

Configuration Instruction

APS5000 Series Battery Module with Deye Inverter



Configuration Insutruction for Solar Storage System

Configuration Instruction of APS5000 with Deye Inverter Operation Manual



Information Version: V1.1

This manual introduces APS5000 from AESON POWER to configuration with Deye inverter to setting up as a solar storage system. Please read this manual before using and follow the instruction carefully during the installation process. Any confusion, please contact AESON POWER for advice and clarification.

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Instruction: The all operations must be performed by a qualified electrician, wearing protective gear and using professional tools.

1. Example of Appearance



**DEYE Inverter
(SUN-5K-SG04LP3-EU)**



APS5000 Battery Module Series

(1) Tools for Installation

1.1 Electrical Tools



Wire Stripping Pliers



Pliers for Multi-functional Network Cable



Screwdrivers



Sleeve Tool



Copper Nose Hydraulic Pliers



High-voltage insulated gloves

1.2 Communication Tools



RS232/485 two-in-one Communicator



8-core Network Cable with RJ45 Connector



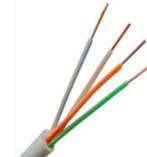
4-core Crystal Head with RJ11 Interface



RJ45 Crystal Head

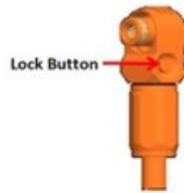


4 pairs of 8-core Twisted Pair Cables



4-core Telephone Line

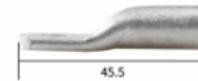
1.3 Special Accessories



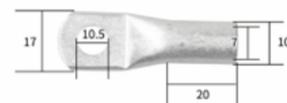
ES-BPC-C-16-25-OG-CONNECTOR/Phoenix



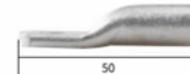
25-6 Lug



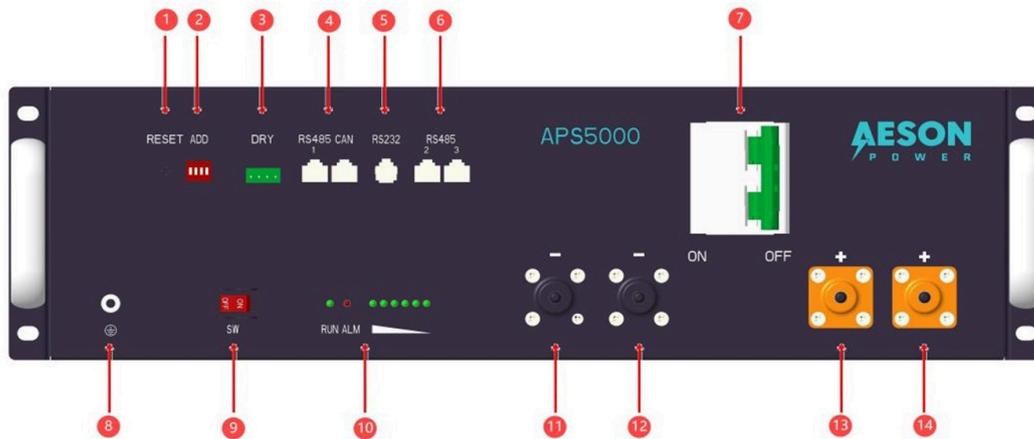
25-8 Lug



25-10 Lug



2. Schematic Diagram of Interface



APS5000 Interface Diagram

1. RESET: Long press 3~6 seconds to hibernate or activate BMS;

Long press 6~10 seconds to reset BMS

2. ADD: DIP switches and it needs to avoid the address set to the same. (See Figure 1 below)

3. DRY Contactor:

Dry contactor which is used to turn on or turn off low voltage or low current signals, commonly used in input end of sensors, buttons, switches and other equipment (see Figure 2 below)

4. RS485① and CAN:

This interface is used to communicate with the inverter, when this battery is the master, it can summarize the slave data and communicate with the inverter.

CAN default baud rate 500K, RS485 default baud rate 9600bps.

5. RS232:

This interface communicates with the upper computer to monitor various information of the battery, including the main protocol settings.

RS232 baud rate default 9600bps.

6. RS485② and RS485③:

Internal communication interface between batteries, mainly used for parallel operation and can also be used to communicate with the upper computer to monitor various information of the battery. However, it is not possible to set the protocol settings.

