RESU FLEX

Quick Installation Manual for RESU FLEX

Full installation

LG Energy Solution strongly advises users to exercise due care in following LG Energy Solution's product installation manual. Warranty claims are invalid if damage is caused by human error in a manner inconsistent with the installation manual's instructions.

Version 1.0

LG Energy Solution

ENGLISH

About this manual

This manual intends to illustrate the key points when installing LG Energy Solution's RESU Flex battery.

Make sure to read the Full Installation manual before installing RESU Flex battery. You can find the full installation manual under www.lgessbattery.com or using the QR-code in the front page of this manual.

If you are uncertain about any of the requirements, recommendations, or safety procedures described in this manual, contact LG Energy Solution immediately for advice and clarification. The information included in this manual is accurate at the time of publication. However, the product specifications are subject to change without prior notice. In addition, the illustrations in this manual are meant to help explain system configuration concepts and installation instructions. The illustrated items may differ from the actual items at the installation location.

Contents

1. Safety

1.1 Safety Instructions

For safety reasons, installers are responsible for familiarizing themselves with the contents of this document and all warnings before performing any installation and service.

1.1.1 Battery Handling Guide

- Do not expose the battery to an open flame.
- Do not place the product near to highly flammable materials.
- Do not expose or place near water sources such as downspouts or sprinklers.
- Do not store or install the product in direct sunlight.
- Do not install the product in an airtight enclosure or in an area without ventilation.
- Do not install the product in living area of dwelling units or in sleeping units Other than within storage and utility spaces.
- Store in a cool and dry place. (Do not store in greenhouses or storage areas for hay, straw, chaff, animal feed, fertilizer, vegetables, or fruit products.)
- Store the product on a flat, level surface.
- Store the product out of reach of children and animals.
- Store the product in clean environment, free of dust, dirt and debris.
- Do not allow unqualified personnel to disconnect, disassemble or repair the product. Product handing, service and installation must be carried out by qualified and competent personnel.
- Do not damage the Product by dropping, deforming, impacting, cutting or penetrating with a sharp object. Doing so may cause a fire or leakage of electrolytes.
- Do not touch the product if liquid spills on it. There is a risk of electric shock. Handle the battery wearing insulated gloves.
- Do not step on the product or the product's packaging since the product may be damaged.
- Do not place any foreign objects on top of the Battery Pack and on the cooling fin.
- Do not put the battery pack upside down on the ground.
- Do not connect the power cables at terminal the block in the opposite direction.
- Do not charge or discharge a damaged battery.
- If the Product is installed in a garage or carport, ensure there is adequate clearance from vehicles.
- The battery pack has been certified IP55 and can be installed indoors as well as outdoors. However, if installed outdoors, do not allow the battery pack to be exposed to direct sunlight or water sources, as they may cause:
  - Power limitation phenomena in the battery (with a resulting decrease in energy production by the system).
  - Premature wear of the electrical/electromechanical and mechanical components.
  - Reduction in performance, performance warranty and possible damage of the battery
- Only use the product with a LGES-authorized inverter.
  For a list of compatible inverters, go to :
  https://www.lgessbattery.com/us (in case of North America)
  https://www.lgessbattery.com/au (in case of Australia)
  https://www.lgessbattery.com/eu (in case of all EU-countries in general)
  https://www.lgessbattery.com/de (in case of Germany)
  https://www.lgessbattery.com/it (in case of Italy)
  https://www.lgessbattery.com/es (in case of Spain)
- Do not connect any AC conductors or photovoltaic conductors directly to the battery pack. These are only to be connected to the inverter.

2. Installation

RESU FLEX can be installed in a Standing or Wall-mounting form.

2.1 Installation location

Make sure that the installation location meets the following conditions:

- The building is designed to withstand earthquakes.
- The location is far away from the sea, to avoid salt water and humidity.
- The floor is flat and level.
- There are no flammable or explosive materials nearby.
- The optimal ambient temperature is between 20 and 30°C.
- The temperature and humidity stays at a constant level.
- There is minimal dust and dirt in the area.
- There are no corrosive gases present, including ammonia and acid vapor.

NOTE

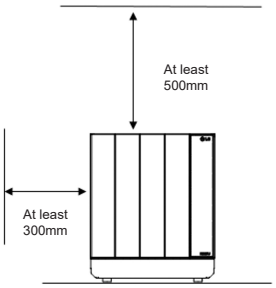
The Resu Battery pack is rated at IP55 and thus can be installed outdoors as well as indoors. However. if installed outdoors, do not allow the battery pack to be exposed to direct sunligh and moisture.

NOTE

If the ambient temperature is outside the operating temperature range (-10℃ ~ 50℃), the battery pack will stop operation to protect itself. The optimal ambient temperature range for the battery pack is between 20℃ and 30℃.
Frequent exposure to harsh temperatures may deteriorate the performance and life of the battery pack.

