

# Installation and User Manual



**5K3 Dual Voltage Energy Storage System**

**LOW VOLTAGE & HIGH VOLTAGE**



**ATTENTION:** The battery could explode and/or be severely damaged if dropped or crushed.



**ATTENTION:** Appropriate mechanical lifting equipment must be used since the Battery Module weighs 126.3 lb /57.3 kg



**ATTENTION:** The battery may explode if exposed to open flames or other extreme sources of heat.

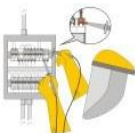


**ATTENTION:** The battery terminals must be disconnected before commencing any work on the battery.



**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 are ZERO volts present on the terminals before performing any operation on the battery.**



**ATTENTION:** Always wear Individual protection devices, use insulated tools, and follow the safety plan of this manual.



**At end of life, these batteries must be disposed of properly by a certified professional company.**

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## Statement:

The information and guidance contained in this manual is related to the **5K3 LV/HV** Stackable model of battery. This manual contains two sections:

**Section 2 is for LOW VOLTAGE APPLICATION**

**Section 3 is for HIGH VOLTAGE APPLICATION**

In case of product upgrades or 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](http://www.wecobatteries.com)

It is essential that the Battery Module is equipped with the latest firmware version available.

New batteries always ship with the latest version of firmware.

From time to time, firmware will be updated to improve the functionalities and battery capabilities. The latest version of the firmware is always available free of charge and can be updated by your local installer. You can always contact [service@wecobatteries.com](mailto:service@wecobatteries.com) for additional information on the upgrade procedure.



### NOTICE:

This Battery Module is designed to be used indoors.

The STANDARD IP21 degree of protection does not allow installation in outdoor environments even if sheltered from the weather.

The Battery Modules must be stored indoors in a clean, dry, cool location in a limited access area.

## Preface:

Thank you for choosing our product. We will provide you with a high-quality product as well as reliable after-sale 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.

## Declaration:

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

All trademarks shown in this manual belong to their legitimate owners; trademarks of third parties, product names, trade names, corporate names and companies mentioned may be trademarks owned by their respective owners or registered trademarks of other companies and are used purely for explanatory purposes and for the benefit of the owner, without any purpose of violation of the copyright in force.

## System Design

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

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

## Battery Operation

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

### Storage

Battery Module shall be stored in original packaging, in a clean, level, dry, cool location indoors.

Recommended storage temperature is 77°F (25°C).

The battery can be stored in the range of -4°F to +113°F (-20°C to +45°C) but it requires an inspection and recharge every three months (max charging current is 0.1C).

Max SoC storage % is 50%.

Max Transportation SoC is 30% in accordance with UN 38.3 Prescriptions

### Temperature

Many chemical reactions are affected 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 at 77°F (25°C) will only deliver approximately 75% of rated capacity at +50°F (+10°C).

At temperatures down to +19.4°F (+7°C) the charge current may be limited to 0.1C depending on other factors, however at temperatures below +19.4°F (-7°C) charging is restricted by the BMS.

As part of the Performance Warranty, Charge and Discharge shall be in the range +68°F to +77°F (+20°C to +25°C). 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.

### Charging

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

### 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 Warranty, 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 Warranty.

Warranties only apply to batteries connected via BMS line to an approved inverter.

Any other use, even if permitted by the BMS ranges, is not covered by the Performance Warranty.

## Product Overview

The WeCo 5K3 LV/HV Dual Voltage is a Stackable Battery Module with a DUAL VOLTAGE module that can be used in a Low Voltage configuration or in a High Voltage configuration.

For LOW VOLTAGE (Max 58.4 Vdc)\* Configuration Refer to Section 2

For HIGH VOLTAGE (Max 934.4 Vdc)\* Configuration Refer to Section 3

\*Voltage ranges are estimates only as they always depend on interactions with other devices and ambient conditions.

## Information in this Manual

### About this Manual

This manual relates only to the 5K3 LV/HV Stackable Battery Module. Only trained and qualified installers should install, repair or charge these Battery Modules. This manual should be reviewed in its entirety for proper storage, installation and operation of the Battery Module.

### Use Range

This installation guidance applies for the High Voltage and Low Voltage Inverters.

Make sure to use the correct inverter charging parameters before connecting to the battery.

Each WeCo Module 5K3 LV/HV Battery Module has two different circuits and depending on the inverter voltage range, the installer must choose the correct battery configuration for that range.

### Additional Information

Product specifications subject to change without notice.



#### IMPORTANT NOTICES:

HV BOX minimum startup voltage is 150 Vdc, (three modules) however it is suggested to use a minimum of four modules to have an adequate buffer of energy to prevent low voltage shutdown of the HV BOX during a long period of the inverter on standby, or due to solar charger inactivity.

The WeCo Module 5K3 LV/HV Stackable Battery Module is designed for home and commercial applications from 5.3 kWh to 530 kWh in Low Voltage configuration and from 21.2 kWh to 748.8 kWh in High Voltage configuration.

For the calculation of the energy of a cluster (in both LV and HV systems) the nominal capacity of a battery is generally counted in 5.2kWh as a result of the multiple connection inefficiency, estimated at a loss of 2%

### Symbols Used

Symbol Meanings:



#### CAUTION:

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



#### NOTICE:

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



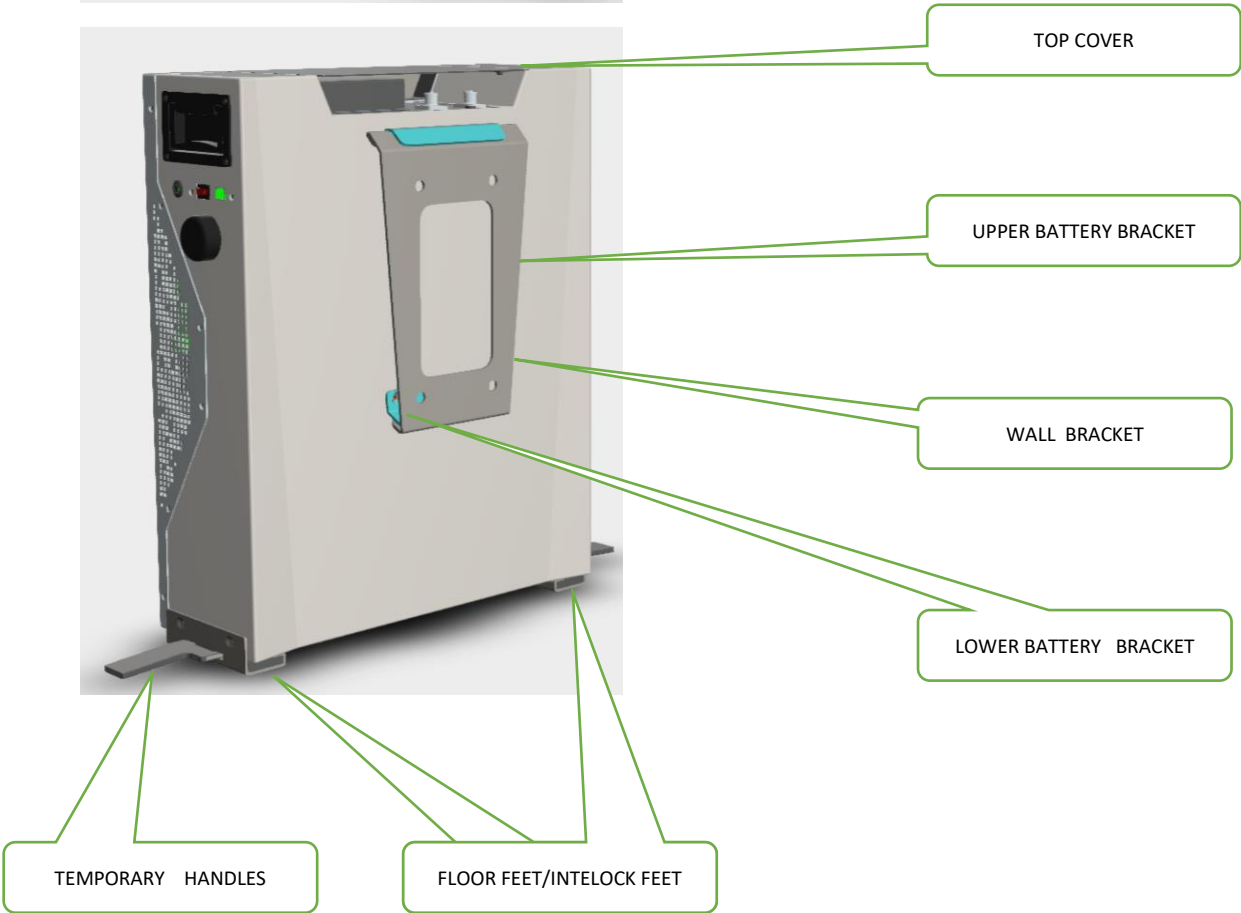
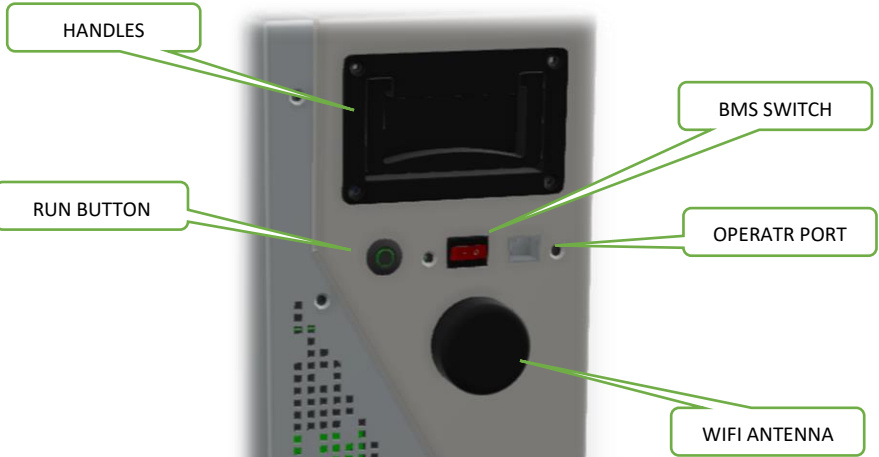
#### INFORMATION:

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



### BATTERY OVERVIEW:

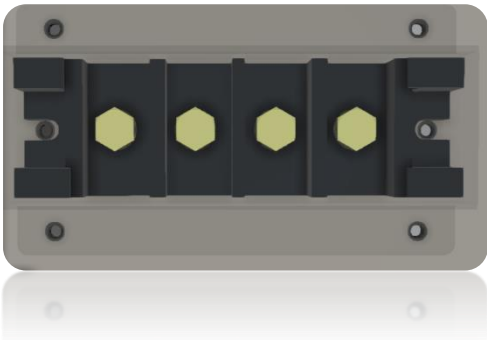
INFORMATION provides tips that are valuable for optimum installation and operation of the product.



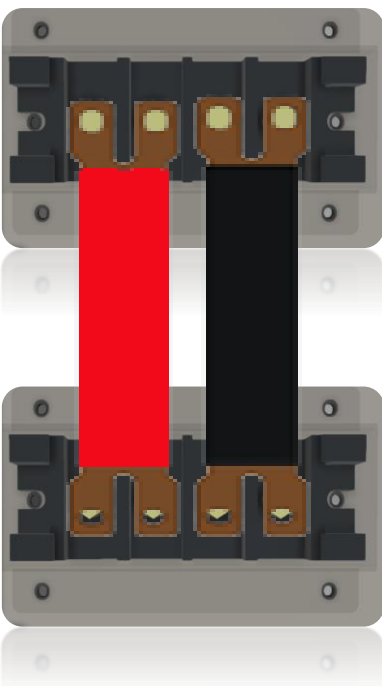


**ATTENTION: THE BATTERY IS DUAL VOLTAGE - BE AWARE OF THE DIFFERENT CONNECTION METHODS AND THE SPECIFIC USE OF THE TERMINAL CONNECTORS.**

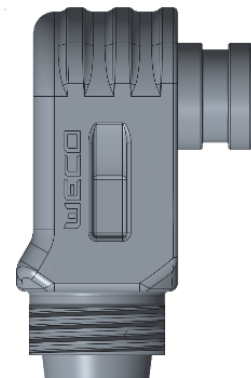
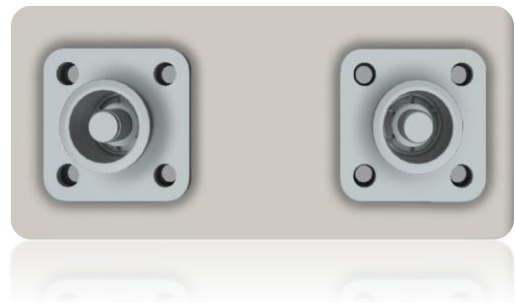
SCREW TERMINAL  
LOW VOLTAGE ONLY



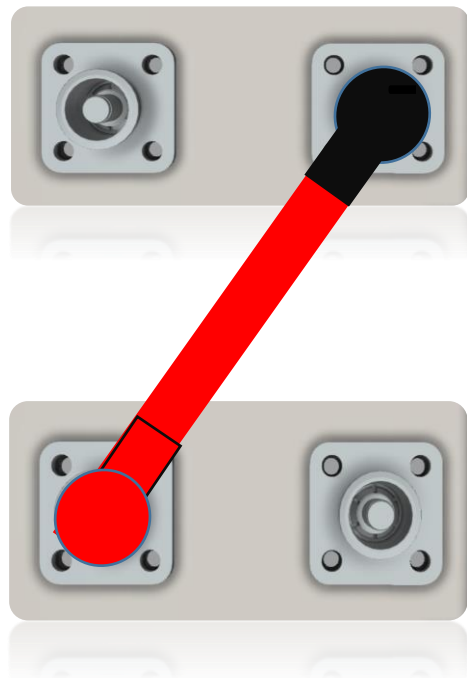
PARALLEL CONNECTION



FAST CONNECTORS  
HIGH VOLTAGE ONLY



SERIAL CONNECTION



## Safety

### Warnings and Notifications

Installation environment requirements: The WeCo Module 5K3 LV/HV Stackable Battery Module is designed for household/commercial purposes. For installation, it must be installed in a location complying with IP20 (IP 55 or 65 are available on request). Installations in locations that do not comply with IP20 may cause failure and/or damage to the product, in which case the product warranty will become void.

#### Safety Guidelines



#### CAUTION:

Adequately insulated tools up to 1500V shall be used at all times to ensure battery terminals are not short circuited. All electrical connections on the WeCo Module 5K3 LV/HV Battery Module shall be made only by qualified personnel.

When installed and operated in accordance with this manual, the WeCo Module 5K3 LV/HV Battery Module will perform in 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 are not fully understood by the reader, the reader must not perform any operation on the battery until they have contacted the WECO MODULE technical service representative 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 Federal, State and Local laws and regulations in accordance with the industry standards of the product.

Installation personnel shall not wear metallic objects, such as watches, jewelry and other metal items when performing installations. Do not store un-insulated tools in pockets or tool belt while working in vicinity of battery to avoid short circuits and personal injuries.



#### CAUTION:

The weight of an individual WeCo Module 5K3 LV/HV Battery Module is 126.3 lb / 57.3 kg. Please use original packaging and follow all safety precautions if the Battery Module is to be relocated to another location, to avoid damage to the product and personal injury.



#### ATTENTION:

**The high voltage configuration must have a minimum number of 4 modules in order to reach at least 200 Vdc in series. The maximum number of modules that can be stacked is 8 on each tower (due to the tower height and stability) and the maximum number of modules composing an HV string must not exceed 16 or the max Inverter Input Voltage of the Battery Channel. Installer must refer to the Inverter manual before performing any connection**

## GENERAL PREPARATION

Before Installation:

Ensure that all the modules are turned OFF.

Battery installation location should be at least 20m away from sources of heat, sparks or other sources of extreme temperature. Battery connecting cables shall be as short as possible to prevent excessive voltage drops.

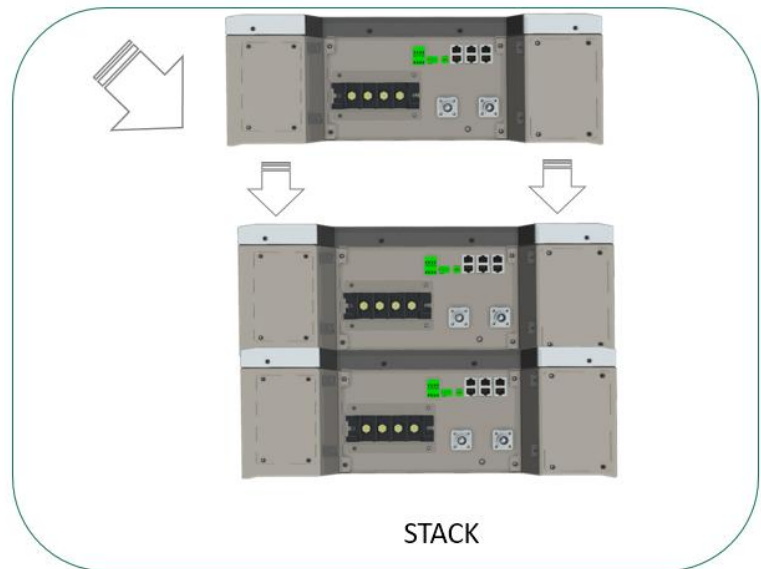
Batteries with different capacity, different type/model or design or from different manufacturers shall not be connected together.

1. Before connecting the battery, the battery positive and negative poles shall be carefully checked to ensure correct installation.
2. The installation location must be on a flat level surface, in a dry, clean and protected room, away from water and humidity.



The mechanical installation method for the WeCo Module 5K3 LV/HV Battery Modules can be considered “conceptually” the same for HV and LV configurations.

Before starting any operation on the battery, make sure to position the modules in their final position and structurally fix all the modules that make up the system.



The installer who intends to install the WeCo Module 5K3 LV/HV Battery Module in the HV configuration should read this entire manual including the HV configuration information defined in Section 3.



**ATTENTION:**

**STACKABLE INSTALLATION INFORMATION**

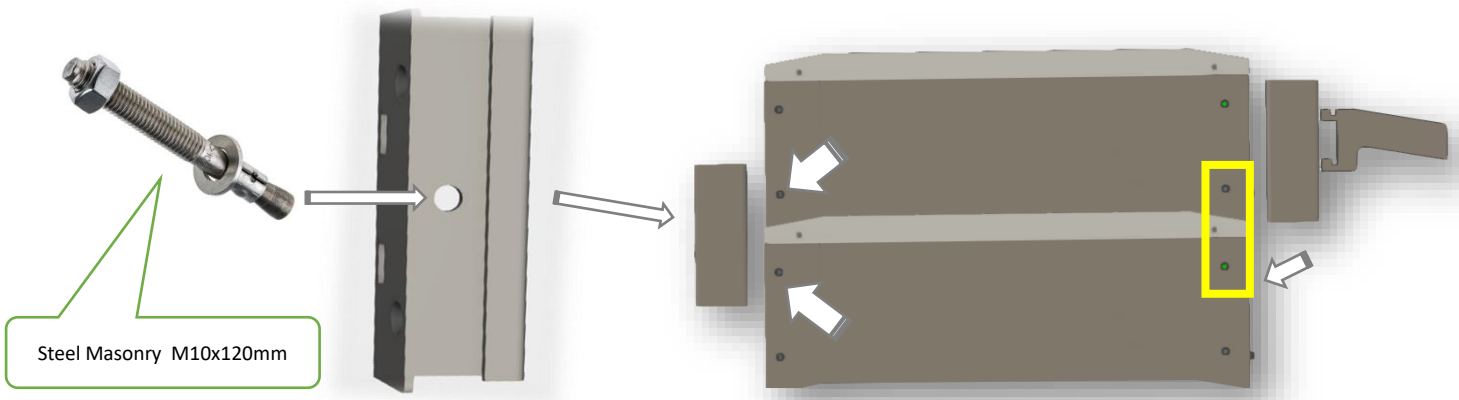
The stack configuration shall be concluded by interlocking the modules by using the module feet as shown below:

Step 1> Remove the feet by losing the two screws M6 on the side of the pack

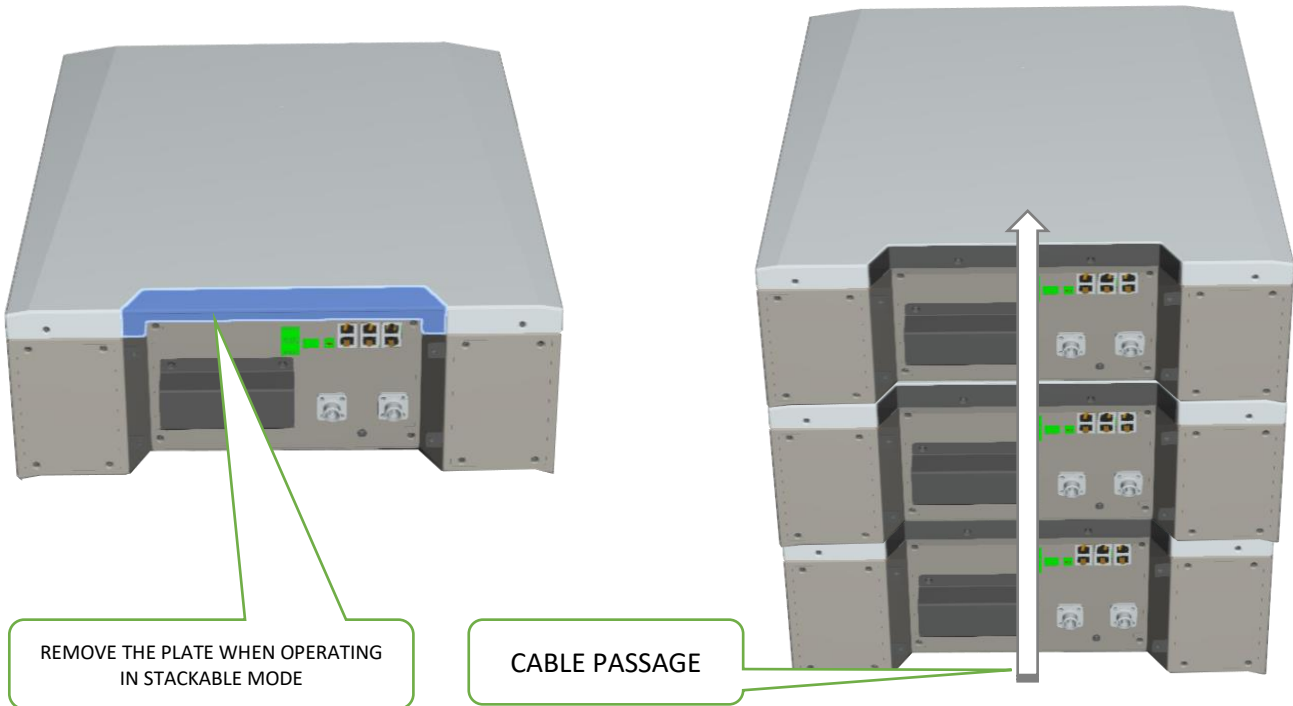
Step 2> Install the feet on the lower using the upper hole and secure it with the screw

Step3 > With a drill make an hole on the wall in correspondence with the hole marked with A letter and fix it to the wall using a wall plug screw

Sep4> When the both feet have been secured to the wall it is possible to install the second module and proceed with the same sequence up to the upper last module/



**When operating in stack mode, remove the upper (trapezoidal) front part from the battery to allow the cables to pass through. The front plate must be reinstated to protect the cables after the installation is complete.**

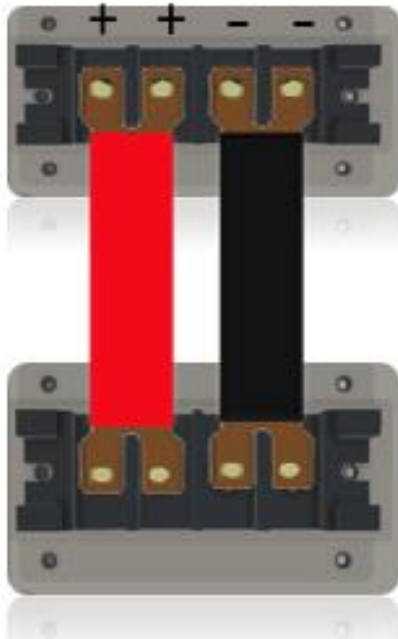




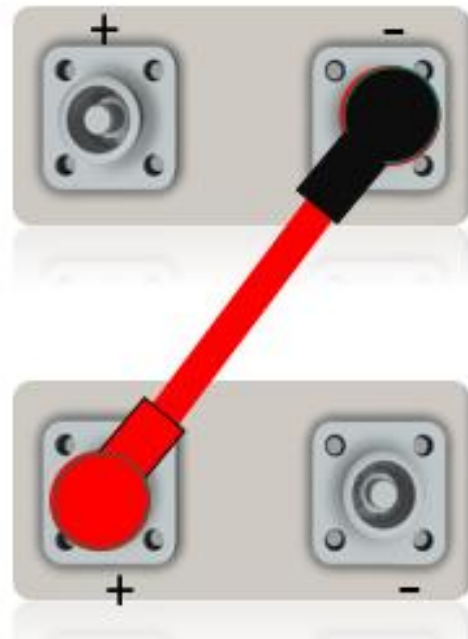
**ATTENTION:**

The 5K3 LV/HV battery module has two terminals for connecting the power supply. The installer must pay the utmost attention to the respective functions.

