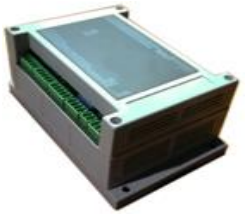
Система контроля внутреннего сопротивления аккумуляторных батарей

（Battery Internal Resistance Monitoring System）



дисплей системы мониторинга

RS485

#1 ZHCL-BMU
Измерительный прибор группы батарей

#2 ZHCL-BMU
Измерительный прибор группы батарей

#3 ZHCL-BMU
Измерительный прибор группы батарей

#4 ZHCL-BMU
Измерительный прибор группы батарей

#5 ZHCL-BMU
Измерительный прибор группы батарей

#6 ZHCL-BMU
Измерительный прибор группы батарей

#1 BMU-2V
Прибор измерения сопротивления аккумуляторных батарей
или
#1 BMU-12V
Прибор измерения сопротивления аккумуляторных батарей

#648 BMU-2V
Прибор измерения сопротивления аккумуляторных батарей
или
#300 BMU-12V
Прибор измерения сопротивления аккумуляторных батарей

1、introduction：

Возможность измерения до 648 элементов 2В батарей, или до 300 моноблоков 12В батареи.

1. Может отображать и сигнализировать о напряжении, сопротивлении и температуре аккумуляторной батареи.

2. Может отображать гистограмму существующего напряжения, сопротивления и температуры элемента батареи в другом цвете. Нормальное состояние аккумулятора - гистограммы зеленого цвета. Чем ближе параметр к аварии, тем ближе гистограмма к красному цвету, чтобы можно было определить состояние батареи по гистограмме другого цвета.

3. Может отображать графики напряжения, сопротивления и температуры элемента батареи в течение одного дня.

4. Может показать гистограмму самого высокого значения напряжения, сопротивления и температуры каждого элемента батареи за всю историю, чтобы можно было обнаружить неисправный элемент батареи.

5. Может отображать графики сопротивления каждого элемента батареи в течение одного года, чтобы можно было увидеть тенденцию изменения сопротивления.

6. Может отображать и сигнализировать о напряжении группы аккумуляторов, токе, температуре и емкости.

7. Может показать график напряжения группы батарей, тока и емкости

8. Имеет функцию балансировки батареи.

9. Возможна запись истории аварий.

10. Система работает с монитором JK070-BMU + Измерительный прибор группы батарей ZHCL-BMU + Прибор измерения сопротивления аккумуляторных батарей BMU-12 / 2V.

JK070-BMU: отображает и изменяет данные батареи.

ZHCL-BMU: измеряет данные группы батарей и показывает их на мониторе JK070-BMU.

BMU-12 / 2V: измеряет данные элементов батареи и показывает их на мониторе JK070-BMU.

Монитор JK070-BMU может работать максимально с 6 комплектами ZHCL-BMU, каждый ZHCL-BMU может работать максимально с 108-ю измерительными приборами батарей BMU-2V (АБ 2В) или каждым ZHCL-BMU может работать максимально с 50-ю BMU-12V (АБ 12В)

11. Протокол Modbus с портом RS485 или Ethernet.

12. 7-дюймовый TFT-дисплей с разрешением 800*480 точек, резистивный сенсорный экран

13. Русское и английское меню.

14. Порт USB.

English：

it can measure max 648 pcs of 2V battery cells, or max 300 pcs of 12V battery cells.

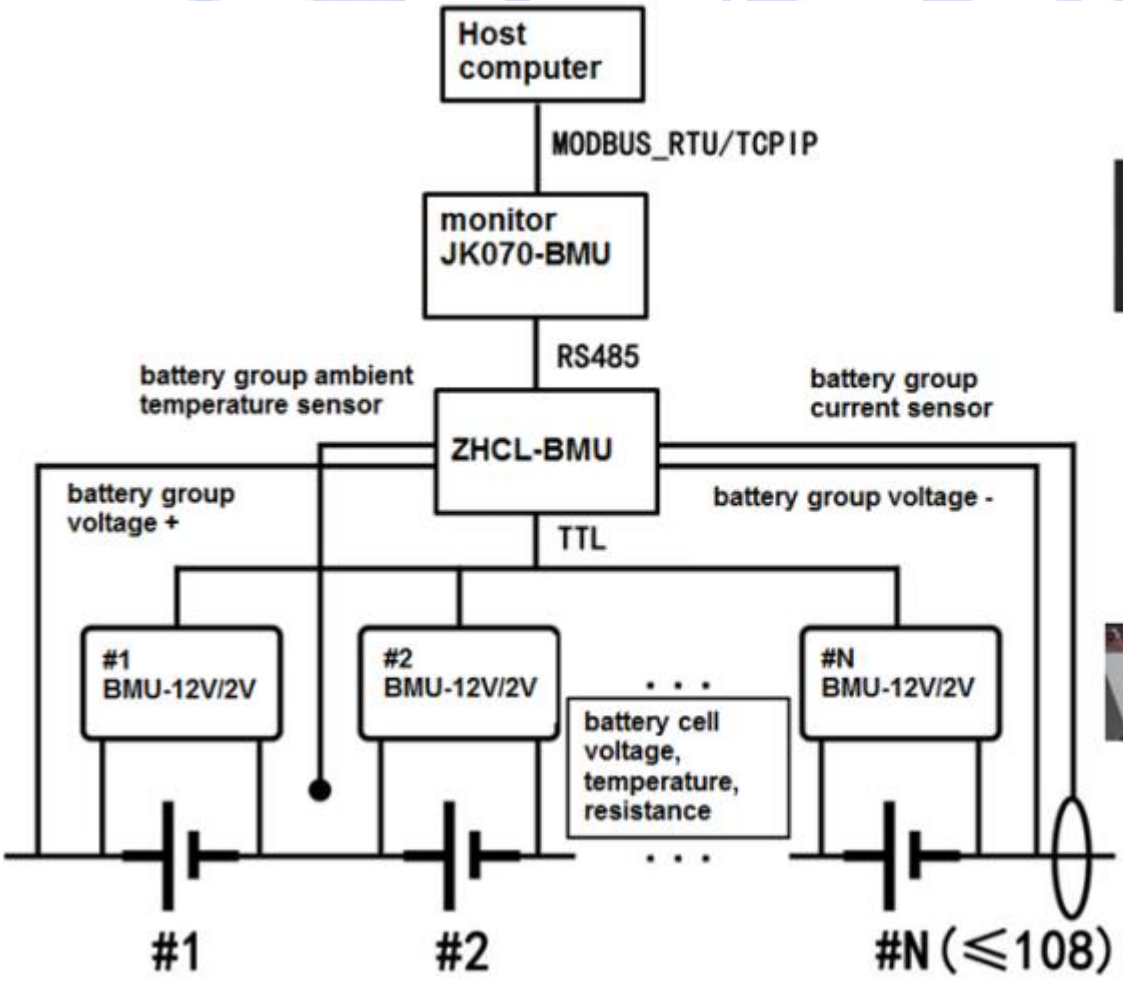
1. it can display and make alarm for the battery cell voltage, resistance, and temperature.

