

# PBAT Battery Monitoring System Installation Instruction Manual V3.3

1 – 1 Solution



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## 1. Precautions

### **When measuring lines are installed:**

1. It is recommended to use a torque wrench , please refer to the parameters provided by the battery manufacturer for the torque size.
2. It is recommended to use insulating gloves when installing measuring lines.
3. To prevent the measuring wire from touching the positive and negative electrodes of other batteries , and the battery holder.

### **When battery cell sensor is installed:**

1. Battery cell sensor breathing light facing outward , ensuring that measuring lines are firmly installed and then plugged directly.
2. When pasting 3M glue , it is necessary to clean the surface of the battery ,and make the battery cell sensor clip is clean and dry . Pasting 3M glue adhesive on the clip at first , and then pasting the clip on the surface of the battery , pressing for 30-60s,it is recommended to install battery cell sensor after 24 hours.

### **When battery cell sensor communication lines are installed:**

- 1.It is need to follow the rules of “left in and right out” between battery cell sensors.(For details , refer to the step 2 of Chapter 4)
- 2.Communication lines should be installed in the slot , or away from the strong cable.

### **When battery string sensor is installed:**

- 1.The string voltage terminals are connected to the positive and negative poles of the entire battery , it is recommended to connect a fuse in series.(Refer to the installation diagram in Chapter 2)

Note :The string voltage can be calculated by the unit accumulation method , for details , refer to the commissioning manual.

2. When battery count in the group is less than or equal to 60,connect Com1 directly to the first battery cell sensor.

When battery count in the group is greater than 60,it is recommended to adopt the connection mode of Com1 and Com2 dividing battery cell sensor.

For example :

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- ① When battery count in the group is 40, connect Com1 directly to the first battery cell sensor.
- ② When battery count in the group is 80, connect Com1 to the battery cell sensor from 1 to 40, connect Com2 to the battery cell sensor from 41 to 80.

**When Hall sensor is installed:**


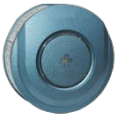


















1. There are some direction requirements ,there is a black arrow above the Hall , the direction of the arrow is consistent with the direction of the current.
2. Try to make the cable through the Hall at a vertical angle.
3. Hall is generally installed in:
  - ①the electrode cable of UPS positive ,that is the positive of the first battery.
  - ②the electrode cable of the last battery negative , that is UPS negative.

**When intelligent gateway is installed:**

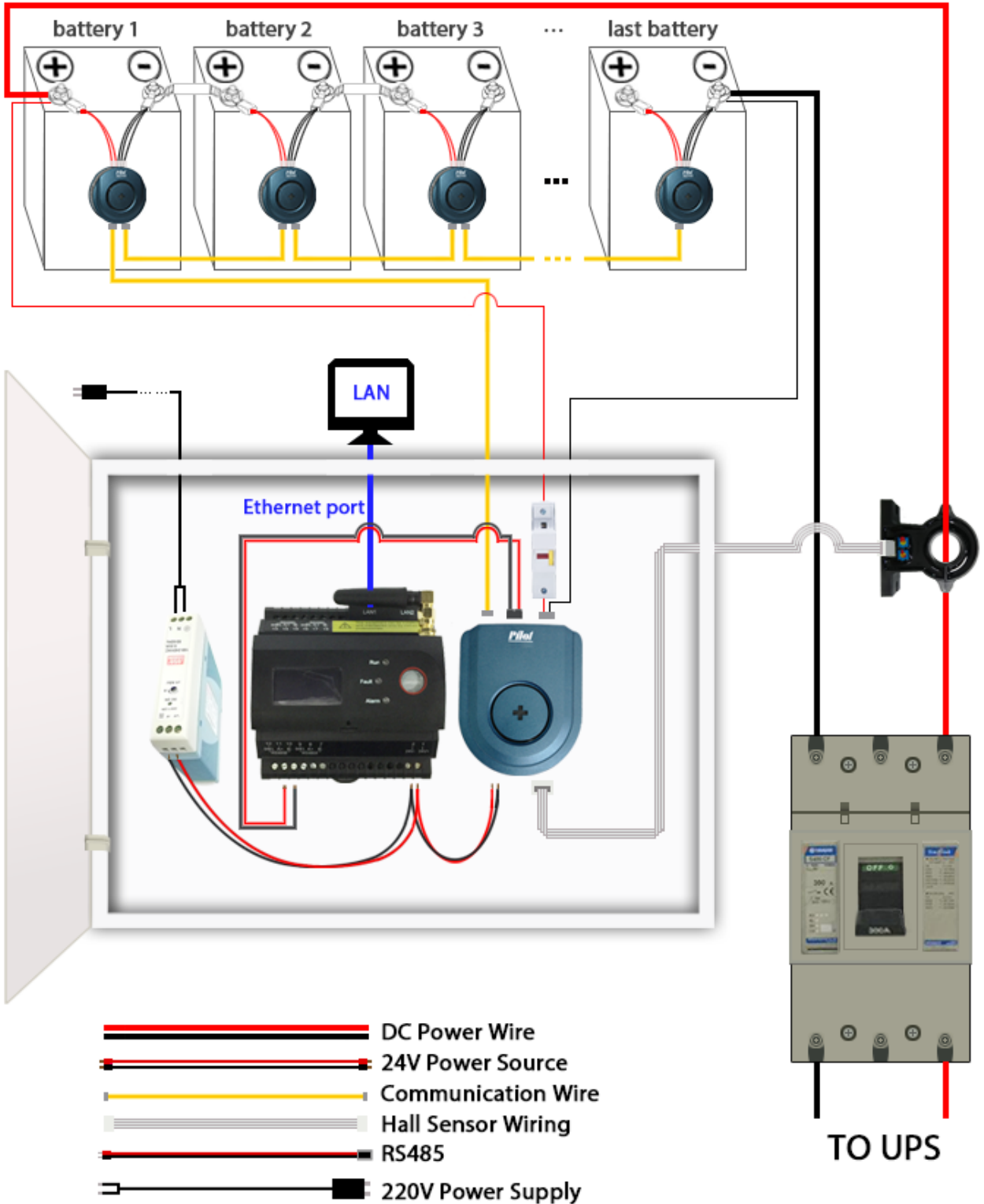
There is RS485A/B/C /D above the intelligent gateway,RS485A represents battery pack 1, RS485B represents battery pack 2, RS485C represents battery pack 3, RS485D represents battery pack 4,connect PBAT600 respectively.

