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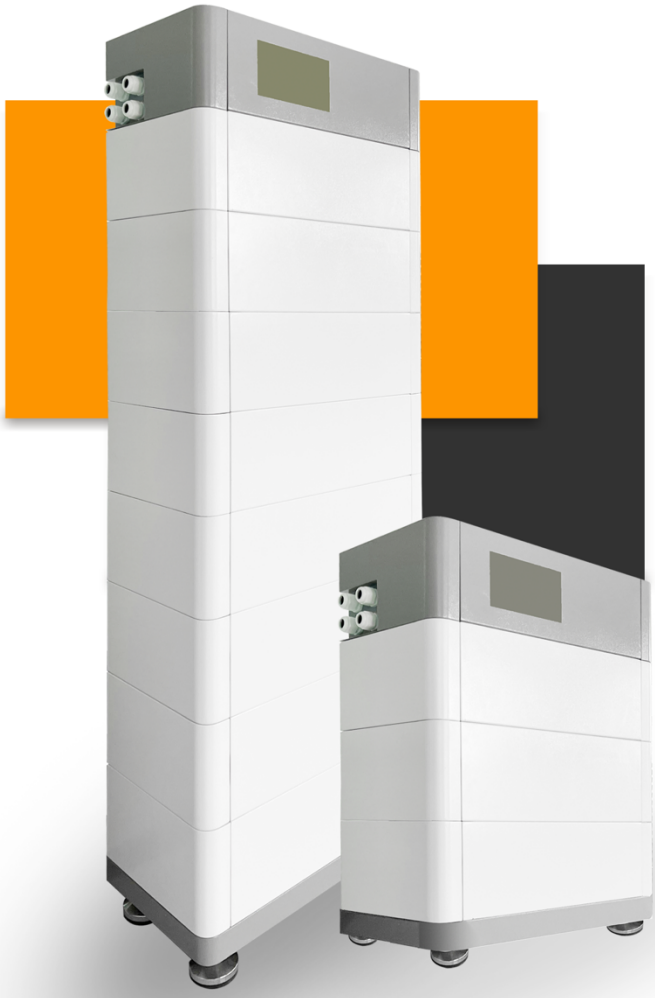
Make Impossible to Possible



Service Guideline and Checklist

Version 23.2

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1. General steps

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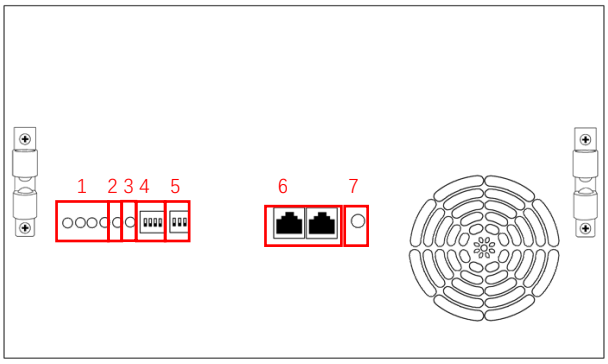
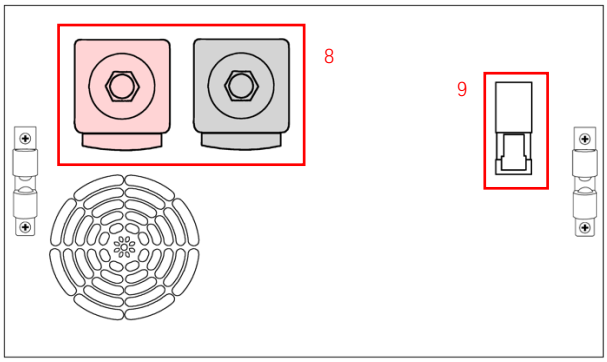
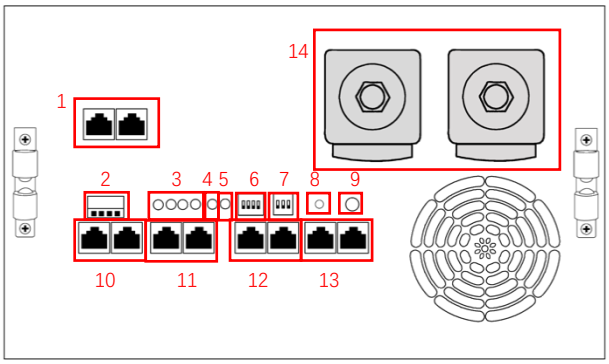
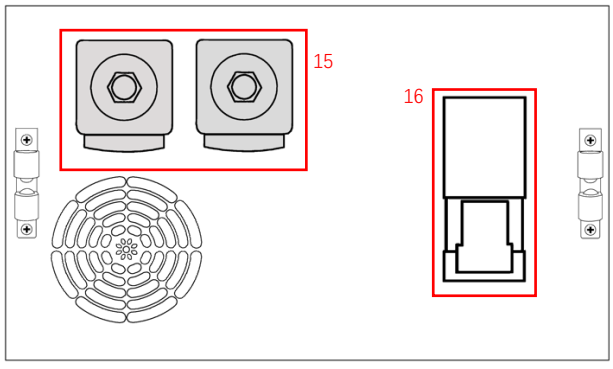
<tr><td>2</td><td>Only one connection method</td><td>The battery packs in one cabinet only support a single connection mode: series connection (high voltage system) or parallel connection (low voltage system). It is strictly forbidden to connect in series and parallel at the same time in one battery cabinet</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Battery pack external connections</td><td> 

