

## LB-1000 Battery Charger/Discharger User Manual




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## 1. INTRODUCTION

This Users Manual gives full information on how to use LB-1000 Battery Charger/Discharger safely and effectively. Please read the manual carefully so as to obtain maximum performance of the unit and its accessories.

 **WARNING:** Read this manual completely before connecting and powering on the unit to avoid possible damage caused by improper use of this instrument.

### 1.1. Accessories

After receiving the LB-1000, please check it carefully for the below:


- Ensure that no damage occurred during transportation. Upon any damage or failure of operation based on this instrument, please contact Eagle Eye immediately.
- Make sure you have each item below

1. LB-1000 main unit (1)
2. Carrying case (1)
3. Voltage testing lead with two clamps (1)
4. Load cable (black & red) (2)
5. User Manual, found on USB(1)
6. Analyzing software, found on USB (1)
7. AC power cord (1)

## 1.2. Safety Information




For your protection, please read this safety information completely before operating the LB-1000. Carefully observe all warnings, precautions and instructions.

<sup>^</sup> **WARNING:** Servicing described in this manual is to be done only by qualified personnel. To avoid electrical shock, do not service the instrument unless you are qualified to do so.

 <b>DANGER</b>	<p>Safety testing has been done on this instrument thoroughly before shipment. However, mishandling during use could result in injury or other bad consequences, as well as damage to the instrument. Make sure that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulted directly from instrument defects.</p>
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### Safety Symbols

Description of symbols used in this manual.

 <b>DANGER</b>	<p>Indicates correct operation to prevent an extreme hazard that could result in serious injury or other bad consequences to users.</p>
 <b>WARNING</b>	<p>Indicates correct operation to prevent a significant hazard that could result in serious injury or other bad consequences to users.</p>
 <b>CAUTION</b>	<p>Indicates correct operation to prevent possible injury to users or damage to the instrument.</p>
<b>NOTE</b>	<p>Indicates advisory items related to performance or correct operation of the instrument.</p>

## 1.3 Precautions

To avoid electrical shock or fire, read these precautions first before using the unit:

- Except as explained in this manual, do not attempt to service this equipment yourself.
- Do not operate the LB-1000 around explosive gas or vapor.
- Use only insulated load cables, and test leads as supplied with the LB-1000
- Before use, inspect the LB-1000, load cables, test leads and accessories for mechanical damage and replace when damaged. Look for cracks or missing plastic. Pay special attention to the insulation surrounding the connectors.
- Remove all clamps, test leads and accessories that are not in use.
- Do not apply input voltages above the rating of the instrument.
- Before use, check that the selected/indicated voltage ranges on the LB-1000 matches the local line power voltage and frequency.
- Proper installation is essential to the correct functioning of your analyzing software CD. If you have any questions about installation, please contact us for assistance.
- After testing batteries, there is high temperature inside the main body of LB-1000. Therefore, please keep the unit powered on to cool the heat for at least 5 minutes. Do not shut down the unit right after testing. This is very important to ensure the performance of all electronic parts inside the mainbody.

This manual describes the general installation and use of the test equipment. If your system has features or accessories not addressed in this manual, please contact us.

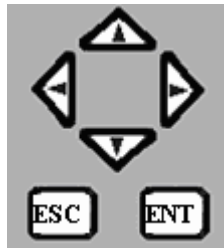
## 2. OVERVIEW

**2.1 About LB-1000** is a compact unit for daily maintenance of a single cell/unit, especially for old cells. It plays three roles: charger, discharger and activator, which will facilitate your maintenance for batteries. These three functions could be used individually or comprehensively. When used comprehensively, lag-out battery will experience low-volt constant current charging and discharging singly or in multi-circles (1~99). By activating the disabled active material on battery electrode plate, it amends the battery malfunction caused by chemical failure and thus boosts the capacity of old battery. Activation curve and certain parameters (e.g.: voltage and resistance) will display on screen as activation ends.

Battery activation is very significant for resources utilization and efficiency increasing. However, it is important to know that not all weak batteries could be activated by LB-1000. It can only amend the weak batteries whose bad condition is caused by chemical malfunction instead of physical failure such as short-circuit of electrode plate.

## 2.2 Display and Keypad

LB-1000 main body has two ways of operation, by touch screen and keypad. Both ways have same operation effect. Operation of keypad will be as below:



Keys Operation:

Key	Functions
▼ ▲	Change the numbers of parameters
◀ ▶	Move to orient different options for changing.
ENT	<ol style="list-style-type: none"> <li>1. Confirm the selection or option</li> <li>2. Confirm input</li> </ol>
ESC	<ol style="list-style-type: none"> <li>1. Return to the previous page</li> <li>2. End testing.</li> </ol>

## 2.3 Features

- ◆ Portable device
- ◆ User friendly
- ◆ Designed to be easy-to-use
- ◆ Powerful functions with 3 in 1 (discharger, charger and activator)
- ◆ Accurate data results and vivid waveforms
- ◆ Integrated functions for displaying, controlling and loading
- ◆ Password management in key parts
- ◆ Safety circuits to prevent damage to cells
- ◆ Monitoring of cell condition
- ◆ Direct USB drive for data transferring
- ◆ Convenient analysis software in PC
- ◆ Software system updatable

## 2.4 Specifications

Technical Specification	Measurement Mode	Resolution	Accuracy
<b>Charging Current</b>	1-100A (cell: 2V) 1-30A (cell: 12V) 1-30A(cell:6V)	1A	1A
<b>Discharging Current</b>	1-100A(cell:2V) 1-30A(cell:12V ) 1-30A(cell:6V)	1A	1A
<b>Charging Voltage</b>	1.7-2.4V(2V) 5.4-7.2V(6V) 10.2-15V(12V)	0.1V	0.25%

<b>Discharging Voltage</b>	1.7-2.4V(2V) 5.4-7.2V(6V) 10.2-15V(12V)	0.1V	0.25%
<b>Power Supply</b>	AC 120V±10% (AC 220V available upon request)		
<b>LCD Display</b>	128*64 pixels		
<b>Operating Temperature</b>	5°C ~ 50°C		
<b>Operating Humidity</b>	5% ~ 90%RH		
<b>Dimension</b>	40x30x20cm		
<b>Net Weight</b>	10Kg		
<b>Communication Port</b>	USB		

## 2.5 Measurement Flowchart

The measurement workflow is described below

Measurement Preparations	<ol style="list-style-type: none"> <li>1. Connect AC power cord</li> <li>2. Connect testing leads</li> <li>3. Turn the power on</li> </ol>
Start Measurement	<ol style="list-style-type: none"> <li>1. Select measuring mode</li> <li>2. Read testing results</li> </ol>
Ending of Measurement	<ol style="list-style-type: none"> <li>1. Disconnect the testing leads from the testing cell</li> <li>2. Turn off the power</li> <li>3. Remove the AC power cord</li> </ol>
*Data uploading	<ol style="list-style-type: none"> <li>1. To load the measuring data to PC, insert a USB drive in LB-1000 and transfer the data</li> <li>2. Data system management on PC</li> </ol>

**⚠ WARNING:** There are high voltage and current in the cell and LB-1000 components. Only qualified personnel can perform all these measuring procedure. Pay attention to electrical and chemical safety precautions in cell installation and removing, testing leads connection and measurements.

