RESU10H

INSTALLATION MANUAL

LG Chem

The information included in this manual is accurate at the time of publication. However, this manual is subject to change without prior notice. In addition, the illustrations in this manual are meant only to help explain system configuration concepts and installation instructions.
Please note the image shown is for illustration purposes only.

Rev.1_Nov.2016

Contents

1 Safety

1.1 Symbols

Caution, risk of electric shock

Do not place nor install near flammable or explosive materials.

Install the product out of reach of children.

Read the instruction manual before starting installation and operation.

Heavy weight may cause serious injury to the back.

Do not dispose of the product with household wastes.

Recyclable

Disconnect the equipment before carrying out maintenance or repair.

Observe precautions for handling electrostatic discharge sensitive devices.

1.2 Safety instructions

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

1.2.1 General safety precautions

Over-voltages or wrong wiring can damage the Battery Pack and cause deflagration, which can be extremely dangerous.

Avoid installing the Battery Pack where flammable materials are stored. Do not install in places where explosive gas or chemicals are present.

The utility grid, solar input, and battery voltage must be disconnected from the Battery Pack before wiring. Wiring must be carried out by a Qualified personnel. Battery Pack is not user serviceable. High voltage is present in the device.

The electronics inside the Battery Pack are vulnerable to electrostatic discharge.

Be sure to be grounded before handling the Battery Pack.

Read the label with Warning Symbols and Precautions, which is visibly under to the Battery Cover (see Section 1.3)

1.2.2 Battery handling guide

- Do not expose battery to temperature over 55°C and open flame.
- Do not damage the unit in such ways as dropping, deforming, impacting, cutting or penetrating with a sharp object. It may cause a leakage of electrolyte or fire.
- Do not connect anode and cathode terminal block opposite direction.
- Do not charge or discharge damaged battery.
- Do not place any foreign objects on the top of the Battery Pack and on the cooling fin.
- Do not put the battery pack upside down on the ground.
- Do not disconnect, disassemble or repair by an unqualified personnel. Services must be made by qualified personnel only.

- All types of breakdown of the product may lead to a leakage of electrolyte or flammable gas.
- Do not place the product nearby flammables. It may lead to fire or explosion in case of accident.
- Keep out of reach of children or animals.
- Keep the product away from direct liquid. Do not touch or use if liquid is spilled on the product.
- Store at cool and dry place.
  (Do not storage place : Storage are for hay, straw, chaff, animal feed, fertilizers, vegetables or fruit products, greenhouse)
- Only use the product with a LGC-authorized inverter.
- Do not connect any AC conductors or Photo-voltaic conductors directly to the battery pack and should be only connected to the Inverter
- Make sure not to accumulate snow over the battery pack or submerge battery pack in liquids.
- Do not expose or place near water sources like downspouts or sprinklers
- If the battery pack is installed in the garage then ensure the product is above the height of the vehicle bumper.
- Ensure proper care is taken to keep off any foreign object on top of the battery pack
- The RESU 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 and water source as it may cause :
  - Power limitation phenomena in the battery
    (with a resulting decreased energy production by the system)
  - Premature wear of the electrical/electromechanical components and mechanical components (gaskets)
  - Reduction in performance, service life and possible damage of the battery
- Product should be installed within 6 months of manufactured date.

1.2.3 Response to emergency situations

- If a user happens to be exposed to internal materials of the battery cell due to damage on the outer casing, the following actions are recommended.

  Inhalation : Leave the contaminated area immediately and seek medical attention.

  Eye contact : Rinse eyes with running water for 15 minutes and seek medical attention.

  Contact with skin : Wash the contacted area with soap thoroughly and seek medical attention.

  Ingestion: Induce vomiting and seek medical attention.

- **Fire extinguishing media**

  Respirator is not required during normal operations.
  Use FM-200 or CO2 extinguisher for batter fire.
  Use an ABC fire extinguisher, if the fire is not from battery and not spread to it yet.

- **Fire fighting instructions**

  If fire occurs when charging batteries, if it is safe to do so, shut off the power to charge (Shut off the circuit breaker).

  When batteries are heated above 150℃, there may be a possible exlposion.

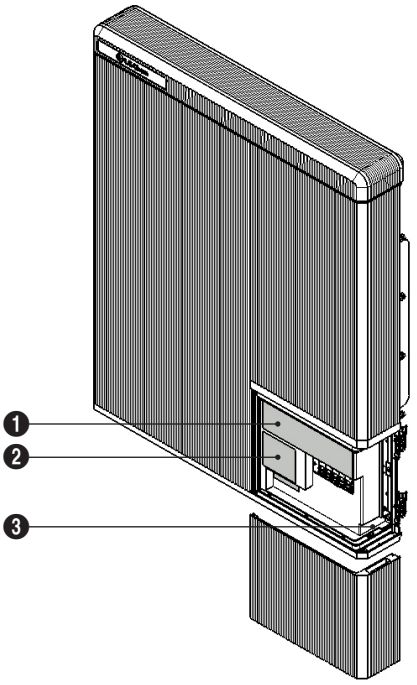
- **Effective ways to deal with accidents**

  On land : Place damaged battery into a segregated place and call local fire department or service engineer.

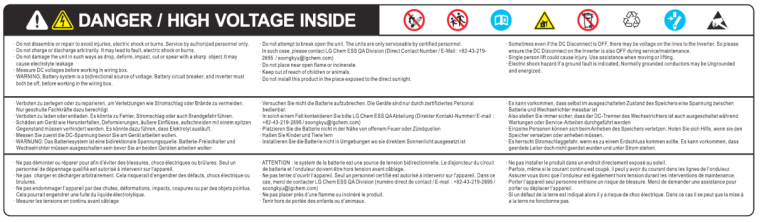
  In water : Stay out of the water and don't touch anything if any part of the battery, inverter, or wiring is submarged.
  Do not use submerged battery again and contact the service engineer.

