![WECO logo]

WECO ESS

LOW VOLTAGE HUB VALID FOR 4K4 PRO and 5K3 LV/HV

(This Manual Is not Valid for installation with 5K3-XP battery module)

LV-HUB GEN-02

WECO

ATTENTION: This is a CAN communication device, it is very sensitive to shocks and electromagnetic fields.
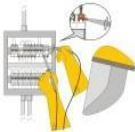
ATTENTION: This is a LOW VOLTAGE device and must be powered from the battery common power line

ATTENTION: This device 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.

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

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

Statement:

The information and guidance contained in this manual is related to the **LV-HUB- GEN2- EMEA version (Not Valid for UL versions)** Stackable model of battery. This manual contains two sections:

LV-HUB GEN-2 it is designed to be staked on a 5K3 type battery

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
It is essential that the device is equipped with the latest firmware version available on the web site
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 WeCo for additional information on the upgrade procedure.

NOTICE:

This device is designed to be used indoors.

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

The 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

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.

The LV-HUB GEN2 - EMEA version is designed to connect in parallel multiple clusters with a single CAN connection to the Hybrid Inverter

Product Overview

The LV-HUB GEN-2 is a CAN communication Combiner and can be used to connect multiple master CAN

communication addresses from multiple clusters that composing an LV system

The LV-HUB-XP is not a power device

LV-HUB GEN-2 need a power input in the range of 45-58V, that can be provided directly from the common

LV bus bar that connect all the cluster using the provided cables

Information in this Manual

About this Manual

Only trained and authorized personnel should install, repair or program thus device.

This manual should be reviewed in its entirety for proper storage, installation and operation of the device

Use Range

This device can be used only in low voltage applications

Additional Information

Product specifications subject to change without notice.

⚠️ **IMPORTANT NOTICES：**

LV-HUB-XP minimum startup voltage is 30 Vdc and the max input voltage is 60Vdc

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.
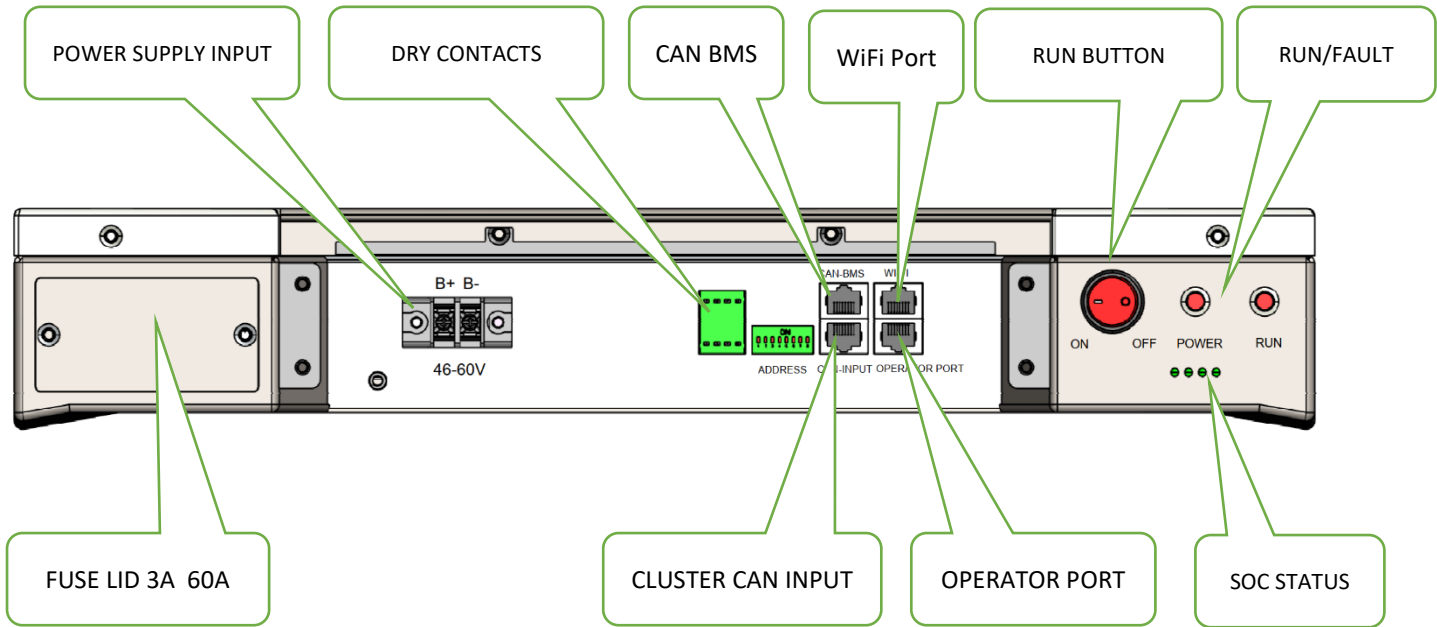
⚠️ **INFORMATION：**

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

LV HUB Overview

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

| POWER SUPPLY INPUT | DRY CONTACTS | CAN BMS | WiFi Port | RUN BUTTON | RUN/FAULT |

| FUSE LID 3A 60A | CLUSTER CAN INPUT | OPERATOR PORT | SOC STATUS |

⚠️ **SEE THE POWER/CURRENT CONFIGURATION**
SET THE INVERTER POWER AS PER THE CABLES' CAPABILITIES

Each battery pack and each cluster must have the same Voltage and Firmware.
All stack configurations must use the WeCo 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 LV HUB works only with CAN communication-approved inverters.**

For 4K4 PRO & 5K3 LVHV-EU (Version 2019/21)

ATTENTION

For the Above Models of batteries, the LV HUB GEN-2 can manage a maximum of 7 clusters composed of a maximum of 8 modules each.
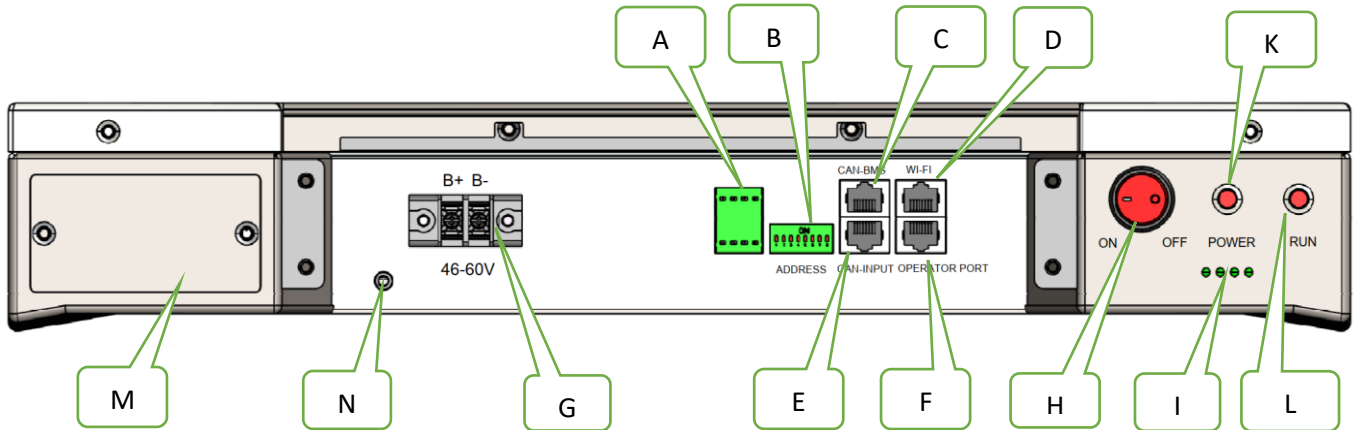

ATTENTION

_The batteries BMS must UPGRADE the firmware"BAT_HUB_V448" for HUB application_

A MULTI CLUSTER SYSTEM SHALL BE CONNECTED WITH BUS BAR BETWEEN MODULES.

