KSTAR BluePulse Gen2 C&I ESS Solution Installation and Commissioning Guide

Applicable to:

PCS: KAC20/25/29.9/30/40/49.9/50DP2

ESS Cabinet: BC70/89/107DE2, BC197/215DE2

Draft Version 1.2 11 Aug 2025

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Before transporting, storing, installing, using, and/or maintaining the equipment, read this manual, adhere strictly to its prescriptions, and pay attention to the labels on the equipment.
In this manual,

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- “You” or “your” refers to an individual or a legal entity transporting, storing, installing, using, and/or maintaining the equipment.

5 About This Document

This document describes the system architecture, communication logic, and operation of the commercial and industrial (C&I) solar - energy storage solution,

as well as the installation, cable connection, check and preparation before power-on, system power-on commissioning, power-off, and power-on operations.
The safety precautions, product introduction, site selection requirements, and maintenance information of the devices involved in the solution are described in the user manuals of the corresponding devices.
This document is intended for:

- Technical support engineers
- Hardware installation engineers
- Commissioning engineers

The “KAC50DP2” mentioned in this document represents the entire 20KW-50KW product series.
The “BC107DE2” mentioned in this document represents the entire 70/89/107KWH product series.
The “BC197DE2” mentioned in this document represents the 197/215KWH product series.

6 System Introduction

The Industrial and Commercial Energy Storage System (ESS), embodied in the KSTAR BluePulse PV+ESS All-in-One system, acts as a versatile multiple energy source gateway. It efficiently manages power from utility mains, solar photovoltaics (PV), and diesel generators (DG) to meet diverse commercial and industrial needs.

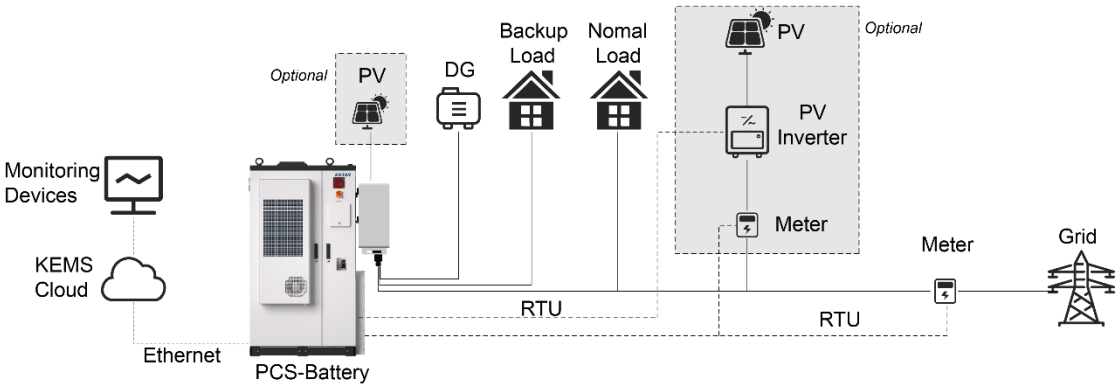


Figure 6-1 System Diagram of the KSTAR BluePulse PV+ESS All-in-One Energy Storage System, illustrating connections between PV, DG, grid, loads, and monitoring components.

Notice:

- Only the Kstar string inverter can communicate with the EMS
- Only the Kstar string inverter can be connected on the PCS backup output and the total string inverter capacity is not more than the total parallel PCS capacity
- Otherwise the PV inverter shall be installed on the grid side.

6.1 System Overview

Power Sources: Optional PV systems and diesel generators provide renewable and backup energy, complementing the grid.
Loads: Supports normal and backup loads, including commercial warehouses, industrial facilities, and office complexes, ensuring uninterrupted power.
Grid Integration: A meter connects to the grid via the RTU protocol for energy exchange and monitoring.
Optional PV Inverter: Enhances solar energy utilization.
Monitoring: The KEMS cloud platform, via Internet/4G/Wi-Fi, enables real-time management.

6.2 Key Features

Energy Management: Supports grid-connected modes like self-consumption,

time-of-use, and peak shaving for optimized efficiency.

Off-Grid Operation: Offers PV-Battery or PV-Battery-DG modes for reliable power in off-grid scenarios.

Backup Capability: Switches to backup mode in under 10ms during outages.

Scalability: Expands with optional PV and DG, supporting up to 6 off-grid and 20 on-grid parallel units.

Safety: Features fire safety with alarms, valves, and smoke/CO sensors, is UL 9540A certified, and provides a long-lasting battery life.

This PV+ESS is ideal for self-consumption, time-of-use (TOU), peak shaving, emergency backup, and VPP participation, forming a robust foundation for modern energy infrastructure.

7 Installing the ESS Cabinet and Its Grounding Cable

Please refers to the document “User Manual for Industrial and Commercial Battery Cabinet, BC107DE2”. Or “User Manual for Industrial and Commercial Battery Cabinet, BC197DE2”

Notices:

When there are multiple PCSs connected on the backup output,

- The length of AC power cables between PCS grid output and upstream AC distribution box must be the same.
- The length of AC power cables between PCS backup output and downstream AC distribution box must be the same.
- The Syn Communication Cables length is 7.5m. Please design the ESS cabinet layout accordingly.

8 Installing the PCS

Please refers to the document “KAC50DP2 Series Commercial and Industrial Power Conversion System User Manual”.

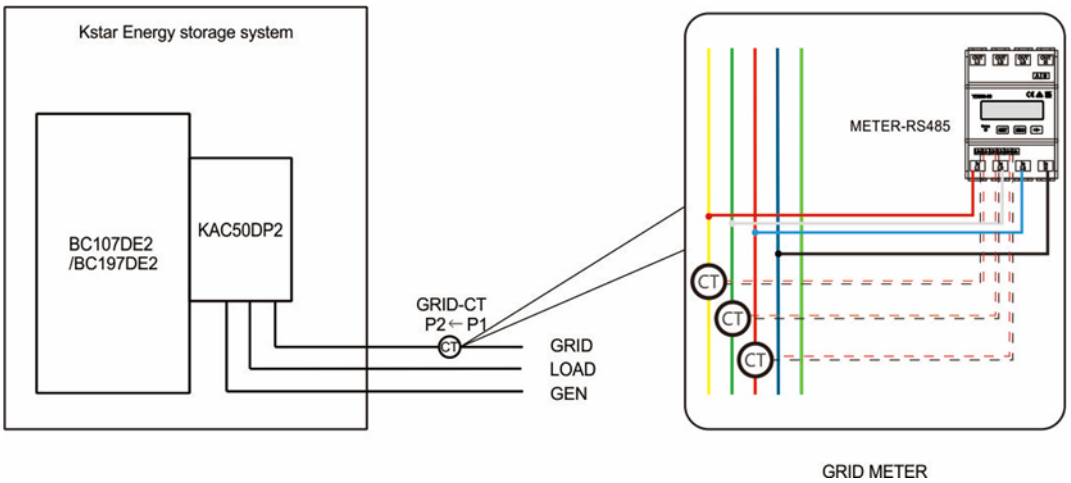
Notices:

When there are multiple PCSs connected on the backup output,

- The length of AC power cables between PCS grid output and upstream AC distribution box must be the same.
- The length of AC power cables between PCS backup output and downstream AC distribution box must be the same.
- The Syn Communication Cables length is 7.5m. Please design the PCSs layout accordingly.

9 Installing the Meter

9.1 Installing the Meter on the Grid Connecting Point

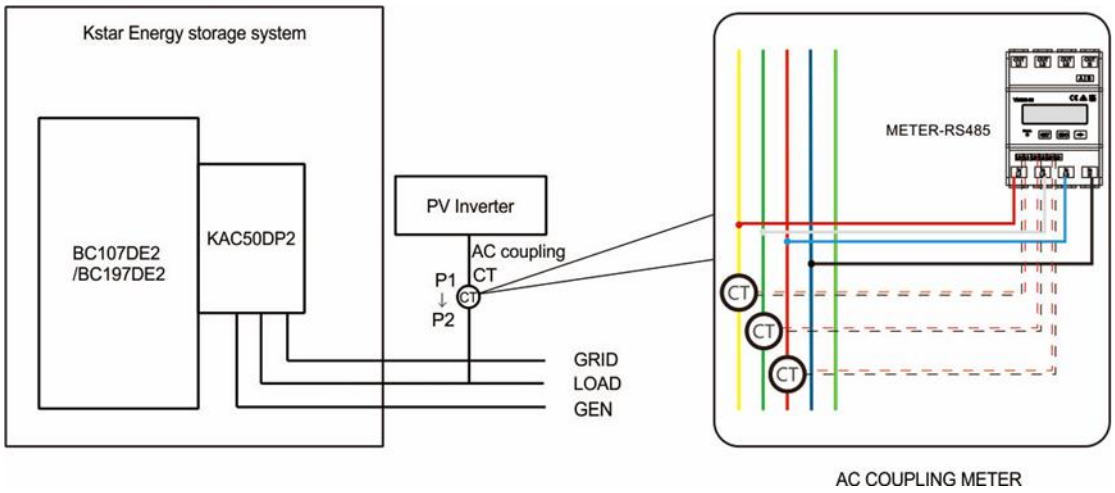


Notice:

- Before installing the meter, the AC cable from PCS grid output to grid connecting point shall be installed.
- CT must direct from Grid to PCS
- The RS485 address of grid meter must be set as “1”
- Set the CT current rate on the meter
- The above setting refers to the meter manual

9.2 Installing the Meter on the AC Coupling Inverter (If Applicable)

When there’s AC coupling PV inverter connected on the system, a meter must be installed on the output of PV inverters.
Otherwise, the power calculation of PV production and load is not correct.



AC COUPLING METER

Notice:

- Before installing the meter, the AC cable from PV inverter output to grid connecting point shall be installed.
- CT must direct from PV Inverter to PCS(Grid)
- The RS485 address of PV inverter meter must be set as “5”
- Set the CT current rate on the meter
- The above setting refers to the meter manual

10 Installing the EMS01D

Please refers to the document “User Manual for EMS01D”

Notice:
The EMS01D power supply shall be connected to the backup output of PCS if there is an on/off grid system.

11 Installing Cables

Installers can refer the following sections about installation cables according to the different system which is installed.

Case1: 1 KAC50DP2 and 1 BC107DE2

Case2: 1 KAC50DP2 and 2 BC107DE2

Case3: 1 KAC50DP2 and 1 BC197DE2

Case4: 1 KAC50DP2 and 2 BC197DE2

Case5: 2 KAC50DP2 and 1 BC197DE2

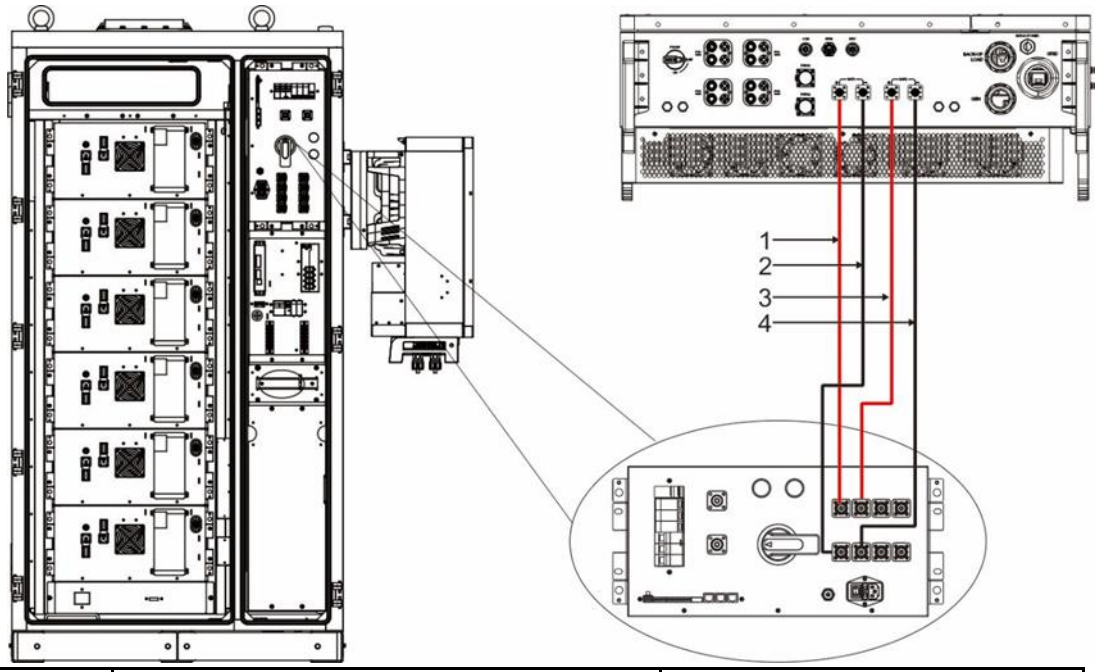
System Sections	Case 1	Case 2	Case 3	Case 4	Case 5
11.1.1	Y				
11.1.2		Y			
11.1.3			Y		
11.1.4				Y	
11.1.5					Y
11.2.1	Y	Y			
11.2.2			Y	Y	
11.2.3					Y
11.3.1	Y				
11.3.2		Y			
11.3.3			Y		
11.3.4				Y	
11.3.5					Y
11.4.1	Y	Y	Y	Y	Y
11.4.2	Y (if backup function is used)				
11.4.3	Y (if genset is connected)				
11.5	Y (if PV panels are connected)				
11.6.1	Y (if NO EMS01D is installed)				
11.6.2	Y (if EMS01D is installed)				
11.7.1		Y			
11.7.2				Y	
11.8.1	Y (if multiple unit systems are parallel)				
11.8.2	Y (if multiple unit systems are backup parallel)				
11.9	Y	Y	Y	Y	Y
11.10	Y (if genset is connected)				
11.11.1	Y (if Kstar PV inverter is connected in a system without EMS01D)				
11.11.2	Y (if Kstar PV inverter is connected in a system with EMS01D)				
11.12	Y	Y	Y	Y	Y

Cables Preparation

ITEMS	Max Current	Proposed Diameter(㎟)	Proposed diameter (AWG)	Connector	Provided by
PV	DC 24A	4~6 ㎟	9~11AWG	/	installer
Battery DC cable	DC 80A	20~35 ㎟	2~4AWG	/	Kstar
GRID	AC 160A	≥34 ㎟	≥2AWG	M8	installer
LOAD	AC110A	20~35 ㎟	2~4AWG	M6	installer
GEN 口	AC 110A	20~35 ㎟	2~4AWG	M6	installer
AC AUX power	AC 12A	/	/	M4	Kstar
PCS parallel communication	/	/	/	/	Kstar
PCS RS485	/	/	/	/	Kstar
Grounding	/	10~16 ㎟	5~7AWG	M6	installer

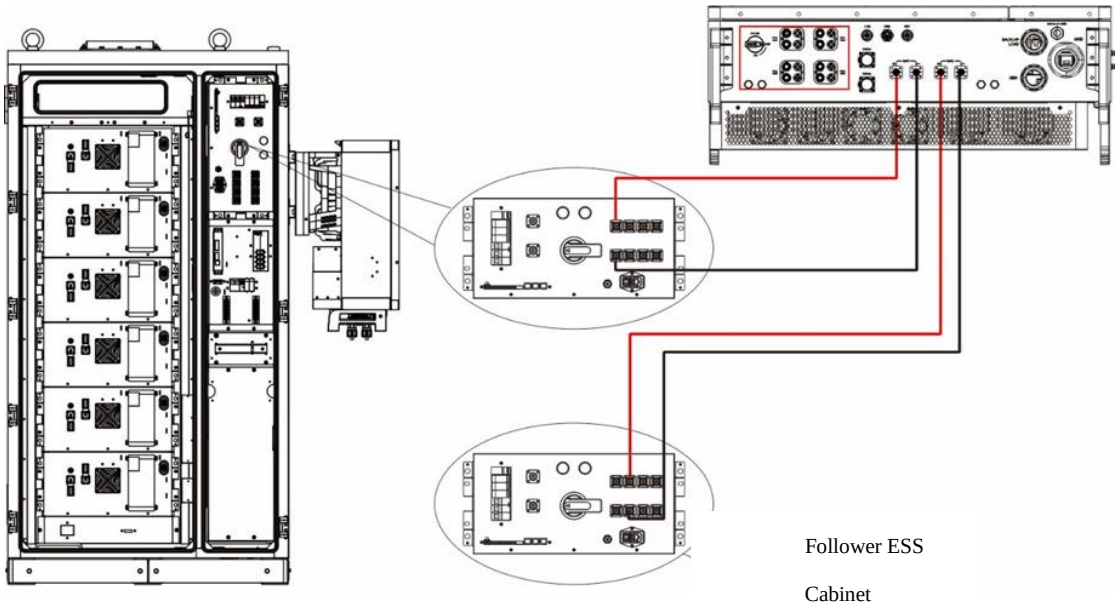
11.1 Installing DC Cables between PCS and ESS Cabinet