1.3 Warning label

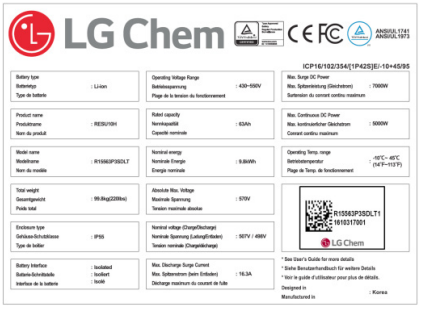
Warning labels and other relevant labels are attached to the inside of the battery pack.



1. Warning label



2. Product label



3. Traceability label

1.4 Qualified personnel

This guide and the tasks and procedures described herein are intended for use by skilled workers only. A skilled worker is defined as a trained and qualified electrician or installer who has all of the following skills and experience:

- Knowledge of the functional principles and operation of on-grid and off-grid (backup) systems.
- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
- Knowledge of the installation of electrical devices
- Knowledge of and adherence to this guide and all safety precautions and best practices.

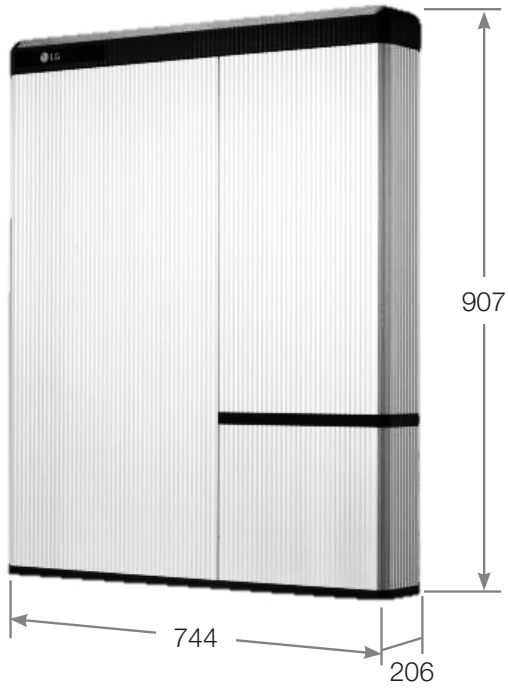
2 Product Introduction

2.1 Technical data

2.1.1 Dimensions and weight

	RESU10H
P/N	EVESPBO0100A0
Width	744 mm (29.3″)
Height	907 mm (35.7″)
Depth	206 mm (8.1″)
Weight [1)]	99.8 kg (220 lbs)

1) A battery pack's weight varies slightly.



2.1.2 Performance

RESU10H

Electrical Characteristics		
Total Energy Capacity[1)]		9.8 kWh@25°C (77°F), 100% SOE
Usable Energy Capacity[1)]		9.3kWh
Battery Capacity		63 Ah
Voltage Range	Charge	468 to 550 V_{DC}
	Discharge	430 to 507 V_{DC}
Absolute Max. Voltage		570V_{DC}
Max. Charge/Discharge Current		10.7A@467V / 11.7A@427V
Max. Charge/Discharge Power[2)]		5kW
Peak Power[3)] (only discharging)		7kW for 10 sec.
Peak Current (only discharging)		16.3A@430V for 10 sec.
Communication Interface		CAN
DC Disconnect		Circuit Breaker
Connection Method		Spring Type Connector
User interface		LEDs for Normal and Fault operation

Operating Conditions	
Installation Location	Indoor / Outdoor (Wall-Mounted)
Operating Temperature	14 to 113°F (-10 to 45°C)
Operating Temperature (Recommended)	59 to 86°F (15 to 30°C)
Storage Temperature	-22 to 131°F (-30 to 55°C)
Humidity	5% to 95%
Altitude	Max. 6,562ft (2,000m)
Cooling Strategy	Natural Convection

Certification		
Safety	Cell	UL1642
	Battery Pack	UL1973 / CE / RCM / TUV(IEC 62619)
Emissions		FCC
Hazardous Materials Classification		Class 9
Transportation		UN38.3 (UNDOT)
Ingress Rating		IP55

※ Test Conditions - Temperature 25°C

1) Values for Battery only.

2) LG Chem recommends 3.3kW for maximizing battery lifetime.

3) Peak Current excludes repeated short duration(less than 5 sec. of current pattern).

2.2 Feature

- Compact Energy storage unit for domestic photovoltaic system compatibility
- Residential 400V DC battery pack system : Daily cycle residential battery system
- No Additional Devices : Aux Power and Protection Devices* Included

  *Protection Devices
  - Inverter interface (between Battery Pack and Inverter) : Over Voltage, Over Current, External Short Circuit, Reverse Polarity, Inrush Current, Ground Fault , Over Temp.
  - Battery inside (between Li-Ion battery and DC/DC converter) : Internal Short Circuit, Over Voltage, Over Current, Over Temp, Under Voltage
- Flexible installation : Indoor or Outdoor

2.3 Warehouse storage instructions

2.3.1 Packaging specification

Category		Contents			
Size (LxWxH) (mm)		1,120 (44")	1,100 (43")	450 (17.7")	Outer Size
Qty/Box (ea)		1			1ea× 2 layers
Packaging Materials		Hard Cardboard			Disposable
		Wood			Disposable
		Wood			Disposable
Weight (kg)	Packaging	40 (88lbs)			Pallet + Box + Inner
	Gross	147.8(326lbs)			Product + Packaging

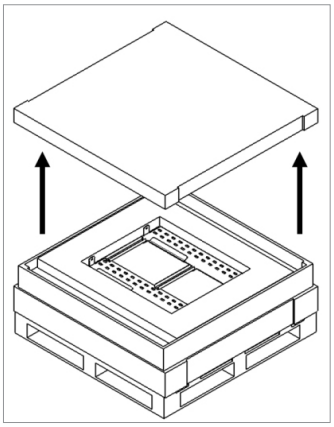
2.3.2 Handling

- Do not step on the product or the product package. The product may be damaged.
- A ventilated area is strongly recommended for handling the prouct.
- Store the product on a flat surface.
- There must be no flammable or explosive materials nearby.
- The temperature and humidity should be maintained at a constant level.
- There should be minimal dust and dirt in the area.
- Do not store this product in a place exposed to direct sunlight.
- Store this product out of reach of children and animals.

