



# **B-Box Pro 2.5~10.0**

## **User Manual**

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# 1 General Information

## 1.1 About this manual

This user manual introduces the B-Box product information, user guidance, safety caution items and normal failure and actions. Users can contact the after sales service center if any abnormal failure or urgent issues occur.

## 1.2 Target Group

This user manual is applied to the B-BOX 2.5, B-BOX 5.0, B-BOX 7.5, and B-BOX 10.0.

## 1.3 Intended usage

The B-BOX can be used in household energy storage applications, including on/off-grid system. The B-BOX works with different inverter brands and the user should refer to the configuration list of approved inverter brands recommended by BYD.

## 1.4 B-BOX and B-Plus definition

BYD battery box products B-Box 2.5~B-Box 10.0 are defined as below:

B-Box: Battery Box

B-Plus 2.5: Battery unit with nominal capacity of 2.56 KWh to be installed inside the cabinet as an energy storage module.

B-Box 2.5: Battery nominal capacity is 2.56 KWh (Includes 1pc B-Plus 2.5)

B-Box 5.0: Battery nominal capacity is 5.12 KWh (Includes 2pcs of B-Plus 2.5)

B-Box 7.5: Battery nominal capacity is 7.68 KWh (Includes 3pcs of B-Plus 2.5)

B-Box 10.0: Battery nominal capacity is 10.24 KWh (Includes 4pcs of B-Plus 2.5)

## 1.5 Identifying the Product

The type label describes the product identification information, which is attached to the product. For safe usage, the user must become familiar with the information on the type label. The type label displays:

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Product Name:

Product Type/Nominal Capacity:

Nominal Voltage:

Max Current Discharge & Charge:

Ambient Temperature Range:

## 2 Safety

### 2.1 Safety precaution

Warning, notice and caution

Users are kindly requested to use the battery which is supplied by BYD Lithium Battery Company Limited in strict accordance with the datasheet and remarks included at the end of this document.

**BYD Lithium Battery Co., Ltd. will not guarantee or accept liability for a product installed and operated not in accordance to the guidance manual and resulting in an accident.**



#### **WARNING**

Do not crush the battery and always dispose according to safety regulations (Do not dispose in fire or water).

Recharge battery at least every 6 months (when in storage).

Once discharged, recharge battery within 7 days.

Do not expose to temperatures above 55°C and keep out of direct sunlight.

Ensure secure grounding. Do not reverse the front panel.

Do not short/reverse polarity or connect in series.

Disconnect from power and load before maintenance.

Only be operated by qualified professionals.

Store according to related standard.

Do not put one battery on top of another when unpackaged.

In the process of transportation and storage, the goods are not allowed to be stacked in layers or at a height greater than specified.

When increasing the battery capacity, users should first power off the battery and other power inputs.

B-BOX products can only be used in home energy storage applications, and their use is not allowed for life-sustaining medical devices and automotive applications.



Continuous operation of a damaged B-Box can lead to a dangerous situation that may cause serious injury due to electrical shock. B-Box can only be operated when it is technically faultless and in an operationally safe state.

Regularly check the B-Box for visible damage making sure that all safety equipment is freely accessible at all times. If a B-Box is damaged, do not touch it.

Please contact a BYD after sales service supplier if a significant event message displays on the LCD or APP of the inverter.



Li-ion battery inside. When disassembling the system, do not intentionally short the positive (+) and negative (-) terminals with metallic objects.

All works on system and electrical connections must be carried out by qualified personnel only. B-Box provides an emergency switch to be used for urgent situations.

A potentially hazardous circumstance such as excessive heat or electrolyte mist may occur due to incorrect operation, damage or abuse. If the safety precautions and the warning messages described are not fully understood, or if you have any questions, please contact after sales service for guidance. The safety section may not include all regulations for your region.

Personnel working with B-Box products must review applicable federal, state and local regulations as well as the industry standards regarding this product.

When transporting the system packaged as a bundle, remove the battery from the cabinet and transport them separately.



## 2.2 Safety guidelines for installation



Li-ion battery (energy storage unit) inside. When assembling the system, do not intentionally make a short connection between the positive (+) and negative (-) terminals of the battery box with a metallic object.

