

Installation, Operation and Maintenance Instructions

Polarium Battery System



Copyright

© Polarium Energy Solutions AB. 2025. All Rights Reserved. No part of this document may be reproduced or used without the expressed written consent of Polarium Energy Solutions AB.

Disclaimer

The contents of this document are subject to change without notice due to continual updates to the product along with the methodology.

Reference online publications for the most updated iteration of this or any document produced by Polarium. Polarium and partners shall hold no liability for damages or errors due to the use of this document during its installation or operation.

Table of Content

1.	Introduction	5
1.1.	Purpose of this Document	5
1.2.	Product Introduction	5
2.	Safety Warnings and Precautions	6
2.1.	Safety Messages used in this Manual	6
2.2.	Read the User and Installation Manual	7
2.3.	Qualified Electrician	7
2.4.	Personal Protection	7
2.5.	Battery Electrolyte	7
2.6.	Electrical Hazard	7
2.7.	Risk of Fire	9
2.8.	Warning	9
2.9.	First Aid Measures	9
2.10.	Caution	10
2.11.	Warranty	10
2.12.	Packaging	10
2.13.	Transportation	10
2.14.	Storage	11
3.	Product Description	12
3.1.	System Overview	12
3.2.	Module Descriptions	14
3.3.	Indicators and Buttons	15
4.	Residential User Preparations	17
5.	Installation	18
5.1.	Prerequisites	19
5.2.	Preparations	20
5.3.	Installation Sequence	22
5.4.	Unpack and Check for Damages	22
5.5.	Mount the Product to Wall	23
5.6.	Install the Pulse Clamps	30
5.7.	Configure System and Update Software	31
5.8.	Verify the installation	31
6.	Residential User Operation	33
6.1.	Log in to the Polarium Battery System	33
6.2.	Shut down the Polarium Battery System	34
6.3.	Residential User Interface/App	34
7.	Maintenance	38
7.1.	Residential User Maintenance Check	38
7.2.	Spare Parts	38
7.3.	Disassemble and Dismount the Product	38
7.4.	Replace the Battery Module	42
7.5.	Replace the Inverter Module	42

7.6.	Replace the Antenna	43
7.7.	Replace the Pulse Clamps	43
7.8.	Replace the Cover	43
7.9.	Disposal and Recycling	44
8.	Troubleshooting	45
9.	Technical Specifications	46
9.1.	Battery Energy Storage System (BESS)	46
9.2.	Battery Module	47
9.3.	Inverter Module	48
9.4.	Controller (RF Specification)	49
10.	Appendix	51
10.1.	Abbreviations / Acronyms	51

1. Introduction

1.1. Purpose of this Document

This document describes how to install, operate, handle, maintain, and troubleshoot the Polarium Battery System in its intended environment.

This document is aimed at qualified electricians who install, troubleshoot, or perform maintenance on the product. The sections marked RESIDENTIAL USER are aimed at residential users.

1.2. Product Introduction

The Polarium battery system is a compact and modular battery energy storage system (BESS), designed for grid integration of high-voltage lithium batteries within the residential segment. It consists of 1-2 battery units, as well as an inverter unit, with an integrated controller and human machine interface (HMI).

The product is designed to support the following end-user applications:

- **Load Shifting**
The battery is controlled based on energy tariff, with the objective to shift the load demand from peak hours to off-peak hours of the day, thereby reducing the cost of the energy.
- **Solar Self-consumption**
The battery is charged with solar energy generated by grid-tied PV inverters. Instead of exporting excess solar energy to the grid at a low price, the energy is stored during the day. Subsequently, the battery is discharged to supply loads at night.
- **Peak shaving**
The battery is discharged to supply energy at times of temporary high power demand, and recharged at times of lower demand. The purpose is to lower the maximum power drawn from the utility grid, thereby allowing savings related to peakpower tariffs.
- **Ancillary Services**
The battery is setup to participate in grid stability support schemes such as Fast Frequency Response (FFR) and Frequency Containment Reserve (FCR). An aggregator entity coordinates multiple BESS into a virtual power plant (VPP), thereby achieving the power demand of the grid transmission system operator.
For detailed product-specific information, refer to the technical specifications or contact Polarium.

1.2.1. Contact and Support








For support, contact your local sales representative.

For inquiries and support regarding battery disposal through Polarium: Info@polarium.com

2. Safety Warnings and Precautions

For all electrical installation, service, and maintenance work refer to the requirements in EN 50110-1:2013 - Operation of electrical installations for qualified electricians.

2.1. Safety Messages used in this Manual

Symbol	Admonition	Meaning
	WARNING!	Used when there is a potentially dangerous situation. Death or serious injury may result if appropriate precautions are not taken.
	ELECTRICAL HAZARD!	Used when there is a potentially dangerous situation involving electricity. Death or serious injury may result if appropriate precautions are not taken.
	FIRE HAZARD!	Used when there is a potentially dangerous situation involving fire. Death or serious injury may result if appropriate precautions are not taken.
	FLAMMABLE GAS HAZARD!	Used when misuse of the battery modules can result in the release of flammable gases. Death or serious injury may result if appropriate precautions are not taken.
	TIP-OVER HAZARD!	Used when there is a potentially dangerous situation involving objects tipping and falling over, when not mechanically secured in location. Death or serious injury may result if appropriate precautions are not taken.
	MECHANICAL HAZARD!	Used when there is a risk of strains, crushing and injuries caused by lifting or dropping heavy parts, and minor cuts and injuries caused by packaging material or sharp edges.
	CAUTION!	Used when there is a situation where damage or injury could occur. Minor injury and/or damage to property may result if appropriate precautions are not taken.
	READ THE USER MANUAL	Important information referenced in the manuals.
	CAPACITOR DISCHARGE!	Indicates risk of death or serious injury caused by residual voltage if the indicated time for discharge is not applied.

2.2. Read the User and Installation Manual

Read the user guide in its entirety before installing, handling, or operating the product.

- The product must be handled, transported, stored, installed, and used in accordance with the instructions and specifications in this document. Handling and usage that is not in accordance with instructions and specifications will invalidate the warranties.
- The battery system is intended for installation in a location that meets the requirements for installation.
- The installation must be performed by a qualified electrician.
- Always follow the installation manual and referred documents when installing the product.
- For any questions about installation and operation, consult your local sales representative.
- Failure to read, understand and follow the safety precautions may lead to potential risks, such as hazardous situations involving death or serious injuries by fire, residual voltage, or explosion.

2.3. Qualified Electrician

Unpacking, assembly, installation, disassembly, troubleshooting, replacement, repairs, and service of this Battery Energy Storage System (BESS) must only be performed by qualified and trained electricians.

2.4. Personal Protection

Use the Personal Protective Equipment (PPE) relevant for each installation and/or maintenance task as described in this manual. The main hazards during installation are related to Low Voltage (400VAC and up to 900VDC) electrical works and to crushing, pinching and cuts during lifting and fitting operations.

2.5. Battery Electrolyte

For warnings and instructions regarding the battery electrolyte, a copy of the Material Safety Data Sheet (MSDS) can be supplied on request, please contact Polarium™ support.

2.6. Electrical Hazard

- Unpacking, assembly, installation, disassembly, troubleshooting, replacement, repairs, and service of this Battery Energy Storage System (BESS) must only be performed by qualified and trained electricians.
- Do not touch the battery system. A qualified electrician must handle the system. Turn the AC main switch OFF and wait for 10 minutes before handling the inverter after the system shutdown. The inverter is still energized when switched off and disconnected. Disconnect the communication cable before handling battery connectors, there is a risk of death or serious injury caused by energized capacitors and residual voltage.
- Electrical installation works must follow the procedures and rules defined by local and national electrical safety standards.
- A qualified electrician must perform a full risk analysis of the installation site and make sure that the system is properly grounded. There is a risk of death or serious injuries, in case of insufficient grounding and exposed live parts.
- A qualified electrician must perform a full risk analysis of the site before any maintenance or replacement work. Make sure the system is properly grounded. There is a risk of death or serious injuries, in case of insufficient grounding and exposed live parts.

- All tools used for installing the battery should be insulated and rated to a minimum of 1000 V DC.
- Do not touch the battery terminals Normally Open (NO) or high voltage circuits. There is a risk of death or serious burn injuries.
- Ensure the inverter and each battery module are properly grounded to the base frame, and that the overall Protective Earthing (PE) system of the Battery Energy Storage System (BESS) is connected and tested before starting the system, to prevent an electric shock.
- If the product is or appears damaged, do not touch any parts. Turn the AC main switch OFF and contact support. The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injuries, in case of damage to the product and exposed live parts.
- In case of a faulty battery module, a qualified electrician must perform a full risk analysis of the site before any maintenance or replacement work. Use Personal Protective Equipment (PPE) and handle the battery carefully. There is a risk of serious burn injuries, caused by short circuiting, thermal runaway, and explosion.
- Systems that are not in use must be switched off.
- Do not wire or attach the battery modules in any other way than that specified in the Installation Manual. Incorrect wiring may result in hazards such as damage to the module or explosion.
- Do not insert metal objects into the output terminals of the battery module or inverter.
- Do not crush or place heavy loads on the inverter module as damage may occur.
- Do not install or use battery modules or an inverter module which have been dropped due to the risk of internal damage.
- Do not use damaged, frayed, or non-approved electrical cables and connectors.
- There is a risk of electric shock. Do not remove the battery system cover/enclosure. There are no user serviceable parts inside. Contact a qualified authorized Polarium™ technician for service.
- Turn the AC main switch OFF In the event of:
 - Lost connectivity to the Installer App, or if the system cannot be shut off.
 - Incorrectly installed or lost protective earthing (PE).
 - Isolation fault in the system.
 - Offline system after reporting of faulty unit.
- The electrician must assess whether a Residual Current Device (RCD) and/or lightning protection system is required before installing the Polarium Battery System.
- A qualified electrician must perform the following procedure. There is a risk of death or serious injuries caused by access to live parts, residual voltage and potential thermal runaway.
 1. Ensure that the AC main switch is turned OFF.
 2. Wait for 10 minutes.
 3. Turn the DC safety switch OFF on the inverter.
 4. Disconnect the communication cable from the inverter before handling the battery.

2.7. Risk of Fire

- The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injury caused by residual voltage.
- Do not disassemble units.
- Do not short-circuit the battery module.
- Do not crush or place heavy loads on the battery module as damage may occur to the cells internally causing a short circuit.
- Mount a fire protection board for installations on wooden walls.
- Do not install the product near a heat source, minimum 2 meters from the product. There is a risk of serious burn injuries caused by explosion and thermal runaway. Ensure no flammable materials are near the unit during installation or operation.
- Do not drop or hit the product. Carefully and firmly, handle the product. There is a risk of serious burn injuries caused by internal short circuiting or penetration from dropping the product.
- In case of a faulty battery module, a qualified electrician must perform a full risk analysis of the site before any maintenance or replacement work. Use Personal Protective Equipment (PPE) and handle the battery carefully. There is a risk of serious burn injuries, caused by short circuiting, thermal runaway, and explosion.
- Do not expose the battery module to fire or temperatures higher than 60 °C. High temperatures may cause the battery to overheat or even self-ignite. High temperatures may also result in loss of performance and decreased life expectancy of the product.
- Immediately disconnect the battery if, during operation, the battery heats up rapidly or in any way feels abnormally hot, (60 °C or greater).
- Immediately disconnect the battery if, during operation, the battery appears abnormal in any way.
- Only use components and cables provided by Polarium within the product. External connection must comply with local wiring regulations.

2.8. Warning

- Use Personal Protective Equipment (PPE) and handle the battery carefully. There is a risk of death or serious injuries, in case of damaged goods or faulty parts from production.



TIP-OVER HAZARD!

- Ensure that the product is properly mounted and secured. There is a risk of injuries due to units tipping and falling over.



MECHANICAL HAZARD!

