Installation Guidance

B-Box Res2.5~10.0

Rev1.0_April.2017

Content

Installation Video Website:http://www.byd.com/energy/b-box-25.htm

Safety

 **CAUTION:**

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

All work 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/or abuse.

Personnel working with B-Box 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 human damage.

When Increase battery, should power off the battery and other power input first.

Ensure reliable grounding. Do not reverse the front panel.

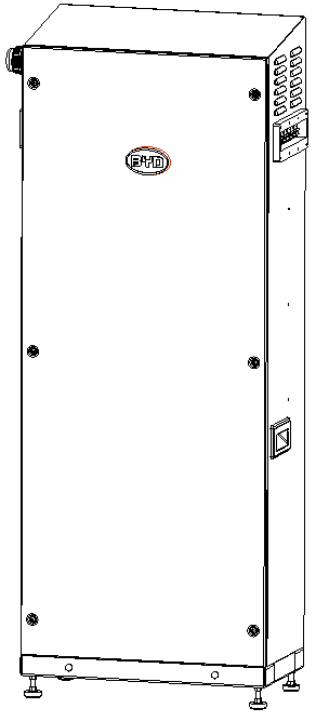
Can't use the deformation of the battery.

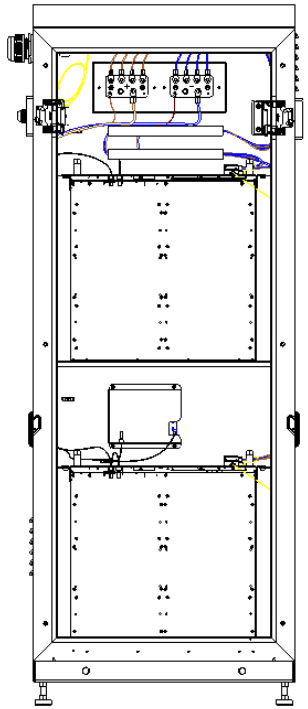
By checking to verify the installation Settings are correct.

Need to clean, smooth, waterproof, and so on and so forth, the installation.

1 Product Overview

BYD battery box products B-Box Res 2.5~10.0 as the energy storage parts can be used in off-grid & on-grid energy storage system.

