

INSTALLATION MANUAL

# Energy Storage System

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

MODEL  
D005KD1N111



<https://www.lg.com/global/business/ess/residential/dc-5>

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# Safety Information

1

Getting Started

**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 work 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 or repairs must be performed by qualified personnel, or personnel from an authorized support center.



## 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 amounts to over 25 kg. Serious injury may occur due to the heavy weight of the product. 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 Extension Kit. An Emergency Charge is not an ESS fault.



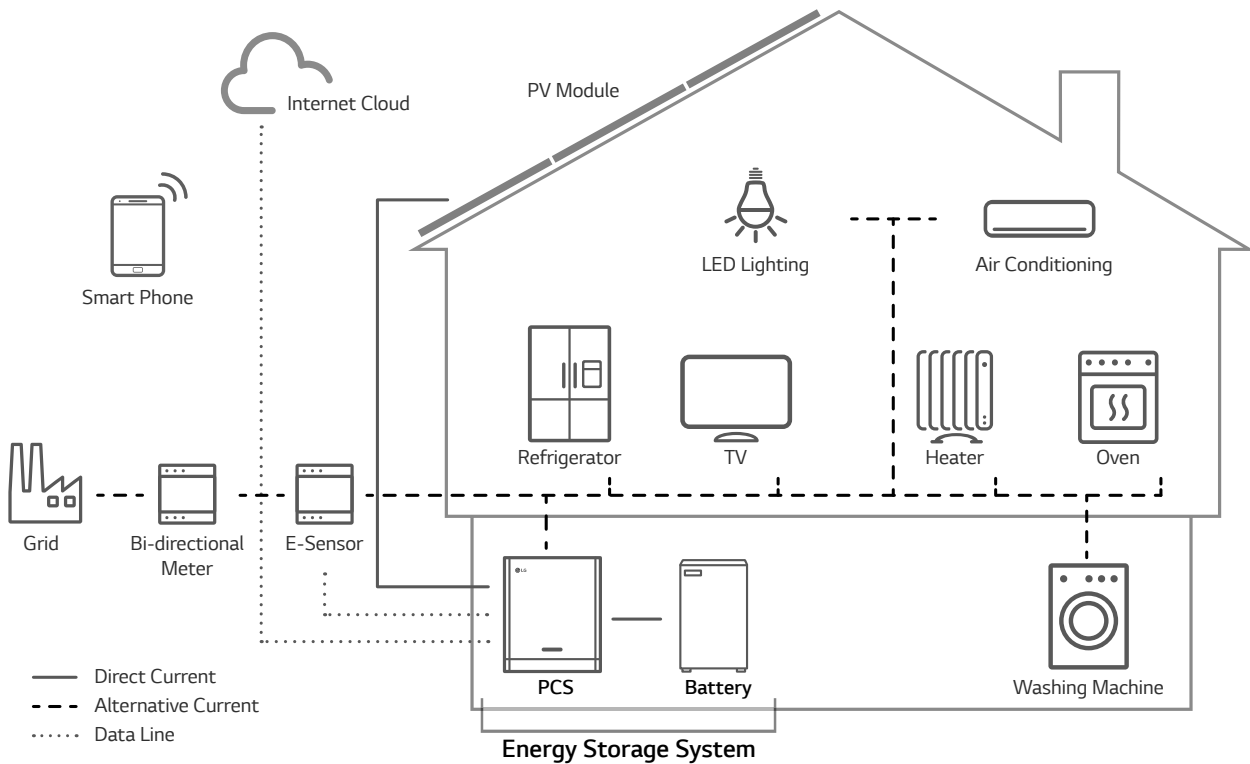
## NOTE

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

- Before making connections, please make sure the PV array open circuit voltage is within 800 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.
- Servicing of batteries should be performed or supervised by LG service person or trained installer.
- This document is for your reference only. Read the installation manual on the website below.  
<https://www.lg.com/global/business/ess/residential/dc-5>
- Please check the following website for warranty policy.  
<https://www.lg.com/global/business/ess/residential/dc-5>

# 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 grid.



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.

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# Symbol used on the label

Label	Symbol	Description																																					
 <ul style="list-style-type: none"> <li>■ MODEL : D005KE1N111</li> <li>■ PRODUCT NO. : D005KE1N111.ADE2N</li> <li>■ MANUFACTURER : LG Electronics Inc.</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">DC INPUT — — — (OVC II)</td> <td>V<sub>DC</sub> Max.</td> <td colspan="2">800V</td> </tr> <tr> <td>V<sub>DC</sub> MPP</td> <td colspan="2">210 - 680V</td> </tr> <tr> <td>I<sub>DC</sub> Max.</td> <td colspan="2">12A(per MPP)</td> </tr> <tr> <td>I<sub>SC</sub> Max.</td> <td colspan="2">13A(per MPP)</td> </tr> <tr> <td rowspan="6" style="text-align: center; vertical-align: middle;">AC OUTPUT (3/N/PE-) 3N ~ ~ ~ (OVC III)</td> <td>V<sub>AC</sub> Nom.</td> <td colspan="2">400/230V</td> </tr> <tr> <td>I<sub>AC</sub> Max.</td> <td colspan="2">8A</td> </tr> <tr> <td>f<sub>AC</sub> Nom.</td> <td colspan="2">50Hz</td> </tr> <tr> <td>P<sub>AC</sub> Nom.</td> <td colspan="2">5,000W</td> </tr> <tr> <td>Power Factor</td> <td colspan="2">-0.9 ~ +0.9</td> </tr> <tr> <td colspan="4" style="text-align: center;">Operation Temperature Range : 0 ~ 40 °C</td> </tr> </table> <p>IEC/EN62109-1/-2, VDE-AR-N 4105, VDE 0126-1-1, EN50438, C10/11          TOR D4:2016, OVE/ONORM E 8001-4-712, IEC/EN61000          Class B Group 1 Product / Protection Class(Class I), IP21</p> <p><b>Li-ion Battery Pack Input</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>V<sub>DC</sub> Nom.</td> <td>207.2V</td> <td>I<sub>DC</sub> Max.</td> <td>19A</td> </tr> </table> <p><b>⚠ DANGER</b></p> <ul style="list-style-type: none"> <li>■ DANGER TO LIFE DUE TO HIGH VOLTAGES OF THE PV ARRAY.</li> <li>■ DANGER TO LIFE DUE TO HIGH VOLTAGES ON THE BATTERY PACK.</li> <li>■ DANGER TO LIFE DUE TO ELECTRIC SHOCK.</li> <li>■ DO NOT CONTACT WITH ELECTRICALLY ACTIVE PARTS.</li> <li>■ TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.</li> </ul> <p><b>⚠ WARNING</b></p> <ul style="list-style-type: none"> <li>■ REFER TO USER AND INSTALLATION MANUALS BEFORE INSTALLING, OPERATION OR SERVICING THIS UNIT.</li> </ul> <p><b>⚡ WARNING dual supply</b>  Do not work on this equipment until it is isolated from both mains and on-site generation supplies</p> <p>Isolate on-site generator at _____          Isolate mains supply at _____</p> <p><a href="http://www.lg.com/global/business/ess">www.lg.com/global/business/ess</a>  <b>LG Electronics EU Representative</b>          LG Electronics European Shared Service Center B.V.          Krijgsman 1, 1186 DM Amstelveen, The Netherlands</p> <p>   </p> <p> Type Approved Safety Regular Production Surveillance          www.tuv.com ID 1419054390</p> <p> 8 806098 189809</p> <p>    10min MEZ67628704 <b>MADE IN KOREA</b></p>	DC INPUT — — — (OVC II)	V <sub>DC</sub> Max.	800V		V <sub>DC</sub> MPP	210 - 680V		I <sub>DC</sub> Max.	12A(per MPP)		I <sub>SC</sub> Max.	13A(per MPP)		AC OUTPUT (3/N/PE-) 3N ~ ~ ~ (OVC III)	V <sub>AC</sub> Nom.	400/230V		I <sub>AC</sub> Max.	8A		f <sub>AC</sub> Nom.	50Hz		P <sub>AC</sub> Nom.	5,000W		Power Factor	-0.9 ~ +0.9		Operation Temperature Range : 0 ~ 40 °C				V <sub>DC</sub> Nom.	207.2V	I <sub>DC</sub> Max.	19A	<p><b>DC INPUT</b> — — — (OVC II)</p> <p><b>AC OUTPUT</b> ~ ~ ~ (OVC III)</p> <p>IP21</p> <p></p> <p></p> <p></p> <p></p> <p> 10min</p> <p></p>	<p>Direct current input</p> <p>Three phase four wire alternating current conductor</p> <p>This product is protected against insertion of fingers and will not be damaged during a specified test in which it is exposed to vertically dripping water.</p> <p>This product should not be disposed of with other household waste. Disposal regulations should be observed in this country.</p> <p>Caution, risk of danger</p> <p>Refer to the installation manual or operating manual.</p> <p>Caution, hot surface</p> <p>Caution, risk of electric shock, energy storage timed discharge</p> <p>The relevant equipment complies with the requirements in the EC guidelines.</p>
DC INPUT — — — (OVC II)		V <sub>DC</sub> Max.	800V																																				
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## Abbreviations on this manual

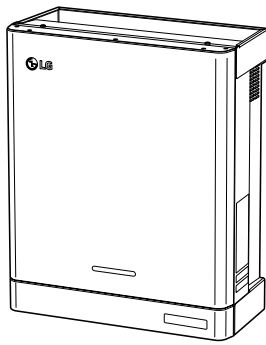
Abbreviation	Designation	Explanation
ESS	Energy Storage System	Inverter system that stores energy into a battery and uses it.
PCS	Power Conditioning System	A device intended to convert DC electricity generated from PV system to AC electricity and feed it to household appliances.
PV	Photovoltaic	Solar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

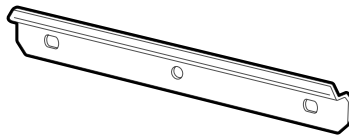
Terms	Explanation
Azimuth	In the Northern hemisphere, the azimuth angle indicates by how much degrees the module surface deviates from a full south aspect. In the southern hemisphere, it indicates the deviation from a full north aspect. The azimuth angle is counted with positive values within the range 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

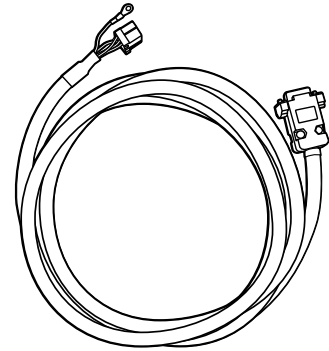
## Contents of this product



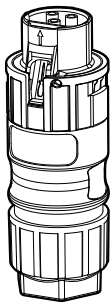
Power conditioning system  
(1EA)



Wall bracket (1EA)



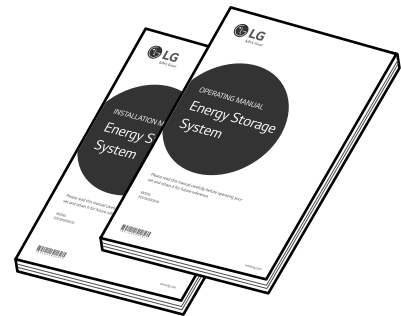
BMS cable (3m, 1EA)



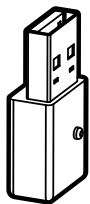
Battery cable plug



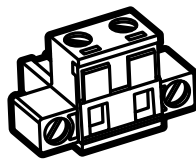
Grid cable plug



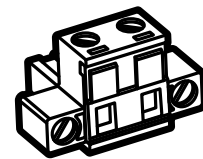
Installation Manual and  
Operating Manual (1EA each)



WLAN dongle (Inserted)



Energy meter plug



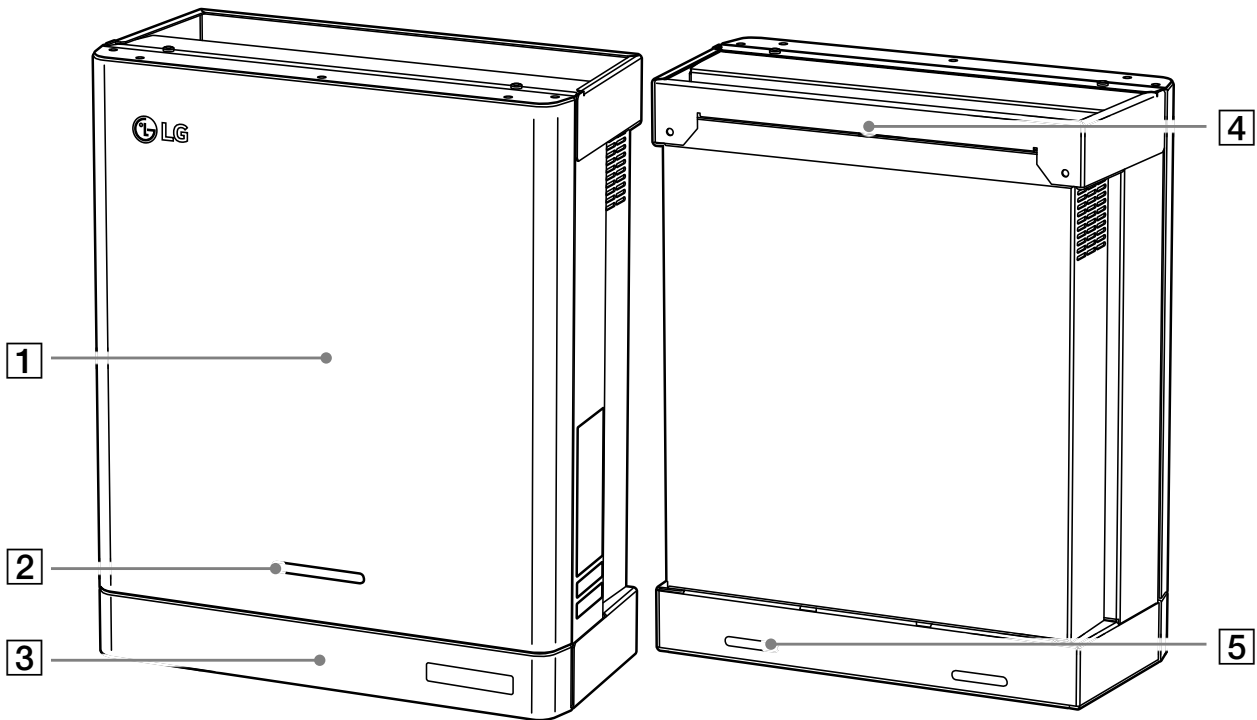
Heatpump plug  
(Not supported)

## Additional components for installation

Applied to	Additional Components
Wall mounting	<ul style="list-style-type: none"> <li>• Stainless steel screws with diameter 6 mm - 8mm</li> <li>• Anchors</li> </ul>
PV connections	<ul style="list-style-type: none"> <li>• MC4 connectors</li> <li>• Lead wires with the cross-sectional area 2.5 mm<sup>2</sup> - 6 mm<sup>2</sup></li> </ul>
Battery Connections	<ul style="list-style-type: none"> <li>• Lead wires with the cross-sectional area 2.5 mm<sup>2</sup> - 4 mm<sup>2</sup></li> </ul>
Grid connections	<ul style="list-style-type: none"> <li>• Lead wires with the cross-sectional area 2.5 mm<sup>2</sup> - 6 mm<sup>2</sup> (including yellow green stripe cable)</li> </ul>
Energy meter and internet connections	<ul style="list-style-type: none"> <li>• LAN cable</li> <li>• RJ-45 plug</li> <li>• Energy meter cable</li> </ul>
Grounding	<ul style="list-style-type: none"> <li>• LAN cable</li> <li>• RJ-45 plug</li> <li>• Energy meter cable</li> </ul>

# Name of each part

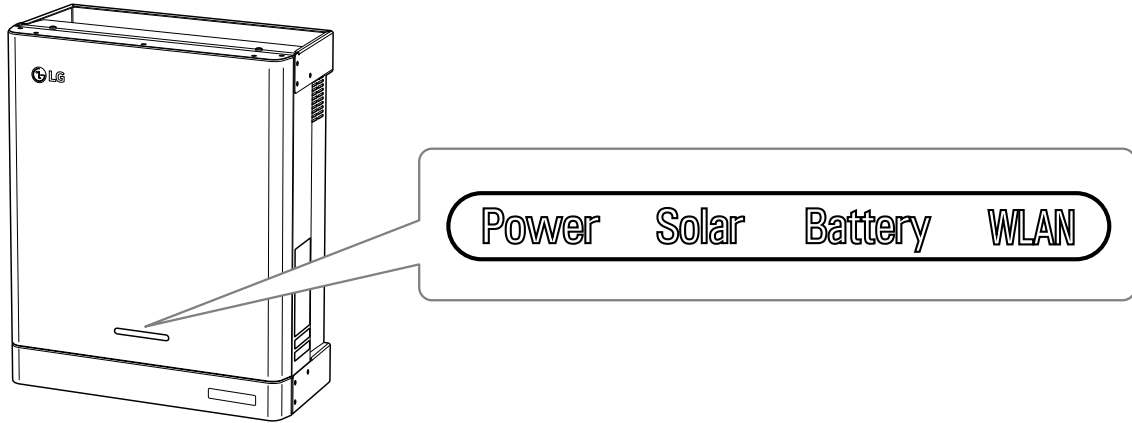
## Front and Rear



- 1** PCS body
- 2** LED Indications
- 3** Lower Cover

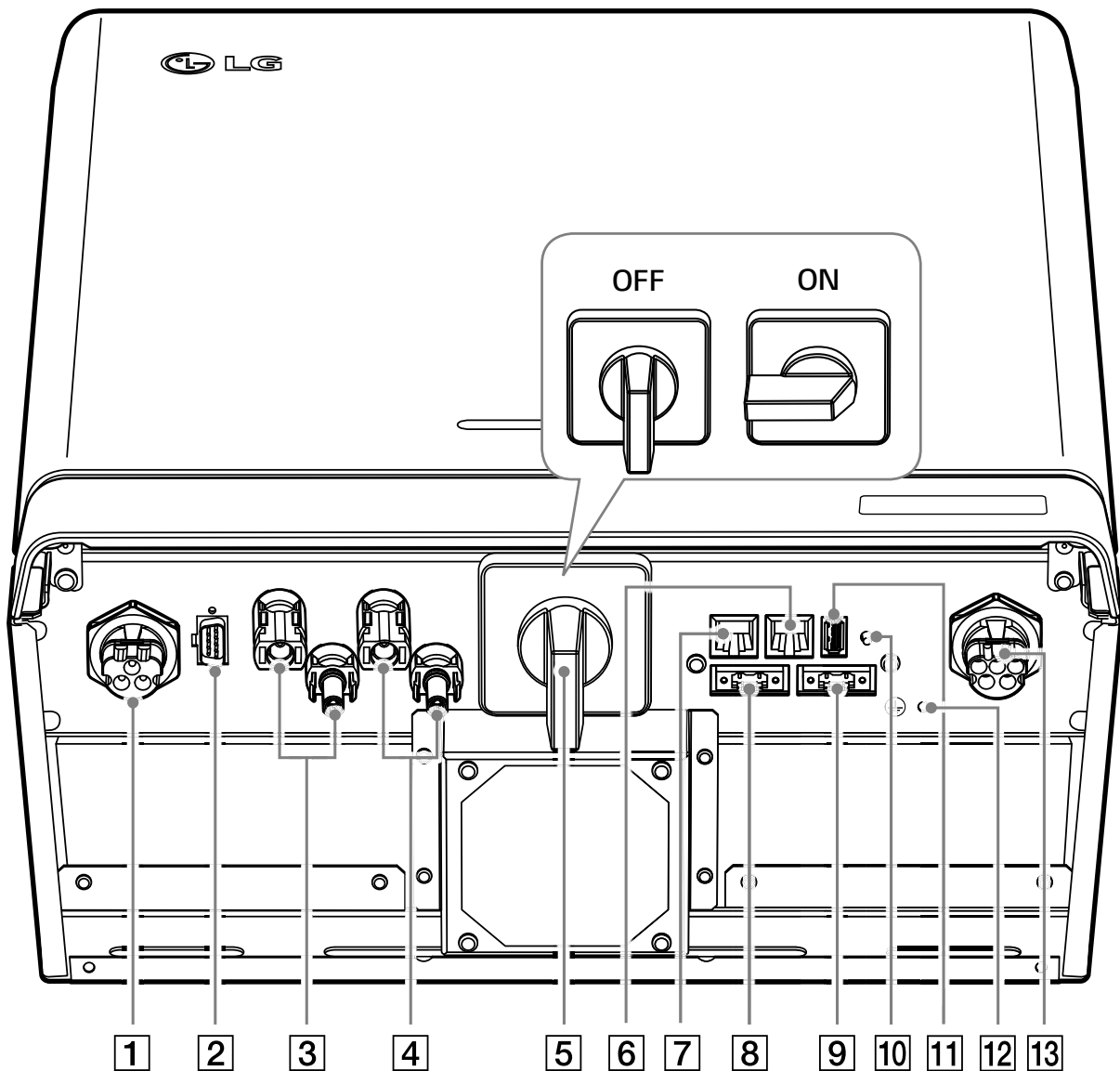
- 4** Bracket connected part
- 5** Screw holes for wall mounting

## 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	Not connected
	Green	Network connected
	Blue	WLAN network connected
	Red (Blink)	Network disconnected

## Bottom



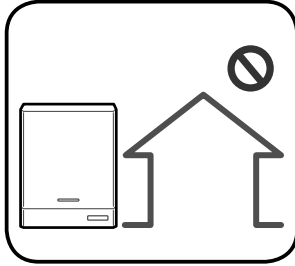
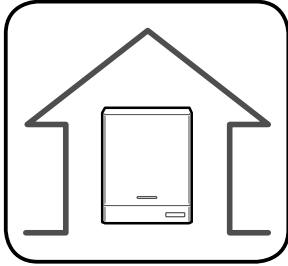
- |                                     |  |
|-------------------------------------|--|
| <b>1</b> Battery DC cable connector | <b>8</b> Meter connector                     |
| <b>2</b> BMS control connector      | <b>9</b> Heat pump connector (Not supported) |
| <b>3</b> PV1(+ and -) connectors    | <b>10</b> Wireless connection button         |
| <b>4</b> PV2 (+ and -) connectors   | <b>11</b> WLAN dongle port (USB type)        |
| <b>5</b> PV switch (DC Disconnect)  | <b>12</b> Additional PE connection hole      |
| <b>6</b> DRM port (Not supported)   | <b>13</b> AC grid cable connector            |
| <b>7</b> Ethernet port              |  |

# Choice of location

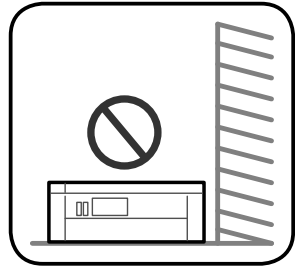
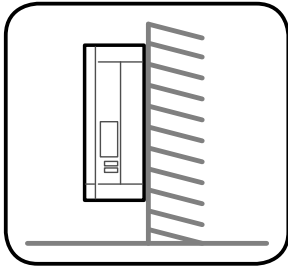
## Mounting Location

2

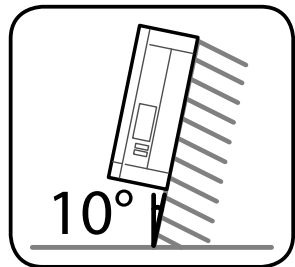
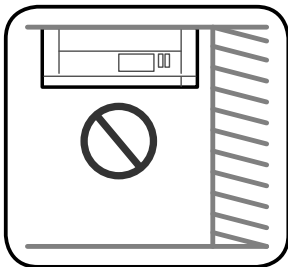
Installation



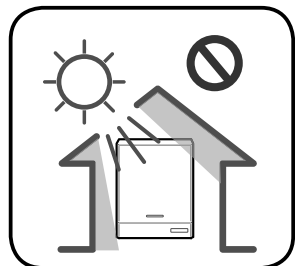
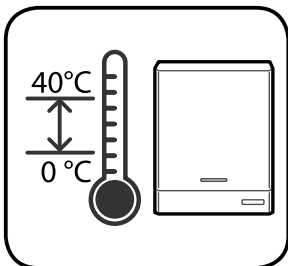
- This product is designed to be installed indoor use only. Do not install this product outdoor.
- Install this product on the place where PV cables, energy meter cables, grid cables and battery cables are easily accessible.



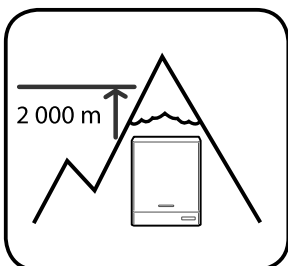
- This product is designed to be installed on the wall only. Do not install this product on the ground.
- The mounting surface must be able to support the weight of this product (25 kg).



- 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.

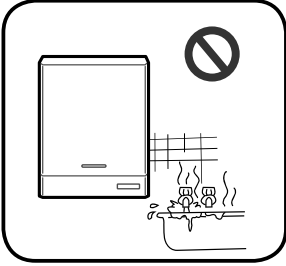


This product must not be installed or used at altitudes above 2 000 m.

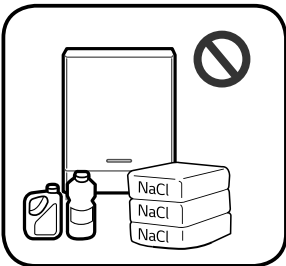




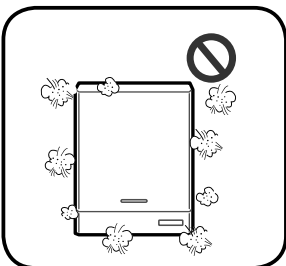
Do not install this product in places where flooding frequently occurs.



- 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.

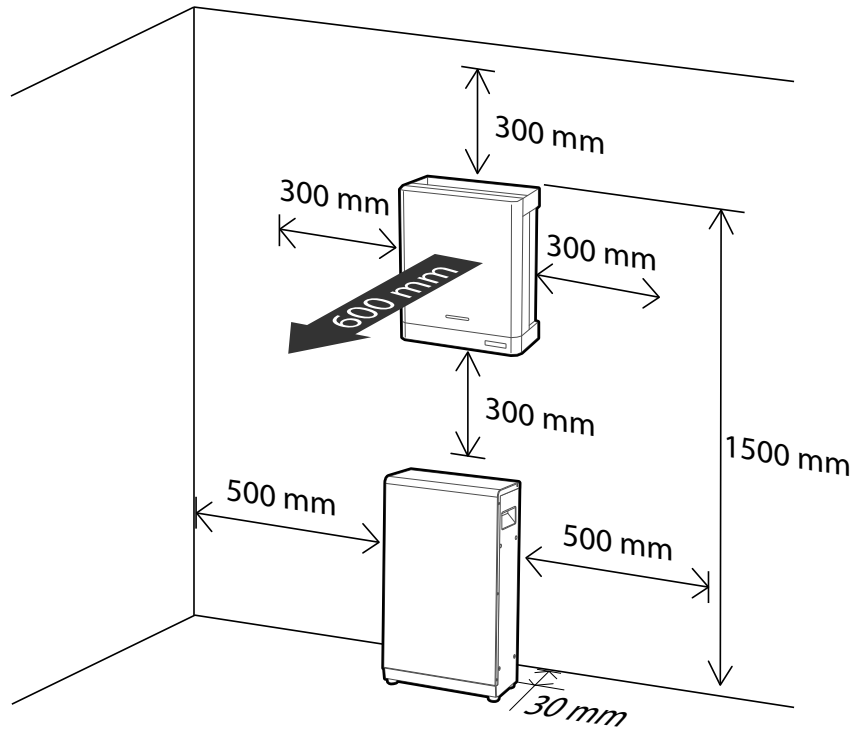


- Do not install this product in a place with ammonia, corrosive vapours, acids or salts.
- Install this product out of reach from children and pet.



