BTS9000：The Most Cutting-edge equipment for Battery Material Research

BTS9000 is based on Neware 6th-generation testing system. It's designed for battery material research, high-precision tests, pulse charge/discharge tests, DCIR test, and cycle life test.

As the most cutting-edge equipment for battery material research, BTS9000 comes with extremely high accuracy($\pm$ 0.02% of FS), amazing hardware response speed($\leqslant$100μs), wide range of applications, high-speed testing data acquisition and many other industry-proven characteristics, it's your ultimate choice for battery material research!

Comes to the pulse tests, BTS9000 supports GSM(Global System for Mobile Communications), GPRS(General Packet Radio Service), CDMA-standby, CDMA-talk(Code Division Multiple Access), IDEN(Integrated Digital Enhanced Networks), etc. It characterized with a data acquisition frequency up to 1000Hz, an accuracy of 0.02% FS and a minimum pulse width of 400us (microsecond) which can be utilized for GSM or some other rapid pulse tests.

Indexes

1、FEATURES AND FUNCTIONS

◆ Extremely high accuracy($\pm$0.02% of FS)
◆ Hardware Response Time: $\leqslant$100μs

◆ Min pulse width: 400μs

◆ Adaptable to a wide range of products (cells, batteries, super-capacitors and battery modules, etc.)

◆ Wide range of applications (grading, over charging/discharging, ladder-type charge/discharge, pulse)

◆ DCIR, HPPC and GSM Pulse tests supported

◆ 4 channels paralleled available

◆ Multi-current range available(4 ranges per channel)

◆ Every channel can be user programmed to operate in steps of CCC(Constant Current Charging), CVC(Constant Voltage Charging), CC&CVC(Constant Current & Constant Voltage Charging), CPC(Constant Power Charging), CCD(Constant Current Discharging), CPD(Constant Power Discharging), Pulse, DCIR, etc.

◆ Completely independent channels allow users to run multiple independent tests simultaneously without affecting other channels

◆ With the BTS client software, data is easily viewed graphically

◆ Diverse alligators and probe connection accessories for choose

2、HARDWARE SPECIFICATIONS

Input Power: AC 220V ±10% 50Hz

Voltage Output Range: 0 - 5V

Resolution: AD(16bit); DA(16bit)

Control Accuracy: ±0.02% of FS

Measuring Accuracy: ±0.02% of FS

Hardware Response Time: ≤100μs (10%-90% Current)

Data recording rate: up to 1000Hz, △T/△U/△I

Operating modes: Charge - CC(Constant Current),CV(Constant Voltage), CC&CV(Constant Current & Constant Voltage), CP(Constant Power), Pulse
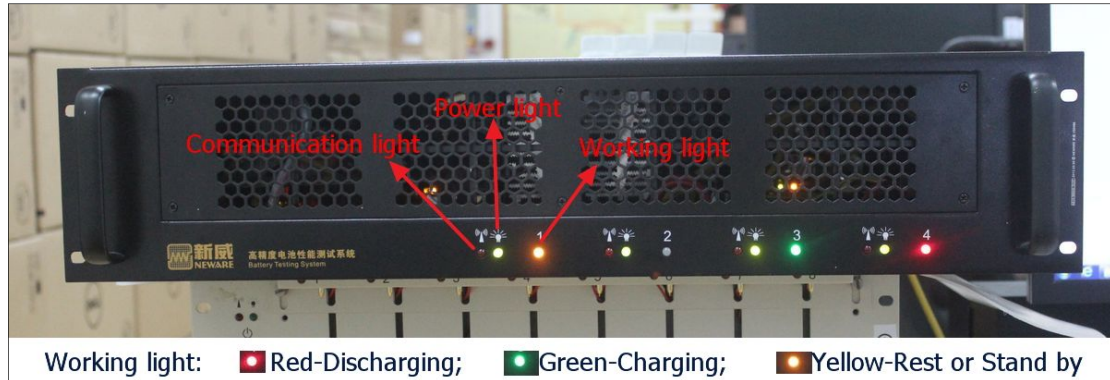
Discharge- CC(Constant Current), CV(Constant Voltage), CR(Constant Resistance), CP(Constant Power), Pulse

