



SBS-8400

BATTERY CAPACITY TESTER

USER MANUAL

(V2.2)

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Contents

1. Introduction	3
1.1 Features	3
1.2 System Component Unit.....	5
2. Main Technical Parameter	6
2.1 Environment & Condition for Use.....	6
2.2 Structure & Weight	6
2.3 Working Power Supply.....	6
2.4 Input Voltage from Battery Strings	6
2.5 Discharge Current Range	6
2.6 Parameter Display & Measure Accuracy	7
2.7 Protection & Warning	7
2.8 Data Management & Communication	7
3. Basic Operational Principle	8
3.1 Battery Testing Principle	8
3.2 Constant Current Principle.....	9
4. Operating Instructions	10
4.1 Environments Requirement.....	10
4.2 Panel Description	10
4.3 Main Machine Connection.....	11
4.4 Wireless Modules Connection	12
4.5 Starting Up and Input Operation	17
4.6 Check the Connection of the Wireless Modules.....	18
4.7 The Preset Function	19
4.8 Discharge.....	19
4.9 Download the Data to PC.....	21
4.10 System Setup.....	22
4.11 Charge Monitoring Function.....	24
4.12 Multiple units in parallel	24
5. PC software instruction.....	26
5.1 Main Functions.....	26
5.2 Install Analysis Software to PC.....	27
5.3 Real Time Recording During the Testing.....	28
5.4 Download Data File from USB Disk	28
5.5 Generate Excel Test Report	30
6. Attentions	31
7. After-Sale Service.....	31

1. Introduction

1.1 Features

In all electric devices and running network systems, along with the growing intelligence and automation, uninterrupted power supply already becomes a fundamental and crucial component. And whatever in DC or AC power supply system, as the chief backup power source, battery strings play an extremely important role. When the external power source runs normally, the battery strings are on the floating charge status. Once the outage or other electric accidents happen, battery strings would be the only backup power suppliers of the actual load in the short time.

As we know, except for the regular service life cycle, the actual service time of battery strings also depends on materials, structures, craftwork and maintenance. Both defects of production and misuses in the running can cause the early failure of battery strings. To guarantee the power supply in an emergency, it is necessary to do a routine discharging to check the capacity and service time of battery strings. The discharge test can help maintainer to locate the lag cells promptly, prolong the service time by replacing them, and evaluate the expectation of batteries life cycle.

Based on over 10 years battery testing experiences and exclusive technologies, we has succeeded in developing systemized, high-intellectual and extremely high-accurate SBS-8400 battery capacity testers.

The advantageous features of SBS-8400 main machine:

- a) **Adopting wireless battery monitoring technology**, available for 1.2V/2V/6V/12V cells voltage monitoring
- b) **Each wireless module can monitor 4 cells simultaneously**, compared with the traditional method that each module only can monitor 1 cell, the new wiring operation becomes easier because the quantity of new modules needed is only a quarter of old-fashioned modules.(only 6 wireless modules for 48V battery strings)
- c) **Available for offline & online discharging test of multiple battery string**, SBS-8400 can simultaneously record the actual discharge currents of each battery strings in the test. (As accessories, extra current clamps are needed for multiple groups testing)
- d) **The discharge current is continuously adjustable and automatically keeps stable**, during the online discharging, the current displayed in LCD = the discharge current of battery string = the current created by main machine + the current of the actual load. Because during the discharging the current of the actual load probably changes according to the decrease of the online voltage,

SBS-8400 main machine can automatically adjust to keep the current stable in the whole testing.

- e) **Offering manual function for setting the cell number which voltages below the threshold value**, this design could help you to locate more lag cells in once constant discharging.
- f) **Intelligent menu design**, the simplified menu minimizes the training for users.
- g) **Applying the electric heating component made by aero-alloy for the power consumption section**, new generation material levels up the coefficient of safety and the transition rate between electricity and heat, meanwhile reduces the volume and weight.
- h) **Automatic calculating function for the discharging current**, SBS-8400 installs the discharge current formulae for all hour rates internally, so the setting interface can tell users the suitable discharge currents without manual calculation according to the marked capacities of battery strings and the testing hour rates.
- i) **Real scan and display the voltage data of each battery during the discharging**, and display the histogram of all batteries to follow the battery voltage tracks in whole discharging process, using the different colors to highlight the lowest and the highest voltage can simplify the analysis of the variety of battery voltages.
- j) **5.7 inch colorful touching LCD screen**, the big touching screen can fulfill the click operation on the screen easily and directly, and show all parameters and the voltage histogram in the discharging process.
- k) **Intelligent judge program**, SBS-8400 can identify the situations that the battery voltages reach the threshold value or the signal missing by manual mistake. Avoiding manual interruption in the discharging, this revolutionary program makes the test stable and smooth.
- l) **The presetting function for discharge parameters**, SBS-8400 provide 8 locations for setting up all discharge parameters in advance, this design can skip the setting procedures for the same discharging, simplified the operation and speed up the test.
- m) **Allow connecting with PC during the discharging** for downloading the real time data, or use USB memory devices to download the integral data after the discharging process, PC analysis software assists users to analyze the data and create test report.
- n) **8M internal memory**, SBS-8400 main machine can record several sets of data independently, and the menu interface provides some management operations like reviewing, analyzing and deleting.

The advantageous features of SBS-8400 analysis software:

- a) Support data downloading and analyzing through real time communication or USB memory devices
- b) The software interface includes: battery voltages curve and bar chart, battery resistances bar chart, group voltage curve, current curve, capacities histogram, data form and so on.
- c) Powerful capacity estimating function, the software can predict the capacity of each battery in the tested group.
- d) The software shows the data by various ways like bar charts, curve, and form. And users can magnify or minify any windows to read more details.
- e) Automatically create EXCEL data report, it's so convenient to send or download the data.

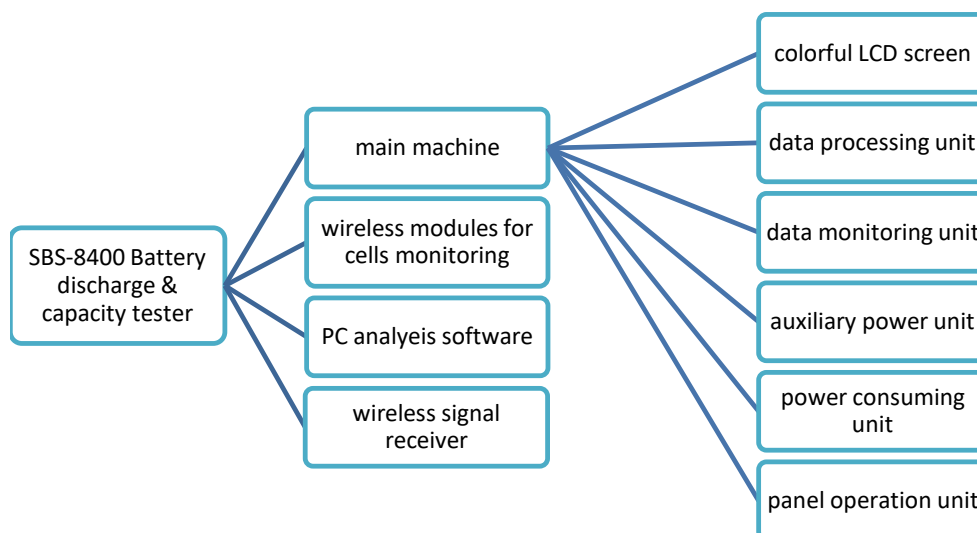
SBS-8400 has diversified protective functions, which include the sounds alarm, lights warning, and clear interface prompts.

SBS-8400 is small in volume, light in weight, simple to operate, highly accurate product line. For different applications, SBS-8400 is available for the discharging test of 12V, 24V, 48V, 72V, 96V, 110V, 120V, 220V, 240V battery strings etc.

1.2 System Component Unit

The SBS-8400 battery capacity tester consists by main machine, wireless modules for cells monitoring, wireless signal receiver and PC analysis software.

And the main machine is organized by colorful LCD screen, data processing unit, data monitoring unit, auxiliary power unit, power consuming unit and panel operation unit.



2. Main Technical Parameter

2.1 Environment & Condition for Use

2.1.1 Operating temperature

-5℃ ~ +50℃, full power, forced air cooling

2.1.2 Storage temperature

-40℃ ~ +70℃

2.1.3 Relative humidity

≤90% (40℃±2℃)

2.1.4 Altitude limit

0~2000m, -5℃~+50℃, full power

2000m~4000m, -5℃~+30℃, full power;

30℃~+50℃, decrease power for use.

2.2 Structure & Weight

Adopting the stainless steel shell, SBS-8400 has sturdy and stable structure. Meanwhile, the unique material of power consumption unit makes SBS-8400 main machine portable.

The dimension (length*breadth*height):

SBS-8400: 670mm×230mm×370mm

Weight:

SBS-8400: 24 kg (main tester only)

2.3 Working Power Supply

SBS-8400: AC 220V single phase 45Hz~65Hz

2.4 Input Voltage from Battery Strings

SBS-8400: 10~300V

2.5 Discharge Current Range

Voltage Range	Current Range
10-15V	0-60 A
15V-60V	0-120 A
86-150V	0-120 A
190-280V	0-60 A

2.6 Parameter Display & Measure Accuracy

Parameter Display:	5.7 inch LCD colorful touch screen
Displayed discharge current:	resolution 0.1A accuracy $\leq \pm 0.5\%$
Displayed battery strings voltage:	resolution 0.1V accuracy $\leq \pm 0.5\%$
Displayed cells voltage:	1.2V/2V/6V cells resolution 0.001V / accuracy $\leq \pm 0.05\%$ 12V cells resolution 0.01V / accuracy $\leq \pm 0.05\%$

2.7 Protection & Warning

The protection design of SBS-8400:

- 2.7.1 The protections of DC input overvoltage, polarity reversal in battery connecting, over current in discharging, and system overheat
- 2.7.2 When the discharging is abnormal, the warning light and buzzer would activate, meanwhile the LCD screen would show clear prompt.

2.8 Data Management & Communication

2.8.1 Discharge Data Management

- a) The sampling and incidents data can be saved continuously and automatically, so the test record will not lost even when power off.
- b) Support to manual inspection
- c) Support to read & download the data by communication port
- d) Display the residual space of internal memory
- e) Smart deleting selection: delete all or delete the selected record.

2.8.2 Setting Work Parameters

In "Preset" interface, the user can set the discharge current, battery capacity, cells number, the stop threshold value of battery string voltage and cell voltage, discharge capacity, discharge time in the allowed range and SBS-8400 provide 8 locations to save the presetting parameters for common usage.

2.8.3 Communication

- a) Internal wireless signal receiver can help SBS-8400 main machine to record the cell monitoring & sampling data.
- b) By RS232 port in SBS-8400 main machine, PC can connect with SBS-8400 to display real time discharge data.
- c) By USB port in SBS-8400 main machine, user can download the data to PC by USB-disk.
- d) By parataxis control port, SBS-8400 main machine can co-work with SBS-S series DC load bank.

