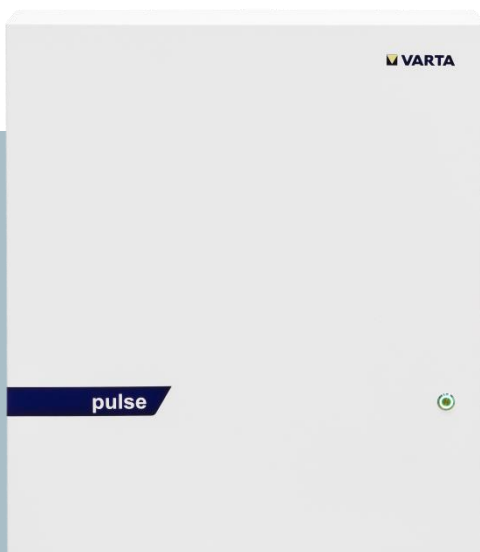


INSTRUCTION MANUAL

VARTA pulse



VARTA Storage GmbH

Congratulations!

You have opted for an energy storage system from VARTA Storage GmbH! We are pleased that in doing so, you chose a durable system for which we considered quality paramount. Please read through these instructions carefully. They describe how to operate and use the battery.

Have fun storing power!

Guidance for the qualified electrician



The first part of this manual contains general information on how to use the VARTA pulse energy storage system.

Further information can be found in the “Installation”, “Operation in the password-protected area” and “Maintenance” sections.

Legal notice

Translation of the original instruction manual for VARTA pulse

VARTA Storage GmbH
Nürnberger Strasse 65
86720 Nördlingen
Germany

www.varta-storage.com

Tel.: 0049 9081 240 86 60
info@varta-storage.com

Technical service:
technical.service@varta-storage.com
Tel.: 0049 9081 240 86 44

Document number: OM_850_853

Updated: 12/2017

Version: 01

Contents

General	12
1. Information about this manual.....	12
1.1 Explanation of symbols	12
1.1.1 Safety instructions	12
1.1.2 Warning levels.....	13
1.1.3 General safety signs.....	14
1.1.4 Warning signs.....	15
2. Safety	16
2.1 General information on safety	16
2.2 Intended use	18
2.3 Requirements regarding qualified electricians	19
2.4 General hazard sources.....	20
2.4.1 Danger of electrical voltage.....	20
2.4.2 Danger from water.....	21
2.4.3 Danger from oxidising and corrosive substances	22
2.4.4 Danger from heat	23
2.4.5 Danger from misbehaviour	24
2.5 Safety devices.....	25
3. Function, scope of delivery and technical parameters.....	26
3.1 Function	26
3.2 Scope of delivery.....	27
3.3 Front view VARTA pulse	28
3.4 System overview	29
3.5 Rating plate	30
3.6 Technical parameters	31

Operation.....	33
4. Switching on and off, web interface.....	33
4.1 Switching on and off	34
4.2 LED ring indications	35
4.3 Web interface	36
4.3.1 Access to the web interface.....	36
4.3.2 Information on the welcome page (Home)	37
4.3.3 External relays (optional).....	38
4.3.4 Portal (optional)	39
5. Maintenance and cleaning	40
5.1 Maintenance work	40
5.2 Cleaning	41
6. Malfunction/event of damage	42
6.1 Malfunction indicators.....	43
6.1.1 Malfunction indicators of the LED ring.....	43
6.1.2 Malfunction indicators on the web interface	43
6.2 Behaviour in the event of damage	43
Installation.....	45
7. Transport and storage	45
7.1 Transport	45
7.2 Transportation regulations and safety instructions	46
7.3 Packaging/transport control	48
7.4 Storage	50
8. Assembly and installation	51
8.1 Check the components.....	51
8.2 Requirements for the installation location	52

8.3	Installation location	53
8.3.1	Dimensions and features	53
8.3.2	Environmental conditions	54
8.3.3	Impermissible locations and environmental conditions	55
8.4	Warranty.....	55
8.5	Warranty registration.....	58
8.5.1	Warranty registration by the installation engineer	58
8.5.2	Warranty registration by the customer	63
8.6	Preparation of the electrical connection.....	67
8.6.1	Connections to the distributor box.....	69
8.6.2	Preparation of the AC port for the building grid.....	69
8.6.3	VARTA Split Core current sensor	71
8.7	Preparation of assembly	74
8.8	Installing and connecting the energy storage system.....	75
8.9	Battery module assembly.....	78
8.9.1	Inspecting the battery module	79
8.9.2	Behaviour in the event of damage	80
8.9.3	Installing and connecting the battery module.....	81
8.9.4	Installing the battery module	82
8.9.5	Closing the energy storage system.....	85

8.10 Initial commissioning	87
8.10.1 Switching on	87
8.10.2 Password entry	89
8.10.3 Entering the serial numbers of the battery module	90
8.10.4 Portal connection	92
8.10.5 Setting the grid parameters for GS protection	93
8.10.6 Reboot	94
8.10.7 Checks on the welcome page	95
8.10.8 Checks on the "System" page	96
8.10.9 Exiting the password-protected area	97
8.11 Quick Install	98
Operation in the password-protected area	100
9. The password-protected area	100
9.1 Access to the web interface - password entry	100
9.2 System	101
9.3 Version	101
9.4 Settings	102
9.4.1 Basic settings	103
9.4.2 Network	104
9.4.3 Service settings	105
9.4.4 Grid parameters for GS protection	106
9.4.5 Reactive power compensation	108
9.5 Power limitation	114
9.6 Logging out	114

Maintenance.....	115
10.Maintenance basics	115
10.1 Safety instructions.....	115
10.2 Scope of maintenance work.....	117
11.Service and repair work	118
11.1 Inspecting the energy storage system from outside	118
11.2 Checking the system parameters (Service).....	118
11.2.1 Checking the online status	118
11.2.2 Error lists	119
11.2.3 Checking the software version	120
11.2.4 Software update	120
11.2.5 Air filter change: Resetting the time	121
11.2.6 Checking the fan	121
11.3 Checking the system parameters	122
11.3.1 Checking the current sensor values.....	122
11.3.2 Checking the battery inverter	123
11.3.3 Checking the battery module	124

11.4 Service and maintenance: Housing interior	125
11.4.1 Opening the energy storage system	127
11.4.2 Removing the battery inverter	128
11.4.3 Installing the battery inverter	130
11.4.4 Removing and installing the battery module	131
11.4.5 Removing the battery module.....	132
11.4.6 Installing the battery module.....	134
11.4.7 Cleaning the fan and air filter.....	134
11.5 Completion of service and repair work.....	135
11.5.1 Checking the operating state.....	136
11.6 Cleaning	138
12.Malfunctions	138
12.1 Malfunction indicators of the LED ring	139
12.2 Malfunction indicators on the web interface	139
13.Disassembly and disposal.....	140
13.1 Planning disassembly.....	140
13.2 Disassembling	141
13.3 Disposal.....	141
14.Relocation.....	142
14.1 Planning a relocation	142
14.2 Relocating	143

About this manual

Please read this instruction manual before beginning any kind of work. It contains important information, in order to ensure trouble-free functioning of the VARTA pulse energy storage system.

The manual is structured in a way, so all work can be carried out by a qualified electrician certified by VARTA Storage.

Storage of the manual

The instruction manual should be kept in close proximity to the VARTA pulse and must be permanently available to all individuals involved in working on the energy storage system.

If the owner changes, the instruction manual has to be handed over.

Target groups

This manual is intended for different target groups:

- End customers
- Qualified electrician who is responsible for installation, commissioning and maintenance.

Scope

This manual is part of the system and corresponds to the state-of-the-art at the time of publication. It is intended for the product VARTA pulse in the expansion stages pulse 3 and pulse 6.



Please keep in mind that this instruction manual also refers to optional components, which are not included in the scope of delivery as standard. These parts or components are designated "optional" in this manual. Just skip these parts of the manual if your energy storage is not equipped with them.


Limitation of liability

VARTA Storage GmbH accepts no liability for personal injuries, material damage, damages at the product, as well as consequential damages arising from non-observance of this manual, improper use of the product, during repairs, opening of the storage cabinet and other activities carried out by unqualified electricians or electricians who were not certified by VARTA Storage. This limitation of liability also applies to the use of non-approved spare parts, as well as non-observance of the stated maintenance intervals.

It is prohibited to carry out unauthorised modifications or technical changes at the product.

© VARTA Storage GmbH 2017

Special attention required

	ATTENTION
	<p>Energy storage system switched off!</p> <p>Potential damage to the battery module due to deep discharge!</p> <p>➔ The energy storage system may be switched off <u>temporarily</u> only for maintenance purposes.</p>

General

1. Information about this manual

1.1 Explanation of symbols

This instruction manual uses the following types of safety instructions and tips:



Indicates tips for handling the device.

1.1.1 Safety instructions

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

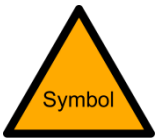


	 Signal word
	Type and source of the hazard! Potential consequence(s) in case of non-  Measures and restraints for avoiding the hazard.

Table 1: Safety instructions

1.1.2 **Warning levels**

Signal word and warning colour indicate the warning level and give immediate information on type and severity of the consequences if measures for avoiding the hazard are not taken.





Warning colour/signal word		Consequences
	DANGER	warns of an immediately dangerous situation, which might lead to death or serious injuries and/or fire.
	WARNING	warns of a potentially dangerous situation, which might lead to death or serious injuries and/or fire.
	CAUTION	warns of a potentially dangerous situation, which might lead to death or minor injuries and/or fire.
	ATTENTION	warns of a potential situation, which might lead to material and environmental damages, and which might interrupt the

Table 2: Warning levels

1.1.3 General safety signs





Symbol	Meaning
	Prohibition symbols are circular, showing a black pictogram on a white background surrounded by a red edge with a crossbar.
	Mandatory action symbols are circular, showing a white symbol on a blue background.
	Warning signs are triangular, showing a black symbol and edge on a yellow background.
	Environmental regulations are information on statutory requirements, which have to be complied with, especially during disposal.

Table 3: Safety signs

1.1.4 **Warning signs**

	General warning sign
	Warning of electrical voltage
	Warning of oxidising substances
	Warning of hand injuries
	Warning of cut injuries
	Warning of hazards due to batteries
	Warning of non-observance of the discharge time: 3 minutes!



Table 4: Warning signs

General
Operation
Installation
Operation (Service)
Maintenance

2. Safety

2.1 General information on safety

Any person in charge of carrying out work on the system must have read and understood this manual.

	 WARNING
	<p>Non-observance of the safety instructions!</p> <p>Improper use can lead to fatal injuries!</p> <p>➔ Prior to use, ensure that all protective devices are functioning.</p>

By observing the safety instructions and complying with the instructed health and safety measures, the risk will be limited.



Read the instruction manual.

This manual cannot describe every conceivable situation, therefore the currently applicable standards as well as the appropriate regulations for industrial safety and health protection always have priority.

Furthermore, the use of the energy storage system is associated with residual risks under the following circumstances:

- Installation and maintenance work is not performed correctly.
- Installation and maintenance work is performed by personnel who have not been trained and not been instructed.
- The safety instructions provided in this manual are not observed.

All safety instructions have to be strictly followed, the observance is for your safety. The device must not be modified in any way.

General

Operation



Installation

Operation (Service)




Maintenance

2.2 Intended use

VARTA pulse as well as the components thereof, is built to state-of-the-art technology and to product-specific standards. This product is designed for storing electricity from renewable energy generating plants, such as photovoltaic systems or other energy sources such as CHPs. Any other use must be agreed in consultation with the manufacturer and the local energy supplier. The energy storage system may be operated only when hanging on a wall.

	 WARNING
	Possible mortal danger due to wrong use!
	<p>Possible mortal danger!</p> <p>➡ The device accommodates parts carrying hazardous voltages. Contact with these parts can be fatal.</p> <p>➡ Any usage beyond or other than the intended use of the energy storage system or individual parts of it might lead to life threatening situations.</p>
Do not use VARTA pulse:	
<ul style="list-style-type: none">• for mobile use at land, water or air.• for use at medical devices.• e.g. lying or standing on the floor or a table.	

2.3 Requirements regarding qualified electricians

	 WARNING
	<p>Insufficient qualification of the electrician!</p> <p>Personal injuries and material damage!</p> <p>➔ Work on the VARTA pulse system (e.g. installation and maintenance work) may only be carried out by qualified electricians who are certified by VARTA Storage!</p>



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

General

Operation

Installation





Operation (Service)

Maintenance



2.4 General hazard sources

If the following instructions for handling the device are not observed, this might lead to personal injury or material damage at the device, for which VARTA Storage will accept no liability.

2.4.1 Danger of electrical voltage


  	<div style="background-color: red; color: white; padding: 5px; display: flex; align-items: center;">  DANGER </div> <p>Contact with electrical voltage!</p> <p>Risk of fatal injury from electric shock!</p> <ul style="list-style-type: none"> ➔ Keep the energy storage system always closed. ➔ Pay attention to damage of the electrical equipment! Eliminate defects immediately. ➔ Only the electrician is allowed to open the energy storage system when it is switched off. ➔ Respect the waiting times.
---	--

2.4.2 **Danger from water**



	 WARNING
	<p>Entry of water into electrical systems!</p> <p>Possible mortal danger and material damage!</p> <ul style="list-style-type: none">➔ Do not use water for cleaning the energy storage system.➔ Never put down containers with fluids (beverage containers and the like) on electrical systems.➔ The relative humidity inside the room must not exceed 80%.➔ Do not put wet devices or components into operation.➔ Do not put devices or components that have become wet into operation.➔ Contact VARTA Storage.

General
Operation
Installation
Operation (Service)
Maintenance

2.4.3 Danger from oxidising and corrosive substances

	WARNING
	<p>Storage and use of oxidising and corrosive substances!</p> <p>Increases the risk of fire and the risk of electric shocks!</p> <p>➔ Store the above mentioned substances only at places that are intended for them.</p> <p>➔ Do not clean the system with agents containing acid, lye or solvents.</p>

2.4.4 Danger from heat

	ATTENTION
	<p>Insufficient ventilation of the system!</p> <p>Overheating of the system possible!</p> <ul style="list-style-type: none"> ➔ Keep the ventilation openings clear. ➔ Ensure sufficient ventilation.
	ATTENTION
	<p>Heat input due to direct sunlight or devices emitting heat!</p> <p>Overheating and damage of the system possible!</p> <ul style="list-style-type: none"> ➔ Protect the system against direct sunlight. ➔ Do not use fan heaters or the like near the system.

General




Operation

Installation



Operation (Service)

Maintenance

2.4.5 Danger from misbehaviour

	<p style="text-align: center;">ATTENTION</p> <p>Energy storage system switched off! Potential damage to the battery module due to deep discharge!</p> <p>➔ The energy storage system may be switched off <u>temporarily</u> only for maintenance purposes.</p>
	<p style="text-align: center;">ATTENTION</p> <p>Objects on the system! Risk of injury due to falling objects, and the system might be damaged!</p> <p>➔ Do not put any objects on the energy storage system.</p>
	<p style="text-align: center;">ATTENTION</p> <p>Blocked access In the event of damage, the system cannot be switched off!</p> <p>➔ The access to the energy storage system must always be ensured.</p> <p>➔ Access to the associated circuit-breaker must be assured at all times</p>

2.5 Safety devices

	 WARNING
	<p>Defective safety devices!</p> <p>Possible mortal danger!</p> <ul style="list-style-type: none"> ➔ Safety devices must not be damaged, modified, removed, or decommissioned. ➔ The proper functioning of the safety devices must be tested by qualified electricians who are certified by VARTA Storage after completion of installation and commissioning.

The VARTA pulse energy storage system has multiple safety devices. Including grid and system protection to country-specific standards, e.g. VDE-AR-N 4105, closed electrical operating area, overtemperature cutout and a mechanical shutoff mechanism. This switches off the unit if an attempt is made to open the housing before the energy storage system has been de-energised.

Furthermore it is recommended to install a smoke detector in the installation room of the VARTA pulse.

General

Operation

Installation

Operation (Service)

Maintenance

3. Function, scope of delivery and technical parameters

3.1 Function

The VARTA pulse energy storage system is intended for use on a AC household electrical system and is capable of being connected to a separate grid-coupled photovoltaic system. This must be a generating unit which supplies to surplus rather than to full feed. There is also provision for storing renewable energy, for example from small wind turbines or other energy sources such as CHPs.

The energy stored system is intended to increase the in-house consumption percentage and the economy of a photovoltaic system. If the photovoltaic system generates more electricity than immediately needed, it can be stored temporarily in the energy storage system. The electricity will be fed into the building grid, as soon as the consumption rises again above the electricity generated by the photovoltaic system.

The energy storage system is integrated into the building grid as an AC connection and operates independently of the photovoltaic system. A current sensor controls the charge and discharge processes of the energy storage system. It is mounted in the fuse box, directly behind the consumption/feed-in meter, and measures all incoming and outgoing currents.

If the current sensor measures outgoing currents in case of available free charge capacity of the energy storage system, it will be charged. During the process, the battery inverter inside the energy storage system converts AC to DC and charges the battery module. If the maximum charge capacity is reached, or the solar electricity exceeds the maximum charging current, the surplus solar electricity is fed into the public grid. If the photovoltaic system is not able to cover the current electricity demand inside the building, the current sensor measures incoming currents. As a

result, the energy storage system gives output into the building grid, in order to minimise the external electricity consumption and the associated costs.

Before the VARTA energy storage system is installed, the appropriate energy provider/grid operator must be asked whether it is necessary to register the system.

3.2 Scope of delivery

The VARTA energy storage system consists of:

Storage system:

- 1 x battery module,
- 1 x battery inverter,
- 1 x mounting plate,
- 1 x hood,
- 1 x pre-installed cable set,
- 1 x instruction manual,

Extra items:

- 1 x current sensor (50 A),
- 20 m sensor cable RJ12,
- 1 x AC connector,
- 4 x mounting screws for the battery module,
- 3 x mounting screws for the hood.

Customer folder

- accompanying letter,
- return envelope,
- commissioning report,
- service booklet,
- warranty records,
- Online Portal Agreement.