Min pulse width: 400μs

Multi range: Each channel supports 4 ranges

3、 PANELS ILLUSTRATION

a) Front Panel

b) Rear Panel


## 4、 HARDWARE PREPARATION AND CONNECTION

5、 SOFTWARE INSTALLATION

What you may get of the software altogether with BTS9000 hardware is on a CD-ROM, or a compressed package download from the URL we offer you. If you get a compressed software package, **you're supposed to uncompressed the software package to a directory before you install it.** The following picture is the similar files or directories what you see after you successfully uncompressed the software package.
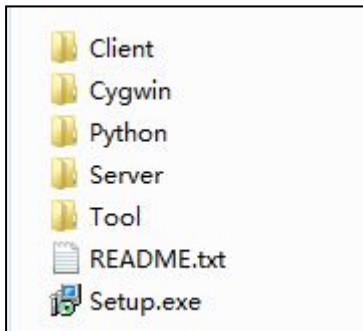
Simply double click the executable file Setup.exe, the instillation process start up as the following picture.
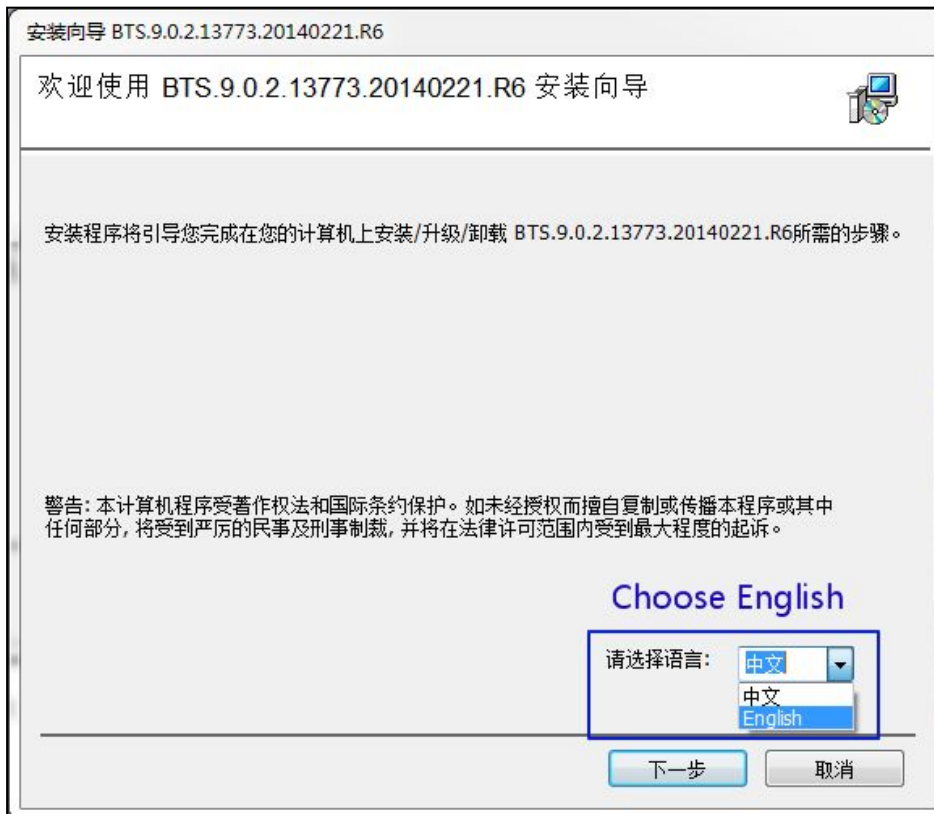
Normally it starts with the Chinese language, you'd choose from the drop-down list and choose English, then you get an English installation user interface.
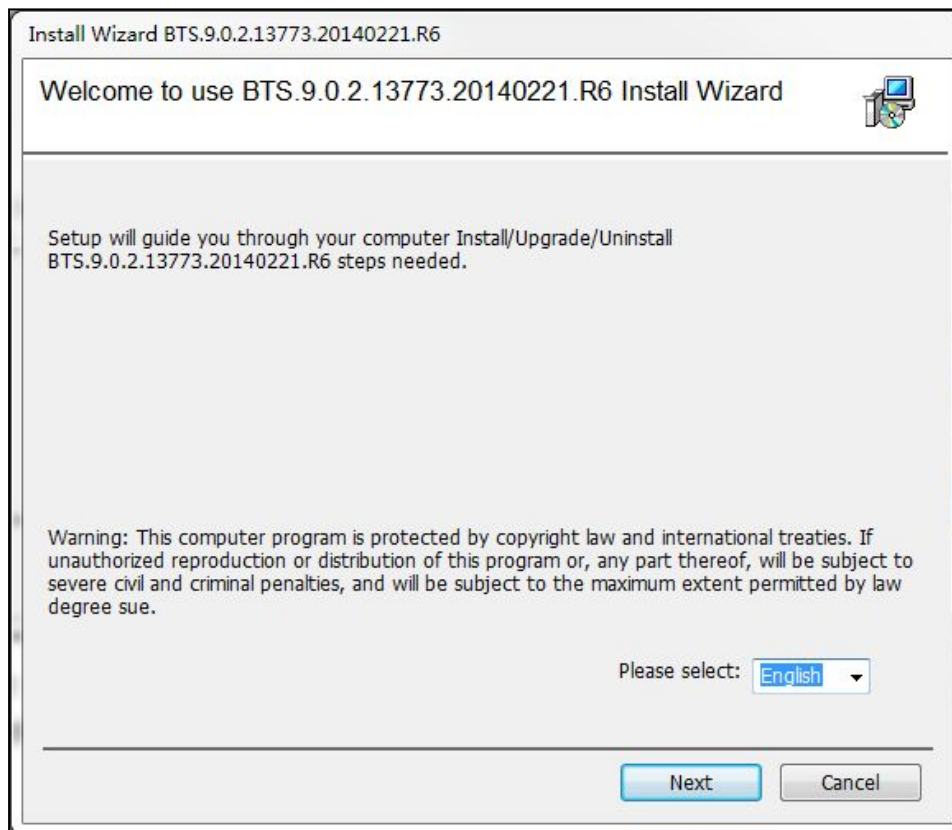
Following that, just as you did the same with hundreds of other softwares, click "Next" button and follow the instructions of the installation.
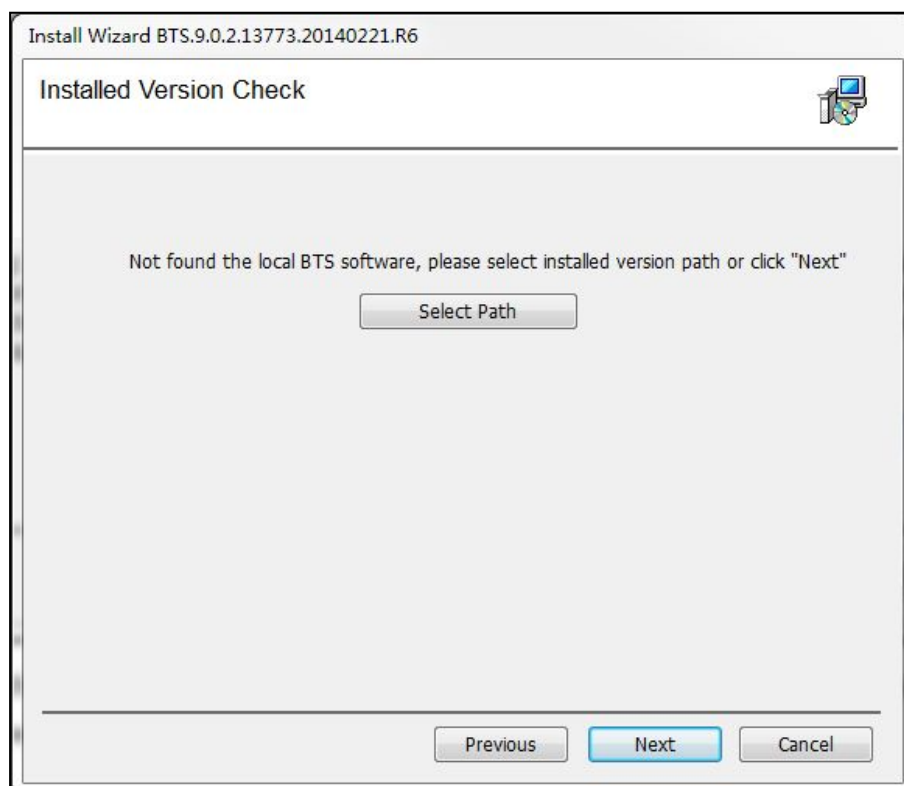
Normally, BTS software will be installed to "D:\Neware" directory (if there's a logical hard drive D, if not, it'll be "C:\Neware"), and **you can choose the where to install the software as you like, but you'd choose the bigger hard disk partition, because all the test data will be saved in**

the same directory where the software installed.
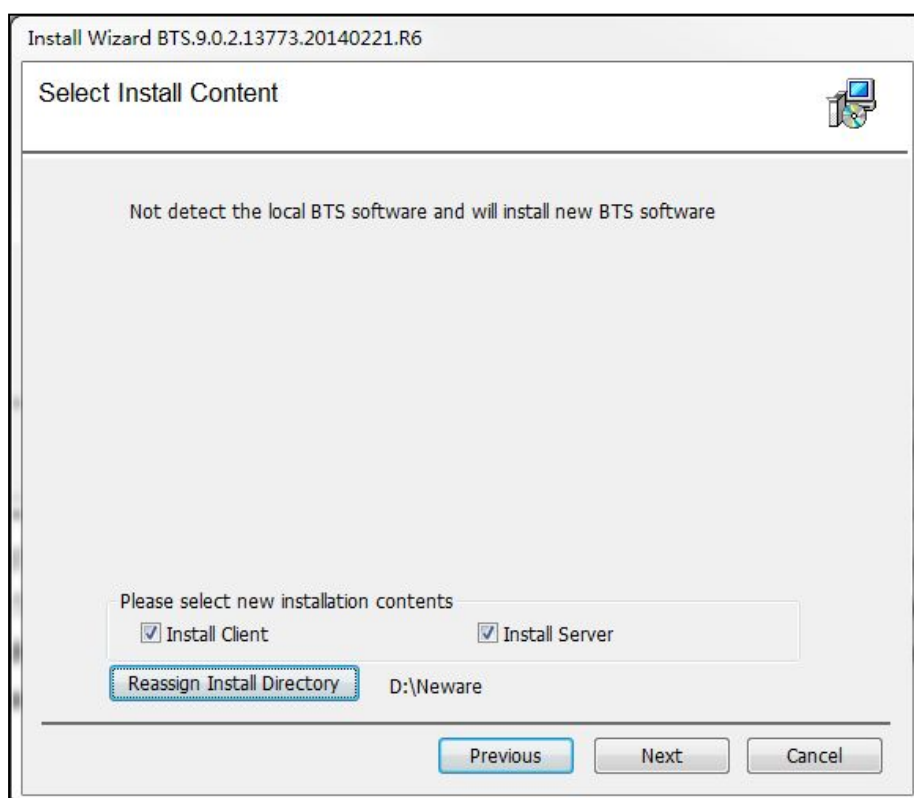
You can install the "BTS Server" on a computer(we call it the server computer), and install several "BTS Client" on other computers(the client computers), all the test data will be saved on the Server computer, and Client computers connect with the server computer.

