OPERATING MANUAL

VARTA element backup

VARTA Storage GmbH

Legal notice

Operating manual VARTA element backup

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Note to the electrical specialist

This manual contains, in the first part, general information on the operation of the VARTA element backup energy storage system.
You will find further information in the *Installation*, *Operation in the password-protected area* and *Maintenance* sections.

Contents

About this manual

Read this operating manual through carefully before beginning any work. It contains important advice to ensure flawless functioning of the VARTA element backup energy storage system. The manual is structured in such a way that all work must be performed by a qualified electrical specialist who is certified by VARTA Storage GmbH.

Target groups

This manual is directed at various target groups:

- End customers
- Electrical specialists responsible for installation, commissioning and maintenance.

Scope of application

This manual is part of the system and corresponds to the technical state-of-the-art at the time of publication. It applies to the product VARTA element backup in the expansion stages: 6, 12 and 18 kWh, as of serial number 127XXXXXX (type plate).

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i Please note that this operating manual also refers to optional components that are not included as standard in the scope of delivery.
These components and/or system parts are marked in this manual as "optional". Simply skip these parts of the manual if your energy store is not equipped with them.

General equal treatment

VARTA Storage GmbH is conscious of the significance of language in relation to the equal treatment of men and women. For ease of legibility, no gender-specific differentiation is deployed. In the interests of equal treatment, corresponding terms apply to both sexes.

Notice for special attention

ATTENTION
Energy store switched off! Possible damage to the batter module due to deep discharge. ➡ The energy storage system may be switched off only temporarily for maintenance purposes.

Depending on the network quality and the occurrence of network faults, the grid and plant protection can be triggered and the replacement power network transitioned to at interruption times. VARTA Storage GmbH assumes no liability for resulting damage.
Performing reconstructions or technical alterations to the product on one's own authority is prohibited.

General

1 Information about this manual

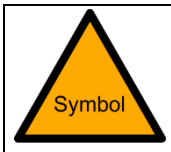
1.1 Symbol explanation

The following types of safety directions and tips are used in this operating manual

i	Indicates tips regarding use of the device.

1.2 Safety instructions

In this manual, the safety directions are structured as follows:

	**Signal word** **Type and source of danger!** Possible consequence(s) in the event of non-compliance. ➡ Measure and prohibitions to avoid the danger.

1.2.1 Warning stages

Signal word and warning colour identify the warning stage and provide an immediate indication of the type and severity of consequences if the measures to avoid the danger are not followed.

Warning colour / signal word	Consequences
DANGER	warns of a directly dangerous situation that can lead to death or to serious injuries and/or fire.
WARNING	warns of a possibly dangerous situation that can lead to death or to serious injuries and/or fire.
CAUTION	warns of a possibly dangerous situation that can lead to light injuries and/or material damage.
ATTENTION	warns of a possible situation that can lead to material and environmental damage and disrupt operations.

1.3 General safety signs

Symbol	Meaning
	Prohibition signs are round, with a black pictogram, on a white background and a red border and crossbar.
	Prohibition signs are round, with a white symbol, on a blue background.
	Warning signs are triangular, with a black symbol and border, on a yellow background.
	Environmental regulations are indications of state regulations to be complied with, particularly in relation to disposal.

1.4 Warning sign

 General warning sign

 Warning of hand injuries

 Warning of electric shock

 Warning of cut injuries

 Warning of oxidising substances

 Warning of dangers due to batteries

 warning of non-compliance with the discharge time. Comply with a waiting time of at least 3 minutes.

2 Safety

2.1 General information on safety

Each person mandated with works on the system must have read and understood this manual and especially the "Safety" chapter.

WARNING

Non-compliance with the safety instructions!

Improper use can lead to fatal injuries.

➡ Before use, ensure that all the protective equipment works.

Compliance with the safety directions and the occupational safety measures in which training is provided limits the risk.

Read the operating manual.

This manual cannot describe every conceivable situation; therefore, the applicable standards as well as the corresponding regulations for occupational health and safety always have priority. Additionally, use of the energy storage system is associated with residual dangers under the following circumstances:

- The installation and maintenance works are not carried out properly.
- The installation and maintenance works are carried out by untrained and non-instructed personnel.
- The safety directions provided in this manual are not followed.

All safety directions must be followed without fail; compliance with them is for your safety. No modifications may be made to the device.

2.2 Intended use

The VARTA element backup with its components is built according to the state of the art and the product-specific standards and is to be used for the storage of electricity from photovoltaic systems. Other uses must be coordinated with the manufacturer and the local energy supplier.
In the event of a power failure, the replacement power function of the VARTA element backup is to enable the supply of selected consumers in the household. The technical parameters described in chapter 3.8 from page 20 indicate the efficiency of the store. In the rarest of cases, these power values will suffice to supply a home completely with power. Connect selected consumers to the replacement power network. To ensure that these consumers will be safely supplied in the event of a power failure, test the function as described in chapter 4.4 "Testing the replacement power function" on page 24.

- The replacement power function of the VARTA element backup is not an uninterrupted power supply (UPS) or safety power supply.
- When switching from mains to replacement power and back, a supply interruption occurs.

2.3 Disclaimer

VARTA Storage GmbH assumes no liability for damage to consumers in the replacement power network that has occurred due to the triggering of the grid and plant protection owing to network faults.

2.4 Erroneous use

WARNING

Possible danger to life due to erroneous use!

Possible danger to life.

- In the interior of the device there are parts with dangerous voltages. Contact with these can lead to death.
- Any use that goes beyond the intended use or other use of the energy storage system or individual parts can lead to life-threatening situations.
- The store does not provide a UPS functionality.
- When switching from mains to replacement power and back, a supply interruption occurs.
- Do not move any devices on which the omission of the replacement power supply leads to material damage.
- Do not move any devices on which the omission of the replacement power supply leads to personal damage.

2.5 Prohibited use

Do not use VARTA element backup:

- for mobile use on land, water, or in the air,
- for permanently off-grid operation,
- for use on medical equipment,
- for use as a safety power supply,
- to connect the replacement power network of several stores simultaneously,
- do not cascade any further energy stores in the replacement power network,
- to connect generator systems to the replacement power network.

2.6 Requirements for electrical specialists

WARNING

Insufficient qualification of the electrical specialist.

Personal and material damage.

- Activities on the VARTA element backup system (e.g. installation and maintenance work) may be performed by qualified electrical specialists certified by VARTA Storage only.

Here, specialists refers to persons who, among other things, possess the knowledge of relevant terms and skills.
Are able to evaluate the following works and recognise possible dangers due to their technical training, knowledge and experience as well as knowledge of the relevant provisions:

- Assembly of electrical equipment.
- Assembly and connection of data lines.
- Assembly and connection of power supply lines.

i The “Installation”, “Operation in the password-protected area” and “Maintenance” sections contain further information for the electrical specialists.

2.7 General danger sources

If the following directions on handling the device are not complied with, this can lead to personal damage and material damage to the device for which VARTA Storage GmbH assumes no liability.

2.7.1 Danger due to electrical voltage

DANGER

Contact with electrical voltage.

Danger to life due to electric shock.

- Always keep the energy store closed.
- Look out for damage to the electrical equipment.
- Have defects eliminated immediately.
- Only the electrical specialist is allowed to open the energy store.
- The energy store may be opened only while switched off.
- Comply with a waiting time of at least 3 minutes.

DANGER

Contact with electrical voltage.

Danger to life due to electric shock on the replacement power connection.

- Only the electrical specialist is allowed to open the energy store.
- Switch off the energy store.
- Ensure that the supply line of the system is disconnected from the mains.
- Comply with a waiting time of at least 3 minutes.

2.7.2 Danger due to water

WARNING

Entry of water into electrical installations.

Possible danger to life and material damage.

- Do not use water to clean the energy store.
- Do not deposit containers with liquids (such as drinks cups) on electrical installations.
- The relative humidity in the room must not exceed 80%.

2.7.3 Danger due to oxidising and corrosive substances

WARNING

Storage and use of oxidising and/or corrosive substances.

Increases the fire risk and the risk of electric shocks.

- Store the above-named substances only in the places intended for them.
- Do not clean the system with acid-, lye- or solvent-containing means.

2.7.4 Danger due to heat

ATTENTION

Insufficient ventilation of the system!

Overheating of the system possible.

➡ Keep vents clear.

➡ Ensure sufficient ventilation.

ATTENTION

Heat entry due to direct solar radiation or devices that emit heat!

Overheating of and damage to the system possible.

➡ Protect system from direct solar radiation.

➡ Do not use a fan heater or a similar device near the system.

2.7.5 Danger due to misconduct

ATTENTION

Energy store switched off!

Possible damage to the batter module due to deep discharge.

➡ The energy storage system may be switched off only temporarily for maintenance purposes.

ATTENTION

Objects on the system!

Risk of injury due to falling objects and the system can be damaged.

➡ Do not deposit objects on the energy store.

ATTENTION

Access blocked!

System cannot be switched off in the event of damage.

➡ Access to the energy store must be ensured at all times.

2.7.6 Safety equipment

WARNING

Defective safety equipment!

Possible danger to life.

- Safety equipment must not be damaged, modified, removed or decommissioned.
- The flawless functioning of the safety equipment must be checked following the end of the installation and commissioning by qualified electrical specialists certified by VARTA.

The VARTA element backup energy storage system has several pieces of safety equipment. These include grid and system protection according to VDE-AR-N 4105, closed electrical operating area, overtemperature switch-off and a door switch. The latter switches the energy store off if an attempt is made to open the storage cabinet without previously disconnecting it from the mains.

- According to the country-specific specifications, the installation of a switch-off mechanism may be necessary.
- Switching off does not disconnect the replacement power connection of a VARTA element backup from the mains.

A smoke detector must be installed in the setup room of the VARTA element backup.

3 Function, scope of delivery and technical parameters

3.1 Function of the VARTA element backup

The VARTA element backup energy storage system is a storage system for operation in a 3-phase house network with the option of connecting a separate grid-connected photovoltaic system. The latter must be a generation system that feeds in not at full infeed, but after excess.
The VARTA element backup system serves to increase the percentage of self-consumption and the economic efficiency of a photovoltaic system. If the photovoltaic system produces more electricity than is immediately consumed, it can be stored intermediately in the energy storage system. The electricity is fed into the house network again from the store as soon as the consumption is bigger again than the electricity quantity generated by the photovoltaic system.
The VARTA element backup system is integrated into the house network triple-phase on the alternating current side and works independently of the photovoltaic system.
A current sensor controls the charging and discharging processes of the energy storage system. If the current sensor measures outgoing currents while there is available free charging capacity of the energy storage system, the latter is charged. In the process, the batter converter in the VARTA element backup system converts the alternating current into direct current and charges the battery modules. If the maximum charging capacity is reached or if the solar-produced electricity exceeds the maximum charging current, the excess solar power is fed into the public network. If the photovoltaic system cannot cover the current electricity requirements in the house, the current sensor measures incoming currents. Thereupon, the energy storage system issues power into the house network in order to minimise the external volume of purchased electricity and the associated costs.
Additionally, the VARTA element backup offers a replacement power function. With a VARTA element backup, selected electrical consumers can be supplied with electrical energy on the replacement power network even in the event of a power failure. To this end, the store keeps a reserve capacity ready that can be used in the event of a power failure.
In the integrated network operation, the electrical consumers connected to the replacement power network are supplied from the integrated network. To this end, the energy is not conducted through the batteries, but "looped through" the store (bypass). In the event of a power failure in the integrated network, the replacement power network is supplied after a short interruption. Once the integrated network is stable again, the supply is switched to the integrated network. Here, there is a short interruption in the replacement power network. In the event of a power failure, the "black start" button allows manual start-up in the replacement power mode.

- The replacement power function of the VARTA element backup is not an uninterrupted power supply (UPS) or safety power supply.

3.1.1 Term definition

3.1.1.1 Bypass

Consumers connected to the replacement power network are also monitored in the integrated network operation by grid and plant protection. If a network fault is detected in the integrated network mode, these consumers must be switched off, provided the network fault is pending.

- Thus, interruptions of the consumers on the replacement power connection can occur in the integrated mode.

3.1.1.2 Integrated network operation

The public electricity network (integrated network) is available. Electrical consumers connected to the replacement power network are supplied by the integrated network.

3.1.1.3 Replacement power network

The public electricity network (integrated network) is not available. Electrical consumers connected to the replacement power network are supplied by the storage system. Replacement power network refers to the part of the customer's system that is connected to the replacement power connection of the store (compare chapter 11.7: "Connection plans of the VARTA element backup", beginning on page 43). This includes the safety equipment (fuses, RCDs) as well as the connected consumers.

3.1.1.4 Black start

Starting the store during the time of a failure of the public electricity network is referred to as a black start.

- The replacement power function of the VARTA element backup is not an uninterrupted power supply (UPS) or safety power supply.

Note: Before installation of the VARTA element backup, it must be clarified with the respective energy supply company whether it is necessary to register the system.

3.2 Cascade mode:

- In cascade mode, only one energy store can be used to supply replacement power.
- If the replacement power function is activated on several energy stores, no energy store will supply replacement power.

3.3 Scope of delivery DE

The VARTA element backup energy storage system includes: a storage cabinet with integrated energy and battery management, battery module(s) and battery converters.

VARTA element backup	**6**	**12**	**18**
Number of battery chargers	1	2	3
Number of communication cable sets	1	2	3
Number of power cables	1	2	3
Number of accessories kits	1	1	1

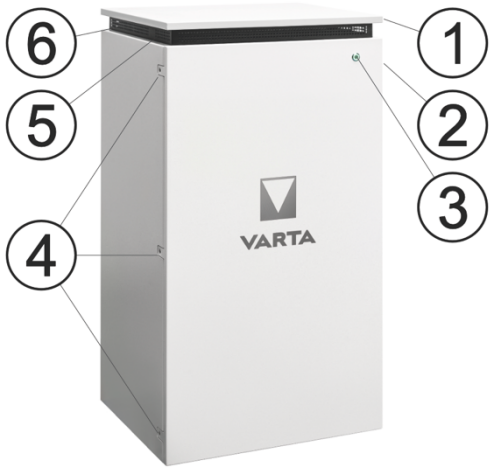
Accessories kit:

VARTA Split Core current sensor,
20 m sensor cable,
1 x AC connector,
12 x fastening screws for battery module(s),
1 x user manual,
1 x AC connection socket replacement power,
1 x earthing connection set consisting of an M6 nut, 2 washers and a chopper disc.

Optional

VARTA replacement power box

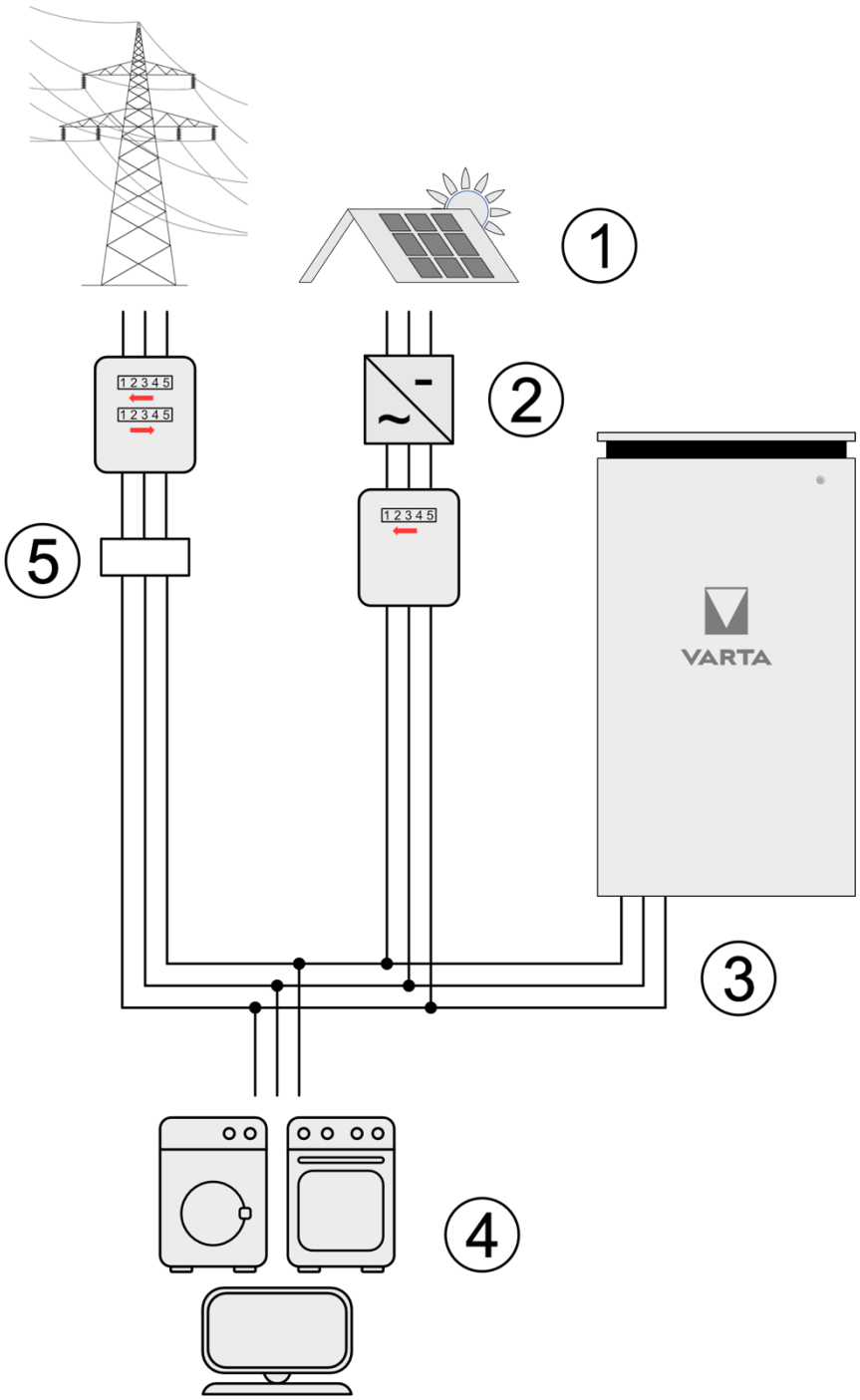
3.4 View of the VARTA element backup



No.	Description	No.	Description
1	Cover	4	Screws for opening the door
2	Type plate	5	Black start button
3	On/off switch	6	Ventilation grid

3.5 System overview Own consumption optimisation

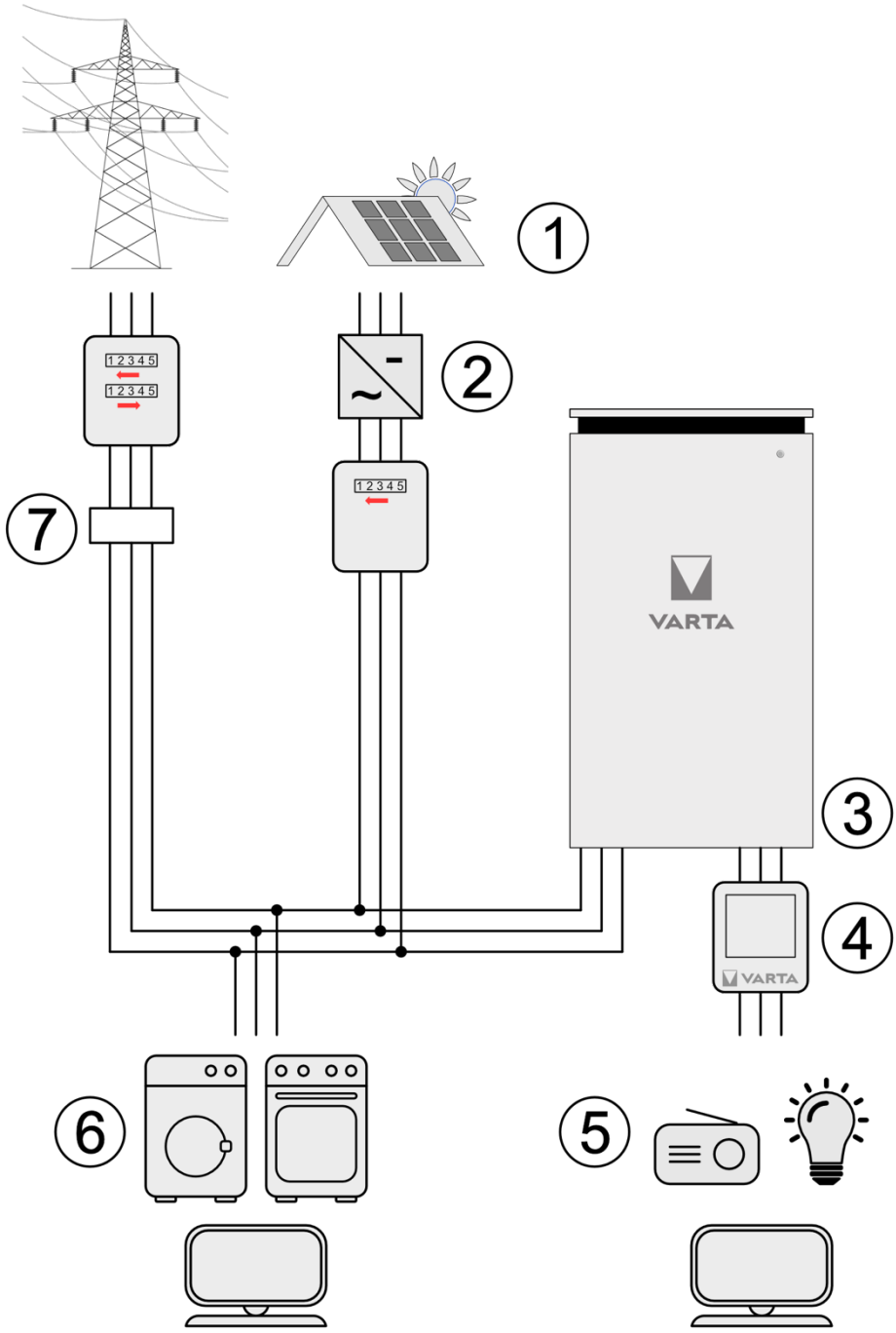
This system overview shows the classic use of a VARTA element backup for own consumption optimisation. The replacement power function is not used here.



No.	Description	No.	Description
1	Photovoltaic system	4	Consumers in the household
2	Converter for photovoltaic system	5	Current sensor
3	VARTA element backup		

3.6 System overview with replacement power consumers

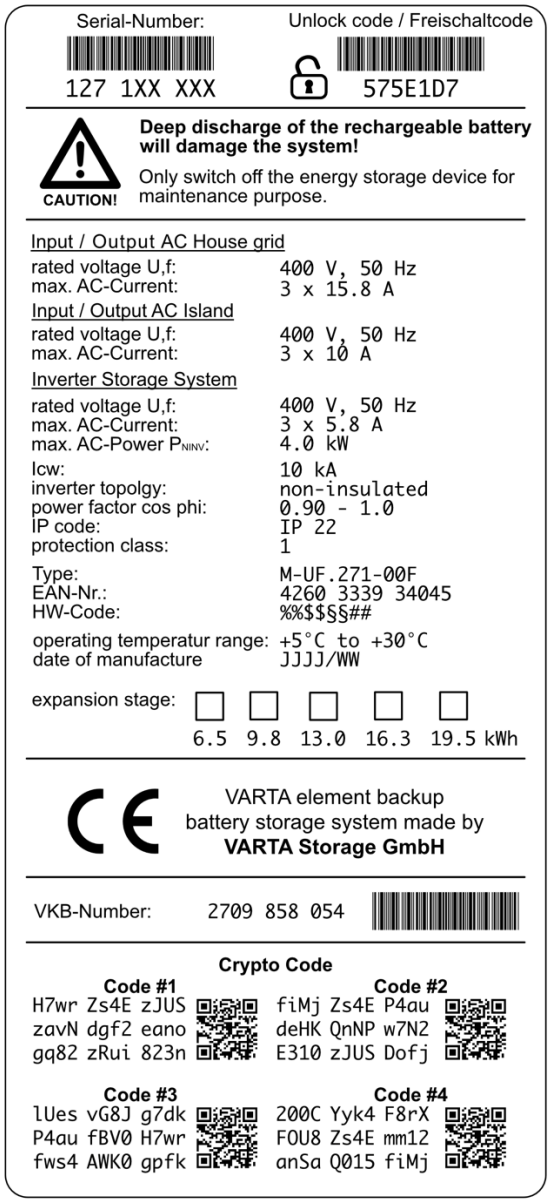
This system overview shows the layout of a VARTA element backup system with connected replacement power consumers. In the event of a power failure, the consumers shown in (5) are supplied by the storage system.



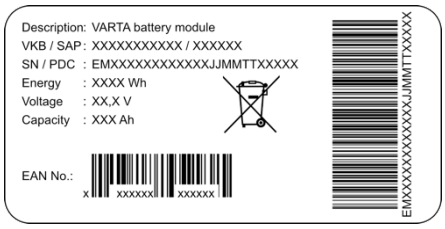
No.	Description	No.	Description
1	Photovoltaic system	5	Consumers entitled to replacement power
2	Converter for photovoltaic system	6	Consumers in the household
3	VARTA element backup	7	Current sensor
4	VARTA replacement power box		

3.7 Identification

3.7.1 Type plate



3.7.2 ID label of the battery module



3.8 Technical parameters VARTA element backup

Expansion stages	**6**	**12**	**18**
Nominal capacity (kWh)	6.5	13.0	19.5
Integrated network operation			
AC charging power (kW)	2.2	4.0	4.0
AC discharging power (kW)	1.8	3.7	4.0
Batter converter layout	without isolating transformer		
Grid connection	400 V AC, 3-phase, 50 Hz		
Inrush current	< max. operating current for input and output		
Replacement power network operation			
AC discharging power (kW)	1.8	3.7	4.0
Network	230 V AC, 1-phase, 50 Hz		
	400 V AC, 3-phase, 50 Hz		
Max. current per phase	5.8 A		
Short-term overload per phase	max. 12 A		
Safeguard			
Safeguard grid-side	16 A (B-character)	RCD type A 0.03/25 A (TT network)	
Safeguard consumer replacement power network	6 A (B-character)	RCD type B 0.03/25 A	
Performance recording	3-phase, by means of current sensor		
Setup site	within the house		
Own consumption optimisation	3-phase, regulated		
Performance recording	3-phase, by means of current sensor		
Transport and packaging			
Dimensions in mm (W x H x D)	600 x 1176 x 500		
Weight (incl. battery module)	115 kg	165 kg	215 kg
System transport	vertical on a pallet		
Packaging in mm (W x H x D)	700 x 1,325 x 600		

Switchover time (interruption time)

The switchover time between the separation of the power supply and the replacement power mode is normally under 90 seconds. This also applies to the switchover time to the integrated network mode.

3.9.1 Battery module

VKB number	56462705099
Electrochemistry cell	Li-ions
Nominal module capacity	6.5 kWh
Discharge depth	90%
Useful module capacity	5.9 kWh
Connection	contact-safe
Cell monitoring	integrated
Dimensions in mm (W x H x D)	445 x 110 x 587
Weight	45 kg
Packaging in mm (W x H x D)	800 x 460 x 600

3.9.2 Environmental rating

Environmental category	Air-conditioned in inner rooms*
Classification of the wet rooms	No wet rooms allowed
Soiling grade	2
Ingress protection	IP22
Typical/max. Noise emission	42 dBA / 49 dBA
Ambient temperature	+5 °C to +30 °C
Relative humidity	< 80%
Max. altitude	2000 m above sea level
Overvoltage category	III
Protection class	1

* The energy storage system is fully enclosed by a building and/or housing. Thus the energy storage system is protected from sun, dust and other external influences. Additionally, the building and/or housing is air-conditioned with regard to temperature, humidity and air filtering.

