



## Workshop Manual e-up! 2014 ➤

### Electric motor (210, LS1)

Engine ID	EAB A								
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Edition 09.2018

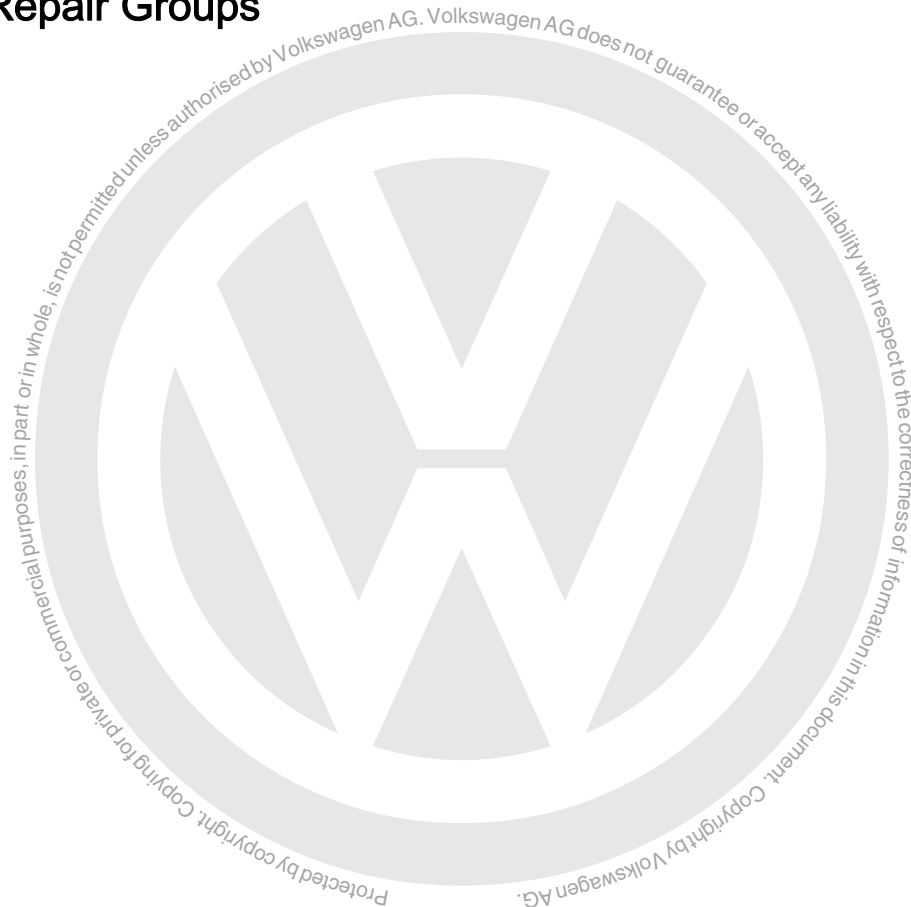


## List of Workshop Manual Repair Groups

### Repair Group

00 - Technical data

93 - Electric drive systems



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



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## 00 – Technical data

### 1 Safety information

(VRL012266; Edition 09.2018)

⇒ [“1.1 Safety precautions when working on a high-voltage system”, page 1](#)

⇒ [“1.2 Safety precautions when working in the vicinity of high-voltage components”, page 2](#)

⇒ [“1.3 Safety precautions when using testers and measuring instruments during a road test”, page 2](#)

⇒ [“1.4 Safety precautions when working on the cooling system”, page 2](#)

#### 1.1 Safety precautions when working on a high-voltage system

##### Danger to life from high voltage

The high-voltage system is under high voltage. Severe or fatal injury from electric shock.

- Persons with life-preserving or other electronic medical devices in or on their body must not perform any work on the high-voltage system. Such medical devices include internal analgesic pumps, implanted defibrillators, pacemakers, insulin pumps and hearing aids.
- The high-voltage system must be de-energised by a suitably qualified technician.

##### Risk of injury due to unexpected motor start

On electric and hybrid vehicles, it can easily be missed that the vehicle is in „ready“ mode. There is a risk of parts of the body becoming trapped or drawn in.

- Switch off ignition.
- Always store the ignition key outside the vehicle.

##### Risk of damage to high-voltage cables

Improper handling of high-voltage cables or high-voltage connectors can result in damage to their insulation.

- Never support body weight on high-voltage cables or high-voltage connectors.
- Never support any tools on high-voltage cables or high-voltage connectors.
- Never kink or severely bend high-voltage cables.
- Always observe the coding when connecting high-voltage connectors.



## 1.2 Safety precautions when working in the vicinity of high-voltage components

### Danger to life from high voltage

The high-voltage system is under high voltage. Damage to high-voltage components can result in severe or fatal injury from electric shock.

- Perform visual check of high-voltage components and high-voltage cables.
- Never use cutting or forming tools, or any other sharp-edged tools.
- Never use heat sources such as welding, brazing, soldering, hot air or thermal bonding equipment.

## 1.3 Safety precautions when using testers and measuring instruments during a road test

### Risk of injury caused by unsecured testing and measuring instruments

When the front passenger airbag is triggered in an accident, insufficiently secured testing and measuring instruments become dangerous projectiles.

- Secure testing and measuring instruments on the rear seat.

or

- Have a second person operate the test and measuring equipment on the rear seat.

## 1.4 Safety precautions when working on the cooling system

### Danger of scalding by hot coolant

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.





## 2 Repair instructions

⇒ [“2.1 Contact corrosion”, page 3](#)

⇒ [“2.2 Routing and attachment of lines”, page 3](#)

⇒ [“2.3 Rules for cleanliness when working on high-voltage system”, page 3](#)

### 2.1 Contact corrosion

Contact corrosion can occur if non-approved fasteners are used on the vehicle (bolts, nuts, washers, etc.).

For this reason, only connecting elements with a special surface coating have been fitted.

Furthermore, rubber and plastic components as well as adhesives are made of non-conductive materials.

If there is any doubt about the suitability of parts, a general rule is to use new parts ⇒ Electronic parts catalogue.

**Observe the following:**

- ◆ Only use genuine replacement parts which are tested and compatible with aluminium.
- ◆ Only use Volkswagen Genuine Accessories.
- ◆ Damage resulting from contact corrosion is not covered by the warranty.

### 2.2 Routing and attachment of lines

- ◆ Mark lines prior to removal to prevent them from being interchanged and to ensure that they are fitted in their original positions. This applies for fuel, hydraulic and vacuum lines as well as lines for activated charcoal filter system and electrical wiring. Make sketches or take photographs if necessary.
- ◆ To avoid damaging pipes and wires, ensure adequate clearance from all moving or hot components in the engine compartment on account of the confined space.

### 2.3 Rules for cleanliness when working on high-voltage system

When working on the high-voltage system, pay careful attention to the following rules for cleanliness:

- ◆ Thoroughly clean all connections/inspection holes and corresponding surrounding areas before disconnecting/opening them.
- ◆ Place removed parts on a clean surface and cover them over. Use lint-free cloths only.
- ◆ Carefully cover opened components or seal them if repairs cannot be carried out immediately.
- ◆ Install only clean components.
- ◆ Remove packing from replacement parts immediately prior to installation and not before.
- ◆ Do not use parts that have been kept unpackaged (for example in toolboxes).
- ◆ Transportation and protective packaging and sealing caps must be removed only immediately before fitting.
- ◆ If system is open, do not work with compressed air. Do not move the vehicle.



### 3 Hazard classification for the high-voltage system

#### DANGER

The vehicle's high-voltage system and the high-voltage battery are dangerous and can cause burns or other injuries and even lead to a fatal electric shock.

- Any work on the high-voltage system, or on systems which could be indirectly affected by it, must only be carried out by properly trained and qualified expert personnel.
- In the event of queries or uncertainties regarding the terms "high-voltage technician" or "high-voltage expert", or those concerning the high-voltage system, the responsible importer must be contacted prior to the start of any work.
- Any repair work must be performed in accordance with applicable laws and regulations, the state-of-the-art technology, any relevant accident prevention regulations (in Germany, including but not limited to the BGI/GUV-I 8686 – Training for work on vehicles with high voltage systems), as well as this workshop manual.

Before work on the high-voltage system is started, a high-voltage technician must de-energise the high-voltage system

⇒ [page 167](#) .

The types of work for which the high-voltage system has to be de-energised are indicated in the list entitled "Work on the high-voltage system" ⇒ [page 4](#) .

#### Work for which the high-voltage system has to be de-energised:

- ◆ Only the HVT is authorised to de-energise the high-voltage system so that it is certified.
- ◆ All work on an e-up! must be carried out only by those who are at least qualified as electrically instructed persons (EIP).
- ◆ Regardless of the work to be performed, visually inspect high-voltage components in the work area.
- ◆ The high-voltage cables must not be extensively bent or kinked.
- ◆ In the event of conspicuous findings or uncertainties, the high-voltage technician (HVT) or the high-voltage expert (HVE) must be consulted.
- ◆ Any work involving metal-removing, deforming and sharp-edged tools or heat sources such as welding, soldering, hot air, thermal bonding and infrared drying in the vicinity of high-voltage components and cables is prohibited. In this case, the high-voltage system must be de-energised and the respective component removed or sufficiently protected.
- ◆ All listed work refers to the removal and installation or the renewal of the individual components.
- ◆ For reasons of safety, the following activities must not be carried out during charging.
- ◆ Activities that prolong the charging process.
- ◆ Activities for which the vehicle must be de-energised and made safe in accordance with the ensuing hazard rating.
- ◆ Activities during which the vehicle is moved and cables and connectors could be placed under strain (pulled).



- ◆ Activities during which the connected charging cable could present a danger of tripping and injury.
- ◆ Activities during which the charging cable could block work paths and emergency exit routes.
- ◆ Activities on the 12V battery.
- ◆ For regular maintenance work, the high-voltage system does not have to be de-energised.

### Explanation of qualifications

#### Working on high-voltage system

Qualification Volkswagen	DGUV-I 200-005	Scenario
EIP (person with electrical training)	Chapter 2	Induction training for non-electrical work (< 60 VDC)
HVT (high-voltage technician)	Chapter 3.1 b	Working on inherently safe HV production vehicles <ul style="list-style-type: none"> <li>◆ Vehicles are de-energised exclusively with certification.</li> <li>◆ Complete contact protection in place.</li> </ul>
HVE level 1 (high-voltage expert)	Chapter 3.2 b	Working on not inherently safe HV production vehicles <ul style="list-style-type: none"> <li>◆ Vehicles are also de-energised without certification or there is no complete contact protection in place, e.g. in the event of an accident.</li> </ul>
HVE level 2 (high-voltage expert)	Chapter 3.3	Working on live accumulators <ul style="list-style-type: none"> <li>◆ Working on live parts, inevitably with no contact protection, for fault finding, component replacement, etc.</li> </ul>

When working on the following components:	Minimum qualification ➔ <a href="#">page 5</a>
De-energise high-voltage system	HVT

#### Work on power unit

When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➔ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Three-phase current drive - VX54-	X			EIP



When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➔ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Electric drive motor - V141-	X			EIP
Drive motor temperature sender/rotor position sender -G712- / -G713-	X			EIP

**Work on power and control electronics for electric drive**

When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➔ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Power and control electronics for electric drive - JX1- with ♦ Electric drive control unit - J841- ♦ Intermediate circuit capacitor 1 - C25- ♦ Voltage converter - A19- ♦ DC/AC converter for drive motor - A37-	X			EIP
High-voltage system fuse 3 - S353-	X			EIP

**Work on high-voltage system**

When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➔ <a href="#">page 5</a>
	yes (diagnostic and manual power disconnection)		no	
Potential equalisation lines (earth) with connection to HV components	X			HVT
Measure insulation resistance	X			HVT
Maintenance connector for high-voltage system (service connector, service disconnect)			X	EIP
PX – high-voltage cables (orange) in vehicle	X			HVT

**Work on heating and air conditioning system**

When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➔ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Electrical air conditioner compressor - V470-	X			EIP
High-voltage heater (PTC) - Z115-	X			EIP



When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➤ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Work on heating and air conditioning system in vehicle interior			X	EIP
Refrigerant lines in the vehicle periphery (work which is not directly on the AC compressor and can be carried out without opening the refrigerant circuit, e.g. loosening and securing refrigerant lines)			X	EIP
Air conditioning performance test (for checking the pressure levels in the refrigerant circuit by means of air conditioning service equipment)			X	EIP
Refrigerant lines directly on the AC compressor	X			EIP
Extract, evacuate or fill refrigerant			X	EIP
Coolant circulation pump before power and control electronics for electric drive - V508-			X	EIP

### Work on charging connection

When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➤ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
High-voltage battery charging socket 1 - UX4- with <ul style="list-style-type: none"> <li>◆ Temperature sender for charging socket 1 - G853-</li> <li>◆ LED module for charging socket 1 - L263-</li> <li>◆ Actuator for high-voltage charging socket lock 1 - F498-</li> </ul>	X			EIP
Immediate charge button - E766-			X	EIP
Manual release mechanism for charging connector	X			EIP
Charge high-voltage battery in workshop area			X	EIP

### Work on charging unit

When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➤ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Charging unit 1 for high-voltage battery - AX4- with control unit for high-voltage battery charging unit - J1050-	X			EIP

**Work on high-voltage battery**

When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➔ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Remove and install underbody cladding			X	EIP
Remove and install high-voltage battery 1 - AX2-	X			HVT
Disconnect high-voltage network connection	X			HVT
Disconnect low-voltage connection of high-voltage battery			X	EIP
Removing and installing high-voltage battery 1 - AX2- service cover			X	HVE
Battery regulation control unit - J840-			X	HVE
Module monitor control unit for batteries - J497- (battery removed)				HVE
Switching unit for high-voltage battery - SX6- (battery removed)				HVE
Open high-voltage battery 1 - AX2- (battery removed)				HVE
Bond high-voltage battery 1 - AX2- (battery removed)				HVE
Battery module 1 - J991- and other battery modules (battery removed)				HVE

**Work on accident vehicles**

When working on the following components:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➔ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Assessment of condition of high-voltage battery 1 - AX2-				HVT
Body work (with straightening jig)	X			EIP
Paint vehicle – observe instructions in paint manual			X	EIP

**Work in vicinity of high-voltage components**

When working on the following components or for following work:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➔ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Body work (assembly work as well as glass and dent repairs)			X	EIP
Gearbox with electric drive motor	X			EIP
Steering rack	X			EIP
Subframe, front	X			EIP





When working on the following components or for following work:	Must the HVT de-energise high-voltage system before work is started?			Minimum qualification: ➤ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Front brakes			X	EIP
Rear brakes			X	EIP
Brake servo			X	EIP
Brake pressure accumulator for energy recovery of brake system			X	EIP
Rear axle and running gear			X	EIP
Underbody cladding			X	EIP
When welding, cover high-voltage components and visually inspect afterwards	X			EIP
Work involving metal-removing, deforming and sharp-edged tools or heat sources such as welding, soldering, hot air, thermal bonding and infrared drying in the vicinity of high-voltage components and cables	X			EIP
Work for which the motor is lifted, right side (e.g. motor mounting)			X	EIP
Work for which the motor is lifted, left side (e.g. gearbox mounting)	X			EIP
Control units and electric components of 12-V system (except airbag)			X	EIP
Battery - A-			X	EIP
Front left headlight - MX1-			X	EIP
Front right headlight - MX2-			X	EIP
Change bulb in headlight			X	EIP

### General work

When working on the following components:	De-energise high-voltage system before work is started?			Minimum qualification: ➤ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Drain and fill fluids (coolant and oils)			X	EIP
Coolant circuit and coolant expansion tank			X	EIP
Change tyres			X	EIP
Miscellaneous work on 12 V system (excluding airbag)			X	EIP
Work on earth points of 12-V system (without potential equalisation lines)			X	EIP
Tail lights			X	EIP
Renew/repair windows			X	EIP
Repairs in vehicle interior			X	EIP
Repairs in roof area			X	EIP
Repairs on rear lid			X	EIP
Repairs on bumpers			X	EIP



When working on the following components:	De-energise high-voltage system before work is started?			Minimum qualification: ➔ <a href="#">page 5</a>
	yes (manual power disconnect)		no	
Move lock carrier to service position (with high-voltage battery charging socket 1 - UX4- )	X			EIP
Removing and installing lock carrier (with high-voltage battery charging socket 1 - UX4- )	X			EIP
Assembly work on lock carrier (with high-voltage battery charging socket 1 - UX4- )	X			EIP
Move lock carrier to service position			X	EIP
Remove and install lock carrier			X	EIP
Repair work on lock carrier			X	EIP



## 93 – Electric drive systems

### 1 High-voltage components

⇒ [“1.1 Overview of fitting locations - high-voltage components”, page 11](#)

⇒ [“1.2 Testing high-voltage components and high-voltage cables”, page 12](#)

#### 1.1 Overview of fitting locations - high-voltage components

##### 1 - High-voltage battery charging socket 1 - UX4-

- ☐ Assembly overview  
⇒ [page 174](#)
- ☐ Removing and installing  
⇒ [page 175](#)

##### 2 - High-voltage battery 1 - AX2-

- ☐ Assembly overview  
⇒ [page 17](#)
- ☐ Removing and installing  
⇒ [page 25](#)

##### 3 - Power and control electronics for electric drive - JX1-

- ☐ Assembly overview  
⇒ [page 109](#)
- ☐ Removing and installing  
⇒ [page 110](#)

##### Integrated components:

- ◆ Electric drive control unit - J841-
- ◆ Intermediate circuit capacitor 1 - C25-
- ◆ Voltage converter - A19-
- ◆ DC/AC converter for drive motor - A37-

##### 4 - Charging unit 1 for high-voltage battery - AX4-

- ☐ With control unit for high-voltage battery charger - J1050-
- ☐ Assembly overview  
⇒ [page 185](#)
- ☐ Removing and installing ⇒ [page 186](#)

##### 5 - High-voltage heater (PTC) - Z115-

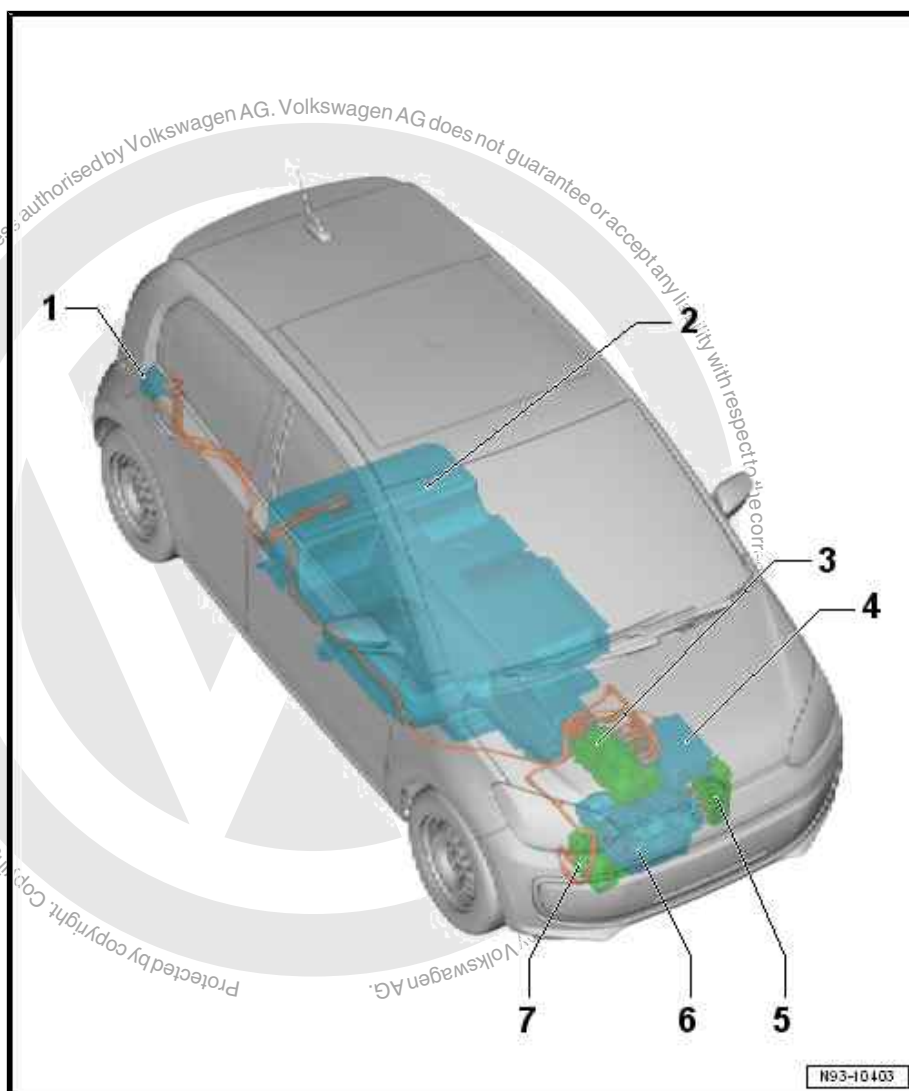
- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Coolant circuit; Removing and installing High-voltage heater (PTC) - Z115- and high-voltage heater control unit (PTC) - J848-

##### 6 - Three-phase current drive - VX54-

- ☐ Assembly overview ⇒ [page 118](#)
- ☐ Removing and installing ⇒ [page 121](#)

##### Integrated components:

- ◆ Electric drive motor - V141-





- ◆ Drive motor temperature sender - G712-
- ◆ Drive motor rotor position sender 1 - G713-

#### 7 - Electrical air conditioner compressor - V470-

- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87; Air conditioner compressor; Removing and installing Electrical air conditioner compressor - V470-

### 1.2 Testing high-voltage components and high-voltage cables

- Check high-voltage components and high-voltage cables for external damage.
- Check insulation of high-voltage cables and potential equalisation lines.



## 2 Warning stickers

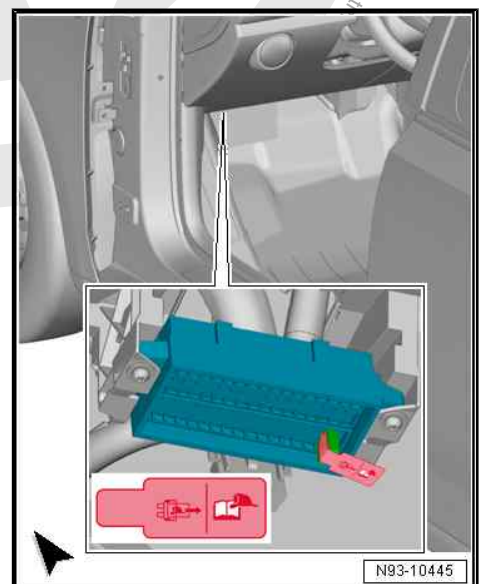
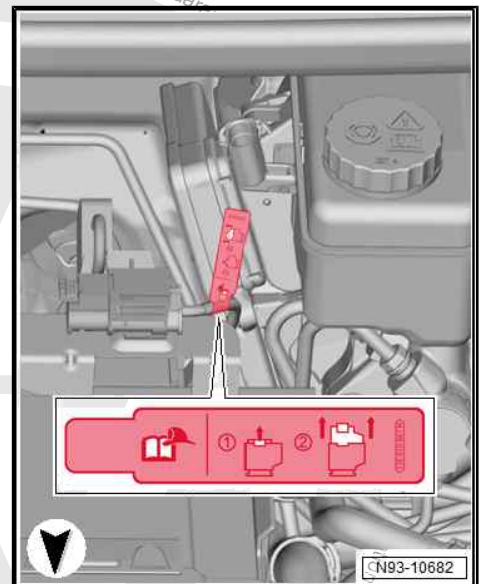
⇒ **"2.1 Checking warning stickers", page 13**

### 2.1 Checking warning stickers

All high-voltage components are equipped with warning stickers.

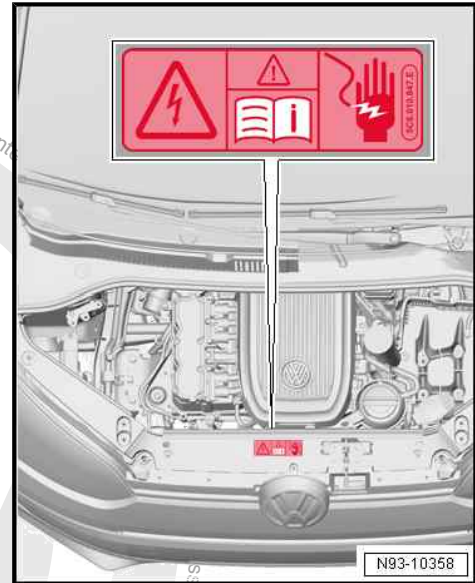
When performing maintenance work, ensure that warning stickers are not soiled or damaged and are present on all high-voltage components.

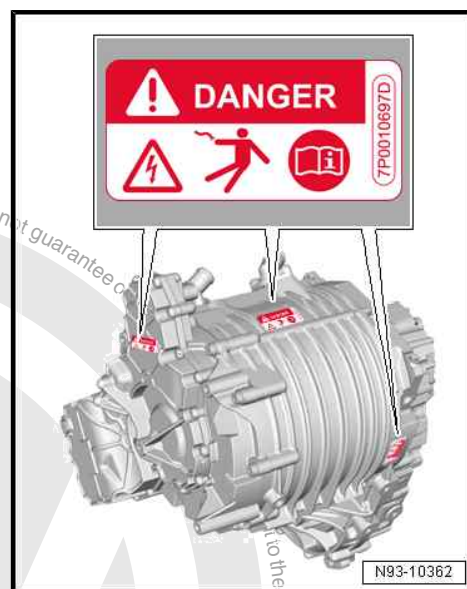
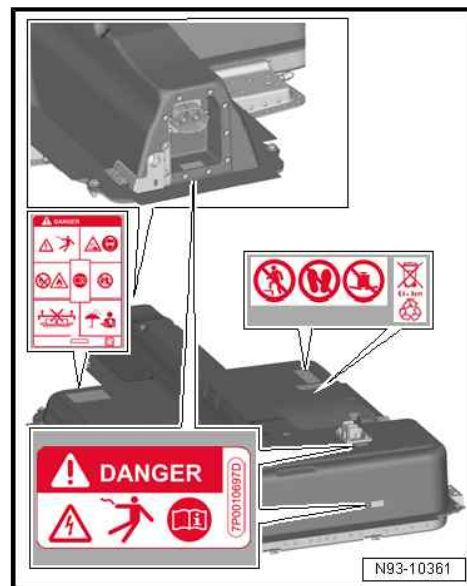
Warning stickers must be fitted on following assembly groups:



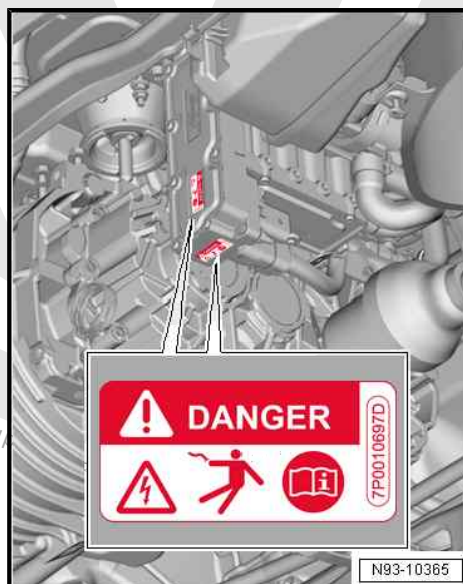
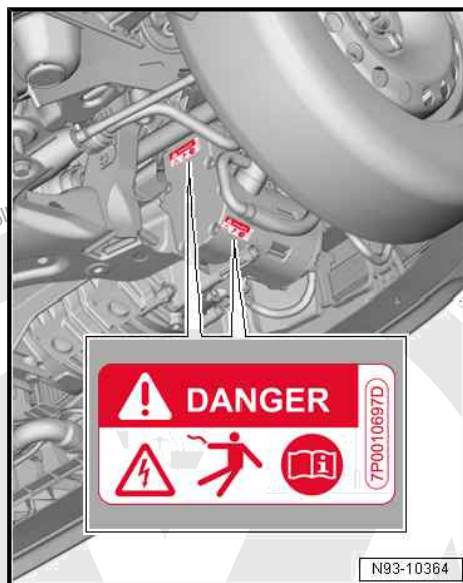


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- ◆ Rescue information, in motor compartment underneath cover for motor compartment
- ◆ Rescue information, interior
- ◆ Front lock carrier
- ◆ Service flap, battery regulation control unit
- ◆ Battery regulation control unit
- ◆ High-voltage battery 1 - AX2-
- ◆ Three-phase current drive - VX54-
- ◆ Power and control electronics for electric drive - JX1-
- ◆ Electrical air conditioner compressor - V470-
- ◆ High-voltage heater (PTC) - Z115-
- ◆ Charging unit 1 for high-voltage battery - AX4-







### 3 High-voltage battery unit

⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

⇒ [“3.2 Visual inspection of high-voltage battery 1 AX2”, page 24](#)

⇒ [“3.3 Performing diagnosis on high-voltage battery 1 AX2”, page 24](#)

⇒ [“3.4 Remove and install high-voltage battery 1 AX2”, page 25](#)

⇒ [“3.5 Raising high-voltage battery 1 AX2”, page 30](#)

⇒ [“3.6 Leakage test for high-voltage battery”, page 32](#)

⇒ [“3.7 Checking high-voltage battery for leaks”, page 33](#)

⇒ [“3.8 Opening high-voltage battery 1 AX2”, page 34](#)

⇒ [“3.9 Voltage and insulation measurement”, page 38](#)

⇒ [“3.10 Opening the electric circuit”, page 40](#)

⇒ [“3.11 Sealing high-voltage battery”, page 42](#)

⇒ [“3.12 Removing and installing module monitor control unit for batteries J497”, page 46](#)

⇒ [“3.13 Removing and installing switching unit for high-voltage battery SX6”, page 47](#)

⇒ [“3.14 Removing and installing battery regulation control unit J840”, page 50](#)

⇒ [“3.15 Removing and installing charge voltage control unit for high-voltage battery J966”, page 52](#)

⇒ [“3.16 Removing and installing cable guide”, page 53](#)

⇒ [“3.17 Visual check of wiring harness”, page 57](#)

⇒ [“3.18 Removing and installing battery test lead”, page 57](#)

⇒ [“3.19 Discharging and charging capacitor”, page 60](#)

⇒ [“3.20 Removing and installing capacitors”, page 62](#)

⇒ [“3.21 Charging and discharging the battery modules”, page 62](#)

⇒ [“3.22 Removing and installing battery modules”, page 64](#)

⇒ [“3.23 Removing and installing crash bar”, page 107](#)

#### 3.1 Assembly overview - high-voltage battery

##### Assembly overview I - high-voltage battery

There are two versions of the high-voltage battery 1 - AX2- :

- ◆ Without a DC charging connection
- ◆ With a DC charging connection



### 1 - Nuts

- ☐ Qty. 4
- ☐ Renew after removal
- ☐ 4 Nm

### 2 - Bolts

- ☐ Qty. 8
- ☐ 10 Nm

### 3 - Upper part of battery

- ☐ With shielding
- ☐ Renew after removal

### 4 - Locating piece

### 5 - Charging connection

- ☐ DC-charging equipment version

### 6 - Seal

- ☐ Renew after removal

### 7 - Battery modules

- ☐ Assembly overview  
⇒ [page 20](#)
- ☐ Connection diagram  
⇒ [page 21](#)

### 8 - Bolts

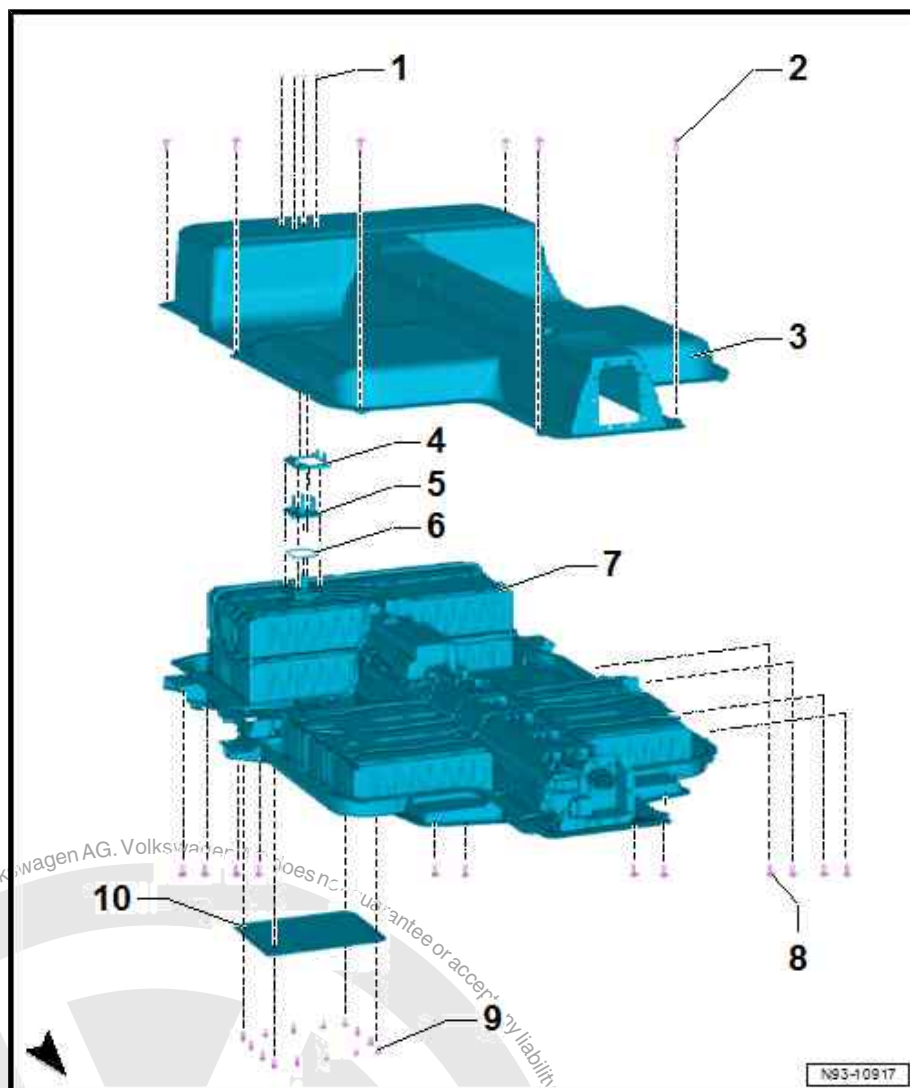
- ☐ Qty. 12
- ☐ 40 Nm

### 9 - Bolts

- ☐ Qty. 14
- ☐ Observe tightening sequence ⇒ [page 52](#)
- ☐ 5.5 Nm

### 10 - Service flap

- ☐ Renew after removal
- ☐ Remove the service cover from its packaging only immediately before installing
- ☐ Check service cover seal for damage
- ☐ Apply four-eyes principle when installing service cover
- ☐ Removing and installing ⇒ [page 50](#)



## Assembly overview II - high-voltage battery





#### 1 - Battery regulation control unit - J840-

- ☐ Removing and installing  
⇒ [page 50](#)

#### 2 - Switching unit for high-voltage battery - SX6-

- ☐ Removing and installing  
⇒ [page 47](#)

#### 3 - Module monitor control unit for batteries - J497-

- ☒ For battery modules
- ☐ Removing and installing  
⇒ [page 46](#)

#### 4 - Silicate bag

- ☐ Renew every time high-voltage battery 1 - AX2- is opened
- ☐ Remove from packaging only immediately before bonding

#### 5 - Wiring guide

- ☐ Removing and installing  
⇒ [page 53](#)

#### 6 - Bolts

- ☐ For upper modules
- ☐ Qty. 4 per battery module
- ☐ 8 Nm

#### 7 - Bolts

- ☐ Mountings for upper modules and fastener for lower modules
- ☐ Qty. 4 per battery module
- ☐ Renew after removal
- ☐ 8 Nm +180°

#### 8 - Battery modules

- ☐ Assembly overview ⇒ [page 20](#)
- ☐ Connection diagram ⇒ [page 21](#)

#### 9 - Lower shell of battery

#### 10 - Bolts

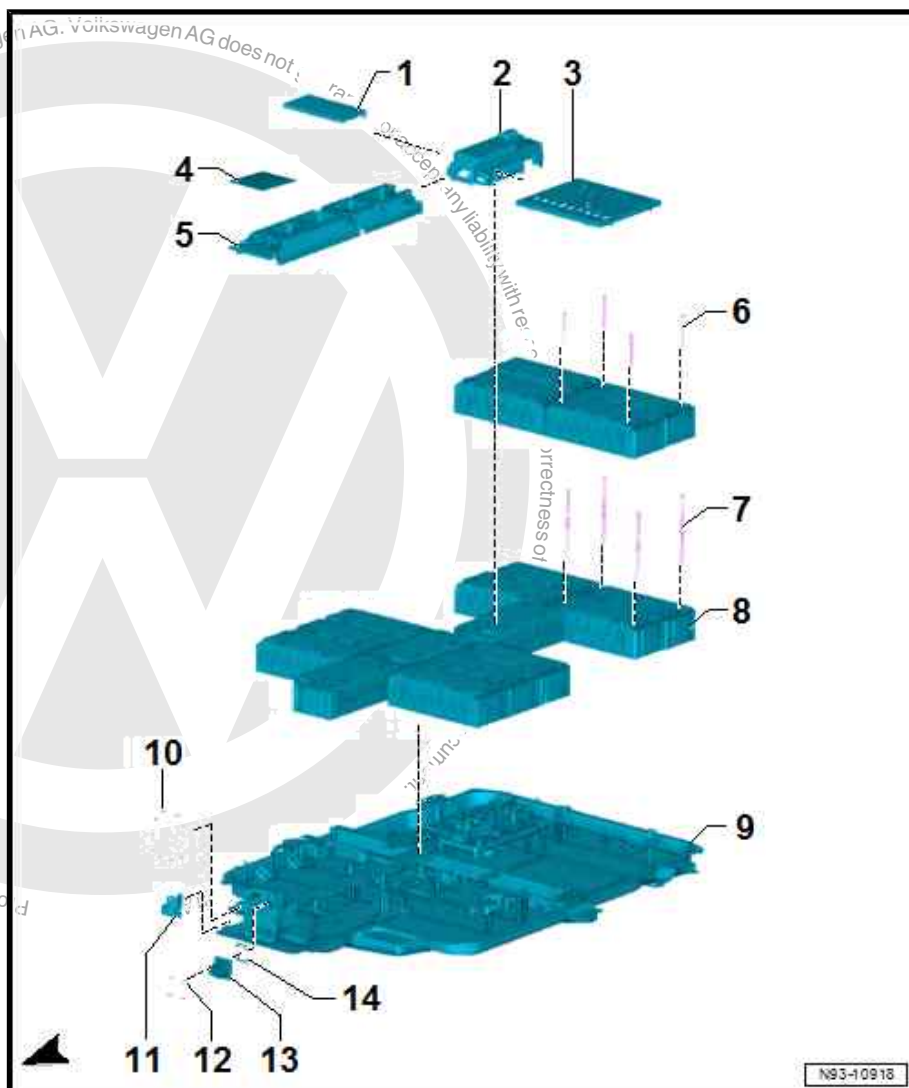
- ☐ Qty. 10
- ☐ 4 Nm

#### 11 - Bracket

- ☐ For onboard electrical system wiring harness

#### 12 - Bolts

- ☐ Qty. 4
- ☐ Renew after removal
- ☐ 4 Nm





### 13 - High-voltage network wiring junction

### 14 - Seal

- ☐ Renew after removal

### Assembly overview - battery modules

#### 0 - Battery module 0 - J1068-

- ☐ Removing and installing  
⇒ [page 64](#)

#### 1 - Battery module 1 - J991-

- ☐ Removing and installing  
⇒ [page 66](#)

#### 2 - Battery module 2 - J992-

- ☐ Removing and installing  
⇒ [page 68](#)

#### 3 - Battery module 3 - J993-

- ☐ Removing and installing  
⇒ [page 70](#)

#### 4 - Battery module 4 - J994-

- ☐ Removing and installing  
⇒ [page 73](#)

#### 5 - Battery module 5 - J995-

- ☐ Removing and installing  
⇒ [page 75](#)

#### 6 - Battery module 6 - J996-

- ☐ Removing and installing  
⇒ [page 77](#)

#### 7 - Battery module 7 - J997-

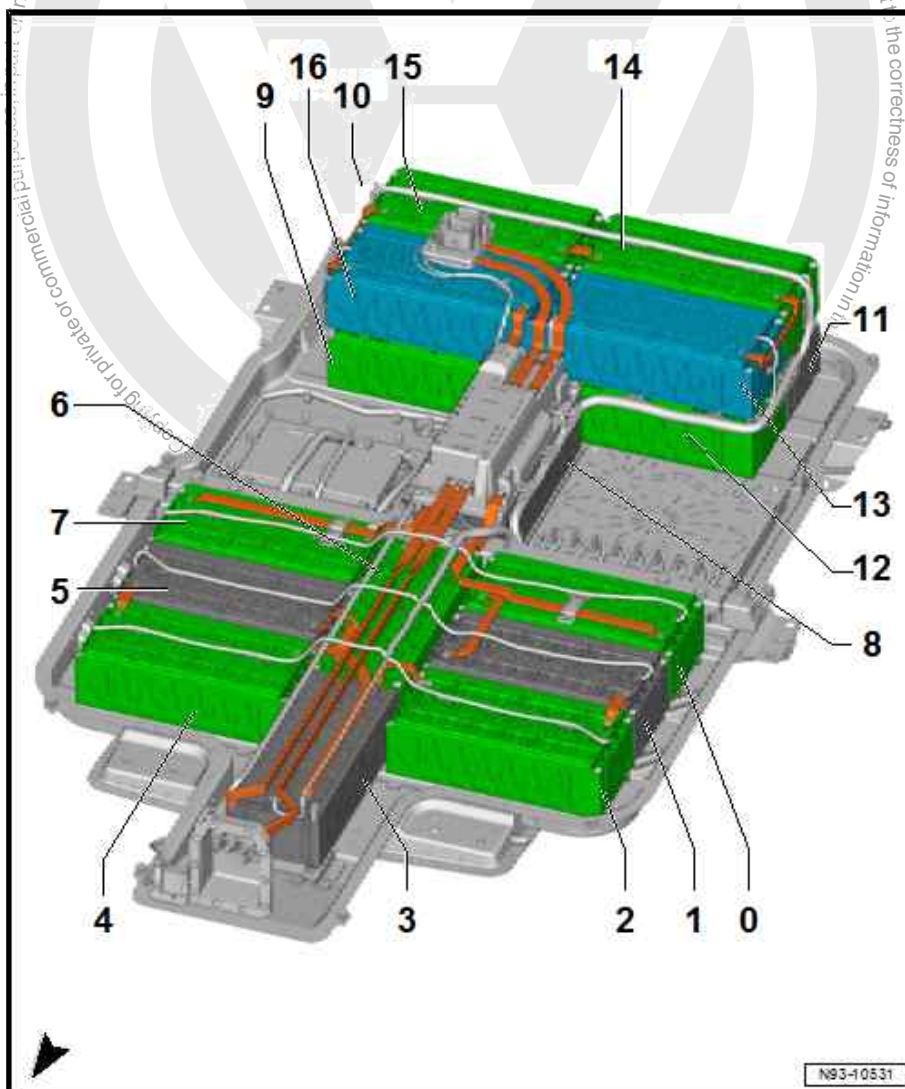
- ☐ Removing and installing  
⇒ [page 81](#)

#### 8 - Battery module 8 - J998-

- ☐ Removing and installing  
⇒ [page 83](#)

#### 9 - Battery module 9 - J999-

- ☐ Removing and installing





⇒ [page 86](#)

**10 - Battery module 10 - J1000-**

- ❑ Removing and installing ⇒ [page 88](#)

**11 - Battery module 11 - J1001-**

- ❑ Removing and installing ⇒ [page 91](#)

**12 - Battery module 12 - J1002-**

- ❑ Removing and installing ⇒ [page 93](#)

**13 - Battery module 13 - J1045-**

- ❑ Removing and installing ⇒ [page 96](#)

**14 - Battery module 14 - J1046-**

- ❑ Removing and installing ⇒ [page 99](#)

**15 - Battery module 15 - J1047-**

- ❑ Removing and installing ⇒ [page 102](#)

**16 - Battery module 16 - J1048-**

- ❑ Removing and installing ⇒ [page 105](#)

**Connection diagram for battery module**

The battery modules are connected in series.





**0 - Battery module 0 - J1068-**

- ☐ Removing and installing  
⇒ [page 64](#)
- ☐ Nuts for high-voltage  
connecting piece
- ☐ 7.5 Nm

**1 - Battery module 1 - J991-**

- ☐ Removing and installing  
⇒ [page 66](#)
- ☐ Nuts for high-voltage  
connecting piece
- ☐ 7.5 Nm

**2 - Battery module 2 - J992-**

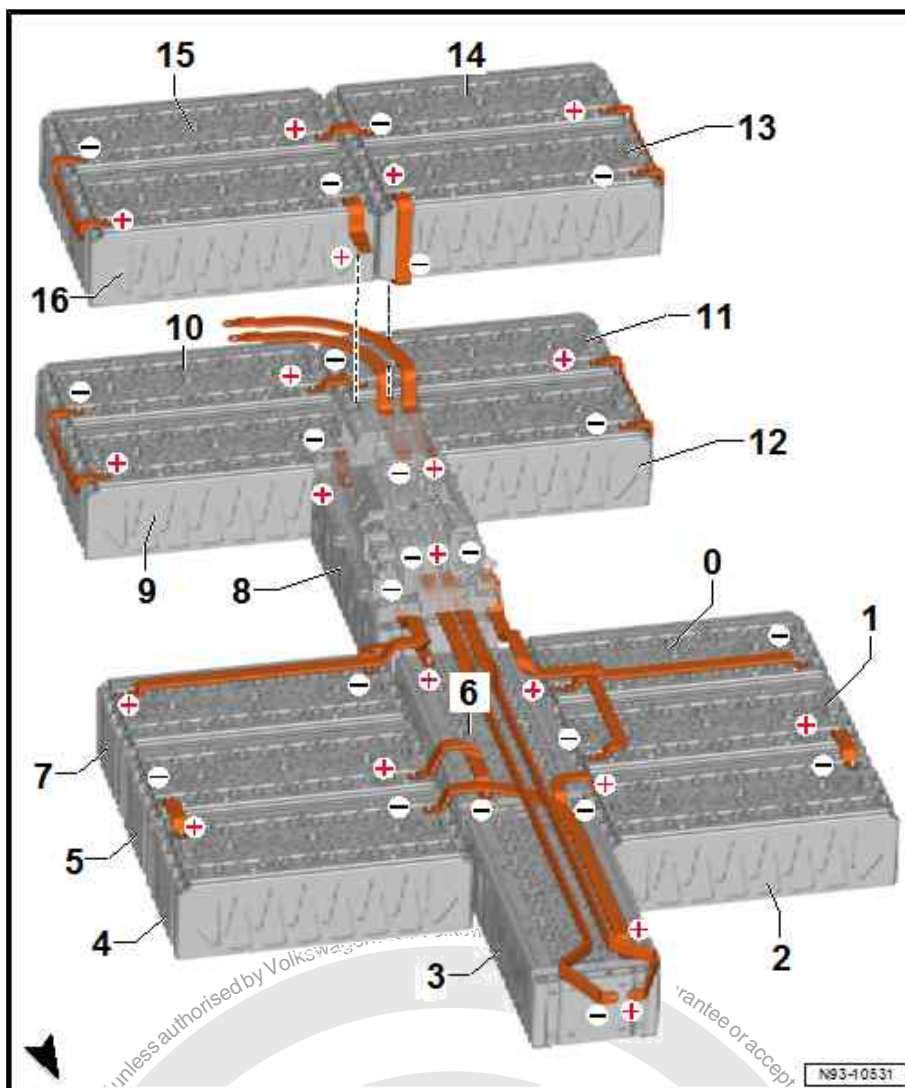
- ☐ Removing and installing  
⇒ [page 68](#)
- ☐ Nuts for high-voltage  
connecting piece
- ☐ 7.5 Nm

**3 - Battery module 3 - J993-**

- ☐ Removing and installing  
⇒ [page 70](#)
- ☐ Nuts for high-voltage  
connecting piece
- ☐ 7.5 Nm

**4 - Battery module 4 - J994-**

- ☐ Removing and installing  
⇒ [page 73](#)
- ☐ Nuts for high-voltage





connecting piece

- ☐ 7.5 Nm

#### 5 - Battery module 5 - J995-

- ☐ Removing and installing ⇒ [page 75](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 6 - Battery module 6 - J996-

- ☐ Removing and installing ⇒ [page 77](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 7 - Battery module 7 - J997-

- ☐ Removing and installing ⇒ [page 81](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 8 - Battery module 8 - J998-

- ☐ Removing and installing ⇒ [page 83](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 9 - Battery module 9 - J999-

- ☐ Removing and installing ⇒ [page 86](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 10 - Battery module 10 - J1000-

- ☐ Removing and installing ⇒ [page 88](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 11 - Battery module 11 - J1001-

- ☐ Removing and installing ⇒ [page 91](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 12 - Battery module 12 - J1002-

- ☐ Removing and installing ⇒ [page 93](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 13 - Battery module 13 - J1045-

- ☐ Removing and installing ⇒ [page 96](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 14 - Battery module 14 - J1046-

- ☐ Removing and installing ⇒ [page 99](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 15 - Battery module 15 - J1047-

- ☐ Removing and installing ⇒ [page 102](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

#### 16 - Battery module 16 - J1048-





- ☐ Removing and installing ⇒ [page 105](#)
- ☐ Nuts for high-voltage connecting piece
- ☐ 7.5 Nm

## 3.2 Visual inspection of high-voltage battery

### 1 - AX2-

#### Sequence of operations



#### CAUTION

Danger of burns from hot high-voltage battery.

Risk of burns to the hands.

- Wear protective gloves.



#### Note

*Inform the high-voltage expert if any problems arise or entries in the event memory appear.*

Check high-voltage battery 1 - AX2- for

- ◆ Cracks in battery case or battery tray
- ◆ Deformation of battery case or battery tray
- ◆ Colour changes due to temperature and tarnishing of housing
- ◆ Escaping electrolyte
- ◆ Damage to high-voltage contacts
- ◆ Legible and available information and warning stickers
- ◆ Fitted potential equalisation line
- ◆ Corrosion damage
- ◆ The DC sealing plug, which is inserted in its as-received condition, must seal the unassigned DC connection of the AC version and remain in place.
- Inform the high-voltage expert if any problems arise or entries in the event memory appear.
- After a visual inspection, carry out a diagnosis on high-voltage battery 1 - AX2- ⇒ [page 24](#).

## 3.3 Performing diagnosis on high-voltage battery 1 - AX2-

#### Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester

#### Sequence of operations



#### Note

*Carry out the diagnosis on the high-voltage battery 1 - AX2- when it is installed in the vehicle.*

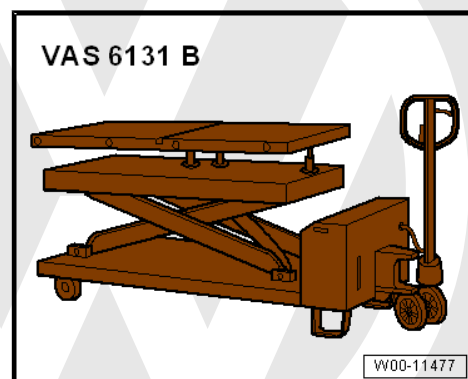
- Start Guided Fault Finding ⇒ Vehicle diagnostic tester.



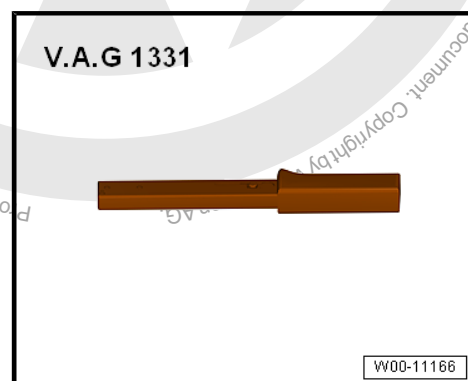
### 3.4 Remove and install high-voltage battery 1 - AX2-

#### Special tools and workshop equipment required

- ◆ Scissor-type assembly platform - VAS 6131 B-



- ◆ Torque wrench - V.A.G 1331-



- ◆ Tensioning strap - T10038-



- ◆ Set of mountings for Audi - VAS 6131/10-
- ◆ Supplement set, Audi Q7 > 2005 - VAS 6131/13-

#### Removing

- Carry out visual inspection of high-voltage battery 1 - AX2-  
⇒ [page 24](#) .



#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



## ⚠ CAUTION

**Danger of burns from hot high-voltage battery.**

**Risk of burns to the hands.**

- Wear protective gloves.