LV-HUB DEVICE OVERVIEW

Interface Description and Connector		
A	I/O CONTACT 2X	Programmable closure/contact
B	DIP SWITCH	reserved, undefined
C	CAN BUS PORT	CAN / BMS Bus PORT for external solar – grid charger
D	WIFI PORT	Wi-Fi External PORT
E	CLUSTER CAN PORT	Master Cluster CAN from last master of the system
F	OPERATOR PORT	OPERATOR PORT FOR RS232/USB converter
G	INLET 48 Vdc	Connector for power input to connect to the bus bar (5A fuse inside)
H	ON OFF SWITCH	Internal Power Supply Switch
I	SYSTEM SOC	Show the system SOC, 0-25%●,25-50%●●, 50-75%●●●, 75-100%●●●●.
K	POWER LED	RED > POWER ON No light > POWER OFF
L	RUN LED	Steady light > system normal Flashing > system failure
M	FUSE HOLDER	LV circuit Fuse
N	GND screw Connection	5mm Screw Terminal

Low Voltage CAN HUB Dimensions
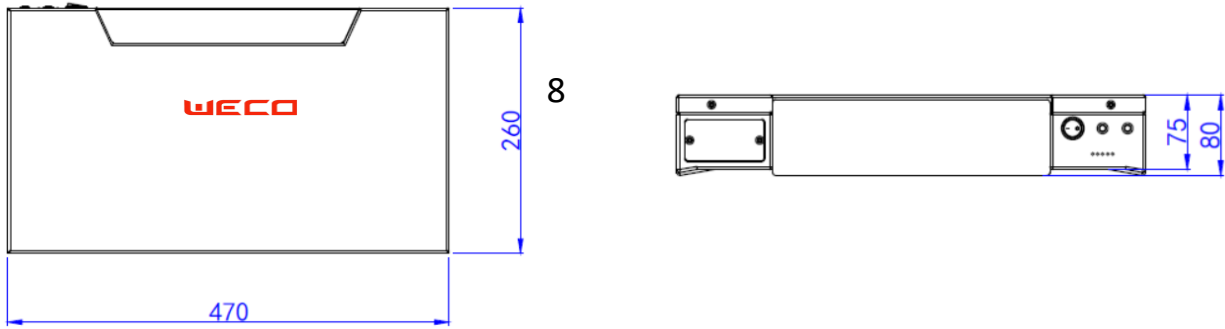
Control Logic and Protection Limit

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

control logic.

MAX CURRENT WITH BUS BAR

Modules \ Clusters	1	2	3	4	5	6	7
1	100	196	288	376	460	540	616
2	196	376	540	688	820	936	1036
3	288	540	756	936	1080	1188	1260
4	376	688	936	1120	1240	1296	1400
5	460	820	1080	1240	1300	1500	1750
6	540	936	1188	1296	1500	1800	2100
7	616	1036	1260	1400	1750	2100	2450
8	688	1120	1296	1600	2000	2400	2800
9	756	1188	1350	1800	2250	2700	3150
10	820	1240	1500	2000	2500	3000	3500
11	880	1276	1650	2200	2750	3300	3850
12	936	1296	1800	2400	3000	3600	4200
13	988	1300	1950	2600	3250	3900	4550
14	1036	1400	2100	2800	3500	4200	4900
15	1080	1500	2250	3000	3750	4500	5250

* Please refer to the above table according to the number of clusters and parallels applicable to the system.

1. The charge current will be limited to zero Amps when the single module voltage has been reached 56.8V.
2. The discharge current will be limited to zero Amps when the single module voltage has been discharged to 50.4V.
3. The battery system will communicate with the inverter to limit the current.
4. Each Battery Module will be protected by the same logic separately as per single module protection concept.
5. If some modules, individually, reach any fault status, the single module will protect and disconnect from the system in less than 3 seconds.
6. The current limit must be adjusted according to the real active batteries in system to restore the normal function.
7. If the cluster is not balanced, the current limitation set from the HUB to the inverter will be sent 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.
8. If more than two batteries in one cluster are in protection mode, the entire cluster will protect by shutting down.
9. If there are more than two clusters in protection mode, the full system will be protected.
10. The battery sends information to the inverter to limit the charge/discharge current to zero Amps if the battery is detecting an over current.
11. 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 switch and run 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.
12. 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.

CAN Hub General System Description
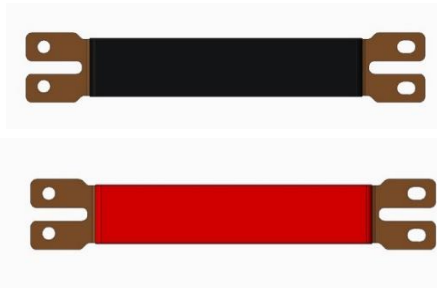
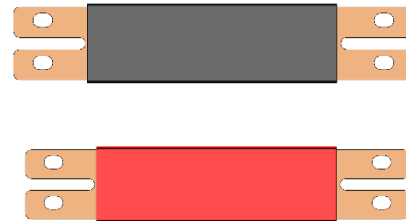CAN Hub is Mandatory for Multiple Cluster Installation
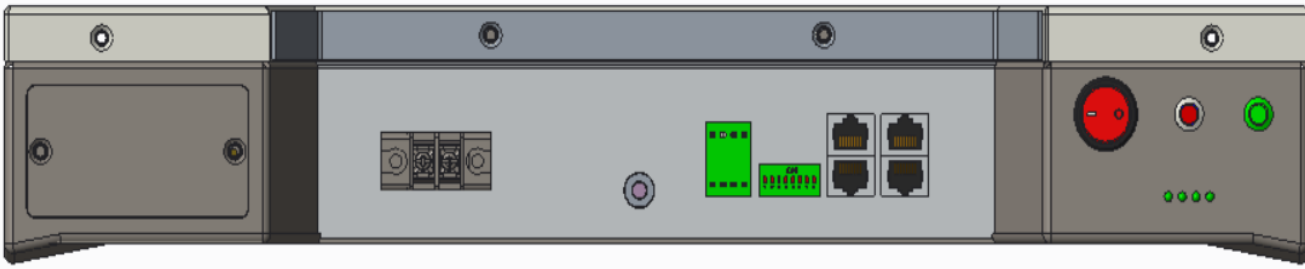
ATTENTION:

BEFORE PROCEEDING WITH THE 4K4 PRO & 5K3LVHV INSTALLATION IT IS MANDATORY TO READ THE INSTRUCTIONS BELOW

Special BUS Bar for Parallel Configuration

(MODULES INTERCONECTION BUS BAR MODEL – ACCESSORY)

4K4 PRO BUSBAR   **5K3LVHV or XP BUSBAR**

⚠️ **ATTENTION: BUS BARS ARE MANDATORY FOR STACK SYSTEM WITHIN 300A (Refer to the 5K3 manual).**

⚠️ **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.**

Multi Cluster Configurations for 4K4 and 5K3 LV/HV

Before using the MASTER HUB device, make sure to update the modules with the latest update Firmware available on www.wecobatteries.com

To use and set up the MASTER HUB, the installer must follow the instructions contained in this manual.

1. It is possible to stack from a minimum of three modules per cluster to a maximum of 8 modules for 4k4 pro and 5k3 LV/HV

2. It is possible to create up to 5 clusters with a maximum of 8 modules each for a total of 40 batteries for the 4k4PRO and 5K3 XP

3. All the battery modules of each cluster must have all the DIP Switches set by set as per the parallel sequence showed in the manuals of each model.

4. **The master module of each cluster that needs to be addressed with the specific cluster ID via PC software.**

   Each master battery of each cluster needs to be assigned with a unique and progressive ID as shown below.

5. The first cluster will have the ID 01 and needs to be connected from the CAN-B PORT to the CAN-A PORT of the consecutive Cluster that will have the ID02. Proceed with the Daisy Chain connection between Clusters up to the last.

6. From the master battery, of the last cluster needs to be connected the HUB from the CAN-B PORT to the CAN INPUT PORT of the HUB.

7. The Connection of the power cables between HUBs must be executed in accordance with the previous instruction.

8. The HUB can be powered with 2 x 6mm² cables from the common bus bar to the INPUT terminal of the HUB.

9. The HUB is connected via CAN to the inverter from the HUB CAN-BMS PORT.

10. Press the RUN Button of ALL batteries of each Cluster for wake up the batteries.

11. When all the connections have been completed, it is possible to turn on the HUB with the POWER SWITCH.

12. According to the numbers of modules connected, the entire startup procedure could take up to 320 seconds to be completed.

Module Set Up

Each battery module must have the same Voltage, SOC% and Firmware.
The battery firmware must be the version" FW-V4.48" available on the web site :
https://wecobatteries.com/download-area/#104-106-battery-firmware-for-wehub

Firmware upgrade operation (each battery need to be upgraded with the special HUB FIRMWARE VERSIO)
This FW is valid for both 4K4 PRO and 5K3-LV/HV

For this setting use only the WeCo RS 232 CONVERTER
Launch the WeCo software > Select Module setting program > Select the Com port and connect to the battery get info >
Click Search new firmware > Select the firmware > Load Firmware > wait for the upgrade completion > The Green bar
Show the upgrading status > Pop up the window show Upgrade success.

SOFTWARE FOR HUB SET

WECO-HubTOOL-V1.00-Beta16-20220106

WeCo RS 232 CONVERTER

STEP BY STEP PROCEDURE

Do not turn on the batteries until the entire system has been connected with the BUS BAR between modules and the Power cable is connected to the common bus bar or to the inverter

1. Stack all the modules in positions (Verify the load with a local civil engineer).

2. Connect each module to GND and to the Master GND node.

3. Assign each MASTER with a progressive ID via the PC software (max 5 Clusters).

4. Connect the MASTER ID01, starting from the CAN-B PORT to the CAN-A PORT of MASTER ID02 and proceed up to the last MASTER.

