

SMORSN

MSB Series Lithium-Iron Battery



Manual

Ver20220501

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SMORSN

This manual introduces MSB Series Lithium Iron Battery from SMORSN, Please read this manual before you install the battery and follow the instruction carefully during the installation. Any confusion, you can contact SMORSN for advice.

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1. Safety Precautions



Reminding

- 1) It is very important and necessary to read the user manual carefully (in the accessories) before installing or using battery .Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock ,serious injury ,or death,or can damage battery ,potential rendering it inoperable .
- 2) If the battery is stored for a long time ,it is required to charge them every six months ,and the soc should be no less than 90% .
- 3) Battery needs to be recharged within 12 hours, after fully discharged .
- 4) Do not expose cable outside .
- 5) All the battery terminals must be disconnected for maintenance .
- 6) Please contact the supplier within 24 hours if there is something abnormal .
- 7) Do not use cleaning solvents to clean battery .
- 8) Do not expose battery to flammable or harsh chemicals or vapors .
- 9) Do not paint any part of battery ,include any internal or external components .
- 10) Do not connect battery with PV solar wiring directly .
- 11) The warranty claims are excluded for direct or indirect damage due to items above .
- 12) Any foreign object is prohibited to insert into any part of battery .



Warning

1.1 Before Connecting

- 1) After unpacking, please check product and packing list first ,if the product is damaged or lack of parts ,please contact with the local retailer .
- 2) Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode .
- 3) Wiring must be correct, do not mistake the positive and negative cables ,and ensure no short circuit with the external device .
- 4) It is prohibited to connect the battery and AC power directly .
- 5) With embedded BMS in battery. ECO series battery can be connected in series to 48V or 24V. Wall-mounted / Free-standing series is **not** allowed to be used in series.
- 6) Battery system must be well grounded and the resistance must be less than 1 Ω .
- 7) Please ensure the electrical parameters of battery system are compatible to related equipment.
- 8) Keep the battery away from water and fire .

1.2 In Using

- 1) If the battery system needs to be moved or repaired ,the power must be cut off and the battery is completely shutdown .
- 2) It is prohibited to connect the battery with different type of battery .
- 3) It is prohibited to put the battery working with faulty or incompatible inverter .
- 4) It is prohibited to disassemble the battery (QC tab removed or damaged) .
- 5) In case of fire ,only dry powder fire extinguisher can be used ,liquid fire extinguishers are prohibited .
- 6) Please do not open, repair or disassemble the battery except staffs from SMORSN or authorized by SMORSN. We will not undertake any consequences or related responsibility which is because of violation of safety operation or violating of design ,production and equipment safety standards .

2. Introduction

MSB series lithium iron battery is one of new energy storage products developed and produced by SMORSN, it can be used to support reliable power for various types of equipment and system, it is especially suitable for application scene of high power, limited installation space, restricted load-bearing and long cycle life.

MSB series has built-in BMS battery management system, which can manage and monitor cells information including voltage, current and temperature. What's more, BMS can balance cells charging and discharging to extend cycle life.

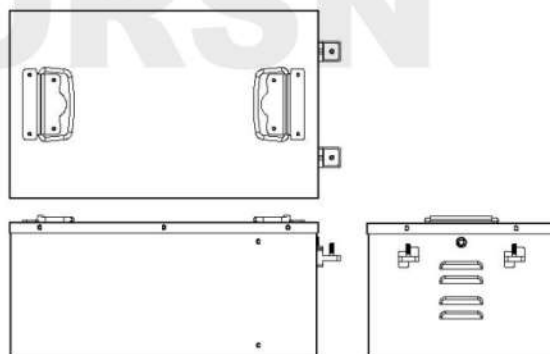
Multiple batteries can be connected in parallel to expand capacity and power in parallel for larger capacity and longer power supporting duration requirements.

2.1 features:

- ◆ The whole module is non-toxic, non-polluting and environmentally friendly.
- ◆ Cathode material is made from LiFePO_4 with safety performance and long cycle life.
- ◆ Battery management system (BMS) has protection functions including over-discharge, over-charge, over-current and high/low temperature.
- ◆ The system can automatically manage charge and discharge state and balance current and voltage of each cell.
- ◆ Flexible configuration, multiple battery modules can be in parallel for expanding capacity and Power.
- ◆ Adopted self-cooling mode would rapidly reduce system entire noise.
The module has less self-discharge, up to 6 months without charging it on shelf, no memory effect, excellent performance of shallow charge and discharge.
- ◆ Working temperature range is from -10°C to 50°C , (charge $0^{\circ}\text{C} \sim 50^{\circ}\text{C}$, discharge $-10^{\circ}\text{C} \sim 50^{\circ}\text{C}$) with excellent discharge performance and cycle life.
- ◆ Small size and light weight, ECO/wall-mounted/free-standing and standard of rack-mounted series designed module are comfortable for installation and maintenance.

