SBS-6000
Battery Analyzer
User's Manual
V2.0

Storage Battery Systems, Inc.

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Safety matters

In the whole test process, please comply with common. safety prevent norms. If you use the tester without this user manual, and the tester is damaged, DADI Telecom won't undertake any responsibility. Please be sure to obey the following safety norms, lest cause bodily injury or tester damage.

Warning

Battery charging

Charging the battery must use the charger from the manufacturer. You can't use any unauthorized charger, lest cause tester damage or accident.

Battery replacement

Please use the manufacturer configured Li batteries. You can't operate the tester in inflammable or explosive environment. Do not use the tester in environment with inflammable or explosive liquid or steam. In this environment, it will be dangerous with any electrical instruments.

Open rear cover

Unless you want to replace modules, please don't open rear cover or bottom cover. The replace must be operated by formal trained stuff. There is high voltage in some areas inside the tester which will cause dangerous if it is mishandled.

LCD

If the LCD is damaged and liquid outflows, please don't inhaled it into mouth or splash on skin. If the liquid is splashed into eye or mouth, please immediately rinse with water and go to the hospital; if the liquid is splashed on skin or clothes, please wipe with alcohol firstly, and then wash with soap and water. In addition, take care, don't be scratched by glass fragments, don't touch the border of glass fragments.

Catalogue

Chapter 1   General

SBS-6000 Storage Battery Impendence Analyzer is the most powerful and well performed storage battery test equipment. It is a multipurpose impendence instrument and micro ohm meter with the most complete functions and supports the domestic and foreign standards. The equipment can test all kinds of battery like 2V, 4V, 6V, 8V, 12V, 24V, 48V, it can also test resistance of conductor and metal connector, the test precision reaches $1\mu\Omega$. The analyzer adapts the VLSI and powerful microprocessor, and can operate the data exchange with RS232, TCP/IP port, meanwhile it adapts the large colorful LCD screen, and the analyzer could achieve the analysis, display and report output of testing data by itself. It is a top grade meter which is suitable for military, communications operators and power department etc.

Chapter 2   Inspection

It's absolutely necessary for you to read inspections before unpack package and check the instrument or test. In this chapter, we would like to help you know the initial work status of the instrument.

2.1   Unpack the Instrument

Before unpacking, please check whether there is any damage in the carton and the bag. If any, please sort all of the articles per the packing list and perform self-check according to instructions of the Section 2.4 until the instrument can work normally.

In case that damaged bag or incomplete articles happen or the instrument cannot achieve function tests, please contact us immediately.

2.2   Accessory and Option

Accessories to the SBS-6000, please refer to the packing list. If received articles are not the same with what is specified in the packing list, please inform us immediately so as not to make any influence on using.

2.3   Power Supply

The SBS-6000 supports two power supply modes, DC and battery, with a built-in large capacity rechargeable lithium battery for 8-hour long consecutive operation after being fully charged.

When using external power supply, the battery will charge automatically with the battery capacity shown on the right top corner of LCD of SBS-6000 at any moment.

When using AC power, please use the AC charger accompanied, or the instrument will be damaged.

Precautions:
！Don't dispose wasted battery in water or fire for fear of backfire or pollution.
！Don't make the two poles of the battery in short circuit for fear of dangers.
！Don't make battery close to fire source or use in high temperature for fear of severe personal injury.

Chapter 3　General operation and use guide

3.1　Operation standard

Test interface

Please connect the wire to test interface, and then connect the wire to tested line. Please don't touch the bare metal part of test clips, lest there is high voltage on wire.

RS232 port

Don't connect with RS232 port with electricity, also don't short-circuit the interface by metal, otherwise easily damage the internal circuit.

Display

The new tester has a protective mask on LCD, please rip it before use.

Cleaning

This tester shell is made of plastic, please use dry and soft cloth to wipe and clean, please do not use a volatile chemical agents, otherwise easy cause discoloring or deformation.

Protection of shell and operation panel

Please don't spray the volatile chemical reagent onto shell or panel, or don't make them touch with rubber or PVC for long time, which easy to cause fault.

Move tester

When you want to move the tester, please check the power wire and cable, to ensure them unconnected with tester, and then take tester by both hands.

Longtime unused

If the tester is longtime unused, the battery characteristics will getting worse, or the battery need charging. If the charging time is very short and operation time is also short, the tester has to be replaced.

Faults

If the internal emit strange voice, smell or smoke, please immediately shut off the tester and power supply, and contact us.

3.2　　Use notes

➢　When you use the tester for the first time, please fully charge the battery.

➢　If there appear abnormal pages or crashed, please shutdown the tester and then restart again.

➢　Please don't let the tester in direct sunlight or close to heat place, which maybe cause adverse affect to inside circuit or shell.

➢　If the tester is moved to the environment which has higher temperature or temperature changing quickly, the tester will generate condensing. So, the best way is to leave the tester in the new environment one hour before operation.

Chapter 4 Menu
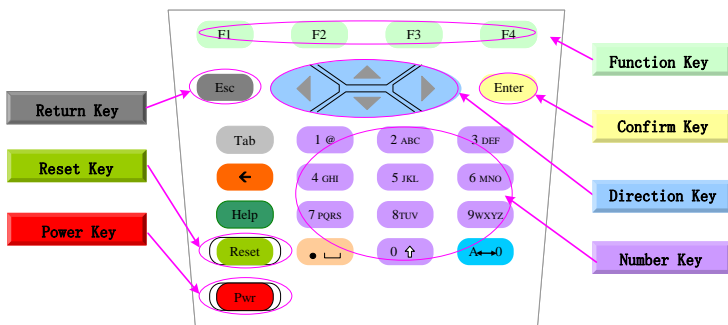
4.1   instrument front view

Host appearance

Test cable

4.2　　Instrument's Buttons

Keyboard introduction

It includes power key, reset key, return key, function key, arrow key, OK key and number key. The key functions are as follows:

Power key: power on/off. When the tester is on, press this key for a while to close, when the tester appears anomaly and can not be closed through closing icon or power key, press this key for a while (About 5 seconds) to shut off the tester.

Reset key: press this key to reset system.

Return key: press this key to return to last menu or cancel setting.

Function key: four keys F1, F2, F3 and F4, in different test and setting interface, the function is different.

Direction key: up, down, left, right, move toward corresponding direction by operating different cursor key.

Confirm key: press it for confirmation.

Number key: 0-9 ten numbers, press this key to input corresponding number.

4.3　　instrument upside and interface

Power Adaptor interface

Instrument power adaptor, input 50Hz AC 220V commercial power,

allowed error range: ±10%, output 8.4V.

TEST CABLE test interface

TEST CABLE test interface is the special interface for battery resistance test line.

Ethernet interface

This interface is standard RJ45 interface, use Ethernet crossed line.

RESERVE interface

Standby interface.

RS232 interface

Professional external RS232 parallel serial Line for the connection between instruments & PC.

4.4　other parts

Test cable

Battery resistance test cable, connect with TEST CABLE interface at one end, connect with tested battery at another end, red is positive, black is negative.

Ethernet cable

The cable equipped with the instrument is crossed network cable for connecting with PC. When Ethernet connection is normal, Ethernet indicator on RJ45 interface is on.

RS232 Serial cable

Serial cable equipped with the instrument is RS232 Serial cable, it is connected with PC for tester parameter setting and reading records.

Chapter 5 Operation Instructions

5.1   Power on/off

Power on Instrument: Press the power on/off button, and it will display LOGO icon and then enter into the below operation display:

Power off instrument: A long press the power on/off button, about 5 seconds.

5.2   Instruction of tester's LCD display

It will show the main display when power on the tester. It includes: Battery indicator, Date and time, status bar and function icon.
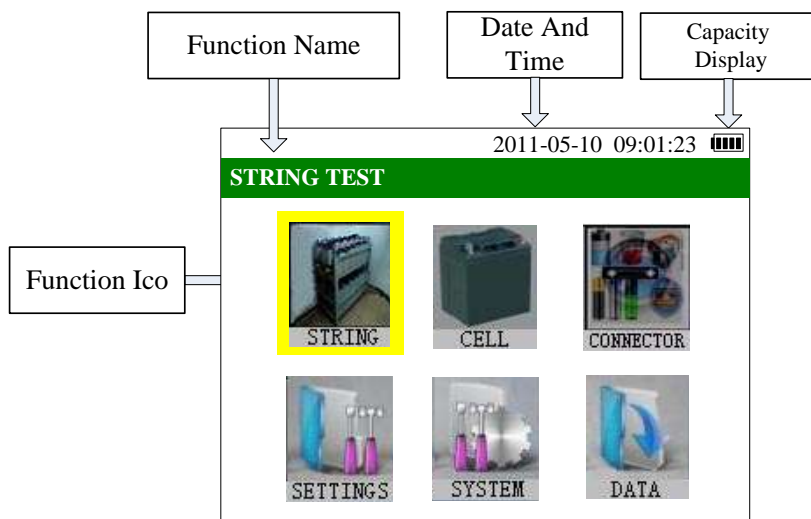
It includes series function icon, and each icon indicates a function. Please select the related icon and click the ENTER button into a function.

5.3   Test Setting

Functions description

Please process the parameter setting before test. It include: String setting, Cell setting, Conn setting, Data Storage, Alarm Threshold setting, test type setting, Battery sampling and zero resistance setting.

How to use

Select the related setting items, click <Enter> icon enter into the right display. When the display shows in gray color it means that the display was under browse mode without any parameters setting. Detail as follow:

Navigation

Date \Time And Power

Settings functions

Settings content

function keys

Within screen:
2011-05-10 09:01:23

TEST SETTING

1. String Mode:
2. Cell Mode:
3. Conn Mode:
4. Save Mode:
5. Set Warning:
6. Input Comp：
7. Set Test Type:
8. Sample Test:

Station：01
String：01
V Type：2 V-0500AH
V Warning：02.00V
REF：
000.483mΩ

Esc   Enter
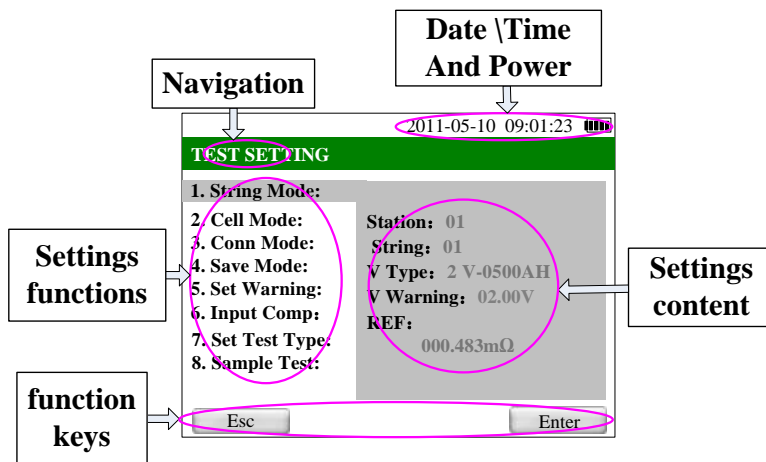
5.3.1 String setting

Functions description

Set the String setting parameters like: Station No., Group No., Battery type, Low pressure alarm value and Group reference value. Battery type includes battery voltage type and capacity. Low pressure alarm value is the alarm threshold value of the measured battery, the instruments will alarm when the measured voltage lower than the threshold one.

It should process Alarm threshold and test type setting before String setting. Details please check the chapter "Alarm Threshold Setting" and "Test Type Setting".

How to use

Select the "String Mode" on the main test setting display and click <Enter> icon to process the String testing.

When you process the String Mode, the battery type, alarm threshold, reference value and others all in gray color, it shows that the string is already exist and you can not make change. Please amend Group No.

