Kamada power

USER GUIDE

LiFePO4 Battery System for Households

Contents

1 ABOUT THIS MANUAL

1.1 Purpose

This manual describes the introduction,installation, operation and emergency situations of the battery bank. Please read this manual carefully before installations and operations. Keep this manual for future reference.

1.2 Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

1.3 Safety Instructions

WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

1.Before using the unit, read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.
2. CAUTION –-- To reduce risk of injury,damage,even burst. please use it following using manual. In case of causing personal
3. Do not disassemble the battery. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of fire.
4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. CAUTION – Only qualified personnel can install this device with inverter.
6. For optimum operation of this battery, please follow required spec to select appropriate cable size.
7. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion or fire.
8. Please strictly follow installation procedure.

1.4 Can be connected in parallel

1. The batteries can be connected in parallel. Series connection is not allowed. Use in upright position only.

2. The batteries are not allowed to connected with PWM controller for charging.

Special Attention: Due to the built-in protection board of the lithium battery pack is with over-discharge protection function, it is strongly recommended to stop using the load when the battery pack is over-discharged. The battery pack cannot be repeatedly activated for discharge. Therefore, when the battery pack is low power, please charge the battery as soon as possible when main power or solar energy is available.

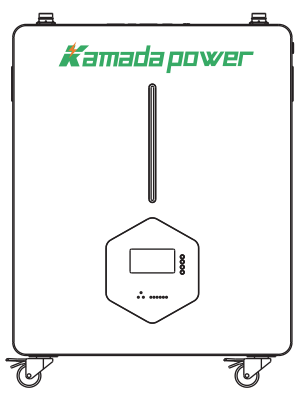
2.INTRODUCTION

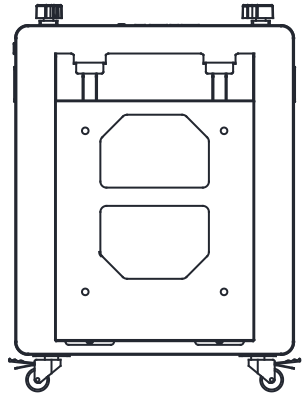
The battery main using for energy storage system. Built-in smart BMS to match various of hybrid inverters.

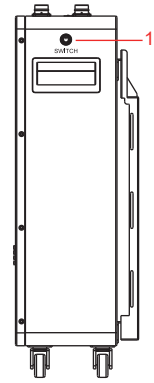
2.1 Features

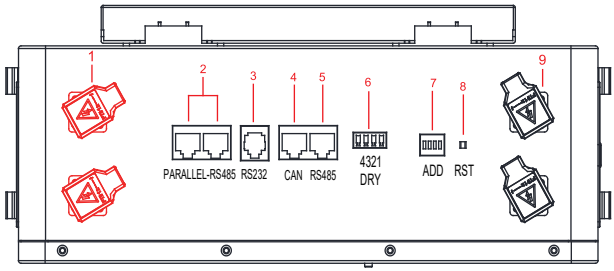
- LiFePO4 Battery.
- Long warranty period:5 years.
- Higher energy density, smaller volumn.
- This battery pack is designed for energy storage systems.
- Support connected in parallel mode for expansion.
- Battery management system(BMS): The battery packs built-in BMS monitors itsoperation and prevents the battery from operating outside design limitations.
- Expandability:This battery pack can be easily expanded by adding expansion battery packs in parallel connection.