3. Basic Operational Principle

3.1 Battery Testing Principle

Because of the complexity of battery electric-chemical reaction and the diversity of materials, structure, craftwork, and installation environments, it causes that the battery strings from different manufacturers have much differences. Even the same type batteries from same manufacturers can't guarantee the same good performance. Until now, there is no a uniform method can check the quality of batteries easily and efficiently. The processes of battery drown and failure is still complicated, so the testing and capacity estimation is still a difficult problem for battery application.

Nowadays, for the most popular lead-acid batteries—VRLA batteries, the common and effective test methods are testing the cell voltage routinely and deep cycle discharging annually. We believe:

- a) The battery voltage in floating charge status and the batteries capacities has no correlation.

As we know, even the batteries which have a low capacity still can show a normal voltage in floating charge status. So the maintainer can't estimate the capacity based on the batteries voltage without discharging.

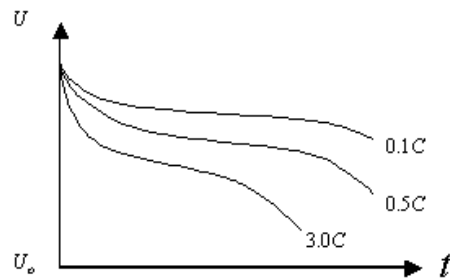
- b) Deep cycle (full capacity) discharge is still the most accurate method to test the performance of batteries.

For the battery strings created by several cells in series, the actual capacity of battery strings relies on the ability of the worst cell. So the chief goal of battery strings discharging is to find the lag cell and replace it to increase the service time of the whole battery system.

Usually, battery discharge test need to add constant current on the tested battery strings, and monitor the voltage dropping status of each cell until drops to the stop

threshold value. Based on the actual energy discharged, the discharge tester can show the accurate capacity of the tested battery strings.

The voltage dropping curve in the discharging process:



From the curve, we can know for different types, materials and craftwork, the voltage dropping data is the most uniform and accurate evident for estimating the battery capacity. And the curve also shows that using different hour rate to discharge the same batteries would get different results. For avoiding the harm of discharging, batteries discharge has to apply the suitable hour rate.

3.2 Constant Current Principle

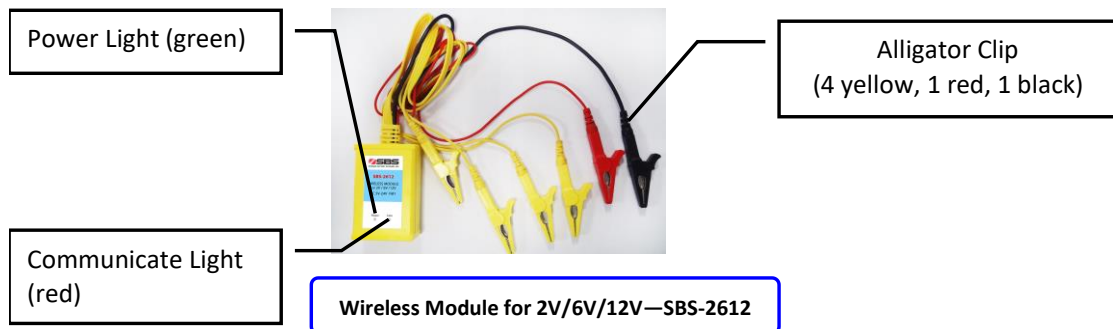
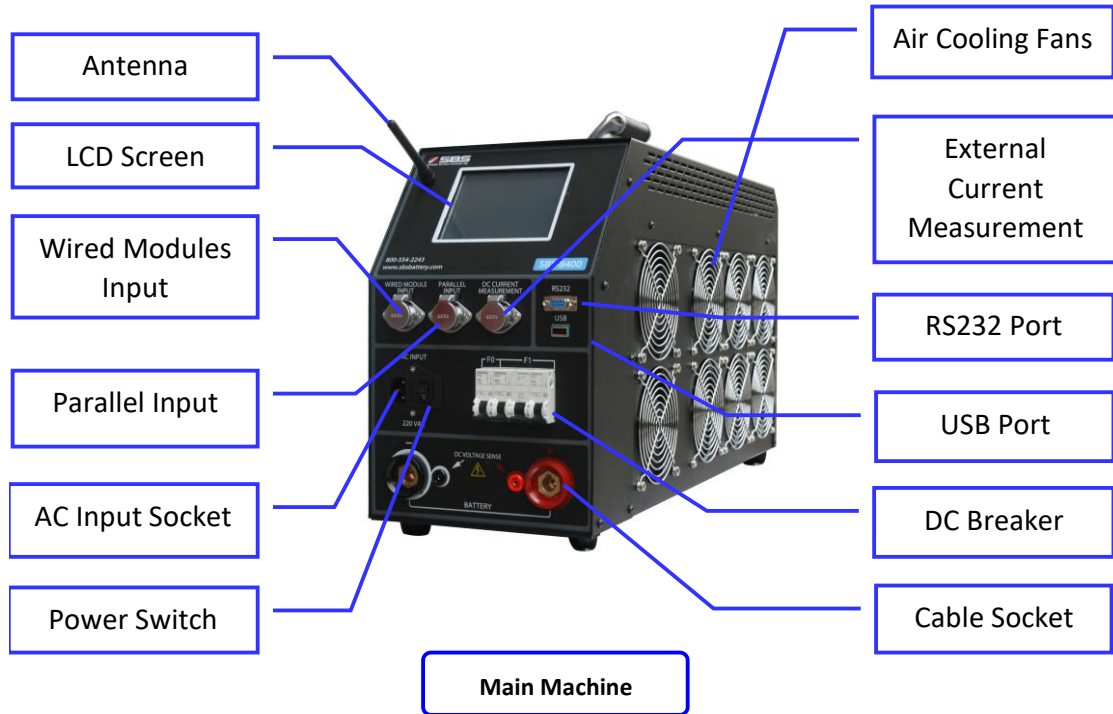
The internal circuit of SBS-8400 adopts PWM (pulse width modulation) control technique. Under the control of central processing unit, the power circuit can discharge the battery strings in the setting current accurately.

4. Operating Instructions

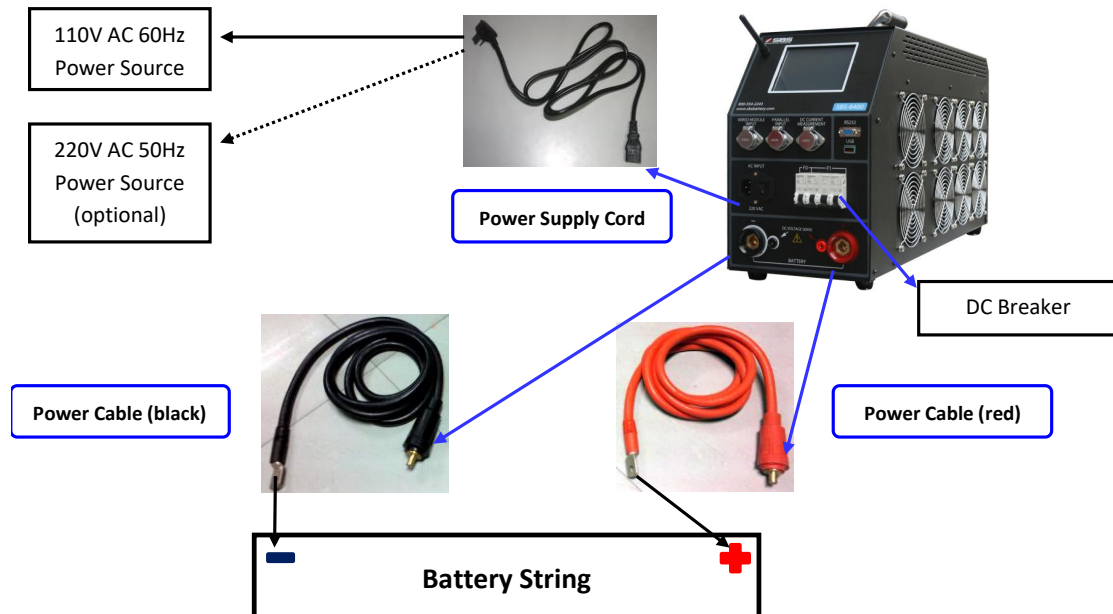
4.1 Environments Requirement

Should be NO CORROSIVE, NO EXPLOSIVE, NO ELECTRICAL BREAKDOWN AIR OR CONDUCTIVE DUST.

4.2 Panel Description



4.3 Main Machine Connection



4.3.1 Use the power cable (1 red, 1 black) to connect the main machine with the tested battery string.

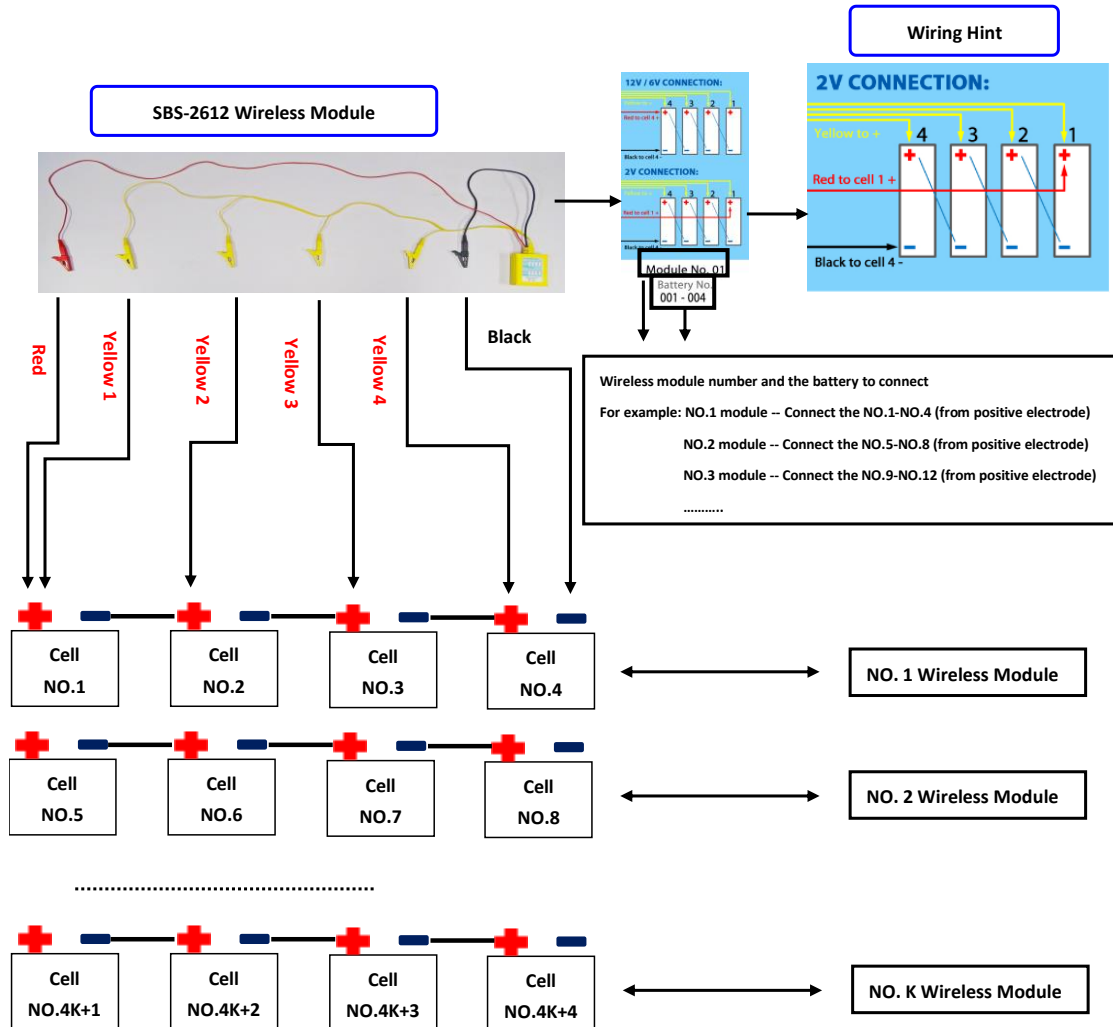
4.3.2 Use the power supply cord to connect main machine with the AC power source

- SBS-8400 support 110V AC 50Hz/60Hz external AC power source
- If the power source is 220V AC 50Hz/60Hz, please use a 220V AC to 110V AC transformer to start the tester, or inform us when you plan to order SBS-8400, we will adjust power source to support 220V AC.

