Huazheng®

HZFD-200
Battery Discharge Tester

Huazheng Electric Manufacturing (Baoding) Co., Ltd

Contents

I. General

1.1 General Introduction

Battery Load Bank is a special instrument for the test of NiCD and Lead-acid storage battery string of the whole string voltage of 24V, 48V, 110V, 220V, in communication room, and cell voltage of 1.2V/2V/6V/12V, and it adopts current advanced testing technology theory, and has obtained a series of breakthrough in research and application of new technology, new parts, new material and new techniques, which is designed in accordance with the requests of national related testing and maintenance regulations and it is a special detection instrument for the performance detection of stationary battery. Its big discharge power, small volume, light weight, complete function of data management software of upper computer could greatly reduce the work load of daily testing and maintenance of stationary battery.

1.2 Main Functions and Features

- The product is utilized color touch screen. It can be operated via finger or the touch pen with convenience and flexibility.
- Data save mode: Internal save and external save(SD Card)
- Enhanced over voltage protecting function ,
- Automatically recovery the over current protecting function
- Overheating protection .

On line Monitoring Function:

- When the battery string is under the conditions of on-line discharge, uniform charge, and floating charge, the instrument could perform real-time monitoring for the battery string and cell; the monitoring includes the whole string voltage, cell voltage, the whole string charge/discharge current, the whole string charge capacity, the whole string discharge capacity, monitoring time and etc

Discharge Function:

Perform discharge of constant current taking advantage of intellectualized dummy load after the battery string is removed from system, set up the parameters of “discharge

current”、“discharge time ”、“discharge capacity” 、“final protective voltage of whole string” and “final protective voltage of cell”, and the tester could carry out discharge function automatically, display discharge current、battery discharged capacity、the whole string voltage, cell voltage, discharge time and etc at real time; when the string reaches setup value of final discharge voltage、setup value of final discharge capacity、setup value of final discharge time、any cell voltage is below setup value of final cell voltage or manual final operation could stop discharge test. The final cell voltage conditions can also be set to alarmed is not only stop.

- It could save 10 groups of on-line monitoring data and 10 groups of discharge test data; the user could perform query, deletion, and export operation of SD card.
  The computer could connect with instrument via the serial, perform test control and real-time monitor of instrument, and carry out graphic analysis.
- The computer could connect with instrument via the serial, perform test control and real-time monitor of instrument, and carry out graphic analysis.

Automatic protection function:

- The tester would stop the test automatically when it could detect the abnormity of the whole battery string or cell, and the working abnormity of tester in order to make protection of battery during the test process.
- The host machine of tester adopts the design integrating the monitoring part with power part, the power part adopts new-type high-effective parts, and it is a storage battery comprehensive tester with small volume and high efficiency.
- Humanized operation interface, simple operation, clear flow, and each operation could have English cue. Aquamarine blue high-brightness, large-screen LCD, and the display effect are clear and beautiful.
- Powerful functions of upper computer data management software, friendly interface, which could offer data management, print, analysis, statistics of report forms, automatic creation of test report , etc

1.3 Test Procedure Introduction:

1.3.1 On Line Monitoring Test Procedure

First Step: Connect Cell Voltage monitoring module (See details in section 2.4)

Second Step: Connect group voltage test line to the two poles of battery string (see the details in section 2.5)

Third Step: Plug in and Switch on the tester .

Forth Step: Enter into on line monitoring setup . (see the details in section 3.1)

Firth Step: Press " OK " Start test .

1.3.2 Discharge Test Procedure:

Step1: Connect cell voltage monitoring module (See details in section 2.4)

Step2: Pull" On" on the discharge switch (to prevent reverse connection of the discharge cable and damage the tester , and also if misconnection, the warning will be given.)

Step3: Connect the discharge cable to the the host machine and battery bank respectively.) Note: Red line is + positive ; Black line : - Negative) reverse connection will be warning . (See details in section 2.5)

Step 4: Connect group voltage test line to the two poles of battery string.

Step 5: Plug in and switch on the tester.

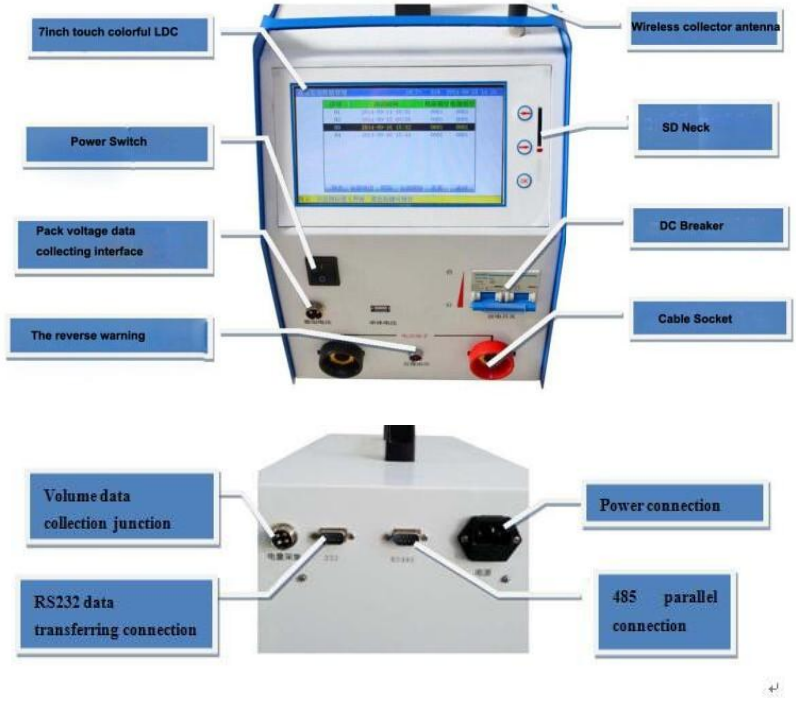
Step 6 : Enter into discharge test parameters setup.(see details in 3.2)

Step 7: Pull " off"on the discharge switch .

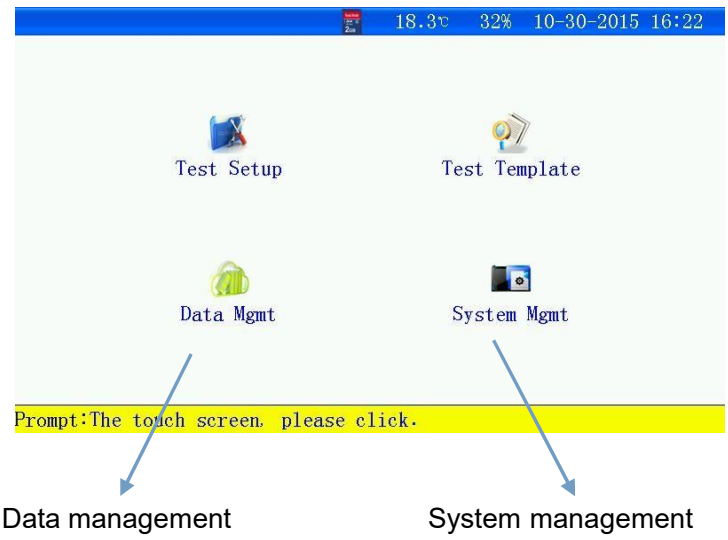
Step 8: Press " ok" start test .

II. Junction Port and Connection Directions

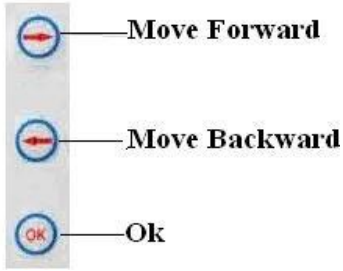
2.1 Junction Port Introduction



2.2 LCD Display



2.3 Keys: (Touch screen and keys)



2.4 Wire/Wireless Cell voltage monitoring module (Optional)

2.4.1 Two kinds of communication ways between cell voltage monitoring module and the host machine.

a. Wireless communication : use wireless module with antenna

- Stay away from strong electromagnetic shielding and electromagnetic interference
- Range is 1m-20m between wireless module and the host machine.

b. Wire communication: wire module connection by USB.

2.4.2 Cell voltage monitoring module is divided into two types:

a、24cells module (each module can monitor 24cells, cell voltage type: 1.2V or 2V or 6V or 12V.)

b、6cells module (each module can monitor 6cells, cell voltage type: 1.2V or 2V or 6V or 12V).