- Handle the product carefully and firmly and use Personal Protective Equipment (PPE). There is a risk of minor cuts and injuries caused by packaging material or sharp edges.
- Use ergonomic techniques according to best practice to unpack and lift the product into position. Use Personal Protective Equipment (PPE). There is a risk of strains and injuries caused by lifting or dropping heavy parts.

2.9. First Aid Measures

The following first aid measures are required only in case of exposure to interior battery components, and battery electrolyte in case of damage to the external battery casing. Undamaged, closed cells do not represent health risks.

In case of inhalation, ensure access to fresh air. Consult a physician immediately.

In case of battery electrolyte in contact with the skin, wash off immediately with plenty of water. Consult a physician immediately.

In case of contact with the eyes, rinse immediately with plenty of water, including under the eyelids, for at least 15 minutes. Seek immediate medical treatment from an eye specialist.

In case of ingestion, drink plenty of water. Call a physician immediately.

2.10. Caution

- Keep the battery connected to the grid. Batteries that are disconnected for an extended period of time can self-discharge to a level from which the battery does not permit recovery. Do not disconnect the battery for longer than a month
- Installing a product in an inappropriate environment can lead to product failure or malfunction. Do not attempt any installation work if the operating temperature range or operating non-condensing humidity range thresholds are exceeded. Do not install the product in a place where there is a risk of flooding.

2.11. Warranty

The warranty of the product may be invalid and any liability for damages may be rejected if installation and operation are not compliant with the Polarium warranty conditions. Polarium assumes no responsibility for any consequential damages. The following actions and events are considered a failure to comply with the warranty conditions:

- Damage to the product due to failure to observe the installation procedures, recommendations, warnings, and precautions specified in this document.
- Damage to the product during transport and storage.
- Damage to the product due to incorrect installation.
- Damage to the product due to improper storage and product operating environment.
- Damage to the product due to failure to comply with safety instructions.
- Damage to the product due to product installation or repair by those who are not qualified.
- Damage to the product due to natural disasters.

2.12. Packaging

- Batteries are delivered from the factory in packaging dedicated for transport and storage of the particular battery (UN Certified package for Transport of Dangerous Goods) – keep the battery in its packaging until it is time for installation.
- Keeping the battery in its original packaging helps to protect from pollution, moisture, and mechanical damage.
- Do not remove the battery from its packaging before arriving at the installation location.

2.13. Transportation

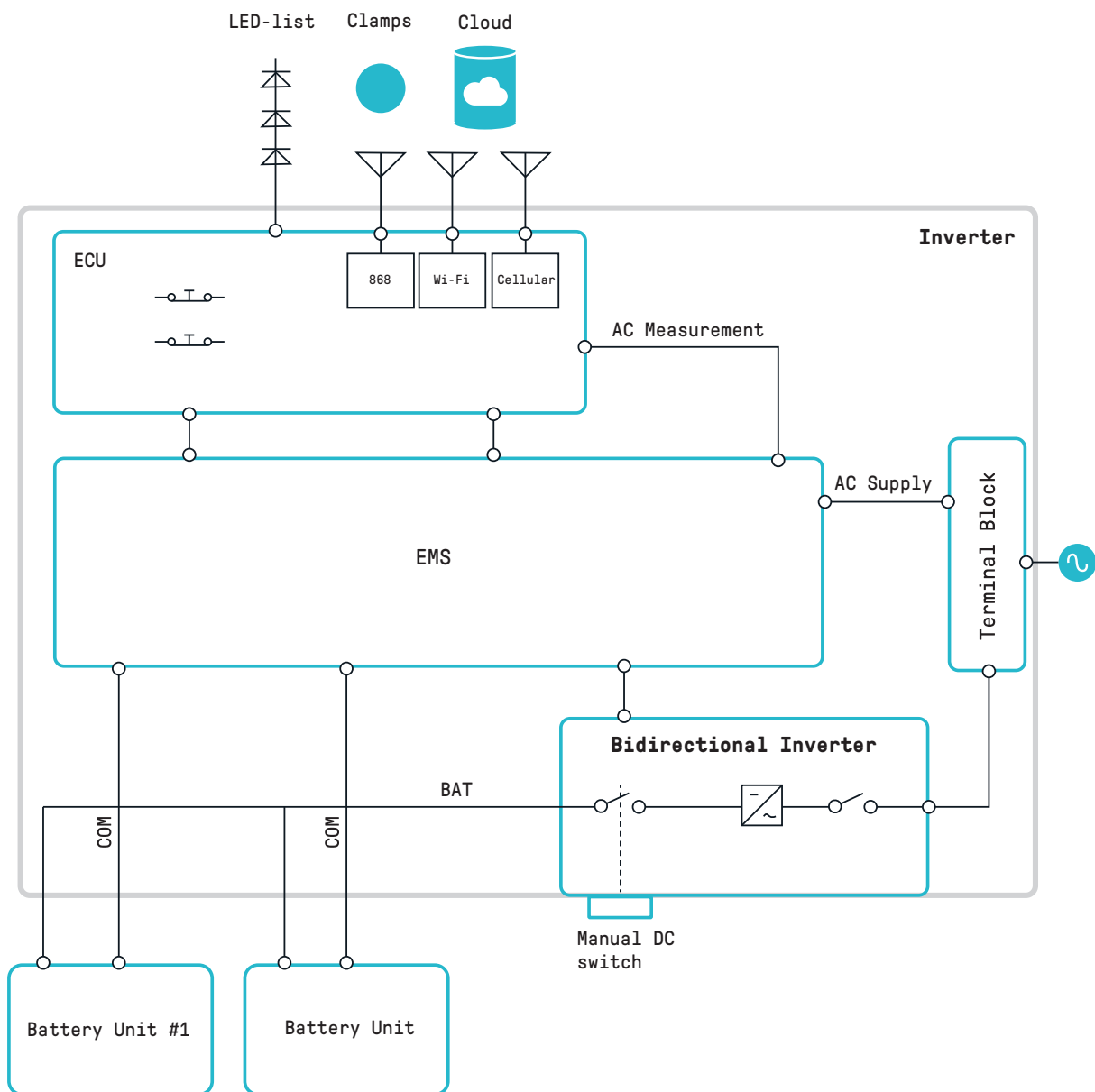
- Lithium batteries are classified as dangerous goods and transport restrictions apply – be sure to follow any global and local regulations concerning handling and transport of lithium batteries.
- Handle the battery in accordance with any specific marking on the packaging – for example concerning package position and stacking instructions.
- The battery in its packaging should be handled with care. It should not be exposed to the weather (rain, excessive heat, etc.), vibrations or sudden impacts, all of which could cause damage to or decrease performance of the battery.

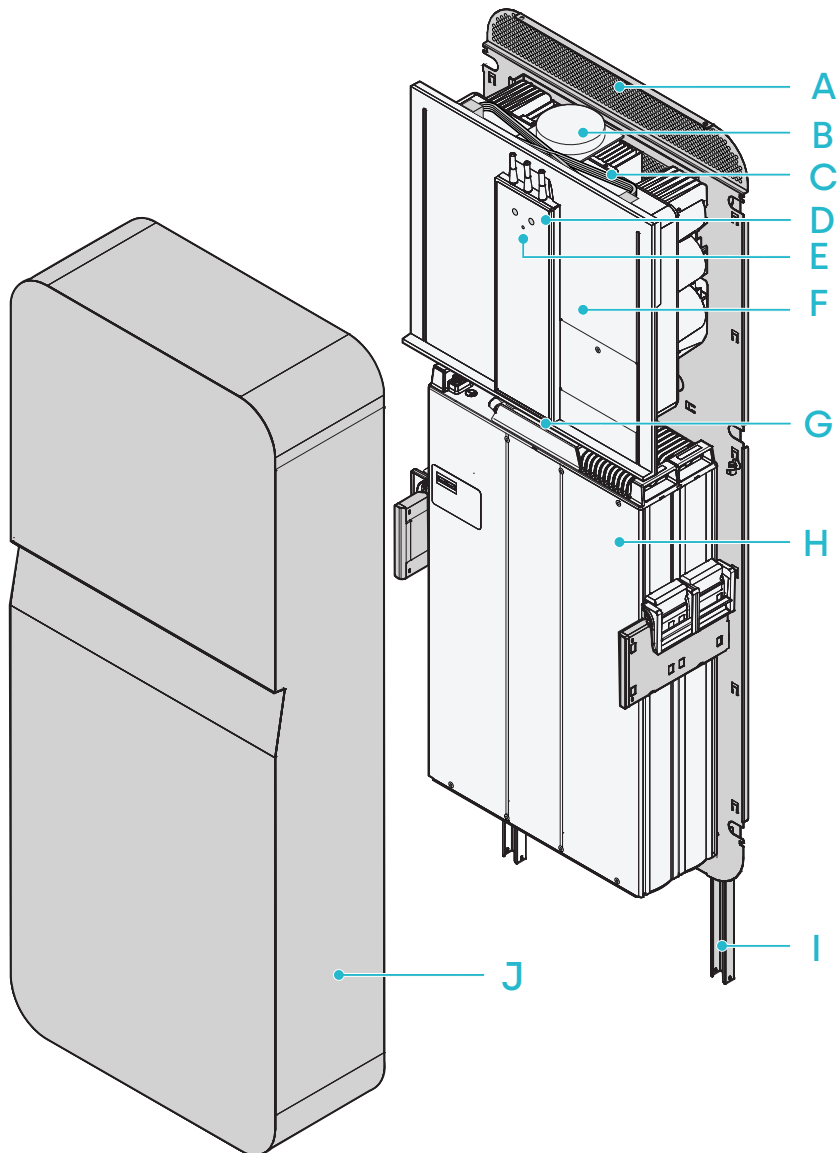
2.14. Storage

- Batteries are best stored in a dry, indoor storage in order to prevent degradation of performance.
- Batteries stored for an extended period of time can self-discharge to a level from which the battery does not permit recovery. To avoid this, make sure to charge the battery to 50% State of Charge no later than at the "charge by" date stated on the packaging, and thereafter check the State of Charge (SOC) at least once a year. Charge the battery to 50% if the SOC is less than 20%. Refer to the battery datasheet or contact your Polarium™ representative to obtain the correct charging voltages.
- Keep the battery connected to the grid. Batteries stored for an extended period of time can self-discharge to a level from which the battery does not permit recovery. Do not disconnect the battery for longer than a month.

3. Product Description

3.1. System Overview





A	Base Frame
B	Antenna
C	Antenna Bracket
D	Internal LED
E	Buttons
F	Inverter Module
G	External LED Strip
H	Battery Module (option 1-2)
I	Supports (optional)
J	Cover

NOTE! Pulse Clamps 1-2: Pulse grid clamps at the mains, pulse solar clamps at the solar inverter

3.2. Module Descriptions

3.2.1. Controller Module

Energy Management System (EMS)

The Energy Management System (EMS) controls the operating state of the system, via wired communication interfaces (RS485, Modbus RTE) to the inverter, battery management system (BMS) and Electronic Control Unit (ECU). It controls the charging/discharging state of the battery, via controlling the active power set-point of the inverter.

It also includes an auxiliary Power Supply Unit (PSU), that powers the electronics in the system from the AC supply.

Electronic Control Unit (ECU)

The Electronic Control Unit (ECU) incorporates external interfaces for both human-machine (HMI) and machine-machine (MMI) interaction. This includes:

Wireless interfaces

- An LTE and Wi-Fi for IP connectivity, and connection to a Cloud service provider.
- An 868Mhz RF interface to pulse clamps, mounted at the facility metering point/points.

LED

- Internal indicator for troubleshooting.
- External LED strip for battery status monitoring and ambient lighting.

3.2.2. Battery Module

Each battery module consists of 14 cell-packs connected in series, distributed on 2 cell interconnect boards. Each cell-pack consists of 15S2P cells and a Battery Monitoring Module (BMM) that measures the cell voltages and temperatures.