4.4 Wireless Modules Connection

Before connecting, please install the antenna stick in main tester

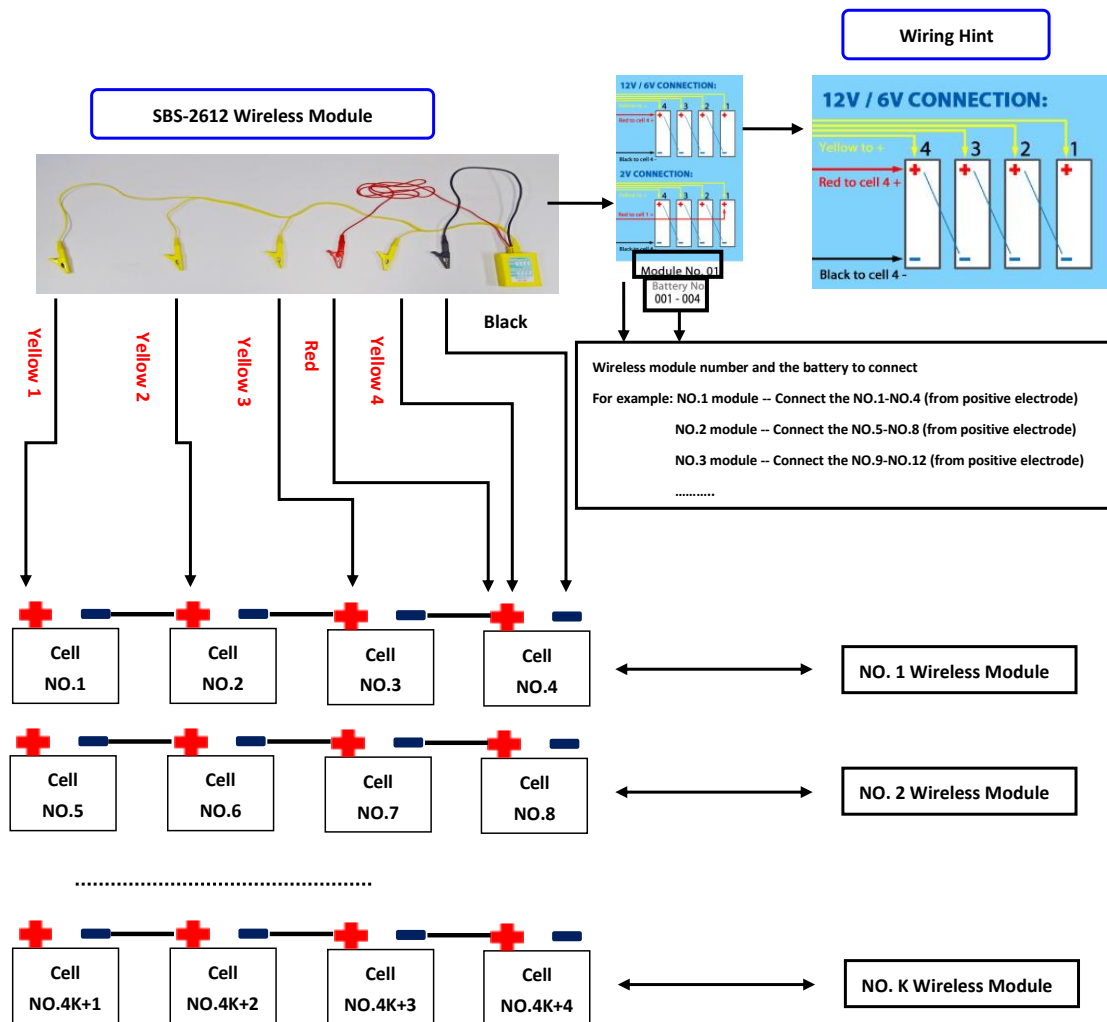
4.4.1 SBS-2612 wireless modules (for 2V) connection



4.4.1.1 Read the module number from the label in the modules, find the right batteries to connect with. **Do not connect the modules to 4 batteries no adjacent like NO.1, 3, 8, 9; it will probably damage the module immediately!**

4.4.1.2 Use the alligator clips (1 red, 1 black, 4 yellow) to connect modules with the batteries, please follow the right wiring rule “Yellow 1 to Yellow 4, from long to short”, and the wiring hint also print on the label of modules.

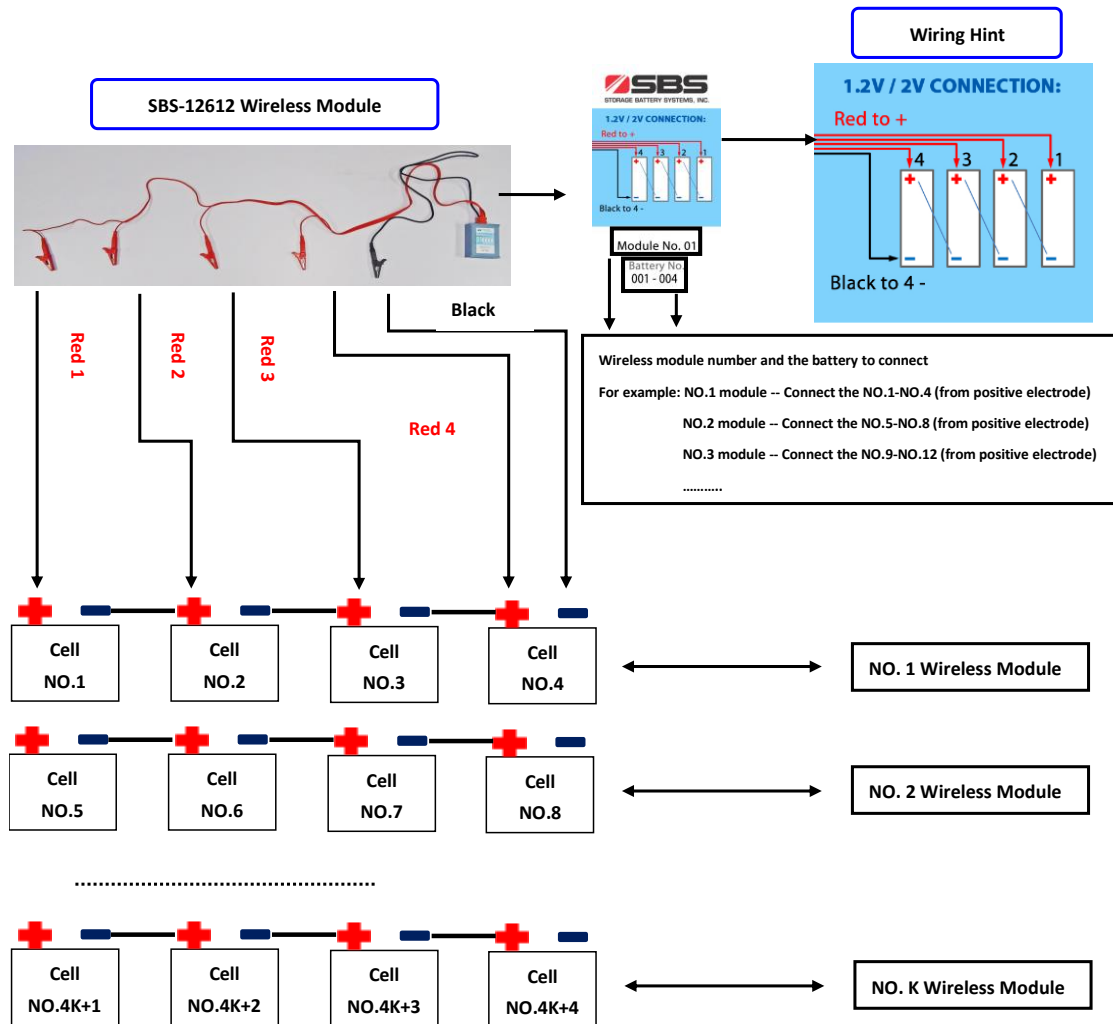
4.4.2 SBS-2612 wireless modules (for 12V, 6V) connection



4.4.2.1 Read the module number from the label in the modules, find the right batteries to connect with. **Do not connect the modules to 4 batteries no adjacent like NO.1, 3, 8, 9; it will probably damage the module immediately!**

4.4.2.2 Use the alligator clips (1 red, 1 black, 4 yellow) to connect modules with the batteries, please follow the right wiring rule “Yellow 1 to Yellow 4, from long to short”, and the wiring hint also print on the label of modules.

