Repair Manual

Golf 2009 ➢

Electrical System E-Golf

Edition 10.2014

List of Workshop Manual Repair Groups

Repair Group

93 - Electric Drive

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

Contents

93 – Electric Drive

1 High Voltage System Safety Precautions

(Edition 10.2014)

Note

Check with the importer is there are any questions regarding the designations “high voltage technician”, “high voltage expert” or high voltage system.

Before beginning work on the high voltage system, a high voltage technician. Refer to ⇒ page 6 must disable the high voltage system. Refer to
⇒ “3 High Voltage System, De-Energizing”, page 8 .

For a list of work requiring the high voltage system to be disabled, refer to the list “Working on the High Voltage System”. Refer to
⇒ page 2 .

WARNING

Pay close attention to the following when working on the high voltage system, otherwise fatal injuries could occur:

- ***Only a qualified technician (or at least a high voltage technician) should disable the high voltage electrical system.***
- ***The high voltage technician makes sure the system is disabled and cannot turn on again.***
- ***The high voltage technician makes sure the system cannot turn on again by safekeeping the key and the high voltage system maintenance connector.***
- ***The high voltage technician puts a sign on the vehicle saying the voltage is disabled.***
- ***The minimum requirement for working on the E-Golf (for example, performing Maintenance work, changing a tire, checking the Convenience System) is that the technician be a high voltage technician.***
- ***Only a technicians specializing in electrical systems with additional training in working with high voltage may remove the high voltage battery.***
- ***The high voltage technician must disable the system before any work may be performed on the high voltage system.***
- ***Only a high voltage expert (HVE) may perform repairs to the vehicle if it is not possible to disable the high voltage electrical system.***
- ***Individuals with electrical medical equipment must not work on vehicles with a high voltage electrical system. Examples of electrical medical equipment include pain medication pumps, implanted heart defibrillators, pacemakers, insulin pumps and hearing aids.***

Follow all guidelines for clean working conditions when working on the high voltage system. Refer to

⇒ “2 Clean Working Conditions When Working on High Voltage System”, page 7 .

Follow all Safety Precautions when handling high voltage cables.
Refer to ⇒ “10.1 General Information”, page 37 .

Note

- *Check the contact surfaces on the potential equalization cables before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *Otherwise, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

Observe the following precautions when working on the high voltage system:

- Only the high voltage technician may disable the high voltage system using the specific procedures or methods.
- Only technicians, who have the minimum requirements as a high voltage technician, may work on the E-Golf.
- Always visually inspect the area around high voltage components when working on an electric vehicle.
- Do not excessively bend or flex high voltage cables.
- Always contact a high voltage technician if anything unusual occurs or if something is unclear.
- When working near high voltage components and high voltage cables, do not use tools that generate heat, that have sharp edges or that are used for cutting or shaping, such as welding, soldering, hot air or thermal adhesive equipment.

Working on the High Voltage System

When working on the following components:	Minimum qualifications. Refer to ⇒ page 6
Disabling the high voltage system	High voltage technician

When working on the following components:	The High Voltage System Must Be Disabled By A High Voltage Technician Prior To Beginning the Work?		Minimum qualification. Refer to ⇒ page 6 :
	Yes	No	
Electro-Drive Drive Motor - V141- including the transmission	X		High voltage technician
Electric Drive Power and Control Electronics - JX1-	X		High voltage technician
TW High Voltage System Maintenance Connector		X	High voltage technician
Electrical A/C Compressor High Voltage Cable - P3- (high voltage distributor/air conditioner compressor)	X		High voltage technician
Drive Motor High Voltage Cable 1 - P4-	X		High voltage technician
Drive Motor High Voltage Cable 2 - P5-	X		High voltage technician
Drive Motor High Voltage Cable 3 - P6-	X		High voltage technician
High Voltage Battery High Voltage Cable - P7-	X		High voltage technician

When working on the following components:	The High Voltage System Must Be Disabled By A High Voltage Technician Prior To Beginning the Work?		Minimum qualification. Refer to ⇒ page 6 :
	Yes	No	
Wire Junction/High Voltage Battery Cable - P8-	X		High voltage technician
High Voltage Cable for the Power and Control Electronics, Positive - P9-	X		High voltage technician
High Voltage Cable for the Power and Control Electronics, Negative - P10-	X		High voltage technician
High Voltage Heating High Voltage Cable (PTC) - P11-	X		High voltage technician
Charger 1/Wire Junction High Voltage Cable - P12-	X		High voltage technician
Charger 2/Wire Junction High Voltage Cable - P13-	X		High voltage technician
Charger 3/Wire Junction High Voltage Cable - P14-	X		High voltage technician
Charger 1/High Voltage Charge Network Distributor High Voltage Cable - P15-	X		High voltage technician
Charger 2/High Voltage Charge Network Distributor High Voltage Cable - P16-	X		High voltage technician
Charger 3/High Voltage Charge Network Distributor High Voltage Cable - P17-	X		High voltage technician
High Voltage Charge Network Distributor/ High Voltage Charging Socket High Voltage Cable 1 - P18-	X		High voltage technician
High Voltage Charge Network Distributor/ High Voltage Charging Socket High Voltage Cable 2 - P19-	X		High voltage technician
High Voltage Battery 1 - AX2- (luggage compartment)	X		Technicians specializing in electrical systems with high voltage
High Voltage Battery 2 - AX3- (floor panel battery)	X		Technicians specializing in electrical systems with high voltage
Charging the high voltage battery in the workshop		X	High voltage technician
Electrical A/C Compressor - V470-	X		High voltage technician
Potential equalization cables with connection to high voltage components		X	High voltage technician
Potential equalization cables with connection in high voltage components	X		High voltage technician
High voltage component cooling system		X	High voltage technician
Temperature Sensor in Front Of High Voltage Heater (PTC) - G785-		X	High voltage technician
Temperature Sensor after High Voltage Battery Heat Exchanger - G786-		X	High voltage technician
Temperature Sensor after Heat Exchanger - G787-		X	High voltage technician
Temperature Sensor after Electro-Drive Drive Motor - G788-		X	High voltage technician
Temperature Sensor after Electric Drive Power and Control Electronics - G789-		X	High voltage technician
Heater Coolant Shut-Off Valve - N279-		X	High voltage technician
High Voltage Battery Coolant Shut-Off Valve - N540-		X	High voltage technician

When working on the following components:	The High Voltage System Must Be Disabled By A High Voltage Technician Prior To Beginning the Work?		Minimum qualification. Refer to ⇒ page 6 :
	Yes	No	
Heater and A/C Unit Refrigerant Cut-Off Valve - N541-		X	High voltage technician
High Voltage Battery Heater Core Refrigerant Cut-Off Valve - N542-		X	High voltage technician
Coolant Pump in front of Electric Drive Power and Control Electronics - V508-		X	High voltage technician
Coolant Pump In Front Of High Voltage Heater (PTC) - V509-		X	High voltage technician
High Voltage Heater (PTC) - Z115-	X		High voltage technician
Measuring insulation resistance	X		High voltage technician
High Voltage Battery Charger 1 - AX4-	X		High voltage technician
High Voltage Battery Charger 2 - AX5-	X		High voltage technician
High Voltage Battery Charger 3 - AX6-	X		High voltage technician
High Voltage Battery Charge Connection 1 - U34-	X		High voltage technician
High Voltage Battery Charge Connection 2 - U35-	X		High voltage technician
Connection and Junction Box 1 - SX1-	X		High voltage technician
High Voltage Charge Network Distributor - SX4-	X		High voltage technician
Exterior Speaker - R68- (left)		X	High voltage technician
Exterior Speaker 2 - R69- (right)		X	High voltage technician
Structure Borne Sound Control Module - J869-		X	High voltage technician
High Voltage Battery Heat Exchanger - VX63-	X		High voltage technician
Immediate Upload Button - E766-		X	High voltage technician
Fuse in high voltage network distributor	X		High voltage technician
High Voltage Battery Fan - V510-		X	High voltage technician
High Voltage Charge Flap Lock 1 Adjuster - F496-		X	High voltage technician
High Voltage Charge Flap Lock 2 Adjuster - F497-		X	High voltage technician
High Voltage Connector Lock 1 Adjuster - F498-		X	High voltage technician
High Voltage Connector Lock 2 Adjuster - F499-		X	High voltage technician

Conventional work near high voltage components

When working on the following components:	The High Voltage System Must Be Disabled By A High Voltage Technician Prior To Beginning the Work?		Minimum qualification. Refer to ⇒ page 6 :
	Yes	No	
Reservoir		X	High voltage technician
Front subframe		X	High voltage technician
Front brakes		X	
Rear axle		X	High voltage technician
Underbody Panel		X	High voltage technician

When working on the following components:	The High Voltage System Must Be Disabled By A High Voltage Technician Prior To Beginning the Work?		Minimum qualification. Refer to ⇒ page 6 :
	Yes	No	
Welding (cover all high voltage components and check afterwards). Remove the batteries!	X		High voltage technician
Vehicle Body Work (Using an Alignment Bench)	X		High voltage technician
Vehicle body work (assembly and glass repair)		X	High voltage technician
Paint work. Refer to ⇒ Paint General Information; Rep. Gr. 00 ; Safety Precautions when Painting a Vehicle with Electric Drive .	X		High voltage technician
When working near high voltage components and high voltage cables, do not use tools that generate heat, that have sharp edges or that are used for cutting or shaping, such as welding, soldering, hot air or thermal adhesive equipment.	X		High voltage technician
Left and Right Headlamps, Removing and Installing		X	High voltage technician
Headlamp Bulbs, Removing and Installing		X	High voltage technician

General work

When working on the following components:	The High Voltage System Must Be Disabled Prior To Beginning the Work?		Minimum qualification. Refer to ⇒ page 6 :
	Yes	No	
12V Battery, Removing and Installing		X	High voltage technician
General Controls Modules and Electric Components, 12V, Removing and Installing		X	High voltage technician
Fluids, Coolant and Fluids, Draining and Filling		X	High voltage technician
Drain coolant/evacuate/fill	X		High voltage technician
Refrigerant pipes directly to the A/C compressor	X		High voltage technician
A/C electric drive power test (to check the refrigerant circuit pressure for A/C Service Station)		X	High voltage technician
Peripheral refrigerant line (work that does not involve the A/C compressor directly without opening the opening the refrigerant circuit, for example, loosening and tightening the refrigerant line)		X	High voltage technician
Do the work while the drive engine is lifted i.e. with an engine mount	X		High voltage technician
Power Steering Control Module - J500-		X	High voltage technician
Electric vacuum pump (12 V)		X	High voltage technician
Painting and drying through 55 °C (otherwise remove the battery)		X	High voltage technician

Qualification explanation

Qualification	Area of application
High voltage technician	The qualified high voltage technician has the following authorizations: 1. General Work and Maintenance 2. Disabling the system 3. Securing against switching on the system 4. Making sure the system is disabled (certified measurement) 5. Starting the vehicle again
HVE (high voltage expert)	A high voltage expert is actually a high voltage technician but with an extra qualification that allows them to disable the high voltage system in the case that a high voltage technician is not able to perform measurements with the standard tools and equipment. The high voltage expert must continue the work if the high voltage technician does not have the authority to work on the high voltage system. The high voltage expert is responsible exclusively to disable the high voltage system if it cannot be disabled by the high voltage technician using the usual means or methods.
Technicians specializing in electrical systems with high voltage	Electro specialists with additional training in working with voltage

2 Clean Working Conditions When Working on High Voltage System

Carefully follow the guidelines for clean working conditions when working on the high voltage system:

- Thoroughly clean the connection locations/maintenance openings and the area around them prior to loosening/opening.
- Place the removed parts on a clean surface and cover them. Use only lint-free cloths!
- Cover or seal any open components carefully if the repair is not going to be performed immediately.
- Install only clean components.
- Remove the replacement parts from their packaging just prior to installing them.
- Do not use any parts that have been removed from their packaging and left out (for example, in a tool boxes).
- Remove any transport or protective packaging and covers just before installing the component.
- When the system is open: do not use compressed air. Do not move the vehicle.

3 High Voltage System, De-Energizing

Special tools and workshop equipment required

- Vehicle Diagnostic Tester
- Hybrid Test Module - VAS6558-
- “Danger High Voltage” Sticker
- “Do Not Switch On High Voltage System” Sticker

WARNING

Individuals performing this task could receive an electrical shock.

An electrical shock can result in death.

Read and follow the High Voltage Electrical System General Warnings. Refer to ⇒ “1 High Voltage System Safety Precautions”, page 1 .

- *A high voltage technician must disable the system before any work can be performed on the high voltage electrical system or the vehicle body. To find out which procedures require this step, refer to the table “Procedures that require the high voltage system to be disabled:”. Refer to ⇒ page 2*
- *The minimum requirement for working on the E-Golf is that the technician be a high voltage technician.*

– De-energize the high voltage system using the Vehicle Diagnostic Tester .

4 High Voltage System, Turning Back On

Special tools and workshop equipment required

- Vehicle Diagnostic Tester

WARNING

Individuals performing this task could receive an electrical shock.

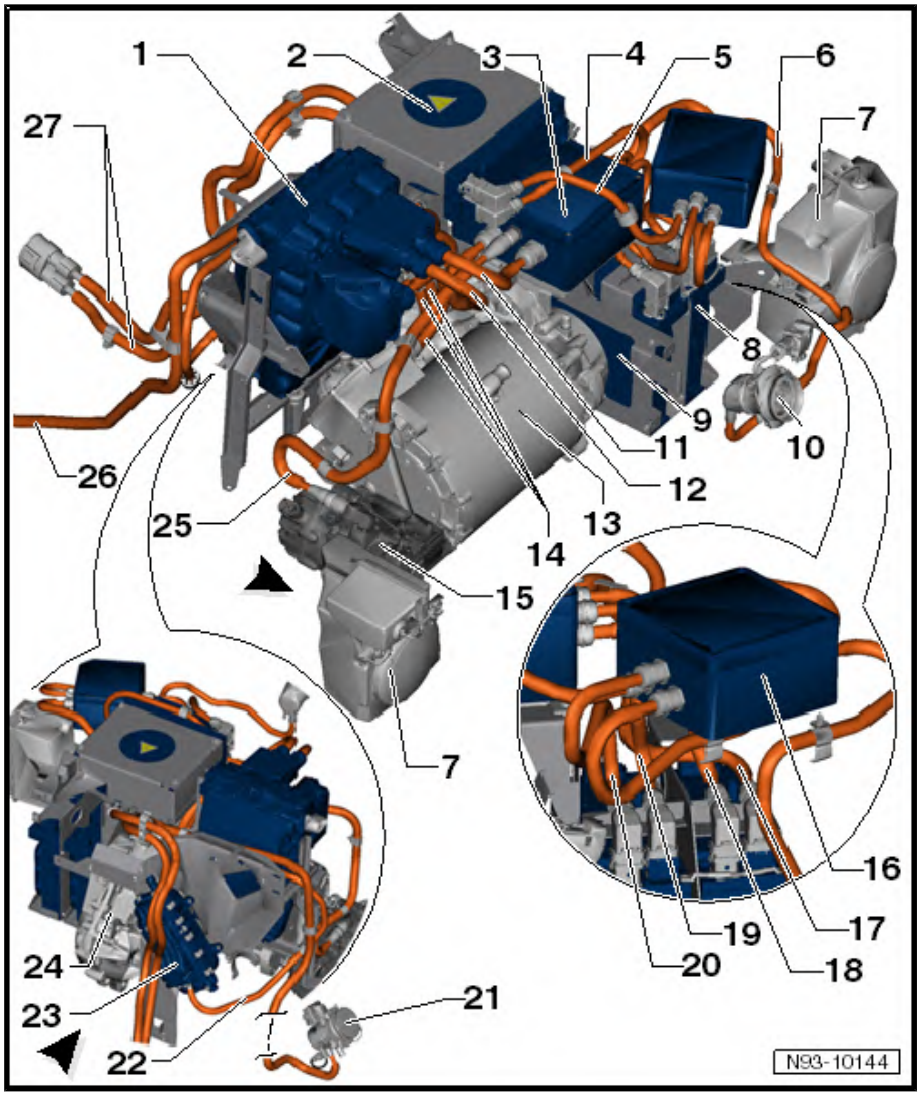
An electrical shock can result in death.