The Battery Management System (BMS) is the brain of the battery and ensures that the battery remains within its safe operating envelope, based on measured current, voltages and temperatures measurements. In case of a fault, the BMS disconnects the battery from the DC-bus.

3.2.3. Inverter Module

The system connects to the (400V) AC grid via a three-phase, bi-directional inverter, based on a transformer-less topology. The battery is coupled to the DC-link of the inverter, via an internal pre-charge circuit, in order to prevent inrush currents while connecting to the battery.

The inverter also includes relays, which can disconnect the inverter from the AC grid in case of fault conditions, including islanding and ground faults. A manual (DC) safety switch is located on the underside of the inverter. There are two buttons in the front of the inverter module to be used during production, test, installation, and service modes.

The antenna is connected to the inverter module and is installed on top of the inverter or on a wall.

3.2.4. Pulse Clamps

The pulse-clamp current sensors, pulse clamps, are real time meters that measure net energy flow, and transmit information to the provider.

The pulse clamps are paired wirelessly with the The Electronic Control Unit (ECU) of the Battery during installation. The communication cable is connected to an 868 MHz band.

The units are powered through a 240/5V adapter and have an additional built-in battery backup.

The Pulse Grid Clamp installed at the mains, measures net energy flow in and out of the grid.

The Pulse Solar Clamp installed at the solar inverter, measures solar production, for users who have a solar setup.

3.2.5. Configurations and Options

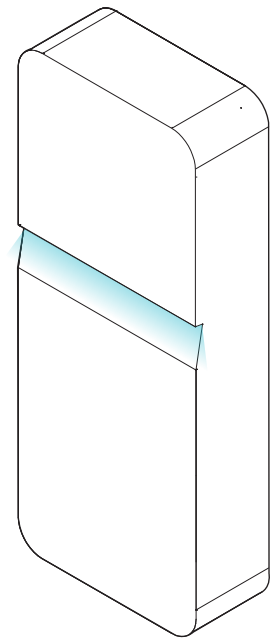
- Solar setup including pulse solar clamps
- Batteries: 1-2 Batteries
- Supports
- Colours:
 - Black
 - White
 - Red

3.3. Indicators and Buttons




The two buttons and internal LED are used during production, test, installation, and service modes by qualified electricians or technicians.

The external LED indicates State of Charge (SOC), charge and discharge status.

3.3.1. External LED Indicator/LED Strip











Number of LEDs that are solid from the middle	State of charge 0-100%
LED on only middle	0%
LED on all	100%

Color	Behavior	Description
White 	No animation	Battery is idle
Purple 	Lights from the edges towards the middle	LEDs animate from the edges towards the middle
Green 	Lights from the middle out towards the edges	Battery is discharging

*Total brightness is natively adjusted based on ambient light readings.

3.3.2. Internal LED Indicator

The multicolored LED is used to diagnose the system state related to the current LTE connectivity:

Color	Behavior	Description
Blue 	Steady	Operational Mode
Green 	Steady	Service Mode
Red 	Steady	Production Mode
Purple 	Steady	Standalone Mode
Green 	Slow blink	Toggle operational → Service Mode
blue 	Slow blink	Toggle service → Operational Mode
Yellow 	Slow blink Fast blink	Soft reset pending Soft reset confirm
Red 	Slow blink Fast blink	Factory reset pending Factory reset confirm
White 	Slow blink	OTA in progress

3.3.3. Buttons

- **Left button:** service mode that allows clamp pairing, registers with Cloud, enables local web server.
- **Right button:** reset, power cycles the controls.
- **Both buttons for 5 s:** Factory reset or stand-alone mode.

4. Residential User Preparations



WARNING!

- Do not handle the Polarium Battery System units. Unpacking, assembly, installation, troubleshooting, disassembly, replacements and repairs must only be performed by an electrician.
- A full risk analysis of the installation site must be performed by the electrician before installing the product.



ELECTRICAL HAZARD!

- The electrician must determine if a Residual Current Device (RCD) and/or Lightning protection system need(s) to be installed before the Polarium Battery System installation. Each installation site must be assessed, depending on the local environment and requirements.



FIRE HAZARD!



FLAMMABLE GAS HAZARD!

- A fire protection board is required for installations on wooden walls. The placement must be assessed and mounted by a qualified electrician.



CAUTION!

- Keep the battery connected to the grid. Batteries that are disconnected for an extended period of time can self-discharge to a level from which the battery does not permit recovery. Do not disconnect the battery for longer than a month.
- For any questions about installation and operation, consult your local sales representative.
- The warranty of the product may be invalid and any liability for damages may be rejected if installation and operation are not compliant with the Polarium warranty conditions. Polarium assumes no responsibility for any consequential damages.

Residential user instructions:

1. Follow the instructions via Installer App.
2. Fill in the requested customer data, options, and verify:
 - Supply and grounding system (TN/TT)
 - Main fuse, 3 phase
 - Type of mounting:
 - Wall mounting:
 - Visible or hidden cable installation
 - Solar setup/installation (including the pulse solar clamps)
3. Choose placement for the product to prepare for mounting and installation according to the requirements and customer information.

5. Installation



WARNING!

- The installation site must be in compliance with climate conditions according to IEC 60721-3-4/IEC 60721-3-3:2019.
- The installation must be performed by a qualified electrician.
- The battery system is intended for installation in a location that meets the requirements for installation.
- Electrical installation works must follow the procedures and rules defined by local and national electrical safety standards.
- A qualified electrician must perform a full risk analysis of the installation site and make sure that the system is properly grounded. There is a risk of death or serious injuries, in case of insufficient grounding and exposed live parts.
- Use the Personal Protective Equipment (PPE) relevant for each installation and/or maintenance task as described in this manual. The main hazards during installation are related to Low Voltage (400VAC and up to 900VDC) electrical works and to crushing, pinching and cuts during lifting and fitting operations.



ELECTRICAL HAZARD!

- The electrician must determine if a Residual Current Device (RCD) and/or Lightning protection system need to be installed before the Polarium Battery System installation.
- Handle the battery carefully. There is a risk of death or serious burn injuries, in case of damaged goods or faulty parts from production.
- The battery modules are supplied in a charged condition and are capable of extremely high short-circuit currents. Take care to avoid short-circuiting cables or to reverse the polarity of connections. Accidental shorting of cables can result in severe electrical arcing, causing burns and electric shock to nearby personnel.
- Ensure the inverter and each battery module are properly grounded to the base frame, and that the overall Protective Earthing (PE) system of the Battery Energy Storage System (BESS) is connected and tested before starting the system, to prevent an electric shock.
- Do not touch the battery terminals Normally Open (NO) or high voltage circuits. There is a risk of death or serious burn injuries.
- Do not wire or attach the battery modules in any other way than that specified in the Installation Manual. Incorrect wiring may result in hazards such as damage to the module or explosion.
- Do not insert metal objects into the output terminals of the battery module or inverter.
- Do not crush or place heavy loads on the inverter module as damage may occur.
- Do not install or use battery modules or an inverter module which have been dropped due to the risk of internal damage.
- Do not use damaged, frayed, or non-approved electrical cables and connectors.



CAPACITOR DISCHARGE!

If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused by residual voltage.



FIRE HAZARD!



FLAMMABLE GAS HAZARD!

- A fire protection board is required for installations on wooden walls. The placement must be assessed and mounted by a qualified electrician.
- Do not expose the battery module to fire or temperatures higher than 60 °C. High temperatures may cause the battery to overheat or even self-ignite. High temperatures may also result in loss of performance and decreased life expectancy of the product.
- Do not drop or hit the product. Handle the product carefully and firmly. There is a risk of serious burn injuries caused by internal short circuiting or penetration from dropping the product.
- Do not expose the battery module to fire or temperatures higher than 60 °C. High temperatures may cause the battery to overheat or even self-ignite. High temperatures may also result in loss of performance and decreased life expectancy of the product.



TIP-OVER HAZARD!

- Ensure that the product is properly mounted and secured. There is a risk of injuries due to units tipping and falling over.



MECHANICAL HAZARD!

- Handle the product carefully and firmly and use Personal Protective Equipment (PPE). There is a risk of minor cuts and injuries caused by packaging material or sharp edges.
- Use ergonomic techniques according to best practice to unpack and lift the product into position. Use Personal Protective Equipment (PPE). There is a risk of strains and injuries caused by lifting or dropping heavy parts.



CAUTION!

- Installing a product in an inappropriate environment can lead to product failure or malfunction. Do not attempt any installation work if the operating temperature range or operating non-condensing humidity range thresholds are exceeded. Do not install the product in a place where there is a risk of flooding.

5.1. Prerequisites

Refer to the Technical specifications for installation data.

5.1.1. Requirements for Installation

Recommended installation	<ul style="list-style-type: none">▪ Outside wall▪ Pump house, garage etc
Limitations	<ul style="list-style-type: none">▪ Not in close proximity to residential spaces▪ No obstructions to air flow by vegetation or objects
Wall material and properties	<ul style="list-style-type: none">▪ Concrete, wood, brick▪ Wooden wall requires fire protection board installation▪ Load bearing capacity: 130 kg
Temperature	-20 to +45 °C
Main power supply	<ul style="list-style-type: none">▪ Fuse: 3-phase, 16 A (type-C MCB recommended)▪ AC cable: 2.5mm², shielded▪ Supply and grounding system (TN/TT)

Altitude	Max 3 000 m
Minimum height	25 cm
Maximum height	According to ergonomic principles
Distance to surrounding objects	30 cm
Distance to heat source	2 m
Distance to another battery	30 cm
Connectivity, position, and signal of the LTE-connection and Wi-Fi	

5.1.2. Tools and Materials



WARNING!

All tools used for installing the battery should be insulated and rated to a minimum of 1000 V DC.

Required Tools and Materials

Sharp Knife (box cutter)

Electric screwdriver / drill: T20, T25

Spirit level

Water pump pliers

Hammer

Sheath stripper

Cable grips

End sleeves

Cable lug

Cable crimp

Crimp tool

Wire stripper / Wire cutter

DIN rail mount

Rubber sealing strip

Electrical insulating tape

Cable clamps

Industrial key

Personal Protective Equipment

Insulated gloves

Safety shoes

Non-flammable clothes

Eye protection

5.2. Preparations



WARNING!

- Unpacking, assembly, installation, troubleshooting, disassembly, replacements and repairs must only be performed by an electrician.
- The battery system is intended for installation in a location that meets the requirements for installation.
- A full risk analysis of the installation site must be performed by the electrician before installing the product.

5.2.1. RCD and Lightning Protection

WARNING!

A full risk analysis of the installation site must be performed by the electrician before installing the product.

The electrician must determine if a Residual Current Device (RCD) and/or Lightning protection system need to be installed before the Polarium Battery System installation.

Each installation site must be assessed, depending on the local environment and requirements.

Residual Current Device (RCD)

If an RCD is installed the recommendation is to use a Type B and current level set to minimum 100mA.