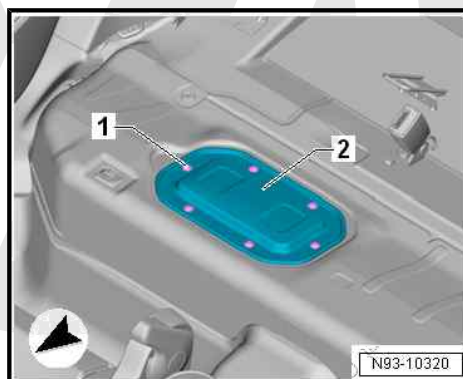


## Note

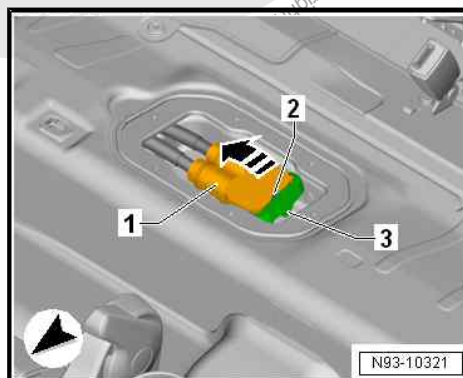
*It is not possible to remove high-voltage battery 1 - AX2- on all lifting platforms. Ensure that there is sufficient clearance.*

### Vehicles with DC charging connection

- Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Rear seats; Removing and installing bench seat / individual seats .
- Unscrew bolts -1-.
- Detach cover -2-.

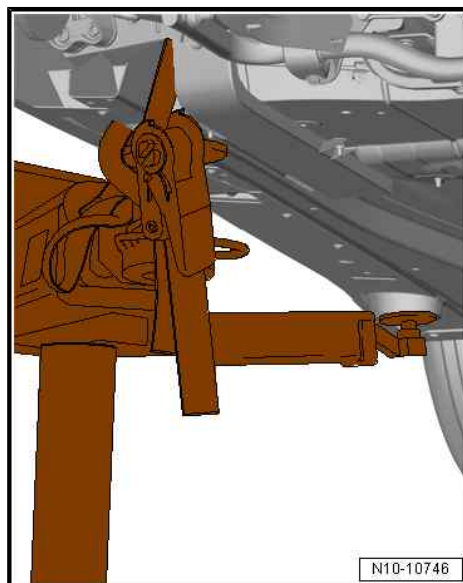


- Raise fuse -2-.
- Pull locating lug -3- forwards.
- Swing up bar in -direction of arrow-.



### Continuation for all vehicles

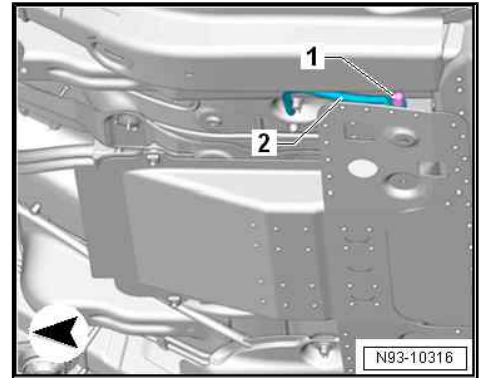
- Raise vehicle.
- Secure vehicle using tensioning strap - T10038- .
- Remove underbody covers ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cover; Assembly overview - underbody covers, e-up! .



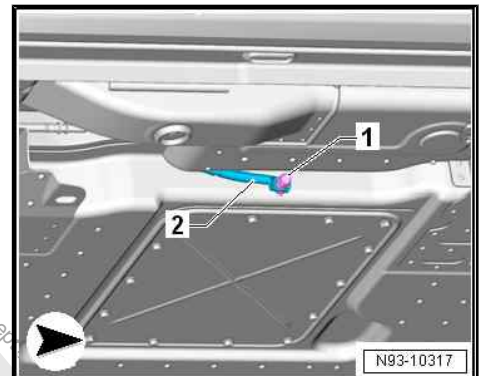




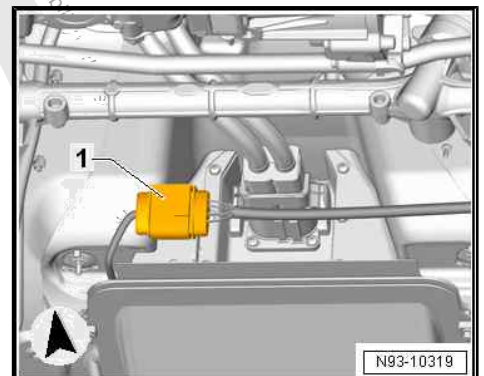
- Unscrew nut -1-.
- Detach potential equalisation line on left -2-.



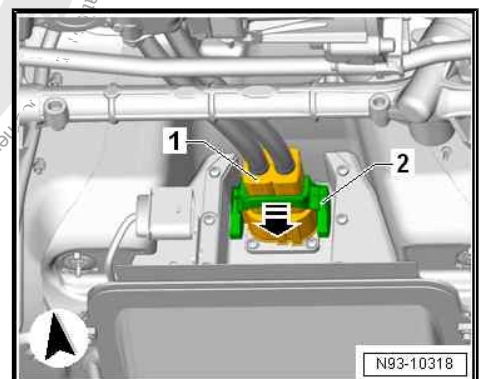
- Unscrew nut -1-.
- Detach potential equalisation line on right -2-.



- Disconnect electrical connector -1-.

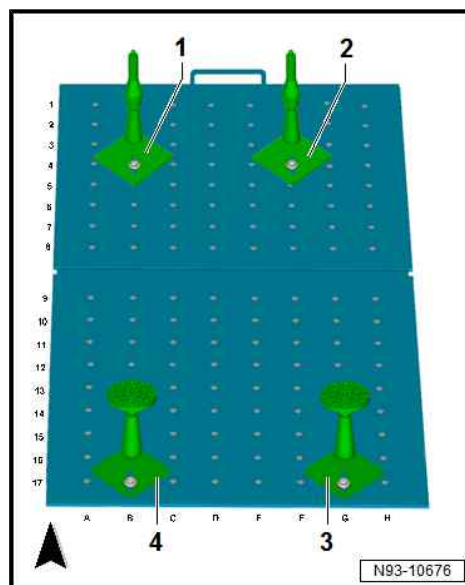


- Disconnect connector -1- by releasing locking bar -2- in -direction of arrow-.



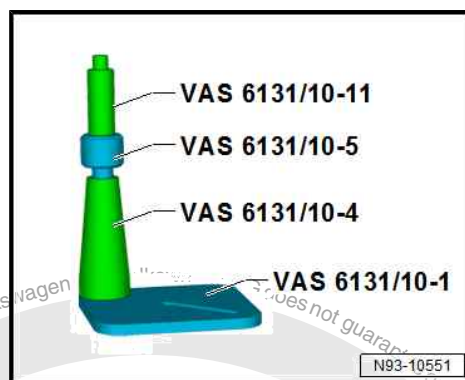


Prepare supports and scissor-type assembly platform:



Front supports -1 and 2-:

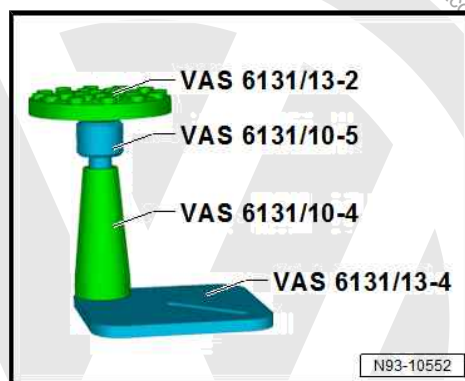
- ◆ Plate - VAS 6131/10-1-
- ◆ Taper - VAS 6131/10-4-
- ◆ Knurled section - VAS 6131/10-5-
- ◆ Support - VAS 6131/10-11-



Rear supports -3 and 4-

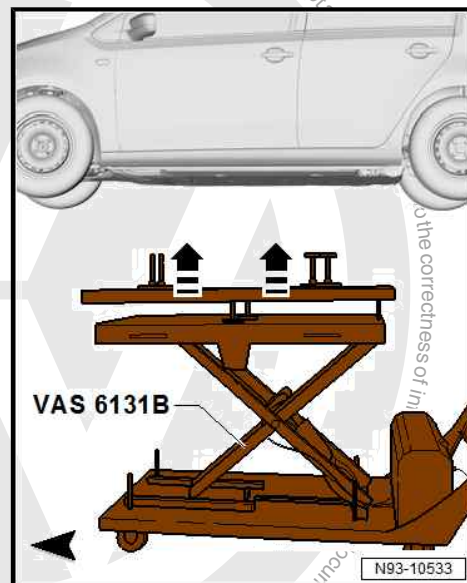
- ◆ Support - VAS 6131/13-2-
- ◆ Taper - VAS 6131/10-4-
- ◆ Knurled section - VAS 6131/10-5-
- ◆ Plate - VAS 6131/13-4-

Continuation, removing high-voltage battery 1 - AX2-

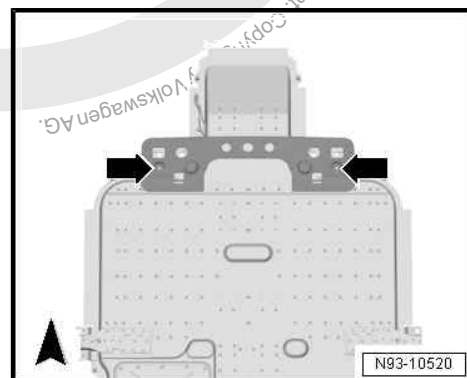




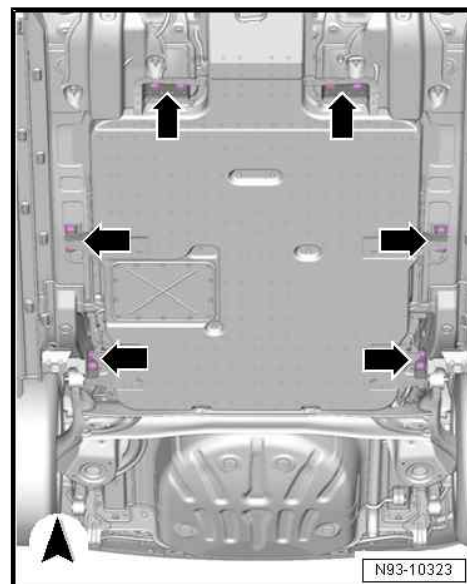
- Place prepared scissor-type assembly platform under vehicle -arrow-, and align.



- Guide front supports into holes -arrows-



- Unscrew bolts -arrows-.





- Lower high-voltage battery 1 - AX2- 3 cm -arrow A-.
- Push high-voltage battery 1 - AX2- 2 cm in direction of travel -arrow B-.
- Lower high-voltage battery 1 - AX2- completely -arrow C-.

### Installing

Install in reverse order of removal, observing the following:

- Align high-voltage battery 1 - AX2- under vehicle using scissor-type assembly platform - VAS 6131 B- .
- Raise scissor-type assembly platform - VAS 6131 B- enough to guide high-voltage battery 1 - AX2- past rear axle.
- Carefully raise high-voltage battery 1 - AX2- further.
- Bolt on high-voltage battery 1 - AX2- .



### WARNING

**Danger to life from high voltage.**

**Electrical shocks can cause serious injuries or death.**

- Have a qualified technician re-energise the high-voltage system.

- Commission high-voltage system ➔ [page 169](#)

### Specified torques

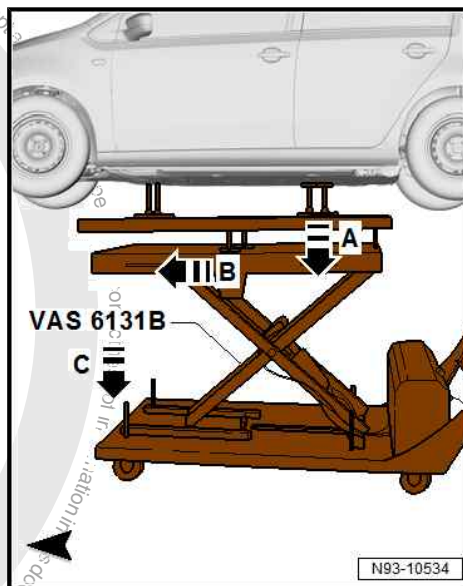
- ♦ ➔ [“3.1 Assembly overview - high-voltage battery”, page 17](#)
- ♦ ➔ [“15.1 Overview of fitting locations - potential equalisation lines”, page 170](#)

Component	Specified torque
Plug for fuel tank sender	8 Nm

## 3.5 Raising high-voltage battery 1 - AX2-

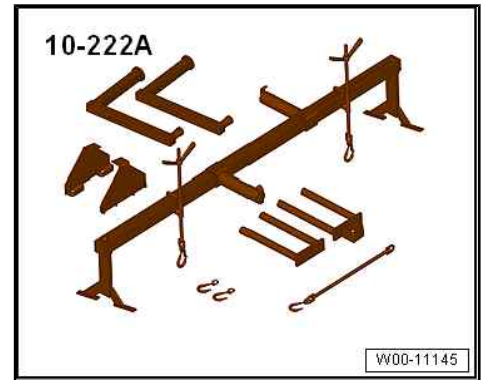
### Special tools and workshop equipment required

- ♦ Workshop hoist - VAS 6100-





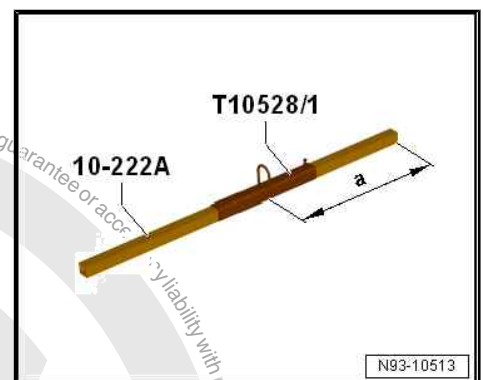
◆ Support - 10 - 222 A-



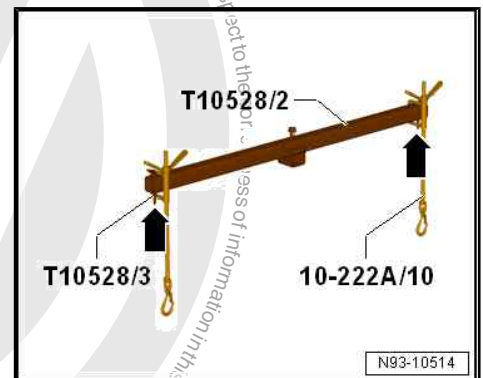
◆ Transport device - T10528-

**Sequence of operations**

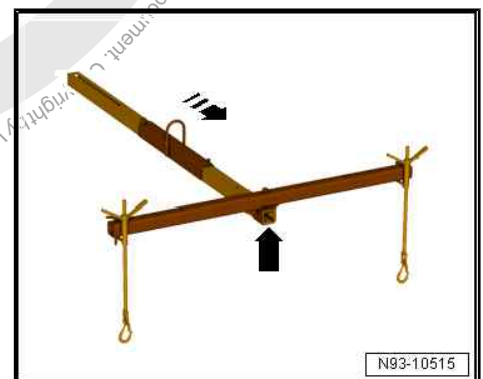
- Push support - T10528/1- onto support bracket - 10 - 222 A- .
- Adjust support - T10528/1- to -dimension a-, and lock it in position.
- -Dimension a- = 515 mm
- Hook support bracket - 10 - 222 A- with support - T10528/1- onto workshop hoist - VAS 6100- .



- Push 2 hooks - 10 - 222 A /10- onto first cross member - T10528/2- as shown in illustration.
- Push locking pins - T10528/3- into outer positions 6 -arrows-.

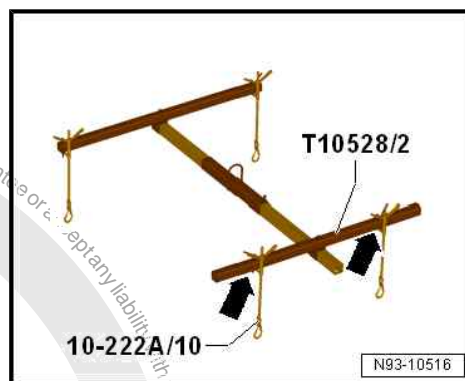


- Push prepared cross member - T10528/2- onto support bracket - 10 - 222 A- in -direction of arrow-.
- End of cross member - T10528/2- must be flush -arrow-.
- Lock cross member - T10528/2- in position.





- Push 2 hooks - 10 - 222 A /10- onto second cross member - T10528/2- as shown in illustration.
- Push locking pins - T10528/3- into inner positions 2 -arrows-.
- Push second prepared cross member - T10528/2- onto support bracket - 10 - 222 A- .
- Leave locking mechanism of cross member - T10528/2- loose.



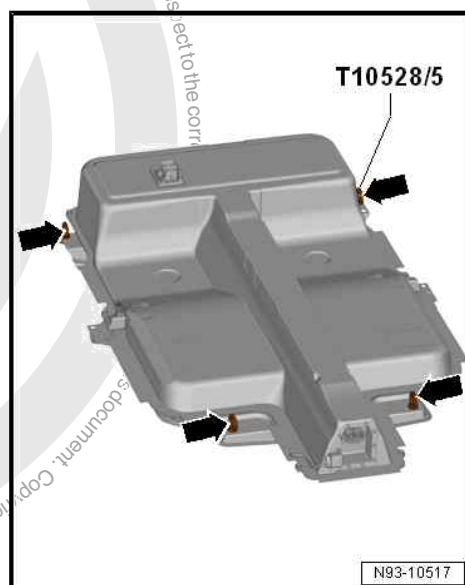
- Attach lifting eye bolts - T10528/5- to high-voltage battery 1 - AX2- at indicated positions -arrows-.
- Move workshop hoist - VAS 6100- over high-voltage battery 1 - AX2- with prepared support - T10528- .



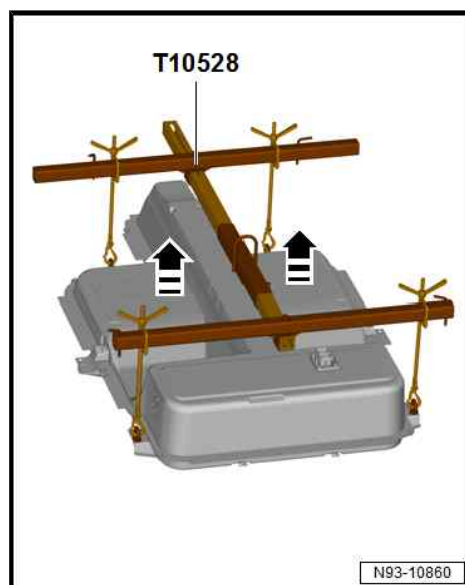
#### Note

*Do not rest support - T10528- on high-voltage battery 1 - AX2- .*

- Attach hooks - 10 - 222 A /10- to lifting eye bolts - T10528/5- -arrows-.
- Align second, still loose cross member - T10528/2- straight, and fix it in position.



- Raise high-voltage battery 1 - AX2- in -direction of arrow-.



## 3.6 Leakage test for high-voltage battery

### Special tools and workshop equipment required

- ◆ -Vehicle diagnostic tester-
- ◆ Leak tester - VAS 6911-
- ◆ Autonomous software - VAS 6910/5-





- ◆ Rubber bungs - VAS 6911/10-



#### Note

- ◆ *A leakage test must always be carried out before opening and after closing the high-voltage battery 1 - AX2- .*
- ◆ *The leakage test is carried out with the leak tester - VAS 6911- in conjunction with the autonomous software - VAS 6910/5- .*

#### Sequence of operations

- Unclip venting elements.
- Seal venting elements with rubber bungs - VAS 6911/10- .
- Take leak tester - VAS 6911- out of carrying case.
- Set leak tester - VAS 6911- on a flat surface.
- Connect current supply to leak tester - VAS 6911- .
- Start autonomous software - VAS 6910/5- in the ⇒ Vehicle diagnostic tester.
- Under the diagnosis menu in the autonomous software - VAS 6910/5- , start the leakage test.



#### Note

- ◆ *The further procedure for the leakage test is shown in the autonomous software - VAS 6910/5- .*
- ◆ *All steps in the autonomous software - VAS 6910/5- must be carried out as described.*
- If leakage is determined, carry out a check to find its source ⇒ [page 33](#) .
- Install venting elements.

### 3.7 Checking high-voltage battery for leaks

#### Special tools and workshop equipment required

- ◆ Leak detecting system - VAS 6911/14-
- ◆ Test plug set - VAS 6911/3-
- ◆ Gas leak detecting system - VAS 523 003-
- Connect leak detection system - VAS 6911/14- to high-voltage battery 1 - AX2- .
- Allow forming gas into high-voltage battery 1 - AX2- .
- Slowly guide gas leak detector - VAS 523 003- over bond seam and seals, while observing the display on gas leak detector - VAS 523 003- .
- Locate any leakage.



### 3.8 Opening high-voltage battery 1 - AX2-

#### **! DANGER**

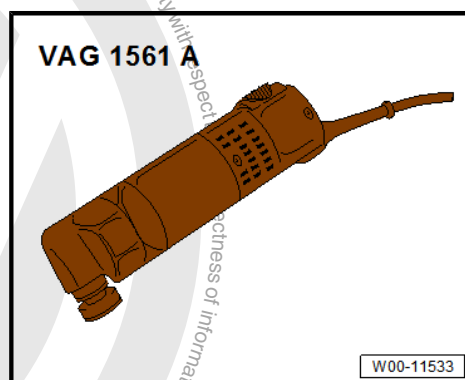
**Danger to life from high voltage.**

**Electrical shocks will cause serious injuries or death.**

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

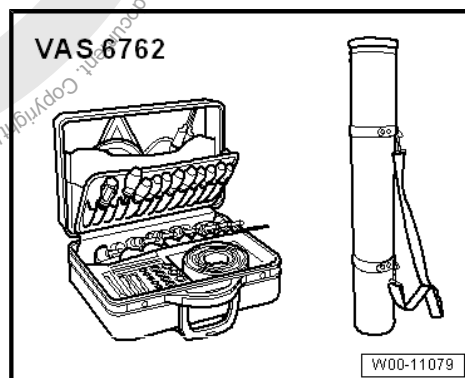
#### Special tools and workshop equipment required

- ◆ Electric cutter - V.A.G 1561A-



- ◆ Cutter, 27 mm - VAS 6900/1-

- ◆ High-voltage tool set - VAS 6762-



- ◆ Repair set for high-voltage battery - VAS 6900-
- ◆ High-voltage tool set - VAS 6883-
- ◆ Safety cover - T10437-
- ◆ Commercially available vacuum cleaner with plastic nozzle

#### Sequence of operations

#### **! DANGER**

**Danger to life from high voltage.**

**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .

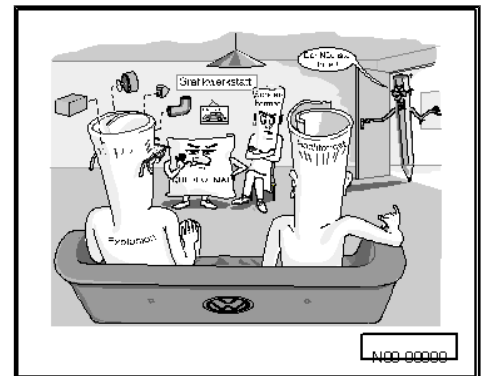




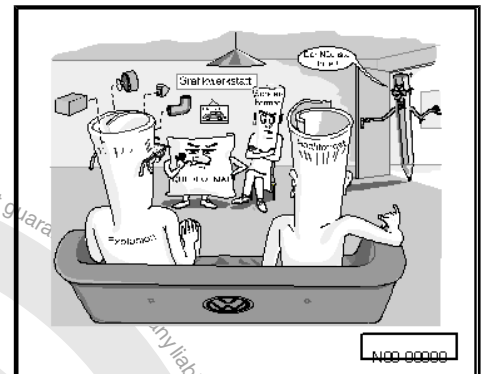
## Note

- ◆ *A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*
- ◆ *If the high-voltage battery 1 - AX2- is to be opened, it must be reported accordingly beforehand. Work on the battery must never be performed autonomously.*

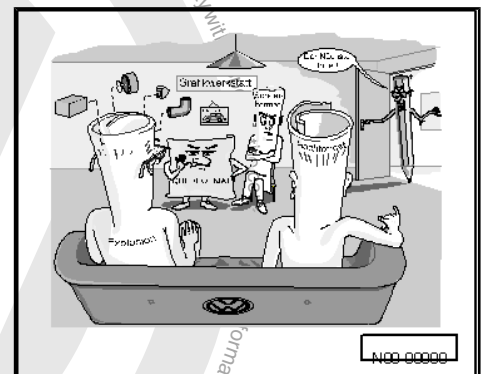
- Remove high-voltage battery 1 - AX2- ⇒ [page 25](#) .
- Carry out leakage test high-voltage battery 1 - AX2- ⇒ [page 32](#) .
- Release connector -1- in -direction of arrow-.
- Unscrew bolts -2-.



- Unscrew nuts -1- from charging connection -2-.
- Unclip charging connection -arrows-.

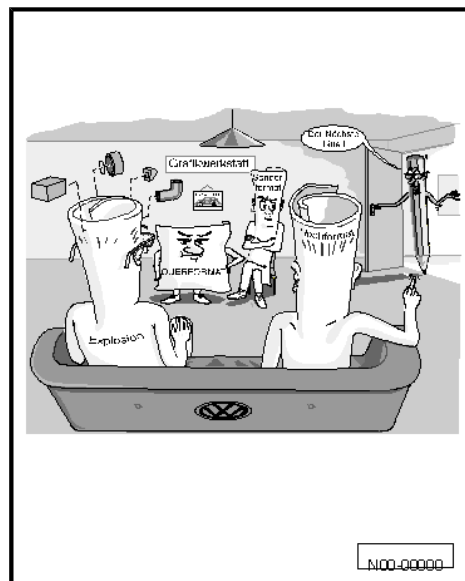


- Turn over charging connection in direction of -arrow-.
- Remove fuse -2-. To do this, lever it off at sides, and pull it off towards outside.
- Unpin the two wires ⇒ Electrical system; General information; Rep. gr. 97; Lines .





- Unscrew bolts -arrows-.
- Lever off buffer stops on left and right.



- Bend shielding -arrows- upwards by 90°.
- Fit blade, 27 mm - VAS 6900/1- to electric cutter - V.A.G 1561A- .
- Set speed setting on electric cutter - V.A.G 1561A- to 4.



#### Note

- ♦ Hold the electric cutter - V.A.G 1561A- with both hands at its rear end.
- ♦ Wear protective gloves, safety goggles and ear protection!
- Starting at rear left, cut through bonded seam using electric cutter - V.A.G 1561A- and cutter, 27 mm - VAS 6900/1- . Always guide electric cutter - V.A.G 1561A- along the upper shell while doing so.

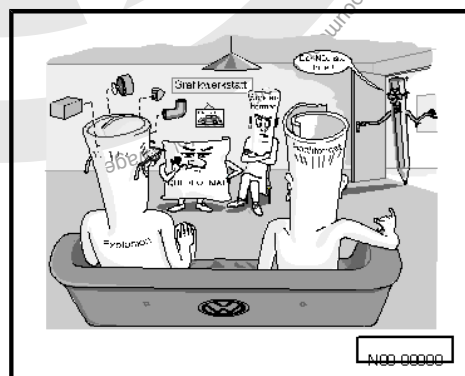
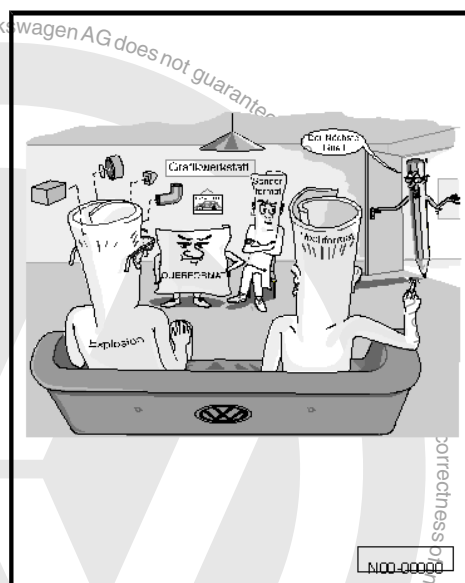


#### Note

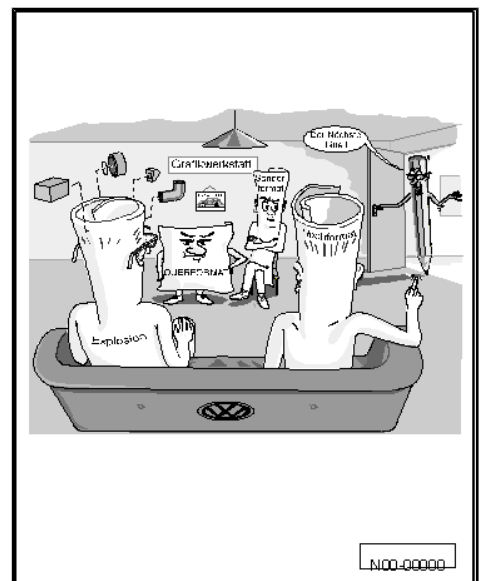
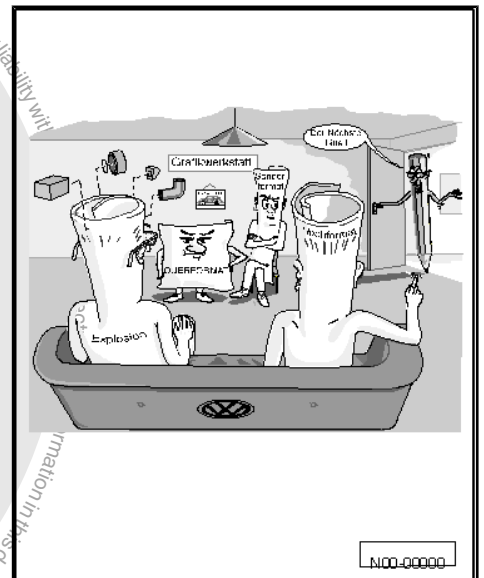
There are spacers positioned in regular intervals along the bonded seam.

#### Overview of spacers

- 1 - Spacers at threaded connections
- 2 - Spacers in bonded seam



- 





### 3.9 Voltage and insulation measurement

#### DANGER

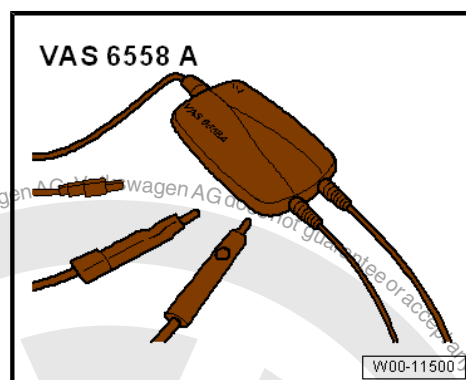
Danger to life from high voltage.

Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ◆ High-voltage test module - VAS 6558 A-



- ◆ High-voltage test adapter - VAS 6558/16-

- ◆ Vehicle diagnostic tester

#### Sequence of operations

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .
- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .

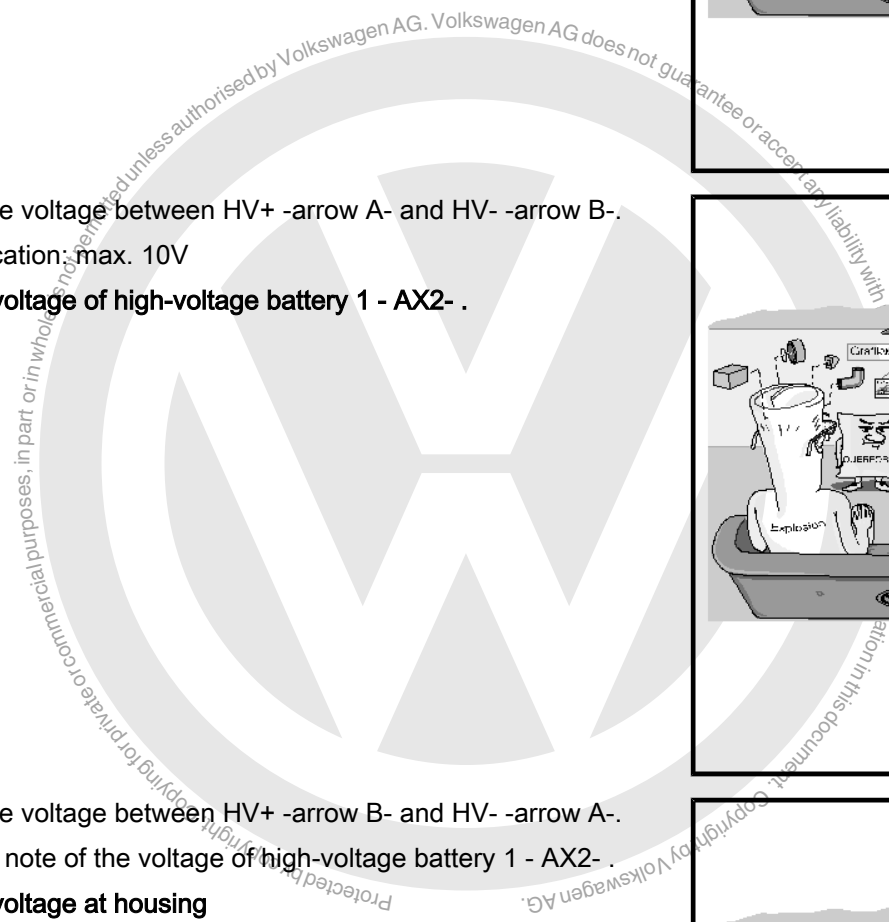
Measuring voltage at traction power cables to make sure that high-voltage system is de-energised



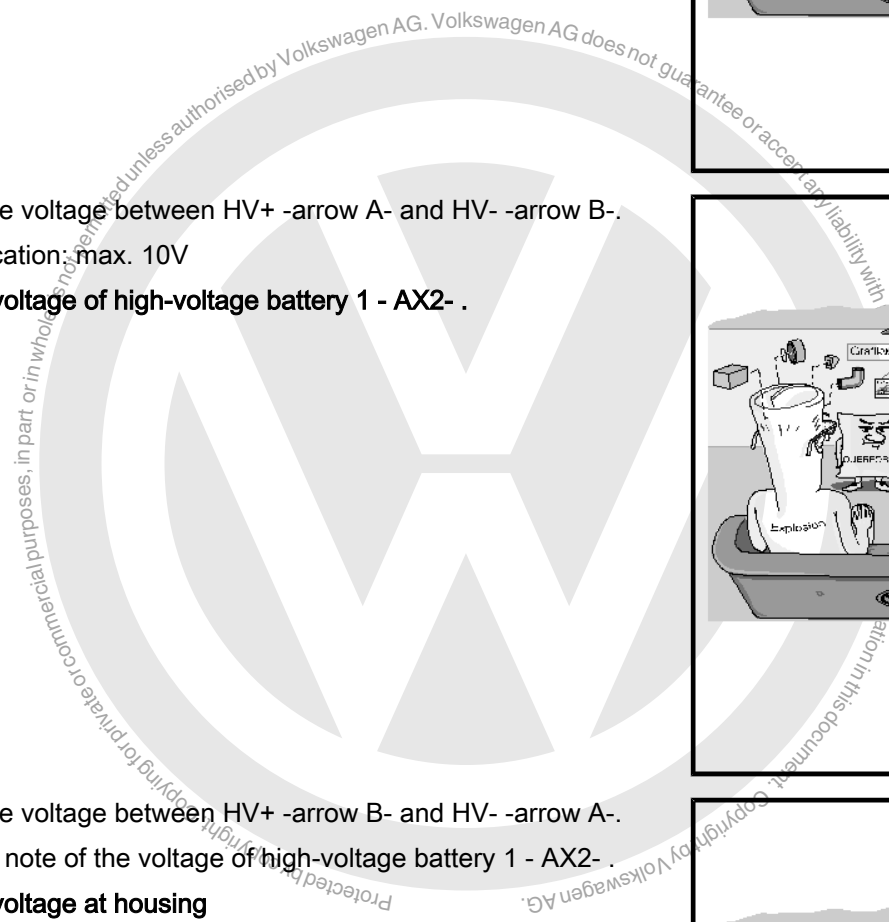
#### Note

- ◆ *When working on the battery modules without wearing appropriate high-voltage protection clothing, the voltage must not exceed 60 V. For this, the voltage of the battery modules must be reduced.*
- ◆ *All tests are performed with the high-voltage test module - VAS 6558 A- and the ⇒ Vehicle diagnostic tester.*

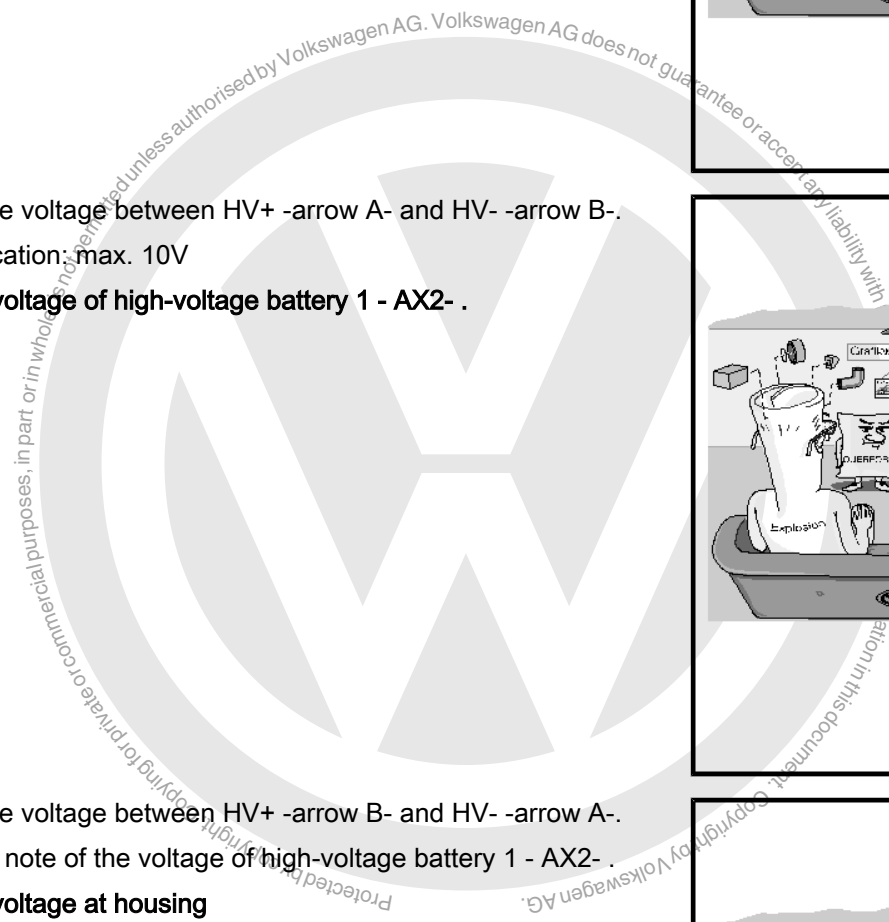
- Make sure that the high-voltage system is de-energised by measuring voltage at charging connection**



- ### Checking voltage of high-voltage battery 1 - AX2- .



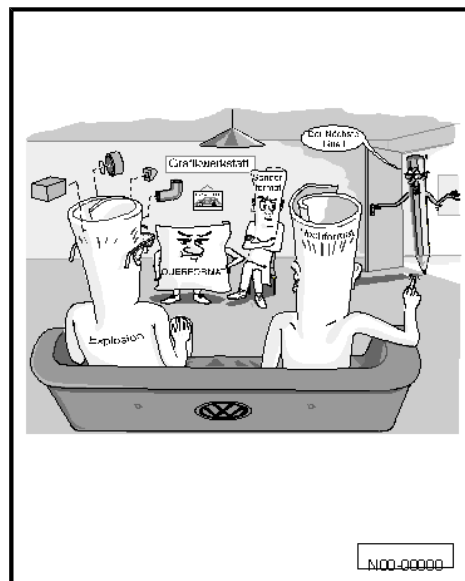
- ### Checking voltage at housing



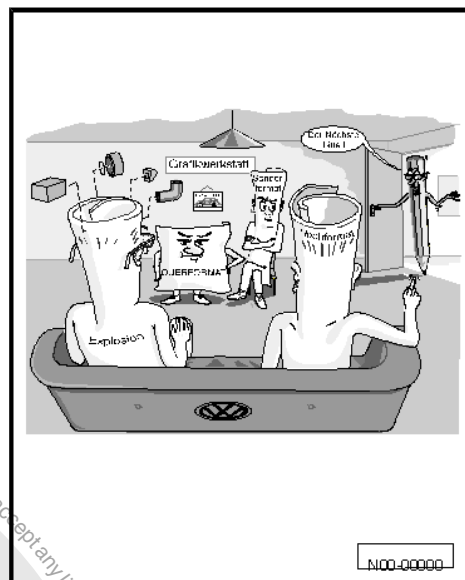


- Measure voltage between HV+ -arrow A- and housing -arrow B-.
- Specification: max. 10V

#### Checking voltage at housing



- Measure voltage between HV- -arrow B- and housing -arrow A-.
- Specification: max. 10V



### 3.10 Opening the electric circuit

#### **! DANGER**

**Danger to life from high voltage.**

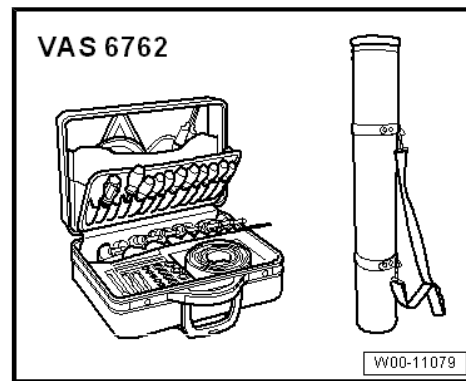
**Electrical shocks will cause serious injuries or death.**

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

**Special tools and workshop equipment required**



◆ High-voltage tool set - VAS 6762-



◆ High-voltage tool set - VAS 6883-

Sequence of operations

**! DANGER**

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



**Note**

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Switch off voltage supply of high-voltage diagnostic box - VAS 5581- .



**Note**

*When connected in the wrong order, the component may become damaged.*

- Pull off connectors in the sequence -1 through 10-.



**Note**

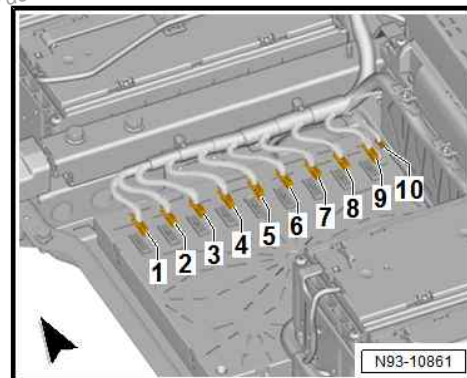
*The electrical circuit is opened by removing the connecting piece for battery module on the input side from the negative terminal of a master module.*

**Coupling point battery module 14 - J1046- and battery module 15 - J1047-**

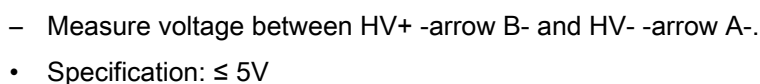
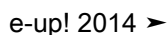


**Note**

*Mark the installation position of the connectors and high-voltage connecting pieces.*

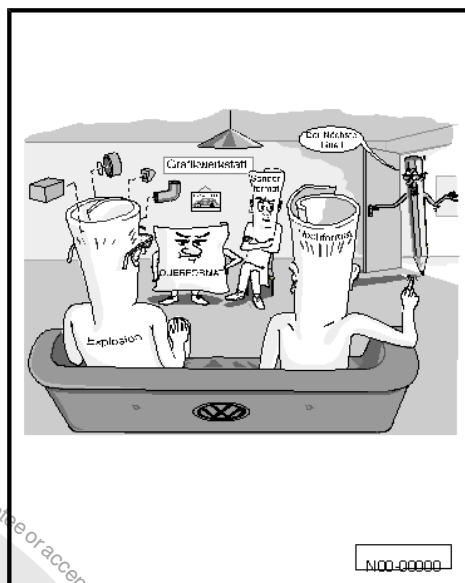






*The voltage »decreases« during the measurement.*

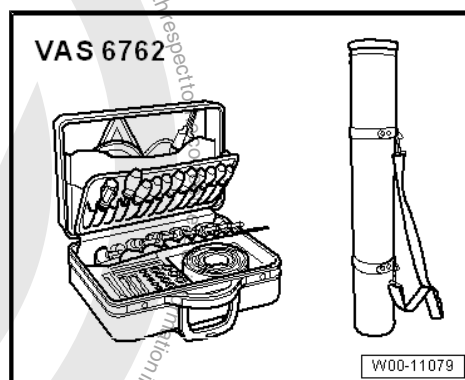
- Repeat measurement.
- Perform visual inspection on wiring harness ⇒ page 57.



### 3.11 Sealing high-voltage battery

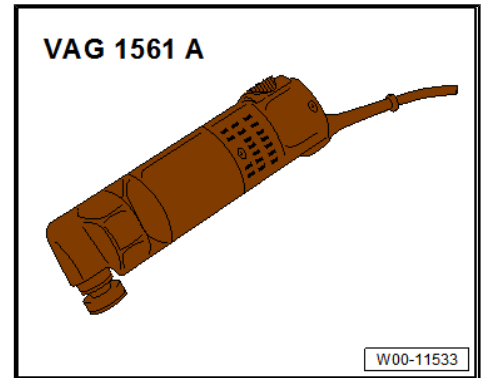
### Special tools and workshop equipment required

- ◆ High-voltage tool set - VAS 6762-

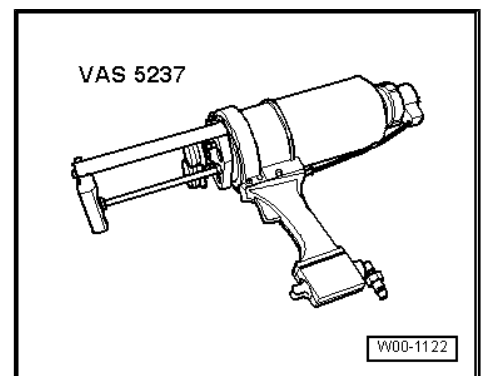




- ◆ Electric cutter - V.A.G 1561A-



- ◆ Double cartridge gun - VAS 5237-



- ◆ Torque wrench - V.A.G 1410-



- ◆ Autonomous software - VAS 6910/5-
- ◆ Repair set for high-voltage battery - VAS 6900-
- ◆ Commercially available vacuum cleaner with plastic nozzle

#### Sequence of operations

- Before bonding, perform diagnosis of high-voltage battery 1 - AX2- [⇒ page 24](#).



#### NOTICE

**Risk of damage to paintwork structure caused by activator.**

- Apply activator precisely onto adhesive bead, and do not spill any activator.



## Preparing lower part of battery



### Note

- ◆ *Cut back the residual adhesive sealant to 1...2 mm only immediately before bonding.*
- ◆ *The remaining material serves as adhesion base for newly applied 2-pack window adhesive.*
- Using electric cutter - V.A.G 1561A- and scraper, 25 mm - VAS 6900/2- , cut back adhesive bead on lower part of battery to 1 ... 2 mm. Do not remove it completely.
- Use a vacuum cleaner with plastic nozzle to clean the lower part of battery until sealing material and dirt are completely removed.
- If necessary, rectify any paintwork damage in accordance with  
⇒ General information, Paint; Rep. gr. 00
- Renew seal for high-voltage network connection.



### NOTICE

#### Risk of damage to paintwork structure caused by activator.

- **Apply activator precisely onto adhesive bead, and do not spill any activator.**
- Apply activator to bonding surface of lower part of battery. Allow activator to flash off for the prescribed flash-off time.

## Preparing new upper shell of high-voltage battery

- Clean bonding surface with cleaning solution.
- Sand bonding surface.
- Clean bonding surface with cleaning solution.
- Coat bonding surface with glass/paint primer. Allow glass/paint primer to flash off for the prescribed flash-off time.

## Preparations before sealing

- Check spacers for completeness and proper seating.
- Mark spacers on upper shell of high-voltage battery.
- Open one-handed clamps - VAS 6900/4- and distribute around high-voltage battery 1 - AX2- .
- Prepare bolts for upper shell of high-voltage battery.
- Prepare tools.
- Prepare 2-pack window adhesive, twice if necessary.

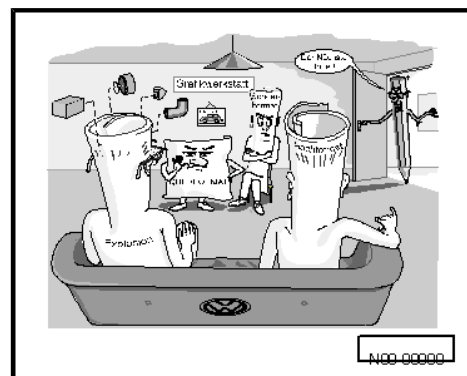
## Sealing high-voltage battery 1 - AX2-

- Prepare double cartridge gun - VAS 5237- and 2-pack window adhesive.
- Insert new silicate bags.



## Note

- ◆ *Remove the new silicate bags from their packaging only immediately before bonding.*
- ◆ *The upper shell of the high-voltage battery must be installed within 10 minutes, or adhesive properties of glass adhesive will be impaired.*
- Apply 2-pack window adhesive all-round moving double cartridge gun perpendicular to upper shell of high-voltage battery.
- With the aid of a second mechanic, place upper shell of high-voltage battery onto lower part of battery. The following should be observed:
  - Guide DC charging connection into upper part of battery.
- Start bolts in the respective threaded holes.
- Fit one-handed clamp - 6900/4- at indicated positions -arrows-, and slightly tighten by hand.
- Remove one-handed clamp - 6900/4- after curing period has elapsed.



- Bend shielding -arrows- back to original position.



## Note

- ◆ *Depending on the used adhesive, the bonded joint must be allowed to cure for up to 4 hours.*
- ◆ *The minimum curing period for the 2-pack window adhesive is 2 hours.*
- ◆ *The minimum curing period refers to the time between bonding and subsequent processing of the component. During this period, the high-voltage battery 1 - AX2- must be left on the scissor-type assembly platform at a room temperature of at least 15°C.*

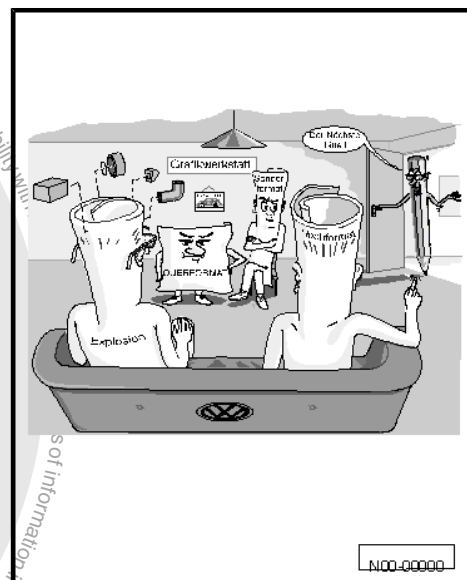
Tighten nuts for DC charging connection.

Tighten bolts for high-voltage network connection.

- Apply warning sticker to new battery upper section  
⇒ ["2.1 Checking warning stickers", page 13](#).
- Seal bolts with wax ⇒ Vehicle-specific paint information.
- Carry out leakage test  
⇒ ["3.6 Leakage test for high-voltage battery", page 32](#)

## Specified torques

- ◆ ⇒ ["3.1 Assembly overview- high-voltage battery", page 17](#)





### 3.12 Removing and installing module monitor control unit for batteries - J497-

#### DANGER

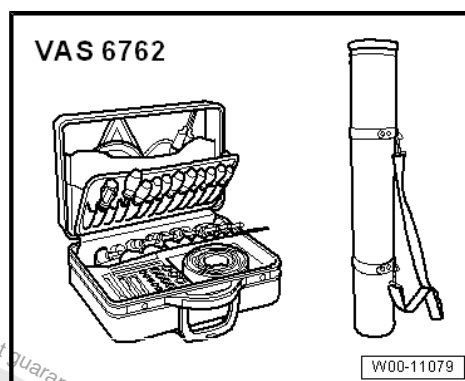
Danger to life from high voltage.

Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ♦ High-voltage tool set - VAS 6762-



#### Removing

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

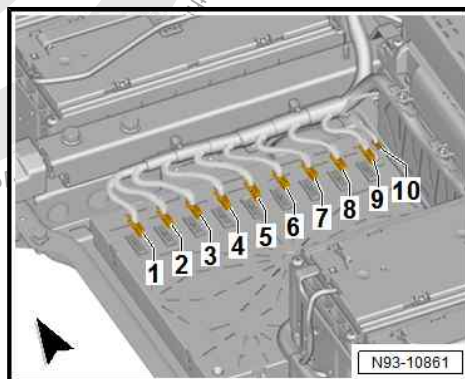
- De-energise high-voltage system ➔ [page 167](#) .
- Open high-voltage battery 1 - AX2- ➔ [page 34](#) .



