

WF24 - Replacing High-Voltage Battery Control Unit (Workshop Campaign)

Important: **CRITICAL WARNING** - This campaign includes steps where control unit(s) in the vehicle will be programmed with the PIWIS Tester. The vehicle voltage must be maintained between 13.5 volts and 14.5 volts during this programming. Failure to maintain this voltage could result in damaged control unit(s). Damage caused by inadequate voltage during programming is not a warrantable defect. The technician must verify the actual vehicle voltage in the PIWIS Tester before starting the campaign and also document the actual voltage on the repair order. Please refer to Equipment Information EQ1401 for a list of suitable battery chargers/power supplies which should be used to maintain vehicle voltage.

Model Year: 2015

Vehicle Type: Panamera S E-Hybrid

Concerns: High-voltage battery control unit

Information: This is to inform you of a voluntary Workshop Campaign on the above-mentioned vehicles. **There is a possibility that parts from a certain batch that do not meet the required specifications were installed in control units for the high-voltage battery on the affected vehicles.**

As a result, the high-voltage system can fail when attempting to start the vehicle. If this happens, the vehicle will not start and the warning message "Hybrid system failure" will appear in the instrument cluster.

Action Required: Replace and re-program high-voltage battery control unit.

Affected Vehicles: The VIN(s) can be checked by using PIWIS Vehicle Information link to verify if the campaign affects the vehicle. This campaign is scope specific to the VIN! Failure to verify in PIWIS may result in an improper repair. This campaign affects 101 vehicles in North America.

Parts Info: **NOTE: PARTS WILL NOT BE AUTOMATICALLY ALLOCATED TO YOUR DEALERSHIP. ALL PARTS MUST BE ORDERED VIA A PTEC/PAV.**

Part No.	Designation - Use	Qty.
000.043.210.11	⇒ High-voltage battery control unit	1 ea.
970.611.901.03	⇒ Battery fuse box cover	1 ea.
955.606.838.00	⇒ Tie-wrap clip	5 ea.
970.555.643.01	⇒ Screw bolt for locking mechanism	2 ea.

999.507.584.02	⇒ Clamp	10 ea.
999.507.839.01	⇒ Clip	10 ea.
958.701.739.00	⇒ Warning sign for cover	1 ea.
970.611.901.17	⇒ Set of screws for control unit	1 ea.

Includes:

...	Flange nut, M5 – For securing control unit	5 ea.
...	Cheese head bolt, M6 x 25 – For securing E-box (not required during the campaign)	5 ea.
970.611.901.14	⇒ Set of screws for fuse	1 ea.

Includes:

...	Dowel (not required during the campaign)	2 ea.
...	Oval-head screw, M6 x 12 – For securing cover to high-voltage battery housing	3 ea.
...	Cheese head bolt, M8 x 12 – Fuse on high-voltage battery (not required during the campaign)	2 ea.
970.611.901.05	⇒ Fuse	1 ea.

Includes:

...	Fuse cover	1 ea.
...	250 A fuse – High-voltage battery	1 ea.
...	Cheese head bolt, M8 x 12 – Fuse on high-voltage battery	2 ea.
...	Washer	2 ea.
...	Cover – Protective cap after removing fuse	1 ea.

Also required:

000.043.301.47	⇒ Antifreeze (1-liter container)	approx. 1 liter per vehicle (As much as required)
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Materials: ... Tie-wrap, approx. 3.0 x 200 mm 5 ea. ¹
 e.g. 999.513.075.40

¹ The WWS Warranty system will automatically add into the "Miscellaneous item" section (sublet) of the claim after the claim has been submitted.

... Tap, M6 x 1.0 with spiral grooves 1 ea. ²



Tap with spiral groove



Information

If the specified tap is **not** already **available in the workshop** or if it was not ordered for **workshop campaign WD57**, it must be **ordered once** specifically for carrying out this work.

During this repair measure, only use **taps with spiral grooves**, which guide the chips out of the bore in the opposite direction to the cutting direction.

Only **one** M6 x 1.0 tap may be invoiced for each affected Porsche dealer.

² The WWS Warranty system will automatically add into the "Miscellaneous item" section (sublet) of the claim after the claim has been submitted.

Special Tools:

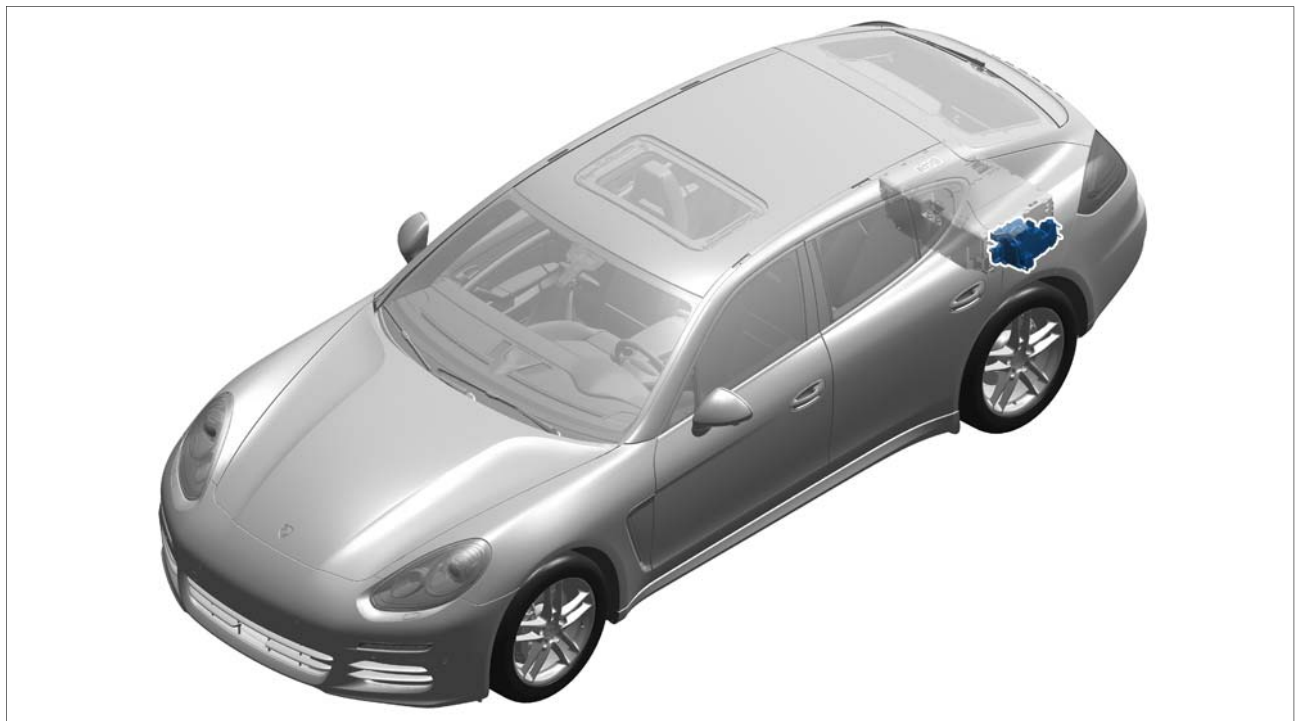
Designation/Comment	Use
VAS 6558/9-6 - High-voltage test adapter HVA 280	Isolating high-voltage system from power supply
VAS 6558/9-7 - High-voltage test adapter HVR 40	
VAS 6839 - Voltage tester	
T40262 - Locking cap	
T40262 - Locking cap	
VAS 6884 - High-voltage cordon	Setting up high-voltage work area

9860 - Adapter plate

Removing and installing high-voltage battery

9874 - Assembly aid**3033 - Lifting tackle****VAS 6100 - Workshop crane****9696 - Filling device**Assembly pliers for spring band clamps, e.g. **Nr.192 - Hose clamping pliers**Torque wrench, e.g. **9768 - Electronic torque wrench, 2 - 100 Nm (1.5 - 74 ftlb.)** (2 – 100 Nm/1.5 – 74 ftlb.)**VAS 6883 - Insulated tool set**

Removing and installing high-voltage fuse and high-voltage battery control unit

Torque wrench, e.g. **V.A.G 1783 - Torque wrench, 2-10 Nm (1.5-7.5 ftlb.)** (2 – 10 Nm/1.5 – 7.5 ftlb.)**9818 - PIWIS Tester II**Installation
Position:*Installation position of high-voltage battery control unit*

Claim See Attachment "A".
 Submission:

Removing high-voltage battery control unit



High voltage

- Danger of electric shock from live parts
 - Risk of serious burns or death
- ⇒ Work on the HV battery may only be carried out by a high-voltage technician.
- ⇒ Always use insulated tools **VAS 6883 - Insulated tool set** when working on the HV battery.
- ⇒ Observe general warning notes for working on the high-voltage vehicle electrical system. ⇒ *Workshop Manual '2X00IN General warning notes for working on the high-voltage electrical system'*



Information

Before starting to work on the high-voltage system, a high-voltage technician must isolate the high-voltage system from the power supply.

The document ⇒ *Workshop Manual '2X00IN Isolation from supply prior to performing maintenance tasks on hybrid vehicles'* describes the various types of work for which the high-voltage system must be isolated from the power supply.

The test log **Verifying absence of electric charge** and **Restarting high-voltage system** can be found under Standard forms in PIWIS.



Information

Always use insulated tools **VAS 6883 - Insulated tool set** when working on the high-voltage battery and a high-voltage cordon **VAS 6884 - High-voltage cordon** when working on a HV work bay.

- Work Procedure: 1 Read out the values using the PIWIS Tester before removing the old high-voltage battery control unit ⇒ *Workshop Manual '279455 Replacing control unit for HV battery'*.
- 2 Observe warning notes ⇒ *Workshop Manual '2X00IN General warning notes for working on the high-voltage vehicle electrical system'*.



Restricted area for HV battery

- 3 **Isolate the high-voltage system from the power supply** and complete the relevant documentation on isolating the system from the power supply.
⇒ *Workshop Manual '2X00IN Isolating high-voltage electrical system from power supply/Starting high-voltage electrical system'*
- 4 Remove high-voltage battery ⇒ *Workshop Manual '270819 Removing and installing high-voltage battery - section on "Removing"*.
- 5 Set up a high-voltage cordon **VAS 6884 - High-voltage cordon** around the high-voltage workstation.

NOTICE

Incorrect removal or fitting of safety-related screws for the high-voltage battery.

- Risk of damage to rivet nuts
 - Risk of damage to screw heads
 - Risk of damage to high-voltage battery
- ⇒ Loosen and tighten fastening screws without using electric tools.
- ⇒ Only loosen and tighten fastening screws using special tool VAS 6883 Insulated tool set.
- ⇒ Be extremely careful when loosening fastening screws. See Note: ⇒ "Procedure for loosening micro-self-locking screws".
- ⇒ Clean the threaded bores before fitting the fastening screws. See Note: ⇒ "Procedure for cleaning threaded bores on the high-voltage battery".
- ⇒ Always use new fastening screws.
- ⇒ Observe specified tightening torques.

