DYNESS Battery Products

Technical training course

Dyness
ENERGY STORAGE SYSTEM

2019/11/11

DYNESS Battery Products Introduction & Installation

B4850

B3(B4874)

Powerbox F

Dyness

CONTENTS

Product version distinction

Product introduction B4850&B3

Installation Precautions

Main parameter Settings

Miscellaneous instructions

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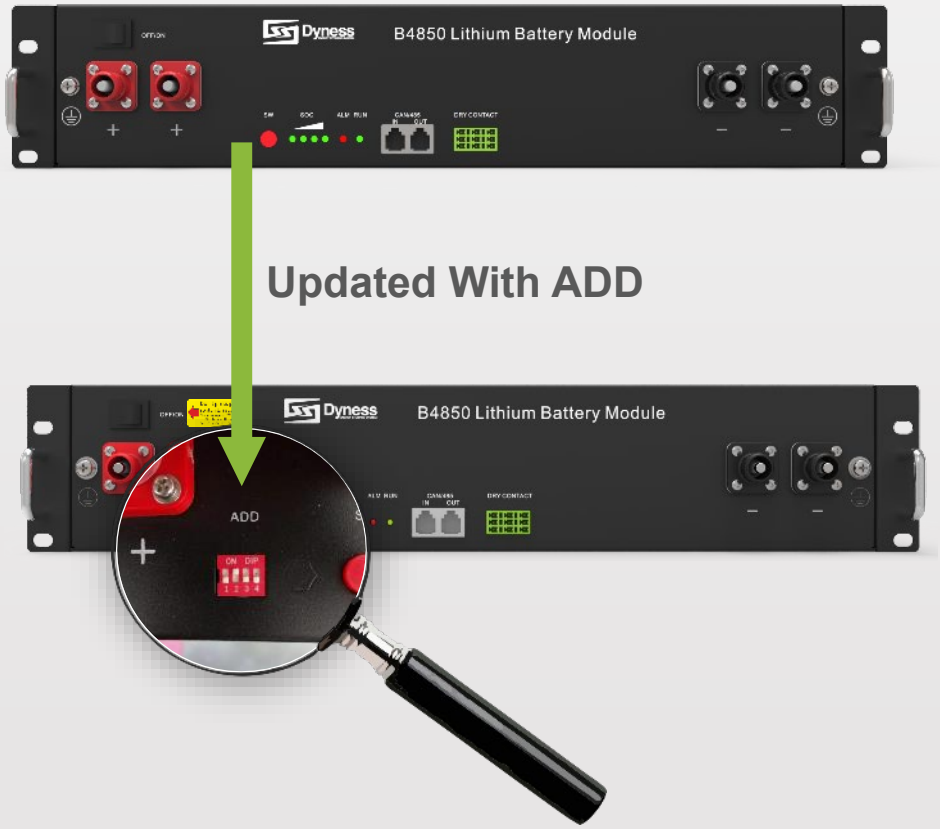
Product version distinction

B4850



B3(B4874)

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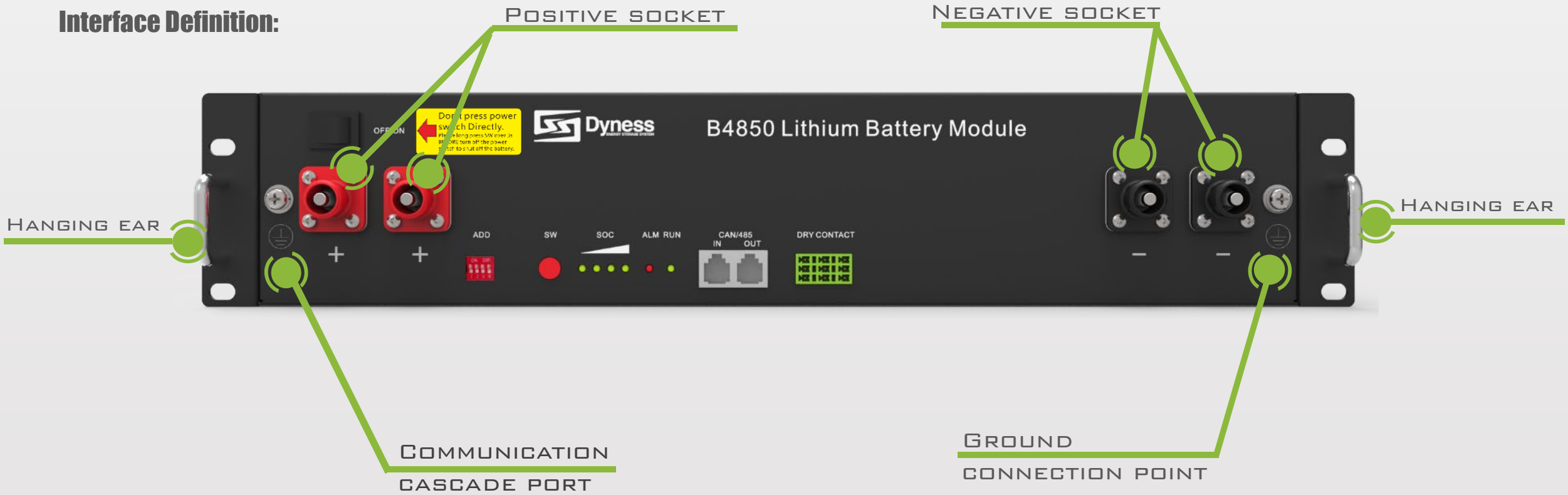
Product introduction

B4850 and B3 (B4850) are only different in capacity, so the following content is mainly introduced with B4850 as an example.

