Workshop Manual

Arteon 2021 ➤, Arteon Shooting Brake 2021 ➤, Golf 2013 ➤, Golf 2017 ➤, Golf Variant 2014 ➤, ID.3 2020 ➤, ID.4 2021 ➤, Jetta 2011 ➤, Passat 2015 ➤, Passat 2019 ➤, Passat Variant 2015 ➤, Passat Variant 2019 ➤, Tiguan 2021 ➤, Touareg 2010 ➤, Touareg 2015 ➤, Touareg 2018 ➤, e-Crafter 2019 ➤, e-Golf 2014 ➤, e-Golf 2017 ➤, e-up! 2014 ➤, e-up! 2017 ➤, e-up! 2020 ➤

High-voltage system - General information									
Engine ID	CUKC	CUKB	DGEA	DGEB	CNLA	CRJA	EAGA	EAZA	EABA
	CGEA	CGFA	EBSA	EBMA	DFKA	DGEB	EBJA	EBJC	EBJD
	EBHA								

Edition 02.2021

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.

Contents

00 – Technical data

1 Safety information

(VRL015196; Edition 02.2021)

1.1 Safety measures for working on vehicles with high-voltage system

Danger to life from high voltage

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

- People having electronic medical devices for life support or health maintenance in or on their bodies are prohibited from working on the high-voltage system. Such medical devices include internal analgesic pumps, implanted defibrillators, pacemakers, insulin pumps and hearing aids.
- High-voltage system must be de-energised by a suitably qualified technician.

Risk of injury from unexpected engine/motor start

On electric and hybrid vehicles, it can easily be overlooked 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 may 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 motor, 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

⇒ c2.1 orrosion", page 3

⇒ a2.2 nd attachment of lines", page 3

⇒ f2.3 or 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 (ETKA).

Please note

- 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 onto a clean surface and cover. 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.

93 – Electric drive systems

1 Hazard classification for the high-voltage system

⇒ i1.1 nformation", page 5

⇒ t1.2 raining/staff qualifications", page 6

1.1 General information

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, may 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 recognised engineering practices, any relevant accident prevention regulations (in Germany, including but not limited to the Information of the German Social Accident Insurance (DGUV) 200-005 – Qualification 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.

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" in the vehicle-specific manuals.

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

- Only the HVT is authorised to certify that the high-voltage system has been de-energised.
- All work measures to be carried out on a high-voltage system may only be carried out by a person qualified to at least the level of electrically instructed person (EIP).
- Regardless of the work to be performed, visually inspect high-voltage components in the work area.
- High-voltage cables must not be overly 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.

Note

- *The hazard ratings can vary from one vehicle to the next.*
- *Refer to the relevant workshop manual for vehicle-specific information.*

1.2 Induction training/staff qualifications

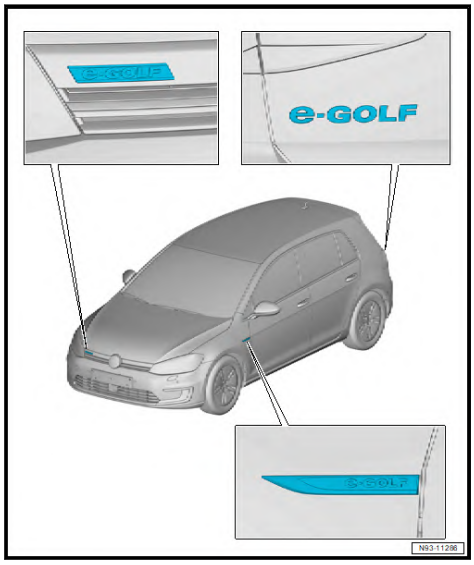
Qualification Volkswagen	DGUV-I 200-005	Scenario
EIP (person with electrical training)	Chapter 2	Induction training for non-electrical work (< 60 VDC)
HVT (high-voltage technician)	Chapter 3.1 b	Working on inherently safe HV production vehicles ♦ Vehicles are de-energised exclusively with certification. ♦ Complete contact protection in place.
HVE level 1 (high-voltage expert)	Chapter 3.2 b	Working on not inherently safe HV production vehicles ♦ Vehicles are also de-energised without certification or there is no complete contact protection in place, e.g. in the event of an accident.

Qualification Volkswagen	DGUV-I 200-005	Scenario
HVE level 2 (high-voltage expert)	Chapter 3.3	Working on live accumulators ◆ Working on parts supplied with voltage, inevitably with no contact protection, for fault finding, component replacement, etc.

2 Identification features of high-voltage vehicles

High-voltage vehicles can be identified by means of the following characteristics:

Model-specific badges on exterior at front and rear and on side

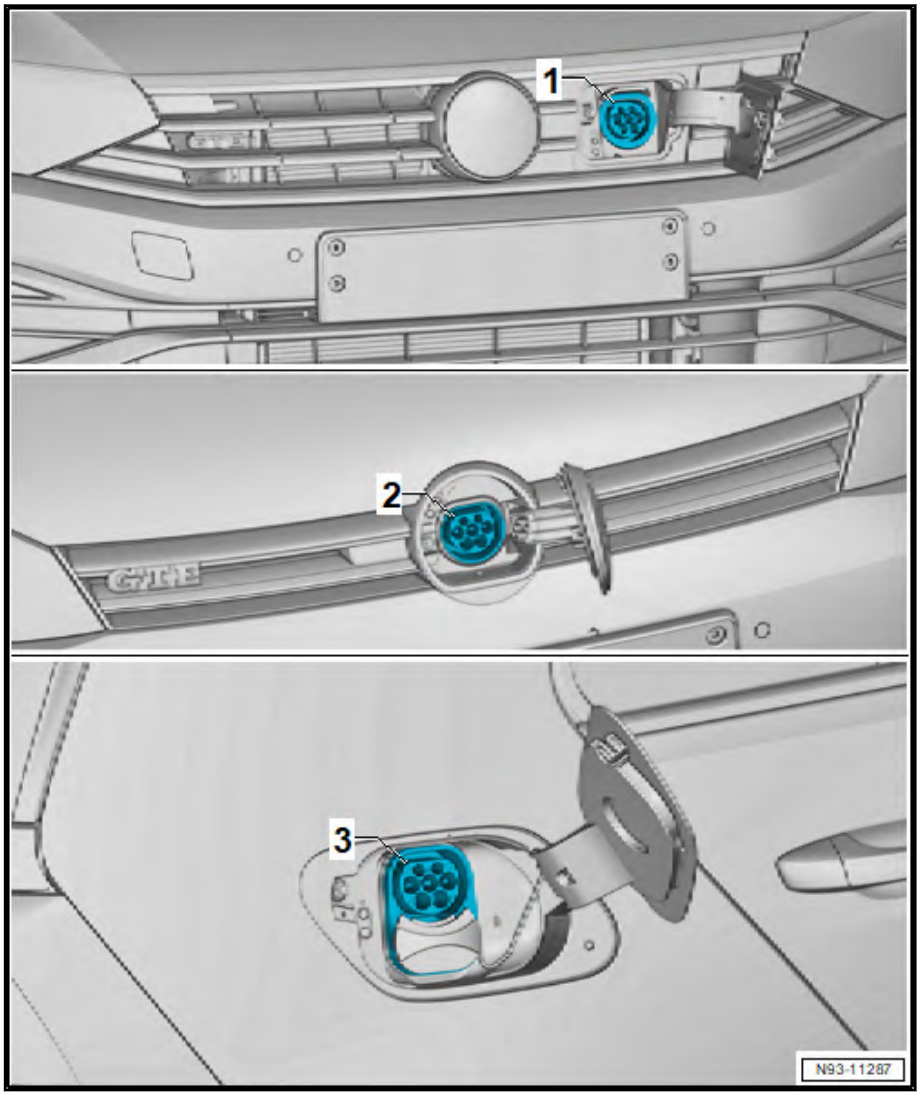


Possible fitting locations of charging socket

1 - Next to badge

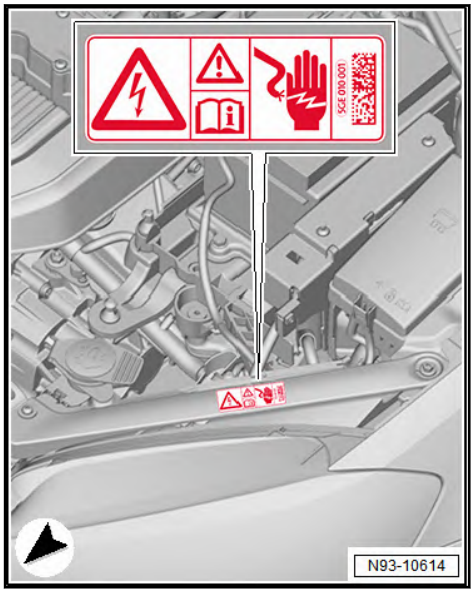
2 - After badge

3 - Behind tank flap

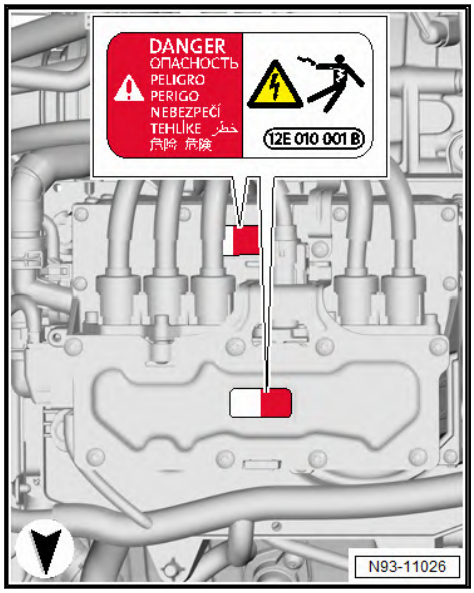


Hazard warning signs/notices in engine and interior

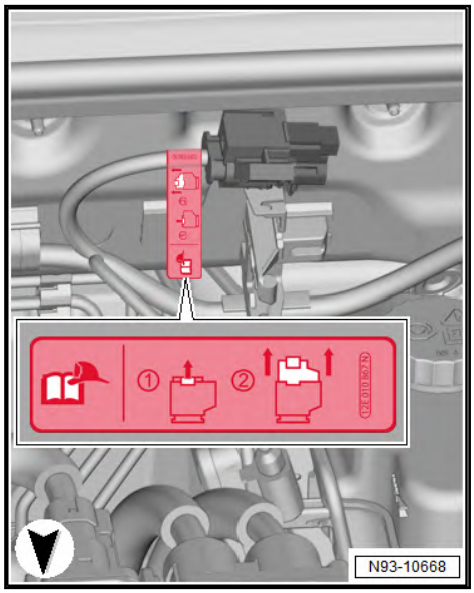
Front left of lock carrier



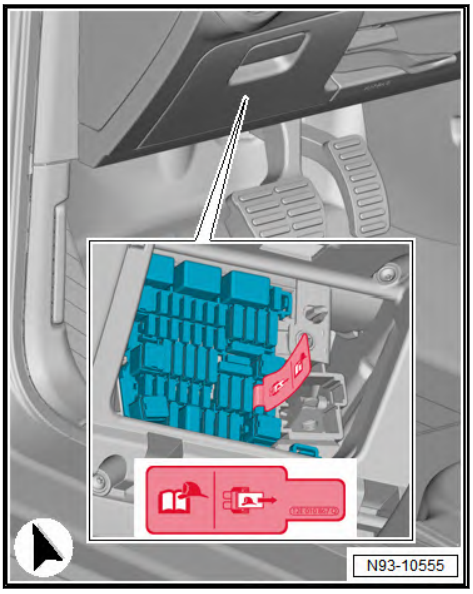
By power and control electronics for electric drive -JX1- in engine compartment



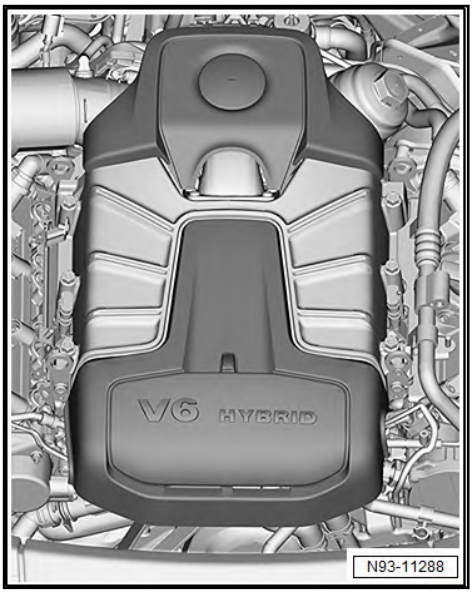
Rescue information, in engine compartment on plenum chamber bulkhead



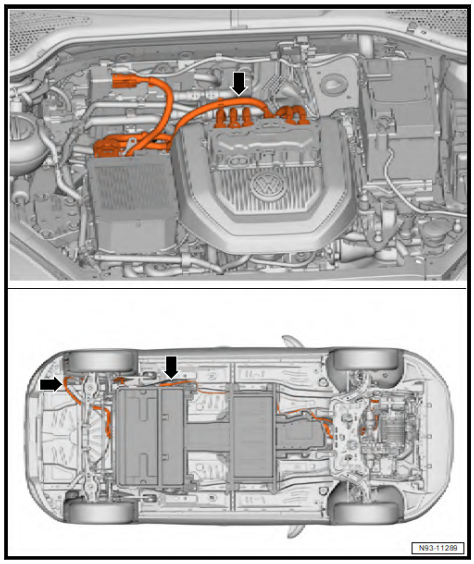
Rescue information, in vehicle interior on fuse carrier under dash panel



Model-specific badges in engine compartment on engine compartment cover



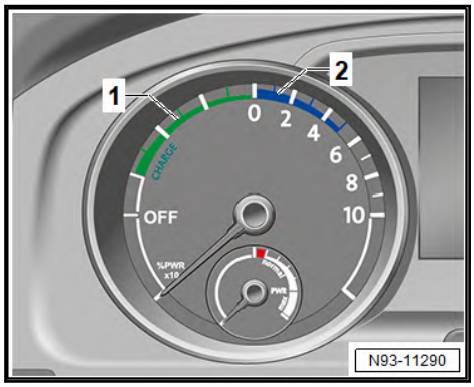
Orange-coloured high-voltage cables, e.g. in engine compartment and on underbody



Note

- *The electrical wiring of the high-voltage system differs significantly from the wiring of the remaining electrical system and the 12-V system.*
- *Due to the high voltage and current rating the high-voltage cables have a significantly larger cross section and are connected via specific contacts. As opposed to the 12-V electrical system the high-voltage system is not grounded on the body.*
- *In order to clearly signify the risk resulting from the high voltage, all cables of the high-voltage system are coloured in orange.*
- *The high-voltage cables are protected against reverse connection. They cannot be connected incorrectly since they are colour-coded and mechanically coded.*
- *Aside from being colour-coded, the components also have warning labels.*

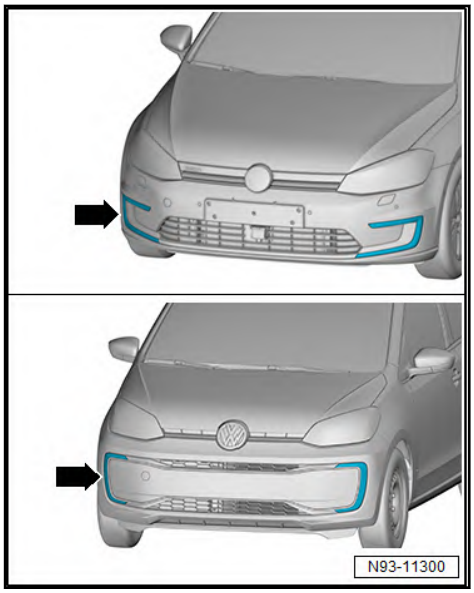
Special displays in dash panel insert



1 - Charge

2 - Ready

LED design modules in bumper, e.g. on e-up! and e-Golf



3 Working on high-voltage vehicles

3.1 Personal protective equipment (PPE)

Note

Application scenarios can be gleaned from the vehicle-specific workshop manual.

According to the ⇒ Electronic parts catalogue (ETKA), the following items of protective clothing and equipment are available:

- Safety shoes
- Coat for high-voltage experts
- Helmet for high-voltage experts
- Visor for high-voltage experts
- Balaclava for high-voltage experts
- Gloves for high-voltage experts
- Glove liners for high-voltage experts
- Jacket for high-voltage experts
- Trousers for high-voltage experts
- Protective coveralls for high-voltage experts

For sizes and order numbers, see ⇒ Electronic parts catalogue (ETKA).

3.2 Workshop procedure for high-voltage vehicles

3.2.1 Workshop procedure for EIPs

	Measure
1	Smoke development? Fire? Fluid ingress in high-voltage battery? High-voltage battery damaged or modified? If yes: ♦ If possible, park vehicle in safe area according to quarantine arrangements ⇒ page 17 ♦ Appoint HVT and transfer responsibility ⇒ page 15 If no: ♦ Continue with 2
2	Mark vehicle as "high-voltage vehicle"

	Measure
3	Airbag or belt tensioner triggered? If yes: ◆ Park vehicle in safe area according to quarantine arrangements ⇒ page 17 ◆ Appoint HVT and transfer responsibility ⇒ page 15 If no: ◆ Continue with 4
4	Switch on ignition
5	HV warning lamp on in dash panel insert? If yes: ◆ Appoint HVT and transfer responsibility ⇒ page 15 If no: ◆ Continue with 6
6	System de-energisation necessary? If yes: ◆ Appoint HVT and transfer responsibility ⇒ page 15 If no: ◆ Continue with 7
7	Switch off ignition
8	Outcome of visual inspection of HV components and cables in working area OK? If no: ◆ Appoint HVT and transfer responsibility ⇒ page 15 If yes: ◆ Continue with 9
9	Maintenance and repair of conventional components according to workshop manual
	Replacement of HV components / repair in vicinity of HV components according to workshop manual After replacement, bring high-voltage system back into operation: ◆ Appoint HVT and transfer responsibility ⇒ page 15

3.2.2 Workshop procedure for HVT

With product technician

	Measure
1	Visual inspection and diagnosis on vehicle, high-voltage system/high-voltage battery
2	High-voltage battery classification necessary? If yes: ◆ High-voltage battery classification ⇒ page 26 If no: ◆ Certified de-energisation ⇒ page 16
3	High-voltage battery quarantine necessary? If yes: ◆ Park vehicle in safe area according to quarantine arrangements ⇒ page 17 ◆ Appoint HVE and transfer responsibility ⇒ page 16 If no: ◆ Certified de-energisation ⇒ page 16

	Measure
4	Visual inspection of HV components and cables in working area
5	HV component repair? If no: ◆ Appoint EIP, responsibility remains with HVT ⇒ page 14 If yes: ◆ Continue with 6
6	HV component repair – is it de-energised or protected to prevent contact? If no: ◆ Appoint HVE and transfer responsibility ⇒ page 16 If yes: ◆ Continue with 7
7	Remove HV component according to workshop manual and repair
8	Install high-voltage component in vehicle
9	Re-energising high-voltage system

3.2.3 Workshop procedure for HVE

	Measure
1	High-voltage battery classification ⇒ page 26
2	Certified de-energisation ⇒ page 16
3	Switch off high-voltage system and make safe
4	If necessary, remove high-voltage battery, pack and prepare for transport
5	Remove HV component and repair according to workshop manual ◆ Appoint HVT and transfer responsibility ⇒ page 15

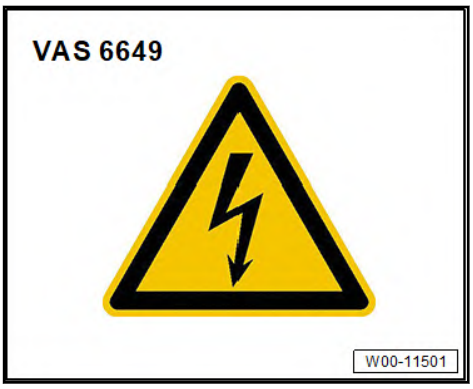
3.2.4 Certified de-energisation

	Procedure for HVT	Procedure for HVE
1	De-energise system	De-energise system
2	Secure to prevent reactivation	Secure to prevent reactivation
3	Confirmed de-energised? If no: ◆ Appoint HVE and transfer responsibility ⇒ page 16 If yes: ◆ Continue with 4 ⇒ page 15	Confirmed de-energised? If no: ◆ Switch off high-voltage system and make safe ⇒ page 16 If yes: ◆ Continue with 4 ⇒ page 16

4 Quarantine arrangements

Special tools and workshop equipment required

- Warning sign "Warning! Dangerous electrical voltage" -VAS 6649-



- Prohibition sign -VAS 6881-

- Prohibition sign -VAS 6882-

- Warning sign -VAS 6786-

- Temperature gauge -VAS 6886-

Working on accident-damaged high-voltage vehicles

DANGER

If the high-voltage battery is severely damaged or there is cause for concern, do not perform diagnosis until a high-voltage expert (HVE) has been consulted.