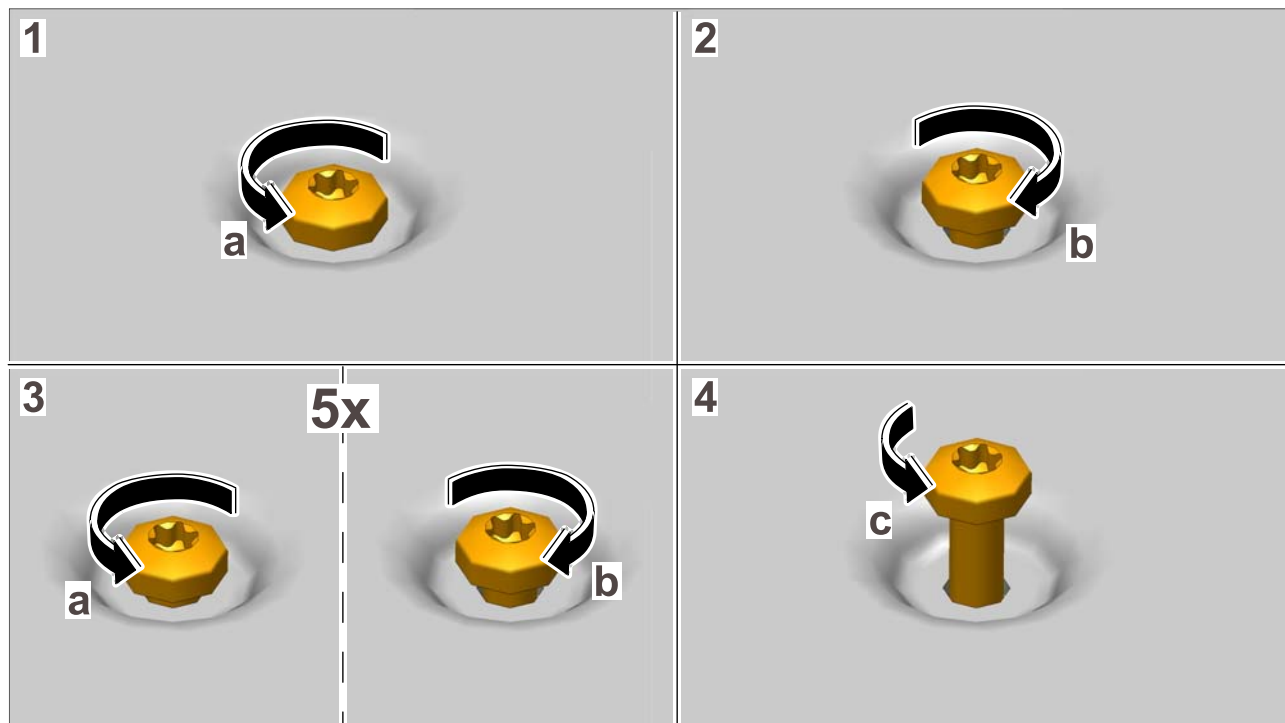
**Information****Procedure for loosening micro-self-locking screws.**

The covers on the high-voltage batteries are secured using fastening screws with high-strength screw locking agent. However, these can be difficult to loosen as a result of certain environmental conditions and depending on the service life of the vehicle.

To avoid breaking off or damaging fastening screws, always loosen the fastening screws as follows:

- 1.) Mark the fastening screw using a felt-tip pen and carefully loosen it by half (1/2) a turn ⇒ *Loosening fastening screws -arrow a-*.
- 2.) Screw the fastening screw in again by half (1/2) a turn ⇒ *Loosening fastening screws -arrow b-*.
- 3.) Repeat Steps 1 and 2 at least five times (5x) until the loosening torque of the fastening screw is reduced significantly. The fastening screw can then be turned easily.

4.) After Step 3, the torque should be much lower so that the fastening screw can be loosened completely ⇒ *Loosening fastening screws -arrow c-*.



Loosening fastening screws



Information

If the **cover on the fuse carrier** for the high-voltage battery **cannot be removed** because the screw heads or rivet nuts are damaged, for example, proceed as follows:

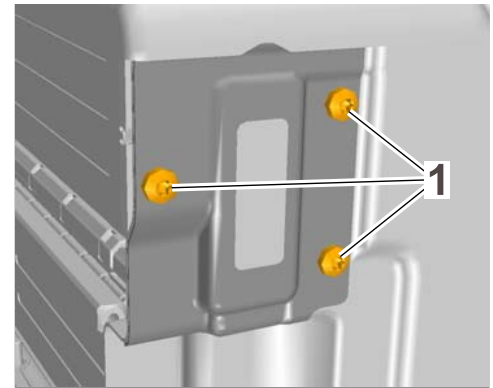
- **Stop working** on the high-voltage battery **immediately**.
- To find out what to do next, contact Technical Support.

- 6 Remove fuse carrier cover.
 - 6.1 Loosen fastening screws ⇒ *Removing fuse carrier cover -1-* as described above.
 - 6.2 Push fuse carrier cover down and remove it.



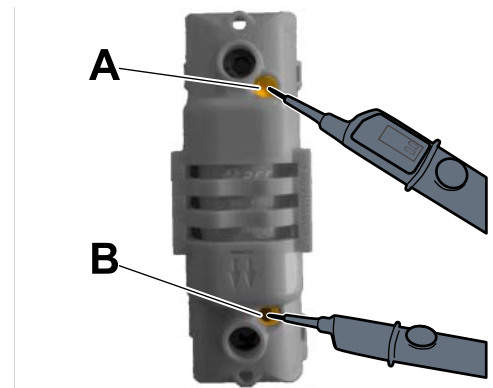
Information

Perform function test on voltage tester at the vehicle jump-start terminals using a reference voltage.



