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.

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If you need help troubleshooting or installing your device, please contact your local VARTA storage's technical support team stated on our homepage https://www.varta-storage.com/kontakt/.

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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.

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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.

Special attention required

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

General

1. Information about this manual

1.1. Explanation of symbols

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

i	Indicates tips for handling the device.

1.1.1 Safety instructions

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

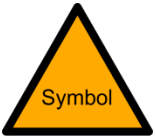
	**SIGNAL WORD** **Type and source of the hazard!** Potential consequence(s) in case of non-observance. ➡ Measures and restraints for avoiding the hazard.

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 operating sequence.

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

2. Safety

2.2. General information on safety

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

WARNING

Non-observance of the safety instructions!

Improper use can lead to fatal injuries.

➡ Prior to use, ensure that all protective devices are functioning.

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.

2.3. 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. The device is not designed to be used in three-phase combinations.

WARNING

Possible mortal danger due to wrong use!

Possible mortal danger.

➡ The device accommodates parts carrying hazardous voltages. Contact with these parts can be fatal.

➡ 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.

Do not use VARTA pulse:

- for mobile use at land, water or air.
- for use at medical devices.
- e.g. lying or standing on the floor or a table.

2.4. Requirements regarding qualified electricians

WARNING

Insufficient qualification of the electrician!

Personal injuries and material damage.

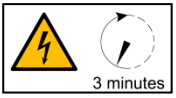
➡ Work on the VARTA pulse system (e.g. installation and maintenance work) may only be carried out by qualified electricians who are certified by VARTA Storage!

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

2.5. 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.

2.5.1 Danger of electrical voltage



DANGER

Contact with electrical voltage!

Risk of fatal injury from electric shock.

- 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.

2.5.2 Danger from water

WARNING

Entry of water into electrical systems!

Possible mortal danger and material damage.

- 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.

2.5.3 Danger from oxidising and corrosive substances

WARNING

Storage and use of oxidising and corrosive substances!

Increases the risk of fire and the risk of electric shocks.

➡ Store the above mentioned substances only at places that are intended for them.

➡ Do not clean the system with agents containing acid, lye or solvents.

2.5.4 Danger from heat

	**ATTENTION** **Insufficient ventilation of the system!** Overheating of the system possible. ➡ Keep the ventilation openings clear. ➡ Ensure sufficient ventilation.

	**ATTENTION** Heat input due to direct sunlight or devices emitting heat! Overheating and damage of the system possible! ➡ Protect the system against direct sunlight. ➡ Do not use fan heaters or the like near the system.

2.5.5 Danger from misbehaviour

ATTENTION

Energy storage system switched off!

Potential damage to the battery module due to deep discharge.

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

ATTENTION

Objects on the system!

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

➡ Do not put any objects on the energy storage system.

ATTENTION

Blocked access!

In the event of damage, the system cannot be switched off.

➡ The access to the energy storage system must always be ensured.

➡ Access to the associated circuit-breaker must be assured at all times

2.6. Safety devices

WARNING

Defective safety devices!

Possible mortal danger.

- 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.

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. Derating

Power reduction (derating) entails the temporary curtailment in the maximum power of the battery inverter in order to prevent excessive heating of components. VARTA energy storage systems have been designed to ensure that the permissible operating temperature is not exceeded and derating is not necessary if the operating and ambient conditions are complied with. To prevent temperature derating of the energy storage system, you should make sure that the energy storage system can emit heat into the ambient air.

Frequent temperature-related derating can have the following causes:

- The system cannot emit sufficient heat into the ambient air because the air filters are dirty or have failed.
- The place of installation of the energy storage system does not offer the climatic conditions required.
- Atypical operation that differs significantly from the photovoltaic cycle.

3.3. 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.

3.4. Front view VARTA pulse

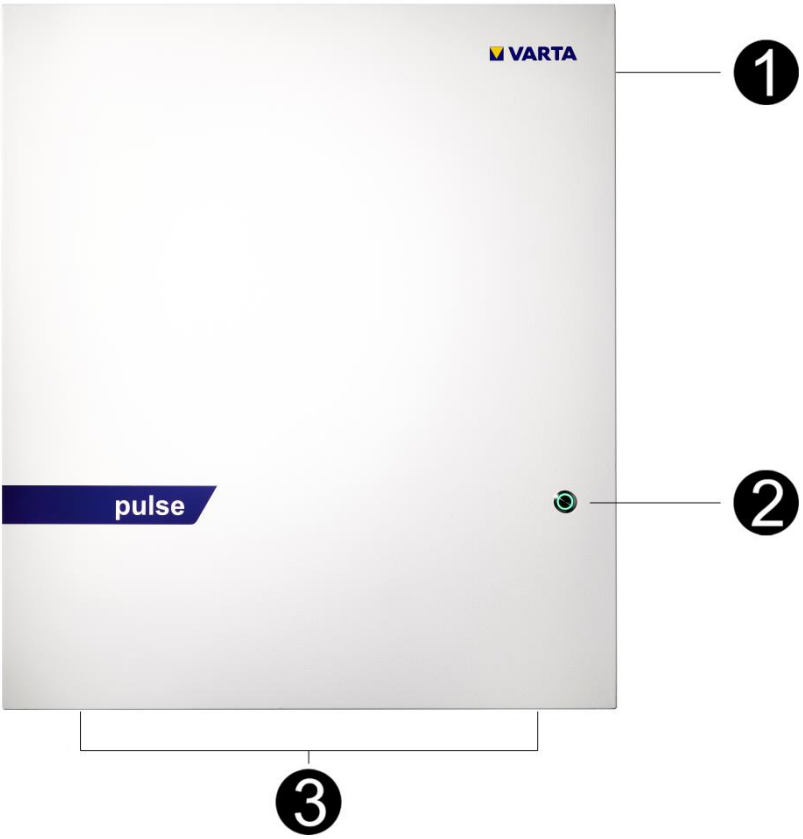


Figure 1: Front view

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

3.5. System overview

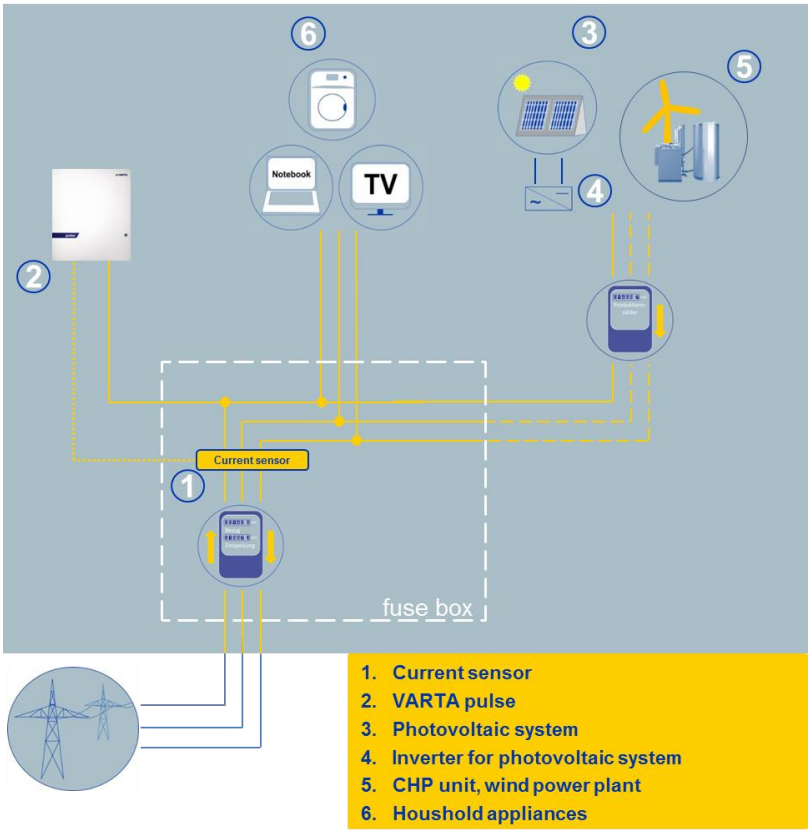


Figure 2: System overview

3.6. Rating plate

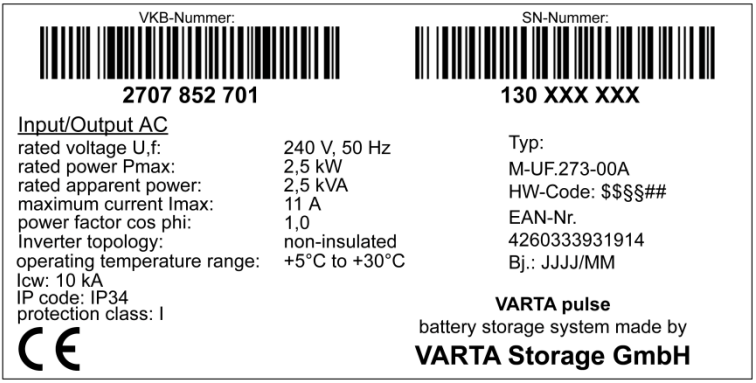
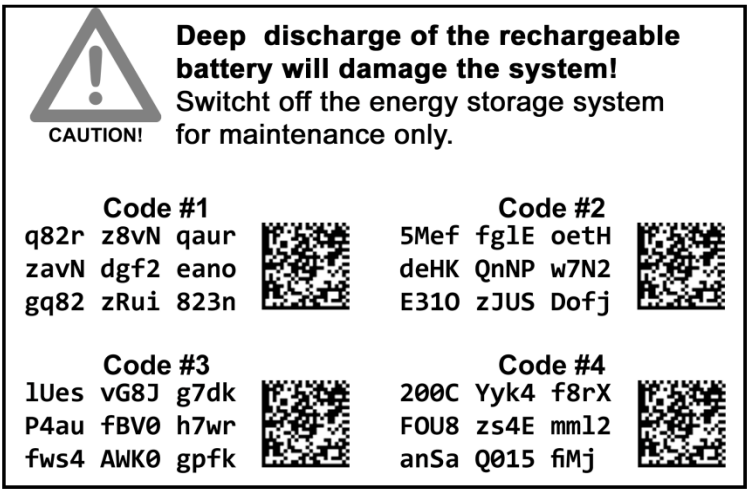


Figure 3: Rating plate (example)



3.7. Technical parameters

The device is not designed to be used in three-phase combinations. In accordance with the AS/NZS 4777.2:2015 rules,communication to DRED is necessary.

VARTA PULSE 3

Nominal capacity	3.3 kWh
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
Inrush current	no inrush current
Internal consumption optimisation	Automatically controlled
Power measurement	3-phase, via current sensor
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
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 module)	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
Inrush current	no inrush current
Internal consumption optimisation	Automatically controlled
Power measurement	3-phase, via current sensor
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 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	IP34
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

DANGER

Contact with electrical voltage!

Risk of fatal injury from electric shock.

- 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.

ATTENTION

Energy storage system switched off!

Potential damage to the battery module due to deep discharge.

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

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.

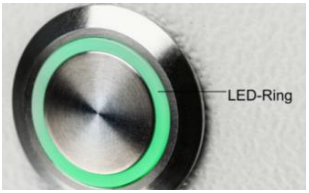


Figure 4: On/Off button with LED ring

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

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.

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i 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.

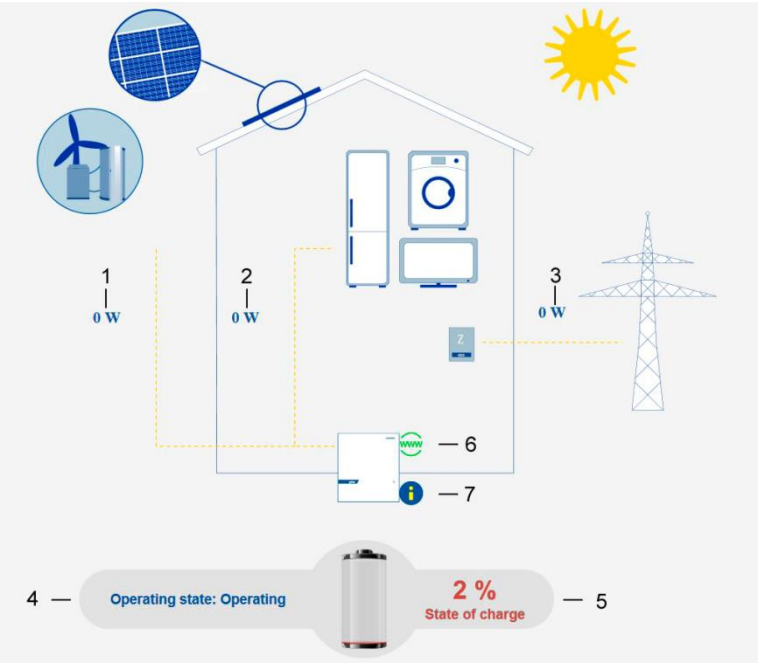

Figure 5: Web interface: Welcome page

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.

