Installation Guide

Kratos (B10L)

Rev 1.1_Mar.2017

Content

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 system with a metallic object.

All work on the system and electrical connections must be carried out by qualified personnel only. Kratos 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 Kratos 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.

Ensure reliable grounding. Do not reverse the front panel.

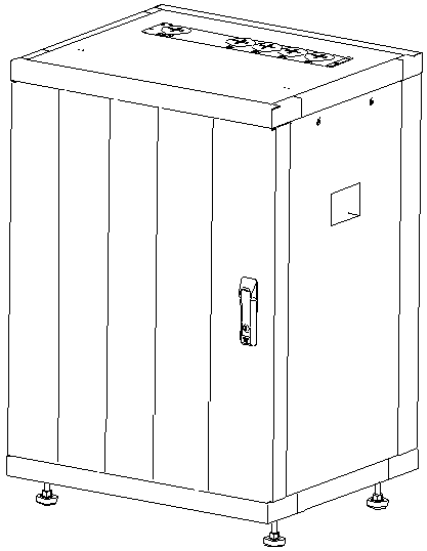
CAUTION:

Due to high weight of Kratos, please use hard package and do safety protection when transport, please also pay attention to the safety to avoid human damage.

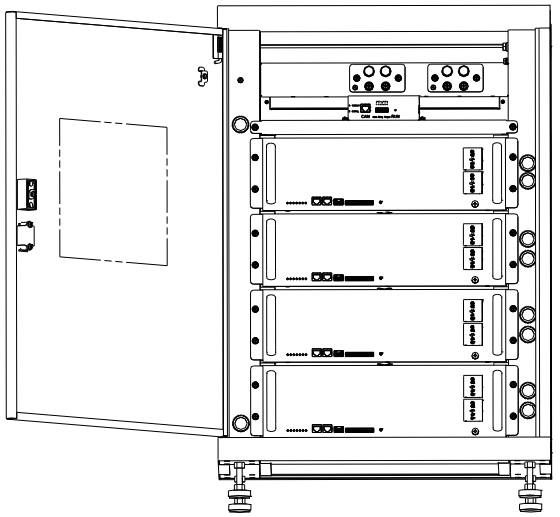
When Increase battery, should power off the battery and other power input first.

1 Product Overview

Kratos as the energy storage parts can be used in off-grid & on-grid energy storage system.