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and Station No. to build a new string and then set the related string parameters. There have shortcut keys of some parameters, for the one do not have shortcut keys, User's can input NO.. Detail as follow:

	2011-05-10 09:01:23 [▪▪▪▪]
TEST SETTING	
1. String Mode:	
2. Cell Mode:	**Station：01**
3. Conn Mode:	**String：01**
4. Save Mode:	**V Type：2 V**
5. Set Warning:	**V Warning：02.10V**
6. Set Test Type：	**REF：**
7. Sample Test:	**000.483mΩ**
8. Zero Setting:	
Esc	Enter

Support voltage type: 2V, 4V, 6V, 8V, 12V, 24V. Click related shortcut keys for setting, like below:

	2011-05-10 09:01:23 [▪▪▪▪]
TEST SETTING	
1. String Mode:	
2. Cell Mode:	**Station：01**
3. Conn Mode:	**String：01**
4. Save Mode:	**V Type：2 V- 0500AH**
5. Set Warning:	**V Warning：02.10V**
6. Set Test Type：	**REF：**
7. Sample Test:	**000.483mΩ**
8. Zero Setting:	
2V	4V	6V	More

Comparison threshold value setting include: Manual Input directly or Select threshold value. Select threshold means choose the Built-in set value. The Build-in values can get directly from the sampling battery testing or the configured download software. Details please take the chapter "Sampling Battery" for reference. Display of Manual Input value as follow:

```
                              2011-05-10  09:01:23  ▮▮▮▮
  TEST SETTING
  1. String Mode:
  2. Cell Mode:         Station：01
  3. Conn Mode:          String：01
  4. Save Mode:         V Type：2 V- 0500AH
  5. Set Warning:       V Warning：02.10V
  6. Set Test Type：    REF：
  7. Sample Test:           000.483mΩ
  8. Zero Setting:

      Esc        Srlect        Input        Enter
```

During Conductance testing mode, manual input threshold value display as follow:

```
                              2011-05-10  09:01:23  ▮▮▮▮
  TEST SETTING
  1. String Mode:
  2. Cell Mode:         Station：01
  3. Conn Mode:          String：01
  4. Save Mode:         V Type：2 V- 0500AH
  5. Set Warning:       V Warning：02.10V
  6. Set Test Type：    REF：
  7. Sample Test:           2027S
  8. Zero Setting:

      Esc        Srlect        Input        Enter
```
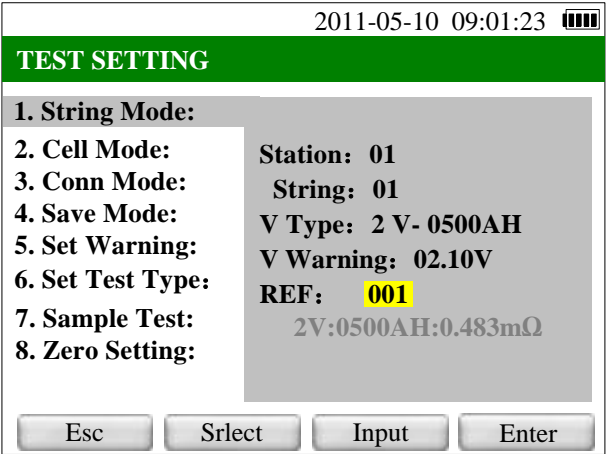
Select the saved threshold value, click function key <-1><+1> to change the serial No. and choose value. It will show in Gray color if it can not configure. The display of select threshold value as follow:

```
                           2011-05-10  09:01:23  ▮▮▮▮
  TEST SETTING

  1. String Mode:
  2. Cell Mode:           Station：01
  3. Conn Mode:            String：01
  4. Save Mode:           V Type： 2 V- 0500AH
  5. Set Warning:         V Warning：02.10V
  6. Set Test Type：      REF：    001
  7. Sample Test:            2V:0500AH:0.483mΩ
  8. Zero Setting:

     Esc        Srlect      Input       Enter
```

5.3.2　　Cell setting
Functions description

Set the Cell setting parameters like: Battery type, Low pressure alarm value and reference value. Battery type includes battery voltage and capacity. Low pressure alarm value is the alarm threshold value of the measured battery, the instruments will alarm when the measured voltage lower than the threshold one.

How to use

Comparison threshold value setting include: Manual Input directly or Select threshold value. Select threshold means choose the Built-in set value. The Build-in values can get directly from the sampling battery testing or the configured download software. Details please take the chapter "Sampling Battery" for reference. Display of Cell setting as follow:

Support voltage type: 2V, 4V, 6V, 8V, 12V, 24V. Click related shortcut keys for setting, like below:
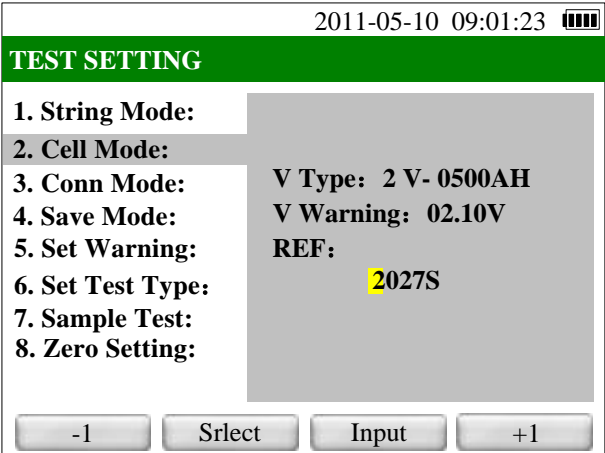

Comparison threshold value setting include: Manual Input directly or Select threshold value. Select threshold means choose the Built-in set value. The Build-in values can get directly from the sampling battery
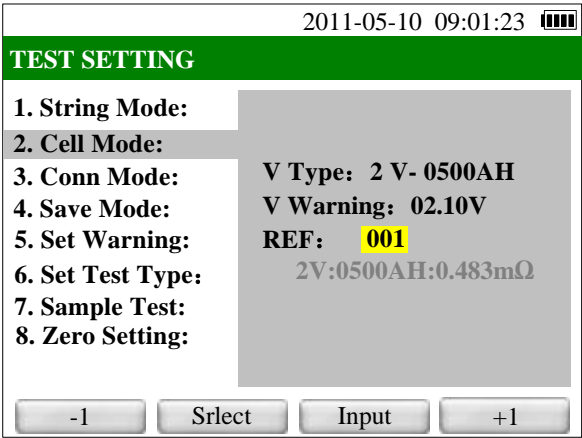
testing or the configured download software. Details please take the chapter "Sampling Battery" for reference. When the test type is resistance, the display of manual input threshold value of Cell setting as follow:
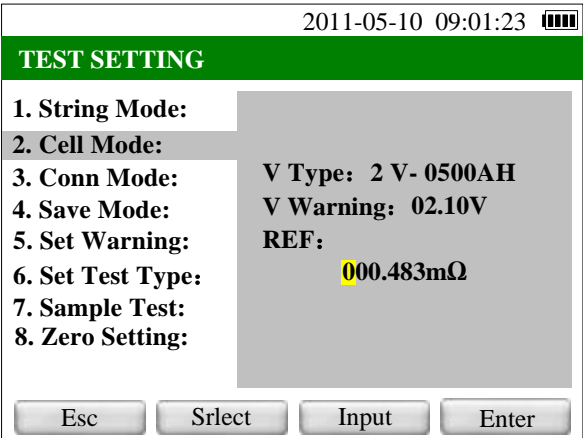
```
                                    2011-05-10  09:01:23  ▐▋▋▌
  TEST SETTING

  1. String Mode:
  2. Cell Mode:
  3. Conn Mode:              V Type：2 V- 0500AH
  4. Save Mode:              V Warning：02.10V
  5. Set Warning:            REF：
  6. Set Test Type：             000.483mΩ
  7. Sample Test:
  8. Zero Setting:


  ┌─────────┐ ┌─────────┐ ┌─────────┐ ┌─────────┐
  │   Esc   │ │  Srlect │ │  Input  │ │  Enter  │
  └─────────┘ └─────────┘ └─────────┘ └─────────┘
```

During Conductance testing type, manual input threshold value display as follow:

```
                                    2011-05-10  09:01:23  ▐▋▋▌
  TEST SETTING

  1. String Mode:
  2. Cell Mode:
  3. Conn Mode:              V Type：2 V- 0500AH
  4. Save Mode:              V Warning：02.10V
  5. Set Warning:            REF：
  6. Set Test Type：             2027S
  7. Sample Test:
  8. Zero Setting:


  ┌─────────┐ ┌─────────┐ ┌─────────┐ ┌─────────┐
  │   -1    │ │  Srlect │ │  Input  │ │   +1    │
  └─────────┘ └─────────┘ └─────────┘ └─────────┘
```

Select the saved threshold value, press function key <-1><+1> to change the serial No. and choose value. It will show in Gray color if it can not configure. The display of select threshold value as follow:

```
                          2011-05-10  09:01:23  ▮▮▮▮

 TEST SETTING

 1. String Mode:
 2. Cell Mode:
 3. Conn Mode:        V Type：2 V- 0500AH
 4. Save Mode:        V Warning：02.10V
 5. Set Warning:      REF：   001
 6. Set Test Type：      2V:0500AH:0.483mΩ
 7. Sample Test:
 8. Zero Setting:


     -1          Srlect       Input        +1
```

5.3.3   Conn setting

Functions description

Set the string setting parameters like: Station No., Group No., Group reference value and Pole No.. Pole No. means the Pole No. of Cell battery.

It should process Alarm threshold and test type setting before Conn. Details please check the chapter "Alarm Threshold Setting" and "Test Type Setting".

How to use

When you process the Conn setting, the Pole No., reference value and others all in gray color, it shows that the string already exists and you can not make changes. Please amend Group No. or Station No. to build a new string and then set the related string parameters.

It is Manual input type of Conn reference value setting. Pole No. means

the Pole No. of each Cell battery, the serial No. of Connector is based on the No. of Pole. During resistance testing, the display of Connector setting as follow:

2011-05-10 09:01:23
TEST SETTING

1. String Mode:
2. Cell Mode:
3. Conn Mode:
4. Save Mode:
5. Set Warning:
6. Set Test Type：
7. Sample Test:
8. Zero Setting:

Station: 01
 String：01
REF：000.050mΩ
Post Per JAR：2

Esc   Enter

During Conductance testing type, manual input threshold value display as follow:

2011-05-10 09:01:23
TEST SETTING

1. String Mode:
2. Cell Mode:
3. Conn Mode:
4. Save Mode:
5. Set Warning:
6. Set Test Type：
7. Sample Test:
8. Zero Setting:

Station: 01
 String：01
REF：20000 S
Post Per JAR：2

Esc   Enter

5.3.4   Data storage setting

Functions description

Set the related parameters of String testing, Cell testing, Conn testing and data storage saving. There are two saving types of data storage: Manual & Auto.

When you set Manual saving, you should click the related saving keys to store the data.

If you set Auto saving, the instruments will auto saving the date once the testing results coming stable.