#### Note

*When connected in the wrong order, the component may become damaged.*

- Pull off connectors in the sequence -1 through 10-.





- Release fasteners -2- in direction of -arrows-, respectively.
- Remove module monitor control unit for batteries - J497-- -1-.

#### Installing

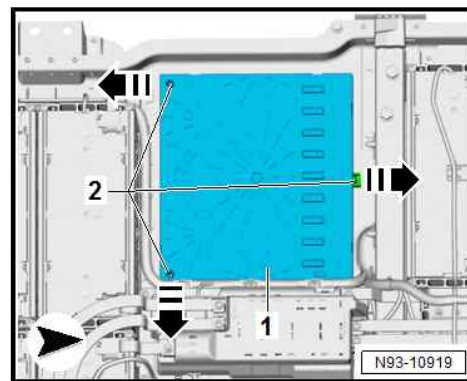
Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ➤ [page 57](#) .

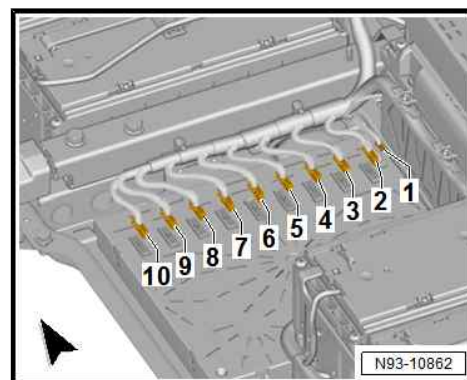


#### Note

*When connected in the wrong order, the component may become damaged.*



- Connect connectors in the sequence -1 through 10-.



### 3.13 Removing and installing switching unit for high-voltage battery - SX6-



#### DANGER

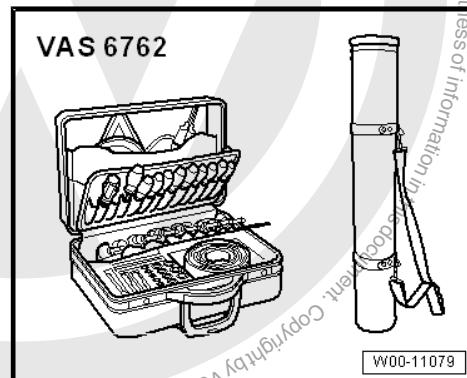
**Danger to life from high voltage.**

**Electrical shocks will cause serious injuries or death.**

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-





## Removing

### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ➔ [page 167](#) .



### Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ➔ [page 34](#) .
- Open electrical circuit ➔ [page 40](#) .
- Carefully cut open cable fasteners -arrows-.

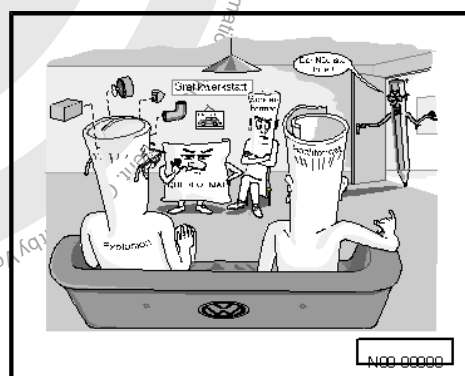
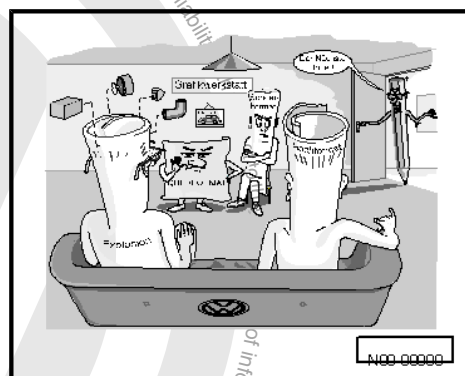
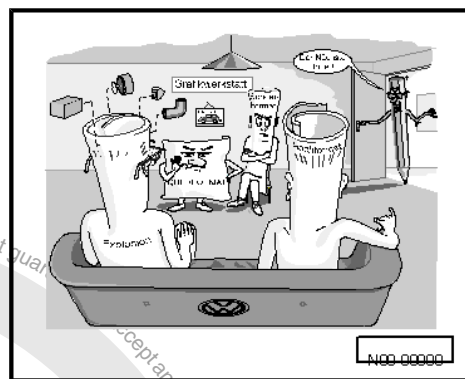


### Note

*Do not unclip the cable retainers, because otherwise the switching unit for high-voltage battery - SX6- may become damaged.*

- Disconnect connectors -1 and 2- from switching unit for high-voltage battery - SX6- -3-.

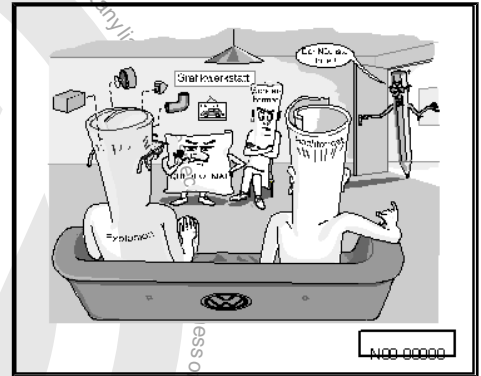
- Fold up accidental contact protection cover -1-.
- Unscrew bolt -2-.
- Unscrew nut -3-.
- Disconnect electrical connector -4-.



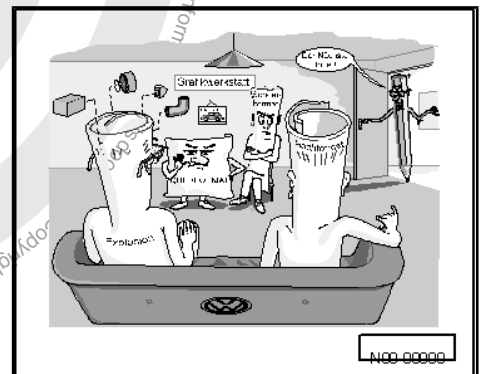




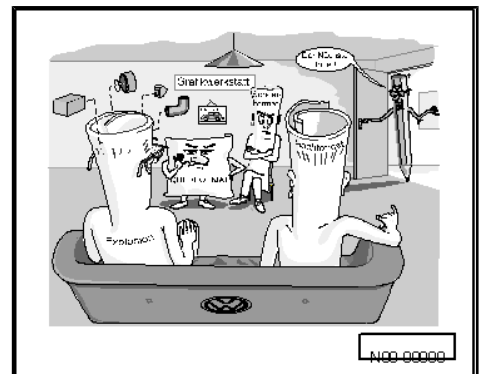
- Unclip cable retainer -1- -arrow-, and detach it in -direction of arrow-.
- Remove high-voltage connecting piece between battery module 0 - J1068- and switching unit for high-voltage battery - SX6- .
- Fold down accidental contact protection cover.



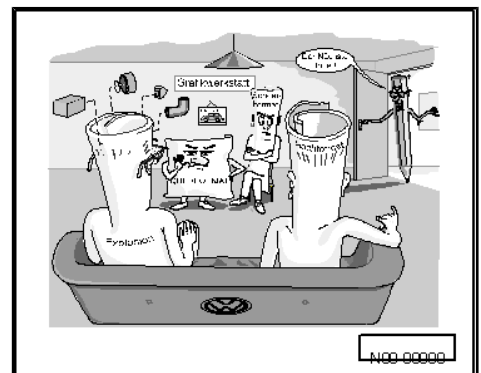
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between switching unit for high-voltage battery - SX6- and battery module 16 - J1048- .
- Fold down accidental contact protection cover.



- Unscrew bolts -1-.
- Pull cables back slightly.



- Unscrew bolts -3-.
- Detach charging cables -1 and 2-.





- Unscrew bolts -2-, and detach switching unit for high-voltage battery - SX6- -1-.

### Installing

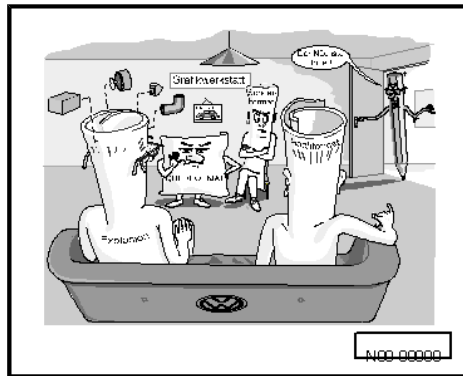
Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ➔ [page 57](#) .



#### Note

*When connected in the wrong order, the component may become damaged.*



- Connect connectors in the sequence -1 through 10-



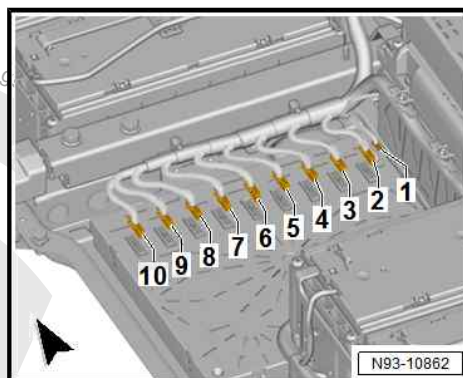
#### Note

*The adherence to the correct specified torques must be verified by a second mechanic.*

### Specified torques

- ♦ ➔ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts and bolts for high-voltage connecting piece	7.5 Nm	Renew
Bolts for switching unit for high-voltage battery - SX6-	9 Nm	Renew



## 3.14 Removing and installing battery regulation control unit - J840-

### Special tools and workshop equipment required

- ♦ Torque wrench - V.A.G 1331-



#### Note

*When replacing the battery regulation control unit - J840- there is no need to carry out a leakage test.*

### Removing

- Carry out visual inspection of high-voltage battery 1 - AX2- ➔ [page 24](#) .



- Remove underbody covers ➔ General body repairs, exterior; Rep. gr. 66 ; Underbody cover; Assembly overview - underbody covers, e-up! .

Unscrew bolts -2-.

- Detach cover -1-.



**Note**

*The cover for the battery regulation control unit - J840- must be renewed following removal.*

- Unscrew nut -2-.

- Remove potential equalisation line.

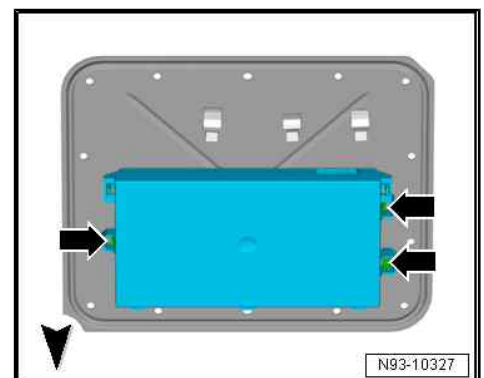
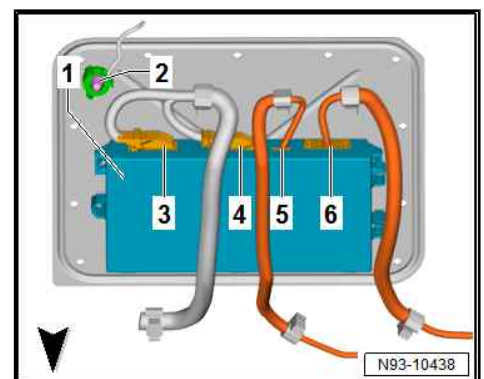
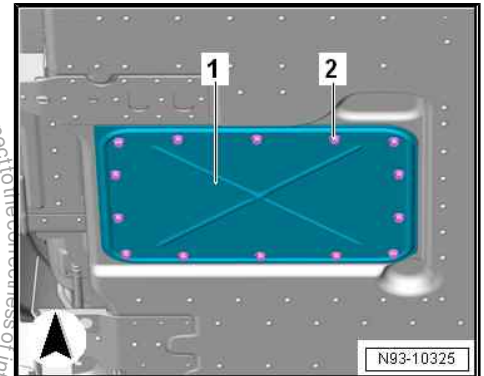


**Note**

*The cables -5 and 6- are high-voltage cables!*

- Disconnect electrical connectors -3 through 6- from battery regulation control unit - J840- -1-.

- Release battery regulation control unit - J840- -arrows-, and remove it.





- Twist off retaining clips for wiring harnesses -1- in -direction of arrow-.

### Installing

Install in reverse order of removal, observing the following:



#### Note

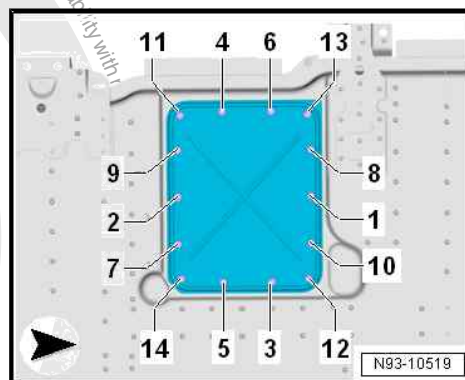
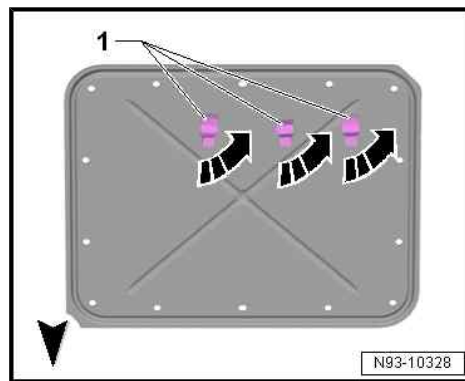
- ♦ The service cover must be renewed following removal.
- ♦ Remove the service cover from its packaging only immediately before installing.
- ♦ Check service cover seal for damage. If the seal is damaged, a new service cover must be installed.
- ♦ Apply four-eyes principle when installing service cover.
- ♦ If the bolts cannot be tightened, install new cap nuts ⇒ *Electric parts catalogue*.

- Perform visual inspection on wiring harness ⇒ [page 57](#).

### Tightening sequence for service cover

#### Specified torques

- ♦ ⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)



Component	Specified torque
Nut for earth point	9 Nm

## 3.15 Removing and installing charge voltage control unit for high-voltage battery - J966-

### Removing

- Remove front left seat ⇒ Seat frames; Rep. gr. 72 ; Front seat; Removing and installing front seat .
- Raise floor covering sufficiently for access to charge voltage control unit for high-voltage battery - J966- .

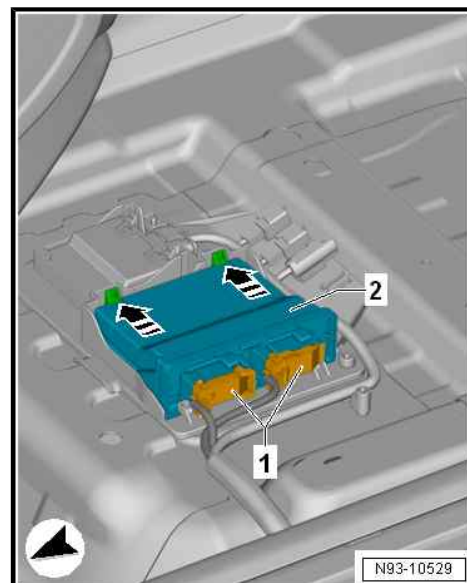


- Disconnect electrical connectors -1-.
- Release locking lugs in -direction of arrow-.
- Swing out charge voltage control unit for high-voltage battery - J966- -2- upwards.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ➔ [page 57](#) .



### 3.16 Removing and installing cable guide

#### **! DANGER**

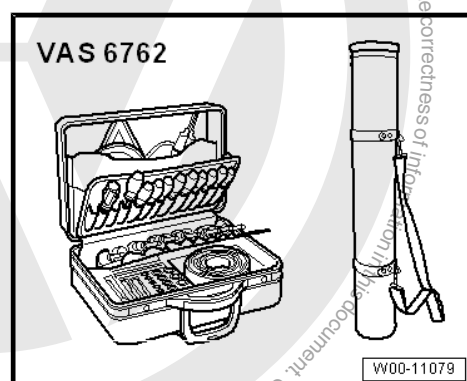
**Danger to life from high voltage.**

**Electrical shocks will cause serious injuries or death.**

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

#### Removing

#### **! DANGER**

**Danger to life from high voltage.**

**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

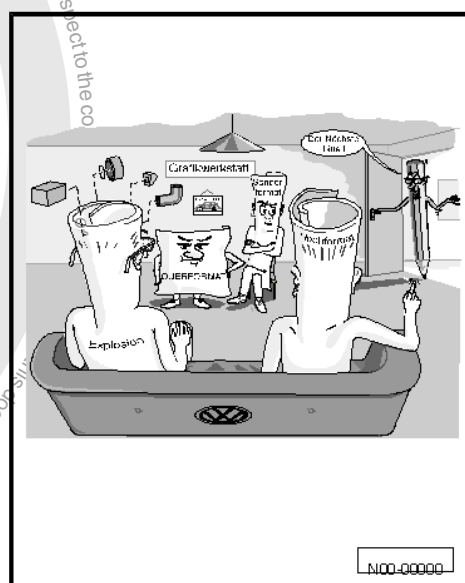
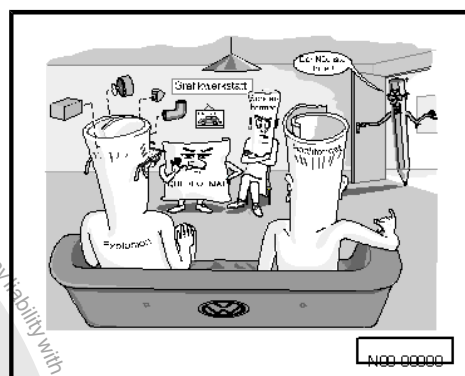
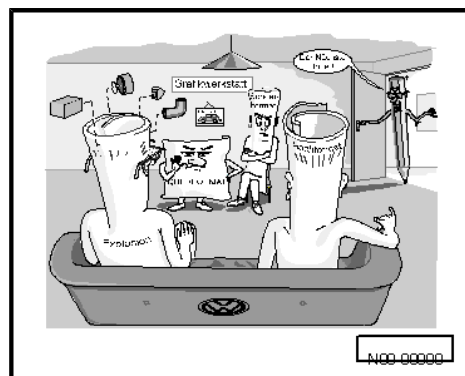
- De-energise high-voltage system ➔ [page 167](#) .



## Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

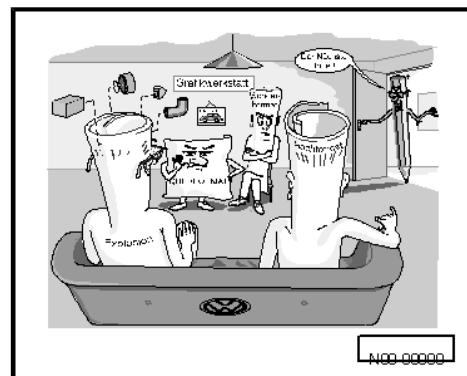
- Open high-voltage battery 1 - AX2- ➔ [page 34](#) .
- Open electrical circuit ➔ [page 40](#) .
- Fold up accidental contact protection cover -1-.
- Unscrew bolt -2-.
- Unscrew nut -3-.
- Disconnect electrical connector -4-.
- Unclip cable retainer -1- -arrow-, and detach it in -direction of arrow-.
- Remove high-voltage connecting piece between battery module 0 - J1068- and switching unit for high-voltage battery - SX6- .
- Fold down accidental contact protection cover.
- Carefully open cable fastener -2-, and remove wire from retainer -1-.



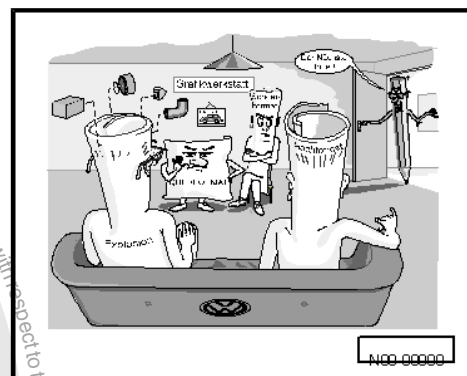




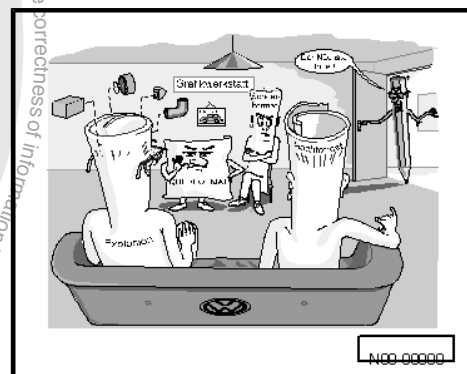
- Disconnect electrical connectors -1, 2 and 3-.
- Lay wires of battery modules on top.



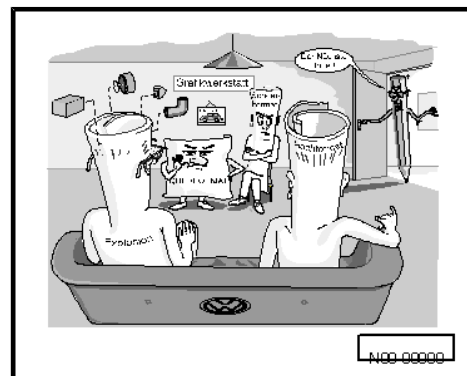
- Disconnect electrical connectors -1, 2 and 3-.



- Unclip cable retainer -arrow-, and detach it in -direction of arrow-.
- Lay wires of battery modules on top.



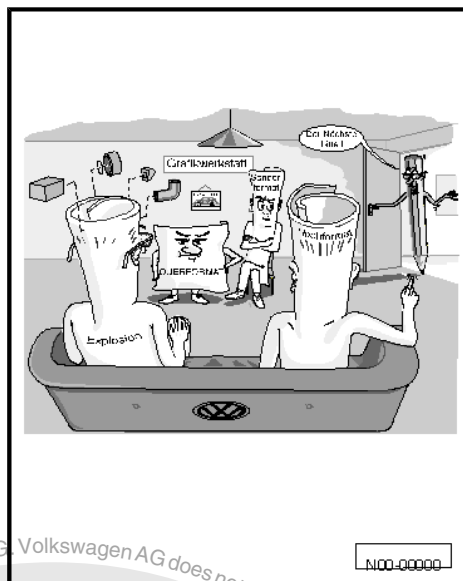
- Unscrew bolts -1-.



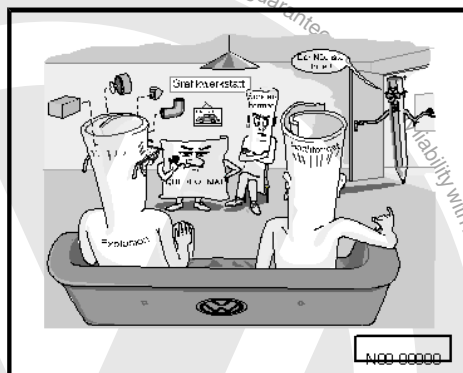




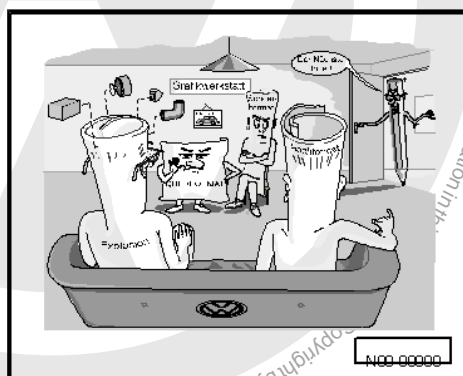
- Release cover of high-voltage connection -1- -arrows-, and fold it upwards.



- Unscrew bolts -1-.
- Remove traction power cables.



- Remove silicate bags -1-.





- Unclip wiring harnesses -3- from cable guide -2-, and lay them to one side.
- Unscrew bolts -1-, and remove cable guide upwards.

### Installing

Install in reverse order of removal, observing the following:

- Renew silicate bags.
- Perform visual inspection on wiring harness ⇒ [page 57](#) .



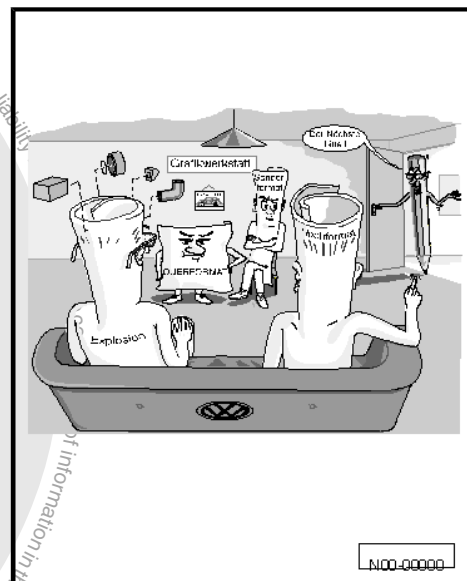
#### Note

*The adherence to the correct specified torques must be verified by a second mechanic.*

### Specified torques

- ◆ ["3.1 Assembly overview - high-voltage battery", page 17](#)

Component	Specified torque	Note
Nuts and bolts for high-voltage connecting piece	7.5 Nm	Renew
Bolts for cable guide	8 Nm	Renew



## 3.17 Visual check of wiring harness



#### Note

*After an electrical connector has been disconnected, it must be checked for damage.*

### Visual check of wiring harness

- ◆ Check catches for damage
- ◆ Make sure connector pins are not bent
- ◆ Make sure connector pins are properly inserted

## 3.18 Removing and installing battery test lead



#### Note

*The test lead of the battery is cast into the bottom section of the battery housing. This has to be renewed for replacement of the test lead.*

### Removing

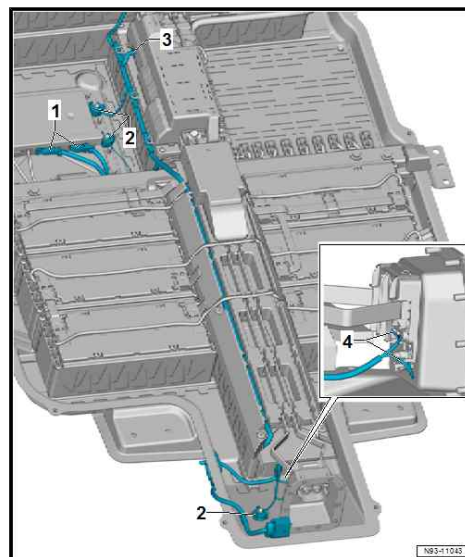
- Remove battery module 3 - J993- ⇒ [page 70](#) .
- Detach connector -1- of battery regulation control unit - J840- .
- Loosen nuts -2-.
- Detach connector -3- of switching unit for high-voltage battery - SX6- .



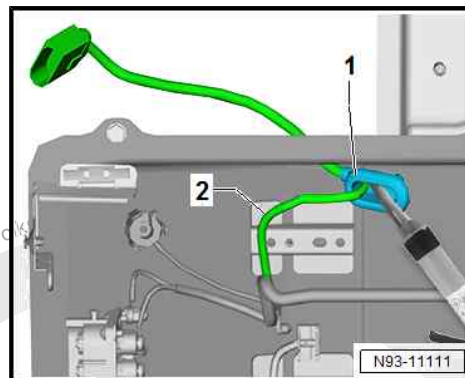
- Detach cable -4-.

### Installing

- Clean adhesive bond area for cable feedthrough with isopropanol.
- Guide test lead through opening in lower part of battery housing.



- Fill neck of cable guide with adhesive.

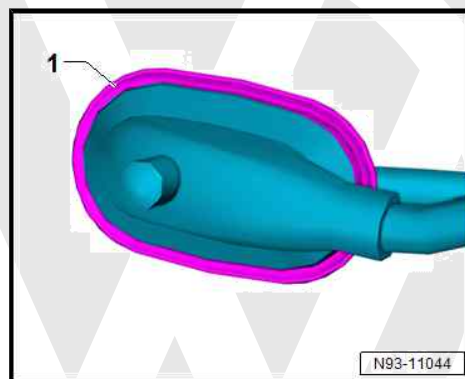


- Prepare test lead in bottom part of battery housing for bonding. Coat cable feedthrough at sealing lip all around with 1-pack adhesive as shown -1-.

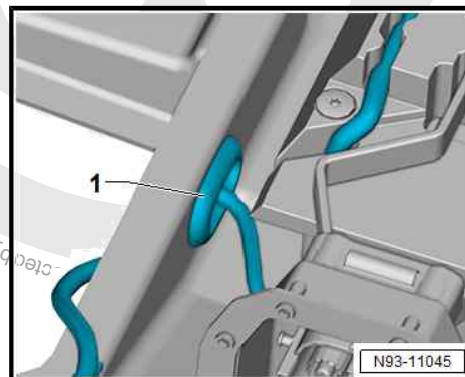


### Note

*When inserting test lead on neck of cable guide, do not pull wiring harness.*



- Insert cable guide in lower part of battery housing.
- Prepare cable guide in lower part of battery housing for filling with 1-pack adhesive.





- Apply adhesive strip beneath cable guide.



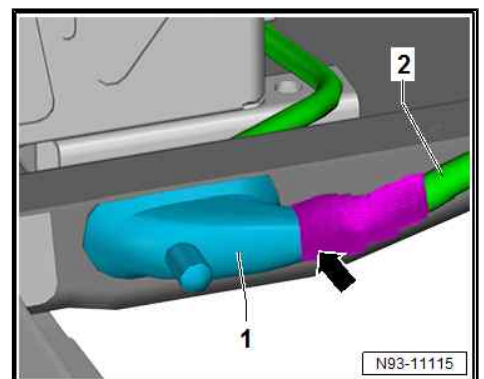
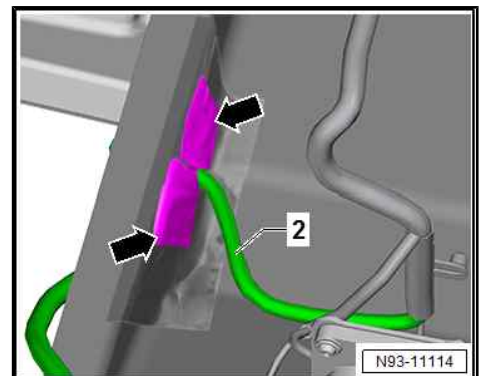
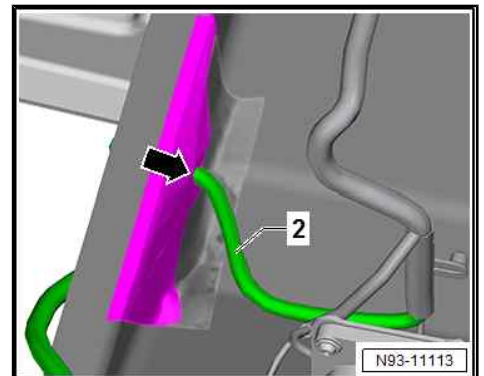
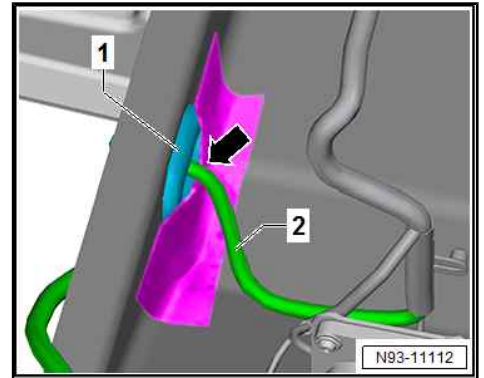
**Note**

*The adhesive strip must not be attached in the area of the adhesive bead.*

Attach adhesive strip above cable guide flush with lower part of battery housing.

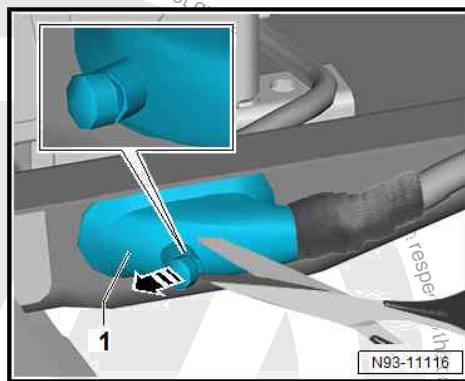
- Using two short adhesive strips, seal previously fitted strips in addition.

- Unless already done, engineer strain relief -arrow- on cable guide.

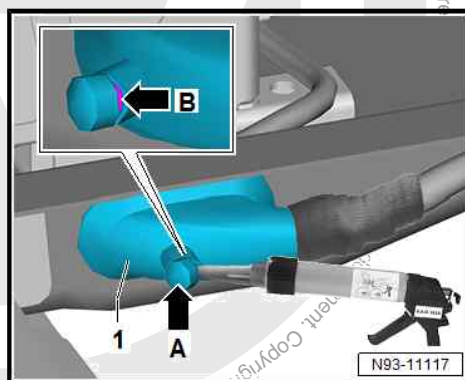




- Make cut in rubber protrusion -arrow- of cable guide down to halfway using suitable tool from high-voltage tool set - VAS 6762- .



- Fill 1-pack adhesive in open rubber protrusion of cable guide. Ensure 1-pack adhesive is spread evenly when doing this. To do this, fill 1-pack adhesive from different angles -arrow A- -arrow B-.
- Fill 1-pack adhesive until it seeps out of opening of rubber protrusion.
- Seal open rubber protrusion.
- Carefully push out 1-pack adhesive from inside to spread 1-pack adhesive evenly. Cable guide and adhesive tape inside must not give under light pressure.



### 3.19 Discharging and charging capacitor

#### DANGER

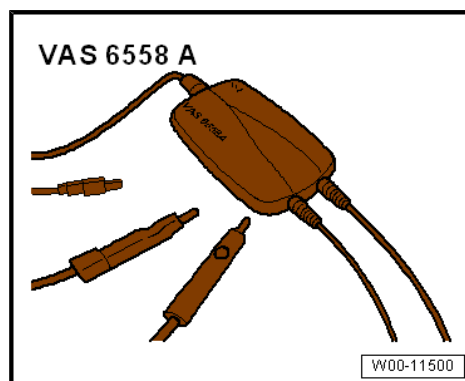
**Danger to life from high voltage.**

**Electrical shocks will cause serious injuries or death.**

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

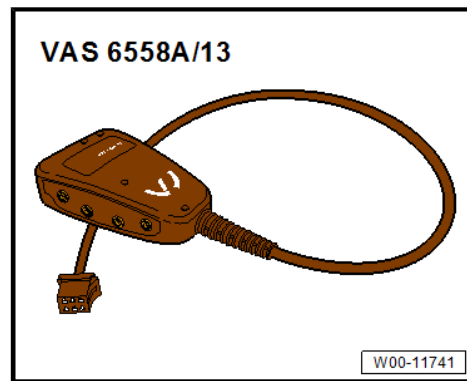
#### Special tools and workshop equipment required

- ◆ -Vehicle diagnostic tester-
- ◆ High-voltage test module - VAS 6558 A-





- ◆ Adapter - VAS 6558A/13-



- ◆ Autonomous software - VAS 6910/5-

### DANGER

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system [⇒ page 167](#) .



### Note

- ◆ *Before each repair on the high-voltage battery 1 - AX2- the capacitors must discharge and charge again when the repair is finished.*
- ◆ *The entire voltage of the high-voltage battery 1 - AX2- is stored in the capacitors until the capacitors are discharged.*
- ◆ *The capacitors are discharged using the autonomous software - VAS 6910/5- in conjunction with the high-voltage testing module - VAS 6558 A- and adapter - VAS 6558A/13- .*
- ◆ *The user is informed on the discharged capacitors through the autonomous software - VAS 6910/5- together with the high-voltage test module - VAS 6558 A- .*
- ◆ *All steps for discharging the capacitors are indicated via the autonomous software - VAS 6910/5- .*

### Discharging capacitors

- Open high-voltage battery 1 - AX2- [⇒ page 34](#) .
- Open electrical circuit [⇒ page 40](#) .
- Start autonomous software - VAS 6910/5- in the ⇒ Vehicle diagnostic tester.



### Note

- ◆ *The further procedure for the discharging and charging the capacitors is shown via the autonomous software - VAS 6910/5- .*
- ◆ *All steps in the autonomous software - VAS 6910/5- must be carried out as described.*





## Charging capacitors

- Charging the capacitors is done in reverse order, observing the following:
- Perform visual inspection on wiring harness ➔ [page 57](#) .

## 3.20 Removing and installing capacitors

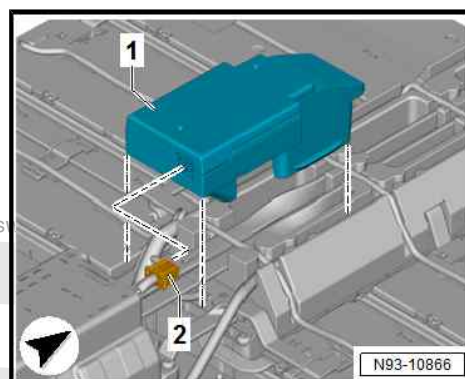
### Removing

- Open high-voltage battery 1 - AX2- ➔ [page 34](#) .
- Disconnect electrical connector -2-.
- Remove capacitors with protective housing -1- upwards.

### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ➔ [page 57](#) .
- Charge capacitors ➔ [page 60](#) .



## 3.21 Charging and discharging the battery modules

### **! DANGER**

**Danger to life from high voltage.**

**Electrical shocks will cause serious injuries or death.**

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

### Special tools and workshop equipment required

- ◆ -Vehicle diagnostic tester-
- ◆ High-voltage tool set - VAS 6762-



- ◆ Autonomous software - VAS 6910/5-
- ◆ Module balancer - VAS 6910-





## Sequence of operations

### DANGER

**Danger to life from high voltage.**

**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ➔ [page 167](#) .
- Open high-voltage battery 1 - AX2- ➔ [page 34](#) .
- Open electrical circuit ➔ [page 40](#) .
- Discharge capacitors ➔ [page 60](#) .
- Remove the corresponding battery module ➔ [page 64](#) .



### Note

*If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- .*

- Start autonomous software - VAS 6910/5- in the ➔ Vehicle diagnostic tester.



### Note

- ◆ *The further procedure for discharging and charging the capacitors using the module balancer - VAS 6910- is shown via the autonomous software - VAS 6910/5- .*
- ◆ *All steps in the autonomous software - VAS 6910/5- must be carried out as described.*



## 3.22 Removing and installing battery modules

⇒ ["3.22.1 Removing and installing battery module 0 J1068", page 64](#)

⇒ ["3.22.2 Removing and installing battery module 1 J991", page 66](#)

⇒ ["3.22.3 Removing and installing battery module 2 J992", page 68](#)

⇒ ["3.22.4 Removing and installing battery module 3 J993", page 70](#)

⇒ ["3.22.5 Removing and installing battery module 4 J994", page 73](#)

⇒ ["3.22.6 Removing and installing battery module 5 J995", page 75](#)

⇒ ["3.22.7 Removing and installing battery module 6 J996", page 77](#)

⇒ ["3.22.8 Removing and installing battery module 7 J997", page 81](#)

⇒ ["3.22.9 Removing and installing battery module 8 J998", page 83](#)

⇒ ["3.22.10 Removing and installing battery module 9 J999", page 86](#)

⇒ ["3.22.11 Removing and installing battery module 10 J1000", page 88](#)

⇒ ["3.22.12 Removing and installing battery module 11 J1001", page 91](#)

⇒ ["3.22.13 Removing and installing battery module 12 J1002", page 93](#)

⇒ ["3.22.14 Removing and installing battery module 13 J1045", page 96](#)

⇒ ["3.22.15 Removing and installing battery module 14 J1046", page 99](#)

⇒ ["3.22.16 Removing and installing battery module 15 J1047", page 102](#)

⇒ ["3.22.17 Removing and installing battery module 16 J1048", page 105](#)

### 3.22.1 Removing and installing battery module 0 - J1068-

#### DANGER

Danger to life from high voltage.

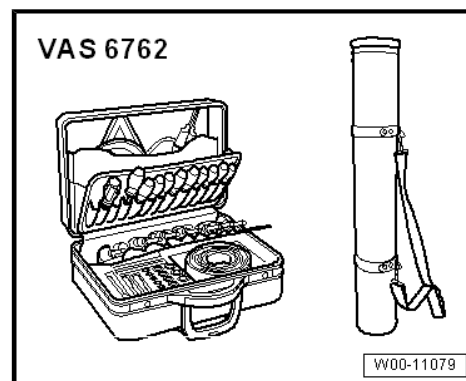
Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

Special tools and workshop equipment required



- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

### Removing

#### DANGER

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#)



#### Note

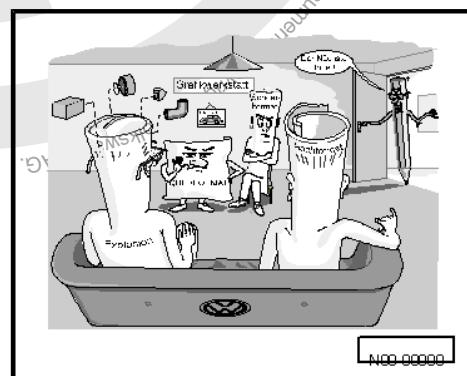
*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery -1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .



#### Note

- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .*
- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*
- Remove cable guide ⇒ [page 53](#)
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 0 - J1068- and battery module 1 - J991-
- Fold down accidental contact protection cover -1-.





- Unscrew bolts -2-, and remove battery module 0 - J1068- -1-.

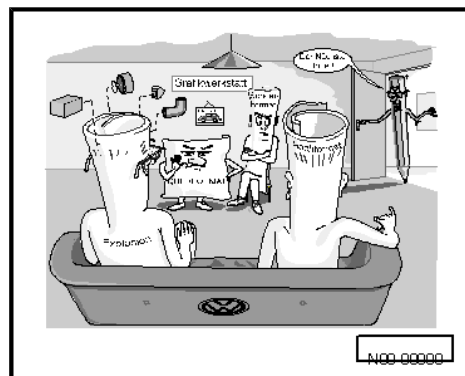
**Note**

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

**Installing**

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ➔ [page 57](#) .

**Note**

- ♦ The battery module must be properly seated in the mounting.
  - ♦ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
  - ♦ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ➔ [page 47](#) .

**Specified torques**

- ♦ ➔ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

### 3.22.2 Removing and installing battery module 1 - J991-

**DANGER**

**Danger to life from high voltage.**

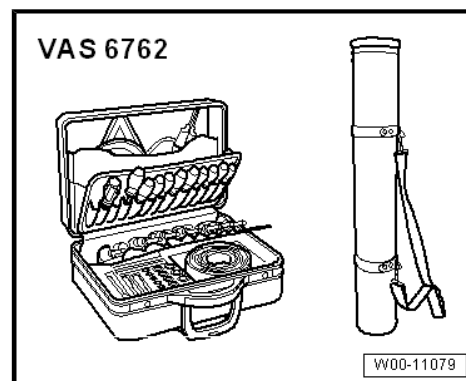
**Electrical shocks will cause serious injuries or death.**

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

**Special tools and workshop equipment required**



◆ High-voltage tool set - VAS 6762-



◆ High-voltage tool set - VAS 6883-

Removing

**! DANGER**

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



**Note**

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .

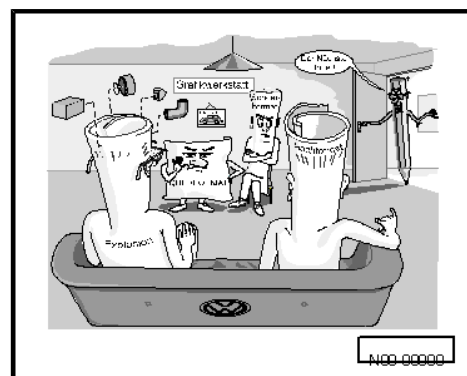


**Note**

- ◆ If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .

- ◆ Mark the installation position of the connectors and high-voltage connecting pieces.

- Remove cable guide ⇒ [page 53](#) .
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 0 - J1068- and battery module 1 - J991- .
- Fold down accidental contact protection cover -1-.





- Unscrew bolts -2-, and remove battery module 1 - J991- -1-.

**Note**

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

**Installing**

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ➔ [page 57](#) .

**Note**

- ♦ The battery module must be properly seated in the mounting.
- ♦ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ♦ The adherence to the correct specified torques must be verified by a second mechanic.

- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ➔ [page 47](#) .

**Specified torques**

- ♦ ➔ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

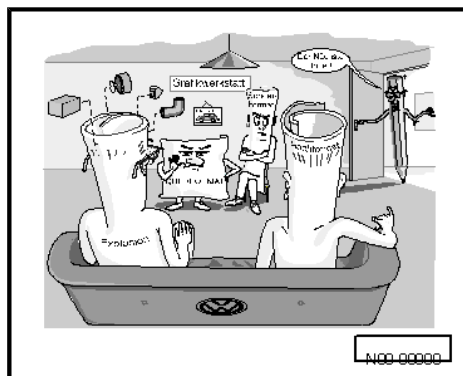
### 3.22.3 Removing and installing battery module 2 - J992-

**DANGER**

Danger to life from high voltage.

Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

**Special tools and workshop equipment required**



- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

#### Removing

#### DANGER

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



#### Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .

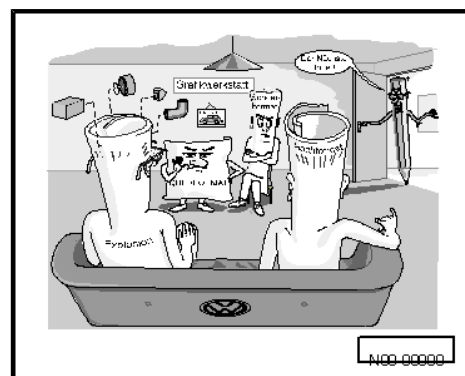


#### Note

- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .*

- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*

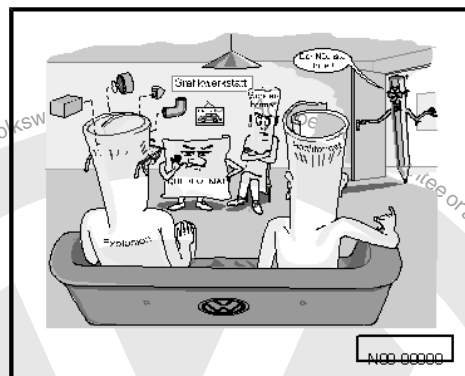
- Remove cable guide ⇒ [page 53](#) .
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 3 - J993- and battery module 4 - J994- .
- Fold down accidental contact protection cover -1-.







- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 2 - J992- and battery module 3 - J993- .
- Fold down accidental contact protection cover -1-.



- Unscrew bolts -2-, and remove battery module 2 - J992- -1-.



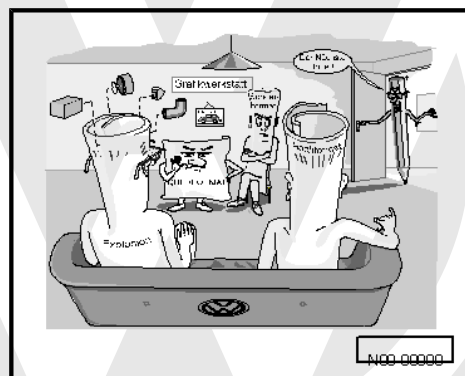
#### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#) .



#### Note

- ♦ The battery module must be properly seated in the mounting.
- ♦ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ♦ The adherence to the correct specified torques must be verified by a second mechanic.

- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#) .

#### Specified torques

- ♦ ⇒ ["3.1 Assembly overview - high-voltage battery", page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

### 3.22.4 Removing and installing battery module 3 - J993-



#### DANGER

Danger to life from high voltage.

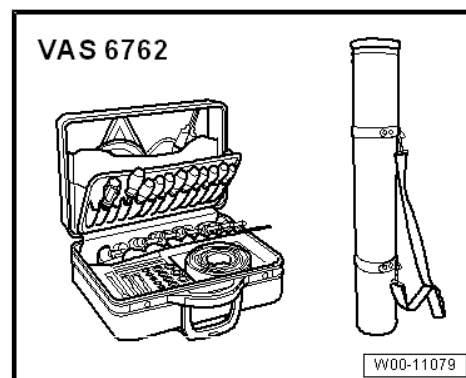
Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.



### Special tools and workshop equipment required

- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

### Removing

#### DANGER

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



#### Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .

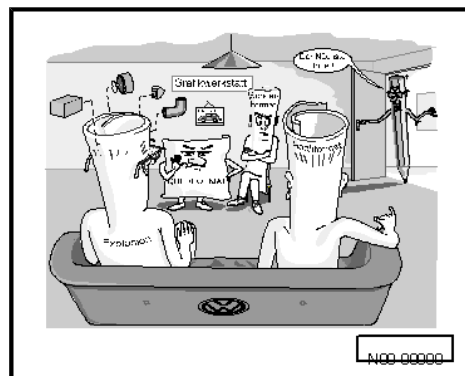


#### Note

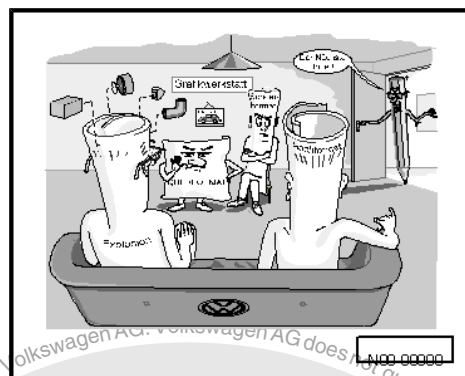
- ◆ If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .
- ◆ Mark the installation position of the connectors and high-voltage connecting pieces.
- Remove cable guide ⇒ [page 53](#) .



- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 3 - J993- and battery module 4 - J994- .
- Fold down accidental contact protection cover -1-.



- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -2- between battery module 3 - J992- and battery module 3 - J993- .
- Fold down accidental contact protection cover -1-.



- Unscrew bolts -2-, and remove battery module 3 - J993- -1-.



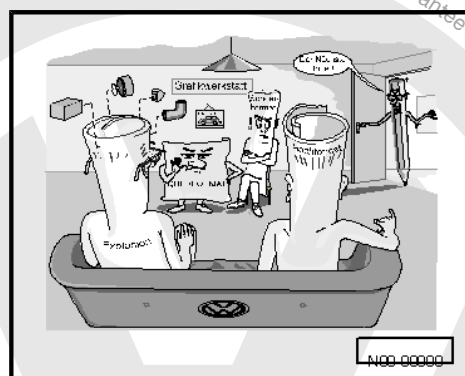
#### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness → [page 57](#) .



#### Note

- ♦ The battery module must be properly seated in the mounting.
- ♦ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ♦ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- → [page 47](#) .

#### Specified torques

- ♦ ⇒ ["3.1 Assembly overview - high-voltage battery", page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew



### 3.22.5 Removing and installing battery module 4 - J994-

#### DANGER

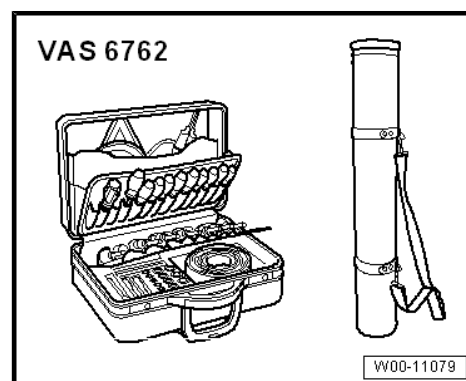
Danger to life from high voltage.

Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

#### Removing

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



#### Note

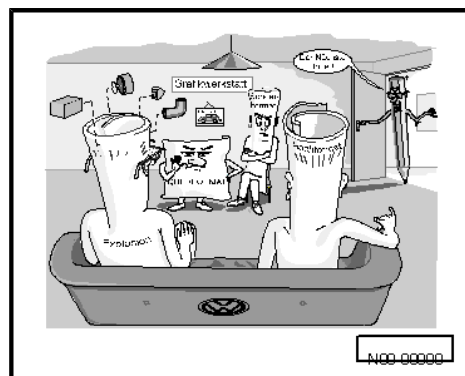
*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .



## Note

- ◆ If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .
- ◆ Mark the installation position of the connectors and high-voltage connecting pieces.
- Remove cable guide ⇒ [page 53](#) .
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 3 - J993- and battery module 4 - J994- .
- Fold down accidental contact protection cover -1-.

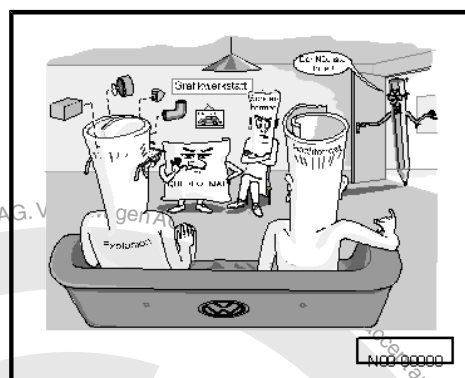


- Unscrew bolts -2-, and remove battery module 4 - J994- -1-.



## Note

- ◆ The illustration shows battery module 2 - J992- .
- ◆ Place battery module on a clean surface with the battery terminals facing upwards and cover it.



## Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#) .