Note

- *The following points must always be observed and obeyed.*
- *If a defective or accident-damaged high-voltage vehicle is delivered to the premises, inform a high-voltage technician (HVT).*
- *Unload and park vehicles with lithium-ion high-voltage battery directly in a dedicated space if possible.*
- *Service partners should make immediate and direct contact with the nearest high-voltage service partner or importer.*
- *Mark the high-voltage vehicle with -VAS 6649- (additional signs/markings necessary in event of quarantine).*
- *Secure high-voltage vehicle to prevent unauthorised access.*
- *Severely damaged vehicles and removed lithium-ion high-voltage batteries must be protected especially against rain and moisture.*
- *The use of a sealed floor plate is recommended.*

Arrangements for setting up quarantine area

1 - Warning sign VAS 6786 »Warning! Dangerous batteries«

2 - Warning sign VAS 6649 »Warning! Dangerous electrical voltage«

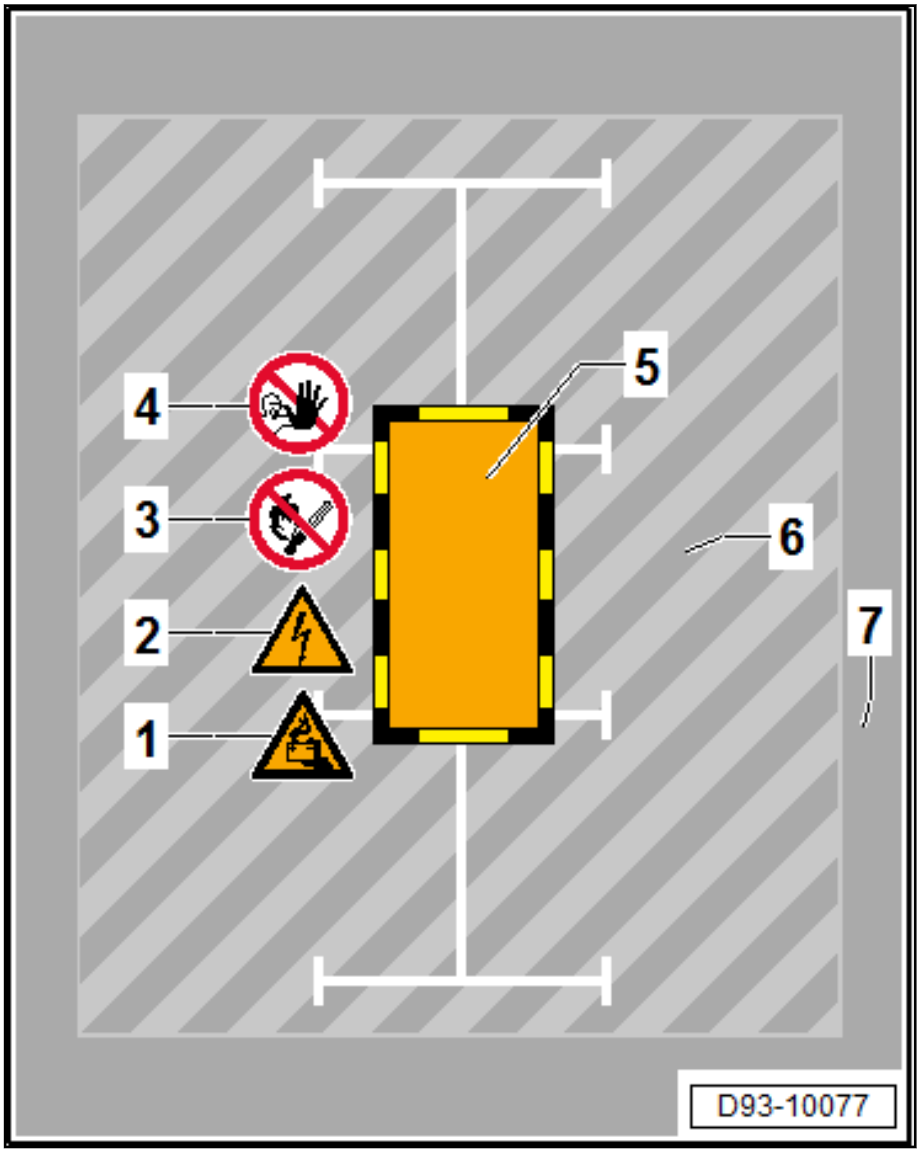
3 - Prohibition sign VAS 6882 »Keep away from fire«

4 - Prohibition sign VAS 6881 »Access prohibited«

5 - Isolated area inc. hazard warning signs

6 - Outer safety zone

7 - Suitable clear area (e.g. parking space)



Procedure (continued)

– Record incident immediately in DISS.

– Inspect the accident-damaged vehicle carefully and rate the following assessment criteria.

Assessment criteria	Meaning
Are there signs of fire?	Answering any question with yes means: Beware! Hazard ►Follow measure (a) Answering all questions with no means: Continue with (b)
Are there any signs in particular of sparks, smoke or vapour?	
Can unusual noises be heard inside the high-voltage battery (e.g. crackling or hissing)?	
Is a strong or potent odour noticeable?	
Is fluid escaping from the high-voltage battery and/or is it likely that there is fluid inside the battery system (e.g. electrolyte, escaped coolant)?	
Does the high-voltage battery exhibit severe mechanical damage with exposed electrical wiring and contacts?	

Assessment criteria	Meaning
Is the high-voltage battery accessible for temperature measurements (e.g. high-voltage battery accessible due to missing or damaged body parts) and is the surface temperature of the high-voltage battery higher than 80°C?	

Note

Use temperature gauge -VAS 6886- to measure temperature.

a) Observe the following measures in the event of “BEWARE! HAZARD”:
Maintain a safe distance and keep the vehicle/battery under observation.
Have fire extinguishing equipment ready and at the first sign of fire notify the fire service immediately and, if necessary, evacuate the building.
Do not inhale smoke/gas.
If the high-voltage battery has suffered mechanical damage with exposed, accessible contacts and conductors, do not touch the vehicle or the high-voltage battery.
If possible, quarantine the vehicle/battery.
Cordon off a wide area around the vehicle and inform the responsible high-voltage expert (HVE) or the importer.

b) If the accident-damaged high-voltage vehicle is deemed to be non-hazardous based on the assessment criteria, the following steps must be taken:
Run the test program in “Guided Functions” for classifying/assessing the condition of the lithium-ion high-voltage battery using ⇒ Vehicle diagnostic tester.
Follow the instructions in the test program.
For a detailed description, refer to the respective workshop manual or instructions.

Note

- *Perform the work steps outside the workshop or in a suitable area if possible.*
- *It may be necessary to repair the 12V onboard electrical system before a diagnosis can be carried out.*

5 Assessing accident-damaged vehicles

5.1 General information

The quality of the documentation is of great importance for assessment of the damage to the bottom battery shell. Different measures are recommended depending on which areas are damaged and how deep the dents or scratches are:

- Paint repair
- Replacement of bottom battery shell
- Replacement of components within battery

5.2 Photographic documentation

Special tools and workshop equipment required

- Camera
- Adhesive tape
- Digital depth gauge
- Tape measure

Procedure

– Classification of lithium-ion high-voltage battery with aid of ODIS ⇒ page 26 .

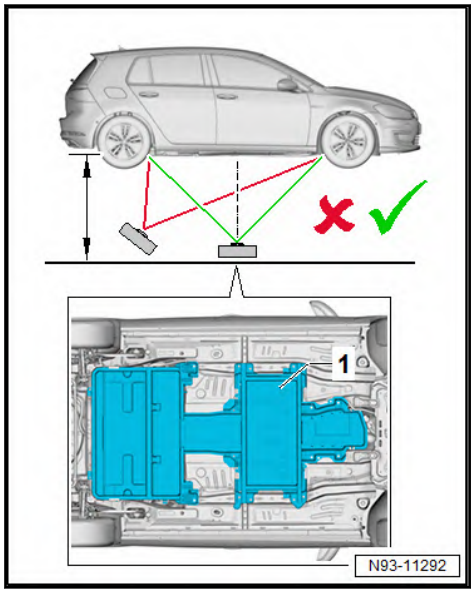
Note

The position of the lifting platform should be as high as possible because the whole battery needs to be visible in the pictures.

– Remove underbody cladding ⇒ General body repairs, exterior; Rep. gr. 66; Underbody cladding; Removing and installing underbody cladding.

– Roughly clean entire area.

– Align camera parallel to underbody.

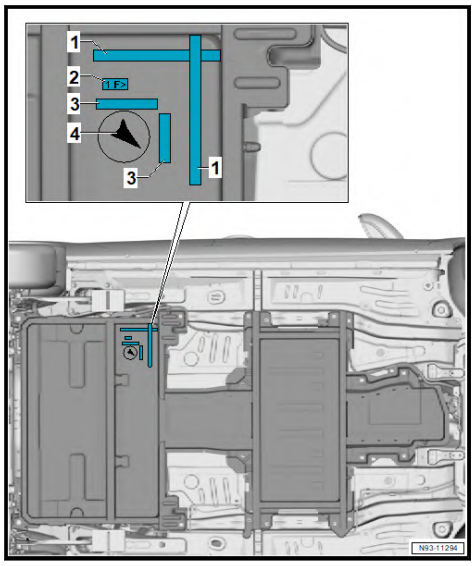


– Take picture of whole bottom battery shell -1-. It may be necessary to take several pictures to gain a better overview.

Note

Apply markings to bottom battery shell. A drawing is not sufficient.

– For precise localisation of dent -4-, mark position -3- at which it is deepest.



– Use reference points on bottom battery shell to do this, e.g. edges.
– Record length and width of damaged area using two strips of adhesive tape -1-.

Note

The direction of travel should be evident on each photo. If there are numerous areas of damage, number them respectively.

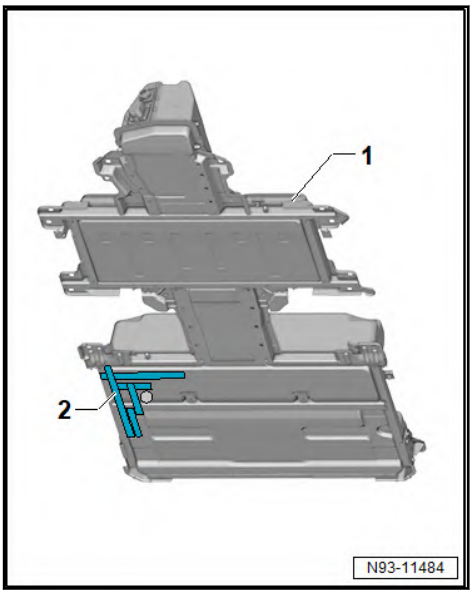
– Mark direction of travel with “F→” -2-.

Note

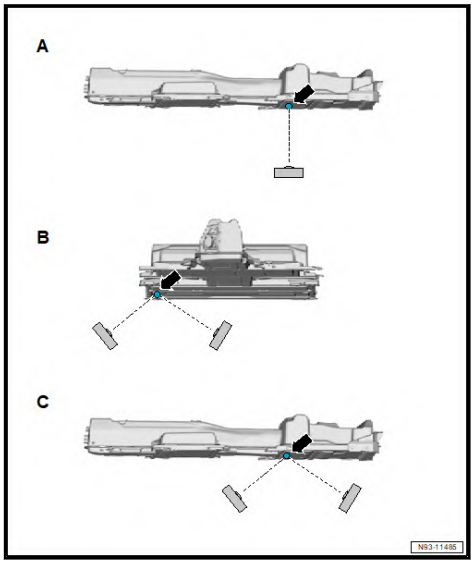
Make sure that photos include the direction of travel -2- and numbers.

– Take close-up pictures from various angles. These help to appraise the extent of damage.

Overview of bottom battery shell -1- and area of damage -2-



Examples of different angles/perspectives of view



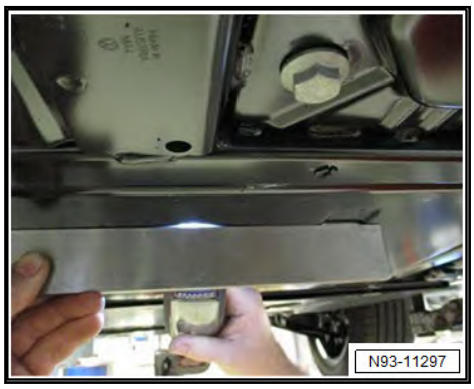
– Clearly draw around dent and damaged area with a marker.

Example photos

Example 1

Example 2

Example 3



– Measure depth of dent with digital depth gauge.

– Take picture of measurement.

6 High-voltage battery

6.1 Classifying high-voltage battery

6.1.1 Fundamentals of classifying lithium-ion high-voltage batteries

Classifying lithium-ion batteries

The lithium-ion high-voltage batteries that Volkswagen installs in electric and hybrid vehicles are highly complex components and systems that may not be immune to defects, failure or partial failure over the course of their service life.

Lithium-ion high-voltage batteries can also suffer damage in traffic accidents.

Since lithium-ion high-voltage batteries are deemed to be hazardous materials on account of the substances inside them, the respective battery condition plays a decisive role in how high-voltage batteries are handled during service operations and the workshop process.

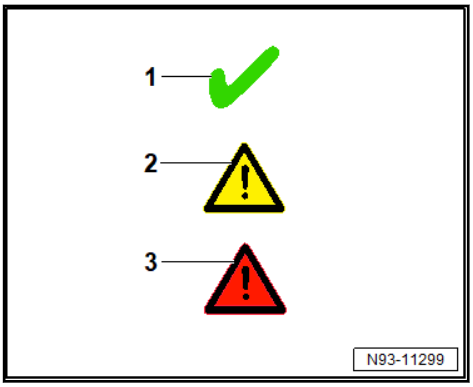
This applies in particular to:

- The qualification requirements of service employees (EIP, HVT, HVE)
- The repairability of the lithium-ion high-voltage battery
- The transport and packaging process for lithium-ion high-voltage batteries
- The quarantine arrangements and reporting processes necessary in special cases

Rating and assessment criteria during classification

To determine whether and to what extent the lithium-ion high-voltage battery poses a higher level of danger, it must be subject to classification.

3 statuses can be assigned to lithium-ion high-voltage batteries:



1 - NORMAL (not critical)

2 - WARNING (critical)

3 - DANGER (dangerous)

The rating is carried out based on the following assessment criteria:

- Visual and sensory criteria
- Functional and electrical criteria
- Thermal criteria

Precise decoding and an overview of the criteria can be gleaned from the following matrix of classifications and measures.

Classification matrix

Assessment criteria			Classification
Visual, sensory	Functional, electric	Thermal	
♦ No relevant mechanical damage ♦ No fluid leaks	♦ High-voltage battery can be diagnosed ♦ No relevant entries in event memory	♦ Temperature within tolerance	• NORMAL Not critical: No measures have to be taken.
Fulfilment of ALL criteria results in classification “Normal” →			
♦ Relevant mechanical damage (e.g. dent, crack, opening, defective seal) ♦ Corrosive damage ♦ Pungent smell	♦ High-voltage battery cannot be diagnosed ♦ Relevant entries in event memory	♦ Temperature outside tolerance	• WARNING Critical: Failure to observe the recommended measures may lead to fatal/serious injury.
Fulfilment of ONE criterion results in classification “Warning” →			
♦ Fluid leak and/or suspected fluid in high-voltage battery system ♦ Smoke/vapour ♦ Fire, sparks ♦ Noise (hissing, crackling) ♦ Mechanical damage with exposed, accessible contacts/conductors		♦ Temperature ≥ 80 C	• DANGER Dangerous: Failure to observe the recommended measures will lead to fatal/serious injury.
Fulfilment of ONE criterion results in classification “Danger” →			

Matrix of measures

Classification	Immediate measure	Other measures and processes		
		Repair *	Intermediate storage/quarantine	Packaging and transport

NORMAL	♦ None required	♦ Repair, if necessary	Intermediate storage: ♦ Original packaging ♦ Well clear of roads/traffic ♦ Not stacked, flat on ground ♦ Stored undercover outside and protected against rain	♦ Original packaging
		↑ Transfer to not critical status possible through repair		
WARNING	♦ Quarantine ♦ Immediately bring outside, into quarantine area/quarantine cabinet ♦ Use PPE if necessary	♦ Implement disposal measures if repair not possible	♦ Inform responsible party in accordance with reporting procedure ♦ Move vehicle/ high-voltage battery to suitable outside area/space ♦ Water-protection for removed high-voltage battery	♦ Special transport crate required (may need to be dismantled) ♦ May only be packaged by trained personnel
Carry out additional actions as instructed by HVE				
			↑ Transfer by qualified personnel	
DANGER	♦ Keep a safe distance ♦ Call fire service immediately if necessary (e.g. in event of fire). ♦ Do not inhale smoke/gas. ♦ Cordon off a wide area and inform responsible party in accordance with reporting procedure (e.g. supervisor, HVT, HVE, importer). ♦ Quarantine vehicle/battery if possible.	♦ Not relevant	♦ Quarantine vehicle/battery and call fire service if necessary ♦ Keep high-voltage battery under observation	♦ Do not package ♦ Do not transport

1) As per workshop manual/extent of repair

Classification procedure

- Classification is carried out with software-support by means of “Guided Functions” via ODIS (Offboard Diagnostic Information System).
- Among other things, measured values of cell voltages and temperature sensors are collected, the event memory is interrogated and communication with the battery regulation control unit is checked.
- Classification via ODIS can be carried out not only with the lithium-ion high-voltage battery fitted in the vehicle but also with the high-voltage battery removed.
- Execution in the latter case requires additional, model-specific adapters (tools) (see Part 2 “Classification of lithium-ion high-voltage batteries with aid of ODIS”).
- In all instances, only the HVE is able to reclassify the battery according to specific assessment scenarios.
- Further details can be gleaned from the respective workshop manual.

Procedural diagram

Visual, sensory, function, electric and thermal assessment	Criteria:
	1 Signs of fire?
	2 Sparks, smoke, vapour noticeable?
	3 Noise from high-voltage battery (e.g. crackling)?
	4 Pungent smell?
	5 Fluid leak or suspected fluid in high-voltage battery system?
	6 Severe mechanical damage to high-voltage battery?
	7 Temperature and cell voltage measurement?
	8 Functional check in high-voltage battery?
↓	
Rating	NORMAL (not critical)
	WARNING (critical)
	DANGER (dangerous)

6.1.2 Classification of lithium-ion high-voltage batteries with aid of ODIS

To classify the condition of a lithium-ion high-voltage battery that has been removed and isolated from the vehicle system, the following special tools are required:

Special tools and workshop equipment required

- High-voltage diagnostic box -VAS 5581-

- “Professional” diagnosis unit -VAS 6150E-
- Adapter cable -VAS 5581/1-1- or adapter cable -VAS 5581/1-1A-
- Adapter cable -VAS 5581/3- or adapter cable -VAS 5581/3A-
- Adapter cable -VAS 5581/5-

Procedure

Assessment of condition – high-voltage battery fitted in vehicle

– Connect ⇒ Vehicle diagnostic tester to vehicle.

Procedure in ODIS

– Open ODIS.

– Continue with `Start diagnosis`.

– Select `manual` in the window for manual entry of the basic vehicle characteristics.

– Remove tick from `Work with Guided Fault Finding`.

– Select “8C Hybrid battery management” entry from control unit list.

Right-click to call up options.

– Select `8C-Assessment of condition`.

– Confirm with `Run`.

Following the instructions and answer the questions about the condition of the high-voltage battery all the way to the end.

– Select `Protocol`.

– Select `Save`.

– Select `Long protocol` in dialogue window.

Note

The long protocol includes the interrogated measured values.

– Confirm with `OK`.

