29/04/2019

ENGLISH

INSTALLATION MANUAL

Energy Storage System

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

MODEL
LG ESS Home 10 (D010KE1N211)
LG ESS Home 8 (D008KE1N211)

MFL71429501

https://www.lg.com/global/business/ess/residential/dc-8-10

Safety Information

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

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

- There is high possibility of electric shock or serious burns due to the high voltages in power conditioning circuits.
- High voltages on AC and DC cables. Risk of death or serious injury due to electric shock.
- A potentially hazardous circumstance such as excessive heat or electrolyte mist may occur due to improper operating conditions, damage, misuse and/or abuse.
- This product have potential danger such as death or serious injury by fire, high voltages or explosion if appropriate precautions are not read or fully understood.
- Do not place flammable or potentially explosive objects near the product.
- Do not place any kind of objects on top of the product during operation.
- All works on the PV modules, power conditioning system, and battery system must be carried out by qualified personnel only.
- Electrical installations must be done in accordance with the local and national electrical safety standards.
- 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 cover. There is no user serviceable parts inside. Refer servicing to qualified and accredited service technician.
- Electrical shock hazard. Do not touch uninsulated wires when the product cover is removed.
- In the event of fault, the system must not be restarted. Product maintenance of repairs must be performed by qualified personnel, or personnel from an authorized support center.
- If the connected batteries are not LG battery, not only the batteries but also the PCS is not guaranteed by LG Electronics.

⚠ 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.
- Before testing electrical parts inside the system, it takes at least 10-minute standby period of time to complete discharging the system.
- The contents included in this box are power conditioning system and its accessories, and the entire weight is very heavy. Serious injury may occur due to the heavy weight of the package with PCS and accessories. Therefore, special care must be taken in handling. Make sure to have at least two persons deliver and remove the package.
- Do not use the damaged, cracked or frayed electrical cables and connectors. Protect the electrical cables from physical or mechanical abuse, 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 part by a qualified personnel.'
- Ensure that you connect the earth ground wire to prevent possible electric shock. Do not try to ground the product by connecting it to telephone wires, lightning rods or gas pipes.
- The product should not be exposed to water (dripping or splashing) and no objects filled with liquids, such as vases, should be placed on the product.
- To prevent fire or electric shock hazard, do not expose this production to rain or moisture.
- Do not block any ventilation openings. Ensure reliable operation of the product and protect it from over heating. The openings shall never be blocked by placing any object on this product.
- The temperature of metal enclosure may be high during operation.
- In order to avoid radio-interference, all accessories (like a energy meter) intended for connection to the product shall be 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 only be performed by LGE service person or trained installer, qualified to install PCS.
- If the AC circuit breaker is turned off and the PCS is not 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 DC terminal block. Refer to the installation wiring diagram for details.
- Do not step on the product or the product package. The product may be damaged.
- Do not dispose of batteries in a fire. The batteries may explode.
- Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

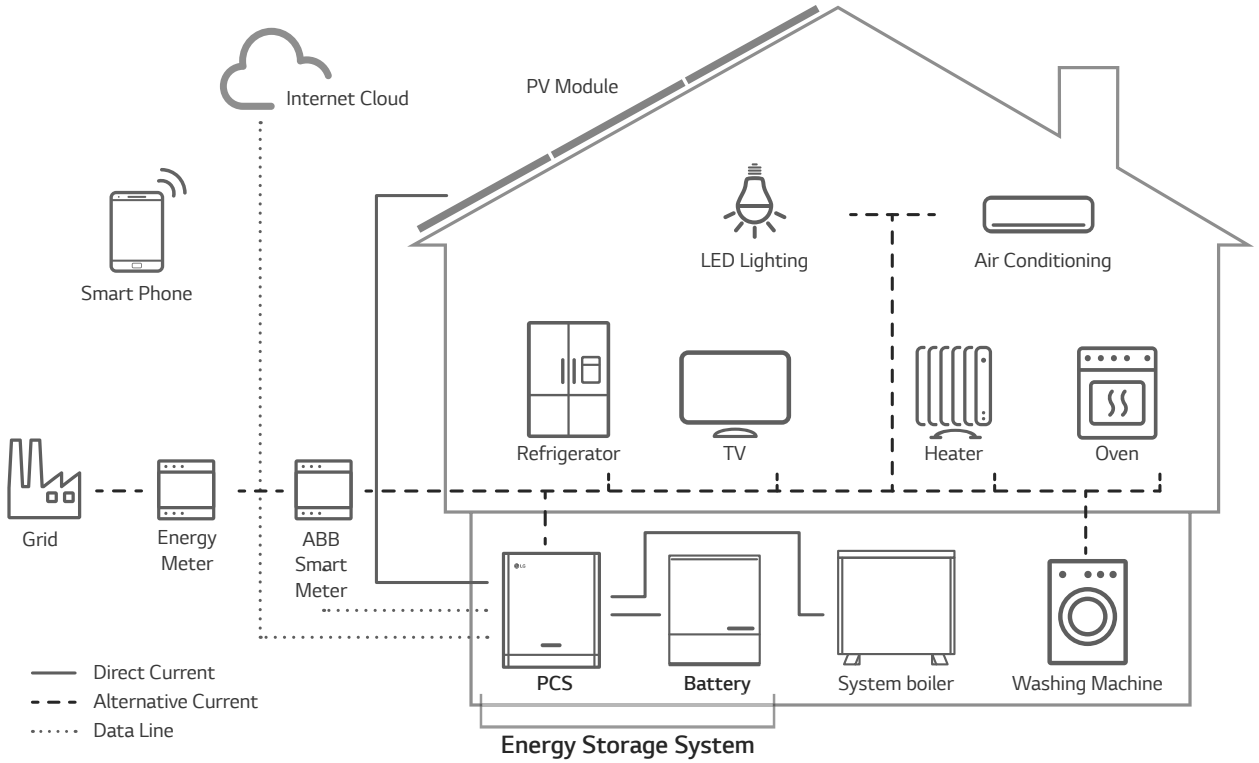
- A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries.
  a) Remove watches, ring, or other metal objects.
  b) Use tools with insulated handles.
  c) Wear rubber gloves, boots and glasses
  d) Do not lay tools or metal parts on top of battery.
- Do not leave the ESS in the Fault standby state for a long time because of the battery discharge may occur during the long standby state.
- If the battery fault occurs immediately after starting PCS it means Battery failure. Check the battery SOC also 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.

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

- Before making connections, please make sure the PV array open circuit voltage is within 1000 V. Otherwise the product could be damaged.
- Never use any solvents, abrasives or corrosive materials to clean this product.
- Do not store on or place against any objects to the product. It may cause serious defects or malfunction.
- 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 your equipment.
- Serving of batteries should be performed or supervised by LG service person or trained installer.
- The battery does not discharged when the load is under the certain level.
- 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 A (or type B) is allowed on the supply side of this product.
- This product is designed to be installed indoor use only. Do not install this product outdoor.
- This document is for your reference only. Read the installation manual on the website below.
  https://www.lg.com/global/business/ess/residential/dc-8-10
- Please check the following website for warranty policy.
  https://www.lg.com/global/business/ess/residential/dc-8-10

Product Features

This product is intended to store direct current (DC) electricity generated from photovoltaic (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 power grid.
And, the battery supplies power to the household load in an emergency.



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

- **DC-Coupled ESS**
  LG ESS can achieve higher system efficiency due to simpler power conversion process.
- **Three-Phase Connection**
  3-phase connection secures phase balancing.
- **Smart Management**
  With built-in Smart PMS, it analyses PV generation and load consumption and implements to charge and discharge immediately. Also it monitors main system & battery conditions to maintain its stable condition always.
- **Web-monitoring Service**
  Customers and installers can monitor their ESS with various devices such as PC, tablet or smart phones.
- **Backup Mode**
  In an emergency, the battery supplies power to the household load.

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Symbol used on the Label

Label	Symbol	Description
	DC INPUT (OVC II)	Direct current input
	AC OUTPUT (3/N/PE~) 3N (OVC III)	Three phase four wire alternating current conductor
	IP21	This product is protected against insertion of fingers and will not damaged during a specified test in which it is exposed to vertically dripping water.
		This product should not be disposed of with other household waste. Disposal regulations should be observed in this country.
		Caution, risk of danger
		Refer to the installation manual or operating manual.
		Caution, hot surface
	10min	Caution, risk of electric shock, energy storage timed discharge
		The relevant equipment complies with the requirements in the EC guidelines.

Abbreviations on this Manual

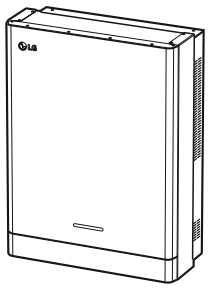
Abbreviation	Designation	Explanation
ESS	Energy Storage System	Inverter system that stores energy into a battery and uses it.
PCS	Power Conditioning System	A device intended to convert DC electricity generated from PV system to AC electricity and feed it to household appliances.
PV	Photovoltaic	Solar 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.
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.
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

Glossary

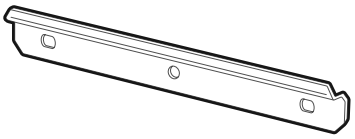
Terms	Explanation
Azimuth	In the Northern hemisphere, the azimuth angle indicates by how much degrees the module surface deviates from a full south aspect. In the southern hemisphere, it indicates the deviation from a full north aspect. The azimuth angle is counted with positive values within the range from south (0°) to west (90°) and it counted with negative values within the range from south (0°) to east (-90°).
Tilt angle	The tilt angle indicates by how much degrees the tilt of the module surface deviates from the horizontal.
PV module	The PV module refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity.
PV array	Technical device for the conversion of solar energy into electrical energy. All serial and parallel installed and connected to PV modules of a PV system are referred to as a PV array.

Unpacking

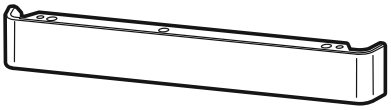
Contents of this Product



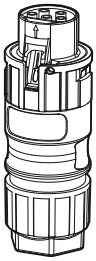
Power conditioning system (1EA)



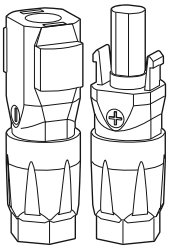
Wall bracket (1EA)



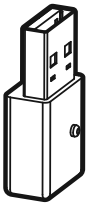
Lower cover



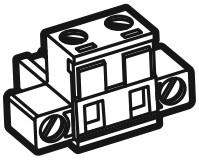
Grid cable plug



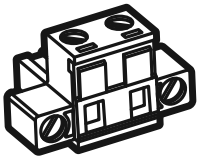
Battery cable plugs (2 EA each)



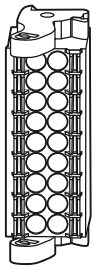
WLAN dongle (Inserted)



Energy meter plug



Heat Pump Plug (option)



Communication connector

Lower cover screws (2EA)

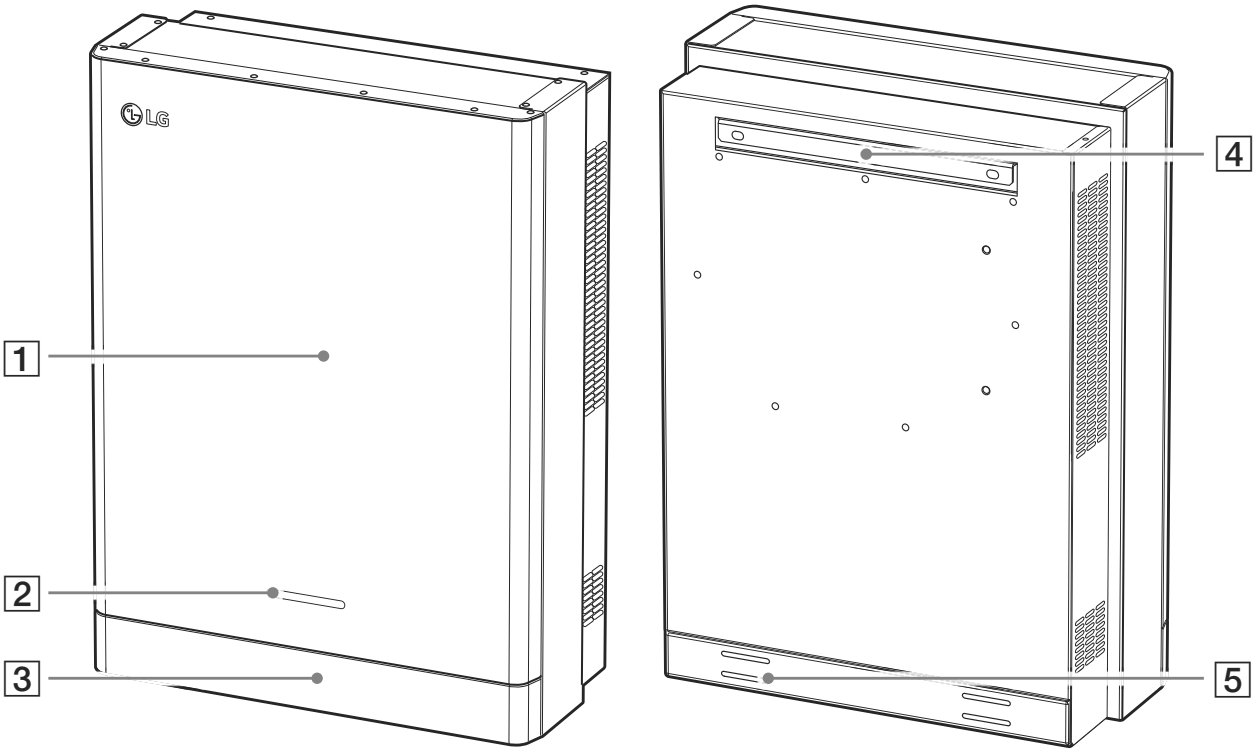
Quick Installation Manual & User Manual (1EA each)

Additional Components for Installation

Applied to	Additional Components
Wall mounting	• Stainless steel screws with diameter 6 mm - 8mm • Anchors
PV connections	• MC4 connectors • 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)
Energy meter and internet connections	• LAN cable • RJ-45 plug • Energy meter cable
Grounding	• LAN cable • RJ-45 plug • Energy meter cable
ATS	• ATS Connectors • ATS Connector cables

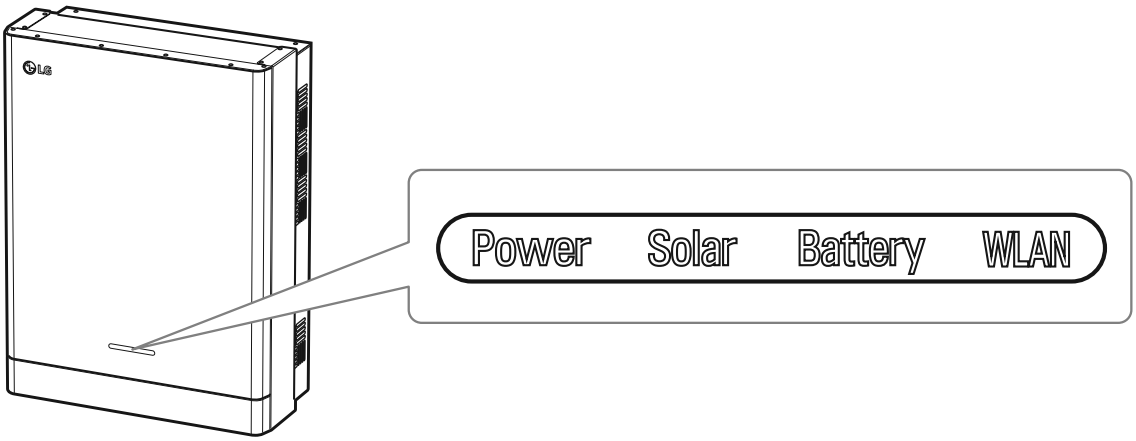
Name of Each Part

Front and Rear



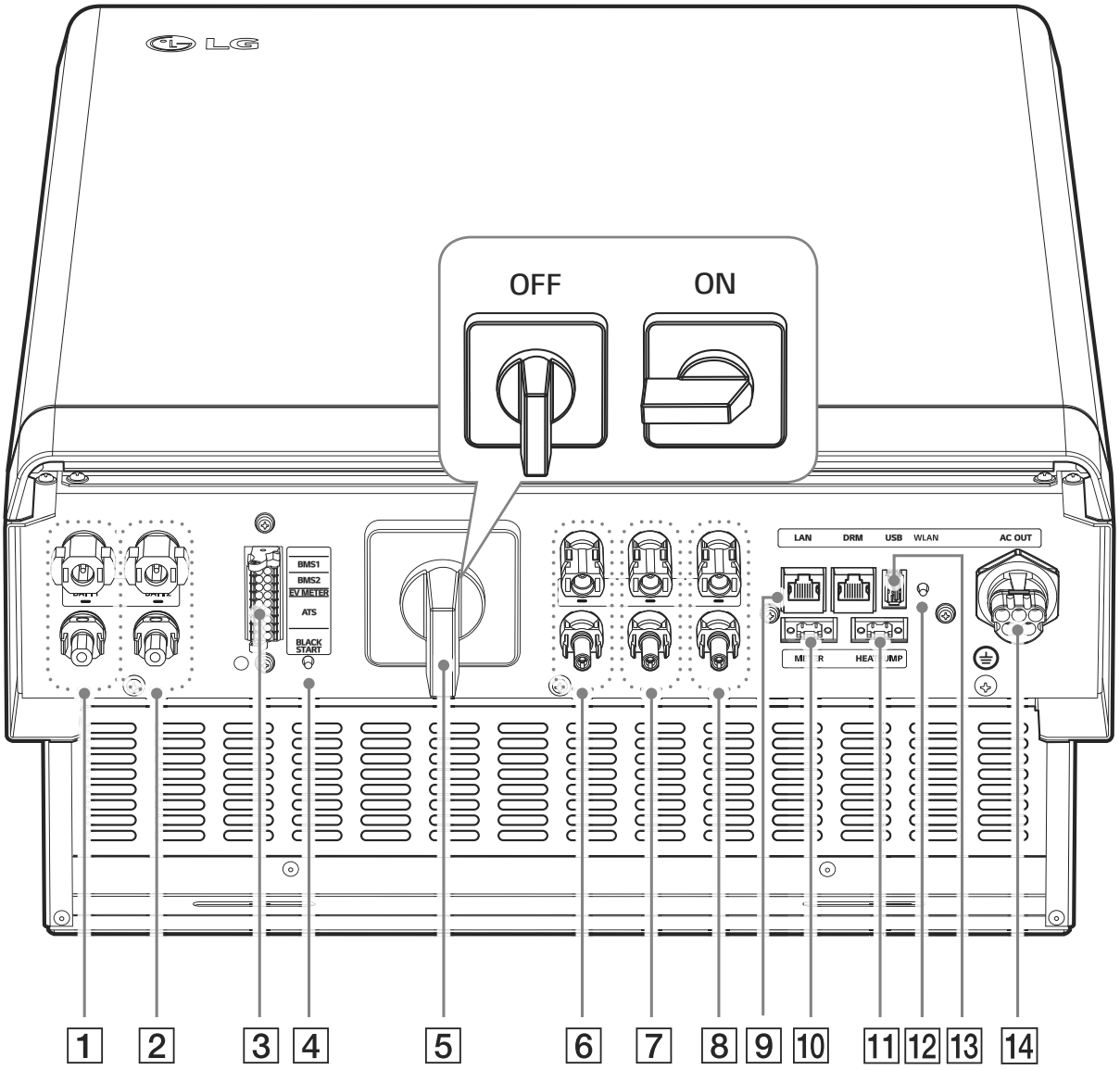
1 PCS body
2 LED Indications
3 Lower Cover
4 Bracket connected part
5 Screw holes for wall mounting