Interface Definition:



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Product introduction

Interface Definition:

Product Precautions:

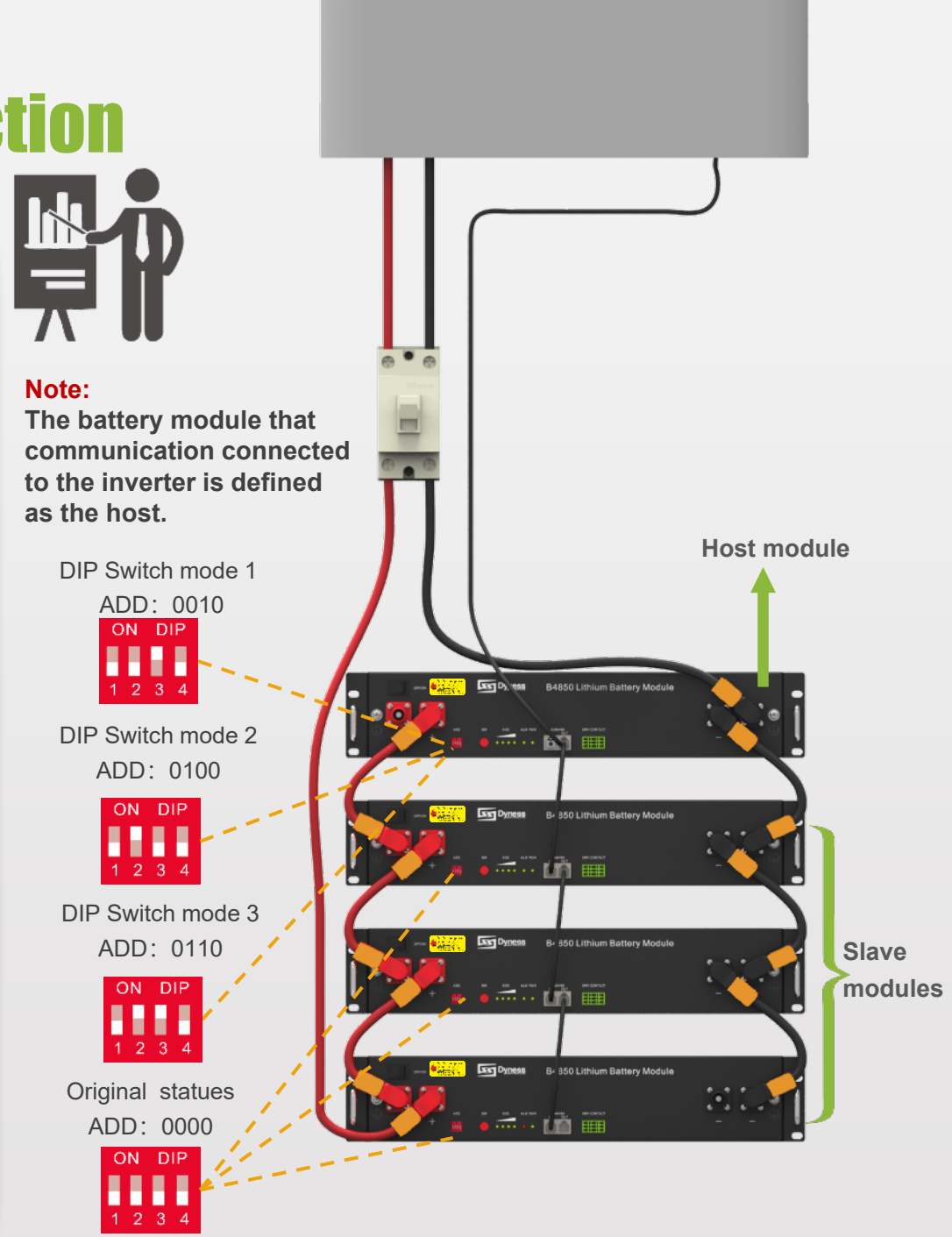
1. Power switch: Has two status, OFF/ON, during use must in the “ON” state.
2. DIP switch : Used to match different inverters.
3. SW: Press and hold this button for 3 seconds to put the battery into the power-on or standby state when the power switch button is in the ON state.
4. Communication cascade port, support CAN/ RS485 communication. (Factory default CAN mode)
5. Indicated lights, including SOC lights, ALM light, RUN light, which indicate the status of the battery.
6. DRY CONTACT, only used for the internal connection of Powerbox.

Product introduction

DIP switch Instruction :

When the B4850/ B3 are used in parallel or alone and the host battery is with DIP switch, the following matters need attention

1. The communication cable to the inverter should use the one that the Pin 6 and 7 are not short connection.
2. One of the B4850 is used as the host, other modules are slaves.
   If the product is used alone, it is the host itself.
3. If the inverter is one of GDW, Solis, LUX, etc the DIP switch mode of the host is shown as No.1.
   After connecting the Communication cable to inverter and Communication parallel cable, then dial "#3" button of the DIP switch of the host unit to "ON" position (Push to the top), then turn on all batteries.
4. If the inverter is one of Growatt, GMDE, Saj, the DIP switch mode of the host is shown as No.2.
   After connecting the Communication cable to inverter and Communication parallel cable, then dial "#2" button of the DIP switch of the host unit to "ON" position (Push to the top), then turn on all batteries.
5. If the battery module is in communication with the GROWATT-SPF-off-grid inverter by 485 communication, turn the host DIP switch "#2" and "#3" to "ON“ position (Push to the top), then turn on all batteries.
6. The DIP switch mode of the slaves do not need to move.



Product introduction

DIP Switch mode 1
ADD: 0010

Compatible inverter brand in DIP Switch mode 1:

GOODWE
YOUR SOLAR ENGINE

solis

SOLAX POWER

SMA

SOFAR SOLAR

VoltronicPower
Advancing Power

IMEON ENERGY
Your Power, Your Rules

SUNGROW
Clean power for all

LUXPOWER TEK

RENAC

DELIOS

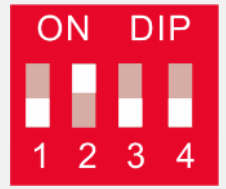
Deye 德業

victron energy
BLUE POWER

Product introduction

DIP Switch mode 2

ADD: 0100



Compatible inverter brand in DIP Switch mode 2:

powering tomorrow Growatt

SAJ

GMDE

Product introduction

DIP Switch mode 3

ADD: 0110

Compatible inverter brand in DIP Switch mode 3:

powering tomorrow

Growatt

-SPF-off-grid

Product introduction

Communication cable Instruction :

When the B4850/ B3 are used in parallel or alone and the host battery is with DIP switch, the following matters need attention