RS485 baud rate default 9600bps.

7. Double Pole Air Breaker:

Connect or disconnect battery power input and output, which need to be turned on before charging and discharging after the BMS works.

Parameter: type C, rated voltage 160V/DC, rated current 125A, ICU: 10kA.

8. Earthing: For battery earthing

9. SW: BMS switch, turn on the BMS to start working. After there is no abnormality, then turn on the breaker.

10. Running and Alarm: LED indicators .

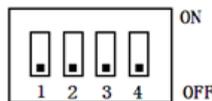
11. Negative connector①: Negative of power input/output①①

12. Negative connector②: Negative of power input/output②②

13. Positive connector①: Positive of power input/output①①

14. Positive connector②: Positive of power input/output②②

ADD	DIP 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

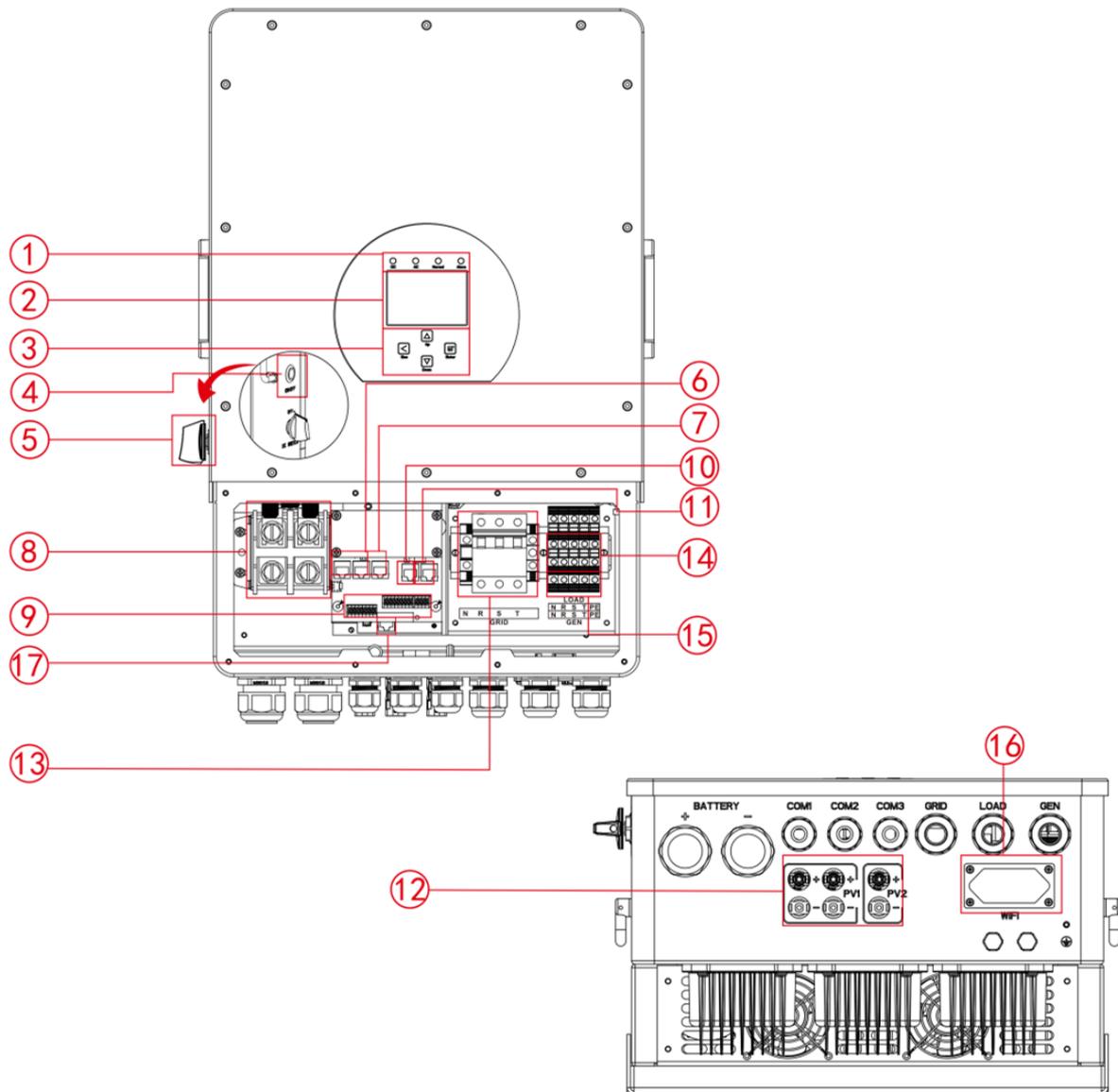


1	NO1
2	COM1
3	NO2
4	COM2



Figure1: DIP Switch Setting Definition

Figure2: DRY Contactor Definition



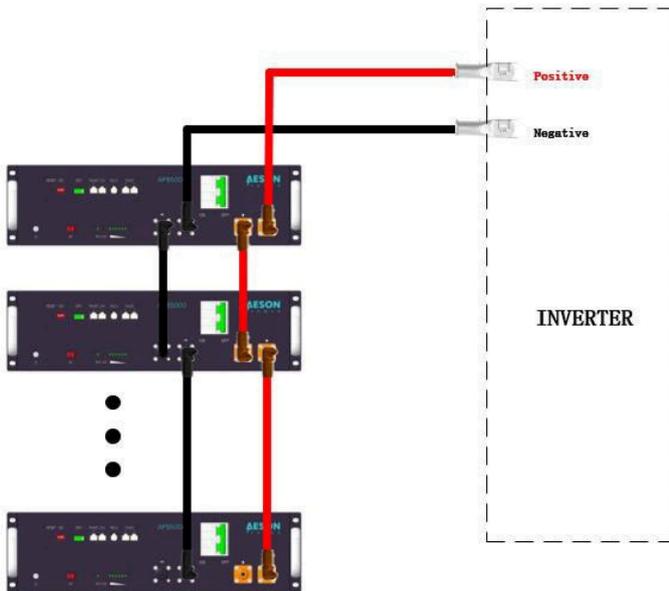
- | | | |