Removing fuse carrier cover

- 7 Verify isolation from the power supply at the high-voltage battery fuse using a voltage tester **VAS 6839 - Voltage tester**.
 - 7.1 Contact point ⇒ *Verifying absence of electric charge -A-* to contact point ⇒ *Verifying absence of electric charge -B-*.
 - 7.2 Contact point ⇒ *Verifying absence of electric charge -A-* to housing.
 - 7.3 Contact point ⇒ *Verifying absence of electric charge -B-* to housing.
 - 7.4 Check contact point ⇒ *Verifying absence of electric charge -A-* to contact point ⇒ *Verifying absence of electric charge -B-* again to prevent static charge.



Verifying absence of electric charge



Information

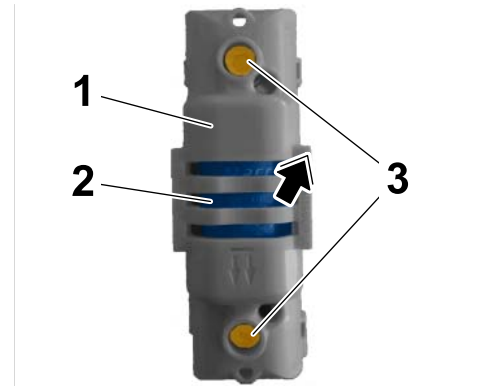
Further steps may only be carried out if the measured voltage is less than 1 V. If this is not the case, stop working on the system and contact Technical Support.



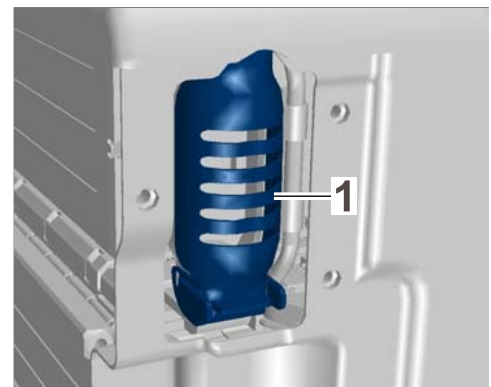
Information

Once absence of electric charge has been verified using the voltage tester, the fuse must be replaced without any interruption to work.

- 8 Remove high-voltage battery fuse.
 - 8.1 Unscrew and remove fastening screws ⇒ *Removing fuse -3-* for cap ⇒ *Removing fuse -1-* and fuse ⇒ *Removing fuse -2-*.
 - 8.2 Carefully remove cap ⇒ *Removing fuse -1-* together with fuse ⇒ *Removing fuse -2-*.
- 9 Unclip cap ⇒ *Installing cap -1-* from fuse and insert it on the high-voltage battery again.



Removing fuse



Installing cap



Information

Procedure for cleaning threaded bores (through-bore) on the side bar of the high-voltage battery.

After loosening micro-self-locking fastening screws, it is important to remove the particles of screw locking agent from the threaded bores.

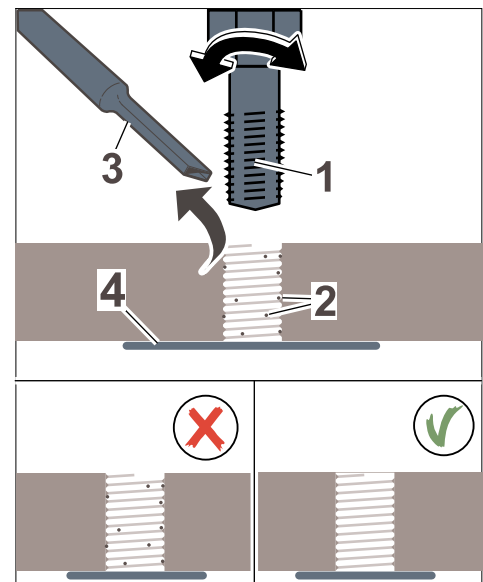
- All tasks required for cleaning the thread must be done manually. Wear the prescribed personal protective equipment.
- Never use lubricant for cleaning the threaded bores.
- When cleaning the threaded bores, always make sure that no remaining pieces of the micro-encapsulated coating or metal chips get into the battery housing. Use a vacuum cleaner to do this.



Comparison of taps

When cleaning the threaded bores (M6) on the high-voltage battery, always proceed as follows:

1. Stick two strips (50 x 80 mm) of fabric adhesive tape ⇒ *Cleaning threaded bore -4-* on the inside of the bar on the high-voltage battery using a plastic wedge. The bores must be completely sealed.
 2. Insert tap (with spiral grooves) ⇒ *Cleaning threaded bore -1-* into the threaded bore.
 3. Hold a vacuum cleaner with a plastic nozzle ⇒ *Cleaning threaded bore -3-* at the threaded bore in such a way that the remaining pieces of adhesive and metal chips ⇒ *Cleaning threaded bore -2-* will be removed.
 4. Turn the tap back and forth by a quarter (1/4) to a half (1/2) a turn several times ⇒ *Cleaning threaded bore -arrow-* to extract the remaining adhesive and metal chips that are dislodged.
 5. Repeat Step 3 several times until the threaded bore is completely cleaned. Make sure not to puncture the fabric adhesive tape.
 6. Carefully pull off fabric adhesive tape and always use a vacuum cleaner to remove any loose particles at the same time.
- 10 Clean the screw threads of the fastening points as described above using an **M6 x 1.0 tap with spiral grooves**.