## 2.6 Definition of Abbreviation

Below are the definitions of all the abbreviated words used in the operating software of LB-1000 Battery Charger/Discharger.

Abbreviation	Full name	Abbreviation	Full name
Act-res	activation result	I	current
adj	adjust	imin	short time
Alr	already	M	minute
C	capacity	Paral	Parallel
calib	calibration	param	parameter
Case	acquisition case	pls	please
CHG	charge	S	second

comm	communication	span	time span
cyc	cycling	StableU	voltage-stabilization
del	delete	strg/stg	string
dir	direction	syst	system
DIS	discharge	T	time
EX	exit	tot	total
Factory	Factory parameter	U	voltage
H	hour		

### 3. MEASURE PREPARATION

This section describes how to connect testing leads and AC power cord properly in correct sequence:

1. Connect the LB-1000 to an appropriate AC power supply via power cord.
2. Connect the black load cable with LB-1000 main unit and negative pole of cell, and red cable the positive pole. Please DO NOT connect them reversely.
3. Connect one end (one-port-one-cable) of the voltage testing lead with unit. And connect the other two ends with cells: the black clamp with negative pole and red with positive.



Fig.3.1.1



Fig.3.1.2



Fig.3.1.3

**⚠ WARNING:** Make sure that these cables are correctly connected; otherwise the LB-1000 may not work properly and may become significantly damaged.

### 4. MEASUREMENT

#### 4.1 Power On and Off

Press power switch to ON. After initialization of about 10 seconds, you will come to the main menu as below:





Fig. 4.1

## 4.2 Cell Charge

To charge a single battery, please connect the testing leads well and select **[Charge]** in main menu to enter cell charge mode. Press **[ENT]** to confirm:

**NOTE:** The LB-1000 has 3 options for different battery types: 2V, 6V and 12V.



Fig. 4.2.1

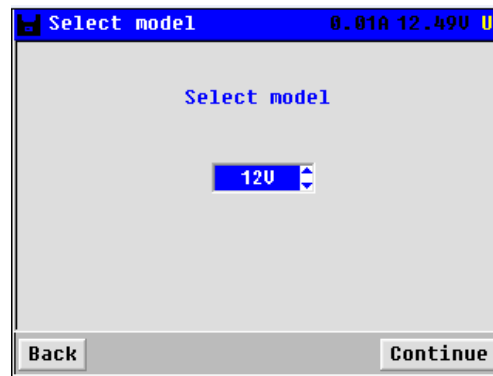


Fig. 4.2.2

Press **[ESC]** to go back to upper menu, or press **[continue]** to continuing charge mode, screen will display as below:

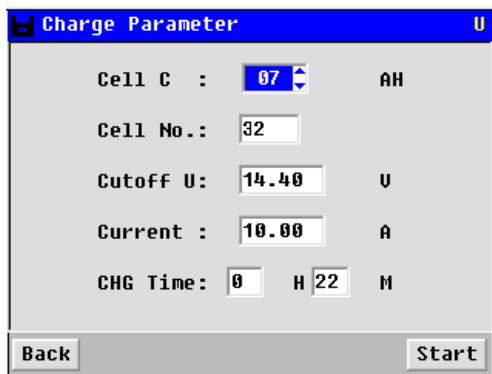


Fig. 4.2.3

Use the arrow keys for different parameters setting. Charge time should not exceed 48 hours. Press **[ENT]** or **[Start]** to start charging, or press **[ESC]** to go back.

**NOTE:**

- Setting of cutoff voltage is for the protection of cell. Correct setting of cutoff voltage value will prevent the cell from over charging or over discharging and thus avoid damage to the cell. The following settings are for general reference only:  
 2V cell---Cutoff discharge voltage:1.8 V; cutoff charge voltage: 2.45V  
 12V cell---Cutoff discharge voltage:10.8 V; cutoff charge voltage: 14.5V
- Also pay attention to the current setting for cell of small capacity. You are suggested to charge and discharge it with speed of 0.1C, which means that working current is 0.1 time of cell capacity.

After pressing **ENT**, the LB-1000 will enter charging status as below:

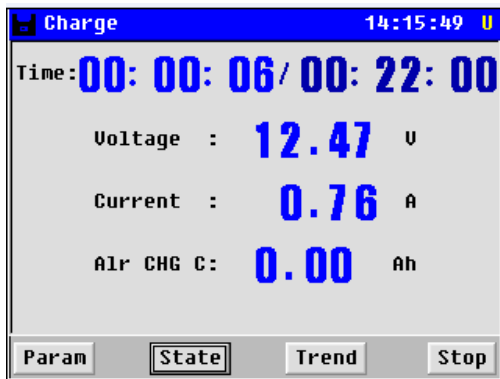


Fig. 4.2.4

You can click **[Param]** to check the charging parameter. Or you can click **[Trend]** to check the current & voltage charging curve

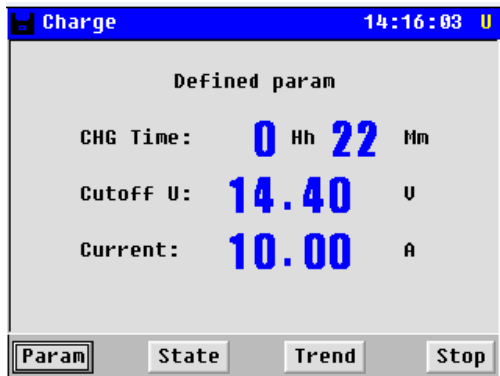


Fig. 4.2.5

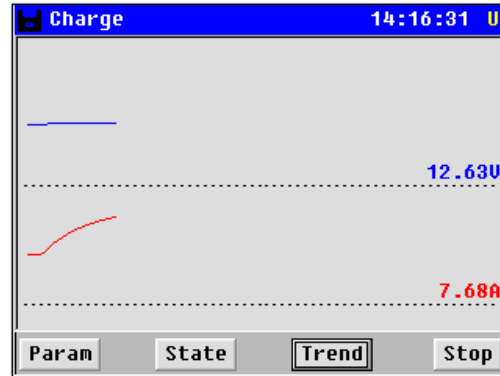


Fig. 4.2.6

After charging is done, wait for 5 minutes for resistance testing and then it will show the charging result to you as below screen. Press ← or → arrow key to choose the item you want to check, such as **[Param]**, **[Trend]**, Press **ESC** or **[Back]** to go back to cell charge menu.