4.4. 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.

4.5. 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 8.5. Warranty registration).

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).

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

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5. Maintenance and cleaning

WARNING

Improper execution of maintenance and cleaning work!

Possible mortal danger.

➡ Ensure that only qualified electricians certified by VARTA Storage carry out maintenance and cleaning work.

➡ Only original parts are to be used for maintenance work.

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.

Please note that the SD card has a limited service life. To ensure continuous data storage, we recommend that you replace the SD card every two years. The SD card of the manufacturer: GOODRAM type No.: SDU4GCMGRB was successfully tested.

i 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

Entry of water into electrical systems!

Possible mortal danger.

➡ Do not use water for cleaning the energy storage system.

➡ Never put down containers with fluids (beverage containers and the like) on electrical systems.

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.

6. Malfunction/event of damage

WARNING

Improper elimination of malfunctions!

Possible mortal danger.

➡ Ensure that only qualified electricians certified by VARTA Storage carry out work at the energy storage system.

i 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 i icon.
- 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

Improper handling in case of fire and flooding!

Possible mortal danger.

- 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.

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

WARNING

Damaged battery module due to technical defect!

Pungent smell.

- Avoid contact with possibly leaking fluid.
- Avoid contact with possibly escaping vapours.
- If possible, switch off the system and disconnect the fuses.
- Avoid sparks and open flames.
- Ventilate the installation room.
- In case of a malfunction, contact the qualified electrician.

Installation

This section is intended for the qualified electrician.

7. Transport and storage

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.

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.

The housing is packed separately from the battery module.

7.2. Transportation regulations and safety instructions

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.

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.

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

Installation of damaged components!

Mortal danger.

➡ Do not accept clearly damaged packaging.

➡ Contact VARTA Storage.

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.

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).

7.4. Storage

WARNING

Entry of water into electrical systems!

Short-circuit and corrosion due to condensation.

➡ Adhere to the storage conditions.

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

Material damage due to overly long storage!

Deep discharge of the battery module!

➡ Adhere to the storage conditions.

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

Entry of water into electrical systems!

Short-circuit and corrosion due to condensation.

➡ Start the assembly not until the components have room temperature.

WARNING

Installation of damaged components!

Possible mortal danger.

➡ Check all components on visible damages.

➡ Do not install damaged components.

➡ Contact VARTA Storage.

8.2. Requirements for the installation location

This section is intended for the qualified electrician.

WARNING

Entry of water into electrical systems!

Mortal danger from electric shock.

➡ Install the storage cabinet only inside buildings.

➡ Observe all requirements for the installation location.

CAUTION

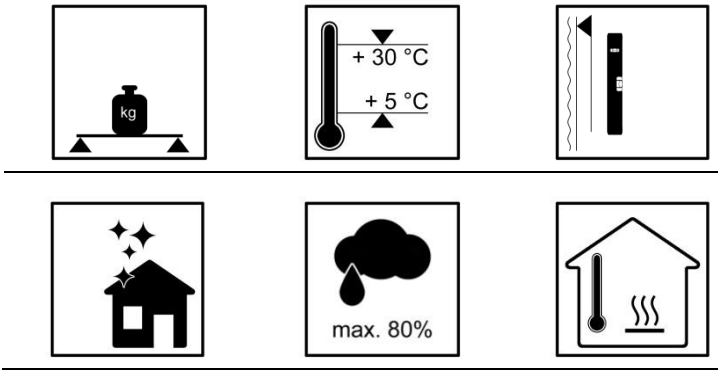
Personal injury and material damage due to wrong installation and lack of space!

Crush injuries of limbs.

➡ Place the cabinet, so a safe installation, operation, maintenance and disassembly are possible when used properly.

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 3.7. 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.

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.

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.

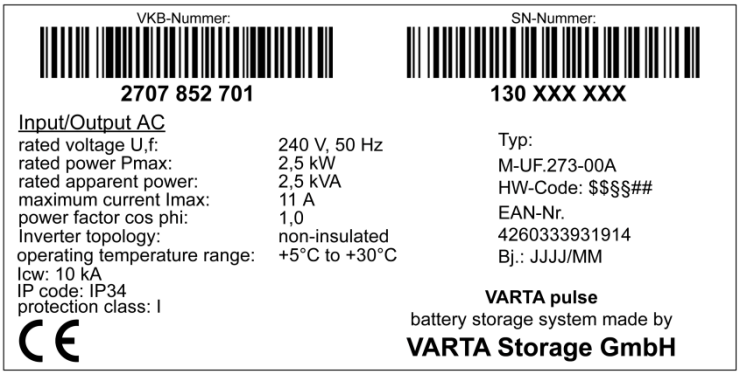


Figure 6: Example of ID label for the system (in the hood)

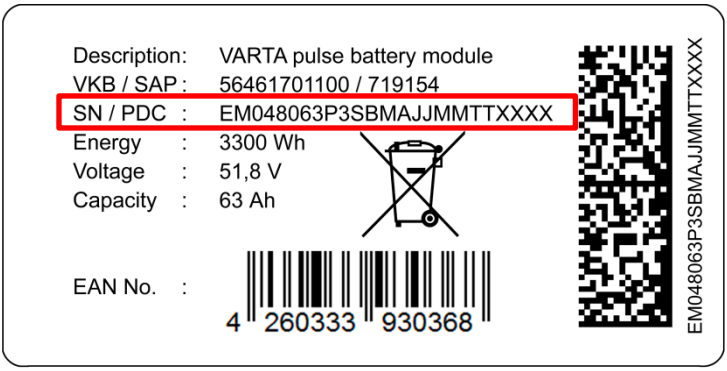


Figure 7: ID label of the battery module (example)

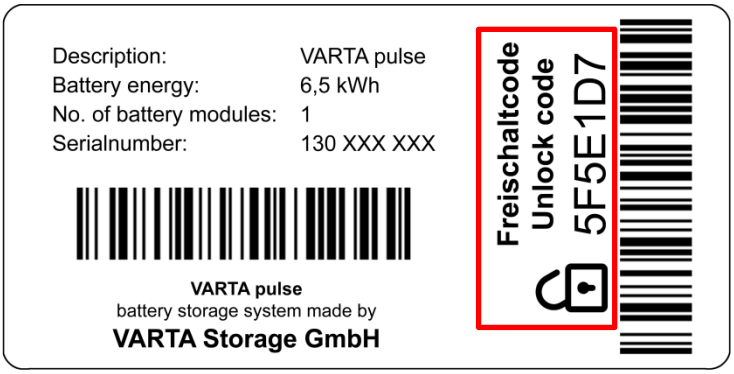


Figure 8: Activation code label (example)

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

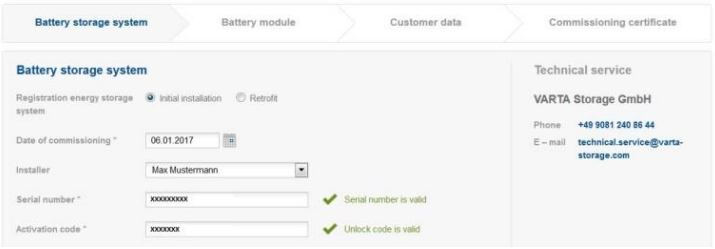
Open page www.varta-storage.com
Change to "energy storage systems"

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 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.

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

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

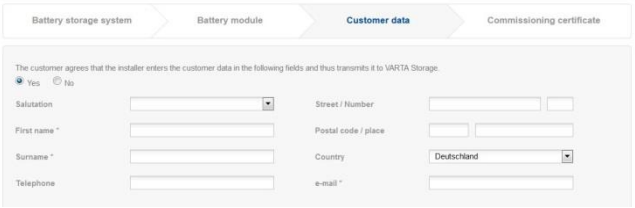
Call up the next screen "customer data" with "next".

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

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.

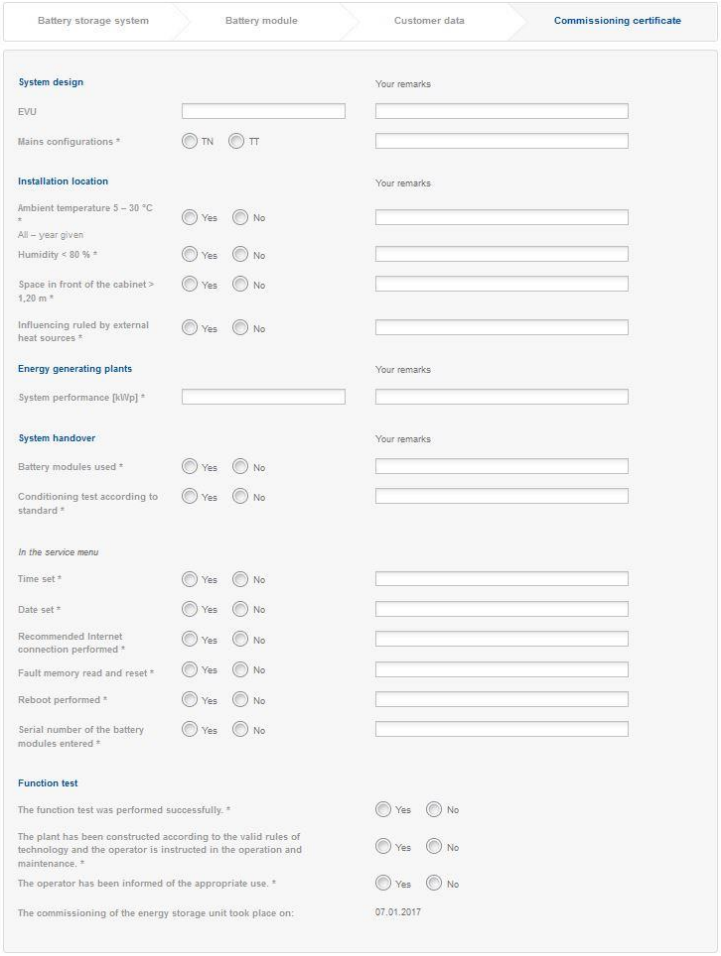
Entering the customer data.



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

		Your remarks
EVU		
Mains configurations *	TN TT	

Installation location

		Your remarks
Ambient temperature 5 – 30 °C * All – year given	Yes No	
Humidity < 80 % *	Yes No	
Space in front of the cabinet > 1,20 m *	Yes No	
Influencing ruled by external heat sources *	Yes No	

Energy generating plants

		Your remarks
System performance [kWp] *		

System handover

		Your remarks
Battery modules used *	Yes No	
Conditioning test according to standard *	Yes No	

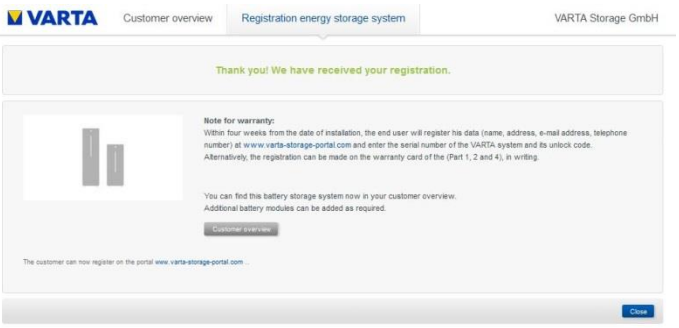
In the service menu

Time set *	Yes No	
Date set *	Yes No	
Recommended Internet connection performed *	Yes No	
Fault memory read and reset *	Yes No	
Reboot performed *	Yes No	
Serial number of the battery modules entered *	Yes No	

Function test

The function test was performed successfully. *	Yes No
The plant has been constructed according to the valid rules of technology and the operator is instructed in the operation and maintenance. *	Yes No
The operator has been informed of the appropriate use. *	Yes No
The commissioning of the energy storage unit took place on:	07.01.2017

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

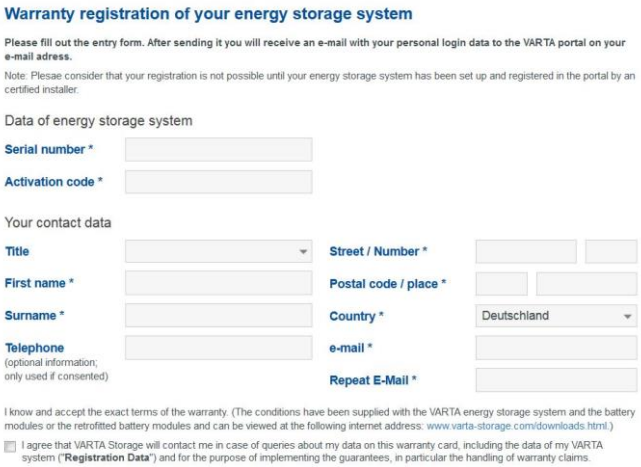
Open page www.varta-storage.com
Change to "energy storage systems"

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.



