Installation Manual

HeSU 4k4 PRO Battery Module

Wall and Stackable Solution

Version -P- up to 8 modules in parallel with FW version Above 10.06

PREFACE

Thank you for choosing our product. We will provide you with a high-quality product as well as reliable after service. To protect against harm to both personnel and the product, please read this manual carefully.

This manual provides detailed information on operation, maintenance and troubleshooting of the product as well as health and safety advice.

Special Announcement:

The manufacturer holds the right of final explanation of any content in this manual.

SYSTEM DESIGN

Systems Design is the process of defining the architecture, components, modules, interfaces, and load data for a system to satisfy specified requirements.

For a solar system these components are the PV modules, inverter/charge controller & batteries, as well as the different interfaces of those components.

BATTERY OPERATION

There are several factors that affect the operation of the battery concerning its ability to deliver capacity and life expectancy.

Storage

Module properly packed into original DG9 carton box to be stored indoors in a clean, level, dry, cool location.

Recommended storage temperature is 25°C

The Battery can be stored in the range of -20°C + 45°C but it is required an inspection and recharge every three months (max charging current is 0.1C)

Max SoC storage % is 50%

Temperature

Many chemical reactions are effected by temperature, and this is true of the reaction that occurs in a storage battery.

The chemical reaction of a Li-Ion is slowed down by a lowering of the electrolyte temperature that results in less capacity.

A battery that will deliver 100% of rated capacity at25°C will only deliver approximately 75% of rated capacity at 10°C.

At temperatures below -7°C the BMS will allow only 0.1C charging Current below -7°C the charge is forbidden.

As part of the performance Warranty, Charge and Discharge shall be in the range 20-25°C 0,5C any usage outside this range is not covered by Performance Warranty

Depth of Discharge (DoD)

Depth of discharge is a function of design. The deeper the discharge per cycle, the shorter the life of the battery. A cycle is a discharge and its subsequent recharge regardless of depth of discharge.
The number of cycles at a specific DoD and the projected life in years the battery / battery system will provide prior to needing replacement.

Charging

Majority of battery capacity/life issues can be traced to improper charging. Improper charging settings may lead to an overcharging or undercharging condition.

WeCo guarantee only batteries connected via BMS line to the Approved inverter

Typical Inverters/Charge Controllers are equipped with CAN/BMS interface ad no settings are required to charge and discharge the battery.

Warranty

Although the BMS of the battery allows a wide range of use both in terms of temperature and charging currents, this should not be construed as an implicit authorization to use the battery at these levels.

For the purposes of the performance guarantee, it is mandatory that the battery is used within the range of temperature and charge / discharge current and Depth of Discharge indicated in the performance guarantee.

Any other use, even if permitted by the BMS ranges, is not covered by a performance guarantee

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HeSU 4k4 PRO Battery Module

In case of product upgrades to the 4k4 PRO Battery Module or for other reasons, this document will be adjusted accordingly. Unless otherwise agreed, this document is intended to be used only as a guide, and all statements, information and advice in the documentation shall not constitute any express or implied action in contradiction to local regulations or standards.

For more information, please contact us.

The official information and the latest datasheet are available on www.wecobatteries.com

It is essential that the battery unit is equipped with the latest firmware version available.

WeCo will release new firmware to improve the functionalities and battery capabilities from time to time

The latest version of the firmware is always available free of charge, the battery firmware can be updated by your local installer.

You can also write an email to service@weco.uk.com to understand the upgrade procedure.

ATTENTION

The 4k4 PRO Battery Module is designed to be used indoors.

The STANDARD IP20 degree of protection does not allow installation in outdoor environments even if sheltered from the weather.

The INDOOR definition means literally the internal environment, the room must be closed to unauthorized persons, ventilated and dry.

 ATTENTION: The battery can explode under heavy impact.

 ATTENTION: Always wear Individual protection devices and follow the safety plan.

 ATTENTION: The batteries weight exceeds 25kg. Appropriate mechanical lifting equipment must be used.

 ATTENTION: The battery terminals must be disconnected before commencing any work on the battery.

 ATTENTION: This battery can accumulate parasite current. Do not touch the B+ and B- terminals. Always check the B+ and B- terminals with a voltmeter. Always ensure that there is ZERO volts present on the terminals before performing any operation on the battery.

 ATTENTION: The battery can explode and must not be exposed to open flames or other extreme sources of heat.

 ATTENTION: Battery must be recycled by a professional company

TABLE OF CONTENTS

1 PREFACE

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To protect against harm to both personnel and the product, please read this manual carefully.

This manual provides detailed information on operation, maintenance and troubleshooting of the product as well as health and safety advice.

For Warranty and Performance Warranty must refer to the Latest Official Limited Warranty Document

STORAGE & PRE-OPERATIONAL PROCEDURES

1.1 Storage - Transportation – Removing / relocation of batteries

- ✓ This Battery is considered DANGEROUS GOODS by the United Nation and must be treated accordingly
- ✓ Each box comes from the factory with the below labels

- ✓ This battery can only be transported and stored with the original approved Carton Box, Certified as per UN CLASS 9 Y80
- ✓ This Battery must be stored in its original carton box in a dry and cool place, WeCo carton box are marked as below

- ✓ The transportation and Storage SoC shall not exceed 50%
- ✓ The Shelf period without recharging is 6 months, it is required a quick charge up to 70% DoD and discharge back to 50% at 0.5C /25°C
- ✓ To preserve the performance the shelf life of this battery store at 25°C 70% Humidity
- ✓ Optimal Storage temperature of the battery is between 15°C and 35°C
- ✓ The self-Discharge in the range of 15-35°C is around 1% a month, outside this range could exceed 10% a month.
- ✓ Do not store the batteries near sources of heat, vapor, Gas, Fuels, Sparks or anything that could generate fire or explosion.
- ✓ Store inside and protect from water and moisture.
- ✓ Transportation of new and used or damaged modules must be in accordance with the UN 38.3 Regulation and with the local rules
- ✓ If one or more working units needs to be removed or relocated this must be marked as **USED BATTERY** (follow local rules)
- ✓ If one or more modules need to be replaced due to damage, they should be marked as **DAMAGED USED BATTERY** and take any applicable procedures for location and local regulations.

2 INFORMATION IN THIS MANUAL

2.1 About this Manual

This manual relates only to the HeSU 4K4 PRO Low Voltage Universal Stackable Model. This manual is intended to be used only by qualified installers who must read carefully and always refer to the manual for guidance on correct operation and maintenance of the product.

2.2 Use Range

This installation guidance applies only to the HeSU 4K4 PRO Low Voltage Universal Stackable Model.

2.3 Additional Information

Specification of the product can be changed without any notice to customers.

2.4 Symbols Used

Symbol meanings：

⚠Caution:

CAUTION represents hazardous situations which can cause light injuries if not avoided.

⚠Notice:

NOTICE represents the situations which can cause damage to property if not avoided.

⚠Information:

INFORMATION provides tips that are valuable for optimum installation and operation of the product.

3 SAFETY

3.1 Warnings and Notification

Installation environment requirements: -HESU- SERIES is designed for household purposes. For installation, it must be installed in a location complying with IP20. (IP 55 or IP65 are available on request). Installations in locations that do not comply with IP20 may cause failure and/or damage to the product and subsequently the product warranty will be considered void.

3.2 Safety Guidelines

⚠Caution:

At all times be certain to avoid a short-circuit between the anode terminal and a cathode terminal of the battery. All electrical connections on the -HESU- SERIES must be made only by qualified professional personnel.

When installed and operated in accordance with this manual, the HeSU Series battery will perform as a safe and reliable manner in accordance with the battery operating specifications.

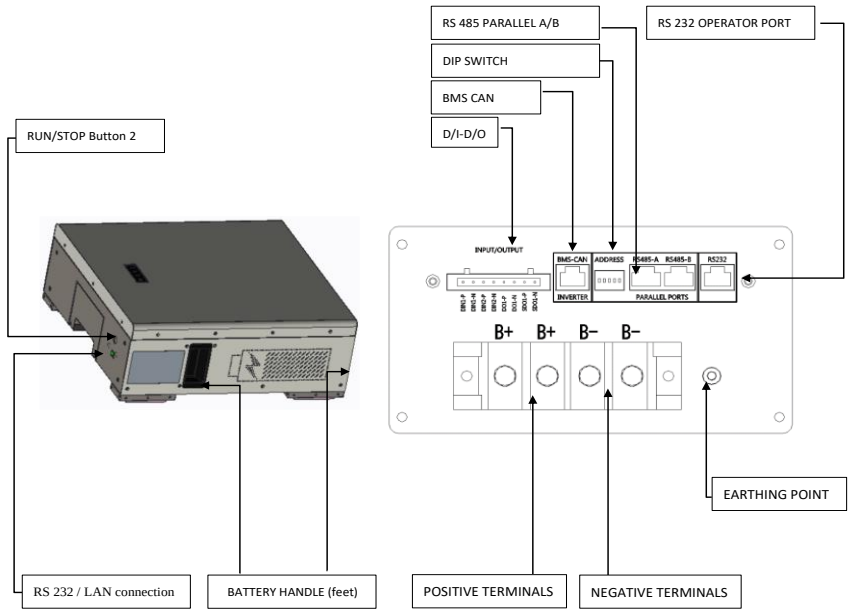
Subjecting the battery to an unsuitable operating environment or to damage, misuse or abuse may result in health and safety risks such as overheating or electrolyte smoke potential. All personnel must comply with the safety precautions and observe all warnings as detailed in this document. If any of the safety precautions or procedures detailed in this manual is not fully understood by the reader, the reader must not perform any operation on the battery, until they have contacted WECO the customer service officer for clarification and confirmation of understanding of the correct procedure.

The safety guidelines included in this document may not include or consider all the regulations in your area of installation/operation. When installing and operating this product the installer must review and consider applicable local laws and regulations in accordance with the industry standards of the product.

Installation personnel shall not wear watches and other metal items when performing installations as a precaution to avoid short circuits and personal injuries.

⚠Caution:

The weight of an individual HeSU 4K4 PRO battery is around 50kg, please use original packaging and perform all safety precautions if the battery is to be relocated to another location, to avoid damage to the product and personnel injury.



4 PRODUCT OVERVIEW

4.1 Product Introduction

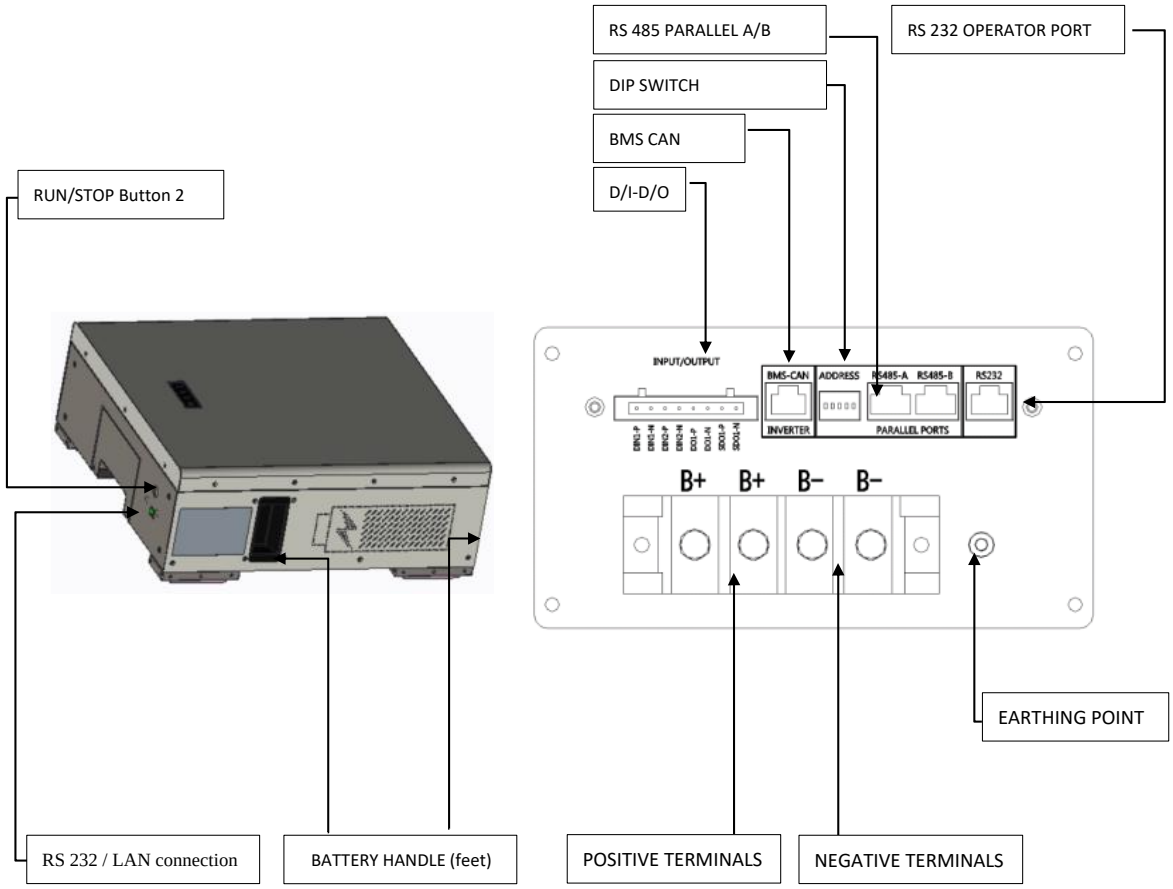
The HeSU Series batteries can be used as an on-grid or off-grid energy storage system. It is recommended not to use this product for any purpose other than the intended purpose as described in this document.

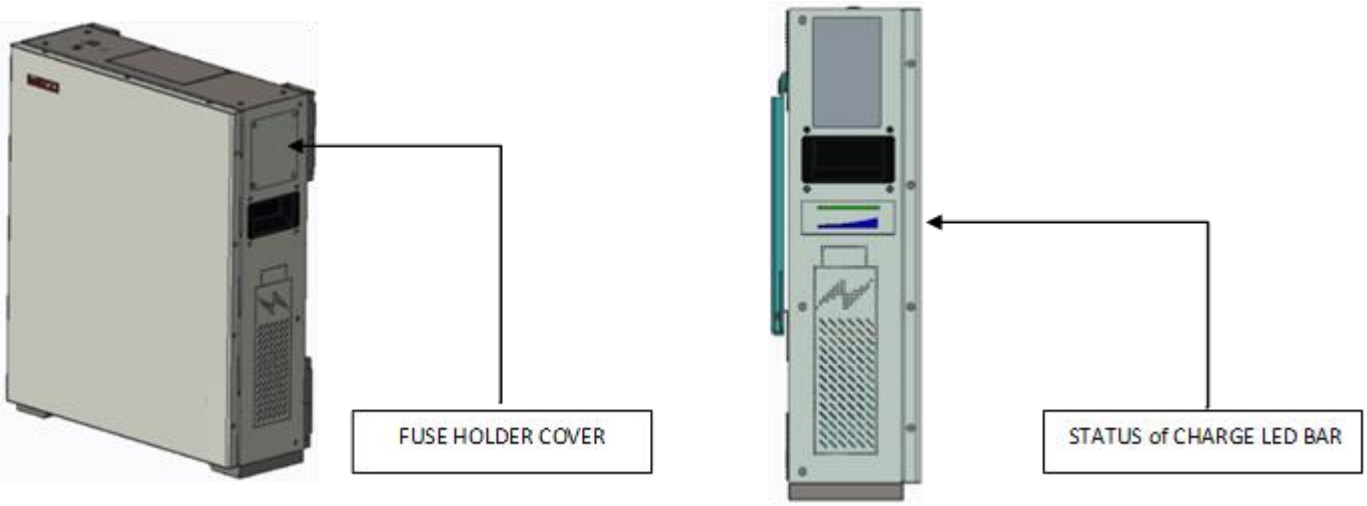
Use of this product other than as described in this document will nullify the product guarantee. The substitution or installation of any components of this battery will nullify the product guarantee.