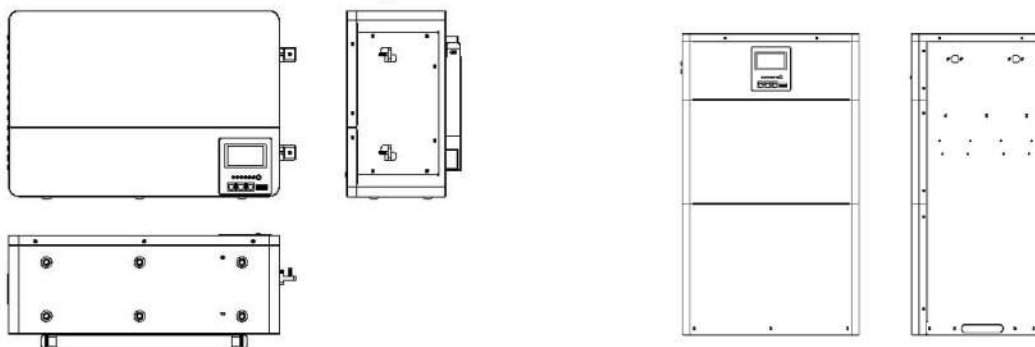
2.2 Specifications:

ECO series



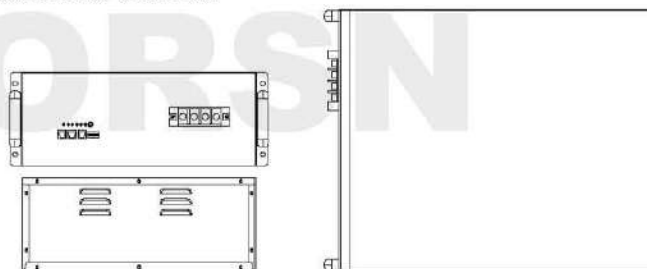
Basic parameters	12.8V100AH	12.8V150AH	12.8V200AH	25.6V100AH	25.6V200AH	51.2V100AH
Nominal voltage	12.8Vdc			25.6Vdc		51.2Vdc
Nominal capacity	1280Wh	1920Wh	2560Wh	2560Wh	5120Wh	5120Wh
Discharge voltage	11.2~14.6Vdc			22.4~29.2Vdc		44.8~58.4Vdc
Charge voltage	13.8~14.4Vdc			27.6~28.8Vdc		55.2~57.6Vdc
Max. CHG. current	100A	100A	150A	100A	150A	100A
Max. DISC. current	100A	150A	150A	100A	150A	100A
Peak DISC. current	200A(30 sec.)					
LED Display	LED status indicator					
communication	RS485 , RS232 , CAN(optional)					
Working temperature	charge 0℃~ 50℃ ,discharge -10℃~ 50℃					
Shelf temperature	-20℃~60℃					
certification	UN38.3 , CB(IEC62619) , CE					

Wall-mounted/Free-standing series



Basic parameters	25.6V100AH	25.6V150AH	25.6V200AH	51.2V100AH	51.2V150AH	51.2V200AH
Nominal voltage	25.6Vdc			51.2Vdc		
Nominal capacity	2560Wh	3840Wh	5120Wh	5120Wh	7680Wh	10.24KWh
Discharge voltage	22.4~29.2Vdc			44.8~58.4Vdc		
Charge voltage	27.6~28.8Vdc			55.2~57.6Vdc		
Max. CHG. current	100A	100A	150A	100A	100A	150A
Max. DISC. current	100A	150A	150A	100A	150A	150A
Peak DISC. current	200A(30 sec.)					
LED Display	LED status indicator					
communication	RS485 , RS232 , CAN(optional)					
Working temperature	charge 0℃~ 50℃ ,discharge -10℃~ 50℃					
Shelf temperature	-20℃~60℃					
certification	UN38.3 , CB(IEC62619) , CE					