2.4.3 Cell Voltage monitor module Junction port introduction:

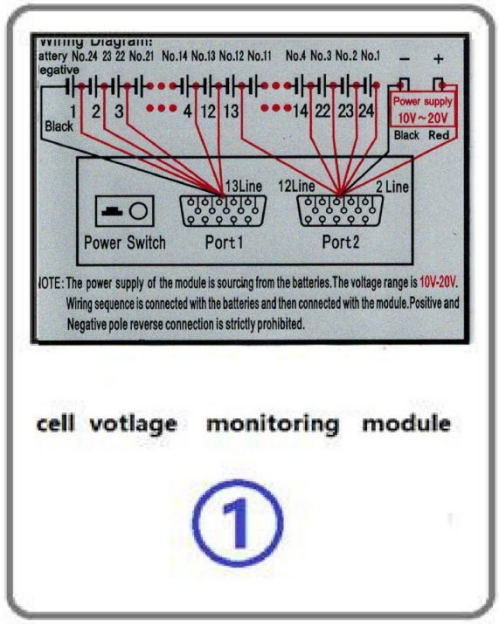
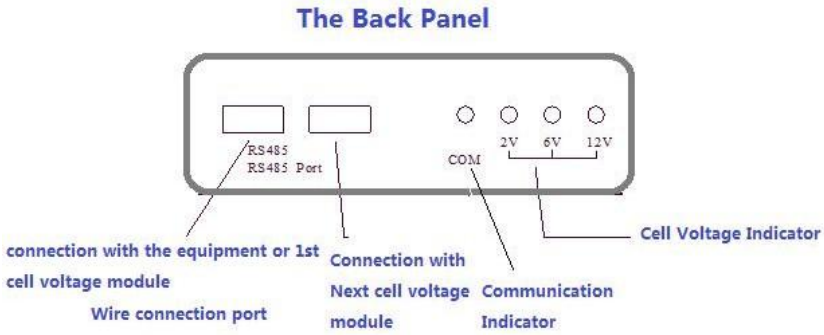
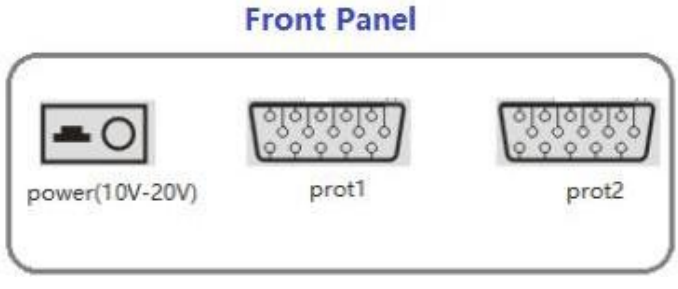


Figure 2.4.3





2.4.4 Cell voltage monitoring module connection procedure:

Step 1: To confirm the numbers of cell module used for battery string .

- 1. The numbers of cell voltage module = the numbers of battery for whole

group /the numbers of battery monitored by each module

- For example: the numbers of battery is 110cells, the configured module can monitor 24cells, then 110/24=4.58, so five modules are needed.

Step 2: Connect cell voltage module with the battery.

(Start from No.1 module) .

Sequence of Wiring：

1 、 Wiring from the battery negative terminal, firstly connecting No.1 black line to negative pole of string battery, No.2 line connecting to the positive pole of the first battery, and so on…. See the diagram as below：

2、 After finishing the wiring of all the batteries, then to connect the module, No.1- 13 Line connecting to Port 2 of the module, No.14-25 Line connecting to Port 1 of the module.

3、 If you adopt wire test mode, it needs USB line to connect to the front panel of the tester

- After finishing line link, to View and confirm exactly connection, please connect air interface with“ port 1 and port 2 of cell voltage module. Port1 corresponding to 12core beam; Port 2 corresponding to 13 core beam.
- Power supply of Cell voltage module is sourcing from the batteries , there are two cables on the cell voltage module (without label No.) firstly check whether power switch on the module is shut down (0 is shut down, - is open), then connect two cables (Red and black cable without any label No.) to “ 10V-20V” Power source, please open the power switch after confirmation of correct connection.
- (See the figure 2.4.3). Power electric method: if cell voltage is 2V, Powered by 5cells; cell voltage is 6V, powered by 2cells; cell voltage is 12V, Powered by 1cell.
- After power up from cell voltage module, the indicator light will flicker of corresponding module.
- For example below:

a. To take 24cells , cell voltage 2V for example , the wiring with one cell voltage monitoring module below:

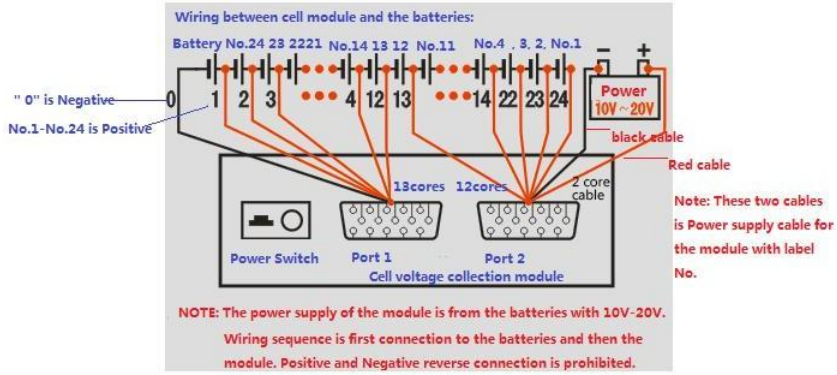


Figure 2.4.4 24cells 2V connection with one cell voltage module.

b. To take 8cells cell voltage 6V for example , the user only connect in the first nine core of " Port 2 ", spare four core without connection. See below:

C. If String voltage is 220V , cell voltage 2V, 110cells , the needed cell voltage module is 110 / 24=4.58 modules , the module equipped is 5pcs ; the last module only need to monitor 14cells . the wiring below :

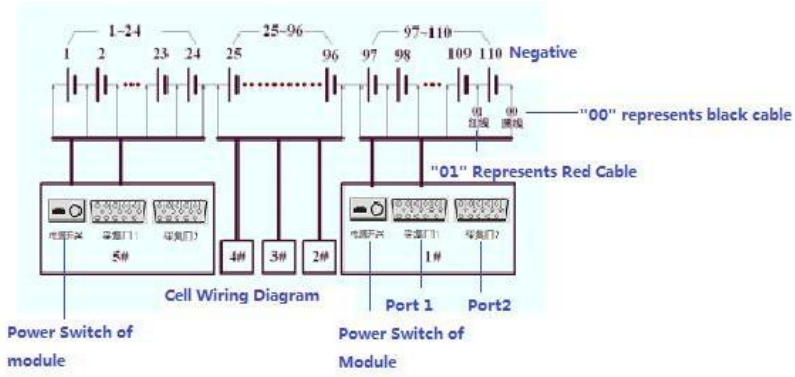
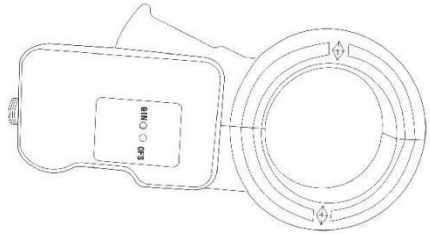


Figure 2.4.4-3 Multi-module connection with the batteries

Step 3: if cell voltage monitoring module is wired communication, please connect USB Line to each module and the host machine; if wireless communication, please connect with antenna.



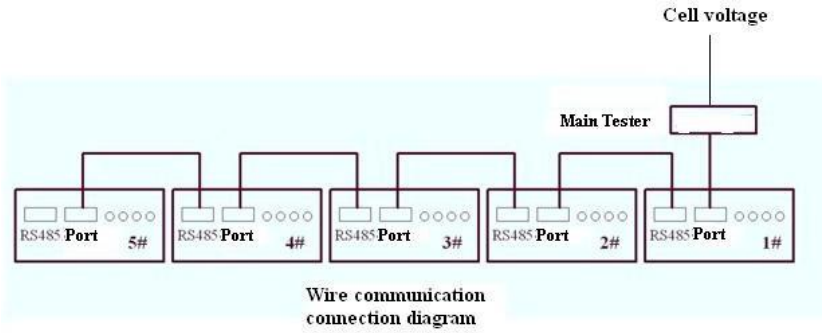


Figure2.4.4.4

2.5 The Host Machine Wiring Directions

2.5.1 Connection and disconnection rules

- **Before test, wiring is in accordance with firstly connecting the tester, and then connecting the batteries.**
- **After finishing test, user should disconnect the lines on the battery string, then the lines of the tester.**

2.5.2 Wiring of Discharge cable

- Connect “+”(red) with positive pole of a string of battery, and connect“-”(black) with negative pole of battery string. Prohibit to connecting contrarily!