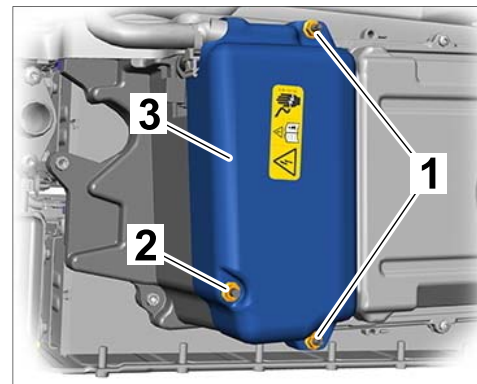


Cleaning threaded bore

11 Remove high-voltage battery control unit.

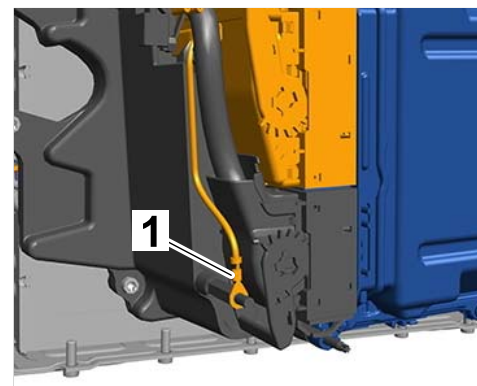
11.1 Loosen fastening nuts ⇒ *Removing cover for high-voltage battery control unit -1, 2-* on the cover of the high-voltage battery control unit and remove cover ⇒ *Removing cover for high-voltage battery control unit -3-*.

11.2 Remove spacers under the fastening nuts ⇒ *Removing cover for high-voltage battery control unit -1-*.



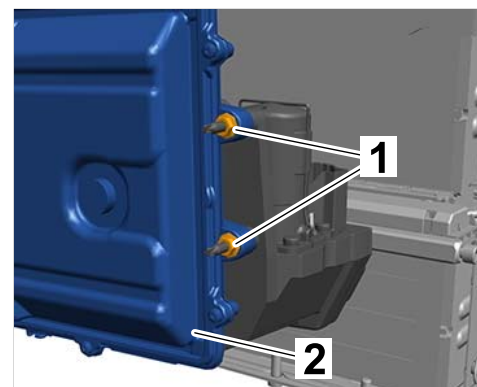
Removing cover for high-voltage battery control unit

11.3 Remove ground line ⇒ *Removing ground line -1-* from the fastening bolt.



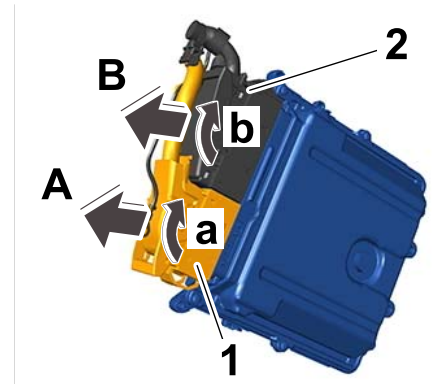
Removing ground line

11.4 Loosen fastening nuts ⇒ *Removing high-voltage battery control unit -1-* and pull off high-voltage battery control unit ⇒ *Removing high-voltage battery control unit -2-*.



Removing high-voltage battery control unit

- 11.5 Release electric plug connection ⇒ *Releasing electric plug connections -1-* at the high-voltage battery control unit completely ⇒ *Releasing electric plug connections -arrows a-* and disconnect it ⇒ *Releasing electric plug connections -arrow A-*.
- 11.6 Release electric plug connection ⇒ *Releasing electric plug connections -2-* completely ⇒ *Releasing electric plug connections -arrow b-* and disconnect it ⇒ *Releasing electric plug connections -arrow B-*.
- 11.7 Remove high-voltage battery control unit.

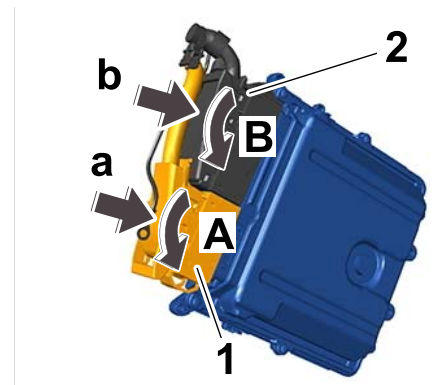


Releasing electric plug connections

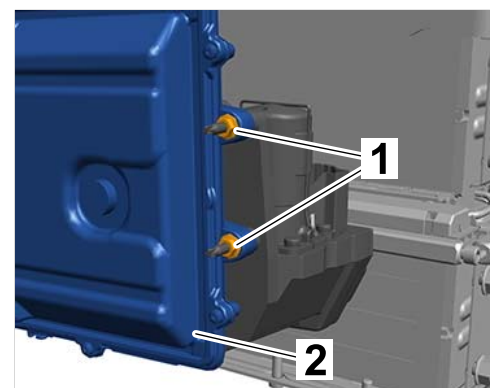
Installing high-voltage battery control unit

Work Procedure: 1 Install high-voltage battery control unit.

