# GOODWE



# **User Manual**

# **Rechargeable Lithium Ion Battery System**

Lynx Home U Series

V 1.3-2022-08-30

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#### **Limitation of Liability**

The manufacturer shall not be liable for any consequences like battery damage or property loss under the following circumstances:

- Modify, alter, or replace parts of the battery system without official authorization from the manufacturer.
- Anyone except technicians from the manufacturer changes or erases the serial number.
- Establish a battery system that does not meet the criteria, safety regulations, and other related requirements.
- Non-observance to the User Manual.
- Improper use or misuse of the battery.
- Inadequate ventilation.
- The maintenance routine does not follow accepted standards.
- Force majeure like earthquakes, storms, thunders, over voltage, or fire hazards, etc.
- Any external factors.

# Updates

The latest document contains all the updates made in earlier issues.

### V1.0 2021-03-30

- First release.
- V1.1 2021-07-19
- Updated 5.3 System Installation.

#### V1.2 2022-03-15

• Updated 2.2 Symbol Description.

#### V1.3 2022-08-30

- Updated 5.3.3 Cable Connection.
- Updated 6.2 Power On.
- Updated 6.5 Power Off.
- Updated 07 Technical Parameters.

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# 01 Safety Precaution

### \rm **DANGER**

- Please keep Power Off before any operations to avoid danger. Strictly follow all safety precautions outlined in this manual and safety labels on the equipment.
- All installation operations should be performed by trained and knowledgeable technical personnel who are familiar with local standards and electric systems. Learn about the product before installation.
- Do not use the battery or the power control unit if it is defective, broken, or damaged.
- Do not disassemble, modify, or replace any part of the battery or the power control unit without official authorization from the manufacturer.
- Damaged battery may leak electrolyte. Do not contact with the liquid leakage or volatile matter. Please contact After-sales Service for help immediately.

### 

Anyone contact the leaked substance accidentally has to do as following:

- Breath in the leaked substance: Evacuate from the polluted area, and seek immediate medical assistance.
- Eye contact: Rinse your eyes for at least 15 minutes with clean water and seek immediate medical assistance.
- Skin contact: Thoroughly wash the touch area with soap and clean water, and seek immediate medical assistance.
- Ingestion: Induce vomiting, and seek immediate medical assistance.
- Do not move the battery system if it is connected with external battery expansion modules. Please contact After-sales Service to replace batteries or add batteries.

### **<u>A</u>** CAUTION

#### Transportation:

- Protect the battery system from damage during transportation and storage.
- Take the weight of the battery and the power control unit into account and carefully lift the battery and the power control unit.
- Wear gloves when handling the battery.
- Do not hit, pull, drag, or step on the battery system or put unrelated items into any part of the battery system.
- The transportation must be carried out by trained professionals. All operations during the process have to be recorded.
- Keep the equipment stable to avoid dumping, which can result in equipment damage and personal injuries.
- In the event of a fire, please make sure that the carbon dioxide extinguisher or Novac1230 or FM-200 is nearby.
- The fire cannot be put out by water or ABC dry powder extinguisher. Firefighters are required to wear full protective clothing and self-contained breathing apparatus.
- The battery may explode when the ambient temperature exceeds 150°C.
- Please use appropriate tools and take protective measures when installing and maintaining heavy equipment. Improper operations will cause personal injuries.
- Use professional insulating tools when operating the equipment under high voltage.
- Place the cables at lease 30mm away from the heating components or heat sources, otherwise the insulation layer of the cables may be aging or broken due to high temperature.
- Tie the cables of the same type together, and place cables of different types at leas 30mm apart. Do not place the cables entangled or crossed.

