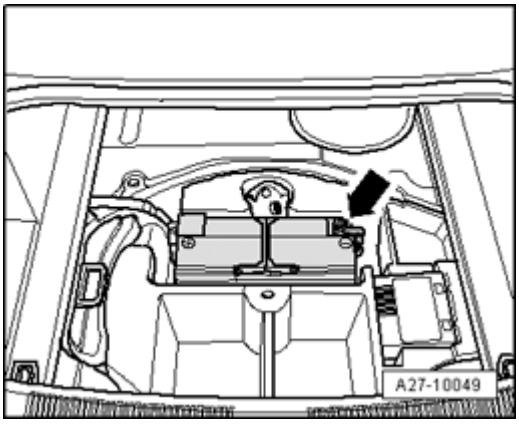

Fig. 7: Disconnecting Battery Ground (GND) Strap
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lift luggage compartment floor covering and secure.
- Disconnect battery negative (-) terminal - **arrow** - from battery post.

Connecting

- Reconnect negative (-) terminal to battery post and tighten to specified torque.

The following steps are required after reconnecting battery:

NOTE:

- **When reconnecting battery, activate vehicle equipment (radio/radio navigation system, clock, electric window lifters) in accordance with Owners Manual.**
- **Further measures after reconnecting the voltage supply, refer to**

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applicable engine repair information,

- **24 MULTIPORT FUEL INJECTION (MFI) for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMB**
- **24 - MULTIPORT FUEL INJECTION (MFI) for 2.0 LITER 4-CYL. 4V TURBO FUEL INJECTION IGNITION, ENGINE CODE(S): BPG, BWT**
- **24 MULTIPORT FUEL INJECTION (MFI) for 3.0 LITER 6-CYL. 5V FUEL INJECTION & IGNITION, ENGINE CODE(S): AVK, BGN**
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- **24 MULTIPORT FUEL INJECTION (MFI) for 4.2 LITER V8 5V FUEL INJECTION AND IGNITION, ENGINE CODE(S): BHF**

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- **Check proper function of remote control keys; adapt keys if necessary. Inform customer that all additional keys must also be adapted to ensure that the remote control works properly Owners Manual.**
- **After re-connecting battery, the ESP indicator lamp will go out only after driving a distance of several meters.**

Tightening torque

Component - fastener	Nm
Battery terminal to battery post - nut	7.5

Battery in engine compartment, removing and installing

Removing

CAUTION:

- **Prior to handling or servicing batteries, read, understand and observe the Warning and Safety Measures for lead-acid batteries --> Warnings and safety measures for lead-acid batteries**
- **Always wear suitable protective clothing Eye protection and protective clothing:.**

CAUTION: Before beginning repairs on the electrical system:

- **Where applicable, obtain anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch the ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**

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- **On vehicles equipped with Audi Telematics by OnStar (R) , switch-off the emergency (back-up) battery for the Telematic/Telephone Control Module prior to disconnecting vehicle battery --> 91 - COMMUNICATION**
- **After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to Repair Information and/or Owners Manual.**
- **After reconnecting vehicle battery on vehicles equipped with Audi Telematics by OnStar (R) , switch-on the emergency (back-up) battery for the Telematic/Telephone Control Module --> 91 - COMMUNICATION**

Special tools, testers and auxiliary items required

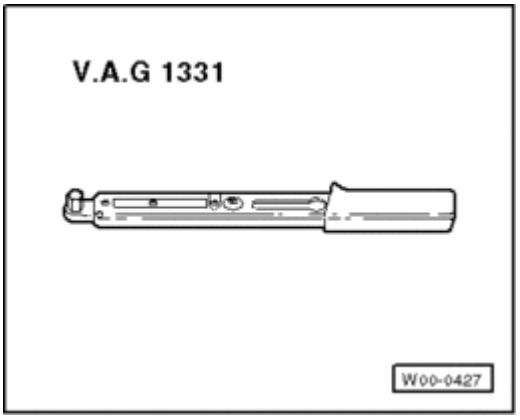

Fig. 8: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Torque wrench VAG 1331 or (equivalent 5 - 50 Nm)

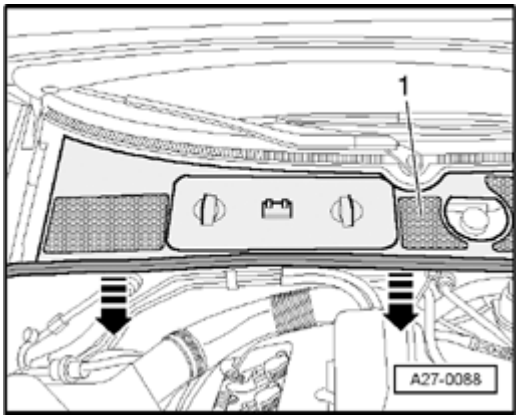

Fig. 9: Identifying Plenum Chamber Cover & Removing Rubber Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove rubber seal from plenum chamber cover in direction of - **arrow** -.
- Remove plenum chamber cover - **1** - from the front.
- Disconnect negative (-) terminal - **1** - from battery

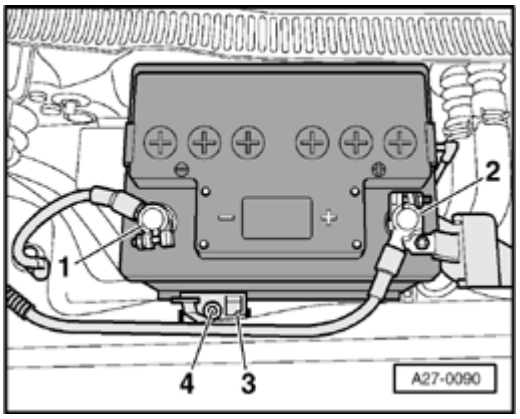

Fig. 10: Locating Battery Terminals On Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Then disconnect positive (+) terminal - **2** - from battery.
- Remove bolt - **4** - from battery hold-down bracket - **3** -.

NOTE:

- **On vehicles with suspension cross-brace, hex socket bolt - 4 - must be removed using an Allen key with ball head.**
- **Loosen bolt enough so that ball head of Allen key contacts suspension cross-brace.**
- **Leave bolt and securing bracket in place and swivel battery out from under hold-down bracket.**

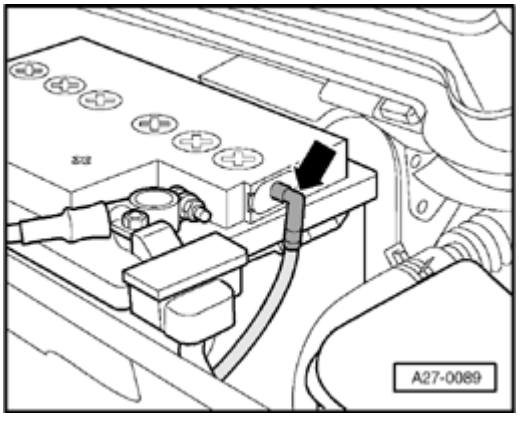

Fig. 11: Identifying Angle Piece Of Central Gas Venting System
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect angled connector of central gas venting system - **arrow** -.

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- Carefully lift battery out of plenum chamber.

CAUTION: When disposing batteries it is absolutely necessary that the disposal procedures for batteries and sulfuric acid are observed.

Installing

Install in reverse order of removal, noting the following:

NOTE:

- **Only maintenance-free batteries conforming to standards "TL82506" (as of December 1997) and "VW75073" (as of August 2001) may be installed.**
- **Batteries from the Audi parts range feature a base strip adapter for matching to different retainer flanges. The battery operating instructions give details of when and how to use the base strip adapter.**

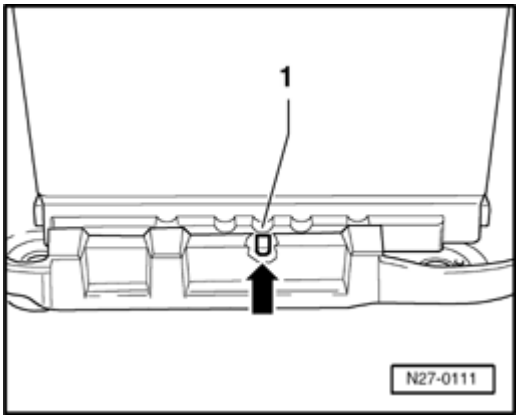

Fig. 12: Battery Foot Strip Cut-Out
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert battery in battery carrier so that lug at rear of battery carrier - **arrow** - engages in recess in battery base strip - **1** -.

- It should no longer be possible to move the battery.

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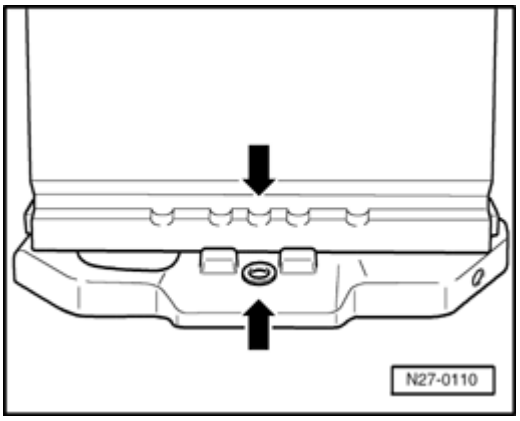

Fig. 13: Center Cut-Out In Battery Foot Strip Aligned With Threaded Hole In Battery Carrier
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- The battery has been properly inserted if the center recess in the battery base strip aligns with the tapped hole in the battery tray - **arrows** -.

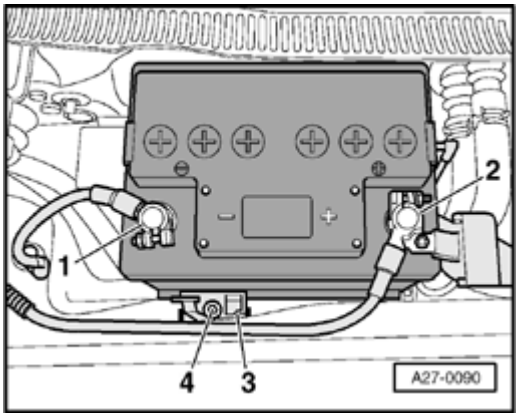

Fig. 14: Locating Battery Terminals On Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install battery hold-down bracket - **3** - and fasten with bolt - **4** -.

NOTE:

- **Lug on battery retainer must engage in recess on battery base strip.**

Reconnect battery in the following sequence with ignition and electrical equipment switched off:

- First connect positive (+) terminal - **2** - to battery post and torque nut to specification.
- Then connect negative (-) terminal - **1** - to battery post and torque nut to specification.
- Connect hose for central gas venting system; see notes --> **Batteries with central gas venting**.
- Check firm attachment of battery following installation --> **Battery installation, checking**.

The following steps are required after reconnecting battery:

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NOTE:

- **When reconnecting battery, activate vehicle equipment (radio/radio navigation system, clock, electric window lifters) in accordance with Owners Manual.**
- **On vehicles equipped with Audi Telematics by OnStar (R) , switch on emergency (back-up) battery --> 91 - COMMUNICATION .**
- **Further measures after reconnecting the voltage supply, refer to appropriate engine repair information, RG 24.**
- **Check proper function of remote control keys; adapt keys if necessary. Inform customer that all additional keys must also be adapted to ensure that the remote control works properly Owners Manual.**
- **After re-connecting battery, the ESP indicator lamp will go out only after driving a distance of several meters.**

Tightening torques

Component - fastener	Nm
Battery hold-down bracket - nut	12
Battery terminal to battery post - nut	7.5

Battery in luggage compartment, removing and installing

CAUTION:

- **Prior to handling or servicing batteries, read, understand and observe the Warning and Safety Measures for lead-acid batteries --> Warnings and safety measures for lead-acid batteries**
- **Always wear suitable protective clothing Eye protection and protective clothing:.**

CAUTION: Before beginning repairs on the electrical system:

- **Where applicable, obtain anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch the ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**
- **After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to Repair Information and/or Owners Manual.**

Removing

Special tools, testers and auxiliary items required

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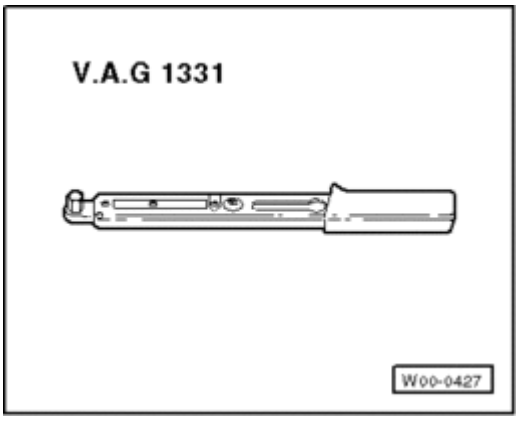

Fig. 15: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Torque wrench VAG 1331 or (equivalent 5 - 50 Nm)

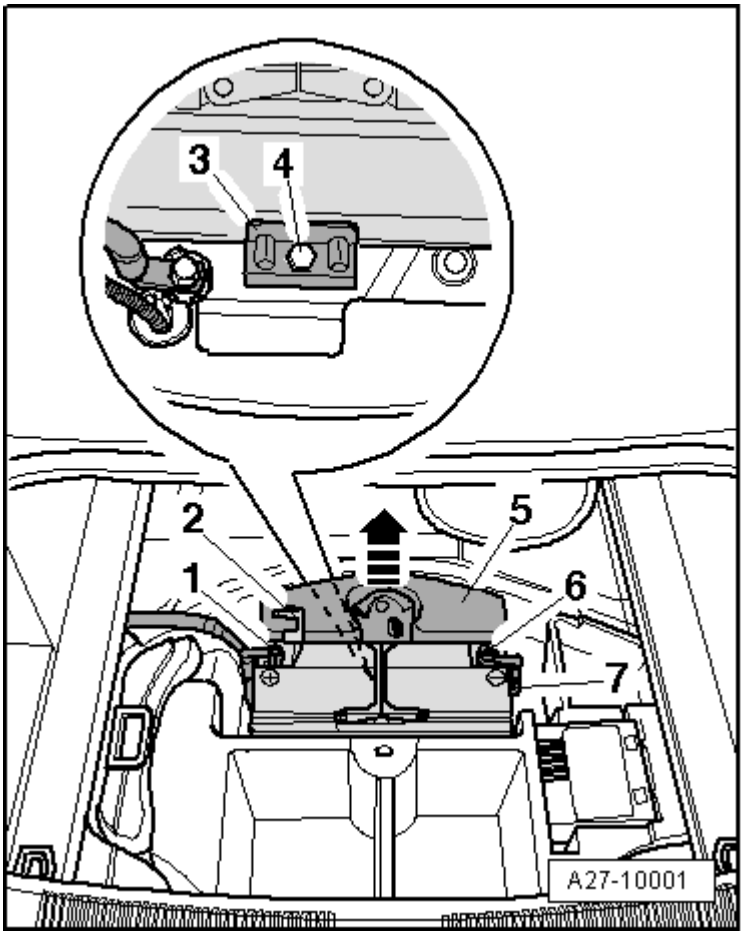

Fig. 16: Removing/Install Battery From Battery Console Retaining Strip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lift luggage compartment floor covering and secure.

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- Remove formed insert behind battery - **5** - upward - **arrow** -.
- Disconnect negative (-) terminal - **6** - from battery
- Fold positive terminal cover - **2** - upward.

- Then disconnect positive (+) terminal - **1** - from battery.
- Disconnect central gas venting system hose - **7** -.
- Remove bolt - **4** - from battery hold-down bracket - **3** -.
- Remove battery from battery console retaining strip.

- Remove battery from luggage compartment.

CAUTION: When disposing batteries it is absolutely necessary that the disposal procedures for batteries and sulfuric acid are observed.

Installing

NOTE:

- **Only maintenance-free batteries conforming to standards "TL82506" (as of December 1997) and "VW75073" (as of August 2001) may be installed.**
- **Batteries from the Audi Parts Program have a bottom strip-adapter for adapting to different grip channels. Whether and how bottom strip-adapter is used, refer to operating instructions for battery.**

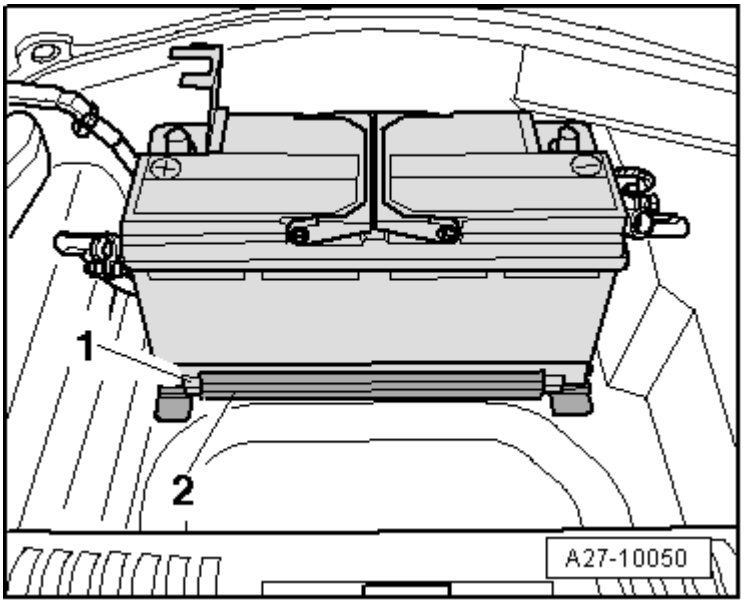

Fig. 17: Identifying Battery Clamping Strip And Battery Holder Mount
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert battery in battery holder.

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- Battery clamping strip - **1** - must engage in battery holder mount - **2** -.
- It should no longer be possible to move the battery.

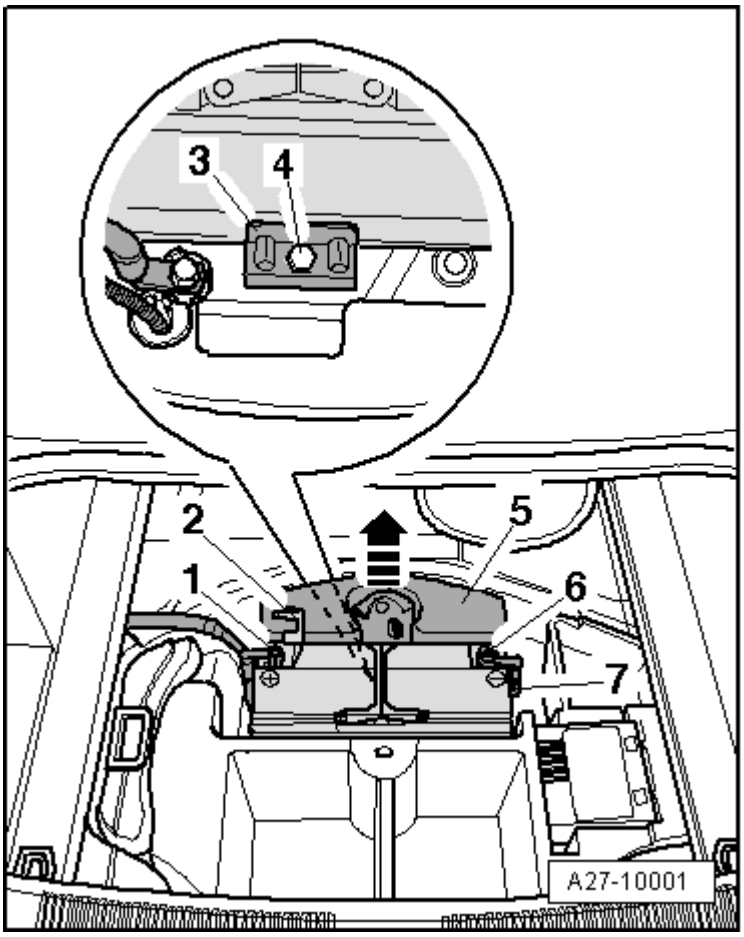

Fig. 18: Removing/Install Battery From Battery Console Retaining Strip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position battery hold-down bracket - **3** -.

- Lug on battery retainer must engage in recess on battery base strip.

- Hand tighten bolt - **4** -.

Reconnect battery in the following sequence with ignition and electrical equipment switched off:

- First connect positive (+) terminal - **1** - to battery post and torque nut to specification.
- Close positive terminal cover - **2** -.
- Then connect negative (-) terminal - **6** - to battery post and torque nut to specification.
- Connect hose for central gas venting system; see notes --> **Batteries with central gas venting**.

- Check firm attachment of battery following installation --> **Battery installation, checking**.

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The following steps are required after reconnecting battery:

NOTE:

- **When reconnecting battery, activate vehicle equipment (radio/radio navigation system, clock, electric window lifters) in accordance with Owners Manual.**
- **Further measures after reconnecting the voltage supply refer to applicable engine repair information,**
  - **24 MULTIPORT FUEL INJECTION (MFI) for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMB**
  - **24 - MULTIPORT FUEL INJECTION (MFI) for 2.0 LITER 4-CYL. 4V TURBO FUEL INJECTION IGNITION, ENGINE CODE(S): BPG, BWT**
  - **24 MULTIPORT FUEL INJECTION (MFI) for 3.0 LITER 6-CYL. 5V FUEL INJECTION & IGNITION, ENGINE CODE(S): AVK, BGN**
  - **24 - FUEL INJECTION SYSTEM for 3.2 V6 4V FUEL INJECTION IGNITION, ENGINE CODE(S): BKH**
  - **24 - MULTIPORT FUEL INJECTION (MFI) for 4.2 LITER V8 4V FUEL INJECTION AND IGNITION, ENGINE CODE(S): BNS**
  - **24 MULTIPORT FUEL INJECTION (MFI) for 4.2 LITER V8 5V FUEL INJECTION AND IGNITION, ENGINE CODE(S): BHF**

  .
- **Check proper function of remote control keys; adapt keys if necessary. Inform customer that all additional keys must also be adapted to ensure that the remote control works properly Owners Manual.**
- **After re-connecting battery, the ESP indicator lamp will go out only after driving a distance of several meters.**

Tightening torques

Component - fastener	Nm
Battery hold-down bracket - nut	12
Battery terminal to battery post - nut	7.5

Battery installation, checking

Battery must not be moveable after battery hold-down bracket and bolt is installed.

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

- **Shortened battery service life due to vibration damage.**
- **Battery cell and plate damage.**
- **Electrolyte leakage due to battery case damage.**
- **Poor collision safety.**

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Batteries with central gas venting

CAUTION:

- **Ensure venting system hose is always attached to battery.**
- **On batteries with central gas venting hose/pipe, ensure that hose does not become disconnected. Only then is the battery able to vent freely.**

NOTE:

- **The latest generation of batteries is equipped with a central gas venting system and a fine-mesh "flame trap". Function: The gases produced during charging escape through a central opening in the top of the battery cover. The fine-mesh flame trap which prevents ignition of the flammable gas in the battery is also located here. The flame trap comprises a small round fiberglass mat approx. 15 mm in diameter and 2 mm thick. It operates in a manner similar to a valve, i.e. it allows the gas produced in the battery by gassing to escape.**

Battery with charge indicator (magic eye), checking

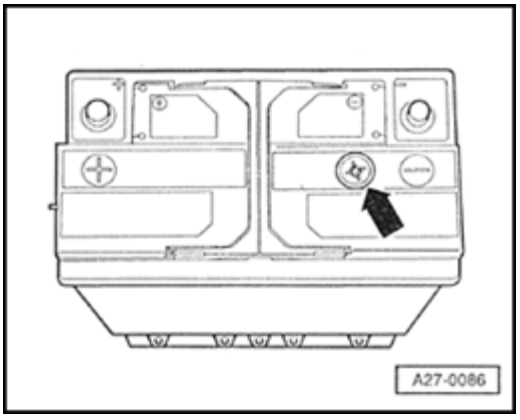

Fig. 19: Locating Magic Eye
Courtesy of VOLKSWAGEN UNITED STATES, INC.

The charge indicator - **arrow** - provides information on the electrolyte level and charge level of the battery to be tested.

Three different colored indications are possible:

color indicator	Battery status
Green	• Battery adequately charged.
Black	• Not charged or inadequately charged.
Colorless or yellow	• Critical electrolyte level reached; topping up with distilled water essential.

NOTE:

- **If a battery is more than 5 years old and the indicator is colorless, replace**

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battery.

Test sequence

NOTE:

- **When recharging the battery, and during driving, air bubbles may form under the "magic eye". They distort the color displayed by the magic eye.**
- **If batteries are fitted with sealing plugs for production reasons, these are covered with plastic foil.**
- **Prior to visual inspection, use screwdriver handle to tap gently and carefully on "magic eye" to disperse any bubbles.**
- **Observe color of charge indicator --> Battery with charge indicator (magic eye), checking.**

Visual inspection

Visually inspect battery before performing measurements, e.g. no-load voltage, specific gravity of electrolyte or battery test.

CAUTION:

- **Prior to handling or servicing batteries, read, understand and observe the Warning and Safety Measures for lead-acid batteries --> Warnings and safety measures for lead-acid batteries**
- **Always wear suitable protective clothing Eye protection and protective clothing:.**

- Check for the following:

- Battery housing damage. Electrolyte can leak out if the housing is damaged.
- Battery posts (battery cable terminals) damaged. Proper contact of connections is not ensured if battery posts are damaged. This may then result in cable burn-out and electrical system malfunctions.
- Batterys original sealing plugs fitted. The sealing plugs must be fitted with an O-ring. Only use sealing plugs of same type (same as original equipment) if originals are lost or damaged.

No-load voltage, checking

Special tools, testers and auxiliary items required

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Fig. 20: Identifying Multimeter V.A.G 1526B
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Multimeter VAG 1526 B , Fluke 83 or equivalent

Test requirements

- Always heed the following, otherwise correct measurement is not guaranteed.

NOTE:

- **If no load voltage measurement is carried out with the battery installed in vehicle, disconnect negative (-) battery terminal.**
- **The battery must not be loaded by connected power consumers for at least 2 hours before making measurements.**
- **The battery must not be charged for at least 2 hours before making the measurements.**

CAUTION:

- **On vehicles equipped with Audi Telematics by OnStar (R) , switch-off the emergency (back-up) battery for the Telematic/Telephone Control Module prior to disconnecting vehicle battery --> 91 - COMMUNICATION**
- **After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to Repair Information and/or Owners Manual.**
- **After reconnecting vehicle battery on vehicles equipped with Audi Telematics by OnStar (R) , switch-on the emergency (back-up) battery for the Telematic/Telephone Control Module --> 91 - COMMUNICATION**

CAUTION:

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

- Disconnect negative (-) terminal from battery post.