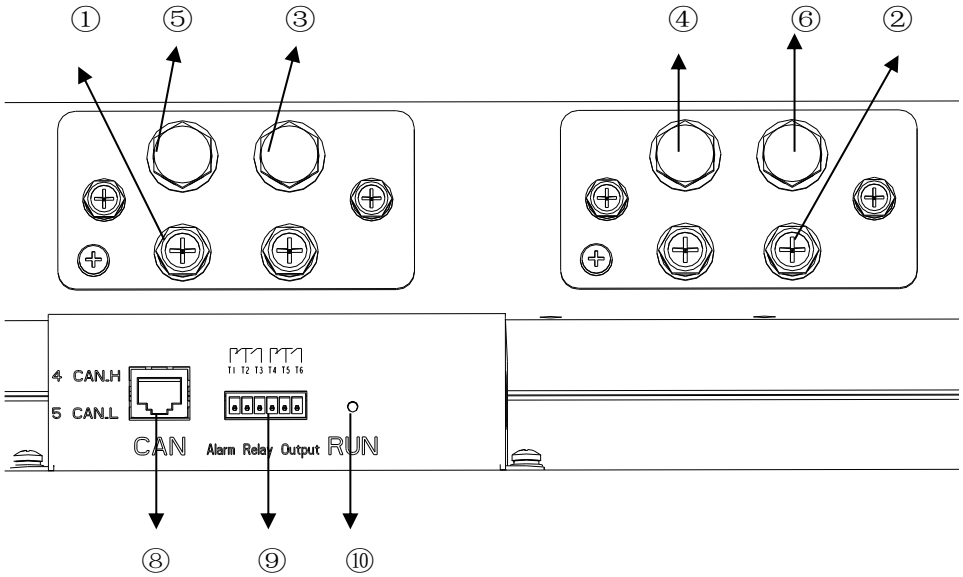


Overview



Internal view

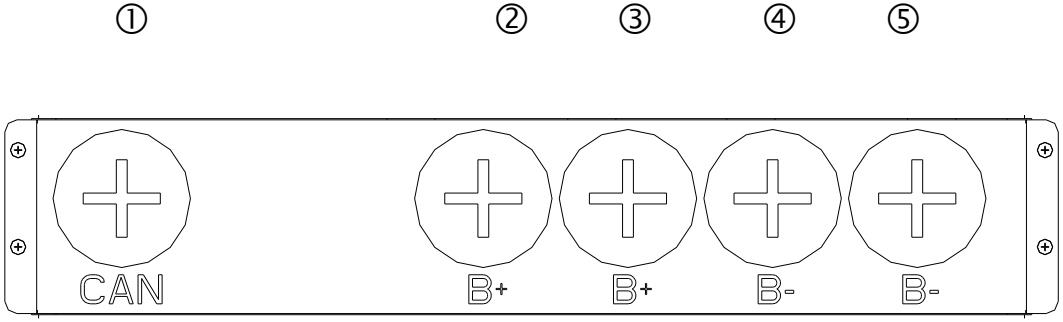
2 Cabinet terminal introduction



Terminal compare list

No.	Interface	Mark	Function
①	B+	/	Connect to battery in cabinet, each terminal can connect 1~2 battery
②	B-	/	Connect to battery in cabinet
③	P+	/	Connect to inverter
④	P-	/	Connect to inverter
⑤	P+	/	Connect to another KRATOS or Combiner box
⑥	P-	/	Connect to another KRATOS or Combiner box
⑦	Grounded		Connect the grounded cable from battery.
⑧	CAN port RS485	CAN	Connect to inverter CAN port. Update and maintenance
⑨	Dry contact		Dry contact application, output alarm info.
⑩	Run led	Run	Indicate the Plus is running status