PARALLEL CONNECTION



SERIAL CONNECTION



**ATTENTION:**

The low voltage screw terminal only supports parallel connection with maximum voltage 60V  
 CAUTION> Connecting these terminals in series will cause serious damage to the battery  
**DO NOT CONNECT IN SERIES**

Fast Connector terminals only support series connections up to 1000Vdc  
 CAUTION> Connecting these terminals in parallel will cause serious damage to the battery  
**DO NOT CONNECT IN PARALLEL**

## SECTION 1 - STORAGE & PRE-OPERATIONAL PROCEDURES

### 1.1 Storage - Transportation – Removing / Relocation of Batteries

- ✓ This Battery is considered DANGEROUS GOODS by the United Nations 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 MODULE carton box is marked as below:



- ✓ The transportation and Storage State of Charge (SoC) shall not exceed 50%.
- ✓ The shelf period without recharging is 6 months, and then requires a quick charge up to 70% DoD and discharge back to 50% at 0.5C / 77°F (25°C).
- ✓ To preserve the performance and shelf life, this battery should optimally be stored at 77°F (25°F) and @70% humidity.
- ✓ Acceptable storage temperature range of the battery is between +59°F and +95°F (+15°C and +35°C).
- ✓ The self-discharge in the range of +59°F to +119°F (+15°C to +35°C) is around 1% a month. Anything 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 Federal, State and Local regulations.
- ✓ If one or more working Battery Modules need to be removed or relocated, they must be marked as **USED BATTERY** (follow local rules).
- ✓ If one or more Battery Modules need to be replaced due to damage, they should be marked as **DAMAGED USED BATTERY** and follow any applicable procedures and all Federal, State and Local regulations.

**LOW VOLTAGE DEVICES FOR 5K3**



The installer approaching this battery model for the first time must understand the use and operation of its accessories.

The 5K3 LV/HV battery module can be equipped with auxiliary devices such as the WE HUB or SUPERHUB for configuration for Low Voltage Clusters, or it must necessarily be equipped with the HVBOX device in order to create a high voltage system.

**LOW VOLTAGE FW 6.xx**

**WEHUB**

**SUPERHUB**

**HIGH VOLTAGE 9.xx**

**HVBOX**



Each device or accessory of the 5K3 LV/HV will have a specific Firmware that manages the logic and interconnection functions between Battery Modules and devices.

It is therefore important to understand the operational and interaction concepts of the 5K3 LV/HV battery within a more complex system.

**BATTERY + HUB**

Firmware  
**4.48**

**HUB**

Firmware  
**1.18**

**SUPERHUB**

Firmware  
**7.01**

**HV BOX**

Firmware  
**8.01**



## 1.2 Module Unpacking and Handling

The battery is always delivered in WALL mode and it is therefore necessary for the installer to make simple changes to install the STACK kit. Below are the installation phases.

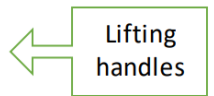
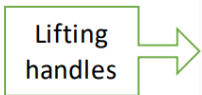
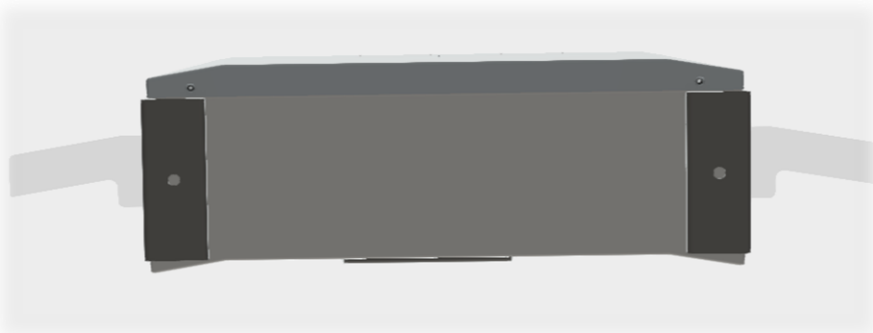
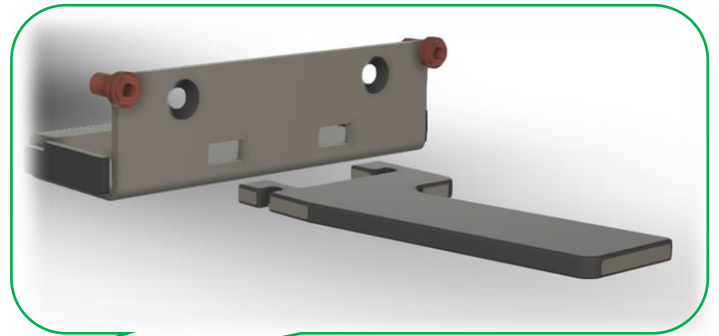


**ATTENTION:**

**The battery must be lifted by four persons, using the four handles.**

Two handles are built in and the other two are provided as temporary handles to be used as shown below.

Open the carton box, find the portable and retractable handles, position them and proceed with lifting.



### 1.2.1 Package Information and System Configuration List

The battery box is packed in cartons with accessories.

Upon receipt, review the configuration list carefully to make sure that the battery box and accessories are received in the correct quantities and type, and visually inspect to ensure that they are free from damage.

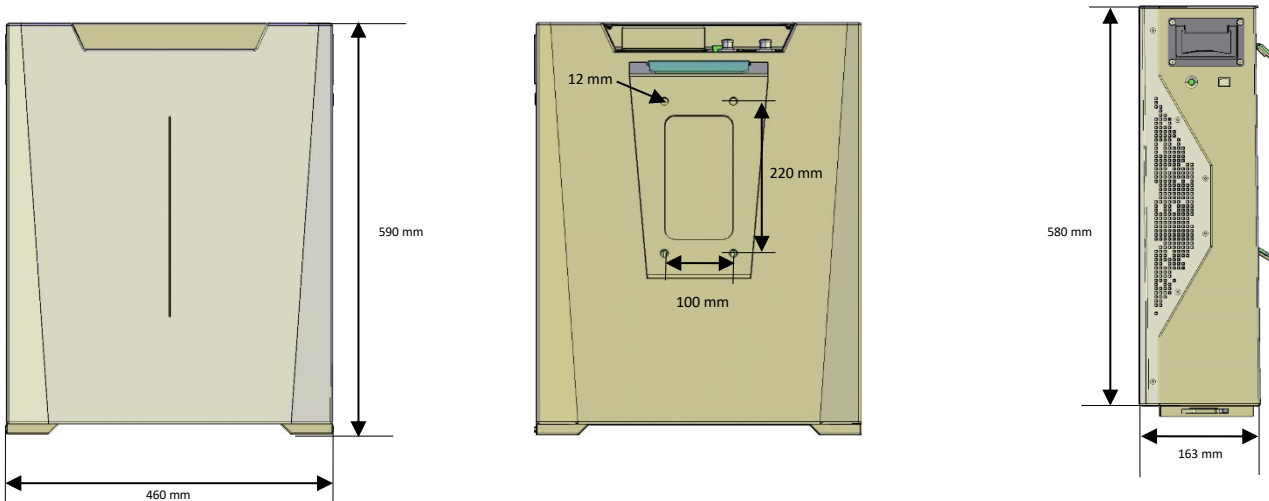
Refer to Section 2.1.3 for Low Voltage packing list and to Section 3.1.3 for High Voltage packing list. If battery is damaged and/or components missing, contact your local WeCo Module representative.

### 1.3 Wall Mount or Stack Mount Configuration



**NOTE:** The WeCo Module 5K3 LV/HV Battery Module ships as standard in the wall mount configuration.

#### 1.3.1 Battery Dimensions (Wall Bracket)



#### 1.3.2 Wall Mount

Step 1: Install the wall bracket by using the wall plugs and screws contained in the battery kit.

The wall must be inspected before proceeding with the bracket installation. A local civil engineer should assess the correct installation method, either wall mounted or floor mounted.

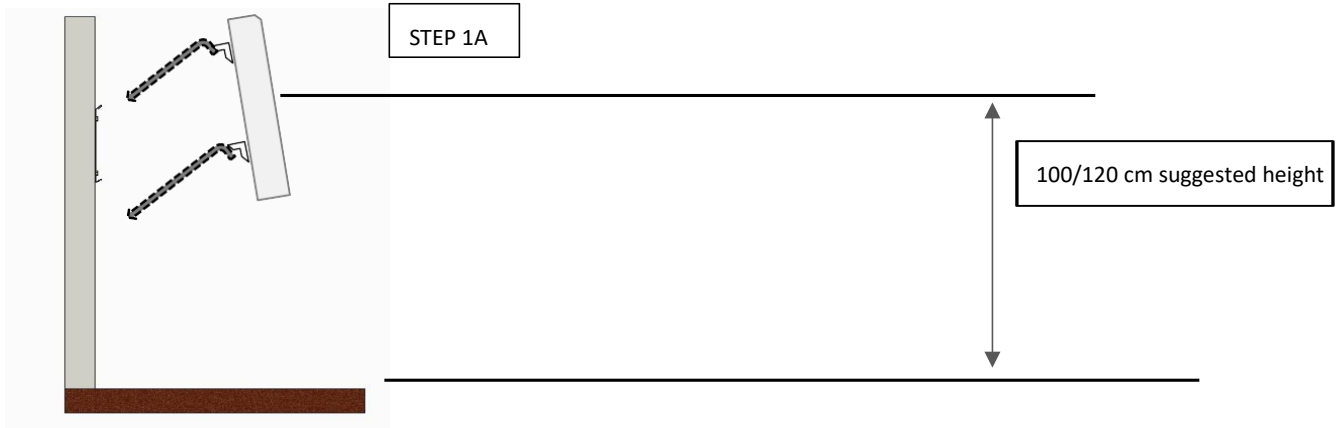
STEP 1





**ATTENTION:**

The Battery Module weighs 126.3 lb /57.3 kg and must be installed with the help of a mechanical lift, and/or with at least two people equipped with suitable suction cups for mechanical lifting or lifting straps.

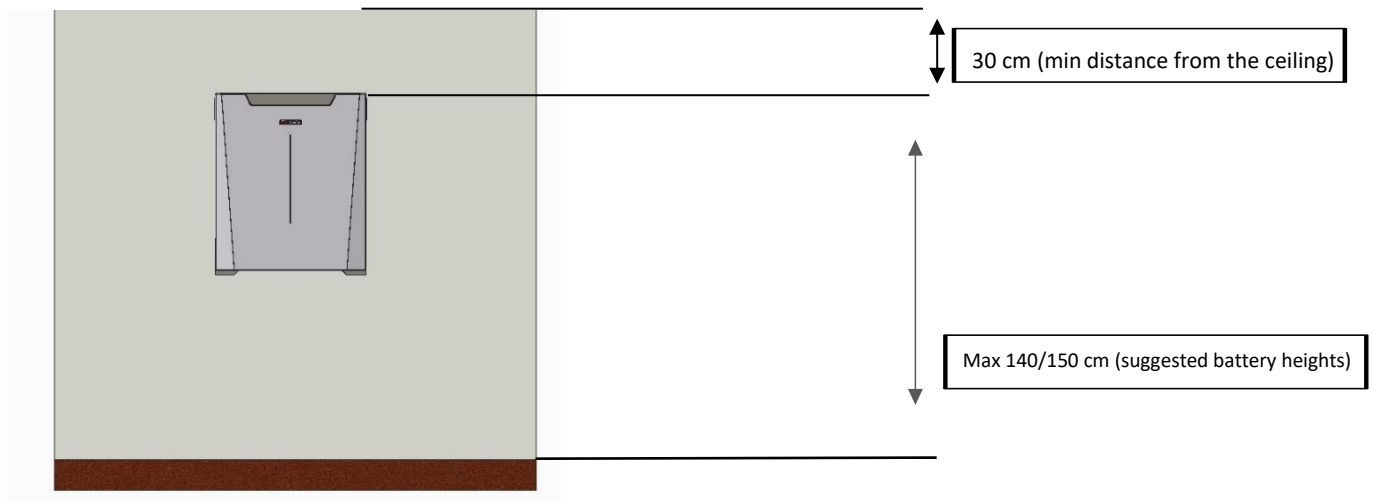


The Bracket must be installed on a flat and vertical wall.

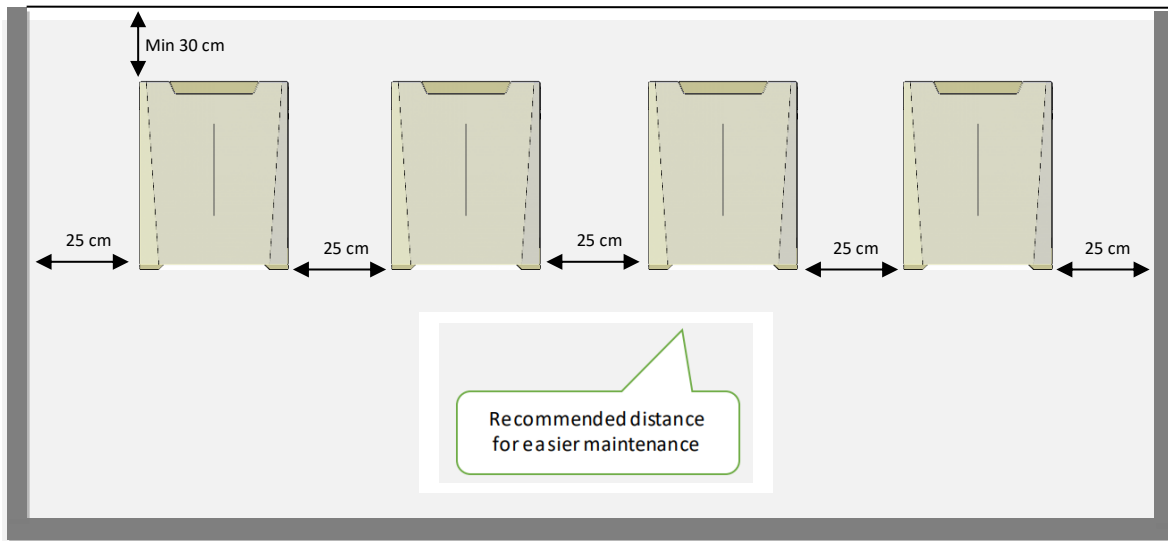
The steel bracket must be flush to the wall without any empty spaces between the wall surface and the back side of the bracket. Make sure to have adequate space to install the battery before proceeding with the installation.

**Step 2:** Install the battery by fitting the back bracket of the module with the wall bracket interlocking.

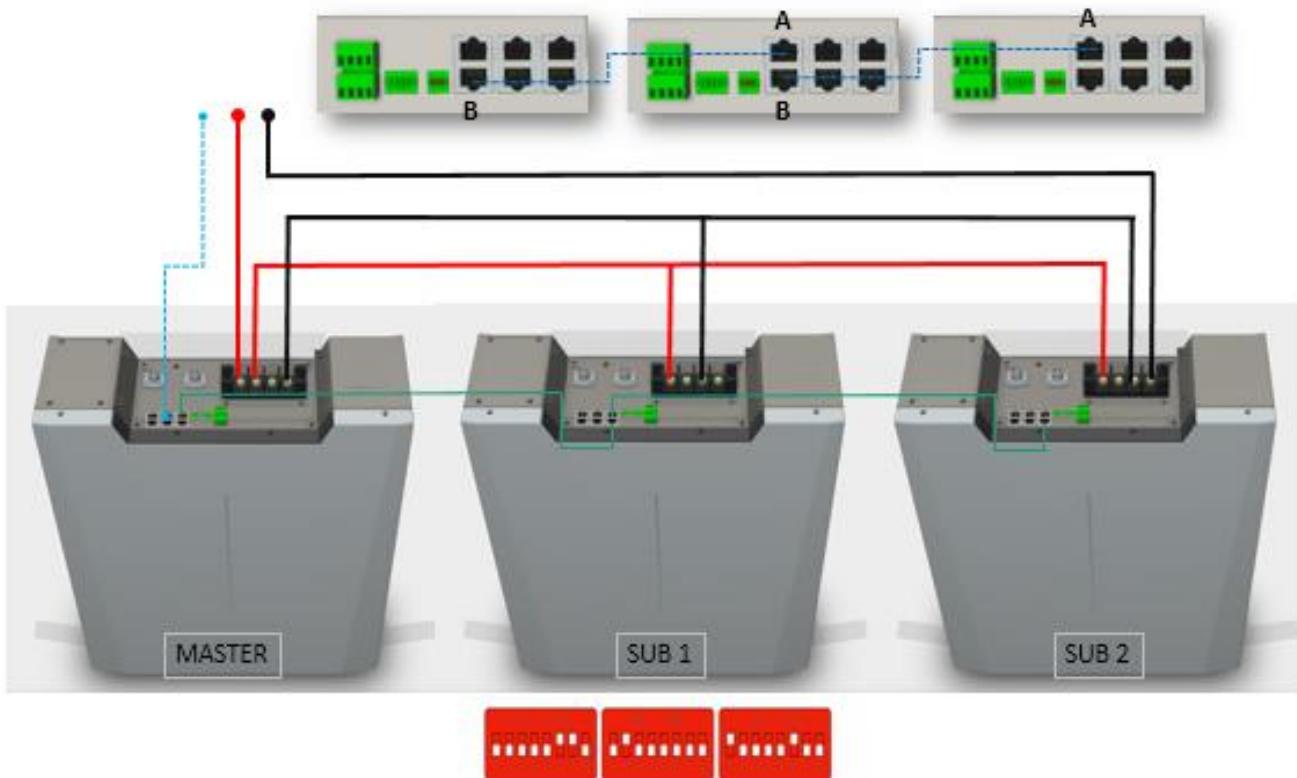
This operation must be conducted with a mechanical lifting device and/or with at least two specialized installers. Make sure the Battery Module is stable and properly locked into the upper interlocking plug.



Step 2A: In case of multiple module installation, make sure to respect the distance between the modules and the ceiling.



Example of a Floor or Wall Mounted battery cluster connected with power cables and data cables.



### 1.3.3 Stack Mount



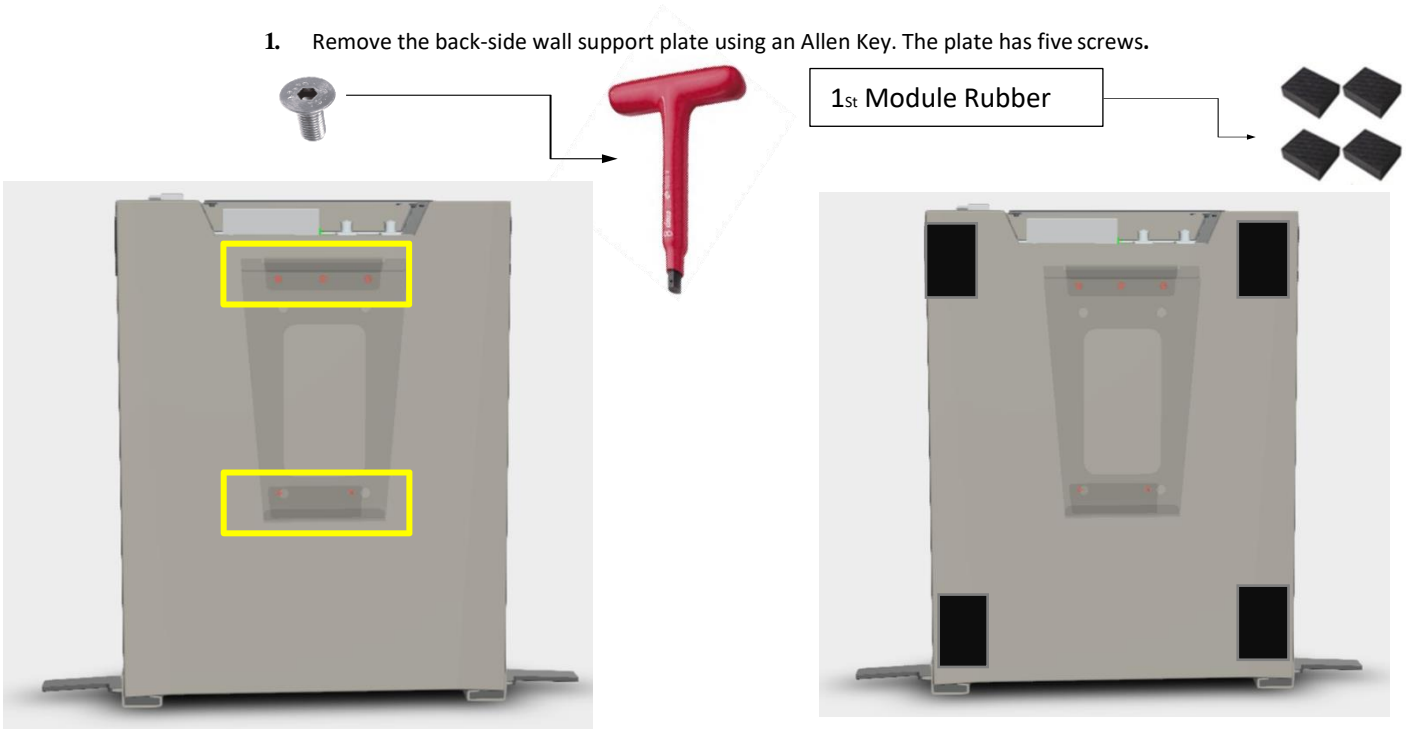
**ATTENTION:**

The Battery Module weighs 126.3 lb /57.3 kg and must be installed with the help of a mechanical lift, and/or with at least two people equipped with suitable suction cups for mechanical lifting or lifting straps.

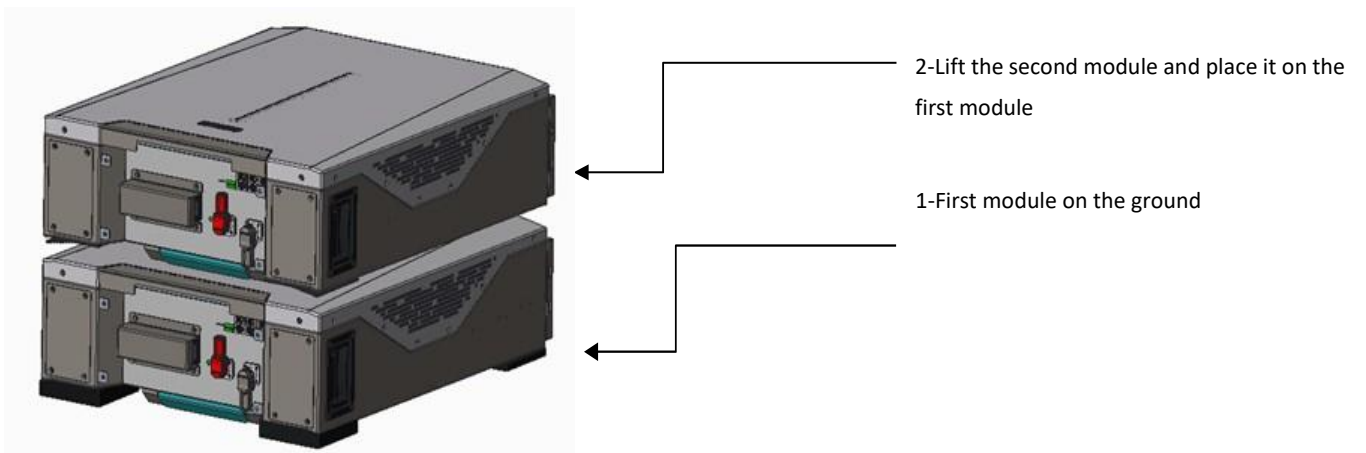
As previously stated in this manual, the 5K3 LV/HV Battery Module comes as standard in wall mount configuration.

To install in the Stackable configuration, the screws on the back of the battery module must be removed.

1. Remove the back-side wall support plate using an Allen Key. The plate has five screws.



2. Once the wall bracket support has been removed, start stacking the second module on top of the first module laid on the ground by using the front retractable handles.





**ATTENTION:**

Before stacking the batteries, the installer must check the maximum permissible floor load. It is recommended that the installer obtains approval from a civil engineer.

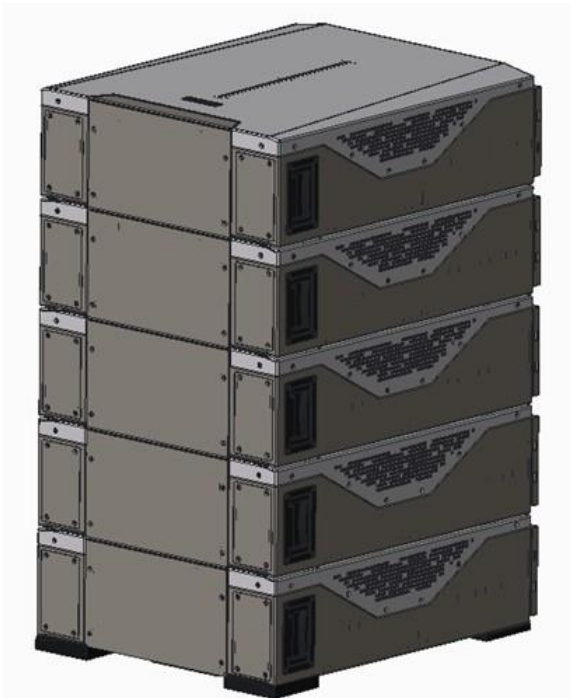
For vertical ground mounting, the support surface of the Battery Module is distributed on 4 insulated supports (rubber pads), 10 x 4 cm each. Make sure to install a distribution plate or make a proper foundation to support the weight.