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Battery in engine compartment --> **Battery in engine compartment, disconnecting and reconnecting**

Battery in luggage compartment --> **Battery in luggage compartment, disconnecting and connecting**

- Measure voltage between battery posts.

- Battery is OK if measuring instrument reading is 12.5 V or above.
- The battery no-load voltage must at no time be less than 12.5 Volts, otherwise the battery must be recharged immediately --> **Battery, charging**.

- Repeat voltage measurement between terminals.

- Battery no-load voltage must not be less than 12.5 Volts.

- If no-load voltage is not OK, replace battery.

Install in reverse order of removal, noting the following:

- Reconnect battery. Required steps:

Battery in engine compartment Reconnecting

Battery in luggage compartment Connecting

Electrolyte level - batteries with charge indicator (magic eye), checking

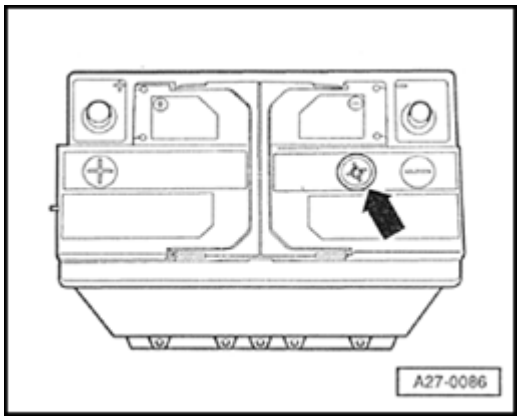

Fig. 21: Locating Magic Eye
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Electrolyte level on batteries with charge indicator - **arrow** - can be established from the color indication. Three different colored displays are possible:

color indicator	Battery status
Green	• Battery adequately charged.

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Black	• Not charged or inadequately charged.
Colorless or yellow	• Critical electrolyte level reached; topping up with distilled water essential, procedure --> **Electrolyte level - batteries with sealing plugs, checking**

Electrolyte level - batteries with sealing plugs, checking

CAUTION:

- **Prior to handling or servicing batteries, read, understand and observe the Warning and Safety Measures for lead-acid batteries Smoking, naked flames, fires and sparks:.**
- **Always wear suitable protective clothing Eye protection and protective clothing:.**
- **Only use flashlight to illuminate inside of battery casing.**
- **Never illuminate inside of battery casing with a naked flame.**
- **Keep naked flames and burning cigarettes away from batteries.**
- **When disposing of batteries, always pay attention to the appropriate regulations for batteries and sulfuric acid.**
- **Proper battery sealing plugs must be used to ensure differing battery cover systems are sealed correctly. Use genuine sealing plugs of same construction if lost or damaged.**
- **The plugs must be installed with an O-ring seal.**

Special tools, testers and auxiliary items required

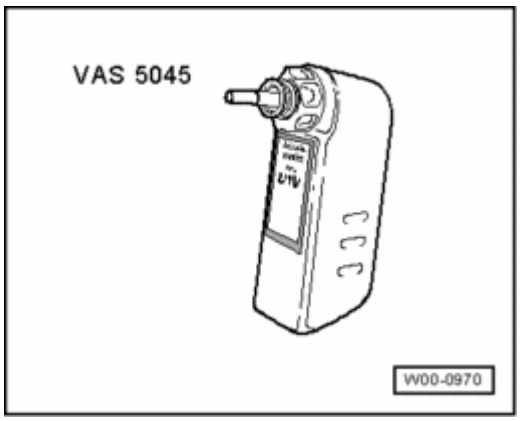

Fig. 22: Battery fill bottle VAS 5045
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Battery filler bottle VAS 5045

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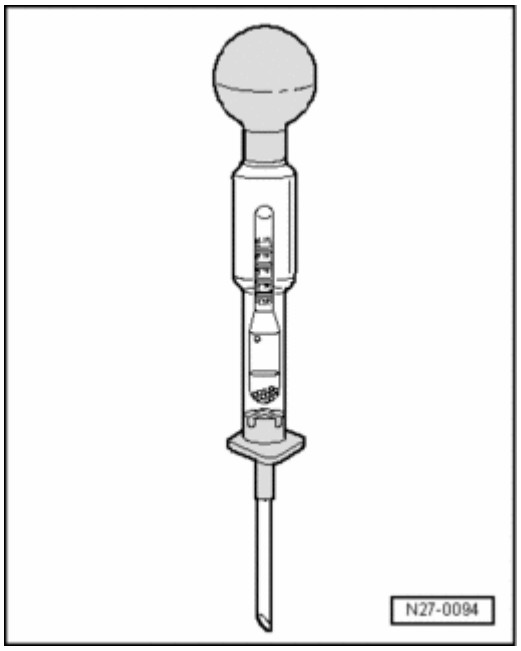

Fig. 23: Identifying Commercially Available Hydrometer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hydrometer (commercially available)

The correct electrolyte level is an important factor in ensuring long battery service life.

- On batteries with visible min. and max marks it is sufficient to perform visual inspection from outside to check electrolyte level.

- The electrolyte level must be above the minimum marking but not exceed the max marking.

- On batteries on which the min. and max marks are difficult to see, or on which the electrolyte level cannot be seen because of the opacity of the battery housing, remove the sealing plugs.
- Check the electrolyte level by making a visual inspection of the inside of the battery.

- The electrolyte level must coincide with the internal level mark (plastic web). This corresponds to the max marking on the outside.

Electrolyte level too low

If the electrolyte level is too low, drying-out of the cell plates will reduce the capacity (power) of the battery. The cell plates must be fully covered by electrolyte (sulfuric acid/water mixture) in order to prevent corrosion of plates, plate bridges and cell connectors. Such corrosion would impair battery operation and make the battery unusable.

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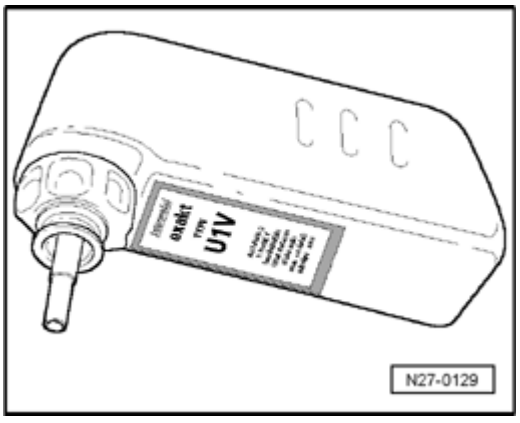

Fig. 24: VAS 5045 Battery Filling Bottle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If electrolyte level is too low, use battery filler bottle VAS 5045 to add distilled water until max mark is reached.

NOTE:

- **Filler neck of battery filler bottle VAS 5045 is designed to prevent over-filling of battery cell and electrolyte spills. When the maximum filling level is reached, the flow of distilled water into the battery cell is cut off.**
- **Use distilled water only, this prevents contamination of the battery electrolyte and the associated increase in self discharge.**
- **Screw sealing plugs of battery cells back in again.**

CAUTION:

- **Battery openings must be fitted with the correct plugs to ensure that battery cover (different types!) is properly secured. Always use correct sealing plugs (same as original equipment) in the event of loss or damage.**
- **The plugs must be equipped with an O-ring seal.**

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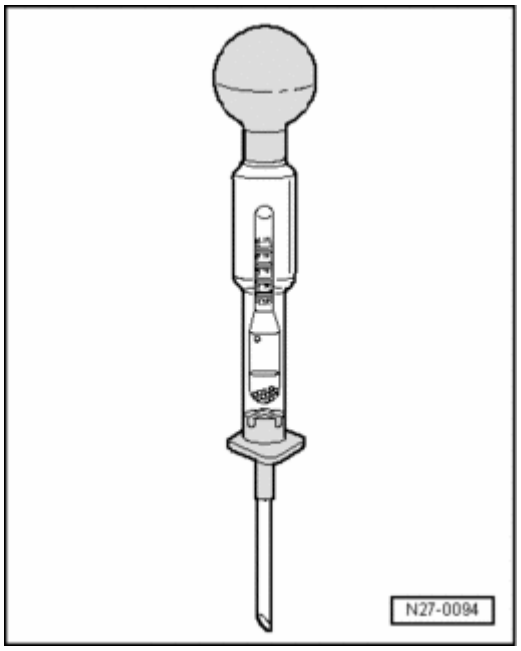

Fig. 25: Identifying Commercially Available Hydrometer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Electrolyte level too high

If the electrolyte level is too high (overfilled), escaping electrolyte (sulfuric acid/water mixture) will cause damage outside the battery.

- If the electrolyte level is above the inner level mark (the plastic web) or the outer max mark, it is essential to drain some off.
- Remove the battery cell sealing plugs.
- Use a commercially available hydrometer to drain off the sulfuric acid until it has fallen to the level of the plastic web or the max mark as appropriate.
- Screw sealing plugs of battery cells back in again.

CAUTION:

- **Battery openings must be fitted with the correct plugs to ensure that battery cover (different types!) is properly secured. Always use correct sealing plugs (same as original equipment) in the event of loss or damage.**
- **The plugs must be equipped with an O-ring seal.**

Electrolyte specific gravity - batteries with sealing plugs, checking

CAUTION:

- **Prior to handling or servicing batteries, read, understand and observe the Warning and Safety Measures for lead-acid batteries Smoking, naked flames, fires and sparks:.**
- **Always wear suitable protective clothing Eye protection and**

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protective clothing:.

- **When disposing of batteries, always pay attention to the appropriate regulations for batteries and sulfuric acid.**
- **Proper battery sealing plugs must be used to ensure differing battery cover systems are sealed correctly. Use genuine sealing plugs of same construction if lost or damaged.**
- **The plugs must be installed with an O-ring seal.**

Special tools, testers and auxiliary items required

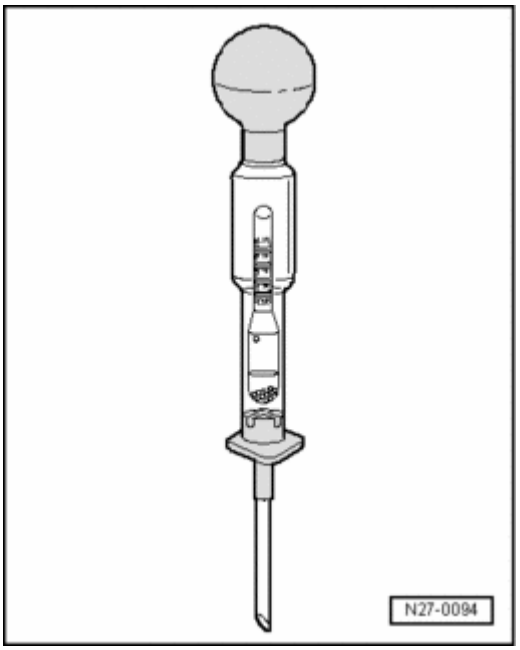

Fig. 26: Identifying Commercially Available Hydrometer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hydrometer (commercially available)

NOTE:

- **The electrolyte specific gravity test in conjunction with the battery test provides specific information on battery condition.**
- **The temperature of the battery electrolyte must be at least 10 ° C.**
- **Electrolyte specific gravity can be checked immediately after charging battery.**

Test sequence

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

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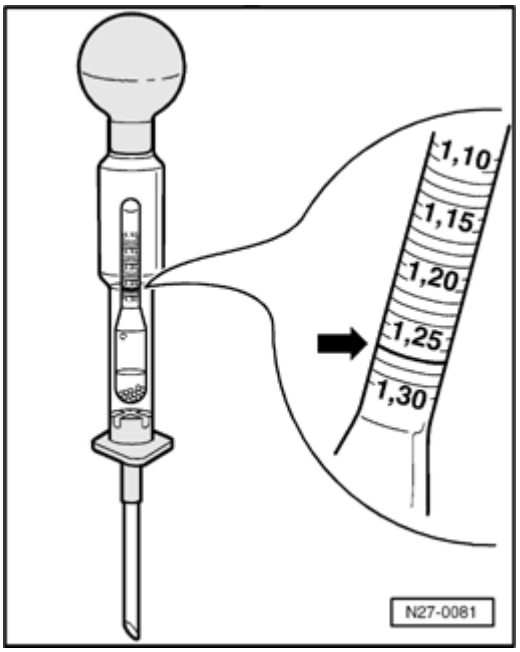

Fig. 27: Hydrometer Specific Gravity Reading
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Immerse end of hydrometer in a cell and extract sufficient electrolyte so that float swims free in the electrolyte.

- The greater the specific gravity of the electrolyte drawn in, the higher the float will ride.
- The specific gravity in kg/dm ^{3} (specific gravity of electrolyte) can be read off the scale - **arrow** - on the hydrometer.

- Take reading on hydrometer and compare to values given in table:

Charge condition in normal climatic zones	specific gravity of electrolyte in kg/dm ^{3}
discharged	1.12
half charged	1.20
well charged	1.28

Charge level in tropical countries	specific gravity of electrolyte in kg/dm ^{3}
discharged	1.08
half charged	1.16
fully charged	1.23

The specific gravity in normal climatic zones must be at least 1.24 kg/dm ^{3} . If specific gravity is too low in all battery cells:

- Charge battery and then repeat electrolyte specific gravity test.

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Example 1:

Battery cell:	1	2	3	4	5	6
specific gravity per cell in kg/dm ^{3}	1.24	1.25	1.25	1.10 $^{1)}$	1.24	1.25
• $^{1)}$ Specific gravity in cell 4 is too low (deviation is greater than 0.03 kg/dm ^{3}).						

* specific gravity in cell 4 is too low (deviation greater than 0.03 kg/dm ^{3})

Example 2:

Battery cell:	1	2	3	4	5	6
specific gravity per cell in kg/dm ^{3}	1.26	1.26	1.25	1.14 $^{1)}$	1.18 $^{1)}$	1.24
• $^{1)}$ Specific gravity in cell 4 and 5 is too low (deviation is greater than 0.03 kg/dm ^{3}).						

* specific gravity in cells 4 and 5 is too low (deviation greater than 0.03 kg/dm ^{3})

If specifications are not obtained:

- Replace battery.

NOTE:

- **The measured values for the electrolyte specific gravity of the individual battery cells must NOT deviate by more than 0.03 kg/dm ^{3} , otherwise battery has to be replaced.**
- **Reinstall battery sealing plugs.**

CAUTION:

- **Battery openings must be fitted with the correct plugs to ensure that battery cover (different types!) is properly secured. Always use correct sealing plugs (same as original equipment) in the event of loss or damage.**
- **The plugs must be equipped with an O-ring seal.**

Battery, testing

CAUTION:

- **Prior to handling or servicing batteries, read, understand and observe the Warning and Safety Measures for lead-acid batteries Smoking, naked flames, fires and sparks:.**
- **Always wear suitable protective clothing Eye protection and protective clothing:.**
- **DO NOT battery test batteries which are gassing. Otherwise there is a risk of explosion.**

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- **The following notes and procedures must be followed to ensure correct measurements.**
- **When disposing of batteries, always pay attention to the appropriate regulations for batteries and sulfuric acid.**

NOTE:

- **In order to better determine a batterys overall condition, it is recommended to always perform the battery test in conjunction with the electrolyte specific gravity test**
- **Always follow the battery tester operating instructions.**
- **It is not necessary to remove battery from vehicle or disconnect battery terminals.**

Special tools, testers and auxiliary items required

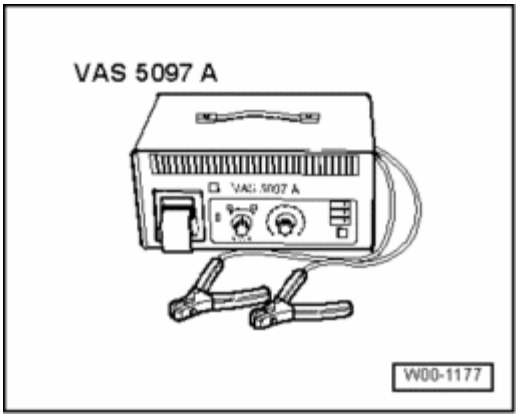

Fig. 28: Battery VAS Tester
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Battery Test Kit Midtronics MCR 340V (VAG tester illustrated here for reference only).

CAUTION:

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

- Check no-load voltage --> **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" (refer to MCR 340V Instruction Manual).
- Select battery type (AGR or conventional) (refer to MCR 340V Instruction Manual).
- Set tester to "Warranty Test" (refer to MCR 340V Instruction Manual).
- Perform battery test by setting load current on tester according to battery (DIN) capacity (refer to MCR 340V Instruction Manual).

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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 --> **Battery, charging**
Use inCHARGE	Charge battery --> **Battery, charging**
Replace Battery	Replace battery --> **Battery in engine compartment, removing and installing**
Bad Cell - Replace	Replace battery --> **Battery in engine compartment, removing and installing**

Battery, charging

CAUTION:

- **Prior to handling or servicing batteries, read, understand and observe the Warning and Safety Measures for lead-acid batteries Smoking, naked flames, fires and sparks:.**
- **Always wear suitable protective clothing Eye protection and protective clothing:.**

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

- Battery Charging Station: Midtronics INC-940.

NOTE:

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- **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.**

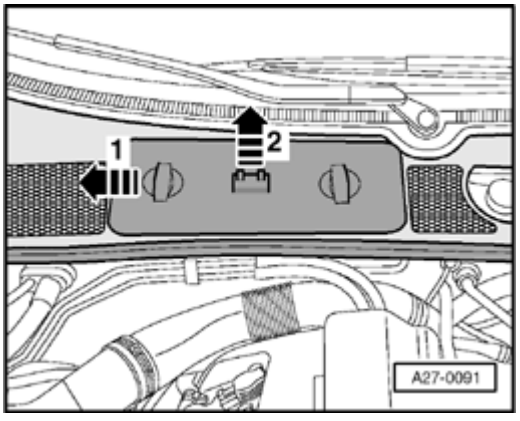

Fig. 29: Pushing Cover Over Battery Toward Right And Removing It Upward
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide battery cover to right - **arrow 1** - and lift off - **arrow 2** - where applicable.

Battery in engine compartment:

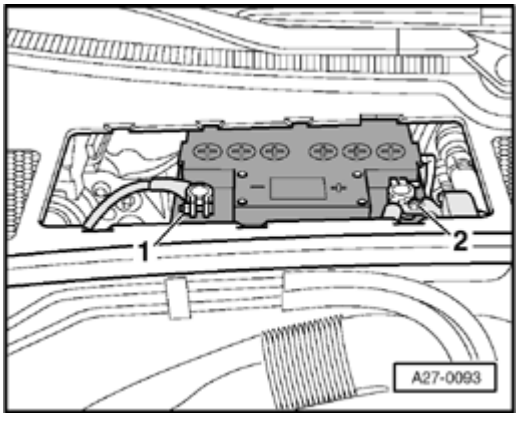

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Fig. 30: Identifying Battery Terminals, Nuts, And Terminal Clamps
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect battery charger to battery, positive to positive (+) - **2** - , negative to negative (-) - **1** -.

Battery in engine compartment:

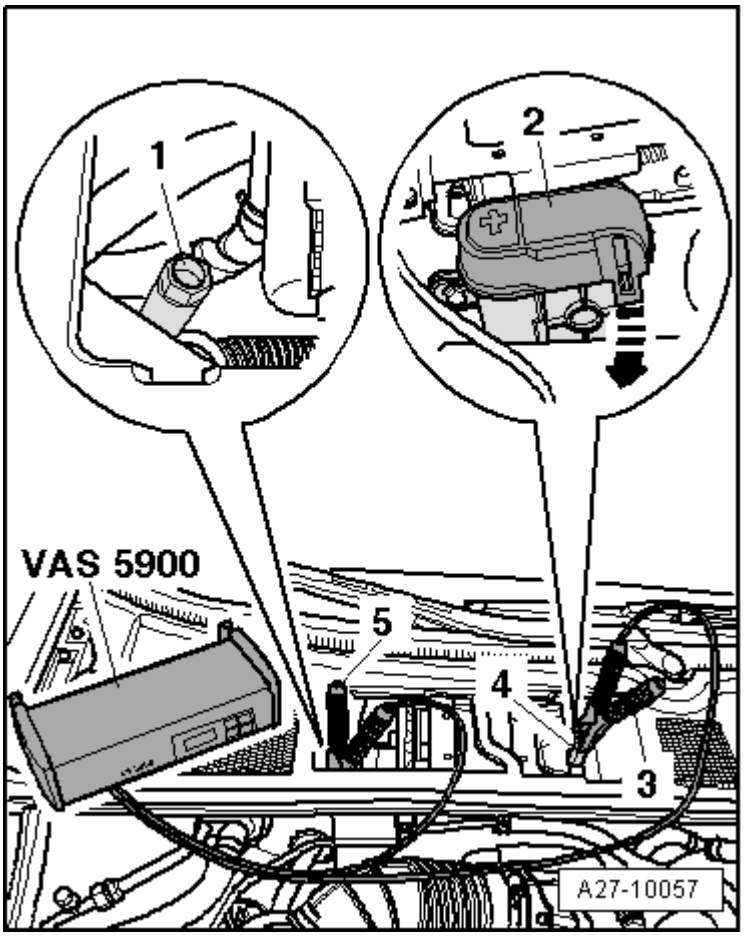

Fig. 31: Identifying Battery Charger Connected To Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release retaining clamps - **arrow** - and open cover - **2** - over positive terminal.
- Connect positive battery charger clamp - **3** - to positive (+) terminal - **4** - and to negative battery charger clamp - **5** - to negative terminal - **1** - (VAS 5900 charger shown for illustration purposes only).

All:

- Switch on battery charger.

CAUTION: If battery begins gassing (boiling) violently when charging, REDUCE charging rate immediately.

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- Adjust charging rate according to battery capacity (refer to Midtronics INC-940 Instruction Manual).

Charging totally discharged batteries

- Batteries which have not been used for lengthy periods, e.g. in vehicles which have not been driven, are subject to self-discharge.
- A battery is considered to be totally discharged if the no-load voltage has dropped below 11.6 V. Initial battery damage can occur between 12.2 and 11.6 V. Measuring no-load voltage --> **No-load voltage, checking**.
- In a totally discharged battery the electrolyte (sulfuric acid/water mixture) is reduced to almost all water, as the sulfuric acid content is heavily reduced. At temperatures below zero, the battery may freeze and the cause the housing to burst.
- Totally discharged batteries become sulphated, i.e. all the plate surfaces of such batteries become hard. The electrolyte has a slightly milky appearance (instead of being clear).

- If totally discharged batteries are charged directly after being discharged, the sulphation dissipates.
- If this is not done, the plates become even harder and their ability to absorb charge is impaired. This results in reduced power output.

Procedure for charging exhausted batteries (sulphated)

Totally discharged batteries (that are also sulphated) must be charged as follows using a low charging current:

- Set charging current to approx. 5 % of battery capacity, i.e. for a 60 Ah battery the charging current is approx. 3 A.
- Charging battery --> **Battery, charging**.

- The charging voltage (U_{max}) must not exceed 14.4 V.

CAUTION: 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.

Quick-charging

CAUTION:

- **Prior to handling or servicing batteries, read, understand and observe the Warning and Safety Measures for lead-acid batteries Smoking, naked flames, fires and sparks:.**
- **Always wear suitable protective clothing Eye protection and protective clothing:.**

Danger of explosion!

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- **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.**

CAUTION:

- **Battery must not be connected to vehicle electrical system when quick charging. Where applicable, disconnect battery in engine compartment --> Battery in engine compartment, disconnecting and reconnecting. Where applicable, disconnect battery in luggage compartment --> Battery in luggage compartment, disconnecting and connecting.**
- **Never quick-charge a totally discharged battery. Effective charging will not take place.**

NOTE:

- **The battery temperature must be at least 10 ° C.**
- **Quick-charging of batteries should only be performed in exceptional circumstances (e.g. boost starting) as rapid charging may cause damage.**

BATTERY INTERRUPT IGNITER N253 - AUDI RS4

Battery Interrupt Igniter N253 - Audi RS4, removing and installing

Battery Interrupt Igniter N253 must be replaced if faulty or damaged.

- Battery Interrupt Igniter N253 , replacing --> **69 - PASSENGER PROTECTION - AIRBAGS, SEAT BELTS** .

GENERATOR (GEN)

Generator (GEN) - 4-cylinder 1.8L Turbo engine, removing and installing

Special tools, testers and auxiliary items required

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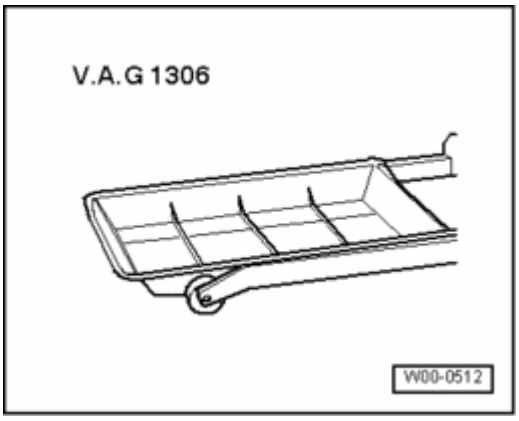

Fig. 32: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG 1306 or drip tray for workshop crane VAS 6208

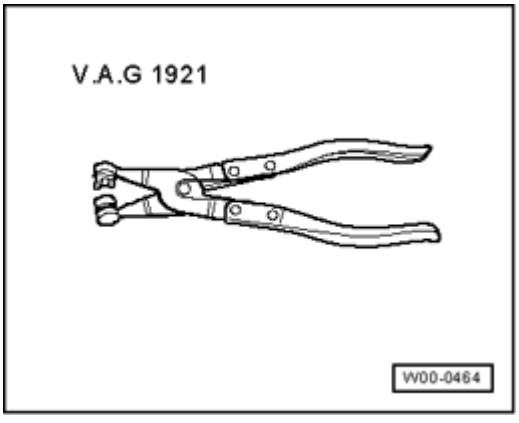

Fig. 33: Identifying Hose Clip Pliers Vag 1921
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hose clip pliers VAG 1921

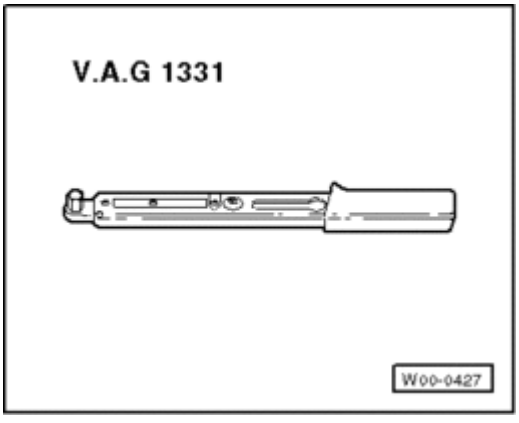

Fig. 34: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.