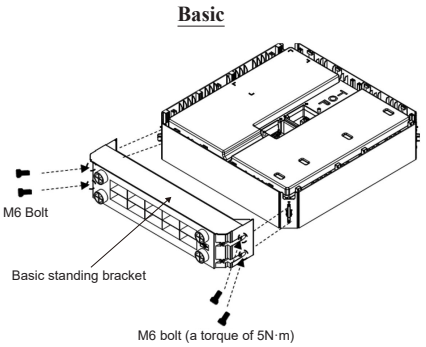
2.2 Standing Installation

2.2.1 Clearance

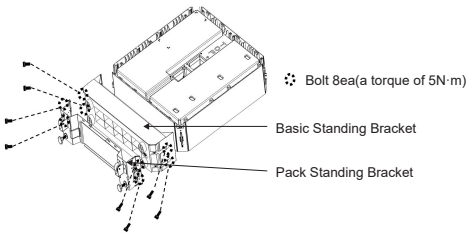


2.2.2 Installation and Cable Connection of BMA and BPU for stand type

1. Assemble the Basic Standing Bracket to the BMA.



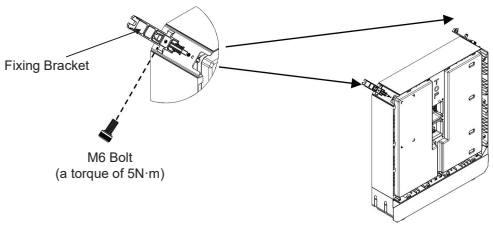
When adding Optional Standing Bracket



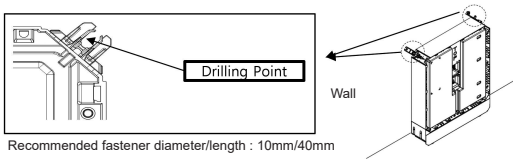
*Optional Standing Bracket is for additional purchase and is not included in basic package.

2. Fix the first BMA to the wall.

1) Assemble Fixing Brackets on the first BMA.



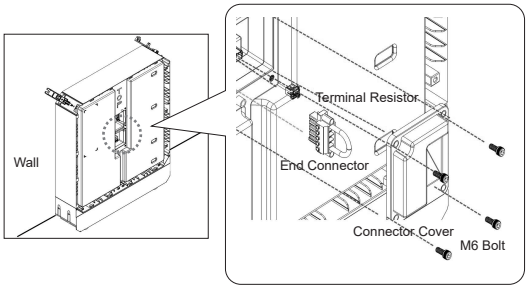
2) Move the first BMA to the wall and mark the drill point for the Fixing Brackets. Drill holes at the marked points and fix the BMA to the wall.



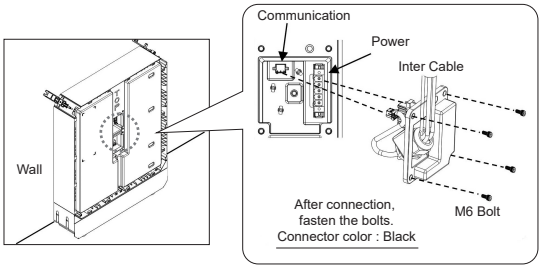
Recommended fastener diameter/length : 10mm/40mm

3. Connect the Terminal Resistor, End Connector and Connector Cover to the Bottom Terminal Block inside the BMA.

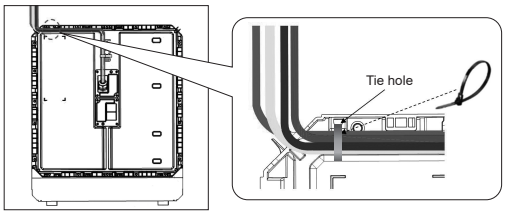
* Terminal Resistor, End Connector and Connector Cover are included in the BPU package.



4. Connect the Inter Cable to the Top Terminal Block inside the BMA.



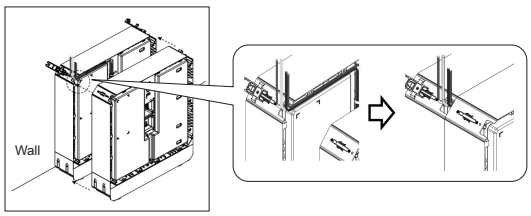
5. Tidy up the cable by inserting in the attachable path inside the BMA and fasten the cable using the Tie hole.

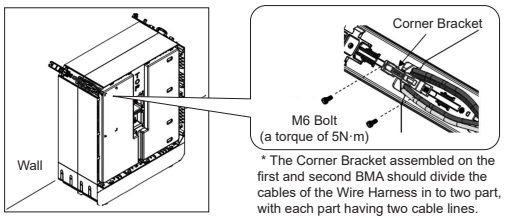


⚠ CAUTION

Be careful not to damage the cable.

6. Install the second BMA in front of the first BMA.



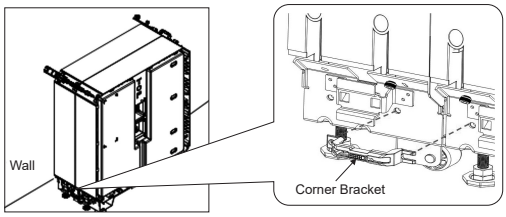


* The Corner Bracket assembled on the first and second BMA should divide the cables of the Wire Harness in to two part, with each part having two cable lines.

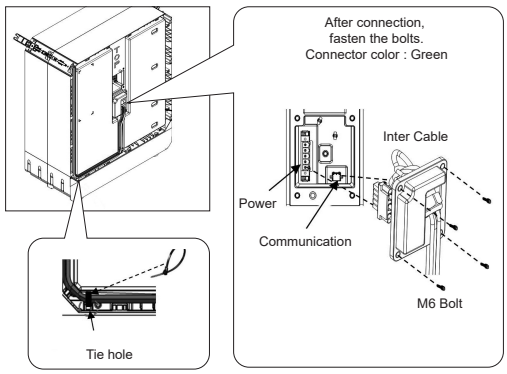
⚠ CAUTION

When the second BMA is installed in front of the first BMA, make sure that the Inter Cable does not interfere between the BMAs.