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 adress.

Note: Plesae 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

First name *

Surname *

Telephone
(optional information;
only used if consented)

Street / Number *

Postal code / place *

Country * Deutschland

e-mail *

Repeat E-Mail *

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 hold 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

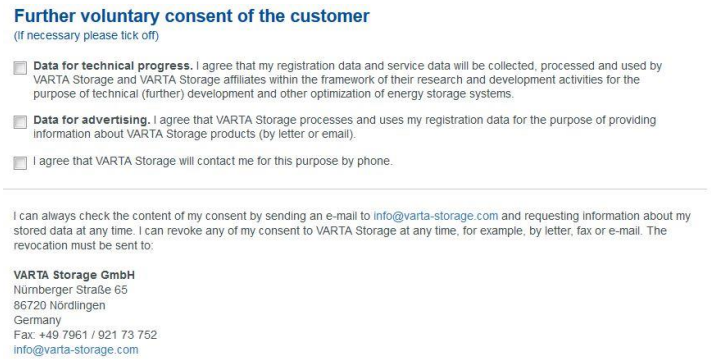
of your decision to revoke this agreement by means of a clear statement (for example, a letter, fax or e-mail sent by mail). You can use the Sample Revocation Form But this is not required.

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 8 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).

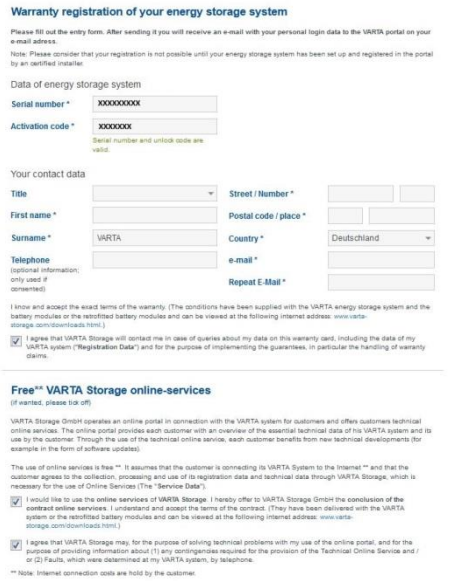
☐ I agree that VARTA Storage will contact me for this purpose by phone.

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.



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 adress.

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 * XXXXXXXXX

Activation code * XXXXXXX

Serial number and unlock code are valid.

Your contact data

Title | Street / Number *
First name * | Postal code / place *
Surname * VARTA | Country * Deutschland
Telephone (optional information; only used if consented) | e-mail *
Repeat E-Mail *

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).

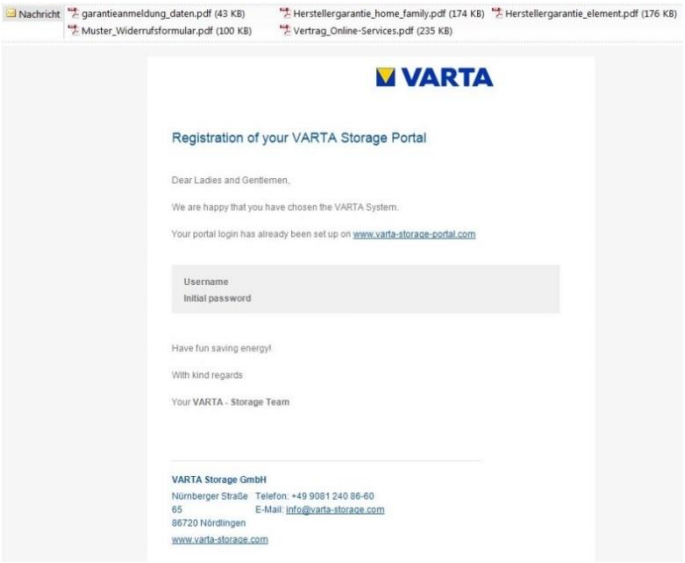
The use of online services is free **. It assumes that the customer is connecting its VARTA System to the Internet ** and that the customer agrees to the collection, processing and use of its registration data and technical data through VARTA Storage, which is necessary for the use of Online Services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

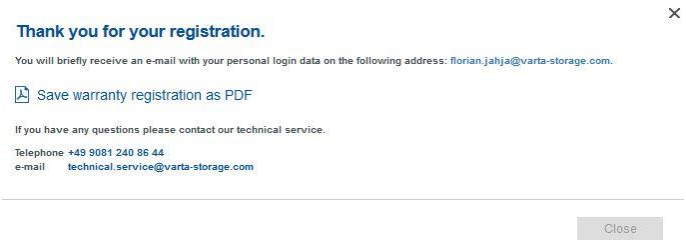
☑ I would like to use the **online services of VARTA Storage**. I hereby offer to VARTA Storage GmbH the **conclusion of the contract online services**. I understand and accept the terms of the contract. (They have been delivered with the VARTA system or the retrofitted battery modules and can be viewed 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 hold by the customer.

Correct the entries or send the registration now.





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

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.

WARNING

Improper installation!

Personal injury and material damage.

- 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 1 - 4) 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

(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

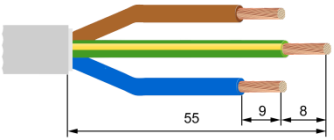


Figure 9: Stripping cables

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.
- Connection of a solid-wire conductor:
  Insert the stripped conductor as far as possible.

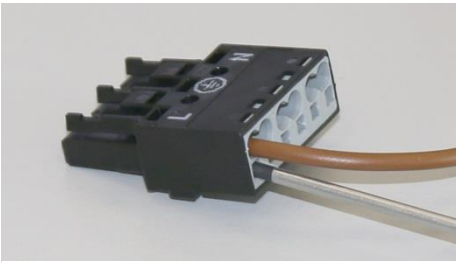


Figure 10: AC connector

- 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.

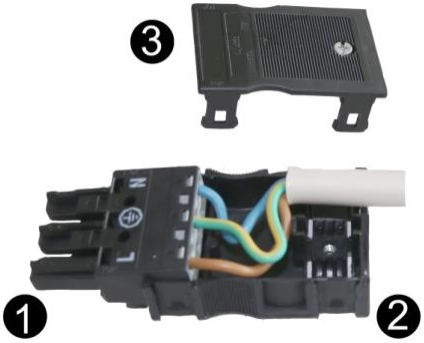


Figure 11: AC connector with strain relief

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

Reversed phases!

Charging and discharging malfunction.

➡ Conductors L1, L2, L3 for the building connection and PV current sensor must have the same phase assignment.

➡ Make the connection for a **clockwise phase sequence**.

ATTENTION

Contamination of the magnetic cores!

The current sensor will be damaged.

➡ Do not touch the magnetic cores.

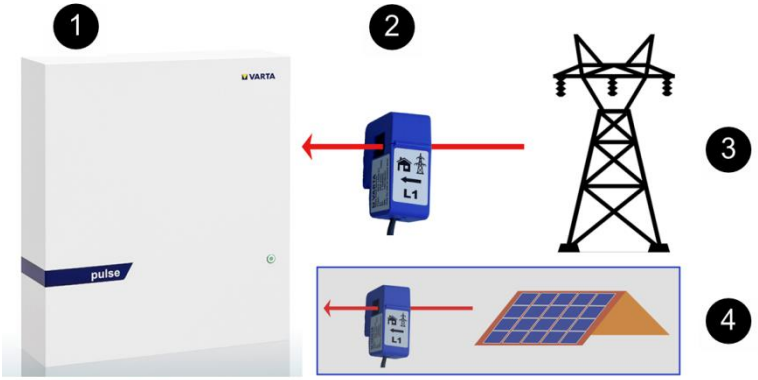
➡ Ensure a clean working environment.

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.



1	VARTA pulse
2	VARTA Split Core current sensor
3	Grid
4	**Optional** a second one of VARTA Split Core current sensor.

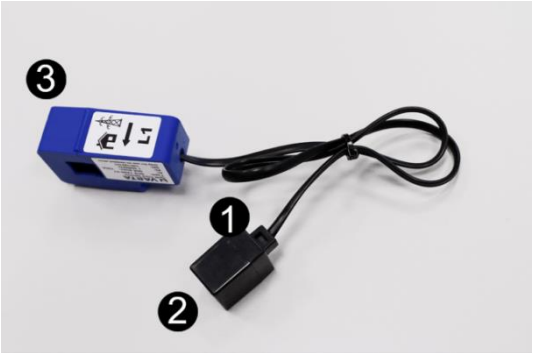


Figure 12: VARTA Split Core current sensor (Single Phase)

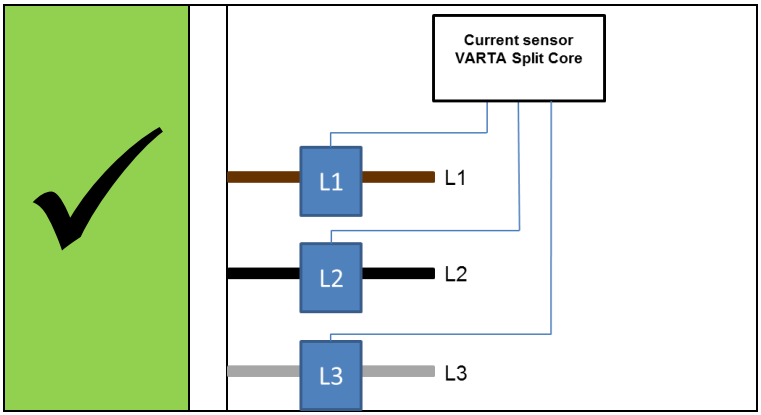
Figure 13: VARTA Split Core current sensor (Three Phase)

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

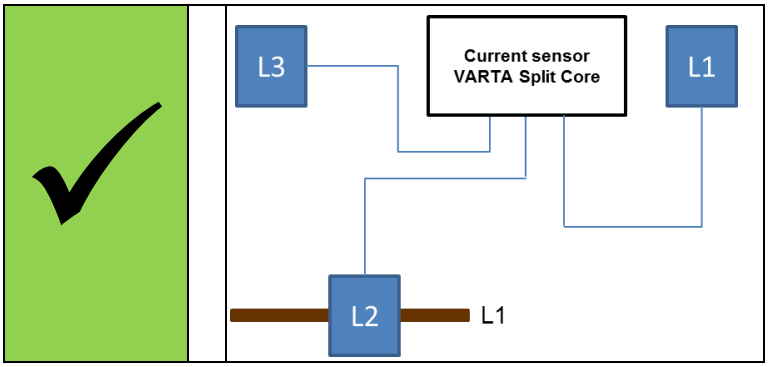
To attach the folding transformer to the VARTA Split Core current sensor, guide the wire through the opening in the blue folding transformer. Open the latch on the back, place the folding transformer around the wire and close it again. The latch must engage audibly.

For a single-phase house connection in comination with a 3-phase sensor only L2 is used!
Do not use the folding transformer L1 and L3!