11.1.1 Case1 – 1 KAC50DP2 and 1 BC107DE2



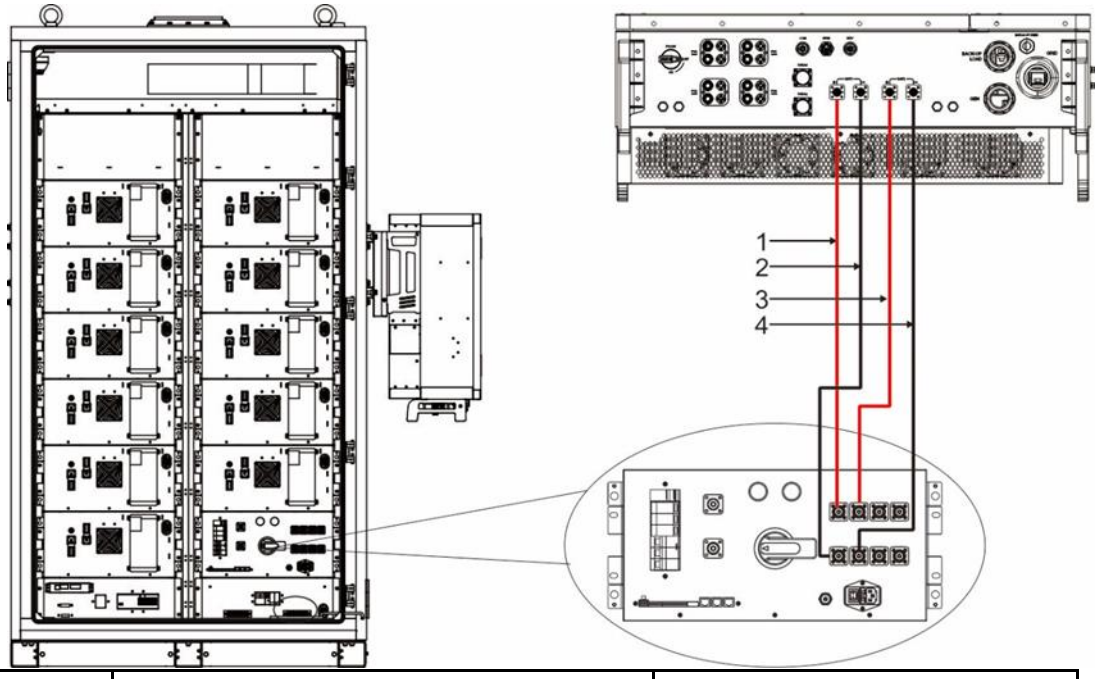
NO	FROM		TO	
1	KAC50DP2	BAT1+	BC107DE2	P+
2	KAC50DP2	BAT1-	BC107DE2	P-
3	KAC50DP2	BAT2+	BC107DE2	P+
4	KAC50DP2	BAT2-	BC107DE2	P-

11.1.2 Case2 – 1KAC50DP2 and 2 BC107DE2



NO.	FROM		TO	
1	KAC50DP2	BAT1+	Leader BC107DE2	P+
2	KAC50DP2	BAT1-	Leader BC107DE2	P-
3	KAC50DP2	BAT2+	Follower BC107DE2	P+
4	KAC50DP2	BAT2-	Follower BC107DE2	P-

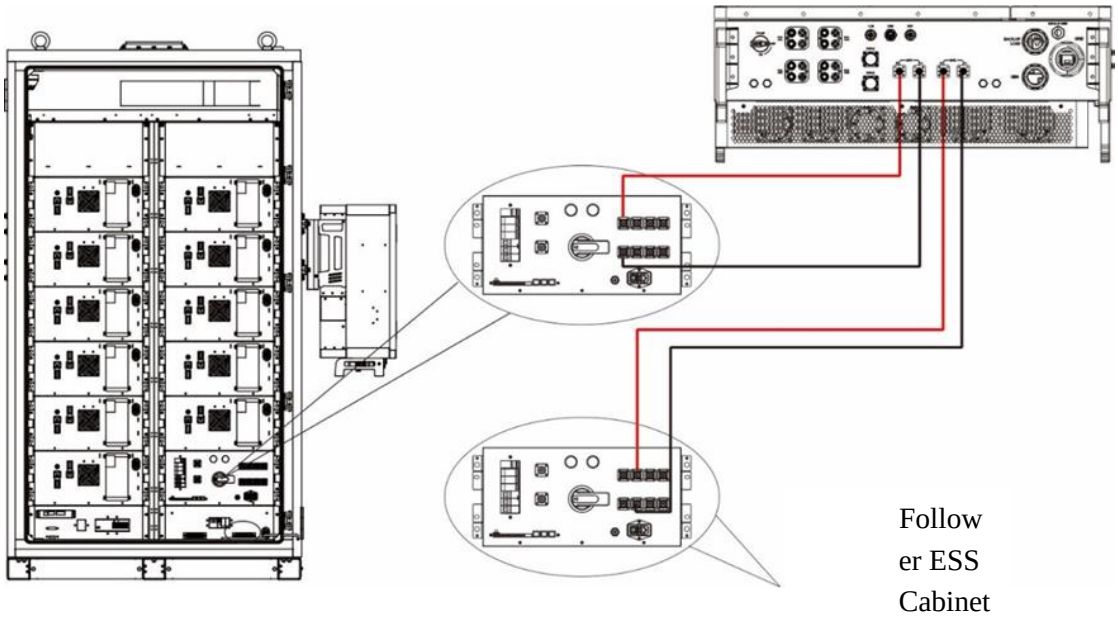
11.1.3 Case3 - 1 KAC50DP2 and 1 BC197DE2



NO	FROM		TO	
1	KAC50DP2	BAT1+	BC197DE2	P+

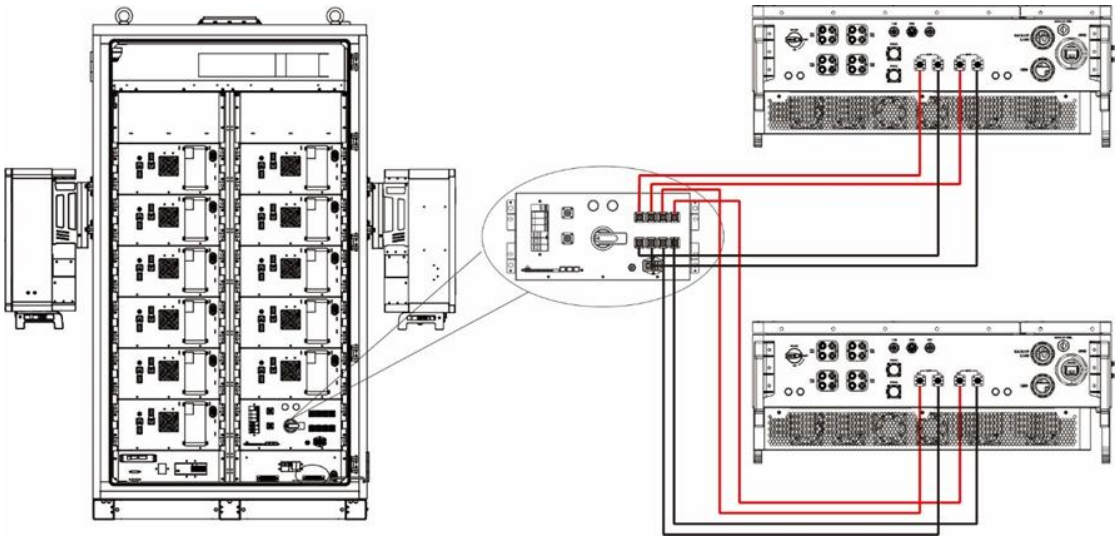
2	KAC50DP2	BAT1-	BC197DE2	P-
3	KAC50DP2	BAT2+	BC197DE2	P+
4	KAC50DP2	BAT2-	BC197DE2	P-

11.1.4 Case4 - 1 KAC50DP2 and 2 BC197DE2



NO	FROM		TO	
1	KAC50DP2	BAT1+	Leader BC197DE2	P+
2	KAC50DP2	BAT1-	Leader BC197DE2	P-
3	KAC50DP2	BAT2+	Follower BC197DE2	P+
4	KAC50DP2	BAT2-	Follower BC197DE2	P-

11.1.5 Case5 - 2 KAC50DP2 and 1 BC197DE2

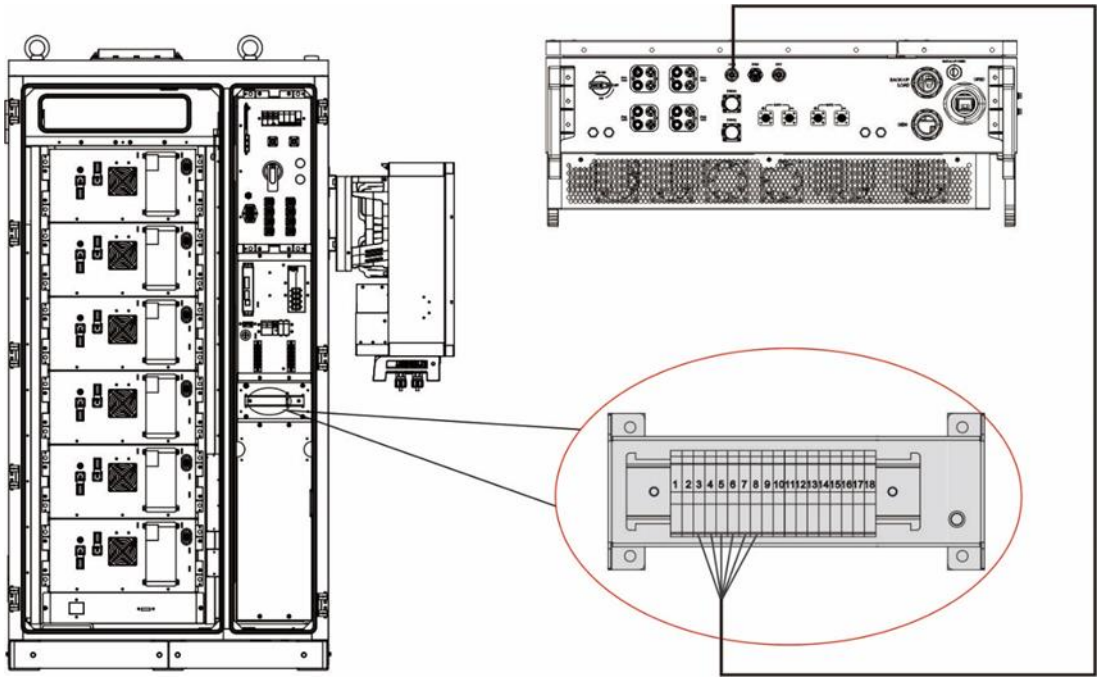


NO	FROM		TO	
1	1#KAC50DP2	BAT1+	BC197DE2	P+
2	1#KAC50DP2	BAT1-	BC197DE2	P-
3	1#KAC50DP2	BAT2+	BC197DE2	P+
4	1#KAC50DP2	BAT2-	BC197DE2	P-
5	2#KAC50DP2	BAT1+	BC197DE2	P+
6	2#KAC50DP2	BAT1-	BC197DE2	P-
7	2#KAC50DP2	BAT2+	BC197DE2	P+
8	2#KAC50DP2	BAT2-	BC197DE2	P-

11.2 Installing Communication Cables between PCS and ESS Cabinet

11.2.1 Installing Communication Cables between PCS and BC107DE2 ESS Cabinet

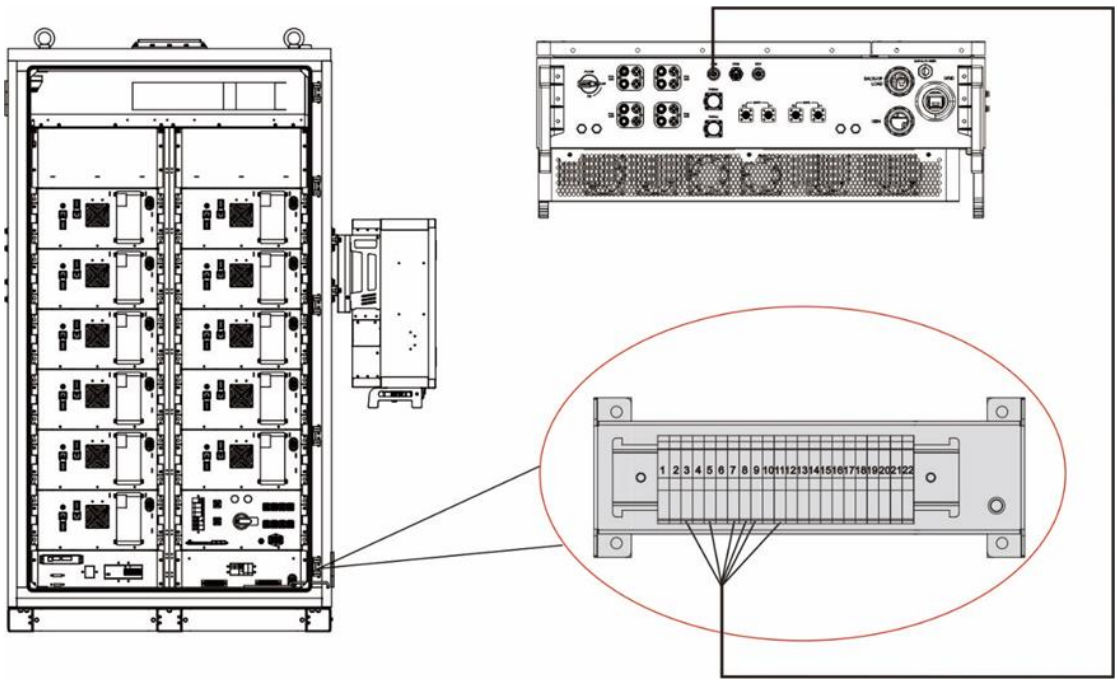
When there are 2 ESS cabinets connected with 1 PCS, only the leader ESS cabinet communicates with the PCS.



FROM		TO-BC107DE2- TERMINAL BLOCK		
KAC50DP2	COM	GREEN	BMS_CAN_H	Pin3
		YELLOW	BMS_CAN_L	Pin4
		RED	EMS_CAN_H	Pin5
		ORANGE	EMS_CAN_L	Pin6
		BLACK	485A	Pin7
		BROWN	485B	Pin8

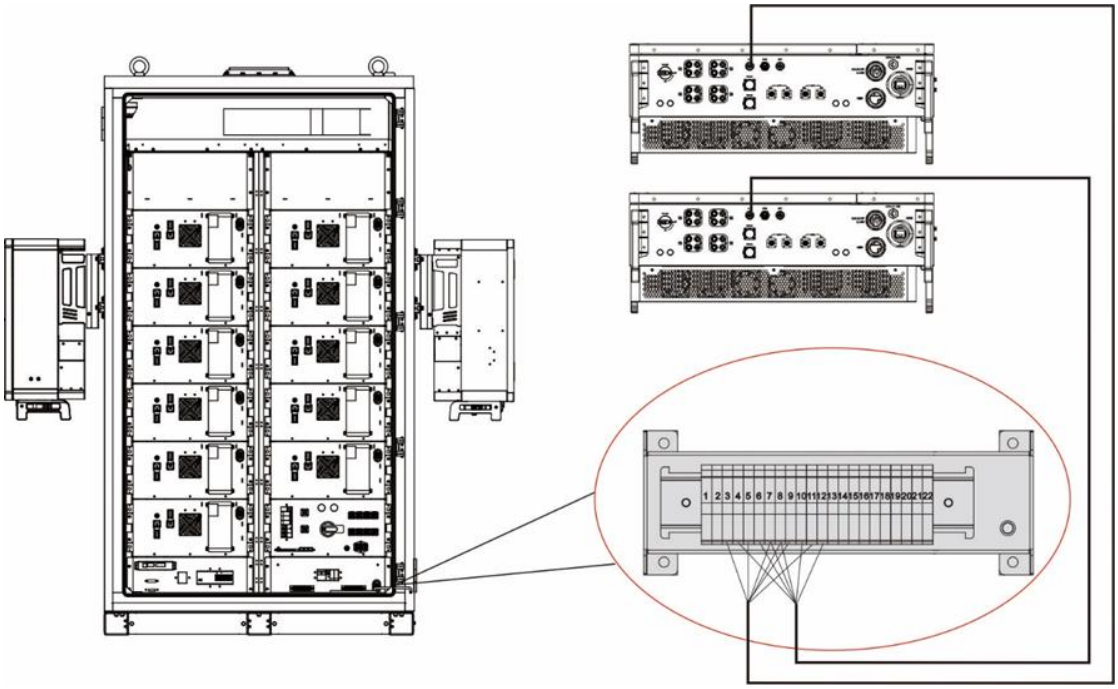
11.2.2 Installing Communication Cables between PCS and BC197DE2 ESS Cabinet

When there are 2 ESS cabinets connected with 1 PCS, only the leader ESS cabinet communicates with the PCS.