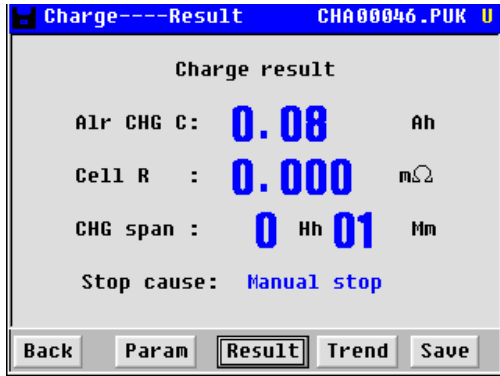


Fig. 4.2.7

### 4.3 Cell Discharge

To have a discharge testing, please connect the testing leads well and go to main menu and choose **[Discharge]** as below:



Fig. 4.3.1

Press **[ENT]** to go to parameters setting screen as below, choose the cell voltage type first:

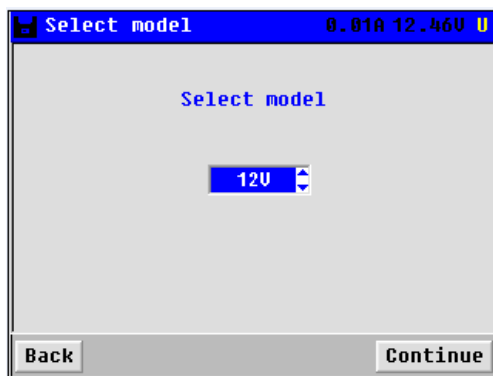


Fig. 4.3.2

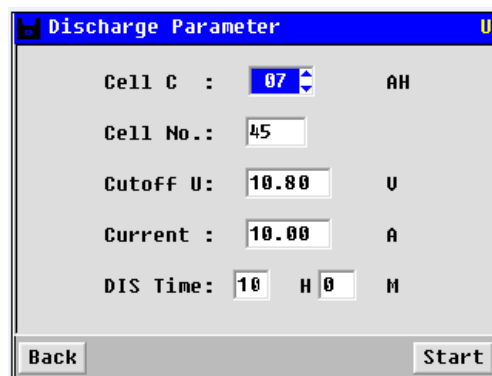


Fig. 4.3.3

There are five parameters for setting including cell capacity, cell number, cutoff voltage, discharge current and discharge time. Press ←/→ to orient different parameters and ↑/↓ to change the setting values.

NOTE: Total discharge time should not exceed 48 hours.

After the above setting, please press **[ENT]** or **[Start]** for discharge confirmation. You will see the discharge status as below:

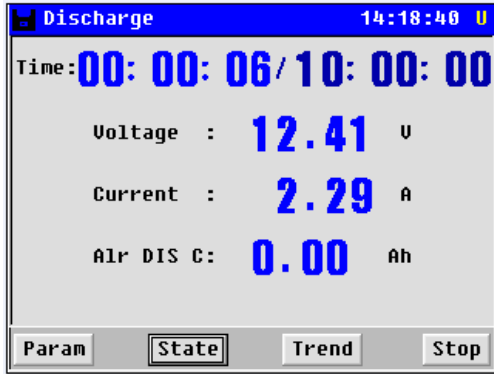


Fig. 4.3.4

You can click **[Param]** to check the discharging parameter. Or you can click **[Trend]** to check the current & voltage discharging curve

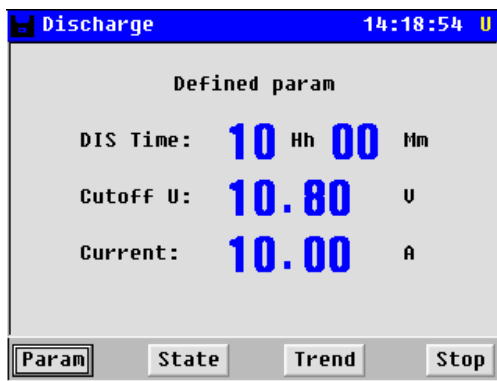


Fig. 4.3.5

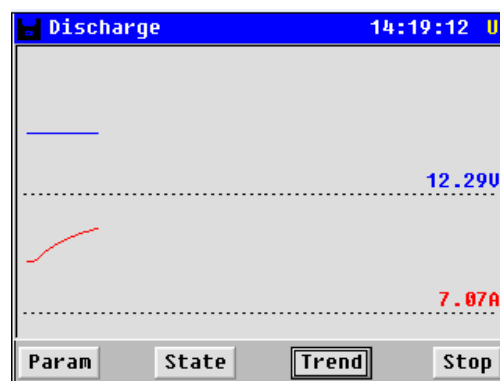


Fig. 4.3.7

When the test has completed, you can check the results.

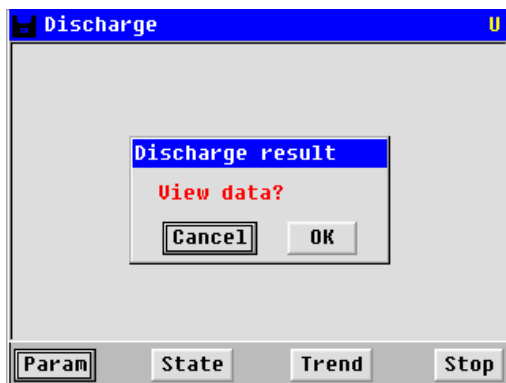


Fig. 4.3.10

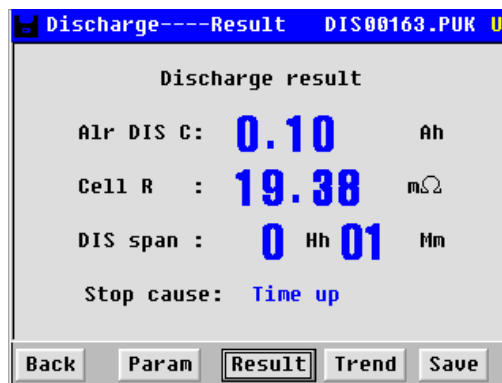


Fig. 4.3.11

Press ↓ arrow key to page down, you will see changing curve of current. Press **[ESC]** to return back to the upper menu.

## 4.4 Cell Activation

Like the function of charge and discharge, setting for activation parameters is necessary before operation of activation. Selection of cell type could be 2V, 6V or 12V. Also set cell serial number, discharge voltage lower limit, charge voltage upper limit and cycle times in the same way by using arrow keys. Maximum activation cycle is 9.

Activation process is:

Test battery Discharging→Test battery→Charging

Highlight and select **[Activate]** in main menu by using the arrow keys. Press **[ENT]** to confirm. LB-1000 allows 3 options: 2v, 6v and 12v, choose the right model for the battery.