How to use

Select the data storage saving type and click OK key to enter into. The display as follow:

```
┌─────────────────────────────────────────────┐
│                    2011-05-10  09:01:23  ▥▥▥ │
├─────────────────────────────────────────────┤
│ TEST SETTING                                 │
│                                              │
│ 1. String Mode:                              │
│ 2. Cell Mode:                                │
│ 3. Conn Mode:        Save Mode Of Data       │
│ 4. Save Mode:                                │
│ 5. Set Warning:    String Mode: Manual       │
│ 6. Set Test Type:                            │
│ 7. Sample Test:      Cell Mode: Manual       │
│ 8. Zero Setting:     Conn Mode: Manual       │
│                                              │
│  ┌─────┐  ┌────────┐  ┌──────┐  ┌───────┐    │
│  │ Esc │  │ Manual │  │ Auto │  │ Enter │    │
│  └─────┘  └────────┘  └──────┘  └───────┘    │
└─────────────────────────────────────────────┘
```
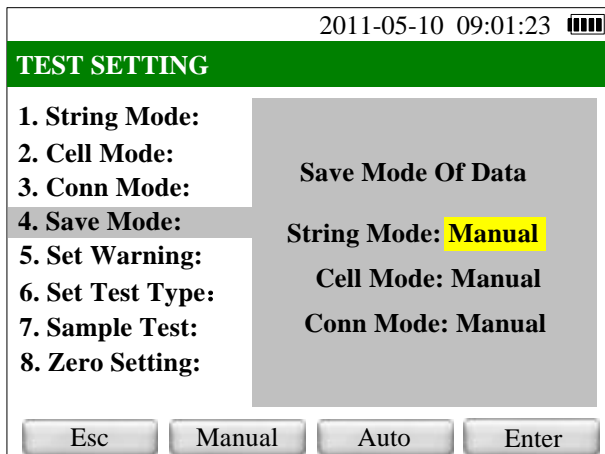
Click up & down key to select the items you want to setting, click <Manual> <Auto> function key to choose the saving type.

5.3.5   Alarm Threshold Setting

Functions description

Set the alarm & replacement value of the battery resistance. If test battery's resistance, the setting value should be the multiple of the reference value. If test conductance, the setting value should be the percentage of the reference value.

How to use

Select the alarm threshold setting and enter into the setting display, if it is resistance testing, the display as follow:

```
                          2011-05-10  09:01:23  ▥
 ┌──────────────────────────────────────────────┐
 │ TEST SETTING                                   │
 │ 1. String Mode:                                │
 │ 2. Cell Mode:                                  │
 │ 3. Conn Mode:                                  │
 │ 4. Save Mode:        Warning：1.5 REF          │
 │ 5. Set Warning:         Fail： 2.0 REF         │
 │ 6. Set Test Type：                             │
 │ 7. Sample Test:                                │
 │ 8. Zero Setting:                               │
 │                                                │
 │   Esc        +0.1        -0.1        Enter     │
 └──────────────────────────────────────────────┘
```

Click up & down keys to select the items you want to set. Click <+0.1><-0.1> function key to set the alarm and replacement threshold and then save. The alarm & replacement value should be the multiple of the reference resistance value. 1.5REF means the instrument will warning and alarm when the testing results 1.5 times greater and 2 times less than the reference value. 2.0REF means the instrument will process replacement alarm when the testing value 2 times greater than the measured value.

During Conductance testing type, manual input threshold value display as follow:

2011-05-10 09:01:23
TEST SETTING

1. String Mode:
2. Cell Mode:
3. Conn Mode:
4. Save Mode:
5. Set Warning:
6. Set Test Type:
7. Sample Test:
8. Zero Setting:

Warning: 65% REF
Fail: 50% REF

| Esc | +1% | -1% | Enter |

Click up & down keys to select the items you want to set. Click <+1%><-1%> function key to set the alarm and replacement threshold and then save. The alarm & replacement value should be the percentage of the reference conductance value. 65%REF is the alarm threshold value, it will process warning and alarm when the test value 50% lower than the reference value. 50%REF is the replacement threshold value, it will alarm when the test value lower than the measured value 50%REF.

5.3.6 Test type setting
Functions description

Set the test type. There are two type for setting: Resistance and Conductance.

Note: Change test type is only effective for Cell testing. For the String and Conn testing, the test type can not changed, as the test type is

already confirmed before you set up the testing string. If you want to amend the test type of String & Conn testing, you should re-build testing string.

How to use

Select the test type setting and enter into the display show as follow:
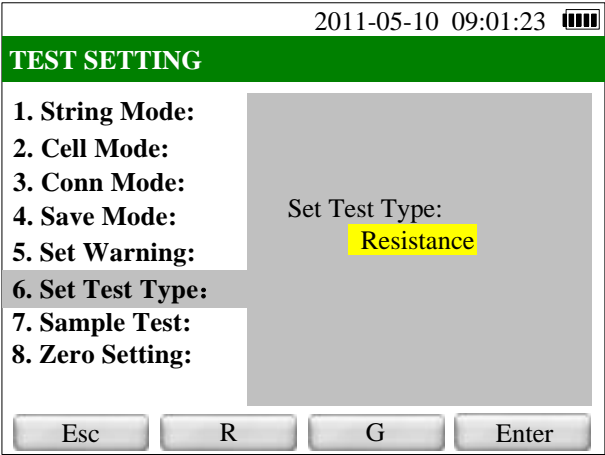
Click <R> <G> function key to set the testing type.

5.3.7   Battery Sampling

Functions description

Battery sampling used to setup a test reference value by this way. Thus this value downloads to the unit by PC software configuring a reference value. Totally, for reference values, storage capacity is over 300 items.

How to use

Select battery sampling and click the confirm key to enter into the below interface:

| | | 2011-05-10 09:01:23 ▮▮▮▮ |

TEST SETTING

	Sample Test:			
1. String Mode:	**NO.**	**V**	**AH**	**REF**
2. Cell Mode:	**001**	**12V**	**45**	**6.500 mΩ**
3. Conn Mode:	002	2V	500	0.380 mΩ
4. Save Mode:	003	2V	1000	0.200 mΩ
6. Set Test Type：	004	2V	100	1.000 mΩ
6. Set Test Type：	005	2V	2000	0.100 mΩ
6. Set Test Type：	006	2V	200	0.500 mΩ
8. Zero Setting:				

| Esc | Set Comp | Page Up | Next |

Click <page Up><Next> to check the reference value, by up and down key selecting the current reference number, click <Set Comp> key to enter into battery sampling interface as below:

| | 2011-05-10 09:01:23 ▮▮▮▮ |

TEST SETTING

1. String Mode:
2. Cell Mode: **Sample Test:**
3. Conn Mode: **REF Number: 001**
4. Save Mode: **Sample：30**
5. Set Warning: **Capability：0500AH**
6. Set Test Type：   **V-Type: 2V**
7. Sample Test: **Test Range：4 mΩ**
8. Zero Setting:

| Esc | Sampling |

Click Up/down key to select setup options, and according to battery actual parameter to setup the sample parameter. We suggest to use

---

new battery for sampling while the sample number no less than 10 items is highly recommended . When setup finished, click <Sampling> key enter into the sampling interface as below:

2011-05-10 09:01:23 ||||
Sample Test
REF Number：001   Sample：30
R	**0 . 421 (mΩ)**
Sample NO.1
Range：4 mΩ
Esc   Save

Save test results once data became stable until all samples are tested, at this time, the test interface will display Min and Average value. According to actual needs, click <Save Ave>or<Save Min> keys to setup the average value or min value as reference value and complete the battery sampling's operation. As long as click <Esc> key you could drop out battery sampling, of course, reference values are not be saved at last.

```
┌─────────────────────────────────────────────┐
│                        2011-05-10  09:01:23  ▮▮▮▮ │
├─────────────────────────────────────────────┤
│ Sample Test                                   │
│                                               │
│  REF Number：001              Sample：30      │
│                                               │
│    ┌─────┬───────────────────────┐           │
│    │  R  │   0 . 421 (mΩ)        │           │
│    └─────┴───────────────────────┘           │
│                                               │
│              Sample NO.30                     │
│                                               │
│    Min：0.412(mΩ)      Average：0.432(mΩ)     │
│                                               │
│   Range：4 mΩ                                 │
│   ┌──────┐ ┌──────────┐ ┌──────────┐         │
│   │ Esc  │ │ Save Ave │ │ Save Min │         │
│   └──────┘ └──────────┘ └──────────┘         │
└─────────────────────────────────────────────┘
```

5.3.8   Impedance Zero Adjustment Function

Functions description

This impedance zero functions is used to calibrate the tester by adjusting impedance 0 range value, in order to make the test results are much more reliable. When difference of environment temperature and normal temperature 25 ℃ is over 10 ℃ or above this value, we would suggest to use zero adjustment function. Correct and properly use zero adjustment function that can improve measurement accuracy.

Note: In below description that mentioned zero adjustment board is in good conductive metal plate, when zero adjusting, you have to try two test clip or probe as close as possible.

How to use

Check below clip testing cable and setting board connection diagram.

zero adjustment board

Test line
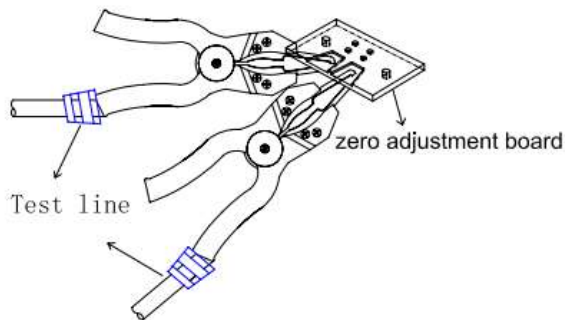
to make sure the outlets of the
wires are of the same position

When using probes testing cable for zero setting, four probes have to insert to related four holes, below is probes and setting board connection diagram.
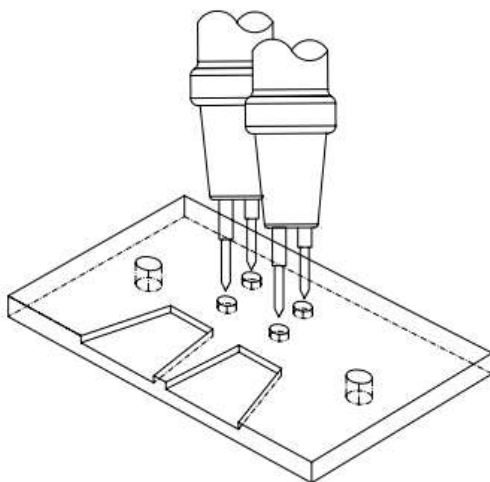
Select and confirm impedance zero setting function key enter into

below interface.

2011-05-10 09:01:23
TEST SETTING

1. String Mode:
2. Cell Mode:
3. Conn Mode:
4. Save Mode:
5. Set Warning:
6. Set Test Type：
7. Sample Test:
8. Zero Setting:

Zero Adjust

Connect zero board

0.000（mΩ）

Range：4mΩ
Function OFF

| Func On | Func Off | Range | Esc |

When tester is in impedance zero setting interfaces, it will alert "Please connect to zero setting board" you have to connect testing clip or probes to setting board, tester will be in auto zero setting. At the same time impedance zero setting interface alert "Zero Setting" about 6 seconds to complete current gear zero setting, you can press F4key to switch gear for each gear zero setting as below interface.

2011-05-10 09:01:23
TEST SETTING

1. String Mode:
2. Cell Mode:
3. Conn Mode:
4. Save Mode:
5. Set Warning:
6. Set Test Type：
7. Sample Test:
8. Zero Setting:

Zero Adjust

Adjusting Zero

0.007（mΩ）

Range：4mΩ
Function OFF

| Func On | Func Off | Range | Esc |

When tester in zero setting it will auto shut off zero setting function, when setting finished, tester will display "Complete" and automatic power on zero setting function. You also can use <ON> functional keys to power on or <OFF> functional keys to power off zero setting as below interface.

