ENERGY TECHNOLOGIES
BUILD LIFE BETTER

RESIDENTIAL
BATTERY



MANA 16.0-1M1

Product Description

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01 TECHNICAL DATA

NOTE

Operating current derating according to the cell voltage and battery temperature.

More Usable Energy
Deep cycle DOD control

Flexible Investment
Up to 15 units in parallel

Safe & Reliable
Premium Lithium Iron Phosphate (LFP)

Easy Installation
Four wheels easy movement Floor stand

Quick Commissioning
One button ON/OFF Automatic ID assignment

Universal Compatibility
Compatible with major PCS brands

Auto aerosol fire extinguishing
Ultimate security, strengthen defenses



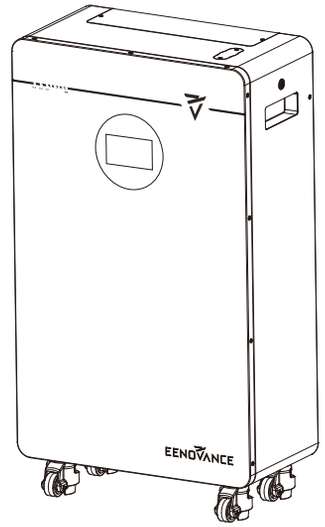
Datasheet

Model	MANA 16.0-1M1
Performance	
Cell Technology	LFP ($LiFePO_4$), Lithium Iron Phosphate
Nominal Voltage	51.2 Vdc
Nominal Capacity	314 Ah
Battery Usable Energy [1]	16076.8 Wh
Operating Voltage	44.8 - 56.16 Vdc
Nomianl Charge And Discharge Current	157 A
Max. Charge And Discharge Current	200 A
Communication	
Display	LCD display
Communication	CAN / RS485 / RS232 / Wi-Fi
General Specification	
Dimension (W×D×H)	485×245×785 mm 19.1×9.6×30.91 inch
Weight (kg)	122 kg (265.96 lbs)
Installation	Floor stand
Operating Temperature [2]	Charge: 0 to 55°C (32 to 131°F) Discharge: -20 to 55°C (-4 to 131°F)
Operating / Storage / Humidity	≤ 95%RH (No condensation)
Ingress Protection Rating	IP 20
Warranty Period	10 years
Scalability	Max 15 batteries in parallel
Standard Compliance	
Compliance	UN38.3 / IEC62619 / IEC61000 (More available upon request)

[1] Test conditions: 100% depth of discharge (DOD), 0.2C rate charge & discharge at 25°C.
[2] Charge/discharge derating occurs when the operating temperature is below 0°C or above 45°C.