Do not install this product in places and environments subject to heavy build-up of dust.

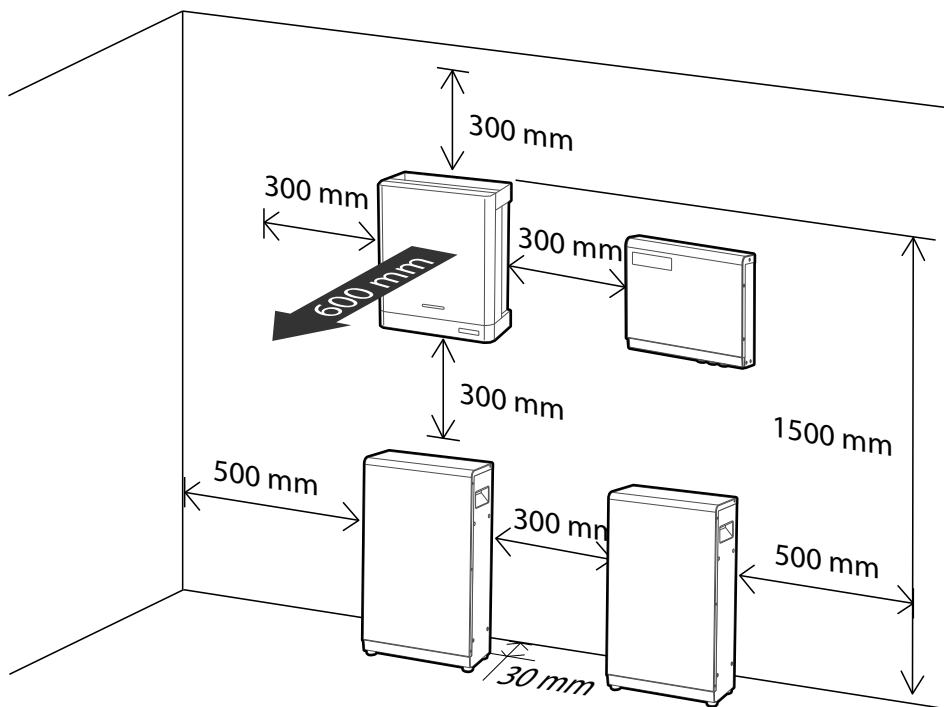
## Minimum clearance



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.

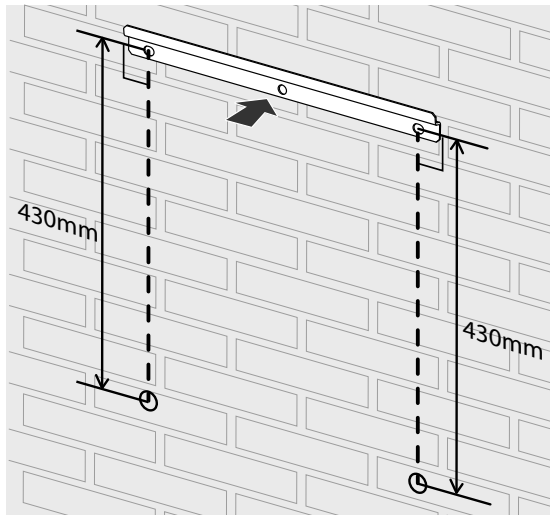
## Minimum clearance (with extension)



# Wall Mounting

This product must be installed on the wall considering appropriate environments described in previous pages. 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.

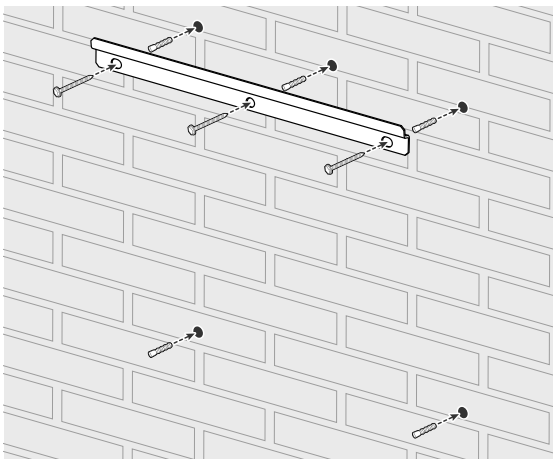
## WARNING

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

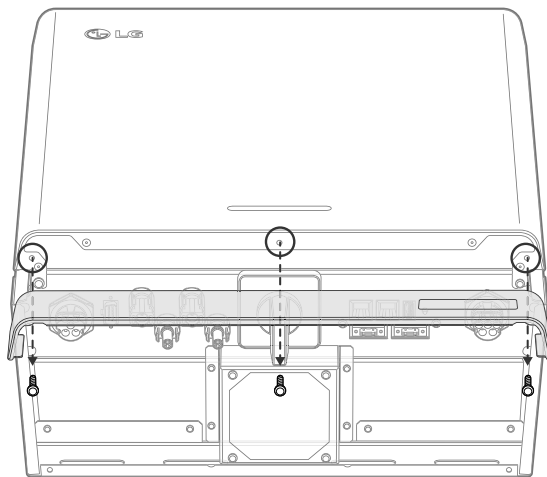


Hang this product to the wall bracket. Make sure that at least two persons work together to move the product.

**CAUTION**

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

4

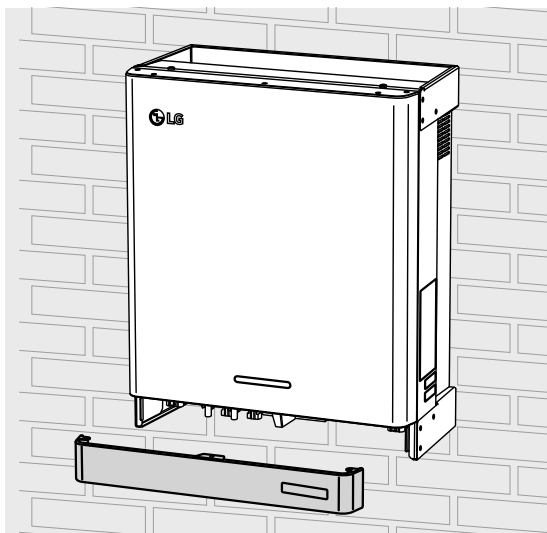


Remove the lower cover fixing screws as shown in the figure.

**NOTE**

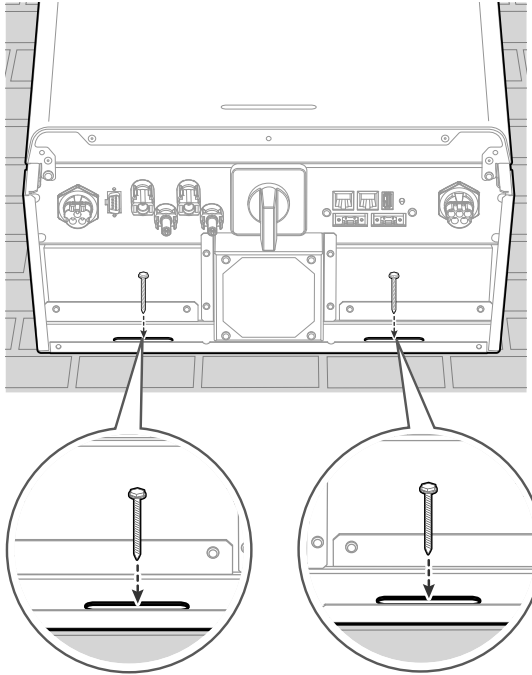
Hold the lower cover when attaching or removing the lower cover. Care with handling the lower cover.

5



Disassemble the lower cover from the product.

6



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.

---

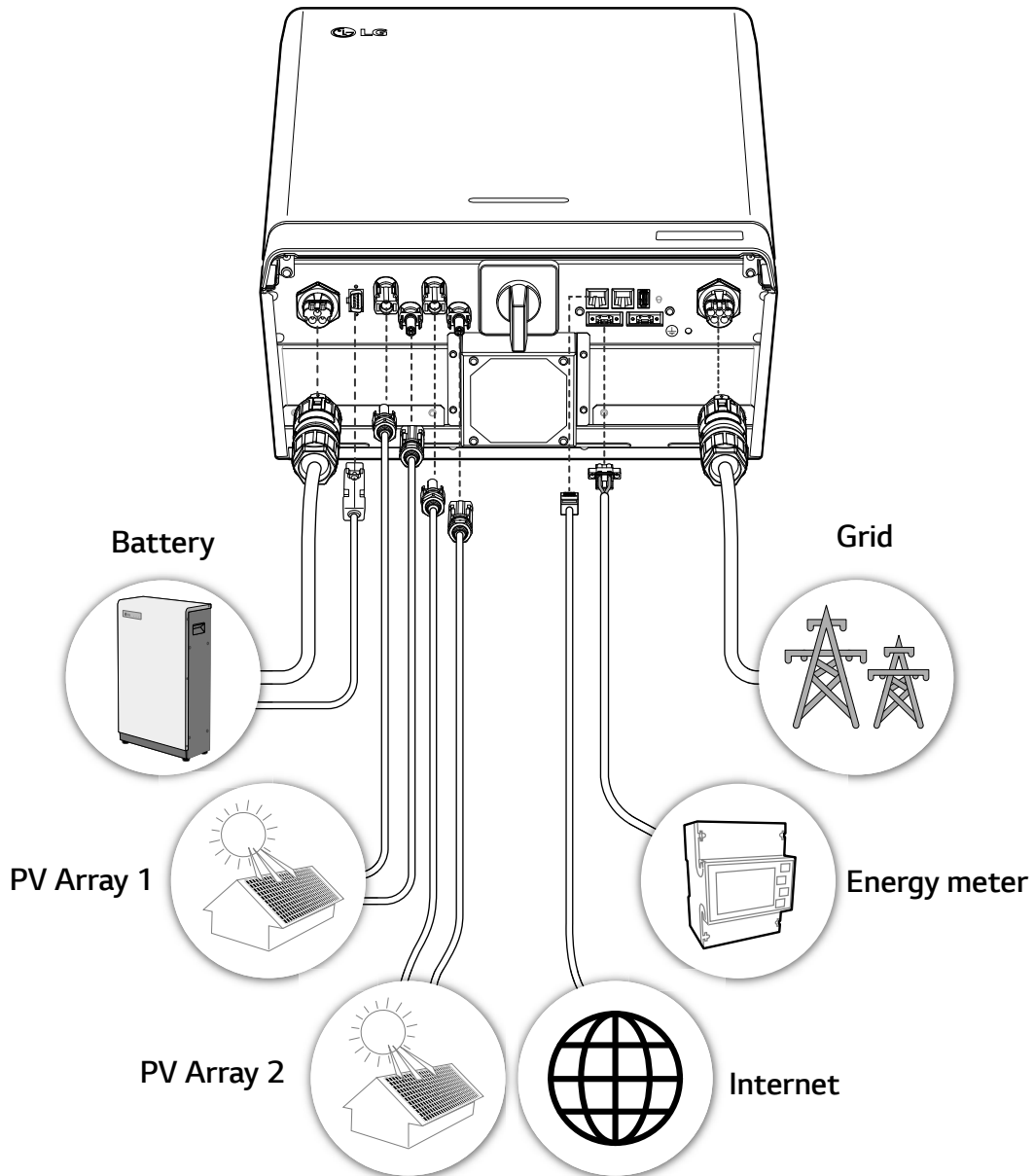
---

**i 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.
-

# Connections

## Connection Overview



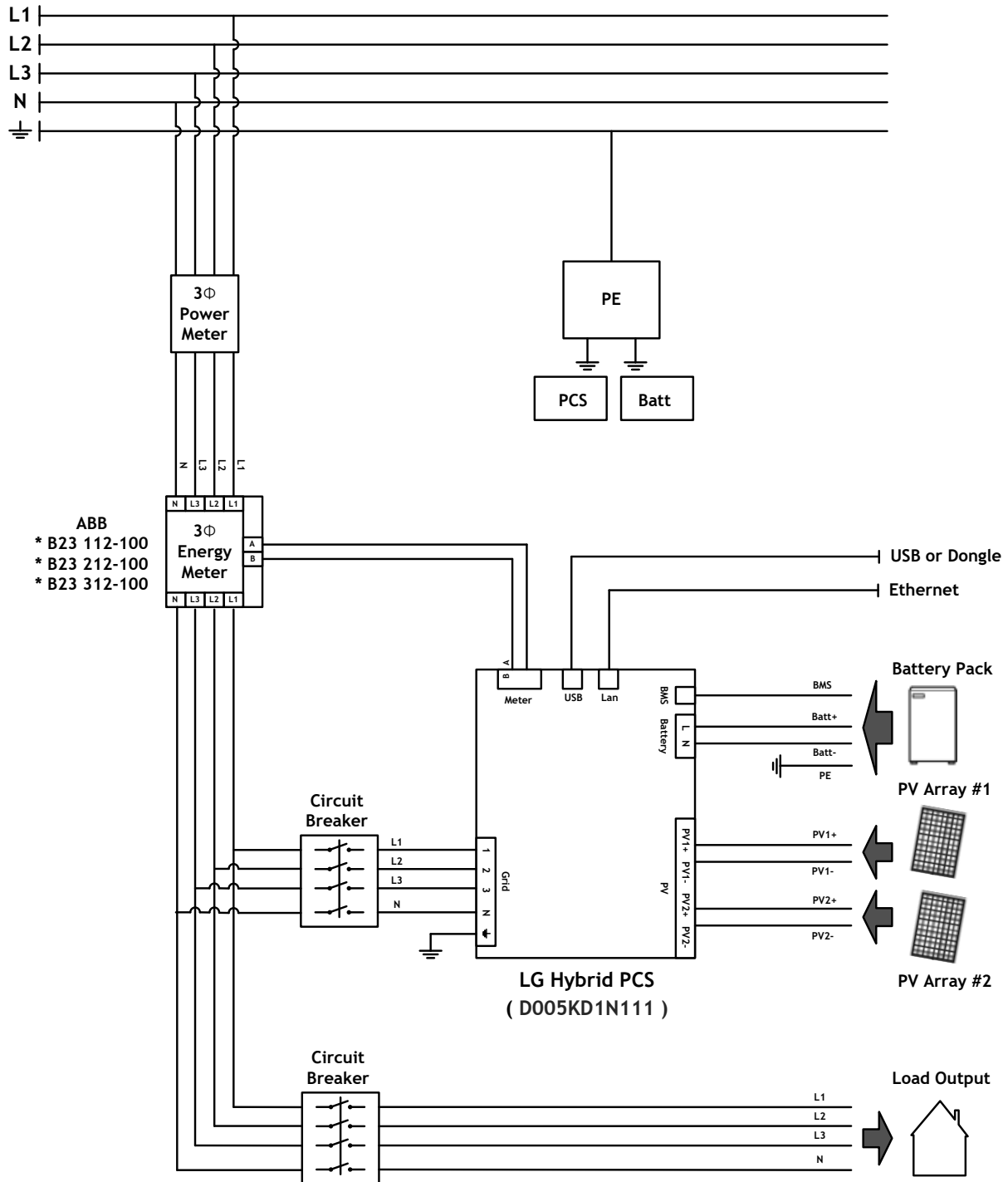
### **!** WARNING

- 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.

## Connection Diagram



## PV array connections

You can connect up to two 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 800 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.
- 

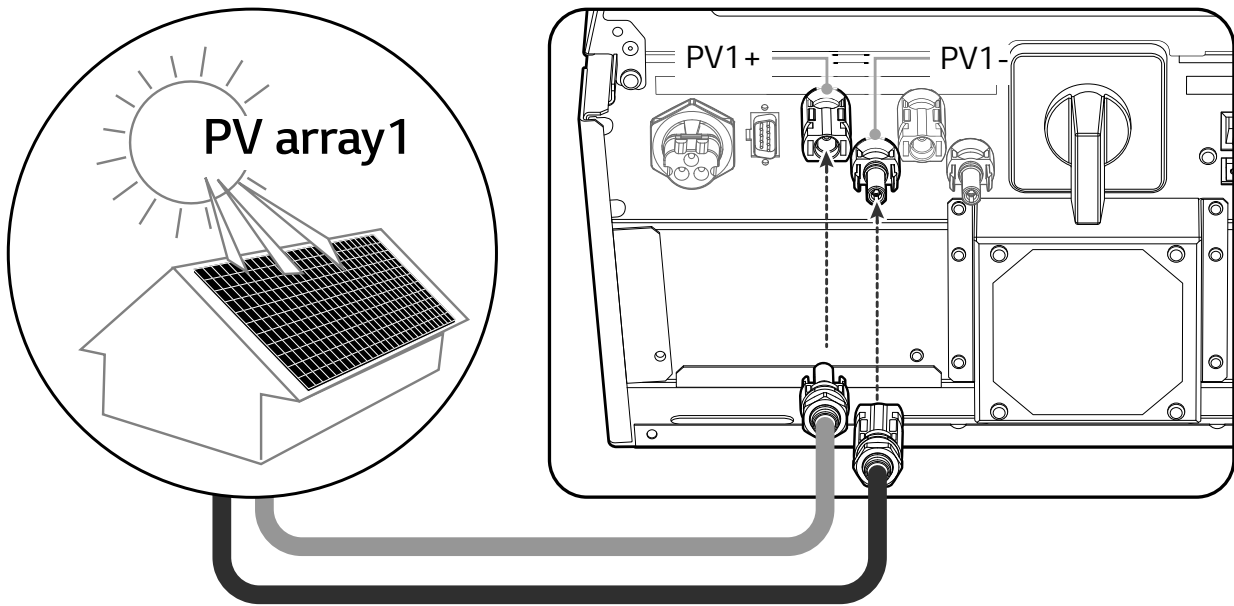
### **NOTE**

- PV modules shall have an IEC61730 Application Class A rating or equivalent.
  - For DC cables of PV connections, it is recommended to use the cross-sectional area of lead wire between 2.5 mm<sup>2</sup> and 6 mm<sup>2</sup>.
  - When you connect only one PV array to the PCS, the PV array must be connected to the PV1 (+ and -) connectors.
  - When you use both PV1 and PV2 connectors, use the PV1 connectors for bigger PV array.
-



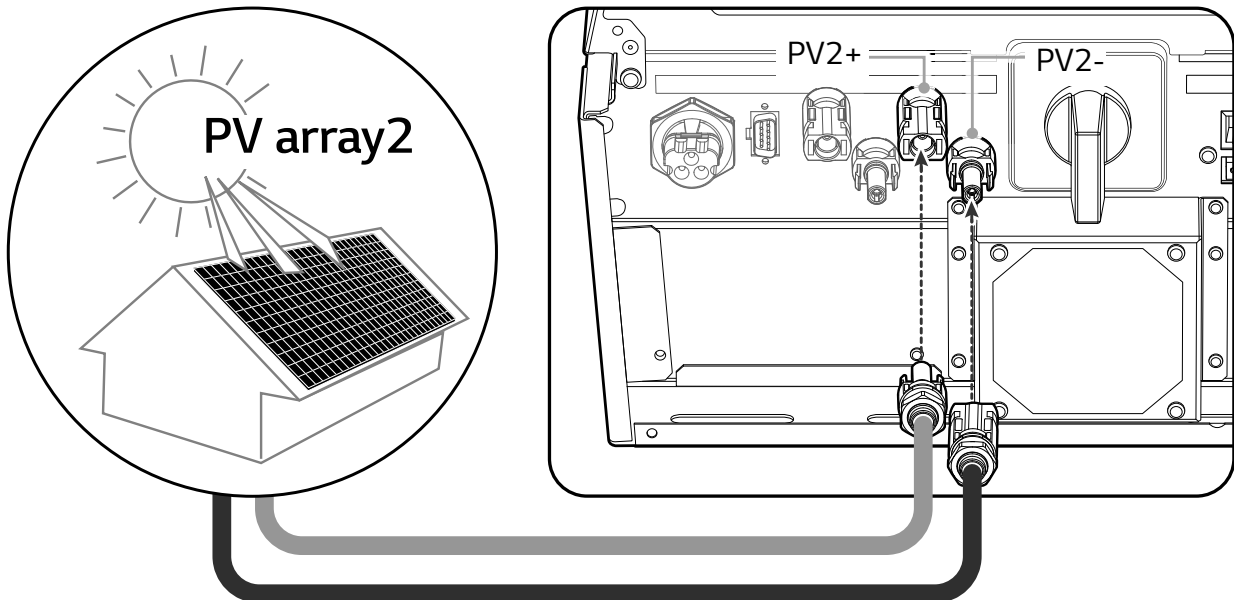
## PV1 connection

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



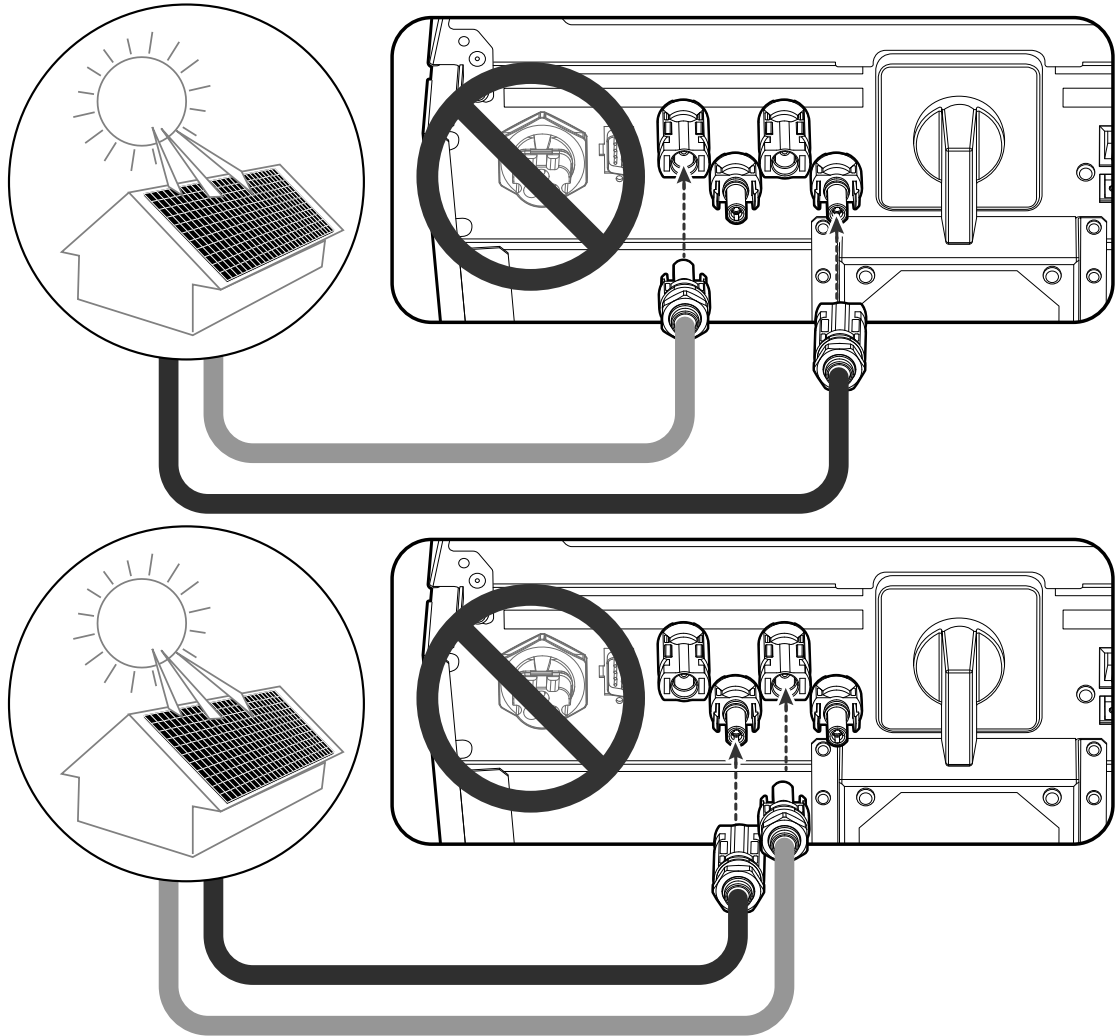
## PV2 connection

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

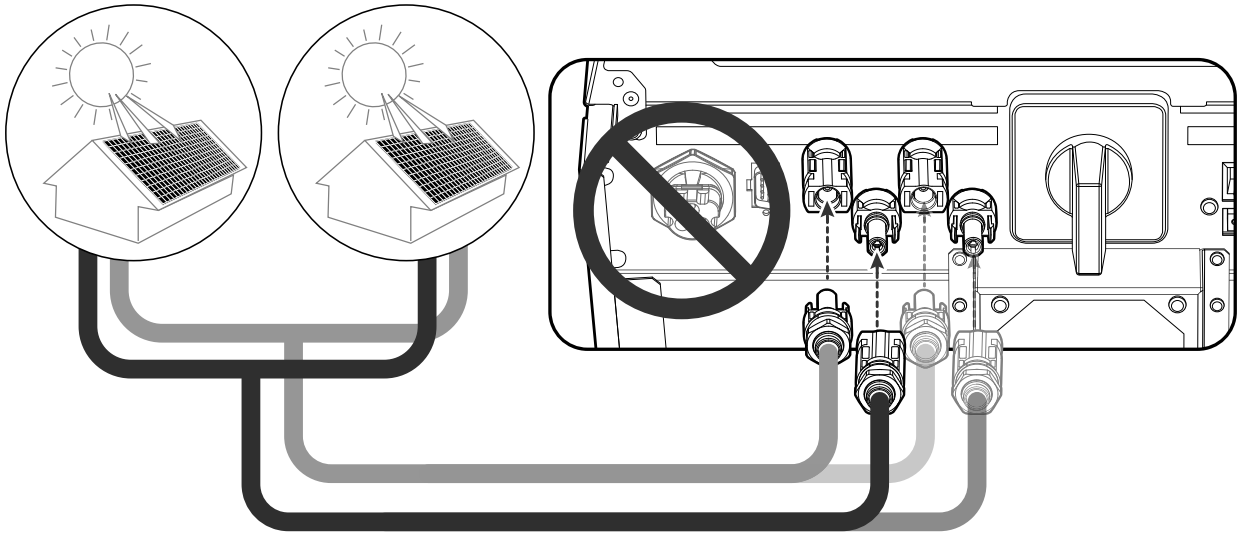


**! WARNING**

- 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.
- Do not connect the PV cable from one PV array to the PV1 +, PV2- or PV1 -, PV2+ connectors on the product. It 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.