Read and follow the High Voltage Electrical System General Warnings. Refer to ⇒ "1 High Voltage System Safety Precautions", page 1 .

- *A high voltage technician must disable the system before any work can be performed on the high voltage electrical system or the vehicle body. To find out which procedures require this step, refer to the table "Procedures that require the high voltage system to be disabled:". Refer to ⇒ page 2*
- *Only technicians trained in electrical systems may work on vehicles with a high voltage electrical system. All work must be performed by a high voltage technician.*

– Turn back on the high voltage system using the Vehicle Diagnostic Tester .

5 Component Location Overview - High Voltage Components



1 - Electric Drive Power and Control Electronics - JX1-

- ❑ Electrical Drive Control Module - J841-
- ❑ Voltage Converter - A19-
- ❑ Drive Motor Inverter - A37-
- ❑ Intermediate Circuit Capacitor 1 - C25-
- ❑ Removing and installing. Refer to ⇒ “8 Electric Drive Power and Control Electronics”, page 23 .

2 - High Voltage Battery Charger 3 - AX6-

- ❑ Removing and installing. Refer to ⇒ “12.1 High Voltage Battery Charger 3, Removing and Installing”, page 42 .

3 - Connection and Junction Box 1 - SX1-

- ❑ Removing and installing.

4 - Charger 3/Wire Junction High Voltage Cable - P14-

5 - Charger 3/High Voltage Charge Network Distributor High Voltage Cable - P17-

6 - High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 1 - P20-

7 - Exterior Speaker - R68- Left and Exterior Speaker 2 - R69- Right

8 - High Voltage Battery Charger 1 - AX4-

9 - High Voltage Battery Charger 2 - AX5-

10 - Front High Voltage Battery Charge Connection 2 - U35-

11 - High Voltage Cable for the Power and Control Electronics, Positive - P9-

12 - High Voltage Cable for the Power and Control Electronics, Negative - P10-

13 - Electro-Drive Drive Motor - V141-

- ❑ Removing and installing. Refer to ⇒ “9.2 Electric Drive Motor, Removing and Installing”, page 28 .

14 - Drive Motor High Voltage Wiring Harness - PX2-

- ❑ Drive Motor High Voltage Cable 1 - P4-
- ❑ Drive Motor High Voltage Cable 2 - P5-
- ❑ Drive Motor High Voltage Cable 3 - P6-

15 - Electrical A/C Compressor - V470-

16 - High Voltage Charge Network Distributor - SX4-

17 - Charger 1/High Voltage Charge Network Distributor High Voltage Cable - P15-

18 - Charger 1/Wire Junction High Voltage Cable - P12-

19 - Charger 2/High Voltage Charge Network Distributor High Voltage Cable - P16-

20 - Charger 2/Wire Junction High Voltage Cable - P13-

21 - Rear High Voltage Battery Charge Connection 1 - U34-

22 - High Voltage Heating High Voltage Cable (PTC) - P11-

23 - High Voltage Heater (PTC) - Z115-

24 - Transmission

25 - Electric A/C Compressor High Voltage Cable - P3-

26 - High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 2 - P21-

27 - Floor Battery/High Voltage Network Wire Junction High Voltage Cable

6 High Voltage Technology Description

⇒ “6.1 High Voltage Vehicle Drives”, page 12

6.1 High Voltage Vehicle Drives

⇒ “6.1.1 General Information”, page 12

⇒ “6.1.2 Driving Modes”, page 12

⇒ “6.1.3 Regenerating”, page 12

6.1.1 General Information

The selector lever in the center console has the standard gears: reverse (R), forward (D) and neutral (N) There is also a B (braking) setting, in which the Golf uses the maximum amount of kinetic energy when decelerating and braking. This "recuperation" is similar to heavy engine braking. In D, the Golf likewise recuperates and then the shift paddles on the steering wheel dispense the intensity.

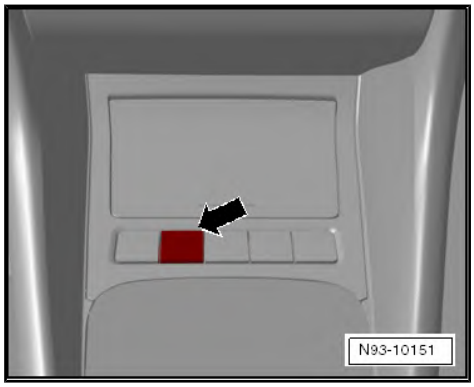
Note

Additional information:

Refer to the Owner's Manual.

6.1.2 Driving Modes

Use the “Range” button in the center console to select a driving mode:



Normal V_{max} = 135 km/h. Climatronic in normal mode. All the power of the electric drive is available.

Eco V_{max} = 120 km/h. The Climatronic is in optimal consumption Eco mode. The power of the electric drive is reduced when compared to the Normal driving mode. Energy consumption is reduced when compared to Normal drive mode.

Range V_{max} = 95 km/h. The Climatronic is off. The power of the electric drive is reduced once again when compared to the Eco driving mode. The energy consumption is reduced compared to Eco drive mode once again.

Note

- *The power of the electric drive is limited in the Range and Eco drive modes. This limiting effect can be temporarily cancelled out by heavy acceleration ("Kickdown").*
- *It is not possible to heat or cool the vehicle when the Climatronic is deactivated in the Range mode. The defroster however still works.*

Drive Mode Button, Removing and Installing. Refer to ⇒ Electrical Equipment; Rep. Gr. 96 ; Button in Center Console Storage Compartment, Removing and Installing .

6.1.3 Regenerating

Regenerating:

Regenerating means the energy from the moving wheels is recovered and regenerated into electrical energy. The recovered energy is used to brake the vehicle. Electric current is produced

by the Electro-Drive Drive Motor - V141- working as a generator and this electricity is stored in the high voltage battery or it is used to supply auxiliary components.

If the high voltage battery cannot store any more energy after a long recovery, then the vehicle cannot regenerate any more. It is possible again only when the battery is no longer fully charged.

7 High Volt Battery

7.1 General Information

WARNING

Only a technicians specializing in electrical systems with additional training in working with high voltage may remove the high voltage battery.

The high voltage batteries provide the Three-Phrase Current Drive - VX54- with the necessary high voltage in order to be able to drive the vehicle. It is composed of 2 units. One battery is inside the luggage compartment and the second one is under the vehicle. Both batteries should always be considered as a single unit.

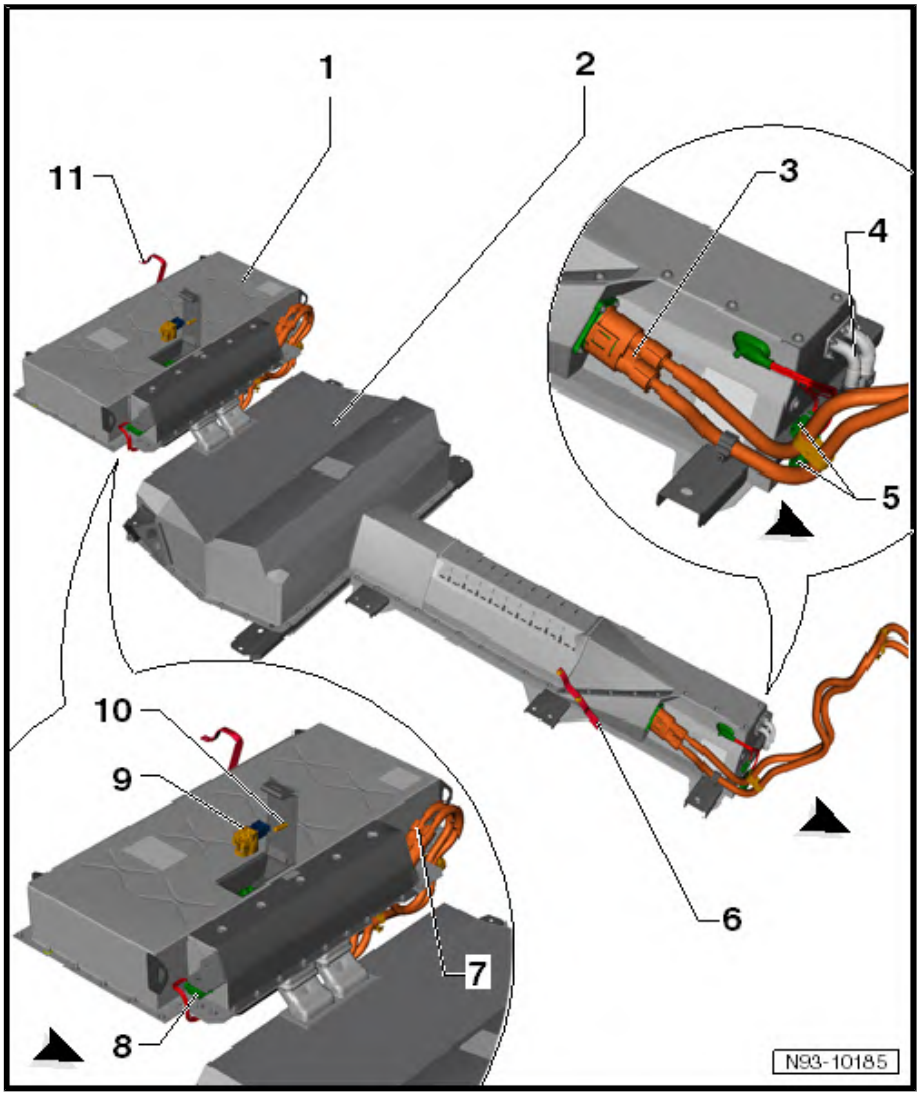
It is not permitted to drive through deep water (splash water) or us direct streams of water (high pressure cleaning of the battery system).

It is necessary to inspect the battery system if the plastic gets deformed (for example, placing something on it). Check the instructions under the chapters High Voltage Battery 1 - AX2- and High Voltage Battery 2 - AX3- . Refer to ⇒ “7.4 High Voltage Battery 1 AX2 / High Voltage Battery 2 AX3 , Checking”, page 22 .

An increased cell voltage delta in the battery system can occur caused by different self-discharging rates in the battery cells and this limits the useable energy. The battery system has functions that compensate for this self-discharging (balancing) and this assures maximum useable energy. It is there necessary that the battery system is regularly charging and discharging.

– Severe discharge must be avoided. The battery system must be charged if the state of charge is less than 20%.

7.2 Overview - High Voltage Battery



1 - High Voltage Battery 2 - AX3-

WARNING

Only a technicians specializing in electrical systems with additional training in working with high voltage may remove the high voltage battery.

- ❑ Removing and installing. Refer to ⇒ "7.3 High Voltage Battery, Removing and Installing", page 15 .

2 - High Voltage Battery 1 - AX2-

- ❑ Removing and installing. Refer to ⇒ "7.3 High Voltage Battery, Removing and Installing", page 15 .

3 - High Voltage Battery 1 - AX2- High Voltage Connector

4 - High Voltage Battery 1 - AX2- Radiator Connection

5 - High Voltage Battery 1 - AX2- 12 V Connection

6 - High Voltage Battery 1 - AX2- Potential Equalization Cable

7 - High Voltage Battery 1 - AX2- High Voltage Connector

8 - High Voltage Battery 2 - AX3- 12 V Connection

9 - High Voltage System Maintenance Connector - TW-

10 - Pilot Line Connector 1 - TV44-

7.3 High Voltage Battery, Removing and Installing

Special tools and workshop equipment required

- Torque Wrench 1331 5-50Nm - VAG1331-
- Shop Crane - VAS6100-
- Scissor Lift Table - VAS6131A-
- Lifting tool, high voltage battery AX5, inside the luggage compartment
- High voltage battery holder AX6, on the floor panel
- Tool for unlocking the high voltage cable from the high voltage batteries

Removing:

WARNING

Read and follow the High Voltage Electrical System General Warnings. Refer to ⇒ "1 High Voltage System Safety Precautions", page 1 .

Note

Pay attention to the instructions for handling high voltage cables. Refer to ⇒ "10.1 General Information", page 37 .

WARNING

High voltage on the electric vehicle high voltage system.

Danger of electrocution!

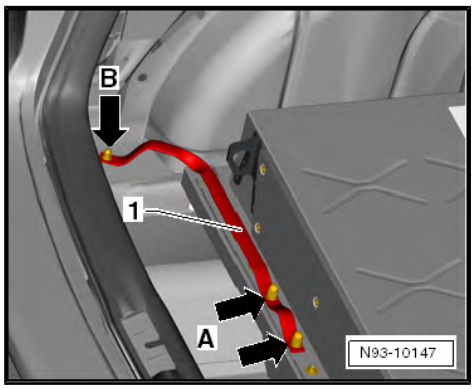
The following procedure requires working on the high voltage system. Disable the high voltage system now. Refer to ⇒ "3 High Voltage System, De-Energizing", page 8 .