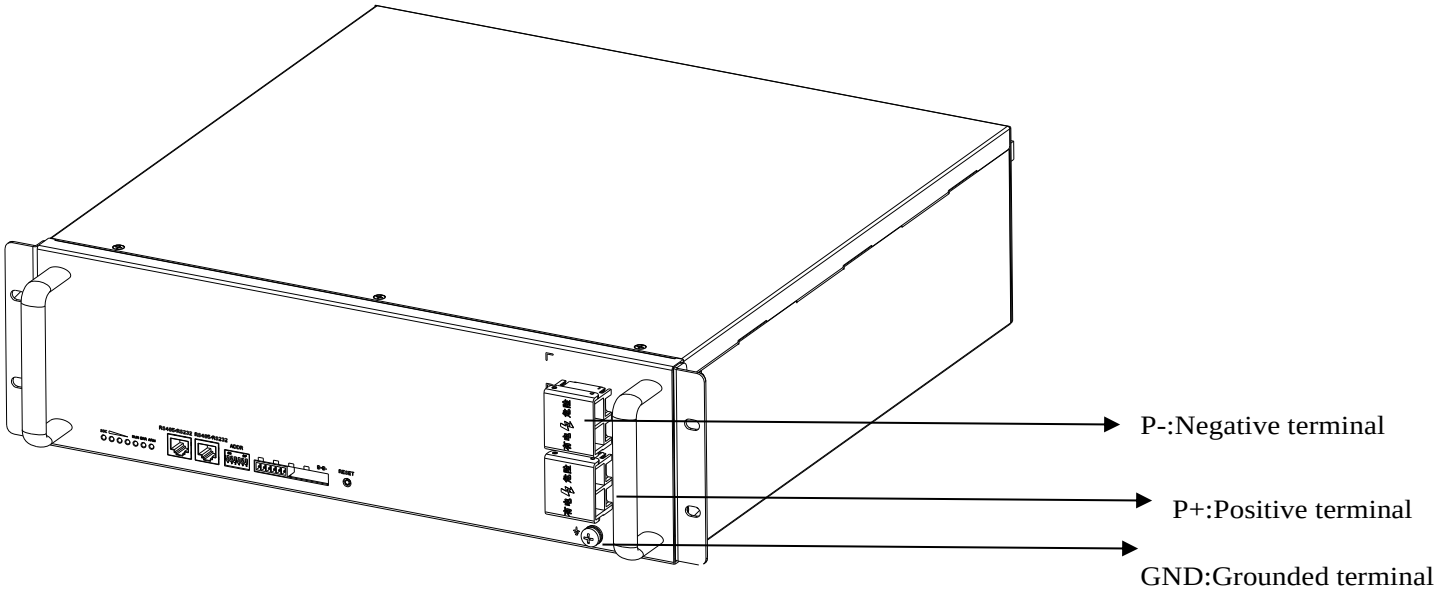
3 Cable outlet of cabinet



Compare list

No.	Interface	Mark	Function
①	CAN	CAN	CAN communication cable
②	B+	B+	Positive cable from another KRATOS
③	B+	B+	Positive cable from inverter
④	B-	B-	Negative cable from inverter
⑤	B-	B-	Negative cable from another KRATOS

4 B10L2.5M interface and terminal introduction



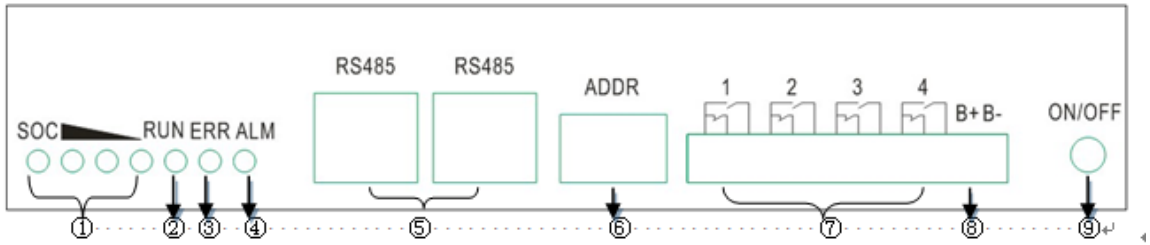


Table 1 Display and communicate interface

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

5.1Installation 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.

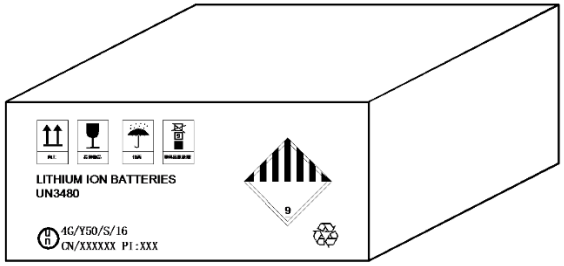
c) Batteries with different capacity, different P/N or different manufactures are not allowed for connection.

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

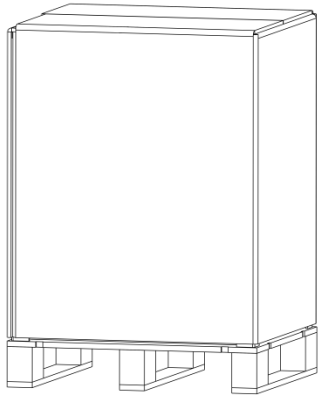
e) The mounting floor should be horizontal.