|------------------------|-----------------------------|------------------------------|
| 1: Inverter indicators | 7: Meter-485 port | 13: *Circuit breaker of Grid |
| 2: LCD display | 8: Battery input connectors | 14: Load |
| 3: Function buttons | 9: Function port | 15: Generator input |
| 4: Power on/off button | 10: Modbus port | 16: WiFi Interface |
| 5: DC switch | 11: BMS port | 17: DRM port |
| 6: Parallel port | 12: PV input with two MPPT | |
- * for some hardware versions, the circuit breaker of Grid is not existed

Inverter Interface Diagram (Example is SUN-5K-SG04LP3-EU)

3. Electrical Wiring Instructions between Deye and APS5000

(1) Internal Wiring of the APS5000

1.1 Electrical Wiring for Outputs Under 5KW

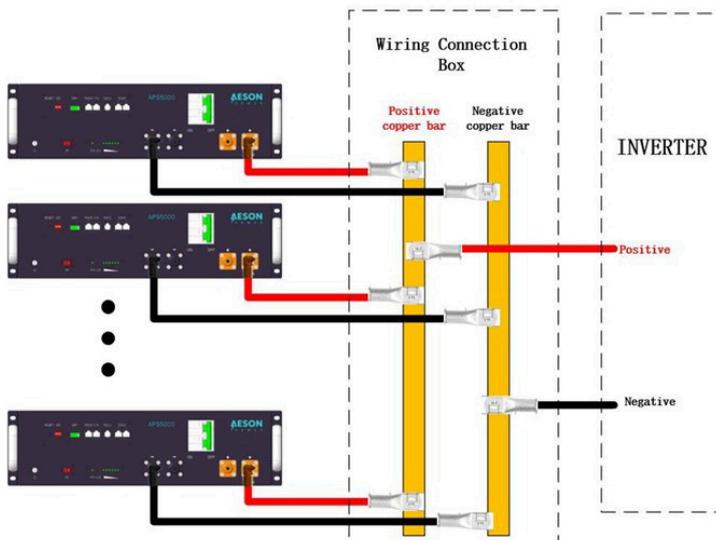


Use 4AWG gauge pure copper flexible wire with ES-BPC-C-16-25-OG CONNECTOR/Phoenix. The positive terminal of each of the two batteries is connected to the positive terminal and the negative terminal is connected to the negative terminal. Up to 15 batteries in parallel.