When adding Optional Standing Bracket



7. Apply the Wire Harness along the attachable path as the below image and connect it to the Bottom Terminal Block of the second BMA.



8. If third and/or forth BMAs are to be installed, repeat the steps from No.4 to No.7.

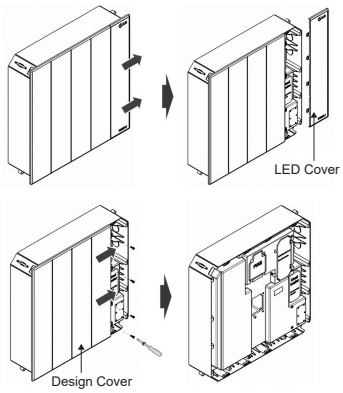
9. Apply the BPU in front of the last BMA, and connect the last BMA with the BPU with Wire Harness by repeating the steps from No.4 to No.7.

Remove LED Cover and Design Cover of the BPU

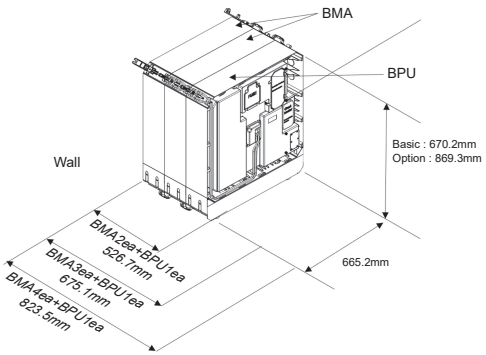
1) Slide and remove the LED Cover of the BPU.

2) Unscrew the 4 bolts on the right side of the BPU as illustrated below.

3) Slide and remove the Design Cover of the BPU.



10. Refer to the dimension information by different number of BMAs, as illustrated below.



2.2.3 Finalizing Installation

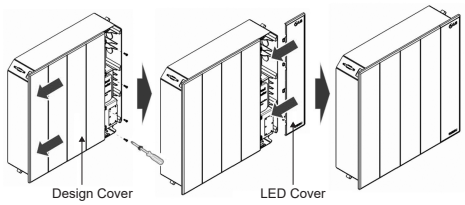
The following steps shall be executed after the connection to the inverter and commissioning is completed.

1. Reassemble the BPU's Design Cover and LED Cover.

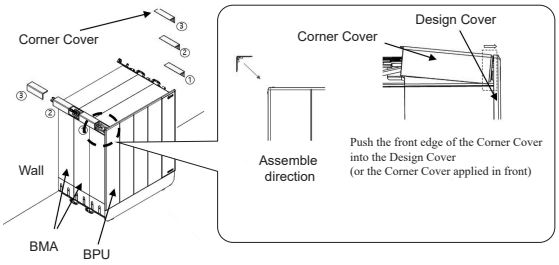
1) Reassemble the Design Cover of the BPU by sliding it backwards.

2) Fasten the 4 bolts that were removed.

3) Reassemble the LED Cover of the BPU by sliding it backwards.

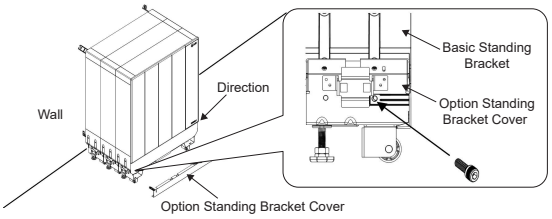


4. After the two covers of the BPU are replaced, assemble the Corner Covers on each corner of the BMA and BPU to protect the cables.

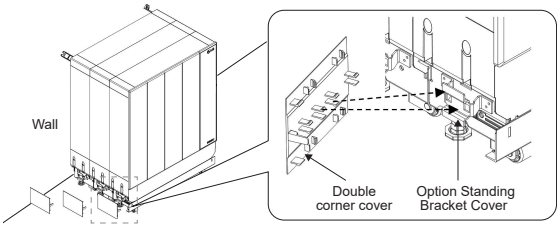


In case of option

1) Apply the Wire Harness along the attachable path as the below image and connect it to the Bottom Terminal Block of the second BMA.



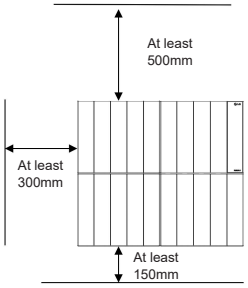
2) Assemble Double Corner Cover into Optional Standing Bracket.



2.3 Wall-mounting Installation

For Wall-mounting installation, the BMA and BPU can be placed in various layouts. Please select a layout for installation in advance and check for the mounting and cabling order in the following 'Wall-mounting Layout' section.

2.3.1 Clearance



2.3.2 Mounting Brackets Installation

1. Select a layout for the Wall-mounting Installation.

2. Decide the position of Mounting Bracket.

3. Drill holes in the wall for the anchor bolts. Drill holes in the wall for the anchor bolts (minimal size of M8 0.3in is required). The drilling depth should be at least 50mm.