For mostly users and cases, install BTS server and client on one computer is enough, and later, when you are in need, you can install the BTS client on other computers separately.

In the installation process, it may warn you to install Microsoft office(mainly for data export to excel file function) and turn off the Windows firewall.
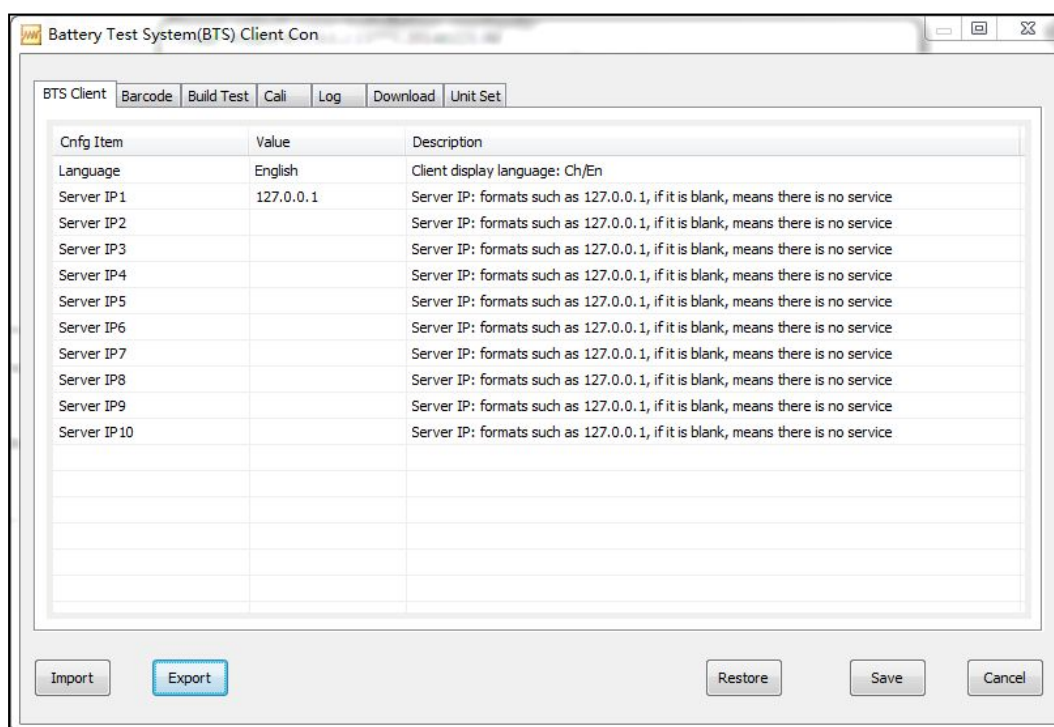
After the installation finished, a configuration window will pop up automatically. In this window, you can set up:

TAB BTS Client: BTS Server IP Address, if there are more than 1 BTS Server you installed, fill the IP Addresses of the servers, otherwise, leave the BTS Client configuration alone.

TAB Barcode: Configuration of the battery bar-code, normally, just leave this alone.

TAB Build Test: Set up the color of work steps, you can choose different color for different tests, such as charge steps in green color and discharge steps in red color, set this up as you like.

TAB Cali: Cali means "calibration", in this tab, you can set up all the parameters of calibration, such as the calibration report file path, the file format of the calibration report, etc. This tab is important and useful, you'd have a look and change the values if necessary.

TAB Log: All about the errors and warnings of the software, don't change any value of this.

**TAB Download**: Important! We suggest you change the NDA exported file path to a directory you use often.

TAB Unit Set: Different measuring units you can choose to match your habit. Such as 'A' or 'mA' for current, 'V' or 'mV' for voltage, etc. Normally, leave this tab alone.

If you change any value of the tabs, click the "Save" button and close the configuration window.

After the configuration, A communication software **WinPcap will be installed(it's a safe, windows platform network communication package, please install it)**. And you'd choose the