General

Operation

Installation

Operation (Service)

Maintenance

3.3 Front view VARTA pulse

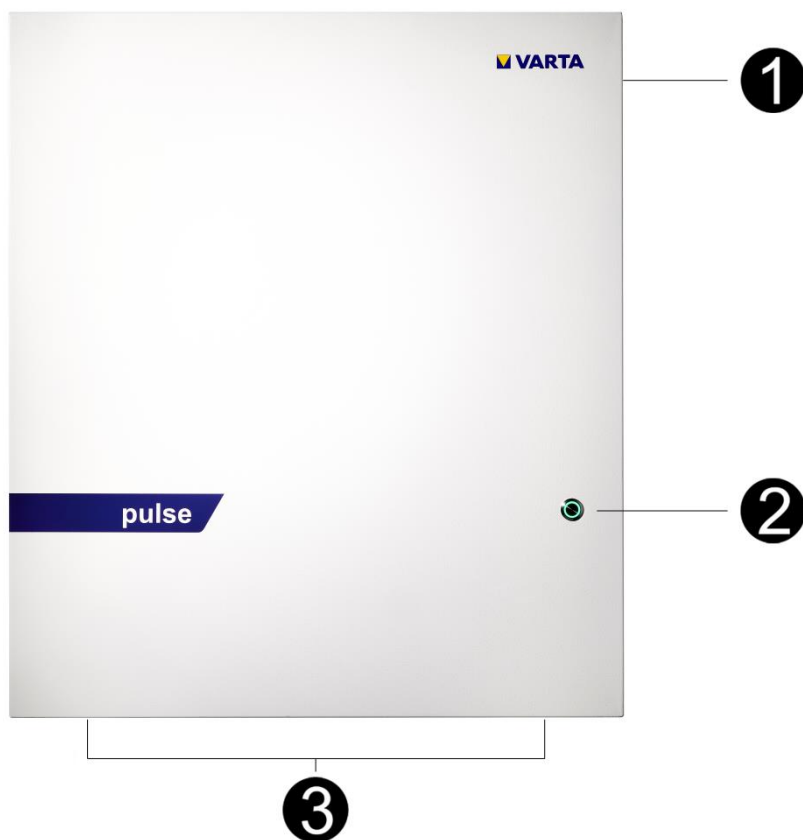


Figure 1: Front view

1	Rating plate
2	On/Off button
3	Position of the screws

3.4 System overview

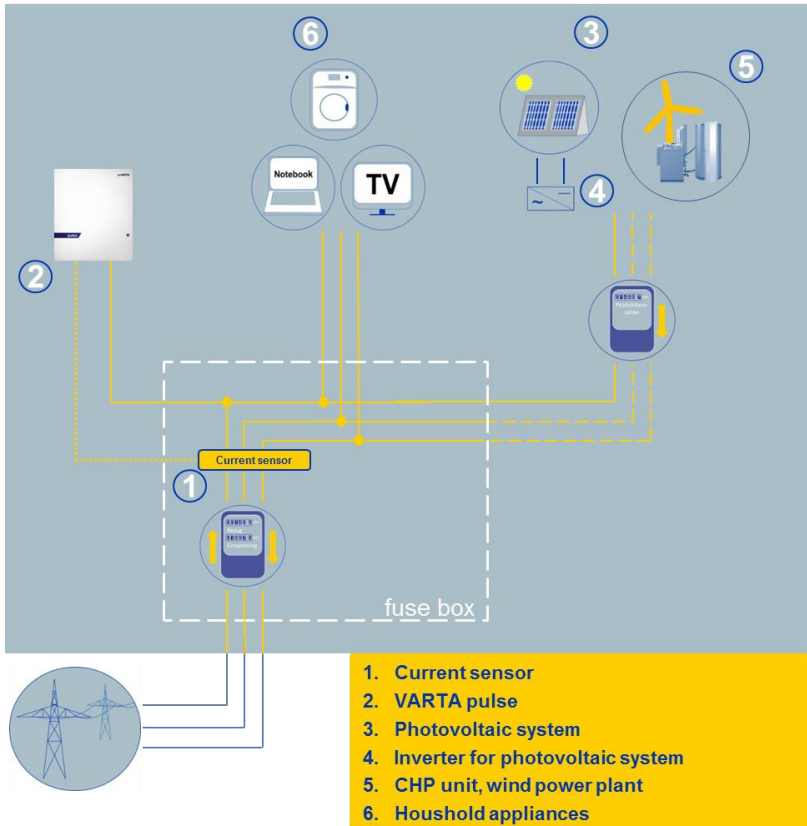


Figure 2: System overview

General

Operation

Installation

Operation (Service)

Maintenance

3.5 Rating plate

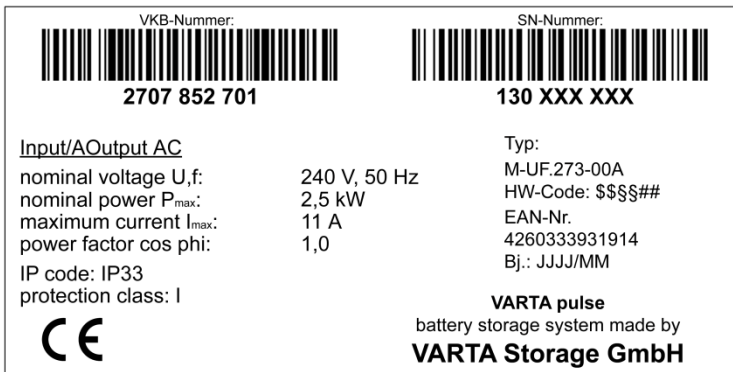


Figure 3: Rating plate (example)

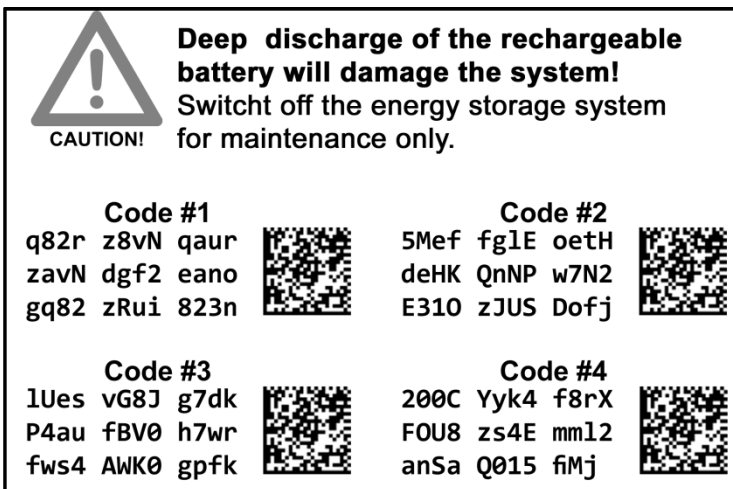


Figure 4: Cryptocode (example)

3.6 Technical parameters

VARTA PULSE 3

▶ Nominal capacity	3.3 kWh	General
▶ AC charge power	1.8 kW	
▶ AC discharge power	1.6 kW	
▶ Battery inverter structure	without isolation transformer	
▶ Dimensions in mm (W x H x D)	600 x 690 x 190	
▶ Weight (incl. battery module)	45 kg	
▶ Installation location	inside the building	
▶ Grid connection	240 V AC, 50 Hz	
▶ Make current	< max. operating current for input and output	
▶ Maximum output residual current	max. 11 A for 100 µs	Operation
▶ Internal consumption optimisation	Automatically controlled	
▶ Power measurement	3-phase, via current sensor	Installation
▶ System transport	horizontally on a pallet	
▶ Packaging in mm (W x H x D)	620 x 700 x 210	
▶ Grid system fusing	16 A (B-character)	

Table 5: Technical parameters - VARTA pulse 3

VARTA PULSE 6

▶ Nominal capacity	6.5 kWh	Operation (Service)
▶ AC charge power	2.5 kW	
▶ AC discharge power	2.3 kW	
▶ Battery inverter structure	without isolation transformer	
▶ Dimensions in mm (W x H x D)	600 x 690 x 190	
▶ Weight (incl. battery modules)	65 kg	
▶ Installation location	inside the building	
▶ Grid connection	240 V AC, 50 Hz	
▶ Make current	< max. operating current for input and output	
▶ Maximum output residual current	max. 11 A for 100 µs	Maintenance
▶ Internal consumption optimisation	Automatically controlled	
▶ Power measurement	3-phase, via current sensor	
▶ System transport	vertical on a pallet	
▶ Packaging in mm (W x H x D)	620 x 700 x 210	
▶ Grid system fusing	16 A (B-character)	

Table 6: Technical parameters - VARTA pulse 6

BATTERY MODULE (VKB 56461701100)

- ▶ Electrochemical cell Li-ion
- ▶ Nominal module capacity 3.3 kWh
- ▶ Discharge depth 90 %
- ▶ Useful module capacity 3.0 kWh
- ▶ Connection touch safe
- ▶ Cell monitoring integrated
- ▶ Dimensions in mm (W x H x D) 445 x 110 x 339
- ▶ Weight 25 kg
- ▶ Packaging in mm (W x H x D) 800 x 460 x 600

BATTERY MODULE (VKB 56462701100)

- ▶ Electrochemical cell Li-ion
- ▶ Nominal module capacity 6.5 kWh
- ▶ Discharge depth 90 %
- ▶ Useful module capacity 5.9 kWh
- ▶ Connection touch 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

Table 7: Technical parameters – battery modules

ENVIRONMENTAL RATING DATA





- ▶ Environmental category Air-conditioned indoors*
- ▶ Classification of wet rooms No wet rooms allowed
- ▶ Degree of contamination 2
- ▶ Ingress protection IP33
- ▶ Ambient temperature +5 °C to +30 °C
- ▶ Relative humidity < 80 %
- ▶ Max. altitude 2000 m ASL
- ▶ Overvoltage category III
- ▶ Protection class 1

*The energy storage system is completely enclosed by a building or housing. This protects the energy storage system against sunlight, dust, mould and other external influences. Additionally, the building or housing is air-conditioned with regard to temperature, air humidity and air filtering.

Table 8: Technical parameters – environmental rating data

Operation

4. Switching on and off, web interface

  	<div data-bbox="375 311 929 375" style="background-color: red; color: white; padding: 5px;">⚠ DANGER</div> <p>Contact with electrical voltage!</p> <p>Risk of fatal injury from electric shock!</p> <ul style="list-style-type: none"> ➔ Keep the energy storage system always closed. ➔ Pay attention to damage of the electrical equipment. ➔ Eliminate defects immediately. ➔ Only the electrician is allowed to open the energy storage system when it is switched off. ➔ Respect the waiting times.
	<div data-bbox="375 893 929 949" style="background-color: yellow; padding: 5px;">ATTENTION</div> <p>Energy storage system switched off!</p> <p>Potential damage to the battery module due to deep discharge!</p> <ul style="list-style-type: none"> ➔ The energy storage system may be switched off <u>temporarily</u> only for maintenance purposes.

General

Operation

Installation

Operation (Service)

Maintenance

4.1 Switching on and off

The *On/Off* button on the front of the housing is pressed by the certified installation engineer during commissioning and for service work. In case of damage (see Chapter 6.2), the system can be shut-down using the *On/Off* button.

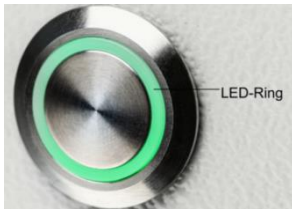


Figure 5: On/Off button with LED ring

4.2 LED ring indications

The LED ring at the *On/Off* button indicates the states and events which occur while the energy storage system is in operation.









LED ring colour		LED action	Operating state
Green		Flashes every second (approx. 90 s)	System check
Green		Steady light	Ready
Green		Flashes every 3 s	Standby
Green		Pulses with increasing intensity	Charge
Green		Pulses with decreasing intensity	Unloading
Green-red		Flashes	Update
Red		Steady light	Error*
Red		Flashes every second	Current sensor check failed
*The i-button on the welcome page of the web interface displays information about current errors (see Chapter 4.3.2).			

Table 9: LED ring indications at the *On/Off* button

General

Operation

Installation

Operation (Service)

Maintenance

4.3 Web interface

The web interface offers the option of configuring settings, as well as monitoring and controlling the energy storage system functions.

4.3.1 Access to the web interface

To access the web interface, you will need the serial number of the energy storage system. The serial number can be found on the rating plate on the outside of the housing (top). See Figure 3: Rating plate.

Connect your storage system to the router of your home network by means of the network cable. The connection (RJ45 socket) is located on the right side of the housing. See Figure 15: Battery inverter sockets (bottom)

Enter into the address line of your browser after `http://varta` the **serial number** of the energy storage system.
e.g.: <http://varta130023456>

- The welcome page of the web interface will appear.



Access to the web interface might require the browser to be refreshed.

The web interface is factory-tested with the following browsers:
Firefox, Internet Explorer, Chrome and Opera.

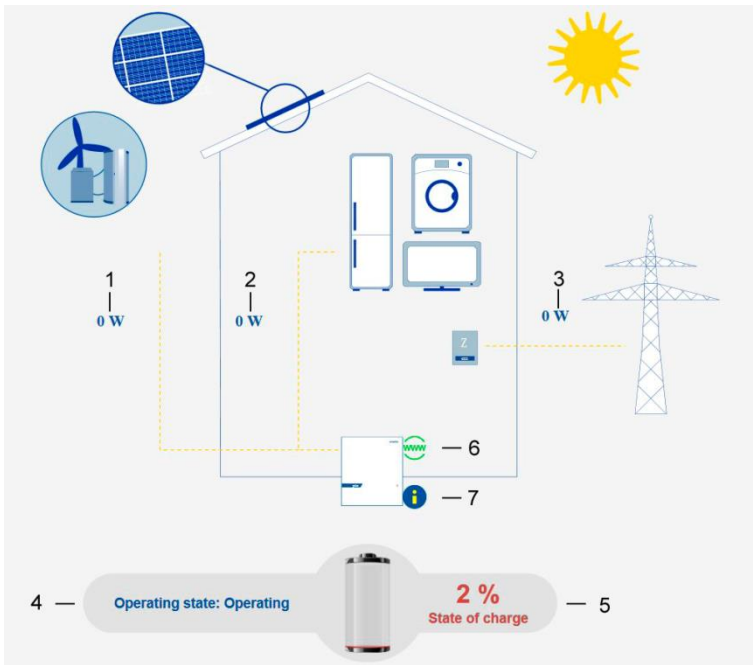


Figure 6: Web interface: Welcome page

4.3.2 Information on the welcome page (Home)

The welcome page provides an overview of the current power values and the states of the energy storage system:

(1) Charge power of the battery inverter in watt (W):

The energy storage system is charged with this power (power of the generating units, e.g. PV system, CHP, minus the direct internal consumption).

(2) Discharge power of the battery inverter in watt (W): The energy storage system is discharged with this power.

(3) Power of the grid supply/grid draw (W): The power supplied into the public grid or drawn from the public grid is displayed.

(4) Operating state of the energy storage system: The operating state, e.g. *standby*, *charging*, *error* is displayed.

(5) The charging state of the energy storage system in %: The charge level of the energy storage system is displayed.

(6) WWW: Indicates whether the energy storage system is connected to the VARTA server (green = online, red = offline).

(7) Info button (i): Displays information about the storage system, e.g. IP address, energy counter, or the most recent grid faults.

To see further explanations, move the cursor over the symbols.

4.3.3 External relays (optional)

Via the web interface, up to four external relays can be individually programmed for controlling special functions, such as switching consumers or generating units on/off. Clicking the *Ext. relay* button shows the corresponding page.

A download available from www.varta-storage.com provides further information.

4.3.4 Portal (optional)

The www.varta-storage-portal.com portal serves to monitor and visualise energy storage systems. To ensure continuous data transmission, the Internet connection must not be interrupted for longer than five days.

Access to the portal is activated once the "I wish to use the VARTA Storage Online Portal" prompt that appears during online login to the storage system is confirmed. A download is available from www.varta-storage.com for the online login to the storage system and for using the portal (see Chapter 8.5Warranty registration).




Alternatively, you can tick the "I wish to use the VARTA Storage Online Portal" box on the warranty card, which you return to VARTA Storage.

Use of the Online Portal is free-of-charge. The Internet connection costs must be borne by the customer. However, there is no entitlement to access the portal (see the Terms and Conditions for the Online Portal in the download area).



The data displayed on the VARTA Storage portal cannot be used for billing purposes.

5. Maintenance and cleaning

 	 WARNING
	<p>Improper execution of maintenance and cleaning work</p> <p>Possible mortal danger!</p> <p>➔ Ensure that only qualified electricians certified by VARTA Storage carry out maintenance and cleaning work.</p> <p>➔ Only original parts are to be used for maintenance work.</p>

5.1 Maintenance work

Maintenance of the energy storage system includes:

- Service (= inspection and maintenance)
- Repair and technical improvements and any additions




To maintain the warranty entitlement (outside of Germany, Austria and Switzerland: to safeguard any warranty claims), the first service must be carried out within two years of the installation date. Subsequent servicing must be at three year intervals.



Retain the service booklet together with the instruction manual.




- The extent of the maintenance work is described in the Chapter Maintenance.

5.2 Cleaning

 	 WARNING
	<p>Entry of water into electrical systems!</p> <p>Possible mortal danger!</p> <p>➔ Do not use water for cleaning the energy storage system.</p> <p>➔ Never put down containers with fluids (beverage containers and the like) on electrical systems.</p>

<p>Cleaning agents</p>
<p>Do not use any cleaning agents containing acid, lye or solvents!</p>
<p>Cleaning the outside of the housing</p>
<ul style="list-style-type: none"> • clean with a vacuum cleaner. • wipe with a damp, not wet, cloth.

6. Malfunction/event of damage

 	 WARNING
	<p>Improper elimination of malfunctions!</p> <p>Possible mortal danger!</p> <p>➔ Ensure that only qualified electricians certified by VARTA Storage carry out work at the energy storage system.</p>



In case of a malfunction, contact the qualified electrician.


6.1 Malfunction indicators

6.1.1 Malfunction indicators of the LED ring



The LED ring of the *On/Off* button on the front of the housing indicates malfunctions. See Table 9, Chapter 4.2.

6.1.2 Malfunction indicators on the web interface

Malfunctions are displayed on the welcome page of the web interface.

- To do this, click on the .
- A window will open. Any pending system errors and the previous five grid faults can be read from this window.