This connection scheme is A-type parallel connection method to extend the capacity. And the total rated current is still 100A after parallel connection, and the rated capacity changes from 100Ah to 100*N Ah (N is the number of batteries). Up to 15 batteries in parallel.

Note: The inverter power of this solution does not exceed 5kW, otherwise there may be a safety hazard if it exceeds the current carrying range of the connector.

1.2 Electrical Wiring for Outputs Above 5KW



One end of the connection cable is ES-BPC-C-16-25-OG-CONNECTOR/Phoenix and the other end is the copper nose which is the corresponding size with the junction box. The wire specification is 4AWG pure copper flexible wire. The positive terminal of each battery group is connected to the total positive copper row, and the negative terminal of each battery group is connected to the total negative copper row.

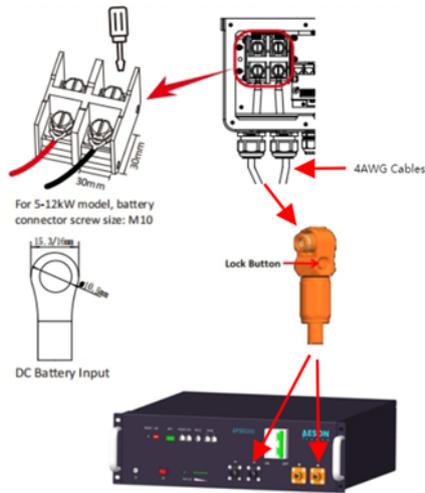
This connection scheme is a B-type parallel connection method to extend the power. And the total rated power is 5.12*N (kW) (N is the number of batteries) after parallel connection. The total rated power after parallel connection is based on the BATTERY INPUT of the inverter.

Up to 15 batteries in parallel.

Note: Consumable equipment is not included in the APS5000 list, such as junction boxes, copper rows, copper row connecting wires, copper noses, etc. And these need to be purchased by yourself. If the power of the inverter is M kw, the battery required is at least $1+(M/5.12)$ integer value. If the inverter power exceeds 5.12*N (KW) (N is the number of batteries), the batteries will be disconnected by triggering the overcurrent protection.

(2) External Wiring of APS5000 and DEYE Inverters

Connect the wiring harness of inverter and the APS5000 power supply



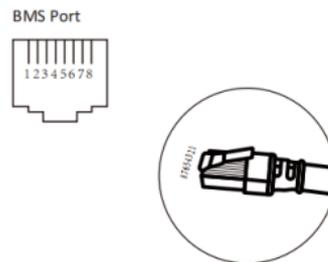
According to the dimensions specified in the BAT+ and BAT- of the DEYE inverters, use copper nose hydraulic pliers to fix the applicable M6 / M8 / M10 copper nose to one end of the 4 AWG specification to connect the inverter. At the other end, the ES-BPC-C-16-25-OG-CONNECTO RPhoenix terminal is fixed for connecting the APS5000, which is a self-locking button type.

The power cable is fixed to the inverter BAT+ and BAT- respectively according to the positive and negative poles by using a socket tool of suitable size, and the battery end is directly buckled ES-BPC-C-16-25-OG-CONNECTOR / Phoenix.

4. Communication Wiring Instructions between Deye and APS5000

(1) Pin Definition

RJ45 Pin	Definition notes
1、 2、 3、 6、 7、 8	NC
4	CAN-H
5	CAN-L



Definition Of DEYE INVERTER CAN Port

CAN - Use 8P8C vertical RJ45 sockets	
RJ45 Pin	Definition notes
1、 3、 6、 7、 8	NC
4	CAN-H
5	CAN-L
2	GND

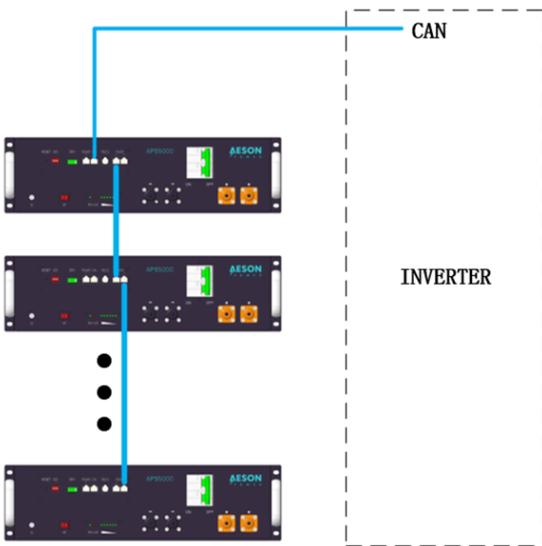
Definition of APS5000 CAN Port to DEYE INVERTER