2. it can show the histogram of the battery cell existing voltage, resistance, and temperature in different color. The normal battery is green color histogram. The closer to alarm parameter, the closer to red color histogram, so that you can easily identify the battery status by the different color histogram.

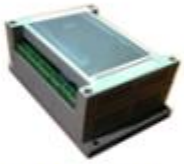
3. it can show the curve pictures of the battery cell voltage, resistance and temperature parameter during one day time.

4. it can show the histogram of the highest value of each battery cell voltage, resistance and temperature in the past history, so that you can found out the fault battery cell easily.

5. it can show the curve pictures of each battery cell resistance parameter during one year time, so that you can see the resistance variation trend.
6. it can show and make alarm for the battery group voltage, current, temperature, and capacity.
7. it can show the curve picture of the battery group voltage, current and capacity
8. It has the function of battery balancing.
9. with function of fault alarm history. When the existing alarm disappear, it will save this alarm to the alarm history list.
10. the system consist of Monitor JK070-BMU+Battery Group Data Measuring device ZHCL-BMU+ Battery Cell Resistance Measuring device BMU-12/2V.
JK070-BMU: show and set the battery data.
ZHCL-BMU: measure the battery group data, and show it in the monitor JK070-BUM.
BMU-12/2V: measure the battery cell data, and show it in the monitor JK070-BMU.
The monitor JK070-BMU can work with max 6 set of ZHCL-BMU, each set of ZHCL-BMU with max 108 pcs of battery cell measuring device BMU-2V (2V battery cell), or each set of ZHCL-BMU with max 50 pcs of BMU-12V (12V battery cell)
11. protocol Modbus with RS485 or Ethernet port.
12. 7 inch 800*480 TFT screen, resistive touchscreen
13. English and Russian menu.
14. with USB port.



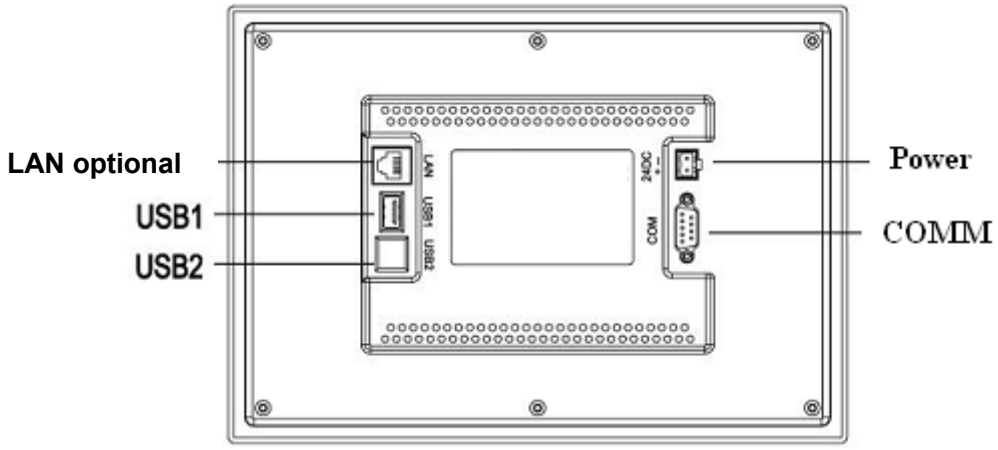

JK070-BMU


ZHCL-BMU


BMU-12V/2V

2. parameter

2.1 size

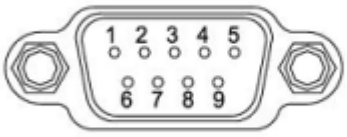


Picture 2-1 monitor JK070-BMU back side

2.2 parameter

Interface	Description
USB1	Flash memory
USB2	used for debug
Power	24V DC +-20%
LAN(RJ45) (optional)	Ethernet, Modbus TCP/IP
COMM	1XRS232, 3XRS485

2.3 port definition



COMM description

COM1	2	RS232 RXD
	3	RS232 TXD
	5	GND
COM2	7	RS485 +
	8	RS485 –
COM3	4	RS485 +
	9	RS485 –
COM4	1	RS485 +
	6	RS485 –

Picture 2-2 port definition

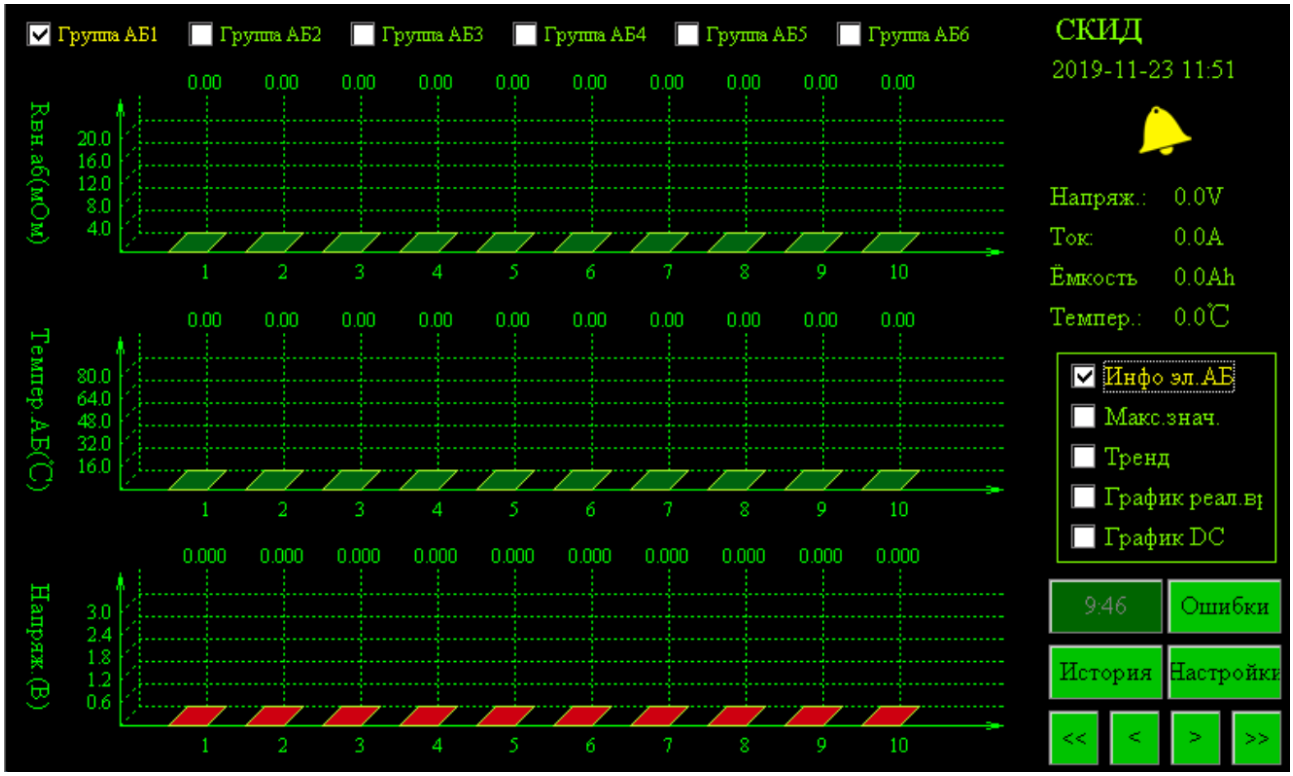
function	Port number		definition
To RTU	7	RS485+	485A
	8	RS485-	485B
To host PC	1	RS485+	485A
	6	RS485-	485B