1. SOC of battery pack
2. Fault alarm light
3. Run light
4. Address dip
5. Mode dip (choose series connection or parallel connection)
6. RS485-2, RS485-2 communication ports
7. Battery pack ON/OFF button</td></tr>
<tr><td> 

8. Positive and negative terminal posts of the</td></tr>
</table>

		battery pack (red: positive; black: negative) 9. Battery pack air switch
4	BCU external connections	 1. RS485-4 communication ports 2. Dry ports 3. SOC of battery pack 4. Fault alarm light 5. Run light 6. Address dip 7. Mode dip (choose series connection or parallel connection) 8. Reset button 9. BCU ON/OFF button 10. RS485-1, CAN-1 communication ports 11. RS485-3, CAN-3 communication ports 12. CAN-2 communication ports 13. RS485-2 communication ports 14. Positive and negative terminal posts of the battery pack (red: positive; black: negative)
		 15. Positive and negative terminal posts of the battery pack (red: positive; black: negative)

		16. BCU air switch
5	Closed connection area	The Connection Area must be closed in order to keep safe.
6	Proper restart	NOTE: It is important that the energy storage system is switched on before switching on inverter! Defined restart (mind the sequence) 1) Switch off the inverter (if any) 2) Press ON/OFF button on the BCU communication area for 3 seconds (If more than two battery cabinets, press the ON/OFF button of Master BMU only). When the “Beep” sound is heard, the system is powered off and the display is turned off. 3) Push down each BCU air switches to off. 4) Push down air switches of all battery packs. 5)wait 10 minutes 6) Switch on all air switches of battery packs and BMUs. 7) Press the “ON/OFF” button of the master BMU 8) Switch on the inverter (if any)
7	Checking the correct operation	The system runs properly if: ☐ the displays battery SOC correctly ☐ System charges / discharges Note: If you cannot complete the commissioning, then turn off the battery before you leave the site and make sure all switches are off. If this is not possible, lift the BCU. Make sure the system will be set into operation quickly.

2. Error analysis

2.1 BCU shows no reaction.

No.	Name	Solution
1	Connection	Check whether the external connection is

	problem	correct. ☐ Positive & negative connection ☐ Communication cable (More communication information on Part 3-3.1)
2	Dialing problem	Check whether the BCU dial code is correct. (If the dial code is incorrect, please turn off the power of the whole system and set it again) ☐ Address dip ☐ Connection mode dip More communication information on Part 3-3.2
3	Air switch	Check whether the BCU air switch has been opened
4	ON/OFF button	Check whether the BCU ON/OFF button is working. (After pressing the button, the BCU screen lights up after hearing the beep. At this time, after hearing a clickety-clack sound, the system begins running normally.)

2.2 BCU button is on, but BCU shows no reaction.

No.	Name	Solution
5	Connection problem	Check whether the external connection is correct. ☐ Positive & negative connection ☐ Communication cable (More communication information on Part 3-3.1)

2.3 SOC & charging logic

The first operating cycle (charge/discharge) is critical to the overall system/new battery pack. Please finish an operating cycle after the system connection is complete.