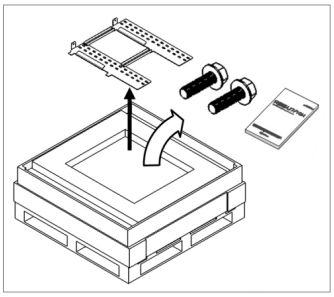
3 Installation

3.1 Mechanical requirements

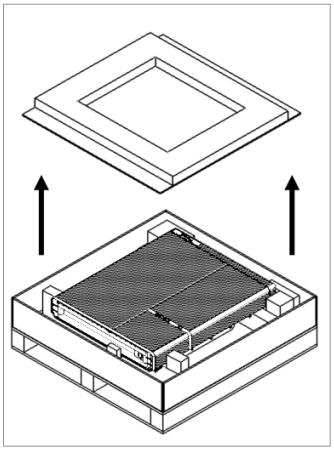
3.1.1 Unboxing the package



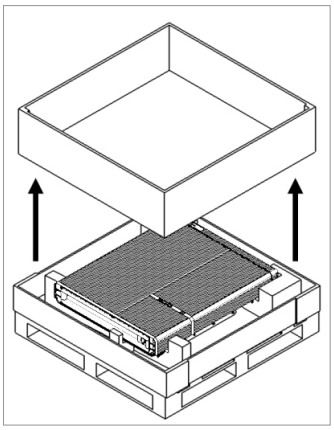
1. Lift the cover upwards to remove it.



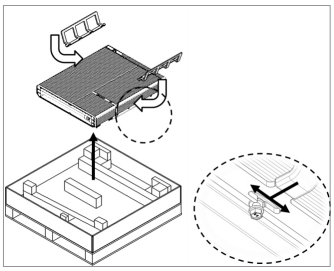
2. Pull out other items. Take them out and check if any item is missing. See Package items on section 3.1.2



3. Remove the wall bracket guide pad & cushioning pad.



4. Remove the side cover.



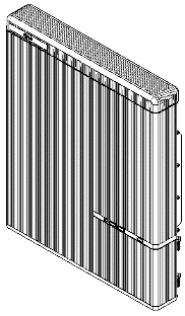
5. Pull out the battery pack using handles and stand it up.
   (Lift handles are sold optionally for this product)

⚠ CAUTION

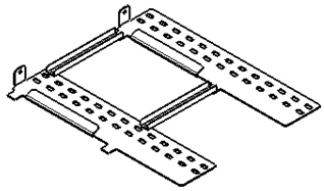
According to regional regulations, several people may be required for moving equipment.

3.1.2 Items in the package

These items are included in the package.



Battery pack



Wall bracket

M6 wall mount bolts (2EA)

Manual

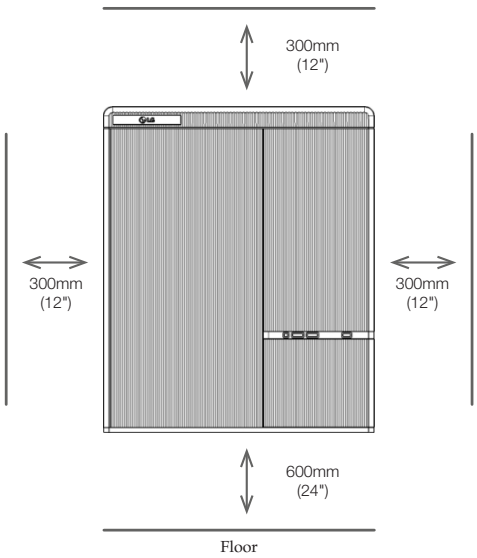
3.1.3 Installation locations

- The building should be designed to withstand earthquakes.
- A waterproof and properly ventilated area is recommended. (IP55)
- Install the product on a flat wall.
- There must be no flammable or explosive materials nearby.
- The ambient temperature should be within the range of 14-113°F (-10-45°C).
- The temperature and humidity should be maintained at a constant level.
- There should be minimal dust and dirt in the area.
- Battery pack must be installed on walls that are upright and can support 330lbs (150kg).
- Do not install this product in a place exposed to the direct sunlight and rain/ snow falls.
- Install this product out of reach of children and animals.

⚠ CAUTION

If the ambient temperature is outside the operating range, the battery pack stops operating to protect itself. The optimal temperature range for the battery pack to operate is from 15°C to 30°C. Frequent exposure to harsh temperatures may deteriorate the performance and life of the battery pack.

3.1.4 Clearance

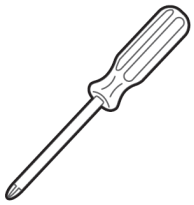


- Recommended clearances (>12") for the left, right, top and bottom of the product is shown in the figure for the proper ventilation and installer convenience.

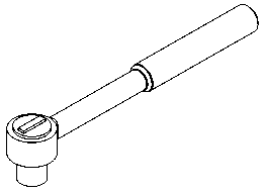
3.1.5 Tools & safety gears required

- **Tools**

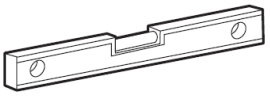
  The following tools are required to install the battery pack :



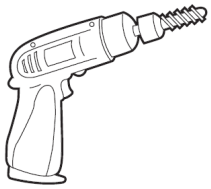
Precision screwdriver



M6 Torque wrench



Inclinometer



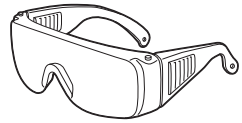
Drill
(Min. Diameter 10mm, 0.4")

Pencil or Marker

- **Safety gears for personal protection**

  It is recommended to wear the following safety gears when handling the battery pack.