***i* 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-).

## 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

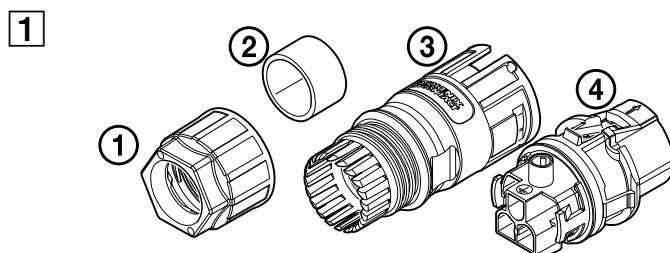
Incorrect battery polarity connection will damage the product seriously. This damage is not covered by the warranty.

### **i** NOTE

The total length of DC battery cable and BMS cable must be 3 m or less.

## DC cable connection

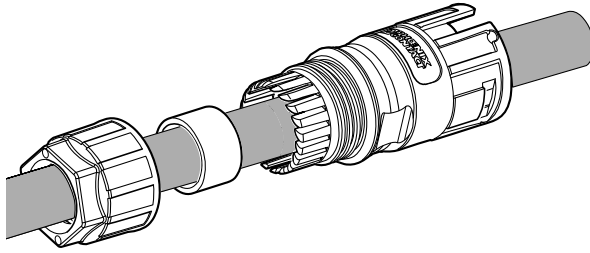
Connect the DC cable on the battery to the DC terminal on this product.



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

1. cable gland
2. rubber seal
3. housing
4. Contact carriers

2

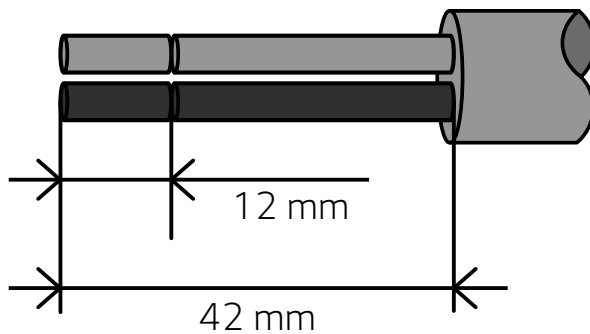


Pass the battery cable through the cable gland, rubber seal and housing as shown in the figure.

### NOTE

- For battery cable connections, the cross-sectional area of lead wire between 2.5 mm<sup>2</sup> and 4 mm<sup>2</sup> is recommended.
- Battery cable is not supplied on this product package. The system installer is responsible for selecting proper components for the installation.

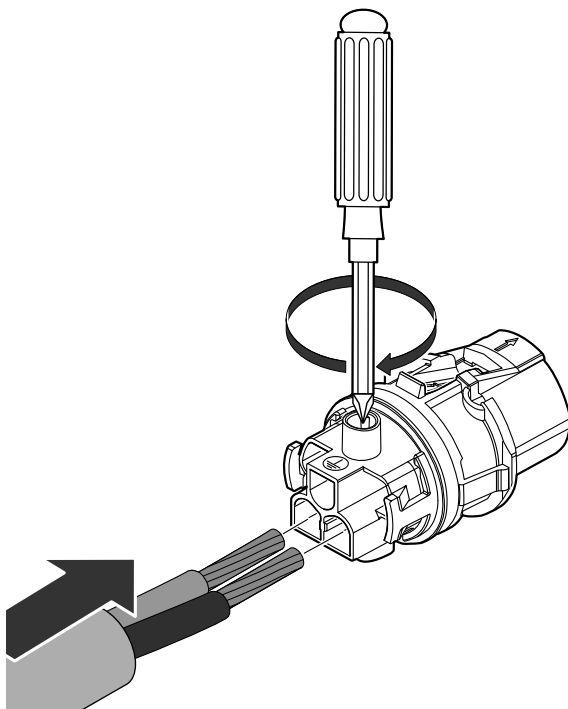
3



Strip the battery cable as shown in the figure.

1. Strip 42 mm off the battery cable.
2. Strip 12 mm off the every wires.

4



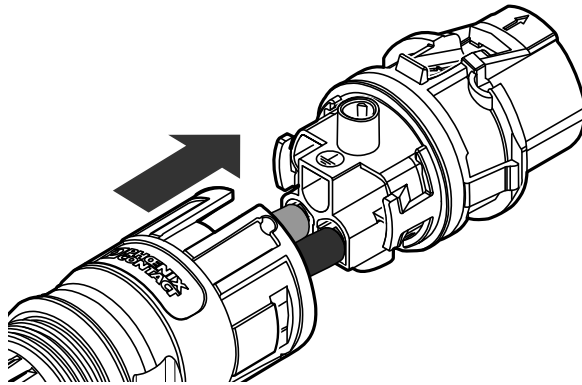
Connect the wires to the corresponding wire hole on the contact carriers.

Wire hole **L** ↔ Battery wire **+**

Wire hole **N** ↔ Battery wire **-**

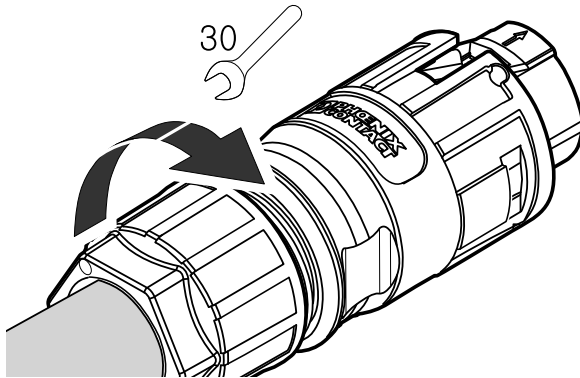
And then fasten the screws on the contact carriers. (1 N.m)

5



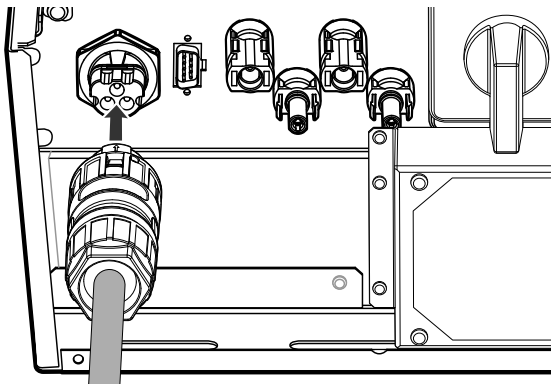
Push the contact carriers into the housing until it clicks.

6



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

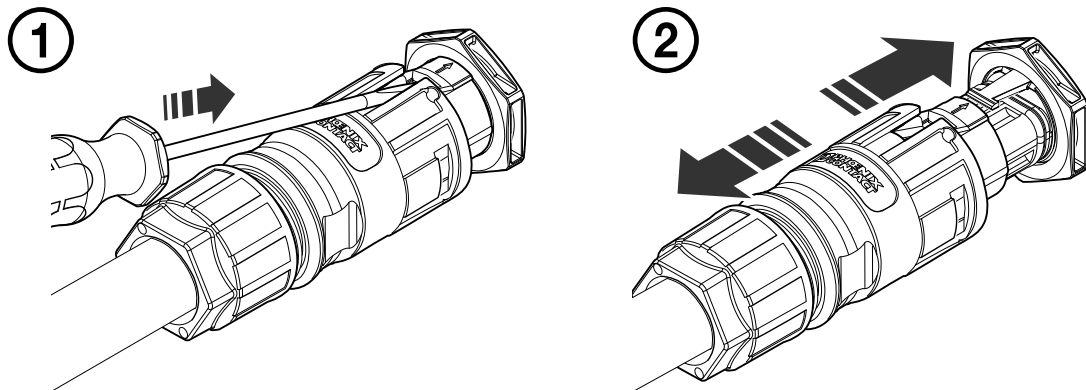
7



Connect the battery cable plug to the battery DC 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.

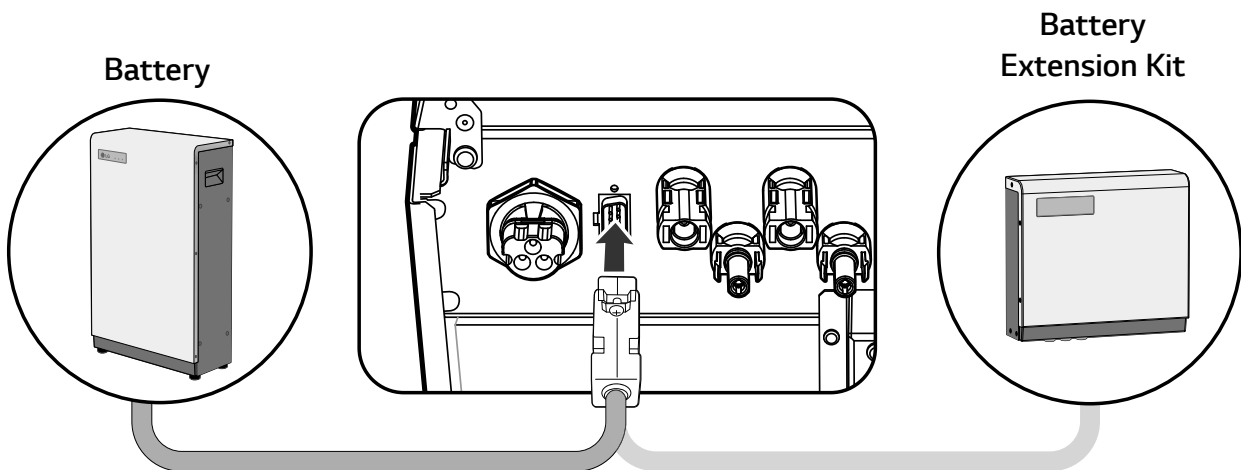


### **!** WARNING

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

## Battery communication connection

Connect the supplied BMS cable to the battery and connect the other end of the BMS cable to the product as shown in the figure. After making a connection, fasten the screws on the connector to fix it.



### **!** CAUTION

Do not use any other BMS cable except supplied BMS cable in the system package.

## 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

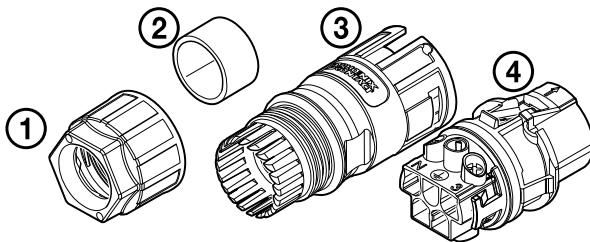
Make sure the AC circuit breaker, PV switch and DC circuit breaker of the battery are disconnected before starting electrical cable connections. .

### **i** NOTE

- AC circuit breaker must be the current ratings of 16A.
- 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**

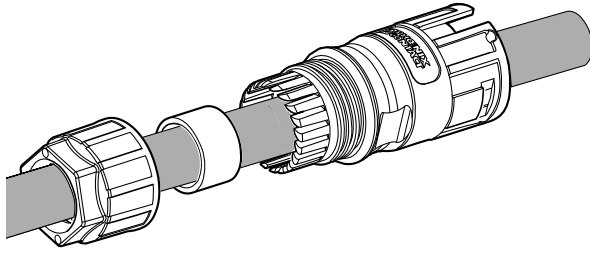


Check the components of grid cable plug which is supplied in the product package.

1. cable gland
2. rubber seal
3. housing
4. Contact carriers



2

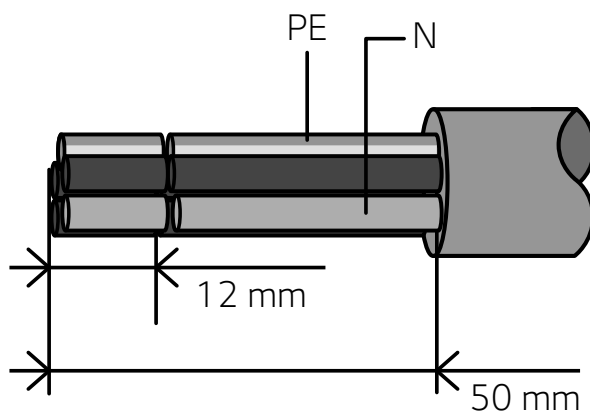


Pass the AC cable through the cable gland, rubber seal and housing as shown in the figure.

### **i** NOTE

- For AC cable connections, the cross-sectional area of lead wire between 2.5 mm<sup>2</sup> and 6 mm<sup>2</sup> is recommended.
- AC cable is not supplied on this product package. The system installer is responsible for selecting proper components for the installation.
- The recommended cable diameter for the AC cable gland is 16 mm. (including sheath)

3



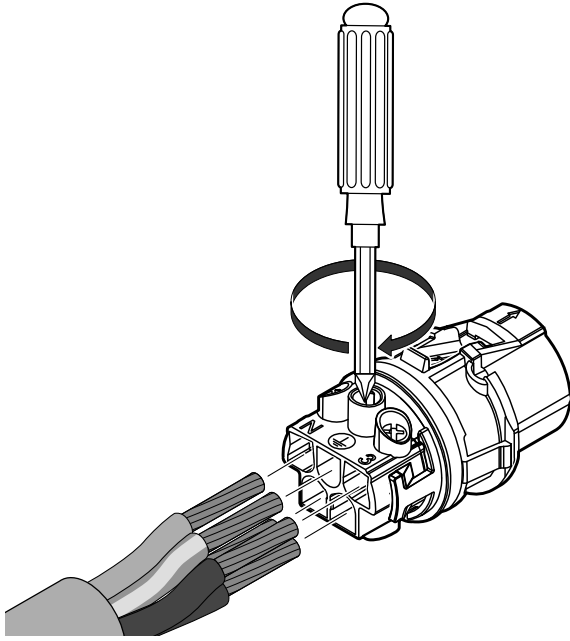
Strip the AC cable as shown in the figure.

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

### **i** 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**

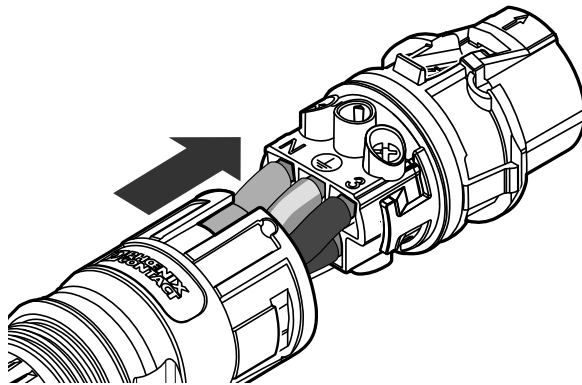
Wire hole  $\perp$  ↔ Grounding wire **PE**

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

### *i* NOTE

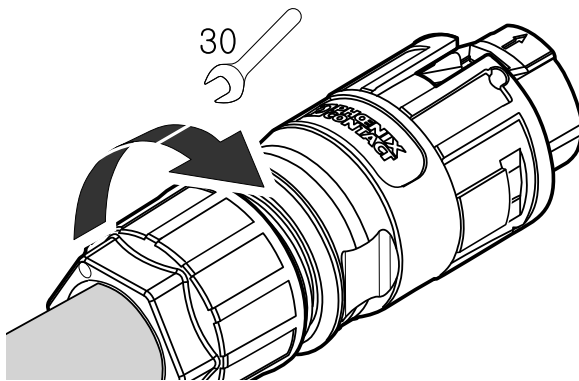
- The N (neutral) hole in the contact carrier must be connected to the N(neutral) terminal of the AC circuit breaker on the distribution box correctly. Otherwise the product could be damaged seriously.
- The PE (Protective Earth) grounding connector in the contact carrier must be connected to the  $\perp$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

5



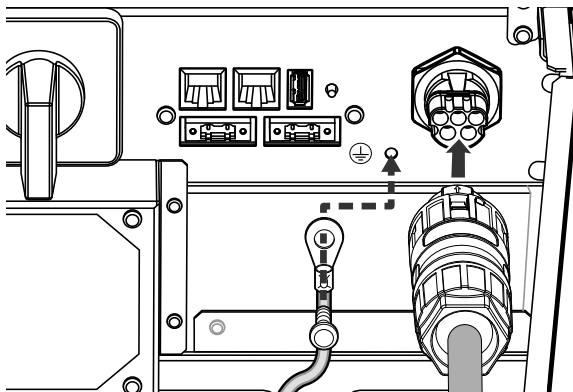
Push the contact carriers into the housing until it clicks.

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



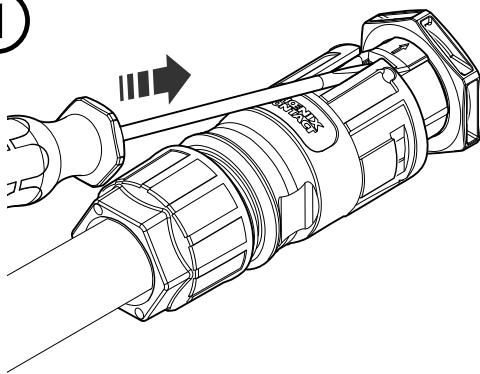
Connect the AC cable plug to the AC grid cable connector at the bottom of the product.

And then connect the additional grounding wire to the additional grounding connector. (M4)

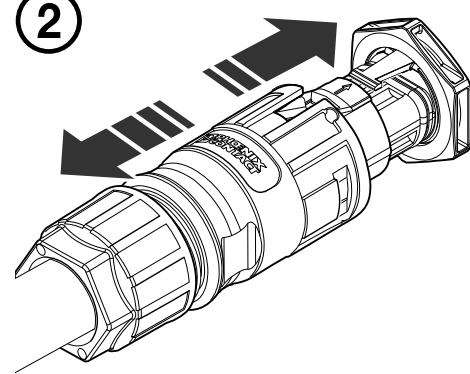
## Disconnecting the plug

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

1



2



## 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.

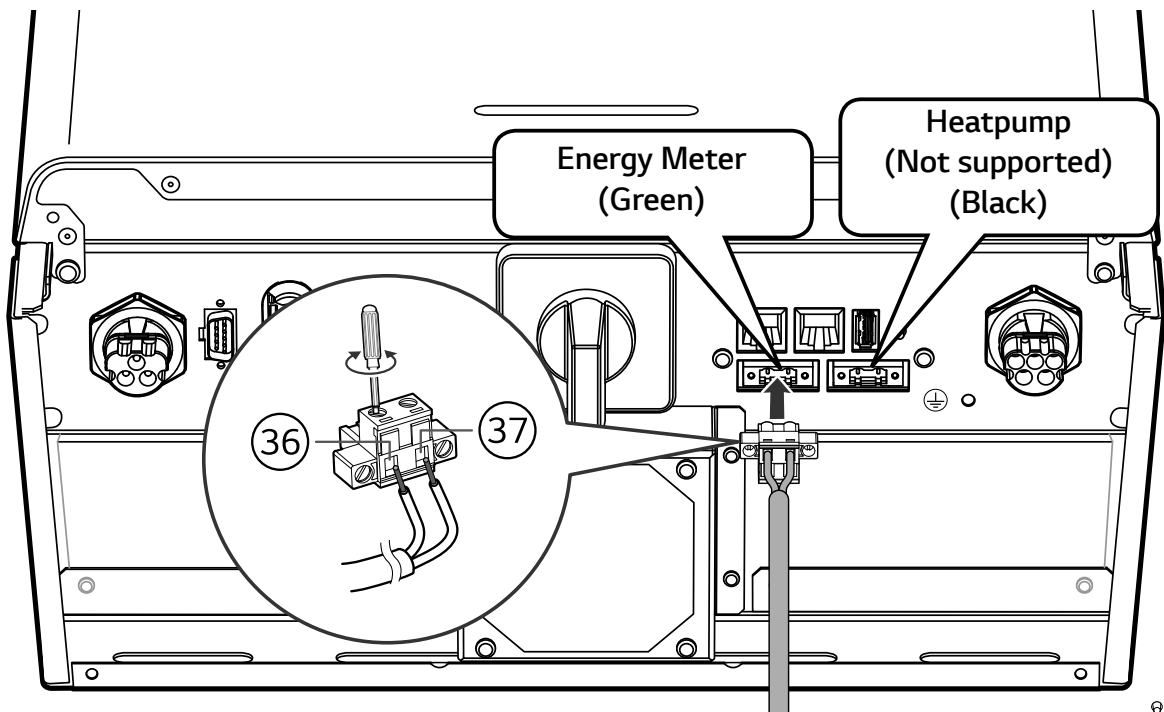
Internet connection is required to use variety of functions such as network update, EnerVu monitoring system, etc. You may need to contact your Internet service provider (ISP) to connect this product to the internet.

### 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.

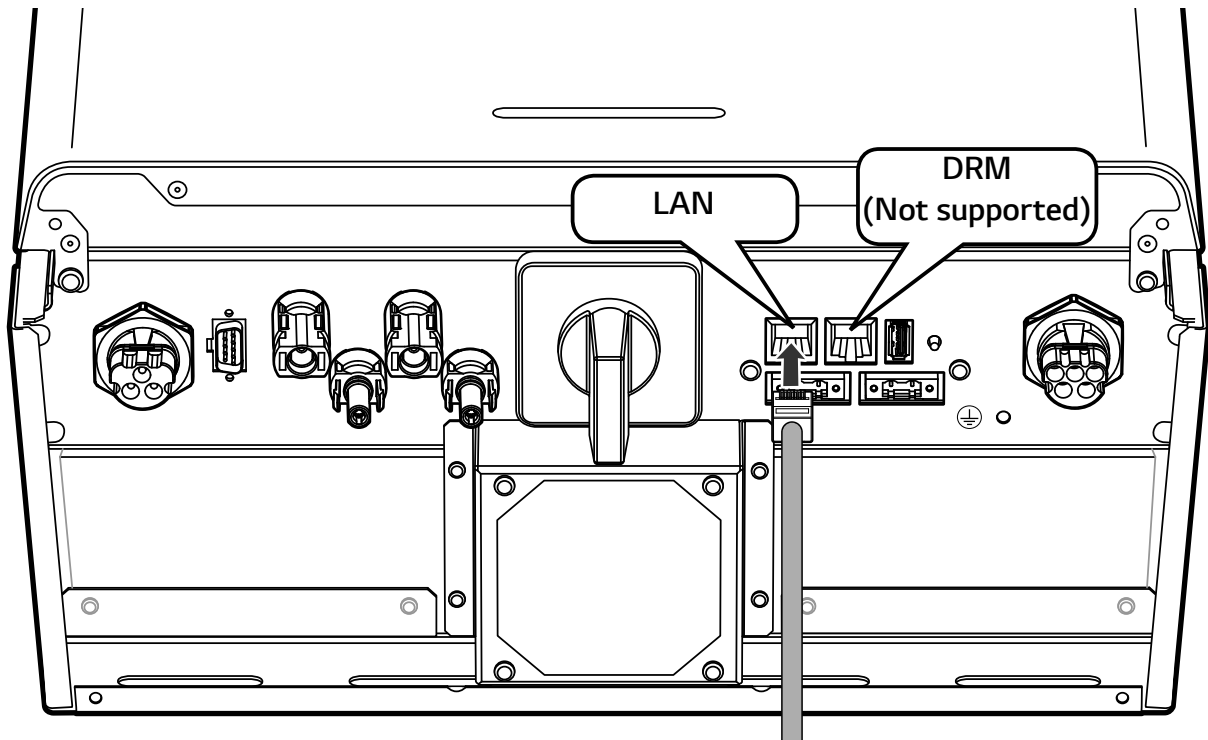


### NOTE

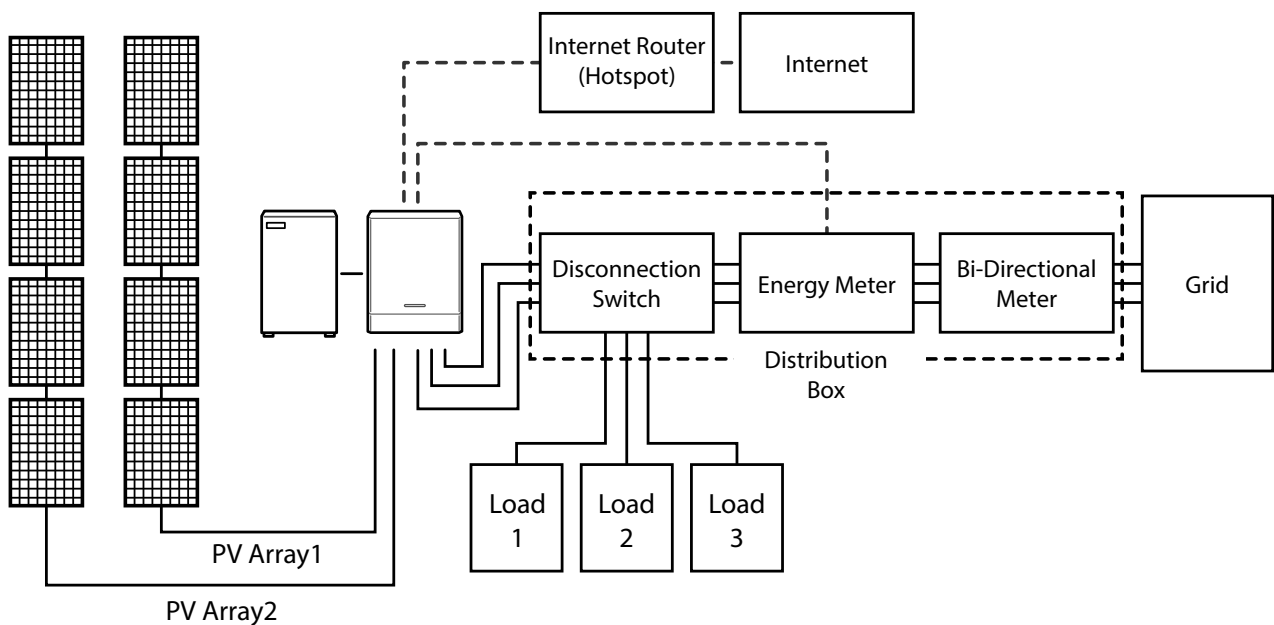
- Compatible energy meter brand and model name are stated on page 78.
- The numbers described in the figure are the port number for the ABB energy meter connection.