No.	Name	Solution
6	SOC at commissioning	A new BCU might show a different SOC at the beginning (mostly 50% / 30% / 0%). However, this is only to be understood as a placeholder value, as a new BCU cannot

		measure the SOC of battery modules. As soon as the system starts to run (charge / discharge), the SOC detection is corrected gradually. The SOC calibration is completed at the latest after a full cycle.
7	SOC accuracy	The SOC of an LFP battery cannot be measured. It is a calculated value. In general, the state of charge (SOC) of a battery is calculated using the voltage, but other factors such as temperature, current flow and charging behavior also play a role. The calculation of SOC is generally more precise if the battery regularly sees full cycles. Every now and then an SOC correction / calibration might occur， that is normal.
8	New battery pack/cabinet connection	A new battery pack / cabinet might show a different SOC at the beginning. However, this is only to be understood as a placeholder value, as BCU cannot measure the SOC of new battery pack / cabinet. As soon as the system starts to run (charge/discharge) the SOC detection is corrected gradually. The SOC calibration is completed at the latest after a full cycle.
9	SOC of Battery cabinet	The overall capacity of the battery cabinet is affected by the capacity and connection method of the connected battery packs. If there are battery packs with low capacity in the battery cabinet, then depending on the connection method of batteries are packs this will happen: - Series connection (high voltage system): The overall capacity of the battery cabinet is the same as the capacity of the lowest capacity battery pack. - Parallel connection (low voltage system): The overall capacity of the battery cabinet is the average of the capacities of

		all connected battery packs under the same BCU.

2.4 Incorrect number quantity

The number of battery cabinets/battery packs displayed does not match the actual installed number.

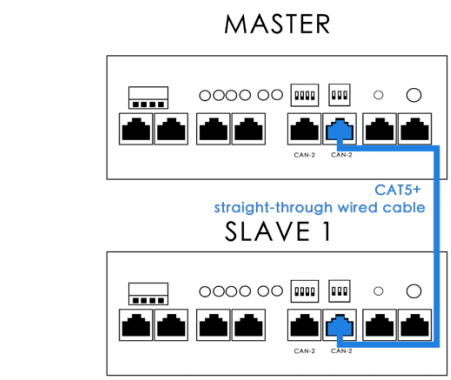
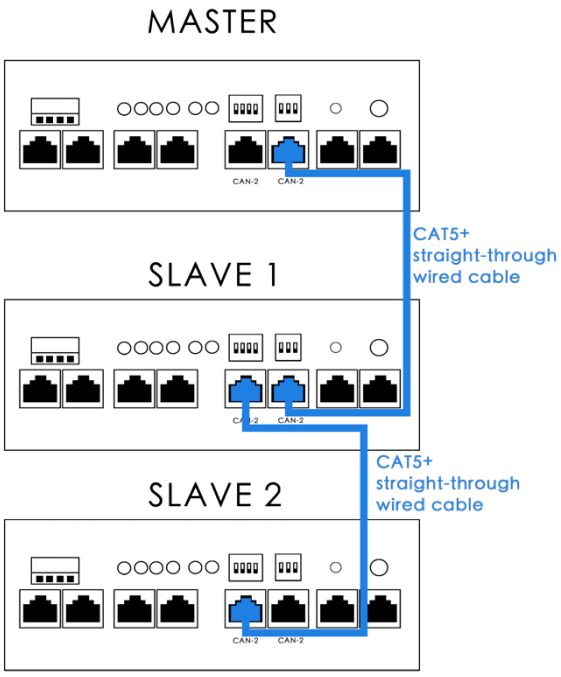
No.	Name	Solution
10	Communication problem	Check whether the communication cable connecting is correct. (Recommend reconnection) ☐ Cabinet – cabinet communication cable ☐ Battery pack – BCU communication cable ☐ Battery pack – battery pack communication cable More communication information on Part 3-3.1
11	display delay	Tap the BCU screen to refresh. (If you change the setting of system, usually the BCU display has a delay of about 10s, please refresh.)

2.5 Unexpected shutdown

No.	Name	Solution
12	Low capacity	Check the capacity of battery system. ☐ Capacity is too low to operate normally
13	Inverter warning	The parameter of inverter ☐ Inverter parameters do not match battery system parameters. (Please check the inverter data parameters) ☐ The output power exceeds the inverter parameter range. (Please check the inverter data parameters)
14	Protection trigger	See more information on Part2-2.7

2.6 System Extension

No.	Name	Solution
15	Extension battery pack	When a new battery pack is connected, the display will show parameter information such as the capacity and relative information of newly connected battery pack and battery cabinet which it is connected. The parameters such as the capacity of the battery cabinet will be adjusted according to the information of the new connected battery pack (refer to 2.3-8 for details). **Note: Don't forget to adjust the number of modules in the configuration, it is necessary. The first operating cycle (charge/discharge) is critical to the overall system/new battery pack. Please finish an operating cycle after the system connection is complete.**
16	Parallel battery cabinet	Cabling / installation (including parallel connection) is described in the short installation guide. Some notes: - A DC bus bar is needed to collect DC cables. There is a matching DC combiner box from CONCENPOWER. Details in the corresponding data sheet and manual of CONCENPOWER combiner box. - Battery needs to be the same type (battery pack connection methods & quantity) - Communication established via master/slave.