LED Indications



LED	Color	Description
Power	Off	Grid is not connected.
	White	Grid is connected.
	White (Blink)	PCS Fault
Solar	Off	Energy is not being generated.
	Green	Energy is being generated.
	White (Blink)	PCS Fault
Battery	Off	Stand by
	Green	Battery is in charging
	Blue	Battery is in discharging
	Red (Blink)	Battery error
	White (Blink)	PCS Fault
WLAN	Off	Unplugged WLAN dongle
	Green	Network connected
	Blue	WLAN network connected
	Red (Blink)	Network disconnected

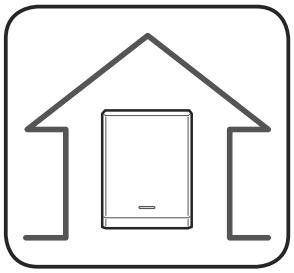
Bottom

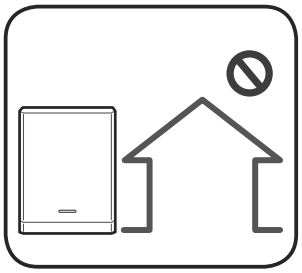


1. Battery DC cable connectors 1
2. Battery DC cable connectors 2
3. ATS, BMS, EV METER Communication terminals
4. Black start button
5. PV switch (DC Disconnect)
6. PV1(+ and -) connectors
7. PV2 (+ and -) connectors
8. PV3 (+ and -) connectors
9. Ethernet port
10. Meter connector
11. Heat pump connector (Not supported)
12. Wireless connection button
13. WLAN dongle port (USB type)
14. AC grid cable connector

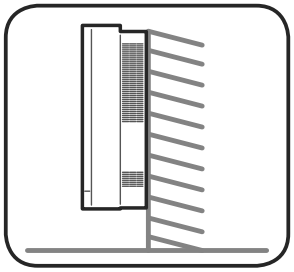
Choice of location

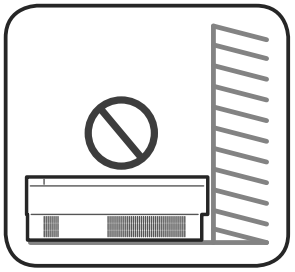
Mounting Location



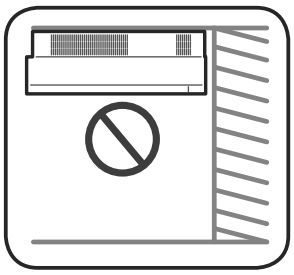


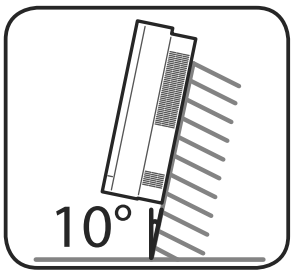
- This product is designed to be installed indoor use only. Do not install this product outdoor.
- Install this product on the place where PV cables, energy meter cables, grid cables and battery cables are easily accessible.



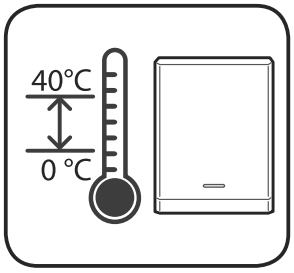


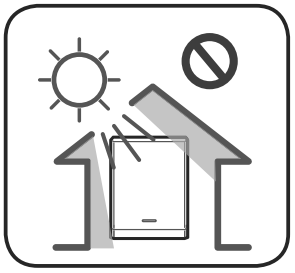
- This product is designed to be installed on the wall only. Do not install this product on the ground.
- The mounting surface must be able to support the weight of this product (34 kg).



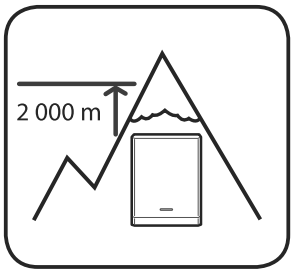


- Do not install the product on the ceiling.
- Do not install the product widthwise or install on a wall with lean more than 10 degrees.
- Do not install the product tilting forward.
- Install the product the connection side down.



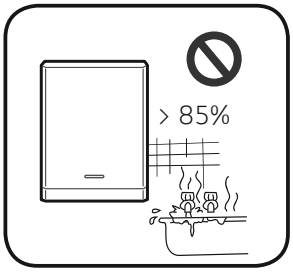


- Appropriate operating temperature is from 0° C to 40° C.
- Do not install this product in the place exposed to the direct sunlight.
- Install the product in a clean, cool room.

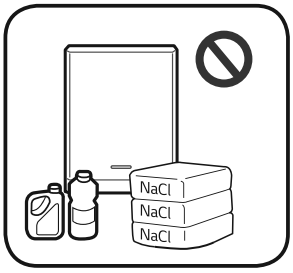


This product must not be installed or used at altitudes above 2 000 m.

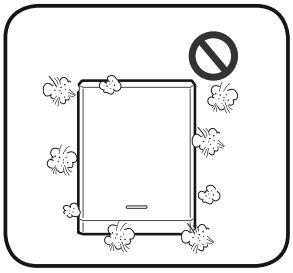
Do not install this product in places where flooding frequently occurs.



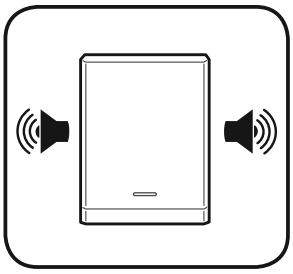
- Do not install this product to highly humid area such as bathroom.
- This product generates low levels of noise at certain times, it should not be installed close to living areas.
- Noise level may differ depending on the installed location.
- Do not install the product where there is vibration.



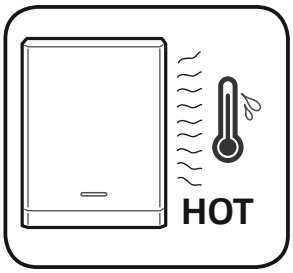
- Do not install this product in a place with ammonia, corrosive vapours, acids or salts.
- Install this product out of reach from children and pet.



- 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.

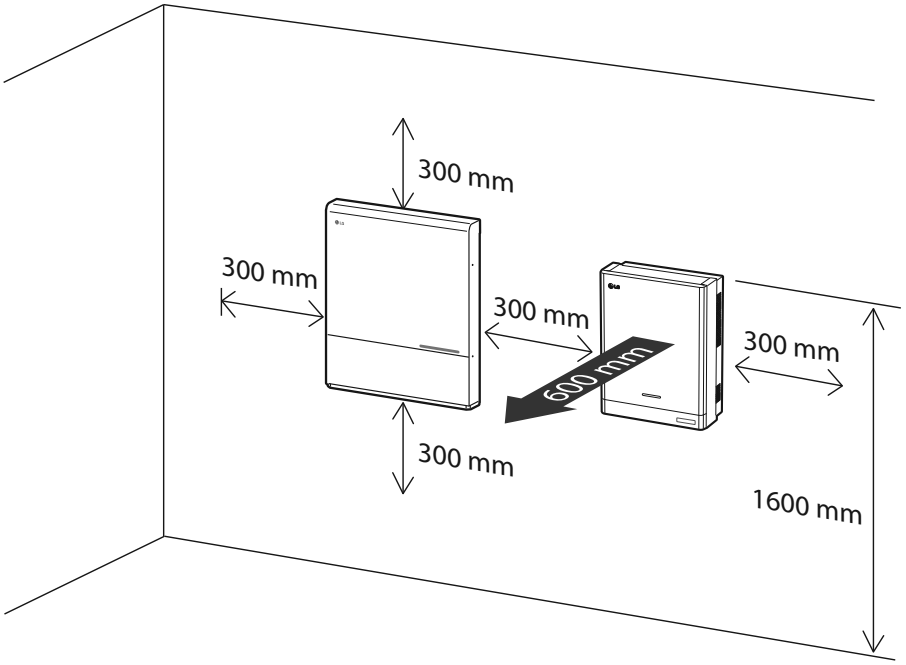


Please consult the location to your installer when installing in places subject to noise.



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

Minimum Clearance

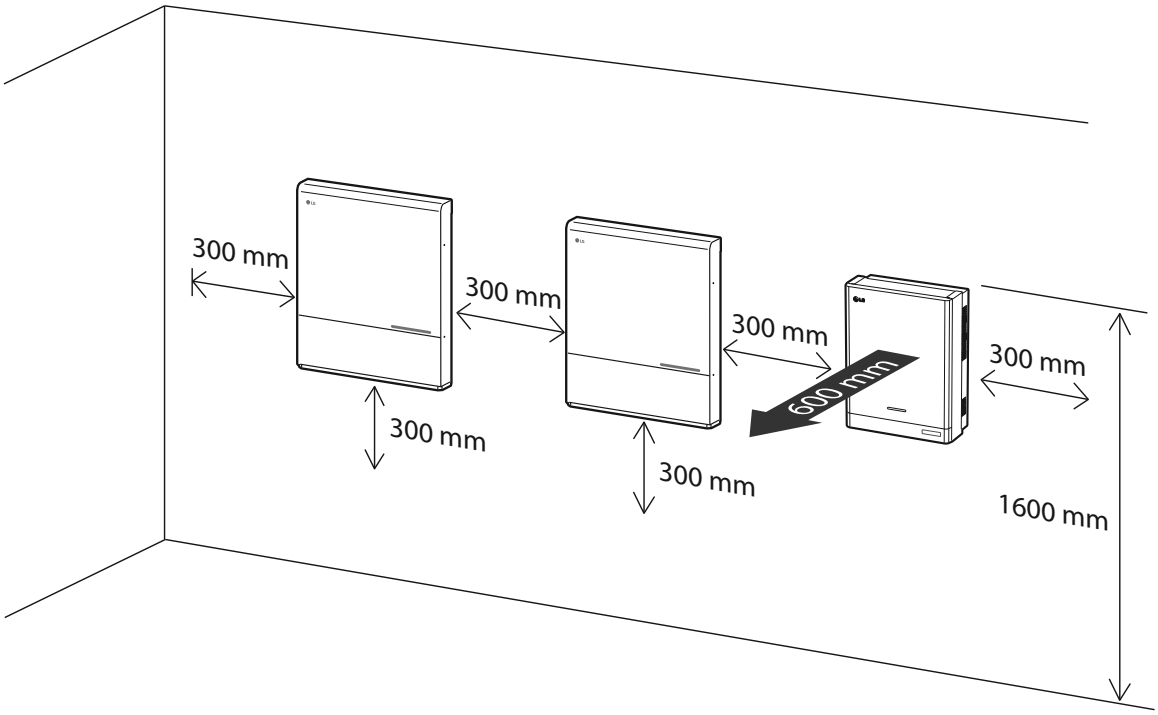


This product must be installed with clearance at the left, right, top, bottom and front of the product as shown in the figure.

Only the battery can be installed at the bottom clearance space of the product. If you install the battery unit at the bottom clearance space, leave the clearance space between the battery and the product more than 300 mm.

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

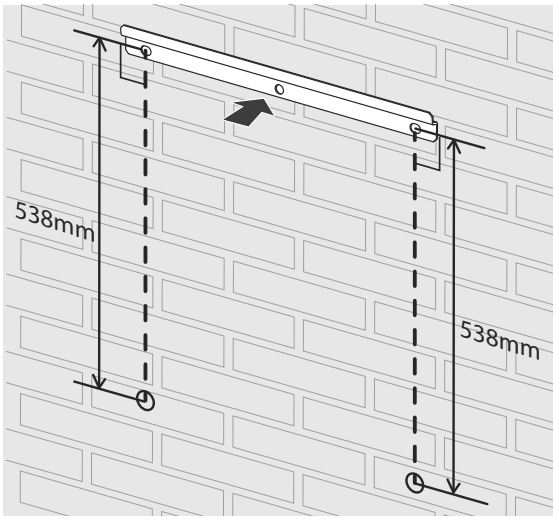
Minimum clearance (dual batteries)



Wall Mounting

This product must be installed on the wall considering appropriate environments described in 'Choice of location' on page 16. Follow the mounting instruction described below exactly and securely.

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.

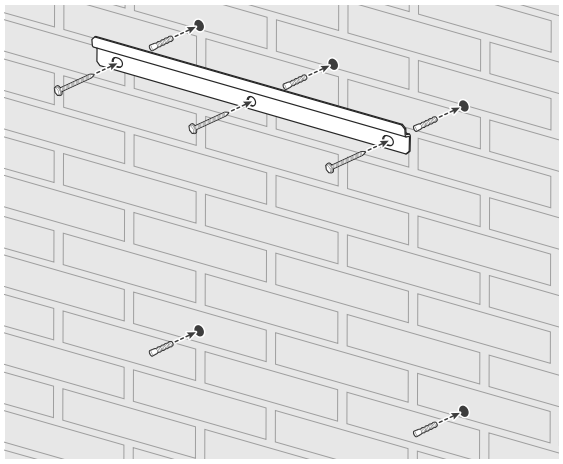
WARNING

It is important to ensure the drilling locations are not located on any electrical wiring within the wall.

NOTE

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

2



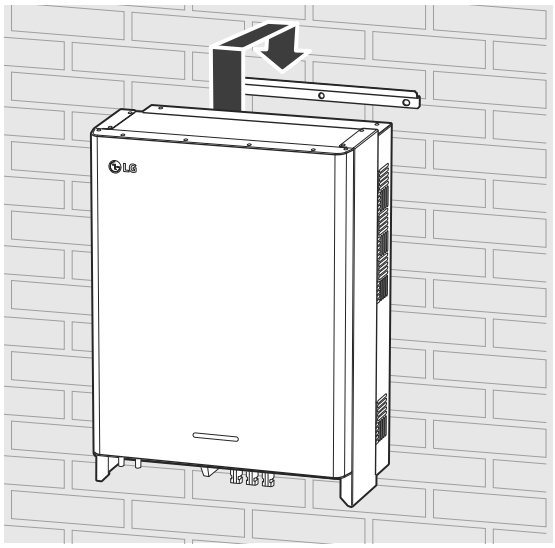
Fix the wall bracket with screws and anchors.

And insert anchors into the holes at the lower part.

NOTE

- Before fixing the bracket screws, check the horizontal level once again using inclinometer.
- 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.

3

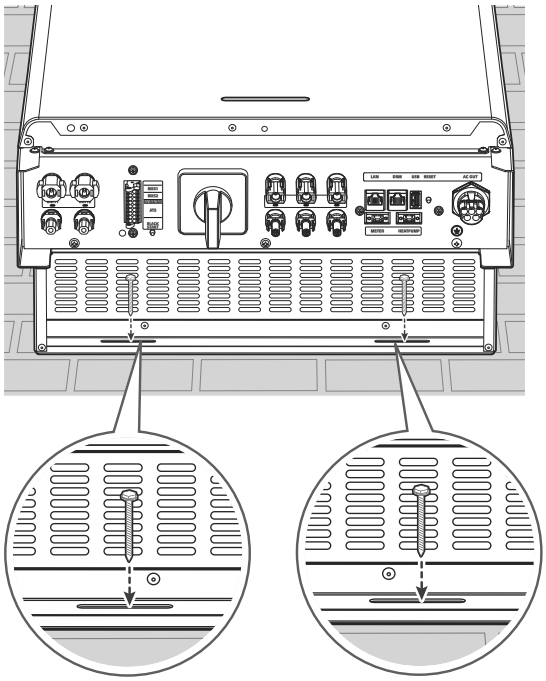


Hang this product to the wall bracket.
Make sure that at least two persons work together to move the product.

CAUTION

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

4



Drill holes on the screw hole positions and fix the product to the wall with screws and anchors.

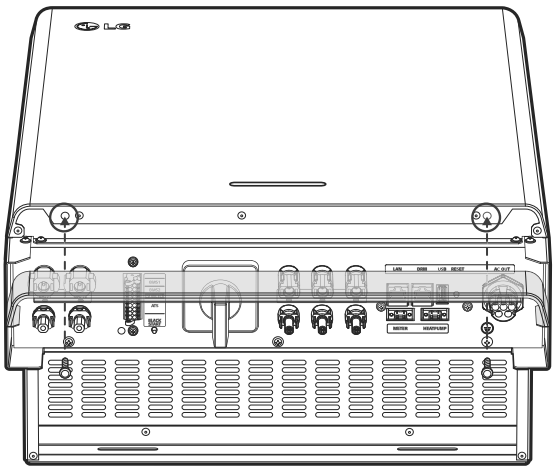
WARNING

It is important to ensure the drilling locations are not located on any electrical wiring within the wall.

NOTE

- 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



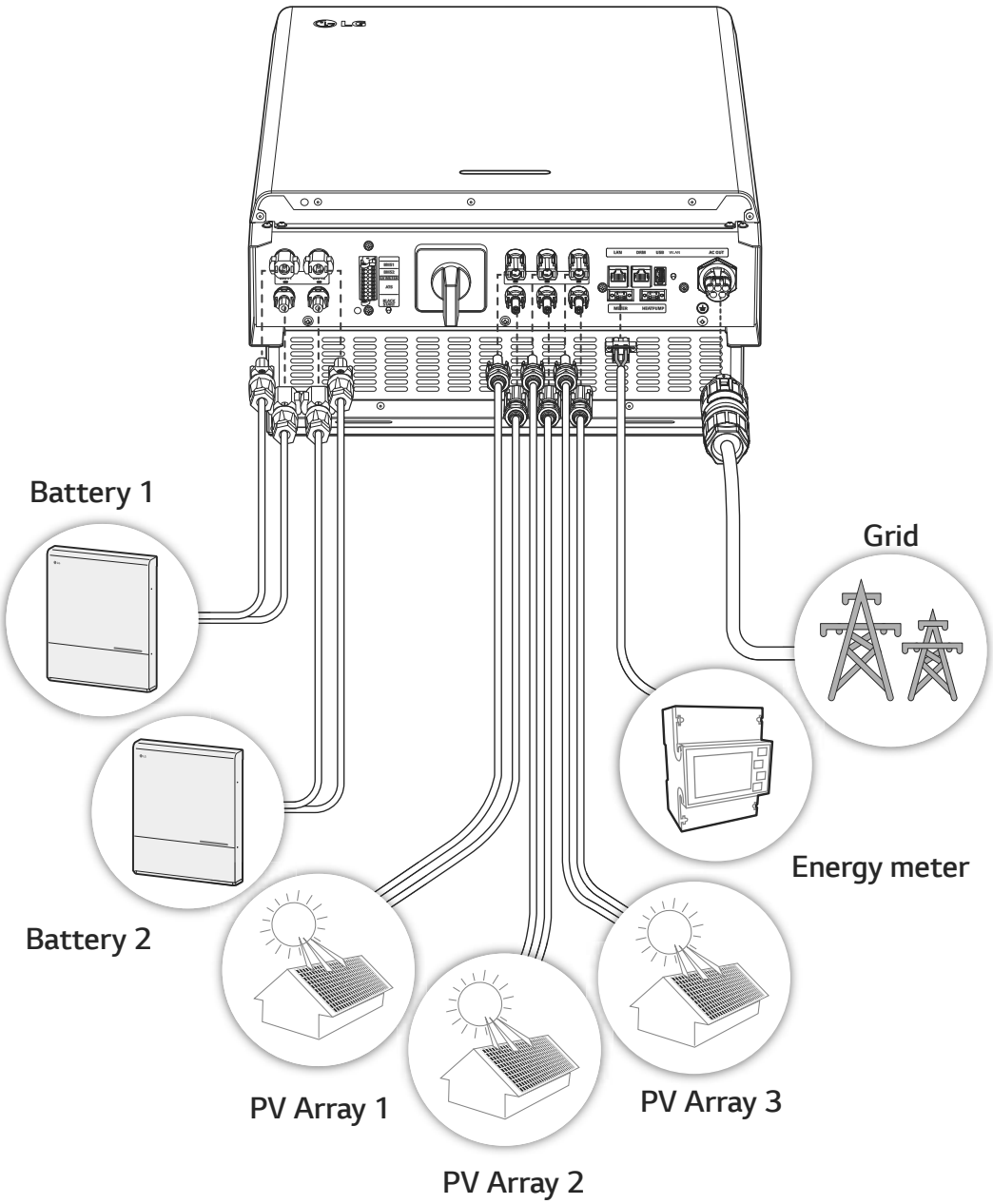
After finishing every electrical connections, assemble the supplied lower cover and fix the screws as shown in the figure.