3.10 Derating

Derating means a temporary reduction of the maximum power of the battery inverter. Derating can occur due to several influences such as mains voltage, mains frequency, temperature or battery voltages. To avoid temperature derating of the energy storage device, make sure that the energy storage device can dissipate heat to the ambient air.
Frequent temperature-induced derating can have the following causes:

- The system cannot issue enough heat to the ambient air because the air filters are soiled or have failed.
- The installation site of the energy store does not offer the requisite climatic conditions.
- Atypical operation that deviates heavily from the photovoltaic cycle.

4 Replacement power operation VARTA element backup

DANGER

Functional fault of the energy store.

Danger to life due to failure of medical equipment.

➡ Do not connect any medical equipment to the energy store.

DANGER

Contact with electrical voltage.

Danger to life due to electric shock.

➡ Label the distributors for the replacement power.

➡ Separate the replacement power circuit from the store.

Attention

Functional fault of the energy store.

Danger of material damage.

➡ Do not connect any information and communication equipment to the energy store

➡ Do not connect any cooling equipment to the energy store.

In the event of a power failure, the VARTA element backup automatically switches to the replacement power mode. Thus, it is possible to continue to operate selected consumers.

- The replacement power function of the VARTA element backup is not an uninterrupted power supply (UPS) or safety power supply.

Note: A requirement for the replacement power mode is that the energy store is not empty.
The maximum available power is dependent on the number of battery modules installed and their charging status. You will find the technical data in chapter 3.8 “Technical parameters of VARTA element backup”, beginning on page 20.

4.1 Replacement power box (Optional)

The replacement power box is intended for connecting consumers to the replacement power network.
The following components are installed in the replacement power box:

- F2 (safeguard consumer on the replacement power network),
- Q2 (residual current device type B for consumers on the replacement power network).

Note: If the replacement power box is not used, the corresponding protection elements must be set up in the customer distribution (see chapter 43: “Connection plans of the VARTA element backup”, beginning on page 43).

Installation of the replacement power box

- Open the replacement power box.
- Fasten the replacement power box to a flat and stable wall with screws.
- Bore the necessary cable ducts.
- Introduce the lines.
- Clip the lines onto the labelled terminals.
- Close the box.

4.2 Electrical consumers in the replacement power operation

The technical requirements described in chapter 3.8 “Technical parameters of VARTA element backup", beginning on page 20, apply to the connection of electrical consumers to the replacement power network. In addition to the general connection values, such as mains voltage, power and nominal current, the inrush current is to be taken into account in the replacement power mode.
Please note: The starting or inrush current can reach multiple times the nominal current. This affects, for example, transformers, switching power supplies or halogen lamps. In general, this value is not indicated on the type plates and data sheets of the consumers. In general, this value is of subordinate importance for connecting consumers to the integrated network, as the integrated network allows very high inrush currents.
For devices that are to be connected to the replacement power network of the VARTA element backup, the inrush current is limited to 12 A. Here, the total of all connected consumers is to be taken into account.

- Consumers with a short-term starting current < 12 A can be started.
- If the starting current of the consumers is greater than 12 A and falling to permanently under 6 A, the store will build up the replacement power network in that the internal regulator starts the store dependent on the internal current and voltage limit.
- Consumers in the replacement power path do not necessarily have to start in replacement power mode, even if they can be operated in the integrated network mode.

4.2.1 Notes on connection:

- Ensure that the loads are spread as equally as possible over the individual phases.

Example of possible loads
Please note that indicated values are a recommendation for individual devices. The data can deviate in individual cases. The combination of various consumers must be tested individually at the end customer's premises as described in chapter 4.4 “Testing the replacement power function" on page 24. The loads are to be spread as equally as possible over the individual phases.

Small household appliance:	up to 200 Watt.
Illuminant:	up to 500 Watt.
Cooling/freezing units:	up to 100 Watt.
Entertainment electronics:	up to 200 Watt.
Heating facilities:	up to 150 Watt.
Machine tools:	not recommended.
Motorised consumers:	not recommended.

4.2.2 Overload

If electrical consumers with too high a power or too high an inrush current are installed on the replacement power network, the store cannot operate them. If the starting current of 12 A is not sufficient to switch on the consumer, for example, in the event of too high a breakaway torque of a motor, the consumer cannot be operated on the replacement power network.

- If the mains voltage cannot be built up within 3 attempts, the store goes into a fault state. In this way, the connected consumers are protected.
- After a waiting time of 30 minutes in this fault state, the store switches itself off automatically.
- In this waiting time, you have the chance to have the fault state shown to you. (See chapter 4.4: “Testing the replacement power function" on page 24.)

Remedial measures:

- Reduce the power of the connected consumers.
- Redistribute the consumers across the 3 phases.

To recommission the VARTA element backup:

- Switch the energy store off and on again.
- Actuate the black start button.

4.3 Black start

With the black start button, the store can be started, even if no integrated network is available.
Examples:

- The store was switched off at the time of the power failure.
- A fault necessitates a restart.

Please use the following procedure for the start:

- Switch the store on at the *on switch*,
- keep the *black start button* pressed down for approx. 1 second.

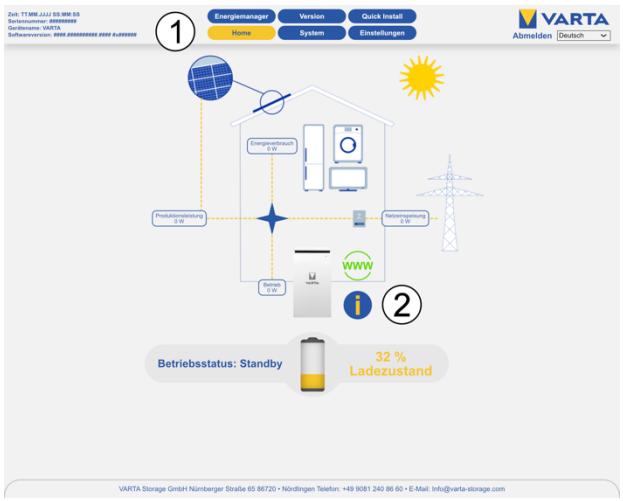
Please note: If the store is fully discharged, a black start cannot be carried out.

4.4 Testing the replacement power function

Please regularly check the replacement power function, especially after new or additional consumers have been connected.
Please note: To test the least favourable case, activate all the consumers simultaneously.

- Test the function by switching off the fuse in the supply line of the store (compare chapter 11.7: "Connection plans of the VARTA element backup", beginning on page 43; "F1").

The store will build up the replacement power network automatically within the defined switchover time and supply the connected consumers. Should this not be the case, carry out the remedial measures described in chapter 4.2.2 "Overload" on page 23.
Note: Any faults that occur are displayed in the web interface.



Note: According to the *expansion stage of the energy store* and after a *software update*, the website can deviate from the image shown.

- Click on the i symbol with the mouse cursor (2).

A window opens. Here, a current system error and the last five network errors can be read.

4.5 Activate replacement power function

The parameters of the replacement power supply can be set in the Energy Manager tab *Replacement power* (1).

1	Replacement power button
2	Information
3	Replacement power function active / inactive
4	Replacement power reserve

The replacement power function of the store is activated in field (3).

Note on the replacement power function for cascade mode:
In cascade mode, only one energy store can be used to supply replacement power. If the replacement power function is activated on several energy stores, no energy store will supply replacement power.

Replacement power reserve

The storage system is discharged up to this charging status in the integrated network mode. The capacity set in field (4) is reserved for the supply in the event of a power failure. Values between 0% - 30% SOC can be set here.

Notes on setting the value:

The value is a weighting between capacity for own consumption optimisation and supply duration in the event of a power failure. The smaller the set reserve capacity, the greater the capacity that can be used for the normal own consumption optimisation. At the same time, however, the capacity reserved for a power failure is smaller.

5 Guarantee

For the guarantee to become effective, the following data must be held by VARTA Storage:

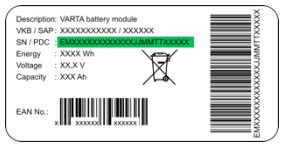
- Serial number (SN number) of the VARTA system,
- Serial number of the battery module(s),
- Name and email address of the end customer.

These data are stored by the installer in the installer portal of VARTA Storage.

Carry out the guarantee registration of the *energy store* within *four weeks* following the installation of the energy store.
The battery module(s) is/are to be installed by the installer **20 weeks** after *delivery* at the latest

5.1 Guarantee registration

The online-based guarantee registration consists of two parts:
Note: You will find the necessary data on the copy of the type plate attached to the storage cabinet and on the ID label of the battery module(s).



- This label is intended for the customer's personal documents.

5.1.1 Part 1: Installer

Registration of the energy store by the *installer*.

- Launch the page: https://b2b.varta-storage.com/nc/b2b.html
- Enter all the necessary data.

5.1.2 Part 2: End customer

You can carry out the guarantee registration once the *installer has registered the energy store.*

- Please call up the following site in the browser: https://varta-portal.energy
- Register in the portal by clicking on *Register* and providing the necessary information.
- Provide an individual password.
- Please log in to the portal with your access data and follow the directions and steps there.

Operation

6 Switching on and off, web interface

DANGER

Contact with electrical voltage.

Danger to life due to electric shock.

- Always keep the energy store closed.
- Look out for damage to the electrical equipment.
- Have defects eliminated immediately.
- Only the electrical specialist is allowed to open the energy store.
- The energy store may be opened only while switched off.
- Comply with a waiting time of at least 3 minutes.

DANGER

Contact with electrical voltage.

Danger to life due to electric shock on the replacement power connection.

- Only the electrical specialist is allowed to open the energy store.
- Switch off the energy store.
- Ensure that the supply line of the system is disconnected from the mains.
- Comply with a waiting time of at least 3 minutes.

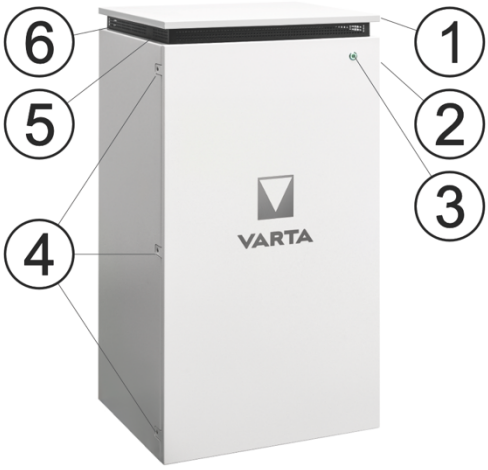
ATTENTION

Energy store switched off.

Possible damage to the batter module due to deep discharge.

- The energy storage system may be switched off only temporarily for maintenance purposes.

6.1 The VARTA element backup



No.	Description
1	Cover
2	Type plate
3	On/off switch
4	Screws for opening the door
5	Black start button
6	Ventilation grid

6.1.1 Switching on and off (VARTA element backup)

The VARTA element backup is started up using the on/off switch (3). Here, it should be taken into account, however, that the replacement power connection is also supplied with voltage from the mains when switched off. Thus, consumers connected to the replacement power connection are also supplied when the store is switched off.
If the replacement power connection is to be disconnected, the store must be switched off using the on/off switch (3) and the network connection of the store switched off. (Racking out the store connection).
These two steps must be performed for work on the replacement power connection as well as for work on the storage system.
If only the connection of the storage system is switched off but not the store via the switch (3), the store will automatically switch into replacement power mode and supply the replacement power connection.
In the event of damage (see chapter 9.1), the system can be shut down using the on/off switch.

6.1.2 VARTA element backup – switching on the replacement power mode

6.1.2.1 Automatic (standard)

In the event of a power failure, the VARTA element backup automatically switches to the replacement power mode.
Note: A requirement for the replacement power mode is that the energy store is not empty.

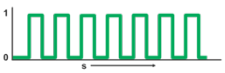
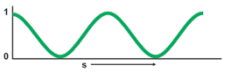
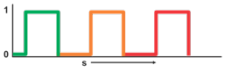
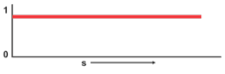
6.1.2.2 Manual switch-on

Manual switch-on of the replacement power mode becomes necessary if the energy store is to be switched on for the first time without an available integrated network or if the store has switched off in the replacement power mode e.g. after an overload.
The following steps are required for the manual switch-on of the energy store:

- Switch on the energy store with the on/off button (3) (button locked in).
- Press the black start button (5) for min. 1 second.

6.2 Displays of the LED ring on the on/off switch

The LED ring of the on/off switch informs regarding the conditions and occurrences  in the operation of the energy storage system.

LED ring Colour		Action	Operating status energy store	LED ring flash mode
Grey			OFF	
Green		Lights up permanently	Operation	
Green		Flashes every 0.5 seconds	System check	
Green		Vibrates every 3 seconds	Standby	
Green		Vibrates with decreasing intensity	Discharge	
Green		Vibrates with increasing intensity	Charge	
Green Red		Transition	Service mode	
Green-Orange		Vibrates	Update (Not available in the replacement power network)	
Green-Orange-Red		Flashes	Start-up not yet complete	
Orange		Lights up permanently	Replacement power network: Operation	
Orange		Vibrates with decreasing intensity	Replacement power network: Discharge	
Orange		Vibrates with increasing intensity	Replacement power network: Charge	
Red		Lights up permanently	Error	
Red		Flashes once per second	Current sensor check failed	

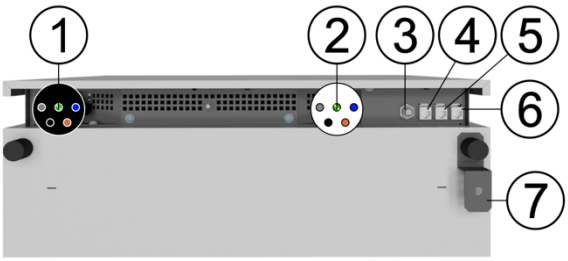
6.3 The web interface

The web interface serves to visualise the current measured values as well as to configure settings and functions. In the following, the necessary steps for the initial start-up *on the software-side* are explained. As a condition, the energy store must be installed according to the operating manual and the initialisation must have been successful.
The interface of the system can change visually after software updates. Individual functions and menu items are described in the web interface.
Further possible designations of the buttons are shown when the mouse is dragged over the button.
Note: Click on the *information symbols* shown to receive further information. You will find these in the settings and the respective functions. Here, you should ideally use Mozilla Firefox or Google Chrome as your browser.

6.3.1 Access to the web interface

For access to the web interface, you require the serial number of the energy storage system. You will find the serial number on the type plate on the outside of the cabinet (top).

- Connect your storage cabinet to the router of your home network using the network cable. The port (pos. 6 in the next image) is found on the back of the storage cabinet.



No.	Description
1	Network connection (house network)
2	Replacement power connection
3	**Optional:** Demand response enabling device (DRED)
4	PV current measurement (RJ12 socket)
5	Grid current measurement (RJ12 socket)
6	Network (RJ45 socket)
7	Wall fastening

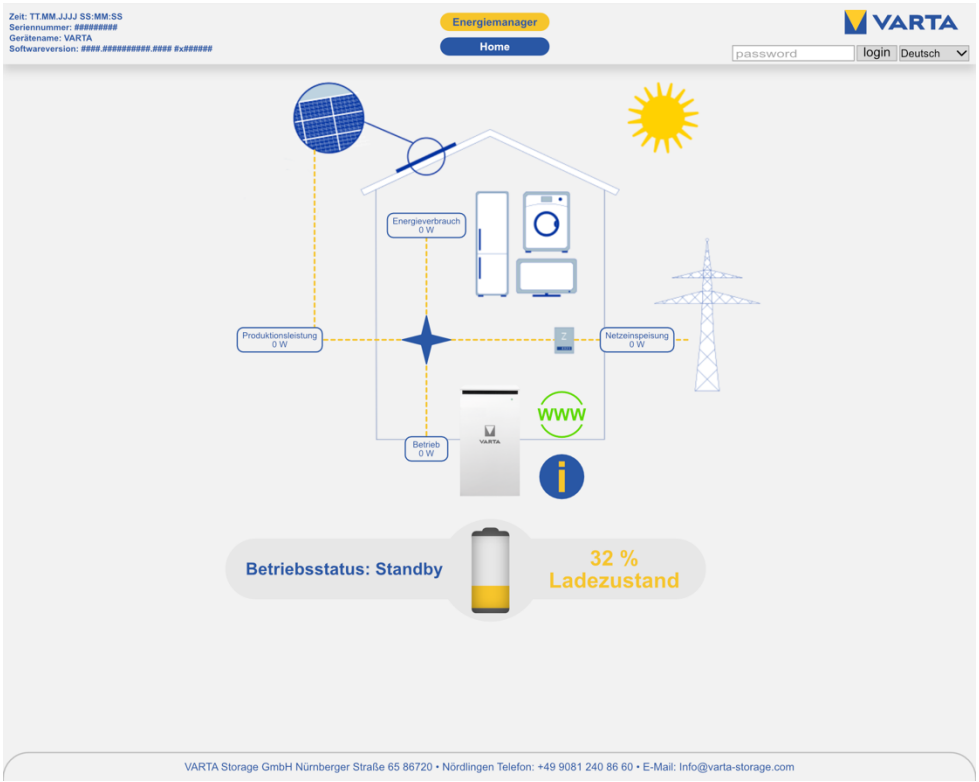
- Enter the **serial number** of the energy storage system in the address bar in your browser after http://varta.
  For example: http://varta127023456. You will find the serial number on the type plate on the outside of the energy store.

---

i For access to the web interface, the browser may need to be updated.

- The homepage of the web interface appears.

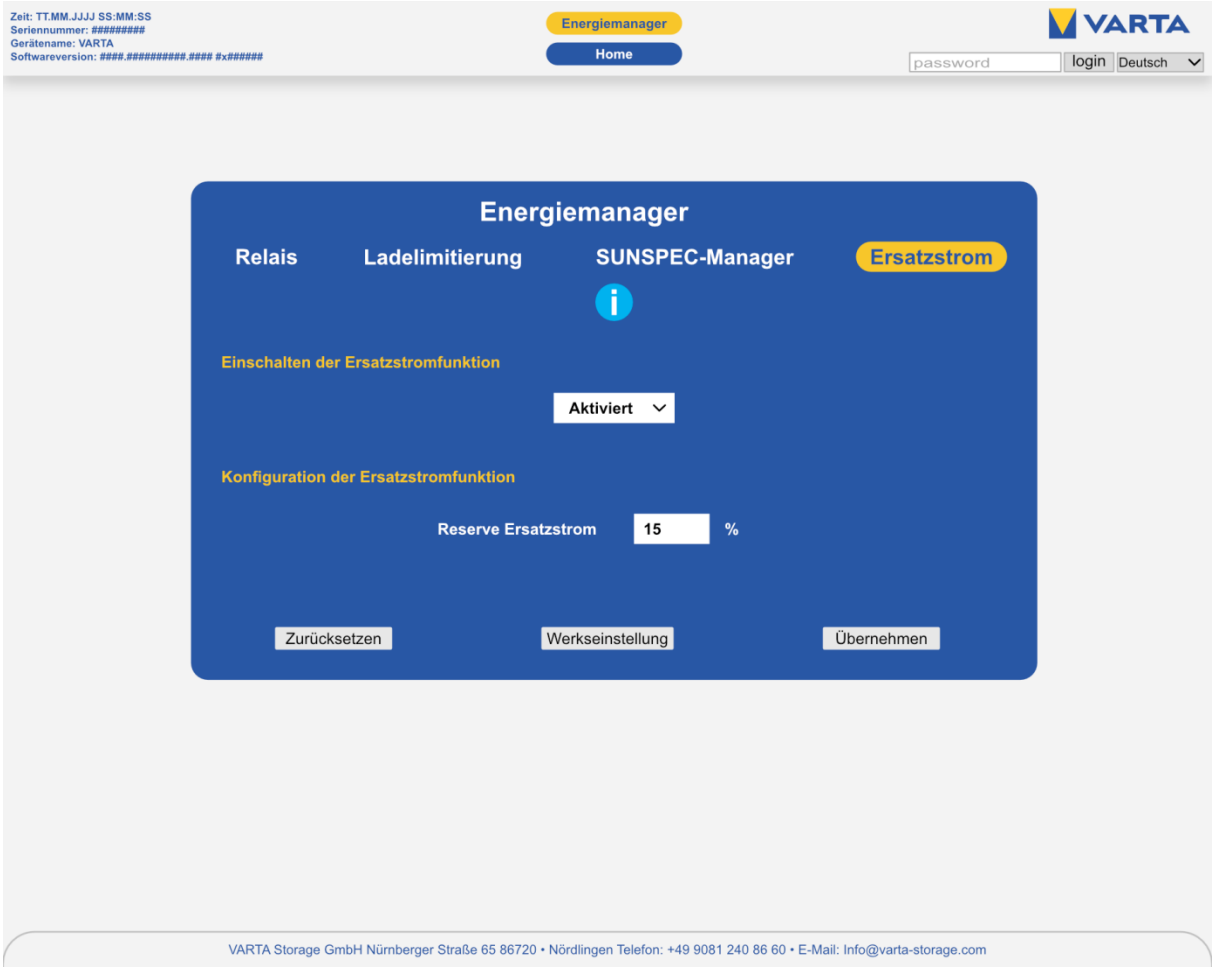
Note: According to the *expansion stage of the energy store* and after a *software update*, the website can deviate from the following images.



6.3.2 The Energy Manager

To manage special tasks such as switching on/off consumers or generation systems, up to four external relays can *optionally* be programmed on an individual basis via the web interface.

Additionally, in this way, the PV yield can be optimised and the SUNSPEC configuration performed. Here you can also configure the parameters of the replacement power function.
After you have clicked on the *Energy Manager* button, the corresponding page appears.



6.4 The portal

The portal https://varta-portal.energy serves to monitor and visualise energy storage systems.
To ensure continuous data transfer, the internet connection must not be interrupted for longer than five days, even in the case of voluntary use outside of an online guarantee. In the event that an online guarantee is concluded, a permanent internet connection must be ensured.
Access to the portal is activated as soon as you agree to the VARTA online services as part of the guarantee registration.
Use of the portal is free. The internet connection costs must be borne by the customer. However, there is no claim to access to the portal.

---

i The data shown on the portal of VARTA cannot be used for settlement purposes.

---

7 Maintenance and cleaning

WARNING

Improper performance of maintenance and cleaning works.

Possible danger to life.

- ➡ Ensure that an electrical specialist carries out the maintenance and cleaning works.
- ➡ Only original parts are to be used for maintenance works.

7.1 Maintenance works

The maintenance of the energy storage system includes:

- Service (inspection and maintenance),
- Repair,
- Technical improvements,
- Expansions, if necessary.

The first service is to be carried out within two years of the installation date. Thereafter, the service must take place every three years. The scope of the maintenance works is described in the Maintenance chapter.
Please note that the SD card has a limited lifespan. To ensure continuous data storage, we recommend replacing the SD card every two years.
The SD card of the manufacturer was successfully tested: GOODRAM type no.: SDU4GCMGRB.
For the documentation of the maintenance, see chapter 18 on page 106.

7.2 Cleaning

WARNING

Entry of water into electrical installations.

Possible danger to life.

- ➡ Do not use water to clean the energy store
- ➡ Do not deposit containers with liquids (such as drinks cups) on electrical installations.

Cleaning agents

Do not use cleaning agents containing acid, lye or solvents!

Cleaning outside of housing

- clean with vacuum cleaner.
- wipe with damp, not wet, cloth.

8 Fault

	**WARNING** **Improper elimination of faults.** Possible danger to life. ➡ Ensure that an electrical specialist performs the works on the energy store.

i In the event of a fault, contact the electrical specialist.

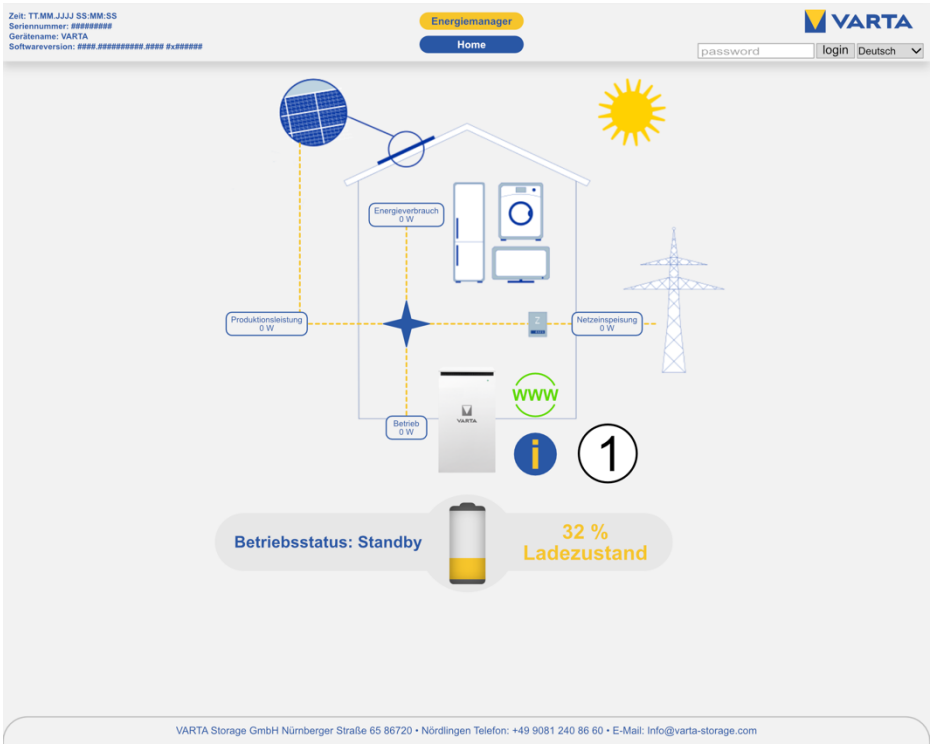
8.1 Fault displays

8.1.1 Fault displays of the LED ring on the on/off switch

The LED ring of the on/off switch on the front of the cabinet displays faults. The i symbol (1) on the homepage of the web interface informs you about the currently occurring fault.

8.1.2 Faults displays on the web interface

Faults are displayed on the homepage of the web interface.
Note: According to the *expansion stage of the energy store* and after a *software update*, the website can deviate from the following image.



- Click on the i symbol with the mouse cursor (1).
- A window opens. Here, a current system error and the last five network errors can be read.

9 Case of damage

9.1 Behaviour in the event of damage

WARNING

Improper action in the case of fire and flooding.

Possible danger to life.

- If possible, switch off the system and fuses.
- Leave the danger area.
- In the event of a fire, inform the fire brigade immediately.
- Inform the fire brigade that there are lithium-ion batteries in the energy storage system.

i In the case of events such as fire or flood, level-headed behaviour can limit the damage.

WARNING

Damaged battery module due to technical defect!

Penetrating smell

- Avoid contact with any escaping liquid.
- Avoid contact with any escaping vapours.
- If possible, switch off the system and fuses.
- Avoid sparks and naked flames.
- Ventilate the setup room.
- In the event of a fault, contact the electrical specialist.

Installation

This section is directed towards the electrical specialist.

10 Transport and storage

10.1 Transport

Lithium-ion batteries are dangerous goods. The battery modules are designed and tested in such a way that they may be transported up to a total weight of 333 kg under compliance with the conditions of ADR 1.1.3.6 (not transport requiring labelling provided there are no other dangerous goods on or in the vehicle). The other requirements of GGVSEB and ADR must also be complied with. Delivery takes place in tested dangerous goods packaging. The lithium-ion batteries were successfully subjected to the UN 38.3 Transport test (UN Manual of Tests and Criteria, Part III, subsection 38.3) and passed it. The storage cabinet is packed separately from the battery modules.

10.2 Transport regulations and safety directions

WARNING

Improper transport due to lack of specialist knowledge.

