

MastMinder Installation Guide - Regular Lithium Battery

Example – 6,400 AH Site



ATTENTION :

1. Before using any battery, please check the appearance and voltage of the battery. In case of any abnormality, please do not use and contact MastMinder.
2. Please check and charge each battery as soon as possible after delivery and certainly within 3 months.
3. When any battery needs to be stored again, please disconnect the circuit breaker of the battery.
4. Please fully charge each battery before putting it into use.
5. If the battery is completely discharged, please charge it within 24h, otherwise the battery may be damaged due to over-discharge.
6. Please use the same batch of batteries in parallel.
7. Before parallel connection of batteries, please check each battery voltage is similar to avoid any heavy charging / discharging between batteries.
8. If the battery cannot be charged or opened because it is not used for a long time, please contact MastMinder.
9. Please charge according to the voltage and current recommended and required by MastMinder, otherwise, the battery may be damaged.



WARNING :

1. Do not short circuit the battery.
2. Do not reverse connect the battery.
3. Do not open the battery shell without permission.
4. Do not damage the battery shell.
5. Disconnect the load and charge before connecting the battery.
8. Do not use batteries in series.

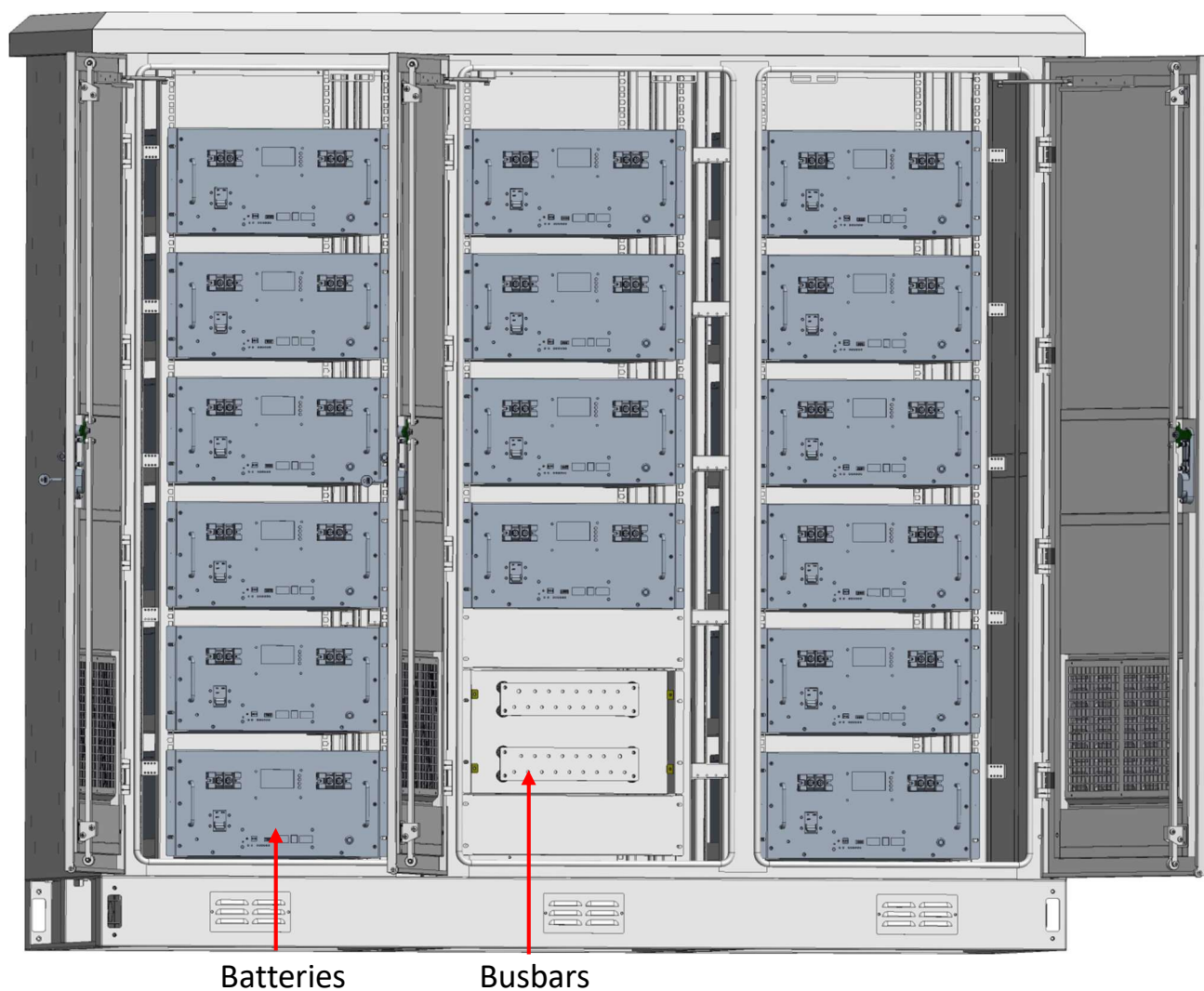
General installation notes:

1. Perform this installation in conjunction with referencing and fully understanding the “MastMinder User manual - Regular Lithium_Battery_V3.6_20221124D.pdf”.
2. Before physically installing, please check the appearance of each battery including its voltage and display for any damage or faults.
3. Install the batteries into the cabinets using the M6 screws and snap nuts as supplied.
4. Connect the fan power cables to the busbar.
5. Divide the batteries into groups of 8 as per the drawing below and set the dip switches on the front of each battery to the binary number 1 to 8 to identify each battery in each group of 8 (see User Manual for details).
6. Similarly, set the top rightmost dip switch on the number 1 battery of each group ON to identify this battery as the Master of the Group of 8. It will also be the battery where we set the IP Address for remote access for SNMP data extraction (see User Manual for details).
7. Similarly, still referencing the batteries into groups of 8 as per the drawing below, connect the parallel RS485 communication cable using standard RJ45 connectors to connect all the batteries within each group (see User Manual for details).
(Use 400mm standard network cable).
8. With each battery MCB in the Off (Open) position then physically connect the DC positive & negative cables between each battery and the relative busbars.
The length of the power cables from each battery to the busbar must be the same, to ensure a balance of voltages and currents between batteries.
9. The length of the power cables from the two outdoor cabinets to the controller must also be the same. (To ensure a balance of voltages and currents between cabinets)
10. Connect the monitoring software and set the IP address of the battery as detailed in the manual Annex6.
(MastMinder User manual - Regular Lithium_Battery_V3.6_20221124D.pdf)
11. There are no software settings that need to be made in the batteries other than setting the IP Address as above to facilitate SNMP access.
12. The RS485 monitoring and control software provided is to be used solely for monitoring purposes other than setting the IP Addresses. This software may also be used with the instructions of MastMinder to make updates, otherwise none is necessary.
(There is a separate User Manual document for the RS485 monitoring & control software).
(There is also a download link for the RS485 monitoring & control software provided in the annex to this document)
13. Similarly, the SNMP access is simply for remote monitoring.
14. There is also a link in this annex to a Outback MX80 configuration video, outlining the parameters required to charge a 16-cell Lithium battery with a nominal voltage of 51.2 volts).

These 6,400 AH solar storage sites consist of the following configuration.

- Each site consists of 2 large fan cooled battery cabinets, connected in parallel.
- Each battery cabinet contains 16 x 200 AH 51.2 Volt Lithium modules, all connected in parallel.

Battery layout (as below)



Logical wiring layout and connections.

There are fundamentally two sets of cables connecting all the batteries together as follows.

1. The first is the DC positive and negative cables that connect all the batteries together in parallel to the positive and negative bus bars.

There is nothing special about this other than one important factor that **ALL the cables must be the same length between the battery connections and the bus bar connections.**

This is to ensure that all the batteries have the same resistance in parallel as Lithium batteries are much more sensitive to charging and discharging voltages.

2. The second is the RS485 cables that allows the BMS (Battery Management System) to communicate between the batteries.

For the RS485 communications, the batteries are divided into 2 groups of 8 batteries within each cabinet, as per the diagram further below.