## 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.



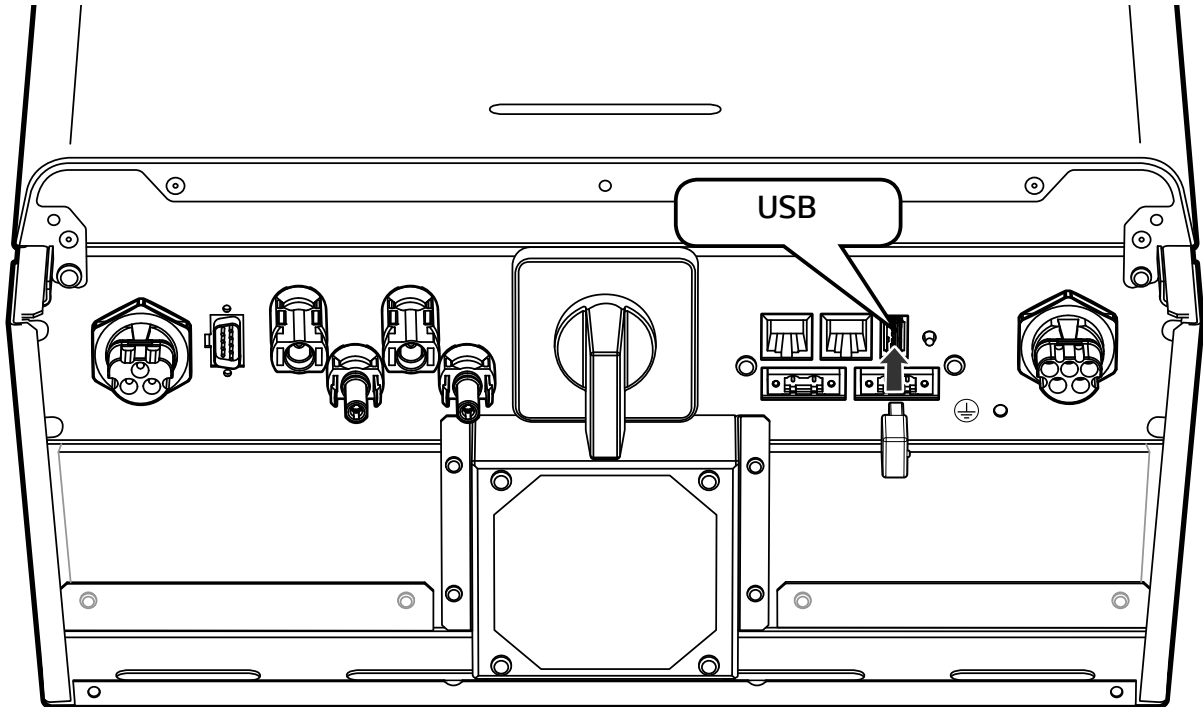
## Energy meter and LAN connection diagram



## 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.



2

Installation

## 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.

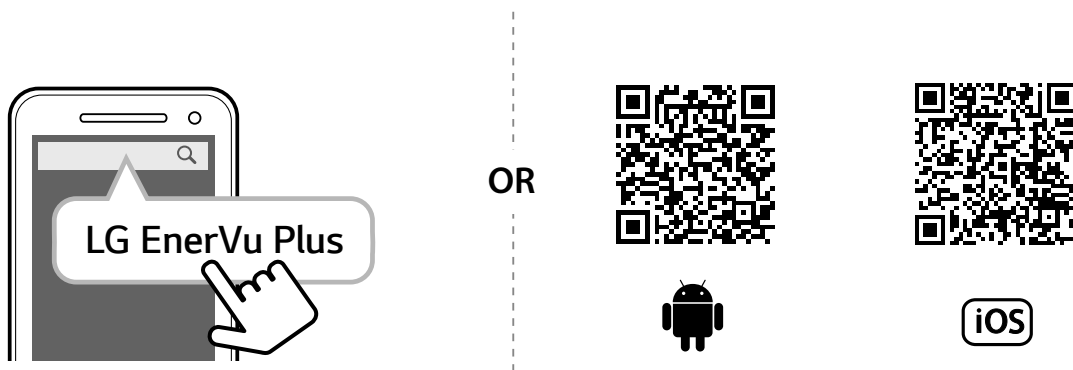
# Installer settings

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.



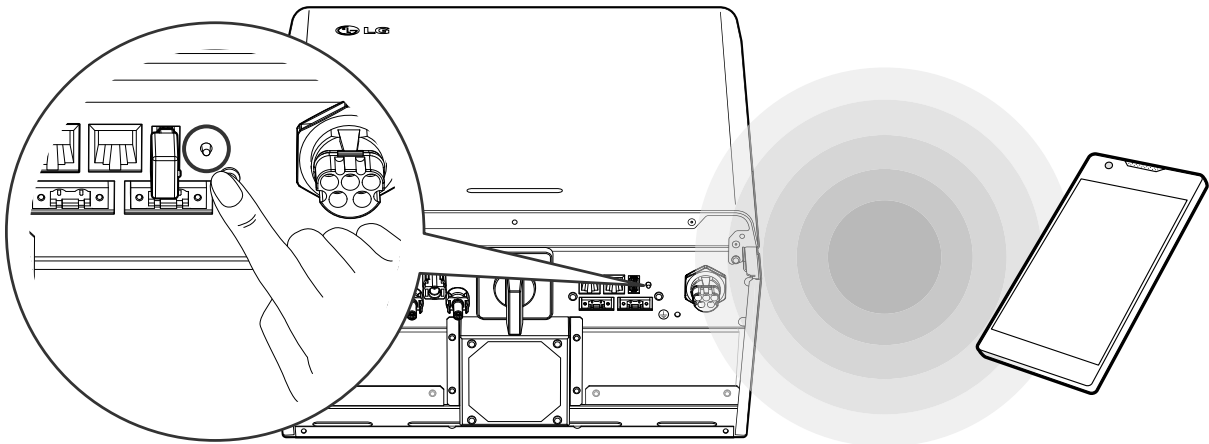
### NOTE

- 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.



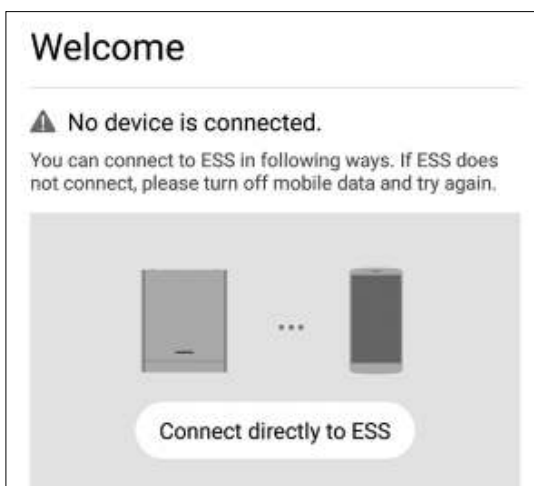
### Connect directly to ESS

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

**Connect directly to ESS**



Push the WLAN button on bottom of ESS, and go to the menu Settings > WLAN and select ESS to connect. ESS WLAN password is 'WLAN Password' on right side of ESS device.

**CANCEL OK**

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.

### **i** NOTE

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

4

**Connect directly to ESS**



Push the WLAN button on bottom of ESS, and go to the menu Settings > WLAN and select ESS to connect. ESS WLAN password is 'WLAN Password' on right side of ESS device.

**CANCEL OK**

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

Select the SSID which starts with 'LGE\_ESS'. The password input screen appears.

### **i** NOTE

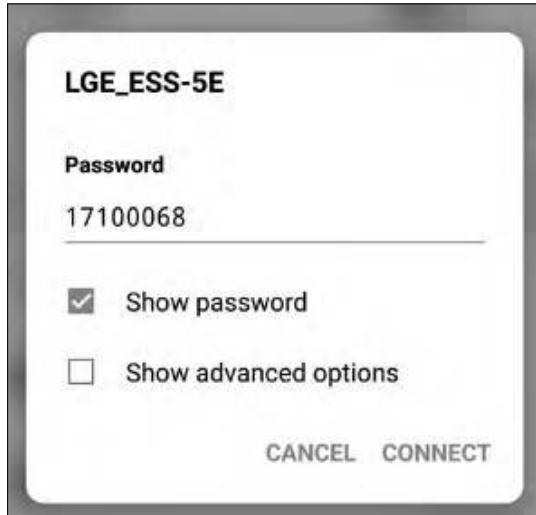
The last 2 characters of the SSID are the same as the last 2 characters of the system registration number.

Example :

SSID (LGE\_ESS-**5E**)

Registration No. (LGE-ESS-  
DE1710BKRH0068**5E**)

5



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

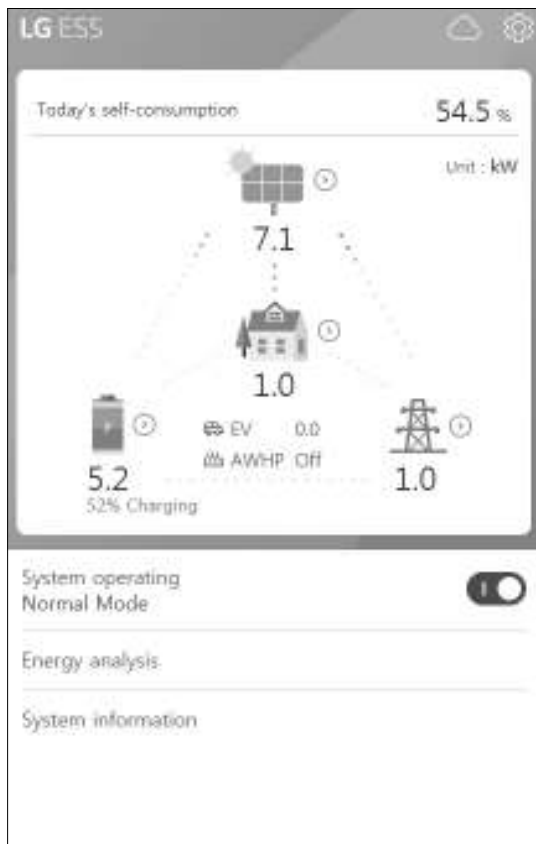
The WLAN password is 8 digit numbers. Find the 'WLAN password' printed in the label outside of the PCS.

**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 recommended to change the password after first entering. See 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] and [PV2]

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 [Accept] to complete the setting.

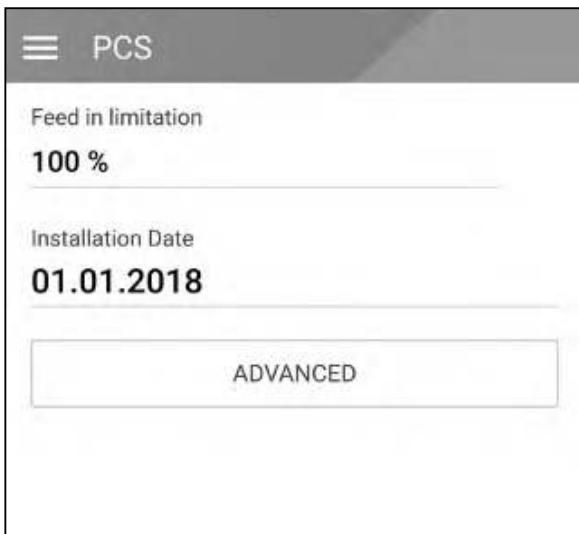
Tap [Start Auto] to collect the connected energy meter information and set all the option values automatically.

### NOTE

The [PV System Capacity] options of [PV1] and [PV2] 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.

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

Set the options as described below.

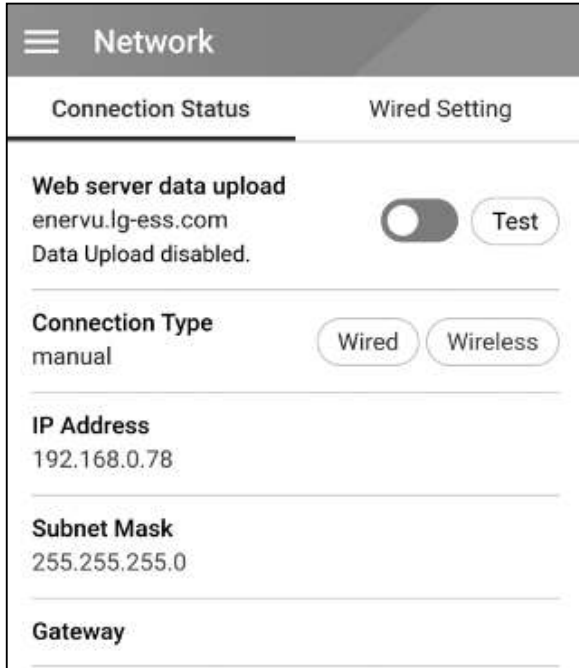
1. Select the currently selected value. Input menu appears on the screen.
2. Input desired value.
3. Select [Accept] to complete the setting.

Tab [ADVANCED] 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) NumOfActive Point, Q(U) Xa, Q(U) Xb, Q(U) Xc, Q(U) Xd, Q(U) Xe, Q(U) Xf, Q(U) Xg, Q(U) Xh, Q(U) Ya, Q(U) Yb, Q(U) Yc, Q(U) Yd, Q(U) Ye, Q(U) Yf, Q(U) Yg, Q(U) Yh, Q(U) Power Lock-in, Q(U) Power Lock-out, Q(U)\_OP Reactive range
- When changing the option values of [PCS] menu, refer to page 80 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 devices.

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

### Wired Network Setting

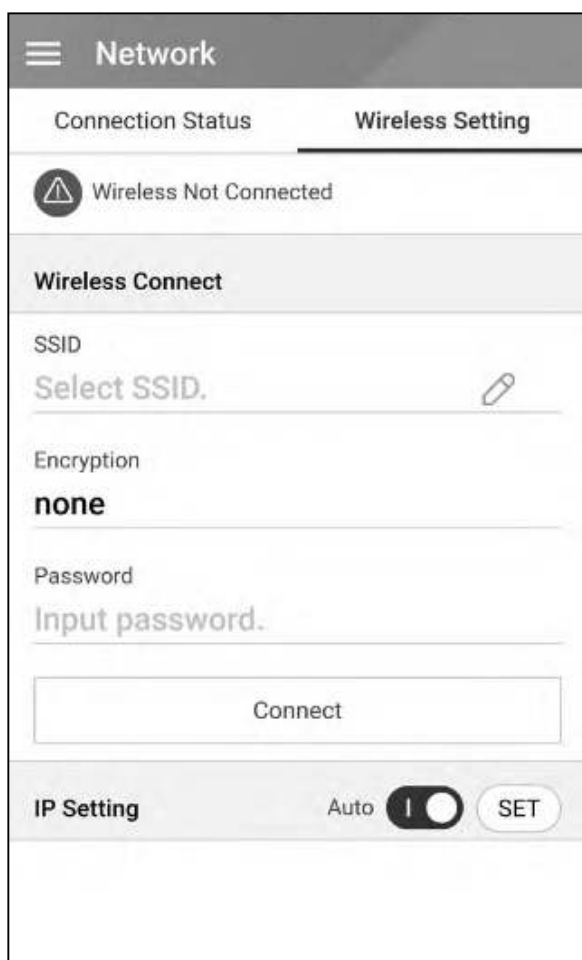


When the [Connection Type] option in the [Connection Status] is set to [Wired], Wired connection options are displayed.

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.

Tap [SSID] field 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, tap [Connect] to finish the wireless network connection.

If the connection is successful, [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 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.

 **NOTE**

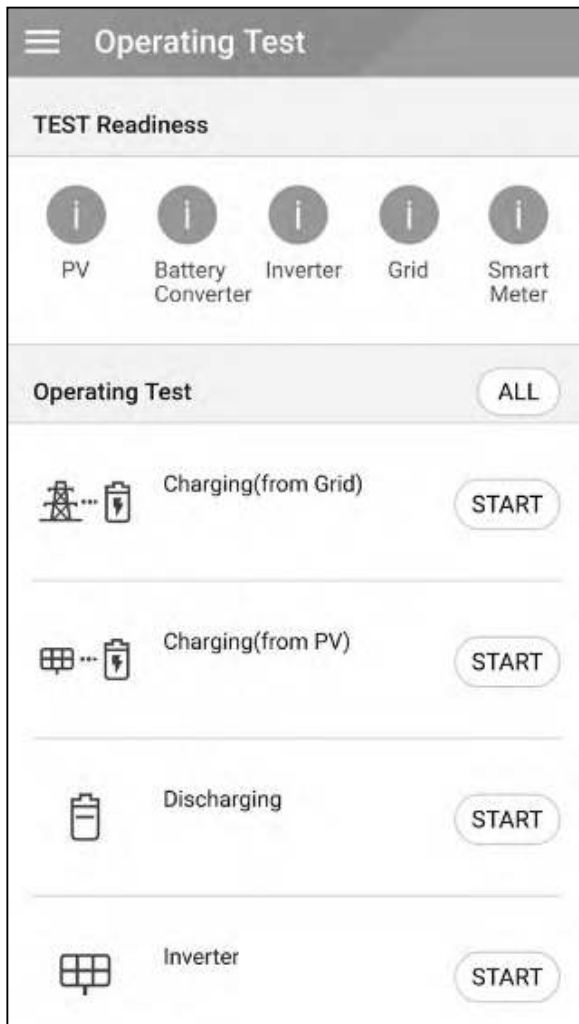
Notes on internet Connection:

- 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.

### 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 10 % and the solar radiation amount is sufficient.

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 page 63.

## 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.



[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]

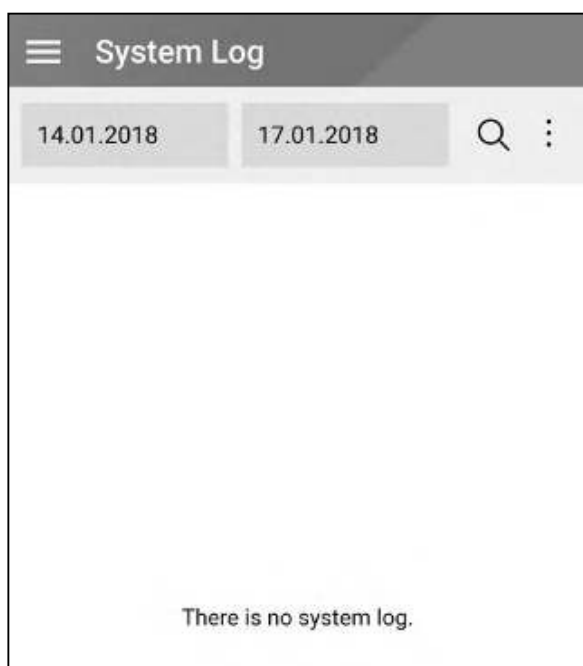
To use the EnerVu web monitoring system, the ESS system and its owner must be registered to the EnerVu web server. Use this option to register the system conveniently without accessing EnerVu screen on the web browser.

Refer to 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 page 63 for more information of error codes, messages and solutions.

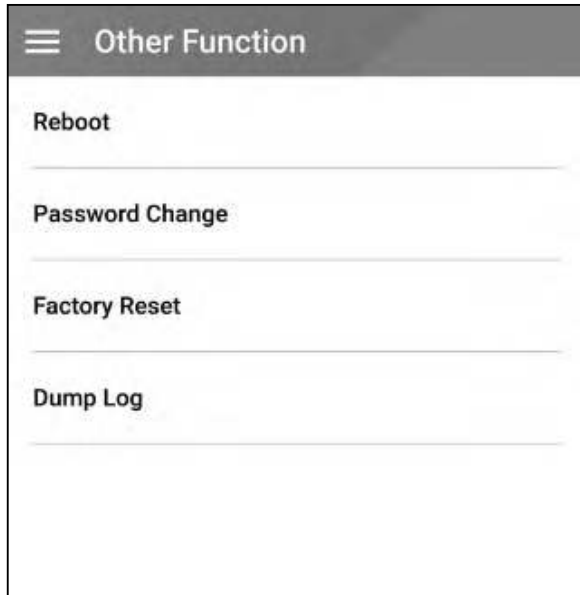


Tap [System Log] on [Installer Settings]. The list of all notice occurring in this product during certain period.

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 [Installer Settins] 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 select [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]. 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

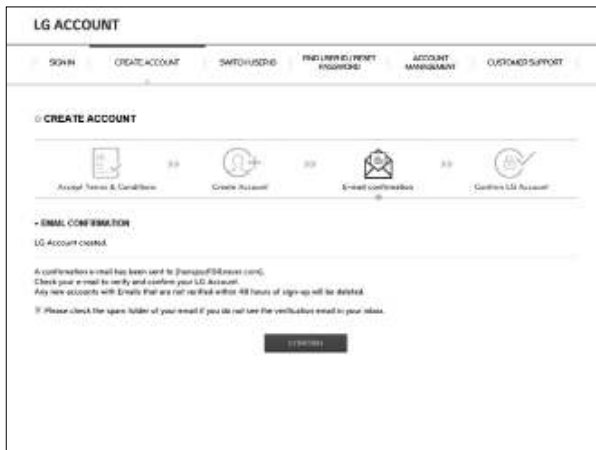
Fill your e-mail address in [User ID] field and select [CHECK AVAILABILITY]. Fill in [Password], [Password confirm] and [Birthday] fields and select [CONFIRM]. The E-mail confirmation page appears.

3 Settings

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



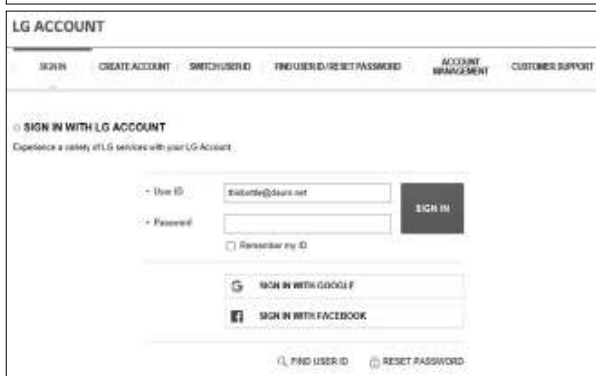
On the account creation page, select [CONFIRM] to complete creating your account.

6

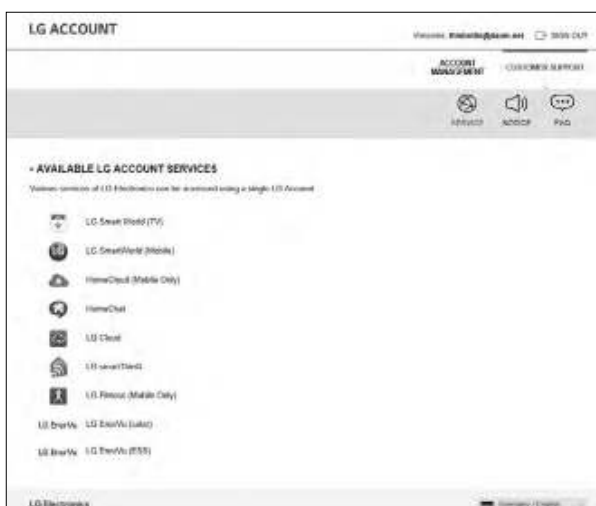


Select [SIGN IN] to go to the [SIGN IN WITH LG ACCOUNT] page.

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



7

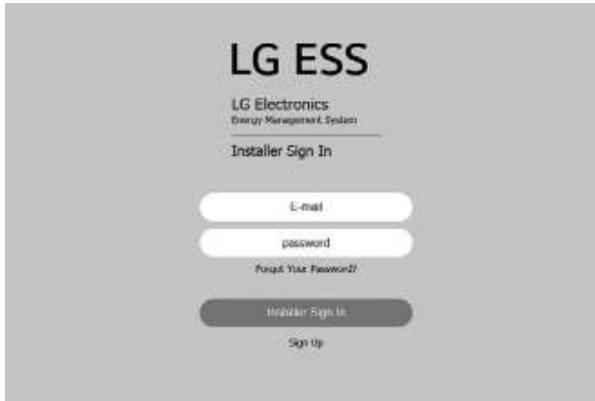


Available LG account services are displayed on the screen.

## 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.

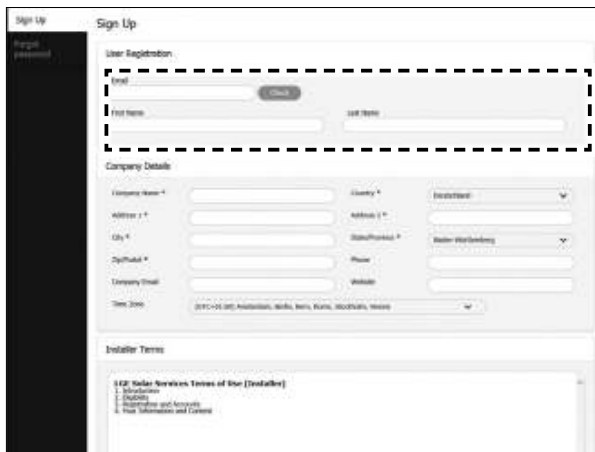
1



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

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

2

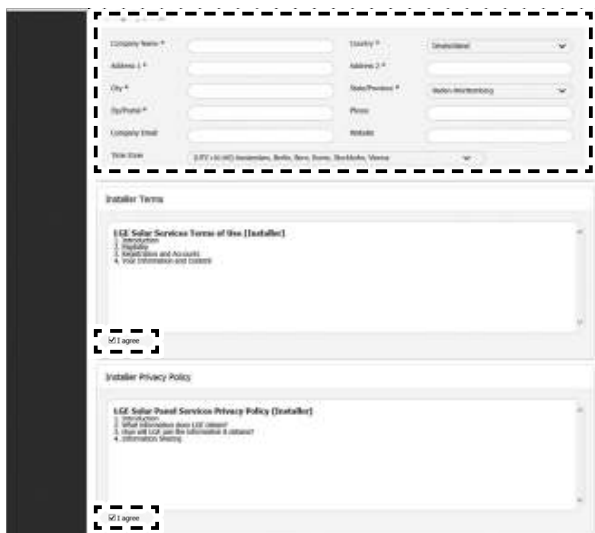


Select [Sign Up]. The [Sign Up] page appears.

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.

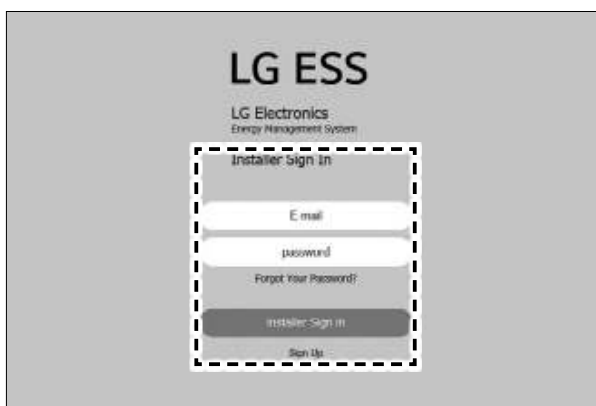
## Registering the PCS (Web browser)

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.