3、operation instruction:

3.1 data inquiry

3.1.1 battery cell data

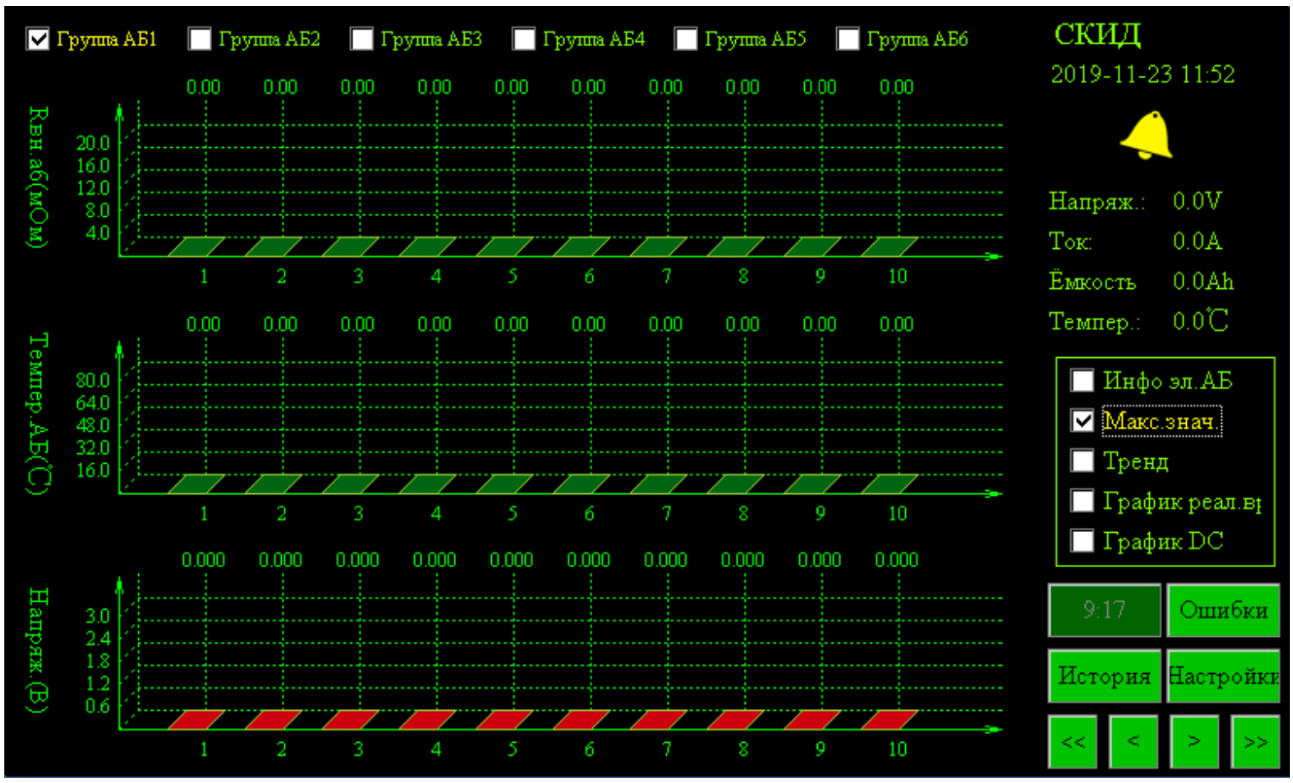
Choose the “cell information” in the menu, it will show each battery cell data.



3-1 battery cell data

3.1.2 battery cell max value in history

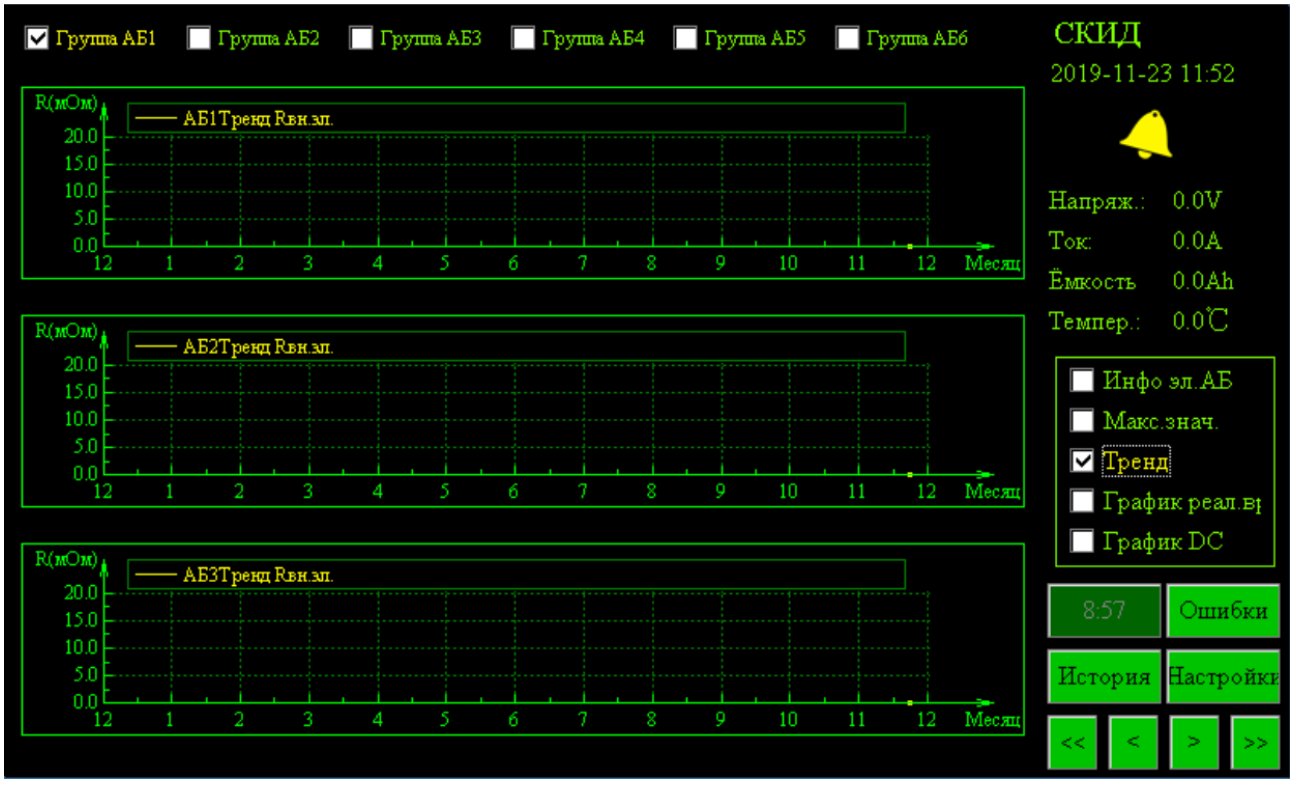
Choose “peak value”, it will show each battery cell max value in history