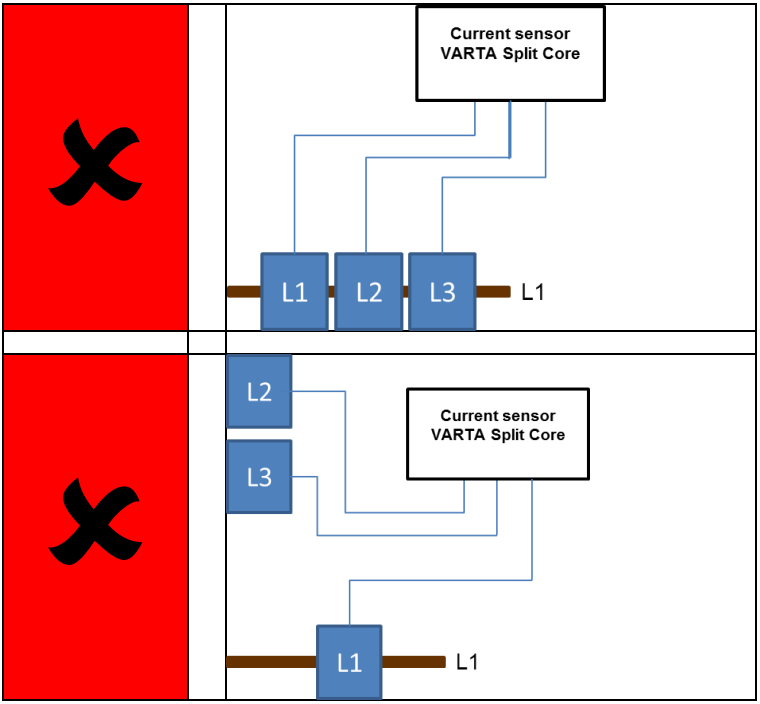
THREE PHASE



SINGLE PHASE



NOT PERMITTED



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.

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.

i The device is not designed to be used in three-phase combinations.

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: VARTA Split Core current sensor (Three Phase)) to the energy storage system (Figure 15: Battery inverter sockets (bottom).

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

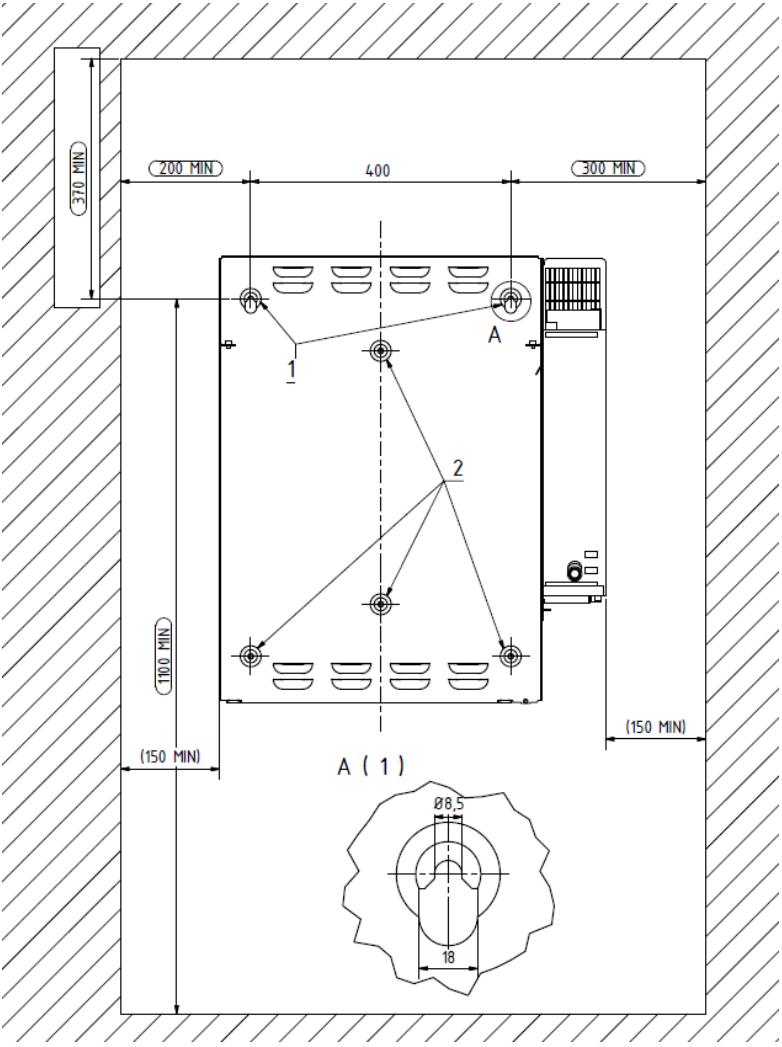


Figure 14: Dimensions on mounting plate (mm)

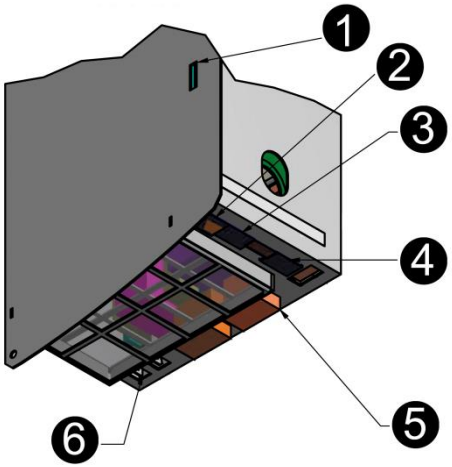


Figure 15: Battery inverter sockets (bottom)

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.

DANGER

Contact with live parts!

Mortal danger.

- 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.

WARNING

Contact with sharp-edged parts!

Cut injuries.

- Wear your personal protective equipment.

8.10. Inspecting the battery module

WARNING

Damaged battery module!

Personal injuries and material damage.

- 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

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

8.11. Behaviour in the event of damage

WARNING

Improper handling in case of damaged battery module!

Personal injuries and material damage.

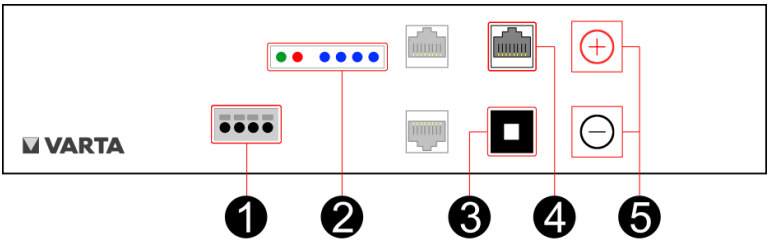
- ➡ Do not open the battery module.
- ➡ Do not attempt to repair it.
- ➡ Avoid contact with possibly leaking fluid.
- ➡ Avoid contact with possibly escaping vapours.

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.

8.12. Installing and connecting the battery module

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

	ATTENTION
	Reversed wires of error and warning messages. Wrong error message to the control. ➡ Observe the given colour-coding.



1	DRY contact	4	CAN
2	LED-indicator	5	Battery power connection
3	Activation button		

Figure 16: VARTA pulse battery module

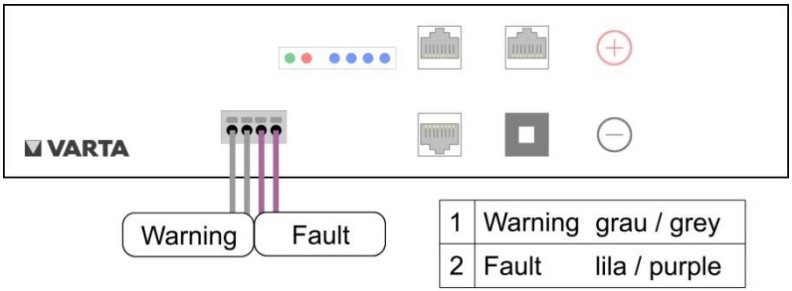


Figure 17: Battery module terminals (DRY contact)

8.12.1 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 18: "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 19: "Internal connections".

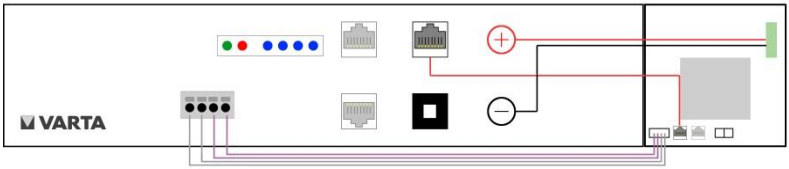


Figure 19: Internal connections

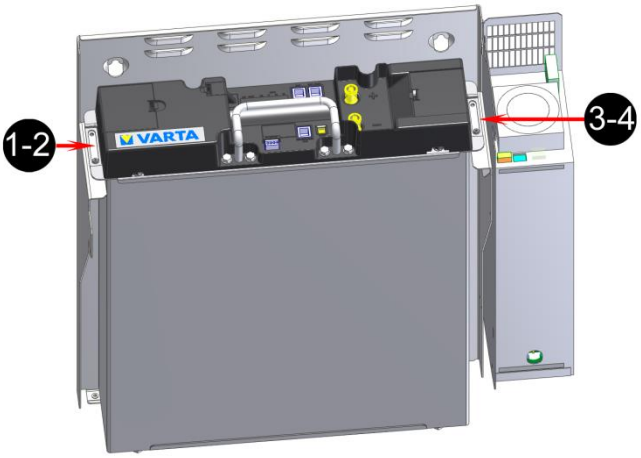


Figure 18: Battery module fastening screws

Battery power connection:
Plug on both connectors with correct polarity.

- Every connector must engage audibly.

Communication 1:

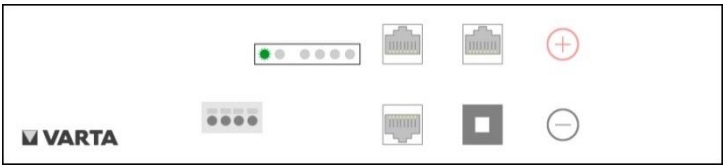
- Insert the four communication cables into the openings in the clamping connector. The connections are self-clamping.
  For the pin assignment, see Figure 17: "Battery module terminals (DRY contact)"

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.



8.12.2 Closing the energy storage system

WARNING

Damaged cables due to improper assembly!

Electric shock!

➡ Check all assembly steps before closing the energy storage system.

➡ Do not use any force when closing the hood.

ATTENTION

On/Off switch could be damaged!

System cannot be put into operation.

➡ 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:

- 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.

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.

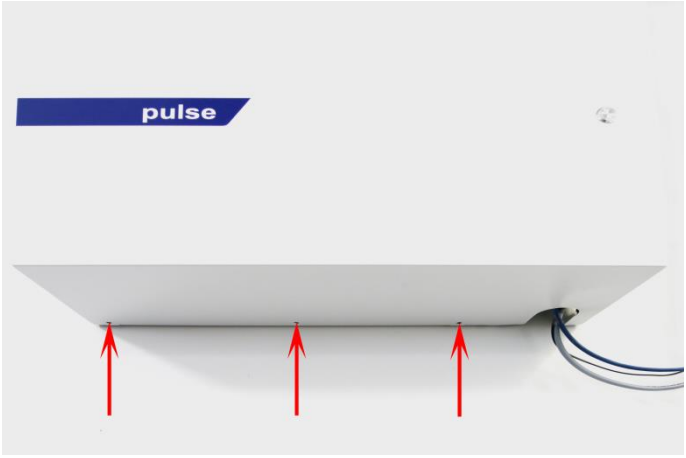


Figure 20: Hood fastening screws

8.13. Initial commissioning

This section is intended for the qualified electrician.

8.13.1 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

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. 90 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

8.13.2 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). 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!

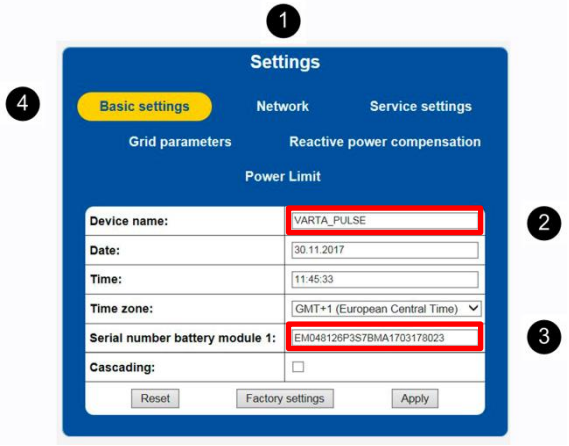
- Enter the password into the field for installation engineer access.

Further tabs appear in the header.

For a simplified installation, you can use the menu *Quick Install* (see Chapter 8.14.).

8.13.3 Entering the serial numbers of the battery module

Click on the Settings tab (1).



