VOLKSWAGEN GROUP

User Manual

VAS 6910A Module-Balancer

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1 General

1.1 Contents

This documentation describes the VAS 6910A and how to use it. Strict compliance with the safety instructions in chapter *Safety* and the remainder of the user manual is required.

This document is an integral part of the equipment. Keep it throughout the life of the equipment and pass it on to any subsequent owners or users.

1.2 Intended Use

The equipment is designed for the repair of HV batteries and battery modules. The equipment in this case is used to prepare new battery modules for installation in the case of replacement and to bring them to the voltage level of the rest of the HV battery modules. Moreover, the battery status of individual modules can also be checked.

The equipment may only be used indoors.

The equipment is designed for stationary use and must not be used in a mobile capacity.

Modules must be fully discharged before transport.

All modules to be used must be registered in the Offboard Diagnostic Information System Service (hereinafter referred to as ODIS Service) or the Porsche Integrated Workshop Information System (hereinafter referred to as PIWIS) and approved by Volkswagen AG.

Any use not specified herein is considered unintended use.

1.3 Target Group

The equipment is intended for vehicle repair/service shops or similar institutions.

It is intended for qualified users only.

Information

For more information, please contact your importer.

Comply with the regulations applicable in your country.

Read and follow this user manual.

2 Safety

This user manual contains important warnings and safety instructions that require user attention. Non-compliance with these warnings may result in death or serious injury.

The measuring results of this product depend not only on the proper functioning of the product itself, but also on a number of other boundary conditions. It is therefore essential that the results provided by this product are reviewed by an expert (e.g. a validity check) before any additional measures are taken based on these measuring results.

When using the product, a qualified specialist must ensure that the test object or test system cannot enter operating modes that could cause personal injury or material damage.

The user is solely responsible for the proper use of the equipment and must follow all instructions and notes in the ODIS Service or PIWIS.

2.1 Important Safety Instructions Workshop Tasks

The following list covers general work in workshops. Not all points necessarily apply to this equipment.

- Read the operations manual completely and carefully.
- In the event that the equipment is dropped or damaged, have it checked by a qualified service technician before starting operation again.
- Ensure that cables are not stretched or kinked or come into contact with sharp edges.
- Do not allow the equipment to come into contact with hot or moving parts.
- Always disconnect the equipment from the USB port and power supply when not in use.
- Pull on the plug and not the cable to remove the plug from the USB port.
- Allow the equipment to cool down completely before putting it away.
- When not in use, always unplug the equipment after turning it off.
- When storing the equipment, lay the hoses loosely around the equipment.

- To reduce the risk of fire, do not operate the equipment near open containers with flammable liquids (gasoline).

- Always operate the equipment at table height and never on the workshop floor.

- To reduce the risk of electric shock, avoid using the equipment on wet surfaces or exposing it to rain.

- Operate the equipment only as described in this manual.

- Only use accessories recommended by the manufacturer.

- Wear safety glasses when working. Everyday glasses only have shock-resistant lenses, they are not suitable safety glasses.

- All tools must be declared as “power tools” (1000 V). All tools and electrical safety gloves must be checked for damage before and after use.

- Never wear metal items such as jewelry, piercings, etc. while working.

KEEP THESE INSTRUCTIONS IN A SAFE PLACE!

2.2 Safety Instructions and Warning Signs

The following safety instructions and additional safety symbols are used in this documentation:

DANGER

DANGER indicates a dangerous situation which, if not avoided, leads to death or serious injury.

WARNING

WARNING indicates a dangerous situation which, if not avoided, can lead to death or serious injury.

CAUTION

CAUTION indicates a dangerous situation which, if not avoided, can lead to slight or moderate injury.

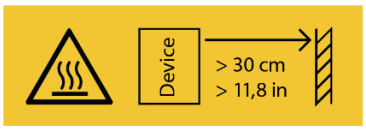
Additional safety symbols

Failure to comply with the following instructions can result in life-threatening injuries

and damage to property.

Danger from electric voltage

Hot surface warning



Maintain ventilation distance

Notes:

NOTE

This text refers to situations or operating errors that can lead to damage to property or data loss.

Information

This text refers to important information or instructions. Failure to comply with these instructions will significantly prevent or hinder successful termination of the actions described in this documentation.

2.3 Safety Concept

DANGER

Risk of death from electric voltage on vehicles equipped with high-voltage systems

The voltage present at the HV battery and the components connected to it can be fatal. Make sure that no one comes in contact with the HV battery connections, the connection lines of the HV battery, or any other live parts. The battery to be tested must be removed from the vehicle. If the measurements are carried out on a battery that is open but still installed in the vehicle, the vehicle must be deactivated and secured.

DANGER

Risk of death from electric voltage on vehicles equipped with high-voltage systems

Only appropriately qualified and authorized personnel are allowed to carry out work, particularly disassembly work, on high-voltage vehicles.

DANGER

Risk of death from electric voltage on vehicles equipped with high-voltage systems

For live-line work, specific safety and vocational training conditions apply.
Make sure to comply with these conditions in all situations.

DANGER

Risk of death from electric voltage on vehicles equipped with high-voltage systems

Make sure that all necessary safety precautions have been taken before starting the measurement.
Check that the HV insulating gloves or electrical safety gloves are suitable before using them.

DANGER

Risk of death due to electric voltage

Unprotected parts can carry dangerous voltages.
Do not open the equipment yourself. Troubleshooting is only permitted by AVL DiTEST.