3-2 battery cell max value in history

3.1.3 curve picture for each battery cell resistance variation trend

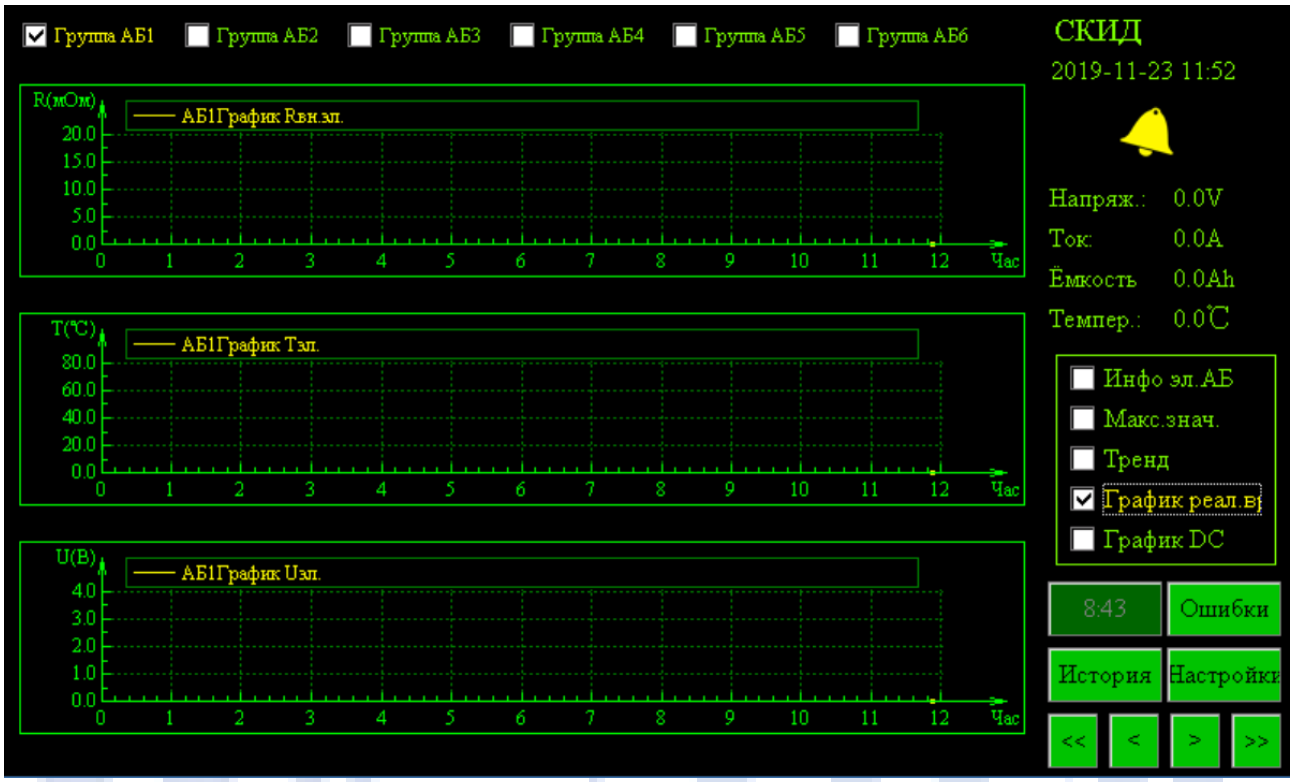
Choose “trend line”, it will show each battery cell resistance variation trend picture.



3-3 battery cell resistance variation trend picture

3.1.4 batter cell existing voltage, resistance and temperature picture.

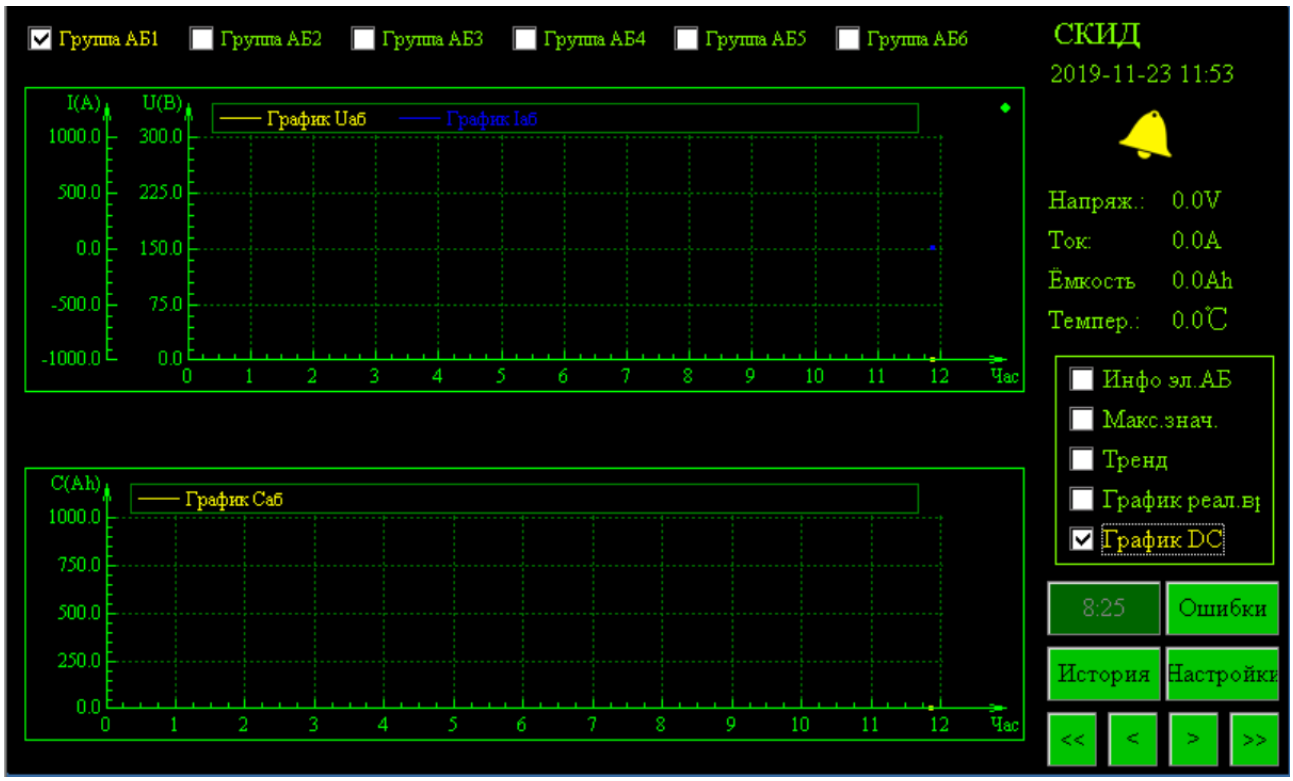
Choose the “V.I.T.curve”, it will show the batter cell existing voltage, resistance and temperature



3-4 batter cell existing voltage, resistance and temperature picture

3.1.5 existing DC data (battery group data)

Choose the “DC curve”, it will show the existing battery group voltage, current and capacity.