2011-05-10 09:01:23
TEST SETTING

1. String Mode:	
2. Cell Mode:	**Zero Adjust**
3. Conn Mode:	
4. Save Mode:	Complete
5. Set Warning:	**0.007（mΩ）**
6. Set Test Type：	
7. Sample Test:	**Range：4mΩ**
8. Zero Setting:	**Function OFF**

Func On	**Func Off**	Range	Esc
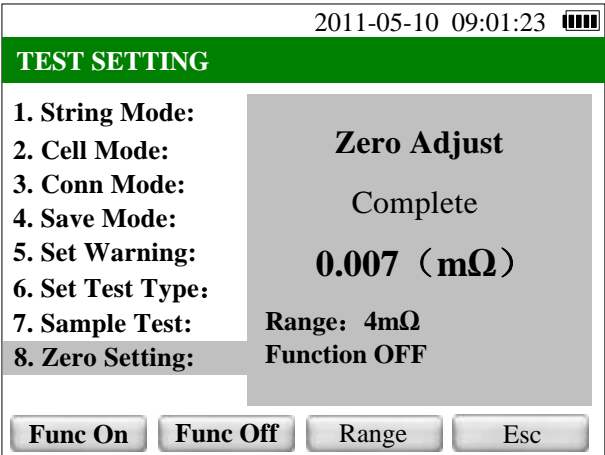
If zero setting is not correct or power on this function during the test, it will cause test results are not accurate, meanwhile, it needs to zero setting once more for incorrect gear.

5.4　Test Functions

Functions description

Test functions contain three methods: string testing, Cell testing and Conn testing. Each function adapts to different type of testing. String testing is used to the whole battery testing, and that can manage the series number of battery test results, and analysis the data, find out the inequality Cell battery in fast way. View data and check out battery Chart so that search invalid battery rapidly. Cell test is used to test every kinds of Cell battery, that can test and setup different types of test parameter. Conn testing inspects each of battery Conn and generate graphic when data viewing, that can quickly find the failure connector.

Impedance gear has 6 types（4mΩ, 40mΩ, 400mΩ, 4Ω, 40Ω, 400 Ω）, when gear setup auto switch, it would auto switch measure range according to different impedance value. During the range switch, impedance value becomes unstable, only when value range is stable and impedance measurement value to stabilized, in this case you can complete the impedance results compare and save. Temperature measurement must equip with a temperature probe or clip to test and display temperature value. Prior to compare functions, they need to set the reference value (input or test battery sample to obtain the reference value). This tester support 300 items compare data. The set of reference value can be done by PC software or by tester. In order to learn details please refer to "Battery sampling" Chapter.

How to use

Connect the top of unit "TEST CABLE" interface by a test cable and fix it. The other end clip the battery positive/negative, red clip connect positive, while black clip connect the negative as below:
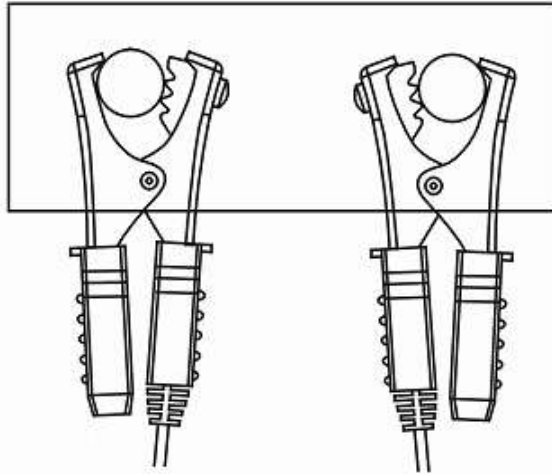
"Test clip" connect to battery terminal sketch

When test type is resistance test, the interface is as below:
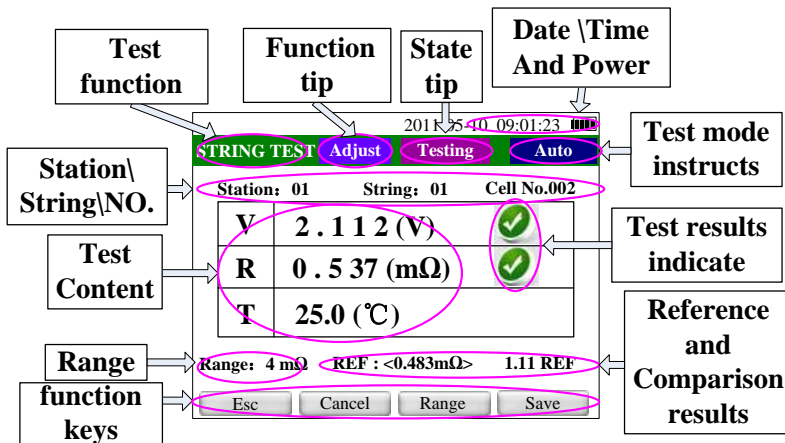
Test type is conductivity test interface as below:
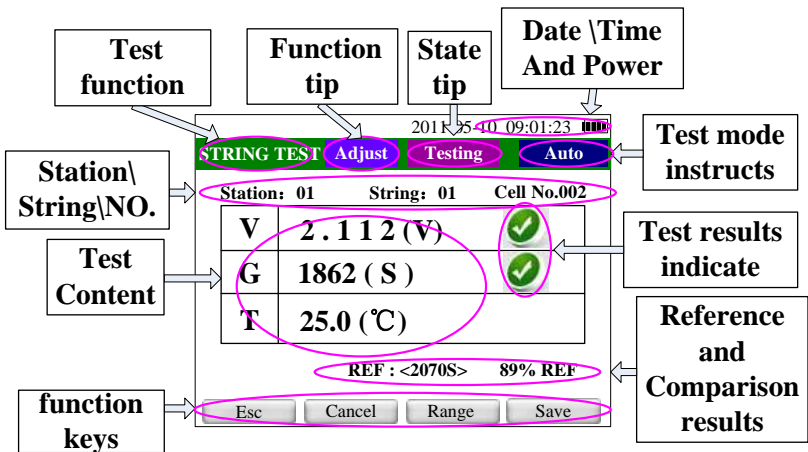
Test function	Three types: String testing, Cell testing and Conn testing.
Function Prompt	Prompt when zero adjustment is on, but not prompt when zero adjustment is off.
Status Prompt	Auto test: When test clip or probe is connected to battery, it will display "Testing", and also display "Saved" if the data already saved. Manual test: When save data it will display "Saved" and disappear after 1 second.
Battery Time Indication	Display current time and battery left capacity.
Test method indication	Test method includes two types: Manual test and auto test, manual test must need press keys by hand that can save test data, auto test that tester

	auto test and save data automatically.
Group, Station, Battery number	Display current group, station, battery number three types of test status and display them in different ways.
Test display	Display test results, string testing and Cell testing display: voltage, impedance and temperature, Conn display impedance and temperature.
Range	Display impedance test use the current gear, if the test type is conductivity that would not display gear.
Functional keys	Four functions correspondence to F1-F4 keys, in difference functions has different interfaces.
Reference value and results compare (Test types is resistance)	"REF: 0.483 m Ω" stands for reference value, 0.483 m Ω, "1.11REF" stands for tested impedance value is 1.11 times of reference value. When impedance and voltage test value marked as means test values does not exceed the alarmed threshold. Otherwise, tested value marked as that means tested battery voltage is exceed alarms. Tested impedance marked as means test results are exceeded replaced value of configured threshold. When impedance marked as that means compare result is greater than warning value of setup alarm threshold.

Reference value and compare results （Test type is conductivity）	"REF: 2070S" stands for 2070S, "89%REF" stands for test conductivity reference value is 89%. When impedance and voltage value marked as means test value exceed alarm threshold, battery status is normal, but if test voltage marked as that means battery voltage is lower than alarms, impedance marked as means compare results lower than replaced value of setup alarm threshold. As tested impedance marked as and then the compare results are lower than warning value of alarm threshold as well as higher than replaced value.

Note:

• Test cable and battery must have good connection otherwise it will affect test results.

• When test value display "Over" that means the impedance exceed test range.

• When test value display "------", that means test cable open or test cable is cut off. When test cable connected improperly or tested item value is over exceed the test range it will display "------".

5.4.1   String Testing

Functions description

When perform the string testing, can test battery voltage, impedance, and temperature at the same time.

How to use

Click String testing icon that may enter into the string testing interface as below:

Connection method can refer to "Test Functions" Chapter

Before string testing you have to setup parameter of test strings, detailed operation please go for the "String Testing Setup" Chapter. When complete the setup if alarm threshold need changed again or test type is invalid to current test strings. Each string can save 430 items battery, in the condition of manual test, save data has to wait until test data to be stabilized.

5.4.2   Cell Testing
Functions description
When tester performs Cell testing, that can test battery voltage,

impedance and temperature at the same time.

How to use

Click Cell testing ![CELL] icon that can enter into Cell test interface such as follows:

	2011-05-10 09:01:23 ▮▮▮▮
CELL TEST	**Saved** **Manual**

Cell No.002

V	**2 . 1 1 2 (V)**	✓
R	**0 . 5 37 (mΩ)**	✓
T	**25.0 (℃)**	

Range：4 mΩ   REF : <0.483mΩ>   1.11 REF

Esc	Cancel	Range	Save

Connect method please refer to the "Test Functions" Chapter.

Before Cell testing please setup Cell parameter, detailed operation method refer to "Cell Testing Setup" Chapter. Each alarm threshold changing and test type of current Cell are valid. Cell testing can save at least 800 items test results. In the condition of manual testing, save data have to wait until results data to be stabilized.

5.4.3   Conn Testing
Functions description
When tester perform Conn testing, it can test impedance and

temperature of connector.

How to use

Click connector CONNECTOR icon, and then enter into the Conn test interface as follows:

Connection method please refer to Chapter "Test Functions"

Before Conn testing please setup the parameter of connector first, detailed operation method please refer to "Conn Test Setup" Chapter. When this setup completes, alarm threshold changing and testing type of current test strings are all invalid. Data save method can be changed during string testing. Each string can save at least 480 items data. Under the circumstances of manual testing, manual save data have to wait for data is stable.

5.4.4   Compare Functions

Functions description

Compare function that means compare current test result and setup reference value, thereby in this way to judge tested battery health status.

Before compare functions, you need to setup comparator (input or test battery sample to obtain reference value), this tester support 300 items data compare. Comparator setup can be down by PC software or also by tester. Please go for detailed operation method by chapter "Battery Sampling"

How to use

At the test interface click <Comp> key on or <Cancel> off this function, when compare function is on it will display compare results (as follows)

When test type is impedance: "REF：0.483 mΩ" stands for reference value is 0.483 mΩ, "1.11REF" stands for tested impedance value is 1.11 times of reference value. Impedance and voltage value marked as

 that means test result is under alarm threshold value, battery

status is normal, but if test voltage marked as that means tested voltage is too low and alarming, test impedance marked as

 the result of comparison is larger than replaced value of alarm threshold settings, the measured battery is in failure in need of

replacement. Once impedance marked as compare results is larger than warning value of alarm threshold but lower than replaced value of alarm threshold, that indicates battery needs more maintenance, as follows:

	2011-05-10 09:01:23 ▥
STRING TEST	**Saved** **Manual**

Station：01 String：01 Cell No.002

V	2 . 1 1 2 (V)	✅
R	0 . 5 37 (mΩ)	✅
T	25.0 (℃)	

Range：4 mΩ **REF : <0.483mΩ>** **1.11 REF**

[Esc] [Cancel] [Range] [Save]

When test type is in the mode of Conductivity, "REF：2070S" that means reference value is 2070S，"89%REF" that means tested conductivity reference value is 89%. When impedance and voltage test value checked by ✅ means test results didn't exceed alarm threshold, and also battery status in normal. If voltage checked by ❌ icon that means measured battery voltage is too low and alarming, while impedance checked by ❌ means compare results is lower than changed valued of alarm threshold setting and it in need of replacement. If conductivity is checked by ❓ icon means compare results lower than warning value of alarm threshold but higher than replaced value, in this case battery need more maintenance, as follows:

	2011-05-10 09:01:23

STRING TEST   `Saved`   `Manual`

Station：01   String：01   Cell No.002

V	2 . 1 1 2 (V)	✅
G	1862 (S)	✅
T	25.0 (℃)	

REF : <2070 S>   89% REF

[Esc]   [Cancel]   [Save]

5.4.5   Re-test Functions

Functions description

In the circumstances of auto save, three test modes are all have Re-test functions, when test clip still connect with tested battery, you need to re-test the battery again, the new test data can overlay last auto save test data.