4.4.3 SBS-12612 wireless modules (for 1.2V, 2V) connection



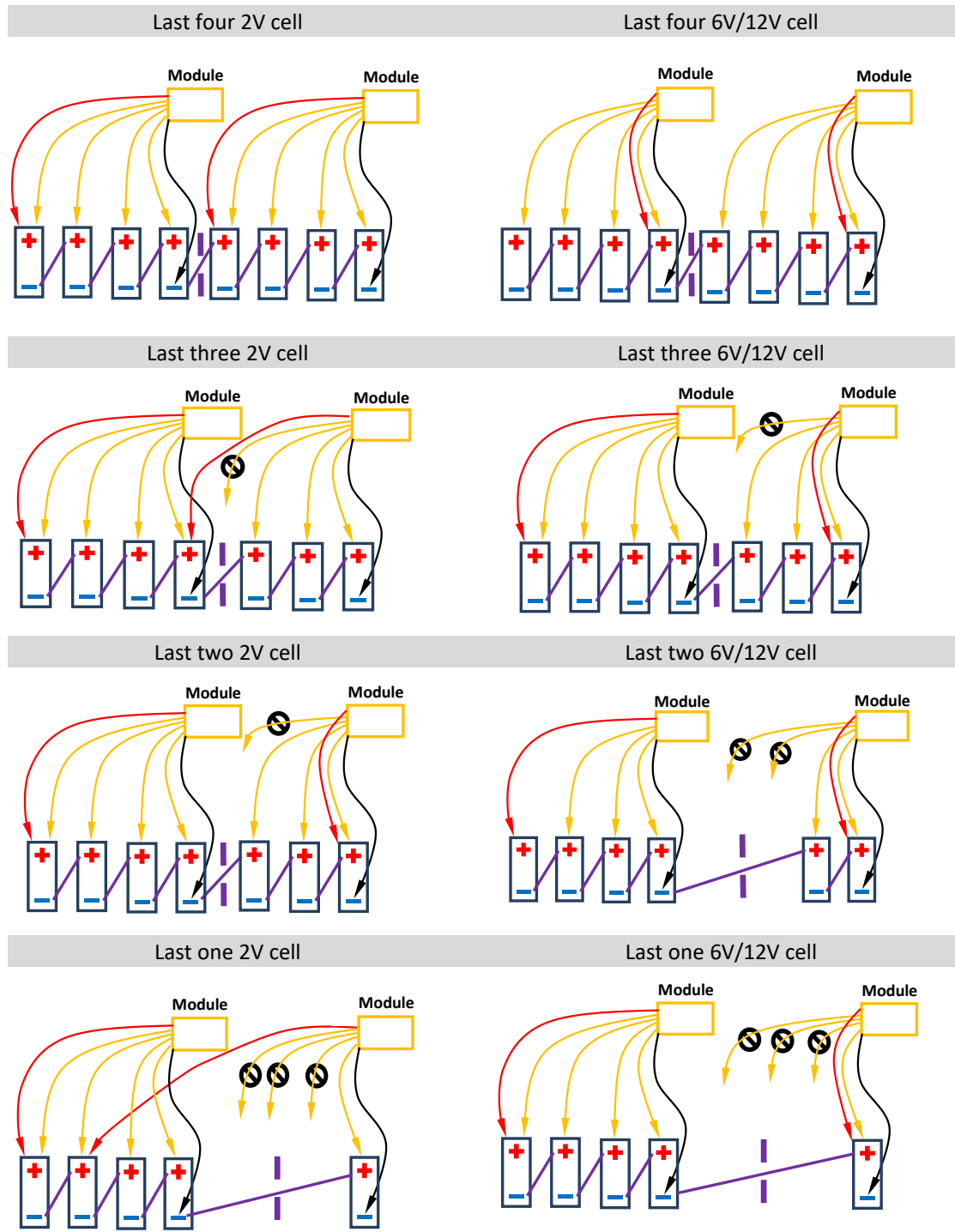
4.4.3.1 Read the module number from the label in the modules, find the right batteries to connect with. **Do not connect the modules to 4 batteries no adjacent like NO.1, 3, 8, 9; it will probably damage the module immediately!**

4.4.3.2 Use the alligator clips (4 red, 1 black) to connect modules with the batteries, please follow the right wiring rule “Red 1 to Red 4, from long to short”, and the wiring hint also print on the label of modules.

4.4.4 Connecting guide when cell quantity is not multiple of 4

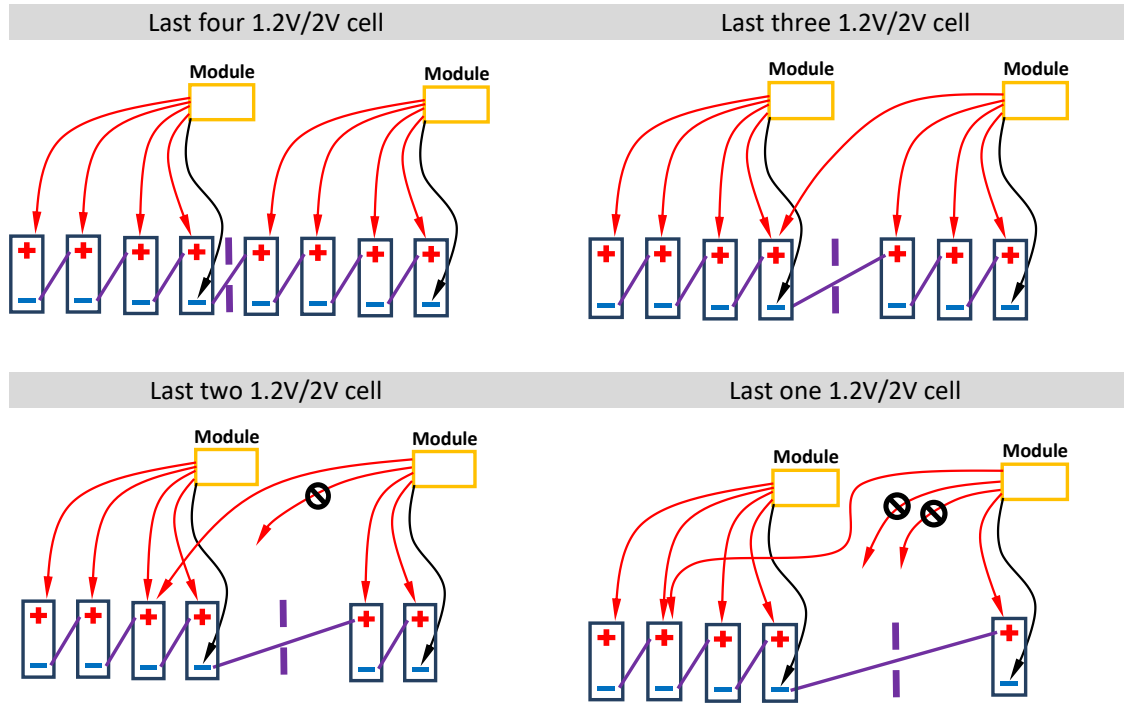
4.4.4.1 SBS-2612 wiring for last 4 to 1 cells

- 4 yellow wires, from left to right = from long to short
- means this wire no need to connect
- separate the last cells with other cells



4.4.4.2 SBS-12612 wiring for last 4 to 1 cells

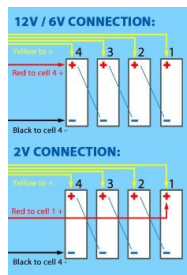
- 4 red wires, from left to right = from long to short
- means this wire no need to connect
- separate the last cells with other cells



4.4.5 About spare module & reassign module No.

4.4.5.1 About No. 0 spare modules

In each unit we offer, you can find some No. 0 spare modules. They have the following label. No number assigned. They can assign to any module No., and assist you to proceed testing when any assigned module is fail.



Module No. __
 Battery No. __-__

No. 0 Spare Module Label

4.4.5.2 Activate No. 0 spare modules

When any assigned module is fail (for example, No. 3 module is fail), you can connect No. 0 spare module with 4 cells, just like a normal module, disconnect all other modules.

Please edit spare module to No. 3 module to replace the fail one at 'Congfig Module Addr:' of 'Setup' menu. Just set '003#' and press 'config'. The spare module will become new No. 3 module.



4.4.5.3 How to erase and reassign the assigned module

If you don't have more spare modules, one assigned module is fail (for example, No. 3 module is fail) but you have no need assigned modules (No. 1 to No. 10 are needed for the recent testing, you have No.11 to No. 15), you can erase No.15 and reassign to No. 3 for urgent requirement.

- Open the box the No.15 module; you will see a small button on the PCB. (yellow frame in the picture)
- Keep pressing on this button, don't loose it, and connect it with 4 cells, just like a normal module. It will be powered on, and wait about 5-8 seconds. And loose the button.
- Check 'BatteryView' in LCD, if Cell 57- Cell 60 (belong to No. 15 module) is not result, it means No. 15 module is erased to No. 0 spare one.
- Do the procedure in '4.4.5.2 Activate No. 0 spare modules', to edit it to No. 3.



4.5 Starting Up and Input Operation

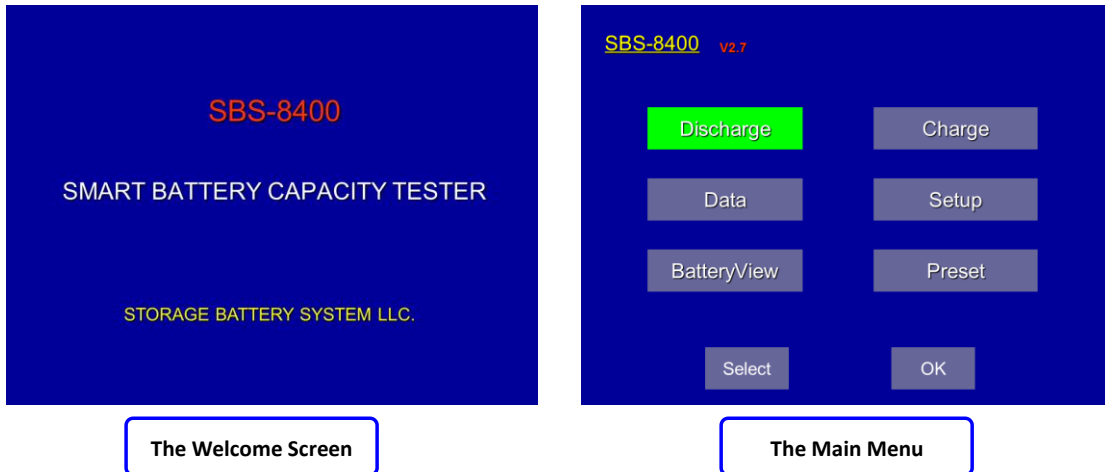
4.5.1 After the main machine connection, turn on the power switch to start up SBS-4815CT.

4.5.2 In the welcome interface, you can see the type name, tester name, and our company name. Press any key into main menu, if 10 more seconds without press, the system will jump to main menu automatically.