Fig. 4.4.1

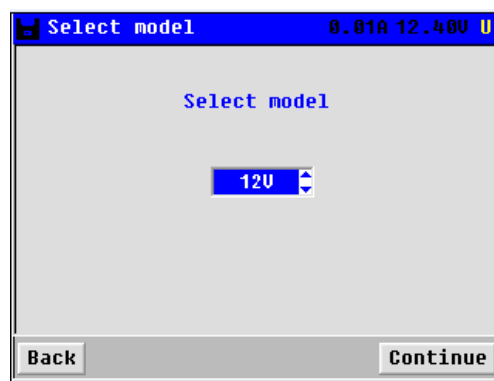


Fig. 4.4.2

Press **[Continue]** to next step, it will show the below page, Use the arrow keys for setting different parameters. After parameter setting , press **[Continue]**.

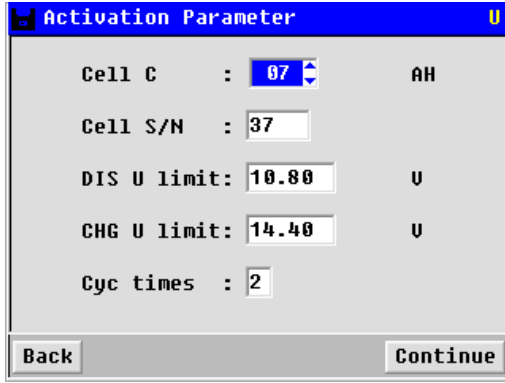


Fig. 4.4.3

If the cycles are more than 1, press **[Continue]** to set the parameters of each cycle after the previous setting (In the above screen the cycle time is set). Parameters in each cycle include discharge current, discharge time, charge current and charge time. In all cycles of activation, charge time and discharge time should not exceed 18 hours. And total cycle time should not exceed 100 hours.

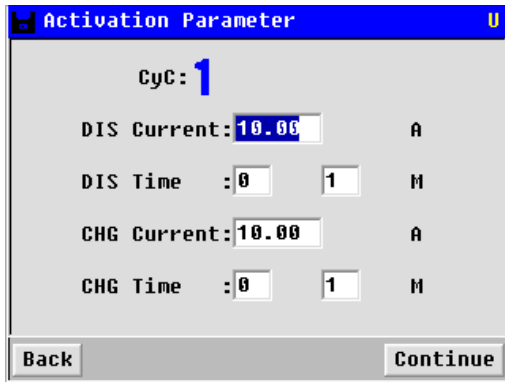


Fig. 4.4.4

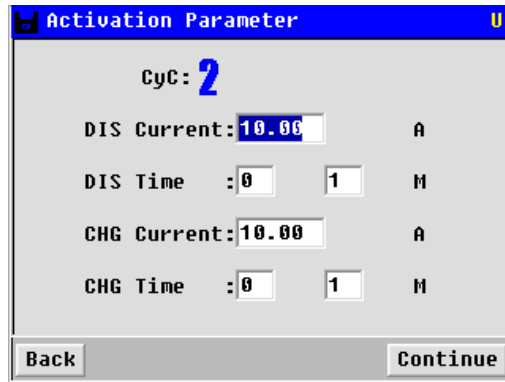


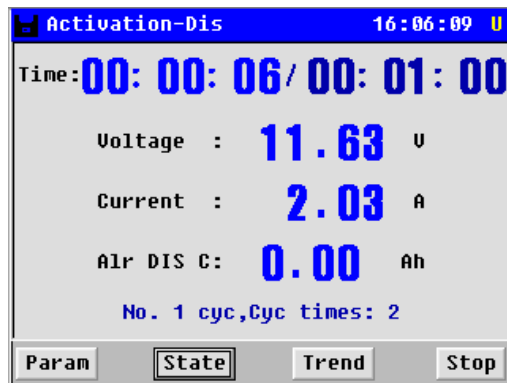
Fig. 4.4.5

After all the settings are confirmed, Press **[Continue]**

Fig. 4.4.6

Fig. 4.4.7

You can press **[Param]** to check the activation-discharge parameters, or you can press **[Trend]** to check the Voltage&Current curve.



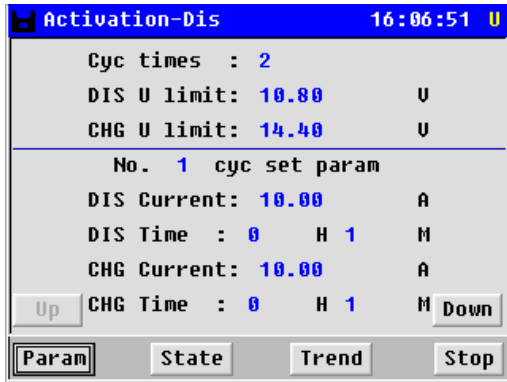


Fig. 4.4.8

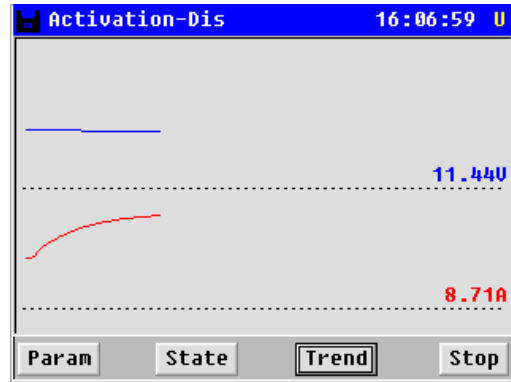
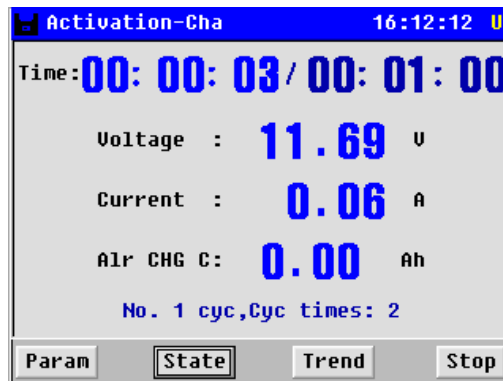


Fig. 4.4.9

When finishing activation-discharging, the LB-1000 will begin activation-charging, below shows the charging state

Fig. 4.4.11



You can press **[Param]** to check the activation-charge parameters, or you can press **[Trend]** to check the Voltage & Current curve.