		 ---  - Check dial code of DIP switches (More information on Part3-3.2)

2.7 Error event

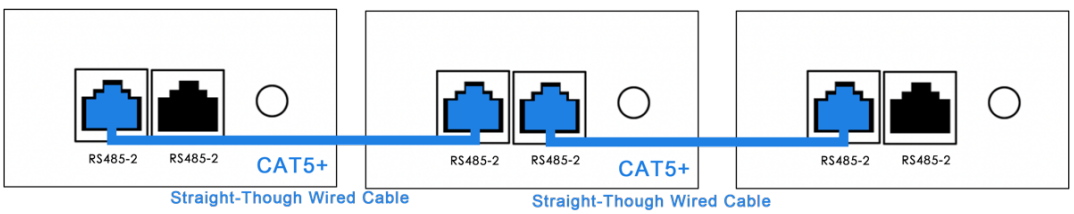
No.	Name	Solution
17	Over voltage protection (OVP)	The problem may be caused by charging the battery system. Turn off the charging of the system, wait for the system voltage to return to normal, and then the protection will be automatically released. Test the voltage of each battery pack (Part 4)

18	Under voltage protection (UVP)	Shut down the system quickly to avoid further discharge. Check whether the system can shut down normally (by pressing the BCU ON/OFF button for 5s). - If the system cannot shut down normally, remove the BCU. Avoid further discharge of the battery, by searching the problem while the battery is completely off / BCU is removed. Do not turn on the battery before making sure the inverter should be able to charge the battery. Test the voltage of each battery pack (Part 4)
19	Over current protection (OCP)	Shut down the output of system. Wait for the system current to return to normal and the protection will be released automatically
20	Over temperature protection (OTP)	Shut down the system quickly to avoid further operating. Wait for the system temperature to return to normal and the protection will be released automatically
21	Under temperature protection (UTP)	The ambient temperature (more information on parameter sheet) of the system is too low, please adjust the ambient temperature.

3. Communication information

3.1 Communication cable connection

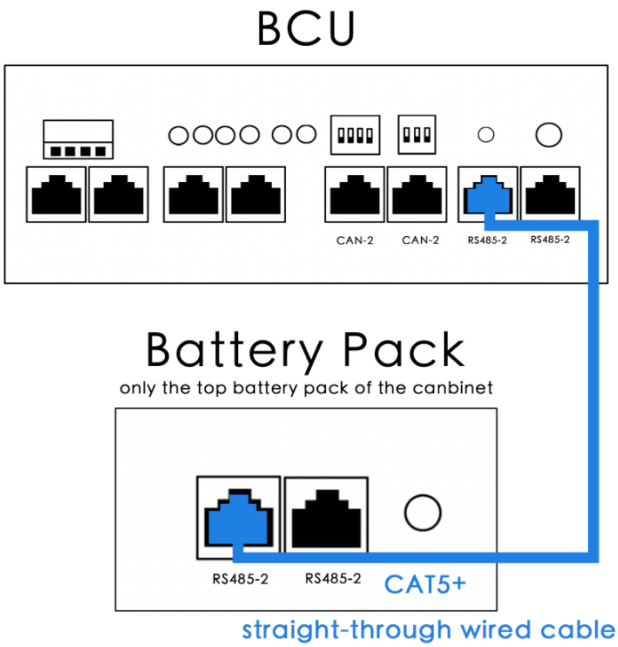
3.1.1 Between Battery packs (RS485-2 to RS485-2)