Lightning protection

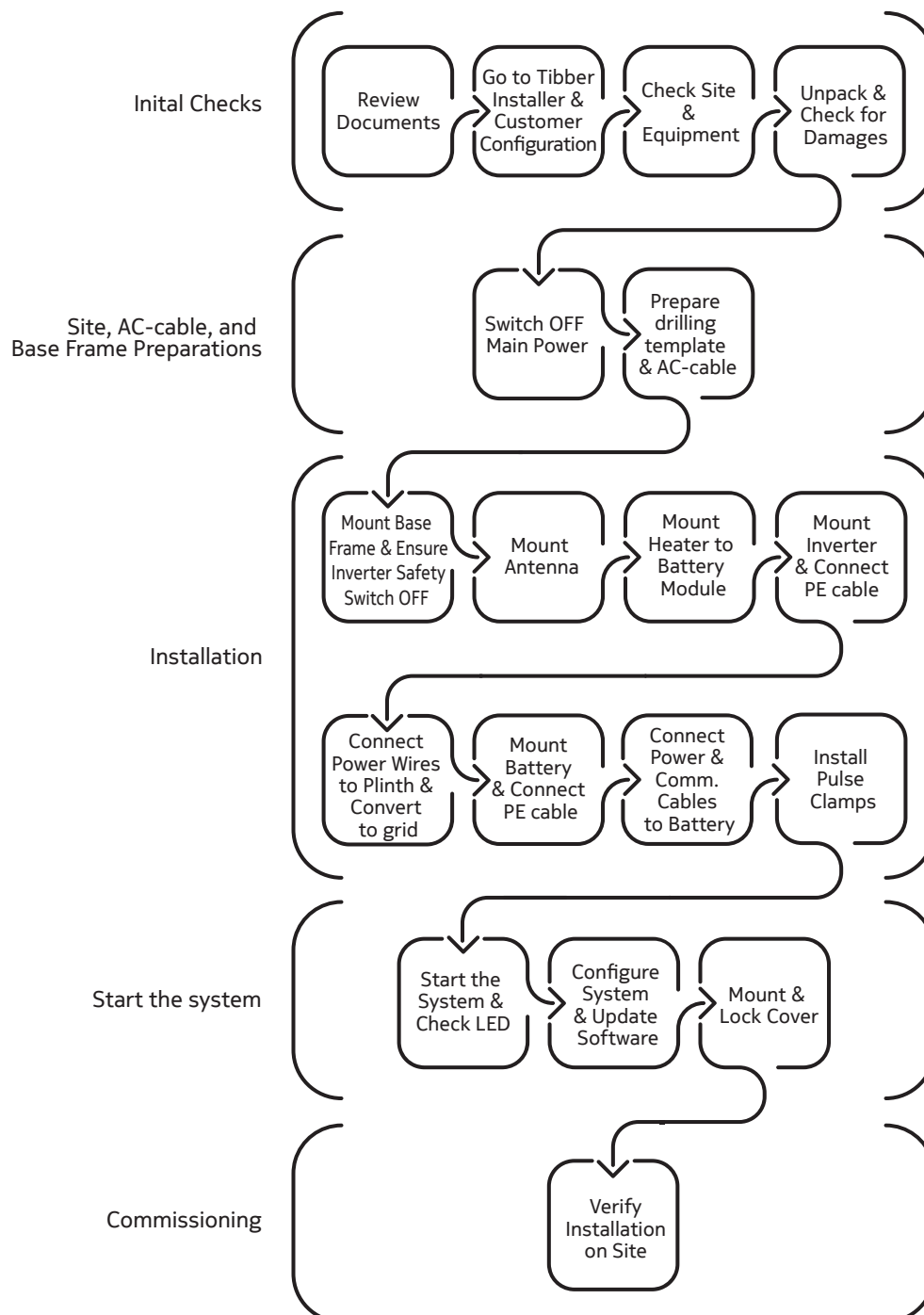
The Battery system is designed for OVC III. If the system is installed in an environment requiring OVC IV, an external surge protection is needed.

5.2.2. Pre-installation Checklist

WARNING!

- Unpacking, assembly, installation, troubleshooting, disassembly, replacements and repairs must only be performed by an electrician.
- A full risk analysis of the installation site must be performed by the electrician before installing the product.
- The battery system is intended for installation in a location that meets the requirements for installation.
- The site must be accessible for transport of the system components.
- Modifications to the existing installation must be completed.
- The site must be clear of foreign objects.
- Equipment and material to be installed must be available at the site and verified as complete and undamaged.
- All tools and materials required for installation must be available.
- The electrician must determine if a Residual Current Device (RCD) and/or Lightning protection system need to be installed before the Polarium Battery System installation. Each installation site must be assessed, depending on the local environment and requirements.

5.3. Installation Sequence



5.4. Unpack and Check for Damages



WARNING!

- Unpack the battery on site. The battery is considered dangerous goods and must be transported in its original packaging to prevent risk of damage.
- Read the safety information and follow the instructions for disassembly to perform maintenance, troubleshooting, tests, relocation, reinstallation, unit replacement, service, and repairs.
- Use the Personal Protective Equipment (PPE) relevant for each installation as described in this manual. The main hazards during installation are related to Low Voltage (400 VAC and up to 900 VDC) electrical works and to crushing, pinching and cuts during lifting and fitting operations.

1. Lifting must be carried out in compliance with local health and safety guidelines.
2. Inspect the packaging for damage. Document and report any damage to the product.
3. Lay the box flat on the ground to unpack. Do not unpack vertically.
4. Check that all required hardware is included. Check the Installer Web App (install.homevolt.com) for complete unbox list for each installation.
5. Check the shock detector on the battery module for indication of damages.
6. Inspect the battery, connectors, and seals between casing parts. Do not install a battery that you suspect is damaged.
7. If a battery module shows any sign of physical damage, please stop the installation and contact your local sales representative.
8. Save the packaging material if you need to use it again. Packaging is certified for shipment of the specific battery as batteries are considered dangerous goods. If there is no requirement for reuse, discard the material in accordance with local regulations. Please recycle all packaging responsibly.

5.5. Mount the Product to Wall

5.5.1. Prepare the AC/Power Cable

The installation of the AC cable/main power supply may vary depending on the setup at the installation site.

1. Ensure that the AC cable meets the requirements for outdoor installation, including:

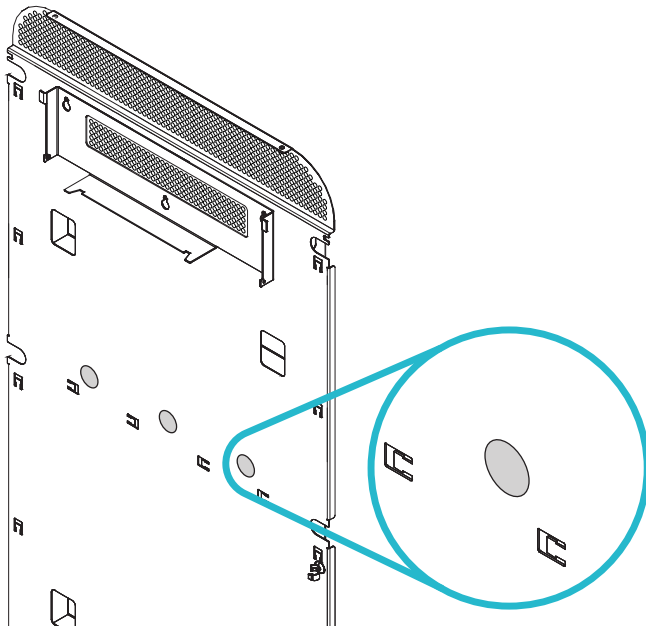
Cable type	Shielded cable (shield connected to PE)
Minimum cable cross-section	2.5 mm ²
Cable routing and strapping	Downwards and according to best practice
Size of main cable outer jacket	11 to 14 mm
Cable for outdoor use	UV-resistance, temperature limit for each installation site

2. Ensure the power system voltage is set correctly for the application.
3. Test the AC cable/main power supply to exclude or confirm possible cable failure/faults before starting the installation.
4. Use a strain relief to secure the AC cable/main power cable if necessary and applicable to the installation site.

5.5.2. Prepare Wall Mounting

1. Ensure that the mounting location is in accordance with the requirements for the installation site. See "5.1.1. Requirements for Installation" on page 19.
2. Use the base frame as a drilling template.
3. Choose one of the cableway alternatives hidden or visible cable for wall mounting.

5.5.3. Mount Base Frame to Wall - Hidden AC Cable



This mounting alternative depends on the wall requirements.

1. Choose one point of reference for mounting on the drilling template. Drill a hole and insert one screw according to best practice depending on the wall material, loadbearing capacity, and requirements on the installation site.
2. Choose one of the three points of reference for a hidden cableway on the drilling template for the AC cable/main power cable.
3. Drill a hole for the AC cable according to best practice and run the cable through the wall and drilling template.
4. Remove the corresponding knockout on the base frame.
5. Attach the rubber protection into the knockout hole.
6. Hang the base frame by the corresponding hole onto the screw.
7. Pull the AC cable through the base frame.
8. Place the spirit level on the inverter mounting bracket, align and drill the parallel hole for mounting.
9. Mount and secure the base frame to the wall using all the included screws.
10. Drop down one or two supports from the base frame (optional equipment) if necessary to support the product.

5.5.4. Mount Base Frame to Wall - Visible AC Cable

1. Choose a point of reference for the first screw on the drilling template. Drill a hole and insert the screw according to best practice depending on the wall material, loadbearing capacity, and requirements on the installation site.
2. Hang the base frame by the corresponding hole/point onto the screw.
3. Pull the AC cable through the base frame.
4. Place the spirit level on the inverter mounting bracket, align and drill the parallel hole and insert the screw for mounting.

5. Mount and secure the base frame to the wall using all the included screws.
6. Drop down one or two supports (optional equipment) if necessary to support the product.
7. Shape the cable to run it properly from the main power supply to the base frame. Attach a rubber sealing strip at the reference point to protect the cable, if necessary.
8. Run the AC cable through one of the 6 reference points on the base frame, according to best practice and safety standards. Consider: cableway distance, cable exposure, and cable bending radius.
9. Run and attach the AC cable with cable ties along the markings on the base frame with enough length to connect it to the inverter terminal.

5.5.5. Signal Strength and Options for Antenna Installation

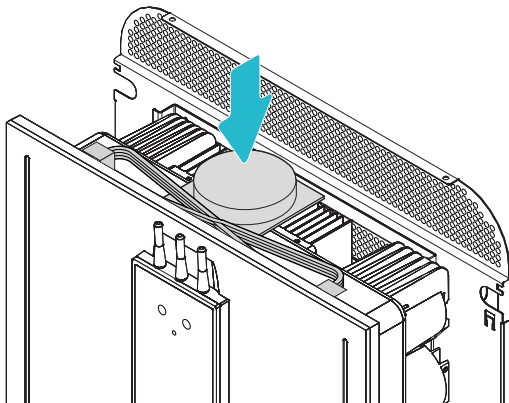
There are two options for installing the antenna, depending on the LTE- and Wi-Fi signal strength.

- Mount the Antenna on the Inverter
- Mount the Antenna on the Wall

5.5.6. Mount the Antenna on the Inverter

Capacitors inverter

1. Make sure the inverter safety switch is turned OFF.
2. Screw the antenna bracket onto the inverter. Use the prepared holes.
3. Wrap the antenna cable round the bracket with no excess length.



4. Slide the antenna into the bracket opening to secure it properly.
5. Hang the inverter unit onto the mounting bracket on the base frame.
6. Follow the instructions: Mount and Ground the Inverter to the Base Frame

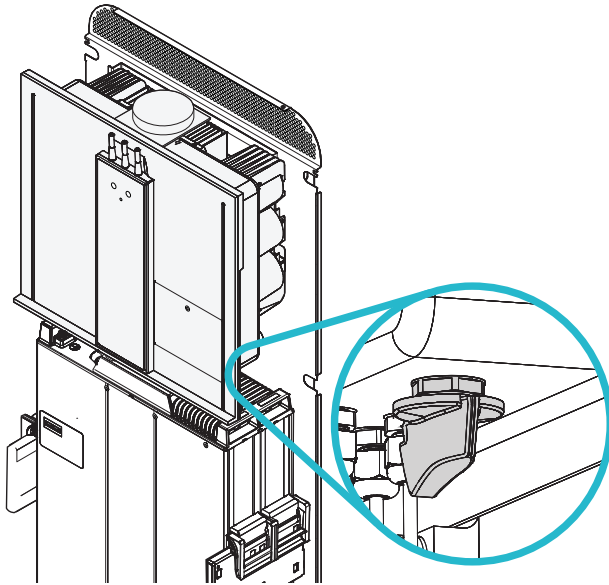
5.5.7. Mount and Ground the Inverter to the Base Frame



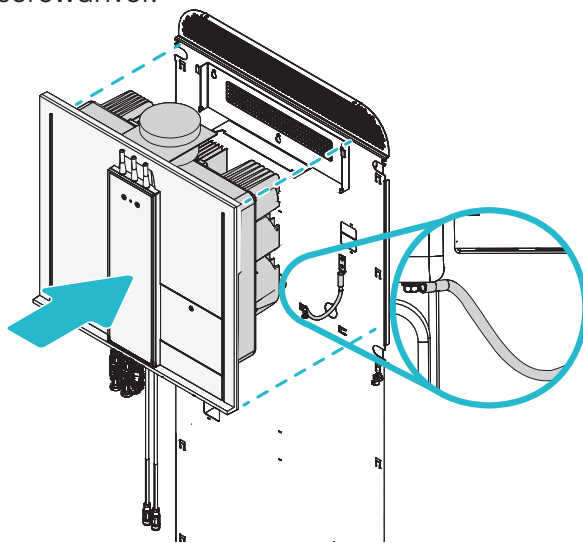
ELECTRICAL HAZARD!

