

HZNZ-100

Battery Internal Resistance Tester



Dear user:

Thank you for choosing HZNZ-100 Battery Internal Resistance Tester

We hope that this instrument can make your work easier and more enjoyable, so that you can get the feeling of office automation in the test and analysis work.

Before using the instrument, please read this manual, and operate and maintain the instrument according to the manual to prolong its service life. "Just a light press, the test will be completed automatically" is the operating characteristics of this instrument.

If you are satisfied with this instrument, please tell your colleagues; if you are not satisfied with this instrument, please call (0312) 6775656 to tell you to serve you at all times-Baoding Huazheng Electric Manufacturing Co., Ltd., our company will definitely make you satisfied !

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I. Summarize

1.1 General

This accumulator internal resistance tester utilized colour resistance touch screen. It can be operated via finger or the touch pen with convenience and flexibility. It is portable and the data can be known soon exactly. This instrument can store and process data of battery voltage and internal resistance. It will alarm for any battery failure. We can check data, download data and delete data on the instrument. Software in PC can display and .

1.2 Main function

- Store 999 data. Users can check, download and delete data.
- Storage way: Internal storage or SD card (It's unnecessary to download data).
- Download data. Transfer data to computer by SD card.
- Humanized operation. Easy and clear, every step will display tips for reference.
- Powerful data manage software. Friendly board. Provide the data management, printing, analysis, report, etc.

1.3 Main feature

- High accuracy online test, large volume data
 - a. Instrument test range is 0.000mΩ-99.999mΩ.
 - b. Store 999 units battery information permanent (Each unit including batteries up to 500 pieces) .
 - c. Each report can indicate 500 pieces batteries information permanently.
 - d. Battery volume test range: 5AH-6000AH.
- 5"colour touch LCD. Chinese information modular operation. Great conversational interface.
- Instrument can display chart and analyze column charts.
- It can analyze volume and verify the battery quality level-better, good, bad.
- It will display wave. Tell us practical battery highest, lowest and average power. Power wave (optional).

- Via SD card port all test data can be stored in PC permanently. Track and analyze the battery “medical record”.
- Powerful data management. The instrument can be used separately without computer.
- Strong overload protection on power. Make it work more reliable.
- Recover overcurrent fault protection create more convenience.
- Utilized latest SOC chip simplified circuit increase the reliability.
- Large volume battery and adapter supply power together to convene user.
- Smart warning on low power ensure test accuracy .
- Small foot print, light weight .
- Automatic test mode convene user to measure.
- Perfect PC test data analysis software.
 - a. Automatic analysis on battery “worse” status.
 - b. Record the history report describe the battery quality curve.
 - c. Compare and analyze battery in same group.
 - d. Manage all batteries by different grades (Better, good, general, bad).

1.4 Specification

Measure range	Internal resistance: 0.000mΩ-99.999mΩ Voltage: 0.000v--25v
Min. resolution	Internal resistance: 0.001mΩ Voltage: 1mV
Measure accuracy	Internal resistance: $\pm 0.5\%$ rdg ± 6 dgt Voltage: $\pm 0.2\%$ rdg ± 6 dgt
Power source	12V, chargeable Li-battery
Consumption	8 hours standby mode
Storage volume	64Mbit Flash + 8G SD card
LCD	5" colour touch screen

II.Junction Port And Cables Instruction

2.1 Instrument port

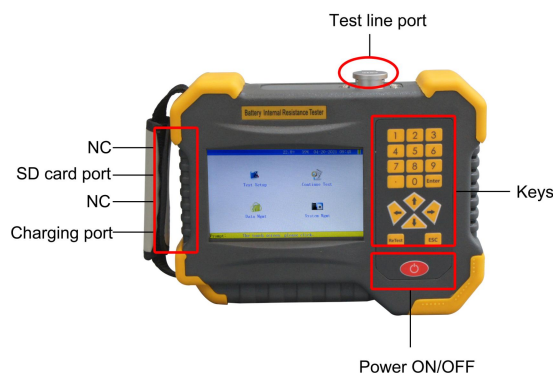


Fig 2.1 Instrument port

- Test line port: Open the cap and insert wire here
- SD card port: Insert the SD card here
- Charging port: Charge the instrument here
- Keys:
 - a. Move the direction keys to select certain function
 - b. 0-9 number keys
 - c. Enter: Confirming. Start the test
 - d. Re Test: Test again. Do a test again
 - e. ESC: Back to last step

2.2 Wiring instruction

2.2.1 Wiring Notices:

- During test please don't put test clip on bolts cap to avoid affecting test accuracy but can put it on pole bar or connection strip.
- If we can't clip the test clips please turn to test pin (option part).
- Battery reference internal resistance please refer to information from manufacturer. If no supplied information please refer to instrument one. It will affect evaluation.
- Confirming test mode. Before test line connecting battery please confirm test mode firstly to ensure whole process smooth.