5. Connect the LAST MASTER from the CAN-B PORT to the CAN INPUT PORT of the HUB.

6. Connect the CAN-BMS PORT with the INVERT CAN PORT (follow the PIN OUT provided by the Inverter manufacturer for CAN L CAN H).

7. Set the cluster batteries DIP switch according to the parallel configuration. (*more detail checks the 4k4pro or 5K3 manual)

8. Connect the RS485 from PORT B of the MASTER to the PORT A RS485 of the SUB1 and proceed in Daisy Chain up to the last module.

9. Turn ON the HUB Switch.

10. Press the POWER BUTTON on all modules for 2-seconds to start the wake-up process on all SUB modules.

BATTERY SOFTWARE SET UP PROCEDURE

STEP 1, Upgrade all the batteries with the FW version 4.48

- Access the Software and select the Low Voltage section, click on the FREE ACCESS button

- Select the Battery image ``MODULE SETTING PROGRAM``

- Set the COM port and Press CONNECT

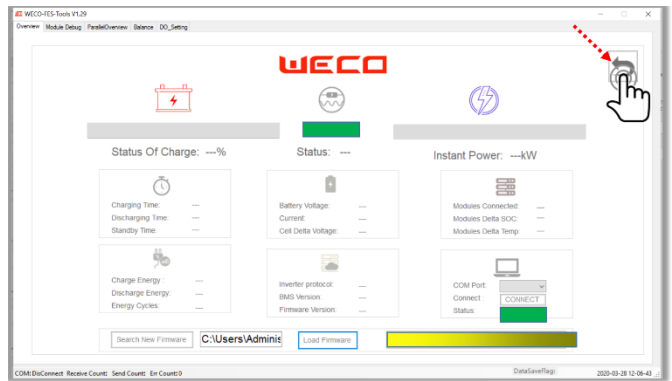- Select SEARCH NEW FIRMWARE and LOAD the FW 4.48, the Press UPGRADE FIRMWARE
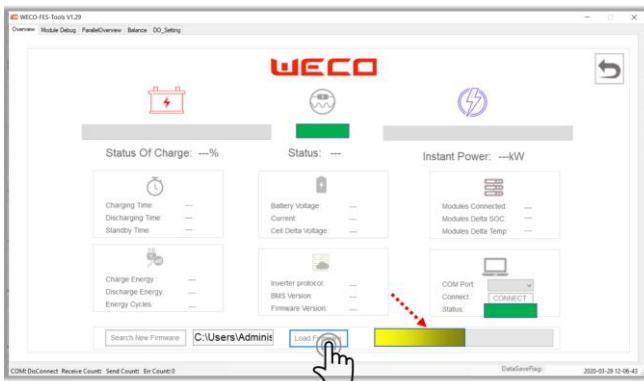
  Repeat the same UPGRADE to all the batteries of each cluster

CONNECTING WITH THE BATTERY
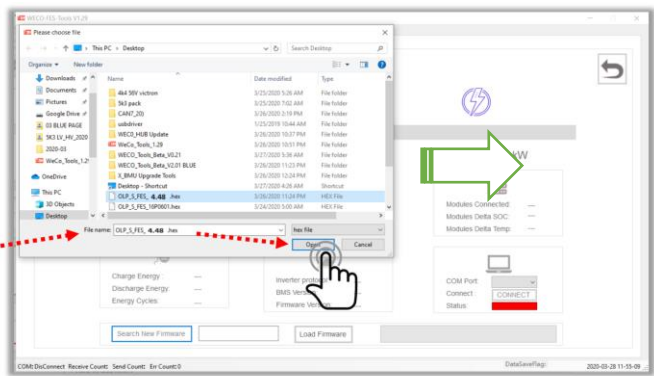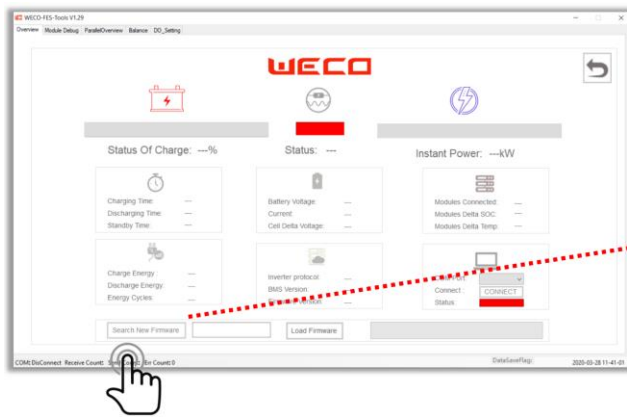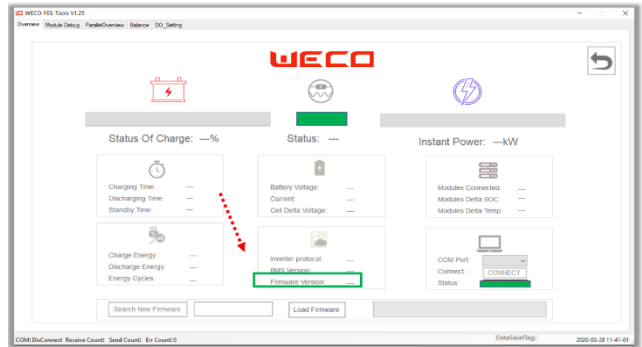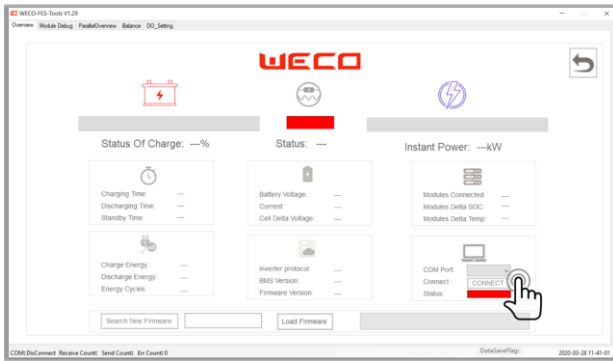
LAUNCH THE FW UPGRADE

Cluster set up

Master ID Set Up and Connection Diagram

DIP SETTING SEQUENCE VALID FOR 4K4 PRO and 5K3 LV HV (Not VALID FOR 5K3-XP)

It is important to follow the diagrams below to make the connections in the correct sequence.

Each cluster must have its own unique address, check the DIP chart for CLUSTER 01 and CLUSTER 02~05.
All the batteries in the group FOLLOW the DIP address chart below (see picture):

CLUSTER 01

DIP ADDRESS CHART (CLUSTER 01*)

CLUSTER 02 to

DIP ADDRESS CHART (CLUSTER 02 to 5*)
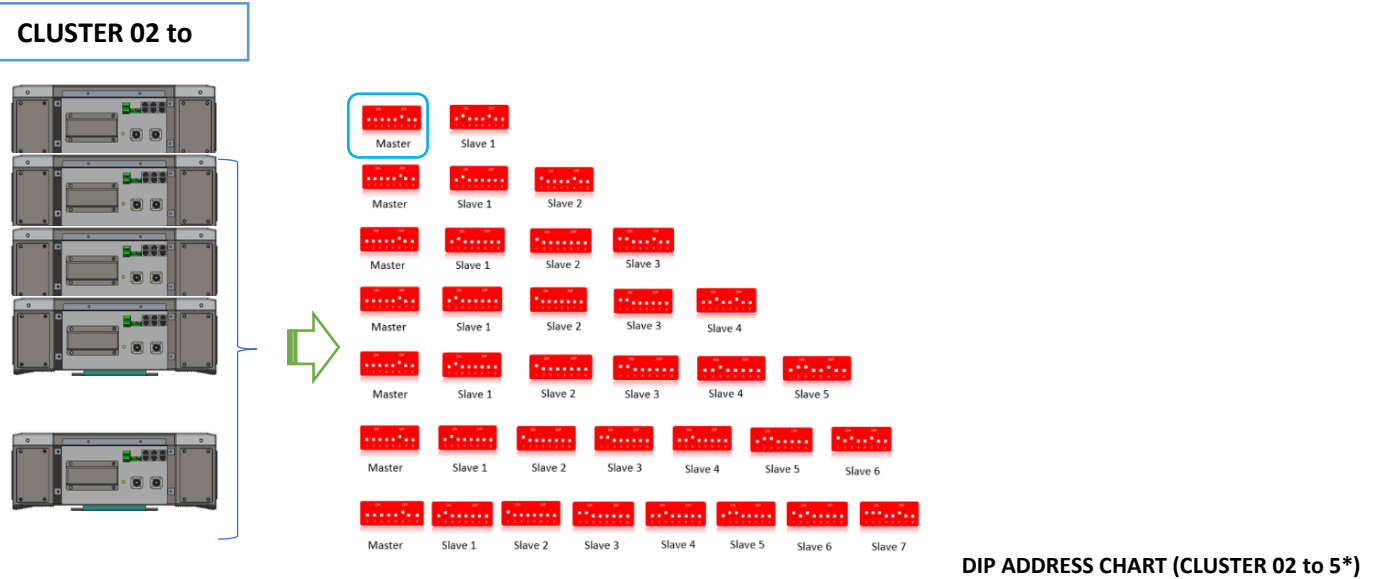
THE MASTER BATTERY OF EACH CLUSTER MUST BE SET ACCORDING AS PER THIS DIP CONFIGURATIONS