Insulated gloves



Safety goggles

Safety shoes

3.1.6 Mounting bracket

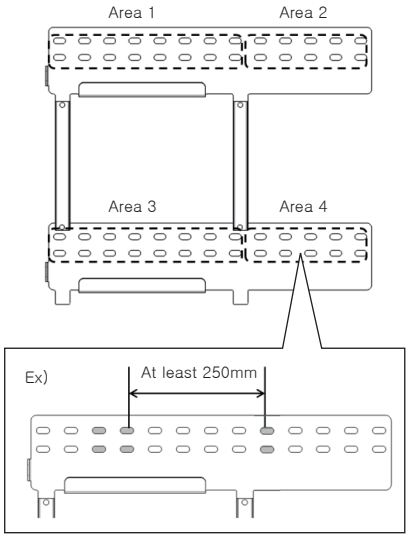
When installing the battery pack on a wall, make sure that the wall is capable of supporting the weight of the battery pack. (Min. 150kg)

⚠ CAUTION

Make sure that the battery pack is at all times exposed to the ambient air.
The battery pack is cooled by natural convection. If the battery pack is entirely or partially covered or shielded, it may cause the battery pack to stop operating.

To mount the battery pack on a wall, take the following steps :

1. Mark the location on the wall for the holes.
2. Drill holes for fasteners in the wall.
3. Drive the fasteners through the mounting bracket into the holes.



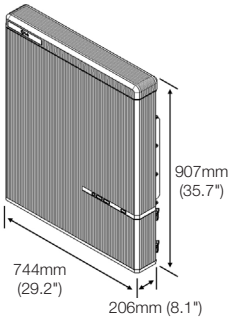
- Recommended diameter : 10mm(0.4") Min.
- Recommended length : 70mm(2.8") Min.
- Recommended material : Stainless steel (8.8T)
- Minimum fastener count : 4(Area1) / 2(Area2) / 4(Area3) / 2(Area4) - Vertically
- Minimum fastener clearance : At least 250mm(10") ex. Between Area 1's last fastener and Area 2's first fastener

3.1.7 Appearance and dimension

- Appearance

  Proper handling and care is recommended as disassembly, change of color, scratches, leakage of liquid, and stains may influence the economic value of the battery pack.

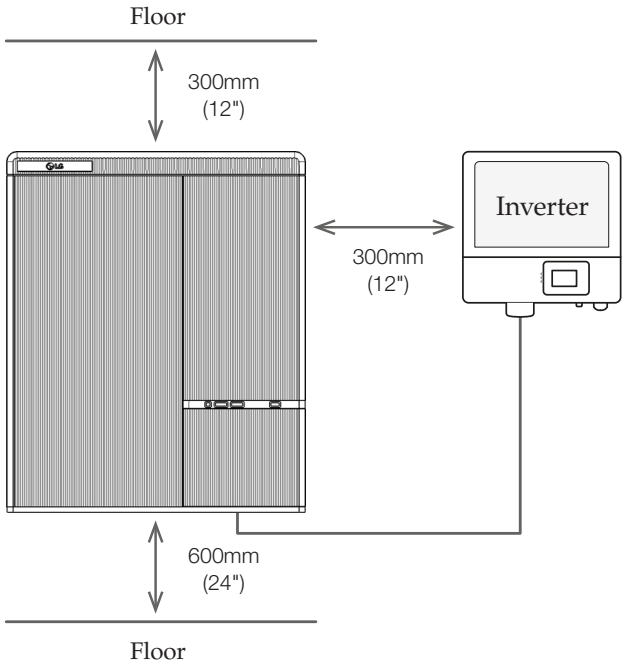
- Pack appearance and dimension



Color and Material
Front / Rear Cover : Silver or Gold, Aluminum
Top / Bottom / LED Cover : Black, Plastic

3.1.8 System clearance

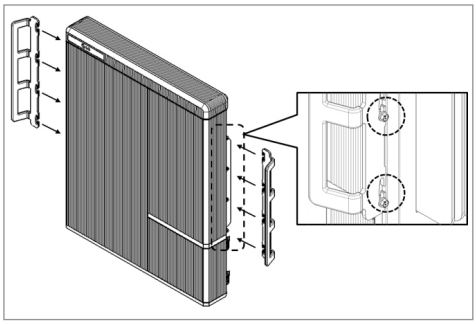
Battery requires adequate clearance for installation, cabling, and airflow.
Minimum clearance in the system configuration is as follows.



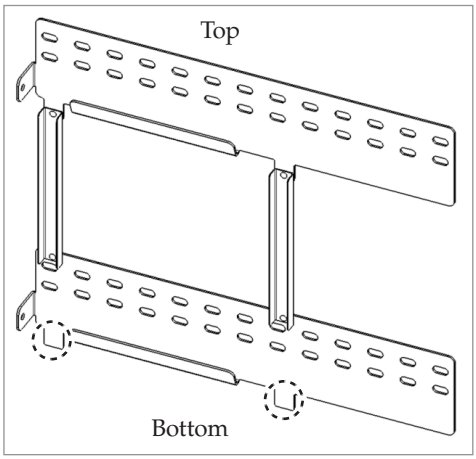
3.1.9 Installing the battery pack

⚠ CAUTION

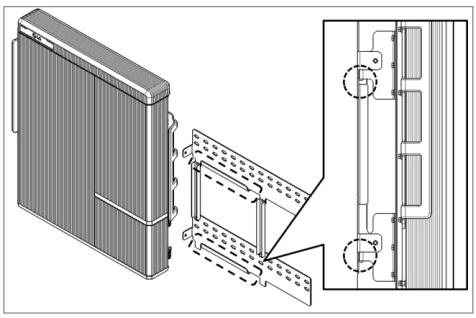
Make sure that the inverter AC and DC disconnects are turned off before connecting the power cable to the battery pack.