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.

i 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:

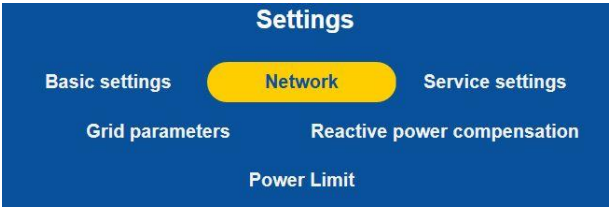
The current sensor check failed. Please switch the battery storage system off and back on again.

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.

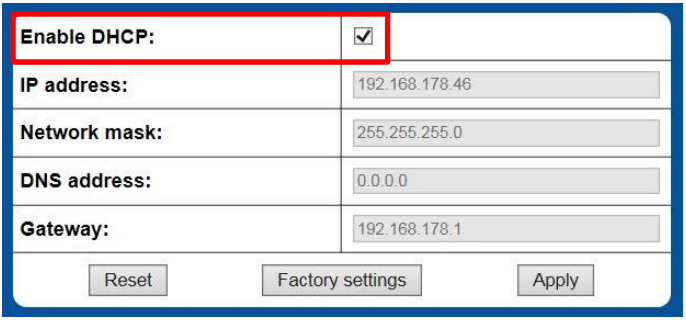
8.13.4 Portal connection



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).

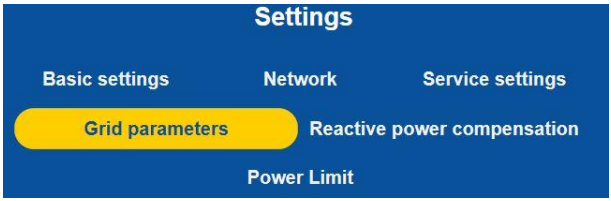
If the connection is not made automatically, use the parameters in the instructions for the network router. DNS and gateway address are usually identical for commercially available DSL routers. These addresses can differ for company networks. Moreover, ports 4500, 21 and 37 need to be enabled for the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

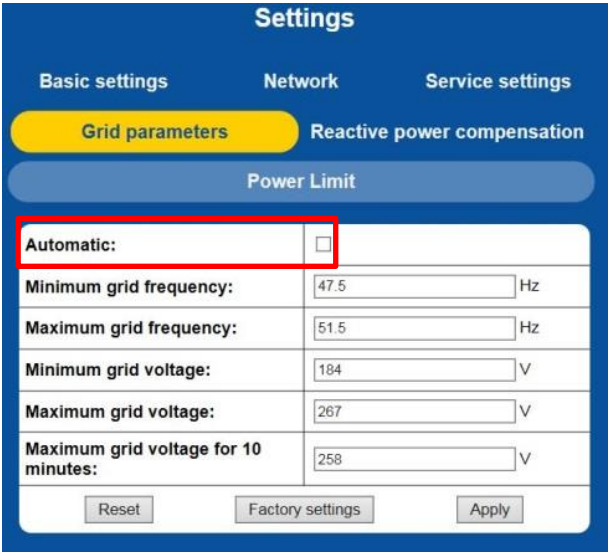
See Chapter 9.4.2 .

8.13.5 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.
- The Grid parameters page will appear.
- Change the settings - if necessary.



- 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

8.13.6 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.

8.13.7 Checks on the welcome page

Click on the Home button.

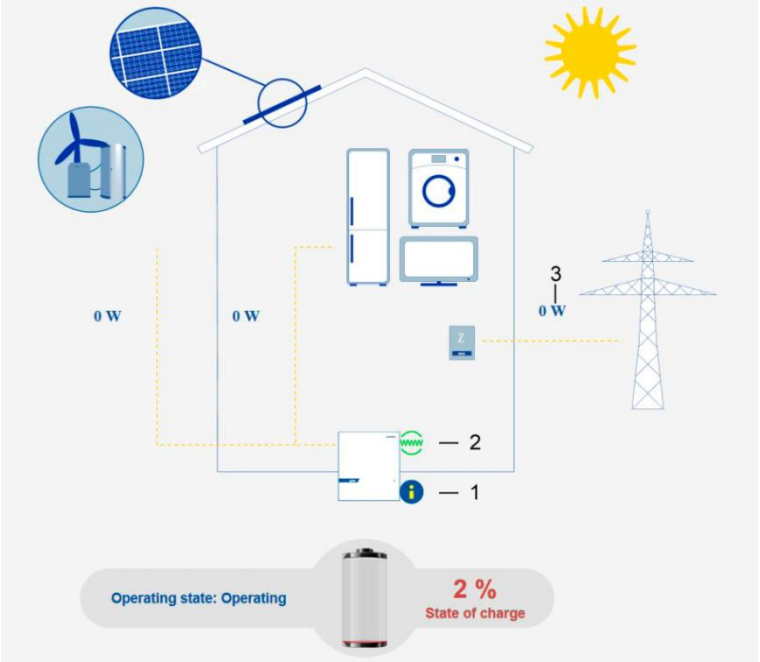


Figure 22: Checking the welcome page on the web interface

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 24). Possibly the System page shows information for troubleshooting (see Chapter 11.2.2).

Figure 23: Info window on the web interface

8.13.8 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 Grid	-6,82 A	-0,15 A	-2,36 A
I PV	0.14 A	-0.05 A	0.13 A
Sensor Phase	Phase 1		
U Inv	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.

Serial numbers oft the battery modules
EM048126P3S7BMA17031708023

8.13.9 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.

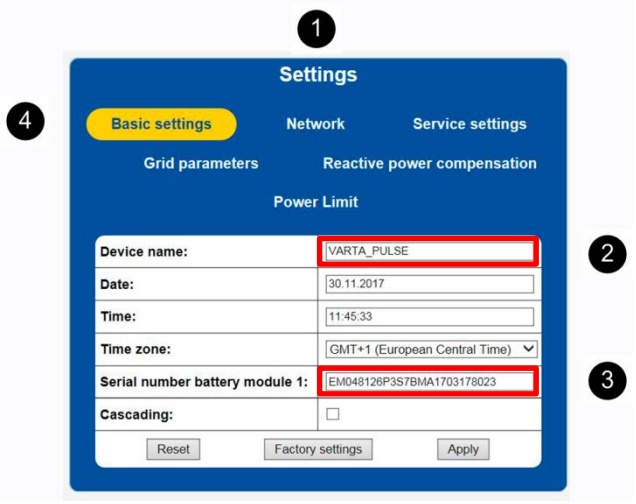
8.14. Quick Install

- 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*.



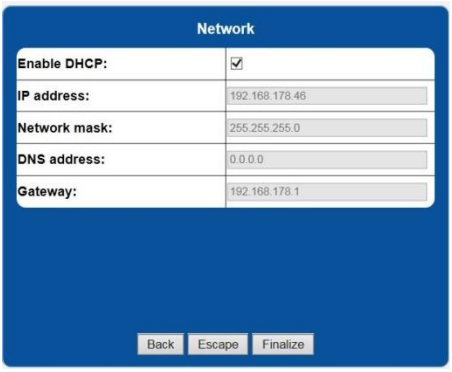
Network settings menu

The network settings will be applied unchanged.

- Click *Next*.

Grid parameters menu

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



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

9. Operation in the password-protected area

This section is intended for the qualified electrician.

9.1. The password-protected area

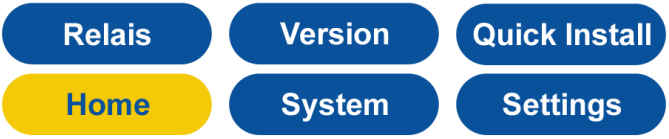
9.1.1 Access to the web interface - password entry

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.

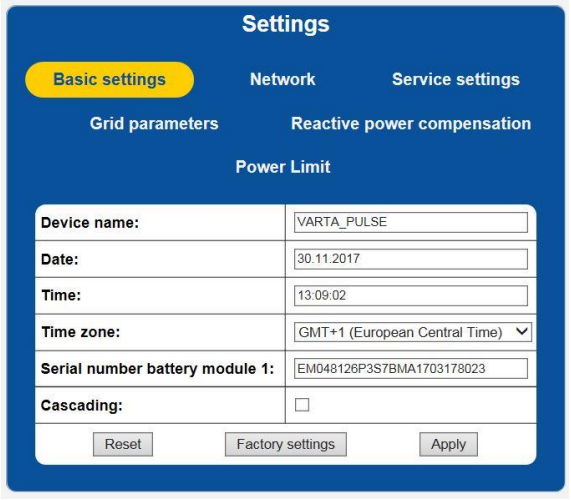
9.3. Version

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

OVERVIEW OF THE VERSION

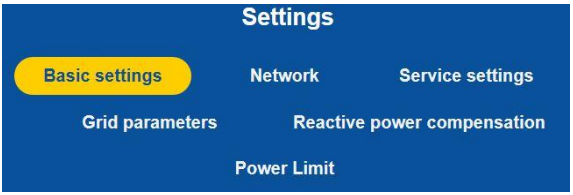
No.	Serial	Mac	SW ID	HW ID	SW Version	BL Version
WR	K593166	534A5D	11	FF	C11000124	1.3.0.3
EMS	00295F	-	15	FF	C21000132	-
DCEN	zFFFFFF	4DFBFF	A0	FF	C31000303	3.0.4
EM	M378336	0CC200	-	7	C41000115	x.1.0.2

9.4. Settings



The Settings page gives you access to other input screens.

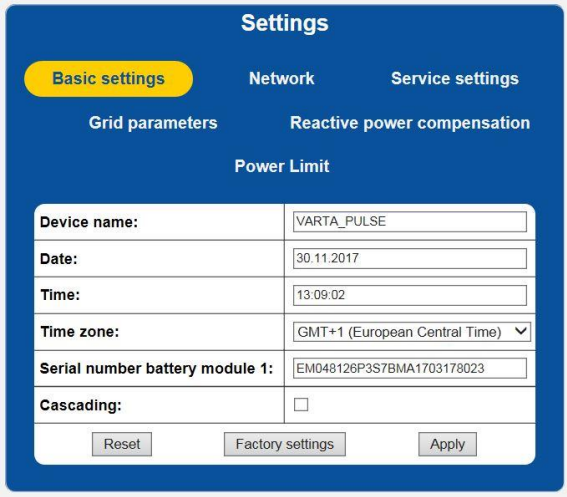
- Click on a tab.



- 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



Basic settings can be changed on this page:

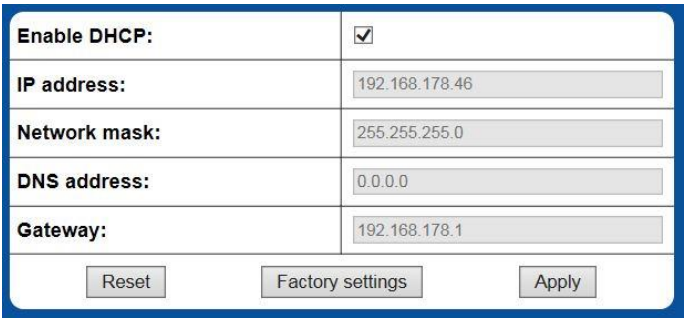
Device name: Input during initial commissioning. The maximum length is 20 characters.

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.

9.4.2 Network



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.

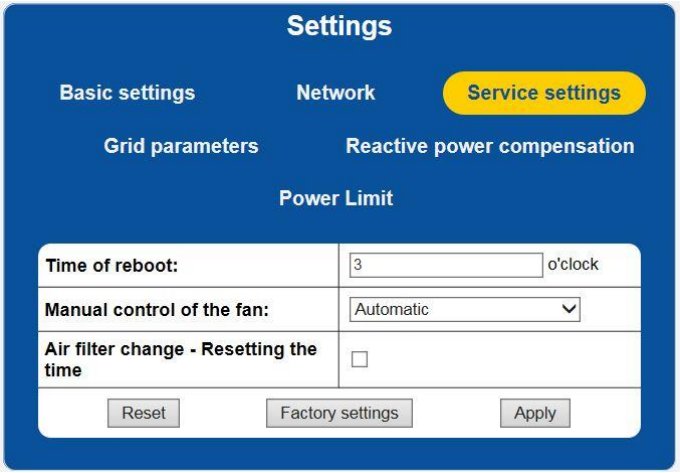
---

i

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

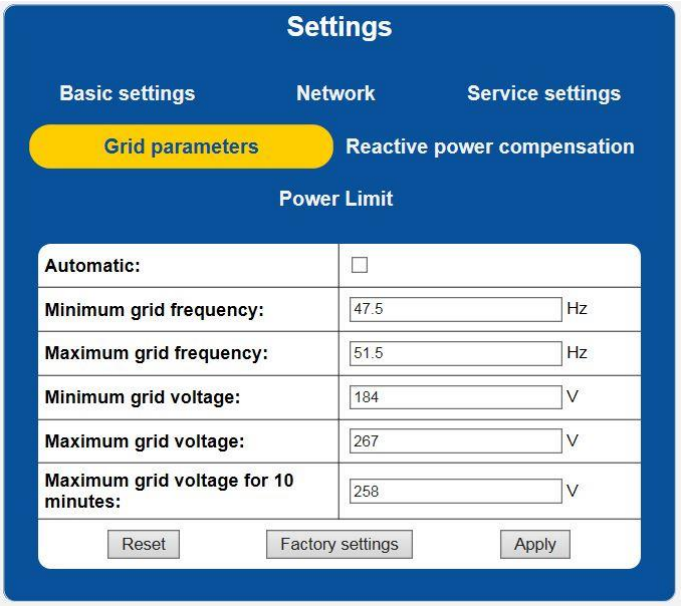
Automatic (= 0), middle level (= 1) and highest level (= 2).