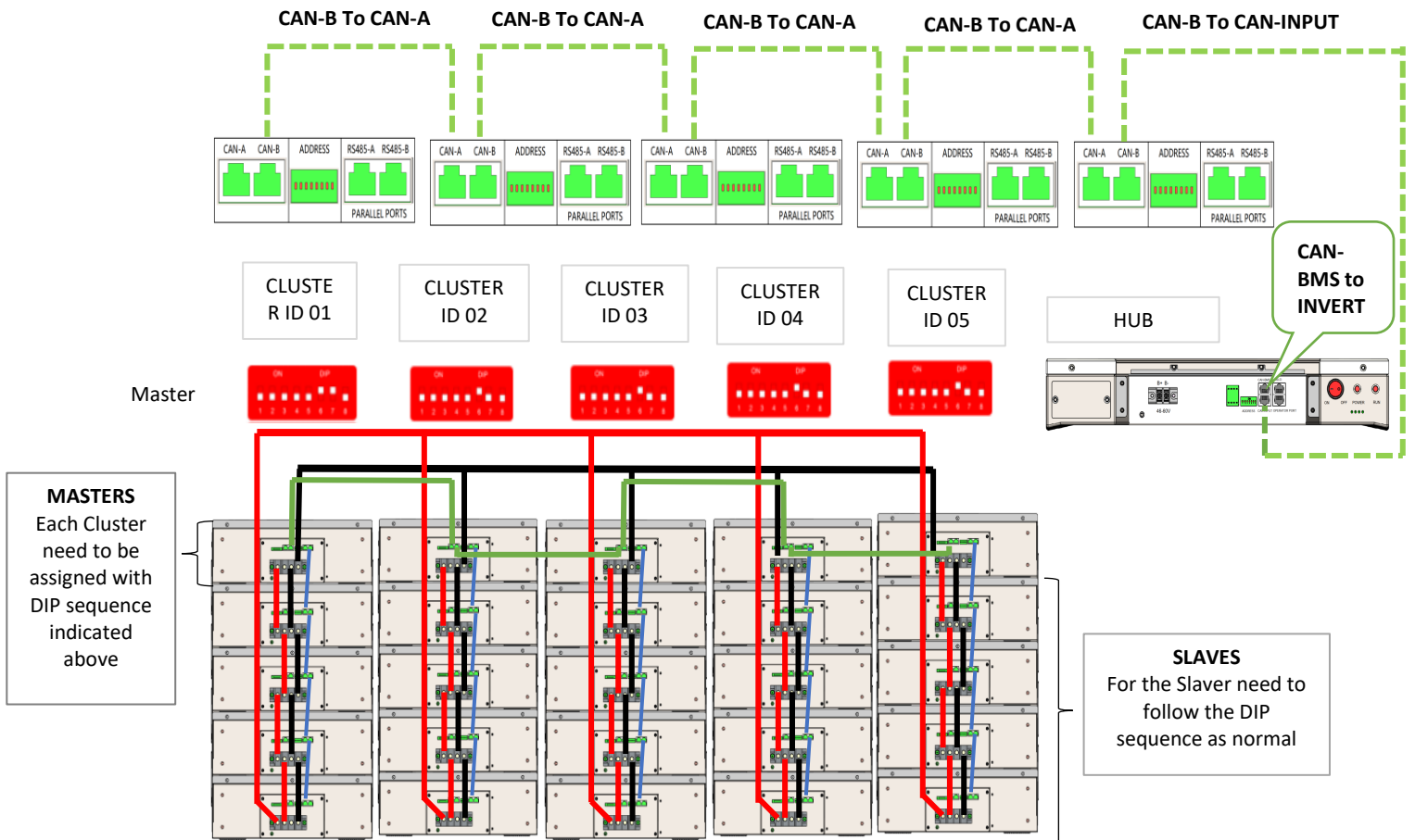| CLUSTER 1* | CLUSTER 2** | CLUSTER 3 | CLUSTER 4 | CLUSTER 5 |
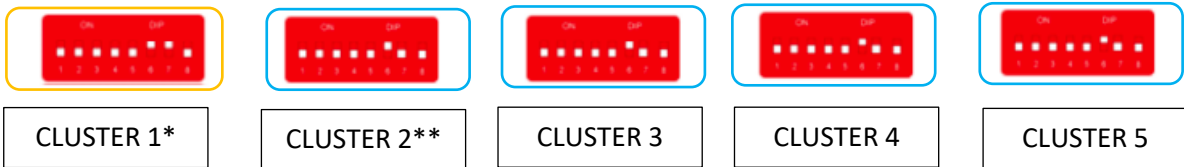
WARNING

Only the first batteries of each cluster must be set following the sequence from ID 01 to ID 05 to then assigning the ID number via the PC SOFTWARE and allowing the HUB to detect the exact number of cluster that is composing the system.

ATTENTION

⚠️

All the master batteries must be connected in Daisy Chain from the first module to the last module, connecting the CAN PORTS

CAN-B and CAN-A to the last module from the CAN-B PORT for connection to the HUB PORT -CAN INPUT-

CLUSTERS DIP SETTING FOR 4K4 PRO

CAN-B To CAN-A   CAN-B To CAN-A   CAN-B To CAN-A   CAN-B To CAN-A   CAN-B To CAN-INPUT

CLUSTER ID 01   CLUSTER ID 02   CLUSTER ID 03   CLUSTER ID 04   CLUSTER ID 05   HUB

CAN-BMS to INVERT

Master

MASTERS
Each Cluster need to be assigned with DIP sequence indicated above

SLAVES
For the Slaver need to follow the DIP sequence as normal
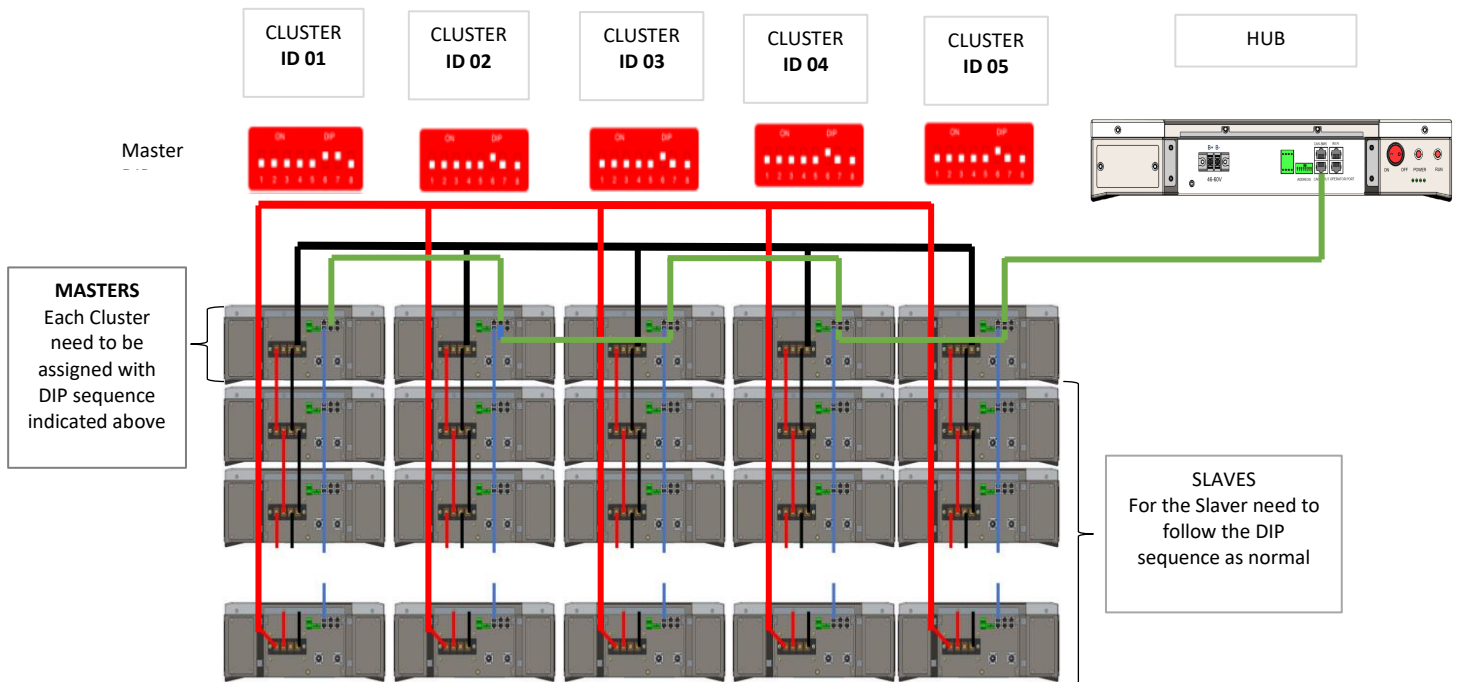
⚠️

