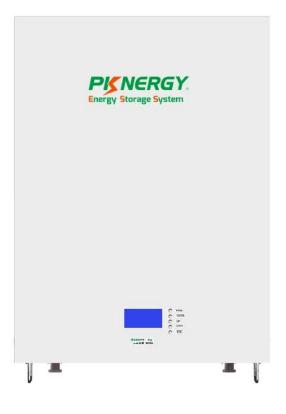


# **User** manual



SHENZHEN PKNERGY ENERGY CO.,LTD E-mail: sales@pknergy.com Website: http://www.pknergy.com



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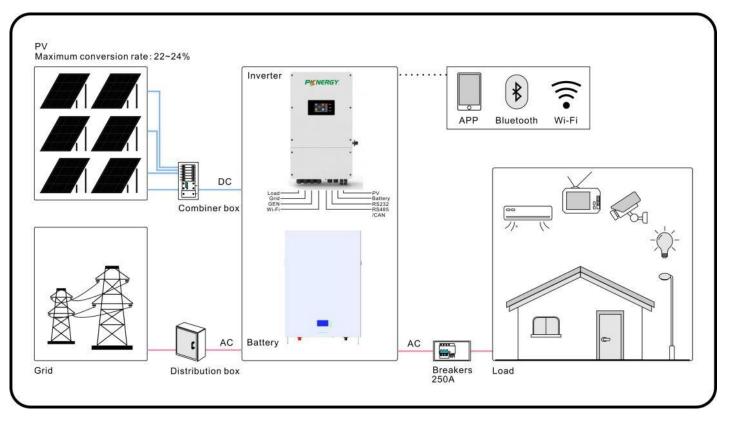
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# 1. Introduction

The Energy storage pack is an essential component of the photovoltaic power generation system. It can provide electricity for the connected load, and it can also store photovoltaic solar modules, fuel generators, or wind energy generators by charging the remaining energy in case of emergency. When the sun goes down, energy demand is high, or there is a power outage, you can use the energy stored in the system to meet your energy needs at no additional cost. In addition, the energy storage Pack can help you achieve energy self-consumption and ultimately achieve the goal of energy independence.

According to different power conditions, the energy storage PACK can output power during peak power consumption, and can also store energy during low power consumption. Therefore, when connecting the matching photovoltaic modules or inverter arrays, external equipment is required to match the energy storage the working parameters of the pack to achieve the highest operating efficiency. For a simple diagram of a typical energy storage system.



# 2. Safety Warning

It is very important and necessary to read the user manual carefully before

Installing or using the battery. Failure to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, death, or may damage the battery and the whole system.

• If the battery is stored for a long time, it is requirement that they are charged every three to six months, and the SOC should be no less than 80%, after fully discharging, The battery needs to be recharged within 12 hours.

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## **PKNERGY** Energy Storage System

- •Do not expose cable outside;Do not use cleaning solvents to clean the battery.
- •All battery terminals must be disconnected before maintenance.
- •Do not expose the battery to flammable or harsh chemicals or vapors.
- •Do not paint any part of the battery, include any internal or external components.
- •Do not connect battery with PV solar wiring directly.
- •Any foreign object is prohibited to be inserted into any part of the battery.

•After unpacking, please check the battery and pack list first, if the battery is damaged or spare parts are missing, Please contact the dealer.

•Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode;

•Wiring must be correct, do not mix-connect the positive and negative cables, and ensure no short circuit with the external device;

- •It is prohibited to connect the battery with AC power directly;
- •The BMS in the battery is designed for 24VDC/48VDC, DO NOT connect battery in series;
- •It is prohibited to connect the battery with different type of battery;

•Please ensure the electrical parameters of battery system are compatible to inverter;

•Keep the battery away from fire or water.

•Our company will not bear any warranty claims for direct or indirect damage caused by violation of the above items.