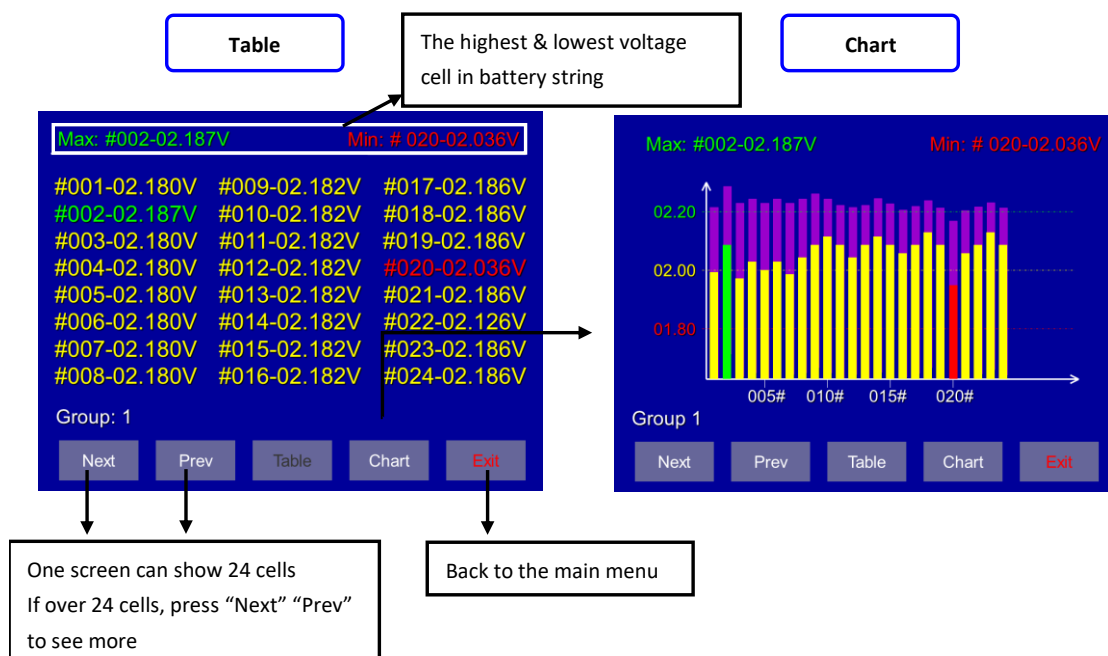
4.5.3 SBS-4815CT input way: press on the screen directly

4.5.3 SBS-8400 input way: press on the screen directly



4.6 Check the Connection of the Wireless Modules

4.6.1 Press “BatteryView” in the main menu into the table interface, if all wireless modules connected, you can see the voltage of each cell. If the voltages of some cells are not showed, please check the wireless modules connection



4.6.2 Press “Chart” to see the histogram of each cell

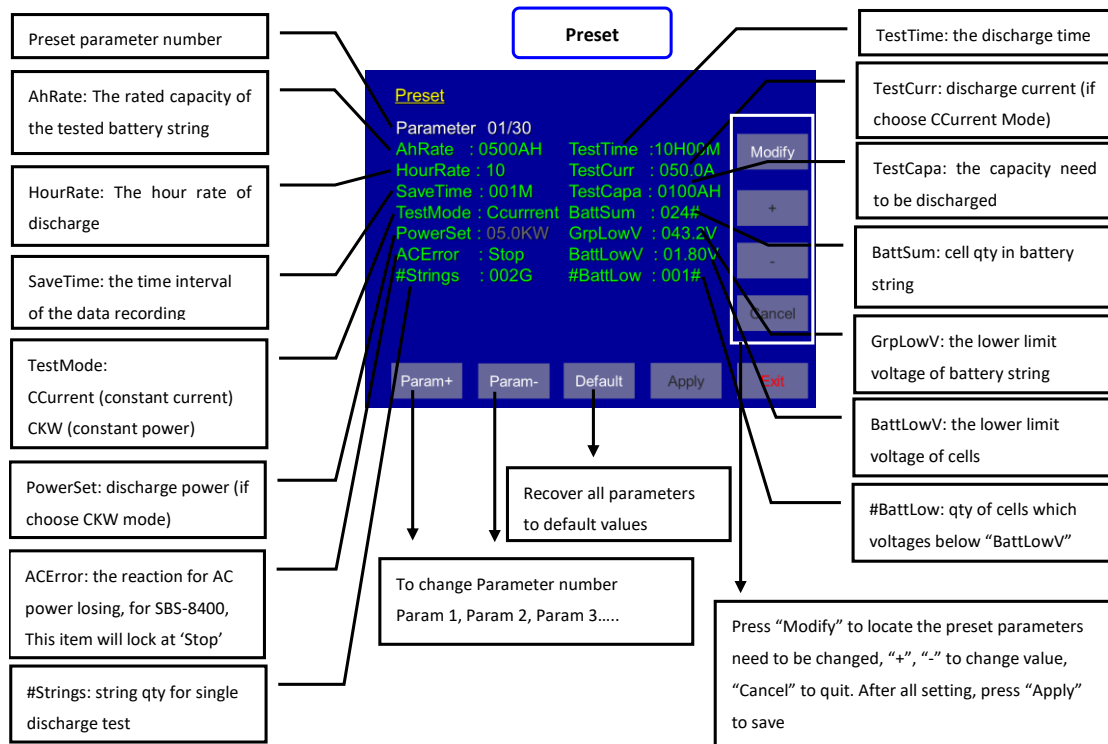
4.6.3 Both in the table and chart interface, one screen only can show 24 cells, if the tested battery string has more than 24 cells, please press “Next” & “Prev” to see more.

4.6.4 Press “Exit” goes back to the main menu

4.7 The Preset Function

4.7.1 The preset function provides 30 locations to save the discharge test; you can load the same setting in the repeated test. No need to set all parameters again. Of course SBS-8400 can support manual setting in the discharge interface without presetting.

Press “Preset” in the main menu into the preset function interface



4.7.2 “TestCapa”, “TestTime”, “BattLowV”, “GrpLowV” are all the discharging stop conditions, any of them is reached, the discharge will stop automatically

4.7.3 For 1 battery string discharging, please keep “#Strings” in “001G”, if you need 2-4 strings parallel discharge once time, they need 2-4 times wireless modules, and the current will be 1/2-1/4 for each string.

4.7.4 If you want the discharging to stop when one bad cell reaches the “BattLowV”, please keep “#Battlow” in “001#”. If you want the discharging to stop when N bad cells reach the “BattLowV”, you can set the “#BattLow” to the number you need.

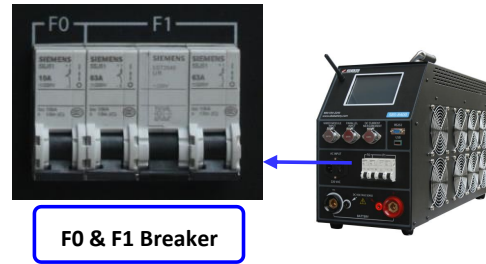
4.7.5 If you don’t need wireless modules in the discharge, please set the “BattSum” to “000#”. “BattLowV” will stop work to end the discharging.

4.8 Discharge

4.8.1 Press “Discharge” in the main menu into the parameter interface

4.8.2 In parameter interface, you can see all same parameters in the “Preset”; you can re-edit the discharge parameters here and “Apply” to save them.

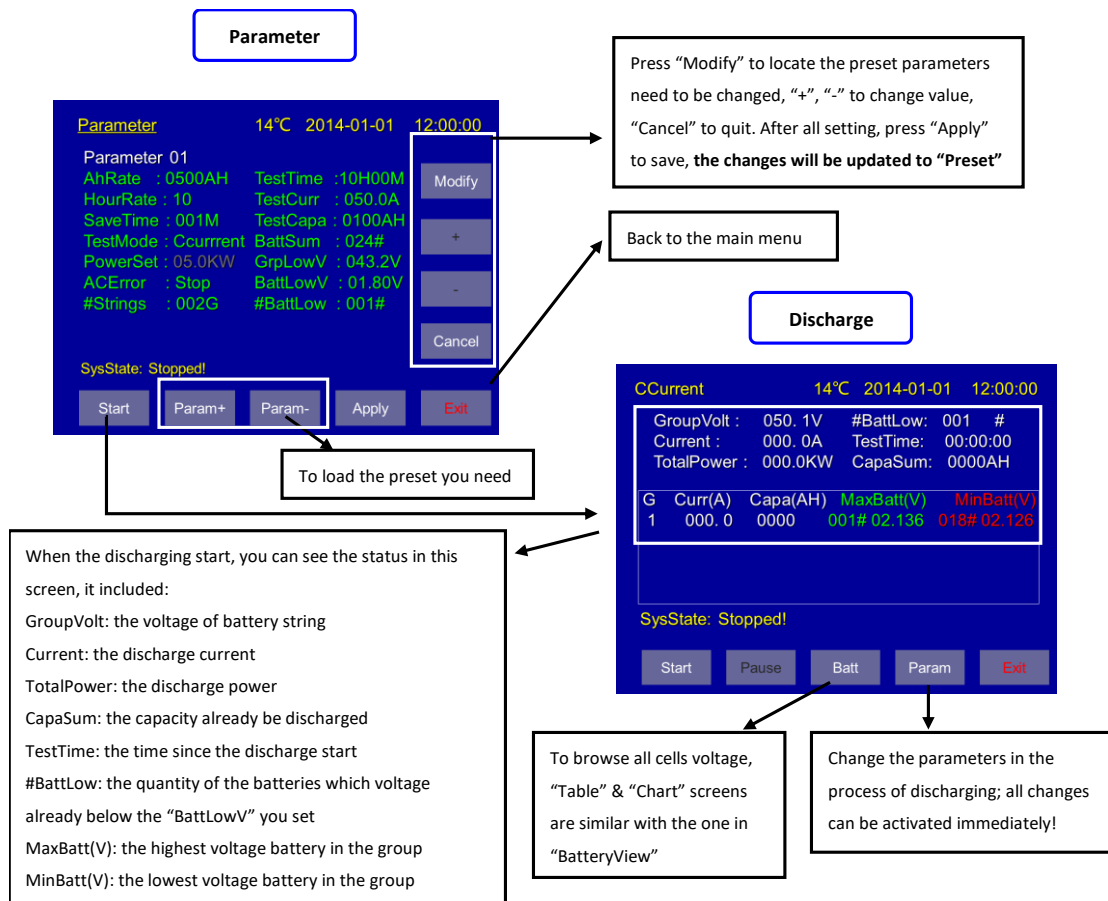
4.8.3 Press “Start” into the discharge interface, and turn on ‘F0’ breaker, if battery string is connected correctly with main unit by power cables, you can see battery string voltage in ‘GroupVolt’.



F0 & F1 Breaker

4.8.4 Press “Start” again to start discharge, LCD will show a Popup-window to ask you check whether all fans start working. And then a popup-window again to ask you turns on ‘F1’ breaker.

4.8.5 Manual stop the discharge: press “Pause” to pause the discharge, and press “Stop” to end the discharge, or press “Start” to continue the discharge.



4.8.6 Press “Param” to change the parameters during the discharging (if necessary), all changes can be activated immediately and the discharging will not be stopped.