DANGER

Risk of death due to electric voltage

In the event of danger, deactivate the equipment using the switch-off button and disconnect the mains plug. Note that the DC connections are still live due to the connected battery module. Wear personal protective equipment.

DANGER

Risk of death due to electric voltage

Battery terminals must be covered during charging to prevent contact and to protect against short circuiting.

WARNING

Read and follow the safety precautions on the screen.

WARNING

Risk of fire when charging defective modules

Never charge defective modules. Charging defective modules can result in a module fire.

WARNING

Electrical Shock Current Hazard

If the equipment is not operated on a type A RCD fused circuit, voltage may be present in parts in the event of a fault. Only operate the equipment on a type A RCD fused circuit.

WARNING

Danger of electric voltage due to damaged cables

Damaged cables can energize parts of the equipment and lead to dangerous electrical shocks if touched. Always check the cables for damage before using the equipment.

Do not pinch the cables or place any heavy objects on them, and do not place the cables over sharp edges.

Do not excessively or forcefully pull, bend or kink the cables.

WARNING

Risk of fire due to short circuit

There is a risk of short circuiting if the power cables are disconnected during charging. Do not disconnect the charging cables while charging.

WARNING

Risk of fire due to arcing

There is a risk of arcing if the power cables are disconnected during charging. Do not disconnect the charging cables while charging.

WARNING

Electrical shock current hazard

Water or rain entering the equipment may cause short circuiting and dangerous shock currents to pass through the body. Only use the equipment indoors in a dry environment.

WARNING

Risk of fire due to overheating

Exceeding the appropriate equipment temperature limits can cause the equipment to overheat and catch fire. Comply with the appropriate equipment temperature limits.

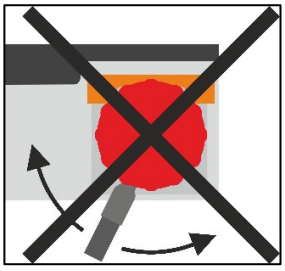
WARNING

Risk of fire due to overheating

Use only terminal cables with a 16 mm² cross-section. Only use terminal cables matching the item number specified in this user manual (see 3 *Standard* Scope of Supply.) Other terminal cables may be necessary for future vehicle models. These are not specified in the user manual.

WARNING

Make sure that all contact surfaces are clean.
Check that all cables are tightly secured after connecting.



CAUTION

High load hazard

If only one person is carrying the equipment, it may fall due to its weight and cause injuries. Have two people carry the equipment and hold it by the plastic cover for a better grip.

NOTE

To prevent charging errors, do not touch the modules while charging.

NOTE

Comply with the country-specific regulations for feeding energy to the public grid. Compliance with these regulations is the responsibility of the particular user of the equipment. Failure to comply may result in grid destabilization, material damage, or dangerous, unforeseen issues in the electric circuit.

NOTE

Feeding energy back to the grid is not possible in the case of batteries with less than 20 V.

NOTE

Only use accessories approved by Volkswagen AG.

NOTE

Do not replace detachable power cables with inadequately sized power cables.

NOTE

Position the equipment to ensure sufficient ventilation.
Do not block fans and air outlets. Air must be able to circulate freely. Always provide a ventilation distance of at least 30 cm/11.8 inches.

NOTE

The power input of the equipment must be defined for a maximum current of 16 A. The maximum current that the equipment can draw is 16 A. The equipment connection cable must be suitable for continuous current. Position the equipment so that the disconnect switch can be freely accessed at all times. Only cables mentioned in this user manual may be used.

NOTE

Upon delivery of the equipment, prevent condensation from forming inside the unit. Leave the equipment for 3 hours at the operating location to allow the temperature to equalize before turning it on.

NOTE

Before cleaning the equipment, turn it off at the disconnect switch and disconnect the mains plug.

Disconnect all adapter cables and ensure that no liquid enters the housing.

NOTE

To clean the equipment as specified by IP protection class 30, do not use running water or a high-pressure cleaner. In addition, do not use any corrosive cleaning agents.

Information

For more information, please contact your importer.

Information

Install the Offboard Diagnostic Information System Service (hereinafter referred to as ODIS Service) before connecting the equipment to the PC.

Administrator rights are required for the installation.

3 Standard Scope of Supply

Table 1: Standard Scope of Supply

Equipment and documentation	ID number	
1 × VAS 6910A/1 Equipment VAS 6910A Module Balancer	ASE 447 230 01 000	BO8063
Quickstart Guide		AT8153
USB stick		
USB cable		
1 × VAS 611 001 USB connecting cable (USB 2.0 A to USB 2.0 B rugged)	ASE 611 001 00 000	EX7069
Terminal cable with terminal cover, knurled bolt, nut and bracket		
1 × VAS 6910A/24 Cable set (HV) (positive and negative connection cable incl. brackets and knurled nuts)	ASE 447 312 00 000	
1 × VAS 6910/26 Terminal cover set (positive and negative)	ASE 447 316 00 000	

4 Charging Cables

NOTE

Only use accessories approved by Volkswagen AG.

Table 2: Power Cables

Power cables (country-specific) VAS 622 021	ID number	
CEE 3p 400 V 16 A	ASE 622 021 00 001	VS9354
CEE 3p 400 V 32 A	ASE 622 021 00 002	VS9355
NEMA 14/50 16 A	ASE 622 021 00 023	VS9356
NEMA 10/50 16 A	ASE 622 021 00 026	VS9404
American Denki 3p 4wire 60 A	ASE 622 021 00 070	VS9357
Hard-wired	ASE 622 021 00 084	VS9358

5 Assembly

The following chapter describes the equipment assembly.