WARNING

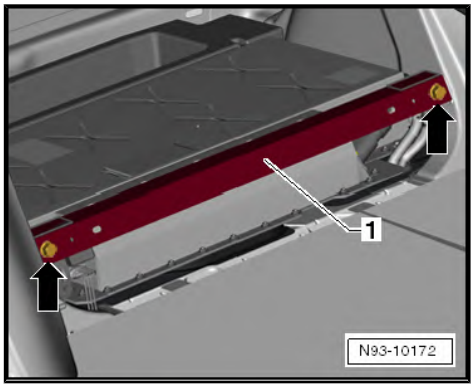
Only a technicians specializing in electrical systems with additional training in working with high voltage may remove the high voltage battery.

Perform the following:

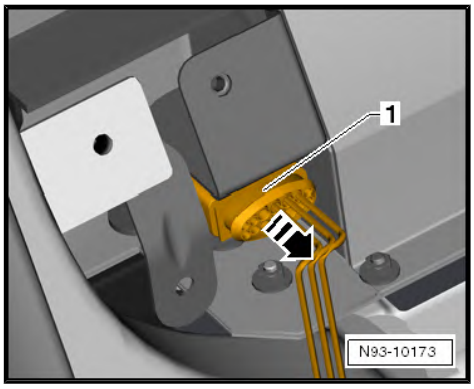
– De-energize the high voltage system. Refer to ⇒ "3 High Voltage System, De-Energizing", page 8 .
– Disconnect the 12 V battery.
– Remove the luggage compartment floor. Refer to ⇒ Body Interior; Rep. Gr. 70 ; Trim Panels, Luggage Compartment; Cargo Floor, Removing and Installing .
– Remove the tire mobility kit and vehicle tools from the luggage compartment.
– Remove the nuts -arrows A- from the high voltage battery and then remove the potential equalization cable (ground cable) from the battery.



– Remove the bolts -arrows- and the cover -1-.



– Unclip the connector -1- from the holder in direction of -arrow- and then disconnect the connector.



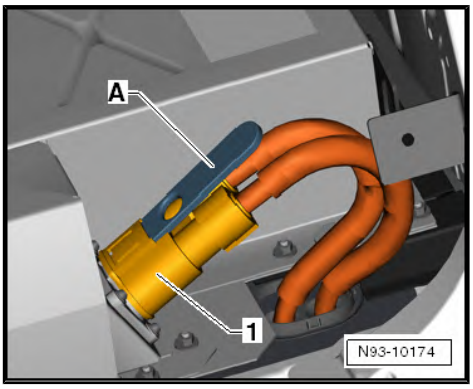
– Unlock the high voltage connector -1- using the unlock tool -A- and then disconnect it from the battery.

WARNING

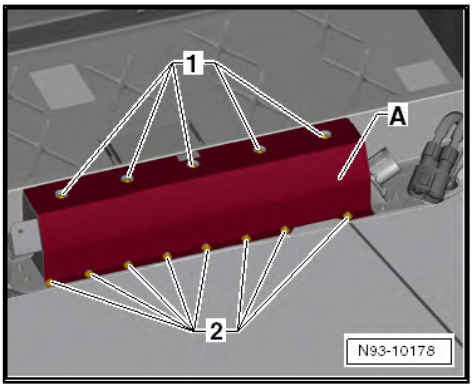
High voltage on the high volt battery system in spite of the voltage being disabled.

Danger of electrocution!

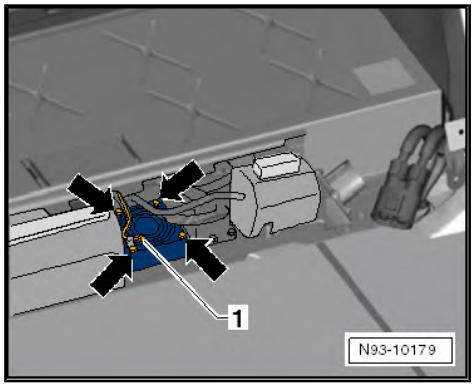
Only an technicians specializing in electrical systems and in working with high voltage may perform the work.



– Remove the bolts -1-, the nuts -2- and the cover -A-.



– Remove the 4 bolts from the fan and then move the fan to the side.



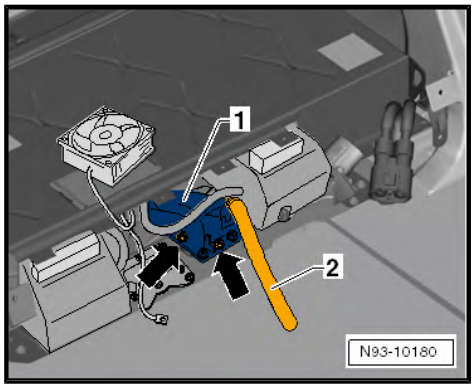
Caution

Danger of a battery short circuit.

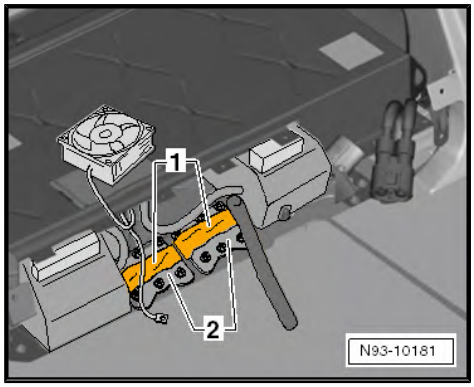
Make sure nothing can fall into the air guide leading to the battery.

Cover the air guides with tape.

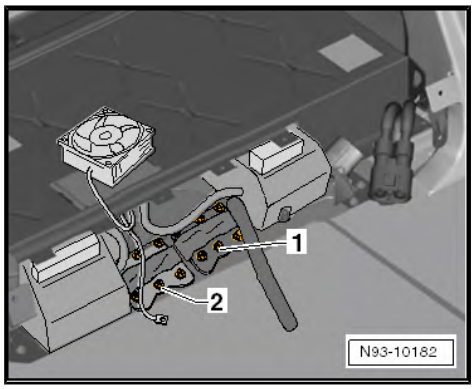
– Remove the nuts -arrows- and the air guide -1-.



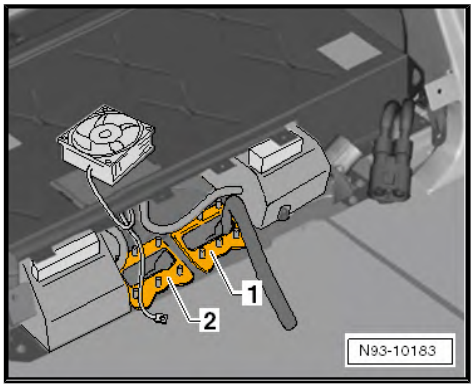
– Cover the air guide with tape.



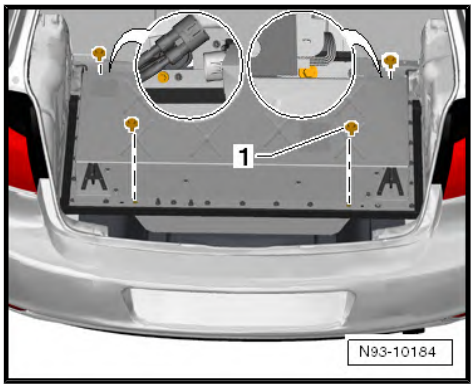
– Remove the 12 nuts -1 and 2-.



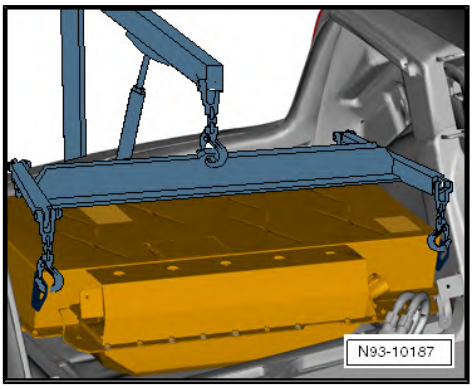
– Remove the seals -1 and 2- from the stud bolts and lay them down.



– Remove the 4 bolts -1- from the battery.



– Lift the battery out of the vehicle using the crane and lifting tool.



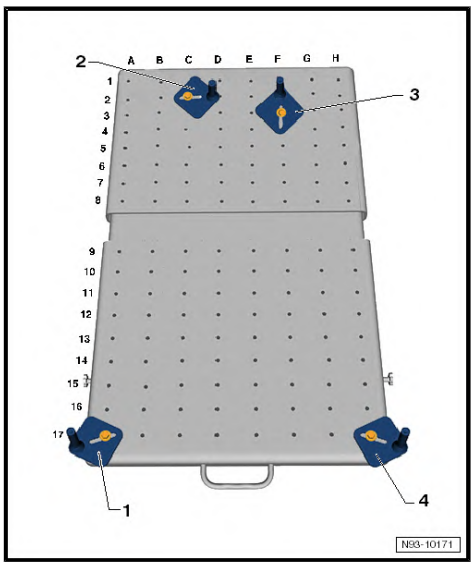
– Set up the Scissor Lift Table - VAS6131A- .

-1- VAS6131/1-6

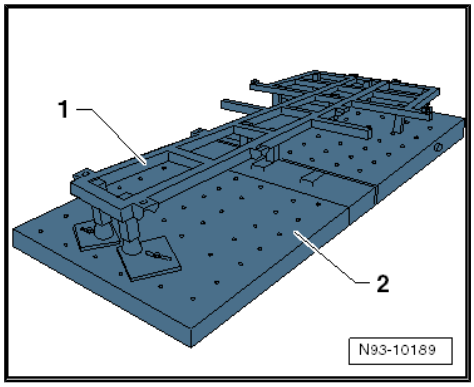
-2- VAS6131/1-4

-3- VAS6131/1-4

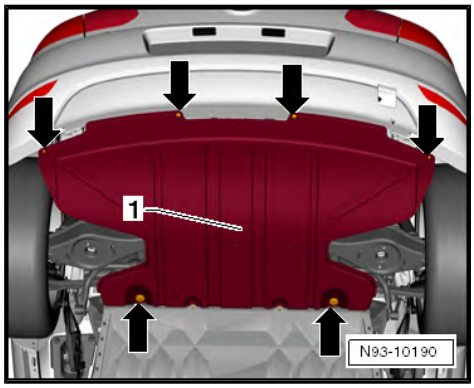
-4- VAS6131/1-6



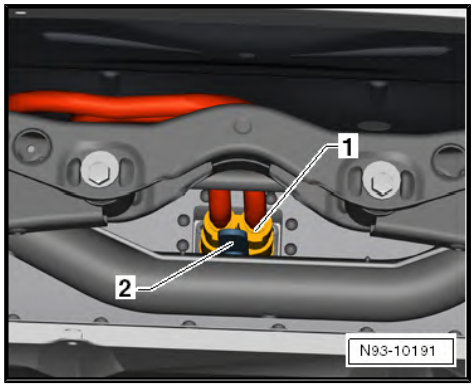
– Secure the high voltage battery charger 3 AX6 on the Scissor Lift Table - VAS6131A- .



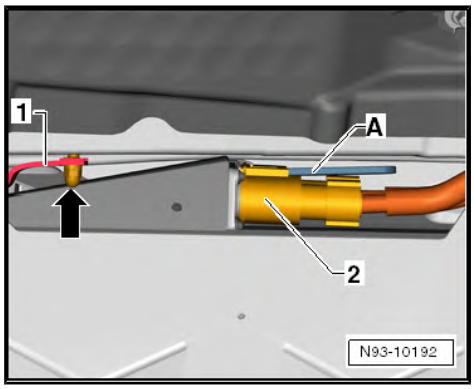
– Remove the bolts -arrows- and the underbody panel -1-.



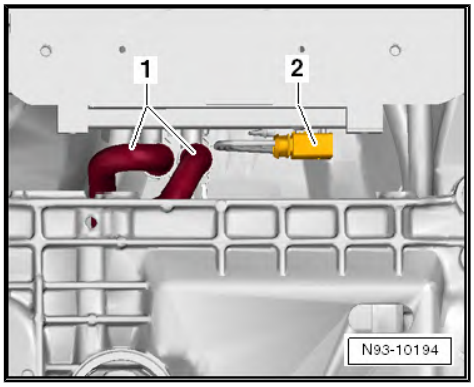
– Unlock and disconnect the connector -1- using the unlock tool -2-.



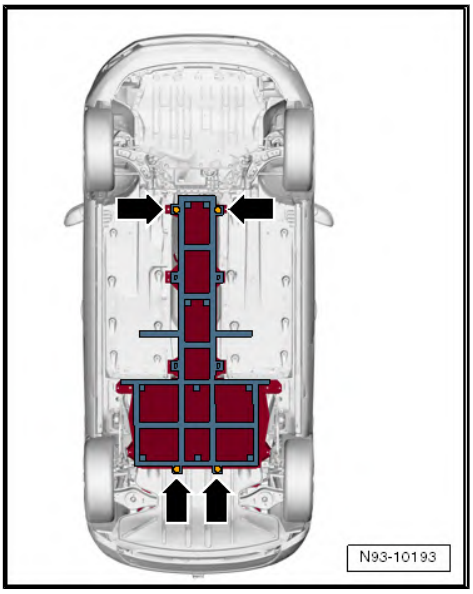
– Unlock and disconnect the connector -2- using the unlock tool -A-.
– Remove the cap nut -arrow- and remove the potential equalization cable -1- from the stud bolt.



– Remove the coolant hoses -1- from the High Voltage Battery 1 - AX2- .
– Disconnect the connector -2-.



– Bolt the battery support frame to High Voltage Battery 1 - AX2- .



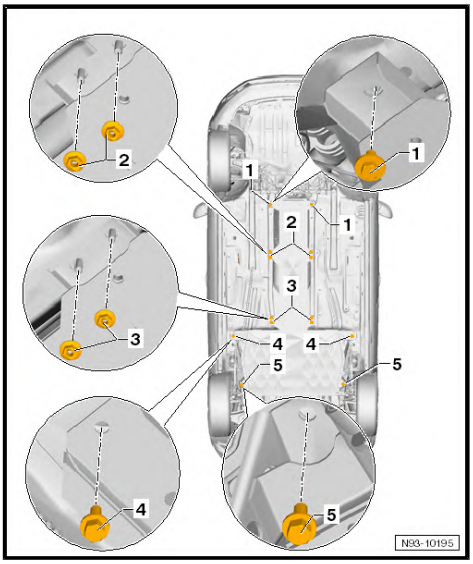
– Remove the bolts -arrows- from High Voltage Battery 1 - AX2- on the vehicle underbody.
– Lower the High Voltage Battery 1 - AX2- using the scissor lift table.

Installing:

Install in reverse order of removal. Note the following:

Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *Otherwise, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*



– Restart the high voltage system and complete the required documentation. Refer to
⇒ “4 High Voltage System, Turning Back On”, page 9 .