6.2 Behaviour in the event of damage

	 WARNING
	<p>Improper handling in case of fire and flooding!</p> <p>Possible mortal danger!</p> <ul style="list-style-type: none"> ➔ If possible, switch off the system and circuit-breakers. ➔ Leave the hazard zone. ➔ In case of fire, call the fire brigade immediately. ➔ Inform the fire brigade about the lithium-ion batteries inside the energy storage system.

In the event of a fire or flooding, prudent behaviour can limit the damage.



Damaged battery module due to technical defect!



In case of a malfunction, contact the qualified electrician.



Installation



This section is intended for the qualified electrician.

General

7. Transport and storage

Operation

7.1 Transport

Lithium-ion batteries are hazardous goods. The battery modules are constructed and tested in a way, so they are allowed to be transported up to a total weight of 333 kg by complying with the conditions of ADR 1.1.3.6 (transport not subject to labelling, as long as there are no other hazardous goods on or inside the vehicle). The other requirements of GGVSEB (ordinance on the national and international carriage of hazardous goods by road, rail, and inland waterways) and ADR (Agreement on Dangerous Goods by Road) also have to be fulfilled. Delivery is made in tested hazardous goods packaging.

Installation



Lithium-ion batteries were successfully tested according to UN 38.3 transport test (UN Manual of Tests and Criteria, Part III, subsection 38.3) and have passed.

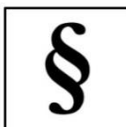
Operation (Service)

The housing is packed separately from the battery module.

Maintenance

7.2 Transportation regulations and safety instructions

 	<div style="background-color: yellow; padding: 5px;">! WARNING</div> <p>Improper transport due to lack of professional knowledge!</p> <p>Possible mortal danger and material damage!</p> <p>➔ The transportation of the energy storage system and its components is only allowed to be carried out by the manufacturer and the electricians qualified and certified by him.</p> <p>➔ Be prudent during transport.</p> <p>➔ Adhere to the transportation regulations.</p>
--	--



Energy storage system and battery modules

- must not be temporarily stored in the transport vehicle.
- The energy storage system must not be transported if a battery module has already been installed.
- The driver or co-driver are not allowed to open the outer packaging of a battery module.

Energy storage system and battery modules

- A tested ABC fire extinguisher with a minimum capacity of 2 kg has to be carried along.
- Heed the symbols on the packaging.
- Transport the parts only in enclosed vehicles.
- The load has to be properly secured.
- Transport the battery module only in its intended transport packaging.
- Adhere to the requirements according to GGVSEB and ADR.

Use your personal protective equipment.



This reduces the risk of injuries during the mechanical work.



WARNING

Components are heavy!

This might lead to overburdened intervertebral discs, bruises and crushing!



Carry out the work described in this chapter with 2 persons or suitable equipment.



General

Operation

Installation

Operation (Service)

Maintenance



When exchanging a battery module, request new hazardous goods packaging if required, pack the battery module and have it picked up by the supplier.

7.3 Packaging/transport control

	 DANGER
	<p>Installation of damaged components!</p> <p>Mortal danger!</p> <p>➡ Do not accept clearly damaged packaging.</p> <p>➡ Contact VARTA Storage.</p>

The housing and battery module (individually packaged) are delivered in separate and tested packaging units on pallets. The disposal of the packaging will be taken over by the installation engineer. Please examine the deliveries on completeness and damages:

- If damages are already visible at the packaging, please note this down on the delivery documents and have the driver confirm this by signature.
- If the packaging is severely damaged, reject the deliveries.

i

Do not remove the packaging until immediately prior to installation. This prevents damage.

Keep the packaging material, so the system can be properly packaged in case of a subsequent transport (relocation).

General



Operation

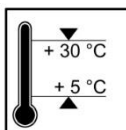
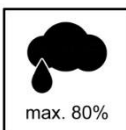
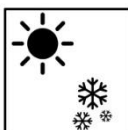
Installation

Operation (Service)

Maintenance

7.4 Storage

	 WARNING
	<p>Entry of water into electrical systems!</p> <p>Short-circuit and corrosion due to condensation!</p> <p>➔ Adhere to the storage conditions.</p>




The housing and the battery module

- must not be temporarily stored in the transport vehicle.
- must not be stored outdoors.
- do not expose to abrupt temperature changes.

The housing and the battery module

- are to be stored dry, at a humidity of < 80%.
- are to be stored at a temperature of 5-30 °C (optimum: +18 °C).

	ATTENTION
	<p>Material damage due to overly long storage!</p> <p>Deep discharge of the battery module!</p> <p>➔ Adhere to the storage conditions.</p>

The battery module





- must be commissioned by the manufacturer or a qualified electrician certified by VARTA Storage within **eleven weeks** of being delivered.

8. Assembly and installation



This section is intended for the qualified electrician.

8.1 Check the components

	 WARNING
	<p>Entry of water into electrical systems!</p> <p>Short-circuit and corrosion due to condensation!</p> <p>➔ Start the assembly not until the components have room temperature.</p>
	 WARNING
	<p>Installation of damaged components!</p> <p>Possible mortal danger!</p> <p>➔ Check all components on visible damages.</p> <p>➔ Do not install damaged components.</p> <p>➔ Contact VARTA Storage.</p>

General

Operation

Installation



Operation (Service)


Maintenance

8.2 Requirements for the installation location



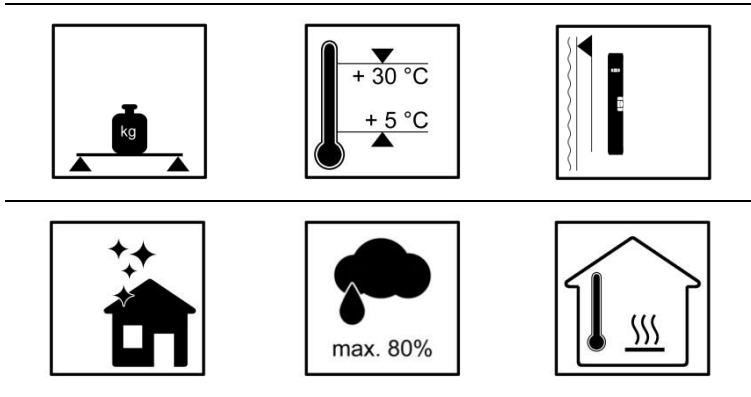
This section is intended for the qualified electrician.

 	<div style="background-color: #FFD700; padding: 5px;">⚠ WARNING</div> <p>Entry of water into electrical systems!</p> <p>Mortal danger from electric shock!</p> <p>➔ Install the storage cabinet only inside buildings.</p> <p>➔ Observe all requirements for the installation location.</p>
--	---

	<div style="background-color: #FFFF00; padding: 5px;">⚠ CAUTION</div> <p>Personal injury and material damage due to wrong installation and lack of space!</p> <p>Crush injuries of limbs!</p> <p>➔ Place the cabinet, so a safe installation, operation, maintenance and disassembly are possible when used properly.</p>
--	---

8.3 Installation location

The following dimensions and framework conditions have to be complied with at the installation location.



8.3.1 Dimensions and features

Recommended volume of min. 30 m³, a vertical, flat wall surface of min. 200 cm x 90 cm (height x width). It must have sufficient load-bearing capacity, i.e. for 4 times the weight of the energy storage system itself.

Weight of the energy storage system → Chapter 3.6 Technical parameters

- If necessary, have the statics tested.

The ground, the adjacent walls and ceiling must not consist of heat-sensitive material.

The distance to adjacent installations must be at least 15 cm to the right and left. A clear space of approx. 120 cm in depth is required in front of the device to carry out installation and maintenance work from the front. In order to secure the means of escape, doors must not swing into this clear space.

General

Operation

Installation

Operation (Service)

Maintenance

The screws for opening the housing must be accessible from below. Comply with the min. dimensions in Figure 14: "Dimensions on mounting plate (mm)".

A minimum clearance of 30 cm must be left above the housing. To ensure that the cooling air can exit the unit unhindered, the min. clearance of 15 cm to either side must be ensured.

8.3.2 Environmental conditions

The installation location must match a pollution degree 2.

A continuous air exchange, possibly via forced ventilation, e.g. window, air-conditioning system, ventilation or the like, has always to be ensured. The distance to the ventilation must be at least 100 cm.

The room temperature must always be between 5 – 30 °C (optimum +18 °C), the relative humidity must be < 80%.

- Recommendation: well ventilated room without external heat sources



Sufficient rodent protection must be provided.



Smoking is not allowed at the installation location.

8.3.3 Impermissible locations and environmental conditions

Altitudes above 2,000 metres,
Garages, carports or other places, at which the environmental conditions are not satisfied.

Locations:

- with unsuitable climatic or geographical conditions,
- with an explosive atmosphere,
- at which flammable or oxidising substances are stored,
- wet rooms,
- with high fluctuations of the ambient temperature,
- with direct sunlight,
- with a humidity above 80% and condensation,
- in which the temperature might be below the freezing point,
- in which salty humidity might enter,
- with an ammonia-containing environment.

8.4 Warranty

For the warranty to be effective (to safeguard any warranty claims outside Germany, Austria and Switzerland), VARTA Storage must be in possession of the following data:

- Commissioning report (including date of commissioning).
- Serial number (SN number) of the VARTA system.
The ID label (rating plate) of the system is affixed inside the storage cabinet.
- Serial number of the battery module.
The ID label of the battery module is enclosed in the packaging.

General

Operation

Installation

Operation (Service)

Maintenance

The installation engineer enters these data in the VARTA Storage installation engineer portal. Within four weeks of the installation date, the customer must register their data (name, address, email address, telephone number) at www.varta-storage-portal.com and enter the serial number (SN number) of the energy storage system and the activation code. The installation engineer can also register the data, subject to the customer's consent.

- The activation code label (Unlock Code) is affixed to the inside of the storage cabinet on the inside of the hood. This label is provided for the customer's personal documents.

As an alternative to this procedure, the completed and signed warranty records (commissioning report and warranty card, together with the affixed ID label for the VARTA system and battery module) can be sent to VARTA Storage within four weeks of the installation date.

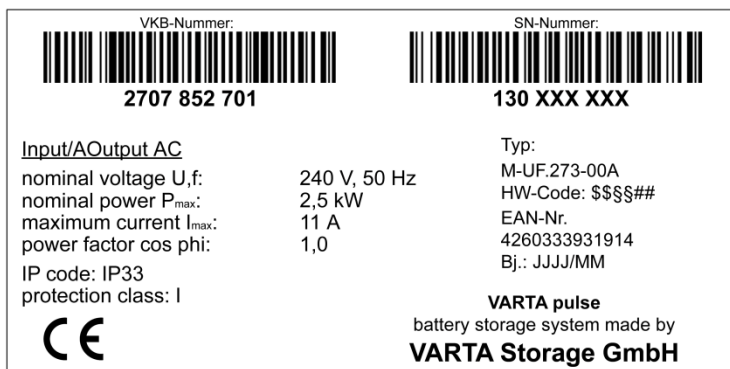


Figure 7: Example of ID label for the system (in the hood)

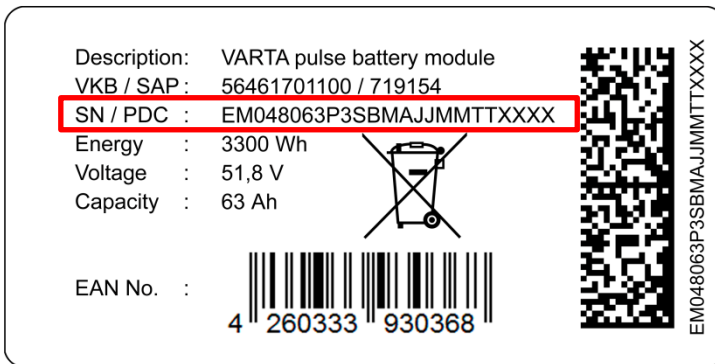


Figure 8: ID label of the battery module (example)

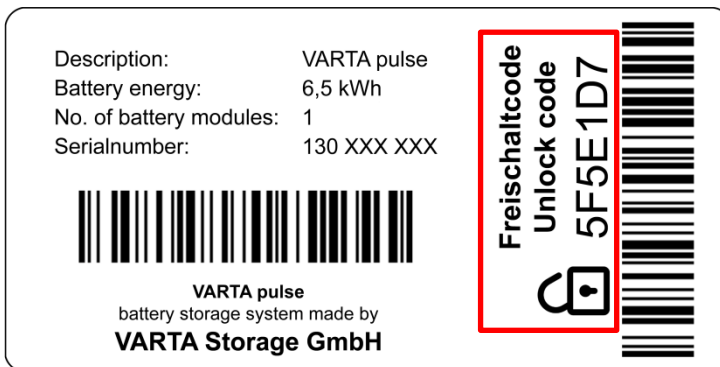


Figure 9: Activation code label (example)

General

Operation

Installation

Operation (Service)

Maintenance

8.5 Warranty registration

This online-based warranty registration consists of two parts:

Part 1: Registration of the energy storage system by the installation engineer incl. commissioning report (Chapter 8.5.1)

Part 2: Warranty registration by the end customer incl. registration for the web portal (Chapter 8.5.2)

8.5.1 Warranty registration by the installation engineer

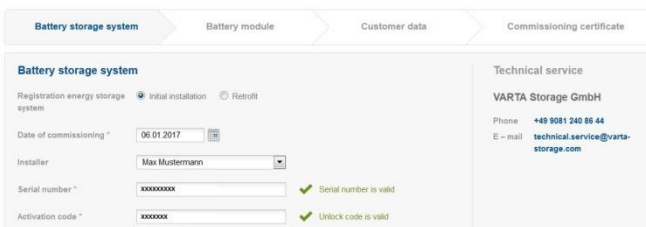
Open page www.varta-storage.com

Change to "energy storage systems"

- Registration in the B2B area with login and password
- On the welcome page, click on "Start VARTA-Portal"
Change to "energy storage registration"

Entering the data for the battery storage:

- Initial installation/retrofit,
- Date,
- Installation engineer,
- Serial number,
- Activation code,



The screenshot shows a web form titled "Battery storage system" with a progress bar at the top indicating four steps: "Battery storage system" (active), "Battery module", "Customer data", and "Commissioning certificate".

Under the "Battery storage system" section, there are two radio buttons for "Registration energy storage system": "Initial installation" (selected) and "Retrofit".

Below this, there are input fields for:

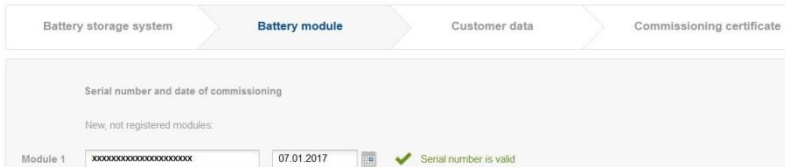
- "Date of commissioning *": A date picker set to "06.01.2017".
- "Installer": A dropdown menu showing "Max Mustermann".
- "Serial number *": A text input field containing "XXXXXXXX" with a green checkmark and the text "Serial number is valid" to its right.
- "Activation code *": A text input field containing "XXXXXX" with a green checkmark and the text "Unlock code is valid" to its right.

On the right side of the form, there is a "Technical service" section for "VARTA Storage GmbH" with contact information: "Phone: +49 9081 240 95 44" and "E-mail: technical.service@varta-storage.com".

The serial number (SN number) and the activation code (Unlock Code) can be found on the stickers on the inside of the housing.

Open the next screen "battery module" with "next".

- Enter the serial number.



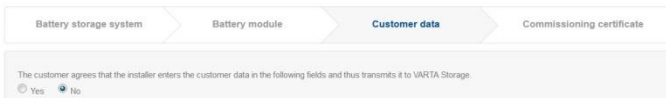

If the storage system is connected to the Internet, the serial number of the installed battery module will be transmitted automatically.



The battery module has to be registered at the latest 11 weeks after delivery.

Call up the next screen "customer data" with "next".

- Determine whether the customer agrees that the installation engineer completes the following fields and transmits them to VARTA Storage.

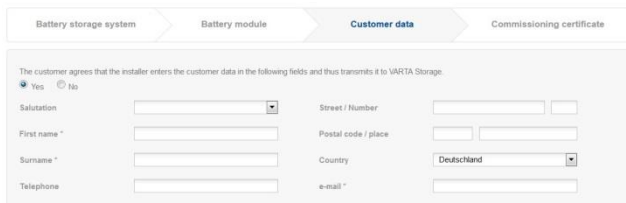


The customer agrees that the installer enters the customer data in the following fields and thus transmits it to VARTA Storage.

☒ Yes ☐ No

- If "Yes", continue with the next screen
- If "No", the screen "customer data" will be skipped. In this case, the end customer has to enter these data in the 2nd part of the warranty registration himself.

Entering the customer data.



The customer agrees that the installer enters the customer data in the following fields and thus transmits it to VARTA Storage.

☒ Yes ☐ No

Salutation Street / Number

First name * Postal code / place

Surname * Country

Telephone e-mail *

Mandatory fields are marked with an *.

Call up the next screen "commissioning" with "next".

Details of the commissioning report.

Battery storage system	Battery module	Customer data	Commissioning certificate
System design			
EVU		Your remarks	
<input type="text"/>		<input type="text"/>	
Mains configurations *		<input type="text"/>	
<input checked="" type="radio"/> TN <input type="radio"/> TT			
Installation location			
Ambient temperature 5 – 30 °C *		Your remarks	
<input checked="" type="radio"/> Yes <input type="radio"/> No		<input type="text"/>	
All – year given		<input type="text"/>	
Humidity < 80 % *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
Space in front of the cabinet > 1,20 m *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
Influencing ruled by external heat sources *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
Energy generating plants			
System performance [kWp] *		Your remarks	
<input type="text"/>		<input type="text"/>	
System handover			
Battery modules used *		Your remarks	
<input checked="" type="radio"/> Yes <input type="radio"/> No		<input type="text"/>	
Conditioning test according to standard *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
In the service menu			
Time set *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
Date set *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
Recommended Internet connection performed *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
Fault memory read and reset *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
Reboot performed *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
Serial number of the battery modules entered *		<input type="text"/>	
<input checked="" type="radio"/> Yes <input type="radio"/> No			
Function test			
The function test was performed successfully. *		<input checked="" type="radio"/> Yes <input type="radio"/> No	
The plant has been constructed according to the valid rules of technology and the operator is instructed in the operation and maintenance. *		<input checked="" type="radio"/> Yes <input type="radio"/> No	
The operator has been informed of the appropriate use. *		<input checked="" type="radio"/> Yes <input type="radio"/> No	
The commissioning of the energy storage unit took place on:		07.01.2017	

General

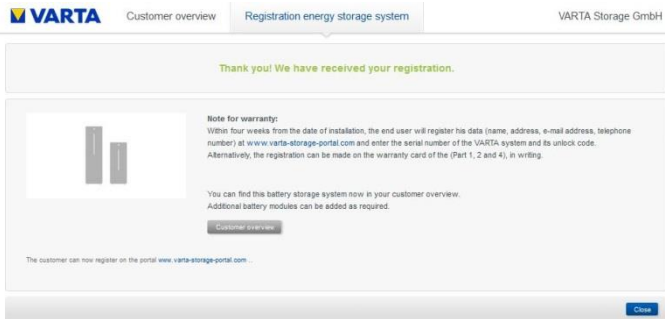
Operation

Installation

Operation (Service)

Maintenance

Confirmation of the registration



Completion of the registration with "close"

These data can be viewed in the B2B area:

Open under "warranty registration" or save as a PDF.