1. The battery without the DIP switch, the matching communication cable is shown in Figure 2 and Figure 3. Only the INVERTER and BATTERY indicator labels are attached to the two ends of the cable (The specifically matched inverter has been indicated in the indicator labels of INVERTER.).
2. The battery with the DIP switch, the matching communication cable is shown in Figure 1. Another label attached to the end of cable with the INVERTER label noted that “Cable only for B4850/B3 which with ADD/DIP switch” (The specifically matched inverter has been indicated in the indicator labels of INVERTER.).
3. Note: For batteries with the DIP switch, both types of communication cable can be used. For batteries without the DIP switch, only the cable with the label which marked “Cable only for B4850/B3 which without DIP switch” can be used.
4. First batch of batteries from CNBM and ELLIES only goods with no DIP switch. The matching communication cable are shown in Figure 2 and Figure 3.
   The color of the communication cable has no effect on the connection of the inverter, it only depends on which inverters are marked on the indicator label.
5. The batteries that arrive after the first shipment are all equipped with the DIP switch. The first batch of communication cables need to be stored separately from the communication lines that arrive later to avoid confusion.

Cable only for B4850/B3 which with DIP switch

Cable only for B4850/B3 which without DIP switch

Product introduction

Indicator light status description:

Battery Status	SOC	LED1	LED2	LED3	LED4	ALM	RUN
Shutdown	/	off	off	off	off	off	off
Standby	75%≤SOC≤100%	●	●	●	●	off	Flashing
	50%≤SOC < 75%	●	●	●	off	off	Flashing
	25%≤SOC < 50%	●	●	off	off	off	Flashing
	5% < SOC < 25%	●	off	off	off	off	Flashing
	0% < SOC≤5%	●	off	off	off	off	Flashing
	SOC=0	off	off	off	off	Flashing/●	Flashing
Charging	SOC=100%	●	●	●	●	Flash first then always bright	Flashing
	75%≤SOC < 100%	●	●	●	Flashing	off	Flashing
	50%≤SOC < 75%	●	●	Flashing	off	off	Flashing
	25%≤SOC < 50%	●	Flashing	off	off	off	Flashing
	0% < SOC < 25%	Flashing	off	off	off	off	Flashing
Discharging	75%≤SOC≤100%	●	●	●	●	off	●
	50%≤SOC < 75%	●	●	●	off	off	●
	25%≤SOC < 50%	●	●	off	off	off	●
	5% < SOC < 25%	●	off	off	off	off	●
	0% < SOC≤5%	●	off	off	off	Flashing	●
	SOC=0	off	off	off	off	Flashing/●	Flashing

● means green light always on
Flashing: means green light flashing

● means red light always on
Flashing: means red light flashing

Note:

Definition of SOC=0 :

The cell voltage get to 2.9V, and the SOC is calibrated as 0.

- When the cell voltage down to 2.85V, then the battery start forced charging.
- When the cell voltage down to 2.75V, then the battery turns on over-discharge protection.
- When the cell voltage down to 2.65V, then the battery will enter forced sleep state.

Note:

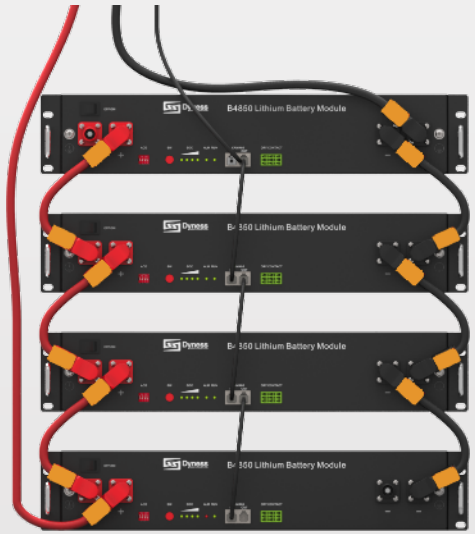
About ALM lights:

- Flashing - battery alarm Always on - battery protection
- When ALM is always on during charging, it means the battery is full. After stopping charging the battery for a period of time, ALM will remove.
- ALM is always on during discharging, indicating that the voltage is low to the protection value and needs to be charged.

Product introduction

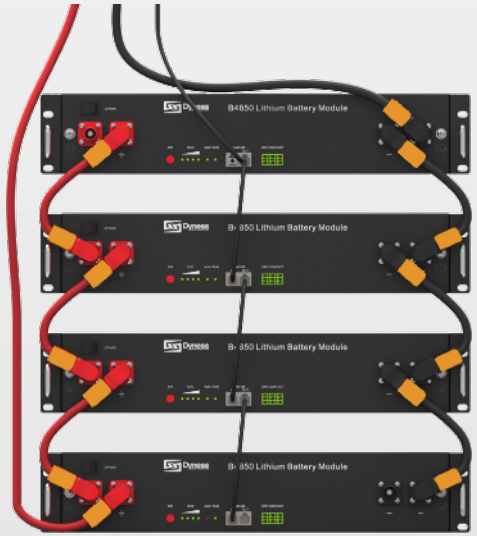
Multi-batteries parallel use instructions:

B4850 and B3 (B4850) are only different in capacity, so the following content is mainly introduced with B4850 as an example.



Case 1: In the parallel system, if the batteries are all with DIP switch. DIP Switch mode of the host selects mode 1,2 or 3 which according to the inverter model. The slave DIP switch keep the initial state.

Case 2: In the parallel system, the battery with DIP switch and the battery without the DIP switch are mixed, use the battery with the DIP switch as the host. DIP Switch mode of the host selects mode 1,2 or 3 which according to the inverter model. The slave DIP switch keep the initial state.



Case 3: In the parallel system, if all batteries are without the DIP switch. Please make sure to use the correct communication cable to inverter.

Note:

When the battery used as the host has a DIP switch, **you must set the DIP switch mode first,** then turn it on, so that the address can be assigned normally, and there will be no cases that multiple batteries compete to be the host.

