

NEWARE TECHNOLOGY

User Manual 7.6.X

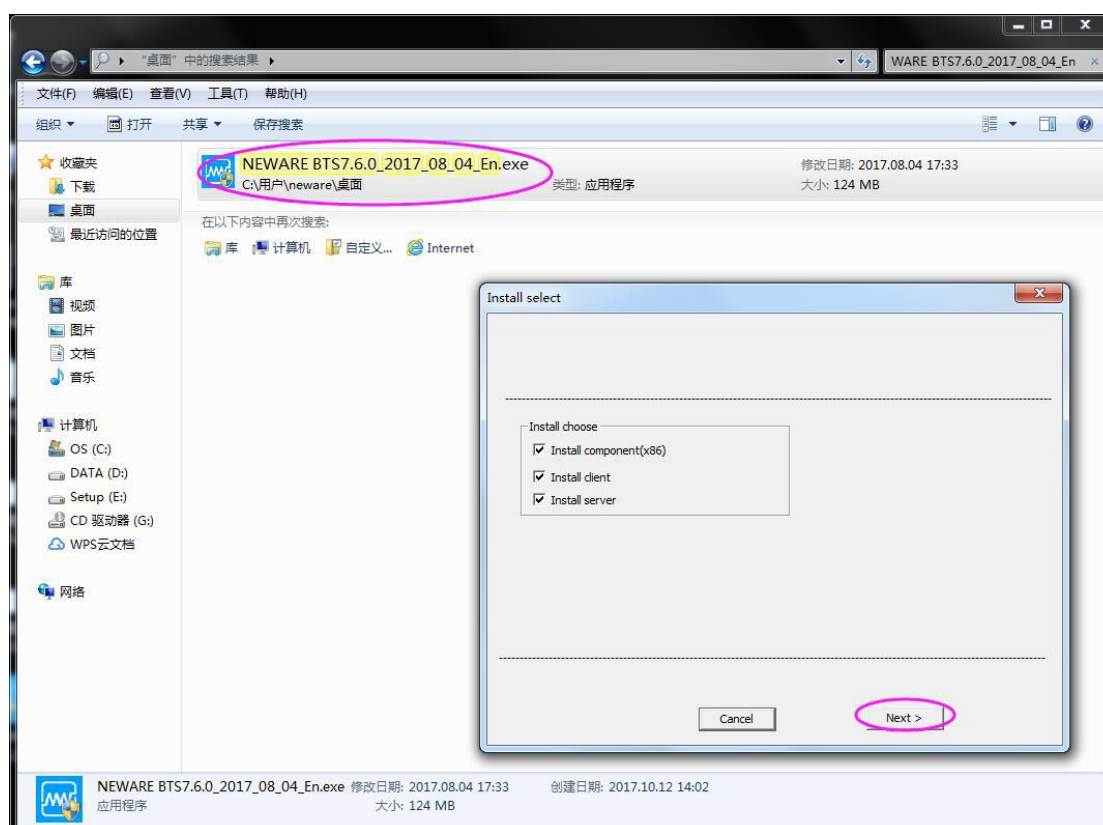
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BTS7.6.0 Software Operation Instruction