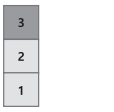
Wall mounting layout

BPU BMA

BPU1+BMA2 (8.6kWh)

1 BMA installation order

H: Height
W: Width

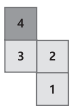
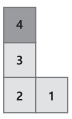
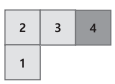
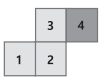
3-1	3-2	3-3	3-4	3-5
				
H : 1342.4mm W : 1342.4mm	H : 1342.4mm W : 1342.4mm	H : 2013.6mm W : 671.2mm	H : 1342.4mm W : 1342.4mm	H : 671.2mm W : 2013.6mm

BPU BMA

BPU1+BMA3 (12.9kWh)

1 BMA installation order

H: Height
W: Width

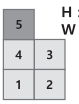
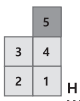
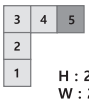
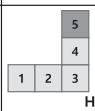
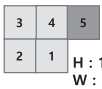
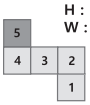
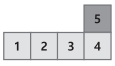
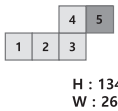
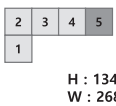
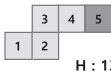
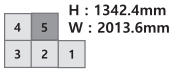
4-1	4-2	4-3	4-4	4-5
				
H : 2013.6mm W : 1342.4mm	H : 2013.6mm W : 1342.4mm	H : 2013.6mm W : 1342.4mm	H : 2013.6mm W : 1342.4mm	H : 671.2mm W : 2684.8mm
4-6	**4-7**	**4-8**	**4-9**	**4-10**
				
H : 1342.4mm W : 2013.6mm	H : 1342.4mm W : 2013.6mm	H : 1342.4mm W : 1342.4mm	H : 2013.6mm W : 1342.4mm	H : 1342.4mm W : 2013.6mm
4-11				
				
H : 1342.4mm W : 2013.6mm				

BPU BMA

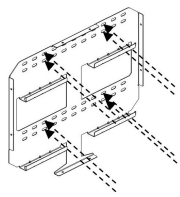
BPU1+BMA4 (17.2kWh)

1 BMA installation order

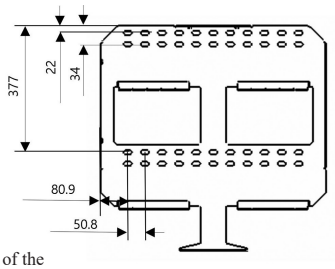
H: Height
W: Width

5-1	5-2	5-3	5-4	5-5
 H : 2013.6mm W : 1342.4mm	 H : 2013.6mm W : 1342.4mm	 H : 2013.6mm W : 2013.6mm	 H : 2013.6mm W : 2013.6mm	 H : 2013.6mm W : 2013.6mm
5-6	**5-7**	**5-8**	**5-9**	**5-10**
 H : 2013.6mm W : 2013.6mm	 H : 2013.6mm W : 2013.6mm	 H : 2013.6mm W : 2013.6mm	 H : 2013.6mm W : 1342.4mm	 H : 1342.4mm W : 2013.6mm
5-11	**5-12**	**5-13**	**5-14**	**5-15**
 H : 2013.6mm W : 2013.6mm	 H : 1342.4mm W : 2684.8mm	 H : 2013.6mm W : 1342.4mm	 H : 1342.4mm W : 2684.8mm	 H : 1342.4mm W : 2684.8mm
5-16	**5-17**	**5-18**	**5-19**	**5-20**
 H : 1342.4mm W : 2684.8mm	 H : 2013.6mm W : 2013.6mm	 H : 1342.4mm W : 2684.8mm	 H : 1342.4mm W : 3356mm	 H : 1342.4mm W : 2013.6mm

4. Drive and pre-tighten the anchor bolts into the holes in the wall through the screw holes on the Wall Mounting Bracket.

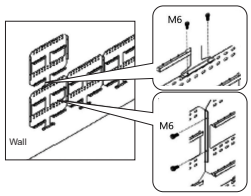


Depending on the condition of the wall, bolt at least 8 points

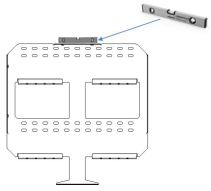


Information of hole position (mm)

5. Connect the Brackets with each other using bolts, from left to right and from top to bottom direction. After connecting the Mounting Brackets, check the balance and fully fasten the bolts to the wall.



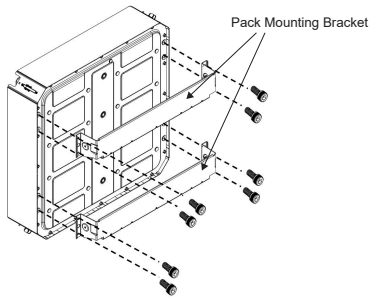
Fasten the Mounting Brackets with M6 bolts.



After check the balance and fully fasten the bolts to the wall

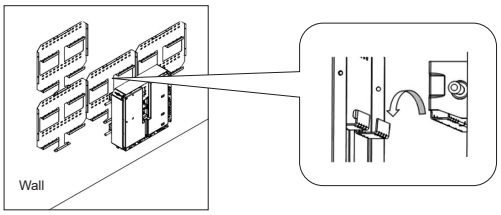
2.3.3 Installation and Cable Connection of BMA and BPU for Wall type

1. Assemble the Pack Mounting Bracket to the BMA.

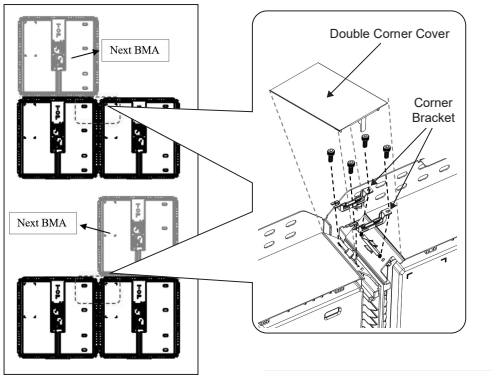


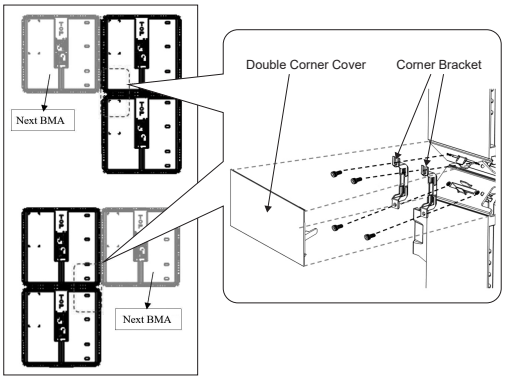
2. Assemble the BMA to the Wall Mounting Bracket using the handle.