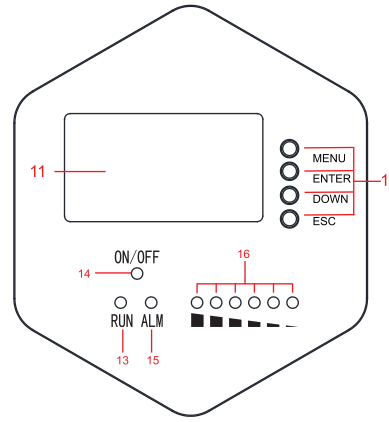
2.2 Product Over View（KMD-PL Series）





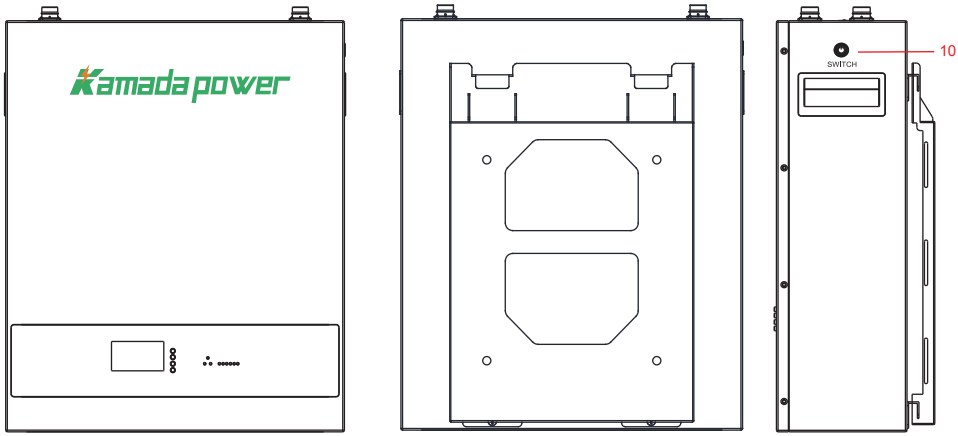


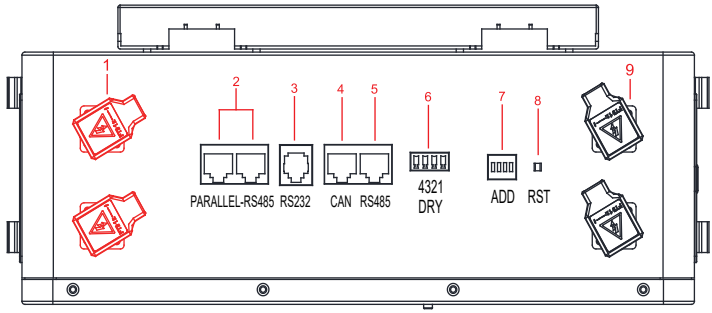




No.	Name	Function Description
1	Power Positive Terminal	Power positive output, two terminals with the same positive terminal is a parallel output
2	RS485 Communication Interface	1.Testing battery performance 2.When multiple batteries are used in parallel, it acts as a communication connection port between batterie
3	RS232 Communication Interface	Testing and modifying battery parameters
4	CAN Communication Interface	Connection to CAN port of inverter
5	RS485 Communication Interface	Connection to RS485 port of inverter
6	DRY Communication Interface	DRY output terminal Dry contact 1-PIN1 to PIN2: Normally open, closed when fault protection; Dry contact 2-PIN3 to PIN4: Normally open, alarm closed when low battery
7	ADD Address Switch	When connecting batteries in parallel by dialing the code Address identification of different batteries (see attached page for dialing rules)
8	RST Button (Electronic)	1. You can turn on and off the battery, the default is automatically turned on when the power switch is turned on, long press for 3 seconds, when the power indicator is flashing, release to automatically turn off the battery output 2. After battery troubleshooting, if the ALM indicator is still on, press the RST button for 3-5 seconds, when the power indicator is flashing, release the ALM indicator to turn off
9	Power Negative Terminal	Power negative output, two terminals with negative terminal is parallel output
10	Power Switch	Turn on and off the battery
11	Display	Display all basic parameters of the battery
12	4 Display Buttons	MENU ENTER DOWN ESC
13	RUN Indicator	The indicator light is on to indicate that the battery is
14	ON/OFF Indicator	The indicator light is on to indicate that the battery is on
15	ALM Indicator	The indicator light is on to indicate a battery alarm or fault
16	6 Power Indicators	Different power levels show different number of indicators

（KMD-PC Series）





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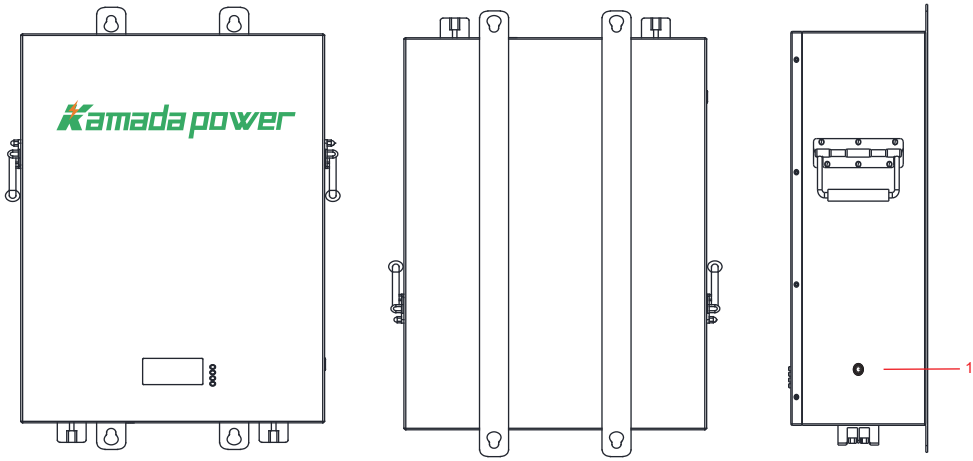
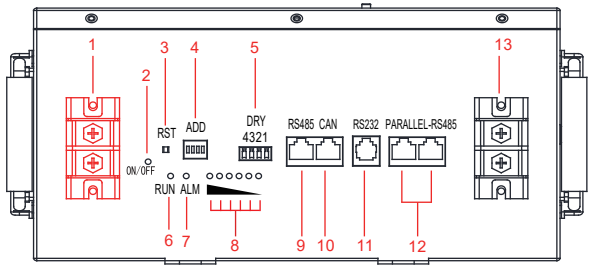
（KMD-PJ Series）