8.5.2 Warranty registration by the customer

Open page www.varta-storage.com

Change to "energy storage systems"

- Registration in the portal
- Under: "No access yet? Register now" with serial number and activation code.
- Enter the following details:
 - Battery storage,
 - Contact data,
 - Declaration for contacting via telephone,
 - Declaration for the use of the online services plus contacting via telephone,
 - Cancellation right information,
 - Voluntary consents of the customer.

General

Operation

Installation

Operation (Service)

Maintenance

Warranty registration of your energy storage system

Please fill out the entry form. After sending it you will receive an e-mail with your personal login data to the VARTA portal on your e-mail address.

Note: Please consider that your registration is not possible until your energy storage system has been set up and registered in the portal by an certified installer.

Data of energy storage system

Serial number *

Activation code *

Your contact data

Title	<input type="text"/>	Street / Number *	<input type="text"/>
First name *	<input type="text"/>	Postal code / place *	<input type="text"/>
Surname *	<input type="text"/>	Country *	Deutschland <input type="text"/>
Telephone	<input type="text"/>	e-mail *	<input type="text"/>
(optional information; only used if consented)		Repeat E-Mail *	<input type="text"/>

I know and accept the exact terms of the warranty. (The conditions have been supplied with the VARTA energy storage system and the battery modules or the retrofitted battery modules and can be viewed at the following internet address: www.varta-storage.com/downloads.html.)

☐ I agree that VARTA Storage will contact me in case of queries about my data on this warranty card, including the data of my VARTA system ("Registration Data") and for the purpose of implementing the guarantees, in particular the handling of warranty claims.

Free** VARTA Storage online-services

(if wanted, please tick off)

VARTA Storage GmbH operates an online portal in connection with the VARTA system for customers and offers customers technical online services. The online portal provides each customer with an overview of the essential technical data of his VARTA system and its use by the customer. Through the use of the technical online service, each customer benefits from new technical developments (for example in the form of software updates).

The use of online services is free **. It assumes that the customer is connecting its VARTA System to the internet ** and that the customer agrees to the collection, processing and use of its registration data and technical data through VARTA Storage, which is necessary for the use of Online Services (The "Service Data").

☐ I would like to use the **online services of VARTA Storage**. I hereby offer to VARTA Storage GmbH the **conclusion of the contract online services**. I understand and accept the terms of the contract. (They have been delivered with the VARTA system or the retrofitted battery modules and can be viewed at the following internet address: www.varta-storage.com/downloads.html.)

☐ I agree that VARTA Storage may, for the purpose of solving technical problems with my use of the online portal, and for the purpose of providing information about (1) any contingencies required for the provision of the Technical Online Service and / or (2) Faults, which were determined at my VARTA system, by telephone.

** Note: Internet connection costs are held by the customer.

Cancellation policy:

Right of revocation: You have the right to revoke any of your contractual declarations within a period of fourteen days without giving reasons. The revocation period shall be fourteen days from the date of conclusion of the contract. In order to exercise your right of revocation, you must inform us

VARTA Storage GmbH
Nürnberger Straße 65
86720 Nördlingen
Germany
Tel: +49 9081 / 240 86 60
Fax: +49 7961 / 921 73 7
info@varta-storage.com

of your decision to revoke this agreement by means of a clear statement (for example, a letter, fax or e-mail sent by mail). You can use the Sample Revocation Form But this is not required.

In order to keep the revocation period, it is sufficient that you send the notification of the exercise of the right of revocation before the end of the revocation period.

Consequences of revocation: Im Falle des wirksamen Widerrufs sind die empfangenen Leistungen spätestens nach vierzehn Tagen zurückzugewähren. In case of an effective revocation, the services received must be returned no later than fourteen days. In case of revocation, you owe a reasonable amount according to § 357 Paragraph 5 of the Civil Code for the service provided by VARTA Storage GmbH. If you exercise the right of revocation, upon request of VARTA Storage GmbH from this expressly the beginning of performance before expiration Of the withdrawal period.

Exceptions of right of rescission: The right of rescission expires, in the case of a contract for the delivery of digital contents not present on a physical medium, if the VARTA Storage GmbH has begun the execution of the contract after (1) explicitly agreeing that VARTA Storage GmbH has commenced the execution of the contract before expiry of the period of revocation, and (2) confirmed your knowledge that you will lose your right of revocation by your consent at the beginning of the execution of the contract.

End of cancellation policy

Further voluntary consent of the customer

(if necessary please tick off)

☐ **Data for technical progress.** I agree that my registration data and service data will be collected, processed and used by VARTA Storage and VARTA Storage affiliates within the framework of their research and development activities for the purpose of technical (further) development and other optimization of energy storage systems.

☐ **Data for advertising.** I agree that VARTA Storage processes and uses my registration data for the purpose of providing information about VARTA Storage products (by letter or email).

☐ I agree that VARTA Storage will contact me for this purpose by phone.

I can always check the content of my consent by sending an e-mail to info@varta-storage.com and requesting information about my stored data at any time. I can revoke any of my consent to VARTA Storage at any time, for example, by letter, fax or e-mail. The revocation must be sent to:

VARTA Storage GmbH
Nürnberger Straße 65
86720 Nördlingen
Germany
Fax: +49 7961 / 921 73 752
info@varta-storage.com

Click the button "Send registration now".

After completion of the entries, the details of the warranty registration are displayed.

Correct the entries or send the registration now.

Warranty registration of your energy storage system

Please fill out the entry form. After sending it you will receive an e-mail with your personal login data to the VARTA portal on your e-mail address.
Note: Please consider that your registration is not possible until your energy storage system has been set up and registered in the portal by an certified installer.

Data of energy storage system

Serial number *

Activation code *

Serial number and unlock code are valid.

Your contact data

Title	<input type="text"/>	Street / Number *	<input type="text"/>
First name *	<input type="text"/>	Postal code / place *	<input type="text"/>
Surname *	<input type="text" value="VARTA"/>	Country *	<input type="text" value="Deutschland"/>
Telephone <small>(optional information; only used if contacted)</small>	<input type="text"/>	e-mail *	<input type="text"/>
		Repeat E-Mail *	<input type="text"/>

I know and accept the award terms of the warranty. (The conditions have been supplied with the VARTA energy storage system and the battery modules or the retrofit battery modules and can be viewed at the following internet address: www.varta-storage.com/downloads.html.)

☒ I agree that VARTA Storage will contact me in case of queries about my data on this warranty card, including the data of my VARTA system ("Registration Data") and for the purpose of implementing the guarantees, in particular the handling of warranty claims.

Free** VARTA Storage online-services

(if wanted, please tick off)

VARTA Storage GmbH operates an online portal in connection with the VARTA system for customers and offers customers technical online services. The online portal provides each customer with an overview of the essential technical data of his VARTA system and its use by the customer. Through the use of the technical online service, each customer benefits from new technical developments (for example in the form of software updates).

The use of online services is free **. It assumes that the customer is connecting to VARTA System to the Internet ** and that the customer agrees to the collection, processing and use of its registration data and technical data through VARTA Storage, which is necessary for the use of Online Services (The "Service Data").

☒ I would like to use the online services of VARTA Storage. I hereby offer to VARTA Storage GmbH the conclusion of the contract online services. I understand and accept the terms of the contract. (They have been delivered with the VARTA system or the retrofit battery modules and can be viewed at the following internet address: www.varta-storage.com/downloads.html.)

☒ I agree that VARTA Storage may, for the purpose of solving technical problems with my use of the online portal, and for the purpose of providing information about (1) any contingencies required for the provision of the Technical Online Service and / or (2) faults, which were determined at my VARTA system, by telephone.

** Note: Internet connection costs are held by the customer.

Cancellation policy:

Right of revocation: You have the right to revoke any of your contractual declarations within a period of fourteen days without giving reasons. The revocation period shall be fourteen days from the date of conclusion of the contract. In order to exercise your right of revocation, you must inform us:

VARTA Storage GmbH
Humminger Straße 95
86720 Moosinning
Germany
Tel: +49 1801 1240 86 80
Fax: +49 1801 1821 73 72
info@varta-storage.com

of your decision to revoke this agreement by means of a clear statement (for example, a letter, fax or e-mail sent by mail). You can use the Sample Revocation form but this is not required.

In order to keep the revocation period, it is sufficient that you send the notification of the exercise of the right of revocation before the end of the revocation period.

Consequences of revocation: In the case of a revocation, the services received must be returned no later than fourteen days. In case of revocation, you owe a reasonable amount according to § 287 Paragraph 1 of the Civil Code for the service provided by VARTA Storage GmbH. If you exercise the right of revocation, upon request of VARTA Storage GmbH from this expressly the beginning of performance before expiration of the withdrawal period.

Exceptions of right of revocation: The right of revocation expires, in the case of a contract for the delivery of digital contents not stored on a physical medium, if the VARTA Storage GmbH has begun the execution of the contract after (1) expressly agreeing that VARTA Storage GmbH has commenced the execution of the contract before expiry of the period of revocation, and (2) confirmed your knowledge that you will lose your right of revocation by your consent at the beginning of the execution of the contract.

End of cancellation policy

Further voluntary consent of the customer

(if necessary please tick off)

☒ Data for technical progress: I agree that my registration data and service data will be collected, processed and used by VARTA Storage and VARTA Storage affiliates within the framework of their research and development activities for the purpose of technical (further) development and other optimization of energy storage systems.

☒ Data for advertising: I agree that VARTA Storage companies will use my registration data for the purpose of providing information about VARTA Storage products (by letter or e-mail).

☒ I agree that VARTA Storage will contact me for this purpose by phone.

I can always change the content of my consent by sending an email to info@varta-storage.com and requesting information about my stored data at any time. I can revoke any of my consent to VARTA Storage at any time, for example, by letter, fax or e-mail. The revocation must be sent to:

VARTA Storage GmbH
Humminger Straße 95
86720 Moosinning
Germany
Tel: +49 1801 1240 86 80
Fax: +49 1801 1821 73 72
info@varta-storage.com

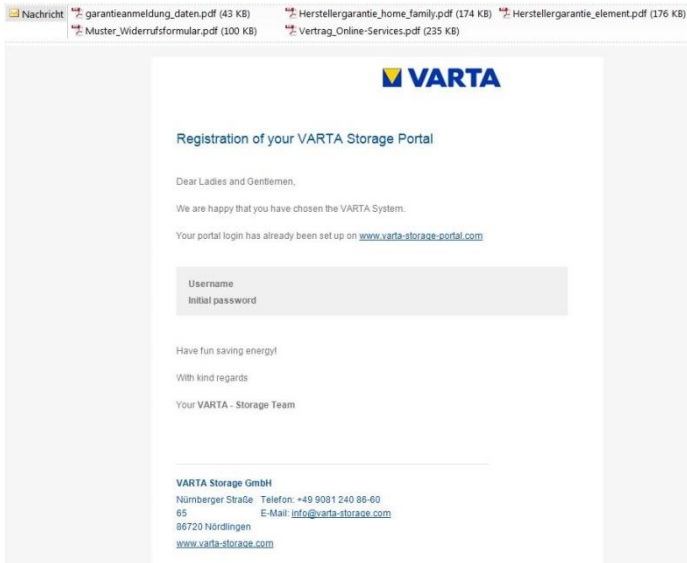
General

Operation

Installation

Operation (Service)

Maintenance



Thank you for your registration.

You will briefly receive an e-mail with your personal login data on the following address: florian.jahja@varta-storage.com.

 [Save warranty registration as PDF](#)

If you have any questions please contact our technical service.

Telephone: +49 9081 240 88 44

e-mail: technical.service@varta-storage.com

Close

After registration, the customer receives an email with the access data.

Alternatively, the customer can register with the enclosed warranty card (sheet 1, 2 and 4).

8.6 Preparation of the electrical connection



This section is intended for the qualified electrician.

Use your personal protective equipment.



This reduces the risk of injuries during the mechanical work.

Observe the safety rules!



- Disconnect.
- Lock out.
- Check for absence of voltage.
- Before connecting up the power supply, make sure that no persons are in the hazard zone.



General

Operation

Installation

Operation (Service)

Maintenance

	 WARNING
	<p>Improper installation!</p> <p>Personal injury and material damage!</p> <ul style="list-style-type: none"> ➡ The fuse for the energy storage system must meet the requirements for a disconnecting device. ➡ Fuse the device connection at the energy storage system with a 16 A fuse type B. ➡ Observe the disconnect conditions in accordance with VDE 0100-410. ➡ Never connect the energy storage system without a PE and N connection. ➡ The system is intended to have a permanent connection. Neutral and phase must not be interchanged. Otherwise, internal protection and metering devices might not function. ➡ A suitable separator must be installed between power grid and customer system (e.g. selective automatic cut-out 'SAC'), which can be used for all-poles disconnection of the customer system from the grid during maintenance work. ➡ Observe the specified conductor cross-sections.

For the position of the separators, see the connection diagrams (Figures 1a/1b and 2a/2b) in the Appendix.

8.6.1 Connections to the distributor box

The following connections must be prepared:

- Device connection:
 - Recommendation: 3 x 2.5 mm²
 - Sensor cable: RJ12 (included in delivery)
 - LAN connection

i

1. Do not allow any mechanical load on the sensor cable.
2. In order to minimise losses, the wiring section between storage and connection should not be longer than 20 m.

8.6.2 Preparation of the AC port for the building grid

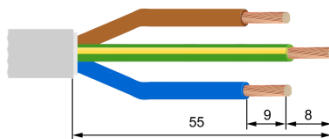


Figure 10: Stripping cables

To connect to the building grid, the 3-wire AC cable must be connected to the supplied AC connector.

- Strip the cable 55 mm at the end.
- The PE conductor must be 8 mm longer than the other four conductors. Shorten these conductors accordingly.
- Strip the insulation off the ends of the conductors in the cable for a length of approx. 9 mm.

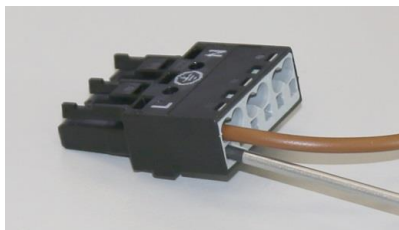


Figure 11: AC connector

- Connection of a solid-wire conductor:
Insert the stripped conductor as far as possible.
- Connection of a stranded-wire conductor:
Press the clamping springs with a screwdriver
(2.5 mm blade width)
Insert the stripped conductor as far as possible.
- To release the conductor, press the springs with a screwdriver.

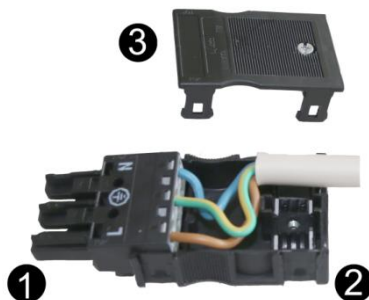



Figure 12: AC connector with strain relief


1	AC connector
2	Strain relief housing (lower part)
3	Strain relief housing (upper part)

- Form the connection cable
- Place the strain relief housing on the connection piece and insert the cable.
- Snap the upper part of the strain relief into place and draw together with the screw.

8.6.3 VARTA Split Core current sensor

If the energy storage system to be installed is to be cascaded with further energy storage systems, the following step will **not** be carried out. Instead, see instruction manual for cascading. (Optional add-on package required)

	ATTENTION
	<p>Reversed phases!</p> <p>Charging and discharging malfunction!</p> <p>➔ Conductors L1, L2, L3 for the building connection and PV current sensor must have the same phase assignment.</p> <p>➔ Make the connection for a clockwise phase sequence.</p>

	ATTENTION
	<p>Contamination of the magnetic cores!</p> <p>The current sensor will be damaged!</p> <p>➔ Do not touch the magnetic cores.</p> <p>➔ Ensure a clean working environment.</p>

In order to ensure optimisation of in-house consumption, the current sensor must capture all values of consumption and infeed. Therefore, it is located directly behind the consumption and feed meter. The VARTA Split Core Stromsensor consists of a connection box and three folding transformers. Each has a nominal current rating of 50 A (maximum current 100 A) per phase. The

connection box is designed for top hat-rail mounting. The connection for the sensor cable provided for connecting to the energy storage system is located in the connection box. For the location of the "Current measurement" socket on the energy storage system, see Figure 15: "Battery inverter sockets (bottom)".

For the VARTA Split Core current sensor to detect the reference and in-fed power correctly, it is necessary to adhere to the following:

- The phase assignment L1, L2, L3 must provide a **clockwise phase sequence**.
- The arrows on the folding transformers must point in the sub-distribution direction.



Figure 13: VARTA Split Core current sensor

1	Current sensor
2	"Current measurement" connection socket
3	folding transformer (L1, L2, L3)

To attach the folding transformer to the VARTA Split Core current sensor, guide the wire through the opening in the blue folding transformer. Open the latch on the back, place the folding

transformer around the wire and close it again. The latch must engage audibly.

PV current transformer (optional)

VARTA pulse has a provision for connection of an additional VARTA Split Core current sensor for visualization of the power from the provider.

In this case:

- The phases of the building's current sensor must match the phases of the PV current sensor.
- The arrows on the folding transformers point in the sub-distribution direction.