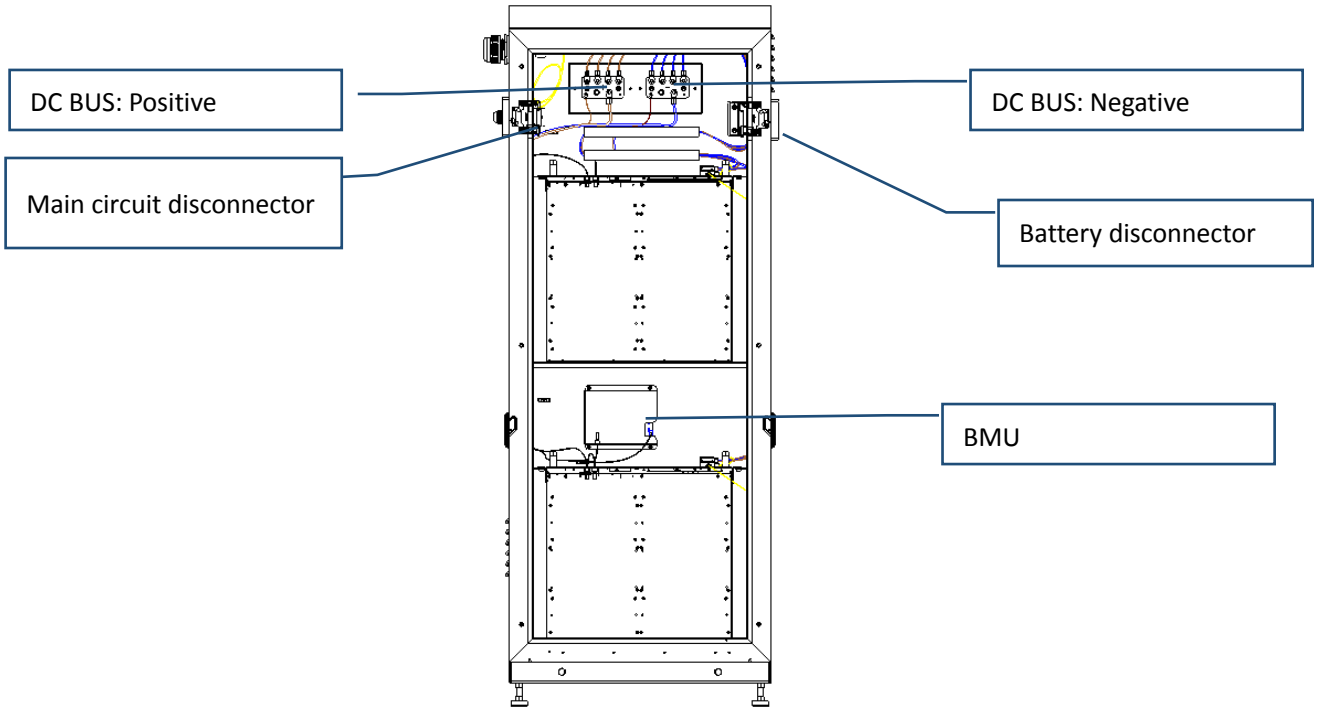




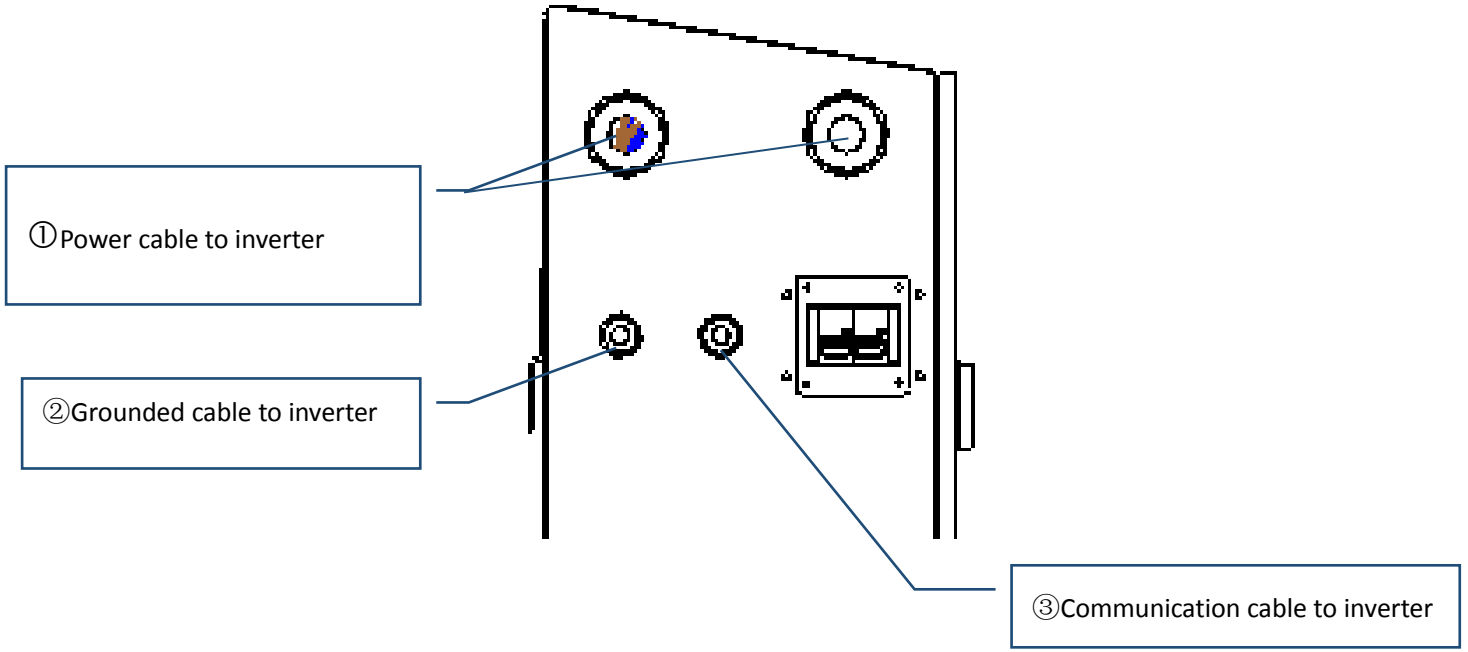
Overview of B-Box

Internal view of B-Box

2 Cabinet introduction

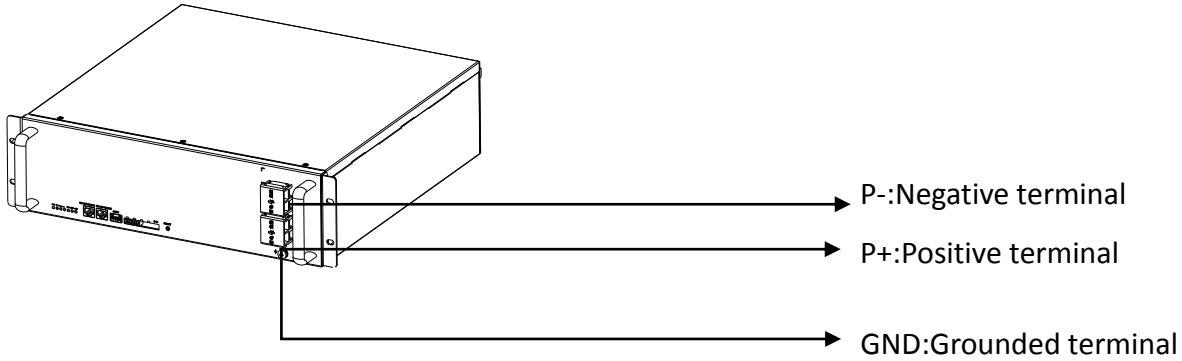


3 Cable outlet of cabinet

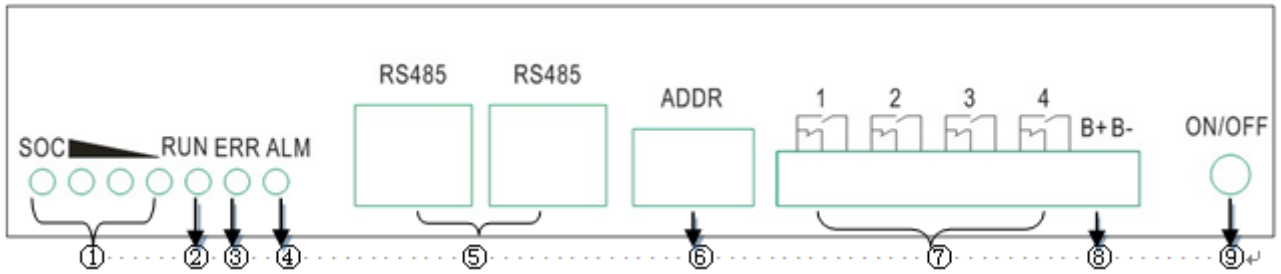


No.	Interface	Mark	Function
①	B+/B-output	B+/B-	Power cable from inverter
②	GND	GND	Grounded cable from inverter
③	CAN	CAN	CAN communication cable

4 B-Plus2.5 interface and terminal introduction



4.1 Display and communicate interface



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

5Preparations

5.1 Installation notice

a) Battery installation location should be away from heat and avoid produce spark. The safety distance should be above than 0.5m.

b) Battery installing connecting cables should be as short as possible, to prevent excessive line pressure drop.

c) Batteries with different capacity, different P/N or different manufactures are not allowed for connection.

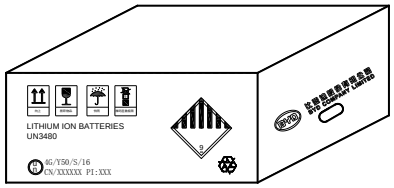
d) Before connecting the battery, the battery positive and negative poles need to be carefully checked as well to ensure correct installation.

e) The mounting floor should be horizontal.

5.2Package information and system configuration list

The cabinet and battery are packaged separately with cartons, the components are taken along with the cabinet or battery package, before installation, installer should read the system configuration list.

No.	Item Description	Qty	Purpose	Picture
1	Anchor bolt	4	Make a distance from cabinet to ground.	
2	User Manual	1	System information and using method and Warranty items.	\
3	Installation Manual	1	System installation guidance	\



4	Cable through connector(IP55)	4	Cable through and waterproof	

No.	Item Description	Qty	Purpose	Picture
1	Positive cable	1	Battery P+ connection	
2	Negative cable	1	Battery P- connection	
3	GND	1	Connect Battery grounded terminal	
4	Communication cable	1	Battery RS485 port connection	

5.3 Configuration list

Type	B-Box Res 2.5	B-Box Res 5.0	B-Box Res 7.5	B-Box Res 10.0
B-Box cabinet	1	1	1	1

B-Plus2.5	1	2	3	4
User manual	1	1	1	1
Positive cable	1	2	3	4
Negative cable	1	2	3	4
Communicate cable	1	2	3	4
Grounded cable	1	2	3	4