Possible danger to life and material damage.

- The energy store and its components may be transported only by the manufacturer and electrical specialists qualified and certified by the manufacturer.
- Operate carefully during transport.
- Adhere to the transport regulations.




The housing and the battery module

- must not be stored temporarily in the transport vehicle.
- the energy store must not be transported if a battery module is already integrated.
- the outer packaging of a battery module must not be opened by the vehicle driver or co-driver.

The housing and the battery module

- a tested ABC fire extinguisher with a minimum volume capacity of 2 kg is to be carried.
- pay attention to the symbols on the packaging.
- Transport the parts in closed vehicles only.
- the load is to be properly secured.
- transport the battery module in its intended transport packaging only.
- comply with the requirements pursuant to GGVSEB and ADR!

Use your personal protective equipment.



This reduces the risk of injuries during the mechanical works.


WARNING

Components are heavy.

This can lead to overburdened intervertebral discs, contusions and strains.

➡ Carry out the works described in this chapter with 2 persons or suitable aids.

i If a battery module is being replaced, it may be appropriate to request new dangerous goods packaging, pack the battery module and have it collected by the supplier.

10.3 Packaging/transport control

DANGER

Installation of damaged components.

Danger to life.

➡ Do not accept clearly damaged packaging.

➡ Contact VARTA.

The storage cabinet and the battery module (individually packed) are delivered in separate and tested packaging units on pallets. The installer assumes the disposal of the packaging. Please check the deliveries for completeness and damage:

- Should damage be recognisable on the packaging, please note this on the delivery documents and have this confirmed by the driver by means of a signature.
- Reject deliveries in heavily damaged packaging.

To identify improper handling during transport, a ShockWatch® sticker is attached on the outside of the cardboard packaging of the storage cabinet. If the impact indicator shows the colour red, the shipment was exposed to strong shaking.

- The storage cabinet is possibly damaged.
- Do not reject the acceptance!
- Note "Indicator red" on the transport certificate.
- Leave everything in its original packaging and promptly demand a damage inspection by the transporter.

Figure 1: ShockWatch® sticker

i Remove the packaging only immediately before setup. You will thus avoid damage.
It may be appropriate to keep the packaging material so that the system can be properly packaged again in the event of later transport (location change).

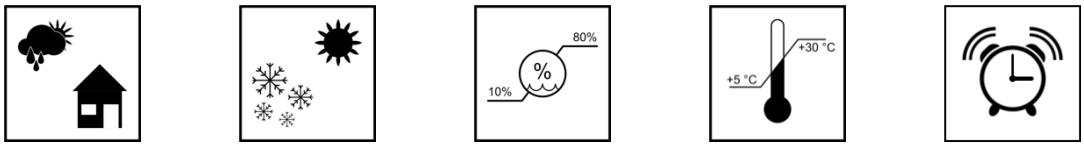
10.4 Storage

WARNING

Entry of water into electrical installations.

Short circuit and corrosion due to condensation water.

➡ Adhere to the storage conditions.



The housing and the battery module

- Do not store temporarily in the transport vehicle.
- Do not store outdoors.
- No abrupt temperature change.

The housing and the battery module

- Store dry at a humidity < 80%.
- Store at a temperature of +5 °C to +30 °C (optimal: +18 °C).

	**ATTENTION** **Material damage due to superimposition.** Deep discharge of the battery module. ➡ Adhere to the storage conditions.

The battery module
• Have it commissioned within 20 weeks of delivery by the manufacturer or by an electrical specialist.

11 Assembly and installation

This section is directed towards the electrical specialist.

11.1 Test components

	**WARNING** **Entry of water into electrical installations!** Short circuit and corrosion due to condensation water. ➡ Begin with the assembly only when the components have taken on room temperature.
	**WARNING** **Installation of damaged components!** Possible danger to life. ➡ Check all components for visible damage. ➡ Do not install damaged components. ➡ Contact VARTA.

11.2 Setup site requirements

Danger

Blocked escape routes

Possible danger to life and material damage.

- Keep escape routes clear.
- Do not mount the energy store in areas that block escape routes.
- Do not lay or deposit objects in areas of the escape routes.
- Avoid tripping hazards.

WARNING

Entry of water into electrical installations.

Danger to life due to electric shock.

- Set up the storage cabinet only within buildings.
- Pay attention to the IP protection class of the energy store
- Comply with all the requirements concerning the setup site.

CAUTION

Personal and material damage due to erroneous setup and lack of space.

Crushing injuries to limbs.

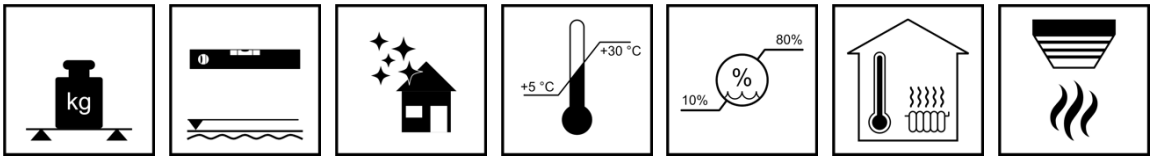
- Position the cabinet in such a way that hazard-free installation, operation, maintenance and dismount is possible in the case of intended use.

11.3 Suitable assembly sites

Suitable sites include dry cellars, service entrance rooms and utility rooms.
At assembly, be aware that operating noises of the energy store may be disruptive.

11.4 Setup site

The following measurements and general conditions must be complied with at the setup site.



11.4.1 Dimensions and equipment

For the room in which VARTA element backup is set up, a volume of at least 30 m^3 is recommended. A horizontal, flat floor with a minimum surface area of 70 cm x 55 cm (width x depth). The floor must be sufficiently stable.
For the weight of the energy store, see chapter 3.8 "Technical parameters", beginning on page 20.

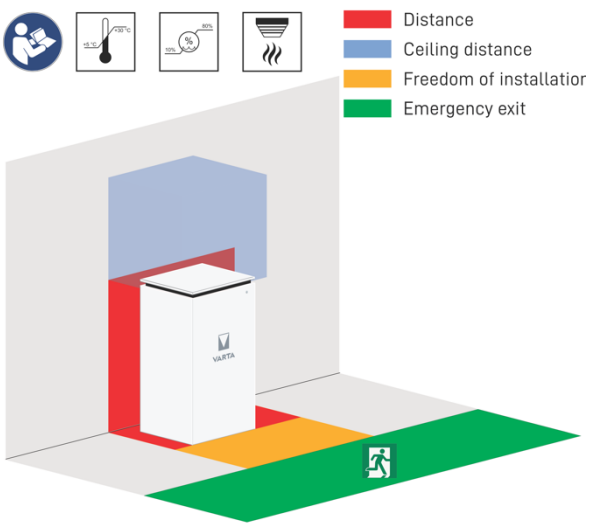
- If appropriate, have the statics checked.

The subsurface, connecting walls and ceilings must not consist of heart-sensitive materials.

- A smoke detector must be installed in the setup room of the VARTA element backup.

The distance to adjacent installations must be approximately 5 cm to the right and approximately 10 cm to the left. A space of approx. 120 cm in depth in front of the device is required to be able to perform installation and maintenance work via the front door. To ensure that escape is possible, the swivel range of doors must not extend into this space.

The screws to open the storage cabinet on the left beside the front door must be accessible. A gap of at least 30 cm in height must be provided for above the storage cabinet. The gap between the wall and the back of the cabinet must remain clear so that the cooling air can escape unhindered from the device.



11.4.2 Environmental conditions

The setup site must correspond to a soiling grade of 2.
It must be ensured that a continuous exchange of air takes place, perhaps by means of external ventilation e.g. windows, air-conditioning system, ventilation or similar.

- The distance to the ventilation must be at least 100 cm.
- The room temperature must always be between +5 °C and 30 °C (optimally +18 °C), the relative humidity < 80%.

Our recommendation: A well-ventilated room without external heat sources.

Ensure sufficient protection from rodents.

Smoking is prohibited at the setup site!

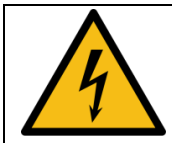
11.4.3 Non-permitted locations and environmental conditions

Altitudes above 2,000 metres, garages, carports or other locations where the environmental conditions are not complied with.
Locations:

- Living and bedrooms,
- with an explosive atmosphere,
- in which flammable or oxidising substances are stored,
- wet rooms,
- with large changes in ambient temperature,
- with direct solar radiation,
- with a humidity of over 80% and condensation,
- in which the freezing point can be exceeded,
- into which salty moisture can penetrate,
- with an ammoniacal environment.

11.5 Preparation of the electrical connection

This section is directed towards the electrical specialist.



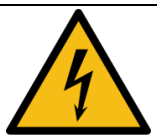
DANGER

Contact with electrical voltage.

Danger to life due to electric shock.

➡ Switch off the replacement power circuit.

➡ Switch off connected generation systems.



DANGER

Switching off the supply line of the store can activate the replacement power mode.

Danger to life due to electric shock.

➡ Switch off the store.

➡ Switch off the supply line.

Use your personal protective equipment.



This reduces the risk of injuries during the mechanical works.

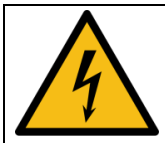
Adhere to the safety rules!



- Disconnect from the mains.
- Secure against switching on again.
- Ensure de-energised state.

Increased caution at the replacement power connection.

- Before connecting to energy, ensure that there are no persons in the danger zone.

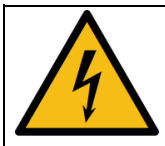


WARNING

Improper installation.

Personal and material damage.

- Configure the fuse in front of the energy storage system as three-pole. The fuse must meet the requirements of a separator
- Secure the device connection on the energy store with a 16 A fuse type B.
- Comply with the country-specific installation regulations, such as VDE 0100.
- Never connect the energy storage system without a PE and N connection.
- There must be a suitable separator (e.g. a selective circuit breaker) between the mains and the customer's system with which the customer's system can be separated from the mains on an all-pole basis in the event of maintenance works.
- Adhere to the indicated line cross-sections.



WARNING

Improper installation of the replacement power supply.

Personal and material damage.

- Earth the store with at least 10 mm².
- Secure the end customer circuits with a RCD type B and a fuse max. 6A.
- Label all the distributors and sockets connected to the replacement power network.
- Label all the circuits connected to the replacement power network.
- Do not cascade any further energy stores in the replacement power network.

11.6 External power reduction

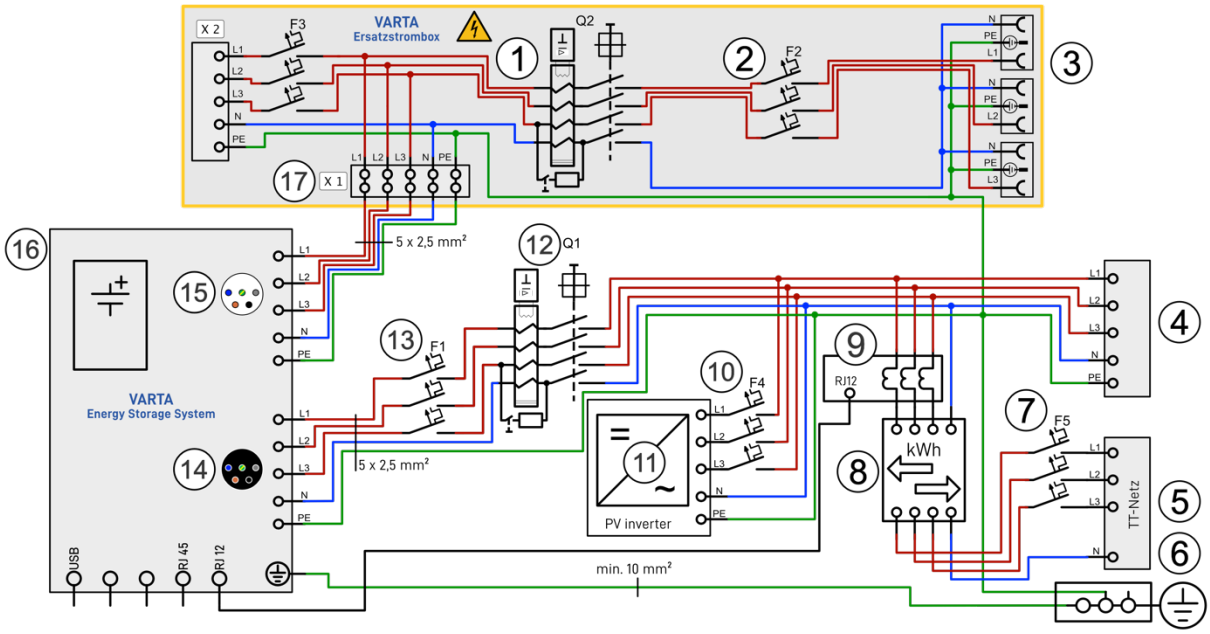
The electricity grid operator is authorised to perform a temporary specification and/or restriction of the active power until switch-off. Therefore, according to the country-specific specifications, the installation of a switch-off mechanism may be necessary. The VARTA element backup supplies potential-free binary inputs for power reduction and switch-off for the external active power switch-off. When installing, pay attention to the short guide on external power reduction (LINK or QR code.
The disconnecting device is not integrated in the following energy stores:

Designation	VKB number
VARTA element backup 6 / S5	270 985 8340
VARTA element backup 12 / S5	270 985 8350
VARTA element backup 18 / S5	270 985 8360

11.7 Connection plans of the VARTA element backup

The regulations of the country-specific standards, such as DIN VDE 0100, are to be complied with. Meter concepts are to be coordinated with the electricity grid operator.

11.7.1 VARTA element backup with replacement power box in the TT network

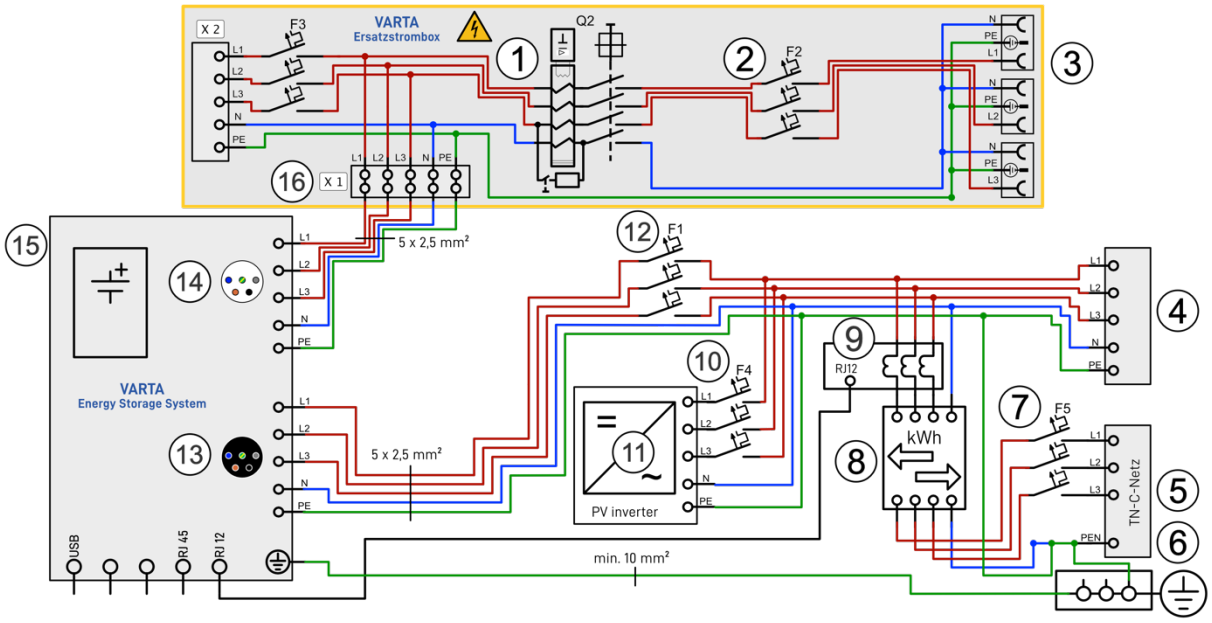


1	Q2 Residual current device type B IΔn 30 mA
2	F2 Circuit breaker 6 A type B
3	Three sockets for consumers entitled to replacement power

To prevent electrical accidents: Label the distributor for the replacement power.

4	Subdistribution
5	House connection
6	Equipotential bus bar
7	F5 Line protection/fuse house connection
8	Consumption and feed-in meter
9	Current sensor
10	F4 Circuit breaker according to converter regulation
11	Converter for photovoltaic systems
12	Q1 Residual current device type A IΔn 30 mA
13	F1 Circuit breaker 16 A type B 6 kA
14	Integrated network connection (black)
15	Replacement power connection (light grey)
16	VARTA element backup with integrated section switches according to AR 4105
17	X1 Feed clamp for energy store

11.7.2 VARTA element backup with replacement power box in the TN-C network

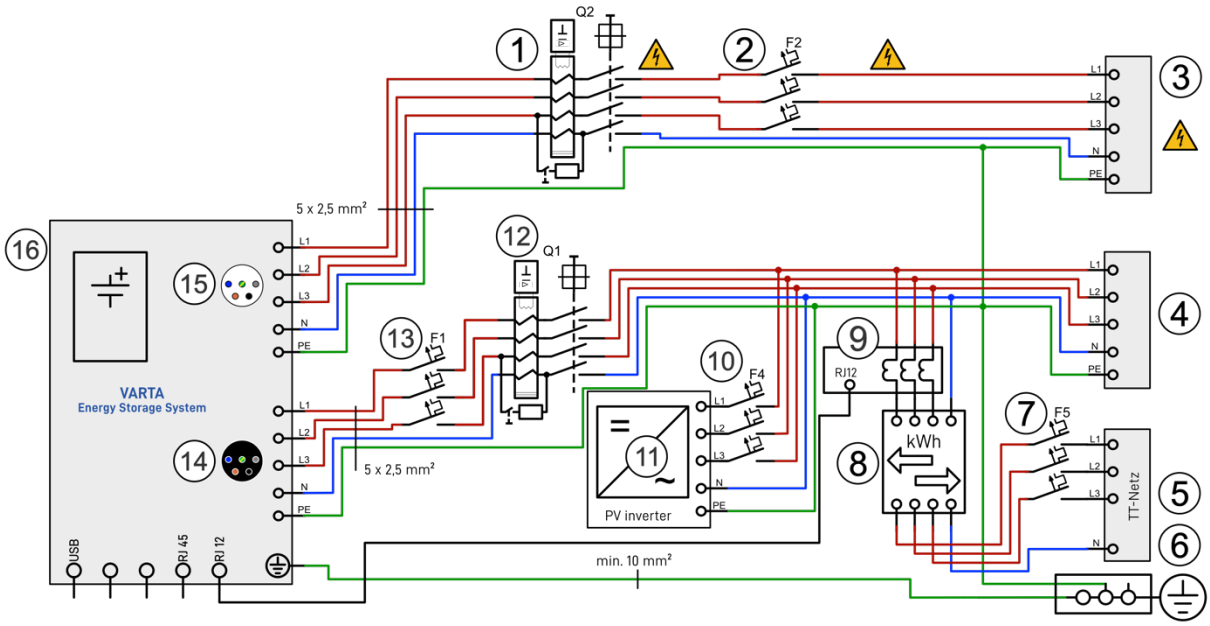


1	Q2 Residual current device type B IΔn 30 mA
2	F2 Circuit breaker 6 A type B
3	Three sockets for consumers entitled to replacement power

To prevent electrical accidents: Label the distributor for the replacement power.

4	Subdistribution
5	House connection
6	Equipotential bus bar
7	F5 Line protection/fuse house connection
8	Consumption and feed-in meter
9	Current sensor
10	F4 Circuit breaker according to converter regulation
11	Converter for photovoltaic systems
12	F1 Circuit breaker 16 A type B
13	Integrated network connection (black)
14	Replacement power connection (light grey)
15	VARTA element backup with integrated section switches according to AR 4105
16	X1 Feed clamp for energy store

11.7.3 VARTA element backup in the house installation in the TT network

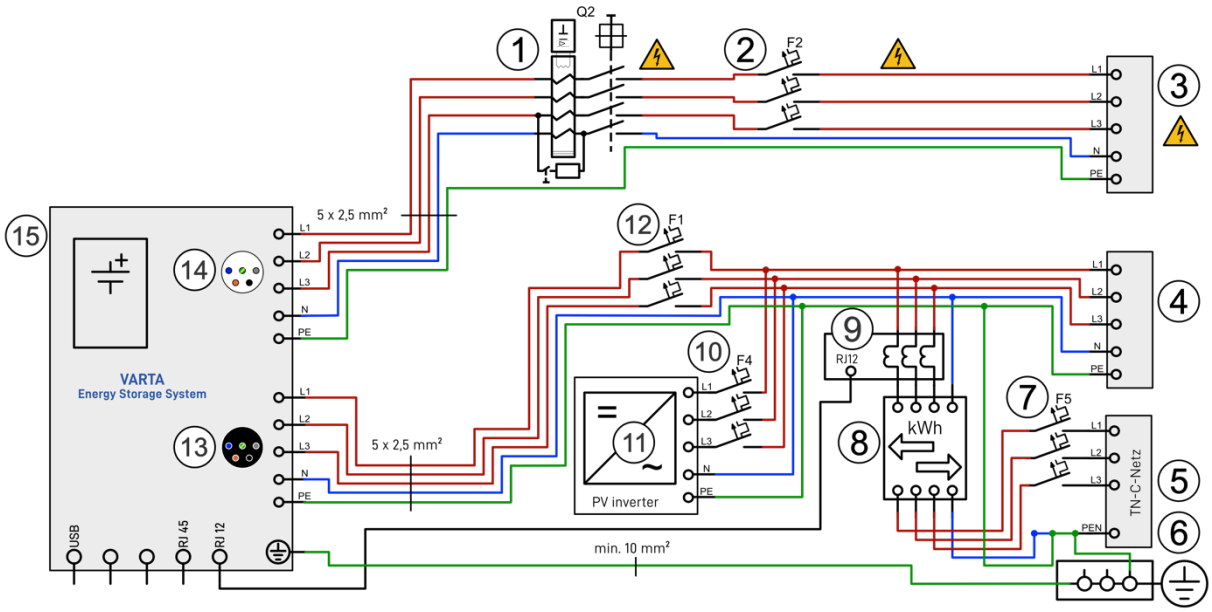


1	Q2 Residual current device type B IΔn 30 mA
2	F2 Circuit breaker 6 A type B
3	Output terminal for consumers entitled to replacement power

To prevent electrical accidents: Label the distributor for the replacement power.

4	Subdistribution
5	House connection
6	Equipotential bus bar
7	F5 Line protection/fuse house connection
8	Consumption and feed-in meter
9	Current sensor
10	F4 Circuit breaker according to converter regulation
11	Converter for photovoltaic systems
12	Q1 Residual current device type A IΔn 30 mA
13	F1 Circuit breaker 16 A type B
14	Integrated network connection (black)
15	Replacement power connection (light grey)
16	VARTA element backup with integrated section switches according to AR 4105

11.7.4 VARTA element backup in the house installation in the TN-C network

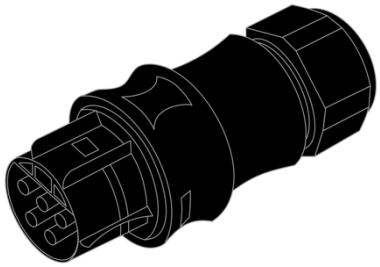


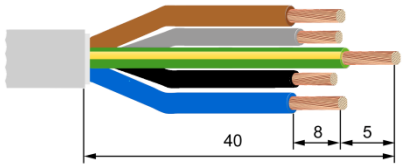
1	Q2 Residual current device type B IΔn 30 mA
2	F2 Circuit breaker 6 A type B
3	Output terminal for consumers entitled to replacement power

To prevent electrical accidents: Label the distributor for the replacement power.

4	Subdistribution
5	House connection
6	Equipotential bus bar
7	F5 Line protection/fuse house connection
8	Consumption and feed-in meter
9	Current sensor
10	F4 Circuit breaker according to converter regulation
11	Converter for photovoltaic systems
12	F1 Circuit breaker 16 A type B
13	Integrated network connection (black)
14	Replacement power connection (light grey)
15	VARTA element backup with integrated section switches according to AR 4105

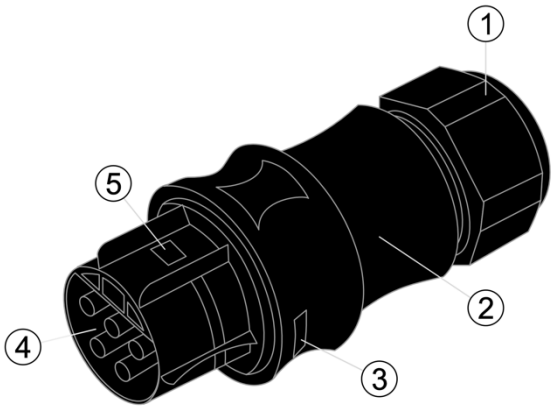
11.8 Network connection preparation (black plug)





For the network connection, the 5-wire network connection line must be connected to the plug connection (black plug) provided

- Strip the connection line 40mm at the end.
- The PE conductor must be 5mm longer than the other four conductors (L1, L2, L3, N). Shorten these conductors accordingly.
- Strip the five wires of the house connection at the ends 8mm.
- In the case of fire-wired conductors, wire terminations are to be used.

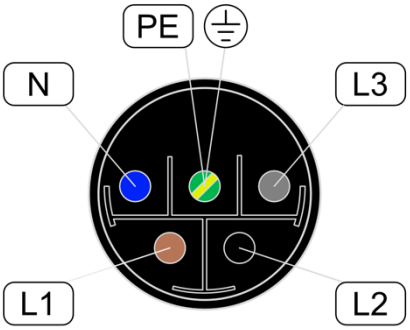


No.	Description
1	Cap nut for tension relief
2	Plug housing
3	Opening for latching when inserting To release: Press in detent
4	Contact insert
5	Opening for detent (two-sided). For latching when mounting the plug

- Unscrew the cap nut of the tension relief.
- Remove the plug housing: To this end, release the catch by pressing the two side detents simultaneously.
- Slide the cap nut and the plug housing over the line.

---

i A flexible, non-metallic sheathed cable facilitates the mounting work.



Description	
L1	brown
L2	black
L3	grey
N	blue
PE	green-yellow

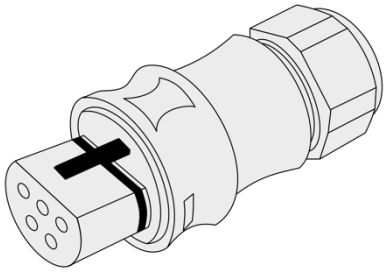
- Introduce the wires into the screw connections in the contact insert and tighten.

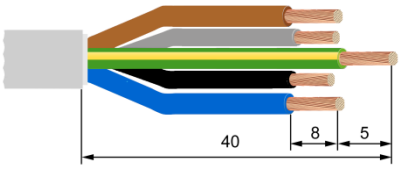
---

i Ensure that the conductors are securely fixed in the connections.

- Introduce the contact insert into the plug housing. Both parts must audibly latch into each other with the side detents.
- Tighten the cap nut for tension relief.

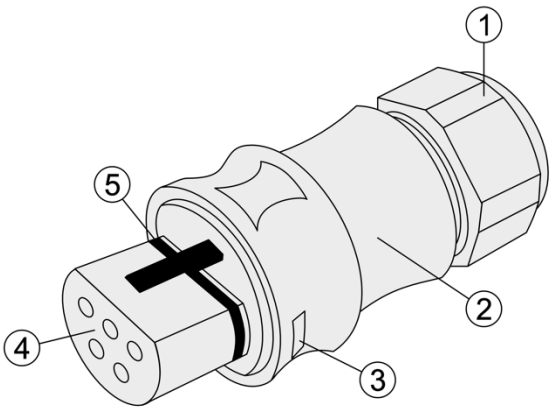
11.8.1 Replacement power connection preparation (light grey plug)





For the replacement power connection, the 5-wire replacement power connection line must be connected to the
plug connection (light-grey plug) provided.