Note : There is a special selection PBAT-GATE 2Z,only two sets of batteries are supported.

## 2. Product list

Model	Equipment diagram	Diagram
PBAT 61-02 / 61-12 Battery cell sensor		
PBAT 600 Battery string sensor		
PBAT-Gate Intelligent gateway		
24V DC power supply		
Hall sensor (Measuring string current)		
Battery measuring line (6Pin, U type connector, Φ8mm)		
Battery measuring line (6Pin, O type connector, Φ8mm)		
Battery cell sensor communication line (DL-BUS communication, RJ11 connector)		
RS485 communication line		
Hall connection line		

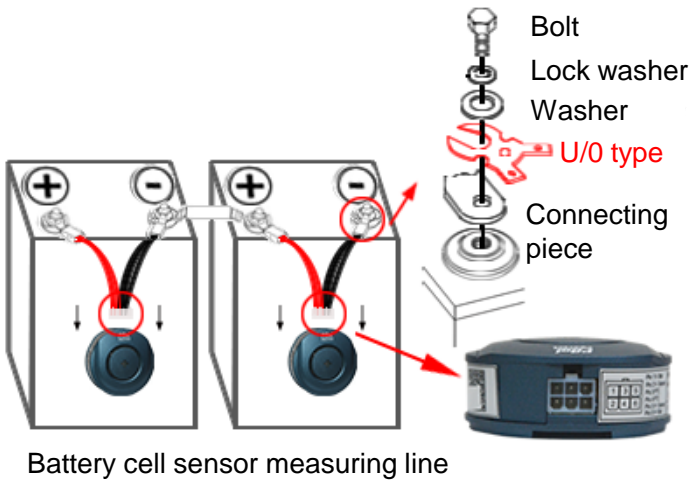
### 3. Wiring diagram(Take a group of batteries as an example)



## 4. Installation steps

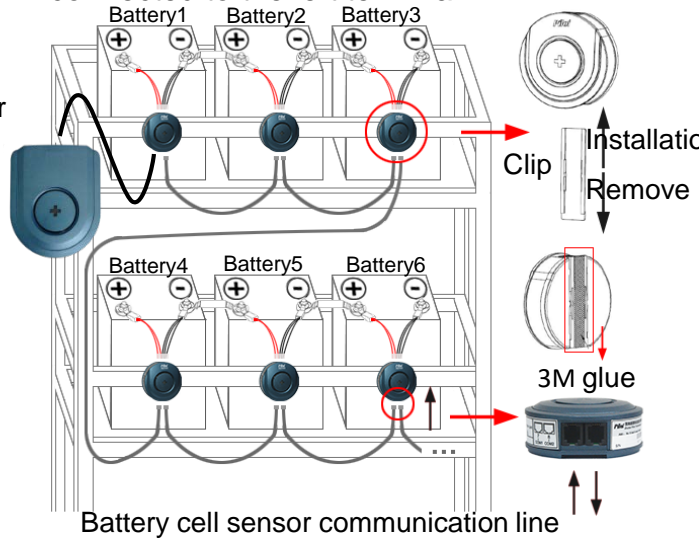
### Step1:

Connect the measuring lines of battery cell sensor, red terminal end positive and black terminal end negative.



### Step2:

Connect the communication lines of battery cell sensor, it is need to follow the rules of "left in and right out" between battery cell sensors, the last battery cell sensor is only connected to the left terminal.



### Step3 :

Connect the 24V power supply of PBAT600, Hall, group voltage, intelligent gateway, the first battery cell sensor.