The use of any components contained within or connected to this battery other than the products sold as part of this product or recommended by the manufacturer will nullify the product guarantee.

Connecting more than five individual HeSU 4K4 PRO battery units in parallel will nullify the product guarantee.

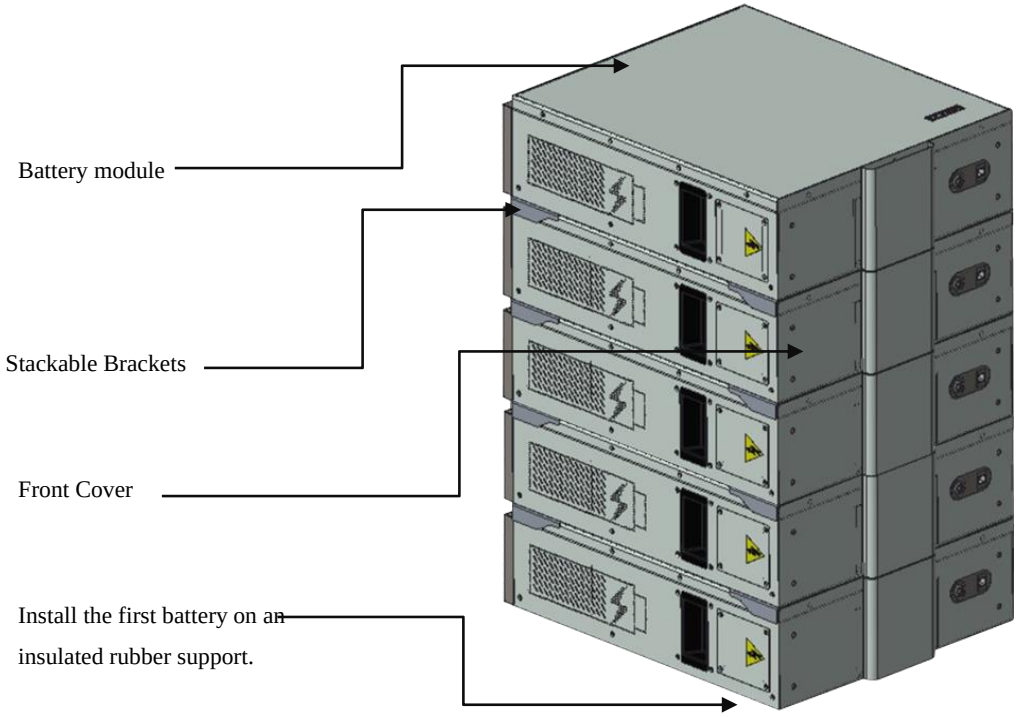
4.2 Identifying the Product Components





A Stackable system can be realized by utilizing the Stack Kit(to be purchased separately)

Once installed the system will appears like the picture below.



The nameplate label attached to the product describes the product parameters, including model type and serial number. Installers must always check that the specifications displayed on the nameplate of the battery module relates to the installation manual that is being referred to for guidance.

Only qualified personnel, with a comprehensive understanding of this manual are permitted to install this product.

4.3 LED Bar definitions

During startup: LED1-LED5: GREEN for 5 Seconds

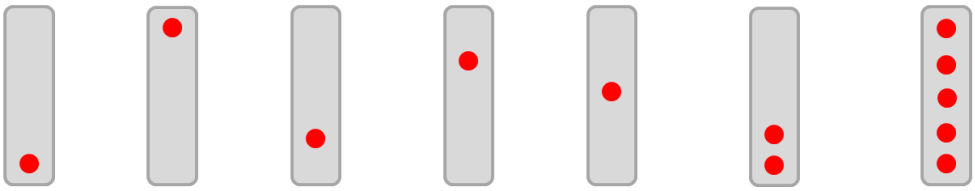
After startup: LED1-LED5 changes to BLUE color and the SOC of the battery will be displayed.

SOC STAUS

SOC 90-100%
SOC 55-89%
SOC 32-54%
SOC 6-31%
SOC 5% * (Yellow when SOC is below 4,9%)

ERRORS

Low voltage contactor open	High voltage contactor open	Low temperature contactor open	High temperature contactor open	High current contactor open	Slave lost communication with Master	BMS Fault
LED1 on RED	LED5 on RED	LED2 on RED	LED4 on RED	LED3 on RED	LED1-LED2 on RED	LED1-LED5 on RED



⚠ Information:

During the normal status the LED bar always displays SOC value.

During a Fault or Error the LED bar displays the SOC value for 5 seconds, and then displays the battery fault status for 5 seconds, alternately

5 SYSTEM INSTALLATION

The battery is packed in a carton box. The total weight exceeds 55Kg and as such it is mandatory that the opening, unpacking and preliminary checking of the battery is conducted by carried out by a minimum of two people.

5.1 Installation Notice

a) Before installation, check the battery open circuit voltage.

b) Battery installation location should be at least 20m away from sources of heat, sparks or other source of potential danger.

c) Battery connecting cables should be as short as possible to prevent excessive voltage drops.

d) Batteries with different capacity, different P/N or from different manufactures must never be connected together.

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

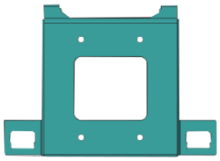
f) The battery should be installed on a horizontal plane.

5.2 Package Information and Parts List

The battery is packed in a carton together with standard accessories. When unpacking the battery, be sure to check that the battery and accessories are free from damage and that the correct quantities of each component are included within the carton.

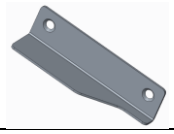
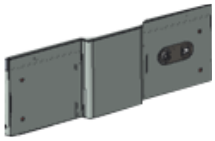
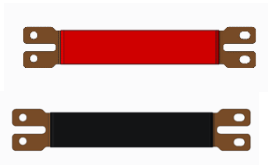
The following list of components can be used as a check list when unpacking the individual battery and battery kits.

5.2.1 Parts list * Included Accessories

Number	Name	Quantity	Description	Image
1	Battery	1	Lithium battery module	
2	Wall mounting plate	1	Support Plate	
3	Wall screws	4	Wall Plate Fixing Screws+Plug	
4	CAN cable RJ45 (RJ 45/RJ9)	1	1.5m	

5	RJ45 parallel cable	1	1.5m	
6	Power cable	1	Length 2.5m 25mm diameter	
7	User manual	1		https://wecobatteries.com/download-area/

5.2.2 Stack Kit (To be purchased separately)

Number	Name	Quantity	Description	Image
1	Stack Feet with rubber	2	Left Side + 2 Screws	
2	Stack Feet with rubber	2	Right Side+ 2 Screws	
3	Front Cover	1	Front Cover + 4 Screws	
4	Parallel Bus Bar	1+1	1 Red Bus Bar 1 Black Bus Bar	

5.2.3 Recommended Installation Tools

To remove the terminal cover it is required an Allan Key 2.5mm

 Multimeter + Current clamp	 Screw Driver Set	 Allen Key Set	 Drill + Hammer
 Electrician Scissors	 Wrench set	 Lifting strap + mechanical lifter	 RS 232/USB+screw terminal (insulated)

5.2.3 Personal Protective Equipment

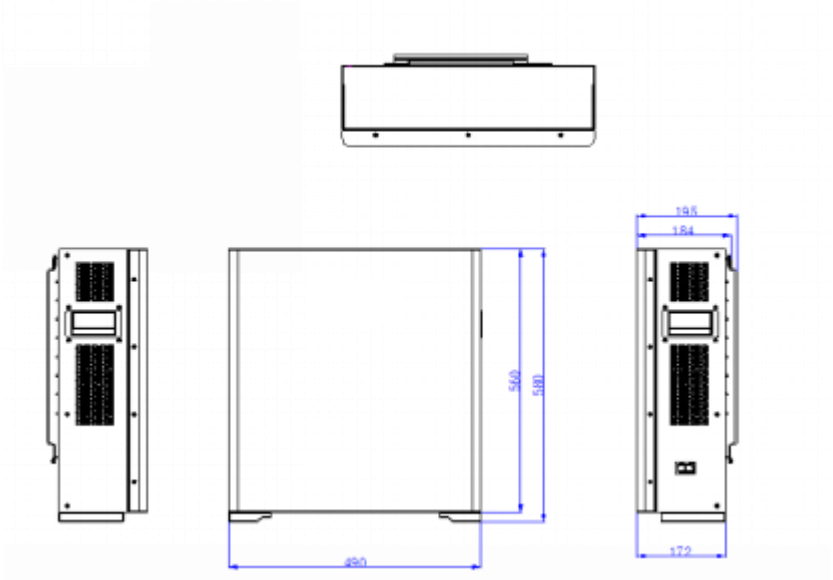





5.3.1 Installation Procedure (Wall Mount)

Preparing the installation area by considering the battery dimension and weight.

The battery weight is 56kg. The wall or the floor must be capable of supporting the battery weight.

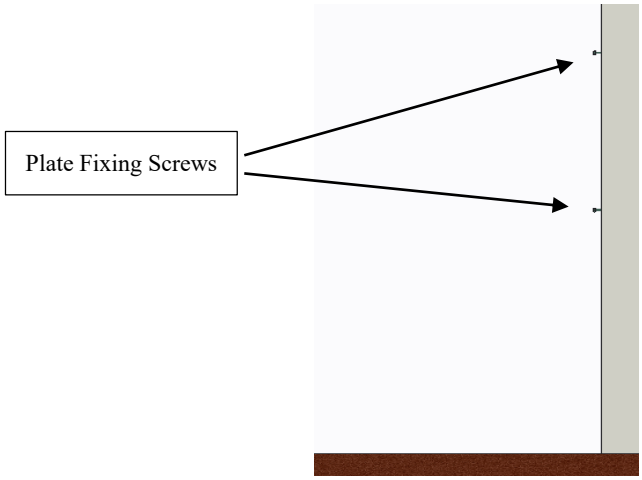


Wall Installation Procedure

Step 1： Install the fixing screws on the appropriate height of the wall. The scheme is as following:

⚠Information:

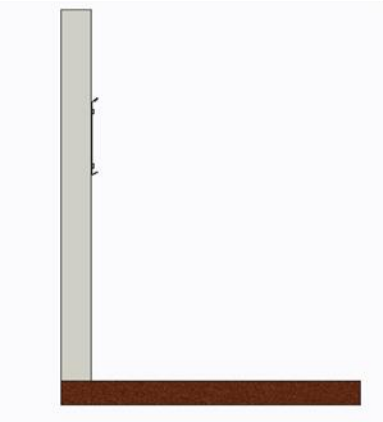
When installing the screws, please check the wall plug size, WeCo provides 4x ϕ10*60mm, but it may be that a different size or type will be required depending on the actual installation surface.



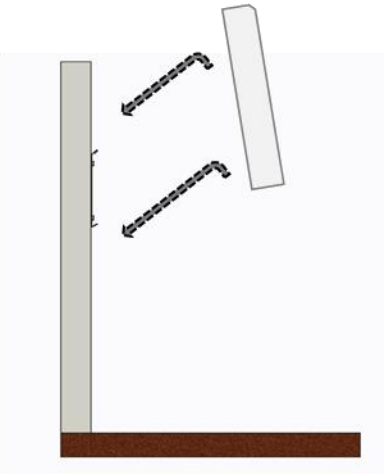
Step 2: Make sure that the mounting screws are firmly and securely attached to the wall.

Information:

When the battery bracket is fixed, please work with a partner to avoid damage to the product or personal injury and install the battery on the wall bracket.



Step 3: Fix the support plate on the wall



Step 4: Interlock the battery module with the wall bracket

Information:

For wall and floor installation it is always required to secure the battery module with the vertical structure by using the provided bracket

Free standing installations are strictly forbidden

Wall Mounted

Floor Mounted

Information:

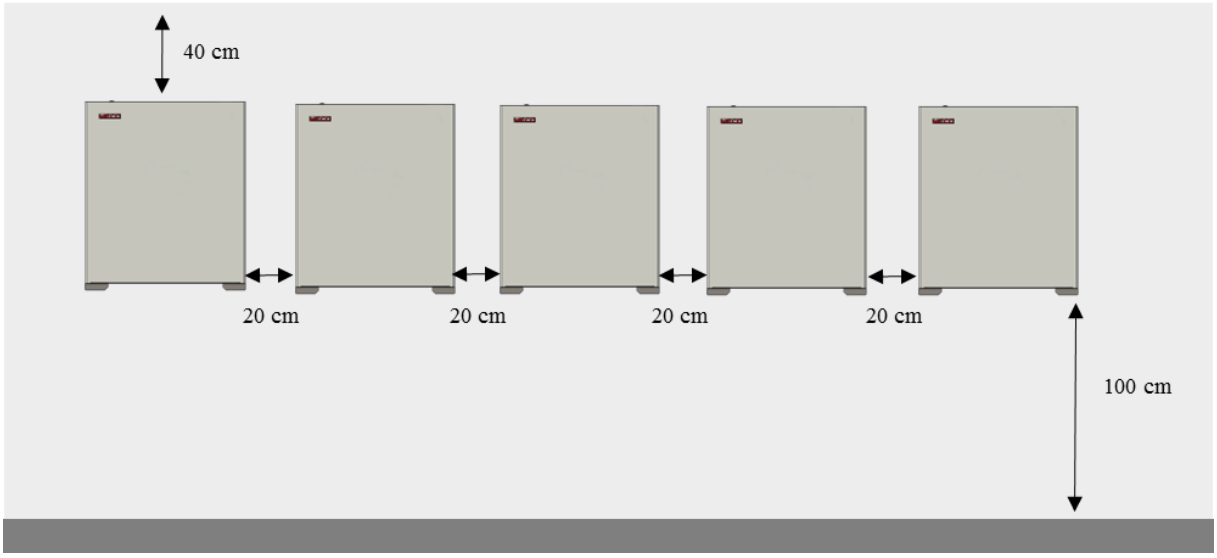
When installing the battery, please work with appropriate lifting devices managed by at least two people to avoid product damage or personal injury. The battery module exceeds 55Kg.

Wall Mounted Installation of Multiple Batteries

Keep 20 cm between the batteries and or between walls and other objects on the left and right side.

Maintain at least 40 cm from the ceiling.