- Strip the connection line 40mm at the end.
- The PE conductor must be 5mm longer than the other four conductors (L1, L2, L3, N). Shorten these conductors accordingly.
- Strip the five wires of the house connection at the ends 8mm.
- In the case of fire-wired conductors, wire terminations are to be used.

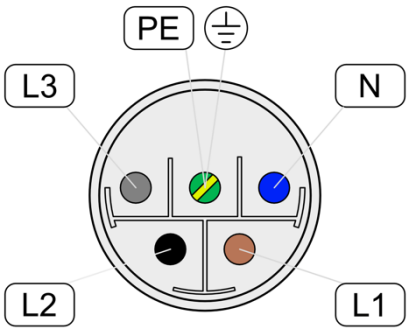


No.	Description
1	Cap nut for tension relief
2	Plug housing
3	Opening for latching when inserting To release: Press in detent
4	Contact insert
5	Opening for detent (two-sided). For latching when mounting the plug

- Unscrew the cap nut of the tension relief.
- Remove the plug housing: To this end, release the catch by pressing the two side detents simultaneously.
- Slide the cap nut and the plug housing over the line.

---

i A flexible, non-metallic sheathed cable facilitates the mounting work.



Description	
L1	brown
L2	black
L3	grey
N	blue
PE	green-yellow

- Introduce the wires into the screw connections in the contact insert and tighten.

---

i Ensure that the conductors are securely fixed in the connections.

- Introduce the contact insert into the plug housing. Both parts must audibly latch into each other with the side detents.
- Tighten the cap nut for tension relief.

11.8.2 Connecting the VARTA Split Core current sensor

If the energy store to be installed is to be cascaded with further energy stores, the following work step is **not** performed. Instead, see the operating manual for the cascading. (Optional extra package required)

ATTENTION

Inverted phases.

Fault of the charging and discharging function.

➡ The house connection must be executed as a **clockwise rotating field**.

➡ Conductors L1, L2, L3 for house connection, current sensor and AC plug must have the same phase assignment.

➡ It is not sufficient to execute the connection as a **clockwise rotating field**.

ATTENTION

Soiling of the magnetic cores.

Current sensor is damaged.

➡ Do not touch the magnetic cores.

➡ Ensure a clean working environment.

To ensure the own consumption optimisation, the house network current sensor must record all values of consumption and infeed. For this reason, it is located right behind the consumption and feed-in meter. The VARTA Split Core Stromsensor consists of a terminal box and three folding transducers. Their nominal current is 50 A (maximum current 100 A) per phase. The terminal box is designed for top hat rail mounting. The connection for the sensor cable included in the delivery for connecting to the energy storage system is found in the terminal box. For the position of the "current measurement" socket on the energy storage system, see Figure 3: Back of storage cabinet on page 52.

Figure 3: Back of storage cabinetFor the VARTA Split Core current sensor to record the consumption and feed-in performance correctly, the following must be complied with:

- The house connection must be executed as a **clockwise rotating field**.
- The phase assignment L1, L2, L3 of sensor and energy store must be identical.
- The arrows on the folding transducers must point towards the sub-distribution / store.

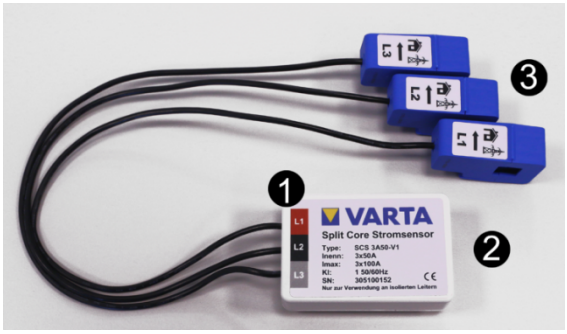


Figure 2: VARTA Split Core current sensor

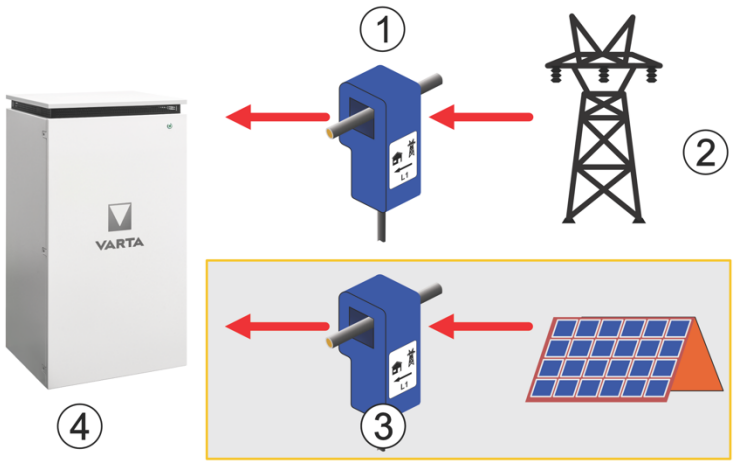
No.	Description
1	Current sensor
2	Connection socket “current measurement”
3	Folding transducers (L1, L2, L3)

To mount the folding transducer on the VARTA Split Core current sensor, the conductor must be placed through the opening of the blue folding transducer. To this end, open the locking mechanism on the back, place the folding transducer around the conductor and close it. It must latch in audibly.

11.9 Connecting the optional current sensor

The VARTA element backup has the option of connecting an additional VARTA Split Core current sensor to visualise the generator performance.
Here,

- the phase of the house network current sensor must harmonise with the phases of the PV sensor,
- the arrows on the folding transducers must point towards the sub-distribution.



No.	Description
1	VARTA Split Core current sensor
2	Mains
3	**Optional:** A second VARTA Split Core current sensor.
4	VARTA element backup

11.10 Assembly preparation

This section is directed towards the electrical specialist.

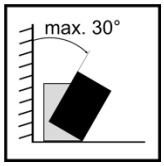
Read the operating manual.

WARNING

Components are heavy.

This can lead to overburdened intervertebral discs, contusions and strains.

➡ Carry out the works described in this chapter with 2 persons or suitable aids.



At the setup site, tilt cabinet maximum 30°
→ Danger of slippage!

11.11 Setting up and connecting the storage cabinet

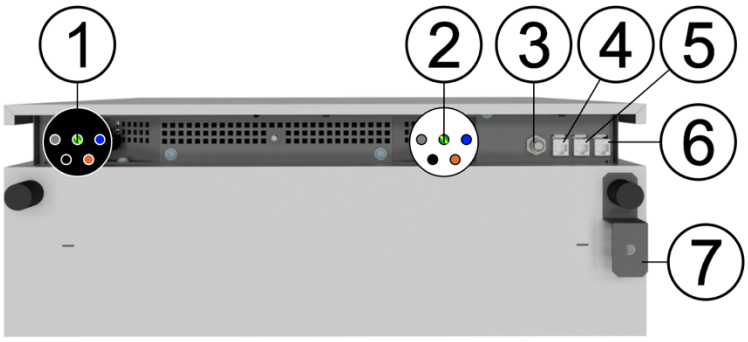


Figure 3: Back of storage cabinet

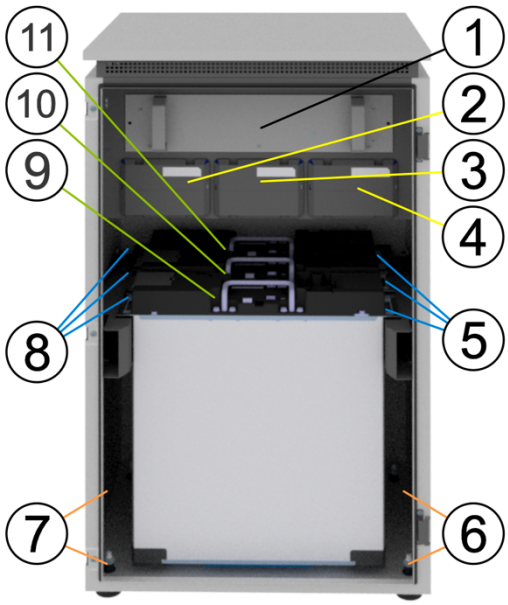
No.	Description
1	Network connection (house network)
2	Replacement power connection (light grey)
3	**Optional:** Demand response enabling device (DRED)
4	PV sensor (RJ12 socket)
5	Grid sensor (RJ12 socket)
6	LAN (RJ45 socket)
7	Wall fastening

- Position the energy store *without battery module* at the setup site.
- Mount the power connector (black) onto the port (1). The closure locks in audibly.
- Mount the replacement power connector (light grey) onto the port (2). The closure locks in audibly.
- Sockets 5 and 6 are intended for the connection of the current measurement and the network.

---

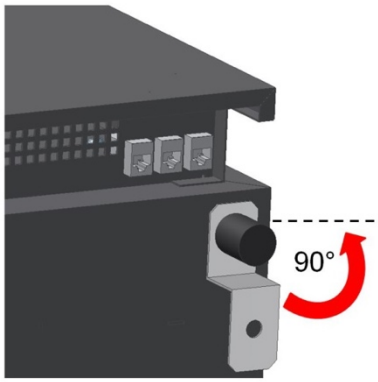
i Changing the plant settings requires that there be a network connection.

- Adjust the levelling feet (pos. 6 and 7 on the next image) to a height of approximately 4 cm.
- Be aware that the maximum height of the levelling feet is 5 cm.



No.	Designation
1	Converter
2	Battery charger 1 (BL 1)
3	Battery charger 2 (BL 2)
4	Battery charger 3 (BL 3)
5	2 fastening screws per battery module right
6	2 levelling feet
7	2 levelling feet
8	2 fastening screws per battery module left
9	Battery module 3 (BM 3)
10	Battery module 2 (BM 2)
11	Battery module 1 (BM 1)

- Align the storage cabinet with a spirit level.
- When adjusting, ensure that you comply with the maximum height of the levelling feet of 5 cm.
- Fasten the energy store to the back wall. To this end, turn the fastening angle outwardly 90°.



11.11.1 Battery module assembly

This section is directed towards the electrical specialist.

DANGER

Touching live parts!

Danger to life.

- Comply with a waiting time of at least 3 minutes.
- Ensure that the battery modules are switched off and that no LED display is lit up.
- The energy store must not be transported if a battery module is already integrated.
- Keep unauthorised persons away.

WARNING

Touching sharp-edged parts!

Cut injuries.

- Wear your personal protective equipment

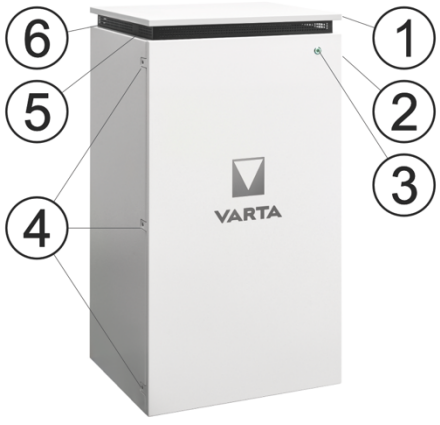
11.11.2 Opening the storage cabinet

The VARTA element backup is shut down using the on/off switch (3). Here, it should be taken into account, however, that the replacement power connection is also supplied with voltage from the mains when switched off. Thus, consumers connected to the replacement power connection are also supplied when the store is switched off. If the replacement power connection is to be disconnected, the store must be switched off using the on/off switch (3) and the network connection of the store switched off. (Racking out the store connection). These two steps must be performed for work on the replacement power connection as well as for work on the storage system.

1. Actuate the on/off switch (3),
2. Rack out fuse F1 (compare connection diagram).

Ensure that the on/off switch on the front of the housing is at "OFF" and the supply line to the store is switched off.

To open the door, remove the three screws (4) on the left side of the cabinet.
Aid: Torx 25 screwdriver



No.	Description
1	Cover
2	Type plate
3	On/off switch
4	Screws for opening the door
5	Black start button
6	Ventilation grid

11.11.3 Check the battery modules

WARNING

Damaged battery module!

Personal and material damage.

- Unpack the battery module carefully.
- Check the battery module for damage and cleanness.
- Under no circumstances integrate and commission a damaged or soiled battery module!
- Transport the battery module carefully.
- Do not deposit parts on the battery module.
- Keep unauthorised persons away!

Cleaning agents

Do not use cleaning agents containing acid, lye or solvents!

11.11.4 Behaviour in the event of damage

WARNING

Improper handling of damaged battery module!

Personal and material damage

- Do not open the battery module.
- Do not attempt a repair!
- Avoid contact with any escaping liquid!
- Avoid contact with any escaping vapours!

Damaged or soiled battery module

Contact VARTA.

First aid in the event of contact with escaping liquid

If inhaled:
- Leave the room.
- Request or seek medical assistance immediately.

In the event of skin contact:
- Wash the affected area thoroughly with water and soap.
- Request or seek medical assistance immediately.

In the event of eye contact:
- Rinse eyes with flowing water for at least 15 minutes.
- Request or seek medical assistance immediately.

11.11.5 Fit and connect battery modules

WARNING

Improper handling of battery module.

Personal and material damage.

- ➡ Carry out the works described in this chapter with 2 persons or suitable aids.
- ➡ Do not lift the battery module using the handle.
- ➡ Hold the battery module by the handle when fitting it.

ATTENTION

Two battery modules on one battery charger.

Material damage due to excessively large current flow.

- ➡ Always connect only one battery module to a battery charger

ATTENTION

Superimposition of battery module.

Deep discharge of the battery module.

- ➡ As soon as you have begun the commissioning, it must be carried out to the end.

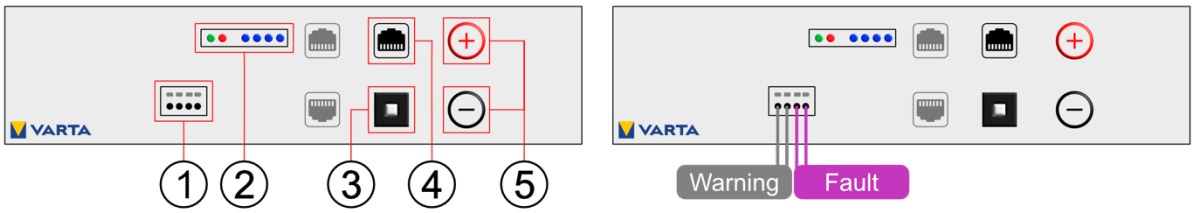
ATTENTION

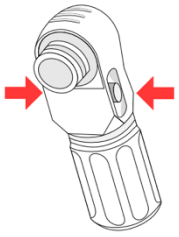
Inverted wires of error and warning messages.

Wrong error message to the control.

- ➡ Pay attention to the specified colour coding.

11.11.6 Connections on the battery module

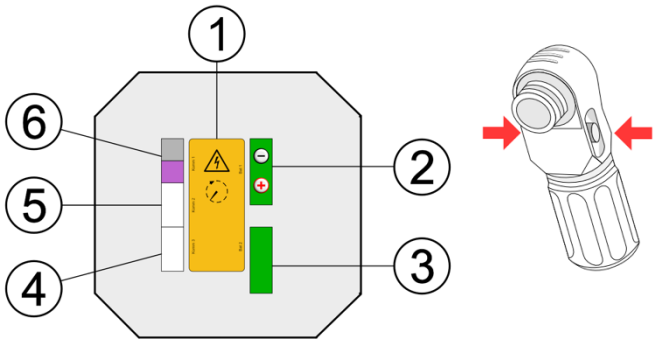




No.	Designation
1	DRY contact
2	LED display
3	Activation button
4	CAN
5	Connections for battery current

Designation	Farbe	Colour	Couleur	Colore
Fault	lila	purple	pourpre	porpora
Warning	grau	grey	gris	grigio

11.11.7 Connections on the battery charger (front)

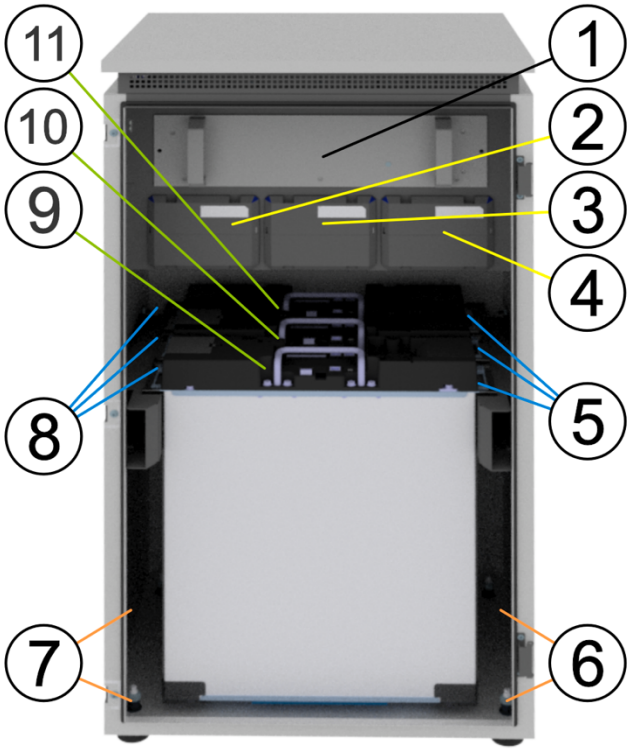


No.	Designation
1	Directions and warnings
2	Battery current 1
3	⚠ Do NOT use - battery current 2
4	Communication 3 (Comm 3) RJ45 socket
5	Communication 2 (Comm 2) RJ11 socket - NOT used
6	Communication 1 (Comm 1) Warning and Fault

11.11.8 Position of the battery modules

Depending on the model, up to three battery modules are integrated.

- The first battery module (11) is mounted on the back wall of the energy store.



No.	Designation
1	Converter
2	Battery charger 1 (BL 1)
3	Battery charger 2 (BL 2)
4	Battery charger 3 (BL 3)
5	2 fastening screws per battery module right
6	2 levelling feet
7	2 levelling feet
8	2 fastening screws per battery module left
9	Battery module 3 (BM 3)
10	Battery module 2 (BM 2)
11	Battery module 1 (BM 1)

11.11.9 Element 6 - Fit and connect battery module

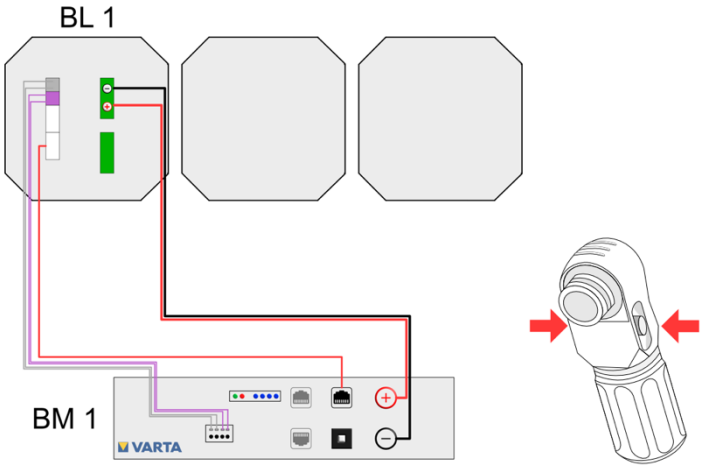


Figure 4: Battery charger 1 - battery module 1

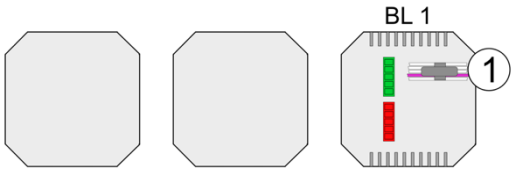


Figure 5: Battery charger 1 – back

1	Cable of converter with inscription and 1 x colour: *violet*

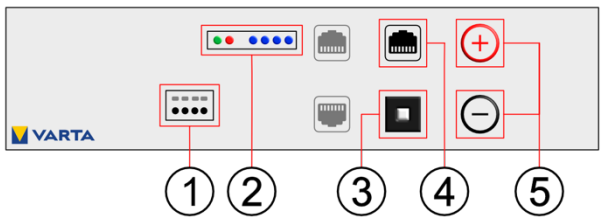
Mounting the battery module

- Battery module 1 (BM 1) is positioned behind, on the back wall of the storage cabinet.

Create the connection between battery charger 1 (BL 1) and battery module 1 (BM 1):

a. Battery current connection (no. 5):
- Pay attention to the polarity.
- Insert the two plugs.

b. Communication (no. 1):
- Pay attention to the pin assignment.
- Insert the four communication cables into the openings of the clamping connector.
- The connections are self-clamping.

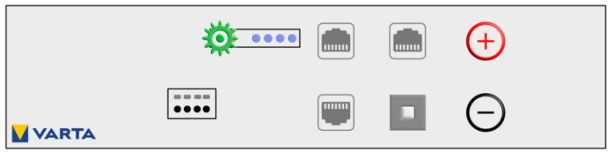


c. Communication (no. 4):
- Insert the communication cable (red, CAN).

d. Attaching:
- Slide the battery module backwards.
- Attach the battery module to the mounting holes of the tracks with the screws provided.
  Aid: Gr. 4 Allen key.

Connect battery module:

- Press the activation button (no. 3) on the battery module.
  The LED display on the battery module displays the functionality.



11.11.10 Element 12 - Fit and connect battery modules

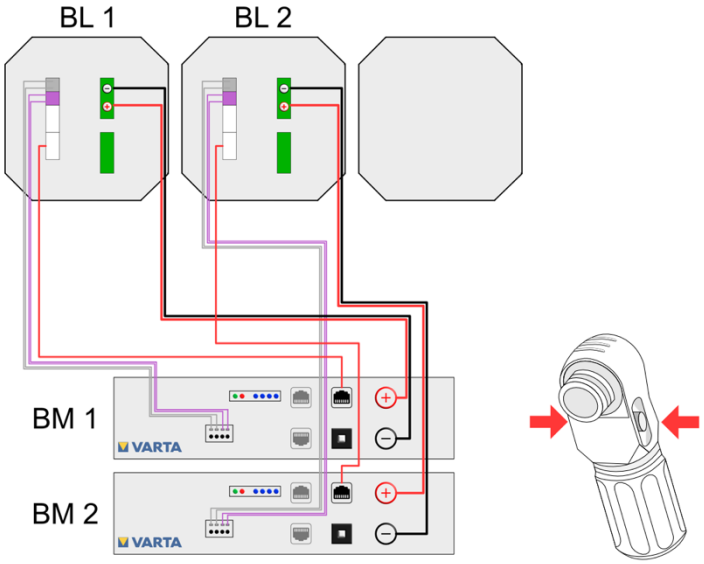


Figure 6: Battery chargers 1 and 2, battery modules 1 and 2

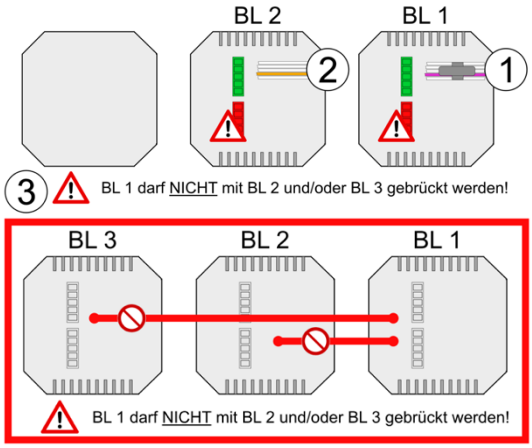
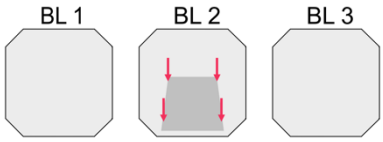


Figure 7: Battery charger 1 and 2 back

1	Cable of converter with inscription and 1 x colour: *violet*
2	Connect the cable of converter 1 x colour: *orange* to the battery charger 2 (BC 2)
3	Battery charger 1 must NOT be bridged with battery charger 2 and/or battery charger 3!

Mounting battery charger 2

- Remove the cover at position BL 2.
- Remove the bottom plate in battery charger shaft BL 2.
- Mount battery charger 2. The battery charger locks into the end position. It is not necessary to use a screwdriver.



Mounting battery module 1

- Battery module 1 (BM 1) is positioned behind, on the back wall of the storage cabinet.

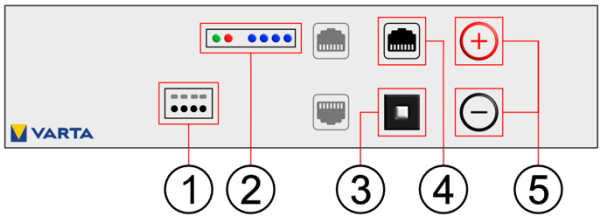
Mounting battery module 2

- Battery module 2 (BM 2) is positioned in front of battery module 1 (BM 1).

First create the connection between battery charger 1 (BL 1) and battery module 1 (BM 1).

a. Battery current connection (no. 5):

- Pay attention to the polarity.
- Insert the two plugs.



b. Communication (no. 1):

- Pay attention to the pin assignment.
- Insert the four communication cables into the openings of the clamping connector.
- The connections are self-clamping.

c. Communication (no. 4):

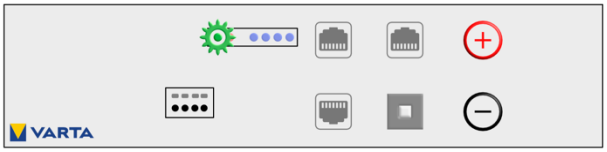
- Insert the communication cable (red, CAN).

d. Attaching:

- Slide battery module 1 backwards.
- Attach the battery module to the mounting holes of the tracks with the screws provided.
  Aid: Gr. 4 Allen key
- Repeat the process starting at ***point a*** to create the connection between battery charger 2 (BL 2) and battery module 2 (BM 2).

Connect battery modules:

- Press the activation button (no. 3) on the battery modules.
  The LED display on the battery modules displays the functionality.