2.5.3 Wiring of string voltage collection lines

- Connect string voltage lines to the corresponding poles of the battery string, Connect “+”(red) with positive pole of a string of battery, and connect“-”(black) with negative pole of battery sting. Prohibit to connecting contrarily!

2.5.4 Connect with 220V power cord of tester. Do not connect when adopting

direct current as power supply. The user should carefully View the wiring is right or not, and notice the positive and negative wiring of battery terminal and the terminal of voltage collection line are right or not, it is prohibited to connect contrarily!

2.5.5 Connect with power supply, and the tester could run after View.

2.6 Power Collector (Optional)

- When the tester is used for on-line monitoring, the power collector is used for monitoring charge/discharge current of battery string.
- When the tester is used for discharge test, the power collector is used for testing discharge current of user's equipment.
- The indication direction of power collector is charge current direction of battery string, and prohibit to connecting contrarily.

2.7 Parallel Connection (Optional)

- Two battery load banks can be combined into systems to match up for different battery capacities. The main purpose is in parallel connection, the main purpose is to provide higher load current for use in constant current or constant power tests.
- Battery load bank and extra load in connection by RS485 Port. One unit is setup as the host machine, another is the slaves (see details in 3.12)

  NOTE: If the clients use their own heater/dummy load as extra load for increasing the load current, the operation steps in the followings:

  1. Power collector (current clamp) clip the output line of Negative of heater/dummy load, please notice the direction of the current clamp.
  2. Please connect line of current clamp to the port of Power collector on the tester.
  3. Switch on our tester and set up the parameters. See the details in 3.1.2)
  4. Switch on the heater/dummy load.
  5. Confirm our tester work .

III. Operation Directions

3.1 On Line Monitoring Function

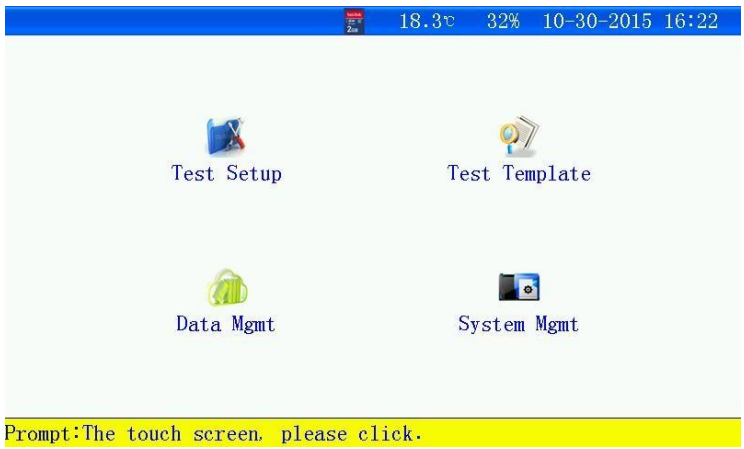
When the battery string is under the conditions of on-line discharge, uniform charge, and floating charge, the instrument could perform real-time monitoring for the battery string and cell voltage. when the string reaches setup value of final discharge voltage、setup value of final discharge capacity、setup value of final discharge time、any cell voltage is below setup value of final cell voltage or manual final operation could stop discharge test.

3.1.1 Testing preparation

Wiring: Firstly connecting with the tester, then the batteries.

3.1.2 Parameters setup

Turn on the instrument the screen will display “Specs settings”, “Specs template”, “Data management”, “System settings”



Specs settings: set the voltage, current, discharging efficiency, engine room information, etc.

Specs template: Standard template can be used directly;

Data management: Test result analyze, including histogram analysis

System settings: Including time, touch screen precise, data correction, product generation, etc. (This function has been set well before delivery it’s unnecessary to adjust it)

● Main interface" Test Setup" —"Monitor" Enter online monitor settings interface.

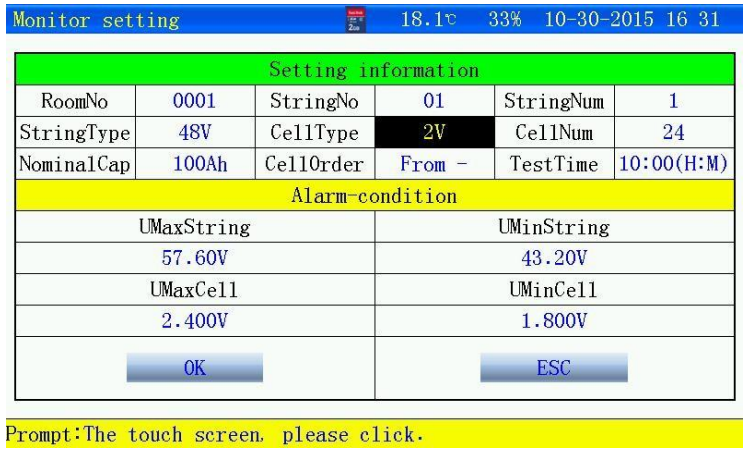


Figure 3.1.2 Online monitor specs settings

- StringNum: String Number
- NominalCap: Nominal Capacity
- UMax String: Max. String Voltage
- UMinString: Min. Voltage of String
- UMaxCell: Max Cell Voltage
- UMinCell: Min Cell Voltage
- Input parameters setup according to the prompt of the interface, if setup error," Flute. Flute, flute. "will be warned .
- Room No. 0001-9999
- No of battery string 01-99
- Number of Battery String: 1-2string
- Type of String Voltage: according to the type of string voltage you need to test, for example, 24V or 48V etc.
- Cell voltage type: Rated cell voltage (1.2V or 2V or 6V or 12V)
- Numbers of each string: the monitored cells of string (Max.240cells)
- Rated Capacity: Rated capacity of individual battery.
- Choice of Cell Order: First Negative and then Positive. It only for record of data, irrelevant with connection of cell collection line .
- Test time: Hour: Minute; Min 1min, Max: 99h59min.

- Upper limit of string voltage: Alarm parameters for upper limit of string voltage.
- Lower limit of string voltage: Alarm parameters for lower limit of string voltage
- Upper limit of cell voltage : Alarm parameters for upper limit of cell voltage
- Lower limit of cell voltage: Alarm parameters for lower limit of cell voltage

After finishing settings press “Confirm” and begin online monitoring

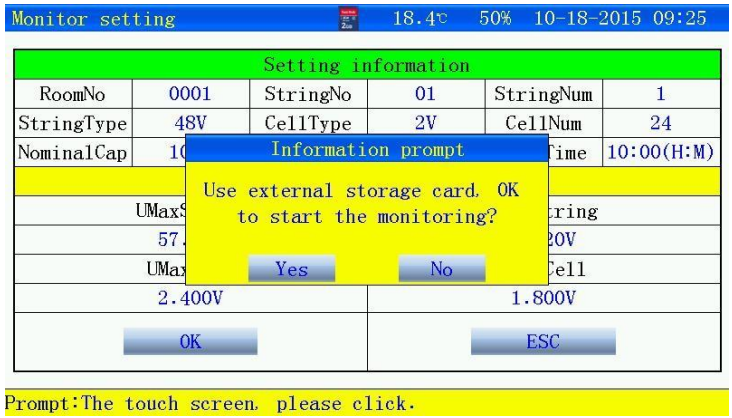


Figure 3.1.2-1 Start test

3.1.3 Interface of test

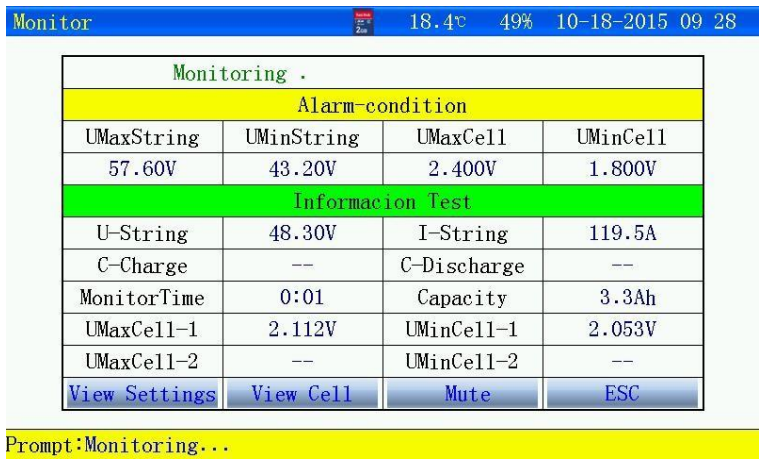


Figure 3.1.3 interface of on line monitoring

- If happen to warning for the data, it display “ Red”
- View setup information: user can modify warning condition on test.
- View cell information : display cell voltage and histogram of battery string (See details in 3.1.4)
- Mute: If reach warning condition, the tester will display reason of warning and give off prompt tone “Flute. Flute, flute…
- EQUIT : Stop monitoring