1. Application Installation

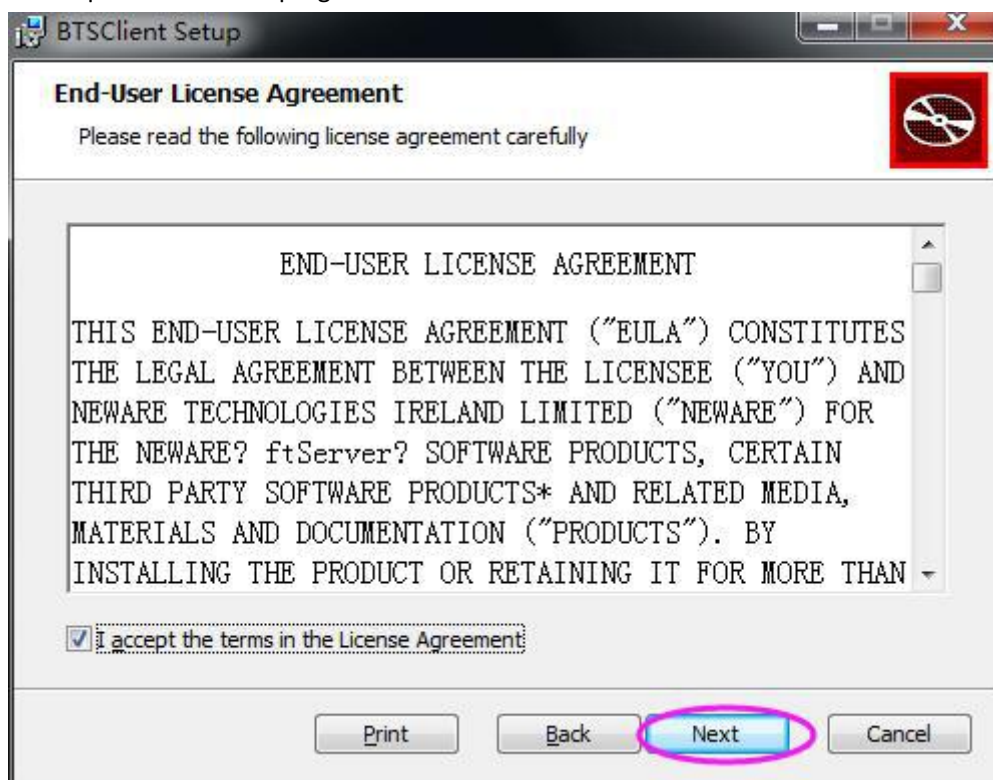
1.1 Software Installation

Open the software installation package and find the BTS-4000 file, right click to run the program as an administrator. Select all options and Click the “Next”.