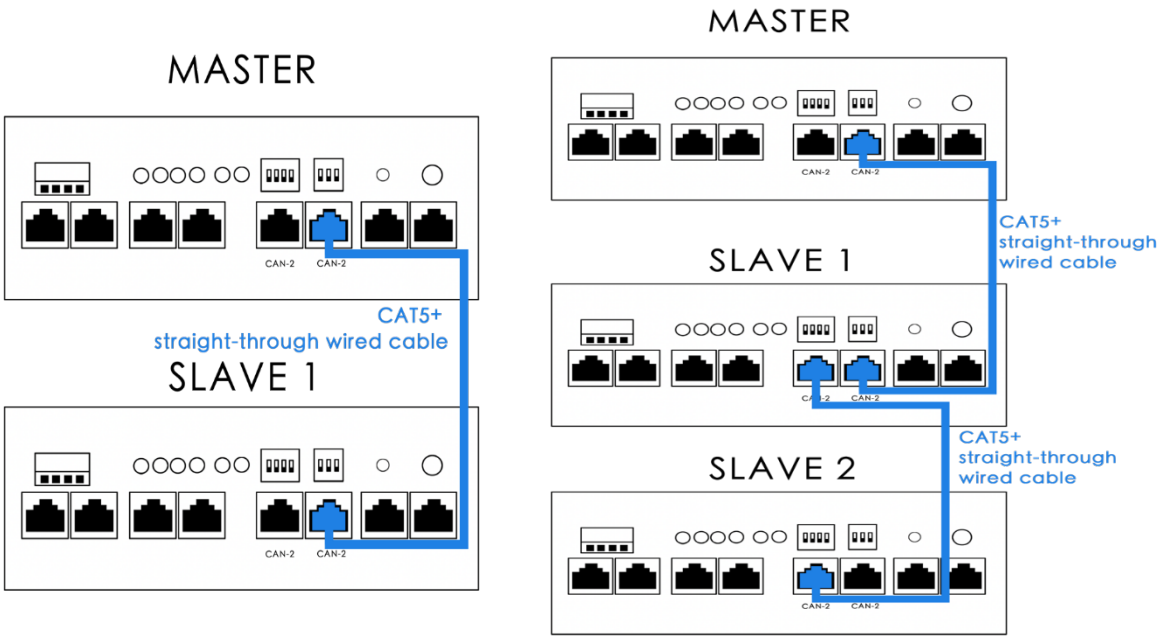
The figure shows 3 battery packs as an example, more battery packs can be

deduced by analogy.

3.1.2 Between battery packs and BCU (RS485-2 to RS485-2)



3.1.3 Parallel connection between battery cabinets (CAN-2 to CAN-2)



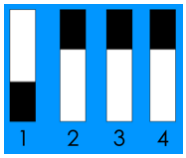
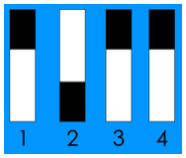
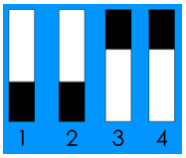
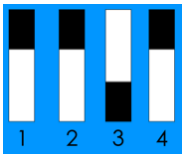
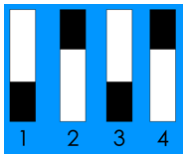
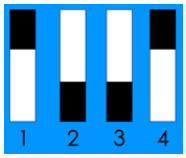
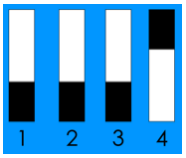
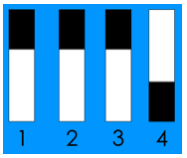
The figure shows 2 and 3 battery cabinet as an example, more battery packs can be deduced by analogy and refer to Part 2.6-16. NOTE: There can only be one MASTER battery cabinet, and the others are slaves.

3.2 Dial code

3.2.1 Battery pack address (NO.) dial code (Blue dip)

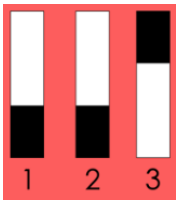
Please dial in numerical order, prohibit dialing jump the numerical order.

Note: The black is dial button

Dial code				
Pack No.	1 (the bottom battery pack)	2	3	4
Dial code				
Pack No.	5	6	7	8

3.2.2 Battery packs connection mode code (Red dip)

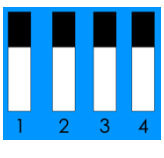
Note: The black is dial button; This Product uses **series** connection between battery packs in one cabinet

Series connection (High voltage system)	

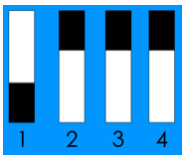
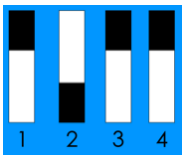
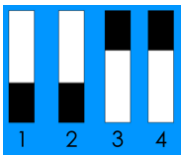
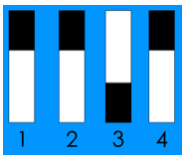
3.2.3 Battery BCU address (No.) dial code (Blue dip)

Please dial in numerical order, prohibit dialing jump the numerical order.