ATTENTION
It is important to restart the batteries after any DIP setting to complete the setup of each single module

ATTENTION

All the master batteries must be connected in Daisy Chain from the first module to the last module, connecting the CAN PORTS
CAN-B and CAN-A to the last module from the CAN-B PORT for connection to the HUB PORT -CAN INPUT-

CLUSTERS DIP SETTING FOR 5K3 LV/HV

Master

| CLUSTER ID 01 | CLUSTER ID 02 | CLUSTER ID 03 | CLUSTER ID 04 | CLUSTER ID 05 | HUB |

MASTERS
Each Cluster need to be assigned with DIP sequence indicated above

SLAVES
For the Slaver need to follow the DIP sequence as normal

ATTENTION
It is important to restart the batteries after any DIP setting to complete the set up of each single module

Cluster Setting operation

* For this setting use only the WeCo RS 232 CONVERTER

and the HUB SOFTWARE   `WECO-HubTOOL-V1.00-Beta16-20220106`   *using the PASSWORD: **1010***

Launch the WeCo software > Select Cluster setting program > Select the Com port and connect the battery get info >

- **Make sure that all the Firmware version are consistent**
- Make sure that all the SoC are at the same Value * suggested 100%
- **Make sure that the modules voltage are levelled**
- If one of the above values is not aligned with the others, the installer must clear the imbalance by acting individually on each module
- When all of the three sections are in Green Status will be possible to proceed to the next step.

SOFTWARE OVERVIEW

CLUSTER OVERVIEW

Select the cluster ID and assign the ID (Each master of each cluster must have an ID assigned)

- From the Overview page it is possible to check the status of the cluster and assigning the ID by connecting the RS232 Converter to the Master Battery of the cluster
- Select the Cluster from the Drop List starting from 1 and press SET, the ID is now assigned to the first Cluster Repeat the same actions to all the clusters
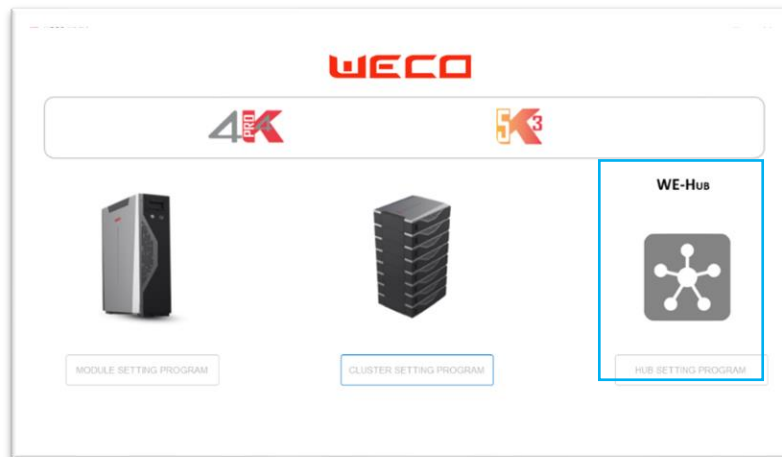
ATTENTION

If the Modules that are composing the clusters are not consistent with the rest of the cluster, the software will highlight the problem and to proceed it will be necessary to clear any error

SYSTEM OVERVIEW

By selecting the WE HUB icon from the software, after plugging the RS232 converter on the Cluster Number 01 (ID-1) it will be possible to have a general overview of the system as shown below
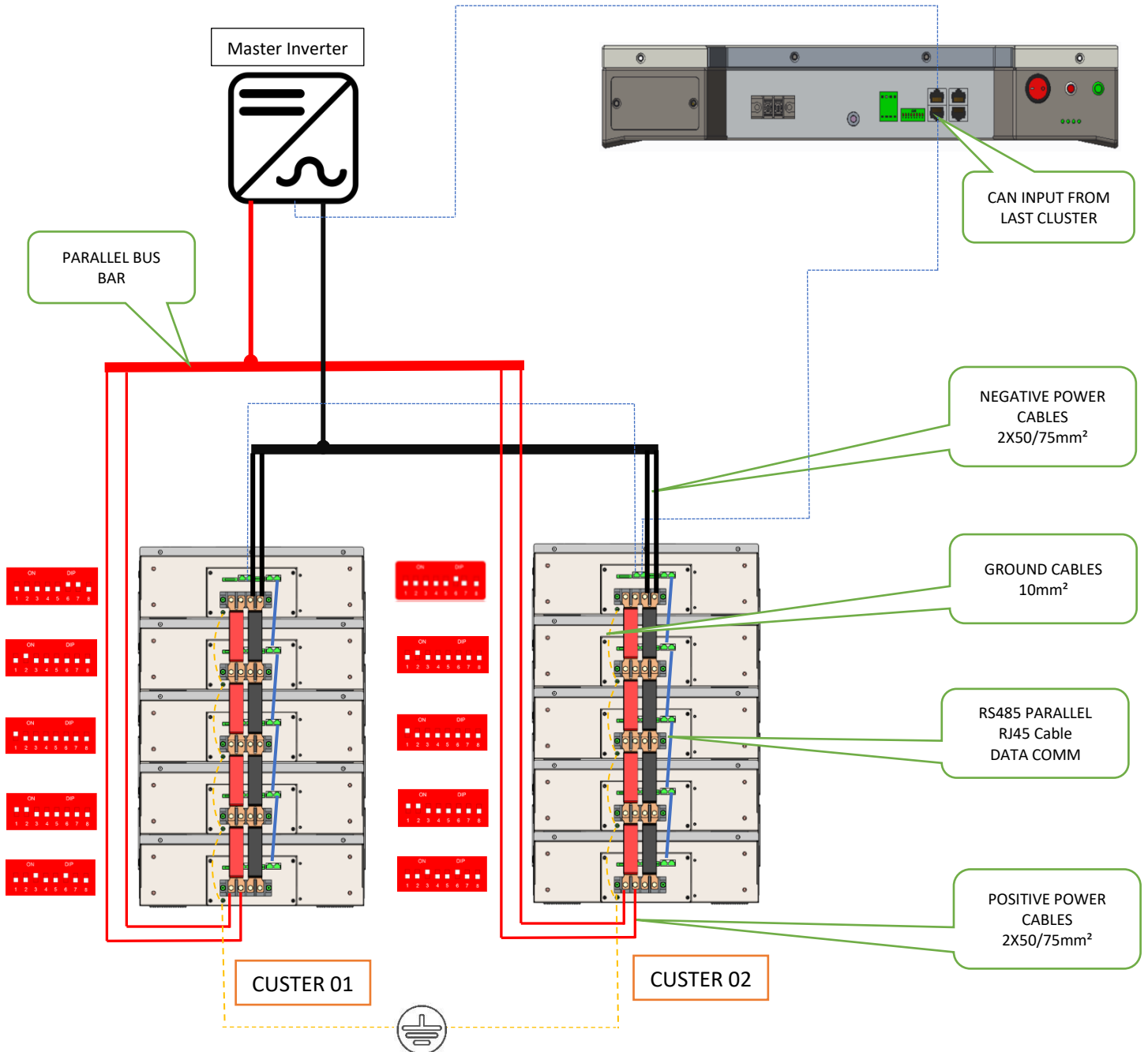

Below and example of two clusters composed by 3 modules each.

4K4 PRO

*The cluster can be composed by 8 batteries in parallel, this diagram take 5 modules in parallel as example.