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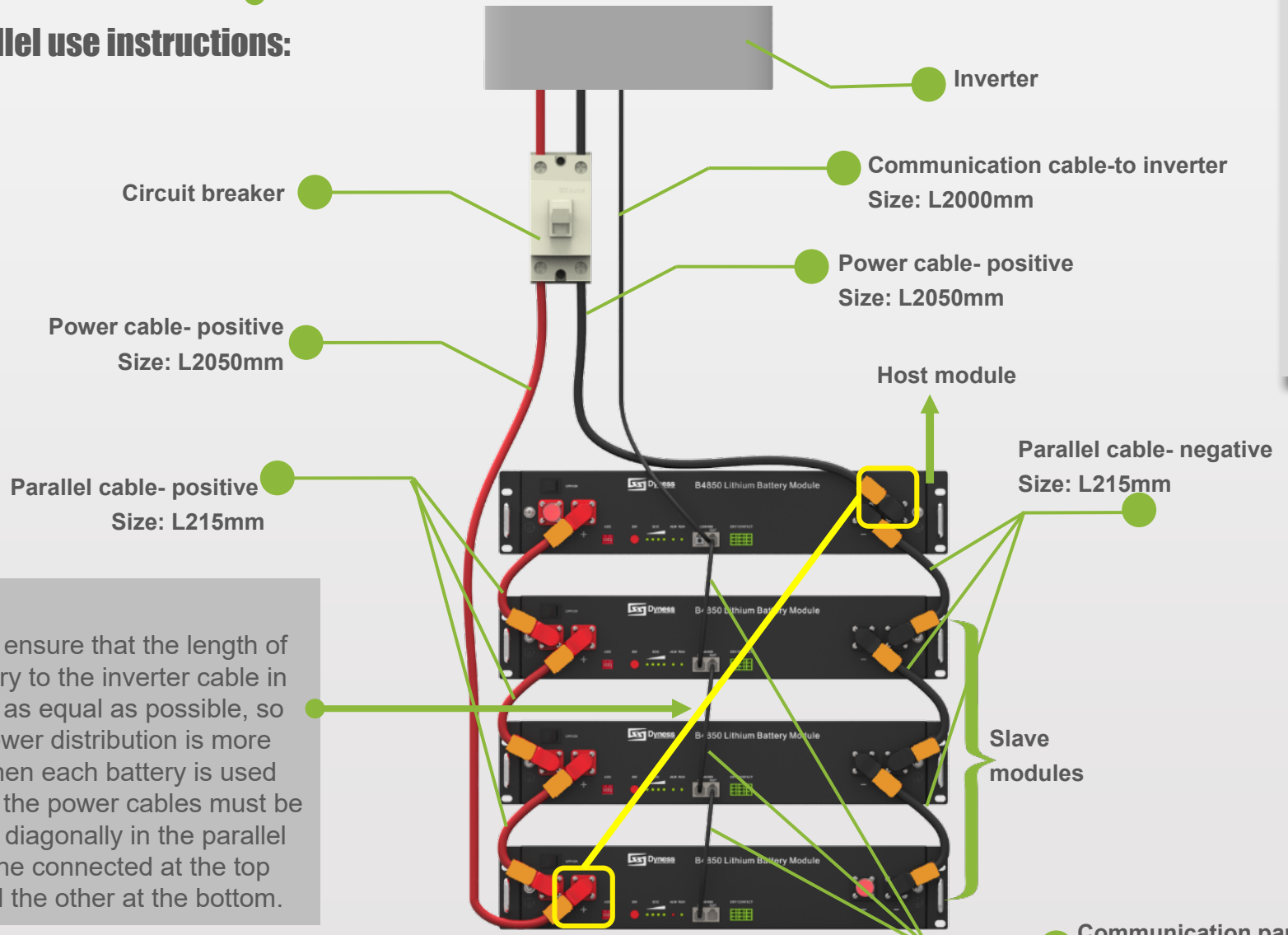
Product introduction

Multi-batteries parallel use instructions:



Note:

In order to ensure that the length of each battery to the inverter cable in the loop is as equal as possible, so that the power distribution is more uniform when each battery is used in parallel, the power cables must be connected diagonally in the parallel system. One connected at the top socket and the other at the bottom.

Host & slave definition:

- The battery module that communication connected to the inverter is defined as the host.
- The other battery that communicates with the inverter through the cascade cable is the slave.