RS485 - Use 8P8C vertical RJ45 sockets		RS485 - Use 8P8C vertical RJ45 sockets	
RJ45 Pin	Definition notes	RJ45 Pin	Definition notes
1、 8	RS485-B	1、 8	RS485-B
2、 7	RS485-A	2、 7	RS485-A
3、 6	GND	3、 6	GND
4、 5	NC	4、 5	NC

Definition of APS5000 Parallel RS485 to Another APS5000

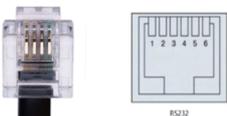
RS232 - Use 6P6C vertical RJ11 sockets	
RJ11 Pin	Definition notes
1、 2、 6	NC
3	TX (single board)
4	RX (single board)
5	GND

(2) Internal Wiring of the APS5000

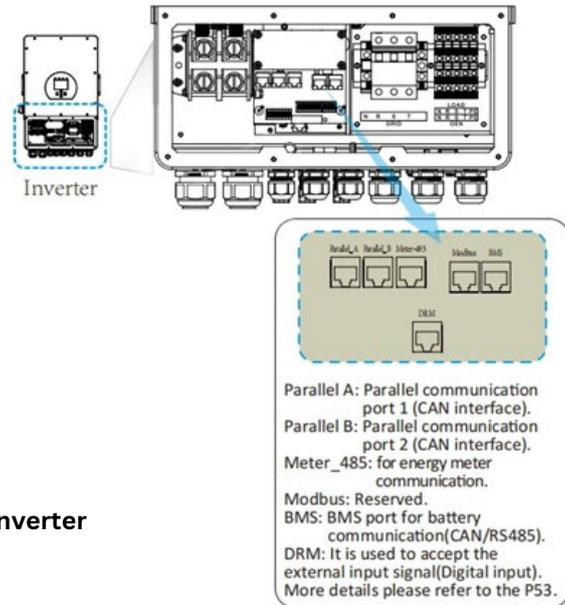


- 2.1 The number of batteries is at least 2 units and up to 15 units.
- 2.2 The internal interface is unified as Parallel RS485.
- 2.3 Connection cable is an 8-core network cable with RJ45 connector.
- 2.4 The host address must be 1 which is responsible for communicating with the inverter.
- 2.5 Other slave addresses can be any one of 2-15.
- 2.6 Addresses cannot be duplicated.
- 2.7 The communication wiring is the same for the A-type parallel connection method and the B-type parallel connection method as shown in the figure below.

The communication wiring for A-parallel method and B-parallel method



Definition Of APS5000 R232 Port for PC program



Definition of Communication Port of Deye Inverter

(3)External Wiring of APS5000 and DEYE Inverters.

ADD	DIP 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



3.1 APS5000 Master DIP setting shows below.

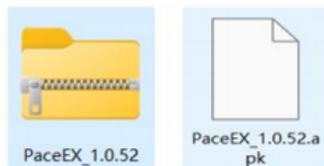
3.2 The APS5000 communication interface is a CAN port and the other RS485 port is reserved.