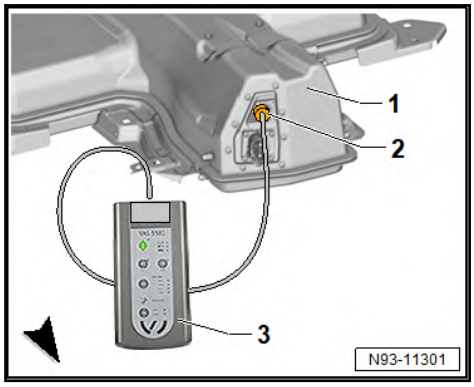
– Save the protocol as an HTML file along with all of the necessary data.

Assessment of condition – high-voltage battery removed from vehicle

Note

The following process steps exemplify the initial steps of diagnosis for assessment of a removed lithium-ion high-voltage battery with the aid of ODIS.

– Connect high-voltage diagnostic box -VAS 5581- -3- with vehicle-specific test adapters -2- to communication plug of high-voltage battery -1-.



– Switch on high-voltage diagnostic box -VAS 5581- -3-.
– Activate terminal 15 F1.
– Activate terminal 30 F2.
– Set CAN-R select to “120-R” using the F3 button.
– Connect to ⇒ Vehicle diagnostic tester via remote diagnosis head -VAS 5054A- or USB cable.

Note

- *Instructions are provided to the user via ⇒ Vehicle diagnostic tester on how to proceed with assessment of the condition of the high-voltage battery removed from the vehicle.*
- *Perform all work steps as described on ⇒ Vehicle diagnostic tester.*

Procedure in ODIS

– Open ODIS.
– Continue with “Start diagnosis”.

Note

The system automatically searches for the corresponding VIN. However, since battery diagnosis is being carried out on a removed high-voltage battery, no VIN can be found.

– Confirm the fault message with request to identify vehicle manually with OK.
– Select manual in the window for manual entry of the basic vehicle characteristics.

– Enter VIN from vehicle.
– Remove tick from Work with Guided Fault Finding.
– Confirm message for confirmation that “Guided Fault Finding” should be deselected with Yes.
– Select “8C Hybrid battery management” entry from control unit list.

Right-click to call up options.

– Select Guided Functions.
– Select Identify control unit to facilitate communication.

Note

If the control unit is not found, identify manually.

– Right-click on “8C Hybrid battery management” to call up options again.
– Select Assessment of condition of high-voltage battery.
– Confirm with Run.

Following the instructions and answer the questions about the condition of the high-voltage battery all the way to the end.

– Select Protocol.
– Select Save.
– Select Long protocol in dialogue window.

Note

The long protocol includes the interrogated measured values.

– Confirm with OK.
– Save the protocol as an HTML file along with all of the necessary data.

6.2 High-voltage battery handling and storage

The lithium-ion high-voltage batteries are deemed to be hazardous materials. Transport and storage are subject to certain restrictions that may vary depending on country-specific requirements. Different types of packaging are required according to the lithium-ion high-voltage battery classification.

Intermediate storage of lithium-ion high-voltage batteries

- The lithium-ion high-voltage battery must not be intermediately stored in the open or directly in the working area.
- The lithium-ion high-voltage battery must be protected against mechanical and thermal influences as well as moisture.
- When the battery is intermediately stored, it must be in a location which is not accessible to non-authorised workshop personnel or customers. (e.g. storeroom/warehouse)

Replacement of lithium-ion high-voltage batteries - no measures necessary for high-voltage battery

- The lithium-ion high-voltage battery can be stored in its original packaging.
- The removed lithium-ion high-voltage battery is placed in the original packaging and sent back in this way.
- For transport within the workshop, suitable aids are required due to the heavy weight.

Replacement of lithium-ion high-voltage batteries - measures necessary for high-voltage battery

1 Classification of lithium-ion high-voltage battery with aid of test program according to following criteria

- Thermal irregularities of lithium-ion high-voltage battery
- Visible damage to lithium-ion high-voltage battery
- Functional irregularities of lithium-ion high-voltage battery

2 Storage of lithium-ion high-voltage batteries if one of the points from 1 applies.

- Lithium-ion high-voltage battery stays in vehicle
- Vehicle must be parked outside. Observe the following:
- Park vehicle in safe area according to quarantine arrangements ⇒ page 17

If additional measures are necessary due to the classification of the lithium-ion high-voltage battery, the first step is an obligation to report or technical repair query in the DISS system. Product support will then decide which steps to take and, if necessary, will send out a specially trained representative.

6.3 Packaging high-voltage batteries

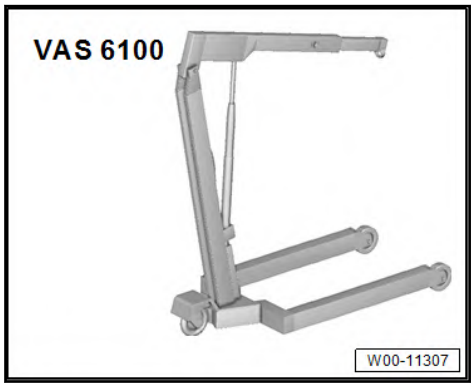
⇒ h6.3.1 igh-voltage battery, e-up!", page 34

⇒ h6.3.2 igh-voltage battery, e-Golf", page 42

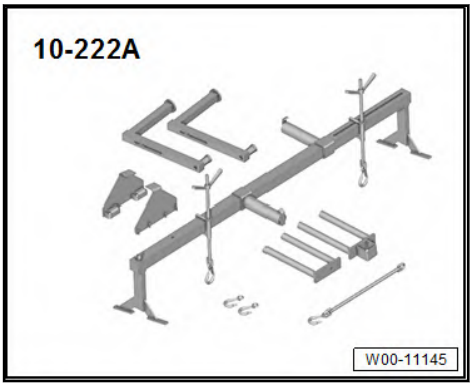
6.3.1 Packaging high-voltage battery, e-up!

Special tools and workshop equipment required

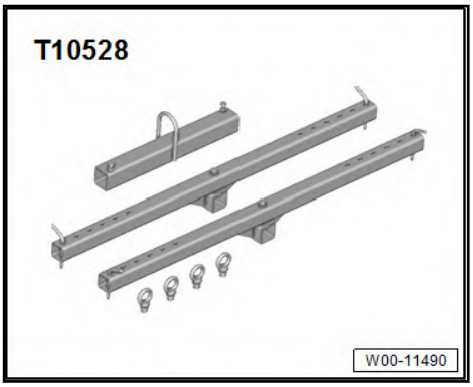
- Workshop hoist -VAS 6100-



- Support bracket -10 - 222 A-

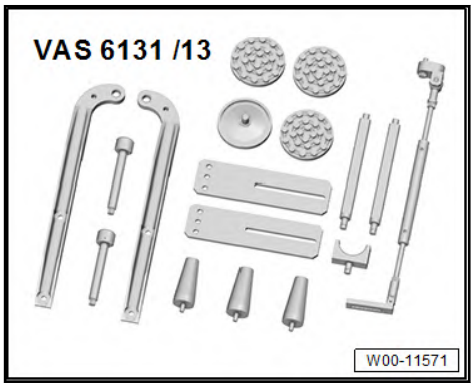


- Towing bracket -T10528-

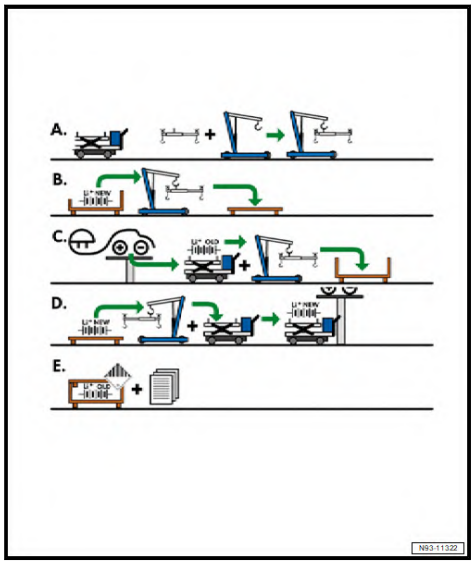


- Scissor-type assembly platform -VAS 6131 B-

- Plate -VAS 6131/10-1-
- Supplementary kit -VAS 6131/13-



Overview of procedure



The procedure for packaging a lithium-ion high-voltage battery for the e-up! is broken down into the following work steps:

A - Prepare scissor-type assembly platform and mounting tool

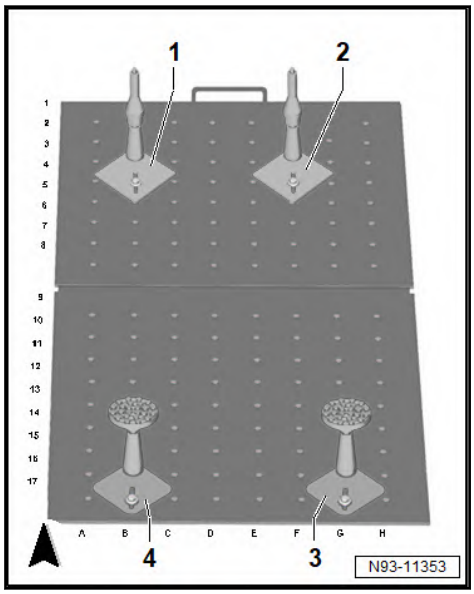
B - Place new high-voltage battery on cover of genuine part crate

C - Remove high-voltage battery and place in genuine part crate

D - Place new high-voltage battery from cover of genuine part crate on scissor-type assembly platform and install

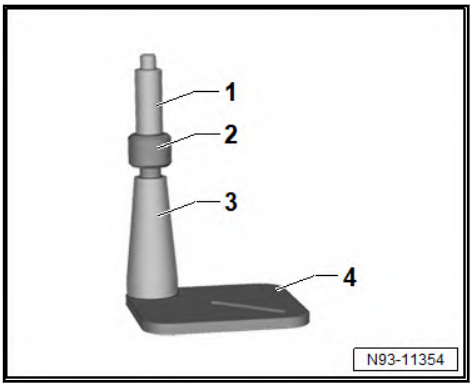
E - Close genuine part crate and prepare for transport

Preparing scissor-type assembly



– Mount and align supports -1 to 4- on scissor-type assembly platform -VAS 6131 B-.

Front supports -1 and 2-:



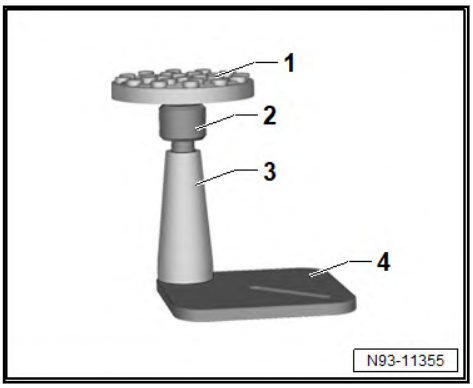
1 - Support -VAS 6131/10-11-

2 - Knurled section -VAS 6131/10-5-

3 - Taper -VAS 6131/10-4-

4 - Plate -VAS 6131/10-1-

Rear supports -3 and 4-:



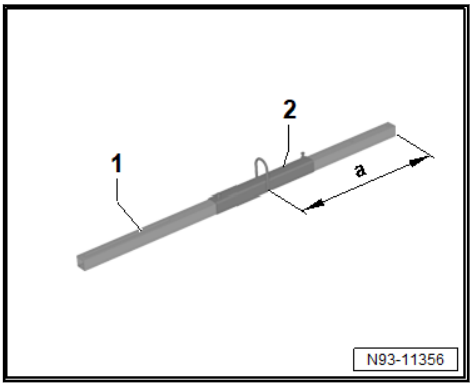
1 - Support -VAS 6131/13-2-

2 - Knurled section -VAS 6131/10-5-

3 - Taper -VAS 6131/10-4-

4 - Plate -VAS 6131/13-4-

Preparing support



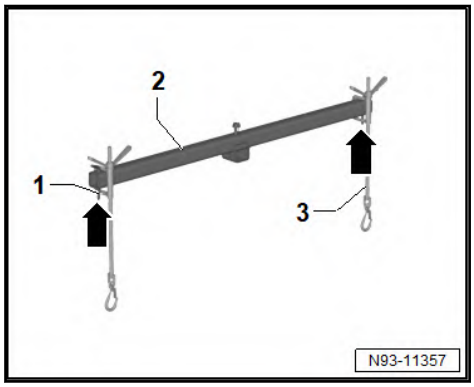
– Push support -T10528/1- -2- onto support bracket -10 - 222 A- -1-.

– Adjust support -T10528/1- -2- to -dimension a- and lock in position.

- -Dimension a- = 515 mm

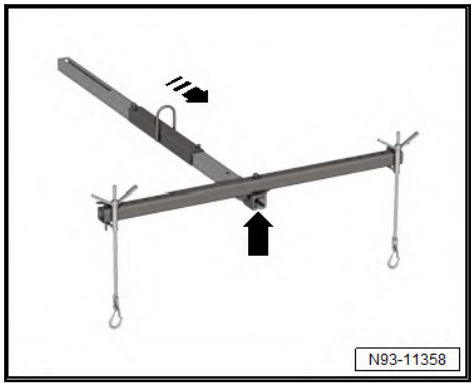
– Hook support bracket -10 - 222 A- -1- with support -T10528/1- -2- onto workshop hoist -VAS 6100-.

– Push two hooks -10 - 222 A /10- -3- onto first cross member -T10528/2- -2- as shown in illustration.



– Push locking pins -T10528/3- into outer positions 6 -arrows-.

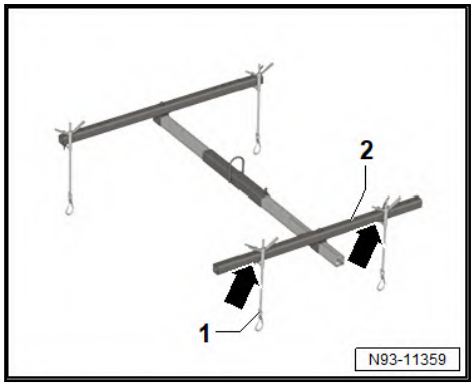
– Push prepared cross member -T10528/2- in direction of -arrow- onto support bracket -10 - 222 A-.



– End of cross member -T10528/2- must be flush -arrow-.

– Lock cross member -T10528/2- in position.

– Push two hooks -10 - 222 A /10- -1- onto second cross member -T10528/2- -2- as shown in illustration.

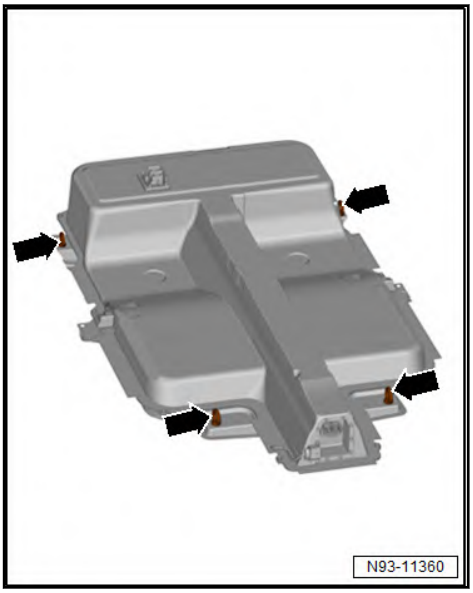


– Push locking pins -T10528/3- into inner positions 2 -arrows-.

– Push second prepared cross member -T10528/2- onto support bracket -10 - 222 A-.

– Leave locking mechanism of cross member -T10528/2- loose.

Place new high-voltage battery 1 -AX2- on cover of genuine part crate.



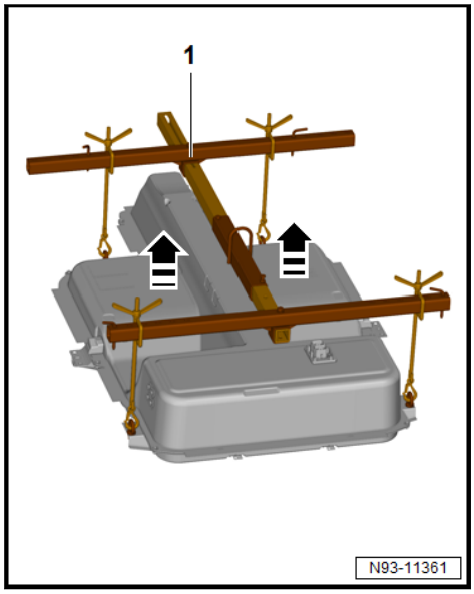
– Open genuine part crate.
– Remove cover and place down on ground with top pointing up so that cover can be reached with scissor-type assembly platform -VAS 6131 B- and workshop hoist.
– Loosen securing bolts -arrows- with which high-voltage battery 1 -AX2- is secured in genuine part crate.
– Remove nuts and washers.
– Attach lifting eye bolts -T10528/5- to high-voltage battery 1 -AX2- at positions shown -arrows-.
– Move workshop hoist -VAS 6100- over high-voltage battery 1 -AX2- with prepared support -T10528-.

NOTICE

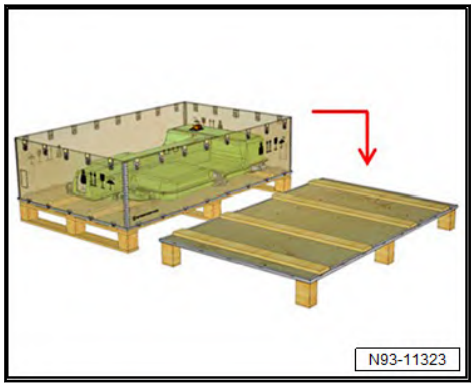
Risk of damage to high-voltage battery 1 -AX2-.

– **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.
– Lift high-voltage battery 1 -AX2- out of genuine part crate in direction of -arrow- with cross member -T10528- -1-.



– Place high-voltage battery 1 -AX2- on top of genuine part crate cover.



NOTICE

Risk of damage to high-voltage battery 1 -AX2-.

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

– Detach hook -10 - 222 A /10-.

– Unscrew lifting eye bolts -T10528/5-.

Remove high-voltage battery 1 -AX2- and place in genuine part crate

– Assess condition of old high-voltage battery 1 -AX2- in situ ⇒ page 30 .

– Remove high-voltage battery 1 -AX2- ⇒ Rep. gr. 93; High-voltage battery unit; Removing and installing high-voltage battery 1AX2.

– Visually inspect high-voltage battery 1 -AX2- to ensure that it is safe to transport.

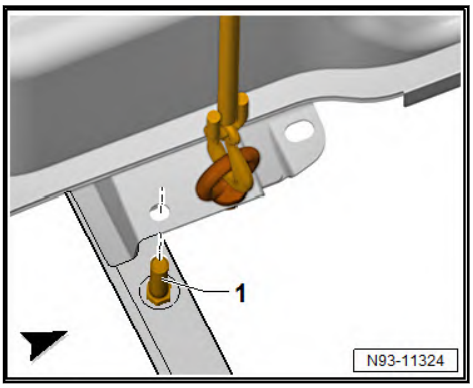
– Take high-voltage battery 1 -AX2- from scissor-type assembly platform -VAS 6131 B-.

– Lower high-voltage battery 1 -AX2- in genuine part crate.

Note

Observe securing bolts -1-.

– Guide all securing bolts -1- into corresponding holes.

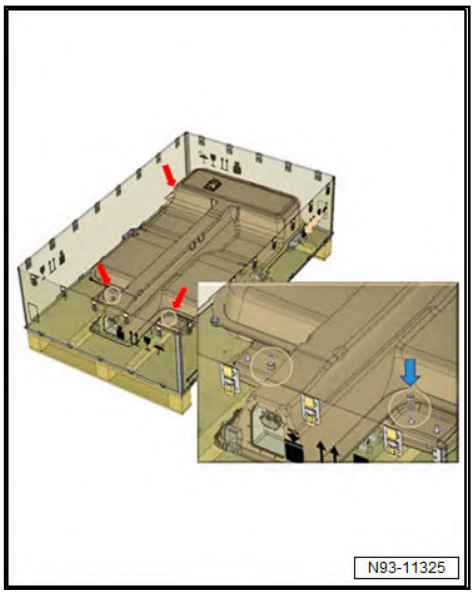


– Detach hook -10 - 222 A /10-.
– Unscrew lifting eye bolts -T10528/5-.

Note

- *If any of the securing bolts fail to tighten, they will need to be counterheld.*
- *Ensure when tightening bolts that bottom battery shell is not distorted.*

– Start nuts with washers on 4 securing bolts in genuine part crate and tighten.