3.1.4 Cell data information

Figure 3.1.4Interface of cell voltage test data

- UpGroup: Up String
- DownGroup: Down Sting
- If cell voltage displays as blue, it represents Max value , Red data as Min value .
- Histogram: graphic display of battery string
- Each page display the data of 24cells.
- Back: Back to main interface .

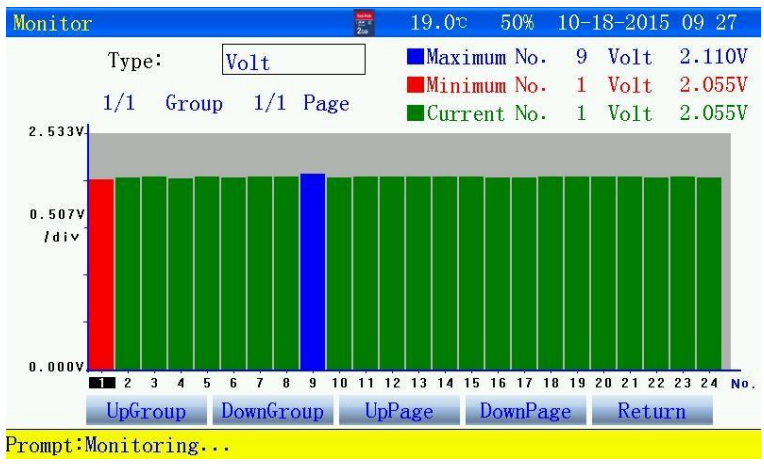


Figure 3.1.4-1 Histogram of cell voltage

- To click the histogram will display the voltage of one battery.

3.1.5 Stop Test

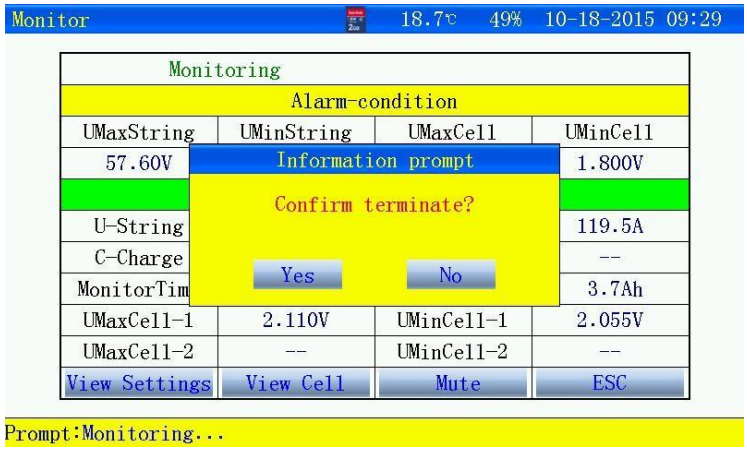


Figure 3.1.5 To stop the test or not

- Click “Yes” to stop test

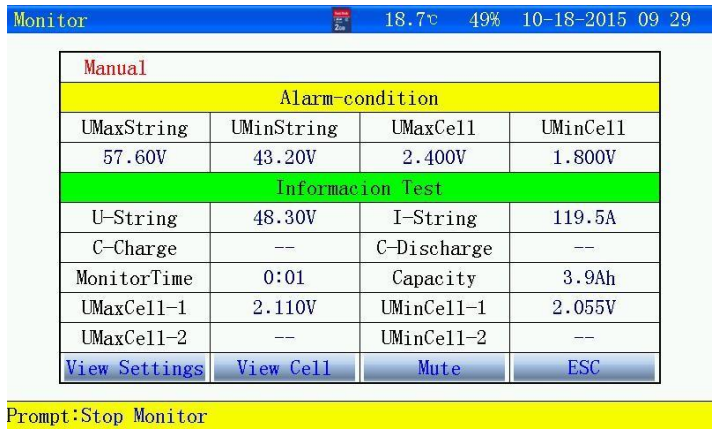


Figure 3.1.5-1 End monitoring

- After finishing test, View test data and see in 3.5
- Turn off power supply of the tester, disconnect the connection lines , firstly disconnecting the line on the batteries , then the line on the tester .

3.2 Discharge Function

Perform discharge of constant current taking advantage of intellectualized dummy load after the battery string is removed from system. when the string reaches setup value of final discharge voltage、setup value of final discharge capacity、setup value of final discharge time、any cell voltage is below setup value of final cell voltage or manual final operation could stop discharge test.

3.2.1 Test preparation

- Firstly connecting discharge cable to the tester, then to the batteries. it

adopts in parallel connection between battery string and the tester .

- If the tester add extra load, please set up the tester as the mode of the host machine to control the extra load . After finishing setup, then begin to test.

3.2.2 Parameters setup

Turn on the tester and enter into the interface below , choose "Test Setup" — "Discharge", enter into interface of discharge parameters.

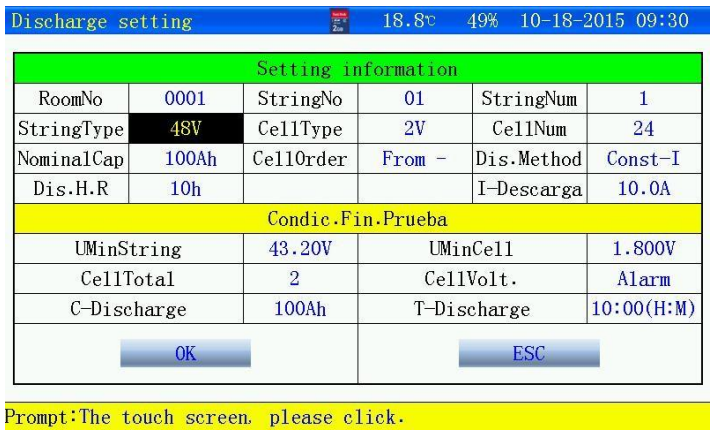


Figure 3.2.2 Interface of setup of discharge parameters

- Input parameters setup according to the prompt of the interface, if setup error," Flute. Flute, flute. "will be warned .
- Room No. 0001-9999
- No of battery string 01-99
- Number of Battery String: 1-2string
- Type of String Voltage: according to the type of string voltage you need to test, for example, 24V or 48V etc…
- Cell voltage type: Rated cell voltage (1.2V or 2V or 6V or 12V)
- Numbers of each string: the monitored cells of string (Max.240cells)
- Rated Capacity: Rated capacity of individual battery
- Choice of Cell Order: First Negative and then Positive. It only for record of data, irrelevant with connection of cell collection line
- Test time: Hour: Minute; Min 1min, Max: 99h59min.
- Mode of Discharge:

a、Constant current: Value of current setup should not bigger than rated current.

b 、 Constant Power: 48V: Max value of power setup =(Type of string *1.2* Max discharge current/1000) KW

- Discharge hour rate: 0.5-10H optional

  Lower limit of String voltage: during discharging to battery, if don't need monitor string voltage , user need setup value of string voltage as "0" in terminal condition .

  Lower limit of Cell voltage: during discharging, if don't need monitor cell voltage, user need setup value of cell voltage as "0" in terminal condition.