11.11.11 Element 18 - Fit and connect battery modules

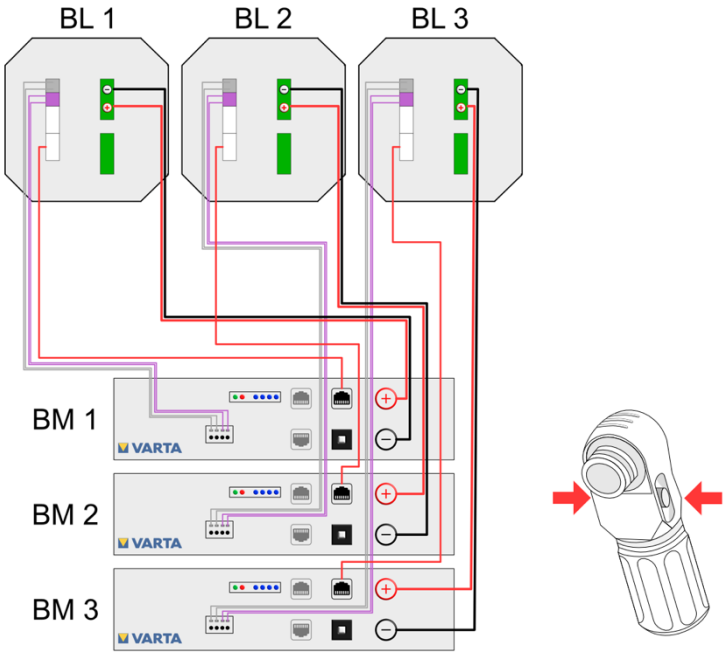


Figure 8: Battery chargers 1 and 2, battery modules 1, 2 and 3,

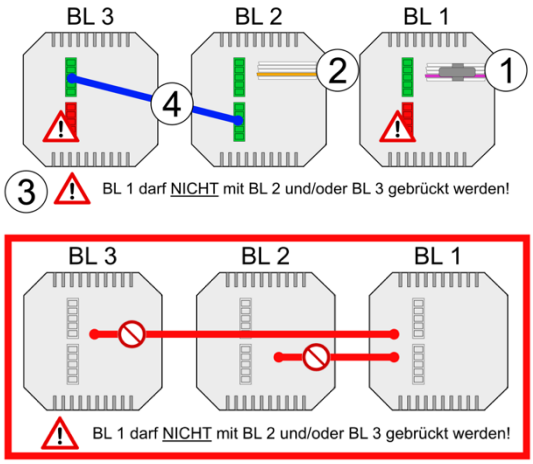
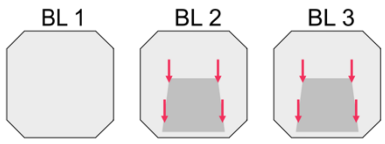


Figure 9: Battery chargers 1, 2 and 3 back

1	Cable of converter with inscription and 1 x colour: *violet*
2	Connect the cable of converter 1 x colour: *orange* to the battery charger 2 (BC 2)
3	Battery charger 1 must NOT be bridged with battery charger 2 and/or battery charger 3!
4	Connect the bridge from battery charger 2 (BC 2) to battery charger 3 (BC 3)

Mounting battery chargers 2 and 3

- Remove the cover at position BL 2 and BL 3.
- Remove the bottom plates of battery charger shaft BL 2 and BL 3.
- Mount battery chargers 2 and 3. The battery chargers lock into the end position. It is not necessary to use a screwdriver.



Mounting battery module 1

- Battery module 1 (BM 1) is positioned behind, on the back wall of the storage cabinet.

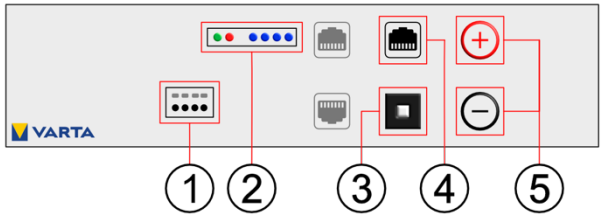
Mounting battery module 2

- Battery module 2 (BM 2) is positioned in front of battery module 1 (BM 1).

Mounting battery module 3

- Battery module 3 (BM 3) is positioned in front of battery module 2 (BM 3).

First create the connection between battery charger 1 (BL 1) and battery module 1 (BM 1).



a. Battery current connection (no. 5):
- Pay attention to the polarity.
- Insert the two plugs.

b. Communication (no. 1):
- Pay attention to the pin assignment.
- Insert the four communication cables into the openings of the clamping connector.
- The connections are self-clamping.

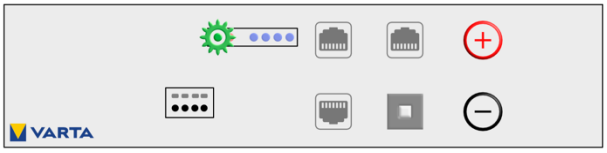
c. Communication (no. 4):
- Insert the communication cable (red, CAN).

d. Attaching:
- Slide battery module 1 backwards.
- Attach the battery module to the mounting holes of the tracks with the screws provided.
  Aid: Gr. 4 Allen key

e. Connect battery charger 2 and battery module 2
- Repeat the process starting at ***point a*** to create the connection between battery charger 2 (BL 2) and battery module 2 (BM 2).

f. Connect battery charger 3 and battery module 3
- Repeat the process starting at ***point a*** to create the connection between battery charger 3 (BL 3) and battery module 3 (BM 3).

Connect battery modules:



- Press the activation button (no. 3) on the battery modules.
  The LED display on the battery modules displays the functionality.

11.11.12 Closing the storage cabinet

Before you close the energy store, please check:

- Are all tools removed?
- Is the interior clean?
- Are there no loose parts in the interior?
- Are there no small parts in the interior?
- Are all cable connections created correctly?

If necessary, go through the points again.

If all the points are OK, then:

- Lock the energy store with the delivered screws.

11.12 Initial start-up

This section is directed towards the electrical specialist.

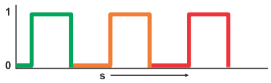
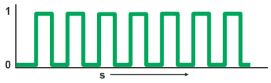
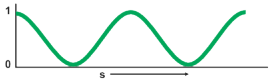
11.12.1 Check activation of the battery modules

If you do not carry out the initial start-up immediately following the installation of the battery modules, the battery modules must be reactivated as described in chapter 11.11.9 beginning on page 59, chapter 11.11.10 beginning on page 60 and chapter 11.11.11 beginning on page 62.
The following steps are required for switching on the VARTA element backup energy storage system:

- The network cable is inserted.
- The fuse on the house network is switched on.
- Switch the store "ON" with the on/off switch.
  (The button is locked in the lower position.)

i After switching on, it is necessary to carry out the *Quick Install* in the *web interface*.

- Until the conclusion of the Quick Install, the LED ring changes between the colours: Green - orange - red.
- The initialisation can be tracked on the LED ring on the on/off switch.

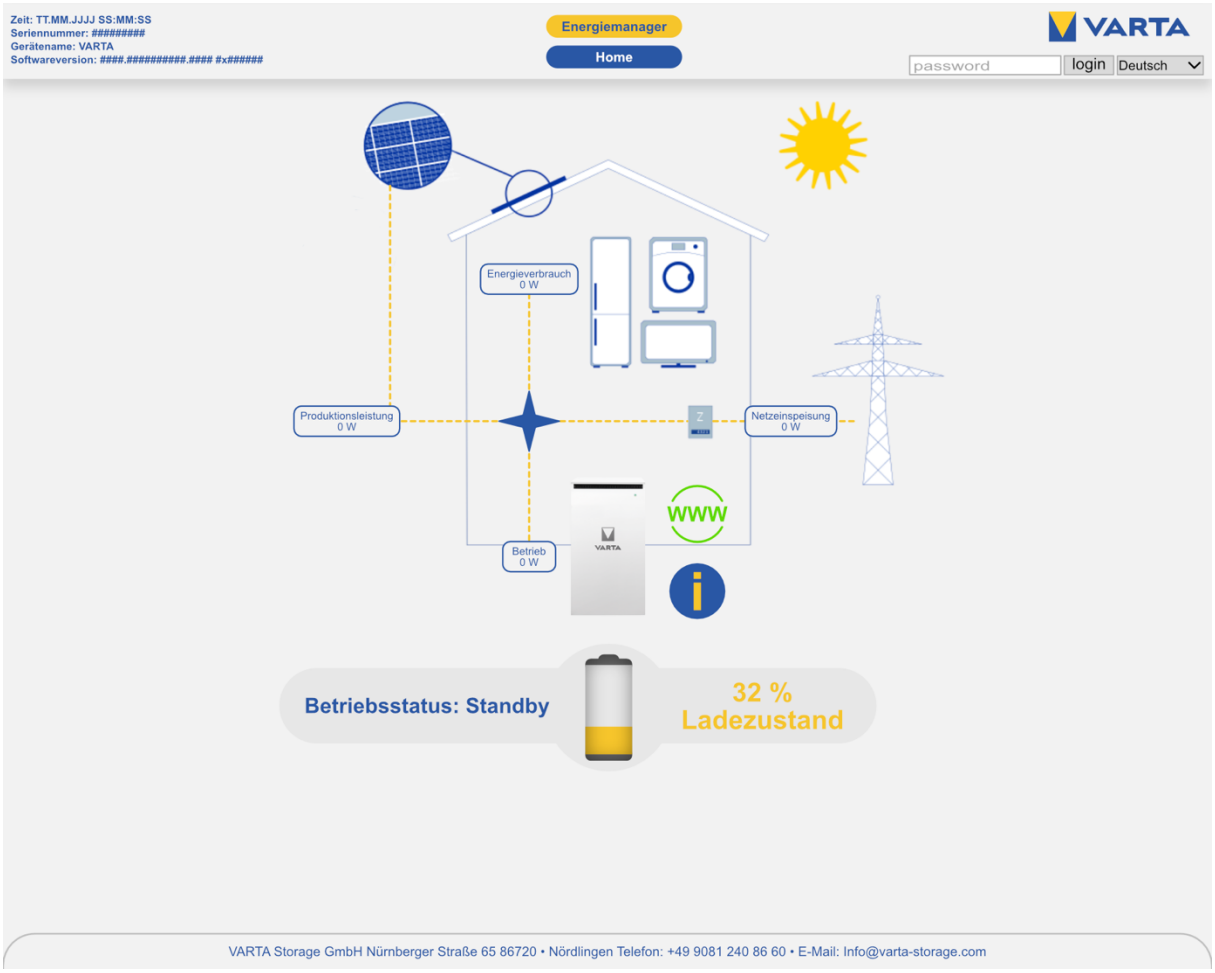
LED ring Colour	LED ring Action	Operating status energy store	LED ring flash mode
Green-Orange-Red	 Flashes	Start-up not yet complete	
Green	 Flashes every 0.5 seconds	System check	
Green	 Lights up permanently	Operation	
Green	 Vibrates every 3 seconds	Standby	
Green	 Vibrates with decreasing intensity	Discharge	
Green	 Vibrates with increasing intensity	Charge	

11.12.2 Password entry

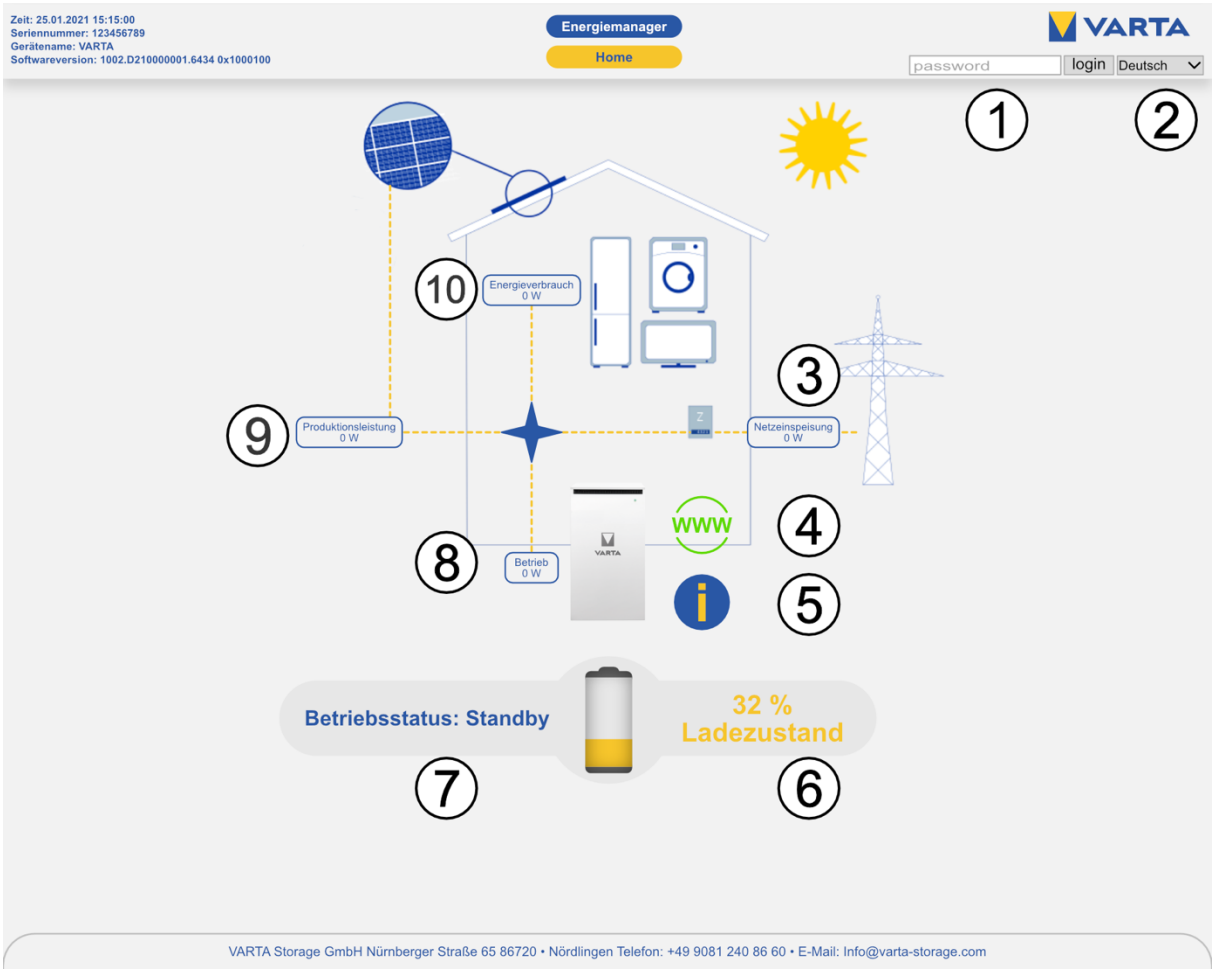
The storage cabinet must be connected to the router of the home network.

- Connect your PC/notebook to the customer's network.
- Enter the **serial number** of the energy storage system in the address bar in your browser after http://varta.
  For example: http://varta127023456. You will find the serial number on the type plate on the outside of the energy store.
- The homepage of the web interface appears.

Note: According to the *expansion stage of the energy store* and after a *software update*, the website can deviate from the following images.



Note: Should access not be possible via the customer network, the connection to the store can be created via a direct connection. To this end, insert the network cable directly into your PC/notebook. The IP address of the store is 169.254.0.5. Some parameters may be changed only by trained and qualified personnel and not by the operator!



No.	Description
1	Field for entering the password
2	Language selection
3	Network supply
4	Internet connection to the VARTA server (green = online, red = offline).
5	Information
6	Charging status
7	Operating status
8	Operation
9	Productivity performance
10	Energy consumption

- Enter your password in field (1) *password*.

Further buttons appear in the header.

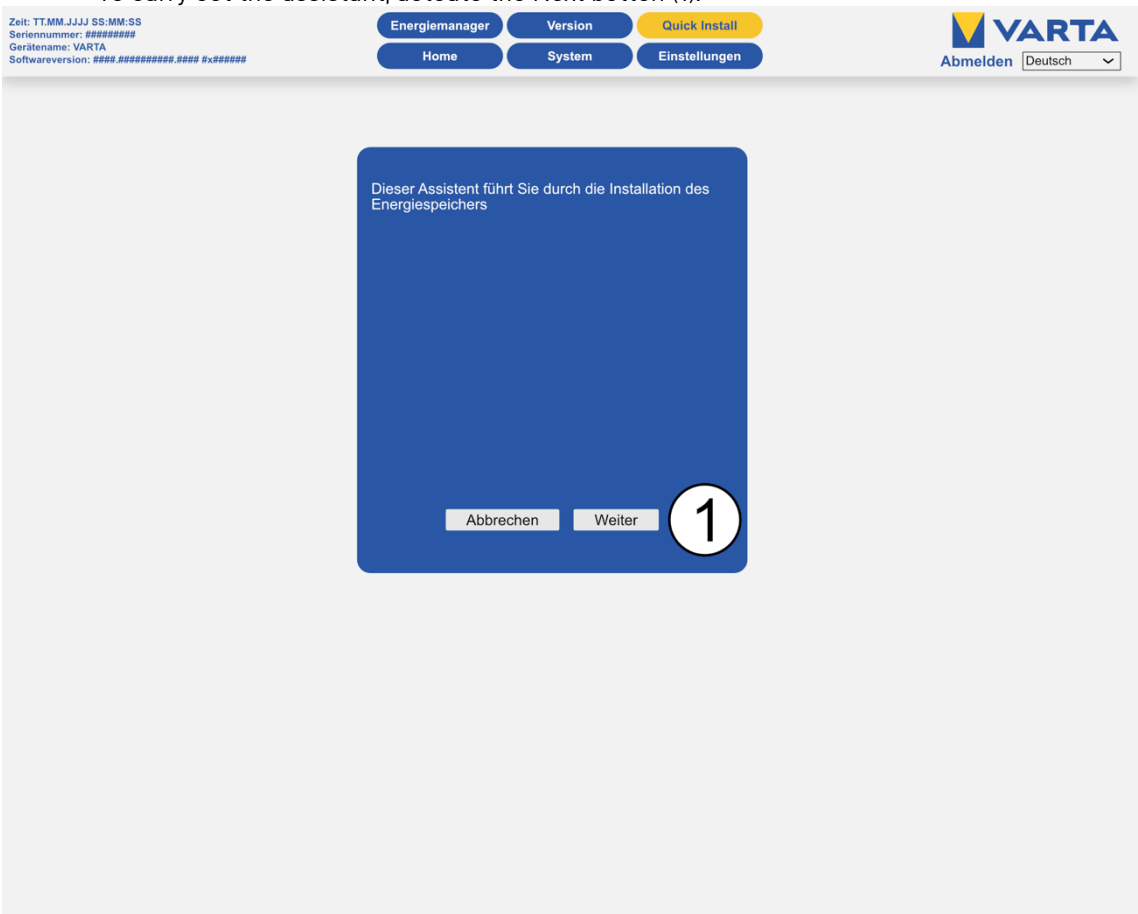
---

i After the initial installation, it is necessary to carry out the *Quick Install* in the *web interface*.

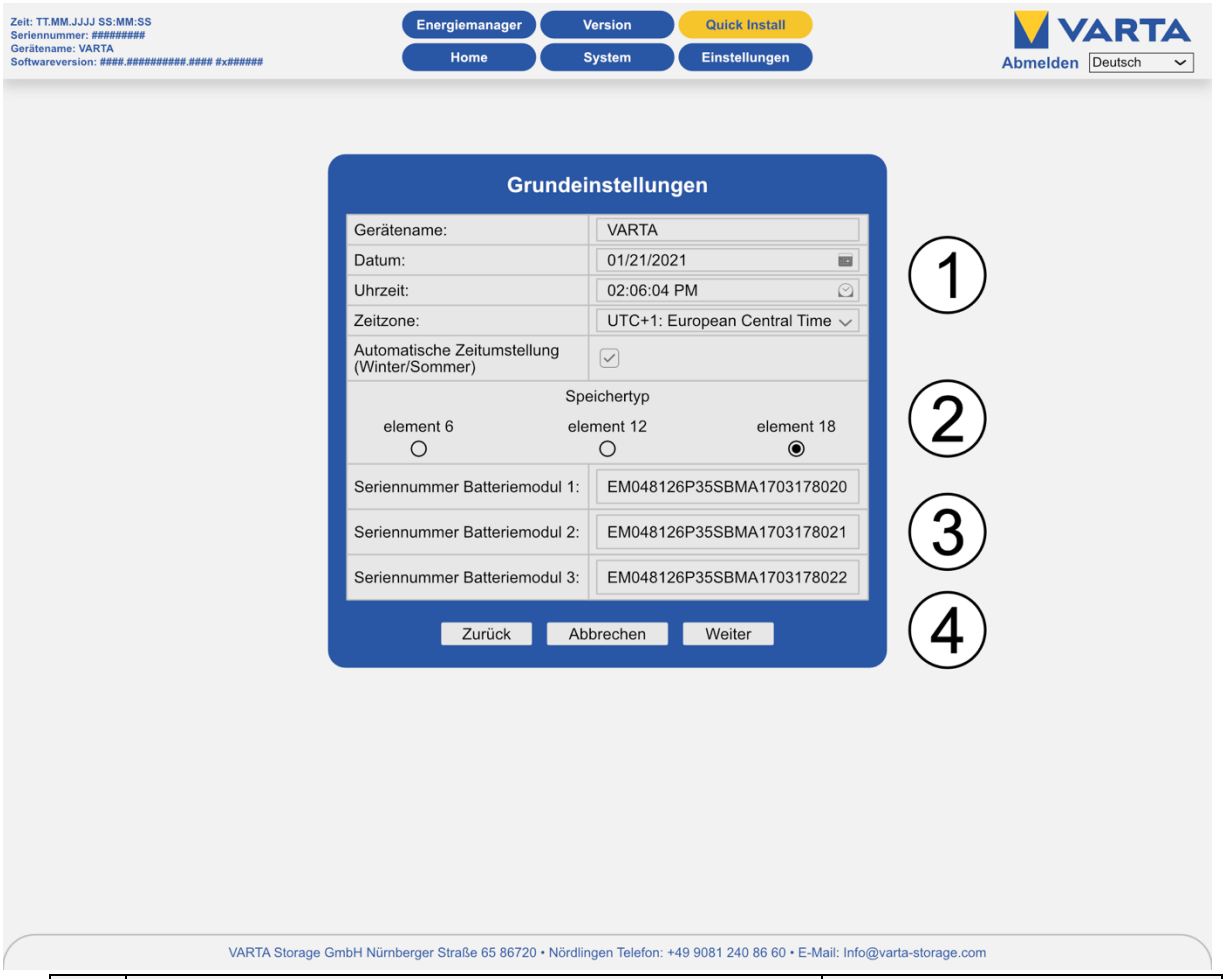
No.	Description
1	Version
2	Quick Install
3	Logout
4	Settings
5	System

- Actuate the *Quick Install* button (2) in the header.

- To carry out the assistant, actuate the *Next* button (1).

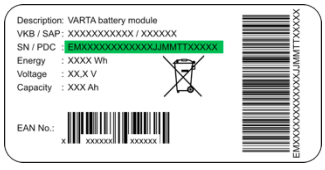


11.12.3 Quick Install - basic settings



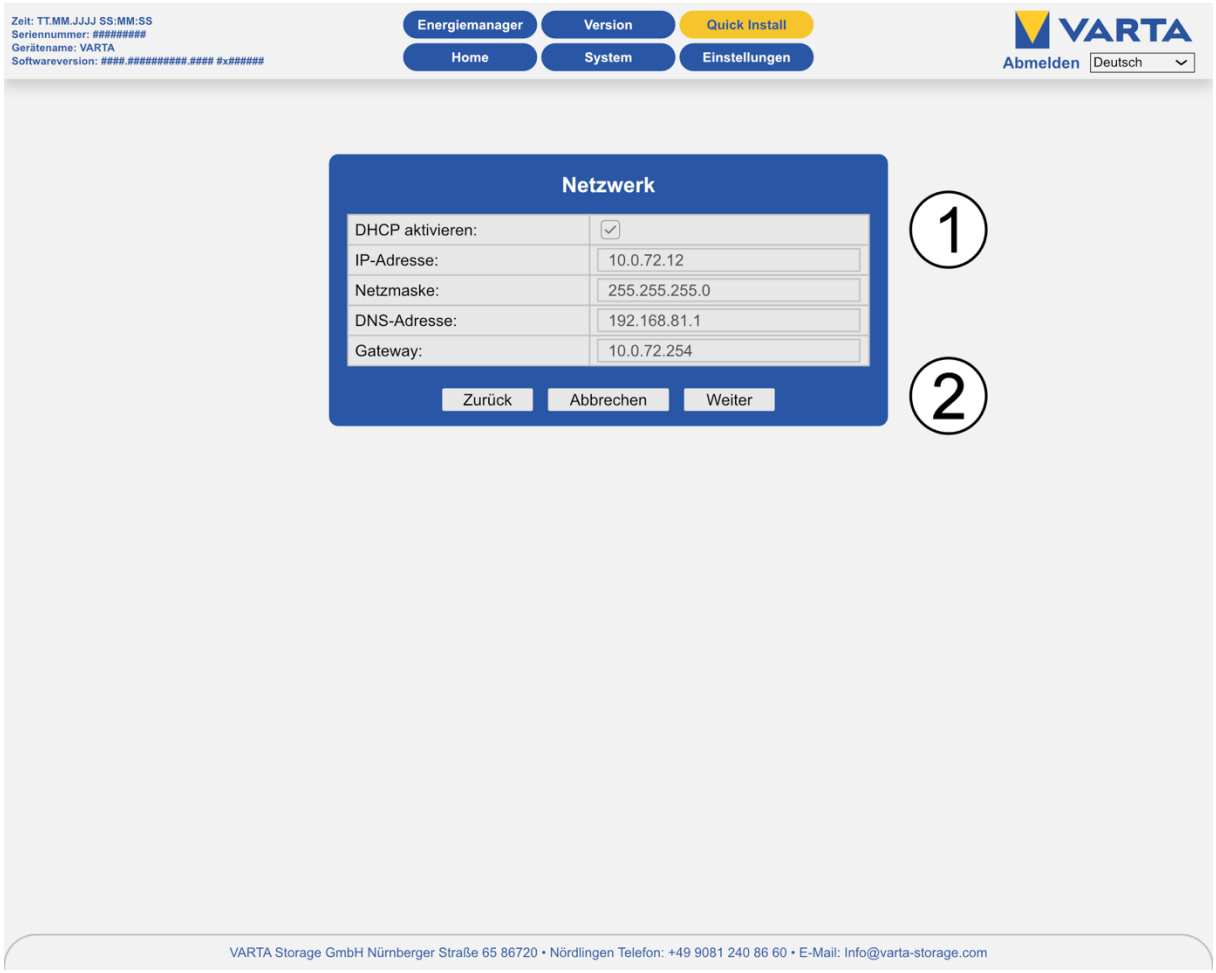
No.	Description	
1	Device name entry	maximum 20 characters
	Date entry	
	Time entry	
	Time zone entry	
	Selection automatic switchover summer- wintertime	Checkbox active / inactive
2	Selection store type	Radio button active / inactive
3	Serial number entry battery modules 1 to 3	
4	Back / Cancel / Next	

- Enter an individual name for the device.
- Enter date, time and time zone.
- Select whether the system should switch automatically to summer- wintertime.
- Select the store type.
- Enter the serial number(s) of the installed battery module (Ausbaustufe element 6) and/or the installed battery modules (expansion stage element 12 - 18). The order of the entry is irrelevant.
- Click on *Next* (4).



i Without indicating the correct serial number(s) of the battery modules, it is not possible to commission the store.