DC power cord in this group of batteries

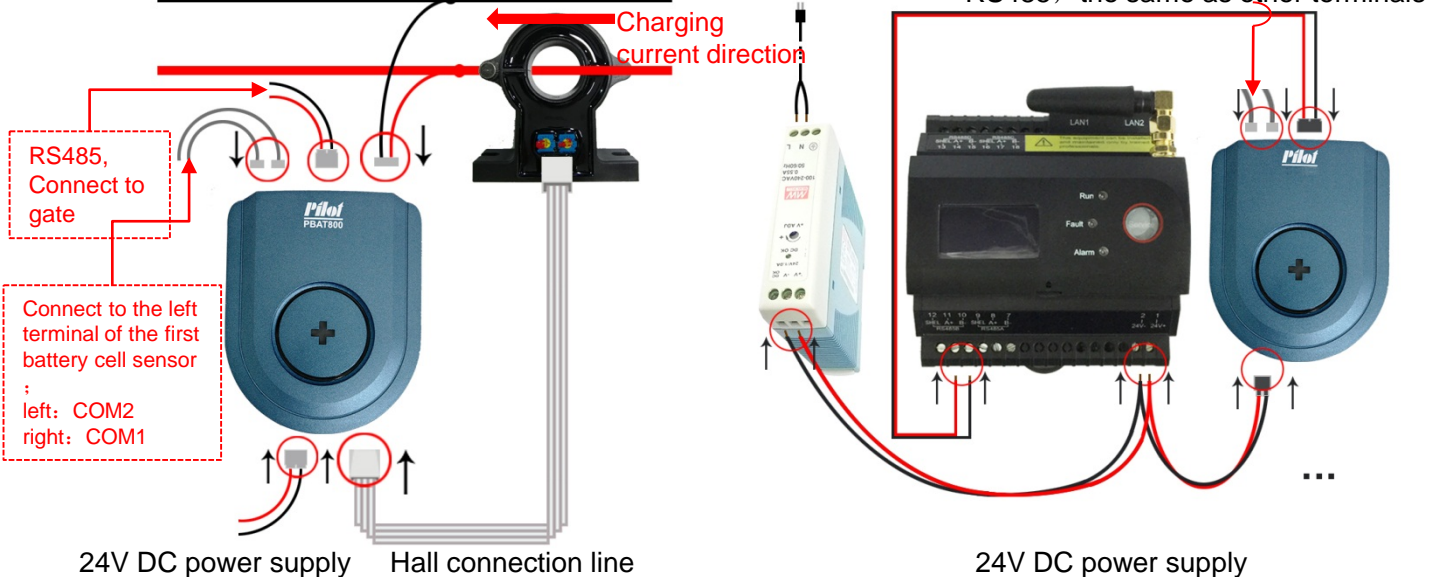
### Step4:

Connect PBAT600 to the RS485A/B/C/D port of intelligent gateway through RS485 line.

Connect to the left terminal of the first battery cell sensor  
left: COM2 right: COM1

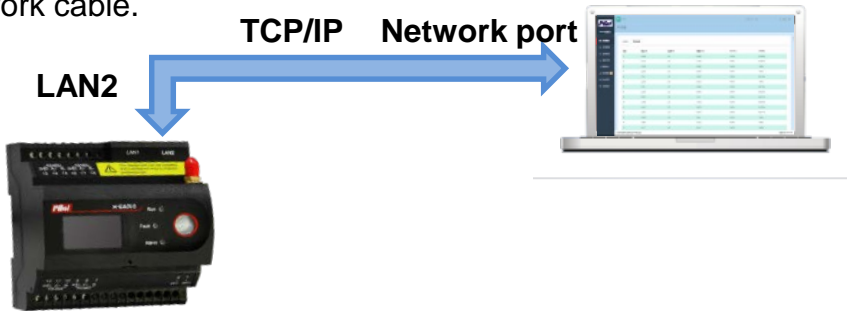
220V AC power supply,  
Comes from UPS

RS485, the same as other terminals

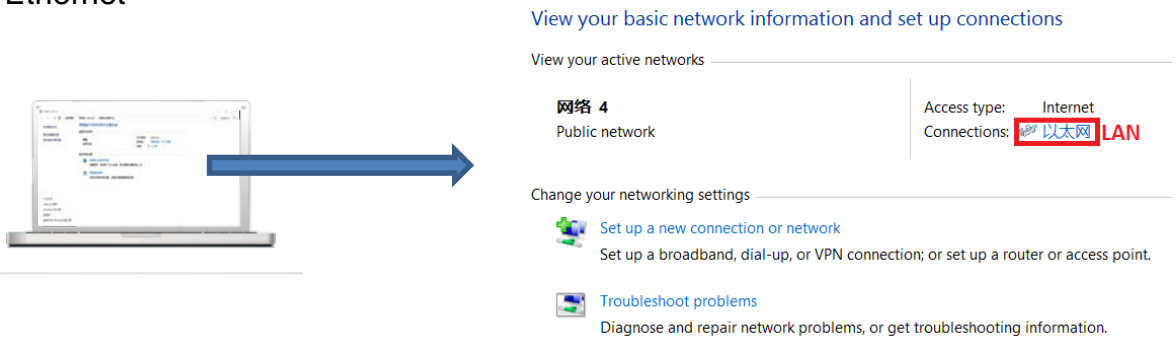


## 5. System basic commissioning

Step1: Connect the LAN2 port of the intelligent gateway to the computer network port by using a network cable.



Step2: Enter “Control Panel” →Open “Network and Sharing Center” →Click “Ethernet”



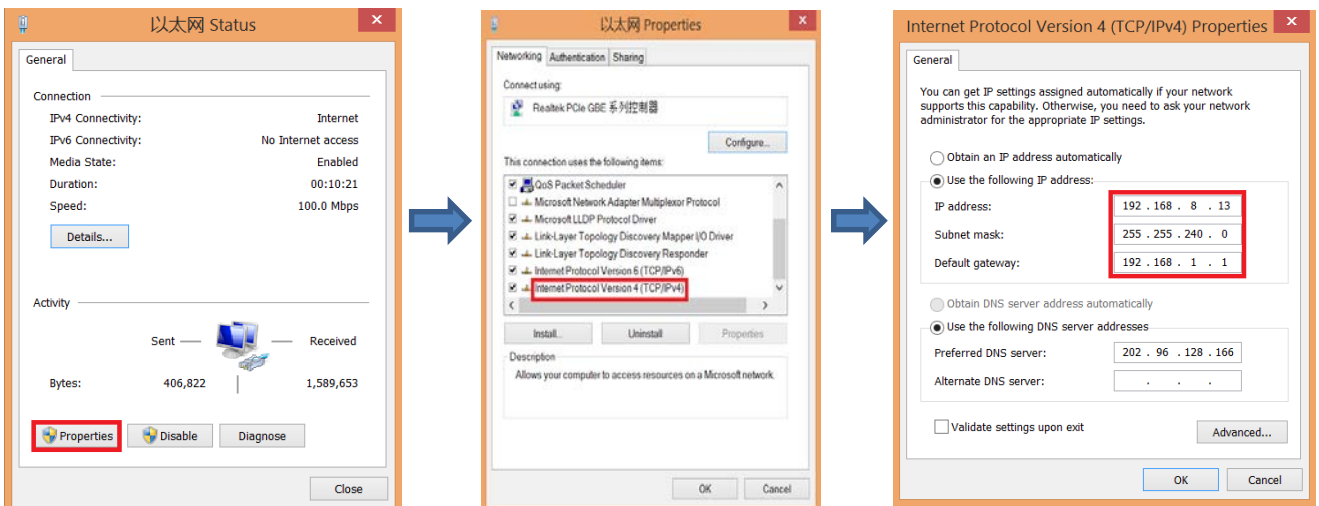
Step3: Click “Properties” → “Internet Protocol Version 4 (TCP/IPv4)” → “Use the following IP address”