### **EU Declaration of Conformity**

The Battery sold in the European market meets the following directives and requirements:

- Electromagnetic compatibility Directive 2014/30/EU (EMC)
- Electrical Apparatus Low Voltage Directive 2014/35/EU (LVD)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS)
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

You can download the EU Declaration of Conformity on <u>https://en.goodwe.com.</u>

# 02 **Product Introduction** 2.1 Product Description

- This manual introduces Lynx Home U Series(LV) Battery System (hereinafter referred to as the Battery System), including the product introduction, application, installation, commission, and technical parameters, etc.
- At most 6 batteries can be connected in this Battery System.
- The battery system can be compatible with the following inverter series:

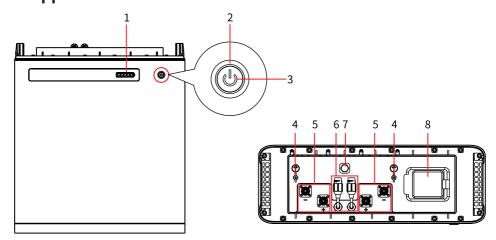


Goodwe Inverter

# 2.2 Symbol Description

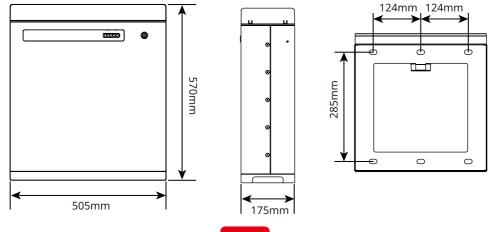
Symbol	Description	Symbol	Description
	Potential risks exist. Wear proper PPE before any operations.		Install the equipment away from fire sources.
	High voltage hazard. Power off the equipment first before any operations.		Keep the equipment away from children.
	Operate the equipment properly to avoid explosion danger.		No extinguishing with water.
	The equipment contains corrosive electrolytes. In case of a leak in the equipment, avoid contact the leaked liquid or gas.	X	Do not dispose of the equipment with household garbage at its end of life.
	Read through the user manual before any operations.		Put the battery in the right place and recycle it in compliance with local environmental regulations.
	Pay attention to safety protection during installation	CE	CE Mark
	RCM Mark		Grounding. To indicate PE cable connection position.

# **03 Battery Introduction** 3.1 Appearance



No.	Parts
1	SOC Indicator
2	Switch Button
3	Button Indicator
4	Grounding Teminal
5	Power Cable Port
6	CAN COM Port
7	Ventilation Valve
8	Circuit-Breaker

# 3.2 Dimensions



# 04 Storage and Package

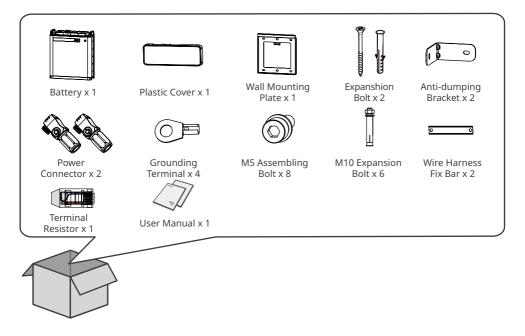
# 4.1 Storage Environment

If the equipment is not to be installed or used immediately, please ensure that the storage environment meets the following requirements:

- Pack the equipment using a packing box and put some desiccant in the box before sealing.
- Put the equipment back to the packing box if it is not to be installed in 3 days after unpacking.
- Storage SOC: 25%~50%SOC. Charge and discharge the battery every 3 months.
- Recommended storage temperature: -20°C~40°C(less than one month) or 0°C~35°C(less than one year).
- Recommended storage humidity: 0%~95%RH(no condensation). Do not install the battery if any moist or condensation is found.
- Place the quipment in a cool place where away from direct sunlight.
- Keep the equipment away from inflammable, explosive, and corrosive matters.
- Keep the equipment away from the rain.

# 4.2 Packing List

- Check outer packing for damage and model before unpacking it. If you find any damage or the model is not what you requested, do not unpack the product and contact the after-sales service as soon as possible.
- Check whether the deliverables are intact and complete first after unpacking the battery. If anything wrong, contact the after-sales service as soon as possible.