 in the installation process to make sure this service can start automatically.
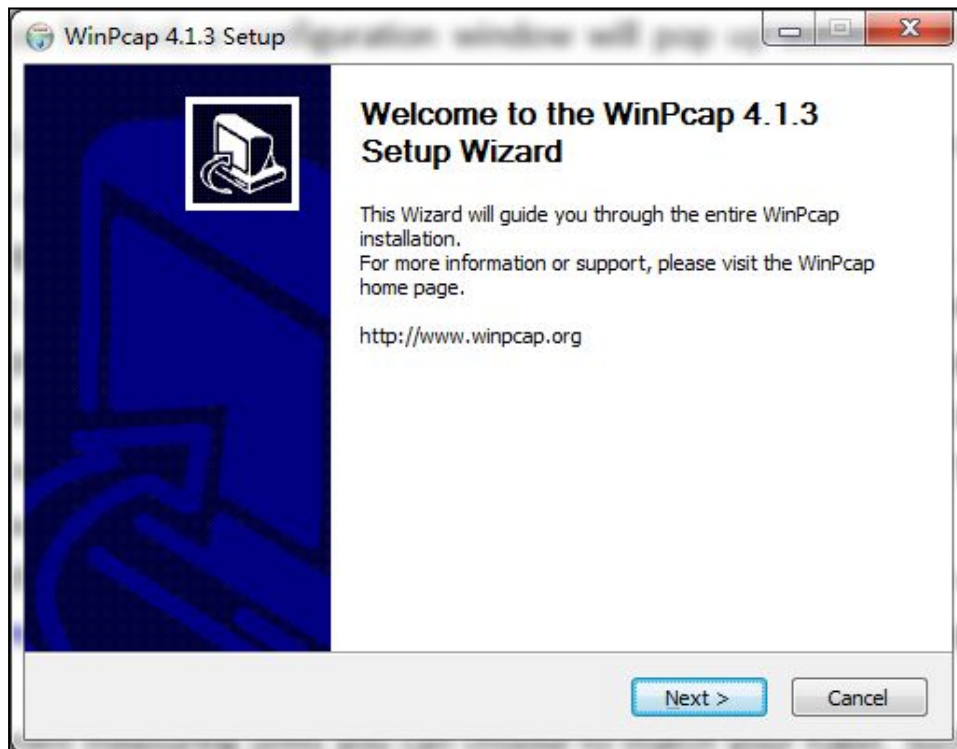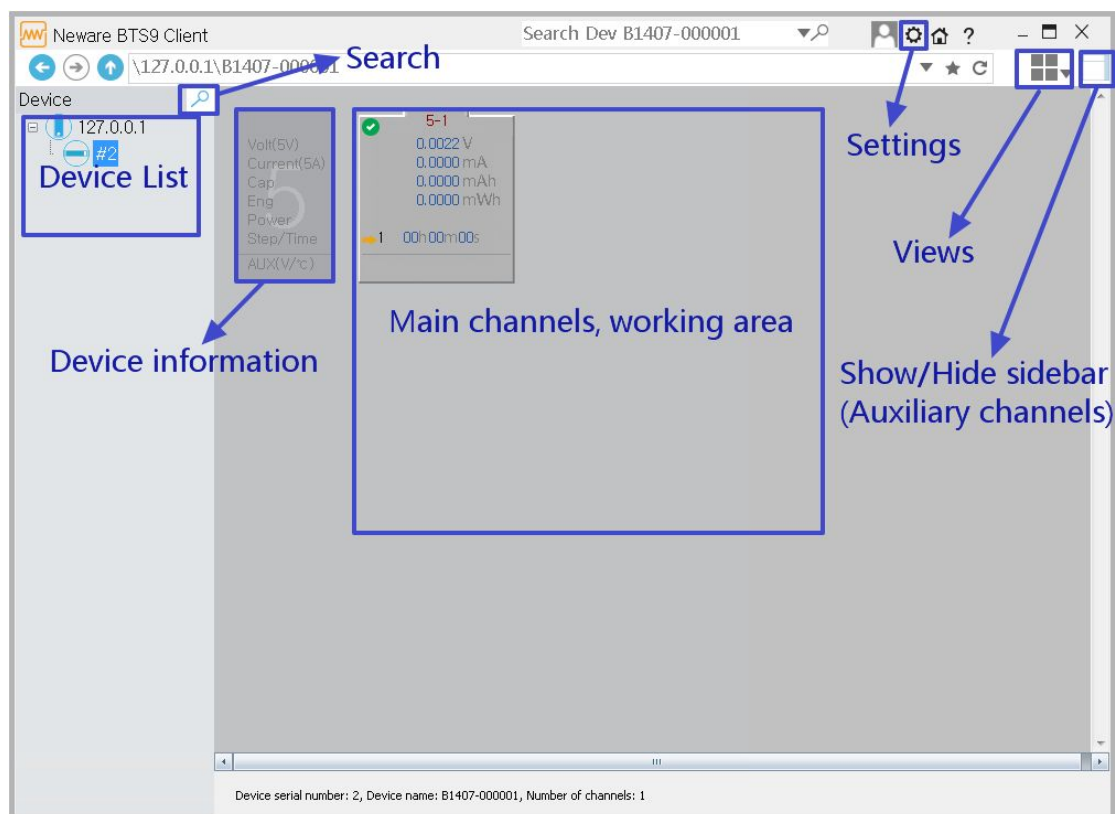
After all of these above steps finish, the whole installation process completes, and you get the final installation prompt information as the following window.
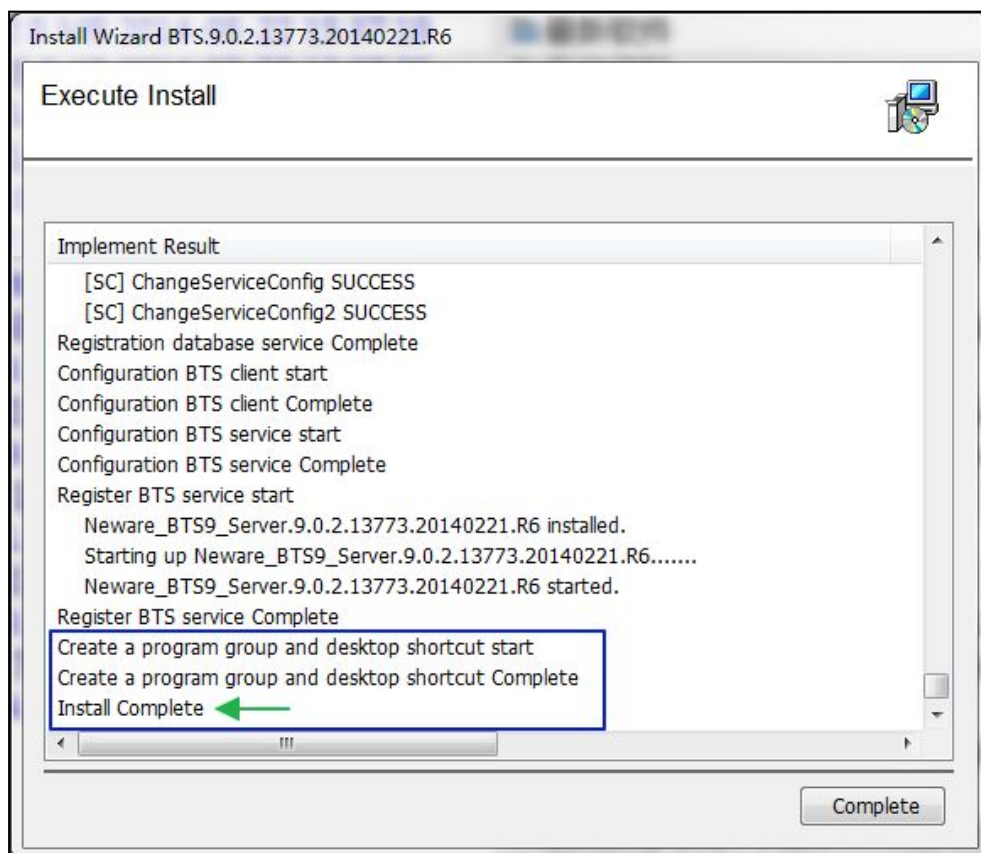
6、CLIENT SOFTWARE ILLUSTRATION

From the Windows start menu, in the group of "Neware", click "Neware_BTS9_Client", you can start up the BTS Client software, it's supposed to look like this:


# a) Search and connect BTS9000 with computer

Before you get started, first of all, you are supposed to connect BTS9000 with your host computer, right? Let's do it.

Click the "Search" button (looks like a magnifier) on the left corner of the Client software, in the popup "search device" window, follow the step 1, 2, 3 in the following picture(check zwj, hit the search button), and normally, you will see the search result list).