02 PRODUCT OVERVIEW

2.1 Brief Introduction



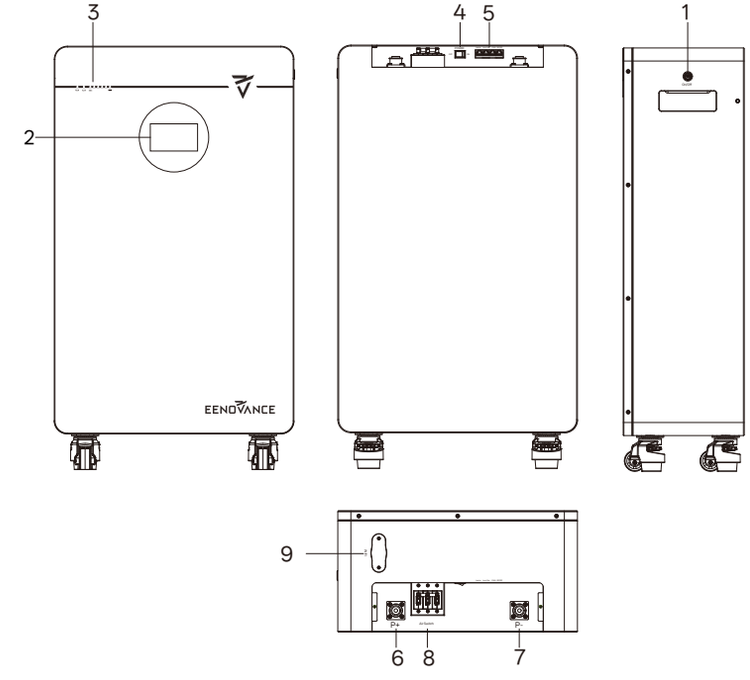
PRODUCT OVERVIEW

MANA 16.0-1M1 is a lithium battery with an operating voltage range of 44.8~56.16V.
It is designed for residential energy storage applications and is compatible with 48V battery hybrid inverter. MANA 16.0-1M1 is not suitable for supporting life-sustaining medical devices.

MANA 16.0-1M1 has built-in BMS (Battery Management System), which can manage and monitor cells information including voltage, current and temperature. Besides that, BMS can balance cells charging to extend cycle life. BMS has protection functions including over-discharge, over-charge, over-current and high / low temperature; the system can automatically manage the charge state, discharge state, and balance state.

Up to 15 MANA 16.0-1M1 can be connected in parallel to increase capacity and power.

2.2 Interface Introduction



Operation interface description:

Serial Number	Name	Description
1	ON/OFF button	Start-up switch
2	Touch-sensitive LCD display	Display battery information
3	Status indicator	Operation, alarm, and SOC status
4	Rocker switch	BMS switch
5	Communication port	Communication interface
6	Positive terminal	Total positive terminal
7	Negative terminal	Total negative terminal
8	Air Switch	Output switch
9	WiFi interface	Port for WiFi

2.2.1 CAN / RS485 Port

CAN / RS485 Communication terminal (RJ45 port) connects to inverter and operates using the CAN / RS485 protocol.

PIN	Definition
Pin 1, Pin 8	RS485-B (to Inverter, reserved)
Pin 2, Pin 7	RS485-A (to Inverter, reserved)
Pin 3	NC
Pin 4	CANH (to Inverter)
Pin 5	CANL (to Inverter)
Pin 6	GND

2.2.2 RS232 Port

RS232 terminal (RJ45 port) uses the RS232 protocol and is for manufacturer or engineer servicing or professional engineers to debug .

PIN	Definition
Pin 1, Pin 8	GND
Pin 2, Pin 7	RS232_TX
Pin 3, Pin 6	RS232_RX
Pin 4, Pin 5	NC

2.2.3 Link In/Link Out

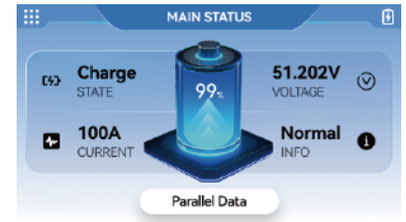
Link In/Link Out terminal (RJ45 port) is used for battery parallel communication.

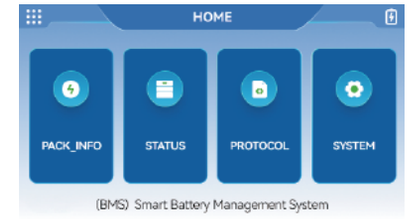
Link in	
Pin1	NC
Pin2, Pin7	RS485-A (Parallel communication)
Pin3, Pin6	RS485-B (Parallel communication)
Pin4	UP IN+ (Parallel address)
Pin5	UP IN- (Parallel address)
Pin8	GND

Link out	
Pin1	NC
Pin2, Pin7	RS485-A (Parallel communication)
Pin3, Pin6	RS485-B (Parallel communication)
Pin4	DN OP+ (Parallel address)
Pin5	DN OP- (Parallel address)
Pin8	GND

2.2.4 Function Description Of The Touch-Sensitive LCD Display

Upon powering on or tapping the display area, the system will enter the battery "MAIN STATUS" page. Click the icon in the upper left corner to access the "Home" page, and click the icon in the upper right corner to return to the "MAIN STATUS" page. The two main interfaces are illustrated as follows.