* Depending on the BMA location on the wall, the position of the handle on the BMA varies.
* The Design Cover of the BPU should be removed before installing the BPU to the Mounting Bracket.

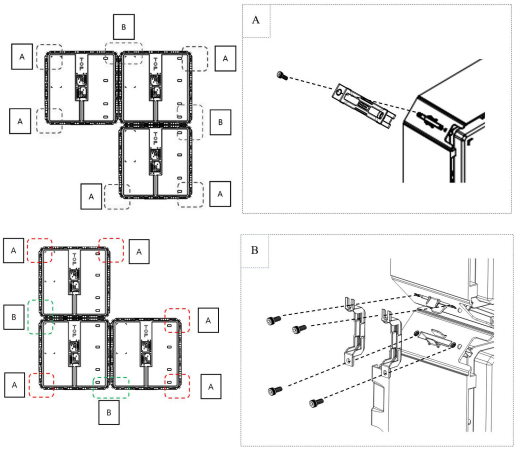


3. In the marked part, assemble the corner bracket and double corner cover first and then install the next BMA.



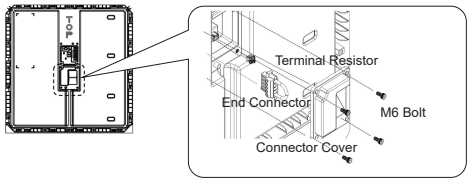


4. Once all the BMAs and BPU are installed, assemble the Corner Brackets on all corners of the BMA and BPU.
(A : Corner Bracket 1ea, B : Corner Bracket 2ea)



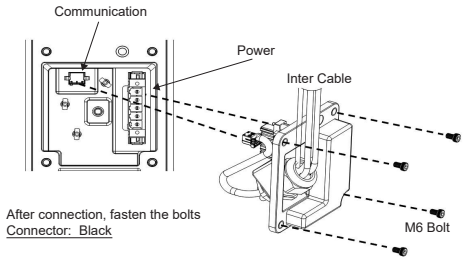
5. Once all the BMAs and BPU are installed, start the cable wiring between the BMAs and BPU. Make sure that the cabling order is the same as the installation order of the BMA as the Wall-mounting Layout and the BPU is always the last one in the order.

6. Connect the Terminal Resistor, End Connector and Connector Cover to the Bottom Terminal Block of the first BMA in order of the 'Wall-mounting layout'

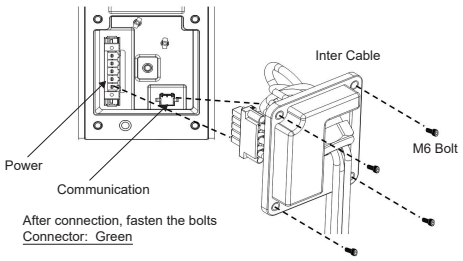


7. Connect the Inter Cables between the BMAs and BPU in order.

1) Top Terminal Block



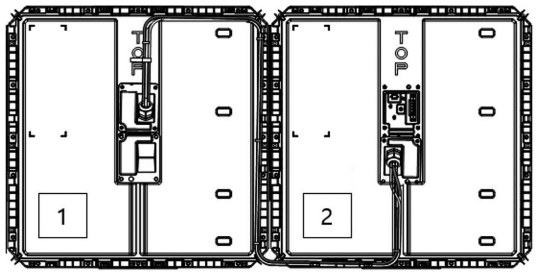
2) Bottom Terminal Block



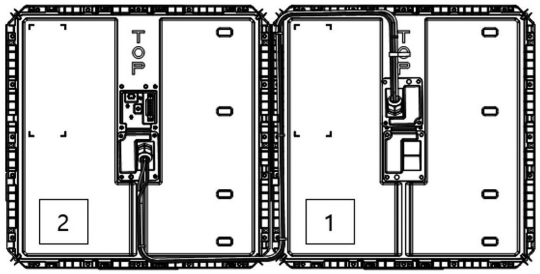
8. Tidy up the Inter Cable by inserting it into the attachable path inside the BMA and fasten the cable using the Tie hole.