No.	Description	Silk-screen	13
1	Output terminal	+	
2	Output terminal	-	
3	Reset button	RST	ONOF
4	RS485/CAN	ADS	
5	Dry port	DRY CONTACT	
6	CAN bus Port	CAN	
7	RS485A Port	RS485A	
8	RS232 Port	RS232	
9	RS485B Port	RS485B/RS485B	
10	LED indicate	RUN	
11	LED indicate	ALM	3 4 5 6 7 8 9 15 16
12	LED indicate	CAPACITY	
13	LCD		
14	LCD	MEUN/Enter/UP/ESC	
15	E-Switch	ON/OFF	
16	Bracket		
17	Handle		

# 3. Function interface description

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# 4. Installation the tool

Personal protective equipment:



#### Necessary installation tools



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# 5. Mounting the PACK

Material preparation:









Output line

Screw

Parallel communication

lineInverter communication line



Mounting brackets

Step 1:

Choose suitable firm wall with thickness greater than 100mm.

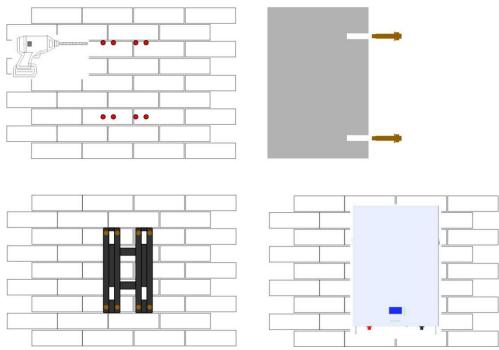
Use the mounting frame as a template, mark the hole position.

Drill 8 holes according to the hole position, it is ø10 with depth 80mm.

Hammer the M10 screws to the above holes, and screw the nut.

Raise the battery to slightly above the hook, while maintaining the battery balance.

Secure the battery to the wall through a hook.



A falling device can cause serious or even fatal damage: never install the battery on the hook screw unless you ensure that the hook screws are firmly installed on the wall and after a thorough inspection.

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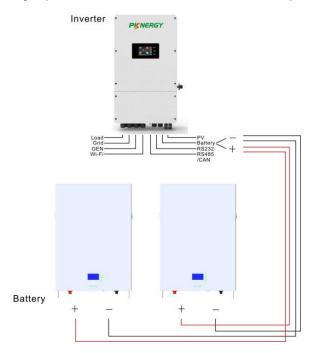
Step 2:

Parallel use of battery:

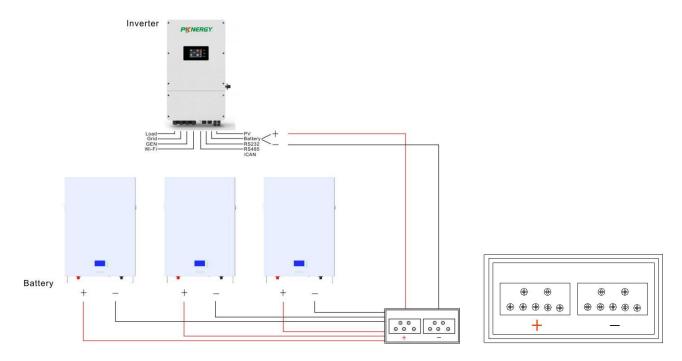
When the battery needs to be used in parallel, the maximum connection is 16 units, but we recommend using 2-4 units according to the application, please select the appropriate accessories:

The positive/negative electrode of each battery is directly converging at the battery input end of the inverter.

The two batteries should be connected in parallel first. The battery near the inverter is the main output and connected to the battery input terminal of the inverter. The wire required for the confluence is not included in the standard package.



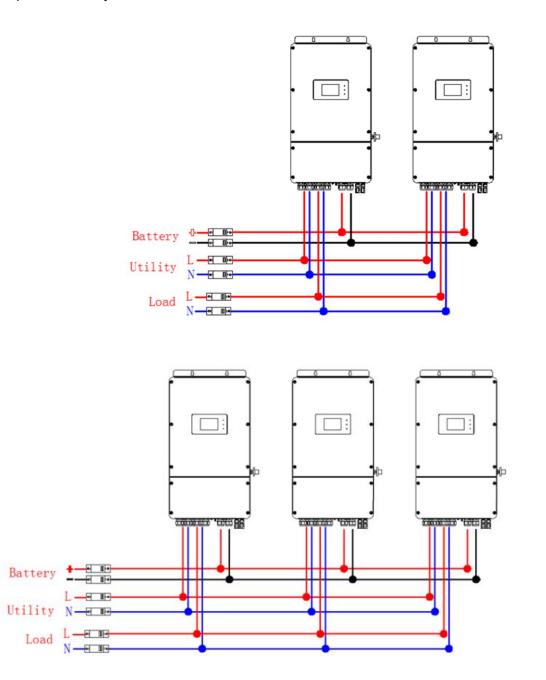
More than 3 batteries in parallel require the use of an additional bus box not included in the standard package:



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Step 3: The battery is connected to the inverter



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# 6. LED working status

SYS status	Abnormal event	ON/ OFF	RUN	ALM	Capacity LED						Description	
										۲		
Shutdown	Dormancy	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	/	
Standby	Normal	ON	Flash 1	ON						Dormancy		
Standby	Warning	ON	Flash 1		Accord		зараси				Module low voltage	
	Normal	ON	ON	OFF	According to the highest capacity						ALM does not flicker	
Charge	Warning ON ON Flash 3											
Unarge	Over Voltage Protection	ON	ON	OFF	ON	ON	ON	ON	ON	ON	There is no mains power, and the indicator turns to standby	
	Over current Temperature Protection	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging	
	Normal	ON	Flash 3	OFF							/	
	Warning	ON	Flash 3		According to capacity indicator					/		
Discharge	Under Voltage Protection	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging	
	Over current Short circuit Temperature Reverse connection Protection	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging	

Flash mode	ON	OFF		
Flash1	0.25s	3.75s		
Flash2	0.5s	0.5s		
Flash3	0.5s	1.5s		

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# 7. LCD screen display

① Display rendering



#### ② Main menu page

After BMS is activated, will show the welcome screen, press the "MENU" button to enter the main menu page. As shown in the figure below:

Welcome To Use	≫Analog Info≫		
Smart BMS	BMS Status≫		
Press MENU Key	Para Setting≫ Sys Setting≫		

#### ③ Battery parameters page

When the cursor" » "is point to "Battery Parameters Acquisition" press "ENTER" key will enter the page of "Battery Parameters Acquisition" As shown in the figure below:

<pre>&gt; PackV: 53.22 V Im: 0.00 A Temperature&gt; Cell Voltage&gt;</pre>	T1: 26.1℃ T2: 26.2℃ T3: 26.6℃ T4: 26.2℃	PCB_T: 27.4°C ENV_T: 27.4°C
Cell01: 3333 mV Cell02: 3333 mV Cell03: 3331 mV Cell04: 3329 mV	≫CellCapacity≫	SOC:         0.00 %           FCC:         50.0AH           Rm :         0.0AH           CC :         0

When the cursor "» "is point to"Battery Status" press "ENTER" key will enter the page of "Battery Status", As shown in the figure below:

≫ Status: Idle Record≫ BMS Status≫	≫ OVP: 0	> UV : N UVP: N OC: N OCP: N
<pre> &gt; SCP: 00/UTP: 00CP: 0UVP: 7 </pre>	≫ SCP: N —Failure: N	<pre>&gt;OT : N OTP: N OV: N OVP: N</pre>
Non-production manufacturer can not use.	Baud rate:9600	

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#### **Parameter Settings**

Screen can not set parameters Baud Rate:9600 ,Can not be set.

Key description

①SW1----MENU,SW2----ENTER,SW3----UP,SW4----DOWN, SW5----ESC.

②Each item is "》"or"--"as a beginning, among them"》"shows the current cursor position, press "UP" or

"DOWN" key can move the cursor position; with" "end of the project, the content of the said project has not shown, press "ENTER" key can enter the corresponding page

corresponding page.

③Press "ESC" key can be returned at the next higher level directory; In any position, press" MENU" key can return to the main menu page.

④when BMS inter sleep mode, press any key, can activate the screen.

Inter standby mode , with no keystrokes 1 minutes later, LCD will enter Shutdown mode press any key, screen can be activated.