General

Operation

Installation

Operation (Service)

Maintenance

8.7 Preparation of assembly



This section is intended for the qualified electrician.



Read the instruction manual.



WARNING

Components are heavy!

This might lead to overburdened intervertebral discs, bruises and crushing!



Carry out the work described in this chapter with 2 persons or suitable equipment.

8.8 Installing and connecting the energy storage system



Use suitable fasteners!

- (1) Mark the positions of the upper right and left holes as shown in Figure 14 "Dimensions on mounting plate (mm)". (Position 1 in the drawing)
- (2) Remove the mounting plate with battery inverter from the worksite.

Note: No dust from drilling must be allowed to get in or on the unit.

- (3) Drill holes at both positions and screw in the screws so that there is a distance of approx. 3 mm between the wall and screw head.
- (4) Remove the carrying straps from the mounting plate.
- (5) Install the mounting plate.

Note: Make sure that the mounting plate slides down into the keyholes.

- (6) Check that the mounting plate is level.
- (7) Mark the remaining 4 holes (position 2 in the drawing).
- (8) Remove the mounting plate.
- (9) Drill the four holes.
- (10) Install the mounting plate.
- (11) Screw the mounting plate to the wall securely.

Connect the current sensor (Figure 13) to the energy storage system (Figure 15).

- (1) Insert the AC connector into the AC grid socket.
- (2) Insert the sensor cable and the network cable into the corresponding sockets

General

Operation

Installation

Operation (Service)

Maintenance

Subject to modification! Updated 12/2017

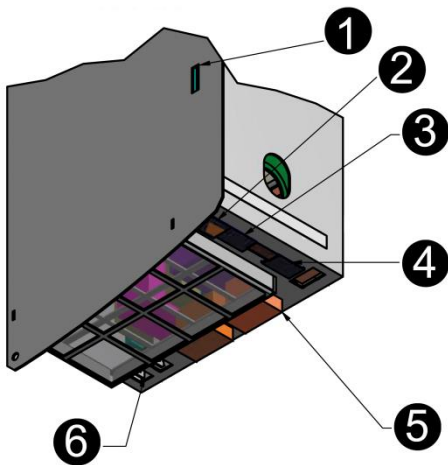


Figure 15: Battery inverter sockets (bottom)

AC connection area	
1	Micro-SD card slot
2	LAN
3	PV sensor (optional)
4	Grid sensor
5	AC grid
6	Main earth (PE) (2x)







Note that the specific country code must be set on the country selector switch. Read the accompanying bulletin.

8.9 Battery module assembly



This section is intended for the qualified electrician.

  	<div style="background-color: red; color: white; padding: 5px;">⚠ DANGER</div> <p>Contact with live parts!</p> <p>Mortal danger!</p> <ul style="list-style-type: none"> ➔ Adhere to the waiting times. ➔ Make sure that the battery module is switched off and no LED indicator is lit. ➔ The energy storage system must not be transported if a battery module has already been installed. ➔ Keep unauthorised persons away.
---	---

	<div style="background-color: yellow; padding: 5px;">⚠ WARNING</div> <p>Contact with sharp-edged parts!</p> <p>Cut injuries!</p> <ul style="list-style-type: none"> ➔ Wear your personal protective equipment.
---	---

8.9.1 Inspecting the battery module

	 WARNING
	<p>Damaged battery module!</p> <p>Personal injuries and material damage!</p> <ul style="list-style-type: none"> ➔ Unpack the battery module carefully. ➔ Check the battery module for damages and cleanness. ➔ Never install and commission a damaged or contaminated battery module. ➔ Transport the battery module carefully. ➔ Do not put any parts on the battery module. ➔ Keep unauthorised persons away.
Cleaning agents	
<p>Do not use any cleaning agents containing acid, lye or solvents.</p>	

General



Operation

Installation

Operation (Service)

Maintenance

8.9.2 Behaviour in the event of damage

	 WARNING
	<p>Improper handling in case of damaged battery module!</p> <p>Personal injuries and material damage!</p> <ul style="list-style-type: none"> ➡ Do not open the battery module. ➡ Do not attempt to repair it. ➡ Avoid contact with possibly leaking fluid. ➡ Avoid contact with possibly escaping vapours.

Damaged or contaminated battery module

Contact VARTA Storage.

First aid in case of contact with electrolyte

When inhaling: Leave the room.

- Get medical attention immediately.


In case of skin contact: Thoroughly wash the affected area with water and soap.


- Get medical attention immediately.

In case of eye contact: Rinse eyes with running water for at least 15 minutes.

- Get medical attention immediately.

8.9.3 Installing and connecting the battery module

	ATTENTION
	<p>Overly long storage of the battery module!</p> <p>Deep discharge of the battery module!</p> <p>➔ Once you started commissioning, it has to be carried out until finished.</p>

	ATTENTION
	<p>Reversed wires of error and warning messages!</p> <p>Wrong error message to the control!</p> <p>➔ Observe the given colour-coding.</p>

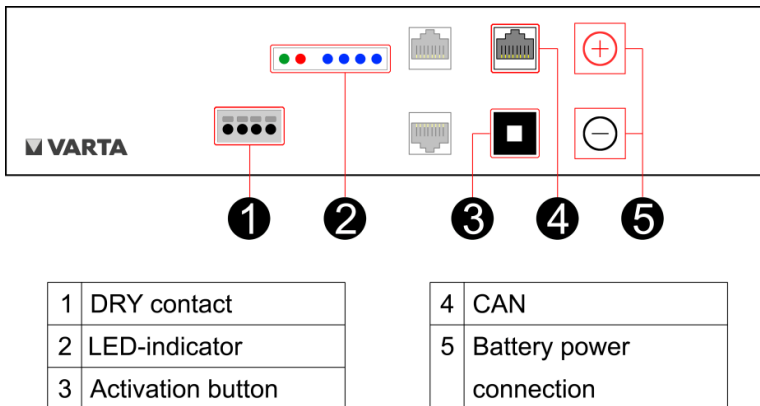


Figure 16: VARTA pulse battery module

General

Operation

Installation

Operation (Service)

Maintenance

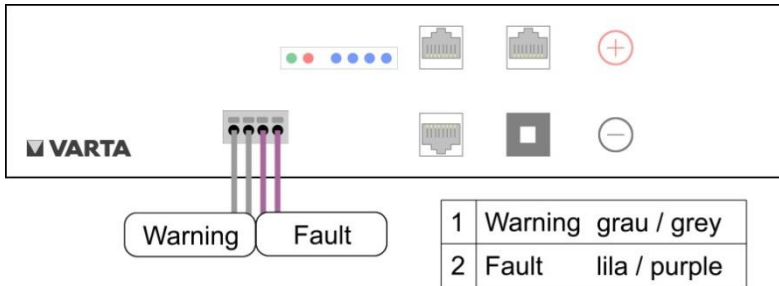



Figure 17: Battery module terminals (DRY contact)

8.9.4 Installing the battery module



WARNING

Improper handling of the battery module!

Personal injury and material damage!

- ➔ Carry out the work described in this chapter with 2 persons or suitable equipment.
- ➔ Do not lift the battery module by the handle.
- ➔ Use the handle to guide the battery module during installation.

The battery module is positioned as shown in Figure 19: "Battery module fastening screws".

Lift the battery module onto the two mounting rails on the mounting plate.

- The handle is intended only for guiding the battery module.

The oblong holes on the battery module serve to centre the battery module using the two preinstalled screws.

Push the battery module back and secure it by means of the four screws provided.

Make the connections to the battery module as shown in Figure 18: "Internal connections".

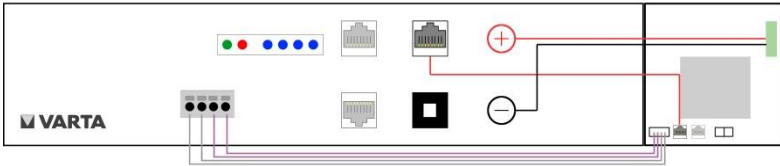


Figure 18: Internal connections

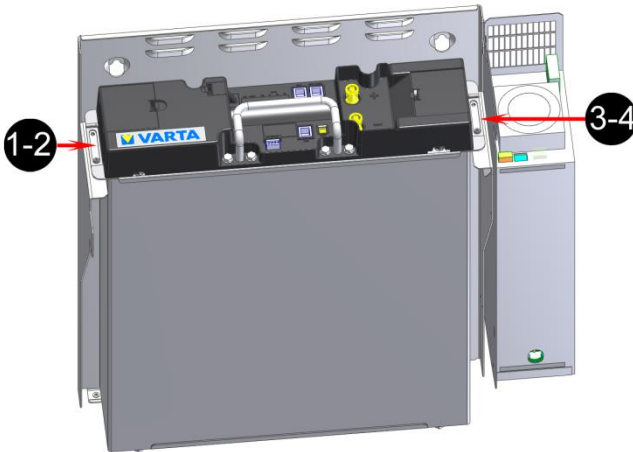


Figure 19: Battery module fastening screws

General

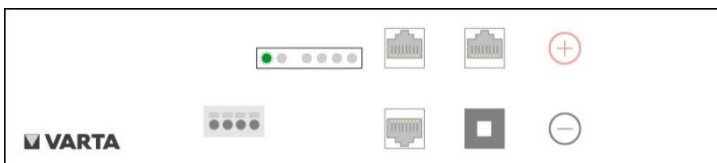
Operation

Installation




Operation (Service)

Maintenance

- **Battery power connection:**
Plug on both connectors with correct polarity.
Every connector must engage audibly.
- **Communication 1:**
Insert the four communication cables into the openings in the clamping connector.
The connections are self-clamping.
For the pin assignment, see Figure 17: "Battery module terminals (DRY contact)"
- **Communication 2:**
Plug in the communication cable (red, CAN).
- **Check readiness for operation:**
Press the activation button on the battery module.
The LED indicator on the battery module indicates that the unit is ready for operation.



8.9.5 Closing the energy storage system

	 WARNING
	<p>Damaged cables due to improper assembly!</p> <p>Electric shock!</p> <p>➔ Check all assembly steps before closing the energy storage system.</p> <p>➔ Do not use any force when closing the hood.</p>
	ATTENTION
	<p>On/Off switch could be damaged!</p> <p>System cannot be put into operation!</p> <p>➔ Do not use any force when closing the hood; the switch must fit in the opening in the battery inverter.</p>

Before you close the energy storage system, please check:

- all tools removed?
- is the interior clean?
 - no loose parts in the interior?
 - no small parts in the interior?
- all cable connections correctly established?
- all cable bushings installed correctly?
- edge protection installed at the intended locations?

Make any necessary corrections.

General

Operation

Installation

Operation (Service)

Maintenance

If everything is all right, then:

- place the hood over the mounting plate at an angle of 45°,
- lower the hood carefully until it rests against the back of the mounting plate,
- connect the earth cable between the hood and battery inverter,
- check the electrical connection between the hood and central earthing point by means of a continuity test,
- swivel the hood towards the unit while paying attention to the position of the On/Off switch
 - Make sure that no cables are pinched!
 - The spring must engage audibly!
- secure the energy storage system with the three supplied screws on the bottom.

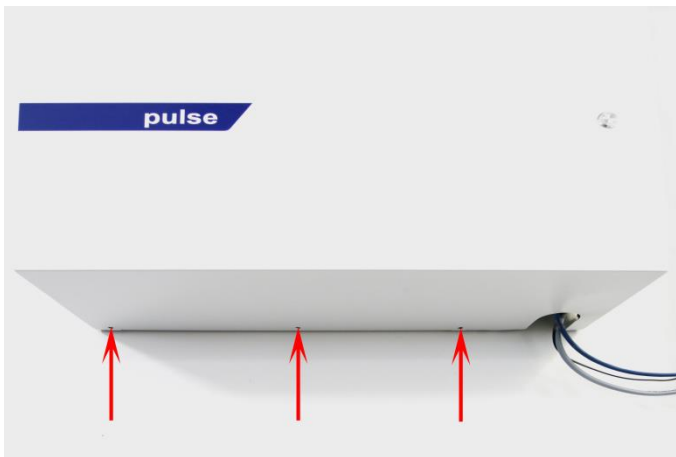


Figure 20: Hood fastening screws

8.10 Initial commissioning



This section is intended for the qualified electrician.

8.10.1 Switching on

The VARTA energy storage system is switched on as follows:

- Housing closed and secured by screws.
- Make sure that the network cable is connected.
- Connect the fuse at the building grid.
- Activate storage system using *On/Off* button. The button will be locked in the lower position.

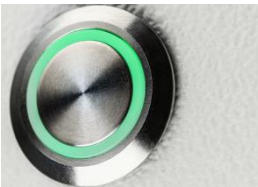


Figure 21: On/Off button

General




Operation

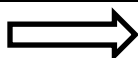
Installation

Operation (Service)


Maintenance

The initialisation process can be tracked at the LED ring of the On/Off button.

LED ring colour		LED action	Operating state
Green		Flashes every second Duration approx. 20 s	System check
Green		Steady light	Ready
Red		Steady light	Probable error: The battery modules have not yet been configured.



Continue with commissioning!

LED ring colour		Possible cause	Remedy
White		On/Off button not pressed	Press On/Off button
		Hood not positioned correctly	Open hood and then position it as instructed
		Fuse not switched on	Switch on fuse
		No AC grid connection	Check AC grid connection and establish, if necessary
		Switch defective	Check switch and replace, if necessary

8.10.2 Password entry

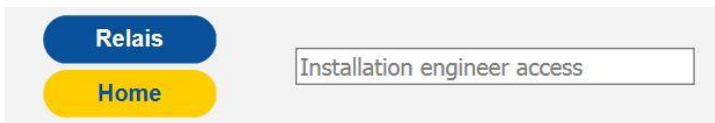
The energy storage system must be connected to the router of the home network.

- Connect your PC/Notebook to the customer's network.
- Enter the **serial number** of the energy storage system behind `http://varta` in the address line of your browser.
e. g.: `http://varta130000815`
- The serial number can be found on the rating plate on the outside of the housing.
- The welcome page of the web interface will appear.

If the storage system cannot be accessed via the customer's network, a connection can be established by means of the VARTA network configurator (NCT). Can you can download this from the B2B area at VARTA-storage.com after entering your username and personal password.

Certain parameters may be changed only by trained and qualified personnel, not by the operating company!

- Enter the password into the field for installation engineer access.



The screenshot shows a web interface with two buttons on the left: a blue 'Relais' button and a yellow 'Home' button. To the right of these buttons is a text input field with the placeholder text 'Installation engineer access'.

General

Operation

Installation

Operation (Service)

Maintenance

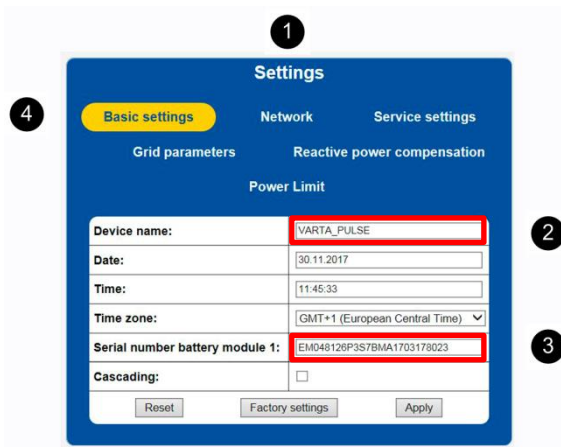
- Further tabs appear in the header.



For a simplified installation, you can use the menu *Quick Install* (see Chapter 8.11).

8.10.3 Entering the serial numbers of the battery module

- Click on the *Settings* tab (1).



The screenshot shows the 'Settings' page with the following structure:

- 1** (Annotation): Points to the 'Settings' tab in the top header.
- 4** (Annotation): Points to the 'Basic settings' tab within the Settings page.
- 2** (Annotation): Points to the 'Device name' field, which contains 'VARTA_PULSE'.
- 3** (Annotation): Points to the 'Serial number battery module 1' field, which contains 'EMD48126P3S7BMA1703178023'.

Other visible fields include 'Date' (30.11.2017), 'Time' (11:45:33), 'Time zone' (GMT+1 (European Central Time)), and 'Cascading' (unchecked). Buttons at the bottom include 'Reset', 'Factory settings', and 'Apply'.

- The Settings page opens.
- Click on the *Basic settings* tab (4).
- Enter an individual name (2) for the device. The maximum length is 20 characters.
- Enter the serial number of the installed battery module (3).
- Click on *Apply*.



The storage system cannot be commissioned unless the correct serial number of the battery module is provided.

Once the correct serial numbers have been entered, the LED ring indicator changes from red to green.

If the LED remains red or flashes red, the following remedies have to be taken

Remedy: LED ring flashes red

Error:

The current sensor check failed. Please switch the battery storage system off and back on again.

Check the connection to the current sensor. Check that the phase assignment on the current sensor is for a clockwise phase sequence.

If the LED ring continues to flash red after the restart (duration approx. 3 minutes), check the connection to the current sensor.

If the LED ring continues to flash red, please contact VARTA Storage.

General

Operation

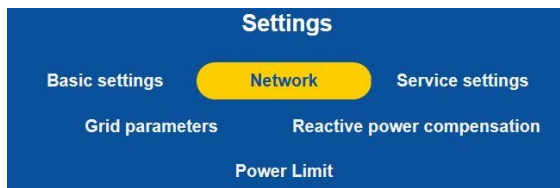
Installation

Operation (Service)

Maintenance

8.10.4 Portal connection

- Select the *Network* tab from *Settings*.



By default, the storage system uses the settings of the customer's network; for this, the selection field next to *Activate DHCP* is ticked (factory setting).

Enable DHCP:	<input checked="" type="checkbox"/>
IP address:	192.168.178.46
Network mask:	255.255.255.0
DNS address:	0.0.0.0
Gateway:	192.168.178.1
<input type="button" value="Reset"/> <input type="button" value="Factory settings"/> <input type="button" value="Apply"/>	

If the connection is not made automatically, use the parameters in the instructions for the network router. DNS and gateway address are usually identical for commercially available DSL routers. These addresses can differ for company networks. Moreover, ports 4500, 21 and 37 need to be enabled for the connection to the portal (does not apply for all users).



If IP address, DNS address and gateway are to be set up statically, knowledge of the static address assignment is required.