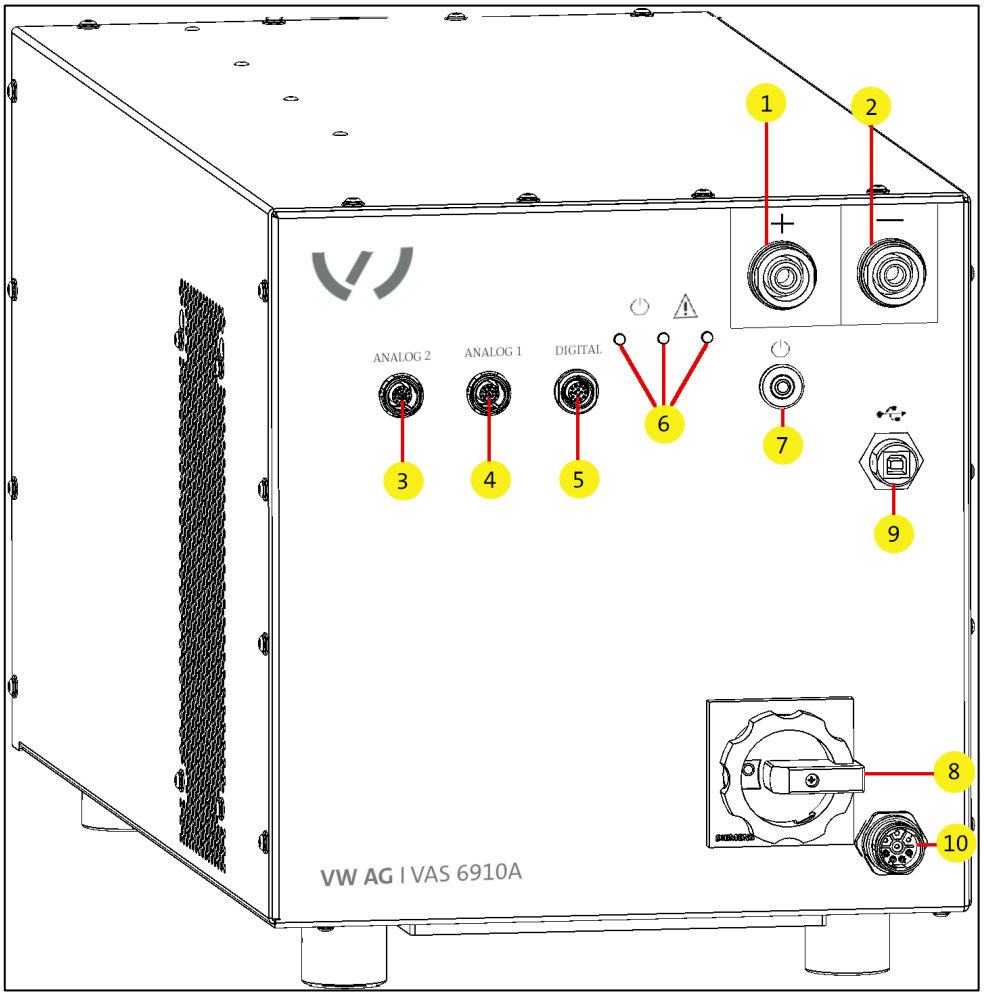


Figure 1: Front view

(1) Socket for HV+ terminal connection cable (red)
(2) Socket for HV- terminal connection cable (black)
(3) Socket for Analog 2 communication cable
(4) Socket for Analog 1 communication cable
(5) Socket for digital communication cable
(6) Status LEDs (see Status **LEDs**On/Off button
⇨ Exit standby
⇨ On/Off power module
(Only the power modules are turned on/off)
(7) Power disconnect switch I ON/0 OFF (Cuts off supply of power to equipment)
(8) Port for USB 2.0 B rugged
(9) Socket for power cable

Status LEDs

The following table lists the statuses of the LEDs:

Table 3: Explanation of Status LEDs

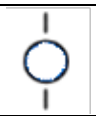
LED	Status	Frequency/Hz	On/ms – Off/ms
	Off	-	-
	Lights up	-	-
	Flashing slowly	0.5 Hz	125 ms/1875 ms
	Flashing	1 Hz	500 ms/500 ms
	Flashing quickly	4 Hz	125 ms/125 ms

Table 4: Status LEDs

Blue	Green	Red	Explanation
Flashing slowly	Off	Off	Stand-by
Flashing slowly	Off	Flashing quickly	Stand-by and failed self-test
Lights up	Lights up	Off	Idle
Lights up	Lights up	Flashing quickly	Idle and failed self-test
Lights up	Off	Lights up	Charging/discharging
Lights up	Off	Flashing	Error
Lights up	Off	Off	Self-Test
Lights up	Flashing	Off	Measuring battery status
Lights up	Lights up	Lights up	During current pulse only

6 Commissioning

Information

Install the ODIS Service before connecting the equipment to the PC.
Administrator rights are required for the installation.

Operation of the software is displayed in ODIS Service or PIWIS.

WARNING

Danger of electric voltage due to damaged cables

Damaged cables can energize parts of the equipment and cause electric shocks if touched. Always check the cables for damage before using the equipment. Do not pinch the cables or place any heavy objects on them, and do not place the cables over sharp edges.
Do not excessively or forcefully pull, bend or kink the cables.