19-inch 4U Rack-mounted series

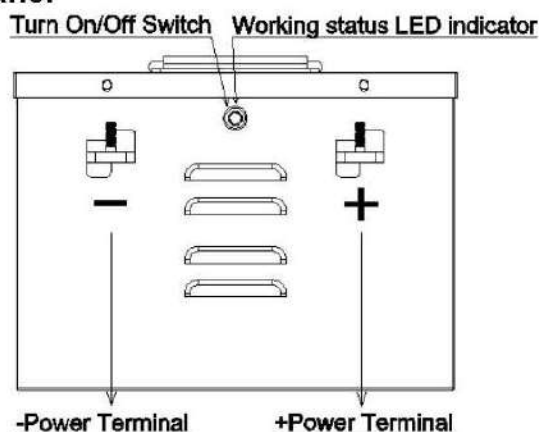


Basic parameters	51.2V100AH	51.2V150AH	51.2V180AH	51.2V200AH
Nominal voltage	51.2Vdc			
Nominal capacity	5120Wh	7680Wh	9216Wh	10.24KWh
Discharge voltage	44.8~58.4Vdc			
Charge voltage	55.2~57.6Vdc			
Max. CHG. current	100A	100A	150A	150A
Max. DISC. current	100A	150A	150A	150A
Peak DISC. current	200A(30 sec.)			
LED Display	LED status indicator			
communication	RS485 , RS232 , CAN(optional)			
Working temperature	charge 0℃~ 50℃ ,discharge -10℃~ 50℃			
Shelf temperature	-20℃~60℃			
certification	UN38.3 , CB(IEC62619) , CE			

2.3 Equipment Interface Instruction

This section details the front and back panel of the interface function .

ECO series battery Front panel



Turn On/Off Switch

(12Vdc series) If there is no input or output current, press this switch for 3 seconds and then release it quickly. The blue LED light will turn off. After hearing the ticking sound, the battery voltage output will be turned off. After pressing the switch, the battery pack will re-enter the working mode.

(24Vdc and 48Vdc series) If there is no input or output current, continuously touch this switch for 10 times. The blue LED light will turn off. After hearing the ticking sound, the battery voltage output will be turned off. After touching the switch, the battery pack will re-enter the working mode.

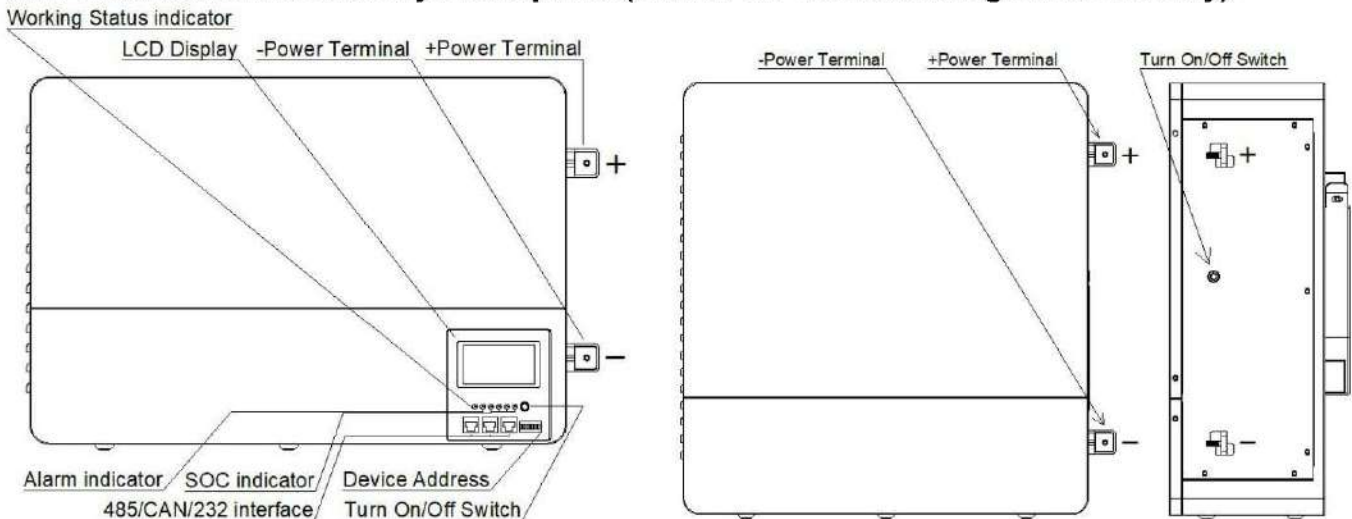
Work status LED indicator

Run: Please touch this switch when you receive the lithium battery pack. The blue LED light will always be turned on, and the battery voltage will be output by the red and black terminals. When the battery pack SOC is less than 20%, the blue LED light will flash and the battery pack needs to be charged immediately.