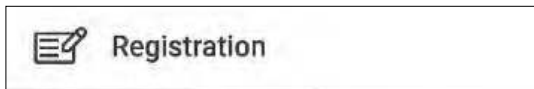
And Select [Activation] at the bottom of the page to finish the activation process.

## 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

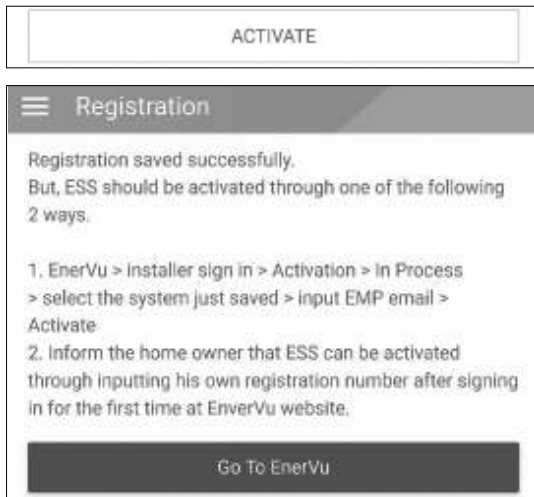
Enter the every fields in the [EnerVu] menu. The \* marked fields are required fields.

### 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 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

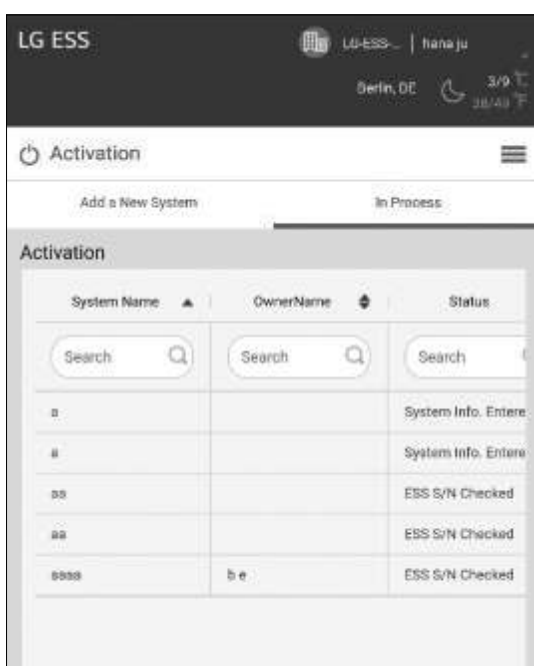


On your browser, visit LG EnerVu page at <http://enervu.lg-ess.com>.

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.

3

Settings

### 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.

### **i** NOTE

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

# Error Codes and Messages

- 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 Extension Kit. An Emergency Charge is not an ESS fault.

## PCS 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 lower than the limitation and the state is maintained for more than 10 minutes	Contact service center

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
P412	Extention Kit Relay Fault	Extention Kit Relay is melted	Contact service center
P460	Grid L1 Under Voltage	Voltage level of the grid (L1) is lower than the limitation	Automatically restart within a Minute
P461	Grid L2 Under Voltage	Voltage level of the grid (L2) is lower than the limitation	Automatically restart within a Minute
P462	Grid L3 Under Voltage	Voltage level of the grid (L3) is lower than the limitation	Automatically restart within a Minute
P463	Grid L1 Over Voltage	Voltage level of the grid (L1) is higher than the limitation	Automatically restart within a Minute
P464	Grid L2 Over Voltage	Voltage level of the grid (L2) is higher than the limitation	Automatically restart within a Minute
P465	Grid L3 Over Voltage	Voltage level of the grid (L3) is higher than the limitation	Automatically restart within a Minute
P466	Grid L1 Over Voltage 10min	The 10minutes average voltage level of the grid (L1) is higher than the limitation	Automatically restart within a Minute
P467	Grid L2 Over Voltage 10min	The 10minutes average voltage level of the grid (L2) is higher than the limitation	Automatically restart within a Minute
P468	Grid L3 Over Voltage 10min	The 10minutes average voltage level of the grid (L3) is higher than the limitation	Automatically restart within a Minute
P469	Grid Over Frequency	Frequency level of the grid is higher than the limitation	Automatically restart within a Minute
P470	Grid Under Frequency	Frequency level of the grid is lower than the limitation	Automatically restart within a Minute
P471	Grid Anti Islanding	There was a power failure	Automatically restart within a Minute
P472	Grid L1 DC Offset Current	DC offset current is added on grid(L1)	Automatically restart within a Minute
P473	Grid L2 DC Offset Current	DC offset current is added on grid(L2)	Automatically restart within a Minute



P474	Grid L3 DC Offset Current	DC offset current is added on grid(L3)	Automatically restart within a Minute
P500	PV Insulation Resistance	Insulation resistance level on PV is lower than the limitation	Automatically restart within a Minute
P501	Inverter Over Temp.	The inverter IGBT temperature is higher than the limitation	<ul style="list-style-type: none"> <li>• Clean the filter (refer to page 76)</li> <li>• Automatically restart within a Minute</li> </ul>
P502	PV Over Temp.	The PV IGBT temperature is higher than the limitation	<ul style="list-style-type: none"> <li>• Clean the filter (refer to page 76)</li> <li>• Automatically restart within a Minute</li> </ul>
P503	Batt Over Temp.	The battery IGBT temperature is higher than the limitation	<ul style="list-style-type: none"> <li>• Clean the filter (refer to page 76)</li> <li>• Automatically restart within a Minute</li> </ul>
P504	DC Link Over Voltage	Voltage level of the DC Link is higher than the limitation	Automatically restart within a Minute
P505	DC Link Over Voltage Unbalance	Voltage level of the DC Link balance is higher than the limitation	Automatically restart within a Minute
P506	PVA Over Voltage	Voltage level of PV A is higher than the limitation	Automatically restart within a Minute
P507	PVB Over Voltage	Voltage level of PV B is higher than the limitation	Automatically restart within a Minute
P508	Batt Over Voltage	Voltage level of battery is higher than the limitation	Automatically restart within a Minute
P516	Batt Over Current Instant	Current level of the battery is instantaneously higher than the limitation	Automatically restart within a Minute
P517	PVA Over Current Instant	Current level of the PV A is instantaneously higher than the limitation	Automatically restart within a Minute
P518	PVB Over Current Instant	Current level of the PV B is instantaneously higher than the limitation	Automatically restart within a Minute

P519	L1 Over Current Instant	Current level of the grid (L1) is instantaneously higher than the limitation	Automatically restart within a Minute
P520	L2 Over Current Instant	Current level of the grid (L2) is instantaneously higher than the limitation	Automatically restart within a Minute
P521	L3 Over Current Instant	Current level of the grid (L3) is instantaneously higher than the limitation	Automatically restart within a Minute
P522	Batt Over Current	Current level of the battery is higher than the limitation	Automatically restart within a Minute
P523	PVA Over Current	Current level of the PV A is higher than the limitation	Automatically restart within a Minute
P524	PVB Over Current	Current level of the PV B is higher than the limitation	Automatically restart within a Minute
P525	L1 Over Current	Current level of the grid (L1) is higher than the limitation	Automatically restart within a Minute
P526	L2 Over Current	Current level of the grid (L2) is higher than the limitation	Automatically restart within a Minute
P527	L3 Over Current	Current level of the grid (L3) is higher than the limitation	Automatically restart within a Minute
P528	RCD Fault	Residual current level is higher than the limitation	Automatically restart within a Minute
P532	Grid Relay1	Grid relay is not operable (L1-1)	Automatically restart within a Minute
P533	Grid Relay2	Grid relay is not operable (L1-2)	Automatically restart within a Minute
P534	Grid Relay3	Grid relay is not operable (L2-1)	Automatically restart within a Minute
P535	Grid Relay4	Grid relay is not operable (L2-2)	Automatically restart within a Minute
P536	Grid Relay5	Grid relay is not operable (L3-1)	Automatically restart within a Minute
P537	Grid Relay6	Grid relay is not operable (L3-2)	Automatically restart within a Minute
P538	Grid Relay7	Grid relay is not operable (N-1)	Automatically restart within a Minute

P539	Grid Relay8	Grid relay is not operable (N-2)	Automatically restart within a Minute
P540	SDSP Detection	The sub-processing unit in the product is in fault	Automatically restart within a Minute
P541	Fan Detection	The cooling fan in the product is in fault	Automatically restart within a Minute

## Battery Fault (Single)

B101	Cell Over Voltage Warning	Cell Voltage level of battery cell is higher than 4.25V	Automatically restart within a Minute
B102	Cell Under Voltage Warning	Cell Voltage level of battery cell is lower than 2.8V	Automatically restart within a Minute
B103	Cell Voltage Imbalance Warning	Cell Voltage differences between the battery cells are higher than 300mV	Automatically restart within a Minute
B104	Pack Over Voltage Warning	Pack Voltage level of battery pack is higher than 236V	Automatically restart within a Minute
B105	Pack Under Voltage Warning	Pack Voltage level of battery pack is lower than 166V	Automatically restart within a Minute
B106	Over Charge Current Warning	Current level of the battery is higher than 20.6A	Automatically restart within a Minute
B107	Over Discharge Current Warning	Current level of the battery is lower than 20.6A	Automatically restart within a Minute
B108	Over Temperature warning	The battery temperature is higher than 45°C	Automatically restart within a Minute
B109	Under Temperature warning	The battery temperature is lower than -10°C	Automatically restart within a Minute
B110	Temperature Deviation Warning	Temperature differences between the batteries are over 5°C	Automatically restart within a Minute

B301	Cell Over Voltage Fault	Cell Voltage level of battery cell is higher than 4.3V	Contact service center
B302	Cell Over Voltage 2nd Protection	Cell Voltage level of battery cell is higher than 4.4V	Contact service center
B303	Cell Under Voltage Fault	Cell Voltage level of battery cell is lower than 2.6V	Contact service center

B304	Cell Voltage Imbalance Fault	Cell Voltage differences between the battery cells are higher than 500mV	Contact service center
B305	Pack Over Voltage Fault	Pack Voltage level of battery pack is higher than 241V	Contact service center
B306	Pack Under Voltage Fault	Pack Voltage level of battery pack is lower than 160V	Contact service center
B307	Over Charge Current Fault	Current level of charging is higher than 22.5A	Contact service center
B308	Over Discharge Current Fault	Current level of discharging is higher than 22.5A	Contact service center
B309	Over Temperature fault	The battery temperature is higher than 50°C	Contact service center
B310	Under Temperature fault	The battery temperature is lower than -15°C	Contact service center
B311	Temperature Deviation Fault	Temperature differences between the battery are over 10°C	Contact service center
B312	Current Sensor Offset Error	Fault has been detected on the current sensor	Contact service center
B313	External Communication Error	Communication error has been detected between the battery and the PCS	Contact service center
B314	External 12V Power Error	The power is not supplied to the battery from the PCS	Contact service center
B315	Internal Communication Error	Internal communication error has been detected for 10sec	Contact service center
B316	Current Sensor Line Error	Current Sensor Line Error	Contact service center
B317	Temperature Sensor Error	Temperature sensor error	Contact service center
B318	MBMS MCU-Battery Monitoring IC Comm. Error	MBMS MCU-Battery Monitoring IC Comm. Error	Contact service center
B319	RBMS Ref V Error	Voltage level of the battery management system is higher than the protection limitation.	Contact service center
B320	MBMS ADC Reference Voltage Error	MBMS ADC Reference Voltage Error	Contact service center

B321	MBMS Cell Voltage Measurement Circuit Fail	MBMS Cell Voltage Measurement Circuit Fail	Contact service center
B322	RBMS Flash CRC Error	RBMS Flash CRC Error	Contact service center
B323	Cell Voltage Sensing Line Open	Cell Voltage Sensing Line Open	Contact service center
B324	Cell Sum Voltage Deviation Error	Cell Sum Voltage Deviation Error	Contact service center
B325	RBMS-RBMS LOC	Internal communication error has been detected.	Contact service center
B326	RBMS_MCU_SelfTest_F	RBMS MCU Self Test Fail	Contact service center
B327	RAM Check	RAM Check Error	Contact service center
B328	ROM Check	ROM Check Error	Contact service center
B329	MBMS Initialize Error	MBMS Initialize Error	Contact service center
B330	OBD Fail	OBD Fail Fault	Contact service center
B331	MBMS S/W Version Check Error	MBMS S/W Version Check Error	Contact service center
B332	MBMS EEPROM Error	MBMS EEPROM Error	Contact service center

## Extension Kit Fault

B120	General Warning	General Warning	Automatically restart within a Minute
B121	Internal Communication Warning	Internal communication error has been detected for 5sec	Automatically restart within a Minute

B400	General Fault	General Fault	Contact service center
B401	External Communication Fault	Internal communication error has been detected for 610sec	Contact service center
B402	Internal Communication Fault	Internal communication error has been detected for 10sec	Contact service center
B403	Component Malfunction	Component Malfunction	Contact service center

B404	Pack Voltage Deviation	Voltage differences between the battery cells are higher than 3.5 V	Contact service center
B405	Termal Fuse Error	Termal Fuse Error	Contact service center
B406	Battery SMPS Error	Battery SMPS Error	Contact service center

## Battery Fault (Extension)

B140	Unit1 Cell Over Voltage Warning	Cell Voltage level of battery cell is higher than 4.25V	Automatically restart within a Minute
B141	Unit1 Cell Under Voltage Warning	Cell Voltage level of battery cell is lower than 2.8V	Automatically restart within a Minute
B142	Unit1 Cell Voltage Imbalance Warning	Cell Voltage differences between the battery cells are higher than 300mV	Automatically restart within a Minute
B143	Unit1 Pack Over Voltage Warning	PackVoltage level of battery pack is higher than 236V	Automatically restart within a Minute
B144	Unit1 Pack Under Voltage Warning	Pack Voltage level of battery pack is lower than 166V	Automatically restart within a Minute
B145	Unit1 Over Charge Current Warning	Current level of the battery is higher than 20.6A	Automatically restart within a Minute
B146	Unit1 Over Discharge Current Warning	Current level of the battery is lower than 20.6A	Automatically restart within a Minute
B147	Unit1 Over Temperature warning	The battery temperature is higher than 45°C	Automatically restart within a Minute
B148	Unit1 Under Temperature warning	The battery temperature is lower than -10°C	Automatically restart within a Minute
B149	Unit1 Temperature Deviation Warning	Temperature differences between the batteries are over 5°C	Automatically restart within a Minute
B160	Unit2 Cell Over Voltage Warning	Cell Voltage level of battery cell is higher than 4.25V	Automatically restart within a Minute
B161	Unit2 Cell Under Voltage Warning	Cell Voltage level of battery cell is lower than 2.8V	Automatically restart within a Minute
B162	Unit2 Cell Voltage Imbalance Warning	Cell Voltage differences between the battery cells are higher than 300mV	Automatically restart within a Minute

B163	Unit2 Pack Over Voltage Warning	PackVoltage level of battery pack is higher than 236V	Automatically restart within a Minute
B164	Unit2 Pack Under Voltage Warning	Pack Voltage level of battery pack is lower than 166V	Automatically restart within a Minute
B165	Unit2 Over Charge Current Warning	Current level of the battery is higher than 20.6A	Automatically restart within a Minute
B166	Unit2 Over Discharge Current Warning	Current level of the battery is lower than 20.6A	Automatically restart within a Minute
B167	Unit2 Over Temperature warning	The battery temperature is higher than 45°C	Automatically restart within a Minute
B168	Unit2 Under Temperature warning	The battery temperature is lower than -10°C	Automatically restart within a Minute
B169	Unit2 Temperature Deviation Warning	Temperature differences between the batteries are over 5°C	Automatically restart within a Minute
B432	Unit1 Cell Over Voltage Fault	Cell Voltage level of battery cell is higher than 4.3V	Contact service center
B434	Unit1 Cell Under Voltage Fault	Cell Voltage level of battery cell is lower than 2.6V	Contact service center
B435	Unit1 Cell Voltage Difference Fault	Cell Voltage differences between the battery cells are higher than 500mV	Contact service center
B436	Unit1 Pack Over Voltage Fault	Pack Voltage level of battery pack is higher than 241V	Contact service center
B437	Unit1 Pack Under Voltage Fault	Pack Voltage level of battery pack is lower than 160V	Contact service center
B438	Unit1 Charging Over Current Fault	Current level of charging is higher than 22.5A	Contact service center
B439	Unit1 Discharging Over Current Fault	Current level of discharging is higher than 22.5A	Contact service center
B440	Unit1 Over Temperature Fault	The battery temperature is higher than 50°C	Contact service center
B441	Unit1 Under Temperature Fault	The battery temperature is lower than -15°C	Contact service center
B442	Unit1 Temperature Deviation Fault	Temperature differences between the battery are over 10°C	Contact service center
B443	Unit1 Internal Communication Fault	Internal communication error has been detected for 10sec	Contact service center

B444	Unit1 On-Board Diagnosis Fault	Unit1 On-Board Diagnosis Fault	Contact service center
B448	Unit1 Temperature Sensor Error	Unit1 Temperature Sensor Error	Contact service center
B449	Unit1 Current Sensor Offset Error	Unit1 Current Sensor Offset Error	Contact service center
B450	Unit1 Current Sensor Line Error	Unit1 Current Sensor Line Error	Contact service center
B451	Unit1 MCU Self Test Fail	Unit1 MCU Self Test Fail	Contact service center
B452	Unit1 Cell Sum Voltage Deviation Error	Unit1 Cell Sum Voltage Deviation Error	Contact service center
B453	Unit1 RBMS EEPROM/Flash CRC Error	Unit1 RBMS EEPROM/Flash CRC Error	Contact service center
B454	Unit1 External 12V Power Error	Unit1 External 12V Power Error	Contact service center
B455	Unit1 RBMS ADC Reference Voltage Error	Unit1 RBMS ADC Reference Voltage Error	Contact service center
B457	Unit1 MBMS EEPROM Error	Unit1 MBMS EEPROM Error	Contact service center
B458	Unit1 MBMS S/W Version Check Error	Unit1 MBMS S/W Version Check Error	Contact service center
B459	Unit1 MBMS Initalize Error	Unit1 MBMS Initalize Error	Contact service center
B460	Unit1 Cell Voltage Sensor Line Error	Unit1 Cell Voltage Sensor Line Error	Contact service center
B461	Unit1 Cell Voltage Masurement Circuit Fail	Unit1 Cell Voltage Masurement Circuit Fail	Contact service center
B462	Unit1 MBMS ADC Reference Voltage Error	Unit1 MBMS ADC Reference Voltage Error	Contact service center
B463	Unit1 MCU-Battery Monitoring IC Comm. Error	Unit1 MCU-Battery Monitoring IC Comm. Error	Contact service center



B464	Unit1 ROM Check Error	Unit1 ROM Check Error	Contact service center
B465	Unit1 RAM Check Error	Unit1 RAM Check Error	Contact service center
B480	Unit2 Cell Over Voltage Fault	Cell Voltage level of battery cell is higher than 4.3V	Contact service center
B482	Unit2 Cell Under Voltage Fault	Cell Voltage level of battery cell is lower than 2.6V	Contact service center
B483	Unit2 Cell Voltage Difference Fault	Cell Voltage differences between the battery cells are higher than 500mV	Contact service center
B484	Unit2 Pack Over Voltage Fault	Pack Voltage level of battery pack is higher than 241V	Contact service center
B485	Unit2 Pack Under Voltage Fault	Pack Voltage level of battery pack is lower than 160V	Contact service center
B486	Unit2 Charging Over Current Fault	Current level of charging is higher than 22.5A	Contact service center
B487	Unit2 Discharging Over Current Fault	Current level of discharging is higher than 22.5A	Contact service center
B488	Unit2 Over Temperature Fault	The battery temperature is higher than 50°C	Contact service center
B489	Unit2 Under Temperature Fault	The battery temperature is lower than -15°C	Contact service center
B490	Unit2 Temperature Deviation Fault	Temperature differences between the battery are over 10°C	Contact service center
B491	Unit2 Internal Communication Fault	Internal communication error has been detected for 10sec	Contact service center
B492	Unit2 On-Board Diagnosis Fault	Unit1 On-Board Diagnosis Fault	Contact service center
B496	Unit2 Temperature Sensor Error	Unit1 Temperature Sensor Error	Contact service center
B497	Unit2 Current Sensor Offset Error	Unit1 Current Sensor Offset Error	Contact service center
B498	Unit2 Current Sensor Line Error	Unit1 Current Sensor Line Error	Contact service center
B499	Unit2 MCU Self Test Fail	Unit1 MCU Self Test Fail	Contact service center

B500	Unit2 Cell Sum Voltage Deviation Error	Unit1 Cell Sum Voltage Deviation Error	Contact service center
B501	Unit2 RBMS EEPROM/Flash CRC Error	Unit1 RBMS EEPROM/Flash CRC Error	Contact service center
B502	Unit2 External 12V Power Error	Unit1 External 12V Power Error	Contact service center
B503	Unit2 RBMS ADC Reference Voltage Error	Unit1 RBMS ADC Reference Voltage Error	Contact service center
B505	Unit2 MBMS EEPROM Error	Unit1 MBMS EEPROM Error	Contact service center
B506	Unit2 MBMS S/W Version Check Error	Unit1 MBMS S/W Version Check Error	Contact service center
B507	Unit2 MBMS Initalize Error	Unit1 MBMS Initalize Error	Contact service center
B508	Unit2 Cell Voltage Sensor Line Error	Unit1 Cell Voltage Sensor Line Error	Contact service center
B509	Unit2 Cell Voltage Measurement Circuit Fail	Unit1 Cell Voltage Measurement Circuit Fail	Contact service center
B510	Unit2 MBMS ADC Reference Voltage Error	Unit1 MBMS ADC Reference Voltage Error	Contact service center
B511	Unit2 MCU-Battery Monitoring IC Comm. Error	Unit1 MCU-Battery Monitoring IC Comm. Error	Contact service center
B512	Unit2 ROM Check Error	Unit1 ROM Check Error	Contact service center
B513	Unit2 RAM Check Error	Unit1 RAM Check Error	Contact service center

- 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 any technical problem or question, please contact the service center below.**

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

Tel : DE: 0049 (0)39484 / 976 380  
AT: 0043 (0)720 / 11 66 01  
CH: 0041 (0)44 / 505 11 42  
E-Mail : lge@e-service48.de

LG Electronics Deutschland GmbH  
Alfred-Herrhausen-Allee 3-5  
65760 Eschborn

Tel. : + 0049 18 06 807 020  
E-Mail: b2b.service@lge.de

# Maintenance

## Cleaning the product

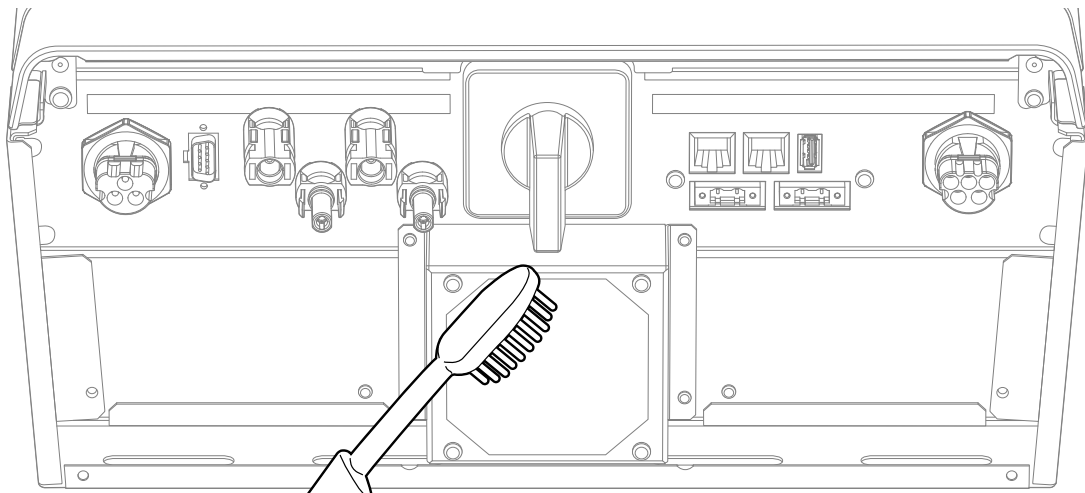
Wipe off the outside of the product with a soft towel with lukewarm water and wipe it with a clean hand towel so that dirt will not occur when using a neutral detergent.

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 as shown in the figure.



## 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

DC Input	
Max. input voltage	800 V
Min. input voltage	210 V
Max. DC power	6,6 kW (3,3 kW per MPPT)
Input voltage range MPPT at rated AC output power	210-680 V
Number of MPPT	2
Number of string per MPPT	1
Max. input current per MPPT	12 A
Backfeed current	0 A
Short circuit current (Isc) per MPPT	13 A

AC Output	
Rated grid voltage	3-NPE 400 V / 230 V
AC voltage range	319 – 458 V / 184 – 264.5 V
Frequency (Frequency Range)	50 Hz (47.5 Hz – 51.5 Hz)
Max.Output Power	5.6 kVA
Rated Output Power	5kW
Current Inrush	70 Aac-peak / 0.05 ms
Max. fault current	80 Aac-peak / 20 ms
Max. output overcurrent protection	11 A
Max. output current	8 A
Total harmonic distortion / Power Factor with Rated Power	< 5% / ±0.9
Phases	3

<b>Battery</b>	
Battery Type	Lithium Polymer
Max Charge(Discharge) Power	3.0 kW
Capacity (Expandable)	6.4 kWh (Max. 12.8 kWh)
DoD	90 %
Current Capacity	31.5 Ah
Rated Input Voltage	207.2 V

<b>Efficiency (PCS)</b>	
Max. Efficiency (PV to Grid)	97.7 %
European Efficiency (PV to Grid)	96 %

<b>General Data</b>	
Dimensions (W/H/D, mm)	408 / 490 / 185 (PCS) 408 / 682 / 180 (Battery)
Weight (PCS / Battery)	25 kg / 58 kg
Operating temperature	0 °C to 40 °C

<b>Energy Meter Compatibility</b>	
<b>Manufacturer</b>	<b>Model</b>
ABB	B23 112-100
	B23 212-100
	B23 312-100

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)	CE / IEC62109-1/-2, VDE-AR-N-4105 / VDE 0126-1-1 / TOR D4 2016 / OVE / ONORM E 8001-4-712 / IEC61000 series
Certification (Battery)	CE / IEC62133 / IEC62619 / UN38.3

- 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.