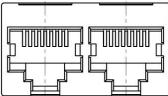
# 8. Connection mode for communication

RS485 interface for communication with upper computer; With CAN interface, CAN carry out multi-machine parallel communication.(RS485 baud rate 19200, CAN baud rate 500K)

When the host (the dialing address 1, 2, 3 and is OFF) CAN communicates only with the inverter, when

the code 6 is on, it can support the pylontech protocol, the code 5 and 6 are on, it supports the Guerrero watt protocol.

# 9. RS485/CAN Interface definition



#### **RS485 and CAN**

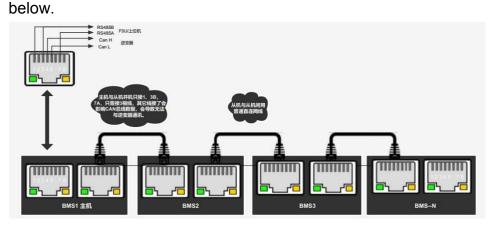
RS485	(8P8C)	CAN(8P8C)				
DJ45	illustrate	DJ45	illustrate			
1、8	RS485-B	9、10、11、14、16	NC			
2、7	RS485-A	12	CANL			
3、6	GND	13	CANH			
4、5	NC	15	GND			

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# 10. Parallel interface

BMS battery packs communicate in parallel via RS485 bus, and can also communicate with devices with RS485 bus, while RS232 interface realizes communication with PC or other intelligent terminals, human-computer interaction RS485 bus parallel connection of any battery pack information, multi-machine parallel bus interface See the figure



# 11. BMS RS232 communication instructions

The BMS can communicate with the host computer through the RS232 interface, so that the host computer can monitor and set various information of the battery, including battery voltage, current, temperature, status and battery production information, etc., and the default baud rate is 9600bps. Operation instructions:

- 11.1 Accessories
- 11.2 Accessories introduced
- 11.3 Fitting installation steps
- 11.4 BMS software installation steps
- 11.5 Introduction to the functions of the host computer
- 11.6 Debugging steps of the host computer
- 11.7 Other settings

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#### 11.1 Accessories



USB to RJ12 crystal head



Computer (upper computer)



#### RJ12 The order of the lines:

RS232 (RJ12 6P6C) RJ12							
1, 5, 6 NC							
2	GND						
3	RX						
4	TX						

#### Where to buy: Brand: DTECH

(https://item.m.jd.com/product/100056943642.html?utm\_source=iosapp&utm\_medium=appshare&utm\_campaign=t\_335139774&utm\_term=CopyURL&ad\_od=share&gx=RnAonS8DazLah8IR 5Q&gxd=RnAoy29eOzbfn8pDqYRzDLdkRBFs44NA603gijT5SyWCqjx-no1rDykVnXRAWV8)

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#### 11.3 Fitting installation steps

\* The USB to RJ12 crystal head cable is integrated, and you only need to communicate with the seller about the RJ12 wiring sequence.

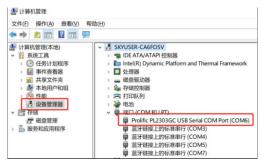
\* After the USB is connected to the computer, the program will be installed automatically, and it will be displayed in My Computer - Device Manager-Ports:Prolific PL2303GC USB Serial COM Port (COM\*\*). \* COM\*\*:It will be automatically sorted according to the number of USB installations on my computer.



Plug in the USB port of your computer



RJ12 is connected to the battery RS232



Automatic installer



Battery DIP setting: 1: NO, 2: OFF, 3: OFF, 4: OFF

#### 11.4 BMS software installation steps



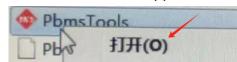
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#### Host computer program software

#### Installation Steps:

①unpack 解压到当前文件夹(X)
 ②Double-click the application



#### ③Start the program (No login required):



- 11.5 Introduction to the functions of the host computer
- ① Realtime Monitoring
- 2 Mu1ti Monitoring
- ③ Memory Info.
- ④ Parameter Setting
- ⑤ System Config
- 6 Export Datas