CAUTION: The cooling system is pressurized when the engine is warm. Wear gloves and other protection and carefully release system pressure if necessary, before performing repairs.

- Open filler cap for coolant expansion tank.
- Remove engine cover.
- Lift vehicle.

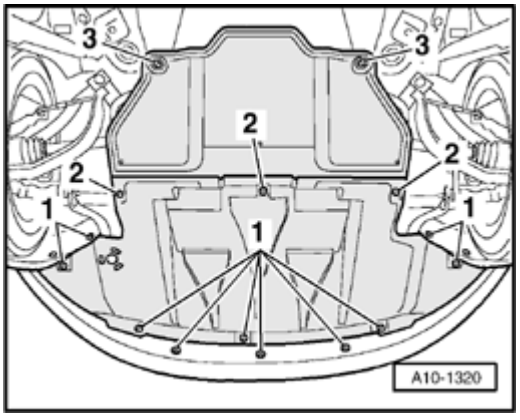

Fig. 35: Identifying Quick-Release Fasteners And Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners - **1** - and - **2** - and remove front noise insulation.

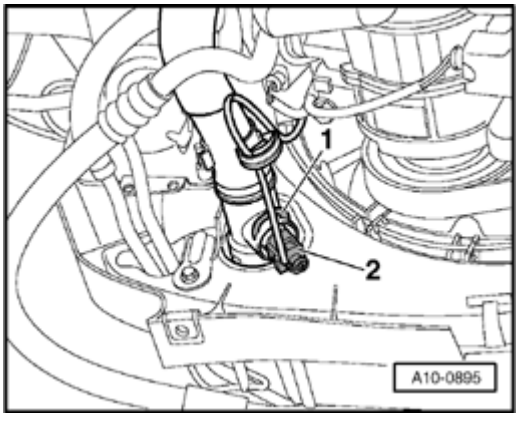

Fig. 36: Locating Retaining Clip And Engine Coolant Temperature (ECT) Sensor
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place drip tray VAG 1306 or drip tray for workshop crane VAS 6208 below engine.

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- Pull off retaining clip - **1** - and pull out Engine Coolant Temperature (ECT) Sensor (on Engine) G83 - **2** -.
- Drain coolant from radiator only.

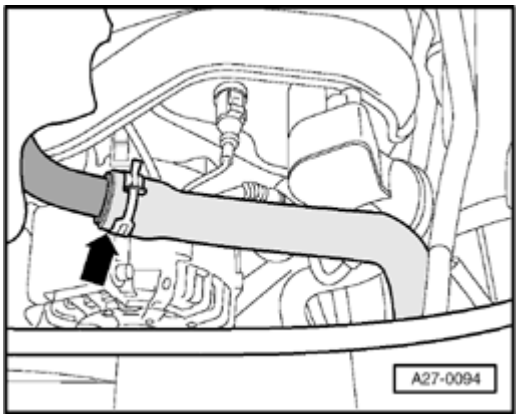

Fig. 37: Identifying Top Coolant Hose At Coolant Pipe
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect top coolant hose from coolant pipe - **arrow** -.

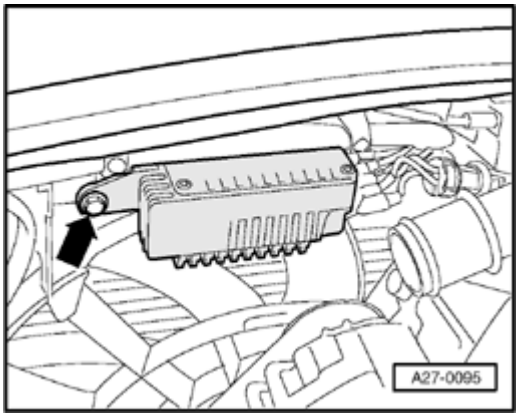

Fig. 38: Identifying Coolant Fan Control Module
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove radiator fan control module - **arrow** - and set aside.

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

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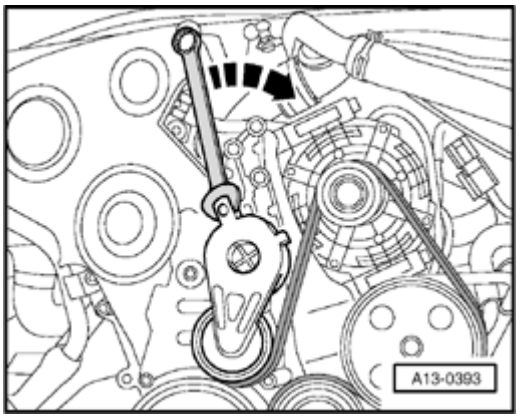

Fig. 39: Identifying Ribbed Belt Tensioner
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Relieve ribbed belt tension by turning tensioner in direction of - **arrow** -.
- Remove ribbed belt from generator pulley.
- Release pressure from the tensioner.

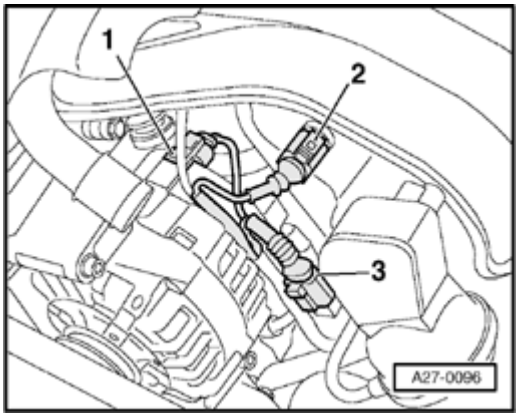

Fig. 40: Identifying Electrical Harness Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection - **1** -.

NOTE:

- **Electrical connections - 2 - and - 3 - not applicable to US/CDN models.**

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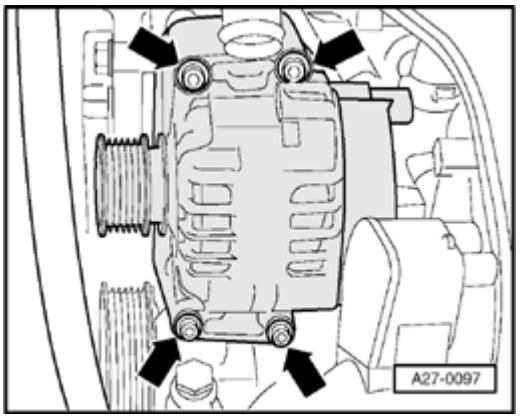

Fig. 41: Identifying Upper And Lower Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove top and bottom bolts - **arrows** - and swing generator forward.

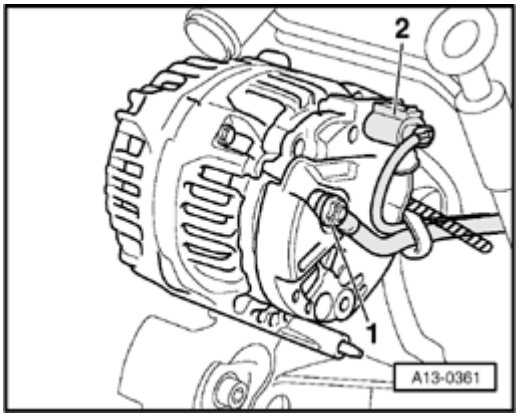

Fig. 42: Generator Electrical Connector And Terminal B+
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection - **2** -.
- Remove 30 (B+) terminal - **1** -.
- Remove generator.

Installing

Install in reverse order of removal, noting the following:

CAUTION:

- **Before installing the ribbed belt, ensure that all subassemblies (generator, a/c compressor etc.) are securely mounted and turn freely.**
- **When installing belt, ensure correct seating in the belt pulleys!**
- **Reinstall all hose clamps, harness retainers and replace all removed cable ties as originally installed in production.**

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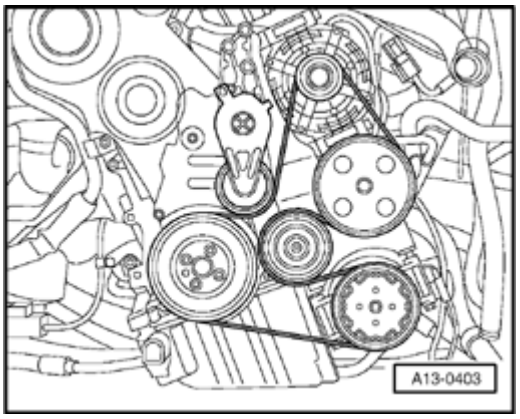

Fig. 43: Ribbed Belt, Seated Correctly
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Note running direction of ribbed belt as previously marked and route as illustrated.
- Top up coolant --> 1.8 Liter 4-Cyl. 5V Turbo Engine Mechanical, Engine Code(s) AMB -
  - **19 - ENGINE - COOLING SYSTEM** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **19 - ENGINE - COOLING SYSTEM** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **19 ENGINE - COOLING SYSTEM** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **19 - ENGINE - COOLING SYSTEM** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE (S): BKH
  - **19 - ENGINE - COOLING SYSTEM** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **19 - ENGINE - COOLING SYSTEM** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

  .
- Reconnect battery. Required steps **Reconnecting**.
- Start engine and check belt running.

Tightening Torques (1.8L)

Tightening Torques

Component - fastener	Nm
Generator (GEN) to engine - bolt	23
Terminal 30/B+ to generator - nut	16

Generator (GEN) - 4-cylinder 2.0L Turbo FSI engine, removing and installing

Special tools, testers and auxiliary items required

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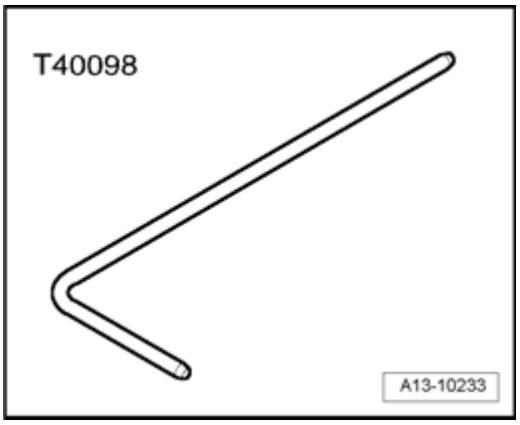

Fig. 44: Locking Tool T40098
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Locking pin T40098 or equivalent

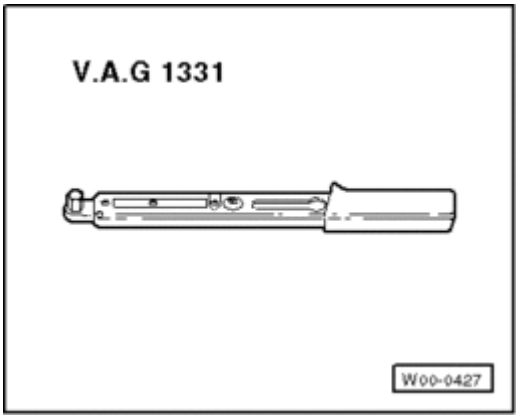

Fig. 45: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.

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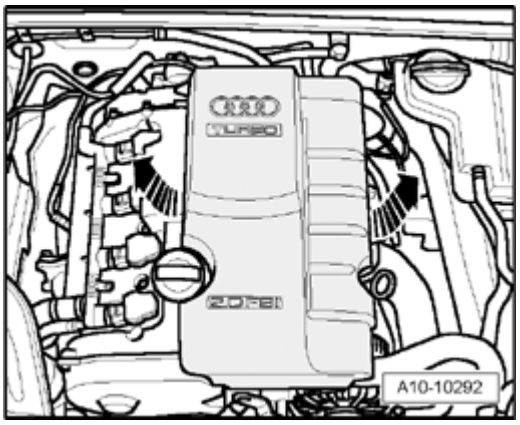

Fig. 46: Removing Engine Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove engine cover - **arrows** -.

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

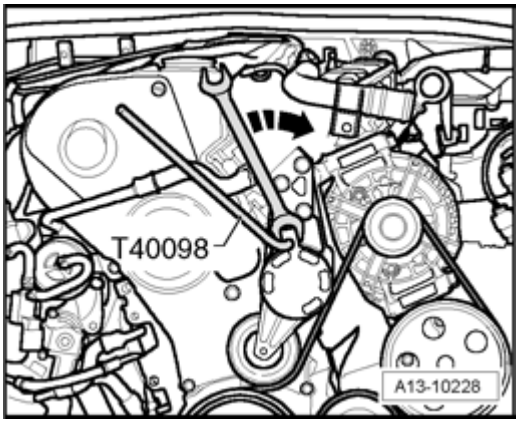

Fig. 47: Pivoting Belt Tensioner For Ribbed Belt To Relieve Tension On Ribbed Belt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Relieve ribbed belt tension by turning tensioner in direction of - **arrow** - and lock in place using locking pin T40098.
- Remove ribbed belt.

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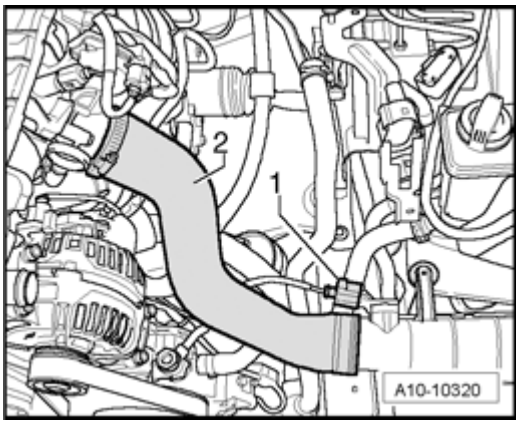

Fig. 48: Separating Electrical Connector From Charge Air Pressure Sensor G31 & Removing Left Charge Air Hose
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove air hose - **2** - at intake manifold.

NOTE:

- **Disregard - 1 -.**

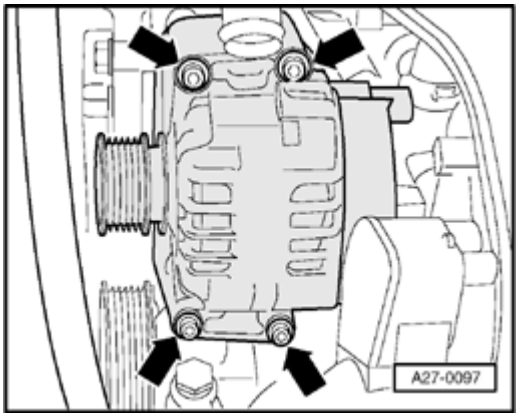

Fig. 49: Identifying Upper And Lower Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove top and bottom bolts - **arrows** - and swing generator forward.

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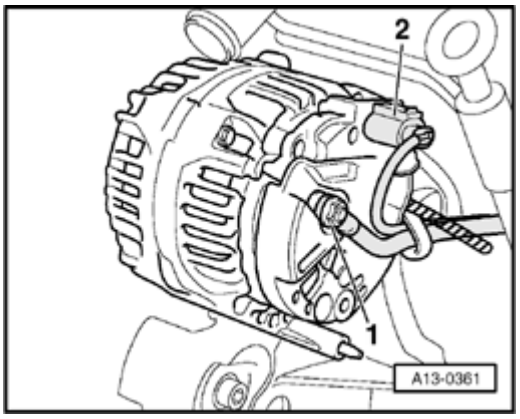

Fig. 50: Generator Electrical Connector And Terminal B+
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection - **2** -.
- Remove D+ terminal - **1** -.
- Remove generator.

Installing

Install in reverse order of removal, noting the following:

CAUTION:

- **Before installing the ribbed belt, ensure that all subassemblies (generator, a/c compressor etc.) are securely mounted and turn freely.**
- **When installing belt, ensure correct seating in the belt pulleys!**
- **Reinstall all hose clamps, harness retainers and replace all removed cable ties as originally installed in production.**

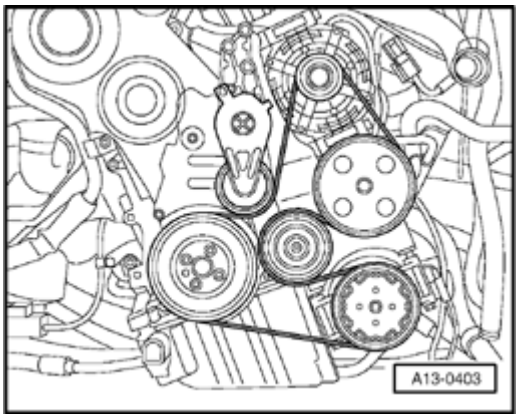

Fig. 51: Ribbed Belt, Seated Correctly
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Note running direction of ribbed belt as previously marked and route as illustrated.

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- Top up coolant --> 2.0 Liter 4-Cyl. 4V Turbo Fuel Injection Ignition, Engine Code(s): BPG -
  - **19 - ENGINE - COOLING SYSTEM** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **19 - ENGINE - COOLING SYSTEM** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **19 ENGINE - COOLING SYSTEM** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **19 - ENGINE - COOLING SYSTEM** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE (S): BKH
  - **19 - ENGINE - COOLING SYSTEM** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **19 - ENGINE - COOLING SYSTEM** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

  .
- Reconnect battery. Required steps **Reconnecting**.
- Start engine and check belt running.

Tightening Torques (2.0L)

Tightening Torques

Component - fastener	Nm
Generator (GEN) to engine - bolt	23
Terminal 30/B+ to generator - nut	16

Generator (GEN) - 3.0L 6-cylinder engine, removing and installing

Special tools, testers and auxiliary items required

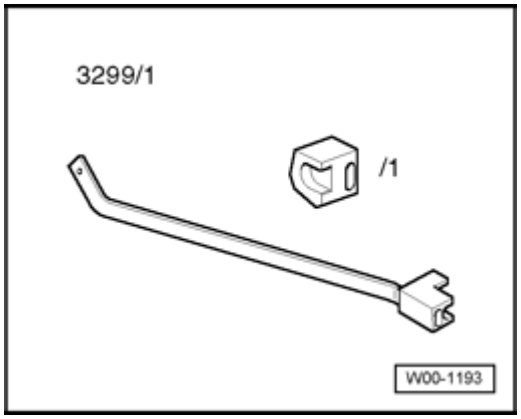

Fig. 52: Ribbed Belt Installation Tool 3299 With Tensioner Claw 3299/1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Ribbed Belt Installation Tool 3299 with tensioner claw 3299/1

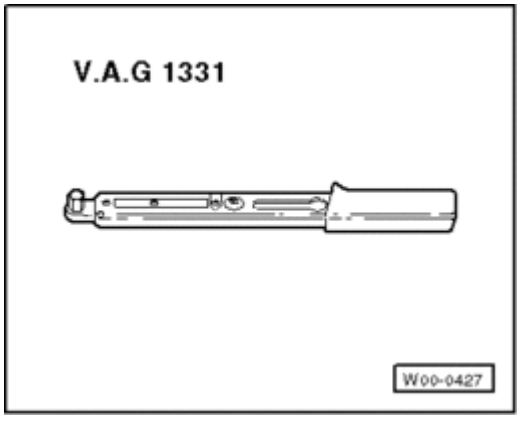

Fig. 53: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.

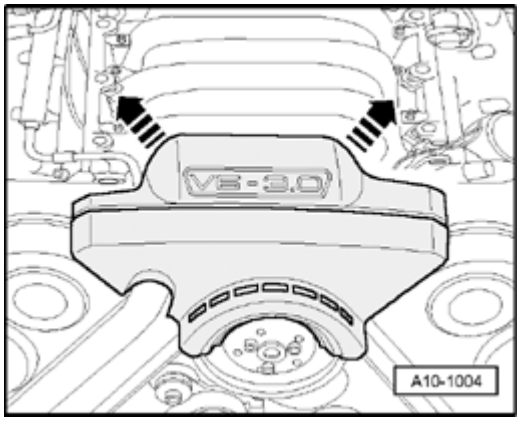

Fig. 54: Removing Front Engine Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove front engine cover - **arrows** -.

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

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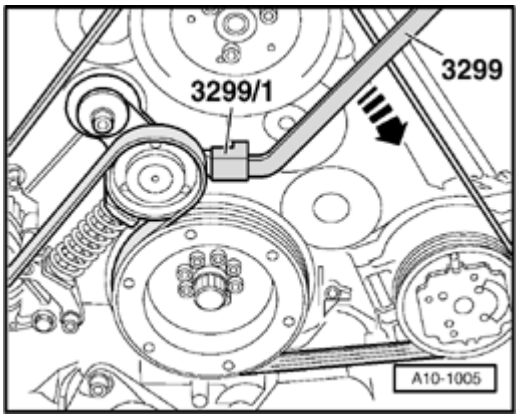

Fig. 55: Swinging Ribbed Belt Tensioner To Release Tension On Ribbed Belt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Relieve ribbed belt tension by turning tensioner in direction of - **arrow** -.
- Remove ribbed belt from power steering pump pulley.
- Lift vehicle.

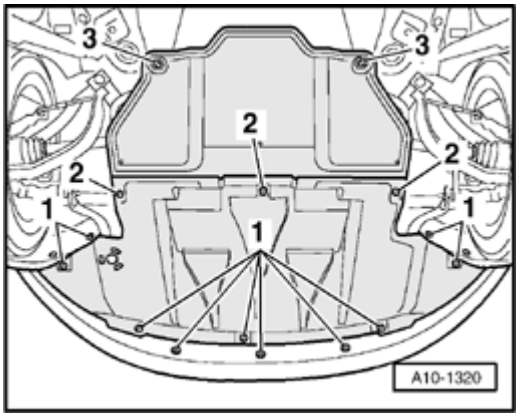

Fig. 56: Identifying Quick-Release Fasteners And Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners - **1** - and - **2** - and remove front noise insulation.

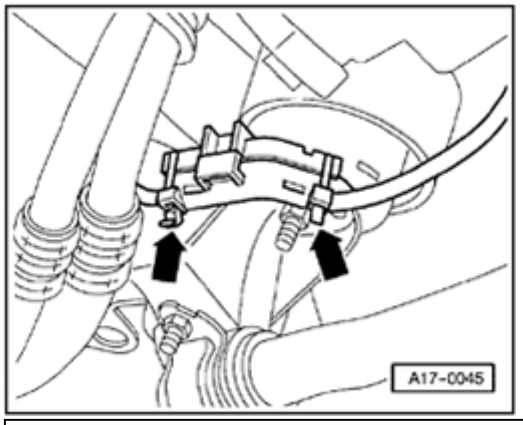

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Fig. 57: Starter Wiring Bracket Cable Ties
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cable ties - **arrows** - , unclip cover for starter cable guide harness and remove harness from guide.

Vehicles with automatic transmission:

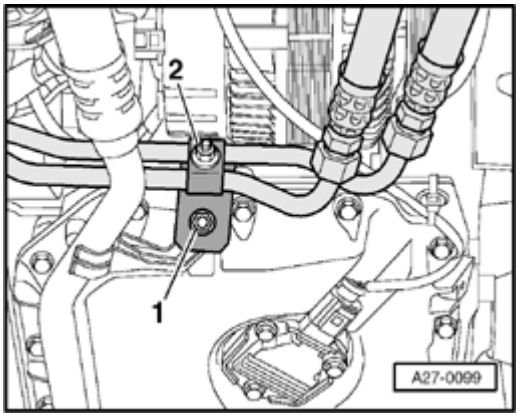

Fig. 58: Unscrewing Nut For Clamp For ATF Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nuts - **1** - and - **2** -.
- Remove bracket for ATF lines.

All models:

- Unclip refrigerant line from bracket at sump.
- Disconnect electrical connections at generator.
- Remove bolts - **arrows** -.

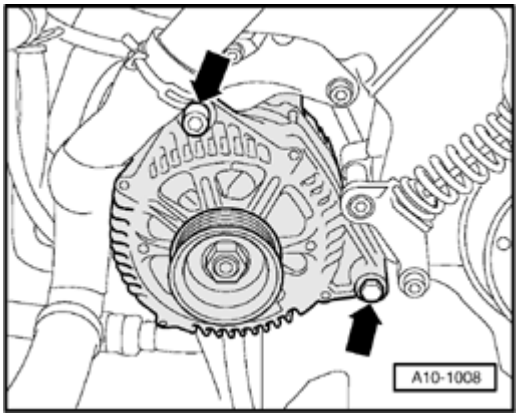

Fig. 59: Identifying Bolts And Generator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove generator.

Installing

Install in reverse order of removal, noting the following:

CAUTION:

- **Before installing the ribbed belt, ensure that all subassemblies (generator, a/c compressor etc.) are securely mounted and turn freely.**
- **When installing belt, ensure correct seating in the belt pulleys!**
- **Reinstall all hose clamps, harness retainers and replace all removed cable ties as originally installed in production.**

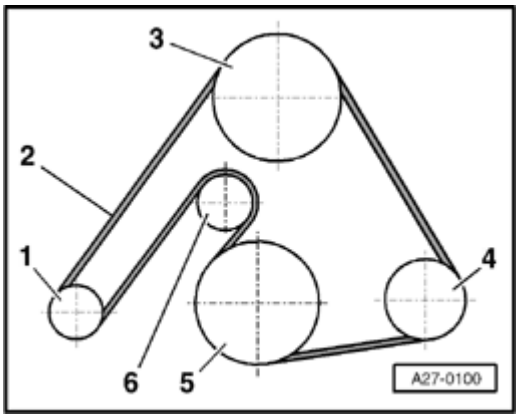

Fig. 60: Identifying Belt Path
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Note running direction of ribbed belt as previously marked and route as illustrated.

1. Generator (GEN)
2. Ribbed belt
3. Power steering pump
4. Air conditioner compressor
5. Crankshaft
6. Tensioning roller

- Reconnect battery. Required steps **Reconnecting**.
- Start engine and check belt running.

Tightening torques

Component - fastener		Nm
	M8	22

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Generator to engine bracket - bolts	M10	45
Terminal 30/B+ to generator - nut		16
Bracket for refrigerant line to sump - bolt		10
Bracket for starter wire to engine console - bolt		10

Generator (GEN) - 3.2L 6-cylinder FSI engine, removing and installing

Special tools, testers and auxiliary items required

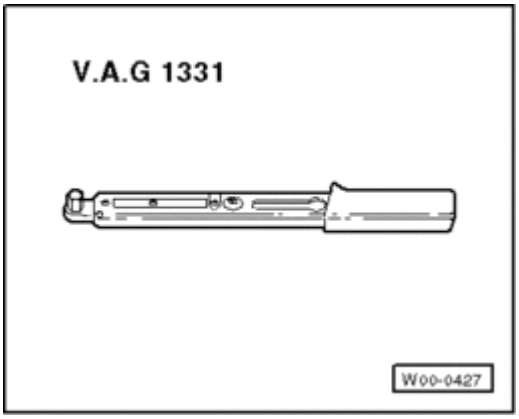

Fig. 61: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.