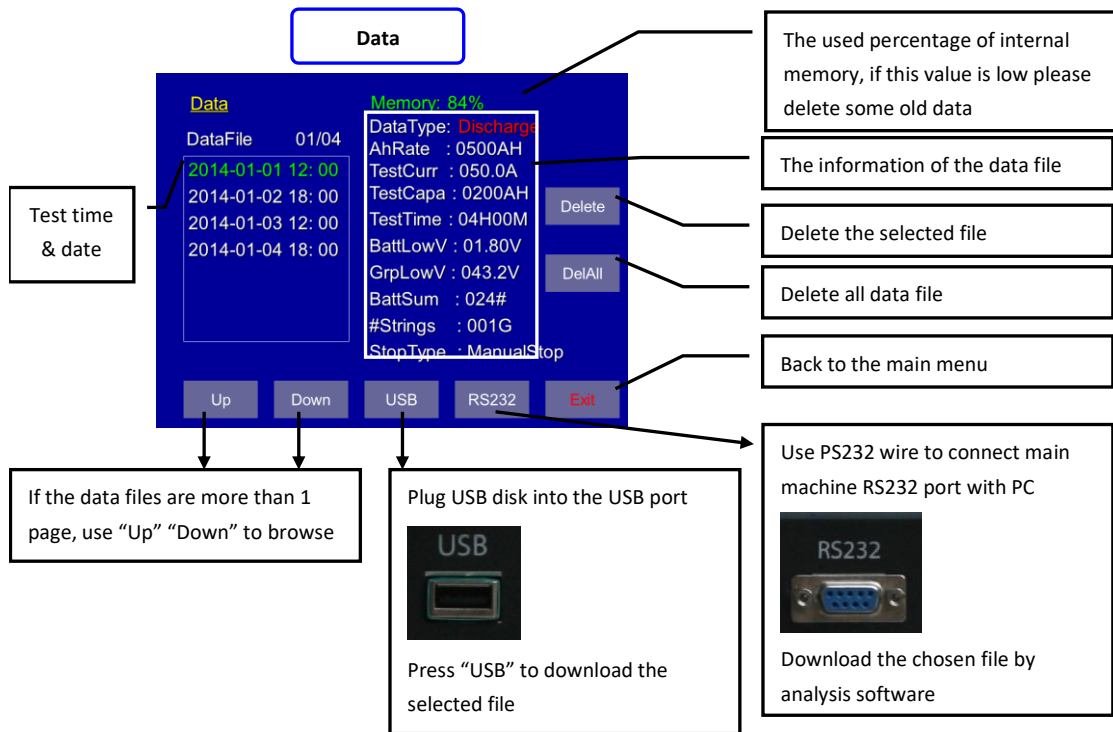
4.8.7 “SysState:” in the discharge interface will help you know the status of the discharging.

4.9 Download the Data to PC

4.9.1 SBS-8400 provides two ways to record the test data:

- a) Use the RS232 wire to connect main machine with PC, by analysis software, the real time test data can be download during the test.
- b) Internal memory always save all testing data, you can download the data by USB disk or RS232 wire to PC.

4.9.2 Press “Data” in the main menu into the data interface



4.10 System Setup

4.10.1 Press “Setup” in the main menu into setup interface

The screenshot shows the 'Setup' interface with the following parameters and controls:

- System date & time:** Date: 2014-01-01, Time: 12:00:00
- InputType:** Touch
- BattLowAct:** Stop
- BattOrder:** Inc From Batt+
- ConfigModuleAddr:** 000#
- ModuleFreq:** 01FM
- Clamp range:** 200A
- Buttons:** Modify, +, -, Cal, Exit, Config

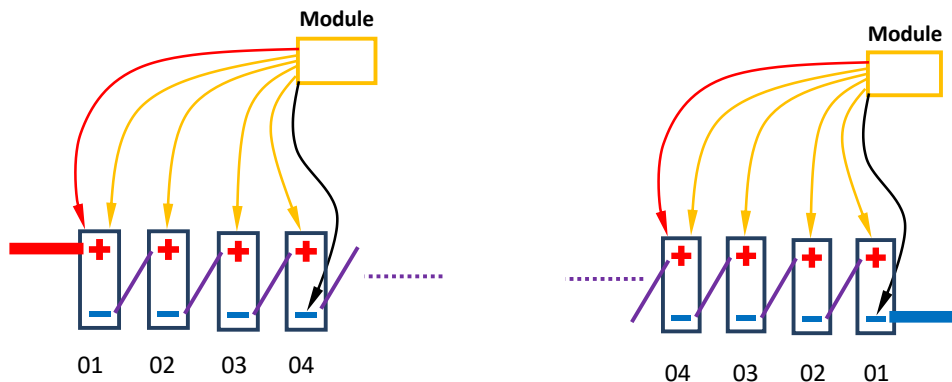
Callouts provide detailed explanations:

- InputType:** for SBS-8400, this item is locked at 'Touch'
- BattLowAct:** the operation when the cells which voltage reached the "BattLowV" is over '#BattLow': Stop or Pause
- BattOrder:** wireless modules connecting way, from the positive or negative electrode to start
- Cal:** change Date to 2099-12-XX, 'Cal' button will be activated, for going to 'Calibration' interface
- Modify:** Press "Modify" to locate the parameters need to be changed, "+", "-" for change value
- ConfigModuleAddr:** assign spare module to No. you need. Please follow '4.4.5.2 Activate No. 0 spare modules'
- ModuleFreq:** change frequency of wireless receiver for working with different Frequency wireless modules
- Clamp range:** change the external current clamp range for different clamp type(100A/200A/600A)

4.10.2 'BattLowAct' give more options when you located some very bad cell in short discharge but you want to remove them and proceed discharge more to know other cells situation. Choose 'Pause', the discharge can be continued when you adjust setting and 'Start' again, the whole process will be recorded in single data file.

4.10.3 When cell No. of your battery string starts from negative electrode, please set 'BattOrder' to 'From Batt-'. SBS-8400 will reserve 4 cells sequence at each wireless module to keep your testing result correct.

Cell No. start from positive >> From + Cell No. start from negative >> From -

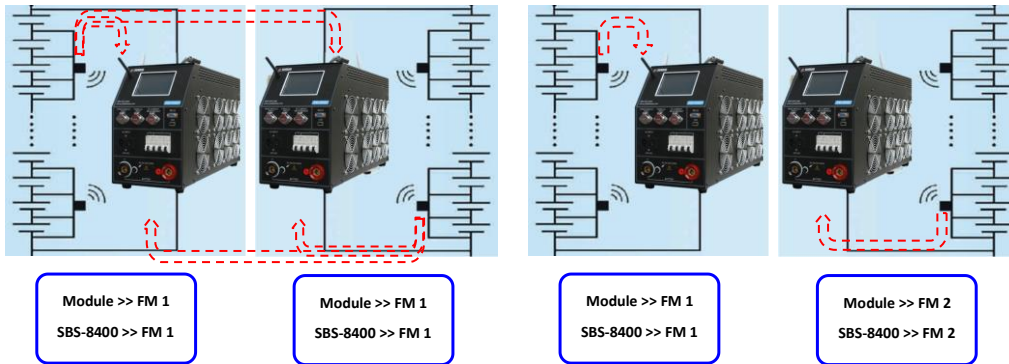


4.10.4 'ConfigModuleAddr': please follow '4.4.5.2 Activate No. 0 spare modules' for assign spare module to the one you need.

4.10.5 If two SBS-8400s with 2 sets of wireless modules are testing different battery string in same battery room, the same No. modules in two set have interference issue. In this kind of test application, it needs 2 set of wireless modules with different frequency. ‘ModuleFreq’ can change frequency of SBS-8400 wireless receiver for working with different Frequency wireless modules.

Same frequency in same room >> Interference

Different frequency in same room >> No interference



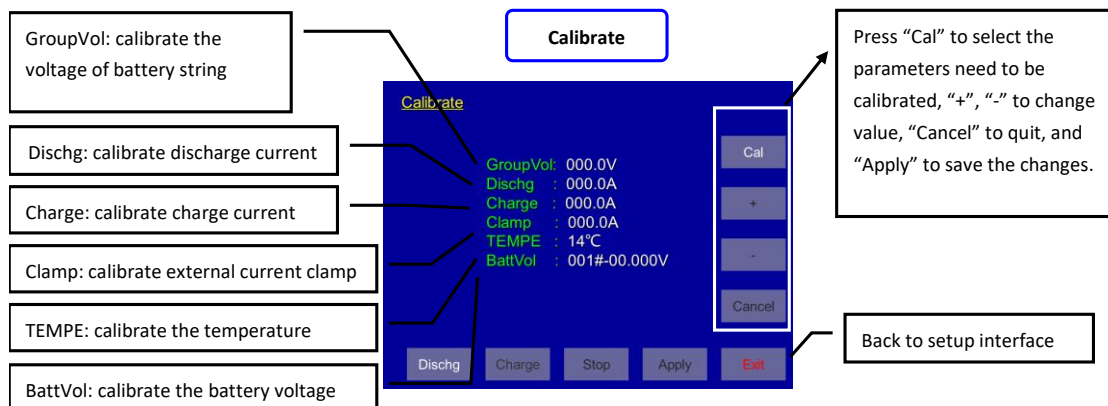
4.10.6 SBS-8400 can work with three different range external clamp-100A/ 200A/ 600A. Please select the correct clamp type when you connect external clamp with SBS-8400.

The external clamp is needed when:

- a) Two SBS-8400 or SBS-8400 + SBS-S load bank co-working in parallel, external clamp will measure the external unit current and add it up to one SBS-8400.
- b) SBS-8400 run charge monitoring function, external clamp will measure current from charger to battery string, and calculate the total Ah charged.



4.10.7 SBS-8400 provide calibration function, if you have high accuracy multi-meter and Ammeter, you can calibrate the tester by yourself. Change the date to 2099-12(year-month), the “Cal” button will be activated. Press “Cal” into calibration interface.



4.11 Charge Monitoring Function

4.11.1 Although SBS-8400 can't charge the test battery string, it provides charge monitoring function to record the process of charging.

4.11.2 Press "Charge" in the main menu into charge interface, and press "start" to record the charge process.

When pressing "Start" to record the charge, you can see the status in this screen, it included:

GroupVolt: the voltage of battery string

Current: the charge current (external clamp needed)


CapaSum: the capacity already be charged (external clamp needed)

TestTime: the time since the charge starts

MaxBatt(V): the highest voltage battery in the group

MinBatt(V): the lowest voltage battery in the group

Charge



To browse all cells voltage, "Table" & "Chart" screens are similar with the one in "BatteryView"

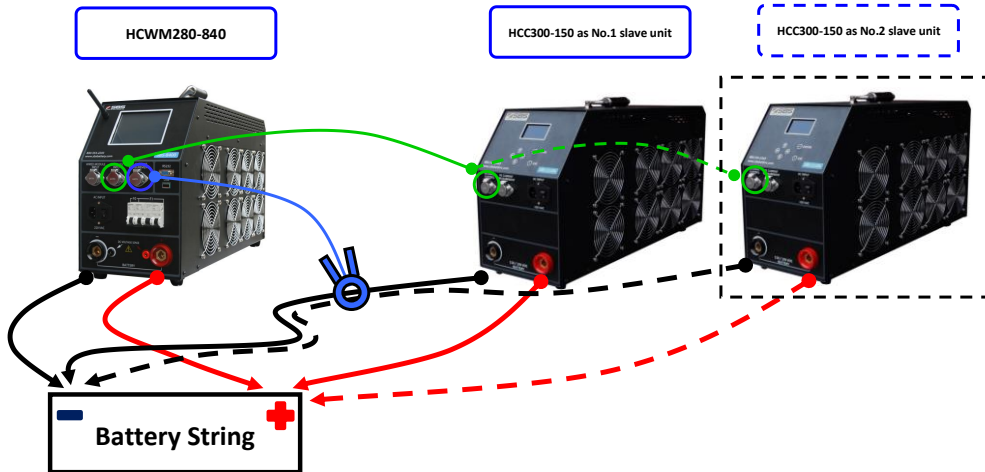
Back to the main menu

4.12 Multiple units in parallel

4.12.1 SBS-8400 + SBS-S unit(s) in parallel

4.12.1.1 Connecting

- a) Connect SBS-8400 & SBS-S unit(s) with battery string by power cables
- b) Connect external current clamp with SBS-8400 – 'DC CURRENT MEASUREMENT' port, and put clamp on the all cables from SBS-S unit(s) to battery string.
- c) Connect parallel control wire from SBS-8400 – 'PARALLEL INPUT' port to SBS-S – 'EXTERNAL CONTROL' port. (If there are 2 SBS-S units, please contact us to order the special control wire)



4.12.1.2 Setting

- a) Select the correct 'Clamp range' in SBS-8400 Setup interface
- b) Set all 4 stop thresholds and other details in SBS-8400 parameters interface, and set the total discharge current to 'TestCurr' you need (for example: 200A in total).
- c) Set all stop thresholds in SBS-S unit(s), and set current to the max value which SBS-S unit(s) can offer (for example: set 100A in SBS-1110S).
- d) Save all setting in SBS-S unit(s) and let LCD on the discharge screen.