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.

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.

- **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
Italy	46,00	52,00	160	280	280
Australia	47,00	52,00	180	260	255
New Zealand	45,00	52,00	180	260	248

Table 10: Grid parameter default settings

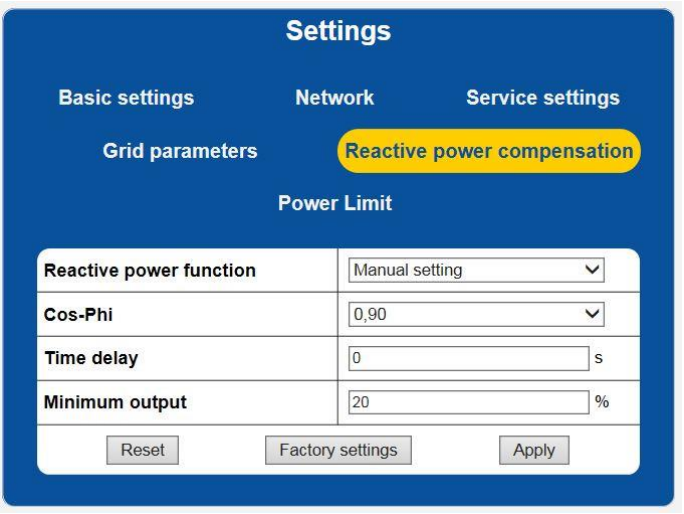
Note: If the *Automatic* option is **not** selected, the following parameters can also be set to suit the individual requirements of the grid operator:

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

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 φ 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.



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 φ.

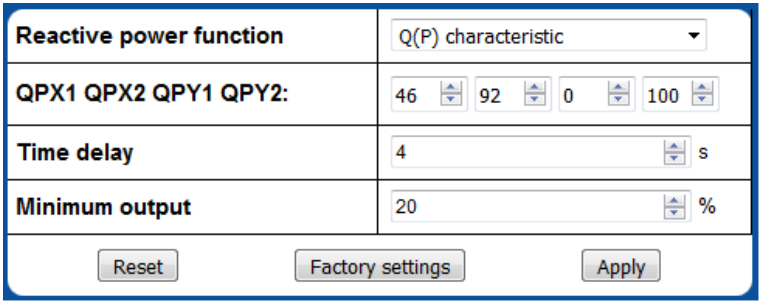
Manual input

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.
- **QPX1 QPX2:** Enter the settings for QPX1 and QPX2 by using the numerical input fields. You can find the settings in Q(P) characteristic.
- **QPY1 QPY2:** Enter the settings for QPY1 and QPY2 by using the numerical input fields. You can find the settings in Table 11.

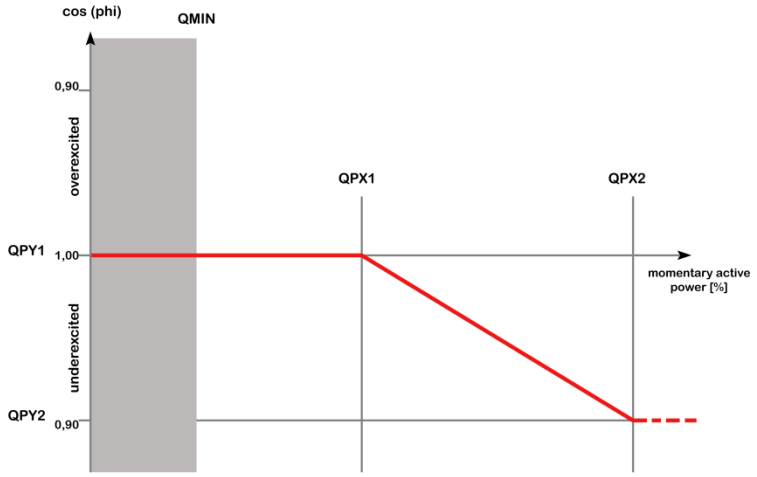


Figure 24: Q(P) characteristic

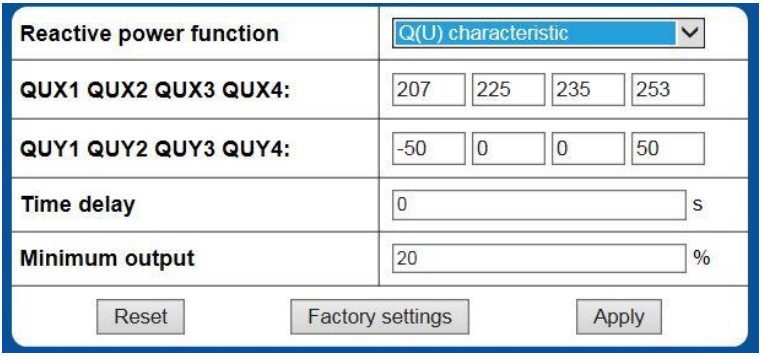
Parameter	Meaning
QPX1	Starting point of the Q(P) characteristic on the power axis. The parameter is entered in %. Example: QXP1 = 50 → The characteristic begins at 50% of the rated maximum power.
QPY1	Power factor at the start of the Q(P) characteristic. The setting can be found in Table 10. Normally, 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.



- **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.

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.

Parameter	Meaning
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

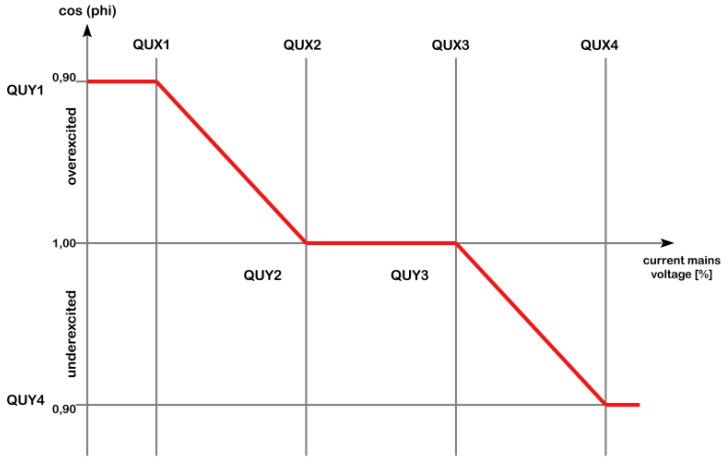


Figure 25: Q(U) characteristic

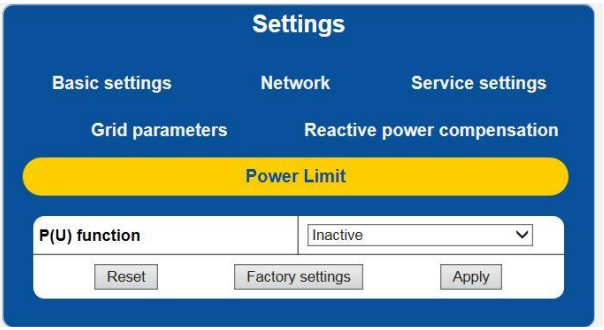
When setting the parameters, the following condition must be adhered to:
QUX1 ≤ QUX2 < QUX3 ≤ QUX4

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.

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.



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

DANGER

Contact with live parts!

Mortal danger.

- 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!



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

WARNING

Improper execution of maintenance and cleaning work!

Possible mortal danger.

➡ 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

Contact with sharp-edged parts!

Cut injuries.

➡ Wear your personal protective equipment.

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.

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. .

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 11.4.6)?
- 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 9.1. 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 list	NA error list
No errors	No NA errors

Error rectification

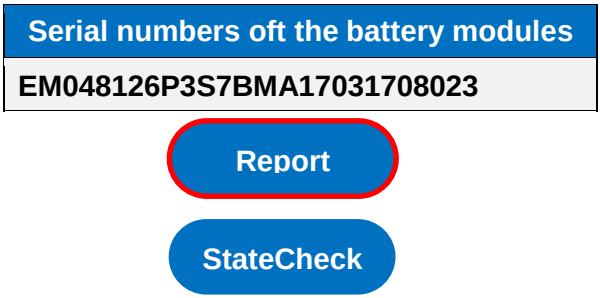
- Identify the errors using the error descriptions.
- Check above all whether there are any temperature errors in the error list (error text with leading T…). This provides an indication of the maintenance that needs to be carried out (fan and ventilation openings) as well as improper ambient conditions.

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.

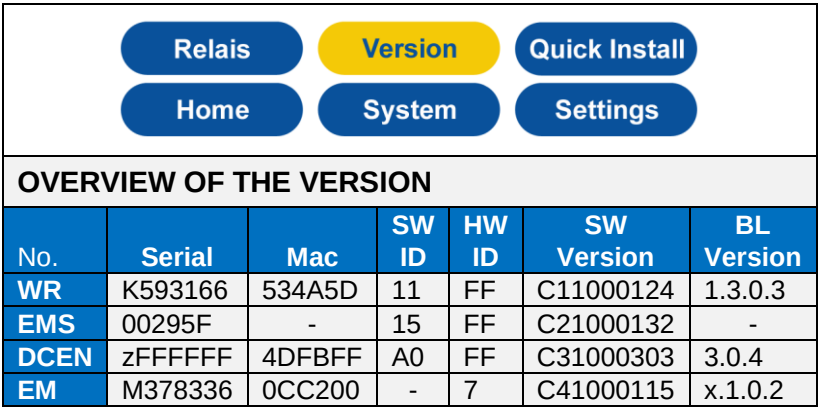
If the errors cannot be rectified, notify VARTA Service.

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



11.2.3 Checking the software version

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



OVERVIEW OF THE VERSION

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	zFFFFFF	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.

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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

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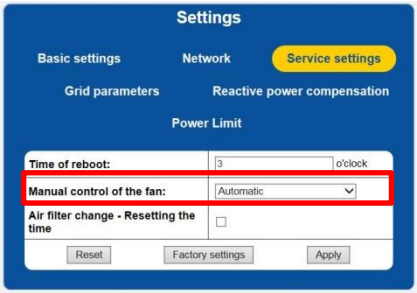
11.2.5 Air filter change: Resetting the time

The air filter must be replaced at every second service. See Chapter 11.4.6

From the Settings tab, select the Service settings item.

- Check the Reset air filter box.
- Click on Apply.

11.2.6 Checking the fan

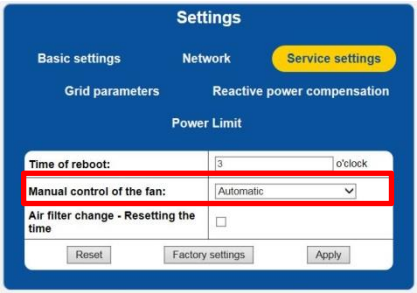


From the Settings tab, select the Service settings item.

- 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.

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 9.1.

11.3.1 Checking the current sensor values

- Select the System page.

OVERVIEW BATTERY INVERTER			
	L1	L2	L3
I Grid	-6,82 A	-0,15 A	-2,36 A
I PV	0.14 A	-0.05 A	0.13 A
Sensor Phase	Phase 1		
U Inv	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.