2.2.2 battery connection diagram

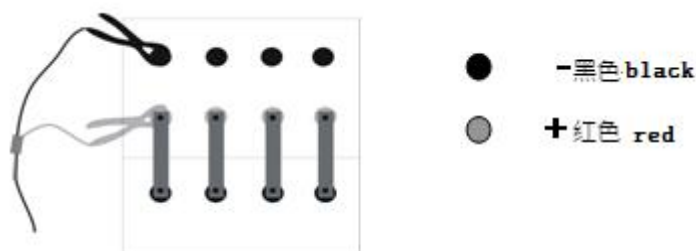


Fig 2.2.2 Poles connection

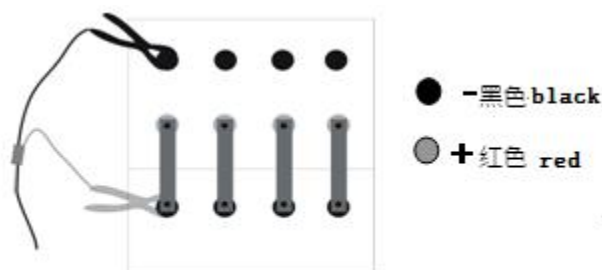


Fig 2.2.2-1 Connect connection strip

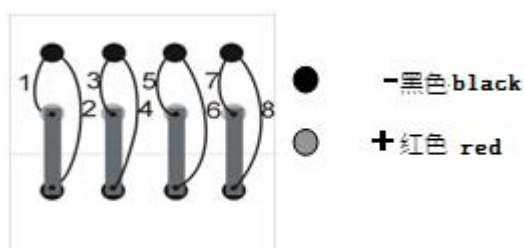


Fig 2.2.2 -2 Connection strip test

2.2.3 Test battery pole

When we test one group battery please test one battery all poles and connection strip (if there is) completely then begin next battery test. We can select any way to test different poles of one battery but please make sure all battery direction are same. After testing one battery pole, if we select “test connection strip” test the connection strip then begin next test on battery pole.

2.2.4 Test connection strip (before testing strip please test pole)

- When we select “test connection strip” please add the line according to above diagram.

- b. Before it is going to testing a battery bank, it has to finish all testing of poles and connectors of one battery, then start to testing next battery. First, test the poles, and then test the connectors. When finished testing of all poles and connectors of one battery, test the next cell battery poles and connectors as the same direction.

III. Operation Rules

3.1 Fast test procedure

First step:. Press power button long time and release it until enter into

interface .



Second step: setting: main interface “Test Setup” —“New Batt”, enter into new battery parameters setting interface.

Set Parameters					
RoomNo.	0001	Tech-ID	0001	PileNo.	0001
CellNum	0500	B.Brand	USER	CellType	2V
Cnormal	100Ah	Ri-ref	1.000mΩ	Ulowlim.	2.100V
OperMode	Manual	PoleNum	2		
Test Options					
TestMode	Pole only				
TestPlan	Volt & Resistance				
Input Options					
U-float	0.00V	I-float	0.000A	Temp.	25℃
Start Test			ESC		

Prompt: The touch screen please click.

Fig 3.1 Set test specification

- Set machine room, technician, battery number
- Set battery quantity (need the test battery quantity)
- Battery manufacture selection:
 - 1) Select “USER” then set single battery voltage, volume, reference internal resistance according to battery specification.
 - 2) If select other battery manufacturer then set these specification via menu.
- Minimum voltage setting. During test if voltage is lower than this level device will send alarm but won't affect test.
- Test mode: By manual or automatic
 - 1) If manual test each change on test clip will request us to click “Start test” for next

test.

- 2) If automatic test every time change on test clip the instrument will test automatically don't need manual click.

- Pole quantity setting. According to poles quantity to set.
- Test mode:
 - 1) Test the connection strip resistance.
 - 2) Select "test connection strip" If don't test select "test on pole".
- Test item:
 - 1) Test voltage and internal resistance together.
 - 2) Just test voltage no internal resistance.
 - 3) Test all voltage firstly then test internal resistance.
- It's unnecessary to set float charging voltage, current, temperature won't affect test.

Third step: Finish setting. Connect instrument and test line. Clip the test clips on battery (pay attention on pole. Red is positive and black is negative) Click "Start test" Click "Yes".

Forth step: test process

- After finishing test of first battery, remove test clip to next battery(firstly remove test clip on the negative pole and then remove test clip on the positive pole ; Or remove two clips simultaneously).
- Oper Mode:
 1. " Manual", click "Start " test next battery .
 2. " Auto" the instrument test automatically after 1-2s , user don't click " start " .

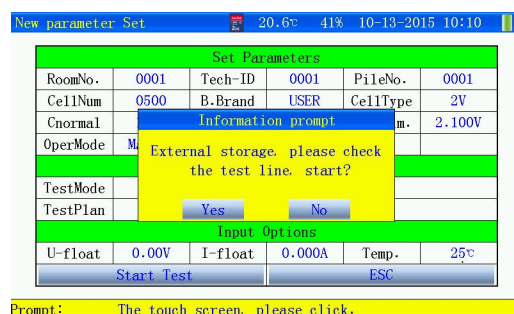


Fig.3.1-1 Start test

Fifth step: end of test: Finish the test. Click "Return" to the main interface. If the

whole battery group test was not finished when return but want to go on test click “Test battery” the test will be continued as per last test.

Sixth step: data check : “Data Mgmt” Select certain files and click “View” We’ll find detail data.

Seventh step: Generation of report: Print test report. External storage. SD card can transfer data to computer by card reader. Just open the software in the computer will be ok. If it’s internal storage click “Data Mgmt” and click “Exp ALL” the data will be transferred to SD card. Then repeat first operation we’ll read all information.