# 05 System Installation

# **5.1 Installation Environment**

- Install the Battery System on the ground with sufficient bearing capacity and flatness. Increase the bearing capacity and flatness of the ground by laying the foundation, adding bearing plates and so on.
- The optimal temperature for the battery is 20~40°C.
- Avoid exposing the equipment to direct sunlight or rain.
- Install the equipment away from heat/cold source.
- Do not install the equipment in the place where the temperature changes extremely.
- Install the equipment away from strong interferences to ensure its regular work.
- Keep children away from the equipment.
- Do not install the equipment in places prone to accumulate water.
- Do not put inflammable or explosive matters near the equipment.

# 5.2 Space Requirements

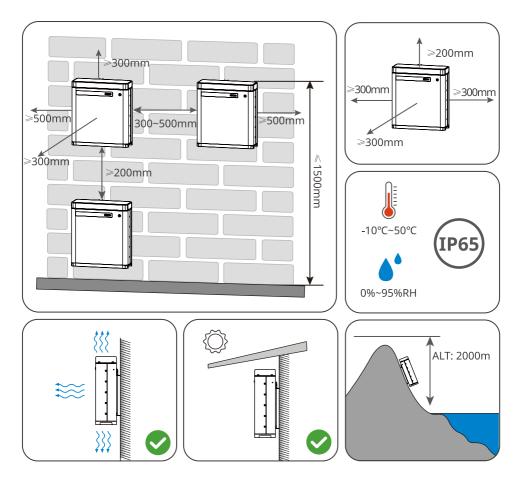
### NOTICE

The space between the left and the right battery is a recommened distance. Keep the distance as short as you can if there is no influence to the operation.







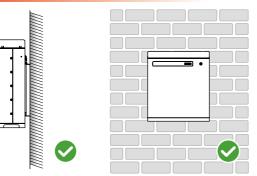


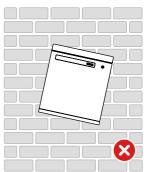
#### **Mounting Support Requirements**

- The mounting support shall be nonflammable and fireproof.
- Install the equipment on a surface that is solid enough to bear the product weight.
- Put the battery system near the wall and install the locking brackets to prevent the battery from falling down

#### **Installation Angle Requirements**

• Install the equipment vertically, no tilt or upside down.





# 5.3 System Installation

### NOTICE

If multi batteries are to be connected, check and select batteries with similar production date and a same cell grade.

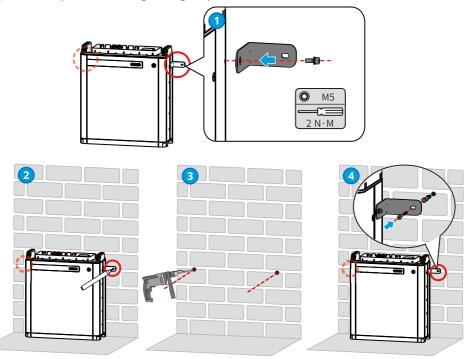
# 5.3.1 Floor Mounting

**Step1** Screw the anti-dumping bracke on the battery.

**Step2** Align the battery and the wall, then put the anti-dumping bracket close to the wall. Mark the drilling position and remove the battery.

**Step3** Drill a hole on the wall using the driller. Hole diameter 10mm and depth 80mm.

**Step4** Fix the expansion bolts, tightening torque: 10N·m.



### 5.3.2 Wall Mounting

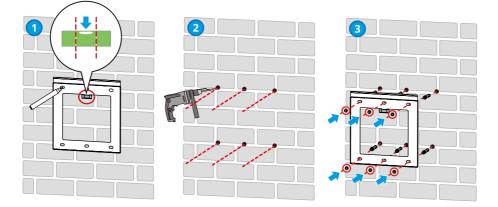
#### NOTICE

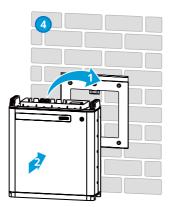
Wall mounting needs to be done by two persons.

**Step1** Place the wall mounting plate close to the wall firmly, mark the drilling position and remove the wall mounting plate.

**Step2** Drill a hole on the wall using the driller. Hole diameter 13mm and depth 65mm. **Step3** Fix the M10 expansion bolts, tightening torque: 10N m.

**Step4** Install the battery on the mounting plate.



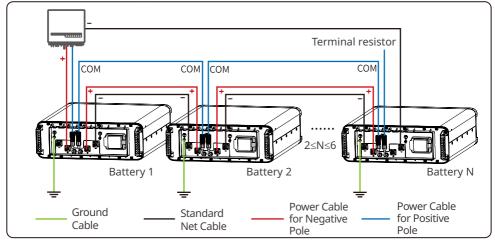




### 5.3.3 Cable Connection

#### Overview of the cable connection

Take SBP series as an example here.



#### **Ground Cable Connection**

NOTICE

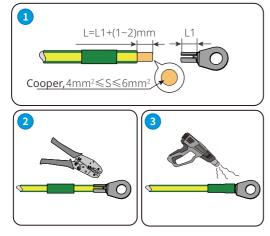
- Connect the PE cable first before installing the equipment. Disconnect the PE cable before dismantling the equipment.
- The drawing force of the cables after crimping is at least 400N.
- Connect any one of the two ground cables to the ground. Reserve the other ground cable.
- The cross-sectional area of the PE cable conductor: 4-6mm<sup>2</sup>. The cable should meet standards for outdoor use.

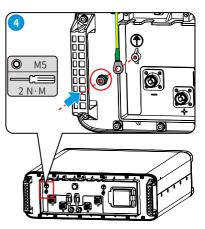
**Step1** Prepare PE cable.

**Step2** Crimp the PE cable.

Step3 Install the Heat shrink tube.

**Step4** Connect the PE cable to the battery.





#### **Power Cable Connection**

### NOTICE

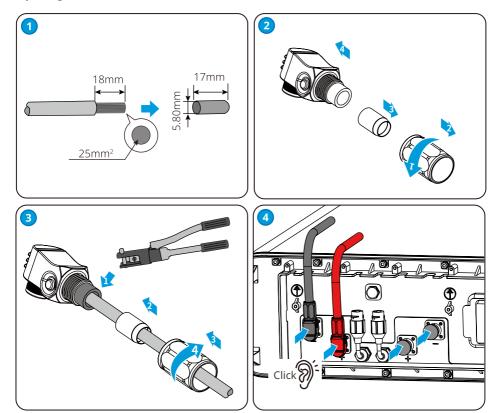
- Connect the red power cable to the red wire harness, and the black power cable to the black wire harness. The cross-sectional area of the crimping part is 25mm<sup>2</sup>.
- Withstand Voltage: DC1500V; Temperature: -40°C~200°C.
- Stripped conductor length: 18±1mm.
- Secure the back shell and check whether there is any gap.
- Recommended tool: manual hydraulic press plier(mould:25mm<sup>2</sup>)
- Drawing force after crimping≥1200N.
- If a single battery is applied, you are suggested to connect any one of the two power ports and cover the other port using the protective cover.
- Connect power cables between multi batteries in parallel, which means connect postive pole of one battery to the positive pole of the next battery, and negative pole to negative pole. Cover and protect the reserved power port of the last battery.
- The power cable between the batteries should be as short as it can be and meet installation requirements.

**Step1** Prepare Power cable.

**Step2** Disassemble the Power connector.

**Step3** Insert the Power Cable into the Power connector.

Step4 Plug the Power connector into the Power Cable Port.



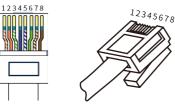
#### **Communication Cable Connection**

#### NOTICE

#### The two communication cables are the same.

- Do not use RJ45 cable with protective cover.
- When one battery is applied, connect one communication cable to the inverter by RJ45 connector and connect the other cable to the terminal resistance.
- When multiple batteries are applied, connect the communication ports in series using net cables. Connect one communication cable of the last battery to the terminal resistance.

#### **RJ45 Registered Jack**



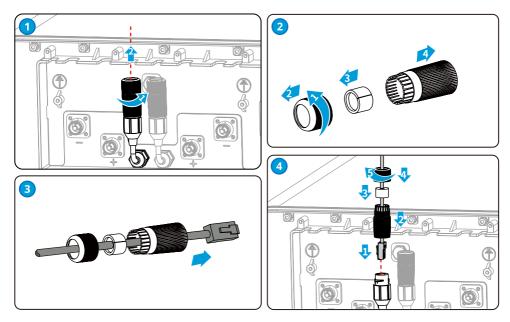
PIN	LX U5.4-L	LX U5.4-20	
1	N/A	RS485_A	
2	N/A	RS485_B	
4	CAN_H	CAN_H	
5	CAN_L	CAN_L	
3,6,7,8	N/A	N/A	

**CAN COM Port** 

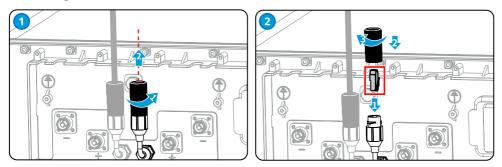
- Step1 Remove the waterproof module.
- Step2 Disassemble the waterproof module.

**Step3** Route the cable through the waterproof module.

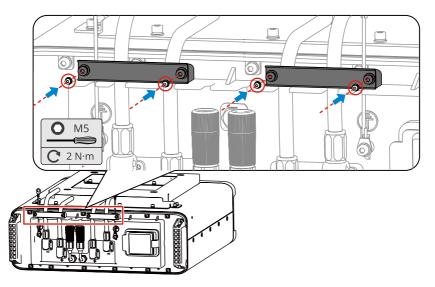
Step4 Connect the communication cable to the battery.



#### Installing the terminal resistor



## 5.3.4 Install the Wire Harness Fix Bar



# **06 System Operation** 6.1 Check Before Power On

Check the following items before power on. Otherwise, the Battery System may be damaged.

No.	Items
1	The equipment is installed firmly in a place where is convenient for operation and maintenance. The installation place is clean and well ventilated.
2	The ground cable, power cable, communication cable and terminal resistance are connected correctly and securely.
3	The cable ties meet the cabling requirements and are reasonably distributed. No cables or ties are broken.
4	Unused ports are sealed.

# 6.2 Power On

#### NOTICE

• The DC breaker between the inverter and the battery, and between the two batteries, shall be installed in accordance with local laws and regulations.

#### LX U5.4-L

**Step1** (Optional) Turn on the breaker between the inverter and the battery system.

Step2 (Optional) Turn on the breaker between the batteries (For parallized batteries).

**Step3** Turn on the inverter in the system following the instructions in the user manual of the inverter.

**Step4** Turn on the Circuit-Breaker.

**Step5** Press the switch button of all batteries in 30s, otherwise the equipment will start alarming.

#### LX U5.4-20

**Step1** (Optional) Turn on the breaker between the inverter and the battery system.

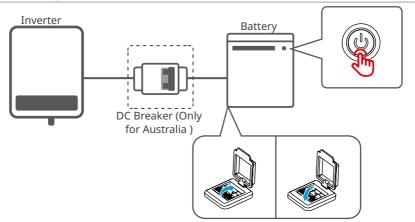
Step2 (Optional) Turn on the breaker between the batteries (For parallized batteries).

**Step3** Turn on the Circuit-Breaker.

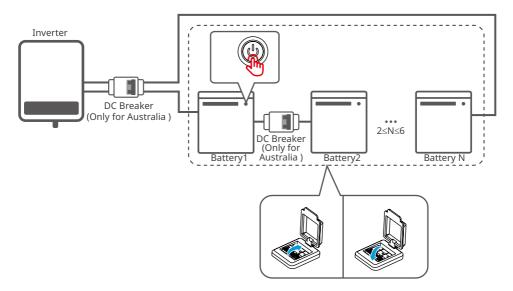
**Step4** Press the battery buttons. (Only press one battery's button when batteries are in parallized connection.)

**Step5** Turn on the inverter in the system following the instructions in the user manual of the inverter.

### Single battery



# Parallized batteries



## **6.3 Battery Parameter Settings**

Select the right options on PV Master after connecting the battery and the inverter.

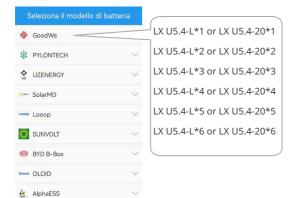
APP Installatin and Connection:







Select the battery model on PV Master:



Select "LX U5.4-L or LX U5.4-20" on PV Master.

#### NOTICE

"Battery Selection Abnormal" will be displayed if you select the wrong battery model. Please select the right battery model accordingly.

# 6.4 Indicator Status(LX U5.4-L)



SOC Indicator

**Button Indicator** 

Button Indicator	Status
Green Light	Standby, Working, Alert
Red Light	Faulty

### 6.4.1 Normal State

Button Indicator	SOC Indicator	Description
		SOC<5%
Standby:green light blinking for 1s Working:green light on		5%≤SOC<25%
		25%≤SOC<50%
		50%≤SOC<75%
		75%≤SOC<95%
		SOC≥95%

### 6.4.2 Alerting

Button Indicator	SOC Indicator	Alerting	Solutions
		Temperature Exception	Power off and restart after 2 hours.If the
		High Temperature	problem persists, please contact GoodWe.
		Low Temperature Discharging	Power off and Wait for the temperature to increase. Restart the battery. If the problem persists, please contact GoodWe.
		Overcurrent When Charging	
Green light		Overcurrent When Discharging	Restart the battery. If the problem persists, please contact GoodWe.
blingking for 3s		Overvoltage	
		Under voltage	Press the button consecutively for 5 times in 10s if you can charge the battery. The voltage will recover to normal.
		Low Temperature Charging	Power off and Wait for the temperature to increase. Restart the battery. If the problem persists, please contact GoodWe.
		The cell voltage difference is extremely high	Power off and restart after 2 hours.If the problem persists, please contact GoodWe.

#### NOTICE

- .
- Restart the battery by pressing the switch button. If the batteries power off under undervoltage protection and multiple batteries are connected, just press the button of any one battery consecutively for 5 times to activate them. .

### 6.4.3 Faulty

Button Indicator	SOC Indicator	Fault	Solution
		Temp. sensor failure	Restart the battery. If the problem persists,
		MOS Failure	please contact GoodWe for help.
		Circuit-Breaker Failure	Turn on the Circuit-Breaker.If the problem persists, please contact GoodWe.
		Slaver Control Communication Lost	Power off and check the communication cable. Restart the battery.If the problem persists, please contact GoodWe.
		SN Failure	Contact GoodWe for help.
Red light blinking for 3s		Master Control Communication Lost	Power off and check the communication cable. Restart the battery.If the problem persists, please contact GoodWe.
		Inconsistent Software Version	Contact GoodWe for help.
		Multi Master Control Failure	Start all batteries in 30s after shutting down.
		MOS Overtemperature	Power off for 2 hours.If the problem persists, please contact GoodWe.
		Communication Failure	Power off and check the communication cable. Restart the battery. If the problem persists, please contact GoodWe.

# 6.5 Indicator Status(LX U5.4-20)



Button Indicator	Status
Green Light	Standby, Working
Red Light	Alert, Faulty

### 6.5.1 Normal State

Button Indicator	SOC Indicator	Description	
		SOC<5%	
Idlay groon light blink 2		5%≤SOC<25%	
Idle: green light blink 2 times in 1 second Standby: green light blink 1 time in 1 second Working: Steady green		25%≤SOC<50%	
		50%≤SOC<75%	
		75%≤SOC<95%	
		SOC≥95%	
NOTICE			

• The SOC indicator keeps on when charging.

• The SOC indicator blinks one time when discharging.

# 6.5.2 Alerting

Button Indicator	SOC Indicator	Solution
Red light blink 1 time in 1 second		The alerting is dealt by the batter system itself. For more detailed
		information, you can check via PV Master App.
	<b>•</b>	

### 6.5.3 Faulty

### NOTICE

• Restart the battery by pressing the switch button.

Button Indicator	SOC Indicator	Fault	Solution		
Steady red		Overvoltage	Power off for 2 hours.If the problem persists, please contact GoodWe.		
Red light blink 1 time in 1 second		Under voltage	Contact GoodWe for help.		
		Cell High Temperature	Power off for 2 hours.If the problem persists, please contact GoodWe.		
		Low Temperature Charging	Power off the equipment and wait until the temperature recovers. If the problem persists after restarting, please contact GoodWe.		
		Low Temperature Discharging	Power off the equipment and wait until the temperature recovers. If the problem persists after restarting, please contact GoodWe.		
		Overcurrent When Charging	Restart the battery. If the problem persists,		
Steady red		Overcurrent When Discharging	please contact GoodWe for help.		
		Temperature Exception	Power off for 2 hours.If the problem persists, please contact GoodWe.		
		The cell voltage difference is extremely high	Power off for 12 hours.If the problem persists, please contact GoodWe.		
		Harness Abnormal			
		MOS Open-Circuit Fault	Restart the battery. If the problem persists, please contact GoodWe for help.		
		MOS Short-Circuit Fault			
		Parallized Connection Fault	Check the battery model. If the battery model is not correct, please contact GoodWe.		
		BMU Communication Fault	Restart the battery. If the problem persists,		
		MCU Internal Communication Fault	please contact GoodWe for help.		
		Air Switch Short- Circuit Fault	Contact GoodWe for help.		

	Precharge Failure	Restart the battery. If the problem persists, please contact GoodWe for help.
Stand and	MOS Overtemperature Fault	Power off for 2 hours.If the problem persists, please contact GoodWe.
Steady red	Current Sensor Overtemperature Fault	Power off for 2 hours.If the problem persists, please contact GoodWe.
	Microelectronic Fault	Contact GoodWe for help.

### 6.6 Power Off

Please follow the steps to power off the Battery System, otherwise, the System may be damaged.

#### LX U5.4-L

**Step1** Press the switch button for at least 5s until the indicator lights off. Press the button of any one battey if multi batteries are connected.

Step2 Turn off the Circuit-Breaker.

**Step3** Make sure that the SOC indicator of the battery is off.

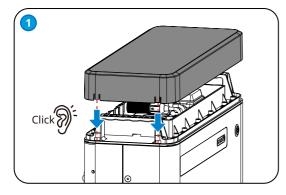
#### LX U5.4-20

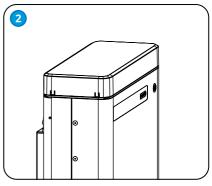
- **Step1** Disconnect the circuit breakers of all batteries.
- Step2 Make sure that the SOC indicator of the battery is off.

# 6.7 Install the Plastic Cover

#### NOTICE

- Ensure that the battery can work normally before installing the cover.
- Do not press the cables during installation.





# 07 Technical Parameters

Techn	ical Data	LX U5.4-L	2*LX U5.4-L	3*LX U5.4-L	4*LX U5.4-L	5*LX U5.4-L	6*LX U5.4-L	
Rated Ene	ergy (kWh)*1	5.4	10.8	16.2	21.6	27	32.4	
Usable En	ergy (kWh)*2	4.8	9.6	14.4	19.2	24	28.8	
Cell Type		LFP(LiFePO4)						
Cell Configuration		16S1P	16S2P	16S3P	16S4P	16S5P	16S6P	
Rated V	/oltage (V)	51.2 V						
Operating Vo	ltage Range (V)	48~57.6						
	uous Discharge ent (A)*3	50 100						
	harge Power W)*3	2.88 5.76						
Short-Cire	cuit Current	2.323kA@1.0ms						
Comm	unication	CAN						
Weight (Kg)		57	114	171	228	285	342	
Dimensions	(W*D*H) (mm)	505×570×175 (LX U5.4-L)						
Operating Temperature (°C)		Charge:0~+50 / Discharge:-10~+50						
Storage temperature (°C)		-20~+40 (≤One Month) / 0~+35 (≤One Year)						
Humidity		0~95%						
Altit	ude (m)	2000						
Protection Degree		IP65						
Installation Location		Wall-Mounted / Ground-Mounted						
Round-trip Efficiency		93.0%						
Cycl	e Life*⁴	≥ 4000 @0.5C/0.5C						
Chandraud	Safety	IEC62619, IEC 62040, CEC						
and	Standard and EMC		CE, RCM					
Certification	Transportation	UN38.3						
	tions, Cell Voltage System Usable F					r battery syste	em at	

beginning life. System Usable Energy may vary with different Inverter.