- Test time: Hour: Minute; Min 1min, Max: 99h59min.
- After finishing setup and confirm the connection line again, Close the discharge switch and begin to discharge

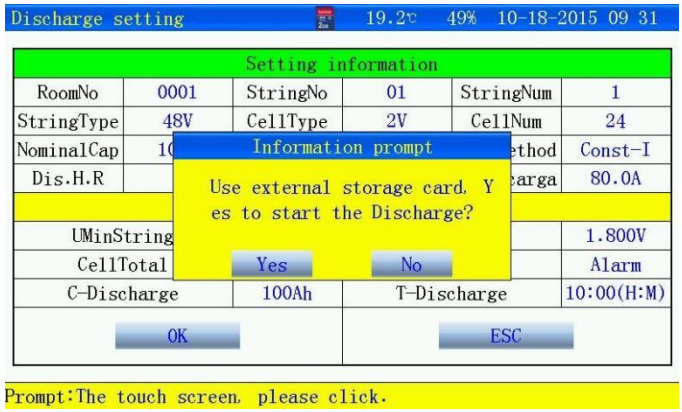


Figure 3.2.2-1 Interface of discharge

- Click"Yes", start discharge

3.2.3 Interface of Test

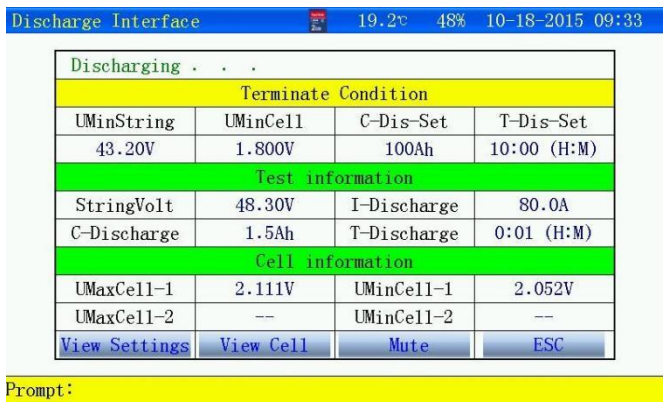


Figure 3.2.3 Interface of Discharging

- If happen to warning for the data, it display " Red"
- View setup information: user can modify warning condition on test.
- View cell information : display cell voltage and histogram of battery string (See details in 3.1.4)
- Mute: If reach warning condition, the tester will display reason of warning and give off prompt tone "Flute. Flute, flute.
- EQUIT : Stop monitoring.

3.2.4 Cell data information

Figure3.2.4 Cell voltage data

- If cell voltage displays as blue, it represents Max value , Red data as Min value.
- Histogram: graphic display of battery string
- Each page displays the data of 24cells.
- Back: back to main interface of test

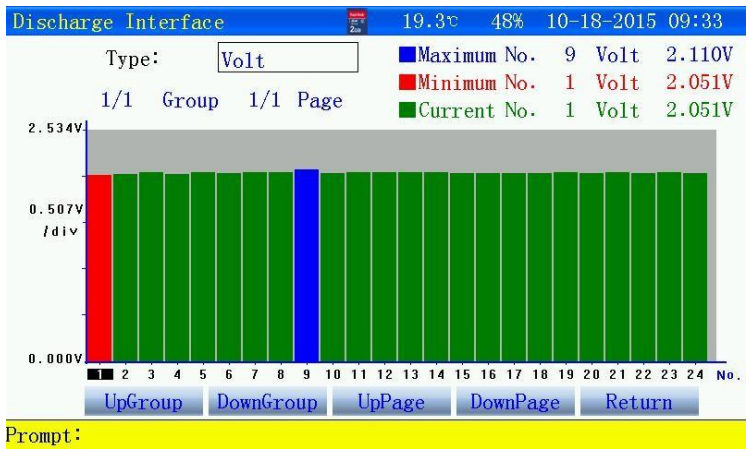


Figure 3.2.4-1 Histogram of cell voltage

- To click the histogram will display voltage of one battery.

3.2.5 Stop of discharge:

- below setup value of final cell voltage or manual final operation could stop discharge test, the tester proceed heat dissipation before turning off power supply of tester so as to prevent the damage of the tester .

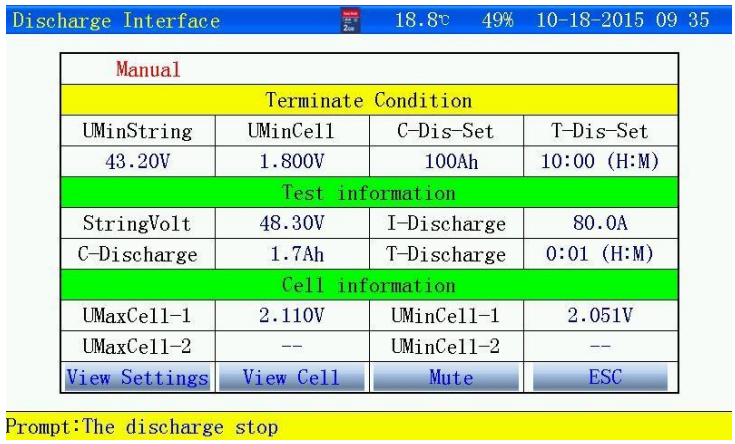


Figure 3.2.5 end of discharge

- End of test: View the test data and see in3.5
- Turn off discharge switch and power supply of the tester and disconnect connection lines , firstly disconnecting connection line on the battery, then on the tester .

3.3Test Template Function

- Main interface enter into 

- Each function of the tester can supply 10groups of template of test parameters, self-defined parameters.

3.4 Data Management Function

- Data save mode: internal save and external save
- Main interface enter into" 

", click the icon of on line monitoring, discharge test and capacity evaluation for check.

3.4.1 Mode of Data save:

- To use internal save mode, the time interval for one minute during the test. The tester automatically allocate the save time according to the test time.

- Max 5-10groups test data for internal save

Figure 3.5.1 Data internal save

- “Export”: Export of Data to choose one record, then click”Export”to SD Card .
- “Exp-All”: Export all the data: to click “ Exp all”to SD card .
- Del-All : Delete all the data
- Del: delete one record

View information: firstly choose one record and click “ view information” for detailed data information

3.4.2 External Save (SD card) mode:

- Use external save, time interval of data save can be setup, Min data save time for 5s.
- External save: Max 999groups test data
- File name: Function code-Room No.-Battery string No.-battery No.-Date & Time
  a. J：On line monitoring data: J0001-01-150112135048.CFJ
  b. F: Discharge data: F0001-01-150112135048.CFJ

Figure3.5.2 Discharge test data

- Each page displays 9 records , to View through page up and page down
- Del-All :Delete all the data
- Del: delete one record
- View: firstly choose one record and click “view” for detailed data information.

3.4.3 View information

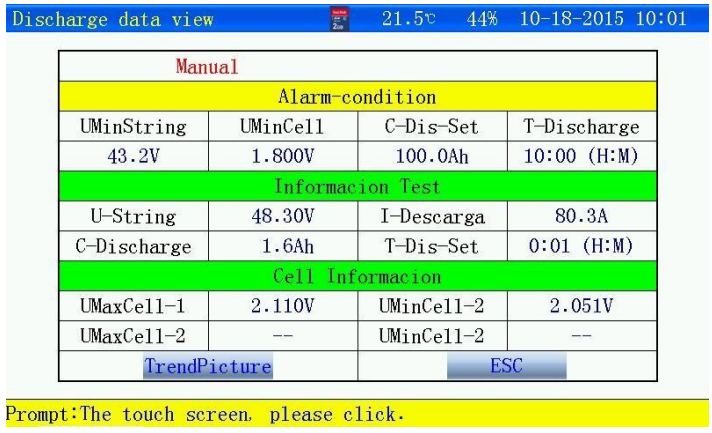


Figure3.5.3 End of test

- Graphs can’t be Viewed if test time lower than 1min,
- Graphs of data: View string voltage, cell voltage.