5.2 Package 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	\



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	

5.3Configuration list

Type	B10L2.5	B10L5.0	B10L7.5	B10L10.0
KRATOS cabinet	1	1	1	1
B10L2.5M	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

Knife

5.5 Personal protective equipment

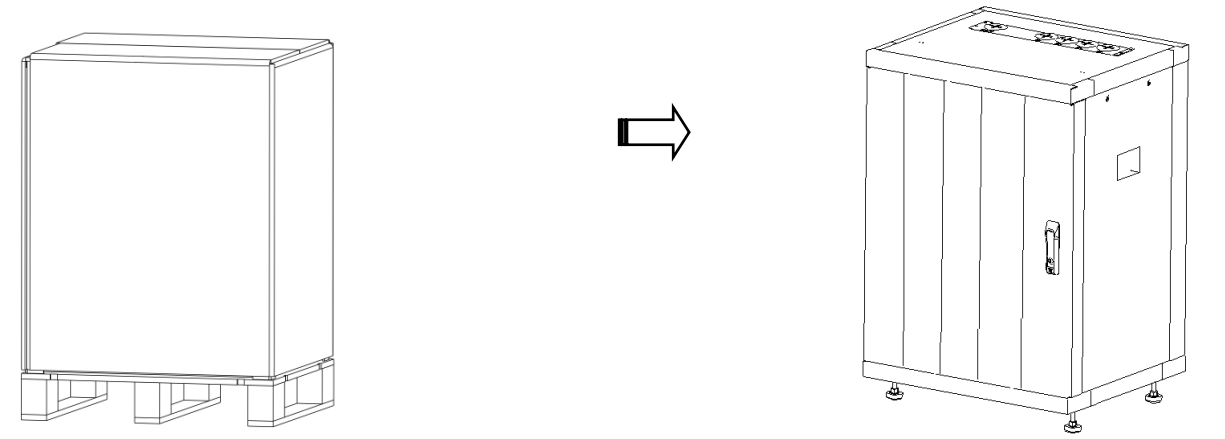
Insulated gloves

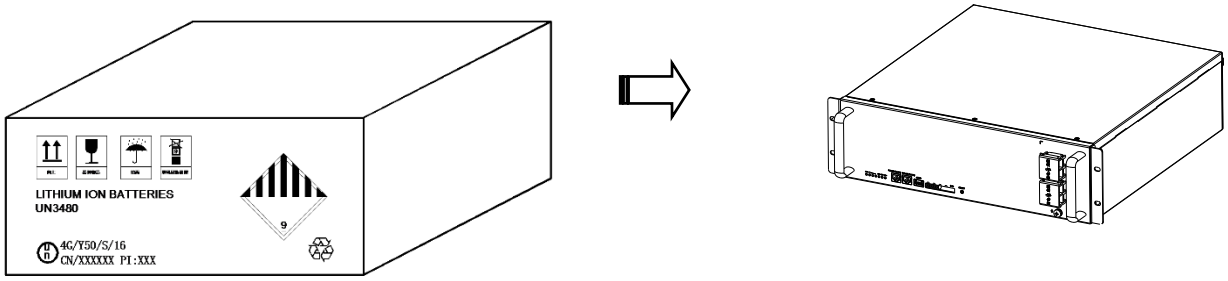
Safety shoes

6Installation

6.1Open the package

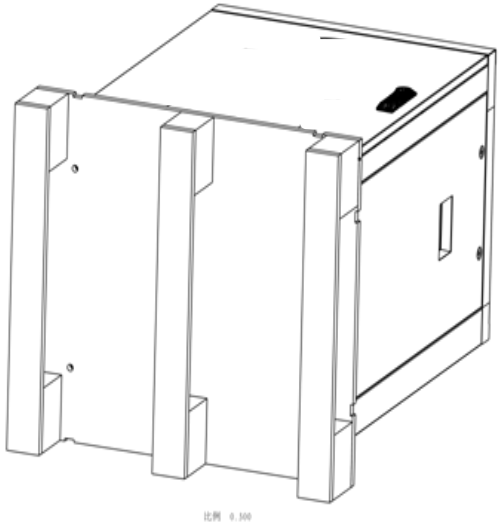
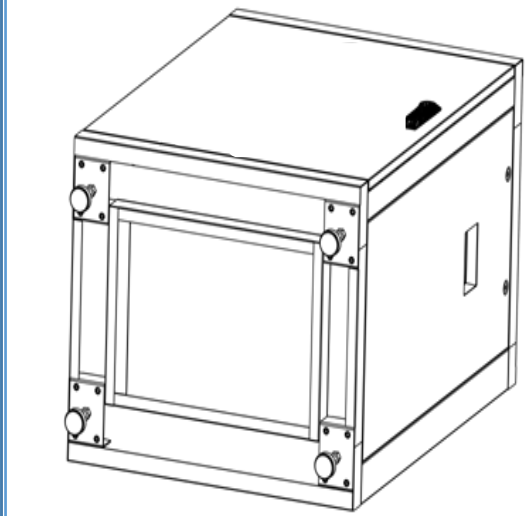
Tools: Knife