7.4 High Voltage Battery 1 - AX2- / High Voltage Battery 2 - AX3- , Checking

Perform a visual inspection as well as an electrical check. Visually inspect the battery housing, the high voltage connections and the coolant hose connections. Use the Vehicle Diagnostic Tester for the electric test. Document the following results from the electric test:

Electrical test:

- Faults stored in the DTC memory
- U_{min}/ U_{max}
- R_{iso}
- kWh
- Ah

Visual inspection:

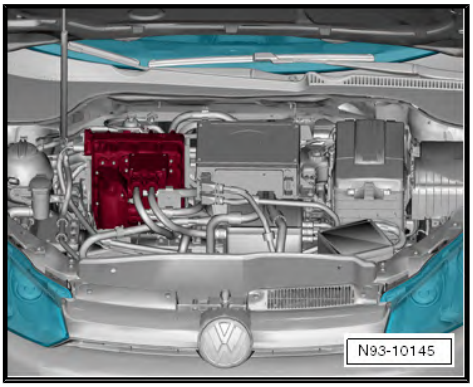
- The insulation on the high voltage connections must not be damage.
- The coolant connections must be intact and without any leaks.
- The battery housing must be bolted securely to the vehicle. The outer contour of the plastic battery housing may not be deformed more than 10 mm.
- The battery housing and its mounts must not be corroded which could impair the vehicle safety in traffic or the function of the battery.
- There must be no corrosion on the ground cable (potential equalization cable) between the vehicle and the battery housing.

Note

It is recommended to check the battery system once a month or after every 3,000 km of driving.

8 Electric Drive Power and Control Electronics

8.1 General Information



The Electro-Drive Drive Motor - V141- forms the connection between the Electric Drive Power and Control Electronics - JX1- and the high voltage battery. It contains the Voltage Converter - A19- , the Drive Motor Inverter - A37- and the Electrical Drive Control Module - J841- .

The Drive Motor Inverter - A37- converts the DC current from the High Voltage Battery into AC for driving using the Electro-Drive Drive Motor - V141- . The Voltage Converter - A19- changes the high voltage to low voltage to supply the 12V vehicle electrical system. The Electric Drive Power and Control Electronics - JX1- is water cooled and is installed in the engine compartment on the right front side.

The following high voltage cables are part of the Electric Drive Power and Control Electronics - JX1- :

- High Voltage Cable for the Power and Control Electronics, Positive - P9- from the Electric Drive Power and Control Electronics - JX1- to the High Voltage Network Wire Junction - TV31-
- High Voltage Cable for the Power and Control Electronics, Negative - P10- from the Electric Drive Power and Control Electronics - JX1- to the High Voltage Network Wire Junction - TV31-
- Drive Motor High Voltage Cable 1 - P4- from the Electric Drive Power and Control Electronics - JX1- to the Three-Phrase Current Drive - VX54-
- Drive Motor High Voltage Cable 2 - P5- from the Electric Drive Power and Control Electronics - JX1- to the Three-Phrase Current Drive - VX54-
- Drive Motor High Voltage Cable 3 - P6- from the Electric Drive Power and Control Electronics - JX1- to the Three-Phrase Current Drive - VX54-

8.2 Electric Drive Power and Control Electronics, Checking

WARNING

Inspect the Electric Drive Power and Control Electronics - JX1- for:

- *Traces of fluid on the water connections*
- *Damage on the housing and the connector*
- *Coolant level in the coolant reservoir*
- *Applicable potential equalization cable. Refer to ⇒ "18 Potential Equalization Cables", page 49 .*

8.3 Electric Drive Output and Control Electronics, Removing and Installing

Special tools and workshop equipment required

- Torque Wrench 1331 5-50Nm - VAG1331-
- Hose Clamps - Up To 25mm - 3094-

WARNING

Read and follow the High Voltage Electrical System General Warnings. Refer to ⇒ "1 High Voltage System Safety Precautions", page 1 .

Note

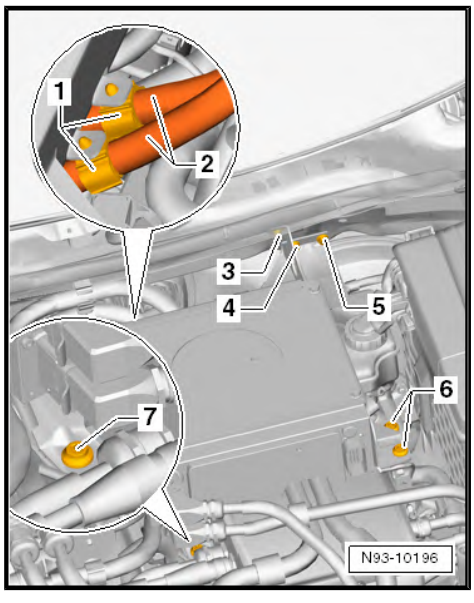
Pay attention to the instructions for handling high voltage cables. Refer to ⇒ "10.1 General Information", page 37 .

Removing:

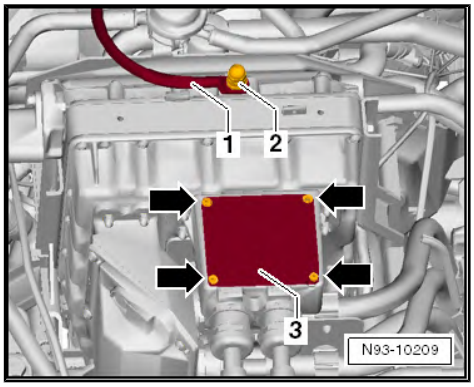
WARNING

Hybrid vehicle high voltage in the high voltage system. Danger of electrocution! The following procedure requires working on the high voltage system. Disable the high voltage system now. Refer to ⇒ "3 High Voltage System, De-Energizing", page 8 .

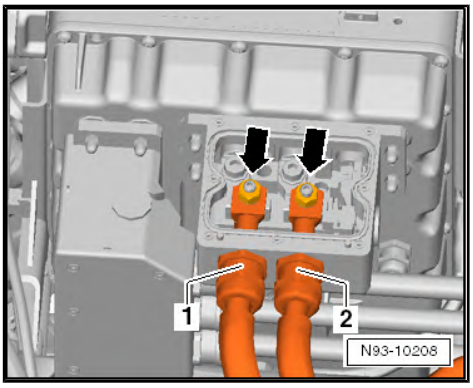
– De-energize the high voltage system. Refer to ⇒ "3 High Voltage System, De-Energizing", page 8 .
– Disconnect the 12 V battery. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Battery, Disconnecting and Connecting .
– Remove charger 3. Refer to ⇒ "12.1 High Voltage Battery Charger 3, Removing and Installing", page 42 .
– Open the high voltage cable holder -1- and disengage the high voltage cables.
– Remove the bolt -3- (3 Nm), bolts -4-, -5- (9 Nm), -6- and -7- (20 Nm) and the holder.
– Remove the nut -2- and then remove the potential equalization cable from the Electric Drive Power and Control Electronics -JX1- .



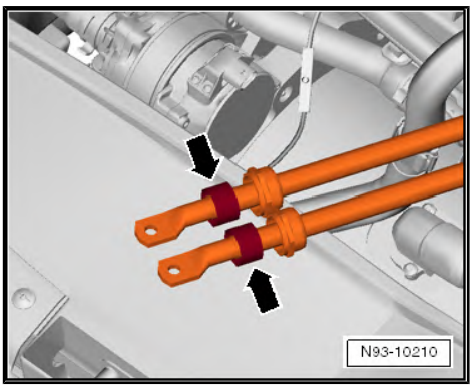
– Remove the bolts -arrows- (2.5 Nm) and the cover -3 -.
– Remove the nuts -arrows-.



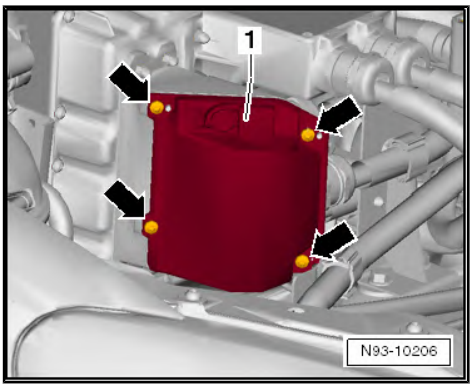
– Remove the high voltage cables -1- and -2- from the Electric Drive Power and Control Electronics - JX1- .



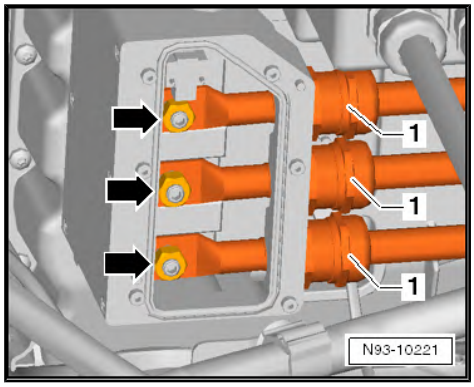
– Cut the shields -arrows- to prevent damaging the high voltage cables.



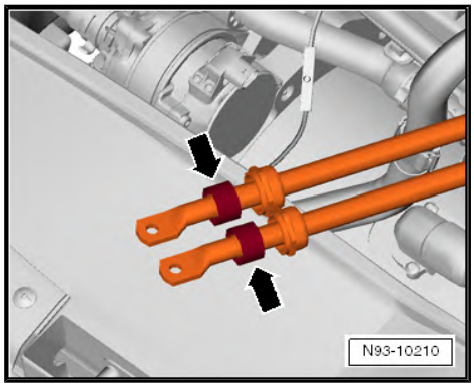
– Remove the bolts -arrows- (5 Nm) and then remove the cover -1- from the Electric Drive Power and Control Electronics - JX1- .



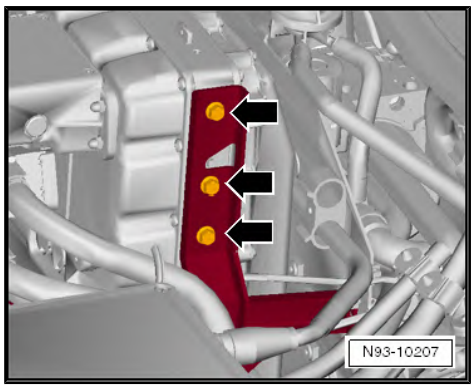
– Remove the nuts -arrows- (15 Nm). Remove the threaded connections -1- (18 Nm) and then remove the high voltage cables with the shield from the Electric Drive Power and Control Electronics - JX1- .

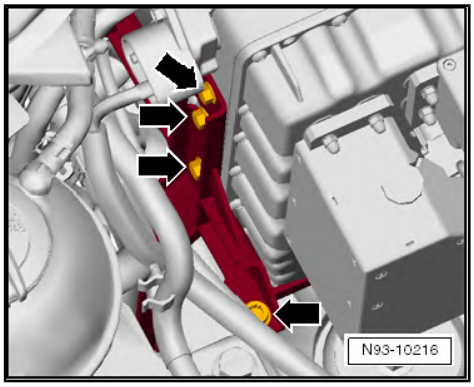


– Cut the shields -arrows- to prevent damaging the high voltage cables.



– Remove the bolts -arrows- (10 Nm).





– Remove the bolts -arrows- (10 Nm).
– Disconnect the coolant hose from the Electric Drive Power and Control Electronics - JX1- .

Note

Catch the escaping coolant in a suitable container.

– Remove the Electric Drive Power and Control Electronics - JX1- upward and out of the vehicle.

Installing:

Install in reverse order of removal. Note the following:

Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *Otherwise, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Tighten all threaded connections to the tightening specifications.
– Restart the high voltage system and complete the required documentation. Refer to
⇒ “4 High Voltage System, Turning Back On”, page 9 .

9 Electro-Drive Drive Motor

9.1 General Information

The Electro-Drive Drive Motor - V141- is where the internal combustion engine is located. It works directly with the transmission input shaft and performs the following:

- It functions like an engine to drive the vehicle with electricity only.
- It functions like a generator to supply and charge the vehicle electrical system and the Hybrid Battery - A38- with current.

9.2 Electric Drive Motor, Removing and Installing

Special tools and workshop equipment required

- Shop Crane - VAS6100-
- Tray - VAG1306-
- Torque Wrench 1331 5-50Nm - VAG1331-
- Scissor Lift Table - VAS6131A-
- Mount for the Electro-Drive Drive Motor - V141-
- Ladder - VAS5085-

WARNING

Read and follow the High Voltage Electrical System General Warnings. Refer to ⇒ “1 High Voltage System Safety Precautions”, page 1 .

Note

Pay attention to the instructions for handling high voltage cables. Refer to ⇒ “10.1 General Information”, page 37 .

Removing:

WARNING

High voltage on the electric vehicle high voltage system.

Danger of electrocution!

The following procedure requires working on the high voltage system. Disable the high voltage system now. Refer to ⇒ “3 High Voltage System, De-Energizing”, page 8 .

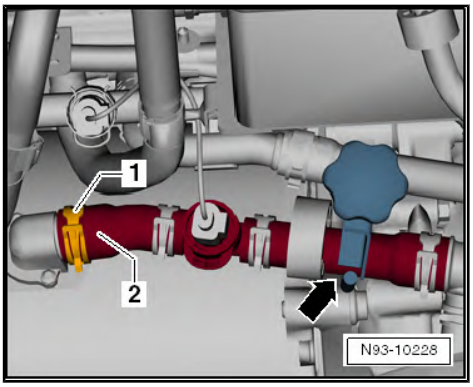
– De-energize the high voltage system. Refer to ⇒ “3 High Voltage System, De-Energizing”, page 8 .

– Disconnect the 12 V battery.

– Disconnect the upper coolant hose from the Electro-Drive Drive Motor - V141- using Hose Clamps - Up To 25mm - 3094- .

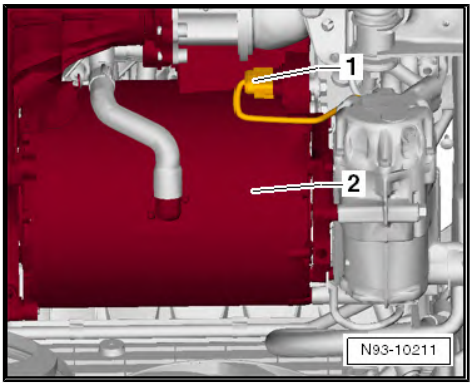
– Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 50 ; Noise Insulation .

– Remove the front section of the wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Wheel Housing Liner .

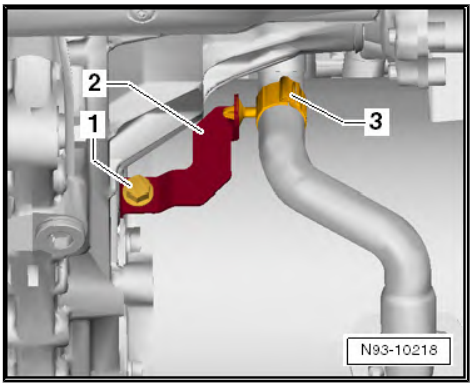


– Unlock and disconnect the connector from the Electro-Drive Drive Motor - V141- .