For this, it is required to read out the router's network configuration, for example.

The address range 172.30.xxx.xxx and 172.31.xxx.xxx must not be used as a static or dynamic IP for the storage system.

General

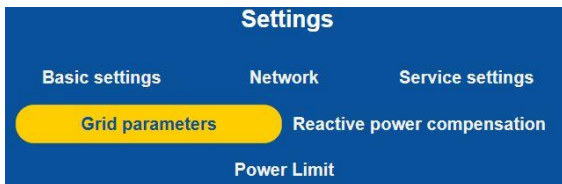
See Chapter 9.4.2.

Operation

8.10.5 Setting the grid parameters for GS protection

The grid parameters for GS protection have to be adjusted to the requirements of the country in question.

- Click on the Grid parameters tab.

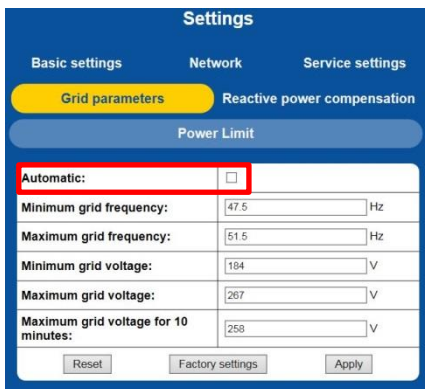


Installation

- The Grid parameters page will appear.
- Change the settings - if necessary.

Operation (Service)

Maintenance



Settings	
Basic settings Network Service settings	
Grid parameters Reactive power compensation	
Power Limit	
Automatic:	<input type="checkbox"/>
Minimum grid frequency:	47.5 Hz
Maximum grid frequency:	51.5 Hz
Minimum grid voltage:	184 V
Maximum grid voltage:	267 V
Maximum grid voltage for 10 minutes:	258 V
<input type="button" value="Reset"/> <input type="button" value="Factory settings"/> <input type="button" value="Apply"/>	

Setting: Automatic

- Check the *Automatic* option.
- Select the country for which the settings are to apply from the dropdown list.
- Click on *Apply*.

The *Automatic* setting uses the default values that are saved for the selected country (see Table 10).

For the individual grid parameter settings, see Chapter 9.4.4.

8.10.6 Reboot

A reboot is required after parameters are changed.

- To do so, turn the storage system off and then back on again at the *On/Off* button.
- Afterwards, checks on the welcome page and on the *System* page are necessary.

8.10.7 Checks on the welcome page

- Click on the *Home* button.

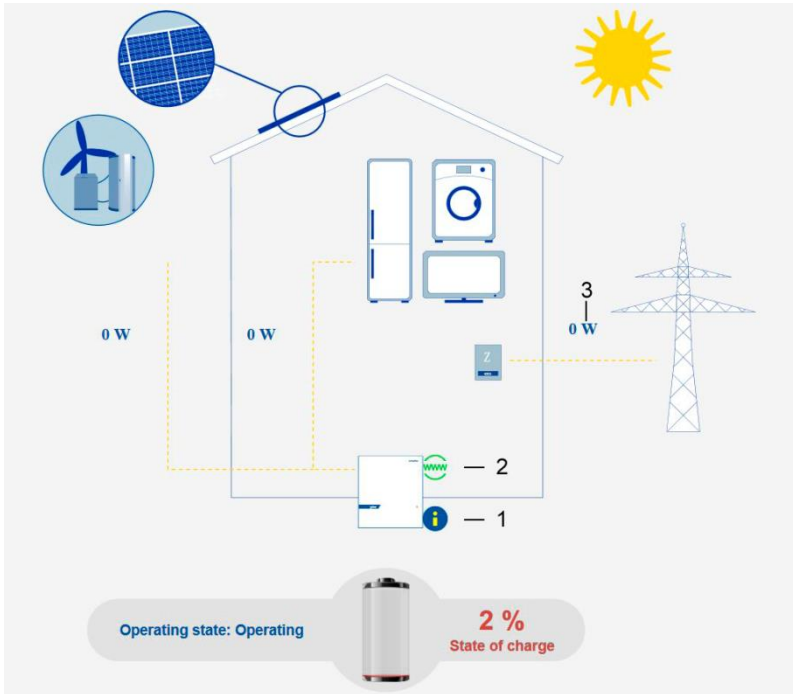


Figure 22: Checking the welcome page on the web interface

1	Check the display of the current sensor on reasonable values
2	Check the online status (green = online)
3	Click on the (i) button. There should be no errors displayed in the info window (see Figure 23). Figure 23Possibly the System page shows information for

Grid info:
 IP: 192.168.178.46
 Operating state: Standby

Grid → building: 257504 Wh
 Home → grid: 257345 Wh
 Inverter AC → DC: 214405 Wh
 Cycle counter: 24
 Time to filter change: 5224 Hours

NA error list:

 No errors

troubleshooting (see Chapter 11.2.2).

Figure 23: Info window on the web interface

8.10.8 Checks on the "System" page

- Click on the *System* tab.



Checking the connections

Once the energy storage system has been setup and connected, it is necessary to check whether the system signals a current flow at all three phases (realistic currents).

Overview battery inverter			
	L1	L2	L3
I Verbund	-0.22 A	0.04 A	0.01 A
I PV	-0.10 A	0.16 A	0.22 A
U WR	0 V		

- An error has occurred if the value for the current (I grid) hovers between +0.01 and -0.01 on one of the connected phases. Check the cable connection to the current sensor.
- If realistic values are not displayed, check whether the connection corresponds to a clockwise phase sequence.

Note: The system may need to have a large load at all three phases.

Checking the battery modules

- Check whether the *Battery module serial number* of the installed battery module is displayed.



8.10.9 Exiting the password-protected area

Finally, it is necessary to ensure that the customer is unable to access the password-protected area.

- Click on the *Logout* tab.

8.11 Quick Install

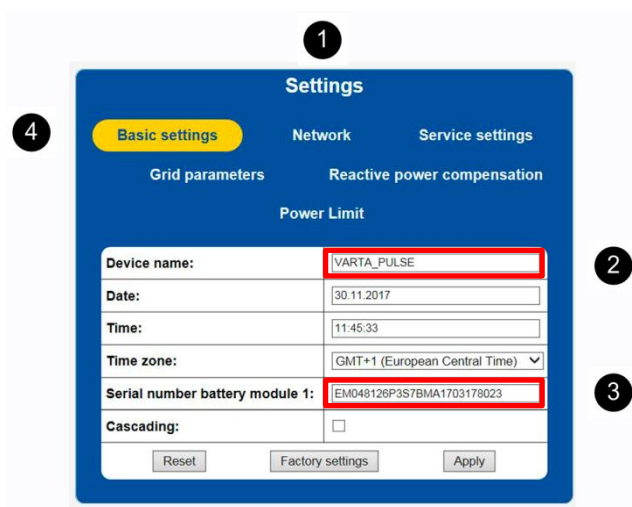
- Click on the *Quick Install* tab.



Follow the wizard step by step.

Basic settings menu:

- Enter the device name (2).
- Enter the serial number of the battery module (3).
- Click *Next*.



Settings

1

4

Basic settings Network Service settings

Grid parameters Reactive power compensation

Power Limit

Device name:	IVARTA_PULSE	2
Date:	30.11.2017	
Time:	11:45:33	
Time zone:	GMT+1 (European Central Time)	
Serial number battery module 1:	EM048126P3S7BMA1703178023	3
Cascading:	<input type="checkbox"/>	

Reset Factory settings Apply

Network settings menu

The network settings will be applied unchanged.

- Click *Next*.

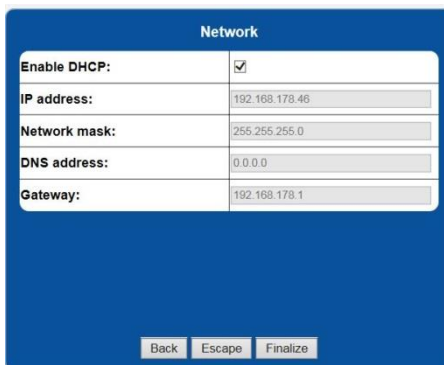


Basic settings	
Device name:	VARTA_PULSE
Date:	30.11.2017
Time:	11:59:16
Time zone:	GMT+1 (European Central Time) ▼
Serial number battery module 1:	EM048126P3S7BMA1703178023

Back Escape Continue

Grid parameters menu

The grid parameters will be set to "Automatic". Select the appropriate country. For further information, see Chapter 9.4.4.



Network	
Enable DHCP:	<input checked="" type="checkbox"/>
IP address:	192.168.178.46
Network mask:	255.255.255.0
DNS address:	0.0.0.0
Gateway:	192.168.178.1

Back Escape Finalize

Complete the Quick Install with *Finish* and switch the storage system off and then back on again at the On/Off button.

Operation in the password-protected area



This section is intended for the qualified electrician.

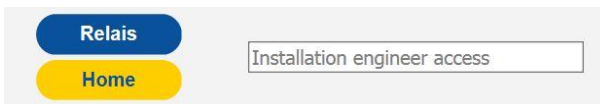
9. The password-protected area

9.1 Access to the web interface - password entry

The procedure for accessing the web interface is described in the Operation section. See Chapter 4.3.1.

Certain parameters may be changed only by trained and qualified personnel, not by the operating company!

- Enter the password into the field for installation engineer access.



- Further tabs appear in the header.
- Click on a tab.



9.2 System

This page provides an up-to-date overview of the serial number, the status of the battery module and battery inverter data.

System and grid errors are displayed in the fields "Error list" and "GS error list".

The serial number of the installed battery module is displayed under the heading *Battery module serial numbers*.

9.3 Version

The versions of the system components can be viewed on this page.

<div> <div>Relais</div> <div>Version</div> <div>Quick Install</div> </div> <div> <div>Home</div> <div>System</div> <div>Settings</div> </div>						
Overview of the versions						
No.	Serial	Mac	SW ID	HW ID	SW Version	BL Version
WR	K593166	534A5D	11	FF	C11000124	1.3.0.3
EMS	00295F	-	15	FF	C21000132	-
DCEN	zFFFFFFF	4DFBFF	A0	FF	C31000303	3.0.4
EM	M378336	0CC200	-	7	C41000115	x.1.0.2

General

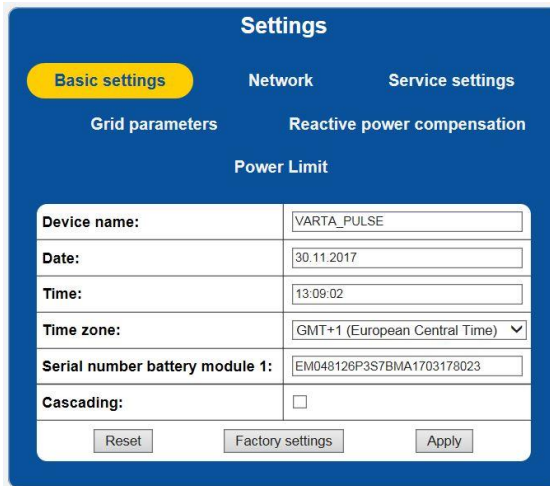
Operation

Installation

Operation (Service)

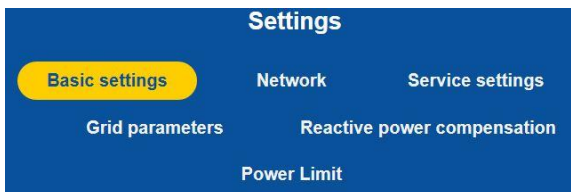
Maintenance

9.4 Settings



The *Settings* page gives you access to other input screens.

- Click on a tab.



- Enter the parameters or check the corresponding selection box.
- Confirm your entries by clicking on the *Apply* button.
- Alternatively, you can restore the *Factory settings* or return to the previous operating state via *Return*.

9.4.1 Basic settings

Settings

Basic settings
Network
Service settings

Grid parameters
Reactive power compensation

Power Limit

Device name:	<input type="text" value="VARTA_PULSE"/>
Date:	<input type="text" value="30.11.2017"/>
Time:	<input type="text" value="13:09:02"/>
Time zone:	<input type="text" value="GMT+1 (European Central Time)"/> ▼
Serial number battery module 1:	<input type="text" value="EM048126P3S7BMA1703178023"/>
Cascading:	<input type="checkbox"/>

Reset
Factory settings
Apply

Basic settings can be changed on this page:

- **Device name:** Input during initial commissioning. The maximum length is 20 characters.
- **Date and time** can be entered here. As a rule, these parameters are automatically synchronised via the time server.
- **Time zone:** For Germany:
GMT+1 (Greenwich Mean Time + 1 h).
- **Battery module serial number:** Enter the serial number (SN) of the battery module here.

General

Operation

Installation

Operation (Service)

Maintenance

9.4.2 Network

Enable DHCP:	<input checked="" type="checkbox"/>
IP address:	192.168.178.46
Network mask:	255.255.255.0
DNS address:	0.0.0.0
Gateway:	192.168.178.1
<div>Reset Factory settings Apply</div>	

By default, the storage device uses the customer's network settings. For this, the selection field next to *Activate DHCP* is checked.

- **DHCP:** This option is used to activate the automatic referencing of the customer's network parameters.
- **IP address:** Is read out automatically.
- **Network mask:** Must be entered manually if DHCP is not activated.
- **DNS address:** Is read out automatically.
- **Gateway:** Is read out automatically.



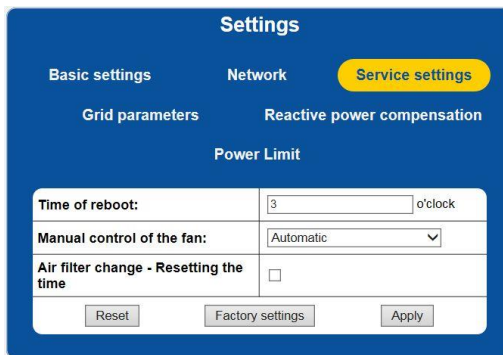
If IP address, DNS address and gateway are to be set up statically, knowledge of the static address assignment is required. For this, it is required to read out the router's network configuration, for example.

The IP ranges 172.30.xxx.xxx to 172.31.xxx.xxx must not be used.

9.4.3 Service settings

The following parameters can be set on this page:

- **Reboot time:** By default, the system reboots at between 3 and 4 o'clock. Any hour between 0 a.m. and 12 p.m. can be entered for the reboot time.
- **Manual fan actuation:** Select between Automatic (= 0), middle level (= 1) and highest level (= 2).



Settings	
Basic settings	Network
Service settings	
Grid parameters	Reactive power compensation
Power Limit	
Time of reboot:	3 o'clock
Manual control of the fan:	Automatic
Air filter change - Resetting the time	<input type="checkbox"/>
<input type="button" value="Reset"/> <input type="button" value="Factory settings"/> <input type="button" value="Apply"/>	

- **Resetting time of air filter change:** The time until the next air filter change can be reset. To do so, check the selection field. It is assumed that the air filter is really replaced or cleaned.

General

Operation

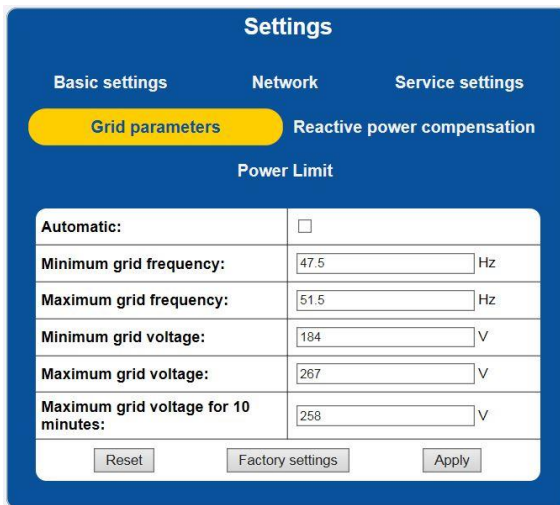
Installation

Operation (Service)

Maintenance

9.4.4 Grid parameters for GS protection

The grid parameters for GS protection for switching off have to be adjusted to the requirements of the respective country. This requires that the country selection switch be set to the correct position prior to commissioning. Read the accompanying bulletin.



The screenshot shows the 'Settings' menu with three tabs: 'Basic settings', 'Network', and 'Service settings'. The 'Basic settings' tab is active, and within it, the 'Grid parameters' sub-tab is selected. Below this, there is a 'Reactive power compensation' section and a 'Power Limit' section. The 'Power Limit' section contains a table with the following parameters and values:

Automatic:	<input type="checkbox"/>
Minimum grid frequency:	47.5 Hz
Maximum grid frequency:	51.5 Hz
Minimum grid voltage:	184 V
Maximum grid voltage:	267 V
Maximum grid voltage for 10 minutes:	258 V

At the bottom of the 'Power Limit' section, there are three buttons: 'Reset', 'Factory settings', and 'Apply'.

- Automatic:** If the selection box is checked, the saved settings will be used for GS protection. In the drop-down list, select the country to which the country selection switch is set. If the country displayed here does not match the switch setting, check the setting of the switch.
- Minimum and maximum values:** These values can be set in addition to the default values.

Standard values for some countries are stored in the device. These may be applied in the device (depends on the setting of the country selection switch). Some of the standard values are shown in Table 10.

	Grid parameters				
Country	FGRID_MIN (in Hz)	FGRID_MAX (in Hz)	UGRID_MIN (in V)	UGRID_Max (in V)	UGRID_MAX10 (in V)
Germany	47.50	51.50	184	264	253
Austria	47.50	51.50	184	264	258
France	47.50	51.50	184	264	253
Italy	47.50	51.50	184	264	253
Netherlands	47.50	51.50	184	264	253

Table 10: Grid parameter default settings

Note: If the *Automatic* option is **not** selected, the following parameters can also be set to suit the individual requirements of the grid operator:

- Minimum grid frequency (FGRID_MIN)
- Maximum grid frequency (FGRID_MAX)
- Minimum grid voltage (UGRID_MIN)
- Minimum grid voltage (UGRID_MAX)
- Minimum grid voltage for 10 minutes (UGRID_MAX10)

General

Operation

Installation

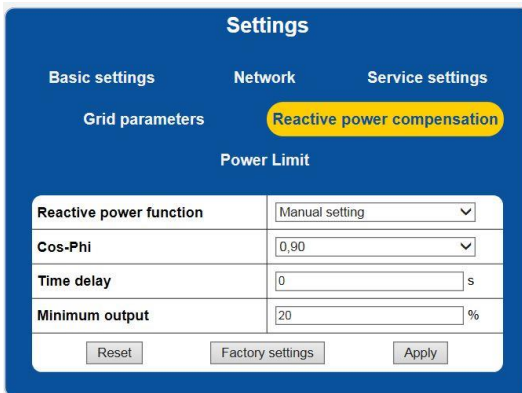
Operation (Service)

Maintenance

9.4.5 Reactive power compensation

Some of the following setting options depend on the position of the rotary selector switch.