3.4.4 Graphs of data

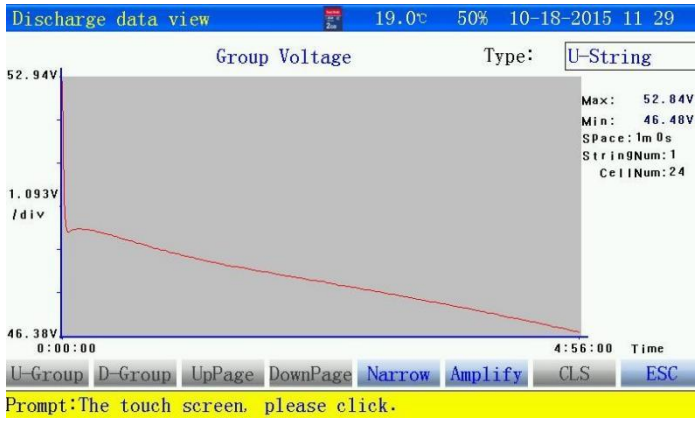


Figure 3.5.4Graphic of string voltage

- View data fixed in time, click graphics field, the time and voltage will be displayed.
- View graphics of cell , pls click “ type selection”

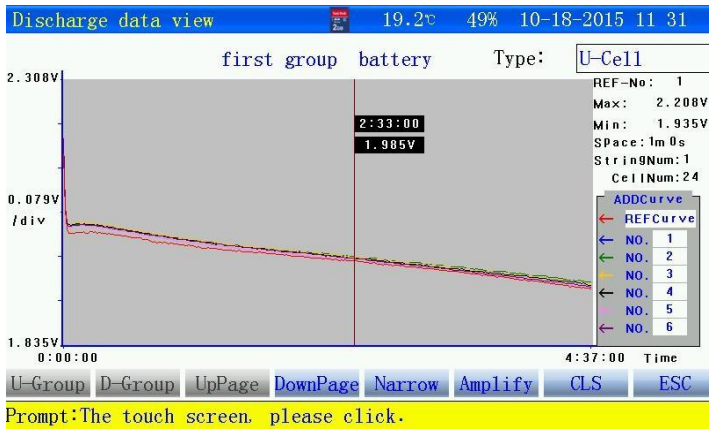


Figure3.5.4-1 Graphic of cell voltage

- View data of one battery, pls click “reference curve”, input No.of battery and click graphics field, the time and voltage will be displayed.
- View data of other batteries through page down or page up.
- Put together different batteries and make curve comparison , click 1or 2…etc in battery section ,then, Add the battery section number

3.5 Date & Time Setup

Enter into “System Mgmt— Date&Time ”the interface of time setup

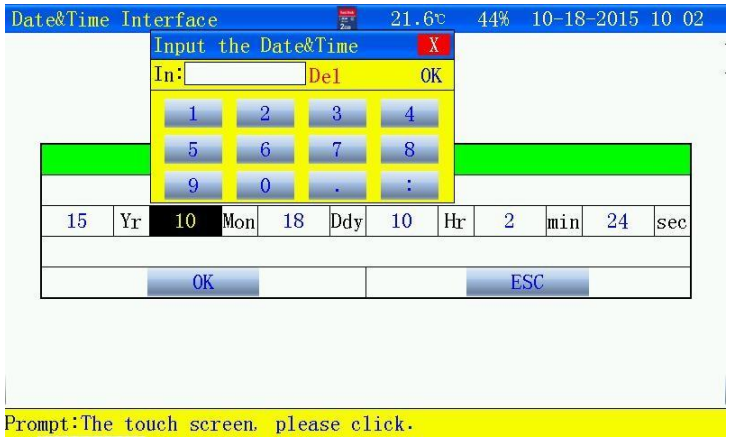


Figure 3.6 Interface of Data& Time setup

- After finishing setup, to click"confirm"and come into effect

3.6 Calibration of Touch Screen

Enter into "System Mgmt—TP Calculate"interface of calibration

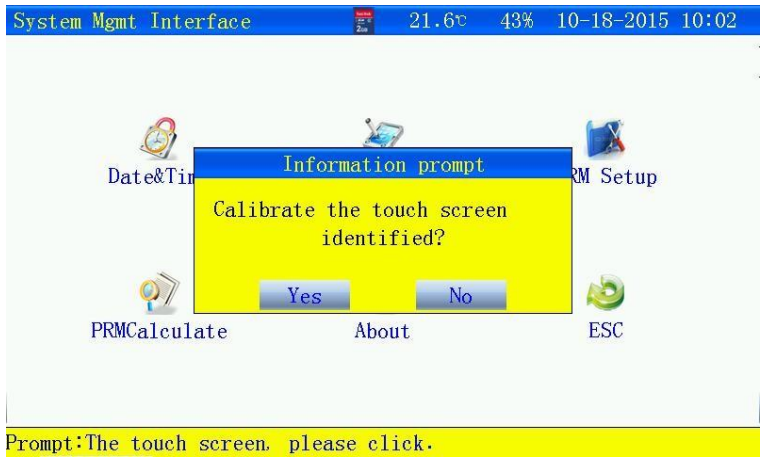


Figure3.7 Calibration of Touch screen

- To click"Yes" and begin calibrating

3.7 Restore Factory Settings

Enter into" System Mgmt — PRM Setup — FactoryReset "the interface of factory default.

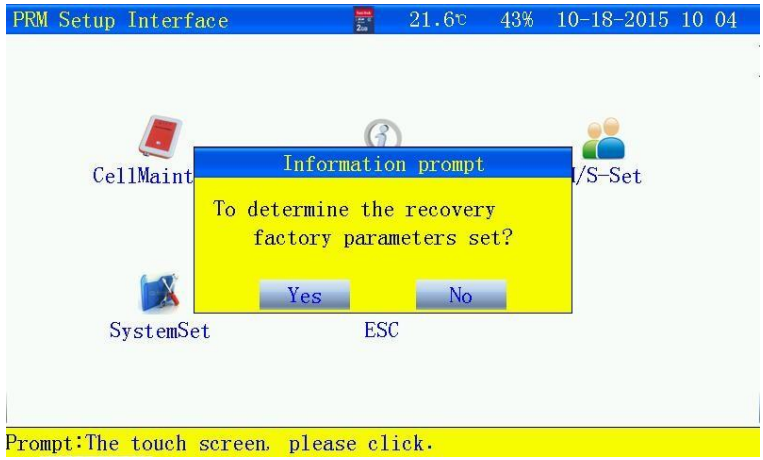


Figure3.9 Restore factory settings

3.8 Setup of Data Save

Data save: internal save and external save (SD Card). To choose external save (SD Card), save interval: Min 5s for one time. internal save: the tester automatically setup according to test time.

Enter into "System Mgmt— PRM Setup—SystemSet " the interface

Figure3.11 data save setup

3.9 Time Save Setup

Enter into "System Mgmt— PRM Setup—SystemSet " the interface

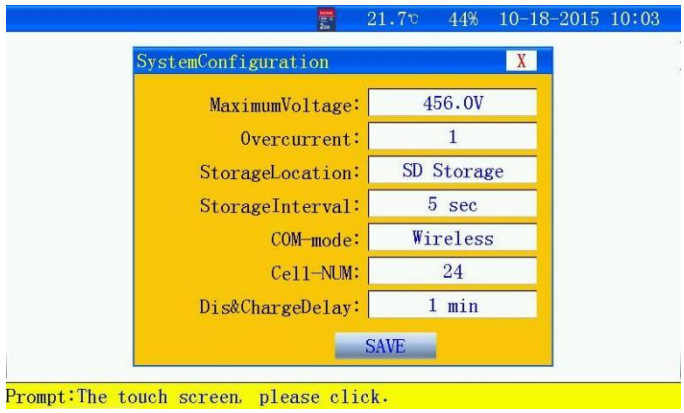


Figure 3.1.2 Interface of time save setup

3.10 Setup of Cell Communication

Enter into "System Mgmt— PRM Setup—SystemSet " the interface

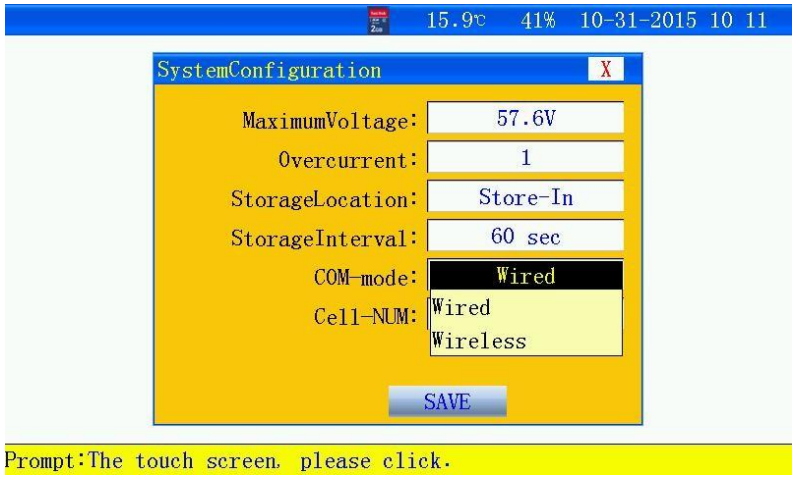
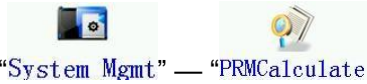


Figure 3.13 Interface of communication setup for the host machine and cell module

3.11 Setup of Numbers of Cell Module

Enter into "System Mgmt— PRM Setup—SystemSet " the interface(3.12)

3.12 Parameters Calibration



Enter into "System Mgmt" — "PRMCalculate"the interface of calibration.