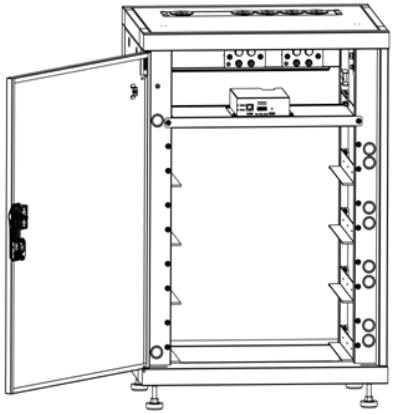
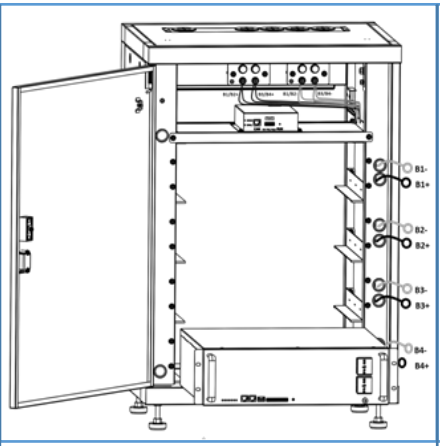
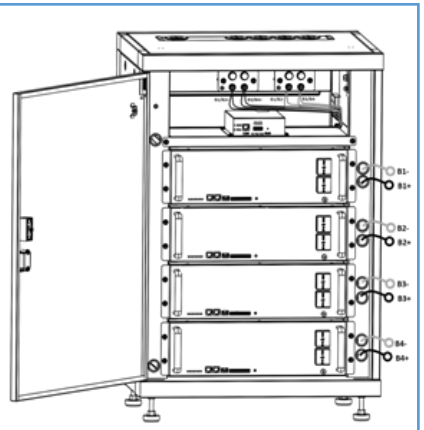
6.2Disassemble the pallet& Anchor bolt installation

Tools: AdjustableSpanner Fixed torque: 10±1Nm

	
Lay down the cabinet, in order to prevent scratches	Take away the pallet and four screws which installed on the root of the pallet.Install the 4pcs anchor bolt into the four hole in bottom of cabinet.

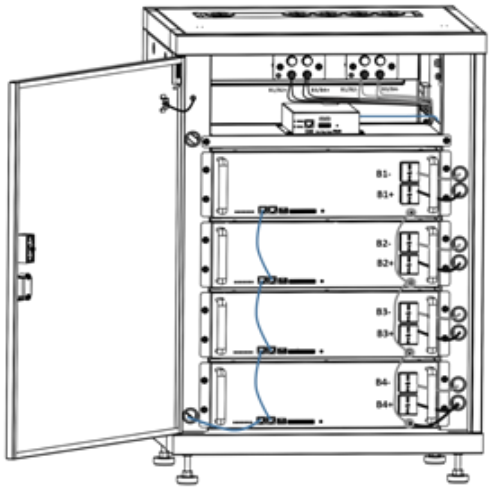
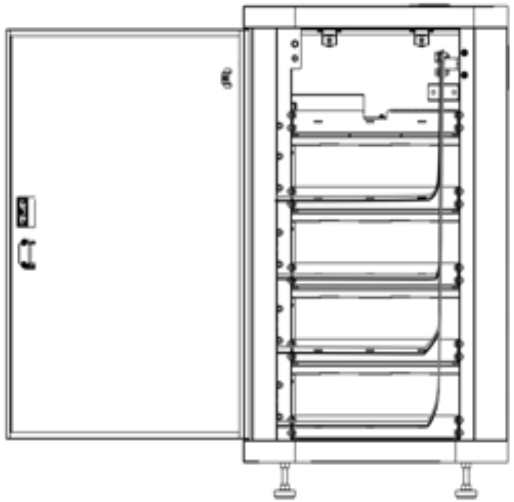
6.3Battery installation