## Note

- ◆ The battery module must be properly seated in the mounting.
- ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ◆ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#) .

## Specified torques

- ◆ ⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew



### 3.22.6 Removing and installing battery module 5 - J995-

#### DANGER

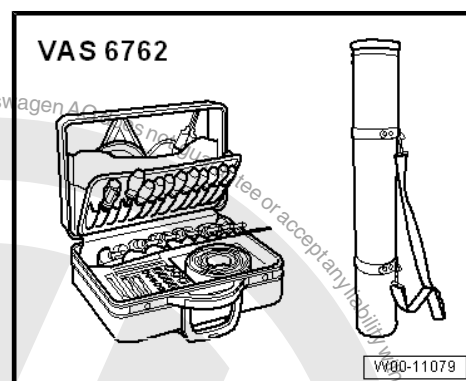
Danger to life from high voltage.

Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

#### Removing

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ➔ [page 167](#) .



#### Note

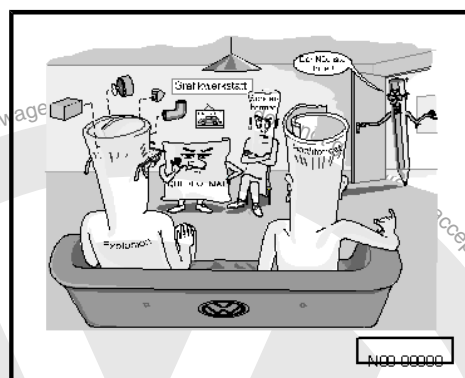
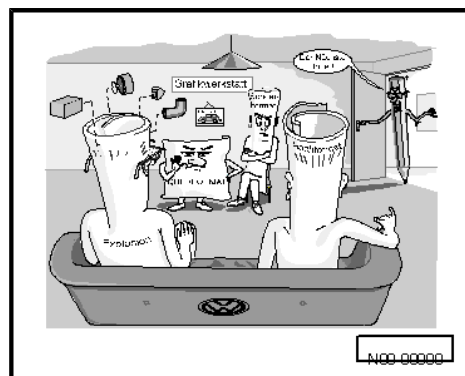
*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ➔ [page 34](#) .
- Open electrical circuit ➔ [page 40](#) .



## Note

- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .*
- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*
- Remove cable guide ⇒ [page 53](#) .
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 3 - J993- and battery module 4 - J994- .
- Fold down accidental contact protection cover -1-.
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 5 - J995- and battery module 6 - J996- .
- Fold down accidental contact protection cover -1-.







- Unscrew bolts -2-, and remove battery module 5 - J995- -1-.



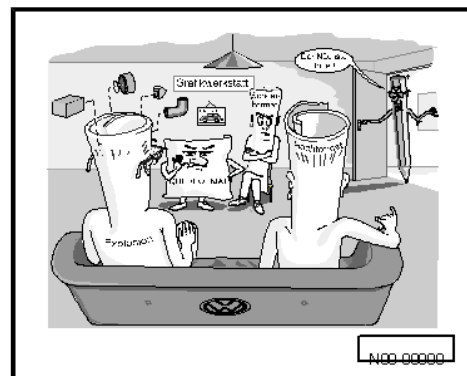
#### Note

- ◆ The illustration shows battery module 1 - J991-.
- ◆ Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#).



#### Note

- ◆ The battery module must be properly seated in the mounting.
- ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ◆ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#).

#### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

### 3.22.7 Removing and installing battery module 6 - J996-



#### DANGER

**Danger to life from high voltage.**

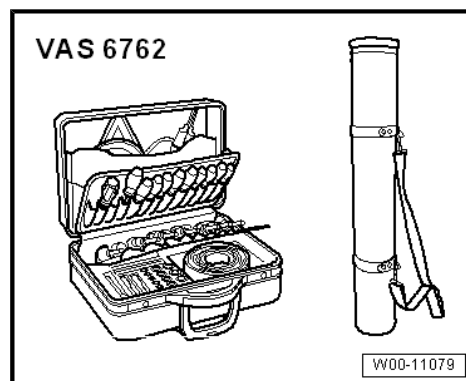
**Electrical shocks will cause serious injuries or death.**

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

Special tools and workshop equipment required



- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

### Removing

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



#### Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .

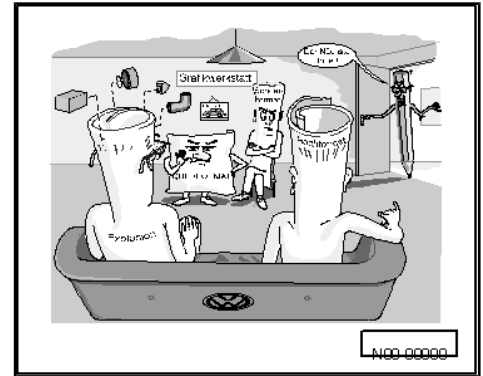


#### Note

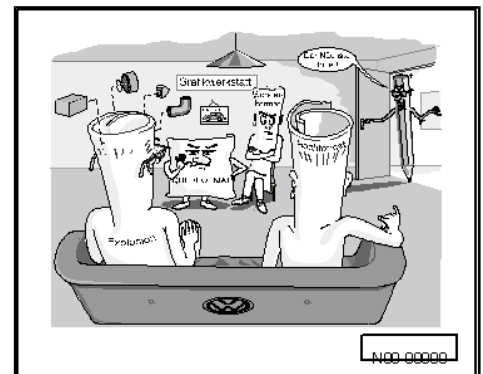
- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .*
- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*
- Remove cable guide ⇒ [page 53](#) .
- Remove switching unit for high-voltage battery - SX6- ⇒ [page 47](#) .



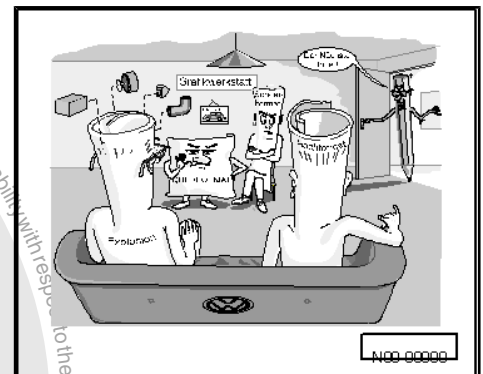
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 3 - J993- and battery module 4 - J994- .
- Fold down accidental contact protection cover -1-.



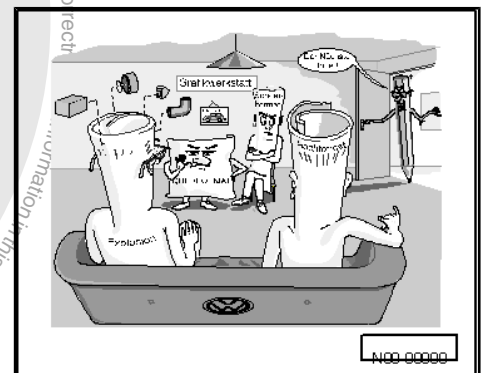
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 2 - J992- and battery module 3 - J993- .
- Fold down accidental contact protection cover -1-.



- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 5 - J995- and battery module 6 - J996- .
- Fold down accidental contact protection cover -1-.

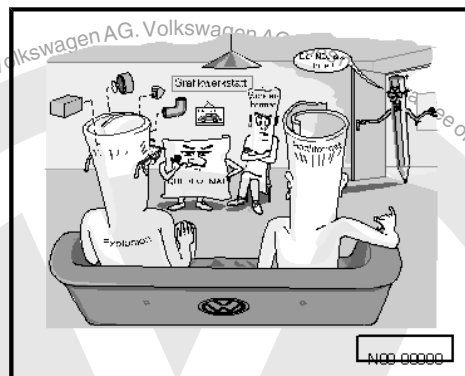


- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 7 - J997- and battery module 8 - J998- .
- Fold down accidental contact protection cover -1-.

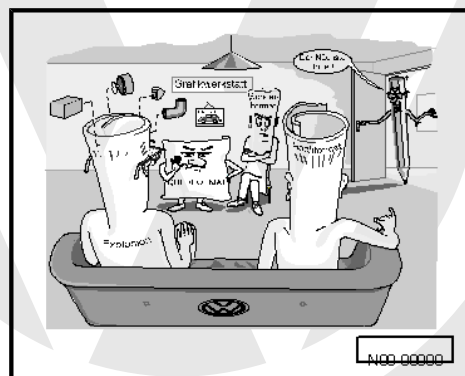




- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 6 - J996- and battery module 7 - J997- .
- Fold down accidental contact protection cover -1-.



- Disconnect connector -arrow-, and lay wire -1- to one side.



- Unscrew bolts -2-, and remove battery module 6 - J996- -1-.



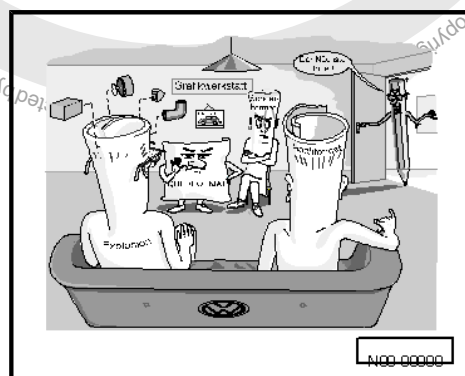
#### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#) .



#### Note

- ◆ The battery module must be properly seated in the mounting.
- ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ◆ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#) .

#### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew



### 3.22.8 Removing and installing battery module 7 - J997-

#### DANGER

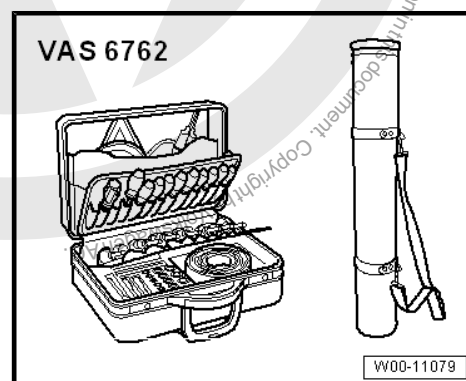
Danger to life from high voltage.

Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ◆ High-voltage tool set - VAS 6762



- ◆ High-voltage tool set - VAS 6883-

#### Removing

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



#### Note

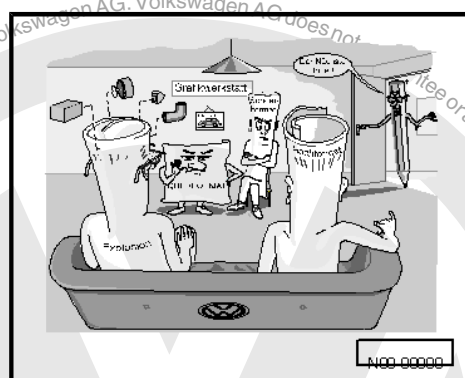
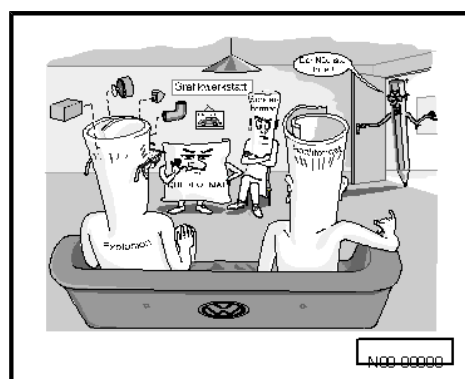
*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .



## Note

- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .*
- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*
- Remove cable guide ⇒ [page 53](#) .
- Remove switching unit for high-voltage battery - SX6- ⇒ [page 47](#) .
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 7 - J997- and battery module 8 - J998- .
- Fold down accidental contact protection cover -1-.
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 6 - J996- and battery module 7 - J997- .
- Fold down accidental contact protection cover -1-.





- Unscrew bolts -2-, and remove battery module 7 - J997- -1-.



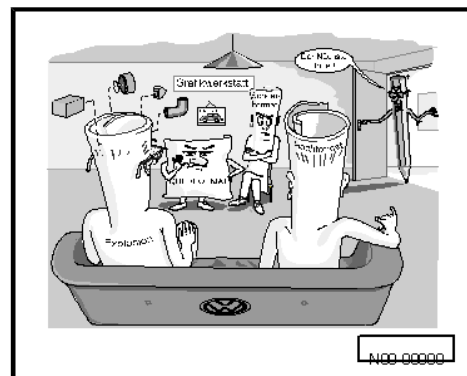
#### Note

- ◆ The illustration shows battery module 0 - J1068-.
- ◆ Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#).



#### Note

- ◆ The battery module must be properly seated in the mounting.
- ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ◆ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#).

#### Specified torques

- ◆ ⇒ ["3.1 Assembly overview - high-voltage battery", page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

### 3.22.9 Removing and installing battery module 8 - J998-



#### DANGER

**Danger to life from high voltage.**

**Electrical shocks will cause serious injuries or death.**

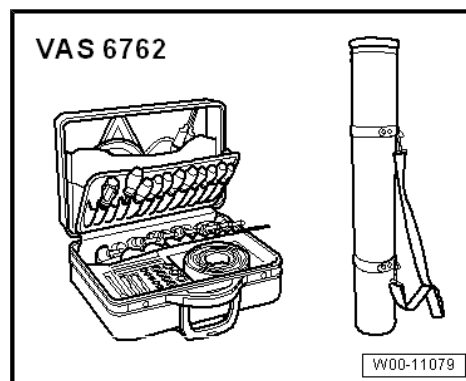
- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

Special tools and workshop equipment required





- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

### Removing

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



#### Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .

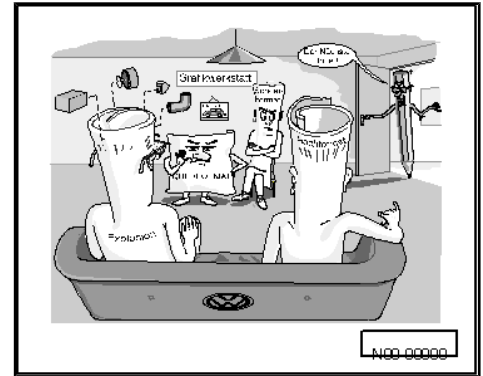


#### Note

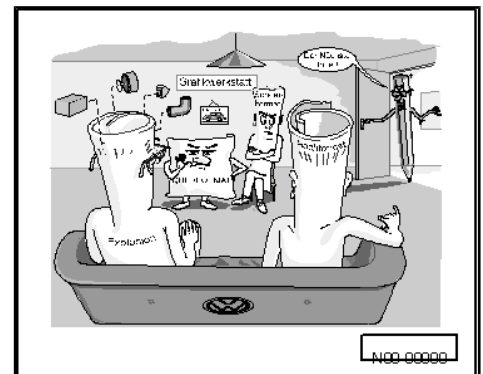
- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910/5- and the autonomous software - VAS 6910/5- ⇒ [page 62](#)*
- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*
- Remove cable guide ⇒ [page 53](#) .
- Remove switching unit for high-voltage battery - SX6- ⇒ [page 47](#) .
- Remove battery module 16 - J1048- ⇒ [page 105](#) .



- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 7 - J997- and battery module 8 - J998- .
- Fold down accidental contact protection cover -1-.



- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 8 - J998- and battery module 9 - J999- .
- Fold down accidental contact protection cover -1-.



- Unscrew bolts -2-, and remove battery module 8 - J998- -1-.



#### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ➔ [page 57](#) .



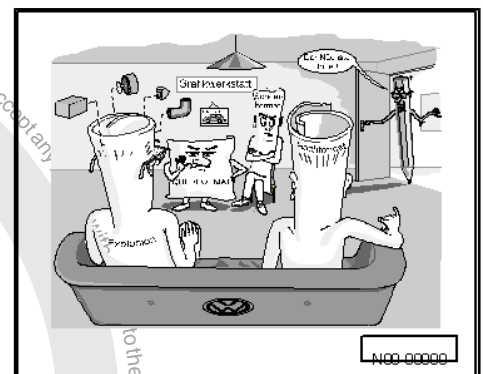
#### Note

- ◆ The battery module must be properly seated in the mounting.
- ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ◆ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ➔ [page 47](#) .

#### Specified torques

- ◆ ➔ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew





### 3.22.10 Removing and installing battery module 9 - J999-

#### DANGER

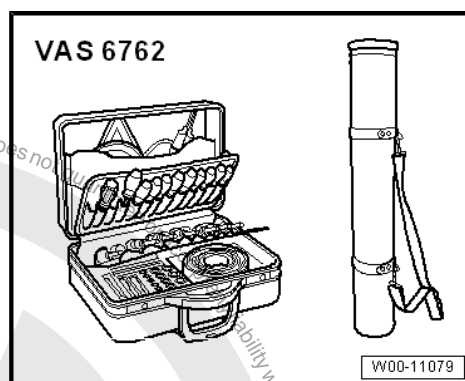
Danger to life from high voltage.

Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ♦ High-voltage tool set - VAS 6762-



- ♦ High-voltage tool set - VAS 6883-

#### Removing

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



#### Note

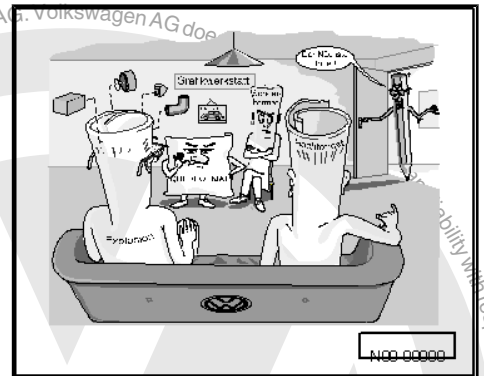
*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .



## Note

- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ➔ [page 62](#) .*
- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*
- Remove switching unit for high-voltage battery - SX6- ➔ [page 47](#) .
- Remove battery module 15 - J1047- ➔ [page 102](#) .
- Remove battery module 16 - J1048- ➔ [page 105](#) .
- Disconnect electrical connectors -3-.
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -4- between battery module 9 - J999- and battery module 10 - J1000- .
- Fold down accidental contact protection cover -1-.





- Unscrew bolts -2-, and remove battery module 9 - J999- -1-.



#### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#) .



#### Note

- ◆ The battery module must be properly seated in the mounting.
  - ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
  - ◆ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#) .

#### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

### 3.22.11 Removing and installing battery module 10 - J1000-



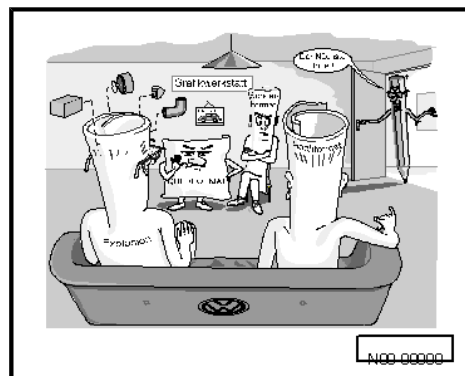
#### DANGER

**Danger to life from high voltage.**

Electrical shocks will cause serious injuries or death.

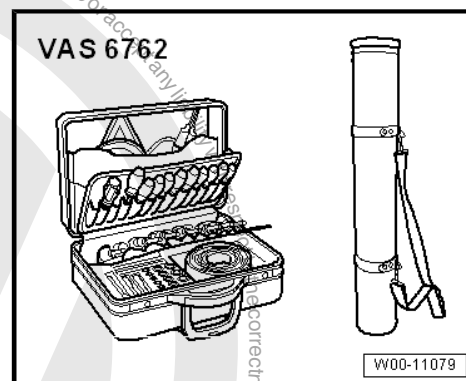
- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required





- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

#### Removing

#### DANGER

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system [⇒ page 167](#) .



#### Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- [⇒ page 34](#) .
- Open electrical circuit [⇒ page 40](#) .

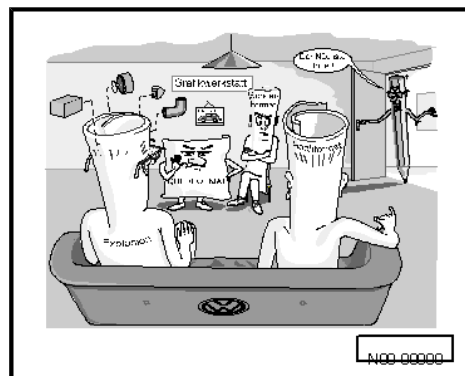


#### Note

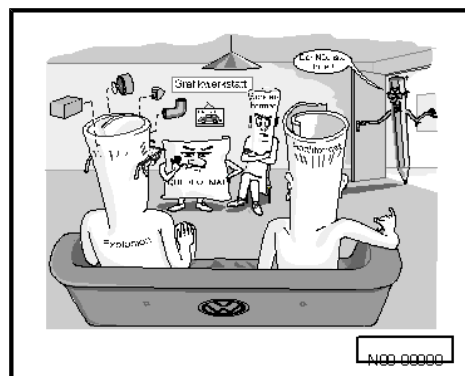
- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- [⇒ page 62](#) .*
- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*
- Remove switching unit for high-voltage battery - SX6- [⇒ page 47](#) .
- Remove battery module 14 - J1046- [⇒ page 99](#) .
- Remove battery module 15 - J1047- [⇒ page 102](#) .
- Remove battery module 16 - J1048- [⇒ page 105](#) .



- Disconnect electrical connectors -3-.
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -4- between battery module 9 - J999- and battery module 10 - J1000- .
- Fold down accidental contact protection cover -1-.



- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 10 - J1000- and battery module 11 - J1001- .
- Fold down accidental contact protection cover -1-.



- Unscrew bolts -2-, and remove battery module 10 - J1000- -1-.



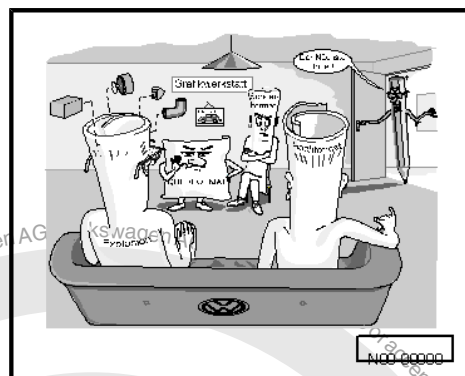
#### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness [→ page 57](#) .



#### Note

- ◆ The battery module must be properly seated in the mounting.
- ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ◆ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- [→ page 47](#) .

#### Specified torques

- ◆ [→ "3.1 Assembly overview - high-voltage battery", page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew





### 3.22.12 Removing and installing battery module 11 - J1001-

#### DANGER

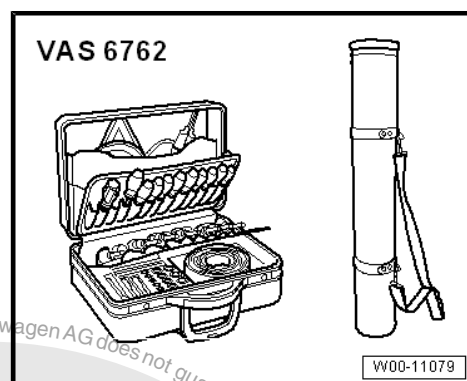
Danger to life from high voltage.

Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

#### Removing

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



#### Note

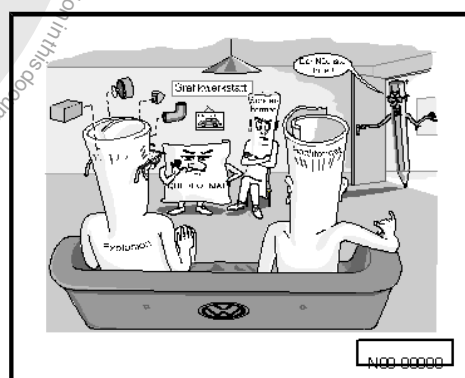
*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2 ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .



## Note

- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .*
- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*
- Remove switching unit for high-voltage battery - SX6- ⇒ [page 47](#) .
- Remove battery module 13 - J1045- ⇒ [page 96](#) .
- Remove battery module 14 - J1046- ⇒ [page 99](#) .
- Remove battery module 15 - J1047- ⇒ [page 102](#) .
- Disconnect connectors -4- of wiring harness.
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 11 - J1001- and battery module 12 - J1002- .
- Fold down accidental contact protection cover -1-.





- Unscrew bolts -2-, and remove battery module 11 - J1001-1-.

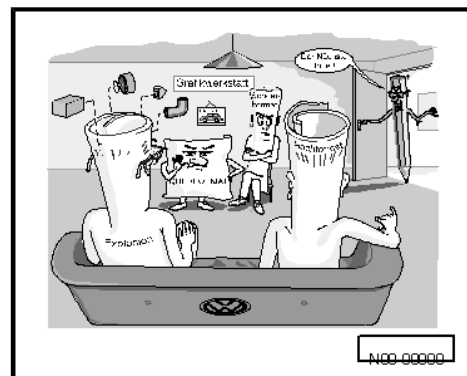
**i Note**

- ◆ *The illustration shows battery module 10 - J1000-.*
- ◆ *Place battery module on a clean surface with the battery terminals facing upwards and cover it.*

**Installing**

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#) .



**i Note**

- ◆ *The battery module must be properly seated in the mounting.*
  - ◆ *Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.*
  - ◆ *The adherence to the correct specified torques must be verified by a second mechanic.*
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#) .

**Specified torques**

- ◆ ⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

### 3.22.13 Removing and installing battery module 12 - J1002-

**! DANGER**

**Danger to life from high voltage.**

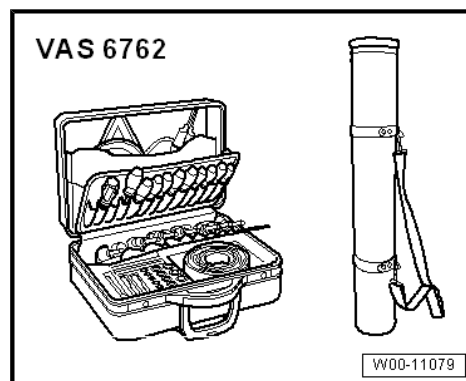
**Electrical shocks will cause serious injuries or death.**

- **Wear protective clothing against the thermal hazards of an electric arc.**
- **Wear an insulated helmet with face shield.**
- **Wear protective gloves.**
- **Wear safety shoes.**

**Special tools and workshop equipment required**



◆ High-voltage tool set - VAS 6762-



◆ High-voltage tool set - VAS 6883-

Removing

**! DANGER**

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ➔ [page 167](#) .



Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ➔ [page 34](#) .
- Open electrical circuit ➔ [page 40](#) .



Note

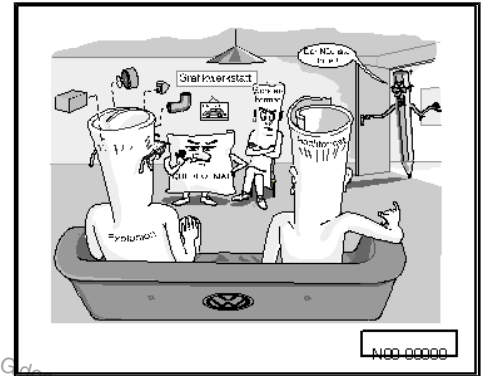
- ◆ If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ➔ [page 62](#) .
- ◆ Mark the installation position of the connectors and high-voltage connecting pieces.

- Remove switching unit for high-voltage battery - SX6- ➔ [page 47](#) .

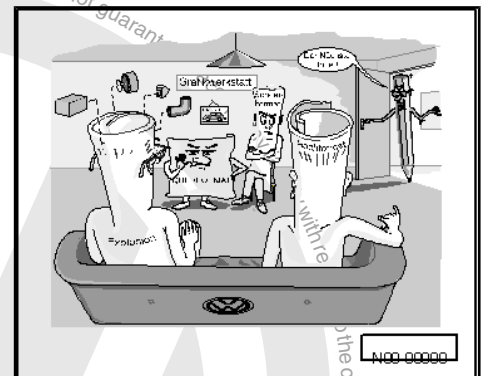
- Remove battery module 13 - J1045- ➔ [page 96](#) .
- Remove battery module 14 - J1046- ➔ [page 99](#) .



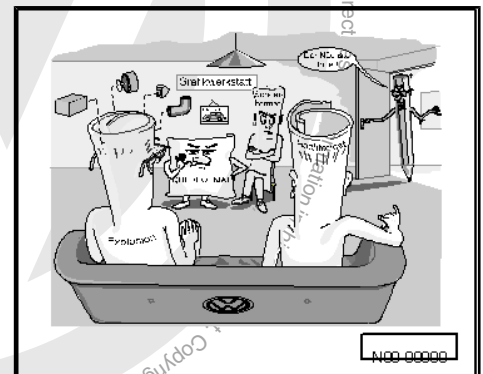
- Unclip wiring harness -arrows-.



- Disconnect connectors -4- of wiring harness.
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 11 - J1001- and battery module 12 - J1002- .
- Cover high-voltage connecting piece -3- with an appropriate guard.
- Fold down accidental contact protection cover -1-.



- Fold up accidental contact protection cover -1-.
- Unscrew nut -2-.
- Remove high-voltage connecting piece -3- for battery module 12 - J1002- .
- Fold down accidental contact protection cover -1-.





- Unscrew bolts -2-, and remove battery module 12 - J1002-1-.



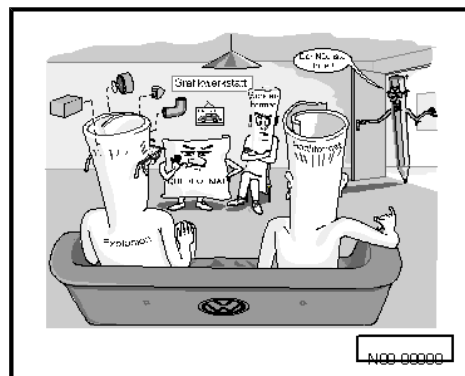
#### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#) .



#### Note

- ♦ The battery module must be properly seated in the mounting.
  - ♦ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
  - ♦ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#) .

#### Specified torques

- ♦ ⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

### 3.22.14 Removing and installing battery module 13 - J1045-



#### DANGER

Danger to life from high voltage.

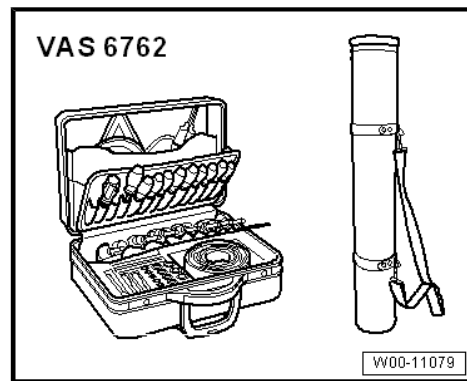
Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

Special tools and workshop equipment required



- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

### Removing

#### DANGER

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#).



#### Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .



#### Note

- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .*

- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*
- Disconnect connectors -2- of wiring harness.
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -arrow-.
- Remove high-voltage connecting piece -3- between battery module 13 - J1045- and battery module 14 - J1046- .

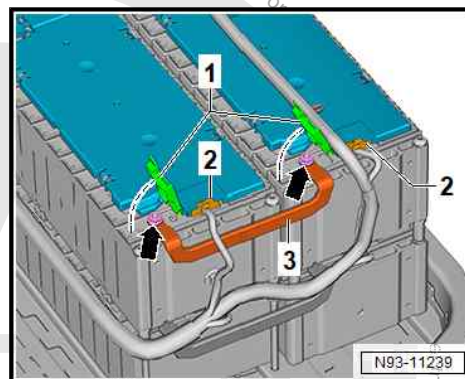




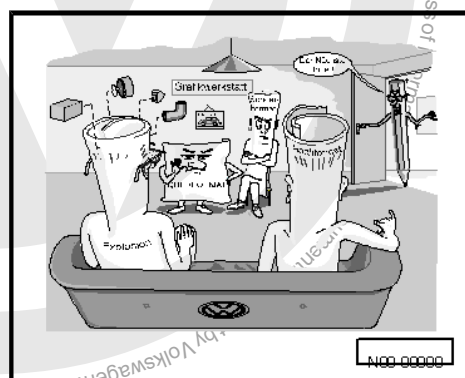
e-up! 2014 ➤

Electric motor (210, LS1) - Edition 09.2018

- Fold down accidental contact protection cover -1-.
- Fold up accidental contact protection cover -1-.



- Unscrew nut -2-.
- Remove high-voltage connecting piece -3-, and cover it with an appropriate guard.





- Unscrew bolts -2-.
- Slightly pull away high-voltage connecting piece -3-, and remove battery module 13 - J1045- -1-.



#### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#) .



#### Note

- ◆ The battery module must be properly seated in the mounting.
- ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
- ◆ The adherence to the correct specified torques must be verified by a second mechanic.

- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#)

#### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

### 3.22.15 Removing and installing battery module 14 - J1046-



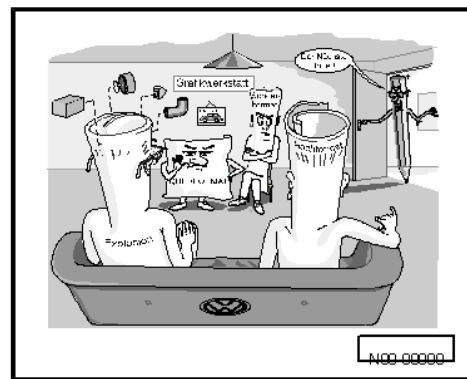
#### DANGER

**Danger to life from high voltage.**

**Electrical shocks will cause serious injuries or death.**

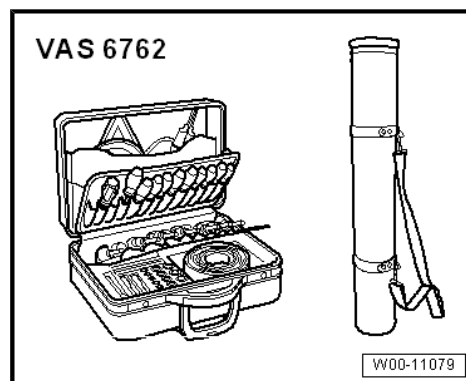
- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required





◆ High-voltage tool set - VAS 6762-



◆ High-voltage tool set - VAS 6883-

Removing

**! DANGER**

**Danger to life from high voltage.**

**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



**Note**

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .

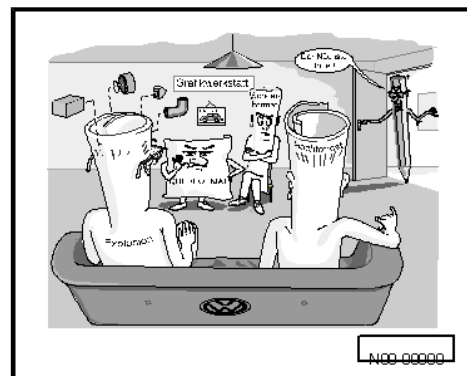


**Note**

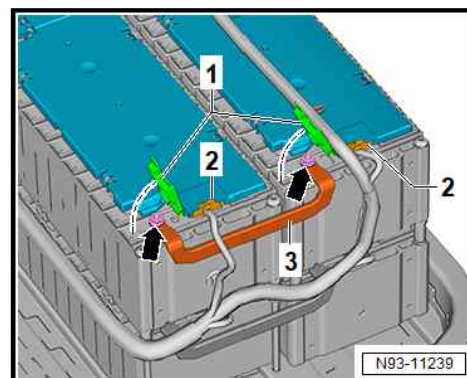
- ◆ If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ⇒ [page 62](#) .
- ◆ Mark the installation position of the connectors and high-voltage connecting pieces.
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 14 - J1046- and battery module 15 - J1047- .



- Fold down accidental contact protection cover -1-.
- Disconnect connectors -2- of wiring harness.
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -arrow-.
- Remove high-voltage connecting piece -3- between battery module 13 - J1045- and battery module 14 - J1046- .



- Fold down accidental contact protection cover -1-.

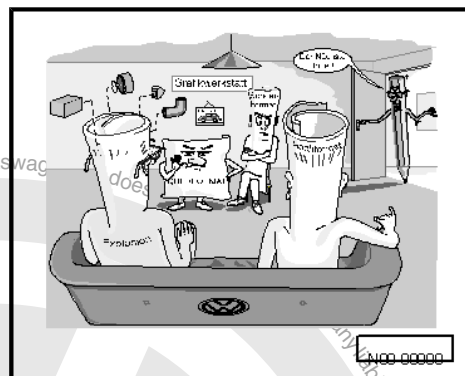




- Unscrew bolts -2-, and remove battery module 14 - J1046-1-.

**Note**

- ♦ The illustration shows battery module 15 - J1047-
- ♦ Place battery module on a clean surface with the battery terminals facing upwards and cover it.

**Installing**

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ➔ [page 57](#) .

**Note**

- ♦ The battery module must be properly seated in the mounting.
  - ♦ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
  - ♦ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries J497- ➔ [page 47](#) .

**Specified torques**

- ♦ ➔ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

### 3.22.16 Removing and installing battery module 15 - J1047-

**DANGER**

**Danger to life from high voltage.**

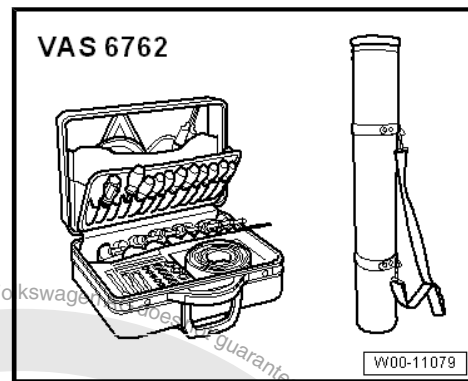
**Electrical shocks will cause serious injuries or death.**

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

**Special tools and workshop equipment required**



◆ High-voltage tool set - VAS 6762-



◆ High-voltage tool set - VAS 6883-

Removing

**! DANGER**

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ➔ [page 167](#) .



**Note**

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ➔ [page 34](#) .
- Open electrical circuit ➔ [page 40](#) .

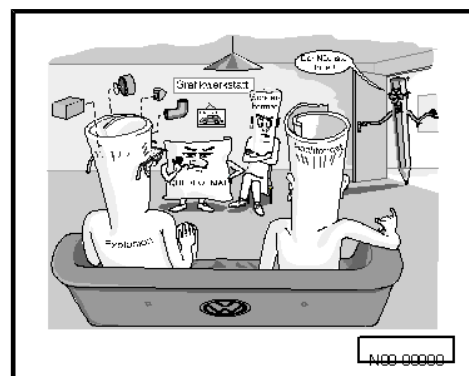


**Note**

- ◆ *If a new battery module is installed, the charge level must be adapted with the module balancer - VAS 6910- and the autonomous software - VAS 6910/5- ➔ [page 62](#) .*

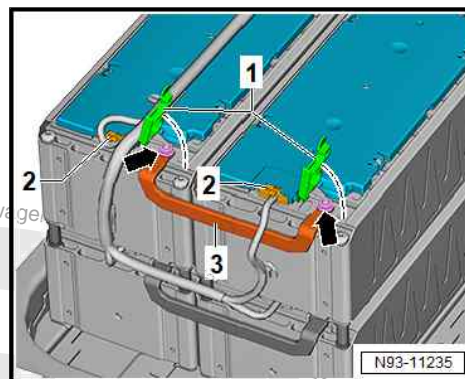
- ◆ *Mark the installation position of the connectors and high-voltage connecting pieces.*

- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 14 - J1046- and battery module 15 - J1047- .
- Fold up accidental contact protection cover -1-.
- Disconnect connectors -2-.
- Unscrew nuts -arrow-.





- Remove high-voltage connecting piece -3- between battery module 15 - J1047- and battery module 16 - J1048- .
- Fold down accidental contact protection cover -1-.



- Unscrew bolts -2-, and remove battery module 15 - J1047- -1-.



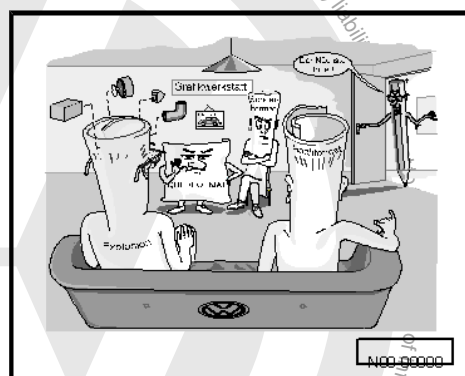
#### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

#### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ⇒ [page 57](#) .



#### Note

- ◆ The battery module must be properly seated in the mounting.
  - ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
  - ◆ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- ⇒ [page 47](#) .

#### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew





### 3.22.17 Removing and installing battery module 16 - J1048-

#### DANGER

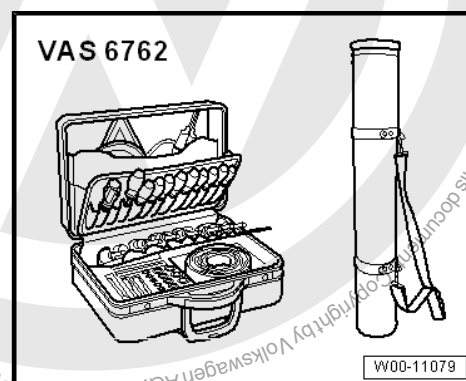
Danger to life from high voltage.

Electrical shocks will cause serious injuries or death.

- Wear protective clothing against the thermal hazards of an electric arc.
- Wear an insulated helmet with face shield.
- Wear protective gloves.
- Wear safety shoes.

#### Special tools and workshop equipment required

- ◆ High-voltage tool set - VAS 6762-



- ◆ High-voltage tool set - VAS 6883-

#### Removing

#### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



#### Note

*A second qualified person is required for all work on an open high-voltage battery. The second person must not actively work on the high-voltage battery, but offers assistance in the case of an accident.*

- Open high-voltage battery 1 - AX2- ⇒ [page 34](#) .
- Open electrical circuit ⇒ [page 40](#) .



## Note

◆ If a new battery module is installed, the charge level must be adapted with the module balancer VAS 6910- and the autonomous software VAS 6910/5- ⇒ [page 62](#).

◆ Mark the installation position of the connectors and high-voltage connecting pieces.

– Unscrew bolts -3-, and remove charging cables -1 and 2-.

– Fold up accidental contact protection cover -1-.

– Unscrew nuts -2-.

– Remove high-voltage connecting piece -3- between switching unit for high-voltage battery - SX6- and battery module 16 - J1048- .

– Fold down accidental contact protection cover -1-.

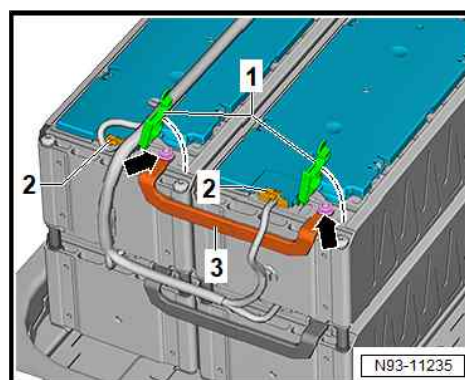
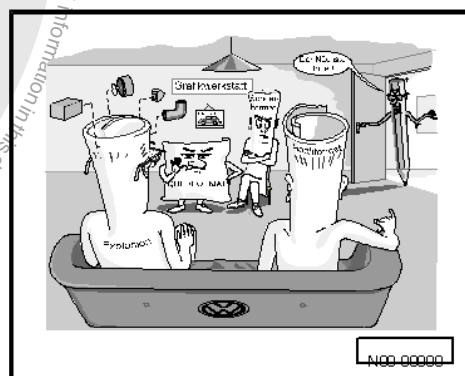
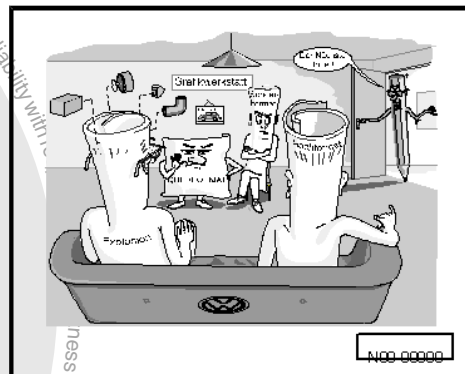
– Fold up accidental contact protection cover -1-.

– Disconnect connectors -2-.

– Unscrew nuts -arrow-.

– Remove high-voltage connecting piece -3- between battery module 15 - J1047- and battery module 16 - J1048- .

– Fold down accidental contact protection cover -1-.





- Unscrew bolts -2-, and remove battery module 16 - J1048-1-.

### Note

Place battery module on a clean surface with the battery terminals facing upwards and cover it.

### Installing

Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness [⇒ page 57](#).

### Note

- ◆ The battery module must be properly seated in the mounting.
  - ◆ Every time a high-voltage connecting piece has been installed, subsequent measurements must be performed to make sure it is not short-circuited to the housing.
  - ◆ The adherence to the correct specified torques must be verified by a second mechanic.
- Adhere to the correct sequence when connecting the module monitor control unit for batteries - J497- [⇒ page 47](#).

### Specified torques

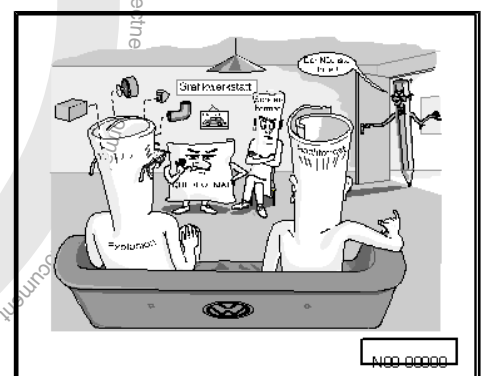
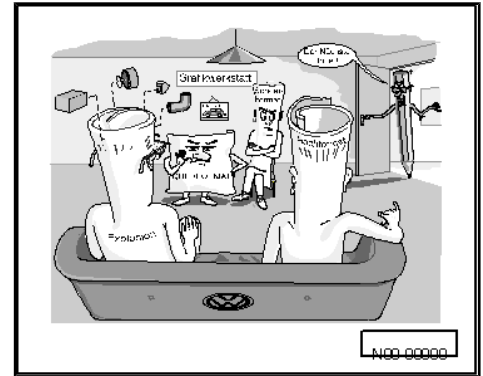
- ◆ [⇒ “3.1 Assembly overview - high-voltage battery”, page 17](#)

Component	Specified torque	Note
Nuts for high-voltage connecting piece	7.5 Nm	Renew

## 3.23 Removing and installing crash bar

### Removing

- Remove switching unit for high-voltage battery - SX6- [⇒ page 47](#).
- Fold up accidental contact protection cover -1-.
- Unscrew nuts -2-.
- Remove high-voltage connecting piece -3- between battery module 7 - J997- and battery module 8 - J998-.
- Fold down accidental contact protection cover -1-.





- Unscrew bolts -2-.
- Carefully remove crash bar -1- from battery.

### Installing

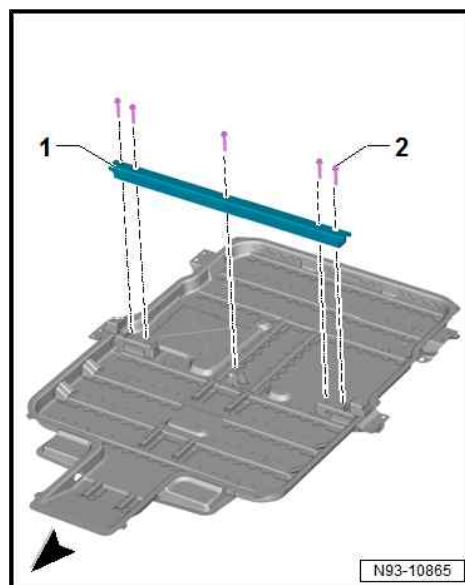
Install in reverse order of removal, observing the following:

- Perform visual inspection on wiring harness ➔ [page 57](#) .

### Specified torques

♦ ➔ ["3.1 Assembly overview - high-voltage battery", page 17](#)

Component	Specified torque	Note
Nuts and bolts for high-voltage connecting piece	7.5 Nm	Renew
Bolts for switching unit for high-voltage battery - SX6-	9 Nm	Renew
Bolts for crash bar	35 Nm	





## 4 Power and control electronics for electric drive

⇒ ["4.1 Assembly overview - power and control electronics for electric drive", page 109](#)

⇒ ["4.2 Removing and installing power and control electronics for electric drive", page 110](#)

⇒ ["4.3 Removing and installing high-voltage system fuse 3 S353", page 114](#)

### 4.1 Assembly overview - power and control electronics for electric drive

#### 1 - Bolts

- ☐ Qty. 7
- ☐ Renew after removal
- ☐ Observe tightening sequence ⇒ [page 114](#)
- ☐ 7 Nm

#### 2 - Cover

#### 3 - Safety cover

- ☐ Renew after removal

#### 4 - Bolts

- ☐ Qty. 2
- ☐ 2.7 Nm

#### 5 - High-voltage system fuse 3 - S353-

- ☐ Removing and installing ⇒ [page 114](#)

#### 6 - Bolts

- ☐ Qty. 4
- ☐ 20 Nm

#### 7 - Cover

#### 8 - Nuts

- ☐ Qty. 2
- ☐ 15 Nm

#### 9 - Battery positive and negative cables

- ☐ Between voltage converter - A19- and battery - -

#### 10 - Power and control electronics for electric drive - JX1-

- ☐ Removing and installing ⇒ [page 110](#)

#### 11 - Bolts

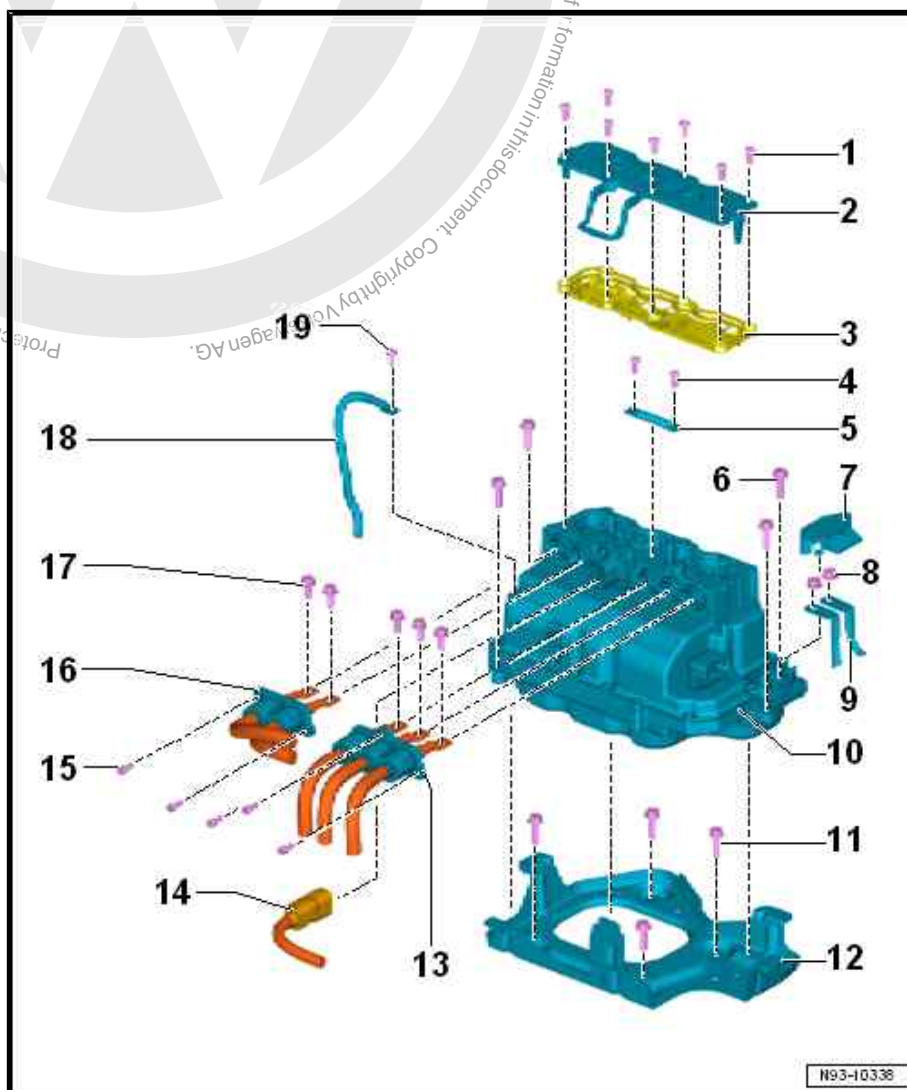
- ☐ Qty. 4
- ☐ 20 Nm

#### 12 - Console

- ☐ For power and control electronics for electric drive - JX1-

#### 13 - High-voltage wiring harness for drive motor - PX2-

- ☐ To electric drive motor - V141-





#### 14 - High-voltage wire for charging unit 1/wiring junction - P12-

- ☐ To high-voltage wiring junction

#### 15 - Bolts

- ☐ Qty. 5
- ☐ 5 Nm

#### 16 - High-voltage wiring harness for high-voltage battery - PX1-

- ☐ To high-voltage battery 1 - AX2-

#### 17 - Bolts

- ☐ Qty. 5
- ☐ 20 Nm

#### 18 - Potential equalisation line

- ☐ Overview of fitting locations ➔ [page 170](#)

#### 19 - Bolt

- ☐ 9 Nm

## 4.2 Removing and installing power and control electronics for electric drive

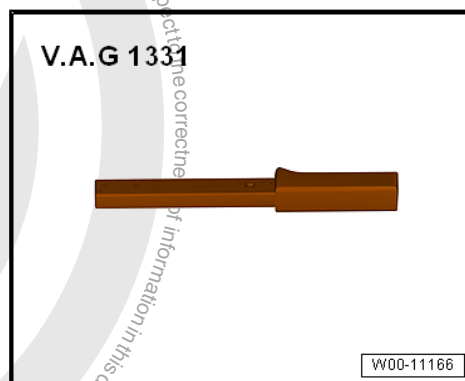


### Note

*The power and control electronics for electric drive - JX1- includes the electric drive control unit - J841- .*

### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



- ◆ Torque wrench - V.A.G 1410-







## Removing

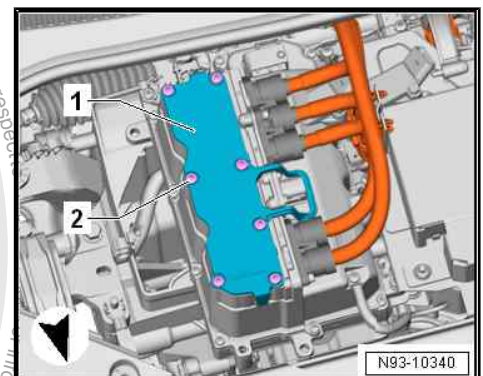
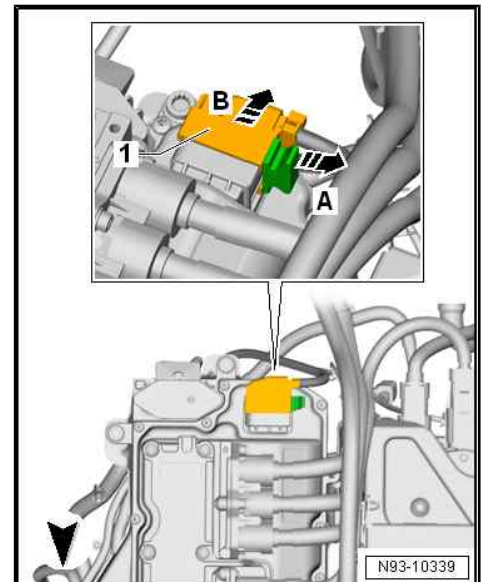
### DANGER

**Danger to life from high voltage.**

**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ➔ [page 167](#) .
- Disconnect 12V battery - A- ➔ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
- Remove underbody covers ➔ General body repairs, exterior; Rep. gr. 66 ; Underbody cover; Assembly overview - underbody covers, e-up! .
- Drain coolant ➔ [page 149](#) .
- Remove bracket for engine (motor) control unit - J623- ➔ [page 138](#) .
- Release connector -1- in -direction of arrow A-.
- Pull off electrical connector -1- in -direction of arrow B-.