The bottom side of the battery is suggested to be at 100cm from the floor

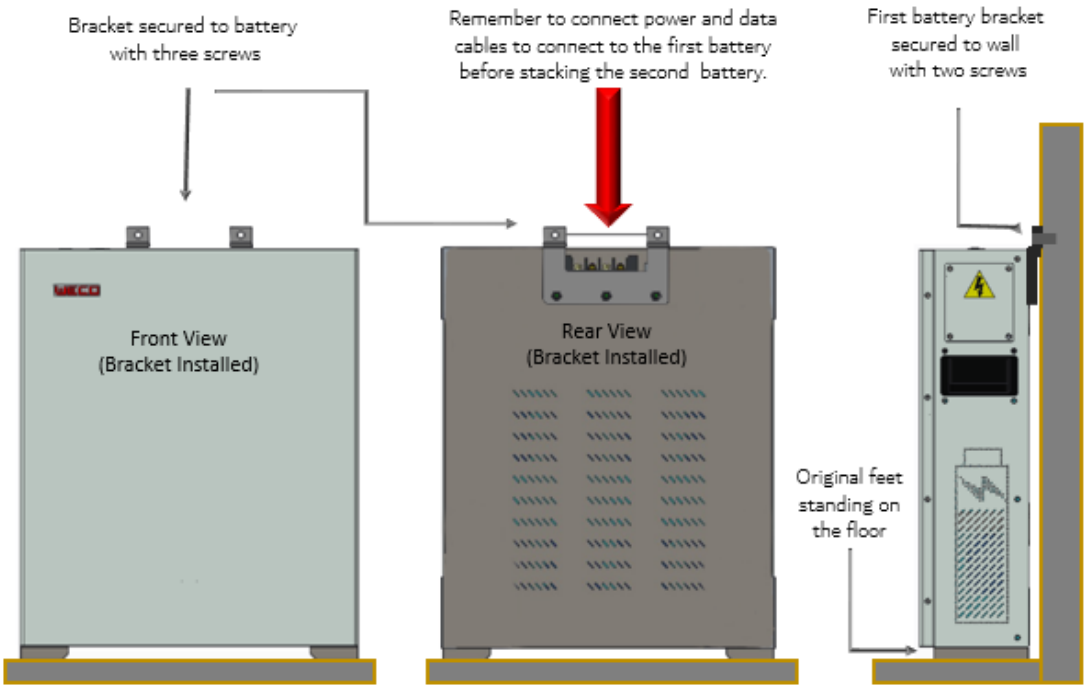


Wall Stack Installation (Vertical Kit) (Maximum Three Batteries per Stack)

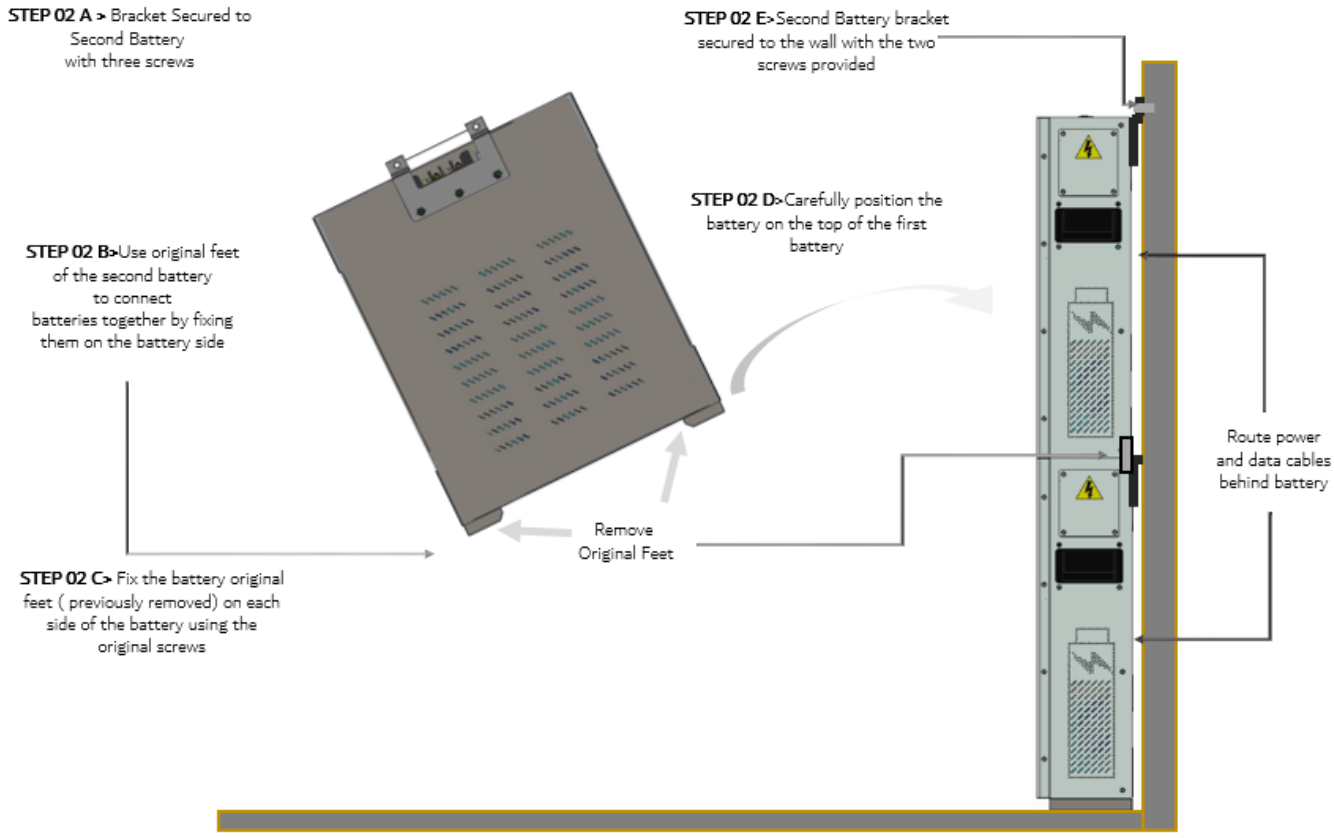
Up to three batteries can be installed vertically, one on top of the other, against a wall with the bottom battery resting on the floor.

This installation will require the vertical installation kit (Vertical Kit) only available for use with the 4K4 batch WE-4K4P-21-23-0001.

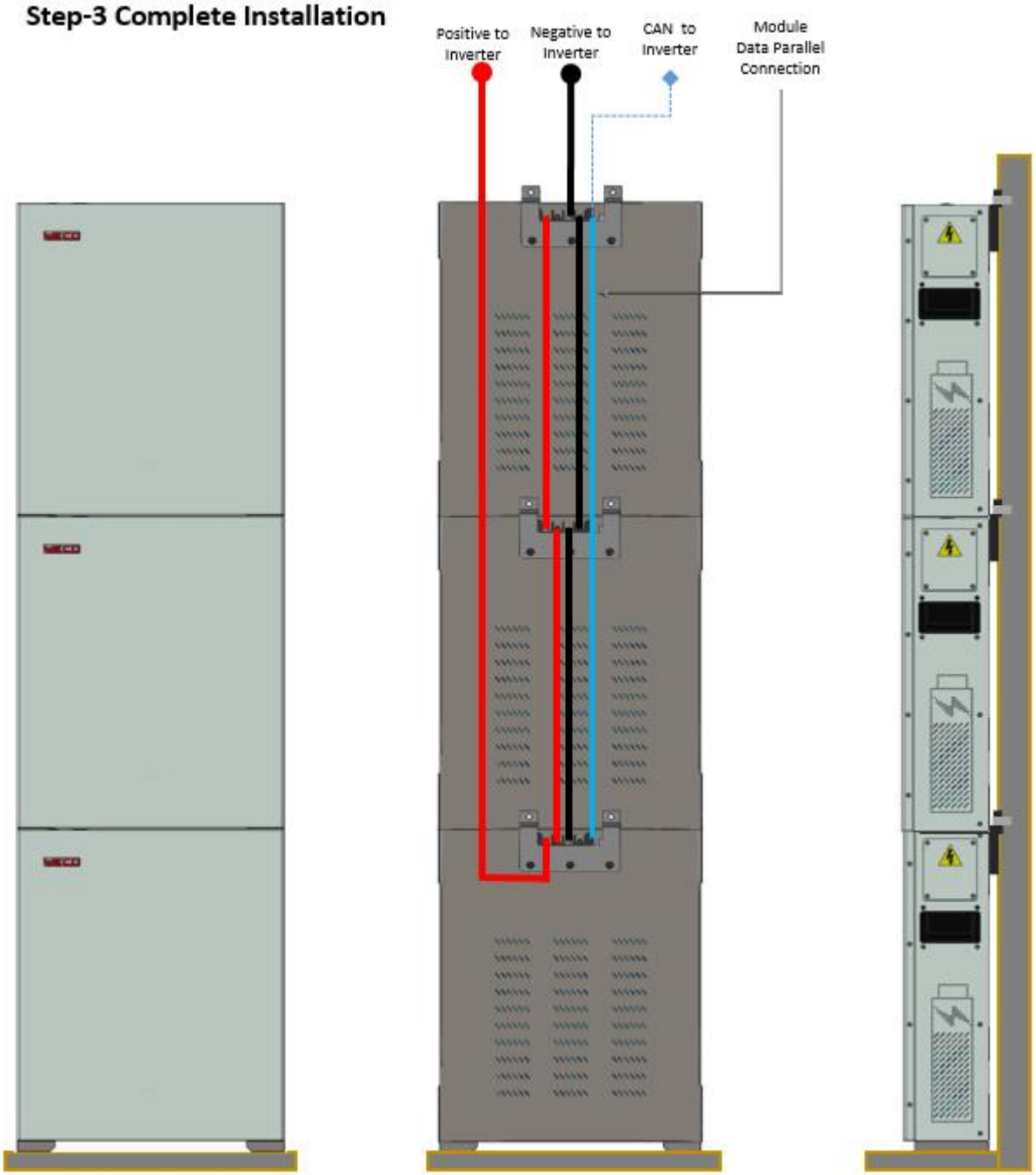
Step-1 Install First Battery Module



Step-2 Install Second Battery Module with Vertical Kit



Step-3 Complete Installation



5.3.2 Floor Stack Installation

5.3.2.1 Installation of accessories and preparatory phases

Phase 1: Choose the support surface carefully, the batteries have a weight of over 55 kg each and can reach 270 kg including the accessories, in a stack of five batteries.

Make sure the support surface is adequate to support the overall battery load.

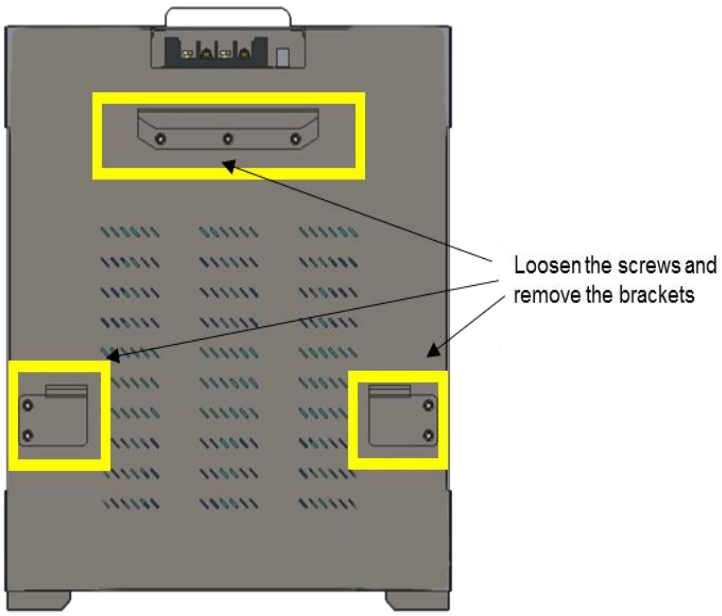
⚠ Information:

Preparation of the modules

The battery is delivered as standard in a **WALL MOUNTED CONFIGURATION** and it is therefore necessary that the installer make simple external changes to install into a **STACKABLE CONFIGURATION**

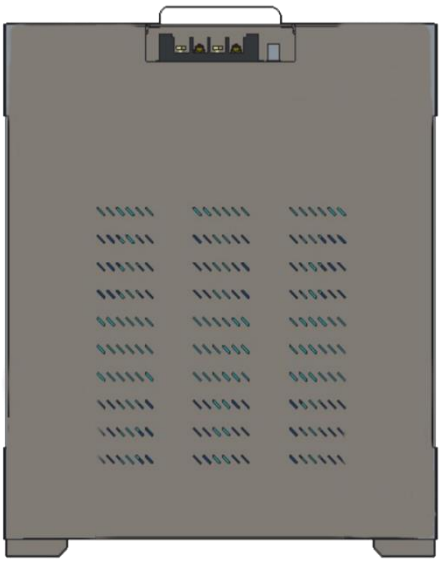
STACK MOUNT INSTALLATION PROCEDURE

Step 1: When the batteries will be stacked you must remove the three brackets from the back side of the battery as shown below

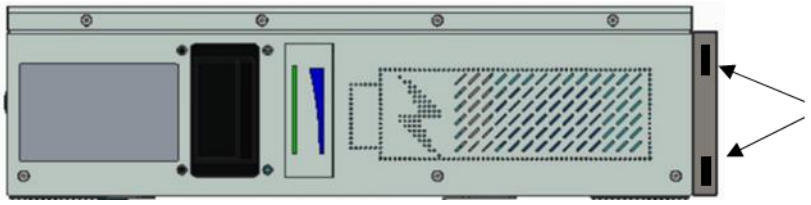


Step 2: Next, install the pads on all four corners of the back of 1st module using the stack brackets in reverse position (see video on WeCo batteries Youtube Channel https://www.youtube.com/watch?v=kzxuK2jWPK8&t=296s)

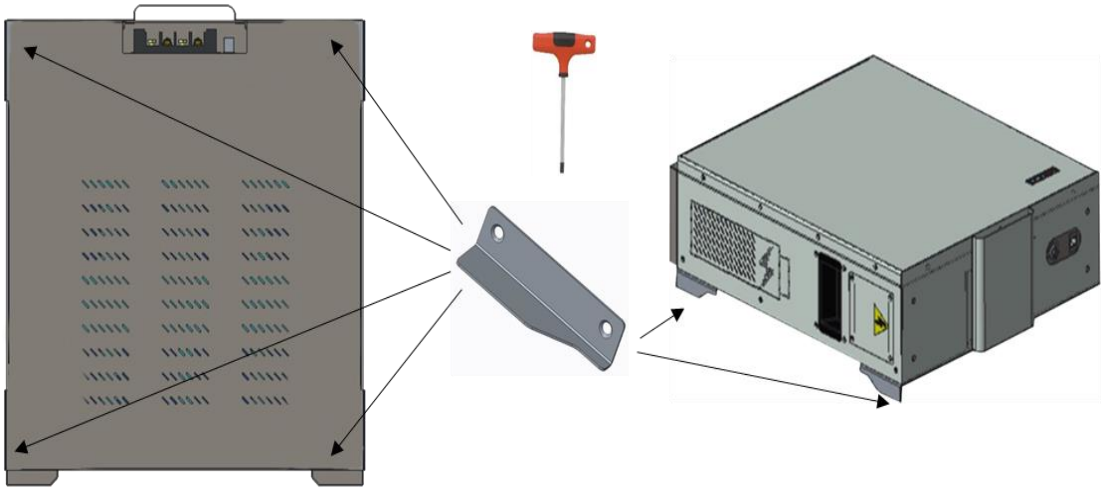
Positioning the first module on a support in accordance with the local regulation and in accordance with the site specifications



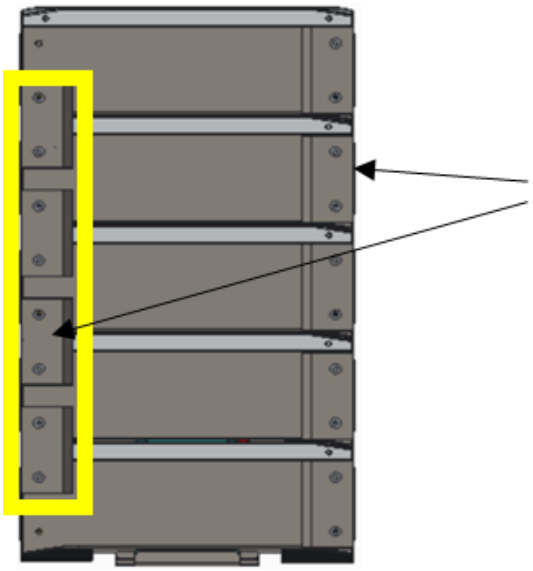
Step 3: To lift and position the battery on top of the first one, use the temporary handles provided with the stack kit and align the second battery with the first and lay down the second module.