FROM		TO-BC197DE2- TERMINAL BLOCK		
KAC50DP2	COM	GREEN	BMS_CAN_H	Pin3
		YELLOW	BMS_CAN_L	Pin5
		RED	EMS_CAN_H	Pin7
		ORANGE	EMS_CAN_L	Pin8
		BLACK	485A	Pin9
		BROWN	485B	Pin11

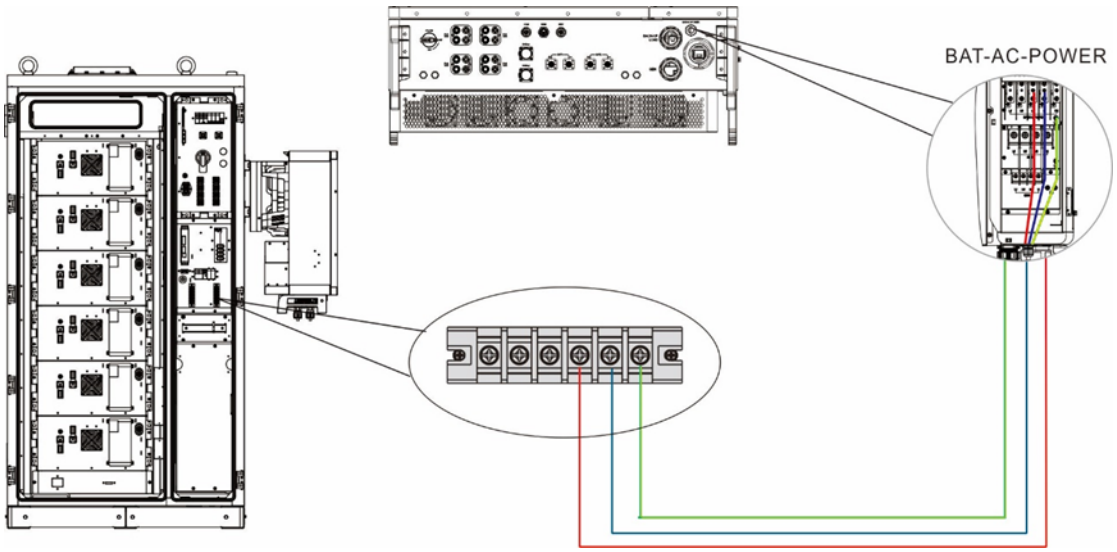
11.2.3 Installing Communication Cables between Two KAC50DP2 and One BC197DE2 ESS Cabinet



FROM		TO-BC197DE2- TERMINAL BLOCK		
1#KAC50DP2	COM	GREEN	BMS_CAN_H	Pin3
		YELLOW	BMS_CAN_L	Pin5
		RED	EMS_CAN_H	Pin7
		ORANGE	EMS_CAN_L	Pin8
		BLACK	485A	Pin9
		BROWN	485B	Pin11
2#KAC50DP2	COM	GREEN	BMS_CAN_H	Pin4
		YELLOW	BMS_CAN_L	Pin6
		RED	EMS_CAN_H	Pin7
		ORANGE	EMS_CAN_L	Pin8
		BLACK	485A	Pin10
		BROWN	485B	Pin12

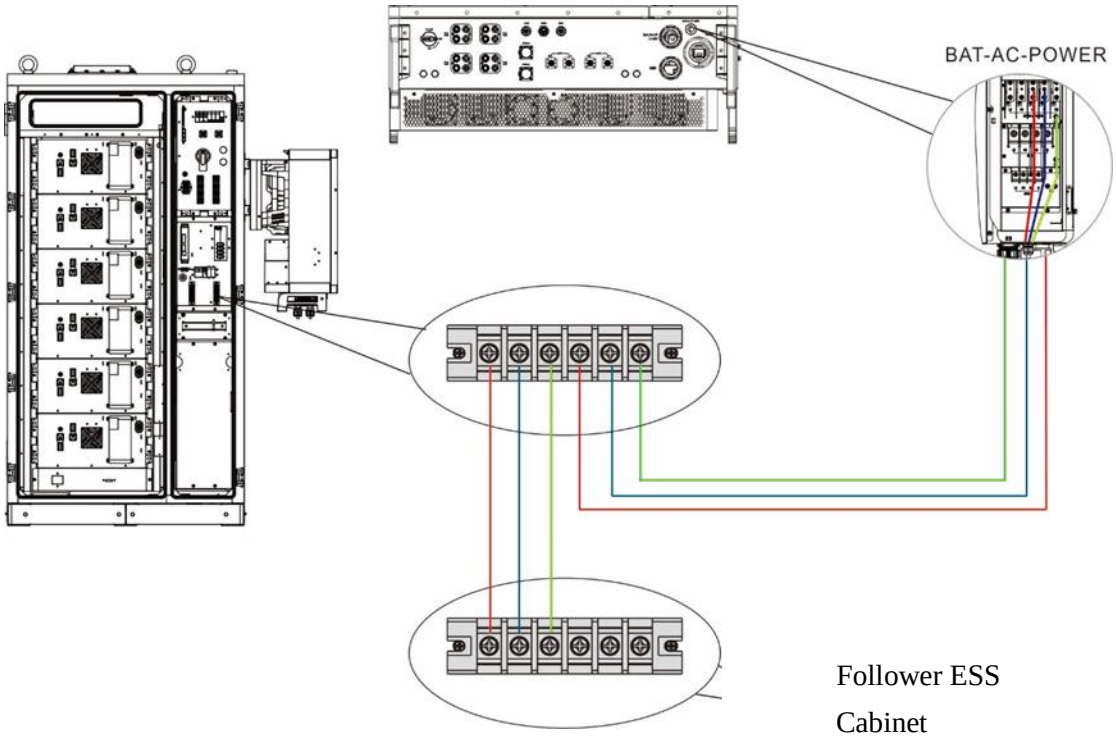
11.3 Installing AC Auxiliary Power Cables of ESS Cabinet

11.3.1 Case1 – 1 KAC50DP2 and 1 BC107DE2

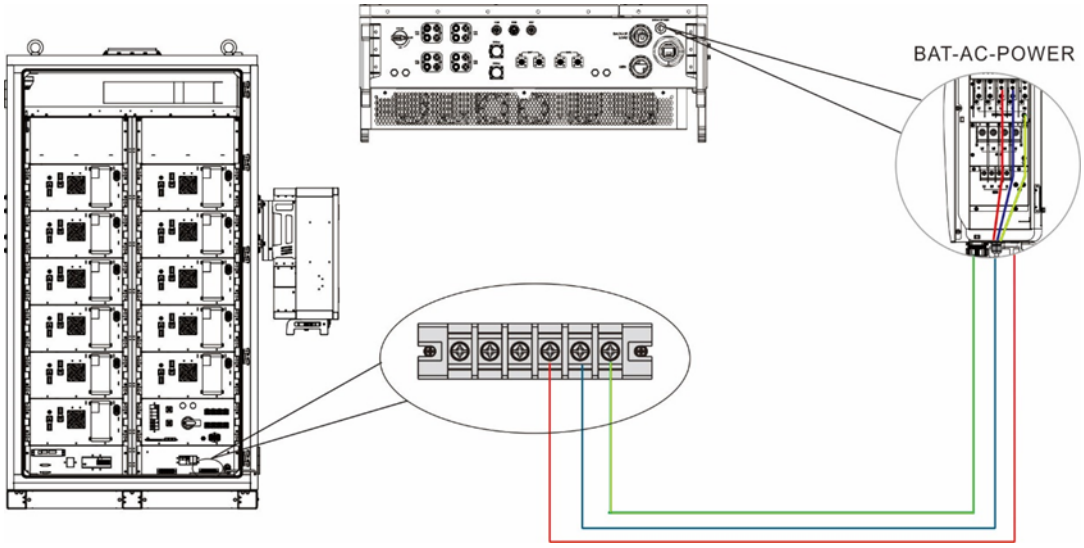


FROM			TO		
KAC50DP2	LOAD Output	L3/N/GND	BC107DE2	INPUT	L /N/PE

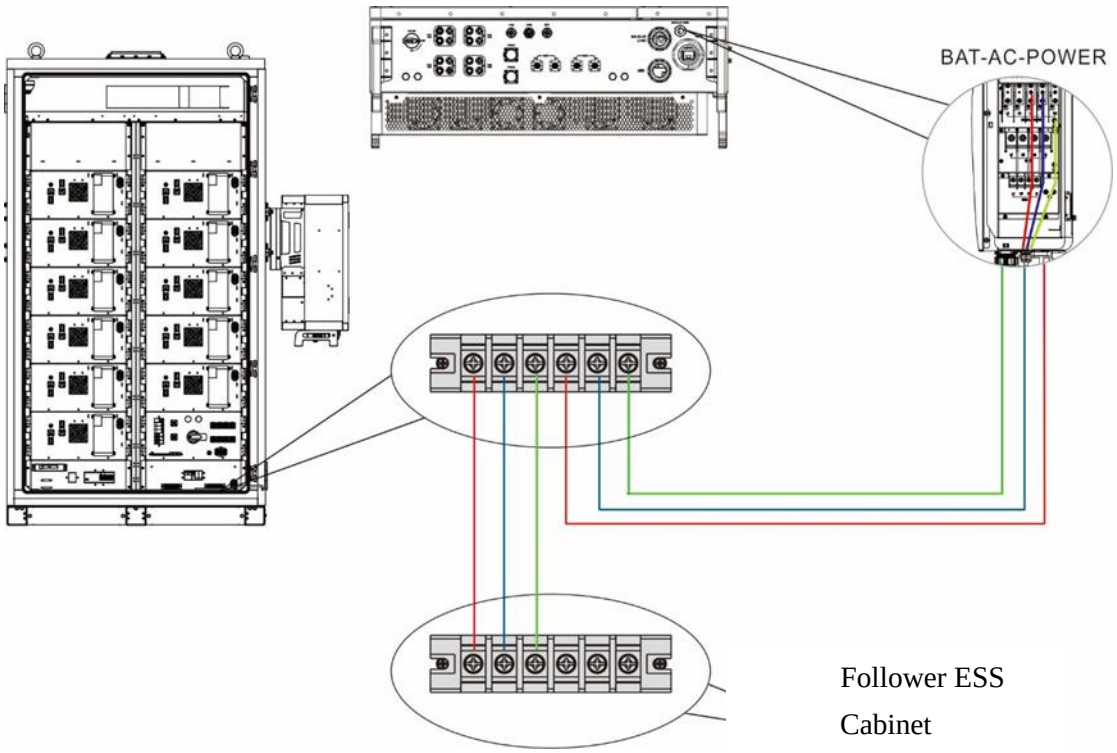
11.3.2 Case2 – 1KAC50DP2 and 2 BC107DE2



11.3.3 Case3 - 1 KAC50DP2 and 1 BC197DE2



11.3.4 Case4 - 1 KAC50DP2 and 2 BC197DE2



11.3.5 Case5 - 2 KAC50DP2 and 1 BC197DE2

Refers to “Case3 - 1 KAC50DP2 and 1 BC197DE2”.

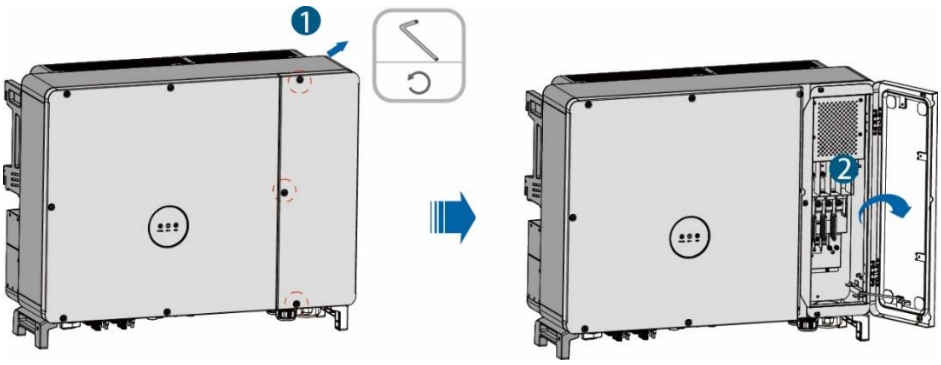
11.4 Installing AC Cables of PCS

Notices:

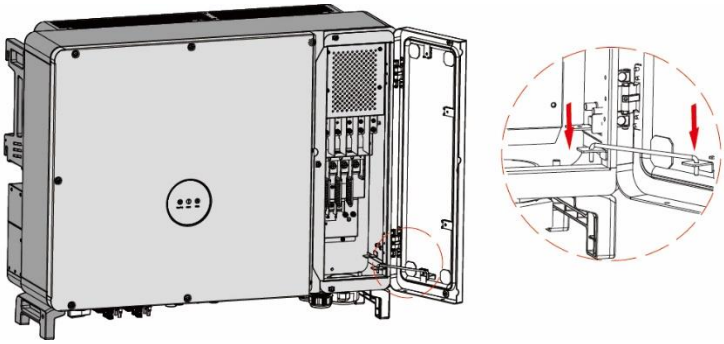
When there are multiple PCSs connected on the backup output,

- The length of AC power cables between PCS grid output and upstream AC distribution box must be the same.
- The length of AC power cables between PCS backup output and downstream AC distribution box must be the same.

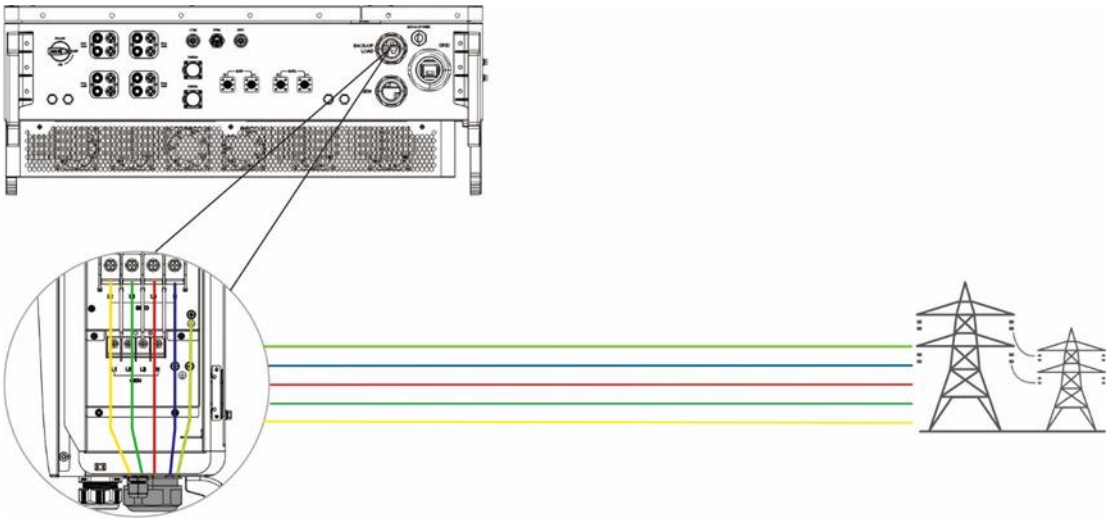
Step1: Open the AC wiring compartment



Step2: Use the limit rod on the junction box cover to secure its position for convenient wiring operations.

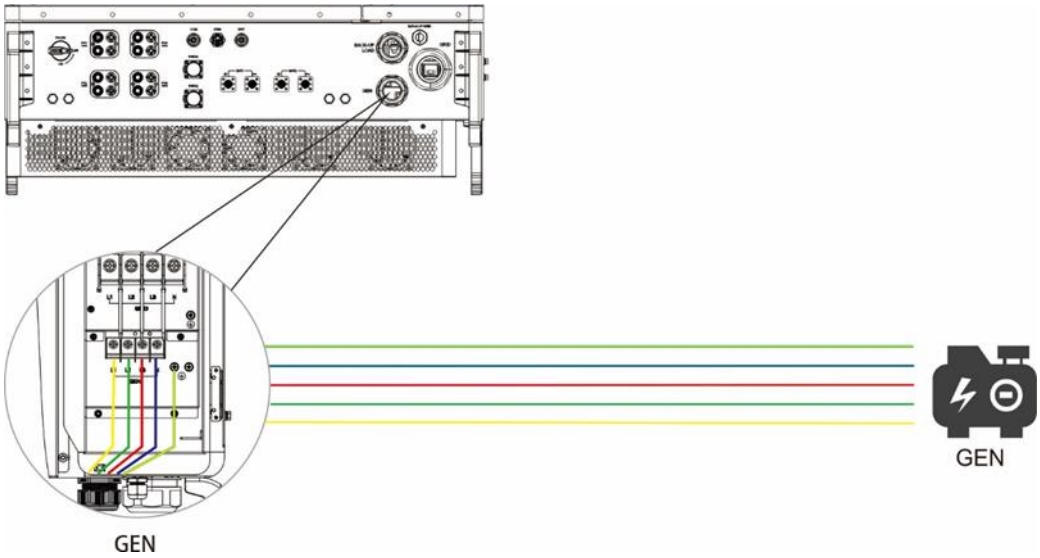


11.4.1 Installing Grid input AC Cable



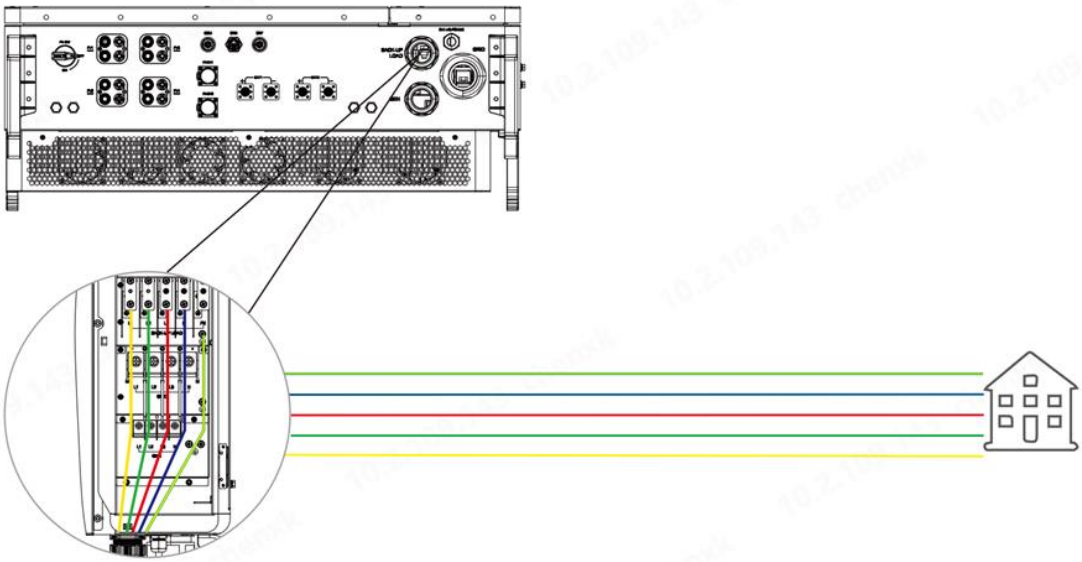
11.4.2 Installing Genset Input AC Cable (if Applicable)

If there are multiple PCS genset parallel, please combine the PCS backup output in the user AC distribution box.