Tools: Cross screwdriver

		
Move the cabinet to the installation place, prepare to install battery	push the battery into battery storey from the bottom,one cabinet can install maximum 4pcs batteries	Finish battery installation

6.4Connect cables

Tools: Cross screwdriver

	
Install the cables	Tie the cable hard, and make the cables pass the hole beside battery

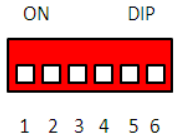
7Battery address set up

7.1“ADDR” switch introduction

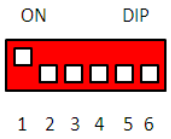
Function: Communicate between battery and BMU, BMU will communication with external equipment when using CAN communication.

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”.

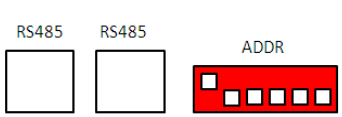


Address: 000000

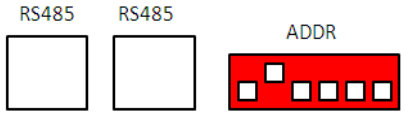


Address:100000

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.

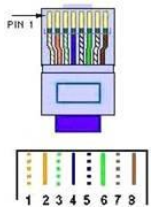
Notice: Make sure of the highest address of B10L2.5M connect to BMU.