Master Inverter

PARALLEL BUS BAR

CAN INPUT FROM LAST CLUSTER

NEGATIVE POWER CABLES 2X50/75mm²

GROUND CABLES 10mm²

RS485 PARALLEL RJ45 Cable DATA COMM

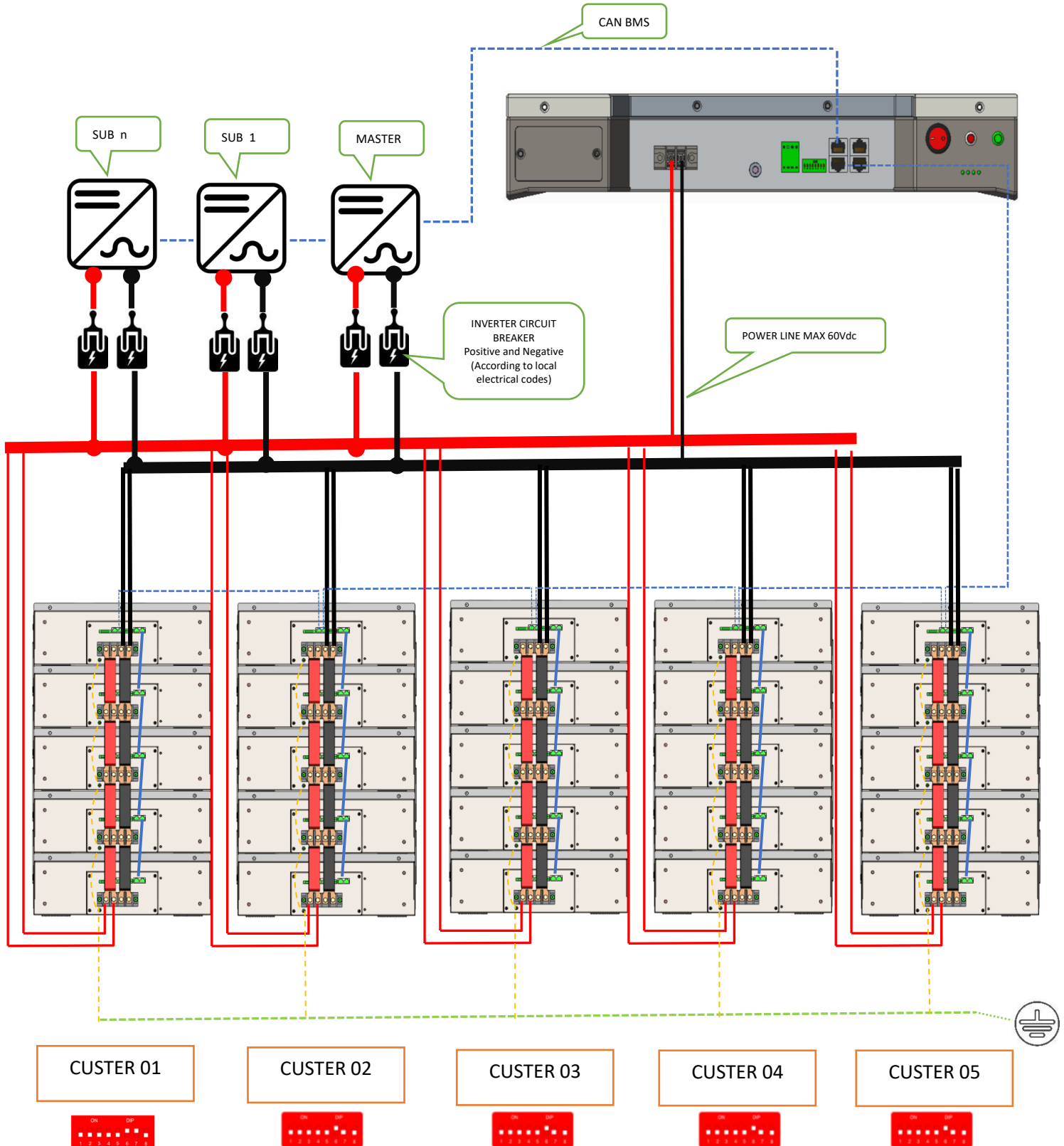POSITIVE POWER CABLES 2X50/75mm²

CUSTER 01

CUSTER 02

ATTENTION:

Each cluster must be equipped with an isolator to individually disconnect (circuit breaker) the battery tower from the parallel bus bar in accordance with local regulations.
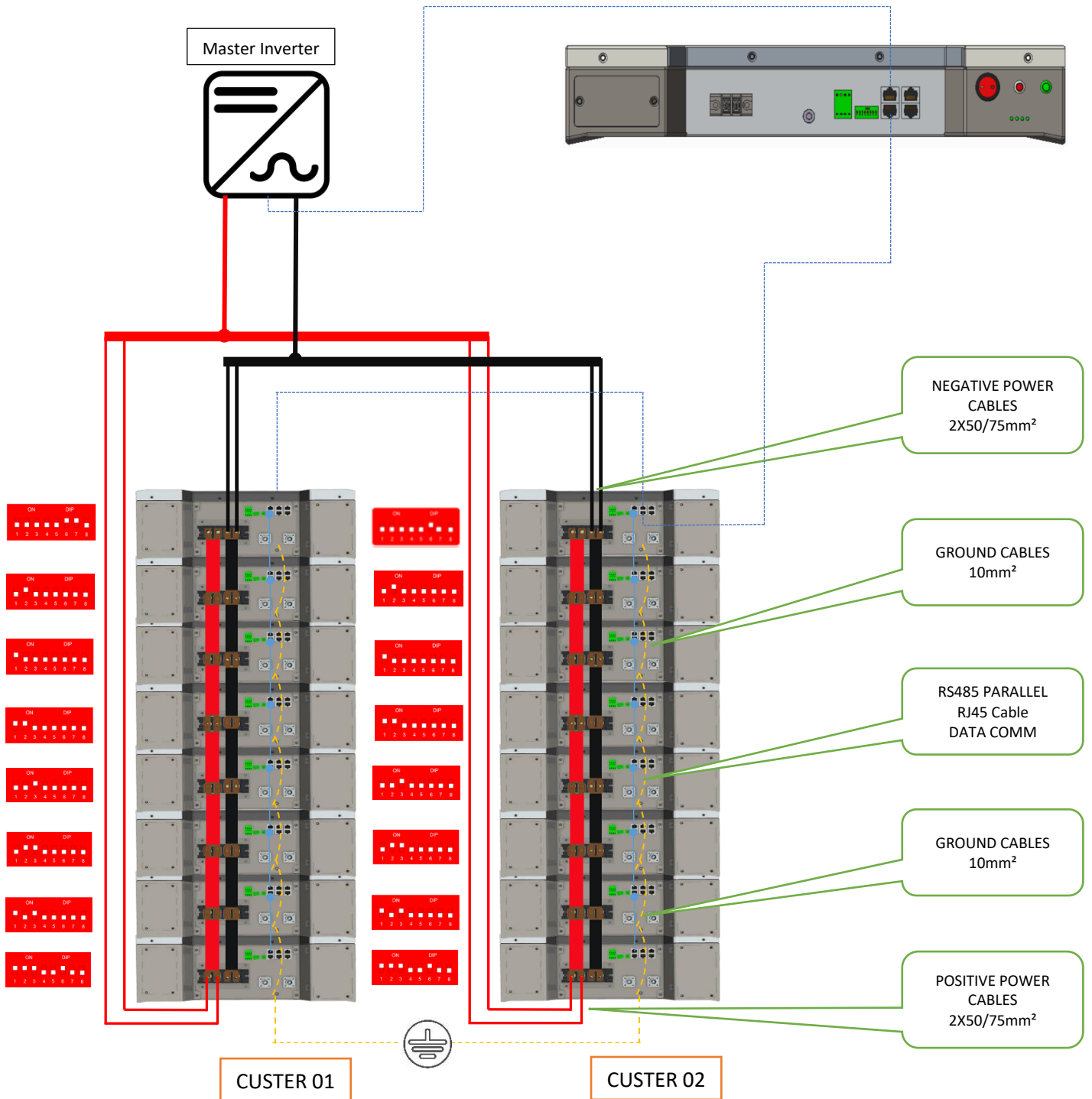
WECO

EXAMPLE of 4K4 PRO

Conceptual Diagram of a Cluster composed of 5 clusters of 5 batteries each.

*Can be composed of 5 clusters of max. 8 batteries each.

CAN BMS

SUB n

SUB 1

MASTER

INVERTER CIRCUIT BREAKER
Positive and Negative
(According to local electrical codes)

POWER LINE MAX 60Vdc

CUSTER 01

CUSTER 02

CUSTER 03

CUSTER 04

CUSTER 05

WECO

Communication Diagram + Power Connection

5K3-LVHV (not valid for 5K3 XP)