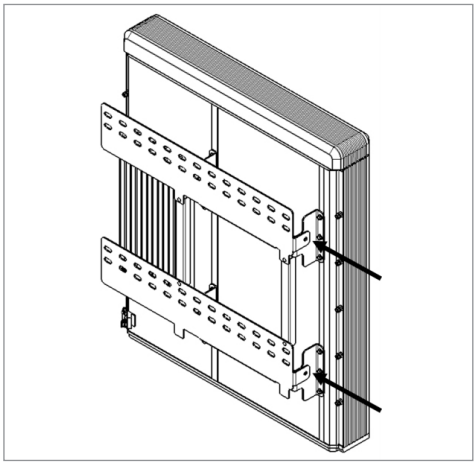
1. Fix the lift handles to the hex-socket screws on the rear (marked position) of both left and right sides.



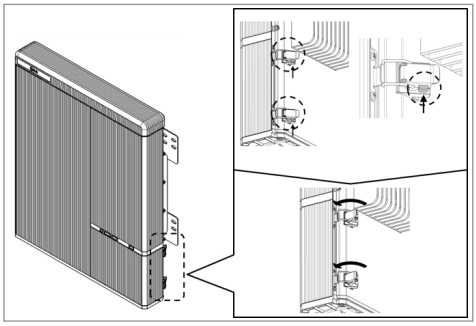
2. Mount the wall bracket to a wall. Tighten the screws, ensuring that they are horizontally driven into the wall. (Must be installed with recommended clearances(720mm[29"]) on the edge of the wall bracket as shown in the figure)



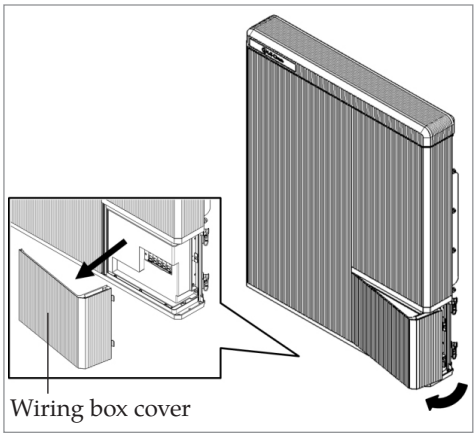
3. Mount the battery pack to a wall bracket's "U" shape clip using the support by lift handles. Remove the lift handles.



4. Tighten the two hex-socket screws enclosed and remove the lift handles. The nuts for these screws are welded to the battery pack chassis. Tighten to a torque of 5 N·m using the M6 torque wrench.



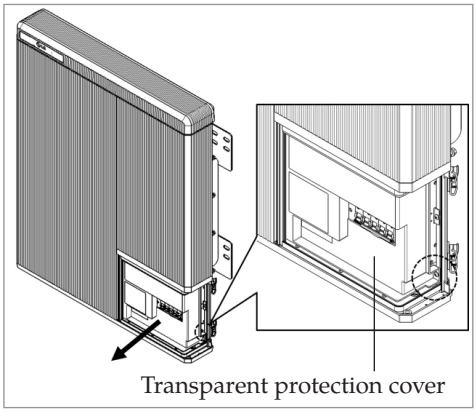
5. Press the two buttons and pull the two latches (marked position) on the rear side of the wiring box cover (hinged door).



6. Open the wiring box cover (about 2~10 degrees), and pull to remove it.

⚠ CAUTION

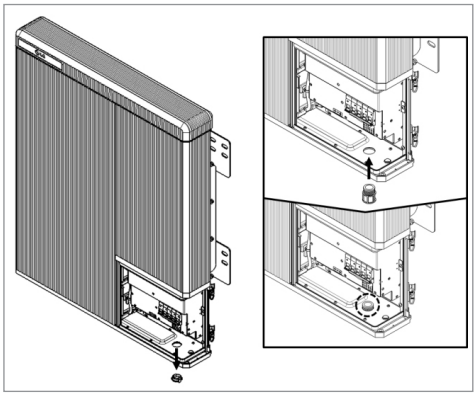
The wiring box cover is heavy. [approx. 1.6kg(3.5lb)] If dropped it may cause injury.



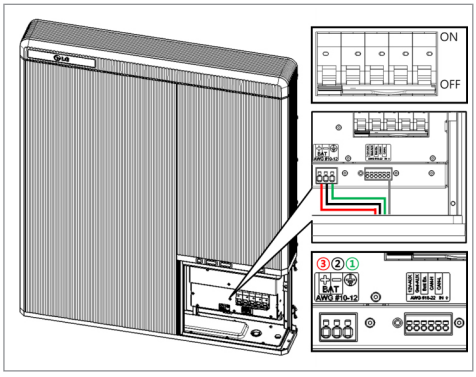
7. Loosen the screw (marked position), and remove the transparent protection cover.

CAUTION

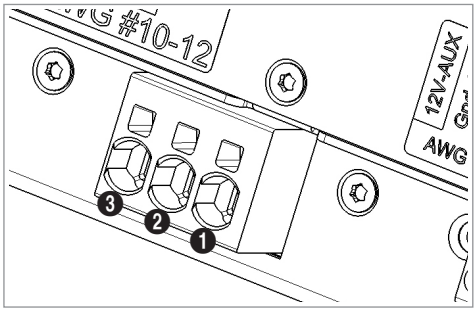
If you lose or break a protection cover, that violates NEC Regulation.