Icon Function Description:

Parallel Data:

Access the summary data page to display aggregated information of paralleled batteries; only shows information for a single battery when operating individually.

PACK_INFO:

Access the battery information page to display overall battery data, including detailed cell voltage and cell temperature information.

STATUS:

Access the battery status information page to display protection and fault details. Items under protection or fault conditions are highlighted in red.

PROTOCOL:

Access the protocol page to view the current protocol. Tap the current protocol to view the protocol list and modify selections.

SYSTEM:

The system information page displays the battery pack SN code, BMS software version number, and allows switching between Chinese and English language modes.

Sleep mode The screen will enter screen-off sleep standby mode after 2 minutes of no touchscreen interaction or power cycle activity. Tap the screen or perform a power cycle to wake the device.

Sleep mode

Under normal operating conditions, the system will enter sleep mode after one minute of no key operation.

In the sleep mode state, the display will activate when any button is pressed.

2.2.5 LED Indicator Definition

Note:
flash 1- 0.25s light / 3.75s off
flash 2- 0.5s light / 0.5s off
flash 3- 0.5s light / 1.5s off

LED Indicators Instructions

		RUN	ALM	Battery Level Indicator						
Status		L8	L7	L6	L5	L4	L3	L2	L1	Descriptions
Shut down		OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All OFF
Standby		Flash 1	OFF	According to the battery level						Indicates Standby
Charging	Normal	Light	OFF	According to the battery level						The highest capacity indicator LED flashes(flash 2), others lighting
	Full Charged	Light	OFF	Light	Light	Light	Light	Light	Light	Turn to standby status when charger off
	Protection	OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
Discharge	Normal	Flash 3	OFF	According to the battery level						
	UVP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
	Protection	OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharge
Fault		OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging and discharge

Charging Battery Level Indicators Instructions

Status		Charging							
Battery Level Indicator		L8	L7	L6	L5	L4	L3	L2	L1
Battery Level (%)	0~17%	Light	OFF	OFF	OFF	OFF	OFF	OFF	Flash 2
	18~33%			OFF	OFF	OFF	OFF	Flash 2	Light
	34~50%			OFF	OFF	OFF	Flash 2	Light	Light
	51~66%			OFF	OFF	Flash 2	Light	Light	Light
	67~83%			OFF	Flash 2	Light	Light	Light	Light
	84~100%			Flash 2	Light	Light	Light	Light	Light
	Full Charged			Light	Light	Light	Light	Light	Light

Discharging Battery Level Indicators Instructions

Status		Discharge							
Battery Level Indicator		L8	L7	L6	L5	L4	L3	L2	L1
Battery Level (%)	0~17%	Flash 3	OFF	OFF	OFF	OFF	OFF	OFF	Light
	18~33%			OFF	OFF	OFF	OFF	Light	Light
	34~50%			OFF	OFF	OFF	Light	Light	Light
	51~66%			OFF	OFF	Light	Light	Light	Light
	67~83%			OFF	Light	Light	Light	Light	Light
	84~100%			Light	Light	Light	Light	Light	Light

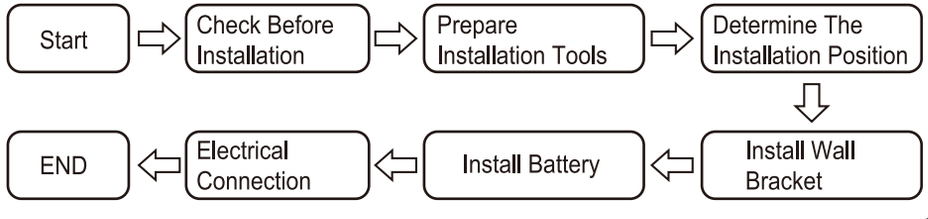
Protection Fault Indicators Instructions