5.4 Installation Tools

Cross screwdriver

M3~M10

Flat tip screwdriver

M3~M6

Sockets spanner

Diagonal cutters

Adjustable wrench

Crimping pliers

5.5 Personal protective equipment

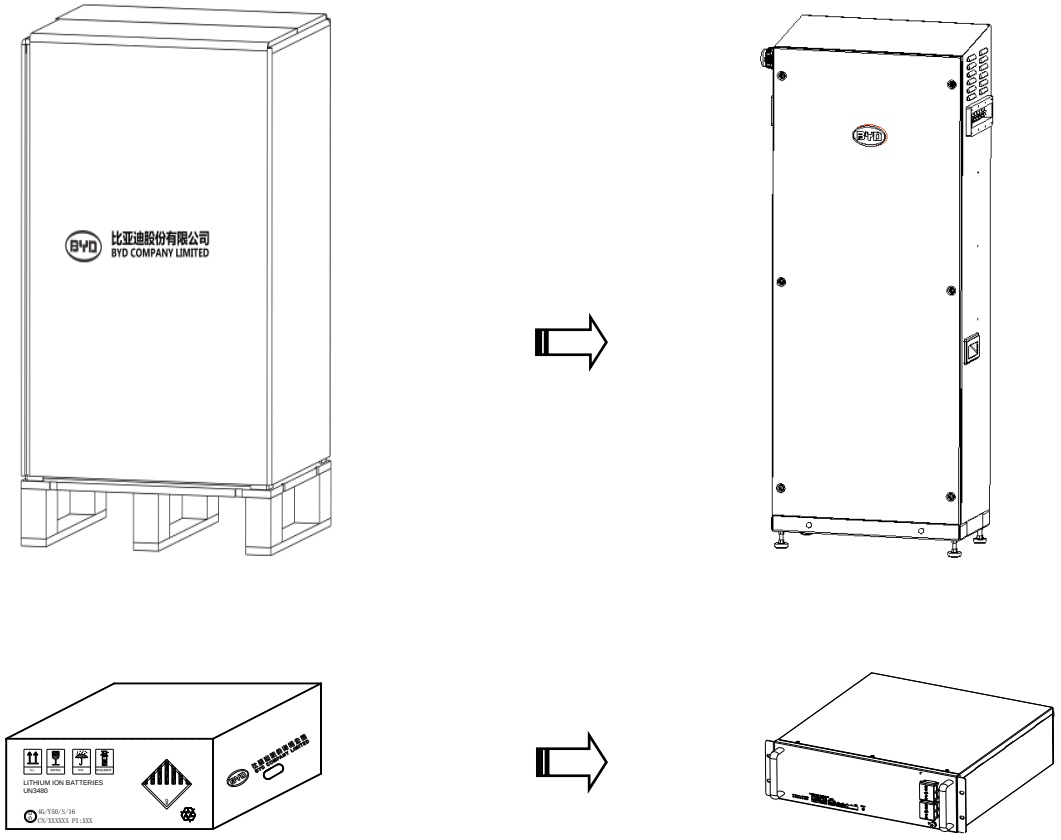
Insulated gloves

Safety shoes

6Installation

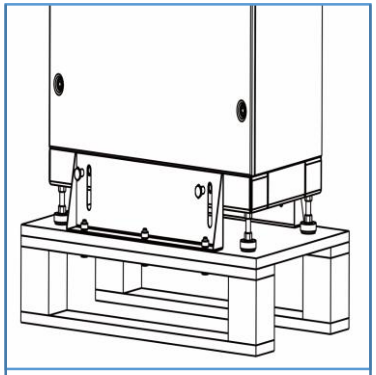
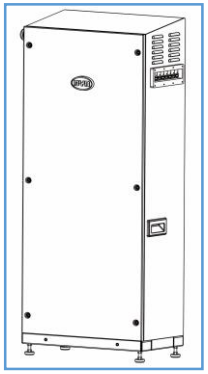
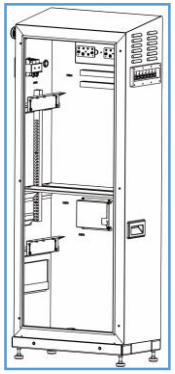
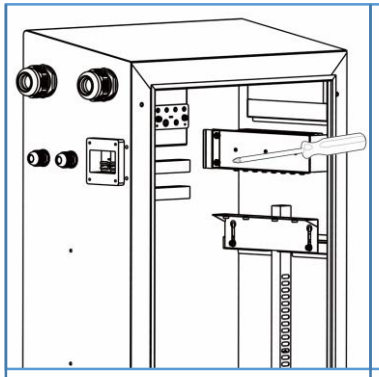
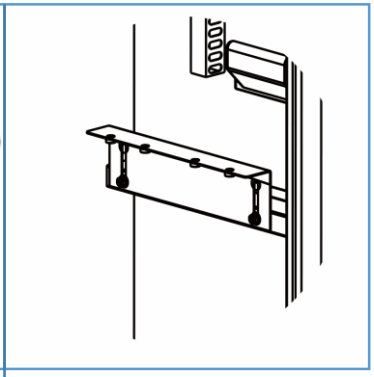
6.1 Open the package

Tools: Knife



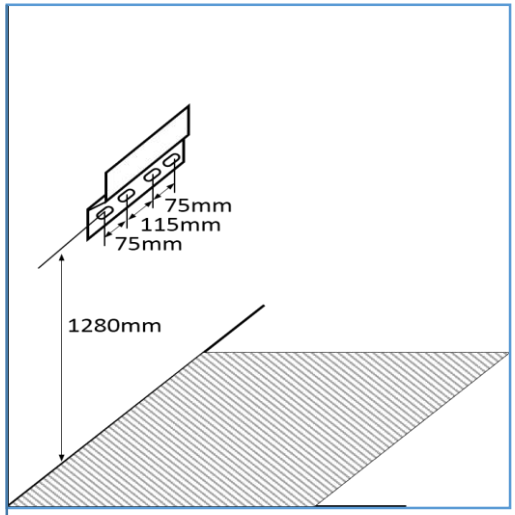
6.2 Disassemble thefixed seat& door and pallet

Tools:screwdriver

				
Remove fixed seat	Remove pallet	Take away the door	Take away the air circuit breakert.	Connect ground wire

6.3Fix the frame on the wall, then fix the cabinet with the fixing frame

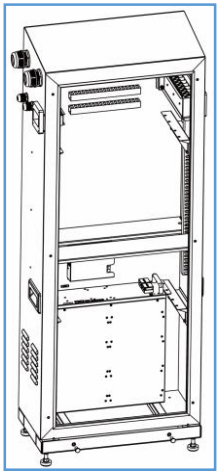
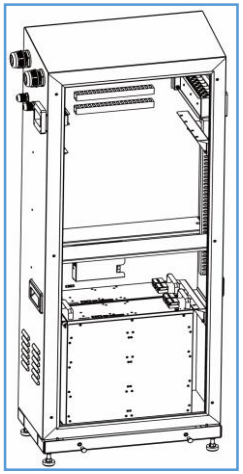
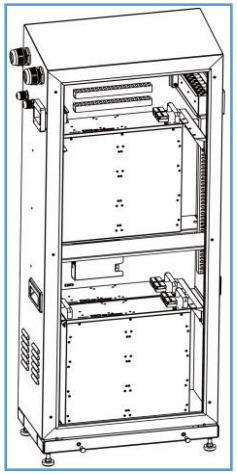
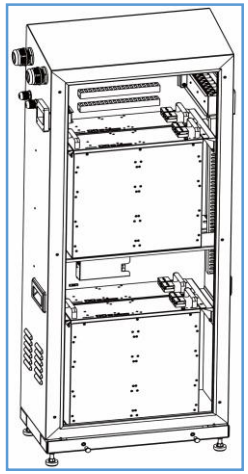
Tools:screwdriver



Fix the frame on the wall
Fixing.