3.2 Test parameters setting

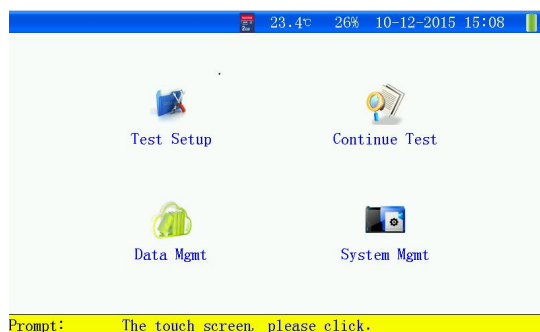


Fig.3.2 Instrument main interface

- Specification setting: Set specifications of battery to be tested.
- Test battery: Continue test of last un-finished battery group.
- Data: management: Check and analyze test data.
- System management: Including time setting, touch accuracy calibration, reference internal resistance maintenance, etc.

3.2.1 New battery specification setting



Main interface “Test Setup” —“New Batt” enter into parameters setting interface .

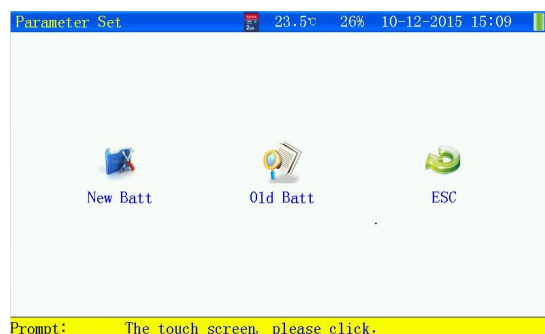


Fig.3.2.1 Specifications setting

- New battery specification: Custom setting on battery test specification.
- Existing battery specification: Specifications of former test battery.

The screenshot shows a software interface titled 'New parameter Set'. At the top, it displays '20.3v', '43%', and the date '10-13-2015 10 07'. The main area is divided into several sections:

Set Parameters					
RoomNo.	0001	Tech-ID	0001	PileNo.	0001
CellNum	0500	B.Brand	USER	CellType	2V
Cnormal	100Ah	Ri-ref	1.000mΩ	Ulowlim.	2.100V
OperMode	Manual	PoleNum	2		

Test Options	
TestMode	Pole only
TestPlan	Volt & Resistance

Input Options			
U-float	0.00V	I-float	0.000A
Temp.	25℃		

At the bottom, there are two buttons: 'Start Test' and 'ESC'. Below the interface, a yellow prompt bar says: 'Prompt: The touch screen, please click.'

Fig.3.2.1-1 New battery specification setting

- Machine room number: 0001-9999.
- Technician number: 0001-9999.
- Battery group number: 0001-9999.
- Battery quantity: 1-500(The continuous test can be made for 500 pcs battery at most).
- B.Brand:
 - Select USER, set the single battery voltage, volume, reference internal resistance specification according to actual demand.
 - When we select battery manufacturer, input voltage, battery volume setting via selection orderly the reference internal resistance will display automatically but also can be input by hand.
- Single voltage: Rated voltage of battery.
- Battery volume: Battery rated volume.
- Reference internal resistance: Refer to battery manufacturer instruction.
- Minimum voltage setting. During test if voltage is lower than this level device will send alarm but won't affect test.
- Test mode:
 - By manual or automatic. If manual test each change on test clip will request us to click "Start test" for next test.
 - Automatic test. Every time change on test clip the instrument will test battery

automatically don't need manual click.

- Pole quantity: 2/4/6/8
- Test mode:
 - 1) Test on pole: Just test pole internal resistance.
 - 2) Test the connection strip: Test pole internal resistance then test the resistance of pole connection strip.
- Test item
 - 1) Test voltage and internal resistance together.
 - 2) Just test voltage no internal resistance.
 - 3) Test all voltage firstly then test internal resistance.
- It's unnecessary to set float charging voltage, float charging current, battery temperature won't affect test.
- Start test: After setting specifications the clip instrument test clips on battery and click "Start test".
- Return: Return to last interface.

3.2.2 Existing battery specification



Main interface" [Test Setup](#) —"Old Batt", choose setting parameters

Old parameter Set					
21.0% 40% 10-13-2015 10:12					
TestTemplate					1/2
ID.	B.Brand	RoomNo.	CellType	Cnormal	Ri-ref
1	2V-1	0001	2V	100Ah	1.000mΩ
2	2V-1	0001	2V	100Ah	1.000mΩ
3	12V1	0001	12V	10Ah	18.700mΩ
4	12V1	0001	12V	10Ah	18.700mΩ
5	12V1	0001	12V	10Ah	18.700mΩ
6	2V-1	0001	2V	100Ah	1.000mΩ
7	2V-1	0001	2V	100Ah	1.000mΩ
8	2V-1	0001	2V	100Ah	1.000mΩ
9	USER	0001	2V	100Ah	1.000mΩ
Del-All Del UpPage DownPage ViewSet ESC					
Prompt: The touch screen, please click.					

Fig 3.2.2 Existing battery specification

- a、"Delete all" : Click it will delete all modular record.
- b、"Delete": Select certain record and then click it will delete present record.
- c、Last page, next page: Find out record.
- d、Check setting: Select certain record click " check setting" enter the specification setting board.

3.3 Start Test

Parameters setup interface click “**Start Test**”, ready enter into test interface.