Status	Protection Fault							
Status Battery Level Indicator	L8	L7	L6	L5	L4	L3	L2	L1
Battery Level(%)			84~100%	67~83%	51~66%	34~50%	18~33%	0~17%
Cell failure	OFF / Light	Light	OFF	OFF	OFF	OFF	OFF	OFF
NTC failure			Light	OFF	OFF	OFF	OFF	OFF
Precharge failure			OFF	Light	OFF	OFF	OFF	OFF
Short circuit fault			Light	Light	OFF	OFF	OFF	OFF
Charging MOS failure			OFF	OFF	Light	OFF	OFF	OFF
Discharge MOS fault			Light	OFF	Light	OFF	OFF	OFF
Precharge failure			OFF	Light	Light	OFF	OFF	OFF
Total negative contact failure			Light	Light	Light	OFF	OFF	OFF
Overvoltage protection of charging cells			OFF	OFF	OFF	Light	OFF	OFF
Overall charging overvoltage protection			Light	OFF	OFF	Light	OFF	OFF
Charging overcurrent protection			OFF	Light	OFF	Light	OFF	OFF
Discharge cell undervoltage protection			Light	Light	OFF	Light	OFF	OFF
Discharge overall undervoltage protection			OFF	OFF	Light	Light	OFF	OFF
Discharge overcurrent protection			Light	OFF	Light	Light	OFF	OFF
Charging high-temperature protection			OFF	Light	Light	Light	OFF	OFF
Charging low-temperature protection			Light	Light	Light	Light	OFF	OFF
High-temperature protection for discharge			OFF	OFF	OFF	OFF	Light	OFF
Discharge low-temperature protection			Light	OFF	OFF	OFF	Light	OFF
MOS tube high-temperature protection			OFF	Light	OFF	OFF	Light	OFF
Environmental low-temperature protection			Light	Light	OFF	OFF	Light	OFF
Ambient high-temperature protection			OFF	OFF	Light	OFF	Light	OFF

Notes:
1. In normal operation the ALM fault lamp is off and the the SOC lamp is indicates power. When a fault occurs, the ALM lamp turn on and the SOC lamp is displays as the fault code (in priority order from low light), if multiple protection faults exist, the RUN lamp will also remain on.

03 INSTALLATION GUIDE

Installation flow chart



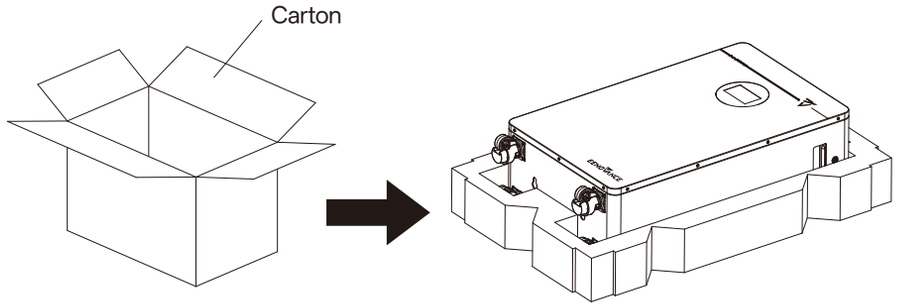
3.1 Checking Before Installation

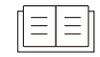
3.1.1 Checking Outer Packing Materials

Packing materials and components may be damaged during transportation.Before installing the battery pack check the outer packing for damage such as holes and cracks. Checking the surface of packing materials for damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer immediately.It is recommended to remove the packing materials within 24 hours before installing the battery.

3.1.2 Checking Deliverables

After unpacking the battery, check the deliverables are intact and complete. If any damage or missing component is found contact the dealer.
The table below lists the components and mechanical parts that should be included.