6.4Battery installation

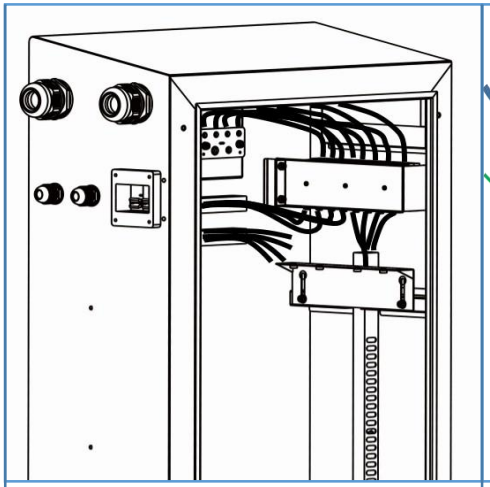
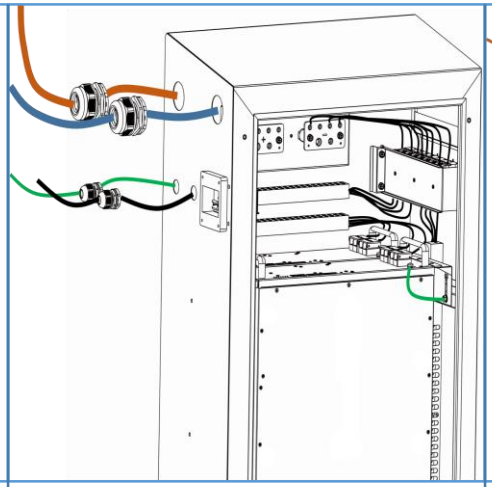
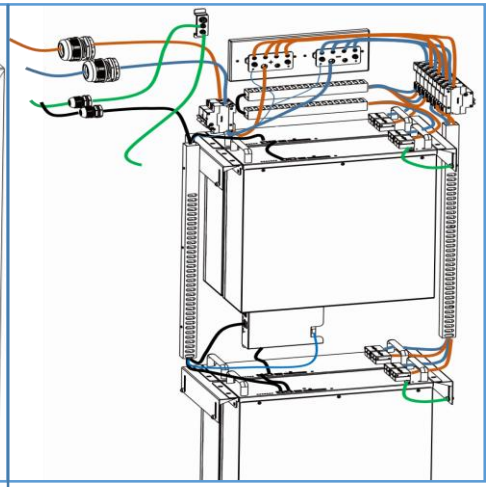
Tools: Cross screwdriver;Sockets spanner

			
Put the first battery into the cabinet. Correct position is inside the bottom layer,close to back panel.	Put the second battery into the cabinet. Correct position is inside the bottom layer,close to front panel.	Put the third battery into the cabinet. Correct position is inside the top layer,close to back panel.	Put the fourth battery into the cabinet. Correct position is inside the top layer,close to front panel. Fix all batteries with screws.

6.5Connect cables with battery

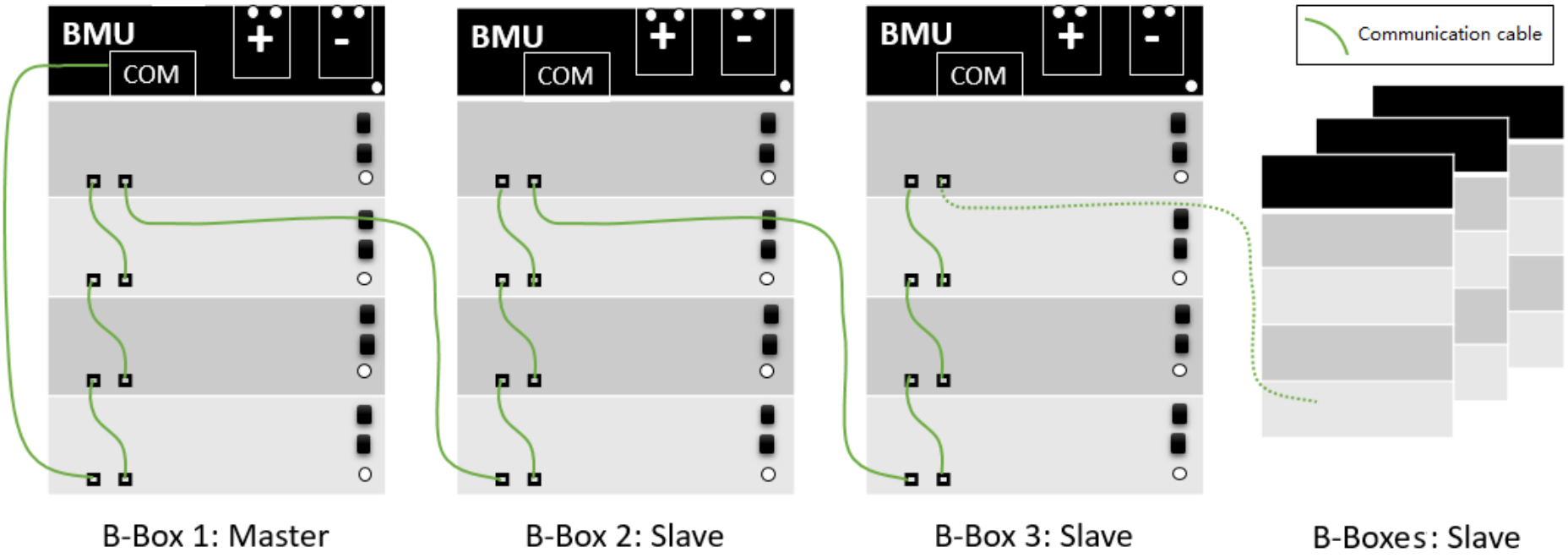
Tools: Cross screw driver Fixed torque: 20±2kgf.cm

Attention: The battery can only in parallel connection, do not connect batteries in series. Do not short connect, reverse polarity connect.