Master Inverter

NEGATIVE POWER CABLES 2X50/75mm²

GROUND CABLES 10mm²

RS485 PARALLEL RJ45 Cable DATA COMM

GROUND CABLES 10mm²

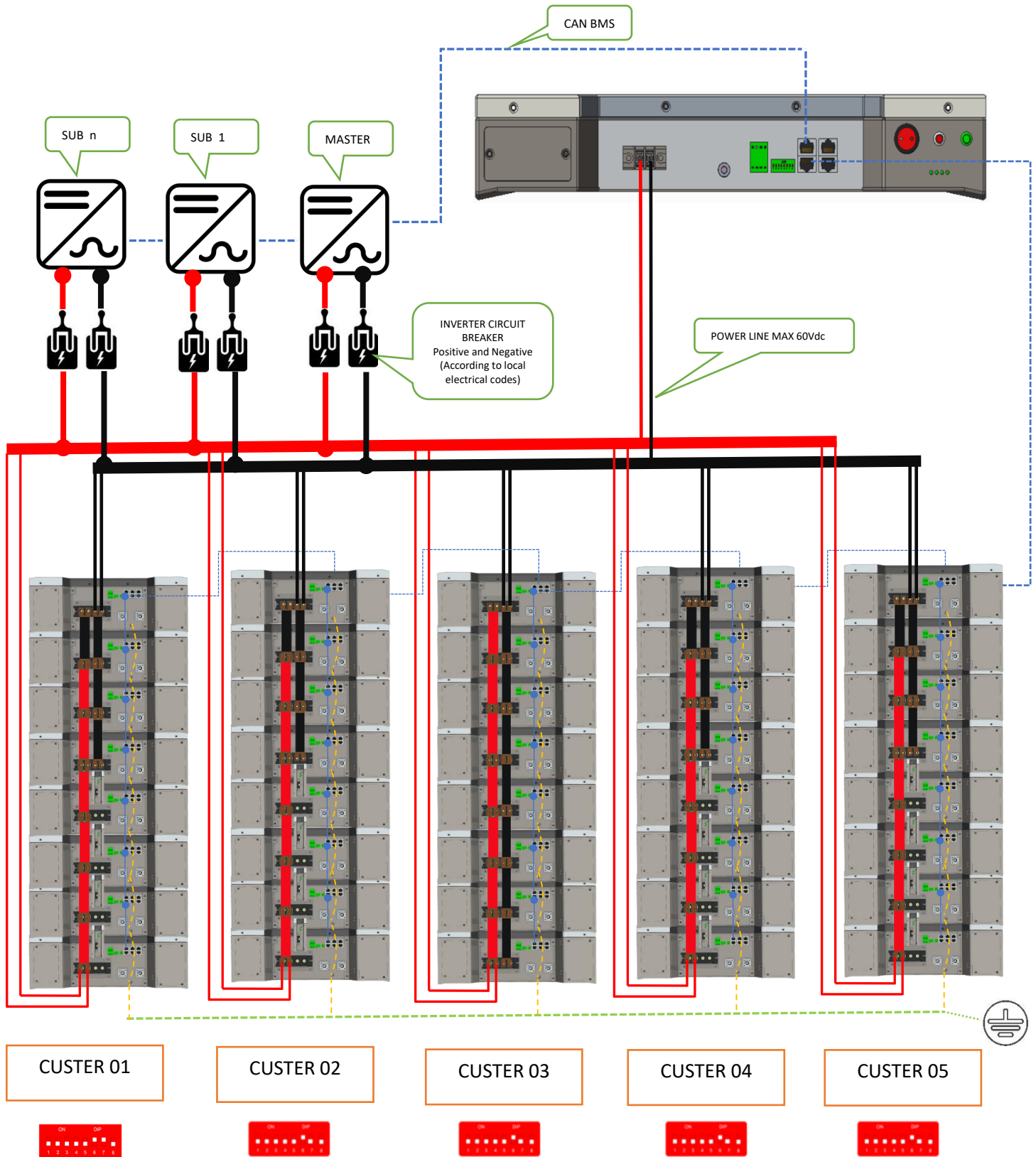POSITIVE POWER CABLES 2X50/75mm²

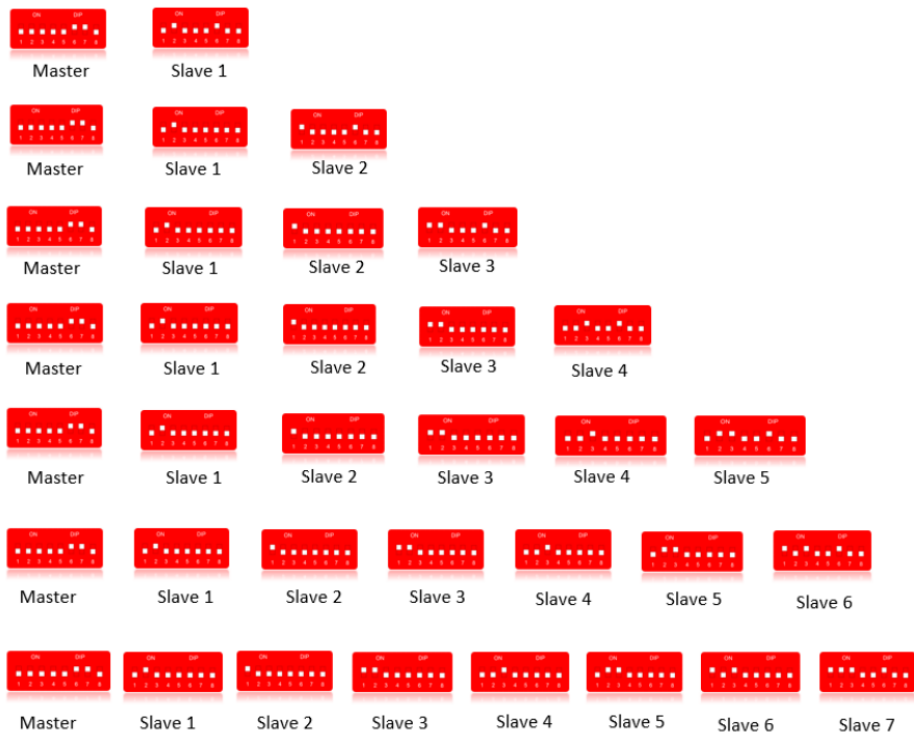CUSTER 01

CUSTER 02

ATTENTION:

Each cluster must be equipped with an isolator to individually disconnect (circuit breaker) the battery tower from the parallel bus bar in accordance with local regulations.

WECO

Conceptual Diagram of a Cluster composed of 5 clusters of 8 batteries each.
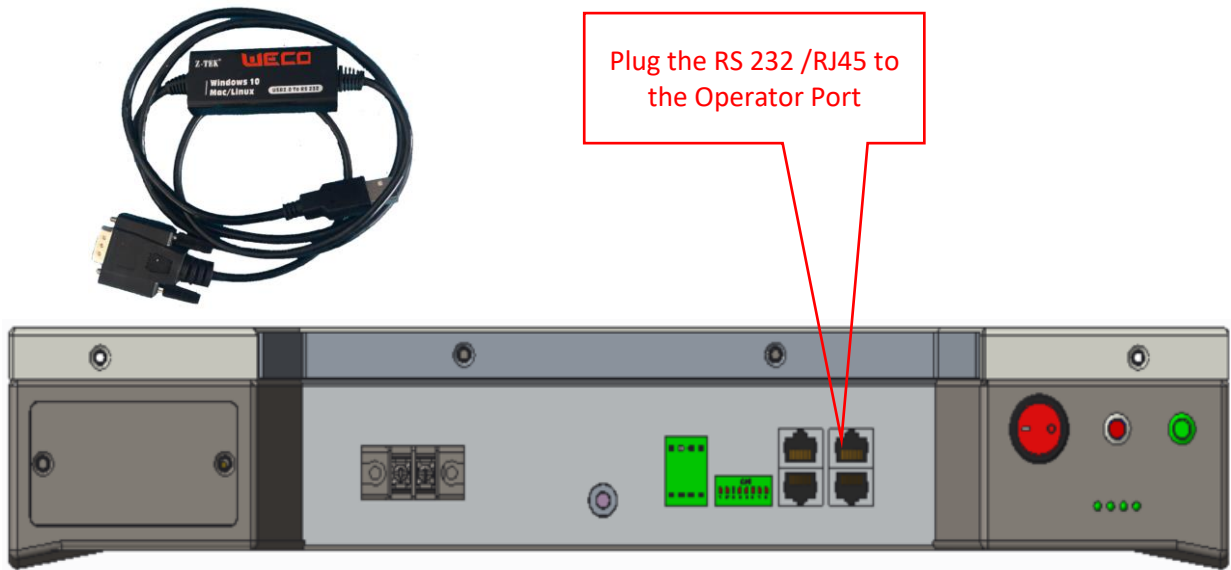
5K3-LVHV (not valid for 5K3 XP)

CAN BMS

SUB n

SUB 1

MASTER

INVERTER CIRCUIT BREAKER
Positive and Negative
(According to local electrical codes)

POWER LINE MAX 60Vdc

CUSTER 01

CUSTER 02

CUSTER 03

CUSTER 04

CUSTER 05

DIP SEQUENCE VALID FOR THE CLUSTER WITH ID 1 (4K4PRO and 5K3 LV/HV)

Master   Slave 1

Master   Slave 1   Slave 2

Master   Slave 1   Slave 2   Slave 3

Master   Slave 1   Slave 2   Slave 3   Slave 4

Master   Slave 1   Slave 2   Slave 3   Slave 4   Slave 5

Master   Slave 1   Slave 2   Slave 3   Slave 4   Slave 5   Slave 6

Master   Slave 1   Slave 2   Slave 3   Slave 4   Slave 5   Slave 6   Slave 7

DIP SEQUENCE VALID FOR THE CLUSTERS WITH ID 2~5 (4K4PRO and 5K3 LV/HV)