NOTE

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

Connections

Connection Overview



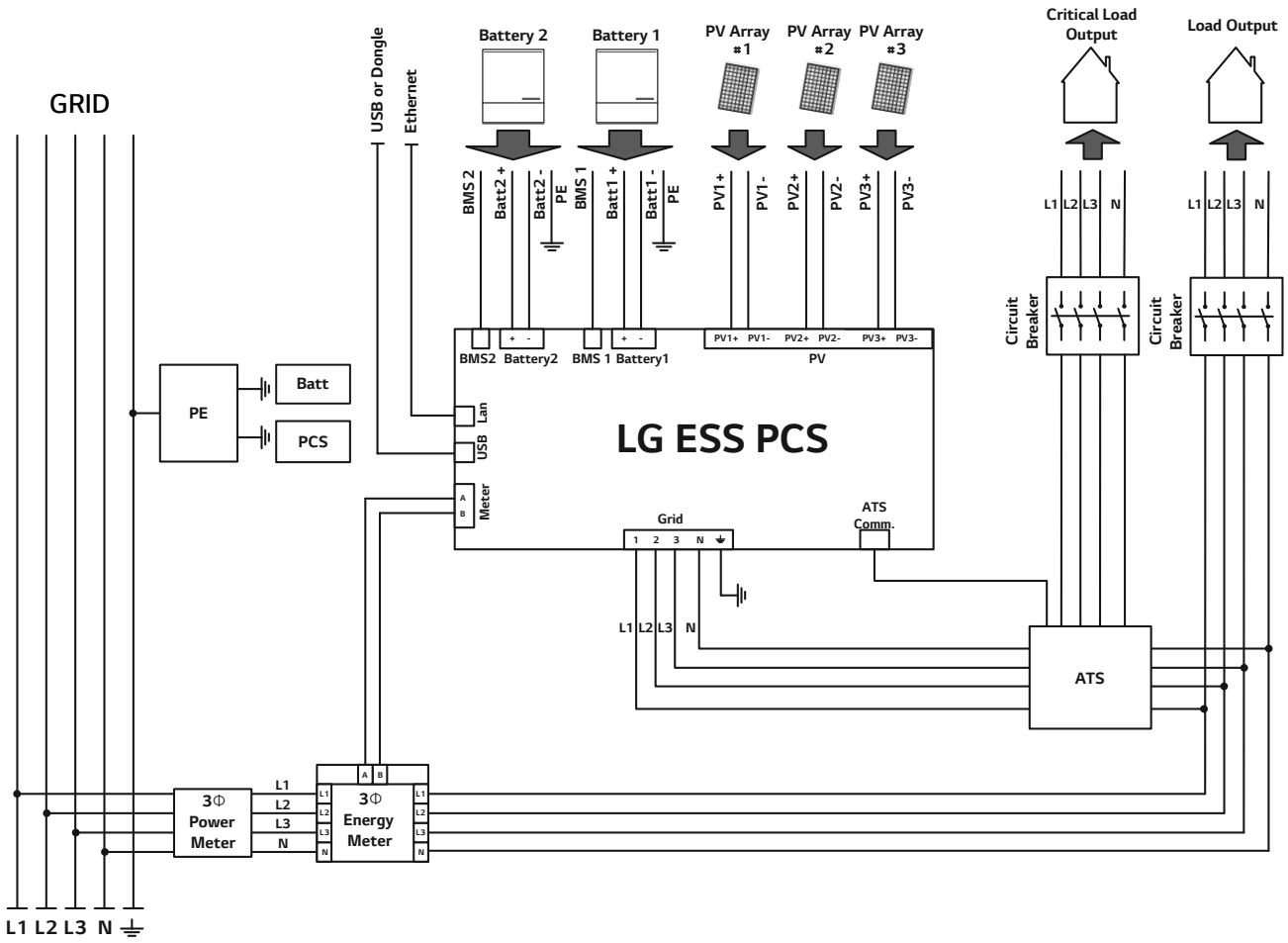
⚠ WARNING

- 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 these PCS and battery must only be performed by electricians or technicians, qualified to install PCS and battery.
- When removing the cover, make sure not to damage connection components.
- Refer to the ATS BOX manual at the following site for detailed information on installing ATS BOX.
  https://www.lg.com/global/business/ess/residential/dc-8-10

Connection Diagram



PV Array Connections

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

WARNING

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

CAUTION

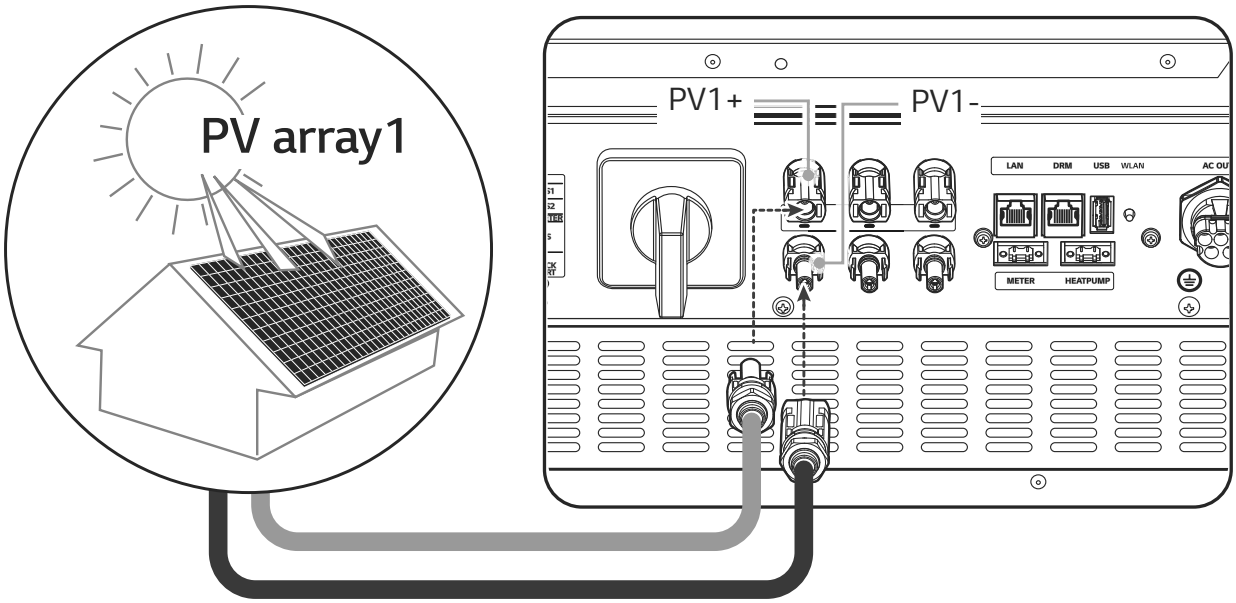
- Before connecting PV array, make sure that the open circuit voltage of PV array is less than 1000 V. Otherwise this product could be damaged.
- Do not connect a ground to a PV+ or PV- connector. It may cause electric shock or the product may permanently be damaged.

NOTE

- 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.

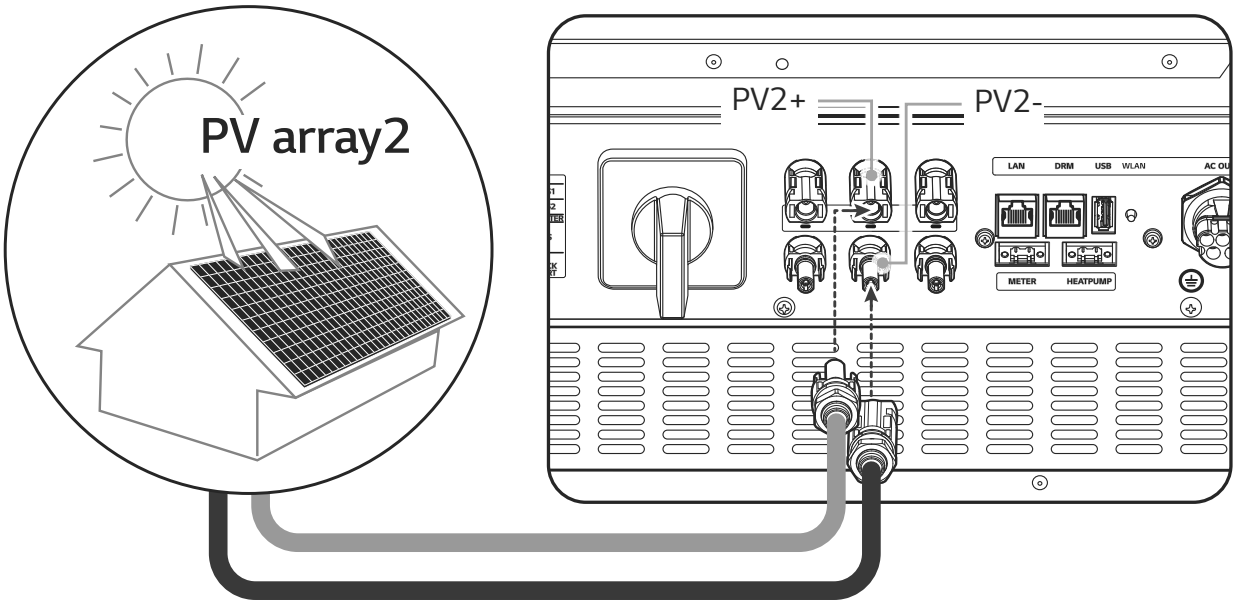
PV1 Connection

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



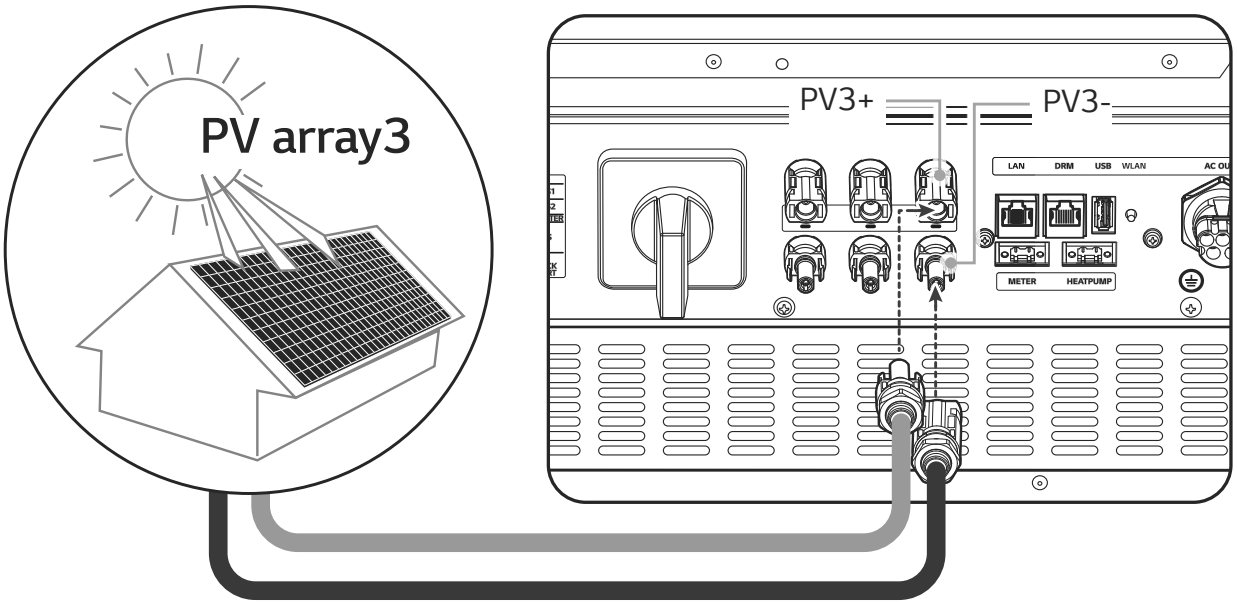
PV2 Connection

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



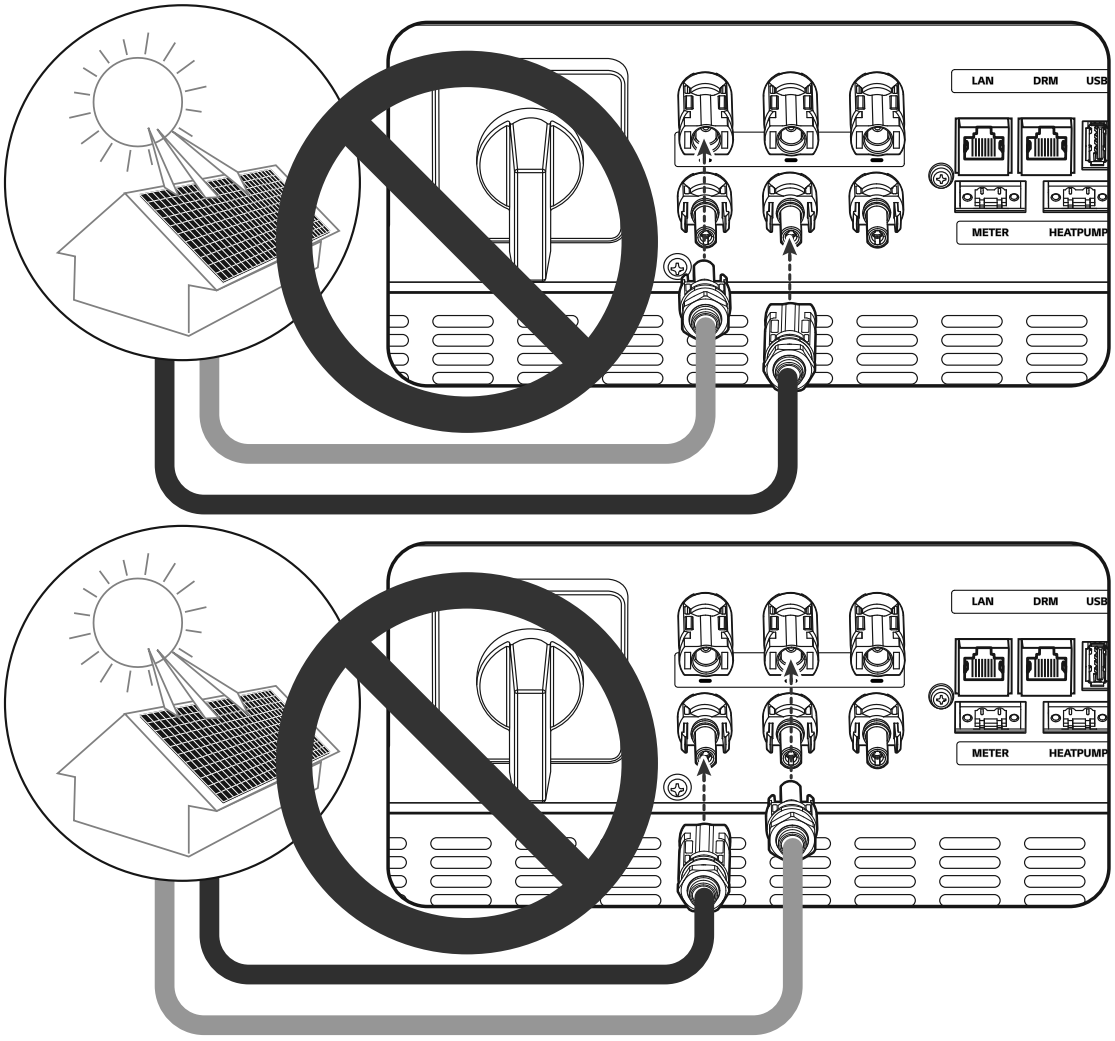
PV3 Connection

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

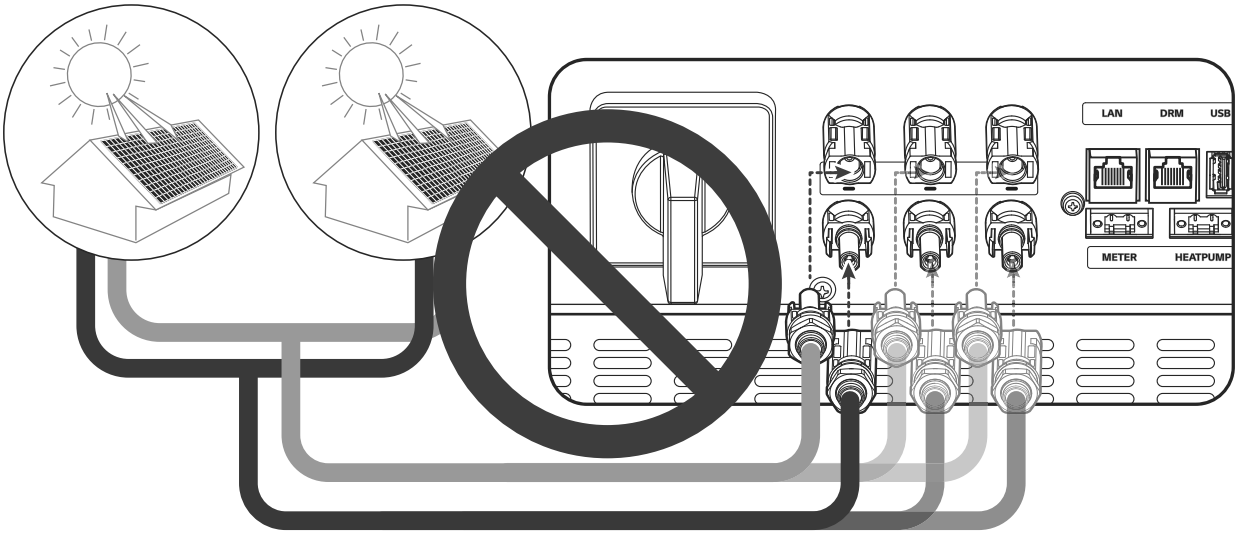


WARNING

- Do not mismatch the connection of the electric poles + to - and - to + when installing. It may cause electric shock or the product may permanently be damaged.
- PV+ and PV- cables from one PV array must be connected to the same PV connector number. (PV1+ and PV1-, PV2+ and PV2-, PV3+ and PV3-) Mismatched connection may cause electric shock or the product may permanently be damaged.