8. Remove the cap on hole in the bottom side, and assemble the ¾" conduit plug. In the case outdoor, it must be sealed to comply “IP55” [ex) gasket, sealing foam, silicon, etc], where the battery pack installation is outdoor.

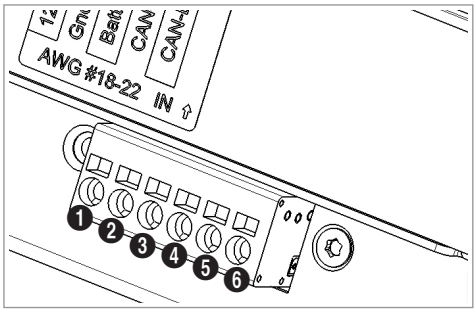


9. Connection Power / Communication cables, according to the labels marked.



10. Power (wire AWG, Max length, Pinning)
    a) Connect the ground wire to terminal 1.
    b) Connect the negative line of the power cable to terminal 2.
    c) Connect the positive line of the power cable to terminal 3.

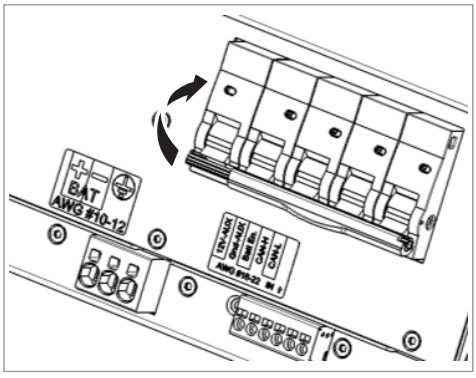
※ For the specifications of the terminal block, see section 3.2.1 Spring Terminal blocks.



11. Communication (wire AWG, Max length, Pinning)

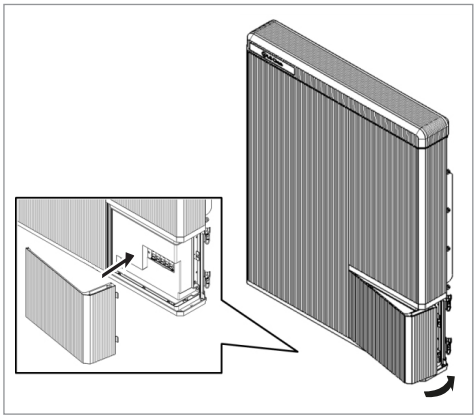
    At first, connect the ground wire to terminal 2. Then, make connections to the other terminals one after another except terminal 6. Leave terminal 6 unconnected.

※ For the specifications of the terminal block, see section 3.2.1 Spring Terminal blocks.



12. Connecting the battery pack to the inverter

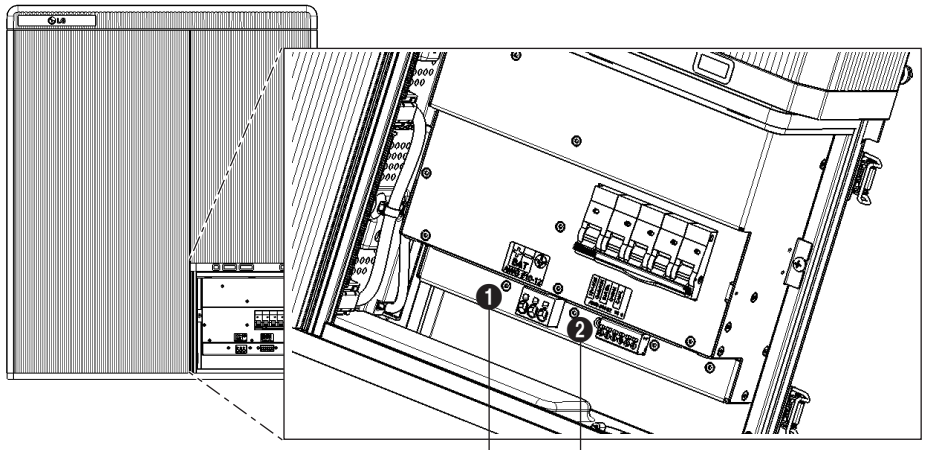
    Refer to the installation instructions for the inverter to connect the power cable and communication cable to the inverter.
    Then, push the circuit breaker switch up so that it is in the ON position.



13. Reattach the transparent protection cover and tighten with the screw (Marked position) Close the wiring box cover. Reattach battery over the two latchets on the rear.

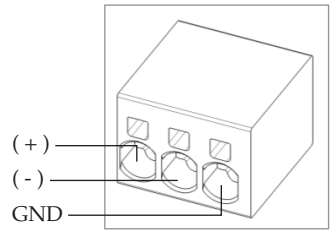
3.2 Cable connection

3.2.1 Spring terminal blocks



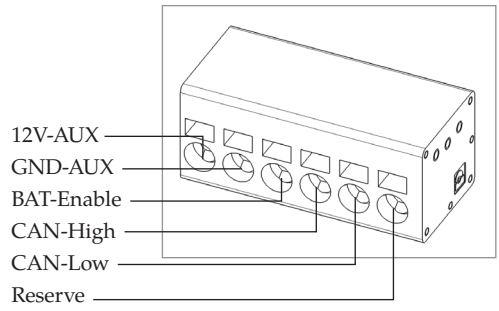
1. Power terminal block

- Max. cable length: 10m (35ft)
- Cable type : 4~10㎟ (10~12AWG)
- DC 600V insulated
- Pinning
- Phoenix contact
- PCB terminal block SPT 5/3-V-7,5-ZB
- P/N : 1719325