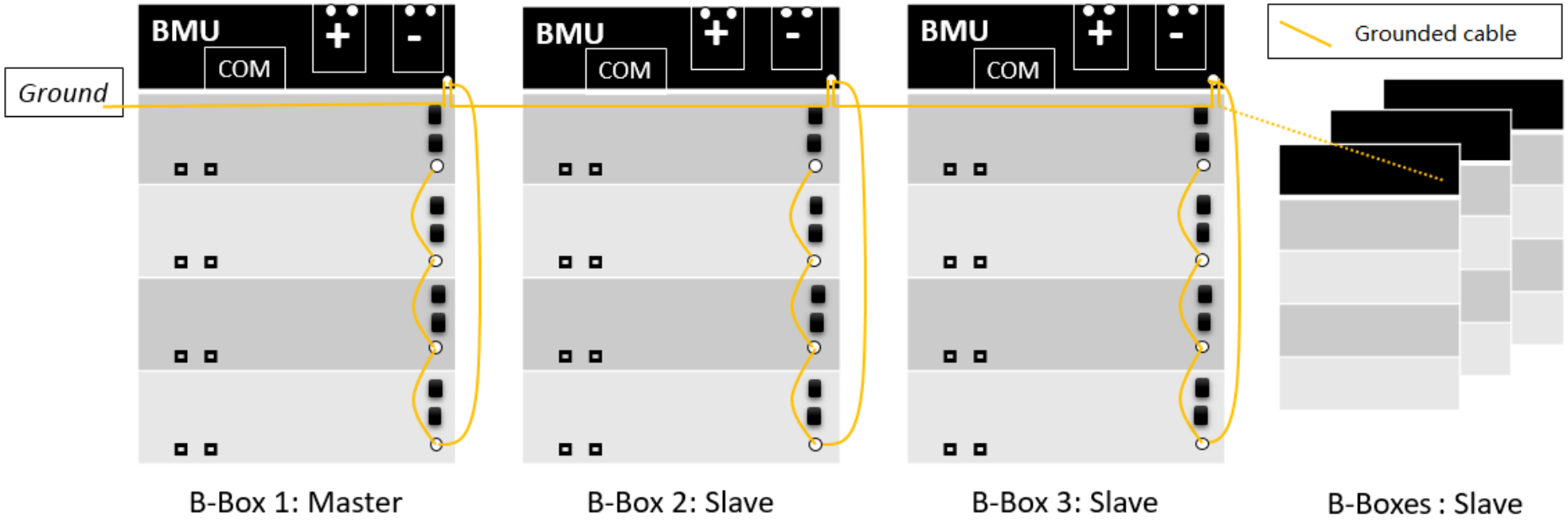
		
Fix the air circuit breakert.Remark:Tube type terminal stripe side toward the positive corresponding rack (lateral) circuit breaker	Fix the cable through connector	Connect the Positive cable to P+ terminal Connect the Negative cable to P- terminal Connect the grounded cable to GND terminal Connect communication cable between BMU and Inverter.

7Parallel connection between multi B-Box

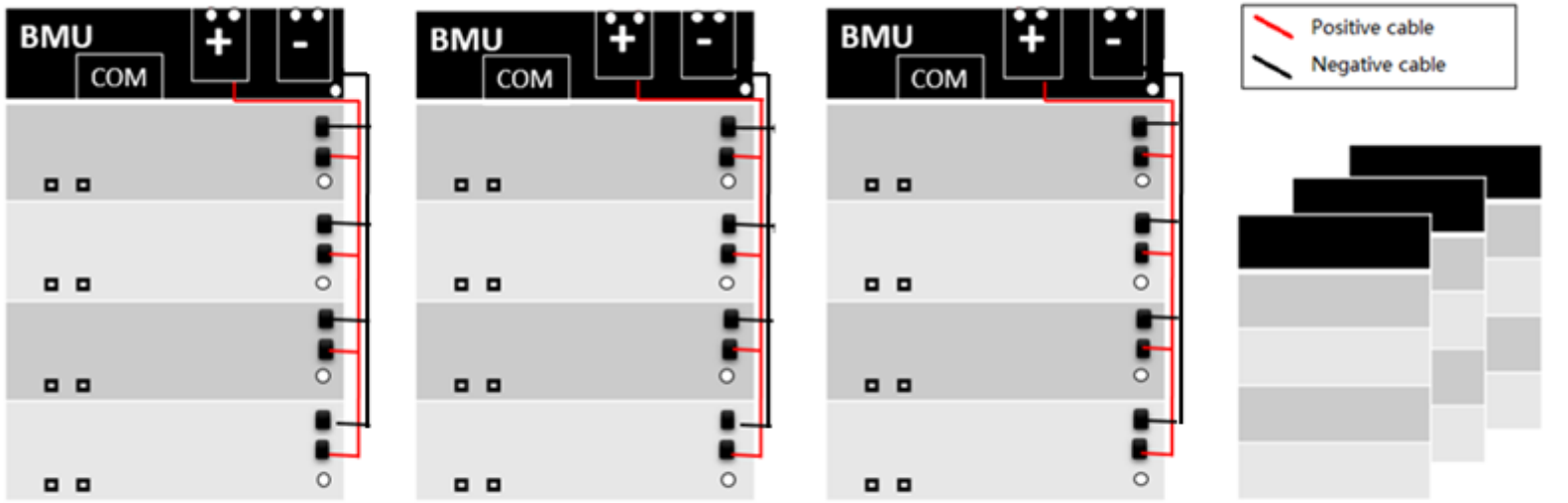
7.1Communication cable connection drawing



7.2Grounded cable connection between several B-Box



7.3Power cable connection between several B-Box



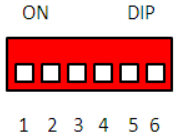
8Battery address set up

8.1“ADDR” switch introduction

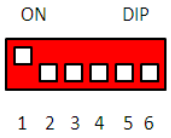
Function: Communicate between battery and BMU, BMU will communication with external equipment when using CAN communication.

Each DIP switch definition:

There are 6 bit switches, keep the switch on down side means”0”, turn up the switch to “ON” means “1”.

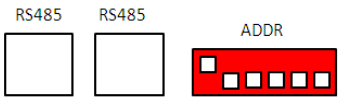


Address: 000000

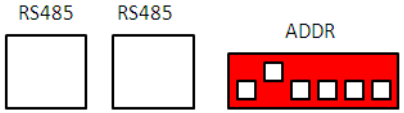


Address: 100000

For example: when two battery in using“ADDR” setting:



No.1 battery address: 100000



No.2 battery address: 010000

Address setting please according to the configuration list in next page.

Notice: Make sure of the highest address of B-Plus2.5 connect to BMU.