The power factor $\cos \varphi$ for compensation of the reactive power is set to 1.00 at the factory. This value may have to be adjusted as specified by the relevant grid operator.



The screenshot shows a settings menu with a blue background. At the top, there are three tabs: 'Basic settings', 'Network', and 'Service settings'. Under 'Basic settings', there are two sub-tabs: 'Grid parameters' and 'Reactive power compensation' (which is highlighted in yellow). Below these tabs, the section is titled 'Power Limit'. It contains a table with four rows: 'Reactive power function' (set to 'Manual setting'), 'Cos-Phi' (set to '0.90'), 'Time delay' (set to '0' with a unit 's'), and 'Minimum output' (set to '20' with a unit '%'). At the bottom of the table, there are three buttons: 'Reset', 'Factory settings', and 'Apply'.

Settings	
Basic settings Network Service settings	
Grid parameters Reactive power compensation	
Power Limit	
Reactive power function	Manual setting ▼
Cos-Phi	0.90 ▼
Time delay	0 s
Minimum output	20 %
<input type="button" value="Reset"/> <input type="button" value="Factory settings"/> <input type="button" value="Apply"/>	

In the drop-down list *reactive power function*, *manual input*, input according to *Q(P) characteristic* and input according to *Q(U) characteristic* are available for adjusting the $\cos \varphi$.

Manual input

- **Reactive power function:** Select *manual input* from the drop-down list.

You can set the target value for $\cos(\phi)$ between 0.9 under-excited and 0.9 over-excited. To do so, select the desired value from the drop-down list.

- **Time delay:** Enter the time in s, after which the reactive power is to be adjusted.
- **Minimum power:** Enter the minimum power in %, up to which the reactive current is not controlled.

Setting as per Q(P) characteristic

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

Reactive power function	Q(P) characteristic
QPX1 QPX2 QPY1 QPY2:	46 92 0 100
Time delay	4 s
Minimum output	20 %
<input type="button" value="Reset"/> <input type="button" value="Factory settings"/> <input type="button" value="Apply"/>	

- **QPX1 QPX2:** Enter the settings for QPX1 and QPX2 by using the numerical input fields. You can find the settings in Figure 24.
- **QPY1 QPY2:** Enter the settings for QPY1 and QPY2 by using the numerical input fields. You can find the settings in Table 11.

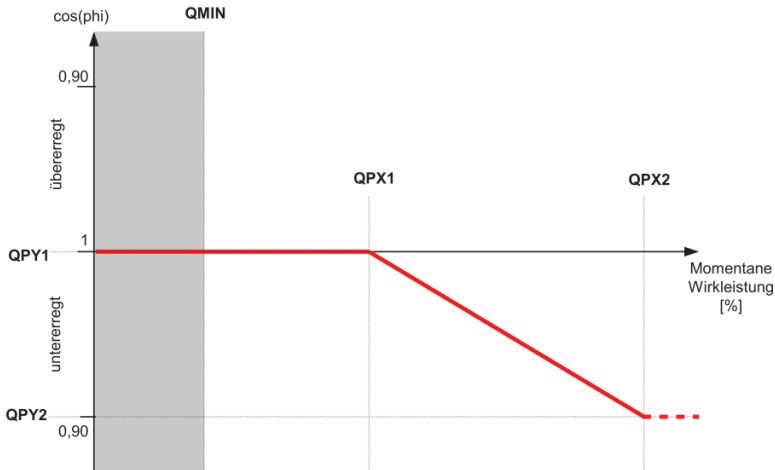


Figure 24: Q(P) characteristic

Parameter	Meaning
QPX1	Starting point of the Q(P) characteristic on the power axis. The parameter is entered in %. Example: QXP1 = 50 → The characteristic begins at 50% of the rated maximum power.
QPY1	Power factor at the start of the Q(P) characteristic. The setting can be found in Table 10. Normally, the power factor at the beginning of the characteristic is 1. According to the table, the value of 0 has to be set for QPY1.
QPX2	End point of the Q(P) characteristic on the power axis. The parameter is entered in %. Example: QPX2 = 90 → The characteristic ends at 90% of the rated maximum power.
QPY2	Power factor at the end of the Q(P) characteristic. The setting can be found in Table 10. Normally, the power factor at the end of the characteristic is 0.95 under-excited. According to the table, the value of -50 has to be set for QPY2.

Table 11: Setting as per Q(P) characteristic

- **Time delay:** Enter the time in s, after which the reactive power is to be adjusted.
- **Minimum power:** Enter the minimum power in %, up to which the reactive current is not controlled.

Setting as per Q(U) characteristic

- **Reactive power function:** Select *Q(U) characteristic* from the drop-down list.

Reactive power function	Q(U) characteristic ▼			
QUX1 QUX2 QUX3 QUX4:	207	225	235	253
QUY1 QUY2 QUY3 QUY4:	-50	0	0	50
Time delay	0			s
Minimum output	20			%
<div>Reset</div> <div>Factory settings</div> <div>Apply</div>				

- **QUX1 to QUX4:** Enter the settings for QUX1 to QUX4 by using the numerical input fields. Find the setting value in Table 12.
- **QUY1 to QUY4:** Enter the settings for QUY1 to QUY4 by using the numerical input fields. You can find the settings in Table 12.

General

Operation

Installation

Operation (Service)

Maintenance

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 → the value of QUX1 is 190.
QUY1	Power factor at the start of the Q(U) characteristic. If the grid voltage falls below the value defined by QUX1, the characteristic is limited to the value set in QUY1. The setting is to be found in Table 10.
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 → the value of QUX2 is 220.
QUY2	Power factor at the end of the first section of the Q(U) characteristic. If the grid voltage increases beyond the value defined by QUX2, the characteristic is limited to the value set in QUY2. The setting is to be found in Table 10. Normally the parameter is set to 0, i.e. no reactive power is produced.
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 → the value of QUX3 is 235.
QUY3	Power factor at the start of the Q(U) characteristic. If the grid voltage falls below the value defined by QUX3, the characteristic is limited to the value set in QUY3. The setting is to be found in Table 10. Normally, the parameter is set to 0, i.e. no reactive power is produced.
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 → the value of QUX4 is 240.
QUY4	Power factor at the end of the first section of the Q(U) characteristic. If the grid voltage increases beyond the value defined by QUX4, the characteristic is limited to the value set in QUY4. The setting is to be found in Table 10.

Table 12: Setting as per Q(U) characteristic

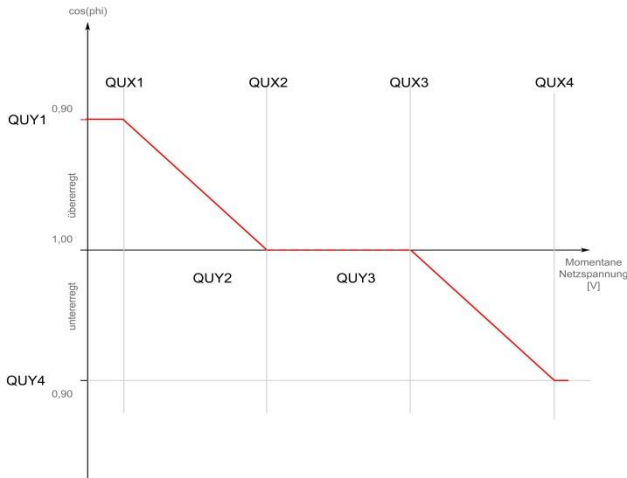


Figure 25: Q(U) characteristic



When setting the parameters, the following condition must be adhered to:

$$QUX1 \leq QUX2 < QUX3 \leq QUX4$$

- **Time delay:** Enter the time in s, after which the reactive power is to be adjusted.
- **Minimum power:** Enter the minimum power in %, up to which the reactive current is not controlled.

General

Operation

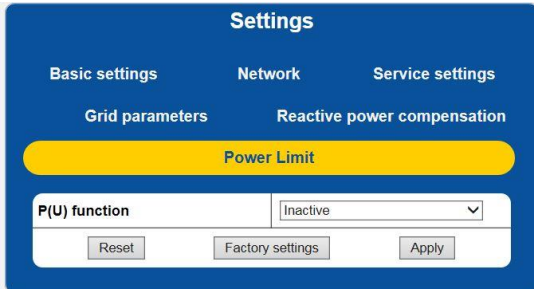
Installation

Operation (Service)

Maintenance

9.5 Power limitation

If you need the power limitation P(U) (TOR D4), you can select either characteristic A or B via the drop down list.



The screenshot shows a web interface titled "Settings" with a blue header. Below the header are four tabs: "Basic settings", "Network", "Service settings", and "Reactive power compensation". The "Power Limit" section is highlighted in yellow. Under this section, there is a "P(U) function" label, a dropdown menu currently set to "Inactive", and three buttons: "Reset", "Factory settings", and "Apply".

9.6 Logging out

Finally, it is necessary to ensure that the customer is unable to access the password-protected area.

- Click on the *Logout* tab.






Maintenance

10. Maintenance basics



This section is intended for the qualified electrician.

10.1 Safety instructions

 	<div style="background-color: red; color: white; padding: 5px;">⚠ DANGER</div> <p>Contact with live parts!</p> <p>Mortal danger!</p> <ul style="list-style-type: none"> ➡ Adhere to the waiting times. ➡ Make sure that the battery modules are switched off and no LED indicator is lit. ➡ The energy storage system must not be transported if a battery module has already been installed.
Observe the safety rules!	
<div style="display: flex; justify-content: space-around; align-items: center;">    </div>	
<ul style="list-style-type: none"> Disconnect. Lock out. Check for absence of voltage. Before connecting up the power supply, make sure that no persons are in the hazard zone. 	




General



Operation




Installation

Operation (Service)

Maintenance

 	 WARNING
	<p>Improper execution of maintenance and cleaning work!</p> <p>Possible mortal danger!</p> <ul style="list-style-type: none"> ➔ Only original parts are to be used for maintenance work. ➔ When all work is complete, cleanly remake and check the contacts and connections and screw in place. ➔ All work on the VARTA pulse system must be documented by the qualified electrician in the service book.

	 WARNING
	<p>Contact with sharp-edged parts!</p> <p>Cut injuries!</p> <ul style="list-style-type: none"> ➔ Wear your personal protective equipment.

 	<div style="background-color: yellow; padding: 5px;"> WARNING</div> <p>Components are heavy!</p> <p>This might lead to overburdened intervertebral discs, bruises and crushing!</p> <p>➔ Carry out the work described in this chapter with 2 persons or suitable equipment.</p>
--	--

10.2 Scope of maintenance work

Maintenance of the VARTA pulse energy storage system includes:

- Service (= inspection and maintenance)
- Repair and technical improvements and any additions

For documentation on the maintenance procedure, see Chapter 5.

General

Operation

Installation

Operation (Service)

Maintenance

11. Service and repair work



This section is intended for the qualified electrician.

11.1 Inspecting the energy storage system from outside

- Is the inlet opening for ventilation on the battery inverter blocked/clogged (see Chapter 11.4.7)?
- Is the room temperature between 5 °C and 30 °C assured throughout the year (+18 °C is the ideal temperature)?
→ Clarify with the customer as to how the temperature in the installation room can be maintained. If necessary, an active fan has to be installed.
→ Clarify with the customer whether any additional heat sources have been installed in the installation room since installation of the storage system or last maintenance.
- Is the wall-mounting stable?
→ Tighten or replace the screws as necessary.

11.2 Checking the system parameters (Service)

The system parameters are checked via the web interface. To do so, please observe Chapter 9 and the service booklet.

11.2.1 Checking the online status

On the web interface welcome page, the WWW icon indicates whether the energy storage system is connected to the VARTA server (green = online, red = offline).

11.2.2 Error lists

Reading out error lists

Select the *System* button from the header.

The error lists for the storage system and the grid and system (GS) protection will be displayed.



Error rectification

- Identify the errors using the error descriptions.
- Check above all whether there are any temperature errors in the error list (error text with leading T...). This provides an indication of the maintenance that needs to be carried out (fan and ventilation openings) as well as improper ambient conditions.
- Notes on troubleshooting can also be found in the overviews *Battery module* and *Battery inverter*. Over there, check the categories status, faults, as well as control WR, control EMS and control ENS.
- Check the GS settings, if necessary (see Chapter 9.4.4) and eliminate the error.
- Then restart the energy storage system. Turn the storage system off and then back on again at the *On/Off* button after waiting approx. 30 seconds.
- If the errors cannot be rectified, notify VARTA Service.

In case of storage systems operated offline, click on the *Report* button and send the report to VARTA Service.



General

Operation

Installation

Operation (Service)

Maintenance

11.2.3 Checking the software version

- Select the *Version* tab from the header.
- The software versions can be read.

<div> <div>Relais</div> <div>Version</div> <div>Quick Install</div> </div> <div> <div>Home</div> <div>System</div> <div>Settings</div> </div>						
Overview of the versions						
No.	Serial	Mac	SW ID	HW ID	SW Version	BL Version
WR	K593166	534A5D	11	FF	C11000124	1.3.0.3
EMS	00295F	-	15	FF	C21000132	-
DCEN	zFFFFFFF	4DFBFF	A0	FF	C31000303	3.0.4
EM	M378336	0CC200	-	7	C41000115	x.1.0.2

11.2.4 Software update

A software update is required if the energy storage system is operated offline or if an "Online Service by VARTA Storage" agreement has been concluded.

The software update can be carried out by using the VARTA network configurator (NCT). This is available for download in the B2B area of the page <https://www.varta-storage.com> after entering the username and the personal password.



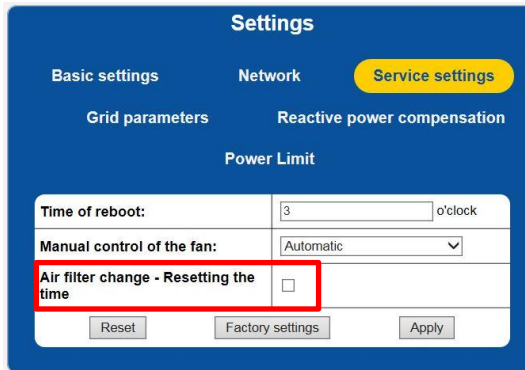
Before you carry out a software update, please check whether any errors are displayed on the web interface. If yes, rectify them first and restart. After this, the system is ready for a software update

11.2.5 Air filter change: Resetting the time

The air filter must be replaced at every second service. See Chapter 11.4.7

- From the *Settings* tab, select the *Service settings* item.
- Check the *Reset air filter* box.
- Click on *Apply*.

11.2.6 Checking the fan



The screenshot shows the 'Settings' application with the 'Service settings' tab selected. Under the 'Power Limit' section, the 'Air filter change - Resetting the time' checkbox is checked and highlighted with a red rectangular box. Other visible settings include 'Time of reboot' set to 3 o'clock and 'Manual control of the fan' set to Automatic.

- From the *Settings* tab, select the *Service settings* item.
- Use *Manual fan control* to toggle between settings 0 (= automatic), 1 (= medium setting) and 2 (= highest setting).
- Check whether the fan is blowing out air at the top right and on the side.
Wait for 10 to 15 s until the fan has reached a constant speed.

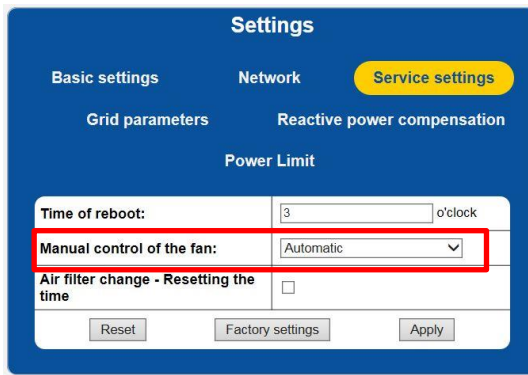
General

Operation

Installation

Operation (Service)

Maintenance



Note: It is possible that the fans are already running.

- Pay attention to noises that indicate mechanical damage.
- Reset to the *Automatic* (0) setting.

11.3 Checking the system parameters

The system parameters are checked via the web interface. To do so, please observe Chapter 9.

11.3.1 Checking the current sensor values

- Select the *System* page.

Overview battery inverter			
	L1	L2	L3
I Verbund	-0.17 A	0.03 A	0.00 A
I PV	-0.12 A	0.16 A	0.21 A
U WR	0 V		

- Check whether the current sensor values (I grid L1, I grid L2 and I grid L3) are realistic:

If a current sensor value is approx. 0, although the phase is currently loaded, the connection between current sensor and energy storage system might be faulty.

If necessary, load all phases separately: Switch on consumers deliberately.

- If necessary, check the current through all three phases with the clamp-on ammeter!

Measures in case of suspicious current sensor values:

- Check whether the connection corresponds to a clockwise phase sequence.
- If the current sensor value of one or several phases is 0 in spite of a load, check the connection between energy storage system and current sensor.
- If necessary, replace the connecting cable (RJ12 cable).

11.3.2 Checking the battery inverter

On the *System* page, check the operating state of the battery inverter for plausibility.

General

Operation

Installation

Operation (Service)

Maintenance

Overview battery inverter

	L1	L2	L3
I Verbund	-0.16 A	0.04 A	0.00 A
I PV	-0.12 A	0.16 A	0.21 A
U WR	0 V		
P Netz	-28 W		
P WR	0 W		
PSoll EMS	0 W		
FNetz	0.00 Hz		
SoC	0 %		
TempHB	19 °C		
TempEMS	19 °C		
Lüfter	0 %		
Steu. WR	Init (0)		
Steu. EMS	DeepSleep (112)		
Steu. ENS	Init (0)		
EMS-Modus	Normal (1)		
U N -> PE	0.0 V		
RCMU	0.0 mA		
UZwk	0 V		

11.3.3 Checking the battery module

The warnings and errors regarding the battery module are displayed on the *System* page. Indicated errors are explained in the error list (see Chapter 11.2.2).






