LG
Life's Good

ENGLISH

OWNER'S &
INSTALLATION MANUAL

# Energy Storage System

Please read this manual carefully before installing your set, and retain it for future reference.

LG Electronics ESS Home 15 (D015KE1N212)

*MFL72131101

https://www.lg.com/global/business/ess/business-resources/download

Rev.02_062824

# Important Safety Instruction

IMPORTANT: THIS PRODUCT SHOULD NOT BE USED FOR ANY PURPOSE OTHER THAN THE PURPOSE DESCRIBED IN THE INSTALLATION MANUAL.

**DANGER** **indicates a hazardous situation that will result in death or serious injury if the instruction is not followed.**

- Do not remove the cover. There are no user serviceable parts inside. Service may be performed only by a trained service provider.
- Risk of electric shock from energy stored in capacitor. Do not remove the cover until 10 minutes after disconnecting all sources when service is needed.
- Electric shock hazard. Do not touch uninsulated wires when the product cover is removed.
- Do not disconnect, disassemble, or attempt to repair to avoid injuries, electric shock, or burns.
- There is a high risk of electric shock or serious burns due to high voltage in the ESS.
- The AC and DC cables contain high voltage. Risk of death or serious injury due to electric shock.
- This product poses potential danger such as death or serious injury from fire, high voltage, or explosion if appropriate precautions are not read, fully understood, and followed.
- When the photovoltaic array is exposed to light, it supplies a DC voltage to the PCS.
- Do not place or install flammable or potentially explosive objects near the product or in an explosive atmosphere.
- Do not charge or discharge arbitrarily. It may lead to failure, electric shock, or burns.
- Do not damage the unit in any manner, such as by dropping, deforming, mishandling, cutting, or piercing with a sharp object. It may cause electrolyte leakage or fire.
- Breakdown of the unit may cause electrolyte leakage or flammable gas generation.
- If electrolytes leak, avoid contact with eyes, skin, and clothes. In the event of accidental contact, flush with water and seek medical help immediately.
- Do not place near open flame or incinerator. It may lead to fire or explosion.

- Keep the unit away from moisture or liquid. Do not touch or use the product if liquids have been spilled on it.
- This product is designed to be installed indoor use only. (Environmental category : Indoor, conditioned) Do not install this product outdoor.
- Keep out of reach of children and animals.
- Electrical installation must be done in accordance with local standards, national electrical safety standards, and the manufacturer's instructions.
- The battery system is a bidirectional source of voltage. The battery circuit breaker and inverter must both be off before working in the wiring box.
- Disconnect each circuit individually before servicing. Both AC and DC voltage sources are terminated inside this equipment.
- Do not dispose of batteries in a fire. The batteries may explode.
- Do not open or assemble while product is in operation.

**WARNING** **Indicates a potentially dangerous situation. Death or serious injury may result if appropriate precautions are not taken.**

- A potentially hazardous circumstance, such as excessive heat or electrolyte mist, may occur due to improper operating conditions, damage, misuse, and/or abuse.
- Do not place any kinds of objects on top of the product during operation.
- All work on the PV modules, power conditioning system, and battery system must be carried out by qualified personnel only.
- Wear rubber gloves and protective clothing (protective glasses and boots) when working on high voltage/high current systems such as PCS and battery systems.
- There is a risk of electric shock. Do not remove Inner Cover. There are no user serviceable parts inside. Refer servicing to a qualified and accredited service technician.
- In the event of a failure, the system must not be restarted. Product maintenance and repairs must be performed by qualified personnel, or personnel from an authorized support center.
- LG Electronics ESS system is not intended for use as a primary or backup power source for life-support systems, other medical equipment, or any other use where product failure could lead to injury, loss of life, or catastrophic property damage. LG disclaims any and all liability arising out of any such use of the system. Further, LG reserves the right to refuse to service any system used for these purposes and disclaims any and all liability arising out of LG's service or refusal to service systems in such circumstances.
- If non LG Electronics batteries are connected to LG PCS, it will void warranty of the PCS and battery.

**CAUTION** **Indicates a situation where damage or injury could occur. If it is not avoided, minor injury and/or damage to property may result.**

- This product is intended for residential use only and should not be used for commercial or industrial purposes.
- Before testing electrical parts inside the system, it takes at least a 10-minute standby period to completely discharge the system.
- This inverter includes an integrated residual current device (RCD). If an external residual current device (RCD) is used, a device of type B should be used, with a tripping current of 30 mA or higher.
- The contents included in this box are the ESS system and its accessories, and the entire weight is very heavy. Serious injury may occur due to the heavy weight of the package with product and accessories inside. Therefore, special care must be taken in handling. Make sure to have at least two persons deliver or remove the package.
- Do not use any damaged, cracked, or frayed electrical cables and connectors. Protect the electrical cables from physical or mechanical damage, such as being twisted, kinked, pinched, closed in a door, or walked upon. Periodically examine the electrical cables of your product, and if its appearance indicates damage or deterioration, discontinue use of this product, and have the cables replaced with an exact replacement by qualified personnel.
- Ensure that the earth ground wire is connected to prevent possible electric shock. Do not try to ground the product by connecting it to telephone wires, lightning rods, or gas pipes.
- To prevent a fire or electric shock hazard, do not expose this product to heavy rain or moisture.
- Do not block any ventilation openings. Ensure reliable operation of the product and protect it from overheating. The openings must never be blocked by placing any object on this product.
- The temperature of the metal enclosure may be high during operation.
- In order to avoid radio interference, all accessories (like an energy meter) intended for connection to the product are suitable for use in residential, commercial, and light-industry areas. Usually this requirement is fulfilled if the equipment complies with the class B limits of EN55022.
- The product must be disposed of according to local regulations.
- The electrical installation of this unit must be performed only by an LGE service person or trained installer, qualified to install PCS.
- If the AC circuit breaker is turned off and the product has not been operated for a long time, the battery may be overdischarged.

- Connect the DC+ and DC- cables to the correct DC+ and DC- terminals on the product.
- Danger of damaging the PCS by overload. Only connect the proper wire to the DC terminal block. Refer to the Connection Diagram for details.
- Do not step on the product or the product package. The product may be damaged.
- Do not open or damage the batteries. Released electrolytes are harmful to the skin and eyes. It may be toxic.
- A battery can pose a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries.
  - Remove watches, rings, or other metal objects.
  - Use tools with insulated handles.
  - Wear rubber gloves, boots, and glasses.
  - Do not lay tools or metal parts on top of the battery.
- Do not leave the ESS in the fault standby state for a long time because battery discharge may occur.
- If a battery failure occurs immediately after starting the PCS it means battery failure. Check the battery SoC as well as voltage and fault information, and turn off the power of the ESS until service action is taken.
- If the battery SoC is low, the battery may charge from the grid for self-protection. (Emergency Charging) This function is to prevent shutdown of the ESS, deep discharge, and failure of the battery. An Emergency Charge is not an ESS fault.
- If the battery SoC is too low during the backup operation in a power outage, the PCS will only charge the battery from Solar PV. It means no power is supplied to the home load. Emergency Charging(backup) will charge the battery up to the backup SoC level that is set (30 % by default). Emergency Charging(backup) is not an ESS fault.
- Install the PCS where the noise from the PCS will not inconvenience neighbors. Failure to do so may result in conflict with neighbors.

## INFO

**Indicates a risk of possible damage to the product.**

- Before making connections, please make sure the PV array open circuit voltage is within 1,000 V; otherwise, the product could be damaged.
- Never use any solvents, abrasives, or corrosive materials to clean this product.
- Do not place the product on or against any objects. It may cause serious defects or malfunctions.
- Before making a connection, make sure the PV switch on this product is switched off.
- This unit is designed to feed power to the public grid only. Do not connect this unit to an AC source or generator. Connecting the product to external devices could result in serious damage to that equipment.
- LG Electronics ESS Home 15/10/8 requires an Internet connection and registration via the LG ThinQ® service. These conditions are mandated for important firmware updates to secure customer safety.
- Servicing batteries should be performed or supervised by an LG service person or trained installer.
- The battery does not discharge when the load is under a certain level.
- This product can cause current with a DC component. Where a residual current-operated protective device (RCD) or residual current monitoring (RCM) device is used for protection in case of direct or indirect contact, only a RCD or RCM of type B is allowed on the supply side of this product.
- This document is for your reference only. Read the installation manual on the website below.
- Please check the following website for the warranty policy.
  http://www.lg.com/global/business/ess/business-resources/download
- For stable operation and periodic system updates of the product, LG Electronics strongly recommends that the user register with EnerVu and stay connected.
- LG Electronics ESS is under continuous development and its firmware is updated at regular intervals. To ensure that the product works properly, LG Electronics ESS must be updated with the latest firmware.
- Malfunctions that can be traced back to the use of outdated firmware are not covered by the LG Electronics' product warranty. The automatic firmware update takes place when LG Electronics ESS is registered with EnerVu (strongly recommended) and connected to the Internet. Further information can be found in Chapter "EnerVu Settings" of the LG Electronics ESS installation manual.

# ThinQ Registration Guide

## Advantages of ThinQ Registration

- Remote monitoring & control of ESS
- Firmware update for better user experience
- Access to “Emergency Ready” feature which protects you from a potential outage based on live weather forecasts
- Remote trouble-shooting (when applicable)

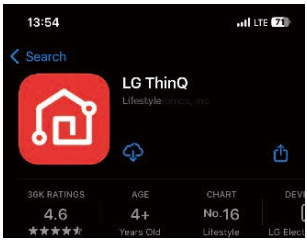
## Things to check before registering the ThinQ app

1 Ensure there is a reliable internet source around you to connect "LGE ESS".

2 Download the ThinQ mobile app on your iOS/Android device to configure the system.

ANDROID APP ON Google play

Download on the App Store



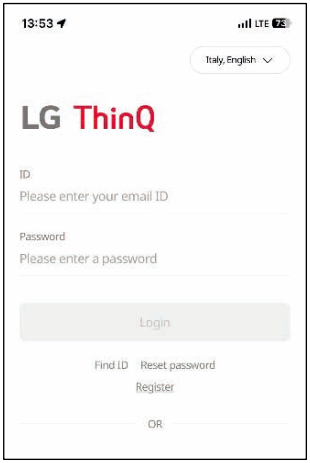
3 Create an account to log in to the ThinQ App. With this app, you can monitor the status of installed devices.

Customer Account : LG ThinQ App. is for customers to monitor and manage the product.

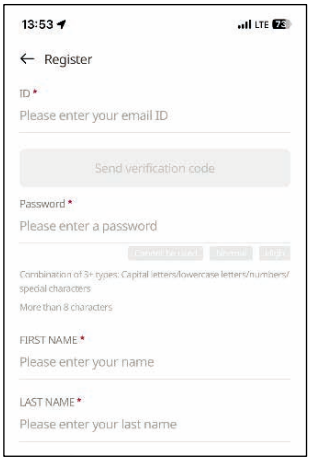
Installer Account : EnerVu plus App. and EnerVu web is for Installer to register and set up the product

Make sure log-in ID it is installer or customer account

**Sign In**

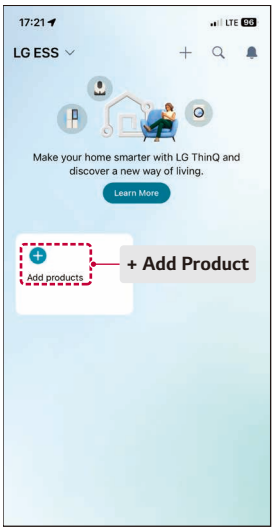


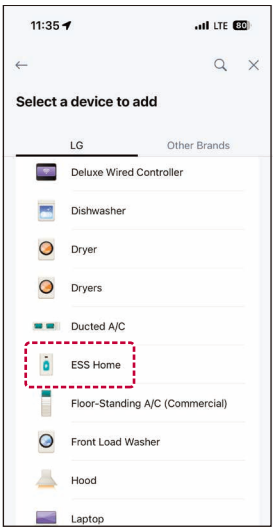

**Register**

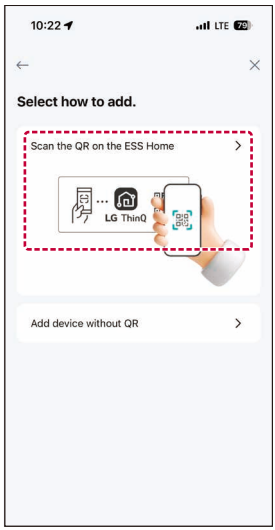


## Connecting your LG Electronics ESS to the LG ThinQ app

1 Register your product according to the ThinQ App Guide.

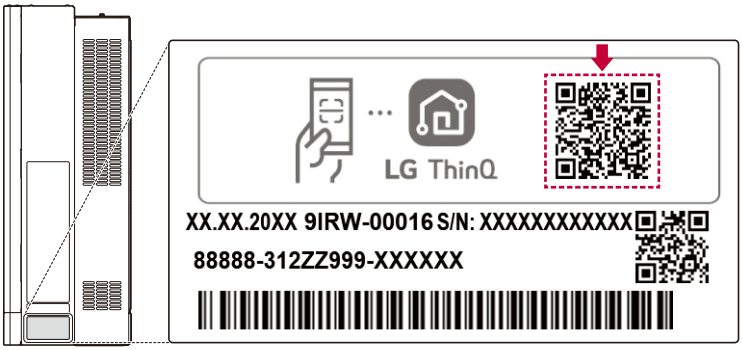


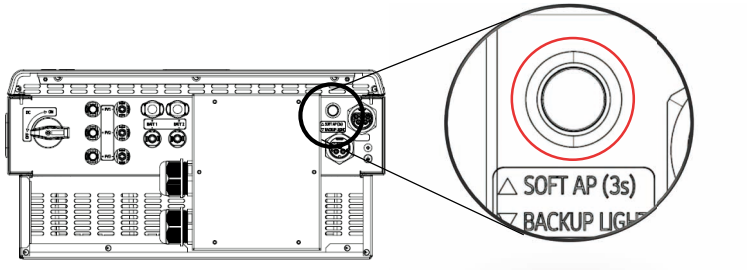




### INFO

- The QR code for the ThinQ app is on the right side of the product



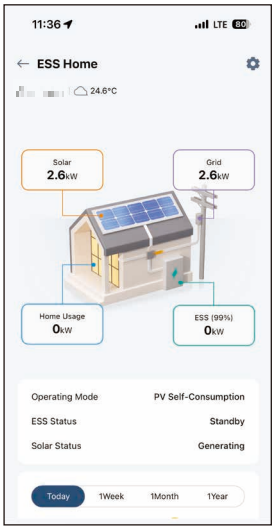
2 To enable the Soft AP, please press and hold for more than 3 seconds.



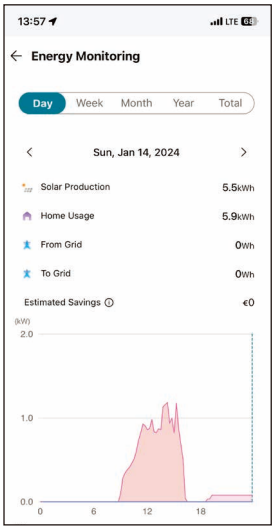

3 Keep your mobile phone close to the ESS Home (H/W) so that they connect.

4 Once connected , open the ESS Home screen on the ThinQ app for energy flow, energy monitoring, and settings.

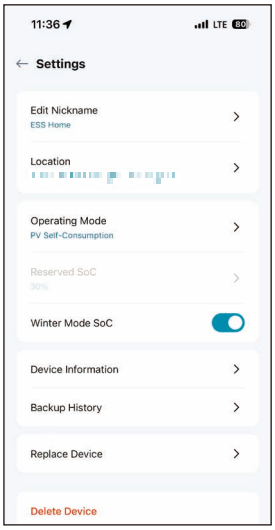
**Energy Flow**




**Energy Monitoring**




**Settings**



# Table of Contents

## Getting Started



## Installation

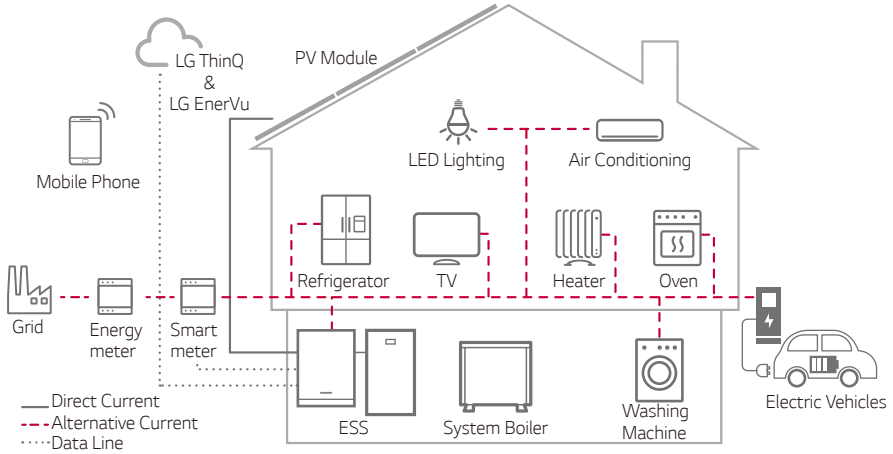
## Troubleshooting



## Appendix

# Product Features

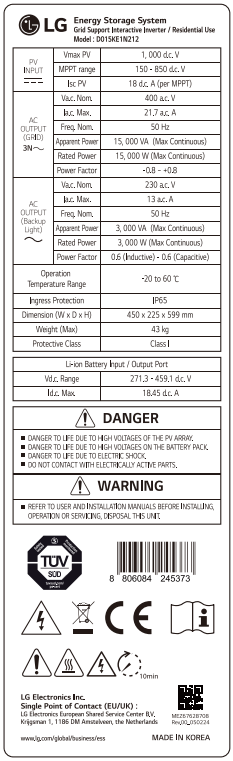
This product is intended to store direct current (DC) electricity generated from photovoltaics (PV) to the connected Lithium-Ion Battery, and convert direct current (DC) electricity from the connected battery and PV to alternating current (AC) electricity and feed this into the electricity grid.
Additionally, this supplies electricity to the household load in an emergency.




The electricity generated from a PV array can be used for house load or stored in the connected battery or sold to energy supply companies.

- **DC-Coupled ESS**
  LG Electronics ESS can achieve higher system efficiency due to simpler power conversion process.
- **Three-Phase Connection**
  Three-phase connection secures phase balancing.
- **Smart Management**
  The built-in Smart PMS analyses PV generation, load consumption, electricity rate(if possible) and weather information. It also monitors the PCS & battery conditions to maintain a stable condition.
  Internet connection and LG ThinQ® connection required.
- **Backup Mode**
  In an emergency, LG Electronics ESS supplies electricity to the dedicated circuit.
  In conjunction with a qualified Enwitec ATS switching device, the LG ESS can supply selected circuits with battery and PV energy in the event of a power failure. (3x230V)
- **App & Web-Monitoring Service**
  The user can monitor LG Electronics ESS with their smart phone. The installer can monitor LG Electronics ESS with their PC, tablet or smart phone.

## Symbols used on Labels

| Label | Symbol | Description |
|---|---|---|
|  | ⎓ | Direct current |
| | ~ | Alternating current |
| | 3N~ | Three-phase alternating current with neutral conductor. |
| | | This product should not be disposed of with other household waste. Domestic disposal regulations should be observed. |
| | | Caution: risk of danger |
| | | Risk of electric shock |
| | | Refer to the installation manual |
| | | Caution: hot surface |
| | 10min | Caution: risk of electric shock, energy storage timed discharge |
| | CE | The relevant equipment complies with the requirements in the EC guidelines. |
| | | TÜV SÜD Certification mark. |

## Abbreviations in this Manual

| Abbreviation | Designation | Explanation |
|---|---|---|
| ESS | Energy Storage System | Inverter system that stores energy into a battery and uses it. |
| PCS | Power Conditioning System | A device intended to convert DC electricity generated from PV system to AC electricity and feed it to household appliances. |
| PMS | Power Management System | A device to control the whole system, including the power management algorithm, and to communicate with the cloud server. |
| PV | Photovoltaic | Solar panel system that converts solar energy into direct current electricity |
| SoC | State of charge | Current state of a battery |
| BMS | Battery Management System | Electronic system that manages a rechargeable battery. |
| BCU | Battery Control Unit | An electronic system that controls a rechargeable battery system to ensure battery safety. |
| DC | Direct Current | - |
| AC | Alternating Current | - |
| DHCP | Dynamic Host Configuration Protocol | Standardized network protocol used on Internet Protocol (IP) networks for automatic distributing network configuration parameters, such as IP addresses for interfaces and services. |
| ATS | Automatic Transfer Switch | A device to separate the home micro grid from the utility grid. |
| Backup Light | Outage Response | An output terminal to supply power in case of a power outage without the need for a separate ATS Box. |
| LAN | Local Area Network | Network that interconnects computers within a limited area. |
| IP | Internet Protocol | A set of rules for sending data across a network |
| AWHP | Air to Water Heat Pump | Low-carbon heating solution |
| IP65 | Ingress Protection level | product has the highest level of dust protection, and is able to withstand low-pressure water jets from all directions. |

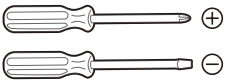
## Required Tools

Insulated gloves (Class 0 :1, 000 AC /1, 500 DC-Red recommended)

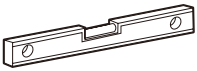
Safety glasses

Protective footwear

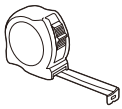
Drill and drill bit



Screw driver
Phillips (5 mm)
Flat head
(6, 5, 4, 2 mm)

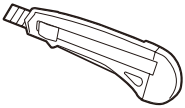


Inclinometer

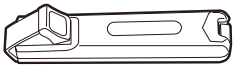


Tape measure

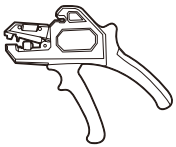
Writing utensil



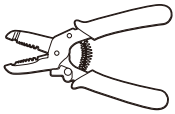
Cutter



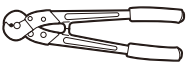
Wire stripper (A)



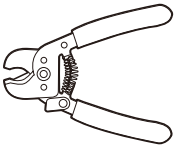
Wire stripper (B)



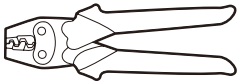
Wire stripper (C)



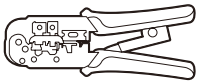
Wire cutter (A)



Wire cutter (B)



Ring terminal crimping tool (optional)



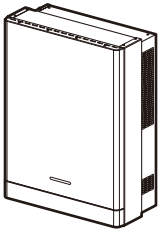
RJ 45 crimping tool

**WARNING**

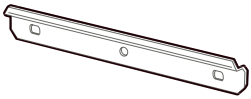
- This product is heavy. Wear appropriate personal protective equipment (such as gloves and protective footwear) when handling these units.

# Unpacking

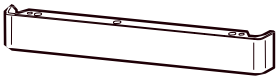
## Contents of this Product



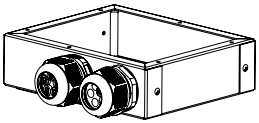
Product (1EA)



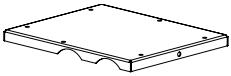
Wall bracket (1EA)



Lower Cover (1EA)



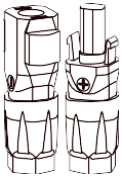
Wiring Box (1EA)



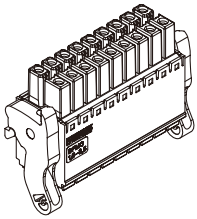
Wiring Box Cover (1EA)

Grid Cable Plug (1EA)

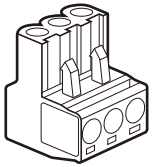
Backup Light Plug (1EA)



Battery Cable Plugs
(2EA each)

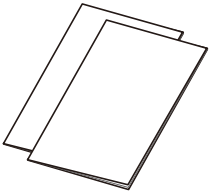


Communication connector (1EA)



Energy meter / AWHP plug (2EA)

Screws (13EA)



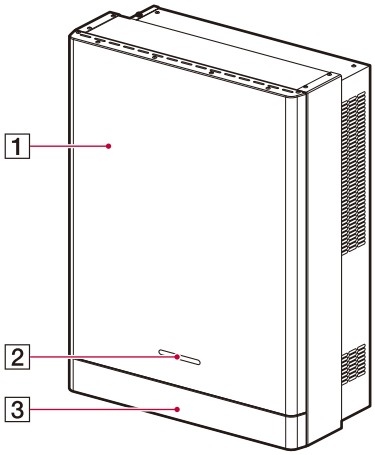
Quick Installation Guide

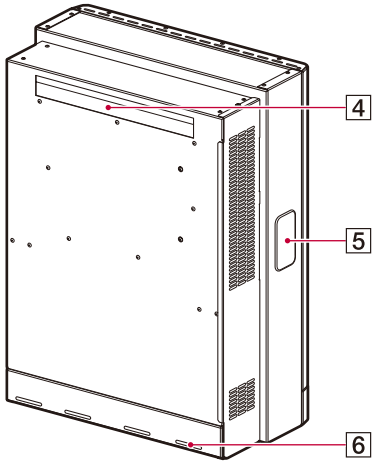
# Additional Components for Installation

| Applied to | Additional Components |
|---|---|
| Wall mounting | • Stainless steel screws with diameter 6 mm - 8mm<br>• Anchors |
| PV connections | • MC4 connectors<br>• Lead wires with the cross-sectional area 4 $mm^2$ - 6 $mm^2$ |
| Battery Connections | • Lead wires with the cross-sectional area 4 $mm^2$ - 6 $mm^2$ |
| Grid connections | • Lead wires with the cross-sectional area 4 $mm^2$ or thicker (including yellow green stripe cable) |
| Grounding | • Lead wires with the cross-sectional area 4 $mm^2$ or thicker (yellow green stripe cable) |
| Internet | • LAN cable (CAT5 or better) |
| ATS<br>Ripple Connections | • RJ45 Plug<br>• Connector cables (CAT5 or better) |
| Energy meter<br>AWHP<br>RS485 Connection | • LAN cable (CAT5 or better) |
| BMS Connection | • LAN cable (CAT5 or better) |

# Name of Each Part

## Front and Rear




1 PCS Body

2 LED Indications

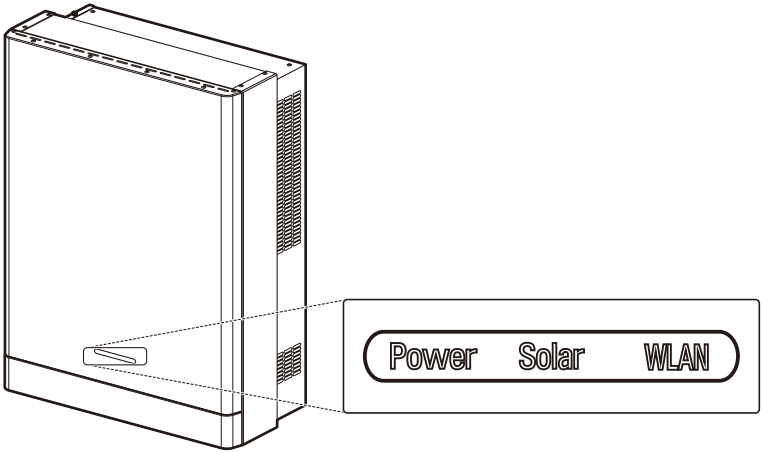
3 Lower Cover

4 Bracket Connected part

5 WLAN Antenna Cover

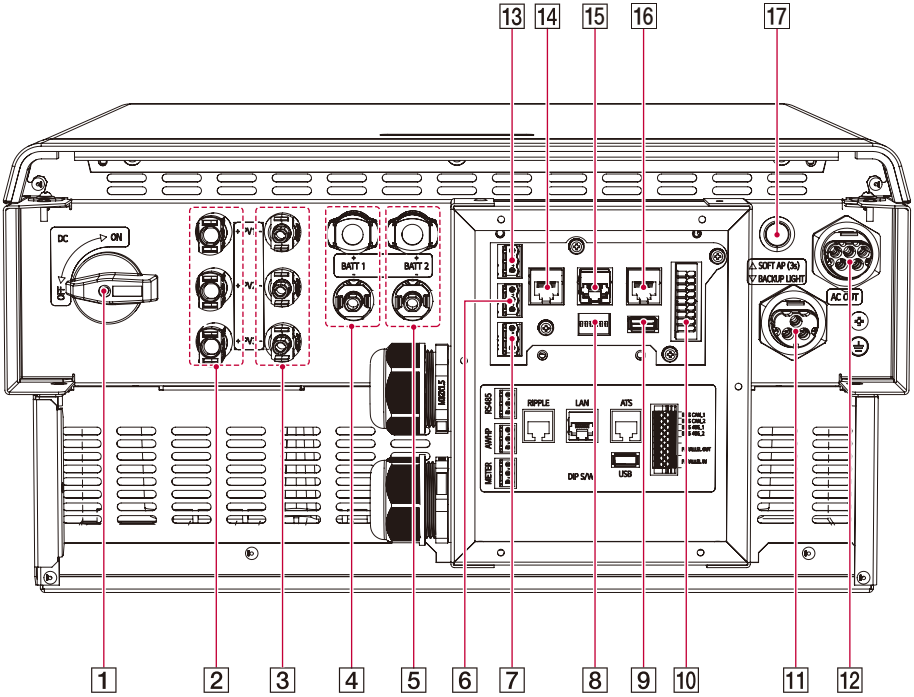
6 Screw Holes for Wall Mounting

# LED Indicators




| LED | Status | Description |
|---|---|---|
| **Power** | **On** | ESS Power On. |
| | **Off** | ESS Power Off. |
| **Solar** | **On** | Energy is being generated. |
| | **Off** | Energy is not being generated. |
| **WLAN** | **On** | Network Connected |
| | | When connected in multiple connections, the Master PCS lights up. |
| | **Off** | Network Disconnected |
| | **Blink** | Soft AP is Activated |
| **Power, Solar, WLAN** | **Blink** | Fault<br>The buzzer is sounding and the Power, Solar, and WLAN are flashing rapidly. |
| | **Blink** | Enter Service Power<br>Solar, and WLAN are flashing alternately. |

## Bottom




1. PV switch (DC Disconnect)
2. PV1, 2, 3 (+) connectors
3. PV1, 2, 3 (-) connectors
4. Battery DC cable connectors 1
5. Battery DC cable connectors 2
6. AWHP Connector
7. Energy meter Connector
8. Dip Switch
9. USB Port
10. Parallel Connection & BMS Connector
11. Backup Light Connector
12. AC output Connector
13. RS485 Connector
14. Ripple Control Port
15. LAN Port / Ethernet port
16. ATS Port
17. Soft AP Button (3s)

# Plan the Installation



## 1. Select Installation Location

- Select an appropriate installation location for the safe use of the product.
- For guidance on the selection of a proper environment, see "Installation location."

## 2. Plan the Cable Connection

- Determine the cable route for the connection, including other devices.

## 3. Distance Between Components

Follow the table below for the maximum allowable length between system components. The wire gauge must meet local codes and, in some circumstances, the wire gauge requirements may change based on length.

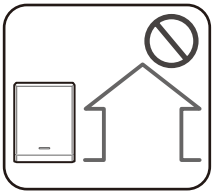
| Types of Connections | Maximum Cable Length |
|---|---|
| Wired Ethernet Connection | Less than 20 m |
| RS485 Communication Cable | Less than 20 m |

**CAUTION**

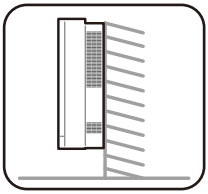
- If you do not follow maximum cable size and length requirements, it may result in intermittent or unreliable operation of the product. In addition, performance issues may arise even after successful commissioning in systems that still need to meet these minimum requirements.

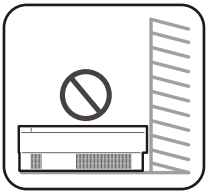
# Choice of location

## Mounting Location

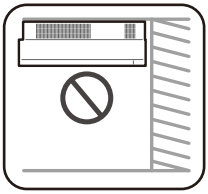


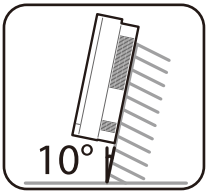
- This product is designed to be installed indoor use only. Do not install this product outdoor.
- Install this product on the place where PV cables, energy meter cables, grid cables and battery cables are easily accessible.



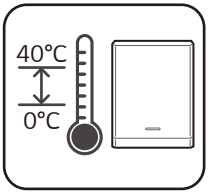


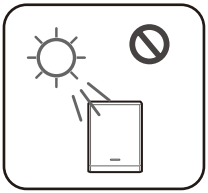
- This product is designed to be installed on the wall only. Do not install this product on the ground.
- The mounting surface must be able to support the weight of this product (43kg).



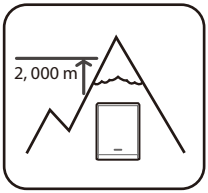



- Do not install the product on the ceiling.
- Do not install the product widthwise or install on a wall with lean more than 10 degrees.
- Do not install the product tilting forward.
- Install the product the connection side down.



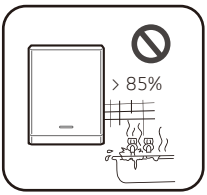



- Appropriate operating temperature is from 0° C to 40° C.
- Do not install this product in the place exposed to the direct sunlight.
- Install the product in a clean, cool room.



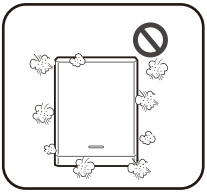

- This product must not be installed or used at altitudes above 2, 000 m.

- Do not install this product in places where flooding frequently occurs.

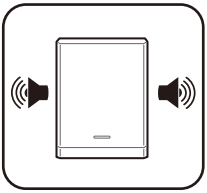



- Do not install this product to highly humid area such as bathroom.
- This product generates low levels of noise at certain times, it should not be installed close to living areas.
- Noise level may differ depending on the installed location.
- Do not install the product where there is vibration.