Contact office for compliance of dthis product :  
 LG Electronics Europeam Shared Service Center B. V Krijgsman 1,  
 1186 DM Amstelveen, The Netherlands  
[www.lg.com](http://www.lg.com)

#### 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#>

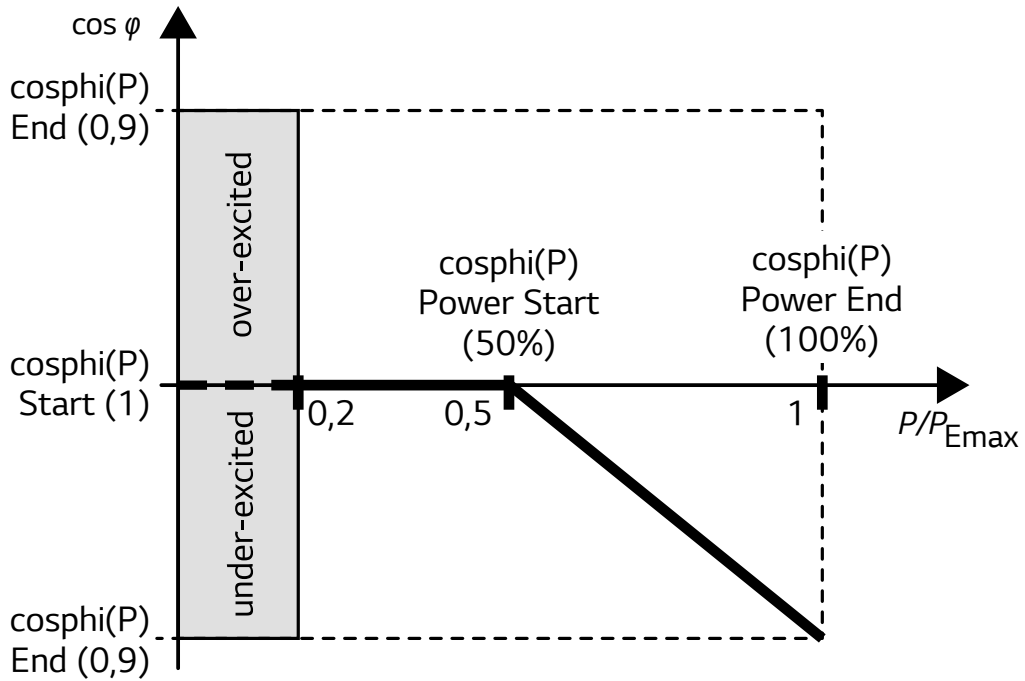
This device is a 2.4 GHz wideband transmission system, intended for use in all EU member states and EFTA countries.

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 $\cos\varphi$ (P)



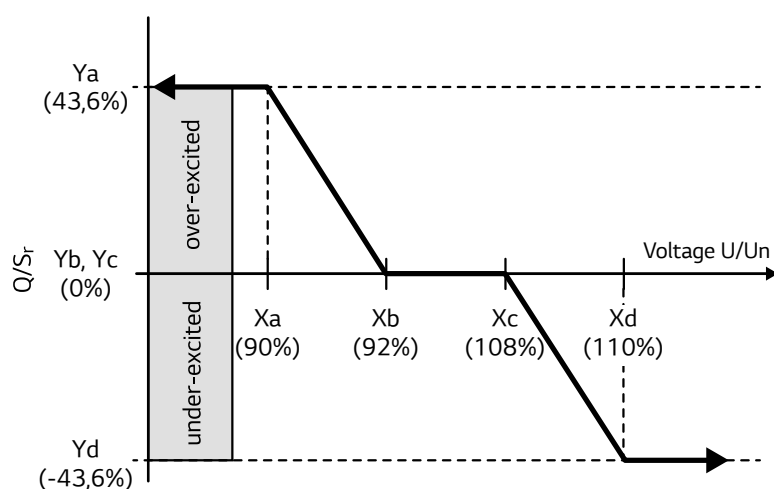
5

Appendix

Name	Description	Default Value	Available Value	Unit
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	%

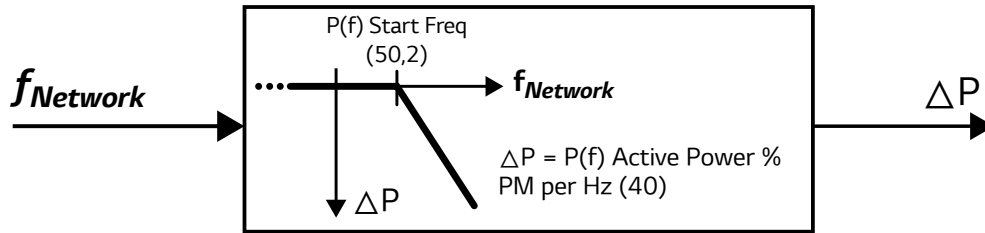


## Reactive power / voltage characteristic Q(U)



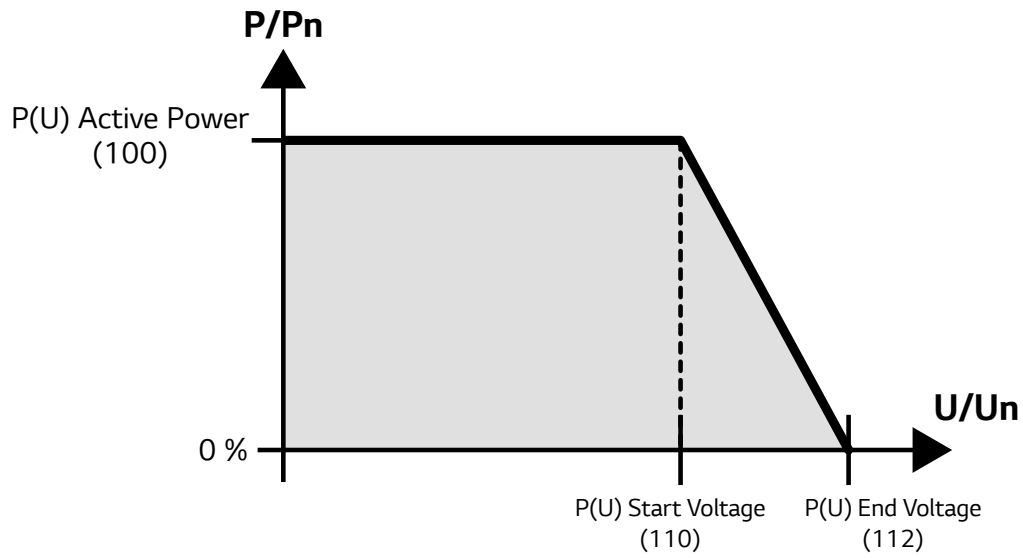
Name	Description	Default Value	Available Value	Unit
Q(U) Number of point	Number of Active point in array	4	0 ~ 8	
Q(U) Xa	Grid voltage point-a (U/Un)	90	80 ~ 120	%
Q(U) Xb	Grid voltage point-b (U/Un)	92	80 ~ 120	%
Q(U) Xc	Grid voltage point-c (U/Un)	108	80 ~ 120	%
Q(U) Xd	Grid voltage point-d (U/Un)	110	80 ~ 120	%
Q(U) Xe	Grid voltage point-e (U/Un)	115	80 ~ 120	%
Q(U) Xf	Grid voltage point-f (U/Un)	115	80 ~ 120	%
Q(U) Xg	Grid voltage point-g (U/Un)	115	80 ~ 120	%
Q(U) Xh	Grid voltage point-h (U/Un)	115	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) Ye	Reactive power point-e (Q/Sr)	0	-43,6 ~ 43,6	%
Q(U) Yf	Reactive power point-f (Q/Sr)	0	-43,6 ~ 43,6	%
Q(U) Yg	Reactive power point-g (Q/Sr)	0	-43,6 ~ 43,6	%
Q(U) Yh	Reactive power point-h (Q/Sr)	0	-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	Unit
P(f) Active Power	Active power gradient at overfrequency	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	Unit
P(U) Active Power	Active power gradient at overvoltage	100	0 ~ 100	%
P(U) Start Voltage	P(U) function starting voltage (U/Un)	110	100 ~ 120	%
P(U) End Voltage	P(U) function end voltage (U/Un)	112	100 ~ 120	%
P(U) wait time	Waiting time of active power gradient	1	60	sec





# How to subscribe to LG ESS web monitoring system

For Installer

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

## Check 3 items before subscribing

Below should be performed on the mobile app before an installer activate owner's ESS.

① Remember the registration number.

System Information > Registration Number

② Network should be connected. (App)

Setting Icon (Gear icon) > Installer settings > Network > wired setting > IP Setting > Auto

Select 'Set' button.

③ LG EnerVu should be connected. (App)

Setting Icon (Gear icon) > Installer settings > Network > Connection status > Web Server data upload > ON

Select 'Test' button.

Check if the pop-up message "Communication with EnerVu is OK" appears.

- We recommend you to use Chrome as an appropriate browser for using EnerVu.
- When subscribing EnerVu, owner can receive benefits of software updates, but if owner does not want to subscribe because of provision of owner's personal information to installer, owner does not need to do.

# Overview

## The steps to subscribe to ENERVU system



: Installer



: End user

1

### Installer (administrator)

How to subscribe to ENERVU system as installer

Page 4 - 8



1.1

### Installer

How to send invitation e-mail to end user

Page 9 - 10



2

### End user

How to subscribe to ENERVU system as end user

Page 11 - 18



3

### Installer

How to activate end user's ESS

Page 19 - 22



4

### End user

How to log in ENERVU system

Page 23 - 26



### Appendix (Installer)

A-1. How to register other installer as a member in a company

Page 27 - 35



### Appendix (Installer)

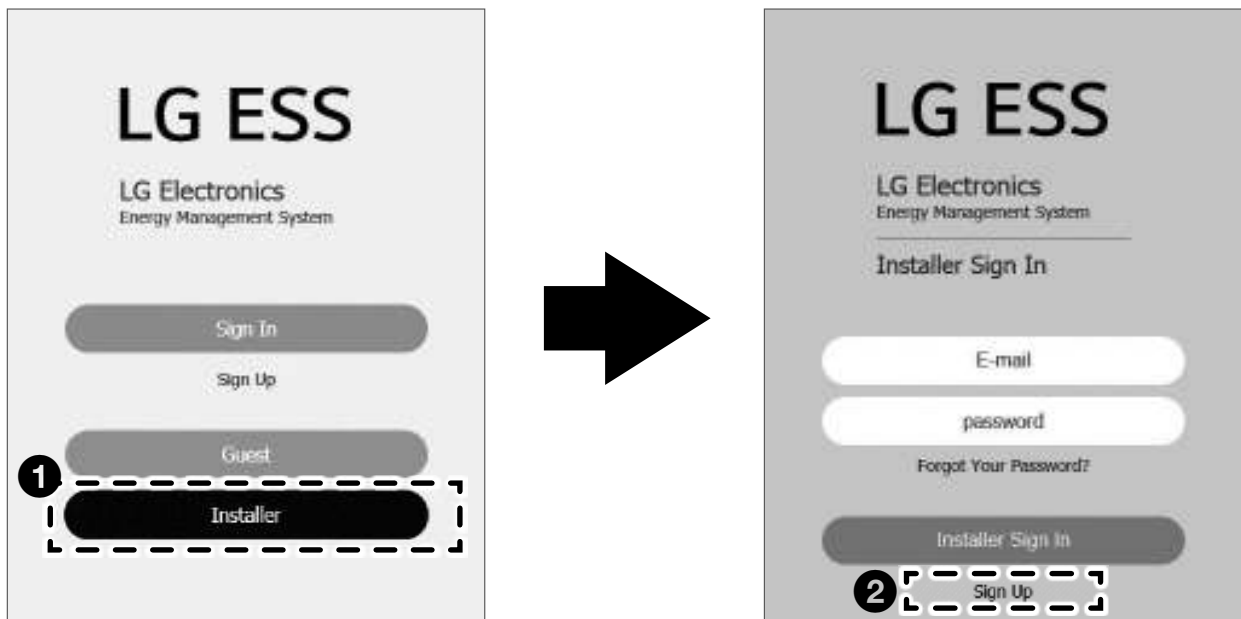
A-2. How to register a subsidiary in a company

Page 33 - 35

## How to subscribe to ENERVU system as an installer

### Sign up

Visits the web site <http://enervu.lg-ess.com/>.



- 1 Select the menu 'Installer.'
- 2 Select the menu 'Sign Up.'



# Installer (administrator)



(2/5)

Sign Up

Forgot password

Sign Up

User Registration

Email

First Name  Last Name

Company Details

Company Name \*  Country \*

Address 1 \*  Address 2

City \*  State/Province \*

Zip/Postal \*  Phone

Company Email  Website

Time Zone

- 3 Fill the e-mail address in the Email box and select 'Check' button.  
Pop-up message 'E-mail address is Available' appears.
- 4 Select 'OK' button.
- 5 Fill in the fields marked with "\*" above.  
This account will be administrator in the company above.  
Later, new installer or subsidiary of the company can be added through this account called administrator.

# Installer (administrator)



(3/5)

## Installer terms

**Installer Terms**

**Nutzungsbedingungen zu den LGE-ESS-Diensten (Installateur)**

1. Einführung
2. Berechtigung
3. Registrierung und Konten
4. Ihre Daten und Inhalte
5. Haftungsausschluss für Nutzererstellte Inhalte
6. Ansprüche aus Immaterialgüterrechten
7. Geistige Eigentumsrechte und gewerbliche Schutzrechte
8. Zugriff auf Dienste und Verfügbarkeit
9. Dienstleistungen Dritter
10. Weitere Pflichten/Einschränkungen hinsichtlich Ihrer Nutzung der Dienste

I agree

**Installer Privacy Policy**

**Datenschutzrichtlinie für LGE-ESS-Dienste (Installateur)**

1. Einführung
2. Wie erhebt LGE Daten und welche Daten werden von LGE erhoben?
3. Wie verwendet LGE die erhobenen Daten?
4. Weitergabe von Daten
5. Datenübermittlung ins Ausland
6. Wie lange bewahrt LGE meine personenbezogenen Daten auf?
7. Sicherheit
8. Datenschutz bei Kindern/Jugendlichen
9. Änderungen an der Datenschutzrichtlinie von LGE
10. Ihre Rechte und Kontaktaufnahme mit LGE

I agree

- 1 Check the 2 boxes 'I agree' above.
- 2 Select 'Submit' button.  
Pop-up message "An e-mail is sent..." appears.
- 3 Select 'OK' button.

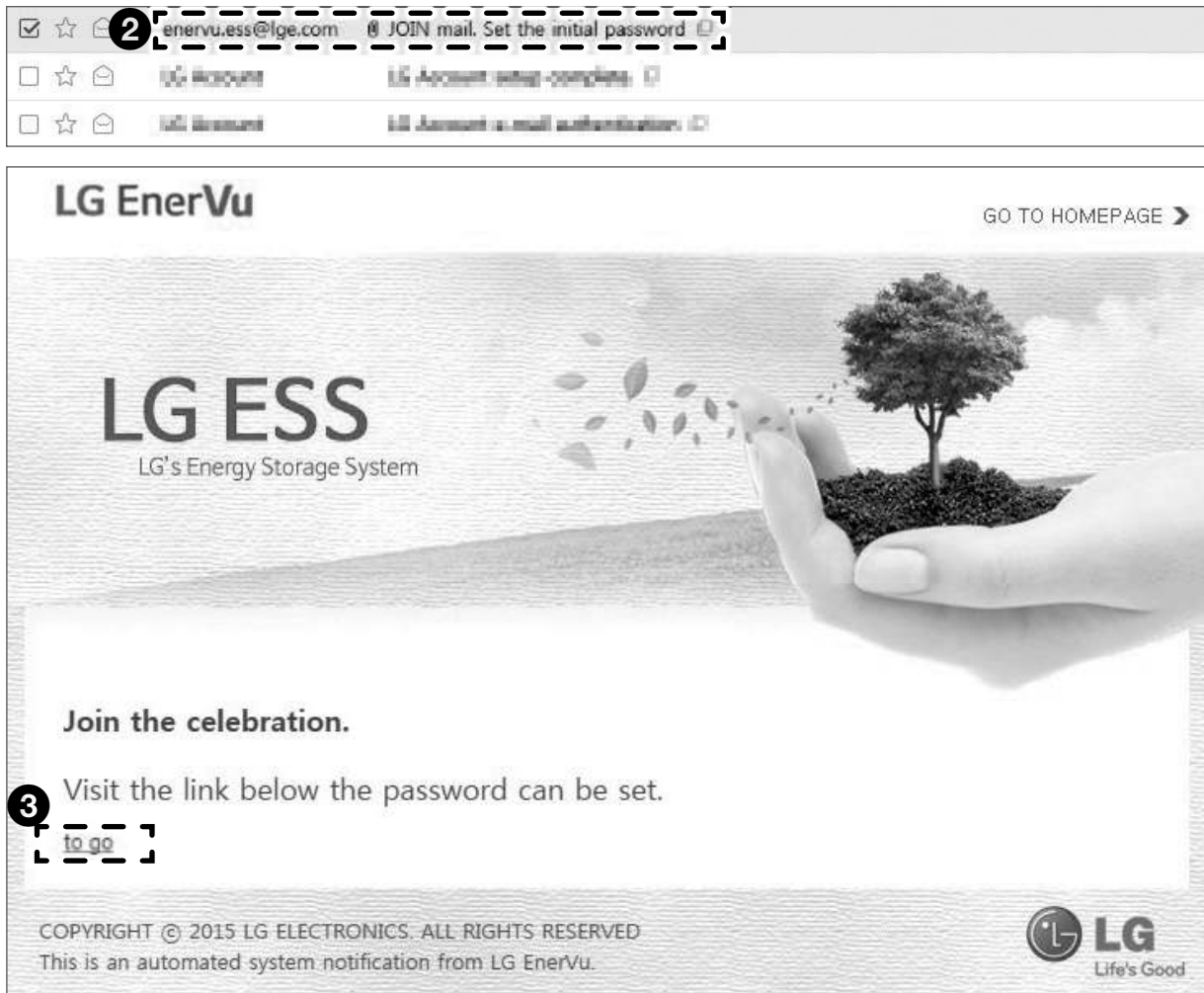
## Installer (administrator)



(4/5)

### Invitation e-mail

- 1 The invitation e-mail would be sent to the e-mail address inputted at the page 'Sign Up'
- 2 Open "JOIN mail. Set the initial password" on the installer's e-mail list.



- 3 Select the link 'to go' above to set password.

## Installer (administrator)



(5/5)

### Set password

The screenshot shows a web form titled 'Set Password'. At the top, it says 'Set Password' and has a note: '\* Your password must be at least eight characters, must contain at least one number and special character(example: '-1@+\_\*!%~^&\*(){}|;:/?), and can't be the same as your email address.' Below this, there are two input fields. The first is labeled '\* Enter new password' and the second is labeled '\* Confirm new password'. A 'Submit' button is at the bottom right. Three numbered callouts are present: '1' points to the first input field, '2' points to the second input field, and '3' points to the 'Submit' button.

- 1 Enter new password after reading cautions displayed on the screen.
- 2 Confirm new password.
- 3 Select the button 'Submit'. Pop-up message 'Successfully saved' appears.
- 4 Select 'OK' button. If the result is successful, installer account creation is complete.

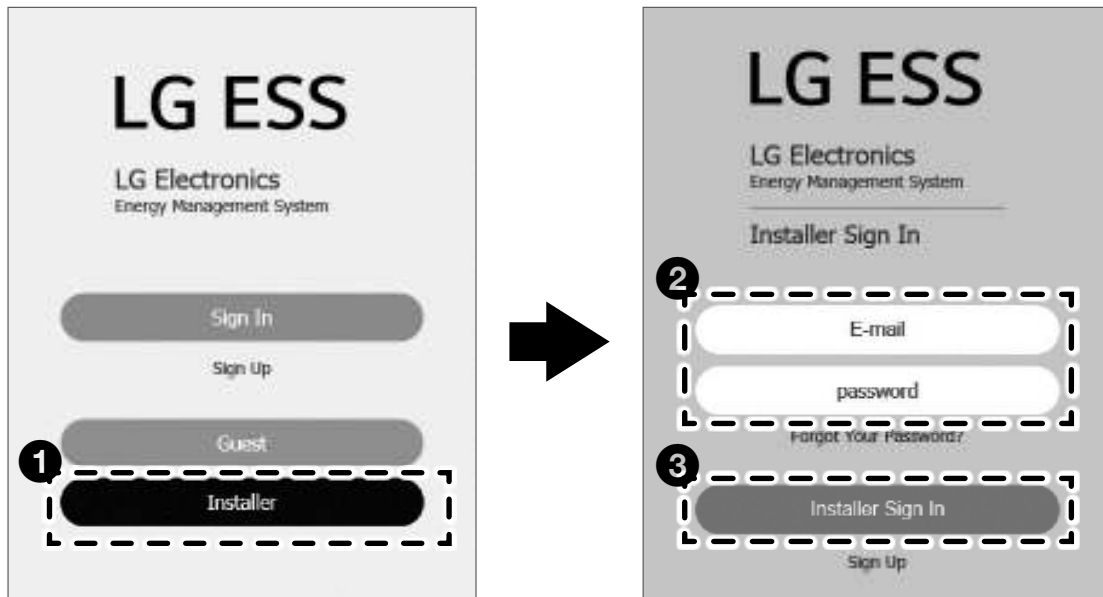
#### NOTE

Password must be at least eight characters and contain one number and special character.

## How to send invitation e-mail to end user

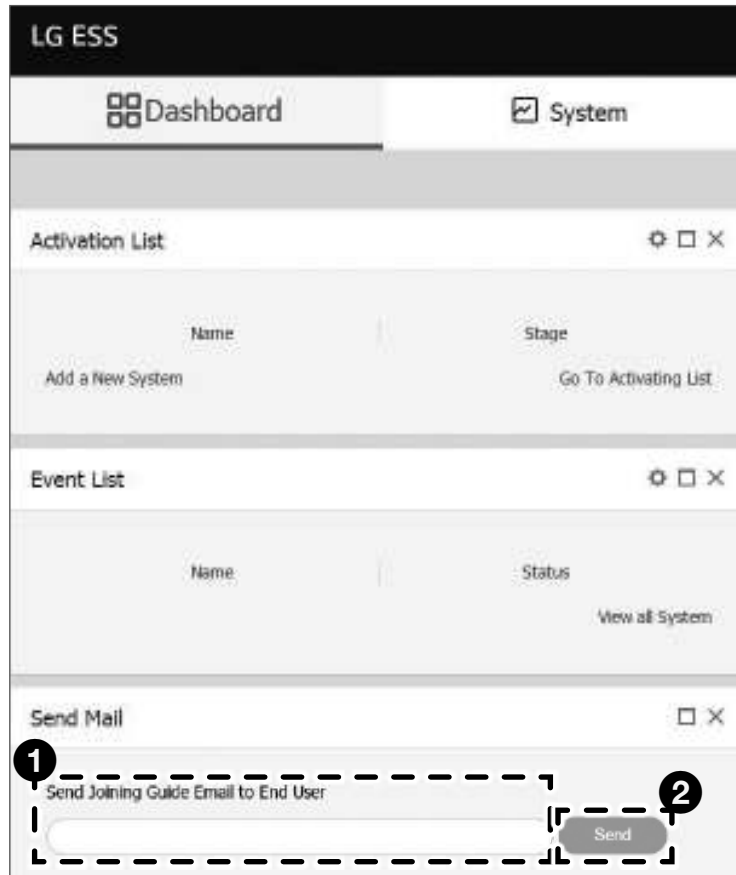
### Sign in

Visits the web site <http://enervu.lg-ess.com/>.



- 1 Select the menu 'Installer'
- 2 Input e-mail and password.
- 3 Select 'Installer Sign In'

## Send e-mail

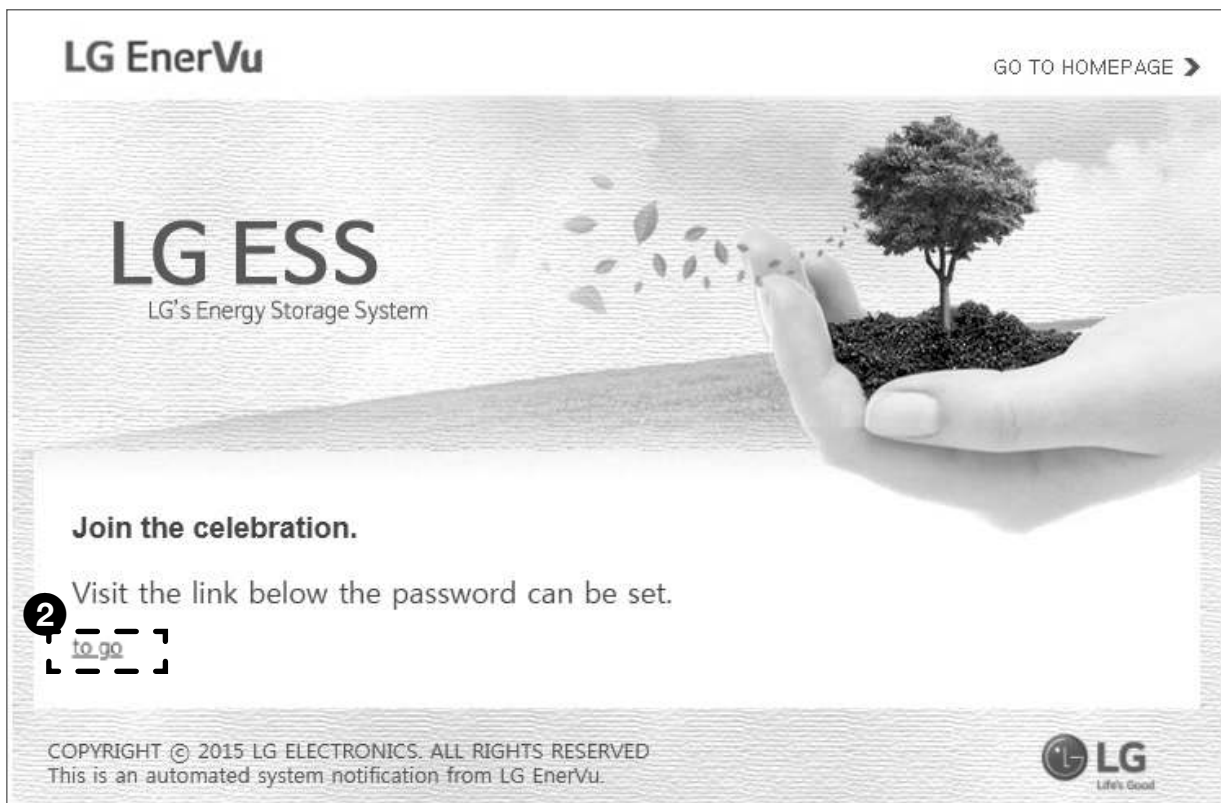


- 1 Input owner's e-mail on the 'Joining Guide Email to End User'
- 2 Select 'Send' button. Pop-up message 'Success' appears.
- 3 Select 'OK' button.