Modify IP address : 192.168.16.X

Subnet mask : 255.255.255.0

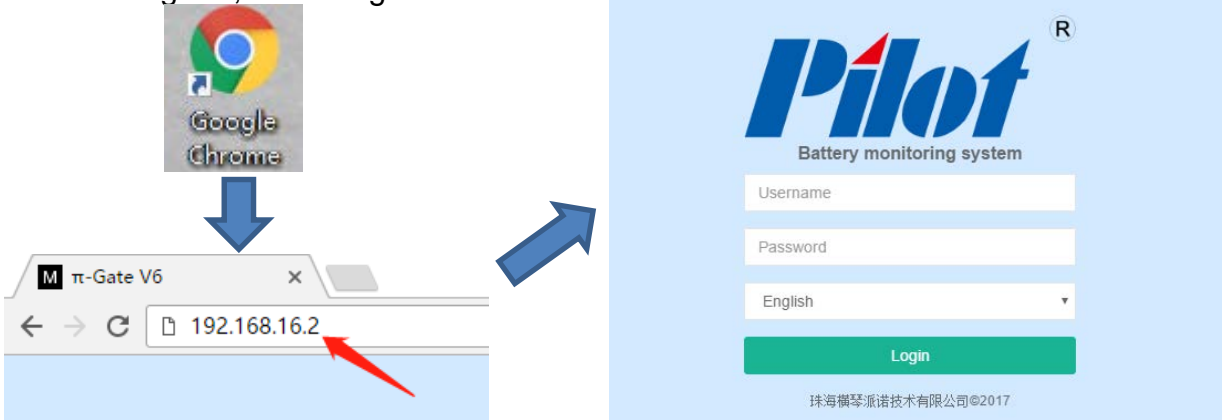
Default gateway : 192.168.1.1

Note: The modified IP address should not be the same as the network address of the battery gateway , it is not allowed to change the IP address to 192.168.16.2,subnet mask and default gateway address can be modified for local area network.





Step4:Download Google Chrome , enter the address “192.168.16.2” after opening ,enter the login screen . Default username: admin , password: admin , choose a language : Chinese/English , click “Login”.

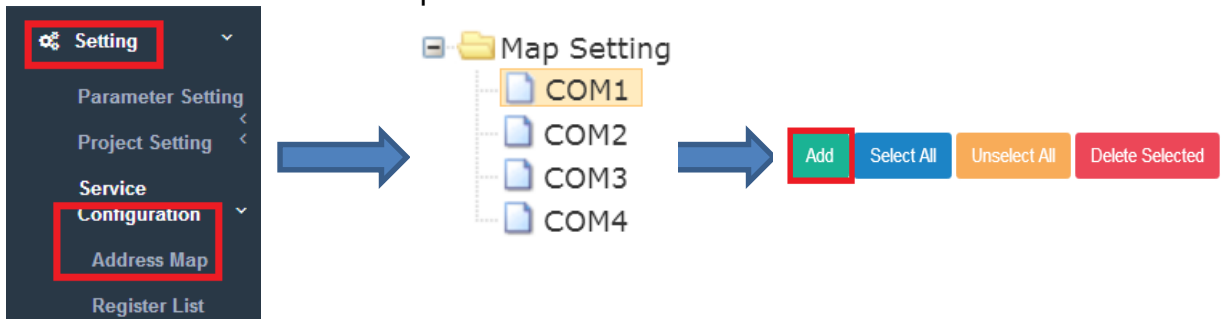


Step5:Select the left menu “Setting” → “Configuration” → “Address Map” Make communication setting.