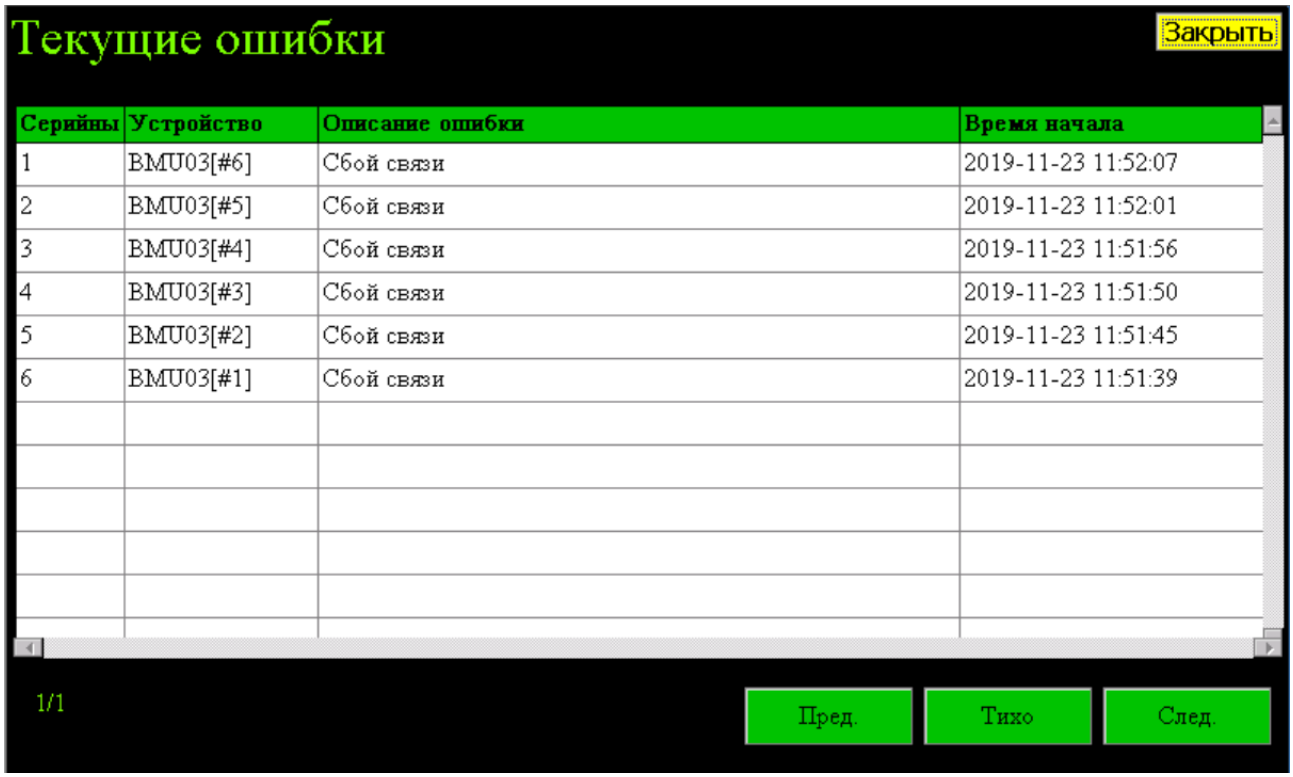


3-5 existing DC data (battery group data)

3.2 fault inquiry

3.2.1 the existing fault

Choose “fault”, or touch the fault indication picture (or), will show the existing fault (current fault), no fault will show , fault will show ..



3-6 exiting fault (current fault)

3.2.2 history fault

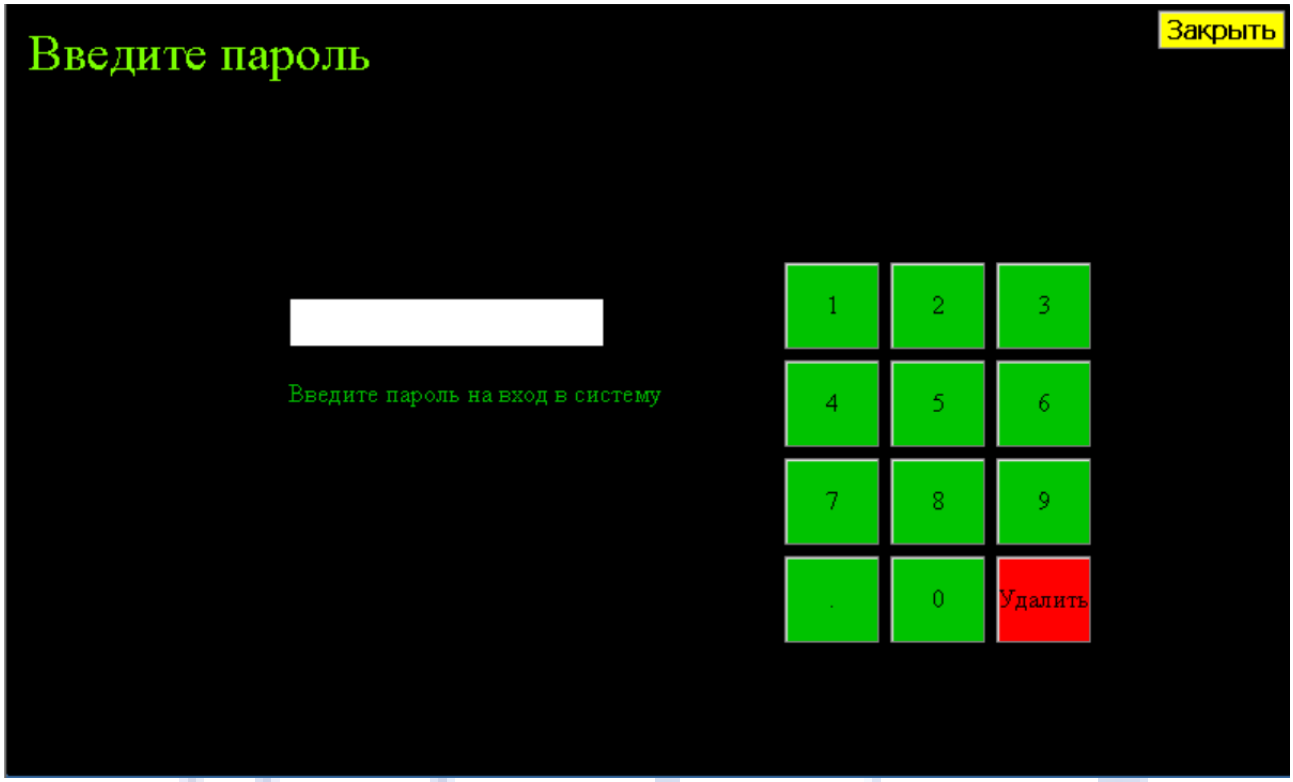
Choose “ history”, will show the history fault.