Place new high-voltage battery 1 -AX2- from cover of genuine part crate on scissor-type assembly platform -VAS 6131 B- and install.

– Take high-voltage battery 1 -AX2- off cover of genuine part crate.

– Place high-voltage battery 1 -AX2- on scissor-type assembly platform -VAS 6131 B-.
– Install high-voltage battery 1 -AX2- ⇒ Rep. gr. 93; High-voltage battery unit; Removing and installing high-voltage battery 1AX2.

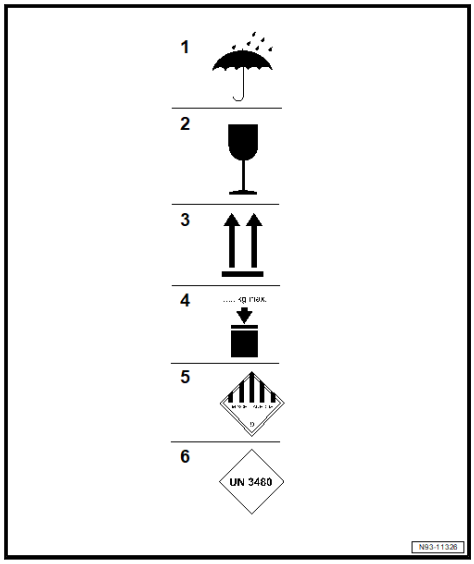
Close genuine part crate and prepare for transport

Note

If the sides have been removed, the bottom tabs of the sides must be folded over again during assembly.

– Fit cover of genuine part crate and close using existing clips.
– Attach tensioning straps.
– Affix or check hazardous material label and package ID.
– Fill in and insert shipping documents.

Notes for transport preparation and hazardous material marking (Europe)

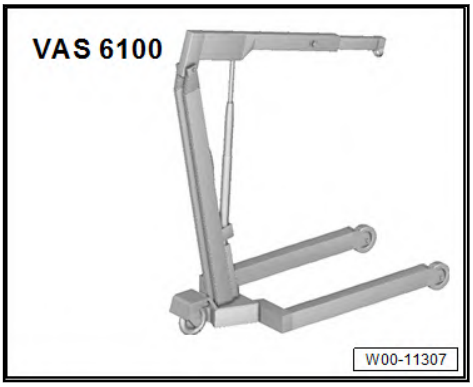


1 - “Protect against water”
2 - “Attention! Fragile”
3 - “This side up”
4 - “Maximum stacking load”
5 - “Hazardous material label: Hazardous material category 9 “Various hazardous substances and items” packaging group 2”
6 - “Type label with UN number UN3480 for lithium-ion batteries”

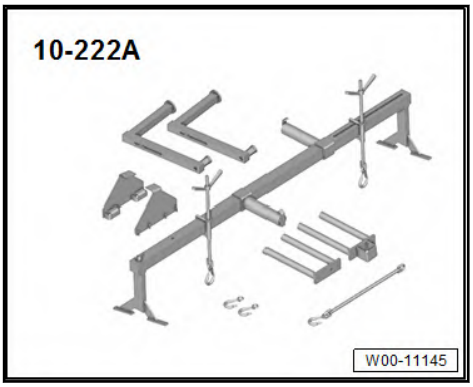
6.3.2 Packaging high-voltage battery, e-Golf

Special tools and workshop equipment required

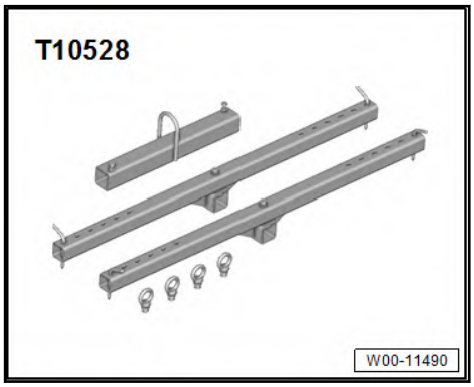
- Workshop hoist -VAS 6100-



- Support bracket -10 - 222 A-



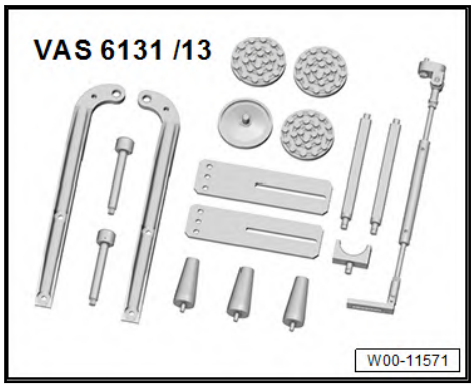
- Hook -10-222A/10-, qty. 6
- Shackle -10-222A/12-, qty. 2
- Towing bracket -T10528-



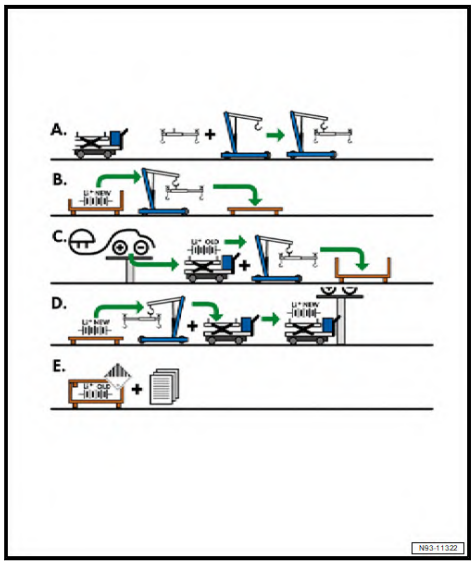
- Locking pin -T10528/3-
- Lifting eye bolt -T10528/5-
- Supplement -T10528/7-/10-

- Scissor-type assembly platform -VAS 6131 B-

- Plate -VAS 6131/10-1-
- Supplementary kit -VAS 6131/13-



Overview of procedure



The procedure for packaging a lithium-ion high-voltage battery for the e-up! is broken down into the following work steps:

A - Prepare scissor-type assembly platform and mounting tool

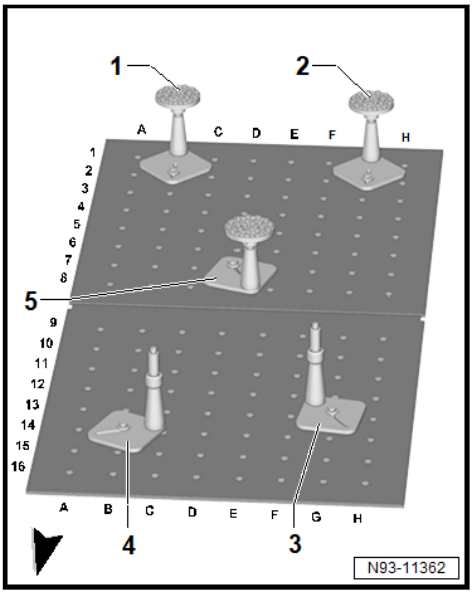
B - Place new high-voltage battery on cover of genuine part crate

C - Remove high-voltage battery and place in genuine part crate

D - Place new high-voltage battery from cover of genuine part crate on scissor-type assembly platform and install

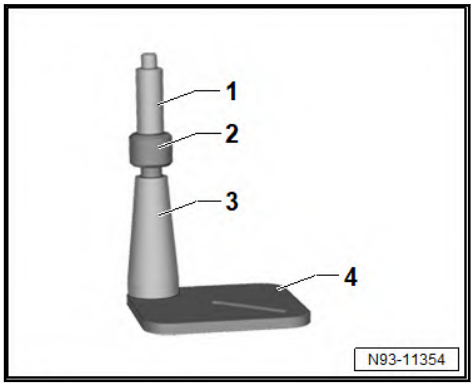
E - Close genuine part crate and prepare for transport

Preparing scissor-type assembly



– Mount and align supports -1 to 5- on scissor-type assembly platform -VAS 6131 B-.

Front supports -3- and -4- for high-voltage battery 1 -AX2-:



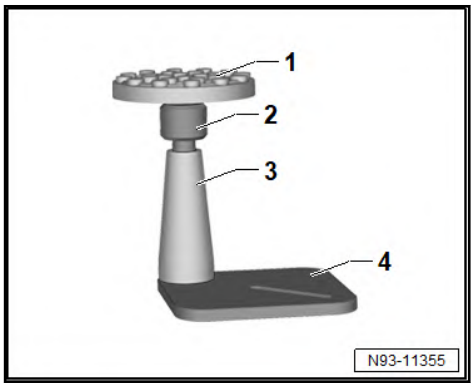
1 - Support -VAS 6131/10-11-

2 - Knurled section -VAS 6131/10-5-

3 - Taper -VAS 6131/10-4-

4 - Plate -VAS 6131/10-1-

Rear supports -1-, -2- and -5- for high-voltage battery 1 -AX2-



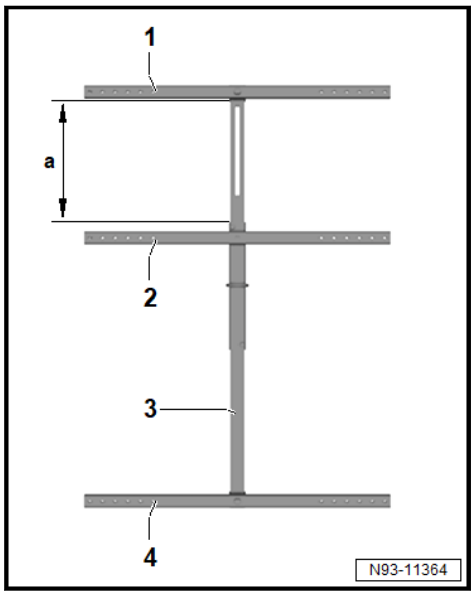
1 - Support -VAS 6131/13-2-

2 - Knurled section -VAS 6131/10-5-

3 - Taper -VAS 6131/10-4-

4 - Plate -VAS 6131/10-1-

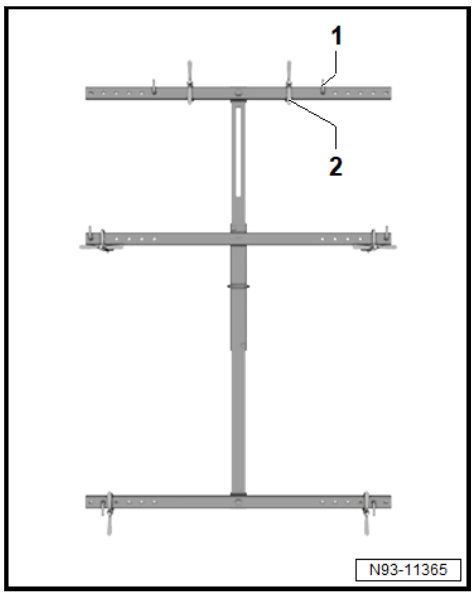
Preparing support



– Push support -T10528/10- -2- onto support bracket -10 - 222 A- -3-.
– Push on cross member -T10528/2- -1- on both ends, and tighten fastening elements.
– Set support -T10528/10- -2- to specified dimension as shown in illustration, and tighten fastening elements.

• -Dimension a- = 515 mm

– Hook support bracket -10 - 222 A- with support -T10528/10- onto workshop hoist -VAS 6100-.
– Push hooks -10 - 222 A /10- -2- onto cross members -T10528/2- and support -T10528/10-, as shown in illustration.



Note

The two hooks on a cross member must be of the same length.

– Insert locking pin -T10528/3- -1- in holes, as shown in illustration:

- Cross member -T10528/2- at oblong hole: position 1
- Support -T10528/10- in centre: position 6
- Cross member -T10528/2- opposite to oblong hole: position 5

Place new high-voltage battery 1 -AX2- on cover of genuine part crate.

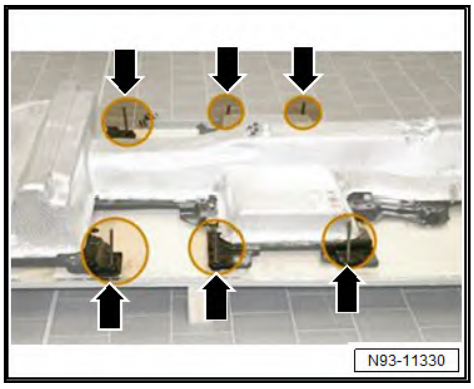
– Open genuine part crate.

– Remove cover and place down on ground with top pointing up so that cover can be reached with scissor-type assembly platform -VAS 6131 B- and workshop hoist.

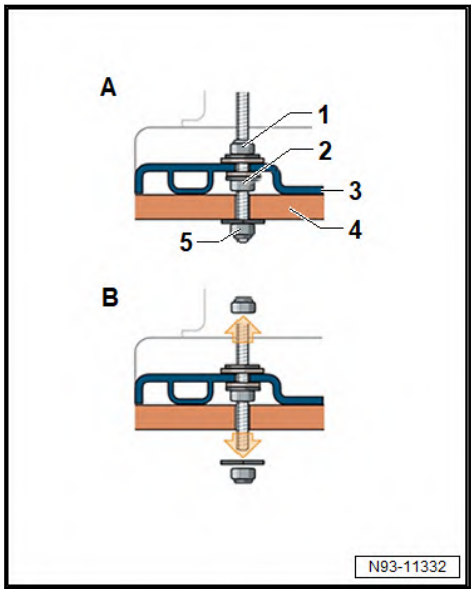
Note

- *The new high-voltage battery 1 -AX2- is secured in the genuine part crate at 6 points with 2 nuts each.*
- *The middle nut is used for lifting.*

– Do not remove threaded rods and nuts -arrow-.

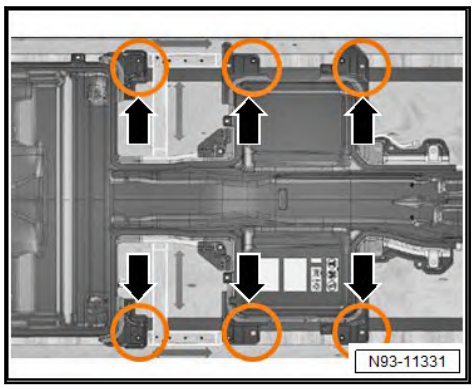


Detailed view

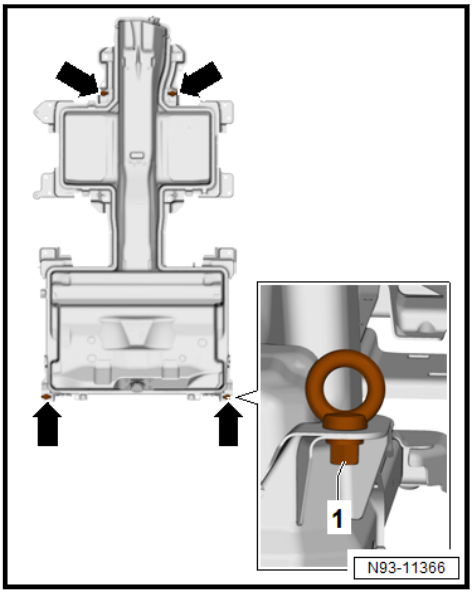


1 - Upper nut (self-locking) on high-voltage battery
2 - Middle nut (used for lifting)
3 - High-voltage battery 1 -AX2-
4 - Genuine part crate
5 - Lower nut (self-locking) on genuine part crate

– Unscrew nuts -arrows-.



Secure lifting eye bolts -T10528/5- on high-voltage battery 1 -AX2-.

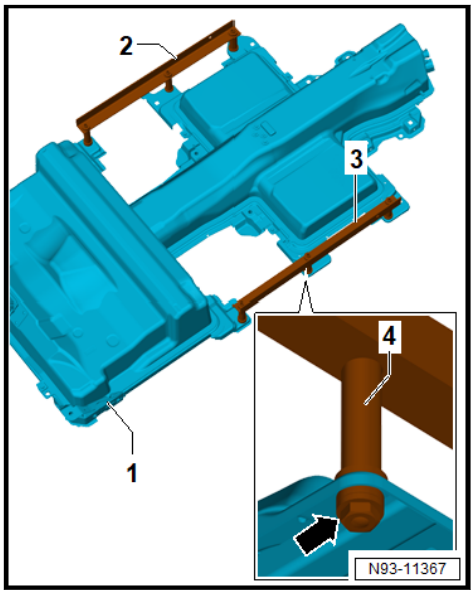


Note

Use washers.

- Install lifting eye bolts -T10528/5- at positions shown -arrows-.
- Tighten lifting eye bolts -T10528/5- -1-.

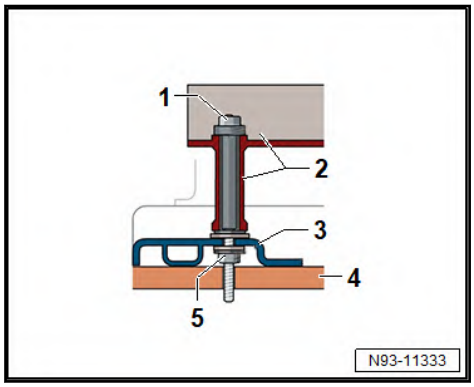
Installing reinforcement struts



- Install reinforcement struts to high-voltage battery 1 -AX2- -1- as shown in illustration. To do this, proceed as follows:
- Fit reinforcement strut -T10528/7/8- -2- and -3- on threaded rods.
- Lightly tighten sleeves with inner thread -T10528/9- -4-.

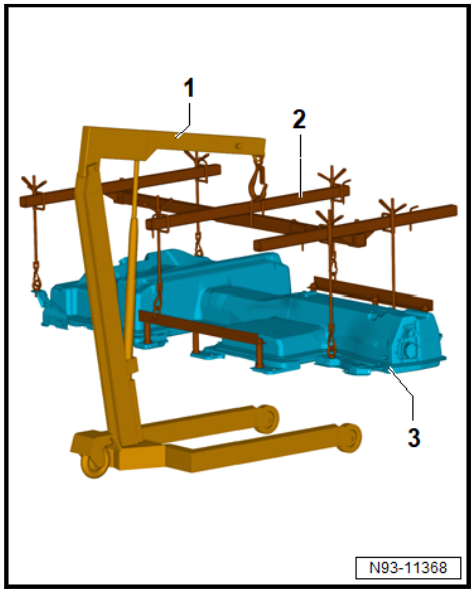
– Screw nuts -arrow- onto threaded rods until flush. Cover of genuine part crate would otherwise suffer damage.
– Attach shackles -10-222A/12- in holes of reinforcement struts and secure.

Detailed view



1 - Sleeves with inner thread -T10528/9-
2 - Reinforcement strut -T10528/7/8-
3 - High-voltage battery 1 -AX2-
4 - Genuine part crate
5 - Middle nut

Secure cross member to high-voltage battery 1 -AX2-.



– Move workshop hoist -VAS 6100- -1- with prepared transport device -T10528- -2- over high-voltage battery 1 -AX2- -3-.

NOTICE

Risk of damage to high-voltage battery 1 -AX2-.

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

– Attach hooks -10 - 222 A /10- in lifting eye bolts -T10528/5-.
– Straighten hooks -10 - 222 A /10- on front and rear cross member -T10528/2- and fix in position.

– Attach hook -10 - 222 A /10- to support -T10528/10-.
– Turn hooks -10 - 222 A /10- in support -T10528/10- to tension slightly.
– Raise high-voltage battery 1 -AX2- with workshop hoist -VAS 6100-.
– Place high-voltage battery 1 -AX2- using workshop hoist -VAS 6100- on cover of genuine part crate.
– Remove lifting eye bolts -T10528/5- and reinforcement strut -T10528/7/8-.

Remove high-voltage battery 1 -AX2- and place in genuine part crate.

– Assess condition of old high-voltage battery 1 -AX2- in situ ⇒ page 30 .
– Remove high-voltage battery 1 -AX2- ⇒ Rep. gr. 93; High-voltage battery unit; Removing and installing high-voltage battery 1AX2.
– Visually inspect high-voltage battery 1 -AX2- to ensure that it is safe to transport.