Power Terminal

There is one pair of terminals, Red is battery positive pole, Black is battery negative pole.

Wall-mounted series battery Front panel (similar as Free-standing series battery)



Working Status indicator

Run: Yellow LED lighting to show the battery is charging, and fast flashing to show the battery is discharging, and slow flashing to show the battery is standby status.

LCD Display

52.88V	0.00A	Chg: On	Dsg: On	B1: 3.30	B2: 3.30
37.04Ah	37%	Max B7:	3.310V	B3: 3.30	B4: 3.30
31 32 31 °C		Min B3:	3.300V	B5: 3.30	B6: 3.30
Holding voltage		Cycles:	00	B7: 3.31	B8: 3.30
B9: 3.30	10: 3.30	End chg:	3.650V	Bat strings: 16	
11: 3.30	12: 3.30	Ret chg:	3.450V	Fullcap: 100.00AH	
13: 3.30	14: 3.30	End dsg:	2.500V	ZeroCur: 0.266A	
15: 3.30	16: 3.30	Ret dsg:	2.700V		

Power Terminal

There is one pair of terminals, Red is battery positive pole, Black is battery negative pole.

Alarm indicator

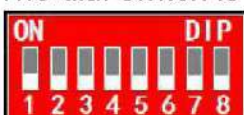
Alarm: Red LED flashing to show the battery has alarm.

SOC indicator

Capacity: Green LEDs to show the battery's current capacity 25% 50% 75% 100%.

Device Address

The dial switch is used to set the address of each BMS protection board.



485/CAN/232 interface

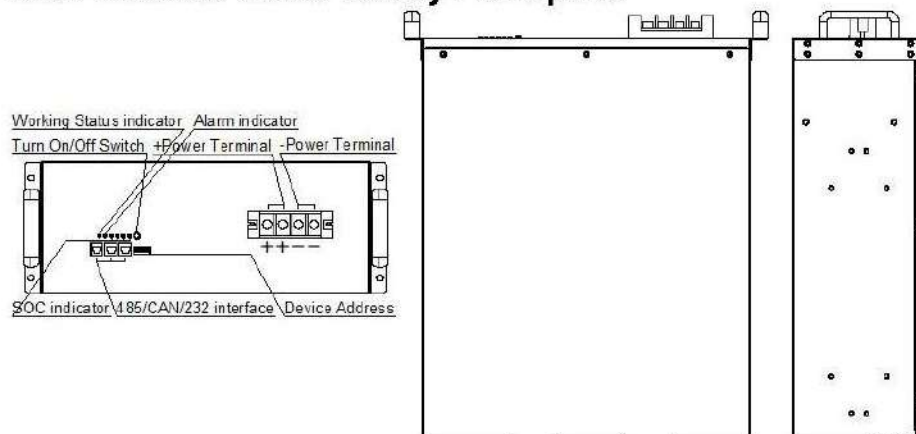
485 Communication follow RS485 protocol.
CAN Communication follow CAN protocol.
232 Communication follow RS232 protocol.

Turn On/Off Switch

(24Vdc and 48Vdc series) If there is no input or output current, continuously touch this switch for 10 times. The blue LED light will turn off. After hearing the ticking sound, the battery voltage output will be turned off. After touching the switch, the battery pack will re-enter the working mode.

If there is a built-in display screen, the button can turn the page to inquire the working status information of the lithium battery.

19-inch 4U Rack-mounted series battery Front panel



Working Status indicator

Run: Yellow LED lighting to show the battery is charging, and fast flashing to show the battery is discharging, and slow flashing to show the battery is standby status.

Alarm indicator

Alarm: Red LED flashing to show the battery has alarm.

Turn On/Off Switch

(48Vdc series) If there is no input or output current, continuously touch this switch for 10 times. The blue LED light will turn off. After hearing the ticking sound, the battery voltage output will be turned off. After touching the switch, the battery pack will re-enter the working mode.

If there is a built-in display screen, the button can turn the page to inquire the working status information of the lithium battery.