NO.	Pictures	Quantity	Description
1		1PCS	Battery
2		1PCS	Power Cable 1
3		1PCS	Power Cable 2
4		1PCS	PE Cable
5		1PCS	Communication Cable
6		2PCS	M6*60 Expansion bolts
7		4PCS	M6*12 bolts
8		2PCS	Wall lock fittings
9		1PCS	Top cover
10		4PCS	M4*8 Countersunk screw
11		1PCS	User manual
12		1PCS	Test report
13		1PCS	QC certificate

3.2 Tools

Model	Tools		
Installation	Knife 	Measuring tape 	Socket wrench （10/16mm） 
	Rubber mallet 	Cross screwdriver 	Hammer drill （8mm） 
Protection	ESD gloves 	Safety goggles 	Anti-dust respirator 
	Safety shoes 		

3.3 Installation Requirements

3.3.1 Installation Environment Requirements

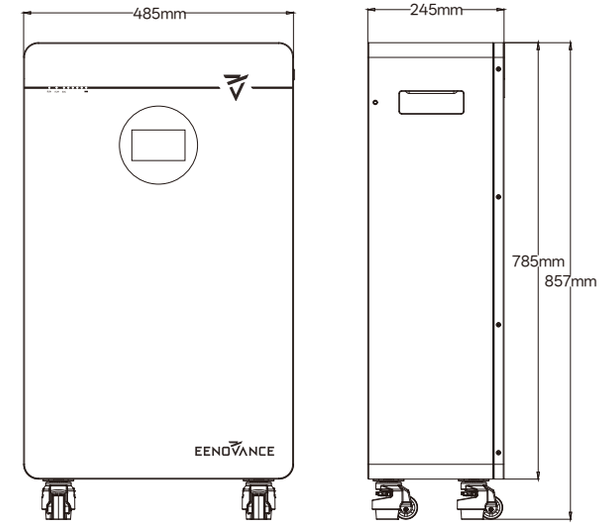
- Install the battery in the indoor environment.
- Place battery in secure location away from children and animals.
- Do not place the battery near any heat sources and avoid sparks.
- Do not expose the battery to moisture or liquids.
- Do not expose the battery to direct sunlight.

3.3.2 Installation Carrier Requirements

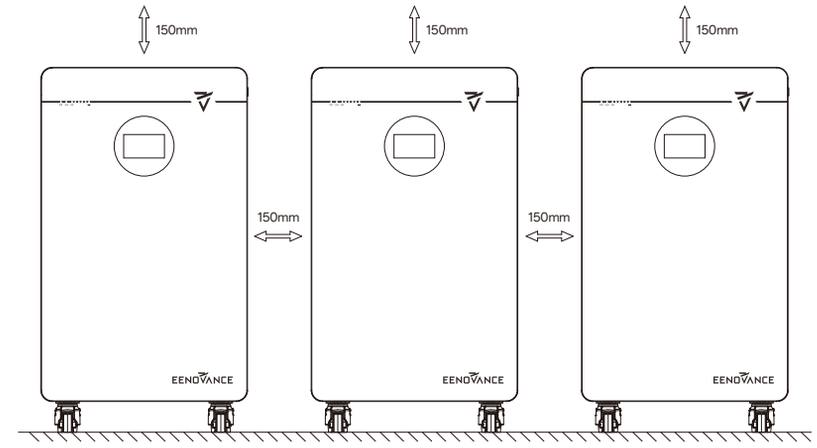
- Install the battery only on fire resistant structures. Do not install batteries on flammable buildings.
- Battery is quite heavy, make sure the wall/ground can meet the load bearing requirements.