3-7 history fault

3.3 system setting

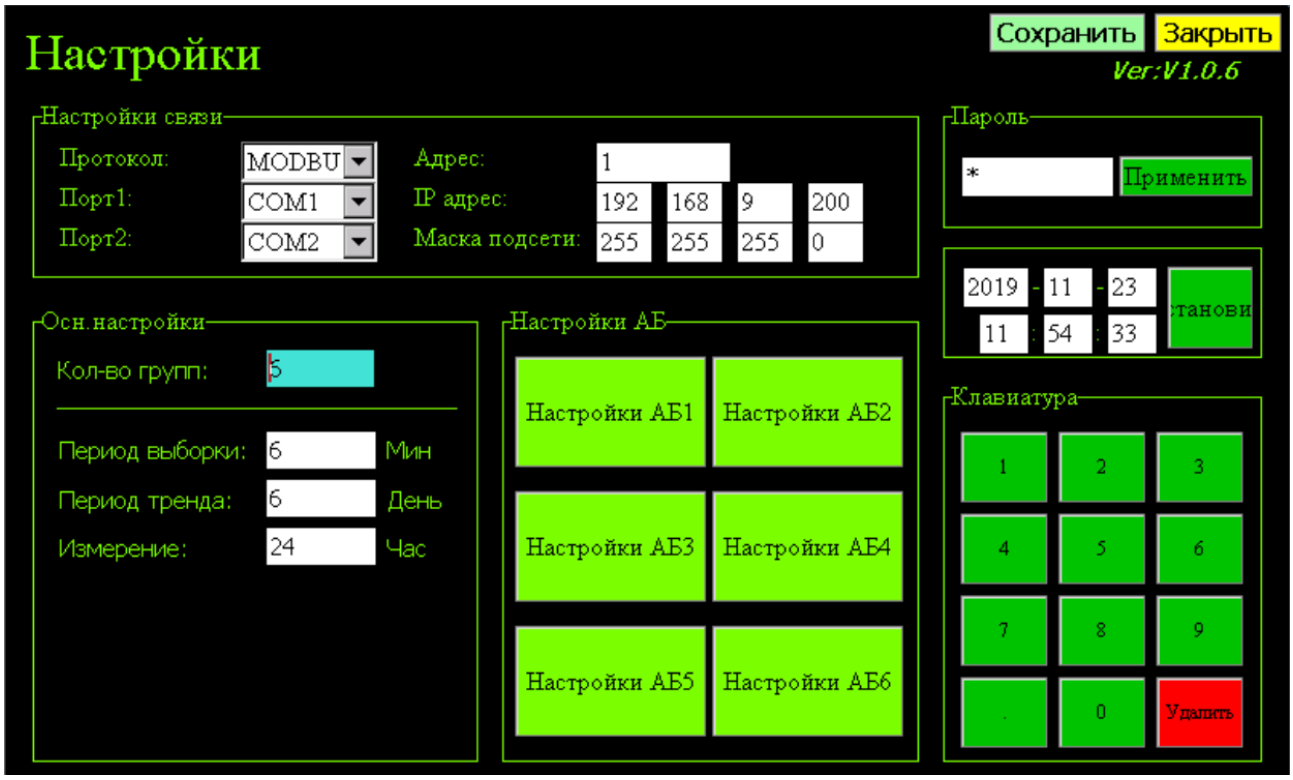
Choose setting, input password (666666), it will show the system setting menu.

3.3.1 input password



3-8 input password

3.3.2 system setting


Настройки
Сохранить
Закрыть
Ver:V1.0.6
Настройки связи
Протокол:
MODBU
Порт1:
COM1
Порт2:
COM2
Адрес:
1
IP адрес:
192
168
9
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Маска подсети:
255
255
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Применить
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23
11
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33
тановi
Осн.настройки
Кол-во групп:
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Период выборки:
6
Мин
Период тренда:
6
День
Измерение:
24
Час
Настройки АБ
Настройки АБ1
Настройки АБ2
Настройки АБ3
Настройки АБ4
Настройки АБ5
Настройки АБ6
Клавиатура
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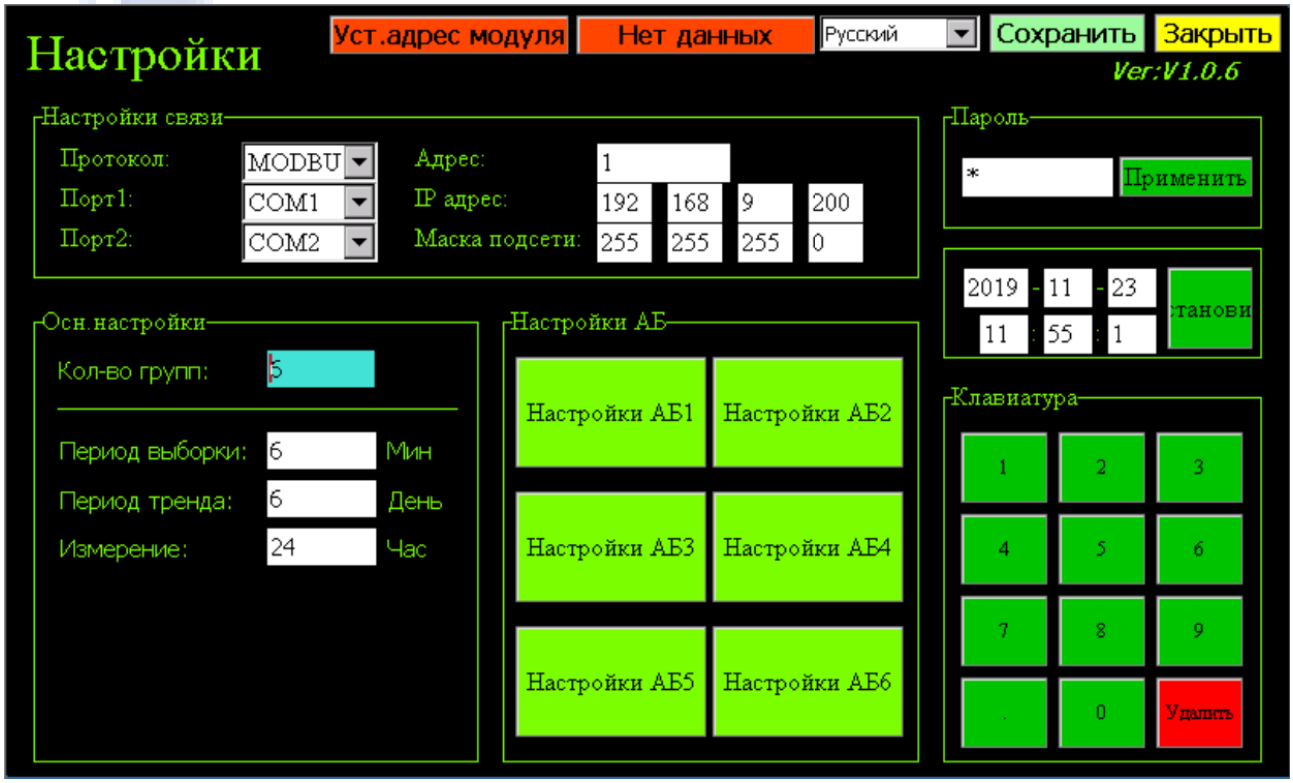
Удалить