All works on the B-Box and electrical connections must be carried out by qualified personnel only.

B-Box provides a safe source of electrical energy when operated as intended and as designed.

Potentially hazardous circumstances such as excessive heat or electrolyte mist may occur under improper operating conditions, damage, misuse and abuse.

The following safety precautions and the warning messages described in this section must be observed. If any of the following precautions are not fully understood, or if you have any questions, contact customer service for guidance. The Safety Section may not include all regulations for your region; personnel working with B-Boxes must review applicable federal, state and local regulations as well as the industry standards regarding this product.

Installation personnel cannot wear watches, etc., to avoid short circuit and accidental damage.



Due to the heavy weight of BYD B-Box 2.5~10.0, please use strong packaging and safety protection equipment during transportation, to ensure safety and avoid accidental damage.

### 3 Technical parameters

	B-Box Pro2.5	B-Box Pro5.0	B-Box Pro7.5	B-Box Pro10.0
Battery Type	Lithium Iron phosphate battery			
Battery module	B-Plus2.5			
Nominal Battery Energy	2.56	5.12	7.68	10.24
Max output power(KW)	2.56	5.12	7.68	10.24
Usable battery energy(KWh)(100% DOD, 0.5C charge & discharge at @+25°C)(KWh)	2.56	5.12	7.68	10.24
Nominal voltage(V)	51.2			
Operating Voltage Range(V)	43.2~56.4			
Ambient Temperature Range(°C)	-10~+50			
Communication	RS485/CAN			
Cabinet Net Dimension(W*D*H mm)(Without ground feet)	600* 510* 883			
Net Weight(Kg)	79	113	146	180
IP level	IP20			

When B-BOX works in different temperatures, the charge and discharge current will be adjusted automatically. For detailed parameter settings, please refer to the table below:

Parameter setting of charge current in various temperature	
Protect temp./Resume temp.(°C)	Normal current(A)
-7~2	0.06C*N
2~12	0.12C*N
12~50	0.7C*N
Remarks:	
1. Effective time is 2mins when changing from one temperature range to another.	
2. N=B-Plus2.5 battery quantity	

Discharge current control with temperature

Protect temp./Resume temp.(°C)	Normal current(A)
-20~50/(-15-50)	0.7~1C*N

Remarks:

1. N= B-Plus2.5 battery quantity

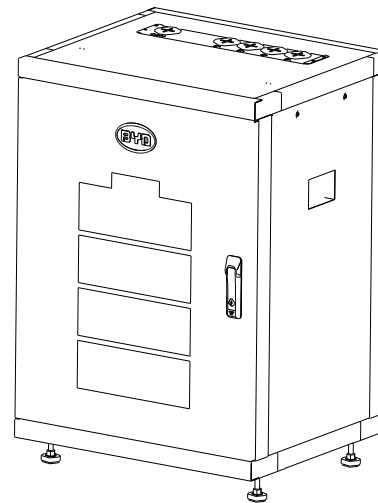
## 4 Technical terms explanation

No.	Terms	comment
1	Discharge	Battery output power for load
2	Charge	Battery power supply(such as DC charger)
3	Full charged	Battery had been full charged, SOC is 100%.
4	Idle	Battery is on status of neither charge nor discharge and has not been fully charged.
5	Shutdown mode	Power off
6	SOC	State of Charge
7	SW	Software
8	HW	Hardware
9	Battery voltage	The voltage between B+/B-
10	Pack voltage	The voltage between P+/P-
11	Cell voltage	Single cell voltage
12	Failure	Battery or BMS are broken, and unit needs replacement
13	Alarm	Battery will stop charging or discharging immediately
14	Protect	Battery stops charging or discharging (e.g. cell is overvoltage). Operation can resume at a later stage.
15	Over discharged	Battery module or batteries overvoltage, need to be recharged timely