In most cases, you'll find more than one devices. **In BTS9000, each channel will be recognized as one separated device. So if you bought a BTS9000 with 4 channels, you'll notice there are 4 devices in the search result list. You can operate each channel separately.**
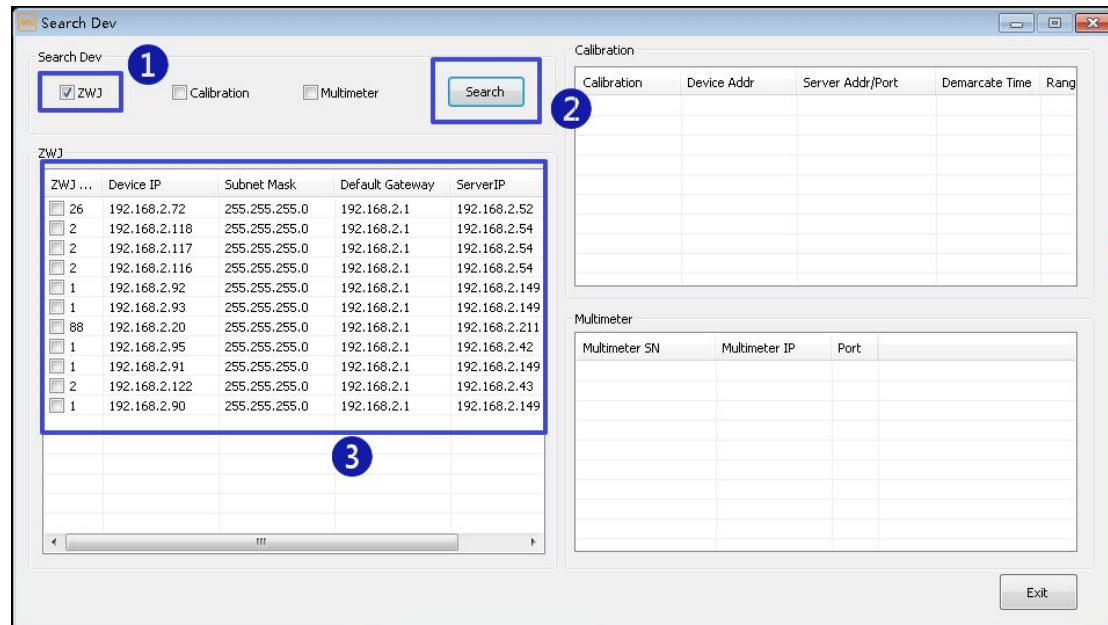
Choose one of the device you want to connect with your computer, double click on it, and you will have this popup window. In most cases, you only have to set up the "Server Address" of the machine, of course, before doing this, you should get the IP address of the computer that the BTS9000 is going to connect with.
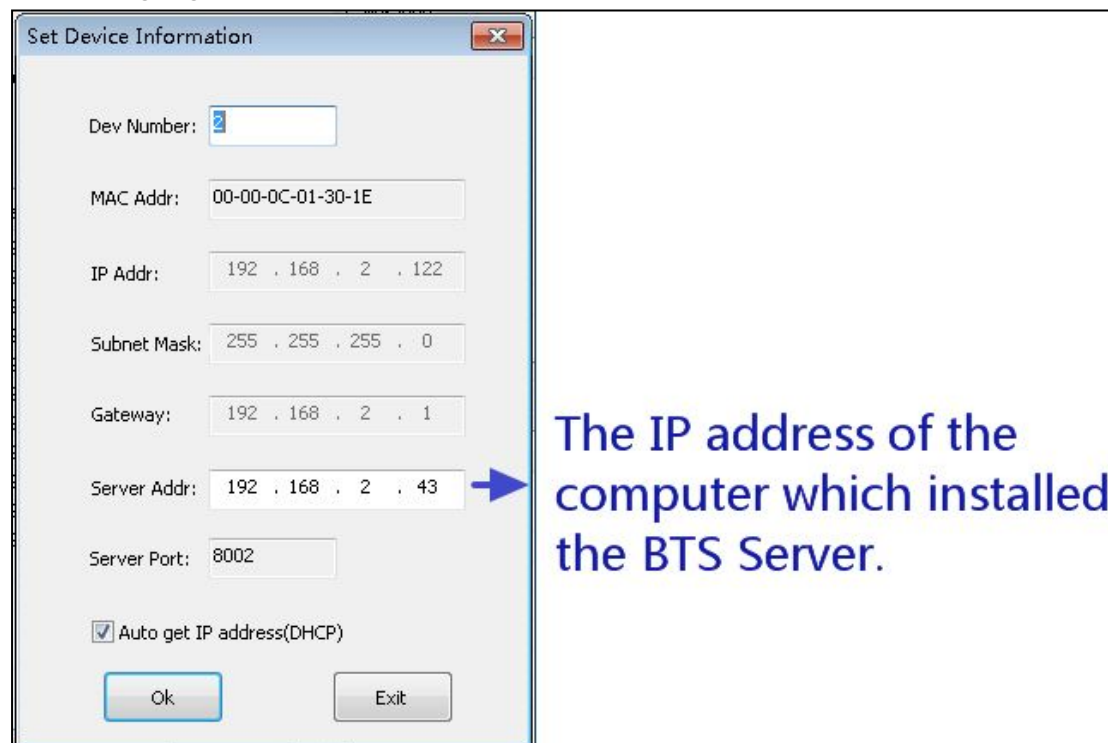
The Server Address is the IP address of the computer which installed the BTS Server(**if you installed BTS Software Server and Client on different computers, then the BTS Server IP Address and BTS Client IP Address are different, please note this.**) Input the Server IP address and click ok, return to the window of the BTS Client. Now you'll see the virtual channels in the main working area, just as the following picture shows, if you can see that, it means your BTS9000 connects with your computer successfully.
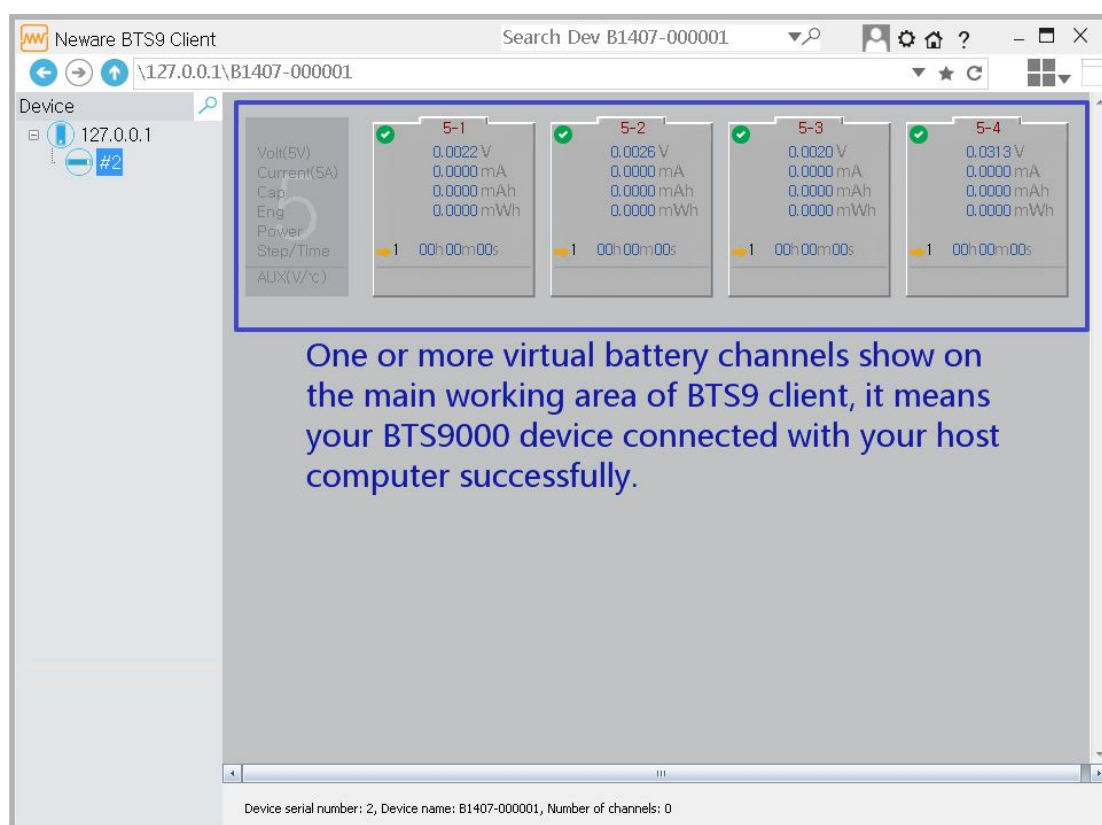
From now on, you are ready to perform the battery tests.