8.2 Battery address setting list (from 1~32 batteries)

Battery No.	Address	Battery No.	Address
1	100000	17	100010
2	010000	18	010010
3	110000	19	110010
4	001000	20	001010
5	101000	21	101010
6	011000	22	011010
7	111000	23	111010
8	000100	24	000110
9	100100	25	100110
10	010100	26	010110
11	110100	27	110110
12	001100	28	001110
13	101100	29	101110
14	011100	30	011110
15	111100	31	111110
16	000010	32	000001

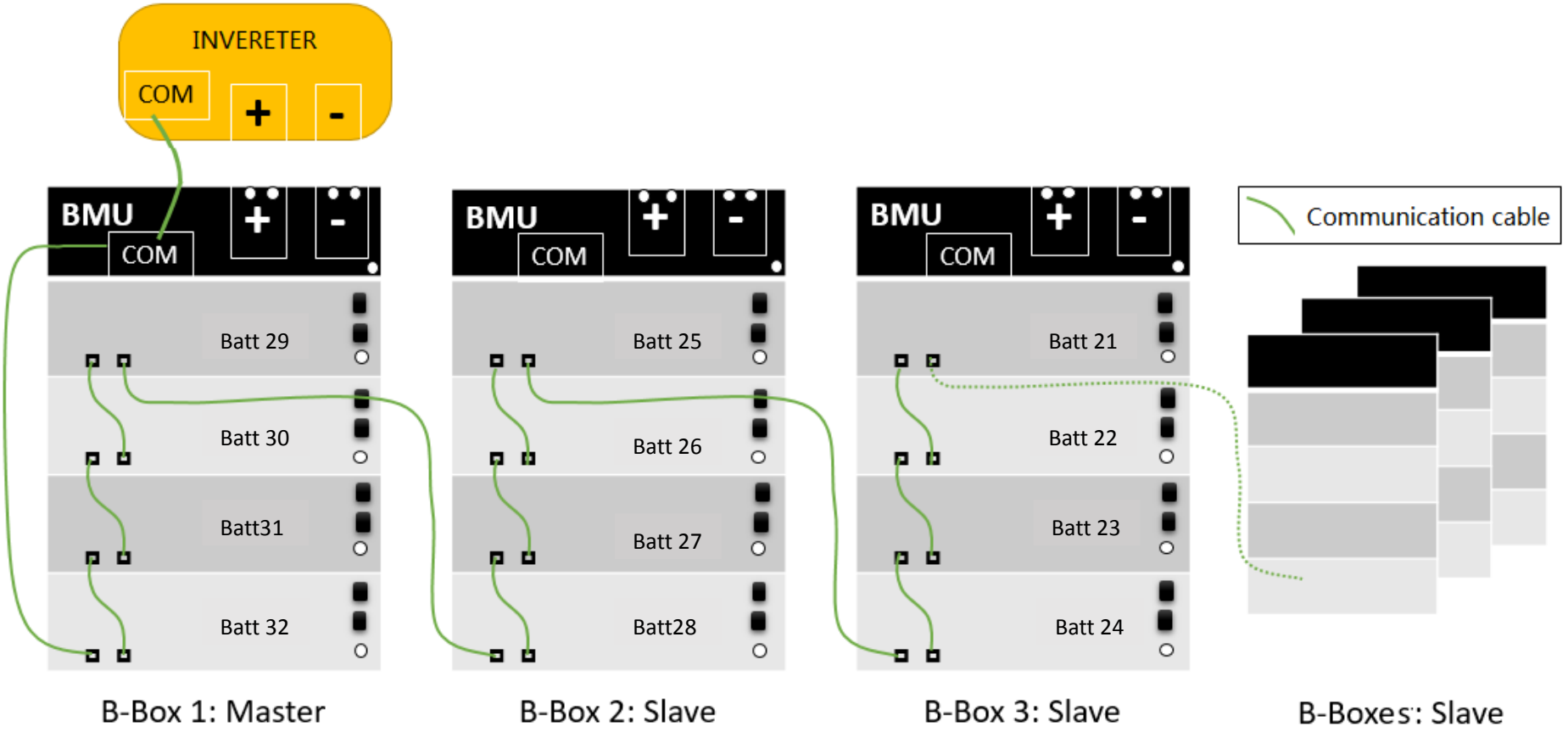
9Connect to inverter

9.1 CAN cable connection

RJ45 PIN define

	B-Box	SMA	GOODWE	SOLAX	VICTRON
CAN H	4	4	4	1	7
CAN L	5	5	5	2	8

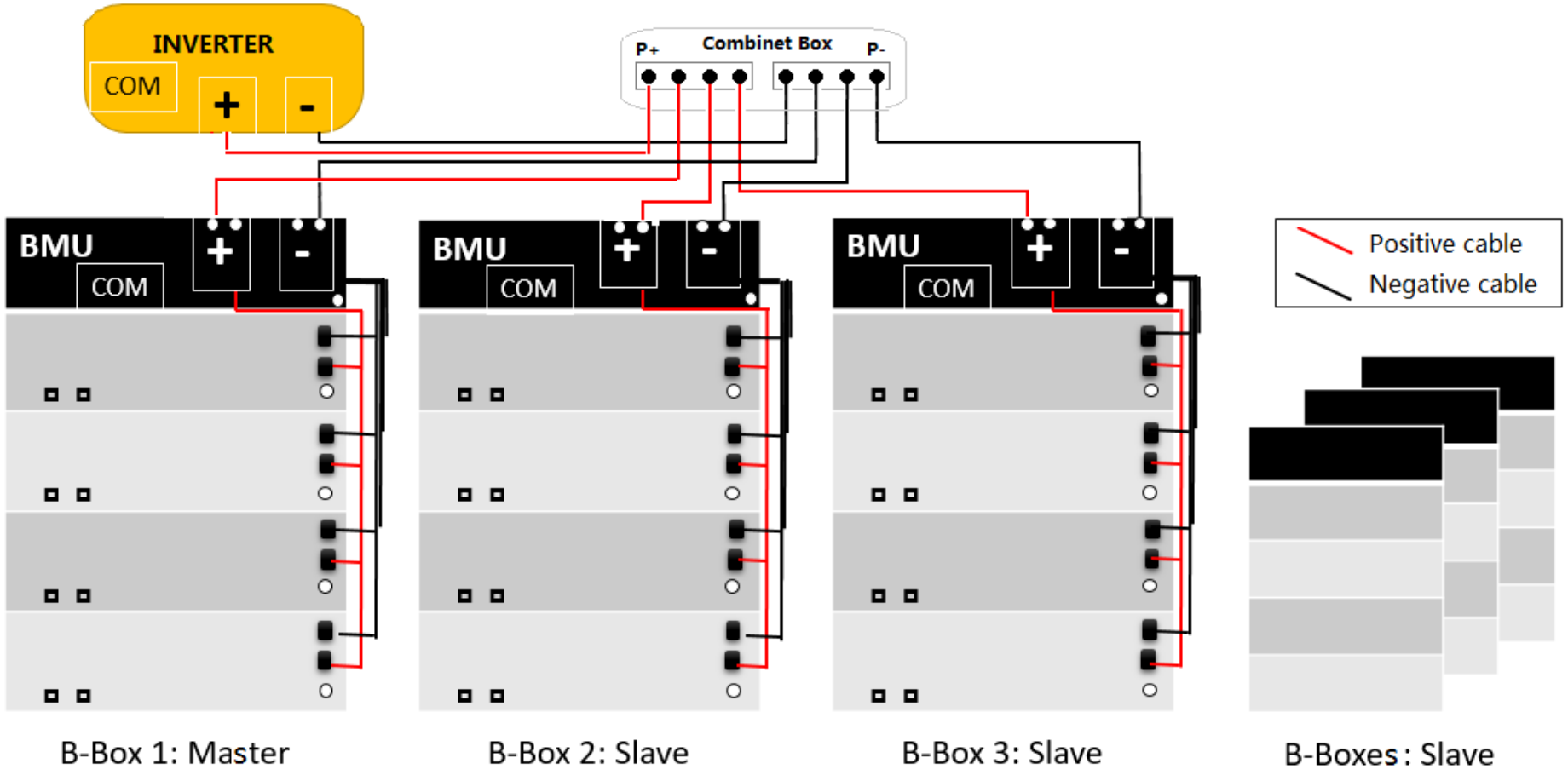
When installer do “CAN” ports connections between B-Box and inverter, please refer to below drawing.