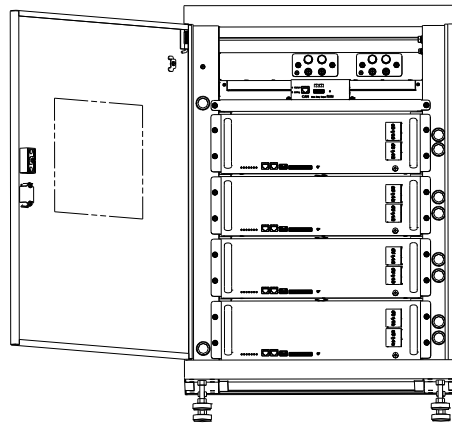
## 5 Product overview

### 5.1 B-BOX System Brief introduction

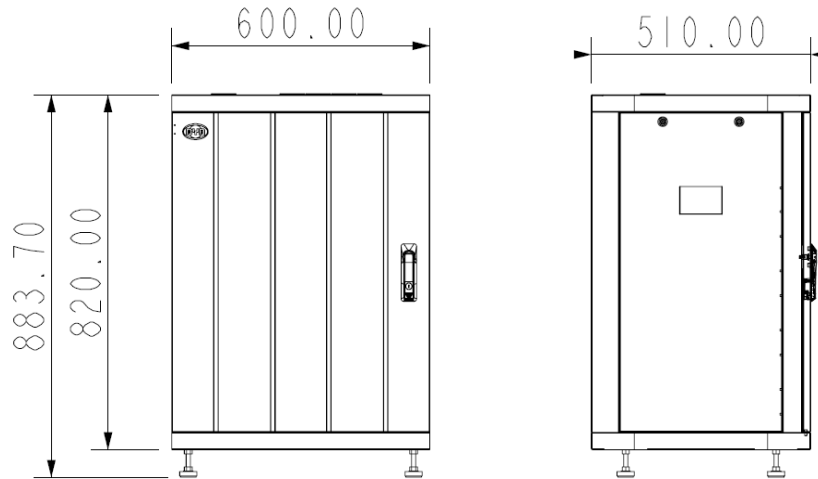
B-Box is the short name for battery box, the energy storage part in the electric power system of a household, and the B-box carries BYD's lithium batteries offering excellent performance. There are 1/2/3/4 pcs batteries modules in each box, and the box supports parallel connection to expand capacity from 2.5KWh to 80KWh, which can meet various capacity requirement for customers.



External drawing



Internal drawing

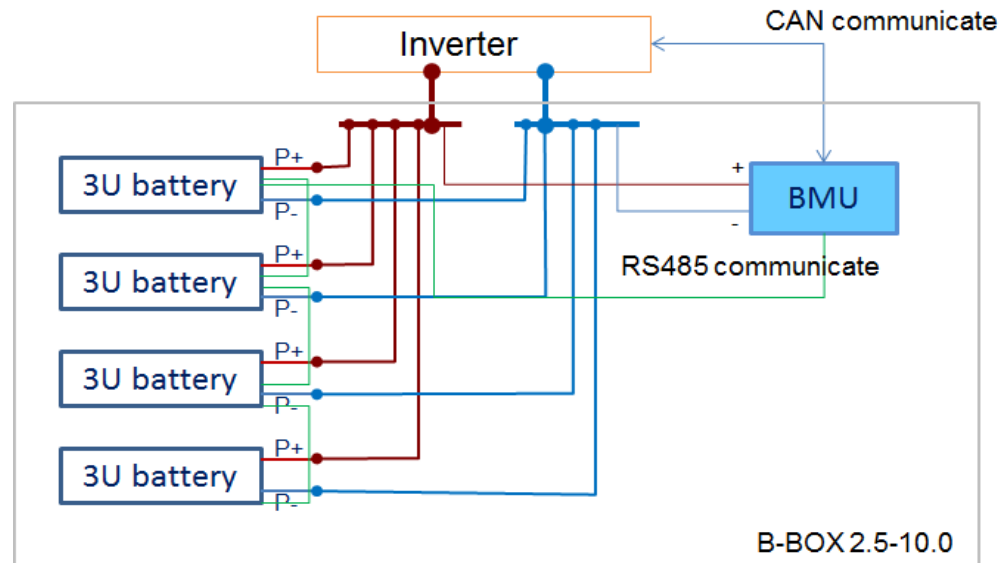


Structure dimension drawing

## 5.2 B-BOX configuration table

No.	Component	Name	Description
1	Cabinet	B-Box Cabinet	The cabinet is used to accommodate the B-Plus 2.5 modules and provide DC output (It can take max 4pcs B-Plus 2.5)
2	Battery	B-Plus2.5	Battery module with 51.2V 50Ah, BYD's P/N is: U3A1-50P-A.
3	BMU	BMU	Battery management unit. Provides communication with external equipment.