#### 11.6 Debugging steps of the host computer

① Modify the language



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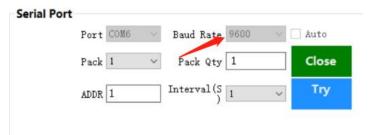


alt	ime H	onitorin	Multi	Moni	toring	Nemc	ry Info.	Par	ameter	Settin	ng S	ystem	Config.	Export	t Datas
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Serial Port
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Port COM6 😪 Baud Rate 9600 😪 Auto
ack	Infor	mation				Tem	perature	_							Pack 1 V Pack Qty 1 Close
	Pack	Voltage	52.65	5 V											ADDR 1 Interval (S 1 Try
	Pack	Current	0.00	A			Tcell 1	25.	6 2	Tcell	. 2	25.9	C		
		SOC	40	\$											
		SOH	100	%			Tcell 3	26.	0 2	Tcell	4	25.4	C		
R	emain	Capacity	40880	лA	н										System Status
	FullO	Capacity	101280	nA	н		MOS_T	27.	4 2	ENV	_т[	27.0	C		<b>CHARGING-ON</b> CHARGING CHG-LIMIT-OFF CACin
1	Batter	y Cycle	3				L		423				10000		●DISCHARGING-ON ●DISCHARGING ●HEATER-OFF ●Fully
Cell V	oltag	e(mV)		-	_										Alarm Status
		MaxVol	t 1	329	1	MinV	olt 7	3	290	Volt	Diff	1			None Protect Status
		Vcel		3291				Vcel		3291					None
				3291	_					3291	-				Fault Status
		Vce.	-	3291	_			Vcell	-	3291	_				None
		Vcel	_					Vcell							Switch Control
		Vce.	_	3291				Vcel]	_	3291					CHG Circuit Close Sound Alarm Open
		Vcel	15	3291				Vcell	. 13	3291					DSG Circuit Close LED Alarm Close Shutdown Off
		Vce.	16	3291				Vcell	. 14	3291					
		Vce.	17	3290				Vcell	. 15	3291					Password Change Clear
		Vce	18	3291				Vcell	16	3291					

② Set up Port (Click Try to automatically query COM\*\*)

Serial Port						
P	ort	COM6	×.	Baud Rate	9600 ~	Auto
P	ack	1	~	Pack Qty	1	Close
A	DDR	1		Interval(S)	1 ~	Try

#### ③ Set up Baud Rate (Set 9600)



- ④ Set up Try (Nothing else is required)
- ⑤ The state after the communication (At the very bottom)

VER: P16S100A-21234-1.05	BMS S/N: 212341124700266H	PACK S/N: HC3GA068231010001	COMM:	Normal

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### ⑥ Click Parameter Setting

Realtime Monitoring Multi	Monitoring	emory Info. Parameter Sett	ing System Con:	fig. Export Datas		S #	*, 🌵 🖽 🖬
Cell OV Alarm(V)	~	Pack OV Alarm(V)	E	Cell UV Alarm(V)		Pack UV Alarm(V)	~
Cell OV Protect(V)	~	Pack OV Protect(V)	~	Cell UV Protect(V)	~	Pack UV Protect(V)	~
Cell OVP Release(V)	~	Pack OVP Release(V)	~	Cell UVP Release(V)	~	Pack UVP Release(V)	
Cell OVP Delay Time(mS)	~	Pack OVP Delay Time(mS)	~	Cell UVP Delay Time(mS)	×	Pack UVP Delay Time(mS)	N
CHG OC Alarm(A)	~	CHG OT Alarm("C)	~	CHG UT Alarm('C)		MOS OT Alarm('C)	
CHG OC Frotect(A)	~	CHG OT Protect("C)	×	CHG UT Protect("C)	~	MOS OT Protect("C)	
CHG OCP Delay Time(mS)	~	CHG OTP Release("C)		CMG UTP Release("C)	~	MOS OTP Release("C)	
DSG OC Alara (A)		DSG OT Alarm("C) DSG OT Protect("C)	~	DSG UT Alarm("C)		ENV UT Alarn('C)	
DSG OC 1 Protect(A)		DSG OTP Release('C)	~	DSG VT Protect("C)	~	ENV UT Protect("C)	
DSG OCP 1 Delay Time(mS)	~	Balance Threshold(V)		DSG UTP Release(°C)	~	ENV UTP Release("C)	
DSG OC 2 Protect(A)	~	Balance $\Delta V_{cell}(nV)$	×	Pack FullCharge Voltage(V)		ENV OT Alarm ('C)	
DSG OCP 2 Delay Time(mS)	~	Sleep Voell(V)	~	Pack FullCharge Current(mA)	~	ENV OT Protect("C)	
SCP Delay Time(uS)	~	Delay Time(min)	~	SOC Low Alarm(%)	~	ENV OTP Release("C)	
Rea	id All	CLS Write All	Reset Se	tting Import	Export		
ER: P16S100A-21234-1.05	BMS S/N: 2123	41124700266H PACK S/N: HC3		COMM: Normal			14:25:4 2023/11/