In case of horizontal installation, the installer must prepare an adequate distribution plate on the floor in order to make a safe and stable support for the battery stack.



**ATTENTION:**

Ensure the support and/or the floor surface is adequate to support the battery load.



631.5 lb / 286.5 kg



505.2 lb / 229.2 kg



378.9 lb / 171.9 kg



252.6 lb / 114.6 kg

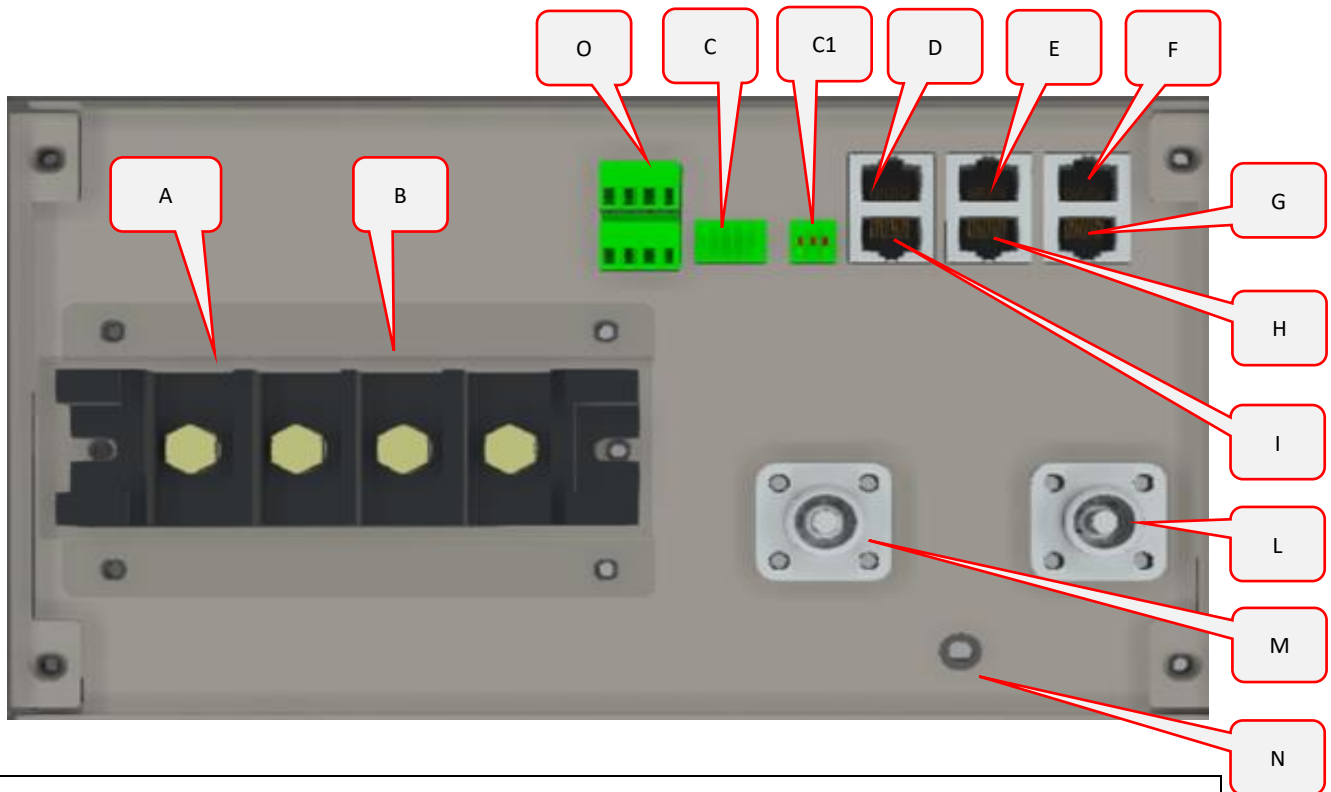


126.3 lb / 57.3 kg



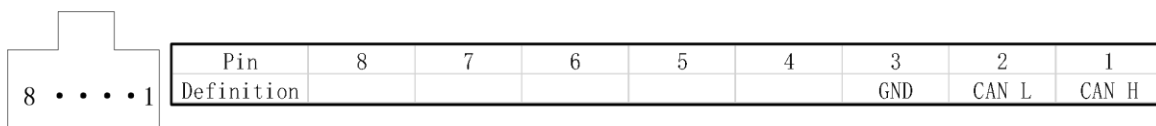
### 1.4 Battery Terminal Function Definition

The terminal layout is shown in the following figure:

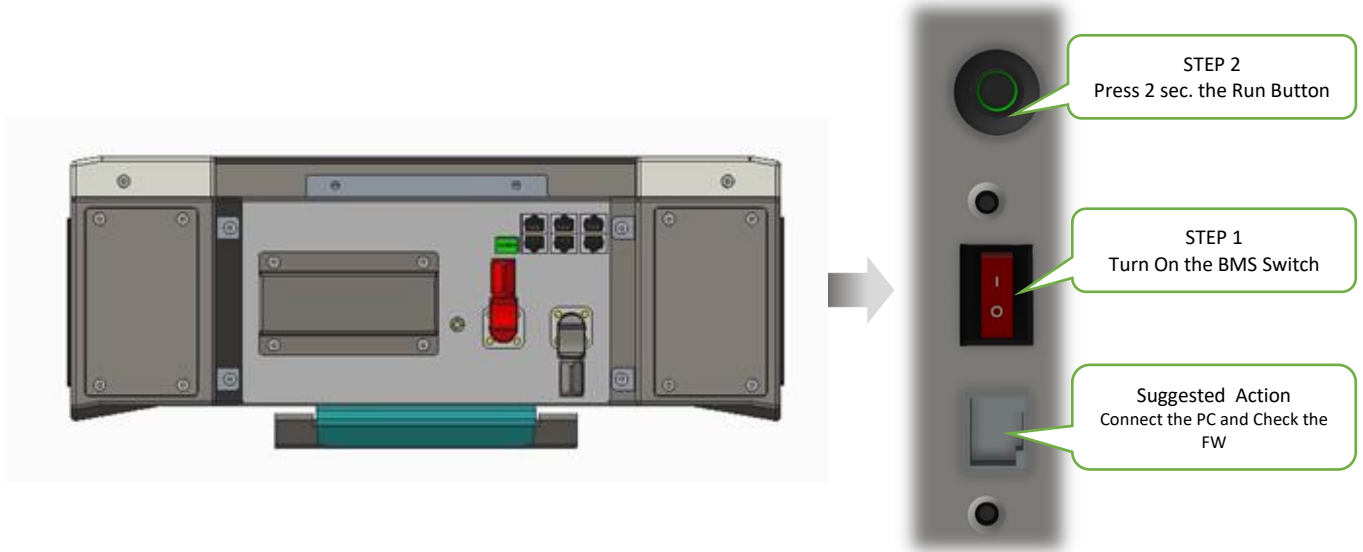


LOW VOLTAGE Wiring definition table		
Interface	Name	Function
A	LV POLE +	LOW VOLTAGE POSITIVE (+) Screw Terminal
B	LV POLE -	LOW VOLTAGE NEGATIVE (-) Screw Terminal
C/C1	DIP SWITCH	DIP SWITCH Address HUB 8 PINS (LV PARALLEL ID SET UP and HV ADDRESS PATH)
D	RS485 A LV	LOW VOLTAGE COMMUNICATION PORT RS485
E	CAN A	CAN – BMS to LOW VOLTAGE INVERTER
F	LINK	Digital Input
G	LINK	Digital Output
H	CAN B	HIGH VOLTAGE SERIAL IDENTIFIER RJ45 CAN PORT
I	RS485 LV	LOW VOLTAGE COMMUNICATION PORT RS485
L	HV POLE -	HIGH VOLTAGE NEGATIVE (-) Fast Connector Terminal for serial connection
M	HV POLE +	HIGH VOLTAGE POSITIVE (+) Fast Connector Terminal for serial connection
N	GND	Ground Terminal
O	DRY CONTACTS	Dry Contacts Terminal

**Attention:** Interface E: RJ45 port corresponding to the CAN bus pin definition



### 1.5 Out of the Box Pre-Operational Check



**Attention:** Do not make any connection to the Battery Module until you have thoroughly read and understood this entire manual.

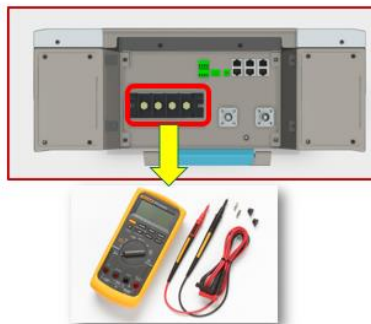
Turn On the BMS Switch button The Power Button is located on the right side of the Battery Module as shown above. The Power Button is a multi-colored button. Pressing the Power Button for 2 seconds will initiate the startup process of the battery.

The Power Button will settle as a steady green color if the battery is operating correctly. If the battery is low on charge, the Power Button will blink.

If the Power Button displays a flashing red color, there is a fault, and you should not attempt any further operation of the battery but contact WeCo Module support at [service@wecobatteries.com](mailto:service@wecobatteries.com)

There is also an RS232 monitoring port which will allow you to check all parameters of the Battery Module. Full instructions on how to interface to the RS232 port can be found in this manual.

**ATTENTION:**  
Before Operating make sure that the voltage is equal to **0 Vdc**  
Battery must be turned off before starting any activity



**Attention:** At this stage, after you have determined that the battery is functioning correctly, it is mandatory to switch the battery off and follow the instructions and guidance in this manual very carefully before attempting any configuration or connection to the Battery Module.

To switch the battery off (shutdown the battery), simply press Start/Stop button for 5-seconds and the green LED light will go off, confirming that the battery has shutdown correctly.



**Attention:** Read this manual thoroughly, and always follow the guidance herein before and while performing any installation procedure.





## SECTION 2 - LOW VOLTAGE CONFIGURATION

### 2.1 Product Introduction

The WeCo Module 5K3 LV/HV Battery Modules can be used as an on-grid or off-grid energy storage system. It is not recommended 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 warranty. The substitution of any components of this Battery Module will nullify the product warranty.

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

Connecting more than eight WeCo Module 5K3 LV/HV Battery Modules in parallel will nullify the product warranty.

#### 2.1.1 Identifying the Individual Module

Module Dimensions	mm	576x461x156
Weight		126.3 lb
	lb (kg)	57.3 kg
Case Material	Type	Steel
Parallel Modules	Max No.	8
Stackable	Type	Yes
Digital Output	No.	2+2
Cell Distribution	P/S	16S

Cell type	mm	LiFePO4
BMS Charge Temp		+19.4°F to +131°F*
	°F (°C)	-7°C to +55°C*
BMS Discharge Temp		+131°F to -4°F*
	°F (°C)	+55°C to -20°C*
Suggested Storage Temp		+77°F (+25°C)
	°F (°C)	shelf life 1 year
Storage Temp/Time outside the suggested storage temperature		-13°F to +131°F / 4 months
	°F (°C)	(-25° +5°C to +30°C+55°C / 4 months)
Self-Discharge @ 77°F (25°C)		1% per month
	%	
Self-Discharge outside the STC		< 3% per month
	%	

*\*Other variables can be introduced by the BMS*



## Product Identification and labels

The nameplate label describes the product parameters and is attached to the product. For details, please refer to the nameplate label of the product. For safety reasons, the installer must have a thorough understanding of the contents of this manual before installing the product.

### BATTERY LABEL

WeCo Srl Viale J.F. Kennedy 113/121 Scarperia -Firenze- Italia	
Emergency Number	Italy (+39) 055 0357960
Model Type	5K3
Nominal Capacity @ Standard Test Conditions	100 Ah
Cell Type	LiFeP04 (Lithium Iron Phosphate)
Nominal Voltage	52 Vdc
Max BMS Protection Voltage	58.4 Vdc
Min BMS Protection Voltage	46.5 Vdc
Charging (-) Discharging (+) BMS Current	-100 A / +100 A (peak +200 A for 5 sec.)
Maximum Short Current (A) and Time (µs)	1500A / 500µs
Parallel Units (from LV terminals)	8 Units (follow the parallel procedure)
Serial Units (from HV terminals)	16 Units (follow serial connection procedure)
IP Grade	IP21
Weight	126.3 lb (57.3 kg)
Standards*	EMC (EN6100-6-3:2007/A1:2011/AC:2012) UL 1973 IEC 6100-3-2:2014 IEC 6100-3-3:2013 IEC 6100-3-1:2007 IEC 62619
Good Class	Dangerous Goods <b>DG9</b> Category <b>3480</b>
UN Class test	<b>UN 38.3</b> Lithium Ion Battery
Production Date	<b>DD/MM/YYYY</b>
This battery must be installed and maintained by qualified professional installers. Read Warranty Terms and Conditions before use; improper use and installation will void the warranty.	
EAN BAR CODE EXAMPLE	 EAN CODE
 <b>MADE IN ITALY (A) ( See below)</b>	
(A) - Viale Kennedy 113-121 CAP 50038 Firenze, Italia (B) - Pioneer Park Plot 13 Dongguan, China Compliant with UN 38.3 Cert Number UN2021-1999-1 and SDS for Sea Safe Transportation Cert Number GJW2021 2045	



### 2.1.2 Accessory List (Standard Kit 120A Single Module LV)









The Battery Module is packed in a carton together with standard accessories. When unpacking the Battery Module, be sure to check that the Battery Module 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 checklist when unpacking the individual Battery Module and battery kits.

Cable diameter	Cable color	Cable Length	Description	QTY.	Picture
25mm	BLACK	250cm	Both sides ring terminal diam 8mm for LV connection ( one cable each battery Box) <b>Required for LV Installation</b>	1	
25mm	RED	250 cm	Both sides ring terminal diam 8mm for LV connection <b>Required for LV Installation</b>	2	
CAT 5	BLUE	120 cm	RJ 45 RJ 9 BMS to Inverter CAN <b>Required for LV Installation</b>	1	
CAT 5	BLUE	120 cm	RJ 45 RJ 45 LV PARALLEL CABLE <b>Required for LV Installation</b>	1	
Wall Bracket			Wall Plate for Battery Support + 4 M10 Wall Plugs + Screws		
Removable Brackets			Set of 2 back brackets with M6 screws (Allen Key) for wall installation	set	
Lifting Handles			2 X LIFTING HANDLES	1 set	
Rubber Tape Pads			4 X each module	4	



**2.1.3 Necessary Installation Tools**

 <p>Multimeter + Current clamp</p>	 <p>Insulated Screwdriver Set</p>	 <p>Insulated Allen Key Set from 2 mm to 8 mm</p>	 <p>Drill + Hammer</p>
 <p>Electrician Scissors</p>	 <p>Insulated Torque Wrench Set</p>	 <p>Lifting Strap + Mechanical Lifter</p>	 <p>RS232/USB + Screw Terminal (insulated)</p>

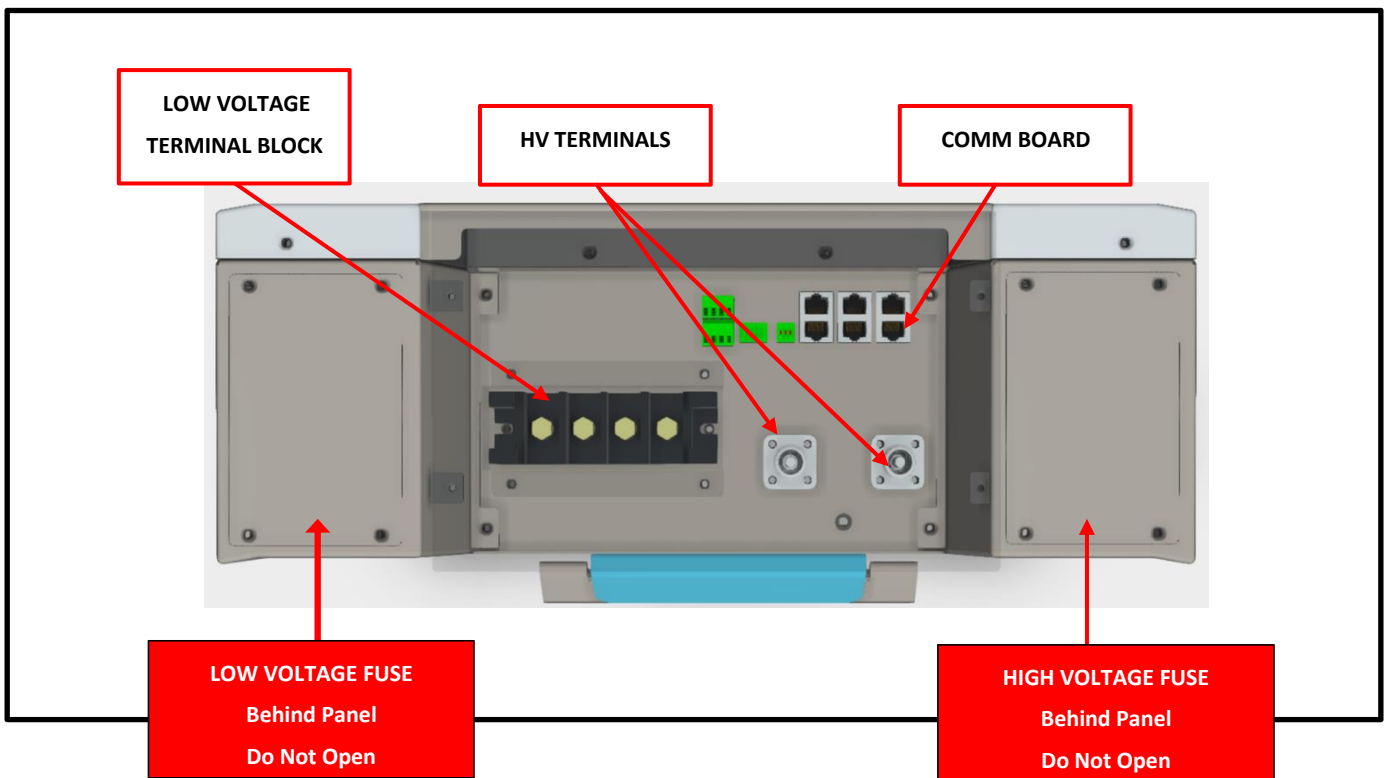
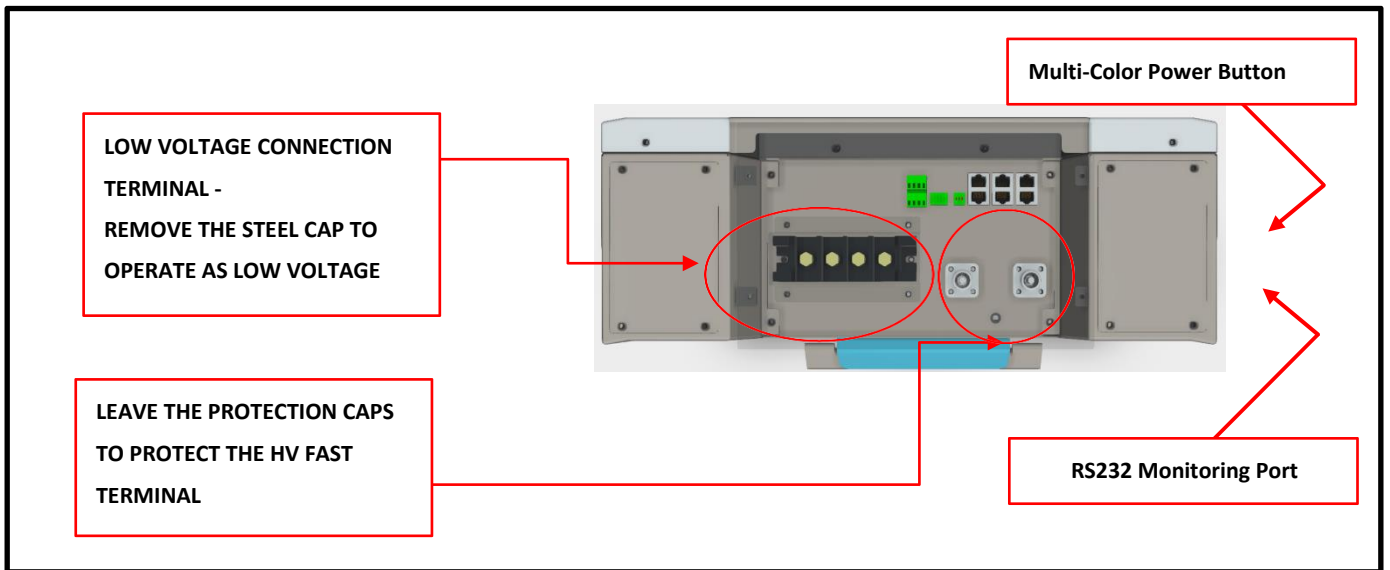
**2.1.4 Personal Protective Equipment +1000 Vdc Insulated Tools**



U  
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G  
E

## 2.2 Low Voltage Module Wiring and Set Up

### 2.2.1 Battery Connections

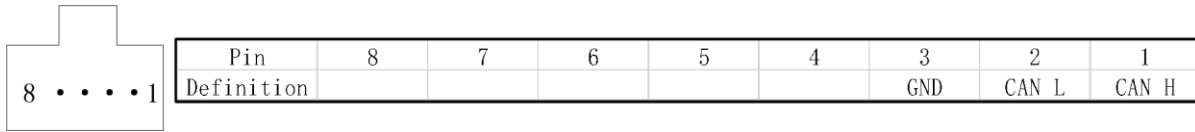


**CAUTION:** The LV fuse is contained in the left portion of the Battery Module as shown above. The access to the fuse is restricted to authorized WeCo Module service personnel and the protection lid cannot be opened by anyone else. The same applies to the HV fuse.



### 2.2.2 BATTERY CAN Pin Out

The terminal layout is shown in the following figure:



### 2.3 Low Voltage DIP Switch Settings



#### ATTENTION:



ALWAYS CONFIGURE THE DIP SWITCH SETTINGS BEFORE CONNECTING ANY POWER CABLES TO THE BATTERY TERMINALS B+ AND B-.



WHEN CHANGES HAVE BEEN MADE TO DIP SWITCH SETTINGS, THE BATTERIES MUST ALWAYS BE RESTARTED FOR THE CHANGES TO TAKE EFFECT.



POWER CABLE CONNECTIONS MUST BE MADE IN STRICT ACCORDANCE WITH THE INSTRUCTIONS IN THIS MANUAL. INCORRECT POWER CONNECTIONS CAN DAMAGE THE BATTERY MODULE AND CAUSE INJURIES.



WHEN THE INVERTER HAS A CANBUS COMMUNICATION PORT, SWITCH #7 OF THE MASTER BATTERY MUST ALWAYS BE SET TO "ON."



**Attention:** All drawings are for reference only. Always refer to the physical product as the standard. If the manual does not match the physical product, stop all actions, remove any connections, and store the batteries in a safe place. Call your Deka Duration technical service representative for assistance.