## 5.3 B-BOX System diagram

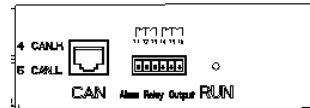


System diagram

## 5.4 General introduction of BMU

BMU is the battery management unit installed in the cabinet; its function is to manage the battery's charge and discharge, collect information from the battery and report to the inverter..

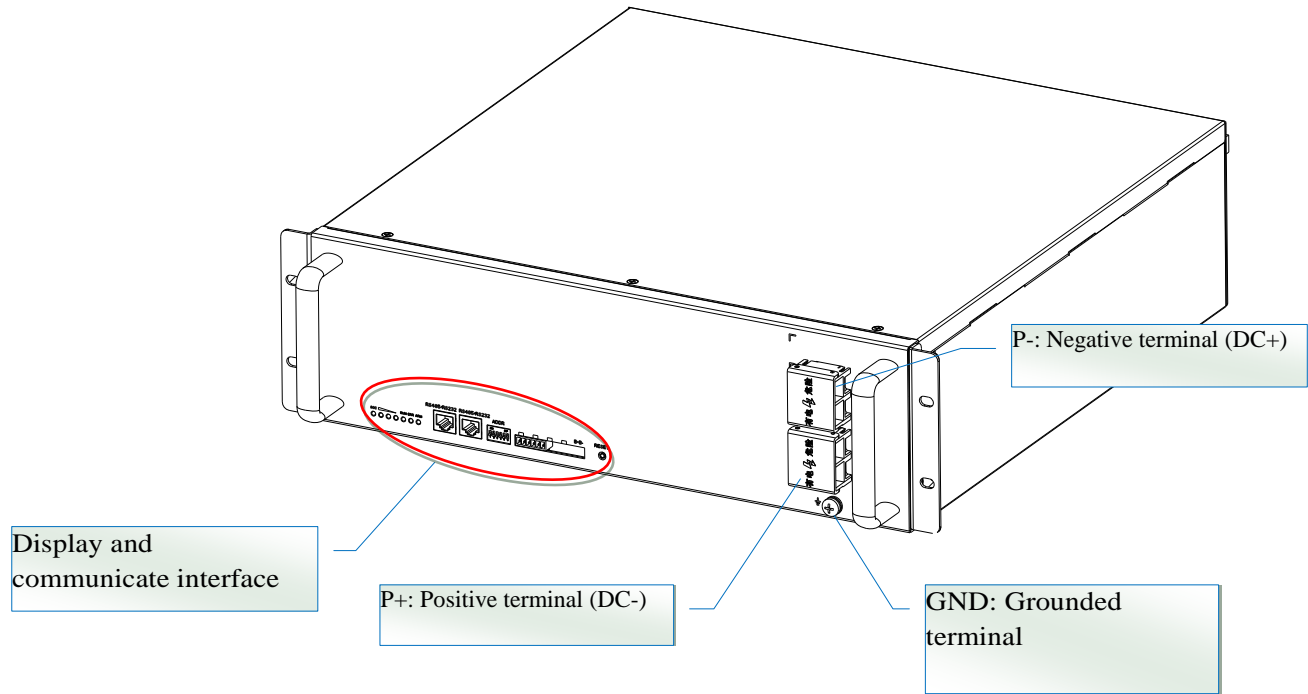
Main function:



- ✓ CAN / RS485 communication with inverter
- ✓ RS485 communicate with battery/BMS
- ✓ Dry contact terminal
- ✓ Other Communication interface for maintenance
- ✓ Charge and discharge management