#### ⑦ Click Read All

PbmsTools HS1.0.9 (Protocol	code:HS-PACE-23	2-BP-V1.1)					- 0 >
Realtime Monitoring Multi	Monitoring	emory Info. Parameter Set	ting System C	onfig.   Export Datas		e e e e e e e e e e e e e e e e e e e	·, 🍦 🖽 ¥
Cell OV Alarn(V)	3,60 🗸	Pack OV Alarm(V)	57.60 🗸	Cell UV Alarm(V)	2.80 🗸	Pack UV Alarm(V)	44.80
Cell OV Protect(V)	3.65 🗸	Pack OV Protect(V)	59.20 v	Cell UV Protect(V)	2.70 🗸	Pack UV Protect(V)	43.20
Cell OVP Release(V)	3.38 🗸	Pack OVP Release(V)	54.00 🗸	Cell UVP Release(V)	2.95 v	Pack UVP Release(V)	47.20
Cell OVP Belay Time(mS)	1000 ~	Pack OVP Delay Time(mS)	1000 ~	Cell UVF Delay Time(mS)	1000 🗸	Pack UVP Delay Time(mS)	1000
CHG OC Alarn(A)	105 🗸	CHG OT Alarm('C)	60 🔍	CHG UT Alarm('C)	0 ~	MOS OT Alars('C)	90
CHG OC Protect(A)	110 🗸	CHG OT Frotect("C)	65 v	CHG UT Protect("C)	-5 ~	MOS OT Protect("C)	115
CHG OCP Delay Time(mS)	1000 ~	CHG OTP Release("C)	<b>55</b> ~	CHG UTP Release("C)	0 ~	MOS OTP Release("C)	85
		DSG OT Alarm('C)	65 v	DSG UT Alara('C)	-15 v		
DSG OC Alarm(A)	105 v	DSG OT Protect("C)	70 🗸			ENV UT Alarm ("C)	-15
ISG OC 1 Protect(A)	110 🗸	DSG OTP Release("C)	60 ~	DSG UT Protect("C)	-20 ~	ENV UT Protect("C)	-20
DSG OCP 1 Delay Time(mS)	1000 🗸	Balance Threshold(V)	3.50 🗸	DSG UTP Release("C)	<b>-15</b> ~	ENV UTP Release("C)	-15
DSG OC 2 Protect(A)	150 🗸	Balance AVcell(mV)	30 ~	Pack FullCharge Voltage(V)	56.00 v	ENV OT Al arm ('C)	65
DSG OCP 2 Delay Time(nS)	100 ~	Sleep Vcell(V)	3.15 🗸	Fack FullCharge Current(sA)	2000 ~	ENV OI Alarm(C)	75
SCP Delay Time(uS)	300 ~	Delay Time(min)	5 v	SOC Low Alarm (%)	5 v	ENV OTP Release("C)	65

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#### ⑧ Click What needs to be modified

Cell OV Alarm(V)	3.55 🗸
Cell OV Protect(V)	3.60 ~
Cell OVP Release(V)	3.38 🗸
Cell OVP Delay Time(mS)	1000 ~