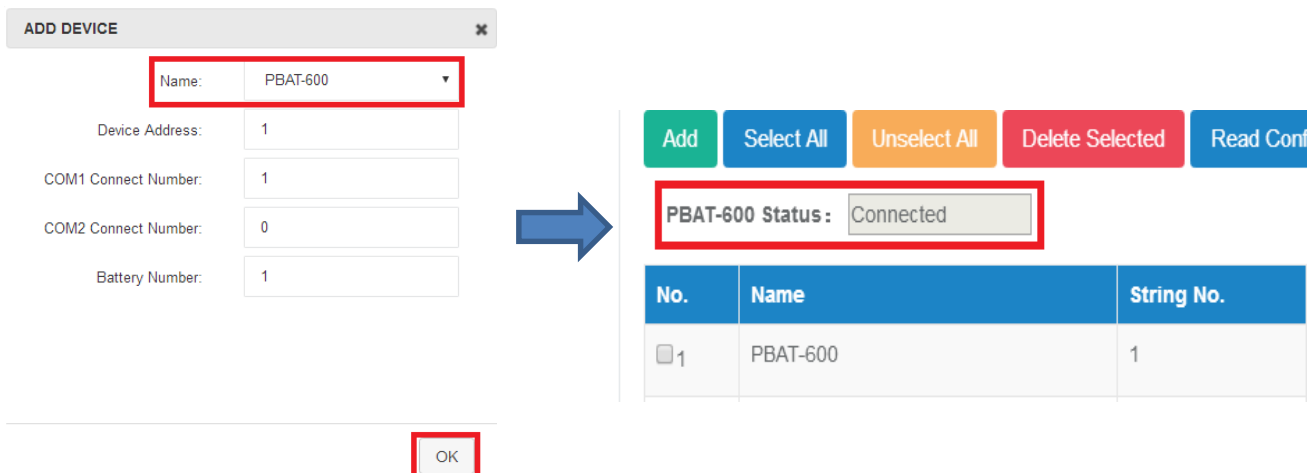
The COM1 to COM4 of the Map Setting is corresponding to the four interfaces “RS485A/B/C/D” of intelligent gateway , and corresponding to battery1 to battery4.

Note: There are only two RS485A/B interfaces for PBAT-GATE-2Z selection.

Click “Add” to enter the next step.



Step6: Add device name: PBAT600,then click “OK” , waiting for PBAT-600 Status: **Connected** , show that connected completed.

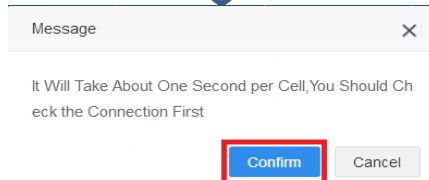


Step7: After PBAT600 is connected , click “SN Auto Sensing”

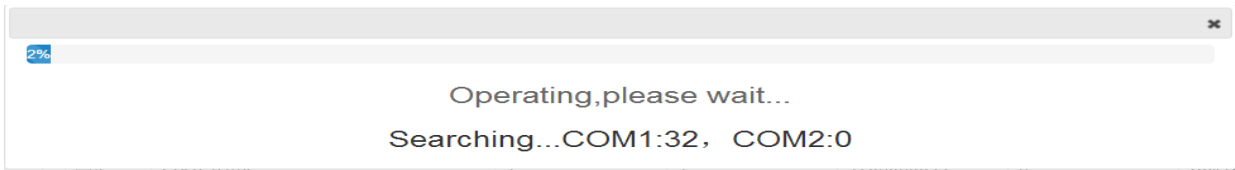


PBAT-600 Status: Connected

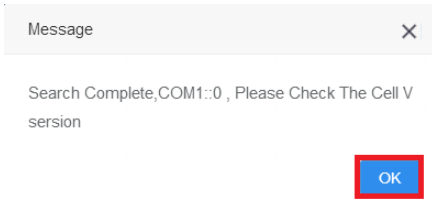
Click “Confirm”



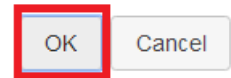
Searching for address



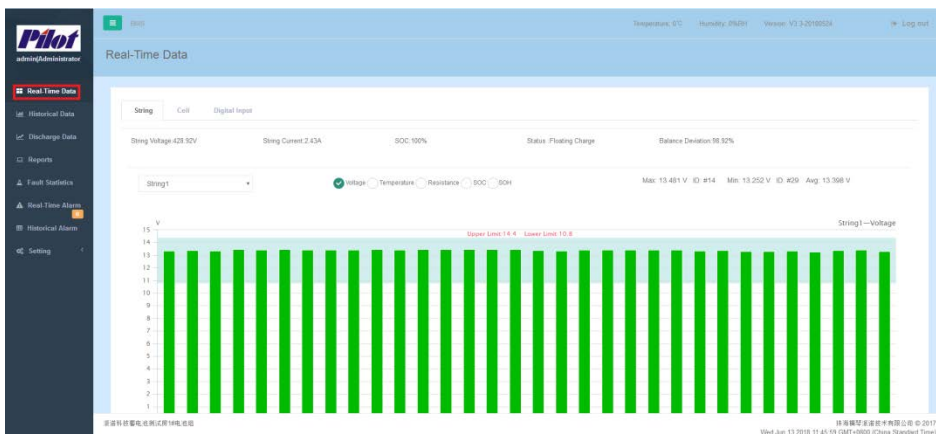
Click “OK” → “OK”



Name	String No.	Channel No.	Device Address	1st Cell Node	Node
PBAT-600	1	1	1	32	String
PBAT-6162	1	1	1705030021	1	Cell Device-COM1
PBAT-6162	1	1	1705030027	2	Cell Device-COM1
PBAT-6162	1	1	1705030044	3	Cell Device-COM1
PBAT-6162	1	1	1705030010	4	Cell Device-COM1
PBAT-6162	1	1	1705030019	5	Cell Device-COM1
PBAT-6162	1	1	1705030002	6	Cell Device-COM1
PBAT-6162	1	1	1705030033	7	Cell Device-COM1
PBAT-6162	1	1	1705030020	8	Cell Device-COM1
PBAT-6162	1	1	1705030028	9	Cell Device-COM1
PBAT-6162	1	1	1708220141	10	Cell Device-COM1