9. Only use the cable path from the three following illustration.

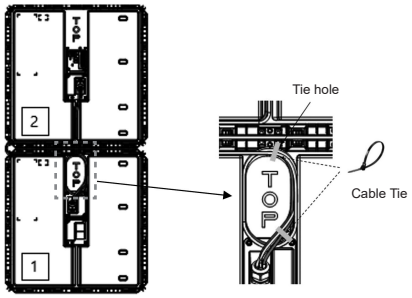
1) Left to right connection



2) Right to left connection



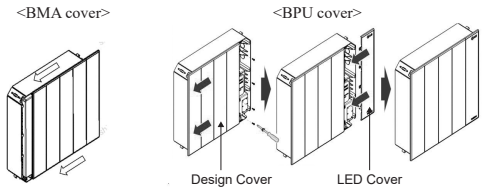
3) Bottom to top connection



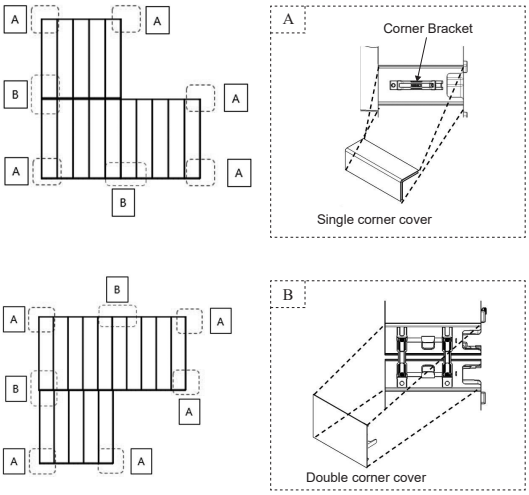
2.3.4 Finalizing Installation

The following steps shall be executed after the connection to the inverter and commissioning is completed.

1. Attached Design Cover to all BMAs by sliding it from right to left.
2. Replace the Design Cover of the BPU by sliding it from right to left.
3. Fasten the 4 bolts that were removed.
4. Replace the LED Cover of the BPU by sliding it backwards.



5. Assemble all Single Corner Cover and Double Corner Cover.
(A : Single Corner Cover, B: Double Corner Cover)

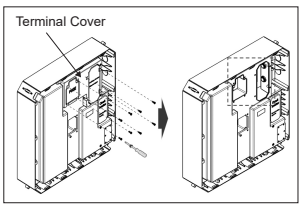


3. Connection to the Inverter

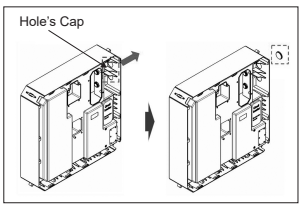
⚠ WARNING

Make sure that inverter is turned off before connecting the BPU to the inverter.

3.1 Prepare for Connection

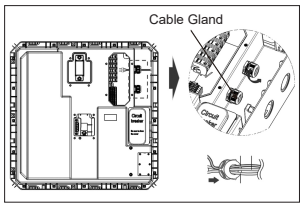


1. Disassemble the Terminal Cover of the BPU by removing the bolts on 8 points.



2. Remove a Cap from the hole on top right side of the BPU.

* One of the Cap is for the BPU parallel connnection



3-1. Loose a Cable Gland

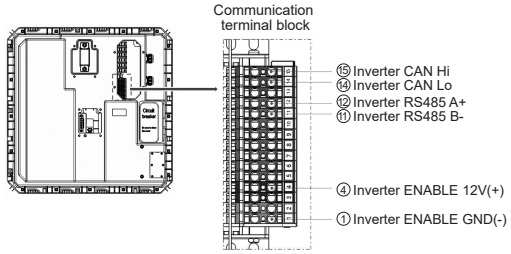
* One of the Cable Glands is for the BPU parallel connection

* Assemble the adapter according to regional regulations.

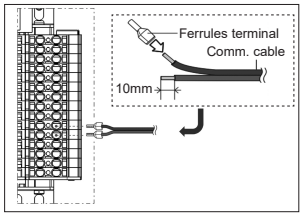
3-2. Insert the cables through the Cable Gland

3.2 Communication line connection

1. Find the Communication terminal block.
   Connect to Communication line according to the communication type. (C AN or RS485)



Recommended Communication Cable



1) Max. cable length : < 30m(98ft)

2) Conductor cross section : 0.3~0.5mm^2

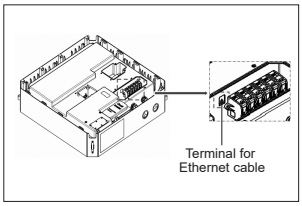
* Use a multi conductor cable(Core 4 or 5) with a outer diameter of 5.5 ~ 6.5mm.

3) Use ferrule terminal for the communication cable.

Pin-map of the Communication Terminal Block

No,	Color	Pin map
1	GRAY	ENABLE GND(-)
2		LTE/WAKE GND(-)
3	BLACK	Input 12V (BPU EOL)
4		Enable 12V (In)
5	RED	WAKE OUT
6		WAKE IN
7		INTERNAL CAN GND
8		INTERNAL CAN Lo
9		INTERNAL CAN Hi
10	BLUE	LTE 12V(+)
11		INVERTER RS485 B-
12		INVERTER RS485 A+
13	GREEN	INVERTER COMMS GND
14		INVERTER CAN Lo
15		INVERTER CAN Hi

2. How to connect Ethernet cable.



1) Insert the cable through the Gland and connect it to the Terminal for Ethernet cable.

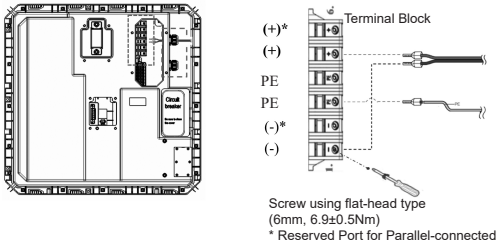
*: Same as common ETHERNET pin map

3.3 Power line connection

NOTE

Pay attention to polarity. Reverse polarity connection causes severe damage to the BMA.