7.2 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

8Connect to inverter

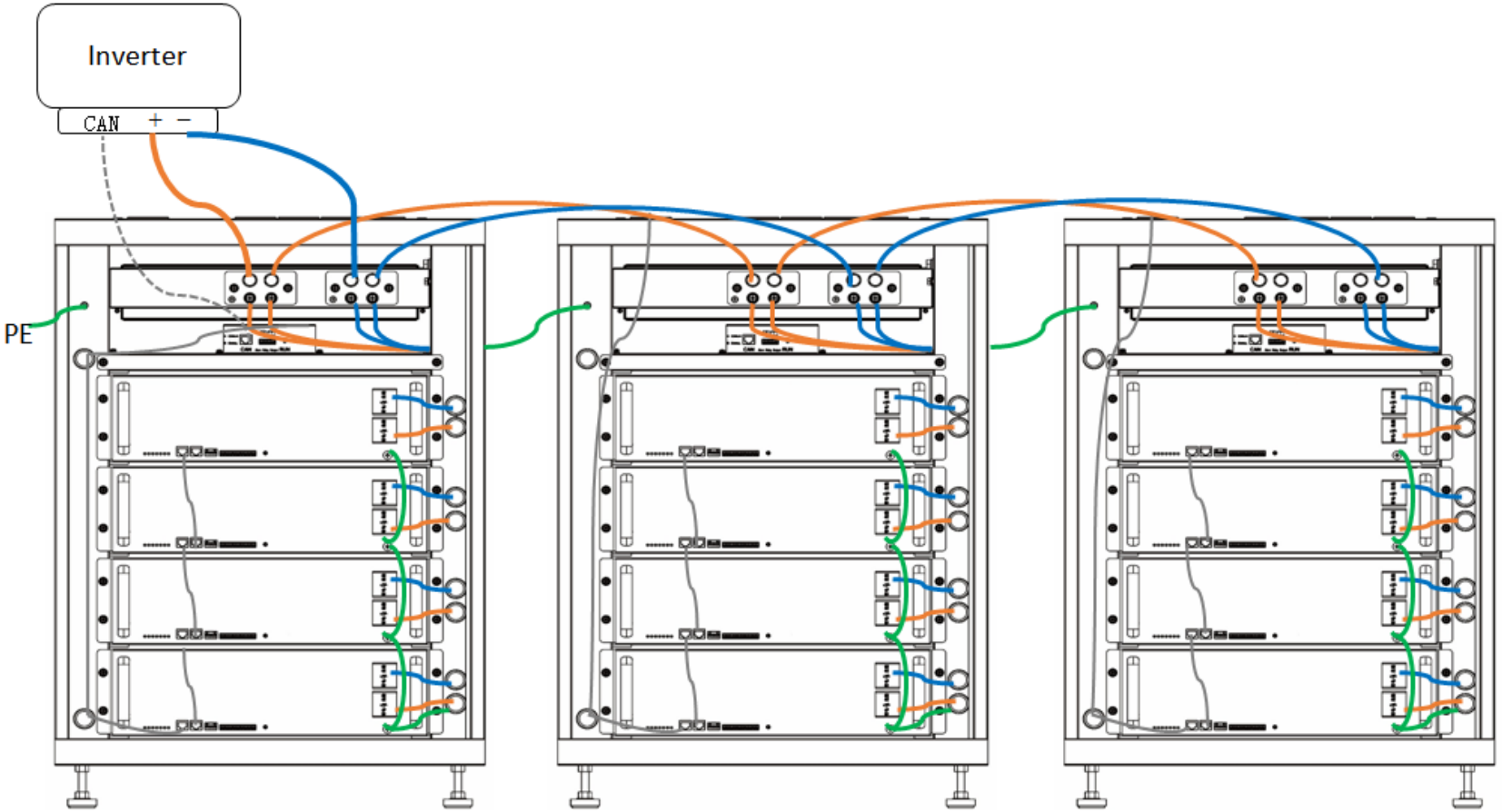
8.1 CAN cable connection



RJ45 PIN define

	KRATOS	SMA	Zeus Appollo	SOLAX	VICTRON
CAN H	4	4	4	1	7
CAN L	5	5	5	2	8

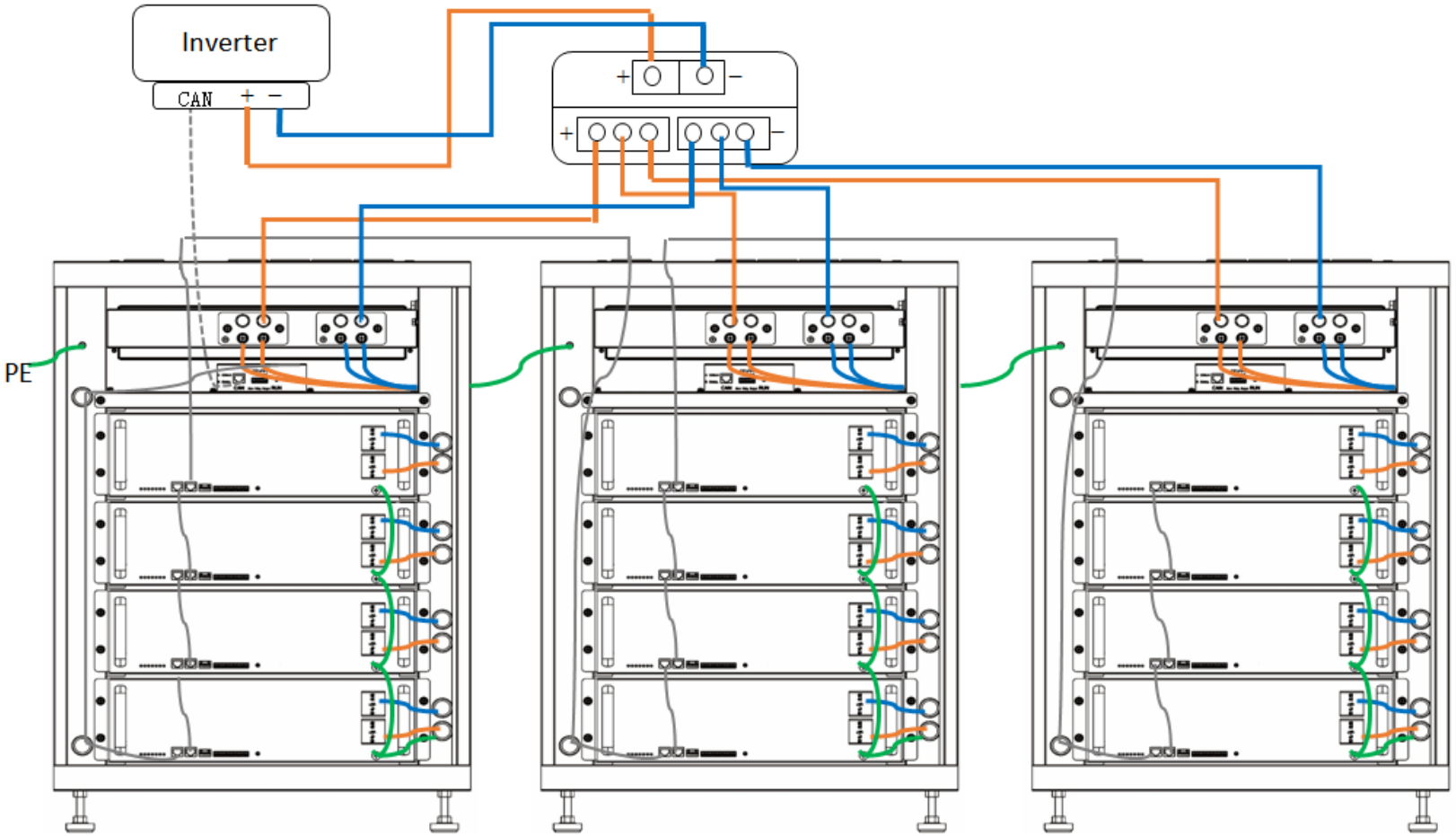
When installer do “CAN” ports connections between KRATOS and inverter, please refer to below drawing.