4.12.1.3 Discharge

- a) Start discharge at SBS-8400, and when the current go up to the max value which SBS-8400 can offer, it will send out control signal to SBS-S unit(s). SBS-S unit(s) starts discharge up to the setting value.

DISCHARGE	STOPPED
VOLT: 123.5V	AMP: 000.0A
CAPACITY:	0000 AH
TEST TIME:	00:00:00

SBS-S unit discharge screen

- b) External clamp will add all discharge current from SBS-S unit(s) to SBS-8400. And SBS-8400 will offer the proper current to keep the total current you set.

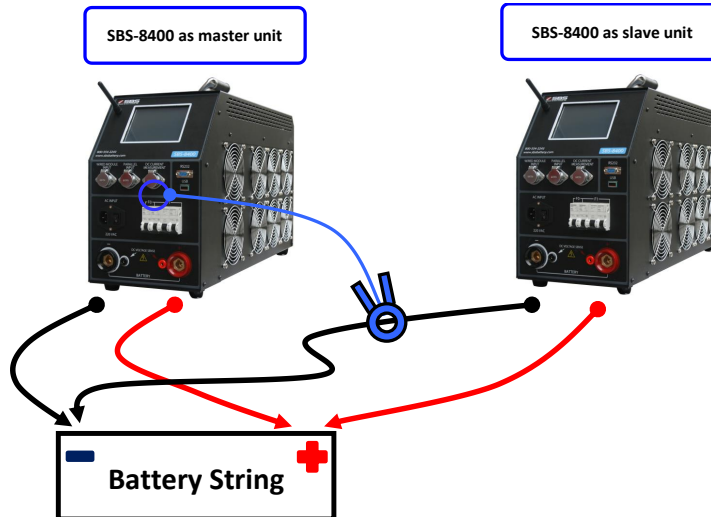
(For example: 200A in total, if SBS-S offer 100A, SBS-8400 will offer 100A, if SBS-S offer 80A, SBS-8400 will offer 120A)

- c) If any stop threshold is reached in SBS-8400, all SBS-S unit(s) can accept control signal to terminate the discharge at the same time.

- d) 4.13.2 Two SBS-8400 in parallel

4.12.2.1 Connecting

- a) Connect SBS-8400(s) with battery string by power cables
- b) Connect external current clamp with master SBS-8400 – 'DC CURRENT MEASUREMENT' port, and put clamp on the cable from slave SBS-8400 to battery string.



4.12.2.2 Setting

- Select the correct 'Clamp range' in master SBS-8400 Setup interface.
- Set all 4 stop thresholds and other details in both SBS-8400 parameters interface, and set the total discharge current to 'TestCurr' in master SBS-8400.
- Set 'TestCurr' to max value which slave SBS-8400 can offer.

4.12.2.3 Discharge

- Start discharge at both SBS-8400, slave SBS-8400 offer max discharge current as you set.
- External clamp will add discharge current from slave SBS-8400 to master SBS-8400. And master SBS-8400 will offer the proper current to keep the total current you set.

(For example: 200A in total, if slave SBS-8400 offer 100A, master SBS-8400 will offer 100A, if slave SBS-8400 offer 80A, master SBS-8400 will offer 120A)

- If any stop threshold is reached in master SBS-8400, slave SBS-8400 also has same setting, so it will also terminate the discharge at the same time.

5. PC software instruction

5.1 Main Functions

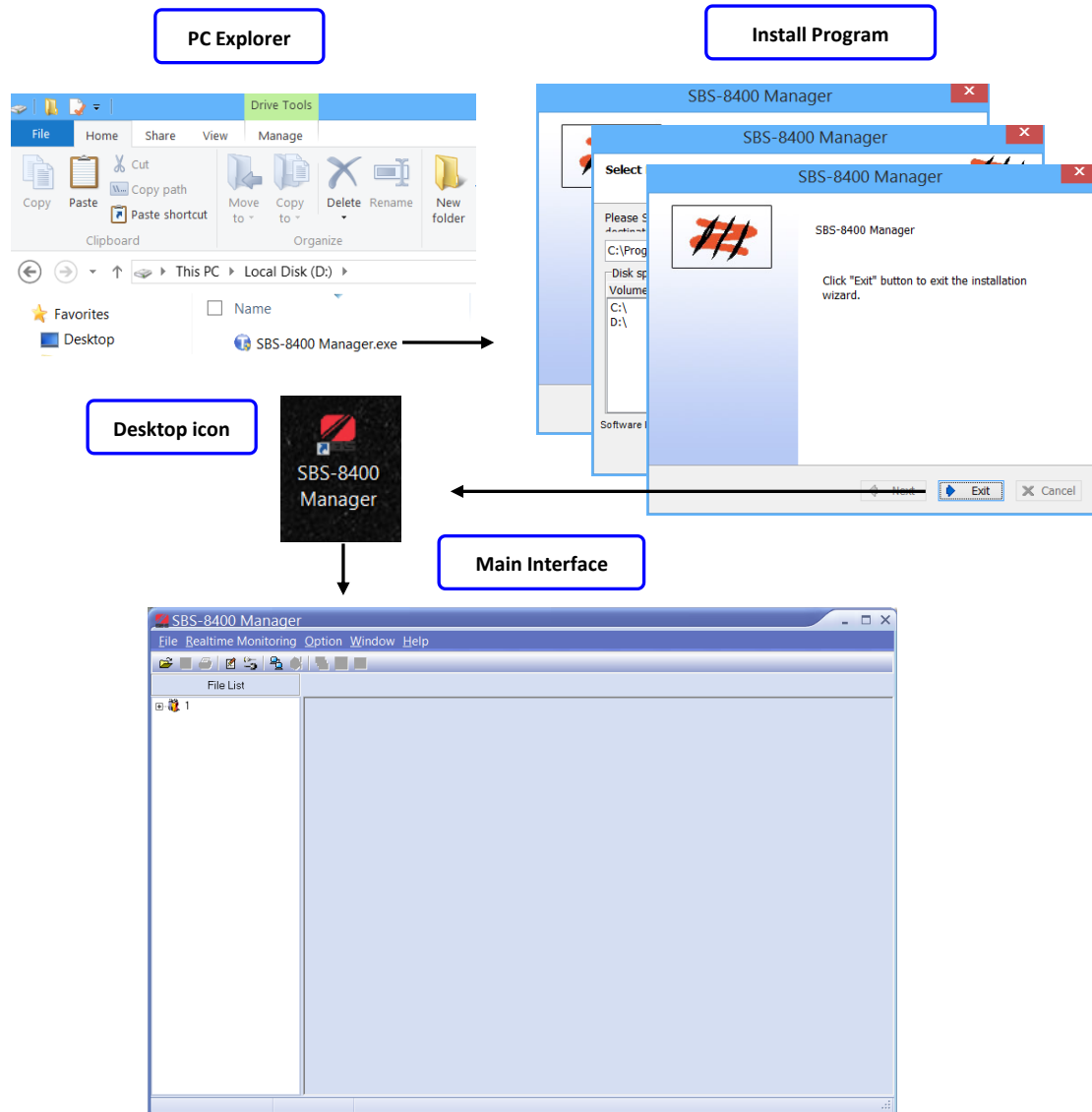
- Recording the real time discharge data by connecting main machine with PC
- Read, display and save the downloaded USB data.
- Generate EXCEL test report

5.2 Install Analysis Software to PC

5.2.1 Please find the install program of analysis software in the CD-ROM or USB disk.

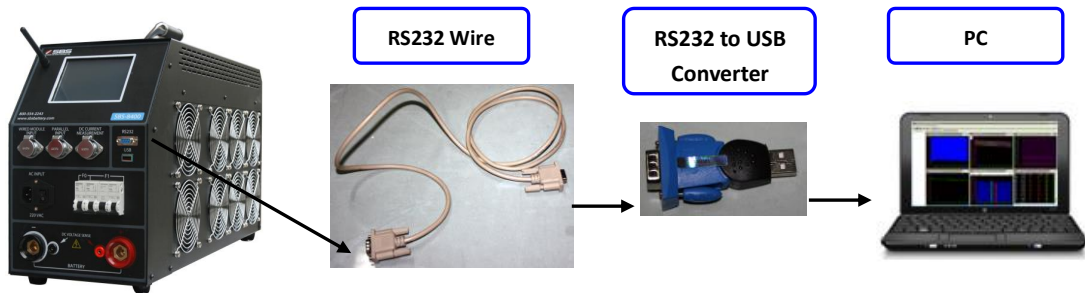
5.2.2 According the prompts to finish the installation.

5.2.3 After the installation, you can click the desktop icon to open the software.



5.3 Real Time Recording During the Testing

5.3.1 Use the RS232 connector to connect the main machine with PC



5.3.2 Choose “Connect” in “Realtime monitoring” menu to open “Real-time Monitoring Links” interface.

The screenshot shows the 'SBS-8400 Manager' software with the 'Realtime Monitoring' menu open. The 'Connect' option is selected, leading to the 'Realtime Monitoring Setting' dialog box. The dialog box contains several sections:

- Test Unit Type:** SBS-8400
- Communication Port:** COM1 (selected from a dropdown)
- Number of Strings:** 1 (selected from a dropdown), with an 'In Parallel' checkbox.
- Data file setting:** A text area for file naming, with a 'Duplicate' checkbox and a 'Save' button.
- Battery Information:** A form with fields for Battery Model, Manufacturer, Type, Capacity, Current, Production Date, Installation Date, Hour Rate, Current Clamp Range, Company/Tech Name, Start Temp, Cell Voltage, # of Batteries / String, and Test Date/Time. Some fields are highlighted in red.