Power Terminal

There is one pair of terminals, Red is battery positive pole, Black is battery negative pole.

SOC indicator

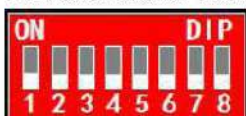
Capacity: Green LEDs to show the battery's current capacity 25% 50% 75% 100%.

485/CAN/232 interface

485 Communication follow RS485 protocol.
CAN Communication follow CAN protocol.
232 Communication follow RS232 protocol.

Device Address

The dial code switch is used to set the address of each BMS protection board.

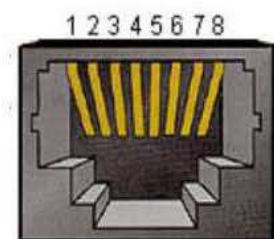


Dial code switch position								Address	Instruction
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	0	0	No cascade, use single
1	0	0	0	0	0	0	0	1	Set to Pack1
0	1	0	0	0	0	0	0	2	Set to Pack2
1	1	0	0	0	0	0	0	3	Set to Pack3
0	0	1	0	0	0	0	0	4	Set to Pack4
1	0	1	0	0	0	0	0	5	Set to Pack5
0	1	1	0	0	0	0	0	6	Set to Pack6
1	1	1	0	0	0	0	0	7	Set to Pack7
0	0	0	1	0	0	0	0	8	Set to Pack8
...
0	1	1	1	1	1	1	1	254	Set to Pack254
1	1	1	1	1	1	1	1	255	Set to Pack255

LED INDICATORS INSTRUCTIONS

State	Nominal/Warning Protection	Run	Alarm	Capacity Indicators LED				Instruction
		●	●	●	●	●	●	
Shut down	Dormancy	OFF	OFF	OFF	OFF	OFF	OFF	All OFF
Standby	Nominal	Slow flash	OFF	Follow battery capacity				Standby
	Warning	Slow flash	flash					Battery at low voltage
Charge	Nominal	ON	OFF	Follow battery capacity				The LED Light of the highest capacity flashing
	Warning	ON	flash					
	Over charge	ON	flash	ON	ON	ON	ON	Stop charging
	Over current, Over temperature	OFF	ON	Follow battery capacity				Stop charging
Discharge	Nominal	Fast flash	OFF	Follow battery capacity				
	Warning	Fast flash	flash					
	Over discharge	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging
	Over current, Over temperature	OFF	ON	OFF	OFF	OFF	OFF	Stop discharging
Disable		OFF	ON	OFF	OFF	OFF	OFF	Stop charging and discharging

Pin	Definition
PIN 1	TXD
PIN 2	RXD
PIN 3	485-B
PIN 4	+12V (DC12V power supply input)
PIN 5	485-A
PIN 6	CAN-H
PIN 7	CAN-L
PIN 8	GND



X2 (RJ45) 端口

BMS FUNCTION

Protection and Alarm	Management and Monitor
Charge/Discharge End	Cells Balance
Charge Over Voltage	Intelligent Charge Model
Discharge Under Voltage	Charge/Discharge Current Limit
Charge/Discharge Over Current	Capacity Retention Calculate
High/Low Temperature(Cell/BMS)	Administrator Monitor
Short/Circuit	Operation Record
Power Cable Reverse	

3. Safe handling of lithium battery guide

3.1 Schematic Diagram of solution



3.2 Tools

The following tools are required to install the battery pack



Wire cutter



Crimping Modular Plier



Screw Driver

NOTE

Use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, cover the entire exposed metal surfaces of the available tools, except their tips, with electrical tape.

3.3 Safety Gear

It is recommended to wear the following safety gear when dealing with the battery back.