6.1 Firmware Update

If a new firmware is provided with an update of the PC application, this will be detected automatically, and an update will be installed.

6.2 Hardware

NOTE

Only use the VAS 622 021 power cable approved by Volkswagen AG.

NOTE

Position the equipment to ensure sufficient ventilation.
Do not block fans and air outlets. Air must be able to circulate freely. Always provide a ventilation distance of at least 30 cm/11.8 inches.

NOTE

The power input of the equipment must be defined for a maximum current of 16 A. The maximum current that the equipment can draw is 16 A. The equipment connection cable must be suitable for continuous current. Position the equipment so that the disconnect switch can be freely accessed at all times. Only cables mentioned in this user manual may be used.

NOTE

Upon delivery of the equipment, prevent condensation from forming inside the unit. Leave the equipment for 3 hours at the operating location to allow the temperature to equalize before turning it on.

To put the equipment into operation, proceed as follows:

1. Connect the power cable VAS 622 021 (Figure 2/position 1) to the socket (Figure 2/position 2).
   Use the force that is necessary to do this.

2. Turn the power cable plug 90° to lock it in place (see Figure 2).
   Make sure that the screw lock is firmly seated on the plug.

3. Insert the power plug into the electrical outlet.

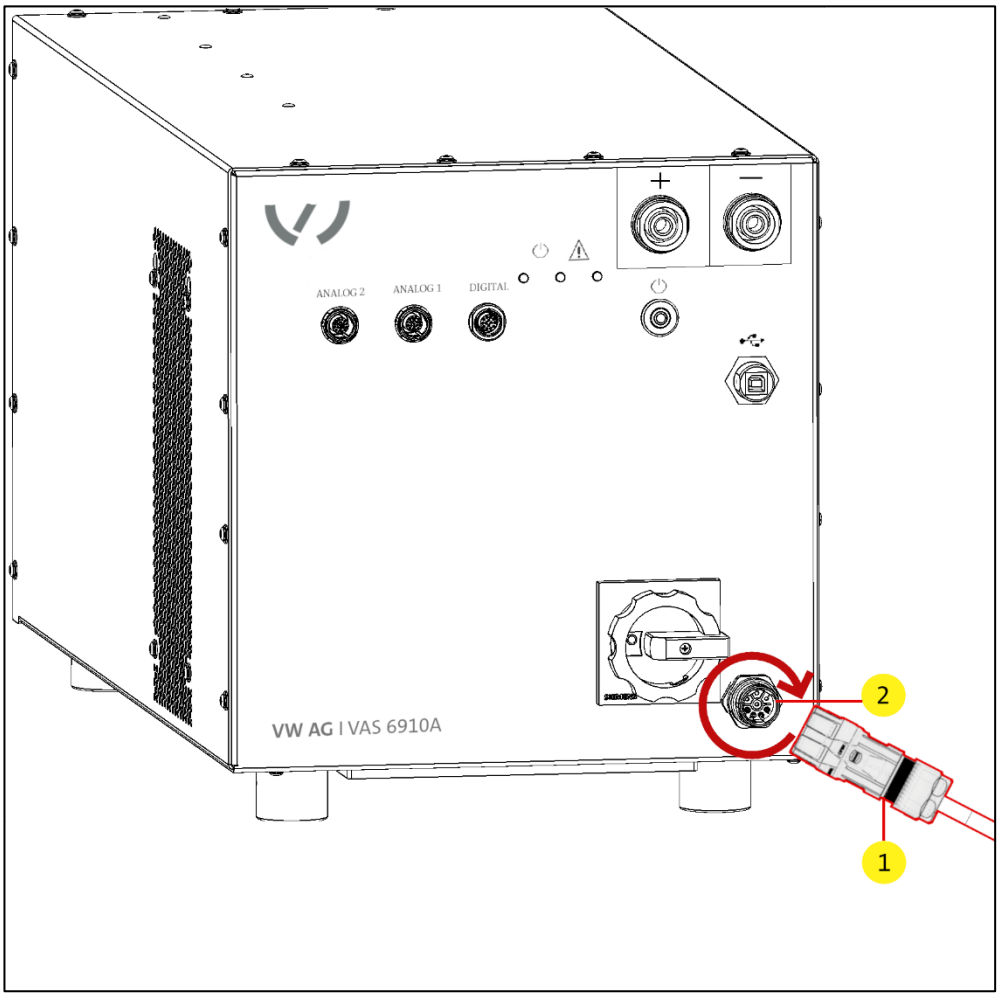


Figure 2: Plugging in the power cable

4. Plug the USB connecting cable VAS 611 001 (Figure 3/position 2) into the USB port (Figure 3/position 1) and secure it with the screw lock (see Figure 3).
   Make sure that the screw lock is firmly seated on the plug.