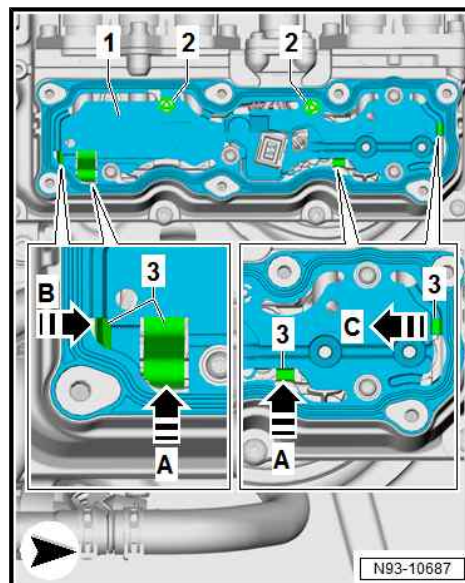
Unscrew bolts -2-.

- Detach cover -1-.

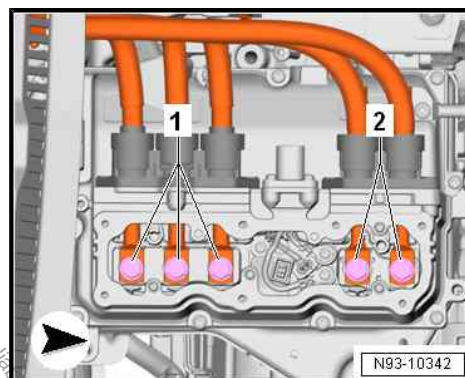




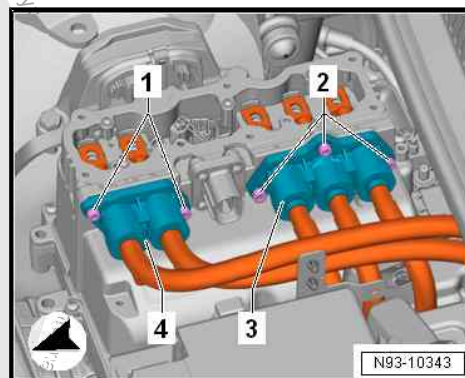
- Release catches -3- in direction of -arrows A, B and C-.
- Unclip catches -2- upwards.
- Remove safety cover -1-.



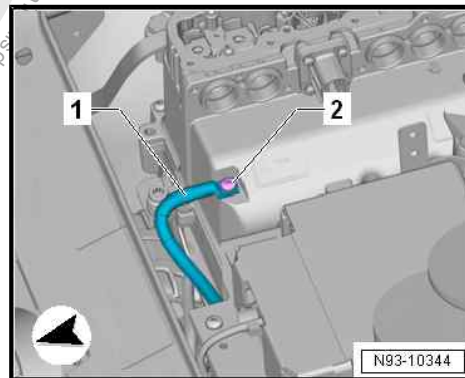
- Unscrew bolts -1 and 2-.



- Unscrew bolts -1 and 2-.
- Pull out high-voltage wiring harnesses PX1 -4- and PX2 -3-.
- Fit cover back on power and control electronics for electric drive - JX1- .

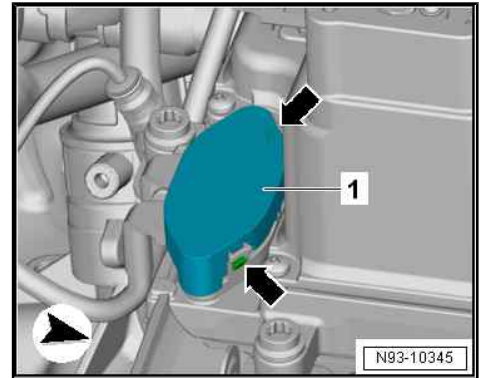


- Unscrew bolt -2-.
- Remove potential equalisation line -1-.

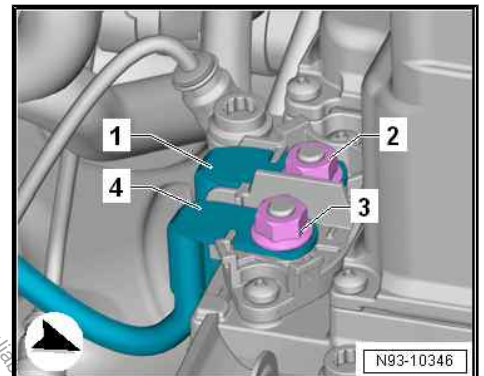




- Unclip cover -1- -arrows-.

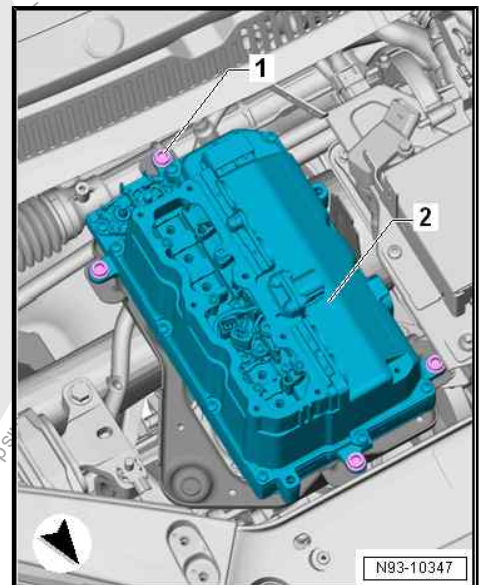


- Unscrew nuts -2 and 3-.
- Detach battery positive and negative cables -1 and 4-.



- Remove bolts -1- for power and control electronics for electric drive - JX1- -2-.

Raise power and control electronics for electric drive - JX1- slightly, and swing to left.

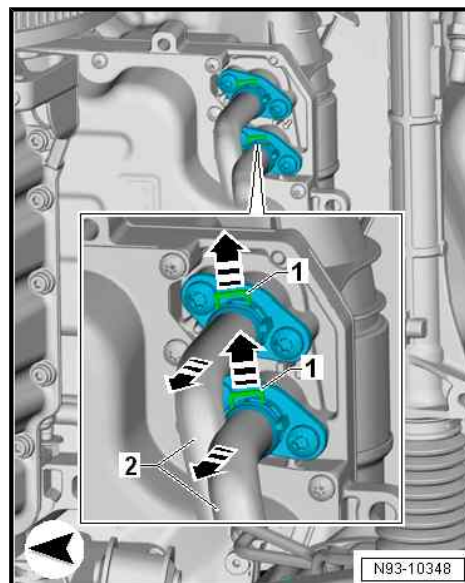




- Release clips -1- in -direction of arrow-.
- Pull off coolant hoses -2-.
- Remove power and control electronics for electric drive - JX1- upwards.

### Installing

Install in reverse order of removal, observing the following:



### Tightening sequence for cover

- Renew bolts after removing.

#### NOTICE

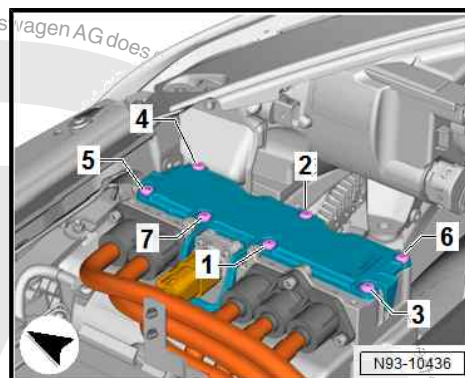
If the power and control electronics for electric drive - JX1- has been renewed, it must be adapted to the immobiliser ⇒ Vehicle diagnostic tester.

#### WARNING

**Danger to life from high voltage.**

Electrical shocks can cause serious injuries or death.

- Have a qualified technician re-energise the high-voltage system.



- Commission high-voltage system ⇒ [page 169](#) .

### Specified torques

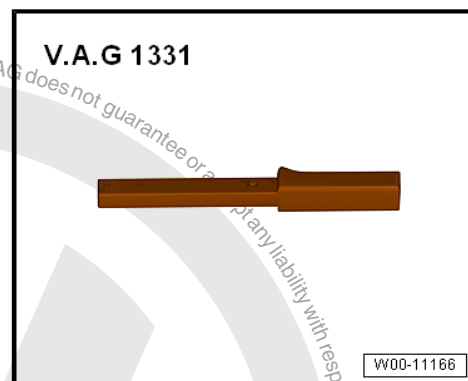
- ♦ ⇒ [“4.1 Assembly overview - power and control electronics for electric drive”, page 109](#)
- ♦ ⇒ [“15.1 Overview of fitting locations - potential equalisation lines”, page 170](#)

## 4.3 Removing and installing high-voltage system fuse 3 - S353-

Special tools and workshop equipment required



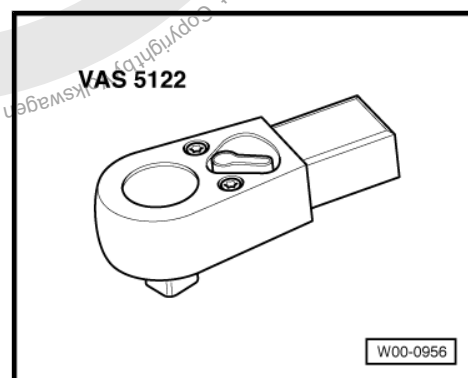
- ◆ Torque wrench - V.A.G 1331-



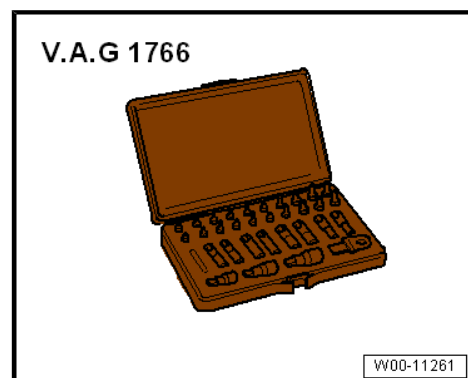
- ◆ Torque wrench - V.A.G 1783-



- ◆ Reversible ratchet - VAS 5122-



- ◆ TORX bit set - V.A.G 1766-







## Removing

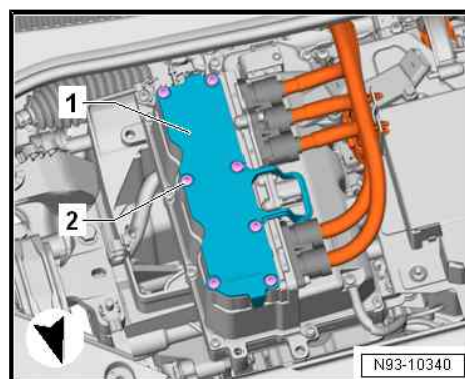
### DANGER

Danger to life from high voltage.

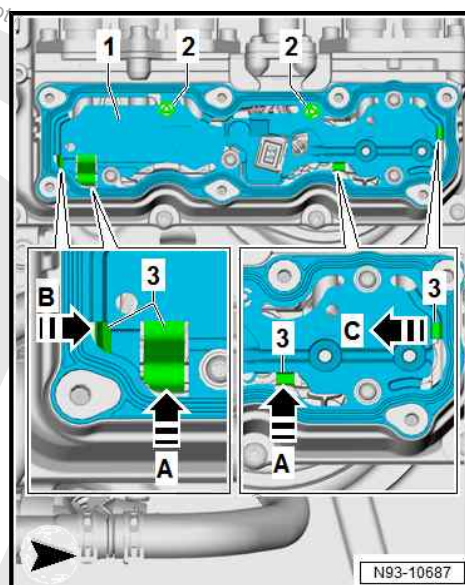
Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .
- Disconnect 12-V battery - A- ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
- Unscrew bolts -2-.
- Detach cover -1-.



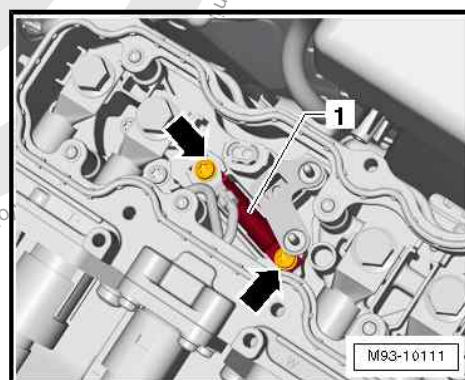
- Release catches -3- in direction of -arrows A, B and C-.
- Unclip catches -2- upwards.
- Remove safety cover -1-.



- Unscrew bolts -arrows-.
- Remove high-voltage system fuse 3 - S353- -1-.

## Installing

Install in reverse order of removal, observing the following:





#### Tightening sequence for cover

##### **WARNING**

Danger to life from high voltage.

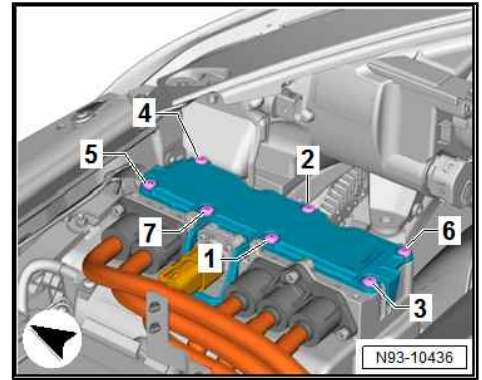
Electrical shocks can cause serious injuries or death.

- Have a qualified technician re-energise the high-voltage system.

- Re-energise high-voltage system. ➔ [page 169](#)

#### Specified torques

- ◆ ➔ [“4.1 Assembly overview - power and control electronics for electric drive”, page 109](#)





## 5 Electric drive motor

⇒ [“5.1 General description - electric drive motor”, page 118](#)

⇒ [“5.2 Assembly overview - electric drive motor”, page 118](#)

⇒ [“5.3 Removing and installing engine cover”, page 120](#)

⇒ [“5.4 Removing and installing three-phase current drive VX54 ”, page 121](#)

⇒ [“5.5 Renewing three-phase current drive VX54 ”, page 129](#)

⇒ [“5.6 Calibrating three-phase current drive VX54 ”, page 129](#)

⇒ [“5.7 Removing and installing gearbox”, page 129](#)

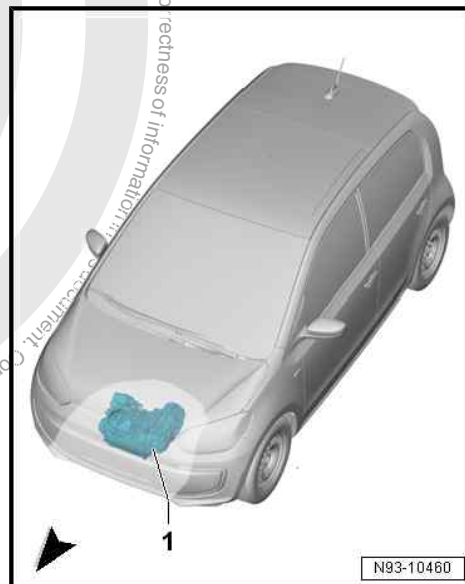
⇒ [“5.8 Removing and installing drive motor temperature sender G712 ”, page 130](#)

⇒ [“5.9 Removing and installing drive motor rotor position sender 1 G713 ”, page 132](#)

### 5.1 General description - electric drive motor

The three-phase current drive - VX54- -1- is located where the combustion engine would otherwise be. It acts directly on the input shaft and has the following tasks:

- ◆ Acts as a motor to drive the vehicle purely by electric means.
- ◆ Acts as a generator to supply the vehicle electrical system with current and charge the high-voltage battery 1 - AX2- .



### 5.2 Assembly overview - electric drive motor





### 1 - Cover for motor compartment

- ☐ Cover for engine (motor) control unit - J623-
- ☐ Removing and installing ⇒ [page 120](#)

### 2 - Engine (motor) control unit - J623-

- ☐ Removing and installing ⇒ [page 136](#)

### 3 - Bracket for engine (motor) control unit - J623-

- ☐ Bolted to charging unit 1 for high-voltage battery - AX4-
- ☐ Removing and installing ⇒ [page 138](#)

### 4 - Charging unit 1 for high-voltage battery - AX4-

- ☐ Secured with bracket to cross member
- ☐ Must be removed in order to remove electric drive motor - V141-
- ☐ Removing and installing ⇒ [page 186](#)

### 5 - Bolts

- ☐ Renew after removal
- ☐ M12 x 1.5 x 85
- ☐ Qty. 2
- ☐ 60 Nm + 180°

### 6 - Suspension link

- ☐ Must only be detached in order to remove electric drive motor - V141-

### 7 - Coolant hoses

- ☐ For cooling three-phase current drive - VX54- ⇒ [page 145](#)

### 8 - Three-phase current drive - VX54-

- ☐ Removing and installing ⇒ [page 121](#)

### Integrated components:

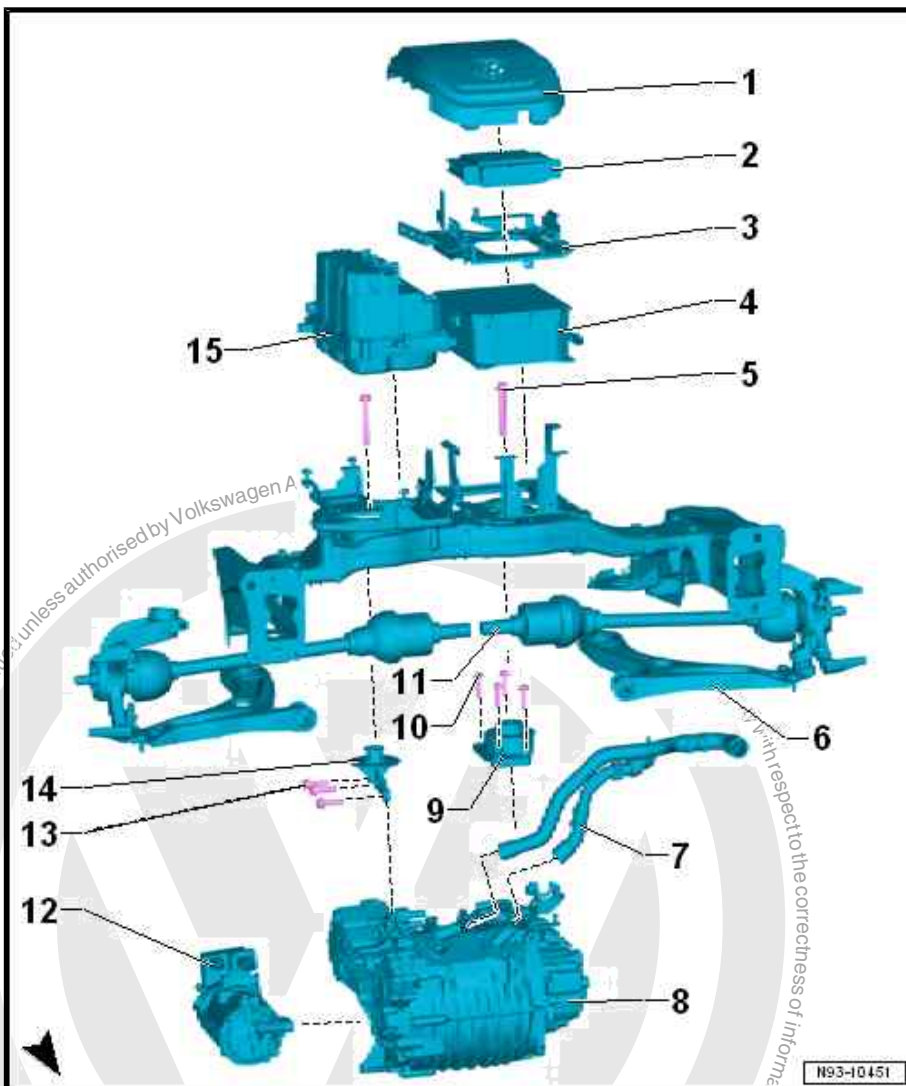
- ◆ Electric drive motor - V141-
- ◆ Drive motor temperature sender - G712-
- ◆ Drive motor rotor position sender 1 - G713-
  - ☐ Renew panel seal
  - ☐ Renew plug

### 9 - Mountings

- ☐ Mounting for three-phase current drive - VX54-
- ☐ Removing and installing ⇒ [page 129](#)

### 10 - Bolts

- ☐ Renew after removal
- ☐ M10 x 40
- ☐ Qty. 4
- ☐ 40 Nm + 90°





### 11 - Drive shaft

- ❑ For transmitting power of three-phase current drive - VX54-
- ❑ Must only be detached for removal of three-phase current drive - VX54-

### 12 - Electrical air conditioner compressor - V470-

- ❑ Must only be detached for removal of three-phase current drive - VX54-

### 13 - Bolts

- ❑ Renew after removal
- ❑ M10 × 40
- ❑ Qty. 3
- ❑ 40 Nm + 90°

### 14 - Mountings

- ❑ Mounting for three-phase current drive - VX54-
- ❑ Removing and installing ⇒ [page 129](#)

### 15 - Power and control electronics for electric drive - JX1-

- ❑ With electric drive control unit - J841-
- ❑ Secured with bracket to cross member
- ❑ Must be removed in order to remove three-phase current drive - VX54-
- ❑ Removing and installing ⇒ [page 110](#)

## 5.3 Removing and installing engine cover

### Removing

- Carefully pull cover for motor compartment -1- off mountings
- 2- one at a time.

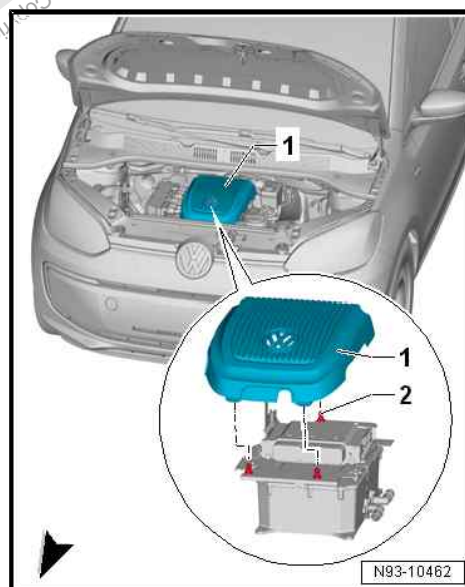
### Installing

Install in reverse order of removal.



### Note

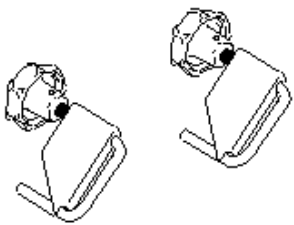
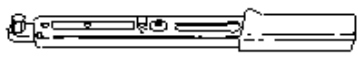
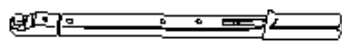
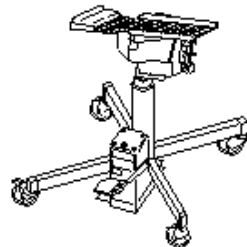
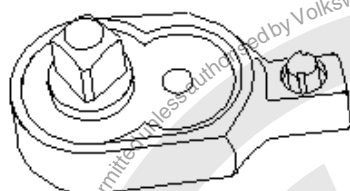

*Before assembling, check fastening elements for damage and renew as necessary.*





## 5.4 Removing and installing three-phase current drive - VX54-

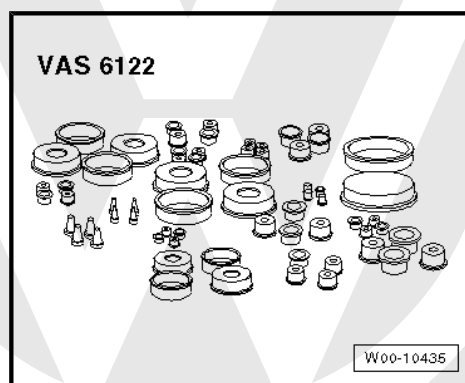
Special tools and workshop equipment required

<p><b>3094</b></p> 	<p><b>V.A.G 1331</b></p> 
<p><b>V.A.G 1332</b></p> 	<p><b>V.A.G 1383</b></p> 
<p><b>V.A.G 1410/3</b></p> 	<p><b>VAS 5085</b></p>  <p>W 10-10066</p>

- ◆ Hose clamps to 25 mm - 3094-
- ◆ Torque wrench - V.A.G 1331-
- ◆ Torque wrench - V.A.G 1332-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Ratchet attachment - V.A.G 1410/3-
- ◆ Ladder - VAS 5085- or commercially available item
- ◆ Adjustment plate - 3282/68-



- ◆ Gearbox support - 3282-
- ◆ Workshop hoist - VAS 6100-
- ◆ Drip tray for workshop hoist - VAS 6208-
- ◆ Spring-type clip pliers - VAS 6362-
- ◆ Wedge - T10161-
- ◆ Engine bung set - VAS 6122-





- ◆ Torque wrench - V.A.G 1410-



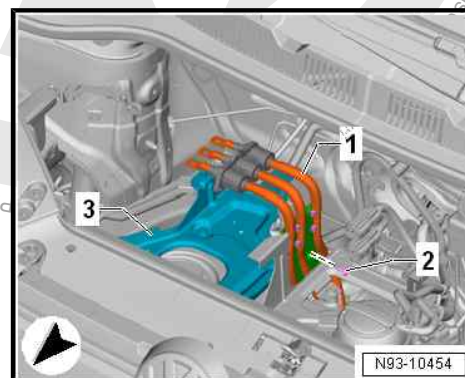
## Removing

### DANGER

**Danger to life from high voltage.  
Severe or fatal injury from electric shock.**

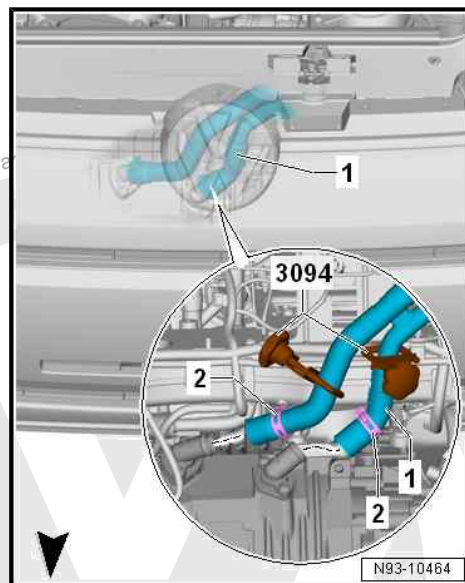
- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#).
- Disconnect 12-V battery ⇒ Electrical system; Rep. gr. 27 ; Disconnecting and connecting battery .
- Remove cover for motor compartment ⇒ [page 120](#) .
- Remove engine control unit - J623- ⇒ [page 136](#) .
- Remove bracket for engine (motor) control unit - J623- ⇒ [page 138](#) .
- Remove underbody covers ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cover; Assembly overview - underbody covers, e-up! .
- Drain coolant ⇒ [page 149](#) .
- Remove charging unit 1 for high-voltage battery - AX4- ⇒ [page 186](#) .
- Remove power and control electronics for electric drive - JX1- ⇒ [page 110](#) .
- Unscrew bolt -2-.
- Remove high-voltage wiring harness for drive motor - PX2- with bracket -1- from bracket for power and control electronics for electric drive - JX1- -3-.

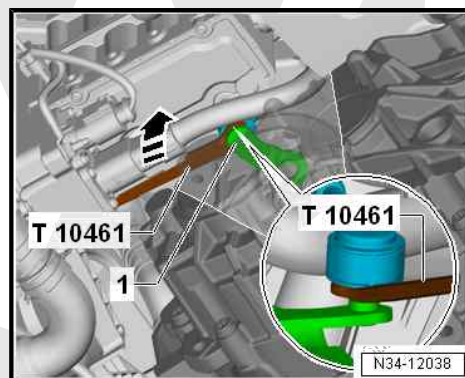




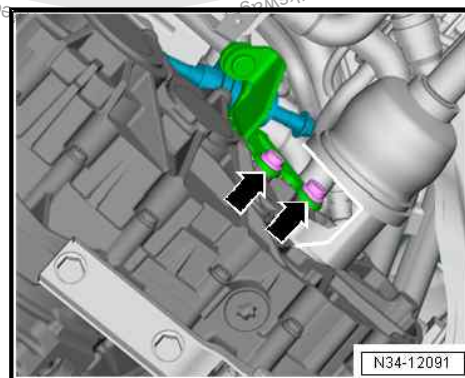
- Clamp off coolant hoses -1- at top of three-phase current drive - VX54- using hose clamps, up to 25 mm - 3094- .
- Open hose clips -2- using hose clip pliers - VAS 6362- and push them back.
- Pull coolant hoses -1- off three-phase current drive - VX54-
- Seal coolant connections and hoses using engine bung set - VAS 6122- .



- Lever selector lever cable off park lock lever -1- using open end spanner 14 mm - T10461- in -direction of arrow-.



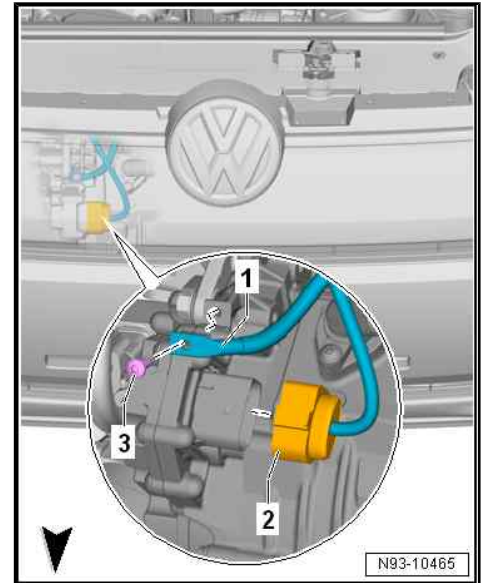
- Unbolt cable support bracket together with selector lever cable from gearbox -arrows-.



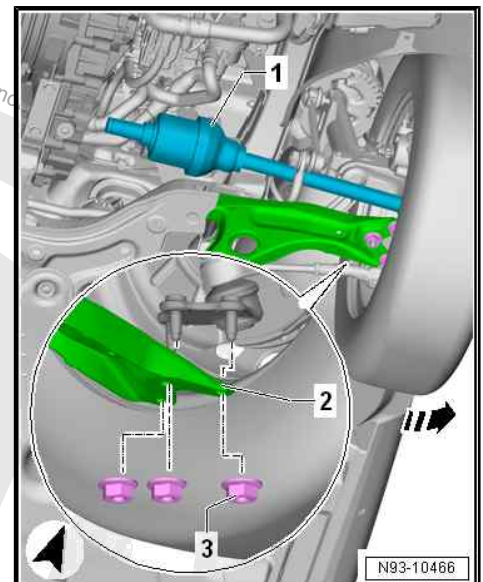




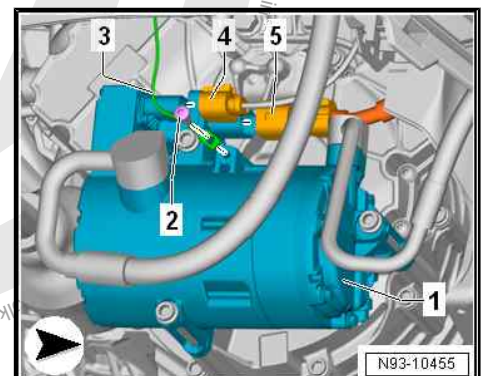
- Unscrew bolt -3-.
- Remove potential equalisation line -1- from three-phase current drive - VX54- .
- Release electrical connector for rotor position and temperature of drive motor -2- on three-phase current drive - VX54- , and pull it off.
- Wrap connector in a clean cloth so that no coolant can come in contact with connector.



- Unscrew nuts -3- on both sides.
- Pull off suspension link -2- downwards. When doing this, swing front axle away in -direction of arrow-.
- Apply wedge - T10161- between gearbox housing and triple roller joint -1- on both sides.
- Press inner joint out of gearbox with a blow to wedge - T10161- using a rubber hammer.
- Secure drive shaft -1- to body on both sides using workshop materials.



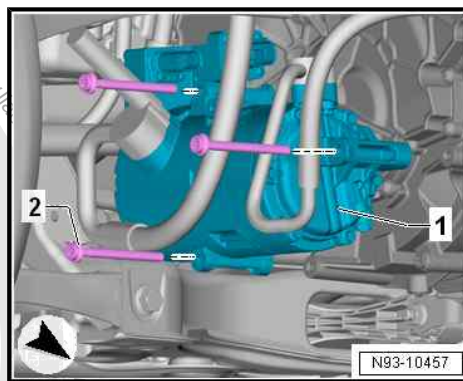
- Partially detach front right wheel housing liner ⇒ General body repairs, exterior, Rep. gr. 66 ; Wheel housing liner; Removing and installing front wheel housing liner .
- Unscrew bolt -2-.
- Remove potential equalisation line -3- from electrical air conditioner compressor - V470- -1-.
- Disconnect electrical connectors -4 and 5-.



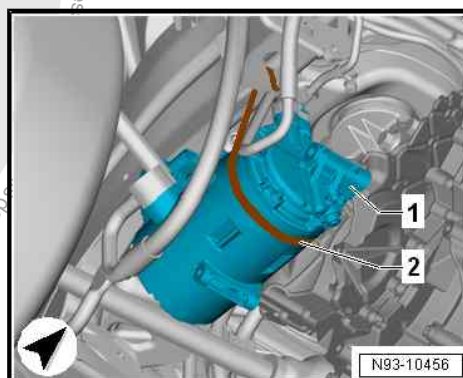




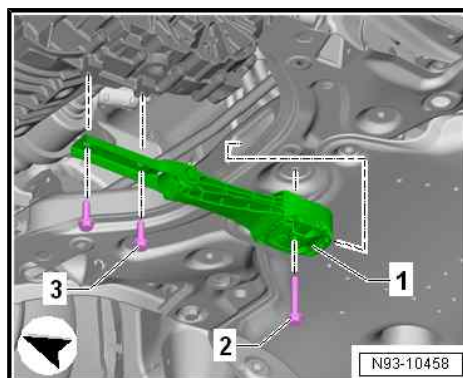
- Unscrew bolts -2-.



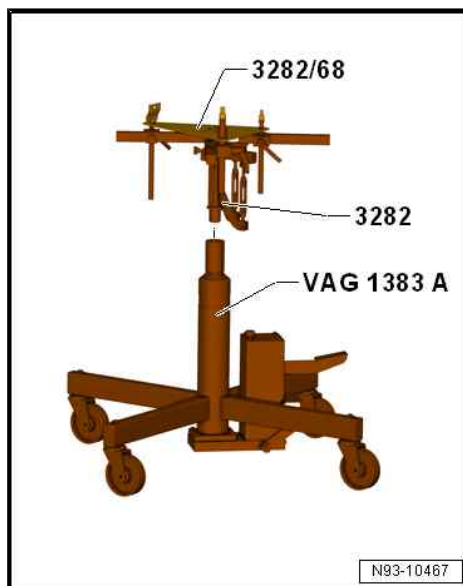
- Detach electrical air conditioner compressor - V470- -1- from bracket.
- Secure electric air conditioner compressor - V470- to body using workshop materials -2-.



- Unscrew bolts -2- and -3-, and remove pendulum support -1- from subframe.

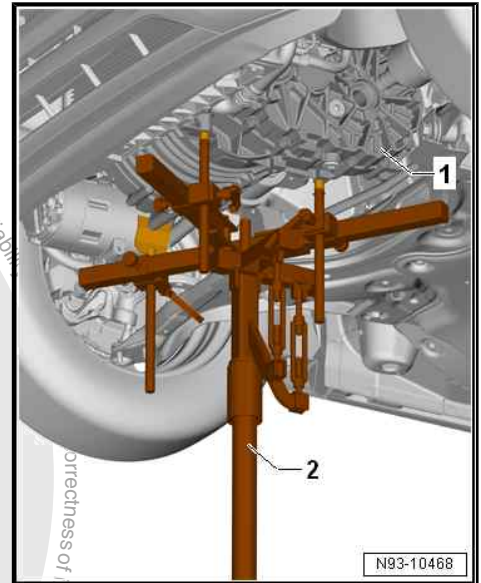


- Fit gearbox support - 3282- to engine and gearbox jack - V.A.G 1383 A- .
- Use adjustment plate - 3282/68- to align supports.

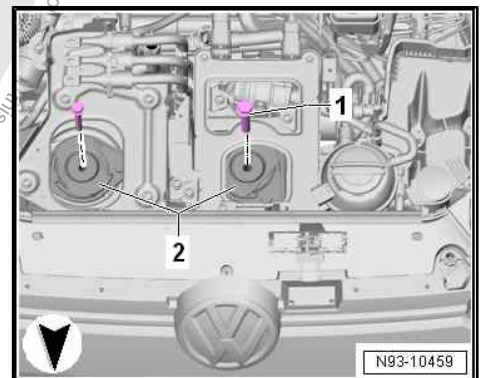




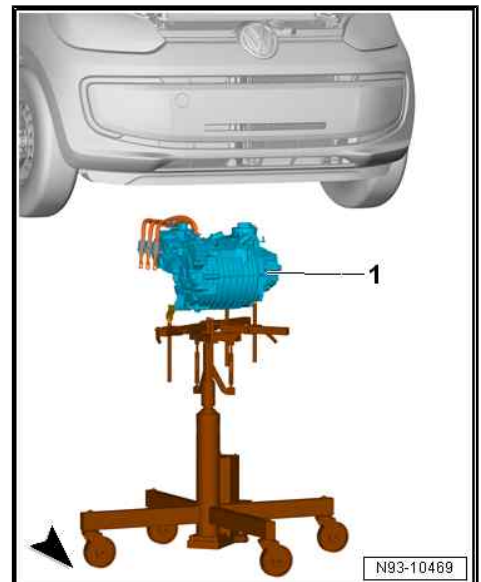
- Position engine and gearbox jack - V.A.G 1383 A- -2- under three-phase current drive - VX54- -1-, and secure jack to drive.



- Remove bolts -1- from mounting brackets -2- from above using ladder - VAS 5085- .

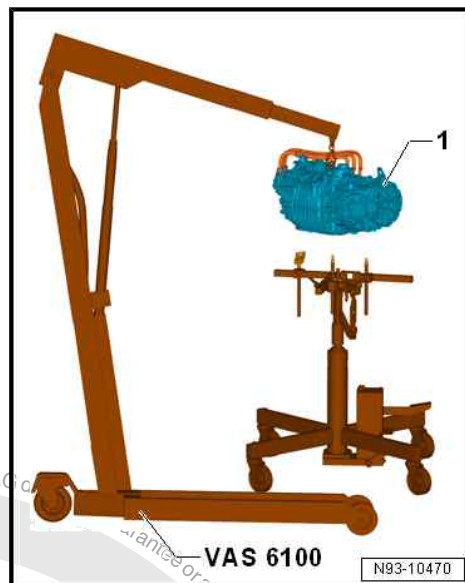


- Lower three-phase current drive - VX54- -1-, while carefully guiding three-phase high-voltage cables out of motor compartment.





- Remove three-phase current drive - VX54- -1- from engine and gearbox jack - VAS 6100- using workshop hoist - 10 - 222 A /12- and shackle - V.A.G 1383 A- .

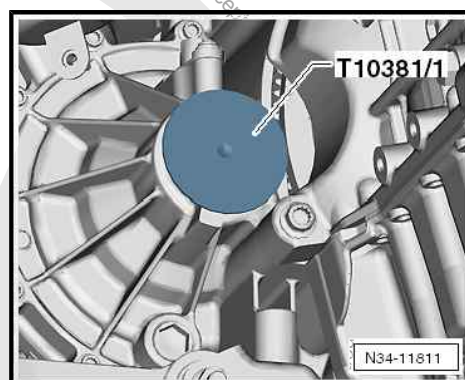


- Insert closure caps - T10381/1- into gearbox.

**Installing:**

Install in reverse order of removal, observing the following:

- Adjust selector lever cable ⇒ Power transmission; Rep. gr. 34 ; Selector mechanism; Checking and adjusting selector lever cable .

**⚠ WARNING**

**Danger to life from high voltage.**

**Electrical shocks can cause serious injuries or death.**

- Have a qualified technician re-energise the high-voltage system.

- Re-energise high-voltage system. ⇒ [page 169](#)

**Specified torques**

- ♦ ⇒ [“5.2 Assembly overview - electric drive motor”, page 118](#)
- ♦ Electrical air conditioner compressor - V470- ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Assembly overview - drive unit of air conditioner compressor  
Electrical air conditioner compressor - V470-
- ♦ Front axle ⇒ Running gear, axles, steering; Rep. gr. 40 ; Front axle; Overview - front axle
- ♦ Selector lever cable on gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Assembly overview - selector mechanism

**Note**

- ♦ *The contact surfaces of the potential equalisation line must be checked prior to installation.*
- ♦ *The contact surfaces must be free of dirt, rust and grease.*
- ♦ *If not, clean the contact surfaces using the contact surface cleaning set - VAS 6410- ⇒ Electrical system; Rep. gr. 97 ; General information; Contact surface cleaning set VAS 6410 .*



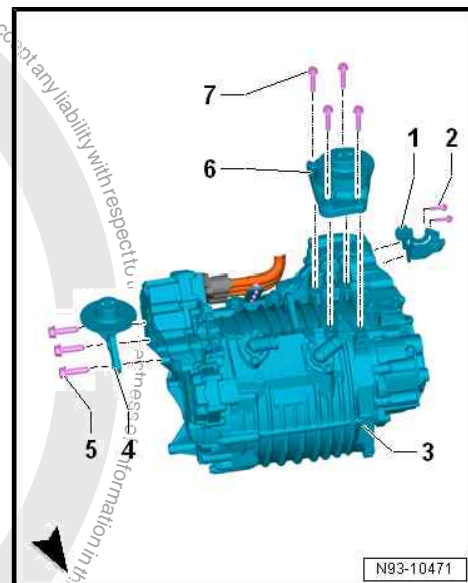
## 5.5 Renewing three-phase current drive - VX54-

### Renewing three-phase current drive - VX54-

- Unscrew bolts -2- for cable support bracket -1-, and secure bracket to new three-phase current drive - VX54- .
- Unscrew bolts -5- for motor mounting -4-, and secure mounting to new three-phase current drive - VX54- .
- Unscrew bolts -7- for gearbox mounting -6-, and secure mounting to new three-phase current drive - VX54- .

### Specified torques

Component	Specified torque	Note
Item -2-: bolt	40 Nm +90° further	Renew
Item -5-: bolt	40 Nm +90° further	Renew
Item -7-: bolt	40 Nm +90° further	Renew



## 5.6 Calibrating three-phase current drive - VX54-



### Note

*It is necessary to calibrate the three-phase current drive - VX54- if*

- ◆ The event memory of systems relevant to OBD were deleted.
- ◆ The software for the electric drive control unit - J841- was updated.
- ◆ The power and control electronics for electric drive - JX1- were renewed.
- ◆ The three-phase current drive - VX54- was renewed.

In these cases, calibration will occur automatically the first time the vehicle is driven. The power output of the drive motor is restricted until the motor has been successfully calibrated.

A test drive is necessary for calibration.

### Prerequisite for testing:

Vehicle is ready to be driven and the high-voltage system has been recommissioned ⇒ Vehicle diagnostic tester.

### Calibration:

- Calibrate three-phase current drive - VX54- ⇒ Vehicle diagnostic tester.

## 5.7 Removing and installing gearbox



### Note

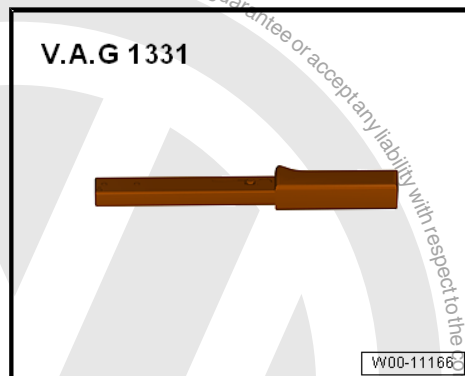
*Separate renewal of the gearbox is not planned at present.*



## 5.8 Removing and installing drive motor temperature sender - G712-

### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



### Removing

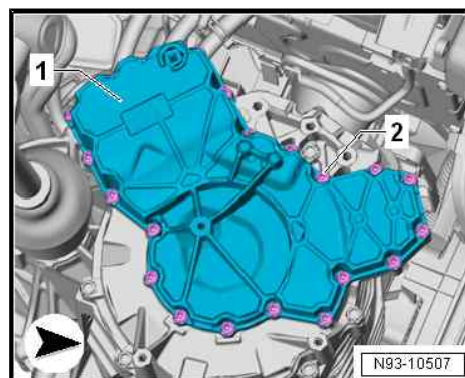
#### DANGER

**Danger to life from high voltage.**

**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

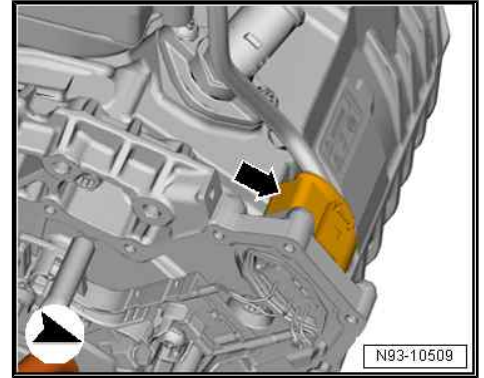
- De-energise high-voltage system ➔ [page 167](#) .
- Select Park position for gearbox.
- Remove underbody covers ➔ General body repairs, exterior; Rep. gr. 66 ; Underbody cover; Assembly overview - underbody covers, e-up! .
- Remove front right wheel housing liner ➔ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing wheel housing liner .
- Unbolt electrical air conditioner compressor - V470- , and secure it to body ➔ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Removing and installing electrical air conditioner compressor - V470- .
- Unscrew bolts -2-.
- Detach cover -1-.



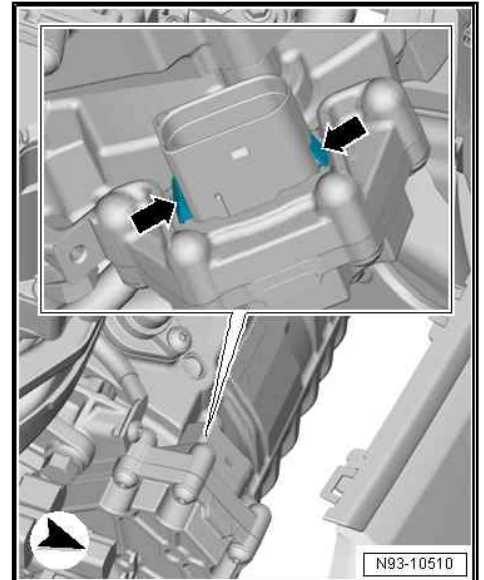




- Disconnect electrical connector -arrow-.



- Release 2 locking lugs -arrows-.
- Unclip connector from housing.
- Note connector assignment for drive motor temperature sender - G712- .
- Open catches.
- Unpin wires of drive motor temperature sender - G712- from connector.

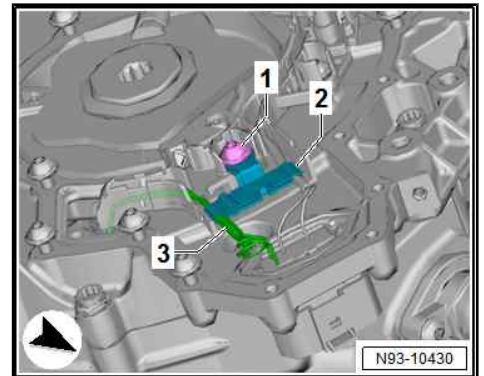


- Unscrew bolt -1-.
- Remove contact bridge -2-.
- Pull drive motor temperature sender - G712- -3- out of rotor.

#### Installing

Install in reverse order of removal, observing the following:

- Renew gasket between cover and housing.



#### **⚠ WARNING**

**Danger to life from high voltage.**

**Electrical shocks can cause serious injuries or death.**

- **Have a qualified technician re-energise the high-voltage system.**

- Re-energise high-voltage system. ➔ [page 169](#)

#### Specified torques

Component	Specified torque	Note
Bolt for contact bridge for sensor wiring harness	6 Nm + 90°	Renew
Cover bolts	8 Nm + 120°	Renew
Sender wheel bolt	120 Nm	





## 5.9 Removing and installing drive motor rotor position sender 1 - G713-

### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



- ◆ Torque wrench - V.A.G 1410-



### Removing

#### DANGER

**Danger to life from high voltage.**

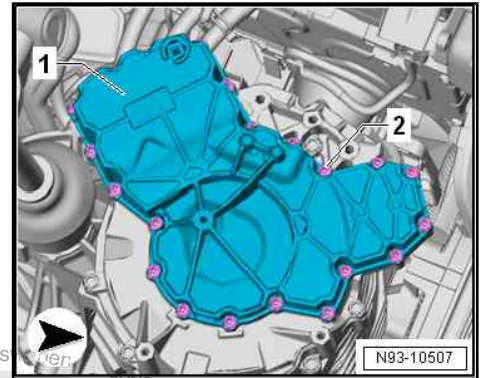
**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

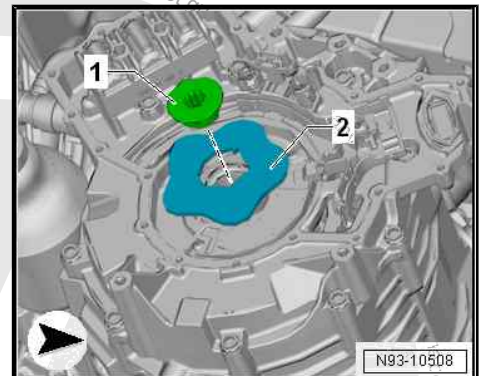
- De-energise high-voltage system ⇒ [page 167](#) .
- Select Park position for gearbox.
- Remove underbody covers ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cover; Assembly overview - underbody covers, e-up! .
- Remove front right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing wheel housing liner .
- Unbolt electrical air conditioner compressor - V470- , and secure it to body ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Removing and installing electrical air conditioner compressor - V470- .



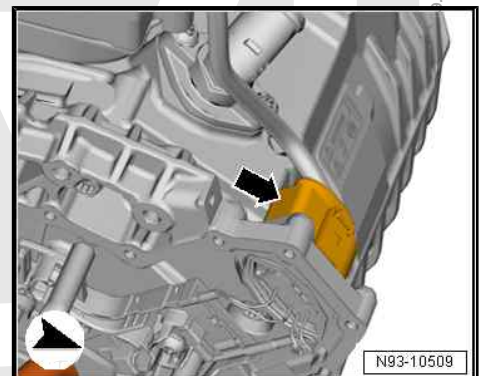
- Unscrew bolts -2-.
- Detach cover -1-.