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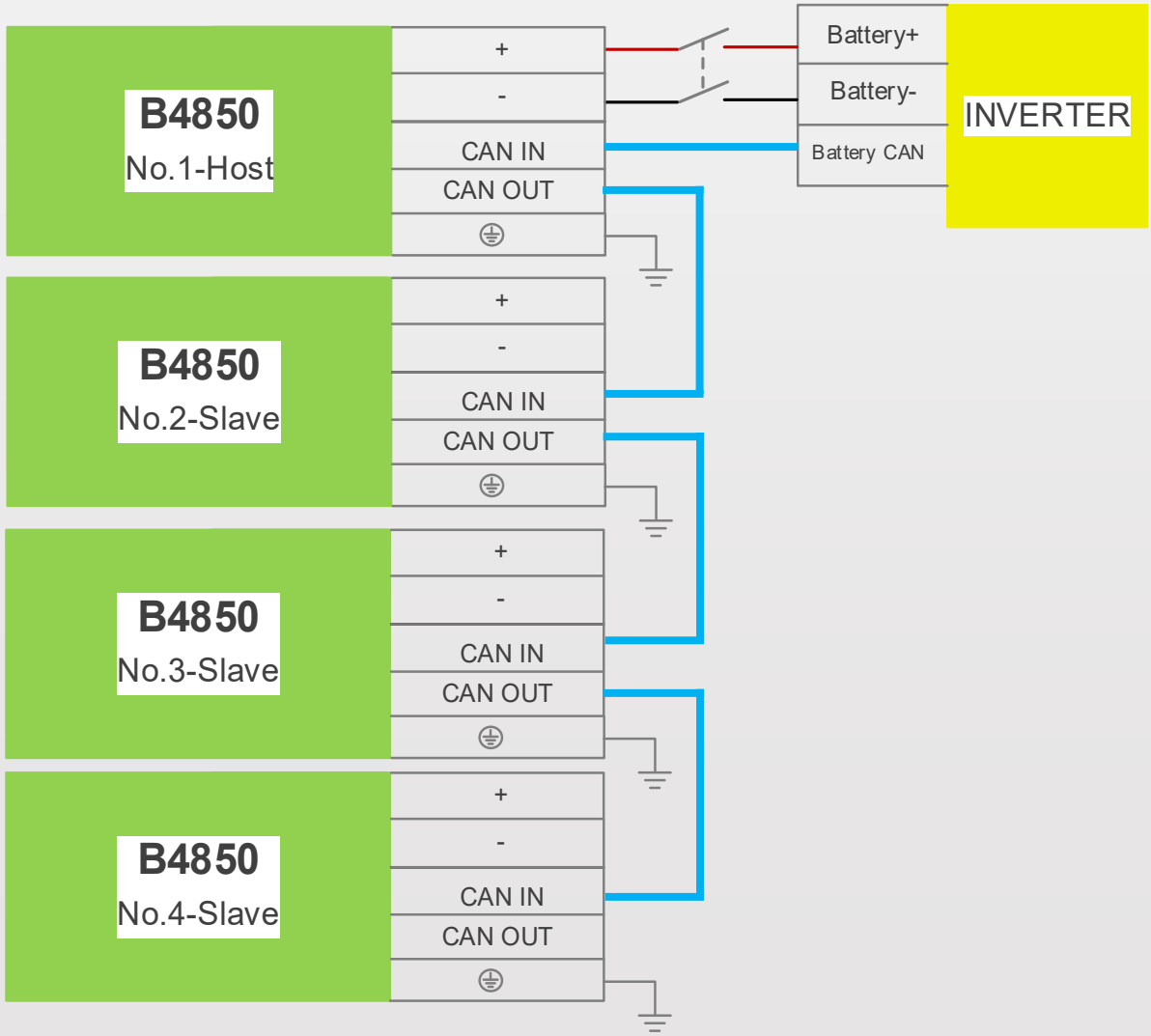
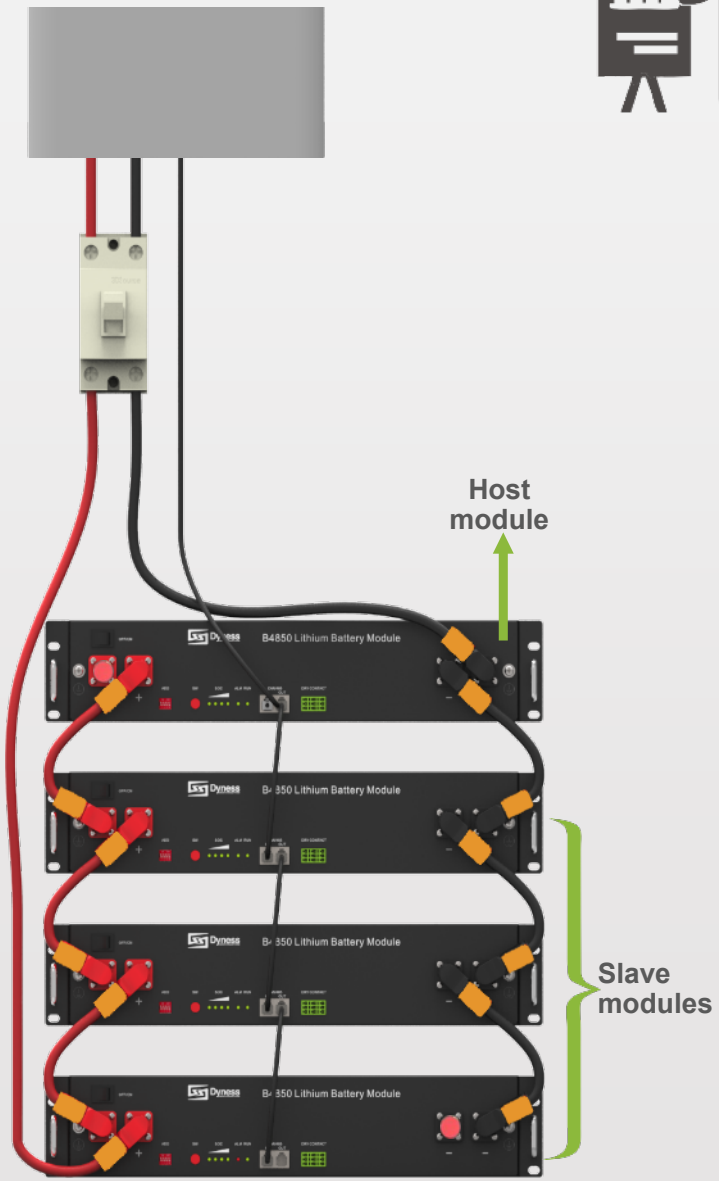
Product introduction

CAN port connection mode when the system is used in parallel:





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Product introduction

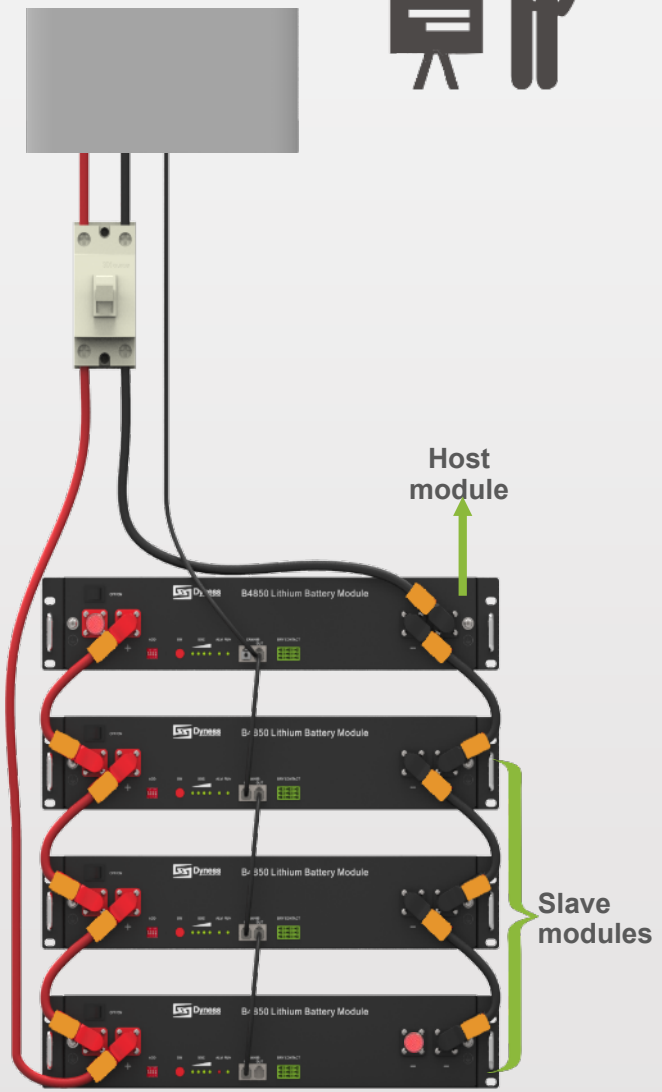
Multi-units parallel use instructions:

The batteries are connected in parallel should according the requirements in the manual.

