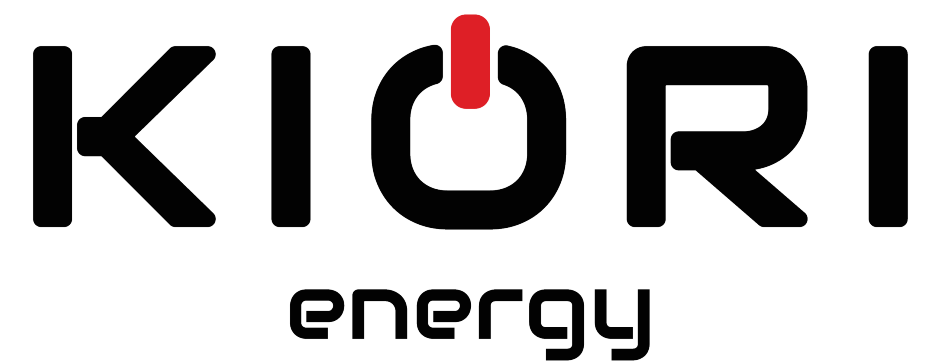
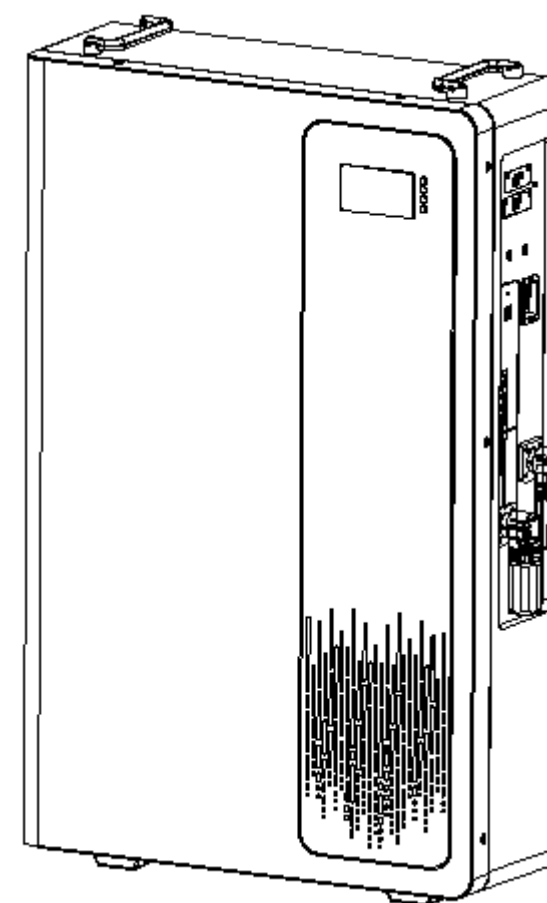




Lithium Battery Power Bank

Product Manual



This manual introduces 48VDC series energy storage battery,Please read this manual before you to install the battery and follow the instruction carefully during the installation .Any confusion ,please contact manufacturer immediately for advice and clarification .

Contents

1. SAFETY PRECAUTIONS -----1

1.1 Before Connecting -----1

1.2 In Using -----1

2. INTRODUCTION -----2

2.1 Features -----2

2.2 Specification -----2

2.3 Equipment interface instruction -----3

2.4 LCD display instruction-----5

3. SAFE HANDLING OF LITHIUM BATTERY GUIDE -----6

3.1 Schematic Diagram of solution -----6

3.2 Tools -----6

3.3 Safety Gear -----6

4. INSTALLATION -----7

4.1 One set Lithium battery product connects to inverter -----7

4.2 Multiple sets ofLithium battery product connects to inverter-----7

4.3 Installation Location-----7

5. TROUBLE SHOOTING STEPS -----8

5.1 Problem determination based on -----8

5.2 Preliminary determination steps -----8

5.3 The battery can not be charged or discharged -----9

6. EMERGENCY SITUATIONS -----9

6. Emergency Situations

1) Leaking Battery

If the battery pack leaks electrolyte, avoid contact 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 SAKO or an authorized dealer for technical support.

4) Damaged Battery

Damaged battery are 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 SAKO or an authorized dealer.



CAUTION

If the ambient temperature is outside the operation range, the battery pack stops 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 Problem determination based on:

1) Whether the battery can be turned on or not.