OVERVIEW BATTERY INVERTER			
	L1	L2	L3
I Grid	-6,82 A	-0,15 A	-2,36 A
I PV	0.14 A	-0.05 A	0.13 A
Sensor Phase	Phase 1		
U Inv	0 V		
P Grid	-2132 W (from the grid)		
P Inv	0 W		
P Request	-1557 W		
F Grid	0.00 Hz		
SoC	0 %		
TempHB	12 °C		
TempEMS	16 °C		
Fan	0 %		
CTRL WR	Init (0)		
CTRL EMS	Deep Sleep (112)		
CTRL ENS	Init (0)		
EMS-Mode	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 MODULE					
SerNr	UBatt	IBatt	PIst	PSoll	SoC
zFFFFFF	48.39 V	0.00 A	0 W	0 W	0 %

OVERVIEW BATTERY MODULE					
UZwk	UVcc	THT	TTR	TBoard	Status
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.

DANGER

Contact with live parts!

Mortal danger.

- 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!



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


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

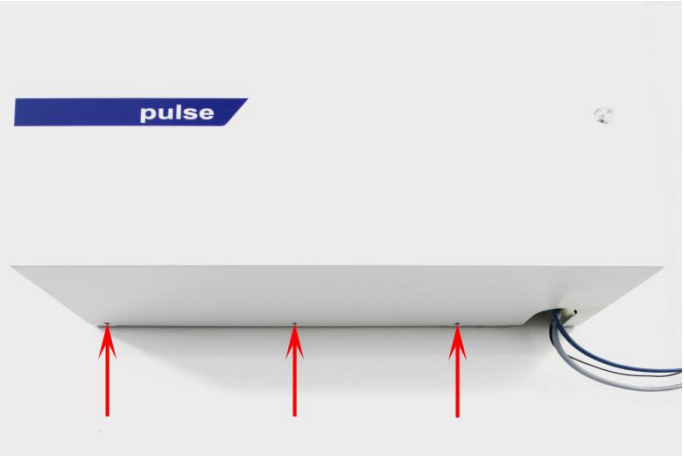


Figure 26: Opening the energy storage system

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

Figure 27: Latch on the earthing connector

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

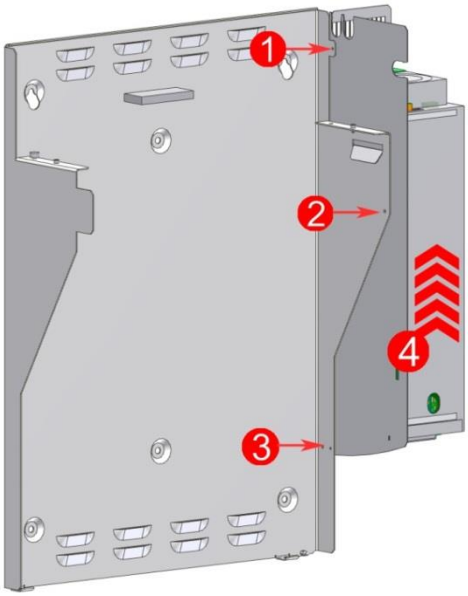


Figure 28: Loosening the screws on the battery inverter

- 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).

---

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

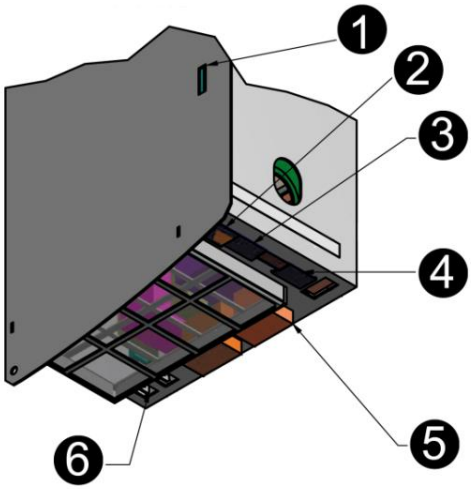


Figure 29: Battery inverter sockets (bottom

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)

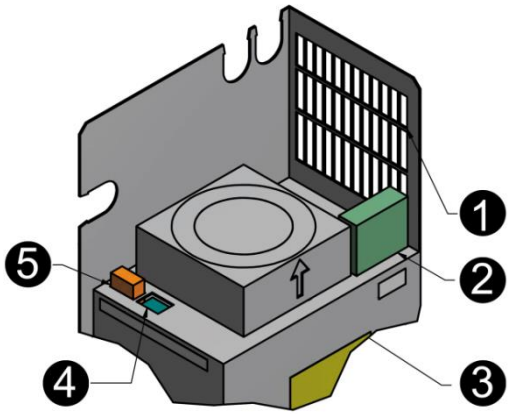


Figure 30: Connections on the battery inverter (top)

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

11.4.2 Installing the battery inverter

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

11.4.3 Removing and installing the battery module

WARNING

Improper handling of the battery module!

Personal injuries and material damage.

- 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.

11.4.4 Removing 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.

ATTENTION

Improper disconnection of the cables!

Damage to the connectors.

- 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.

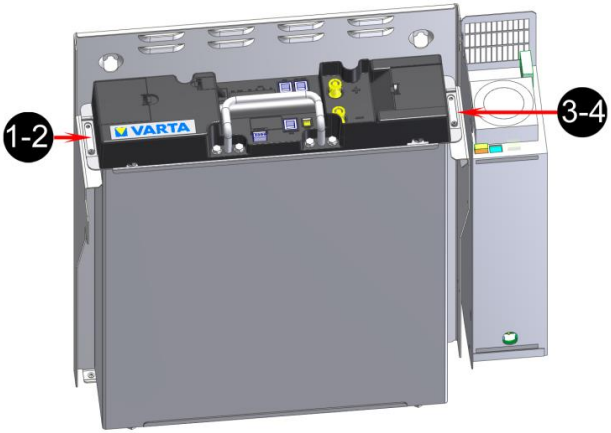
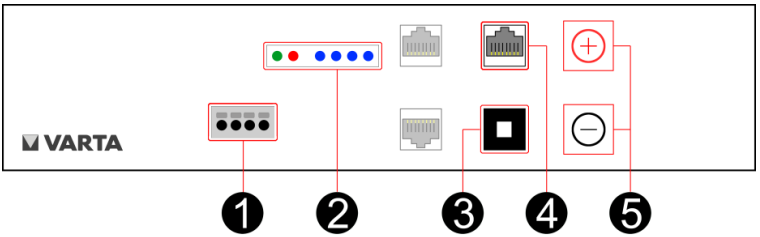


Figure 31: Battery module fastening screws

11.4.5 Installing the battery module

Reinstall the battery module exactly in reverse order.



1	DRY contact	4	CAN
2	LED-indicator	5	Battery power connection
3	Activation button		

Figure 32: Battery module

11.4.6 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.

11.4.7 Exchanging SD Card

Removing SD Card

You can find the SD card in the connection area AC, position 1.

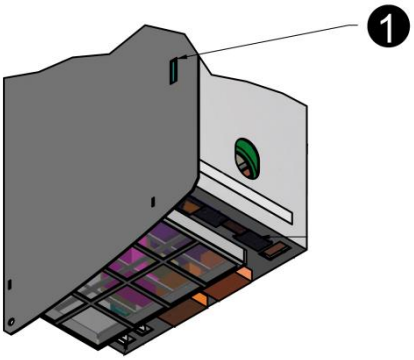


Figure 33: Position of the SD card

Preparing SD Card

Before inserting the new SD card into the battery inverter, you still have to prepare this.

I. To do so, insert the new SD card into a notebook, a computer or into a card reader connected to the computer.

> We recommend using a new SD card. If there is data on the SD card you have chosen, make a backup of this first. Afterwards, format the SD card in FAT32 format.

II. Download the "RES-Webserver-X.X.X.X.zip" file in the VARTA B2B area under downloads and unpack the contained "http" folder.

III. Copy the unpacked "http" folder to the SD card.

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

Installing SD card

I. Insert the prepared SD card into the battery inverter.

II. Close the slot again so that no unwanted air is sucked in.

After installing the SD card, you can restart the energy storage system as described in the instruction manual.

11.5. Completion of service and repair work

DANGER

Contact with live parts!

Mortal danger.

- ➡ 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.

ATTENTION

On/Off switch could be damaged!

System cannot be put into operation.

- ➡ 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.

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 34: 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 8.13.3).

11.5.2 Cleaning

WARNING

Entry of water into electrical systems!

Possible mortal danger.

➡ Do not use water for cleaning the energy storage system.

➡ Never put down containers with fluids (beverage containers and the like) on electrical systems.

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

Improper troubleshooting due to lack of professional knowledge!

Personal injuries and material damage.

➡ Only the qualified electrician is allowed to rectify malfunctions.

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.

13. Disassembly and disposal

13.1. Planning disassembly

WARNING

Improper disassembly due to lack of professional knowledge!

Personal injuries and environmental damage.

➡ Only the qualified electrician is allowed to disassemble the energy storage system.

Read the instruction manual.

i 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.

i

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.

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

14.4. Planning a relocation

WARNING

Improper disassembly due to lack of professional knowledge!

Personal injuries and environmental damage.

➡ Only the qualified electrician is allowed to disassemble the energy storage system.

Read the instruction manual.

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

14.5. 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.

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.

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.

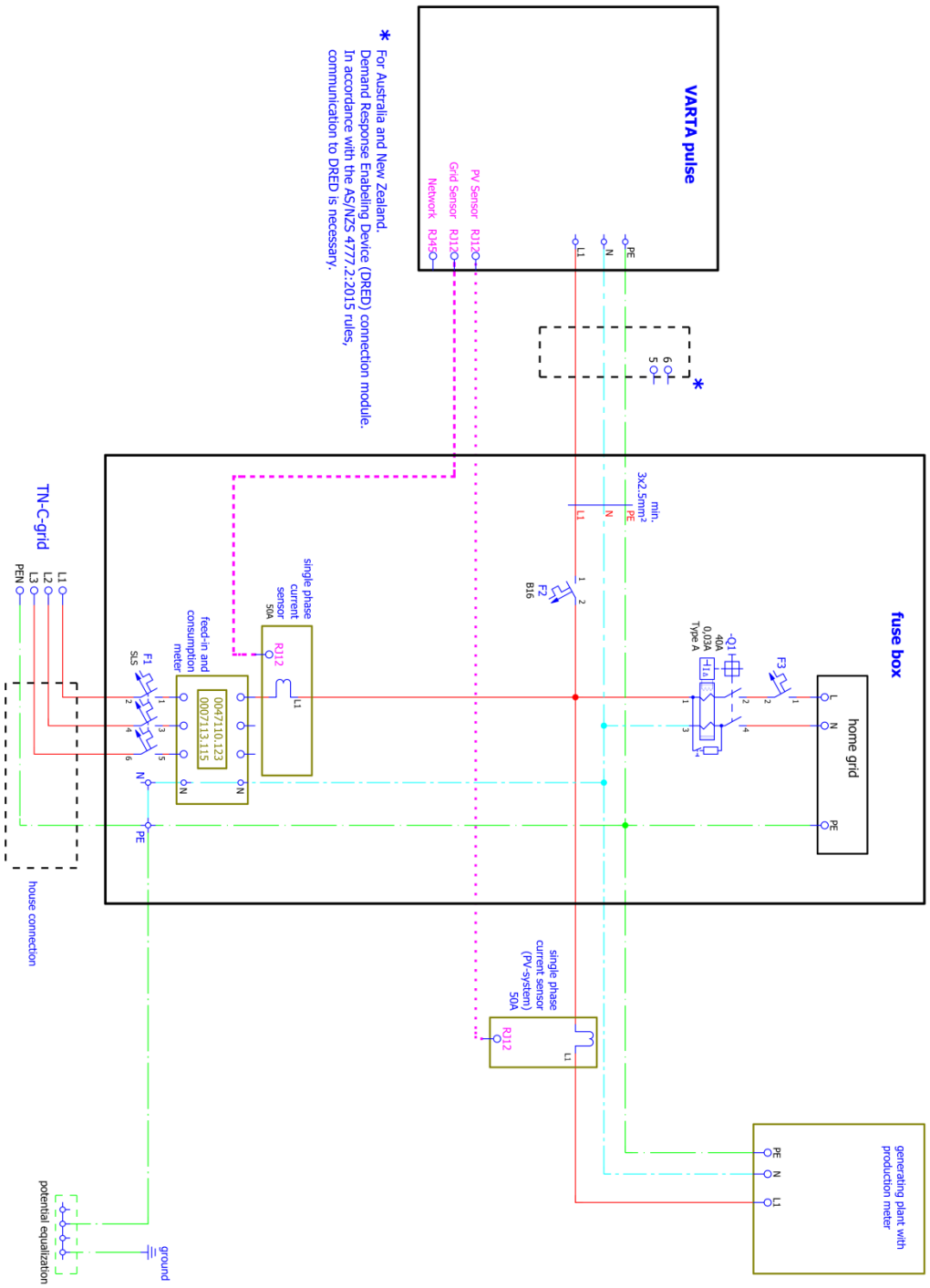
This instruction manual is not to be construed as a contract. Subject to errors, printing mistakes and modifications.