Step 3.a: Lay the first module on a support in accordance with the local regulation and in accordance with the site specifications



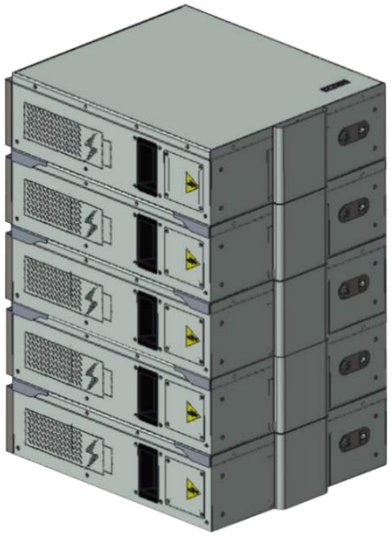
Step 4: Once each battery has been installed in the horizontal position, the feet which shipped with the battery in standard configuration can be removed and installed across the modules to interlock the modules with each other.



Remove the feet from its original position and install as shown in the side highlighted in yellow, do the same operation for both sides

Step 5: Continue installation of the modules considering the floor admitted load.

\WeCo suggests to install a max of 5 modules, and 4+4 to compose a cluster of eight modules.



⚠Caution:

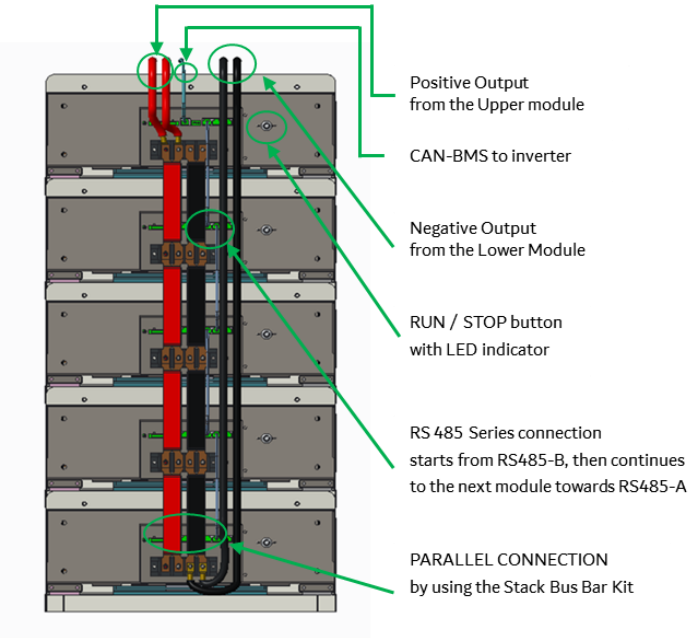
Each battery weights more than 55kg and must be installed with the help of a mechanical lift, and / or with at least two people equipped with suitable suction cups for lifting or with lifting straps

⚠Caution:

MAKE SURE THAT THERE IS **ZERO VOLTAGE ON THE BATTERY TERMINALS**. CHECK THE LED BUTTON ON THE BOTTOM AND ALWAYS MEASURE THE B+ AND B- TERMINALS WITH A MULTIMETER.

Once it has been verified that there are ZERO volts present ON ALL BATTERIES, proceed with the installation of the cables as shown in the diagram below.

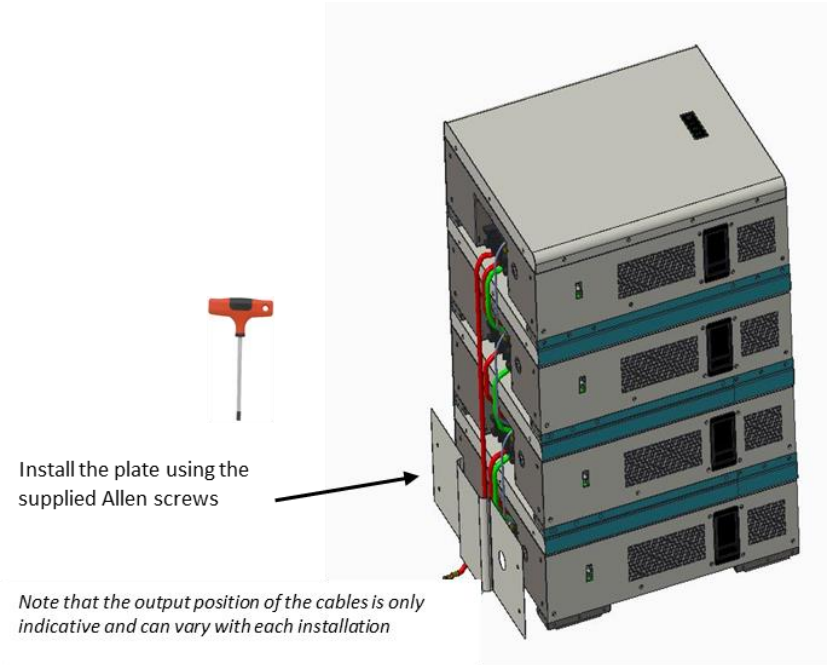
Power Connection by using the STACKABLE KIT BUS BAR



After all cables and bus bars have been connected, and the inverter is correctly set up, try to start up the system by turning ON the master module and proceed toward the last module installed. If the installation is properly set up all the modules will turn on in sequence, install the protective front plate

If the inverters have properly identified the battery BMS model and Capacity, Turn OFF the system your connection is properly set up.

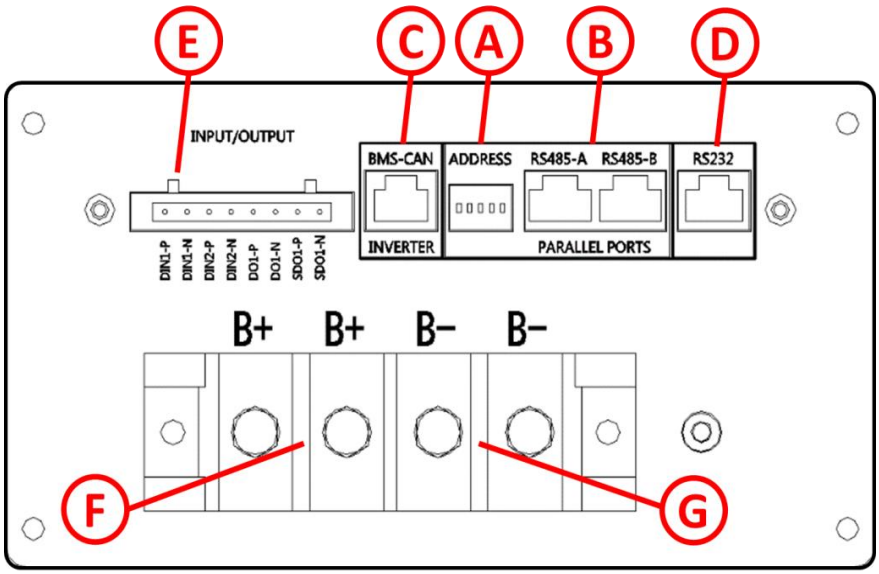
Always install cables in accordance with installation guidelines and avoid long cable runs to prevent excessive voltage drops



5.4 Communication & Control Panel

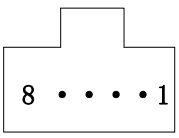
5.4.1 Terminal Function and Definition

The terminal layout is shown in the following figure:



Wiring definition table		
Interface	**Name**	**Function**
A	ADD	DIP switch, set the RS485 address and terminal resistance.
B	RS485-A RS485-B	When the battery is installed as stand-alone it can communicate with the inverter via RS485 interface. When the battery is installed in parallel, the RS485 interface is used for synchronous communication between battery packs.
C	CAN	CAN bus interface communicates with the inverter.
D	RS232	RS232 interface is used for monitoring battery real-time data and troubleshooting. (laptop Connection)
E1	DIN1-P	IO port, interacts with a diesel engine, a photovoltaic device, or other external device.
E2	DIN1-N	
E3	DIN2-P	
E4	DIN2-N	
E5	DO1 -P	
E6	DO1-N	
E7	SDO1-P	
E8	SDO1-N	
F	B+/B+	Battery positive
G	B-/B-	Battery negative

Attention： Interface-C is an RJ45 Port corresponding to the CAN Bus pin definition shown below



Pin	8	7	6	5	4	3	2	1
Definition						GND	CAN_L	CAN_H

5.5 DIP Switch Settings

⚠ Caution:
Always configure the DIP switch settings BEFORE connecting any power cables to the battery terminals B+ and B-.

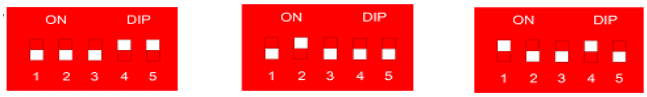
⚠ Caution:
The battery module must be restarted for DIP switch settings to take effect

⚠ Caution:
When connecting to an inverter which has BMS-CAN communication, switch #5 on the Master battery module must always be set to ”ON”.

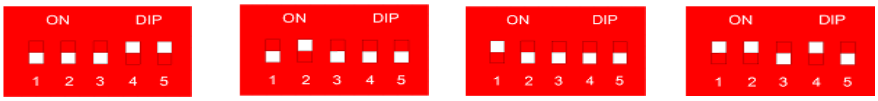
5.5.1 Stand Alone Battery

5.5.2 (Master + Slave#1)

5.5.3 (Master + Slave#1 + Slave#2)

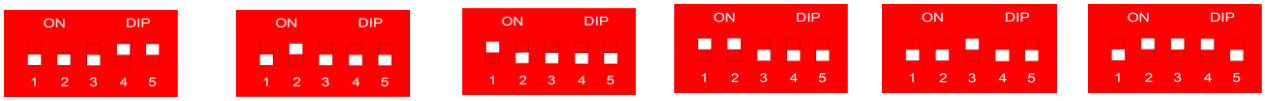


5.5.4 (Master + Slave#1 + Slave#2 + Slave#3)



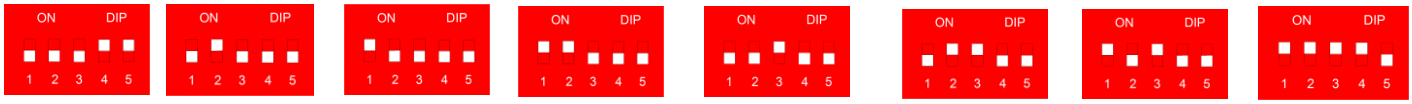
5.5.5 (Master + Slave#1 + Slave#2 + Slave#3 + Slave#4)

5.5.5 (Master + Slave#1 + Slave#2 + Slave#3 + Slave#4+ Slave#5)



5.5.6 (Master + Slave#1 + Slave#2 + Slave#3 + Slave#4 + Slave#5 + Slave#6)

5.5.7 (Master + Slave#1 + Slave#2 + Slave#3 + Slave#4 + Slave#5 + Slave#6 + Slave#7)



⚠Caution:
Always configure the DIP switch settings BEFORE connecting any power cables to the battery terminals B+ and B-.

5.6 Parallel Battery Wiring Convention

⚠Caution:
Parallel battery installation must follow the wiring conventions shown in the illustrations of this section

- 5.6.1 Master Plus Slave#1
- 5.6.2 Master Plus Slave#1 & Slave#2
- 5.6.3 Master Plus Slave#1 & Slave#2 & Slave#3
- 5.6.4 Master Plus Slave#1 & Slave#2 & Slave#3 & Slave#4
- 5.6.5 Master Plus Slave#1 & Slave#2 & Slave#3 & Slave#4 & Slave#5
- 5.6.6 Master Plus Slave#1 & Slave#2 & Slave#3 & Slave#4 & Slave#5 & Slave#6
- 5.6.7 Master Plus Slave#1 & Slave#2 & Slave#3 & Slave#4 & Slave#5 & Slave#6 & Slave#7

⚠Caution:
Failure to follow these wiring conventions can result in damage to the battery and potentially cause personal injuries.

⚠Caution:
For parallel battery connections follow the instructions provided in Section 9 and Section 10 of this manual. These sections give instructions on the diameter of cables to be used in parallel installations. Failure to do so can result in damage to the battery and potentially cause personal injuries.

⚠Caution:
For maximum charge and discharge current refer to the tables given in Section 9, Section 10, Section 11, Section 12 and Section 13 of this manual.

⚠Caution:

All Power Cable Connectors should be tightened to 40 Nm and checked every three months

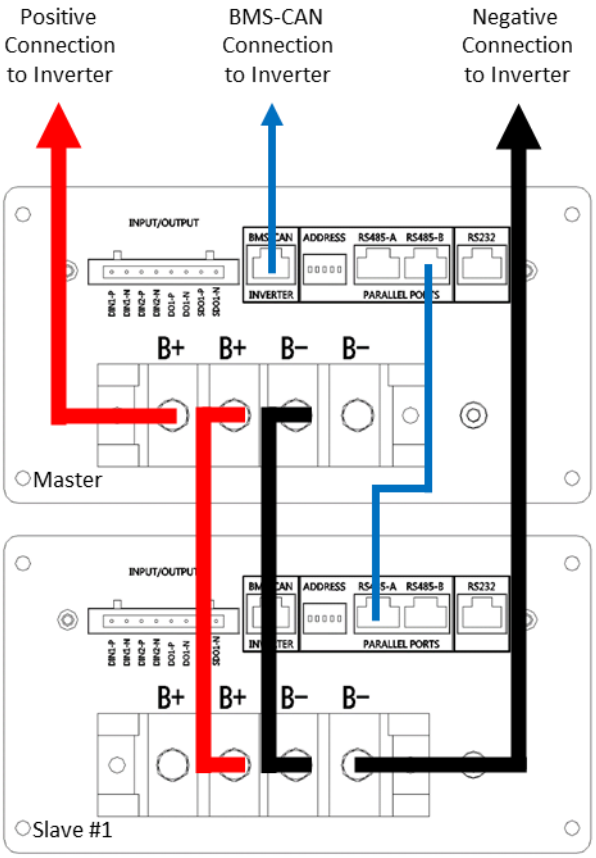
⚠Caution:

The drawings in this manual are for reference only. If the drawings in this manual do not match the actual product that is being installed, DO NOT PROCEED. Ensure that the battery is isolated and that all connections are removed. Store the battery in a safe place and call WeCo product assistance for support service@weco.co.uk.

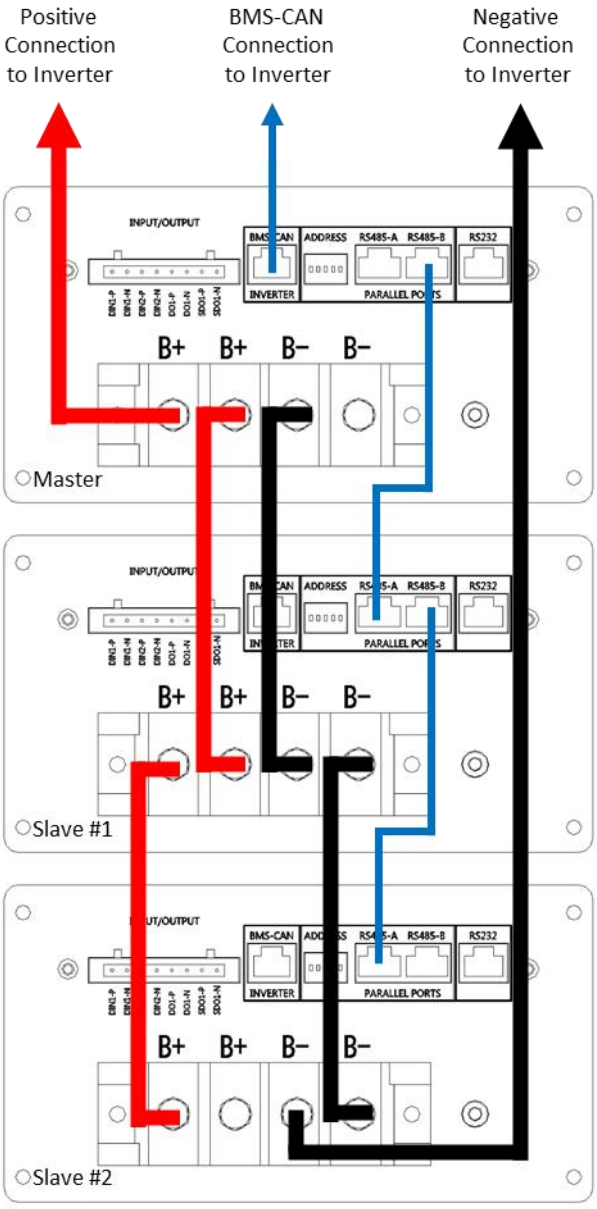
The batteries in each stack communicate with each other via the RS485 ports. The master battery always connects to the RS485-B port and from there connects to the RS485-A port on the Slave#1 module. The RS485-B port on the Slave#1 module then connects to the RS485-A port on the Slave#2 module and so on depending on the number of batteries you have in a stack.