2) If battery is turned on, check the LED light is off, flashing or lighting.

3) If the LED light is off, check whether the battery can be charge/discharge or not.

5.2 Preliminary determination steps:

1) Battery cannot turn 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 turn 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 could 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 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 44.8Vdc(48V system) or less, battery protection will turn on.

Solution: Charge the battery for some time, the LED light turn 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 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.

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 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 products 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) The embedded BMS in the battery .The wall mounted case are not allowed to be used in series ,in the communication state, a maximum of 16 parallel connections are allowed .
- 6) Battery system must be well grounded and the resistance must be less than 1Ω .
- 7) Please ensured 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 manufacturer .We do not undertake any consequences or related responsibility which because of violation of safety operation or violating of design ,production and equipment safety standards .

2. Introduction

48VDC series Lithium battery power bank is one of new energy storage products developed ,it can be used to support reliable power for various types of equipment and systems .Is especially suitable for application scene of high power ,limited installation space ,restricted load-bearing and long cycle life .

48VDC 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 connected in parallel to expand capacity and power in parallel for larger capacity and longer power supporting duration requirements .

2.1 features:

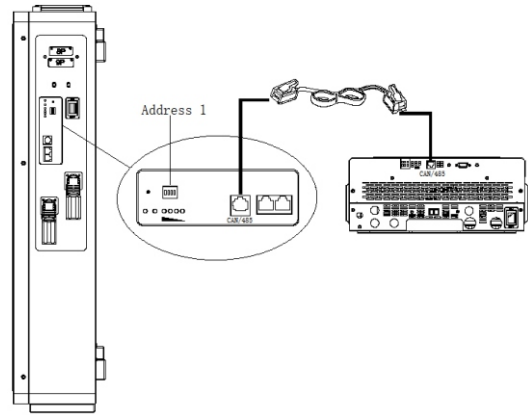
- ◆ The whole module is non-toxic ,non-polluting and environmentally friendly .
- ◆ Cathode material is made from LiFePO4 with safety performance and long cycle life .
- ◆ Battery management system (BMS) has protection functions including over-discharge ,over-charge ,over-current and high/low temperature .
- ◆ 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 rapidly reduced 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°C~ 50°C ,discharge -10°C~ 50°C) with excellent discharge performance and cycle life .
- ◆ Small size and light weight ,box case ,wall mounted case and standard of 19-inch embedded designed module is comfortable for installation and maintenance .

2.2 Specifications:

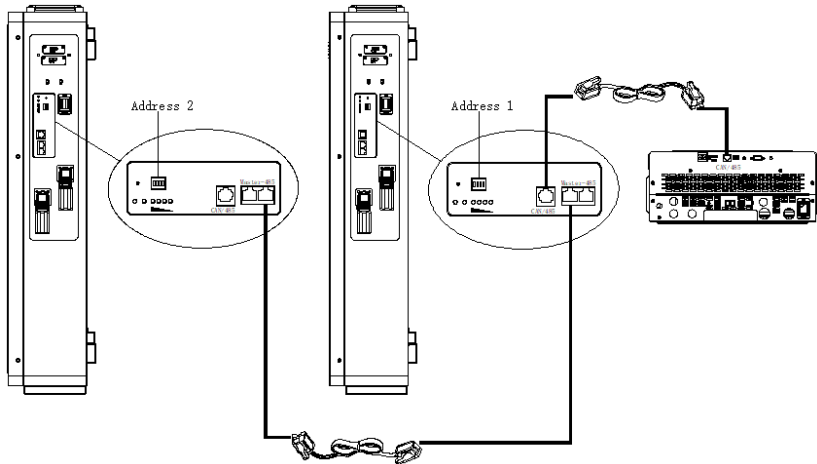
Basic parameters	51.2V100Ah
Nominal voltage	51.2Vdc
Nominal capacity	5120Wh
Discharge voltage	44.8~58.4Vdc
Charge voltage	55.2~57.6Vdc
Max. CHG. current	50A
Max. DISC. current	100A
Peak DISC. current	150A(1 sec.)
Display	LED status indicator , LCD display
communication	RS485 , CAN
Working temperature	charge 0°C~ 50°C ,discharge -10°C~ 50°C
Shelf temperature	-10°C~ 50°C
certification	UN38.3 , MSDS , CE