No.	Name	Function Description
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2	ON/OFF Indicator	The indicator light is on to indicate that the battery is on
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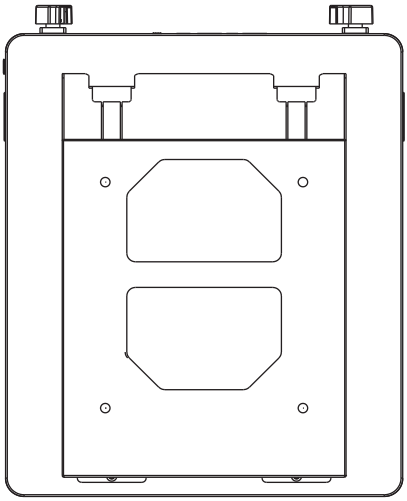
5	DRY Communication Interface	DRY output terminal Dry contact 1-PIN1 to PIN2: Normally open, closed when fault protection; Dry contact 2-PIN3 to PIN4: Normally open, alarm closed when low battery
6	RUN Indicator	The indicator light is on to indicate that the battery is functioning normally
7	ALM Indicator	The indicator light is on to indicate a battery alarm or fault
8	6 Power Indicators	Different power levels show different number of indicators
9	CAN Communication Interface	Connection to CAN port of inverter
10	RS485 Communication Interface	Connection to RS485 port of inverter
11	RS232 Communication Interface	Testing and modifying battery parameters
12	RS485 Communication Interface	1.Testing battery performance 2.When multiple batteries are used in parallel, it acts as a communication connection port between batterie
13	Power Negative Terminal	Power negative output, two terminals with negative terminal is parallel output
14	Power Switch(Mechanical)	Turn on and off the battery
15	Display	Display all basic parameters of the battery
16	4 Display Buttons	MENU ENTER DOWN ESC

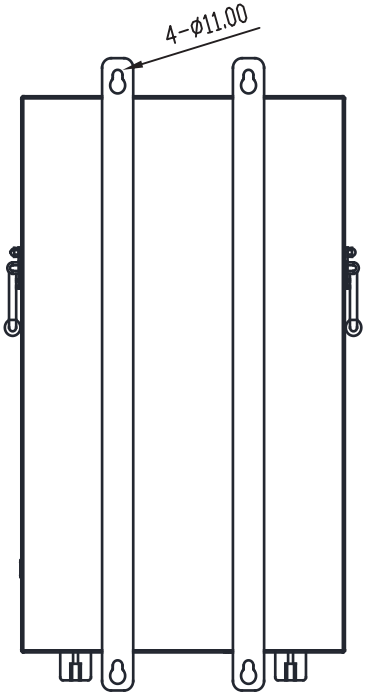
2.3 Mounting the Unit

Consider the following points before selecting where to install:

- Do not mount the battery on flammable construction materials.
- The ambient temperature should be between 0°C and 45°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the right diagram to guarantee sufficient heat dissipation andto have enough space for removing wires.
- Refer to the attached figure for installation hole positions and screw hole sizes of wall mounting supports.