The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injury caused by residual voltage.

1. Make sure the inverter safety switch is turned OFF.



2. Hang the inverter unit onto the mounting bracket on the base frame.
3. Connect the PE cable from the inverter chassis to the base frame with an electric screwdriver.



5.5.8. Mount the Antenna to Wall



ELECTRICAL HAZARD!

The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injury caused by residual voltage.

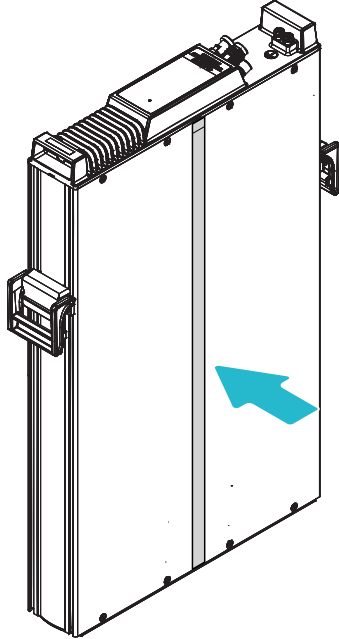
1. Make sure the inverter safety switch is turned OFF.
2. Unwrap a suitable length of the antenna cable for wall placement. If there is any excess cable, wrap it around the bracket.
3. Mount the inverter bracket to the wall according to best practice.
4. Slide the antenna into the bracket opening to secure it properly.
5. Follow the instructions: Mount and Ground the Inverter to the Base Frame.

5.5.9. Mount the Heater to the Battery Module

The heater should be attached to the battery before mounting the battery onto the base frame.

1. Clean the surface of the battery using the cleaning wipe provided in the battery package.
2. Position the heater at the center of the back of the battery (refer to the illustration below)

NOTE! Ensure that the connections are correctly oriented.



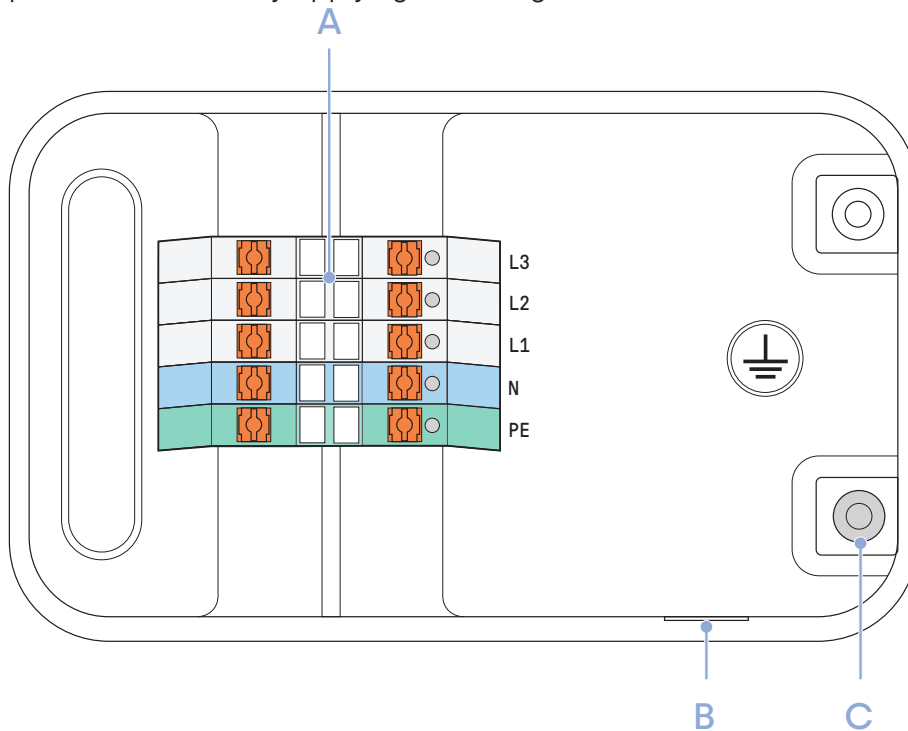
5.5.10. Connect Power Wires to Terminal Block - TN/TT Systems



ELECTRICAL HAZARD!

- The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injury caused by residual voltage.
 - A missing jumper will prevent the inverter from starting and functioning as intended.
 - A jumper connected across the wrong terminals may trip the mains fuse and/or damage the electronics in the inverter.
1. Make sure the AC supply is disconnected, either at the Mains distribution cabinet or the AC disconnect switch.
 2. Make sure the DC disconnect switch is in the OFF position.
 3. Connect the DC connectors to the correct corresponding pole at the DC power-source (e.g. battery).
 4. Unscrew and remove the cover of the AC terminal compartment.
 5. Route the AC cable via the cable gland (B) into the terminal compartment.
 6. Remove the wire sheaths on the power wires with a wire stripper or wire cutter to prepare the wires for terminal connection. Twist each wire and attach end sleeves with a crimp tool if necessary.
 7. Connect the PE wire to the corresponding terminal marked PE.
 8. Connect the grounded shield of the cable. Twist the cable shield and connect to the chassis via the screw terminal (C).

9. Connect the neutral wire to the corresponding terminal marked N.
10. Connect the phase 1, 2 and 3 wires to the corresponding terminals, marked L1, L2, L3.
11. Restore the cover of the AC terminal compartment, and tighten the screw (T20).
12. To begin operation of the inverter, turn the DC disconnect switch to the ON position, followed by applying AC voltage (from Mains or via AC disconnect switch)



5.5.11. Mount, Ground, and Connect the Battery Module



WARNING!

Use the Personal Protective Equipment (PPE) relevant for each installation and/or maintenance task as described in this manual. The main hazards during installation are related to Low Voltage (400VAC and up to 900VDC) electrical works and to crushing, pinching and cuts during lifting and fitting operations.



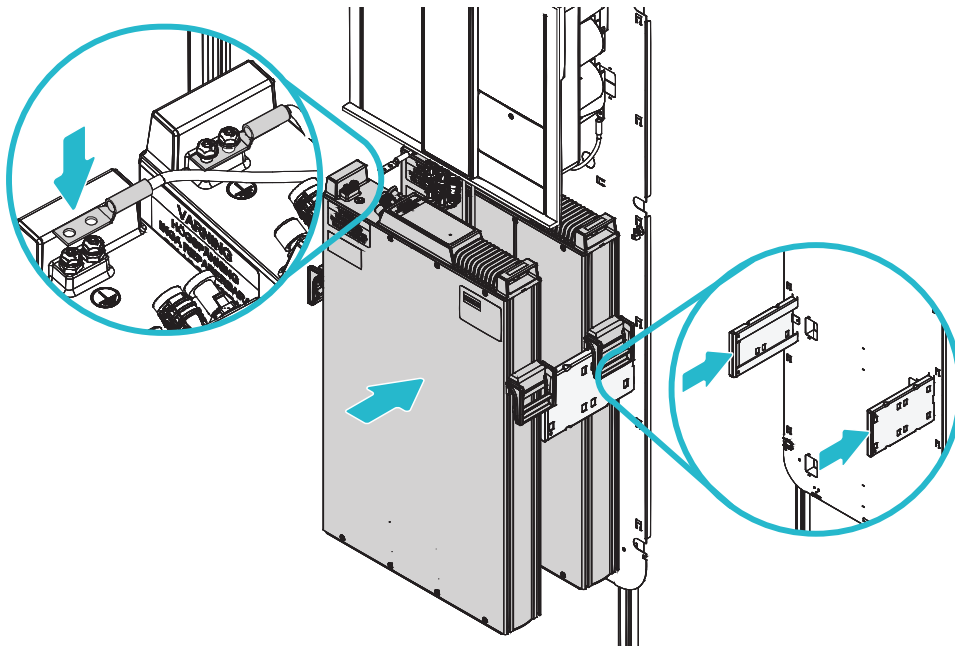
ELECTRICAL HAZARD!

- Handle the battery carefully. There is a risk of death or serious burn injuries, in case of damaged goods or faulty parts from production.
- The battery modules are supplied in a charged condition and are capable of extremely high short-circuit currents. Take care to avoid short-circuiting cables or to reverse the polarity of connections. Accidental shorting of cables can result in severe electrical arcing, causing burns and electric shock to nearby personnel.
- Ensure the inverter and each battery module are properly grounded to the base frame and that the overall Protective Earthing (PE) system of the Battery Energy Storage System (BESS) is connected and tested before starting the system, to prevent an electric shock.
- Do not touch the battery terminals Normally Open (NO) or high voltage circuits. There is a risk of death or serious burn injuries.
- Do not wire or attach the battery modules in any other way than that specified in the Installation Manual. Incorrect wiring may result in hazards such as damage to the module or explosion.

- Do not crush or place heavy loads on the inverter module as damage may occur. Do not use damaged, frayed, or non-approved electrical cables and connectors.
- Do not crush or place heavy loads on the inverter module as damage may occur.

⚠ Mechanical hazard!

Use ergonomic techniques according to best practice to unpack and lift the product into position. Use Personal Protective Equipment (PPE). There is a risk of strains and injuries caused by lifting or dropping heavy parts.

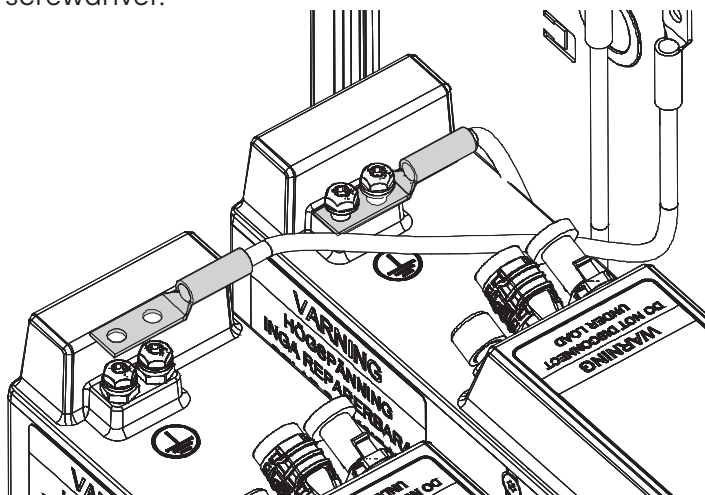


1. Hang the battery brackets on the base frame and secure them with screws on each bracket.

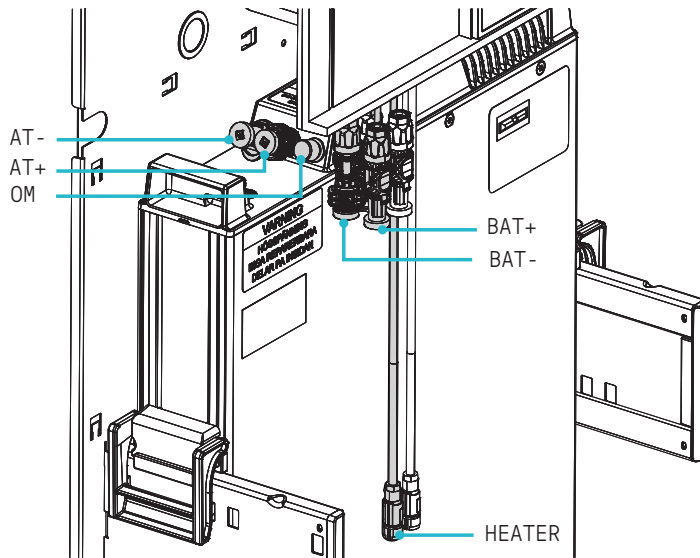
Follow steps 2-8 for each battery:

Note! In case of a single battery unit installation, cover unused cables and wires according to best practice.