How to use

In the circumstances of auto test, if last test data is not correct, you can test battery again by clicking re-test key when test clip is connected with battery, this function can be use repeatedly as follows:

STRING TEST	Saved	Auto

Station：01　　　String：01　　　Cell No.002

V	2 . 1 1 2 (V)	✅
R	0 . 5 37 (mΩ)	✅
T	25.0 (℃)	

Range：4 mΩ　　REF : <0.483mΩ>　　1.11 REF

Esc	Cancel	Range	Retest

Note: when using re-test functions battery number or connector number would not able to add automatically, but it would overlay last test data, and if test clip or probe disconnected with battery, tester would regard that last test is over and jump to next test automatically, so it is not correct to click re-test key when test cable and battery already disconnected.

5.4.6　Gear Setup

Functions description

In order to save time of gear auto switch plus that impedance of multi-battery is in the same test range, you can setup correspondence "Gear" to test

How to use

In the test interface click <Range> functional keys to setup gears. After click gear key the functional keys would change to gear setup keys, as follows:

CELL TEST **Manual**

Cell No.001

V	**2 . 1 1 2 (V)**
R	**0 . 5 37 (mΩ)**
T	**25.0 (℃)**

Range：4 mΩ   REF : <0.483mΩ>   1.11 REF

| 4 mΩ | 40 mΩ | 400 mΩ | More |

Confirm selection by clicking related gear, click <More> functional keys would display other gears setup, as follows:

CELL TEST **Manual**

Cell No.001

V	**2 . 1 1 2 (V)**
R	**0 . 5 37 (mΩ)**
T	**25.0 (℃)**

Range：4 mΩ   REF : <0.483mΩ>   1.11 REF

| 4 Ω | 40 Ω | 400 Ω | More |

Confirm selection by clicking related gear, click <More> functional keys would display other gears setup, as follows:

```
                            2011-05-10  09:01:23  ▯▯▯▯
 CELL TEST                                    Manual

   Cell No.001
   ┌───┬──────────────────────┐
   │ V │   2 . 1 1 2 (V)      │
   ├───┼──────────────────────┤
   │ R │   0 . 5 37 (mΩ)      │
   ├───┼──────────────────────┤
   │ T │   25.0 (℃)           │
   └───┴──────────────────────┘
   Range：4 mΩ   REF : <0.483mΩ>      1.11 REF

     Esc                    Auto       More
```

Click <More> functional keys would display first page gear setup; click <Esc> functional keys would drop out gears switch functions and get back functional keys of test interface, click <Auto> gear functional keys would select a proper gear to test.

5.4.7   Data save function

Functions description

By manual save, the three test methods all have data save function. Data save function will put the test data in inventory.

How to use

By manual save, press the <Save> function key, the test data will be saved, and the test Numbers will add 1 automatically, as following:

	2011-05-10 09:01:23

CELL TEST   **Saved**   **Manual**

Cell No.002

V	2 . 1 1 2 (V)	✓
R	0 . 5 37 (mΩ)	✓
T	25.0 (℃)	

Range：4 mΩ   REF : <0.483mΩ>   1.11 REF

Esc	Cancel	Range	Save
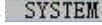
5.5   System setting

Functions description

It is for system time setting, network parameter setting, key voice setting, timing shutdown setting, language setting, restore default setting, Back Light setting, and software version No. view.

How to use

Click system setting SYSTEM icon, you will enter into system setting choose window. The setting content in gray says that it is in browsing mode, and doesn't set specific parameters, as following:
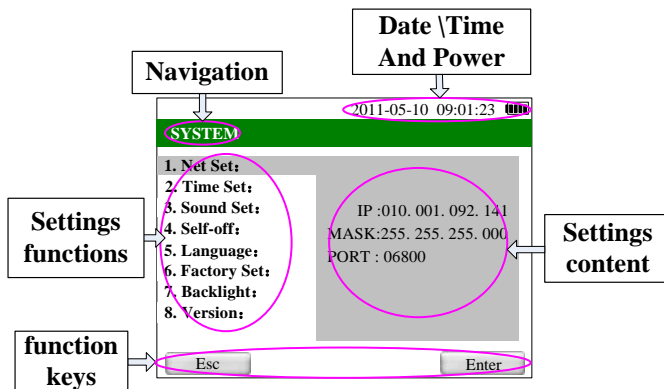
After choose the setting item, press<Enter>, you will enter into the related setting window.

5.5.1 Network setting

Functions description

It is used for configuring network interface parameters, including IP address, the network mask and port No..

How to use

After selecting the network setting item, press<Enter>, you will enter into the network configuration window. As following:

Move to the number which you want to modify by direction key, press number key to input numbers, press<Enter> to save, press<Esc>to quit the network configuration, and won't save it.

5.5.2   Time setting

Functions description

It is used to set time and date.

How to use

After choose the time setting item, press<Enter>, you will enter into the time setting window. As following:

```
                                   2011-05-10  09:01:23  ▉▉▉▉

  SYSTEM

  1. Net Set：
  2. Time Set：
  3. Sound Set：
  4. Self-off：              2000 - 02 - 02
  5. Language：                14 : 12 : 24
  6. Factory Set：
  7. Backlight：
  8. Version：

    Esc                                        Enter
```

Move to the number which you want to modify by direction key, press number key to input numbers, press<Enter> to save, press<Esc>to quit the time setting, and won't save it.
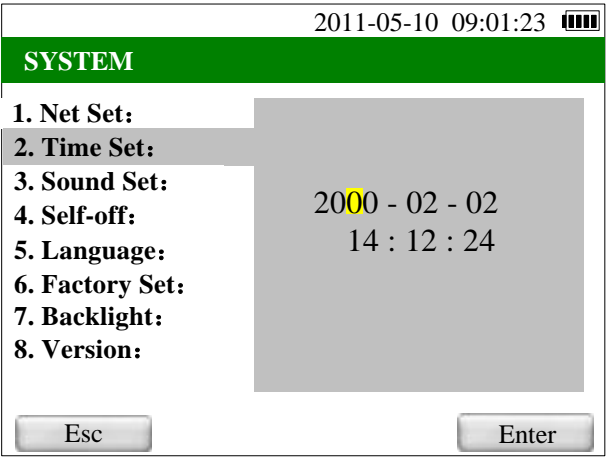
5.5.3   Key voice setting

Functions description

It is used to set the switch of key voice.

How to use

After choose the key voice setting item, press<Enter>, you will enter into the key voice setting window. As following:
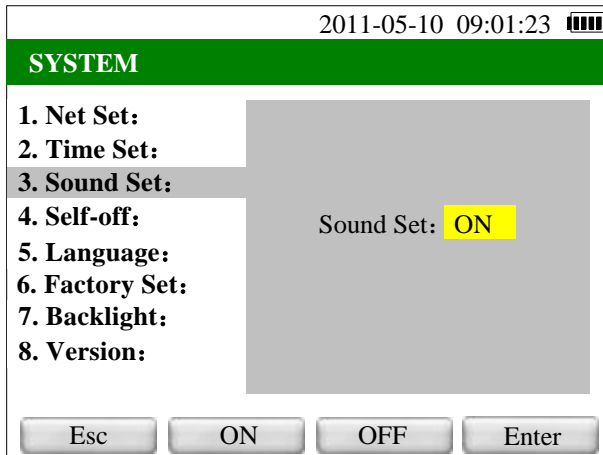
Press<ON>or<OFF>to set key voice, press<Enter> to save, press<Esc>to quit the key voice setting, and won't save it.

5.5.4 Regularly shutdown setting

Functions description

It is used to set the time of timing shutdown.

How to use

After choose the timing shutdown setting item, press<Enter>, you will enter into the Regularly shutdown setting window. As following:

```
                              2011-05-10  09:01:23  ▊▊▊▊
  SYSTEM

  1. Net Set：
  2. Time Set：
  3. Sound Set：
  4. Self-off：           Self-off： 10  Min
  5. Language：
  6. Factory Set：
  7. Backlight：
  8. Version：

   [ 10 Min ]   [ 20 Min ]   [ 30 Min ]   [ 60 Min ]
```

Press<10 Min>,<20 Min >,<30 Min>or<60 Min>to set the shutdown time<10 Min>,<20 Min >,<30 Min>or<60 Min>, press<Enter> to save, press<Esc>to quit the key voice setting, and won't save it.

5.5.5   Language setting
Functions description

Setting the tester using language, now the SBS-6000 supports Chinese and English.

How to use

After choose the language setting item, press<Enter>, you will enter into the language setting window. As following:

Press<English>or<简体中文>to set language, press<Enter> to save, press<Esc>to quit the key voice setting, and won't save it.
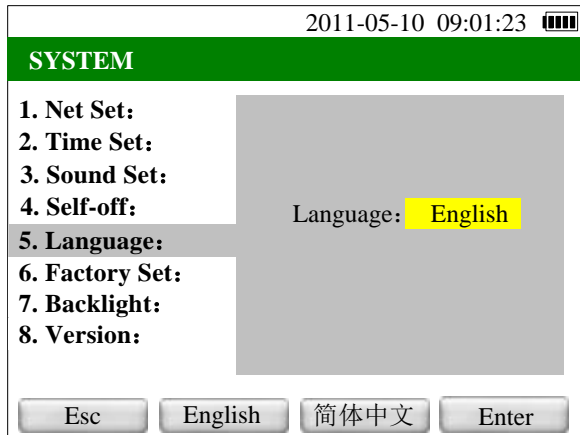
```
                              2011-05-10  09:01:23  ▐▌▌▌▌

  SYSTEM

  1. Net Set：
  2. Time Set：
  3. Sound Set：
  4. Self-off：                    Language： English
  5. Language：
  6. Factory Set：
  7. Backlight：
  8. Version：

     Esc        English    简体中文      Enter
```

5.5.6   Restore default setting

Functions description

It is used to restore the system setting parameters to be the default parameters.

How to use

After choose the restore default setting item, press<Enter>, you will enter into the restore default setting window. As following:

```
                              2011-05-10  09:01:23  ▐▌▌▌▌

  SYSTEM

  1. Net Set：
  2. Time Set：
  3. Sound Set：             Restore factory
  4. Self-off：                  settings
  5. Language：
  6. Factory Set：           Determined to restore
                            the factory settings?
  7. Backlight：
  8. Version：

     Esc                   Cancel      Enter
```
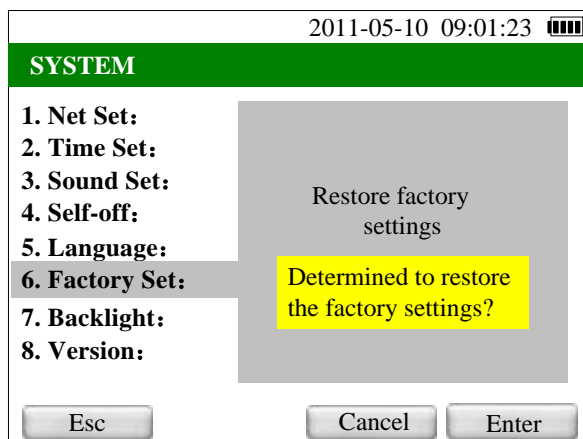
press<Enter> to restore the default parameters and save, press<Esc>to quit the setting, and won't save it.