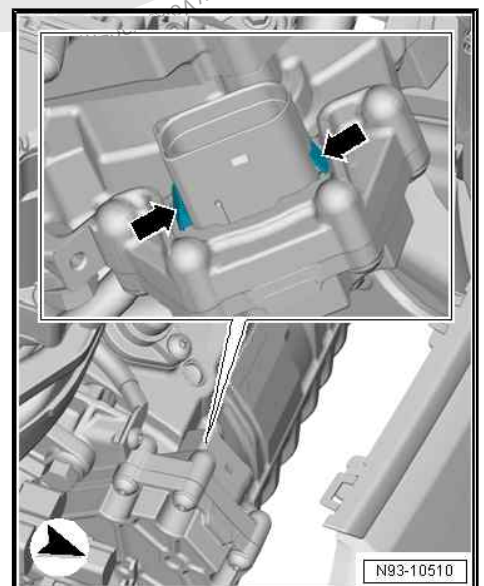
- Unscrew sender wheel bolt -1-.
- Remove shim -2-.



- Disconnect electrical connector -arrow-.

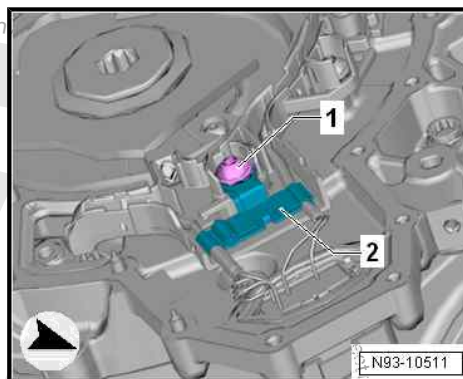


- Release 2 locking lugs -arrows-.
- Unclip connector from housing.
- Note connector assignment for drive motor rotor position sender 1 - G713- .
- Open catches.
- Unpin wires of drive motor rotor position sender 1 - G713- from connector.





- Unscrew bolt -1-.
- Remove contact bridge -2-.

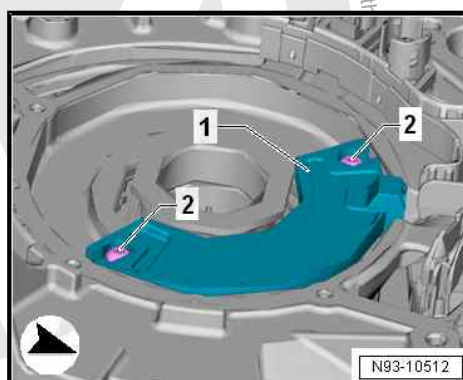


- Unscrew bolts -2-.
- Remove drive motor rotor position sender 1 - G713- -1-.

### Installing

Install in reverse order of removal, observing the following:

- Renew gasket between cover and housing.



### ⚠ WARNING

**Danger to life from high voltage.**  
**Electrical shocks can cause serious injuries or death.**

- **Have a qualified technician re-energise the high-voltage system.**

- Re-energise high-voltage system. ⇒ [page 169](#)

### Specified torques

Component	Specified torque	Note
Bolts for drive motor rotor position sender 1 - G713-	5 Nm +90°	Renew
Bolt for contact bridge for sensor wiring harness	6 Nm +90°	Renew
Cover bolts	8 Nm +120°	Renew
Sender wheel bolt	120 Nm	



## 6 Engine (motor) control unit

⇒ ["6.1 Assembly overview - engine control unit", page 135](#)

⇒ ["6.2 Removing and installing engine \(motor\) control unit J623", page 136](#)

⇒ ["6.3 Removing and installing bracket for engine/motor control unit J623", page 138](#)

### 6.1 Assembly overview - engine control unit

#### 1 - Shear bolt

#### 2 - Protective housing

#### 3 - Engine (motor) control unit - J623-

- ☐ Removing and installing  
⇒ [page 136](#)

#### 4 - Maintenance connector for high-voltage system - TW- (service disconnect)

- ☐ Secured with lock after system has been de-energised
- ☐ Must be unclipped in order to remove bracket -4-

#### 5 - Bolts

- ☐ Qty. 4
- ☐ For bolting bracket for engine (motor) control unit - J623- to charging unit 1 for high-voltage battery - AX4-
- ☐ 9 Nm

#### 6 - Bracket

- ☐ Bracket for engine (motor) control unit - J623- is bolted to bracket for charging unit 1 for high-voltage battery - AX4-
- ☐ Removing and installing  
⇒ [page 138](#)

#### 7 - Retainer

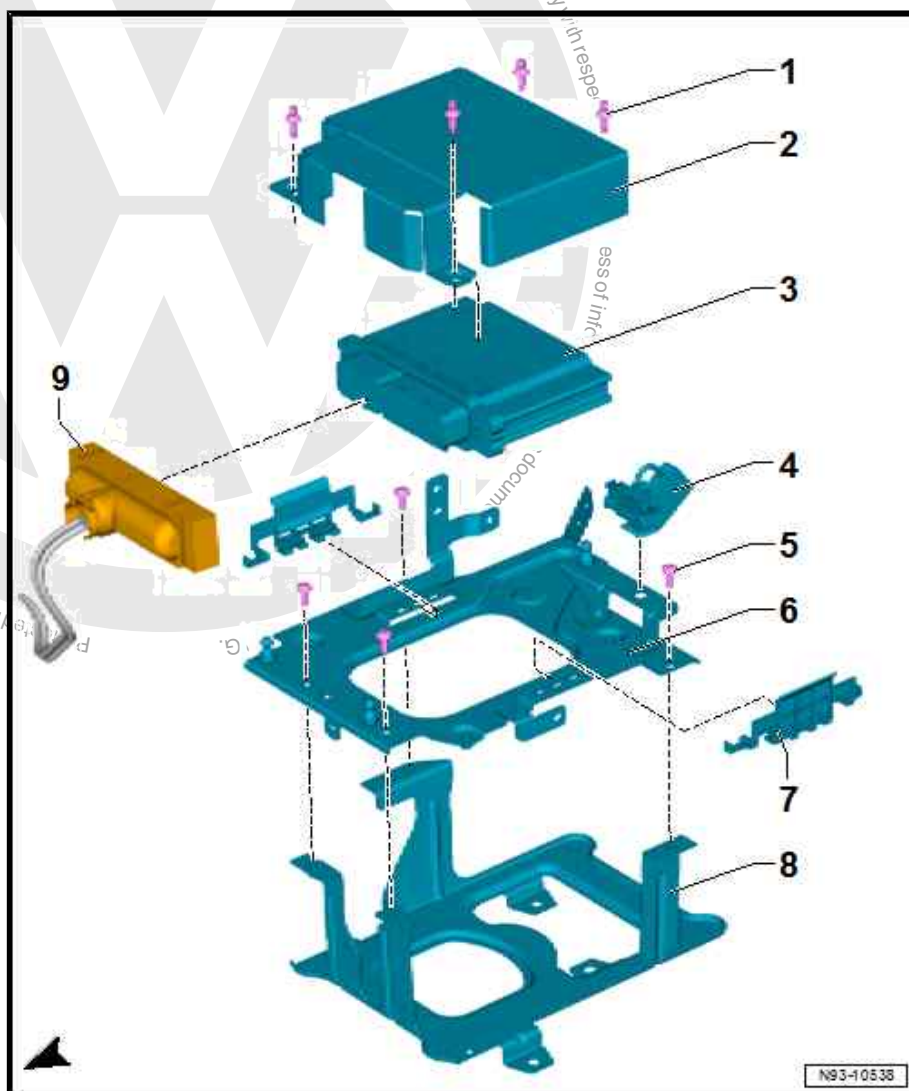
- ☐ Qty. 2, plastic
- ☐ Retainers clipped into bracket for engine (motor) control unit - J623-

#### 8 - Bracket

- ☐ Bracket for charging unit 1 for high-voltage battery - AX4-
- ☐ Secured to cross member
- ☐ Removing and installing ⇒ [page 189](#)

#### 9 - Wiring harness

- ☐ Wiring harness for engine (motor) control unit - J623-





## 6.2 Removing and installing engine (motor) control unit - J623-

⇒ **"6.2.1 Removing and installing engine control unit J623 without protective housing", page 136**

⇒ **"6.2.2 Removing and installing engine (motor) control unit J623 with protective housing", page 136**

### 6.2.1 Removing and installing engine control unit - J623- without protective housing

#### Removing

The adaptation values must be read from the old engine (motor) control unit before the engine (motor) control unit - J623- is renewed ➤ Vehicle diagnostic tester.

If engine/motor control unit - J623- is renewed, it must be adapted to the electronic immobiliser. ➤ Vehicle diagnostic tester "Guided Function".

- Disconnect 12-V battery.
- Remove cover for motor compartment ⇒ [page 120](#) .
- Release electrical connector -3- on engine (motor) control unit - J623- .
- Detach connector -3-.
- Remove engine (motor) control unit - J623- -1- from brackets -2-.

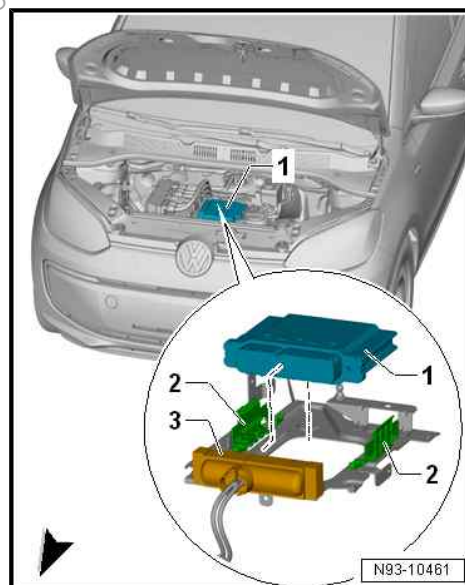
#### Installing

Install in reverse order of removal.



#### Note

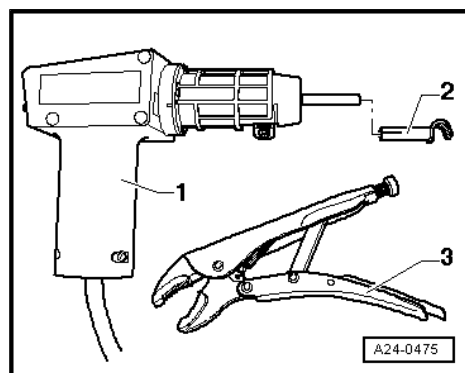
*Before assembling, check fastening elements for damage and renew as necessary.*



### 6.2.2 Removing and installing engine (motor) control unit - J623- with protective housing

#### Special tools and workshop equipment required

- ♦ Hot air blower - VAS 1978/14A- -item 1- with nozzle -2- from wiring harness repair set - VAS 1978 B-







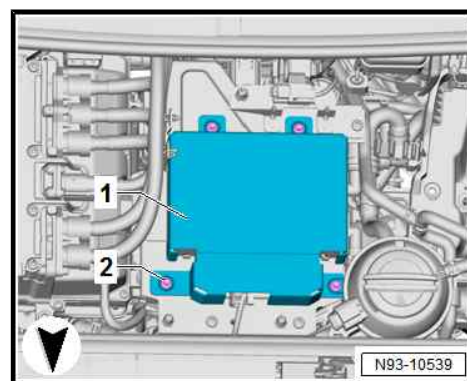
- ◆ Small grinder (commercially available)
- ◆ Vehicle diagnostic tester

### Removing

The adaptation values must be read from the old engine (motor) control unit before the engine (motor) control unit - J623- is renewed ⇒ Vehicle diagnostic tester.

If the engine (motor) control unit - J623- is renewed, it must be adapted to the electronic immobiliser using ⇒ Vehicle diagnostic tester in "Guided Functions" mode.

- Disconnect 12-V battery.
- Remove cover for motor compartment ⇒ [page 120](#) .
- To remove protective housing -1-, unscrew shear bolts -2- as follows:



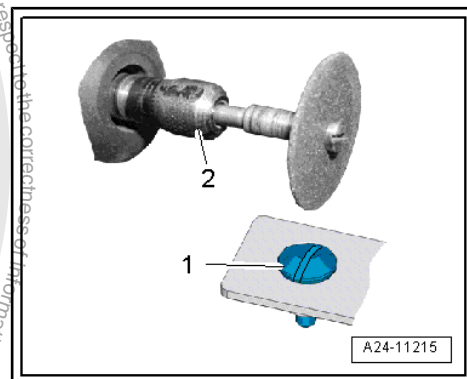
- Make groove (for a screwdriver) in head of shear bolt -1- using a small grinder -2-.



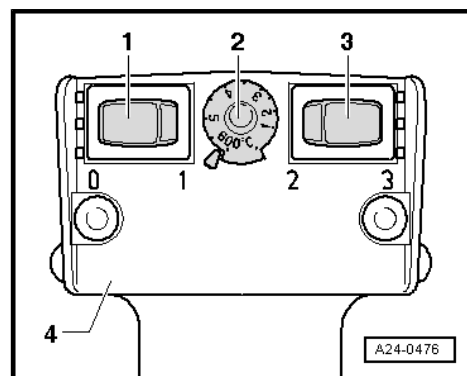
#### Note

*The threads of the shear bolts are secured with locking fluid. To unscrew these bolts, the threads must therefore be heated with the hot air blower.*

- Set up hot air blower as shown in illustration:



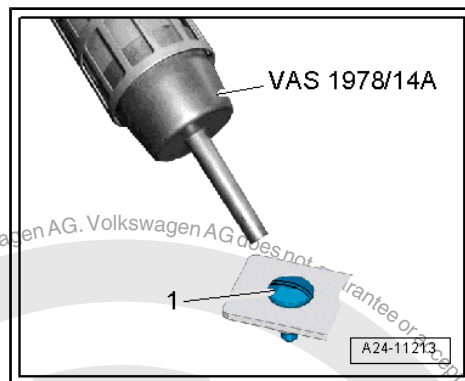
- ◆ Turn potentiometer for temperature adjustment -2- to maximum heater output
- ◆ Set two-stage switch for air flow rate -3- to position 3



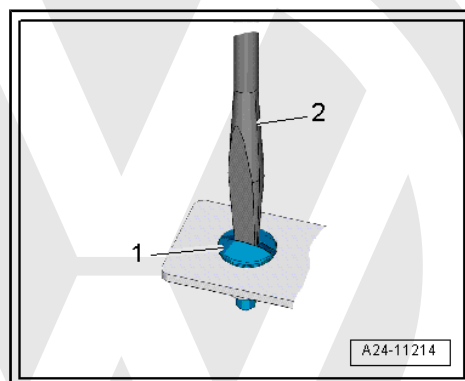




- Heat head of shear bolt -1- for approx. 20 to 30 seconds.



- Unscrew shear bolt -1- with screwdriver -2-.
- Remove protective housing from engine (motor) control unit - J623- .



- Release electrical connector -3- on engine (motor) control unit - J623- .
- Detach connector -3-.
- Remove engine (motor) control unit - J623- -1- from brackets -2-.

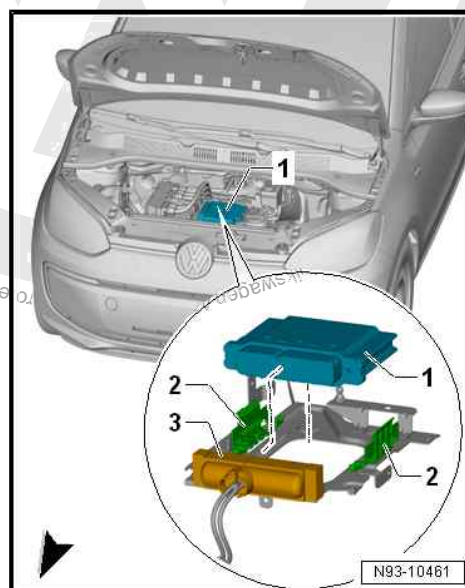
### Installing

Install in reverse order of removal.



### Note

*Before assembling, check fastening elements for damage and renew as necessary.*

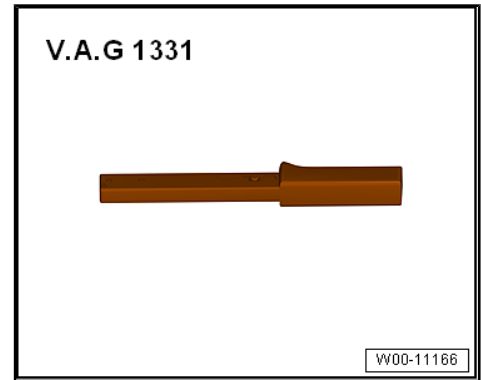


## 6.3 Removing and installing bracket for engine/motor control unit - J623-

Special tools and workshop equipment required



- ◆ Torque wrench - V.A.G 1331-



### Removing

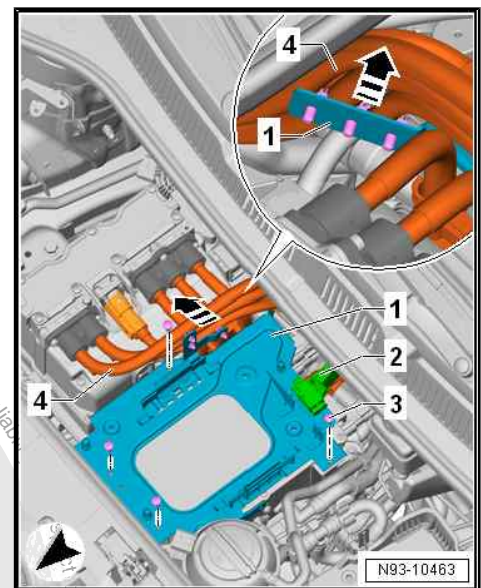
- Remove engine control unit - J623- ➔ [page 136](#) .
- Unclip high-voltage cables -4- from bracket for engine (motor) control unit - J623- -1- in -direction of arrow-.
- Unclip (low-voltage) service disconnecter -2- from bracket for engine (motor) control unit - J623- -1-.
- Unscrew bolts -3-.
- Remove bracket for engine (motor) control unit - J623- -1- upwards out of vehicle.

### Installing

Install in reverse order of removal, observing the following:

### Specified torque

- ◆ ["6.1 Assembly overview - engine control unit", page 135](#)





## 7 High-voltage cables

⇒ **"7.1 General description - high-voltage cables", page 140**

⇒ **"7.2 Overview of fitting locations - high-voltage cables", page 140**

⇒ **"7.3 Removing and installing high-voltage wiring harness for drive motor", page 141**

### 7.1 General description - high-voltage cables

The following high-voltage cables connect the high-voltage components:

- ◆ High-voltage wiring harness for high-voltage battery - PX1-
- ◆ High-voltage wiring harness for drive motor - PX2-
- ◆ High-voltage cable for high-voltage heater (PTC) - P11-
- ◆ High-voltage cable for electric air conditioner compressor - P3-
- ◆ High-voltage cable for charging unit 1 for high-voltage battery - AX4-
- ◆ High-voltage wiring harness for High-voltage battery charging socket 1 - UX4-

### 7.2 Overview of fitting locations - high-voltage cables



#### 1 - Bolts

- ☐ Qty. 2
- ☐ ⇒ [Item 17 \(page 110\)](#)

#### 2 - High-voltage wiring harness for high-voltage battery - PX1-

- ☐ To high-voltage battery 1 - AX2-

#### 3 - High-voltage wire for charging unit 1/wiring junction - P12-

- ☐ To high-voltage wiring junction

#### 4 - Bolts

- ☐ Qty. 3
- ☐ 20 Nm

#### 5 - Bolts

- ☐ Qty. 3
- ☐ ⇒ [Item 17 \(page 110\)](#)

#### 6 - Bolts

- ☐ Qty. 3
- ☐ ⇒ [Item 15 \(page 110\)](#)

#### 7 - High-voltage wiring harness for drive motor - PX2-

- ☐ To electric drive motor - V141-
- ☐ Removing and installing  
⇒ [page 141](#)

#### 8 - Bolts

- ☐ Qty. 4
- ☐ ⇒ [Item 15 \(page 110\)](#)

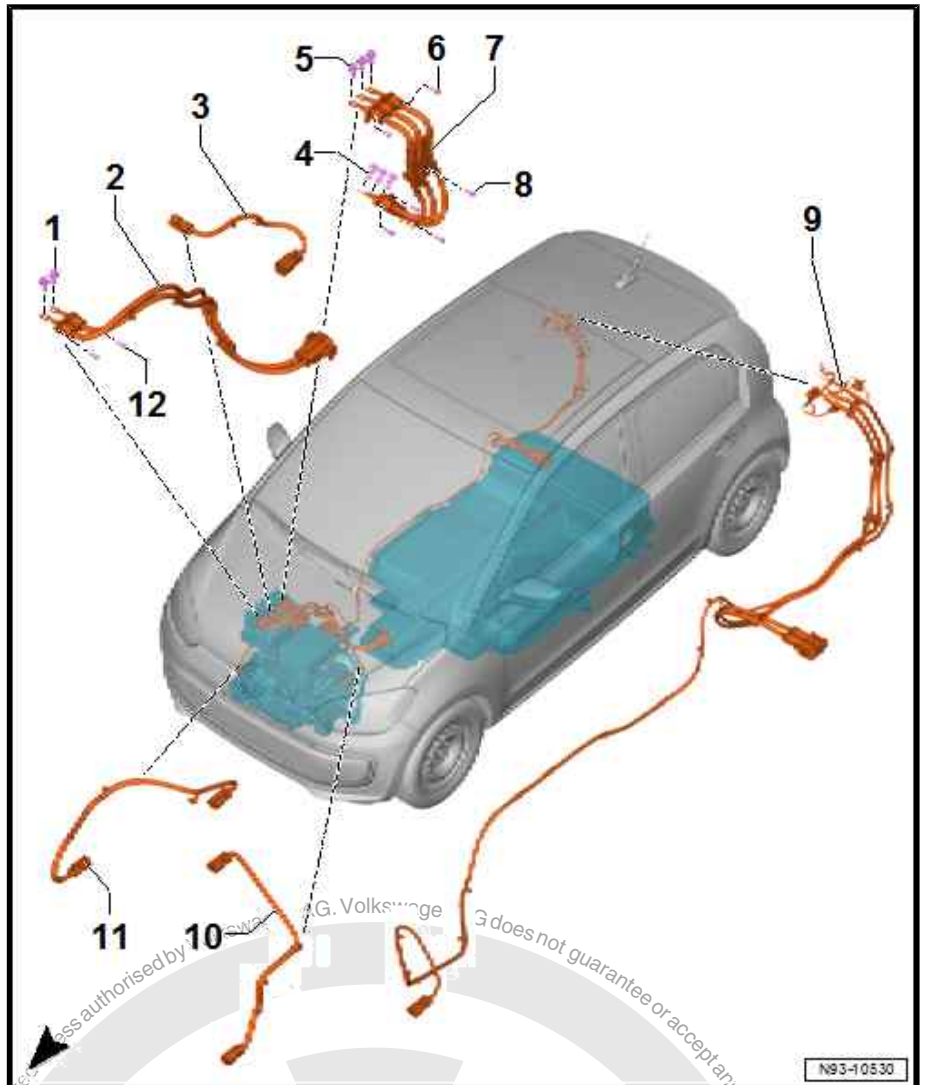
#### 9 - Charging cable 1 - P20-

#### 10 - High-voltage cable for high-voltage heater (PTC) - P11-

#### 11 - High-voltage cable for electric air conditioner compressor - P3-

#### 12 - Bolts

- ☐ Qty. 2
- ☐ ⇒ [Item 15 \(page 110\)](#)

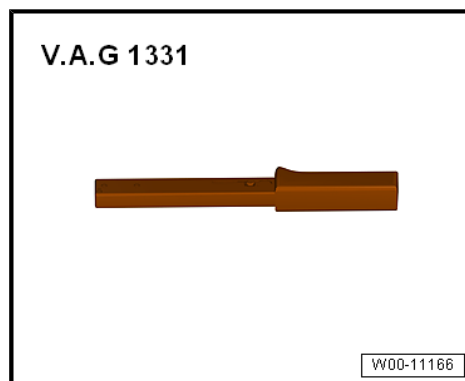


### 7.3 Removing and installing high-voltage wiring harness for drive motor

Special tools and workshop equipment required



- ◆ Torque wrench - V.A.G 1331-



## Removing

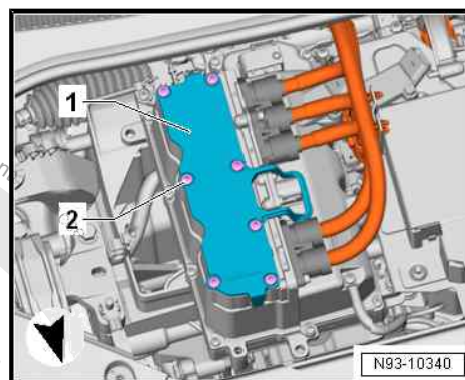
### DANGER

Danger to life from high voltage.

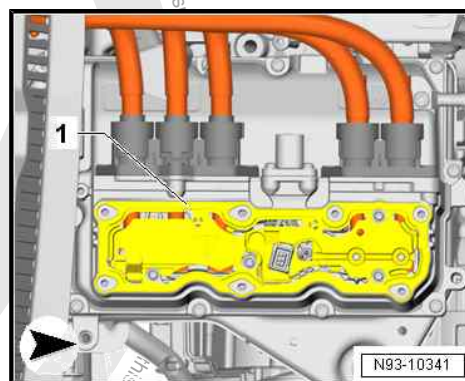
Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ➔ [page 167](#) .
- Select Park position for gearbox.
- Unscrew bolts -2-.
- Detach cover -1-.



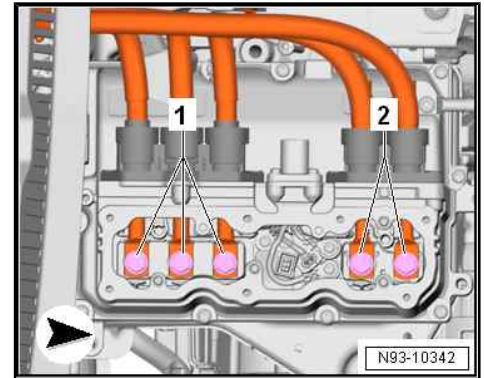
- Unclip and remove safety cover -1-.



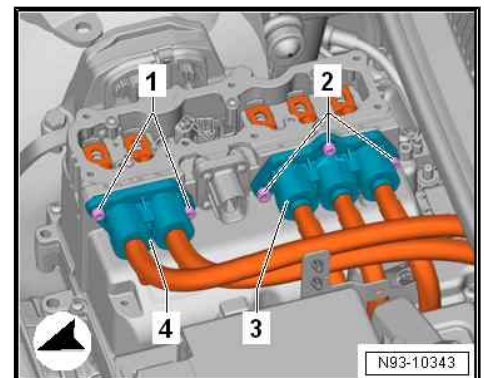




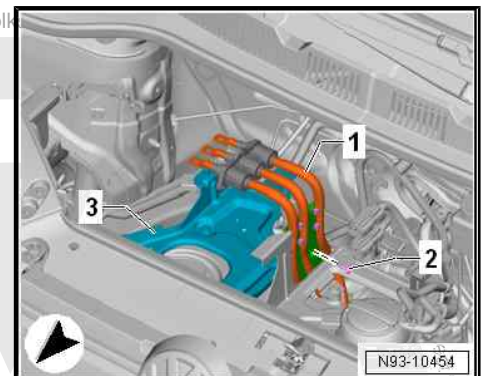
- Unscrew bolts -1-.



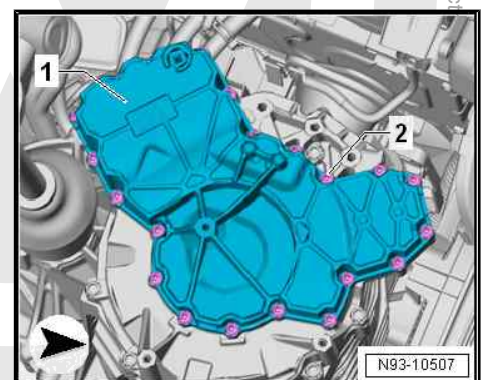
- Unscrew bolts -2-.
- Pull out high-voltage wiring harness for drive motor - PX2- -3-.
- Fit cover back on power and control electronics for electric drive - JX1- .



- Unscrew bolt -2-.
- Remove high-voltage wiring harness for drive motor - PX2- with bracket -1- from bracket for power and control electronics for electric drive - JX1- -3-.
- Remove underbody covers ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cover; Assembly overview - underbody covers, e-up! .
- Remove front right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing wheel housing liner .
- Unbolt electrical air conditioner compressor - V470- , and secure it to body ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Removing and installing electrical air conditioner compressor - V470- .



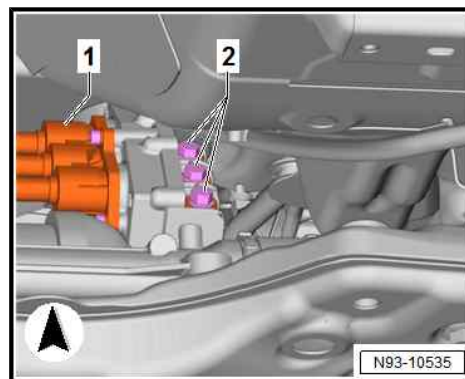
- Unscrew bolts -2-.
- Detach cover -1-.



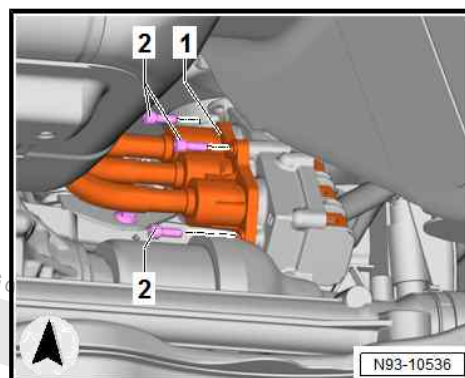




- Unscrew bolts -2- from high-voltage wiring harness for drive motor - PX2- -1-.



- Unscrew bolts -2- from high-voltage wiring harness for drive motor - PX2- -1-.



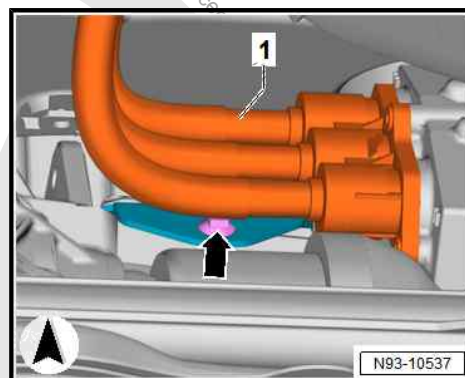
- Unclip high-voltage wiring harness for drive motor - PX2- -1- from retainer -arrow-.
- Pull high-voltage wiring harness for drive motor - PX2- -1- out of three-phase current drive, and remove it upwards.

#### Installing

- Install in reverse order of removal, observing the following:

#### Specified torques

- ♦ ⇒ [“4.1 Assembly overview - power and control electronics for electric drive”, page 109](#)
- ♦ ⇒ [“7.2 Overview of fitting locations - high-voltage cables”, page 140](#)



Component	Specified torque	Note
Bolts for drive motor cover	8 Nm +120°	Renew
Bolts on high-voltage wiring harness for drive motor - PX2- , M8 x 20	20 Nm +45°	Renew
Bolts securing high-voltage wiring harness for drive motor - PX2- to housing, M6 x 20	5 Nm	



## 8 Cooling system for high-voltage system

⇒ ["8.1 Assembly overview - high-voltage system cooling components", page 145](#)

⇒ ["8.2 Coolant hose connection diagram", page 146](#)

⇒ ["8.3 Checking cooling system for leaks", page 147](#)

⇒ ["8.4 Draining and adding coolant", page 149](#)

### 8.1 Assembly overview - high-voltage system cooling components

#### 1 - Power and control electronics for electric drive - JX1-

- ☐ Integrated into coolant circuit
- ☐ With electric drive control unit - J841-
- ☐ Removing and installing ⇒ [page 110](#)

#### 2 - Heat exchanger for heater

- ☐ Removing and installing ⇒ Heating, ventilation and air conditioning; Rep. gr. 87 ; Heating and air conditioning unit, front; Removing and installing heat exchanger

#### 3 - Charging unit 1 for high-voltage battery - AX4-

- ☐ Integrated into coolant circuit
- ☐ With control unit for high-voltage battery charger - J1050-
- ☐ Removing and installing ⇒ [page 186](#)

#### 4 - System coolant circuit high-voltage heater (PTC) - Z115-

- ☐ System coolant circuit with coolant pump for high-temperature circuit - V467-

#### 5 - System coolant circuit three-phase current drive - VX54-

- ☐ System coolant circuit with pump before power and control electronics for electric drive - V508-

#### 6 - Coolant expansion tank

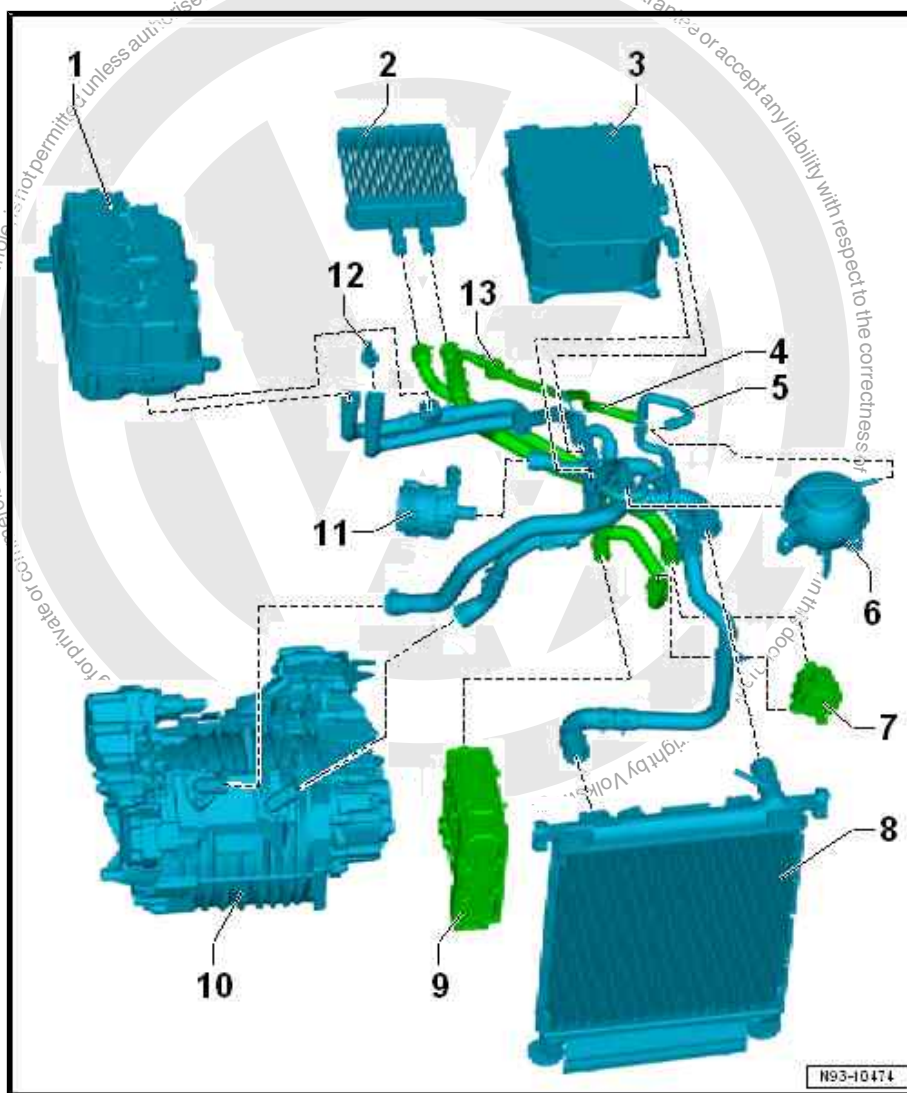
- ☐ Leakage test ⇒ [page 147](#)

#### 7 - Coolant pump for high-temperature circuit - V467-

- ☐ Removing and installing ⇒ [page 155](#)

#### 8 - Radiator for engine coolant

- ☐ Removing and installing ⇒ [page 159](#)



- ❑ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87; Coolant circuit; Removing and installing High-voltage heater (PTC) - Z115- and high-voltage heater control unit (PTC) - J848-

- ❏ Removing and installing ⇒ page 121

- ❏ Removing and installing → **page 154**

- ❏ Removing and installing ⇒ [page 156](#)

### 13 - Restrictor with non-return valve

## 8.2 Coolant hose connection diagram

- ❑ Removing and installing  
⇒ page 110

- ❑ Removing and installing  
⇒ page 156

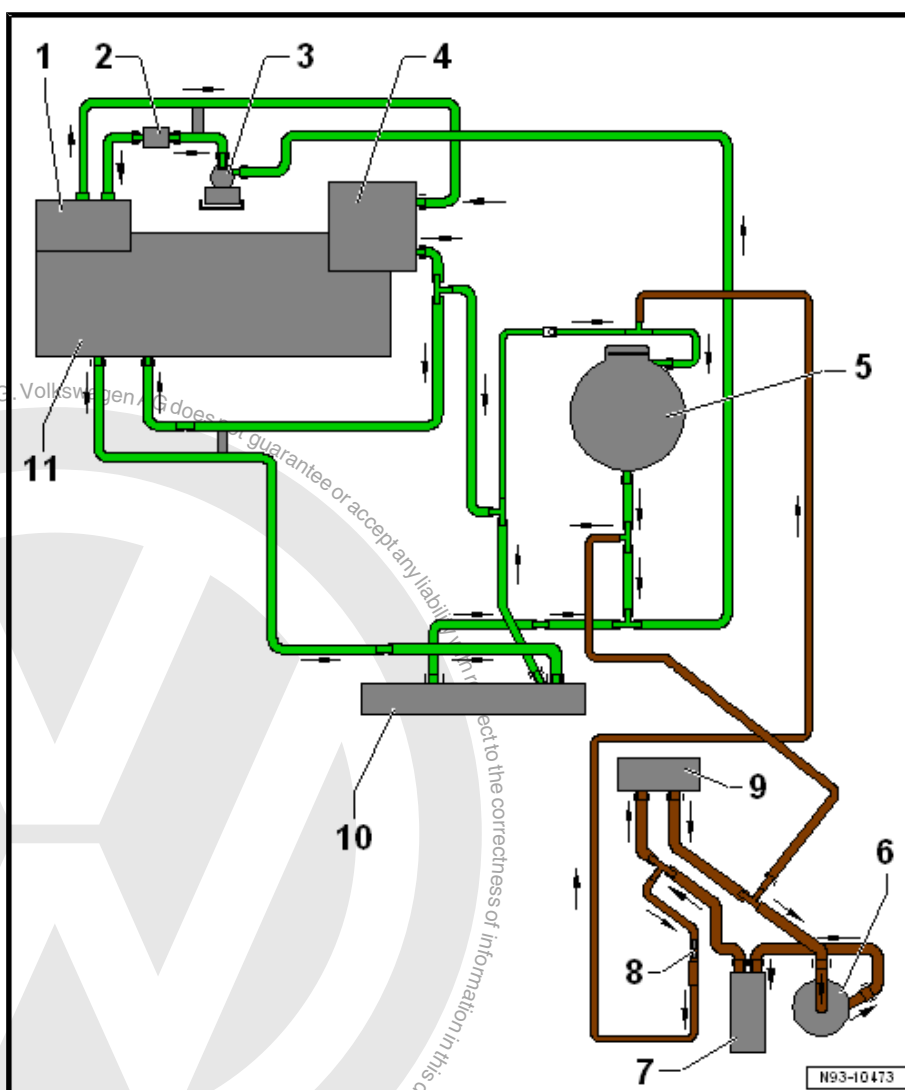
- ❑ Removing and installing  
⇒ page 154

- ❑ Removing and installing  
⇒ page 186

- Leakage test  
⇒ page 147.

- ❏ Removing and installing  
⇒ page 155

- ☐ Removing and installing  
⇒ Heating, air conditioning; Rep. gr. 87 ;





## 8 - Restrictor with non-return valve

## 9 - Heat exchanger for heater

- ☐ Removing and installing ⇒ Heating, ventilation and air conditioning; Rep. gr. 87 ; Heating and air conditioning unit, front; Removing and installing heat exchanger

## 10 - Radiator for engine coolant

- ☐ Removing and installing ⇒ [page 159](#)

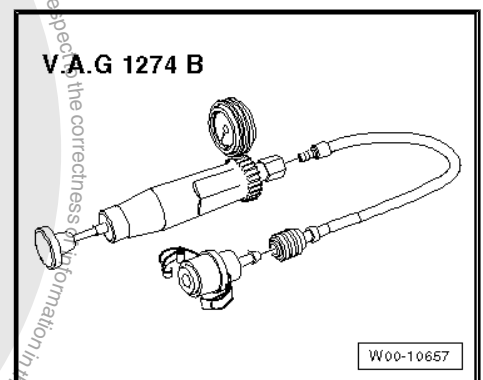
## 11 - Three-phase current drive - VX54-

- ☐ Integrated into coolant circuit
- ☐ Removing and installing ⇒ [page 121](#)

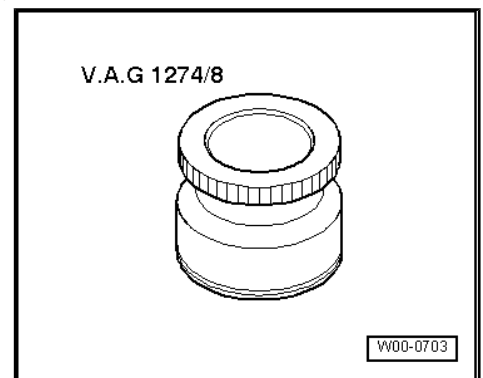
## 8.3 Checking cooling system for leaks

### Special tools and workshop equipment required

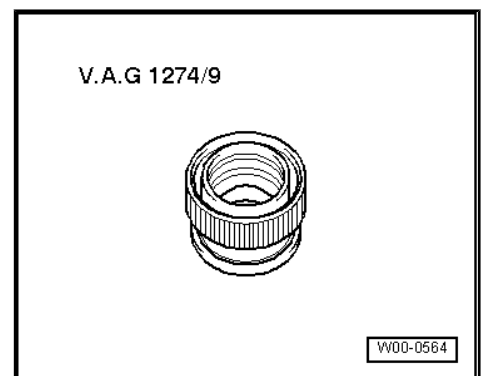
- ◆ Cooling system tester - V.A.G 1274 B-



- ◆ Adapter for cooling system tester - V.A.G 1274/8-

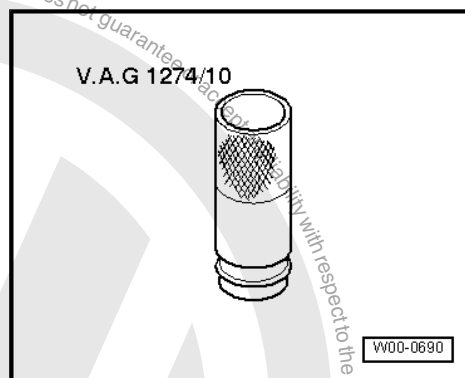


- ◆ Adapter for cooling system tester - V.A.G 1274/9-





◆ Adapter for cooling system tester - V.A.G 1274/10-



**Prerequisites for check**

- Cooling system at operating temperature

**Test sequence**

**⚠ CAUTION**

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

There is a risk of injury to the skin and parts of the body due to scalding.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

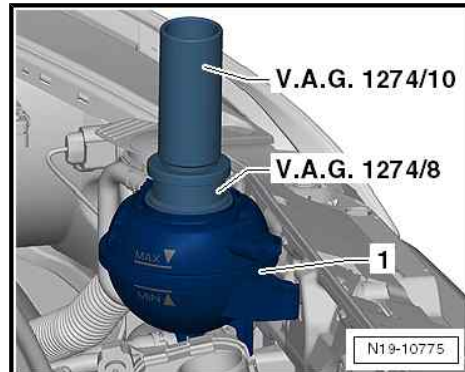
- Screw adapter for cooling system tester - V.A.G 1274/8- into coolant expansion tank -1-.
- Screw adapter for cooling system tester - V.A.G 1274/10- into adapter for cooling system tester - V.A.G 1274/8- .
- Clamp connector - V.A.G 1274 B/1- into adapter for cooling system tester - V.A.G 1274/10- .
- Connect connector - V.A.G 1274 B/1- to cooling system tester - V.A.G 1274 B- using supplied hose.
- Using hand pump of tester, build up a pressure of approx. 1.5 bar.

**⚠ CAUTION**

Danger of scalding by steam and hot coolant.

There is a risk of injury to the skin and parts of the body due to scalding.

- Release pressure by pressing pressure relief valve on cooling system tester until the gauge shows a pressure of 0.



If the pressure drops:

- Search for leaks within engine compartment and on underside of vehicle.

Check pressure relief valve in cap.





- Screw cap -1- into adapter for cooling system tester - V.A.G 1274/9- -2-.
- Clamp connector - V.A.G 1274 B/1- into adapter for cooling system tester - V.A.G 1274/9- .
- Connect connector - V.A.G 1274 B/1- to cooling system tester - V.A.G 1274 B- using supplied hose.
- Build up a pressure of 1.6 bar max. using hand pump of cooling system tester.

The pressure relief valve must still remain closed.

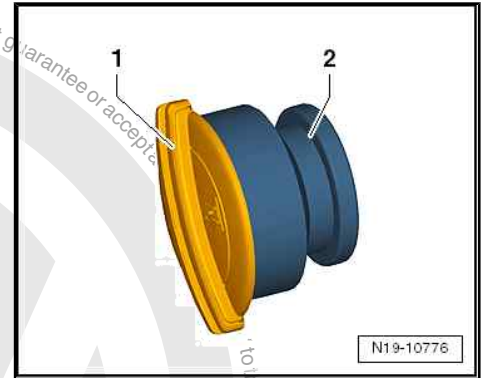
If the pressure relief valve opens prematurely:

- Renew cap.
- Increase pressure.

The pressure relief valve must open once the opening pressure is exceeded.

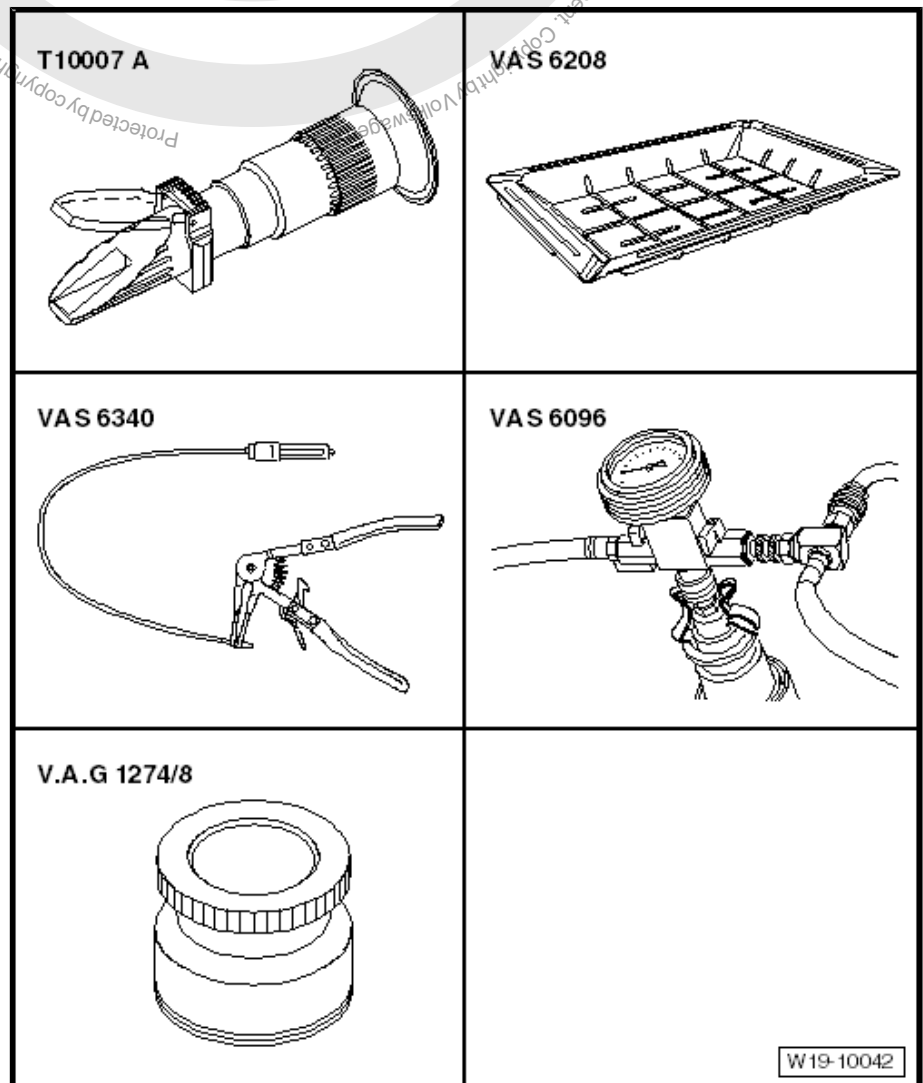
If the pressure relief valve does not open:

- Renew cap.



## 8.4 Draining and adding coolant

Special tools and workshop equipment required







- ◆ Refractometer - T10007 A-
- ◆ Drip tray for workshop hoist - VAS 6208-
- ◆ Hose clip pliers - VAS 6340- or hose clip pliers - VAS 6362-
- ◆ Coolant system charge unit - VAS 6096-
- ◆ Adapter for cooling system tester - V.A.G 1274/8-

### Draining

#### CAUTION

**On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.**

**There is a risk of injury to the skin and parts of the body due to scalding.**

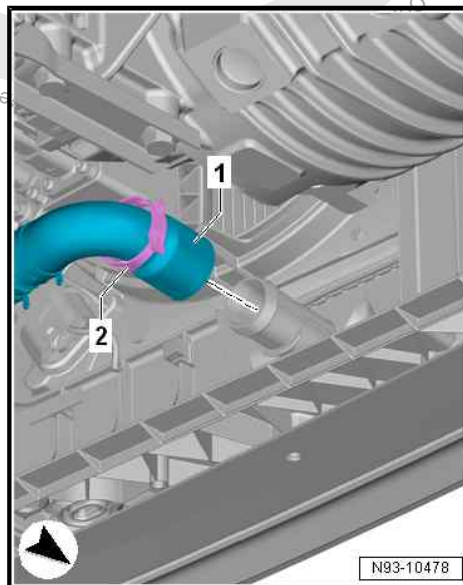
- Wear protective gloves.
  - Wear protective goggles.
  - Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.
- 
- Remove underbody covers ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cover; Assembly overview - underbody covers, e-up! .
  - Release hose clip -2-.
  - Pull coolant hose -1- off radiator.
  - Drain coolant into drip tray for workshop hoist - VAS 6208- .



#### Note

*Observe regulations for disposing of used coolant.*

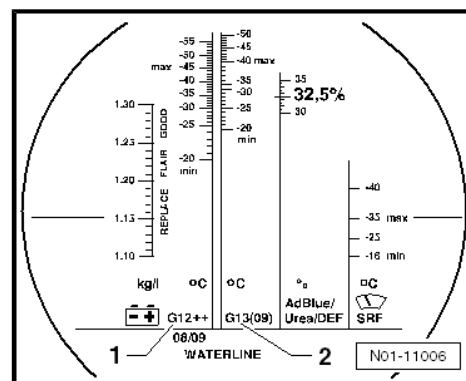
### Filling





## Note

- ◆ The water used for mixing has a major influence on the effectiveness of the coolant. Because the water quality differs from country to country and even from region to region, the quality of the water to be used in the cooling system has been specified by Volkswagen. Distilled water fulfils all requirements. Therefore, only ever use distilled water when mixing coolant for topping up or renewing coolant.
- ◆ Use only coolant additives which conform with the ⇒ *Electronic parts catalogue (ETKA)*. Other coolant additives may reduce corrosion protection substantially. The resulting damage could lead to loss of coolant and subsequent severe damage to the engine.
- ◆ Mixed in the proper proportions, coolant inhibits frost and corrosion damage as well as scaling. Such additives also raise the boiling point of the coolant. For this reason, the cooling system must be filled all-year-round with coolant additives.
- ◆ Because of its high boiling point, the coolant improves engine reliability under heavy loads, particularly in countries with tropical climates.
- ◆ ONLY refractometer - T10007A- may be used for determining current anti-freeze value.
- ◆ Frost protection must be guaranteed down to -25°C as a minimum and, in countries with arctic conditions, down to approx. -36°C. Increasing the frost protection is permissible only if climatic conditions require stronger frost protection. It may, however, be increased only to a maximum of -48°C. Otherwise, the cooling effect will be impaired.
- ◆ Do not reduce the coolant concentration by adding water even in warmer seasons and in warmer countries. Frost protection must be guaranteed down to at least -25°C.
- ◆ Read off anti-freeze figures for respective replenished coolant additives.
- ◆ The temperature read off the refractometer - T10007A- corresponds the »ice flocculation point«. Flakes of ice may start forming in the coolant below this temperature.
- ◆ Never reuse old coolant.
- ◆ Use only a water/coolant additive mixture as a slip agent for coolant hoses.