- 1.1 Connect electric plug connection ⇒ *Connecting electric plug connections -2-* on the high-voltage battery control unit ⇒ *Connecting electric plug connections -b-* and lock it ⇒ *Connecting electric plug connections -B-*.
- 1.2 Connect electric plug connection ⇒ *Connecting electric plug connections -1-* (⇒ *Connecting electric plug connections -a-*) and lock it ⇒ *Connecting electric plug connections -A-*.
- 1.3 Position control unit ⇒ *Installing high-voltage battery control unit -2-* on the E-box and tighten fastening nuts ⇒ *Installing high-voltage battery control unit -1-*.
Tightening torque 5.9 Nm (4.5 ftlb.)

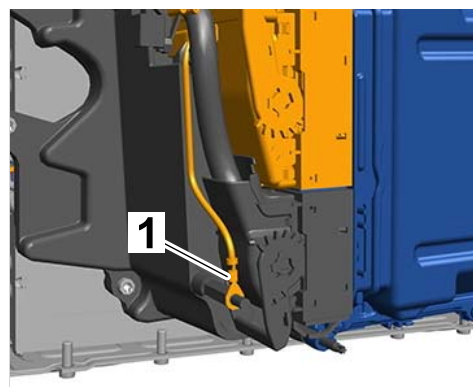


Connecting electric plug connections



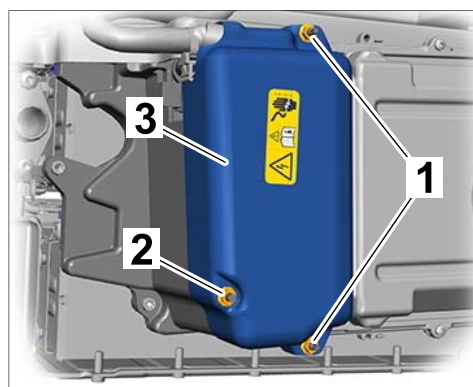
Installing high-voltage battery control unit

- 1.4 Push ground line ⇒ *Pushing on ground line -1-* onto the fastening bolts.



Pushing on ground line

- 1.5 Position spacers on the bolts under the fastening nuts ⇒ *Installing cover for high-voltage battery control unit -2-*.
- 1.6 Position cover on high-voltage battery control unit ⇒ *Installing cover for high-voltage battery control unit -3-* and tighten fastening nuts ⇒ *Installing cover for high-voltage battery control unit -1, 2-*. **Tightening torque 5.9 Nm (4.5 ftlb.)**



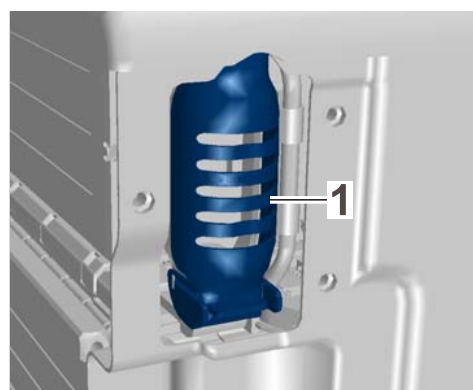
Installing cover for high-voltage battery control unit

- 2 Remove cap ⇒ *Removing cap -1-*.



Information

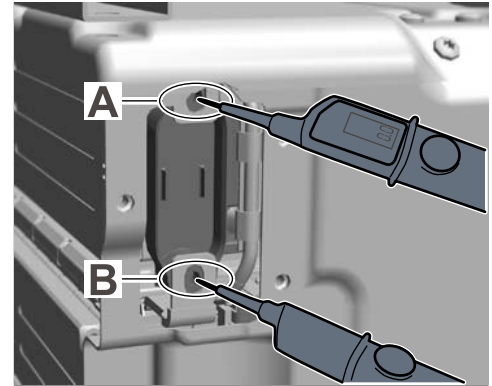
Further steps may only be carried out if the measured voltage is less than 1 V. If this is not the case, stop working on the system and contact Technical Support.



Removing cap

- 3 Verify absence of electric charge at the exposed high-voltage contacts of the high-voltage battery using a suitable voltage tester at contact points ⇒ *Verifying absence of electric charge -A, B-*.
 - 3.1 Contact point ⇒ *Verifying absence of electric charge -A-* to housing.
 - 3.2 Contact point ⇒ *Verifying absence of electric charge -B-* to housing.

The measurement also prevents voltages due to the build-up of static charge.



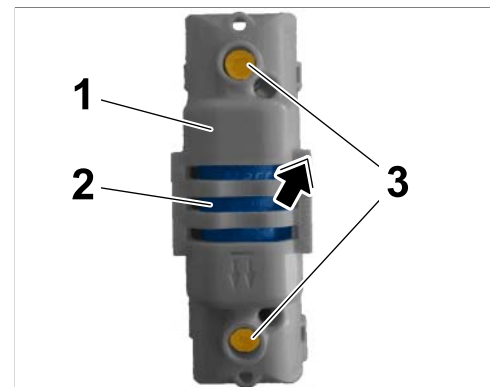
Verifying absence of electric charge



Information

Insert fuse without causing any interruption to work in order to prevent an electrostatic charge.

- 4 Install high-voltage battery fuse.
 - 4.1 Clip fuse into cap.
 - 4.2 Position cap ⇒ *Installing fuse -1-* together with fuse ⇒ *Installing fuse -2-*.
 - 4.3 Screw on fastening screws ⇒ *Installing fuse -3-* for cap ⇒ *Installing fuse -1-* and fuse ⇒ *Installing fuse -2-*. **Tightening torque 10 Nm (7.5 ftlb.)**



Installing fuse

- 5 Position fuse carrier cover and tighten fastening screws ⇒ *Installing fuse carrier cover -1-*. **Tightening torque 10.1 Nm (7.5 ftlb.)**



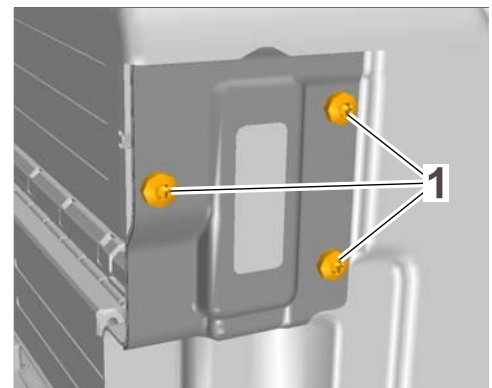
Information

Stickers (warning of dangerous electrical voltage)

In the course of the work required for replacing the control unit, the fuse carrier cover must be replaced.