– Remove the A/C compressor and tie it up with a suitable wire. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 .



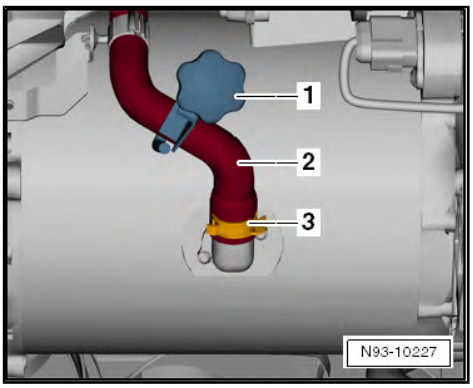
– Remove the bolt -1- (8 Nm). Open the hose holder -3-. Remove the bracket -2-.



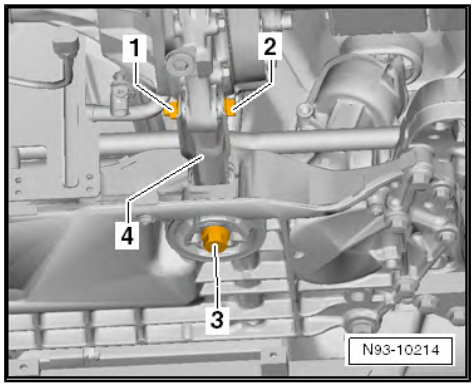
– Disconnect the lower coolant hose from the Electro-Drive Drive Motor - V141- using Hose Clamps - Up To 25mm - 3094- .

– Open the clamp -3- and remove the lower coolant hose -2- from the Electro-Drive Drive Motor - V141- and drain the coolant.

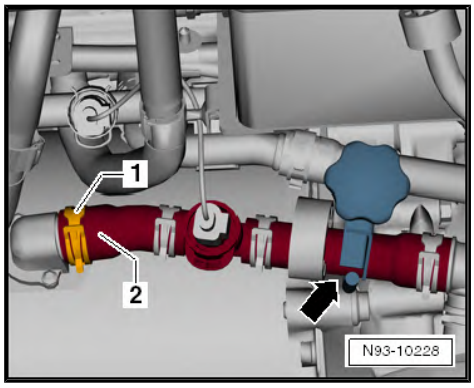
– Remove the input shafts (50 Nm +45°).



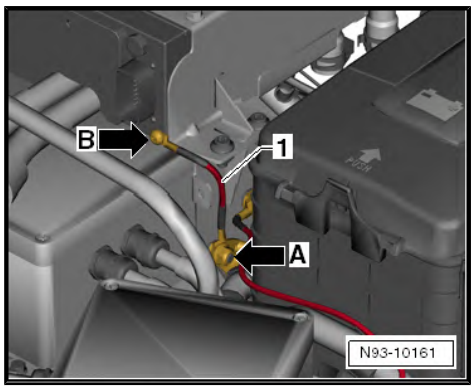
– Remove the nut -1- (40 Nm +90°). Remove the bolt -2-.
– Remove the bolt -3- (100 Nm +90°). Remove the pendulum support -4-.



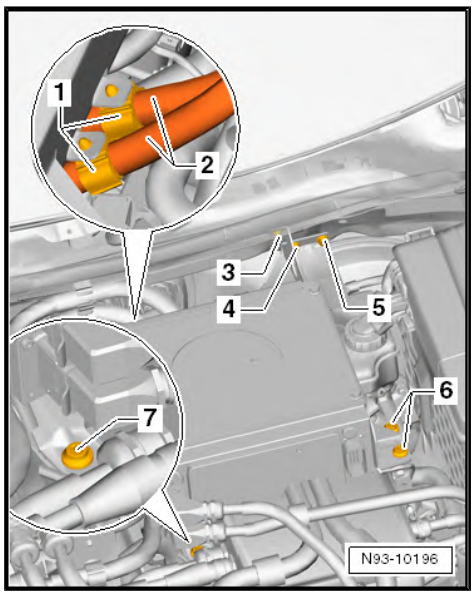
– Loosen the clamp -1- and remove the upper coolant hose -2- from the Electro-Drive Drive Motor - V141- .



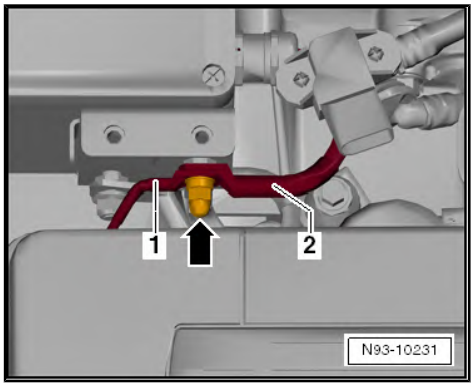
– Remove the bolt -B- (6 Nm).
– Remove the High Voltage Battery Charger 3 - AX6- and move it to the side with the coolant hoses still connected.
– Open the high voltage cable holder -1- and disengage the high voltage cables.



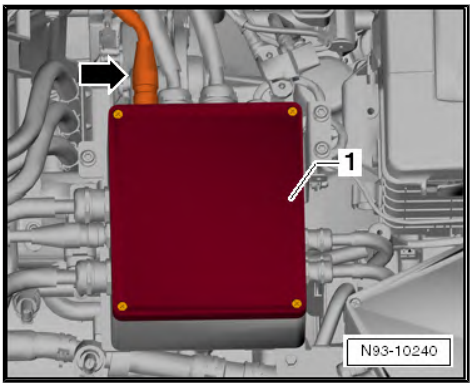
– Remove the bolt -3- (3 Nm), bolts -4-, -5- (9 Nm), -6- and -7- (20 Nm) and the holder.



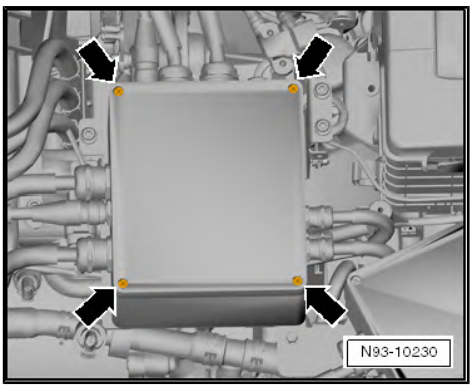
– Remove the nut -arrows- (23 Nm). Remove the potential equalization cables -1- and -2- from the stud bolt.



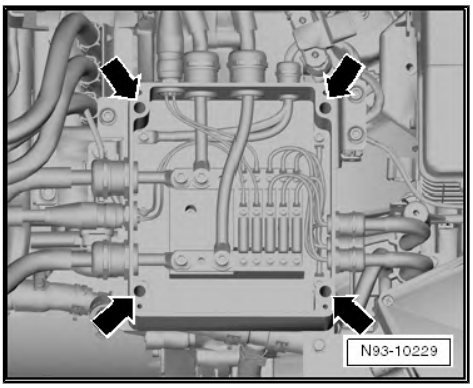
– Disconnect the high voltage cable -arrow- from the Connection and Junction Box 1 - SX1- -1-.



– Loosen the bolts -arrows- and open Connection and Junction Box 1 - SX1- .



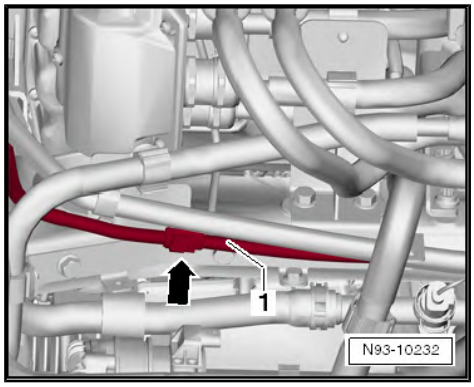
– Loosen the bolts -arrows-.



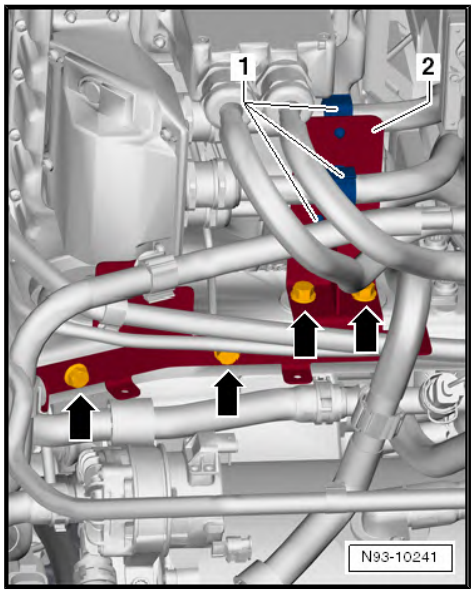
Note

The wiring harness -1- and transmission temperature sensor are not installed in all vehicles.

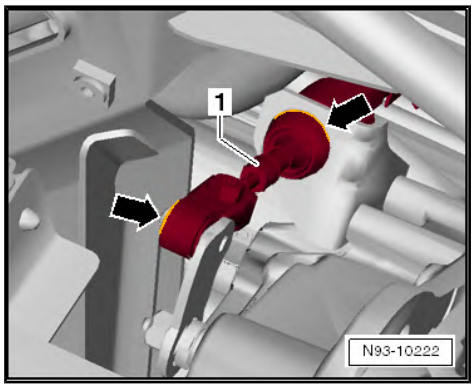
– Disconnect the connector -arrow-. Free up the wiring harness -1- and guide it toward the transmission.



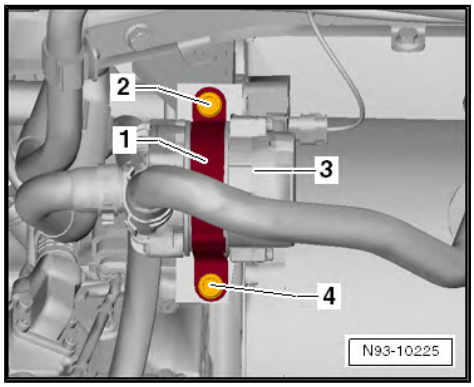
– Open the high voltage cable switch -1-. Remove the bolts -arrows- and remove the bracket -2-.



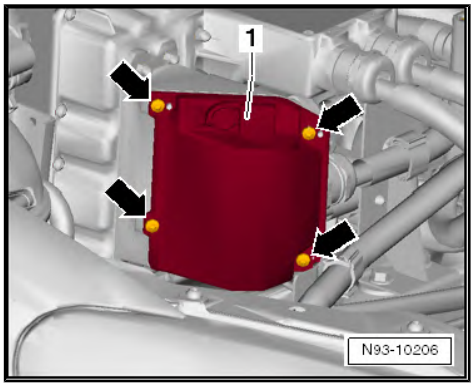
– Open the retainers -arrows- and disengage the selector lever cable.



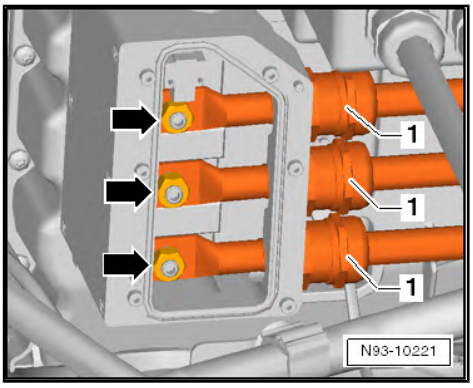
– Remove the bolts -2- and -4- and the bracket -1-. Let the coolant pump -3- hang with the lines still connected. Make sure the running direction is correct when installing.



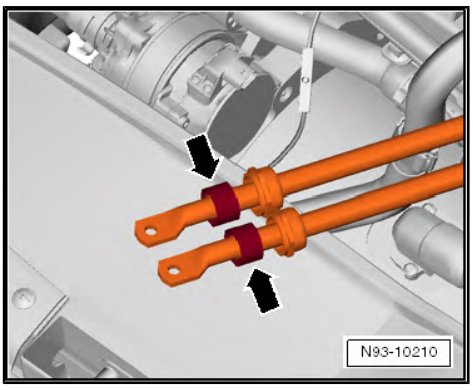
– Remove the bolts -arrows- (5 Nm) and then remove the cover -1- from the Electric Drive Power and Control Electronics - JX1- .



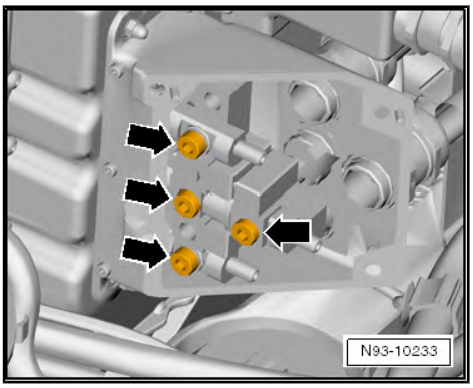
– Remove the nuts -arrows- (15 Nm). Remove the threaded connections -1- (18 Nm) and then remove the high voltage cables with the shield from the Electric Drive Power and Control Electronics - JX1- .



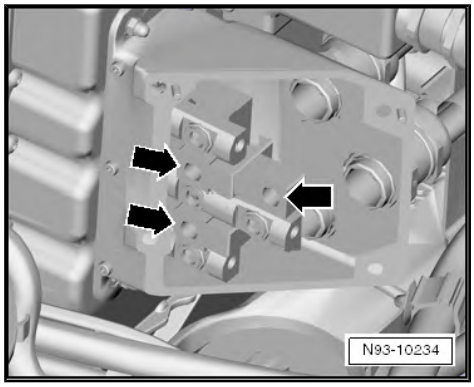
– Cut the 3 shields -arrows- to prevent damaging the high voltage cables.



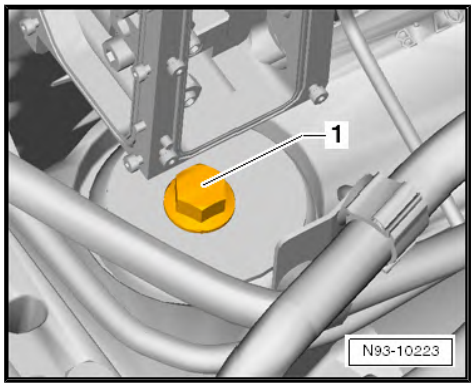
– Remove the bolts -arrows- (15 Nm) and the connections.