（KMD-PL、PC Series）



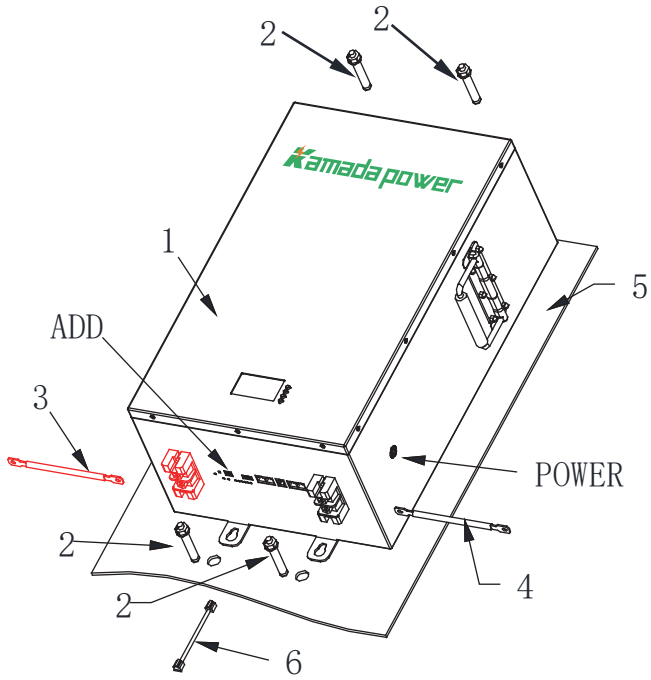
（KMD-PJ Series）

2.4 Specifications

Battery Specifications	KMD PJ/PL/PC24100	KMD PJ/PL/PC24200	KMD PJ/PL/PC48100	KMD PJ/PL/PC48200	KMD PJ/PL/PC51100	KMD PJ/PL/PC51200
ELECTRICAL						
Nominal Voltage	24V/48V/51.2V					
Energy Capacity	100Ah (2.56KWH)	200Ah (5.12KWH)	100Ah (4.8KWH)	200Ah (9.6KWH)	100Ah (5.12KWH)	200Ah (10KWH)
Battery Type	LFP(LiFePO4)					
Depth Of Discharge (DoD)	DoD 80%					
OPERATION						
Max. Charging Current	90A @25℃	90A @25℃	90A @25℃	90A @25℃	90A @25℃	90A @25℃
Max. Discharging Current	100A @25℃	100A @25℃	100A @25℃	100A @25℃	100A @25℃	100A @25℃
Recommend Charging Voltage	28V	28V	52.5V	52.5V	56V	56V
Cut Off Voltage	24V	24V	45V	45V	48V	48V
Operating Temperature Range	0℃~+50℃(Charging)/-20℃~+60℃(Discharging)					
Storage Temperature Range	-30℃~+60℃					
Humidity	5%~ 95%					
BMS						
Modules Connection	Max 15 Batteries In Parallel					
Power Consumption	<2 W					
Communication	RS485/RS232/CAN(Optional)					
PHYSICAL						
Dimensions (Lx W x H)(mm)	345x336x146	547x461x163	547x461x163	547x471x248	542x461x163	547x471x248
Weight	23KGS	45KGS	45KGS	89KGS	45KGS	89KGS
Option	Wheels					
Ingress Protection Rating	IP20					
Cycle life	Around 6000 Times					
Warranty	5 Years Product Warranty, 10 Years Design Life Warranty					
CERTIFICATE						
Certificate	CE/UN38.3/MSDS					

3. INSTALLATION

3.1.1Diagram of accessories (KMD-PJ Series)



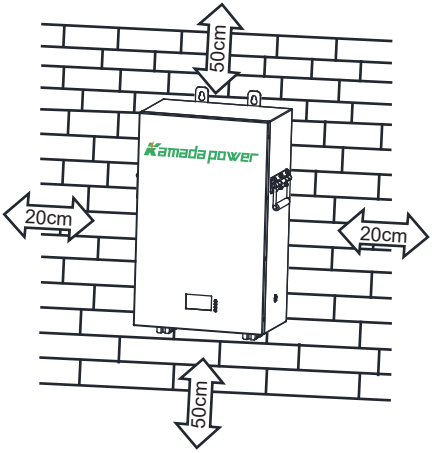
3.2.1 Description of accessories

No.	Part Name	Specification
1	Battery	KMD-PJ24100/KMD-PJ48100/KMD-PJ48200
2	Expansion screws	Outer hexagon expansion screw GB/T5285-1985-M10X80-8.8
3	Output negative power cable	According to different battery specifications and customer needs, match the corresponding output negative power line
4	Output positive power cable	According to different battery specifications and customer needs, match the corresponding output positive power line
5	Load-bearing walls	1. If one battery is hung on the wall: the load-bearing wall of models KMD-PJ4850 and KMD-PJ48100 is 100KG 2. If one battery is hung on the wall: the load-bearing wall of models KMD-PJ48150, KMD-PJ48200 and KMD-PJ48300 is 200KG 3. If multiple batteries are hung on a load-bearing wall, the load-bearing capacity will increase accordingly
6	Communication line between inverter and battery	According to different inverters and customer needs, the corresponding communication network cable is equipped. If the customer does not inform the inverter of the detailed information, we will not provide this communication network cable.

3.3.1 Installation steps（KMD-PJ Series）

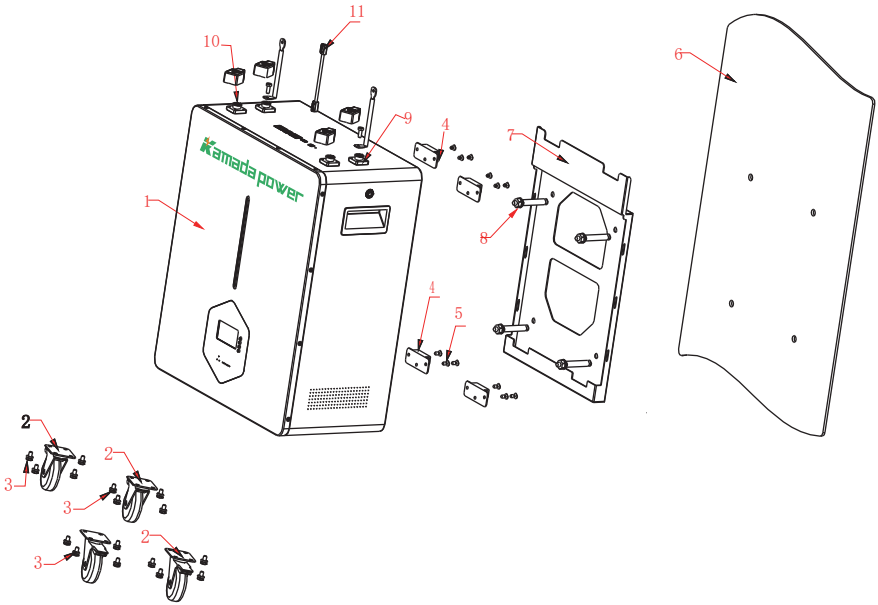
Assembly and commissioning step number	Name	Assembly Instructions
step 1	Fixed expansion screw	a. Fasten the expansion screw to the load-bearing wall
step 2	Wall mounted battery	b. Fasten the battery to the expansion screw
step 3	Pair plugging positive and negative power cables	c.Insert the positive and negative power cord pairs between the battery and the inverter
step 4	Docking inverter and battery communication cable	d.According to the communication protocol port of the inverter, one end of the communication line between the inverter and the battery is plugged into the CAN or RS485 port of the battery, and the other end is plugged into the inverter.
step 5	Dial the ADD address switch	e.If it is a battery, dial 1, and the rules of other dialing addresses are detailed in the attached page.
step 6	turn on the switch	f.Press the power switch on the side to let the ON/OFF RUN 6 battery indicator lights display in green