- 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.



NOTE

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.

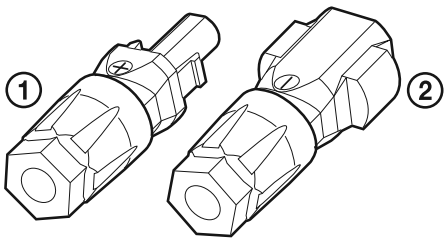
NOTE

- 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.

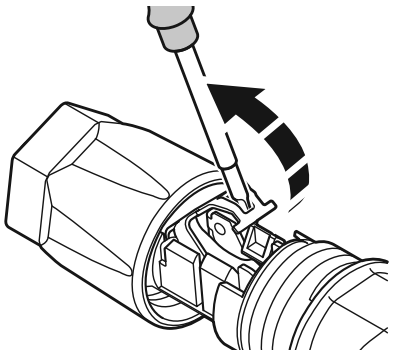
1



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

1. + cable connector
2. – cable connector

2

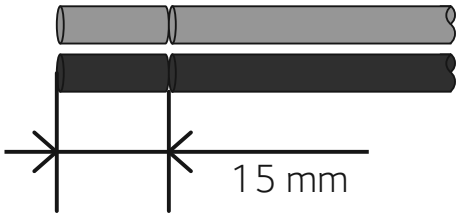


Open the spring using a screwdriver

NOTE

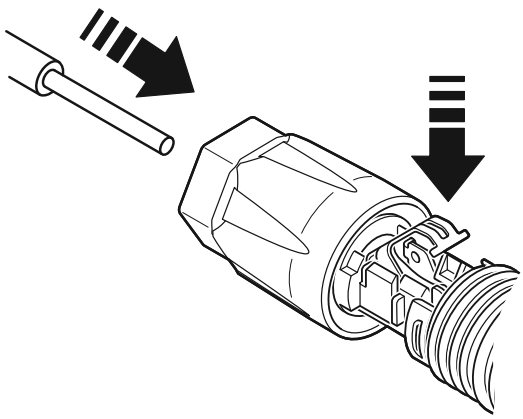
- For battery cable connections, lead wire with cross-sectional area 4 mm^2 – 6 mm^2 is recommended.
- Battery cable is not supplied on this product package. The system installer is responsible for selecting proper components for the installation.

3



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

4



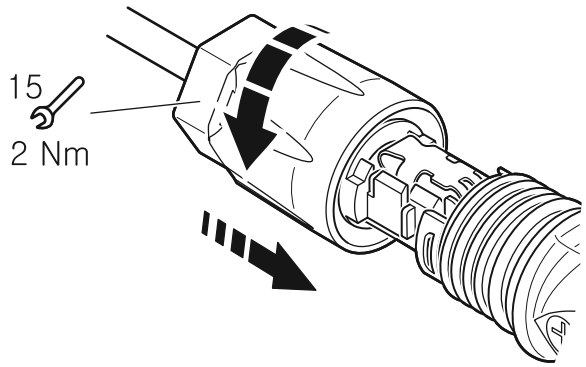
Carefully insert the stripped wires to the corresponding cable connector. The wire ends have to be visible in the spring.

+ cable connector ↔ Battery wire **+**

– cable connector ↔ Battery wire **-**

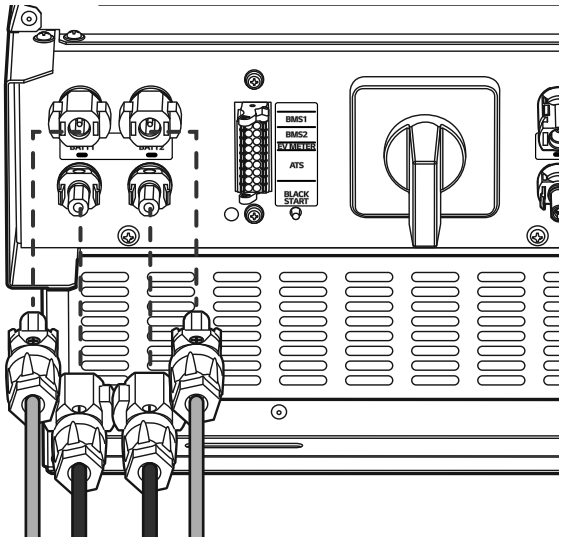
And close the spring. Make sure that the spring is snapped in.

5



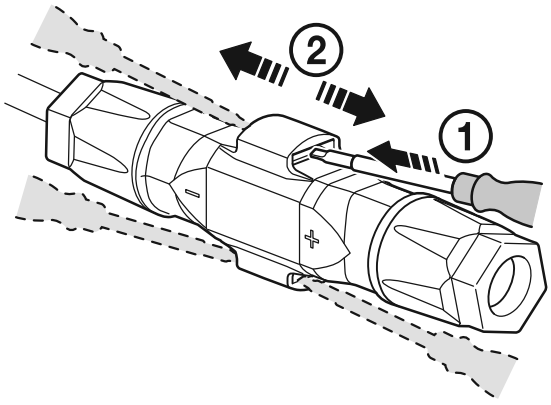
Push the insert into the sleeve and fasten the cable gland to the housing using 15 mm wrench. (2 N.m)

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.

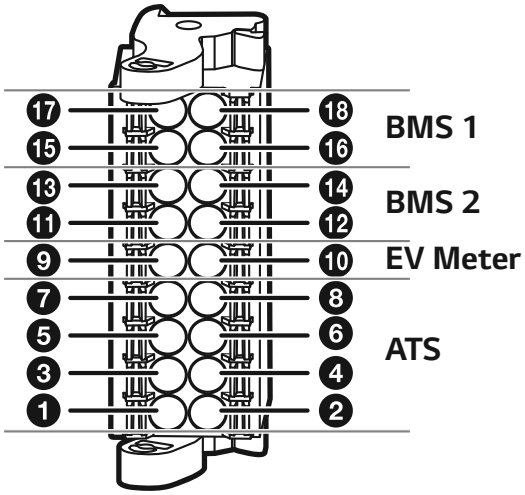
2 Leave the screwdriver in the opening. Pull the two connectors apart.

⚠ WARNING

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

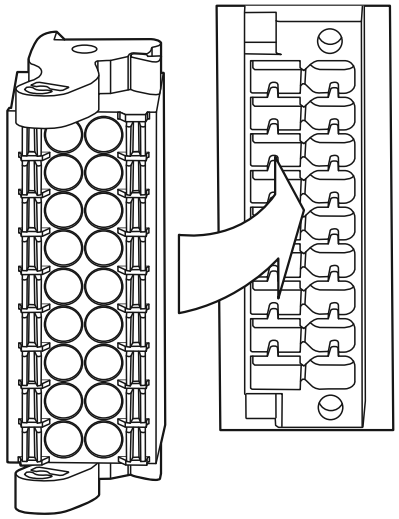
ATS, BMS, EV METER Communication Connections

Connect the supplied communication connector to the battery, ATS and EV communication. After making a connection, connect the commnication connector to the PCS.

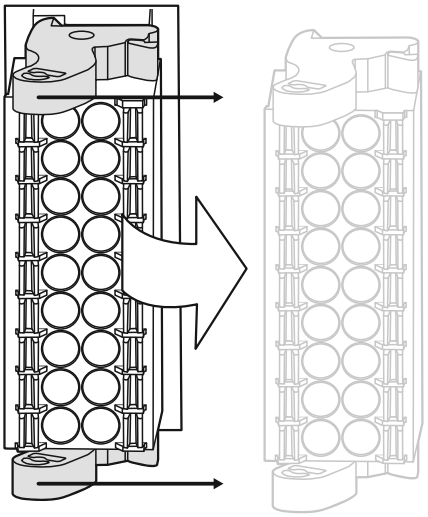


BMS1	17 RS485_A	18 RS485_B
	15 Enable	16 GND
BMS2	13 RS485_A	14 RS485_B
	11 Enable	12 GND
EV Meter	9 RS485_A	10 RS485_B
ATS	7 +12V_ATS	8 BLACK_ATS
	5 GND_ATS	6 SW_ATS BOX
	3 EN_ATS	4 K3_ATS
	1 K14_ATS	2 GND_ATS

Connect / Disconnect the connector

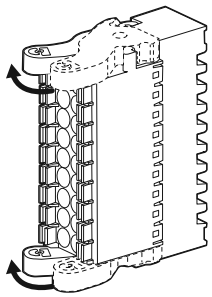


‹ connection ›



‹ disconnection ›

CAUTION



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

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

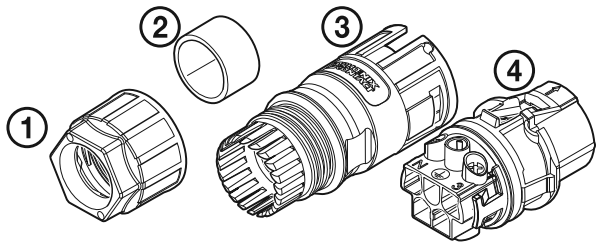
Make sure the AC circuit breaker, PV switch and DC circuit breaker of the battery are disconnected before starting electrical cable connections. .

NOTE

- 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 A (or 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.

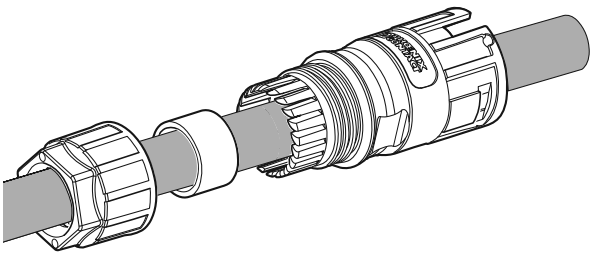
1



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

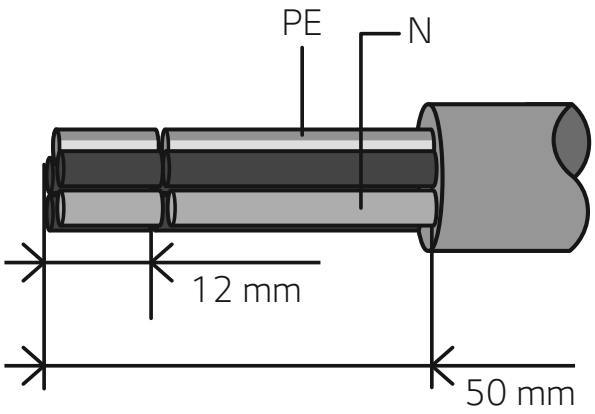


Pass the AC cable through the cable gland, rubber seal and housing as shown in the figure.

NOTE

- 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 recommecded cable diameter for the AC cable gland is 16 mm. (including sheath)

3



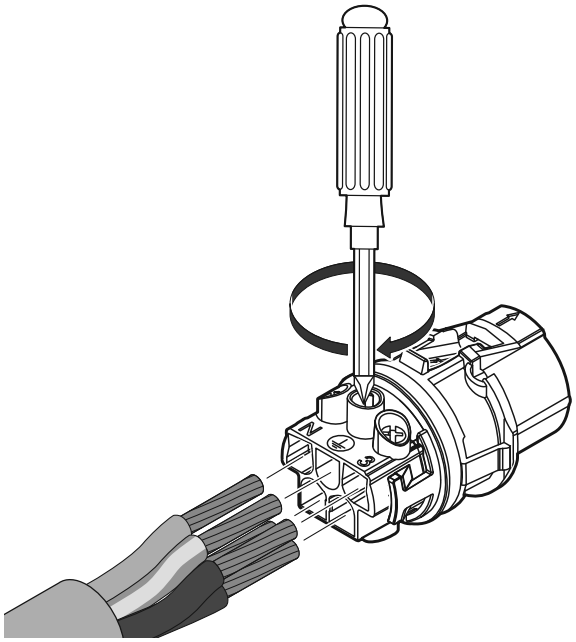
Strip the AC cable as shown in the figure.

1. Strip 50 mm off the AC cable.
2. Strip 12 mm off the every wires.

NOTE

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**

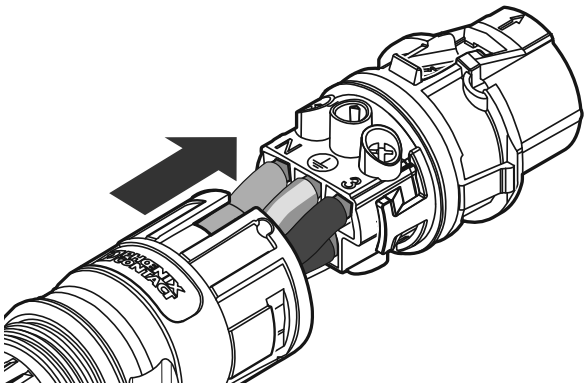
Wire hole ⏚ ↔ Grid wire **PE**

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

NOTE

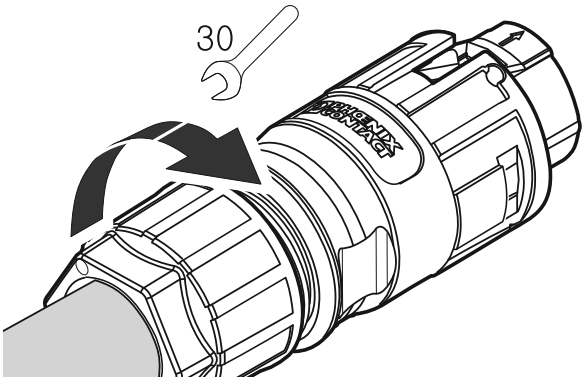
- The N (neutral) hole in the contact carrier must be connected to the N(neutral) terminal of the AC circuit breaker on the distribution box correctly. Otherwise the product could be damaged seriously.
- The PE (Protective Earth) grounding connector in the contact carrier must be connected to the ⏚(Grounding)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

5



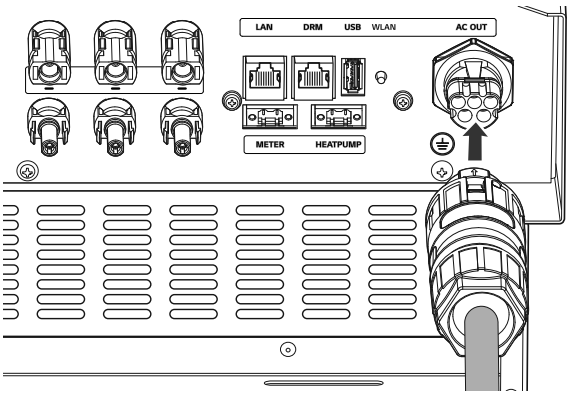
Push the contact carriers into the housing until it clicks.

6



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

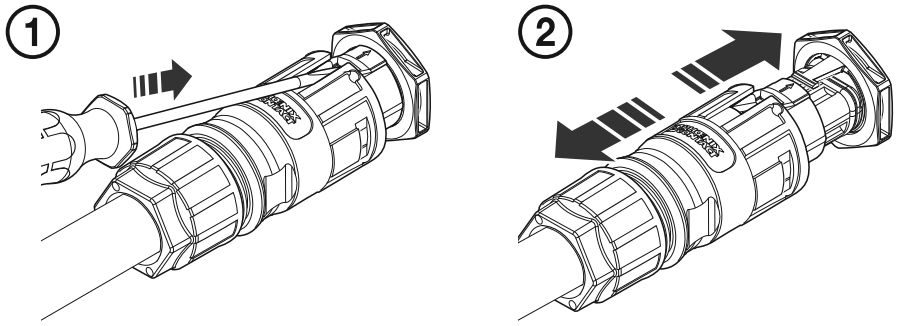
7



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.



WARNING

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

Energy Meter and Internet 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.

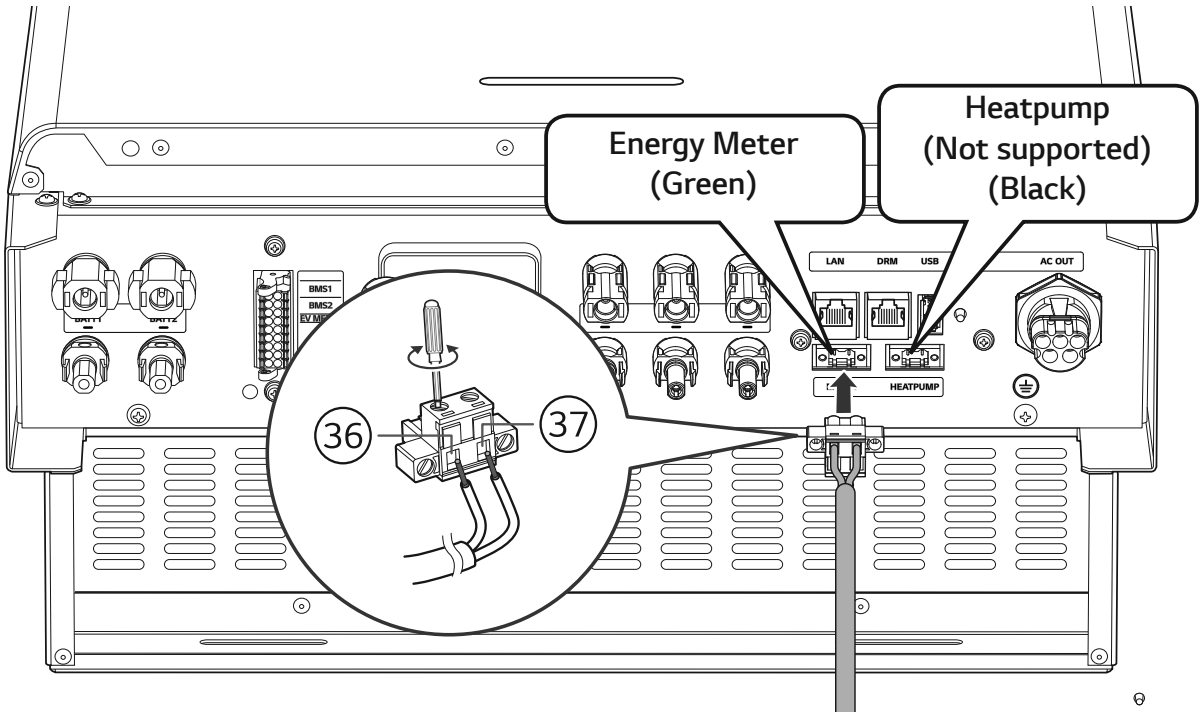
Internet connection is required to use variety of functions such as network update, EnerVu monitoring system, etc. You may need to contact your Internet service provider (ISP) to connect this product to the internet.

WARNING

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

Energy Meter Connection

1. Detach the energy meter plug from the product.
2. Strip two wires of the energy meter cable and insert stripped wire-ends to the corresponding wire hole on the plug, match the numbers in the figure with the connectors on energy meter.
3. Connect the plug to the energy meter connector at the bottom of the product.