 Explanatory text boxes are placed around the dialog:

- One box points to the 'Connect' menu item: "Battery Information: input all information of the tested battery string (the red parts must be filled.)"
- Another points to the 'Communication Port' dropdown: "Communication Port: Choose the COM port number (you can find it in the Device Manager)"
- A third points to the 'Number of Strings' dropdown: "Number of Strings: the tested battery string number once time (Usually it is 1)"
- A fourth points to the 'Save' button: "Save Data: after all input, press 'Save' to create a '*.FGDF' file to save the real time data. If you test more than 1 string once time, option 'Duplicate' can create more files for multiple string data recording"
- A fifth points to the 'Connect' button: "After saving the file, press 'Connect' to wait the real time data"

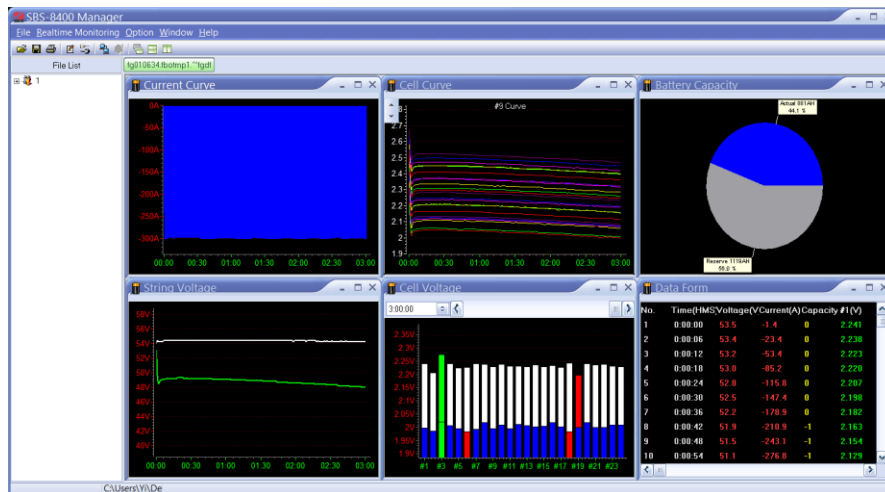
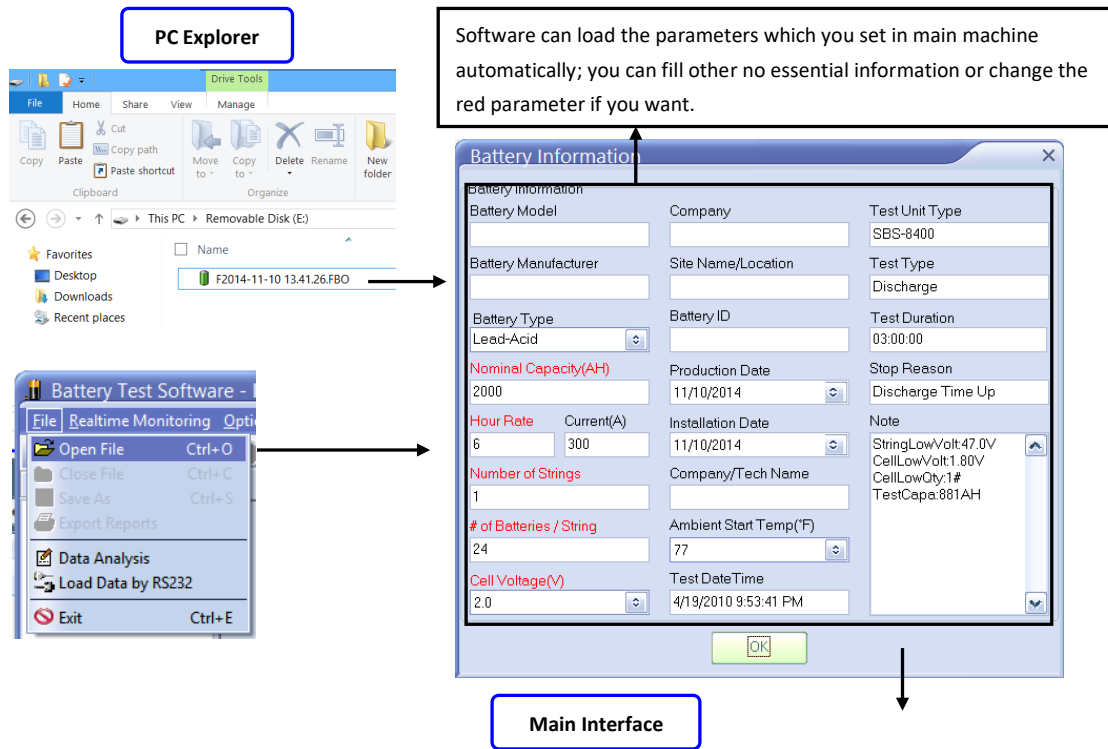
5.3.3 Start the discharge in SBS-8400, and the real time data will keep coming and showing in the PC software interface. Please input the red parameters correctly in the battery information, it can affect the result of capacity evaluation.

5.3.4 The real time data can be saved simultaneously, even though you close the software in the process of discharging, the data file still can show the records before closing.

5.4 Download Data File from USB Disk

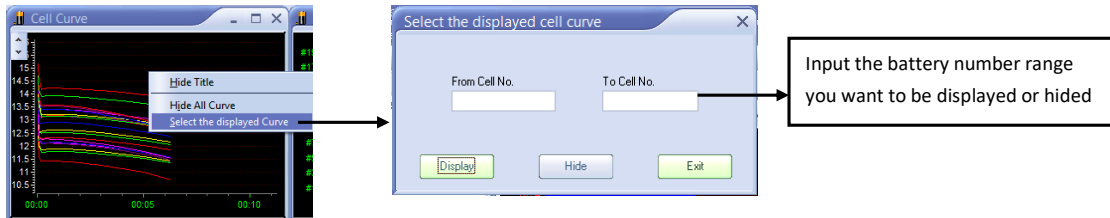
5.4.1 Download the data file from the main machine, you can find the data file named "Fxxxxxxx.FBO". ("xxxxxx" is the time & date of data downloading.)

5.4.2 Double click the file to activate “Battery information” interface. Or you can open the software first and choose “Open file” in “file” menu.



5.4.3 In the main interface, you can see 6 windows to show all necessary testing information:

- Total current curve: the current during the discharging (the value is minus because discharging)
- Cell curve: the voltage curve of each battery, it can be added and deleted by right click menu.



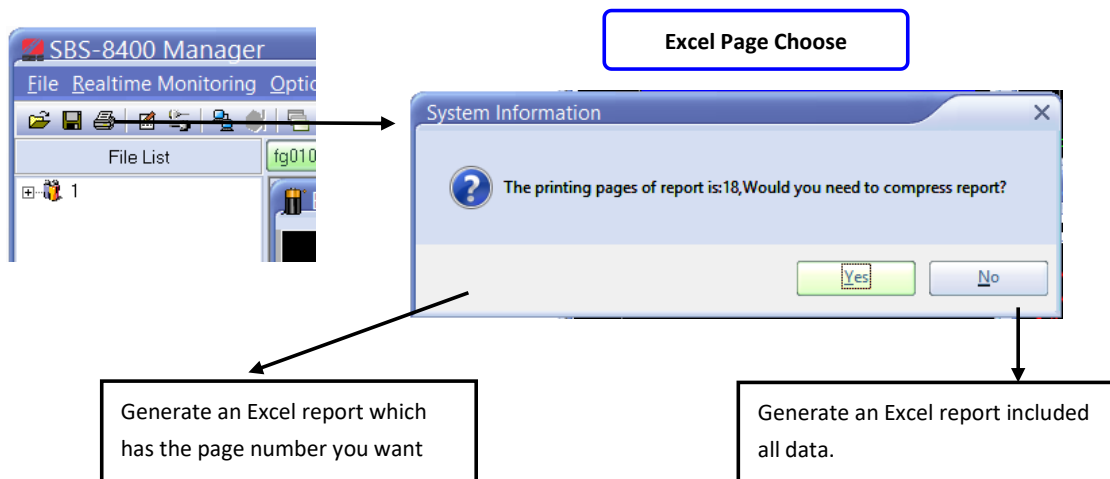
- c) Battery capacity: show the actual capacity, reserve capacity and percentage of battery string
- d) Data form: show the each discharge data by time-interval during the discharging
- e) Cell voltage: each battery voltage can be displayed by bar chart, the bar chart can show you the initial and end voltages. Using the scroll bar on the top of this window, you can locate to any time in the testing to see the relevant result.



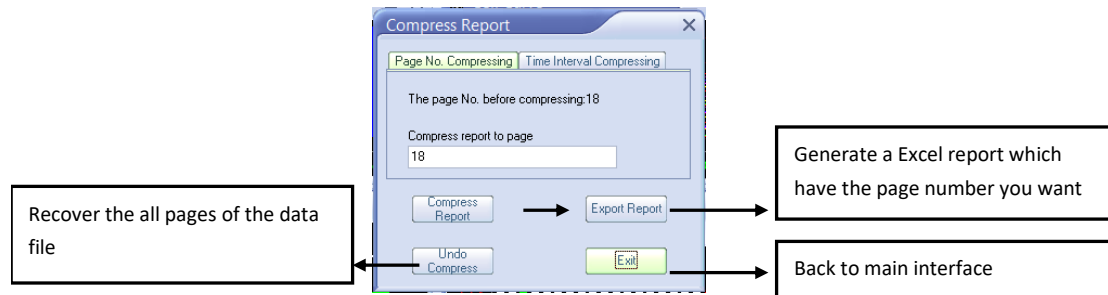
- f) total voltage: the voltage curve of battery string in the discharging process

5.5 Generate Excel Test Report

5.5.1 Press icon to generate a report, and in the “system information” window, it can show you the page number of report; choose “No” to generate Excel report which includes all information. If you don’t need a report which has so many pages, press “Yes” to generate an Excel report which has the page number you want



5.5.2 In the “compress report” interface, input the page number you want, and press “compress report” to decrease the page number and press “Export Report” to save the Excel report.



6. Attentions

- 6.1 For the testing safety and efficiency, please read the manual before operation.
- 6.2 In the process of discharge, we advise that the operator must stay in the testing spot until discharge over.
- 6.3 Please check the datasheet of SBS-8400 to ensure the tested battery string is in the voltage range, if battery string voltage is out of SBS-8400 test range, it would cause damage to main unit.
- 6.4 If you need to know the performance of each cell in the battery strings, wireless modules are essential accessories. Without them, PC analysis software can't the voltage dropping curves to analyze.
- 6.5 If overheat, over current, equipment failure happen in the discharging, the warning alarm would activate automatically. Please turn off the DC breaker & AC input, to avoid a further damage.

7. After-Sale Service

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Fax: (262) 703-3073

Website: www.sbsbattery.com