Настройки
Уст.адрес модуля
Нет данных
Русский
Сохранить
Закрыть
Ver:V1.0.6
Настройки связи
Протокол:
MODBU
Порт1:
COM1
Порт2:
COM2
Адрес:
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IP адрес:
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9
200
Маска подсети:
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Пароль
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Осн.настройки
Кол-во групп:
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Мин
Период тренда:
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День
Измерение:
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Час
Настройки АБ
Настройки АБ1
Настройки АБ2
Настройки АБ3
Настройки АБ4
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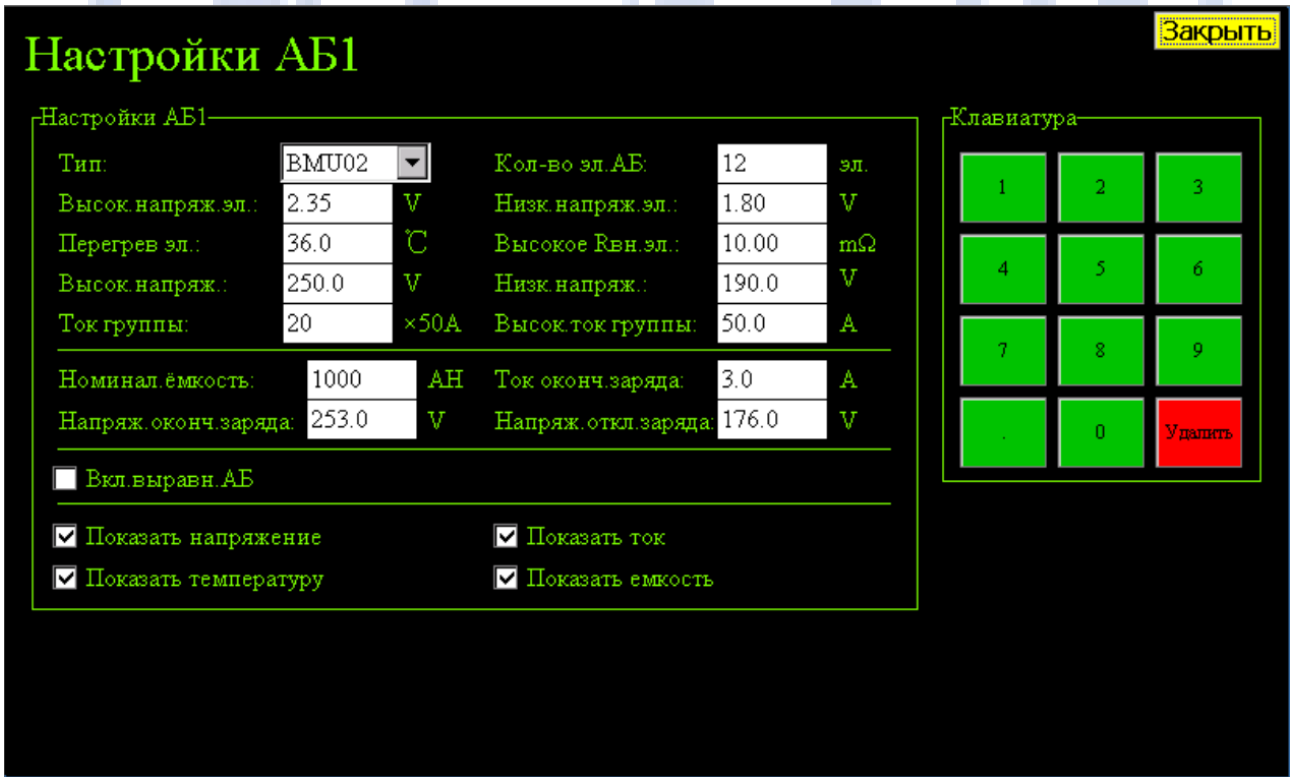
Удалить



3-9 system setting

3.3.2.1 input keyboard

input keyboard can delete or input data.

3.3.2.2 communication setting

Protocol: Modbus RTU.

Upper port: Host PC port COM1/COM2

Lower port: RTU port COM1/COM2

Addr: address for MODBUS_RTU protocol.

IP : when user Ethernet port, set the IP address for the JK070-BMU.

Mask: when user Ethernet port, set the mask address for the JK070-BMU.

3.3.2.3 password management.

You can delete the old password, use a new password.

3.3.2.4 time setting.

Input the new time, click setting, it will change the new time.

3.3.2.4 system setting.

Base setting:

set the battery group qty, max 6 groups in one system.

Set the circle period of battery detecting and measuring.

Samp. Period: set the curve picture period of the battery cell and battery group

Trend Period: set the curve picture period of battery cell resistance trend.

Measuring: set the period of automatic battery resistance measuring.

system setting and alarm parameter:

Battery cell type: BUM-12V or BMU-2V, it means 12V or 2V battery cell.

Battery cell qty: range 1~180 cells.

Battery cell over V alarm: set the alarm for the battery cell over voltage.

Battery cell under V alarm: set the alarm for the battery cell under voltage.

Battery cell over T alarm: set the alarm for the battery cell over Temperature voltage.

Battery cell over R alarm: set the alarm for the battery cell over resistance. It will make alarm when the resistance is over this parameter.

Over V: set the alarm for the battery group over voltage.

Under V: set the alarm for the battery group under voltage.

I sensor: battery group charging current sensor

Over I: battery group current alarm.

Battery capacity management parameter.

Rated Cap.: set the parameter for the battery rated capacity. The battery capacity showed in the system will not over this parameter.

End charge I: set the current of charging complete.

End charge V: set the voltage of charging complete. When the system find the battery group voltage is over this parameter, and charging current is less than “End charge I ”, the system will think the charging is completed.

Cut-off V: set the voltage of discharging complete. When the battery voltage is less than this parameter, the system will think the battery is totally discharged, and the capacity will be zero.

4、working requirements:

1、Should be working less than altitude 2000M

2、Working ambient temperature from －10℃ to ＋45℃, storage temperature from －40℃ to ＋60℃.

3、Ambient humidity less than 90% (ambient temperature 25℃).

4、 No conductive and explosive dust, no caustic gas;

5、 Applicable indoor.

BMU-12V/2V battery cell resistance measuring device

1、introduction

BMU-12V/2V is used to measuring the battery cell data. It has high precision ADC, can measure the battery cell voltage, resistance and temperature. It is with inside discharging resistance. It can work with the ZHCL-BMU to realize the function of battery balancing.