5.5.7   Back Light setting
Functions description
It is used to set the LCD display Back Light.

How to use
After choose the Back Light setting item, press<Enter>, you will enter into the Back Light setting window. As following:
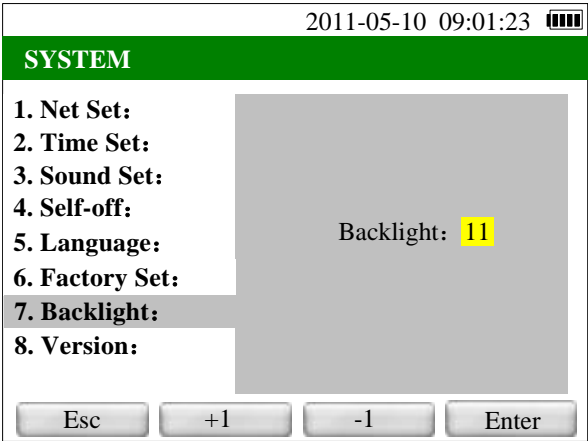
Press<+1>or<-1>to set Back Light, press<Enter> to save, press<Esc>to quit the Back Light setting, and won't save it.
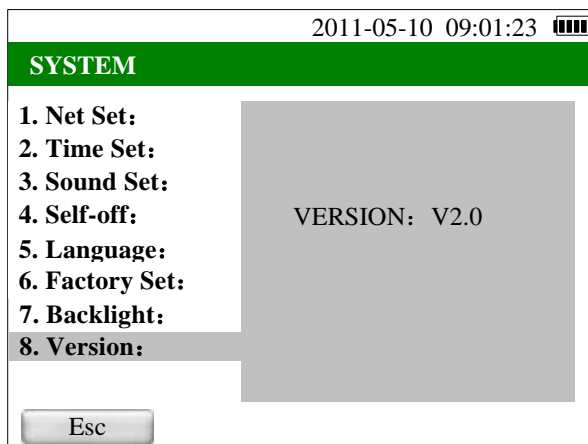
5.5.8   Software Version
Functions description
It is for the review of the software version.

How to use
Review the software version by selecting the "Version".

```
                              2011-05-10  09:01:23  ▥
  SYSTEM
  1. Net Set：
  2. Time Set：
  3. Sound Set：
  4. Self-off：            VERSION： V2.0
  5. Language：
  6. Factory Set：
  7. Backlight：
  8. Version：

    Esc
```

5.6   Data Browsing

Functions description

It is used to browse the testing record of string, cell and connector. The string data has the functions of data analysis, Chart for resistance and voltage. The max value, min value and average value can be got by string data analysis. There is no data analysis for cell which can just review the testing data.

How to use

Select   DATA   the icon of data browsing and click <Enter> to the

interface. There are three kinds of testing records, string data, cell data connector in this interface.

Select the target icon and press <Enter>.

5.6.1   String Data Browsing

Functions description

It 's for the browsing of string data which display the base station number, string number, batteries in the string and saving time of the last battery. The string tests the deletion of a string and strings. Browse the testing data of each string, testing data analysis, voltage Chart and resistance Chart.

How to use

Select the icon   of string data and press <Enter>.

	2011-05-11 09:01:23 ▮▮▮▮

DATA BROWSE -> STRING BROWSE   R Data

Station	String	Total	Test Time
01	**01**	**005**	2011-05-10 09:03:23
01	**02**	**020**	2011-05-10 11:10:20
01	**03**	**030**	2011-05-10 13:20:32
01	**04**	**046**	2011-05-10 14:50:29
01	**05**	**050**	2011-05-10 15:10:53
01	**06**	**043**	2011-05-10 16:01:13
01	**07**	**052**	2011-05-10 16:35:50
01	**08**	**033**	2011-05-10 17:03:25

Page Up	Next	Clear	DEL One

Select the target string by arrow keys and press <Enter>. Previous page and next page keys are used for shift pages. String data supports string deletion. Press <DEL One> can delete the selected data. Press <Clear> can delete all data. Shift strings by arrow keys and the follow is a sample for a string data records.

	2011-05-11 09:01:23 ▮▮▮▮

STRING BROWSE   Station:01 String:01

NO.	001	002	003	004	005
V (V)	2.112	2.112	2.112	2.112	2.112
R (mΩ)	0.568	0.566	0.568	0.568	0.570
T (℃)	25.0	25.0	25.0	25.0	25.0
n*REF	1.17	1.17	1.17	1.17	1.18
Result	PASS	PASS	PASS	PASS	PASS
TimeH/M	09:02	09:02	09:02	09:03	09:03
DateM/D	06/02	06/02	06/02	06/02	06/02

REF : <0.483mΩ>

Page Up		Analyse	Next

Press <Analyse> in the string data and data analysis is preceded. Max value, min value and average value can be generated by data analysis.

	Max	Min	Average
NO.	005	002	
V (V)	2.112	2.112	2.112
R (mΩ)	0.570	0.566	0.568
T (℃)	25.0	25.0	25.0
Result	1.17	1.17	
State	PASS	PASS	
H/M/S	09:15:21	09:03:29	
Y/M/D	11/06/02	11/06/02	

2011-05-11 09:01:23

STRING BROWSE   Resistance

Switch   REF : <0.483mΩ>   Chart

There are two ways for data analysis: resistance analysis and voltage analysis. The users can press the corresponding keys to get through. Applied mode will be showed in the navigation bar. Press <Chart>, a Chart will be showed under the current analysis mode.

The max value, min value and average value will be showed in the voltage Chart. There are 32 batteries in each page and shift page by pressing previous page and next page.
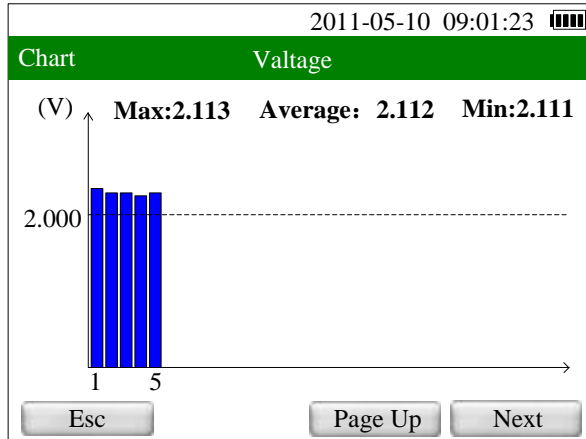
There are max value, min value, average value, reference line and alarm line in resistance Chart. It shows 32 batteries in each page and the user can shift pages by the corresponding keys.
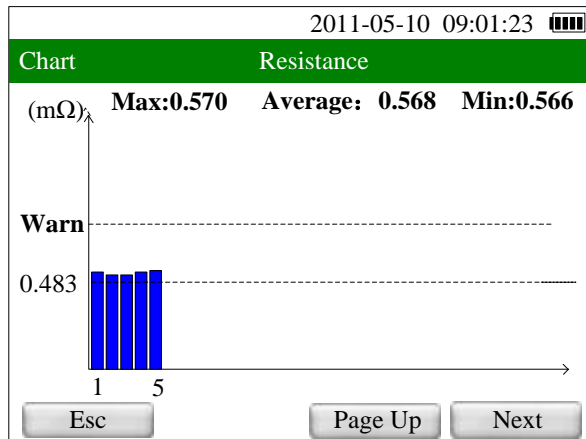
If conductance is tested in the string, a conductance Chart will be generated. And the max value, min value and average vale will be found in it. t shows 32 batteries in each page and the user can shift pages by the corresponding keys.
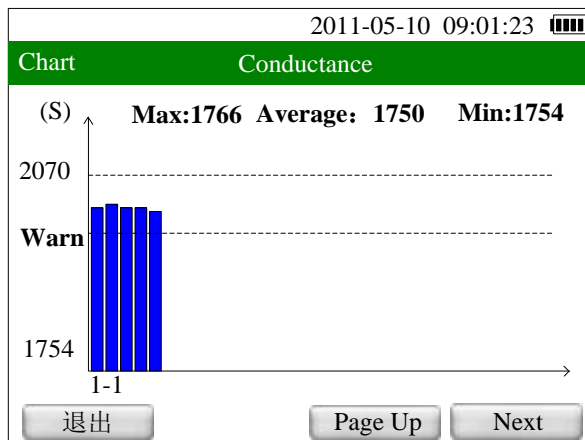
If there is no string data or the data has been deleted, it will show the following interface.
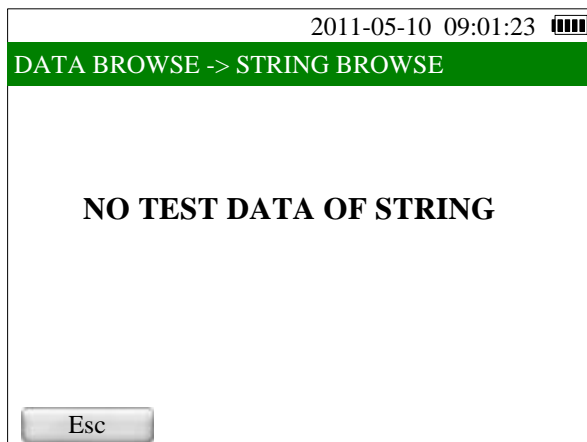
5.6.2   Cell Data Browsing

Functions description

It is used for the review of cell test data. The use can view all the data by shifting pages. All cells test data deletion.

How to use

Select cell browsing icon CELL , and press <Enter>.

	2011-05-10 09:01:23
DATA BROWSE -> CELL BROWSE	

Cell NO.	Test Time
001	2011-05-10 09:01:23
002	2011-05-10 11:10:20
003	2011-05-10 13:20:32
004	2011-05-10 14:50:29
005	2011-05-10 15:10:53
006	2011-05-10 16:01:13
007	2011-05-10 16:35:50
008	2011-05-10 17:03:25

Page Up   Next   Clear

Select the target testing serial by arrow keys and press <Enter>. The user can shift pages for more records. All cell testing data can be deleted by <Clear>. The user can press arrow keys to select the target records.

2011-05-10 09:01:23 🔋	
DATA BROWSE -> CELL BROWSE	
NO.	001
V (V)	2.112
R (mΩ)	0.568
T (℃)	25.0
Result	1.17
State	PASS
Time H/M/S	09:01:23
Date Y/M/D	11-5-10

REF : <0.483mΩ>

Esc   Up   Down

If there is no cell data or the data has been deleted, it shows the following interface.

2011-05-10 09:01:23 🔋
DATA BROWSE -> CELL BROWSE
NO TEST DATA OF CELL
Esc
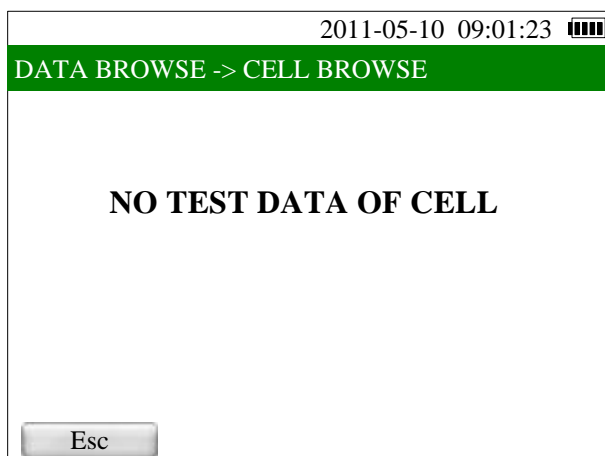
5.6.3   Conn Data Browsing

Functions description

To review all the records in connector, it will show the base station

number, group number, batteries in the string and saving time of the last battery. The Conn tests string deletion and dele all records in connector. Browse the testing data of each Connector, data analysis and Chart.

How to use

Select the icon of Connector browsing and press <Enter>.

2011-05-10 09:01:23 ▐▌▌▌			
DATA BROWSE -> CONN BROWSE			**R Data**
Station	**String**	**Total**	**Test Time**
01	01	005	2011-05-10 09:01:23
01	02	020	2011-05-10 11:10:20
01	03	030	2011-05-10 13:20:32
01	04	046	2011-05-10 14:50:29
01	05	050	2011-05-10 15:10:53
01	06	043	2011-05-10 16:01:13
01	07	052	2011-05-10 16:35:50
01	08	033	2011-05-10 17:03:25
Page Up	Next	Clear	DEL One

Press arrow keys to select the target data and press <Enter>. The user can shift pages for more records. String data supports cell deletion. The selected data can be deleted by <DEL One> and all data can be deleted by <Clear>. The user can press arrow keys to select the target records.