1. Install Parallel power cables and Communication parallel cable between multi batteries.
2. Connect the positive and negative Power cable of the battery to the inverter.
3. Connect the Communication cable of battery to the inverter.
4. Set the DIP switch mode of the host and slave battery.
   (Set the DIP switch mode first, then turn on the batteries, this point is very important!!!)
5. Turn on the power switch of each B4850 to the “I” position in turn, then press SW and keep 3 seconds, and complete the automatic address allocation.

Attention:

- During the normal operation of the parallel battery system, it is forbidden to arbitrarily turn off one or more of the batteries. Or prohibit the operation of turning off and then turning on individual batteries.
- Multi-batteries must follow the “common advance and retreat” principle, that is, after turning off one of the batteries, all other batteries in the system need to be turned off also, which is regarded as “common retreat” operation. After turning on one of the batteries, all other batteries in the system need to be turned on also, which is regarded as “common advance”, this operation is very important!
- Assuming that the above operating principle is violated, if one of the batteries or multiple batteries is manually turned off in the parallel system, all other batteries must be turned off, and then restart the whole system, so that the system automatically reassigns the address to ensure stable operation of the system.



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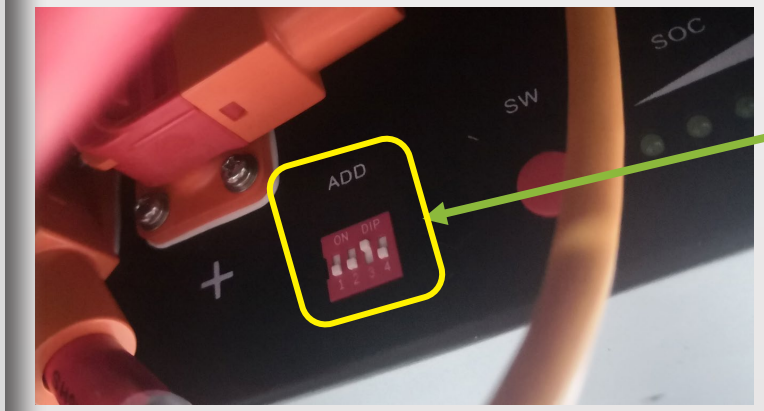
Installation Precautions

The following content mainly introduced Powerbox.

Note:

- If the B4850 inside the POWERBOX that has been shipped is equipped with a DIP switch, that the factory default DIP switch mode of the battery module 1 (host) is Mode 1(Address: 0010).
- If the customer needs to set the communicate with the inverter which matching the DIP switch Mode 2 or 3, they need to open the POWERBOX and set the battery module 1 DIP switch status to Mode 2 or 3.
- The surface of the powerbox cabinet is affixed with a torn invalid label. Therefore, before opening the cover to change the DIP switch mode, you need to contact DYNESS and inform the product ID. DYNESS records this battery ID and authorizes the opening operation to be performed. Except for changing the DIP switch mode, no other operations are allowed.



Battery module 1: The host

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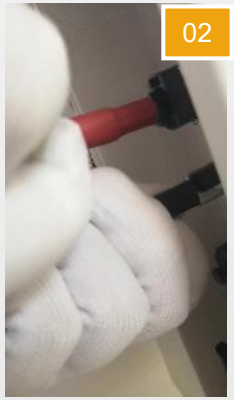
Installation Precautions

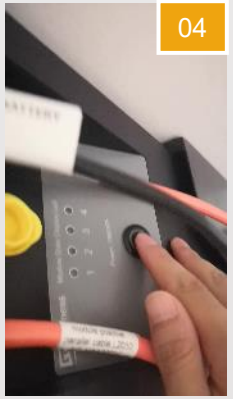
The following content mainly introduced Powerbox.

Electrical connection steps:

1. Before the inverter is connected to the battery, no matter which type of battery, please be sure to connect the PV and the power grid first.
2. Make sure that the power cable and communication cable between the battery and the inverter are all connected.
3. Turn on the photovoltaic switch and inverter power button.
4. Please check that the wiring is correct and make sure that this step is accurate, set the DIP switch mode according to the inverter type then press the reset switch to turn on the battery system.
5. Close the circuit breaker between the grid and the inverter and start the inverter (some inverters cannot be started by AC).
6. Close the DC breaker on the side of the POWERBOX.

Note:
Turning on the battery system must be done in the final step of all installation steps.





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Miscellaneous instructions

The following content introduce of Powerbox system startup/shut down sequence.

1: Powerbox system startup sequence

1. Set the DIP switch mode according to the inverter type. (Only authorized by DYNESS to operate)
2. Complete the wiring between grid, photovoltaic and inverter.
3. Complete the power cable and communication cable wiring between the battery and the inverter.
4. Turned on the inverter power button.
5. Press the reset switch to turn on the Powerbox system.
6. Close the circuit breaker between the grid and the inverter and start the inverter (some inverters cannot be started by AC).
7. Close the DC breaker on the side of the Powerbox.

2: Powerbox system shut down sequence

1. Disconnect the DC breaker on the side of the Powerbox.
2. Long press the reset switch for 3s to turn off the Powerbox system.
3. Disconnect the circuit breaker between the grid and the inverter.
4. Shut down the inverter.

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Main parameter Settings

The following content introduces parameter settings of B4850, B3 & Powerbox.

Parameter Settings:

- Max Charging Vol: 52V
- Min Discharging Vol: 45V
- Float Vol: 51V
- Max Charging/Discharging Current: 25A*battery QTY (e.g. if two battery paralleled, then the current will be 50A.)
- Capacity： Based on the actual ones you are connecting (e.g. if two battery paralleled, then the current will be100Ah.)