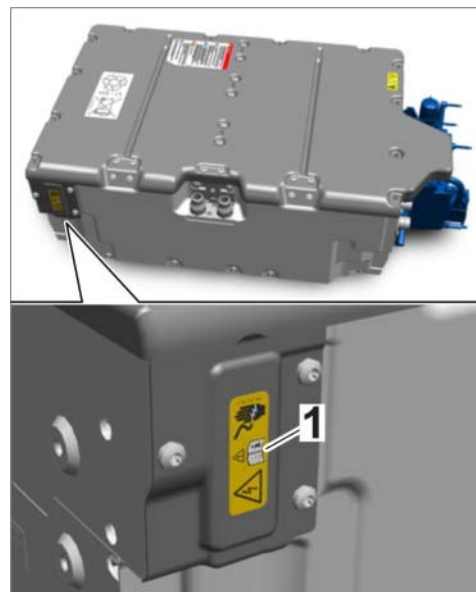
The warning sticker affixed to the cover cannot be re-used.

Before re-installing the high-voltage battery, a sticker must therefore be affixed to the new cover at the same position and with the same text alignment as on the removed cover.



Installing fuse carrier cover

- 6 Affix warning signs ⇒ *Warning sign pictograms -1-* to the high-voltage battery.



Warning sign pictograms

- 7 Install high-voltage battery ⇒ *Workshop Manual '270819 Removing and installing high-voltage battery - section on "Installing"*.
- 8 Restart the high-voltage system and complete the relevant documentation ⇒ *Workshop Manual '2X00IN Isolating high-voltage electrical system from power supply/Starting high-voltage electrical system'*.

Re-programming and coding high-voltage battery control unit

NOTICE

Fault entry in the fault memory and control unit programming aborted due to low-voltage.

- Increased current draw during diagnosis or control unit programming can cause a drop in voltage, which can result in one or more fault entries and the abnormal termination of the programming process.
- ⇒ Before starting control unit programming, connect a suitable battery charger or power supply, suitable for AGM type batteries, recommended current rating of 70A fixed voltage 13.5V to 14.5V.

NOTICE

Control unit programming will be aborted if the WLAN connection is unstable.

- An unstable WLAN connection can interrupt communication between PIWIS Tester II and the vehicle communication module (VCI). As a result, control unit programming may be aborted.

⇒ During control unit programming, always connect PIWIS Tester II to the vehicle communication module (VCI) via the USB cable.

NOTICE**Programming interrupted**

- Malfunctions in control unit
 - Risk of damage to control unit
- ⇒ Route the line between the PIWIS Tester and the vehicle communication module (VCI) without tension to prevent the line from slipping out of the USB connection on the PIWIS Tester.
- ⇒ Lock connecting lines on the vehicle communication module (VCI) using the bayonet lock.
- ⇒ Route the line between the vehicle communication module (VCI) and diagnostic socket on the vehicle without tension and make sure that the connector is inserted fully into the diagnostic socket.
- ⇒ Check that the rechargeable battery for the PIWIS Tester is charged sufficiently. Connect the PIWIS Tester to the power supply unit if necessary.

NOTICE**Control unit programming will be aborted if the vehicle key is not recognized**

- If the vehicle key is not recognized in vehicles with Porsche Entry & Drive, programming cannot be started or will be interrupted.
- ⇒ Switch on the ignition using the original driver's key. To do this, replace the control panel in the ignition lock with the original driver's key if necessary.

Work Procedure: 1 Carry out general preliminary work for control unit programming as described in ⇒ *Workshop Manual '9X00IN Basic instructions and procedure for control unit programming using the PIWIS Tester - section on "Preliminary work"*.

**Information**

The procedure described here is based on the PIWIS Tester II software version **15.300**.

The PIWIS Tester instructions take precedence and in the event of a discrepancy, these are the instructions that must be followed.

A discrepancy may arise with later software versions for example.

**Information**

Once control unit programming is complete, the windscreen wipers can start wiping. Do not work in this area or place any objects on the windshield during programming.

2 **Re-program the high-voltage battery control unit.**

The basic procedure for programming a control unit is described in the Workshop Manual ⇒ *Workshop Manual '9X00IN Basic instructions and procedure for control unit programming using the PIWIS Tester - section on "Programming"*.

Specific information on control unit programming during this campaign:

Required PIWIS Tester software version:	15.410 (or higher)
Type of control unit programming:	Control unit programming using the ' Campaign ' function in the Additional menu on the PIWIS Tester by entering a programming code.
Programming code:	G5L7D
Programming sequence:	Read and follow the information and instructions on the PIWIS Tester during the guided programming sequence. The 'high-voltage battery' control unit is first re-programmed and then re-coded automatically during the programming sequence. Do not interrupt programming and coding.
Programming time (approx.):	12 minutes Once programming and coding is complete, the PIWIS Tester will prompt you to switch the ignition off and then back on again after a waiting time of 6 minutes . The 6-minute waiting time with the ignition switched off is necessary so that on-board diagnosis of the high-voltage system can be performed and completed as required after control unit programming. The vehicle cannot be started until on-board diagnosis is completed successfully. Fault memory entries that were entered as a result of control unit programming can only be deleted after on-board diagnosis has been completed successfully.