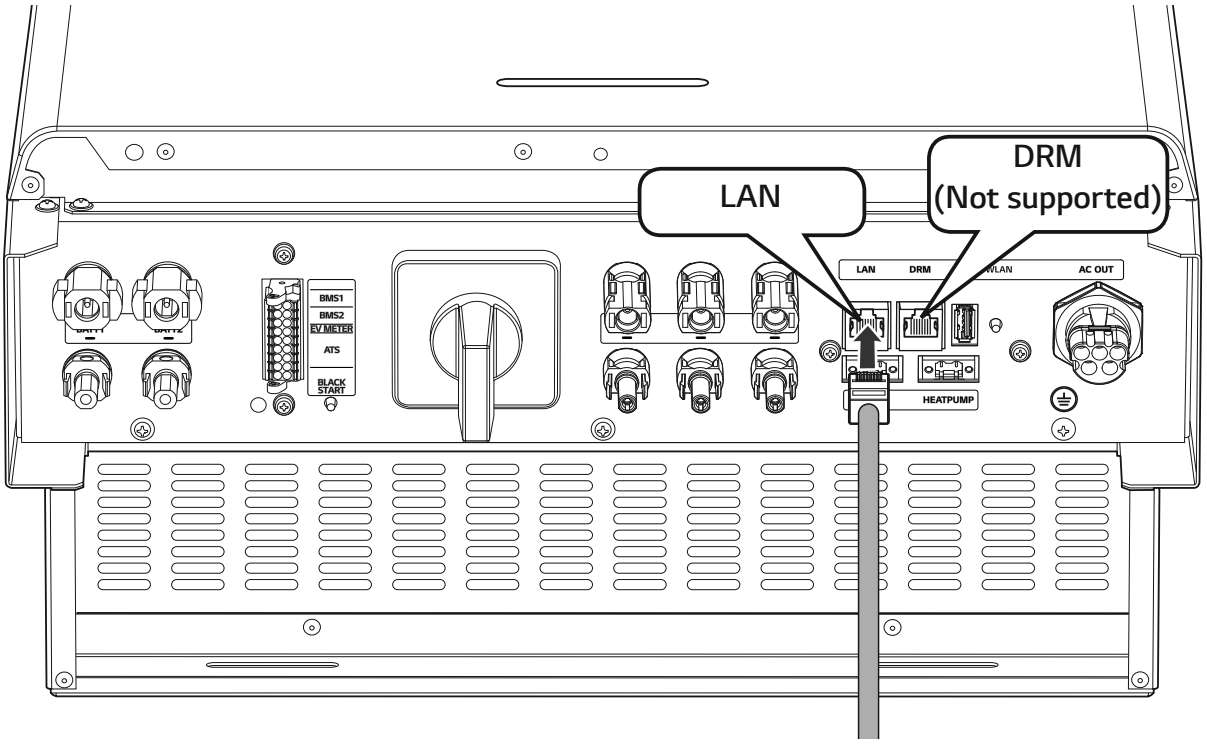


NOTE

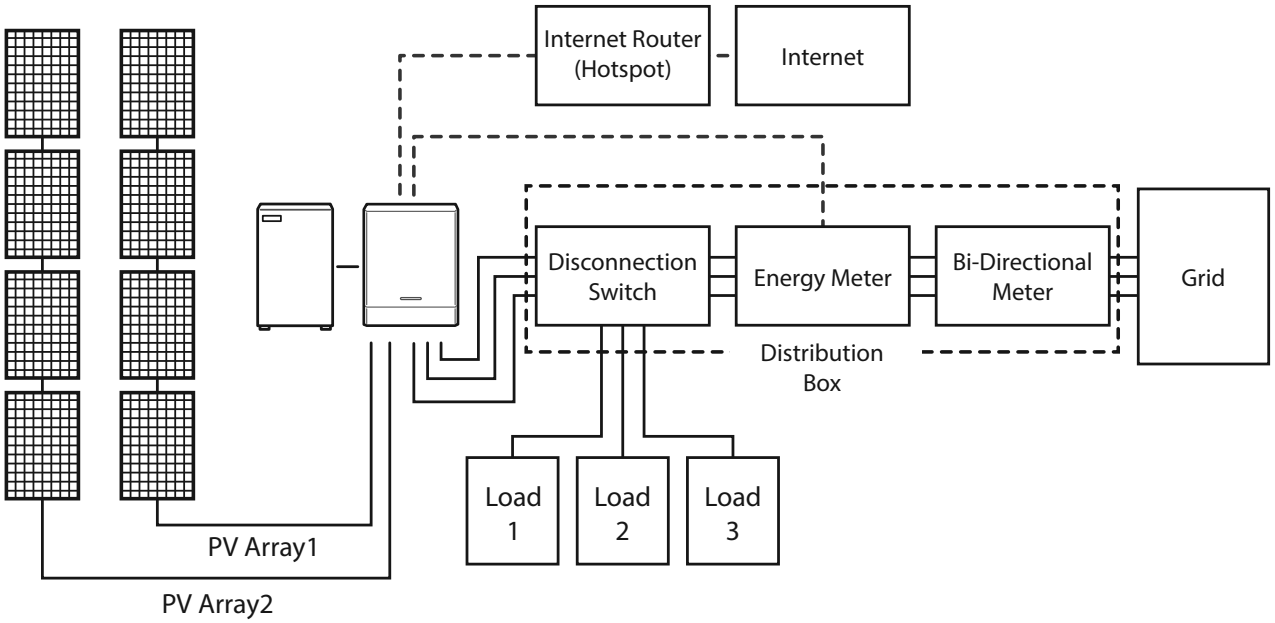
- Compatible energy meter brand and model names are stated in 'Energy Meter Compatibility' on page 76.
- The numbers described in the figure are the port number for the ABB energy meter connection.

Internet Connection

Insert the ethernet cable with RJ-45 plug to the ethernet port at the bottom of the product as shown in the figure.



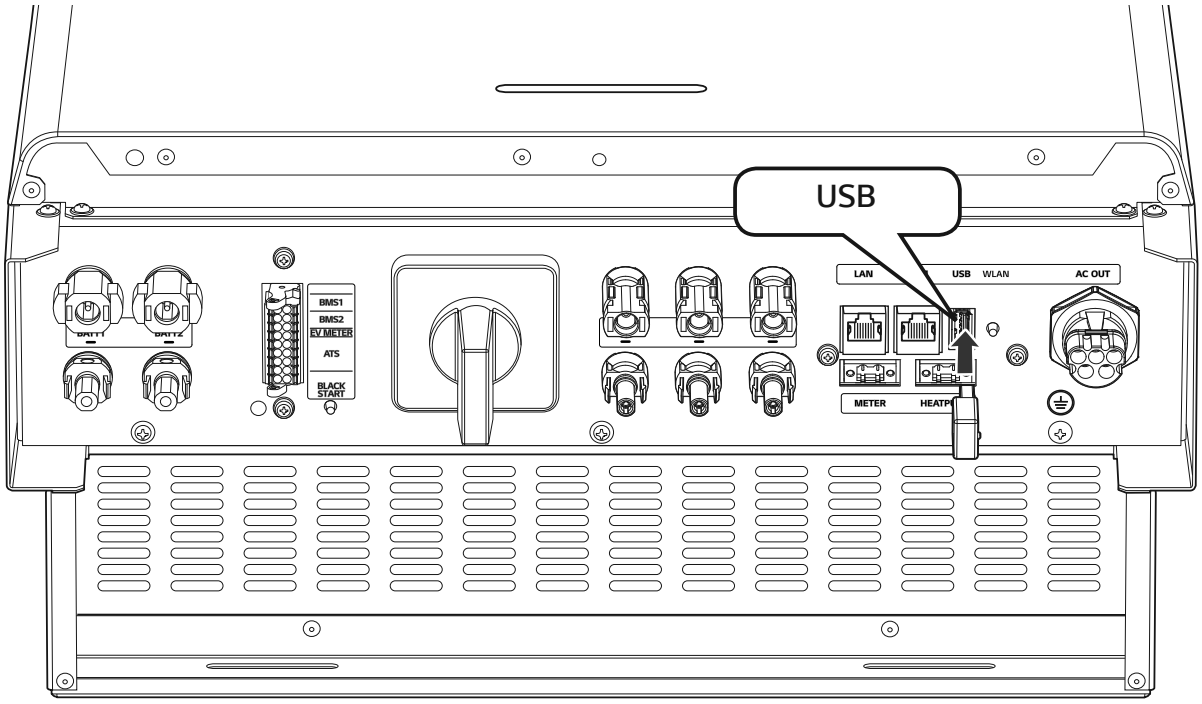
Energy Meter and LAN Connection Diagram



WLAN Dongle Connection

The installer settings and power monitoring can be viewed only in the mobile device connected wirelessly to the product. To connect the product to your mobile device, the WLAN dongle supplied with the product package must be connected to the product.

Insert the WLAN dongle to the USB connector at the bottom of the product as shown in the figure.



Turning on the Product

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

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

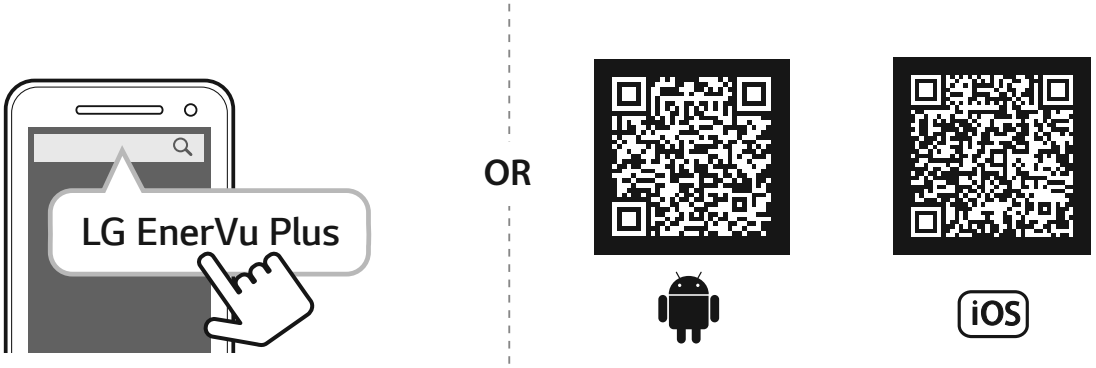
Installer Settings

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

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

Installing 'LG EnerVu Plus' App

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



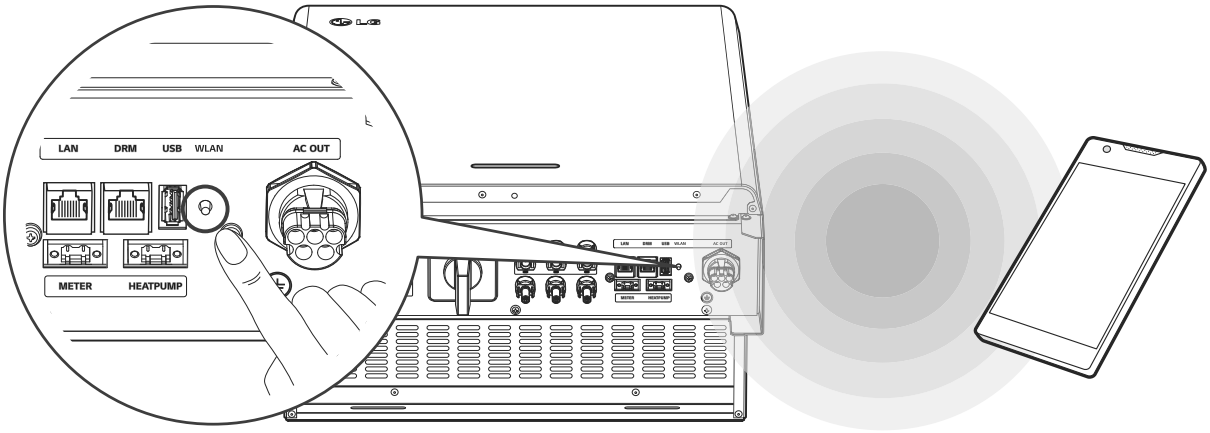
NOTE

- Depending on the device, 'LG EnerVu Plus' app may not work.
- LG EnerVu Plus app will be available in version of the software as follow;
  - Android O/S : Lollipop (5.0) or later
  - iOS O/S : iPhone 6 (9.0) or later

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 'LG EnerVu Plus' application from Apple App store or Google Play store.

To connect to the system directly, the WLAN dongle must be connected to the system. Make sure that the supplied WLAN dongle is connected to the system.

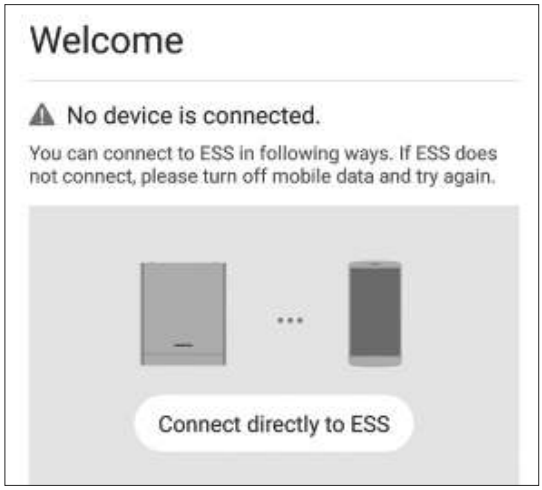


Connect directly to ESS

1

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

2



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

Tap [Connect directly to ESS] option.

3

Press and hold the wireless connection button on the system until [WLAN] LED is lights blue.

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

NOTE

If the connection has not been made for 5 minutes, the [WLAN] LED lights green and the WLAN signal is disabled.

4

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

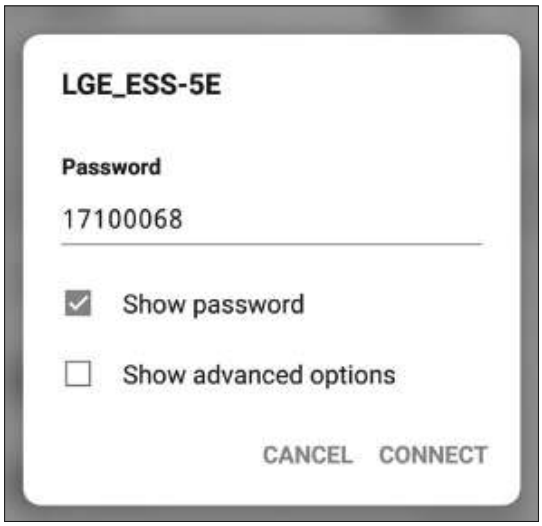
Select the SSID which starts with 'LGE_ESS'. The password input screen appears.

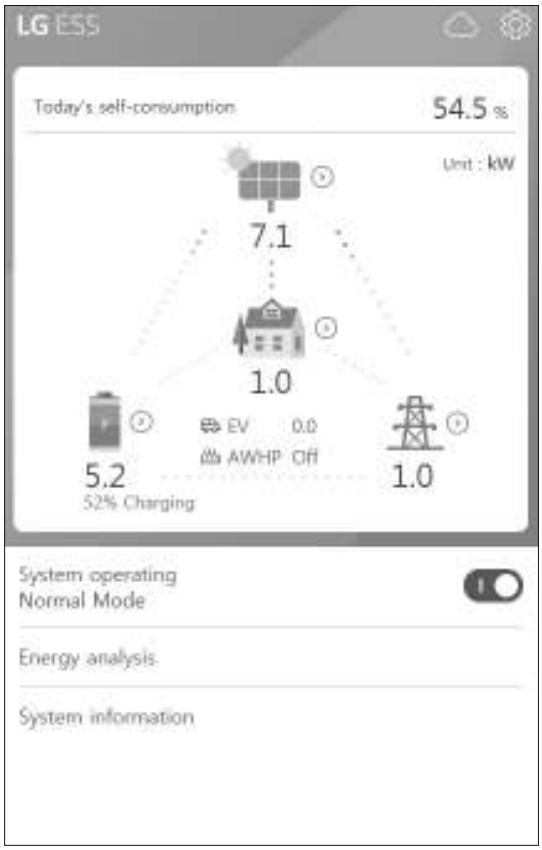
NOTE

The last 2 characters of the SSID are the same as the last 2 characters of the system registration number.

Example :
SSID (LGE_ESS-**5E**)
Registration No.
(LGE-ESS-DE1710BKRH0068**5E**)

5





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

The WLAN password is 8 digit numbers. Find the 'WLAN password' printed in the label outside of the PCS.

NOTE

If the connection failed, try after turning off the mobile data option on your mobile device.

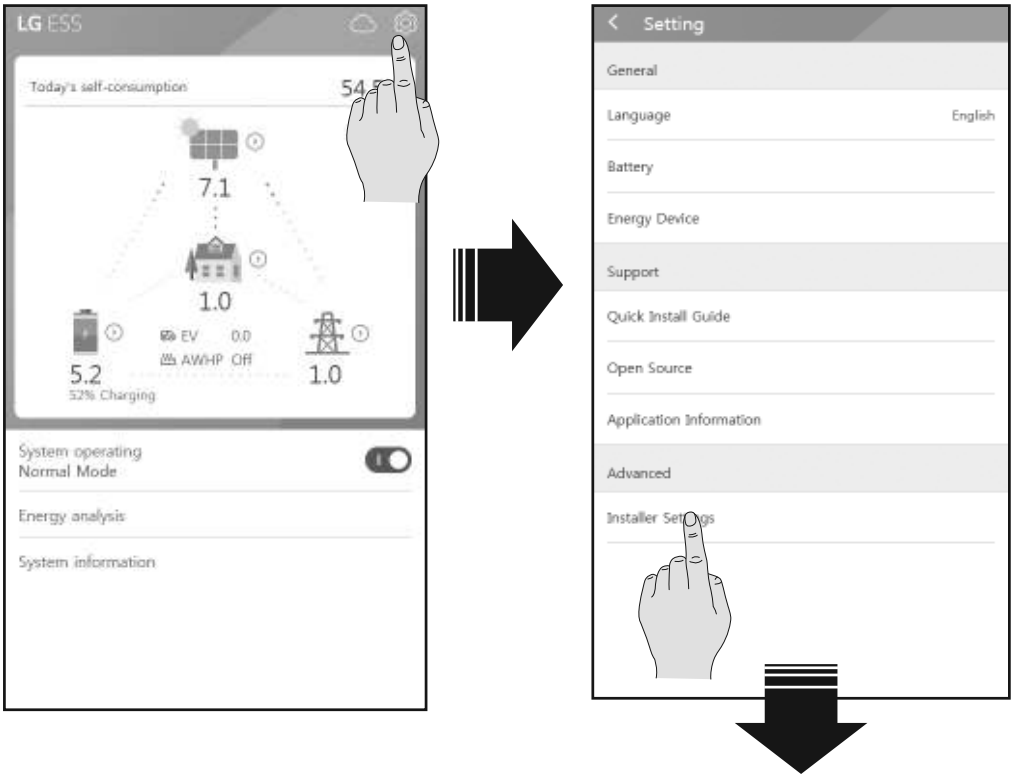
Android : If the connection is successful, main screen appears as shown in the figure.