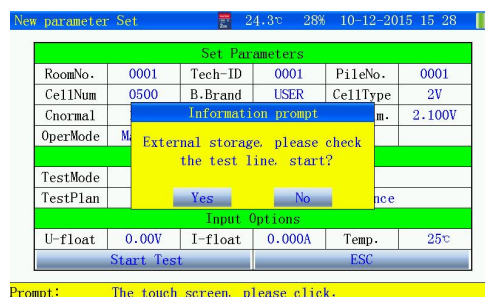


Fig.3.3 Start test

- Connecting test line.
- Select “Yes” enter the test interface.

3.3.1 test interface

- Test item is different from test mode , different interface, see below figure .

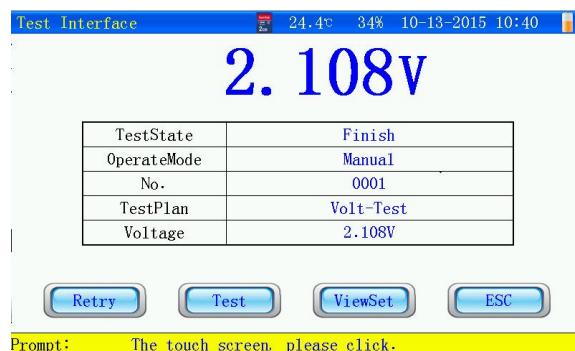


Fig. 3.3.3 Test voltage and internal resistance together

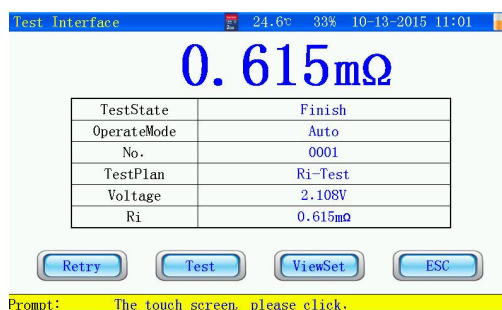


Fig.3.3.3-1 Just measure voltage

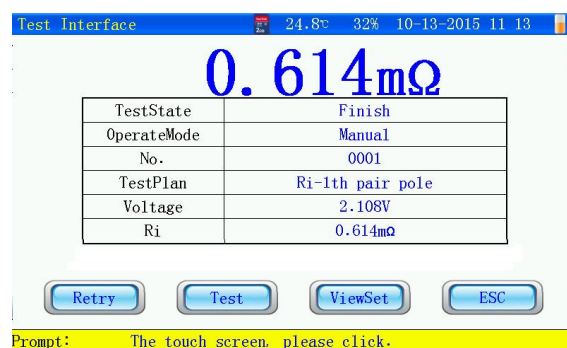


Fig 3.3.3-2 More than 2 poles voltage and internal resistance test

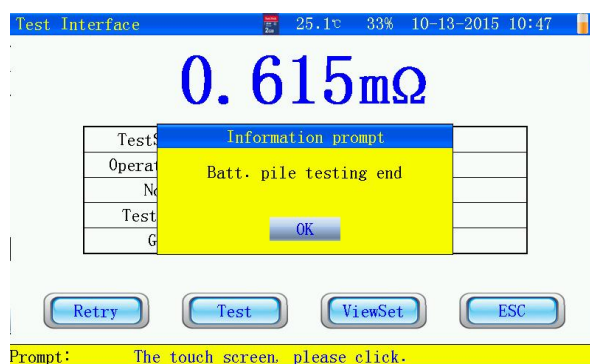


Fig 3.3.3-3 More than 2 poles and connection strip test on voltage and internal resistance

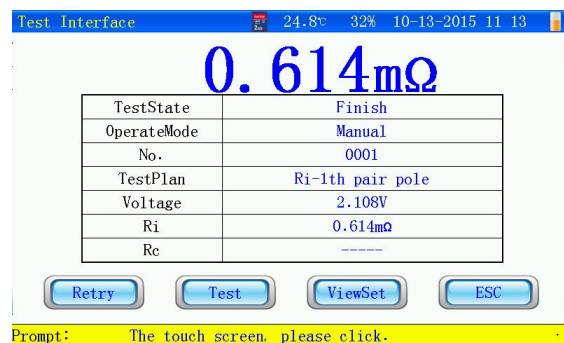


Fig. 3.3.3-4 All battery group after tested

- Test status: In the test or soon to finish.
- Test mode: Select manual test or automatic when set specification.
- Battery number: Testing battery number.
- Test item: The test result we will get.
- Battery voltage: Present battery voltage.
- Battery internal resistance: Present battery internal resistance.

- Connection resistance: Test resistance between pole connection strip.
- Re-test: Test battery again and replace last data when save new data.
- If manual test then each change on test clip will request us to click “Start test” for next test. If automatic test every time change on test clip the instrument will test automatically don't need manual click.

3.4 Continue test

3.4.1 Continue test mode: unfinished test battery bank and historical unfinished battery bank .

3.4.2 Unfinished test battery bank



- main interface” **Continue Test**” enter into continue test

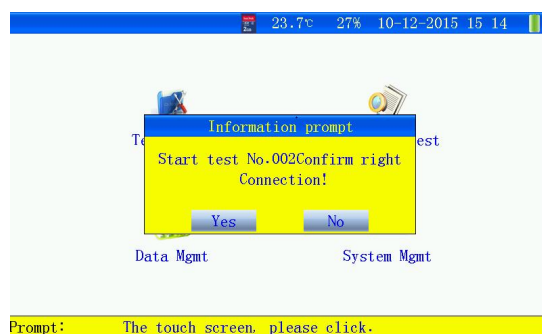


Fig 3.4.2 Test battery

- Continue test please connect battery test trip and click “Yes” to start test.