2. Lift the battery onto the brackets. Ensure that heater is facing the base frame and the connections oriented to the left.
3. Hook the battery unit handles onto the brackets and secure them by snapping them into position.
4. Connect the PE cable to the battery module and the base frame, with an electric screwdriver.



5. Connect the battery positive cable and battery negative cable from the inverter to the corresponding port on the battery unit.



6. Remove the cap of the communication port on the battery module.
7. Connect the communication cable to the port on the battery unit. Tighten the connection by hand.
8. Connect the heater supply cable from the inverter to the heating element.

5.6. Install the Pulse Clamps



ELECTRICAL HAZARD!

The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injury caused by residual voltage.

1. Unpack the pulse grid clamp, and pulse solar clamp, depending on customer setup.
2. Mount a DIN rail mount providing 240/5V adapter power to the pulse clamps if it is possible on the installation site or perform a custom installation according to best practice.
3. Attach the three clamps of the pulse grid clamp around each of the 3 phases at the mains fuse box.
4. Attach the three clamps of the pulse solar clamp around each of the 3 phases at the solar inverter.
5. Go to the Installer Web App (install.homevolt.com) and follow the instructions.
6. Scan the QR code on the pulse clamps packaging.
7. Press down the left button on the inverter module and hold it for 3 seconds to set Polarium Battery System in pairing mode. The Polarium Battery System detects available clamps and clamp connectivity. For solar setup, follow steps 8-12:
8. Turn off the solar production to identify the pulse grid clamp, if applicable to the site setup.
9. Accept and pair the pulse grid clamp.
10. Turn on the solar production.
11. Follow the instructions in the Installer Web App (install.homevolt.com) to accept and pair the pulse solar clamp.

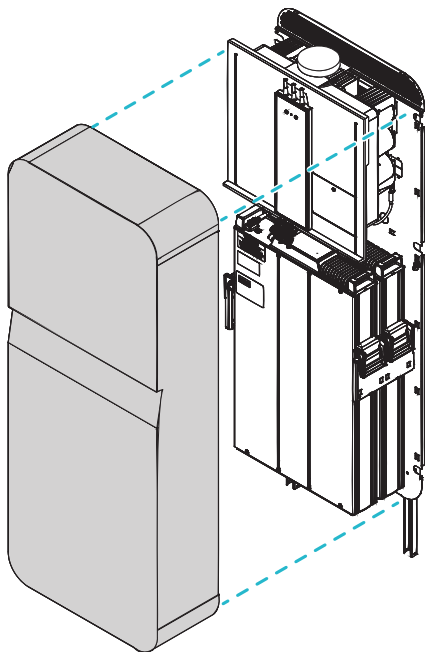
12. Verify and confirm clamp setup using the built in diagnostics tool.

5.7. Configure System and Update Software

1. Follow the instructions and configure the system via Installer Web App (install.homevolt.com).
2. Update the software and ensure that the updates are completed.

5.8. Verify the installation

1. Make sure the unit is grounded according to the instructions.
2. Ensure the power system voltage is set correctly for the application.
3. Refer to the product datasheet and documentation to ensure the installation.
4. Turn the inverter safety switch ON.
5. Turn the main switch ON (AC).
6. Check the LED internal indicator status.
7. Perform Functional test/Commissioning test via the user interface.
8. Mount the cover and lock it with the industrial key at the bottom.



5.8.1. Perform Functional/Commissioning Test



ELECTRICAL HAZARD!

The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injury caused by residual voltage.

1. Go to the Installer Web App (install.homevolt.com)/user interface and follow the instructions.
2. Run full charging via the user interface.
3. Run full discharging via the user interface.
4. Check the user interface for:

- Temperature (via BMS – EMS – ECU)
- AC current
- DC current

5. Turn the AC main switch OFF in the event of:

- Lost connectivity to the Electronic Management System (EMS), or if the system cannot be shut off.
- Incorrectly installed or lost protective earthing (PE).
- Isolation fault in the system.
- Offline system after reporting of faulty unit.

6. Ensure that the AC main switch is turned OFF.

7. Wait for 10 minutes.

8. Turn the DC safety switch OFF on the inverter.

9. Disconnect the communication cable from the inverter before handling the battery.

6. Residential User Operation



WARNING!

- Do not handle the Polarium Battery System. Do not disassemble units. Unpacking, assembly, installation, troubleshooting, disassembly, replacements and repairs must only be performed by an electrician.



READ THE USER MANUAL

- Failure to read, understand and follow the safety precautions may lead to potential risks, such as hazardous situations involving death or serious injuries by fire, residual voltage, or explosion.
- Do not remove the battery cover/enclosure. There are no user serviceable parts inside. There is a risk of death or serious injuries.
- A full risk analysis of the installation site must be performed by the electrician before installing the product.



ELECTRICAL HAZARD!

- The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injury caused by residual voltage.
- If the product is or appears damaged, do not touch any parts. Turn the AC main switch OFF and contact support. The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injuries, in case of damage to the product and exposed live parts.



RISK OF FIRE!



FLAMMABLE GAS HAZARD!

- Do not expose the battery system to fire or temperatures higher than 60 °C. High temperatures may cause the battery to overheat or even self-ignite. High temperatures may also result in loss of performance and decreased life expectancy of the product.
- Follow the first aid measures in case of exposure to interior battery components, and battery electrolyte in case of damage to the external battery casing. Undamaged, closed battery cells do not represent health risks.



CAUTION!

- Keep the battery connected to the grid. Batteries that are disconnected for an extended period of time can self-discharge to a level from which the battery does not permit recovery. Do not disconnect the battery for longer than a month.
- The warranty of the product may be invalid and any liability for damages may be rejected if installation and operation are not compliant with the Polarium warranty conditions. Polarium assumes no responsibility for any consequential damages.
- Contact your local sales representative for support and service.

6.1. Log in to the Polarium Battery System

1. Download the Customer App.
2. Log in to the Customer App and follow the instructions.

6.2. Shut down the Polarium Battery System

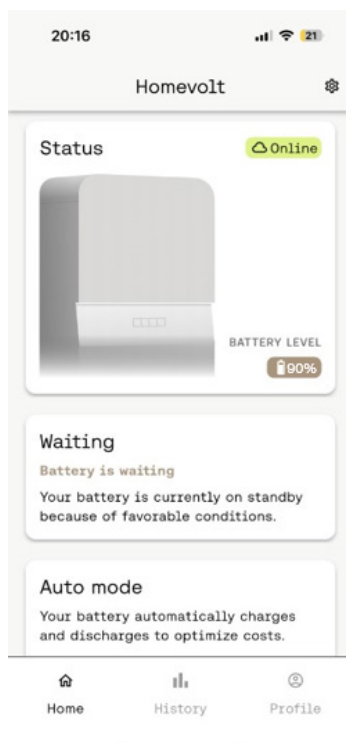
1. Log in to the Customer App and follow the instructions.
2. Turn the main switch off.

6.3. Residential User Interface/App

Note! Contact your local sales representative for instructions, if a user app is provided by them.

6.3.1. Home Screen

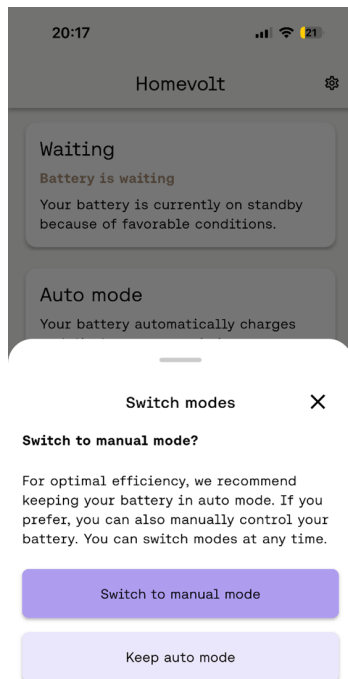
The status section provides the following information::



- Battery Status: Displays whether the battery is online or offline.
- Current Battery Level (State of Charge, SOC): Shows the battery's current charge level.
- Battery Mode: Indicates whether the battery is in user mode or standby mode.

6.3.2. Switch a Mode

1. Scroll down on the home screen to locate the mode section.
2. Tap the mode section.
The **Switch Mode** screen opens.
3. Select a mode from the following options:



- **Auto Mode:** The battery is managed by the partner who sold the battery to the consumer. For optimal performance, it is recommended to keep the battery in this mode.
- **Manual Mode:** Enables users to manage battery settings manually.

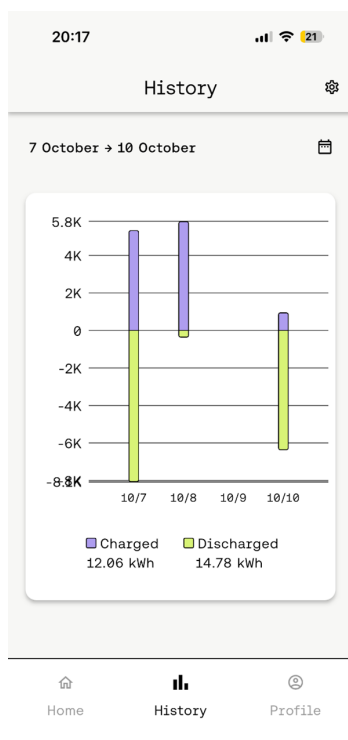
6.3.3. Check History

To access the battery's operational history, navigate to the History tab:

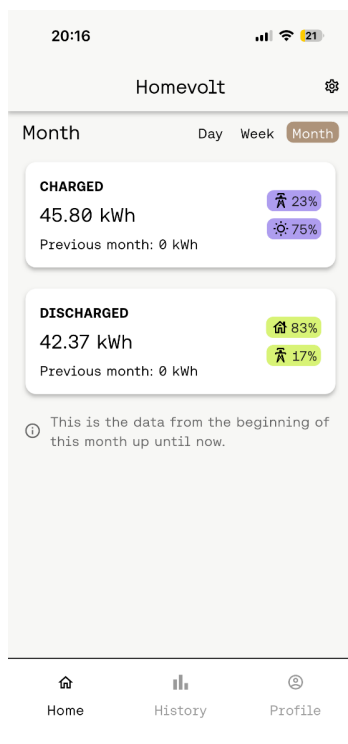
1. Tap the **History** button at the bottom of the application screen.

The **History** tab provides two distinct overviews:

- **Energy Data Overview:** This section displays energy data for a specified time period. The bar chart indicates the amount of energy charged and discharged for each day.



- Charged energy: The amount of energy charged
- Discharged energy: The amount of energy discharged
- **Monthly Overview:** This section provides a summary of the total energy charged and discharged during the current month. It also includes a comparative analysis with the data from the previous month.