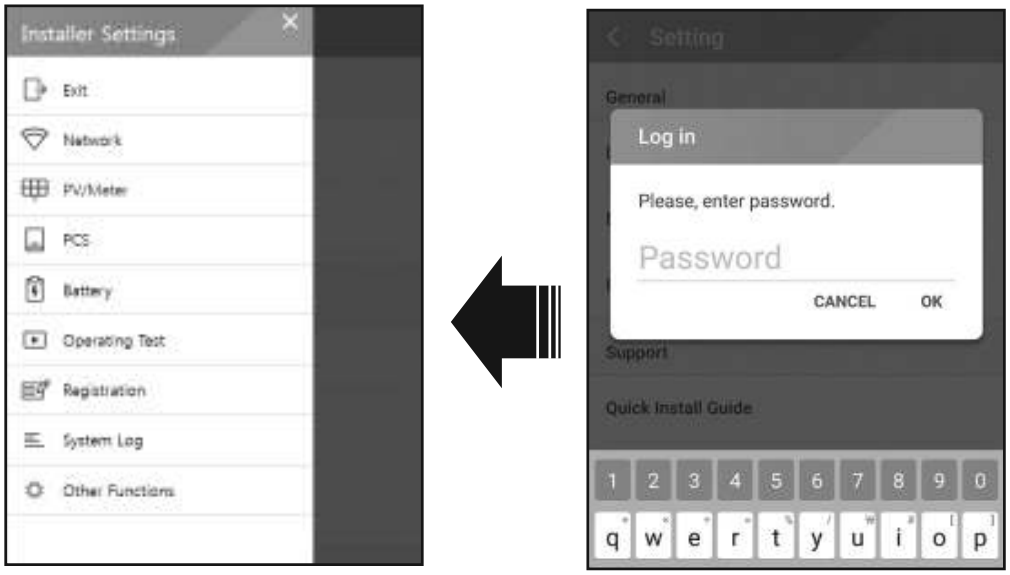
iOS : If the connection is successful, run [LG EnerVu Plus] app to display the main screen as shown in the figure.

Entering [Installer Settings] screen

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

1. Tap [⚙] on the main screen. The [Setting] screen appears.
2. Tap [Installer Setting] option to display password input screen.
3. Enter the installer password and tap [OK] to enter the [Installer Setting] screen.
   Initial password is the case-insensitive registration number printed outside of the PCS. It is recommeded to change the password after first entering. See '[Other function] settings' on page 52 for more information of [Password Change] option.





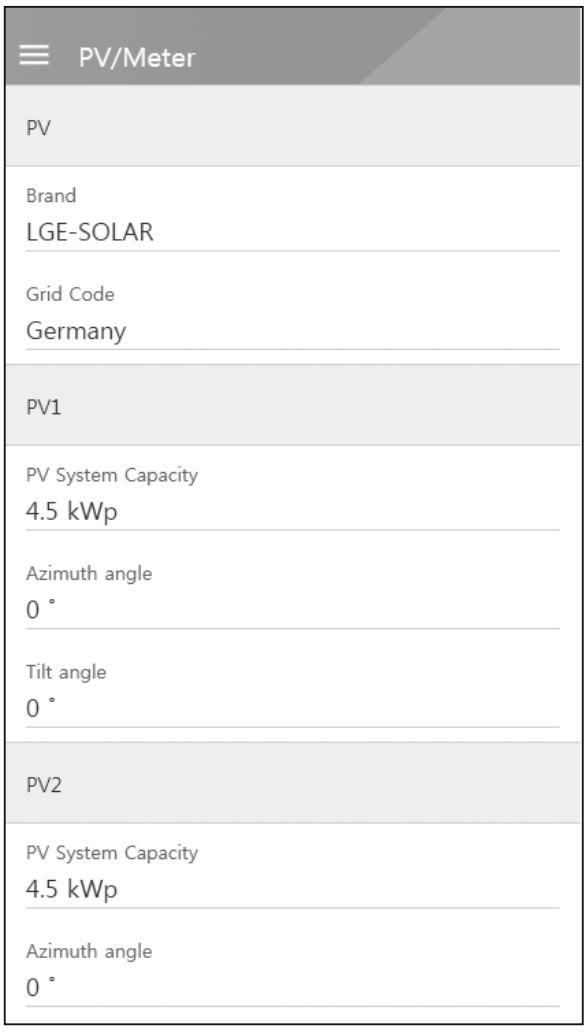
Mandatory settings

The system need to be set mandatory settings in following order when the system is turned on for the first time.

Mandatory settings order : [PV/Meter] > [PCS] > [Network] > [Operating Test]

[PV/Meter] settings

You can check the PV and Meter information.



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

[PV], [PV1], [PV2] and [PV3]

1. Select the currently selected value of each option to change. Input menu appears on the screen.
2. Input the desired value.
3. Select [Accept] to complete the setting.

[Meter]

1. Select the currently selected value of each option to change. Input menu appears on the screen.
2. Input the desired value.
3. Select [Save] to complete the setting.

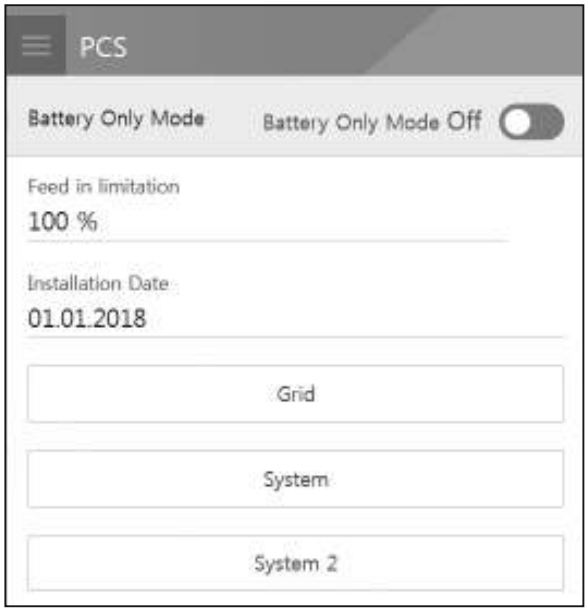
Tap [Start Auto] to collect the connected energy meter information and set all the option values automatically.

NOTE

The [PV System Capacity] options of [PV1], [PV2] and [PV3] are the mandatory options for 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 setting options and values of PCS information are displayed.

[Battery Only Mode], [Feed in limitation], [Installation Date] options can be changed manually.

Set the options as described below.

1. Select the currently selected value. Input menu appears on the screen.
2. Input desired value.
3. Select [Save] to complete the setting.

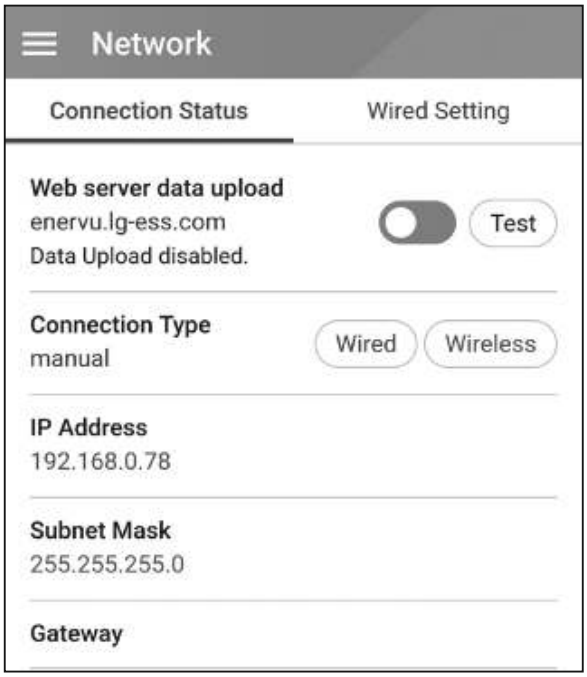
Tap [Grid] , [System] or [System2] to show more setting options for the PCS.

NOTE

- All the values on the [PCS] screen should not be edited by user It may cause system malfunction if you change the values by user.
- **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 Setting
- When changing the option values of [PCS] menu, refer to 'Others' on page 77 for more information.

[Network] Settings



Select [Network] on [Installer Settings]. Current status of the network connection is displayed.

If you want to connect the EnerVu server, tap [Web server data upload] to change to [On]. Tap [Web server data upload] again for turning off the option.

[On] : The energy data of the system is saved and uploaded to the server in every minute.

[Off] : The energy data of the system is not saved. And it is not uploaded to the server.

Tap [Test] to check the server connection.

To use the EnerVu service, you need to subscribe to the EnerVu service and activate the devics.

If the [Web server data upload] option is not set to [On], the data may not uploaded to the server.

Wired Network Setting

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

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

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

Wireless Network Setting

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

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

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

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

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

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

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

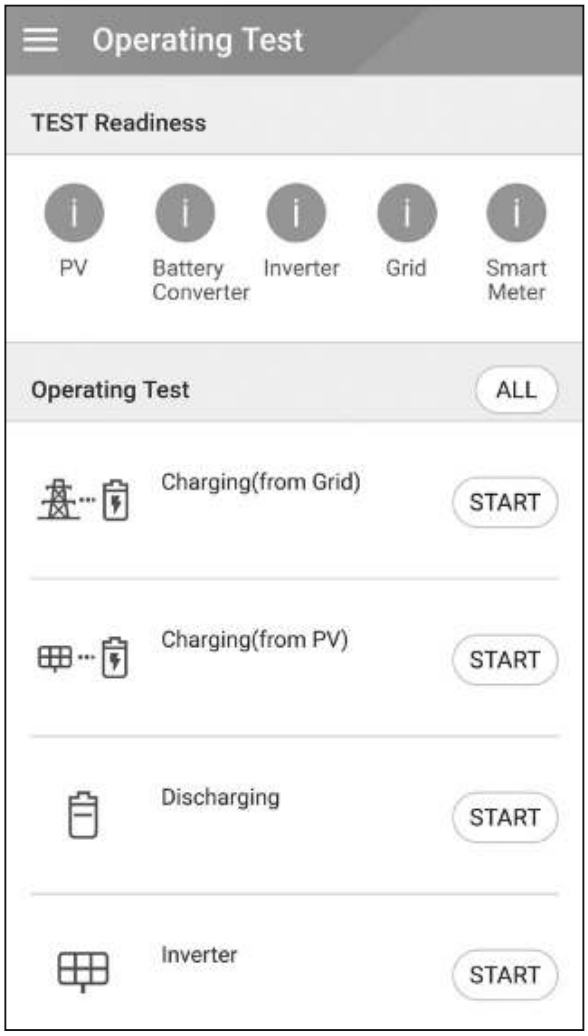
NOTE

Notes on internet Connection:

- Many network connection problems during set up can often be fixed by re-setting 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 malfunction of this product and/or the internet connection feature due to 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) supplying your broadband Internet connection.
- A 10 Base-T or 100 Base-TX LAN port is required for 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 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 the better wireless transmission, install the PCS from the access point as close as possible.
- In some instances, placing the access point at least 0.45 m above the floor may improve the reception.
- When using wireless network connection, remove all the obstacles between the PCS and the access point for better transmission.
- The reception quality over wireless depends on many factors such as type of the access point, distance between the PCS and access point, and the location of the PCS.

[Operating Test] Settings

This is the last stage of mandatory settings. Before operating this product, [Operating Test] must be done for checking all the systems are ready to run. If [Operating Test] is not proceeded, this product does not work.



Tap [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 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 [ALL] button rather than tests separately.

Charging (from Grid) :

The operating test for battery charging through grid.

Charging (from PV) :

The operating test for battery charging through PV.

Discharging:

The operating test for battery discharging to 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 the detailed information. Check and solve the error referring to the error code in the information, and perform the test again. For information on the error code, refer to 'Error Codes and Messages' on page 63.

NOTE

The operating test is a step to verify the PCS status for solar power generation and battery charging / discharging.

It is recommended to proceed when the battery SOC is more than 20 % and the solar radiation amount is sufficient.

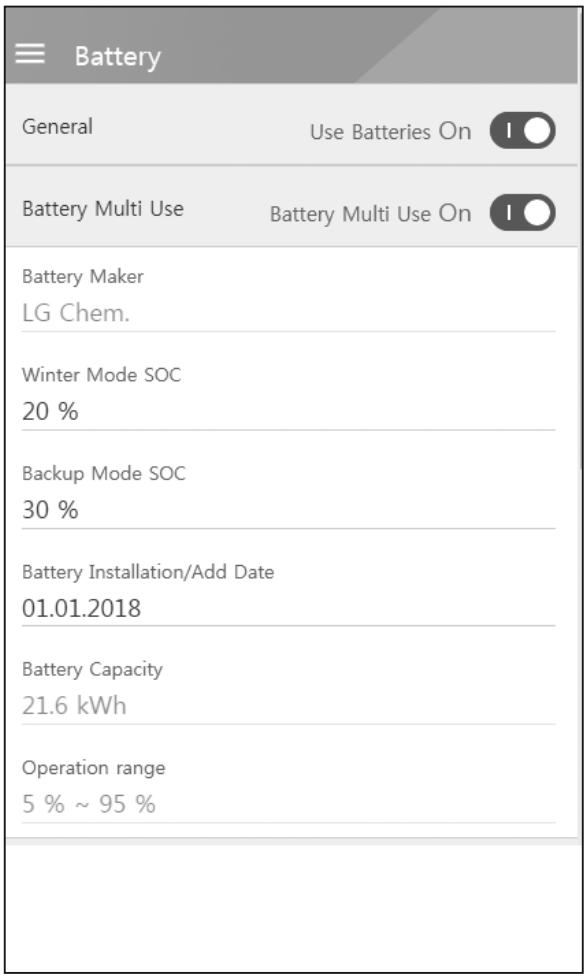
Additional Settings

[Battery] Settings

Select [Battery] on [Installer Settings]. The battery information is displayed.

You can change [Use batteries] setting. Tap the switch to set [On] or [Off]. If the setting is set to [Off], generated energy will not charge the connected battery.

You can change [Battery Multi Use] Setting. Tap the switch to [On] or [Off]. If two batteries are installed, set the setting to [On] to use two batteries.



[Battery maker], [Operating range], [Winter Mode SOC] [Battery Installation Date] and [Battery Capacity] can be set manually.

1. Select the currently selected value of each option to change. Input menu appears on the screen.
2. Input the desired value.
3. Select [Accept] to complete the setting.

⚠ CAUTION

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

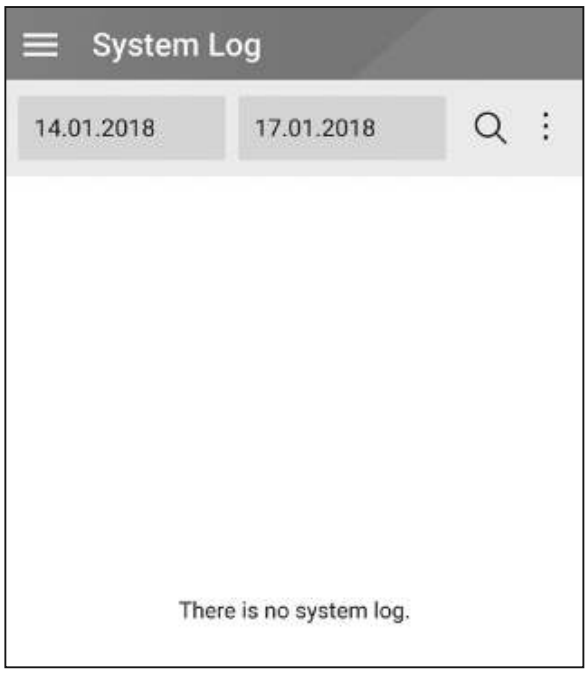
[Registration]

To use the EnerVu web monitoring system, the ESS system and its owner must be registered to the EnerVu web server. Use this option to register the system conveniently without accessing EnerVu screen on the web browser.

Refer to 'Registering the PCS' on page 60 for more information of system registration with mobile application.

[System Log]

You can see the list of mode changes, system fault and system warning log.
Refer to 'Error Codes and Messages' on page 63 for more information of error codes, messages and solutions.

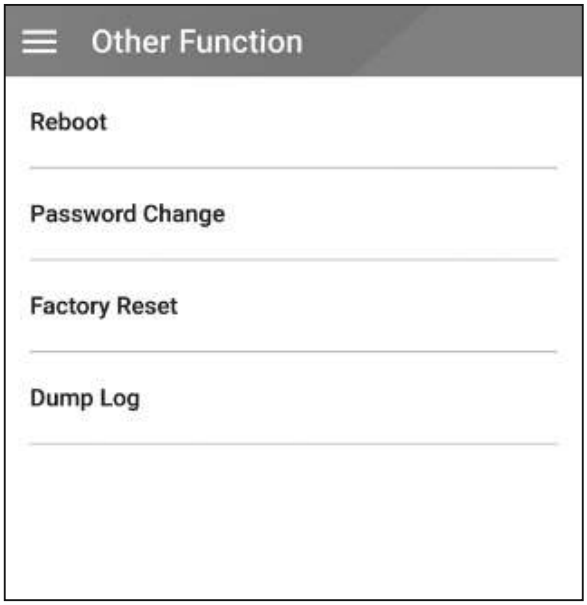


Tap [System Log] on [Installer Settings]. The list of all notice occurring in this product during certain period.

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

[Other function] Settings

Select [Other Function] on [Installler Settings] to display [Reboot], [Password Change], [Factory Reset] and [Dump Log] options.



[Reboot]

Select [Reboot] to reboot 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] filed. And then selelct [Change Password] to complete the password changing.

[Factory Reset]

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

[Dump Log]

You can save the system log file into the SD memory card with this option. Front cover of the system must be removed to insert a SD memory card.

NOTE

If you lose your password, type “passinit” at Login popup to return to the initial password (Registration Number).

EnerVu Settings

To use the EnerVu web monitoring system, the product must be registered to the system server by the installer. After registering, the user can check the variety of information such as system status, information, report using LG EnerVu web monitoring system.

NOTE

End users do not have to register in the EnerVu service. However, if the end user does not use this service, it is not possible to enable maintenance via remote service (such as firmware update) over the Internet.

Preparation

- An internet browser installed computer, tablet or mobile with internet access is needed to access EnerVu web monitoring system.
- This product must be connected to internet. Check [Network] setting menu on the system.
- The system owner must create a LG ESS account before registering the product. Refer to 'Creating a new account (Owner)' section below.

Creating a New Account (Owner)

1

On your browser, visit LG EnerVu page at http://enervu.lg-ess.com.

2

Select [Sign Up] and then select your nationality in the pop-up window. The [Accept Terms & Conditions] page appears. Read the Terms & Conditions and Privacy Policy carefully.

If you agree with every term and condition, click the [I Agree] check box and select [AGREE].
The [Create Account] page appears.

3

Fill your e-mail address in [User ID] field and select [CHECK AVAILABILITY].
Fill in [Password], [Password confirm] and [Birthday] fields and select [CONFIRM].
The E-mail confirmation page appears.

4

A confirmation e-mail will be sent to your e-mail address. On your e-mail, select [CONFIRM] to complete the e-mail confirmation.

5

On the account creation page, select [CONFIRM] to complete creating your account.

6

Select [SIGN IN] to go to the [SIGN IN WITH LG ACCOUNT] page.

Input your [User ID] and [Password] and select [SIGN IN].

7

Available LG account services are displayed on the screen.

Creating a New Account (Administrator)

An administrator can manage the installers belonging to your company and your branches. And an administrator also have all the roles that the installers have.

1

On your browser, visit LG EnerVu page at http://enervu.lg-ess.com.

Select [Installer]. The [Installer Sign In] page appears.