8.2 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.



9Start 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.

9.1 System activity procedures when KRATOS connect to SMA Sunny Island

⑴ Start KRATOS

Active all of the B10L2.5M;

Tips: Press "ON/OFF" button one second can start B10L2.5M, 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 B10L2.5M 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)

⑵Switching 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.

⑶Start the 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.

⑷Set 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 B10L10 parameter settings

⑸System running.

9.2 System activity procedures when KRATOS connect to Zeus Appollo inverter

⑴Download the Z21 Manager APP on user's cell phone and open the home page;

⑵Start KRATOS;

Press the "ON/OFF" button on front panel of B10L2.5M;

Tips: Press one second can start B10L2.5M;

Once start, the LED lights of B10L2.5M 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 inorder 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)

⑶Go to the home page of APP, enter into the Battery Setting page, select correct 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 " B10L10"

⑷System running.

9.3System activity procedures when KRATOS connect to Victron inverter

⑴Inverter start;

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

⑶Start KRATOS;

Press the "ON/OFF" button on front panel of B10L2.5M;

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 B10L2.5M 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 inorder 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)

⑷System running.

9.4 System activity procedures when KRATOS connect to SolaX inverter

⑴Start KRATOS;

Press the “ON/OFF” button on front panel of B10L2.5M;

Tips: Press one second can start B10L2.5M;

Once start, the LED lights of B10L2.5M 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 inorder 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)

(2)Inverter activity;

(3)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.

(4)System running;

10Stop system

Notice:

1. Before stop the system,. System shutdown in the following order：
   AC Load=>PV=>Inverter=>Battery
2. 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:One phase parameter setting

Parameter setup for B10L2.5

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 B10L 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 B10L 7.5	
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 B10L10.0

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 B10L2.5~ B10L10.0 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%

Appendix 2: Three phase parameter setting

Parameter setup for B10L7.5

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	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 B10L10.0

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

Parameter setup for B10L2.5~ B10L10.0 in off-grid

Product	Min capacity
B10L2.5	20%
B10L5.0	15%
B10L7.5	15%
B10L10.0	10%