9.2 Power cable connection

Tools: Cross screwdriver, fixed torque: 25±2.5Nm

Remark: Each rack is negative line need to use the belt, and between each cabinet and inverter line length is the same. Be careful not to reverse connection.



10Start system

Notice: Before activity the system, please inspection according below items:

Confirm all the batteries are powered OFF.

Confirm all power cables are connected correctly and reliably.

Confirm all communication cables are connected correctly and reliably.

10.1System activity procedures when B-Box connect to SMA Sunny Island

⑴ Start B-Box;

i. Turn the switch of main circuit breaker (QFB0) to "ON".

ii. Turn the switch of battery breaker (QFB1、QFB2、QFB3、QFB4) to "ON".

iii. Press the "ON/OFF" button on front panel of B-Plus 2.5;

Tips: Press "ON/OFF" button one second can start B-Plus, According to the number of inverters in the following table, as far as possible within 8 seconds of button to activate the batteries.

	Inverter:1~2PCS	**Inverter:3~4PCS**	**Inverter:5~7PCS**	**Inverter:8~9PCS**
The amount of battery	1	2	3	4

Once start, the LED lights of B-Plus 2.5 will be in different status according battery status as below:

LED status when normal start

Item	**LED**	**Status**
1	Run	Green
2	SOC	More than one is green. Slow blink is charging and Fast blink is discharging. The flash in order means no communication.
3	ERROR	OFF
4	Alarm	OFF

	Status(display interval 2S)	Definition
LED(BMU)	Blinks 1 time	Inverter not connected
	Blinks 2 time	Battery not connected
	Blinks 3 time	Battery disconnect
	Blinks 4 time	Battery failure

Remark:

Slow blink: Indicator light is on and off every 1s (0.5Hz).

Fast blink: indicator light is on and off every 0.25s (2Hz).

SOC status and indicate

Item	Status	Indicate
1	Four lights are all normally on	Capacity is 100%-75% (including)
2	The last three lights are normally on	Capacity is 74%-50% (including)
3	The last two lights are normally on	Capacity is 49%-25% (including)
4	The last one light is normally on	Capacity is 24%-1% (including)

⑵ Switching on the Sunny Island;

Procedure:

• For systems with one Sunny Island, press the "On" button on the Sunny Island.

 The inverter LED on each Sunny Island inverter is glowing orange and the Sunny Island inverters are in standby.

⑶ Start inverter;

Procedure:

• Press the start-stop button on the Sunny Island and hold it until an acoustic signal sounds. Or Press and hold the button on the Sunny Remote Control until an acoustic signal sounds. ☑ The inverter LED on each Sunny Island is glowing green.

⑷ Set up battery parameters on SRC of inverter;

Please refer to the “Battery Parameter setting” table in Appendix1.

Remark: If the battery capacity is greater than or equal to 200AH, according to the Box10.0 parameter settings

⑸ System running.

10.2 System activity procedures when B-Box connect to GOODWE inverter

⑴ Open the GOODWE APP and open the home page;

⑵ Start B-Box;

i. Turn the switch of main circuit breaker(QFB0) to "ON".

ii. Turn the switch of battery breaker (QFB1、QFB2、QFB3、QFB4) to "ON".

iii. Press the "ON/OFF" button on front panel of B-Plus 2.5;

Tips: Press "ON/OFF" button one second can start B-Plus;

Once start, the LED lights of B-Plus 2.5 will be in different status according battery status as below:

LED status when normal start

Item	LED	Status
1	Run	Green
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LED(BMU)	Blinks 1 time	Inverter not connected
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	Blinks 3 time	Battery disconnect
	Blinks 4 time	Battery failure

Remark:

Slow blink: Indicator light is on and off every 1s (0.5Hz).

Fast blink: indicator light is on and off every 0.25s (2HZ)

SOC status and indicate

Item	Status	Indicate
1	Four lights are all normally on	Capacity is 100%-75% (including)
2	The last three lights are normally on	Capacity is 74%-50% (including)
3	The last two lights are normally on	Capacity is 49%-25% (including)
4	The last one light is normally on	Capacity is 24%-1% (including)

⑶ Inverter activity;

⑷ Go to the home page of APP, enter into the Battery Setting page, select “BYD B-Box 2.5/5.0/7.5/10.0” battery, then select “NEXT” until the last page, at last select “Start”.

Remark: If the installed capacity is greater than or equal to 10.0KWh, the App product model is chosen as "BYD B-Box 10"

(5)System running;

10.3 System activity procedures when B-Box connect to Victron inverter

⑴ Inverter start;

⑵ Set the battery DOD at a minimum of 5% on-grid; Set the battery DOD at a minimum of 10% off-grid.

⑶ Start B-Box;

i. Turn the switch of main circuit breaker (QFB0) to "ON".

ii. Turn the switch of battery breaker (QFB1、QFB2、QFB3、QFB4) to "ON".

iii. Press the "ON/OFF" button on front panel of B-Plus 2.5;

Tips: Press "ON/OFF" button one second can start B-Plus, According to the number of inverters in the following table, as far as possible within 8 seconds of button to activate the batteries.

	Inverter:1~2PCS	**Inverter:3~4PCS**	**Inverter:5~7PCS**	**Inverter:8~9PCS**
The amount of battery	1	2	3	4

Once start, the LED lights of B-Plus 2.5 will be in different status according battery status as below:

LED status when normal start

Item	**LED**	**Status**
1	Run	Green
2	SOC	More than one is green. Slow blink is charging and Fast blink is discharging. The flash in order means no communication.
3	ERROR	OFF
4	Alarm	OFF

	Status(display interval 2S)	**Definition**
LED(BMU)	Blinks 1 time	Inverter not connected
	Blinks 2 time	Battery not connected
	Blinks 3 time	Battery disconnect
	Blinks 4 time	Battery failure

Remark:

Slow blink: Indicator light is on and off every 1s (0.5Hz).