11.12.4 Quick Install - network



No.	Description	
1	Activate DHCP	Checkbox active / inactive
2	Back / Cancel / Next	

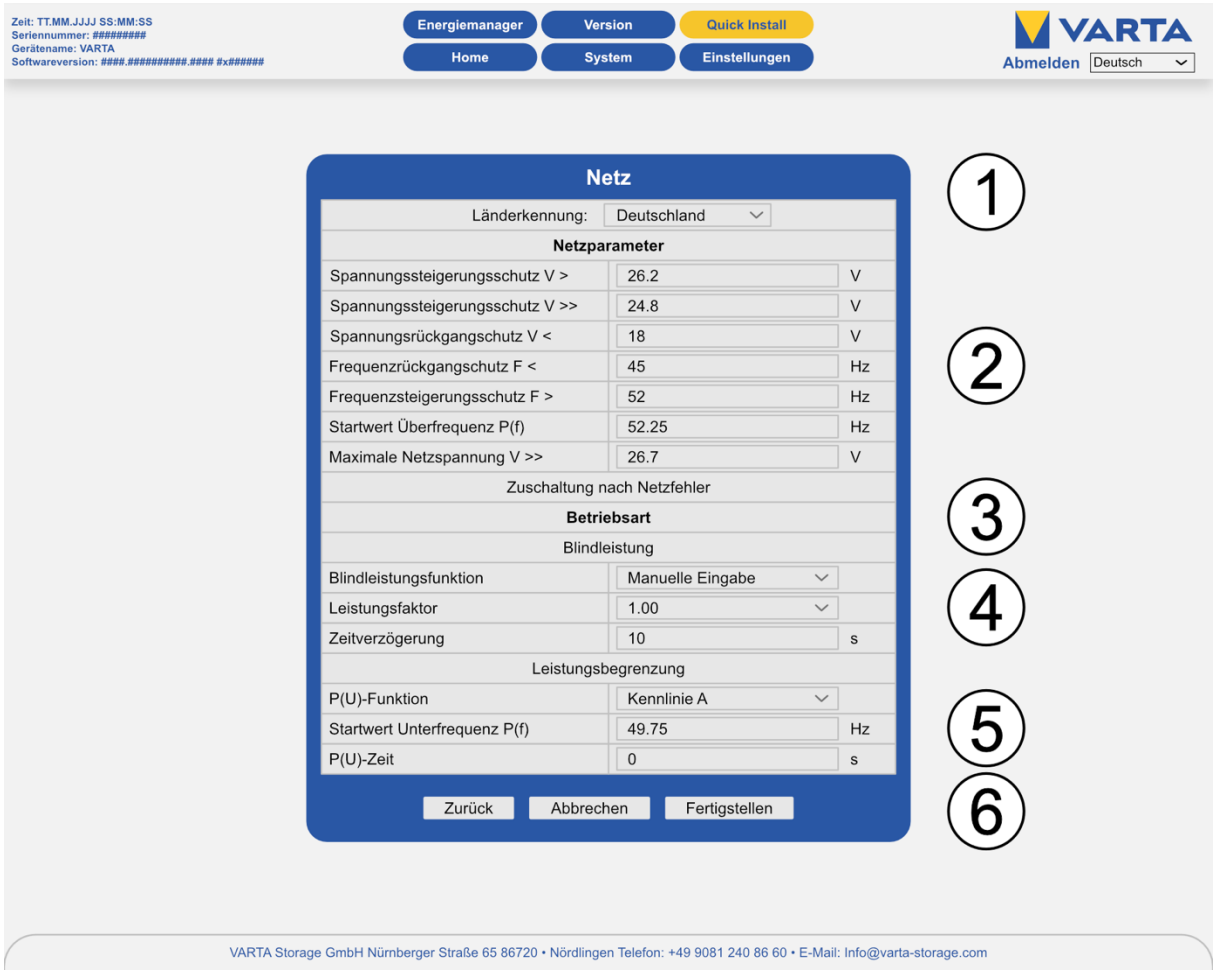
As standard, the store assumes the settings of the customer network.
To this end, the choice box beside *Activate DHCP* (1) is ticked as a factory setting.
Should the connection not take place automatically, take the parameters from the manual of the network router. With commercially available DSL routers, the DNS and gateway address are usually identical. In company networks, they can differ. Additionally, you require the release of ports 4500, 21 and 37 for the connection to the portal (does not apply to all users).

---

i If the IP address, the DNS address and the gateway are to be set up statically, knowledge of the static address issue is required.
For this, it is e.g. necessary to read out the network configuration of the router.
The address range 172.30.xxx.xxx and 172.31.xxx.xxx must not be issued as a static or dynamic IP for the store.

- Click on *Next* (2).

11.12.5 Quick Install - network



No.	Description
1	Country ID
2	Values of the network parameters
3	Operating mode section
4	Values for the idle power
5	Values for the power restriction
6	Back / Cancel / Finish

- Click *Finish* to complete the installation.

The energy store is operational when the on/off switch is lit up green.

If the display of the LED ring on the on/off switch continues to light up red or flashes red, the following remedial measures are to be taken:

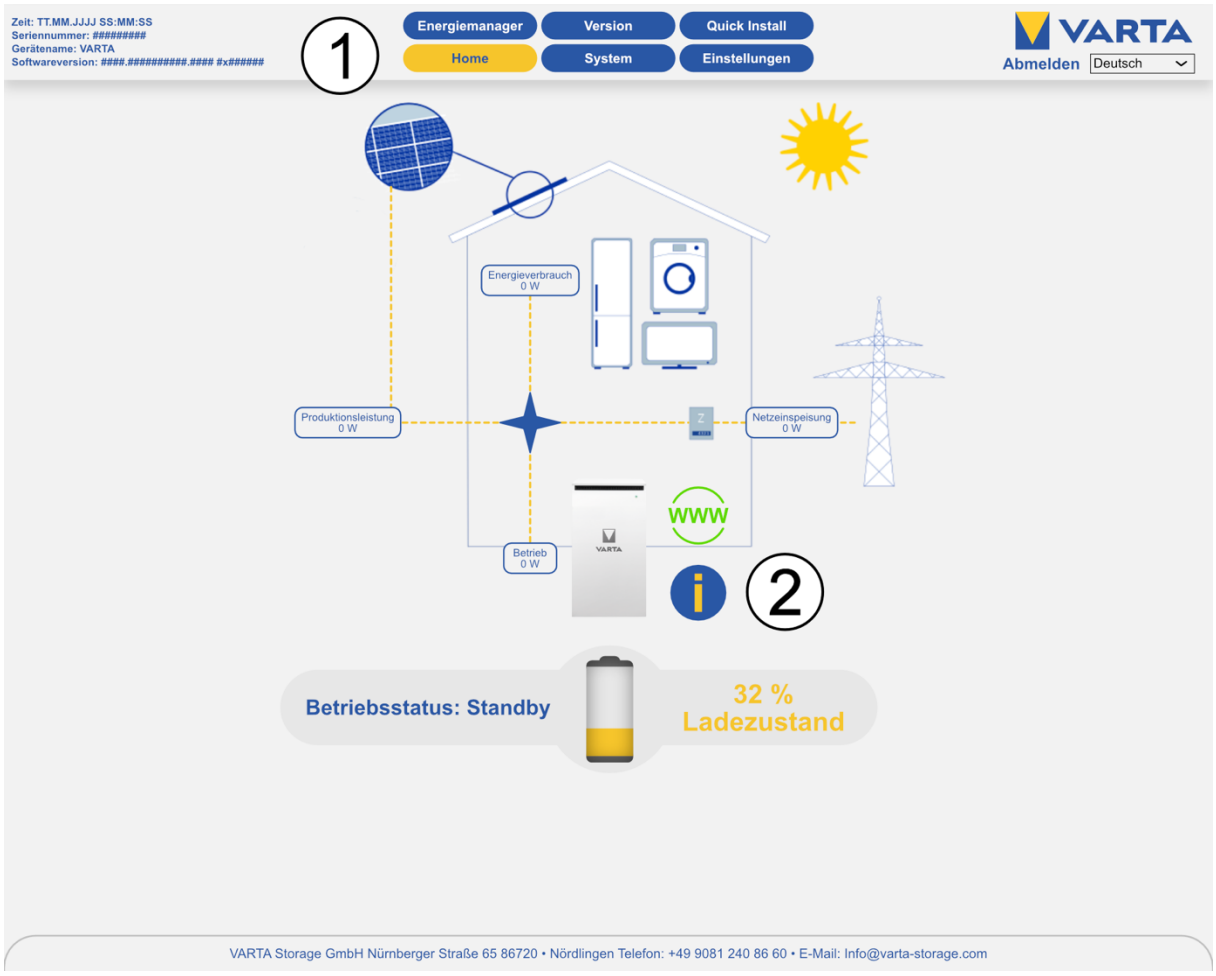
Possible fault: The current sensor check failed. Switch the energy store "OFF" and then "ON" again after a waiting time of approximately 90 seconds.

If the LED ring continues to flash red after the restart (duration approximately 3 minutes): Check the connection to the current sensor and the phase assignment.
Should the LED ring continue to flash red, contact VARTA.

11.13 Checking the system

Once the energy storage system has been set up and connected, various system parameters must be checked.

11.13.1 Check on the homepage



No.	Description
1	Home button
2	Info button

- Click on the *Home* button (1).
- Click on the *Info* button (2).
- Check in the Info window whether errors are displayed.

Integrated network → house: XXXXXX Wh

House → integrated network: XXXXXX Wh

Converter AC → DC: 0 Wh

Cycle meter: XXX / XXX

Time until filter change: XXXX hours

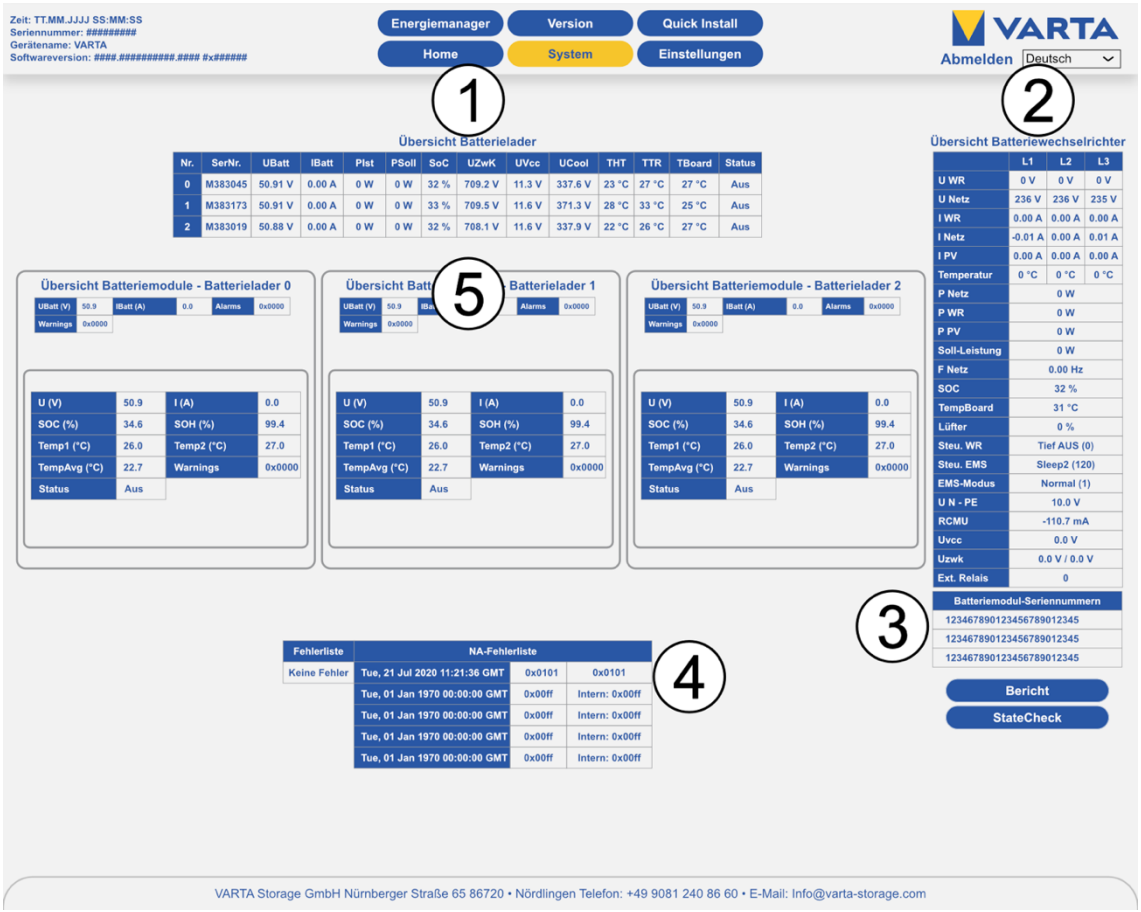
Grid and plant error list:

No errors

11.13.2 Checks on the system page

- Click on the *System* button in the header.

Note: According to the *expansion stage of the energy store* and after a *software update*, the website can deviate from the following image.



No.	Description
1	Battery charger overview
2	Batter converter overview
3	Battery module serial number overview
4	Error list / grid and plant error list
5	Battery modules - battery chargers overview

11.13.3 Checking the connections on the battery converter

- Check whether the system reports a current flow (realistic currents) on all three phases.

Übersicht Batteriewechselrichter

	L1	L2	L3
U WR	0 V	0 V	0 V
U Netz	236 V	236 V	235 V
I WR	0.00 A	0.00 A	0.00 A
I Netz	8.54 A	10.13 A	9.38 A
I PV	0.00 A	0.00 A	0.00 A

Übersicht Batteriewechselrichter

	L1	L2	L3
U WR	0 V	0 V	0 V
U Netz	236 V	236 V	235 V
I WR	0.00 A	0.00 A	0.00 A
I Netz	-0.01 A	0.00 A	0.01 A
I PV	0.00 A	0.00 A	0.00 A

There is a fault if the value for the current (I network) oscillates between +0.01 and -0.01 on all three phases. Check the cable connection to the current sensor.
Note: The system may need to be charged with a large consumer on all three phases.

11.13.4 Checking the battery modules

- Check whether the battery module serial numbers of all installed battery modules are displayed.

Batteriemodul-Seriennummern
12346789012345678901234 5
12346789012345678901234 5
12346789012345678901234 5

Bericht

StateCheck

11.14 Checking the replacement power network

- Connect the intended consumers to the replacement power network.
- Switch off the store fuse (F1 in the connection diagram).
- The store should automatically go into backup mode.
- Interrupt the connection to the consumers for a few seconds.
- Check whether the replacement power network was developed and the consumers are in operation.

Note: Remember that some consumers change operating mode only after a few minutes. Test the replacement power network over a sufficiently long time.

- Check in the web interface whether error messages are displayed.
- Fault remedy: Possibly inrush current too great. Reduce the consumers and carry out the check again.
- Fault remedy: Possibly continuous load too great. Reduce the consumers and carry out the check again.

11.15 Black start key test

3. Switch off the energy store.
4. Switch off the store fuse (F1 in the connection diagram).
5. Switch on the energy store.
6. Press the black start button.

- The store should automatically go into backup mode.
- Check whether the replacement power network was developed and the consumers are in operation.

Note: Remember that some consumers change operating mode only after a few minutes. Test the replacement power network over a sufficiently long time.

- Check in the web interface whether error messages are displayed.
- **Fault remedy:** Possibly inrush current too great. Reduce the consumers and carry out the check again.
- **Fault remedy:** Possibly continuous load too great. Reduce the consumers and carry out the check again.

11.15.1 Leaving the password-protected area

Finally, it must be ensured that the customer does not have access to the password-protected area.

- Click on Logout

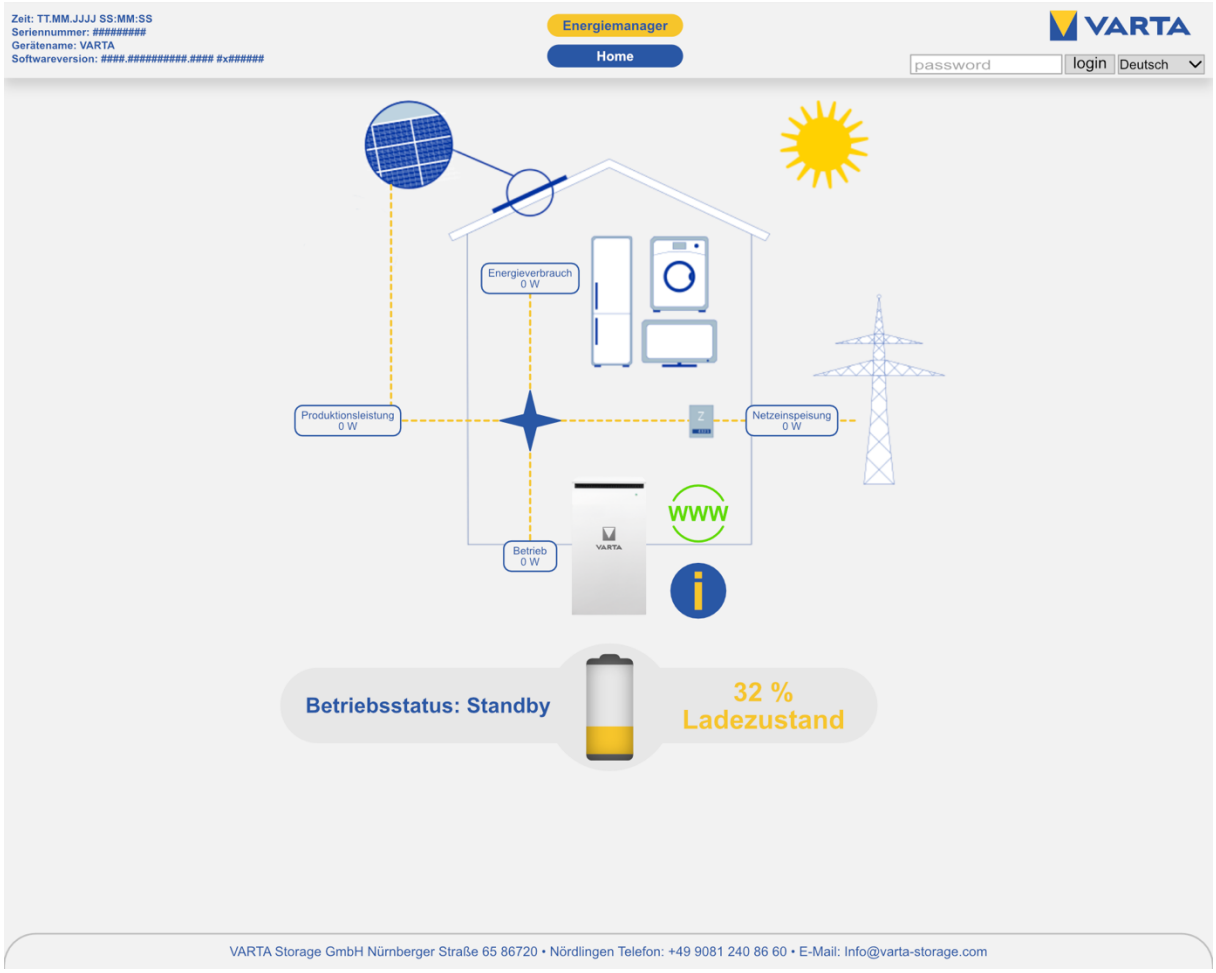
Operation in the password-protected area

This section is directed towards the electrical specialist.

12 The password-protected area

12.1 Access to the password entry web interface

Some parameters may be changed only by trained and qualified personnel and not by the operator!
The access to the web interface is described in chapter 6.3 "The web interface", beginning on page 29.
Note: According to the *expansion stage of the energy store* and after a *software update*, the website can deviate from the following images.



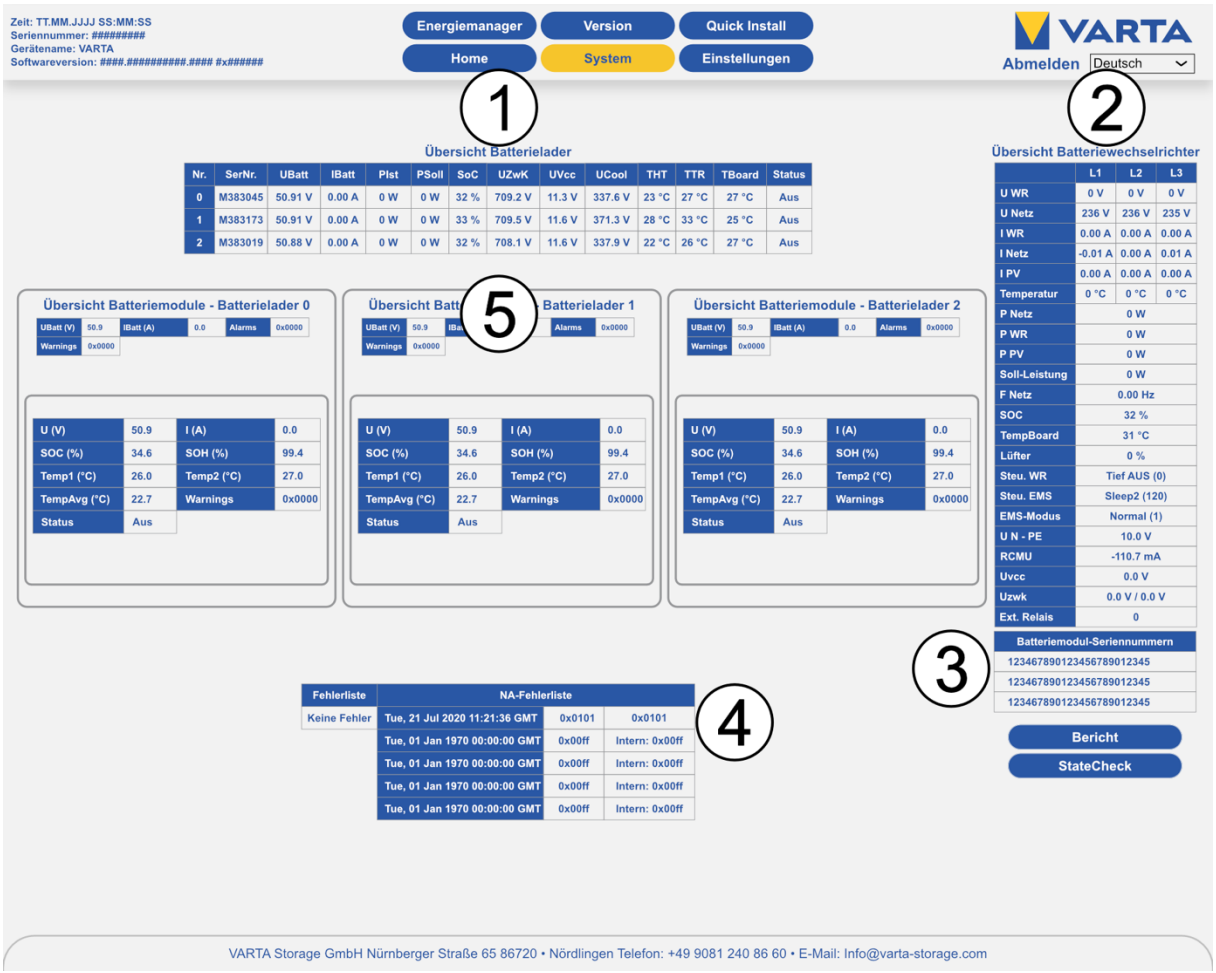
- Enter the password.

You now have access to further menu items, which are explained in the following chapters.

- Click on the *System* button.

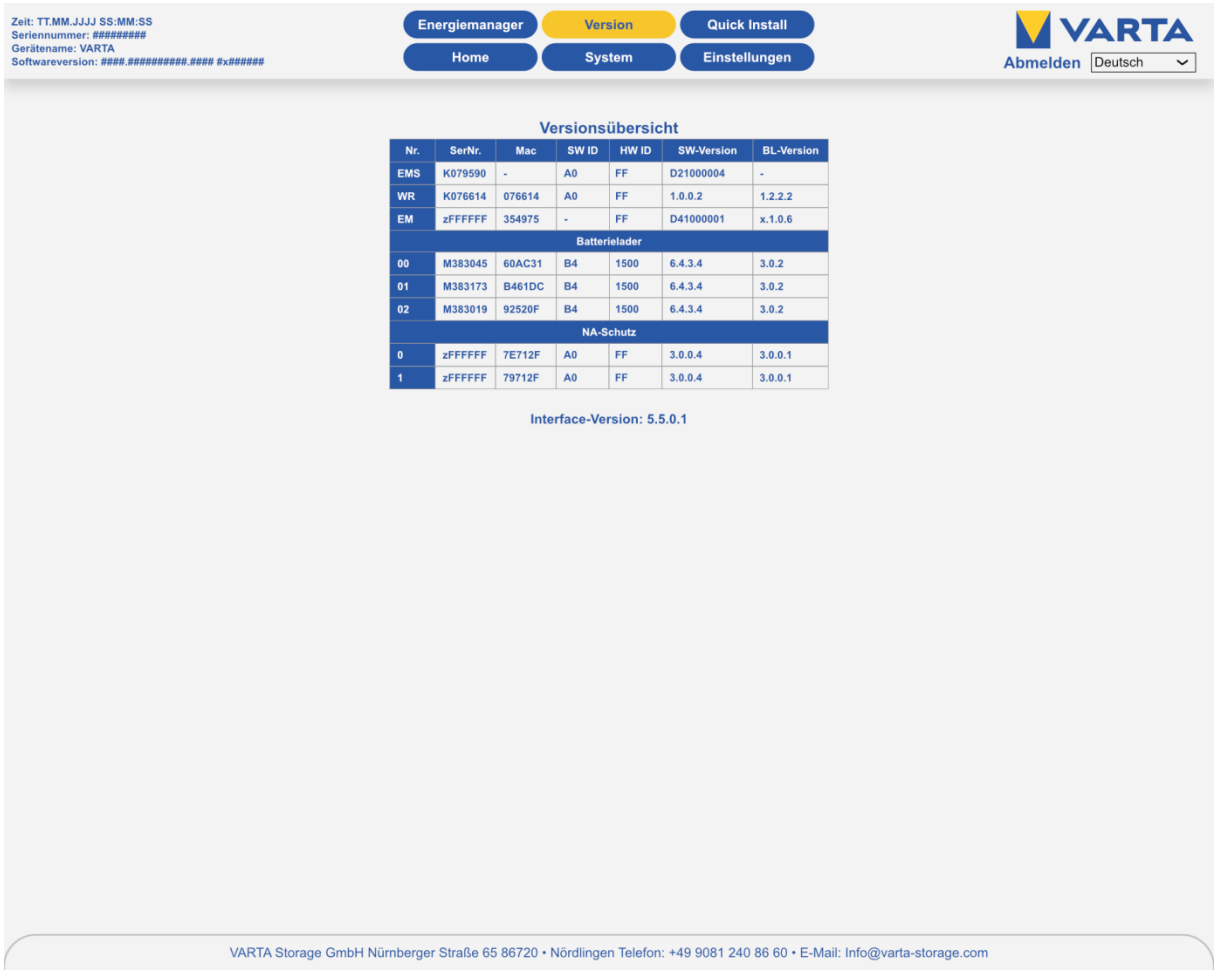
12.2 The system menu

This page shows you a current overview of the battery chargers (1), the data of the battery converter (2), the serial numbers of the battery modules (3), current system faults and network errors (4) and the status of the battery modules (5).



12.3 The version menu

This page shows you the versions of the system components.



12.4 The settings menu

From the *Settings* page, you have access to further input masks.

No.	Description
1	Basic settings
2	Network
3	Service settings
4	Mains
5	OK
6	Factory settings
7	Reset

12.4.1 Basic settings

On this page, basic settings can be changed:
Device name: Entry at initial start-up. A maximum of 20 characters are available.
Date and time can be entered here. Usually, these parameters are synchronised automatically via the time server.
Time zone: For Germany, GMT+1 (Greenwich Mean Time + 1 h) applies.
Automatic time conversion (winter/summer): If the control box is activated, summer and wintertime are automatically switched between.
Store type: Selection of the expansion stage
Serial number battery module 1 (battery module 2 and 3). The serial numbers of the battery modules are entered here. The order of the entry is irrelevant.

- Enter the parameters or tick the corresponding choice box.
- Confirm your entries with the *OK* button (5).

Alternatively, you can reset the parameters to the *Factory setting* (6) or return them to the previous status with *Reset* (7).

12.4.2 Network/portal connection

- In Settings, select the *Network/portal connection*button.

As standard, the store assumes the settings of the customer network. To this end, the choice box beside *Activate DHCP* is ticked.

Activate DHCP:	☒
IP address:	192.168.2.100
Net mask	255.255.255.0
DNS address:	192.168.2.1
Gateway:	192.168.2.1
Reset Factory setting OK	

Activate DHCP: With this option, the automatic receipt of the parameters of the customer network is activated.
IP address: Is read out automatically.
Net mask If DHCP is not activated, it must be entered manually.
DNS address: Is read out automatically.
Gateway: Is read out automatically.

> *i* If the IP address, the DNS address and the gateway are to be set up statically, knowledge of the static address issue is required.
> For this, it is e.g. necessary to read out the network configuration of the router.
> *The IP ranges 172.30.xxx.xxx to 172.31.xxx.xxx must not be used.*

Should the connection not take place automatically, take the parameters from the manual of the network router. With commercially available DSL routers, the DNS and gateway address are usually identical. In company networks, they can differ. Additionally, the release of ports 4500, 21 and 37 is required for the connection to the portal (does not apply to all users).