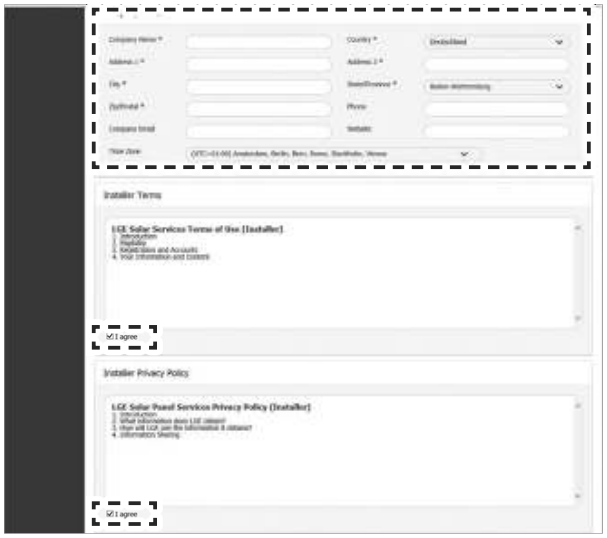
2

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

Fill your mail address in [Email] field and select [Check].

And then fill the [First Name] and [Last Name] fields.

3



Fill the required information on [Company Details] section.

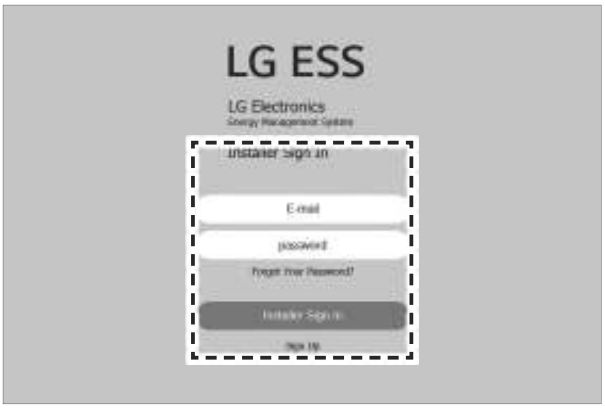
And then read the [Installer Terms] and [Installer Privacy Policy] carefully. If you agree with every terms and policies, click [I agree] check box in each section. [Submit] button appears on the screen.

4

Select [Submit] to complete creating an installer account.

Adding a New Installer

1



On your browser, visit LG EnerVu page at http://enervu.lg-ess.com.

Select [Installer]. The [Installer Sign In] page appears.
And then input the administrator's e-mail address and the password and select [Installer Sign In].

2

Select the [Users] tab on the [Account] page.

Select [Add New User] button to open a new user input page.

3

Input first name and last name of new installer.

Select [Role] option as [User] or [Administrator]. User means installer that has not authority to add user or subsidiary.

Select [Company] option as parent company or subsidiary.

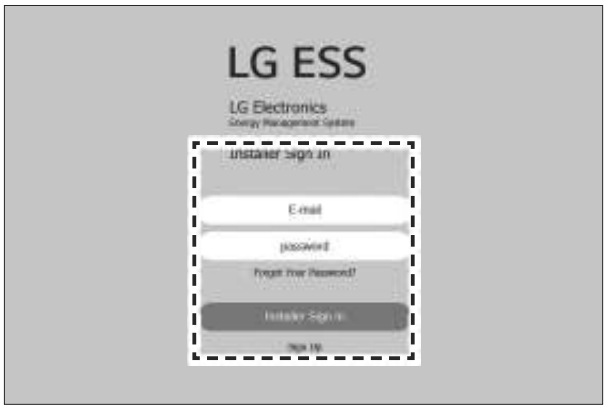
And then select [AddUser] button to register a new installer with pop-up message.

Registering the PCS (Web browser)

1

On your browser, visit LG EnerVu page at http://enervu.lg-ess.com.

2



Select [Installer]. The [Installer Sign In] page appears.
And then input the installer's e-mail address and the password and select [Installer Sign In].

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

3

Select [Activation] tab.
The [Add a New System] screen appears.

4

Fill every information in the [System Info] section and select [Save] to save the information.

5

In the [ESS Info] field, fill the product registration number and select [Check]. The ESS information will automatically be filled.

Select [Save] to go to the next step.

6

Fill the every information In the [Owner] field and select [Save] to save the information.

And Select [Activation] at the bottom of the page to finish the activation process.

Registering the PCS (Mobile App)

Preparation

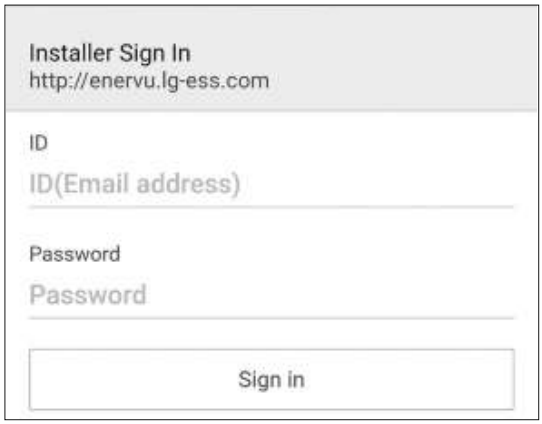
- The mobile application (LG EnerVu Plus) installed tablet or mobile device is needed.
- The PCS system must be connected to the internet and [Web Server data upload] option must be turned on. Check [Network] setting menu in the mobile application.
- The system owner must create a LG ESS account before registering the product. Refer to 'Creating a new account (Owner)' section.

1

Run 'LG EnerVu Plus' app on your mobile device. The main screen appears on the screen.

Tap [installer settings] > [Registration].

2



Input installer's [ID] and [Password] fields and tap [Sign In] to login.

The [Enervu] menu appears on the screen.

3

Enter the every fields in the [EnerVu] menu.

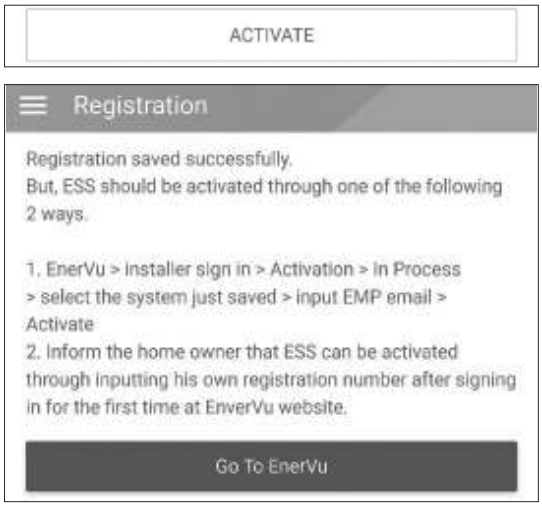
The * marked fields are required fields.

NOTE

For complete registering the system, [Owner email] field must be filled. If the owner does not have an account, [Owner email] option can be skipped and finish the registration with incomplete status.

When the registration is in incomplete status, refer to 'When incomplete registration status' on page 61 for more information.

4



After entering every fields, tap [ACTIVATE] to finish the registration.

Tap [Go To EnerVu] to open the EnerVu page with the web browser.

When incomplete registration status

If the registration is in incomplete status, the system should be activated through one of the following methods.

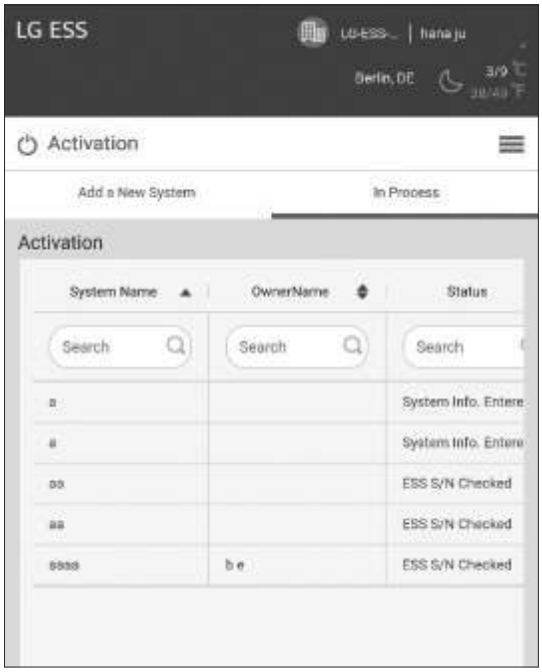
Method 1 (For installer)

1

On your browser, visit LG EnerVu page at http://enervu.lg-ess.com.

Select [Installer]. The [Installer Sign In] page appears.
And then input the installer's e-mail address and the password and select [Installer Sign In].

2



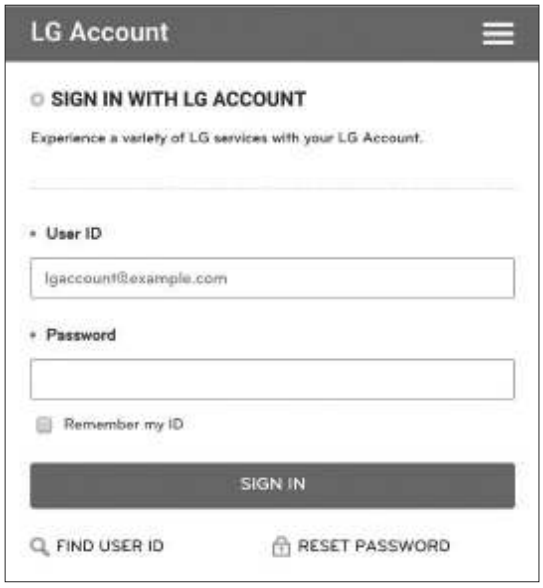
Select [Activation] > [In Process] and select the system name you are going to activate.

3

Fill the every information In the [Owner] field and select [Save] to save the information.

And Select [Activation] at the bottom of the page to finish the activation process.

Method 2 (For owner)



Inform the system owner to make an owner account and login at EnerVu page.

The registration number input screen appears as in the figure.

Note the registration number from the system and input the number to finish the activation.

NOTE

Refer to 'Creating a new account' on page 53 for more information of making a new account.

Error Codes and Messages

PCS Error Codes

- Do not leave the ESS in the Fault standby state for a long time because of the battery discharge may occur during the long standby state.
- If the battery fault occurs immediately after starting PCS it means Battery failure. Check the battery SOC also 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.

Code	Message	Description	Solution
P400	AC MisWiring Fault	Incorrect wiring grid connection has detected	Contact service center
P401	Meter Comm Fault	Communication error with the energy meter	Contact service center
P402	BMS Fault	The BMS fault message from battery.	Contact service center
P403	BMS Comm Fault	Communication error with the connected battery for over 10 seconds.	Contact service center
P404	PMS Comm Fault	Communication error on PCS system	Contact service center
P405	SDSP Comm Fault	Communication error with the processing unit for over 15 seconds	Contact service center
P406	SDSP Fault	P540(SDSP Detection) occurs 3 times	Contact service center
P407	Fan Fault	P541(Fan Detection) occurs 3 times	Contact service center
P408	Grid Relay Fault	Fault occurs 3 times in the same relay	Contact service center
P409	PV Over Voltage Fault	Voltage level of the PV is higher than the limitation and the state is maintained for more than 10 minutes	Contact service center

Code	Message	Description	Solution
P410	Battery Under Voltage Fault	Voltage level of the battery is lower than the limitation and the state is maintained for more than 10 minutes	Contact service center
P411	Battery MisWiring Fault	Battery MisWiring	Contact service center
P460	Grid L1 Under Voltage	Voltage level of the grid (L1) is lower than the limitation	Automatically restart after detecting fault
P461	Grid L2 Under Voltage	Voltage level of the grid (L2) is lower than the limitation	Automatically restart after detecting fault
P462	Grid L3 Under Voltage	Voltage level of the grid (L3) is lower than the limitation	Automatically restart after detecting fault
P463	Grid L1 Over Voltage	Voltage level of the grid (L1) is higher than the limitation	Automatically restart after detecting fault
P464	Grid L2 Over Voltage	Voltage level of the grid (L2) is higher than the limitation	Automatically restart after detecting fault
P465	Grid L3 Over Voltage	Voltage level of the grid (L3) is higher than the limitation	Automatically restart after detecting fault
P466	Grid L1 Over Voltage 10min	The 10minutes average voltage level of the grid (L1) is higher than the limitation	Automatically restart after detecting fault
P467	Grid L2 Over Voltage 10min	The 10minutes average voltage level of the grid (L2) is higher than the limitation	Automatically restart after detecting fault
P468	Grid L3 Over Voltage 10min	The 10minutes average voltage level of the grid (L3) is higher than the limitation	Automatically restart after detecting fault
P469	Grid Over Frequency	Frequency level of the grid is higher than the limitation	Automatically restart after detecting fault
P470	Grid Under Frequency	Frequency level of the grid is lower than the limitation	Automatically restart after detecting fault
P471	Grid Anti Islanding	There was a power failure	Automatically restart after detecting fault
P472	Grid L1 DC Offset Current	DC offset current is added on grid(L1)	Automatically restart after detecting fault
P473	Grid L2 DC Offset Current	DC offset current is added on grid(L2)	Automatically restart after detecting fault

Code	Message	Description	Solution
P474	Grid L3 DC Offset Current	DC offset current is added on grid(L3)	Automatically restart after detecting fault
P500	PV Insulation Resistance	Insulation resistance level on PV is lower than the limitation	Automatically restart after PV IR is normal
P501	Inverter Over Temp.	The inverter IGBT temperature is higher than the limitation	Automatically restart after INV temp is normal
P502	PV Over Temp.	The PV IGBT temperature is higher than the limitation	Automatically restart after PV temp is normal
P503	Batt Over Temp.	The battery IGBT temperature is higher than the limitation	Automatically restart after Battery temp is normal
P504	DC Link Over Voltage	Voltage level of the DC Link is higher than the limitation	Automatically restart after DC Link voltage is normal
P505	DC Link Over Voltage Unbalance	Voltage level of the DC Link balance is higher than the limitation	Automatically restart after DC Link voltage is normal
P506	PVA Over Voltage	Voltage level of PV A is higher than the limitation	Automatically restart after PV A voltage is normal
P507	PVB Over Voltage	Voltage level of PV B is higher than the limitation	Automatically restart after PV B voltage is normal
P508	Batt 1 Over Voltage	Voltage level of battery 1 is higher than the limitation	Automatically restart after Battery 1 voltage is normal
P509	PVC Over Voltage	Voltage level of PV C is higher than the limitation	Automatically restart after PV C voltage is normal
P510	Batt 2 Over Voltage	Voltage level of battery 2 is higher than the limitation	Automatically restart after Battery 2 voltage is normal
P511	DC link Top Over Voltage	Voltage level of the DC Link Top is higher than the limitation	Automatically restart after DC Link voltage is normal
P512	DC link Bottom Over Voltage	Voltage level of the DC Link Bottom is higher than the limitation	Automatically restart after DC Link voltage is normal
P513	DC link Total Over Voltage	Voltage level of the DC Link total is higher than the limitation	Automatically restart after DC Link voltage is normal
P514	Batt 2 Over Current Instant	Current level of the battery 2 is instantaneously higher than the limitation	Automatically restart after Battery 2 Current is normal

Code	Message	Description	Solution
P515	PVC Over Current Instant	Current level of the PV C is instantaneously higher than the limitation	Automatically restart after PV C
P516	Batt 1 Over Current Instant	Current level of the battery 1 is instantaneously higher than the limitation	Automatically restart after Battery 1 Current is normal
P517	PVA Over Current Instant	Current level of the PV A is instantaneously higher than the limitation	Automatically restart after PV A
P518	PVB Over Current Instant	Current level of the PV B is instantaneously higher than the limitation	Automatically restart after PV B
P519	L1 Over Current Instant	Current level of the grid (L1) is instantaneously higher than the limitation	Automatically restart after L1
P520	L2 Over Current Instant	Current level of the grid (L2) is instantaneously higher than the limitation	Automatically restart after L2
P521	L3 Over Current Instant	Current level of the grid (L3) is instantaneously higher than the limitation	Automatically restart after L3
P522	Batt 1 Over Current	Current level of the battery 1 is higher than the limitation	Automatically restart after detecting fault
P523	PVA Over Current	Current level of the PV A is higher than the limitation	Automatically restart after detecting fault
P524	PVB Over Current	Current level of the PV B is higher than the limitation	Automatically restart after detecting fault
P525	L1 Over Current	Current level of the grid (L1) is higher than the limitation	Automatically restart after detecting fault
P526	L2 Over Current	Current level of the grid (L2) is higher than the limitation	Automatically restart after detecting fault
P527	L3 Over Current	Current level of the grid (L3) is higher than the limitation	Automatically restart after detecting fault
P528	RCD Fault	Residual current level is higher than the limitation	Automatically restart after detecting fault
P529	Batt 2 Over Current	Current level of the battery 2 is higher than the limitation	Automatically restart after detecting fault

Code	Message	Description	Solution
P530	PVC Over Current	PVC level is higher than the limitation	Automatically restart after detecting fault
P532	Grid Relay1	Grid relay is not operable (L1-1)	Automatically restart after detecting fault
P533	Grid Relay2	Grid relay is not operable (L1-2)	Automatically restart after detecting fault
P534	Grid Relay3	Grid relay is not operable (L2-1)	Automatically restart after detecting fault
P535	Grid Relay4	Grid relay is not operable (L2-2)	Automatically restart after detecting fault
P536	Grid Relay5	Grid relay is not operable (L3-1)	Automatically restart after detecting fault
P537	Grid Relay6	Grid relay is not operable (L3-2)	Automatically restart after detecting fault
P538	Grid Relay7	Grid relay is not operable (N-1)	Automatically restart after detecting fault
P539	Grid Relay8	Grid relay is not operable (N-2)	Automatically restart after detecting fault
P540	SDSP Detection	The sub-processing unit in the product is in fault	Automatically restart after detecting fault
P541	Fan Detection	The cooling fan 1 in the product is in fault	Automatically restart after detecting fault
P542	Fan 2 Detection	The cooling fan 2 in the product is in fault	Automatically restart after detecting fault
P543	Batt Pre Relay	Batt Pre Relay is not operable	Automatically restart after detecting fault
P544	Batt 1 Relay	Batt 1 Relay is not operable	Automatically restart after detecting fault
P545	Batt 2 Relay	Batt 2 Relay is not operable	Automatically restart after detecting fault
P546	Batt Common Relay	Batt Common Relay is not operable	Automatically restart after detecting fault
P547	SDSP Error	Communication error with the connected SDSP for over	Automatically restart after detecting fault
P548	INV L1 Over Voltage	Voltage level of Inverter L1 is higher than the limitation	Automatically restart after detecting fault

Code	Message	Description	Solution
P549	INV L2 Over Voltage	Voltage level of Inverter L2 is higher than the limitation	Automatically restart after detecting fault
P550	INV L3 Over Voltage	Voltage level of Inverter L3 is higher than the limitation	Automatically restart after detecting fault
P551	PV Source Unmatching	Invalid PV source connection	Automatically restart after detecting fault
P552	Battery Source Unmatching	Invalid Battery source connection	Automatically restart after detecting fault
P553	Battery 1 Disconnection	BMS communication is connected but the power line of battery 1 is not connected	Automatically restart after detecting fault
P554	Battery 2 Disconnection	BMS communication is connected but the power line of battery 2 is not connected	Automatically restart after detecting fault
W101	Inverter Over Temp	The Inverter temperature is higher than the limitation	Automatically restart after detecting fault
W102	PV Over Temp	The PV Converter temperature is higher than the	Automatically restart after detecting fault
W103	Battery Over Temp	The Battery Converter temperature is higher than the	Automatically restart after detecting fault
W104	Outside Over Temp	The ESS PCS Outside temperature is higher than the limitation	Automatically restart after detecting fault
W105	Inside Over Temp	The ESS PCS intside temperature is higher than the limitation	Automatically restart after detecting fault

Battery Error Code

- Each battery is indicated by # 1, # 2, each battery share a code error.