3.4.1 Precautions for Installing Batteries



Install the machine	
Before choosing an installation location, consider the following:	
1	Do not install the battery on flammable building materials
2	Mount on a solid wall
3	Install this inverter at eye level to read the LCD display at all times
4	To ensure optimum operation, the ambient temperature should be between 0 ° C and 55 ° C. Vertical wall installation is recommended
5	Make sure there is a certain amount of free space around the inverter, as shown on the right, to ensure adequate heat dissipation and enough room to move the wires.
Suitable for installation on concrete or other non-combustible surfaces	

3.1.2 Diagram of accessories（KMD-PL Series/KMD-PC Series）



3.2.2 Description of accessories

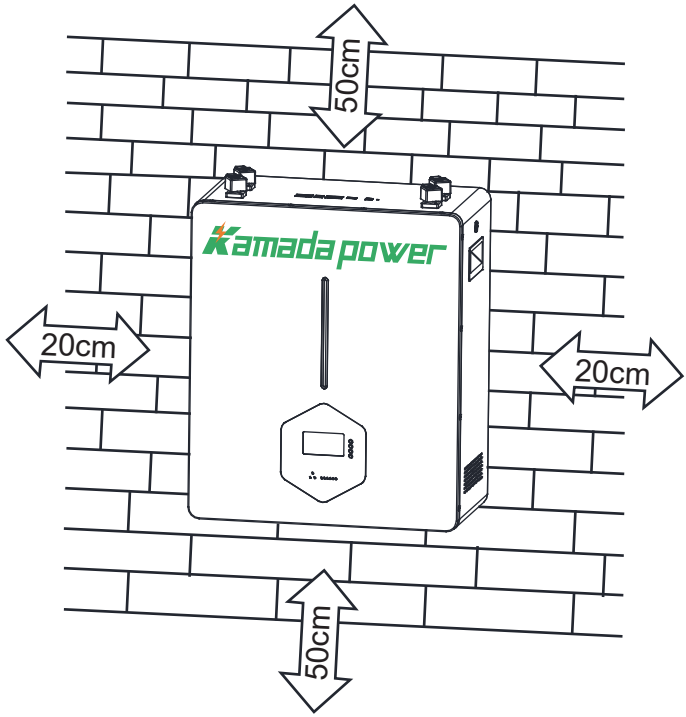
No.	Part Name	Specification
1	Battery	KMD-PLPC4850/KMD-PLPC48100/KMD-PLPC48150/KMD-PLPC48200
2	Caster wheel	Different products with corresponding castors
3	Screws	Screw-Stainless steel natural color-Passivated-M6x10-Machine tooth-Crossed flat head-No combination
4	Mounting ears on the back of the battery	Mounting ears on the back of the battery SPCC surface powder-coated black matte fine sand pattern-80x35x15mm-wall thickness 2mm-3 through-holes with a diameter of 7mm are integrally formed
5	Screws	Match the corresponding screws according to the casters
6	Load-bearing walls	1. If one battery is hung on the wall: the load-bearing wall of models KMD-4850 and KMD-48100 is 100KG 2. If one battery is hung on the wall: the load-bearing wall of models KMD-48150, KMD-48200 and KMD-48300 is 200KG 3. If multiple batteries are hung on a load-bearing wall, the load-bearing capacity will increase accordingly

7	Wall Mount Bracket	Corresponding wall brackets are equipped according to different battery specifications
8	Expansion screws	Outer hexagon expansion screw GB/T5285-1985-M10X80-8.8
9	Output negative power cable	According to different battery specifications and customer needs, match the corresponding output negative power line
10	Output positive power cable	According to different battery specifications and customer needs, match the corresponding output positive power line
11	Communication line between inverter and battery	According to different inverters and customer needs, the corresponding communication network cable is equipped. If the customer does not inform the inverter of the detailed information, we will not provide this communication network cable.