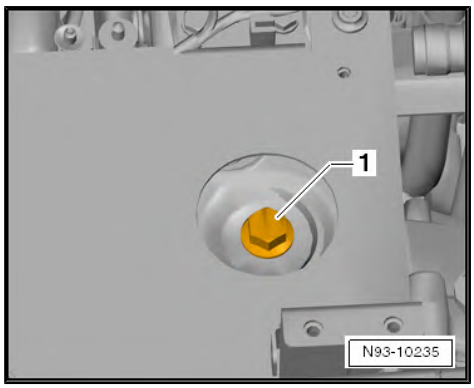
– Remove the bolts -arrows- (6 Nm) and the insulation plate.



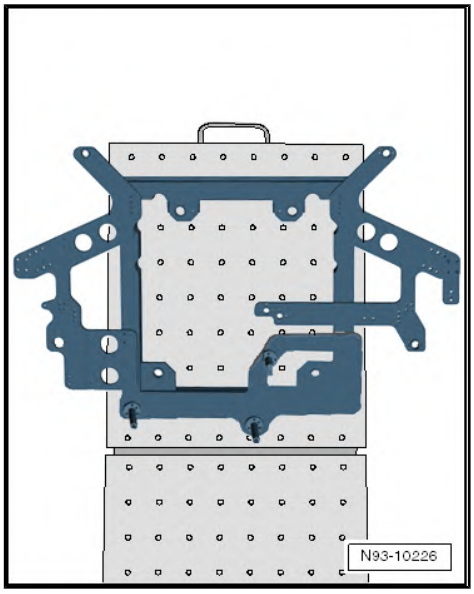
– Loosen the bolt -1- (60 Nm +90°).



– Loosen the bolt -1- (60 Nm +90°).



– Position the bracket for the Electro-Drive Drive Motor - V141- on the Scissor Lift Table - VAS6131A- . Secure the bracket under the Electro-Drive Drive Motor - V141- .
– Remove the bolts from the engine- and transmission mount using ladder VAS5085.
– Lower the Scissor Lift Table - VAS6131A- slowly with the Electro-Drive Drive Motor - V141- . Make sure there is enough clearance.



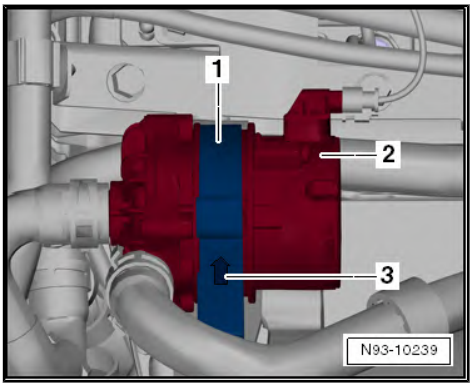
Installing:

Install in reverse order of removal. Note the following:

Note

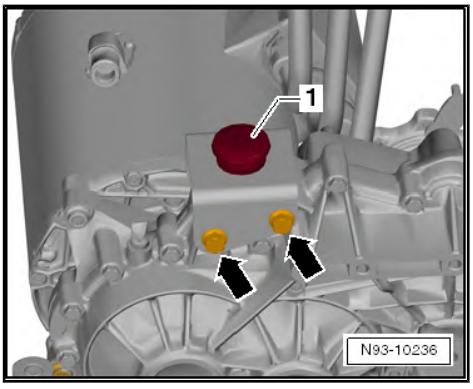
- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *Otherwise, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Pay attention to the installed position of the coolant pump.
– The arrow -3- on the clamp -1- must point up.
– Tighten all threaded connections to the tightening specification and then seal them with sealing paint.
– Replace all bolts and nut that were loosened.

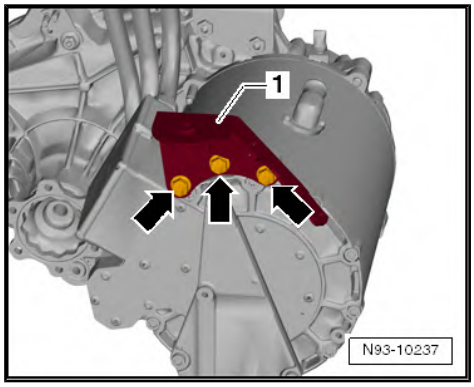


9.3 Electro-Drive Drive Motor, Replacing

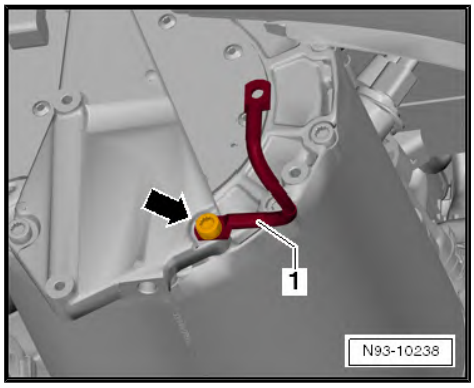
– Remove the bolts -arrows- from the transmission mount -1- (40 Nm+180°) and secure the new Electro-Drive Drive Motor - V141- with new bolts.



– Remove the bolts -arrows- from the engine mount -1- (40 Nm +90°) and secure the new Electro-Drive Drive Motor - V141- with new bolts.



– Remove the bolt -arrow- (20 Nm) from the potential equalization cable -1- and attach it to the new Electro-Drive Drive Motor - V141- .



9.4 Electro-Drive Drive Motor, Calibrating

– Calibrate the electro-drive drive motor using the Vehicle Diagnostic Tester .

9.5 Transmission, Removing and Installing

Currently is it not possible to replace the transmission separately.

10 High Voltage Cables

10.1 General Information

Safety precautions for working with high voltage cables

WARNING

Working with high voltage cables:

- *Do not support yourself or lay tools on the high voltage cable or on any of its components.*
- *When working near high voltage components and high voltage cables, do not use tools that generate heat, that have sharp edges or that are used for cutting or shaping, such as welding, soldering, hot air or thermal adhesive equipment.*
- *When working near high voltage components and high voltage cables, do not use tools that generate heat such as welding, soldering, hot air or thermal adhesive equipment.*
- *Do not excessively bend or flex high voltage cables.*
- *Always contact a high voltage technician if there are questions or if something is not clearly understood.*

The following high voltage cables connect the high voltage components with each other:

- Electrical A/C Compressor High Voltage Cable - P3- from Connection and Junction Box 1 - SX1- to the Electrical A/C Compressor - V470- .
- Drive Motor High Voltage Cable 1 - P4- from the Electric Drive Power and Control Electronics - JX1- to the Electro-Drive Drive Motor - V141-
- Drive Motor High Voltage Cable 2 - P5- from the Electric Drive Power and Control Electronics - JX1- to the Electro-Drive Drive Motor - V141-
- Drive Motor High Voltage Cable 3 - P6- from the Electric Drive Power and Control Electronics - JX1- to the Electro-Drive Drive Motor - V141-
- High Voltage Battery High Voltage Cable - P7- between the high voltage batteries.
- Wire Junction/High Voltage Battery Cable - P8- from High Voltage Battery 2 - AX3- (battery under the floor panel) to Connection and Junction Box 1 - SX1- .
- High Voltage Cable for the Power and Control Electronics, Positive - P9- from Connection and Junction Box 1 - SX1- to the Electric Drive Power and Control Electronics - JX1- .
- High Voltage Cable for the Power and Control Electronics, Negative - P10- from Connection and Junction Box 1 - SX1- to the Electric Drive Power and Control Electronics - JX1- .

- High Voltage Heating High Voltage Cable (PTC) - P11- from the Connection and Junction Box 1 - SX1- to the High Voltage Heater (PTC) - Z115- .
- Charger 1/Wire Junction High Voltage Cable - P12- from High Voltage Battery Charger 1 - AX4- to Connection and Junction Box 1 - SX1- .
- Charger 2/Wire Junction High Voltage Cable - P13- from High Voltage Battery Charger 2 - AX5- to Connection and Junction Box 1 - SX1- .
- Charger 3/Wire Junction High Voltage Cable - P14- from High Voltage Battery Charger 3 - AX6- to Connection and Junction Box 1 - SX1- .
- Charger 1/High Voltage Charge Network Distributor High Voltage Cable - P15- from the High Voltage Battery Charger 1 - AX4- to the High Voltage Charge Network Distributor - SX4- .
- Charger 2/High Voltage Charge Network Distributor High Voltage Cable - P16- from High Voltage Battery Charger 2 - AX5- to the High Voltage Charge Network Distributor - SX4- .
- Charger 3/High Voltage Charge Network Distributor High Voltage Cable - P17- from High Voltage Battery Charger 3 - AX6- to the High Voltage Charge Network Distributor - SX4- .
- High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 1 - P18- from the High Voltage Battery Charge Connection 1 - U34- (in the rear under the fuel filler door) to the High Voltage Charge Network Distributor - SX4- .
- High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 2 - P19- from High Voltage Battery Charge Connection 2 - U35- (in the front under the VW emblem) to the High Voltage Charge Network Distributor - SX4- .

10.2 Component Location Overview - High Voltage Cables

Component Location Overview - High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 2 - P19- , High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 1 - P18- and High Voltage Battery High Voltage Cable - P7-

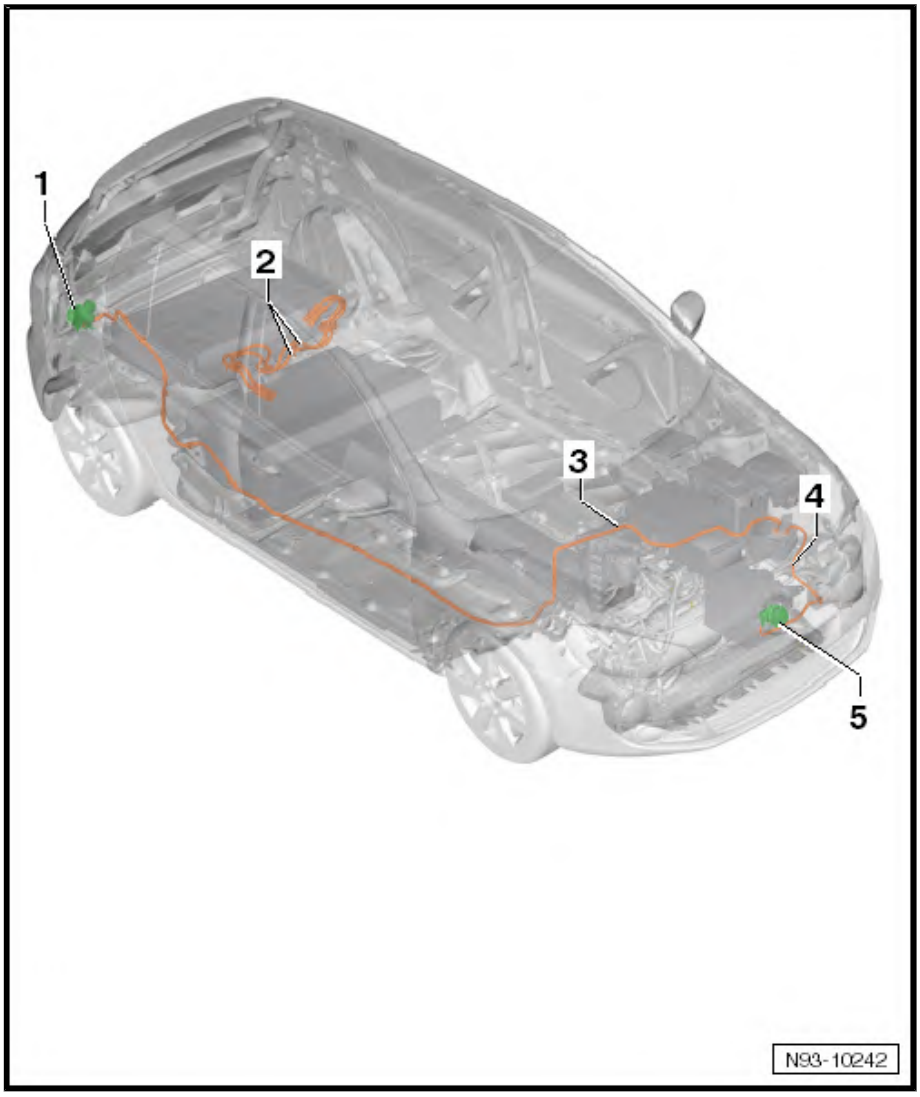
1 - High Voltage Battery Charge Connection 1 - U34-

2 - High Voltage Battery High Voltage Cable - P7-

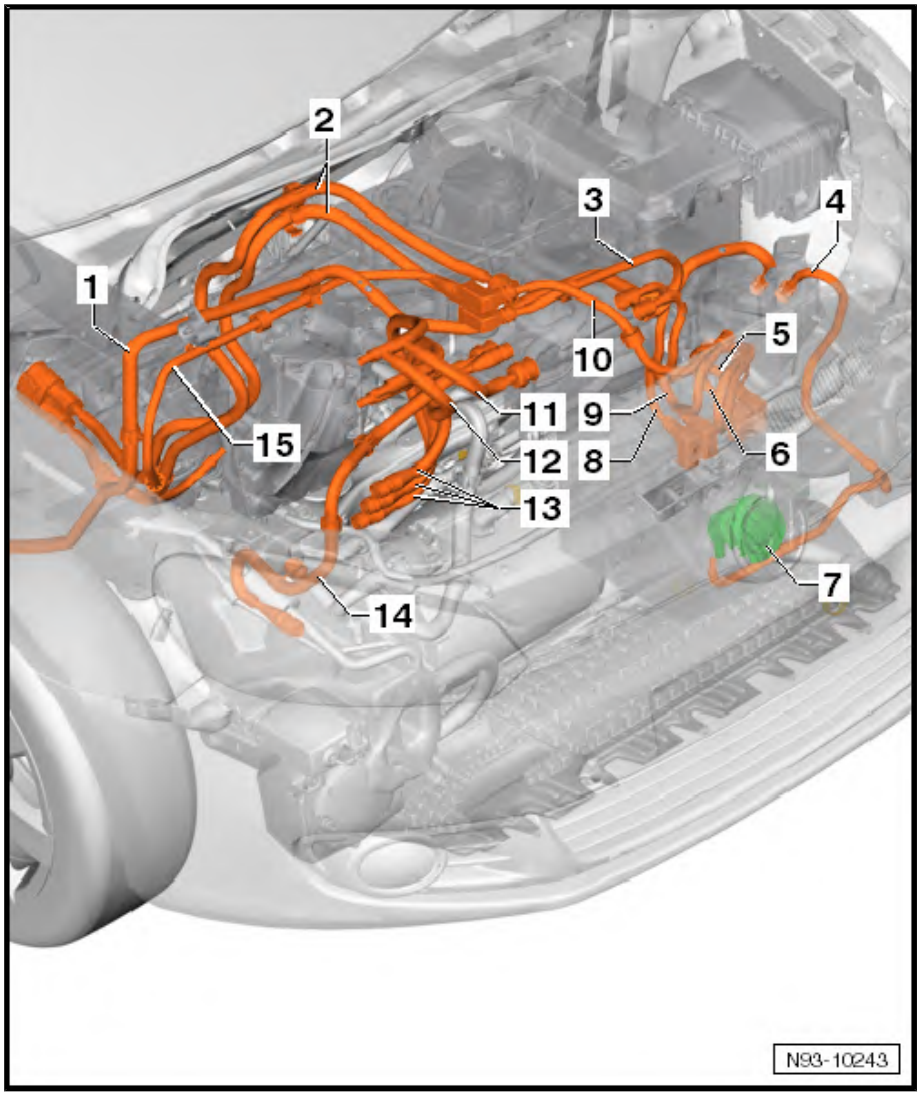
3 - High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 1 - P18-