- Main interface” **Data Mgmt**” — “choose test record” — “View” — “**DataTest**” — “**Con-Test**”.

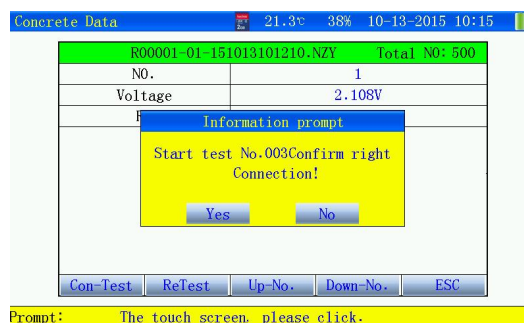


Figure 3.4.2-1 test battery interface

3.5 Data management

3.5.1 Data save: internal storage and external storage (SD Card).



- Main interface “Data Mgmt” , enter into data management interface.

3.5.2 External storage

Data Mgmt Interface	
24.7℃	32% 10-13-2015 11 11
FileData. 1/3	
ID.	File name
1	R00001-01-151006141240.NZY
2	R00001-01-151006143155.NZY
3	R00001-01-151006143437.NZY
4	R00001-01-151006144632.NZY
5	R00001-01-151006144913.NZY
6	R00001-01-151006145142.NZY
7	R00001-01-151006145327.NZY
8	R00001-01-151006145348.NZY
9	R00001-01-151006145651.NZY
Del-All	Del UpPage DownPage View ESC
Prompt: The touch screen. please click.	

Fig.3.5.2 External storage interface

- Name the file: R machine room number-battery group number-test date.
- Every page displays 9-record. Read them by clicking “Last page” “Next page”.
- Delete all: Click it to delete all record.
- Delete: Select certain record and then click it will delete present record.
- Check inforamtion: Select certain record click “ check setting” enter the specification setting board.

Data Mgmt Interface	
24.7℃	32% 10-13-2015 11 11
FileData. 1/3	
ID.	File name
1	R00001-01-151006141240.NZY
2	R00001-01-151006143155.NZY
3	R00001-01-151006143437.NZY
4	R00001-01-151006144632.NZY
5	R00001-01-151006144913.NZY
6	R00001-01-151014110957.NZY
7	R00001-01-151006145327.NZY
8	R00001-01-151006145348.NZY
9	R00001-01-151006145651.NZY
Del-All	Del UpPage DownPage View ESC
Prompt: The touch screen. please click.	

Fig. 3.5.2-1 Record selection

- Select certain record and click “Detail” read every battery detail information.

3.5.3 Internal storage

Data Mgmt Interface			 23.8℃	 28%	10-12-2015 15:14	
FileData.				1/2		
ID.	RoomNo.	PileNo.	Test Time			
1	0001	01	2015-10-06 14:12			
2	0001	01	2015-10-06 14:31			
3	0001	01	2015-10-06 14:34			
4	0001	01	2015-10-06 14:46			
5	0001	01	2015-10-06 14:49			
6	0001	01	2015-10-06 14:51			
7	0001	01	2015-10-06 14:53			
8	0001	01	2015-10-06 14:53			
9	0001	01	2015-10-06 14:56			
Del-All	Del	Exp-All	Export	UpPage	DownPage	View ESC
Prompt: The touch screen, please click.						

Fig.3.5.3Internal storage interface

- Internal storage data will be transferred to computer via SD card for analysis.
- Delete all: Click it to delete all record.
- Delete: Select certain record and then click it will delete present record.
- Click : Download all" the data will be transferred to SD card.
- Download: Select certain record click "Download" to transfer it into SD card.
- Click "Last page" "Next page" to read.
- Check: Select certain record click "Check" to find every battery detail information.

3.5.4 check test data

TestInfo			24.6℃	32%	10-13-2015 11 11
R00001-01-151013110117.NZY > content				1/1	
NO.	Voltage	Ri	Cap	Decide	
1	2.108V	0.615mΩ	100%	Best	
2	2.108V	0.605mΩ	100%	Best	
3	2.108V	0.609mΩ	100%	Best	
4	2.108V	0.620mΩ	100%	Best	
ViewSet		Chart	DataTest	UpPage	DownPage
ESC					
Prompt: The touch screen, please click.					

Fig.3.5.4 Read information

- Battery number: Testing battery number.
- Battery voltage: Present battery voltage.
- Battery internal resistance: Present battery internal resistance.
- Connection resistance: Connection resistance value (Only test battery on pole there is no connection resistance).
- Volume: Left volume percentage.
- Conclusion: Better, good, bad, worse, problem.

- “-----”means this item has not been tested.
- Keys:
- Setting check: Set the check specifications.
- Column chart: All data of test battery displayed via column chart. Including voltage, internal resistance, volume.
- Data test: View detailed test data.
- Last page/Next page to check other battery data.