5. Connect the equipment to the diagnostic tester using the USB connecting cable VAS 611 001.

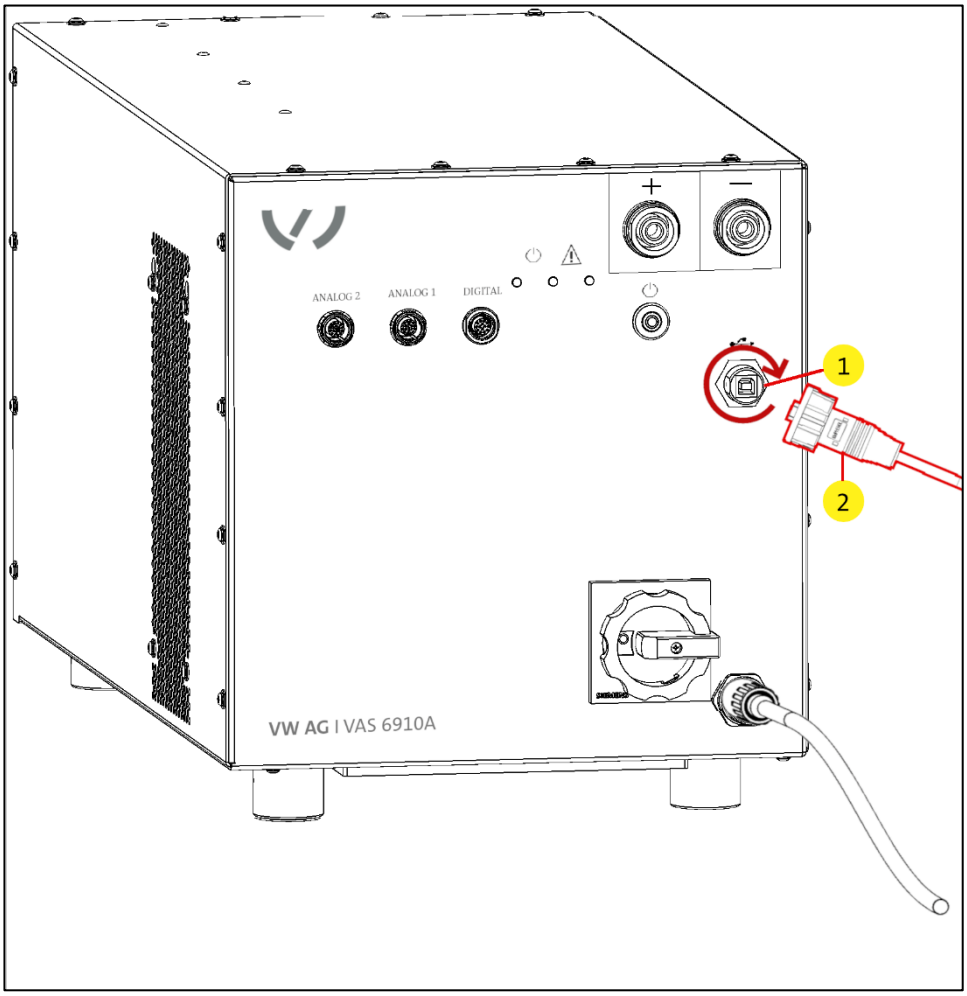


Figure 3: Plugging in the USB connecting cable

WARNING

Electrical Shock Current Hazard

If the equipment is not operated on a type A RCD fused circuit, voltage may be present in component parts. Only operate the equipment on a type A RCD fused circuit.