Each battery within the group of 8 are all connected in parallel via the RS485 ports on each battery.

Each group of 8 will have 1 “Master” unit defined and 7 “Slave” units defined.

The “Master” unit will be the BMS that coordinates the BMS’s in the other 7 units.

The “Master” unit is also the unit that will communicate externally to a lap-top or other monitoring system.

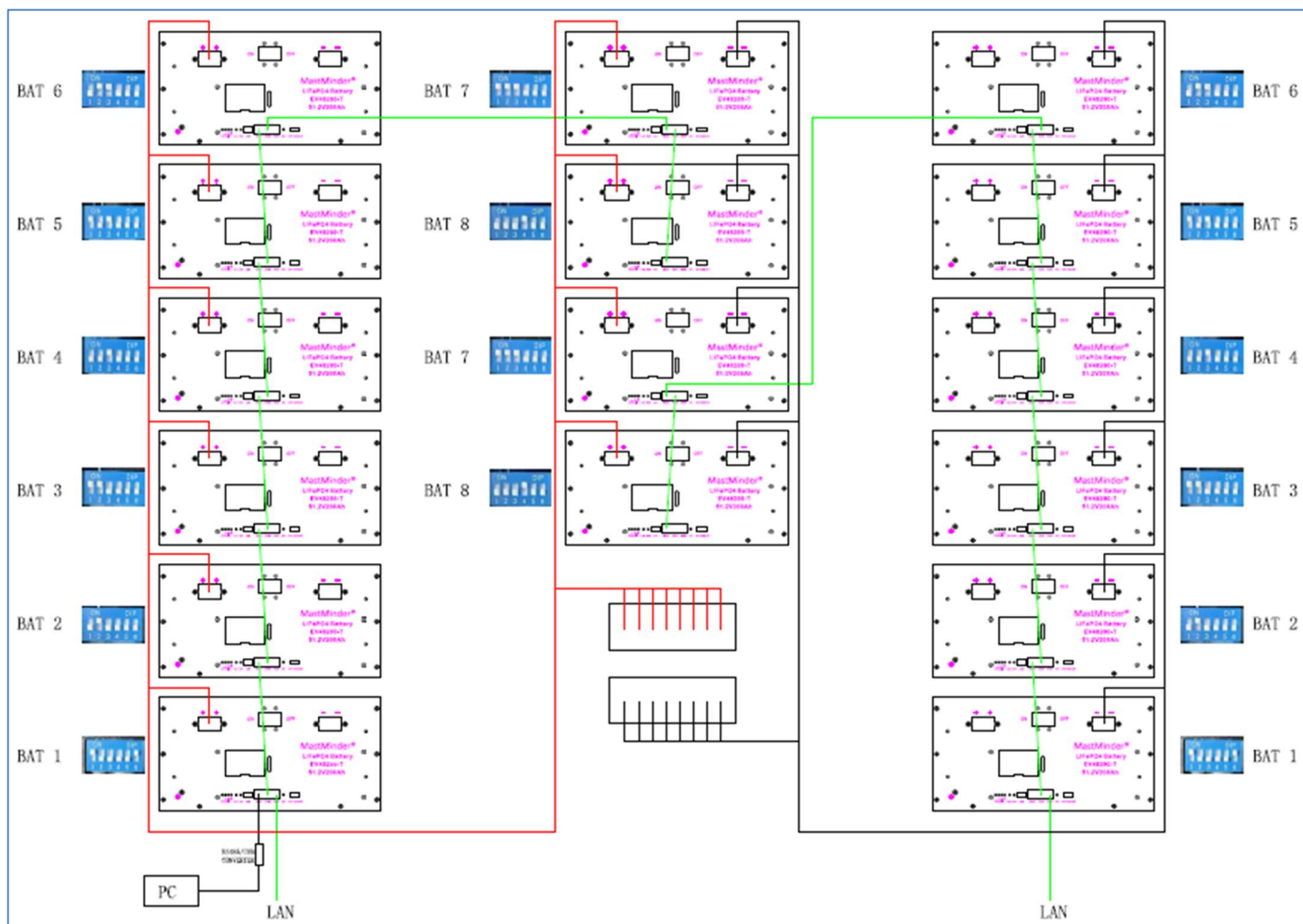
The external communication software running on a PC or other monitoring system will be communicating via the SNMP Port using a unique IP Address configured into the “Master” unit.