3.4 Installation Instructions

3.4.1 Dimensions



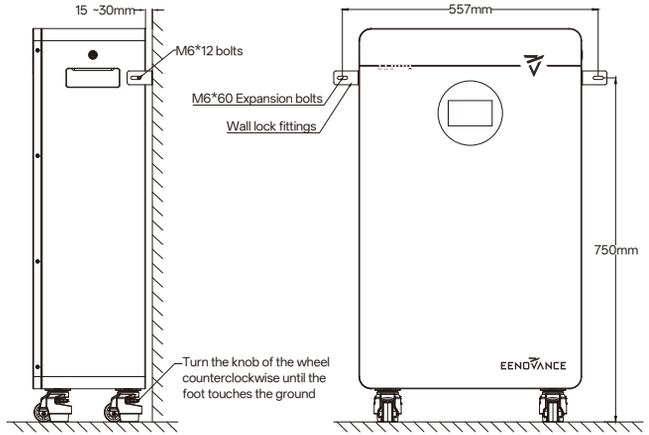
Minimum mounting distance between battery pack and equipment:



3.4.2 Installation Procedure

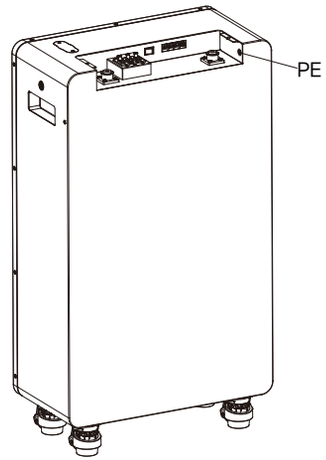
STEP 1

Drill the hall with a 10mm drill bit according to the dimension shown in the figure.
Then install the wall-mount fittings. Finally secure the battery box to the to the wall and ensure the supporting wheel feet are properly positioned.



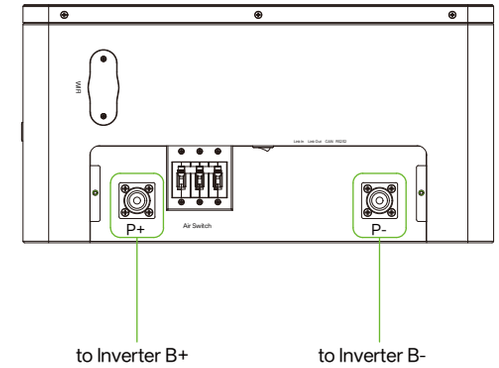
STEP 2

Connect to ground.



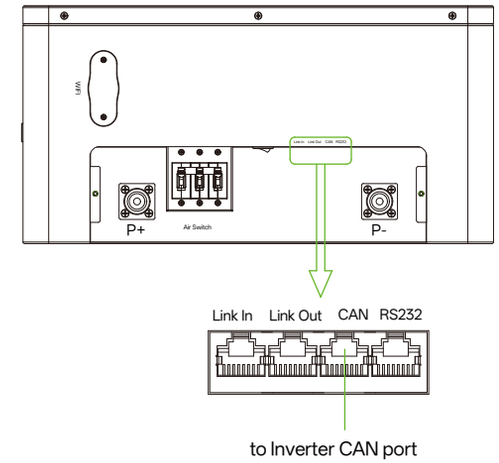
STEP 3

Connect power cable.