4. Installation

4.1 One set Lithium battery product connects to Inverter



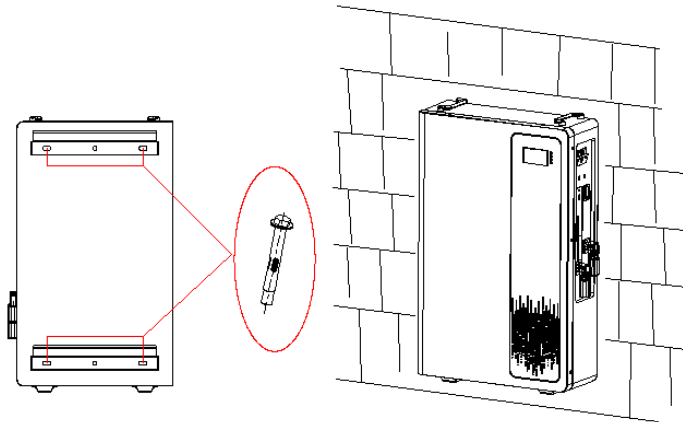
4.2 Multiple sets of Lithium battery product connects to Inverter



4.3 Installation Location

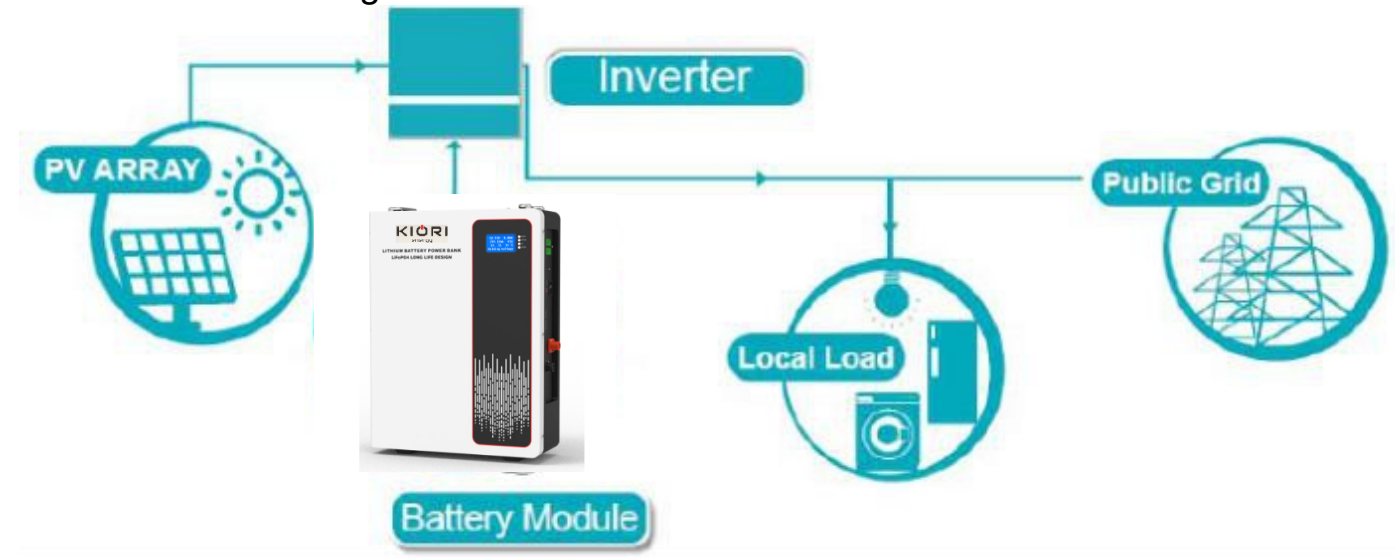
Make sure that the installation location meets the following conditions.

- ◆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.
- ◆Use fitting screws to fix the box on the wall.