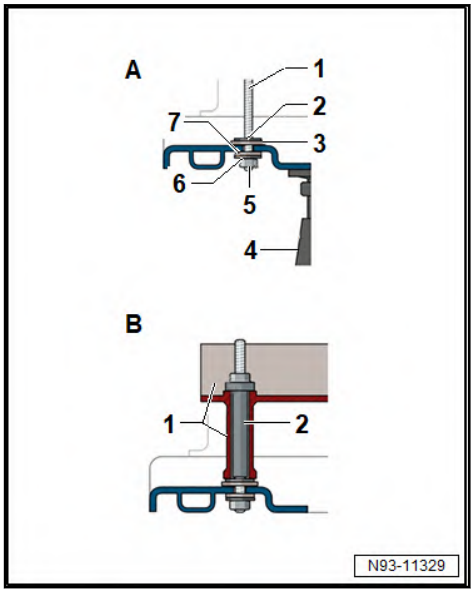
In the next work step the reinforcement strut -T10528/7- and reinforcement strut -T10528/8- are installed to high-voltage battery 1 -AX2-.

The required components are provided as a kit along with the new high-voltage battery 1 -AX2-.

The kit consists of the following:

♦ 6 threaded rods
♦ 6 washers
♦ 6 nuts

Detailed view



A

1 - Threaded rod
2 - Metal washer
3 - Large plastic washer
4 - Scissor-type assembly platform adapter

5 - Nut

6 - Metal washer

7 - Small plastic washer

B

1 - Reinforcement strut -T10528/7/8-

2 - Sleeves with inner thread -T10528/9-

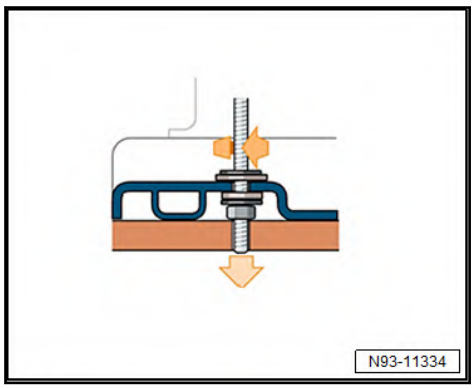
Mount lifting eye bolts -T10528/5- as described above.

– Take up weight of high-voltage battery 1 -AX2- as described above.

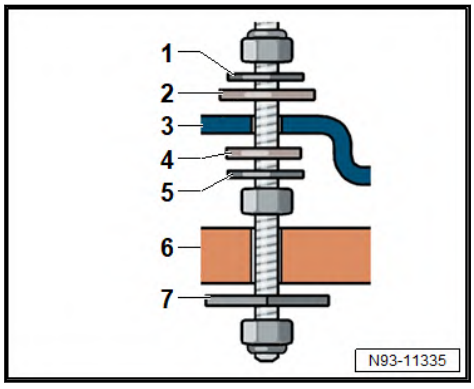
– Lower high-voltage battery 1 -AX2- in genuine part crate.

– Remove lifting eye bolts -T10528/5- and reinforcement strut -T10528/7/8-.

– Screw in threaded rods until these protrude from base of genuine part crate.



– Observe correct sequence of washers.



1 - Small metallic washer

2 - Large plastic washer

3 - High-voltage battery 1 -AX2-

4 - Small plastic washer

5 - Small metallic washer

6 - Genuine part crate

7 - Large, rectangular metallic washer

Note

Ensure when tightening nuts that bottom battery shell is not distorted.

– Secure high-voltage battery 1 -AX2- in genuine part crate from above and below with self-locking nuts.

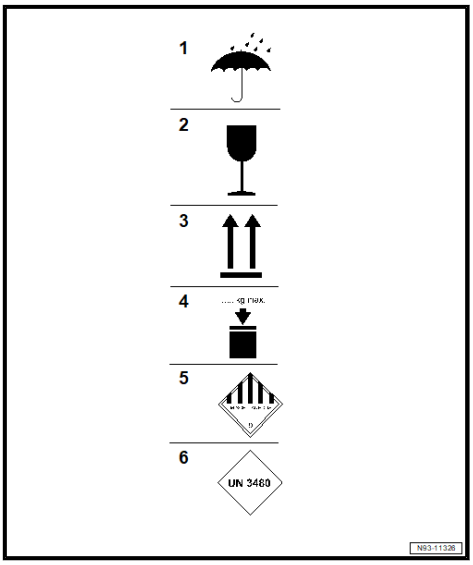
Close genuine part crate and prepare for transport

Note

If the sides have been removed, the bottom tabs of the sides must be folded over again during assembly.

– Fit cover of genuine part crate and close using existing clips.
– Attach tensioning straps.
– Affix or check hazardous material label and package ID.
– Fill in and insert shipping documents.

Notes for transport preparation and hazardous material marking (Europe)



1 - “Protect against water”
2 - “Attention! Fragile”
3 - “This side up”
4 - “Maximum stacking load”
5 - “Hazardous material label: Hazardous material category 9 “Various hazardous substances and items” packaging group 2”
6 - “Type label with UN number UN3480 for lithium-ion batteries”

6.4 Packaging critical high-voltage batteries with “Warning” status

⇒ c6.4.1 ritical high-voltage batteries with Warning status, module”, page 54

⇒ c6.4.2 ritical high-voltage batteries with Warning status, Golf GTE / Passat GTE / Jetta Hybrid”, page 60

⇒ c6.4.3 ritical high-voltage batteries with Warning status, e-Golf / e-up!”, page 70

6.4.1 Packaging critical high-voltage batteries with “Warning” status, module

DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

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

NOTICE

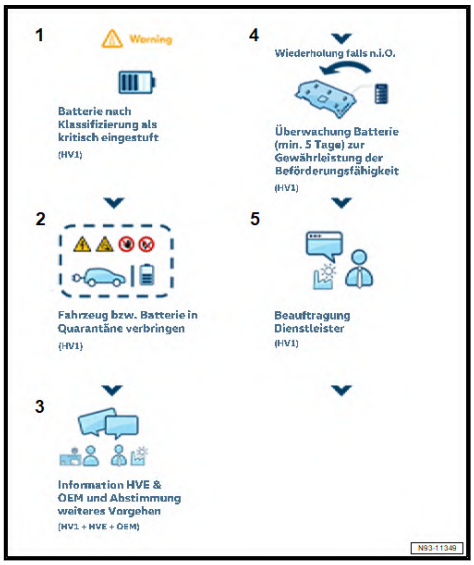
- **Only after receiving induction training (for respective, certified transport crate), at least one responsible high-voltage expert (or higher qualification) or employees of Volkswagen AG who have received induction training.**
- **Hazardous material induction training also required.**
- **Lithium-ion high-voltage batteries and lithium-ion high-voltage battery modules may only be packaged if they are prepared for carriage. See carriage regulations D/BAM/ GGVSEB.**

Described in this workshop manual are the packaging processes of high-voltage batteries that are classed as critical with the status “Warning”.

To determine whether and to what extent the lithium-ion high-voltage battery poses a higher level of danger, it must be subject to classification ⇒ page 26 .

Procedure based on central arrangements for Europe

Part 1



1. - High-voltage battery rated critical.

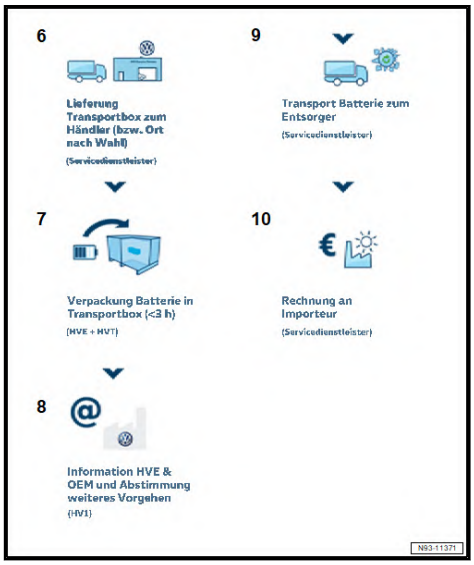
2. - Quarantine high-voltage battery or vehicle ⇒ page 17 . Attach measuring strips to document transportability of high-voltage battery.

3. - HVE makes contact with service provider and arranges appointment for transportation container (after first consulting international product support).

4. - For at least 5 days, high-voltage battery does not react and, in particular, has no increase in temperature.

5. - Appoint service provider

Part 2



6. - Delivery of transportation container inc. expanded glass granules.

7. - Once properly trained, HVE packages high-voltage battery.

8. - Info sent to transportun3480@volkswagen.de.

9. - Packaged high-voltage battery is taken away and transportation container is reconditioned.

10. - Invoice to importer

Transportation container

A special transportation container is required for the dispatch of lithium-ion high-voltage batteries classed as critical from Golf GTE, Passat GTE, e-Golf, e-up! and Jetta Hybrid models.

The containers are currently available in 2 sizes: M and XL.

Description

A high-voltage battery of the following models can be dispatched with transportation container size M:

- Golf GTE
- Passat GTE
- Jetta Hybrid
- Individual or several modules

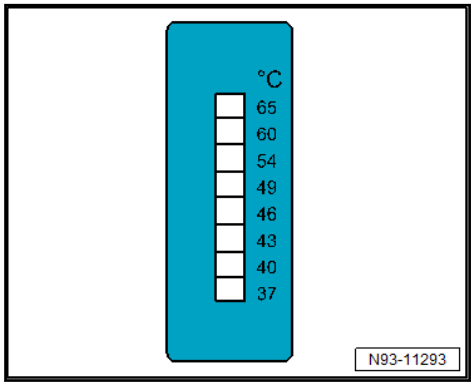
Batteries of the following models can be dispatched with transportation container size XL:

- e-up!
- e-Golf
- Golf GTE
- Passat GTE
- Jetta Hybrid
- Individual or several modules

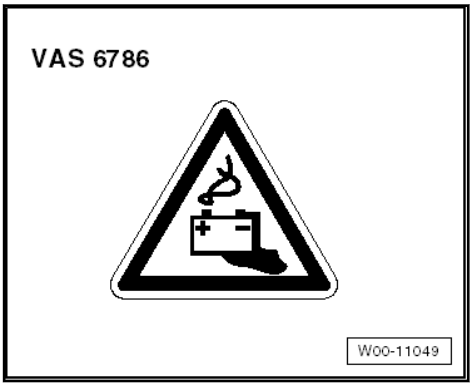
Packing

Special tools and workshop equipment required

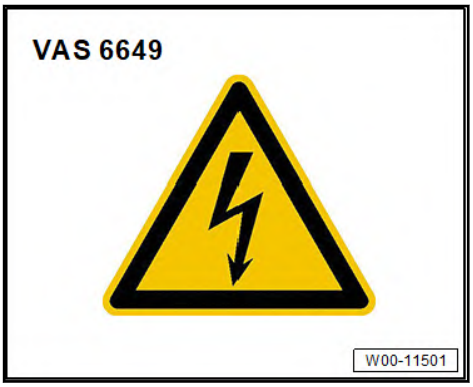
- Qty. 8 temperature measurement strips (irreversible) for temperature range: at least 40 to 60°C



- Warning sign “Warning! Dangerous batteries” -VAS 6786-



- Warning sign “Warning! Dangerous electrical voltage” -VAS 6649-



- High-voltage barrier tape -VAS 6884-
- Personal protective equipment

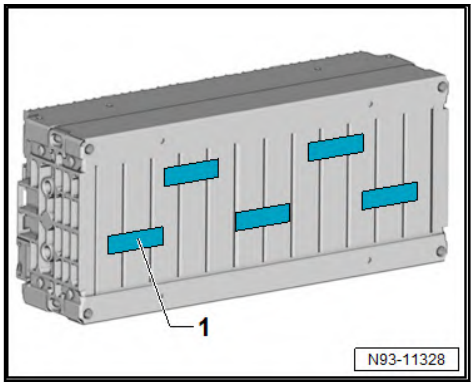
Procedure

– Make all contacts of the battery modules safe to prevent short circuit.

– Seal all openings for service fluids apart from electrolyte.

– Remove deposits of hazardous materials and electrolyte from outside of battery module and lithium.

Apply temperature measurement strips to battery module



– Attach at least 5 temperature measurement strips -1- to battery module housing as shown in diagram.

NOTICE

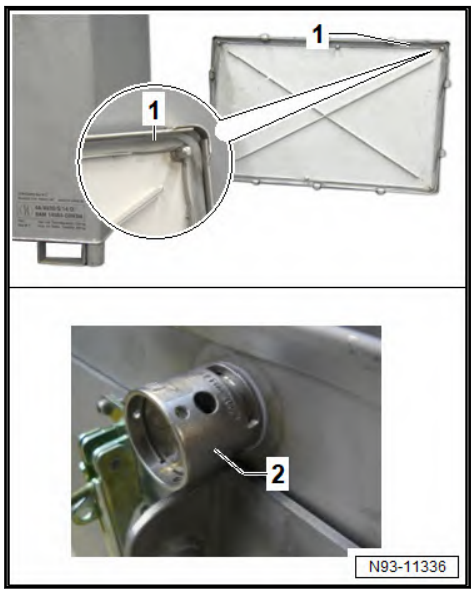
Risk of damage to battery modules

– Protect modules against heat and direct sunlight.

– Directly after applying the strips and before dispatching, record the values in writing or take pictures.
– Before transport, the battery modules must be kept under observation for at least 5 days.
– Record the temperature of the battery modules as well as the ambient temperature.
– Should there be an increase in the temperature during this time, wait for the reaction to subside before keeping under observation again for at least 5 days.
– Repeat this procedure until no further reactions are observed.
– Open fasteners of transportation container.
– Remove cover of transportation container and take out bag of expanded glass granules.

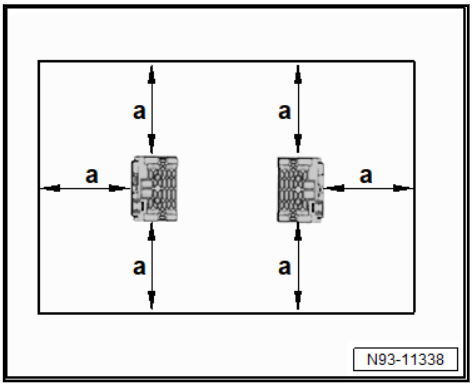
Quantity of PyroBubbles® is sufficient.

– Visually inspect surrounding rubber seal -1- and also pressure relief valves -2- for signs of external damage.



– Pour expanded glass granules onto base of transportation container up to a level of at least 200 mm.

– Place module in transportation container. If there are several modules, these must be placed on end.
– Distance -a- to side edges and between modules should be at least 200 mm.



– Check that there is a space of at least 200 mm between the module and the upper edge of the transportation container for a surrounding layer of expanded glass granules.
– Pour in expanded glass granules so that the gaps and also the entire transportation container up to the upper edge are filled.

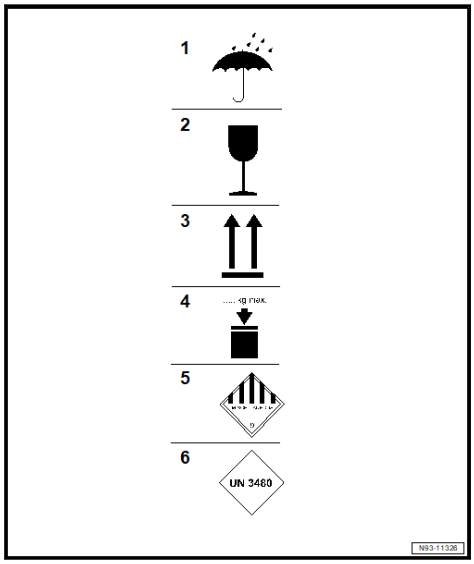
Note

- *Ensure that surrounding rubber seals are not damaged.*
- *If it proves difficult to close the cover, turn the cover 180° if necessary.*

– Place the cover on the transportation container and tightly secure the fasteners all around. Retension the fasteners if necessary.
– Apply the warning notice for hazardous materials and information label to both ends of the transportation container.

- “Dangerous goods class 9”
- “UN number 3480”
- “Beware! Damaged lithium-ion battery”
- “This side up”

Notes for transport preparation and hazardous material marking (Europe)



1 - “Protect against water”

2 - “Attention! Fragile”

3 - “This side up”

4 - “Maximum stacking load”

5 - “Hazardous material label: Hazardous material category 9 “Various hazardous substances and items” packaging group 2”

6 - “Type label with UN number UN3480 for lithium-ion batteries”

6.4.2 Packaging critical high-voltage batteries with “Warning” status, Golf GTE / Passat GTE / Jetta Hybrid

DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

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

NOTICE

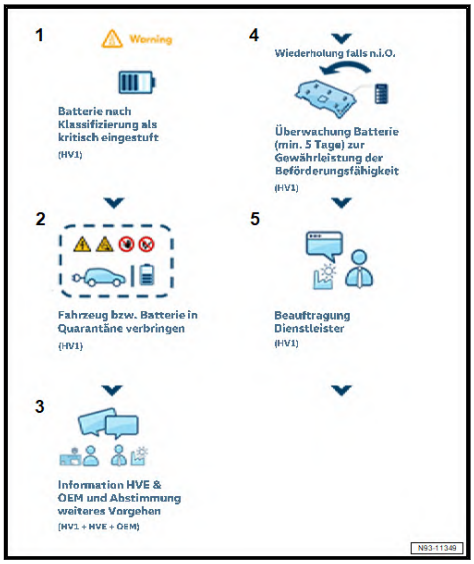
- **Only after receiving induction training (for respective, certified transport crate), at least one responsible high-voltage expert (or higher qualification) or employees of Volkswagen AG who have received induction training.**
- **Hazardous material induction training also required.**
- **Lithium-ion high-voltage batteries and lithium-ion high-voltage battery modules may only be packaged if they are prepared for carriage. See carriage regulations D/BAM/ GGVSEB.**

Described in this workshop manual are the packaging processes of high-voltage batteries that are classed as critical with the status “Warning”.

To determine whether and to what extent the lithium-ion high-voltage battery poses a higher level of danger, it must be subject to classification ⇒ page 26 .

Procedure based on central arrangements for Europe

Part 1



1. - High-voltage battery rated critical.

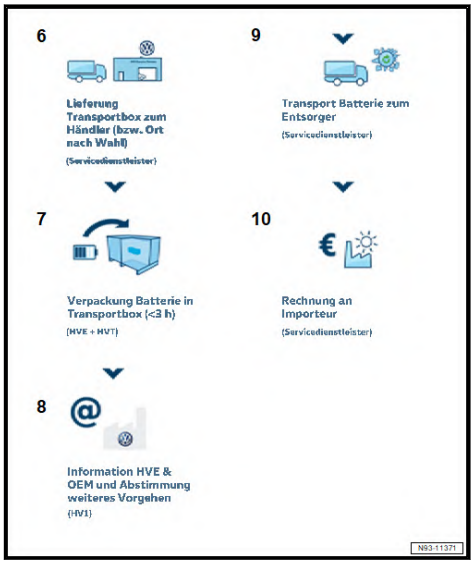
2. - Quarantine high-voltage battery or vehicle ⇒ page 17 . Attach measuring strips to document transportability of high-voltage battery.

3. - HVE makes contact with service provider and arranges appointment for transportation container (after first consulting international product support).

4. - For at least 5 days, high-voltage battery does not react and, in particular, has no increase in temperature.

5. - Appoint service provider

Part 2



6. - Delivery of transportation container inc. expanded glass granules.

7. - Once properly trained, HVE packages high-voltage battery.

8. - Info sent to transportun3480@volkswagen.de.

9. - Packaged high-voltage battery is taken away and transportation container is reconditioned.

10. - Invoice to importer

Transportation container

A special transportation container is required for the dispatch of lithium-ion high-voltage batteries classed as critical from Golf GTE, Passat GTE, e-Golf, e-up! and Jetta Hybrid models.

The containers are currently available in 2 sizes: M and XL.