## 5.5 General introduction of B-Plus 2.5

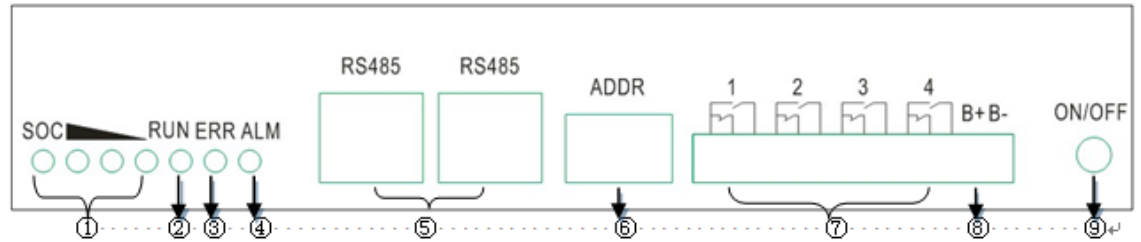
B-Plus is the commercial name of BYD's U3A1-50P-A backup battery with 51.2V & 50Ah which is designed for energy storage applications. The B-Plus 2.5 is an integrated battery which consists of shell, BMS and cells.



B-Plus 2.5 overview

Display and communication interface





Display and communication interface

No.	Interface	Mark	Function
①	SOC LED	SOC	Indicates State of capacity of battery
②	RUN LED	RUN	Indicates the Plus is running status
③	ERR LED	ERR ADDR	Indicates error status
④	ALM LED	Alarm	Indicates alarm status
⑤	RJ45 terminal	RS485	Communication ports
⑥	Address	ADDR	When parallel connection, need setting address.
⑦	Alarm relay output	1.2.3.4	Not used
⑧	Test terminal	B- B+	Measures battery voltage when testing.
⑨	ON/OFF	ON/OFF	Activates battery when no external powers add on battery.

## 5.6 Operating environment

Operating environment parameters

No.	Item	Requirement			Unit	Remark
		Min.	Typical	Max.		
1	Discharging temperature	-10	25	50	°C	
2	Charging temperature	-10	25	50	°C	
3	Relative humidity	5		95	%	
4	Absolute humidity	0.26		25	g/m3	
5	Elevation	-	2000	-	m	
6	IP level	20				

## 5.7 B-Plus 2.5 address switch introduction

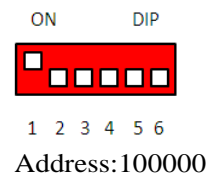
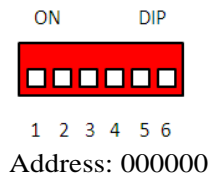
After finished the battery installation, installer should setup battery address through the “ADDR” switch.

“ADDR” switch introduction:

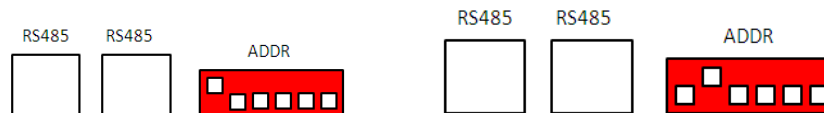
Function: Communication between battery and BMU. The BMU will communicate with external equipment when using CAN communication.

Each DIP switch definition:

There are 6 bit switches, keeping it down means “0”, turn up the switch to “ON” means “1”.



For example: when two batteries are in use, “ADDR” setting shows:



No.1 battery address: 100000

No.2 battery address: 010000

Please refer to the configuration list in Appendix1.

Note: Make sure of the highest address of BMS connecting to the BMU when communicating with the inverter.

## 6 Cleaning and maintenance

### 6.1 Cleaning



**CAUTION:**

When users need to clean the B-BOX, please switch off the system firstly.

The B-BOX system is recommended to be cleaned periodically. If the enclosure is in a dirty condition, please use a soft and dry brush or a vacuum to remove the dirt.

Do not use liquids such as solvents, abrasives or corrosive liquids in the enclosures.