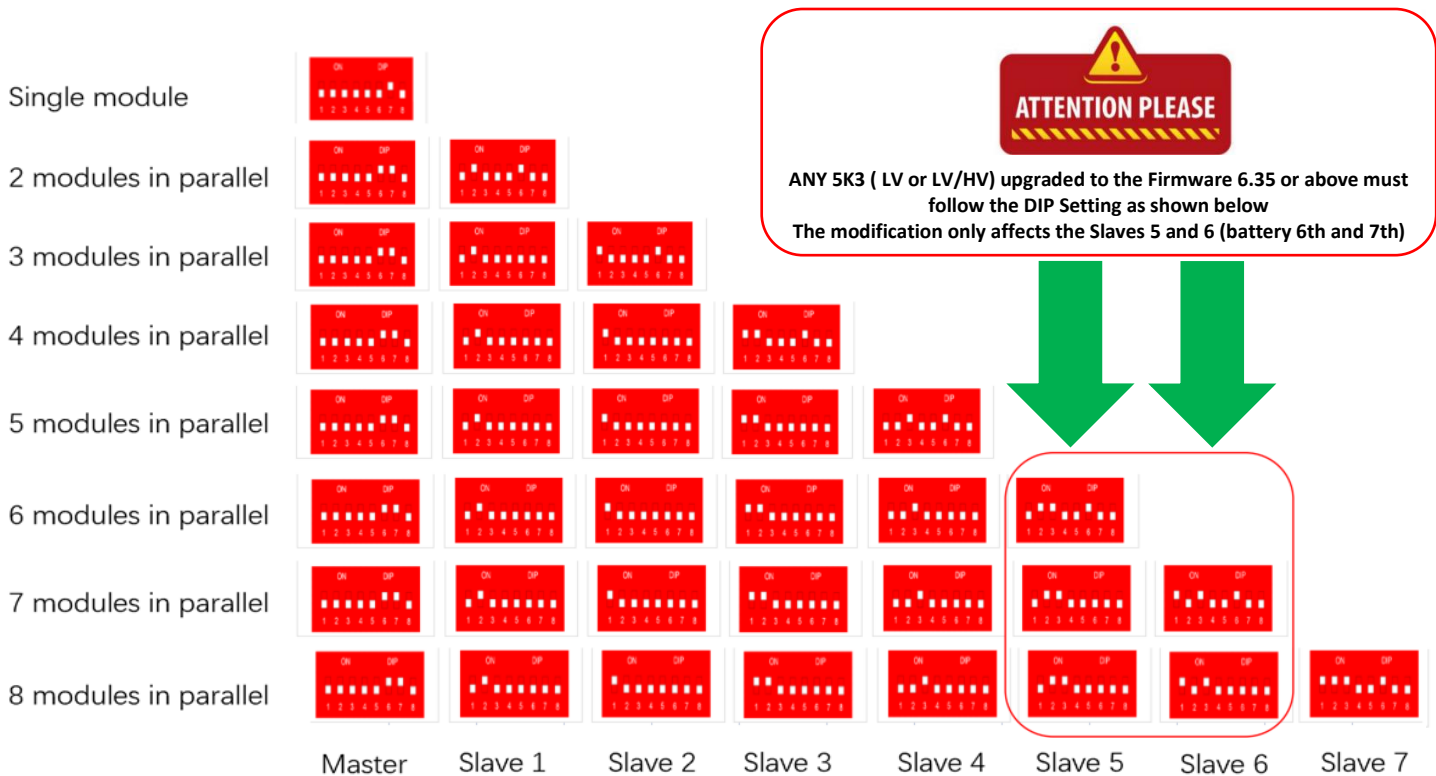
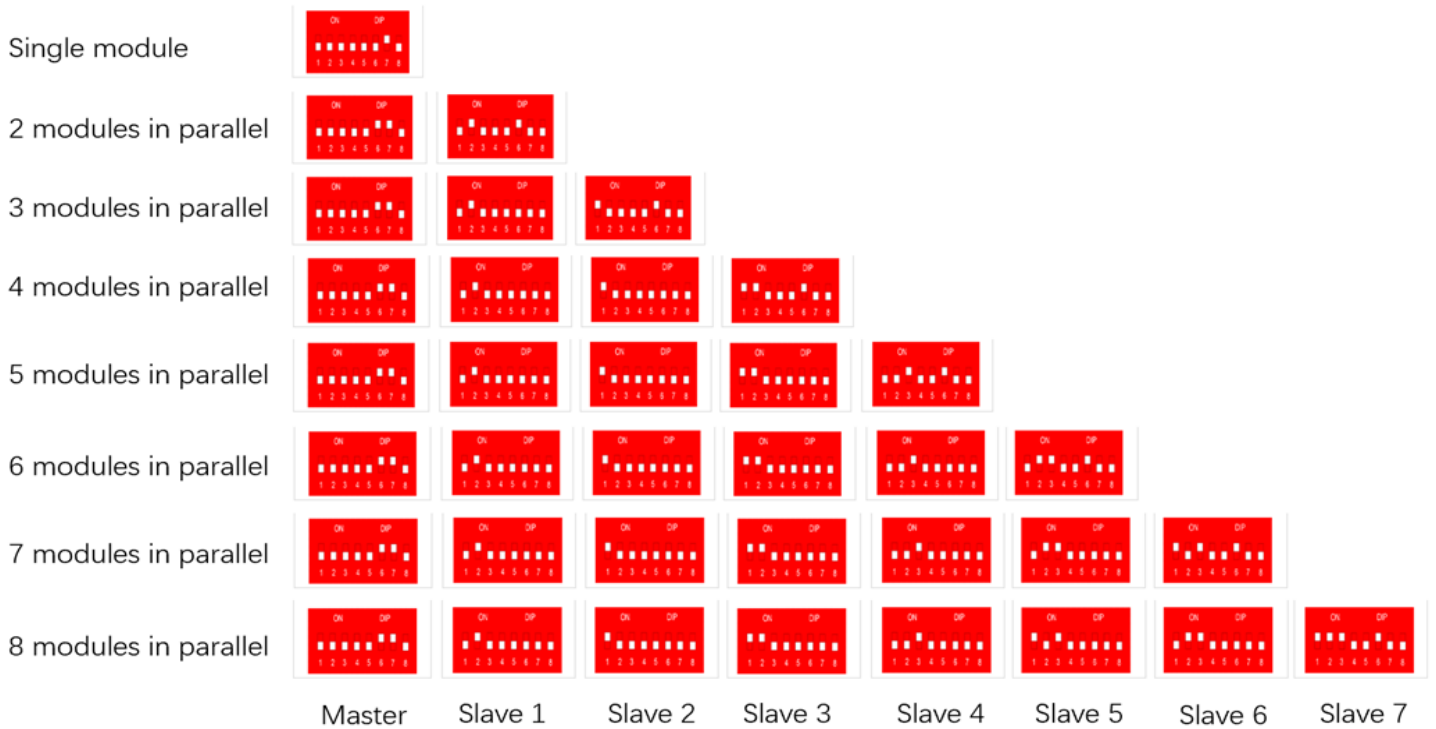
### 2.3.1 LOW VOLTAGE PARALLEL CONFIGURATION

The DIP switch must be set as follows to allow a single Battery Module to communicate with an inverter using CAN communications:

#### DIP CONFIGURATION UP TO EIGHT MODULES IN PARALLEL



**CAUTION:** After setting the DIP switch, the Battery Module must be restarted for the DIP switch changes to take effect.



**CAUTION:** After setting the DIP switches, the Battery Module must be restarted for the DIP switch changes to take effect.



## 2.4 Parallel Battery Wiring Connections



**ATTENTION:**

POWER CABLE CONNECTIONS MUST BE MADE IN STRICT ACCORDANCE WITH THE INSTRUCTIONS IN THIS MANUAL. INCORRECT POWER CONNECTIONS CAN DAMAGE THE BATTERY MODULE AND CAUSE INJURIES.



# 14 Nm (10.33 ft lb)

## Battery Terminal Block Power Cable Tighten

CHECK TORQUE EVERY THREE MONTHS



**Attention:** Screws, Cables and Bus Bar POWER CONNECTIONS on the battery terminal block must be installed with due diligence, and the tightening of the connection terminal must be to 14 Nm (11.06 ft lb). Each terminal should be inspected, and its torque checked every three months.



**Attention:** All drawings are for reference only. Always refer to the physical product as the standard. If the manual does not match the physical product, stop all actions, remove any connections, store the batteries in a safe place and call your WeCo Module technical representative for assistance.



**Attention:** For power cable connection for high current connection diagram, please refer to the specific section. Charging current limitation is mandatory as per this instruction manual.

Screw Diameter (ISO)	Max Fixing Torque [Nm]	Application	Construction Applied Torque [Nm]
M3	1.7	BMS protection Cover	1,2
M4	3.8	External Covers	3
M5	7.5	Isolators and Contactor Supports	7
M6	13	Fuses, Cables and Cable Lungs Connection to Terminals /Feet /Brackets/ Wall Plugs	10
M8	14	Plastic to steel and Cables on Terminal Block / Feet / Brackets / Wall plugs	14
M8	32	Steel on Steel Connection / Steel to copper/ Contactor terminal to Bus bar)	16
M10	62	External Bus Bar ( Aluminium and Copper) steel on steel connection	40
M12	107	External connections, copper to copper joints	80



**ATTENTION**

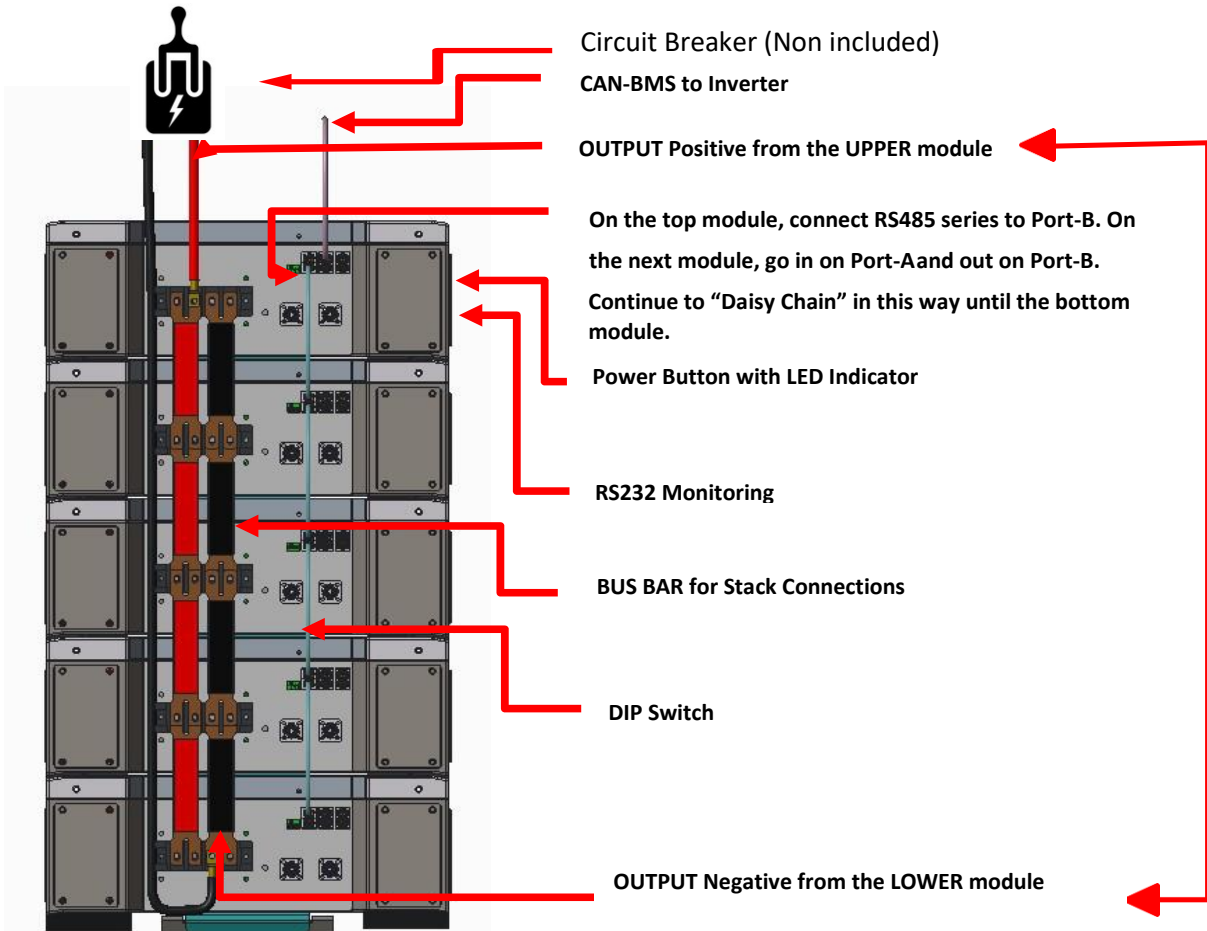
If during the quarterly check the screws will have residual torque lower than these values, it means that the cables and the busbar are subjected to out-of-range currents and the thermal effect is loosening the screws / bolts





**2.4.1 Low Voltage Single Stack Power and Data Connections (8-Modules Maximum)**

- 2.4.1.1 Proceed with the physical installation of the desired quantity and configuration of the Battery Modules, following the installation sequences and guidelines as described in Section 1 of this manual.
- 2.4.1.2 Connect the power cables as indicated below, making sure that the batteries are OFF (check the button LED on the bottom) and always measure the terminals with a multimeter to check for **ZERO VOLTS**.
- 2.4.1.3 As per UL regulation, a circuit Breaker is compulsory to separate the battery circuit from the inverter.



**Information:** When multiple Battery Modules are connected together, it is possible to choose between “capacity” chain series or parallel to increase capacity and peak. In case of parallel, the parallel battery and inverter can only communicate through CAN interface, and the communication between the batteries will be through RS485.



**Attention:** Be sure to follow the above method of “daisy chaining” the RS485 connections, starting at Port-B on the upper Battery Module, then into Port-A on the next module and out of Port-B, then into Port-B on the next module, and so on.



**Caution:** B+ interface is always positive, B- interface is always negative; GND is for the parallel battery grounding port.



**Caution: PRE-CHARGE** The inverter must be connected to the battery and any breaker/fuse installed between the battery and Inverter must be closed **before turning on the battery** or the pre-charge function will not have effect

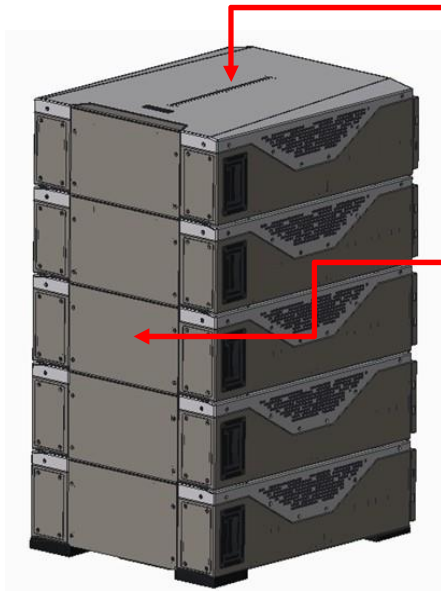
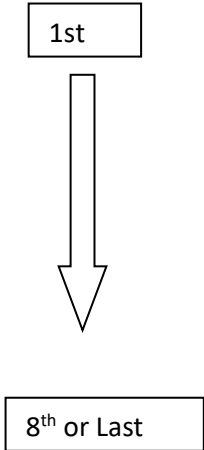
**Missing to follow this procedure might damage the system**




**Information:** Connect the cables according to the installation requirements, always paying attention to minimize the length of the cables to avoid voltage drops.



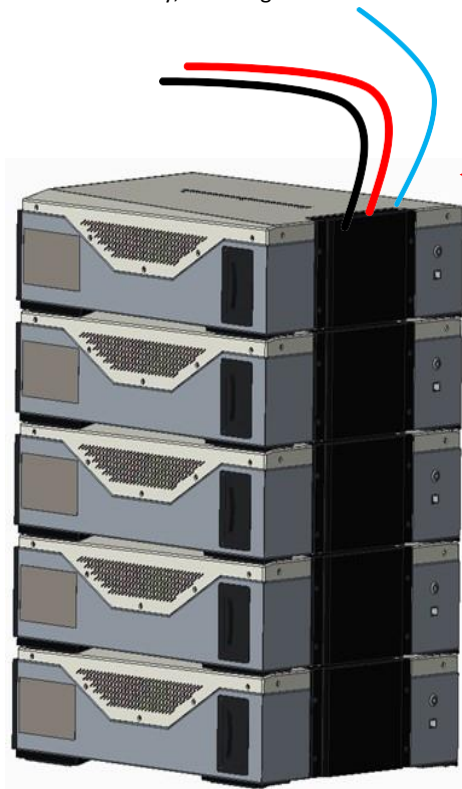
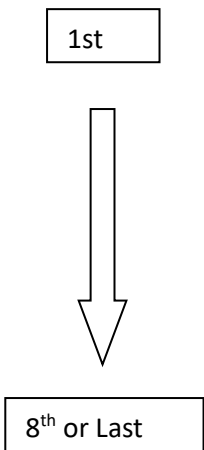
**Attention:** On the top Battery Module, keep the original connection HUB cover.





**Attention:**  
Install the stackable flat front cover plate  
to protect the bus bar and cables  
**BEFORE TURNING ON**

Battery Modules installed correctly, see image below.



Suggested  
Cable Output  
from the  
Upper Side.



## 2.5 Module Activation and Shutdown

### 2.5.1 LED Visual Indication Lights

There are two sources of visual indications on the Battery Module.

- Power Button
- LED Bar

#### 2.5.1.1 Power Button

The Power Button is located to the right of the battery terminal connections on the side of the Battery Module. The Power Button is a multi-colored button and will provide the user with the following indications depending on the state of the battery.

Name	Meaning	Function or Indication Status
BMS Switch	On/Off Button	Turn On the BMS switch before pressing the run button
POWER BUTTON	On/Off Button	Switches the Battery Module on and off.
RUN	Running indicator light (GREEN)	When the Battery Module is running normally, indicator light will be green.
LOW BATTERY	Low battery indicator (GREEN BLINK 1 sec. interval)	When the battery is low (SoC<0-5%), it will blink at 1 second intervals. The RUN button will stop blinking when the battery is in charging mode and the SoC reaches 10%.
FAULT	Fault indicator light (See front LED BAR)	When there is a fault with the Battery, the front LED BAR will show a full RED LED LIGHT and the RUN BUTTON will show no light within 10 seconds from the event.



**STARTUP:** A 2-second press on the Power Button will turn the Battery Module on.

During the startup procedure, the RUN button will blink until the safety inspection has been completed by the BMS.

**SHUTDOWN:** A 5-second press and hold on the Power Button will turn the Battery Module off.

Other functions of the Power Button are explained in the relevant sections of this manual.



**Attention:** Read this entire manual thoroughly to understand the correct startup and shutdown procedures for each battery configuration.



**Attention:** Illustrations shown are for reference only. Please always refer to the physical Battery Module in front of you, and if the module has a different configuration to this manual, stop all activity immediately and contact your WeCo Module technical service representative.



### 2.5.1.2 LED Bar Indications

The LED bar is located on the front of the battery and is to be used as a visual indication.

#### START UP



- 1- LED BAR Check. All the Blue LED will blink for 5 seconds
- 2- SOC Green LED will appear to indicate actual SOC

Warning Indicator ( Most of the time switched off)  
 SOC 81-100%  
 SOC 31-80%  
 SOC 6-30%  
 SOC < 5%

#### OVER/UNDER TEMPERATURE



- 1- If the temperature rises above the BMS limits, the contactor opens
- 2- The LED BAR will start blinking in red color

Warning Indicator  
 SOC 81-100%  
 SOC 31-80%  
 SOC 6-30%  
 SOC < 5%

#### FIRMWARE UPGRADE



- 1- During the firmware upgrade the first blue LED is active for the entire upgrade process
- 2- When the upgrade process has been completed the LED BAR will turn to normal

#### VOLTAGE MISMATCHING



- 1- If the voltage difference between modules is above 2V, all LED in orange color

Warning Indicator  
 SOC 81-100%  
 SOC 31-80%  
 SOC 6-30%  
 SOC < 5%

#### MAJOR FAULT



- 1- Wrong Voltage reading or any abnormal reading
- 2- All the LED BARS will remain fixed red color
- 3- The warning indicator will blink in RED color every 0.5 Sec
- 4- The SOC indicator is not displayed

#### PROTECTION STATUS



- 1- If the current exceed the BMS limit
- 2- If the voltage exceeds the BMS limits (High or Low)
- 3- The full LED bar blinks in RED Color
- 4- The SOC Indicator is not displayed

After any major event that causes the BMS safety intervention, the BMS logic will allow four reconnections attempts: **The first after 4 minutes if the same condition occurs again the next three attempts will be every 4 hours.**

## 2.5.2 Stand Alone Battery Front Panel Control

### 2.5.2.1 Start Battery

Press the Power Button for 2-seconds. The GREEN RUN light should come on. The Battery Module has been activated normally.

### 2.5.2.2 Shut Down Battery

Press and hold the Power Button for 5-seconds. The GREEN RUN light should go off. The Battery Module has been shut down normally.

### 2.5.2.3 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 Module to ensure charging capacity.

**Forced charging approach:** Short press the Battery Module Power Button, the battery RUN light will flash green which means that the battery is entering the compulsory charging mode. If the battery receives 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.

During the forced charging period, the low battery LED will be steady orange up to an SoC of 10% at which point the low battery LED will go out.

## 2.5.3 Parallel Battery Configuration

1. The voltage difference between any of the Battery Modules 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 Battery Modules 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 RS485 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 not install the RS485 on the port-A of the master battery as it will result in a fault).
6. Connect the CAN port of the master Battery Module 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.

### 2.5.3.1 Activation of Parallel Batteries (From Master to Sub #4)

Press the Master Power Button for 2-seconds. The GREEN RUN light should come on. The battery has been activated normally. Short press each Sub Power Button for one second. The GREEN RUN light should come on. The battery has been activated normally.

### 2.5.3.2 Shutdown of Parallel Batteries

Press and hold the Master Power Button for 5-seconds. The GREEN RUN light should go off immediately. The GREEN RUN lights on the sub batteries will not be extinguished immediately.

The RED FAULT lights on the sub 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 sub batteries will go off.

The parallel battery system has shutdown properly.

To completely shutdown the cluster, all SUB batteries should be manually turned OFF by pressing the RUN button and hold for 5 seconds.



#### NOTICE:

When a Master battery is offline in a fault state, or has been manually shutdown, the entire cluster will go offline until the Master comes back online.



#### NOTICE:

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

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



### 2.5.4 LV Direct Parallel Connection WITHOUT Certified Inverter BMS Communication (Open-Loop)

DEKA always recommends using an inverter equipped with CAN communication listed in this manual, however any inverter can be used with WeCo Module batteries by setting the voltage and current values according to the table below.

Note that for installations **WITHOUT** certified Inverter BMS Communications, the maximum number of battery modules per installation is limited to five (5). The DD21001 Low Voltage Hub must not be used without Certified Inverter BMS Communication.

LV/HV 5K3 LV/HV	Individual Module Setting	
Nominal DC Voltage	52	
Nominal Amp Hours	105 / Usable 100Ah	
Rated Capacity	100Ah	
Standard Charge Current	100 Adc	
Max Charge Current	110 Adc Peak	
Standard Discharging Current	100 Adc	
Max Discharging Current	200 Adc Peak 5 sec	
Min Voltage	50.5 Vdc	
Max Voltage	56.00 Vdc	
Warranty Terms Charge Current	50 Adc @ 77°F (25°C) 80% DoD	
Warranty Terms Discharge Current	50 Adc @ 77°F (25°C) 80% DoD	
Charging Current at Various Vdc at 77°F (25°C)	From 50.5 Vdc up to 54.2 Vdc Max 100A	From 54.5 Vdc up to 56.0 Vdc Max 10A
Operative Ambient Temperatures Without CAN Communication	From +50°F to +95°F (+10°C to +35°C)	
Operating Efficiency	98%	
Self-Discharge Rate	1% self-discharge per month @ 77°F (25°C)	
Memory Effect	None	
Performance Warranty Period	10 Years - see <i>Limited Warranty terms</i>	
Note	<p>Without CAN communication, it is not always possible to perform a correct calibration of the cells due to the lack of interaction with the inverter. It is therefore possible that the SoC 100% threshold is not reached.</p> <p>It is recommended to use the minimum and maximum settings indicated, and to monitor the charging process to ensure that the battery does not go into protection mode for Low or High Voltage, Temperature or Current.</p>	



**2.5.5 LV Direct Parallel Connection WITH Certified Inverter BMS Communication (Closed-Loop)**

Note that for installations WITH certified Inverter BMS Communications the maximum number of battery modules per installation is limited to five clusters of eight batteries per cluster. The DD21001 Low Voltage Hub must be used when the installation has more than one cluster.