> *i* If the IP address, the DNS address and the gateway are to be set up statically, knowledge of the static address issue is required.
> For this, it is e.g. necessary to read out the network configuration of the router.
> The address range 172.30.xxx.xxx and 172.31.xxx.xxx must not be issued as a static or dynamic IP for the store.

12.4.3 Reboot

After parameters have been changed, a reboot is necessary.

- To this end, switch the store "OFF" at the on/off switch and then "ON" again after a waiting time of approximately 90 seconds.
- Thereafter, checks are required on the *homepage* and the *System* page.

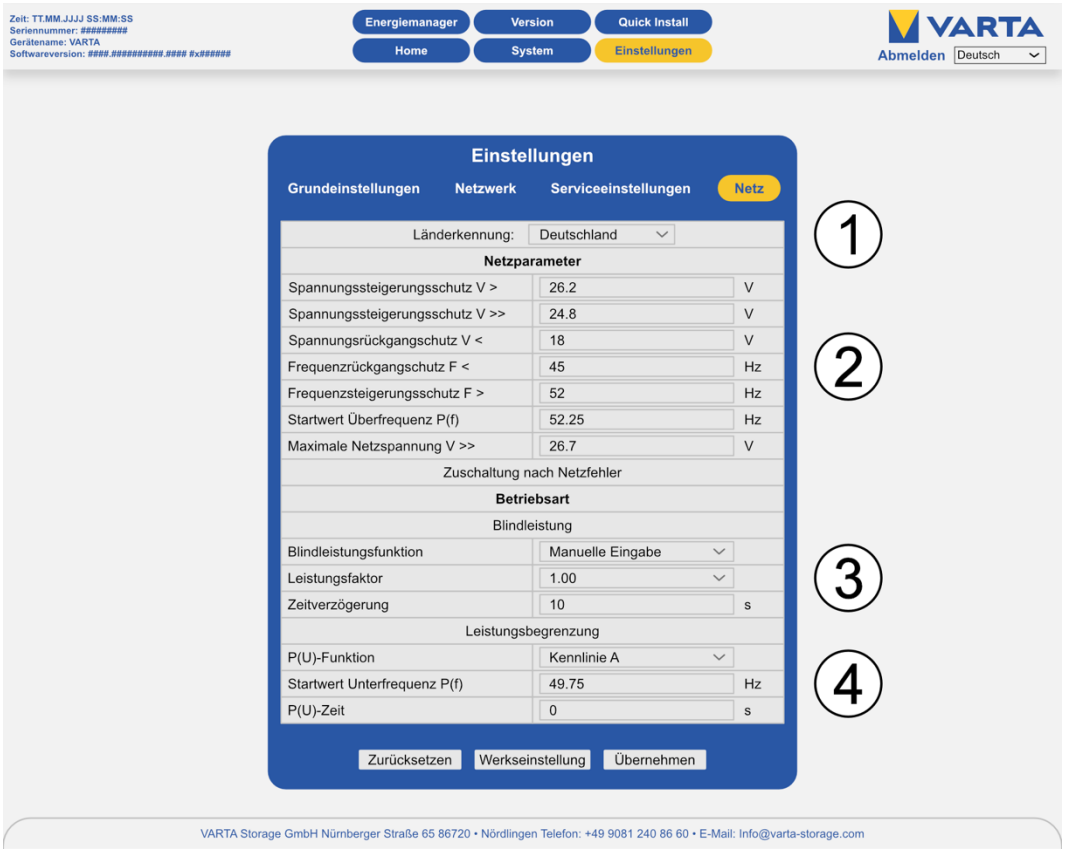
12.4.4 Service settings

The following parameters can be set on this page:
Reboot time: As standard, the reboot takes place between 3 and 4 am. An hour in the period between midnight and midnight can be defined for the time of the reboot.
Reboot days: The week day(s) for the reboot is/are defined using the choice box. At least one day must be ticked.
Manual ventilator activation: Selection between automatic (= 0), medium stage (= 1) and highest stage (= 2).
Reset air filter change time: The time until the next air filter change can be reset. To this end, tick the choice box. A condition is that the air filter is actually replaced or cleaned.
Checking the current sensor: Upon consultation with VARTA Service, the automatic current sensor check can be disactivated.

12.4.5 Network

- The network parameters of the frequency-dependent active power adjustment P(f) and the grid and plant protection must be adapted to the requirements of the respective country.
- Change the settings - if necessary.

Note: The change of network-relevant parameters must be approved by the electricity grid operator.



No.	Description
1	Country ID
2	Network parameters
3	Idle power parameters
4	Power restriction parameters

12.4.5.1 Idle power compensation

On the factory side, the power factor cosϕ to compensate for the idle power is set to 1.0. This value may need to be changed according to the specifications of the respective electricity grid operator. In the *Idle power function* drop-down list, *manual entry*, entry according to *Q(P) characteristic* and entry according to *Q(U) characteristic* can be chosen from to set the cosϕ.

12.4.5.2 Manual entry

- Select *Manual entry* in the drop-down list.

You can set the target value for cos(phi) between 0.9 *under-excited* and 0.9 *over-excited*. To this end, select the desired value in the drop-down list.

	Target value for cos(phi)	Power factor set value
Under-excited	0.90	-100
	0.91	-90
	0.92	-80
	0.93	-70
	0.94	-60
	0.95	-50
	0.96	-40
	0.97	-30
	0.98	-20
	0.99	-10
	1.00	0
Over-excited	0.99	10
	0.98	20
	0.97	30
	0.96	40
	0.95	50
	0.94	60
	0.93	70
	0.92	80
	0.91	90
	0.90	100

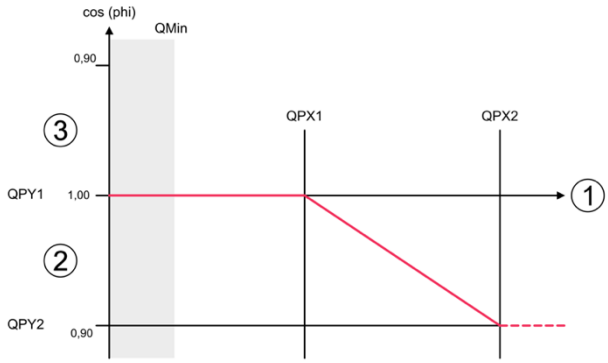
Time delay: Enter the time in seconds after which the idle power is to be reset.
Minimum power: Enter the minimum power up to which the idle current is not regulated in per cent (%).

12.4.5.3 Setting according to Q(P) characteristic

- **Idle power function:** Select the *Q(P) characteristic* in the drop-down list.

QPX1 QPX2: Enter the set values for QPX1 and QPX2 using the number entry fields. Take the set values from Figure 4: Q(P) characteristic.

QPY1 QPY2: Enter the set values for QPY1 and QPY2 using the number entry fields. Take the set values from Figure 4: Q(P) characteristic.



1	Current active power in %
2	under-excited
3	over-excited

Figure 10: Q(P) characteristic

Parameter	Meaning
QPX1	Starting point of the Q(P) characteristic on the power axis. The parameter is entered in per cent (%). *Example*: QXP1 = 50 → The characteristic begins at 50% of the nominal power.
QPY1	Power factor at the start of the Q(P) characteristic. Normally, the power factor is at the start of characteristic 1 (see Figure 4 Q(P) characteristic).
QPX2	End point of the Q(P) characteristic on the power axis. The parameter is entered in per cent (%). *Example:* QPX2 = 90 → The characteristic ends at 90 % of the nominal power.
QPY2	Power factor at the end of the Q(P) characteristic. Normally, the power factor is under-excited at the end of characteristic 0.90 (see Figure 4 Q(P) characteristic).

Table 1: Setting according to Q(P) characteristic

Time delay: Enter the time in seconds after which the idle power is to be reset.

Minimum power: Enter the minimum power up to which the idle current is not regulated in per cent (%).

12.4.6 Setting according to Q(U) characteristic

- Select the *Q(U) characteristic* in the drop-down list.

QUX1 to QUX4: Enter the set values for QUX1 to QUX4 using the number entry fields. Take the set values from Figure 4: Q(P) characteristic.

QUY1 to QUY4: Enter the set values for QUY1 to QUY4 using the number entry fields. Take the set values from the two following tables.

---

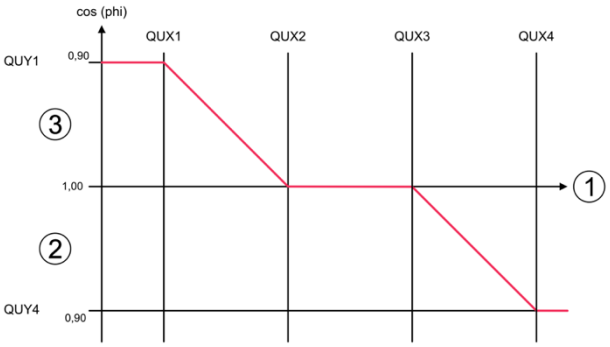
i In setting the parameters, the following condition must be complied with:
QUX1 ≤ QUX2 < QUX3 ≤ QUX4

Time delay: Enter the time in seconds after which the idle power is to be reset.

Minimum power: Enter the minimum power up to which the idle current is not regulated in per cent (%).

Parameter	Meaning
QUX1	Start of the first section of the Q(U) characteristic on the voltage axis. The parameter is entered in V. *Example:* The characteristic begins at 190 V →QUX1 has the value 190.
QUY1	Power factor at the start of the Q(U) characteristic. If the mains voltage comes under the value defined as QUX1, the characteristic is limited to the value set in QUY1 (see Figure 4 Q(P) characteristic).
QUX2	End of the first section of the Q(U) characteristic on the voltage axis. The parameter is entered in V. *Example:* The first section of the characteristic ends at 220 V → QUX2 has the value 220.
QUY2	Power factor at the end of the first section of the Q(U) characteristic. If the mains voltage exceeds the value defined as QUX2, the characteristic is limited to the value set in QUY2. Normally, the parameter is set to 0, i.e. no idle power is produced (see Figure 4 Q(P) characteristic).
QUX3	Start of the second section of the Q(U) characteristic on the voltage axis. The parameter is entered in V. *Example:* The characteristic begins at 235 V → QUX3 has the value 235.
QUY3	Power factor at the start of the Q(U) characteristic. If the mains voltage comes under the value defined as QUX3, the characteristic is limited to the value set in QUY3. Normally, the parameter is set to 0, i.e. no idle power is produced (see Figure 4 Q(P) characteristic).
QUX4	End of the second section of the Q(U) characteristic on the voltage axis. The parameter is entered in V. *Example:* The second section of the characteristic ends at 240 V → QUX4 has the value 240.
QUY4	Power factor at the end of the first section of the Q(U) characteristic. If the mains voltage exceeds the value defined as QUX4, the characteristic is limited to the value set in QUY4 (see Figure 4 Q(P) characteristic).

Table 2: Setting according to Q(U) characteristic



1	Current mains voltage in %
2	under-excited
3	over-excited

Figure 11: Q(U) characteristic

12.5 The power restriction menu

If you require the power restriction P(U) (GATE generator), you can choose between characteristic A and B via the drop-down list.

12.6 Leaving the password-protected area

Finally, it must be ensured that the customer does not have access to the password-protected area.

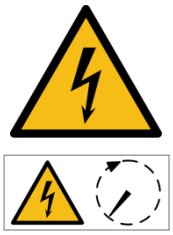
- Click on the *Logout* button.

Maintenance

13 Basic information on maintenance.

This section is directed towards the electrical specialist.

13.1 Safety instructions



DANGER

Touching live parts.

Danger to life.

- Comply with a waiting time of at least 3 minutes.
- Ensure that the battery modules are switched off and that no LED display is lit up.
- The energy store must not be transported if a battery module is already integrated.

DANGER

Contact with electrical voltage.

Danger to life due to electric shock.

- Switch off the replacement power circuit.
- Switch off connected generation systems.

DANGER

Switching off the supply line of the store can activate the replacement power mode.

Danger to life due to electric shock.

- Switch off the store.
- Switch off the supply line.
- Switch off generators connected to the replacement power network.

Adhere to the safety rules!



- Disconnect from the mains.
- Secure against switching on again.
- Ensure de-energised state.
- Before connecting to energy, ensure that there are no persons in the danger zone.

WARNING

Improper performance of maintenance and cleaning works.

Possible danger to life.

- ➡ Only original parts are to be used for maintenance works.
- ➡ After all the works, the connections are to be created cleanly again and screwed.
- ➡ All works on the VARTA element backup system are to be documented by the electrical specialist.

WARNING

Touching sharp-edged parts!

Cut injuries.

- ➡ Wear your personal protective equipment.

WARNING

Components are heavy.

This can lead to overburdened intervertebral discs, contusions and strains.

- ➡ Carry out the works described in this chapter with 2 persons or suitable aids.

13.2 Scope of the maintenanceworks

The maintenance of the VARTA element backup energy storage system includes:

- Service (inspection and maintenance),
- Repair,
- Technical improvements,
- Expansions, if necessary.

For the documentation of the maintenance, see chapter 18 on page 106.

13.3 Service and repair works

This section is directed towards the electrical specialist.

The first service must take place within two years of the installation date. Thereafter, the service interval is 3 years.

Please note that the SD card has a limited lifespan. To ensure continuous data storage, we recommend replacing the SD card every two years. The SD card of the manufacturer was successfully tested: GOODRAM type no.: SDU4GCMGRB.

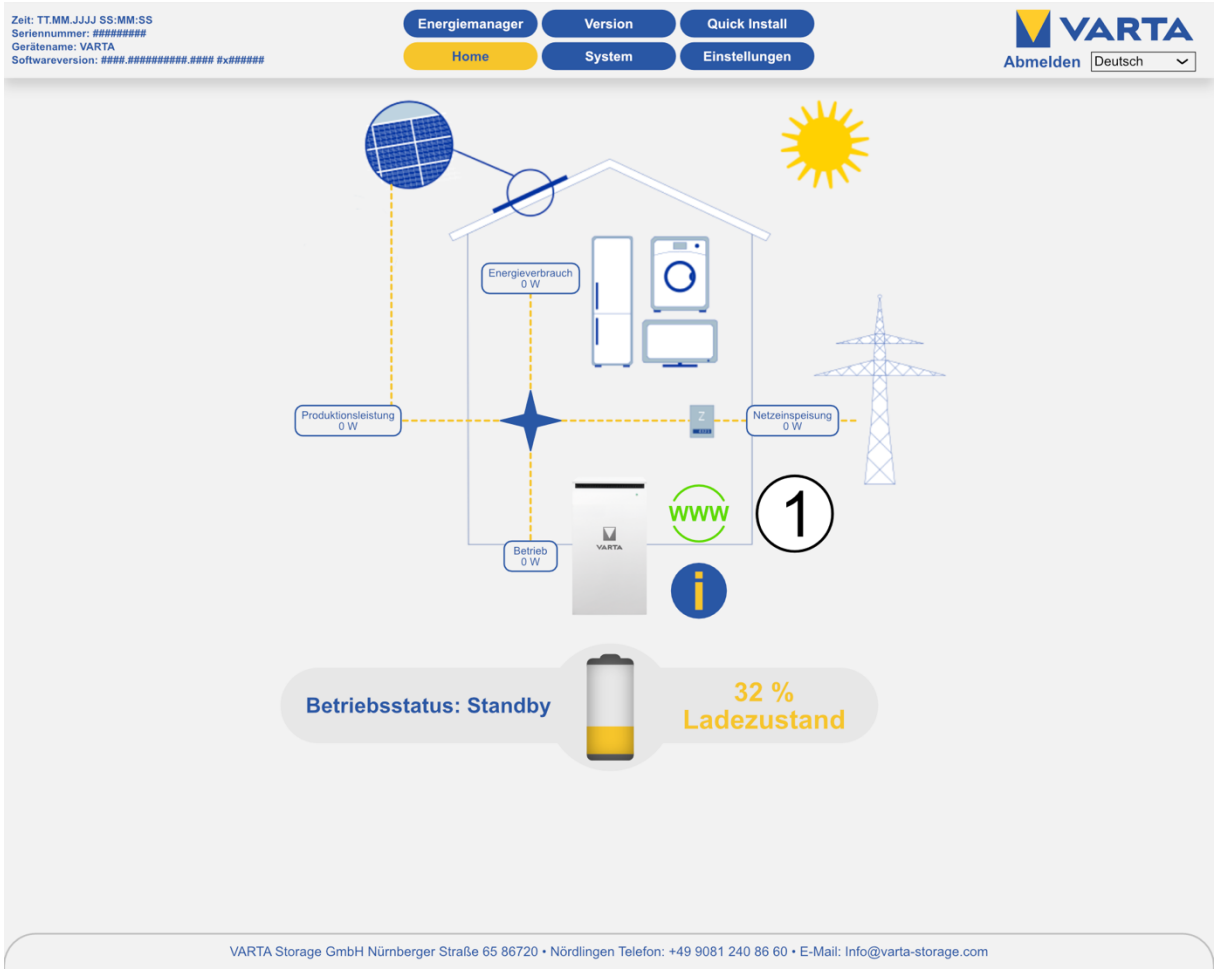
For the documentation of the maintenance, see chapter 18 on page 106.

13.4 External check of the storage cabinet

- Is the ventilation strip on the cover of the storage cabinet clogged/soiled?
  → After removing the cover (see chapter 13.10.10 on page 99), the ventilation strip can be cleaned internally.
- Is the room temperature secured at between +5 °C and +30 °C year-round (+18 °C is ideal)?
  → Clarify with the customer how the temperature can be adhered to in the setup room. An active ventilator may need to be installed.
- Is the storage cabinet stable?
  → If necessary, adjust with the screw feet.
- Is the wall fastening stable?
  → If necessary, tighten the screw or replace it.

13.5 Checking the system parameters (service)

The system parameters are checked via the web interface.
Note: According to the *expansion stage of the energy store* and after a *software update*, the website can deviate from the following image.



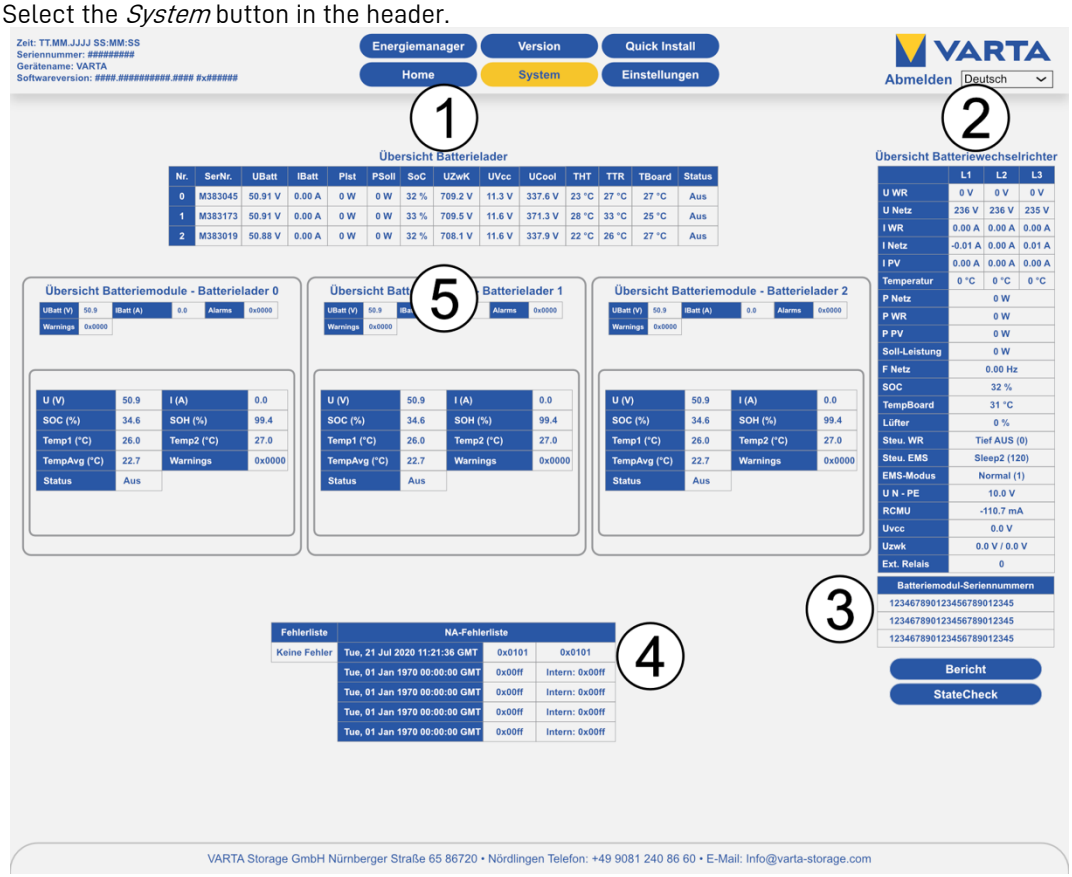
13.5.1 Checking the online status

On the homepage of the web interface, the *WWW symbol* (1) displays whether the energy storage system has a connection to the VARTA server (green = online, red = offline).

13.5.2 Error lists

To read out the error lists:

- Select the *System* button in the header.



No.	Description
1	Battery charger overview
2	Batter converter overview
3	Battery module serial number overview
4	Error list / grid and plant error list
5	Battery modules - battery chargers overview

The error lists (4) for the storage system and the grid and plant protection are displayed.

13.5.3 Eliminating faults

- Identify the faults using the fault descriptions.
- Directions for eliminating faults are also provided by the battery charger, battery module and battery converter overviews.
  There, check the status and faults categories as well as WR control, EMS control and ENS control.
- If necessary, check the grid and plant settings (see chapter 12.4.5 on page 80) and remove the faults.
- Then restart the store. To this end, switch the store “OFF” at the on/off switch and then “ON” again.

If the faults cannot be eliminated, inform VARTA Service.

In the case of stores operated offline, click the *Report* button (3) and send the report to VARTA Service.

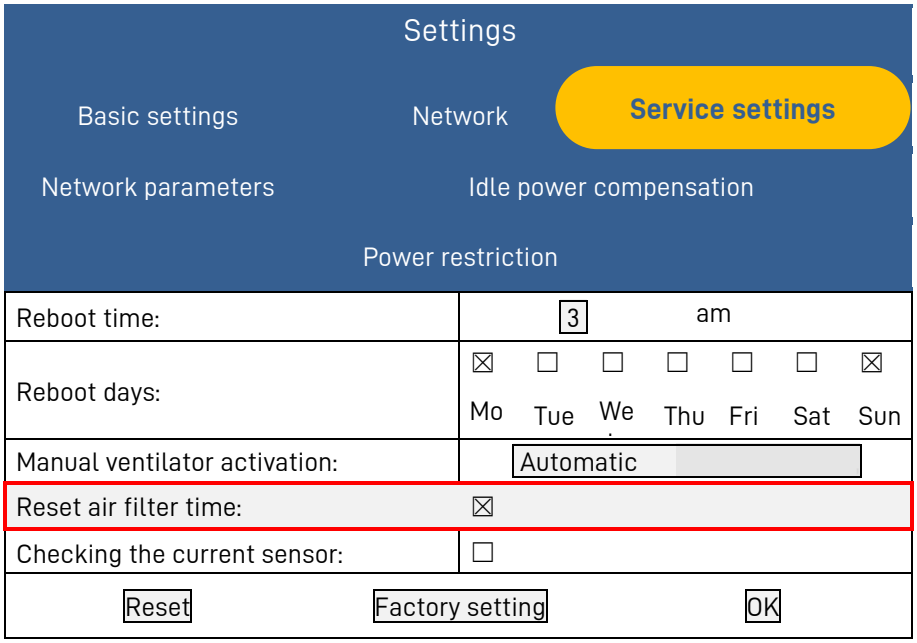
13.5.4 Check software version

In the version overview, you can read out the software versions.

- Select the *Version* button in the header.

13.5.5 Air filter change: Reset time

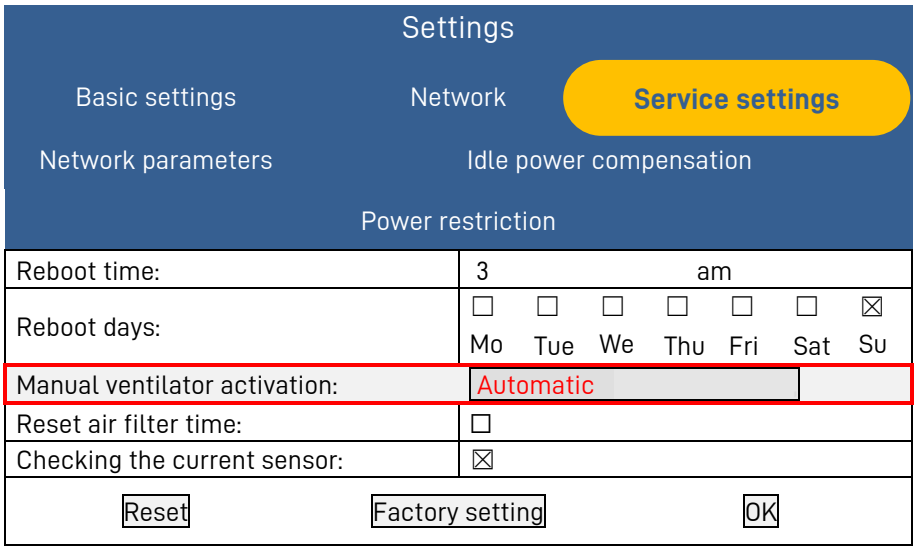
The air filter must be replaced at every second service. Under the *Settings* button, select the item *Service settings*.



- Put a tick beside *Reset air filter time*.
- Click *OK*.

13.5.6 Check ventilator

- Under the *Settings* button, select the item *Service settings*.
- Under *Manual ventilator activation*, change between the stages 0 (Automatic), 1 (medium stage) and 2 (highest stage).



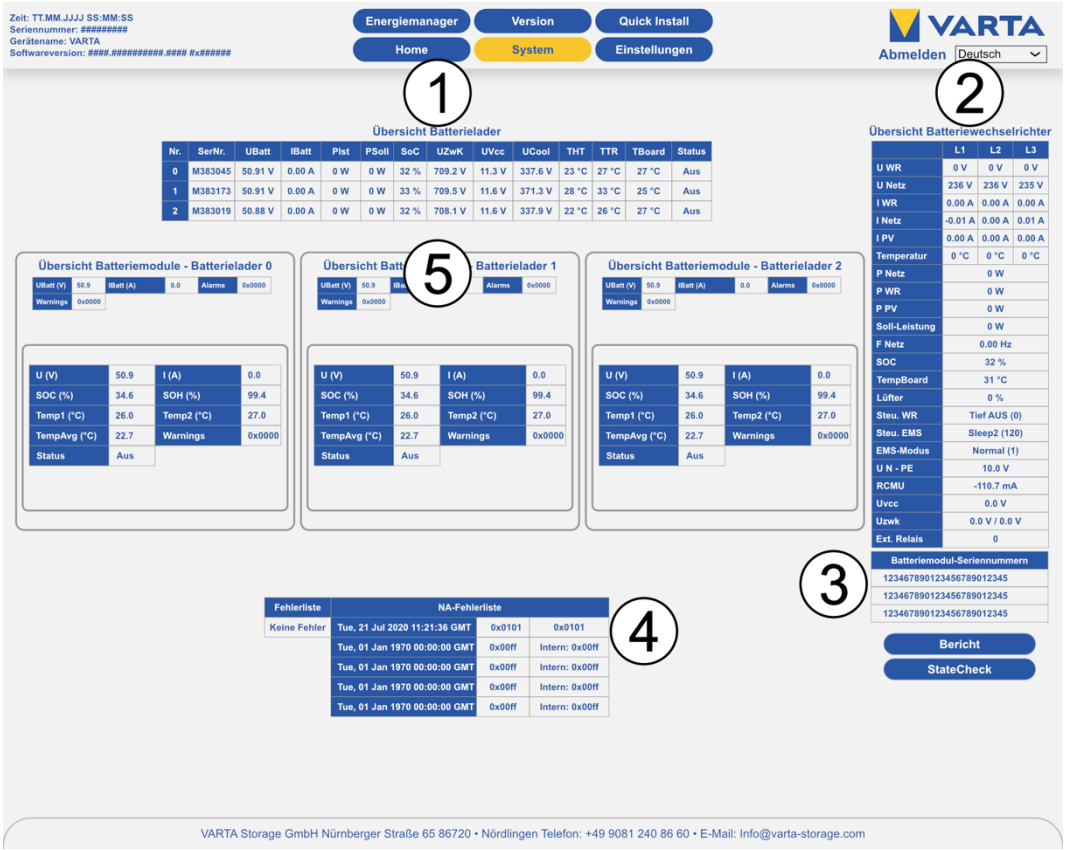
- First check whether the ventilator is blowing out air at the top.
- Wait 10 to 15 seconds until the ventilator has reached a constant speed before continuing with the check. **Note:** It is also possible that the ventilator is already running.
- Look out for noises that indicate mechanical damage.
- Reset to the Automatic stage (0).