3.3 The communication interface of the DEYE inverter is CAN port for BMS of Li-ion battery.

3.4 The connection cable is an 8-core network cable with RJ45 connector.

5. Protocol Setting Instructions between Deye and APS5000

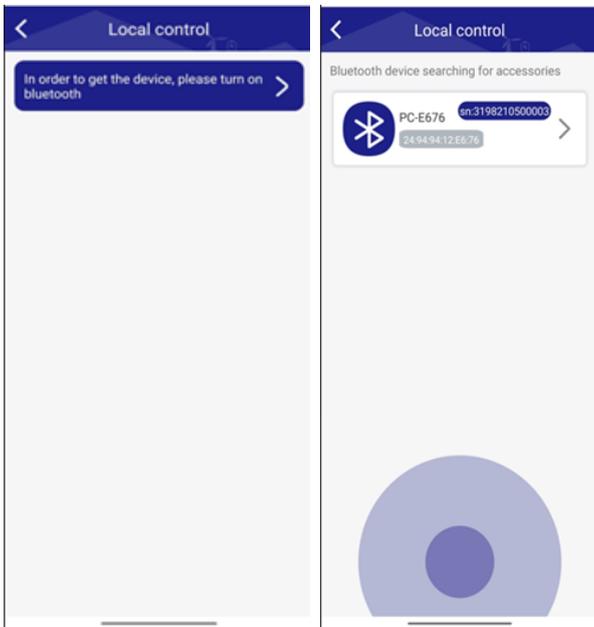
(1)Bluetooth Connection



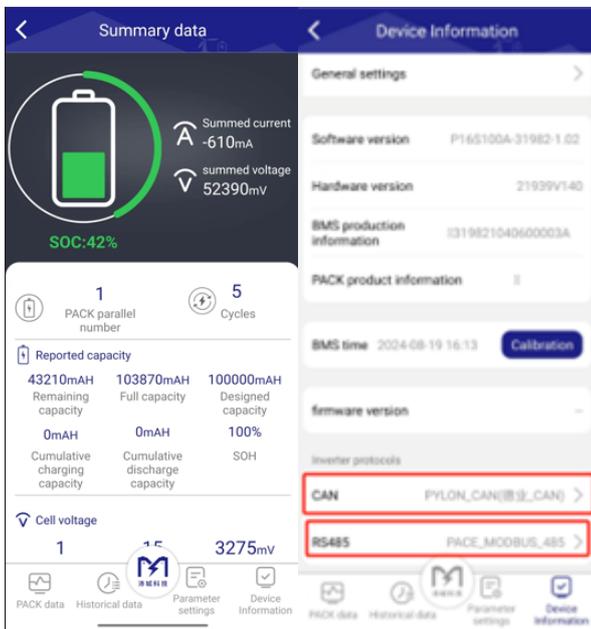
1.1 For Android phones, unzip software package and install the PaceEX. For IOS phones, search and download the PACEEX BMS software in the Apple Store.



1.2 The homepage of phone software. Local control is for Bluetooth connection and remote control is for WIFI connection.



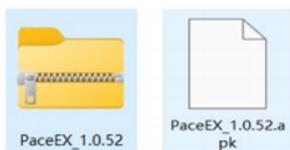
1.3 Check that SW switch of the battery is ON. Turn on the Bluetooth switch of the phone. Click the Local control, Select, and click the battery pack with the corresponding SN code.



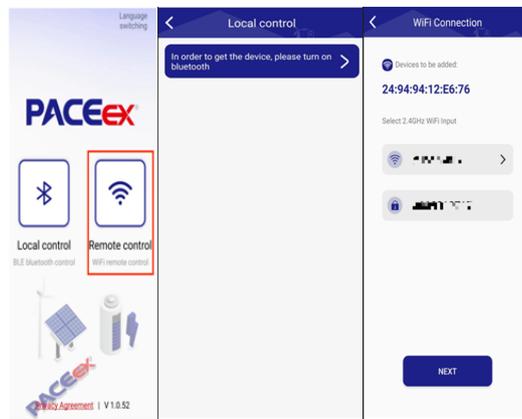
1.4 You can see PACK data, Historical data, Parameter Settings and Device Information.

Click Parameter Settings which can choose the Protocol.

(2) WIFI Connection

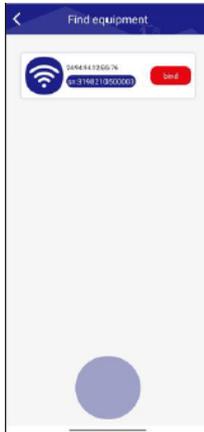


2.1 For Android phones, unzip software package and install the PaceEX.apk For IOS phones, search and download the PACEEX BMS software in the Apple Store.



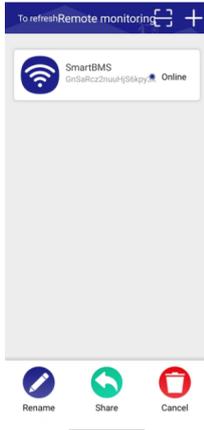
2.2 Check that SW switch of the battery is ON. Turn on the WIFI switch of the phone. Click the Remote control, input recent WIFI username and password.

Then click Next.