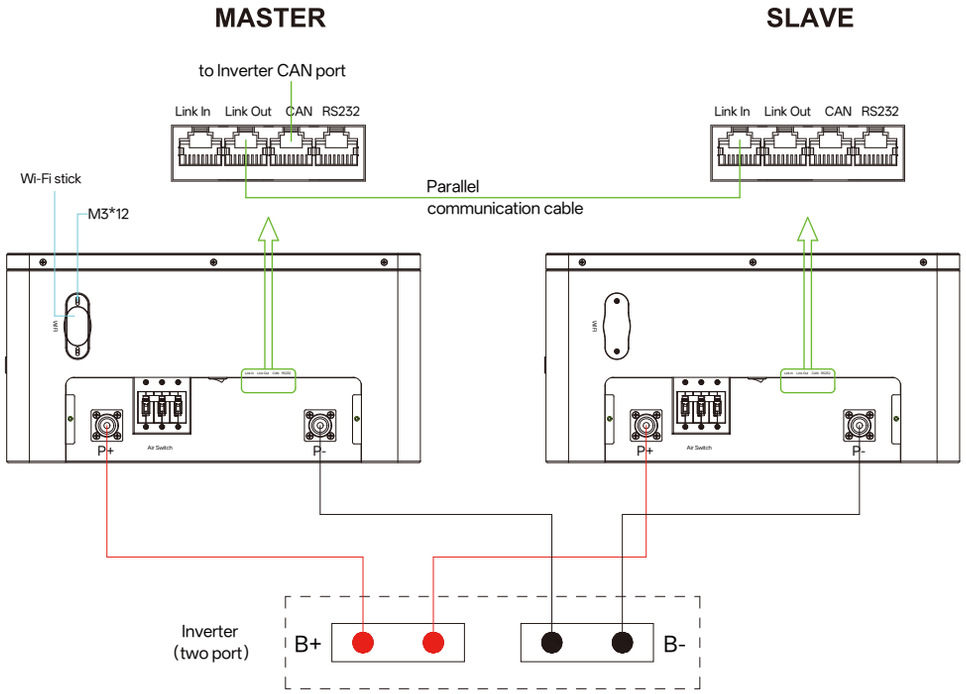
STEP 4

Connect communication cable.



STEP 5

When connecting multiple batteries in parallel, use the wiring method shown below, and then install a Wi-Fi stick on the host unit.



3.4.3 Power On/Off The Battery

1. Power ON

For a single MANA 16.0-1M1, switch on the rocker switch and then press and hold ON / OFF button for more than 3 seconds. LED will flash and the battery will begin normal operation. Indicators L1 to L6 displays battery SOC, while L7/L8 displays battery status, and the LCD display will enter the "MAIN STATUS" page.

For multiple MANA 16.0-1M1 in parallel, switch on the rocker switch of all batteries, and press and hold ON / OFF button on the master battery for more than 3 seconds, LED will flash, the battery system will automatically encode and assign ID to each slave battery, then the battery system will then begin normal operation, and the LCD display of all batteries will enter the "MAIN STATUS" page.

2. Power OFF

Press the ON / OFF button of the master battery more than 3 seconds and then release the button, the master battery will shut down after all slave batteries enter the sleep mode.

For a single MANA 16.0-1M1, simply switch off the rocker switch.

For multiple MANA 16.0-1M1 in parallel, switch off the rocker switch of all slave batteries first. Then switch off the rocker switch of the master battery.

04 MAINTENANCE

4.1 Recharge Requirements During Normal Storage

Battery should be stored in an environment with temperature range between -10°C ~ +45°C, and maintained regularly according to following table with 0.5C (157A) current till 40% SOC after long storage time.

Recharge Conditions When in Storage

Storage Environment Temperature	Relative Humidity of Storage Environment	Storage Time	SOC
Below-10°C	/	prohibit	/
-10~25°C	5%~70%	≤12 months	30% ≤SOC≤60%
25~35°C	5%~70%	≤6 months	30% ≤SOC≤60%
35~45°C	5%~70%	≤3 months	30%≤SOC≤60%
Above 45°C	/	prohibit	/

4.2 Recharge Requirements When Over Discharged

The over-discharged (90% DOD) battery should be recharged according to the following table, otherwise the over-discharged battery will be damaged.

Recharge Conditions When Battery is Over Discharged

Storage Environment Temperature	Storage Time	Note
-10~25°C	≤15 days	Battery Pack disconnected from Inverter
25~35°C	≤7 days	
-10~45°C	<12 hours	Battery Pack connected to Inverter

05 DISPOSAL OF THE BATTERY SYSTEM

Disposal of the battery must comply with the local applicable disposal regulations for electronic waste and used batteries.

- Do not dispose of the battery system with your household waste.
- Avoid exposing the batteries to high temperatures or direct sunlight.
- Avoid exposing the batteries to high humidity or corrosive atmospheres.