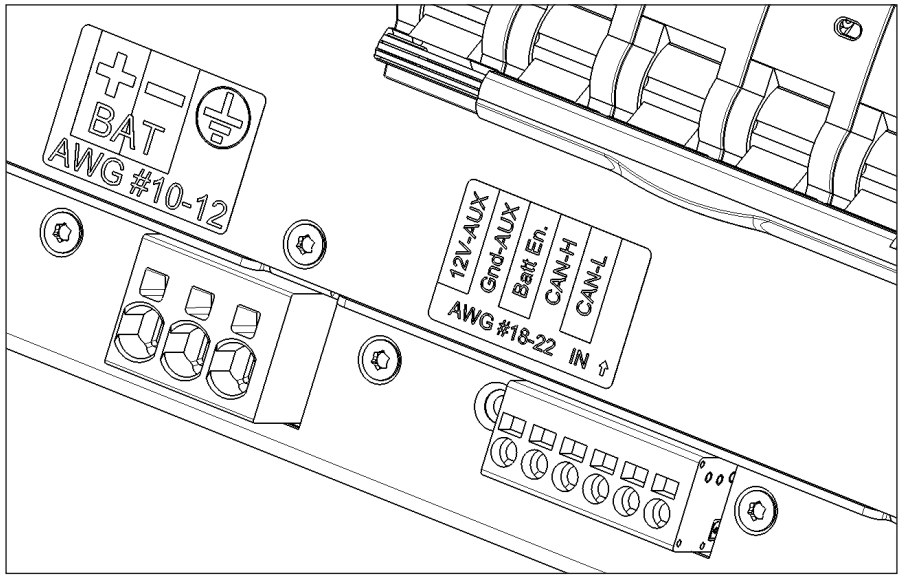


2. Communication terminal block

- Max. cable length: 10m (35ft)
- Cable type : 0.2~1.5㎟ (18~22AWG)
- Pinning
- Phoenix contact
- PCB terminal block SPT 2,5/6-V-5,0
- P/N : 1991134



3.2.2 Connect/disconnect the wire to connector sequence



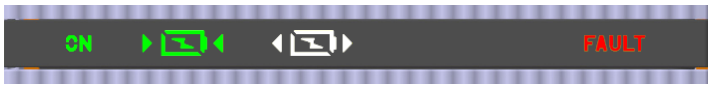
1. To remove one of the wires from its terminal, insert a small screwdriver into the rectangular hall above the terminal.
2. Apply slight pressure to the screwdriver and at the same time pull out the wire.

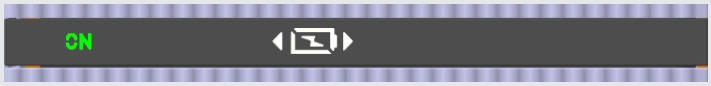
4 Commissioning

4.1 LED status

4.1.1 LED indicators

The LED indicators on the front of the battery pack show its operational state as follows:



LED status	Action
	Power on, Idle
	Charging
	Discharging
	Fault

5 Functionality

5.1 Powering up the system

Put the battery pack in operation by taking the following steps :

1. Make sure that the circuit breaker switch is in the OFF position. (including Trip position)
2. Move the circuit breaker switch to the ON position to turn on the main battery pack.
   See if the battery pack is successfully initialized.
   The power on indicator on the front should turn on in green.
3. Turn on the inverter.

5.2 Shutting off the system

To shut down the battery pack, take the following steps :

1. Turn off the inverter.
2. Turn off the battery pack by moving the circuit breaker switch to the OFF position.
3. Make sure that every indicator on the battery pack is off. It would take 60 seconds at maximum for the indicators to turn off.

5.3 Emergency procedure

The RESU10H battery pack comprises multiple batteries that are designed to prevent hazards resulting from failures. However, LG Chem cannot guarantee their absolute safety.

5.3.1 Fire

In case of fires, it is recommended to have an ABC or carbon dioxide extinguisher.

⚠ WARNING

The battery pack may catch fire when heated above 150°C.

If a fire breaks out in the place where the battery pack is installed, perform the following countermeasures:

1. If it is safe to do so, disconnect the battery pack circuit breaker.
2. If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.
3. If the battery pack is on fire, do not try to extinguish but evacuate people immediately.

⚠ CAUTION

When the battery pack is burning, it leaks poisonous gases.

5.3.2 Damaged or smoking batteries

Damaged or smoking batteries may pose a danger to people or property. If the battery pack is suspected to be damaged or when smoke comes out from the battery, immediately stay away from it and contact LG Chem for advice and information.

6 Troubleshooting

6.1 Troubleshooting

Check the indicators on the front to determine the state of the battery pack. A warning state is triggered when a condition, such as with voltage or temperature, is beyond design limitations. The battery pack's BMS periodically reports its operating state to the inverter.

When the battery pack falls outside prescribed limits, it enters a warning state. When a warning is reported, the inverter immediately stops operation.

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

- Battery over voltage
- Battery under voltage
- Battery over temperature
- Battery under temperature
- Battery discharge over current
- Battery charge over current
- BMS internal communication
- Battery cell voltage imbalance

The abnormal state is cleared when the battery pack recovers normal operation. If battery pack is not working correctly and the issue persists, contact a Qualified personnel, Installer or LG Chem.

NOTE

For a serious warning, if no proper corrective actions are taken by the inverter, the battery pack's circuit breaker automatically trips to protect itself.

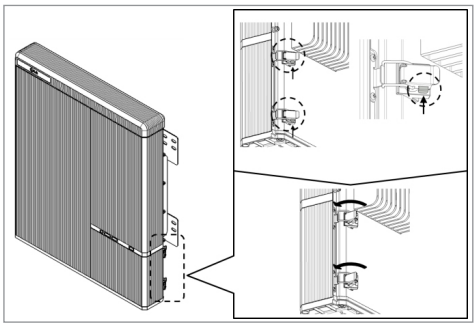
⚠ CAUTION

If the fault LED is on, please contact your local dealer or installer who installed the product or directly contact the LG Chem personnel (page 35) within 24 hours.