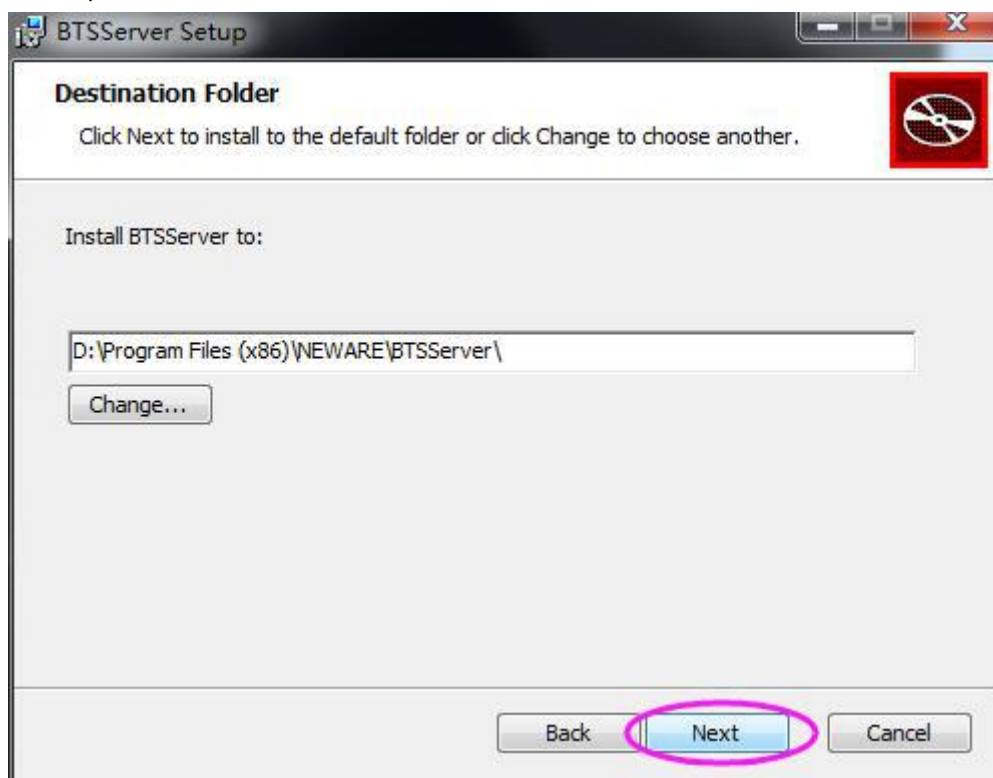


Please install the files to the non-system disk, and it requires large disk space.

Installation process of client program is as below:



Installation process of service is as below:



1.2 Software Configuration Settings

After the installation, check the software configuration settings before the first running.

The installation location is as below:

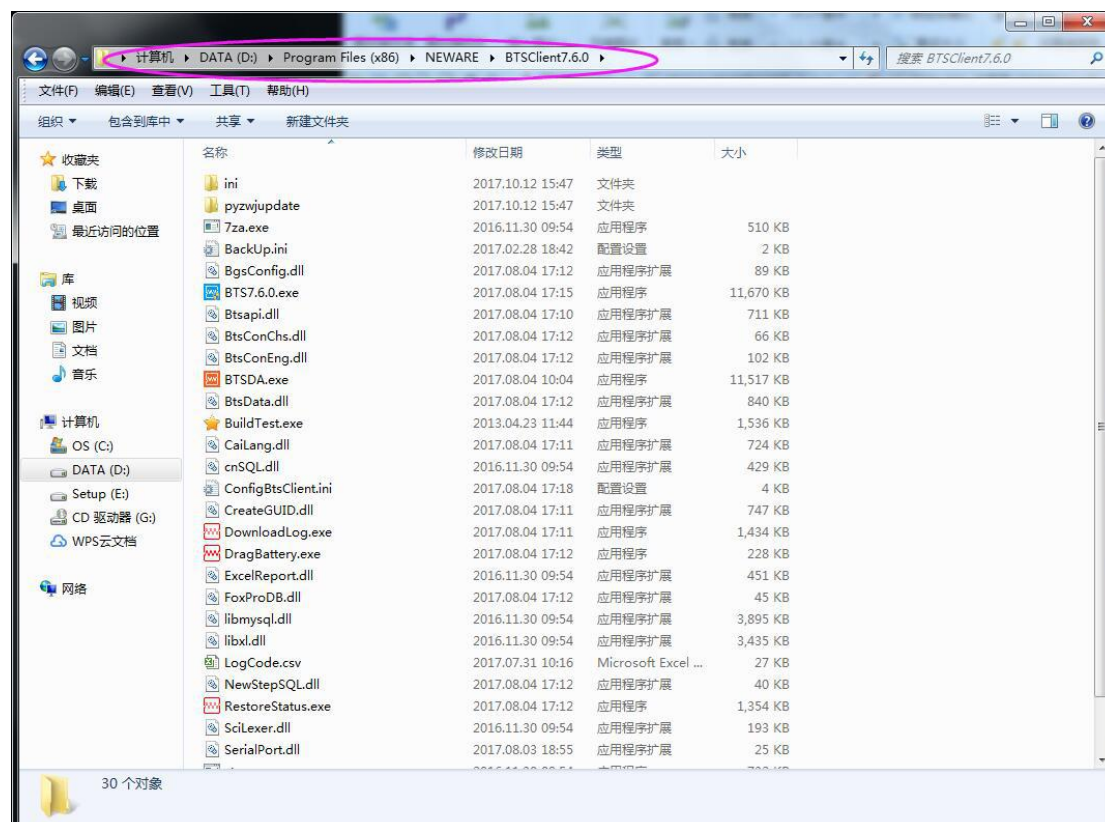
Please find the “BTS General.txt” file in the installation file.