1. Find the Power terminal block inside the terminal hole Connect to Power line as below.



Recommended Power Cable

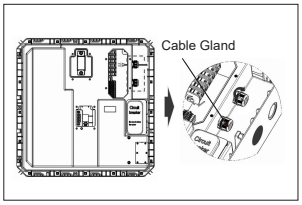
1) Max. cable length : < 30m(98ft)

2) Conductor cross section : 6mm^2

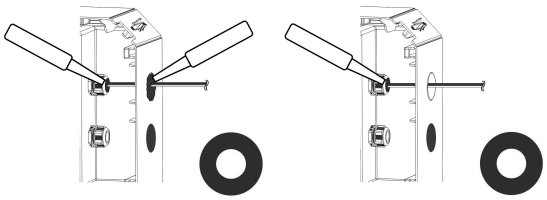
3) Use ferrule terminal for the power cable.

3.4 End of Connection

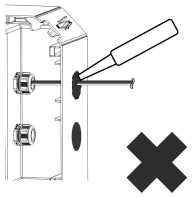
1. Fasten the Cable Gland



2. Seal the Cable Gland with sealant.

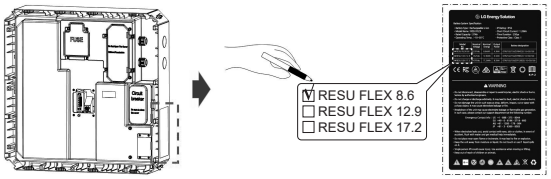


* IP55 is not met when only outer hole is sealed. Make sure that inter hole of the Cable Gland is sealed properly.



3. Mark the Model No. depending on the Battery Configuration.

Battery Configuration		
☐ RESU FLEX 8.6	☐ RESU FLEX 12.9	☐ RESU FLEX 17.2
BPU 1 + BMA2	BPU 1 + BMA3	BPU 1 + BMA4



4. Commissioning

For the battery commissioning you need for installer account

If you don't have your account, please visit LG ESS Battery website and make an account.

https://www.lgessbattery.com/us (in case of North America)

https://www.lgessbattery.com/au (in case of Australia)

https://www.lgessbattery.com/eu (in case of all EU-countries in general)

https://www.lgessbattery.com/de (in case of Germany)

https://www.lgessbattery.com/it (in case of Italy)

https://www.lgessbattery.com/es (in case of Spain)

4.1 Battery setting from RESU Monitor App

RESU FLEX should be set with the RESU Monitor App.

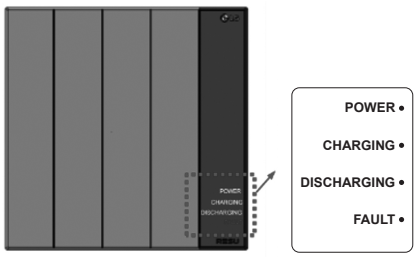
Please download RESU Monitor App and follow the instructions and proceed with the battery setting.

Search for "LG RESU Monitor" in App Store(iOS) or Play Store(Android) to download the RESU Monitor App.

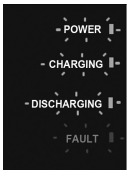
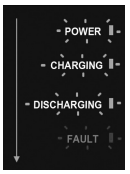
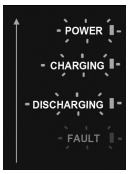
4.2 LED Indicator

There are four LED indicators on the front of the battery packs to show its operating status.

- Power: This indicator stays on while the battery pack is supplied with power for operation.
- Charging: This stays on while the battery pack is charging.
- Discharging: This stays on while the battery pack is discharging.
- Fault: This comes on when the battery pack is in a warning state.



The LED indicators on the front of the BPU shows different state of the battery before setup is completed:

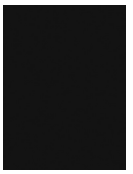
During initial battery setup			
Initial setting not performed	Initial setup error 1*	Initial setup error 2**	Initial setup error 3***
			

* Initial setup error 1: The number of BMA connected to BPU is higher than number of BMA set within the RESU Monitor App.

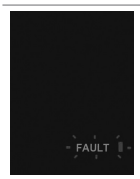
** Initial setup error 2: The number of BMA connected to BPU is less than the number of BMA set within the RESU Monitor App.

*** Initial setup error 3: The SW versions of the BMAs are different.

The LED indicators on the front of the BPU shows different operation state of the battery:

Battery Operation			
STANDBY	CHARGE	DISCHARGE	POWER SAVING
			

Battery fault status.

Battery Fault	
FAULT1	FAULT2
	

4.3 Powering On the Battery Pack

There are four LED indicators on the front of the battery packs to show its operating status.

1. Open circuit breaker cover of BPU.
2. Ensure the circuit breaker switch is in the OFF position.
3. Turn on the circuit breaker.
4. Seconds after the circuit breaker switch is ON, four (4) LED indicators will light up and blink every second. (Battery Setting Required)
   - 4.1 Ensure the LED power indicator is ON to confirm that the battery pack has successfully initialized. Go to step
   - 4.2 If the LEDs are in a state other than 4.1, it means initialization was not successful. Go to Troubleshooting.
5. Close the front cover.
6. Turn on the inverter.

4.4 Shutting Off the Battery Pack

Shut off the battery pack through the following steps:

1. Turn off the inverter.
2. Open the front cover.
3. Turn off the battery pack by moving the circuit breaker switch to the OFF

position.

4. Make sure that every LED indicator on the battery pack is OFF. (After 10 seconds, the LED lights will turn off and the battery will shut down completely.)
5. Close the front cover.

5. Troubleshooting

5.1 Troubleshooting Overview

Check the LED indicators on the front to determine the state of the battery pack. A fault state is triggered when certain conditions like voltage or temperature are beyond design limitations. The battery pack's BMS periodically reports its operating state to the inverter.