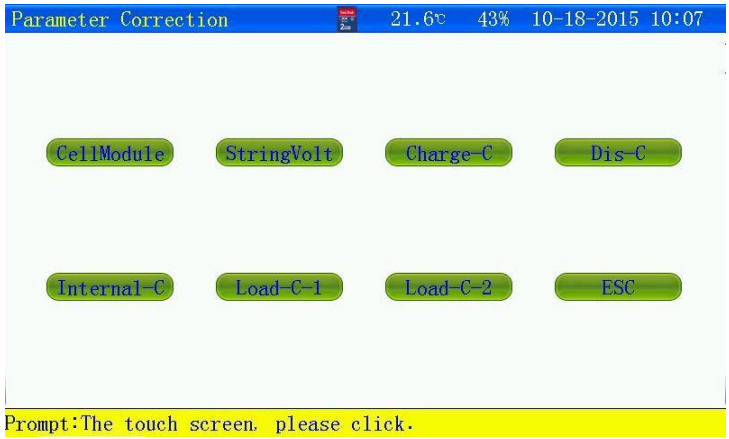


Figure 3.15 Interface of parameters calibration

Parameters have been calibrated out of factory.

3.13 About Product

Enter into" System Mgmt" — " About " the interface

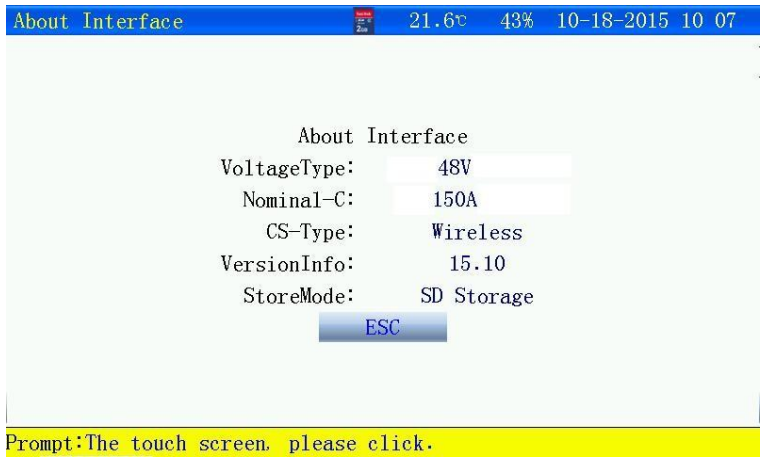


Figure3.16 Interface of product information

- Type of Voltage: Rated voltage of current sting voltage
- Rated current: Max current of corresponding to different voltage
- Communication mode: mode of communication for the host machine and cell voltage monitoring module.
- Save mode: Internal save and external save

IV. PC Software Operation Directions

1、General

1.1 Application

This software is data management software for stationary battery comprehensive tester.

1.2 System configuration

The lowest configuration request for the computer to use this software:

- All kinds of desktop computer and laptop computer with PENTIUM ofstandard serial、USB interface or 100% compatibility.
- One CD-ROM used for install the file.
- One HDD(for example :C:),at least 80M useable disc space
- EMS memory over 64M.
- Display resolution over 1024*768.
- WINDOW 2000\NT\ME\XP\2003 operation system.

Chapter 2 Operation

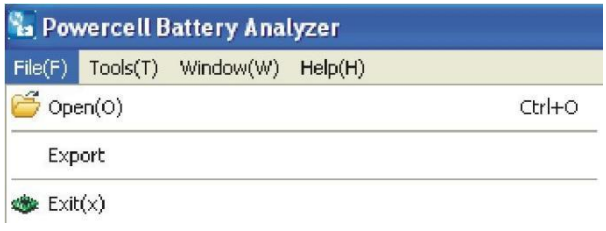
2.1 Setup

Click setup software SETUP .exe, carry out operation in light of interface prompt, and the user could finish the setup of data.

2.2 Startup

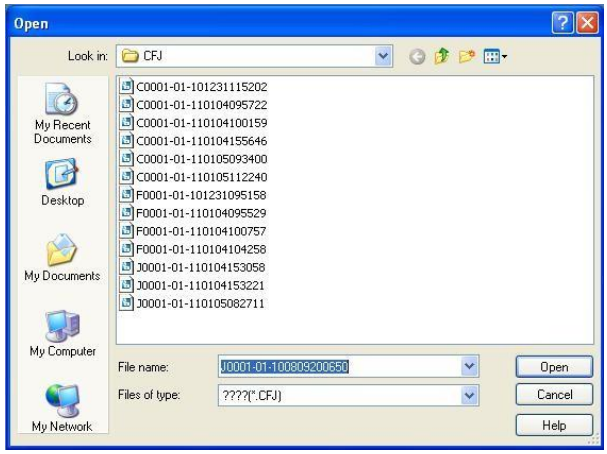
Run “desktop-icon” or run “start-program-icon” to enter into main menu.

2.3 Operation-file



2.3.1 Open

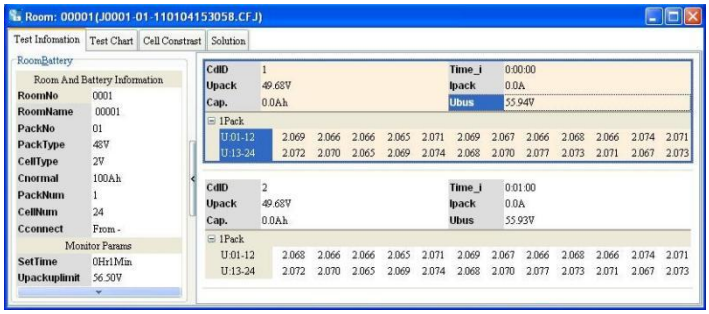
Select ”File-Open” in the menu to enter into test file interface, select one or several test files, click open, and the selected test file would be opened.



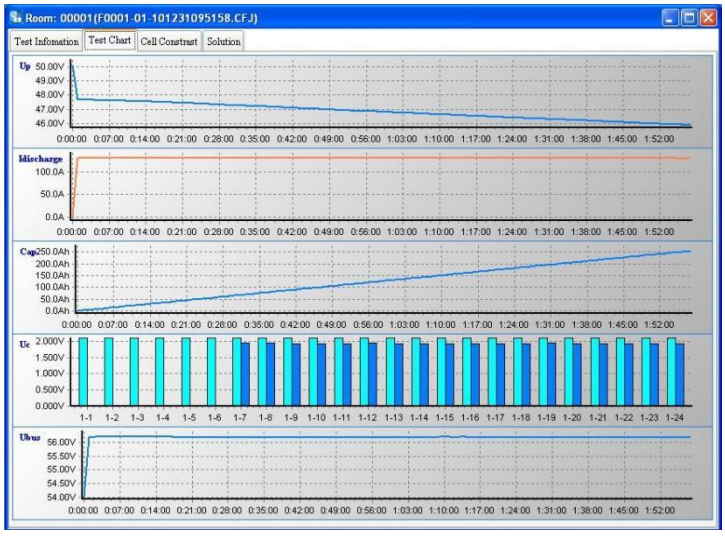
2.3.2 Data operation

Online monitor and discharge test could view test data, test pattern, cell contrast, maintenance solution.