Fast blink: indicator light is on and off every 0.25s (2HZ)

SOC status and indicate

Item	**Status**	**Indicate**
1	Four lights are all normally on	Capacity is 100%-75% (including)
2	The last three lights are normally on	Capacity is 74%-50% (including)
3	The last two lights are normally on	Capacity is 49%-25% (including)
4	The last one light is normally on	Capacity is 24%-1% (including)

⑷ System running.

10.4 System activity procedures when B-Box connect to Solax inverter

⑴ Open the GOODWE APP and open the home page;

⑵ Start B-Box;

i. Turn the switch of main circuit breaker(QFB0) to “ON”.

ii. Turn the switch of battery breaker (QFB1、QFB2、QFB3、QFB4) to “ON”.

iii. Press the “ON/OFF” button on front panel of B-Plus 2.5;

Tips: Press “ON/OFF” button one second can start B-Plus;

Once start, the LED lights of B-Plus 2.5 will be in different status according battery status as below:

LED status when normal start

Item	LED	Status
1	Run	Green
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3	ERROR	OFF
4	Alarm	OFF

	Status(display interval 2S)	Definition
LED(BMU)	Blinks 1 time	Inverter not connected
	Blinks 2 time	Battery not connected
	Blinks 3 time	Battery disconnect
	Blinks 4 time	Battery failure

Remark:

Slow blink: Indicator light is on and off every 1s (0.5Hz).

Fast blink: indicator light is on and off every 0.25s (2HZ)

SOC status and indicate

Item	Status	Indicate
1	Four lights are all normally on	Capacity is 100%-75% (including)
2	The last three lights are normally on	Capacity is 74%-50% (including)
3	The last two lights are normally on	Capacity is 49%-25% (including)
4	The last one light is normally on	Capacity is 24%-1% (including)

⑶ Inverter activity;

⑷ Go to the home page of APP, and enter into Charger Setting page, select “Battery Type Lithium”, then select “Min Capacity” setting 20%, at last select “Battery awaken”.Choosing”YES”. Complete battery parameter settings.

(5)System running;

11Stop system

Notice: Before stop the system, please power off inverter first, then power off battery refer to below items:

i. Power off the devices which connect with batteries: Inverter&MPPT, etc.
ii. Turn the switch of main circuit breaker(QFB0) to“ OFF”
iii. Turn the switch of battery breaker(QFB1、QFB2、QFB3、QFB4) to “OFF”.
iv. Power off all batteries.

After stop the system, please check refer to below items:

- ✓ Confirm all the batteries are powered OFF.
- ✓ All the LED are OFF.
- ✓ Inverter had powered off.

Appendix 1

SMA charger min capacity

Parameter setup for B-Box2.5	
Charging the battery Usage through battery backup system without increased self-consumption	
Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	50
262.01ProtResSOC	3
262.02BatResSOC	10
Charging the battery usage through battery backup system with increased self-consumption	
Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	50
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	6
262.03BUResSOC	0
262.04PVResSOC	8
262.05MinSlfCsmpSOC	75
Charging the battery usage through system for increased self-consumption without a battery backup grid	
Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	50
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	6

262.04PVResSOC	8
262.03BUResSOC	0
262.05MinSlfCsmpSOC	75

Parameter setup for B-Box 5.0

Charging the battery Usage through battery backup system without increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	100
262.01ProtResSOC	3
262.02BatResSOC	7

Charging the battery usage through battery backup system with increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	100
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	4
262.03BUResSOC	0
262.04PVResSOC	6
262.05MinSlfCsmpSOC	80

Charging the battery usage through system for increased self-consumption without a battery backup grid

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	100
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	4

262.04PVResSOC	6
262.03BUResSOC	0
262.05MinSlfCsmpSOC	80

Parameter setup for B-Box7.5

Charging the battery Usage through battery backup system without increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	150
262.01ProtResSOC	3
262.02BatResSOC	6

Charging the battery usage through battery backup system with increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	150
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	4
262.03BUResSOC	0
262.04PVResSOC	4
262.05MinSlfCsmpSOC	85

Charging the battery usage through system for increased self-consumption without a battery backup grid

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	150
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	4

262.04PVResSOC	4
262.03BUResSOC	0
262.05MinSlfCsmpSOC	85

Parameter setup for B-Box10.0

Charging the battery Usage through battery backup system without increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	200
262.01ProtResSOC	3
262.02BatResSOC	6

Charging the battery usage through battery backup system with increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	200
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	4
262.03BUResSOC	0
262.04PVResSOC	4
262.05MinSlfCsmpSOC	85

Charging the battery usage through system for increased self-consumption without a battery backup grid

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	200
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	4

262.04PVResSOC	4
262.03BUResSOC	0
262.05MinSlfCsmpSOC	85

Parameter setup for B-Box in off-grid	
Protection for the Battery	
Parameters	Recommended Value
223.05 BatPro1Soc	12%
223.06 BatPro2Soc	12%
223.07 BatPro3Soc	3%
Gen Autostart Control	
Parameters	Recommended Value
235.03 GnSocTm1Str	17%
235.04 GnSocTm1Stp	35%

Parameter setup for B-Box7.5

Three-phase

Charging the battery Usage through battery backup system without increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	150
262.01ProtResSOC	3
262.02BatResSOC	10

Charging the battery usage through battery backup system with increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	150
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	6
262.03BUResSOC	0
262.04PVResSOC	8
262.05MinSlfCsmpSOC	75

Charging the battery usage through system for increased self-consumption without a battery backup grid

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	150
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	6
262.04PVResSOC	8
262.03BUResSOC	0
262.05MinSlfCsmpSOC	75

Parameter setup for B-Box10.0

Charging the battery Usage through battery backup system without increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	200
262.01ProtResSOC	3
262.02BatResSOC	10

Charging the battery usage through battery backup system with increased self-consumption

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	200
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	6
262.03BUResSOC	0
262.04PVResSOC	8
262.05MinSlfCsmpSOC	75

Charging the battery usage through system for increased self-consumption without a battery backup grid

Parameters	Setup value
003.07Batt Typ	Li Lon_Ext-BMS
003.10Batt Cpynom	200
261.01SlfCsmplncEna	Enable
261.03Saisonenable	Yes
262.01ProtResSOC	3
262.02BatResSOC	6
262.04PVResSOC	8
262.03BUResSOC	0
262.05MinSlfCsmpSOC	75

Appendix 2

Solax charger min capacity

Product	**Min capacity**
B-Box 2.5	20%
B-Box 5.0	15%

B-Box 7.5	15%
B-Box 10.0	10%
B-Box 12.8	10%