	2011-05-10 09:01:23

JOINT BROWSE　　　　　**Station**:01　　**String**:01

NO.	001-1	002-1	003-1	004-1	005-1
R (mΩ)	0.568	0.566	0.568	0.568	0.570
T (℃)	25.0	25.0	25.0	25.0	25.0
Result	1.17	1.17	1.17	1.17	1.18
State	PASS	PASS	PASS	PASS	PASS
TimeH/M	09:02	09:02	09:03	09:04	09:05
DateM/D	06/02	06/02	06/02	06/02	06/02

REF : <0.483mΩ>

[Page Up]　　　　[Analyse]　　[Next]

There is data analysis function in the testing data of Connector. Press <Analyse> and it will analyzer the current data. Please refer to the following graph.

	2011-05-10 09:01:23

Analyse

	Max	**Min**	**Average**
NO.	005-1	002-1	
R (mΩ)	0.570	0.566	0.568
T (℃)	25.0	25.0	25.0
Result	1.18	1.17	
State	PASS	PASS	
H/M/S	09:05:10	09:02:30	
Y/M/D	10/06/02	10/06/02	

REF : <0.483mΩ>

[Esc]　　　　　　　　[Chart]

A Chart can be displayed in the interface of data analysis. Press <Chart> will generate the Chart of current data.

It will show max value, min value, average value, reference line and alarm line in the resistance Chart. Each page will display 32 batteries and the user can shift pages for more records.
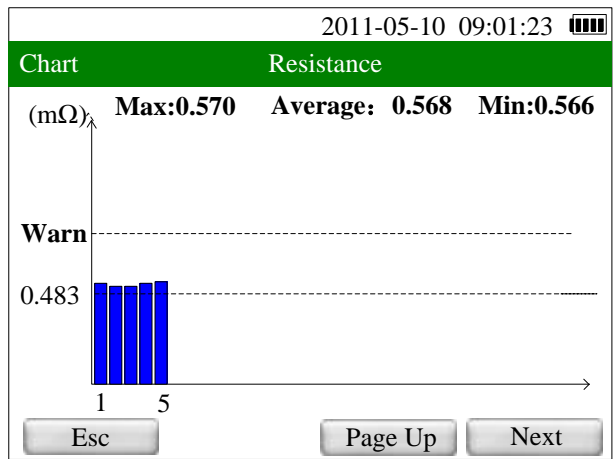
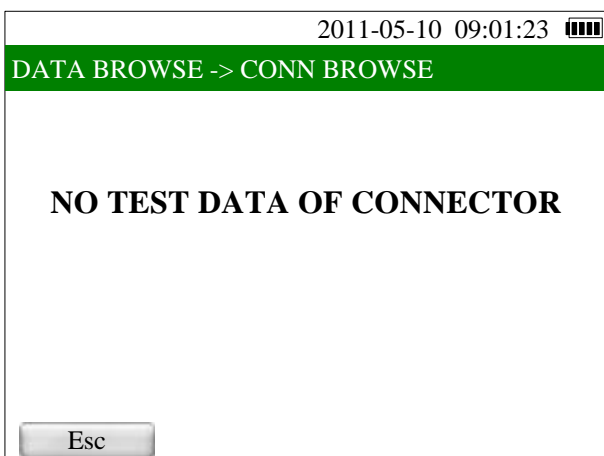If test type of Connector is conductance, it will show the conductance Chart with max value, min value, average value, reference line and alarm line. Each page will display 32 batteries and the user can shift pages for more records.
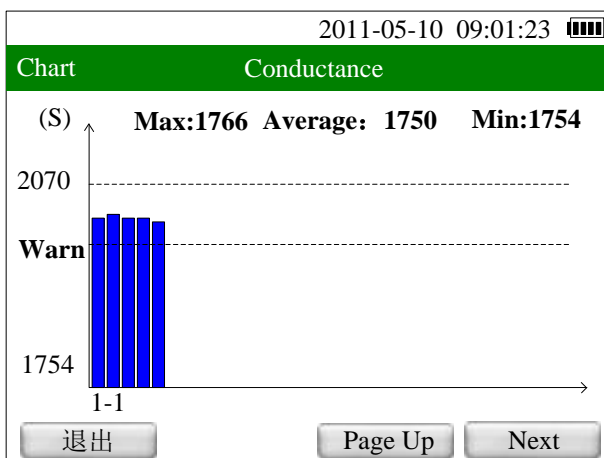
If there is no data of Connector or all data has been deleted, it shows the following:

5.7 PC analysis software operation

5.7.1 Profile

BatteryManage is a PC management software developed by SBS for SBS-6000. It can communicate with SBS-6000 by RS-232 serial interface or TCP/IP network interface.

Main functions:

(1) Read the testing records and save them in the computer.

(2) Print the records in computer.

(3) Delete the records.

(4) Delete the records saved in computer.

(5) Synchronous clock.

(6) Read or allocate the parameters of the equipment.

(7) Read or allocate the comparison reference data.

(8) Analyzer the testing data and generate the Chart for resistance, conductance or voltage.

5.7.2 Installation and uninstall

Installation

Step 1. Double click "BatteryTM_Setup.exe" and begin the installation of BatteryManage.

Step 2. Select the target language and click "Next".
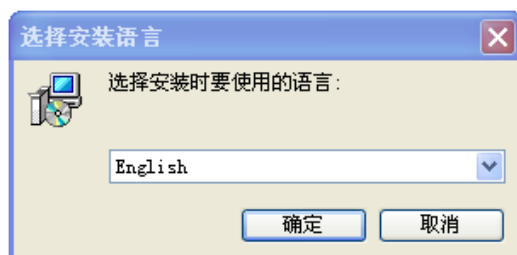
Step 3. Pop up the box of "Installation - Battery Test Manage" and click "Next".

Step 4. Click "browse" to locate the software and click "Next". If locate as default, click "Next".
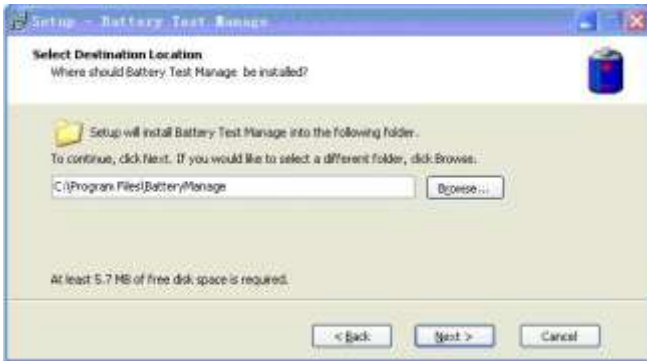
Step 5. Shortcut for the location of program, recommend to use default setting and click "Next".

Step 6. The options for adding shortcuts, recommend to use default setting and click "Next".

Step 7. Installation preview. Click "Installation".

Step 8. Click "Finish" to retreat the program and complete the installation.

Uninstall

Step 1. Double click "unins000.exe" to uninstall the software.

Step 2. Click "Yes" in the popping up dialogue box of Battery Test Manage.

Step 3. Click "OK" to retreat the program and complete the uninstall.

5.7.3 Menus

There are 4 menus in this software and refer to the following table for

details:

Items	Drop-down menu	Functions
File	Historical data	Open the window of "Historical data"
	Log out	Deactivate the software
Parameter	Device parameter	Open the window of "Parameter"
	Communication parameter	Open the window of "Local communication parameter"
Testing data	Read Cell data	Open "Cell data" window to read testing data in current communication mode.
	Read string data	Open "string data" window to read testing data in current communication mode.
	Read Conn data	Open "Conn data" window to read testing data in current communication mode.
Help	About	Display the version number and copyright.

There are 4 operation windows in the software and to get more in the following table:

Items	Functions
Historic Data	Display entire testing data saved in computer and print.
Device Parameter	Read equipment parameter
	Set equipment parameter
	Synchronous equipment clock
	Set comparison reference data of equipment and save it in computer.
	Set comparison parameter (write the comparison reference data in equipment.)
String Data	Read string testing data (to display and read string testing data saved in equipment.)
	Delete string data (delete string testing data saved in equipment.)
	Save string data (Save the string testing data read from the equipment to computer and display them in historic data window.)
	Resistance analysis（display the selected resistance Chart and analyzer the max value, min value and average value.

|	Voltage analysis（display the selected voltage Chart and analyzer the max value, min value and average value.）
Cell Data	Read cell testing data(display and read the cell testing data saved in equipment.)
	Delete cell data (delete cell testing data saved in equipment.)
	Save cell data (Save the cell testing data read from the equipment to computer and display them in historic data window.)
Conn Data	Read Connector testing data (to display and read Connector testing data saved in equipment.)
	Delete Connector data (delete Connector data saved in equipment.)
	Save Connector data (Save the Connector testing data read from the equipment to computer and display them in historic data window.)
	Resistance analysis（display the selected resistance Chart and analyzer the max value, min value and average value.
Communication Parameter	Set serial interface communication parameters (Set serial interface ID, Serial interface communication baud rate)

	Set network communication parameters (set IP address and interfaces of the equipment)

5.7.4   Functions of windows

1.   Local communication configuration

Please configure the communication parameter before other operations to make sure the proper use of software and equipment.

The following is the local communication configuration:
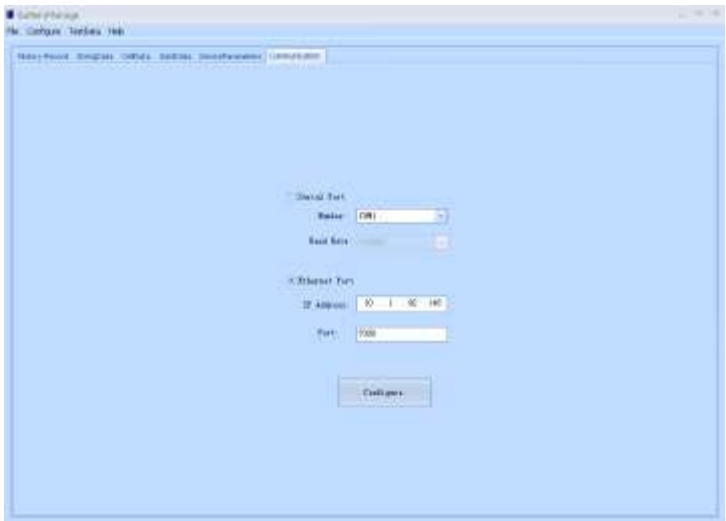
The serial communication parameters are used to set up a computer system communicating with the equipment's serial number.

Communication speed (serial communication baud rate) 115200.

SBS-6000 doesn't support the other baud rate.

The network communication parameter should confirm with communication parameter of the equipment which means the IP

address, interface serial should be confirm with the equipment's.

2.   Equipment Parameters

The user can read equipment parameter, equipment parameter setting, synchronous equipment clock and comparison parameter setting in this window.