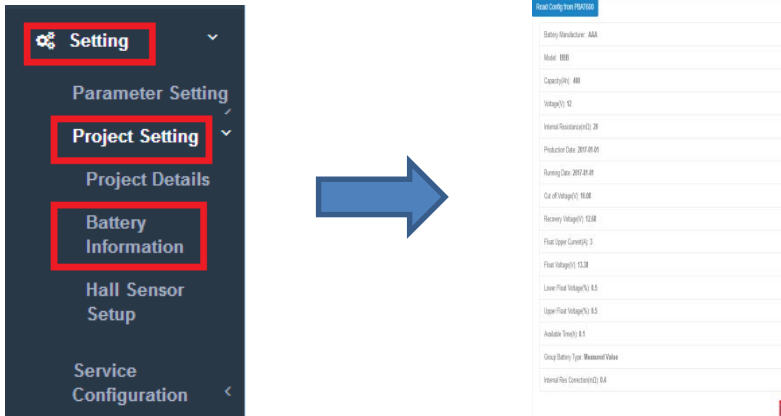
Click “OK” , return to real-time data interface



## 6. Battery information setting

**Step1:** Select the left menu “Setting” → “Project Setting” → “Battery Information” ;

**Step2:** Click “Modify ” in the lower right corner;



**Step3:** Fill in the information on the surface of the battery , and click “Confirm” ;

**Step4:** After the gateway is restarted , pop-up connection completed and click “Confirm”

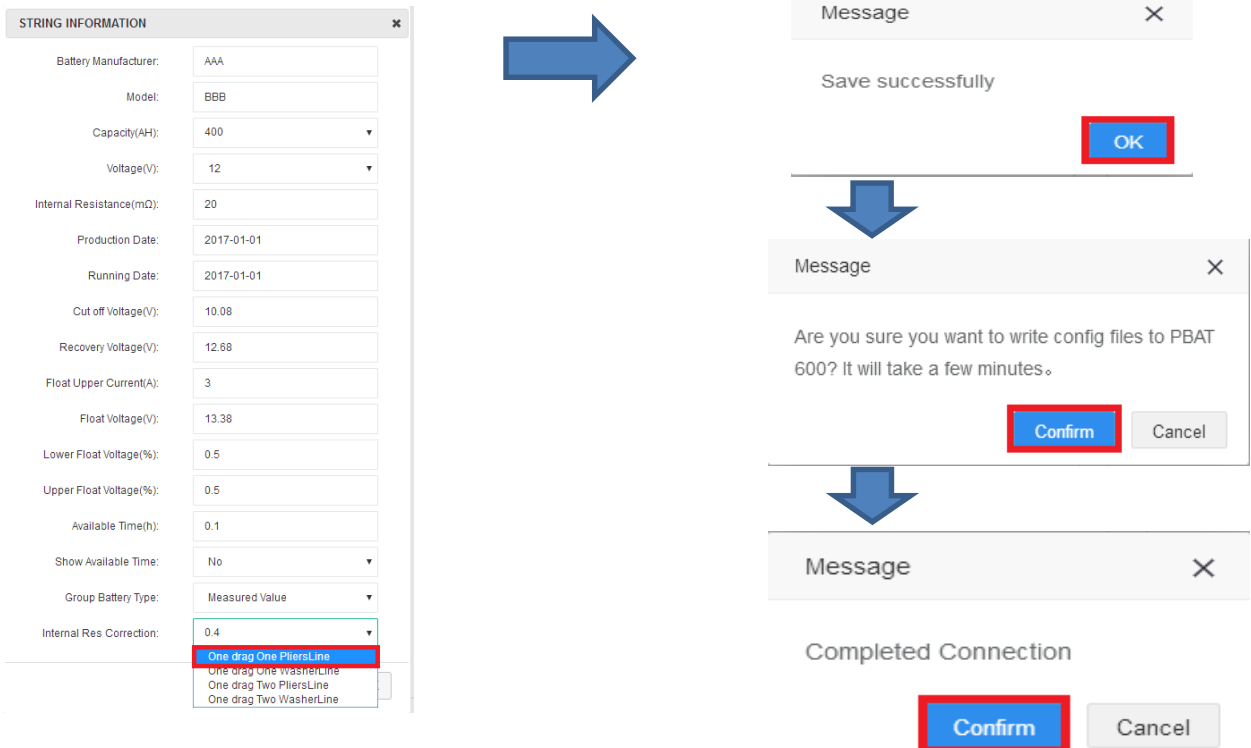
Note: 1.Battery information is for reference only , please contact the battery manufacturer for details.

2.If using the recommended value , please select the correct capacity , voltage , the remaining information will have a recommended value.

3.String voltage measuring mode : select battery cell sensor accumulation , we can calculation string voltage by battery cell sensor without wiring.

Select measuring value, PBAT600 connects the positive and negative pole of the entire battery pack for measurement.

4.Internal resistance correction : Select the type of wire used , it will correct the internal resistance data automatically , it will more accurate.



## 7. Hall sensor setup

**Step1:** Select the left menu “Setting” → “Project Setting” → “Hall Sensor Setup” ;

**Step2:** Select string NO., select Hall sensor specifications:50/100/200/300/400/500A,and then click “Write” ;You can click “Load” to confirm whether the setting is successful.

Note: 1.The adjust function is only used when the group current data error is very large , use with caution.

2.When calibrating , please make sure the current across the Hall’s cable is zero.

The screenshot displays the 'Hall Sensor Setting' interface. On the left, a dark sidebar menu contains the following items: 'Setting', 'Parameter Setting', 'Project Setting', 'Project Details', 'Battery Information', and 'Hall Sensor Setup' (which is highlighted with a red border). A blue arrow points from the 'Hall Sensor Setup' menu item to the main content area.