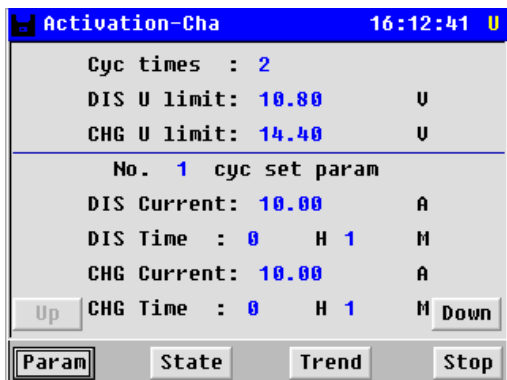


Fig. 4.4.12

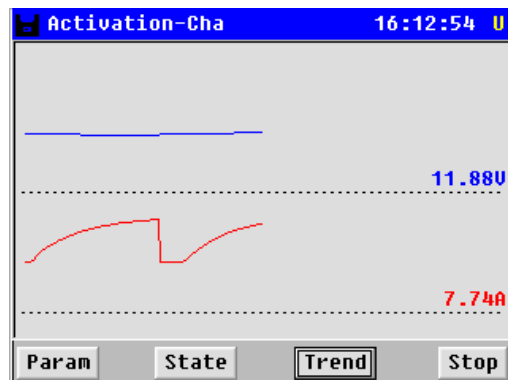
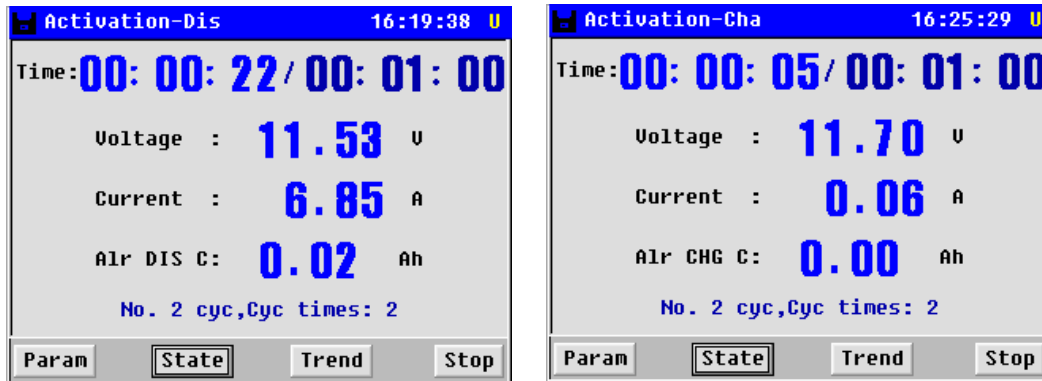


Fig. 4.4.13

When cycle 1 completes, cycle 2 will begin. It will proceed with discharge→charge → as the same in cycle 1.



## 4.5 Data Management

Please return to the main menu as below for data management: Choose the item in "Data for" option, it has three choices: charger, discharger and activator

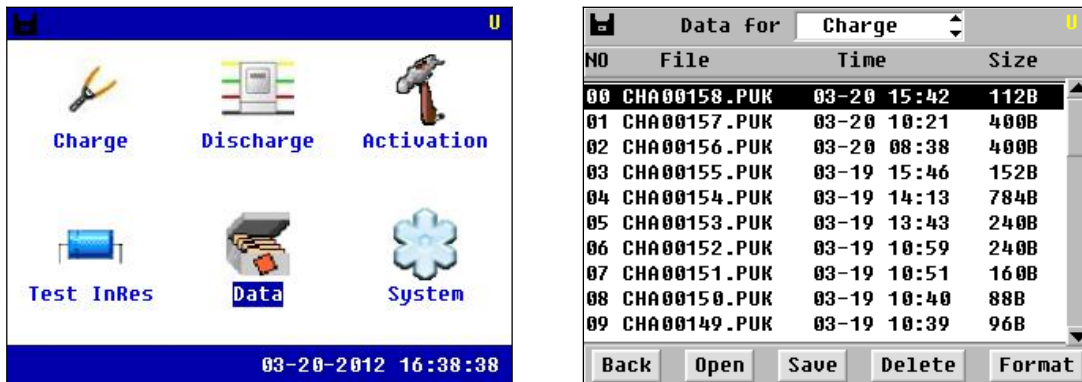


Fig. 4.6.1

Use arrow keys to select data, and double click what you choose, you will see data for previous operations:



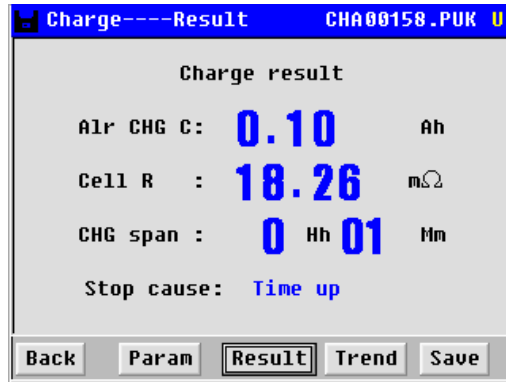


Fig. 4.6.2

If you want to save the data to USB, you can click **[save]** button, it will transfer the data to USB. Make sure that the USB drive has already been inserted in the LB-1000 main unit.

In the same screen as above, select **[Delete]** and relevant testing date for data deleting.

## 4.6 System Management

Please return main menu, you will see the option **[System]** for management.



Fig. 4.7

### 4.6.1 Time Setting

After entering **[System]**, select **[Time]** as below, Use arrow keys on main unit and orient and change the numbers and press **ENT** to save the numbers as below:

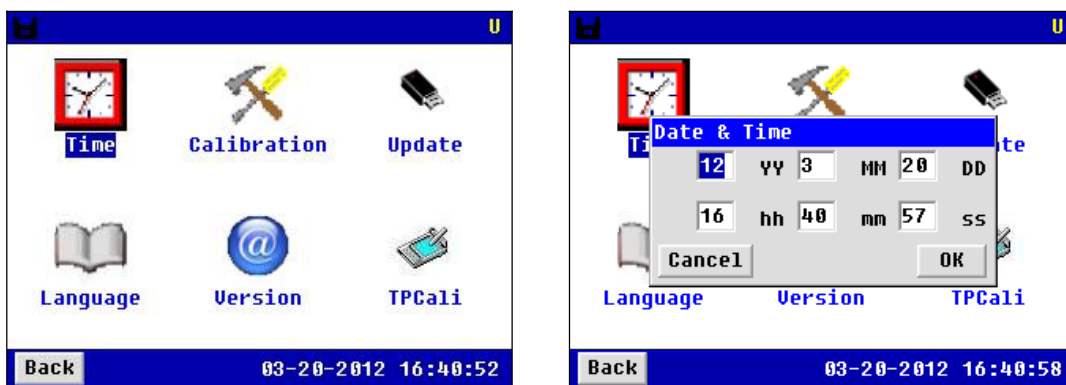


Fig. 4.7.1

### 4.6.2 System Update

System updating is simple and convenient. Save the updating program from EEPS in USB drive and insert the USB drive in the LB-1000 main unit. After restarting the main unit, the program will be updated automatically.

### 4.6.3 System Language

Please return to system menu and choose **[Language]**, change the language you need.



Fig. 4.7.3

## 5. ANALYZING SOFTWARE

Testing data saved in the LB-1000 could be transferred to a personal computer via USB drive for data analyzing. Before analyzing, please install the following software first.