The BMS-CAN port on the Master battery connects to the Inverter.

5.6.1 Master Plus S1



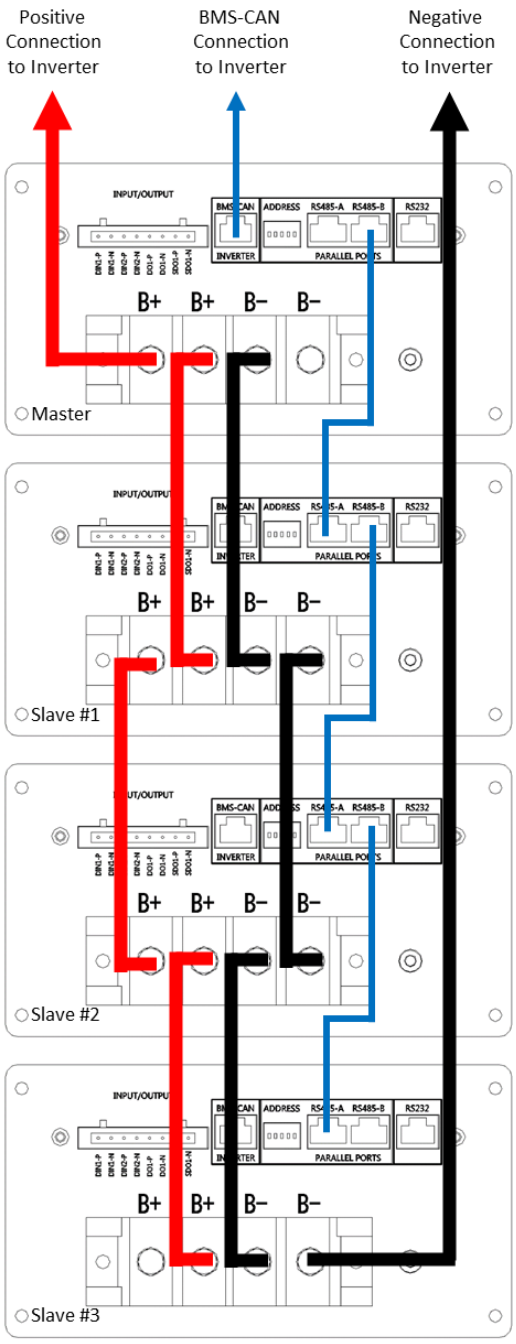
5.6.2 Master Plus S1-S2



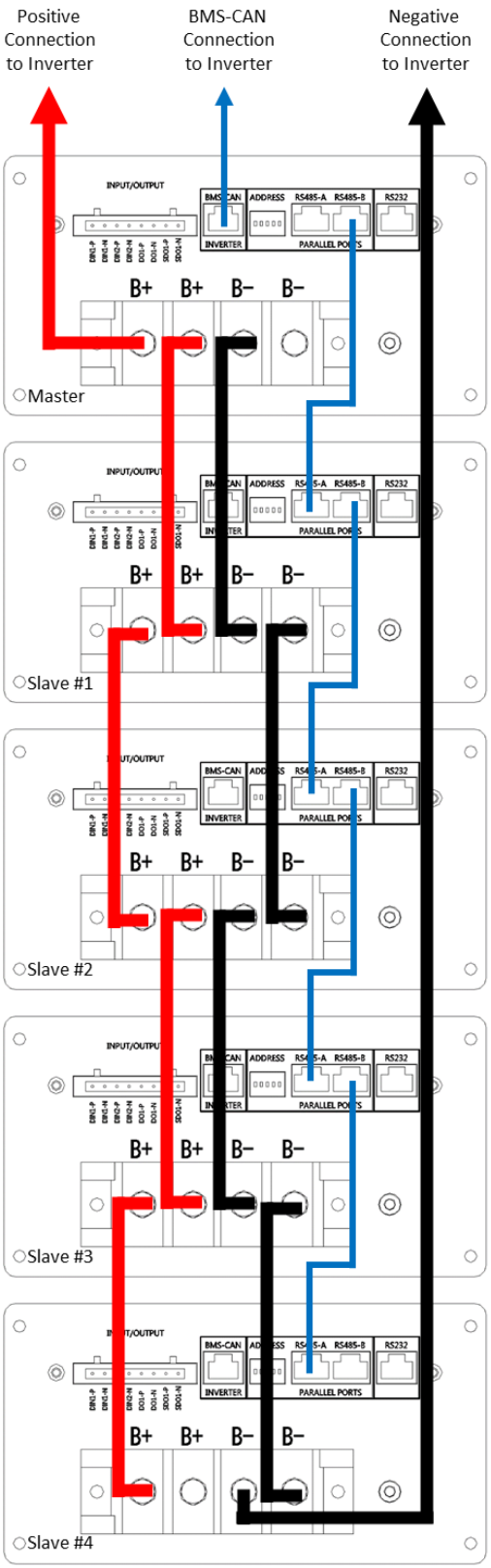
⚠Caution:

For parallel battery connections follow the instructions provided in Section 9 and Section 10 of this manual. These sections give instructions on the diameter of cables to be used in parallel installations. Failure to do so can result in damage to the battery and potentially cause personal injuries.

5.6.3 Master S1-S2-S3



5.6.4 Master Plus S1-S2-S3-S4

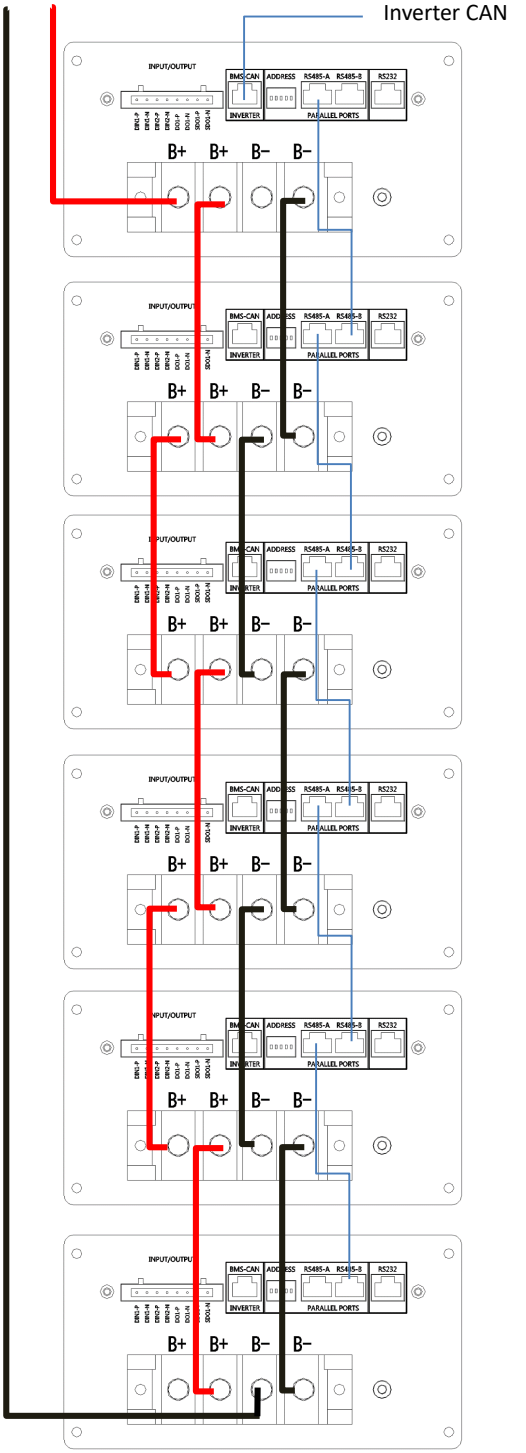


5.6.4 Master Plus S1-S2-S3-S4-S5

Negative and Positive

To Inverter

Inverter CAN

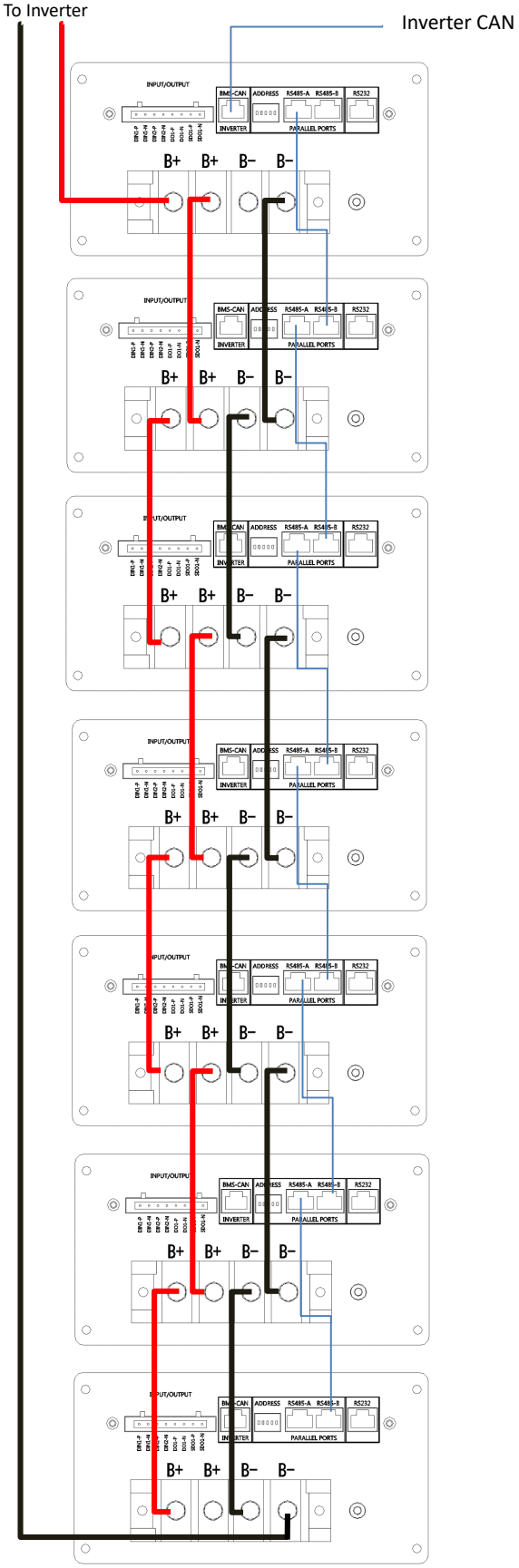


5.6.5 Master Plus S1-S2-S3-S4-S5-S6

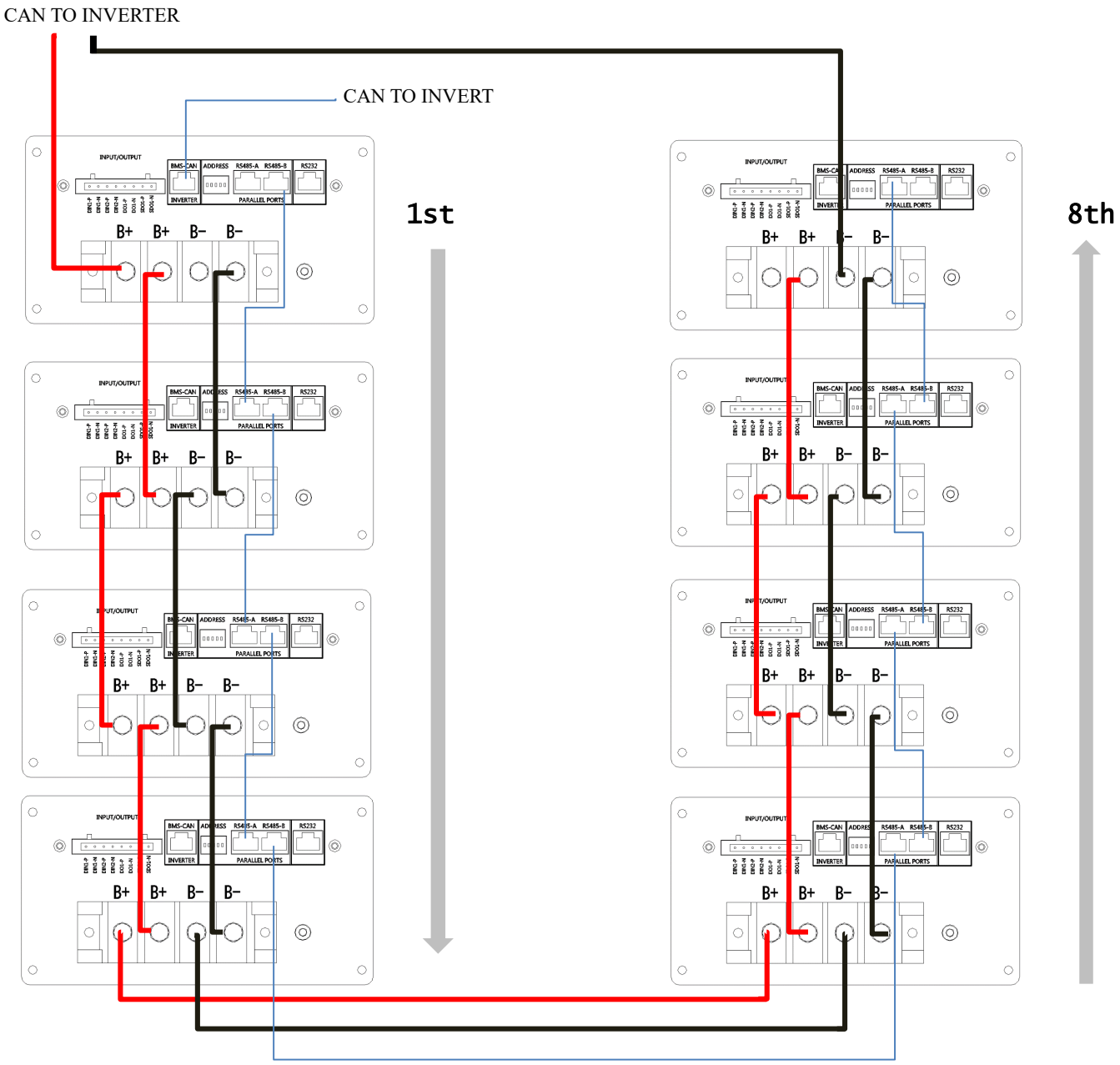
Negative and Positive

To Inverter

Inverter CAN



5.6.5 Master Plus S1-S2-S3-S4-S5-S7



6 BATTERY ACTIVATION AND SHUTDOWN

6.1 Panel buttons and LEDs Explanation

Attention: The drawings in this manual are for reference only. If the actual battery has a different configuration stop all installation activity, ensure that the battery is disconnected and in a safe condition and contact WECO support center

The Power button could be located on top or on the side of the battery

Name	Meaning	Function or indication status
POWER	On/Off button	Switches the module on or off
START	Blinks Green when the battery module is starting up	When the battery box is starting up normally, it blinks for 5 seconds
RUN	Steady Green when the battery module is running normally	When the battery box is running normally, it the power button will remain a steady green

6.2 Stand Alone Battery Front Panel Control

6.2.1 Start Battery

Short press the power button for one second. The GREEN RUN light should come on blinking.