The main content area is titled 'Hall Sensor Setting' and contains the following elements:

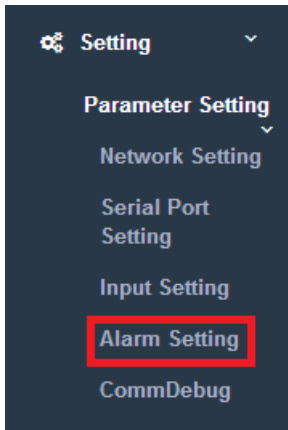
- 'String No.:' dropdown menu with 'String1' selected.
- 'Hall Sensor Specifications:' dropdown menu with '50' selected, followed by the letter 'A'.
- 'Adjust:' button.
- 'Load' and 'Write' buttons.

Below this section is a light blue horizontal separator, followed by a section titled 'PBAT600 Version Information' containing the following fields:

- 'PBAT600 Software Version:' with the value '1.13'.
- 'PBAT600 Test Vserion:' with the value '1.00'.
- 'PBAT600 Hardware Vserion:' with the value '1.00'.
- 'Physical Address:' with the value '1'.

## 8. Rapid alarm setting

- Step1:** Select the left menu “Setting” → “Parameter Setting” → “Alarm Setting” ;  
**Step2:** Select “Apply Alert Template”;



No.	Monitoring Parameter	Trigger Type	Threshold	Recovery	Action Delay(s)	Recovery Delay(s)	Trigger Action	Enable	Graphic Reports
1	String Current(A)	Over High Limit	50	50	0	0	Write Record	Yes	Lf Width
2	String Current(A)	Under Low Limit	-50	-50	0	0	Write Record	Yes	Lf Width
3	String Voltage(V)	Over High Limit	460.8	460.8	0	0	Write Record	Yes	Lf Width
4	String Voltage(V)	Under Low Limit	345.6	345.6	0	0	Write Record	Yes	Lf Width
5	String SOC(%)	Under Low Limit	0	0	0	0	Write Record	No	Lf Width
6	Cell Voltage(V)	Over High Limit	14.4	14.4	0	0	Write Record	Yes	Lf Width
7	Cell Voltage(V)	Under Low Limit	10.8	10.8	0	0	Write Record	Yes	Lf Width
8	Cell Internal Resistance(mΩ)	Over High Limit	30	30	0	0	Write Record	Yes	Lf Width
9	Cell SOC(%)	Under Low Limit	0	0	0	0	Write Record	No	Lf Width
10	Cell SOH(%)	Under Low Limit	0	0	0	0	Write Record	No	Lf Width
11	Cell Temperature(°C)	Over High Limit	50	50	0	0	Write Record	Yes	Lf Width

- Step3:** Voltage type :select the correct voltage type,2V or 12V ;  
 Battery count : enter the battery count in the current set of batteries ;  
 Enter Hall sensor specifications and internal resistance reference(It will obtain battery information automatically and the Hall setting of Hall sensor) ;  
 Click “OK”  
**Step4:**Pop-up alarm parameter list , confirm that the set threshold and recovery are correct or not ; Click “OK” in the lower right corner.  
**Step5:**Finally,in the lower right corner of the alarm settings ,click the red “Confirm Configuration” to complete the simple alarm setting.

**Note:** If you have some knowledge of the battery alarm parameters , please refer to the alarm setting in Chapter 9.

The form contains the following fields: Voltage (dropdown menu set to 12V), Battery Count (text input 32), Hall Sensor (text input 50), Specifications(A): (text input 50), and Internal Resistance(mΩ): (text input 20). There are OK and Cancel buttons at the bottom.

No.	Monitoring Parameter	Trigger Type	Threshold	Recovery
1	String Current(A)	Over High Limit	50	50
2	String Current(A)	Under Low Limit	-50	-50
3	String Voltage(V)	Over High Limit	460.8	460.8
4	String Voltage(V)	Under Low Limit	345.6	345.6
5	String SOC(%)	Under Low Limit	0	0
6	Cell Voltage(V)	Over High Limit	14.4	14.4
7	Cell Voltage(V)	Under Low Limit	10.8	10.8
8	Cell Internal Resistance(mΩ)	Over High Limit	30	30
9	Cell SOC(%)	Under Low Limit	0	0
10	Cell SOH(%)	Under Low Limit	0	0
11	Cell Temperature(°C)	Over High Limit	50	50

No.	Monitoring Parameter	Trigger Type	Threshold	Recovery	Action Delay	Recovery Delay	Trigger Action	Enable	Graphic Reports
1	String Current(A)	Over High Limit	50	50	0	0	Write Record	Yes	Lf Width
2	String Current(A)	Under Low Limit	-50	-50	0	0	Write Record	Yes	Lf Width
3	String Voltage(V)	Over High Limit	460.8	460.8	0	0	Write Record	Yes	Lf Width
4	String Voltage(V)	Under Low Limit	345.6	345.6	0	0	Write Record	Yes	Lf Width
5	String SOC(%)	Under Low Limit	0	0	0	0	Write Record	No	Lf Width
6	Cell Voltage(V)	Over High Limit	14.4	14.4	0	0	Write Record	Yes	Lf Width
7	Cell Voltage(V)	Under Low Limit	10.8	10.8	0	0	Write Record	Yes	Lf Width
8	Cell Internal Resistance(mΩ)	Over High Limit	30	30	0	0	Write Record	Yes	Lf Width
9	Cell SOC(%)	Under Low Limit	0	0	0	0	Write Record	No	Lf Width
10	Cell SOH(%)	Under Low Limit	0	0	0	0	Write Record	No	Lf Width
11	Cell Temperature(°C)	Over High Limit	50	50	0	0	Write Record	Yes	Lf Width