11.4.3 Installing Backup Load output AC Cable (if Applicable)

If there are multiple PCS backup output in parallel, please combine the PCS backup output in the user AC distribution box.



11.5 Installing PV Cables on PCS (if Applicable)

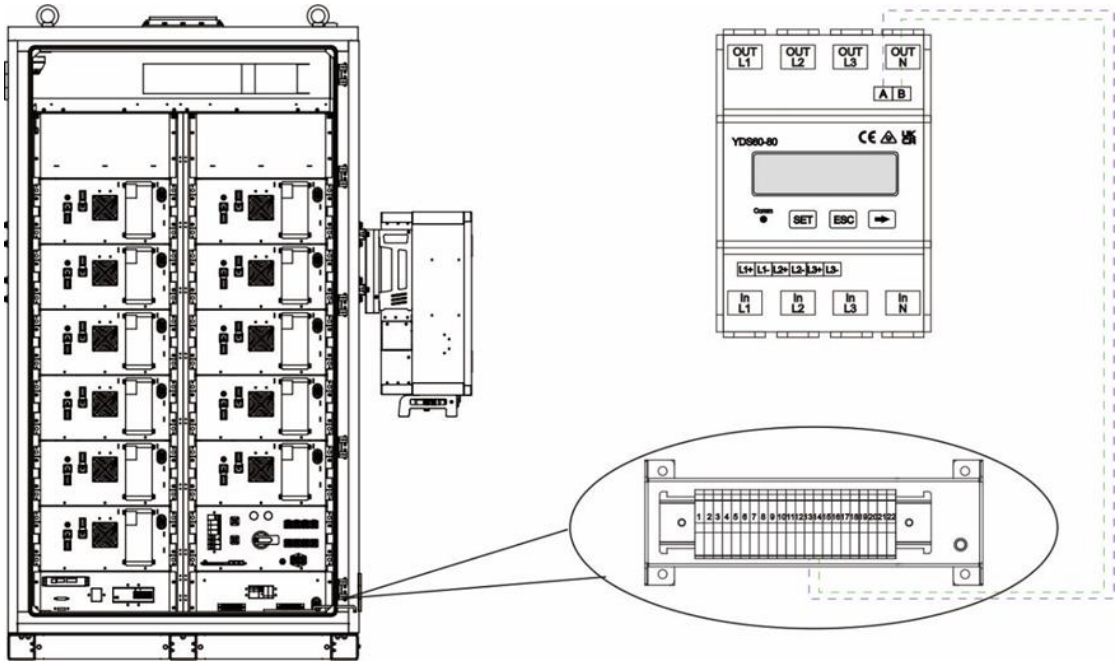
Please refers to the document “KAC50DP2 Series Commercial and Industrial Power Conversion System User Manual”.

11.6 Installing Meter Communication Cables

11.6.1 Installing the Meter Communication cable between Meter and ESS cabinet (if Applicable)

Applicable only to non-parallel systems (including "2 KAC50DP2 and 1 BC197DE2" system) without EMS01D installed. If the system includes an EMS01D, connect the electricity meter communication line to the EMS01D instead. Refer to Section 11.6.2.

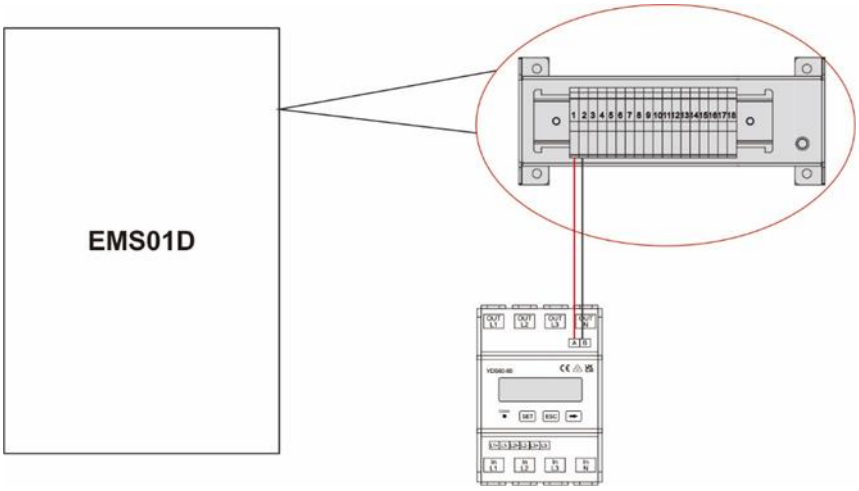
Notice: If there is an AC coupling Solar-ESS system and there are meters on grid input and PV inverter output. Connect the communication cable in the same port of EMS.



FROM-Meter			TO		
METER	A/B	485A/485B	#BC107DE2	TERMINAL BLOCK	Pin9/Pin10
			#BC197DE2	TERMINAL BLOCK	Pin13/Pin14

11.6.2 Installing the Meter Communication cable between Meter and EMS01D (if Applicable)

Notice: If there is an AC coupling Solar-ESS system and there are meters on grid input and PV inverter output. Connect the communication cable in the same port of EMS.



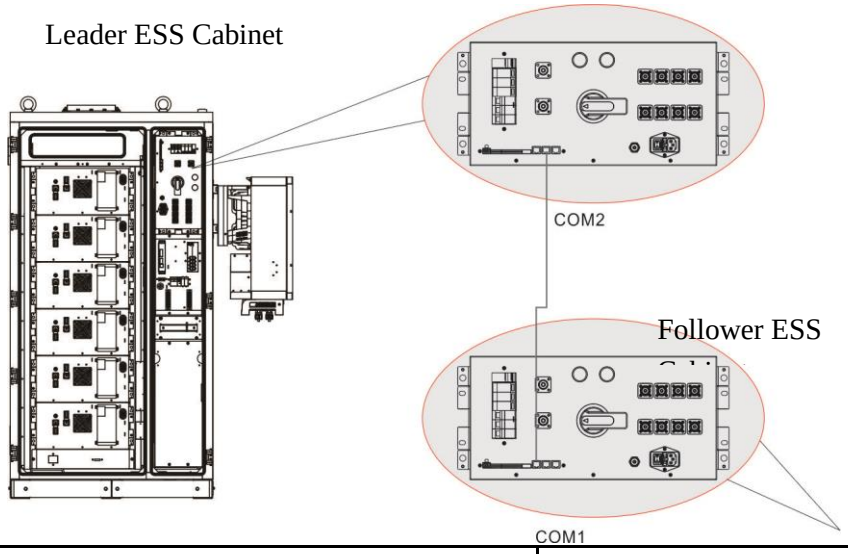
FROM-			TO		
METER	A/B	485A/485B	EMS01D	TERMINAL BLOCK	Pin1/Pin2

11.7 Installing Cables between Two Parallel ESS Cabinets (if Applicable)

It's only for the case that One PCS is connected with Two ESS cabinets.

11.7.1 Case1 – 1 KAC50DP2 and 2 BC107DE2

Notice:
The connection must from leader ESS cabinet "COM2" to follower ESS cabinet "COM1". Otherwise the communication of follower ESS will loss.

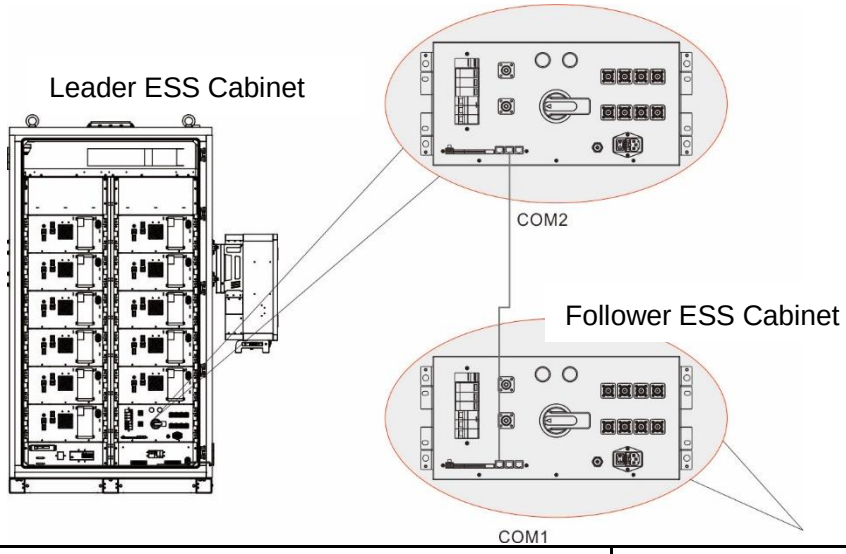


FROM			TO		
Leader BC107D07DE2	High voltage box	COM2	Follower BC107DE2	High voltage box	COM1

11.7.2 Case2 - 1 KAC50DP2 and 2 BC197DE2

Notice:

The connection must from leader ESS cabinet “COM2” to follower ESS cabinet “COM1”. Otherwise the communication of follower ESS will loss.



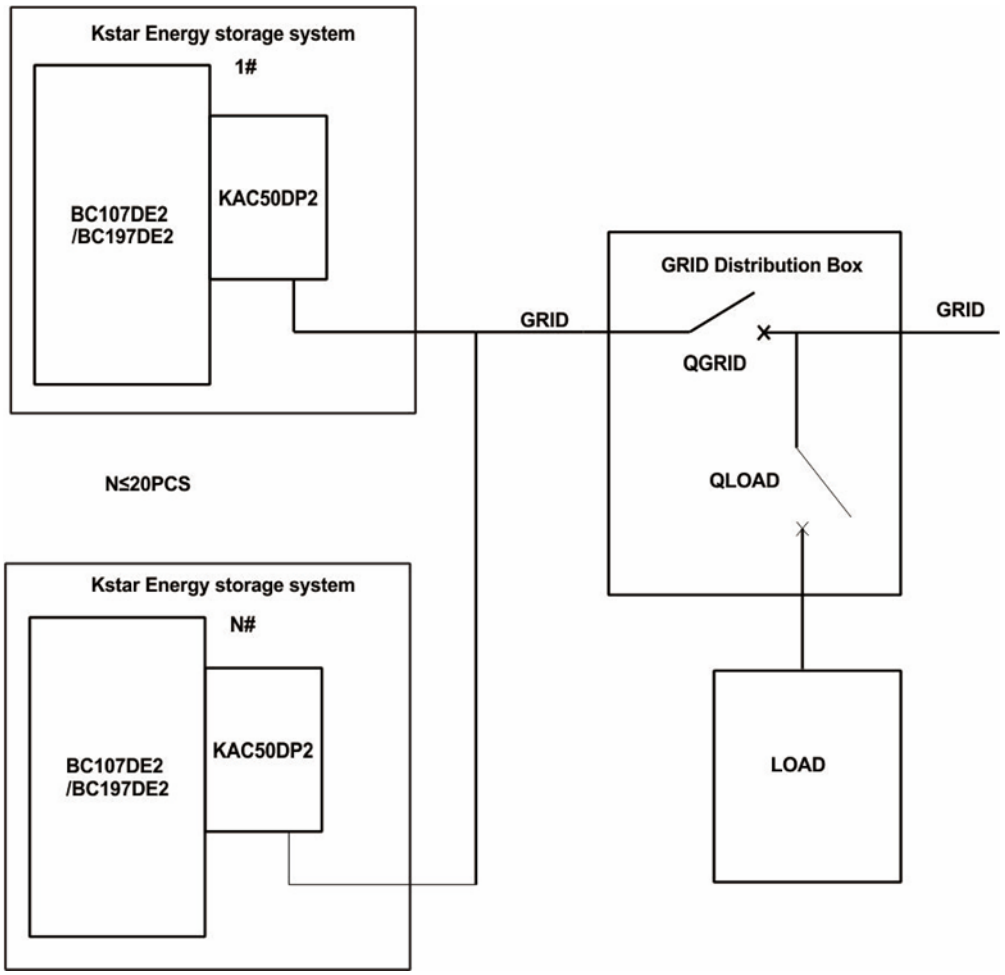
FROM			TO		
Leader BC197DE 2	High voltage box	COM2	Follower BC197DE 2	High voltage box	COM1

11.8 Installing Cables for a Parallel System

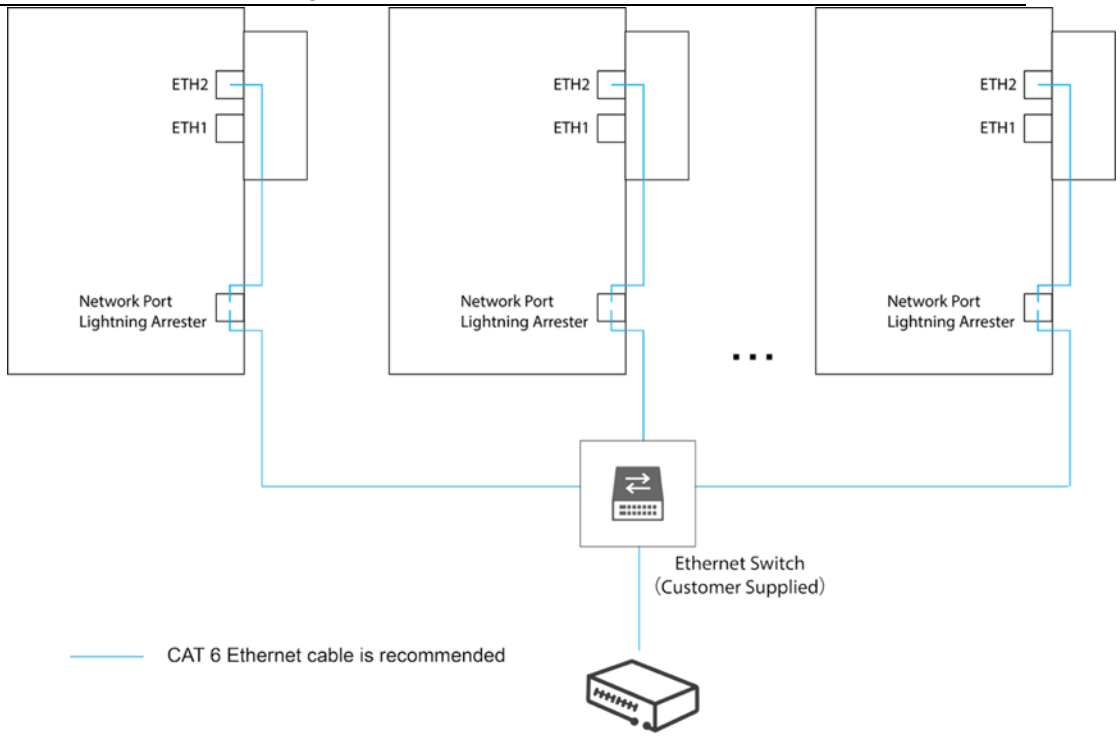
11.8.1 Installing Cables for an On-Grid Parallel System

It’s only for the case that multiple PCSs are connected in parallel on the same grid connecting point.