Software version programmed during this campaign:	1101 Following control unit programming, the software version can be read out of the 'high-voltage battery' control unit in the ⇒ ' Extended identifications ' menu using the PIWIS Tester.
Procedure in the event of error messages appearing during the programming sequence:	⇒ <i>Workshop Manual '9X00IN Basic instructions and procedure for control unit programming using the PIWIS Tester - section on "Troubleshooting"</i> .
Procedure in the event of abnormal termination of control unit programming:	Repeat control unit programming by entering the programming code again.

3 Teach the high-voltage battery control unit.

Following installation, teach the high-voltage battery control unit using the PIWIS Tester. To do this, write the values that were read out of the old control unit at the start of the campaign into the new control unit ⇒ *Workshop Manual '279455 Replacing control unit for HV battery'*.

- 4 Carry out general subsequent work for control unit programming as described in the Workshop Manual ⇒ *Workshop Manual '9X00IN Basic instructions and procedure for control unit programming using the PIWIS Tester - section on "Subsequent work"*.



Information

If the engine will not start and the prompt "Park vehicle safely" appears in the instrument cluster, on-board diagnosis of the hybrid system may not have been completed fully.

If this happens, switch off the ignition, disconnect the PIWIS Tester from the diagnostic socket on the vehicle and lock the vehicle. **Wait for at least 6 minutes**. Then unlock the vehicle and try to start the engine again.



Information

If the **passive** (greyed) fault memory entry "**D00000 - Function restriction due to fault in PSM**" is entered in the 'Electric power steering' control unit, please ignore this. The fault memory entry is stored as a result of a communication problem between the control units caused by the PIWIS Tester connected to the vehicle.

If the control units are found to have other faults, which cannot be erased and are not caused by control unit programming, these faults must be located and corrected.

This work **cannot** be invoiced under the workshop campaign number.

- 5 Enter the workshop campaign in the Warranty and Maintenance booklet.

Attachment "A": **Claim Submission** - Workshop Campaign WF24

Warranty claims should be submitted via WWS/PQIS.

Open campaigns may be checked by using either the PIWIS Vehicle Information system or through PQIS Job Creation.

Labor, parts, and sublet will be automatically inserted when Technician is selected in WWS/PQIS. If necessary, the required part numbers will need to be manually entered into warranty system by the dealer administrator.

Replacing high-voltage battery control unit

Labor time: **504 TU**

- Includes:
- Isolating high-voltage system from power supply and starting high-voltage system
 - Removing and installing subwoofer
 - Removing and installing luggage compartment cover
 - Removing and installing C-pillar trim panel
 - Removing and installing side trim panel
 - Removing and installing cover for lock support
 - Removing and installing battery
 - Removing and installing KESSY antenna
 - Removing and installing high-voltage charger
 - Removing and installing high-voltage battery
 - Removing and installing high-voltage battery fuse
 - Filling coolant
 - Bleeding low-temperature cooling system
 - Connecting and disconnecting battery charger
 - Connecting and disconnecting PIWIS Tester
 - Programming and coding high-voltage battery control unit
 - Reading out and erasing fault memory
 - Calibrating electric machine

Parts required:

000.043.210.11	High-voltage battery control unit	1 ea.
970.611.901.03	Battery fuse box cover	1 ea.
970.611.901.17	Set of screws for control unit	1 ea.
970.611.901.14	Set of screws for fuse	1 ea.
970.611.901.05	Set of screws for high-voltage fuse	1 ea.
955.606.838.00	Tie-wrap clip	5 ea.
970.555.643.01	Screw bolt for locking mechanism	2 ea.
999.507.584.02	Clamp	10 ea.
999.507.839.01	Clip	10 ea.
958.701.739.00	Warning sign for cover	2 ea.
000.043.301.47	Antifreeze, 1-liter container	1 ea.

Materials required:

WF240000001	Tie-wrap	1 ea. (i.e. 5 tie-wraps, approx. 3.0 x 200 mm e.g. 999.513.075.40; for warranty invoicing only)*
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* The WWS Warranty system will automatically add into the "Miscellaneous item" section (sublet) of the claim after the claim has been submitted.

Required tools:

WF240000002	Tap with spiral grooves – M6 x 1.0 tap	1 ea. (= M6 tap, for warranty invoicing only)**
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** The WWS Warranty system will automatically add into the "Miscellaneous item" section (sublet) of the claim after the claim has been submitted.

If the tap is not already available, it must only be invoiced **once** for the first vehicle during **warranty processing** in each Porsche dealership.

Only the **required parts and materials** must be invoiced in the campaign claim for the remaining vehicles on which work is carried out as part of this campaign in the Porsche dealership.

⇒ **Damage code WF24 066 000 2**

- References:
- ⇒ *Workshop Manual '2X00IN General warning notes for working on the high-voltage vehicle electrical system'*
 - ⇒ *Workshop Manual '2X00IN Isolating high-voltage electrical system from power supply/Starting high-voltage electrical system'*
 - ⇒ *Workshop Manual '270819 Removing and installing high-voltage battery'*
 - ⇒ *Workshop Manual '279455 Replacing control unit for HV battery'*

⇒ *Workshop Manual '9X00IN Basic instructions and procedure for control unit programming using the PIWIS Tester'*

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