3.3.2 Installation steps

Assembly and commissioning step number	Name	Assembly Instructions
step 1	Assemble casters	a.Lock the casters to the bottom of the battery with screws
step 2	Assembled battery back lugs	b.Lock the wall hook to the back of the battery with screws
step 3	Assembling wall brackets	c.Screw expansion screws to the load-bearing wall
step 4	Wall Mount Battery	d.Hang the battery on the wall mount
step 5	Pair plugging positive and negative power cables	e.Insert the positive and negative power cord pairs between the battery and the inverter
step 6	Docking inverter and battery communication cable	f.According to the communication protocol port of the inverter, one end of the communication line between the inverter and the battery is plugged into the CAN or RS485 port of the battery, and the other end is plugged into the inverter.
step 7	Dial the ADD address switch	g.If it is only one battery, please dial 1, and the rules of other dialing addresses are detailed in 4.4
step 8	turn on the switch	h.Press the power switch on the side to let the ON/OFF RUN 6 battery indicator lights display in green

3.4.2 Precautions for Installing Batteries



Install the machine	
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1	Do not install the battery on flammable building materials
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3	Install this inverter at eye level to read the LCD display at all times
4	To ensure optimum operation, the ambient temperature should be between 0 ° C and 55 ° C. Vertical wall installation is recommended
5	Make sure there is a certain amount of free space around the inverter, as shown on the right, to ensure adequate heat dissipation and enough room to move the wires.
Suitable for installation on concrete or other non-combustible surfaces	

4.INVERTER CONNECTION

CAUTION

As different inverters have different connection rules, please find the battery connection rules in the inverter user manual and follow it.Here list the basiclly connection step between our battery and unknown brand inverter for your reference.

WARNING

Cut off main power before operation the inverter and battery, after connection and setting is done, Turn on the main power.

4.1 Connection step

Please follow reference steps to implement the connection between battery and inverter:

1.Check the inverter user manual or confirm with the inverter reseller whether the inverter have communication BMS internal:

1) If inverter is without communication BMS RS485/CAN, treat our lithium ion battery as AGM battery

①Connect the postive and negative cables between battery and inverter +/+,-/-(Check the ring terminal size in inveter user manual ,make sure its workable and connect battery and inverter)

②Select "AGM"mode(Sealed lead acid battery) in the inverter

③Setting the battery data on inverter like charging voltage,charging cut off voltage,discharging cut off voltage ,charging current ,charging cut off current, discharging current etc(You can consult battery seller to get those data) ***WARNING***: Set those data before use,otherwise it will damage the battery!

2) If inverter has communication BMS internal,See step NO.2

2.Check the "**Battery connection**"part from inverter user manul, Find the postive and negative cables' ring terminal size and connect the cables. Make sure polarity at both the

battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the inveter terminal.

3.Check the inverter user manual to know inverter communication type(RS485 or CAN),and then Find the corresponding communication type(RS485 or CAN) in "**(4.3)Interface definition**" of battery user manual,The inverter communication network port definition must be consistent with our battery's interface definition, otherwise the connection cannot be successful between inverter and our battery.

4.Find the "**(4.4)Dialer switch**" rules in the battery user manual. If it's only one battery, please dial 1. For more quantities battery connection, please refer to the table about dialer switch

5.Select Lithium ion battery mode on the inverter, some inverter need select BMS brand,please follow the real inverter user manual for the complete setting,consult with battery seller if unknow battery data requested on inverter.

6.Switch on the battery pack, use the RS232 communication converter to connect the battery and your laptop, install the BMS management software on the laptop **(Please contact the battery seller for detailed steps)**. Check whether the communication protocol CAN and RS485 are correctly selected in the BMS management software setting interface.
(If there is no inverter communication protocol corresponding to the brand name, please ask for communication protocol document from inverter seller and sent to the battery seller or switch the "AGM" (Sealed lead acid battery) mode on the inverter firslty, please refer to above NO. 1) ①②③)

7.Turn on the main power,and select the priority mode in the inverter according to your demand.

TIPS: It's only a basiclly guidline about the inverter and battery connection above. The accurate connection way is only refer to the real inverter user manual.

4.2 Communication introduction

RS232

BMS can communicate with the upper computer through RS232 interface, so that the upper computer can monitor all kinds of battery information,including battery voltage, current, temperature, status and batteryproduction information, etc.The default baud rate is 9600bps.

CAN

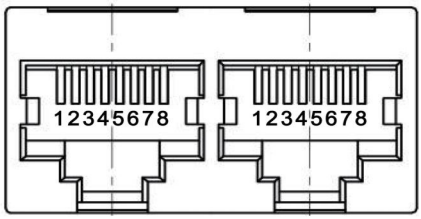
CAN communication, the default communication rate is 500K.

RS485

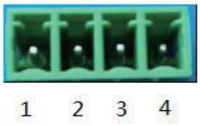
With dual RS485 interfaces, you can view PACK information, and the default baud rate is 9600bps. If you need to communicate with the monitoring device through RS485, the monitoring device is the host, polling data according to the address, The address setting range is 1~15.