Step1: connect the grid input in parallel



Step2: connect the communication cable between PCS and EMS01D (refers to the EMS01D user manual)



11.8.2 Installing Syn Communication Cables for an On/off Grid Parallel System

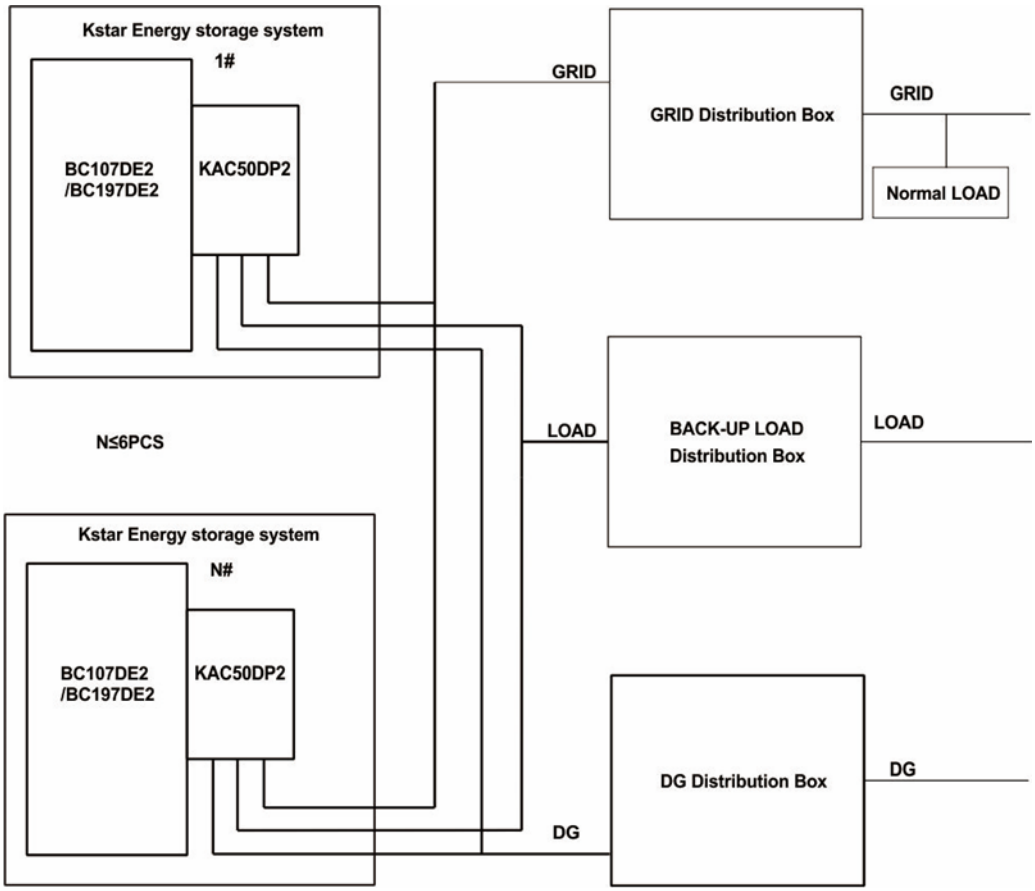
It's only for the case that multiple PCSs are connected in parallel for an on/off grid system.
The maximum number for on/off grid parallel connection is 6.

Notices:
When there are multiple PCSs connected on the backup output,

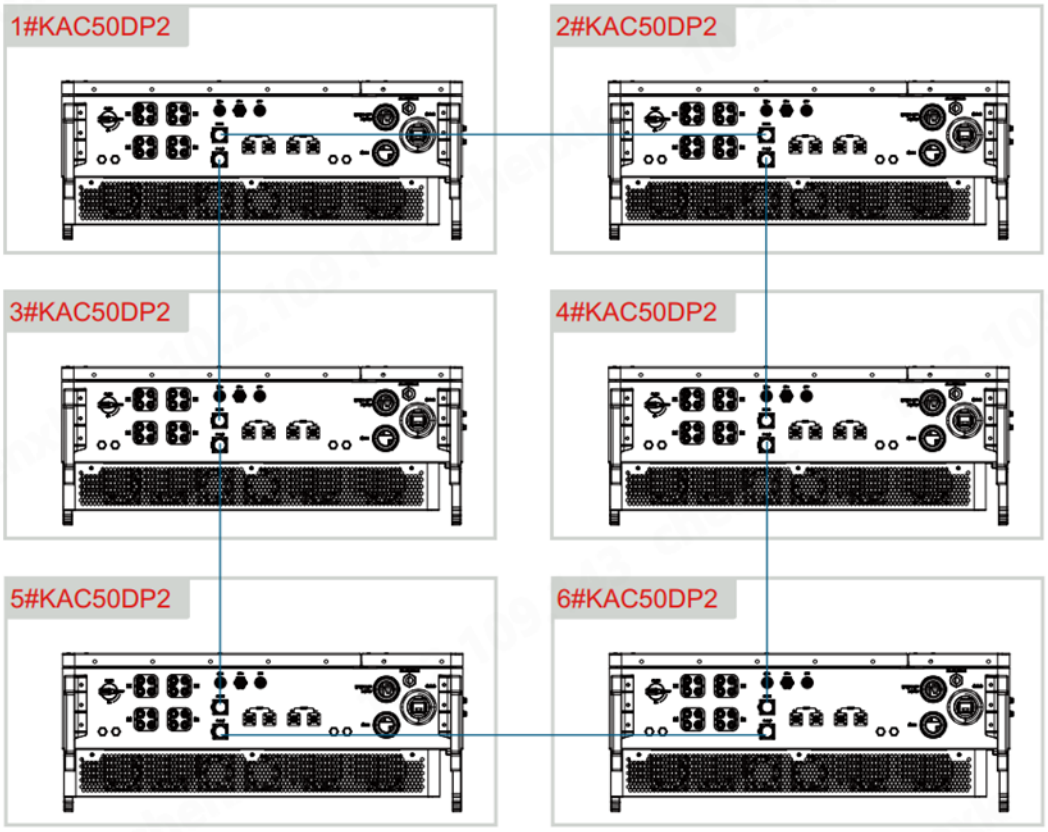
- The length of AC power cables between PCS grid output and upstream AC distribution box must be the same.
- The length of AC power cables between PCS backup output and downstream AC distribution box must be the same.
- The Sync Communication Cables length is 7.5m. Please design the PCSs layout accordingly.

Step0: complete the connection of "Installing Cables for an On-Grid Parallel System"

Step1: connect the backup and genset output in parallel

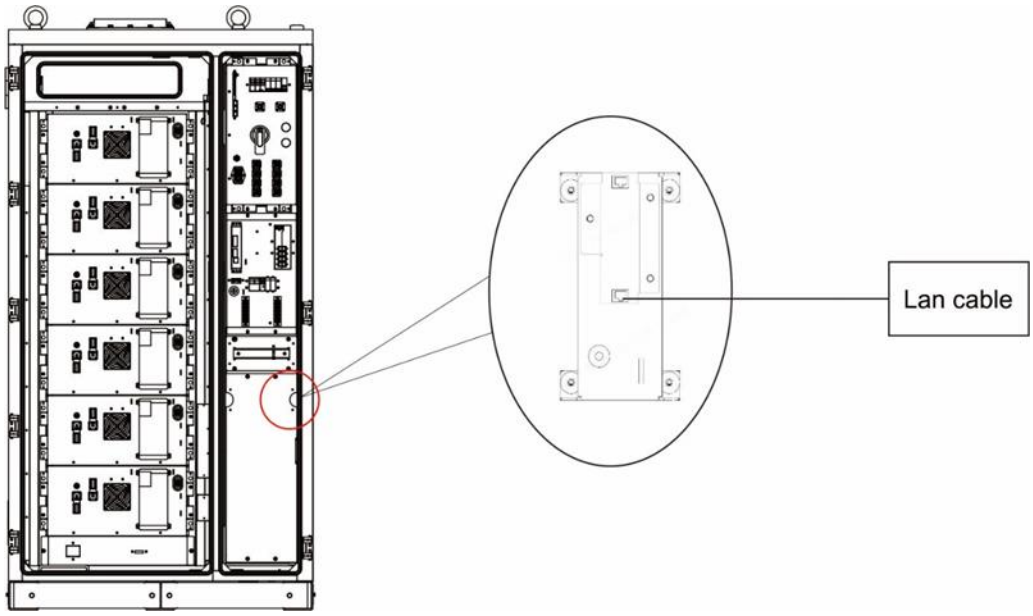


Step2: connect the parallel communication between PCSs.



11.9 Installing LAN Cable for Internet

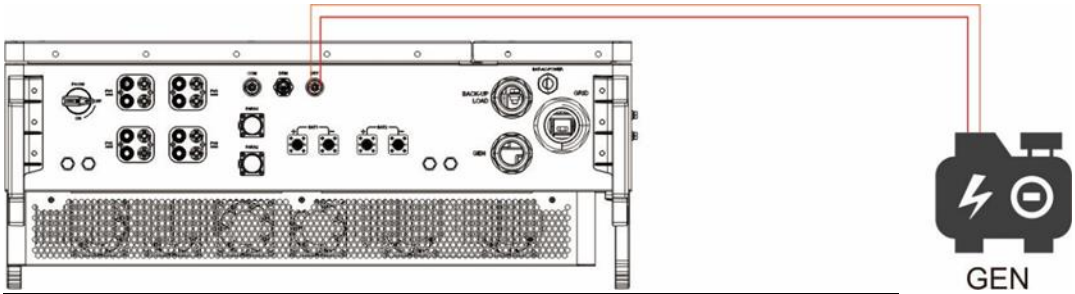
Notices: If there are EMS01D installed, connect the LAN port of EMS01D to the user's internet.



11.10 Installing control Cable of Genset

Notices:

- The genset control signal from PCS is a dry contact Normal Open Signal. The genset start signal shall be set as closed to start.
- If there are multiple PCS in parallel, connect genset control cable to 2 PCS for redundancy.



FROM			TO	
KAC50DP2	DRY	DRY1/2	GEN	GEN-START1/2

11.11 Installing communication Cable of AC coupling Kstar PV inverter (if Applicable)

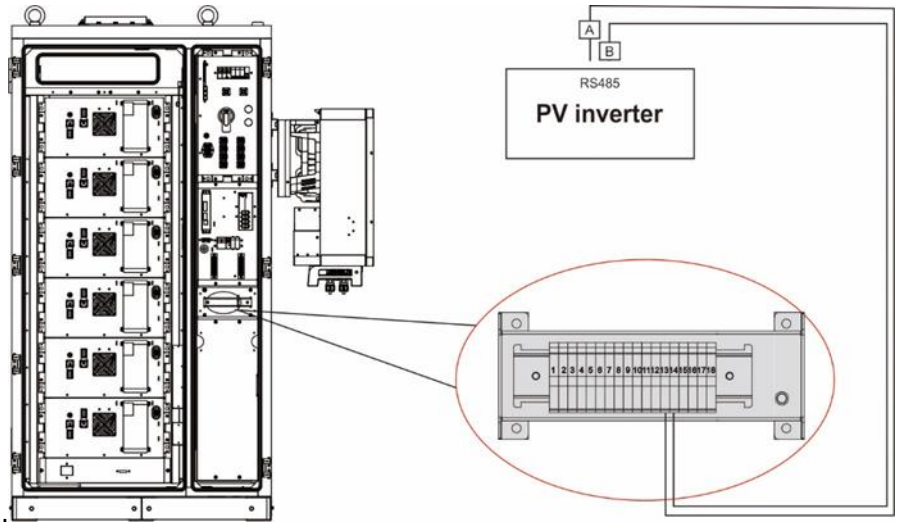
Notice:

If there are two and more Kstar PV inverters connected in the system. First set the RS485 addresses. All inverter default RS485 address is 1.

11.11.1 Communication cable between ESS cabinet and PV inverters

It's only applicable for non-parallel system.
If the PV inverters are connected on the grid input side, the maximum number is 20.
If the PV inverters are connected on the backup input side, the maximum number is 6. And the total inverter capacity is not more than the PCS capacity

Notice:
The connected PV inverter shall be the same model.



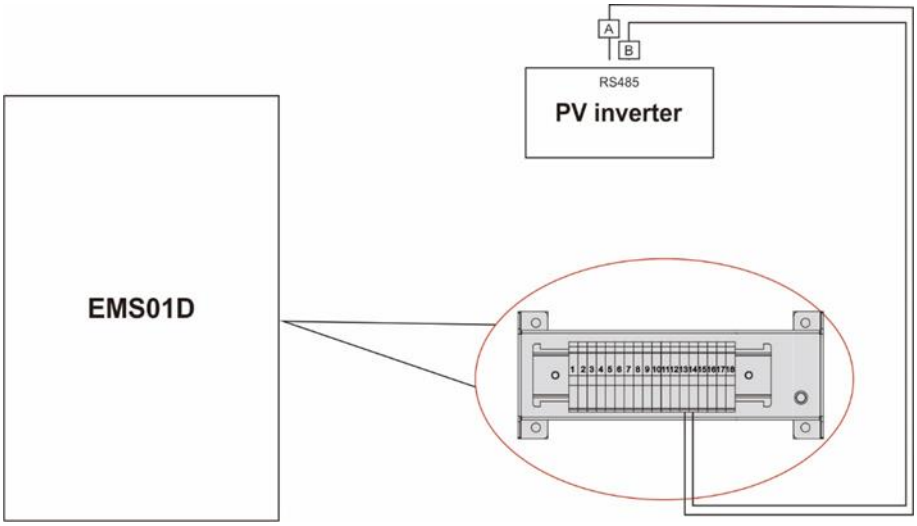
FROM			TO- -		
PV inverter	/	485A/485B	BC107DE2	TERMINAL BLOCK	PIN13/PIN14
			BC197DE2	TERMINAL BLOCK	PIN17/PIN18

11.11.2 Communication cable between EMS01D and PV inverters

It's only applicable for parallel system.
If the PV inverters are connected on the grid input side, the maximum number is 20.
If the PV inverters are connected on the backup input side, the maximum number is 6. And the total inverter capacity is not more than the PCS capacity

Notice:

The connected PV inverter shall be the same model.



FROM			TO		
PV inverter	/	485A/485B	EMS01D	TERMINAL BLOCK	PIN7/PIN8

11.12 Sealing Cable Holes

After cables are installed, seal the cable holes using the delivered sealing putty

12 System Power-On

12.1 Power-On Inspection

12.1.1 General Inspection

No.	Inspection Item	Acceptance Criteria
1	Equipment Appearance	- Equipment is intact, free from damage, rust, or peeling paint. - Repaint if paint is peeling. - Labels are clear, visible, and undamaged; replace damaged labels promptly.
2	Cable Appearance	- Cable insulation is intact with no obvious damage. - Conduit cables and hoses are undamaged.
3	Cable Connections	- Connection positions match the design. - Terminals meet specifications, are securely and reliably connected. - Labels on both cable ends are clear and consistently oriented.
4	Cable Routing	- Adheres to strong and weak current separation principle. - Cables are neatly and aesthetically arranged. - Cable clips are trimmed flush, with no exposed sharp edges. - Adequate slack is left at bends, avoiding tension. - Routing is straight, smooth, with no cable crossovers inside the cabinet.
5	Switches	- External AC distribution cabinet switch is in the OFF state. - Battery cluster switch is in the OFF state.

12.1.2 KAC Installation Inspection

No.	Inspection Item	Acceptance Criteria
1	Installation Inspection	- KAC chassis is free from deformation or damage. - KAC is securely and reliably fixed. - Equipment is properly installed. - Space around KAC meets requirements.
2	Electrical Connection	- Upstream AC and DC switches are in the “OFF” state.

	Inspection	- All cables are free from damage or cracks. - All connection cables are intact. - Ground wires are fully connected and securely fastened. - AC lines are correctly and securely connected, with no open or short circuits. - DC line polarity is correct, connections are secure, with no open or short circuits. - Communication lines are correctly and securely connected.
3	Other Inspections	- AC maintenance compartment is clean and free of construction debris. - AC maintenance compartment door is closed with screws tightened. - DC maintenance compartment door is closed with screws tightened. - Unused network cable interfaces and COM ports have waterproof plugs securely tightened.

12.1.3 Battery Cabinet Installation Inspection

No.	Inspection Item	Acceptance Criteria
1	Installation Inspection	- Battery cabinet chassis is free from deformation or damage. - Battery cabinet is securely and reliably fixed. - Equipment is properly installed. - Space around the battery cabinet meets requirements.
2	Electrical Connection Inspection	- All cables are free from damage or cracks. - All connection cables are intact. - Ground wires are fully connected and securely fastened. - Battery DC lines are correctly and securely connected, with no open or short circuits. - DC line polarity is correct, connections are secure, with no open or short circuits. - Communication lines are correctly and securely connected.
3	Other Inspections	- Battery cabinet interior is clean and free of construction debris. - Battery cabinet door is closed with its lock secured.

12.2 System Power-On

12.2.1 BC107DE2 Single System Power-On

Note: Before closing the internal switch of the battery cabinet's AC-Switch power supply, verify that the AC-Switch supply voltage is within the normal range (220V ± 10%).

Table 12-1 BC107DE2 Single System Power-On Steps

No	Item	Remarks
1	Grid-connected AC distribution cabinet power-on (Off → ON)	As shown in Figure 12-1, Item 1
2	KAC50DP2 PV switch power-on (only if PV is present, Off → ON)	As shown in Figure 12-2, Item 2
3	Battery cabinet DC-Switch power-on (Off → ON)	As shown in Figure 12-3, Item 3
4	Battery cabinet DC rotary switch power-on (Off → ON)	As shown in Figure 12-4, Item 4
5	Battery cabinet Aux power switch on	As shown in Figure 12-5, Item 5
6	Battery cabinet AC-Switch power-on (Off → ON)	As shown in Figure 12-6, Item 6

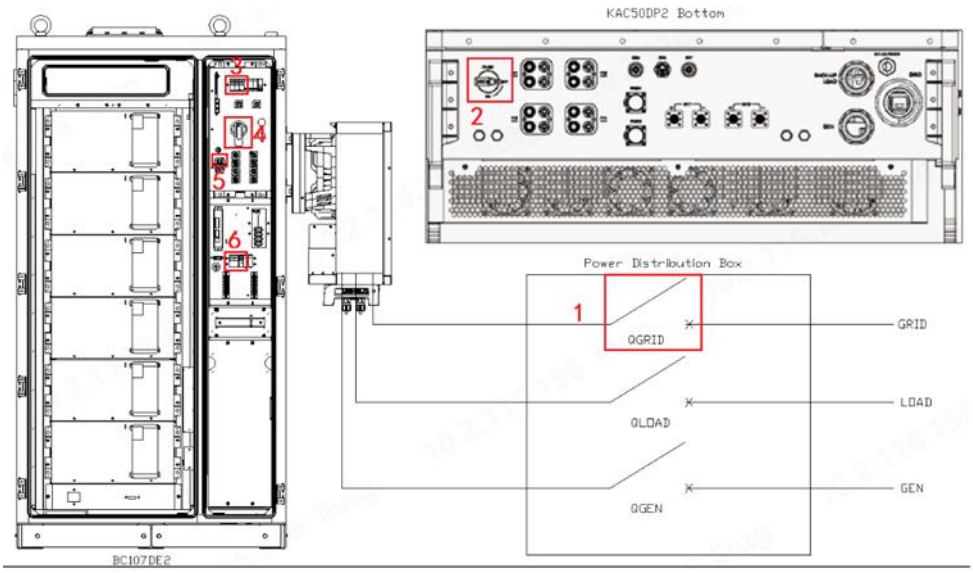


Figure 12-7 BC107DE2 System Switch Locations

12.2.2 BC197DE2 Single System Power-On

Note: Before closing the internal switch of the battery cabinet's AC-Switch power supply, verify that the AC-Switch supply voltage is within the normal range (220V ± 10%).