Insulated gloves



Safety goggles

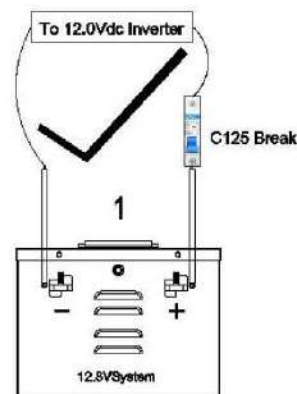
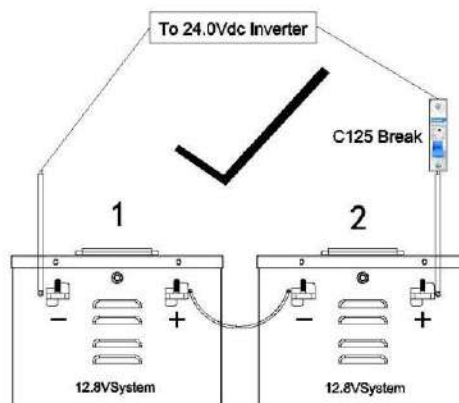
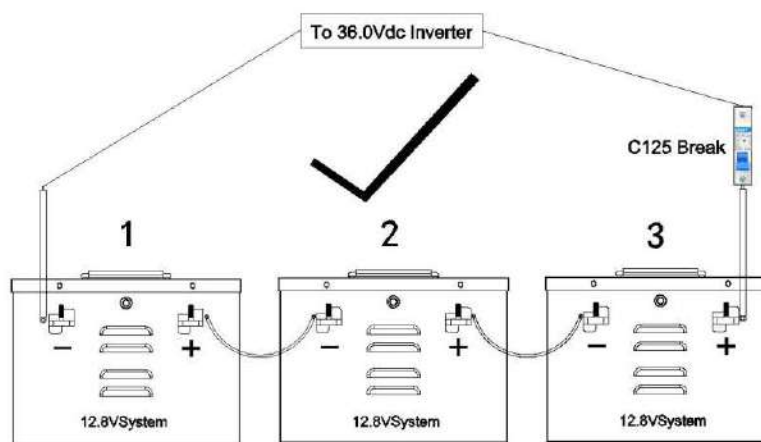
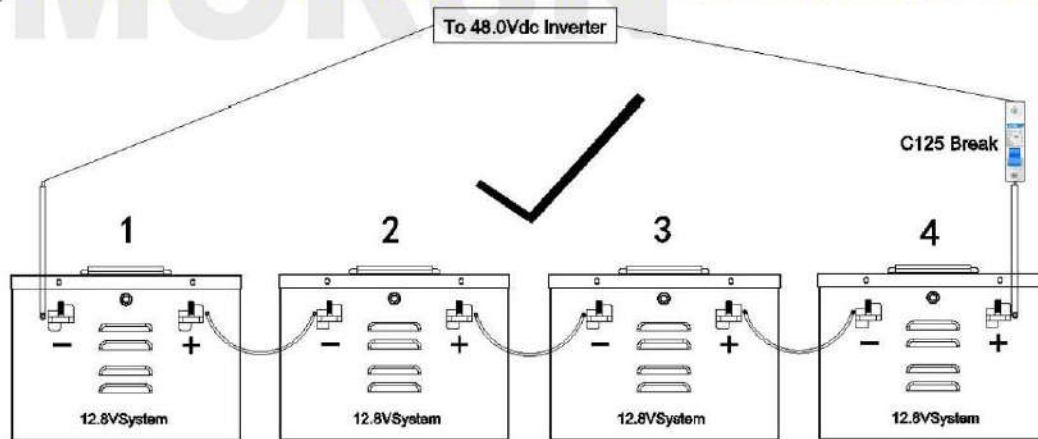


Safety shoes

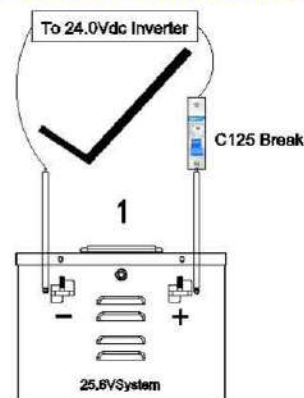
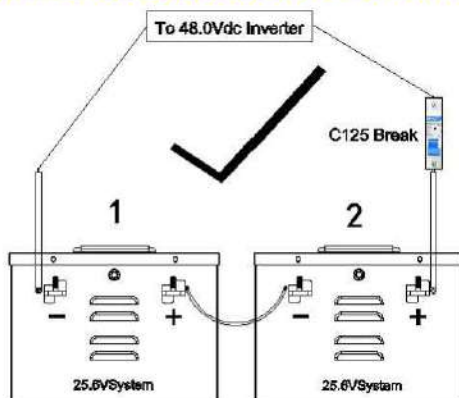
4. Installation

4.1 ECO series Battery connects to inverter

Notice: Maximum 4Pcs 12.8Vdc ECO series batteries can be connected in series to 48Vdc.