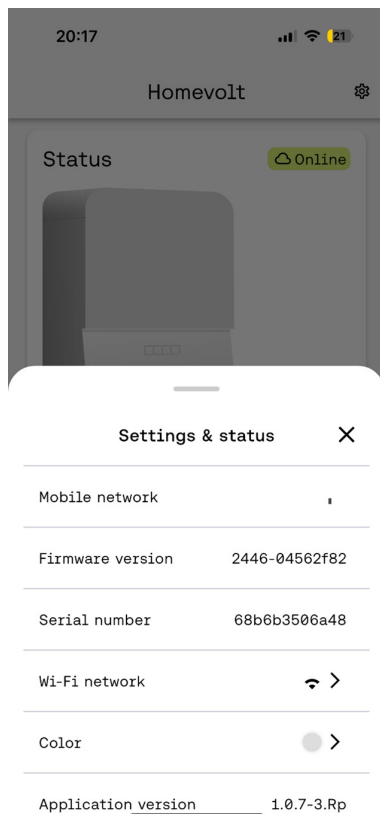


- Charged energy: The percentage from the solar and the grid
- Discharged energy: The percentage used for home consumption and exported to the grid

6.3.4. Change Settings

1. To access the settings screen, tap the **Profile** button located at the bottom of the app's interface.

The following items can be viewed or configured:



- Mobile network: Displays the status of the mobile network.
- Firmware version: Shows the current firmware version of the device.
- Serial number: Lists the device's serial number.
- Wi-Fi network: Indicates the currently connected Wi-Fi network. Tap > to change the network.
- Colour: The application's color theme. Tap > to change the network.
- Application version: Indicates the current version of the application.

7. Maintenance

Read the safety information and follow the instructions for disassembly for to perform maintenance, troubleshooting, tests, relocation, reinstallation, unit replacement, service, and repairs.

The battery system is intended to be maintenance free. Perform the following maintenance tasks regularly.



MECHANICAL HAZARD!



ELECTRICAL HAZARD!

7.1. Residential User Maintenance Check

Regularly check the product for visible damage to the:

- Cover
- AC cable
- Antenna in case if a wall installation
- Pulse Clamps

Keep the area clean and remove any obstructions to air flow or risk of damages or malfunction, such as:

- Water
- Snow
- Vegetation
- Bird nests
- Ants and other insects

In case of any damage to the product or potential errors, contact your local sales representative for support.

7.2. Spare Parts

Contact support for spare parts and replacements.

7.3. Disassemble and Dismount the Product



WARNING!

- Disassembly, maintenance, repairs, and service of this BESS must only be performed by qualified and trained electricians.
- Read the safety information and follow the instructions for disassembly to perform maintenance, troubleshooting, tests, relocation, reinstallation, unit replacement, service, and repairs.
- Use the Personal Protective Equipment (PPE) relevant for each installation and/or maintenance task as described in this manual. The main hazards during installation are related to Low Voltage (400VAC and up to 900VDC) electrical works and to crushing, pinching and cuts during lifting and fitting operations.
- All tools used for installing the battery should be insulated and rated to a minimum of 1000 V DC.
- If the product is or appears damaged, do not touch any parts. Turn the AC main switch OFF. The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injuries, in case of damage to the product

and exposed live parts.

- In case of a faulty battery module, a qualified electrician must perform a full risk analysis of the site before any maintenance or replacement work. Make sure that the system is properly grounded. There is a risk of serious burn injuries, caused by short circuiting, thermal runaway, and explosion.



CAPACITOR DISCHARGE!

If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused by residual voltage.



ELECTRICAL HAZARD!

- Handle the battery carefully. The battery system and inverter module presents an electric shock hazard. The system must be treated as being live at all times, even when external power is not applied. There is also a risk of death or serious burn injuries, in case of damaged goods or faulty parts.
- The battery modules are in a charged condition and are capable of short-circuit currents. Take care to avoid short-circuiting cables or to reverse the polarity of connections. Accidental shorting of cables can result in severe electrical arcing, causing burns and electric shock to nearby personnel.
- Do not touch the battery terminals Normally Open (NO) or high voltage circuits. There is a risk of death or serious burn injuries.



FIRE HAZARD!



FLAMMABLE GAS HAZARD!

- Check the shock detector on the battery module before disassembly.
- Do not drop or hit the product. Handle the product carefully and firmly. There is a risk of serious burn injuries caused by internal short circuiting or penetration from dropping the product.
- Do not expose the battery module to fire or temperatures higher than 60 °C. High temperatures may cause the battery to overheat or even self-ignite. High temperatures may also result in loss of performance and decreased life expectancy of the product.



TIP-OVER HAZARD!

- Handle the product firmly and carefully when dismantling. There is a risk of injuries due to units tipping and falling over.



MECHANICAL HAZARD!

- Use Personal Protective Equipment (PPE). There is a risk of minor cuts and injuries caused by packaging material or sharp edges.
- Use ergonomic techniques according to best practice to dismount and carry the product. There is a risk of strains and injuries caused by lifting or dropping heavy parts.



CAUTION! !

- The product must be handled, transported, stored, installed, and used in accordance with the instructions and specifications in this document. Handling and usage that is not in accordance with instructions and specifications will invalidate the warranties.

7.3.1. Disconnect and Dismount the Battery Module

1. Discharge the system via the user interface.
2. Turn the main switch OFF (AC).
3. Unlock the cover at the bottom with an industrial key.
4. Lift the cover off the base frame.
5. Turn the inverter safety switch OFF. Follow steps 6-12 for each battery. Disconnect the communication cable:
6. Loosen the connection on the communication port by hand and disconnect the communication cable from on the battery module.
7. Put the cap on the communication port on the battery module.

Disconnect the power cables:

8. Disconnect the battery positive cable and battery negative cable from the corresponding ports on the battery module.
9. Unscrew the PE cable connection on the battery module and the base frame, with an electric screwdriver.
10. Unscrew (T20/25) and remove the brackets from the base frame.
11. Pull the handles from the brackets to release the battery module.
12. Lift off the battery module, carefully, and place it immediately in its designated packaging.

7.3.2. Dismount the Antenna from the Wall



CAPACITOR DISCHARGE!

If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused by residual voltage.

1. Turn the main switch OFF (AC).
2. Make sure the inverter safety switch is turned OFF.
3. Carefully, pull the antenna from the bracket opening.
4. Unwrap the antenna cable from the bracket.
5. Unscrew the antenna bracket from the inverter, with an insulated tool.
6. Restore the wall according to best practice.

7.3.3. Disconnect and Dismount the Inverter Module



CAPACITOR DISCHARGE!

If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused by residual voltage.

1. Discharge the system via the user interface.
2. Turn the main switch OFF (AC).
3. Turn the solar production OFF before disconnecting the system, if applicable to the site setup.

4. Wait for 10 minutes after the system has been shut off for the capacitors to discharge/de-energize.
5. Unlock the cover at the bottom with an industrial key.
6. Lift off the cover from the base frame.
7. Turn the inverter DC safety switch OFF.

Disconnect the communication cable:

8. Loosen the connection on the communication port by hand and disconnect the communication cable from on the battery module.
9. Put the cap on the communication port on the battery module.
Disconnect the power cables:
10. Disconnect the battery positive cable and battery negative cable from the corresponding ports on the battery module.
11. Unscrew and remove the inverter cover from the inverter box/terminal (T20/25).
12. Disconnect phase 1, 2 and 3 wires marked L1, L2, L3 from the terminal.
13. In case of a shielded cable disconnect it from the chassis via the screw terminal (B).
14. Disconnect the neutral wire marked N from the terminal, in case of a TN/TT installation.
15. Disconnect the PE wire and the shielded wire from the terminal marked PE.
16. Insulate the power wires with electrical tape to protect them (through the pullout from the terminal).
17. Loosen the AC-cabel connection under the terminal by using water pump pliers and pull out the AC cable from the inverter.
18. Mount and screw the inverter cover on the terminal with 1 screw (T20/25).
19. Unscrew and disconnect the PE cable from the base frame with an electric screwdriver.
Dismount the inverter:
20. Make sure the inverter safety switch is turned OFF.
21. Carefully, lift the inverter module off the mounting bracket on the base frame, and immediately place it designated packaging.

7.3.4. Dismount the Antenna from the Inverter Module



ELECTRICAL HAZARD!



CAPACITOR DISCHARGE!

If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused by residual voltage.

1. Make sure the main power supply/switch (AC) is turned OFF.
2. Make sure the inverter safety switch is turned OFF.
3. Carefully, pull the antenna from the bracket opening.
4. Unwrap the antenna cable from the bracket.
5. Unscrew the antenna bracket from the inverter, with an insulated tool.
6. Place the antenna in its designated packaging.

7.3.5. Dismount the Base Frame

1. Make sure the main power supply/switch (AC) is turned OFF. For installation with hidden cable route, follow step 2-7:
2. Cut the cable ties along the base frame. Detach the AC cable from the connection points.
3. Protect and secure the AC cable according to best practice.
4. Unscrew the screws and remove the base frame.
5. Pull up one or two supports/feet (optional equipment).
6. Remove the drilling template and save it for future reference.
7. If there is no requirement for re-use, discard of the material in accordance with local regulations. Please recycle all packaging responsibly.
8. Place the base frame in its designated packaging.
9. Restore the wall after dismounting according to best practice.

7.3.6. Disconnect the Pulse Clamps

1. Make sure the main power supply/switch (AC) is turned OFF.
2. Turn the solar production OFF before disconnecting the pulse clamps, if applicable to the site setup.
3. Remove the three clamps of the pulse grid clamp from each of the 3 phases at the mains fuse box.
4. Remove the three clamps of the pulse solar clamp from each of the 3 phases at the solar inverter, if applicable to the site setup.
5. Place the pulse clamps in their designated packaging.
6. Unscrew and remove the DIN rail and the 240/5V adapter, if applicable to the site setup.
7. Restore the surface after dismounting the DIN rail according to best practice.

7.4. Replace the Battery Module



CAPACITOR DISCHARGE!

Turn the main switch OFF (AC). If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused by residual voltage.

See:

- "5.5.11. Mount, Ground, and Connect the Battery Module" on page 28
- "7.3. Disassemble and Dismount the Product" on page 38
- "7.3.1. Disconnect and Dismount the Battery Module" on page 40

7.5. Replace the Inverter Module



CAPACITOR DISCHARGE!

Turn the main switch OFF (AC). If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused

by residual voltage.

See:

- "5.5.6. Mount the Antenna on the Inverter" on page 25
- "5.5.7. Mount and Ground the Inverter to the Base Frame" on page 25
- "7.3.2. Dismount the Antenna from the Wall" on page 40
- "7.3.3. Disconnect and Dismount the Inverter Module" on page 40
- "7.3.4. Dismount the Antenna from the Inverter Module" on page 41

7.6. Replace the Antenna



Capacitor discharge!

Turn the main switch OFF (AC). If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused by residual voltage.

See:

- "5.5.6. Mount the Antenna on the Inverter" on page 25
- "5.5.7. Mount and Ground the Inverter to the Base Frame" on page 25
- "7.3.2. Dismount the Antenna from the Wall" on page 40
- "7.3.4. Dismount the Antenna from the Inverter Module" on page 41

7.7. Replace the Pulse Clamps

See:

- "7.3.6. Disconnect the Pulse Clamps" on page 42
- "5.6. Install the Pulse Clamps" on page 30

7.8. Replace the Cover



CAPACITOR DISCHARGE!

Turn the main switch OFF (AC). If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused by residual voltage.

See:

- "5. Installation" on page 18
- "7.3. Disassemble and Dismount the Product" on page 38

1. Turn the main switch OFF (AC).
2. Unlock the cover at the bottom with an industrial key.
3. Lift the cover off the base frame.
4. Turn the inverter safety switch ON.
5. Mount the cover and lock it with the industrial key at the bottom.
6. Turn the main switch ON (AC).



7.9. **Disposal and Recycling**



WARNING!

Handle the battery in accordance with any specific marking on the packaging – for example concerning package position and stacking instructions.

Dispose of the product in accordance with the disposal regulations for electronic waste. Contact a waste disposal operator authorized for handling electronic and lithium battery waste and recycling or contact the organization where you purchased the batteries for further assistance.