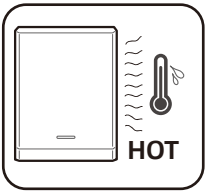

- Do not install this product in a place with ammonia, corrosive vapours, acids or salts.
- Install this product out of reach from children and pet.



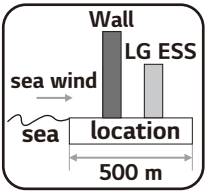
- Do not install this product in places and environments subject to heavy build-up of dust.
- Do not block the air ventilation openings for cooling.
- When cleaning the air duct, shut off all the systems including PCS, PV module, battery and AC circuit breaker.



- This product generates some noise at times and should not be installed close to living or sleeping areas.
- Please consult with your installer when installing in places subject to noise sensitivity.




- The right side of the installed PCS can be hot by the heat from air outlet. Do not place any object near air outlet.



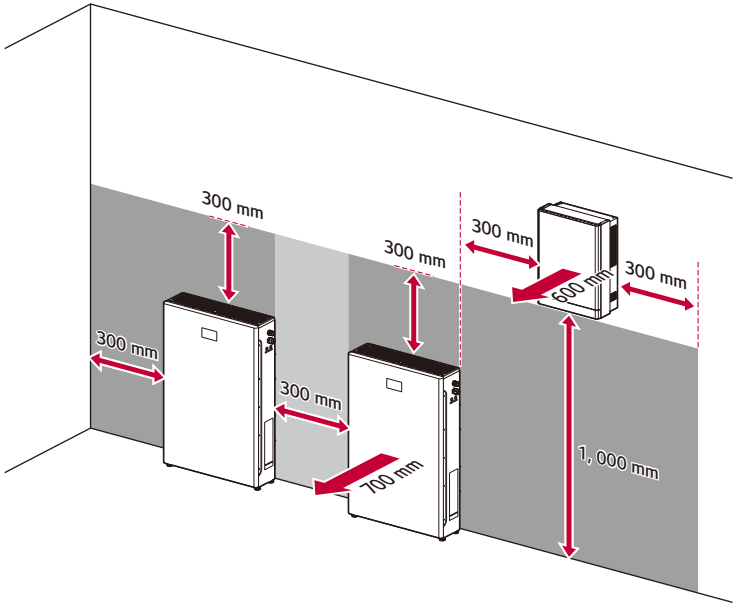

- Do not install within 500 m of the coastline. Sea salt in the air may cause the product to corrode.
- If the product is not exposed to wind currents, it can be installed within 500 m of the coastline.

# Minimum Clearance

This product must be installed with clearance at the left, right, top, bottom and front of the product as shown in the figure.

Be sure not to block right side of the installed PCS. Risk of serious injury due to high temperature.

## HBC Battery (Single and Dual)



# Wall Mounting

This product must be installed on the wall considering appropriate environments described in 'Choice of location' Follow the mounting instruction described below exactly and securely.

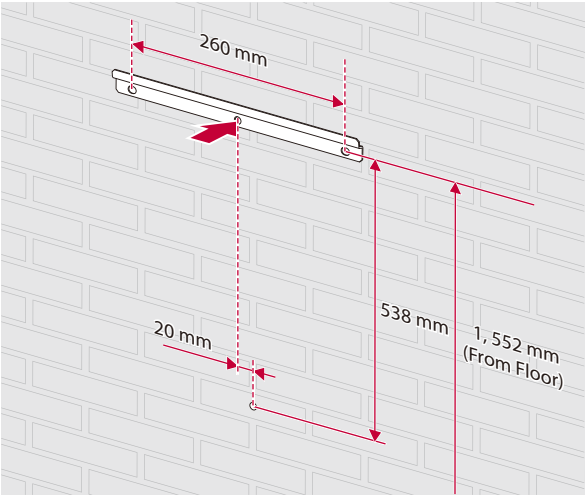
**WARNING**

- It is important to ensure that the drilling locations do not cross any electrical wiring or plumbing inside the wall.

**INFO**

- When attaching the wall bracket to a wall, adjust the horizontal level using inclinometer or a leveler.

1 Place the wall bracket on a wall where meets every installation conditions and clearance.
And indicate the positions to drill using a pencil or the like. And drill holes on the indicated positions.

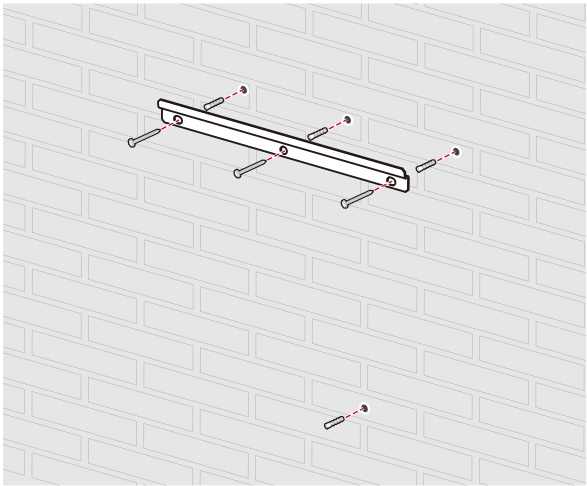


**INFO**

- Before fixing the bracket screws, check the horizontal level once again using inclinometer or a leveler.
- Depending on the surface, different screws and anchors may be required for installing the wall bracket. Therefore, these screws and anchors are not content of the product. The system installer is responsible for selecting the proper screws and anchors.
- It is recommended to use stainless steel screws with M6 - M8.

2 Fix the wall bracket with screws and anchors.

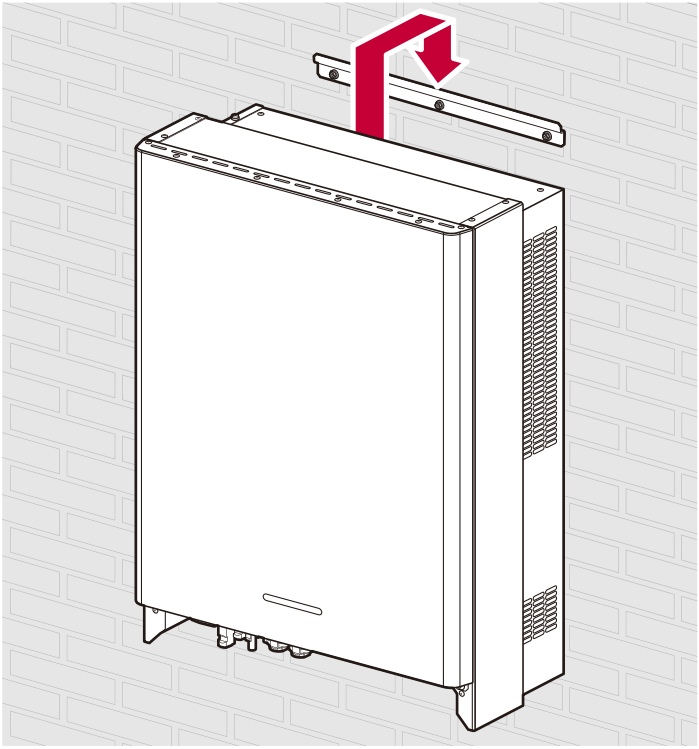
And insert anchors into the holes at the lower part.



## WARNING

- When working on this product, at least two people are needed for safe installation.
- This product is heavy. Wear appropriate personal protective equipment (such as gloves and protective footwear) when handling the unit. Only a sufficient number of trained movers should lift the product.

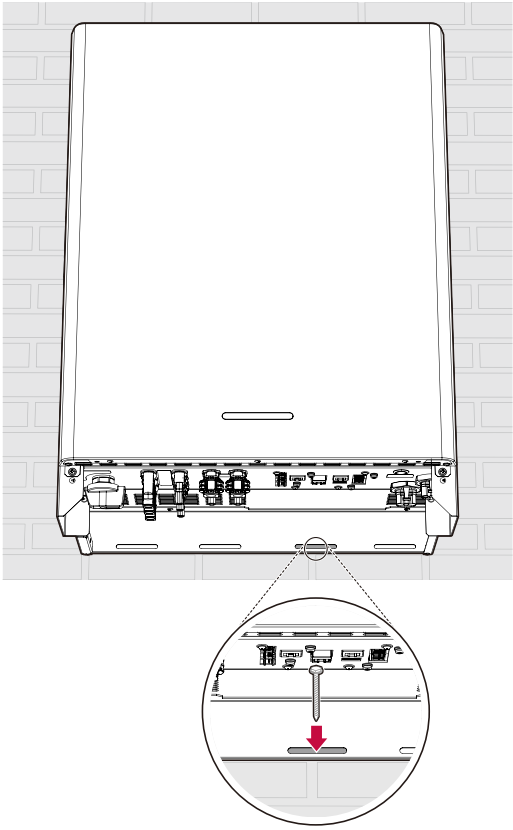
3 Hang this product to the wall bracket. Make sure that at least two persons work together to move the product.



## CAUTION

- Don't hold and lift lower cover in handling and installing

4 Fix the lower part of the product to the wall with screws.



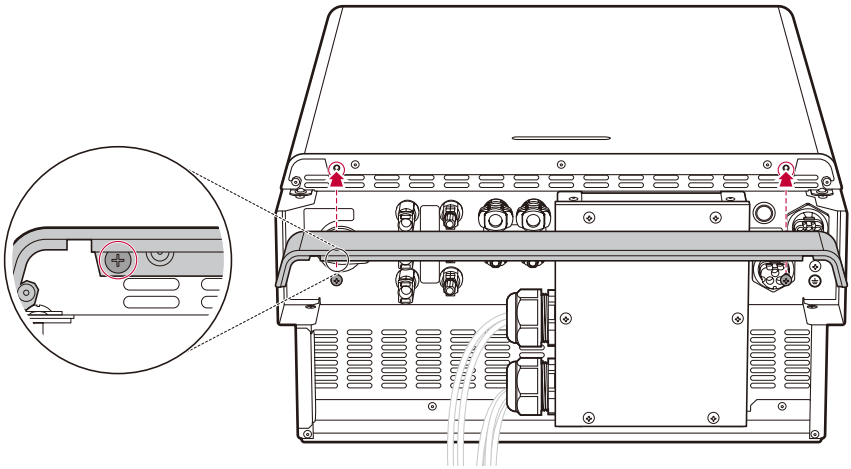
## WARNING

- It is important to ensure that the drilling locations do not cross any electrical wiring or plumbing inside the wall.

## INFO

- Depending on the surface, different screws and anchors may be required for installing the wall brackets. Therefore, these screws and anchors are not content of the product. The system installer is responsible for selecting the proper screws and anchors.
- It is recommended to use stainless steel screws with M6 - M8.

5 After finishing every electrical connections, assemble the supplied lower cover and fix the screws as shown in the figure.

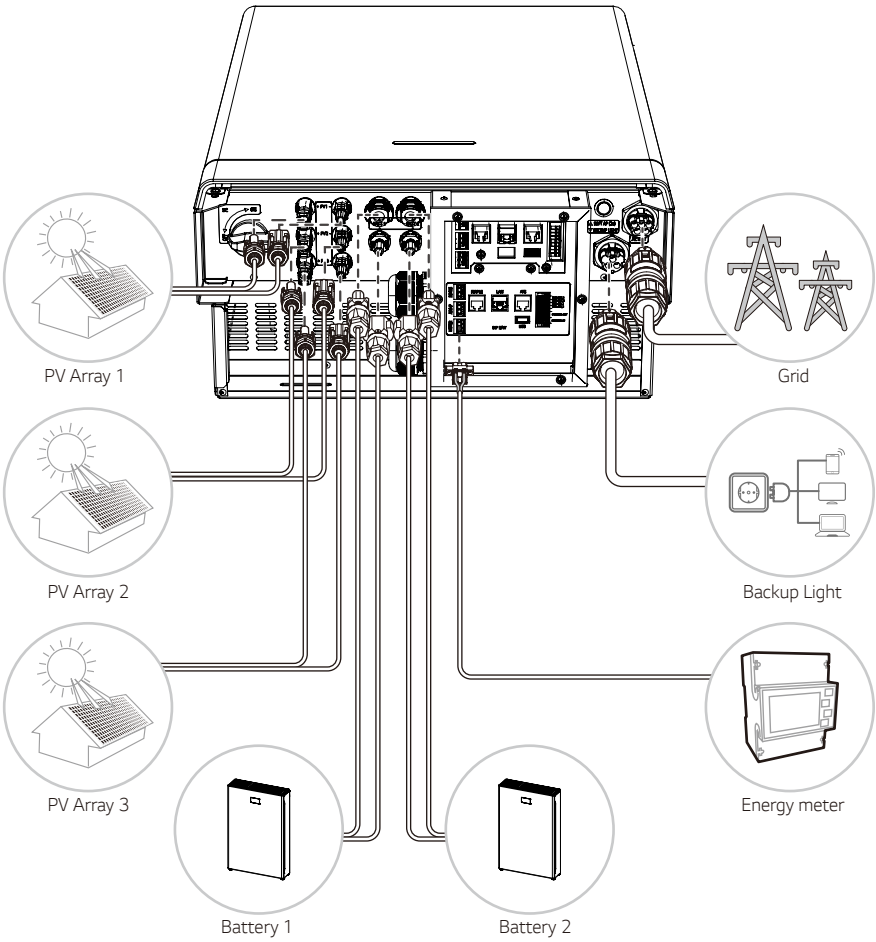


## INFO

- Hold the lower cover when attaching or removing the lower cover. Care with handling the lower cover.

# Connections

## Connection Overview



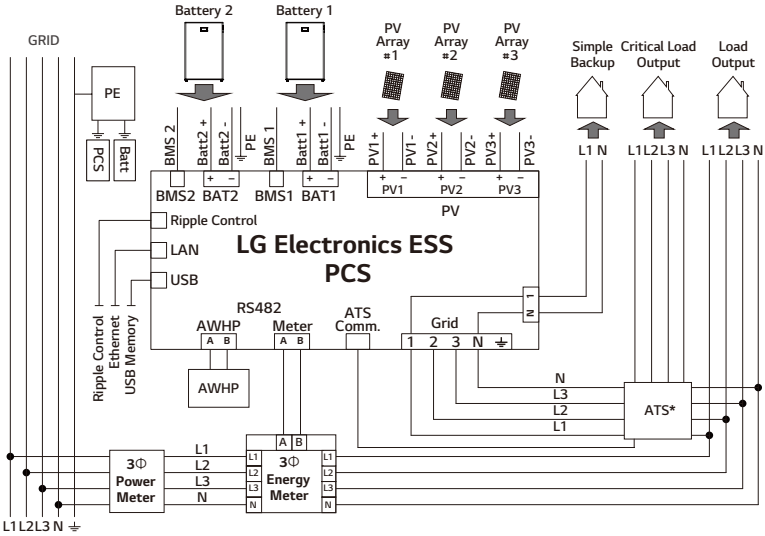

**WARNING**

- Electrical shock hazard. Do not touch uninsulated wires when the PCS cover is removed.
- Before starting electrical cable connections or removing the cover, turn off the AC circuit breaker, PV switch and DC circuit breaker of the battery. (In case of re-installation, turn them off and wait at least 10-minute standby period of time for complete discharge within this product.)
- When the photovoltaic array is exposed to light, it supplies a DC voltage to the PCS.

## CAUTION

- The electrical installation of this product must only be performed by electricians or technicians qualified to install this product.
- When removing the cover, make sure not to damage the connection components.
- After connecting the normal and backup load to the corresponding ATS terminals, check if electricity is supplied properly and whether the grid status is live or out.
- Refer to the ATS BOX manual at the following site for detailed information on installing ATS BOX. https://enwitec.eu/

# Connection Diagram




* ATS: Automated Transfer Switch (Optional component)

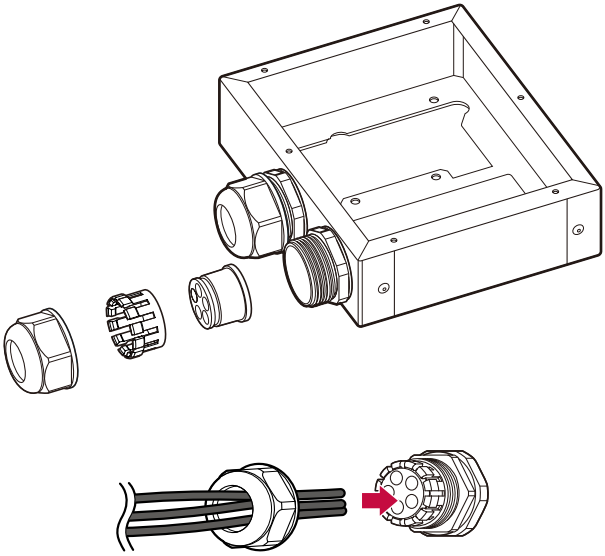
# Communication Connections

## Wiring Box

**CAUTION**

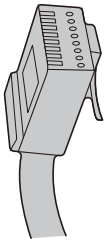
- Communication cable must be CAT5 or better.
- Ground must be necessary if it is marked on page.
- Because the ground connection for communication can reduce unintended electromagnetic waves. Can not be completed Commissioning in status of communication error.

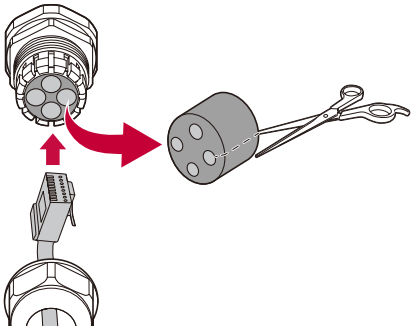
To connect the communication cables, separate the cable gland of wiring box as shown in the figure and pass the cables through each hole.

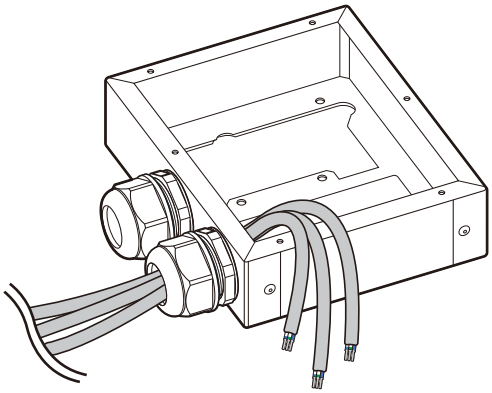


## INFO

- Insert an Ethernet, ATS, Ripple Control cable with an RJ45 plug to the each port at the front of the product as shown in the figure.

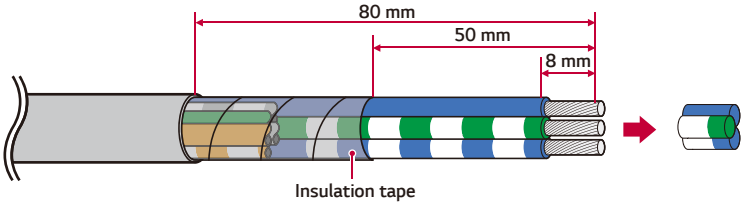






## RS485 Connector

For energy meter and AWHP connections, strip the 3-conductor communication cable and tie up the unused wires and drain wire (if it exists) using insulation tape as shown in the figure.

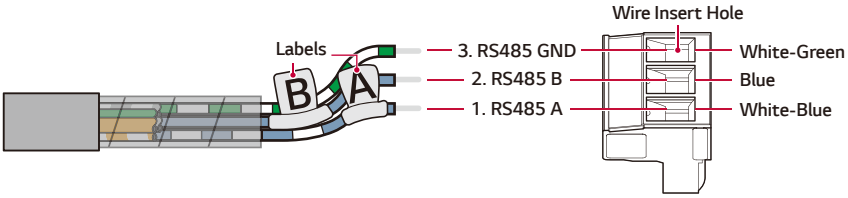



Connect the 3-conductor communication wires to the communication terminal block as shown.

Note the labelling on the each cables when connecting.

Check the labels BUS-A and BUS-B on both ends of the connection to connect to the energy meter.

The BUS-A connection on the ESS side should be connected to the BUS-A connection on the energy meter side, and the BUS-B connection on the ESS side should be connected to the BUS-B connection on the energy meter side



## INFO

- Compatible energy meter brand and model names are stated in 'Energy meter Compatibility.'
- When Connecting Enegry Meter RS485 Communication cable, refer to the below table for the port name.

| Meter / Home15 | Eastron | ABB | Chint | ECS |
|---|---|---|---|---|
| RS485_A | A+ | B(36) | A (24) | D1(6) |
| RS485_B | B- | A(37) | B (25) | D0(5) |
| GND | G | C(35) | - | Common(7) |

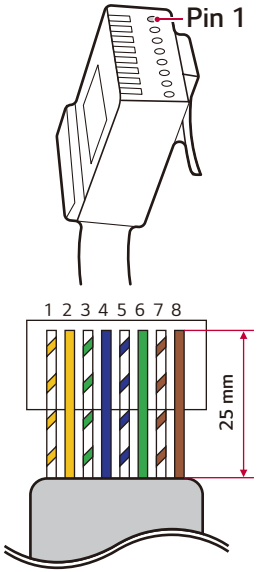
## RJ45 Connector

1 For ATS connection, use a CAT5 (or better) cable to make an RJ45 connector referring to the pinout below.

**RJ45 Pin out (T-568B Standard)**

| Pin | Recommended Wire Color | Ripple Control |
|---|---|---|
| 1 | White-Orange | Not Connect |
| 2 | Orange | Not Connect |
| 3 | White-Green | ATS_K3 |
| 4 | Blue | ATS_K14 |
| 5 | White-Blue | Not Connect |
| 6 | Green | ATS_EN |
| 7 | White-Brown | 12V |
| 8 | Brown | GND |

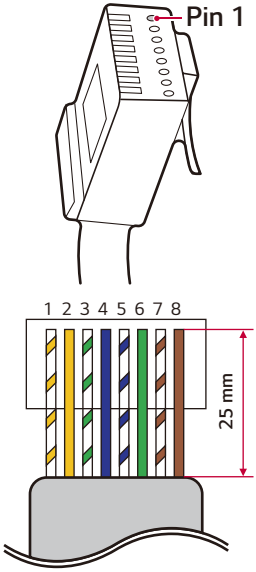
* Cable type : CAT5 UTP or better



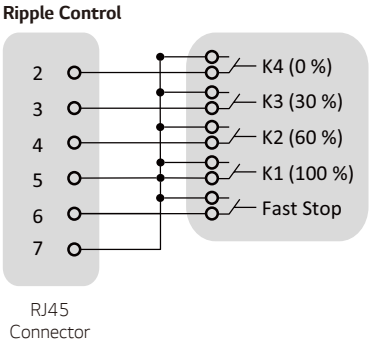

**RJ45 Standard Pin out**

2 For ripple control, use a CAT5 (or better) cable to make an RJ45 connector referring to the pinout below.

| Pin | Recommended Wire Color | Ripple Control | SPI |
|---|---|---|---|
| 1 | White-Orange | - | - |
| 2 | Orange | K4 (0 %) | Ext. signal |
| 3 | White-Green | K3 (30 %) | Local Command |
| 4 | Blue | K2 (60 %) | - |
| 5 | White-Blue | K1 (100 %) | - |
| 6 | Green | Fast Stop | Trip signal |
| 7 | White-Brown | Int.12 V | - |
| 8 | Brown | - | GND |

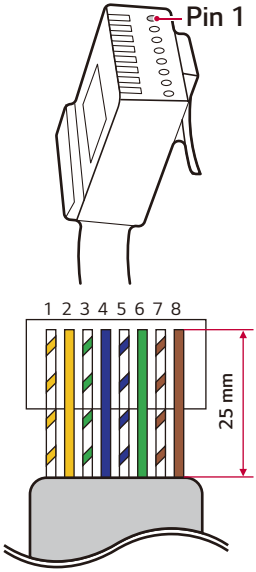



RJ45 Standard Pin out

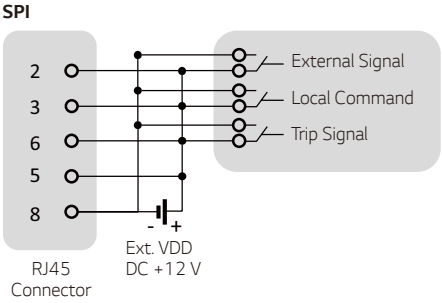



## for Italy

Due to CEI 0-21 regulations, ripple control is supported by SPI (Sistema Protezione Interfaccia) in Italy.
Refer to the pin out below to make and install RJ45.




RJ45 Standard Pin out



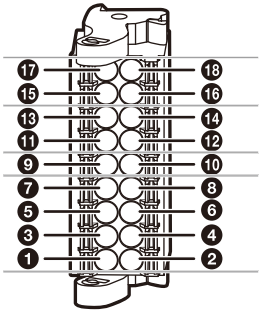
## Communication connector

For parallel and BMS communication connections, connect to the supplied communication connector.

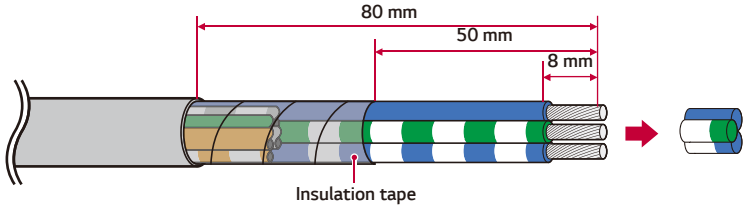
### [BMS Communication Connections]

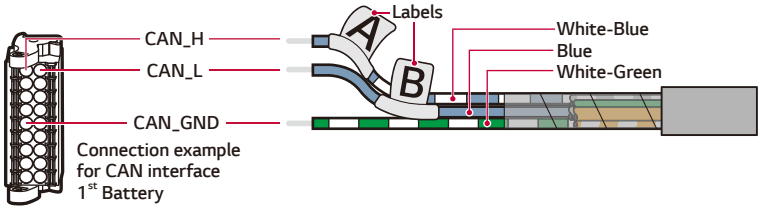
Connect the supplied communication connector to the battery.

Signal wires must be connected to each port of the PCS and Batteries.




| | | | |
|---|---|---|---|
| BMS | CAN 1 | 17 CAN_H | 18 CAN_L |
| | CAN 2 | 15 CAN_H | 16 CAN_L |
| | 485 1 | 13 RS485_RX | 14 RS485_TX |
| | 485 2 | 11 RS485_RX | 12 RS485_TX |
| | GND | 9 BATT_GND | 10 BATT_GND |



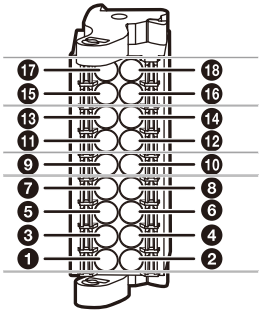



| | HBC | | HBC Plus | |
|---|---|---|---|---|
| | Battery | PCS | Battery | PCS |
| 1st Battery | RS485_Low | ⓭ RS485_RX | CAN_High | ⓱ CAN_H |
| | RS485_High | ⓮ RS485_TX | CAN_Low | ⓲ CAN_L |
| | Shield Earth | ❾ BAT_GND | Shield Earth | ❾ BAT_GND |
| 2nd Battery | RS485_Low | ⓫ RS485_RX | CAN_High | ⓯ CAN_H |
| | RS485_High | ⓬ RS485_TX | CAN_Low | ⓰ CAN_L |
| | Shield Earth | ❿ BAT_GND | Shield Earth | ❿ BAT_GND |

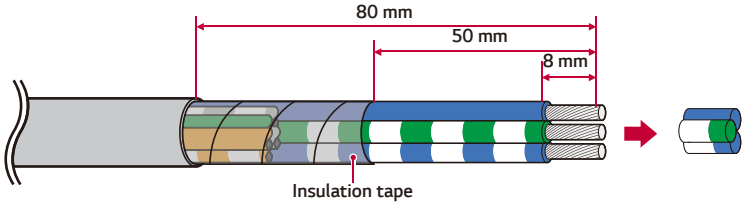
For detailed battery information, please refer to the battery manual.

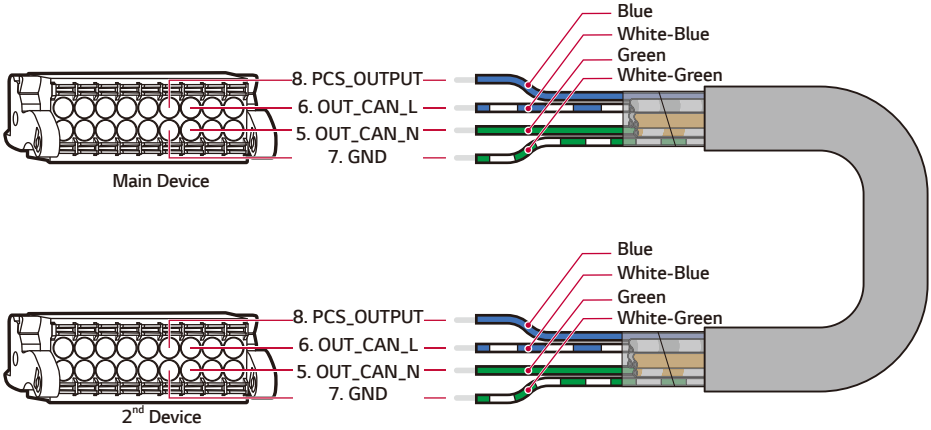
## [Parallel Connection]

Connect the supplied communication connector to the Master PCS and 2nd PCS & 2nd PCS and 3rd PCS. Signal wires must be connected to each port of the Main PCS and 2nd PCS & 2nd PCS and 3rd PCS. Be sure to change the DIP switch settings.

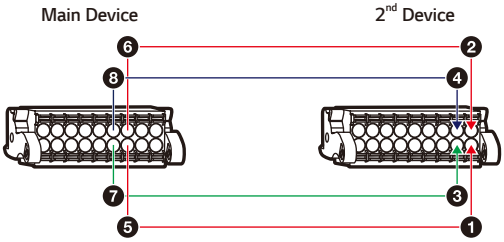



| | | | |
|---|---|---|---|
| Scalability | OUT | 7 GND | 8 PCS_OUTPUT |
| | | 5 OUT_CAN_H | 6 OUT_CAN_L |
| | IN | 3 GND | 4 PCS_INPUT |
| | | 1 IN_CAN_H | 2 IN_CAN_L |

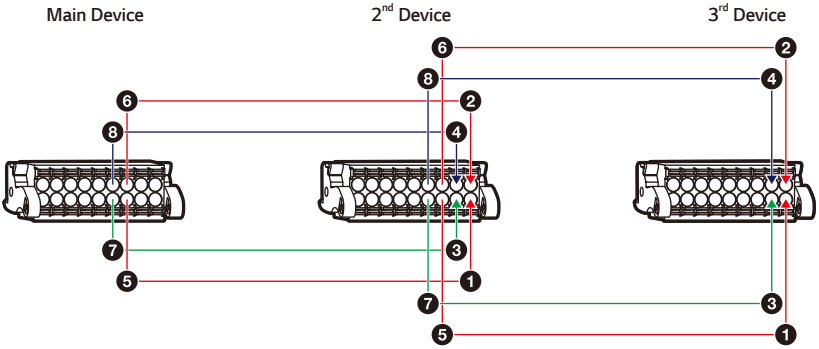


## 2 ESS Parallel Wiring

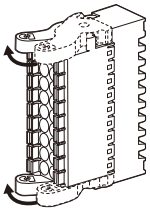



## 3 ESS Parallel Wiring




## CAUTION

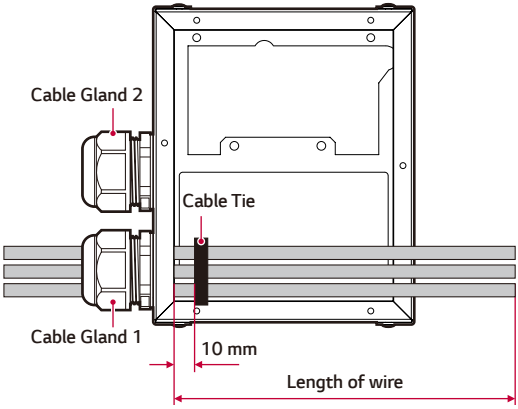
- Recheck the communication connection. If the communication connector is not connected properly, an error may occur.



# Attach the wiring box

1 After all connector work is completed, adjust the cable length according to the table below and bundle the cables with a cable tie as shown in the figure.