Description

A high-voltage battery of the following models can be dispatched with transportation container size M:

- Golf GTE
- Passat GTE
- Jetta Hybrid
- Individual or several modules

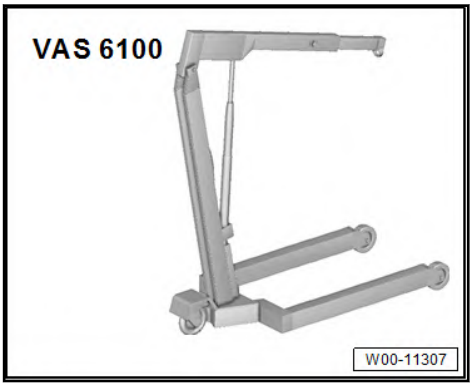
Batteries of the following models can be dispatched with transportation container size XL:

- e-up!
- e-Golf
- Golf GTE
- Passat GTE
- Jetta Hybrid
- Individual or several modules

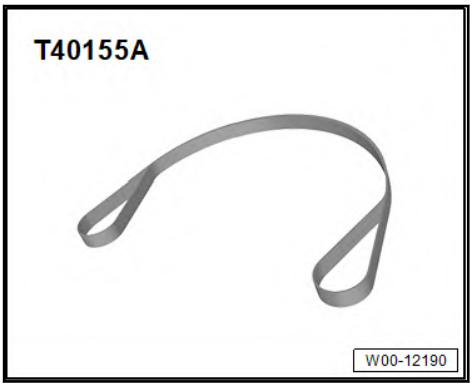
Packing

Special tools and workshop equipment required

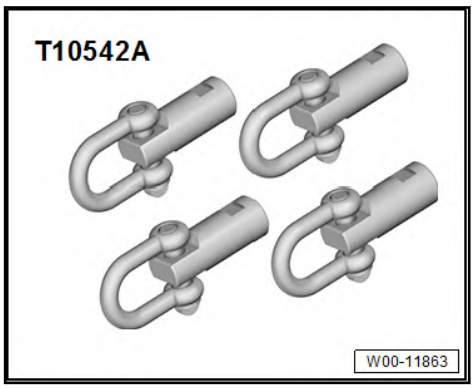
- Workshop hoist -VAS 6100-



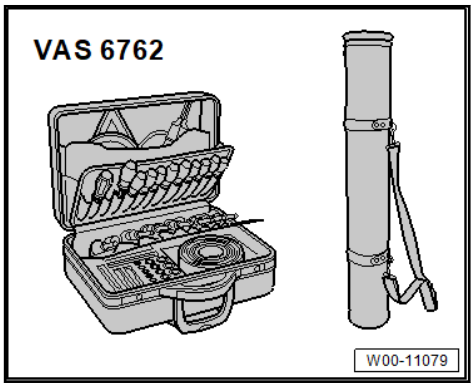
- Retaining strap -T40155A-



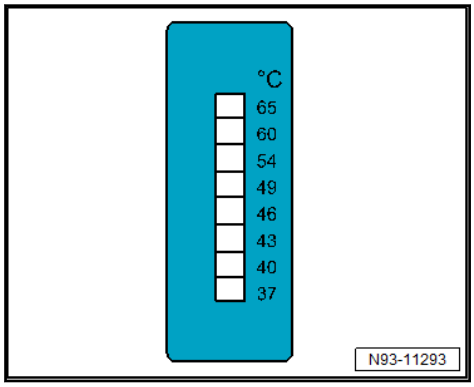
- Adapter -T10542A-



- Shackle -VAS 691 009A-
- High-voltage tool set -VAS 6762-

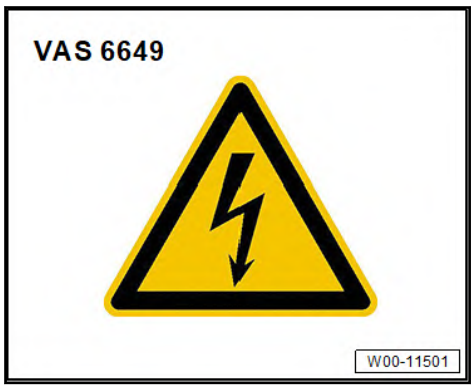


- Qty. 8 temperature measurement strips (irreversible) for temperature range: at least 40 to 60°C



- Warning sign “Warning! Dangerous batteries” -VAS 6786-

- Warning sign “Warning! Dangerous electrical voltage” -VAS 6649-



- High-voltage barrier tape -VAS 6884-
- Personal protective equipment

Procedure

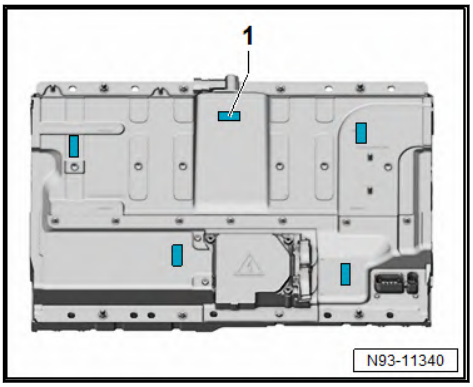
– Make all contacts of high-voltage battery 1 -AX2- safe to prevent short circuit.

– Seal all openings for service fluids apart from electrolyte.

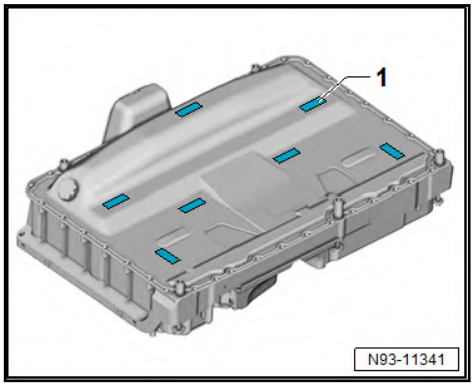
– Remove deposits of hazardous materials and electrolyte from outside of high-voltage battery 1 -AX2-.

Apply temperature measurement strips -1- to high-voltage battery 1 -AX2-

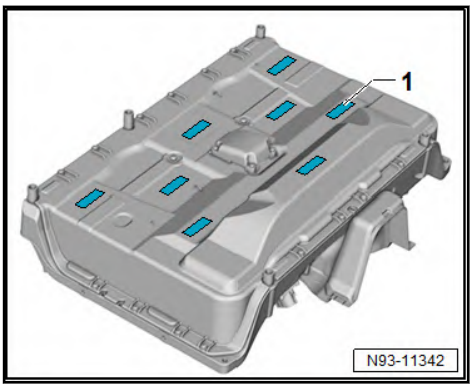
Jetta Hybrid battery



Passat GTE battery



Golf GTE battery



– Attach at least 8 temperature measurement strips -1- to high-voltage battery 1 -AX2- as shown in diagram.

NOTICE

Risk of damage to battery modules

– Protect modules against heat and direct sunlight.

– Directly after applying the strips and before dispatching, record the values in writing or take pictures.

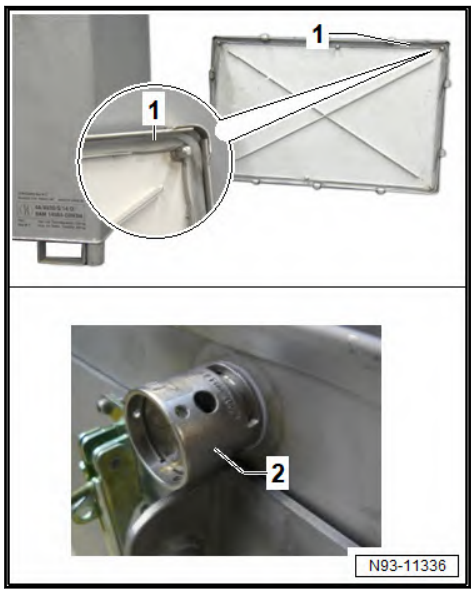
– Before transport, the high-voltage battery 1 -AX2- must be kept under observation for at least 5 days.

– Record the temperature of the high-voltage battery 1 -AX2- as well as the ambient temperature.

– Should there be an increase in the temperature during this time, wait for the reaction to subside before keeping under observation again for at least 5 days.
– Repeat this procedure until no further reactions are observed.
– Open fasteners of transportation container.
– Remove cover of transportation container and take out bag of expanded glass granules.

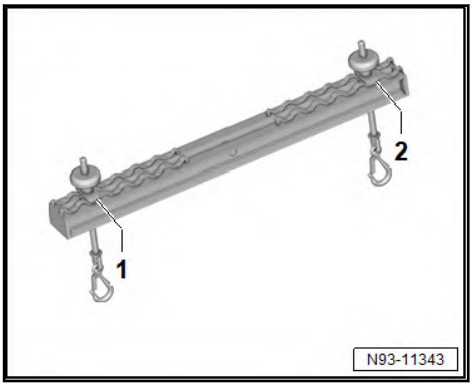
Quantity of PyroBubbles® is sufficient.

– Visually inspect surrounding rubber seal -1- and also pressure relief valves -2- for signs of external damage.



– Pour expanded glass granules onto base of transportation container up to a level of at least 200 mm.

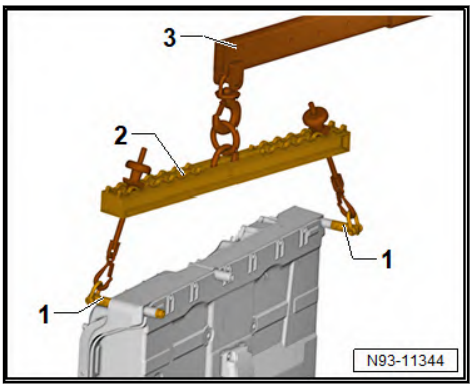
– Attach spindle -3033/8- to position -1- and -2- of lifting tackle -3033-.



Note

Align high-voltage battery 1 -AX2- with adapter -T10542A- attached in just one direction first and then attach adapter -T10542A- in offset position (e.g. if battery is on flat ground).

– Attach lifting tackle -3033--2- to workshop hoist -VAS 6100--3-.

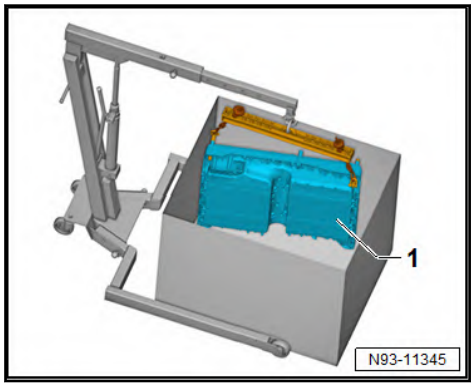


– Mount adapter -T10542A- -1- on outer lifting eyes offset at front and rear on high-voltage battery 1 -AX2- and tighten to 20 Nm.

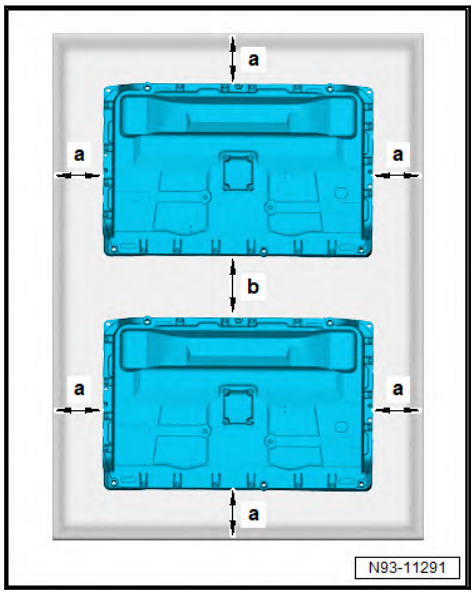
Note

- *For high-voltage battery 1 -AX2- in Jetta models, first remove retaining frame ⇒ Rep. gr. 93; High-voltage battery unit; Assembly overview - high-voltage battery.*
- *If necessary, use workshop hoist -VAS 6100- and retaining strap -T40155- to lift high-voltage battery 1 -AX2- of Jetta into transportation container.*

– Place high-voltage battery 1 -AX2- -1- centrally and diagonally on end onto hollow glass granules.



– Distance from side edges should be at least 120 mm.
– If packing two batteries (Golf GTE and Passat GTE) in the XXL transportation container, the distance of the batteries from the sidewalls -a- should be at least 120 mm.



– Distance between batteries -b- must be at least 200 mm.
– Check that there is a space of at least 120 mm between the high-voltage battery 1 -AX2- and the upper edge of the transportation container for a surrounding layer of expanded glass granules.
– Pour in expanded glass granules so that the gaps and also the entire transportation container up to the upper edge are filled.

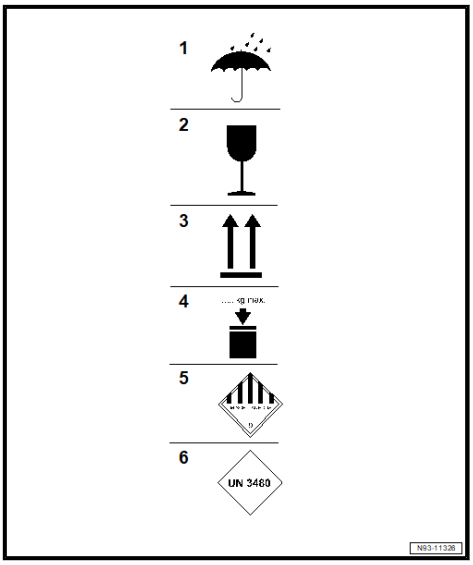
Note

- *Ensure that surrounding rubber seals are not damaged.*
- *If it proves difficult to close the cover, turn the cover 180° if necessary.*

– Place the cover on the transportation container and tightly secure the fasteners all around. Retension the fasteners if necessary.
– Apply the warning notice for hazardous materials and information label to both ends of the transportation container.

- “Dangerous goods class 9”
- “UN number 3480”
- “Beware! Damaged lithium-ion battery”
- “This side up”

Notes for transport preparation and hazardous material marking (Europe)



1 - “Protect against water”

2 - “Attention! Fragile”

3 - “This side up”

4 - “Maximum stacking load”

5 - “Hazardous material label: Hazardous material category 9 “Various hazardous substances and items” packaging group 2”

6 - “Type label with UN number UN3480 for lithium-ion batteries”

6.4.3 Packaging critical high-voltage batteries with “Warning” status, e-Golf / e-up!

DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

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

NOTICE

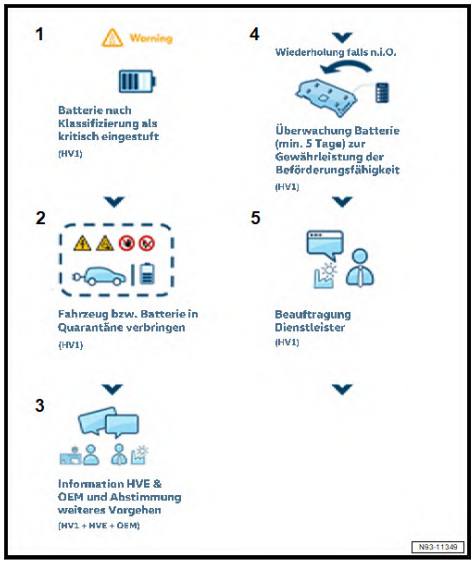
- **Only after receiving induction training (for respective, certified transport crate), at least one responsible high-voltage expert (or higher qualification) or employees of Volkswagen AG who have received induction training.**
- **Hazardous material induction training also required.**
- **Lithium-ion high-voltage batteries and lithium-ion high-voltage battery modules may only be packaged if they are prepared for carriage. See carriage regulations D/BAM/GGVSEB.**

Described in this workshop manual are the packaging processes of high-voltage batteries that are classed as critical with the status “Warning”.

To determine whether and to what extent the lithium-ion high-voltage battery poses a higher level of danger, it must be subject to classification ⇒ page 26 .

Procedure based on central arrangements for Europe

Part 1



1. - High-voltage battery rated critical.

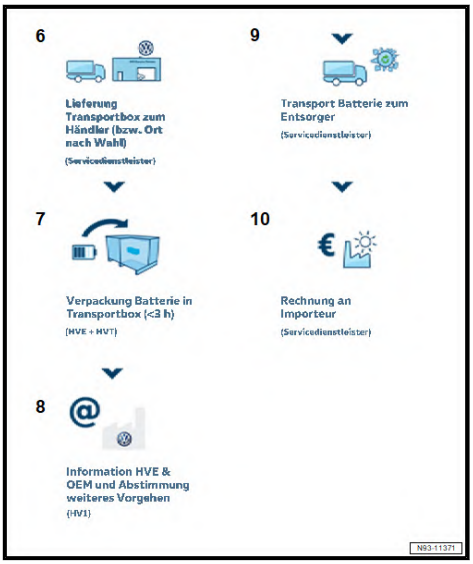
2. - Quarantine high-voltage battery or vehicle ⇒ page 17 . Attach measuring strips to document transportability of high-voltage battery.

3. - HVE makes contact with service provider and arranges appointment for transportation container (after first consulting international product support).

4. - For at least 5 days, high-voltage battery does not react and, in particular, has no increase in temperature.

5. - Appoint service provider

Part 2



6. - Delivery of transportation container inc. expanded glass granules.

7. - Once properly trained, HVE packages high-voltage battery.

8. - Info sent to transportun3480@volkswagen.de.

9. - Packaged high-voltage battery is taken away and transportation container is reconditioned.

10. - Invoice to importer

Transportation container

A special transportation container is required for the dispatch of lithium-ion high-voltage batteries classed as critical from Golf GTE, Passat GTE, e-Golf, e-up! and Jetta Hybrid models.

The containers are currently available in 2 sizes: M and XL.

Description

A high-voltage battery of the following models can be dispatched with transportation container size M:

- Golf GTE

- Passat GTE
- Jetta Hybrid
- Individual or several modules

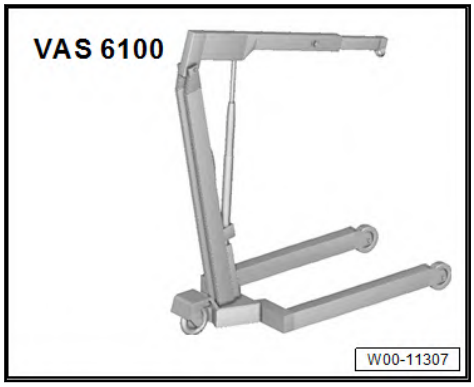
Batteries of the following models can be dispatched with transportation container size XL:

- e-up!
- e-Golf
- Golf GTE
- Passat GTE
- Jetta Hybrid
- Individual or several modules

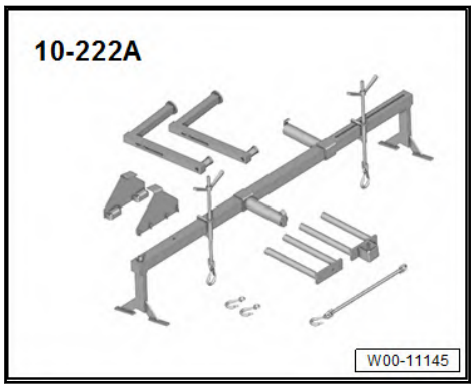
Packing

Special tools and workshop equipment required

- Workshop hoist -VAS 6100-

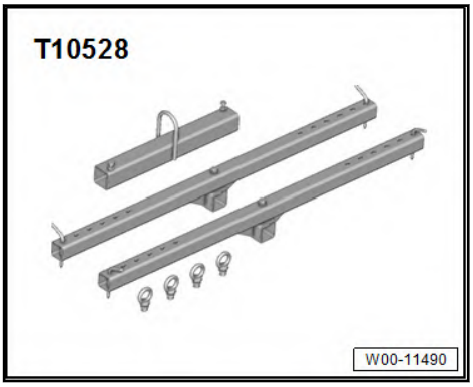


- Support bracket -10 - 222 A-

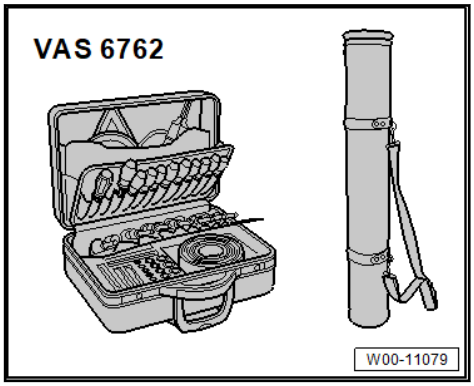


- Hook -10-222A/10-, qty. 6
- Shackle -10-222A/12-, qty. 2

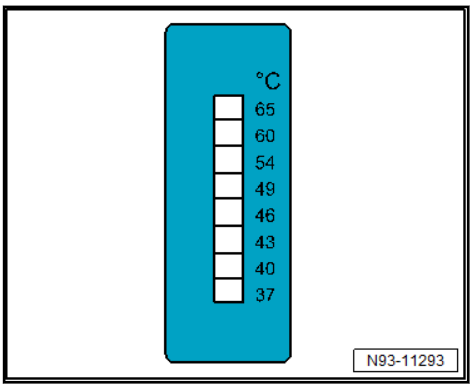
- Towing bracket -T10528-



- Locking pin -T10528/3-
- Lifting eye bolt -T10528/5-
- Supplement -T10528/7-/10-
- Shackle -VAS 691 009A-
- High-voltage tool set -VAS 6762-

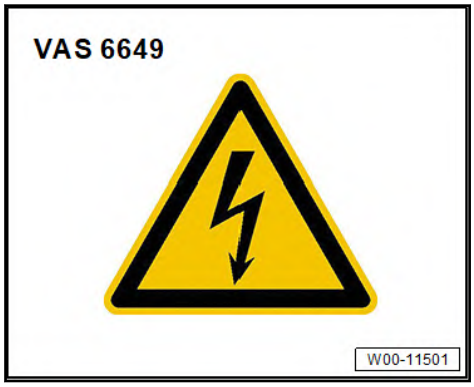


- Qty. 8 temperature measurement strips (irreversible) for temperature range: at least 40 to 60°C



- Warning sign “Warning! Dangerous batteries” -VAS 6786-

- Warning sign “Warning! Dangerous electrical voltage” -VAS 6649-



- High-voltage barrier tape -VAS 6884-
- Personal protective equipment

Procedure

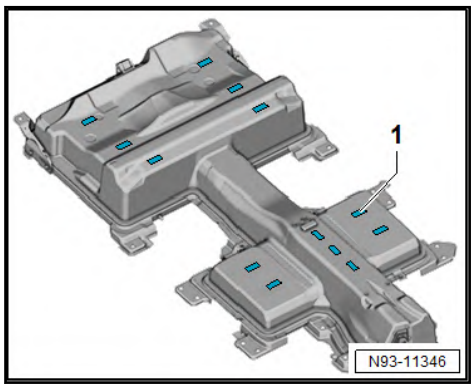
– Make all contacts of high-voltage battery 1 -AX2- safe to prevent short circuit.

– Seal all openings for service fluids apart from electrolyte.

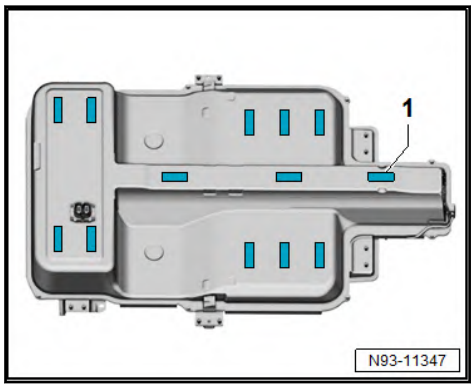
– Remove deposits of hazardous materials and electrolyte from outside of high-voltage battery 1 -AX2-.

Apply temperature measurement strips to battery

e-Golf battery



e-up! battery



– Attach at least 8 temperature measurement strips to high-voltage battery 1 -AX2- as shown in diagram.

NOTICE

Risk of damage to battery modules

– Protect modules against heat and direct sunlight.

– Directly after applying the strips and before dispatching, record the values in writing or take pictures.

– Before transport, the high-voltage battery 1 -AX2- must be kept under observation for at least 5 days.

– Record the temperature of the high-voltage battery 1 -AX2- as well as the ambient temperature.

– Should there be an increase in the temperature during this time, wait for the reaction to subside before keeping under observation again for at least 5 days.

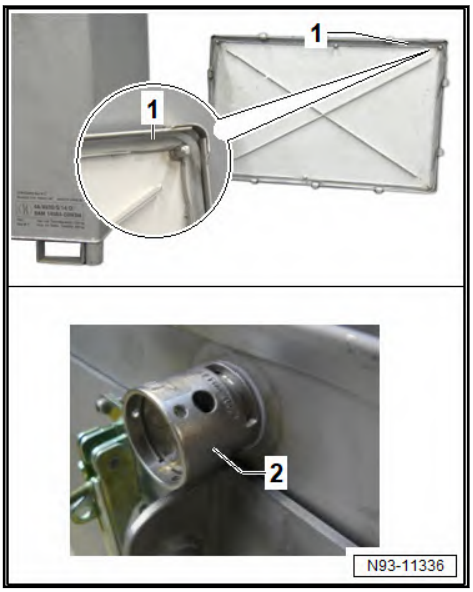
– Repeat this procedure until no further reactions are observed.

– Open fasteners of transportation container.

– Remove cover of transportation container and take out bag of expanded glass granules.

Quantity of PyroBubbles® is sufficient.

– Visually inspect surrounding rubber seal -1- and also pressure relief valves -2- for signs of external damage.

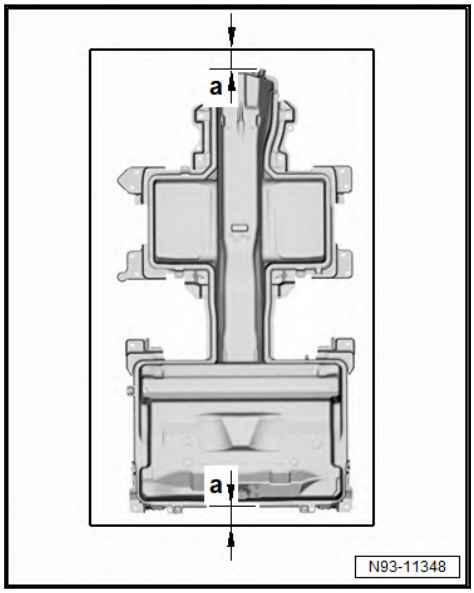


– Pour expanded glass granules onto base of transportation container up to a level of at least 200 mm.

– Take up weight of high-voltage battery 1 -AX2- as described in chapter ⇒ h6.3 igh-voltage batteries", page 34 .

– Place high-voltage battery 1 -AX2- in transportation container.

– Distance -a- from side edges and high-voltage battery 1 -AX2- should be at least 120 mm.



– Check that there is a space of at least 200 mm between the high-voltage battery 1 -AX2- and the upper edge of the transportation container for a surrounding layer of expanded glass granules.

– Pour in expanded glass granules so that the gaps and also the entire transportation container up to the upper edge are filled.

Note

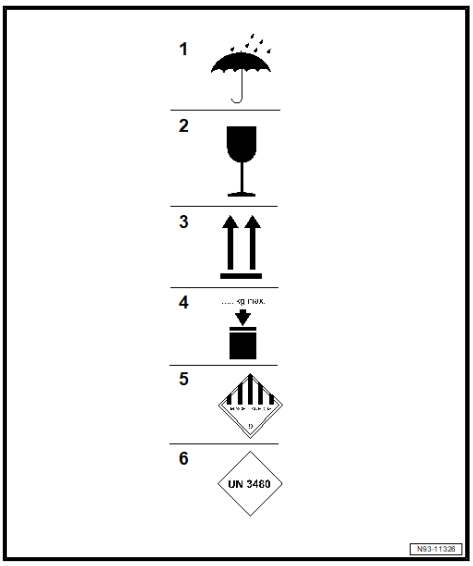
- *Ensure that surrounding rubber seals are not damaged.*
- *If it proves difficult to close the cover, turn the cover 180° if necessary.*

– Place the cover on the transportation container and tightly secure the fasteners all around. Retension the fasteners if necessary.

– Apply the warning notice for hazardous materials and information label to both ends of the transportation container.

- “Dangerous goods class 9”
- “UN number 3480”
- “Beware! Damaged lithium-ion battery”
- “This side up”

Notes for transport preparation and hazardous material marking (Europe)



1 - “Protect against water”

2 - “Attention! Fragile”

3 - “This side up”

4 - “Maximum stacking load”

5 - “Hazardous material label: Hazardous material category 9 “Various hazardous substances and items” packaging group 2”

6 - “Type label with UN number UN3480 for lithium-ion batteries”

6.5 Supplementary information on opening and bonding high-voltage batteries

Only applies to e-up! and e-Golf

DANGER

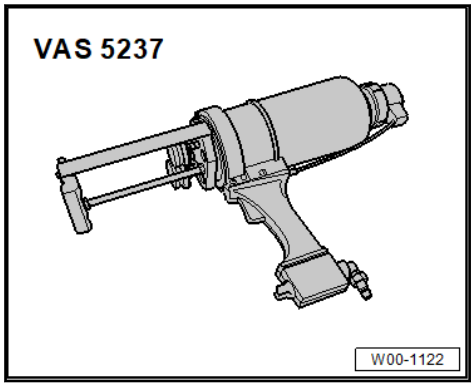
Danger to life from high voltage.

Severe or fatal injury from electric shock.

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

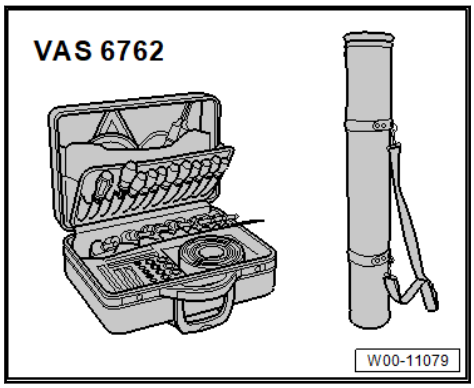
Special tools and workshop equipment required

- Double cartridge gun -VAS 5237-

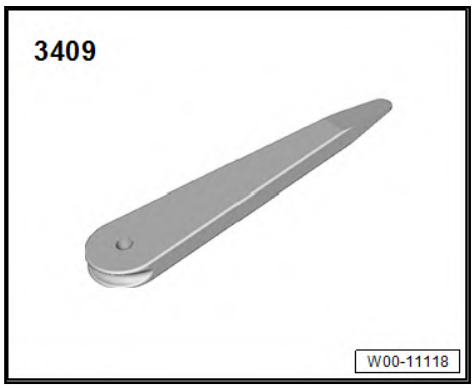


- Electric cutter -V.A.G 1561A-

- Repair set for high-voltage battery -VAS 6900-
- Blade, 27 mm -VAS 6900/1-
- Scraper, 25mm -VAS 6900/2-
- One-handed clamps -VAS 6900/4-
- High-voltage tool set -VAS 6762-



- Removal wedge -3409-



- Commercially available vacuum cleaner with plastic nozzle

Note

For part numbers of materials, see ⇒ Electronic parts catalogue (ETKA).

Special tools and workshop equipment required

- 2-pack window adhesive set 2)
- Cleaning solution 2)
- Applicator 2)
- Glass/paint primer 2)
- Activator 2)
- Corrosion protection wax for EMC bolts 2)
- Sandpaper/non-woven abrasive (grain 120-240)
- Lint-free cleaning cloths

2) Observe manufacturer's instructions enclosed in the packaging.

Open

DANGER

Danger to life from high voltage.

Severe or fatal injury from electric shock.

– High-voltage system must be de-energised by a suitably qualified technician.

DANGER

Danger to life from voltages AC ≥ 30 V and DC ≥ 60 V.

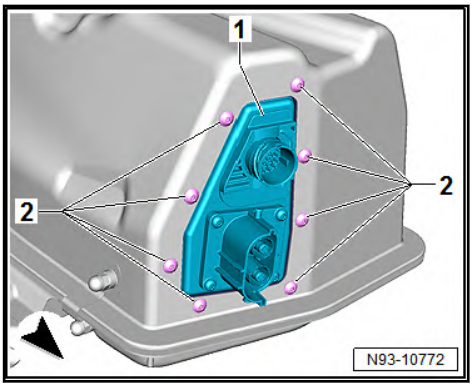
Severe or fatal injuries from electric shock/electric arc.

– The following work must be supervised by an additional specialist with appropriate qualification (at least a mechanic qualified as EIP).

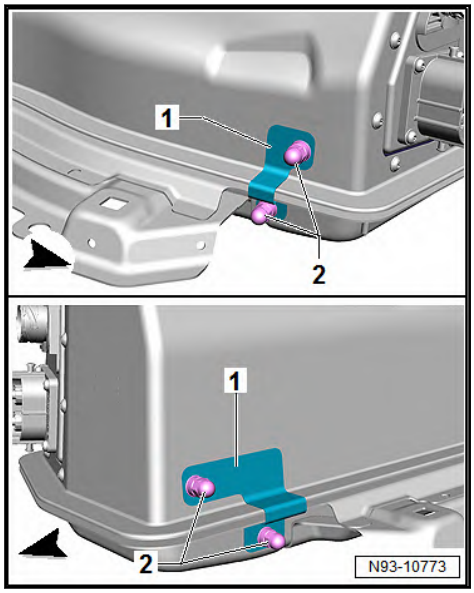
– The second person may support the HVE if required by providing assistance within the framework of his/her qualification.

– Observe country-specific laws and regulations.

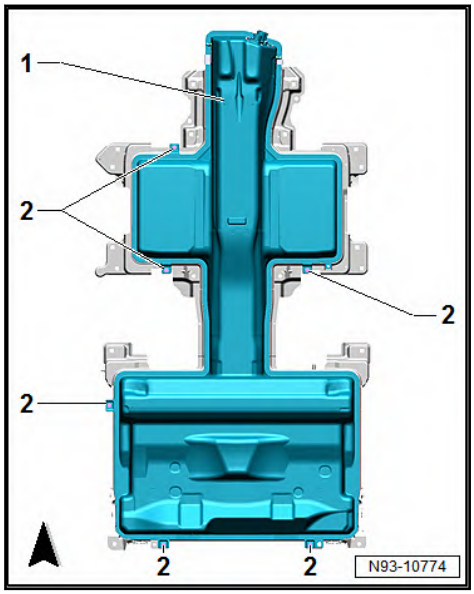
Procedure for e-Golf



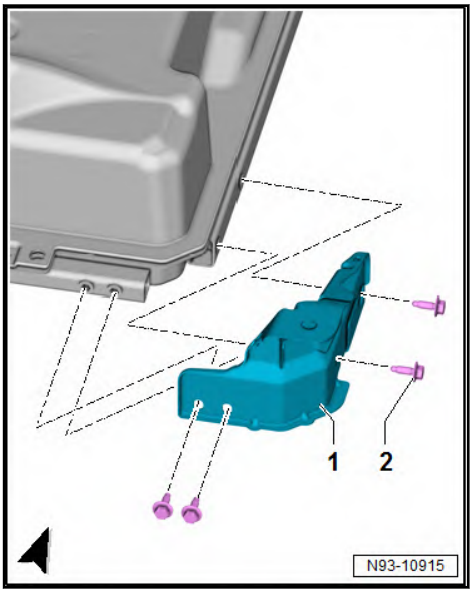
– If present, remove DC connector mounting ⇒ Rep. gr. 93; High-voltage battery unit; Removing and installing DC charging connection.
– Unscrew bolts -2- from connector mounting -1-.
– Unscrew nuts -2- from earth strap -1- and from bottom high-voltage battery shell.



– Remove earth strap -1-.
– Unscrew bolts -2- from top high-voltage battery shell -1-.



– Unscrew bolts -2- from rear left and rear right brackets -1-.



– Remove rear left and rear right brackets -1-.

CAUTION

Risk of injury from swarf being flung into air.

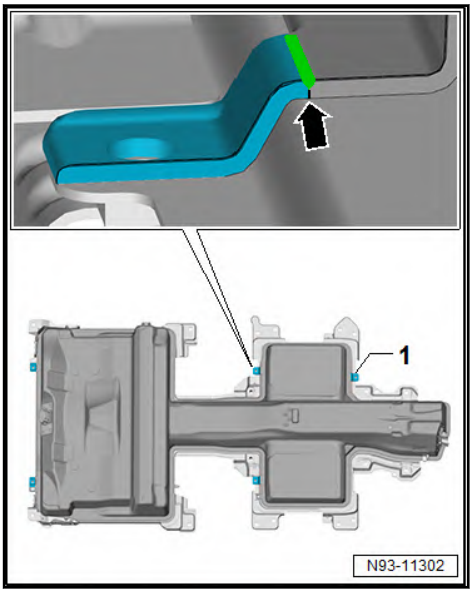
Irritation and injury to skin and eyes possible.

- **Wear protective goggles.**
- **Wear protective gloves.**

Note

To prevent paint damage to bottom shell, make absolutely sure that tabs are not cut through.

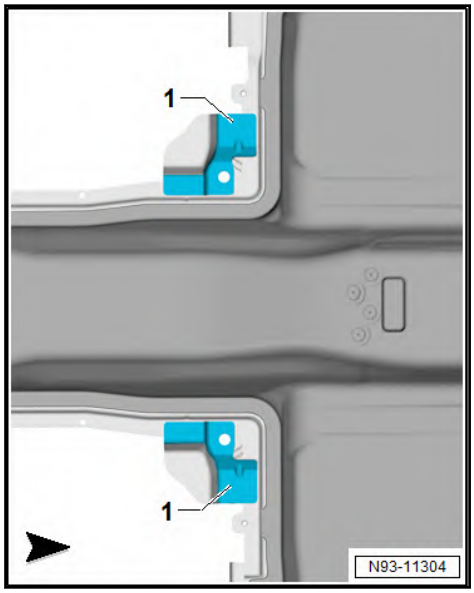
– Lightly cut into tabs -1- of high-voltage battery using electric cutter -V.A.G 1561A- -arrow-.



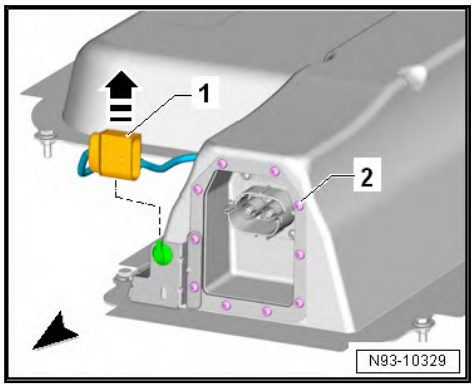
– Break off tabs -1- of high-voltage battery.

– Fold shielding for top high-voltage battery shell upwards.

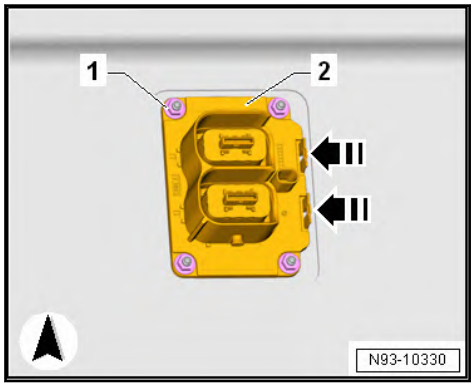
– Apply heavy-duty tape to bottom high-voltage battery shell in area -1-.



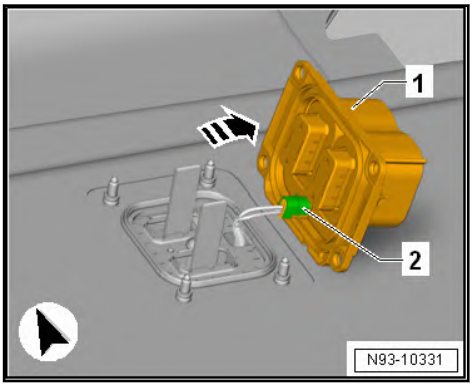
Procedure for e-up!



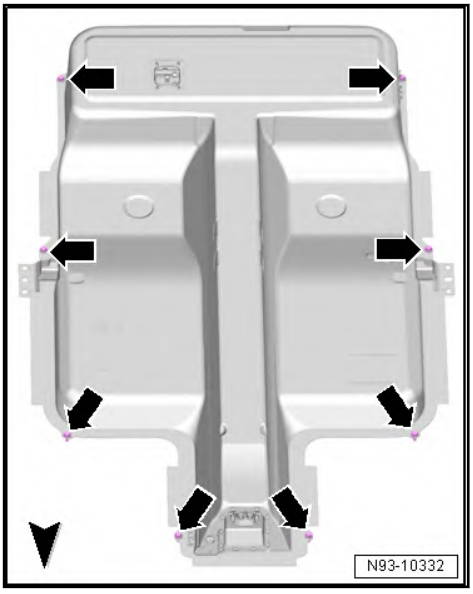
– Release connector -1- in -direction of arrow-.
– Unscrew bolts -2-.
– Unscrew nuts -1- from charging connection -2-.



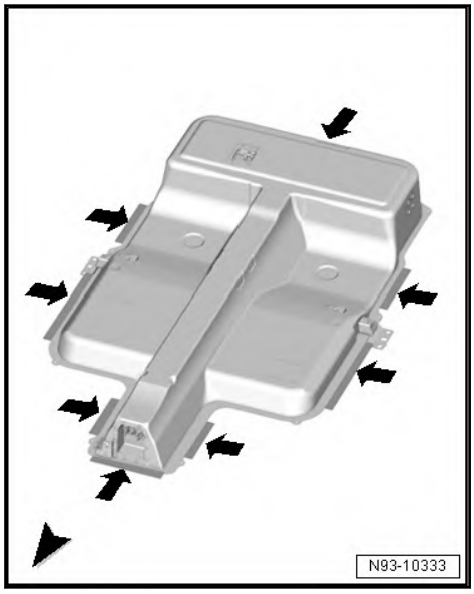
– Unclip charging connection -arrows-.
– Turn over charging connection in direction of -arrow-.



– Remove fuse -2-. To do this, lever it off at sides, and pull it off towards outside.
– Free off two cables ⇒ 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°.



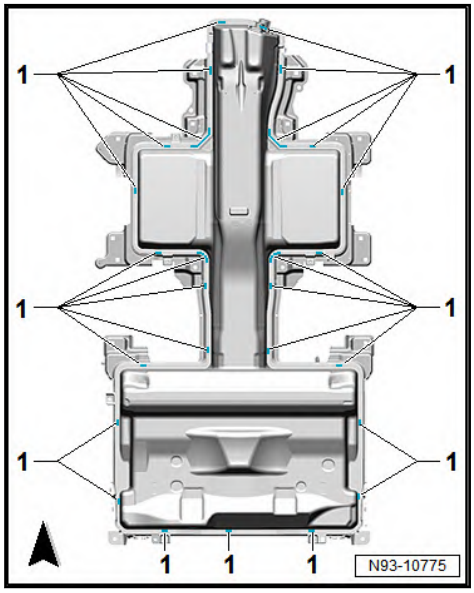
Continuation for both vehicles

– Fit blade, 27 mm -VAS 6900/1- in electric cutter -V.A.G 1561A-.

Note

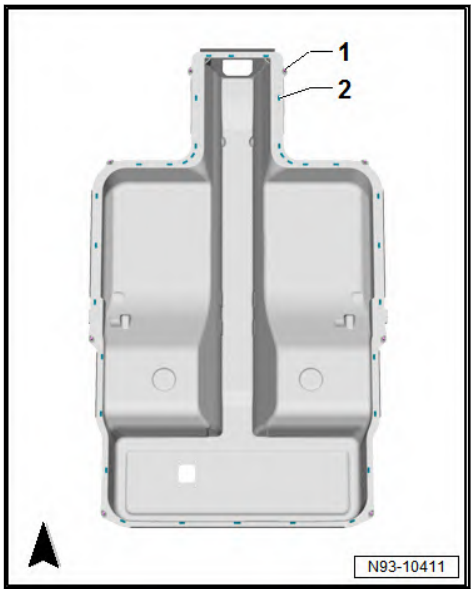
- *There are spacers positioned at regular intervals on both high-voltage batteries.*
- *Spacers must not be cut through to prevent slipping off into bottom shell.*

Overview of spacers on top high-voltage battery shell of e-Golf



1 - Spacers in bonded seam

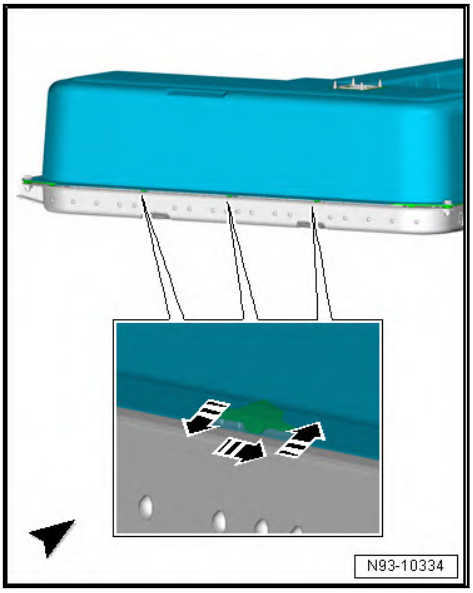
Overview of spacers on top high-voltage battery shell of e-up!



1 - Spacers for threaded connections

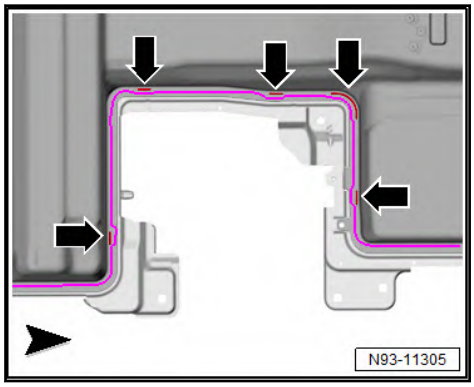
2 - Spacers in bonded seam

– Pull electric cutter -V.A.G 1561A- in area of spacers out of bonded seam -arrows-.



– After passing the spacers, insert electric cutter -V.A.G 1561A- deeper into bonded seam again -arrows-.

Example path of electric cutter -V.A.G 1561A- around spacers -arrows-



NOTICE

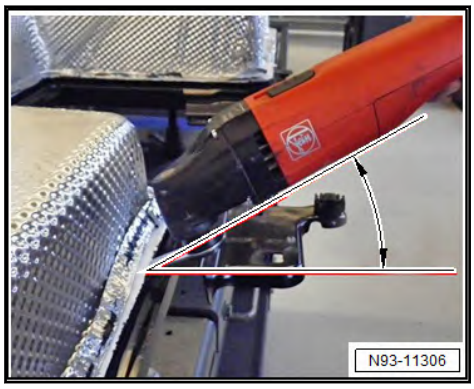
- **Wear protective gloves, safety goggles and ear protection!**
- **Hold the electric cutter -V.A.G 1561A- with both hands at its rear end.**
- **Always guide electric cutter -V.A.G 1561A- along the upper shell of the high-voltage battery.**
- **Adhere to the prescribed sequence for cutting through the bonded seam to prevent the top high-voltage battery shell from shifting.**

– Set speed setting on electric cutter -V.A.G 1561A- to 4.

NOTICE

- **Make absolutely sure that bottom high-voltage battery shell is not damaged.**
- **Design of blade places electric cutter -V.A.G 1561A- at an upward angle of about 45°.**

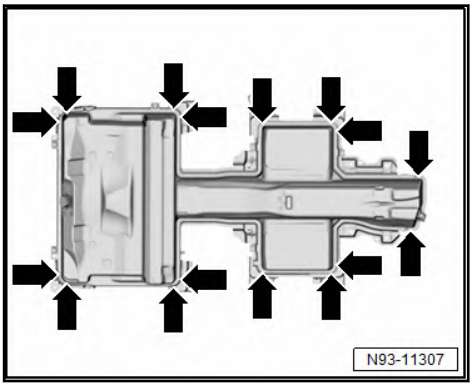
– Guide electric cutter -V.A.G 1561A- upwards -arrow- along top high-voltage battery shell, pulling lightly at all times.



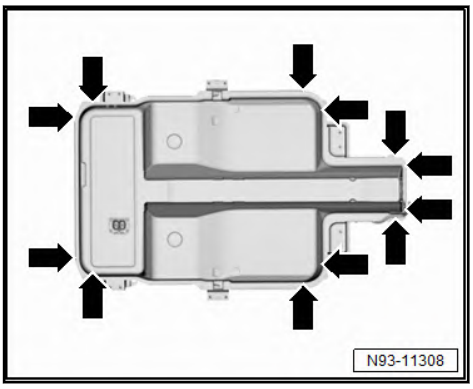
NOTICE

Lever off top high-voltage battery shell with removal wedge -3409- only at specified positions as otherwise the mechanical and electrical components could be damaged, particularly the battery modules.

Placement of removal wedges -3409- on e-Golf high-voltage battery



Placement of removal wedges -3409- on e-up! High-voltage battery



– Lever off top high-voltage battery shell.
– With the aid of a second mechanic, lift off top high-voltage battery shell. To do this, hold at front and rear with both hands.

Bonding

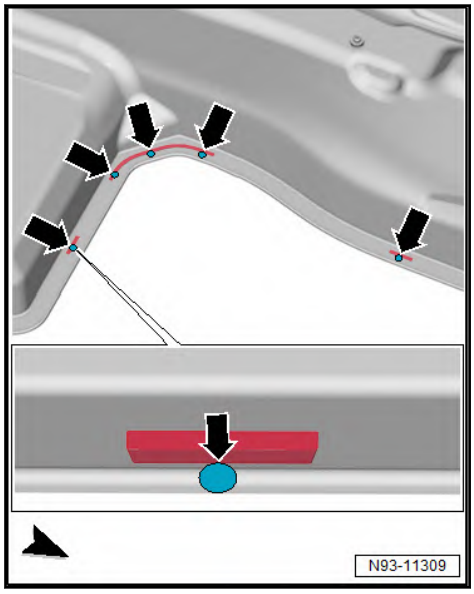
Note

Ideally, testing of the top high-voltage battery shell should take place as soon as the goods are received.

– Inspect the top high-voltage battery shell for damage (also hairline cracks) as these can lead to leaks after bonding.

Preparing top high-voltage battery shell for bonding

– Mark position of spacers on outside of top high-voltage battery shell -arrows-.



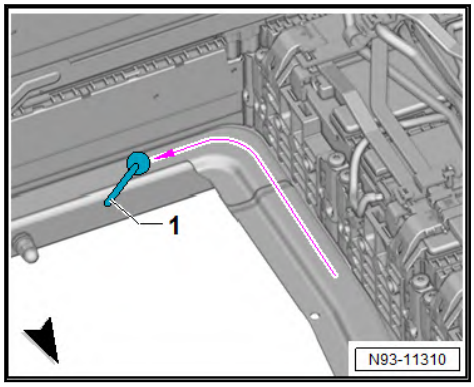
– To facilitate better bonding of glass/paint primer, lightly roughen top shell in area of bonding surface with sandpaper/non-woven abrasive (grain 120-240).
– Clean whole area of top shell to remove sanding dust and other contaminants using vacuum cleaner, lint-free cloth and cleaning solution.
– Then do not touch bonding surface any more.

NOTICE

- **Allow glass/paint primer to dry [3]. There should be no damp areas.**
- **Since the effectiveness of the glass/paint primer starts to diminish significantly after 24 hours, bonding should be carried out within 2 hours of its application. This also prevents potential soiling/contamination.**
- **Apply glass/paint primer by means of applicator only in one direction (do not spread back and forth).**

3) Observe manufacturer's instructions enclosed in the packaging.

– Apply glass/paint primer by means of applicator -1- to entire bonding surface of top high-voltage battery shell in direction of -arrow-.



Preparing bottom high-voltage battery shell for bonding

NOTICE

- **Do not perform this work step until shortly after bonding as the strength of the adhesive on the freshly cut back adhesive seam is greater.**
- **Once the adhesive bead has been cut back, it must not be touched or contaminated (grease, sweat etc.).**
- **To prevent damage to the bottom battery shell and to ensure that the new adhesive bead bonds well, the height of the old adhesive bead should not be less than 1 mm.**

– Have a second mechanic monitor the correct height of the adhesive bead when cutting back.

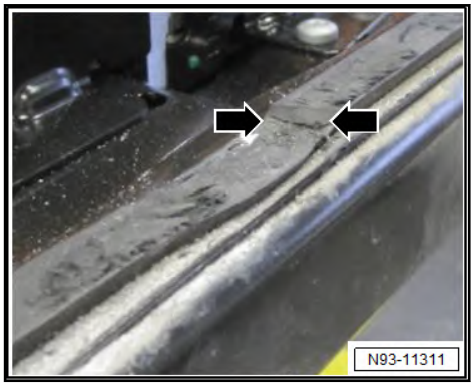
– Make absolutely sure that scraper, 25 mm -VAS 6900/2- is kept straight when cutting.

NOTICE

Overlapping and adhesive bead edges from renewed application of the cutter are bad practice.

– Using electric cutter -V.A.G 1561A- and scraper, 25 mm -VAS 6900/2-, cut back adhesive bead on bottom battery shell to between 1 and 2 mm.

– If the adhesive seam -arrow- has been cut back too far or the paint surface is damaged, the adhesive seam must be completely removed at this point and the paintwork repaired.



– Using a vacuum cleaner with plastic nozzle, clean bottom battery shell until there are no traces of sealing material and dirt.

NOTICE

- **It is extremely important to prevent accidental contact with the adhesive bead while the top high-voltage battery shell is positioned so this work step should be practised beforehand.**
- **Allow activator to dry [4] before commencing with bonding. There should be no damp areas.**
- **Since the effectiveness of the activator starts to diminish significantly after 24 hours, bonding should be carried out within 2 hours of its application. This also prevents potential soiling/contamination.**

4) Observe manufacturer's instructions enclosed in the packaging.

NOTICE

Risk of damage to paintwork structure caused by activator.

– **Apply activator onto adhesive bead with precision and do not spill.**

– Apply activator to cut-back adhesive seam.

Preparations before sealing

– Open one-handed clamps -VAS 6900/4- and distribute around high-voltage battery 1 -AX2-.

– Have bolts ready for top high-voltage battery shell.

– Have tools ready.

– Prepare adhesive cartridges of 2-pack window adhesive set by removing metal base and pressing content inwards at edge of adhesive cartridges then place down.

– If several cartridge sets are required, all of them must be prepared in the same manner beforehand so as not to unnecessarily prolong the bonding process.

– Insert cartridges of 2-pack window adhesive set with connecting adapter in double cartridge gun -VAS 5237-.

– Carefully actuate double cartridge gun -VAS 5237- until both components (black and white) can be seen.

– Screw green mixer nozzle onto connector so that opening points down vertically.

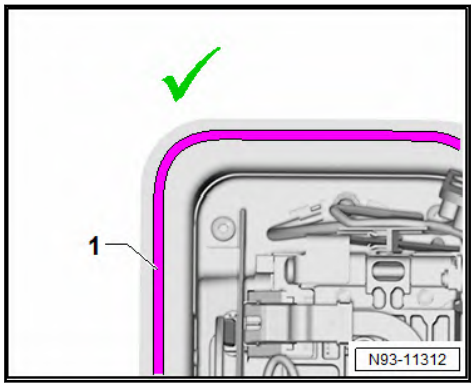
– Then draw an adhesive bead of max. 10 cm to ensure that both components mix.

Bonding high-voltage battery 1 -AX2-

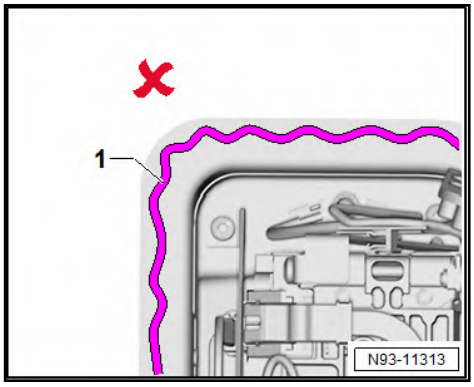
NOTICE

- **Use disposal gloves during the bonding process.**
- **Have a suitable implement ready (e.g. scraper) to tidy up the adhesive seam afterwards.**
- **To shorten the amount of time needed to apply the adhesive bead, it is advisable for 2 persons to apply the adhesive bead in parallel.**
- **The adhesive bead should not be applied too quickly as otherwise it will be too thin and of an insufficient height.**

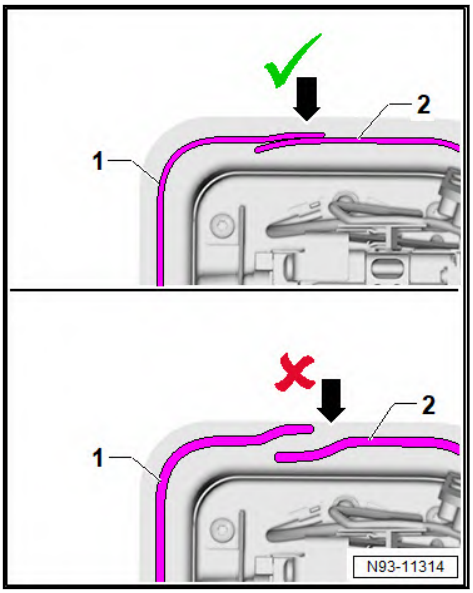
– Apply adhesive bead -1- to bottom high-voltage battery shell, observing the correct speed of application.



Applying too slowly will cause waviness on the ridge of the adhesive bead -1- and as the top high-voltage battery shell is fitted adhesive will be forced out.



When repositioning glue gun, ensure that there are no large gaps -arrow- between adhesive beads -1- and -2- as these will have to be joined retroactively.



– Check the adhesive bead on completion.
– Use a clean implement to redress the point of the adhesive bead if necessary.
– Flatten any waviness and join the gaps.

NOTICE

- **The top high-voltage battery shell must be installed within 10 minutes or the adhesive properties of the 2-pack window adhesive set will be impaired.**
- **When placing the top high-voltage battery shell down, do not accidentally come into contact with the adhesive bead.**
- **Repositioning can cause leaks.**

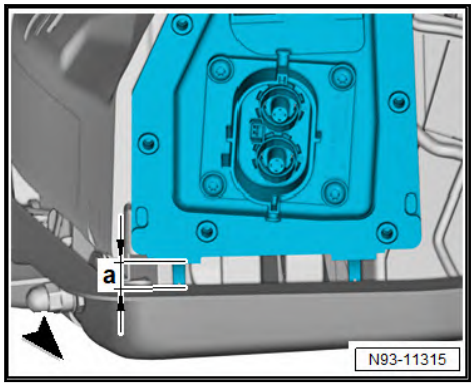
– Fit the top high-voltage battery shell with the aid of 3 mechanics.

Observe the following for high-voltage battery 1 -AX2- of e-Golf models:

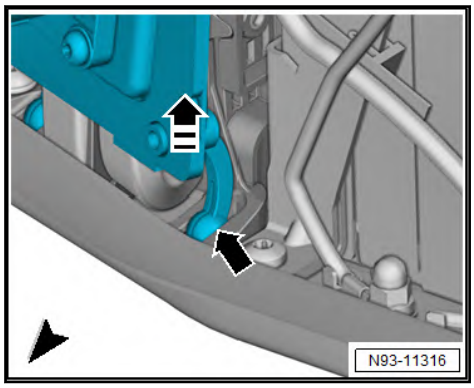
NOTICE

The adhesive seam should not move when the top shell is fitted.

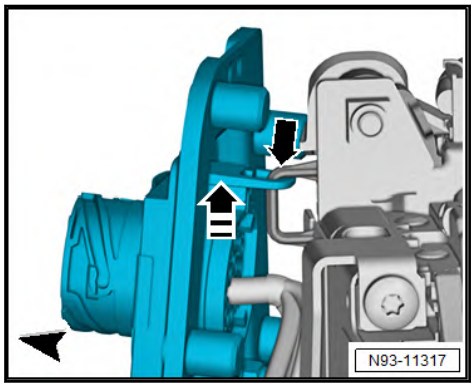
– Ensure that only limited space -a- is available beneath high-voltage system connector.



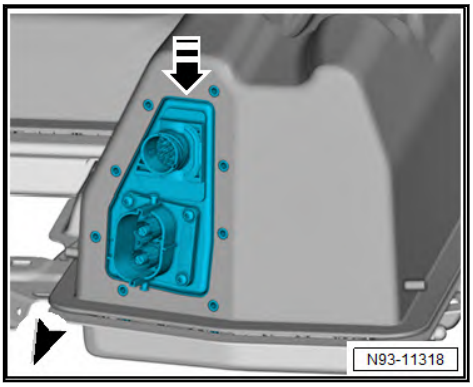
– Gently pull out high-voltage system connector mounting -arrow- from holder upwards in direction of -arrow-.



– Secure high-voltage system connector mounting -arrow-.



– Gently fit top high-voltage battery shell, bring connector mounting into correct position by pressing lightly in direction of -arrow-.



Continuation for both vehicles

NOTICE

Straight after top high-voltage battery shell has been fitted, secure by means of one-handed clamps -VAS 6900/4-.

– Secure top high-voltage battery shell to tabs using EMC bolts.

– Apply even pressure all around top high-voltage battery shell by hand.

NOTICE

- **If one-handed clamps are positioned incorrectly, hairline cracks can develop, which can cause leaks.**
- **Do not overtighten one-handed clamps -VAS 6900/4- as otherwise top high-voltage battery shell will be deformed or adhesive seam will be forced out.**

– Attach one-handed clamps -VAS 6900/4- at previously marked positions.

– Allow 2-pack window adhesive set to dry for 2 hours.

– Remove one-handed clamps -VAS 6900/4-.

– Check high-voltage battery 1 -AX2- for leaks ⇒ Rep. gr. 93; High-voltage battery unit; Leakage test of high-voltage battery 1AX2.

Torque settings

- ⇒ Rep. gr. 93; High-voltage battery unit; Assembly overview - high-voltage battery