Note： Limit current for cables and connectors:120A.

Buzzer setting:

- The latest battery module adds buzzer alarm function.
- When total voltage or any battery cell voltage reaches the protection value during charging/discharge, the battery buzzer alarms and stop charging/discharge. When total voltage or a cell recover to rated return range, the protection is over.
- The buzzer sound alarm setting can be manually turned off on the background software, and the factory default is on.

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Miscellaneous instructions

The following content introduce parameter settings of B4850, B3 & Powerbox.

Other points of attention when using the battery:

1. DYNESS recommends that the battery be prioritized for use with inverters with communication. And whether the battery is used in the lithium battery normal mode or the lead acid mode, it must be strictly set according to the given parameters.
2. Be sure to use the red SW button to turn the battery on or off. It is strictly forbidden to use the power switch to shut down directly, which may cause damage to the battery BMS, especially during battery charging and discharging.
3. We strongly recommend that customers use battery under the power ratio of 1:2 of battery and inverter, for example: 5KW inverter with 3~4 B4850. If the customer uses a high-power inverter with batteries which less than the recommended number, then The parameter settings must be strictly in accordance with the requirements, but battery overload may also occur ! ! !
4. When the batteries are used in parallel, the SOC of each battery must be kept basically the same, and the SOC difference range is controlled within 10% (the SOC consistency should be maintained for any cases).
5. If the SOC of the parallel battery is inconsistent, charge all the batteries in parallel until the battery SOC reaches 100%.
6. The maximum overcurrent capability of the connector and cable of B4850/B3/POWERBOX is 120A. If the customer wants to connect more batteries with high current, it can be used by separate wiring and then flow together or use two positive and negative output power cables. Please consult DYNESS engineer before operation.
7. The BMS used in B4850 and B3 is the same, so there is only a difference in capacity. Same in other usage parameters, such as maximum charge and discharge current, etc.
8. The standard network cable can currently match the inverter with goodwe/solis/growatt/deye/sunsynk/SMA/Renac.

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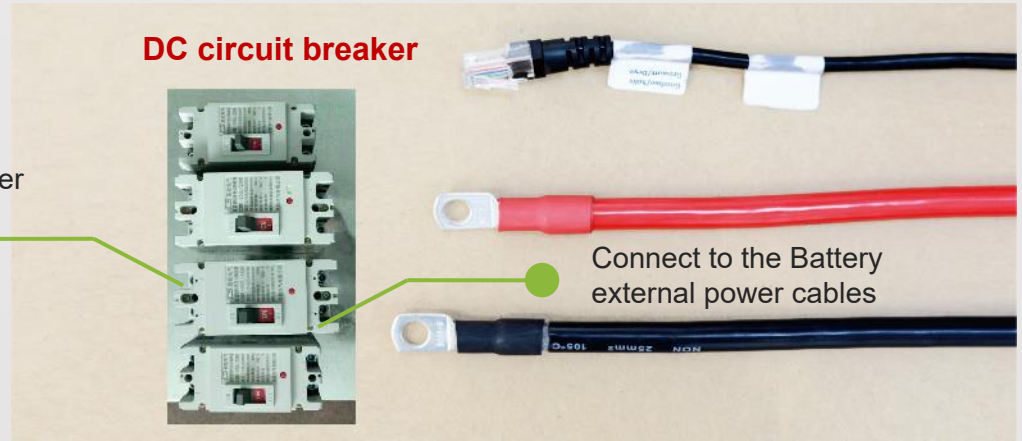
Miscellaneous instructions

The following content introduce of B4850/B3 system startup/shut down sequence.

Case 1: Install DC Breaker between battery and inverter– Startup sequence

1. Complete the wiring between grid, photovoltaic and inverter.
2. Complete the power cable and communication cable wiring between the battery and the inverter.
3. Turned on the inverter power button.
4. Set the DIP switch mode according to the inverter type.
5. Turn on the power switch, then press the SW button for 3s to turn on the B4850/B3 system.
6. Close the circuit breaker between the grid and the inverter and start the inverter (some inverters cannot be started by AC).
7. Close the DC circuit breaker between the inverter and the battery system.



Note:

It is required to add a DC circuit breaker/ Fuse between the inverter and the battery system.

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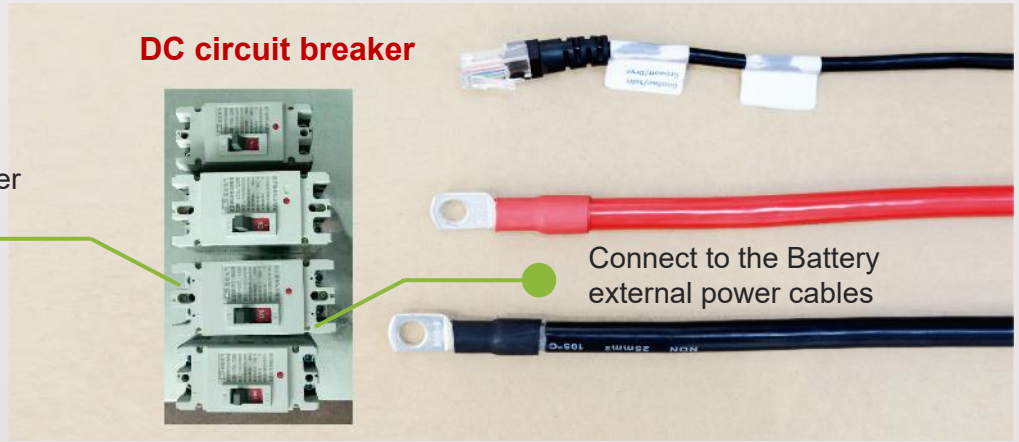
ENERGY STORAGE SYSTEM

Miscellaneous instructions

The following content introduce of B4850/B3 system startup/shut down sequence.

Case 1: Install DC Breaker between battery and inverter– Shut down sequence

1. Disconnect the DC circuit breaker between the inverter and the battery.
2. Press the SW button for 3s, then turn off the power switch to turn off the battery system.
3. Disconnect the circuit breaker between the grid and the inverter.
4. Shut down the inverter.