When the BMU-12V/2V is free or measuring the voltage, temperature, the indication light is off

When the BMU-12V/2V is in the process of equalized discharging, the indication light will flicker.

When the BMU-12V/2V is in the process of measuring the battery resistance, the indication light will be on until the measuring process is completed.

2、parameter:

model	BMU-12V	BMU-2V
Battery cell voltage	12V	2V
Resistance measuring range	5~60mΩ	0.1~10mΩ
Resistance measuring precision	3%FS	3%FS
Resistance Repeatability precision	2%RD±0.01mΩ	2%RD±0.005mΩ
Resistance value	The actual battery cell Resistance (exclude the cable resistance)	
Voltage measuring range	0~15Vdc	0~3Vdc
Voltage measuring precision	0.1%FS	0.1%FS
Temperature measuring range	0~60℃	
Temperature measuring precision	±0.5℃	
Temperature measuring way	Battery pole temperature (cable and sensor in one)	
Reverse connection protection	Yes, if reverse connection, no damage to the BMU-12V/2V	
Safe protection	Over current fuse protection	

	(when the BMU-12V/2V unit is broken with inside short circuit, in order to avoid the battery big current discharging to damage the battery, the BMU-12V/2V unit inside fuse will fusing to protect the battery.)	
power	5~24Vdc	1.8~3Vdc
communication	RJ45	
installation	Stick to the battery cell (50mm×50mm×28mm)	

explanation:

1. BMU-12V/2V resistance measuring precision details:

1、Use a resistance meter to measure it between the battery pole, the testing result is data A.
2、Connect the BMU-12V/2V, and show the testing result B in the monitor JK070-BMU.
3、Calculate the parameter precision as below:
((60-5)×3%)=±1.65mΩ。
The resistance measuring precision is full scale (FS) error marking, It is the absolute error/ full scale (FS).
For example: BUM-12V corresponding error is ((60-5)×3%)=±1.65mΩ.

2. BMU-12V/2V Resistance Repeatability Error

Resistance Repeatability precision means repeated measuring (>5 times), and then read the biggest error of these value (RD) range. The resistance Repeatability precision do not mean the measuring precision, it can only mean the variation of each measuring.

3. BMU-12V/2V voltage measuring precision:

The voltage measuring precision is full scale (FS) error marking, It is the absolute error/ full scale (FS).
For example: BUM-12V corresponding error is (15×0.1%)=±0.015V.

note

1、 BMU-12V and BMU-2V unit should be connected to the correct battery type. If connect the BMU-2V to the 12V battery, it will damage the BMU-2V unit.
2、 For the function of battery balancing, the discharging current is limited, so it did not have a big effect on a battery cell with a big deviation.

ZHCL-BMU battery group data measuring device

1、introduction

ZHCL-BUM can measure the battery group voltage, current, temperature.
It can collect the data from BMU-12V/2V unit.
It has the function of battery balancing.

RS485 port, communication parameter 9600， 8， N， 1, protocol MODBUS-RTU, default communication address is 1.

When power on, it will start the battery data acquisition process.

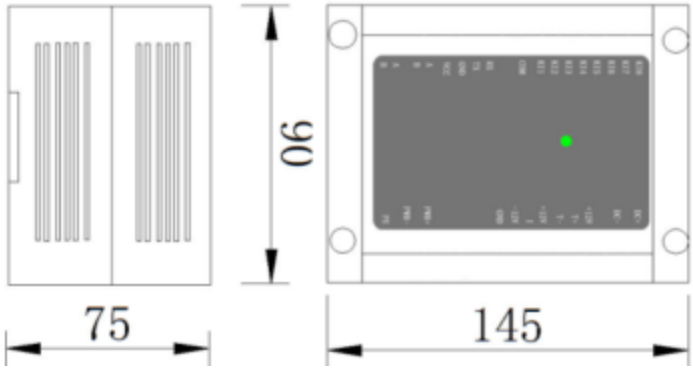
The current sensor is the 100A current type, other type of sensors is not applicable.

The temperature sensor is specially designed.

2、parameter

model	BMU03A
Voltage range	0~600V
Voltage measuring precision	0.5%FS±0.5V
Current range	According to the current sensor
current measuring precision	0.5%FS±0.5A
Temperature measuring range	-20~60℃
Temperature measuring precision	±1.0℃
Temperature measuring way	Temperature sensot
power	90~300Vdc
communication	RS485(MODBUS)
installation	rail

3、size



port	function	note
PWR+,PWR-,PE	Input power	190Vdc~260Vdc
+12V,I,-12V,GND	Measure the battery charging and discharging current	
+12V,T+,T-	Measure the ambient temperature	
DC+,DC-	Measure the voltage	
A,B	RS485	Connect to monitor JK070-BMU
RX,TX,GND,VCC	serial communication interface	Connect to BMU-12V/2V

4、note

1、Input Power is 90~300Vdc, can not be with 220VAC input.

3、 It need the ZHCL-BMU to send command to BMU-12V/2V, then the BMU-12V/2V can begin the measuring of resistance

4、 For the balancing discharging function of BMU12V/2V, it is a long balancing period, in the battery quick charging and discharging process, it has no balancing function. It only have effect when the battery floating charging.

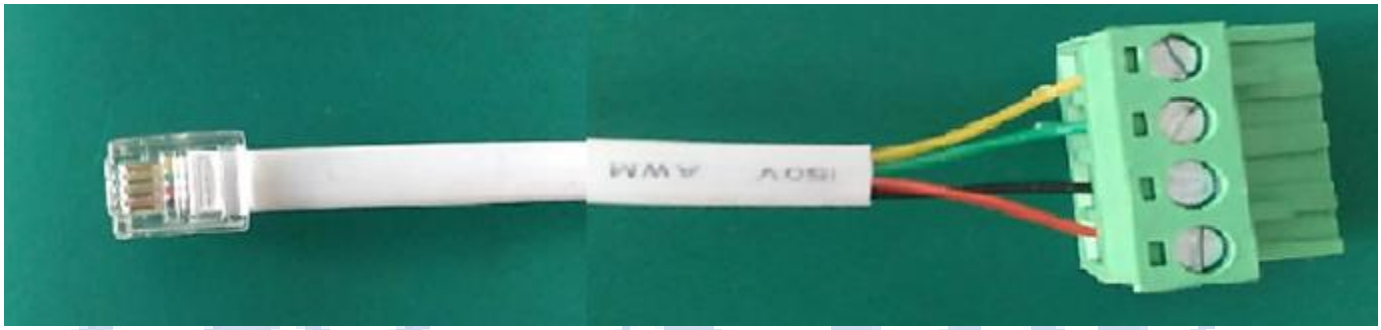
Appendix

BMU-12V/2V

tools：

Connection between ZHCL-BMU and BMU12V/2V：

BMU-12V/2V ZHCL-BMU



To BMU-12V/2V port to ZHCL-BMU port

BMU-12V/2V + ZHCL-BMU