For replacing and cleaning the ventilator: see chapter 13.10.11, page 100.

13.6 Checking the system parameters

The system parameters are checked via the web interface.

- Select the System page.



No.	Description
1	Battery charger overview
2	Batter converter overview
3	Battery module serial number overview
4	Error list / grid and plant error list
5	Battery modules - battery chargers overview

13.6.1 Checking the current sensor values

- The current sensor values are displayed in the battery transducer overview (2).
- Check the current sensor values (I network L1, I network L2 and I network L3) to ensure that they are realistic values.

Übersicht Batteriewechselrichter

	L1	L2	L3
U WR	0 V	0 V	0 V
U Netz	236 V	236 V	235 V
I WR	0.00 A	0.00 A	0.00 A
I Netz	8.54 A	10.13 A	9.38 A
I PV	0.00 A	0.00 A	0.00 A

Übersicht Batteriewechselrichter

	L1	L2	L3
U WR	0 V	0 V	0 V
U Netz	236 V	236 V	235 V
I WR	0.00 A	0.00 A	0.00 A
I Netz	-0.01 A	0.00 A	0.01 A
I PV	0.00 A	0.00 A	0.00 A

- If a current sensor value is approximately 0, even though this phase is currently charged, it may be that the connection between the current sensor and the energy storage system is faulty.
  In this case, if necessary, charge all the phases separately by switching consumers on selectively.
- If necessary, check the current flow through all three phases with the clamp-on ammeter!

13.6.2 Measures in the event of conspicuous current sensor values:

If, despite the charge, the current sensor value of one or several phases is 0, check the connection between the energy storage system and the current sensor.

- If necessary, replace the connection line.
- Check whether the folding ferrites are correctly closed and that the cores are not damaged.

13.7 Check battery charger

- On the *System* page, check the status of the battery charger(s) (1) for plausibility.

13.8 Check the battery modules

- Check on the *System* page whether warnings and errors of the battery modules (5) are displayed. Displayed errors are explained in the error list in chapter 13.5.2 on page 88.

13.9 Checking the replacement power network

1. Connect the intended consumers to the replacement power network.
2. Switch off the store fuse (F1 in the connection diagram).

- The store should automatically go into backup mode.

3. Interrupt the connection to the consumers for a few seconds.
4. Check whether the replacement power network was developed and the consumers are in operation.

Note: Remember that some consumers change operating mode only after a few minutes. Test the replacement power network over a sufficiently long time.

5. Check in the web interface whether error messages are displayed.

Fault remedy: Possibly inrush current too great. Reduce the consumers and carry out the check again.
Fault remedy: Possibly continuous load too great. Reduce the consumers and carry out the check again.

13.9.1 Black start key test

1. Switch off the energy store.
2. Switch off the store fuse (F1 in the connection diagram).
3. Switch on the energy store.
4. Press the black start button.

- The store should automatically go into backup mode.

5. Check whether the replacement power network was developed and the consumers are in operation.

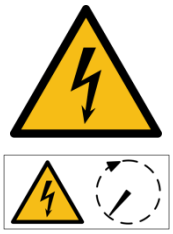
Note: Remember that some consumers change operating mode only after a few minutes. Test the replacement power network over a sufficiently long time.

6. Check in the web interface whether error messages are displayed.

Fault remedy: Possibly inrush current too great. Reduce the consumers and carry out the check again.
Fault remedy: Possibly continuous load too great. Reduce the consumers and carry out the check again.

13.10 Service and repair: Cabinet interior

This section is directed towards the electrical specialist.



DANGER

Touching live parts.

Danger to life.

- ➡ Switch off the store.
- ➡ Comply with a waiting time of at least 3 minutes.
- ➡ Ensure that the battery modules are switched off and that no LED display is lit up.
- ➡ The energy store must not be transported if a battery module is already integrated.

DANGER

Contact with electrical voltage.

Danger to life due to electric shock.

- ➡ Switch off the replacement power circuit.
- ➡ Switch off connected generation systems.

DANGER

Switching off the supply line of the store can activate the replacement power mode.

Danger to life due to electric shock.

- ➡ Switch off the store.
- ➡ Switch off the supply line.
- ➡ Switch off generators connected to the replacement power network.

Adhere to the safety rules!

- Disconnect from the mains.
- Secure against switching on again.
- Ensure de-energised state.
- Before connecting to energy, ensure that there are no persons in the danger zone.

WARNING

Components are heavy.

This can lead to overburdened intervertebral discs, contusions and strains.

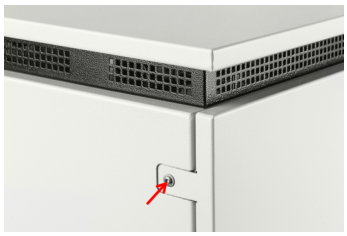
➡ Carry out the works described in this chapter with 2 persons or suitable aids.

13.10.1 Opening the cabinet

The VARTA element backup is shut down using the on/off switch (3). Here, it should be taken into account, however, that the replacement power connection is also supplied with voltage from the mains when switched off. Thus, consumers connected to the replacement power connection are also supplied when the store is switched off. If the replacement power connection is to be disconnected, the store must be switched off using the on/off switch (3) and the network connection of the store switched off. (Racking out the store connection). These two steps must be performed for work on the replacement power connection as well as for work on the storage system.

1. Actuate the on/off switch (3),
2. Rack out fuse F1 (compare connection diagram).

Ensure that the on/off switch on the front of the housing is at "OFF" and the supply line to the store is switched off.



To open the door, remove the three screws on the left side of the cabinet.
Aid: Torx 25 screwdriver

13.10.2 Replace the SD card

The SD card is found in the front area of the battery converter.

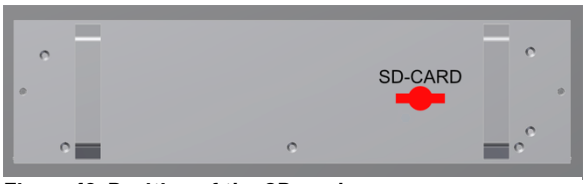


Figure 12: Position of the SD card

Figure 13: Screws on the battery converter

Before inserting the new SD card into the battery converter, you need to prepare it.

1. To this end, insert the new SD card into a notebook, a computer or a card-reading device connected to the computer.

Note: We recommend using a new SD card. Should there be data on the SD card selected by you, back these up first. Then format the SD card in the format FAT32.

2. Download the file RES-Webserver-X.X.X.X.zip in the VARTA B2B section under Downloads and unzip the folder contained in it, "http".
3. Copy the unzipped folder "http" onto the SD card.

Note: The entire "http" folder with all the files must be present on the SD card.

4. Insert the prepared SD card into the battery converter.

Once you have installed the SD card, you can restart the energy storage system. For the documentation of the maintenance, see chapter 18 on page 106.

13.10.3 Dismounting the battery converter

- Loosen the two M 5 x 16 screws on the battery converter.
  Aid: Gr. 4 Allen key

- Pull the battery converter out with the handles using *both hands*!
- Release the plug connections and note the positions.
- To reinstall the battery converter, carry out the work steps in reverse order.

Note: Only converters of type F, material number 727687, may be used.

For the documentation of the maintenance, see chapter 18 on page 106.

13.10.4 Dismounting and installing the battery charger

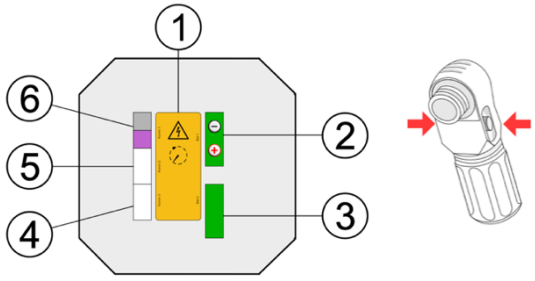
Before unplugging the black/red battery power cable, note the corresponding battery charger and the corresponding battery module.

After installation, the cables must be reinserted on exactly the same battery charger and battery module.

Only transducers of type 01D, material number 801085, may be used.

Ensure that the battery modules are switched off and that no LED display is lit up.

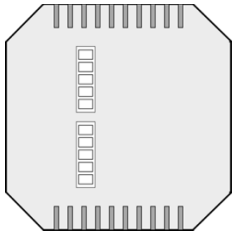
13.10.5 Connections on the battery charger front



No.	Designation
1	Directions and warnings
2	Battery current 1
3	⚠ Do NOT use - battery current 2
4	Communication 3 (Comm 3) RJ45 socket
5	Communication 2 (Comm 2) RJ11 socket - NOT used
6	Communication 1 (Comm 1) Warning and Fault

- Press into the side notches of the battery charger with a screwdriver.
  Aid: Slotted screwdriver.
- Pull the battery charger approximately half-way out of the shaft.
- Unplug the cables on the back.
- Remove the battery charger from the shaft with *both hands*.

13.10.6 View of the battery charger from behind



13.10.7 VARTA element backup Install battery charger

To reinstall the battery converter, carry out the work steps in reverse order. The battery charger locks into the end position. It is not necessary to use a screwdriver.

Note: Pay attention to the assignment of the battery cables.

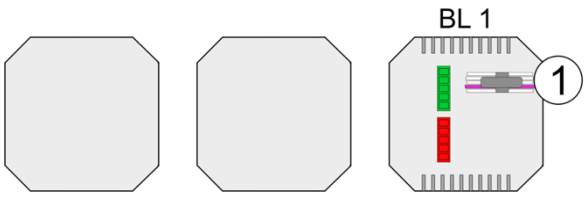


Figure 14: Battery charger 1 – back

1	Cable of converter with inscription and 1 x colour: *violet*

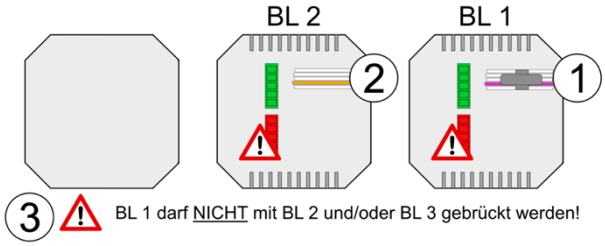
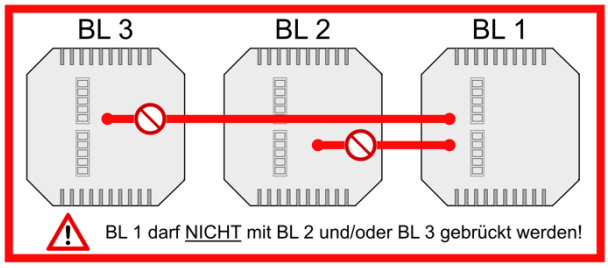


Figure 15: Battery charger 1 and 2 back



1	Cable of converter with inscription and 1 x colour: *violet*
2	Connect the cable of converter 1 x colour: *orange* to the battery charger 2 (BC 2)
3	Battery charger 1 must NOT be bridged with battery charger 2 and/or battery charger 3!

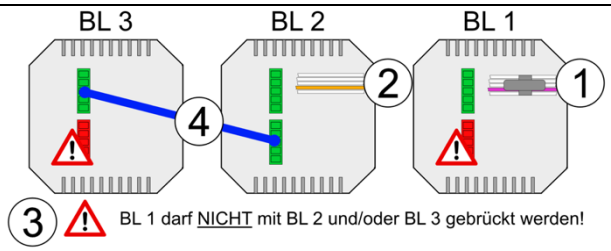
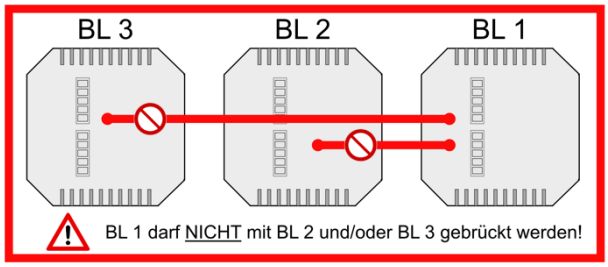
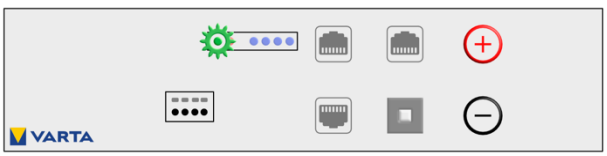


Figure 16: Battery chargers 1, 2 and 3 back



1	Cable of converter with inscription and 1 x colour: *violet*
2	Connect the cable of converter 1 x colour: *orange* to the battery charger 2 (BC 2)
3	Battery charger 1 must NOT be bridged with battery charger 2 and/or battery charger 3!
4	Connect the bridge from battery charger 2 (BC 2) to battery charger 3 (BC 3)

- Switch on the battery module via the activation key. The LED display on the battery modules displays the functionality.



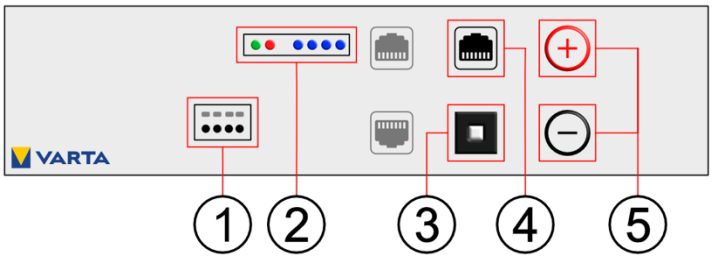
13.10.8 Dismounting and installing the battery modules

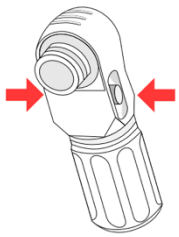
WARNING

Improper handling of battery module.

Personal and material damage.

- ➡ Do not damage the battery module when dismounting and installing it.
- ➡ Do not attempt a repair.
- ➡ Battery modules are maintenance-free and must not be opened under any circumstances.
- ➡ Ensure that the battery modules are switched off and that no LED display is lit up.





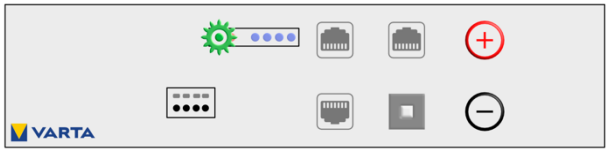
No.	Description	No.	Description
1	DRY contact	4	CAN
2	LED display	5	Connections for battery current
3	Activation button		

- Switch off the battery module at the activation key (no. 3). (Keep button pressed down until the LED goes out).
- Unplug the following line connections:
  - Battery current connection (no. 5),
  - Comm 1 (no. 1) Warning and Fault
  - Comm 3 (no. 4) (RJ48)
- Remove the fastening screws,
- Pull the battery module on the tracks forward.

Installing the battery modules

Reinstall the battery modules in exactly the reverse order. Ensure that the assignment corresponds to the previous condition.

- Switch the battery module(s) on again. The LED display on the battery modules displays the functionality.



13.10.9 Replacing and cleaning the air filter

- Unscrew the filter holder.
  Aid: Torx 25 screwdriver

The air filter can be removed.

- Clean the filter area with a cloth.
- If necessary, clean the air filter with a vacuum cleaner.
- Replace the air filter (at every second service) and screw the filter holder on.

---

i Ensure that no dust from the air filter gets into the interior of the store.

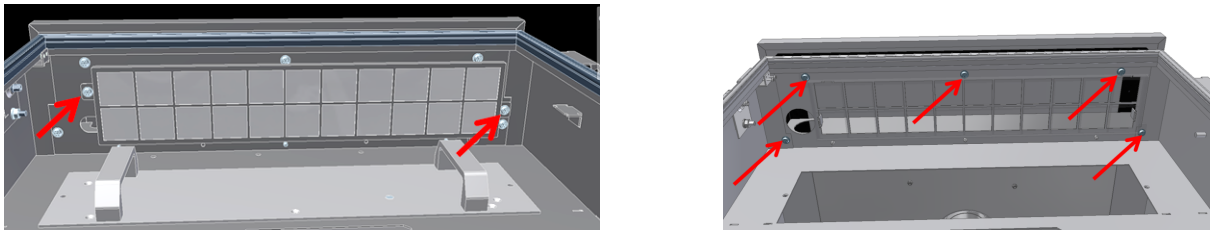


Figure 17: Uninstalling the air filter (from front - bottom)

13.10.10 Dismounting the cover of the storage cabinet

The cover of the storage cabinet is connected to the storage cabinet with eight screws.

- Loosen the fastening screws (5 x) on the front of the open storage cabinet.
  Aid: Torx 25 screwdriver
-
- Loosen the fastening nuts (3 x) on the back of the storage cabinet.
  Aid: Open-end wrench no. 10

Figure 18: Cabinet cover nuts – (behind-bottom)

- Remove the cover.
- Remove the earth conductor from the earth lug on the cover interior.

13.10.11 Cleaning or replacing the ventilator

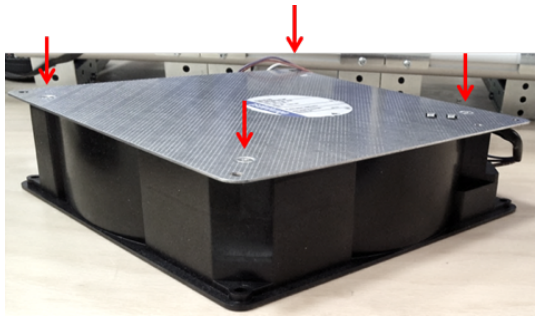
	**⚠ WARNING** **Protective conductor not connected and attached.** Personal and material damage. ➡ Restore the protective conductor connection. ➡ Attach the protective conductor cable.

The ventilator is accessible after the cover is dismounted.

- Check the ventilator for soiling and clean it if necessary
- Check the bearing clearance and the free movement of the ventilator by hand.

Replacing the ventilator

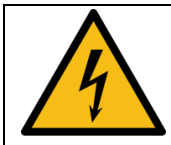
- Unclamp the ventilator (circle).
- Loosen the four screws (arrows) on the ventilator cover and cut the cable tie open.
- **Aid:** Gr. 4 Allen key, side cutter.



- Check the ventilator wheel manually to ensure that it is secure.
- Mount the new ventilator.
- Connect the ventilator.
- Fasten the cable with a cable tie.

For the documentation of the maintenance, see chapter 18 on page 106.

13.11 Completing the service and repair works



DANGER

Contact with electrical voltage.

Danger to life due to electric shock.

- ➡ Switch off the replacement power circuit.
- ➡ Switch off connected generation systems.

DANGER

Switching off the supply line of the store can activate the replacement power mode.

Danger to life due to electric shock.

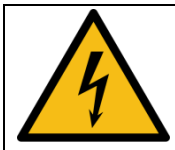
- ➡ Switch off the store.
- ➡ Switch off the supply line.
- ➡ Switch off connected generation systems

DANGER

Touching live parts.

Danger to life.

- ➡ Remove all tools and/or small parts from the interior.
- ➡ Create all the cable connections correctly.
- ➡ Check all the cable ducts.
- ➡ Check all the safety equipment.
- ➡ Ensure that there are no persons in the danger zone before switching on the energy.



WARNING

Damaged cables due to improper assembly.

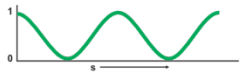
Electric shock.

- ➡ Check all assembly steps before closing the energy store.
- ➡ Do not apply any force when closing the energy store.

13.11.1 Check operating status

- Ensure that there is no soiling or material residues in the device interior.
- Clean with a vacuum cleaner or similar if necessary.
- Switch the battery module(s) on again.
- Close and screw the door.
- Check whether the fuses are switched on again.
- Switch the energy storage system "ON" with the on/off switch. The button is locked in the lower position.

- Check whether the LED ring on the on/off switch displays the following successively after switch-on:

LED ring Colour		LED ring Action	Operating status energy store	LED ring flash mode
Green		Lights up permanently	Operation	
Green		Flashes every 0.5 seconds	System check	
Green		Vibrates every 3 seconds	Standby	
Green		Vibrates with decreasing intensity	Discharge	
Green		Vibrates with increasing intensity	Charge	

- If necessary, check whether error messages are displayed on the web interface (see chapter 11.13.1 "Checks on the system page" on page 71 and 12.2 "The system menu" on page 76). Remove the faults – as far as possible.
- Check the functioning of the ventilator. See chapter 13.5.6 "Checking the ventilator" on page 90.

If battery modules were replaced, enter the serial numbers of the modules on the web interface. See chapter 12.4.1 "Checking the ventilator" on page 78. For the documentation of the maintenance, see chapter 18 page 106.

13.12 Cleaning

WARNING

Entry of water into electrical installations.

Possible danger to life.

➡ Do not use water to clean the energy store.

➡ Do not deposit containers with liquids (such as drinks cups) on electrical installations.

Cleaning agents

Do not use cleaning agents containing acid, lye or solvents!

Cleaning outside of housing

- clean with vacuum cleaner.
- wipe with damp, not wet, cloth.

14 Faults

This section is directed towards the electrical specialist.

⚠ WARNING

Improper fault elimination due to lack of specialist knowledge.

Personal and material damage.

➡ Only the electrical specialist is allowed to eliminate faults.

14.1 Faults displays of the LED ring

The LED ring of the on/off switch on the front of the cabinet displays faults. The *i symbol* on the homepage of the *web interface* informs you about the currently occurring fault.

14.2 Faults displays on the web interface

Faults are displayed on the *System* page of the web interface.

- Select the *System* button in the header.

The error lists for the storage system and the grid and plant protection can be read out.

15 Dismount and disposal

This section is directed towards the electrical specialist.

15.1 Planning dismount

⚠ WARNING

Improper dismount due to lack of specialist knowledge.

Personal and environmental damage.

➡ Only the electrical specialist is allowed to dismount the energy store.

➡ Read the operating manual.

i Should you no longer have the original packaging, request suitable dangerous goods packaging.

15.2 Carry out dismount

Read the operating manual.
Especially the safety chapter.

i The opening of the storage cabinet and the dismount of the components are described in chapter 13.10, beginning on page 93.

The battery modules are to be in a charging status **smaller than 30%**. If necessary, discharge the modules.

15.3 Disposal

The VARTA element backup system must not be disposed of via the house waste.

Battery recycling

DE - GRS: Registration number: 21004215
The packed battery modules will be collected by VARTA Storage or by a company appointed by it. Please contact VARTA Storage (entsorgung@varta-storage.com). If necessary, request the hazardous goods packaging there.

EU - Please contact the distributor in your country.
If you have any questions, we will be happy to help you. Please contact your local technical support. You can find the contact details at www.varta-storage.de

The cabinet can be disposed of as electric scrap, e.g. at a collection station.

16 Move

This section is directed towards the electrical specialist.

16.1 Planning a move

WARNING

Improper dismount due to lack of specialist knowledge.

Personal and environmental damage!

➡ Only the electrical specialist is allowed to dismount the energy store.

➡ Read the operating manual.

i Should you no longer have the original packaging, request suitable dangerous goods packaging.

16.2 Carrying out a move

Danger

Improper further use of the battery modules

Possible danger to life and material damage.

➡ Continue to use the battery modules exclusively in the energy store from which they were dismounted.

WARNING

Improper transport due to lack of specialist knowledge.

Possible danger to life and material damage!

➡ The energy store and its components may be transported only by the manufacturer and electrical specialists qualified and certified by the manufacturer.

➡ Operate carefully during transport.

➡ Adhere to the transport regulations.

➡ Read the operating manual.

i The opening of the storage cabinet and the dismount of the components are described in chapter 13.10, beginning on page 93.

The battery modules are to have a **charging status of 20 to 30%** of their capacity. If necessary, charge or discharge the battery modules.

The battery modules must be recommissioned by a qualified electrical specialist certified by VARTA within **11 weeks** after the dismount.

i Commissioning after a move takes place as described in chapter 8.

17 Spare parts

Spare part	Article no.	Comment
Cover for battery charger shaft	709505	
Battery charger	801085	
Battery module 6.5 kWh	727625	
Ventilator	712390	
element air filter	715155	
SD card	722516	With adapter
Sensor cable	710499	Length: 20 m
VARTA Split Core current sensor 3-phase	719341	
Converter type F	727687	

18 Documentation

With the documentation of the service and maintenance works, you prove that the specified maintenance intervals have been complied with, exclusively original parts have been used and the works on your VARTA element backup storage system have been performed exclusively by qualified electrical specialists certified by VARTA Storage GmbH.
The first service must take place within two years of the installation date. Thereafter, the service interval is 3 years.

18.1 Service works

Customer data:	
Surname, first name	
Address	
Country - post code and town/city	
Telephone number	
Email	

Store location (if different):	
Address	
Country - post code and town/city	

Installation of energy storage system:	
Serial number	
Date	
Certified service employee	
Signature/seal	

Service works*	✓	**Comments**
Check from outside:		
Outer ventilation strip cabinet cover cleaned	❍	
Room temperature +5 °C to +30 °C year-round	❍	
Energy store stable	❍	
LED display on/off switch green	❍	
On/off switch: Function checked	❍	
By web interface:		
Online status “connected”	❍	
Software version	Ver.:	
Meter air filter reset	❍	
Error memory read out	❍	
Ventilator function checked	❍	
Software update (if offline system)	❍	
Replacement power network checked	❍	
Housing interior:		
Air filter checked / replaced**	❍	
Inner ventilation strip cleaned	❍	
Completion:		
Cabinet locked	❍	
Fuse switched on again	❍	
Energy store switched on / function checked	❍	

* For a detailed description of the service works, see the "Maintenance" section in the operating manual.
** The air filter is to be replaced at every second service.

18.2 Repair / other works

Customer data:

Surname, first name _____

Address _____

Country - post code and town/city _____

Telephone number _____

Email _____

Store location (if different):

Address _____

Country - post code and town/city _____

Installation of energy storage system:

Serial number _____

Date _____

Certified service employee _____

Signature/seal _____

Software status: _____

Works performed:

Original parts:	**Serial numbers:**	
	old	**new**

Conspicuous system parameters:	**Values:**

Comments:

19 Appendix

19.1 Figures

19.2 Tables

CE Conformity with the EU directives relevant to the device is confirmed by the CE sign.

Declaration of conformity (DoC)

VARTA Storage GmbH declares that the retrofitting of the VARTA element backup is in accordance with the applicable directives 2014/30/EU and 2014/35/EU. You will find the complete declaration of conformity on our website: www.varta-storage.com. This operating manual is a document without contractual character. Errors, print errors and changes reserved.