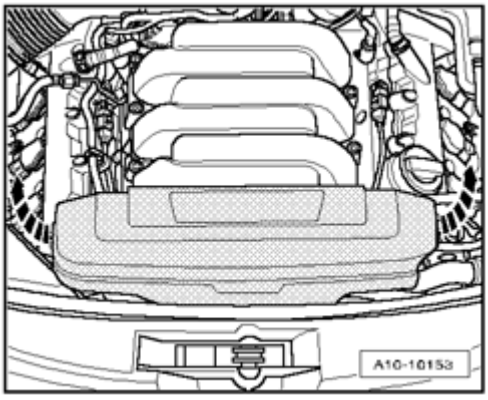

Fig. 62: Identifying Front Engine Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove front engine cover - **arrows** -.

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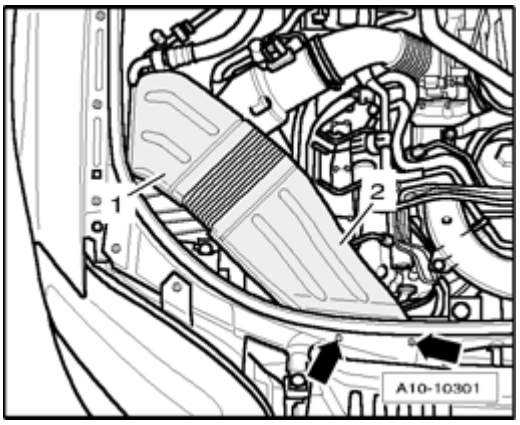

Fig. 63: Identifying Bolts & Air Duct
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **arrows** -.
- Remove air guides - **1** - and - **2** -.
- Lift vehicle.

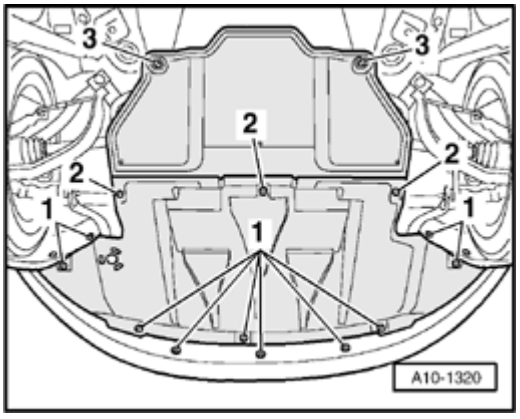

Fig. 64: Identifying Quick-Release Fasteners And Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners - **1** - and - **2** - and remove front noise insulation.
- Remove front bumper cover --> **63 BUMPER** .
- Bring lock carrier into service position --> **50 BODY, FRONT** .

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

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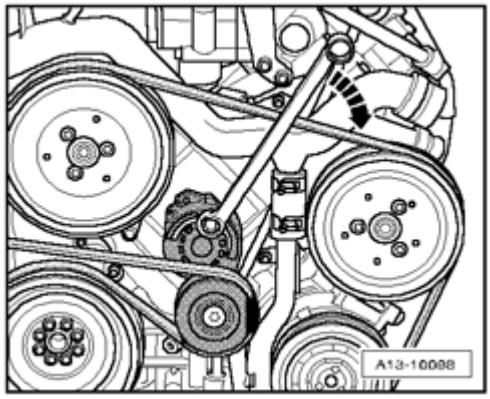

Fig. 65: Pivoting Tensioning Device To Relieve Tension On Ribbed Belt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Relieve ribbed belt tension by turning tensioner in direction of - **arrow** -.
- Remove ribbed belt from generator pulley.
- Allow tensioner to return to operating position.

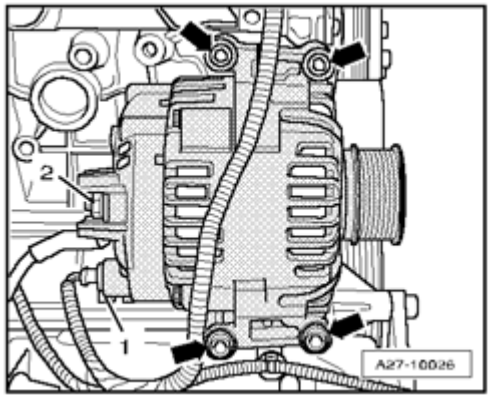

Fig. 66: Identifying Bolts, Electrical Connections, And Generator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** -.
- Disconnect electrical connections - **1** - and - **2** - from Generator.
- Remove Generator.

Installing

Install in reverse order of removal, noting the following:

CAUTION:

- **Before installing the ribbed belt, ensure that all subassemblies (generator, a/c compressor etc.) are securely mounted and turn freely.**

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- **When installing belt, ensure correct seating in the belt pulleys!**
- **Reinstall all hose clamps, harness retainers and replace all removed cable ties as originally installed in production.**

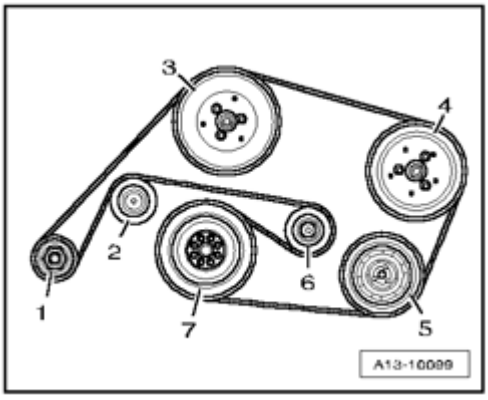

Fig. 67: Placing Ribbed Belt Over Belt Pulley
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Note running direction of ribbed belt as previously marked and route as illustrated.

1. Generator (GEN)
2. Idler
3. Coolant pump
4. Power steering pump
5. Air conditioning compressor
6. Tensioning roller
7. Crankshaft

- Reinstall lock carrier --> **50 BODY, FRONT** .
- Reconnect battery. Required steps **Reconnecting**.
- Start engine and check belt running.
- Reinstall front bumper cover --> **63 BUMPER** .

Tightening Torques (3.2L)

Tightening Torques

Component - fastener	Nm
Generator to engine bracket - bolt	22
Terminal 30/B+ to generator - nut	16

Generator (GEN) - 4.2L 8-cylinder engine (Audi S4), removing and installing

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Special tools, testers and auxiliary items required

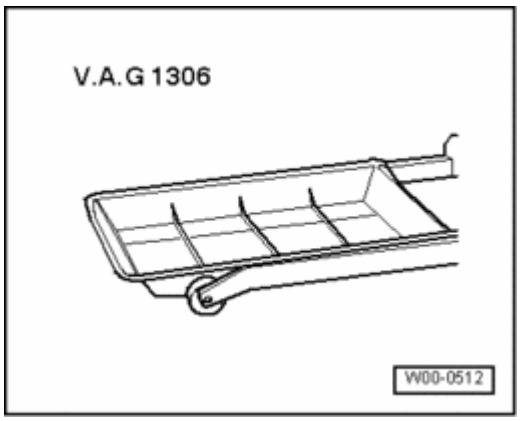

Fig. 68: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG 1306 or drip tray for workshop crane VAS 6208

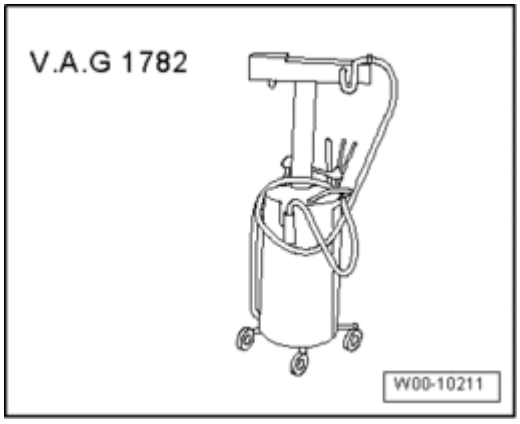

Fig. 69: Identifying Old Oil Collecting And Extracting Device V.A.G 1782
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Oil drain appliance VAG 1782 or UL approved equivalent

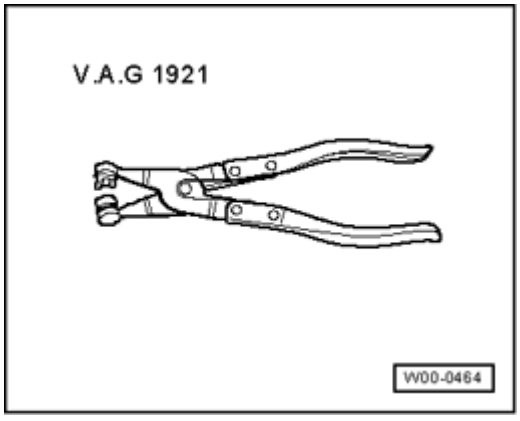

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Fig. 70: Identifying Hose Clip Pliers Vag 1921
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hose clip pliers VAG 1921

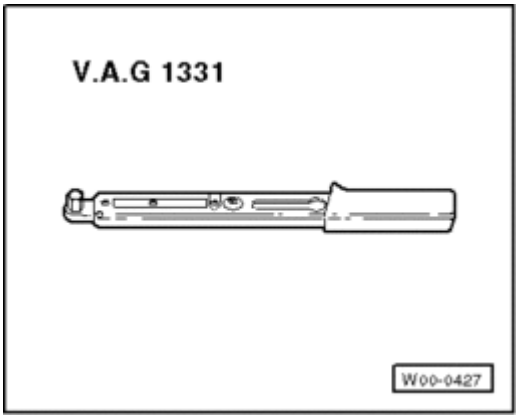

Fig. 71: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

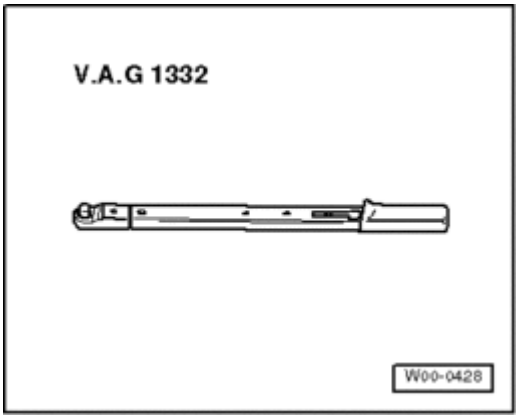

Fig. 72: Identifying Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or 40 - 200 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.
- Use oil drain appliance VAG 1782 (or UL approved equivalent) to draw power steering hydraulic fluid from power steering from reservoir.

CAUTION: The cooling system is pressurized when the engine is warm. Wear gloves and other protection and carefully release system pressure if necessary,

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before performing repairs.

- Open filler cap for coolant expansion tank.
- Lift vehicle
- Remove right front wheel.

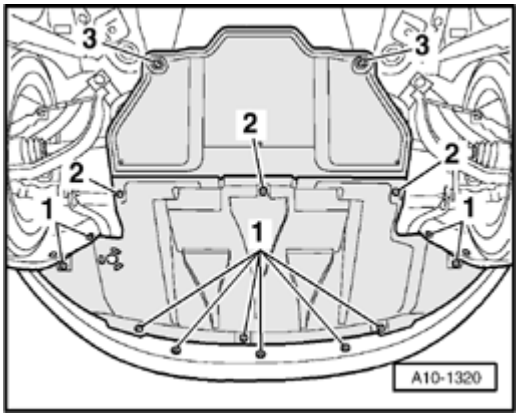

Fig. 73: Identifying Quick-Release Fasteners And Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners - **1** - and - **2** - and remove front noise insulation.

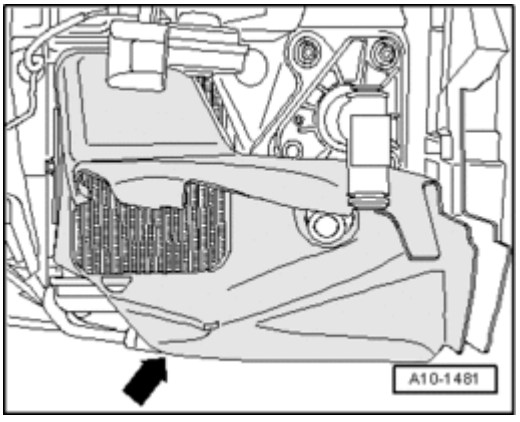

Fig. 74: Removing Right Air Guide In Front Of Auxiliary Cooler
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove air guide - **arrow** - from right auxiliary radiator.

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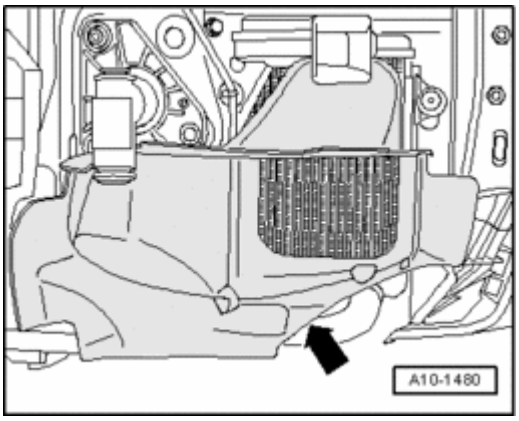

Fig. 75: Removing Left Air Guide In Front Of Auxiliary Cooler
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove air guide - **arrow** - from left auxiliary radiator.

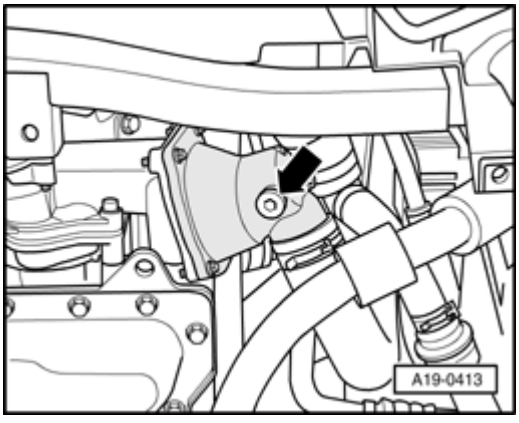

Fig. 76: Removing Drain Plug On Coolant Thermostat Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place drip tray VAG 1306 or drip tray for workshop crane VAS 6208 beneath engine.
- Remove drain plug - **arrow** - at thermostat housing and drain engine coolant.

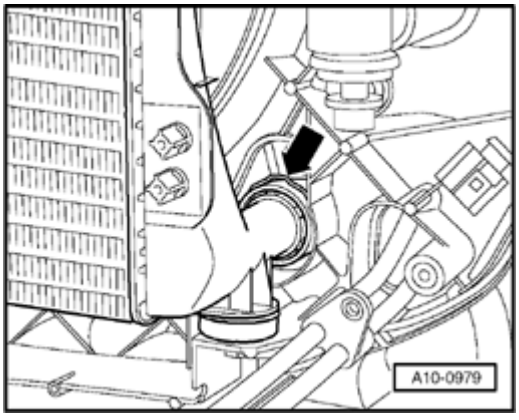

Fig. 77: Disconnecting Lower Coolant Hose From Radiator

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release and pull off bottom coolant hose from radiator - **arrow** - and drain remaining engine coolant.

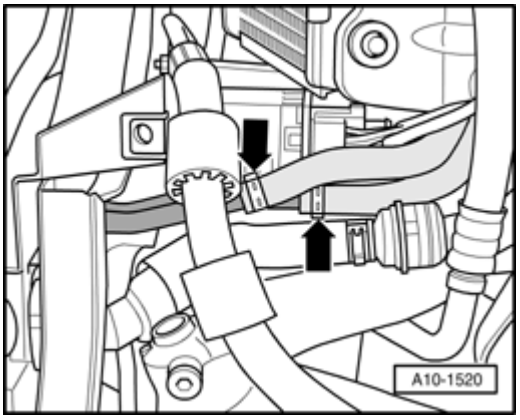

Fig. 78: Disconnecting Hydraulic Lines To Cooling Coil At Left Rear Of Bumper
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place oil drain appliance VAG 1782 underneath.
- Remove hydraulic hoses - **arrows** - at rear of lock carrier to power steering cooling line.

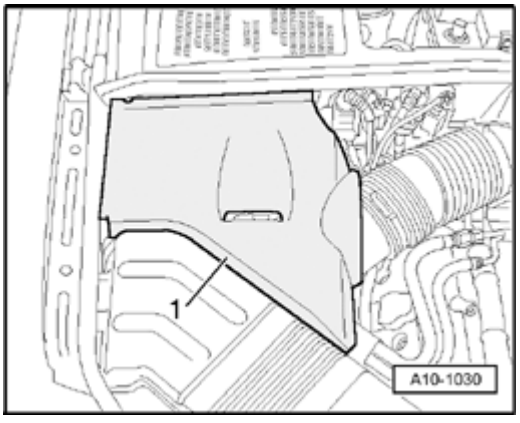

Fig. 79: Removing Cover In Engine Compartment (Right Side)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right engine compartment cover - **1** -.

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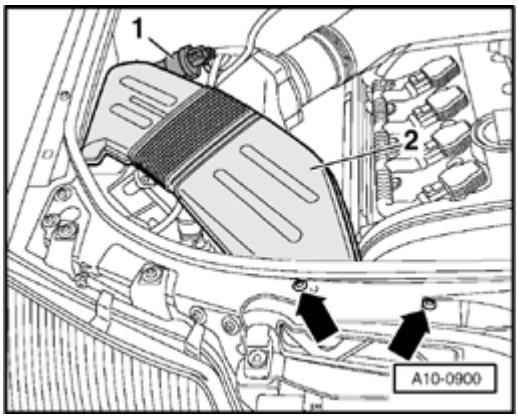

Fig. 80: Evaporative Emission Canister Purge Regulator Valve N80 And Air Duct
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **arrows** -.
- Remove Evaporative Emission (EVAP) Canister Purge Regulator Valve 1 N80 - **1** - at air guide.
- Remove air guide - **2** -.

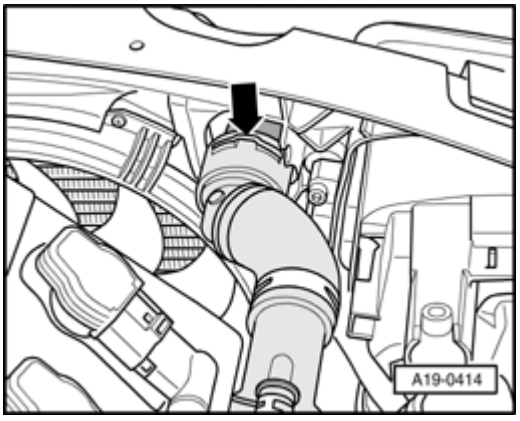

Fig. 81: Disconnecting Top Coolant Hose From Radiator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove top coolant hose - **arrow** - from radiator.

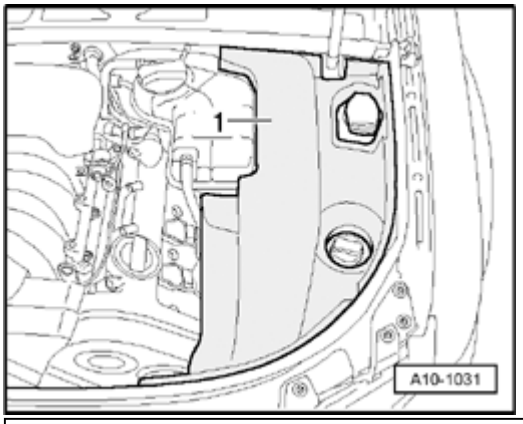

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Fig. 82: Removing Cover In Engine Compartment (Left Side)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove left engine compartment cover - **1** -.

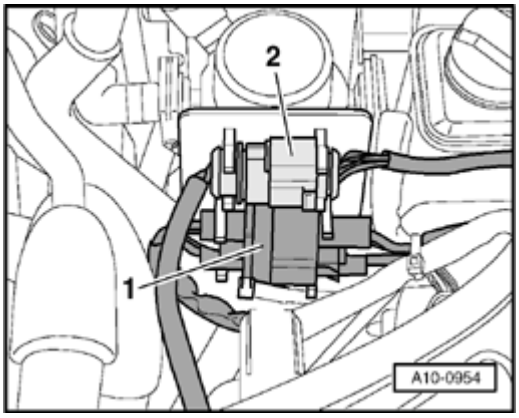

Fig. 83: Removing Electrical Harness Connectors And From Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove electrical connections - **1** - and - **2** - from retainer and disconnect them.
- Set aside harness toward lock carrier.

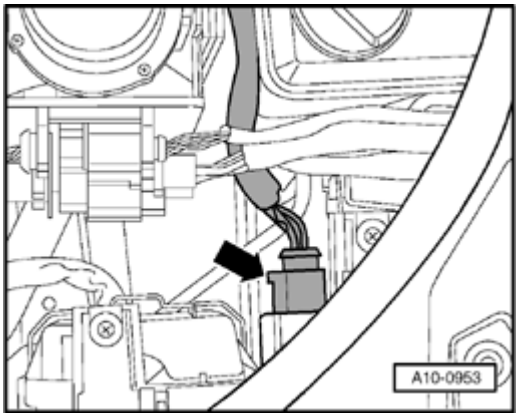

Fig. 84: Disconnecting Electrical Harness Connector For Headlights At Both Sides Of Vehicle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connections for left and right headlamps - **arrow** -.

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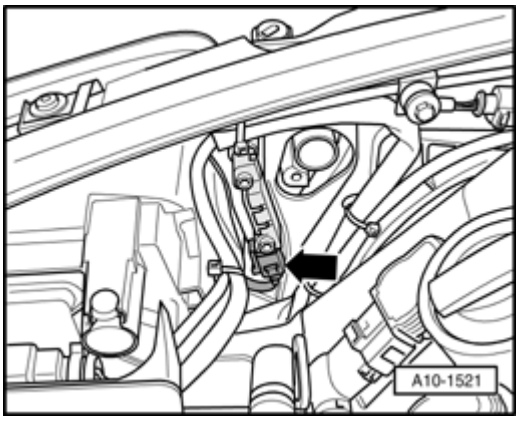

Fig. 85: Disconnecting Electrical Harness Connector For Left/Right Airbag Sensors On Lock Carrier
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connections for both left and right airbag sensors - **arrow** - on lock carrier.
- Set aside harness toward lock carrier.
- Remove hood release cable from lock carrier --> **55 HOOD, LIDS**

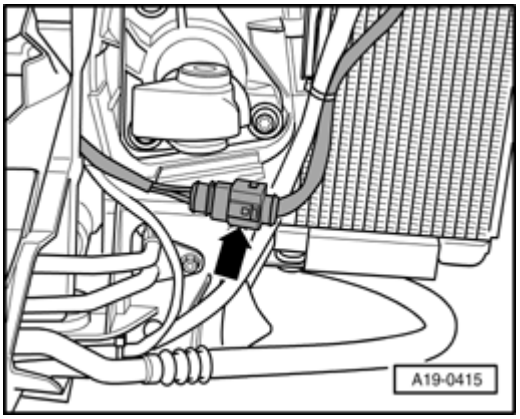

Fig. 86: Disconnecting Electrical Harness Connector For Right Fan
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection - **arrow** - for right radiator fan.

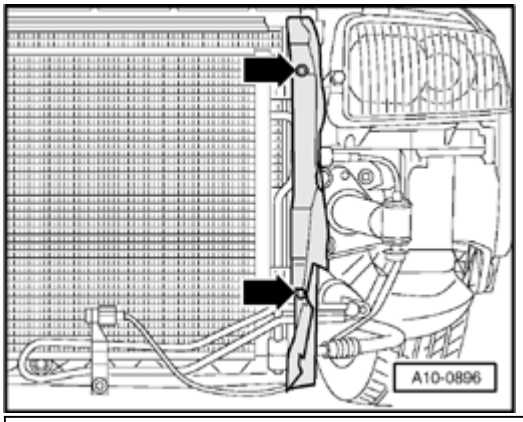

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Fig. 87: Removing Left/Right Air Guides At Radiator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **arrows** - and remove right and left radiator air guides.

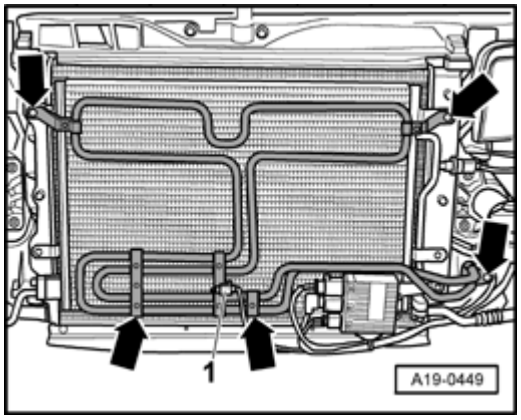

Fig. 88: Removing Power Steering Hydraulic Oil Cooling Pipe
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip temperature sensor - **1** - from retainer and set aside.
- Remove power steering cooling line - **arrows** -.

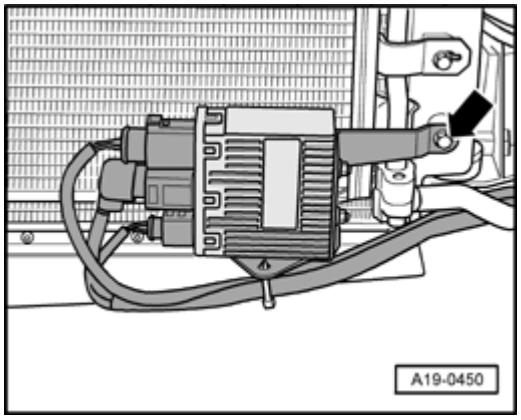

Fig. 89: Removing Coolant Fan Control (FC) Control Module J293 From Radiator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw - **arrow** - and remove cooling fan control module.

CAUTION:

- **In order not to damage the condensor and refrigerant lines/hoses, ensure refrigerant lines are not excessively bent or tensioned in the following procedures.**
- **Do not open refrigerant circuit!**

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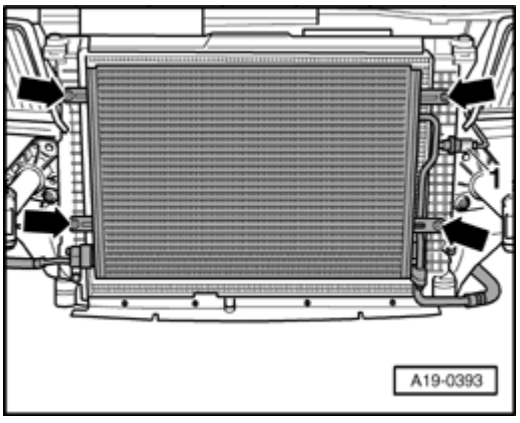

Fig. 90: Disconnecting Electrical Harness Connector At High Pressure Sensor G65
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection - **1** - at High Pressure Sensor G65.
- Remove screws - **arrows** -.
- Remove condensor with refrigerant lines attached and lower downward.