2.3 Select and click to bind the battery in the corresponding SN code. Bluetooth may not be connected, and other mobile phone accounts cannot bind this battery. Next, you can connect via WIFI to view battery information. If the WIFI network can connect to the internet, you can also view the battery information remotely via data networks. Of course, connection speed depends on the distance between the battery and WIFI signal, WIFI signal strength, internet network speed, etc.

Recommendation: It is not recommended to set battery parameters via WIFI at a long distance because of poor signal stability, which may lead to errors.



2.4 Press and hold the battery pop-up option to rename, share, or delete the battery. After delete the battery, other mobile phone accounts can bind this battery.

6. Battery Parameters

(1)APS5000 Internal Parameter Settings

Realtime Monitoring				Multi Monitoring				Memory Info.				Parameter Setting				System Config.				Export Data				Change Language							
<input checked="" type="checkbox"/>	Cell OV Alarm(V)	3.60		<input checked="" type="checkbox"/>	Pack OV Alarm(V)	57.60		<input checked="" type="checkbox"/>	Cell UV Alarm(V)	2.75		<input checked="" type="checkbox"/>	Pack UV Alarm(V)	44.00																	
	Cell OV Protect(V)	3.65			Pack OV Protect(V)	58.40			Cell UV Protect(V)	2.50			Pack UV Protect(V)	40.00																	
	Cell OVP Release(V)	3.33			Pack OVP Release(V)	52.80			Cell UVP Release(V)	3.10			Pack UVP Release(V)	49.60																	
	Cell OVP Delay Time(mS)	1000			Pack OVP Delay Time(mS)	1000			Cell UVP Delay Time(mS)	1000			Pack UVP Delay Time(mS)	1000																	
<input checked="" type="checkbox"/>	CHG OC Alarm(A)	105		<input checked="" type="checkbox"/>	CHG OT Alarm(°C)	45		<input checked="" type="checkbox"/>	CHG UT Alarm(°C)	5		<input checked="" type="checkbox"/>	MOS OT Alarm(°C)	90																	
	CHG OC Protect(A)	110			CHG OT Protect(°C)	50			CHG UT Protect(°C)	0			MOS OT Protect(°C)	115																	
	CHG OCP Delay Time(mS)	1000			CHG OTP Release(°C)	45			CHG UTP Release(°C)	5			MOS OTP Release(°C)	85																	
<input checked="" type="checkbox"/>	DSG OC Alarm(A)	105			DSG OT Alarm(°C)	60			DSG UT Alarm(°C)	-15		<input checked="" type="checkbox"/>	ENV UT Alarm(°C)	-15																	
	DSG OC 1 Protect(A)	110			DSG OT Protect(°C)	65			DSG UT Protect(°C)	-20			ENV UT Protect(°C)	-20																	
	DSG OCP 1 Delay Time(mS)	1000			DSG OTP Release(°C)	60			DSG UTP Release(°C)	-15			ENV UTP Release(°C)	-15																	
	DSG OC 2 Protect(A)	150			Balance Threshold(V)	3.50			Pack FullCharge Voltage(V)	56.00			ENV OT Alarm(°C)	55																	
	DSG OCP 2 Delay Time(mS)	500			Balance ΔVcell(mV)	30			Pack FullCharge Current(mA)	2000			ENV OT Protect(°C)	65																	
	SCP Delay Time(μS)	300			Sleep Vcell(V)	3.15			SOC Low Alarm(%)	5			ENV OTP Release(°C)	55																	
					Delay Time(min)	5																									

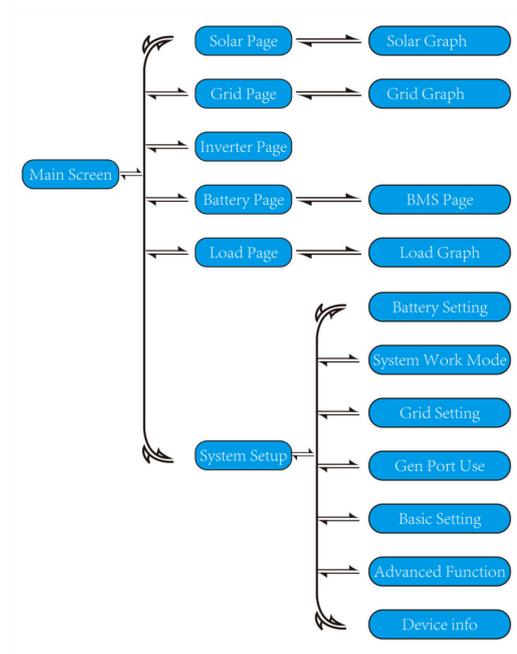
Read All
Write All
Reset Setting
Import
Export
Set As Default