7、SIMPLE BATTERY TEST EXAMPLES

In this chapter, we are going to give you a simple battery test demo, to show you how to use BTS9 software to start up a battery test. This chapter will include: How to use testing step working editor, how to view and save the testing result.

a) Start a test

Right click on the virtual battery icon, choose 'start...' from the popup menu, then the working step editor will show up, just like the following screen-shots.
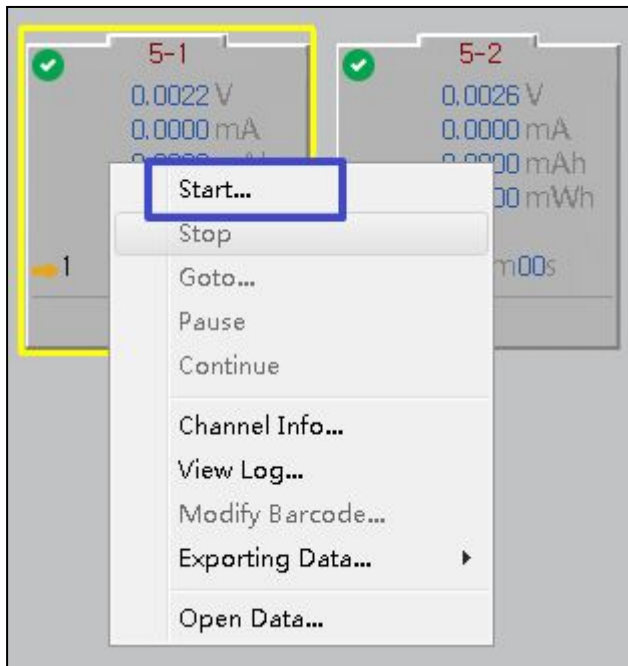
Here is the place you edit the testing steps and start up a test, just like the following screenshot. In this editor, you can choose the working type(rest, charge, discharge, pulse, etc) of each step, and set up the end condition, redo condition of all the steps.
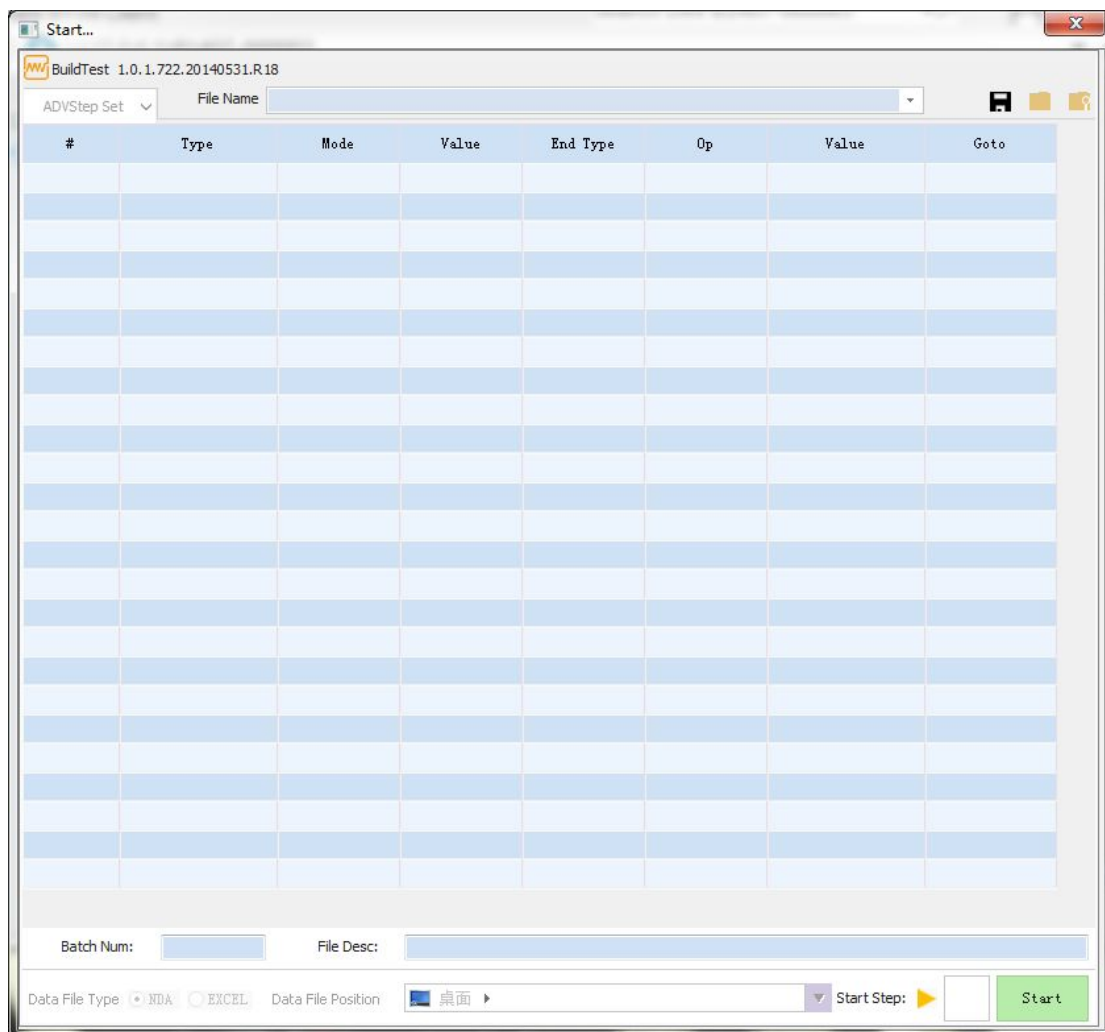
Okay, let's start a simple charge and discharge test. The main characteristics of the battery we use for the demo testing is: 2200mA, Voltage up-limit 4.3V, Normal Charging Voltage 3.7V, Voltage bottom-limit 2.7V. The whole testing would be like this:

1)Connect the battery to BTS9000 Via data wire, and clamp the battery properly; if you don't know how to do this, refer to the following pictures;
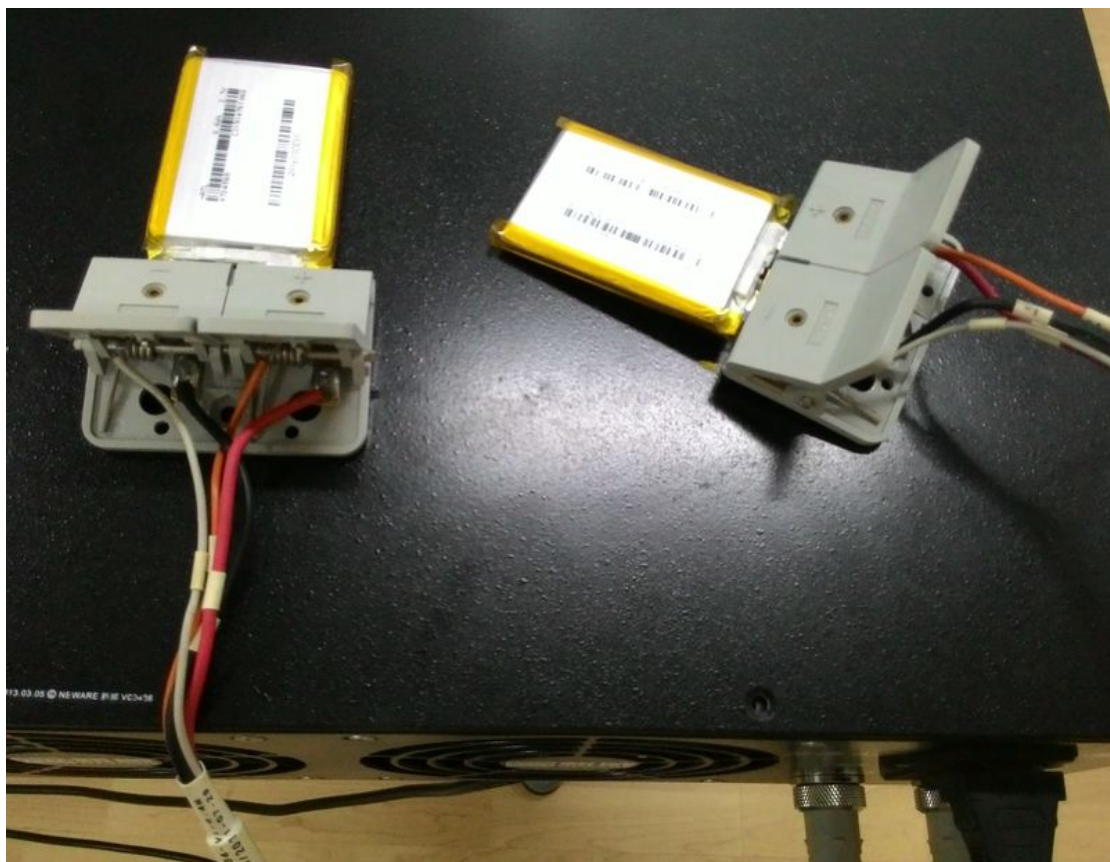
2)Right click on the channel you connect the battery, open up the working steps editor, start

edit the working steps.

3)Rest the battery for about 5 minutes(the 1st step), to be sure the battery in a steady status;

4)Charge the battery with constant current and constant voltage mode(CCCVChg, short for Constant Current and Constant Voltage Charging) at 500mA, until it reaches its voltage up-limit(4.2Volts), then switch to Constant Voltage Charging(it will switch the charging mode automatically, so don't feel bother about this); And the end condition of this CCCVChg is the charging current less than 100mA.

5)Rest the battery for another 5 minutes(the 3rd step);

6)Discharge the battery with constant current mode(CCDChg, short for Constant Current Discharging) at 1000mA, until it reaches it voltage low-limit(2.7Volts, the end condition);

7)Redo the charging and discharging for another 10 times(the 5th step);

8)End.

The whole working steps are supposed to look like the following screenshot. Of course, you'd notice there are a right sidebar on the right side of this form, they are used for protection, you'd set up these protection conditions according to the features of your batteries, to protect your batteries from being overcharged or overdischarged.
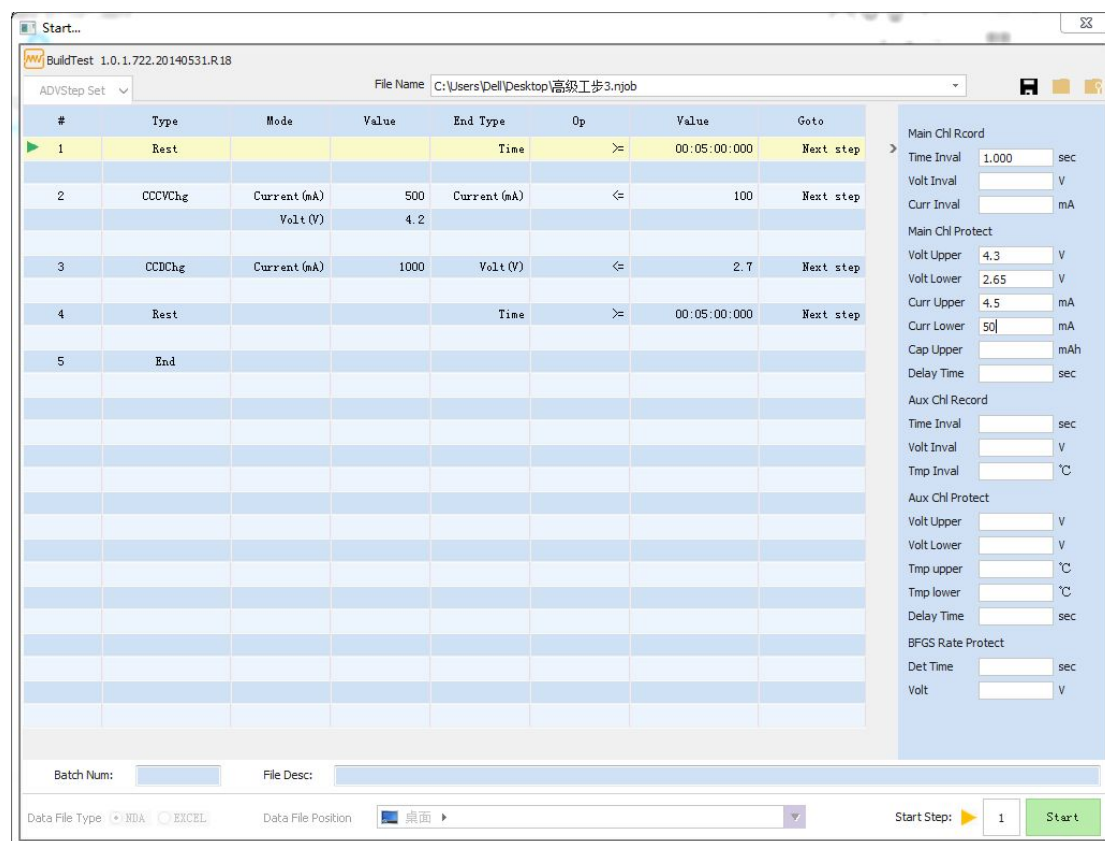