### 6.2 Maintenance

#### 6.2.1 Recharge requirement with normal storage

The B-BOX should be installed in a position with a temperature range of  $-10^{\circ}\text{C}\sim+50^{\circ}\text{C}$  and where the humidity is less than 80%.The load-bearing of the battery's packaging is less than 300Kg, so stacking more than 7 modules is not recommended..

When the battery stored for a long time, need a regular maintenance according to the following table. Charge battery with current of 0.5C (25A) for 1 hour when maintenance.

Storage parameters under different storage conditions-1

Storage environment temperature	Relative humidity of storage environment	Storage time	SOC
Below $-20^{\circ}\text{C}$	/	Avoid	/
$-20\sim 25^{\circ}\text{C}$	5%~70%	$\leq 12$ months	$30\% \leq \text{SOC} \leq 60\%$

25~35℃	5%~70%	≤6months	30%≤SOC≤60%
35~45℃	5%~70%	≤3months	30%≤SOC≤60%
Above 45℃	/	Avoid	/

### 6.2.2 Recharge requirement with over discharge storage

If module is over-discharged during storage, the module will be damaged after several days if the module has not been charged in time.

Storage parameters under different storage conditions-2

Storage environment temperature	Storage time
-20~25℃	≤15 days
25~45℃	≤7 days

## 7 Resolve special situation

### 7.1 Battery over discharged maintenance

In the case of power cuts, continuous rainy days etc., the battery may over-discharge. It will still provide limited energy, but users should pay attention to the backup time of the battery.

### 7.2 Force Majeure

Catastrophic accidents, including lightning, floods, earthquakes, fires and other natural disasters, can bring unpredictable damage to the whole system.

# 8 B-Box configuration list with different inverter

## 8.1 B-BOX configuration list with SMA sunny island-On/Off grid

<b>1 Phase on Grid</b>			
Inverter Type	B-Plus 2.5	Cabinets	
SI 3.0M	≥1	≥1	
SI 4.4M	≥1	≥1	
SI 6.0H	≥1	≥1	
SI 8.0H	≥1	≥1	
Remark: Maximum B-Plus quantity is 32, Cabinet quantity is 8.			
<b>3 Phase off Grid</b>			
Inverter Type	B-Plus 2.5	Cabinets	
SI 3.0M	≥3	≥1	
SI 4.4M	≥4	≥1	
SI 6.0H	≥4	≥1	
SI 8.0H	≥4	≥1	
<b>1 Phase on Grid</b>			
Inverter Type	B-Plus 2.5	Cabinets	
SI 3.0M	≥3	≥1	
SI 4.4M	≥3	≥1	
SI 6.0H	≥5	≥2	
SI 8.0H	≥5	≥2	
<b>3 Phase off Grid</b>			
Inverter Type	B-Plus 2.5	Cabinets	
SI 3.0M	≥8	≥2	
SI 4.4M	≥8	≥2	

SI 6.0H	≥12	≥3
SI 8.0H	≥12	≥3

Remark: Maximum B-Plus quantity is 32,Cabinet quantity is 8.

## 8.2 B-BOX configuration list with GOODWE ES-On/Off grid

1 Phase on Grid		
Inverter Type	B-Plus 2.5	Cabinets
3.6kW	≥1①	≥1
4.6kW	≥1①	≥1
1 Phase off Grid		
Inverter Type	B-Plus 2.5	Cabinets
3.6kW	≥2	≥1
4.6kW	≥2	≥1

Remark: Maximum B-Plus quantity is 32,Cabinet quantity is 8.

①This configuration is only for self-consumption application

## 8.3 B-BOX configuration list with GOODWE BP-On grid

1 Phase on Grid		
Inverter Type	B-Plus 2.5	Cabinets
2.5kW	≥1	≥1

Remark: Maximum B-Plus quantity is 32, Cabinet quantity is 8.