“BTS General.txt”

Double-click to open

(This file checked only when the first installed or re-installed)

Note: Any version before BTS7.6.0, the configuration settings file name is “BTS.ini”, like BTS7.5.6, BTS7.5.5, BTS7.5.4, BTS7.5.3,



The BTS General configuration instructions is as below:

关键项设定	
[CLIENTMODE]	; 客户端模式，默认为2，0-不需要登录，提供少数功能；1-不需要登录，提供全部功能；2-需要登录，提供全部功能
MODE=1	
[BARCODE MODE]	; 条码模式：0 无条码或条码错误不提示；1 无条码或条码错误会提示，可以下发工步；2 无条码或条码错误会提示，不能下发工步
MODE=0	
[STEPCHECKMODE]	; 限制条件千分之二判断：0 编辑时会提示 允许下发；1 会提示 不允许下发；2 不提示 允许下发
MODE=2	
[RECORDCHECKMODE]	; 记录条件千分之二判断：0 不需要千分之二的判断；1需要千分之二的判断
MODE=0	
[IUCHARGE MODE]	; 恒流恒压工步模式：0 必须设置截止电流；1 可以不设置截止电流
MODE=0	
[CVCHARGE MODE]	; 恒压充电工步模式：0 必须设置截止电流；1 可以不设置截止电流
MODE=0	
[DEFAULT CHL TYPE]	; 默认超级映射电池显示方式 0:8排32列 1:32排8列 （修改后需要重新映射）
TYPE=0	
[REAL CHL TYPE]	; 实际映射电池显示方式 0:8排32列 1:32排8列 （修改后需要重新映射）
TYPE=0	

Note:


1. If you need to cancel the software login password, please set CLIENTMODE MODE = 1

2. If you don't need bar code mode, please set BARCODE MODE = 0
3. If you need to be prompted when the setting current or voltage below the minimum setting limit, please set STEPCHECKMODE MODE = 0
4. If you do not need to be prompted when the record conditions below the minimum limit please set RECORDCHECKMODE MODE = 0
5. If the cut-off current conditions are not required in the CC-CV step, please set IUCHARGEMODE MODE = 1
6. If the cut-off current conditions are not required in the CV_Chg step, please set CVCHARGEMODE MODE = 1
7. When testing channels under one control unit is less than 64, please set REAL CHL TYPE TYPE=0
8. When Testing channels under one control unit is more than 64, please set REAL CHL TYPE TYPE=1

Parameters above can be checked or modified according to your requirement, then save it and close it.

(Sometimes the files in the system disk are unmodified, you can copy the file to another disk to modify, then cover the original file, otherwise the modification is invalid.)

1.3 Channel mapping Settings

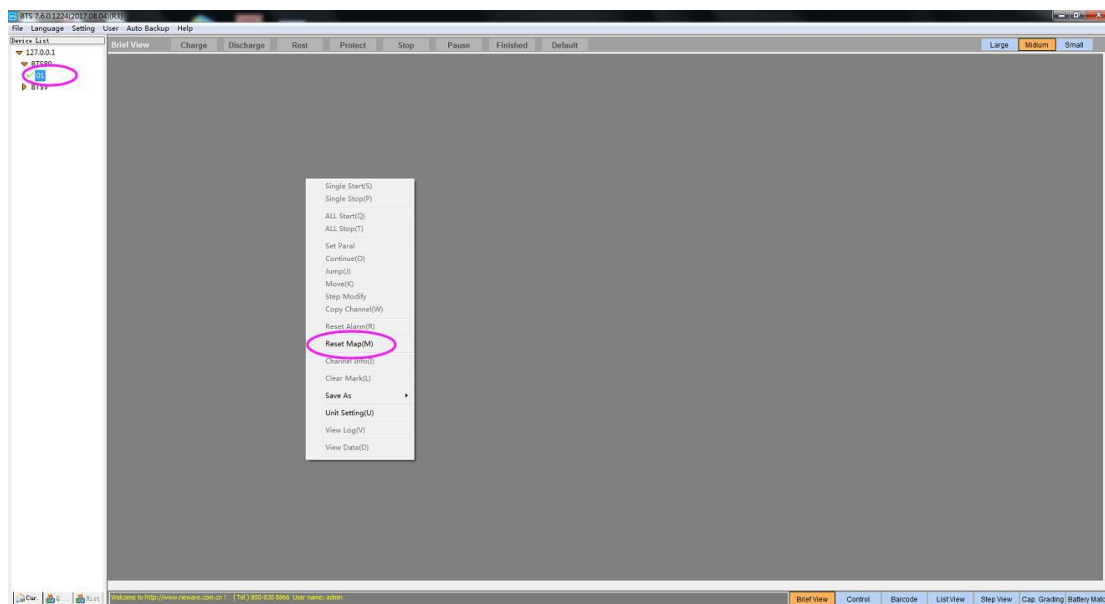
Run the BTS7.5.6  on the desktop after installation.