#### 9 Click Write All



#### 10 Complete the setup

#### 11.7 Other settings System Config:

ealtime Monitoring Multi Monitoring Nemory Info. Par	Setting System Config. Export Datas 🔁 🛱 😘 🌵 🕮 👕
Voltage(mV)	Capacity(mAH)
Vref Calibration	DesignCapacity
Pack Voltage Calibration	RemainCapacity
Current(mA)	FullCapacity
CHC Current Calibration Re	Read Write
Zero Current Calibration Re	Battery Cycle Setting
DSG Current (1000-60000mA) Calibration Re	Battery Cycle 0 🗘 Setting
Cell Number Setting	Inverter protocol
Cell Number V Setting	密码:
CHG Current Setting	CAN Protocol 🗸
Cho current setting	RS485 Protocol 🗸
Start Current(A) - Setting R	Туре
	Read Write
Gap Charge Setting	Manufacture Information
Gap Charge Threshold 🛛 🕓 Set	
	□ Clear text box after writing
	□ no-repeat BMS S/N 20 ~ Write
R: P16S100A-21234-1, 05   BMS S/N: 212341124700266H	: HC3GA068231010001 COMM: Normal 14:26:3

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① Inverter protocol:

	密码:		
CAN	Protocol	PYLON_CAN (德业_CAN)	v
RS485	Protocol	PYLON_485(德业_485)	~
	Type	Manual	~

② Inverter protocol selection:

Inverter protocol				
	密码:			
CAN	Protocol	PYLON_CAN(德业_CAN)	~	
RS485	Protocol	PACE CAN		
	Type	PYLON CAN (徳业 CAN) GROWATT_CAN Victron_CAN SE_CAN 鹏程_CAN SRD CAN		
Manufacture Informa	ation	SMA_CAN GOODWE_CAN		
□ Clear text box aft	er writin	Studer_CAN Sofar_CAN PV CAN		
no-repeat BM	IS S/N	JL_CAN TBB_CAN Aifu CAN		20 ~
-	· · · · [		_	

③ Click Read The setup is complete.

# 12. Dip switch

#### Switch setting

In the multi-machine parallel communication operation, you need to configure the DIP address of each

ON

PACK first. The DIP code adopts the BCD code format, the address of 0 is defined as (black dot is OFF state, blank is ON state, thesa me below),

address 1 address 2 address 2 address 2

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#### **Slave Setting (Tablel)**

Addr		Description			
Addi	#1	#2	#3	#4	Description
0	OFF	OFF	OFF	OFF	PackO
1	ON	OFF	OFF	OFF	Pack1
2	OFF	ON	OFF	OFF	Pack2
3	ON	ON	OFF	OFF	Pack3
4	OFF	OFF	ON	OFF	Pack4
5	ON	OFF	ON	OFF	Pack5
6	OFF	ON	ON	OFF	Pack6
7	ON	ON	ON	OFF	Pack7
8	OFF	OFF	OFF	ON	Pack8
9	ON	OFF	OFF	ON	Pack9
10	OFF	ON	OFF	ON	Pack10
11	ON	ON	OFF	ON	Pack11
12	OFF	OFF	ON	ON	Pack12
13	ON	OFF	ON	ON	Pack13
14	OFF	ON	ON	ON	Pack14
15	ON	ON	ON	ON	Pack15

BAT1-M M-Master S-Slave Ŭ - Ľ ON DIP ON DEP ON OF ON DIP ON DIP ON DIP ON DP Î ON OF ON OF ON DP 

#### 13. Host computer communicationa ddress code setting

Communication Input the current master or slave code system to be communicated in the system parameters of the host computer, and the communication can be detected and communicated. The BMS is configured in stand-alone working mode, and the DIP address can be any address; The BMS is configured in cascading working mode, and the DIP address is selected from 0 to 15 for different addresses.

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SHENZHEN PKNERGY ENERGY CO.,LTD Address: 9th Floor,Block B,Hongrongyuan North Station Center No. 32, Mintar ing Road, Longhua District,Shenzhen China. E-mail: sales@pknergy.com Website: http://www.pknergy.com