**NOTE:** You are recommended to run this software in Windows.

### 5.1 Installing the Software

1. Start the PC.
2. Stop all applications that are running on the PC (recommended).
3. Insert the USB with the analyzing software for the LB-1000.

Once the computer detects the CD-R, screen of **[install]** will pop up. Follow the screen instructions to install the program. After installation, you will find LB-1000 program icon on the PC desktop



Analyzing system of Battery Activator4.02.Ink

### 5.2 Software Startup

A. Double click the software icon on desktop. A window will pop up to remind you to connect to the central database first. This database will be used to save the data when this analyzing software is running. Click **[OK]** to start in the following step.

B. Click **[Data Management]** → **[Connect central database]:**

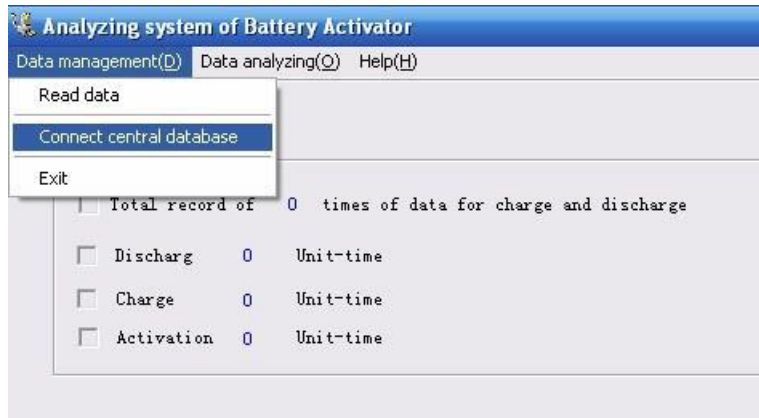


Fig.5.2.B

C. Select [**Create new central database**] and follow the screen instructions to install the default database

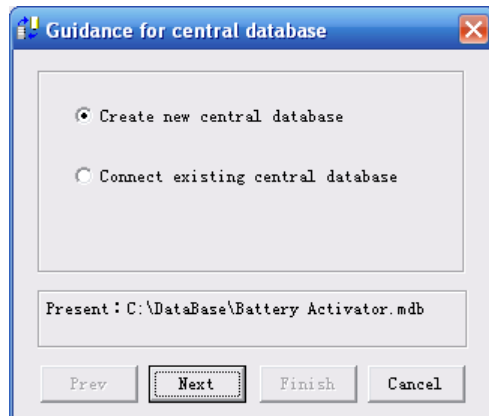


Fig.5.2.C1

Note: Click [**Change Path**] to change the installation path for database, click [**Next**] and then [**Finish**] to complete the setting.



Fig.5.2.C2

D. Or you could select [**Connect existing central database**], click [**Next**] and then [**Finish**] to confirm the path setting.

## 5.3 Main Operation

The main screen and definition of main menu are as below:

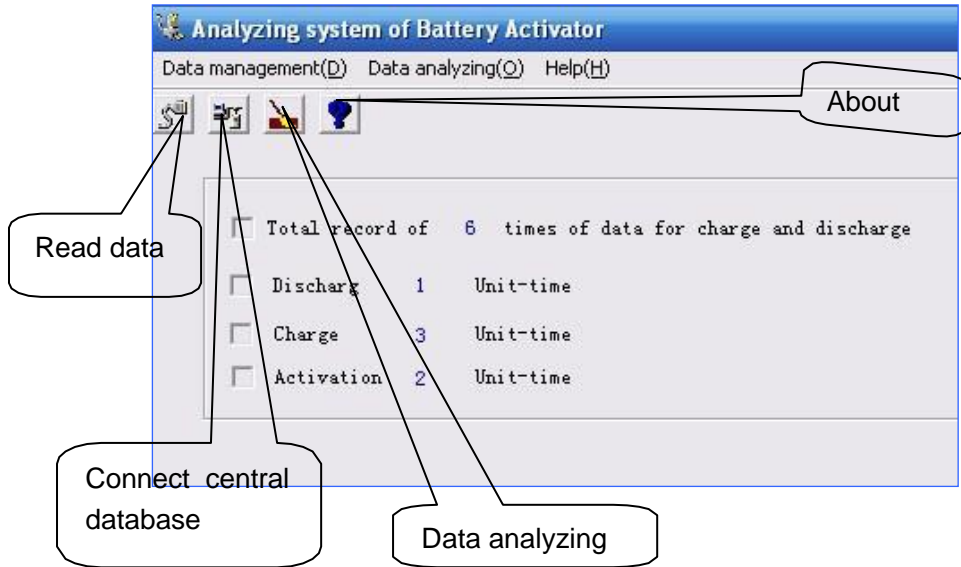
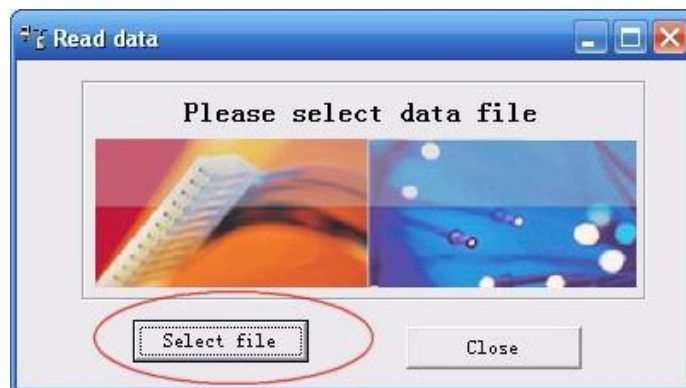
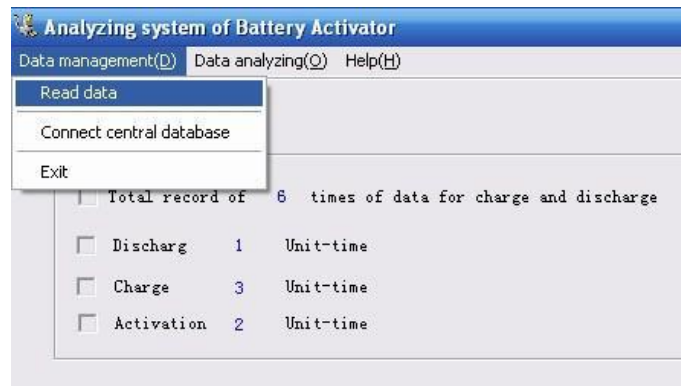


Fig.5.3

### 5.3.1 Read the Data

To view the data saved in USB drive, please firstly insert the USB drive in the PC, select **[Read data]** on analyzing software and select the data with format of ".PUK" (Charge, Discharge and Activation data). Screens are as below:



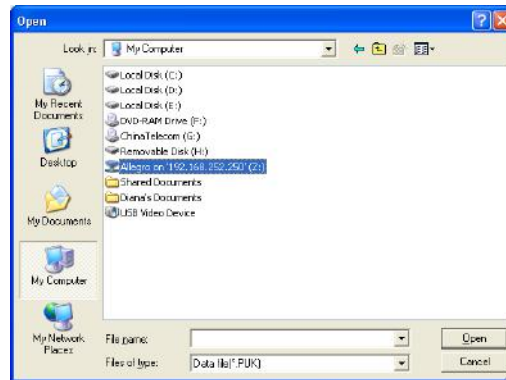


Fig.5.3.1

### 5.3.2 Analyzing for Discharging

To begin analyzing the discharging data, first select **[Data analyzing]**, select **[DIS]** and then cell number in the drop-down option as below:

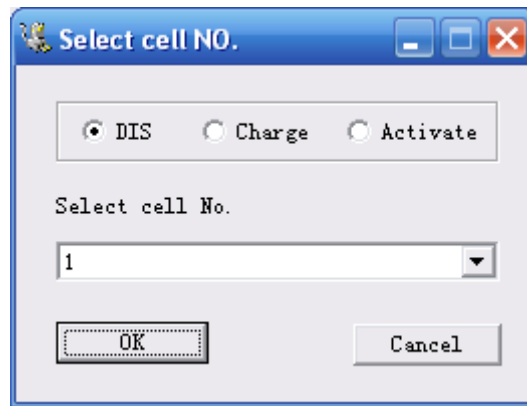


Fig.5.3.2

After the above selection, click **[OK]** to go the following step:

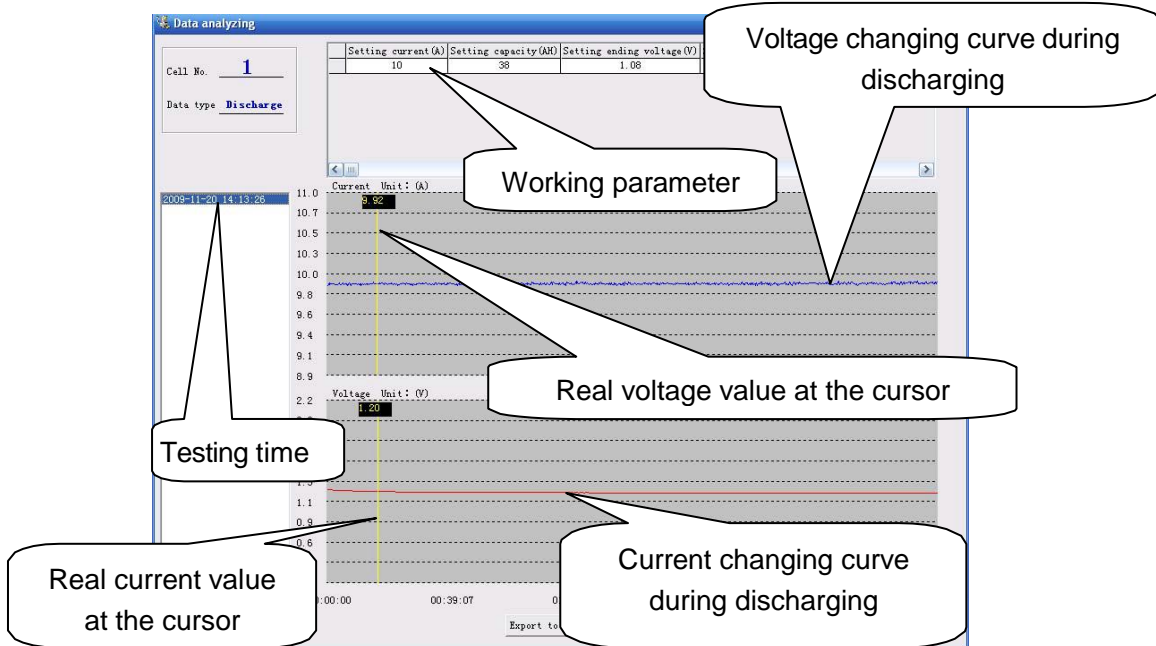


Fig. 5.3.2

To export the testing data in a report, please click the button **Export to Word** at the bottom. Input the necessary information for station number, string number and so on, to continue. The testing data will be generated as a report in the format of Microsoft word. This is same operation for testing data of charging and activation mentioned below.

### 5.3.3 Analyzing for Charging

To begin analyzing the charging data, first select **[Data analyzing]**, select **[Charge]** and then cell number in the drop-down option as below:

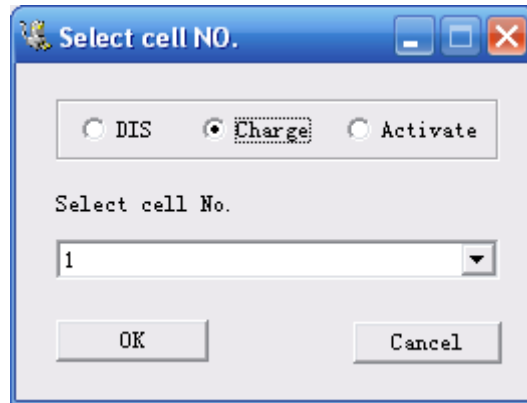


Fig.5.3.3.1

After the above selection, click **[OK]** to go the following step:

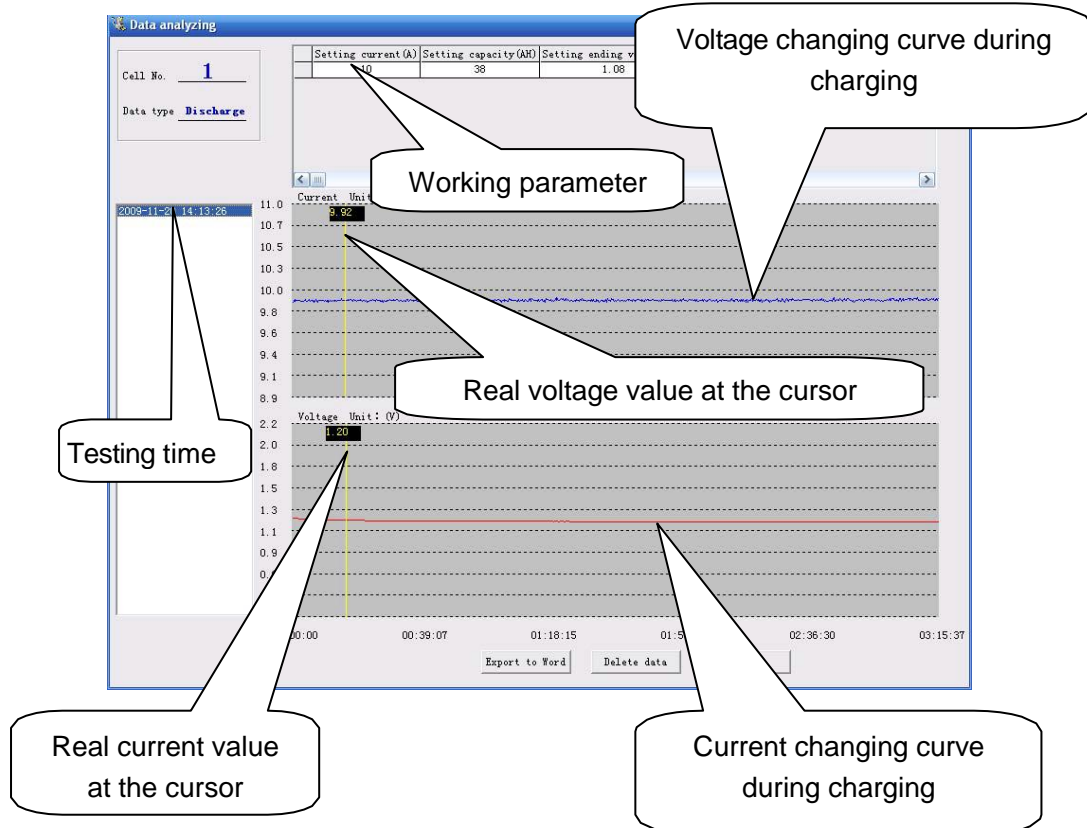


Fig.5.3.3.2

### 5.3.4 Analyzing for Activation

To begin analyzing the activation data first select **[Data analyzing]**, select **[Activate]**

and then cell number in the drop-down option as below:

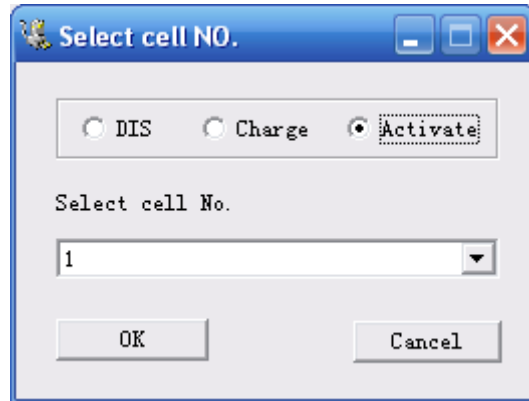


Fig.5.3.4.1

After the above selection, click [OK] to go the following step:

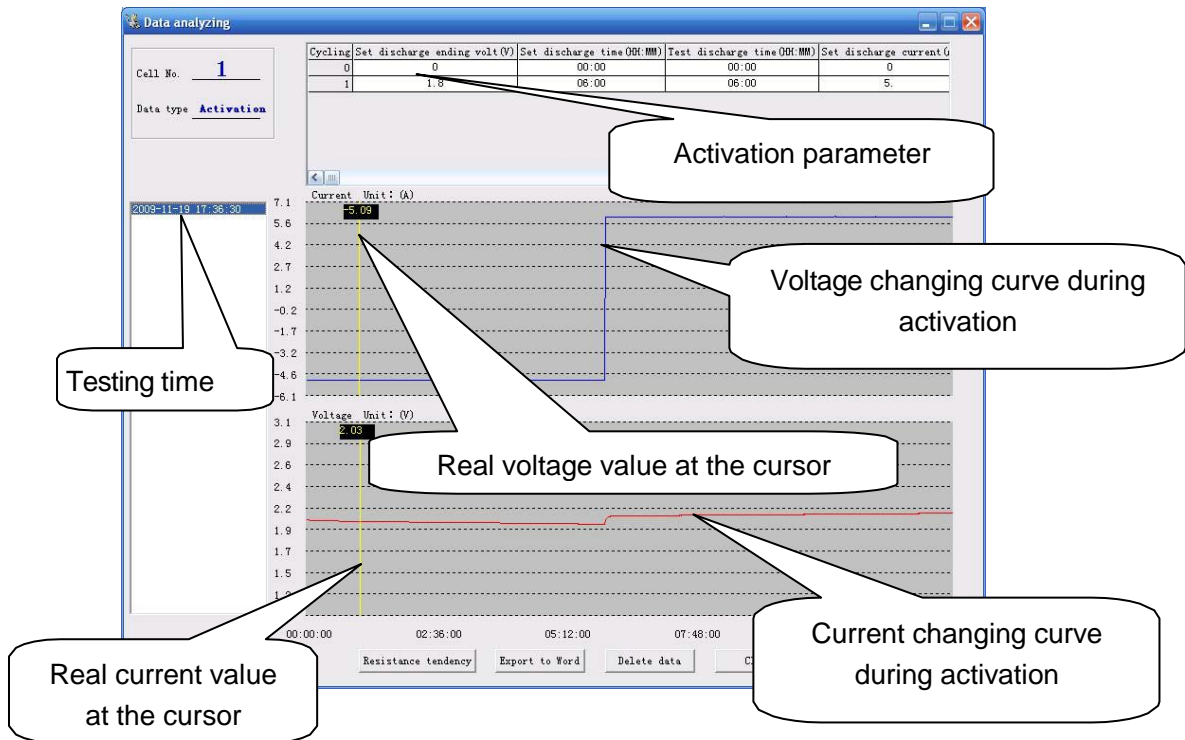


Fig.5.3.4.2

## 6. SERVICE AND MAINTENANCE

### 6.1. Cleaning

Clean LB-1000 main unit and its accessories with damp cloth. Do not use abrasives, solvents, or alcohol, as they can deform or discolor the LB-1000 and the accessories.

**⚠ WARNING:** For your own safety, make sure that the main unit and accessories are not

working and disconnected from the power supply before cleaning.

## 6.2 Storage

After using LB-1000, put the main unit and all its accessories into the carrying case, store the case in ventilating place under proper temperature and humidity. Never expose the LB-1000 and its accessories to water, high humidity, or dampness.

## 6.3 Trouble-shooting

If the LB-1000 appears to be operating unusually try the following solutions:

- **The LB-1000 does not start up**  
The LB-1000 may not be connected to the power supply. If so, connect it with the AC power cord.
- **The LB-1000 continuously beeps when powering up**  
The AC power cord may not be correctly connected. If so, try to connect it properly
- **No signals after the LB-1000 is on**  
The LB-1000 may not be properly connected. If so, make sure it is well connected.
- **The LB-1000 cannot communicate to PC**  
The interface cables may not be properly connected. If so, check them and connect them again to ensure they are well connected.
- **The buttons of the LB-1000 do not work**  
The buttons may be stuck in the button holes. If so, check and press it to let them work properly.
- **The charge/discharge/activation functions cannot be executed after setup**  
The time setup may be incorrect. If so, check and make sure the setup time is no more than 48 hours
- **The USB drive can not be detected after it is inserted to the PC**  
The USB drive may not be well inserted. If so, reinsert it correctly.  
The USB drive may not be in FAT format. If so, format the USB drive.  
And if other problems occur, contact your us or our representatives.

## 7. Contact Eagle Eye Power Solutions

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6306 Eastwood Ct.  
Mequon WI, 53092

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