The battery has been activated normally.

6.2.2 Shut Down Battery

Long press the power button for five seconds. The GREEN RUN light should go off. The battery has been shut down normally.

6.2.3 Low Battery – Force Charge

Prerequisite: The **VOLTAGE** between the battery B + and B- terminals is **ZERO** and the **PANEL LIGHTS ARE OFF**. Battery is in “Shutdown State”.

Preparation condition before forced charging: Connect the charger or the inverter with charging capability to the B+ and B- of the battery box to ensure charging capacity.

Forced charging approach: Short press the battery power button, the battery RUN light will flash green, which means that the battery is entering the compulsory charging mode. If the battery receives an adequate charging power (above 10 Amps/58V) within 90 seconds from pressing the button, the battery will continue to charge normally until a stable state is reached.

If the battery does not receive adequate charging power within 90 seconds after pressing the button, the battery will enter the shutdown mode once again.

6.3 Parallel Battery Configuration

1. The voltage difference between any of the batteries in the stack must not be greater than 2V. Otherwise, the BMS will not allow the batteries to be activated in a parallel connection.
2. SOC of each battery in the stack must be the same (check SOC as individual battery before parallel connection)
3. The power cabling between the batteries is in accordance with section 5.6 of this manual.
4. All DIP switches are configured in accordance with section 5.5 of this manual.
5. The RS 485 inter battery data connections are properly connected as per section 5.6 of this manual. The data connection “daisy chain” must start from port-B of the master battery (do no install the RS485 on the port-A of the master battery, it will occur in a fault)
6. Connect the CAN port of the master battery with the CAN port of the inverter and make sure that the communication is working properly by checking the inverter display
7. Before activating the system, the operator should check the cable connection carefully and make sure that all safety procedures are respected. Check the inverter settings and connection before turning on. In case of an inverter without communication make sure to set the voltage and current value as per the charge/discharge parameters provided in this manual.

6.3.1 Activation of Parallel Batteries (From Master to Slave#4)

Short press the Master power button for one second. The GREEN RUN light should come on. The battery has been activated normally.

Short press the Slave#1 power button for one second. The GREEN RUN light should come on. The battery has been activated normally.

Short press the Slave#2 power button for one second. The GREEN RUN light should come on. The battery has been activated normally.

Short press the Slave#3 power button for one second. The GREEN RUN light should come on. The battery has been activated normally.

Proceed with the same procedure up to the last battery of the cluster * max eight modules

Now all parallel batteries are activated normally and the parallel system is properly powered on.

6.3.2 Shutdown of Parallel Batteries

Long press the Master Power button for five seconds. The GREEN RUN light should go off immediately.

The GREEN RUN lights on the slave batteries will not be extinguished immediately.

The RED FAULT lights on the slave batteries will start flashing after ten seconds and the GREEN RUN lights will remain on.

After one minute the RED Fault lights and the GREEN RUN lights on all slave batteries will go off.

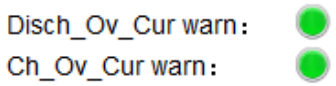
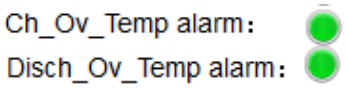
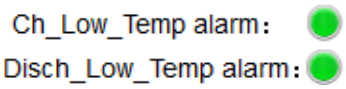
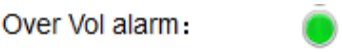
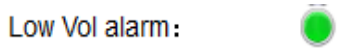
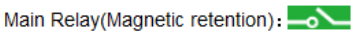
The parallel battery system has shutdown properly.

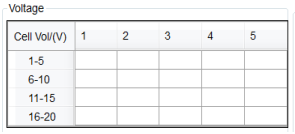
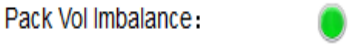
⚠ Notice:

In a parallel battery system, we strongly advise not to switch off individual slave batteries. If there is a reason to switch off a slave battery, we recommend that the procedure described in 6.3.2 of this manual is followed.

Switching off an individual slave battery in a parallel system is possible in an adverse situation, but only as a last resort.

7 TROUBLESHOOTING * (WeCo Monitor via RS 232)

No.	ALARM	SYMPTOM	SOLUTION	PC Software GREEN (NORMAL) RED (FAULT)
1	OVER CURRENT ALARM	The battery relay is disconnected during charging or discharging, and the battery fault light is flashing.	Reduce charge or discharge current	
2	OVER TEMPERATURE ALARM	The battery relay is disconnected during charging or discharging, and the battery fault light is flashing.	Stop charging or discharging, wait until the battery temperature drops and then reuse	
3	LOW TEMPERATURE ALARM	The battery is unable to charge or discharge normally	Waiting for the temperature of the battery to rise to a suitable temperature before charging or discharging	
4	OVER VOLTAGE ALARM	The battery relay is disconnected when charging, and the battery fault light is flashing.	Stop charging and review and reset properly the inverter settings (WeCo suggests to use Closed Loop CAN-BMS inverters)	
5	LOW VOLTAGE ALARM	The battery relay is disconnected when discharging, and the battery fault light is flashing.	Stop discharging from battery. Charge the battery in accordance with the correct charging procedure.	
6	RELAY DAMAGE	The battery is switched on, there is no alarm, but no voltage is present. The battery is switched off, there is no alarm, but voltage is present (always check for with voltage with a meter at all times)	Please contact the after-sales service, replace relay	When this sign is disconnected and green, the relay is disconnected; When this sign is connected and red, the relay is connected; 
7	PROTECTION BOARD DAMAGE	The PC and the batteries RS232 connection is reliable, but the monitoring software cannot read the battery information and status.	Please contact the after-sales service, replace protection board.	

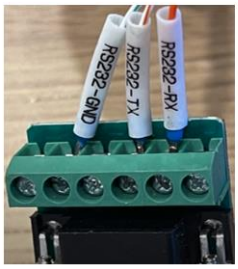
8	CELL DAMAGE	Battery box in the state of no charge and no discharge, a cell voltage and most of the other cells voltage difference greater than 200mV.	Please contact the after-sales service.	The real-time display of the cell voltage on the monitoring software is as follows: 
9	FIRST PARALLEL CONNECTION FAILURE OF BATTERIES	When the batteries are first paralleled, start the system, slave battery fault light flashing. No sound from the slave battery relay action, no voltage output.	Measure the positive and negative voltage of each battery, if the voltage difference between the batteries is greater than 2V, please reduce the voltage difference to less than 2V to try parallel connection	
10	MASTER-SLAVE MACHINE COMMUNICATION EXCEPTIONS	Slave battery fault light flashes, the master machine cannot control slave battery	Check that the communication cables between the master battery and the slave batteries are securely connected	
11	BATTERY OR PARALLEL BATTERY SYSTEM SHUTDOWN CANNOT START	There is no alarm information in the battery, but the batteries are not working properly	Please contact the after-sales service	
12	OTHER EXCEPTIONS	Humidity, cell expansion, frost-Defrost, unbalances etc.	Please contact the after-sales service	FAULT RED

FOR AUTHORIZED TECHNICIANS ONLY

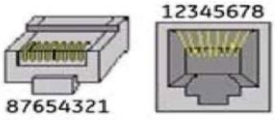
8 SOFTWARE GUIDE

WeCo MONITOR 232 / USB PC CONNECTION

Screw Terminal Side	Cable 232 / RJ45
PIN1	-
PIN 2 T/R-	RX
PIN 3 RXD+	TX
PIN 4	-
PIN 5	GND
PIN 6	-



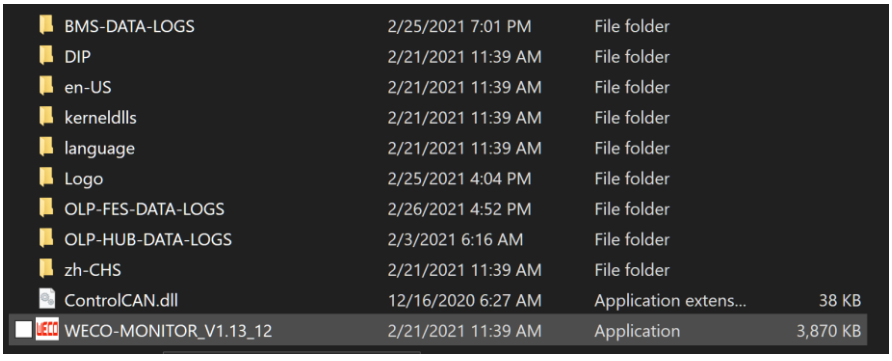
RJ 45 TO WIRE - PIN DEFINITION-
PIN 01 = TX
PIN 02 = RX
PIN 03 = GND
PIN 04 = none
PIN 05 = none
PIN 06 = none
PIN 07 = none
PIN 08 = none



WECO OLP RS232 (USB / RS232 converter is necessary to communicate with the battery, need to be ordered separately)

**PC -Battery communication and set up for 232-USB device is available for auth. Installers.*

8.1 Download ad Launch the EXE file “WeCo Monitor” and wait for the self-installation to complete

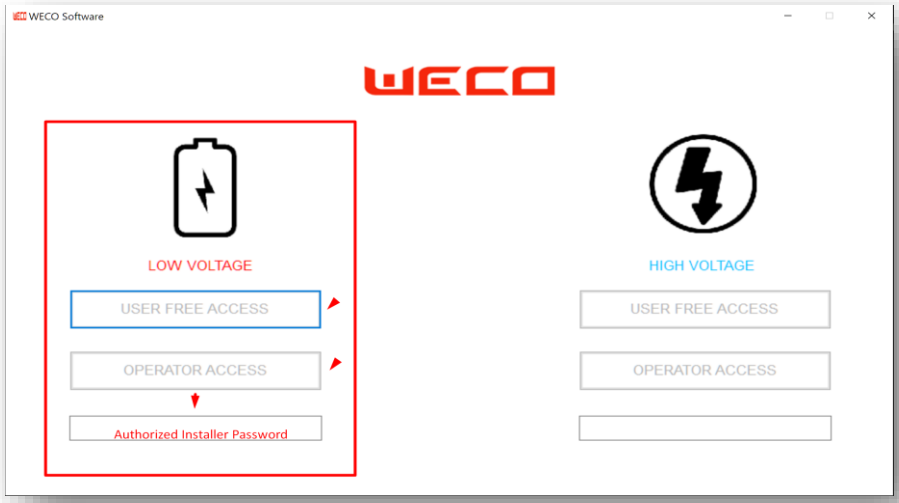


BMS-DATA-LOGS	2/25/2021 7:01 PM	File folder	
DIP	2/21/2021 11:39 AM	File folder	
en-US	2/21/2021 11:39 AM	File folder	
kerneldlls	2/21/2021 11:39 AM	File folder	
language	2/21/2021 11:39 AM	File folder	
Logo	2/25/2021 4:04 PM	File folder	
OLP-FES-DATA-LOGS	2/26/2021 4:52 PM	File folder	
OLP-HUB-DATA-LOGS	2/3/2021 6:16 AM	File folder	
zh-CHS	2/21/2021 11:39 AM	File folder	
ControlCAN.dll	12/16/2020 6:27 AM	Application extens...	38 KB
WECO-MONITOR_V1.13_12	2/21/2021 11:39 AM	Application	3,870 KB

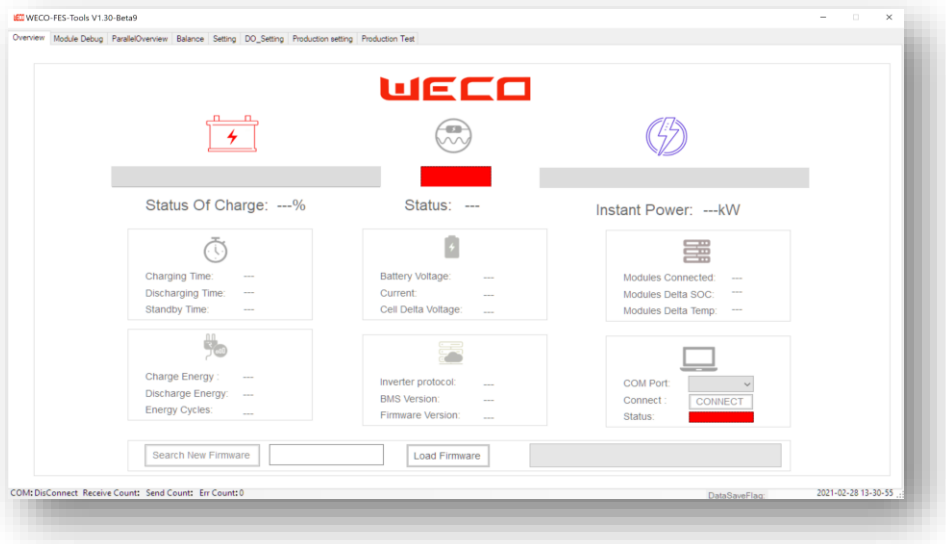
8.2 From the main page select “USER FREE ACCESS” if you are not an authorized installer.

If you are an authorized installer and you have a 1st level password click on the RESTRICTED ACCESS windows and follow the ‘Authorized Installer Guide’

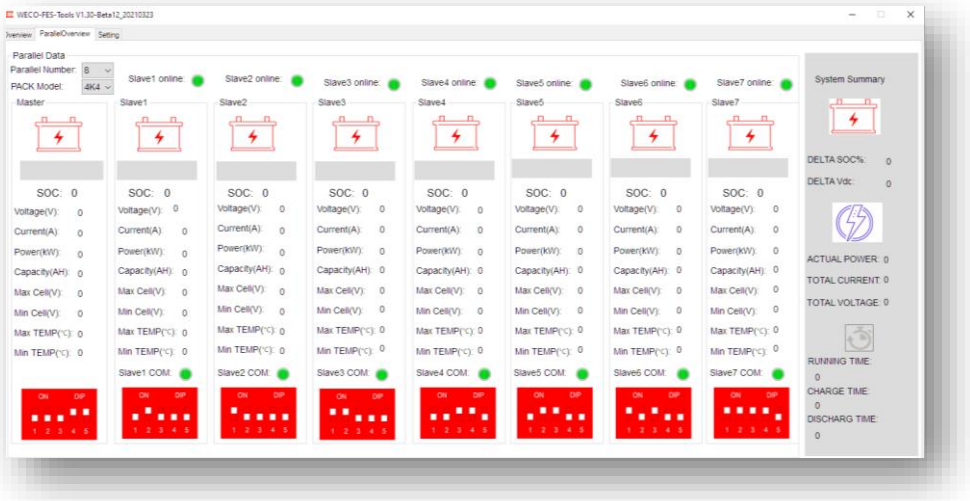
If in possession of a valid password the Authorized installer will be able to access more detailed windows within the software.