LV/HV 5K3 LV/HV	Individual Module Setting	
Nominal DC Voltage	52	
Nominal Amp Hours	105 / usable 100Ah	
Rated Capacity	100Ah	
Standard Charge Current	100 Adc	
Max Charge Current	110 Adc Peak	
Standard Discharging Current	100 Adc	
Max Discharging Current	200 Adc Peak 5 sec	
Warranty Terms Charge Current	50 Adc @ 77°F (25°C) 80% DoD	
Warranty Terms Discharge Current	50 Adc @ 77°F (25°C) 80% DoD	
DC Voltage (extreme) <i>BMS Safety Intervention Voltage Limits</i>	48.5 Vdc	58.4 Vdc
Depth of Discharge	Up to 100%	
Operating Efficiency	98%	
Operating Temp	-13°F to +149°F (-25°C to +65°C)	
Charging Temp @ Max 0.1C	+19.4°F to +32°F (-7°C to 0°C)	
Charging Temp @ Max 0.25C	+32°F to +113°F (0°C to +15°C)	
Charging Temp @ Max 1C	+59°F to +131°F (+15°C to +55°C)	
Discharging Temp @ Max 0.5C	+149°F to +131°F (+65°C to +55°C)	
Discharging Temp @ Max 1C	+131°F to +32°F (+55°C to 0°C)	
Discharging Temp @ Range 0.1C to 0.5C	+32°F to +19.4°F (0°C to -7°C)	
Discharging Temp @ Max 0.1C	+19.4°F to -13°F (-7°C to -25°C)	
Self-Discharge Rate	1% self-discharge per month @ 77°F (25°C)	
Memory Effect	None	
Performance Warranty Period	10 Years – see <i>Limited Warranty terms</i>	





## 2.6 Overview of Multi Cluster System

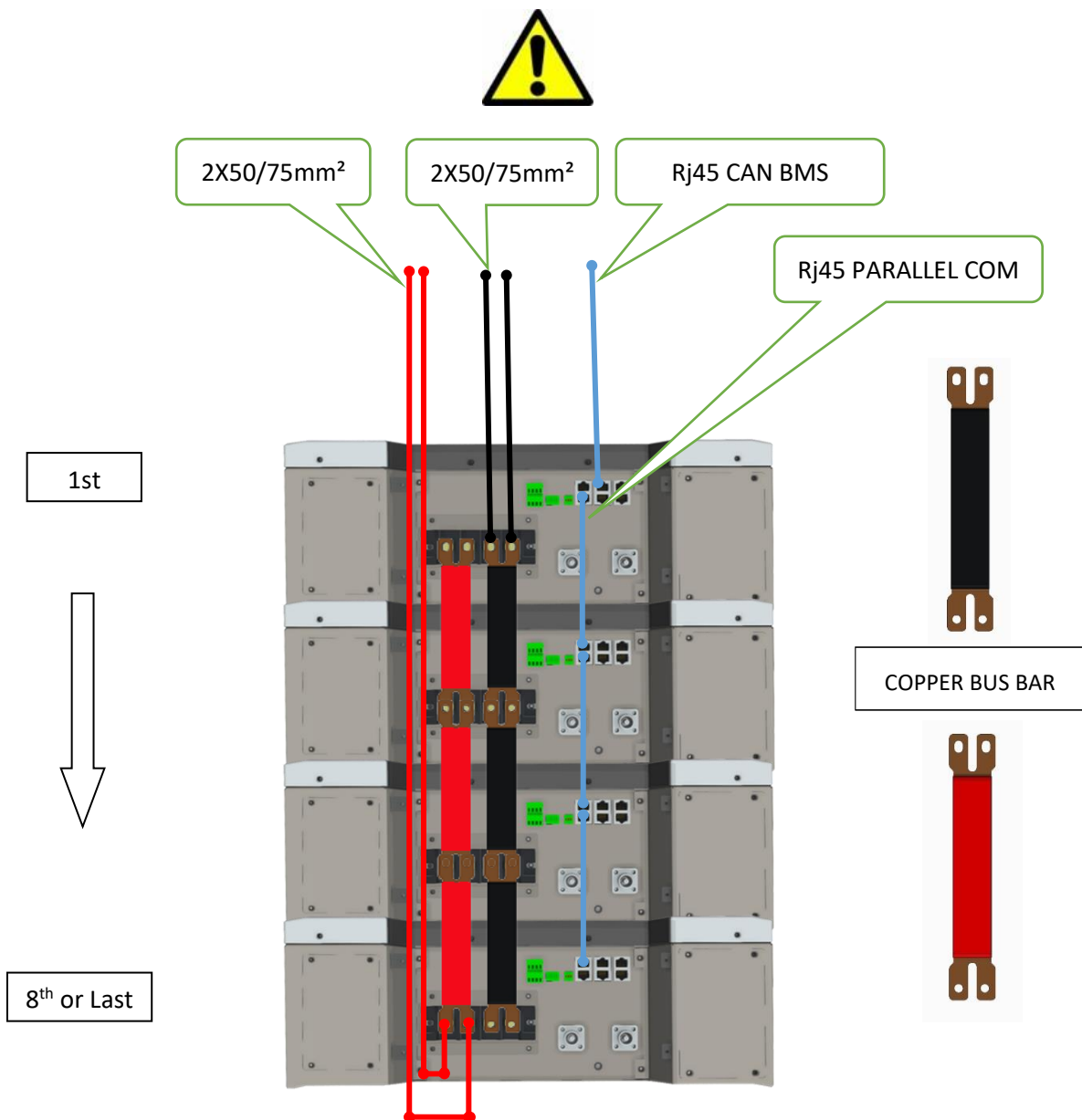
### -Double BUS BAR-

**ATTENTION:** BOTH ENDS OF THE CLUSTER MUST BE CONNECTED WITH TWO OUTPUT CABLES 50 mm<sup>2</sup>.  
CABLES LENGTH SHALL NOT EXCEED 250cm.

Suggested constant current for a cluster of 8 modules is 350A (18200W) and the suggested output cable is composed of two sets of 50 mm<sup>2</sup> each.

2X 50 mm<sup>2</sup> = 2 cables 50 mm<sup>2</sup> connected to both poles

(Positive pole has two connection screws, Negative pole has two connection screws)



**14 Nm (10.33 ft lb)**



Terminal Block must be checked every 3 months.



# INFORMATION

Cable size verification for a cluster composed by 5 or more Modules connected to the inverter with 2 sets of cables (50mm<sup>2</sup> each) for a total of 100 mm<sup>2</sup> each terminal (positive and negative).

## CABLE VERIFICATION:

100 mm<sup>2</sup> (2x 50mm<sup>2</sup>) 2.5m CAN SUPPORT A MAX CONSTANT POWER OF 18200W (18.2kW/52Vdc= 350A<sub>dc</sub>)

### CABLE SECTION VERIFICATION

Direct current

<b>Voltage</b>	<input type="text" value="52"/>	V.
<b>Power</b>	<input type="text" value="18200"/>	W
<b>Voltage drop</b>	<input type="text" value="0.3"/>	V.
<b>Length</b>	<input type="text" value="2.5"/>	m

Calculate    Reset

The decimal digits must be separated by a point and not by a comma. Before the point, a digit must always be entered (for example: 0.2).

---

**Results**

<b>Cable section</b>	<input type="text" value="103.83"/>	mm <sup>2</sup>
----------------------	-------------------------------------	-----------------

### VOLTAGE DROP MAX ALLOWANCES

Direct current

<b>Voltage</b>	<input type="text" value="52"/>	V.
<b>Power</b>	<input type="text" value="18200"/>	W
<b>Section</b>	<input type="text" value="100"/>	mm <sup>2</sup>
<b>Length</b>	<input type="text" value="2.5"/>	m

Calculate    Reset

The decimal digits must be separated by a point and not by a comma. Before the point, a digit must always be entered (for example: 0.2).

---

**Results**

<b>Voltage drop</b>	<input type="text" value="0.31"/>	ΔV
<b>Voltage drop %</b>	<input type="text" value="0.6"/>	ΔV%

Above calculator available on [www.wecobatteries.com](http://www.wecobatteries.com)



## 2.7 CAN Hub for Multi Cluster Configuration

**REQUIRED FOR INSTALLATIONS OF MORE THAN 1 CLUSTER**



# LOW VOLTAGE HUB



**SEE THE POWER/CURRENT CONFIGURATION BELOW**

Each battery pack and each cluster must have the same SoC %.  
 All stack configurations must use the WeCo Module bus bar.  
Each cluster must have the same number of battery packs.

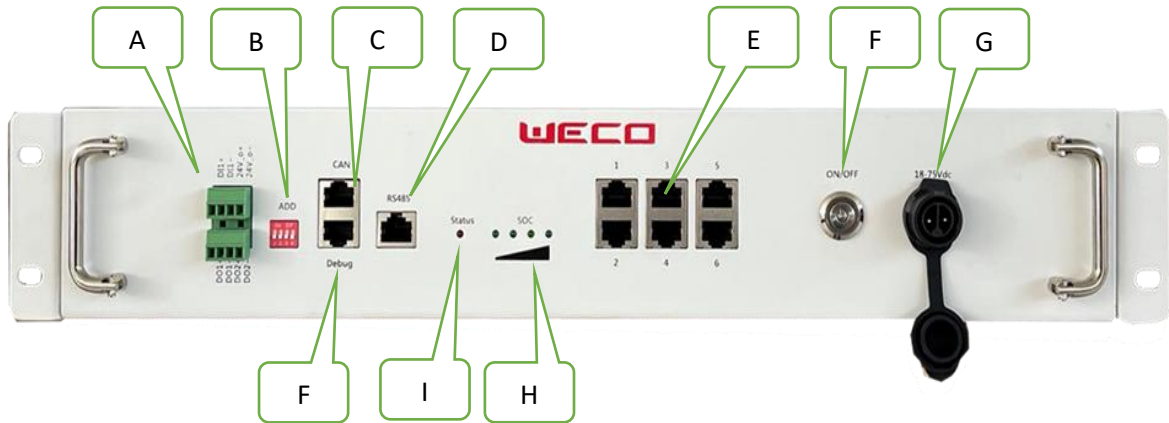


This BMS BMU Master Hub is mandatory when more than one cluster is connected on a common bus bar.



The Master HUB works only with CAN communication approved inverters.

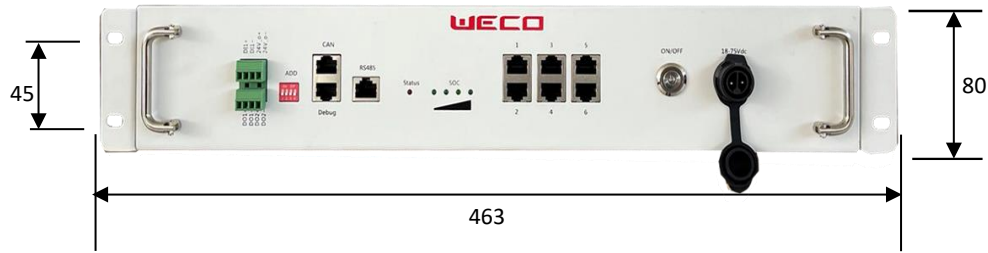
The DD21001 HUB can manage a maximum of 5 clusters composed of a maximum of 8 modules each, **TO BE USED WITH BUS BAR CONNECTION ONLY.**



Interface Description and Connector		
<b>A</b>	I/O CONTACT 2X	Programmable closure/contact
<b>B</b>	DIP SWITCH	Baud Rate Selection
<b>C</b>	CAN BUS PORT	CAN / BMS Bus port for external solar – grid charger
<b>D</b>	RS485 port	RS485 communication port (MODBUS)
<b>E</b>	CLUSTER CAN PORTS 5X	Master Cluster CAN port (from port 1 to port 5)
<b>F</b>	ON OFF SWITCH	Internal Power Supply Switch
<b>G</b>	INLET 48 Vdc	Connector for power input to connect to the bus bar (1A fuse)
<b>H</b>	SOC LED LIGHTS	25% SoC status each LED
<b>I</b>	STATUS LED	Power Indicator
<b>F</b>	CAN ANALYST II PORT	OPERATOR PORT FOR CAN ANALYST



2.7.1 CAN Hub Dimensions



2.8 Control Logic and Protection Limit

The inverter, if applicable, must be set with the below restrictions in addition to the BMS control logic.

MAX CURRENT WITH BUS BAR

clusters batteries	1	2	3	4	5
	CURRENT ALLOWANCE				
1	0	0	0	0	0
2	180	324	432	512	640
3	240	486	576	588	735
4	280	504	588	784	980
5	350	560	630	840	1050
6	360	576	648	1008	1260
7	420	588	882	1176	1470
8	480	672	1008	1344	1680

clusters batteries	1	2	3	4	5
	KILOWATT				
1	0	0	0	0	0
2	9,36	16,8	22,5	26,6	33,3
3	12,48	25,3	30,0	30,6	38,2
4	14,56	26,2	30,6	40,8	51,0
5	18,2	29,1	32,8	43,7	54,6
6	18,72	30,0	33,7	52,4	65,5
7	21,84	30,6	45,9	61,2	76,4
8	24,96	34,9	52,4	69,9	87,4

- The charge current will be limited to zero Amps when the single module voltage has been reached (56.8V).
- The discharge current will be limited to zero Amps when the single module voltage has been discharged to 50.4V.
- The battery system will communicate with the inverter to limit the current.
- Each Battery Module will be protected by the same logic separately as per single module protection concept.
- If some modules, individually, reach any fault status, the single module will protect and disconnect from the system in less than 3 seconds.
- The current limit must be adjusted according to the real active batteries in system in order to restore the normal function.
- If the cluster is not balanced, the current limitation set from the HUB to the inverter will be sent in order to manage the rest of active modules and clusters. At the same time, the imbalanced modules or cluster will equalize in standby mode and will reconnect once in the normal range.
- If more than two batteries in one cluster are in protection mode, the entire cluster will protect by shutting down.
- If there are more than two clusters in protection mode, the full system will be protected.
- The battery sends information to the inverter to limit the charge/discharge current to zero Amps if the battery is detecting an over current.
- The protection built into the BMS will automatically disconnect the battery when it detects excess values. The BMS will attempt to reconnect up to three times to check if the excess values have returned to within the permitted range. After three attempts to reconnect, the BMS will not attempt any further reconnections. The Battery Module can be restarted using the module power button, however, if the external fault condition which caused the Battery Module to shut down is not rectified, the battery will continue to enter the shutdown mode.
- If the current of one cluster is larger than the current limit, the battery system will send a warning in accordance with the single module BMS logic.

## 2.8.1 CAN Hub General System Description

### 2.8.1.1 CAN Hub is Mandatory for Multiple Cluster Installation



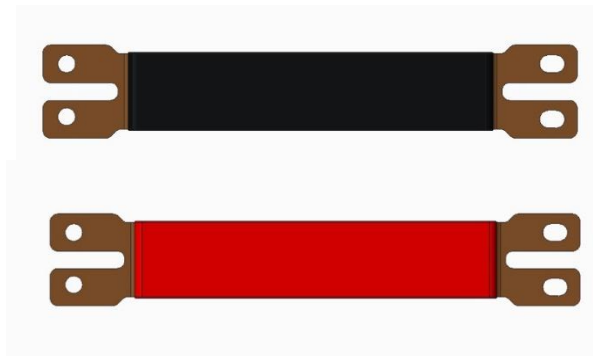
#### **ATTENTION:**

BEFORE PROCEEDING WITH THE DD22100 INSTALLATION IT IS MANDATORY TO READ THE WE HUB GUIDE LINE  
 Download from our website [www.wecobatteries.com](http://www.wecobatteries.com)



### 2.8.1.2 Special BUS Bar for Parallel Configuration

(MODULES INTERCONNECTION BUS BAR MODEL – ACCESSORY)



**ATTENTION: BUS BARS ARE MANDATORY FOR STACK SYSTEM.**



**ATTENTION: DO NOT USE DIFFERENT BUS BAR TYPES OR CABLES.**

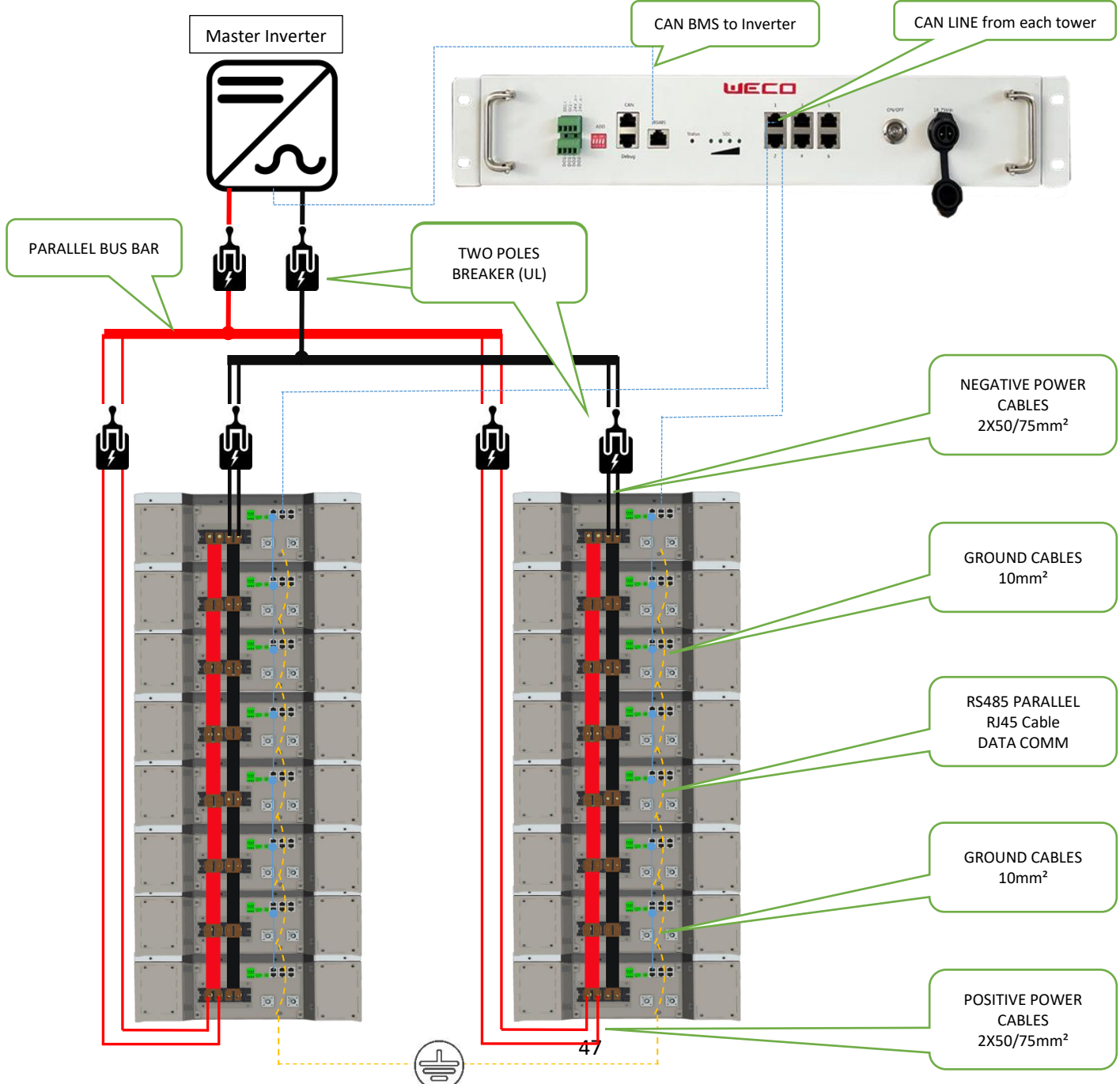


**ATTENTION: EACH BATTERY MODULE AND EACH CLUSTER MUST HAVE THE SAME SoC% and VOLTAGE.  
 ALL THE BATTERY MODULES MUST HAVE THE SAME FIRMWARE.**



### 2.8.2 Multi Cluster Configurations

1. Before using the MASTER HUB device, make sure to update the WeCo BMS Battery Module Firmware with the specific version for CLUSTER APPLICATION at [www.wecobatteries.com](http://www.wecobatteries.com)
2. To use and set up the MASTER HUB, the installer must read the MASTER HUB MANUAL available in the RESOURCES section of the [www.wecobatteries.com](http://www.wecobatteries.com) website, under Energy Storage.
3. Make sure to install the Specific Cluster Connection Firmware on each battery. The Cluster Connection Firmware has a nomenclature starting with 4.xx. Please refer to the specific WeCo BMS Cluster Connection Firmware version at [www.wecobatteries.com](http://www.wecobatteries.com)
4. Set the Cluster ID using the Monitor Cluster Software.
5. Connect the HUB (pre-configured with default setting). If the installers need to change the number of modules per cluster or change the MASTER HUB communication protocol, it will be necessary to use the CAN ANALYST II to set up the new configuration.
6. Any breaker between battery and inverter must be closed before turning on the batteries to avoid Inrush current







**ATTENTION:**

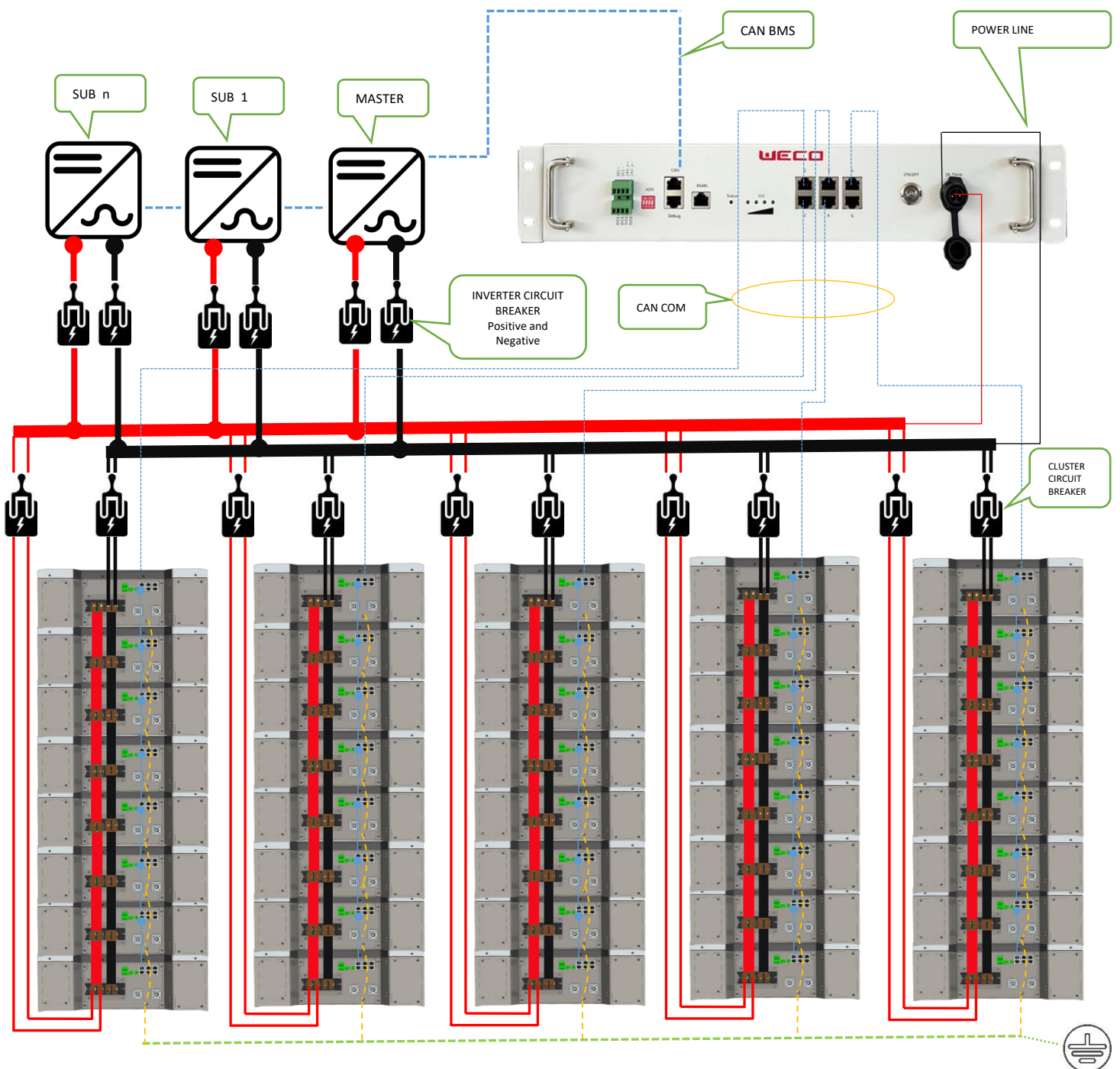
Each cluster must be equipped with an isolator to individually disconnect the battery tower from the parallel bus bar in accordance with UL regulation.



**ATTENTION:**

The circuit between the inverter and the parallel bus bar must be separated by a manual switch in accordance with UL regulations.