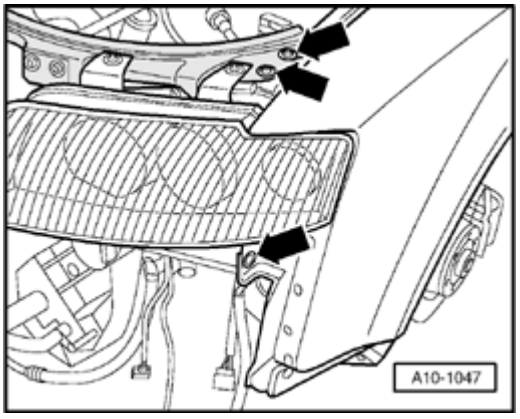

Fig. 91: Removing Bolts At Left/Right Side Of Bumper
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws at lock carrier left and right - **arrows** -.
- Remove front hood sealing gasket from lock carrier and fenders.

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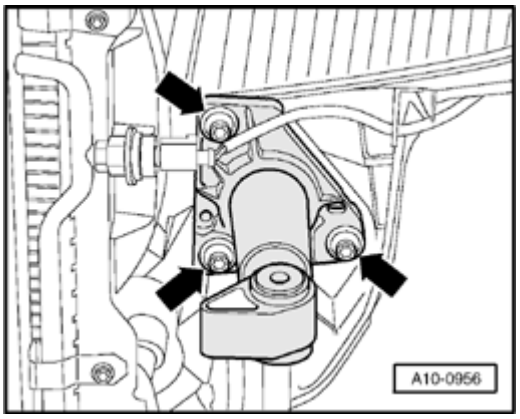

Fig. 92: Removing Bolts At Impact Absorbers At Left/Right
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts at impact absorbers - **arrows** - (left and right).

NOTE:

- **Use an assistant to remove lock carrier in the following step.**
- **Remove lock carrier and tilt aside (secure against falling).**

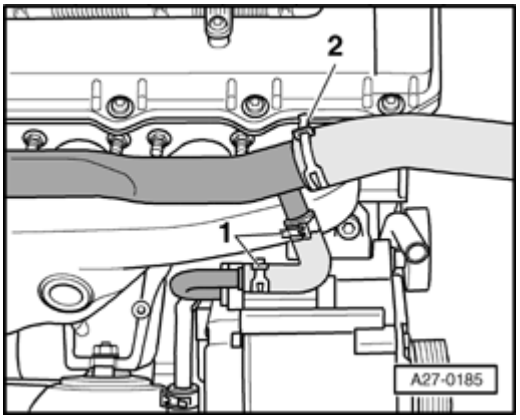

Fig. 93: Removing Hose Clamps And Disconnecting Coolant Hose
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release hose clamp - **2** - and remove coolant hose from right coolant pipe.
- Release hose clamp - **1** - and remove coolant hose from coolant pipe.

NOTE:

- **Engine shown removed in illustration for clarity.**

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

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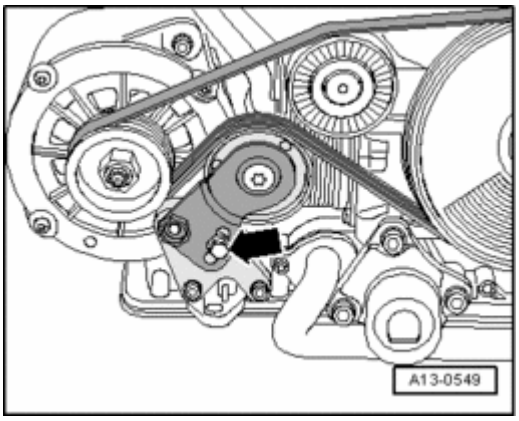

Fig. 94: Loosening Tensioning Bolt And Ribbed Belt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Relieve ribbed belt tension by loosening tensioner bolt - **arrow** -.
- Remove ribbed belt from generator pulley.

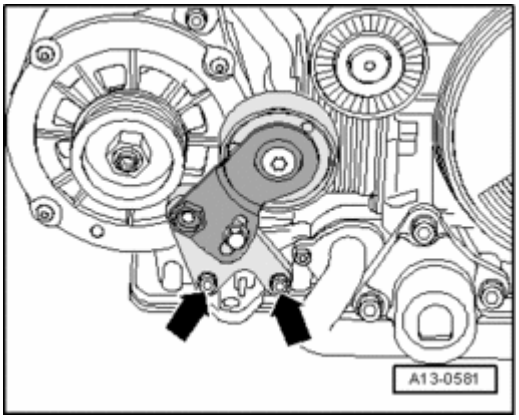

Fig. 95: Removing Tensioning Roller
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** - and remove tensioner.

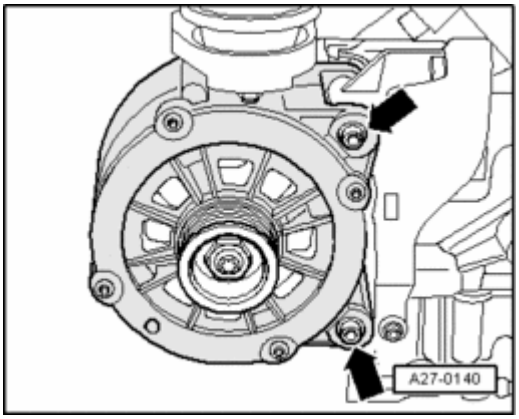

Fig. 96: Removing Generator Bolts

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** -.
- Remove generator from bracket and pull forwards.

NOTE:

- **If generator is difficult to remove from mounting, reinstall mounting bolts loosely and carefully strike bolt heads with hammer in order to loosen mounting threaded bushings.**

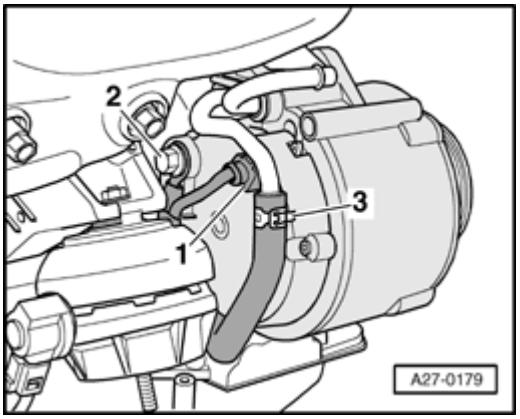

Fig. 97: Disconnecting Coolant Hose On Generator, Electrical Connector & Removing Electrical Wire On Generator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release hose clamp - **3** - and remove coolant hose from generator.
- Disconnect electrical connection - **1** -.
- Remove nut - **2** - and terminal eyelet from generator.
- Remove generator.

Installing

Install in reverse order of removal, noting the following:

CAUTION:

- **Before installing the ribbed belt, ensure that all subassemblies (generator, a/c compressor etc.) are securely mounted and turn freely.**
- **When installing belt, ensure correct seating in the belt pulleys!**
- **Reinstall all hose clamps, harness retainers and replace all removed cable ties as originally installed in production.**

- To aid in installation, drive generator mounting bushings back into mounting flanges approx. 4mm.

CAUTION: Tight generator mounting bushings must be made to move freely in order

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to ensure sufficient clamping force at the specified bolt torque.

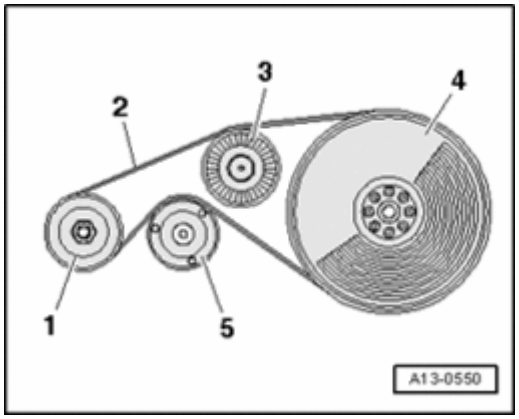

Fig. 98: Placing Ribbed Belt Over Belt Pulley In Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Note running direction of ribbed belt as previously marked and route as illustrated.

1. Generator (GEN)
2. Ribbed belt
3. Idler
4. Vibration damper
5. Tensioning roller

- Tension ribbed belt by rotating tensioner counterclockwise with torque wrench until 70 Nm is achieved.

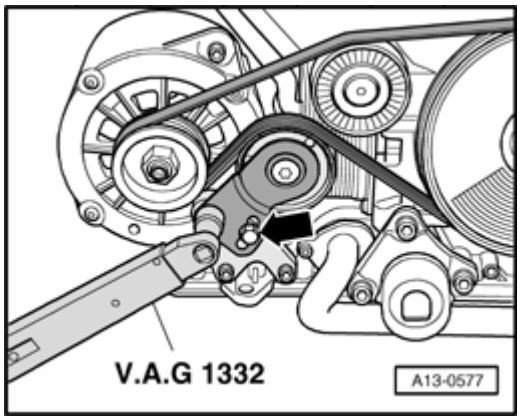

Fig. 99: Positioning Torque Wrench On Belt Tensioner Hex Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hold and simultaneously tighten tensioner bolt - **arrow** - to 22 Nm.
- Reinstall lock carrier and related assemblies --> **50 BODY, FRONT** .
- Reinstall front bumper --> **63 BUMPER** .

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- Top up coolant --> 4.2 Liter V8 5V Engine Mechanical, Engine Code(s): BHF -
  - **19 - ENGINE - COOLING SYSTEM** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **19 - ENGINE - COOLING SYSTEM** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **19 ENGINE - COOLING SYSTEM** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **19 - ENGINE - COOLING SYSTEM** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE (S): BKH
  - **19 - ENGINE - COOLING SYSTEM** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **19 - ENGINE - COOLING SYSTEM** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

  .

- Refill power steering fluid reservoir --> **48 - STEERING**

CAUTION: Power steering pump must NOT be allowed to run dry. Damage will result.

- Reconnect battery. Required steps **Reconnecting**.
- Start engine and check belt running.
- Check and adjust headlamps if necessary --> **00 - TECHNICAL DATA**

Tightening Torques (4.2L - S4)

Tightening Torques

Component - fastener	Nm
Coolant pipes to generator - bolt	9
Terminal 30/B+ to generator - nut	16
Generator (GEN) to engine bracket - bolt	22
Tensioning roller to engine - bolt	22

Generator (GEN) - 4.2L 8-cylinder FSI engine (Audi RS4), removing and installing

Special tools, testers and auxiliary items required

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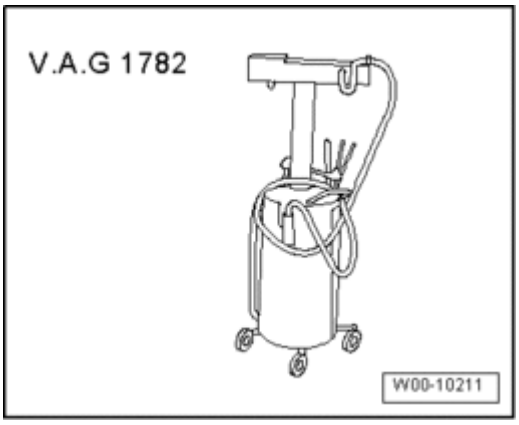

Fig. 100: Identifying Old Oil Collecting And Extracting Device V.A.G 1782
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- oil drain appliance VAG 1782 or UL approved equivalent

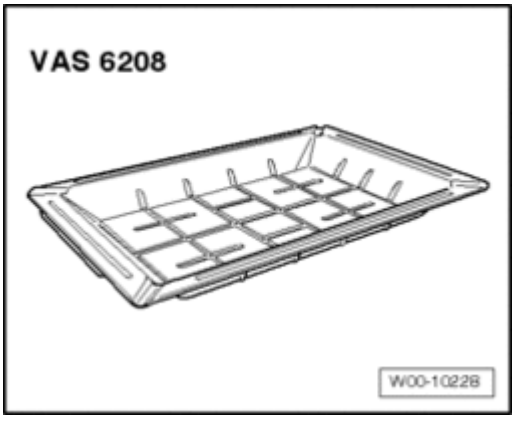

Fig. 101: Drip Tray For VAS 6100, VAS 6208
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Workshop crane drip tray VAS 6208 or drip tray VAG 1306

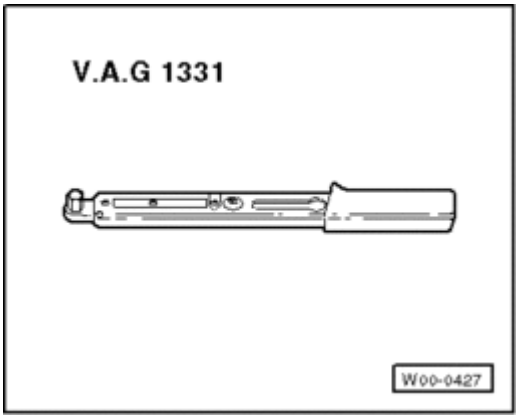

Fig. 102: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

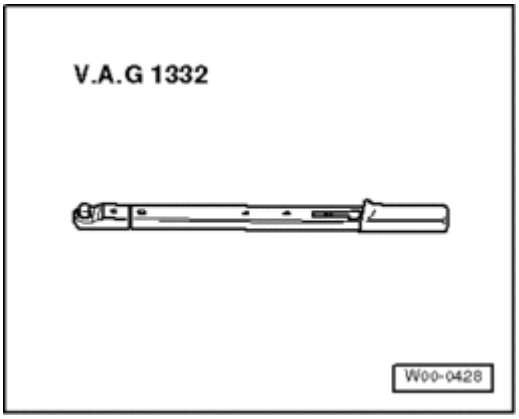

Fig. 103: Identifying Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or 40 - 200 Nm equivalent)

Removing

- Disconnect battery --> **Battery in luggage compartment, disconnecting and connecting**.
- Use oil drain appliance VAG 1782 (or UL approved equivalent) to draw power steering hydraulic fluid from power steering from reservoir.

CAUTION: The cooling system is pressurized when the engine is warm. Wear gloves and other protection and carefully release system pressure if necessary, before performing repairs.

- Open filler cap for coolant expansion tank.
- Lift vehicle
- Remove right front wheel.

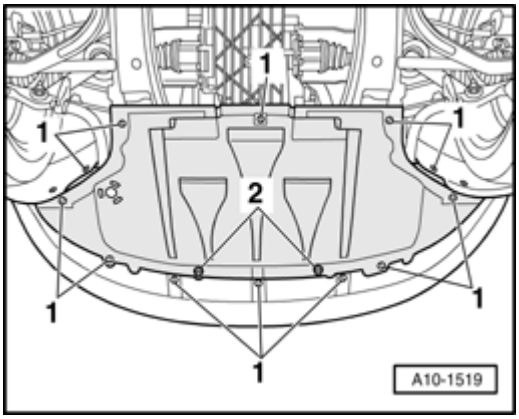

Fig. 104: Removing Quick-Release Fasteners, Screws And Noise Insulation

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners - **1** - and - **2** - and remove front noise insulation.
- Remove right front wheelhouse liner --> **66 EXTERIOR EQUIPMENT** .
- Remove front bumper cover --> **63 BUMPER** Front bumper cover, removing and installing.

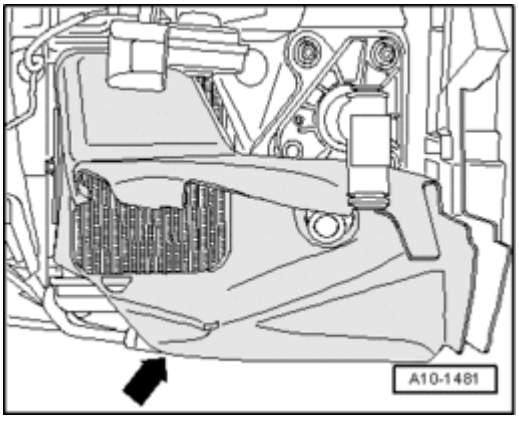

Fig. 105: Removing Right Air Guide In Front Of Auxiliary Cooler
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right air duct - **arrow** - in front of auxiliary radiator.
- Place oil drain appliance VAG 1782 (or UL approved equivalent) under engine.
- Drain engine oil.

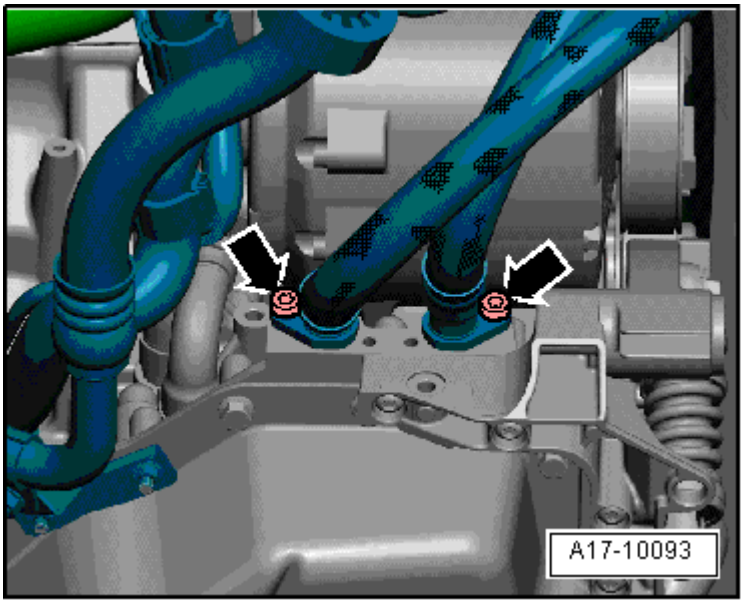

Fig. 106: Removing Bolts On Oil Cooler Lines At Upper Part Of Oil Pan
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **arrows** - at oil cooler lines on upper part of oil pan.

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- Remove oil lines from upper part of oil pan.

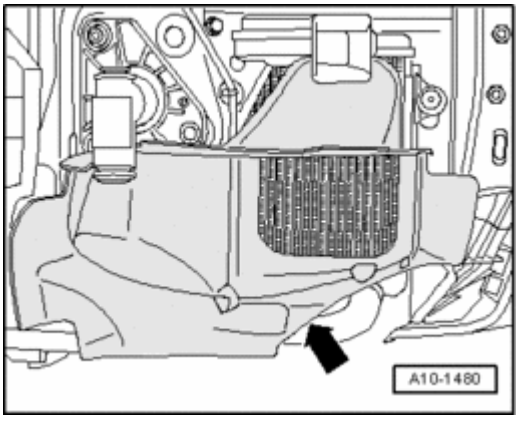

Fig. 107: Removing Left Air Guide In Front Of Auxiliary Cooler
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove left air duct - **arrow** - in front of auxiliary radiator.

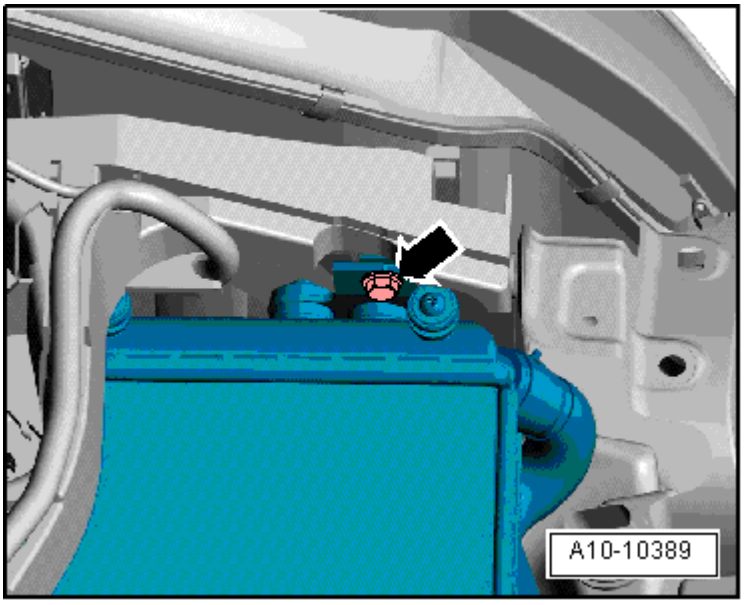

Fig. 108: Removing Bolt On Auxiliary Cooler Upper Bracket, At Left Of Lock Carrier
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **arrow** - at upper left auxiliary radiator bracket at lock carrier.
- Place workshop crane drip tray VAS 6208 or VAG 1306 under engine.

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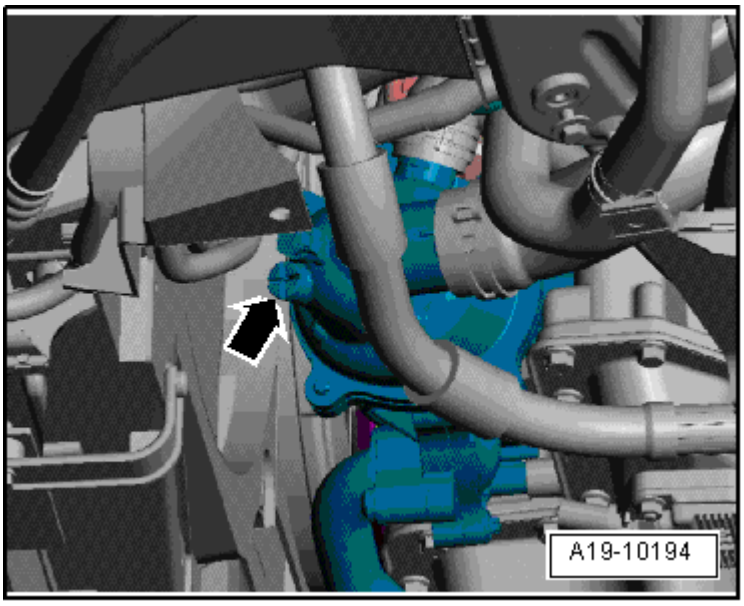

Fig. 109: Removing Drain Plug On Coolant Thermostat Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove drain plug - **arrow** - at coolant regulator housing and drain coolant at engine.

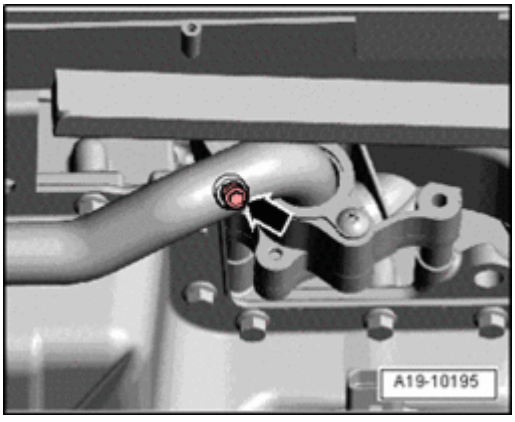

Fig. 110: Removing Drain Plug On Front Coolant Pipe
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Also remove drain plug - **arrow** - at front coolant pipe and drain remaining coolant.

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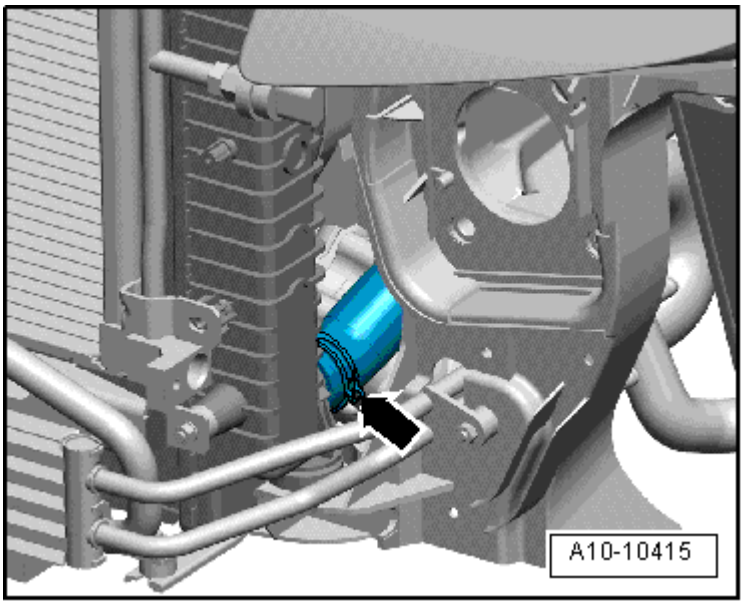

Fig. 111: Removing Coolant Hose Downward From Cooler
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen hose clamp - **arrow** - and remove lower coolant hose from radiator.
- Place oil extractor VAG 1782 under engine.

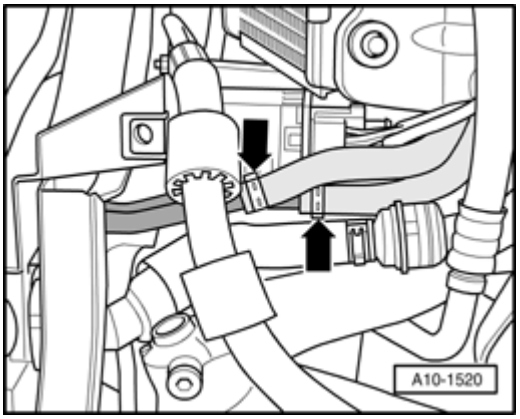

Fig. 112: Disconnecting Hydraulic Lines To Cooling Coil At Left Rear Of Bumper
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect hydraulic lines to rear left radiator coil on lock carrier - **arrows** -.

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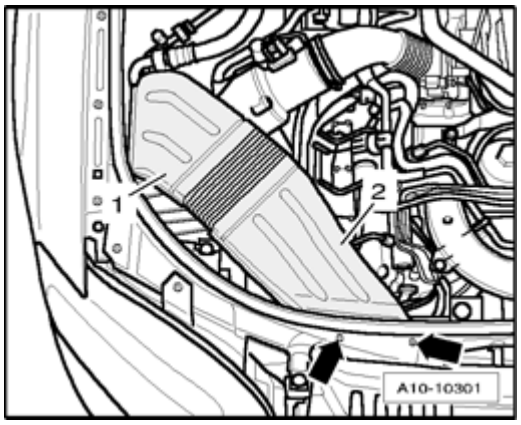

Fig. 113: Identifying Bolts & Air Duct
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **arrows** -.
- Remove air duct - **1** - and - **2** -.