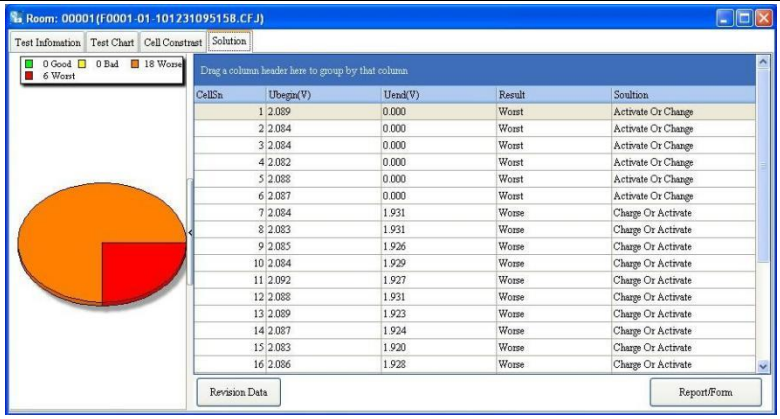
Test data



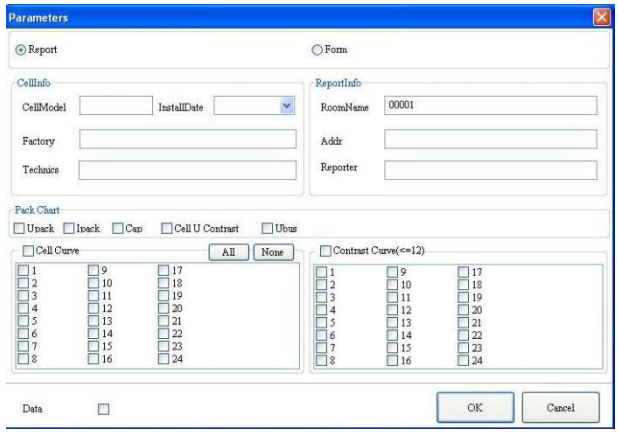
Test pattern



Maintenance solution

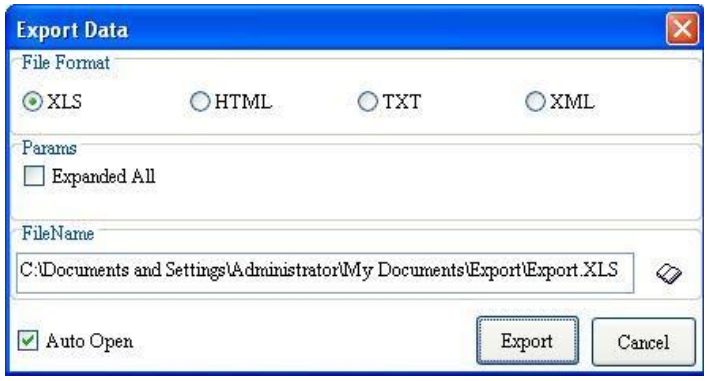


Click print under maintenances solution window, pop up report parameter dialog box, fill in parameters, if needs to create process data, select process parameters and interval of sampling, and the created report would include process data.



2.3.3 Export

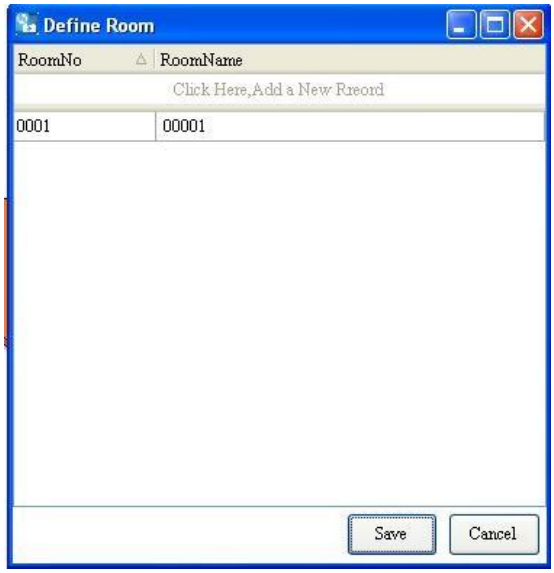
Select “File-Export” in the menu to enter into export interface, select required data format and save path, click export.



2.3.4 Define room

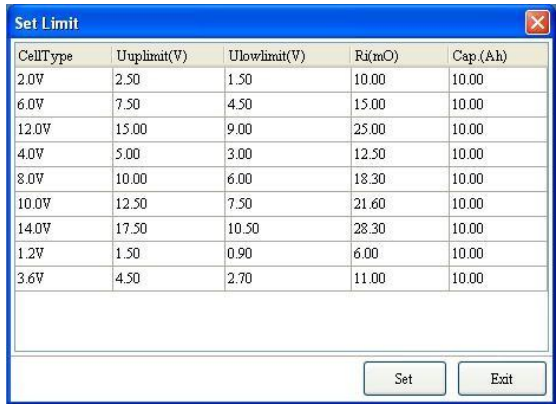
Define room includes corresponding list if room SN and Room Name.

Select “Tool-Define Room ” in the menu to enter into the interface, finish adding, correcting and deleting of serial number of room and room name. User should maintain this table before use the software, this table should be maintained in time when the room info is changeable during operation.



2.3.5 Set limit

Set limit for test data so as to display the data in red for prompt.



2.3.6 Set COM

Select the serial port of computer communicating with tester

Select “Tools- Set COM” in the menu, and press port number of computer.

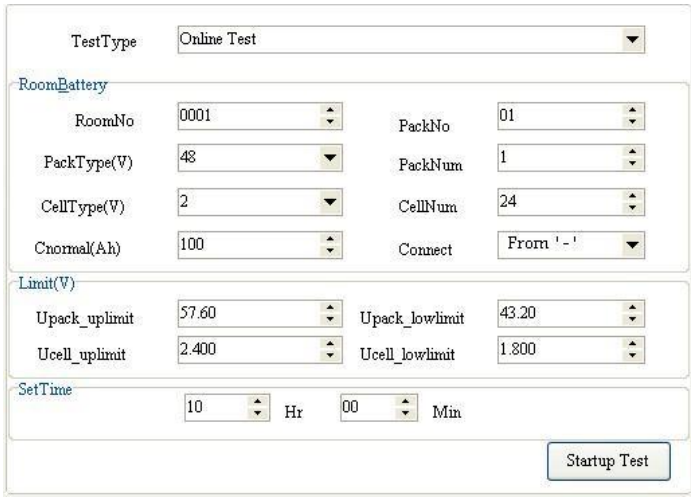
2.3.7 Real - time Monitor

Real-time monitor function includes startup test and real-time monitor.

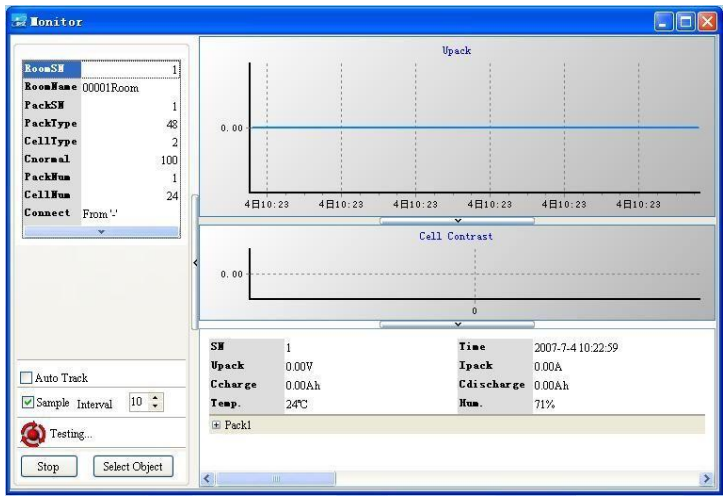
After ensure right connection with tester, click “monitor”, when there is no test for tester and enter into the interface shown by chart A, the user could set parameters and start up the test. If the tester is in online monitor or discharge test, enter into the interface shown by chartB, for the capacity test, it could not possess real-time monitor function. If mistaking connection with tester, it would prompt the user to confirm setup information, turn on discharge test switch of tester after right connection of tester, press OK to enter into test.

For online monitor and discharge test, the user could directly stop the test by PC.

Chart A



ChartB



V. Statement

Our company could improve and complete the technical performance of stationary battery comprehensive tester timely. Simultaneously, this manual could improve with upgrading of products; some part of content could change. If it is changeable, no additional notice.