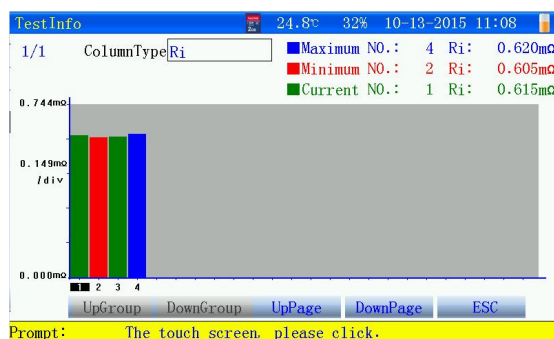


Fig.3.5.4-1. Battery data column chart

- Column selection: Select different column to check different information. Such as voltage, volume, etc.
- If check certain battery information click the column of that battery will display value accordingly.

Concrete Data 21.1v 38% 10-13-2015 10:15	
R00001-01-151013101210.NZY Total NO: 500	
NO.	1
Voltage	2.108V
Ri	0.615mΩ
Con-Test ReTest Up-No. Down-No. ESC	
Prompt: The touch screen, please click.	

Fig.3.5.4-2 One battery test data

- Certain battery detail data and specification.
- Continue test: If present battery group test was not finished click it for continue test.
- Re-test: Test present battery again.

- Last line/Next line to check other battery information.

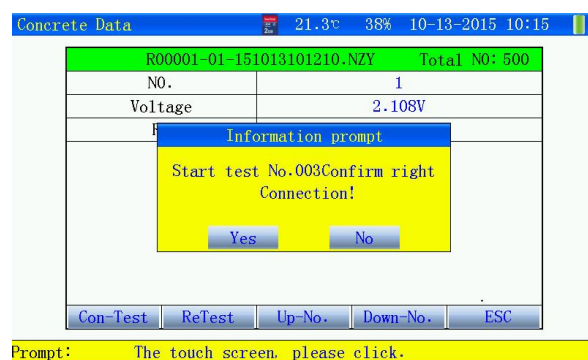


Fig. 3.5.4-3 Continue test

- Battery group test was not finished. Start any battery test connect test strip. Click “Yes” start the test.

3.6 Re-test

Retest the battery



Main interface “Data Mgmt” — “choose test record” — “View” — “DataTest” — “ReTest”.

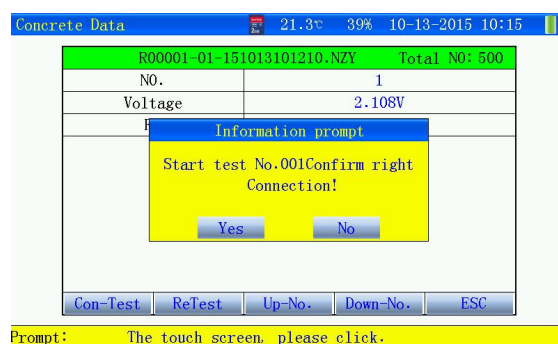


Figure 3.6 the test data of retested battery

3.7 Time setting



Main interface “System Mgmt” — “Date&Time”, enter into date and time setting.

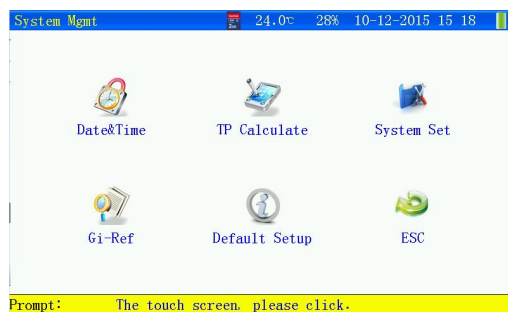


Fig. 3.7 System setting/data setting interface

3.8 Touch screen calibration



Main interface “System Mgmt” — “TP Calculate” enter into calibration interface .

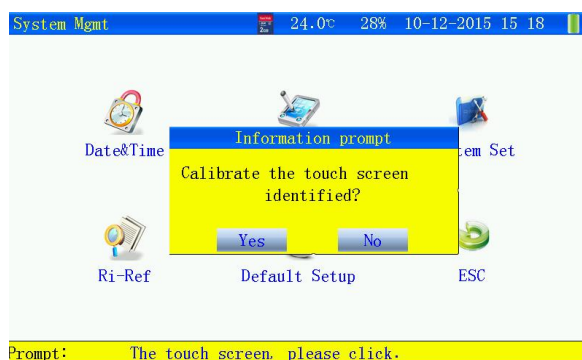


Fig. 3.8 Touch screen calibration

Click “Yes” Touch screen calibration utilized 5 points mode click the “+” orderly. When finish calibration it will return automatically. If any calibration mistake touch screen is not smart we can enter the interface again to calibrate it.

3.9 Back light memory setting when it’ s off



Main interface” System Mgmt”—“ System Set”, enter into parameters setting.

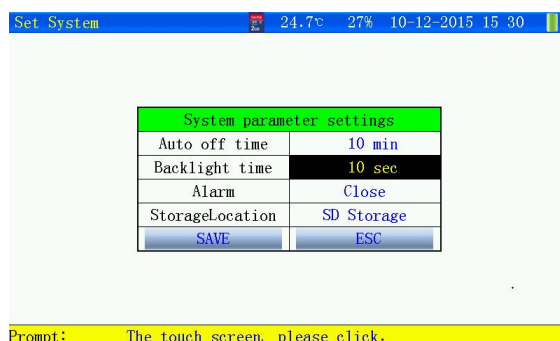


Fig. 3.9 System setting

- Automatic off time: Maximum value is 120 minutes, 0 means no automatic off.
- Back light off time: Maximum value is 120 minutes, 0 means no automatic off.
- Alarm volume: Close-voltage lower than minimum level won't alarm; Open-alarm user.
- Storage:
 - a. Internal storage. Test data will be stored internal it can store maximum 99 group. Transfer it to PC.
 - b. External storage. The data is held in SD card. Maximum is 999 group.
- Finish setting click "Save".