**Conceptual Diagram of a Cluster composed by 5 clusters and 8 batteries each.**







**2.8.3 Cluster Configuration Accessories**

**2.8.3.1 Single Cluster Configuration Kit**

<b>DD21005 STANDARD LV BUS BAR KIT</b>		
<p>1 x Custom BUS BAR Insulated RED module connection</p> <p>1 x Custom BUS BAR Insulated BLACK module connection</p> <p><b>ACCESSORY / NOT INCLUDED</b></p>		<p><b>Each kit includes 1 red + 1 black BUS BAR</b></p>

**2.8.3.2 Multi Cluster Hub Device**

<b>DD21001 MULTICLUSTER INTELLIGENT CAN BUS COMBINER HUB</b>		
<p>1 x Parallel Controller</p>		<p><b>Packed in Carton</b></p>
<p>1 x Cable Power Supply</p>		




**LOW VOLTAGE INVERTER COMPATIBILITY LIST**

INVERTER BRAND	MODEL	Battery Protocol Selection	Modules	Modules in Parallel with WeHub	
AZZURRO ZCS	ZCS Azzurro	SP3000/HYD	WeCo CAN	15	105
Deye	Deye	All	CAN00	15	105
Ingeteam	Play LV	52V	WECO CAN	15	105
mlt INVERTERS	MLT Inverters	Hybrid CAN comm	CAN00	15	105
Schneider Electric	Schneider	XW	CONEXT CAN	15	105
solis	Solis	LV All	SOLIS CAN	15	105
Growatt	Growatt	SPH LV	GROATT CAN	15	105
SMA	SMA	Sunny Island	SMA CAN	15	105
GOODWE	Goodwe	S-All LV Hybrid	GOODWE CAN	15	105
STUDER	Studer Innotec	Xtender	STUDER CAN	15	105
SOFAR SOLAR	Sofar Solar	All	WeCo CAN	15	105
victron energy	Victron Energy	Via Colour Control	VICTRON CAN	15	105
TBB POWER	TBB	ALL	CAN00	15	105
invt	INVT-MEGA	LV All	INVT CAN	15	105
IMEON ENERGY	Imeon Energy	All	IMEON CAN	15	105
Voltronic Power	Voltronic Power	LV All	VOLTRONIC CAN	15	105
MORNINGSTAR	Morningstar	Open Loop	OPEN LOOP	15	/
KEHUA TECH	Kehua Tech	Hybrid LV All	CAN 00	15	105
MUST-solar <sup>2</sup>	Must Solar	PH / PV	OLP CAN	15	105
LUXPOWERTEK	Lux Power Tek	LV Hybrid All	WECO CAN	15	105
SOLAX POWER	Solax Power	SKU-LV All	SOLAX CAN	15	105
SUNGROW	Sungrow	SH3K6/SH4K6	WECO CAN	15	105
Steca	Steca	Open Loop	OPEN LOOP	5	/
OutBack POWER	OutBack	Open Loop	OPEN LOOP	5	/
	(No BMS/ Alpha CAN)				
TSUN	TSUN	LV Hybrid All	WECO CAN	15	25
MPP Solar	MPP	LV ALL	OLP CAN	15	25

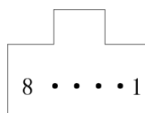
L O W V O L T A G E

**LOW VOLTAGE INVERTER BATTERY TO INVERTER CAN TERMINAL PIN OUT**

LOW VOLTAGE INVERTER CAN / BMS				
	CAN TERMINAL	Inverter Terminal Type	Inverter SIDE (PIN Number)	Battery SIDE RJ45 (PIN Number)
SMA SUNNY ISLAND	CAN L	RJ45	5	2
	CAN H		4	1
	GND			3
ZCS HYD / SP	CAN L	RJ9	2	2
	CAN H		1	1
	GND		3	3
KEHUA SPH	CAN L	RJ45	2	2
	CAN H		1	1
	GND			3
GROWATT	CAN L	RJ45	5	2
	CAN H		4	1
	GND		X	3
DEYE	CAN L	RJ45	5	2
	CAN H		4	1
	GND		2	3
VOLTRONIC	CAN L	RJ45	7	2
	CAN H		6	1
	GND			3
TBB	CAN L	RJ45	5	2
	CAN H		4	1
	GND		2	3
VICTRON	CAN L	RJ45	8	2
	CAN H		7	1
	GND		2	3
SOLIS	CAN L	RJ45	5	2
	CAN H		4	1
	GND		2	3
SCHNEIDER	CAN L	GATEWAY	5	2
	CAN H		4	1
	GND			3
INGETEAM PLAY 48/400V Single Phase	CAN L	SCREW TERMINAL	CAN H	2
	CAN H		CAN L	1
	GND			3

L O W V O L T A G E

**BATTERY PINOUT**



Pin	8	7	6	5	4	3	2	1
Definition						GND	CAN L	CAN H

**SECTION 3 - HIGH VOLTAGE CONFIGURATION****SERIAL CONNECTION AND SYSTEM CONFIGURATION****HIGH VOLTAGE STACKABLE CONFIGURATION****ATTENTION:****THIS SECTION IS FOR HIGH VOLTAGE CONFIGURATION ONLY****IT IS COMPULSORY TO USE THE HV BOX  
FOR THIS CONFIGURATION**

### 3.1 Product Introduction

The WeCo Module 5K3 LV/HV Battery Modules can be used as an on-grid or off-grid energy storage system. It is not recommended 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 Warranty. The substitution of any components of this battery will nullify the Product Warranty.

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 Warranty.



**ATTENTION:** Do not exceed the number of 8 modules in each tower.



**ATTENTION:** The maximum number of Battery Modules that can be connected in series is 16.



**ATTENTION:** HV Box is a compulsory protection and communication device that must be installed for any High Voltage Configuration.



**ATTENTION:** Attempting to operate a system of Battery Modules with less than four modules in series or more than 16 modules in series will nullify the Product Warranty.

Battery Module Weight 126.3 lb / 57.3 kg



**ATTENTION:**

**EXAMPLE:**

A cluster of 12 Battery Modules weigh 1515.6 lb /687.6 kg The support structure/floor must be properly inspected by a civil engineer before starting the installation of the modules.

#### 3.1.1 Identifying the Individual Module

Dimensions	mm	576x461x156
Weight	lb (kg)	126.3 lb (57.3 kg)
Case Material	Type	Steel
Modules in series	Max No.	16
Stackable	Type	Yes
Digital Output	No.	2+2
Cell Distribution	P/S	16S

Cell type	mm	LiFePO4
BMS Charge Temp	°F (°C)	+19.4°F to +131°F* (-7°C to +55°C*)
BMS Discharge Temp	°F (°C)	+131°F to -4°F* (+55°C to -20°C*)
Suggested Storage Temp	°F (°C)	+77°F (+25°C) (shelf life 1 year)
Storage Temp/Time outside the suggested storage temperature	°F (°C)	-13°F to +131°F / 4 months (-25° +5°C to +30°C+55°C / 4 months)
Self-Discharge @ STC 77°F (25°C)	%	1% per month
Self-Discharge outside the STC	%	< 3% per month

### 3.1.2 Product Identification and labels

The nameplate label describes the product parameters and is attached to the product. For details, please refer to the nameplate label of the product. For safety reasons, the installer must have a thorough understanding of the contents of this manual before installing the product.



## HV BOX LABEL

<span style="font-size: 24pt; font-weight: bold; margin: 0 10px;">HV BOX</span>	
WeCo Srl Viale J.F. Kennedy 113/121 Scarperia -Firenze- Italia	
Model (Trade Name)	HV BOX
Model Type	5K3 HV BOX high Voltage
Voltage Range	150 - 950 Vdc
Number of DC Inputs	1+1
Inputs Max Current per Channel	50 Adc +50 Adc
Max Charging Current	100 A
Max Discharge Current	100 A
Active Safety Protection	Automatic Contactor 200 A
Passive Safety Protection	Fuse 200 A / 750 Vdc
Operative Standard Temperature	77°F (25°C)
Storage Temperature	-4°F to +131°F (-20°C to +55°C)
Application	HV Control Unit for DD5300
IP Rating	IP21 (Indoor Application)
Weight	33 lb /15 kg
Standards	EMC IEC 61000 CE UL1973
Production Date	DD/MM/YYYY
EAN BAR CODE EXAMPLE HVB-19-01-5001	 EAN CODE
PAY ATTENTION TO THE HV BOX POLARITY FROM THE BATTERY STRING <span style="float: right;">MADE IN CHINA</span>	
Viale F. Kennedy 113-121, Scarperia e S. Piero (FI), Italy All certifications and safety standards of the DD21002 HV Control Box are in compliance with applicable standards.	

HIGH VOLTAGE









### 3.1.3 Accessory List (Standard Kit)

The Battery Module is packed in a carton together with standard accessories. When unpacking, be sure to check that the Battery Module 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 checklist when unpacking the individual Battery Module and accessories.

Standard LV/HV Accessory Kit (Included with Every Module)					
Cable diameter	Cable color	Cable Length	Description	QTY.	Picture
25mm	BLACK	250cm	Both sides ring terminal diam 8mm for LV connection ( one cable each battery Box) <b>Not Required for HV Installation</b>	1	
25mm	RED	250 cm	Both sides ring terminal diam 8mm for LV connection <b>Not Required for HV Installation</b>	2	
CAT 5	BLUE	120 cm	RJ 45 RJ 9 BMS to Inverter CAN <b>Not Required for HV Installation</b>	1	
CAT 5	BLUE	120 cm	RJ 45 RJ 45 LV PARALLEL CABLE <b>Not Required for HV Installation</b>	1	
25mm	RED	25cm	String Double side SURLOCK, one Side Black – One side red <b>Required for HV Installation</b>	1	
CAT 5	BLUE	20cm	Link + CAN HV communication Cable 2 sides RJ45 <b>Required for HV Installation</b>	2	
Wall Bracket			Wall Plate for Battery Support + 4 M10 Wall Plugs + Screws		
Removable Brackets			Set of 2 back brackets with M6 screws (Allen Key) for wall installation	set	
Lifting Handles			2 X LIFTING HANDLES	1 set	
Rubber Tape Pads			4 X each module	4	

**3.1.4 Necessary Installation Tools**

 <p>Multimeter + Current clamp</p>	 <p>Insulated Screwdriver Set</p>	 <p>Insulated Allen Key Set</p>	 <p>Drill + Hammer</p>
 <p>Electrician Scissors</p>	 <p>Insulated Torque Wrench Set</p>	 <p>Lifting Strap + Mechanical Lifter</p>	 <p>RS 232/USB + Screw Terminal (insulated)</p>

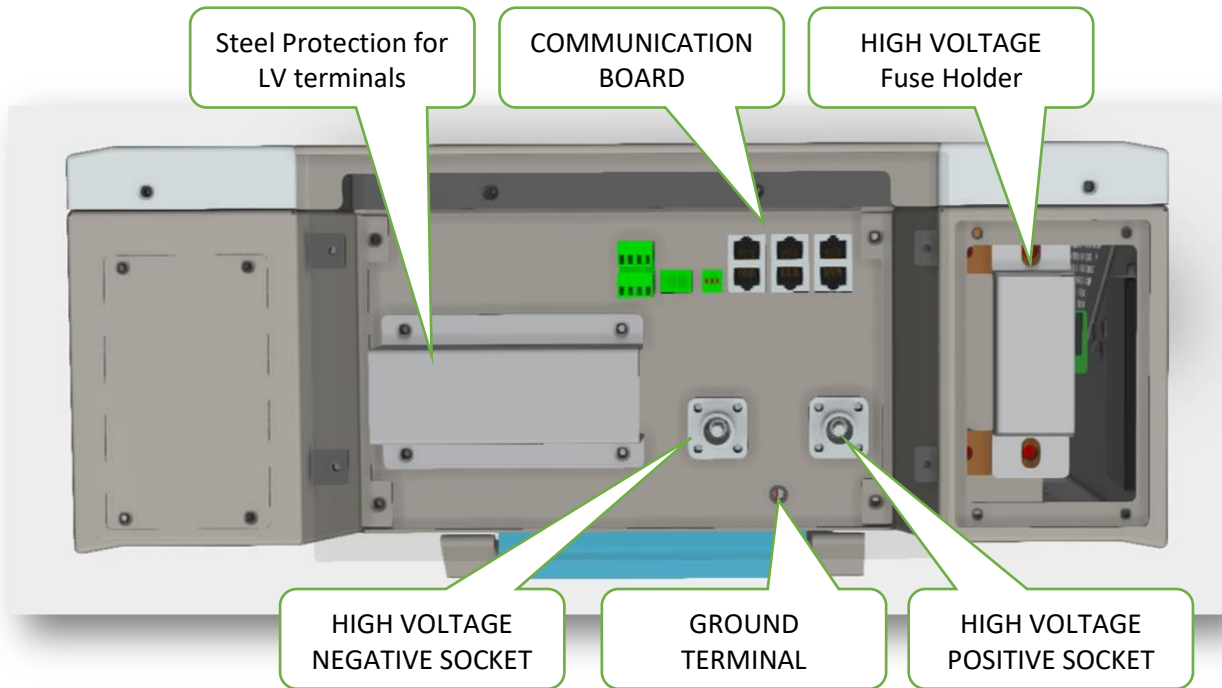
**3.1.5 Personal Protective Equipment + 1000 Vdc Insulated Tool Kit**



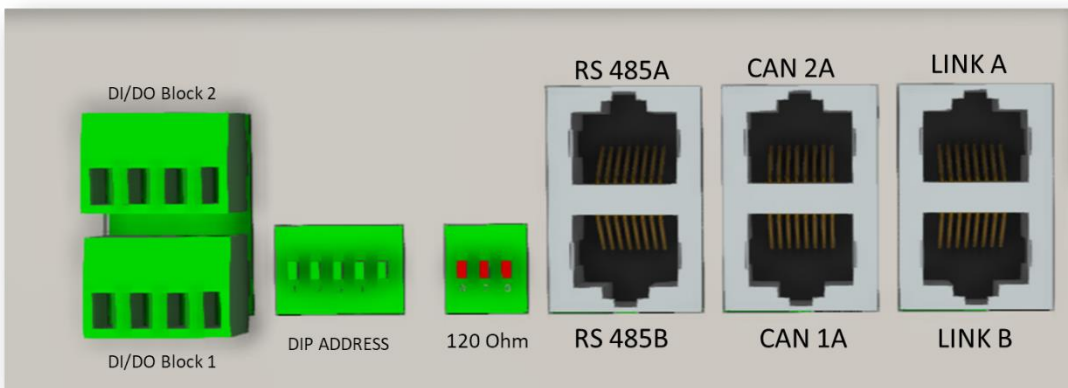


### 3.2 High Voltage Battery Module Wiring and Set Up

#### 3.2.1 Battery Connections



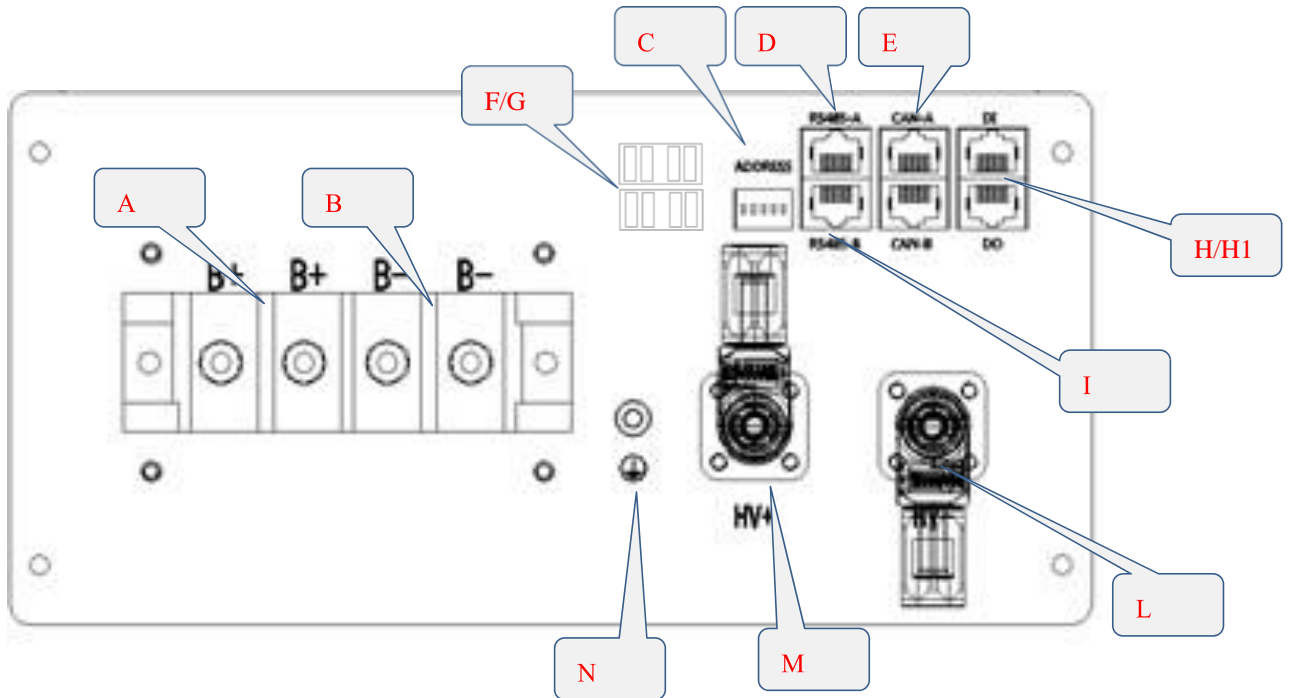
#### Communication Board



**CAUTION:** The LV fuse is contained in the left portion of the module as shown above. The access to the fuse is restricted to authorized WeCo Module service personnel, and the protection lid cannot be opened by anyone else. The same applies to the HV fuse.

### Battery Terminal Definition

The terminal layout is shown in the following figure:

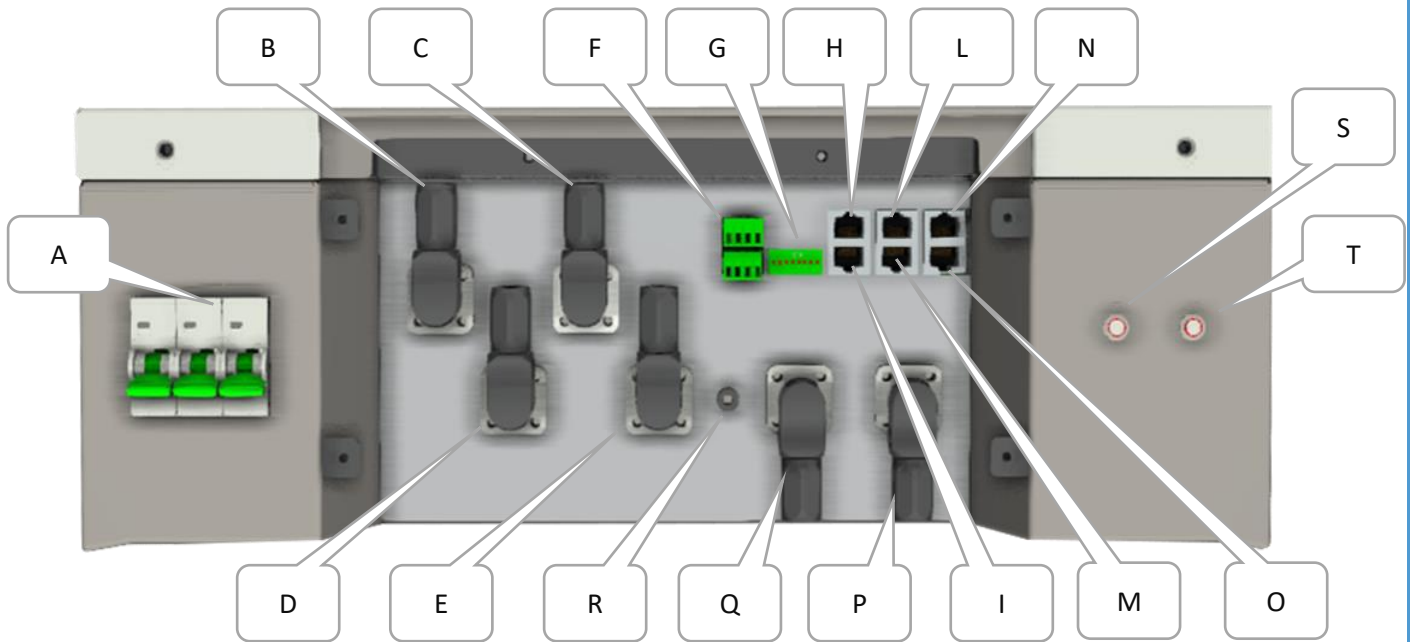


Module Definition Table

Interface	Name	Function
A	LV POLE +	LOW VOLTAGE POSITIVE (+) Screw Terminal (NO USE IN HV CONFIGURATION)
B	LV POLE -	LOW VOLTAGE NEGATIVE (-) Screw Terminal (NO USE IN HV CONFIGURATION)
C	DIP SWITCH	5+3 DIP SWITCH Address HUB (LV PARALLEL ID SET UP)
D	RS485 A LV	LOW VOLTAGE COMMUNICATION PORT RS485
E	CAN A	CAN – BMS to LOW VOLTAGE INVERTER
F	D/I	Digital Input
G	D/O	Digital Output
H	CAN B	LINK IN/OUT
I	RS485 B LV	LOW VOLTAGE COMMUNICATION PORT RS485
L	HV POLE -	HIGH VOLTAGE NEGATIVE (-) Fast Connector Terminal for serial connection
M	HV POLE +	HIGH VOLTAGE POSITIVE (+) Fast Connector Terminal for serial connection
N	GND	Ground Terminal

H  
I  
G  
H  
V  
O  
L  
T  
A  
G  
E

**HV BOX Terminals Definition Table**



HV BOX Definition Table		
Interface	Name	Function
A	GENERAL SWITCH	AUXILIARY SWITCH (DEVICE ON/OFF DRIVER)
B	INPUT CHANNEL +	POSITIVE INPUT FROM THE INVERTER CHANNEL 01 POSITIVE PLUG (+) MAX 50A
C	INPUT CHANNEL -	NEGATIVE INPUT FROM THE INVERTER CHANNEL 01 NEGATIVE PLUG (-) MAX 50A
D	INPUT CHANNEL +	POSITIVE INPUT FROM THE INVERTER CHANNEL 02 POSITIVE PLUG (+) MAX 50A
E	INPUT CHANNEL -	NEGATIVE INPUT FROM THE INVERTER CHANNEL 02 NEGATIVE PLUG (-) MAX 50A
F	D/I – D/O	Digital Input / Digital Output (Both Terminals are programmable via PC Software)
G	DIP TERMINAL	DIP SWITCH TERMINAL (Address)
H	CAN PORT 2-A	RJ45 CAN 2-A PORT (Inverter interface)
I	CAN PORT 2-B	RJ45 CAN 1-A PORT (Line for connection with SUB HV BOX)
L	CAN PORT 1-A	RJ45 CAN 2-B PORT (Connection with the First battery Module)
M	CAN PORT 1-B	RJ45 CAN 1-A PORT (Line for connection with SUB HV BOX)
N	LINK -A	NOT USED
O	LINK -B	RJ45 LINK (Line for connection with first battery module)
P	BATTERY INPUT +	POSITIVE CONNECTION FROM THE POSITIVE TERMINAL OF THE BATTERY
Q	BATTERY INPUT -	NEGATIVE CONNECTION FROM THE NEGATIVE TERMINAL OF THE BATTERY
R	GROUND	GROUND TERMINAL
S	POWER LED	POWER LED (RED COLOR = POWER OK)
T	STATUS LED	COMM and STATUS LED STEADY GREEN= RUN, BLINK= IDLE COMM LOSS or MODULE FAIL)

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Attention: Interface E: RJ45 port corresponding to the CAN bus pin definition

### 3.3 High Voltage Module Configuration



ATTENTION: The High Voltage mode mandates that the Battery Modules must be connected in series.



ATTENTION: The following table provides the possible module configurations. NO OTHER configurations are suitable.



ATTENTION: Before connecting an HV inverter with the HV BOX terminal, always check the Inverter Input range.

DD21002 HV Box				
Tower -1	n°	Min Vdc	Max Vdc	Capacity kWh
Modules in Series	4	200	233.6	20.8
	5	250	292	26
	6	300	350.4	31.2
	7	350	408.8	36.4
	8	400	467.2	41.6
Tower -2	n°	Min Vdc	Max Vdc	Capacity kWh
Modules in Series	9	450	525.6	46.8
	10	500	584	52
	11	550	642.4	57.2
	12	600	700.8	62.4
	13	650	759.2	67.6
	14	700	817.6	72.8
	15	750	876	78
	16	800	934	83.2



ATTENTION

For the calculation of the energy of a cluster (in both LV and HV systems) the nominal capacity of a battery is generally counted in 5.2kWh as a result of the multiple connection inefficiency, estimated at a loss of 2%.

	Pin	8	7	6	5	4	3	2	1
	Definition						GND	CAN L	CAN H

### 3.4 High Voltage DIP Switch Settings



#### ATTENTION:



ALWAYS CONFIGURE THE DIP SWITCH SETTINGS BEFORE CONNECTING ANY POWER CABLES TO THE BATTERY HV TERMINALS.



WHEN CHANGES HAVE BEEN MADE TO DIP SWITCH SETTINGS, THE BATTERIES MUST ALWAYS BE RESTARTED FOR THE CHANGES TO TAKE EFFECT.



POWER CABLE CONNECTIONS MUST BE MADE IN STRICT ACCORDANCE WITH THE INSTRUCTIONS IN THIS MANUAL. INCORRECT POWER CONNECTIONS CAN DAMAGE THE BATTERY AND CAUSE INJURIES.