4.3 Interface definition

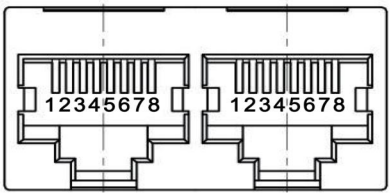
Communication Interface Diagram



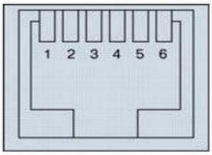
CAN and RS485 interface



Dry contact



Parallel communication port



RS232 communication port

Electrical Interface Definition

RS232 - -Adopt 6P6C vertical RJ11 socket	
RJ11 pin	Definition description
2	NC
3	TX (veneer)
4	RX (veneer)
5	GND

CAN- - adopts 8P8C vertical RJ45 socket		RS485 - - 8P8C vertical RJ45 socket	
RJ45 pin	Specifies	RJ45 pin	Specifies
1、 2、 3、 6、 8	NC	1、8	RS485-B1
5	CANL	2、7	RS485-A1
4	CANH	3、6	GND
7	GND	4、5	NC

CAN and RS485 interface

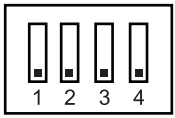
RS485 - - 8P8C vertical RJ45 socket		RS485 - - 8P8C vertical RJ45 socket	
RJ45 pin	Specifies	RJ45 pin	Specifies
1、8	RS485 - B	1、8	RS485-B1
2、7	RS485-A	2、7	RS485-A1
3、6	GND	3、6	GND
4、5	NC	4、5	NC

Parallel communication port

Once the batteries are connected well, simply press On/Off button to enable the output of the battery pack.

4.4 Dial Switch

When PACK is used in parallel, different PACK can be distinguished by setting the address of ADD switch on BATTERY , and it is necessary to avoid setting the address to be the same.For the definition of BMS ADD switch, refer tothe following table.



Address	Dial code switch position			
	# 1	#2	#3	#4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

4.5 ON/ OFF or soC Led (Mode or soC)

LED instructions

Table 1 LED Working status indication

State	Normal / Alarm / Protection	ON/ OFF	RUN	ALM	SOC Indication LEDs						Instructions
		●	●	●	●	●	●	●	●	●	
Power Off	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All off
Standby	Normal	ON	Flash1	OFF	Indication by SOC						Standby
	A larm	ON	Flash1	Flash3							Cell low voltage
Charge	Normal	ON	ON	OFF	Indication by SOC (The top SOC Led Flash 2)						Maximum power LED flash(Flash2), ALM does not flash for over- charge warning
	A larm	ON	ON	Flash3							
	Over Charge Protection	ON	ON	OFF	ON	ON	ON	ON	ON	ON	If no mains supply, LED as standby
	Temperature. Over- current Fault Protection	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Close charge
Discharge	Normal	ON	Flash3	OFF	Indication by SOC						
	A larm	ON	Flash3	Flash3							
	Under Discharge Protection	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Close discharge
	Temperature. Over- current. Short Circuit Fault Protection	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Close discharge
Fault		OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Close charge Close discharge

Table 2 Capacity indication

State		Charge						Discharge					
Capacity indicator light		L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●	L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●
electricity(%)	0~16.6%	OFF	OFF	OFF	OFF	OFF	Flash2	OFF	OFF	OFF	OFF	OFF	ON
	16.6~33.2%	OFF	OFF	OFF	OFF	Flash2	ON	OFF	OFF	OFF	OFF	ON	ON
	33.2~49.8%	OFF	OFF	OFF	Flash2	ON	ON	OFF	OFF	OFF	ON	ON	ON
	49.8~66.4%	OFF	OFF	Flash2	ON	ON	ON	OFF	OFF	ON	ON	ON	ON
	66.4~83.0%	OFF	Flash2	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON
	83.0~100%	Flash2	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Running light ●		ON						Flash(Flash 3)					