3.10 Save setting (see 3.9)



main interface" **System Mgmt** —"System Set", enter into parameter setting interface.

3.11 Reference internal resistance maintenance

- "System management" – "Reference internal resistance").

Ref value Maintain		21.8℃	35%	10-13-2015 10:19
B.Brand	2V-1	Del B.Brand	Add B.Brand	
ID.	CellType	CAP	Ri	
1	2V	100Ah	1.000mΩ	
2	2V	150Ah	0.828mΩ	
3	2V	170Ah	0.759mΩ	
4	2V	200Ah	0.699mΩ	
5	2V	250Ah	0.680mΩ	
6	2V	300Ah	0.648mΩ	
7	2V	350Ah	0.600mΩ	
8	2V	400Ah	0.500mΩ	
9	2V	420Ah	0.479mΩ	
Add B.Brand Data		Save	ESC	

Prompt: The touch screen, please click.

Fig. 3.11 Reference internal resistance edition

- If we need to add or modify internal resistance value form manufacturer please enter this interface.
- Delete battery manufacturer: Click it to delete battery data from present manufacturers.
- Add battery manufacturer: Click it will create a new manufacturer.

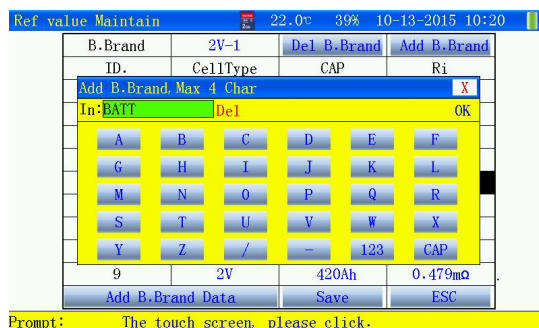


Fig. 3.11-1 Add new manufacturer

- Battery manufacturer name contains 4 letter or number at most.

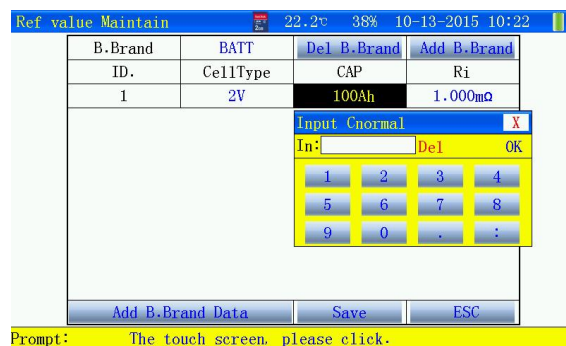


Fig. 3.11-2 Add manufacturer data

- Voltage type: Select it according to battery type.
- Battery volume: Input battery volume.
- Reference internal resistance: Input the internal resistance from manufacturer.
- Save above specification in test data specification select manufacturer will display battery information automatically.

3.12 Initialization setting



main interface “System Mgmt—Default Setup—Recovery”, enter into initialization setting interface.

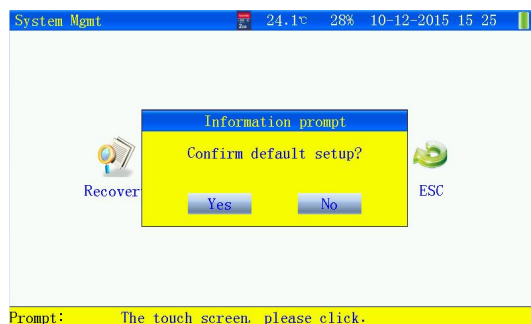


Fig. 3.12 Initialization

- Initialization: Initialize all specifications as factory setting.
- Product information: The instrument info.

IV.PC Software Instruction

4.1 System setting

This software requests following basic requirement.

- The PENTIUM/100% compatible computer or note book with standard USB port
- A hard disc drive (Such as C) holding 80M volume at least.
- Over 64M volume.
- The screen resolution is larger than 1024*768.
- Computer system is higher thanWINDOWS2000/NT/ME/XP/2003.

4.2 Software installation

Open the setup.exe and user do installation according to tips. Operate the software open the SD card data.