Overview battery modules

SerNr	UBatt	IBatt	Plst	PSoll	SoC	UZwk	UVcc	THT	TTR	TBoard	Status
zFFFFFF	48.39 V	0.00 A	0 W	0 W	0 %	0 V	0.0 V	0 °C	0 °C	0 °C	Off

11.4 Service and maintenance: Housing interior



This section is intended for the qualified electrician.

 	<div style="background-color: red; color: white; padding: 5px;">⚠ DANGER</div> <p>Contact with live parts!</p> <p>Mortal danger!</p> <ul style="list-style-type: none"> ➡ Switch the energy storage system off. ➡ Adhere to the waiting times. ➡ Make sure that the battery modules are switched off and no LED indicator is lit. ➡ The energy storage system must not be transported if a battery module has already been installed.
Observe the safety rules!	
<div style="display: flex; justify-content: space-around; align-items: center;">    </div>	
<ul style="list-style-type: none"> Disconnect. Lock out. Check for absence of voltage. Before connecting up the power supply, make sure that no persons are in the hazard zone. 	

General

Operation

Installation

Operation (Service)

Maintenance



WARNING

Components are heavy!

This might lead to overburdened intervertebral discs, bruises and crushing!



Carry out the work described in this chapter with 2 persons or suitable equipment.

11.4.1 Opening the energy storage system

Make sure that the *On/Off* button on the front of the housing is set to "Off" (= not depressed).

- Remove the screws from the bottom of the hood to open the energy storage system.

Aid: Torx 20 screwdriver

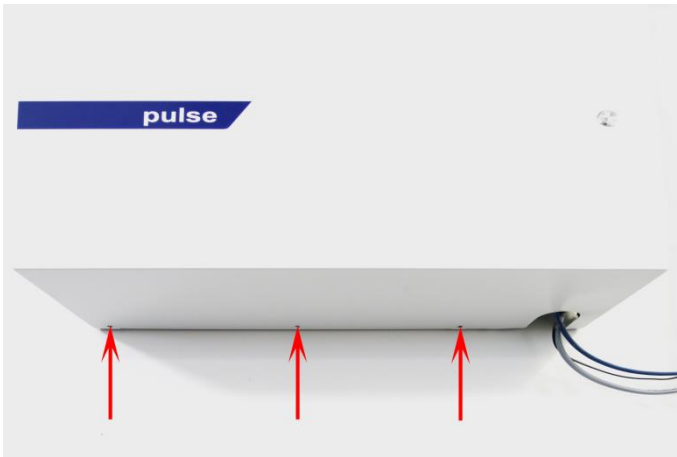


Figure 26: Opening the energy storage system

- Pull the bottom of the hood away from the wall (approx. 30 cm).



Figure 27: Latch on the earthing connector

General

Operation

Installation

Operation (Service)

Maintenance

- Disconnect the earthing connection between the hood and battery inverter. This requires opening the latch.
- Lift off the hood (up).

11.4.2 Removing the battery inverter

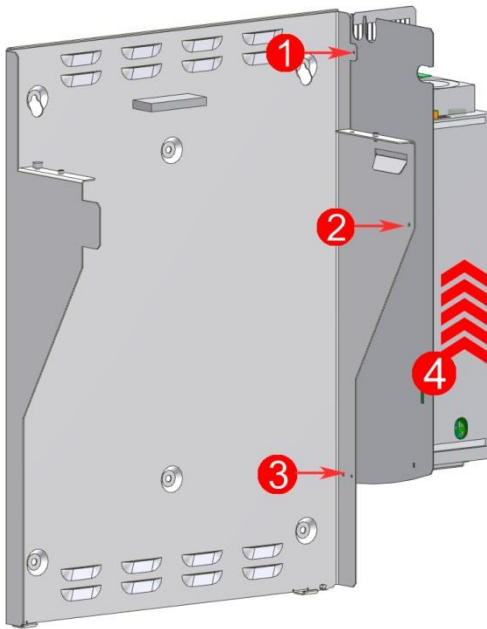


Figure 28: Loosening the screws on the battery inverter

- Disconnect the electrical connections
- Make sure no LEDs are lit on the battery module.
- Loosen the screws 1-3
- Lift the battery inverter up and out of the holder as shown (4).



Make sure that no small parts drop into the battery inverter.

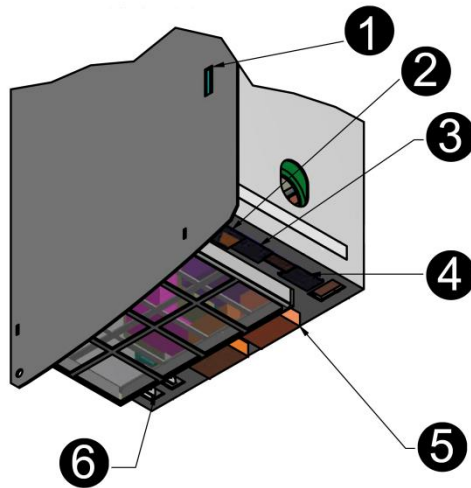


Figure 29: Battery inverter sockets (bottom)

AC connection area	
1	Micro-SD card slot
2	LAN
3	PV sensor (optional)
4	Grid sensor
5	AC grid
6	Main earth (PE) (2x)

General

Operation

Installation

Operation (Service)

Maintenance

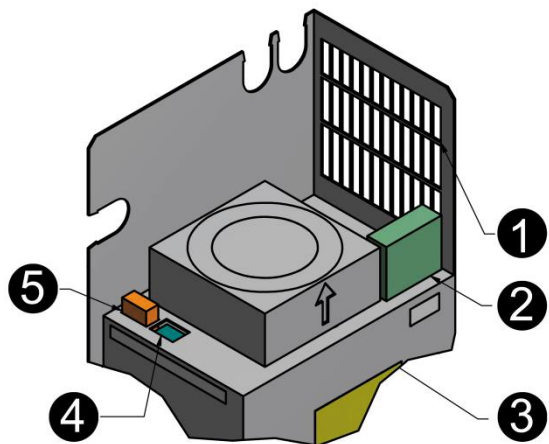





Figure 30: Connections on the battery inverter (top)

DC connection area	
1	Air outlet
2	Batt (battery module)
3	Fan
4	CAN
5	DRY

11.4.3 Installing the battery inverter

To reinstall, perform the working steps in reverse order. The battery inverter stops at the end position.

11.4.4 Removing and installing the battery module

 	 WARNING
	<p>Improper handling of the battery module!</p> <p>Personal injuries and material damage!</p> <ul style="list-style-type: none"> ➔ Do not damage the battery module during removal and installation. ➔ Do not attempt to repair it. ➔ Battery modules are maintenance-free and must not be opened under any circumstances.



Make sure that the battery modules are switched off and no LED indicator is lit.

General




Operation



Installation

Operation (Service)

Maintenance

11.4.5 Removing the battery module

 	 WARNING
	<p>Improper handling of the battery module!</p> <p>Personal injury and material damage!</p> <ul style="list-style-type: none">➔ Carry out the work described in this chapter with 2 persons or suitable equipment.➔ Do not lift the battery module by the handle.➔ Use the handle to guide the battery module during installation.

 	ATTENTION
	<p>Improper disconnection of the cables!</p> <p>Damage to the connectors!</p> <ul style="list-style-type: none">➔ Press the latch on the connector; then carefully pull the connector upwards.



Make sure that the battery module is switched off and no LED indicator is lit.

If the battery module has not switched off automatically:

- Switch off the battery module at the activation button (hold the button, until the LED goes off).

Then disconnect the following wires:



- Connections for battery current
- DRY contact
- CAN

- Loosen the four mounting screws, see:
Figure 31: Battery module fastening screws.
- Lift the battery module off the mounting rails.

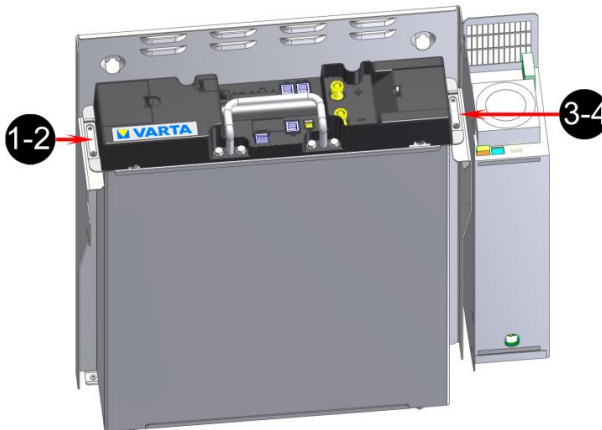


Figure 31: Battery module fastening screws

General

Operation

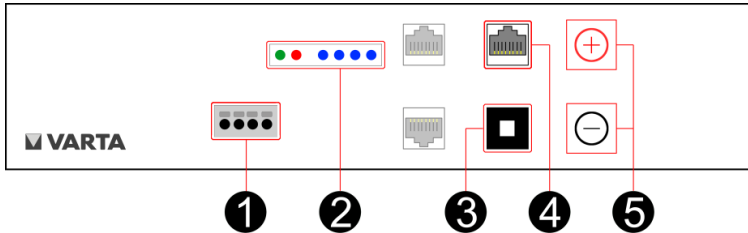
Installation

Operation (Service)

Maintenance

11.4.6 Installing the battery module

Reinstall the battery module exactly in reverse order.



1	DRY contact
2	LED-indicator
3	Activation button

4	CAN
5	Battery power connection

Figure 32: Battery module





11.4.7 Cleaning the fan and air filter

The fan is accessible after the hood has been opened.

- Clean the grille on the air filter.
- Clean the air filter with a vacuum cleaner or exchange it.
- Check the fan for contamination and clean if necessary.
- Check the bearing play and ease of movement of the fan by hand.

If the fan must be replaced, please contact VARTA Storage.

11.5 Completion of service and repair work

 	<div data-bbox="375 212 926 268" style="background-color: red; color: white; padding: 5px;">  DANGER </div> <p>Contact with live parts!</p> <p>Mortal danger!</p> <ul style="list-style-type: none"> ➔ Remove all tools and/or small parts from the interior. ➔ Establish all cable connections correctly. ➔ Check all cable ducts. ➔ Check all safety devices. ➔ No persons in the hazard zone before connecting up the power supply.
	<div data-bbox="364 707 926 762" style="background-color: yellow; padding: 5px;"> ATTENTION </div> <p>On/Off switch could be damaged!</p> <p>System cannot be put into operation!</p> <ul style="list-style-type: none"> ➔ Do not use any force when closing the hood. ➔ The switch must fit in the opening in the battery inverter.

Before you close the energy storage system, please check:

- is the interior clean?
- edge protection installed at the intended locations?

Make any necessary corrections.

General

Operation

Installation

Operation (Service)

Maintenance

If everything is all right, then:

- place the hood over the mounting plate at an angle of 45°,
- lower the hood carefully until it rests against the back of the mounting plate,
- connect the earth cable between the hood and battery inverter,
- check the electrical connection between the hood and central earthing point by means of a continuity test,
- swivel the hood towards the unit while paying attention to the position of the On/Off switch
 - Make sure that no cables are pinched!
 - The spring must engage audibly!
- secure the energy storage system with the three supplied screws on the bottom.






11.5.1 Checking the operating state

- Check whether the fuses have been re-connected.
- Switch on the energy storage system using the *On/Off* button. The button will be locked in the lower position.



Figure 33: On/Off button with LED ring

- Check whether the LED ring indicates the following operating states after the unit is switched on:

LED ring colour		LED action	Operating state
Green		Flashes every second (approx. 90 s)	System check
Green		Steady light	Ready
Green		Flashes every 3 s	Standby
Green		Pulses with increasing intensity	Charge
Green		Pulses with decreasing intensity	Unloading

- If necessary, check whether error messages appear on the web interface (see Chapters 4.3.2 and 9.2) and rectify the errors if possible.
- Check the fan for proper operation (see Chapter 11.2.6).
- If the battery module was exchanged, enter the serial number of the module on the Web interface (see Chapter 8.10.3).

General




Operation

Installation

Operation (Service)

Maintenance

11.6 Cleaning

	 WARNING
	<p>Entry of water into electrical systems</p> <p>Possible mortal danger!</p> <p>→ Do not use water for cleaning the energy storage system.</p> <p>→ Never put down containers with fluids (beverage containers and the like) on electrical systems.</p>




Cleaning agents

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

Cleaning the outside of the housing

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

12. Malfunctions

	 WARNING
	<p>Improper troubleshooting due to lack of professional knowledge!</p> <p>Personal injuries and material damage!</p> <p>→ Only the qualified electrician is allowed to rectify malfunctions.</p>

12.1 Malfunction indicators of the LED ring

The LED ring at the *On/Off* switch indicates malfunctions. See Table 9.

12.2 Malfunction indicators on the web interface

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



- Select the *System* tab from the header.
- The error lists for the storage system and the grid and system (GS) protection can be read out.

General

Operation





Installation

Operation (Service)

Maintenance

13. Disassembly and disposal

13.1 Planning disassembly

 	<div data-bbox="303 284 538 331"> WARNING</div> <p data-bbox="303 352 770 416">Improper disassembly due to lack of professional knowledge!</p> <p data-bbox="303 437 841 469">Personal injuries and environmental damage!</p> <p data-bbox="303 489 841 580"> Only the qualified electrician is allowed to disassemble the energy storage system.</p>
--	---



Read the instruction manual.



If the original packaging is no longer available, request suitable packaging for hazardous goods.

13.2 Disassembling



This section is intended for the qualified electrician.



Read the instruction manual.
Especially the Safety chapter.



How to open the storage cabinet and disassemble the components is described in Chapter 11.4.



The battery modules should be in a charge state of **less than 30%**. If necessary, discharge the modules.

13.3 Disposal



The VARTA pulse system must not be disposed of via domestic waste.

General

Operation

Installation

Operation (Service)

Maintenance







The packed battery modules will be collected by VARTA Storage or by a company assigned by them. For this purpose, please contact VARTA Storage (entsorgung@varta-storage.com). If necessary, also request packaging for hazardous goods. Packaging and collection costs are taken over by VARTA Storage.

- The cabinet can be disposed of as electrical waste, for instance at a recycling centre.

14. Relocation

14.1 Planning a relocation

 	<div data-bbox="314 810 869 871"> WARNING</div> <div data-bbox="314 882 869 943">Improper disassembly due to lack of professional knowledge!</div> <div data-bbox="314 967 869 997">Personal injuries and environmental damage!</div> <div data-bbox="314 1019 869 1114"> Only the qualified electrician is allowed to disassemble the energy storage system.</div>
---	---



Read the instruction manual.



If the original packaging is no longer available, request suitable packaging for hazardous goods.

14.2 Relocating



This section is intended for the qualified electrician.



WARNING

Improper transport due to lack of professional knowledge!

Possible mortal danger and material damage!



➔ The transportation of the energy storage system and its components is only allowed to be carried out by the manufacturer and the electricians qualified and certified by him.

➔ Be prudent during transport.

➔ Adhere to the transportation regulations.



Read the instruction manual.

General

Operation

Installation

Operation (Service)

Maintenance



How to open the storage cabinet and disassemble the components is described in Chapter 11.4.



The battery modules should be in a charge state of **20 to 30%** of their capacity. If necessary, charge or discharge the battery modules.



The battery modules must be commissioned again by a qualified electrician certified by VARTA Storage within 11 weeks after removal.



Perform commissioning after relocation according to Chapter 8.



Conformity with the relevant EU Directives for the device is verified by the CE mark.

Declaration of Conformity (DoC)

The components used have been developed and manufactured in compliance with applicable Directives and Standards.

The complete Declaration of Conformity is available on our Internet page: www.varta-storage.com

This instruction manual is not to be construed as a contract. Subject to errors, printing mistakes and modifications.

Figures

Figure 1: Front view	28
Figure 2: System overview	29
Figure 3: Rating plate (example)	30
Figure 4: Cryptocode (example)	30
Figure 5: On/Off button with LED ring	34
Figure 6: Web interface: Welcome page	37
Figure 7: Example of ID label for the system (in the hood)	56
Figure 8: ID label of the battery module (example)	57
Figure 9: Activation code label (example)	57
Figure 10: Stripping cables	69
Figure 11: AC connector	70
Figure 12: AC connector with strain relief	70
Figure 13: VARTA Split Core current sensor	72
Figure 14: Dimensions on mounting plate (mm)	76
Figure 15: Battery inverter sockets (bottom)	77
Figure 16: VARTA pulse battery module	81
Figure 17: Battery module terminals (DRY contact)	82
Figure 18: Internal connections	83
Figure 19: Battery module fastening screws	83
Figure 20: Hood fastening screws	86
Figure 21: On/Off button	87
Figure 22: Checking the welcome page on the web interface	95
Figure 23: Info window on the web interface	96
Figure 24: Q(P) characteristic	110
Figure 25: Q(U) characteristic	113
Figure 26: Opening the energy storage system	127
Figure 27: Latch on the earthing connector	127
Figure 28: Loosening the screws on the battery inverter	128
Figure 29: Battery inverter sockets (bottom)	129
Figure 30: Connections on the battery inverter (top)	130
Figure 31: Battery module fastening screws	133
Figure 32: Battery module	134
Figure 33: On/Off button with LED ring	136

Tables

Table 1: Safety instructions	12
Table 2: Warning levels.....	13
Table 3: Safety signs.....	14
Table 4: Warning signs.....	15
Table 5: Technical parameters - VARTA pulse 3.....	31
Table 6: Technical parameters - VARTA pulse 6.....	31
Table 7: Technical parameters – battery modules.....	32
Table 8: Technical parameters – environmental rating data.....	32
Table 9: LED ring indications at the <i>On/Off</i> button	35
Table 10: Grid parameter default settings.....	107
Table 11: Setting as per Q(P) characteristic	110
Table 12: Setting as per Q(U) characteristic	112

Appendix

Appendix 1a: Connection diagram of TN system

Appendix 1b: Connection diagram of TT system

Appendix 2a: Connection diagram of TN system with data logger

Appendix 2b: Connection diagram of TT system with data logger