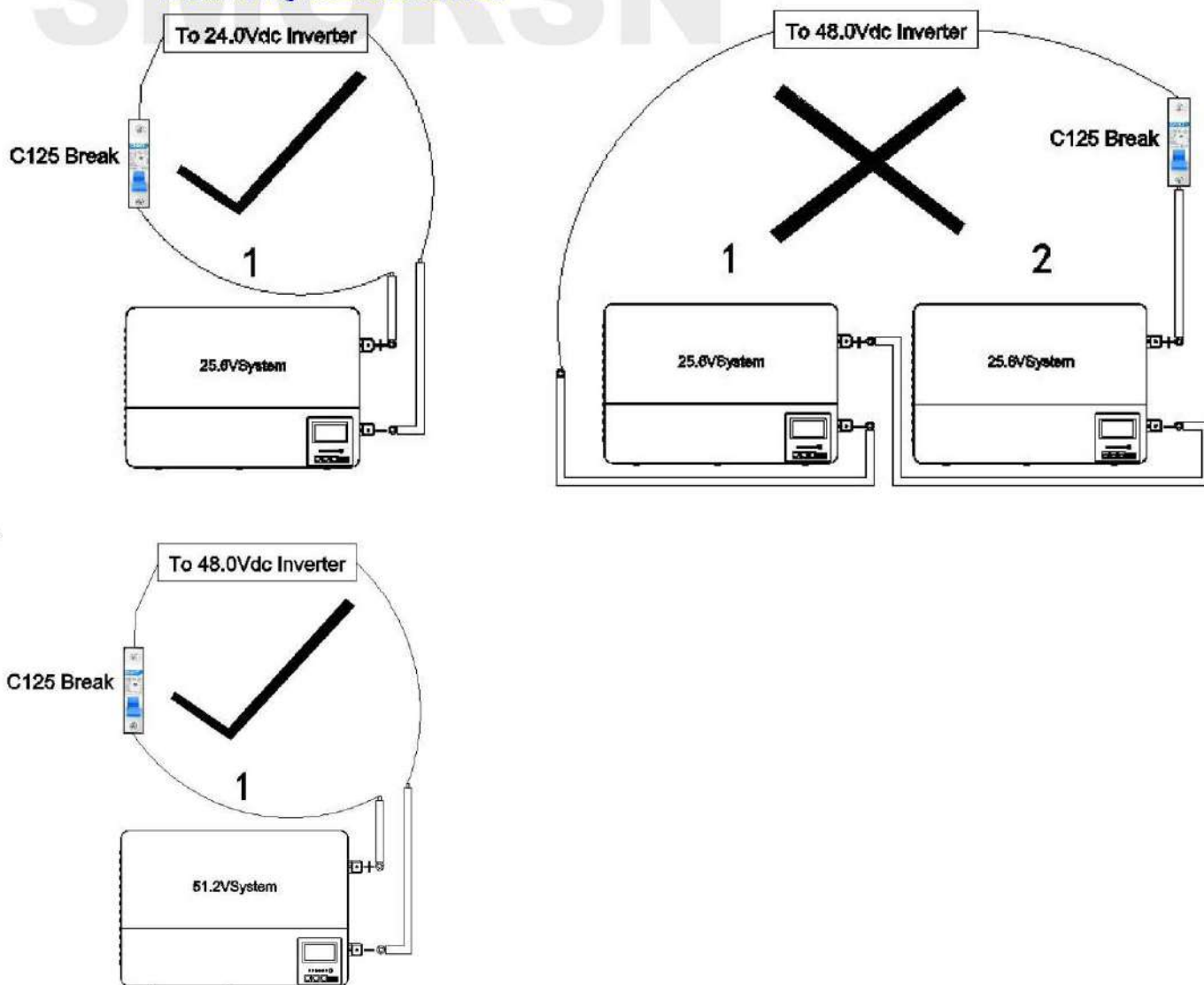


Notice: Maximum 2Pcs 25.6Vdc ECO series batteries can be connected in series to 48Vdc.