Code	Message	Description	Solution
B184	Under SOC Warning	SOC Voltage level of battery cell is lower than the limitation	Automatically restart after detecting fault
B185	Over SOC Warning	SOC Voltage level of battery cell is higher than the limitation	Automatically restart after detecting fault
B186	Over Discharge Power Limit	Discharge Power of the battery is lower than the limitation	Automatically restart after detecting fault
B187	Over Charge Power Limit	Charge Power of the battery is higher than the limitation	Automatically restart after detecting fault
B188	Over Discharge Current	Current level of the battery is lower than the limitation	Automatically restart after detecting fault
B189	Over Charge Current Warning	Current level of the battery is higher than the limitation	Automatically restart after detecting fault
B191	Temperature Deviation Warning	Temperature differences between the batteries are over the limitation	Automatically restart after detecting fault
B192	Under Temperature warning	The battery temperature is lower than the limitation	Automatically restart after detecting fault
B193	Cell Voltage Imbalance Warning	Cell Voltage differences between the battery cells are higher than the limitation	Automatically restart after detecting fault
B194	Cell Under Voltage Warning	Cell Voltage level of battery cell is lower than the limitation	Automatically restart after detecting fault
B195	Cell Over Voltage Warning	Cell Voltage level of battery cell is higher than the limitation	Automatically restart after detecting fault
B601	Battery Monitoring IC Loss Of	Battery Monitoring IC Loss Of Communication Fault	Automatically restart after detecting fault
B606	Over Discharge Power Limit	Discharge Power of the battery is lower than the limitation	Automatically restart after detecting fault
B607	Over Charge Power Limit Fault	Charge Power of the battery is higher than the limitation	Automatically restart after detecting fault
B608	Over Discharge Current Fault	Current level of the battery is lower than the limitation	Automatically restart after detecting fault
B609	Over Charge Current Fault	Current level of the battery is higher than the limitation	Automatically restart after detecting fault

Code	Message	Description	Solution
B610	Temperature Deviation Fault	Temperature differences between the batteries are over the limitation	Automatically restart after detecting fault
B611	Under Temperature fault	The battery temperature is lower than the limitation	Automatically restart after detecting fault
B612	Over Temperature fault	The battery temperature is Higher than the limitation	Automatically restart after detecting fault
B613	Cell Voltage Imbalance Fault	Cell Voltage differences between the battery cells are higher than the limitation	Automatically restart after detecting fault
B614	Cell Under Voltage Fault	Cell Voltage level of battery cell is lower than the limitation	Automatically restart after detecting fault
B615	Cell Over Voltage Fault	Cell Voltage level of battery cell is higher than the limitation	Automatically restart after detecting fault
B616	BMS Fault	BMS Fault	Contact service center
B617	Battery Monitoring IC Loss Of Communication Fault 2	Battery Monitoring IC Loss Of Communication Fault 2	Contact service center
B618	PCS Loss Of Communication Fault2	PCS Loss Of Communication Fault 2	Contact service center
B622	Over Discharge Power Limit Fault	Discharge Power of the battery is lower than the limitation	Contact service center
B623	Over Charge Power Limit Fault	Charge Power of the battery is higher than the limitation	Contact service center
B624	Over Discharge Current Fault	Current level of the battery is lower than the limitation	Contact service center
B625	Over Charge Current Fault	Current level of the battery is higher than the limitation	Contact service center
B627	Under Temperature fault	The battery temperature is lower than the limitation	Contact service center
B628	Over Temperature fault	The battery temperature is Higher than the limitation	Contact service center
B630	Cell Under Voltage Fault	Cell Voltage level of battery cell is lower than the limitation	Contact service center
B625	Over Charge Current Fault	Current level of the battery is higher than the limitation	Contact service center

Code	Message	Description	Solution
B627	Under Temperature fault	The battery temperature is lower than the limitation	Contact service center
B628	Over Temperature fault	The battery temperature is Higher than the limitation	Contact service center
B630	Cell Under Voltage Fault	Cell Voltage level of battery cell is lower than the limitation	Contact service center
B610	Temperature Deviation Fault	Temperature differences between the batteries are over the limitation	Automatically restart after detecting fault
B611	Under Temperature fault	The battery temperature is lower than the limitation	Automatically restart after detecting fault
B612	Over Temperature fault	The battery temperature is Higher than the limitation	Automatically restart after detecting fault
B613	Cell Voltage Imbalance Fault	Cell Voltage differences between the battery cells are higher than the limitation	Automatically restart after detecting fault
B614	Cell Under Voltage Fault	Cell Voltage level of battery cell is lower than the limitation	Automatically restart after detecting fault
B615	Cell Over Voltage Fault	Cell Voltage level of battery cell is higher than the limitation	Automatically restart after detecting fault
B616	BMS Fault	BMS Fault	Contact service center
B617	Battery Monitoring IC Loss Of Communication Fault 2	Battery Monitoring IC Loss Of Communication Fault 2	Contact service center
B618	PCS Loss Of Communication Fault2	PCS Loss Of Communication Fault 2	Contact service center
B622	Over Discharge Power Limit Fault	Discharge Power of the battery is lower than the limitation	Contact service center
B623	Over Charge Power Limit Fault	Charge Power of the battery is higher than the limitation	Contact service center
B624	Over Discharge Current Fault	Current level of the battery is lower than the limitation	Contact service center
B625	Over Charge Current Fault	Current level of the battery is higher than the limitation	Contact service center
B627	Under Temperature fault	The battery temperature is lower than the limitation	Contact service center

Code	Message	Description	Solution
B628	Over Temperature fault	The battery temperature is Higher than the limitation	Contact service center
B630	Cell Under Voltage Fault	Cell Voltage level of battery cell is lower than the limitation	Contact service center
B631	Cell Over Voltage Fault	Cell Voltage level of battery cell is higher than the limitation	Contact service center

Battery DC-DC Converter Error Code

Code	Message	Description	Solution
B632	DDC_Battery Over Voltage	Battery DC-DC Converter Over Voltage	Automatically restart after detecting fault
B633	DDC_Battery Over Current	Battery DC-DC Converter Over Current	Automatically restart after detecting fault
B634	DDC_Over Voltage	DC-DC Over Voltage	Automatically restart after detecting fault
B635	DDC_Link Over Current	DC-DC Link Over Current	Automatically restart after detecting fault
B636	DDC_Over Temperature	DC-DC Converter Over Temperature	Automatically restart after detecting fault
B367	DDC_BMS_Loss of Communication	DC-DC BMS Loss of Communication	Automatically restart after detecting fault
B638	DDC_INVERTER_Loss of Communication	DC-DC INVERTER Loss of Communication	Automatically restart after detecting fault
B639	OVP CB Open	Over Voltage Protection Curcuit Breaker Open	Contact service center
B640	Reverse Polarity_PV power charge DC	Reverse Polarity PV power charge DC	Automatically restart after detecting fault
B641	Reverse Polarity_ Battery try to precharege	Reverse Polarity Battery try to precharege	Automatically restart after detecting fault

- Firmware version, Error codes and Fault conditions on the lists can be accessed on the display. And those can also be accessed from the server.

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

1. Installation Company

   Address : Tel :

2. Customer Service

   LG Electronics ESS | Solar Service
   E-Service Haberkorn GmbH
   Augustenhöhe 7
   06493 Harzgerode

   Tel : Germany: 0049 (0)39484 / 976 380
   Austria: 0043 (0)720 / 11 66 01
   Switzerland: 0041 (0)44 / 505 11 42
   Belgium, Netherlands, Luxembourg: 0031 20 / 456 1660
   E-Mail : lge@e-service48.de

3. LG Electronics Contact

   LG Electronics Deutschland GmbH
   Alfred-Herrhausen-Allee 3-5
   65760 Eschborn
   Tel. : + 0049 18 06 807 020
   E-Mail: b2b.service@lge.de

   LG Electronics Benelux
   Krijgsman 1, 1186 DM, Amstelveen,
   The Netherlands
   Tel: +0031 (0)20 456 3100
   E-Mail: b2b.service@lge.de

Maintenance

Cleaning the Product

Wipe off the outside of the product with a soft towel with lukewarm water and wipe it with a clean hand towel so that dirt will not occur when using a neutral detergent.

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

- It 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 PCS, PV module, battery, AC circuit breaker. After that, clean the filter with soft brush.

Inspecting Regularly

It is recommended to check the operating status and connection status once a year. It should be done by technician or authorized people. Contact authorized dealer or where you purchased.

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.

Specifications

PV Input	LG ESS Home 8	LG ESS Home 10
Input Voltage Range	150 ~ 1,000 V_{DC}	
Max. DC Power (per channel)	12 kW (6 kW)	13.5 kW (7.5 kW)
Usable MPP Voltage Range	150 ~ 800 V	
Number of MPPT	3	
Number of String per MPPT	1	
Max. Input Current per MPPT	13 A	
Max. inverter backfeed current to the array	0 A	

AC Output	LG ESS Home 8	LG ESS Home 10
Rated Grid Voltage	3-NPE 400 V / 230 V	
AC Voltage Range	319 ~ 458 V / 184 ~ 264.5 V	
Frequency(Range)	50Hz (47.5 Hz ~ 51.5 Hz)	
Rated Output Power	8 kVA	10 kVA
Rated Output current	11.5 A	14.4 A
THD / Power Factor	< 5 % / ± 0.8	
Inrush current (peak and duration)	70 Aac / 0.02 ms	
Max. output fault current	80 Aac / 20 ms	
Max. output overcurrent protection	55.6 A_{peak}	

Battery	LGHB 7H	LGHB 10H
Battery Type	Lithium Polymer High Voltage	
Total Capacity	7.0 kWh	9.8 kWh
Usable Capacity	6.6 kWh	9.3 kWh
Max. Charge/Discharge power (Single/Dual)	3.5 kW / 7kW	5 kW / 7 kW
Peak Power (Single/Dual)	5 kW / 10 kW for 5 sec.	7 kW / 10 kW for 10 sec.
Rated output voltage	400 V	
Communication Interface	RS485	
Max. Charge/Discharge Current	8.5 A@420 V /10 A@350 V	11.9 A@420 V /14.3 A@350 V
Voltage (nominal or range)	Charge : 400-450 V_{DC} Discharge: 350-430 V_{DC}	Charge: 400-450 V_{DC} Discharge: 350-430 V_{DC}

1) Value for battery cell only (Depth of discharge 95%)
2) Same as Backup Power

Efficiency (PCS)	
Max. Efficiency (PV to Grid)	97.7 %

General Data	
Dimensions (W/H/D, mm)	450/599/210 (PCS) 746/688/206 (LGHB 7H) 746/903/206 (LGHB 10H)
Weight	34 kg (PCS) / 75 kg (LGHB 7H) / 97 kg (LGHB 10H)
Operating temperature	0 °C to 40 °C (derating at 40-60 °C)

Energy Meter Compatibility	
ABB	B23 112-100, B23 212-100, B23 312-100

ATS (option)	
enwitec	Type 10013677, Type 10013678, Type 10013679

Feature & function	
Noise emission (Typical)	< 40 dB
Cooling	Forced convection
Topology	Transformerless
Degree of protection	IP21
Max. permissible value of relative humidity (non-condensing)	85 % (Climate class 3K5)
Warranty (PCS)	10 years
Warranty (Battery)	10 years (SOH 80 %)
Certification (PCS)	IEC/EN 62109-1/-2, VDE-AR-N 4105, VDE 0126-1-1, ÖVE/ÖNORM E 8001-4-712, TOR D4:2016, IEC61000, EN50438
Class B Group 1 Product	Protection Class(Class I)
Pollution degree	2

- 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

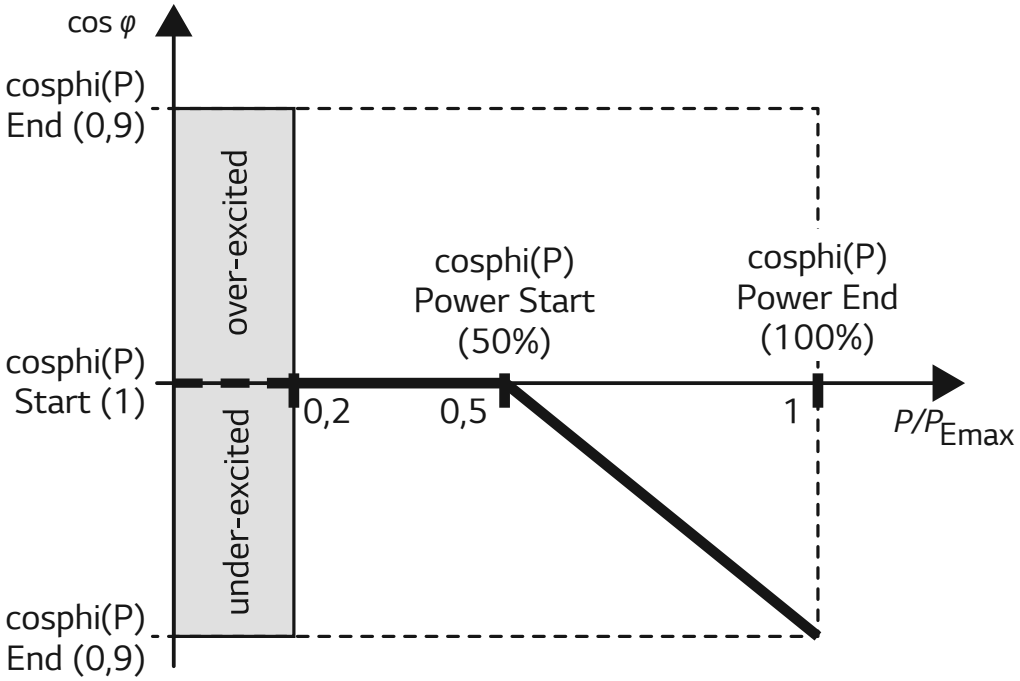
Hereby, LG Electronics declares that the radio equipment type
PCS Unit is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address:
http://www.lg.com/global/support/cedoc/cedoc
This device is a 2.4 GHz wideband transmission system, intended for use in all EU member states and EFTA countries.

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

Frequency Range	2412 - 2472 MHz
Output Power (Max.)	19 dBm
Software Version	LG P1 01.00.01.00

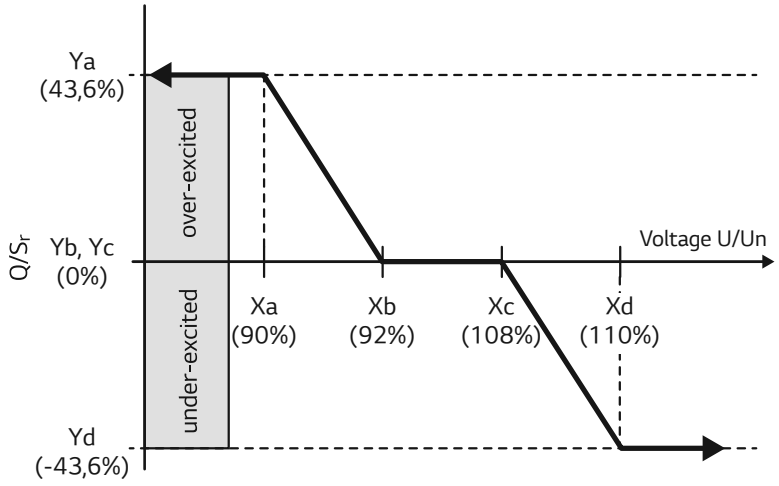
Others

Shift factor / effective characteristic cosφ (P)



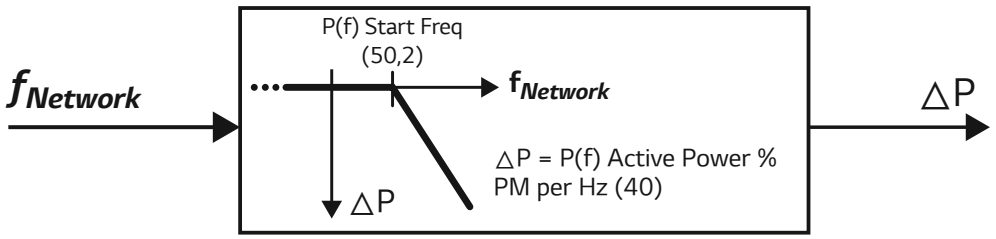
Name	Description	Default Value	Available Value	Uint
cosphi(P) Start	cosphi at starting point	1	0,9 ~ 1	
cosphi(P) End	cosphi at end point	0.95	0,9 ~ 1	
cosphi(P) Power Start	Active power at starting point (P/Pmax)	50	20 ~ 100	%
cosphi(P) Power End	Active power at End point (P/Pmax)	100	20 ~ 100	%

Reactive power / voltage characteristic Q(U)



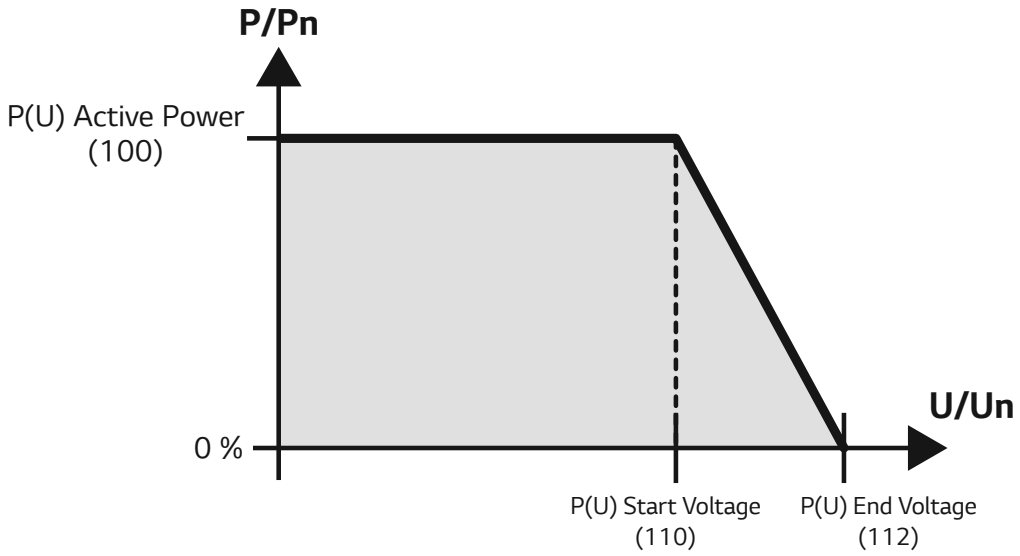
Name	Description	Default Value	Available Value	Uint
Q(U) Number of point	Number of Active point in array	4	0 ~ 8	
Q(U) Xa	Grid voltage point-a (U/Un)	90	80 ~ 120	%
Q(U) Xb	Grid voltage point-b (U/Un)	92	80 ~ 120	%
Q(U) Xc	Grid voltage point-c (U/Un)	108	80 ~ 120	%
Q(U) Xd	Grid voltage point-d (U/Un)	110	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)	10	0 ~ 20	%
Q(U) Lock-out	Active power lock-out (P/Pn)	20	0 ~ 20	%

Active power feed-in at overfrequency P(f)



Name	Description	Default Value	Available Value	Uint
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	1	60	sec

Voltage controlled active power control P(U)



Name	Description	Default Value	Available Value	Uint
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	1	60	sec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