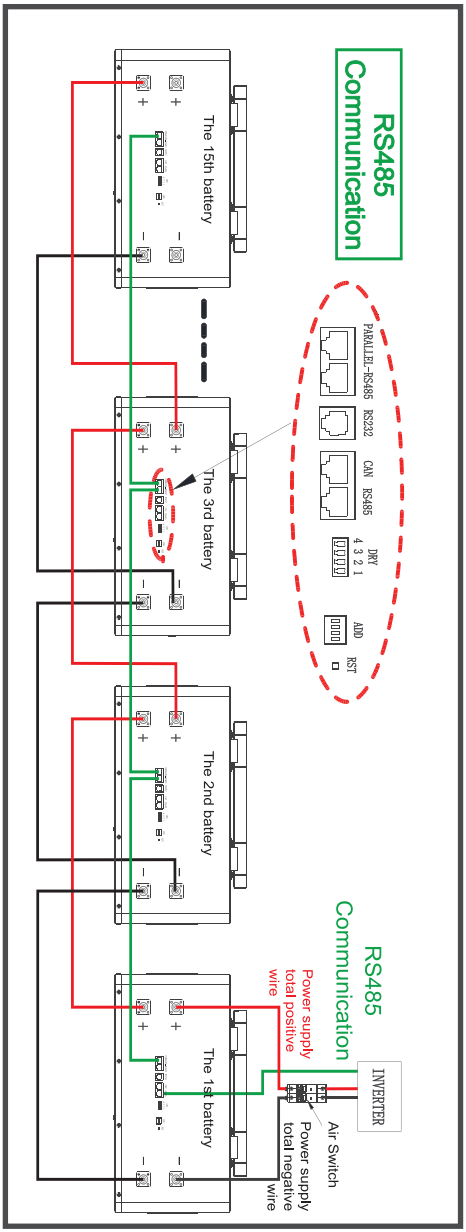
Table 3 LED Flash description

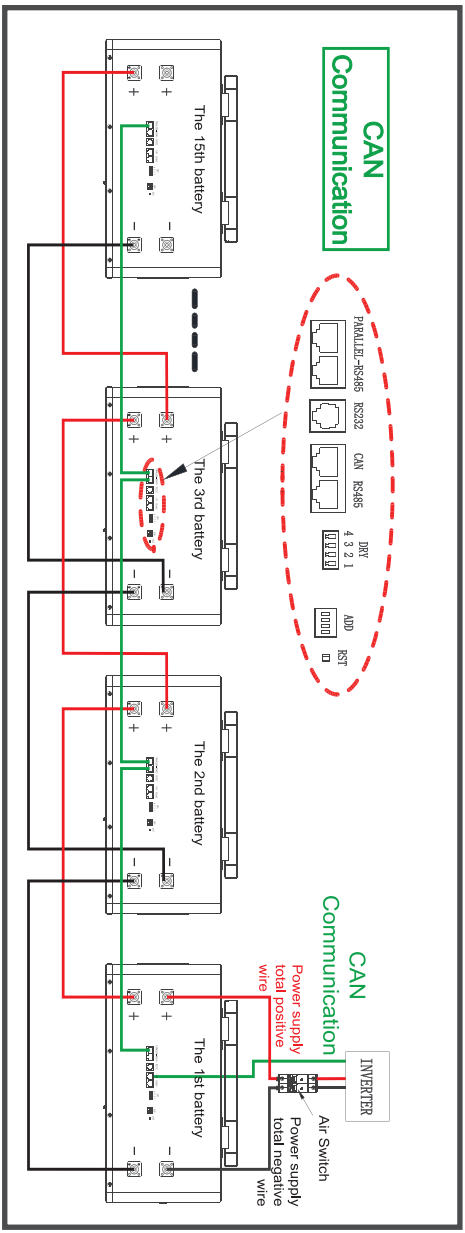
Flashing way	ON	OFF
FLASH 1	0.25S	3.75S
FLASH 2	0. 5S	0. 5S
FLASH 3	0. 5S	1.5S

Note: The LED indicator alarm can be enabled or disabled by the host computer. It is enabled by factory default.

4.6 Connection for Parallel Mode

1. The ADD address of this battery wired with the inverter is 1, other batteries dial the corresponding address according to the dial code address rule
2. Continuous current 100A. 6AWG or 4AWG wire is recommended for the power cord





5.EMERGENCY SITUATIONS

KMD cannot guarantee battery absolute safety.

5.1 Fire

In case of fires, make sure that the following equipment is available near the system.

- SCBA (self-contained breathing apparatus) and protective gear in compliance with the Directive on Personal Protective Equipment 89/686/EEC.
- NOVEC 1230, FM-200, or dioxide extinguisher

Batteries may explode when heated above 130°C. KEEP FAR AWAY from the battery if it catches fire.

5.2 Leaking Batteries

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

- Inhalation: Evacuate the contaminated area, and seek medical attention.
- Contact with eyes: Rinse eyes with running water for 5 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.

5.3 Wet Batteries

If the battery pack is wet or submerged in water, do not let people access it, and contact your supplier for help.

Damaged Batteries

Damaged batteries are not fit for use and are dangerous and must be handled with the utmost care. It may leak electrolyte or produce flammable gas. If the battery pack seems to be damaged, pack it in its original container, and then return it to your supplier.

5.4 Warranty

Products that are operated strictly in accordance with the user manual are covered by the warranty. Any violation of this manual may void the warranty.

Any product damage or property loss caused by the following conditions,KMD does not assume any director indirect liability.

- Product modified, design changed or parts replaced.
- Changed, or attempted repairs and erasing of series number or seals;
- System design and installation are not in compliance with standards and regulations;
- The product has been improperly stored in end user’s premises;
- Transport damage (including painting scratch caused by movement inside packaging during shipping). A claim should be made directly to shipping or insurance company.

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