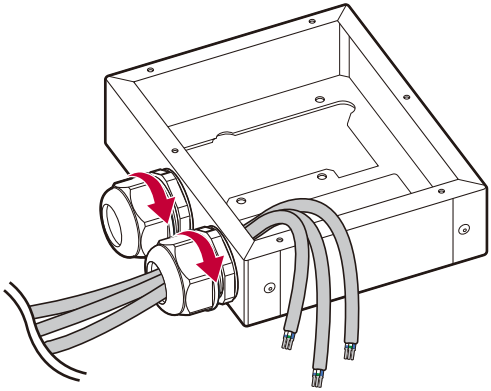
To prevent wire disconnection, the wire connected to the RS485 connector should pass through the Cable Gland 1. Then, inside the Wiring Box, tie the wires together with a cable tie as shown in the figure




| Connected Device | Cable Length for Minimum connection | |
|---|---|---|
| | Recommended Cable Gland | |
| | Cable Gland 1 | Cable Gland 2 |
| RS485 | 170 mm | |
| ATS | 170 mm | |
| Ripple Control | 170 mm | |
| BMS | 185 mm | |

| Connected Device | Cable Length for Maximun connection | |
|---|---|---|
| | Recommended Cable Gland | |
| | Cable Gland 1 | Cable Gland 2 |
| RS485 | 155 mm | |
| METER | 120 mm | |
| AWHP | 150 mm | |
| RIPPLE | 135 mm | |
| LAN | 115 mm | |
| ATS | | 140mm |
| BMS 1 | | 170mm |
| BMS 2 | | 170mm |
| Parallel | | 170mm |

2 Rotate each cable gland cover to tighten the gland hole.

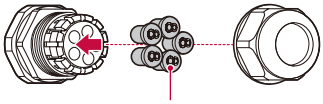


**CAUTION**

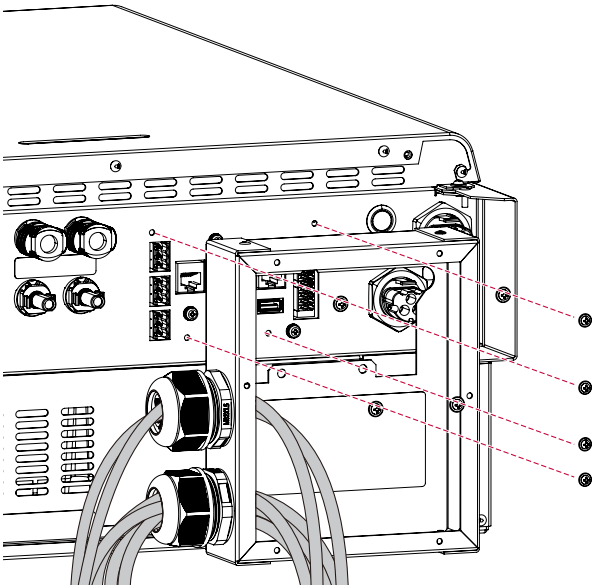
- Make sure the cables are not moving after tightening the cable gland. Otherwise, the IP65 grade cannot be maintained.

**CAUTION**

- To ensure waterproofing, make sure that unused holes are sealed with sealing plugs.

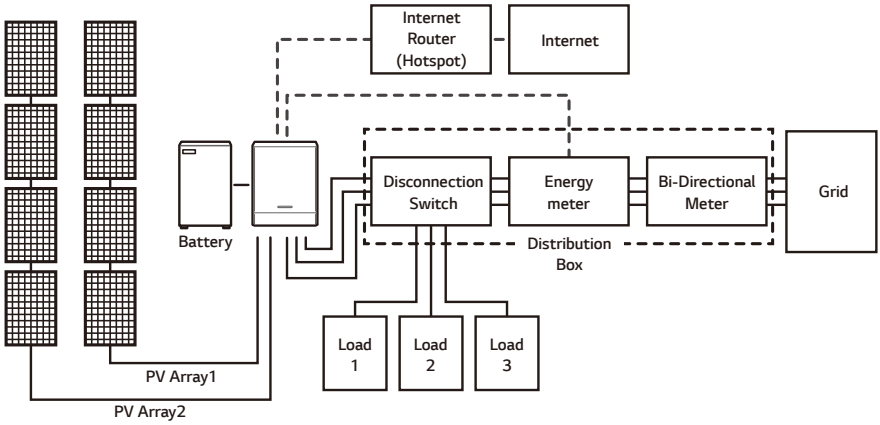


3 Attach the wiring box by 4 M4 nuts as shown in the figure.



# Connections

## Energy meter and LAN Connection Diagram



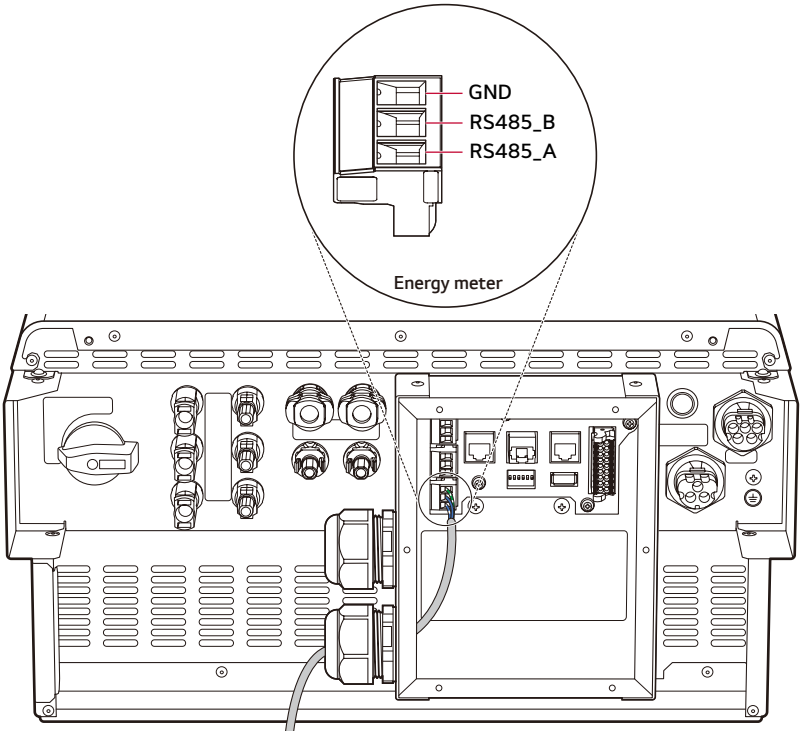
## Energy meter Connection

The energy meter connection is required to get information of energy flow. The energy meter for this product is not included with this product package. Before connecting the energy meter to this product, install the energy meter. Refer to installation manual of the energy meter for more information about energy meter installation.

**WARNING**

- Make sure the AC circuit breaker, PV switch and DC circuit breaker of the battery are disconnected before starting electrical cable connections.

Connect the RS485 plug of energy meter wire to the energy meter connector as shown in the figure.

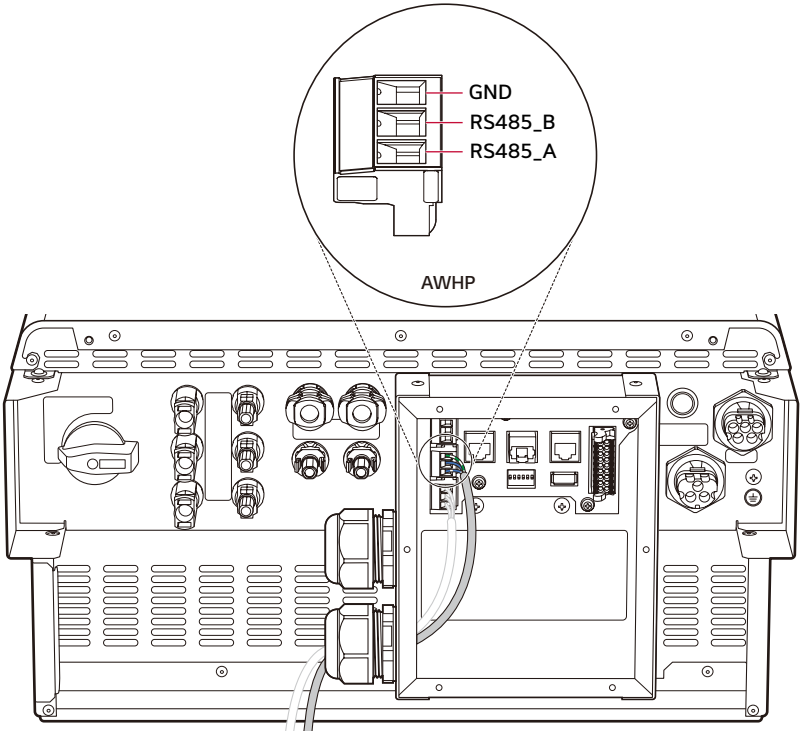


## AWHP connection

The AWHP connection is required to control AWHP. The AWHP for this product is not included with this product package. Before connecting the AWHP to this product, install the AWHP. Refer to installation manual of the AWHP for more information about AWHP installation.

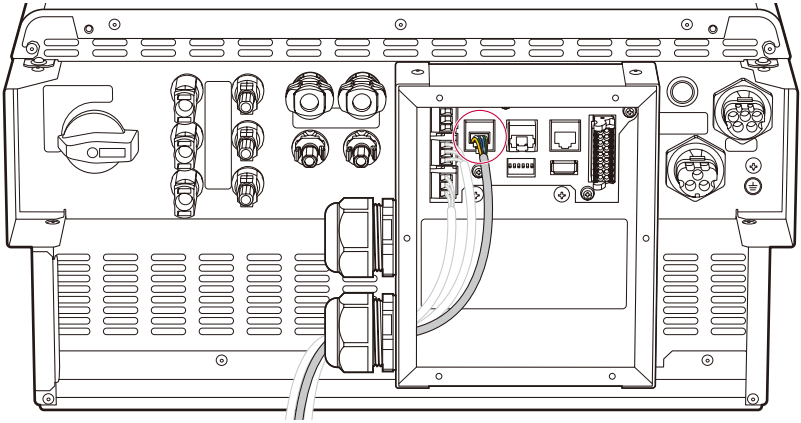
Internet connection is required to use variety of functions such as network update, EnerVu monitoring system, etc. You may need to contact your Internet service provider (ISP) to connect this product to the internet.

Connect the RS485 plug of AWHP to the AWHP connector as shown in the figure



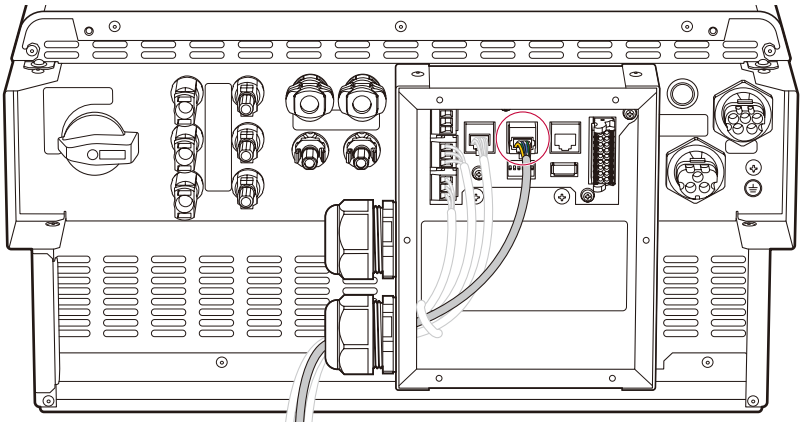
## Ripple Control Connection (if capable)

Connect the RJ45 connector of ripple control to the ripple control port as shown in the figure.



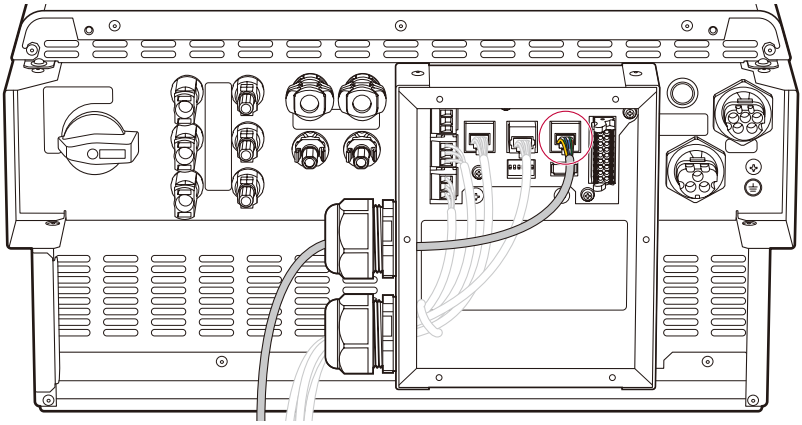
## Internet Connection

Connect the ethernet cable with RJ45 plug to the ethernet port as shown in the figure.



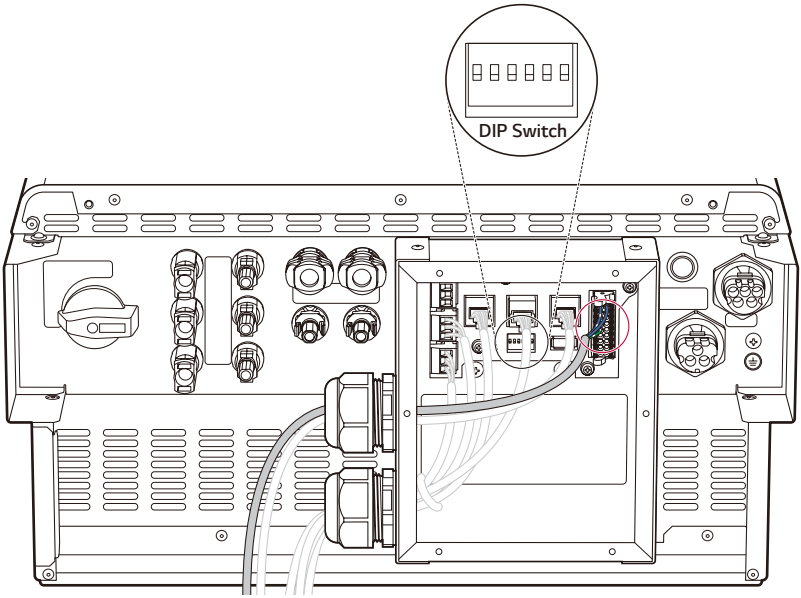
## ATS Connection (if capable)

Connect the RJ45 connector of ATS to the ATS port as shown in the figure.



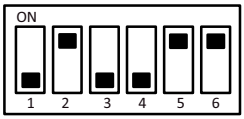
## Parallel Connection, BMS Communication Connections

Connect the Communication connector to the Communication port as shown in the figure.

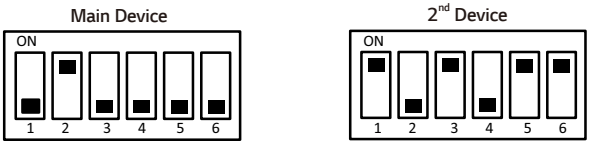



## DIP Switch Setting

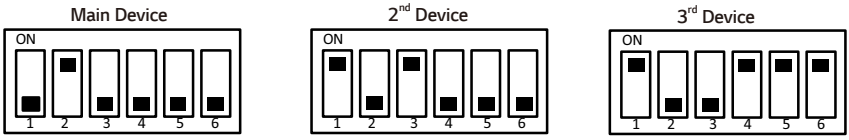
Check DIP switch positions for each setting.




Factory Setting - 1 device install



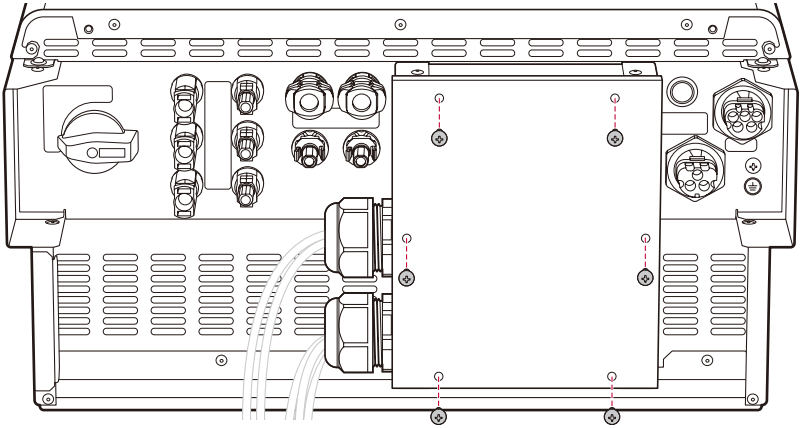

Parallel -2 device install




Parallel -3 devices install

## Closing the wiring box

1 Attach the wiring box cover by 6 M4 nuts as shown in the figure.



## PV Array Connections

You can connect up to three PV arrays directly to the MC4 connectors on this product.

To increase power generation efficiency from PV, Connect PCS channel PV1, PV2, and PV3 in order of PV capacity size.

Power generation priorities operate in the order PV1, PV2, and PV3.

### WARNING

- Make sure the AC circuit breaker, PV switch and DC circuit breaker of the battery are disconnected before starting electrical cable connections.

### CAUTION

- Before connecting PV array, make sure that the open circuit voltage of PV array is less than 1, 000 V. Otherwise this product could be damaged.
- Do not connect a ground to a PV+ or PV- connector. It may cause electric shock or the product may permanently be damaged.

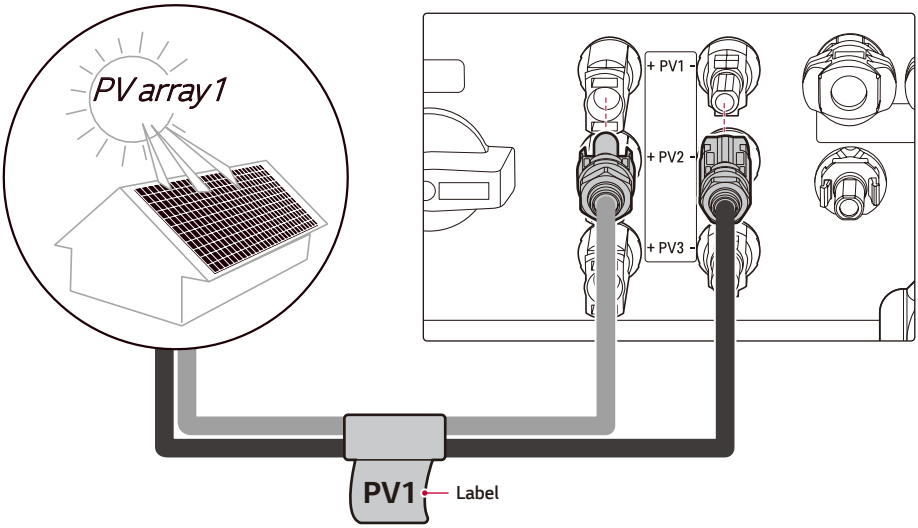
### INFO

- PV modules shall have an IEC61730 Application Class A rating or equivalent.
- For DC cables of PV connections, it is recommended to use the lead wire with cross-sectional area 4 $mm^2$ - 6 $mm^2$.
- When you connect only one PV array to the PCS, the PV array must be connected to the PV1 (+ and -) connectors.
- When you use all PV1, PV2 and PV3 connectors, use the PV1 connectors for bigger PV array.

## PV1 Connection

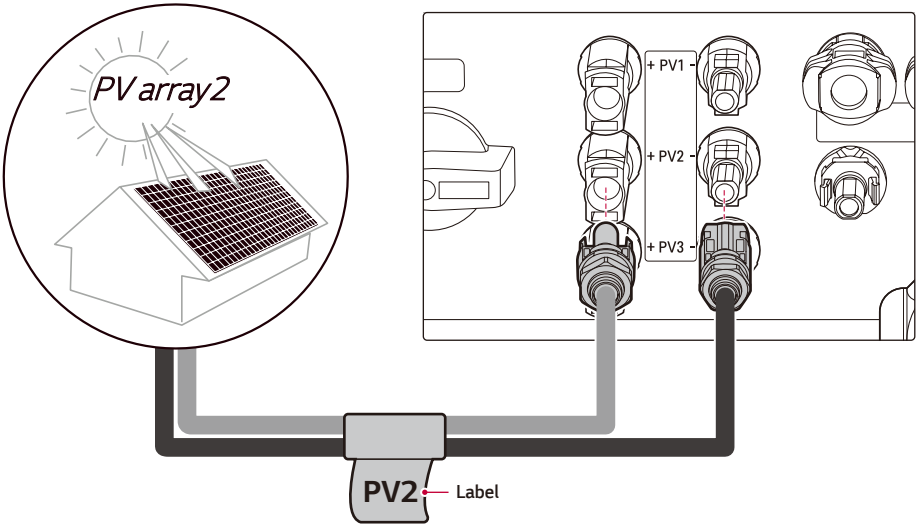
Note the labelling on the each cables when connecting.

Connect DC cables of a PV array to PV1 connectors on this product.



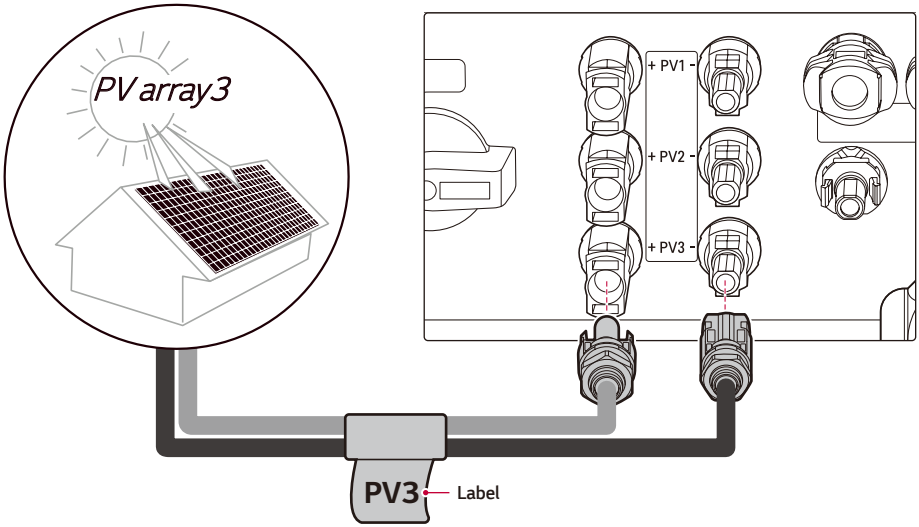

## PV2 Connection

Connect DC cables of a PV array to PV2 connectors on this product.



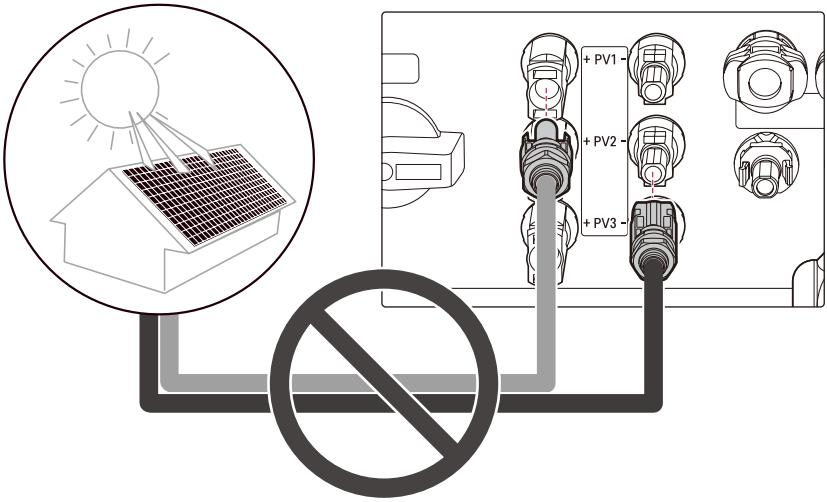
## PV3 Connection

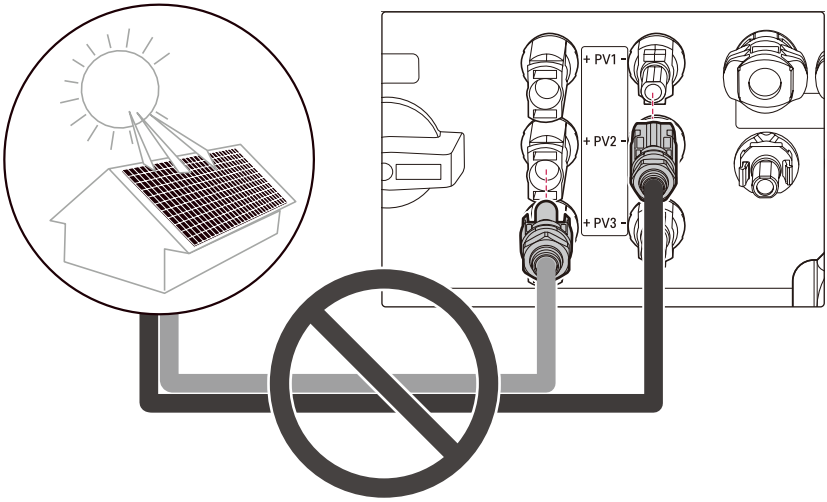
Connect DC cables of a PV array to PV3 connectors on this product.



## WARNING

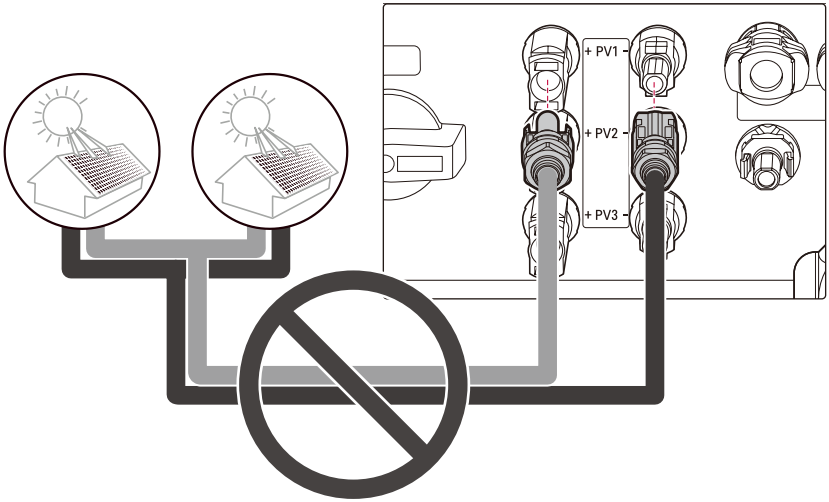
- Do not mismatch the connection of the electric poles + to - and - to + when installing. Otherwise, this may cause electric shock or the product may become permanently damaged.
- PV+ and PV- cables from one PV array must be connected to the same PV connector number. (PV1 + and PV1 -, PV2+ and PV2-) A mismatched connection may cause electric shock or the product may become permanently damaged.
- Note the labelling on the each cables when connecting.



## WARNING

- Do not connect PV arrays in parallel connection to the one PV input on the product. It may cause electric shock or the product may permanently be damaged.




## INFO

- If there is only one PV array connection needed on the system, use PV1+, PV1- connectors. And insert safety caps on unused connectors (PV2+, PV2-, PV3+, PV3-).

## Battery Connections

You can connect a battery to this product. The electricity generated from the connected PV array will be stored in the battery.

The battery for this product are not included with this product package. Before connecting the battery to this product, install the battery on the place where the battery cables are easily accessible to this product.

Refer to the installation manual of the battery for more information about battery installation.

### WARNING

- Make sure the AC circuit breaker, PV switch and DC circuit breaker of the battery are disconnected before starting electrical cable connections.
- Battery replacement can only be carried out by qualified personnel. If the battery needs to be changed, it should be placed with a product which meets the manufacturer's specifications.
- Do not mismatch the connection of the electric poles + to - and - to + when installing. It may cause electric shock or the product may permanently be damaged.

### CAUTION

- Incorrect battery polarity connection will damage the product seriously. This damage is not covered by the warranty.

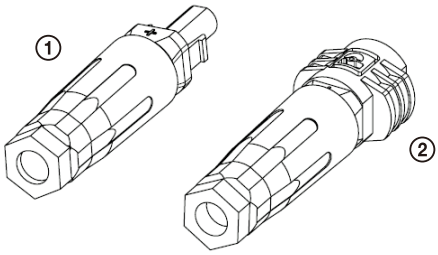
### INFO

- The total length of DC battery cable and BMS cable must be 3 m or less.
- Use the BATT1 connectors for a single battery connection.

## DC cable connection

Connect the DC cable on the battery to the DC terminals on this product.

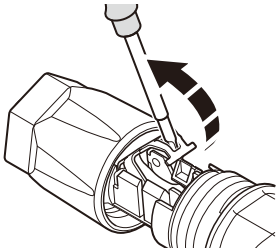
1 Check the components of battery cable plugs which is supplied in the product package.




① + cable connector

② – cable connector

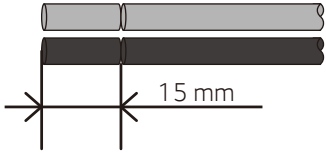
2 Open the spring using a screwdriver



**INFO**

- For battery cable connections, lead wire with cross-sectional area 4 $mm^2$ – 6 $mm^2$ is recommended.
- Battery cable is not supplied on this product package. The system installer is responsible for selecting proper components for the installation.

3 Strip 15 mm off the both + and – battery wires as shown in the figure.

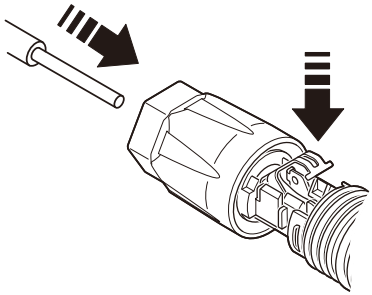



4 Carefully insert the stripped wires to the corresponding cable connector. The wire ends have to be visible in the spring.

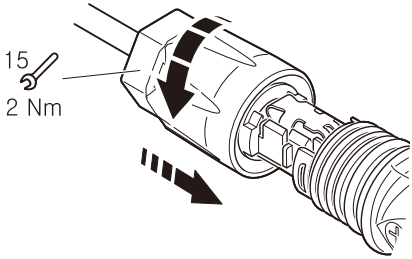
+ cable connector ↔ Battery wire +

– cable connector ↔ Battery wire -

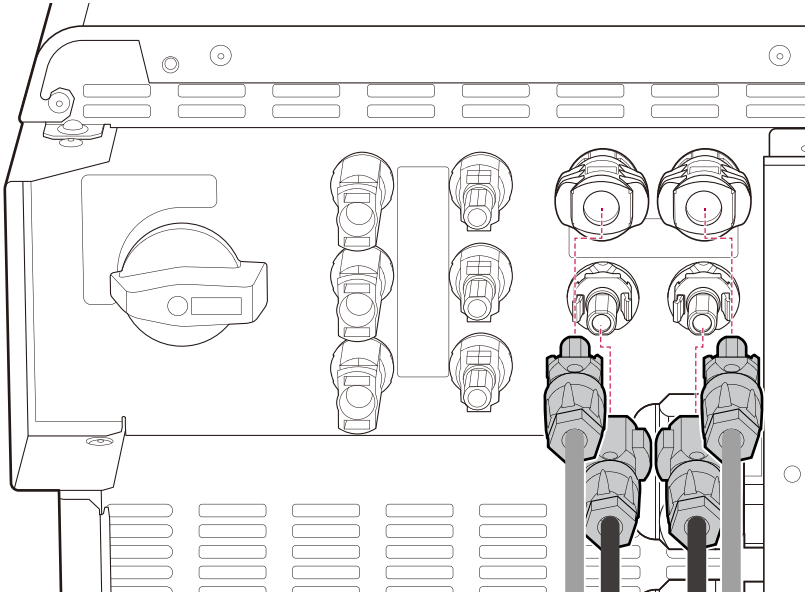
And close the spring. Make sure that the spring is snapped in.



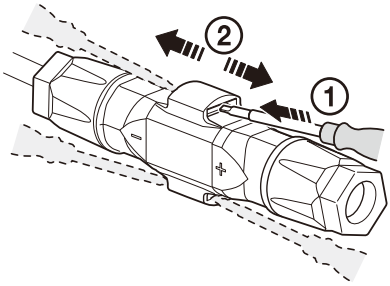
5 Push the insert into the sleeve and fasten the cable gland to the housing using 15 mm wrench. (2 N.m)



6 Connect the both battery cable plugs to the battery DC cable connectors at the bottom of the product.



## Disconnecting the plug




① Insert the screwdriver into one of the four openings.

② Leave the screwdriver in the opening. Pull the two connectors apart.

**WARNING**

- Never connect or disconnect the plug under load. The plugs are not suitable for interrupting the current.

## Grid Connections

To use or sell the generated energy through grid connection, you should connect grid to this product. This product converts DC electricity generated from PV array to AC electricity. The generated energy can be sold to the electric utility or used for the household appliance.

**WARNING**

- Make sure the AC circuit breaker, PV switch and DC circuit breaker of the battery are disconnected before starting electrical cable connections.

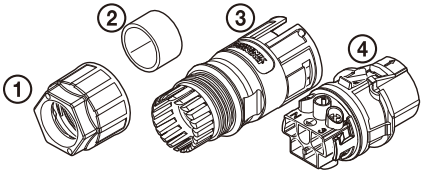
**INFO**

- AC circuit breaker must be the current ratings of 32A.
- The install location of AC circuit breaker must be easy to access.
- This product can cause current with a DC component. Where a Residual Current-operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM of type B is allowed on the supply side of this product.
- Connect the equipment grounding before connecting the AC wires to the grid.

### DC cable connection

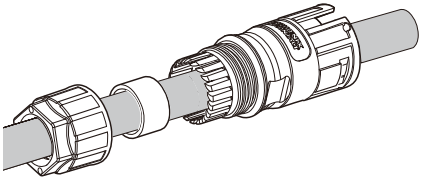
Before making a grid connection, other end of an AC cable should be connected to an AC circuit breaker on the distribution box.

1 Check the components of grid cable plug which is supplied in the product package.




1. Cable gland
2. Rubber seal
3. Housing
4. Contact carriers

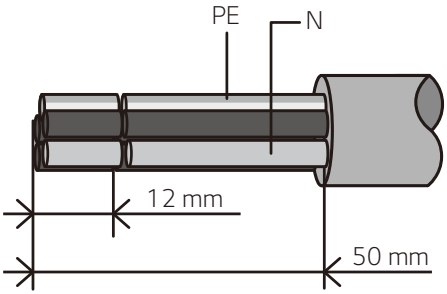
2 Pass the AC cable through the cable gland, rubber seal and housing as shown in the figure.



**INFO**

- For AC cable connections, lead wire with cross-sectional area 4 $mm^2$ or thicker is recommended.
- AC cable is not supplied on this product package. The system installer is responsible for selecting proper components for the installation.
- The recommended cable diameter for the AC cable gland is 16 mm. (including sheath)

3 Strip the AC cable as shown in the figure.




**INFO**

- It is recommended to use a yellow green stripe wire for the PE grounding connection.