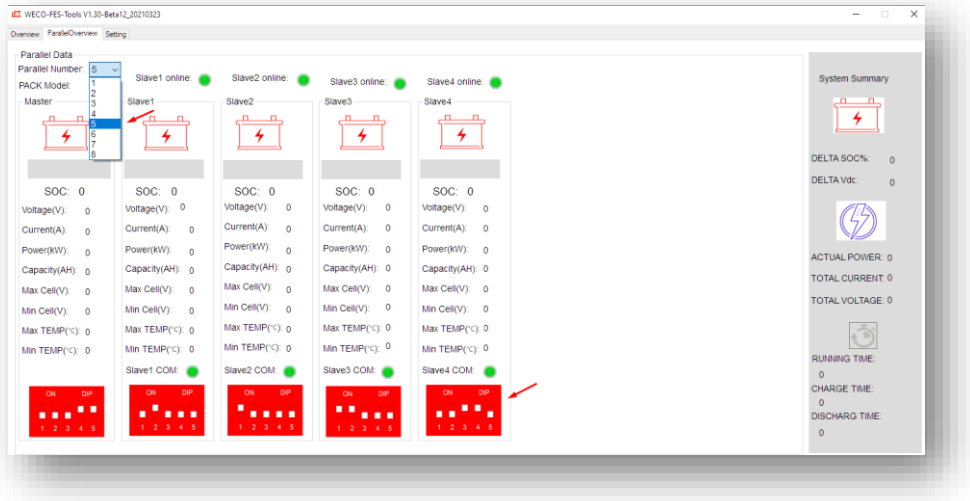
8.3 Connect the RS232 converter between the battery and the PC and search the relative com on the PC settings (device manager of Windows). Select the COM port from the Main page of the WeCo Monitor, then press CONNECT. Follow the instructions and wait for the data to appear on the screen.



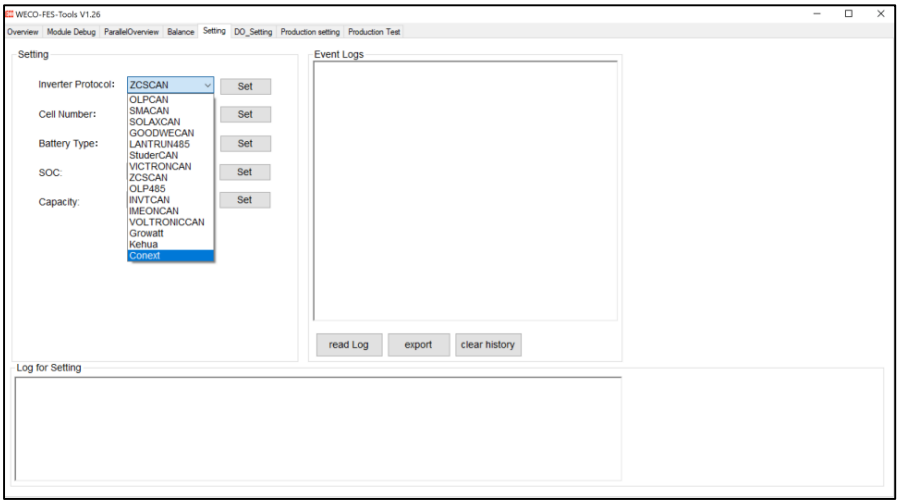
8.4 If more than one module is connected, select Parallel Overview and check the single unit data information



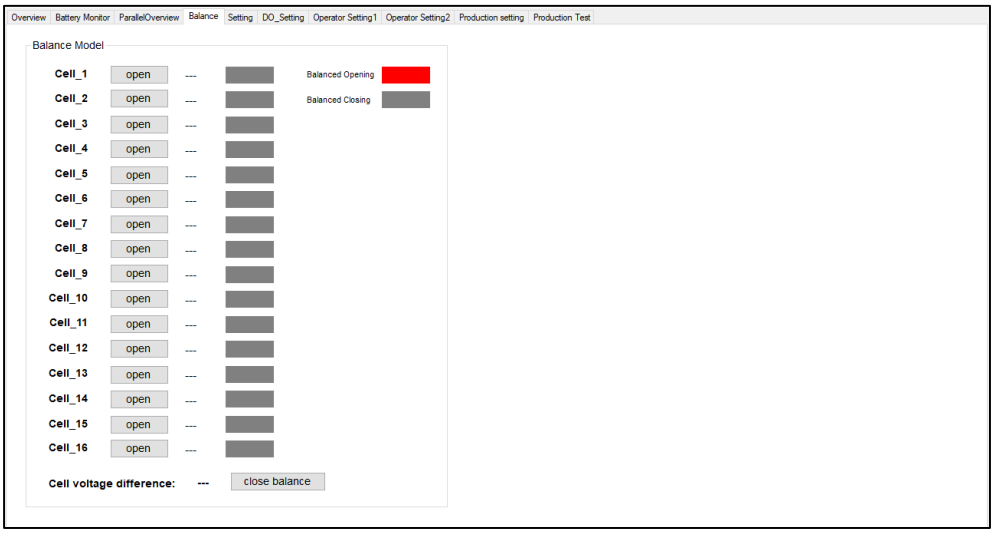
Note: Make sure to select the exact number of modules that composing your cluster in order to have the proper DIP switch setting



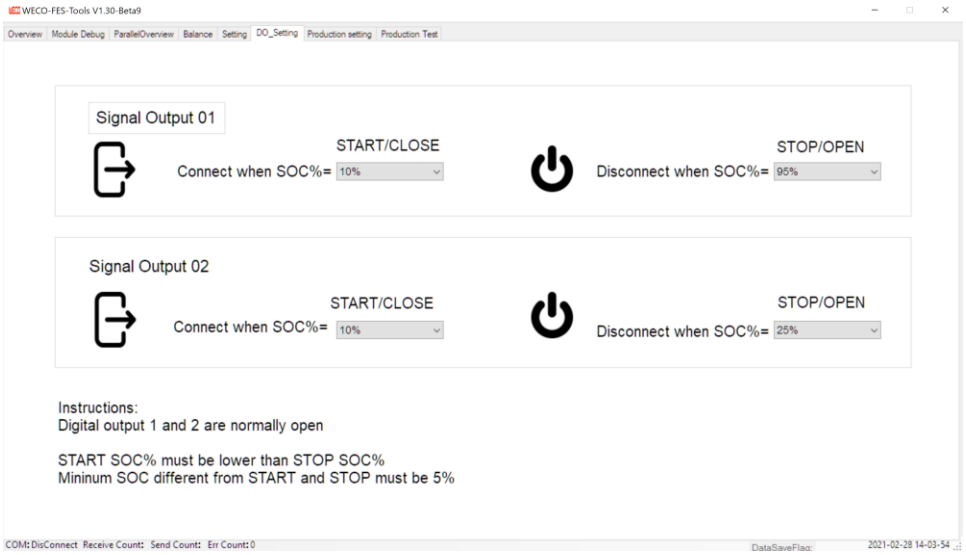
8.4 To set the CAN protocol to match the inverters communication protocol, select the inverter that you are connecting to from the list and press SET, wait for the positive feedback after the first communication with the inverter
Using the Software available on> https://wecobatteries.com/download-area



8.5 The normal mode for equalization is Auto mode, however in the unlikely event of a failure it is possible to perform a manual equalization. If it is necessary to perform a manual equalization, please contact WeCo support for further advice. Reference to the CELL EQUALIZATION MANUAL (not public) will be necessary to activate the manual procedure.
IMPORTANT After the first Manual/Forced Equalization the single cell equalizer will return to Auto mode within 24h.



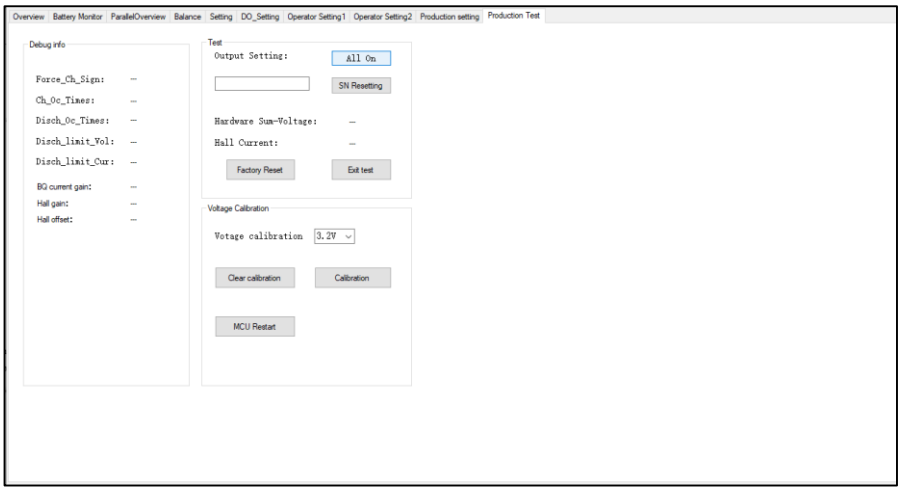
8.6 Dry contact setting page



8.7 Factory reset.

(This must be authorized from the WECO Tech Department) follow the instruction of the FACTORY RESET PROCEDURE

A factory reset made outside WeCo facility or without a prior written approval will void the warranty and may cause severe battery damages.



9. PRODUCT COMPATIBILITY LIST

LOW VOLTAGE COMPATIBILITY								WeHUB		SUPER HUB	
Battery model	Capacity kWh	Inverter Brand		Inverter Series	Battery CAN Selection	Battery Direct Parallelability N°	Battery Bank Capacity (kWh)	WEHUB battery parallelability N°	WEHUB battery Bank Capacity kWh	SUPERHUB battery parallelability N°	SUPERHUB battery Bank Capacity (kWh)
4K4 PRO	4.5	Azzuro	Azzuro ZCS	HYD	WeCo CAN	8	36	40	180	100	450
		Deye	Deye	All	CAN00						
		Schneider	Schneider	XWPRO	Schneider CAN						
		Schneider	Schneider	XW +	Open Loop						
		Phocos	Phocos	PSW Anygrid	Voltronic CAN						
		Growatt	Growatt	SPH							
		SMA	SMA	Sunny Island	SMA CAN						
		Solis	Solis	All	Solis CAN						
		Goodwe	Goodwe	EM	Goodwe CAN						
		Studer	Studer	Extender	Studer CAN						
		Sofar Solar	Sofar Solar	HYD / SP	WeCo CAN						
		Victron Energy	Victron Energy	via Color Cont	Victron CAN						
		TBB	TBB energy	All	CAN00						
		IMEON	IMEON	All	SMA CAN						
		INVT	INVT	All	INVT CAN						
		Voltronic	Voltronic	All	OLP CAN						
		MorningStar	MorningStar	48V types	Open Loop						
		Kehua	Kehua Tech	All	Kehua CAN						
		Must	Must Solar	All	OLP CAN						
		LuxPower	LuxPower	All	WeCo CAN						
		Solax	Solax	LV series	Solax CAN						
		Sungrow	Sungrow	Hybrid Series	WeCo CAN						
		Steca	Steka	All	Open Loop						
		Outback	Outback	All	Open Loop						
		TSUN	TSUN	All	WeCo CAN						
		MPP Solar	MPP solar	All	Voltronic CAN						

For WeHUB and SUPERHUB connection please refer to the Multicluster Manual -We-HUB-

INVERTER TECHNICAL INFORMATION AND WORKING LOGIC

Any inverter can be used with WeCo Batteries shall work within the below parameters

Description	Inverter Low Voltage CUT OFF	Inverter High Voltage CUT OFF	STD Charging Current (Max 110A)	STD Discharging current (Max 110A)
Single Battery Master + Slave1 Master+SL1+SL2 Master+SL1+SL2+SL3 Master+SL1+SL2+SL3+SL4	49.5 =SOC 0% Suggested 50.5= SOC 5% if ON grid Suggested 51.0 =SOC 10% if OFF GRID	54.5 =98%	65A max 110A	70A max 110A

	Temperature Range	**C - rate**
CHARGE	-10°C +7°C	0.1C
	-6°C +0°C	0.2C
	+1°C +10°C	0.3C
	+11°C +14°C	0.8C
	+15°C + 45°C	1.1C
	+46°C +55°C	0.5C

	Temperature Range	**C - rate**
DISCHARGE	-20°C -11°C	0.2C
	-10°C - 7°C	0.3C
	-6°C 0°C	0.3C
	+1°C +10°C	0.8C
	+11°C + 55°C	1.1C
	+56°C +65°C	0.5C

Single Cluster Current Allowance for NON CAN Connection

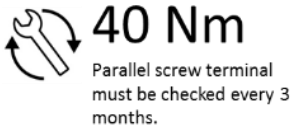
Single Cluster Number of batteries in parallel with 25mm² parallel connection cable	**Maximum Charge/ Discharge** Amps
2	152
3	216
4	280
5	336
6	392
7	448
8	512

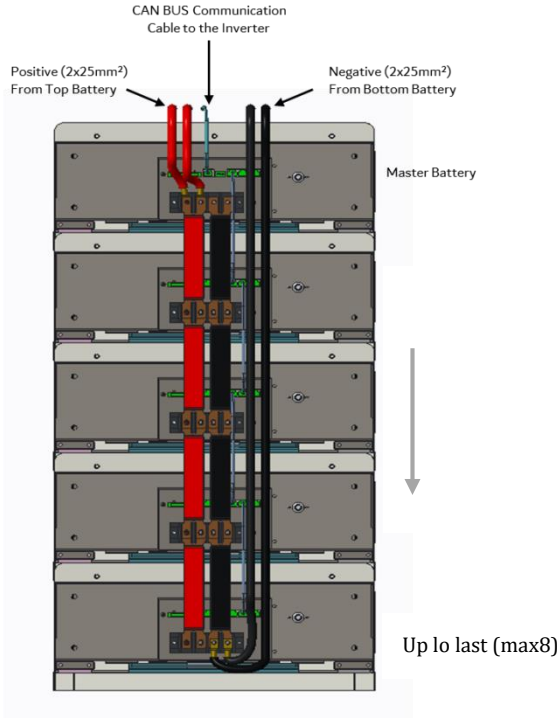
Without CAN Connection the settings for a single battery shall follow the below charts

Multiple Clusters without HUB and CAN COMMUNICATION are not allowed

10. SINGLE CLUSTER CONFIGURATION (CAN CONNECTED)

No HUB is required for a single cluster





ATTENTION

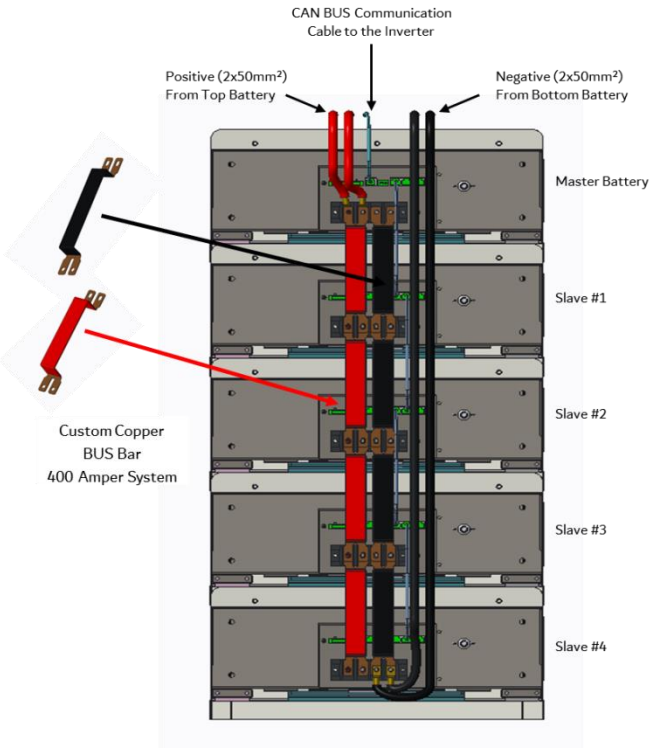
Connect two 25 mm² AWG Wire of the same length on each terminal as shown above

For the Single Cluster configuration with standard 25 mm² AWG cables do not exceed the current ratings listed in the chart below.