## Note

To ensure optimum protection against corrosion, use only distilled water for mixing with coolant additives.

**Recommended mixing ratios (use only distilled water for mixing):**

Frost protection to	Coolant additive
-25°C	40%
-36°C	50%

1) The quantity of coolant can vary depending on the vehicle equipment.



- Connect coolant hose -1-.
- Secure coolant hose with hose clip -2-.
- Screw adapter for cooling system tester - V.A.G 1274/8- onto expansion tank.



#### Note

*The coolant pumps must be actuated in order to fill the coolant system ⇒ Vehicle diagnostic tester.*

- Actuate coolant pumps ⇒ Vehicle diagnostic tester.
- Fill coolant circuit using cooling system charge unit - VAS 6096- ⇒ Operating instructions for cooling system charge unit VAS 6096 .

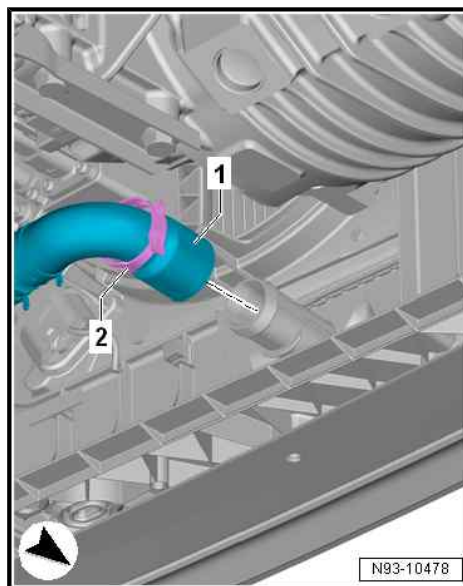
- Fill with coolant up to max. mark on expansion tank -1-.
- Fit cooling system tester - V.A.G 1274 B- onto coolant expansion tank.
- Apply pressure of 1.5 bar to cooling system. See ⇒ [page 147](#) .
- Seal coolant expansion tank -1- with cap -2-.
- Carry out test drive to bring coolant to operating temperature.

#### CAUTION

**On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.**  
**There is a risk of injury to the skin and parts of the body due to scalding.**

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Check coolant level and top up as needed.
- When the motor is at operating temperature, the coolant level may be at or above the "MAX" mark.
- When the motor is cold, the coolant level must be between the "MIN" mark and the "MAX" mark.





## 9 Coolant pump, regulation of cooling system

⇒ ["9.1 Assembly overview - coolant regulator unit", page 153](#)

⇒ ["9.2 Removing and installing power and control electronics for electric drive V508", page 154](#)

⇒ ["9.3 Removing and installing coolant pump for high temperature circuit V467", page 155](#)

⇒ ["9.4 Removing and installing temperature sender after electric drive motor G788", page 156](#)

### 9.1 Assembly overview - coolant regulator unit

**1 - Restrictor with non-return valve**

**2 - Temperature sender after electric drive motor - G788-**

- ☐ Removing and installing  
⇒ [page 156](#)

**3 - Seal**

- ☐ Renew after removal

**4 - Retaining clip**

- ☐ Securing clip for temperature sender after electric drive motor - G788-

**5 - Cross member**

- ☐ Cross member for three-phase current drive - VX54-

**6 - Bracket**

- ☐ Bracket attached to cross member
- ☐ Bracket for high-voltage heater (PTC) - Z115- and coolant pump for high-temperature circuit - V467-

**7 - Retaining clip**

- ☐ Qty. 2

**8 - Coolant pump for high-temperature circuit - V467-**

- ☐ Removing and installing  
⇒ [page 155](#)

**9 - High-voltage heater (PTC) - Z115-**

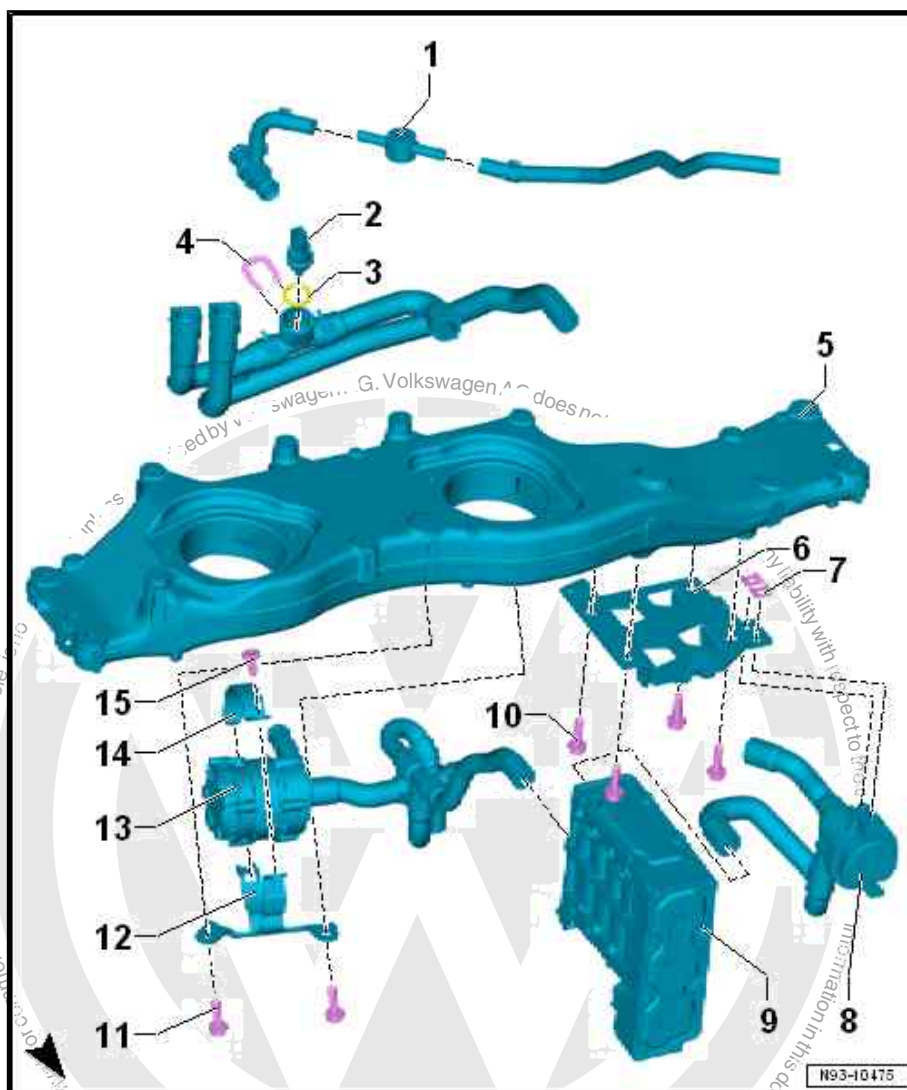
- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Coolant circuit; Removing and installing High-voltage heater (PTC) - Z115- and high-voltage heater control unit (PTC) - J848-

**10 - Bolts**

- ☐ Qty. 4
- ☐ 9 Nm

**11 - Bolts**

- ☐ Qty. 2





- 9 Nm

## 12 - Bracket

- Lower part of bracket for pump before power and control electronics for electric drive - V508-

## 13 - Pump before power and control electronics for electric drive - V508-

- Removing and installing ⇒ [page 154](#)

## 14 - Bracket

- Upper part of bracket for pump before power and control electronics for electric drive - V508-

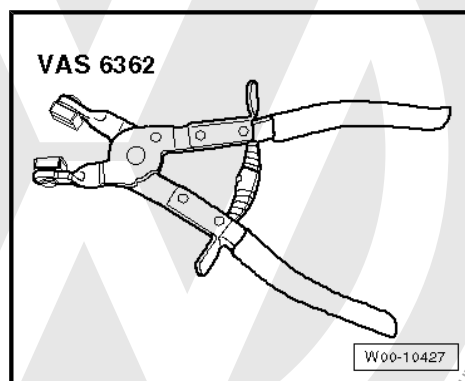
## 15 - Bolt

- 9 Nm

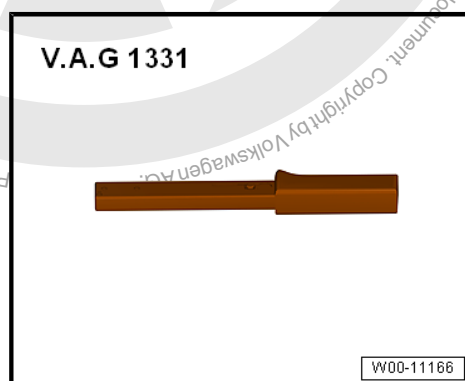
## 9.2 Removing and installing power and control electronics for electric drive - V508-

### Special tools and workshop equipment required

- ◆ Spring-type clip pliers - VAS 6362-



- ◆ Torque wrench - V.A.G 1331-



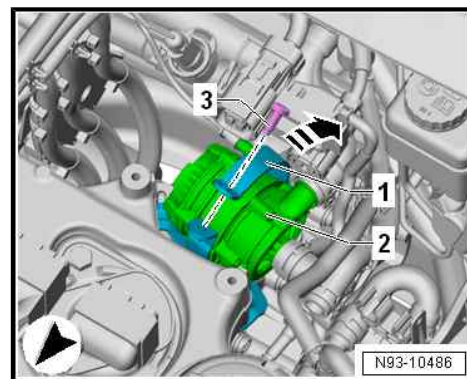
### Removing

- Drain coolant ⇒ [page 149](#) .
- Remove bracket for engine (motor) control unit - J623-  
⇒ [page 138](#) .
- Remove bracket for charging unit 1 for high-voltage battery -  
AX4- ⇒ [page 189](#) .





- Unscrew bolt -3-.
- Detach upper part of bracket -1- in -direction of arrow- from coolant pump -2-, unhook from lower part of bracket and remove.

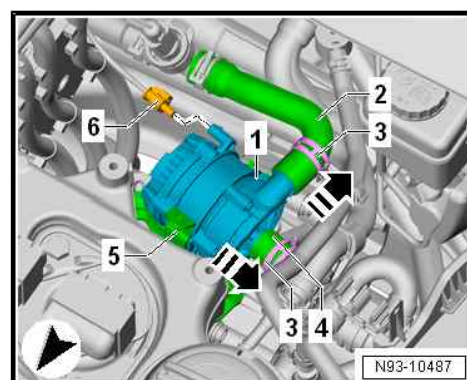


- Disconnect electrical connector -6-.
- Release hose clips -3-.
- Pull coolant hoses -2- and -4- off coolant pump -1- in -direction of arrow-.
- Detach coolant pump -1- from lower part of bracket -5-.

#### Installing

Install in reverse order of removal, observing the following:

- Add coolant ⇒ [page 149](#) .
- Observe electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



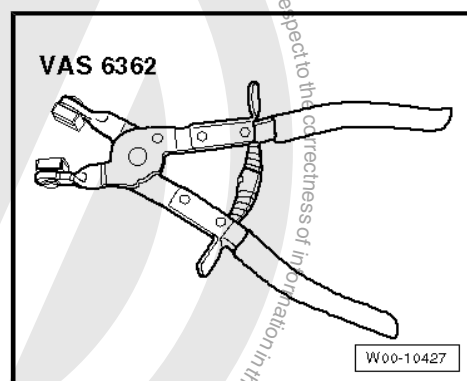
#### Specified torques

- ♦ ⇒ [“9.1 Assembly overview - coolant regulator unit”, page 153](#)

### 9.3 Removing and installing coolant pump for high temperature circuit - V467-

#### Special tools and workshop equipment required

- ♦ Spring-type clip pliers - VAS 6362-



#### Removing

- Drain coolant ⇒ [page 149](#) .





- Disconnect electrical connector -5-.
- Release hose clips -2-.
- Pull coolant hoses -3- and -4- off coolant pump -1- in -direction of arrow-.
- Release and remove securing clips -7-.
- Remove coolant pump -1- from bracket -6-.

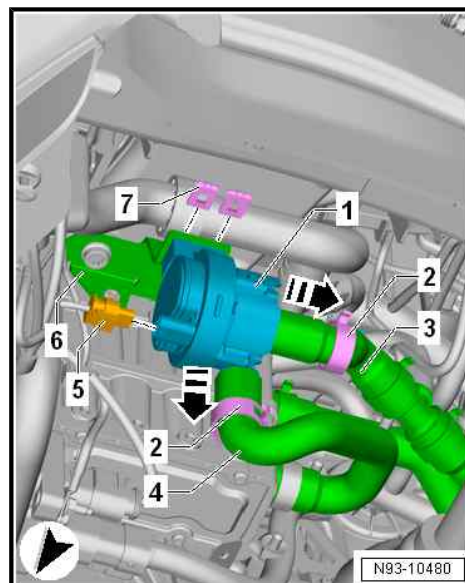
### Installing

Install in reverse order of removal, observing the following:

- Add coolant ⇒ [page 149](#) .
- Observe electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

### Specified torques

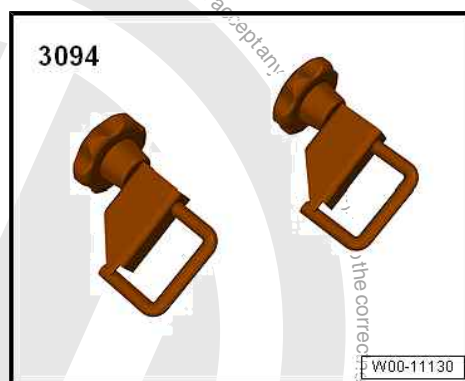
- ♦ ⇒ ["9.1 Assembly overview - coolant regulator unit", page 153](#)



## 9.4 Removing and installing temperature sender after electric drive motor - G788-

### Special tools and workshop equipment required

- ♦ Hose clamps to 25 mm - 3094



### Removing

#### ⚠ CAUTION

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

There is a risk of injury to the skin and parts of the body due to scalding.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Engine cold.



- Disconnect electrical connector -4-.
- Clamp off coolant hose before and after temperature sender using hose clamps up to 25 mm - 3094- .
- Pull off locking clip -5-.
- Remove temperature sender after electric drive motor - G788-3- with seal -2- from union -1-.

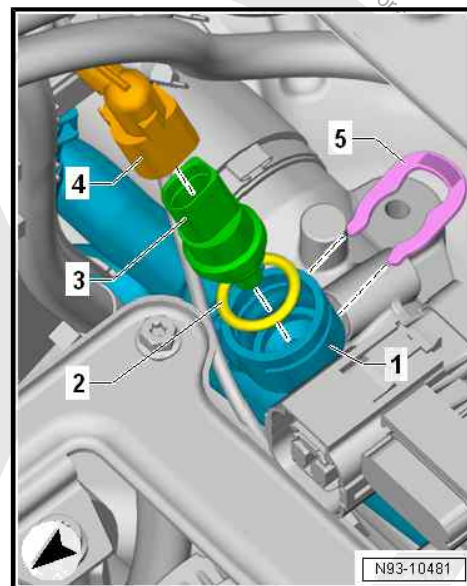
### Installing

Install in reverse order of removal, observing the following:

- Check coolant level and top up as needed ⇒ [page 149](#) .
- Observe electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

### Specified torques

- ◆ ⇒ ["9.1 Assembly overview - coolant regulator unit", page 153](#)



## 10 Radiator, radiator fan

⇒ ["10.1 Assembly overview - radiator/radiator fan", page 158](#)

⇒ ["10.2 Removing and installing radiator", page 159](#)

⇒ ["10.3 Removing and installing cowling with radiator fan", page 162](#)

⇒ ["10.4 Removing and installing radiator fan V7 ", page 163](#)

### 10.1 Assembly overview - radiator/radiator fan

#### 1 - Cap

- ☐ Checking ⇒ [page 147](#)
- ☐ Check using cooling system tester - V.A.G 1274 B- and adapter for cooling system tester - V.A.G 1274/9-
- ☐ Test pressure: 1.4 to 1.6 bar

#### 2 - Expansion tank

- ☐ Check for leaks ⇒ [page 147](#)
- ☐ Check cooling system for leaks using cooling system tester - V.A.G 1274 B- and adapter for cooling system tester - V.A.G 1274/8-
- ☐ Connection diagram for coolant hoses ⇒ [page 146](#)

#### 3 - Coolant hose

- ☐ Connection diagram for coolant hoses ⇒ [page 146](#)
- ☐ Check for firm seating

#### 4 - Upper coolant hose

- ☐ Connection diagram for coolant hoses ⇒ [page 146](#)
- ☐ Check for firm seating

#### 5 - Radiator mounting

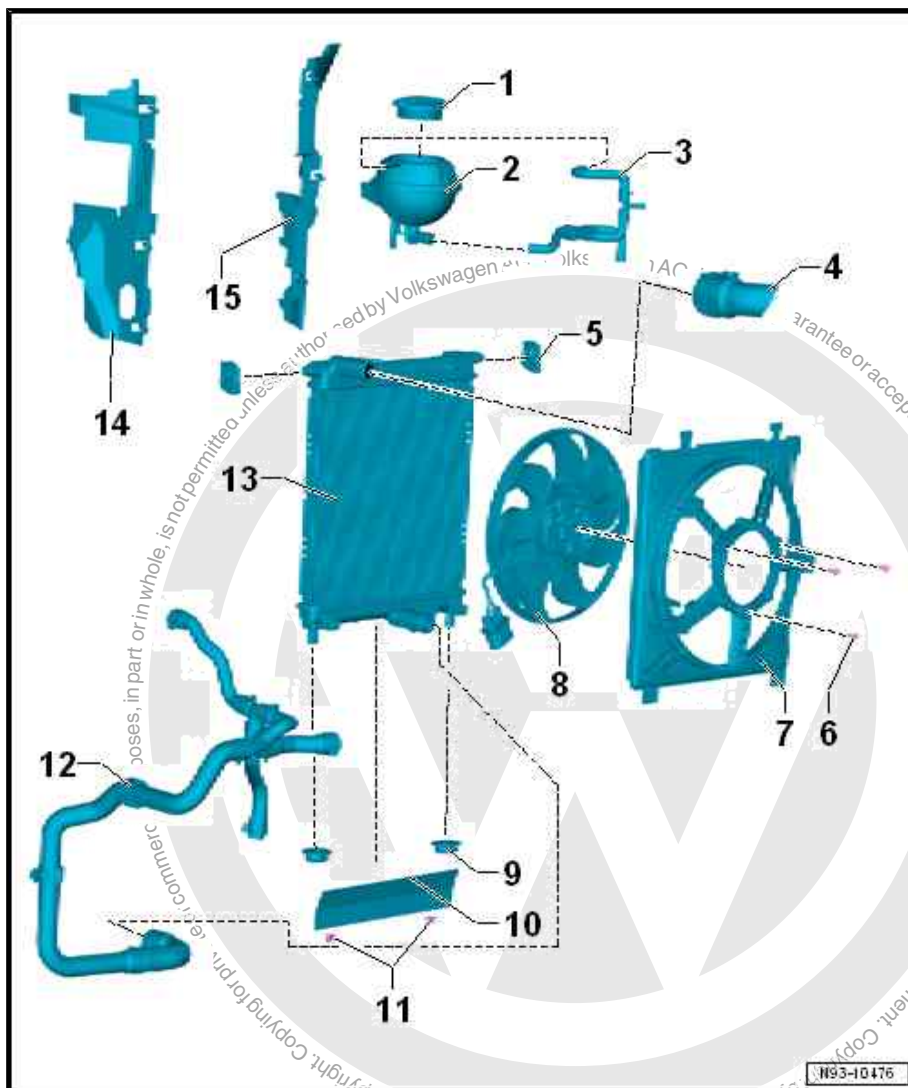
- ☐ At top of radiator
- ☐ Observe installation position
- ☐ Note locking mechanism ⇒ [page 159](#) .

#### 6 - Bolts

- ☐ For securing radiator fan - V7- to cowling
- ☐ Qty. 3
- ☐ 10 Nm

#### 7 - Cowling

- ☐ Removing and installing ⇒ [page 162](#)





## 8 - Radiator fan - V7-

- ☐ Removing and installing ⇒ [page 163](#)

## 9 - Radiator mounting

- ☐ At bottom of radiator
- ☐ Ensure proper seating in lock carrier

## 10 - Lower air guide

- ☐ Attached to bottom of lock carrier

## 11 - Retaining clip

- ☐ Qty. 2
- ☐ Attaches air guide to bottom of lock carrier

## 12 - Lower coolant hose

- ☐ Connection diagram for coolant hoses ⇒ [page 146](#)
- ☐ Check for firm seating

## 13 - Radiator for engine coolant

- ☐ Removing and installing ⇒ [page 159](#)
- ☐ Connection diagram for coolant hoses ⇒ [page 146](#)
- ☐ After renewing, renew entire coolant ⇒ [page 149](#)

## 14 - Air guide, left

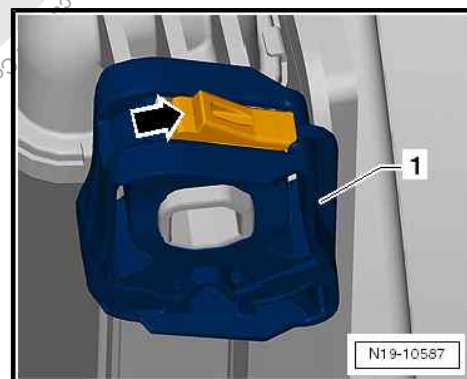
- ☐ Air guide for radiator
- ☐ Engaged in lock carrier

## 15 - Air guide, right

- ☐ Air guide for radiator
- ☐ Engaged in lock carrier

## Locking mechanism of radiator mounting

- To release radiator mounting -1- from lock carrier, locking lug must be pressed down -arrow-.



## 10.2 Removing and installing radiator

### Removing

#### CAUTION

Risk of injury from radiator fan starting automatically.

- Disconnect electrical connectors:



## ⚠ CAUTION

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

There is a risk of injury to the skin and parts of the body due to scalding.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Remove front bumper ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Removing and installing front bumper .
- Remove front left headlights ⇒ Electrical system; Rep. gr. 94 ; Headlights; Removing and installing headlights
- Remove condenser ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing condenser .

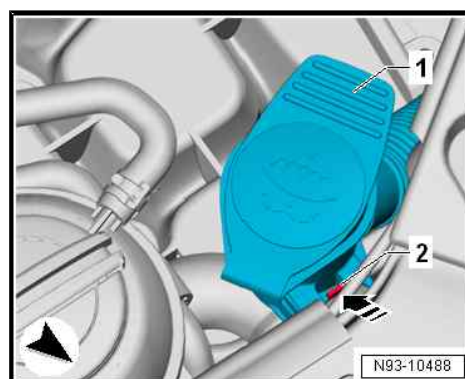
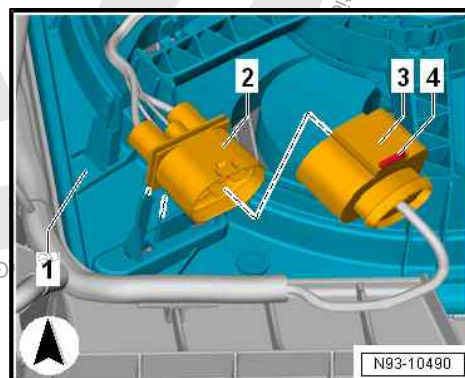


## Note

To prevent damage to condenser, refrigerant lines or hoses, ensure that lines and hoses are not stretched, kinked or bent.

- Drain coolant ⇒ [page 149](#) .
- Release connector -3- at locking lug -4-, and pull off wiring harness -2- for radiator fan
- Detach wiring harness -2- from retainer on cowl -1-.

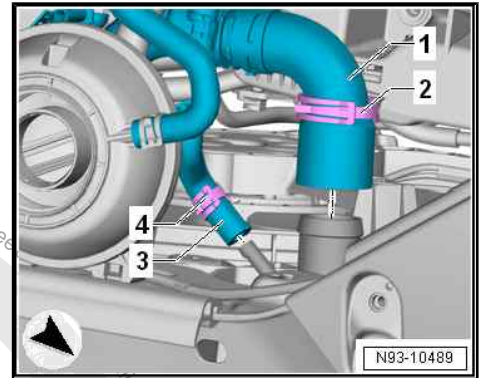
- Release locking lug -2- on filler neck -1- in -direction of arrow-.
- Remove filler neck -1- upwards out of lock carrier.



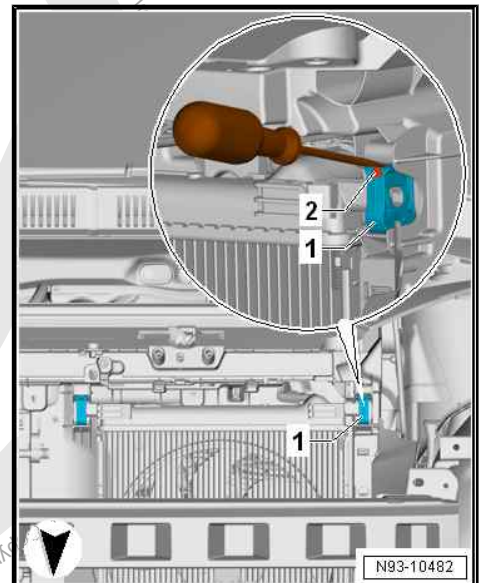




- Open hose clips -2- and -4- using hose clip pliers - VAS 6362- , and push them back.
- Pull coolant hoses -1- and -3- off top of radiator.



- Release locking lugs -2- of radiator mountings -1- on both sides using a screwdriver ➔ [page 159](#) .
- Pull radiator slightly out of the two upper lock carrier supports.







- Tip radiator -1- further forwards in -direction of arrow A-.
- Pull radiator -1- upwards in -direction of arrow B- on right side.
- Tip radiator -1- further forwards in -direction of arrow A- out of lock carrier.
- Pull radiator -1- out of mountings in -direction of arrow C- and remove.

**If radiator is to be renewed:**

- Remove cowling with radiator fan ➔ [page 162](#) .

**Installing**

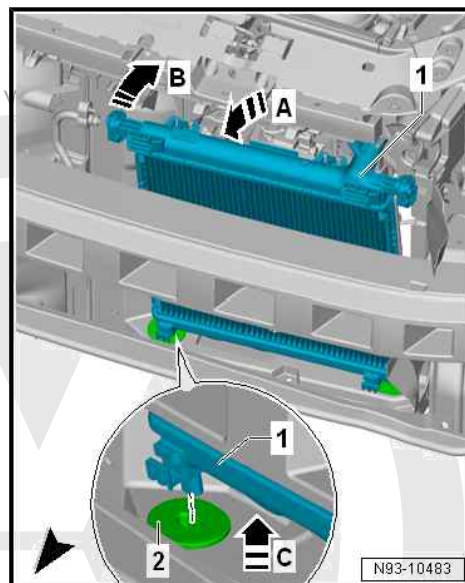
Install in reverse order of removal, observing the following:



**Note**

*To prevent damage to condenser, refrigerant lines or hoses, ensure that lines and hoses are not stretched, kinked or bent.*

- Install condenser ➔ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing condenser .
- Install front left headlight ➔ Electrical system; Rep. gr. 94 ; Headlights; Removing and installing headlights .
- Observe electrical connections and routing ➔ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install front bumper ➔ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Removing and installing front bumper .
- Add coolant ➔ [page 149](#) .



## 10.3 Removing and installing cowling with radiator fan

### Removing



**CAUTION**

Risk of injury from radiator fan starting automatically.

- Disconnect electrical connectors:



**CAUTION**

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

There is a risk of injury to the skin and parts of the body due to scalding.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Remove radiator ➔ [page 159](#) .



- Press locking lug -3- on radiator -1- in -direction of arrow A- while simultaneously releasing cowling -2-.
- Pull cowling -2- in -direction of arrow B- out of lower radiator mounting -1-.
- Remove cowling together with radiator fan - V7- .

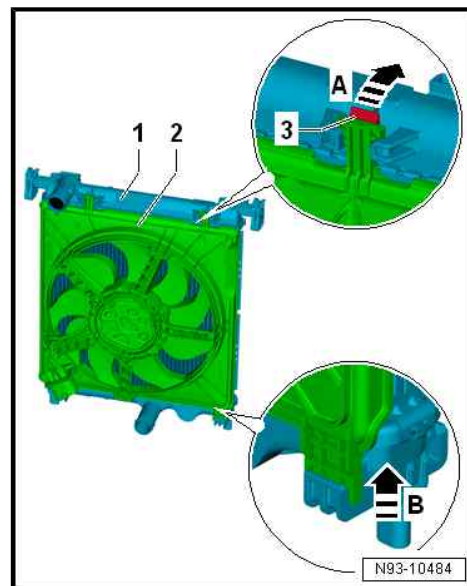
If cowling is to be renewed:

- Remove radiator fan - V7- ⇒ [page 162](#) .

#### Installing

Install in reverse order of removal, observing the following:

- Install radiator ⇒ [page 159](#) .
- Observe electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



## 10.4 Removing and installing radiator fan - V7-

### Removing

#### ⚠ CAUTION

Risk of injury from radiator fan starting automatically.

- Disconnect electrical connectors:

#### ⚠ CAUTION

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

There is a risk of injury to the skin and parts of the body due to scalding.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Remove radiator ⇒ [page 159](#) .
- Removing cowling with radiator fan - V7- ⇒ [page 162](#) .



- Remove wiring harness -4- from retainer on cowling -1-.
- Unscrew bolts -2-.
- Unthread wiring harness -4- from cowling -1-.
- Remove radiator fan - V7- -3- from cowling -1-.

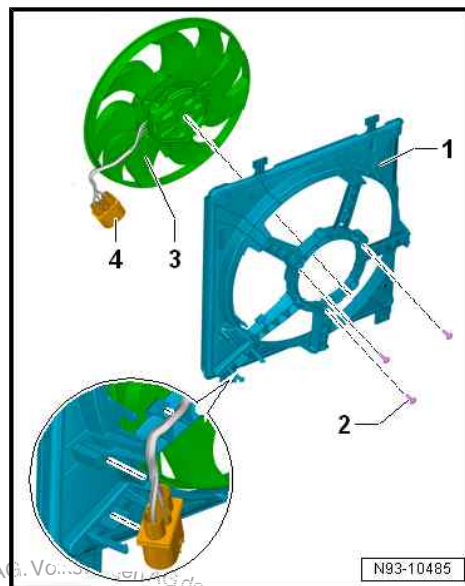
### Installing

Install in reverse order of removal, observing the following:

- Install radiator ⇒ [page 159](#) .
- Observe electrical connections and routing ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

### Specified torque:

- ◆ Bolt ⇒ [Item 6 \(page 158\)](#)





## 11 High-voltage heater (PTC)

Overview of fitting locations ⇒ Heating, air conditioning; Rep. gr.  
87 ; Coolant circuit; Overview of fitting locations - coolant circuit .





## 12 Electrical air conditioner compressor

The electrical air conditioner compressor - V470- is installed on the right in the front in the engine compartment.

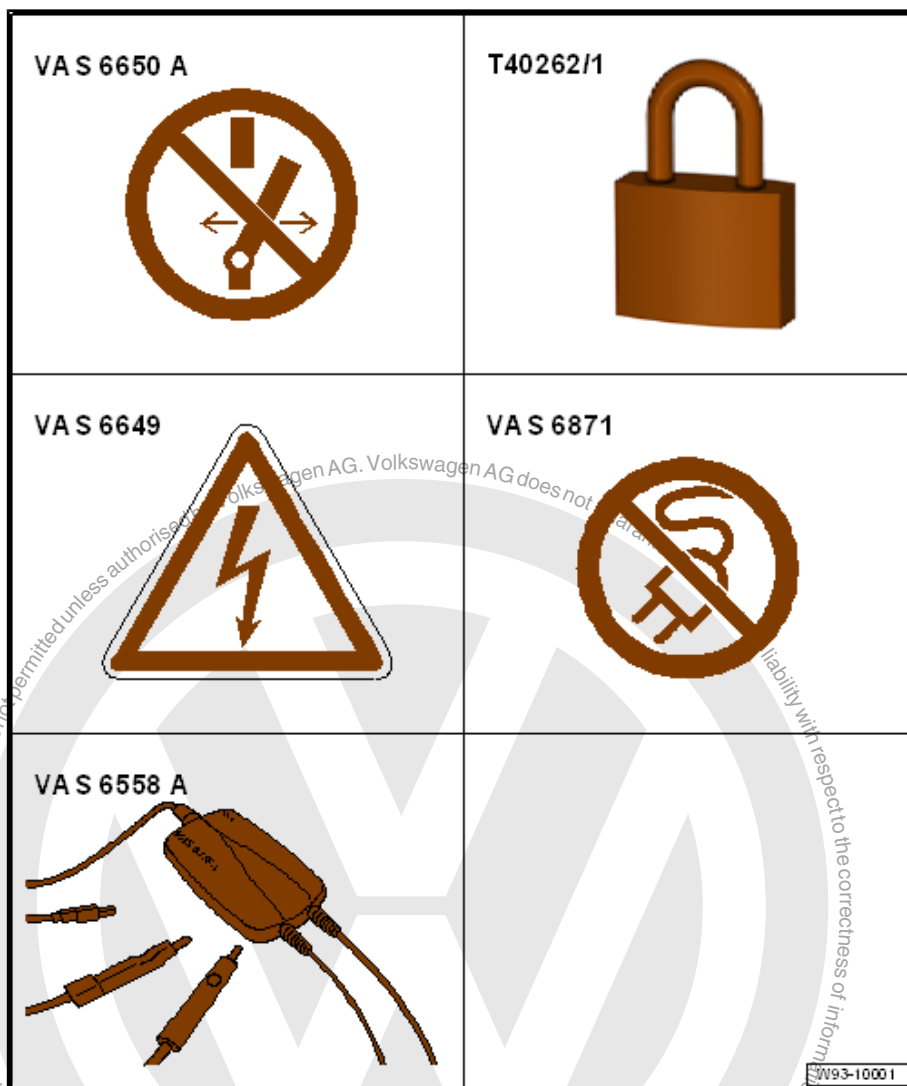
Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ;  
Air conditioner compressor; Removing and installing Electrical air  
conditioner compressor - V470-





## 13 De-energising high-voltage system

Special tools and workshop equipment required



- ◆ Hybrid test module - VAS 6558 A-
- ◆ Hybrid vehicle high voltage warning - VAS 6649-
- ◆ Warning sign "Do not switch" - VAS 6650 A-
- ◆ Charging prohibited warning sign - VAS 6871-
- ◆ Padlock - T40262/1-

- ◆ Pick-up clamps - V.A.G 1594/14-

If problems occur during individual steps of the de-energisation procedure, inform the high-voltage expert.

The post - VAS 6884- can be used to secure the vehicle.

- Park the vehicle in a secure manner.
- Prepare test report.
- Have calibrated voltage tester with suitable test probes ready.
- Prepare signs/notices and cordoning off equipment as needed.





- De-energise high-voltage system ⇒ Vehicle diagnostic tester.





## 14 Re-energising high-voltage system

- Commission high-voltage system ⇒ Vehicle diagnostic tester.





## 15 Potential equalisation lines

⇒ ["15.1 Overview of fitting locations - potential equalisation lines", page 170](#)

⇒ ["15.2 Potential equalisation lines - high-voltage battery 1 AX2", page 171](#)

⇒ ["15.3 Potential equalisation lines - power and control electronics for electric drive JX1", page 171](#)

⇒ ["15.4 Potential equalisation lines - charging unit 1 for high-voltage battery AX4", page 172](#)

⇒ ["15.5 Potential equalisation lines - three-phase current drive VX54", page 172](#)

⇒ ["15.6 Potential equalisation lines - high-voltage heater \(PTC\) Z115", page 172](#)

⇒ ["15.7 Potential equalisation lines - electrical air conditioner compressor V470", page 173](#)

### 15.1 Overview of fitting locations - potential equalisation lines

1 - Potential equalisation line for high-voltage battery 1 - AX2- on right

- ❑ Specified torques  
⇒ [page 171](#)

2 - Potential equalisation line for high-voltage battery 1 - AX2- on left

- ❑ Specified torques  
⇒ [page 171](#)

3 - Potential equalisation line for charging unit 1 for high-voltage battery - AX4-

- ❑ Specified torques  
⇒ [page 172](#)

4 - Potential equalisation line for high-voltage heater (PTC) - Z115-

- ❑ Specified torques  
⇒ [page 172](#)

5 - Potential equalisation line for three-phase current drive - VX54-

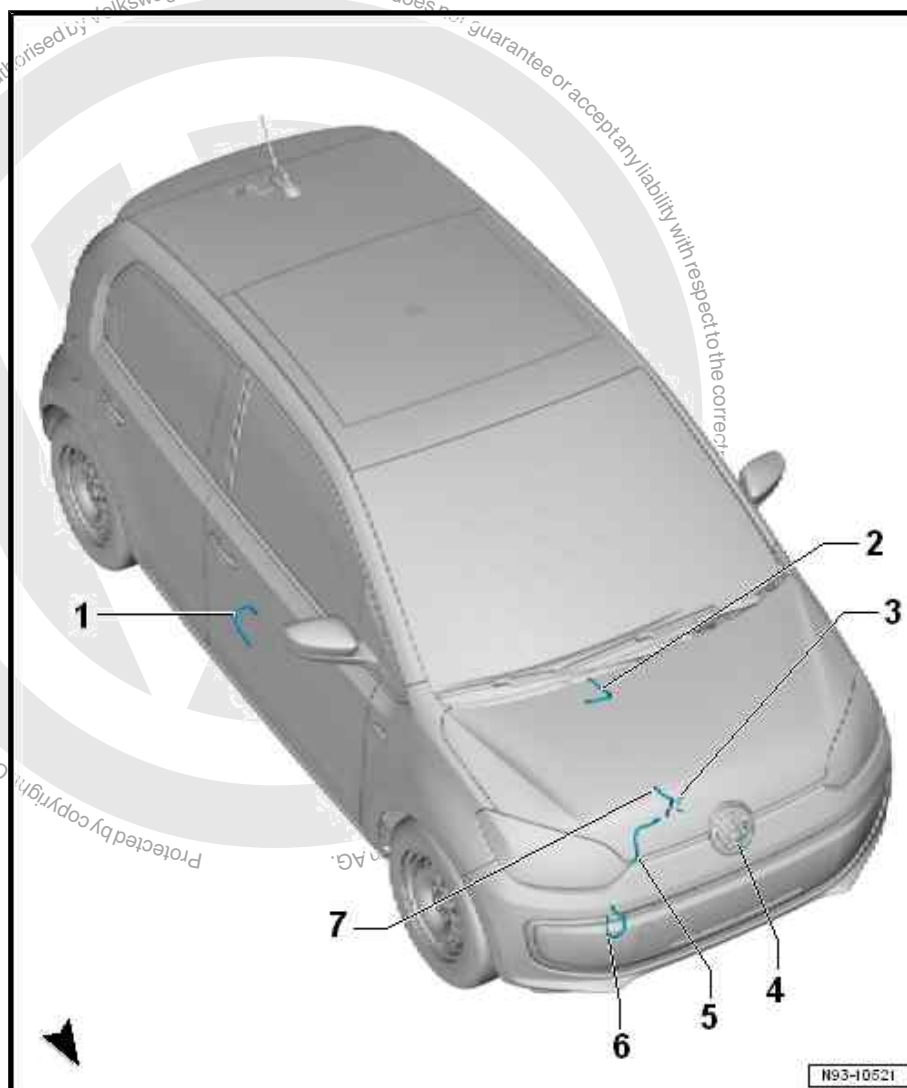
- ❑ Specified torques  
⇒ [page 172](#)

6 - Potential equalisation line for electrical air conditioner compressor - V470-

- ❑ Specified torques  
⇒ [page 173](#)

7 - Potential equalisation line for power and control electronics for electric drive - JX1-

- ❑ Specified torques  
⇒ [page 171](#)



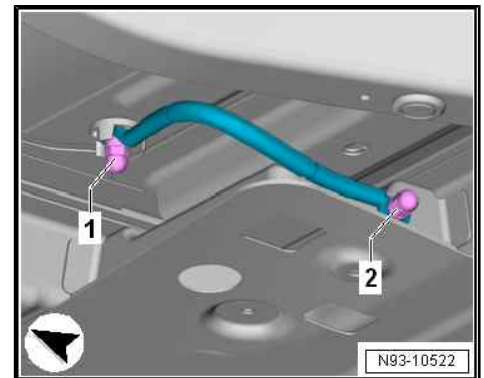


## 15.2 Potential equalisation lines - high-voltage battery 1 - AX2-

Potential equalisation line for high-voltage battery 1 - AX2- on left

Specified torques

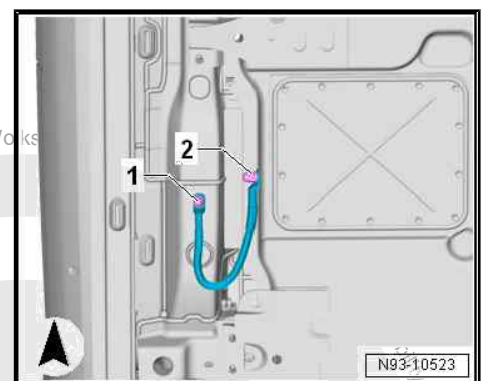
Component	Specified torque
Nut -1-	20 Nm
Nut -2-	20 Nm



Potential equalisation line for high-voltage battery 1 - AX2- on right

Specified torques

Component	Specified torque
Nut -1-	20 Nm
Nut -2-	20 Nm

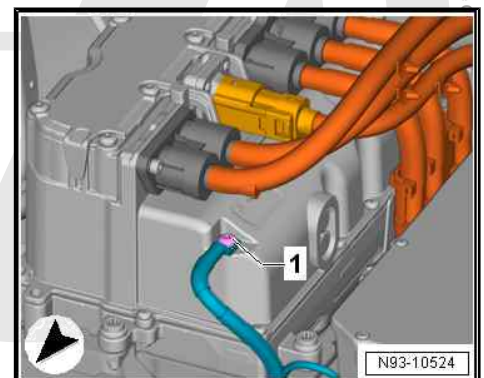


## 15.3 Potential equalisation lines - power and control electronics for electric drive - JX1-

Potential equalisation line for power and control electronics for electric drive - JX1-

Specified torques

Component	Specified torque
Bolt -1-	9 Nm



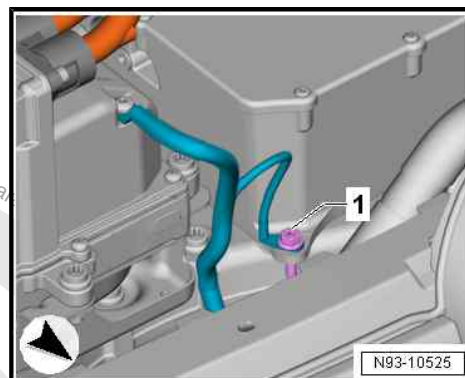


## 15.4 Potential equalisation lines - charging unit 1 for high-voltage battery - AX4-

Potential equalisation line for charging unit 1 for high-voltage battery - AX4-

Specified torques

Component	Specified torque
Bolt -1-	9 Nm

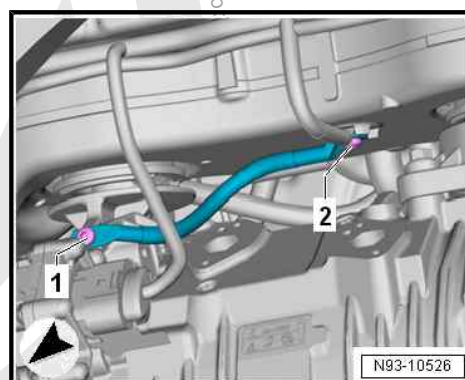


## 15.5 Potential equalisation lines - three-phase current drive - VX54-

Potential equalisation line for three-phase current drive - VX54-

Specified torques

Component	Specified torque
Bolt -1-	9 Nm
Bolt -2-	9 Nm

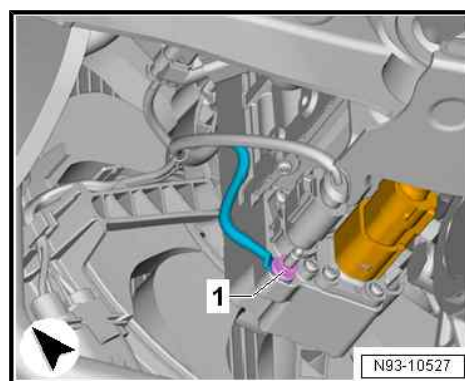


## 15.6 Potential equalisation lines - high-voltage heater (PTC) - Z115-

Potential equalisation line for high-voltage heater (PTC) - Z115-

Specified torques

Component	Specified torque
Nut -1-	9 Nm



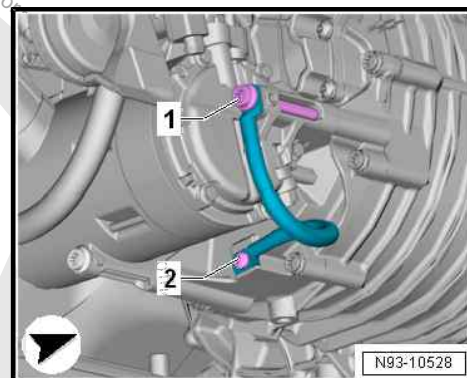


## 15.7 Potential equalisation lines - electrical air conditioner compressor - V470-

Potential equalisation line for electrical air conditioner compressor - V470-

Specified torques

Component	Specified torque
Bolt -1-	23 Nm
Bolt -2-	9 Nm





## 16 Charging socket

⇒ ["16.1 Assembly overview - charging socket", page 174](#)

⇒ ["16.2 Removing and installing high-voltage battery charging socket 1 UX4", page 175](#)

⇒ ["16.3 Removing and installing actuator for high-voltage charging socket lock 1 F498", page 181](#)

⇒ ["16.4 Manual release mechanism for charging socket", page 183](#)

### 16.1 Assembly overview - charging socket

⇒ ["16.1.1 Assembly overview - charging socket, EU and China", page 174](#)

⇒ ["16.1.2 Assembly overview - charging socket, Japan", page 175](#)

#### 16.1.1 Assembly overview - charging socket, EU and China

##### 1 - Tank flap unit

- ❑ Assembly overview ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Assembly overview - tank flap unit
- ❑ Removing and installing ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing fuel tank flap unit .

##### 2 - Bolts

- ❑ Qty. 4
- ❑ 4 Nm

##### 3 - High-voltage battery charging socket 1 - UX4-

- ❑ Removing and installing ⇒ [page 175](#)

##### 4 - Bracket

##### 5 - Nuts

- ❑ Qty. 4
- ❑ 9 Nm

##### 6 - Vehicle electrical system connection

##### 7 - Nut

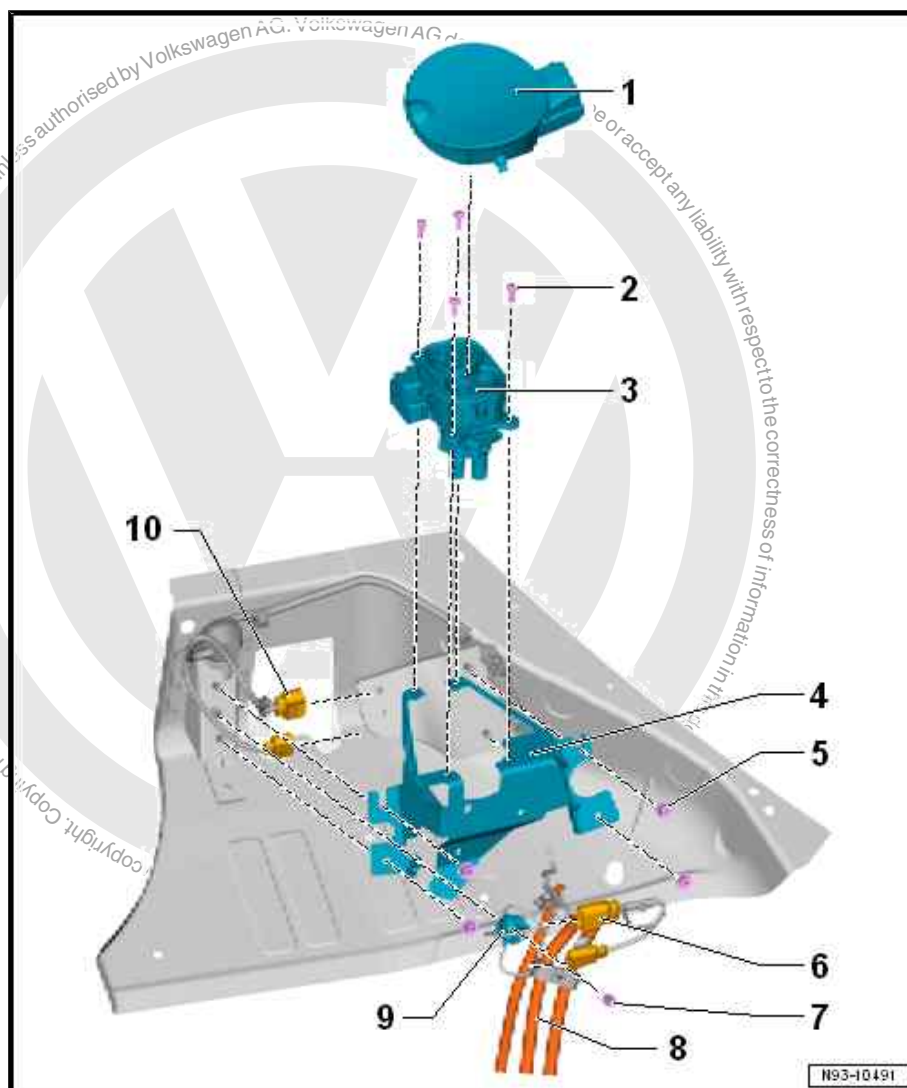
- ❑ 9 Nm

##### 8 - High-voltage cables

- ❑ General description ⇒ [page 140](#)

##### 9 - Earth connection

##### 10 - Vehicle electrical system





## 16.1.2 Assembly overview - charging socket, Japan

### 1 - Bracket

### 2 - Bolts

- Qty. 4
- 9 Nm

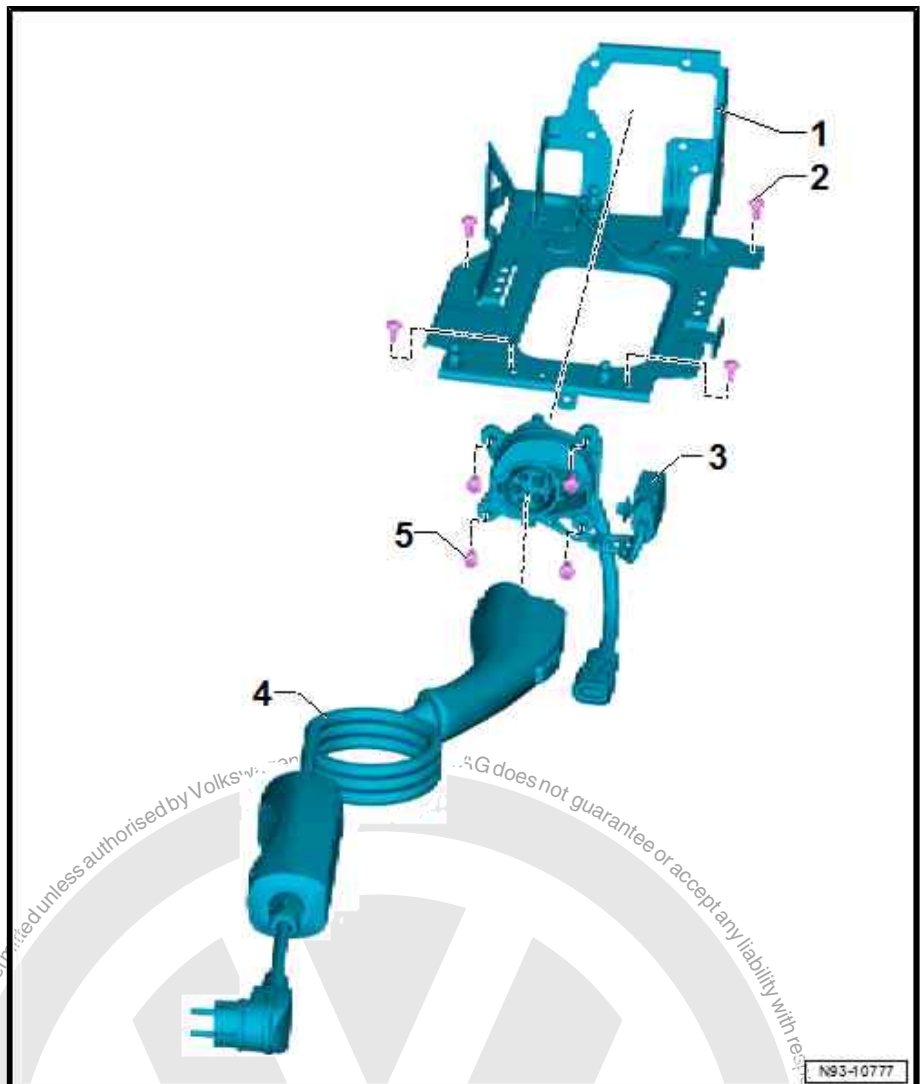
### 3 - High-voltage battery charging socket 1 - UX4-

- Removing and installing  
⇒ [page 175](#)

### 4 - Charging cable

### 5 - Bolts

- Qty. 4
- 4 Nm



## 16.2 Removing and installing high-voltage battery charging socket 1 - UX4-

⇒ [“16.2.1 Removing and installing high-voltage battery charging socket 1 UX4 , EU and China”](#), page 175

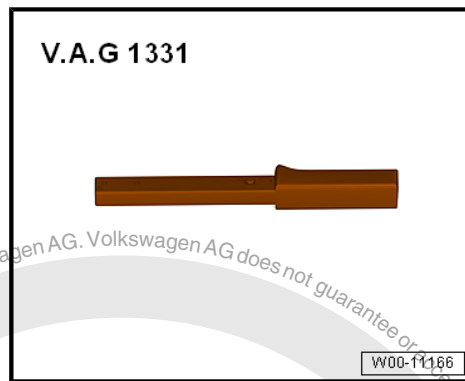
⇒ [“16.2.2 Removing and installing high-voltage battery charging socket 1 UX4 , Japan”](#), page 179

### 16.2.1 Removing and installing high-voltage battery charging socket 1 - UX4- , EU and China

Special tools and workshop equipment required



- ◆ Torque wrench - V.A.G 1331-



- ◆ Torque wrench - V.A.G 1410-



## Removing



### DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .



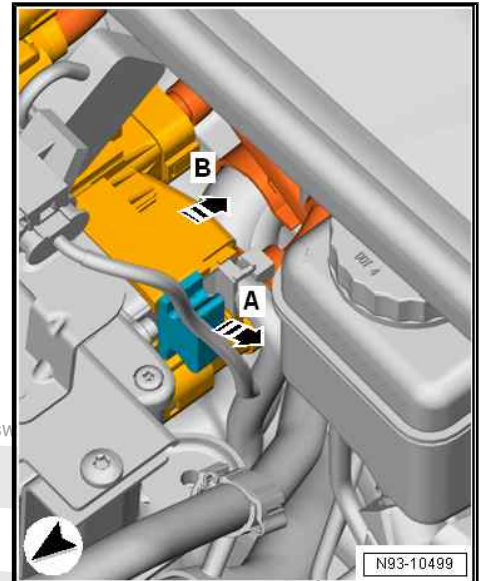
### Note

*The high-voltage battery charging socket 1 - UX4- can be removed only together with the charging cable.*

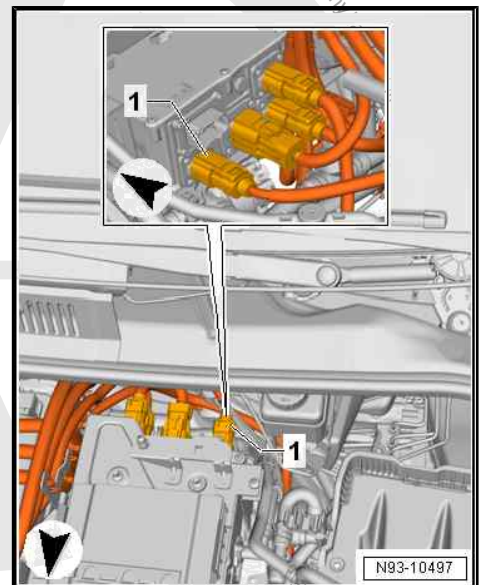
- Remove high-voltage battery 1 - AX2- ⇒ [page 25](#) .