6. Turn the power disconnect switch (Figure 4/position 1) 90° clockwise to the I ON position.

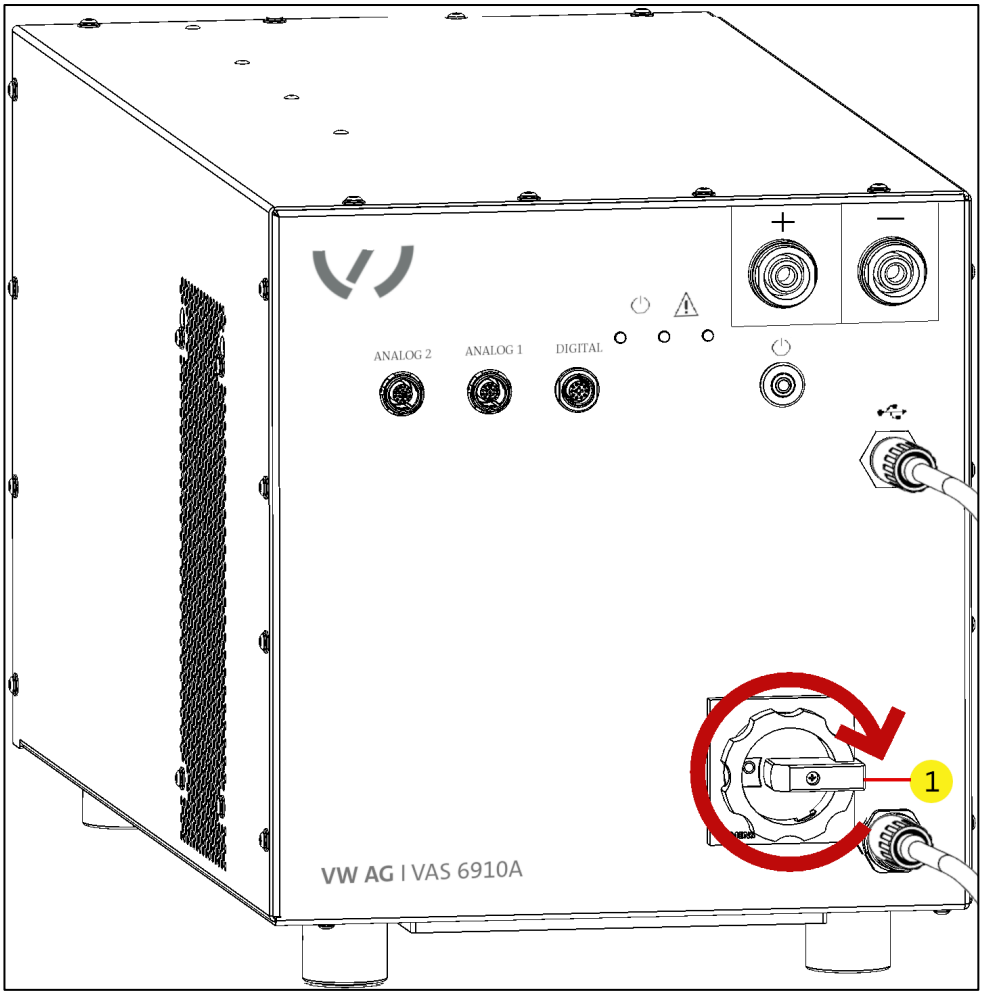


Figure 4: Turn on the power disconnect switch

7. Press the On/Off button (Figure 5/position 1) to deactivate stand-by mode.

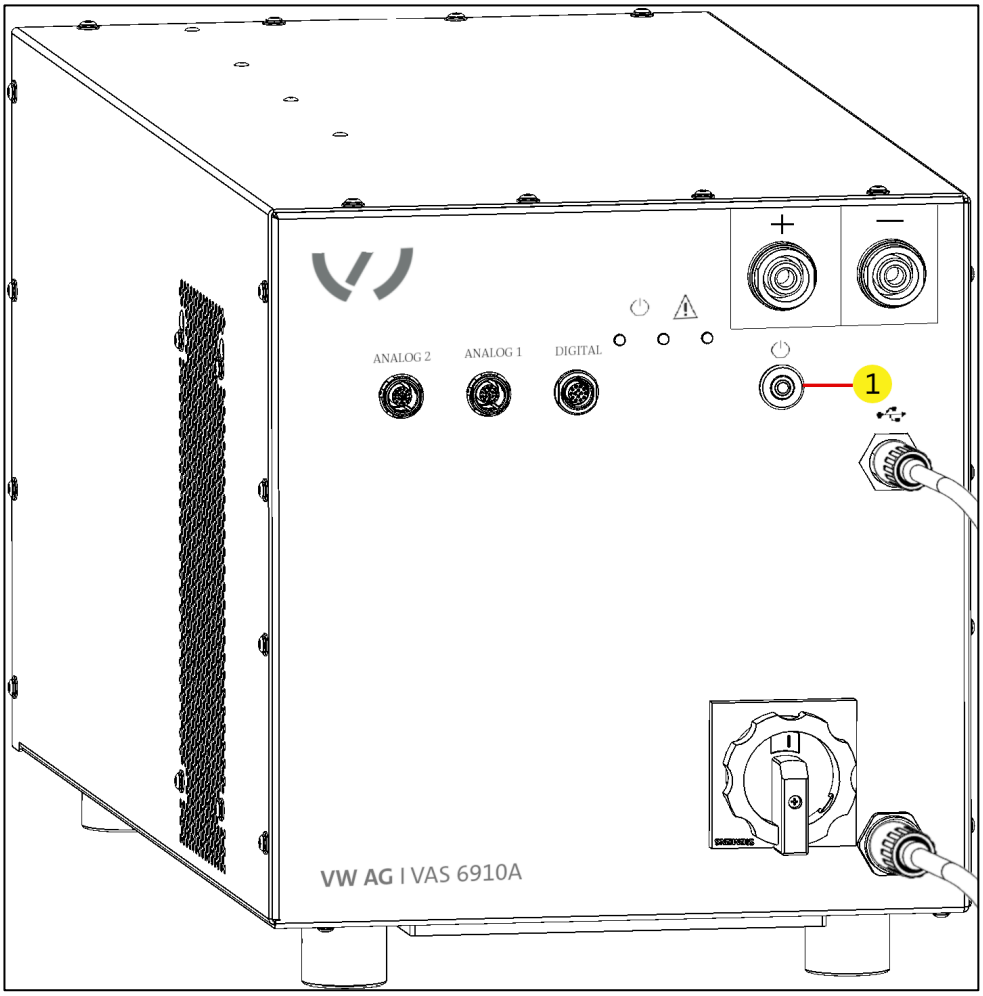


Figure 5: Press the On/Off button

The equipment is now ready for operation.

6.2.1 Attaching the Terminal Covers

Attach terminal covers VAS 6910/26-1 and VAS 6910/26-2 to cable set (HV) VAS 6910A/24-1 and VAS 6910A/24-2as follows:

1. Guide the terminal connection cable through the opening in the associated terminal cover as shown in Figure 6.

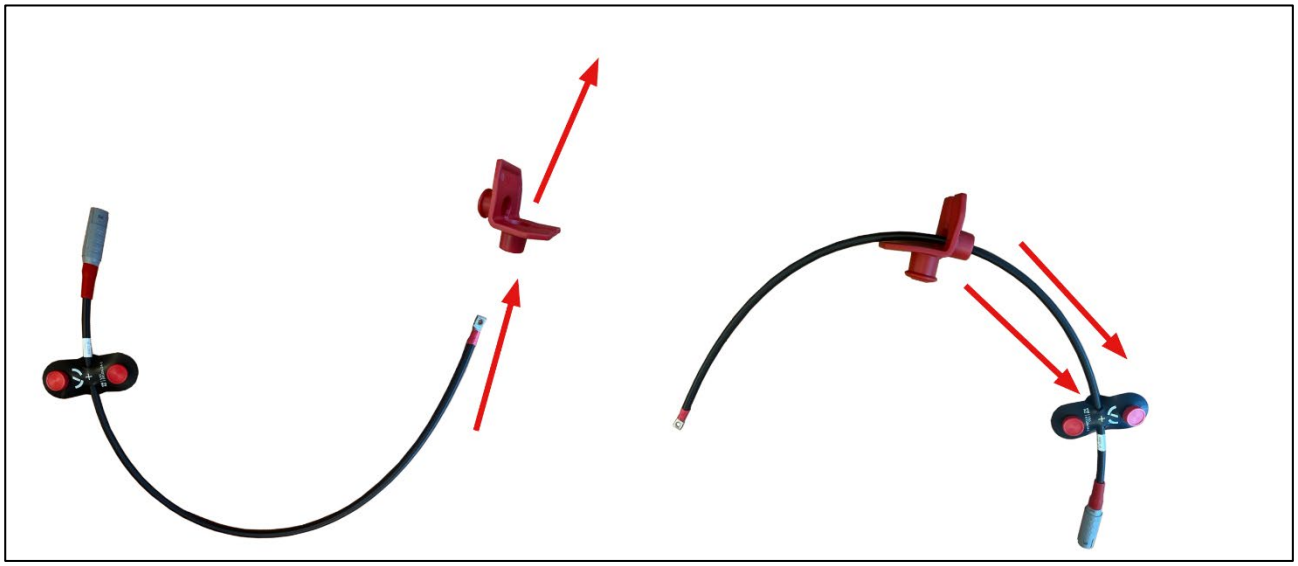


Figure 6: Attaching the terminal covers, HV+ terminal connection cable (red) example

Repeat the procedure for the second terminal connection cable.

If the cable set will not be used right away, always push the terminal covers as far as possible toward the equipment end of the terminal connection cable.

The terminal covers are now attached.

7 Measurement Procedure

WARNING

Read and follow the safety precautions on the screen.

DANGER

Risk of death from electric voltage on vehicles equipped with high-voltage systems

The voltage present at the HV battery and the components connected to it can be fatal. Make sure that no one comes in contact with the HV battery connections, the connection lines of the HV battery, or any other live parts. The battery to be tested must be removed from the vehicle. If the measurements are carried out on a battery that is open but still installed in the vehicle, the vehicle must be deactivated and secured.

DANGER

Risk of death from electric voltage on vehicles equipped with high-voltage systems

Make sure that all necessary safety precautions have been taken before starting the measurement.
Check that the HV insulating gloves or electrical safety gloves are suitable before using them.

DANGER

Risk of death due to electric voltage

In the event of danger, deactivate the equipment using the switch-off button and disconnect the mains plug. Note that the DC connections are still live due to the connected battery module. Wear personal protective equipment.

DANGER

Risk of death due to electric voltage

Battery terminals must be covered during charging to prevent contact and to protect against short circuiting.

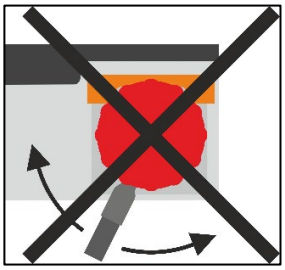
WARNING

Risk of fire due to overheating

Use only terminal cables with a 16 mm² cross-section. Only use terminal cables matching the item number specified in this user manual (see 3 *Standard* Scope of Supply.) Other terminal cables may be necessary for future vehicle models. These are not specified in the user manual.

WARNING

Make sure that all contact surfaces are clean.
Check that all cables are tightly secured after connecting.



7.1 Starting

To start the equipment, proceed as follows:

1. Start the equipment as described in 6 *Commissioning*.
2. Follow the instructions in the guided troubleshooting.

7.2 Charging/Discharging

WARNING

Risk of fire when charging defective modules

Never charge defective modules. Charging defective modules can result in a module fire.

WARNING

Risk of fire due to short circuit

There is a risk of short circuiting if the power cables are disconnected during charging. Do not disconnect the charging cables while charging.

WARNING

Risk of fire due to arcing

There is a risk of arcing if the power cables are disconnected during charging. Do not disconnect the charging cables while charging.

NOTE

To prevent charging errors, do not touch the modules while charging.

The equipment is mainly used to charge and discharge battery modules. The voltage of the battery modules can therefore be set to any charging state within the module range.

Operation of the software is displayed in ODIS Service or PIWIS.

7.3 Battery Status

This function can be used to determine the battery status.

Operation of the software is displayed in ODIS Service or PIWIS.

7.4 Backfeeding to the Grid

NOTE

Comply with the country-specific regulations for feeding energy to the public grid. Compliance with these regulations is the responsibility of the particular user of the equipment. Failure to comply may result in grid destabilization, material damage, or dangerous, unforeseen issues in the power grid.

NOTE

Feeding energy back to the grid is not possible in the case of batteries with less than 20 V.

The equipment features the option to feed the discharged energy into the power grid. This software function can activate the ability to feed energy back to the grid. For more information, see the ODIS Service user manual.

Operation of the software is displayed in ODIS Service or PIWIS.

7.5 Software Update

This function is used to load software updates.

Operation of the software is displayed in ODIS Service or PIWIS.

7.6 Status Query

This function is used to query the status of the equipment.

Operation of the software is displayed in ODIS Service or PIWIS.

7.7 Service GUI

This function calls up the service GUI.

Operation of the software is displayed in ODIS Service or PIWIS.