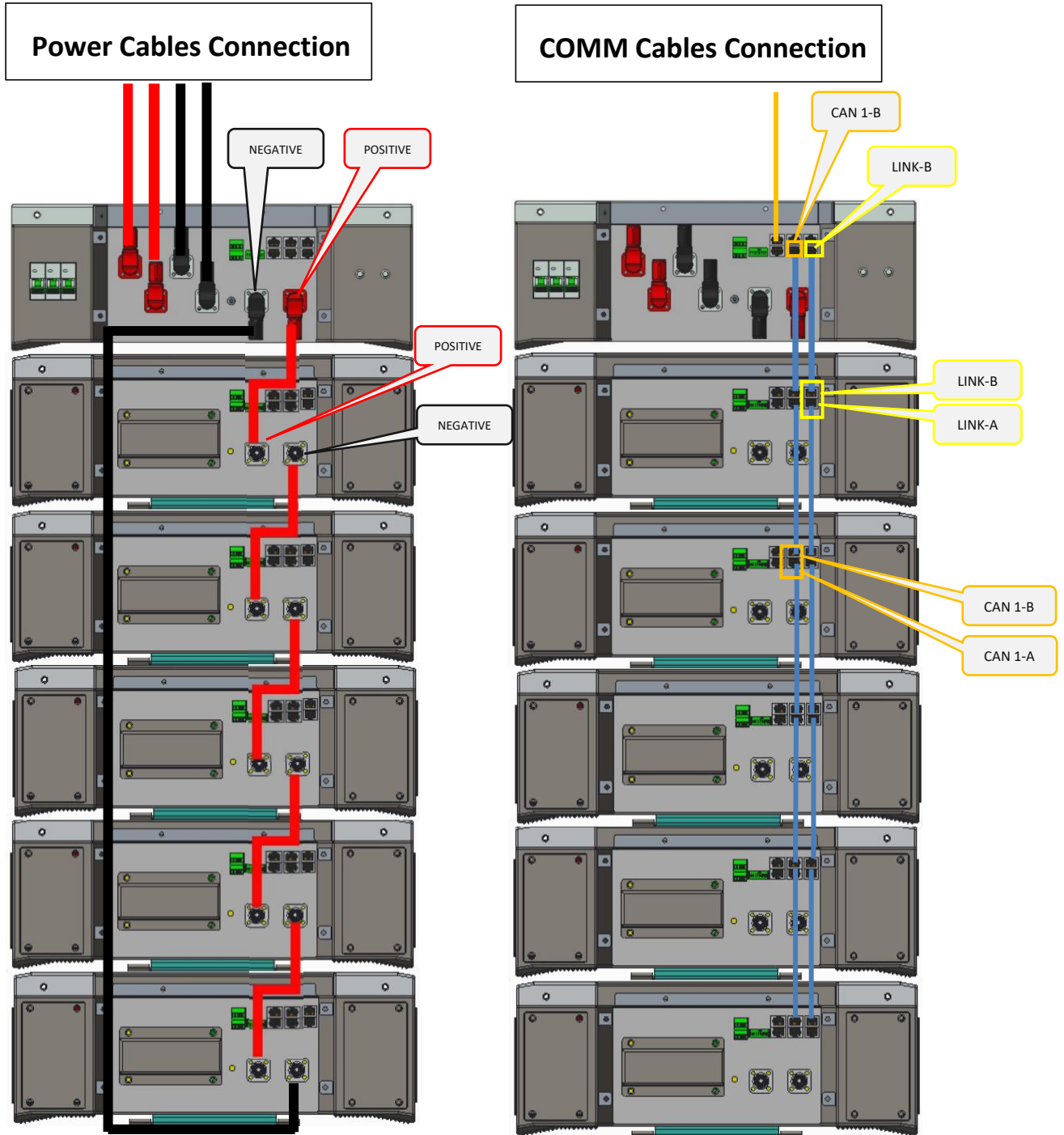
**ATTENTION:** All drawings are for reference only. Always refer to the physical product as the standard. If the manual does not match the physical product, stop all actions, remove any connections and store the batteries in a safe place. Call your WeCo technical representative for assistance.

### 3.4.1 Serial Tower Connection #1 Set-Up of the HV Box CAN Communication Loop

Four batteries connected in series is the minimum allowed configuration for High Voltage operation:



**CAUTION:** After setting the DIP switches, the batteries must be restarted for the DIP switch changes to take effect.



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### 3.5 Serial Battery Wiring Connections



#### ATTENTION:



**POWER CABLE CONNECTIONS MUST BE MADE IN STRICT ACCORDANCE WITH THE INSTRUCTIONS IN THIS MANUAL. INCORRECT POWER CONNECTIONS CAN DAMAGE THE BATTERY AND CAUSE INJURIES OR SERIOUS DANGER AND DAMAGES.**



**Attention:** Screws, Cables and Bus Bar POWER CONNECTIONS must be installed with due diligence, and the tightening of the connection terminal must be to **15Nm (11.06 ft lb)**. Each terminal should be inspected, and its torque checked every three months.



**Attention:** All drawings are for reference only, always refer to the physical product as the standard. If the manual does not match the physical product, stop all actions, remove any connections, store the batteries in a safe place and call your WeCo Module technical representative for assistance.



**Attention:** For power cable connection for high current connection diagram, please refer to the specific section. Charging current limitation is mandatory as per this instruction manual.



**Attention:** Do not use anything other than WeCo Module supplied power and data cables.



**Caution: PRE-CHARGE** The inverter must be connected to the battery and any breaker/fuse installed between the battery and Inverter must be closed **before turning on the battery** or the pre-charge function will not have effect

### 3.5.1 High Voltage Power Connections

5k3 LV HV type A of the HV Box can support maximum of 12modules/ 750Vdc

Proceed with the physical installation of the desired quantity and configuration of the Battery Modules, following the installation sequences and guidelines as described in Section 1 of this manual.

Connect the power cables as indicated, making sure that the batteries are OFF (check the button LED on the bottom).

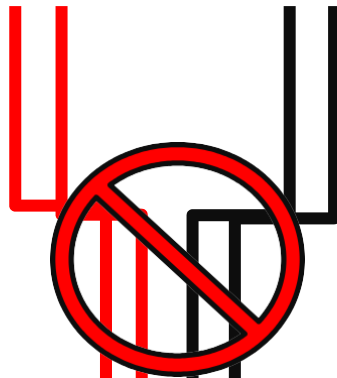
Do not connect the HV Box to the inverter input cables and do not turn on the HV Box breaker before serial connection completion.



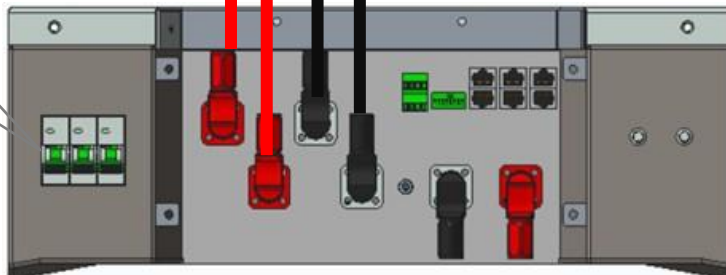
Do Not Connect the Inverter until the HV Box is completely set up



Do Not Connect the HV Box with the inverter at this stage



Keep the Breaker OFF



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### 3.5.2 DATA Connections (Example of 12-Modules)

**Step1:** Set up the DIP Switches as per the picture below.

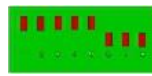
**Step 2:** Connect the CAN and Link ports, starting from the HV Box port CAN A and LINK, then chain connection as shown below.



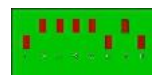
The HV Box must be set up before turning it on. The DIP addresses must follow the picture below to enable the CAN communication. The last module of the series must be terminated by addressing the module as shown in the picture to end the CAN line.



HV Box



Battery Module



End of series

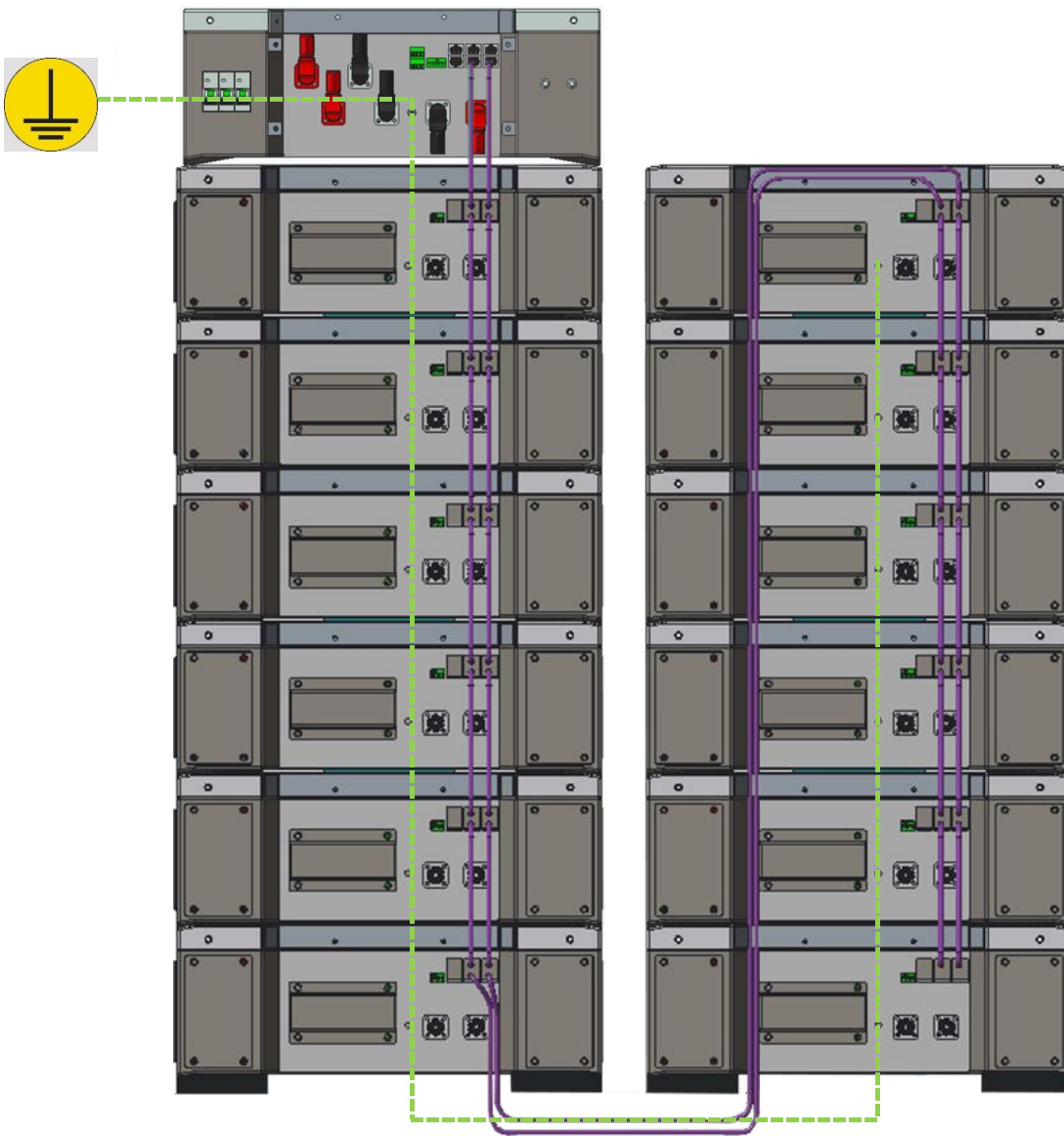


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**Step 4:** Link all modules and the HV Box with 6 mm earthing cables (In/Out) by using the GND connections point.



Make sure that the ground connection is not shared with other potential distributing devices, and that the ground rod is not used for Neutral Line dispersion or Harmonics mitigation circuit.



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### 3.5.3 HV Box and Battery Module Power Connection

**Step 1:** Keep the power box main breaker OFF.

**Step 2:** Connect the positive terminal of the HV Box to the Positive terminal of the 1<sup>st</sup> Battery Module.

**Step 3:** Proceed with the serial connection between all the modules.

**Step 4:** Connect the negative output from the last module to the negative input of the HV Box.

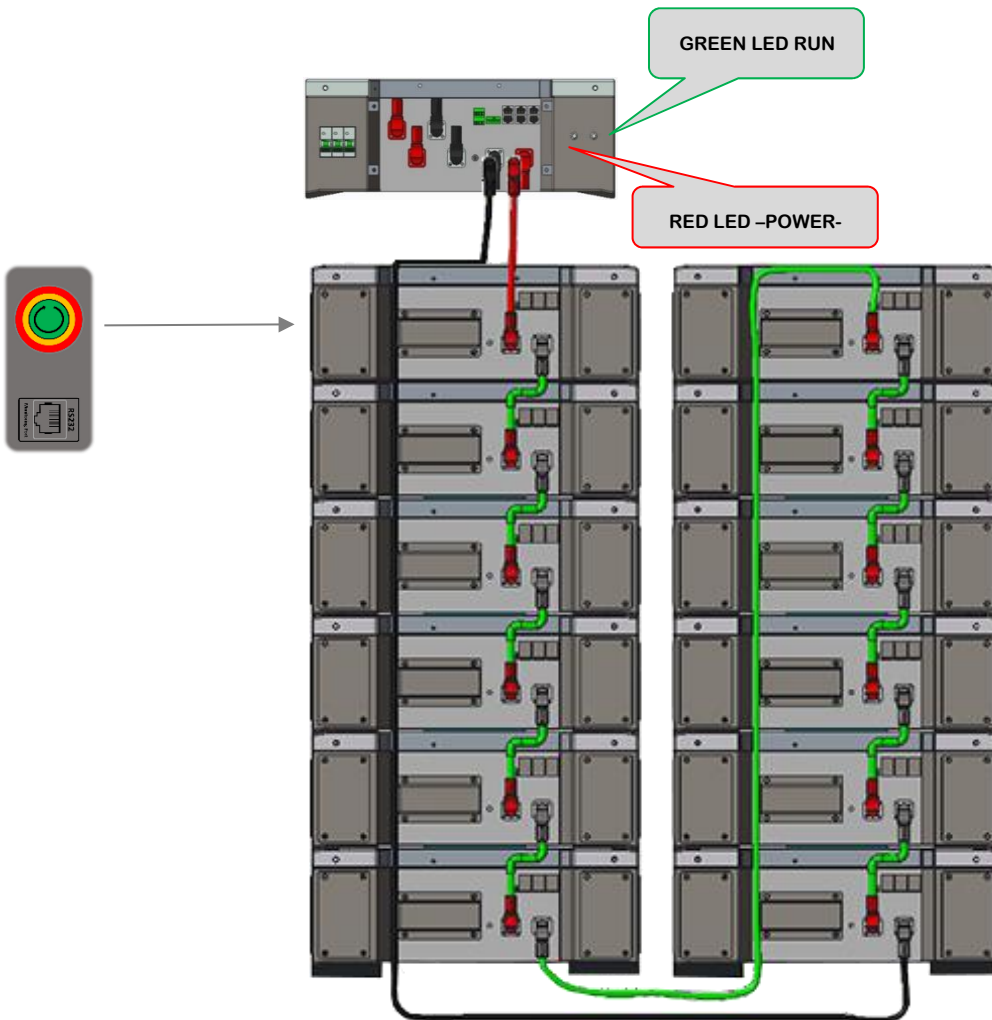
**Step 5:** Connect the Inverter to the HV BOX and close any breaker or fuse between the battery string and the inverter

**Step 6:** Turn on the HV Box breaker and wait for the start-up automatic procedure, the pre-charge function will start

**Step 6:** The HV Box will end the startup procedure within 120 seconds by closing the input circuit. The Orange LED and the Green light will turn on, confirming the working status of the HV Box.

**Step 7:** Each module will turn on automatically and the side button will blink for 3 seconds, then a fixed green light will confirm the run status of each module.

If one or more modules do not turn on automatically, it means that the LINK/CAN connection between modules, or the DIP address of one or more modules, is not properly set up.



**Information:** Arrange the cables according to the specific installation requirements, always paying attention to minimize the length of the cables to avoid voltage drops.

Note: if the system is composed of more than 6 modules, it is required to arrange them as per the image.

**Alternate arrangements are strictly prohibited.**

### 3.5.4 Single HV Box Connection to an Inverter

**Step 1:** Turn the HV Box off by switching off the MAIN BREAKER.

**Step 2:** Turn the Solar Inverter OFF.

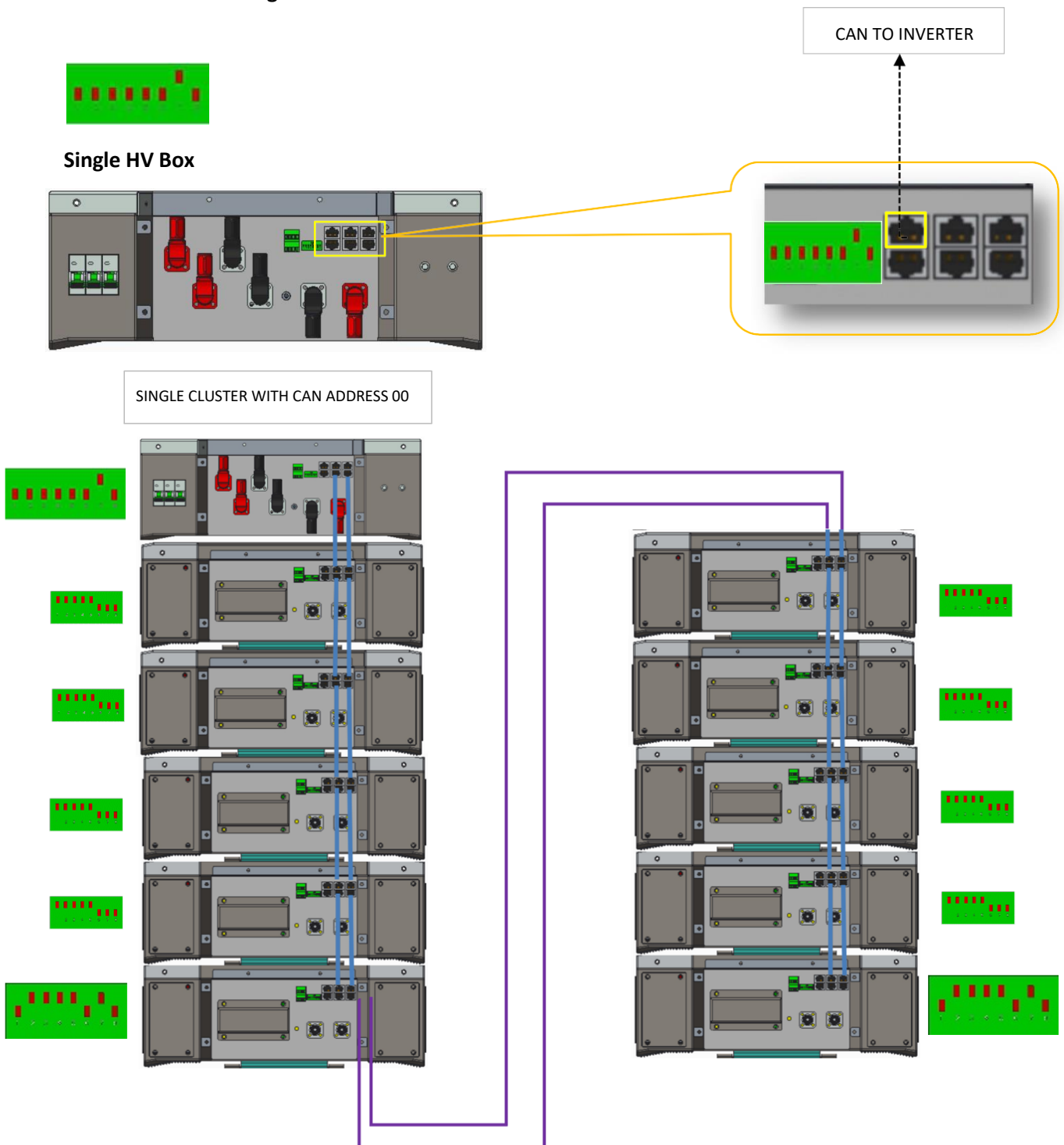
**Step 3:** Connect the RJ45 cable into the port CAN 2A and perform the connection as per the Inverter Manual by following the PIN layout provided below. Make sure the CAN L and CAN H are matching the Inverter Terminal.

**Step 4:** Connect the Power Inputs from the inverter into the H+ and H- terminals.

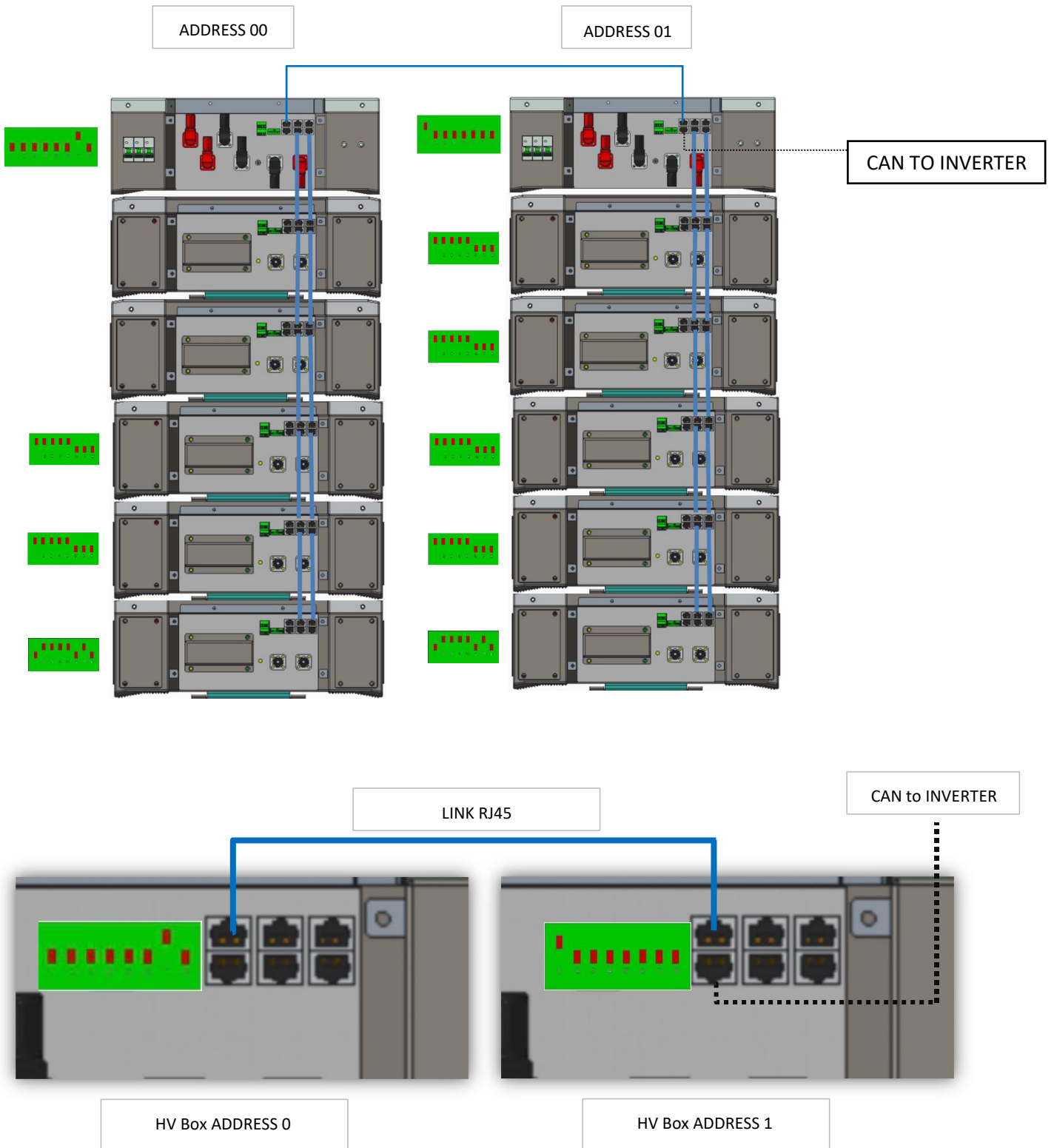
**Step 5:** Turn on the HV Box main breaker.

**Step 6:** Wait for the startup completion of the power box (Green LED) and then turn on the Inverter.

#### Connection and Settings for HV Box



### 3.5.5 Multi HV Box Connection



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### 3.6 HV Box ADDRESS

	HV BOX ADDRESS	DIP1	DIP2	DIP3	DIP4	DIP5	DIP6	DIP7	DIP8
	Adres after the setting	1	2	3	4	5	6	7	8
0	HV BOX Address 00	OFF	OFF	OFF	OFF	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
1	HV BOX Address 01	ON	OFF	OFF	OFF	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
2	HV BOX Address 02	OFF	ON	OFF	OFF	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
3	HV BOX Address 03	ON	ON	OFF	OFF	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
4	HV BOX Address 04	OFF	OFF	ON	OFF	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
5	HV BOX Address 05	ON	OFF	ON	OFF	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
6	HV BOX Address 06	OFF	ON	ON	OFF	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
7	HV BOX Address 07	ON	ON	ON	OFF	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
8	HV BOX Address 08	OFF	OFF	OFF	ON	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
9	HV BOX Address 09	ON	OFF	OFF	ON	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
10	HV BOX Address 10	OFF	ON	OFF	ON	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
11	HV BOX Address 11	ON	ON	OFF	ON	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
12	HV BOX Address 12	OFF	OFF	ON	ON	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
13	HV BOX Address 13	ON	OFF	ON	ON	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
14	HV BOX Address 14	OFF	ON	ON	ON	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved
15	HV BOX Address 15	ON	ON	ON	ON	reserved	reserved	ON-with Terminal resistance OFF-no Terminal resistance	reserved

### 3.6.1 LED Visual Indication Lights

- Power Button
- **Each Battery Module has its own power button, however, when used with the HV Box during normal operation, the power button function has no purpose and is bypassed by the control communications from the HV Box.**



**Caution:** In the HV configuration, the power button will have no effect on the operation of the Battery Module and the operator should not assume that the power button will have switched off the Battery Module when pressed.

#### 3.6.1.1 Power Button

The Power Button is located to the right of the battery terminal connections on the side of the Battery Module. The Power Button is a multi-color button and will provide the user with the following indications depending on the state of the battery.

A 2-second press on the Power Button will turn the Battery Module on.

A 5-second press on the Power Button will turn the Battery Module off.

Other functions of the Power Button are explained in the relevant sections of this manual.



**Attention:** Read this entire manual thoroughly to understand the correct startup and shutdown procedures for each battery configuration.



**Attention:** Illustrations shown are for reference only. Please always refer to the physical Battery Module in front of you, and if the module has a different configuration to this manual, stop all activity immediately and contact your WeCo Module technical representative.

### 3.6.2 Stand-Alone Battery Front Panel Control \* FORCED CHARGE\*

#### 3.6.2.1 Start Battery

Press the Power Button of the HV Box for 3 or more seconds (depends on the system status).