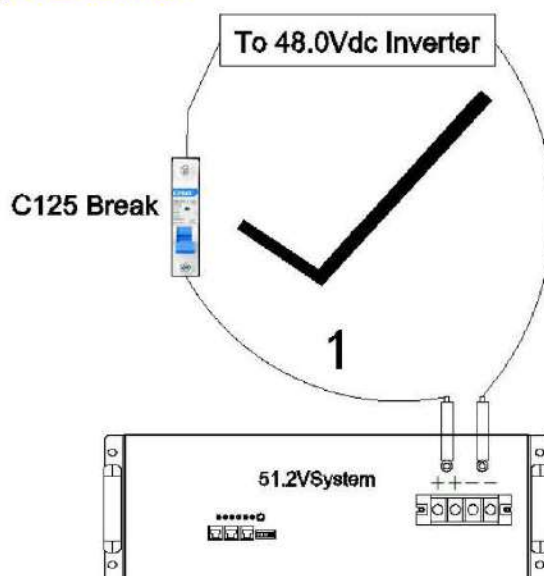
4.2 Wall-mounted / Free-standing series battery connects to inverter

Notice: Wall-mounted / Free-standing series battery is not allowed to be used in series. it can only be used alone.



4.3 19-inch 4U Rack-mounted battery connects to inverter

Notice: Rack-mounted series battery is not allowed to be used in series. it can only be used alone.



4.4 Installation Location

Make sure that the installation location meets the following conditions.

- ◆The area is completely water proof.
- ◆The floor is flat and level.
- ◆There are no flammable or explosive materials.
- ◆The ambient temperature is within the range from 0°C to 50°C.
- ◆The temperature and humidity is maintained at a constant level.
- ◆There is minimal dust and dirt in the area.



CAUTION

If the ambient temperature goes beyond the operation range, the battery will stop operation to protect itself. The optimal temperature range for the battery pack to operate is 0°C to 50°C .

Frequent exposure to harsh temperature may deteriorate the performance and life of the battery pack .

5. Trouble Shooting Steps

5.1 Problems determination based on:

- 1) Whether the battery can be turned on or not.
- 2) If battery is turned on, check whether the LED light is off, flashing or lighting.
- 3) If the LED light is off, check whether the battery can be charged/discharged or not.

5.2 Preliminary determination steps:

- 1) Battery cannot be turned on, switch on the lights are all no lighting or flashing.
If the battery external switch is on, the LED light is flashing, and the external power supply voltage is 48V or more, the battery still unable to be turned on, please contact distributor.
- 2) The battery can be turned on, but red light is lighting, and cannot charge or discharge. If the red light is lighting, that means system is abnormal, please check values as following:
 - a) Temperature: Above 50°C or under -10°C, the battery would not work.
Solution: to move battery to the normal operation temperature range between -10°C and 50°C.
 - b) Current: If current is greater than 150A, battery protection will turn on .
Solution: Check whether current is too large or not, if it is, to change the setting on power supply side.
 - c) High Voltage: If charging voltage above 14.6Vdc(12V system), 29.2Vdc(24V system), 58.4Vdc(48V system), battery protection will turn on.
Solution: Check whether voltage is too high or not, if it is, to change the setting on power supply side.
 - d) Low Voltage: When the battery discharges to 11.2Vdc(12V system), 22.4Vdc(24V system), 44.8Vdc(48V system) or less, battery protection will turn on.
Solution: Charge the battery for some time, the LED light turns off.

5.3 The battery cannot be charged or discharged

1) Cannot be charged:

Disconnect the power cables, measure voltage on power side, if the voltage is 12.8~13.5Vdc (12V system), 25.6~27.0Vdc(24V system), 51.2~54.0Vdc(48V system) ,restart the battery, connect the power cable and try again, if still not work, turn off battery and contact distributor.

2) Unable to discharge:

Disconnect the power cables and measure voltage on battery side, if it is under 44.5V, please charge the battery. If voltage is above 48V and still cannot discharge, turn off battery and contact distributor.

6. Emergency Situations

1) Leaking Battery

If the battery pack leaks electrolyte, avoid contacting with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below .

Inhalation: Evacuate the contaminated area, and seek medical attention.

Contact with eyes: Rinse eyes with flowing water for 15 minutes, and seek medical attention.

Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention.

Ingestion: Induce vomiting, and seek medical attention.

2) Fire

NO WATER! Only dry powder fire extinguisher can be used; if possible, move the battery pack to a safe area before it catches fire.

3) Wet battery

If the battery pack is wet or submerged in water, do not let people access it, and then contact SMORSN or an authorized dealer for technical support.

4) Damaged Battery

Damaged battery is dangerous and must be handled with the utmost care. They are not fit for use and may pose a danger to people or property. If the battery pack seems to be damaged pack it in its original container, and then return it to SMORSN or an authorized dealer.