Master   Slave 1

Master   Slave 1   Slave 2

Master   Slave 1   Slave 2   Slave 3

Master   Slave 1   Slave 2   Slave 3   Slave 4

Master   Slave 1   Slave 2   Slave 3   Slave 4   Slave 5

Master   Slave 1   Slave 2   Slave 3   Slave 4   Slave 5   Slave 6

Master   Slave 1   Slave 2   Slave 3   Slave 4   Slave 5   Slave 6   Slave 7

LV HUB CONNECTION

Plug the RS 232 /RJ45 to the Operator Port

1. Plug the RS 232 / RJ 45 to the operator Port
2. Connect the USB plug of the RS232 to your Laptop
3. Start Up the HUB (To power up the HUB refer to the 5K3LV/HV manual
4. Unzip the Software WeCo Tool for HUB   WECO-HubTOOL-V1.00-Beta16-20220106
5. Open the Software and access to the LV section using the Password **1010**
6. Select the HUB Icon
7. Turn on the HUB by setting the rocker switch to (1) ON
8. From the main page select the COM PORT and Press CONNECT
9. Once the LED lights will turn ON it will be possible to program the HUB
    PS it is always suggested to upgrade the HB FW to the latest Version
10. Select the SETTING page (Upper right Corner)
11. Set the number of cluster you have in your system(from 2 to 7)
12. Set the Number of Modules per cluster (from 2 to 8)
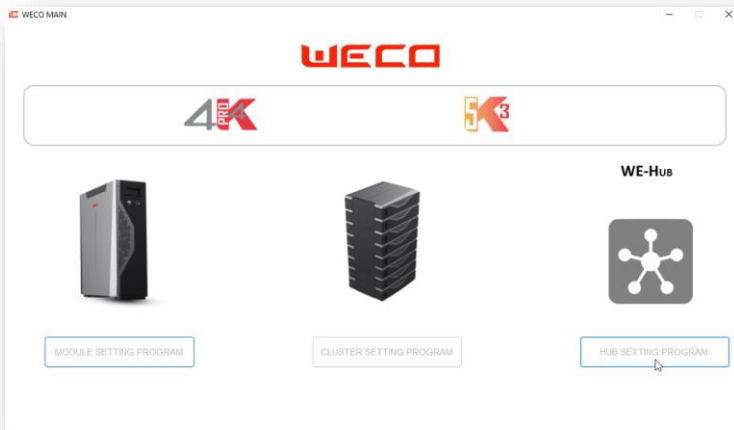13. Press SET to confirm the above selection

STEP BY STEP PROCESS

Access the Software using the password 1010 + press OPERATOR ACCESS
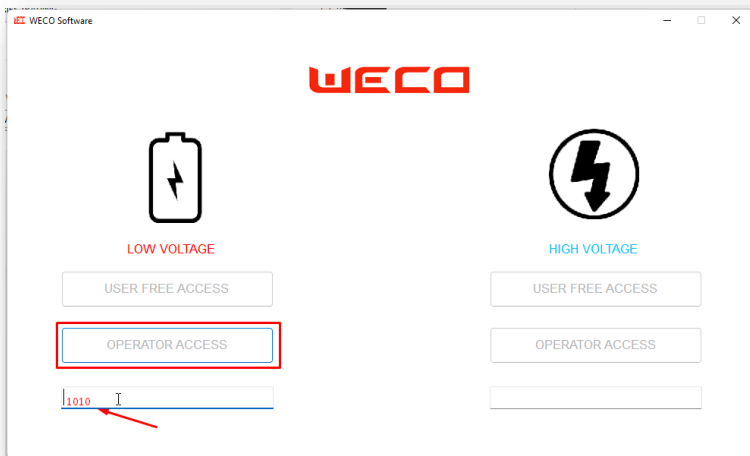
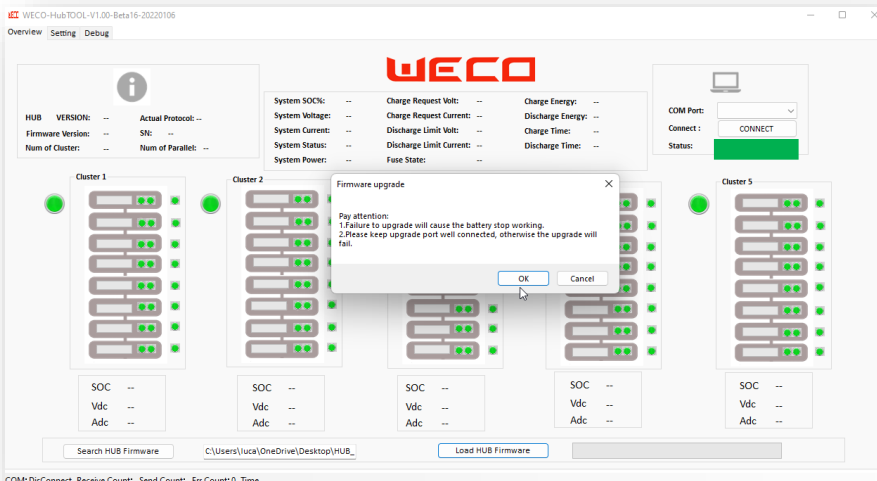Select HUB SETTING tab

Select the COM PORT and press CONNECT

The BAR below the Button Connect Must be GREEN after pressing CONNECT
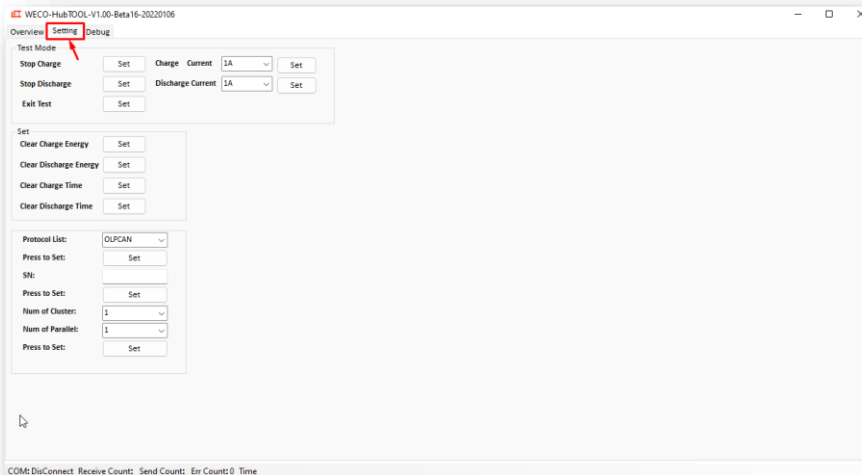

Press Search Hub Firmware and upload the Latest LV HUB FW
At the date of the publication of this manual the most recent FW is: HUB_Relay_V3004_20220412.bin
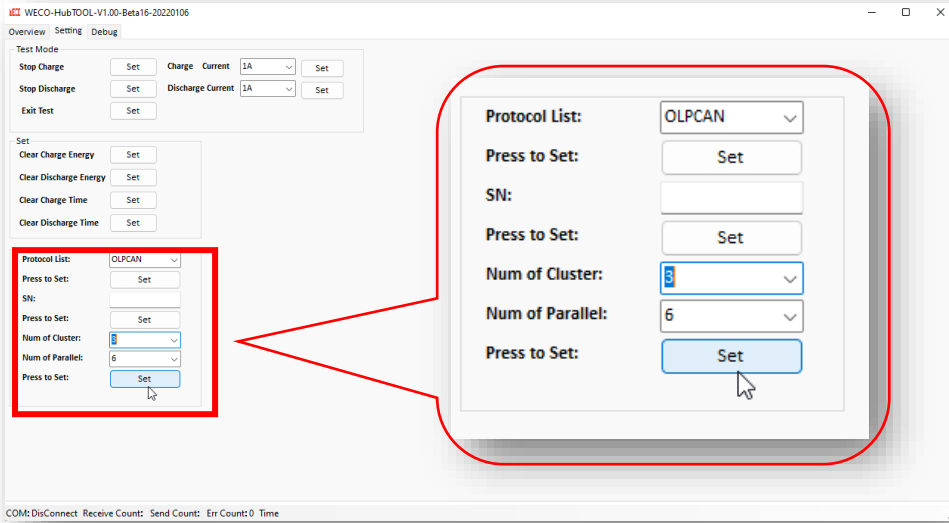Press OK to Upload the FW and wait for the Upgrade process to be completed

Select the SETTING page to program the Number of Cluster and number of batteries per cluster

Select the number of clusters and the number of batteries each cluster and press SET to confirm

As last step it is mandatory to select the inverter protocol (turn on the inverter to enable the communication between LV HUB and Inverter, if the Inverter is not active or the communication cable (BMS /CAN) between the inverter and LV HUB is not connected, the LV HUB with display a FAULT and the Green Light will Blink