4 - High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 2 - P19-

5 - High Voltage Battery Charge Connection 2 - U35-



Component Location Overview - Engine Compartment High Voltage Cable



1 - High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 1 - P18-

2 - Wire Junction/High Voltage Battery Cable - P8-

3 - Charger 3/Wire Junction High Voltage Cable - P14-

4 - High Voltage Charge Network Distributor/High Voltage Charging Socket High Voltage Cable 2 - P19-

5 - Charger 1/High Voltage Charge Network Distributor High Voltage Cable - P15-

6 - Charger 1/Wire Junction High Voltage Cable - P12-

7 - High Voltage Battery Charge Connection 2 - U35-

8 - Charger 2/Wire Junction High Voltage Cable - P13-

9 - Charger 2/High Voltage Charge Network Distributor High Voltage Cable - P16-

10 - Charger 3/High Voltage Charge Network Distributor High Voltage Cable - P17-

11 - High Voltage Cable for the Power and Control Electronics, Positive - P9-

12 - High Voltage Cable for the Power and Control Electronics, Negative - P10-

13 - Drive Motor High Voltage Wiring Harness - PX2-

14 - Electric A/C Compressor High Voltage Cable - P3-

15 - High Voltage Heating High Voltage Cable (PTC) - P11-

10.3 Drive Motor High Voltage Wiring Harness, Removing and Installing

Currently the drive motor high voltage wiring harness cannot be replaced separately, but rather only with the entire Electro-Drive Drive Motor - V141- . The following describes removing and installing the high volt connections on the Electric Drive Power and Control Electronics - JX1- of the three-phase cable.

11 High Voltage Cooling System

⇒ “11.1 Component Location Overview - High Voltage System Cooling”, page 41

11.1 Component Location Overview - High Voltage System Cooling

WARNING

The coolant system is under pressure when the engine is warm.

Danger of scalding by steam and hot coolant.

Reduce the pressure in the cooling system by covering the cap on the coolant reservoir with a cloth and opening it slowly and carefully.

1 - Coolant Pump in front of Electric Drive Power and Control Electronics - V508-

2 - Coolant Pump In Front Of High Voltage Heater (PTC) - V509-

3 - Manual Bleed Valve for Coolant System

4 - High Voltage Battery Coolant Shut-Off Valve - N540-

5 - Temperature Sensor in Front Of High Voltage Heater (PTC) - G785-

6 - High Voltage Heater (PTC) - Z115-

7 - Temperature Sensor after Heat Exchanger - G787-

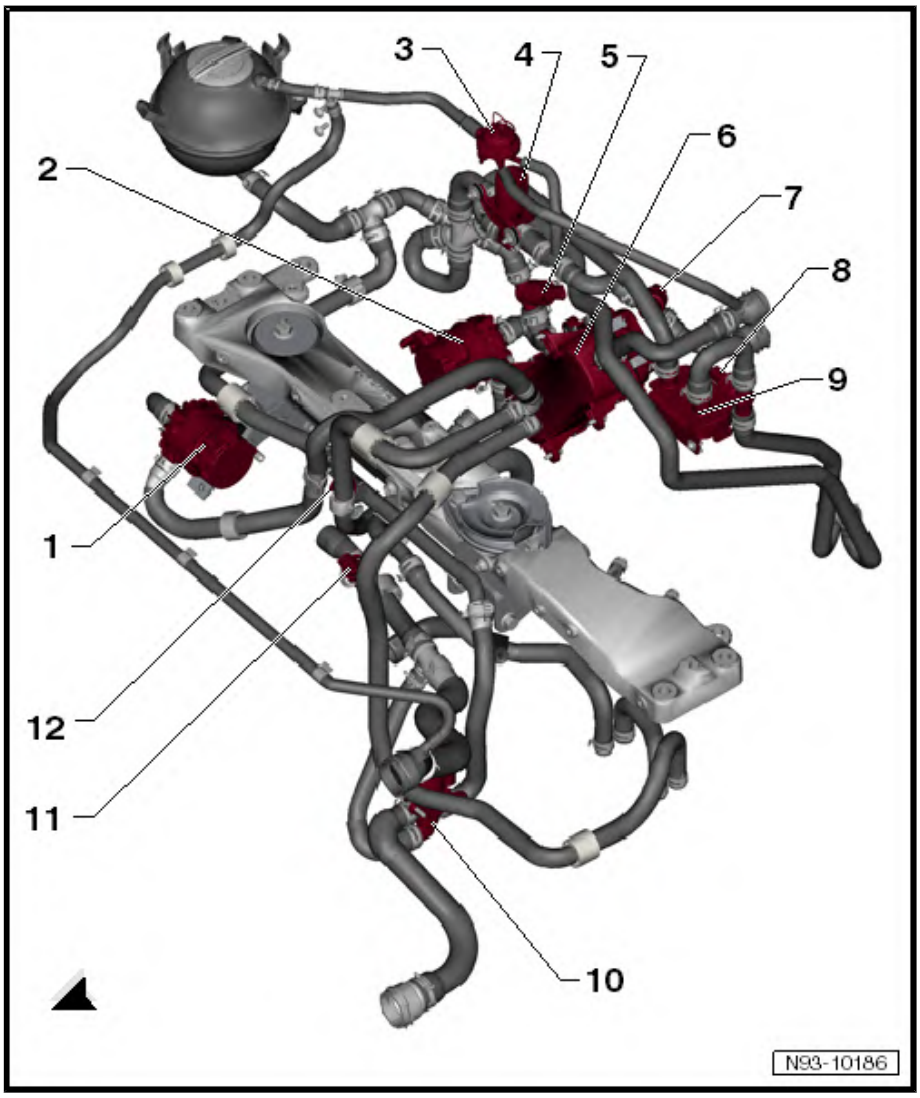
8 - Temperature Sensor after High Voltage Battery Heat Exchanger - G786-

9 - High Voltage Battery Heat Exchanger - VX63-

10 - Heater Coolant Shut-Off Valve - N279-

11 - Temperature Sensor after Electro-Drive Drive Motor - G788-

12 - Temperature Sensor after Electric Drive Power and Control Electronics - G789-



12 Battery Chargers

⇒ “12.1 High Voltage Battery Charger 3, Removing and Installing”, page 42

12.1 High Voltage Battery Charger 3, Removing and Installing

WARNING

Read and follow the High Voltage Electrical System General Warnings. Refer to ⇒ “1 High Voltage System Safety Precautions”, page 1 .

Note

Pay attention to the instructions for handling high voltage cables. Refer to ⇒ “10.1 General Information”, page 37 .

WARNING

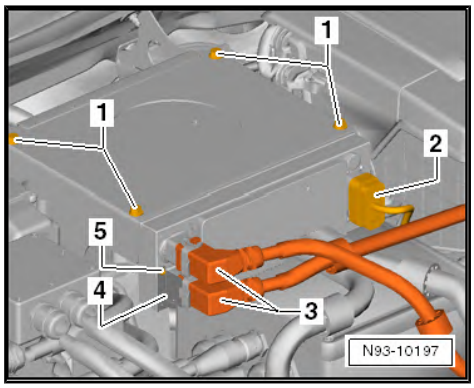
High voltage on the electric vehicle high voltage system.

Danger of electrocution!

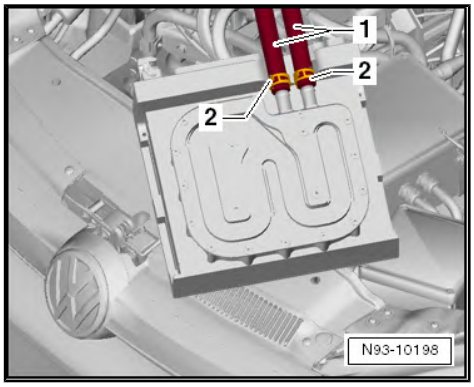
The following procedure requires working on the high voltage system. Disable the high voltage system now. Refer to ⇒ “3 High Voltage System, De-Energizing”, page 8 .

Perform the following:

– De-energize the high voltage system. Refer to ⇒ “3 High Voltage System, De-Energizing”, page 8 .
– Disconnect the 12 V battery.
– Unlock the connector -2- and disconnect it from the battery charger.
– Remove the bolt -5- and the locking plate -4-. Unlock the high voltage cable connector -3- and disconnect it from the battery charger.
– Remove the bolts -1- (9 Nm) and pull the battery charger forward out of the bracket.



– Loosen the clamps -2- and remove the coolant hoses from the battery charger.



Installing:

Install in reverse order of removal. Note the following:

– Tighten all threaded connections to the tightening specifications.

– Restart the high voltage system and complete the required documentation. Refer to
⇒ “4 High Voltage System, Turning Back On”, page 9 .

13 High Voltage Battery Heat Exchanger

PTC Heating Element, Removing and Installing, refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 .

14 High voltage heater (PTC)

PTC Heating Element, Removing and Installing, refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 80 .

15 Immediate upload button

The immediate upload button is located inside the center console. Refer to ⇒ Electrical Equipment; Rep. Gr. 96 ; Lamps and Controls in Center Console .

16 Driving Program Button

The driving program button is located inside the center console. Refer to ⇒ Electrical Equipment; Rep. Gr. 96 ; Lamps and Controls in Center Console .

17 Electric A/C Compressor

The Electrical A/C Compressor - V470- is installed inside the engine compartment in the front on the right side.

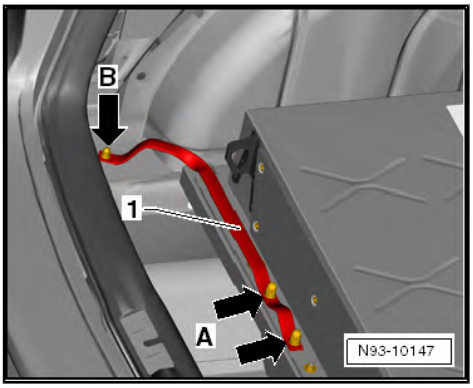
For removing and installing the Electrical A/C Compressor - V470- , refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 .

18 Potential Equalization Cables

18.1 Potential Equalization Cable on High Voltage Battery 1 - AX2- in Luggage Compartment, Removing and Installing

Note

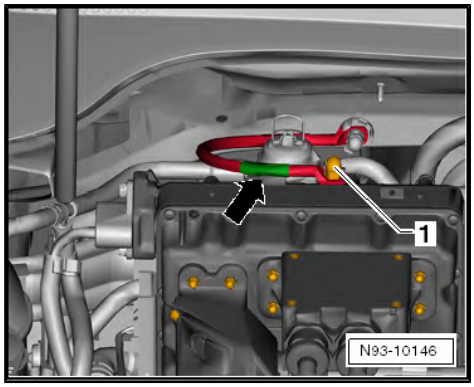
- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*



– Tightening specification for the nuts -A-: 20 Nm.

– Tightening specification, nut to body -B-: 9 Nm.

18.2 Potential Equalization Cable on Electric Drive Power and Control Electronics - JX1- , Removing and Installing



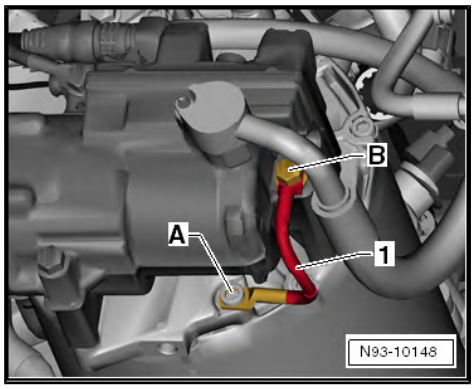
Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Tighten the nut -1- to 20 Nm.

– Tightening specification for the nut to the body: 20 Nm.

18.3 Electro-Drive Drive Motor - V141- Potential Equalization Cable, Removing and Installing



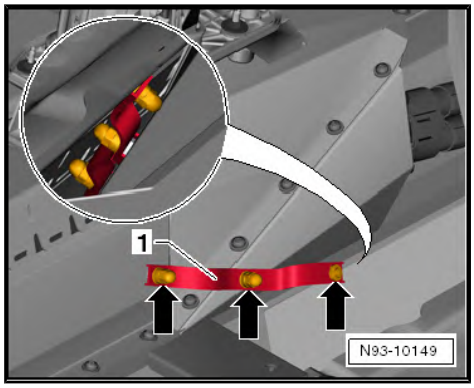
Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Tightening specification for the bolt -A-: 23 Nm.

– Tightening specification for the bolt -B-: 23 Nm.

18.4 High Voltage Battery 2 - AX3- Potential Equalization Cable under Floor Panel, Removing and Installing

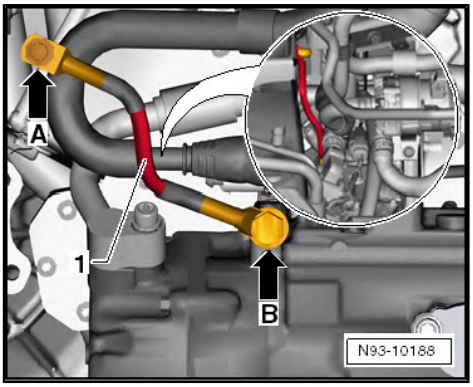


Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Tightening specification for the nuts: 20 Nm.

18.5 Electrical A/C Compressor - V470- Potential Equalization Cable, Removing and Installing



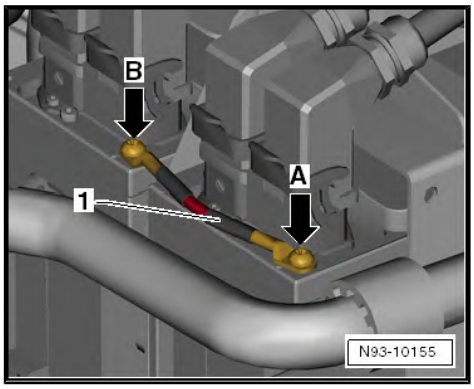
Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Bolt -A- tightening specification: 6 Nm.