4.3 Open test data

Open SD card data

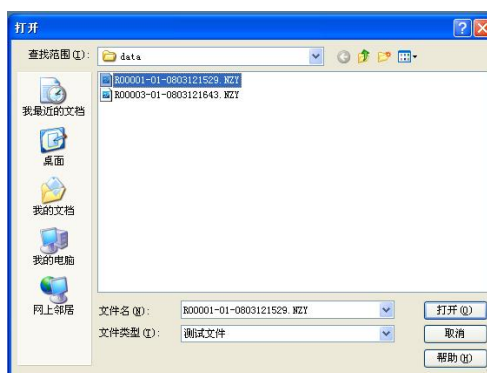


Fig. 4.2 Open SD card data

4.4 data analysis



Fig. 4.2-1

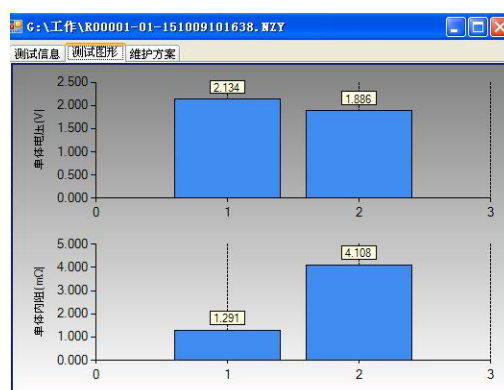


Figure 4.4-1 Graphic Correlation of cell

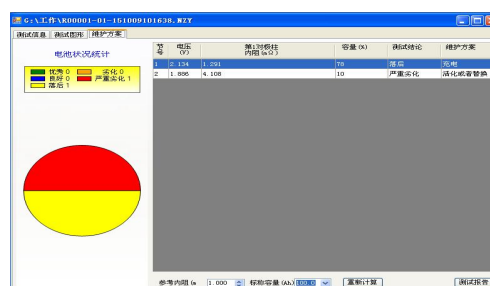


Fig.4.4-2 Maintenance interface

- Reference internal resistance: It can be re-set and restart the computer to analyze the test data again.
- Test report: Click it to create excel report.

4.5 Generation of report

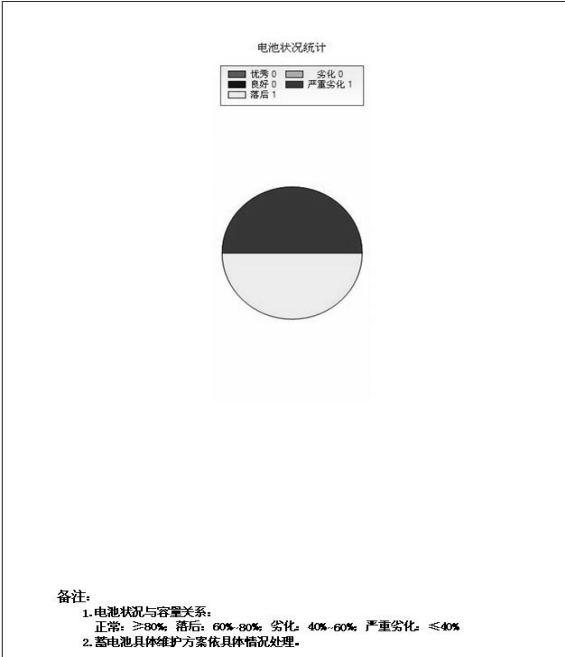


Fig. 4.5 Test report

蓄电池内阻测试报告

机房所属:
机房名称:
测试地点:
报告人:

Fig. 4.5-1 Test report

蓄 电 池 内 阻 测 试 报 表							
机房所属		01		机 柜 编 号		00001	
电池组号	01	操作员编号	00001				
电池类型	2V	电池数量	24		电压下限	2.100V	参考内阻
浮充电压	0.000V	浮充电流	0.000A		放电电压	0.000V	电池温度
开始时间	2015-10-9 10:16				平均电阻	2.100mΩ	平均电压
测 试 结 论							
结论	维护建议		节数		单件明细		
优秀	按照规程维护		0				
良好	按照规程维护		0				
落后	充电		1				
劣化	活化		0				

Fig. 4.5-2 Battery status summarize

测试结果										
节号	电压(V)	极柱内阻(mΩ)	连接条电阻(mΩ)	容量(%)	测试结论	维护方案				
1	2.134	1.291		78	落后	充电				
2	1.886	4.108		10	严重劣化	活化或备替换				

Fig. 4.5-3 Test result

Chapter V Maintenance And Warning

5.1 Failed to be turned on

- Check the connection between instrument and Li-battery. The voltage may be too low to open the device. We may need to replace or charge battery in the instrument.
- Instrument screen will display battery volume in the center. When there is  we need to charge the instrument.

Charging:

- a. Insert the adapter to battery charging port. Connect adapter power to AC power socket.
 - b. When adapter light is green means finish charging.
- Note: Longest charging time is 6-8 hour please don't charge it over.
 - If instrument doesn't reflect anything failed to turn off please open back cover get off the battery and insert it again then turn on the device.
 - If touch screen is not smart please calibrate it in "System management".
 - When screen display "Insert storage card again" please get off the SD card and insert it again or replace SD card.
 - If we don't operate it for a long while during test the instrument will close LCD or whole device automatically. Click the touch screen or press any key will wake it up.

We can set the back light and off time ourselves.

5.2 Display "Inspect batter clip"

Firstly ensure battery clips and pole are connected well and testing battery voltage should be not less than 1.5V.

5.3 Test pin probe bent or can't withdraw

Replace the probe:

- a. Clip the probe on sleeve top by pincher.
- b. Warning: Don't clip the sleeve holding probe to avoid damaging pin.
- c. Pull out the pin probe straightly.
- d. Clip new probe into sleeve.
- e. Push the probe to a soft surface. Such as cardboard until the probe reach the sleeve top.

VI.Packing List

No.	Item	Qty
1	Main engine	1
2	Power Adapter	1
3	Test line	1
4	SD card	1
5	Card reader	1
6	Touch pen	1