\*2: Test conditions, 90% DOD, 0.5C charge & discharge at +25±2 °C. \*3: Nominal Dis-/Charge Current and power derating will occur related to Temperature and SOC.

\*4: Based on Cell under 0.5C/0.5C @ 25±2°C test condition and 80% EOL.

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07 Technical Parameters 📕

Techni	ical Data	LX U5.4-20	2*LX U5.4-20	3*LX U5.4-20	4*LX U5.4-20	5*LX U5.4-20	6*LX U5.4-20	
Usable En	ergy (kWh)*1	5.4 kWh	10.8 kWh	16.2 kWh	21.6 kWh	27 kWh	32.4 kWh	
Cell Type		LFP(LiFePO4)						
Cell Configuration		16S1P	16S2P	16S3P	16S4P	16S5P	16S6P	
Nominal Voltage (V)		51.2						
Operating Voltage Range (V)		47.5~57.6						
Nominal Dis-/Charge Current (A)*2		50 100						
Nominal Power (kW)*2		2.56 5.12						
Short-Circuit Current		2.323kA@1.0ms						
Communication		CAN, RS485						
Weight (Kg)		57	114	171	228	285	342	
Dimensions	s (W*D*H mm)	505×570×175 (LX U5.4-20)						
	Temperature ge (°C)	Charge:0~+50 / Discharge:-10~+50						
Storage Temperature (°C)		-20~+40 (≤ One Month) / 0~+35 (≤One Year)						
Relative Humidity		0~95%						
Max. Operating Altitude (m)		2000						
Ingress Protection Rating		IP65						
Mountir	ng Method	Wall-Mounted / Grounded						
Round-trip Efficiency		95.0%						
Cycl	e Life*³	≥ 4000 @0.5C/0.5C						
	Safety	IEC62619, IEC63056, IEC 62040, CEC						
Standard and Certification	EMC	CE, RCM						
	Transportation	UN38.3						
*1: Test conditions, Cell Voltage 2.5~3.65V, 0.5C charge & discharge at +25±3 °C for battery system at beginning life. System Usable Energy may vary with different Inverter. *2: Nominal Dis-/Charge Current and power derating will occur related to Temperature and SOC. *3: Based on Cell under 0.5C/0.5C @ 25±2°C test condition and 80% EOL.								

# 08 Maintenance

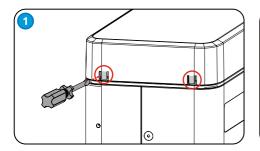
Item	Period		
Fully charge the battery and discharge it to 25~50% if the battery is not in use.	Once Every 3 months		
Check the wall mounting plate, fix it if it is not secured.	Once Every 6 months		
Check whether the outer shell is broken. Repair the painting or contact after-sales service if there is any broken.	Once Every 6 months		
Check whether there is an exposed cable. Replace the exposed cable or contact after-sales service for help.	Once Every 6 months		
Check whether there is debris accumulation around the battery to avoid affecting heat dissipation.	Once Every 6 months		
Check for water and pest to avoid prolonged intrusion.	Once Every 6 months		

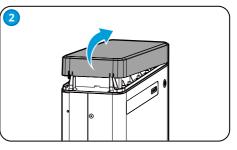
### **WARNING**

- Please contact after-sales for help if you find any problems that may influence the battery or the inverter. Disassemble without permission is strictly forbidden.
- Please contact after-sales for help if the conductive wire is exposed because high voltage danger exists. Do not touch or disassemble privately.
- In case of other emergencies, contact the after-sales as soon as possible. Please operate following the guidance of the after-sales, or just wait for the after-sales service operators.

### **Remove the Plastic Cover**

Gently pry up two clips on one side using a screwdriver to remove the plastic cover.







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