Figures

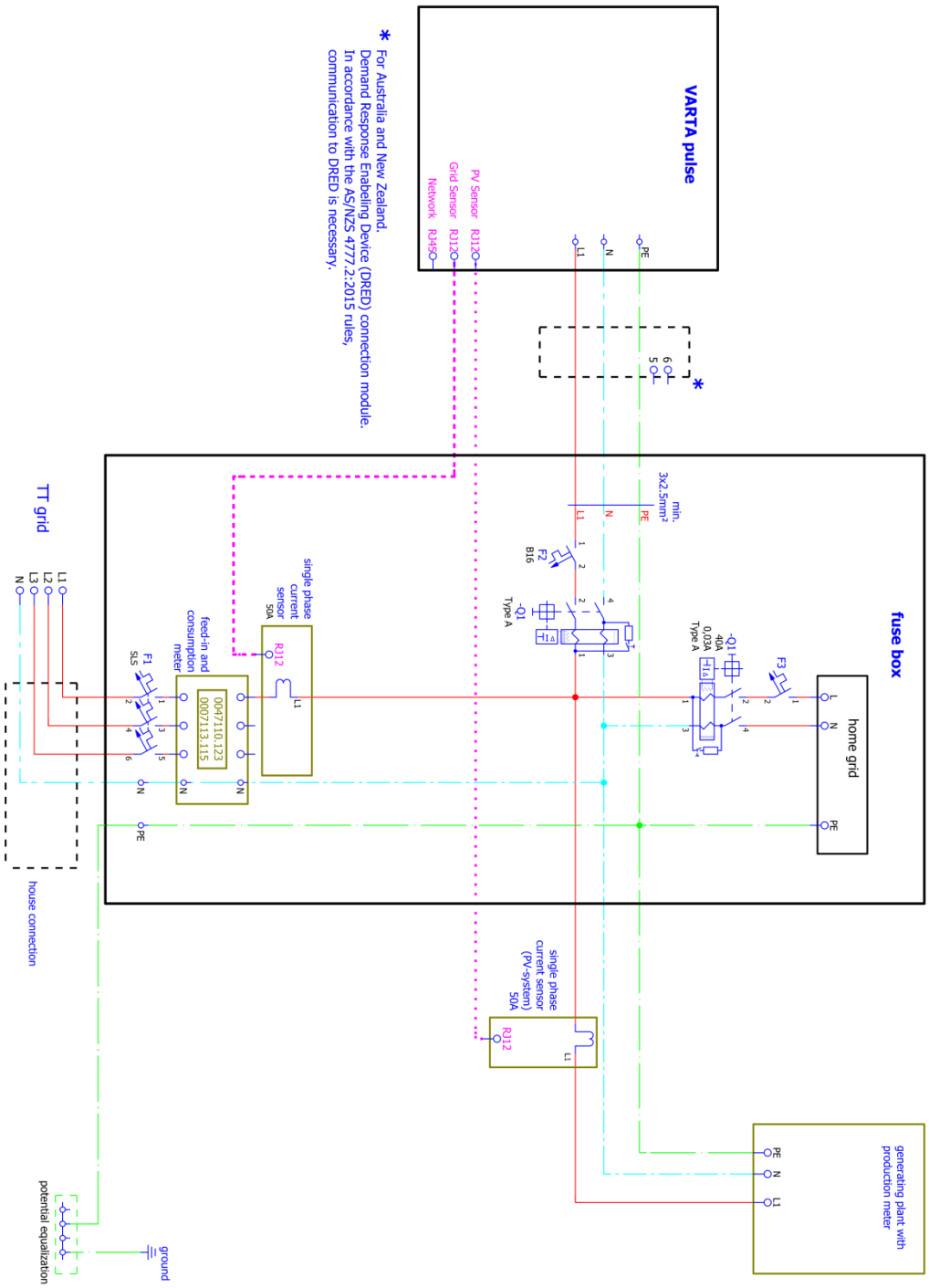
Tables

Appendix

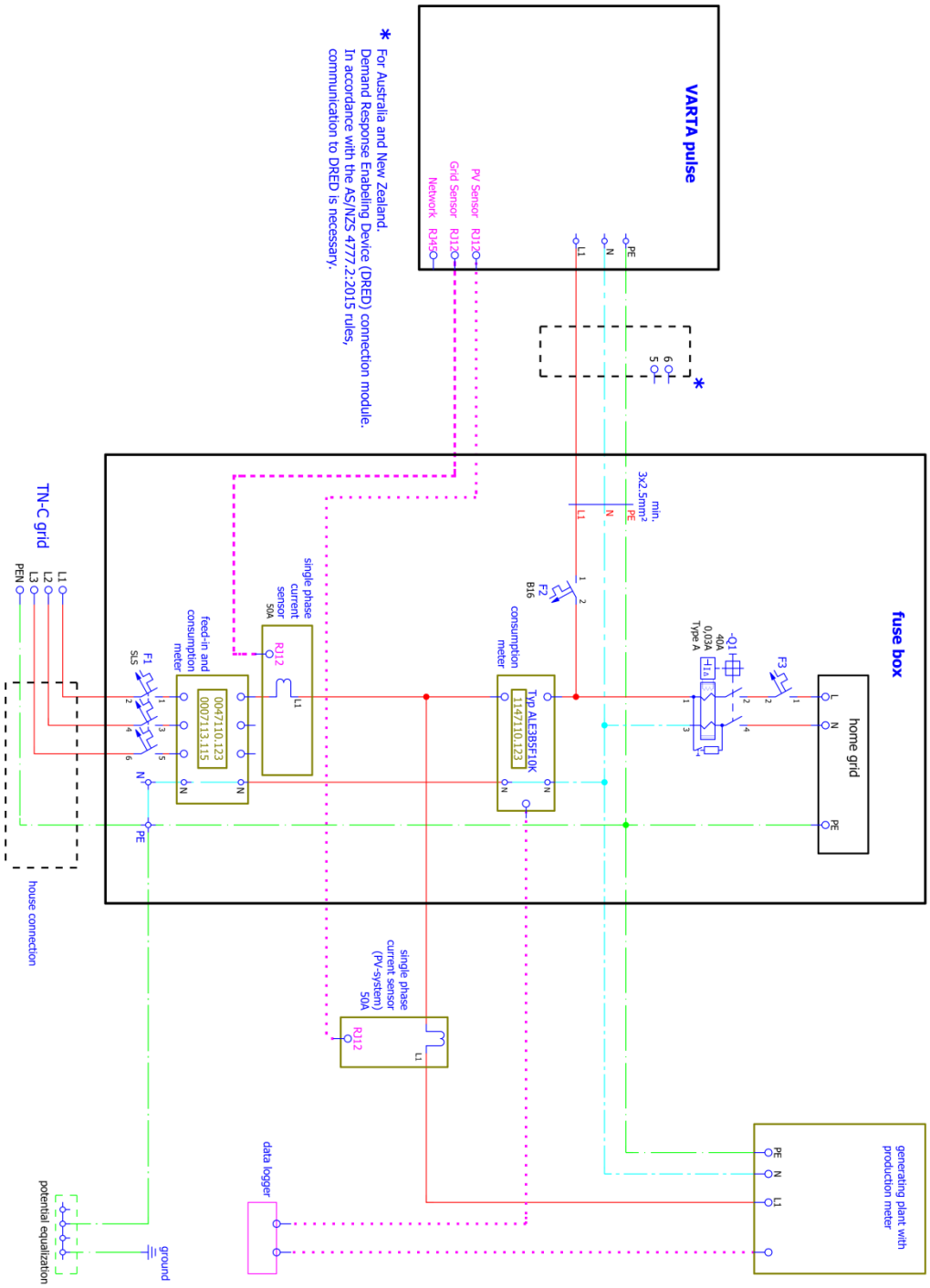
Appendix



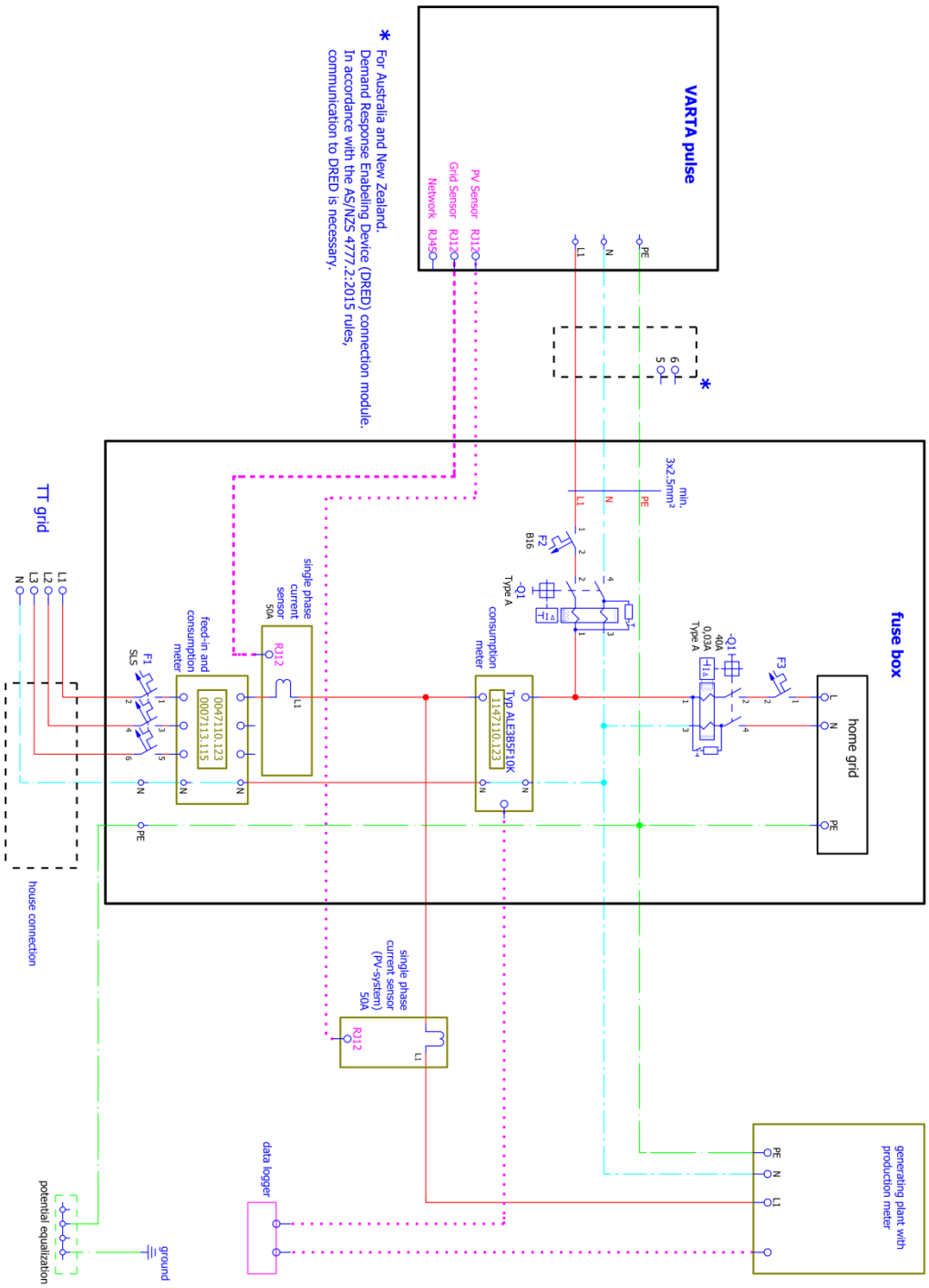
Appendix 1: Connection diagram of TT system



Appendix 2: Connection diagram of TT system with data logger



Appendix 3: Connection diagram of TN-C system



Appendix 4: Connection diagram of TN-C system with data logger