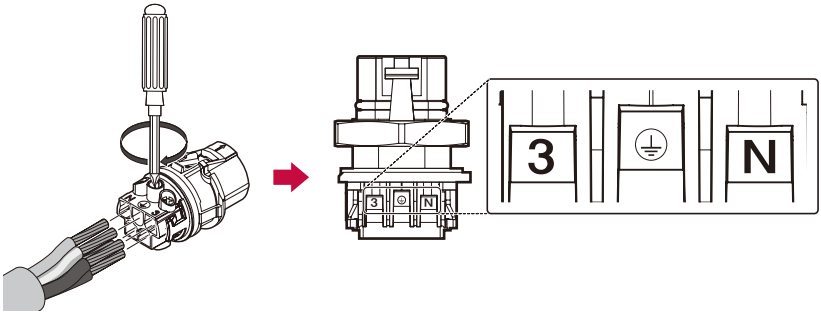
4 Connect the wires to the corresponding wire holes on the contact carriers.

Wire hole 1 ↔ Grid wire L1, Wire hole 2 ↔ Grid wire L2, Wire hole 3 ↔ Grid wire L3,
Wire hole N ↔ Grid wire N, Wire hole ↔ Grounding wire PE

And then fasten the screws on the cantact carriers. (1 N.m)

## CAUTION

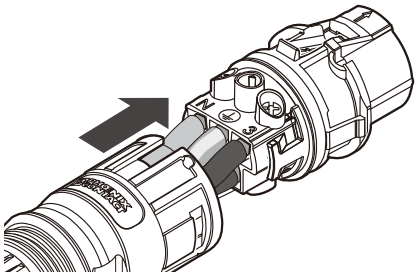
- If L1, L2, L3, N, Ground are connected incorrectly, Can not be completed Commissioning because of Grid Error.
- Check each line through a 3 phase detector.
- Ensure to check the numbers and symbols on the contact carrier before inserting lead wire into the contact carrier.




## INFO

- The N (neutral) hole in the contact carrier must be connected to the N(neutral) terminal of the AC circuit breaker on the distribution box correctly. Otherwise the product could be damaged seriously.
- The PE (Protective Earth) grounding connector in the contact carrier must be connected to the (Grounding) terminal of the distribution box correctly. Otherwise the product could be damaged seriously.

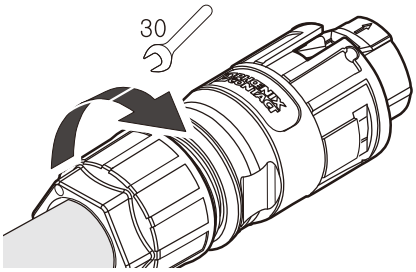
5 Push the contact carriers into the housing until it clicks.



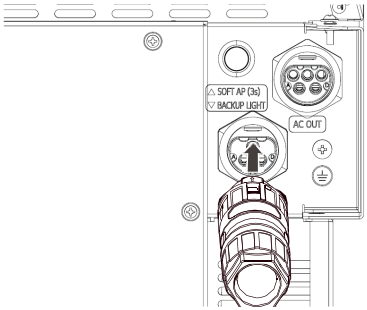
6 Connect the wires to the corresponding wire holes on the contact carriers.

Wire hole 1 ↔ Grid wire L1, Wire hole 2 ↔ Grid wire L2, Wire hole 3 ↔ Grid wire L3, Wire hole N ↔ Grid wire N, Wire hole ↔ Grounding wire PE

And then fasten the screws on the cantact carriers. (1 N.m)



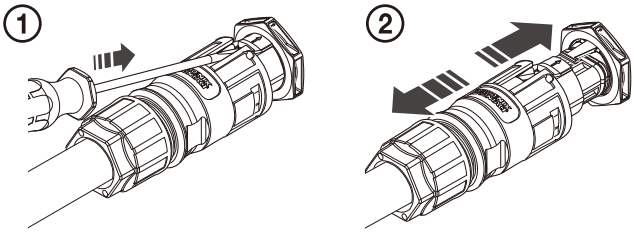

7 Connect the AC cable plug to the AC grid cable connector at the bottom of the product.



## Disconnecting the plug

Press down the release knob with a screw driver, and separate the plug from the connector.

Push the contact carriers into the housing  until it clicks.




**WARNING**

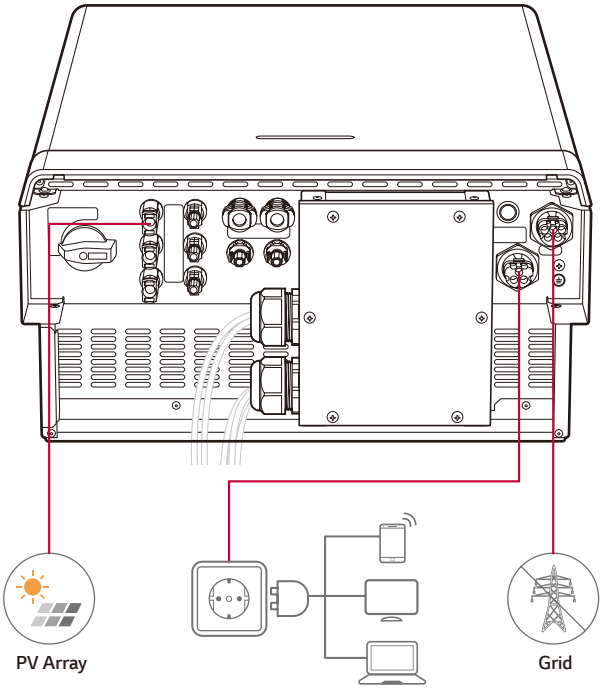
- Never connect or disconnect the plug under load. The plugs are not suitable for interrupting the current.

## Backup Light

It is a socket that is only supplied in case of grid outage based on the currently available battery.

The switch happens automatically via the inverter and doesn't require any additional grid separation components (ATS Box).

Backup Light is for emergency load. It can support up to 3 kW in a single phase.



## Backup Light Connections

To use or sell the generated energy through grid connection, you should connect grid to this product. This product converts DC electricity generated from PV array to AC electricity. The generated energy can be sold to the electric utility or used for the household appliance.

**WARNING**

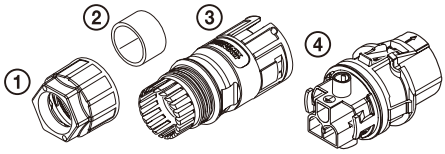
- Make sure the AC circuit breaker, PV switch and DC circuit breaker of the battery are disconnected before starting electrical cable connections.

**INFO**

- AC circuit breaker must be the current ratings of 32A.
- This product can cause current with a DC component. Where a Residual Current-operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM of type B is allowed on the supply side of this product.
- Connect the equipment grounding before connecting the AC wires to the grid.

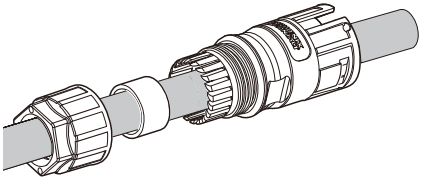
Before making a grid connection, other end of an AC cable should be connected to an AC circuit breaker on the distribution box.

1 Check the components of grid cable plug which is supplied in the product package.




1. Cable gland
2. Rubber seal
3. Housing
4. Contact carriers

2 Pass the AC cable through the cable gland, rubber seal and housing as shown in the figure.

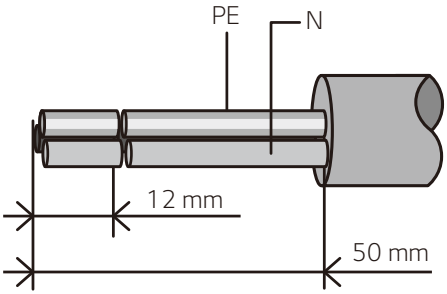




**INFO**

- For AC cable connections, lead wire with cross-sectional area 4 $mm^2$ or thicker is recommended.
- AC cable is not supplied on this product package. The system installer is responsible for selecting proper components for the installation.
- The recommended cable diameter for the AC cable gland is 16 mm. (including sheath)

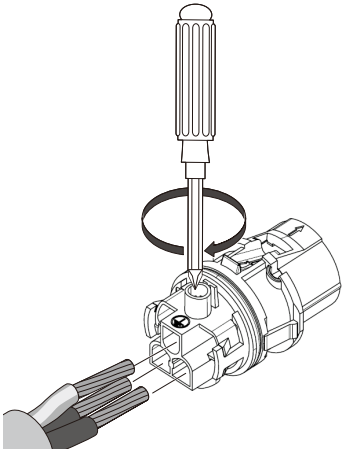
3 Strip the AC cable as shown in the figure.




**INFO**

- It is recommended to use a yellow green stripe wire for the PE grounding connection.

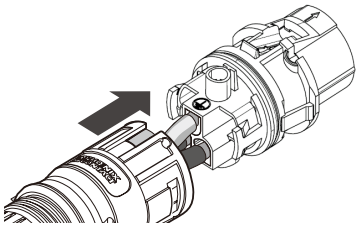
4 Connect the wires to the corresponding wire holes on the contact carriers.
Wire hole L ↔ Grid wire L, Wire hole N ↔ Grid wire N, Wire hole ⏚ ↔ Grounding wire PE
And then fasten the screws on the cantact carriers. (1 N.m)



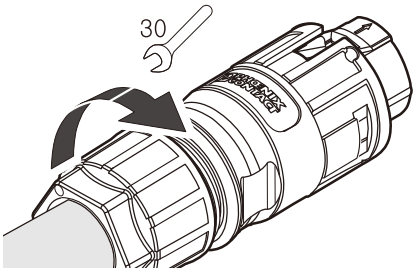
## INFO

- Ensure to check the numbers and symbols on the contact carrier before inserting lead wire into the contact carrier.
- The N (neutral) hole in the contact carrier must be connected to the N(neutral) terminal of the AC circuit breaker on the distribution box correctly. Otherwise the product could be damaged seriously.
- The PE (Protective Earth) grounding connector in the contact carrier must be connected to the (⏚ Grounding) terminal of the distribution box correctly. Otherwise the product could be damaged seriously.

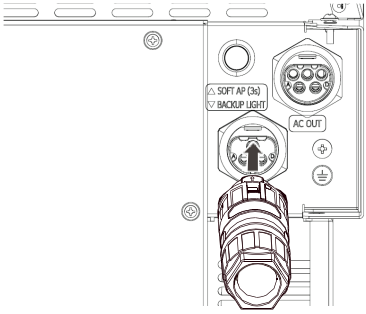
5 Push the contact carriers into the housing until it clicks.



6 Assemble the rubber seal into the housing and fasten the cable gland to the housing using 30 mm wrench. (4.5 N.m)



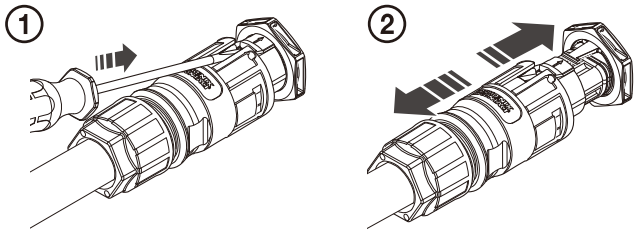

7 Connect the AC cable plug to the AC grid cable connector at the bottom of the product.




## Disconnecting the plug

Press down the release knob with a screw driver, and separate the plug from the connector.

Push the contact carriers into the housing until it clicks.




**WARNING**

- Never connect or disconnect the plug under load. The plugs are not suitable for interrupting the current.

# Turning on the Product

**When all the connections are finished, check the status in numbering order below.**

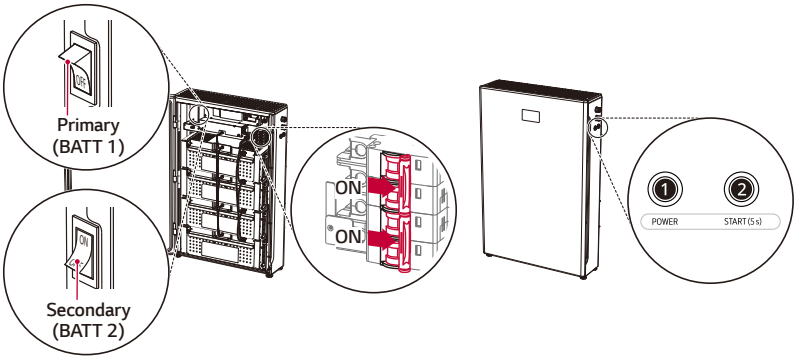
1 Switch the AC circuit breaker in the main distribution panel to the "On" position.

2 Switch the DC circuit breaker of the connected battery to the 'ON' position.

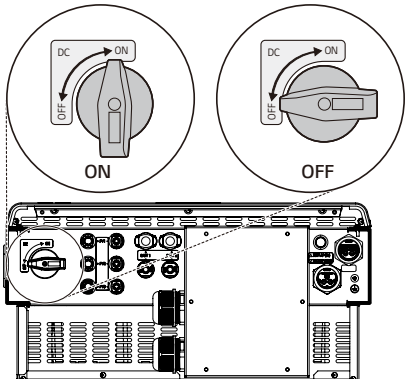
① When setting up the dual battery units to the PCS, switch settings must be set in each battery. Turn the switch to the ON position for the secondary battery unit (BATT 2) and the OFF position for the primary battery unit (BATT 1).

② Switch the PCS circuit breaker and the main circuit breaker of battery unit to ON position.

③ Press the POWER button to turn the battery unit on. And then press and hold the START (5s) button for 5 seconds. You can hear the sound "click".




3 Turn the PV switch of the PCS to the 'ON' position.



# Turning off the Product

**The order of turning off the product is the reverse order of turning on.**

1) Turn the PV switch of the PCS to the 'OFF' position.

2) Switch the DC circuit breaker of the connected battery to the 'OFF' position.

3) Switch the AC circuit breaker in the main distribution panel to the 'OFF' position.

# Backup Load Connection

## Max. load available during backup operation

* This function is applicable only with qualified ATS box.

| Installed Battery | LGHBC11H (3PACK) | | LGHBC15H (4PACK) | |
|---|---|---|---|---|
| | Single | Dual | Single | Dual |
| Total Capacity | 11.87 kWh | 23.74 kWh | 15.83 kWh | 31.66 kWh |
| Usable Capacity[1)] | 10.68 kWh | 21.36 kWh | 14.24 kWh | 28.48 kWh |

[1)] The capacity may decrease as the battery ages.

- Please connect the backup load to backup power terminal of ATS below the Max. power defined in the table above.
- After connecting the normal and backup load to the corresponding terminals of ATS, check if electricity is supplied properly whether the grid alive or outage.
  - Backup load : Home load to supply electricity even if a power outage occurs.
  - Normal load : All electrical home load except backup load

## Additional check point when connecting single-phase and high power loads, even within the max. usable home load capacity

| | Type of load |
|---|---|
| Acceptable | Small plug-in appliance such as TV, Computers, Radios, Routers |
| | Lighting (compact Fluorescent or LED recommended) |
| | Refrigerator and freezers, microwaves, cookers |
| Unacceptable | Large capacity AWHP (Air to water heat pump) |
| | Air-conditioners |
| | Spa / Saunas |
| | Electric cooktop / Electric ovens |
| | Hair dryers |
| | Other Household appliances with high inrush current at start up (e.g. Water pump, Sprinkler, etc.) |

- Do not connect “loads exceeding the maximum capacity” or “unacceptable loads” in backup system. Otherwise, PCS may stop operating.
- In these stop conditions, PCS issues an alarms with “Over load” or “Unacceptable load” fault message through the APP.
- The information above is subject to change at anytime without notice.

# Installer Settings

When this product is turned on for the first time, settings in the [Setup] menu must be set by authorized service personnel.

Before starting [Setup], make sure that the physical connection and installation are done as described in this manual exactly and securely.

**Important : Be sure to install the product in the order below.**

1. Complete commissioning with the installer account in the LG EnerVu plus App.

   If you do not complete commissioning, you will not be able to register your product in the LG ThinQ App.

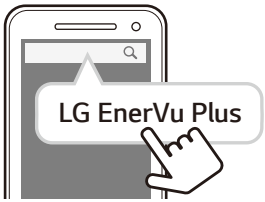
2. Complete product registration with customer account in the LG ThinQ App.

   If you do not complete product registration in the LG ThinQ App, the device will not be searched in EnerVu Web.

3. Final register the product using an installer account on the LG EnerVu web site.

# Installing the 'LG EnerVu Plus' App

Download the 'LG EnerVu Plus' on the Apple App Store or Google Play Store.




OR

iOS

## CAUTION

- LG EnerVu plus App. is for installers only. Log in with your installer account.
- When selecting a region, you must select the region where the product is installed.

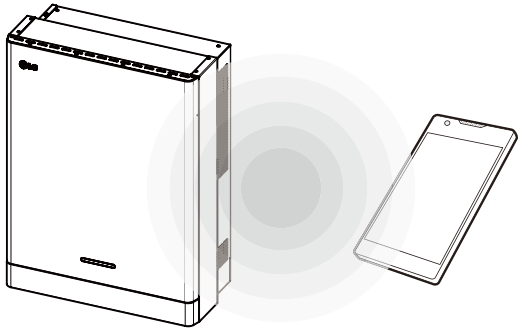
## INFO

- Depending on the device, the 'LG EnerVu Plus' app may not work.
- The LG EnerVu Plus app is available for the following software:
  - Android O/S : Lollipop (5.0) or later
  - iOS O/S : iPhone 6 (9.0) or later

- For the stable operation and periodic system update of the product, LG Electronics strongly recommends that the user register with EnerVu Plus and stay connected.
- LG Electronics ESS is under continuous development and its firmware is updated at regular intervals. To ensure that the product works properly, LG Electronics ESS must be updated with the latest firmware.
- Malfunctions that can be traced back to the use of outdated firmware are not covered by LG Electronics' product warranty. The automatic firmware update takes place when LG Electronics ESS is registered to EnerVu Plus (strongly recommended) and connected to the internet. Further information can be found in the chapter called "EnerVu Plus Settings" of the LG Electronics ESS installation manual.

# Connecting to a Mobile Device

To connect the system to a mobile device, the LG EnerVu Plus mobile application must be installed on your mobile device. Search and download the 'LG EnerVu Plus' application from the Apple App store or Google Play store.



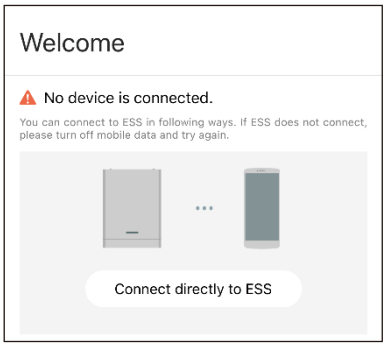


## Connect directly to ESS

1


Run the 'LG EnerVu Plus' app on your mobile device.

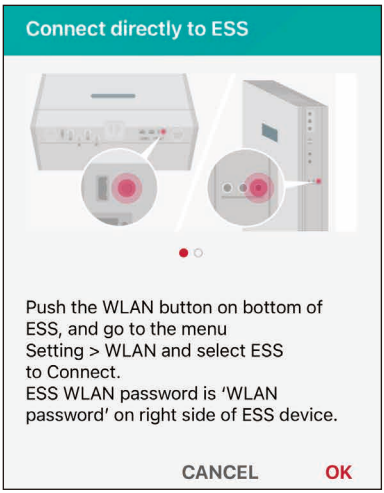
2




If it is the first time connecting to the system, the connection method selection screen appears.

Tap the [Connect directly to ESS] option.

3



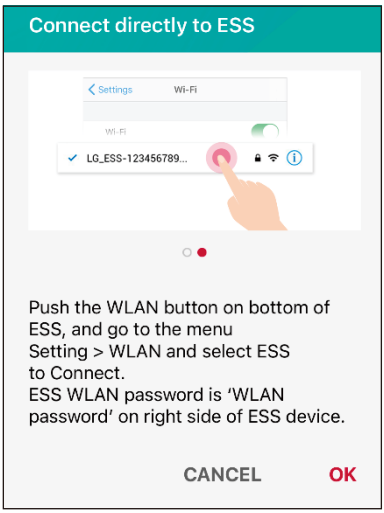

Press and hold the wireless connection button on the system for 3 seconds until a melody sounds.

On your mobile device, tap [OK] to go to the next step.

**INFO**

- If a connection has not been established after 1 hour, the Network LED light will not blink and the WLAN signal will be disabled.

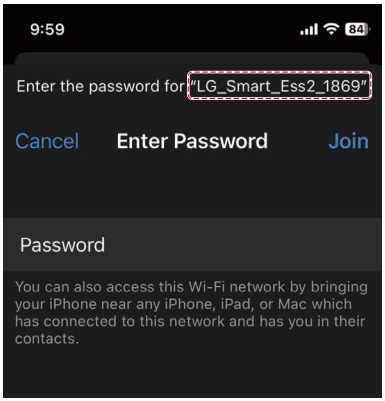
4




Read the guidance and tap [OK] to display the WLAN selection screen.

Select the SSID which starts with 'LG_Smart_Ess2.' The password input screen will appear.

5




Input WLAN password in the password field to connect to the system.

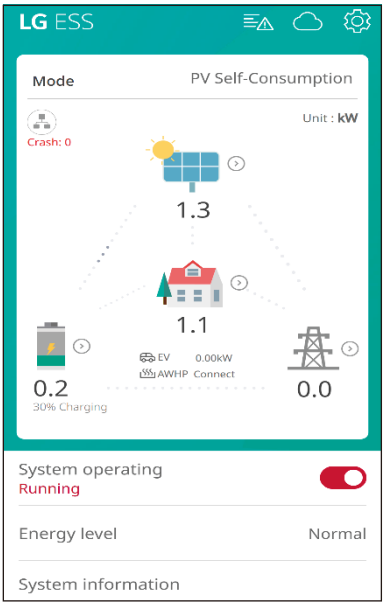
The WLAN password is 8 characters. The WLAN password is 8 characters long, repeating the last 4 characters of the SSID twice.

"LG_Smart_Ess2_1869"



## INFO

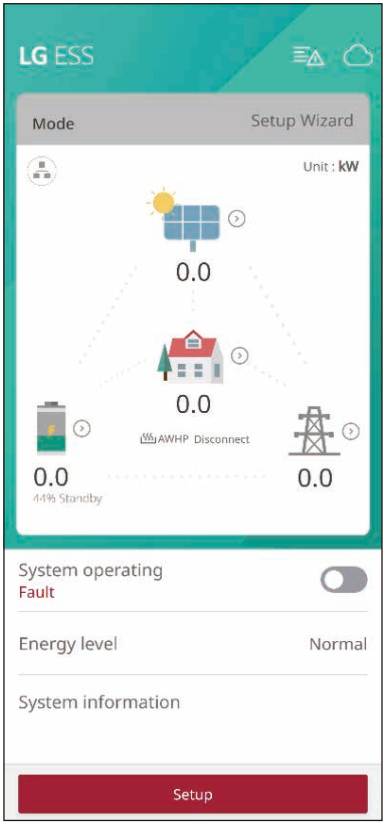
- Example : LG_Smart_Ess2_1869
  In this example the WLAN password would 18691869
- If the connection failed, try again after turning off the mobile data option on your mobile device.
- The password can also be confirmed from the MAC Label.




**Android** : If the connection is successful, run the [LG EnerVu Plus] app to display the main screen as shown in the figure.

**iOS** : If the connection is successful, run the [LG EnerVu Plus] app to display the main screen as shown in the figure.

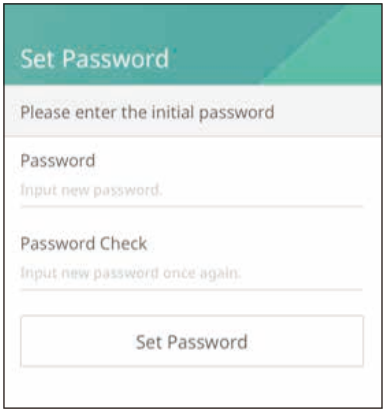
# Entering the [Setup] Screen




**[Setup]**

To enter [Setup] on your mobile device, follow the instructions described below.

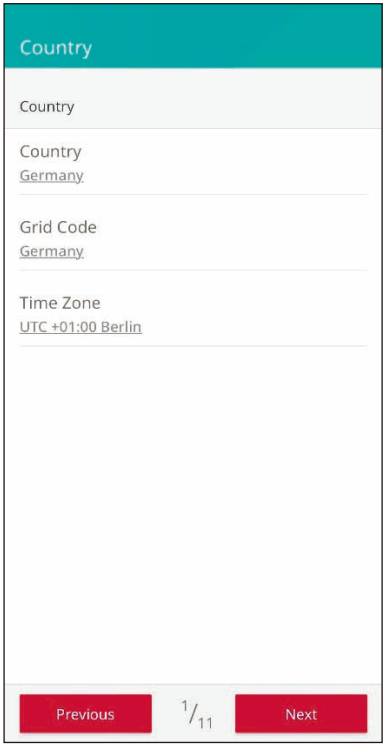
1 Tap [Setup] on the main screen to display the password input screen.




**[Setup] First time**

When entering the [Setup] screen for the first time, you must set an installer password.

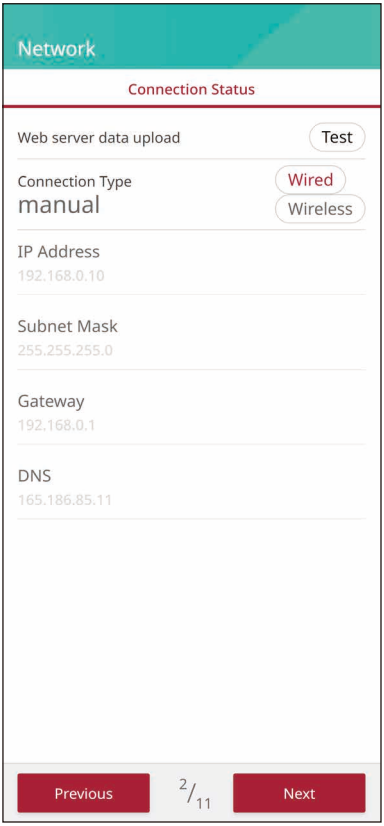
# Country




**[Country]**

1 Select country, grid code, and time zone.

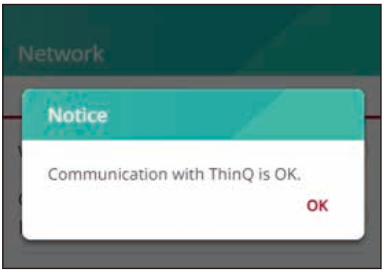
# Network




**[Network]**

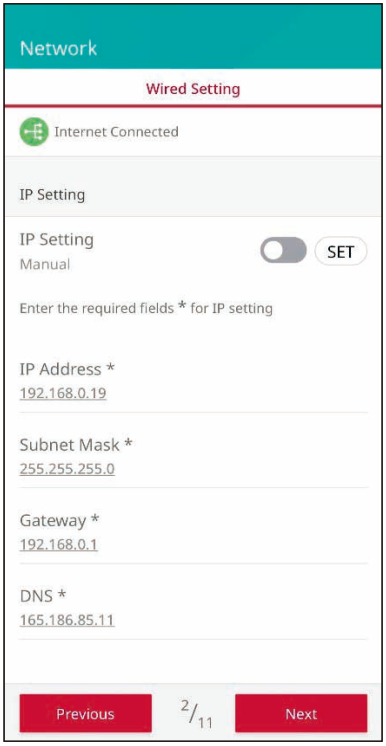
You can view the current connection type and IP information.

The default network connection type is set to [Wired]. To set up a wireless connection, select the connection type as [Wireless].




To check if communication with the cloud is working properly, click the [Test] button and check the OK message.

# Wired Network

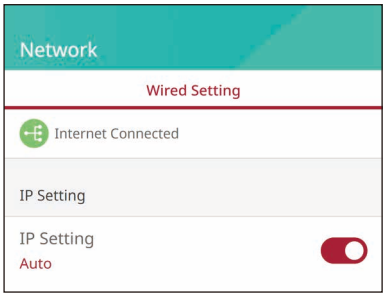



When the [Connection Type] option in the [Connection Status] is set to [Wired]. Wired connection options are displayed.

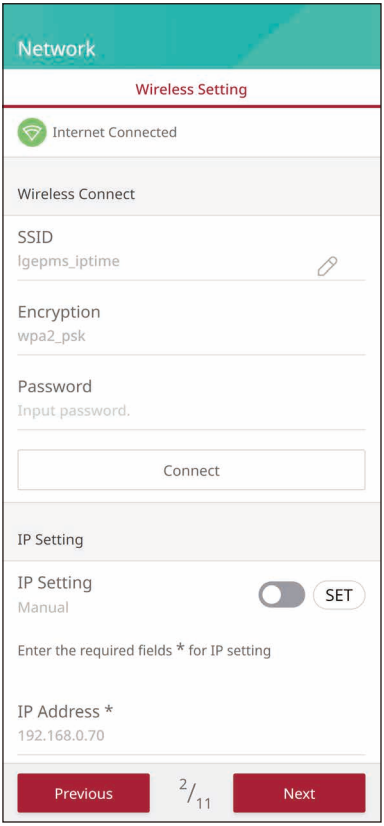
If the connection is successful, [Internet Connected] is displayed on the screen.

If the [IP Settings] option in [Wired Settings] is set to [Auto], this product will be automatically assigned an IP address from the local area network (LAN) via the wired connection. You may need to set the network connection manually depending on the network conditions. In this case, tap [Auto] to change to [Manual].

If you set the [IP Settings] option to [Manual], fill in the [IP address], [Subnet Mask], [Gateway], and [DNS] options manually.



# Wireless Network




When the [Connection Type] option in the [Connection Status] is set to [Wireless]. Wireless connection options are displayed.

Tap the [SSID] field to display the SSID list. Select the SSID which your ESS is connected to and then tap [CONFIRM].

Select the encryption type from the [Encryption] option. And then input the password of the SSID in the [Password] field.

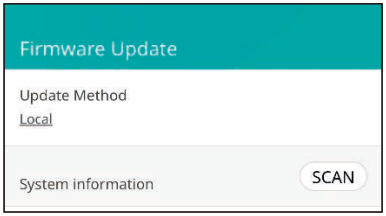
After entering all the fields, tap [Connect] to finish the wireless network connection.

If the connection is successful, [Internet Connected] is displayed on the screen.

If the [IP Settings] option in the [Wireless Settings] tab is set to [Auto], this product will be automatically assigned an IP address from a local area network (LAN) via wireless connection. You may need to set the network connection manually depending on the network conditions. In this case, tap [Auto] to change to [Manual].

If you set the [IP Settings] option to [Manual], fill in the [IP address], [Subnet Mask], [Gateway], and [DNS] options manually.

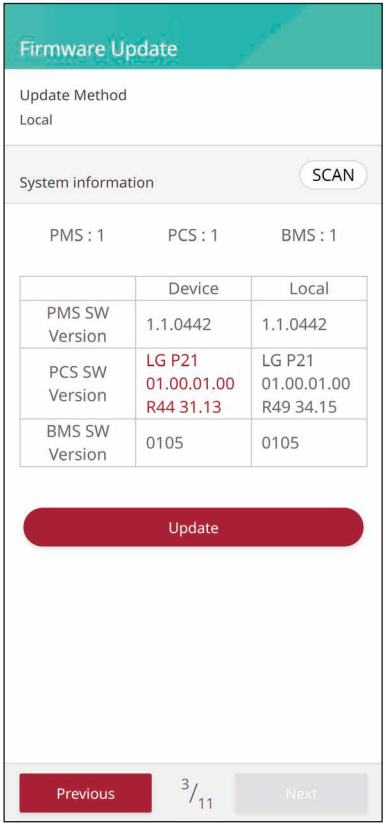
# Firmware Update




**[Firmware Update]**

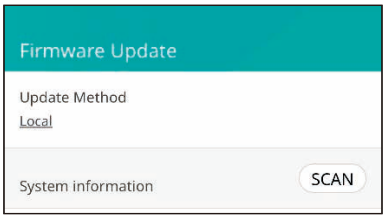
This product must be upgraded to the latest firmware prior to setup.

Upgrade methods are provided as local or server options.



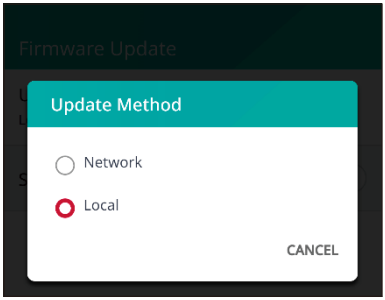

**[Update Method > Local]**

1. Press [SCAN] to retrieve the information.
2. The device version and local version of the system firmware are displayed.
3. Press [Update] to start the firmware update.

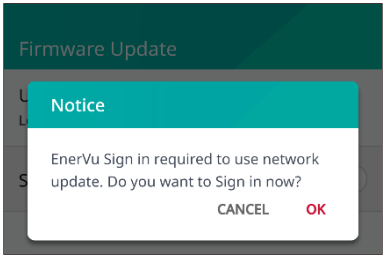



**[Update Method > Network]**

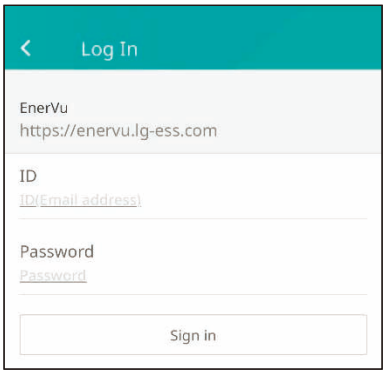
1 Press [Update Method].