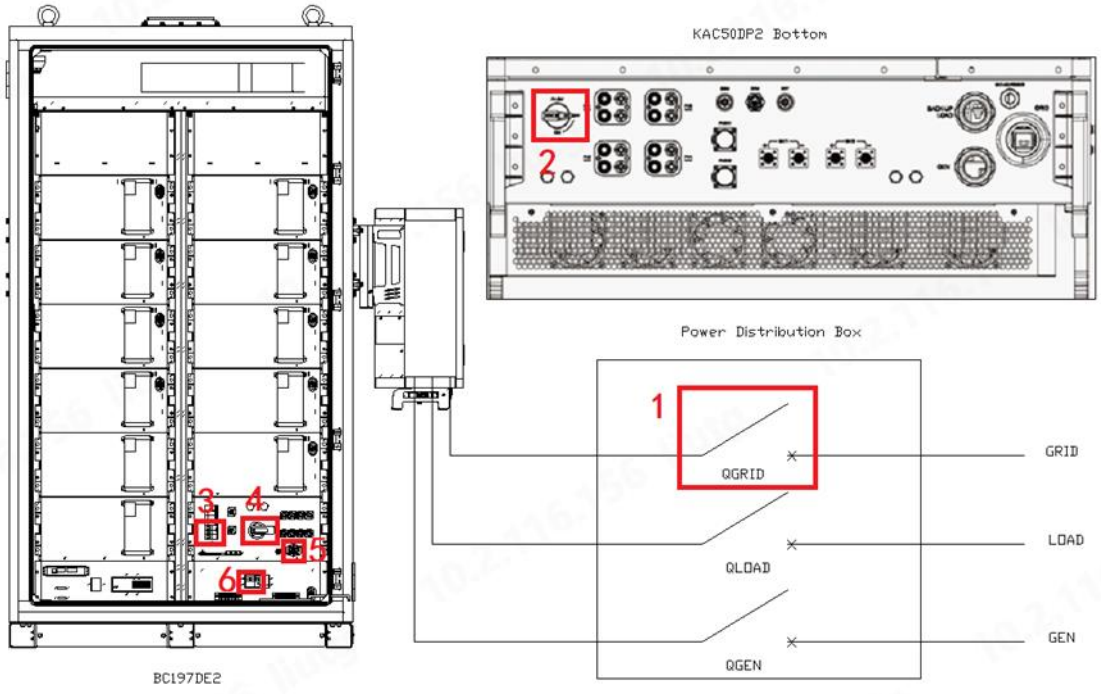
Note: The configuration (2*KAC50DP2* + *1*BC197DE2/BC215DE2) also follows

these power-on steps.

Table 12-2 BC197DE2 Single System Power-On Steps

	Item	Remarks
1	Grid-connected AC distribution cabinet power-on (Off → ON)	As shown in Figure 12-8, Item 1
2	KAC50DP2 PV switch power-on (only if PV is present, Off → ON)	As shown in Figure 12-9, Item 2
3	Battery cabinet DC-Switch power-on (Off → ON)	As shown in Figure 12-10, Item 3
4	Battery cabinet DC rotary switch power-on (Off → ON)	As shown in Figure 12-11, Item 4
5	Battery cabinet Aux power switch on	As shown in Figure 12-12, Item 5
6	Battery cabinet AC-Switch power-on (Off → ON)	As shown in Figure 12-13, Item 6

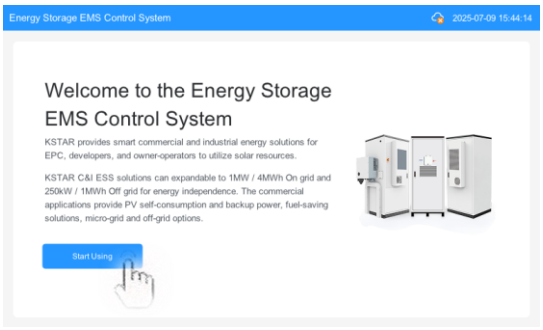
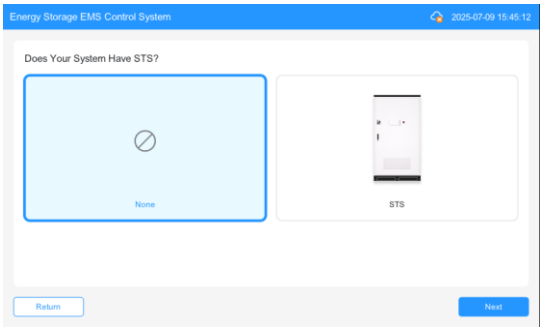
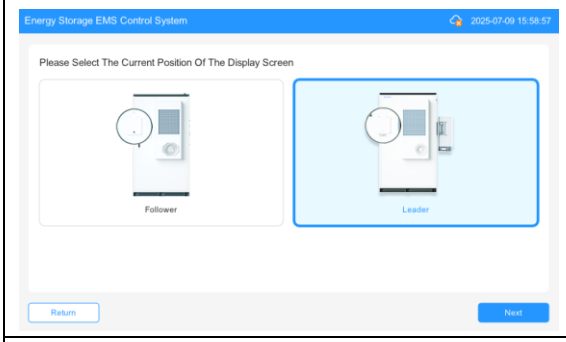
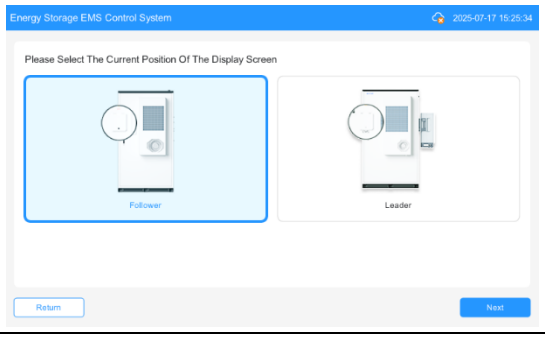
Figure 12-14 BC197DE2 System Switch Locations

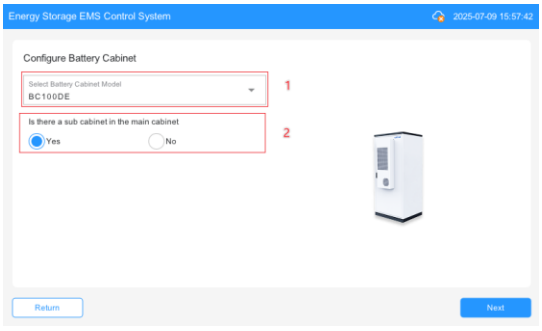


13 Setting and Commissioning

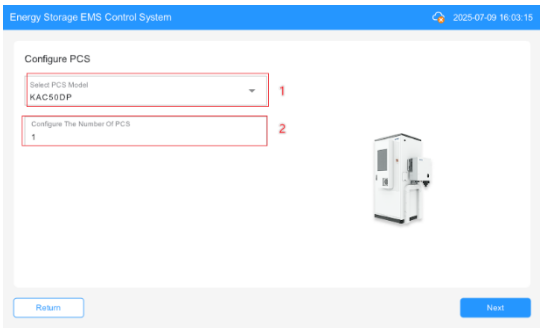
Before the setting on the EMS, please complete the setting on the installed meter, referring to “9 installing the Meter”.

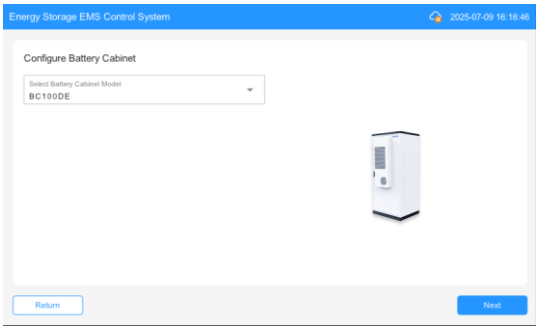
13.1 System Configurations Setting

<table>
<tr><td>Step1：Click to Start
 
</td><td></td></tr>
<tr><td>Step2: Select “NONE” for all Gen2 Hybrid PCS(model: KAC50/100/125DP2)
 
</td><td></td></tr>
<tr><td>Step3-1: Select “Leader” if the setting EMS is on an ESS cabinet with PCS,
 
</td><td>Step3-2: Select “Follower” If the setting EMS is on an ESS cabinet without PCS
 
</td></tr>
<tr><td>Step4-1: Select “BC107DE2/BC197DE2/BC215DE2” according to the installed leader ESS cabinet model. If there is a “follower” ESS cabinet connected in parallel, select “Yes”; otherwise select “No”</td><td>Step4-2:Select “BC107DE2/BC197DE2/BC215DE2” according to the installed follower ESS cabinet model</td></tr>
</table>

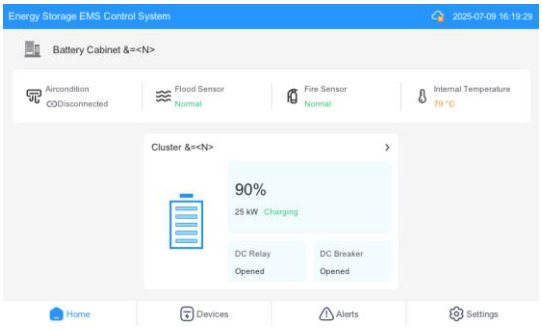


Step5-1: Select the PCS model “KAC50DP2”. Configure the number of PCS on this ESS cabinet.

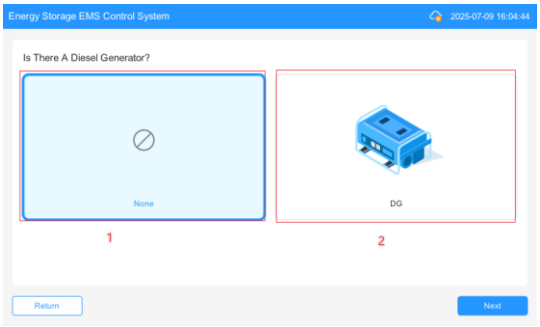




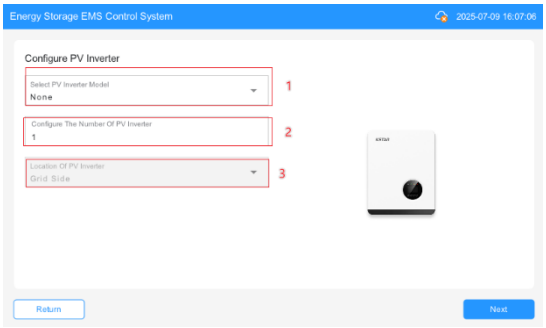
Step5-2 Done



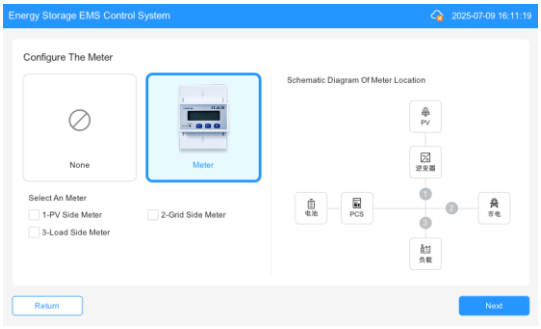
Step6:



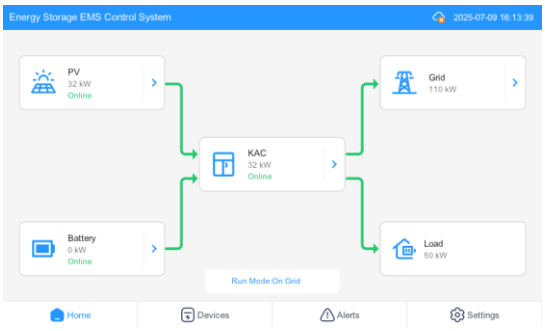
Step7: Configure the AC coupling PV inverter. If the PV inverter is not Kstar brand, select “None”.



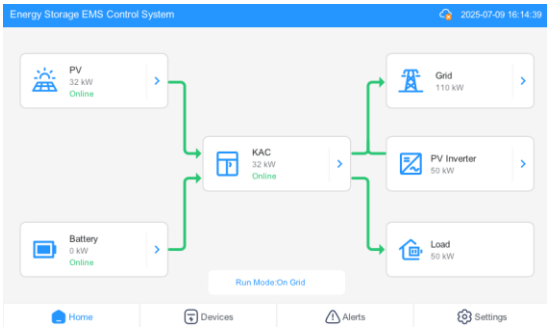
Step8: Configure the meter location.



Step9 Done



or



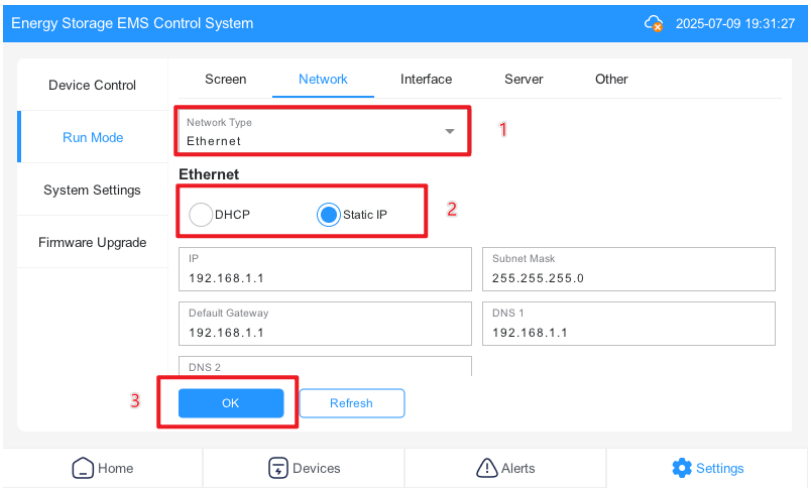
13.2 Internet Connecting Setting

Go to “Setting”-“Run Mode”-“Network”

1, Select “Ethernet” (4G is not supported now)

2, Select “DHCP” or “Static IP”. “DHCP” is proposed setting.

3, Click “OK” to save and quit.



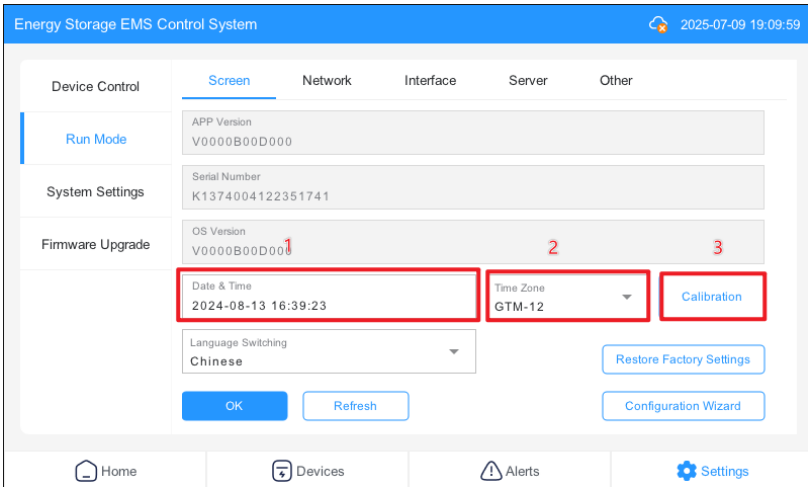
13.3 Basic Setting

13.3.1 Time and Time Zone Setting (if Applicable)

Notice:

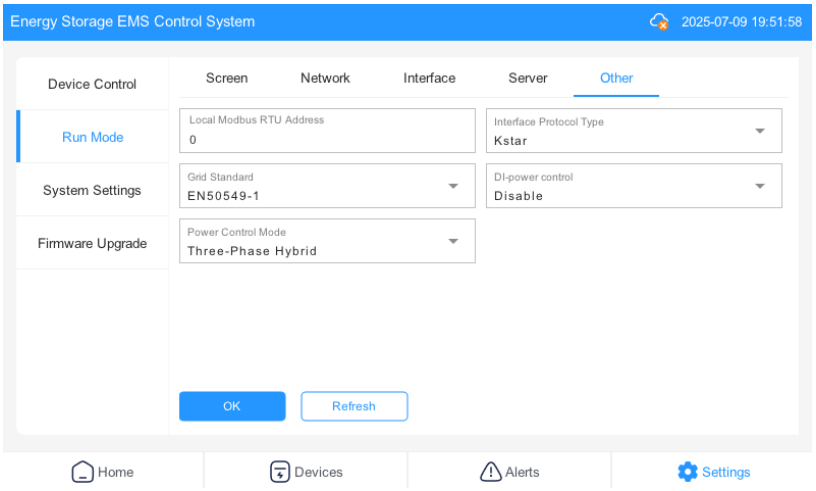
If it's connected in internet, the time can syn from the internet.