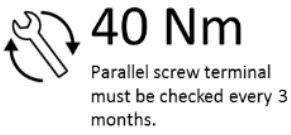
Single Cluster Number of batteries in parallel with 25mm² parallel connection cable	**Maximum Charge/ Discharge** Amps
1	86
2	155
3	206
4	241
5	301
6	310
7	361
8	412

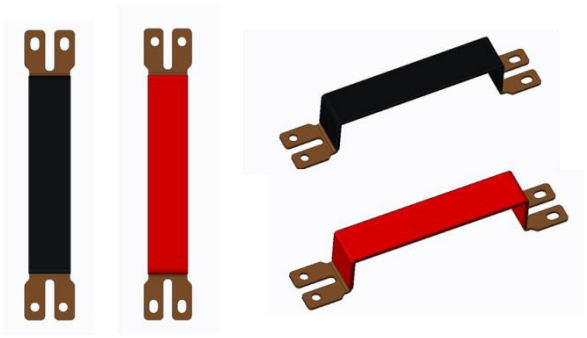
11. SINGLE CLUSTER CONFIGURATION WITH BUS BAR

No HUB is required for a single cluster



4K4 PRO has a specific bus bar size (Do not use 4K4-R type BUS BAR)





SPECIAL BUS BAR FOR PARALLEL CONNECTION UP TO MAX 400A

ATTENTION

Bus Bar is mandatory for systems above 100A

Connect two 50 mm² AWG Wire of the same length on each terminal as shown above

FOR HUB CONFIGURATION REFER TO THE HUB MANUAL

DO NOT USE DIFFERENT BUS BAR TYPES OR CABLES

12. MULTI CLUSTER HUB CONTROLLER (We-HUB)

Multi Cluster CAN Hub for High Capacity and High Current Configuration

Required for Systems with more than one Cluster

BMU BMS COMBINER (We-HUB)

The BMS BMU Multi Cluster Hub Controller (We-HUB) is mandatory when more than one cluster is connected on a common bus bar. The We-HUB can manage a maximum of 5 clusters with a maximum of 5 batteries in each cluster.

⚠ Caution:
Each battery module and each cluster must have the same SOC %

⚠ Caution:
Each Cluster must have the same number of battery modules

⚠ Caution:
For systems above 100A, the modules must be connected in accordance with Section-11 of this manual. The Bus Bar kit reference STK 4K4 PRO-300 must be used.

Interface Description		
A	I/O CONTACT 2X	Programmable closure/ contact
B	DIP SWITCH	Baud Rate Selection
C	CAN BUS PORTS 2X	CAN Bus port for external solar – grid charger
D	RS 485 port	RS 485 communication port (MODBUS)
E	CLUSTER CAN PORTS 5X	Master Cluster CAN port
F	ON OFF SWITCH	Internal Power supply switch
G	INLET 48Vdc	Connector for power input to connect to the bus bar (1A fuse protected)
H	RS232 PORT	External Port for programming and Debug
I	LED LIGHTS 4X	25% SOC status each LED
L	POWER INDICATOR	Power Supply LED Status
To order the We-HUB, use the kit code "Master HUB 300 LV-5"		
		⚠ Notice: **Both Items Ship in One Box**
1 x WeHUB Cable Power Supply		

13. MULTI CLUSTER CURRENT LIMITATIONS

⚠ Caution:

The current limit is set by the WeHUB (BMU-BMS Master Combiner) according with the quantity of clusters and modules connected as per the tables below. The inverter, if has the functions, must be set with the below restrictions in addition to the BMS We-HUB control logic settings.

clusters / batteries	1	2	3	4	5
	CURRENT ALLOWANCE VIA CAN BMS control line				
1	86	155	206	275	344
2	155	279	372	495	557
3	206	372	446	528	660
4	241	433	462	616	700
5	301	488	578	700	700
6	310	495	650	866	928
7	361	577	732	1011	1083
8	412	577	953	1155	1238

The above limits are possible only with approved inverter and only via CAN -BMS connection

1. The charge current will be limited to 0A when the single module voltage has reached 56.8V.
2. The discharge current will be limited to 0A when the single module voltage has been discharged to 46.7V.
3. The battery system will communicate with the inverter to limit the current (If Inverter is Compatible).
4. Each battery will be protected by the same logic separately as per single module protection concept.
5. If some batteries individually will reach any fault status the single battery will protect and disconnect from the system in less than 3 seconds.
6. The current limit of the system must be adjusted according to the active batteries in system in order to restore normal function.
7. If the cluster is not balanced, the current limitation set from the We-HUB to the inverter will be sent in order to manage the rest of active modules and clusters, in the same time the imbalanced modules or cluster will equalize in standby mode and will reconnect once in the normal range.
8. If more than 2 batteries in one cluster are in protection mode the entire cluster will protect by shutting down.
9. If there is more than 2 cluster in protection mode, the full system will protect by shutting down.
10. The batteries will send information to the inverter to limit the charge/discharge current to zero Amps if the battery is detecting an over current. (Hub must be used only with compatible inverters via CAN communication)
11. Current limit protection cycle allows an automatic reconnection for three times. If the issue is not resolved within three reconnection attempts, it is necessary to perform a full manual restart. Precautionary checks in accordance with this manual must be carried out.
12. If the current of one cluster is larger than the current limit, the battery system send a warning according with the single module BMS logic
13. If the warning state does not clear within 5 minutes, the cluster will shut down and a manual reconnection is required. Precautionary checks in accordance with this manual must be carried out.

14. MULTI CLUSTER CONNECTION

⚠Caution:
We-HUB is mandatory when connecting multiple clusters in parallel

⚠Caution:
Each cluster can have a maximum of eight (8) 4K4 PRO modules

⚠Caution:
Each cluster must have the same number of 4K4 PRO modules

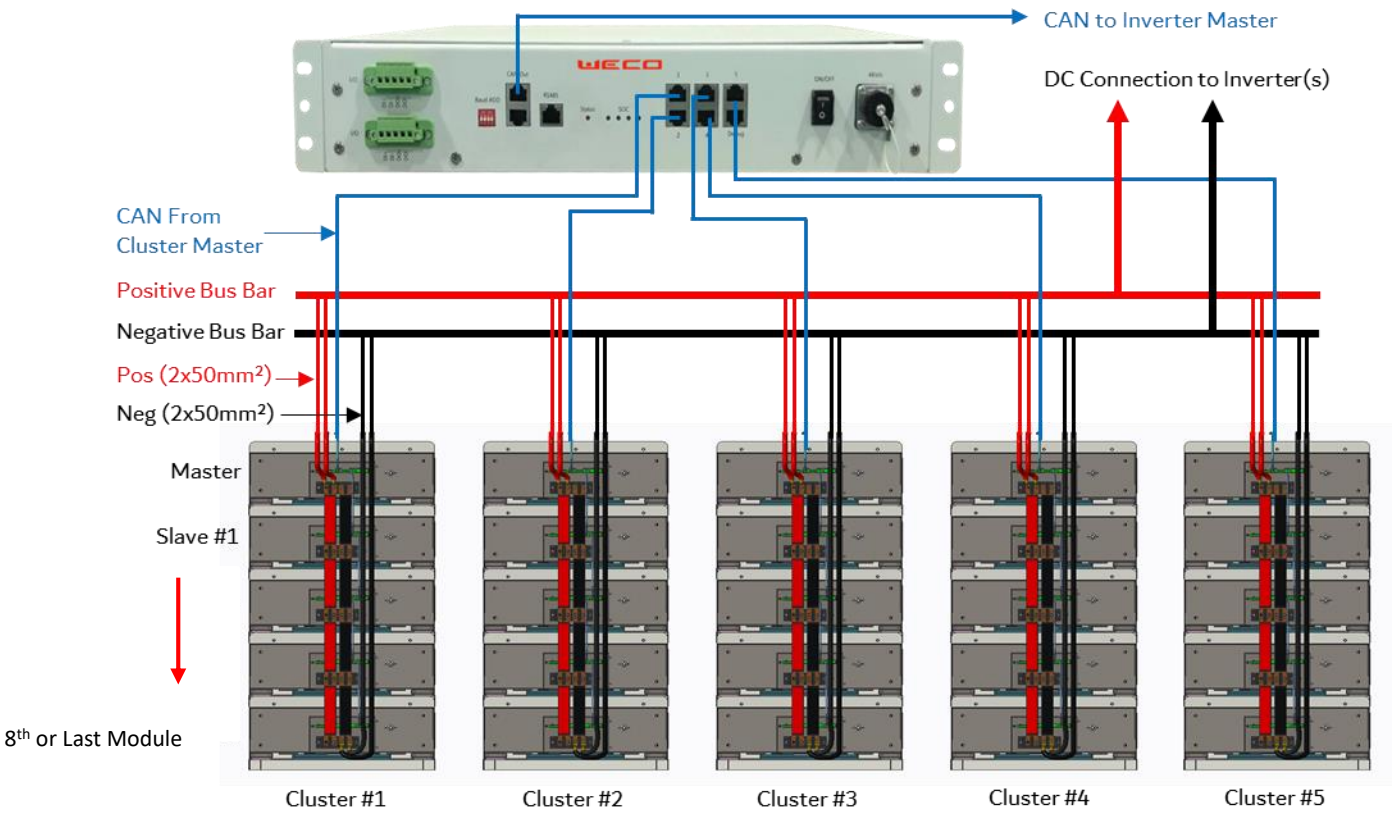
⚠Caution:
Each battery module and cluster must have the same SOC % and Voltage

⚠Caution:
All battery modules must have the same firmware

⚠Caution:
The maximum currents and power stipulated in Section-13 of this manual must not be exceeded

⚠Caution:
The correct sizing of cable and bus bar kits should be installed in accordance with this manual

The following illustration depicts a maximum configuration with five (5) clusters each having five (5) battery modules.



⚠Caution:
All connections external to the battery modules must be in compliance with local regulations.

15. INVERTER SETTINGS WITHOUT BMS-CAN CONNECTION (GENERAL)

⚠ Caution:

Contact service@weco.uk.com, do not install an inverter without a BMS-CAN interface before obtaining approval from WeCo's technical staff.

⚠ Information:

For inverters which cannot communicate with the 4K4PRO battery module using the CAN Bus port, the inverter must be set in accordance with the WeCo 4k4PRO battery specifications provided in the table below.

⚠ Caution:

The parameters in the table below are only applicable to a SINGLE CLUSTER configuration

4K4 PRO	Low Voltage
Nominal DC Voltages	52.2
Usable Amp Hours	86
Rated kWh Capacity	4.5 kWh
Max Output Capacity	86 Ah
Max Charge Current	110 Adc
Suggested discharging Current	86Adc
DC Voltage Range (limited by contactor)	46 to 58.9 (do not use as settings)
Depth of Discharge 100%	Up to 100% (49,5V to 54,5V) from 90% to 100% 10A charge current to be set
Depth of Discharge 90%	51,5V to 54,0V 0.9C
Depth of Discharge 80%	51V to 53,5V
Operating Efficiency	97.8%
Operating Temp	–25° to 65°C
Charging Temp	-5° to 55°C
Self-Discharge Rate	<2% loss per month
Dimensions	46x50x15 cm
Weight	53 kg

WeCo 4K4PRO has a special Lithium Iron Phosphate chemical composition.

After the charging period the total voltage may drop from 54/55 V to 53/52V, this is a normal behavior.

⚠ Caution:

When the battery reaches High Voltage or Cut Off (SOC 100%) do not continue to charge the battery.

In case of single cell overvoltage, the relay will open the circuit and the inverter will shut down.

In case of the inverter shutting down press the RUN button on the battery and shut down the battery, as described in Section 6.2.2 of this manual.

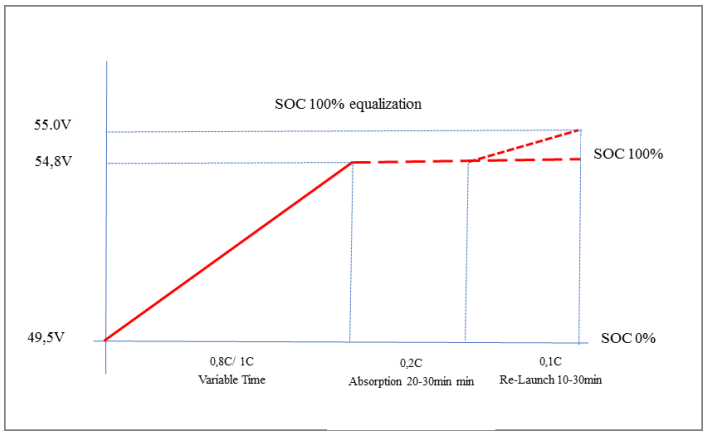
The BMS will perform a self-restart 4 times every 15 minutes for a period of 24 hours and after the 24 hour period, the BMS will perform a self-restart every 12 hours for a period of 4 days.

⚠Information:

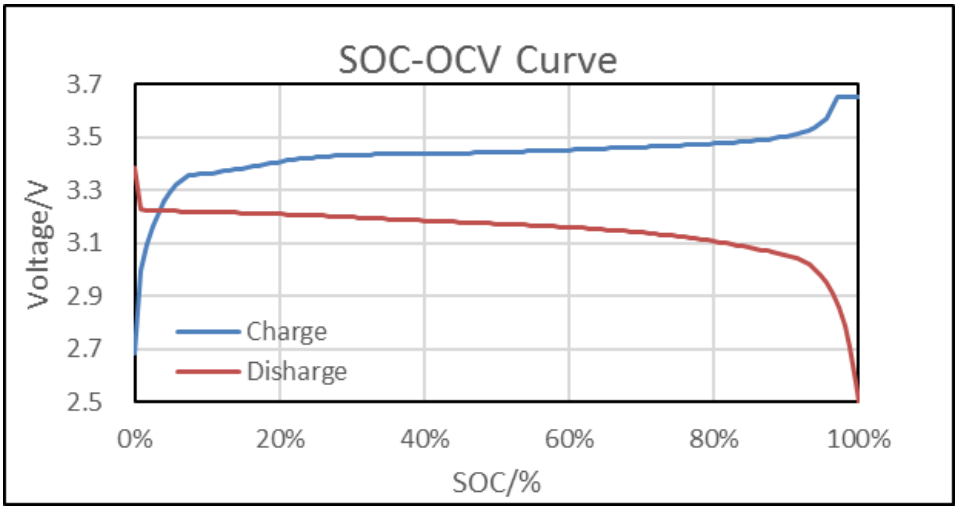
In the case where the current or voltage limit has been exceeded 4 times consecutively, the operator must wait 30 minutes before pressing the RUN button again.

⚠Information:

A reduction of the charging current at the end of charge and end of discharge in addition to a new set up of the voltage range is mandatory if the installation faces faults as described above.



Single Cell Curve @25°C Degrees 0.5C Charge/Discharge



⚠Caution:

The charge and discharge current of the inverter MUST be limited according with the maximum current allowed by each battery cluster configuration as specified in Section 13 of this manual.

The charge and discharge Voltage range of the inverter MUST be limited as per the module maximum values as specified in this manual.

⚠Caution:

DO NOT connect the 4K4PRO Battery module to an inverter which has no BMS-CAN interface without receiving prior approval from the WeCo technical team. To obtain approval contact service@weco.uk.com and wait for a response BEFORE making any connection.

USING THE BATTERY OUTSIDE OF THE WORKING RANGE AS DEFINED IN THIS MANUAL WILL DAMAGE THE BATTERY AND WILL VOID THE WARRANTY.

⚠Information:

NOTE:

This manual is subjected to continuous implementation.

Before install your WeCo batteries please contact our assistance team in order to have the latest manual and any additional support.

Safety improvement is our priority, please cooperate with us to improve the system, any suggestion is well accepted.

WeCo Srl, Italia