## 8.4 B-BOX configuration list with Victron Multiplus/Multigrid-On/Off grid

<b>1 Phase on Grid</b>		
Inverter Type	B-Plus 2.5	Cabinets
3KVA	≥1	≥1
5KVA	≥1	≥1
<b>1 Phase off Grid</b>		
Inverter Type	B-Plus 2.5	Cabinets
3KVA	≥3	≥1
5KVA	≥5	≥2
<b>3 Phase on Grid</b>		
Inverter Type	B-Plus 2.5	Cabinets
3KVA	≥3	≥1
5KVA	≥4	≥1
<b>3 Phase off Grid</b>		
Inverter Type	B-Plus 2.5	Cabinets
3KVA	≥8	≥2
5KVA	≥12	≥3

## 8.5 B-BOX configuration list with Solax-On grid

<b>1 Phase on Grid</b>		
Inverter Type	B-Plus 2.5	Cabinet
SK-SU 3000	≥1	≥1
SK-SU 3700	≥1	≥1
SK-SU 5000	≥1	≥1

## 8.6 B-BOX configuration list with Victron Quattro- On/Off grid

<b>1 Phase on Grid</b>		
Inverter Type	B-Plus 2.5	Cabinet
5KVA	≥1	≥1
8KVA	≥1	≥1
10KVA	≥1	≥1
15KVA	≥1	≥1

<b>1 Phase off Grid</b>		
Inverter Type	B-Plus 2.5	Cabinet
5KVA	≥3	≥1
8KVA	≥5	≥2
10KVA	≥6	≥2
15KVA	≥9	≥3

<b>3 Phase on Grid</b>		
Inverter Type	B-Plus 2.5	Cabinet
5KVA	≥3	≥1
8KVA	≥4	≥1
10KVA	≥5	≥2
15KVA	≥6	≥2



<b>3 Phase off Grid</b>		
Inverter Type	B-Plus 2.5	Cabinet
5KVA	≥9	≥3
8KVA	≥15	≥4
10KVA	≥18	≥5
15KVA	≥27	≥9

## 9 Normal issues and solutions

### 9.1 Normal alarm displayed on the SRC of SMA sunny island and the solution

SMA SRC	Reason	Solution
F221	External Alarm-Invalid Bat Type	Reset battery type to "Li" on SRC.
F920(XA01General)	1.All the batteries fail to communicate at the same time 2.BMU and battery fail to communicate via RS485	1.Inspect whether the RS485 communication cable has been connected correctly and securely 2.Inspect DIP switch settings according to the setting of DIP switch guidance in user manual 3.Change BMU in cabinet
F921(XA02DcHiVolt)	External Alarm - Battery High Voltage	If the red led of the B-Plus 2.5 is on, please contact the service provider to change the battery. If not, check the system settings according to the guidelines.
F922(XA03DcLoVolt)	External Alarm - Battery Low Voltage	
F923(XA04DcHiTmp)	External Alarm - Battery High Temp	
F924(XA05DcLoTmp)	External Alarm - Battery Low Temp	
F925(XA06DcHiTmpC)	External Alarm - Battery High Temp Charge	
F926(XA07DcLoTmpC)	External Alarm - Battery Low Temp Charge	

F927(XA08DcHiCur)	External Alarm - Battery High Current Discharge	
F928(XA09DcHiChgCur)	External Alarm - Battery High Current Charge	
F930(XA11Short)	External Alarm - Short circuit	1.Power off; 2.Inspect short connection of cable between P+ and P- 3.If short connection is confirmed, please reconnect cable correctly 4.Restart battery
F931(XA12Bms)	External Alarm - BMS internal	If the red led of the B-Plus 2.5 is on, please contact the service provider to change the battery. If not, check the system settings according to the guidelines.
F932(XA13CellBal)	External Alarm - Cell imbalance	
F952	External Alarm –Ext BMS Timeout	1.Check the CAN communication to make sure it is connected properly 2.Change BMU

## 9.2 Normal alarm displayed on the APP of GOODWE and the solution

APP of GOODWE	Reason	Solution
BMS status: Battery communication fail	Inverter and BMU communication failure	1.Inspect whether the CAN communication cable has been connected correctly and reliability 2.Change BMU in cabinet

## 9.3 Normal alarm displayed on the screen of Solax and the solution

Screen of Solax	Reason	Solution
BMS LOST	Inverter and BMU communication failure	1. Inspect whether the CAN communication cable has been connected correctly and reliability. 2. Change BMU in cabinet.