# How to subscribe to ENERVU system as an end user

## Invitation e-mail

<input type="checkbox"/>	enervu.ess	<b>1</b> Please subscribe to LG membership service	2016/12/12 18:14	10KB
<input type="checkbox"/>	EnergyPlus Mail	LG ESS 가입 안내 (비밀-영구-보통)	2016/12/12 17:44	102KB
<input type="checkbox"/>	메일	LG ESS 가입 안내 (비밀-영구-보통)	2016/12/12 17:32	357KB



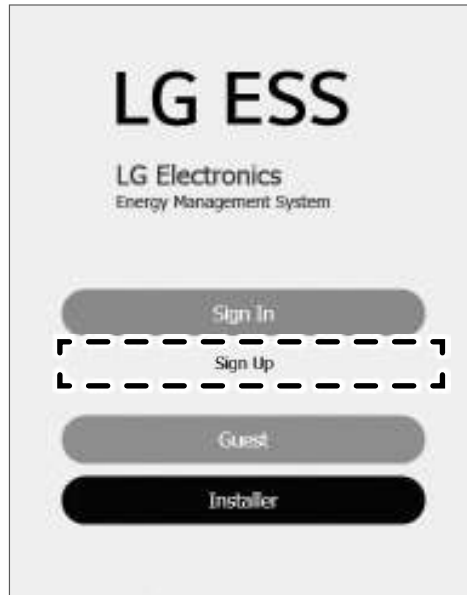
- 1** When e-mail is delivered to owner, open "Please subscribe to LG membership service" on the owner's e-mail list.
- 2** Owner selects the link 'to go' in the invitation e-mail above through his own e-mail.

## End user



(2/8)

## Sign up



Owner selects the link 'Sign Up' if he has not joined the LG account service, otherwise 'Sign In'



# End user



(3/8)

## Accept terms

**LG ACCOUNT**

SIGN IN | CREATE ACCOUNT | SWITCH USER ID | FIND USER ID / RESET PASSWORD | ACCOUNT MANAGEMENT | CUSTOMER SUPPORT

o CREATE ACCOUNT

Accept Terms & Conditions » Create Account » E-mail confirmation » Confirm LG Account

▼ TERMS OF SERVICE

Read and accept the Terms & Conditions and Privacy Policy

LG Account Terms of Use  Select All

2. Wie erholt LGE Daten und welche Daten werden von LGE erhoben?  
3. Wie verwendet LGE die erhobenen Daten?  
4. Weitergabe von Daten  
5. Datenübermittlung ins Ausland  
6. Wie lange bewahrt LGE meine personenbezogenen Daten auf?  
7. Sicherheit

I Agree

Owner checks 'Select All' and select 'AGREE'

## End user



(4/8)

## Input ID

**LG ACCOUNT**

SIGN IN | **CREATE ACCOUNT** | SWITCH USER ID | FIND USER ID / RESET PASSWORD | ACCOUNT MANAGEMENT | CUSTOMER SUPPORT

○ **CREATE ACCOUNT**

Accept Terms & Conditions → Create Account → E-mail confirmation → Confirm LG Account

▼ **CREATE LG ACCOUNT**

1 User ID: lgaccount@example.com [CHECK AVAILABILITY]

3 Password: [ ]

4 Password confirm: [ ]

4 Birthday: Day | Month | Year

Country: Germany

E-mail opt-in  Sign up to receive the latest news and special offers from LG. You will be notified of important changes to the service Terms & Conditions and Privacy Policy regardless of your opt-in setting.

5 [CONFIRM] [CANCEL]

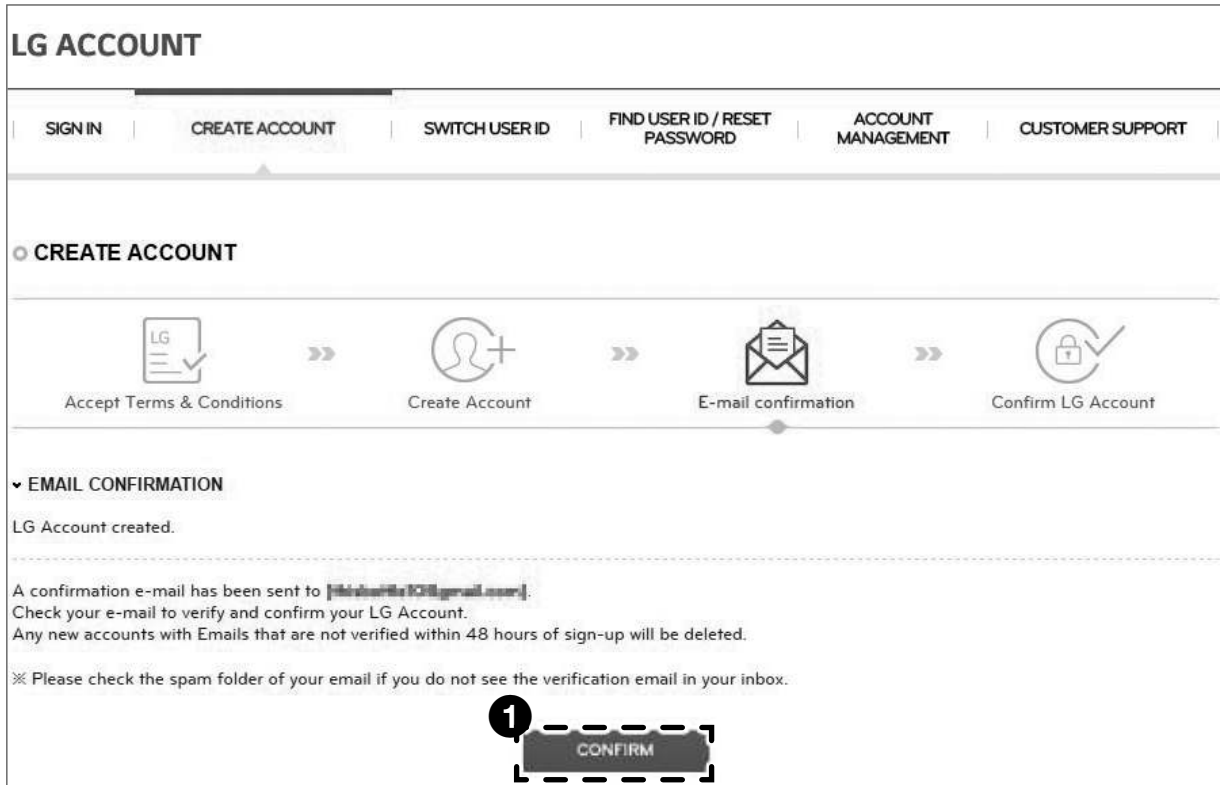
- 1 Owner fills in User ID field and select 'CHECK AVAILABILITY' button.
- 2 Click 'OK' button when pop-up message 'Email valid for use' appears.
- 3 Fill in Password and Password confirm fields.
- 4 Fill in Birthday fields.
- 5 Select 'CONFIRM'.

## End user



(5/8)

## Confirm e-mail



**1** Owner sees EMAIL CONFIRMATION notice.

<input checked="" type="checkbox"/>	LG Account	<b>2</b> LG Account e-mail authentication	2016/12/12 19:08	9KB
<input type="checkbox"/>	RECEIVED	RE: [redacted]	2016/12/12 18:50	20KB
<input type="checkbox"/>	RECEIVED	[redacted]	2016/12/12 18:26	12KB

**2** When e-mail is delivered to owner, open “LG Account e-mail authentication” on the owner’s e-mail list.  
(This message should be checked within 48 hours after signing up.)

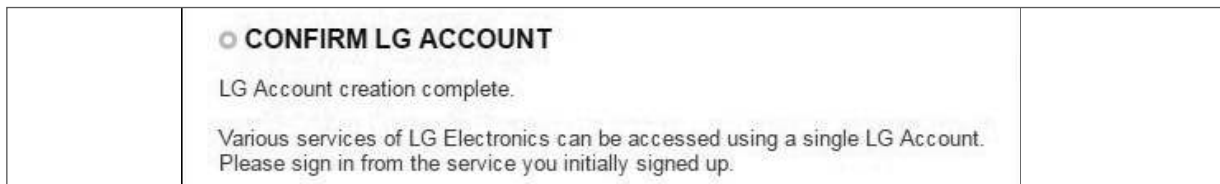
## End user



(6/8)



- 3** Owner confirms LG Account e-mail authentication through his own email and select 'CONFIRM'



- 4** The message 'LG Account creation complete' shows up.

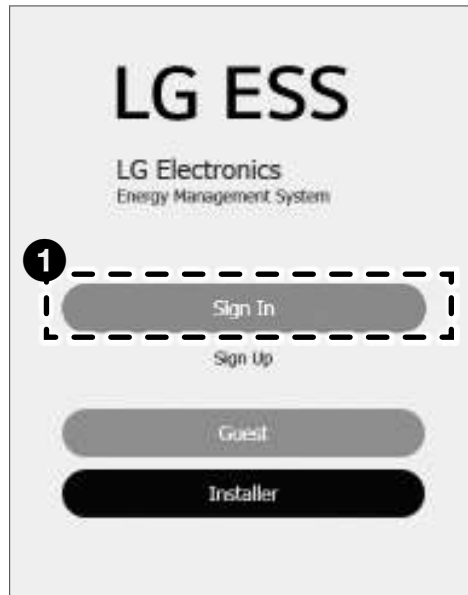
## End user



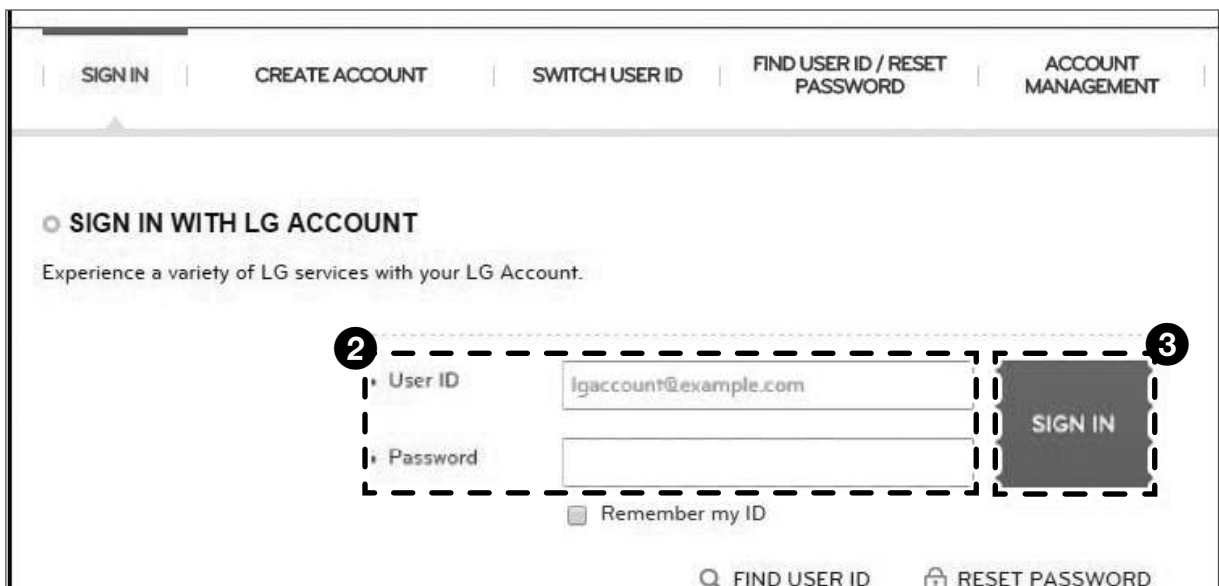
(7/8)

## Sign in

Owner visits the web site <http://enervu.lg-ess.com/>.



**1** Select the menu 'Sign In'



**2** Input e-mail and password.

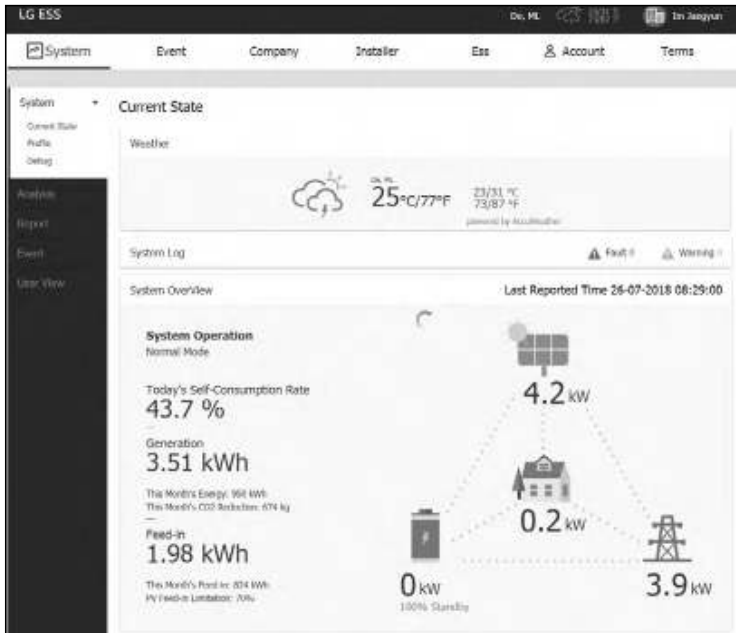
**3** Select 'SIGN IN'

## End user



(8/8)

## Activation



You can see the screen on the left when the registration and activation are completed.



You can see the screen on the left when the registration is in incomplete status.

Input the registration number printed in the label attached outside of the PCS and select [Check] to complete the registration and activation.

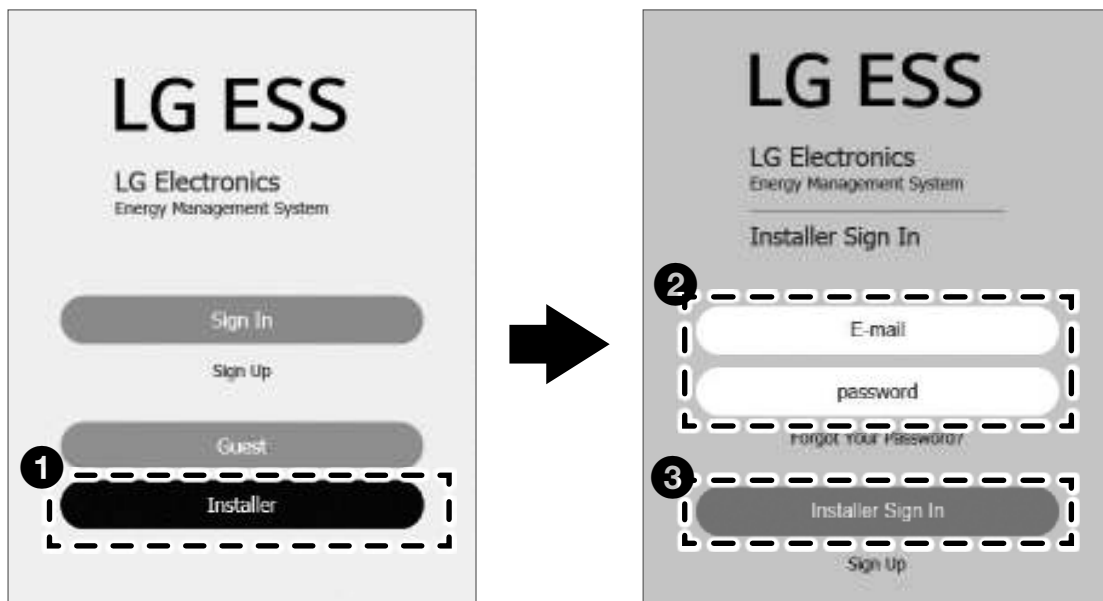
Cannot find the system that matches your registration number entered. Check if your registration number is correct.

If a pop-up message on the left appears on the screen, contact the installer to activate your system.

## How to activate owner's ESS

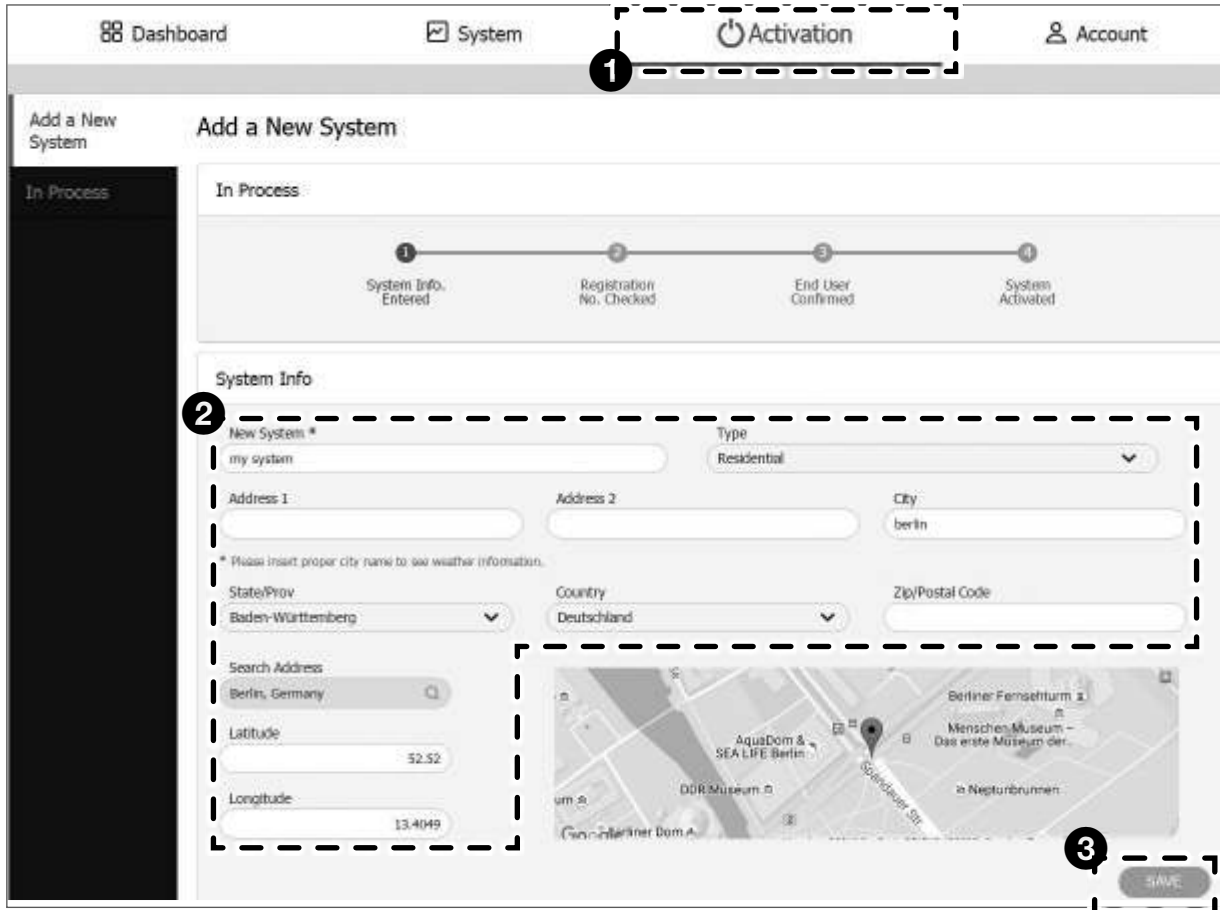
### Sign in

The Installer should read first 'Check 3 items before subscribing' on page 1. And installer visits the web site <http://enervu.lg-ess.com/>.



- 1 Select the menu 'Installer'.
- 2 Input e-mail and password.
- 3 Select 'Installer Sign In'

## Add system info



- 1 Selects Activation menu above.
- 2 Input system name, city, address, latitude, etc.
- 3 Select 'SAVE' button. Pop-up message "Successfully saved." appears.
- 4 Select 'OK' button.



## Check registration number

Scroll the screen to see below.

The screenshot shows a software installation screen titled 'ESS Info'. At the top, there is a 'Registration No.' field with a 'Check' button next to it. A dashed box and a circled '1' highlight this area. Below this is a table with four rows and two columns. The rows are labeled 'Ess Model Name', 'Pms Info', 'Battery Info', and 'Pcs Out Limit'. The columns are labeled 'Winter Mode', 'Pcs Info', and 'Utc'. Below the table is a section titled 'PV Info'. At the bottom, there is an 'Owner' section with three input fields labeled 'Email', 'First Name', and 'Last Name'. A dashed box and a circled '5' highlight these input fields.

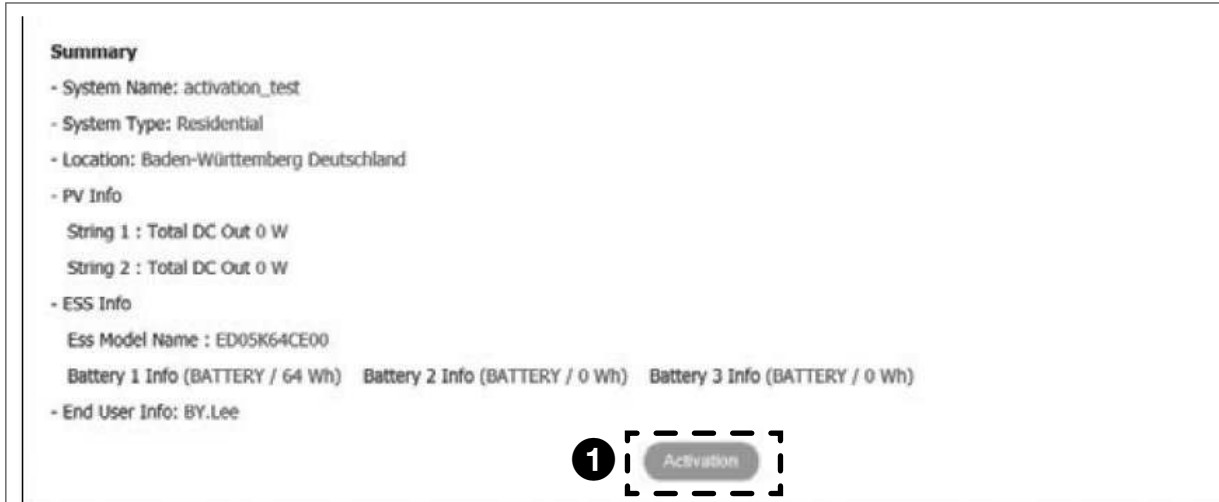
- 1 Inputs ESS Info by select 'Check' with registration number entered. Pop-up message "Registration number is valid." appears (For registraion, refer to "Check 3 items before subscribing" on p.2)
- 2 Select 'OK' button. PV Info is entered automatically.
- 3 Select 'SAVE' button. Pop-up message "Connecting ess to system is success." appears.
- 4 Select 'OK' button.
- 5 Input owner's e-mail for ENERVU, first name and last name.
- 6 Select 'SAVE' button. Pop-up message "EXISTENT email address" appears.
- 7 Select 'OK' button.

# Installer



(4/4)

## Activate



- 1 Finally, select 'Activation' to activate owner's ESS. Pop-up message "Successfully saved." appears.
- 2 Select 'OK' button. Pop-up message "Send Email Success." appears.
- 3 Select 'OK' button.

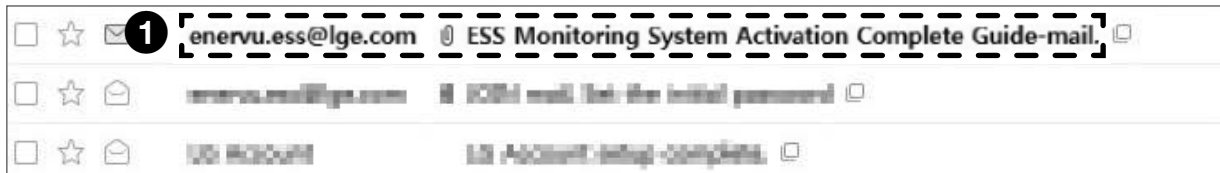
## Check system

Status	Name	State/Prov	PV Energy(Current)	Consumption Energy(Current)	7day PV Energy(Average)	7day Consumption Energy(Average)	Tt Energ
All	Search	Search					
Normal	My System	Baden-Württemberg	24.5 kWh	42.8 kWh	34.1 kWh	57.5 kWh	

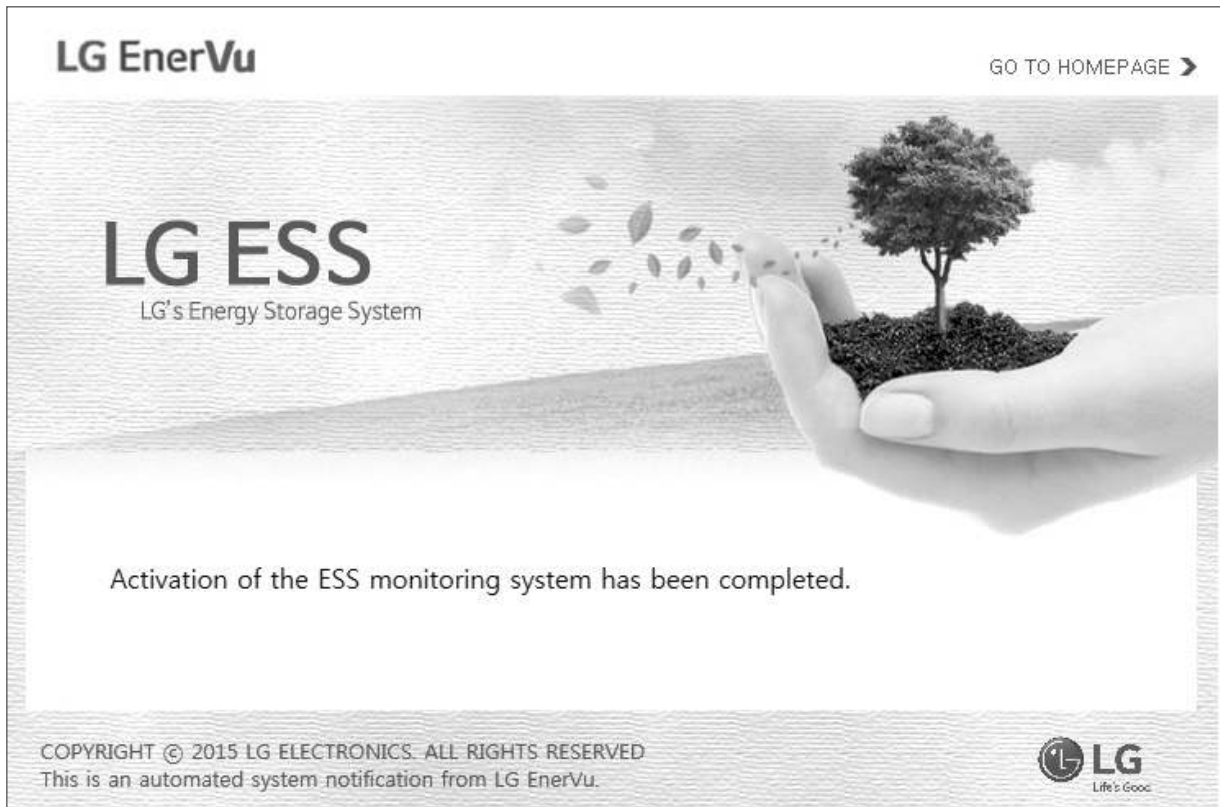
If activation is successful, installer can see the system just registered with the status normal on the tab 'System'

# How to log in ENERVU system

## Sign in



- 1 When e-mail is delivered to owner, open “ESS Monitoring System Activation Complete Guide-mail” on the owner’s e-mail list. Below screen appears.