Suggestion for Temperature, Voltage and Current List

Environment Temperature	Discharge Cut-off Voltage	Charge Cut-off Voltage	Charge Current	Discharge Current
25°C ± 2°C	40V	57.6V	20A	100A

(2)Related Settings of DEYE Inverter

2.1 SETTING GUIDER



2.2 BATTERY SETTING

Battery Setting

Batt Mode: Lithium (selected), Use Batt V, Use Batt %, No Batt. Max A Charge: 40A, Max A Discharge: 40A. Activate Battery:

Battery capacity: it tells Deye hybrid inverter to know your battery bank size.
Use Batt V: Use Battery Voltage for all the settings (V).
Use Batt %: Use Battery SOC for all the settings (%).
Max. A charge/discharge: Max battery charge/discharge current (0-120A for 5kW model, 0-150A for 6kW model, 0-190A for 8kW model, 0-210A for 10kW model, 0-240A for 12kW model).
 For AGM and Flooded, we recommend Ah battery size × 20% = Charge/Discharge amps.
 For Lithium, we recommend Ah battery size × 50% = Charge/Discharge amps.
 For Gel, follow manufacturer's instructions.
No Batt: tick this item if no battery is connected to the system.
Active battery: This feature will help recover a battery that is over discharged by slowly charging from the solar array or grid.

Battery Setting

Start: 30%, A: 40A, Gen Charge: , Grid Charge: , Gen Signal: , Grid Signal: , Gen Max Run Time: 24.0 hours, Gen Down Time: 0.0 hours.

This is Battery Setup page.
Start =30%: Percent S.O.C at 30% system will AutoStart a connected generator to charge the battery bank.
A = 40A: Charge rate of 40A from the attached generator in Amps.
Gen Charge: uses the gen input of the system to charge battery bank from an attached generator.
Gen Signal: Normally open relay that closes when the Gen Start signal state is active.
Gen Max Run Time: It indicates the longest time Generator can run in one day, when time is up, the Generator will be turned off. 24H means that it does not shut down all the time.
Gen Down Time: It indicates the delay time of the Generator to shut down after it has reached the running time.

This is Grid Charge, you need select.
Start =30%: No use, Just for customization.
A = 40A: It indicates the Current that the Grid charges the Battery.
Grid Charge: It indicates that the grid charges the battery.
Grid Signal: Disable.

07/08/2021 11:11:10 Thu

This page tells the PV and diesel generator power the load and battery.

2.2.1 Select Lithium, setting value of Max A Charge and Max A Discharge can not be greater than 100A. It is recommended to set the START setting by 10% to 30%.

Generator

Power: 6000W Today=10 KWH
 Total =10 KWH

V_L1: 230V P_L1: 2KW
 V_L2: 230V P_L2: 2KW
 V_L3: 230V P_L3: 2KW

This page tells generator output voltage, frequency, power. And, how much energy is used from generator.

Battery Setting

Lithium Mode

Shutdown

Low Batt

Restart

Batt Set3

Lithium Mode: This is BMS protocol. Please reference the document (Approved Battery).

Shutdown 10%: It indicates the inverter will shutdown if the SOC below this value.

Low Batt 20%: It indicates the inverter will alarm if the SOC below this value.

Restart 40%: Battery voltage at 40% AC output will resume.

Battery Setting

Float V Shutdown

Absorption V Low Batt

Equalization V Restart

Equalization Days TEMP(CO)(mV/C/Cell) -5

Equalization Hours Batt Resistance

Batt Set3

There are 3 stages of charging the Battery . ①

This is for professional installers, you can keep it if you do not know. ②

Shutdown 20%: The inverter will shutdown if the SOC below this value.

Low Batt 35%: The inverter will alarm if the SOC below this value. ③

Restart 50%: Battery SOC at 50% AC output will resume.

2.2.2 Set as needed and it is recommended to follow the default parameters as shown in the picture.

CONTACT US

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