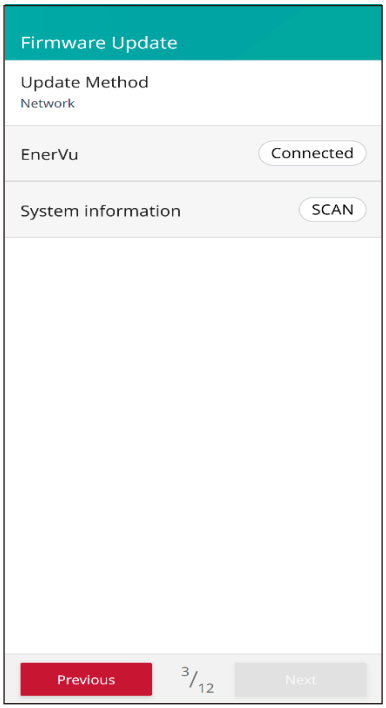

2 Set the Update Method to [Network].



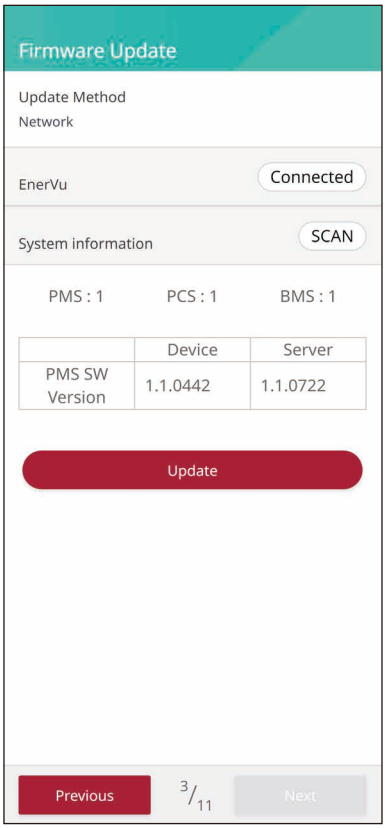

3 EnerVu Sign-in is necessary to use network update.




4 Enter your EnerVu account, Press [Sign-in].



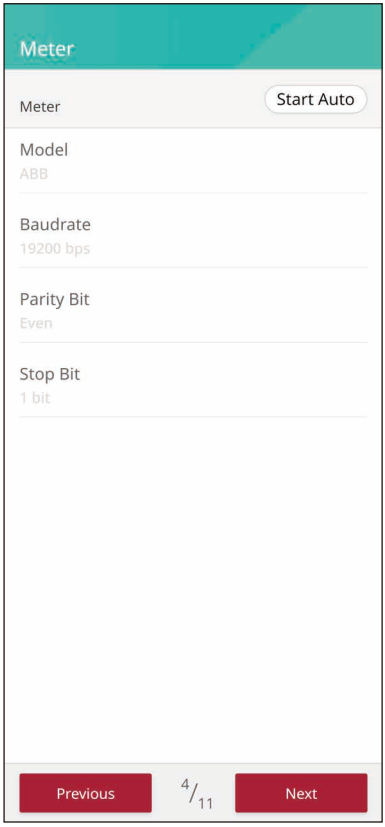

5 Then [Update Method] is changed to [Network] automatically.




**[Update Method > Network]**

1. Press [SCAN] to retrieve the information.
2. The device version and server version of the system firmware are displayed.
3. Press [Update] to start the firmware update.

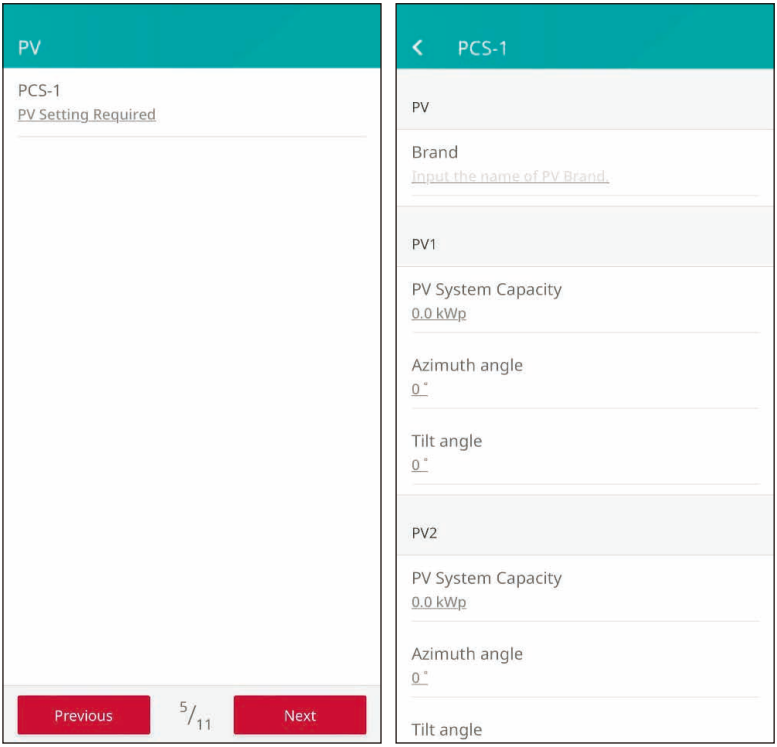
# Meter




**[Meter]**

Press the [Start Auto] button to collect the connected energy meter information and set all the option values automatically.

# PV






[PV]

1 Select PCS for PV settings

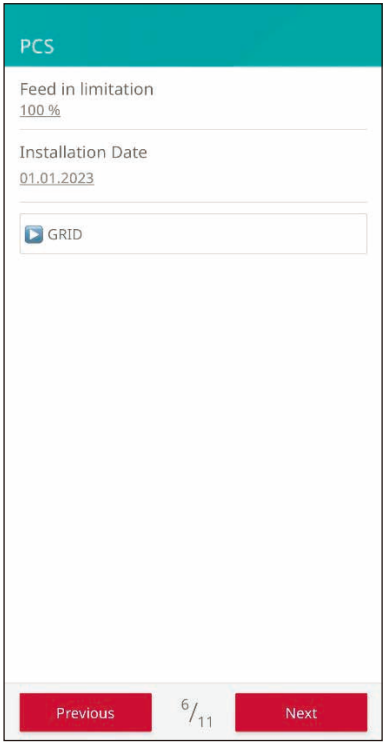
2 Input PV brand name.

3 Input PV capacity, azimuth, and tilt for PV 1.

4 Input PV capacity, azimuth, and tilt for PV 2.

5 Input PV capacity, azimuth, and tilt for PV 3.

# PCS



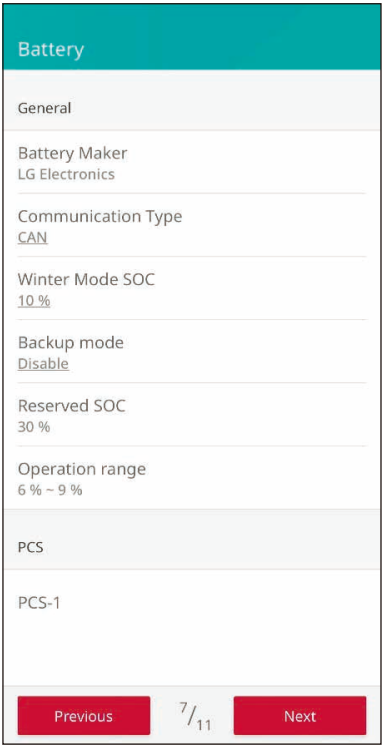

**[PCS]**

[Feed in limitation] and [Installation Date] options can be changed manually.

Set the options as described below.

1. Select the current value. The input menu appears on the screen.
2. Input the desired value.
3. Select [Save] to complete the settings.
4. Tap [Grid] to show more settings options for the PCS.

# Battery




**[Battery]**

Winter Mode SoC

- During the set winter mode period, the battery will not discharge when below the set SoC.

Backup mode

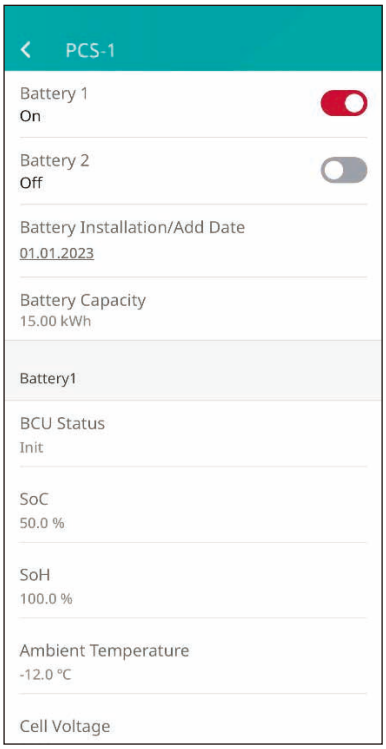
- Backup mode can be selected from among Disable, ATS Backup, or Backup Light.
- **ATS Backup** : A mode that supplies power to the entire load of the ATS connector in the event of a power outage.
  - Power outage detection by ATS.
  - Supply 5 kW to household load within 3 seconds after ATS detection.
  - The battery must be charged when there is sufficient sunlight.
- **Backup Light** : For users who have not installed ATS, it can be accessed through a separate output terminal on the PCS itself. 230 V single phase / generates 3 kW output (depending on battery capacity).
  - When solar power generation is possible, output is provided as a joint power generation source of PV + battery.
  - When solar power generation is not possible (night time, cloudy weather), output is provided only by batteries.
  - Backup Light & ATS Backup both available.
  - Power supply only when power outage is detected.

Reserved SoC

- Reserved SoC can be set when either ATS backup or Backup Light is selected. Battery SoC can be set as high as the set SoC.

Operation range

- This is the emergency charging range and is based on the Real Soc. When it reaches 6%, forced charging begins and charges until it reaches 9%.




**[Battery]**

Select the PCS for Battery Settings.

You can change the [Use Batteries] settings.

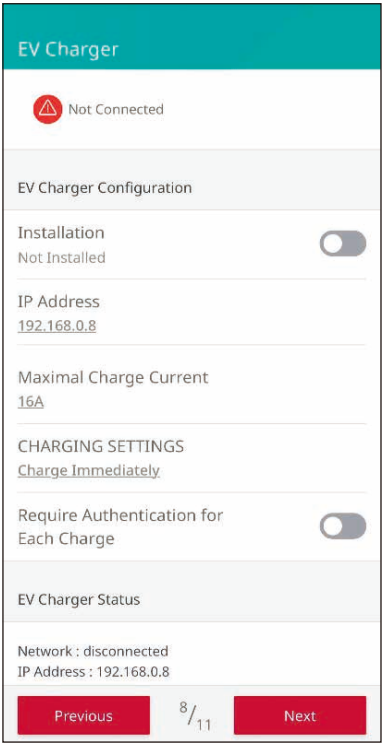
Tap the switch to set battery use [On] or [Off].

If the setting is set to [Off], generated energy will not charge the connected battery.

[Battery Installation Date] can be set manually.

You can see detailed information about each battery.

# EV Charger




**[EV Charger]**

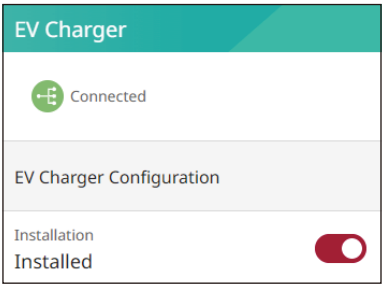
[Precondition]

This product and EVC can be connected through LAN.

To install the EV Charger with LGE ESS, the LG Electronics ESS and EV Charger must be connected to the same network.

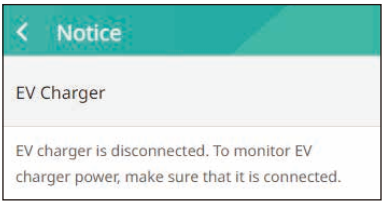
1 Installation

- Press the [Installation] toggle button to connect the EV Charger.
- It automatically locates and connects to an EVC on the same network, and when the connection is complete, the state icon changes to [Connected] and the toggle button changes too.

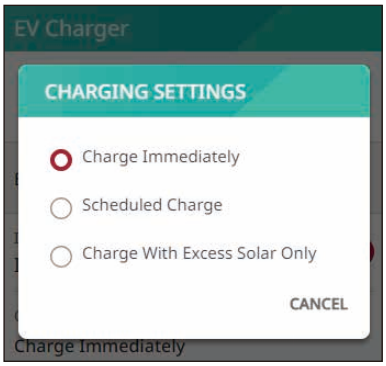


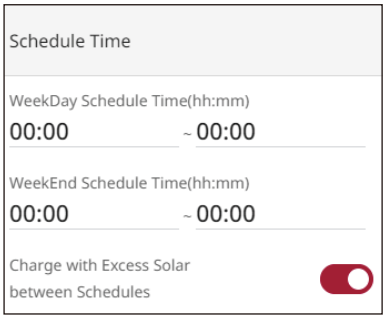

2 Uninstall

- Press the [Installation] toggle button to uninstall the EV charger.




3 If no EVC device is connected, a notice will appear as a pop-up.




**[Configuration > Charging Settings]**

1 Charge Immediately

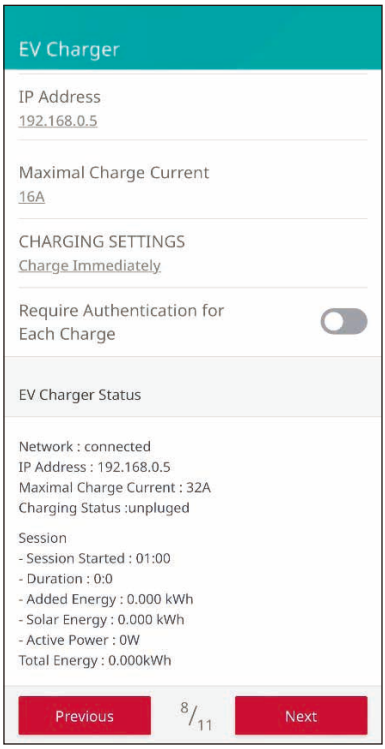
- Charging immediately begins using all available energy sources.

2 Scheduled Charge

- You can set the desired time on weekdays or weekends, and charging begins using all available sources during the set time.
- If [Charge with Excess Solar between Schedules] is enabled, charging is performed if Excess Solar is present outside of the set time.

3 Charge With Excess Solar Only

- Charging is performed if Excess Solar is present outside of the set time.

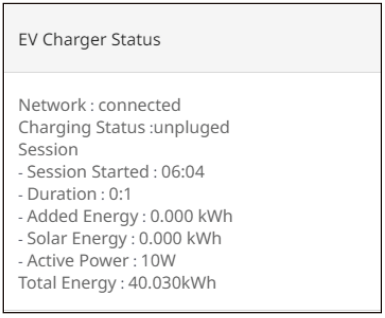



**[Configuration > Require Authentication for Each Charge]**

If the toggle button is enabled, an authentication process is required.

Authentication is possible with the [Authentication] toggle button or RFID registered on the EV Charger.

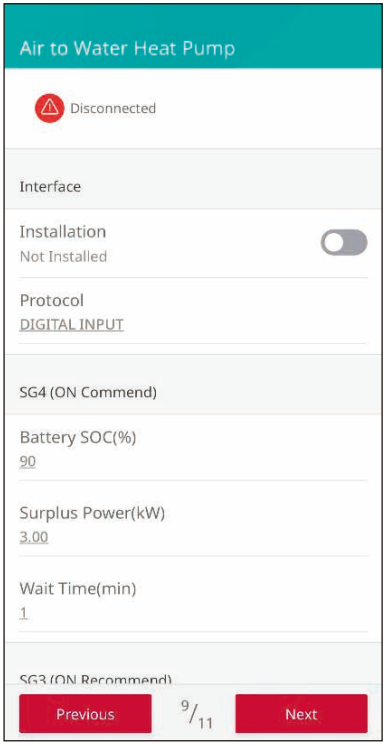
*When the toggle button is disabled, charging occurs immediately without authentication.




**[Status]**

You can see the Network connection status and Charger Status.

# Air-to-Water Heat Pump




**[Air-to-Water Heat Pump]**

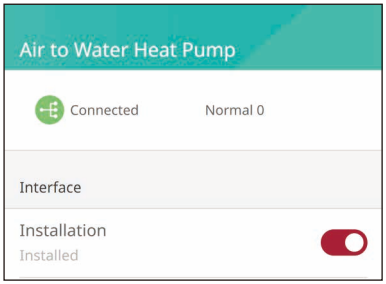
[Precondition]

This product and AWHP can be connected through RS485.

To install the AWHP, this product and AWHP must be connected with twisted wire.

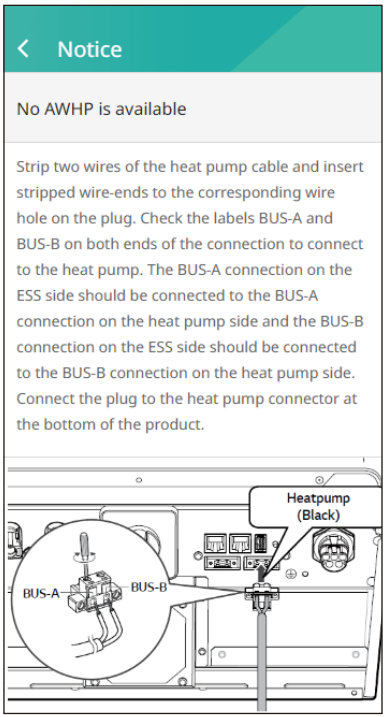
1 Installation

- Press the [Installation] toggle button to connect to an AWHP.
- It automatically locates and connects to an AWHP, and when the connection is complete, the state icon changes to Connected and the toggle button changes too.

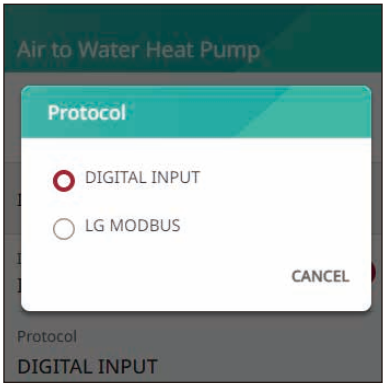



2 Uninstall

- Press the [Installation] toggle button to uninstall the AWHP.




3 If no AWHP device is connected then a notice will pop up.




**[Air-to-Water Heat Pump > Protocol]**

1 This product supports two types of AWHP: LG Modbus and DIGITAL INPUT (SG Ready), and they are automatically detected and connected by tapping the Install button.

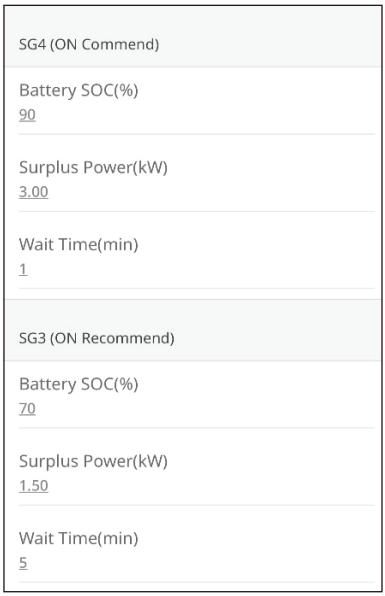
**INFO**

- LG AWHP = LG Modbus
- SG-Ready = Digital Input*
  *Additional hardware necessary to connect to SG-Ready -> LG IO Modul (PEXPMB300)

**[Air-to-Water Heat Pump]**

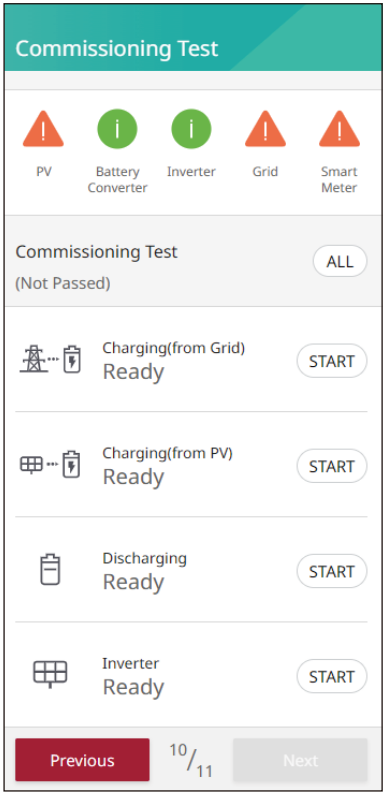
1 LG Modbus : There are ON Commend, ON Recommended, Energy Saving, Super Energy Saving, and Normal modes;additionally, Battery SoC, Surplus Power, and Wait Time can be set.

| | |
|---|---|
| ON Commend | Energy Saving |
| Battery SOC(%)<br>90 | Battery SOC(%)<br>40 |
| Surplus Power(kW)<br>3.00 | Surplus Power(kW)<br>0.75 |
| Wait Time(min)<br>1 | Wait Time(min)<br>5 |
| ON Recommend | Super Energy Saving |
| Battery SOC(%)<br>70 | Battery SOC(%)<br>20 |
| Surplus Power(kW)<br>1.50 | Surplus Power(kW)<br>0.25 |
| Wait Time(min)<br>5 | Wait Time(min)<br>10 |




2 DIGITAL INPUT (SG Ready) : There are SG4 (ON Commend), SC3 (ON Recommended), and Normal; additionally, Battery SoC, Surplus Power, and Wait Time can be set.

# Commissioning Test




**[Commissioning Test]**

You should perform 4 operating tests. To start the test, tap [ALL] to start all the operating test automatically.

You can also run tests separately by tapping [START] on each test.

It is recommended to run all the tests at once using the [ALL] button rather than running the tests separately.

**Charging (from Grid) :**

The operating test for battery charging from the grid.

**Charging (from PV) :**

The operating test for battery charging from PV.

**Discharging:**

The operating test for battery discharging to the grid.

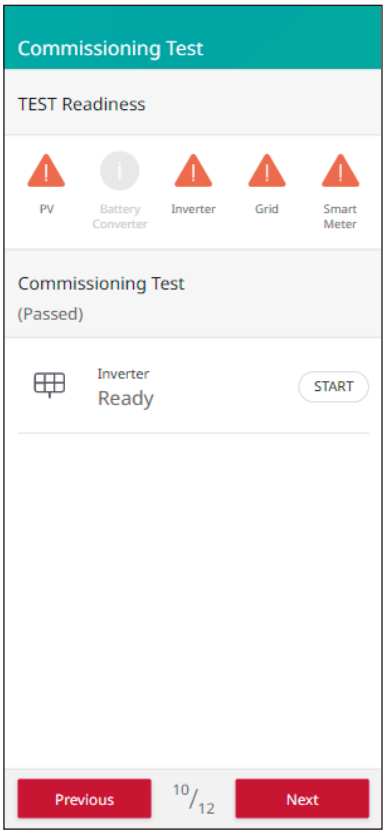
**Inverter :**

The operating test for converting PV's DC power to AC power.

The result is displayed when each test is completed. When there is no problem with the test, [Success] is displayed. When [Fail] is displayed, tap each test result to display detailed information. Check and resolve any error, referring to the error codes in the information, and perform the test again. For information on the error codes, refer to 'Error Codes and Messages.'

**INFO**

- The operating test is a step to verify the PCS status for solar power generation and battery charging / discharging.
- Users are recommended to proceed when the battery SoC is more than 20 % and the solar radiation amount is sufficient.
- If you click the Fail icon, you can check information about the error that occurred.
- You can resolve the issue by referring to the troubleshooting page in the manual for each error code or the guide displayed in the EnerVu Plus app.




**[Commissioning Test]**

You should perform the Inverter test. You can also run tests by tapping [START] for test.

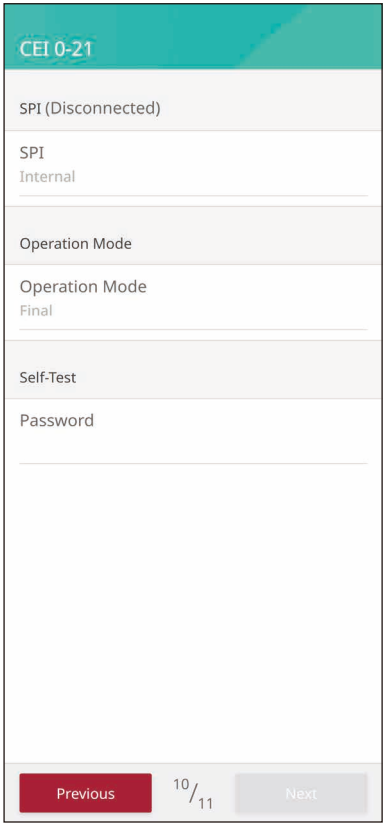
**Inverter :**

The operating test for converting the PV's DC power to AC power.

The result is displayed when the test is completed. When there is no problem with the test, [Success] is displayed.

When [Fail] is displayed, tap the test result to display detailed information. Check and resolve any error, referring to the error codes in the information, and perform the test again. For information on the error codes, refer to 'Error Codes and Messages.'

# CEI 0-21 (Italy Only)




**[SPI Self-Test]**

Inverters of ≤ 10 kW supplied to the electrical grid according to Italian CEI 0-21 must perform a self-test.

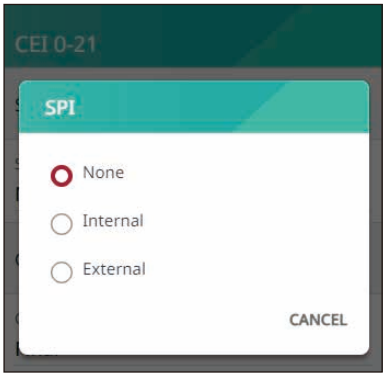
During the self-test, the inverter checks the response time for overvoltage, undervoltage, overfrequency, and underfrequency.

The self-test changes the upper and lower trip limit values for each protection function for frequency monitoring and voltage monitoring.

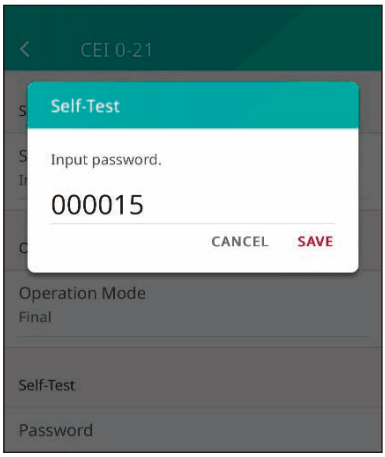
If the measurement exceeds the allowed trip limit, the setup wizard cannot be completed and the inverter will not be usable.

After the self-test is complete, if successful, you can enable ESS operation.

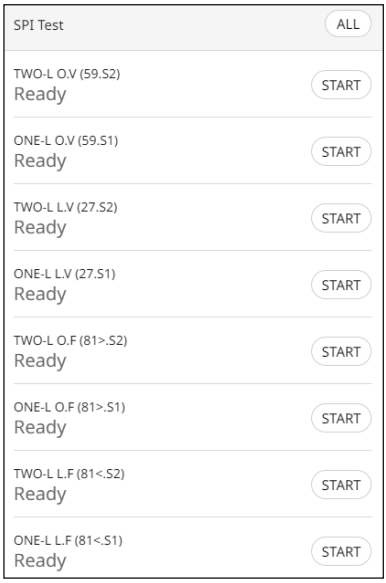
- Requirements :
  Install the inverter, connect the electrical components, and have sufficient solar radiation.




1 SPI Mode Internal mode settings




2 Enter Self-Test Password (000015)




3 Select test items (ALL)

Perform 8 items sequentially by pressing the ALL button, or Items can be tested individually by pressing the START button.

- Items : overvoltage 2, overvoltage 1, undervoltage 2, undervoltage 1, overfrequency 2, overfrequency 1, underfrequency 2, underfrequency 1

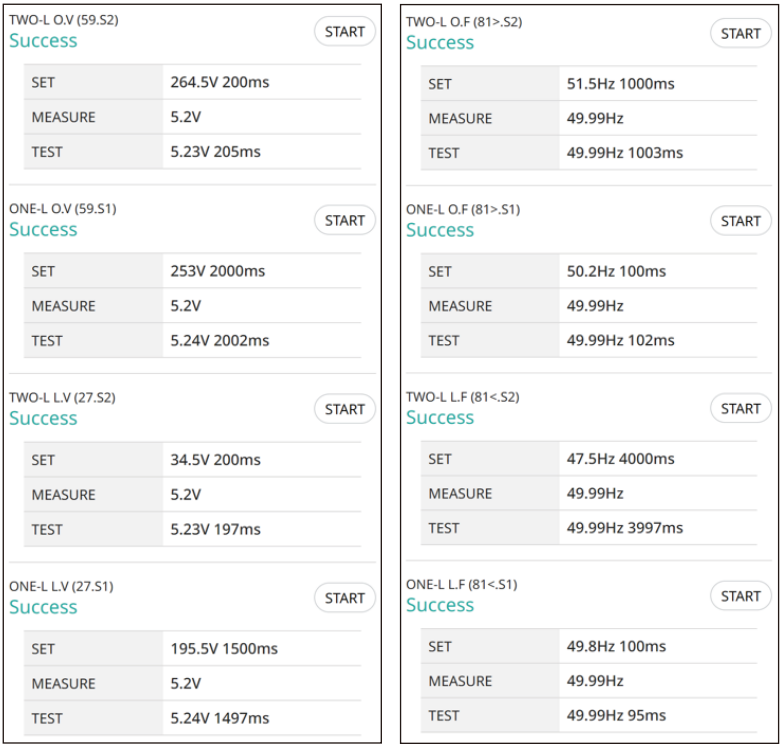

4 Progress and Stop

- Indicates that the selected test item is being tested.
- The item test can be interrupted with the Stop button.


5 Individual Progress and Stop

- Indicates that the selected test item is being tested.
- The item test can be interrupted with the Stop button.

**[Result SPI Self-Test] Example**

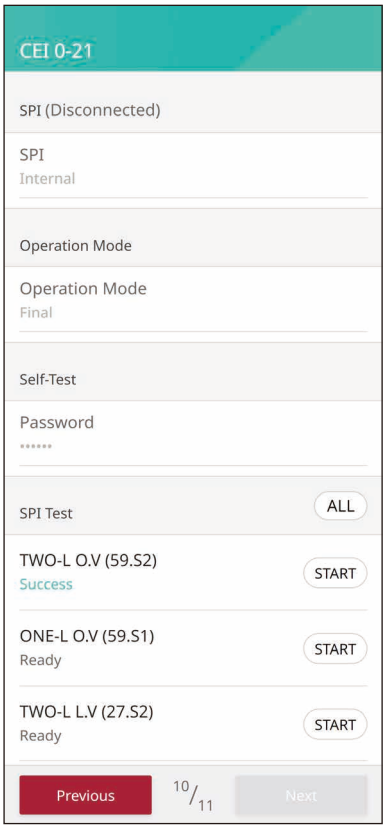



Voltage

- Items: overvoltage 2, overvoltage 1, undervoltage 2, undervoltage 1

Frequency

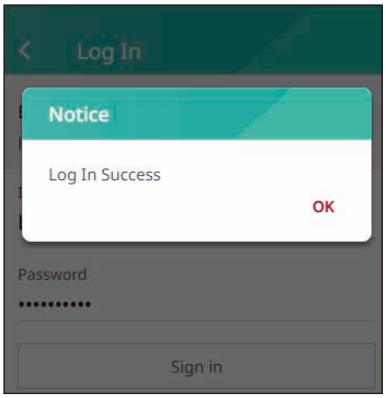
- Items: overfrequency 2, overfrequency 1, underfrequency 2, underfrequency 1



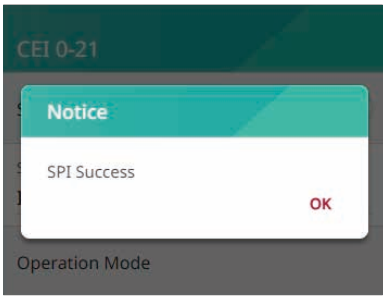

**[Report]**

When all items are tested and the result is successful, a Report button appears in the upper right corner.

A login procedure is required to report the test results to the EnerVu server.

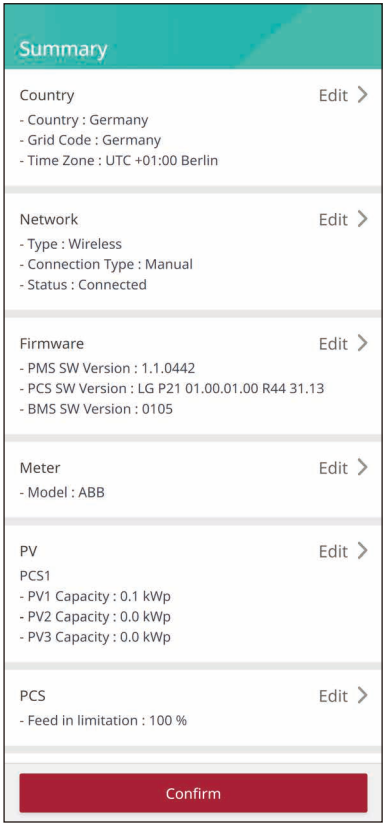



1 If you press the Report button, you can sign in with your installer account.




2 When you press the Report button after successfully logging in, the self-test results are reported to the server.

# Summary




**[Summary]**

This is the last section of the settings. Before operating the system, check all of the settings on the [Summary] display.

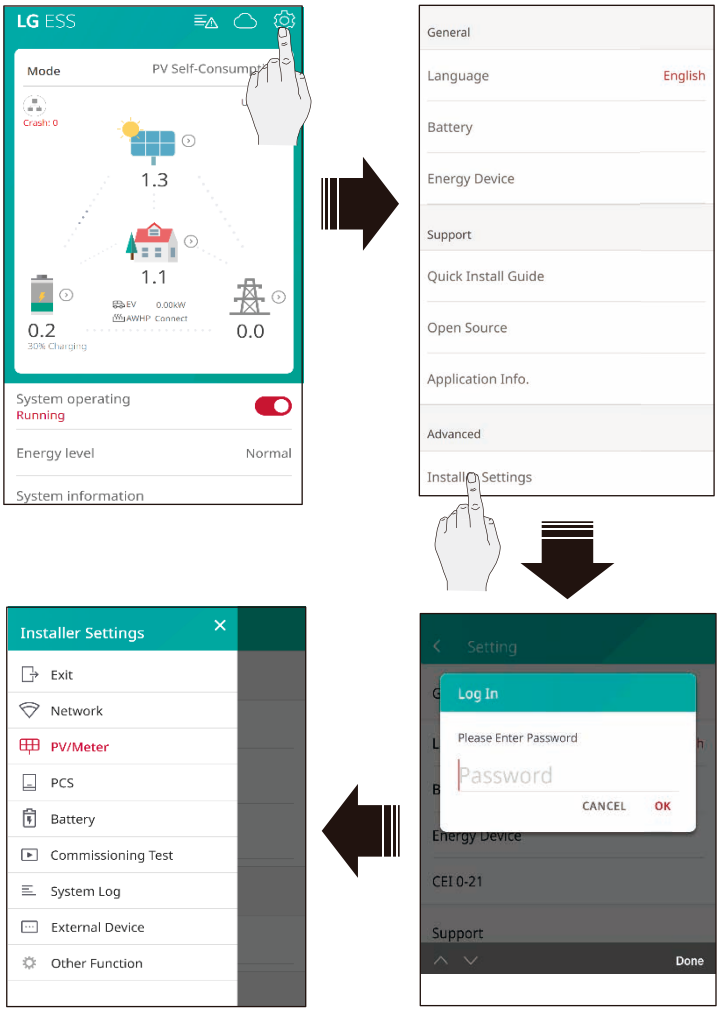
# Entering the [Installer Settings] screen

To enter the [Installer Settings] menu on your mobile device, follow the instructions described below.

1 Tap [⚙] on the main screen. The [Settings] screen appears.

2 Tap the [Installer Settings] option to display the password input screen.

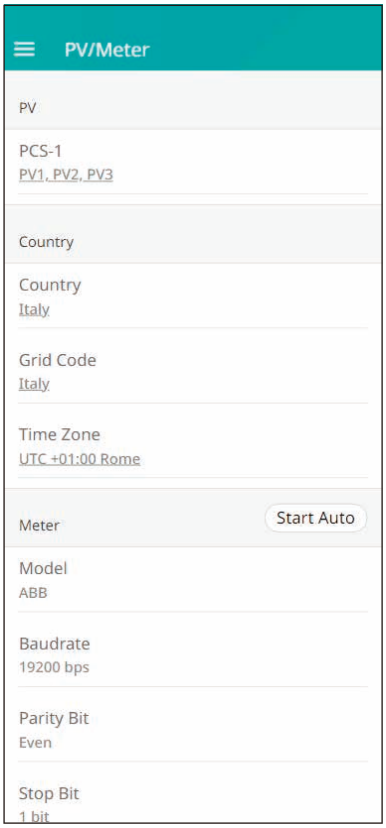
3 Enter the installer password and tap [OK] to enter the [Installer Settings] screen.
The initial password is the case-insensitive registration number printed on the outside of the PCS. It is recommended to change the password after entering the initial password. See '[Other function] settings' for more information on [Password Change] options.



# Installer Settings

## [PV/Meter] Settings

You can check the PV and meter information.




Tap [PV/Meter] in [Installer Settings]. PV and energy meter information is displayed.

**[PV], [PV1], [PV2]**

1. Select the PCS for PV Settings.
2. Input PV brand name.
3. Input PV Capacity, azimuth, and tilt for PV 1.
4. Input PV capacity, azimuth, and tilt for PV 2.
5. Input PV capacity, azimuth, and tilt for PV 3

**[Meter]**

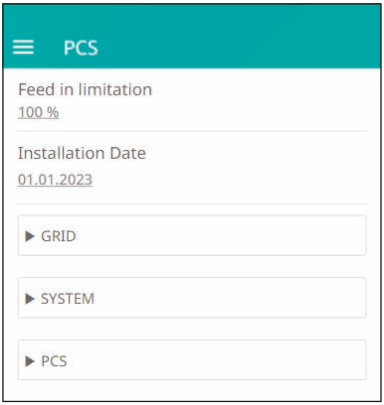
Press the [Start Auto] button to collect the connected energy meter information and set all the option values automatically.

**INFO**

- The [PV System Capacity] options for [PV1] and [PV2] are mandatory for the operating test.

## [PCS] Settings

You can set or check the PCS settings and status.




Select [PCS] on [Installer Settings]. PCS information is displayed.

**[PCS]**

All the settings options and values for PCS information are displayed.

[Feed in limitation], and [Installation Date] options can be changed manually.

Set the options as described below.

1. Select the current value. The input menu appears on the screen.
2. Input the desired value.
3. Select [Save] to complete the settings.

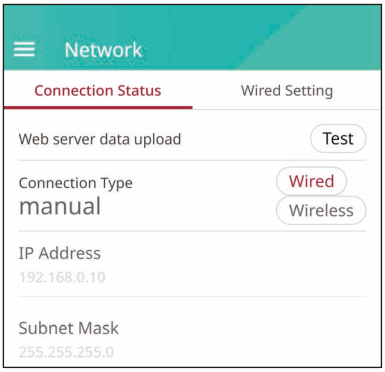
Tap [Grid], [System], or [PCS] to show more settings options for the PCS.



**INFO**

- The values on the [PCS] screen should not be edited by the user. This may cause a system malfunction if the values are changed.
- Viewable information names are listed below -
  Stable Volt Mode, fixed cosPhi Type, fixed cosPhi Setpoint, cosPhi(P) Type, cosPhi(P) Start, cosPhi(P) End, cosPhi(P) PowerStart, cosPhi(P) PowerEnd, fixedQ Reactive Setpoint, Q(U) Xa, Q(U) Xb, Q(U) Xc, Q(U) Xd, Q(U) Ya, Q(U) Yb, Q(U) Yc, Q(U) Yd, EV Meter Enable, PV Settings.
- When changing the option values in the [PCS] menu, refer to 'Others' for more information.

## [Network] Settings

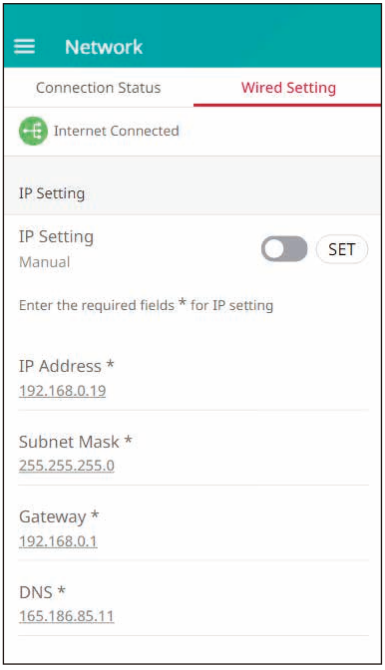



Select [Network] in [Installer Settings]. The current status of the network connection is displayed.

Tap [Test] to check the server connection.



## Wired Network Settings

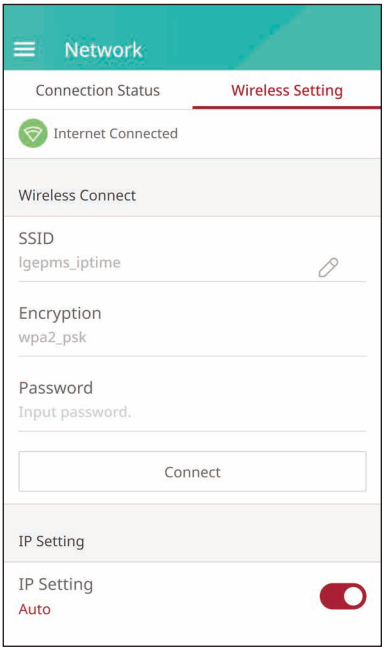



When the [Connection Type] option in the [Connection Status] is set to [Wired]. Wired connection options are displayed.

If the [IP Settings] option in the [Wired settings] tab is set to [Auto], the system will automatically be assigned an IP address from a local area network (LAN) via the wired connection. You may need to set the network connection manually depending on the network conditions. In this case, tap [Auto] to change to [Manual].

If you set the [IP Settings] option to [Manual], fill in [IP address], [Subnet Mask], [Gateway], and [DNS] options manually.

## Wireless Network Settings




When the [Connection Type] option in the [Connection Status] is set to [Wireless]. Wireless connection options are displayed.

Tap the [SSID] field to display the SSID list. Select the SSID which your ESS is connected to and then tap [CONNECT].

Select the encryption type on the [Encryption] option. Then input the password of the SSID in the [Password] field.

After filling in all the fields, tap [Connect] to finish the wireless network connection.

If the connection is successful, [Internet Connected] will be displayed on the screen.

If the [IP Settings] option in the [Wireless Settings] tab is set to [Auto], this product will be automatically assigned an IP address from a local area network (LAN) via the wireless connection. You may need to set the network connection manually depending on the network conditions. In this case, tap [Auto] to change to [Manual].

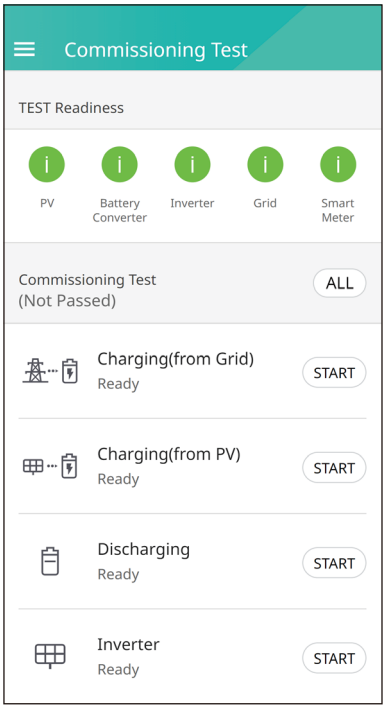
If you set the [IP Settings] option to [Manual], fill in [IP address], [Subnet Mask], [Gateway], and [DNS] options manually.

## INFO

- Notes on Internet Connection:
  - Many network connection problems during setup can often be fixed by resetting the router or modem. After connecting the product to the home network, quickly power off and/or disconnect the power cable of the home network router or cable modem. Then power on and/or connect the power cable again.
  - Depending on the internet service provider (ISP), the number of devices that can receive internet service may be limited by the applicable terms of service. For details, contact your ISP.
  - Our company is not responsible for any product malfunction and/or internet connection failure caused by communication errors/malfunctions associated with your broadband internet connection, or other connected equipment.
  - Some internet connection operations may not be possible due to certain restrictions set by the internet service provider (ISP) that supplies your broadband Internet connection.
  - A 10 Base-T or 100 Base-TX LAN port is required for a wired connection to this product. If your internet service does not allow for such a connection, you will not be able to connect this product.
  - A DSL modem is required to use DSL service and a cable modem is required to use cable modem service. Depending on the access method and subscriber agreement with your ISP, you may not be able to use the internet connection feature contained in this product or you may be limited to the number of devices you can connect at the same time. (If your ISP limits your subscription to one device, this product may not be allowed to connect when a PC has been already connected.)
  - The use of a router may not be allowed or its usage may be limited depending on the policies and restrictions of your ISP. For details, contact your ISP directly.
  - Turn off all unused network equipment in your local home network. Some devices may generate network traffic.
  - For the purpose of better wireless transmission, install the PCS as close as possible to the access point.
  - In some instances, placing the access point at least 0.45 m above the floor may improve the reception.
  - When using a wireless network connection, remove all obstacles between the PCS and the access point for better transmission.
  - The reception quality over wireless depends on many factors, such as type of access point, distance between the PCS and the access point, and the location of the PCS.

## [Commissioning Test] Settings

This is the last section of mandatory settings. Before operating this product, an [Operating Test] must be done to check whether all the systems are ready to run. If the [Operating Test] is not run, this product will not work.




Tab [Operating Test] on [Installer Settings]. The operating test menu is displayed.

You should perform 4 operating tests. To start the test, tap [ALL] to start all the operating tests automatically.

You can also run tests separately by tapping [START] on each test.

It is recommended to run all the tests at once using the [ALL] button rather than separately.

**Charging (from Grid) :**

The operating test for battery charging from the grid.

**Charging (from PV) :**

The operating test for battery charging from PV.

**Discharging:**

The operating test for battery discharging to the grid.

**Inverter:**

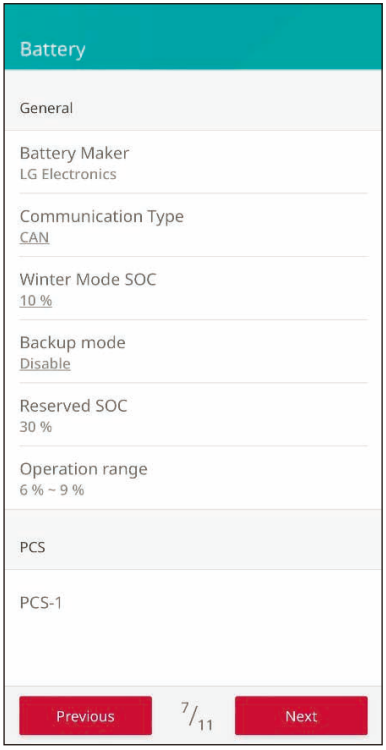
The operating test for converting PV's DC power to AC power.

The result is displayed when each test is completed. When there is no problem with the test, [Success] is displayed. When [Fail] is displayed, tap each test result to display detailed information. Check and resolve any errors, referring to the error codes in the information, and perform the test again. For information on errors code, refer to 'Error Codes and Messages'.

**INFO**

- The operating test is a step to verify the PCS status for solar power generation and battery charging / discharging.
- Users are recommended to proceed when the battery SoC is more than 20 % and the solar radiation amount is sufficient.

# [Battery] Setting




**[Battery]**

Winter Mode SoC

- During the set winter mode period, the battery will not discharge when below the set SoC.

Backup mode

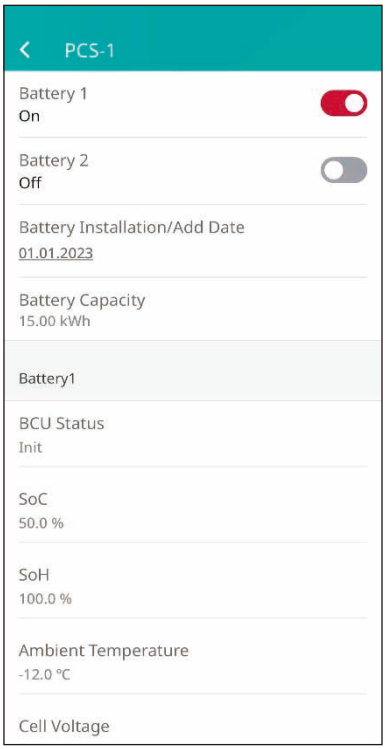
- Backup mode can be selected from among Disable, ATS Backup, or Backup Light.
- **ATS Backup** : A mode that supplies power to the entire load of the ATS connector in the event of a power outage.
  - Power outage detection by ATS.
  - Supply 5 kW to household load within 3 seconds after ATS detection.
  - The battery must be charged when there is sufficient sunlight.
- **Backup Light** : For users who have not installed ATS, it can be accessed through a separate output terminal on the PCS itself. 230 V single phase / generates 3 kW output (depending on battery capacity).
  - When solar power generation is possible, output is provided as a joint power generation source of PV + battery.
  - When solar power generation is not possible (night time, cloudy weather), output is provided only by batteries.
  - Backup Light & ATS Backup both available.
  - Power supply only when power outage is detected.

Reserved SoC

- Reserved SoC can be set when either ATS backup or Backup Light is selected. Battery SoC can be set as high as the set SoC.

Operation range

- This is the emergency charging range and is based on the Real Soc. When it reaches 6%, forced charging begins and charges until it reaches 9%.




**[Battery]**

Select the PCS for Battery Settings.

You can change the [Use Batteries] settings.

Tap the switch to set battery use [On] or [Off].

If the setting is set to [Off], generated energy will not charge the connected battery.

[Battery Installation Date] can be set manually.

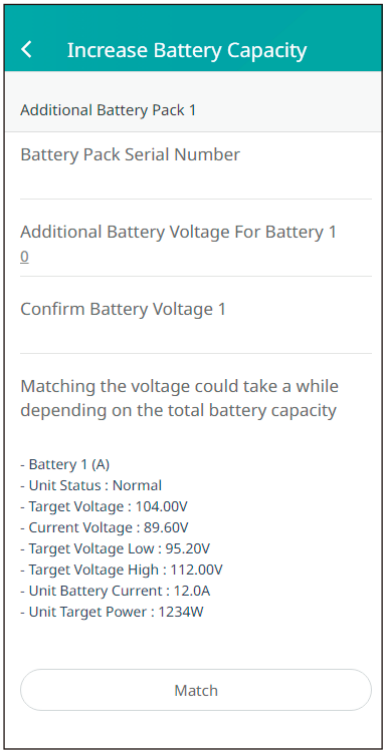
You can see detailed information about each battery.



**CAUTION**

- If the [Use Batteries] setting is set to off or the system is turned off for a long period of time, the battery can be completely discharged and cannot be used anymore. Be sure not to leave the battery dormant for a long period of time.

## Increase Battery Capacity




This menu is used when a 3Pack user adds the battery expansion function to 4Pack.

Enter the Pack Serial Number and voltage information of the battery you want to add.

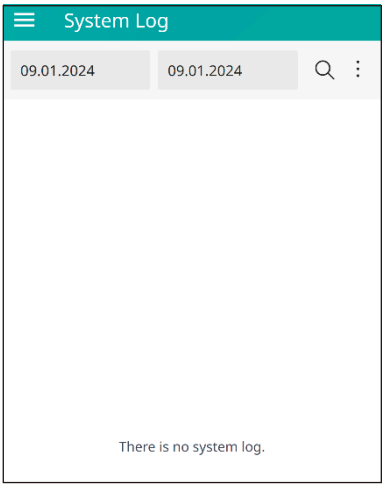
If you have dual batteries, you must fill out all information for two batteries.

Afterwards, when you press the Match button, the voltage of the battery you want to add will match the voltage of the battery you are using through charging or discharging.

When the battery voltage is matched, the matching process automatically stops, and the ESS can then be used on an expanded (4pack) basis.

## [System Log]

You can see the list of mode changes, system errors, and the system warning log.
Refer to 'Error Codes and Messages' for more information about error codes, messages, and solutions.

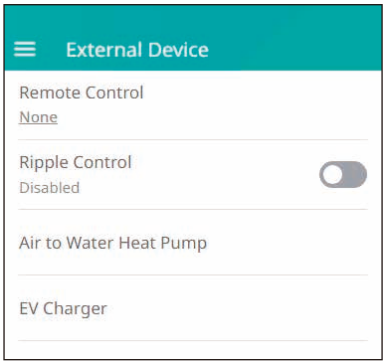



Tap [System Log] on [Installer Settings]. This displays a list of all notices that have occurred over certain period.

Set start date and end date and then select [Search] to display the list of notices during the selected period.

## [External Device] Settings

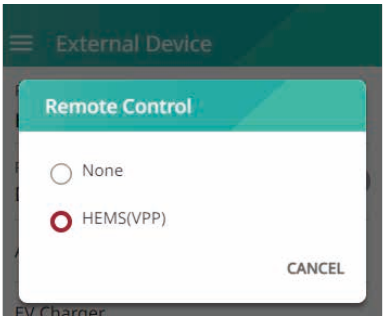
Select [External Device] on [Installler Settings] to [Remote Control], [Ripple Control], [Air-to-Water Heat Pump], and [EV charger] options.

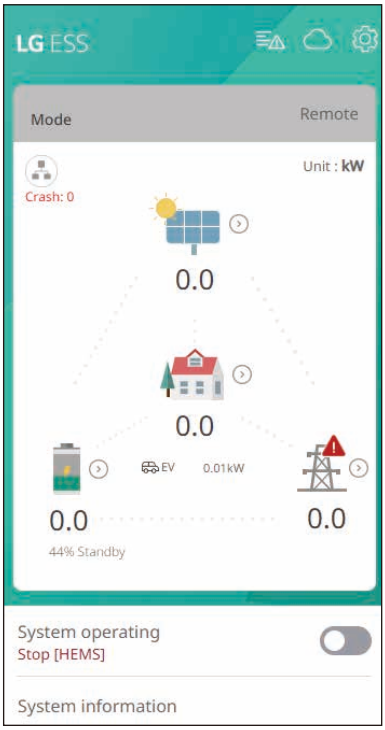



## [Remote Control]

You can Select HEMS (VPP) mode. Then ESS is controlled by a VPP provider.

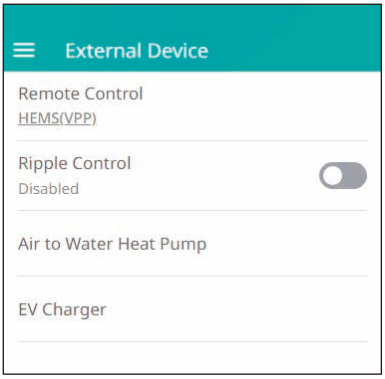
When you select remote mode, you can see that it operates in remote mode on the home screen.

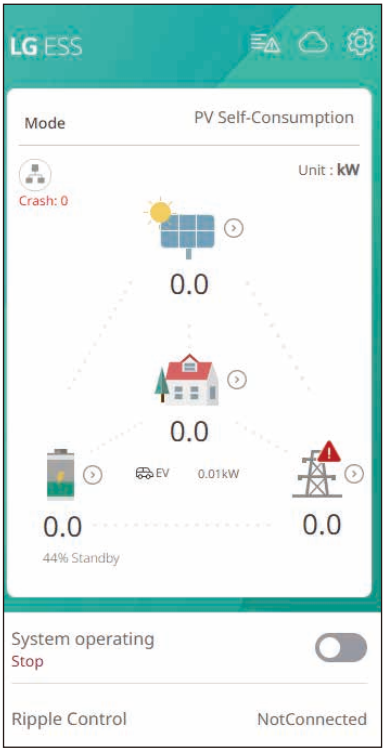


## [Ripple Control]

You can enable Ripple Control. Then ESS Rated Output power is controlled by a Ripple Control Receiver.
When you enable Ripple Control, you can see that it operates in Ripple Control on the home screen.



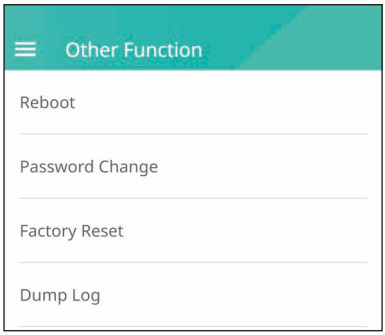

## [Air-to-Water Heat Pump]

## [EV Charger]

For Air-to-Water Heat Pump and EV Charger, please refer to the Setup Wizard Page.

## [Other function] Settings

Select [Other Function] on [Installer Settings] for [Reboot], [Password Change], [Factory Reset], and [Dump Log] options.






**[Reboot]**

Select [Reboot] to reboot the system.

**[Password Change]**

Select [Password Change] on [Installer Settings]. The [Change Password] menu is displayed.

Enter the new password in the [New Password] and [Password Check] field. And then select [Change Password] to complete the password change.

**[Factory Reset]**

Select [Factory Reset] to set all the system settings to their default. All the settings and system logs will be deleted after resetting.

**[Dump Log]**

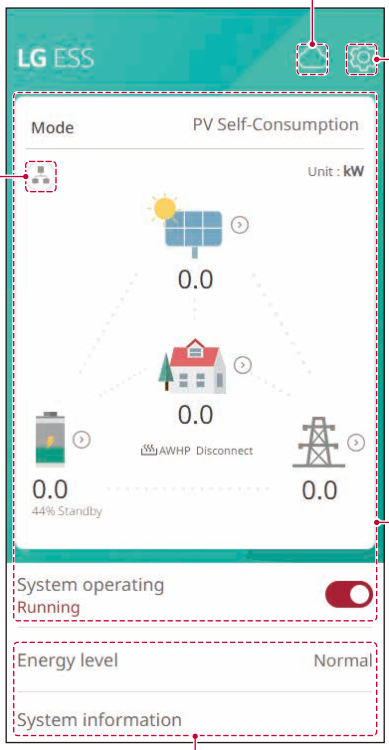
You can save the system log file to a USB memory stick with this option. Be sure to check whether any files that may affect the system are stored on the memory stick before inserting them.

**INFO**

- If you lose your password, please contact a service team.

# About the Main Screen

The main screen displays and indicates the current ESS status in the ESS status menu area. And you can check several settings and information in the ESS setting menu and ESS Information menu areas.




**EnerVu web page link**

**ESS Setting Menu**

- Language
- Battery
- Energy Device
- CEI 0-21
- Quick Install Guide
- Open Source
- Application Information
- Installer Settings

**ESS Info**

- Individual PV
- Individual Battery

**ESS Status Menu**

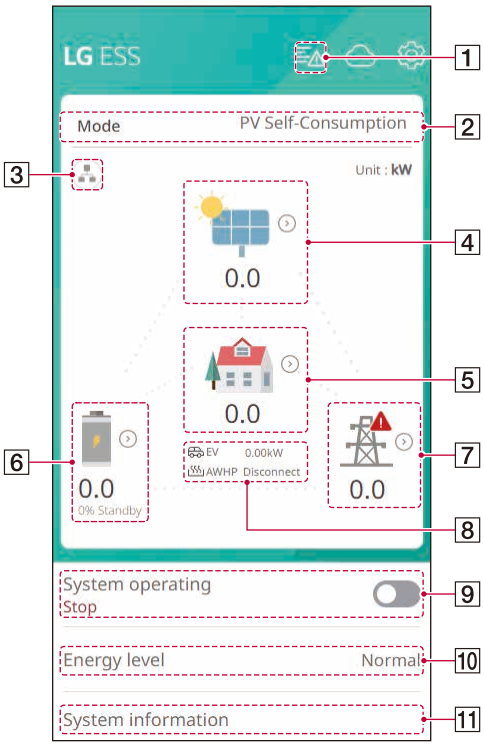
- Load
- Battery
- Energy Device
- PV
- Grid
- Energy Overview
- Notice List
- System Operating

**ESS Information Menu**

- Energy Level
- System Information

# ESS Status Menu

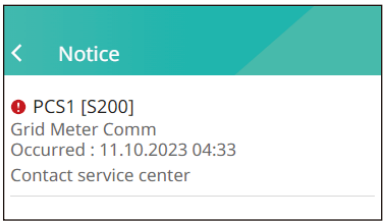
The main screen displays and indicates the current ESS status briefly. When you select an area indicated above, it displays detailed information.




## INFO

- The displayed values are not exact values. The values may differ from actual values.
- Please turn on the AP again, if there is a problem during connection with the AP.

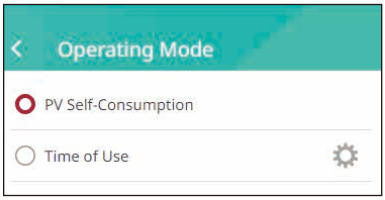
1




Displays details about the system status.

When an has error occurred, the error code, time, and date are displayed on the list.

2




Displays the operation mode of the system.

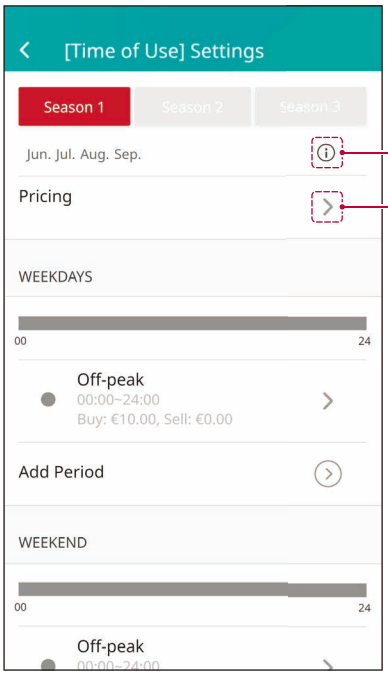
The Operation modes are displayed on the list.

If you select Time of Use, you can input more details.

Please press [ ⚙ ] button.

## [Time of Use] Settings

1. Season and pricing




You can change seasons and prices.

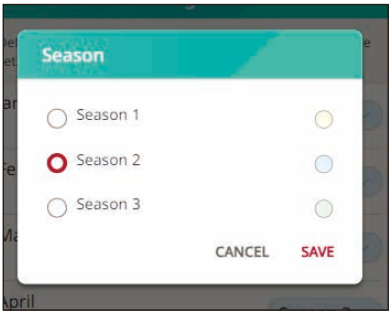
Under the Season button, you will see the selected month.

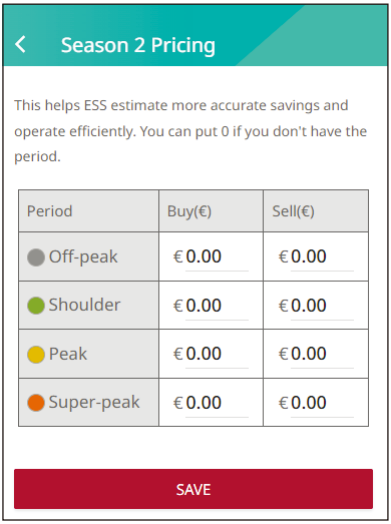
Tap this to change the month of the season.

Tap this to change the pricing.

Please see the next page for detailed information.

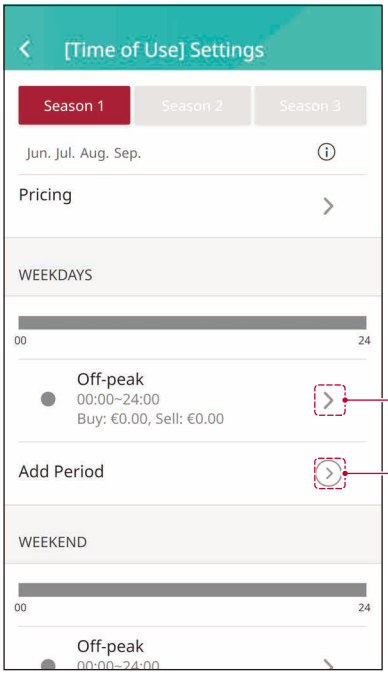

Displays the season corresponding to the month. Change and save the season.




Enter the price for each period, and press the SAVE button.

2. Edit and Add Period

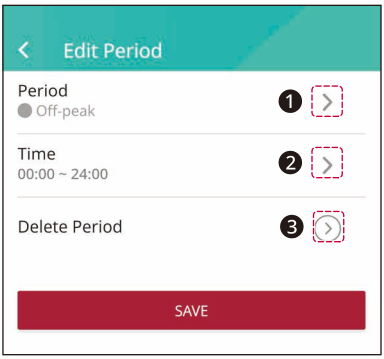


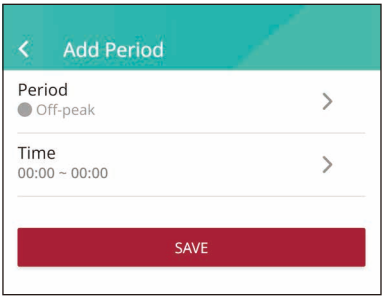

You can edit and add periods.

Tap this to edit the periods.

Tap this to add the periods.

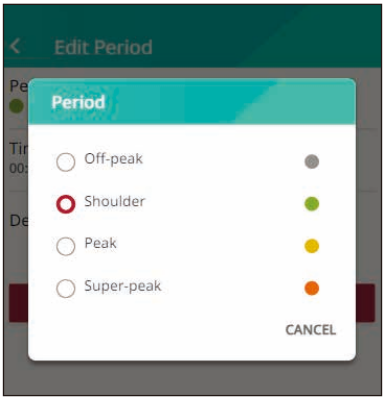
Please see the next page for detailed information.



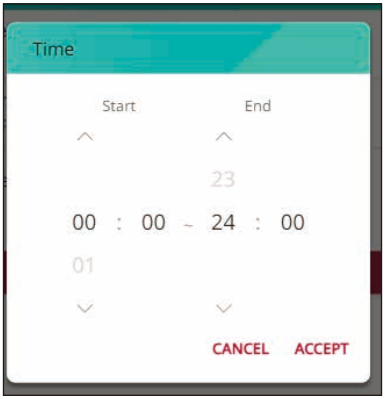




Change the period and time to save it.

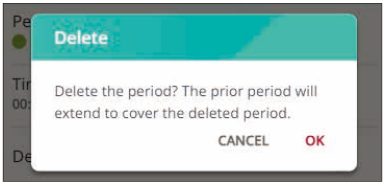
1




2



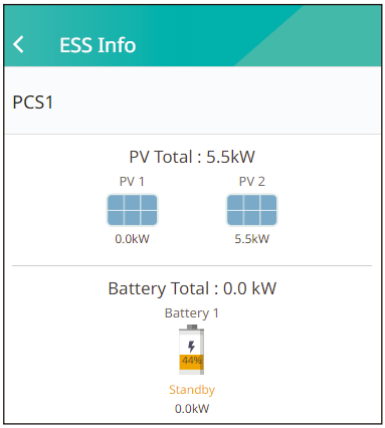

3



## [ESS Info]

Displays the current PV power generation and battery status.

3




4


Displays the generating status of the connected PV briefly. The status values are the sum of PV1, PV2 and PV3.

**Brand** : PV Manufacturer

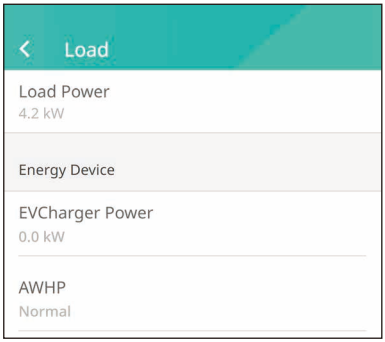
System Capacity : PV capability

**DC Power** : Current PV power

**DC Voltage** : Current PV voltage

**DC Current** : Current PV electric current

5




Displays detailed status of energy consumed in the household.

**Load Power** : Current power consumed in the household.

**Energy Device**

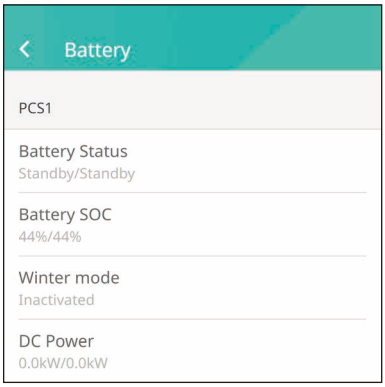
**EVCharger Power :** Current Power consumed for EV.

**AWHP** : AWHP connectivity and ESS energy level indication.

**INFO**

- Energy Level is displayed only when the EV Charger and AWHP are installed and the monitoring option is enabled.

6




Displays the charging and discharging status of the battery briefly.

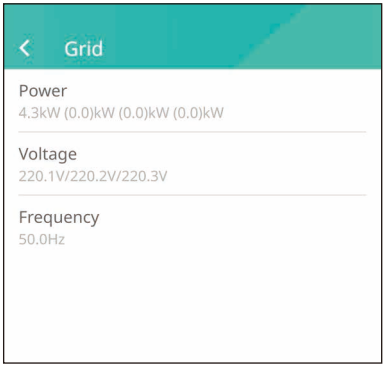
**Battery Status** : Charging / Discharging / Standby

**Battery SoC** : Current SoC (state of charge) level

**Winter Mode** : Shows winter mode status.

**DC Power** : Current output power from the battery

7




Displays the current status of the power grid.

**Power :** Current grid power

**Voltage** : Current grid voltage

**Frequency** : Current grid frequency

8 After the EV Charger and heat pump setup is completed, you can check the EV charging power and heat pump status on the Home screen.

A description of each state is as follows.

**EV** : EV charging power.

**AWHP Connected** : AWHP is connected.

**AWHP Disconnected** : AWHP is disconnected.

9


**[System Operating]**

Tap the switch to start or stop system operation.

10

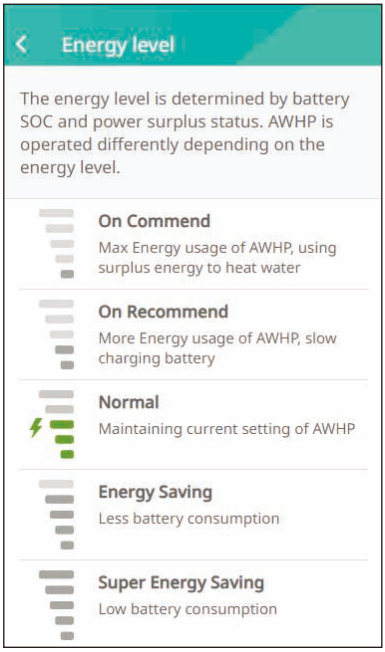

**[Energy level]**

Display ESS Energy Level.

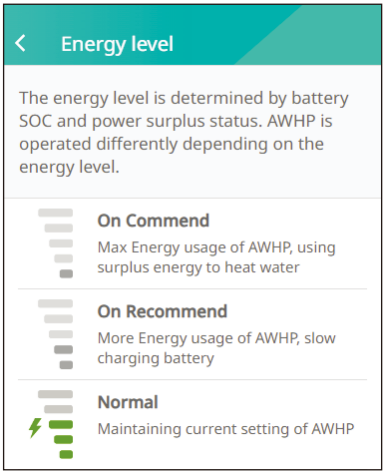
*Energy Level is displayed only when AWHP is installed and the monitoring option is enabled.

**Depending on the protocol, the levels are as follows.

**[Protocol]LG MODBUS**



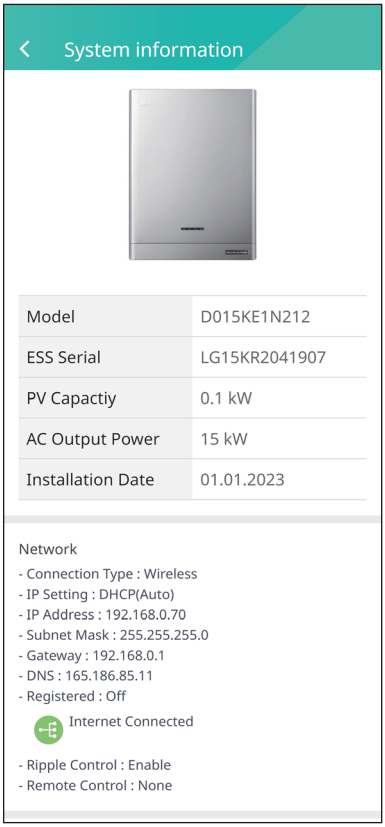

**[Protocol]DIGITAL INPUT**



## System Information

Displays system information of this ESS. You can check the information of the PCS, battery, and network status. Scroll up or down to display next or previous information.

11

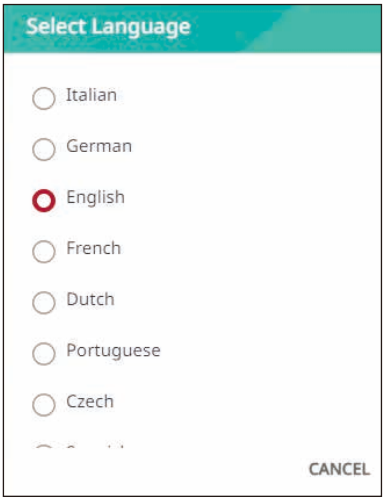



# ESS Settings Menu

You can adjust the general settings of the system. Select [main screen] > [⚙] to display the [Settings] screen.

## Language

Select [⚙] > [Language] to display the language selection screen.

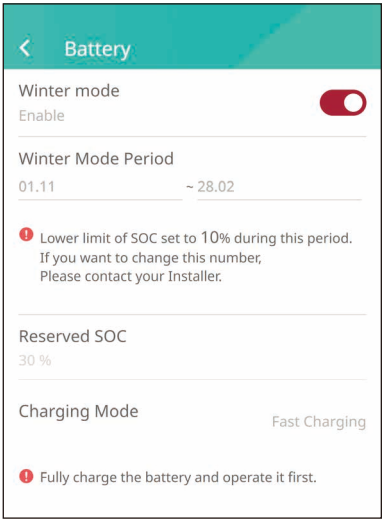



**[Select Language]**

Select the desired language.

## Battery

Select [⚙] > [Battery] to display the battery settings screen.




**[Winter mode]**

Tap this switch to select [Enable] or [Disable].

The minimum SoC level for winter mode can only be changed by the installer.

**[Winter Mode Period]**

Tap the current value to display the settings menu. You can change the period.

1. Select the current value. The period settings menu is displayed.
2. Adjust [Month] and [Day] using ∧ or ∨.
3. Select [APPLY] to complete the setting.

**[Reserved SoC]**

The minimum SoC level of Reserved SoC can only be changed by the installer.

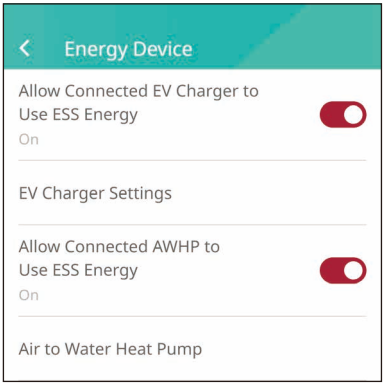
**[Charging Mode]**

Tap this switch to select [Battery Care], [Fast Charging], or [Weather Forecast].

You can change the mode on your own.

## Energy Device

Select [⚙] > [Energy Device] to display the Energy Device screen.




**[EV]**

Tap this switch to select [On] or [Off].

If the 'EV Charger' is not installed, a notice will pop up.

Set the option to [On] to enable EV monitoring.

**[EV Charger Settings]**

You can set the EV Charge Configuration and monitor the EV Charger Status.

Please refer to the Installation Guide for detailed information.

**[AWHP]**

Tap this switch to select [On] or [Off].

The status description of the energy device is as follows.

**Not Connected:** AWHP setting is enabled and is not connected.

**Connected:** AWHP setting is enabled and is connected.

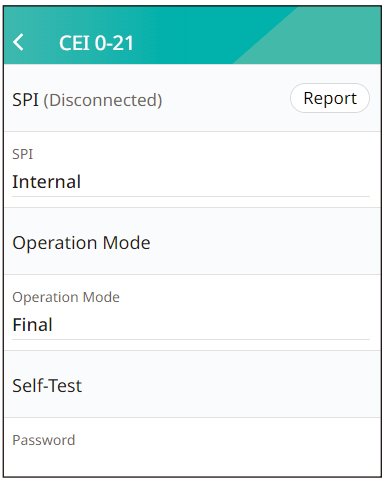
**[Air-to-Water Heat Pump]**

You can set the AWHP Configuration.

Please refer to the Installation Guide for detailed information.

## CEI 0-21

Select [⚙] > [CEI 0-21] to display the CEI 0-21.




**[SPI Self-Test]**

1. SPI Mode set Internal mode
2. Enter Self-Test Password (000015)
3. Press the All button

Please refer to the setup CEI 0-21 Guide for detailed information.

# Quick Install Guide

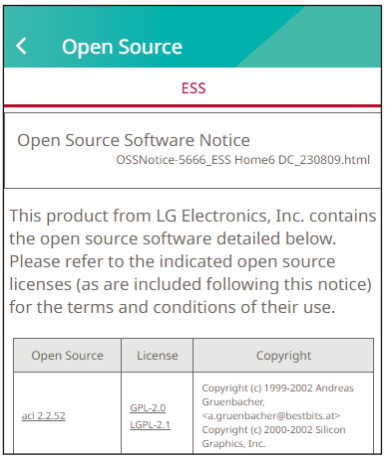
Select [⚙] > [Quick Install Guide] to display the install guidance screen.

You can check the brief installation instructions on the [Quick Install Guide] screen.

## Open Source

You can check the open source information of the application and the system.

Select [⚙] > [Open Source] to display the open source notice screen.

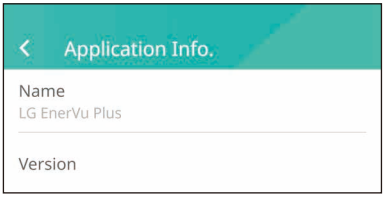



To obtain the source code under GPL, LGPL, MPL, and other open source licenses, which come with this product, please visit http://opensource.lge.com.

In addition to the source code, all referred license terms, warranty disclaimers, and copyright notices are available for download. LG Electronics will also provide open source code via CD-ROM for a charge that covers the cost of distribution (such as media, shipping, and handling) upon email request to opensource@lge.com. This offer is valid for three(3) years from the date on which you purchased the product.

## Application Information

Select [⚙] > [Application Information] to display the application information screen.




You can check the information of this application, including the application name, application package name, and application version.

# EnerVu Settings (Installer Only)

To use the EnerVu web monitoring system, the ESS system must be registered through the LG ThinQ® application first. Then, the installer can add the system in EnerVu.

After registering in EnerVu, the installer can check a variety of information such as system status, information, report, etc.

## Preparation

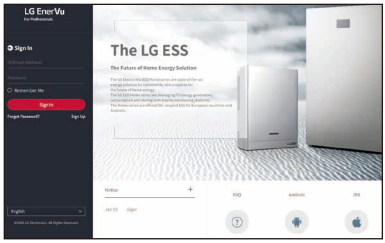
- An internet browser installed on a computer, tablet, or mobile phone with internet access is needed to access the EnerVu web monitoring system.
- This product must be connected to the internet. Check the [Network Type] settings menu in the system.



## Creating a New Account (Administrator)

An administrator can manage the installers belonging to the company and its branches. An administrator also has all the roles that installers have.

1

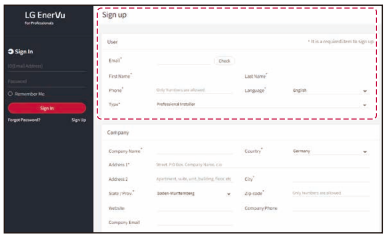



In your browser, visit the LG EnerVu website at https://eu.enervu.lg-ess.com.

When the user and installer selection page appears, select installer.

The [Login] page appears.

2

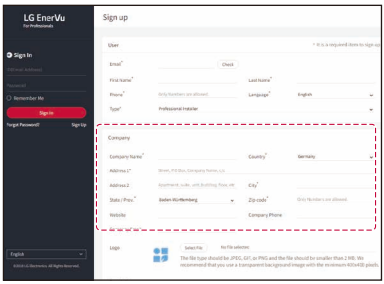



Select [Sign Up]. The [Sign Up] page appears.

Input your email address in the [Email] field and select [Check].

Then, fill out all of the other fields.

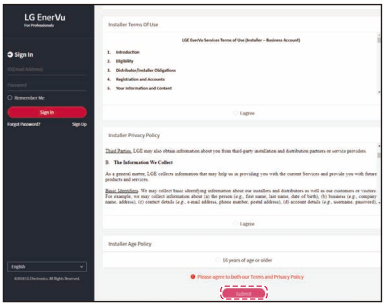
3




Fill the required information in the [Company] section.

Read the [Installer Terms Of Use], [Installer Privacy Policy] and [Installer Age Policy] carefully. If you agree with all of the terms and policies, click the [I agree] check box in each section.

4




Select [Submit] to complete creating an installer account.

5


After signing up, you will receive a verification email to the email address you provided. Please verify the email to set your password.

## Adding a New Installer

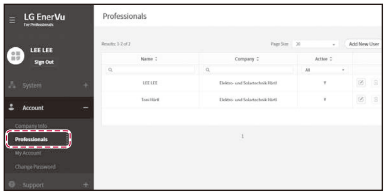
1


In your browser, visit the LG EnerVu website at https://eu.enervu.lg-ess.com.

When the user and installer selection page appears, select installer.

The [Login] page appears. Input the administrator's E-mail address and password and select [Sign In].

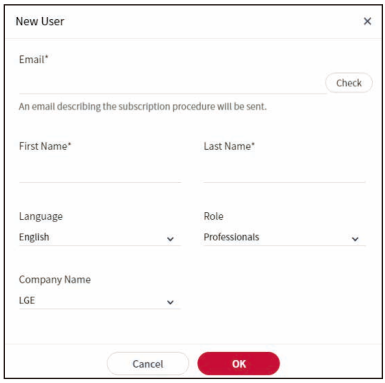
2




Select [Professionals] under the [Account] menu.

Select the [Add New User] button to open a new user input pop-up.

3




Enter the email address for the new installer account and select [Check].

Enter the first name and last name of the new installer.

Select the proper language and [Role].

In [Role], you can select either [Professionals] or [Administrator]. Professional is used for an installer that has no authority to add users or subsidiaries.

Select the [Company Name] option to designate as either a parent company or subsidiary.

Then, select the [OK] button to register the new installer.

4


The new installer will receive an email from EnerVu.

The new installer should reset their password by clicking the link in the email.

Then, the new installer can sign to EnerVu.

# Registering The System (Web Browser)

The installer should follow the procedures below in EnerVu so that Installer can monitor the customer's system through the EnerVu.

1

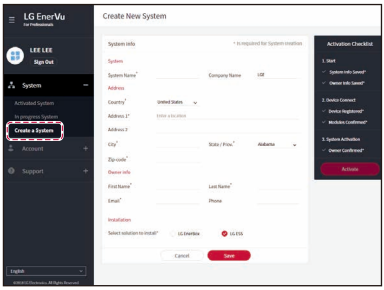

In your browser, visit the LG EnerVu website at https://eu.enervu.lg-ess.com.

When the user and installer selection page appears, select installer.

The [Login] page appears. Input the installer's E-mail address and password and select [Sign In]

If the installer does not have an account, select [Sign Up] to create a new installer account.

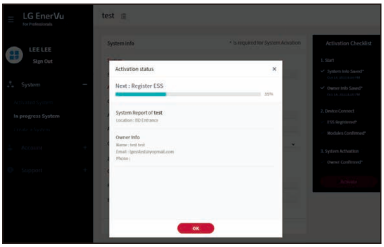
2




Select [Create a System] under the [System] menu.

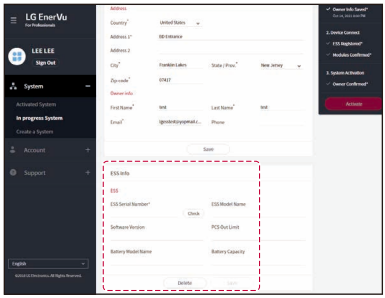
Fill in all of the information in the [System Info] section and select [Save] to save the entries.

3




Select [OK] to go to next step.

4

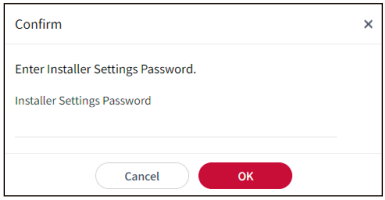



In the [ESS Info] field, enter the product SE Box serial number and select [Check].

If SE Box serial number is valid, the other ESS information fields will automatically be filled.

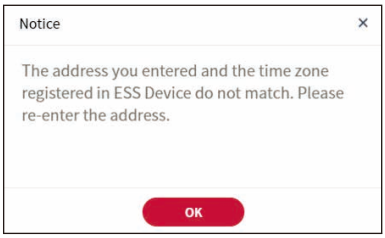
Select [Save] to go to the next step.

5




Enter the installer setting password used in the EnerVu plus App.

6

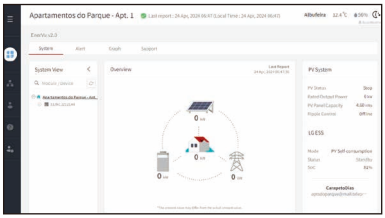



If the previous steps have been successfully done, the installer can now monitor the ESS system.

**INFO**

- If the time zone settings on the system do not match the monitoring system, check the region of the installed ESS system and edit the time zone settings of the system again.

7




By selecting a system under [System] > [Activated system] menu, installer can monitor systems installed by his/her company.

# When Incomplete Registration Status

If the registration is incomplete, the system should be activated through the following steps.

1


In your browser, visit the LG EnerVu website at https://eu.enervu.lg-ess.com.

When the user and installer selection page appears, select installer.

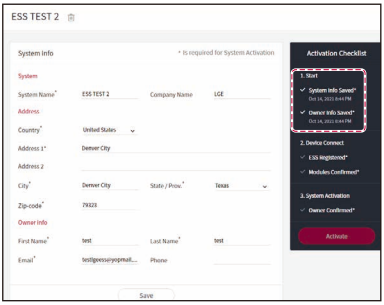
The [Login] page appears. Input the installer's E-mail address and password, then select [Sign In].

2


Select [In progress System] under the [System] menu.

Choose the name of the system you would like to monitor.

3




Many times, the system has an incomplete status because the time zone setting in the ESS system does not match the EnerVu system settings.

If this is the case, the ESS system will not be registered. Please return to Step 1.

Next, check the region that the system is in and set the time zone again.

If the above condition is fulfilled, the installer can then add and monitor the ESS system.

# Error Codes and Messages

## PCS Error Codes

- Do not leave the ESS in the fault standby state for a long time because battery discharge may occur.
- If battery fault occurs immediately after starting the PCS, it means battery failure. Check the battery SoC as well as voltage and fault information, and turn off the power of the ESS until service action is taken.
- If the battery SoC is low, the battery may charge from the grid for self-protection. (Emergency Charging) This function is to prevent the shutdown of the ESS, deep discharge, and failure of the battery. An Emergency Charge is not an ESS fault.

| Code | Message | Description | Solution |
|---|---|---|---|
| P100 | Battery A Unmatching | Power line of BAT B is connected at BAT A Power port. | Contact service center |
| P101 | Battery B Unmatching | Power line of BAT A is connected at BAT B Power port. | Contact service center |
| P105 | BAT A Disconnect | BMS communication of BAT A is connected but the power line of BAT A is not connected. | Contact service center |
| P106 | BAT B Disconnect | BMS communication of BAT B is connected but the power line of BAT B is not connected. | Contact service center |
| P110 | BAT A MisWiring | BAT A reverse polarity wiring. | Contact service center |
| P111 | BAT B MisWiring | BAT A reverse polarity wiring. | Contact service center |
| P120 | Grid MisWiring | Incorrect wiring grid connection has detected. | Contact service center |
| P130 | BAT Relay Error | Battery Relay is not operable. | Contact service center |
| P131 | Grid Relay Error | Grid relay is not operable. | Contact service center |
| P132 | Fan 1 Error | Inspite of send the enable, the Fan1 can not be operating | Contact service center |
| P133 | Fan 2 Error | Inspite of send the enable, the Fan2 can not be operating | Contact service center |
| P134 | Fan 3 Error | Inspite of send the enable, the Fan3 can not be operating | Contact service center |
| P140 | Slave MCU Comm. | Communication error with the connected Slave MCU for over 10 minutes. | Contact service center |

| Code | Message | Description | Solution |
|---|---|---|---|
| P141 | PMS Comm. Error | Communication error with the connected PMS for over 10 minutes. | Contact service center |
| P142 | BATA Comm. Error | Communication error with the connected battery for over 10 minutes. | Contact service center |
| P150 | Backup SoftSrart | During soft-start backup operation, it occurs when PCS Faults are continuous more than 10 times. | Contact service center |
| P151 | Backup Fail | Backup operation failed. | Contact service center |
| P152 | BAT Low SOC | SoC of Battery is lower than 10% | Contact service center |
| P160 | PCS Initial Startup Fail | PCS failed initial startup. | Contact service center |
| P161 | Inverter Control Fail | Inverter failed control. | Contact service center |
| P200 | Grid L1 OV | Voltage level of the grid L1 is higher than the limitation. | Automatically restart after grid L1 voltage is normal |
| P201 | Grid L2 OV | Voltage level of the grid L2 is higher than the limitation. | Automatically restart after grid L2 voltage is normal |
| P202 | Grid L3 OV | Voltage level of the grid L3 is higher than the limitation. | Automatically restart after grid L3 voltage is normal |
| P203 | Grid OV | Voltage level of the grid is higher than the limitation. | Automatically restart after grid voltage is normal |
| P210 | Grid L1 UV | Voltage level of the grid L1 is lower than the limitation. | Automatically restart after grid L1 voltage is normal |
| P211 | Grid L2 UV | Voltage level of the grid L2 is lower than the limitation. | Automatically restart after grid L2 voltage is normal |
| P212 | Grid L3 UV | Voltage level of the grid L3 is lower than the limitation. | Automatically restart after grid L3 voltage is normal |
| P213 | Grid UV | Voltage level of the grid is lower than the limitation. | Automatically restart after grid voltage is normal |
| P220 | Grid OF | Frequency level of the grid is higher than the limitation. | Automatically restart after grid frequency is normal |
| P221 | Grid UF | Frequency level of the grid is lower than the limitation. | Automatically restart after grid frequency is normal |
| P222 | Grid CF | Amount of frequency change is higher than the limitation | Automatically restart after grid frequency is normal |
| P225 | RCD Fault | The residual current is higher than the limitation | Automatically restart after residual current is normal |

| Code | Message | Description | Solution |
|---|---|---|---|
| P230 | L1 DC OffsetCurr | DC offset current of grid L1 is added on grid. | Automatically restart after detecting fault |
| P231 | L2 DC OffsetCurr | DC offset current of grid L2 is added on grid. | Automatically restart after detecting fault |
| P232 | L3 DC OffsetCurr | DC offset current of grid L3 is added on grid. | Automatically restart after detecting fault |
| P233 | N DC OffsetCurr | DC offset current of grid N is added on grid. | Automatically restart after detecting fault |
| P234 | DC OffsetCurr | DC offset current is added on grid. | Automatically restart after detecting fault |
| P240 | Anti-Islanding | There was a power failure. | Automatically restart after detecting fault |
| P250 | Grid L1 OV 10min | Average voltage of the grid L1 for 10mins is higher than the limitation. | Automatically restart after grid L1 voltage is normal |
| P251 | Grid L2 OV 10min | Average voltage of the grid L2 for 10mins is higher than the limitation. | Automatically restart after grid L2 voltage is normal |
| P252 | Grid L3 OV 10min | Average voltage of the grid L3 for 10mins is higher than the limitation. | Automatically restart after grid L3 voltage is normal |
| P253 | Grid OV 10min | Average voltage of the grid for 10mins is higher than the limitation. | Automatically restart after grid voltage is normal |
| P300 | BAT A OV | Voltage level of BAT A is higher than the limitation. | Automatically restart after BAT A voltage is normal |
| P301 | BAT B OV | Voltage level of BAT B is higher than the limitation. | Automatically restart after BAT B voltage is normal |
| P310 | BAT A UV | Voltage level of BAT A is lower than the limitation. | Automatically restart after BAT A voltage is normal |
| P311 | BAT B UV | Voltage level of BAT B is lower than the limitation. | Automatically restart after BAT B voltage is normal |
| P320 | BAT A OC | Current level of the BAT A is higher than the limitation. | Automatically restart after BAT A current is normal |
| P321 | BAT B OC | Current level of the BAT B is higher than the limitation. | Automatically restart after BAT B current is normal |
| P330 | BAT A OC HW | Current level of the BAT A is instantaneously higher than the limitation. | Automatically restart after BAT A current is normal |
| P331 | BAT B OC HW | Current level of the BAT B is instantaneously higher than the limitation. | Automatically restart after BAT B current is normal |
| P350 | BAT A Low SOC | SOC level of BAT A is lower than the limitation. | Automatically restart after BAT A SOC is normal |
| P351 | BAT A State Error | A State Error occurs from the BAT A. | Automatically restart after BAT A state is normal |

| Code | Message | Description | Solution |
|---|---|---|---|
| P353 | BAT A Sleep | BAT A power goes into power saving mode. | Automatically restart after BAT A black start operation is normal |
| P354 | BAT A Power Down | The BAT A power is turned off. | Automatically restart after BAT A black start operation is normal |
| P355 | BAT B Low SOC | SOC level of BAT B is lower than the limitation. | Automatically restart after BAT B SOC is normal |
| P356 | BAT B State Error | A State Error occurs from the BAT B. | Automatically restart after BAT B state is normal |
| P358 | BAT B Sleep | BAT B power goes into power saving mode. | Automatically restart after BAT B black start operation is normal |
| P359 | BAT B Power Down | The BAT B power is turned off. | Automatically restart after BAT B black start operation is normal |
| P370 | DC Link OV | Voltage level of the DC Link is higher than the limitation. | Automatically restart after DC-Link voltage is normal |
| P371 | DC Link OV HW | Voltage level of the DC Link is instantaneously higher than the limitation. | Automatically restart after DC-Link voltage is normal |
| P372 | DC Link UV | Voltage level of the DC Link is lower than the limitation. | Automatically restart after DC-Link voltage is normal |
| P373 | DC Link Top OV | Voltage level of the DC Link Top Cap. is higher than the limitation. | Automatically restart after DC-Link Top Cap. voltage is normal |
| P375 | DC Link Bot OV | Voltage level of the DC Link Bottom Cap. is higher than the limitation. | Automatically restart after DC-Link Top Cap. voltage is normal |
| P377 | DC Link Unbalance | Voltage difference between top and bottom is higher than the limitation. | Automatically restart after DC-Link voltage is normal |
| P378 | DC Link Top UV | Voltage level of the DC Link Top Cap. is lower than the limitation. | Automatically restart after DC-Link Bottom Cap. voltage is normal |
| P379 | DC Link Bot UV | Voltage level of the DC Link Bottom Cap. is lower than the limitation. | Automatically restart after DC-Link Bottom Cap. voltage is normal |
| P400 | PV A OV | Voltage level of the PV A is higher than the limitation. | Automatically restart after PV A voltage is normal |
| P401 | PV B OV | Voltage level of the PV B is higher than the limitation. | Automatically restart after PV B voltage is normal |
| P402 | PV C OV | Voltage level of the PV C is higher than the limitation. | Automatically restart after PV C voltage is normal |

| Code | Message | Description | Solution |
|---|---|---|---|
| P420 | PV A OC | Current level of the PV A is higher than the limitation. | Automatically restart after PV A current is normal |
| P421 | PV B OC | Current level of the PV B is higher than the limitation. | Automatically restart after PV B current is normal |
| P422 | PV C OC | Current level of the PV C is higher than the limitation. | Automatically restart after PV C current is normal |
| P430 | PV A OC HW | Current level of the PV A is instantaneously higher than the limitation. | Automatically restart after PV A current is normal |
| P431 | PV B OC HW | Current level of the PV B is instantaneously higher than the limitation. | Automatically restart after PV B current is normal |
| P432 | PV C OC HW | Current level of the PV C is instantaneously higher than the limitation. | Automatically restart after PV C current is normal |
| P450 | PVR Fault | PV insulation resistance is lower than the limitation | Automatically restart after PV insulation resistance is normal |
| P500 | Grid L1 OC | Current level of the grid L1 is higher than the limitation. | Automatically restart after grid L1 current is normal |
| P501 | Grid L2 OC | Current level of the grid L2 is higher than the limitation. | Automatically restart after grid L2 current is normal |
| P502 | Grid L3 OC | Current level of the grid L3 is higher than the limitation. | Automatically restart after grid L3 current is normal |
| P503 | Grid N OC | Current level of the grid N is higher than the limitation. | Automatically restart after grid N current is normal |
| P505 | Grid LL OC | Current level of the grid is higher than the limitation. | Automatically restart after grid current is normal |
| P510 | Grid L1 OC HW | Current level of the grid L1 is instantaneously higher than the limitation. | Automatically restart after grid L1 current is normal |
| P511 | Grid L2 OC HW | Current level of the grid L2 is instantaneously higher than the limitation. | Automatically restart after grid L2 current is normal |
| P512 | Grid L3 OC HW | Current level of the grid L3 is instantaneously higher than the limitation. | Automatically restart after grid L3 current is normal |
| P513 | Grid N OC HW | Current level of the grid N is instantaneously higher than the limitation. | Automatically restart after grid N current is normal |

| Code | Message | Description | Solution |
|---|---|---|---|
| P514 | Grid LL OC HW | Current level of the grid is instantaneously higher than the limitation. | Automatically restart after grid current is normal |
| P550 | Backup L1 OV | During backup operation, the voltage level of Inverter L1 is higher than the limitation. | Automatically restart after detecting fault |
| P551 | Backup L2 OV | During backup operation, the voltage level of Inverter L2 is higher than the limitation. | Automatically restart after detecting fault |
| P552 | Backup L3 OV | During backup operation, the voltage level of Inverter L3 is higher than the limitation. | Automatically restart after detecting fault |
| P553 | Backup LL OV | During backup operation, the voltage level of Inverter is higher than the limitation. | Automatically restart after detecting fault |
| P560 | Backup Total OL | During backup, the load is higher than the limit discharge power of the inverter. | Automatically restart after detecting fault |
| P561 | Backup L1 OL | During backup, the load L1 is higher than the limit discharge power of the inverter. | Automatically restart after detecting fault |
| P562 | Backup L2 OL | During backup, the load L2 is higher than the limit discharge power of the inverter. | Automatically restart after detecting fault |
| P563 | Backup L3 OL | During backup, the load L3 is higher than the limit discharge power of the inverter. | Automatically restart after detecting fault |
| P570 | Backup L1 EL | During backup, the unacceptable load is connected. | Automatically restart after detecting fault |
| P571 | Backup L2 EL | During backup, the unacceptable load is connected. | Automatically restart after detecting fault |
| P572 | Backup L3 EL | During backup, the unacceptable load is connected. | Automatically restart after detecting fault |
| P573 | Backup LL EL | During backup, the unacceptable load is connected. | Automatically restart after detecting fault |
| P580 | Backup Volt Fail | During backup, the voltage of the inverter is lower than the limitation. | Automatically restart after detecting fault |
| P585 | Grid Alive | During backup operation, when grid power is activated | Automatically restart after detecting fault |
| P590 | Backup L1 UV | During backup, the voltage of the inverter L1 is lower than the limitation. | Automatically restart after detecting fault |
| P591 | Backup L2 UV | During backup, the voltage of the inverter L2 is lower than the limitation. | Automatically restart after detecting fault |
| P592 | Backup L3 UV | During backup, the voltage of the inverter L3 is lower than the limitation. | Automatically restart after detecting fault |

| Code | Message | Description | Solution |
|---|---|---|---|
| P593 | Backup LL UV | During backup, the voltage of the inverter is lower than the limitation. | Automatically restart after detecting fault |
| P600 | Grid Relay1 | Grid relay is not operable. (L1-Grid side) | Automatically restart after detecting fault |
| P601 | Grid Relay2 | Grid relay is not operable. (L1-Inverter side) | Automatically restart after detecting fault |
| P602 | Grid Relay3 | Grid relay is not operable. (L2-Grid side) | Automatically restart after detecting fault |
| P603 | Grid Relay4 | Grid relay is not operable. (L2-Inverter side) | Automatically restart after detecting fault |
| P604 | Grid Relay5 | Grid relay is not operable. (L3-Grid side) | Automatically restart after detecting fault |
| P605 | Grid Relay6 | Grid relay is not operable. (L3-Inverter side) | Automatically restart after detecting fault |
| P606 | Grid Relay7 | Grid relay is not operable. (N-Grid side) | Automatically restart after detecting fault |
| P607 | AC Relay Open | During PCS operation, Grid Relay is opened. | Automatically restart after detecting fault |
| P608 | Grid Relay8 | Grid relay is not operable. (N-Inverter side) | Automatically restart after detecting fault |
| P612 | BAT Relay1 | BAT A Relay is not operable. | Automatically restart after detecting fault |
| P613 | BAT Relay2 | BAT B Relay is not operable. | Automatically restart after detecting fault |
| P614 | BAT Relay3 | BAT C Relay is not operable. | Automatically restart after detecting fault |
| P619 | Backup Relay1 | Backup Relay is not operable. | Automatically restart after detecting fault |
| P621 | Fan 1 Error | Fan 1 is not operable | Contact service center |
| P622 | Fan 2 Error | Fan 2 is not operable | Contact service center |
| P623 | Fan 3 Error | Fan 3 is not operable | Contact service center |
| P631 | Inverter SW1 OT | The inverter (Top) temperature is higher than the limitation. | Automatically restart after INV top temp is normal |