When the battery pack falls outside of prescribed limits, it enters a fault state. When a fault is reported, the inverter immediately terminates operation.

Use the monitoring software on the inverter to identify what caused the fault state. The possible warning messages are as follows:

- Battery Overvoltage
- Battery Undervoltage
- Battery Over Temperature
- Battery Under Temperature
- Battery Discharge Overcurrent
- Battery Charge Overcurrent
- Battery Overcharge Power Limit
- Battery Overdischarge Power Limit
- BMS Internal Error
- External Communication Error
- Internal Communication Error
- Battery Cell Deviation Voltage
- Battery Pack Undervoltage
- Battery Urgent Undervoltage

The fault state is cleared when the battery pack resumes normal operation. If battery pack is not working correctly and the issue persists, contact a qualified staff, Installer or LG Energy Solution regional contact service point.

NOTE

For serious warnings, if no proper corrective action is taken by the inverter, the battery pack's circuit breaker will automatically trip to protect itself.

⚠ CAUTION

If the battery pack or the inverter indicates FAULT or fails to operate, contact LG Energy Solution regional contact point or your distributor immediately.

5.1.1 Post-Installation Checklist

	Yes	No
1. Visually check if the wiring matches the installation manual. (Refer to the chapter. 4)	◯	◯
2. The circuit breaker is ON.	◯	◯
3. The battery LED power indicator is ON.	◯	◯
4. The inverter power is ON.	◯	◯
5. The inverter has the latest firmware installed.	◯	◯
6. The inverter recognizes the battery.	◯	◯
7. The battery is operational after installation.	◯	◯
7-1. The AC grid is connected.		
7-2. The meter is installed.		
7-3. Government approval is complete.		
8. If any item in #7 is checked as no or if the inverter Needs to be turned off, turn off the circuit Breaker.	◯	◯

5.1.2 Troubleshooting Guidelines

If the battery LED power indicator is OFF

1. Turn off the circuit breaker.
2. Turn off the inverter. Verify there is no power at the battery connection.
3. Unplug all the wires and reconnect. Check that the wiring on the battery has been done correctly. Refer to Section 3 Battery-inverter Connection
4. Turn on the circuit breaker.
5. Turn on the inverter.
6. If the LED power indicator is still OFF, turn off the circuit breaker.
7. Disconnect the power cable connector.
8. Contact LG Energy Solution regional contact point.
   1) Contact the inverter manufacturer.
   2) Refer to the inverter installation manual or troubleshooting guidelines.
   3) Refer to the Installation manual (3.Battery-inverter connection) for the location of the battery. and the Circuit Breaker.

If the LED power indicator is ON, but the battery is not charging or discharging

1. Update both the inverter and battery firmware versions. Refer to the inverter's troubleshooting guide for instructions.
2. Check the inverter's battery settings. Refer to the inverter's troubleshooting guide for battery setup instructions.
3. If the battery is recognized, inverter setup has been completed successfully.
4. If the issue persists:
   4-1. Turn off the circuit breaker.
   4-2. Turn off the inverter. Verify there is no power at the battery connection.
   4-3. Unplug all wires and reconnect. Check that the wiring on the battery has been done correctly. Refer to Section.2. and 3.
   4-4. Turn on the circuit breaker.
5. If the battery setup is correct, but the battery is still non-operational, turn off the circuit breaker
6. Contact LG Energy Solution regional service contact point.

If the LED fault indicator is ON

1. Check if the inverter recognizes the battery. Refer to the inverter's troubleshooting guide for battery setup instructions.
2. If the inverter is connected to the internet, collect the log fi les from the inverter company.
   2-1. Send the fault ID to LG Energy Solution regional contact point.

2-2. Turn off the circuit breaker.

2-3. Wait further instruction from LG Energy Solution.

3. If the inverter is not connected to the internet, check the inverter LCD to read the battery's fault ID. Refer to the inverter's troubleshooting guide for instructions.

3-1. Send the fault ID to LG Energy Solution regional contact point.

3-2. Turn off the circuit breaker.

3-3. Wait further instruction from LG Energy Solution.

5.1.3 Contact Information

Damaged batteries are dangerous and must be handled with extreme caution. They are not fit for use and may pose a danger to people or property. If the battery pack seems to be damaged, contact LG Energy Solution regional contact point or your distributor. Use the contacts below for technical assistance. These phone numbers are available only during business hours on weekdays.

Service Contacts		
HQ (KOR) / Other Regions	Address	29, Gwahaksaneop-3-ro, Oksan-myeon, Heungdeok-gu, Cheongju-si , Chungcbeongbuk-do, South Korea
	E-mail	essservice@lgensol.com
US	Address	19481 San Jose Ave City of Industry, CA 91748, U.S.A
	Telephone	+1 888 375 8044
	E-mail	help@etssi.com
Europe	Address	E-Service Haberkorn GmbH, Stolberger Str. 25, 06493 Harzgerode, Germany
	Telephone	+49 (0) 6196 5719 660
	E-mail	lgchem@e-service48.de
Australia	Address	Unit 12, 35 Duolop Road, Mulgrave VIC 3170, Australia
	Telephone	+611300 178 064
	E-mail	essserviceau@lgensol.com

LG Energy Solution

Keep this manual for later use

LG Twin Towers, 128, Yeoui-daero, Yeongdeungpo-gu, Seoul 07336, Republic of Korea
https://www.lghomebattery.com http://www.lgensol.com