Note: The black is dial button

Master Dial code	

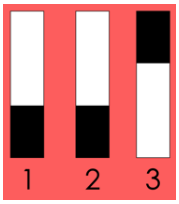
Pack No.	Master

Slaves Dial code				
Pack No.	1	2	3	4

3.2.4 Battery cabinet connection mode code (Red dip)

In the same cabinet, the BCU needs setting as same as the battery packs. This Product uses series connection mode between battery packs, please dial code as below diagram.

Note: The black is dial button

Series connection (High voltage system)	

4. Voltage measurement and undervoltage

ATTENTION: HIGH VOLTAGE! Before the first operation, insulation measures must be taken, and insulating gloves should be worn. Please remove metal objects on your body, such as bracelets, necklaces and other items that may touch the positive and negative terminals of the battery pack.

4.1 Measurement of battery pack voltage

a) Before measuring the voltage of a single battery pack, please make sure that the battery pack is not connected to any cables.
b) Open the air switch of the battery pack.
c) Press the ON/OFF button for the battery pack.
d) Remove the cover of the positive and negative terminals of the battery pack. **(It is strictly forbidden to operate this step without any insulation measures. It is strictly forbidden to allow uninsulated**

body parts to touch the battery pack.)

e) Use voltage meter to measure the voltage. Normally, the voltage range of a single battery pack is around 48V~51.2V.

f) After the measurement is completed, please turn off the button and the air switch in sequence and cover the positive and negative terminals.

4.2 Measurement of cabinet voltage

Take down the BCU and measure the cabinet voltage on the topmost module as shown below. Note: The nominal voltage should be module quantity times 51.2V (for High voltage system); the nominal voltage should be around 51.2V (for Low voltage system).

a) Before performing the following operations, please ensure that the battery cabinet is not connected to the BCU.

b) Open all air switches of the battery packs.

c) Press the ON/OFF button of each battery pack.

d) Remove the cover of the positive and negative terminals of the topmost battery pack. **(It is strictly forbidden to operate this step without any insulation measures. It is strictly forbidden to allow uninsulated body parts to touch the battery pack.)**

e) Use voltage meter to measure the voltage.

f) After the measurement is completed, please press ON/OFF button of each battery pack for 3 seconds and turn off the air switch in sequence and cover the positive and negative terminals.

If the measured voltage deviates significantly from the nominal value as mentioned at beginning in this section, please check the electrical voltage at the individual battery pack.

CONCENPOWER High Voltage Energy Storage System Service Checklist

Important: The installation and all other kinds of works or measurements in combination with the CONCENPOWER Energy Storage System is only allowed by professional and qualified electricians. Improper handling can cause danger and damage. This document does not replace the official CONCENPOWER manuals and documents. No responsibility is accepted for the accuracy of the information.

1. General Steps

   Please carefully check all “General Steps” from page 3 of the Service Guideline and confirm this in the boxes below:

   - ☐ 1.1 Configuration
   - ☐ 1.2 Only one connection method
   - ☐ 1.3 Battery pack external connections
   - ☐ 1.4 BCU external connections
   - ☐ 1.5 Closed connection area
   - ☐ 1.6 Proper restart
   - ☐ 1.7 Checking the correct operation

2. Error analysis

   Please mark the error related Analysis from Chapter 2 of the Service Guideline that you checked and collect all the information related to those Sections.

   - ☐ 2.1 BCU shows no reaction
   - ☐ 2.2 BCU button is on, but BCU shows no reaction
   - ☐ 2.3 SOC & Charing logic
   - ☐ 2.4 Incorrect number quantity
   - ☐ 2.5 Unexpected shutdown
   - ☐ 2.6 System extension
   - ☐ 2.7 Error event

3. Service information

   Please fulfill all available information in below table. Some information like the Serial Number of the BCU is mandatory to receive service

   Service ticket number: _____

   Installer / Delivery information/ contact

   Company: _____ ZIP/city: _____

   Contact person: _____ Phone: _____

   Street No.: _____ Email_____

   System information

   Battery pack number: _____ BCU firmware _____

   BCU number: _____

   Inverter brand: _____ Inverter model: _____

Description of problem:
