93-23-01 - High-Voltage Battery Repair Hints, Tips, and Suggested Practices **Release date:** 2/23/2023

Condition

Applicable Vehicles					
Model(s)	**Year**	**Eng. Code**	**Trans. Code**	**VIN Range From**	**VIN Range To**
ID.4	2021 – 2023	All	All	All	All

Revision Table			
Instance Number	**Published Date**	**Version Number**	**Reason For Update**
2069601/1	2/23/2023	93-23-01	Original publication.

Information for Volkswagen technicians – High-voltage battery repair hints, tips, and suggested practices.

Technical Background

The process of performing a high-voltage battery repair requires planning and strategy to synchronize all of the necessary resources in an efficient manner.

While it is not possible to foresee every situation and circumstance which may be encountered, this bulletin presents various hints, tips, and suggestions, which are presented only as an aid for Volkswagen technicians who have already completed high voltage expert (HVE) and all prerequisite training courses.

Note:

This bulletin is a reference only, and shall not be considered to supersede or replace any published repair manual procedures, ODIS-based instructions, Guided Fault Finding conclusions, or other technical bulletins.

Production Solution

Not applicable.

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Service

Planning and Preparation

- Prevent open-battery idle-time – Check that all the necessary parts were ordered and received in good condition, and that all necessary tools are on-hand before removing or opening the high-voltage battery.
- Shortcuts – Avoid the use of “cheat sheets” or saved lists of parts or repair steps based on prior repairs. Delays arise when part numbers have changed, or if incompatible parts are ordered in error. The exact parts required must be determined in each case by referencing the repair manual to determine single-use parts, and the ETKA parts catalog to order the correct parts.
- Cleanliness – Ensure a clean work area is available, and plan a location where the removed top cover can be set aside and protected after removal. The blue Dreibond sealant used on the top cover remains tacky. If it becomes dirty or contaminated by other substances, then it must be cleaned off before application of additional sealant.
- Lift suitability – Ensure that the lift has suitable weight capacity and clearance for positioning the scissor-lift table, lowering the battery from the vehicle, and rolling it to the work location. Check that the lift arms and pads which contact the vehicle can accommodate battery removal and installation according to the repair manual. – see *“High-Voltage Battery 1 AX2, Removing and Installing”*
- Moving vehicle with battery removed – If circumstances require moving the vehicle off the lift while the high-voltage battery is removed, then multiple people must work together to push the vehicle in a careful and controlled manner, and no person may enter the vehicle while the high-voltage battery is removed. – *see “High-Voltage Battery 1 AX2, Removing and Installing”*

Repair Manual

Always review the repair manual procedures before starting the battery repair, and follow it step-by-step. The repair manual may be updated at any time.

Training materials are a useful reference for understanding repair concepts, but must never be used as a substitute for current repair manual procedures.

Noteworthy changes since the 2021 ID.4 launch:

- The top cover is generally reusable, and is no longer a mandatory replacement single-use part – *see “Battery Housing Upper Section, Checking for Re-Use”*
- Use the pipe brush VAS 294 029 or equivalent to remove old sealant from M24 screw threads in housing and then vacuum the debris – *see “High-Voltage Battery 1 AX2, Opening”*
- The original blue Dreibond sealant need only be removed from the top cover if it is contaminated with dirt or other substances – *see “Battery Housing Upper Section, Checking for Re-Use”*
- Additional blue Dreibond sealant is then applied over top of clean and uncontaminated original sealant on the top cover – see *“High-Voltage Battery 1 AX2, Sealing”*
- The leak test of the housing is done in-car before removal and after reinstallation instead of on the removed battery – *see “High-Voltage Battery 1 AX2, Removing and Installing”*
- The leak test is performed and documented with ODIS, according to the GFF test to check the housing with vacuum instead of pressure – see “*High-Voltage Battery 1 AX2 Leak Test”*

- In the steps for top cover removal, wearing arc-flash and voltage protective apparel (PPE) appears after screw and bolt removal – see *"High-Voltage Battery 1 AX2, Opening"*
- Always confirm no potential short circuit exists by measuring voltage with VAS6762/45 tester before installing the last HV connector between SX8 and J991 – *see "Circuit, Disconnecting"*

Cell Balancing

- Never install any cell module without first ensuring it is properly and precisely balanced to match the cells in the battery which are not being replaced. It is never appropriate to install cell modules which are not properly balanced.
- Balancing time – The amount of balancing time varies in proportion to the difference between the cell voltages in the battery pack and those of the new cell module. If the problem which requires a cell module to be replaced does not render the high-voltage battery inoperable, then it is advantageous to charge or discharge the high-voltage battery in the vehicle before removing it, so that the state of charge (SOC) of the battery pack is closer to the SOC of the new module (typically 25-30%).
- Charging rate – The VAS 6910 provides 5X higher current charging (50A) than discharging (10A). Therefore, it takes less time to charge a new cell module to the target voltage than to discharge it by a comparable amount.
- Voltage precision – Determine the target voltage for the VAS 6910 module balancer, balance the new cell module, and install it shortly thereafter. Consider that if the problem which requires a cell module to be replaced does not render the high-voltage battery inoperable, then the cell voltages in the battery pack may change (such as through operation of heat or air conditioning, 12V consumers, or autonomous recharging of the 12V battery from the high-voltage battery).
- Balancer software – Ensure the most recent and up-to-date software package is used. It is available for download from VW Hub > ServiceNet > Workshop Equipment > Tool Information > Tool Software Updates.

Top Cover – Large Hollow Screws

- Use hand tools only! – Power tools increase the likelihood of aluminum housing thread damage.
- Large hollow screw removal – The large M24 threads are coated with an encapsulated sealant. Remove the hollow screws with care. If resistance is felt, work the screw back and forth slowly.
- Large hollow screw thread cleaning – In addition to brushing out the old sealant with the pipe brush VAS 294 029 or equivalent, a removed old screw in good condition may be used as a cleaning aid. The large tap VAS 274013 should only be used with extreme care if absolutely necessary.
- Hollow screw thread damage – The cosmetic appearance of the threads is not critical. However, if the specified torque cannot be achieved when the new hollow screws are fully installed, then the complete lower housing must be replaced – no approved repair exists!
- Hollow screw installation – If the screw stops turning and torque increases before the shoulder of the screw is seated against the top cover, stop and check threads before reattempting installation.
- Inspect new hollow screws – Check threads for damage and do not use screws which have any significant gouges or nicks in the thread that could cause housing thread damage.

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Top Cover – Small Screws

- Use hand tools only! – Power tools increase the likelihood of aluminum housing thread damage.
- For the many small screws in the cover, a 1/4-inch drive speeder handle with the appropriate Torx bit is a good option, which allows quicker removal than a ratchet without increasing risk of damage.
- Central screws on cover (machine screws with wax) – Remove with care to avoid damage in threads of housing. A broken screw may be removed, but damaged threads are not repairable, and would lead to complete housing replacement!
- Perimeter screws on cover (pointed tip flow-drill screws) – Remove with care to avoid damage. Screws are typically replaced with all new screws of the original type, according to the repair manual. However, repair with over-size screws is possible if thread damage occurs. Refer to repair manual, and obtain ETKA bulletin 9-174 from the parts department for reference.

ODIS Service & Guided Fault Finding

- Obtain a readout of all measured value blocks (not just cell voltages) from the Battery Regulation Control Module -***J840***- (diagnostic address 008C) before removing and opening the battery. Save the log and send to GFF Paperless. This is important documentation to have available for reference if needed, and is much easier to obtain before the battery repair has started.
- From the measured value blocks, record the “Serial number of H-V / hybrid battery” for reference. This may be requested within various GFF test plans. Every battery has a unique serial number, similar to the VIN, which is also printed on the identification label or etched on the battery housing.
- Certain DTCs such as voltage *sensing* high/low are not self-clearing, and will remain static even after the condition has become intermittent. Running through the GFF test “008C – Controller Configuration” after the battery repair has been completed will allow for erasing these faults.
- When replacing the Battery Regulation Control Module -***J840***- always run the necessary GFF test “008C - Control Module, Replacing” before removal of the old control unit, according to the repair manual. If this is not done, the serial number will not be copied from the old to new control unit. If this happens, or if the old control unit is non-responsive, then it is possible to determine the valid serial number from a previous GFF log or from the battery housing identification. If necessary, it is possible to write the serial number manually within adaptations through control module OBD.
- ODIS may be used with the battery removed from the vehicle, in order to validate that no unexpected faults or abnormal measured block values remain, before sealing the battery top cover and reinstalling the battery into the vehicle. Communication with the Battery Regulation Control Module -J840- is possible by using either the VAS 671007 Extension Cables for High Voltage Battery to connect the removed battery to the vehicle, or by using the VAS 5581A High Voltage Diagnostics Box to connect the ODIS tester to the battery directly.

Accuracy of Service Parts

- Batteries assembled in different plants can look nearly identical in physical appearance, yet have different properties and performance characteristics. This includes not only the functional electrical parts, but also single-use parts such as screws, bolts, gaskets, etc.
- Use only the specified parts for the specific battery being repaired, according to the ETKA catalog. Nothing which is designed for one battery may be interchanged with another battery unless it is a common part number for both, according to the ETKA parts catalog.
- Never install a new cell module from one supplier into a battery pack containing cell modules from a different supplier. Cell modules from different suppliers may contain cells with different chemistries or different series-parallel configurations that are not interchangeable.
- It is never appropriate to judge compatibility of cell modules on the basis of physical characteristics, voltage, or connector fitment. Only the part number may be used to determine a suitable replacement part, according to the ETKA parts catalog.

Warranty

Information only.

Required Parts and Tools

Not applicable.

Additional Information

All part and service references provided in this Technical Bulletin are subject to change and/or removal. Always check with your Parts Dept. and Repair Manuals for the latest information.