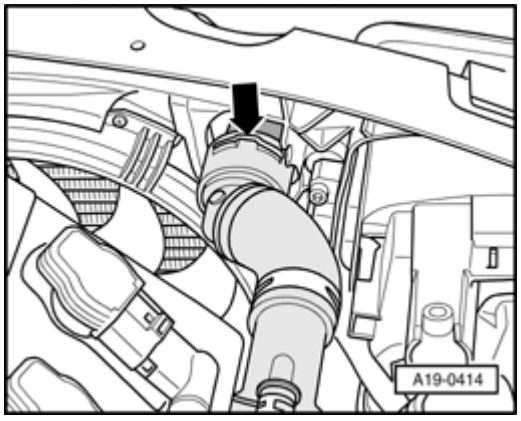

Fig. 114: Disconnecting Top Coolant Hose From Radiator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Detach upper coolant hose - **arrow** - from radiator.

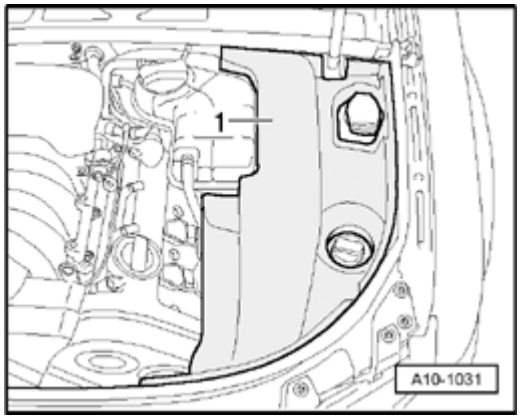

Fig. 115: Removing Cover In Engine Compartment (Left Side)

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover - **1** - at left of engine compartment.

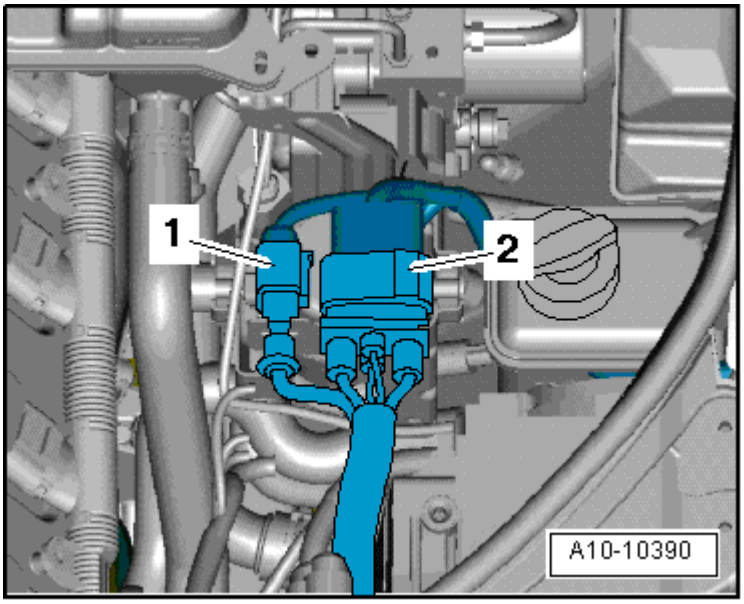

Fig. 116: Removing Electrical Harness Connectors From Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove electrical connections - **1** - and - **2** - from retainer and disconnect.
- Set aside harness toward lock carrier.

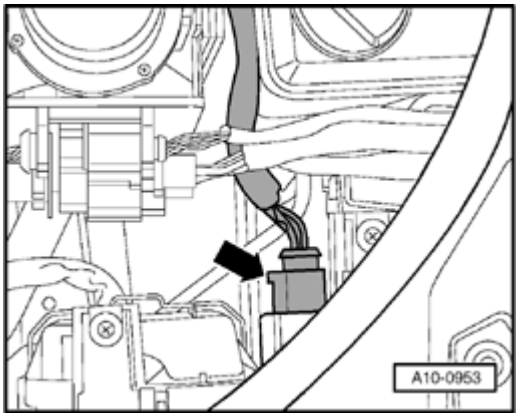

Fig. 117: Disconnecting Electrical Harness Connector For Headlights At Both Sides Of Vehicle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connections for left and right headlamps - **arrow** -.

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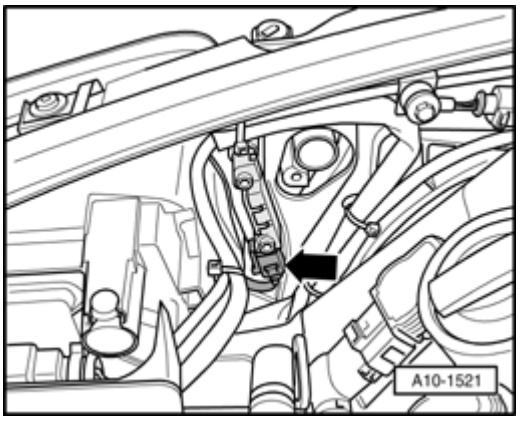

Fig. 118: Disconnecting Electrical Harness Connector For Left/Right Airbag Sensors On Lock Carrier
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connections for left and right airbag sensors - **arrow** - at lock carrier.
- Set aside harness toward lock carrier.
- Remove hood cable at lock carrier --> **55 HOOD, LIDS** .

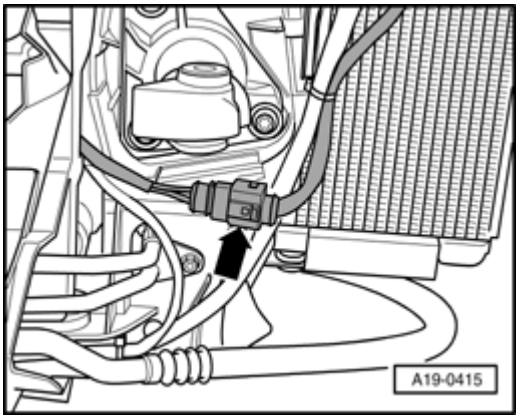

Fig. 119: Disconnecting Electrical Harness Connector For Right Fan
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection for right radiator fan - **arrow** -.

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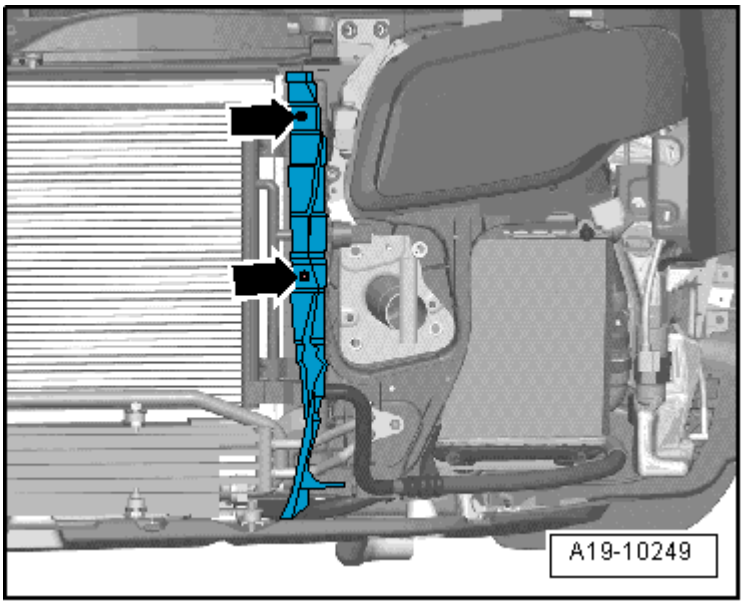

Fig. 120: Removing Bolts On Left/Right Air Guides At Cooler
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **arrows** - at left and right air ducts on radiator.

CAUTION:

- **In order not to damage the condensor and refrigerant lines/hoses, ensure refrigerant lines are not excessively bent or tensioned in the following procedures.**
- **Do not open refrigerant circuit!**

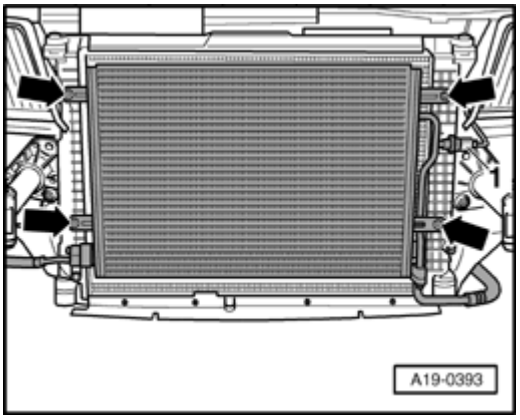

Fig. 121: Disconnecting Electrical Harness Connector At High Pressure Sensor G65
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection - **1** - for High Pressure Sensor G65.
- Remove screws - **arrows** -.
- Remove condenser and swing downward with refrigerant lines connected.

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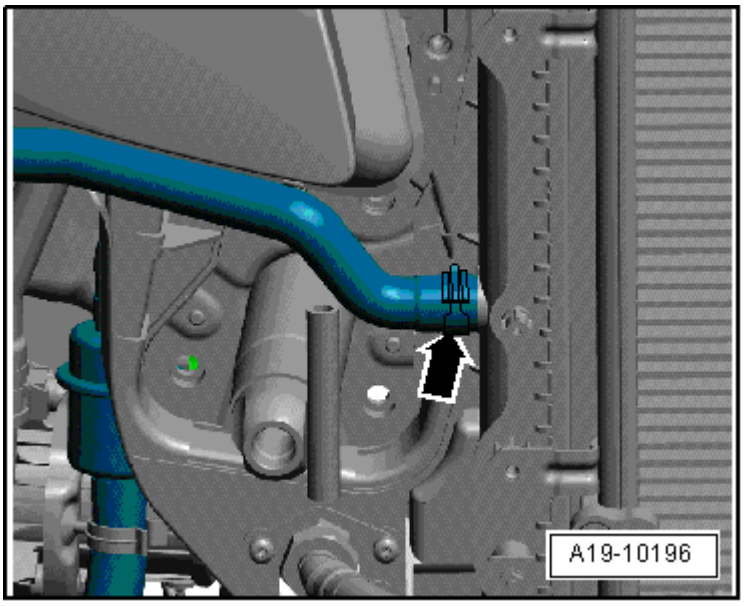

Fig. 122: Removing Right Coolant Hose
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right coolant hose - **arrow** - at radiator.

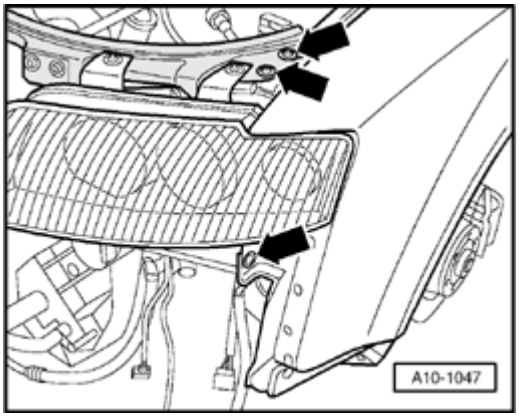

Fig. 123: Removing Bolts At Left/Right Side Of Bumper
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **arrows** - at left and right lock carriers.
- Remove engine compartment seat at lock carrier and fender edges.

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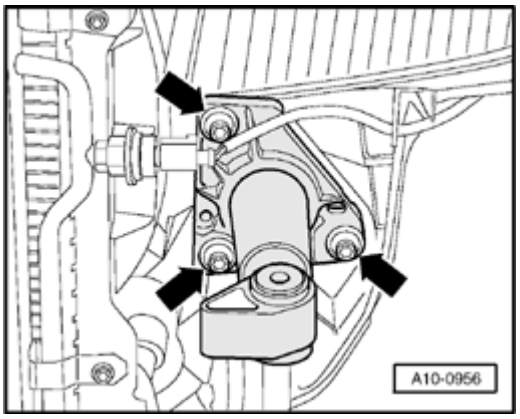

Fig. 124: Removing Bolts At Impact Absorbers At Left/Right
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws on left and right shock absorbers - **arrows** -.

NOTE:

- **Use an assistant to remove lock carrier in the following step.**
- **Remove lock carrier and tilt aside (secure against falling).**

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

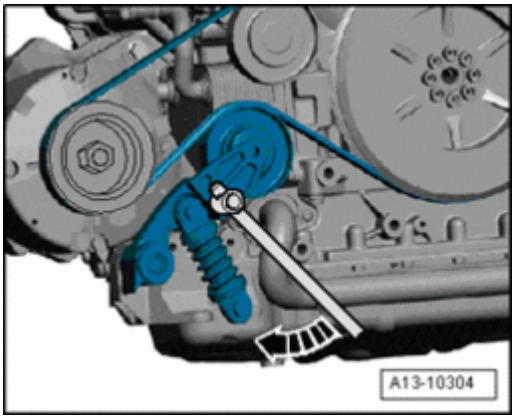

Fig. 125: Releasing Ribbed Belt Tension
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Relieve ribbed belt tension by pivoting tensioner in direction of - **arrow** -.

NOTE:

- **Ensure lever axle is long enough so that it can be completely inserted in tensioner.**
- **Remove ribbed belt from generator pulley.**
- **Release tensioner.**

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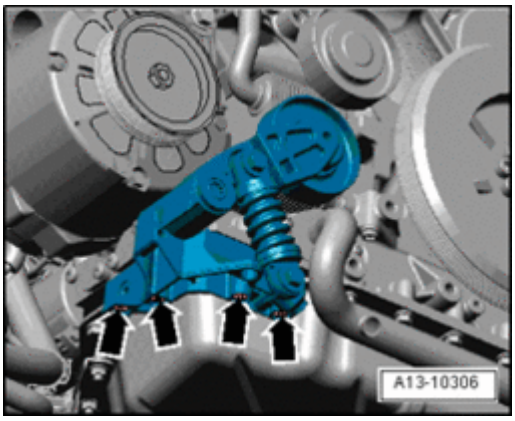

Fig. 126: Removing Bolts & Ribbed Belt Tensioner At Upper Part Of Oil Pan
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** -.
- Remove tensioner - **1** - at upper part of oil pan.

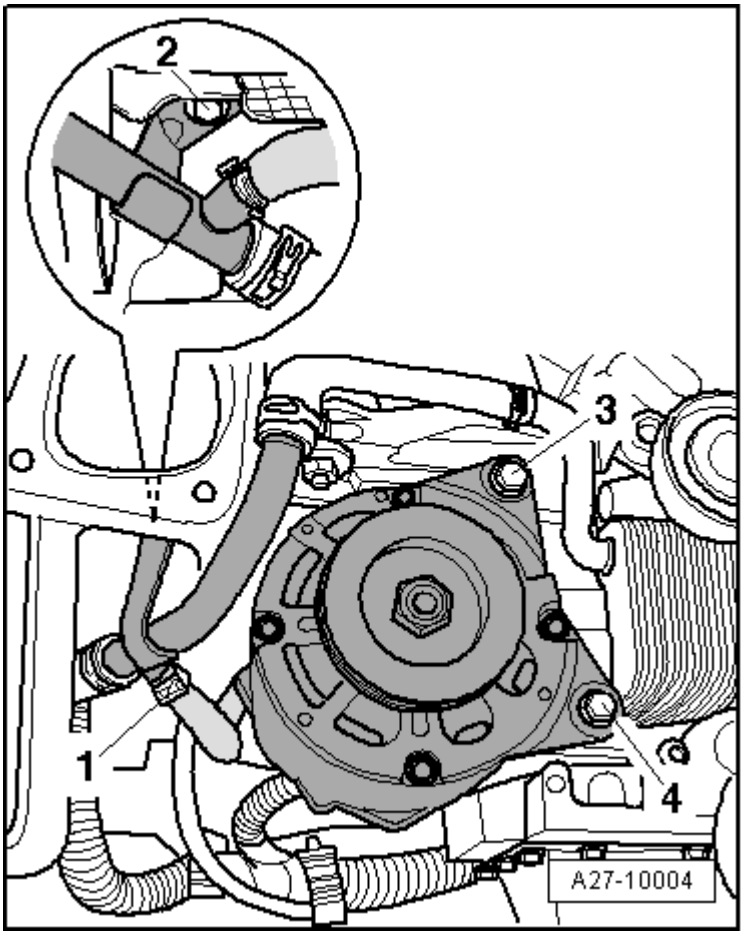

Fig. 127: Removing Bolts And Coolant Hose From Coolant Pipe Bracket And Generator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove bolt - **2** - on coolant pipe bracket.
- Loosen hose clamp and remove coolant hose - **1** - to generator.
- Remove bolts - **3** - and - **4** -.
- Remove generator from bracket and pull forward.

NOTE:

- **If generator is difficult to remove from mounting, reinstall mounting bolts loosely and carefully strike bolt heads with hammer in order to loosen mounting threaded bushings.**

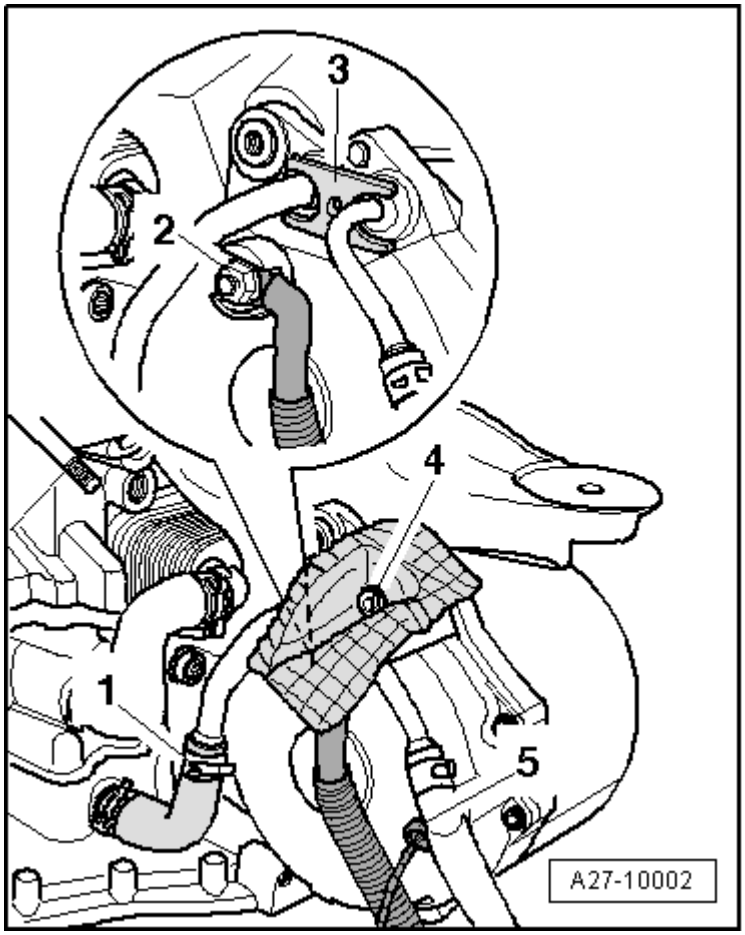

Fig. 128: Identifying Coolant Hose, Electrical Connector, Bolt & Heat Shield
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove coolant hose - **1** - from generator.
- Disconnect electrical connection - **5** -.
- Remove screw - **4** - and remove heat shield.

CAUTION: Ensure coolant pipes do not slip out, otherwise O-rings on removed coolant pipes must be replaced. Re-tighten bracket - 3 - after removing

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heat shield if necessary.

- Remove nut - **2** - and terminal 30 (B+) eyelet from generator.
- Remove generator.

Installing

Install in reverse order of removal, noting the following:

CAUTION:

- **Before installing the ribbed belt, ensure that all subassemblies (generator, a/c compressor etc.) are securely mounted and turn freely.**
- **When installing belt, ensure correct seating in the belt pulleys!**
- **Reinstall all hose clamps, harness retainers and replace all removed cable ties as originally installed in production.**

- To aid in installation, drive generator mounting bushings back into mounting flanges approx. 4mm.

CAUTION: Tight generator mounting bushings must be made to move freely in order to ensure sufficient clamping force at the specified bolt torque.

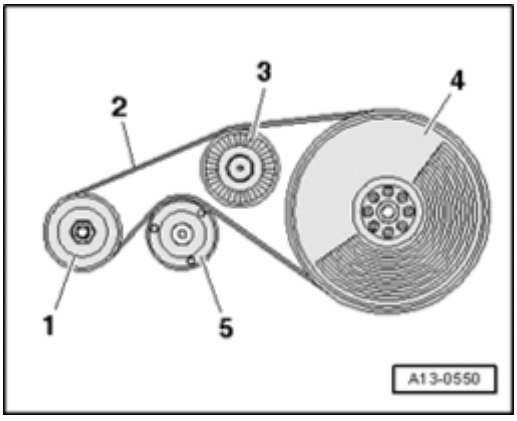

Fig. 129: Placing Ribbed Belt Over Belt Pulley In Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Note running direction of ribbed belt as previously marked and route as illustrated.

1. Generator
2. Ribbed belt
3. Idler pulley
4. Vibration damper
5. Tensioning roller

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- Install lock carrier with attachments --> **50 BODY, FRONT** .
- Install front bumper cover --> **63 BUMPER** Front bumper cover, removing and installing.
- Before starting engine for first time, fill hydraulic oil in power steering reservoir.

CAUTION: Power steering pump must NOT be allowed to run dry. Damage will result.

- Fill engine oil and check oil level.
- Top up coolant --> 4.2 Liter V8 5V Engine Mechanical, Engine Code(s): BNS -
  - **19 - ENGINE - COOLING SYSTEM** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **19 - ENGINE - COOLING SYSTEM** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **19 ENGINE - COOLING SYSTEM** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **19 - ENGINE - COOLING SYSTEM** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE (S): BKH
  - **19 - ENGINE - COOLING SYSTEM** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **19 - ENGINE - COOLING SYSTEM** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

  .
- Reconnect battery. Required steps **Connecting**
- Start engine and check belt routing.
- Check and adjust headlamps --> **00 - TECHNICAL DATA** .

Tightening Torques (4.2L - RS4)

Tightening Torques

Component - fastener	Nm
Coolant pipe bracket to generator - bolt	9
Terminal 30/B+ to generator - nut	16
Generator to engine - bolts	22
Tensioner to upper part of oil pan - bolts	9

STARTER

Starter - 1.8L 4-cylinder Turbo engine, removing and installing

Special tools, testers and auxiliary items required

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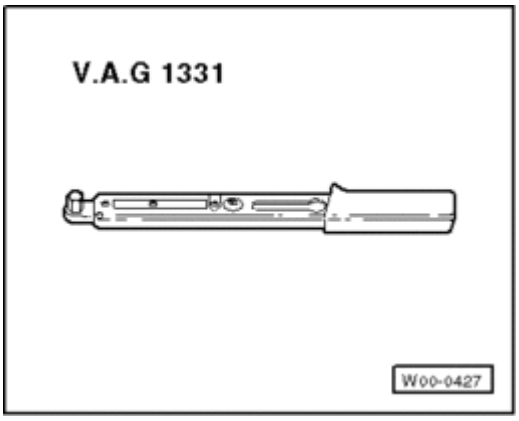

Fig. 130: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

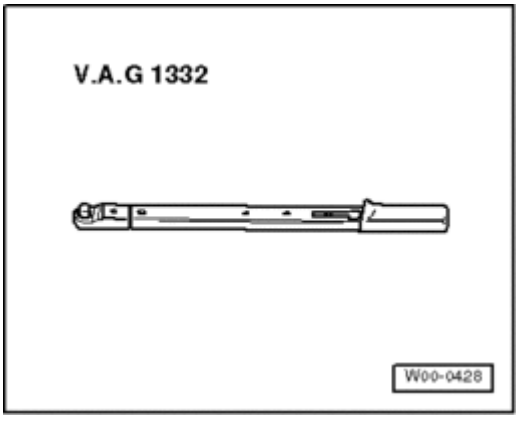

Fig. 131: Identifying Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or 40 - 200 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.
- Lift vehicle.

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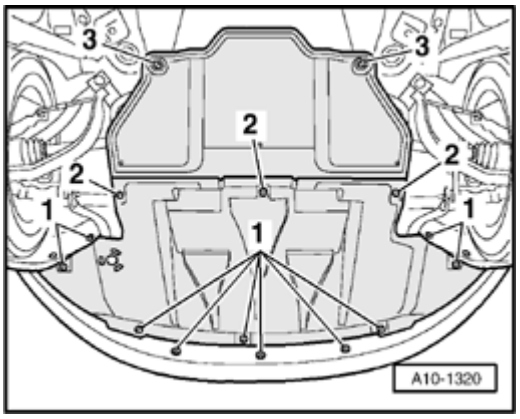

Fig. 132: Identifying Quick-Release Fasteners And Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners - **1** - and - **2** - and remove front noise insulation.

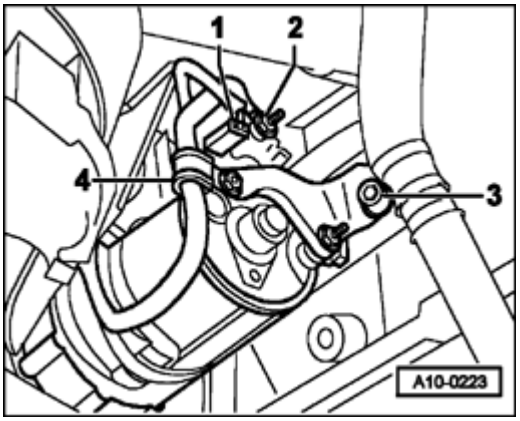

Fig. 133: Identifying Line, Connector Terminal, Clamp, And Insulator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut at starter solenoid terminal B+ - **2** - and remove connector eyelet from terminal.
- Disconnect electrical connection for terminal 50 - **1** -.
- Remove insulator from positive connection on starter where applicable.
- Remove harness clamp - **4** -.

- Remove bolt - **3** - from engine block to starter bracket, and remove bracket.

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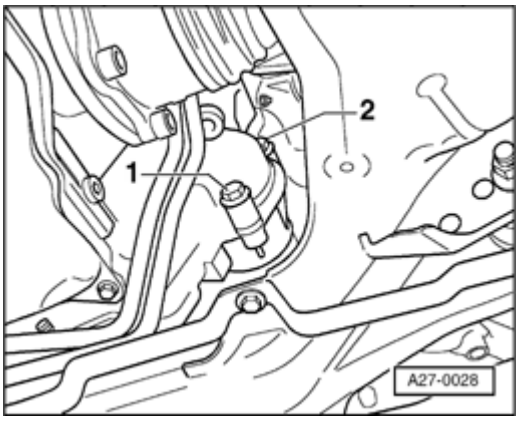

Fig. 134: Identifying Bolts And Starter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **1** - and - **2** -.
- Remove starter from below.

Installing

Install in reverse order of removal, noting the following:

- Reconnect battery. Required steps **Reconnecting**.