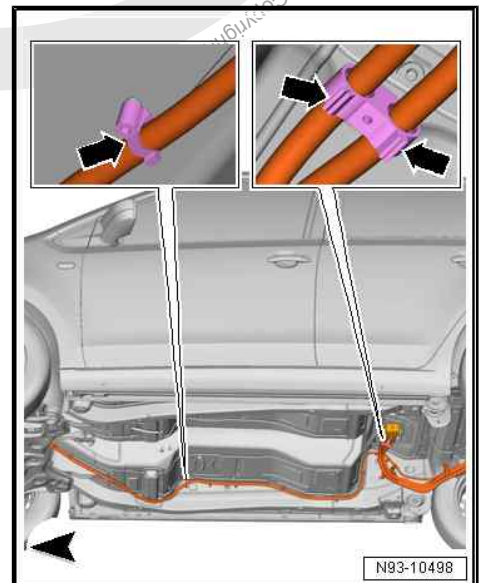
- Release connector in -direction of arrow A-.
- Pull off connector in -direction of arrow B-.



- Release high-voltage cable -1- from behind using a small screwdriver.

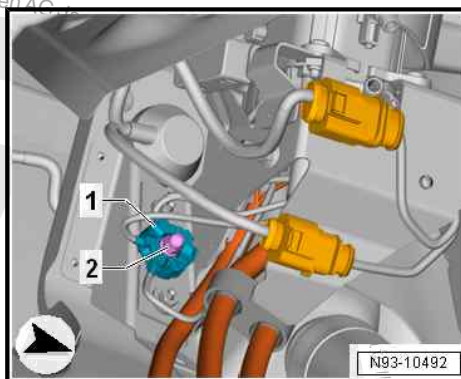


- Detach high-voltage cables from body -arrows-, and move them free.
- Remove rear right wheel.
- Remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing wheel housing liner .

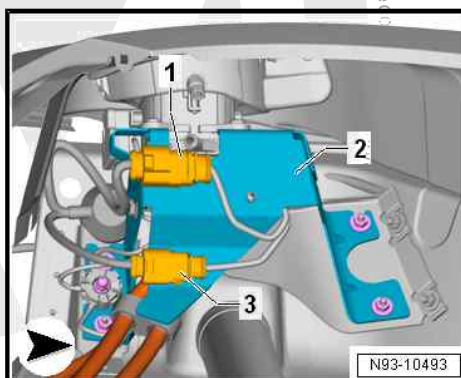




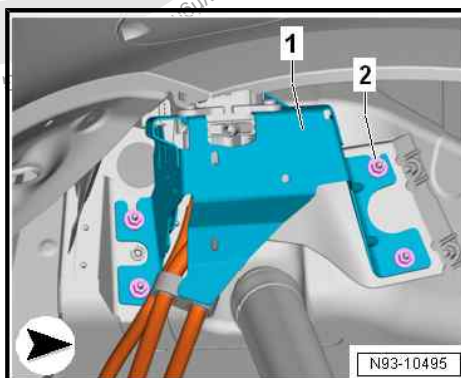
- Unscrew nut -2-.
- Pull off earth connection -1-.



- Disconnect electrical connectors -1 and 3-.
- Unclip electrical connectors -1 and 3- from bracket -2-.

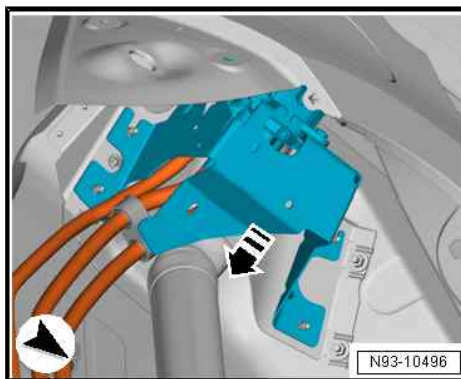


- Unscrew nuts -2- on left and right of bracket -1-.



- Pull high-voltage battery charging socket 1 - UX4- off studs.
- Swing out high-voltage battery charging socket 1 - UX4- downwards in -direction of arrow-.

**If high-voltage battery charging socket 1 - UX4- is to be renewed**







- Unscrew bolts -1-.
- Remove high-voltage battery charging socket 1 - UX4- -2- from bracket -3-.

### Installing

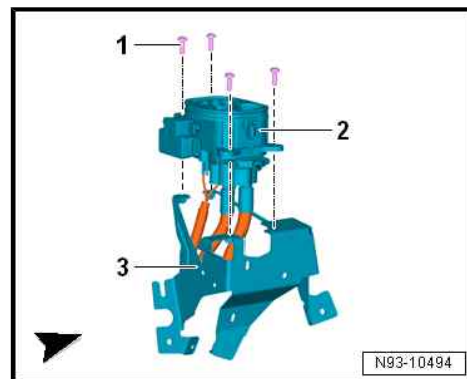
Install in reverse order of removal, observing the following:

#### **WARNING**

**Danger to life from high voltage.**

**Electrical shocks can cause serious injuries or death.**

- **Have a qualified technician re-energise the high-voltage system.**



- Re-energise high-voltage system ⇒ Electric motor (210, LS1); Rep. gr. 93 ; Re-energising high-voltage system .

### Specified torques

- ◆ ⇒ [“16.1 Assembly overview - charging socket”, page 174](#)

## 16.2.2 Removing and installing high-voltage battery charging socket 1 - UX4- , Japan

### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-

**V.A.G 1331**



W00-11166

- ◆ Torque wrench - V.A.G 1410-

**V.A.G 1410**



W00-11174

### Removing

#### **DANGER**

**Danger to life from high voltage.**

**Severe or fatal injury from electric shock.**

- **The high-voltage system must be de-energised by a suitably qualified technician.**





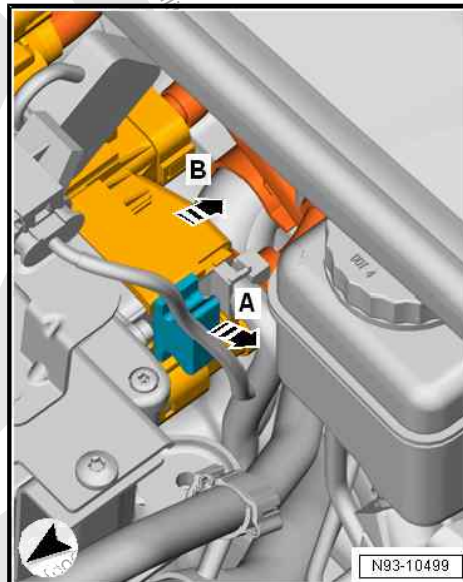
- De-energise high-voltage system ➔ [page 167](#) .



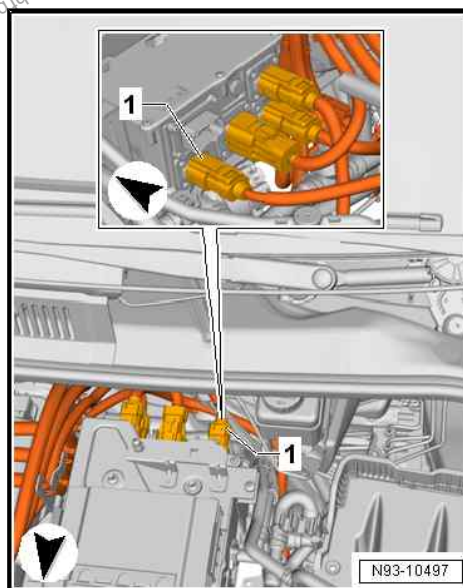
#### Note

*The high-voltage battery charging socket 1 - UX4- can be removed only together with the charging cable.*

- Remove high-voltage battery 1 - AX2- ➔ [page 25](#) .
- Release connector in -direction of arrow A-.
- Pull off connector in -direction of arrow B-.

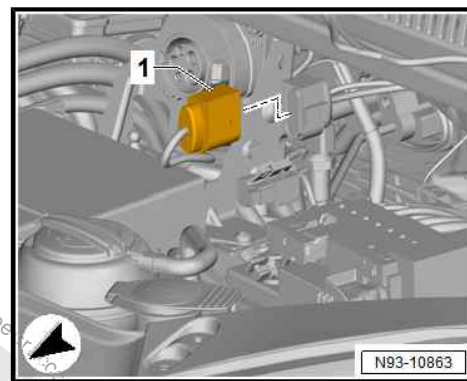


- Release high-voltage cable -1- from behind using a small screwdriver.





- Disconnect electrical connector -1-.
- Unclip counter piece from bracket.



- Unscrew bolts -2-.
- Pull high-voltage battery charging socket 1 - UX4- -1- in -direction of arrow- out of bracket.

#### Installing

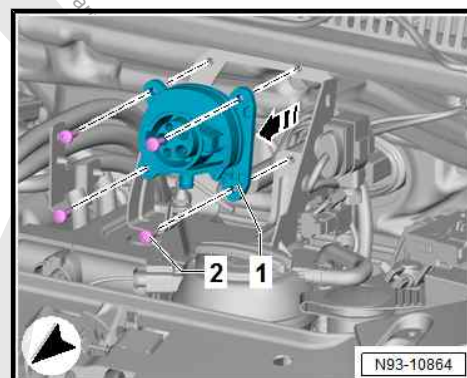
Install in reverse order of removal, observing the following:

#### **⚠ WARNING**

**Danger to life from high voltage.**

**Electrical shocks can cause serious injuries or death.**

- **Have a qualified technician re-energise the high-voltage system.**



- Re-energise high-voltage system ⇒ Electric motor (210, LS1); Rep. gr. 93 ; Re-energising high-voltage system .

#### Specified torques

- ♦ ⇒ [“16.1 Assembly overview - charging socket”, page 174](#)

### 16.3 Removing and installing actuator for high-voltage charging socket lock 1 - F498-

#### Special tools and workshop equipment required

- ♦ Torque wrench 50-100Ncm - VAS 6253A-

#### **⚠ DANGER**

**Danger to life from high voltage.**

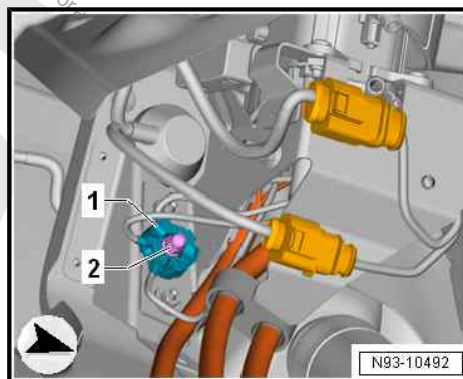
**Severe or fatal injury from electric shock.**

- **The high-voltage system must be de-energised by a suitably qualified technician.**

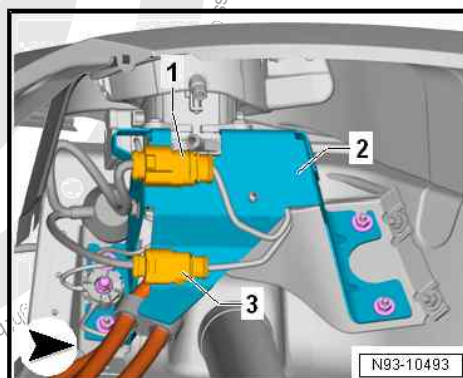
- De-energise high-voltage system ⇒ [page 167](#) .
- Remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing rear wheel housing liner .



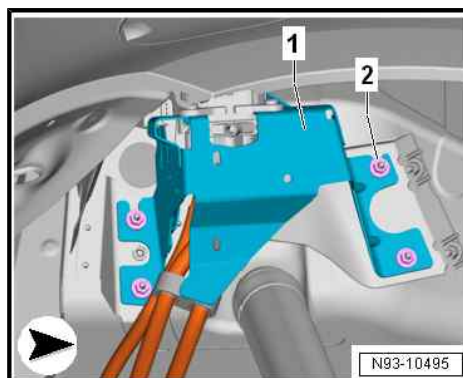
- Unscrew nut -2-.
- Pull off earth connection -1-.



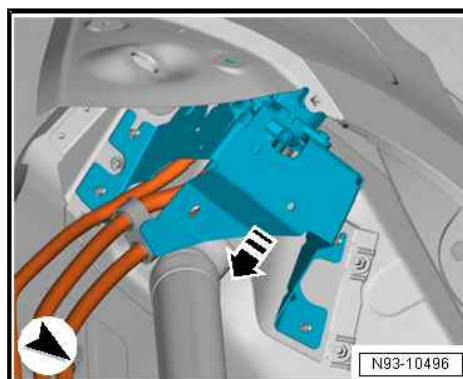
- Disconnect electrical connectors -1 and 3-.
- Unclip electrical connectors -1 and 3- from bracket -2-.



- Unscrew nuts -2- on left and right of bracket -1-.

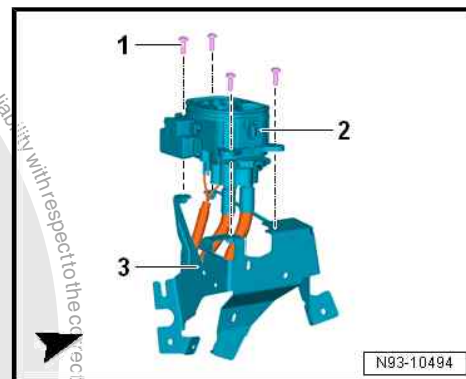


- Pull high-voltage battery charging socket 1 - UX4- off studs.
- Swing out high-voltage battery charging socket 1 - UX4- downwards in -direction of arrow-.





- Unscrew bolts -1-.
- Remove high-voltage battery charging socket 1 - UX4- -2- from bracket -3-.



Unscrew bolts -1-.

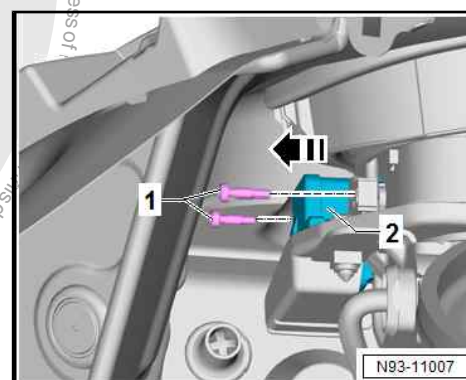
- Remove actuator for high-voltage charging socket lock 1 - F498- -2-.

### Installing

Install in reverse order of removal, observing the following:

### Specified torques

Component	Specified torque
Bolts for actuator for high-voltage charging socket lock 1 - F498- -1-	1.2 Nm



- ◆ ⇒ ["16.1 Assembly overview - charging socket", page 174](#)

### WARNING

**Danger to life from high voltage.**

**Electrical shocks can cause serious injuries or death.**

- Have a qualified technician re-energise the high-voltage system.

- Re-energise high-voltage system ⇒ Electric motor (210, LS1); Rep. gr. 93 ; Re-energising high-voltage system .



### Note

*Once the high-voltage system has been installed and energised, check the function of the actuator for high-voltage charging socket lock 1 - F498- .*

## 16.4 Manual release mechanism for charging socket



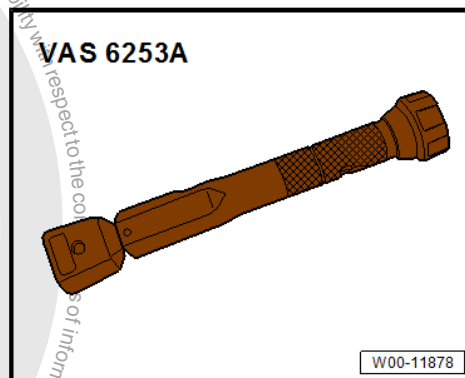
### Note

- ◆ *When charging, the charging connector is blocked through an actuator.*
- ◆ *In the event of an actuator failure, the charging connector can no longer be disconnected from the high-voltage battery charging socket 1 - UX4- .*
- ◆ *Apart from the electrical emergency release, a mechanical emergency release of the actuator is possible, too.*



### Special tools and workshop equipment required

- ♦ Torque wrench - VAS 6253A-



### Removing

#### DANGER

**Danger to life from high voltage.**

**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .
- Remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing rear wheel housing liner .
- Unscrew bolts -1-.
- Push actuator -2- in -direction of arrow- to release connector from charging cable 1 - P20- .

### Installing

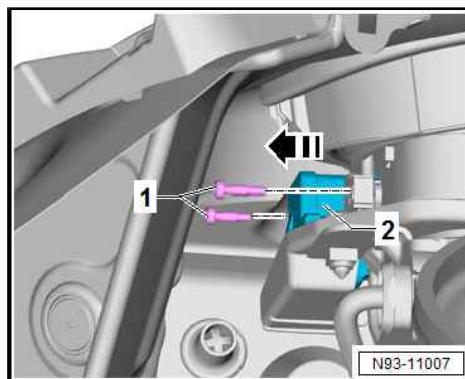
Install in reverse order of removal, observing the following:

#### WARNING

**Danger to life from high voltage.**

**Electrical shocks can cause serious injuries or death.**

- Have a qualified technician re-energise the high-voltage system.



- Commission high-voltage system ⇒ [page 169](#) .

### Specified torques

Component	Specified torque
Bolts -1-	1.2 Nm



## 17 Charging unit for high-voltage battery

⇒ ["17.1 Assembly overview - charging unit for high-voltage battery", page 185](#)

⇒ ["17.2 Removing and installing charging unit 1 for high-voltage battery AX4", page 186](#)

⇒ ["17.3 Removing and installing bracket for charging unit 1 for high-voltage battery AX4", page 189](#)

### 17.1 Assembly overview - charging unit for high-voltage battery

#### 1 - Charging unit 1 for high-voltage battery - AX4-

- ☐ Removing and installing  
⇒ [page 186](#)

#### 2 - Bolts

- ☐ Qty. 4
- ☐ 9 Nm

#### 3 - High-voltage cable

- ☐ To high-voltage heater (PTC) - Z115-

#### 4 - High-voltage cable

- ☐ To electrical air conditioner compressor - V470-

#### 5 - High-voltage cable

- ☐ To power and control electronics for electric drive - JX1-

#### 6 - High-voltage cable

- ☐ From high-voltage battery charging socket 1 - UX4-

#### 7 - Connection for vehicle electrical system

#### 8 - Coolant hose

#### 9 - Clip

#### 10 - Console

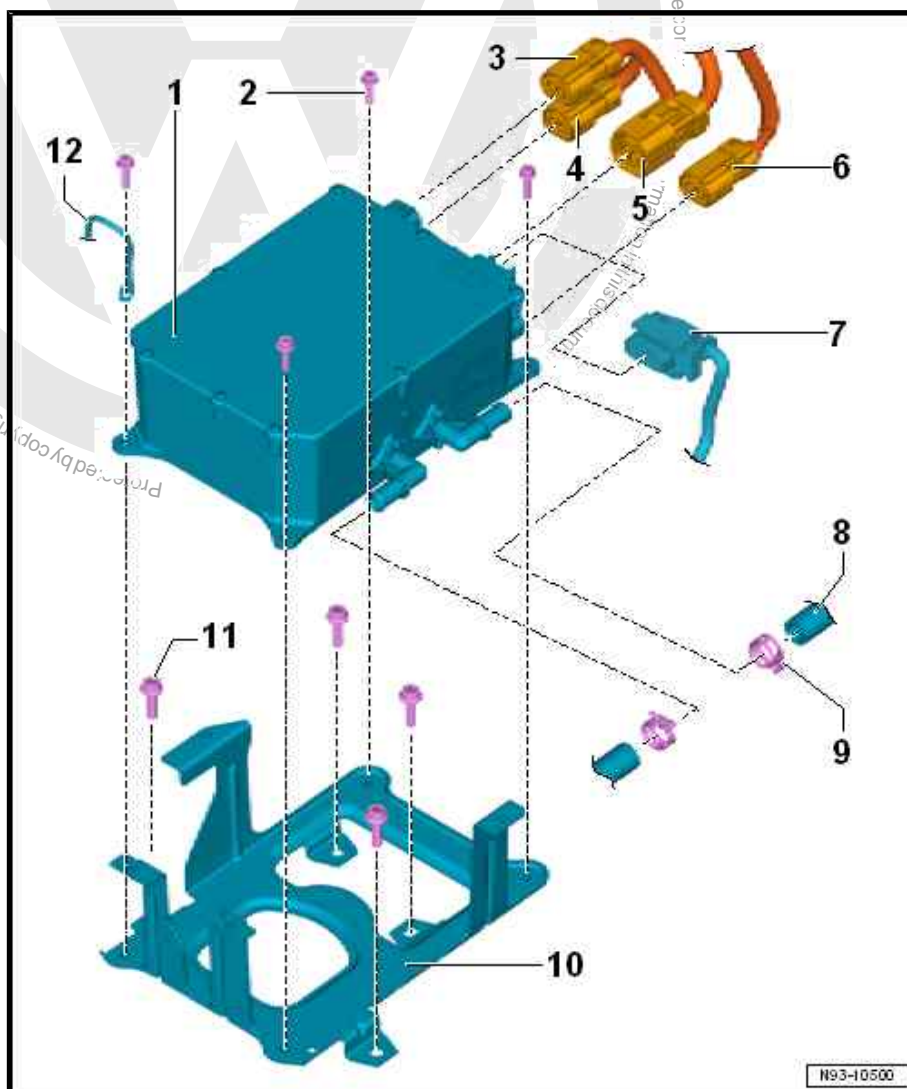
- ☐ Removing and installing  
⇒ [page 189](#)

#### 11 - Bolts

- ☐ Qty. 4
- ☐ 20 Nm

#### 12 - Potential equalisation line

- ☐ Overview of fitting locations ⇒ [page 170](#)







## 17.2 Removing and installing charging unit 1 for high-voltage battery - AX4-

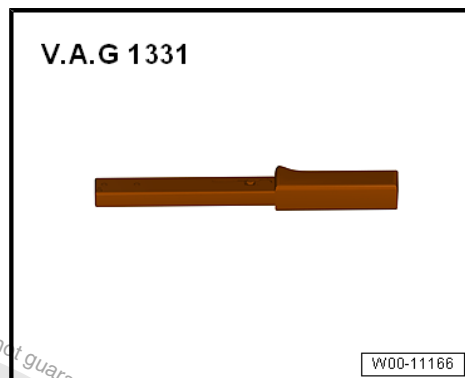


### Note

*Charging unit 1 for high-voltage battery - AX4- contains control unit for high-voltage battery charging unit - J1050-*

### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



### Removing

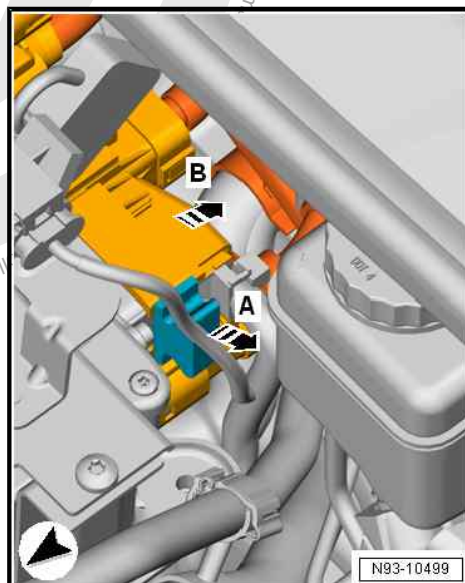
#### DANGER

**Danger to life from high voltage.**

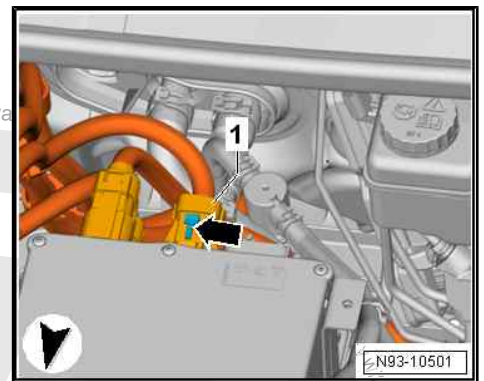
**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .
- Drain coolant ⇒ [page 149](#) .
- Remove cover for motor compartment ⇒ [page 120](#) .
- Remove bracket for engine (motor) control unit - J623- ⇒ [page 138](#) .
- Release connector in -direction of arrow A-.
- Pull off connector in -direction of arrow B-.



- Release high-voltage cable -1- -arrow-, and pull it off.



-



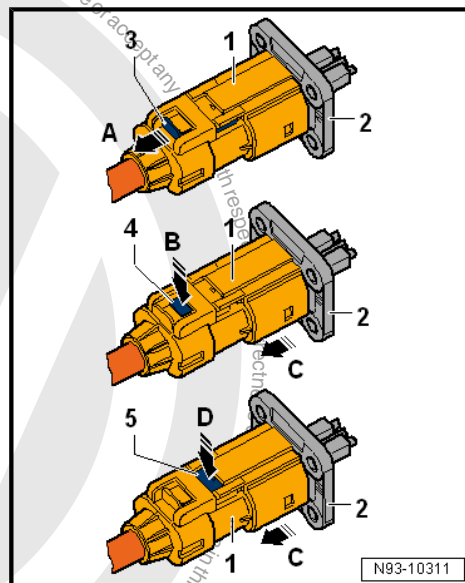
- Pull locking lug -3- in -direction of arrow A-.
- Press lug -4- in -direction of arrow B- while pulling connector -1- in -direction of arrow C- off connector mounting -2-.



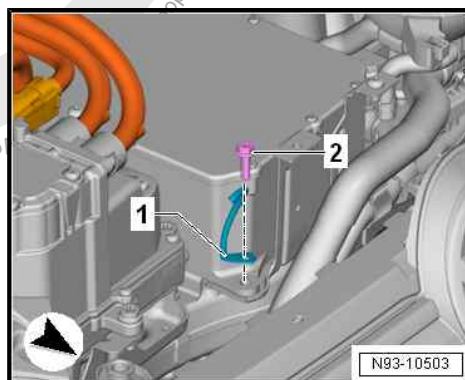
**Note**

*Connector -1- can be pulled about 5 mm out of connector mounting -2-.*

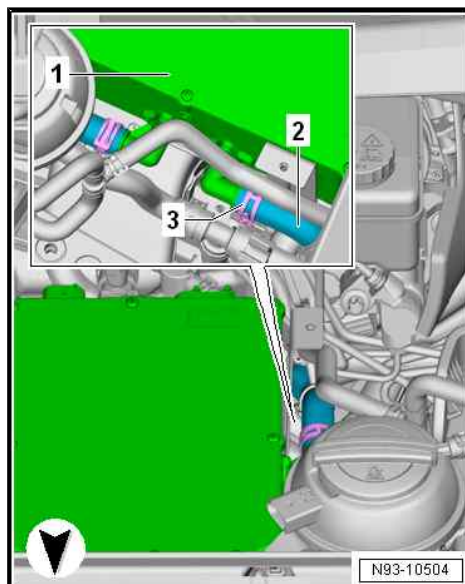
- Press lug -5- in -direction of arrow D- while pulling connector -1- in -direction of arrow C- completely off connector support -2-.



- Unscrew bolt -2-.
- Remove potential equalisation line -1-.



- Loosen clips on right and left -3-.
- Pull water hoses -2- off charging unit 1 for high-voltage battery - AX4- -1-.





- Unscrew bolts -2-.
- Remove charging unit 1 for high-voltage battery - AX4- -1- upwards.

### Installing

Install in reverse order of removal, observing the following:

#### **WARNING**

**Danger to life from high voltage.**

**Electrical shocks can cause serious injuries or death.**

- Have a qualified technician re-energise the high-voltage system.

- Re-energise high-voltage system. ⇒ [page 169](#)

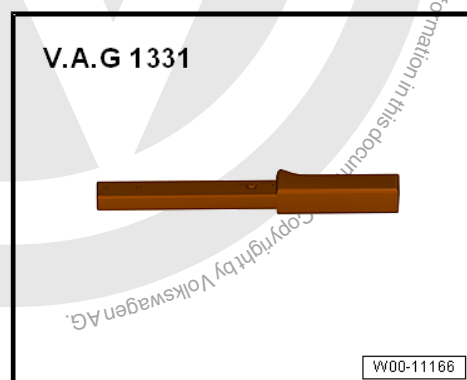
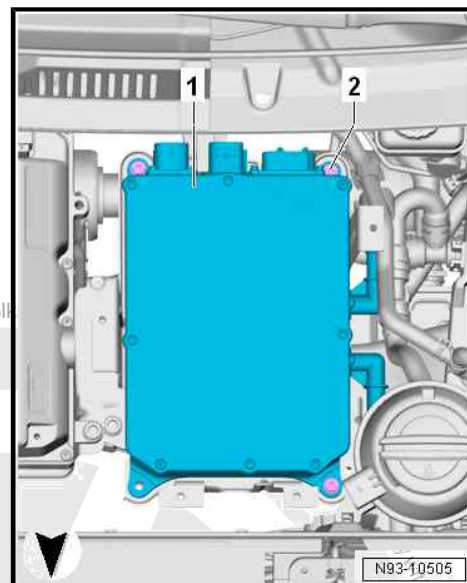
### Specified torques

- ◆ ⇒ [“17.1 Assembly overview - charging unit for high-voltage battery”, page 185](#)
- ◆ ⇒ [“15.1 Overview of fitting locations - potential equalisation lines”, page 170](#)

## 17.3 Removing and installing bracket for charging unit 1 for high-voltage battery - AX4-

### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



### Removing

#### **DANGER**

**Danger to life from high voltage.**

**Severe or fatal injury from electric shock.**

- The high-voltage system must be de-energised by a suitably qualified technician.

- De-energise high-voltage system ⇒ [page 167](#) .
- Remove charging unit 1 for high-voltage battery - AX4- ⇒ [page 186](#) .
- Unclip coolant hoses from bracket.



- Unscrew bolts -2-.
- Remove bracket -1- upwards.

### Installing

Install in reverse order of removal, observing the following:



#### WARNING

**Danger to life from high voltage.**

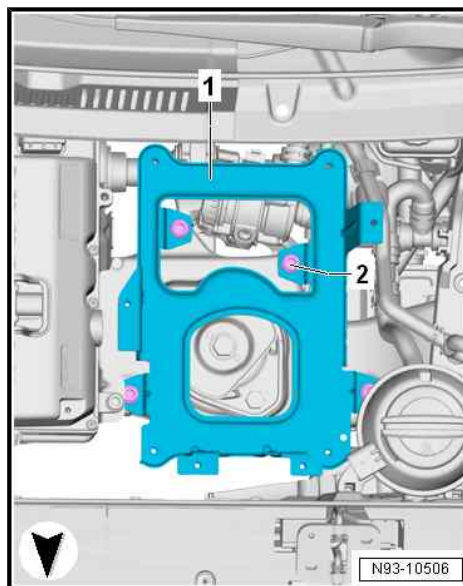
**Electrical shocks can cause serious injuries or death.**

- Have a qualified technician re-energise the high-voltage system.

- Re-energise high-voltage system. ➔ [page 169](#)

### Specified torques

- ♦ ➔ [“17.1 Assembly overview - charging unit for high-voltage battery”, page 185](#)







## 18 Driving sound and engine sound

⇒ ["18.1 Overview of fitting locations - driving sound and engine sound", page 191](#)

⇒ ["18.2 Removing and installing engine sound generator control unit J943", page 192](#)

⇒ ["18.3 Removing and installing actuator 1 for engine sound generator R257", page 193](#)

### 18.1 Overview of fitting locations - driving sound and engine sound

⇒ ["18.1.1 Overview of fitting locations - vehicle noise/engine sound, Europe", page 191](#)

⇒ ["18.1.2 Overview of fitting locations - vehicle noise/engine sound, Japan/China", page 192](#)

#### 18.1.1 Overview of fitting locations - vehicle noise/engine sound, Europe

1 - Actuator 1 for engine sound generator - R257-

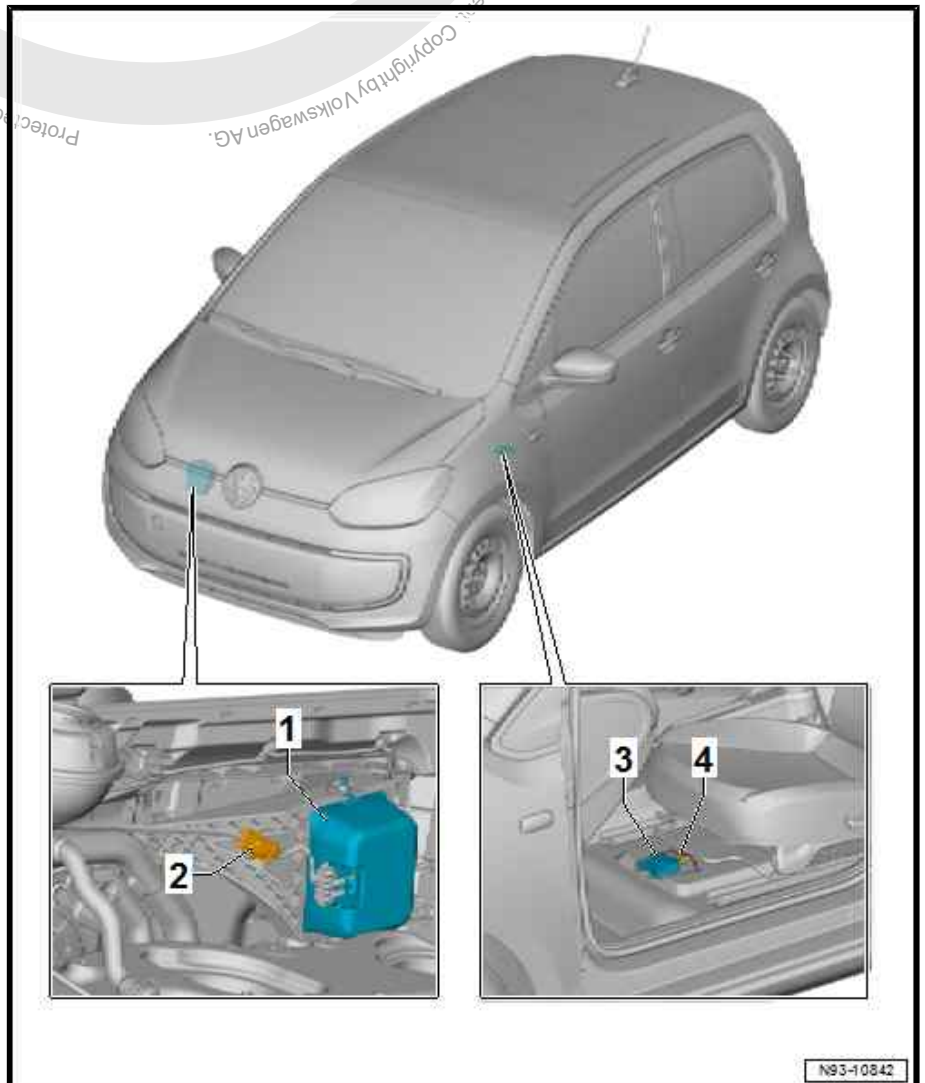
- Removing and installing  
⇒ [page 193](#)

2 - Electrical connector

3 - Engine sound generator control unit - J943-

- ⇒ [page 192](#)

4 - Electrical connector







## 18.1.2 Overview of fitting locations - vehicle noise/engine sound, Japan/China

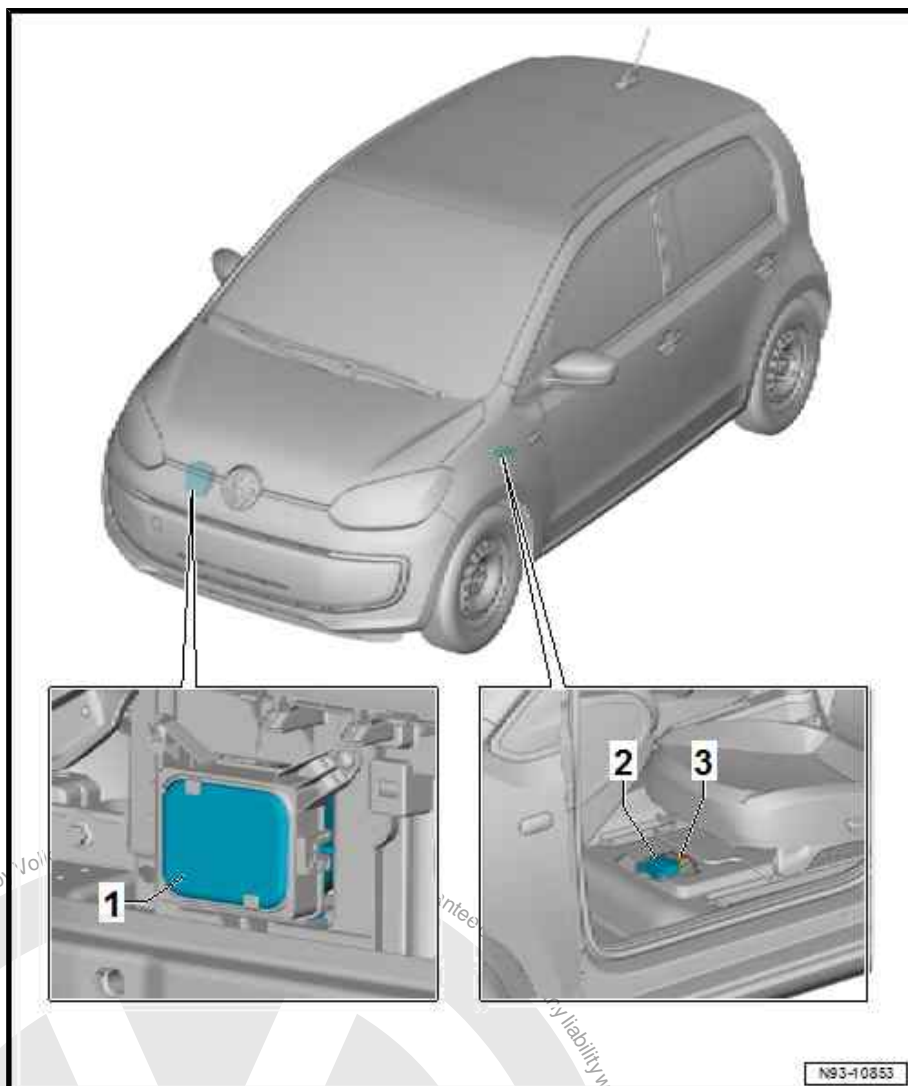
### 1 - Actuator 1 for engine sound generator - R257-

- Removing and installing  
⇒ [page 193](#)

### 2 - Engine sound generator control unit - J943-

- ⇒ [page 192](#)

### 3 - Electrical connector



## 18.2 Removing and installing engine sound generator control unit - J943-

### Removing

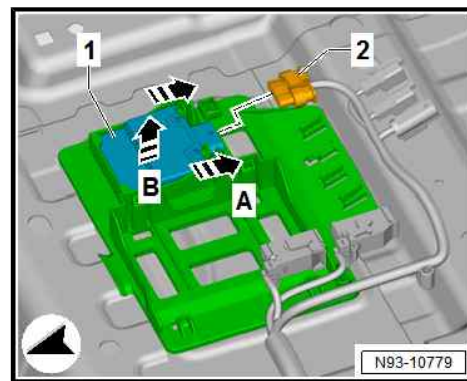
- Fold aside floor covering until engine sound generator control unit - J943- can be accessed ⇒ General body repairs, interior; Rep. gr. 70 ; Trims, interior; Removing and installing floor covering



- Disconnect electrical connector -2-.
- Release engine sound generator control unit - J943- -1- in -direction of arrow A-.
- Remove engine sound generator control unit - J943- -1- upwards in -direction of arrow B-.

#### Installing

Install in reverse order of removal.



### 18.3 Removing and installing actuator 1 for engine sound generator - R257-

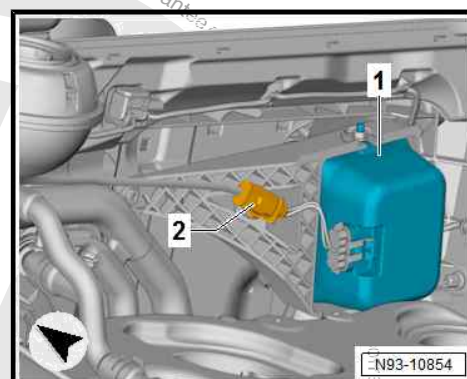
⇒ [“18.3.1 Removing and installing actuator 1 for engine sound generator R257 , Europe”, page 193](#)

⇒ [“18.3.2 Removing and installing actuator 1 for engine sound generator R257 , Japan/China”, page 194](#)

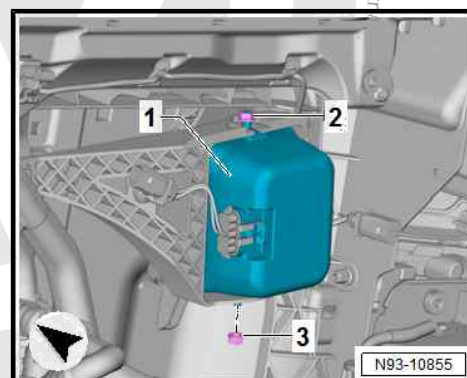
#### 18.3.1 Removing and installing actuator 1 for engine sound generator - R257- , Europe

##### Removing

- Disconnect connector -2- from actuator 1 for engine sound generator - R257- -1-.



- Loosen nut -2- on actuator 1 for engine sound generator - R257- -1-.
- Unscrew nut -3-.





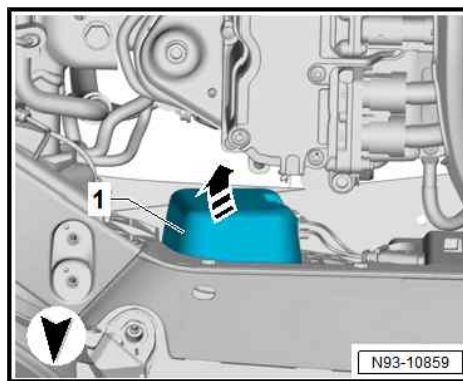
- Swing out actuator 1 for engine sound generator - R257- -1- in -direction of arrow-.

### Installing

Install in reverse order of removal, observing the following:

#### Specified torques

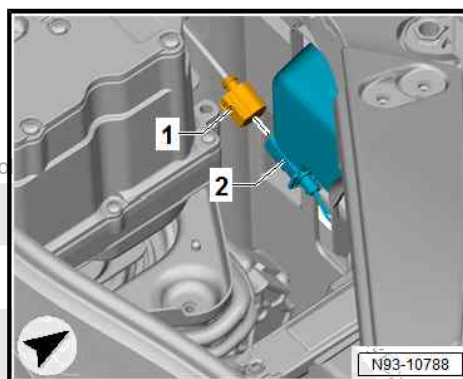
Component	Specified torque
Nuts	8 Nm



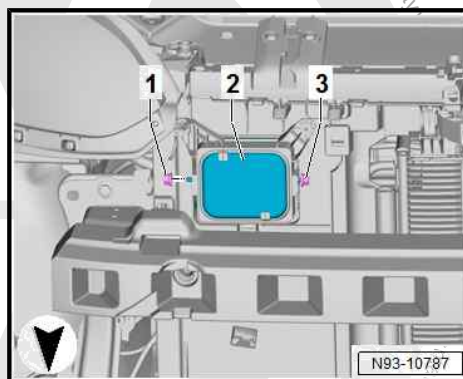
## 18.3.2 Removing and installing actuator 1 for engine sound generator - R257- -, Japan/ China

### Removing

- Disconnect connector -2- from actuator 1 for engine sound generator - R257- -1-.



- Loosen nut -3- on actuator 1 for engine sound generator - R257- -1-.
- Unscrew nut -1-.



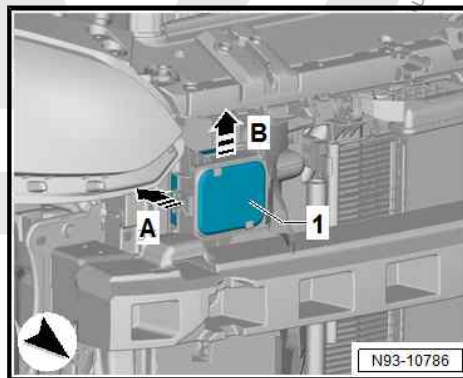
- Guide actuator 1 for engine sound generator - R257- -1- inwards in -direction of arrow A-.
- Swing out actuator 1 for engine sound generator - R257- -1- upwards in -direction of arrow B-.

### Installing

Install in reverse order of removal, observing the following:

#### Specified torques

Component	Specified torque
Nuts	8 Nm





## 19 Accelerator pedal

⇒ ["19.1 Assembly overview - accelerator module", page 195](#)

⇒ ["19.2 Removing and installing accelerator pedal module", page 196](#)

### 19.1 Assembly overview - accelerator module

#### 1 - Mounting bracket

- ☐ Mounting bracket for brake pedal and accelerator pedal module
- ☐ Removing and installing  
⇒ Running gear, axles, steering; Rep. gr. 46 ;  
Brake pedal; Removing and installing mounting bracket

#### 2 - Wiring harness

- ☐ Wiring harness with electrical connector for accelerator pedal module

#### 3 - Fastener

- ☐ To engage accelerator pedal module at top of mounting bracket

#### 4 - Gas pedal module

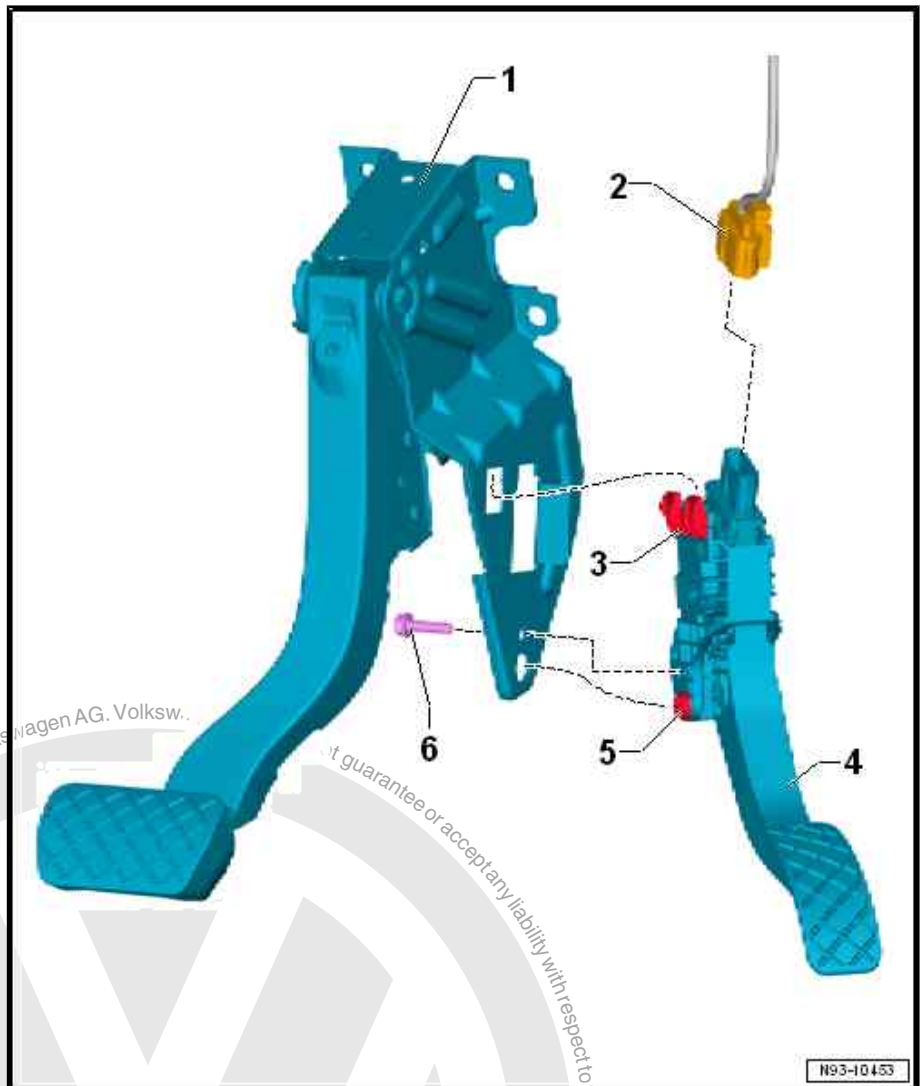
- ☐ Accelerator pedal module - GX2- with accelerator pedal position sender - G79-
- ☐ Removing and installing  
⇒ [page 196](#)

#### 5 - Locating device

- ☐ To engage/locate accelerator pedal module at bottom of mounting bracket

#### 6 - Bolt

- ☐ 6 Nm





## 19.2 Removing and installing accelerator pedal module

### Removing

- Unscrew bolt -3-.
- Move base of accelerator pedal module - GX2- away slightly so that locating device -2- is clear.
- Pull accelerator pedal module - GX2- downwards slightly. In the process, detach upper fasteners -4- from mounting bracket.
- Disconnect electrical connector -5- from accelerator pedal module - GX2- .
- Remove accelerator pedal module - GX2- -1- from footwell.

### Installing

Install in reverse order of removal, observing the following:

### Specified torques

- ♦ ⇒ [“19.1 Assembly overview - accelerator module”, page 195](#)