7.9.1. Handle and dispose of a non-functional Battery Module

When a battery reaches the end of its service life or becomes defective and cannot be repaired it will need to be disposed of and recycled. Batteries should be disposed according to local (country) regulations for electronic waste. Battery disposal and recycling must be carried out by qualified personnel only.

Contact and support for battery disposal: Info@polarium.com

8. Troubleshooting



CAPACITOR DISCHARGE!



ELECTRICAL HAZARD!

- If the system has been in commission/energized recently, wait for 10 minutes to discharge the capacitors to prevent death or serious injuries caused by residual voltage.
- If the product is or appears damaged, do not touch any parts. Turn the AC main switch OFF and contact support. The system must be treated as being live at all times, even when external power is not applied. There is a risk of death or serious injuries, in case of damage to the product and exposed live parts.
- In case of a faulty battery module, a qualified electrician must perform a full risk analysis of the site before any maintenance or replacement work. Use Personal Protective Equipment (PPE) and handle the battery carefully. There is a risk of serious burn injuries, caused by short circuiting, thermal runaway, and explosion.





Residential users: Please contact your local sales representative.

Use the Installer Web App (install.homevolt.com) for troubleshooting for most troubleshooting cases if there is internet connectivity. If there is no internet connectivity log on to a local web server of the battery and review metrics and states.

Problem	Possible Cause	Remedy electrician [Safety placeholder]
Connectivity		
Weak LTE signal	Connectivity, range issues	Reinstall the antenna outside of the enclosure.
		Extend the antenna to up to 3 meters and mount it on a wall.
Weak Wi-Fi signal	Incorrect Wi-Fi setup/access	Ensure or set up a proper Wi-Fi access. The system works best utilizing the home Wi-Fi system.
		Reinstall the antenna outside of the enclosure. Extend the antenna to up to 3 meters and mount it on a wall. Move the Wi-Fi access point closer to the battery or install a Wi-Fi extender.
No or partial connection to the pulse clamps		Reinstall the antenna outside of the enclosure.
		Extend the antenna to up to 3 meters and mount it on a wall.
Solar clamp and grid clamp are mixed up		Check the signal path for obstructions such as dense walls or objects. Perform a reposition or reinstallation if necessary.
		Virtually, switch places of the solar clamp and grid clamp via the user interface/ Installer Web App.

9. Technical Specifications

9.1. Battery Energy Storage System (BESS)

		
Polarium Energy Solutions AB Solnavägen 3H, SE-11363 Stockholm		
Battery Energy Storage System Type 910-00001		
Code	HES-06-00-06-310	HES-13-00-06-310
No. of Battery units	1	2
Rated Energy	6.6 kWh	13.3 kWh
Rated Apparent Power	6 kVA	6 kVA
Rated AC Voltage	3/N/PE-230/400 VAC	
Rated AC Frequency	50 Hz	
Max AC Current	9.6 A	
Ingress protection	IP65 (Primary) IP2x (Secondary)	
  		
<small>Designed in Sweden, Assembled in [country of origin]</small>		






Model	HES-06-00-06-310	HES-13-00-06-310
Battery Type	Lithium (Nickel based)	
Battery Voltage (nominal)	756 V	
Rated AC Voltage	3/N/PE ~230/400 VAC	
Rated AC Frequency	50 Hz	
Supply Earthing	TN, TT	
Rated Apparent Power	6000 VA	
Maximum Active Power	6000 W (Charging /Discharging)	
Rated AC Current	8.7 A	
Maximum AC Current	9.6 A	
No. of Battery Modules	1	2
Rated Capacity	8.8 Ah	17.6 Ah
Rated Energy	6.6 kWh	13.3 kWh
User Interface	Android and iOS app, LED indicator	
Radio	LTE, Wi-Fi (2.4 GHz), WPAN (868 MHz) Dome combination antenna	
General		
Weight (approx.)	~85 kg	~130 kg
Dimensions	W 550 D 250 H 1350 mm	
Operating Temperature	-20 to +45 °C	
Storage Temperature	-20 to +45 °C	
Relative Humidity	4% – 100% / condensing	
IP Class	IP65 (Primary, battery and inverter enclosure) IP21 (Secondary, outer enclosure)	
Environmental Class	IEC 60721-3-4 (outdoor)	
Protective Class	I	
Overvoltage Category	III	
Maximum Altitude	3000 m	
Safety Standards	EN/IEC 62477-1 DIN VDE-AR-E-2510-50	
EMC	EN/IEC 61000-6-1, EN/IEC 61000-6-3 EN/IEC 61000-3-2, EN/IEC 61000-3-3	
Grid Code Compliance	EN 50549-1, VDE-AR-N 4105	

Model**HES-06-00-06-310****HES-13-00-06-310**

Certification Mark

CE, TÜV

9.2. Battery Module


		Capacity Nominal Voltage Charge Voltage End of Discharge Voltage Max Discharge Current Max Charge Current Nominal Energy	8.8 Ah 756 VDC 865 VDC 630 VDC 10 A 8 A 6652 Wh
Polarium Energy Solutions AB Solnavägen 3H, SE-11363 Stockholm INR22/72[2P210S]M/-20+50/90 Type: 810-00238 Code: HVB-006-11-14 Rechargeable Li-ion Battery <small>Polarity see product marking</small> <small>IP65 enclosure</small>			
 80000028019729210001 <small>Designed in Sweden, Assembled in [country of origin]</small>		 class I	 

Model**HVB-006-11-14**

Lithium Chemistry	Nickel based
Rated Capacity	8.8 Ah
Rated Energy	6652 Wh
Nominal Voltage	756 VDC
Charge Voltage for 95% SoC	865 VDC
End-of-Discharge Voltage (LVBD)*	630 VDC
Max Charge/Discharge Current	8 A / 10 A
Circuit Breaker	30 A SiCFET, negative pole Contactor, positive pole
Communication Protocol	RS485, Modbus
Management & Monitoring	Software for PC (Studio) included for full local monitoring and management. Remote connection via Modbus.
General	
Dimensions	W 440 D 735 H 88 mm
Weight	~45 kg
Operating Temperature Charging	+0 to +50 °C
Operating Temperature Discharging	-20 to +50 °C
Storage Temperature	-20 to +45 °C
Relative Humidity	4% - 100% / condensing
IP Class	IP65
Environmental Class	IEC 60721-3-4 (outdoor)
Protective Class	I
Overvoltage Category	II
Maximum Altitude	3000 m
Safety Standards	EN/IEC 62477-1 IEC 62619, IEC 63056
Transport	UN 38.3
EMC	EN/IEC 61000-6-1, EN/IEC 61000-6-3
Certification Mark	CE, TÜV


* Cut-off when one cell reaches 2.75 V, 210 cells in series


9.3. Inverter Module




Model: 810-00237

Battery port	Battery type	Lithium
	Battery voltage range	d.c. 630-865V
	Max. battery charge/ discharge power	6000W/6000W
	Max. battery charge/ discharge current	d.c. 10A/10A
Grid output	Rated grid voltage	a.c. 3/N/PE~ 230/400V
	Rated grid frequency	50Hz
	Rated grid output apparent power	6000VA
	Max. grid output active power	6000W
	Max. grid output current	a.c. 9.6A
Grid input	Rated grid voltage	a.c. 3/N/PE~ 230/400V
	Rated grid frequency	50Hz
	Max. grid input active power	6000W
	Max. grid input current	a.c. 9.6A
General information	Power factor	0.8ind...0.8cap
	Operating temperature range	-25...+60°C
	Inverter topology	Non-isolated
	Ingress protection	IP65
	Protective class	I
	Overvoltage category	II(DC), III(AC)





Polarium Energy Solutions AB
Solnavägen 3H, SE-11363 Stockholm



XXXXXXXXXXXXXXXXXX

532-100005-00

Model

810-00237

Inverter Topology	3-phase, Bi-directional, Transformer-less
AC-Grid Port	
Rated AC Voltage	3/N/PE ~230/400 VAC
Rated AC Frequency	50 Hz
Supply Earthing	TN, TT
AC Voltage Range	300 - 440 VAC
Rated Apparent Power	6000 VA
Maximum Active Power	6000 W
Rated AC Current	8.7 A
Maximum AC Current	9.6 A

Model		810-00237	
Maximum Overcurrent Protection limit		16 A	
Power Factor Range		0.8 inductive(under-excited) - 0.8 capacitive(over-excited)	
Battery Port			
Battery Type		Lithium	
No. of Battery Terminals		2	
Battery Voltage Range		630 - 865 VDC	
Max Battery Charge/Discharge Current		10 A / 10 A	
Max Battery Charge/Discharge Power		6000 W / 6000 W	
General			
Dimensions		W 500 D 225 H 480 mm	
Weight		~ 16 kg	
Operating Temperature		-25 to +60 °C (Power derating of 3%/°C required above 40 °C)	
Storage Temperature		-40 to +70 °C	
Relative Humidity		4% - 95 % / condensing	
IP Class		IP65	
Environmental Class		IEC 60721-3-4 (outdoor)	
Efficiency*		98 %	
Protective Class		I	
Overvoltage Category		DC II / AC III	
Maximum Altitude		3000 m	
Safety Standards		EN/IEC 62477-1	
EMC		EN/IEC 61000-6-2, EN/IEC 61000-6-3 EN/IEC 61000-3-2, EN/IEC 61000-3-3	
Grid Code Compliance		EN 50549-1, VDE-AR-N-4105	
Certification Mark		CE	

* Conversion efficiency (peak), nominal value at optimal output power, temperature, voltage

9.4. Controller (RF Specification)

Model		822-00001		
RF Interface		LTE (CAT M1)	Wi-Fi (2.4 GHz)	LR-WPAN (868 MHz)
Transceiver		Quectel BG95-M3	Espressif ESP32-S3-WROOM-1U	Silicon Labs EFR32FG23
Frequency bands	B1	1920 - 1980 MHz 2110 - 2170 MHz	2412 - 2472 MHz	863 - 868 MHz (K, L band)*
	B3	1920 - 1980 MHz 2110 - 2170 MHz		
	B8	880 - 915 MHz 925 - 960 MHz		
	B20	880 - 915 MHz 925 - 960 MHz		

Model	822-00001		
Channels	8	13	12
Modulation/Protocol	Single carrier	802.11b 802.11g 802.11n(H20) 802.11n(H40)	2-GFSK (Silabs Connect, 802.15.4 based)
Maximum Transmit power (EIRP)	20.99 dBm (B1) 21.35 dBm (B3) 21.31 dBm (B8) 21.35 dBm (B20)	<20 dBm	<14 dBm
Antenna type	Dome combination (3x antennas)		
Antenna gain (including cable)	0.8 dBi	3.88 dBi	-2.01 dBi
Supply Voltage (Nominal)	185 – 250 VAC (230 V)		
Supply Frequency	50-60 Hz		
Max input current	100 mA		
User Interface	Android and iOS app, Web server LED indicator (RGB)		
Radio Standards	EN 300 220-2, EN 300 328 EN 301 908-1, EN 301 908-13		
EMC	IEC 61000-6-2, IEC 61000-6-3 EN 301 489-1, EN 301 489-3, EN 301 489-17, EN 301 489-52		

* Frequency sub-band (K) is allocated only for pairing/provisioning mode

10. Appendix

10.1. Abbreviations / Acronyms

AC	Alternating Current
BESS	Battery Energy Storage System
BMS	Battery Management System
CE	Conformité Européenne, Mandatory marking of compliance to norms for products marketed in the EU
DC	Direct Current
LS	Load Shifting
LV	Low Voltage (<1000 VAC, <1500VDC)
MSD	Material Safety Data
MSDS	Material Safety Data Sheet
PE	Protective Earth
POC	Point of Connection
PPE	Personal Protective Equipment
PSU	Power Supply Unit
PS	Peak Shaving
RCD	Residual Current Device
SoC	State of Charge