Tightening torques

Component - fastener		Nm
	M10	45
Starter to transmission bracket - bolt	M12	65
Terminal B+ to starter - nut		16

Starter - 2.0L 4-cyl Turbo FSI engine, removing and installing

Special tools, testers and auxiliary items required

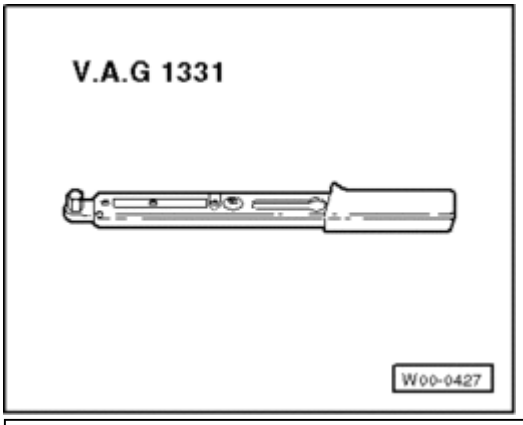

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Fig. 135: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

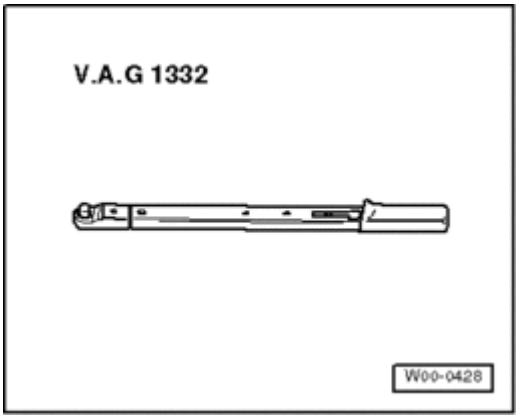

Fig. 136: Identifying Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or 40 - 200 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.
- Lift vehicle.

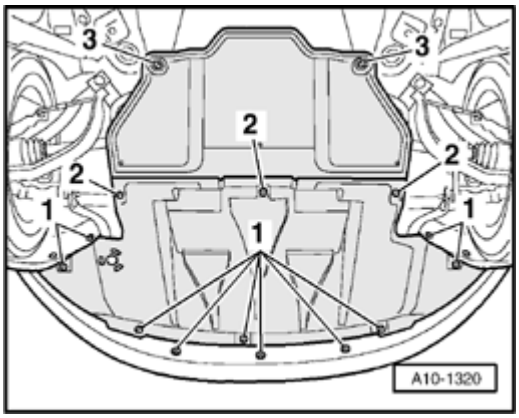

Fig. 137: Identifying Quick-Release Fasteners And Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners - **1** - and - **2** - and remove front noise insulation.

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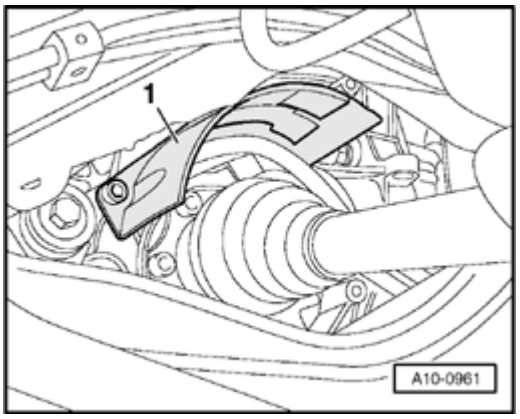

Fig. 138: Removing Left/Right Heat Shields For Drive Axles
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield - **1** - for right drive shaft.

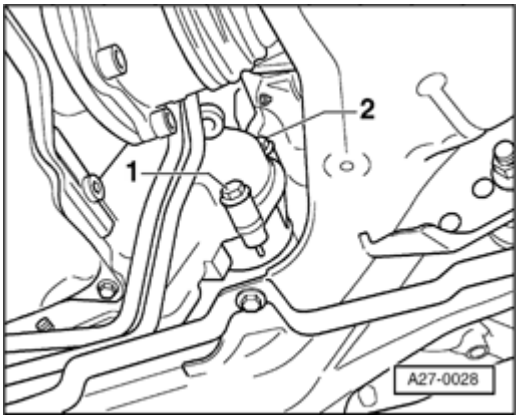

Fig. 139: Identifying Bolts And Starter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **1** - and - **2** -.

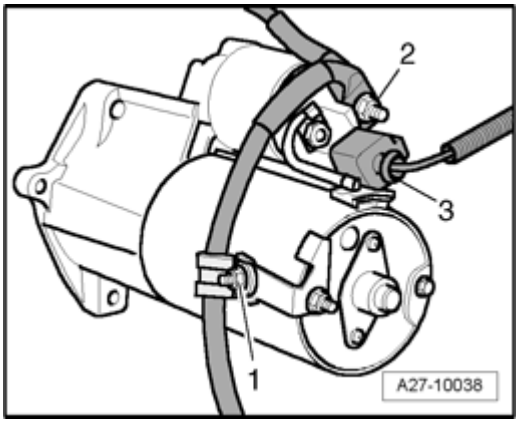

Fig. 140: Identifying Starter, Electrical Connector & Nuts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove starter and swing aside.
- Disconnect electrical connection for terminal 50 - **3** -.
- Remove nut - **1** - for harness clamp.
- Remove nut at starter solenoid terminal B+ - **2** - and remove connector eyelet from terminal.
- Remove starter.

Installing

Install in reverse order of removal, noting the following:

- Reconnect battery. Required steps **Reconnecting**.

Tightening torques

Component - fastener	Nm
Starter to transmission - bolt	65
Terminal B+ to starter - nut	16

Starter - 3.0L 6-cylinder engine, removing and installing

Special tools, testers and auxiliary items required

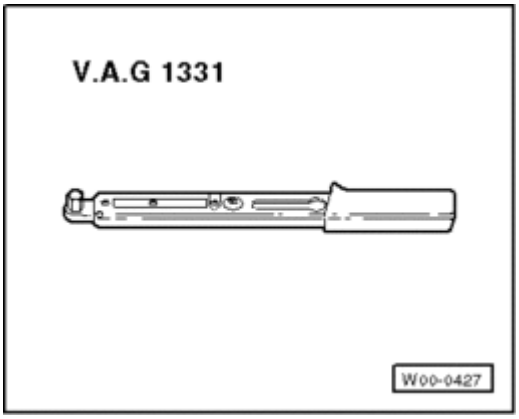

Fig. 141: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

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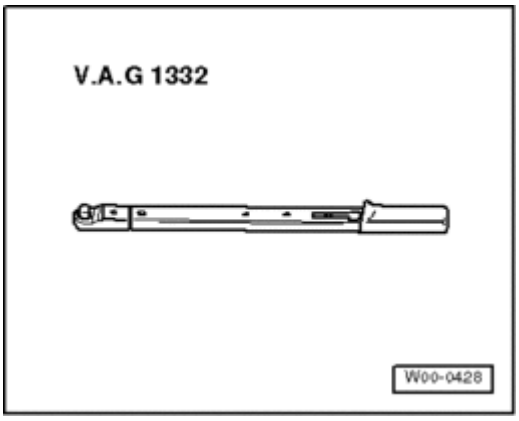

Fig. 142: Identifying Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or 40 - 200 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.
- Lift vehicle.
- Remove right front wheel.
- Remove generator --> **Generator (GEN) - 3.0L 6-cylinder engine, removing and installing**.

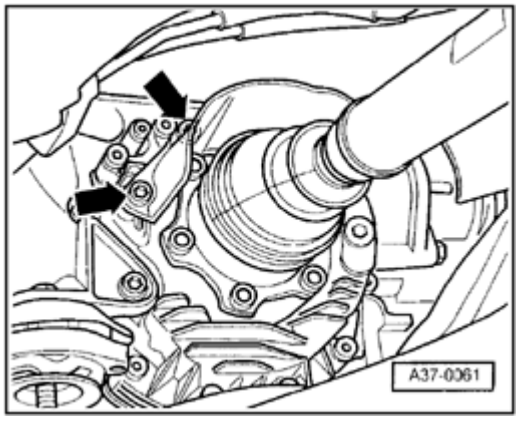

Fig. 143: Identifying Heat Shield For Right Drive Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for right drive shaft - **arrows** -.

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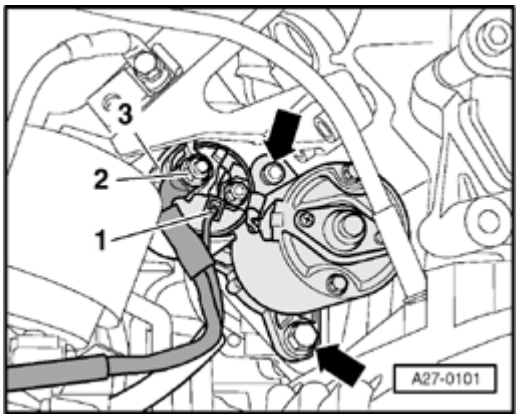

Fig. 144: Identifying Cable For Terminals, Heat Shield From Solenoid Switch, And Starter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut at starter solenoid terminal B+ - **2** - and remove connector eyelet from terminal.
- Disconnect electrical connection for terminal 50 - **1** -.
- Remove solenoid heat shield - **3** -.
- Remove bolts - **arrows** - and remove starter.

Installing

Install in reverse order of removal, noting the following:

- Install generator **Installing**
- Reconnect battery. Required steps **Reconnecting**.

Tightening torques

Component - fastener	Nm
Starter to engine - bolt	45
Terminal B+ to starter - nut	16
Drive shaft heat shield to transmission - bolt	23

Starter - 3.2L 6-cylinder FSI engine, removing and installing

Special tools, testers and auxiliary items required

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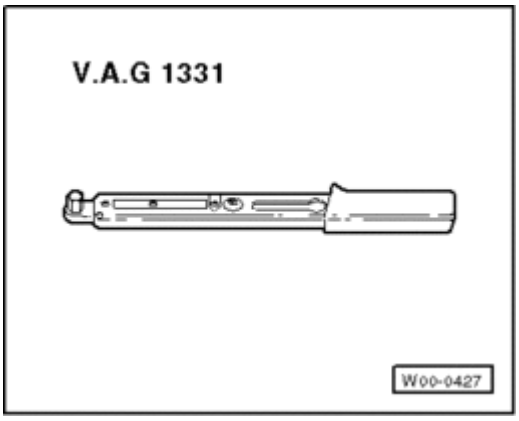

Fig. 145: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

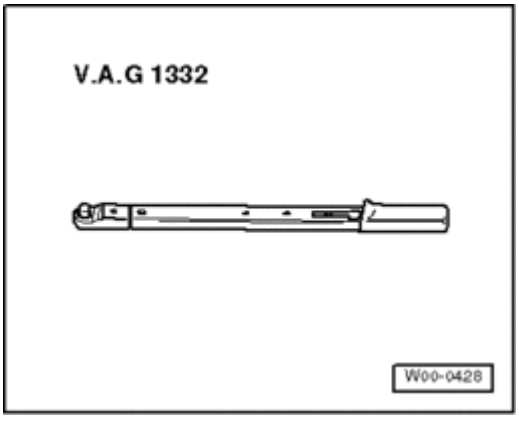

Fig. 146: Identifying Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or 40 - 200 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.
- Lift vehicle.
- Remove right front wheel.

NOTE:

- **Secure brake disc with a wheel bolt.**

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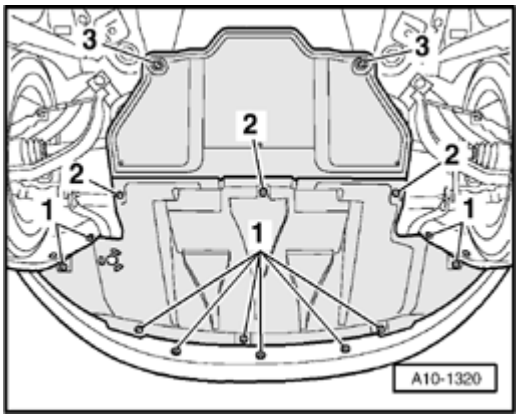

Fig. 147: Identifying Quick-Release Fasteners And Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners - **1 3** - and remove front and rear noise insulation.

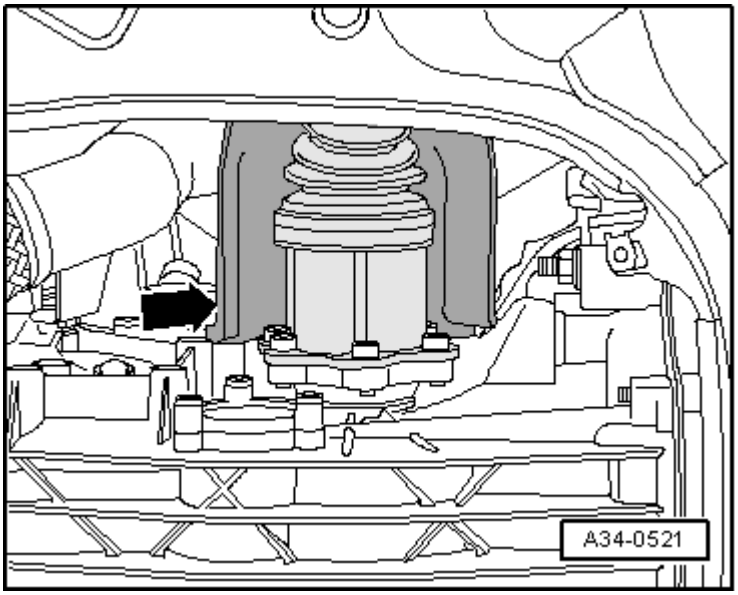

Fig. 148: Drive Axle Heat Shield
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right drive shaft heat shield - **arrow** -.

Vehicles with automatic transmission

- Remove right drive axle from transmission axle flange.

Continued for all:

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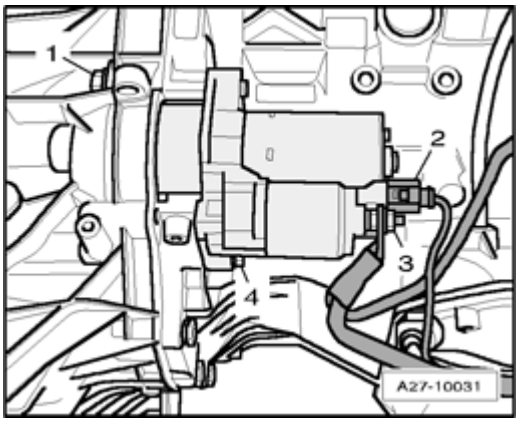

Fig. 149: Identifying Bolts, Starter Solenoid Terminal, And Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut at starter solenoid terminal B+ - **2** - and connection for terminal 50 - **3** -.
- Remove bolts - **1** - and - **4** -.

Vehicles with automatic transmission

- Remove starter towards rear of wheel housing.

Vehicles with standard transmission

- Remove starter from between transmission and subframe.

NOTE:

- **For clarity, subframe shown removed in illustrations.**

Installing

Install in reverse order of removal, noting the following:

- Reinstall right drive axle from transmission axle flange. Refer to appropriate automatic transmission repair information, RG 40.
- Reconnect battery. Required steps **Reconnecting**.

Tightening torques

Component - fastener	Nm
Stater to transmission - bolt	65
Terminal B+ to starter - nut	16
Drive shaft heat shield to transmission - bolt	23

Starter - 4.2L 8-cylinder engine (Audi S4), removing and installing

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Special tools, testers and auxiliary items required

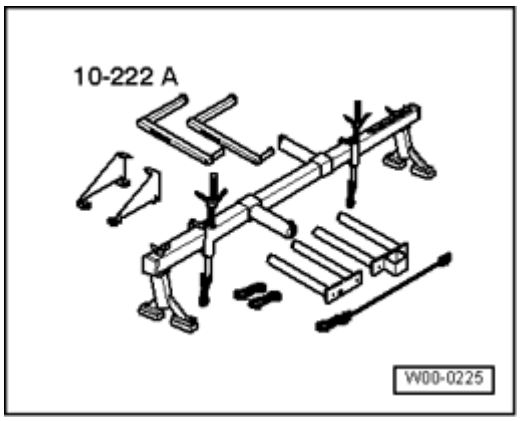

Fig. 150: Identifying 10-222A Engine Support Bridge With 10-222A/8 Bracket For Engine
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine support bridge 10-222 A

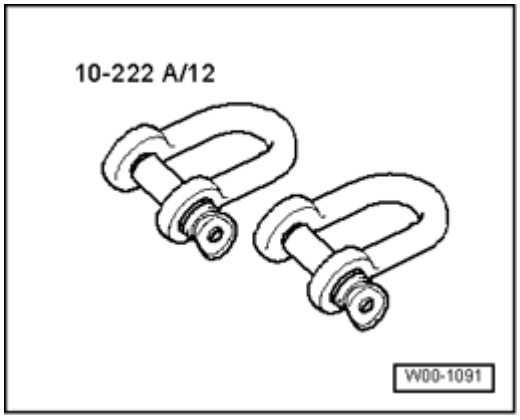

Fig. 151: Identifying Special Tools - Shackle 10 - 222 A/12
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Shackle (set) 10-222 A/12

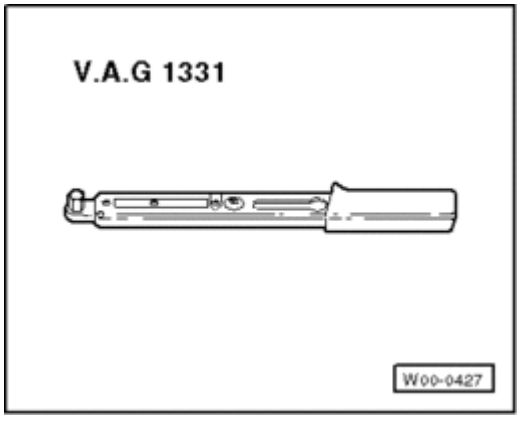

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Fig. 152: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

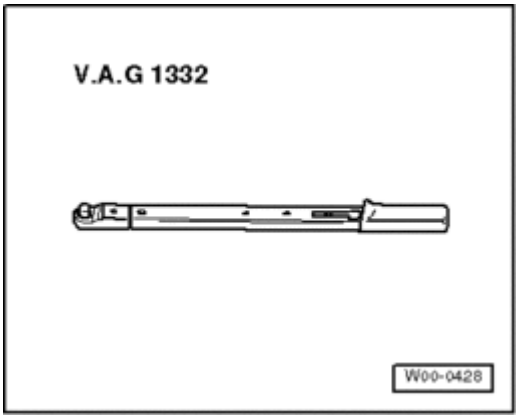

Fig. 153: Identifying Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or 40 - 200 Nm equivalent)

Removing

- Disconnect battery --> **Battery in engine compartment, disconnecting and reconnecting**.

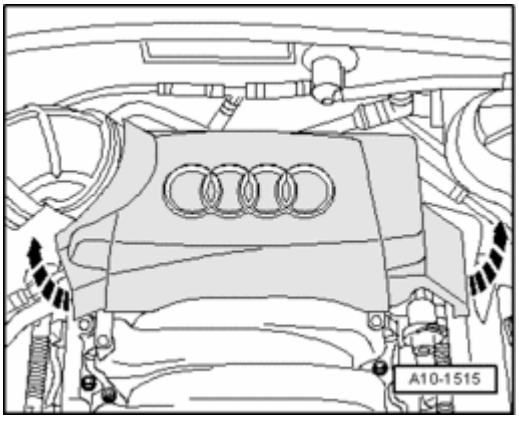

Fig. 154: Removing/Installing Rear Engine Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip engine cover - **arrows** -.

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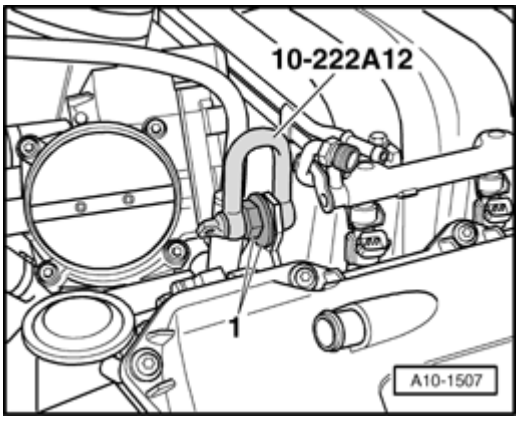

Fig. 155: Securing Shackle 10-222 A/12 To Right Rear Engine Lifting Eyelet
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach shackle 10-222 A/12 to right rear lifting fixture on engine.

NOTE:

- **Disregard - 1 -.**

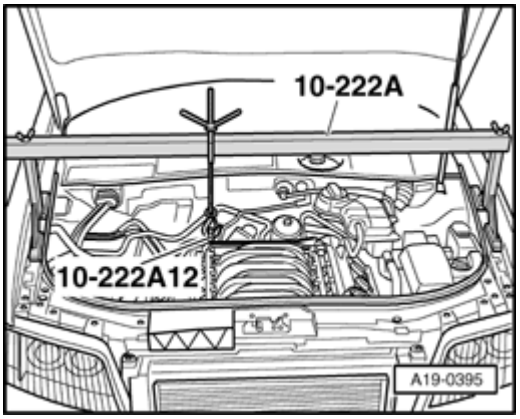

Fig. 156: Engaging Shackle 10-222 A/12 On Spindle Of Engine Support Bridge 10-222 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Assemble support bracket 10-222 A and place across fenders as illustrated.
- Attach shackle to lifting spindle.
- Turn lifting spindle to apply slight lifting tension to engine.
- Lift vehicle.

- Remove right front wheel.

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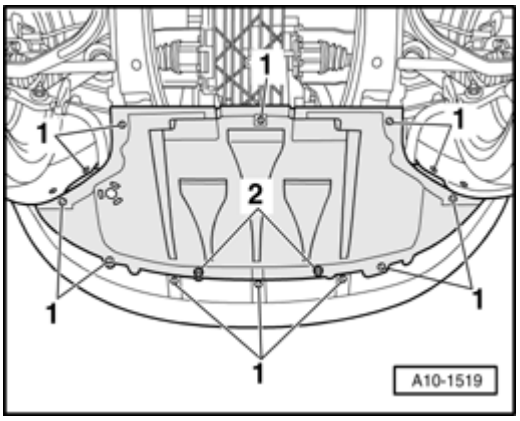

Fig. 157: Removing Quick-Release Fasteners, Screws And Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners - **1** - , remove bolts - **2** - and remove noise insulation.

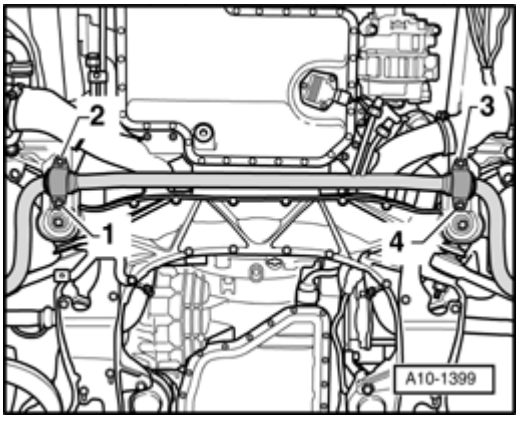

Fig. 158: Removing Nuts For Left/Right Stabilizer Mounts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove anti-roll bar bracket nuts - **1... 4** -.

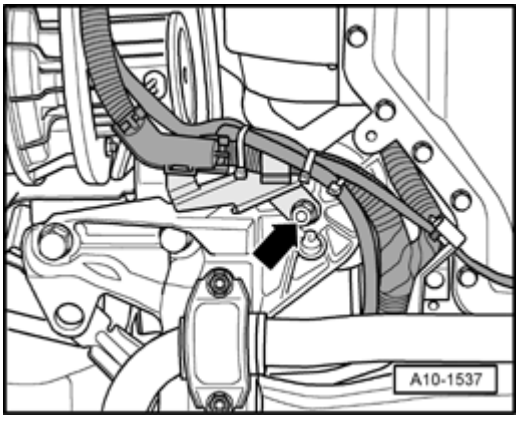

Fig. 159: Removing Wiring Harness Bracket At Right Engine Mount Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove nut - **arrow** - and remove harness retainer from mounting.

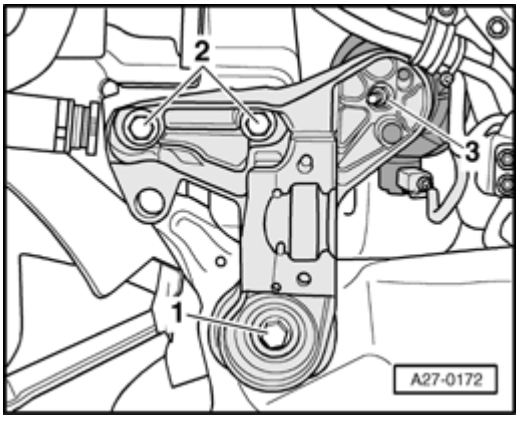

Fig. 160: Identifying Nuts, Bolts, And Right Side Engine Mount Carrier
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut - **3** -.
- Remove bolts - **1** - and - **2** - and remove right side engine mount carrier.

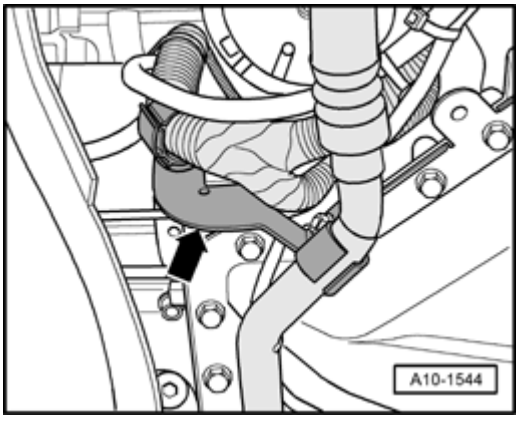

Fig. 161: Removing Refrigerant Line On Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right refrigerant line mounting - **arrow** -.

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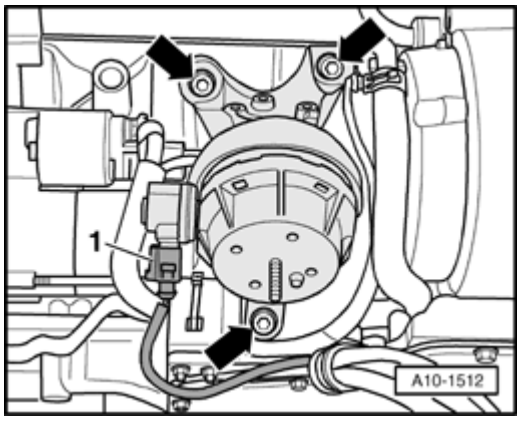

Fig. 162: Disconnecting Electrical Harness Connector At Right Engine Mount
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection - **1** -.
- Remove bolts - **arrows** -.
- Remove right engine mount with bracket.