Go to "Setting"-"Run Mode"-"Screen"



13.3.2 Grid Code Setting

Go to “Setting”-“Run Mode”-“Other”



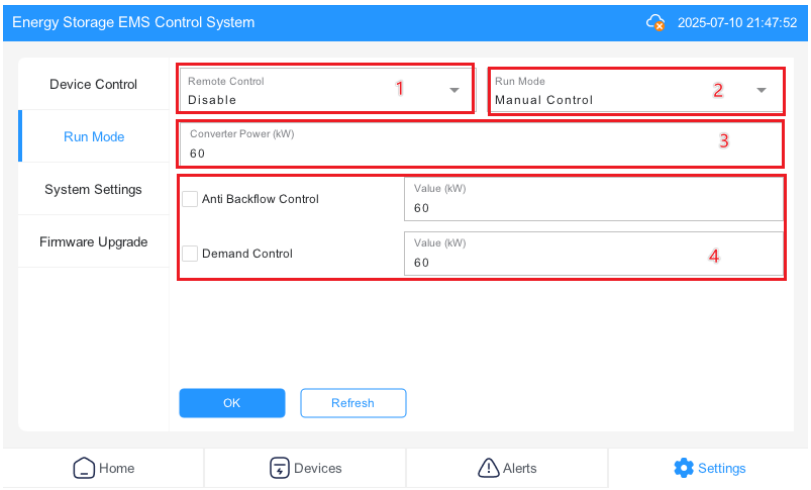
13.3.3 Operation Mode Setting

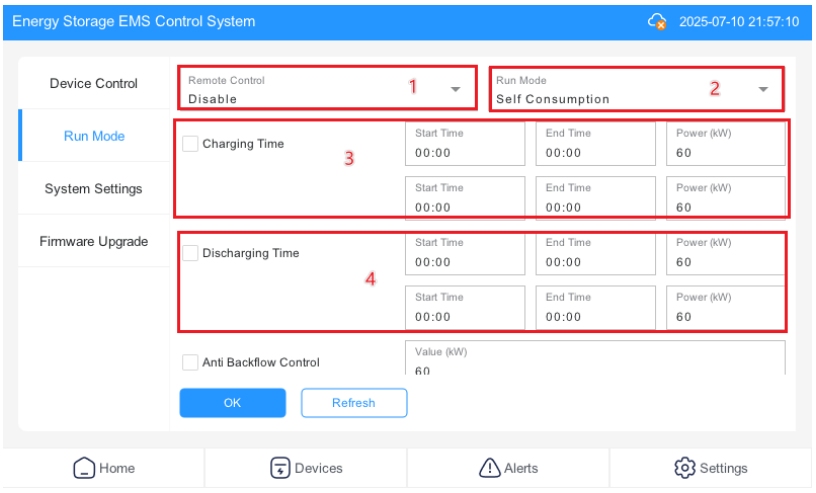
Notice:

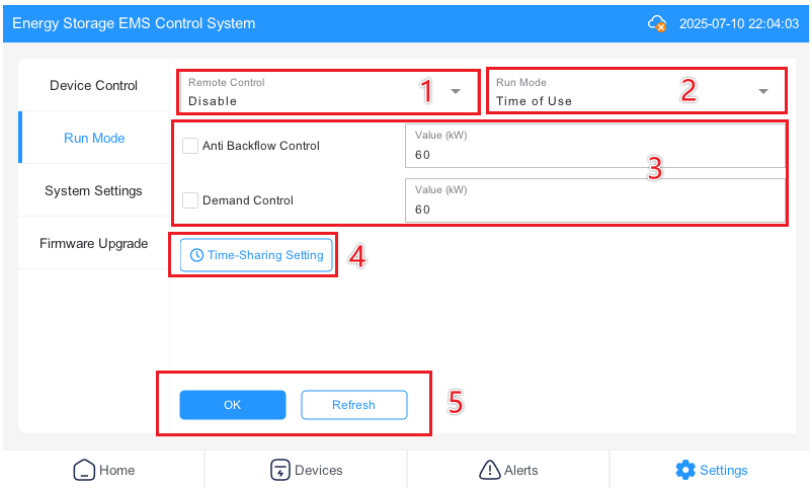
If the ESS unit systems are connected on the EMS01D. Enable the remote control and set the run mode as “manual control”.

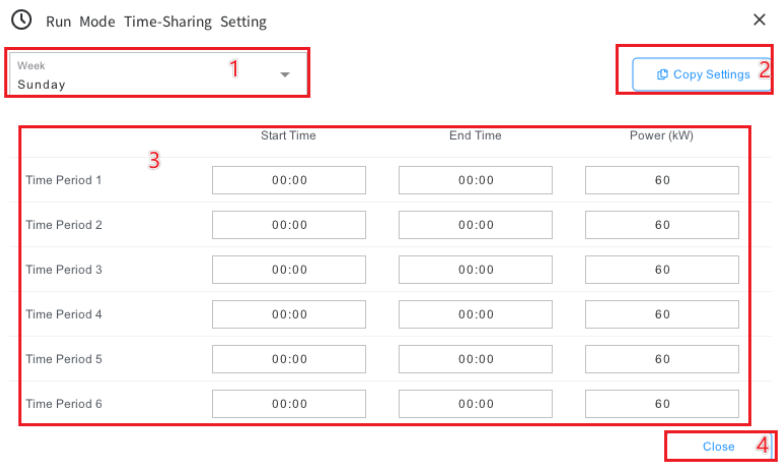
The set the control mode on the EMS01D.

Set the system as “manual control”, “self consumption”, “peak shaving” and “TOU” accordingly.

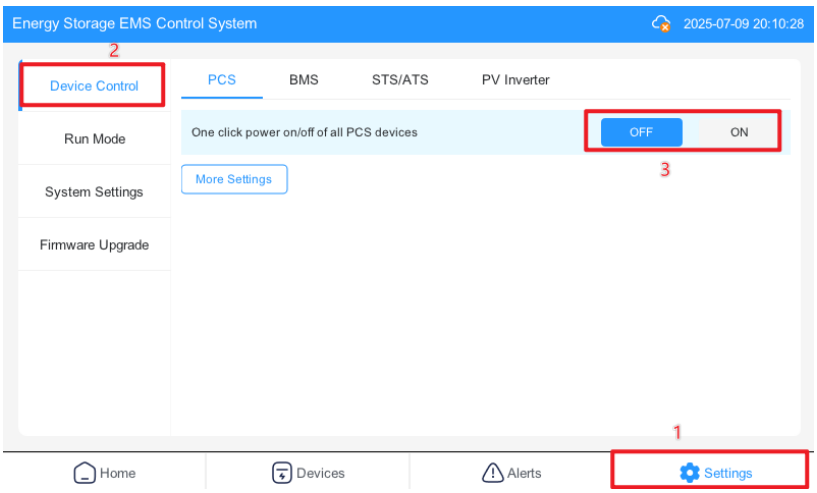








13.4 System Turn On



After the PCS is turn on. It's proposed to set the system to “manual control” mode to test charge/discharge.
Change the working mode according to application after the commissioning is done.

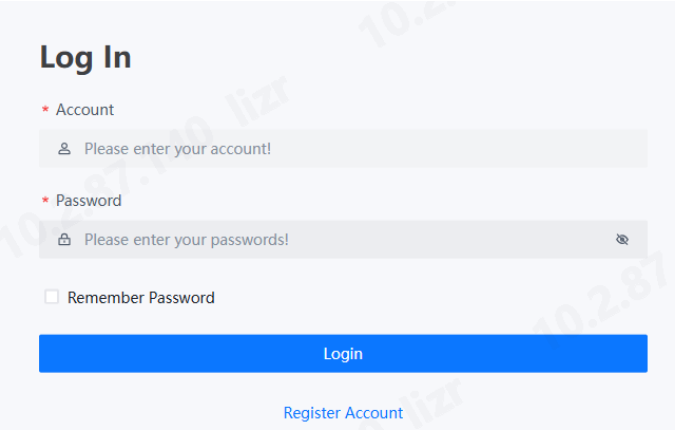
13.5 Advanced Setting

13.5.1 Advanced Setting

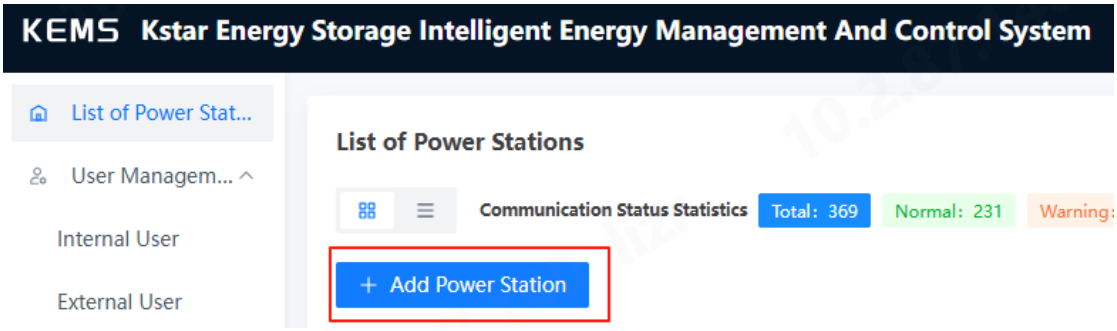
If the system is connected and controlled by a 3rd party controller, Enable the remote control and set the run mode as “manual control”.
please refers to the document “Standard Operating Procedure of KSTAR C&I ESS EMS Protocol for Third-party EMS Control”.

13.6 Create a Power Station

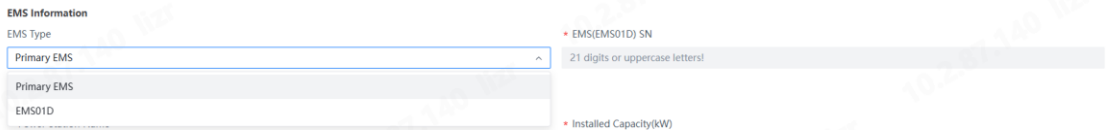
Step1: Login KEMS with your account.
KEMS: https://ems.ksdatacloud.com:8083



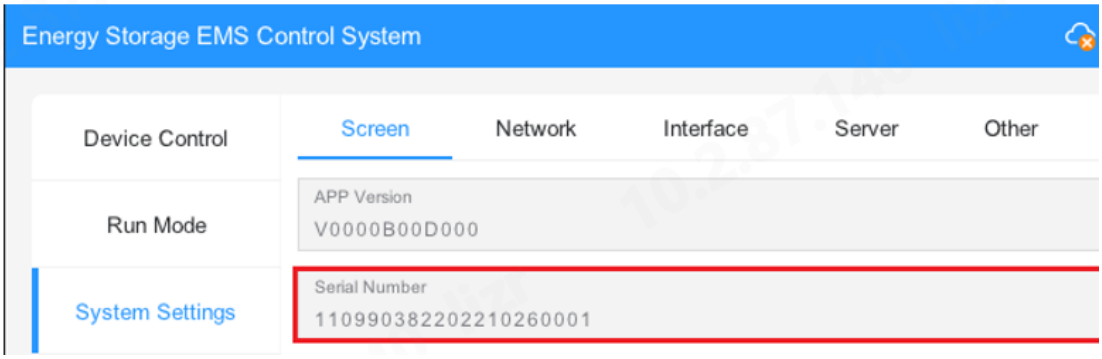
Step2: Add Power Station.



Step3: configure the EMS type and its SN
Select “Primary EMS” if there’s no EMS01D installed. Otherwise select “EMS01D”
And then fill in the SN of the EMS.



You can get the EMS SN on the EMS screen or the ESS cabinet (leader ESS cabinet product label)



If there is EMS01D, refers to EMS01D SN on the product label.

Step4: fill in the power station information.

Step5: Check if the new power station is online.

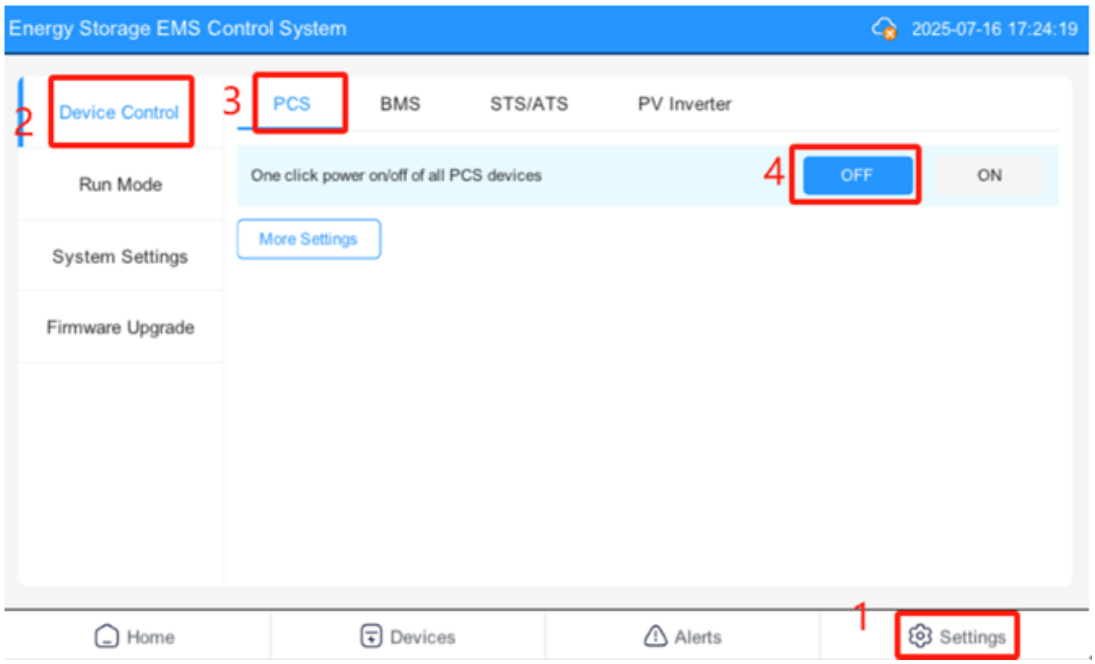
14 System Power-Off

14.1 EMS Shutdown Command

Preconditions: The system is operating in grid-connected or off-grid mode with power output.

Operation Steps:

Step 1: Open EMS “Settings” → “Device Control” → “PCS” → “OFF” interface. Enter password: 000000, issue PCS shutdown command. The shutdown button changes from green to gray, and the KAC display light changes from steady green to flashing red.



Step 2: Click “Home” to check device status, active power, and DC voltage to confirm successful shutdown.

Step 3: Click the “Device” tab to check the operating status and voltage of PCS and battery cabinet to confirm successful shutdown.

14.2 System Power-Off

Power-off requires wearing personal protective equipment (e.g., insulated shoes, insulated gloves). Follow Figure 5-1 or Figure 5-2 for system power-off operations.

Note: Figure 5-1 corresponds to the BC107DE2 battery cabinet, and Figure 5-2 corresponds to the BC197DE2 battery cabinet.

No.	Item	Remarks

1	Grid-connected AC distribution cabinet power-off (ON → Off)	As shown in Figure 5-1/5-2, Item 1
2	KAC50DP2 PV switch power-off (only if PV is present, ON → Off)	As shown in Figure 5-1/5-2, Item 2
3	Battery cabinet DC-Switch power-off (ON → Off)	As shown in Figure 5-1/5-2, Item 3
4	Battery cabinet DC rotary switch power-off (ON → Off)	As shown in Figure 5-1/5-2, Item 4
5	Battery cabinet AC-Switch power-off (ON → Off)	As shown in Figure 5-1/5-2, Item 5

15 Firmware Upgrade

15.1 Remote Firmware Upgrade

Please contact with Kstar technical support engineer or Kstar authorized installers for support.

16 FQA

16.1 Alarms List

PCS Alarms/Protections

Alarm/Protection	**Description**	**Suggestion**
DC Over/Under voltage Protection	When the DC voltage of the storage battery exceeds the allowable range, the PCS will stop operating and display a fault message on the upper computer or EMS.	Overvoltage: Shut down and check if the battery model is correct; Under voltage: Check battery cable connections and whether the battery cabinet switch is on.
PV Over/Under voltage Protection	When the DC voltage of the PV panel exceeds the allowable range, the PCS will stop operating and display a fault message on the upper computer or EMS.	Overvoltage: Disconnect the PV switch and check whether the PV open-circuit voltage is within the allowed range; Under voltage: Check PV cable connection, switch.
Grid Over/Under voltage Protection	When the PCS detects grid voltage beyond the allowable range, it will stop operating and display a fault message on the upper computer or EMS.	Abnormal grid voltage; For under voltage, check whether the grid wiring is properly connected.
Grid Over/Under Frequency Protection	When the PCS detects grid frequency fluctuation beyond the allowable range, it will stop operating and display a fault message.	Abnormal grid frequency; Wait until the grid frequency returns to normal.
Anti-islanding Protection	When the PCS detects grid voltage as zero, it will stop operating and display a fault type on the upper computer or EMS.	Abnormal grid; Wait until grid power is restored.
Reverse Power Protection	When the PCS detects reverse power, it will stop operating and display a fault message.	Check whether the power meter is connected reversely.
Grid Abnormal Protection	When the PCS detects that the grid voltage and frequency are abnormal, it will stop operating and display a fault message.	Wait until grid power returns to normal.
Communication Failure	When the PCS communication with EMS or battery is interrupted, the PCS will stop operating and display a fault message.	Check the communication wiring, address settings, and baud rate configuration.