The GREEN RUN light should come on. The HV Box module has been activated normally and the Battery Modules should come on automatically. If they do not, press the RUN Button of each module and wait for the HV Box string diagnosis. If the HV Box shows a warning LED light (RED), turn the string OFF and connect the PC software for debugging.

#### 3.6.2.2 Shut Down Batteries and HV Box

Long press the Power Button for five seconds and the Run Button on the HV Box.

The GREEN RUN light should go off. The HV Box has been shut down normally.

By switching off the HV Box, all the Battery Modules should turn off automatically. If they do not, shut down manually by pressing and holding the Run Button for 5 seconds.

3.6.2.3 Low Battery – Forced Charge

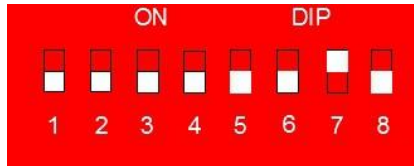


**ATTENTION:** The HV connection cables must be disconnected; the Forced Charge implies to follow the LV section rules.

**THE FORCED CHARGE MUST BE PERFORMED AS SINGLE LOW VOLTAGE MODULE.**

**THE MODULE MUST BE DISCONNECTED FROM THE HV STRING.**

SET THE MODULE DIP SWITCH AS PER THE PICTURE BELOW



**ATTENTION:** Before performing any operation on the Battery Module, make sure that the **VOLTAGE** between the battery B+ and B- terminals in the terminal BLOCK LOW VOLTAGE SECTION is **ZERO (0 Vdc)** and the **PANEL LIGHTS ARE OFF**.

Battery Module is in “Shutdown State,” only after the charging device is connected. The operator can turn on the battery by pressing the Run Button.

**Each Battery Module must be electrically isolated from other Battery Modules. All serial connections cables must be removed.**

**Preparation condition before Forced Charging:** Connect a 60 Vdc 50A charger to the B+ and B- terminal of the of the Battery Module to ensure charging.

**Forced Charging approach:** Short press the Battery Module Power Button, the 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.

During the Forced Charging period, the low battery LED will be steady orange up to an SoC of 10% at which point the low battery LED will go out.



**ATTENTION:** Each Battery Module must be recharged at the same SoC. The inspection must be done by using the WeCo Module RS232 and LV PC software.

This process could take some time and will require either a portable PC or handheld computer device.



**ATTENTION:** When the charging process of each module has been concluded, the serial connection must be restored by following this manual’s instructions.



### 3.7 HIGH VOLTAGE INVERTER COMPATIBILITY

INVERTER BRAND		INVERTER VOLTAGE RANGE	MODEL	HV BOX Protocol Selection	Max Module per String	Max HV BOX per Inverter
	ZCS Azzurro	180-750Vdc	HYD ThreePhase ALL	WeCo CAN	12	9
	Sermatec	150-800Vdc	SMT ThreePhase ALL	WeCo CAN	13	2
	Tsun	150-700Vdc	TSOL HV single Phase	WeCo CAN	12	1
	Megarevo	180-850Vdc	ThreePhase ALL	WeCo CAN	14	2
	Solis	130-750Vdc	5G-K ThreePhase HV ALL	SOLIS CAN	12	9

### CAN PIN DEFINITION FOR HV INVERTERS

INVERTER CAN / BMS					
 87654321	 12345678	CAN TERMINAL	Inverter Terminal Type	Inverter SIDE ( PIN Number )	Battery SIDE RJ45 (PIN Number)
ZCS HV THREEPHASE	CAN L	SCREW TERMINAL		7	2
	CAN H			8	1
	GND				3
SOLIS HV	CAN L	RJ45		5	2
	CAN H			4	1
	GND			2	3
TSUN HV	CAN L	RJ45		5	2
	CAN H			4	1
	GND				3
SERMATEC HV	CAN L	SCREW TERMINAL		L	2
	CAN H			H	1
	GND			GND	3

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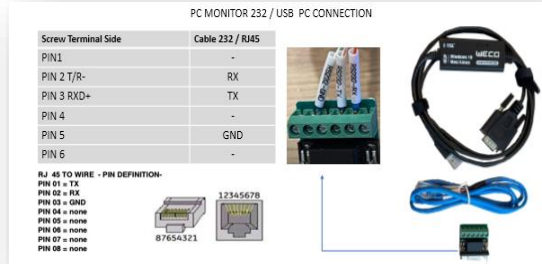
### 3.8 WECO BMS - LOW VOLTAGE PC SOFTWARE for 5K3 LV/HV

#### LOW VOLTAGE SECTION

**Equipment List:**

- PC Windows 10+Service pack 3.5 or above
- RS232 Serial Converter with 232-RJ45 Plug
- WeCo Monitor PC-SOFTWARE

#### PIN OUT RS232 CONVERTER



**STEP 1 Download the latest version of the WeCo BMS PC software at [www.wecobatteries.com](http://www.wecobatteries.com)**

Insert the password: **1010**

Click: Operator Access to run the program in -Operator Mode-

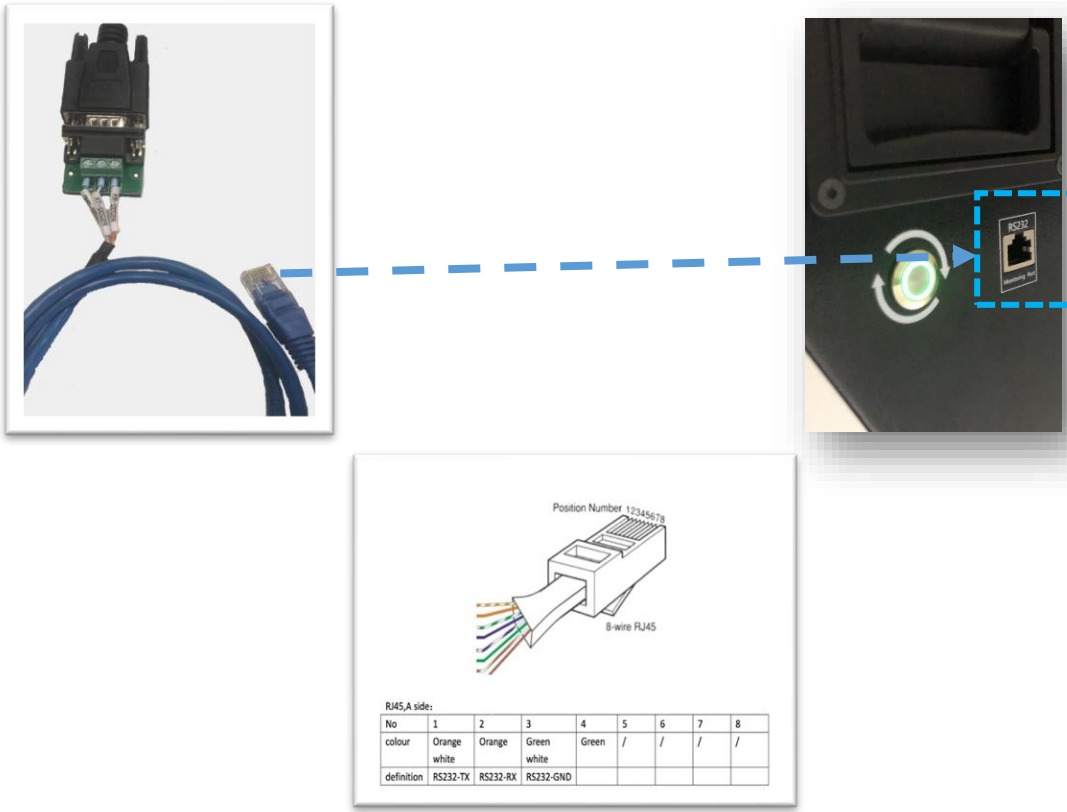


**STEP 2 Select the Single Module Setting Program after pressing OPERATOR ACCESS Button.**



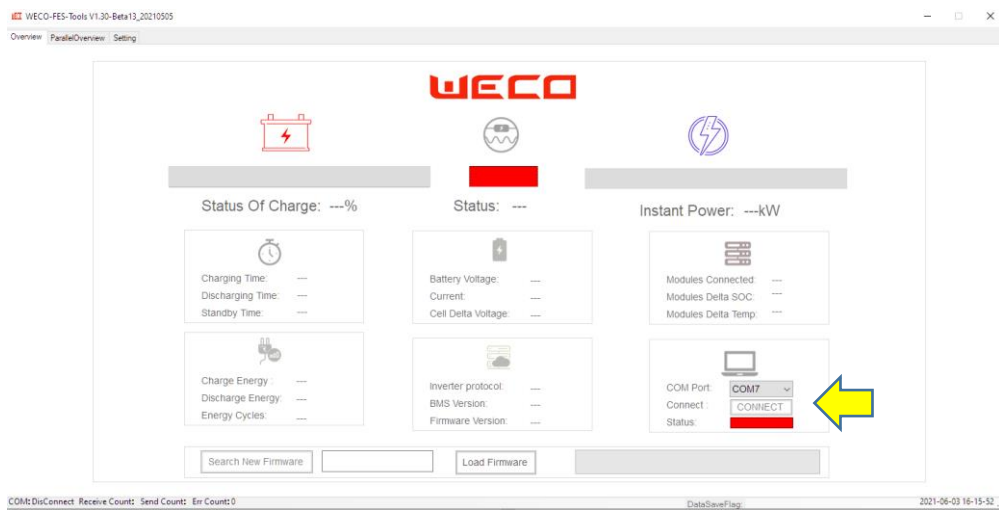
**STEP 3 Connect the RJ45 plug from the RS232-USB Converter to the Operator Port of the Battery Module.**

Operator Port is located on the battery side, near the RUN button.



**STEP 4 Select the COM PORT from the PC Software.**

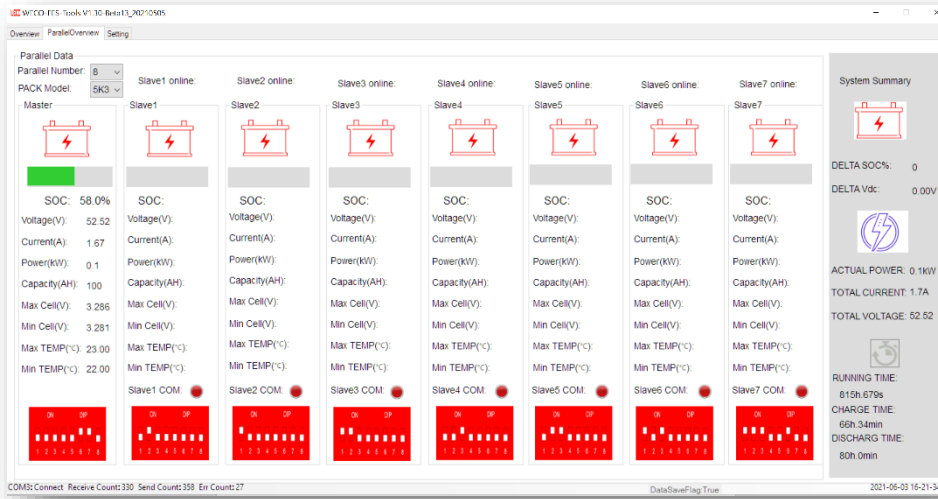
(Check the USB port Number from the Microsoft Windows – Device Manager Page)  
Turn ON the Battery Module and press the CONNECT BUTTON



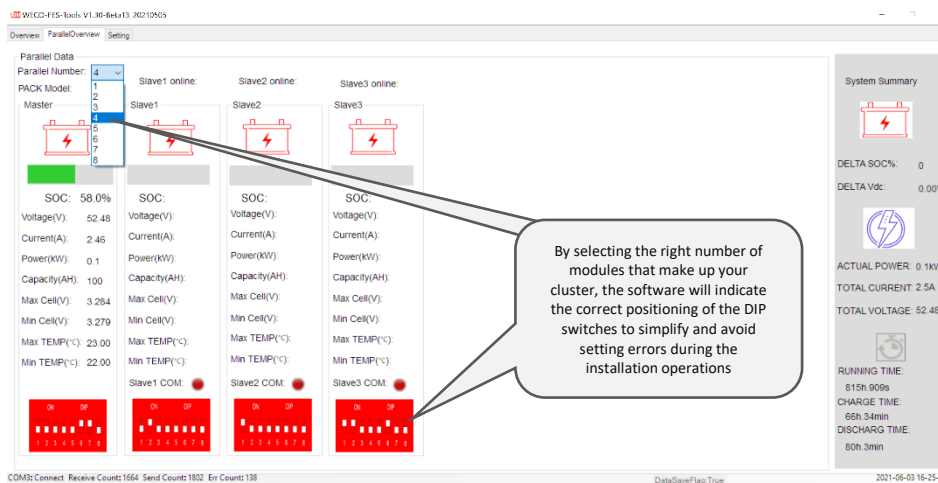
**STEP 5** When the communication is established between the PC and the Battery Module, the PC software will display a page like the one below:



If more than one battery is connected in parallel, all the information will be displayed on this page.

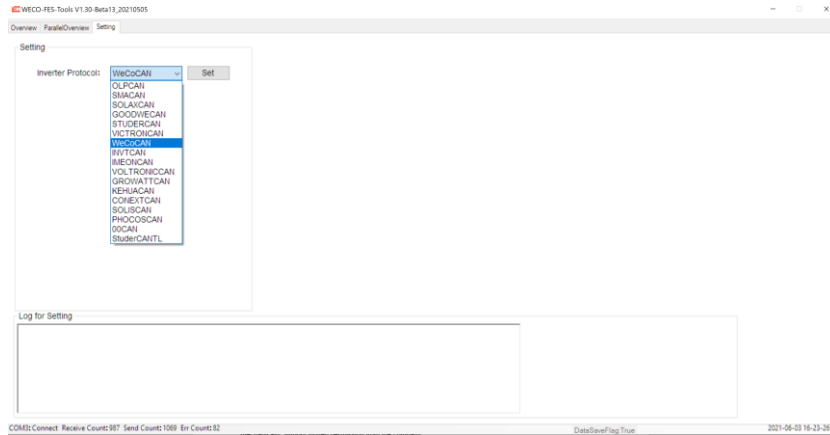


Select the applicable number of batteries that is composing your cluster.



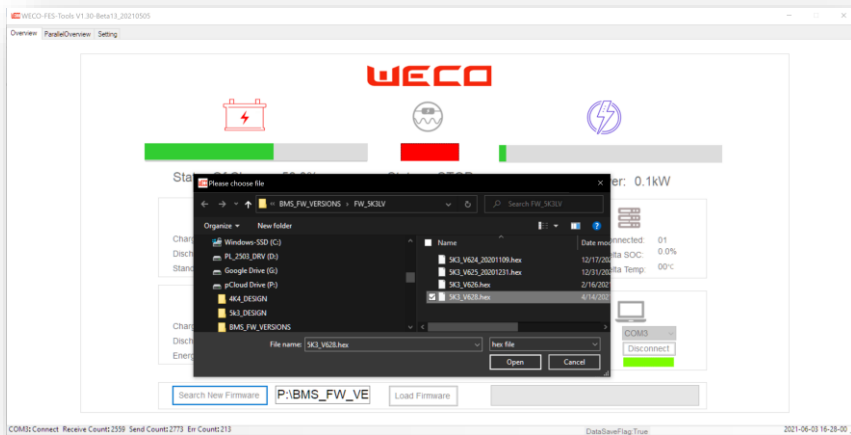
**STEP 6 PROTOCOL MODIFICATION**

In order to connect the battery with an inverter other than the default one, it is necessary to access the SETTING page and select the CAN protocol needed to communicate with the inverter.

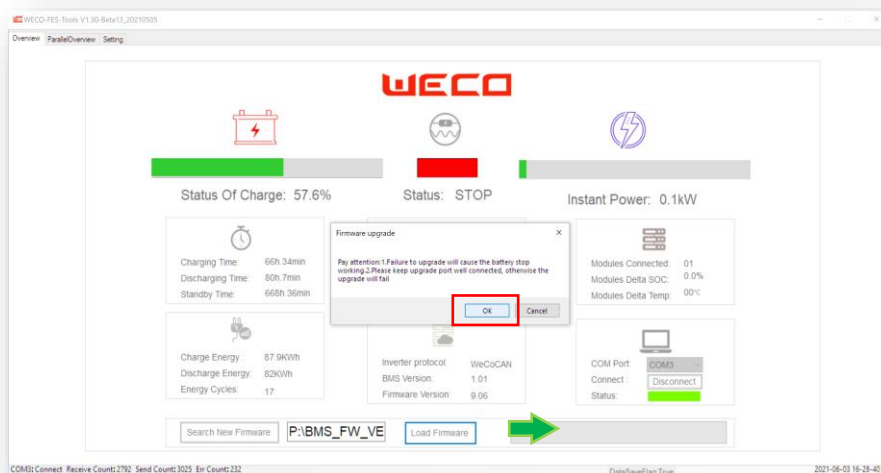


**STEP 7 FIRMWARE UPGRADE**

To update the firmware to a more recent version, it is necessary to download the latest version of the WeCo BMS software at [www.5K3.LV/HV-BMS.com](http://www.5K3.LV/HV-BMS.com) and install it from the software as indicated.



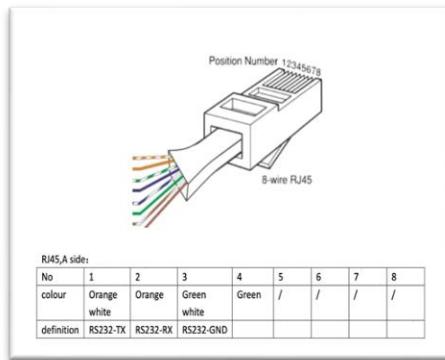
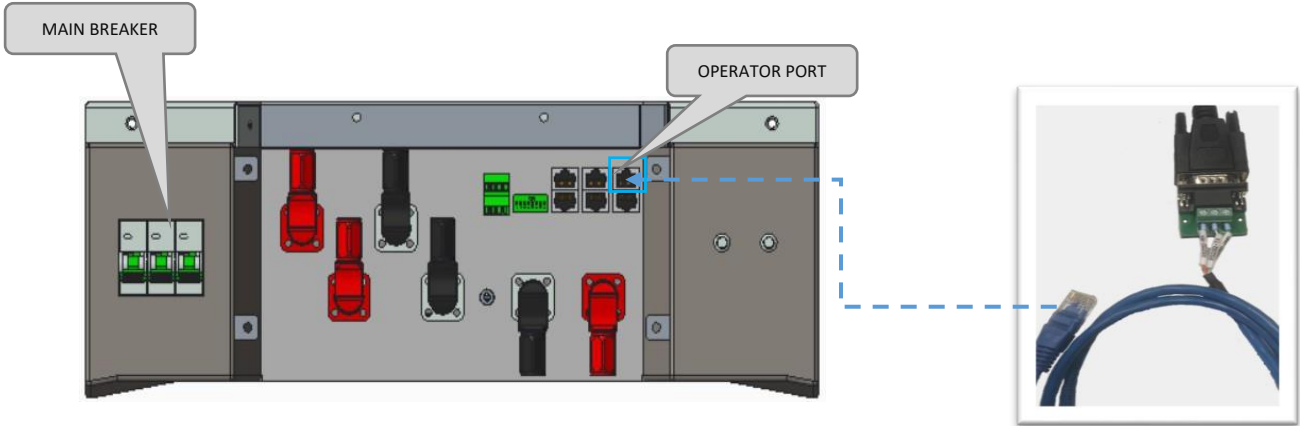
Make sure that the connection between the battery converter and the PC is stable for the duration of the update process. Do not disconnect the connection before the software has confirmed the upgrade.



### 3.9 WECO BMS - HIGH VOLTAGE PC SOFTWARE for 5K3 LV/HV

Use the RS232-USB for the connection between PC and HV BOX.

**STEP 1** Connect the RJ45 Port with the Operator Port located in the front of the HV BOX.  
**TURN ON THE MAIN BREAKER**



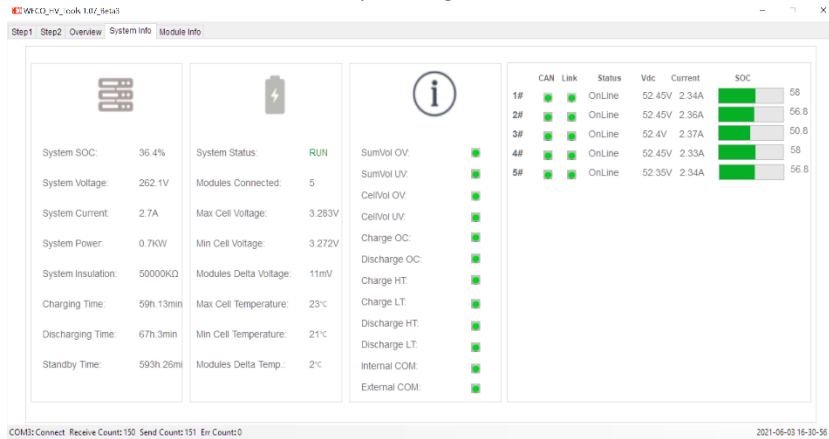
**STEP 2** Select the COM PORT and press CONNECT.

After the communication is established correctly, the PC software will display the system general information as shown below:



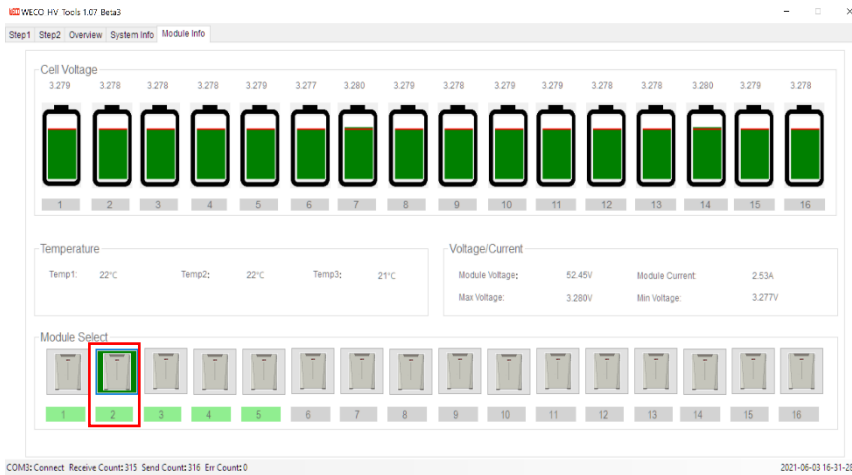
**STEP 3 SYSTEM INFORMATION**

From this page it is possible to view the modules that make up the system. It is also possible to monitor the voltage and current status of each individual module and any warnings or alarms.



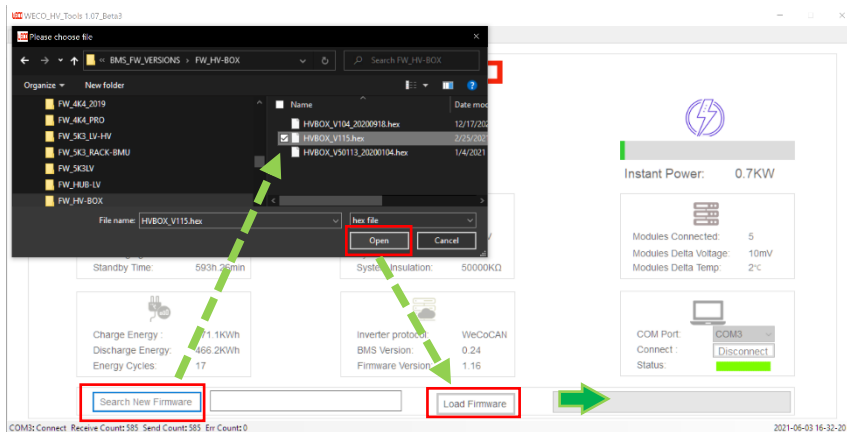
**STEP 4 MODULE INFORMATION**

From this page it is possible to view the individual cells of each module by selecting the desired module at the bottom of the screen.



**STEP 5 HV BOX FW UPGRADE**

By selecting the SEARCH NEW FIRMWARE, it is possible to search for the new HV BOX Firmware available (visit [www.5K3 LV/HV-BMS.com](http://www.5K3 LV/HV-BMS.com) to find the latest version). After selecting the file, press LOAD FIRMWARE to launch the Firmware Upgrade.



After confirming the File and clicking on the LOAD FIRMWARE button, the update procedure will begin and the HV BOX will be updated to the latest version.



The internal contactor may open and close several times after the update procedure is completed.



**ATTENTION: The charge and discharge current of the inverter MUST be limited according to the maximum current allowed by each cluster configuration.**

**The charge and discharge voltage range of the inverter MUST be limited as per the Battery Module maximum value.**



**NOTE:**

All data subject to change without notice. No part of this document may be copied or reproduced, electronically or mechanically, without written permission from the company.

Before installing your WeCo Module Battery Modules, please contact your WeCo Module representative for the latest manual and any additional support.



**WECO**

*WeCo Srl Viale J.F. Kennedy 113-121 Scarperia Firenze Italia*

*Email: [weco@wecobatteries.com](mailto:weco@wecobatteries.com)*

*[www.wecobatteries.com](http://www.wecobatteries.com)*