## 9.4 Normal alarm display on the BMU of B-BOX and the solution

LED of the BMU	Reason	Solution
Flash 1 time	Inverter and BMU communication failure	1. Inspect whether the CAN communication cable has been connected correctly and reliability 2. Change BMU in cabinet;
Flash 2 times	Battery not found	Check whether the BMU and first battery are connected properly
Flash 3 times	Cell not found	Check the battery SOC LEDs is merry-go-round, check if the communication cable and the address of the corresponding battery are set correctly.
Flash 4 times	Any battery failure	Check if the battery light stays lightening, and if so, please contact your installer to replace the battery.

## 9.5 Normal alarm display on B-Plus 2.5 and solution

LED	B-Plus display info	Reason	Solution
LED	Yellow led(Alarm) blinks for 0.5Hz, other LEDs are off ;	Battery is switched off abnormally	Press ON/OFF button for 2-3 seconds to restart the battery, if the battery cannot be resumed, contact the service provider;
	The merry-go-round (10s cycle)	Communication connection timeout	Check the communication cable
	1/3 and 2/4 is blinking	Update status	If not update the firmware, reset the battery.
	Yellow led (Alarm) is normally on 1. press on/off button for 1S and release, hear a short buzzer sound; 2.run lights stay lit, ALM LED is	1time Under voltage (BAT or CELL) 2times Over charge	Automatically resume Automatically resume

blinking, showing alarm;	3times	Low temperature charge over-current	Automatically resume	
	4times	Charge short circuit	Automatically resume	
	5times	Discharge short circuit	Automatically resume	
	6times	Parallel short circuit	Automatically resume	
	7times	Discharge over-current protection	Automatically resume	
	8times	High temperature protection	Automatically resume	
	9times	Low temperature protection	Automatically resume	
	10times	PACK over voltage protection	Automatically resume	
	Red led (Err) is normally on  1) press the on/off button press for 1S and release, hear short buzzer sound; 2) run lights stay lit, ERR LED is blinking, showing alarm;	1time	Voltage sensor failure	Change the battery
		2times	Temperature sensor failure	Change the battery
3times		Charging circuit failure	Change the battery	
4times		Discharge circuit failure	Change the battery	
5times		Batteries failure	Change the battery	
6times		536 communication failure	Change the battery	

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Buzzer	15S for the cycle, each time the buzzing number of successive rings	4times	Reverse, short circuit	1.Power off; 2.Inspect short/reverse connection of cable between P+&P-; 3.If short/reverse connection is confirmed, please reconnect cable correctly; 4.restart battery;
		3times	Batteries failure	Change the battery
		2times	Voltage sensor failure, Temperature sensor failure	Change the battery
		1time	Charging/Discharge circuit failure	Change the battery

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## 10 Warranty

BYD provides warranties only when the product is installed and used according to the description of user manual / installation manual / warranty letter.

## 11 Login in after sales service web

In order to get prompt after sales service after installation, please login your B-BOX information in our after sales service operation online portal.

For technical problems or inquiries for use, please contact our after sales service partner.

The following information is required for timely customer service.

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Product type

Serial Number

Connected PV module type and number

Option equipment

Any problems please contact us by below address:

Contact us:

China

BYD LITHIUM BATTERY Co., LTD

Customer Service Mailbox: [eubatterygrp@byd.com](mailto:eubatterygrp@byd.com)

Telephone: +86 0755 89888888

Address: No.1, Baoping Road, Baolong Industrial Town Longgang Shenzhen, 518116, P.R. China

Germany

EFT Systems GmbH

Customer Service Mailbox: [info@eft-systems.de](mailto:info@eft-systems.de)

Telephone: +49-9352 8523999

Address: Buchenstraße 37, 97816 Lohr am Main, Germany

Australia

Alps Power Pty Ltd

Customer ServiceMailbox: [service@alpspower.com.au](mailto:service@alpspower.com.au)

Telephone: +61478 140 287

Address: U201 15Chatham Road West Ryde NSW 2114 Australia