Please refer to the following:
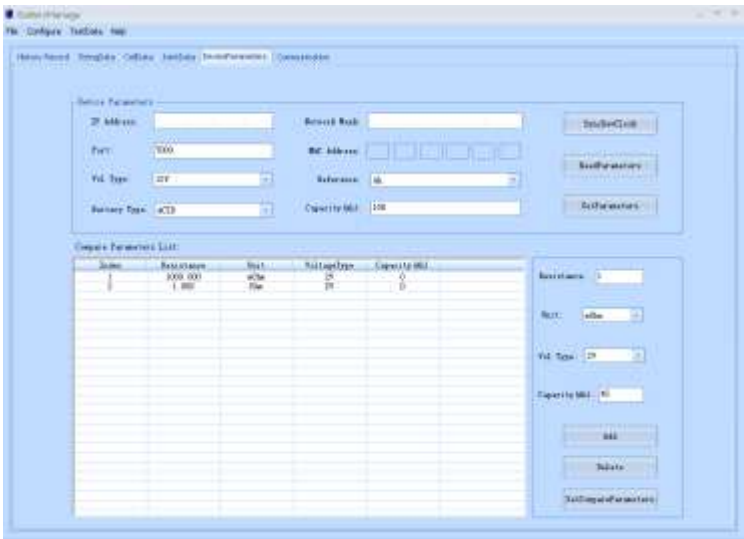
Reading device parameter function is to read the already set IP address, subnet mask, port number, voltage type, battery type, the reference standard and battery capacity information of the equipment and display them in the window of device parameter setting.

The function of device parameter setting is to write IP address, subnet mask, port number, voltage type, battery type, the reference standard and battery capacity information of equipment parameter window in the equipment.

The function of synchronous equipment clock is to write the clock information of the computer in the equipment.

The function of ADD is save the information like serials, resistance, unit, voltage type of the equipment parameter window in to the computer as new comparison reference data.
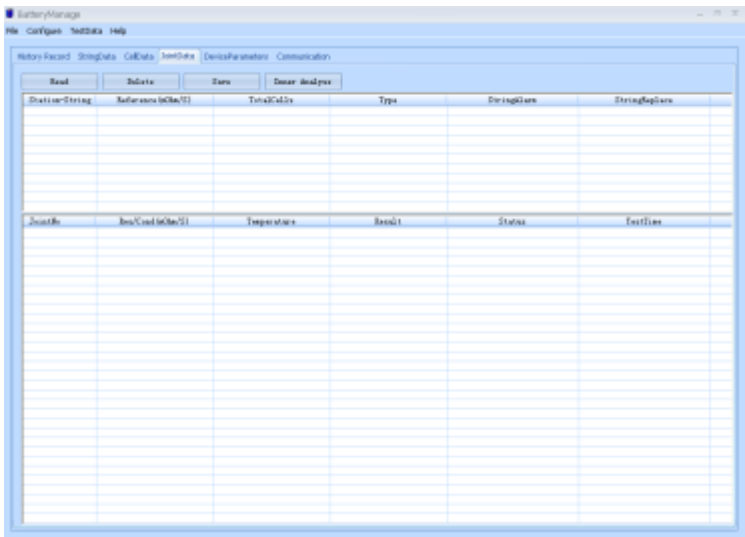
The function of DELETE is deleting the comparison reference data from the computer.

The function of comparison reference data setting is write all comparison reference records in the equipment.

3. Conn Data

The window of Connector is for reading, deleting, saving the testing data of Connector and resistance analysis.

Please refer to the following picture:

The function of Connector test data reading is to read all the Connector

testing data saved in the equipment and display them in the device data control window according to the current communication setting.

The function of Connector testing data delete is to delete all the Connector testing data in the equipment.
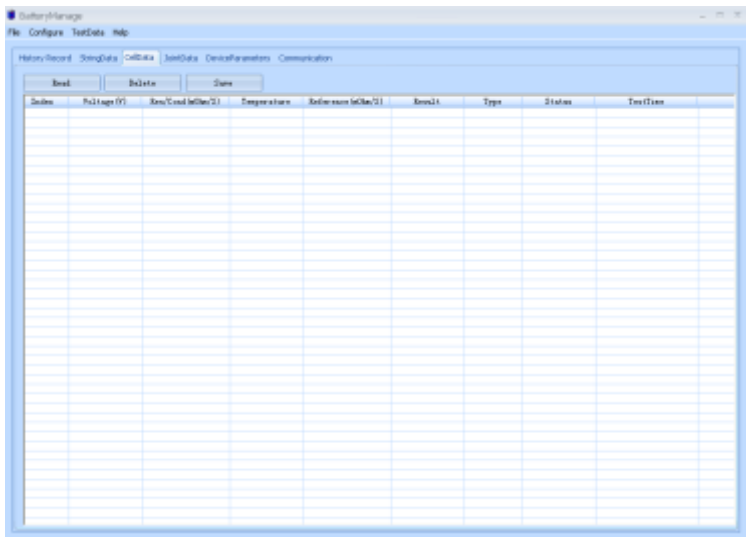
The function of testing data saving is to save the testing data displayed in the equipment data control window in the computer and show them in the historic data window. The user needs to fill the notes when save the files. If the testing time is wrong (e.g. 2011-13-01 00:26:39) , this record is discarded.

Resistance analysis is to analyzer the selected testing data of Connector and analyzes the max value, min value and average value.

4. Cell data

The cell data window provides the reading, deleting and saving cell testing data.

Please refer to the following picture:

The function of cell testing data read is to read the entire cell testing data saved in the equipment and display them in the device data control window according to the current communication setting.
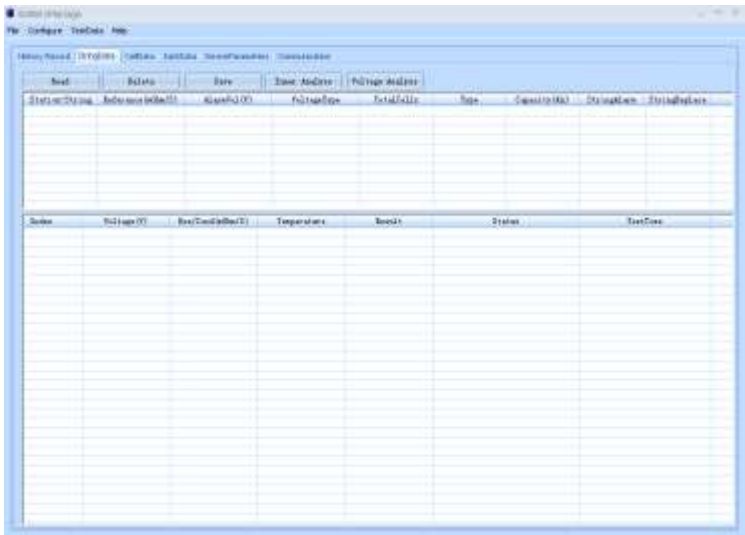
The function of cell bar testing data delete is to delete all the cell testing data in the equipment.

The function of cell testing data saving is to save the testing data displayed in the equipment data control window in the computer and show them in the historic data window. The user needs to fill the notes when save the files. If the testing time is wrong (e.g. 2011-13-01 00:26:39) , this record is discarded.

5. String Data

String data window has the function of reading, deleting and saving string testing data, resistance analysis and voltage analysis.

Please refer to the following picture:

The function of string testing data read is to read the entire string testing data saved in the equipment and display them in the device data control window according to the current communication setting.

The function of string testing data delete is to delete all the string testing data in the equipment.

The function of string testing data saving is to save the testing data displayed in the equipment data control window in the computer and show them in the historic data window. The user needs to fill the notes when save the files. If the testing time is wrong (e.g. 2011-13-01 00:26:39) , this record is discarded.

Resistance analysis is to analyzer the selected string testing data and displays the max value, min value, average value and resistance Chart.

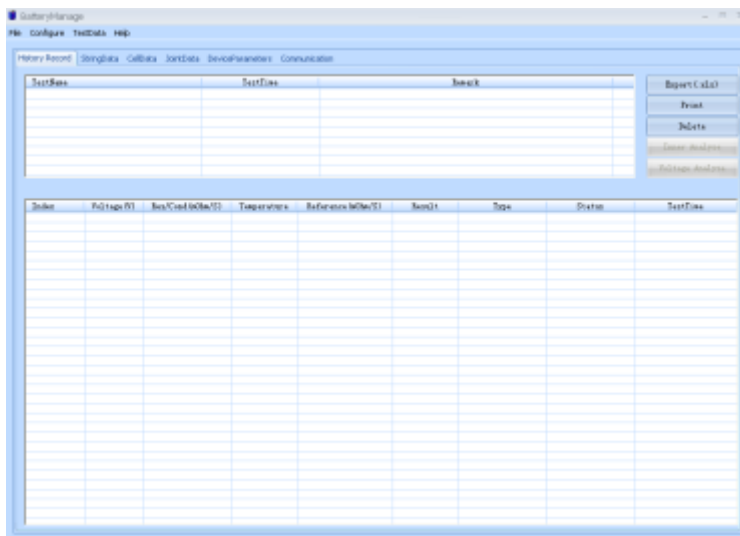Voltage analysis is to analyzer the selected string testing data and displays the max value, min value, average value and resistance Chart.

6. Historic Data

Historic data window has the function of reading, deleting and printing the testing data saved in the computer.

Please refer to the following picture:

The entire testing data of the records table is displayed in data displaying area.

The function of DELETE is to delete the entire testing data in the selected records table.

The function of PRINT is to print the entire testing data in the selected records table.

Resistance analysis is to analyzer the resistance results of selected strings and displays the max value, min value, average value and resistance Chart(Only string data and Connector data have this function).

Voltage analysis is to analyzer the voltage results of selected strings and displays the max value, min value, average value and resistance Chart.

5.8   Instrument charging

There is built-in 7.4V 4400mAh Li battery in this instrument. When battery sign is empty, the instrument will prompt no battery and shut down 1 minute later automatically. In order to not affect your usage, please charge it immediately.

Li battery can be charged anytime because it has no memory effect. We advise you to charge the battery immediately when it has one grid so as to affect normal use.

How to charge: firstly, shut down the instrument and connect AC 220V input plug with AC 220V socket, then put the output plug of charger into the charge port of the instrument. When the instrument is closed, the charge time should be less than 12 hours, or else it would damage the instrument.

5.9   Replace instrument battery

Because the battery is specially designed for the instrument by the factory, you cannot buy it in the market, please contact SBS when you need to change it.

How to replace: place the instrument face down, turn the central fixed screw which under the battery box with the screwdriver, open the battery cover, pull the battery out of the socket. Replace the original battery with a new one of SBS, and tighten the screw.

Don't dispose the battery, put it into battery recycle box or give it to professional department.

Chapter 6 Summary Of Faults

Faults	Cause	Methods
Fail to power on	Battery electricity exhausted.	Connect the external power to charge the battery for several minutes prior to startup.
Display abnormal measurement value	Test cable connection is good or not.	Ensure the test cable connection is correct.
Abnormal comparison result	Set comparison threshold correctly or not.	Set comparison threshold value correctly.
PC management software can not get data from tester	1. Ethernet cable or RS232 serial cable connects or not. 2. Set parameter correctly or not. 3. Whether the internal have data already.	1.Connect Data Line. 2.set PC software and battery tester according to user manual . 3.Save the test data on the instrument.

Chapter 7 Technical Parameter

Dimension(L × W × H)	190mm×108mm×50mm
Weight	1kg
Display	3.5 inches LCD, 320*240
Test resistance	Range: 1μΩ ～ 400Ω Precision: The Gear of 4mΩ:±1.0%rdg ±8dgt Other Gears: ±0.8%rdg ±6dgt
Test voltage	Range: DC 0 ～80V Precision: ±0.1%rdg ±6dgt
Test temperature	Range: −30℃ ～+100℃ Precision: ±1℃
Stored Records	About 220 thousands records
Operation	keyboard
Communication Interface	RJ45 Ethernet Interface RS232 Serial Interface
Operating Temperature Range	−10℃ ～+50℃
Storage Temperature Range	−20℃ ～+70℃

Power	External Power: Power Adapter Battery: Rechargeable Lithium Battery(8.4V/4400mAh) Battery Operation Time: About 8 hours Battery Charging Time: About 6 hours for full discharge

Service Information

Web Site: —————— www.sbsbattery.com

Business Telephone: (262) 703-5800

Technical Support Telephone: (800) 554-2243

techsupport@sbsbattery.com