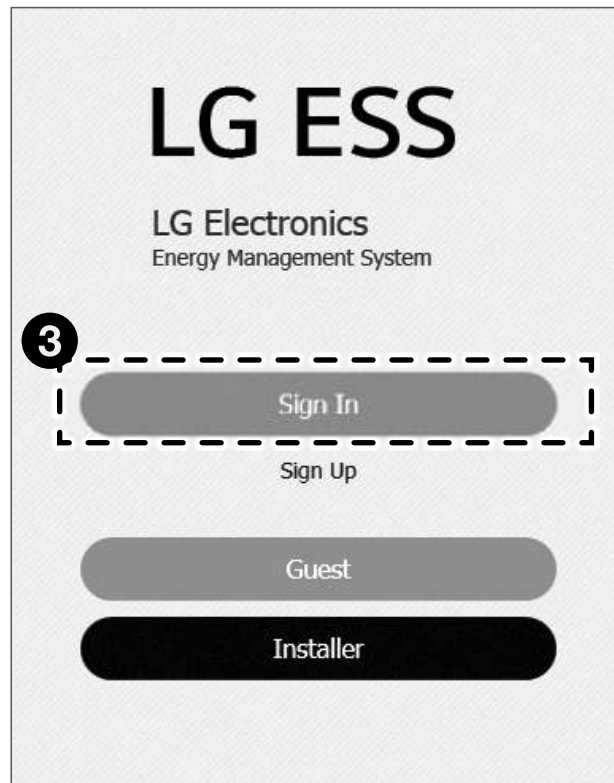


## End user

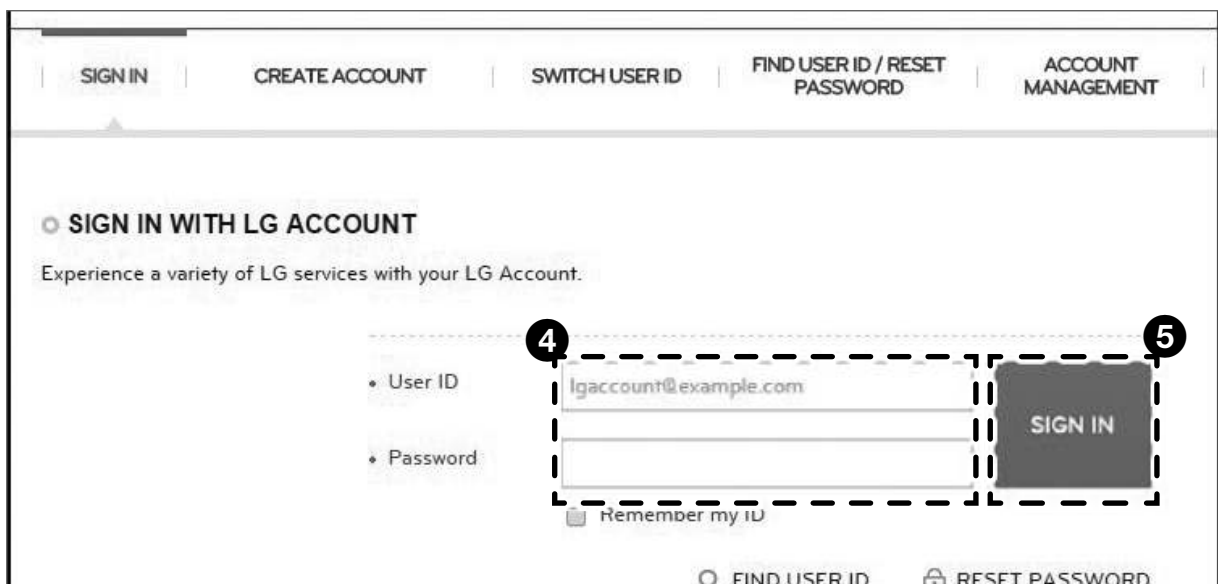


(2/4)

- 2 Owner visits the web site <http://enervu.lg-ess.com/>.



- 3 Select the menu 'Sign In'



- 4 Input e-mail and password.

- 5 Select 'SIGN IN'.

## End user



(3/4)

- 6 Below screen may appear after log-in. The owner can enter the system by clicking 'LG EnerVu (ESS)' icon.

If the owner cannot see this icon, this means there is no ESS available.

### ▼ AVAILABLE LG ACCOUNT SERVICES

Various services of LG Electronics can be accessed using a single LG Account.

-  LG Smart World (TV)
-  LG SmartWorld (Mobile)
-  HomeCloud (Mobile Only)
-  HomeChat
-  LG Cloud
-  LG smartThinQ
-  LG Fitness (Mobile Only)

LG EnerVu   LG EnerVu (solar)

6  

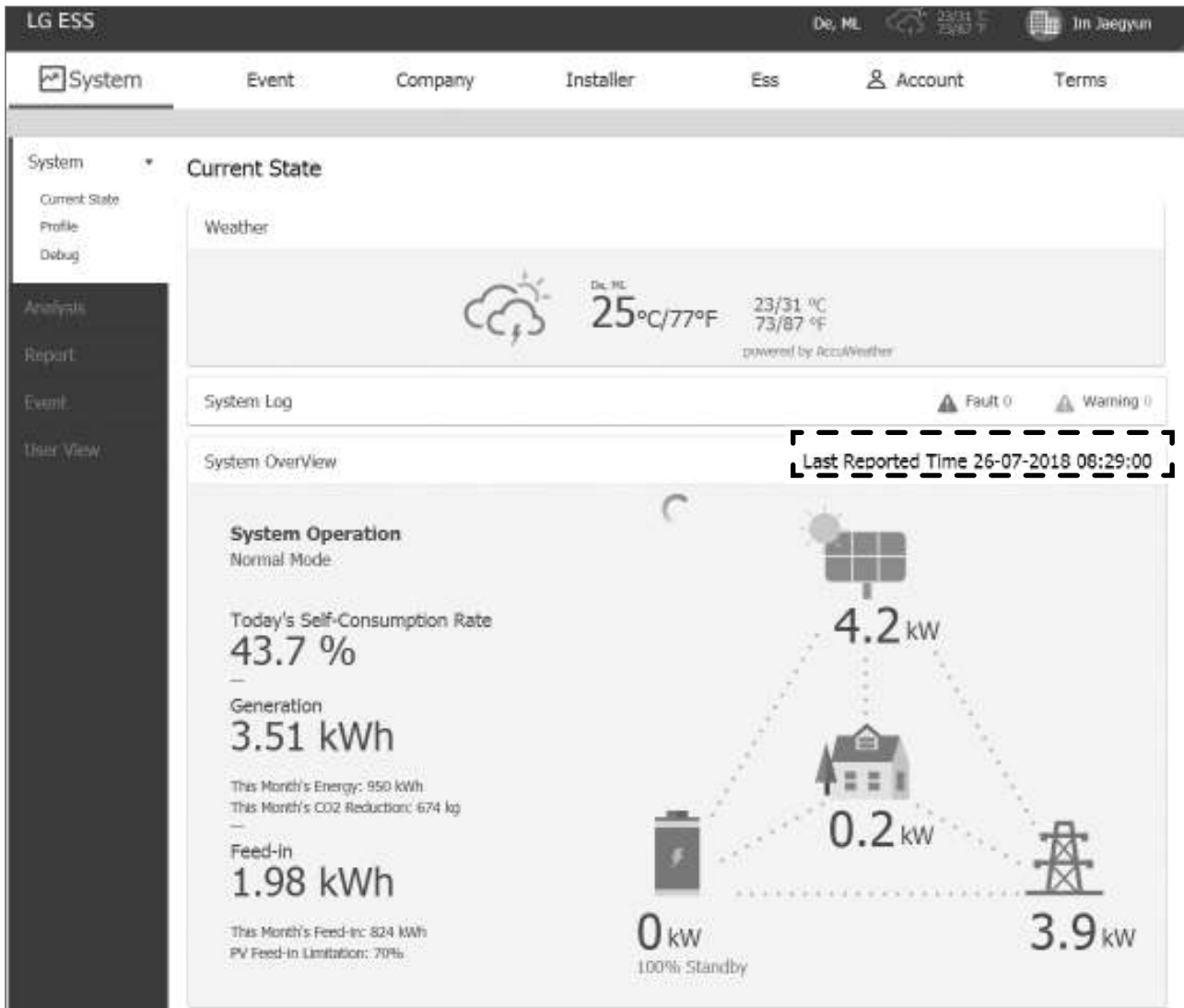
LG Developer   LG Developer

## End user



(4/4)

## Check system



Owner sees his own ESS. If the title 'Last Report Time' does not exist, ESS has not yet reported the data for 1 minutes period.

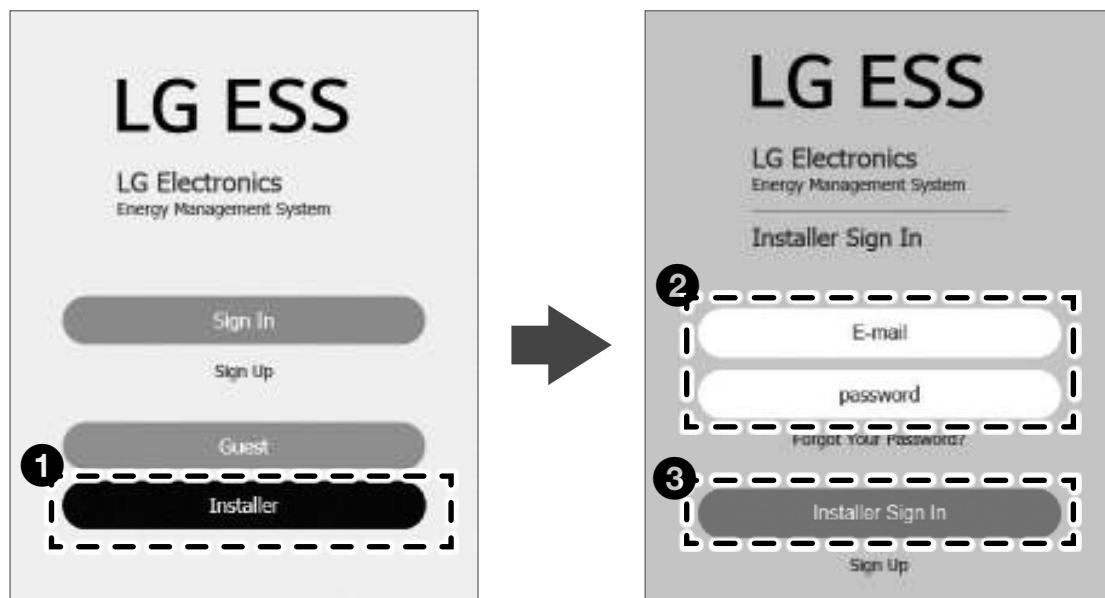


## A-1. How to register other installer as a member in a company

New installer can be added through administrator who is the installer signed up for a company for the first time.

### Sign in

Visits the web site <http://enervu.lg-ess.com/>.



- 1 Select the menu 'Installer'
- 2 Input e-mail and password of administrator.
- 3 Select 'Installer Sign In'

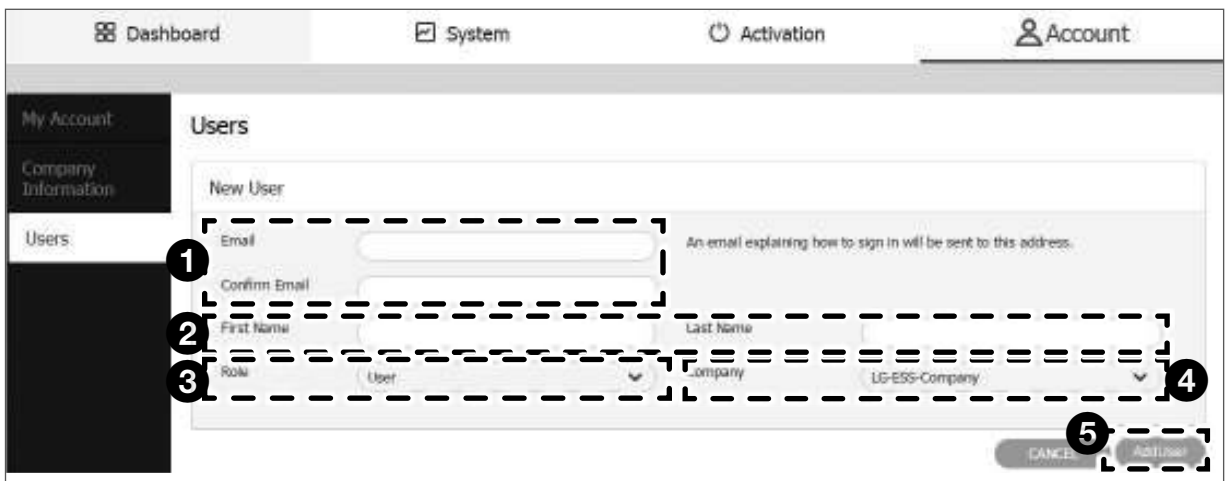


## Users



- 1 Go to the menu 'Account' and 'Users'
- 2 Select the button 'Add New User'

## Add user's info

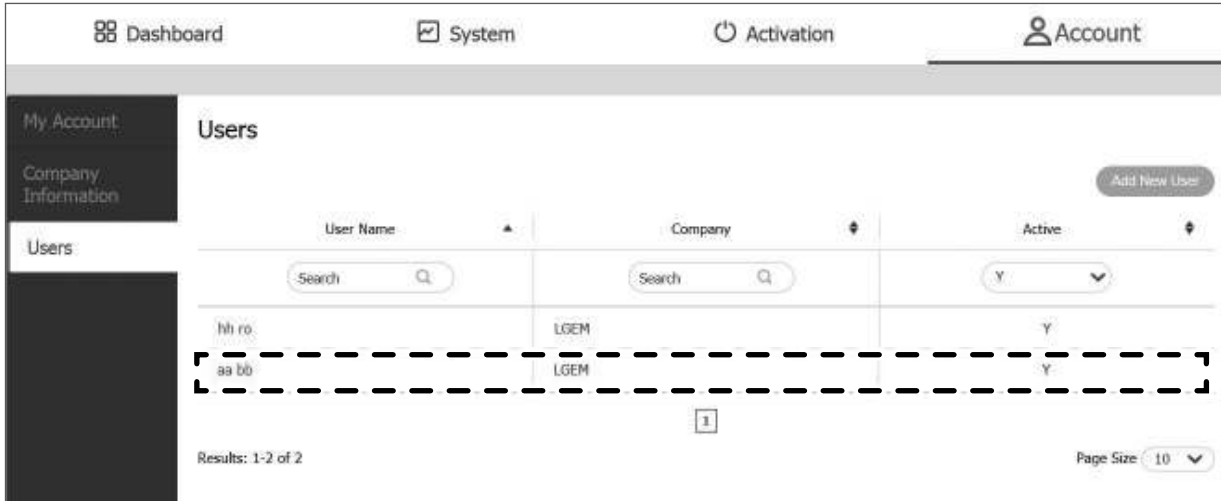


- 1 Input e-mail and confirm e-mail for new installer.
- 2 Input first name and last name of new installer.
- 3 Select Role as User or Administrator.  
User means installer that has not authority to add user or subsidiary.
- 4 Select Company as parent company or subsidiary.
- 5 Finally, select the 'Add User' button. Pop-up message "An E-mail is sent to the email address you entered to set the password" appears.



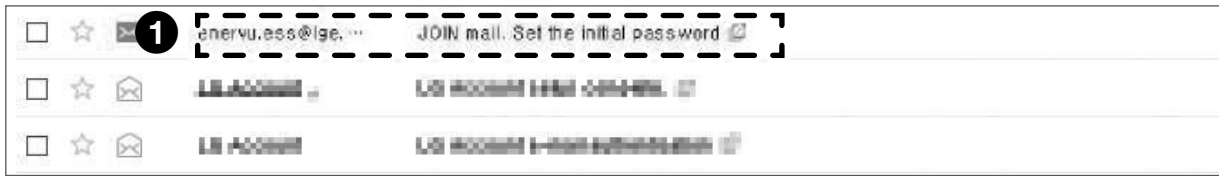


- 6 Select 'OK' button.  
Installer can check that another installer has been registered like below.

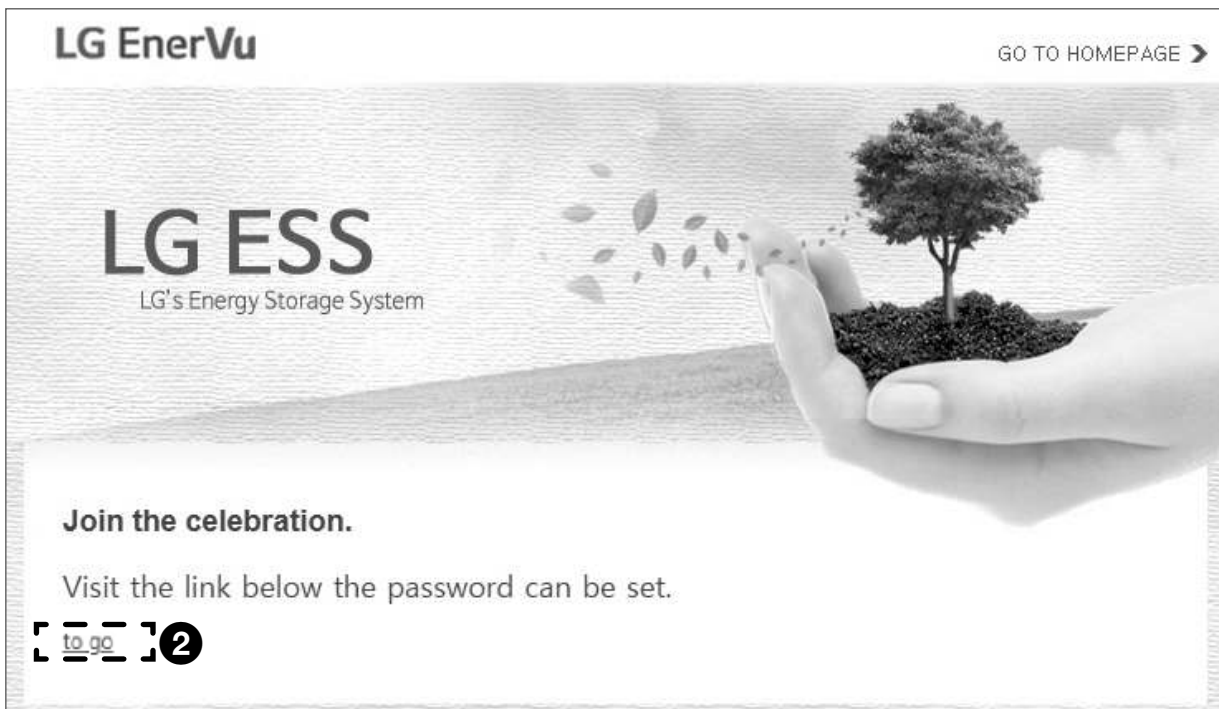




## Join ENERVU



- 1 When e-mail is delivered to owner, open “ESS Monitoring System Activation Complete Guide-mail” on the owner’s e-mail list. Below screen appears.



- 2 New installer can be joined to ENERVU by selecting the link ‘to go’ above in his own email.



## Installer terms

The screenshot shows a web interface for setting up an installer. At the top, there are navigation links: Dashboard, System, Activation, and Account. Below this is a 'Set Password' section. The main content area is titled 'Installer Terms' and contains two scrollable text boxes. The first text box is titled 'Nutzungsbedingungen zu den LGE-ESS-Diensten (Installateur)' and lists 11 numbered items. Below this text box is a dashed box containing the text 'I agree'. The second text box is titled 'Datenschutzrichtlinie für LGE-ESS-Dienste (Installateur)' and lists 11 numbered items. Below this text box is another dashed box containing the text 'I agree'. At the bottom right of the entire form area, there is a dashed box containing the text 'Submit'.

Dashboard System Activation Account

Set Password

Installer Terms

**Nutzungsbedingungen zu den LGE-ESS-Diensten (Installateur)**

1. Einführung
2. Berechtigung
3. Registrierung und Konten
4. Ihre Daten und Inhalte
5. Haftungsausschluss für Nutzererstellte Inhalte
6. Ansprüche aus Immaterialgüterrechten
7. Geistige Eigentumsrechte und gewerbliche Schutzrechte
8. Zugriff auf Dienste und Verfügbarkeit
9. Dienstleistungen Dritter
10. Weitere Pflichten/Einschränkungen hinsichtlich Ihrer Nutzung der Dienste
11. Änderungen der Dienste oder der Nutzungsbedingungen

I agree

Installer Privacy Policy

**Datenschutzrichtlinie für LGE-ESS-Dienste (Installateur)**

1. Einführung
2. Wie erhebt LGE Daten und welche Daten werden von LGE erhoben?
3. Wie verwendet LGE die erhobenen Daten?
4. Weitergabe von Daten
5. Datenübermittlung ins Ausland
6. Wie lange bewahrt LGE meine personenbezogenen Daten auf?
7. Sicherheit
8. Datenschutz bei Kindern/Jugendlichen
9. Änderungen an der Datenschutzrichtlinie von LGE
10. Ihre Rechte und Kontaktaufnahme mit LGE
11. Ankerung der eigenen Daten sowie E-Mail-Kommunikation

I agree

Submit

New installer must select the 2 boxes 'I agree' and the button 'Submit'



## Set password

- 1 Finally, fill the 'Enter new password' and 'Confirm new password' fields.
- 2 Select the 'Submit' button. Pop-up message "Successfully saved" appears
- 3 Select 'OK' button. New installer now becomes a member of a company.



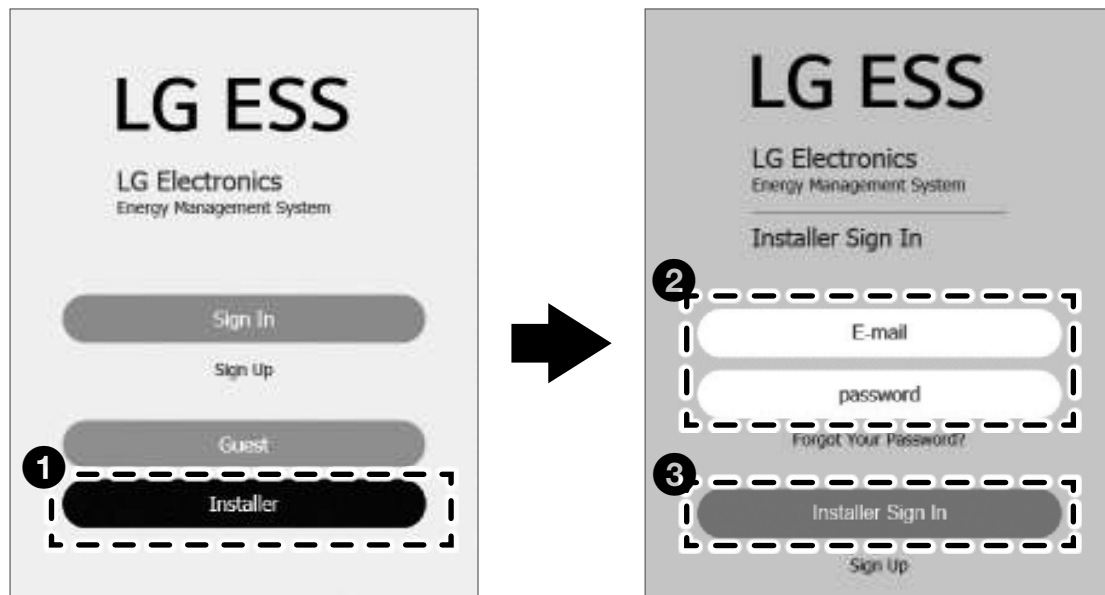
# A-2. How to register a subsidiary\* in a company

A subsidiary can be added through administrator who is the installer signed up for a company for the first time.

\* Subsidiary : Another installer company belonging to a parent company.  
(Parent company and subsidiary are the company hiring multiple installer.)

## Sign in

Visit the web site <http://enervu.lg-ess.com/>.



- 1 Select the menu 'Installer'
- 2 Input e-mail and password of administrator.
- 3 Select 'Installer Sign In'



## Add branch office

The screenshot shows a web interface for managing company information. At the top, there are navigation tabs: Dashboard, System, Activation, and Account. The Account tab is selected. On the left, a sidebar contains 'My Account' and 'Users'. The main content area is titled 'Company Information' and contains a form with the following fields:

- Company Name \*
- Address 1
- City \*
- Postal Code \*
- Company Email
- Country (Dropdown menu: Deutschland)
- Address 2
- State/Province (Dropdown menu: Baden-Württemberg)
- Phone
- Website
- Time Zone (Dropdown menu: (UTC+09:00) Seoul)
- Logo URL (with a note: "과물 선택된 파일 업로드. Must be a JPEG, GIF, or PNG file no larger than 2MB. For best results, we recommend a square image with a transparent background at least 400px wide by 400px tall.")
- Description (with a note: "Text entered here will appear on the public view of systems installed by your company. You may wish to include contact information to help generate sales leads from visitors to these pages.")

At the bottom of the form, there is a 'Submit' button and an 'Add Branch Office' button. The 'Add Branch Office' button is highlighted with a dashed box and a callout '2'. The 'Submit' button is highlighted with a dashed box and a callout '4'. Other callouts include '1' pointing to the Account menu, '3' pointing to the required fields, and '5' pointing to the 'OK' button (not visible in the screenshot).

- ❶ Go to the menu Account > Company Information.
- ❷ Select the 'Add Branch Office' button.
- ❸ All required fields must be inputted.
- ❹ Finally, select the 'Submit' button. Pop-up message "Save complete" appears.
- ❺ Select 'OK' button.



- 6 Click 'Company Information'  
Installer can check that a subsidiary has been registered.

Dashboard System Activation Account

My Account  
Company Information  
Users

### Company Information

6 Company

Company Name \* LGEM Country Deutschland

Address 1 123 Address 2 13

### Office

Add Branch Office

Num	Company Name	Main Office	Address	
1	LGEM	(Main Office)	123 13 berlin Berlin 12345	More ▾
2	ABC	LGEM	Berlin Baden-Württemberg 12345	More ▾