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

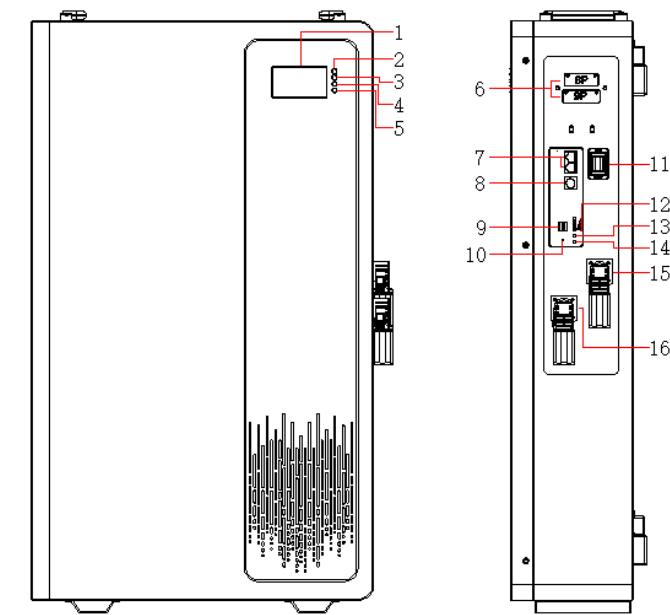


Safety goggles



Safety shoes

2.3 Equipment Interface Instruction



1. LCD Display

Display page of working status data .

2. MENU Operation buttons

Display page of working status data .

3. ENTER Operation buttons

This key allows you to enter the setting page .

4. UP Operation buttons

Display page of working status data .

5. DOWN Operation buttons

Display page of working status data .

6. Active balancing external interfaces

Connect the external equalizer .

7. Master -RS485 interfaces

Follow RS485 protocol, for communication between multiple parallel battery .

8. CAN and RS485 interfaces

Follow CAN protocol, for output battery information .

9. Device address

Used to set the address of each BMS protection board .

10. Program reset button

After pressing with the thimble, the program forces a reset and restart .

11. Power switch

ON~Battery is turn on and the battery has output voltage .

OFF~Battery is turn off and the battery has no output voltage .

12. SOC status indicator

Green LEDS to show the battery's current capacity 25% 50% 75% 100% .

13. Alarm status indicator

Red LED flashing to show the battery has alarm .

14. Run status indicator

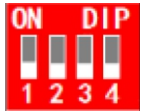
Yellow LED lighting to show the battery is charging ,and fast flashing to show the battery is discharging ,and slow flashing to show the battery is standby status .

15. +Battery terminal

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

16. -Battery termin al

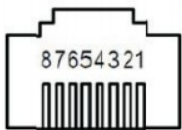
There are one pair of terminals, Black is battery negative pole .



Dial code switch position				Address	Instruction
1	2	3	4		
0	0	0	0	0	No cascade,use single
1	0	0	0	1	Set to Pack1
0	1	0	0	2	Set to Pack2
1	1	0	0	3	Set to Pack3
0	0	1	0	4	Set to Pack4
1	0	1	0	5	Set to Pack5
0	1	1	0	6	Set to Pack6
1	1	1	0	7	Set to Pack7
0	0	0	1	8	Set to Pack8
...	...	...	...	...	...
0	1	1	1	15	Set to Pack15
1	1	1	1	16	Set to Pack16

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					Stop charging
	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



CAN and RS485 interfaces			Master-RS485 interfaces			
RJ45 pin	define		RJ45 pin	define	RJ45 pin	define
1 , 8	RS485-B1		1 , 8	RS485-B	1 , 8	RS485-B
2 , 7	RS485-A1		2 , 7	RS485-A	2 , 7	RS485-A
4	CANH		3 , 6	GND	3 , 6	GND
5	CANL		4 , 5	NC	4 , 5	NC
6	GND					

2.4 LCD display instruction

2.4.1 First screen after turn on the battery ,use the UP and DOWN buttons to turn pages .

Vsum: 48.00 V
Im: 10.00 A
SOC: 50.00 %
FCC: 200.0 AH

CVmax: 3290 mV
CVmin: 3288 mV
CTmax: 23.5 °C
CTmin: 23.1 °C

2.4.1 After use the MENU buttons to enter the menu page .

>>Analog Data >>
--Sys Status >>
--Para Setting >>
--Sys Setting >>

--PackV: 48.00 V
--Im: 10.00 A
--Temperature >>
--Cell Voltage>>

--Analog Data >>
>>Sys Status >>
--Para Setting >>
--Sys Setting >>

--Status: Idle
--Warn/Alarm >>

--Analog Data >>
--Sys Status >>
>>Para Setting >>
--Sys Setting >>

-Non-permission

--Analog Data >>
--Sys Status >>
--Para Setting >>
>>Sys Setting >>

--Bau rate: 9600
--Adr Setting >>
--Com Setting >>
Ver: xxxxxxxxxxxx