– Tightening specification for the bolt -B-: 23 Nm.

18.6 High Voltage Battery Charger 2 - AX5- Potential Equalization Cable, Removing and Installing



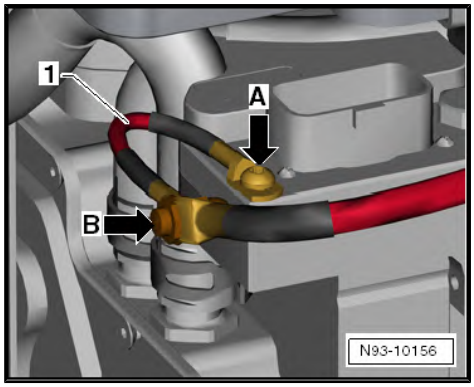
Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Bolt -A- tightening specification: 6 Nm.

– Bolt -B- tightening specification: 6 Nm.

18.7 High Voltage Battery Charger 1 - AX4- Potential Equalization Cable, Removing and Installing



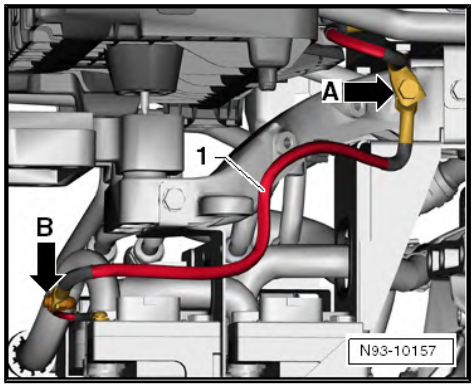
Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Bolt -A- tightening specification: 6 Nm.

– Bolt -B- tightening specification: 9 Nm.

18.8 Potential Equalization Cable Engine Support, Removing and Installing



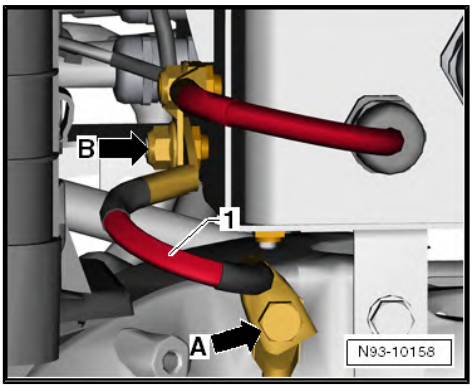
Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Tightening specification for the bolt -A-: 23 Nm.

– Tightening specification for the bolt -B-: 23 Nm.

18.9 Connection and Junction Box 1 - SX1- Potential Equalization Cable Bracket, Removing and Installing, High Voltage Network Junction

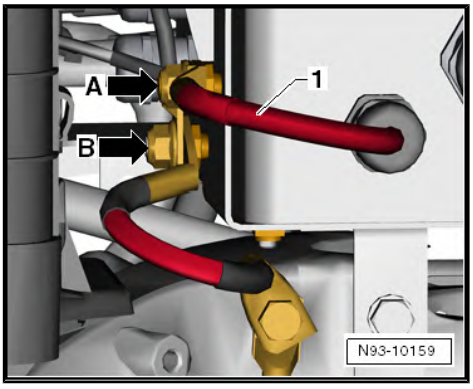


Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Tightening specification for the bolt -A-: 23 Nm.
– Tightening specification for the bolt -B-: 23 Nm.

18.10 Connection and Junction Box 1 - SX1- Potential Equalization Cable, Removing and Installing, High Voltage Network Junction

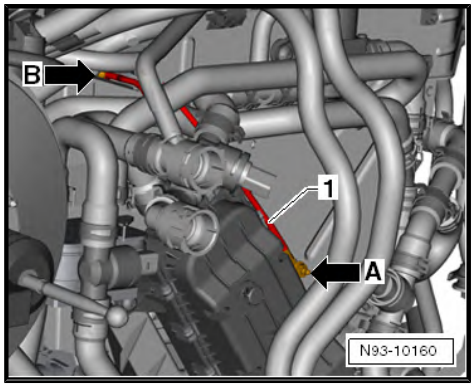


Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Tightening specification for the bolt -A-: 23 Nm.
– Tightening specification for the bolt -B-: 23 Nm.

18.11 High Voltage Heater (PTC) - Z115- Potential Equalization Cable



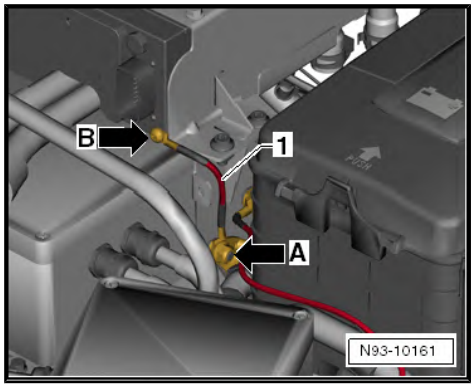
Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Bolt -A- tightening specification: 9 Nm.

– Bolt -B- tightening specification: 9 Nm.

18.12 High Voltage Battery Charger 3 - AX6- Potential Equalization Cable, Removing and Installing



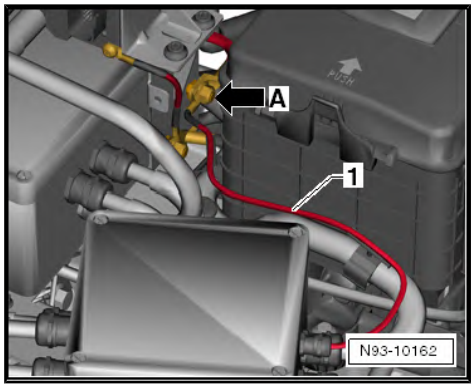
Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Bolt -A- tightening specification: 20 Nm.

– Bolt -B- tightening specification: 6 Nm.

18.13 High Voltage Charge Network Distributor - SX4- Potential Equalization Cable, Removing and Installing

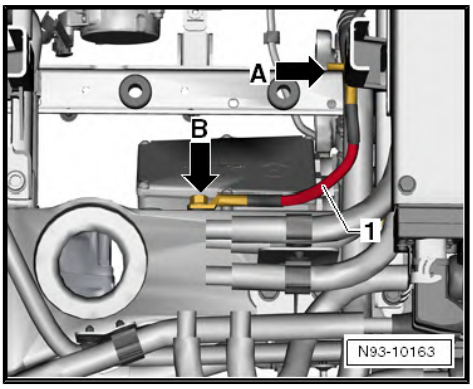


Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Tightening specification for the bolt -A-: 23 Nm.

18.14 Electric Drive Power and Control Electronics - JX1- Potential Equalization Cable Bracket Engine Support, Removing and Installing



Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

– Bolt -A- tightening specification: 9 Nm.

– Bolt -B- tightening specification: 20 Nm.

18.15 Overview - Potential Equalization Cable

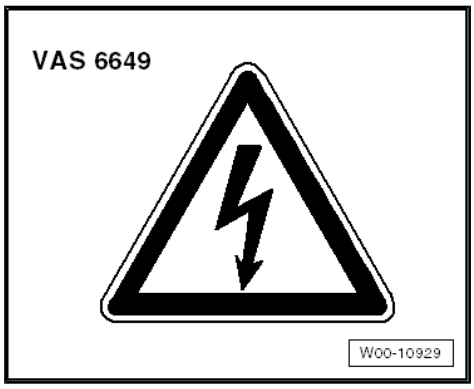
Note

- *Check the contact surfaces on the potential equalization cable before installation.*
- *The contact surfaces must be clean. There must be no rust or grease on them.*
- *If necessary, clean the contact surfaces using the Contact Surface Cleaning Set - VAS6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97 ; Contact Surface Cleaning Set -VAS6410- .*

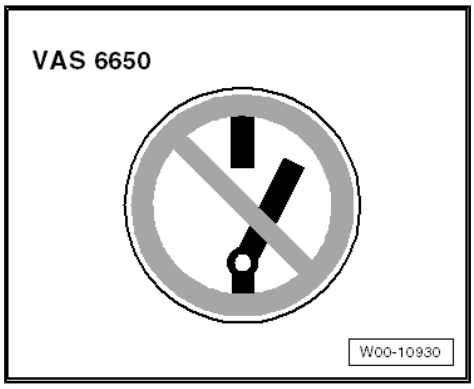
19 Special Tools

Special tools and workshop equipment required

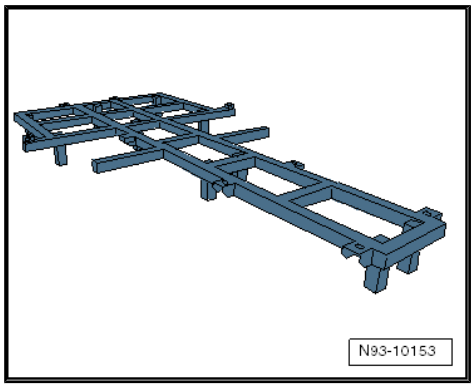
- “Danger High Voltage” Sticker



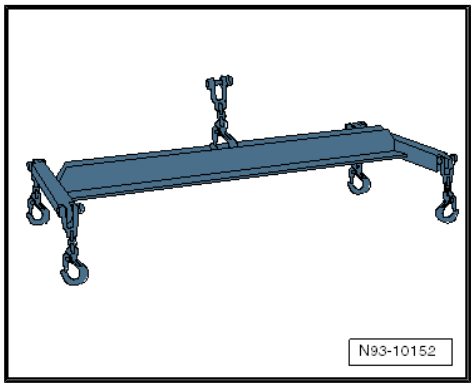
- “Do Not Switch On High Voltage System” Sticker



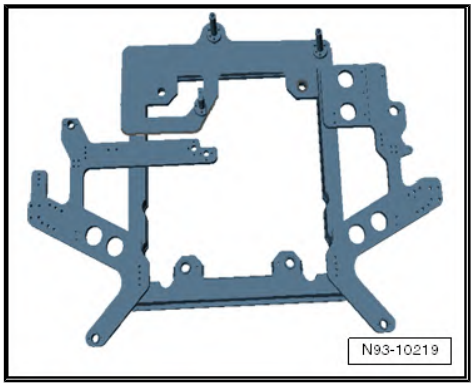
- High Voltage Battery Holder AX6, on Floor Panel



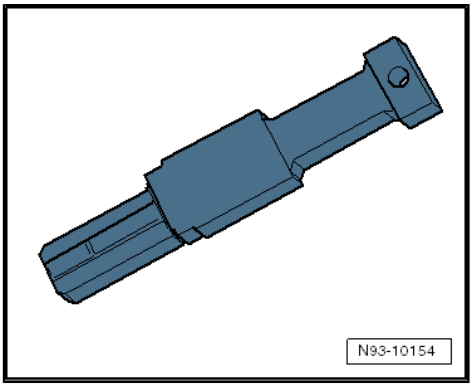
- Lifting Tool, High Voltage Battery AX5, Inside Luggage Compartment



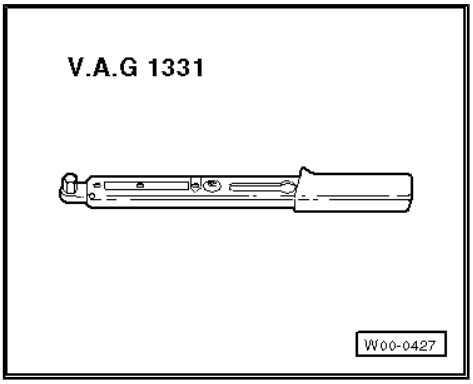
- Mount for Electro-Drive Drive Motor - V141-



- Tool For Unlocking High Voltage Cable from High Voltage Batteries

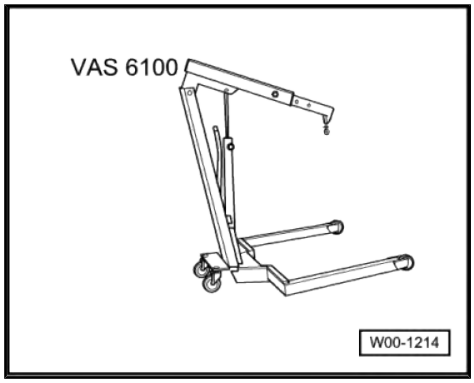


- Tray - VAG1306-
- Torque Wrench 1331 5-50Nm - VAG1331-

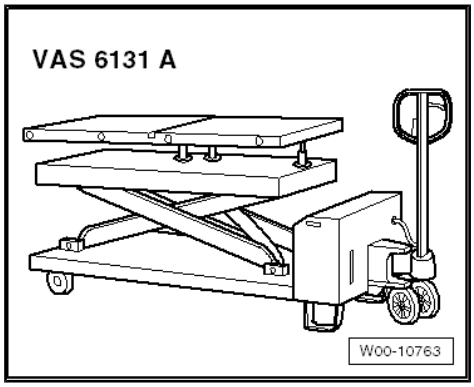


- Ladder - VAS5085-

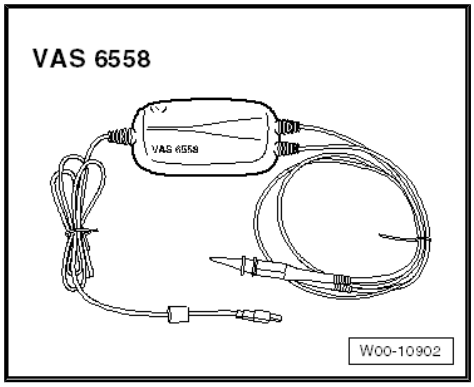
- Shop Crane - VAS6100-



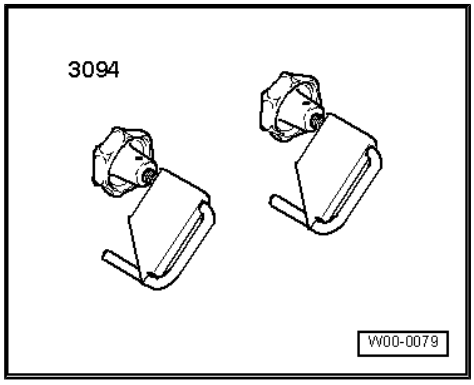
- Scissor Lift Table - VAS6131A-



- Hybrid Test Module - VAS6558-



- Hose Clamps - Up To 25mm - 3094-



20 Revision History

DRUCK NUMBER: K0059051421

Factory Edition	Edit Edition	Job Type	Feedback	Notes	Quality Checked By
10.2014	09/04/2015	Local Update		Changed 5K1 to 5K1 while awaiting factory update in reference to feedback 1121655	Tom Perry
10.2014	12/15/2014	Factory Update	N/A		Tom Perry