If you don't know how to build a testing steps at the beginning, you can load the .njob file we offered by the following method:

1)Open the testing steps editor(by right click on the virtual battery icon, choose 'start…' from the popup menu;

2)Click the "load" button(❶) as shown in the following picture, choose the sample .njob file we provide to you(❷) and open it(❸);

3)Then you will see the complete working steps in the editor.
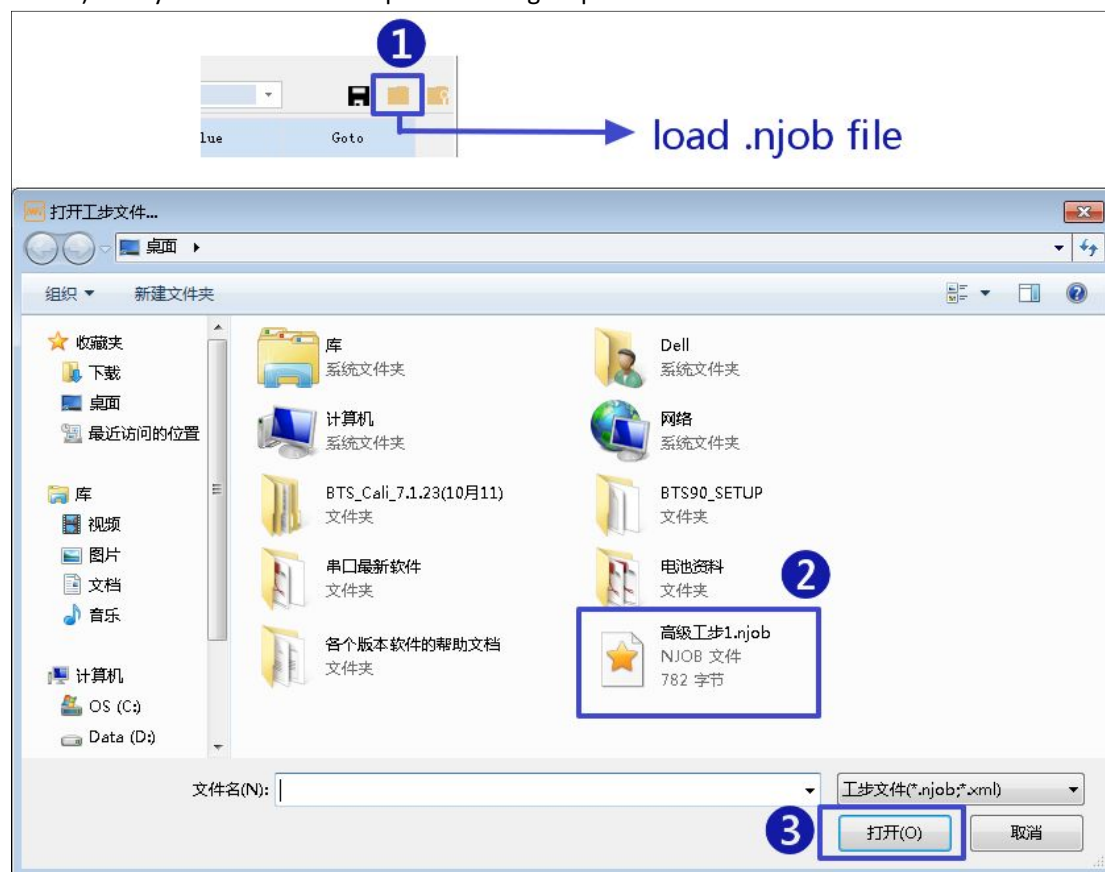
Note: Please don't use the sample working steps scripts to start a test directly, unless you are sure that your battery has the same characteristics as the battery we used for the demo testing(2200mA, Voltage up-limit 4.3V, Normal Charging Voltage 3.7V, Voltage bottom-limit 2.7V). In most cases, you are supposed to create your own working steps and all the conditions for your tests, at least, you should modify the values in the sample working steps according to your batteries.

b) View the testing data

Hope you are doing great so far, are you? After the tests started for a while, we can view the testing data.

It's easy, right click on the channel you want to check the data, choose "Open Data..." from the popup menu, a progress-bar window will show up and indicating the data processing progress.
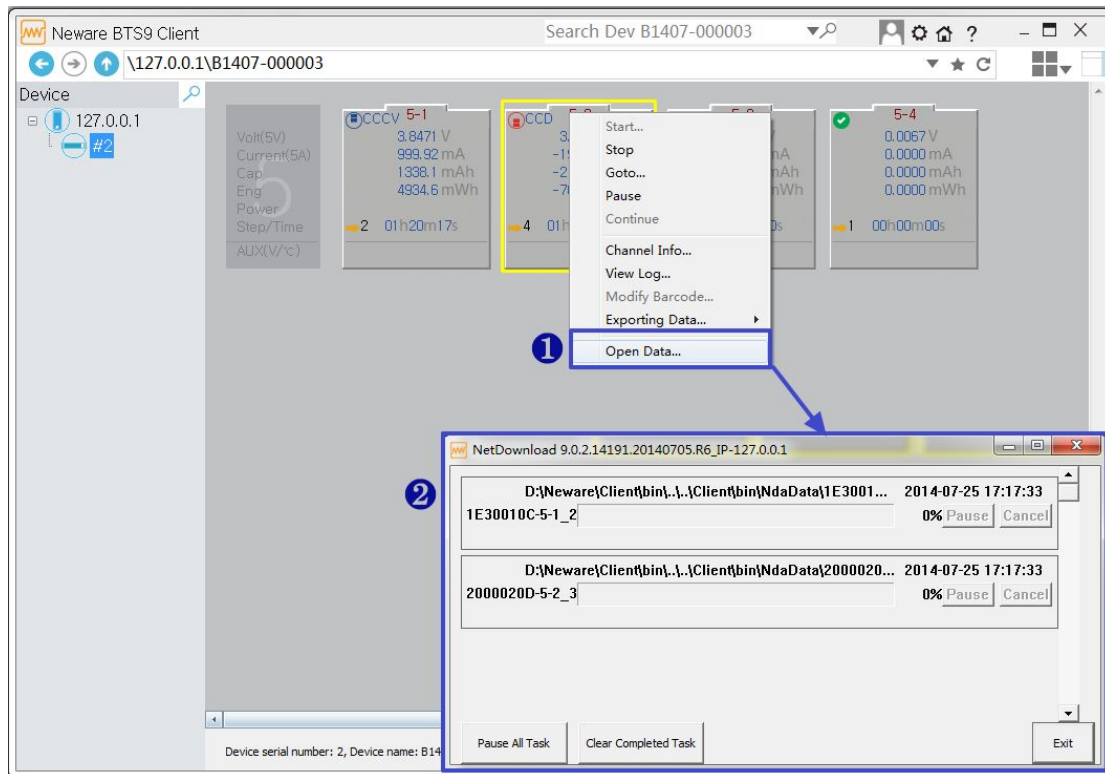
After a very short time, you'll see testing data opened automatically in BTSDA(Battery testing Data Analysis, the bundle software for testing data view, analysis and export). As you can see, left side is the curve of the test, and right side is the detailed testing data.