## 9. Alarm setting

**Step1:** Select the left menu “Setting” → “Parameter Setting” → “Alarm Setting” ;

**Step2:** Select the alarm parameters you want to set , then click “Modify” on the right side of the system;



No.	Monitoring Parameter	Trigger Type	Threshold	Recovery	Action Delay(s)	Recovery Delay(s)	Trigger Action	Enable	Graphic Reports
1	String Current(A)	Over High Limit	50	50	0	0	Write Record	Yes	√ Modify
2	String Current(A)	Under Low Limit	-50	-50	0	0	Write Record	Yes	√ Modify
3	String Voltage(V)	Over High Limit	480.8	480.8	0	0	Write Record	Yes	√ Modify
4	String Voltage(V)	Under Low Limit	320.6	320.6	0	0	Write Record	Yes	√ Modify
5	String SOC(%)	Under Low Limit	0	0	0	0	Write Record	No	√ Modify
6	Cell Voltage(V)	Over High Limit	12.4	12.4	0	0	Write Record	Yes	√ Modify
7	Cell Voltage(V)	Under Low Limit	11.8	11.8	0	0	Write Record	Yes	√ Modify
8	Cell Internal Resistance(mΩ)	Over High Limit	30	30	0	0	Write Record	Yes	√ Modify
9	Cell SOC(%)	Under Low Limit	0	0	0	0	Write Record	No	√ Modify
10	Cell SOH(%)	Under Low Limit	0	0	0	0	Write Record	No	√ Modify
11	Cell Temperature(°C)	Over High Limit	50	50	0	0	Write Record	Yes	√ Modify

**Step3:**Select “Yes” in enable ,enter the alarm threshold and recovery , and then click “OK”

**Step4:**Pop-up “ Save successfully” , click “OK”;

**Step5:**After confirming that all alarm configurations are correct , click the red “Confirm Configuration” in the lower right corner of the alarm settings page.

Note: When the trigger type is upper-limit ,the threshold value is greater than the hysteresis value; When the trigger type is lower-limit ,the threshold value is less than the hysteresis value

Threshold and hysteresis value please refer to the attached page : Alarm setting recommendation table.

**ALARM SETTING** ✕

Enable:  Yes  No

Monitoring Parameter: String Current(A) ▼

Trigger Type: Over High Limit ▼

Threshold: 50

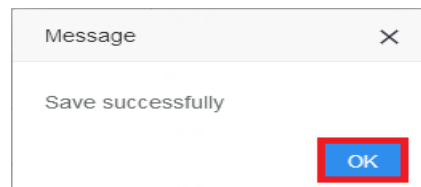
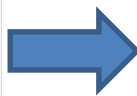
Recovery: 50

Action Delay(s): 0

Recovery Delay(s): 0

Trigger Action: DO/Write Record ▼

OK



No.	Monitoring Parameter	Trigger Type	Threshold	Recovery	Action Delay(s)	Recovery Delay(s)	Trigger Action	Enable	Graphic Reports
1	String Current(A)	Over High Limit	50	50	0	0	Write Record	Yes	√ Modify
2	String Current(A)	Under Low Limit	-50	-50	0	0	Write Record	Yes	√ Modify
3	String Voltage(V)	Over High Limit	480.8	480.8	0	0	Write Record	Yes	√ Modify
4	String Voltage(V)	Under Low Limit	320.6	320.6	0	0	Write Record	Yes	√ Modify
5	String SOC(%)	Under Low Limit	0	0	0	0	Write Record	No	√ Modify
6	Cell Voltage(V)	Over High Limit	12.4	12.4	0	0	Write Record	Yes	√ Modify
7	Cell Voltage(V)	Under Low Limit	11.8	11.8	0	0	Write Record	Yes	√ Modify
8	Cell Internal Resistance(mΩ)	Over High Limit	30	30	0	0	Write Record	Yes	√ Modify
9	Cell SOC(%)	Under Low Limit	0	0	0	0	Write Record	No	√ Modify
10	Cell SOH(%)	Under Low Limit	0	0	0	0	Write Record	No	√ Modify
11	Cell Temperature(°C)	Over High Limit	50	50	0	0	Write Record	Yes	√ Modify

## Attachment: Alarm setting recommendation table

	2V	12V	2 <sup>nd</sup> Upper limit	1 <sup>st</sup> Upper limit	2 <sup>nd</sup> lower limit	1 <sup>st</sup> Lower limit
Float Voltage	2.23 ~ 2.27	13.38 ~ 13.62	2.40	2.56	1.95	1.80
Charge Voltage	2.35 ~ 2.39	14.10 ~ 14.40	2.45	2.60	1.95	1.80
Open Circuit Voltage	2.10 ~ 2.12	12.60 ~ 12.72	-----	-----	-----	-----
Cut-off voltage	1.75 ~ 1.80	10.50 ~ 10.80	-----	-----	1.95	1.80
Reset voltage	2.08 ~ 2.10	12.48 ~ 12.60	-----	-----	-----	-----
Internal Resistance	-----	-----	Standard*1.3	Standard*1.5	-----	-----
Ambient Temperature	-----	-----	30	40	10	0
Negative Temperature (Float)	-----	-----	TEMP+5	TEMP+10	-----	-----
Negative Temperature (Equal)	-----	-----	TEMP+10	TEMP+20	-----	-----
Negative Temperature (Discharge)	-----	-----	TEMP+15	TEMP+30	-----	-----

Note: The above parameters are for reference only, all based on the parameters provided by the battery manufacturer.



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