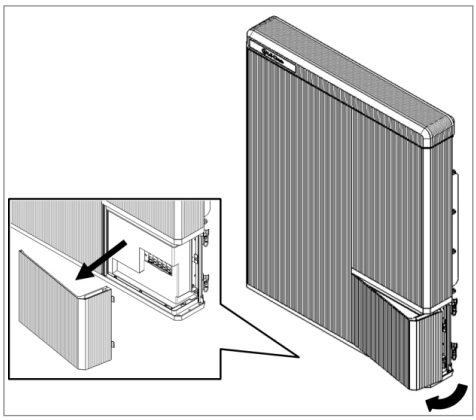
7 Uninstallation & Return

7.1 Return/replacement instructions

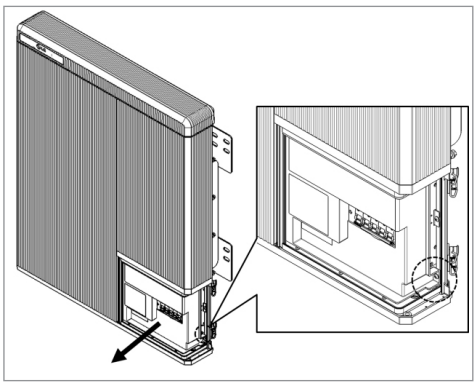
7.1.1 Uninstallation from the wall



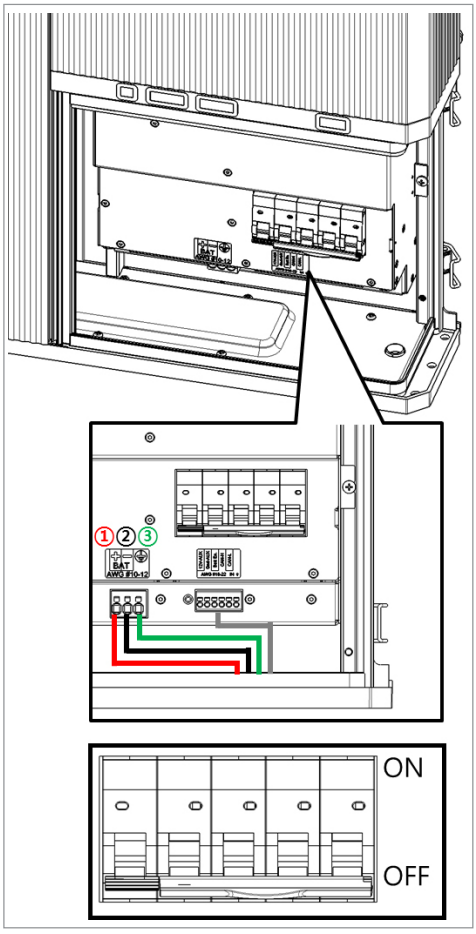
1. Switch OFF the Inverter before starting the uninstallation of the battery pack.
2. Press the two buttons and pull the two latches (marked position) on the rear.



3. Open the wiring box cover (about 2~10 degrees), and pull to remove it.

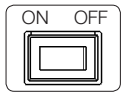


4. Loosen the screw (marked position), and remove the transparent protection cover.



5. Switch off the circuit breaker.

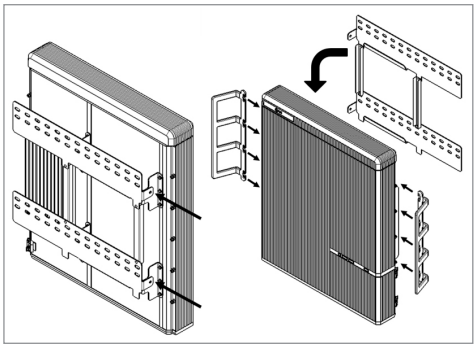
   ※ If you have Auxiliay Power ON/OFF switch, turn off Auxiliay Power switch.



⚠ CAUTION

Do not turn off the Auxiliary Switch while the battery is in operation.

6. Disconnect the communication cable from the communication port.
7. Disconnect the power cable from the terminal block. Disconnect the positive terminal (+) ①. first, and next the negative terminal (–) ②, and finally ground terminal ③.
8. Assemble transparent protection cover. Close the wiring box cover , and lock the ratchet.



9. Loosen the two hex-socket screws using a socket wrench to detach the battery pack from the wall using lift handles.

⚠ CAUTION

According to regional regulations, several people may be required for moving equipment.

7.1.2 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 Chem or your distributor.
Use the contacts below for technical assistance. These phone numbers are available only during business hours on weekdays.

Contact Information		
HQ (KOR)	Address	29, Gwahaksaneop-3-ro, Oksan-myeon, Heungdeok-gu, Cheongju-si , Chungcheongbuk-do, South Korea
	Telephone	+82 43 219 2695
	Email	Soongkyu@lgchem.com
US	Address	1064 Chicago Rd, Troy, MI 48083, USA
	Telephone	+1 248 808 0016
	Email	CSNorthAmericaESS@lgchem.com
Europe	Address	Otto-Volger Str. 7C 65843 Sulzbach (Taunus),Germany
	Telephone	+49 162 297 0918
	Email	aburkert@lgchem.com
Australia	Address	3/6 Pelle St Mitchell ACT 291
	Telephone	+61 1300 18 064
	Email	m_AUservice@lgchem.com
Other Regions	Address	29, Gwahaksaneop-3-ro, Oksan-myeon, Heungdeok-gu, Cheongju-si , Chungcheongbuk-do, South Korea
	Telephone	+82 43 219 2695
	Email	Soongkyu@lgchem.com

Keep this manual for later use.

LG Twin Towers, 128 Yeoui-daero Yeongdeungpo-gu Seoul, Korea. 07336
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