7.8 Shutdown

The equipment does not have an On/Off switch.
The button shown in chapter 5 *Assembly*/Figure 1 only turns the power modules on/off.
To disconnect it from the power grid, press the Off button and disconnect the power plug from the electrical outlet. Turn the disconnect switch to the **0 Off** position.

8 Measurement Procedure

DANGER

Risk of death due to electric voltage

Unprotected parts can carry dangerous voltages.

Do not open the equipment yourself. Troubleshooting is only permitted by AVL DiTEST.

In case of damage, please contact the respective AVL DiTEST office / the respective AVL DiTEST partner in your country.

9 Maintenance and Care

9.1 Visual check

DANGER

Risk of death due to electric voltage

Unprotected parts can carry dangerous voltages.
Do not open the equipment yourself. Troubleshooting is only permitted by AVL DiTEST.

DANGER

Risk of death from electric voltage on vehicles equipped with high-voltage systems

Only qualified and authorized personnel are allowed to carry out work, particularly disassembly work, on high-voltage vehicles.

DANGER

Risk of death from electric voltage on vehicles equipped with high-voltage systems

For live-line work, specific safety and vocational training conditions apply.
Make sure to comply with these conditions in all situations.

Perform a visual inspection regularly. During the visual inspection, check the equipment for the following conditions:

- Gross contamination → 9.2 *Cleaning*
- Damage
- Wear
- Check all parts regularly for damage.

Always replace damaged parts.

9.2 Cleaning

If the housing, sockets or connections are dirty, clean them with a dry cloth.

NOTE

Before cleaning the equipment, turn it off at the disconnect switch and disconnect the mains plug.
Disconnect all adapter cables and ensure that no liquid enters the housing.

NOTE

To clean the equipment as specified by IP protection class 30, do not use running water or a high-pressure cleaner. In addition, do not use any corrosive cleaning agents.

9.3 Storage

Store the equipment as follows:

- Disconnect from power
- Protect from high temperatures
- Protect from humidity
- Protect from the risk of colliding with other objects

For more information on storage, see chapter 10 *Technical Data*.

9.4 Spare Parts

Table 5: Spare Parts

Spare part	ID number
VAS 611 001 USB connecting cable	ASE 611 001 00 000
VAS 6910A/24-1 Connection cable (positive terminal incl. bracket)	ASE 447 313 00 000
VAS 6910A/24-2 Connection cable (negative terminal incl. bracket)	ASE 447 314 00 000
VAS 6910A/24-3 Knurled screws (positive & negative terminals)	ASE 404 515 00 000
VAS 6910A/24-4 Knurled nuts (positive & negative terminals)	ASE 404 516 00 000
VAS 6910/26 Terminal cover set	ASE 447 316 00 000

10 Technical Data

Table 6: Technical Data

Power from AC power grid	
Supply voltage	200 V_{AC} ... 480 V_{AC} (3-phase) 230 V_{AC} ... 240 V_{AC} (1-phase)
Frequency range	50 Hz ... 60 Hz
Max. power consumption	11 kW, 16 A (3-phase), 3.7 kW (1-phase)
Line voltage fluctuation	+/- 10%
Overvoltage category	III
Charging	Max. 11 kW @ 400 V_{AC} (3-phase) 3 V_{DC} ... 400 V_{DC}, max. 80 A
Discharging	Discharge resistance: max. 2 kW, 2 ... 430 V_{DC}, max 50 A Feeding back to grid*: max. 11 kW 20 V_{DC} ... 400 V_{DC}, max. 50 A *** Feeding energy back to the grid is not possible in the case of batteries with less than 20 V.**
Cell monitoring (charging/discharging)	Depends on the cell module type: - Analog measurement of cell voltages and temperatures (0 V ... 5 V) - Digital monitoring via cell module controller Monitored values are voltages, currents and temperatures.
External interfaces	
USB	USB 2.0 A to USB 2.0 B rugged
Country-specific power cables	• CEE 400 V 16 A (440 V, 16 A) • CEE 400 V 32 A (440 V, 16 A) • NEMA 14/50 16 A (240 V, 16 A) • NEMA 10/50 16 A (240 V, 16 A) • American Denki 3p 4wire 60 A (200 V, 16 A) • Hard-wired

Ambient conditions Operation	Indoor use	
	Ambient temperature	0 °C ... +40 °C
	Relative humidity	0% ... 100%, non-condensing
	Altitude	Max 4000 m above sea level (thermal derating from 2000 m)
	Noise level	75 dB
	Pollution degree	2
Transport and storage		
	Ambient temperature	-20 °C ... +55 °C
	Relative humidity	10% ... 80% at max. +25 °C, non-condensing
		Transport in original packaging only
Weight and dimensions	Net weight	23.9 kg
	Gross weight (incl. packaging, pallet, accessories, documentation)	33.5 kg
	Dimensions	702 mm × 321 mm × 362 mm (L × W × H)
Electrical protection	**Safety regulations** Measuring devices: IEC 61010-1 (VDE 0411 part 1) - Protection class I - IP30 degree of protection (except air outlet)	
Certificates	This product complies with all relevant directives and standards. The complete text of the EC Declaration of Conformity can be found in the Internet under: https://www.avlditest.com/index.php/de/downloads-de.html	

11 Index

VOLKSWAGEN GROUP

We have verified that the content of the documentation is consistent with the latest version described. However, discrepancies are still possible, and therefore we cannot guarantee complete consistency. The information in this documentation is, however, checked regularly and necessary corrections are included in subsequent editions. We appreciate any suggestions for improvement.

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