All the “Master” and “Slave” units are defined individually by the dip switch settings on each unit and these are also shown further below and additionally in the User Manual.

So, as an overview, in this scenario of 32 batteries, we have the following setup-

1. A total of 32 batteries, all in parallel, in a total of two cabinets.
2. 16 batteries in each of 2 separate cabinets.
3. 2 groups of 8 batteries per cabinet, making 4 groups in total
4. Each group has one Master unit and 7 Slave units.
5. Each group “Master” is configured with a unique IP Address for SNMP monitoring.
6. Therefore, each SNMP IP Address will view all the cell details of all 8 batteries within that group.
7. A total of 4 separate IP Addresses will need to be used to monitor all the individual cell details of all the 32 batteries.

Please refer to the drawing below to understand the wiring of both the DC Power cables and the RS485 communications between the modules.



Note that all the DC Positive and Negative power cables must be the same length to ensure that each battery has the same resistance to the Bus Bars.

The DC Positive and Negative power cables are shown by the Red & Black cables respectively in the above drawing.

Note also that this drawing showing one cabinet, shows the two groups of 8 units connected separately by the RS485 cables.

One group of 8 goes from BAT 1 to BAT 8 up the left-hand side and then down the centre, the other group of 8 goes from BAT 1 to BAT 8 up the right-hand side and then to the bottom two units in the centre.

The RS485 cable is shown by the Green cables.

The "Master" units will be BAT 1 on bottom left and BAT 1 on bottom right.

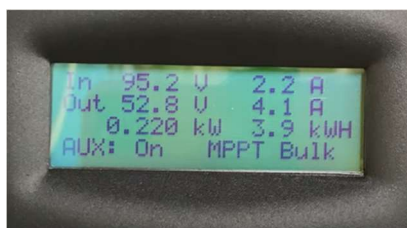
These will also be the SNMP IP connections for monitoring purposes.

Recommended battery parameters of controller

Nominal Characteristics	
Battery Model	MM48200-T
Nominal Voltage	51.2V
Nominal Capacity	200 Ah
Nominal Energy	10240 Wh
Electrical Characteristics	
Recommended Charging Voltage	56.0-56.0 V
Floating Charging Voltage	55-55.5 V
Recommended Charging Current	50 A-100A
Maximum Discharging Current	100 A
Discharging Cut-off Voltage	43.2 V
Working Voltage Range	43.2-58.4 V
Operating Conditions	
Cycle Life	≥3000 Cycles@100% DOD@25°C
Roundtrip Efficiency	≥98%
Operating Charge Temperature	0°C to +50°C
Operating Discharge Temperature	-20°C to +60°C
Storage Temperature	-20°C to +60°C
Mechanical Characteristics	
Length x Width x Height	483 x 550 x 220 mm
Weight	75 Kg
Terminal	M6
Optional Function	
Remote monitoring	SNMP
Anti-theft	Gyroscope

Below is a link explaining how to set Outback MX80 controller parameters for a 16-cell 51.2-volt LiFePO4 Lithium battery. Together with major screen shots for clarification.

<https://www.youtube.com/watch?v=wY6eZK0Wcdg>





To access the RS485 interface then use the USB to RS485 Converter and connector as provided below.
(Two sets of cables were provided with the shipment to Guyana).



Below is a link to download the RS485 Monitoring software.

<https://www.dropbox.com/s/e25tnstkw006ek/RS485%20Monitor.zip?dl=0>

(Also refer to “MastMinder Lithium Battery RS485 Monitor User Manual May 2023.pdf”.

To access the SNMP simply Browse to the IP Address you have set up in each Master unit.
(The SNMP IP Address would be set using the RS485 software above).