Over Temperature Protection	When the internal temperature of the PCS exceeds the allowable limit, the PCS will stop operating and display a fault message.	Check whether the internal fan operates normally and whether the ambient temperature is within the allowed range.
Hardware Failure Protection	When the internal hardware circuit is abnormal, the PCS will stop operating and display a fault message.	Contact after-sales service for handling.
Battery Overvoltage Protection	When the PCS detects battery overvoltage, it will stop operating and display a fault message.	Shut down, check whether the battery voltage is within range, and whether the battery settings are correct.
Battery Under voltage Protection	When the PCS detects battery under voltage, it will stop operating and display a fault message.	Check whether the battery wiring is well connected and whether the battery switch is turned on.
Meter Communication Failure	When PCS detects abnormal communication with the meter, it will stop operating and display a fault message.	Check the wiring and settings of the power meter.
Battery Communication Failure	When PCS detects abnormal communication with the battery, it will stop operating and display a fault message.	Check battery communication wiring, ID, and baud rate.
EMS Communication Failure	When PCS detects abnormal communication with EMS, it will stop operating and display a fault message.	Check communication wiring, protocol settings, and EMS power supply.

ESS Cabinet Alarms/Protections

17 Contact Information

If you have any questions about this product, please contact us.

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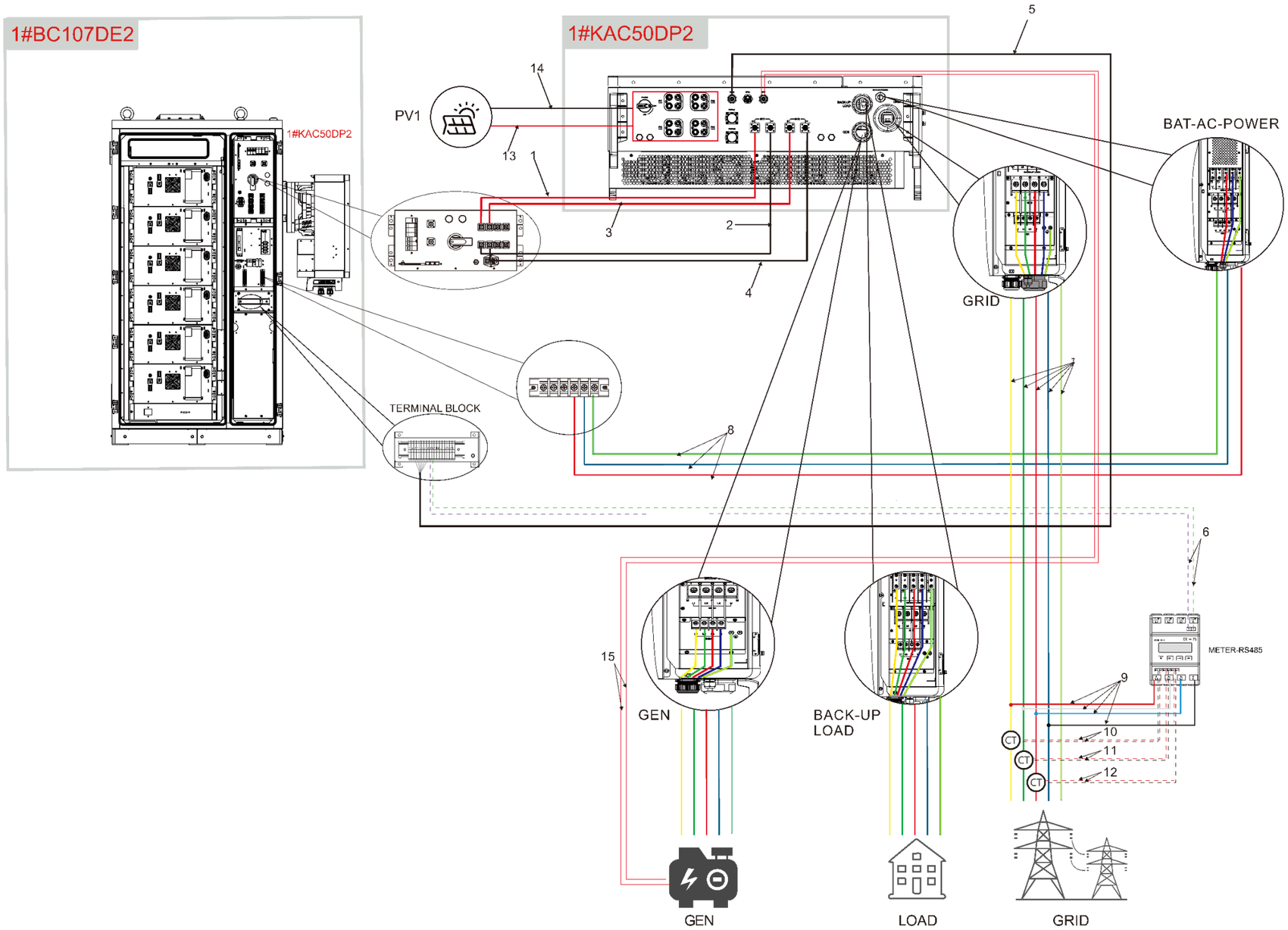
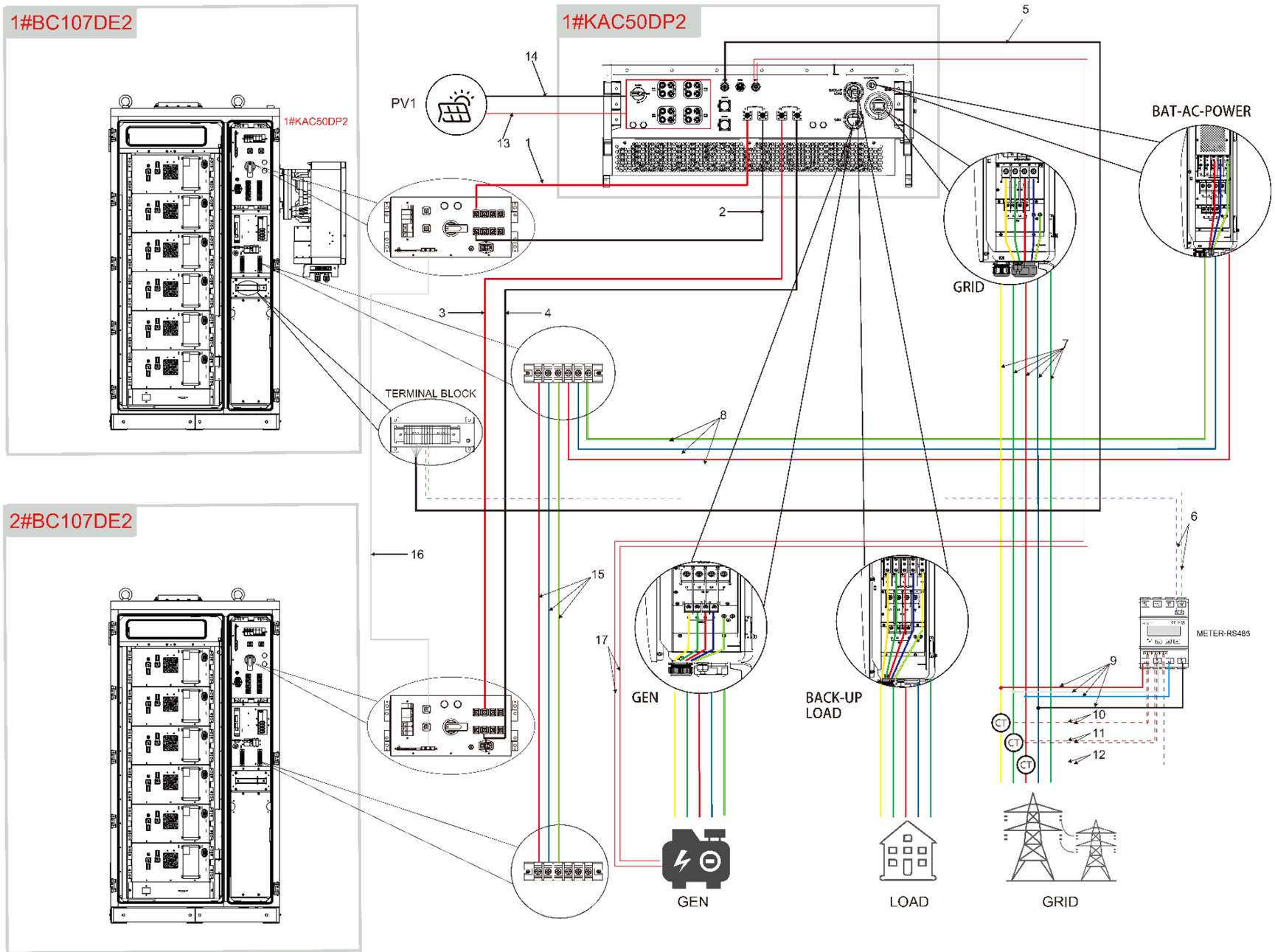
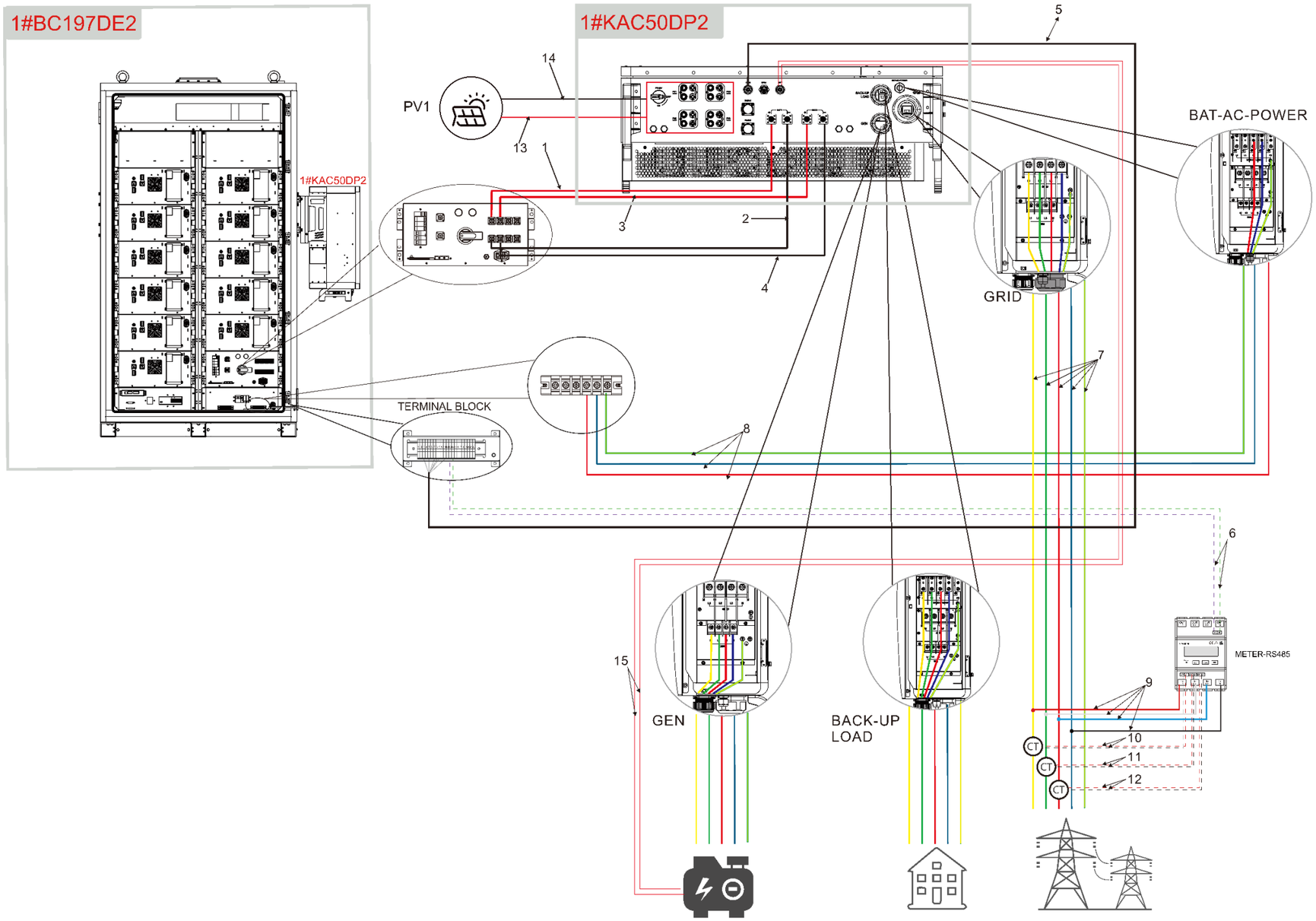
18 Appendix-System Diagrams-1 KAC50DP2 + 1 BC107DE2



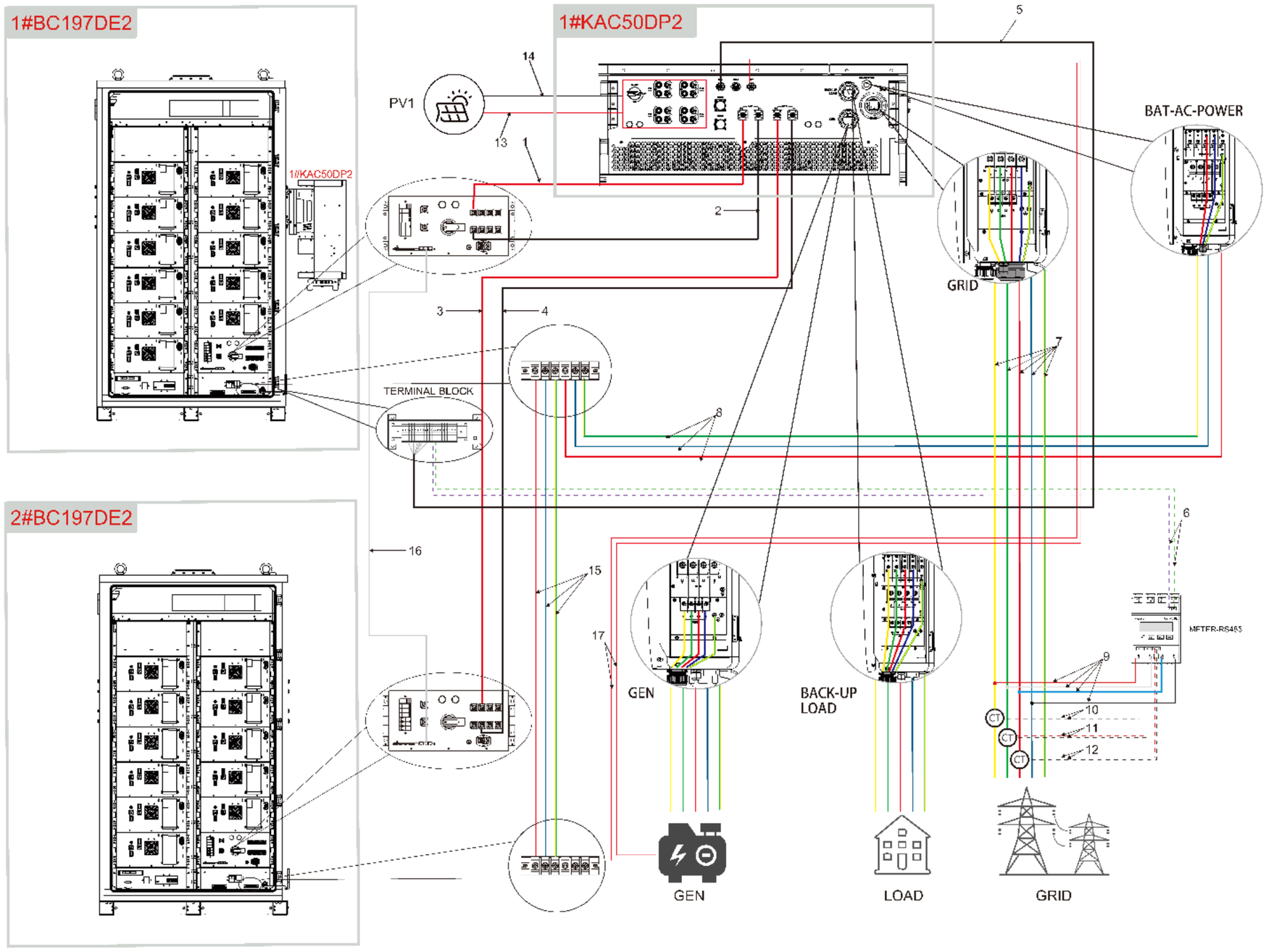
19 Appendix-System Diagrams-1 KAC50DP2 + 2 BC107DE2



20 Appendix-System Diagrams-1 KAC50DP2 + 1 BC197DE2



21 Appendix-System Diagrams-1 KAC50DP2 + 2 BC197DE2



22 Appendix-System Diagrams-2 KAC50DP2 + 1 BC197DE2