| Code | Message | Description | Solution |
|---|---|---|---|
| P632 | Inverter SW2 OT | The inverter (Bottom) temperature is higher than the limitation. | Automatically restart after INV bottom temp is normal |
| P651 | BAT Conv. SW2 OT | The BAT converter (Top) temperature is higher than the limitation. | Automatically restart after BAT Converter top temp is normal |
| P652 | BAT Conv. SW2 OT | The BAT converter (Bottom) temperature is higher than the limitation. | Automatically restart after BAT Converter bottom temp is normal |
| P671 | PV A Conv. OT | The PV A converter temperature is higher than the limitation. | Automatically restart after PV A Converter temp is normal |
| P672 | PV B Conv. OT | The PV B converter temperature is higher than the limitation. | Automatically restart after PV B Converter temp is normal |
| P690 | Internal OT | The PCS inner temperature is higher than the limitation. | Automatically restart after inner temp is normal |
| P691 | External OT | The PCS ambient temperature is higher than the limitation. | Automatically restart after ambient temp is normal |
| P700 | Slave MCU Comm. | Communication error with the connected Slave MCU for over 10 seconds. | Automatically restart after Communication is normal |
| P701 | PMS Comm. Error | Communication error with the connected PMS for over 10 seconds. | Automatically restart after Communication is normal |
| P702 | BAT A Comm. Error | Communication error with the connected battery for over 10 seconds. | Automatically restart after Communication is normal |
| P703 | BAT B Comm. Error | Communication error with the connected battery for over 10 seconds. | Automatically restart after Communication is normal |
| P720 | Slave MCU Error | The Slave MCU unit in the product is in fault. | Automatically restart after detecting fault |
| P721 | MCU Power Fault | The MCU supply power exceeds the allowable range. | Automatically restart after MCU Control Power is normal |
| P722 | GD Desat | PCS Gate-Drive detects a fault. | Automatically restart after detecting fault |
| P723 | GD Low Voltage | Gate voltage at PCS Gate-Drive is lower than the limitation. | Automatically restart after detecting fault |
| P740 | ATS Error | ATS operation status error occurs. | Automatically restart after ATS is normal |
| P741 | Initial Charge | DC-link initial charging of the inverter does not operate normally. | Automatically restart after detecting fault |

| Code | Message | Description | Solution |
|---|---|---|---|
| P750 | Grid LL Volt Sensor | Grid voltage sensing error occurs. | Automatically restart after grid voltage sensing is normal |
| P751 | Grid Freq Sensor | Grid frequency sensing error occurs. | Automatically restart after grid frequency sensing is normal |
| P752 | Safety Function | Error in performing safety functions. | Automatically restart after safety function operation is normal |
| P753 | Micom State Fail | Micom status abnormality detected. | Automatically restart after MICOM state is normal |
| P754 | Grid L1 Volt Sensor | Grid L1 voltage sensing error occurs. | Automatically restart after grid voltage sensing is normal |
| P755 | Grid L2 Volt Sensor | Grid L2 voltage sensing error occurs. | Automatically restart after grid voltage sensing is normal |
| P756 | Grid L3 Volt Sensor | Grid L3 voltage sensing error occurs. | Automatically restart after grid voltage sensing is normal |
| P760 | SRD Para Fault | Grid SRD Parameter setting error occurs. | Automatically restart after detecting fault |
| P765 | Relay Power Off | A relay operation error occurs and the relay power is turned off. | Automatically restart after Relay Status is normal |
| P771 | Inverter SW1 Temp. | The inverter (Top) NTC is not working. | Automatically restart after INV top temp is normal |
| P772 | Inverter SW2 Temp. | The inverter (Bottom) NTC is not working. | Automatically restart after INV bottom temp is normal |
| P791 | BAT Conv. SW1 Temp. | The BAT converter (Top) NTC is not working. | Automatically restart after BAT Converter top temp is normal |
| P792 | BAT Conv. SW2 Temp. | The BAT converter (Bottom) NTC is not working. | Automatically restart after BAT Converter bottom temp is normal |
| P803 | PV SW1 Temp. | The PV Module NTC is not working. | Automatically restart after PV Converter temp is normal |
| P820 | Internal Temp. | The PCS inner NTC is not working. | Automatically restart after inner temp is normal |
| P821 | External Temp. | The PCS ambient NTC is not working. | Automatically restart after ambient temp is normal |

| Code | Message | Description | Solution |
|---|---|---|---|
| P900 | SRD Para Warning | Grid SRD Parameter setting error occurs. | Automatically restart after detecting fault |
| P905 | DC OffsetCurr Warning | DC offset current is added on grid. | Automatically restart after detecting fault |
| P910 | Eeprom Warning | Eeprom Parameter setting error occurs. | Automatically restart after detecting fault |
| P925 | PMS E-Stop | PCS is Emergency Stopped from SEB. | Automatically restart after releasing stop |

# Battery Error Code and Messages

| Code | Message | Description | Solution |
|---|---|---|---|
| B678 | Discharge Over Temperature Warning | Discharge temperature level is higher than the limit | Automatically released after warning condition is cleared |
| B679 | Discharge Under Temperature Warning | Discharge temperature level is lower than the limit | Automatically released after warning condition is cleared |
| B680 | Charge Over Temperature Warning | Charge temperature level is higher than the limit | Automatically released after warning condition is cleared |
| B681 | Charge Under Temperature Warning | Charge temperature level is lower than the limit | Automatically released after warning condition is cleared |
| B682 | Terminal Over Temperature Warning | Power Terminal temperature level is higher than the limit | Automatically released after warning condition is cleared |
| B685 | LED Module interface Warning | Warning of LED module communication | Automatically released after warning condition is cleared |
| B686 | Discharge Over Current Warning | Discharge current level is higher than the limit | Automatically released after warning condition is cleared |
| B687 | Charge Over Current Warning | Charge current level is higher than the limit | Automatically released after warning condition is cleared |
| B689 | Atmosphere Discharge Over Temperature Warning | Discharge Atmosphere temperature level is higher than the limit | Automatically released after warning condition is cleared |
| B690 | Atmosphere Discharge Under Temperature Warning | Discharge Atmosphere temperature level is lower than the limit | Automatically released after warning condition is cleared |
| B691 | Atmosphere Charge Over Temperature Warning | Charge Atmosphere temperature level is higher than the limit | Automatically released after warning condition is cleared |
| B692 | Atmosphere Charge Under Temperature Warning | Charge Atmosphere temperature level is lower than the limit | Automatically released after warning condition is cleared |
| B694 | Over Discharge Power Limit Warning | Discharge Power level is higher than the limit | Automatically released after warning condition is cleared |
| B695 | Over Charge Power Limit Warning | Charge Power level is higher than the limit | Automatically released after warning condition is cleared |
| B697 | ADC Interrupt Warning | Warning of the MCU AD interrupt operation | Automatically released after warning condition is cleared |
| B701 | Safety CRC Check Error | Warning of the safety memory range CRC data | Automatically released after warning condition is cleared |

| Code | Message | Description | Solution |
|---|---|---|---|
| B702 | Cell Over Voltage Fault1 | Cell Voltage level of battery cell is higher than the limit | Automatically restart after fault condition is cleared |
| B703 | Cell Under Voltage Fault1 | Cell Voltage level of battery cell is lower than the limit | Automatically restart after fault condition is cleared |
| B707 | Unit Voltage ADC Mux Fault1 | Unit voltage AD conversion multiplex fault | Automatically restart after fault condition is cleared |
| B710 | Discharge Over Temperature Fault1 | Discharge temperature level is higher than the limit | Automatically restart after fault condition is cleared |
| B711 | Discharge Under Temperature Fault1 | Discharge temperature level is lower than the limit | Automatically restart after fault condition is cleared |
| B712 | Charge Over Temperature Fault1 | Charge temperature level is higher than the limit | Automatically restart after fault condition is cleared |
| B713 | Charge Under Temperature Fault1 | Charge temperature level is lower than the limit | Automatically restart after fault condition is cleared |
| B714 | Terminal Over Temperature Fault1 | Power Terminal temperature level is higher than the limit | Automatically restart after fault condition is cleared |
| B718 | Discharge Over Current Fault1 | Discharge current level is higher than the limit | Automatically restart after fault condition is cleared |
| B719 | Charge Over Current Fault1 | Charge current level is higher than the limit | Automatically restart after fault condition is cleared |
| B721 | Atmosphere Discharge Over Temperature Fault1 | Discharge Atmosphere temperature level is higher than the limit | Automatically restart after fault condition is cleared |
| B722 | Atmosphere Discharge Under Temperature Fault1 | Discharge Atmosphere temperature level is lower than the limit | Automatically restart after fault condition is cleared |
| B723 | Atmosphere Charge Over Temperature Fault1 | Charge Atmosphere temperature level is higher than the limit | Automatically restart after fault condition is cleared |
| B724 | Atmosphere Charge Under Temperature Fault1 | Charge Atmosphere temperature level is lower than the limit | Automatically restart after fault condition is cleared |
| B725 | Current ADC Mux Fault1 | Current AD conversion multiplex fault | Automatically restart after fault condition is cleared |
| B734 | Cell Over Voltage Fault2 | Cell Voltage level of battery cell is higher than the limit | Contact service center |
| B735 | Cell Under Voltage Fault2 | Cell Voltage level of battery cell is lower than the limit | Contact service center |
| B737 | Unit Over voltage Fault2 | Unit Voltage level of battery cell is higher than the limit | Contact service center |

| Code | Message | Description | Solution |
|---|---|---|---|
| B738 | Unit Under voltage Fault2 | Unit Voltage level of battery cell is lower than the limit | Contact service center |
| B740 | Cell Voltage Imbalance Fault2 | Cell voltage difference between battery cells is higher than the limit | Contact service center |
| B741 | Pack Voltage Imbalance Fault2 | Pack voltage difference between battery packs in higher than the limit | Contact service center |
| B742 | Discharge Over Temperature Fault2 | Discharge temperature level is higher than the limit | Contact service center |
| B743 | Discharge Under Temperature Fault2 | Discharge temperature level is lower than the limit | Contact service center |
| B744 | Charge Over Temperature Fault2 | Charge temperature level is higher than the limit | Contact service center |
| B745 | Charge Under Temperature Fault2 | Charge temperature level is lower than the limit | Contact service center |
| B746 | Terminal Over Temperature Fault2 | Power Terminal temperature level is higher than the limit | Contact service center |
| B750 | Discharge Over Current Fault2 | Discharge current level is higher than the limit | Contact service center |
| B751 | Charge Over Current Fault2 | Charge current level is higher than the limit | Contact service center |
| B753 | Atmosphere Discharge Over Temperature Fault2 | Discharge Atmosphere temperature level is higher than the limit | Contact service center |
| B754 | Atmosphere Discharge Under Temperature Fault2 | Discharge Atmosphere temperature level is lower than the limit | Contact service center |
| B755 | Atmosphere Charge Over Temperature Fault2 | Charge Atmosphere temperature level is higher than the limit | Contact service center |
| B756 | Atmosphere Charge Under Temperature Fault2 | Charge Atmosphere temperature level is lower than the limit | Contact service center |
| B762 | Relay Opreation Fault2 | Battery power supply relay operation Fault | Contact service center |
| B766 | BIC ADC Reference Voltage Error | BIC ADC Reference Voltage Error | Contact service center |
| B767 | Cell Voltage Sensor Open Wire | Cell Voltage Sensor Open Wire | Contact service center |

| Code | Message | Description | Solution |
|---|---|---|---|
| B768 | Temperature Sensor Error | Temperature Sensor Error | Contact service center |
| B769 | Current Sensor Line Error | Current Sensor Line Error | Contact service center |
| B771 | Main Power Connection Error | Main Power Connection Error | Contact service center |
| B772 | Unit High Voltage Error (H/W) | Unit High Voltage Error (H/W) | Contact service center |
| B774 | Magic Number Error | Magic Number Error | Contact service center |
| B775 | Pack Number Error | Pack Number Error | Contact service center |
| B776 | MCU ADC Stuck Error | MCU ADC Stuck Error | Contact service center |
| B777 | Temperature ADC Stuck Error | Temperature ADC Stuck Error | Contact service center |
| B778 | Cell ADC Stuck Error | Cell ADC Stuck Error | Contact service center |
| B779 | BCU ADC Reference Voltage Error | BCU ADC Reference Voltage Error | Contact service center |
| B782 | BCU OSC HR object Error | BCU OSC HR object Error | Automatically restart after fault condition is cleared |
| B783 | Internal Communication Error (BCU ↔ BIC) | Internal Communication Error (BCU ↔ BIC) | Automatically restart after fault condition is cleared |
| B784 | External Communication Error ( PCS ↔ BCU ) | External Communication Error (PCS ↔ BCU) | Automatically restart after fault condition is cleared |
| B785 | Watchdog Counter Error | Watchdog Counter Error | Automatically restart after fault condition is cleared |
| B787 | CPU Register Error | CPU Register Error | Automatically restart after fault condition is cleared |
| B788 | FPU Register Error | FPU Register Error | Automatically restart after fault condition is cleared |
| B789 | VCU Register Error | VCU Register Error | Automatically restart after fault condition is cleared |
| B790 | PIE RAM Error | PIE RAM Error | Automatically restart after fault condition is cleared |
| B791 | PIE Handler Error | PIE Handler Error | Automatically restart after fault condition is cleared |
| B792 | BCU ROM ECC Check Error | BCU ROM ECC Check Error | Automatically restart after fault condition is cleared |
| B793 | BCU RAM ECC Check Error | BCU RAM ECC Check Error | Automatically restart after fault condition is cleared |

| Code | Message | Description | Solution |
|---|---|---|---|
| B794 | BCU MCU Clock Check Error | BCU MCU Clock Check Error | Automatically restart after fault condition is cleared |
| B795 | MarchC 1 region Copy Error | MarchC 1 region Copy Error | Automatically restart after fault condition is cleared |
| B796 | MarchC 2 region Copy Error | MarchC 2 region Copy Error | Automatically restart after fault condition is cleared |
| B797 | BCU Oscillator Source Error | BCU Oscillator Source Error | Automatically restart after fault condition is cleared |

- The firmware version, error codes, and fault conditions listed above can be accessed on the display. They can also be accessed from the server.

## PMS Battery Error Code

| Code | Message | Description | Solution |
|---|---|---|---|
| S100 | PCS Ver Mismatch | PCS Version Mismatch | Contact service center |
| S101 | BMS Ver Mismatch | BMS Version Mismatch | Contact service center |
| S106 | SW Update Done | FOTA Update success | This is an SW update notification |
| S107 | SW Update Fail | FOTA Update Failure | This is an SW update notification |
| S200 | Grid Meter Comm | Grid Meter Communication Error | Contact service center |

If you have technical problems or questions, contact the installation company or LG Electronics.

**Installation Company**

| | |
|---|---|
| Address : | Tel : |

**Customer Service**

| | |
|---|---|
| LG Electronics ESS \| Solar Service E-Service Haberkorn GmbH Augustenhöhe 7<br>06493 Harzgerode | Tel: Germany: 0049 (0)39484 / 976 380<br>Austria: 0043 (0)720 / 11 66 01<br>Switzerland: 0041 (0)44 / 505 11 42<br>Belgium, Netherlands, Luxembourg<br>: 0031 20 / 456 1660<br>E-Mail: lge@e-service48.de |

**LG Electronics Contact**

| | |
|---|---|
| LG Electronics Deutschland GmbH<br>Alfred-Herrhausen-Allee 3-5 65760 Eschborn | Tel: + 0049 18 06 807 020<br>E-Mail: b2b.service@lge.de |
| LG Electronics Benelux Krijgsman 1, 1186 DM, Amstelveen, The Netherlands | Tel: +0031 (0)20 456 3100<br>E-Mail: b2b.service@lge.de |

# Maintenance

## Cleaning the Product

Wipe off the outside of the product with a soft towel soaked in lukewarm water, and then dry it with a clean hand towel so that dirt will not accumulate when using a neutral detergent.

When cleaning the outside of the product, do not apply a rough brush, toothpaste, or flammable materials. Do not use cleaning agents containing flammable substances.

- This may cause discoloration of the product or damage to the product.
- Flammable substances: Alcohol (Ethanol, Methanol, Isopropyl alcohol, Isobutyl alcohol, etc.), Thinner, Benzene, Flammable liquid, Abrasive etc.)

Wiping with strong pressure may damage the surface. Do not leave rubber or plastic products in contact with the product for a long period of time.

When cleaning the air duct, shut off all the systems including the PCS, PV module, battery, and AC circuit breaker. Next, clean the filter with soft brush.

## Regular Inspection

It is recommended to check the operating status and connection status once a year. It should be done by a technician or authorized personnel. Contact an authorized dealer or wherever you purchased your product.

## Disposing the Product

When the product reached to the end of its service life or defect beyond repair, dispose the product according to the disposal regulations for electronic waste in your area. Disposing the product must be carried out by qualified personnel only. Contact authorized dealer or where you purchased.

# Disposal of your old appliance

1. This crossed-out wheeled bin symbol indicates that waste electrical and electronic products (WEEE) should be disposed of separately from the municipal waste stream.
2. Old electrical products can contain hazardous substances so correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.
   Your old appliance may contain reusable parts that could be used to repair other products, and other valuable materials that can be recycled to conserve limited resources.
3. You can take your appliance either to the shop where you purchased the product, or contact your local government waste office for details of your nearest authorised WEEE collection point. For the most up to date information for your country please see www.lg.com/global/recycling.

**Removal of waste batteries and accumulators**
**(Product with embedded battery ONLY)**

In case the product contains a battery incorporated within the product which cannot be readily removed by end-users, LG recommends that only qualified professionals remove the battery, either for replacement or for recycling at the end of this product's working life.

To prevent damage to the product, and for their own safety, users should not attempt to remove the battery and should contact LG Service Helpline, or other independent service providers for advice.

Removal of the battery will involve dismantling of the product case, disconnection of the electrical cables/ contacts, and careful extraction of the battery cell using specialized tools.

**Disposal of waste batteries / accumulators**

1. This symbol may be combined with chemical symbols for mercury (Hg), cadmium (Cd) or lead (Pb) if the battery contains more than 0.0005 % of mercury, 0.002 % of cadmium or 0.004 % of lead.
2. All batteries/accumulators should be disposed separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities.
3. The correct disposal of your old batteries/accumulators will help to prevent potential negative consequences for the environment, animal and human health.
4. For more detailed information about disposal of your old batteries/ accumulators, please contact your city office, waste disposal service or the shop where you purchased the product. (http://www.lg.com/global/sustainability/environment/take-back-recycling/global-network-europe)

# Specifications

| DC Port for PV[1)] | | |
|---|---|---|
| **Power Class** | | **15 kW** |
| Max. PV Module SUM connected (With clipping) | kWp | 22.5 |
| Max. PV Power SUM In (Non clipping) | kW | 20.0 |
| Max. PV Power In per Channel | kW | 7.5 |
| Number of Independent MPP Tracker | ea | 3 |
| Number of String per Channel | ea | 1 |
| Max. PV Voltage per Channel (PV Module at coldest) | d.c. V | 1, 000 |
| Nominal PV Voltage | d.c. V | 630 |
| Start-up PV Min. Voltage | d.c. V | 150 |
| MPP Voltage Range | d.c. V | 150 - 850 |
| Min. Voltage for Max. PV Power In per Channel | d.c. V | 500 |
| Max. Input Current | d.c. A | 13 |
| Nominal Input Current | d.c. A | 13 |
| PV Short Circuit Current | d.c. A | 18 |
| Max. Inverter Backfeed Current to the Array | d.c. A | 0 |
| OVC Category | | II |

1) Unless additional comments mentioned, Refer to PV Module STC Conditions

| AC Port for Grid | | |
|---|---|---|
| **Power Class** | | **15 kW** |
| Rated Power | kW | 15.0 |
| Apparent Power | kVA | 15.0 |
| Rated Output Voltage ( L1/L2/L3, N ) | a.c. V | 400 |
| Min. ~ Max. AC Voltage range | a.c. V | 320 - 500 |
| Current (maximum continuous) | a.c. A | 21.7 |
| Max. Output Fault Current | a.c. A | 28.2 |
| Max. Output Overcurrent Protection | a.c. A | 28.2 |
| Inrush Current Capability (<300 msec) | a.c. A | <50 |
| Frequency | Hz | 50 |
| Min. ~ Max. Frequency | Hz | 47.5 - 52.0 |
| Power Factor | | -0.8 ~ +0.8 |
| Max. THD | % | <5 |
| OVC Category | | III |

| DC Port for Battery | | |
|---|---|---|
| **Power Class** | | **15 kW** |
| Nominal Voltage range | d.c. V | 271.3 - 459.1 |
| Max. Continuous Discharging Current | d.c. A | 17.6 |
| Max. Continuous Charging Current | d.c. A | 12.2 |
| Overvoltage Category | | II |

| Built in Feature | |
|---|---|
| **Power Class** | **15 kW** |
| Operating Mode | Hybrid Inverter, PV Inverter |
| AC Power Control Mode | Self Consumption, Ripple Control, Limit Feed In Power[2], Asymmetric Control[3], Time of Use |
| Battery Control Mode | Winter Mode, Fast Charging, Battery Care |
| Connectivity | EV Charger(Ethernet)[4], LGE AWHP, AWHP[5] |
| PV Generation at ATS/Light Backup | Supported |
| Software update | FOTA[6], USB |

2) Refer to the local requirements

3) TBD : Features being planned will be automatically supported through SW FOTA

4) Refer to the list of supported device

5) Refer to the optional device, ACU

6) Automated Firmware update : with internet connection and EneVu Portal registration

| Backup Light | | |
|---|---|---|
| **Power Class** | | **15 kW** |
| Backup Power | kW | 3.0 |
| Max. Apparent Power | kVA | 3.0 |
| Transition time | sec | <5 |
| Peak Output Power (<300msec) | kVA | 4.5 |
| Peak Output Power (<10 sec ) | kVA | 3.6 |
| Nominal Ouput Voltage (Single phase, L / N) | a.c. V | 230 |
| Nominal Output Frequency | Hz | 50 |
| Current (maximum continuous) | a.c. A | 13 |
| Maximum Output Fault Current | a.c. A | 13.69 |
| Maximum Output Overcurrent Protection | a.c. A | 55 |
| Current (inrush) | a.c. A | <50 |
| Overvoltage Category | | II |
| Power factor range | | 0.6(Inductive) - 0.6(Capacitive) |

| ATS Backup without Sun | | |
|---|---|---|
| **Power Class** | | **15 kW** |
| Max. Backup Sum Power (15H / 11H) | kW | 7.5 / 5.6 |
| Max. Apparent Sum Power (15H / 11H) | kVA | 7.5 / 5.6 |
| Max. Apparent / Power per Phase | kW / kVA | 5.0 / 5.0 |
| Transition time | sec | <5 |
| Peak Output Power (<300msec) (15H / 11H) | kVA | 11.25 / 8.4 |
| Peak Output Power (<10 sec) (15H / 11H) | kVA | 9.0 / 6.72 |
| Nominal Ouput Voltage (L1 to N, L2 to N, L3 to N) | a.c. V | 230 |
| Nominal Output Frequency | Hz | 50 |

| ATS Backup with Sun | | |
|---|---|---|
| **Power Class** | | **15 kW** |
| Max. Backup Sum Power (15H / 11H) | kW | 11.5 / 8.0 |
| Max. Apparent Sum Power (15H / 11H) | kVA | 11.5 / 8.0 |
| Max. Apparent / Power per phase | kW / kVA | 5.0 / 5.0 |
| Transition time | sec | <5 |
| Peak Output Power (<300msec) (15H / 11H) | kVA | 15.25 / 11.6 |
| Peak Output Power (<10 sec) (15H / 11H) | kVA | 13.0 / 9.6 |
| Nominal Ouput Voltage (L1 to N, L2 to N, L3 to N) | a.c. V | 230 |
| Nominal Output Frequency | Hz | 50 |

| Efficiency | | |
|---|---|---|
| **Power Class** | | **15 kW** |
| Max. Efficiency (PV → AC) | % | 98 |
| European Efficiency | % | 97.5 |

| General | | |
|---|---|---|
| **Power Class** | | **15 kW** |
| Dimensions (Width / Depth / Height) | mm | 450 (W) / 225 (D) / 599 (H) |
| Weight | kg | 43 |
| Cooling | | Forced convection<br>(automatic Speed Controlled by temperature) |
| Noise Emission (Typical) | dB | < 46 |
| Relative Humidity (non condensing) | % | 85 |
| Max. Installation altitude above Sea level | m | 2, 000 |
| Ingress Protection level | | IP65 |
| Pollution degree | | 2 |
| Protective class | | Class I |
| Operating Temeperature[7)] | ℃ | -20 to 60 |
| Storage Temperature | ℃ | -20 to 60 |
| Topology | | Transformerless |
| Software update | | FOTA[6)], USB |
| Warrnaty | | See URL for full Limited warranty[8)] |
| Energy Meter | | Eastron(SDM630-Modbus V3),<br>Chint(QPV, DTSU666),<br>ABB(B23-112-100, B23-212-100,<br>B23-312-100) |

6) Automated Firmware update : with internet connection and EneVu Portal registration

7) Derating from 40 ℃ at nominal conditions

8) To see the warranty, please visit the following site: https://www.lg.com/global/business/ess/business-resources/download

| Certificates | |
|---|---|
| Inverter Safety | IEC/EN 62109-1/-2 |
| Grid | VDE-AR-N 4105:2018-11, VDE V 0124-100,<br>TOR Erzeuger Type A, OVE-Richtlinie R 25 |
| EMC | EN 55011, EN IEC 61000 |
| RF | RED(2014/53/EU) |

| Battery (Li-ion) | |
|---|---|
| **Power Class** | **15 kW** |
| HBC 15H (BUEL015HBC2) | O |
| HBC 11H (BUEL011HBC2) | O |

# Open Source Software Notice Information

To obtain the source code that is contained in this product, under GPL, LGPL, MPL, and other open source licenses that have the obligation to disclose source code, and to access all referred license terms, copyright notices and other relevant documents, please visit https://opensource.lge.com. LG Electronics will also provide open source code to you on CD-ROM for a charge covering the cost of performing such distribution (such as the cost of media, shipping, and handling) upon email request to opensource@lge.com. This offer is valid to anyone in receipt of this information for a period of three years after our last shipment of this product.

- The noise emission value is measured in a soundproof room and can vary depending on the environment.
- If you are installing in a place sensitive to noise, please consult the installer.
- Design and specifications are subject to change without notice.

CE Contact office for compliance of this product: LG Electronics European Shared Service Center
B. V Krijgsman 1, 1186 DM Amstelveen, The Netherlands
www.lg.com/global/business/ess

**SIMPLIFIED EU DECLARATION OF CONFORMITY**

Hereby, LG Electronics declares that the radio equipment type

PCS Unit is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:

http://www.lg.com/global/support/cedoc/cedoc#

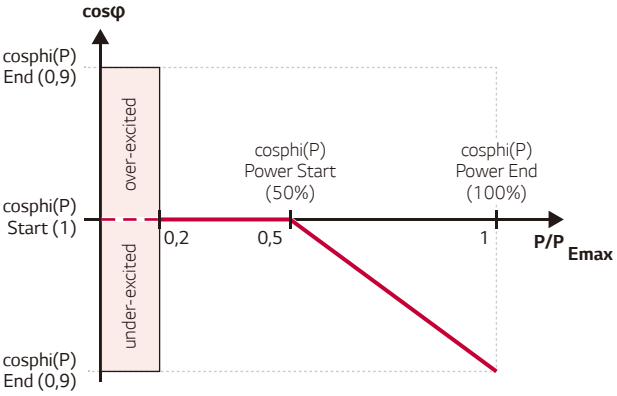
This device is a 2.4 GHz wideband transmission system, intended for use in all EU member states and EFTA countries.

For consideration of the user, this device should be installed and operated with a minimum distance of 20 cm between the device and the body.

| | |
|---|---|
| **Frequency Range** | 2400 - 2483.5 MHz |
| **Output Power (Max.)** | 17.93 dBm |
| **Software Version** | LG P21 01.00.01.00 |

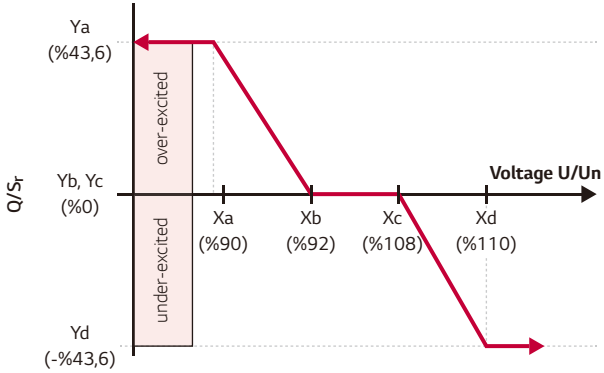
# Others

## Shift factor / effective characteristic cosφ (P)



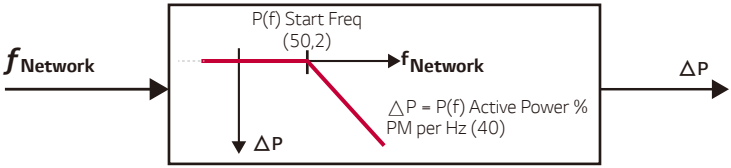

| Name | Description | Default | Range | Unit |
|---|---|---|---|---|
| cosphi(P) Start | cosphi at starting point | 1 | 0,9 ~ 1 | |
| cosphi(P) End | cosphi at end point | 0.90 | 0,9 ~ 1 | |
| cosphi(P) Power Start | TActive power at starting point (P/Pmax) | 50 | 20 ~ 100 | % |
| cosphi(P) Power End | Active power at End point (P/Pmax) | 100 | 20 ~ 100 | % |

# Reactive power / voltage characteristic Q(U)



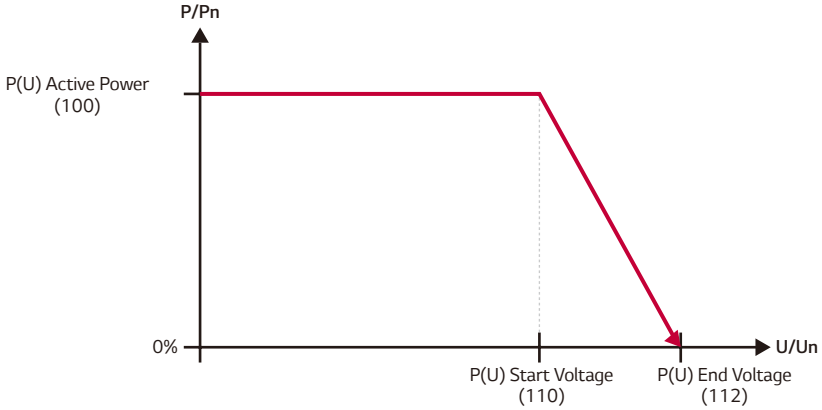

| Name | Description | Default | Range | Unit |
|---|---|---|---|---|
| Q(U) Number of point | Number of Active point in array | 4 | 0 ~ 8 | |
| Q(U) Xa | Grid voltage point-a (U/Un) | 93 | 80 ~ 120 | % |
| Q(U) Xb | Grid voltage point-b (U/Un) | 97 | 80 ~ 120 | % |
| Q(U) Xc | Grid voltage point-c (U/Un) | 103 | 80 ~ 120 | % |
| Q(U) Xd | Grid voltage point-d (U/Un) | 107 | 80 ~ 120 | % |
| Q(U) Ya | Reactive power point-a (Q/Sr) | 43,6 | -43,6 ~ 43,6 | % |
| Q(U) Yb | Reactive power point-b (Q/Sr) | 0 | -43,6~ 43,6 | % |
| Q(U) Yc | Reactive power point-c (Q/Sr) | 0 | -43,6~ 43,6 | % |
| Q(U) Yd | Reactive power point-d (Q/Sr) | -43,6 | -43,6~ 43,6 | % |
| Q(U) Lock-in | Active power lock-in (P/Pn) | 0 | 0 ~ 20 | % |
| Q(U) Lock-out | Active power lock-out (P/Pn) | 0 | 0 ~ 20 | % |

# Active power feed-in at overfrequency P(f)




| Name | Description | Default | Range | Unit |
|---|---|---|---|---|
| P(f) Active Power | Active power gradient at overfereuency | 40 | 0 ~ 100 | % |
| P(f) Start Freq | P(f) function starting frequency | 50,2 | 50 ~ 51,5 | Hz |
| P(f) Reset Freq | P(f) function reset frequency | 50,18 | 50 ~ 51,5 | Hz |
| P(f) wait time | Waiting time of active power gradient after reset frequency | 0.1 | 60 | sec |

## Voltage controlled active power control P(U)




| Name | Description | Default Value | Available Value | Unit |
|---|---|---|---|---|
| P(U) Active Power | Active power gradient at overvoltage | 100 | 0 ~ 100 | % |
| P(U) Start Voltage | P(U) function starting voltage (U/Un) | 110 | 100 ~ 120 | % |
| P(U) End Voltage | P(U) function end voltage (U/Un) | 112 | 100 ~ 120 | % |
| P(U) wait time | Waiting time of active power gradient | 0.1 | 60 | sec |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