Note:

It is required to add a DC circuit breaker/ Fuse between the inverter and the battery system.

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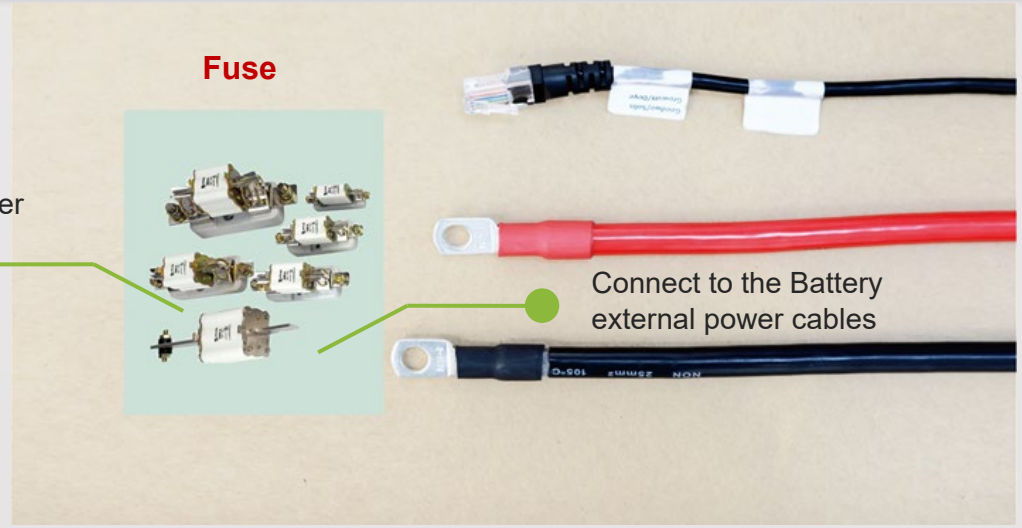
ENERGY STORAGE SYSTEM

Miscellaneous instructions

The following content introduce of B3/B4850 system startup/shut down sequence.

Case 2: Install a Fuse between battery and inverter – Startup sequence

1. Complete the wiring between grid, photovoltaic and inverter.
2. Complete the power cable, communication cable wiring between the battery and the inverter.
3. Turned on the inverter power button.
4. Close the circuit breaker between the inverter and the grid and start the inverter (some inverters cannot be started by AC).
5. Set the DIP switch mode according to the inverter type.
6. Turn on the power switch, then press the SW button for 3s to turn on the B4850/B3 system.



Note:

It is required to add a DC circuit breaker/ Fuse between the inverter and the battery system.

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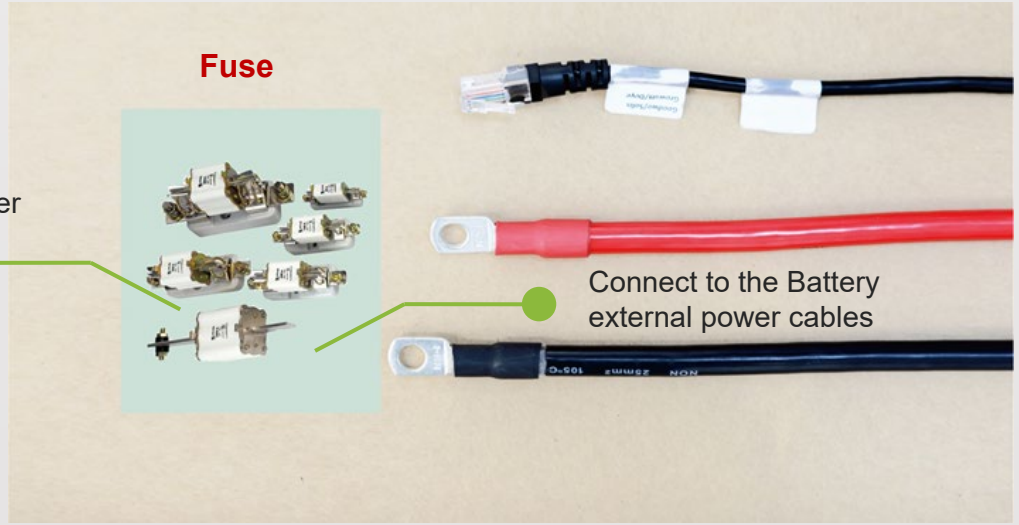
Miscellaneous instructions

The following content introduce of B3/B4850 system startup/shut down sequence.

Case 2: Install a Fuse between battery and inverter – Shut down sequence

1. Press the SW button for 3s, then turn off the power switch to turn off the battery system.
2. Disconnect the circuit breaker between the grid and the inverter.
3. Shut down the inverter.



Note:

It is required to add a DC circuit breaker/ Fuse between the inverter and the battery system.

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Miscellaneous instructions

Battery& Inverter power matching table:

Hybrid Inverter	Off-grid Inverter	B4850			B3			Powerbox	
EPS(backup port) AC Output power	AC Output Power	Min. parallel number	System Energy (KWh)	Max. System Output Power(KW)	Min. parallel number	System Energy (KWh)	Max. System Output Power(KW)	Type	System Energy (KWh)
≤1.2kW		1	2.4	2.4	1	3.6	2.4	Powerbox F-2.5	2.4
≤2.4 kW		2	4.8	4.8	2	7.2	4.8	Powerbox F-5.0	4.8
≤3.6 kW		3	7.2	7.2	3	10.8	7.2	Powerbox F-7.5	7.2
≤4.8 kW		4	9.6	9.6	4	14.4	9.6	Powerbox F-10.0	9.6
≤6.0 kW		5	12	12	5	18	12	Powerbox F-5.0+ Powerbox F-7.5	12
≤7.2 kW		6	14.4	14.4	6	21.6	14.4	2 * Powerbox F-7.5	14.4
≤8.4 kW		7	16.8	16.8	7	25.2	16.8	Powerbox F-7.5+ Powerbox F-10.0	16.8
≤9.6 kW		8	19.2	19.2	8	28.8	19.2	2 * Powerbox F-10.0	19.2
≤14.4 kW		12	28.8	28.8	12	43.2	28.8	3 * Powerbox F-10.0	28.8

Thank you

For your time