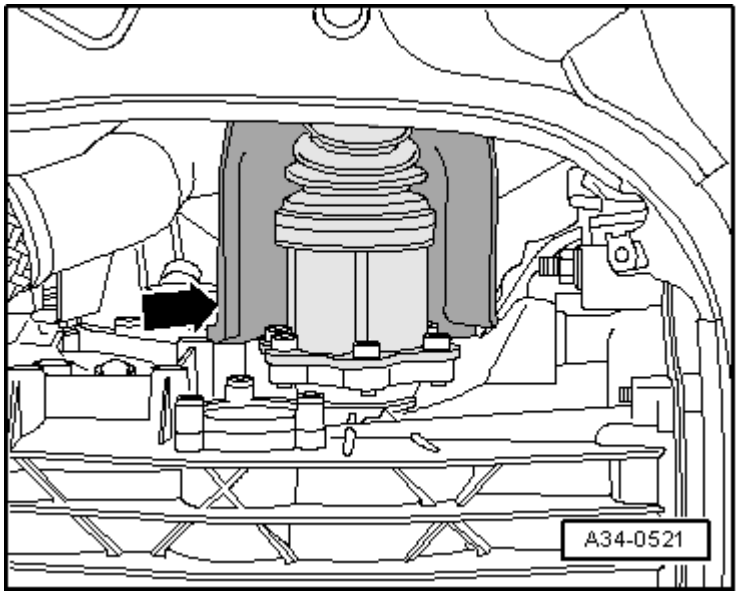

Fig. 163: Drive Axle Heat Shield
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Vehicles with manual transmission:

- Remove right drive shaft heat shield - **arrow** -.

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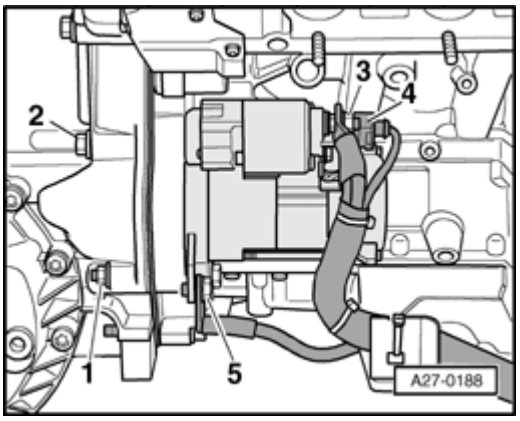

Fig. 164: Identifying Ground (GND) Wire, Wires, Nuts, Bolts & Starter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove ground cable - **5** -.
- Remove nut at starter solenoid terminal B+ - **3** - and connection for terminal 50 - **4** -.
- Remove nut - **1** - and bolt - **2** -.
- Remove starter.

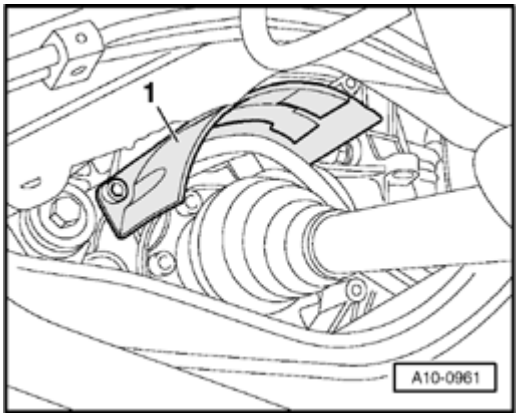

Fig. 165: Removing Left/Right Heat Shields For Drive Axles
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Vehicles with automatic transmission:

- Remove heat shield - **1** - for drive shaft (right-side).

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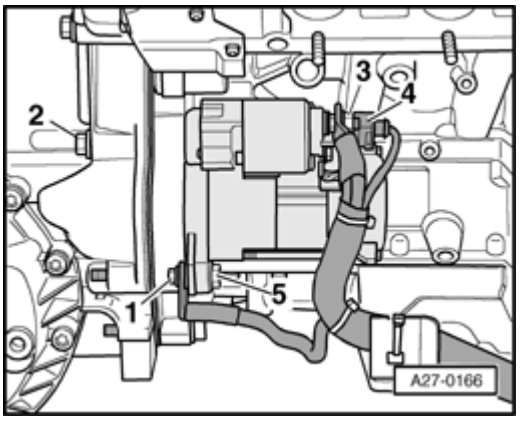

Fig. 166: Identifying Ground (GND) Wire, Starter Electrical Wires, Bolts & Starter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove earth cable - **1** -.
- Remove nut at starter solenoid terminal B+ - **3** - and connection for terminal 50 - **4** -.
- Remove bolts - **2** - and - **5** -.
- Remove starter.

Installing

Install in reverse order of removal, noting the following:

- Install engine mounting and tighten subframe --> **40 - FRONT SUSPENSION** .
- Install anti-roll bar --> **40 - FRONT SUSPENSION** .
- Reconnect battery. Required steps **Reconnecting**.

Tightening torques

Component - fastener	Nm
Starter to transmission - bolt	65
Terminal B+ to starter - nut	16
Ground cable to starter - bolt	22
Engine support to cylinder block - bolt	42 1)
Drive shaft heat shield to transmission - bolt	23

- 1) Insert with locking compound; locking compound.

Starter - 4.2L 8-cylinder FSI engine (Audi RS4), removing and installing

Special tools, testers and auxiliary items required

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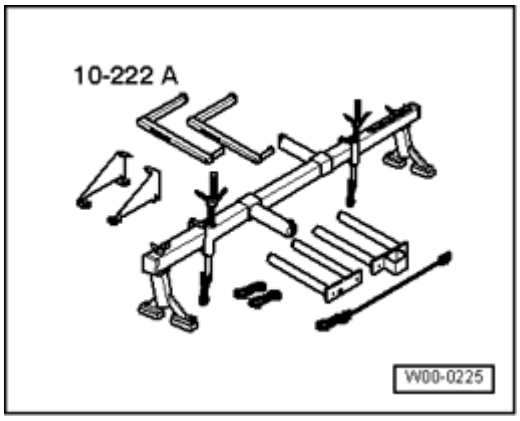

Fig. 167: Identifying 10-222A Engine Support Bridge With 10-222A/8 Bracket For Engine
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine Support Bridge 10-222A

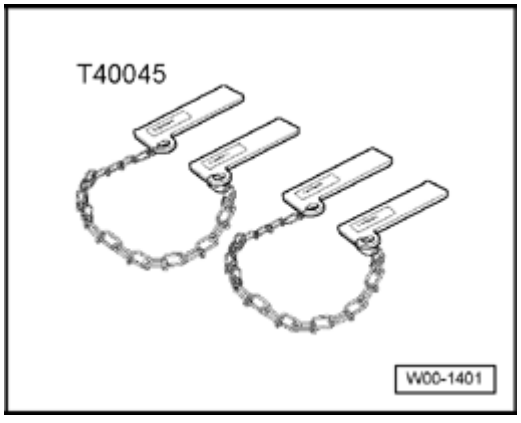

Fig. 168: Insert Pad For Front Fender T40045
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert Pad For Front Fender T40045

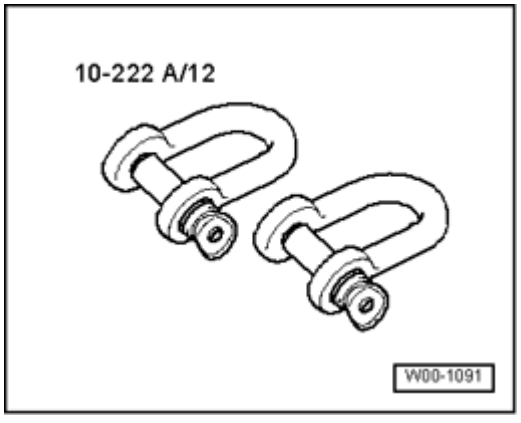

Fig. 169: Identifying Special Tools - Shackle 10 - 222 A/12
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Shackle (set) 10-222 A/12

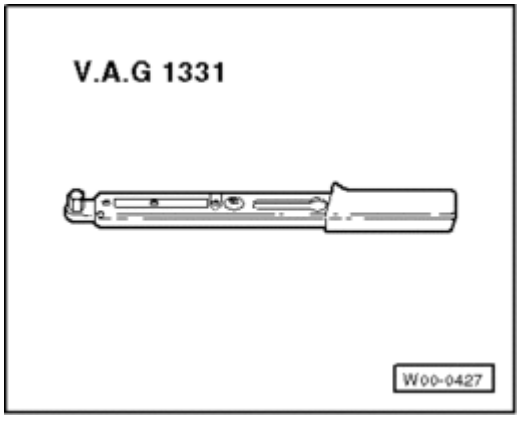

Fig. 170: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or 5 - 50 Nm equivalent)

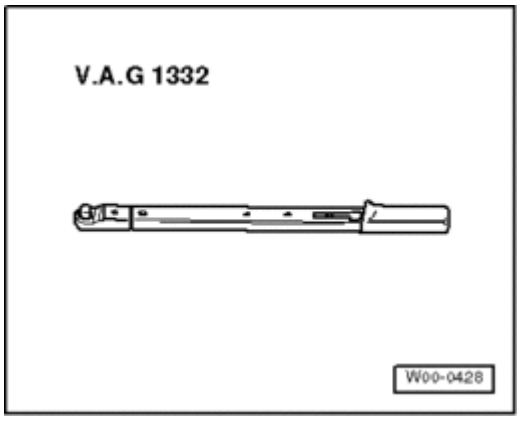

Fig. 171: Identifying Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or 40 - 200 Nm equivalent)

Removing

NOTE:

- **When installing, reinstall all cable ties that were loosened or cut during removal in the same locations.**
- **Disconnect battery --> Battery in luggage compartment, disconnecting and connecting.**

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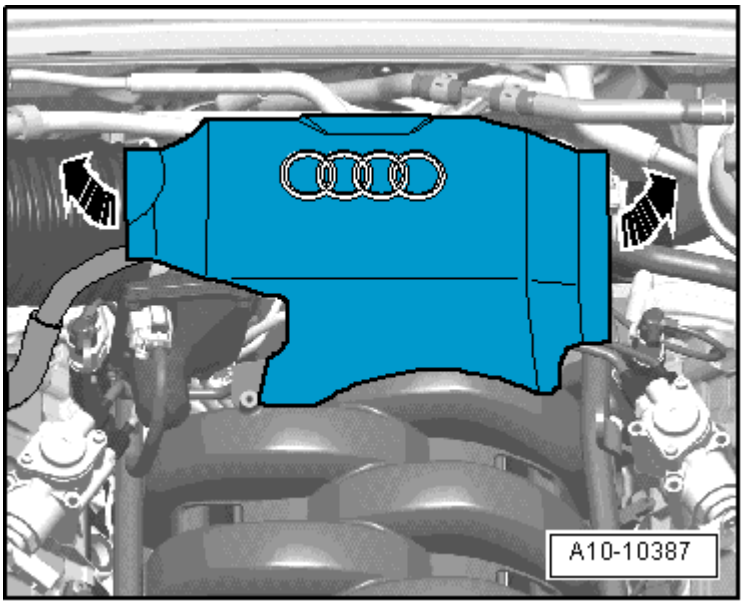

Fig. 172: Pulling Rear Engine Cover Off
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rear engine cover by pulling up in direction of - **arrows** -.

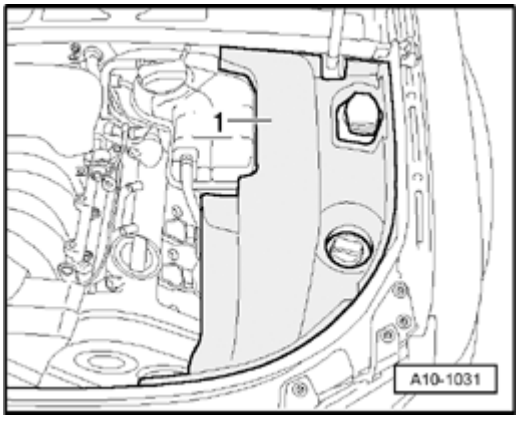

Fig. 173: Removing Cover In Engine Compartment (Left Side)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove left engine compartment cover - **1** -.

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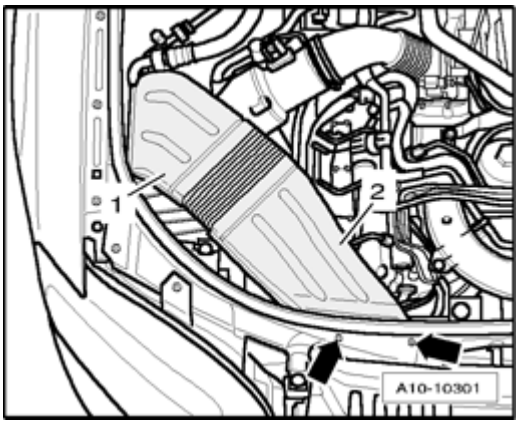

Fig. 174: Identifying Bolts & Air Duct
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **arrows** -.
- Remove air duct - **1** - and - **2** -.
- Remove engine compartment seal at lock carrier and fender edges.

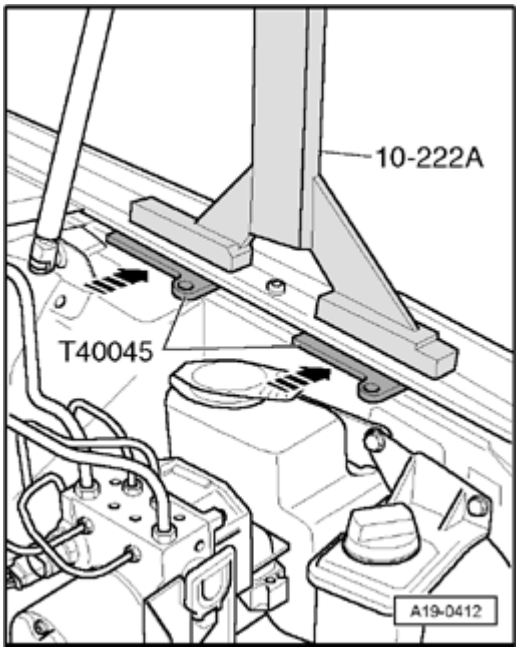

Fig. 175: Inserting Insert Pad For Front Fender T40045 On Both Sides Between Fender Mounting Flange And Body Panel Underneath
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- To avoid damaging bolted fender edges with Engine Support Bridge 10-222A , place Insert Pad For Front Fender T40045 - **arrows** - on both sides between bolted fender edges and panel underneath.

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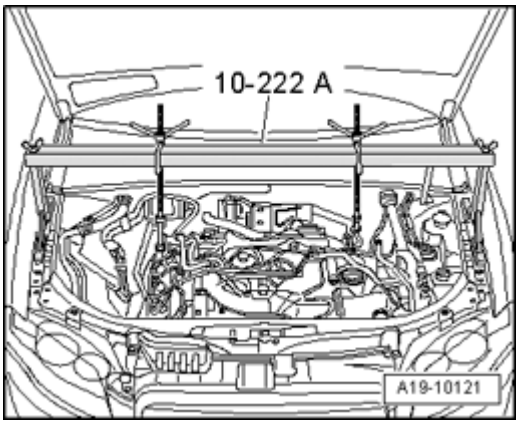

Fig. 176: Locating Engine Support Spindles At Rear Of Crossbar
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place Engine Support Bridge 10-222A on bolted fender edges. Locate engine support spindles at rear of crossbar as illustrated.
- Install Shackles 10-222A/12 at engine support bridge spindles.
- Pre-tension engine slightly with engine support bridge spindles.
- Lift vehicle.

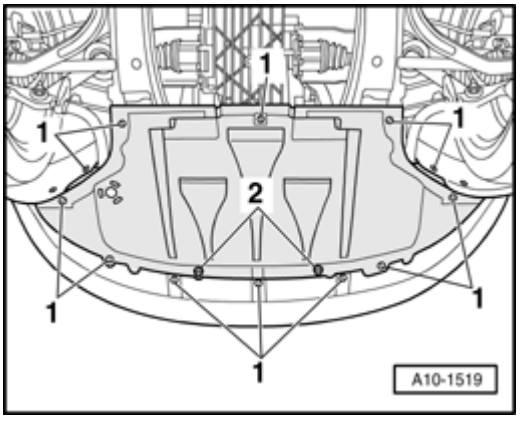

Fig. 177: Removing Quick-Release Fasteners, Screws And Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right front wheel.
- Release fasteners - **1** - , remove screws - **2** - and remove front noise insulation.

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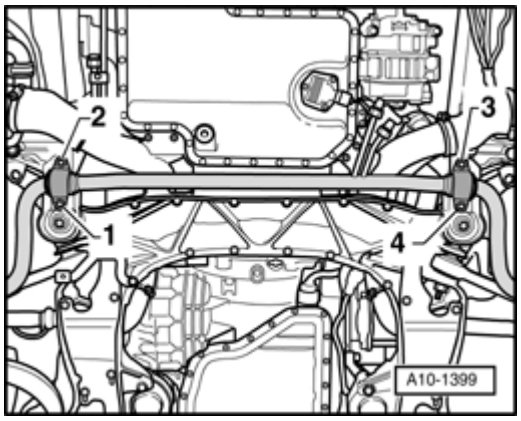

Fig. 178: Removing Nuts For Left/Right Stabilizer Mounts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove left and right stabilizer bar mount nuts - **1** - and - **2** -.
- Swing stabilizer bar down.

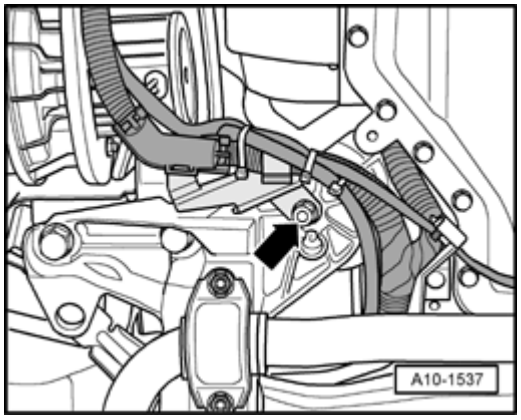

Fig. 179: Removing Wiring Harness Bracket At Right Engine Mount Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove wiring harness bracket at right engine console - **arrows** -.

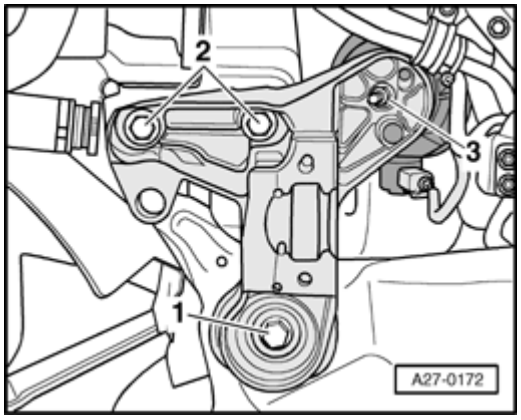

Fig. 180: Identifying Nuts, Bolts, And Right Side Engine Mount Carrier

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut - **3** -.
- Remove bolts - **1** - and - **2** - and remove right engine console.

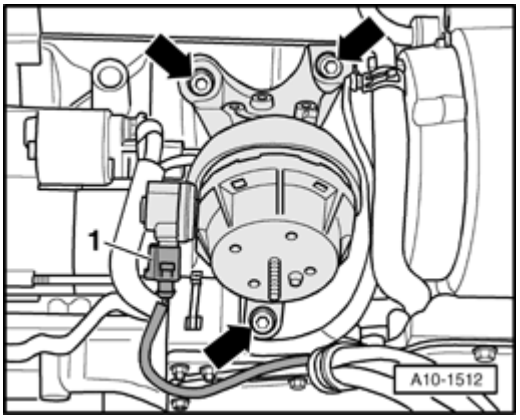

Fig. 181: Disconnecting Electrical Harness Connector At Right Engine Mount
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector at right engine mount - **1** -.
- Remove screws - **arrows** - using a hex socket head wrench with ball head.

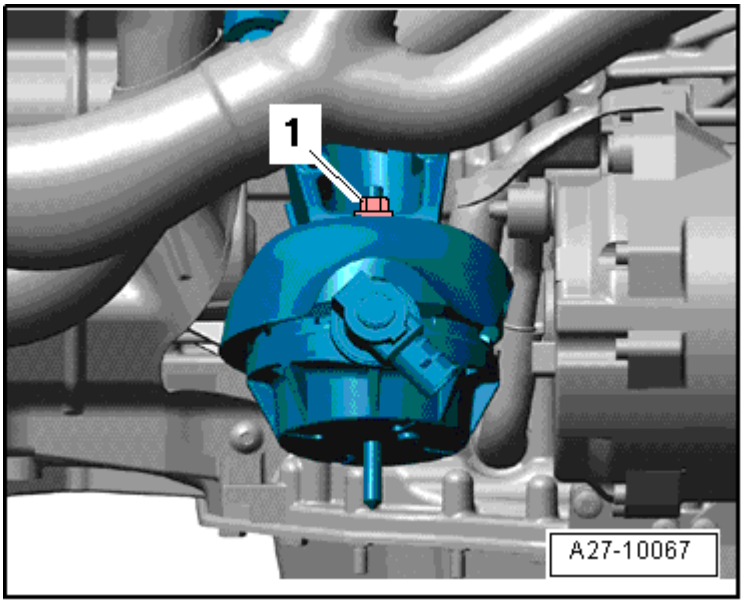

Fig. 182: Identifying Engine Mount Nut
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove engine mount nut - **1** - at right engine support.
- Remove engine mount and engine support.

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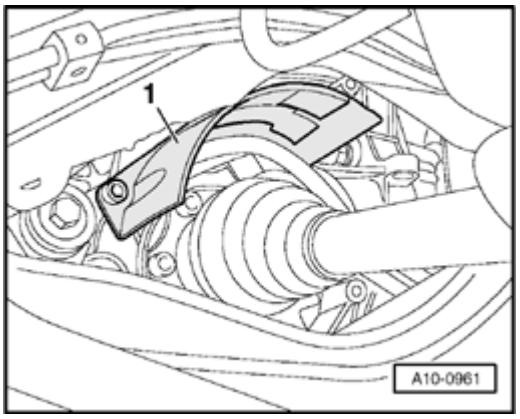

Fig. 183: Removing Left/Right Heat Shields For Drive Axles
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right driveshaft heat shield - **arrow** -.

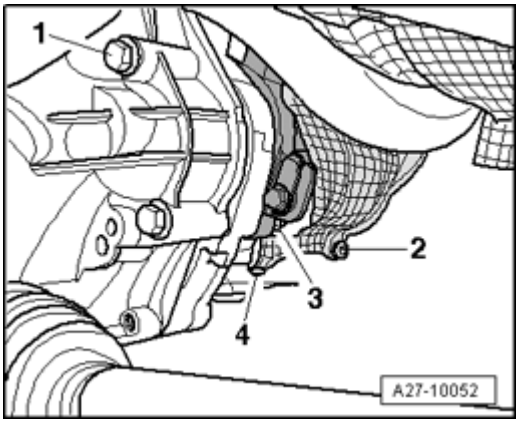

Fig. 184: Identifying Screws, Nuts, And Starter Heat Shield
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - **2** - and - **4** - at starter heat shield.
- Remove nut - **3** - and screw - **1** -.
- Remove starter forward.

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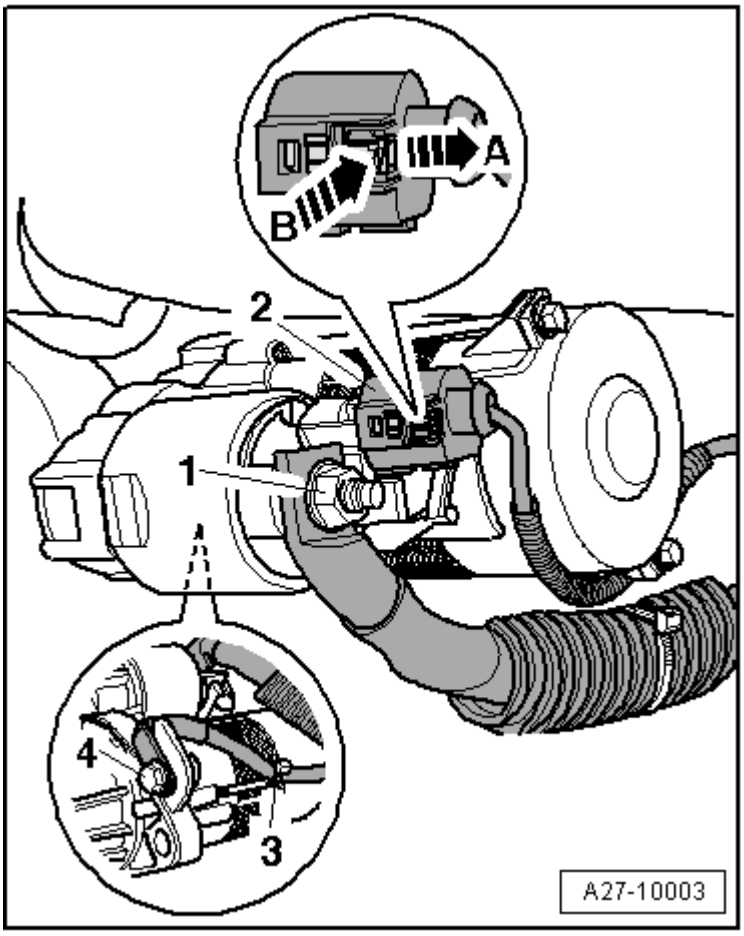

Fig. 185: Identifying Electrical Connection, Locking Mechanism, Nut, Ground Wire, And Cable Ties
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release electrical connection - **2** - by pushing locking mechanism - **arrow A** - and pressing catch down - **arrow B** -.
- Remove nut - **1** - and remove terminal 30 (B+) eyelet.
- Remove ground wire - **4** -.
- Cut through cable ties - **3** -.

- Remove starter.

Installing

Install in reverse order of removal, noting the following:

NOTE:

- **When installing, install cable ties at same location.**
- **Install engine console and tighten subframe --> 40 - FRONT SUSPENSION .**
- **Install stabilizer --> 40 - FRONT SUSPENSION .**
- **Connect battery. Required steps Connecting.**

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Tightening torques

Component - fastener	Nm
Starter to transmission - bolt	65
Terminal B+ to starter - nut	16
Ground cable to starter - bolt	22
Engine support to cylinder block - bolt	42 1)
Heat shield for half-shaft to transmission - bolt	23

- 1) Insert with locking compound; locking compound.

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