The control unit versions and ID are displayed below devices list.

Common Versions: BTS75/BTS79/BTS80/BTS81

Control unit ID value can be modified between 1-255, and each value is unique.

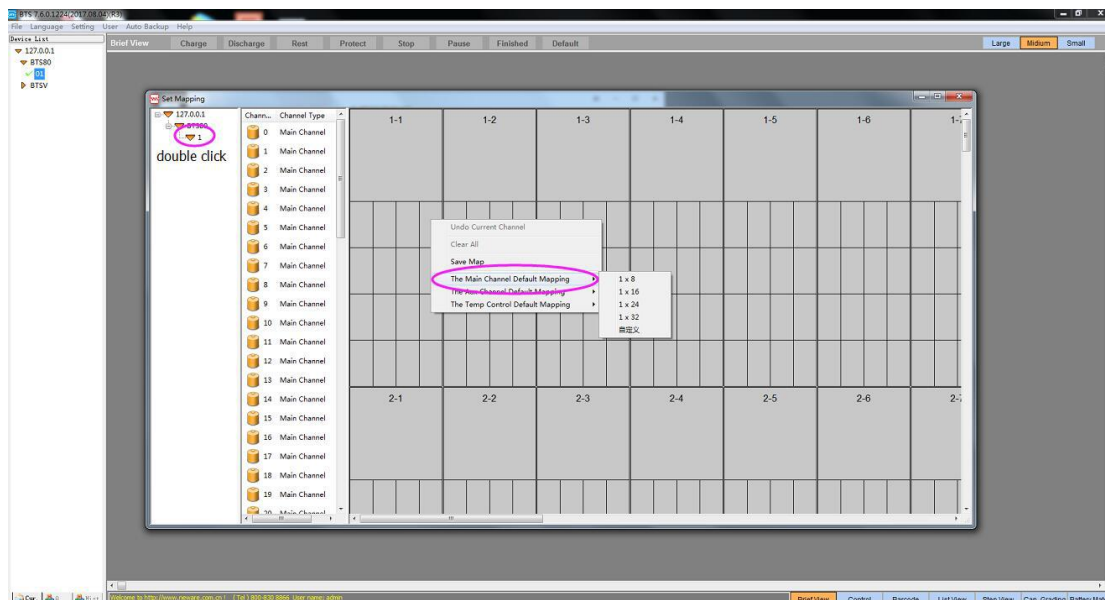
You need to mapping to display the testing channels after the first installation.



Click the “+” in the upper left corner after entering the reset map interface. Double-click the ID number of the control unit. The middle part will display the orange battery symbol means the control unit has recognized the testing channels, and then select the primary channel default map in the context menu of right area.

Note: Please modify the configuration file with the 32 × 8 mode If over 64 channels, otherwise it can only display 8 lines of 64 channels.

The instruction method can be found on the 4th page.

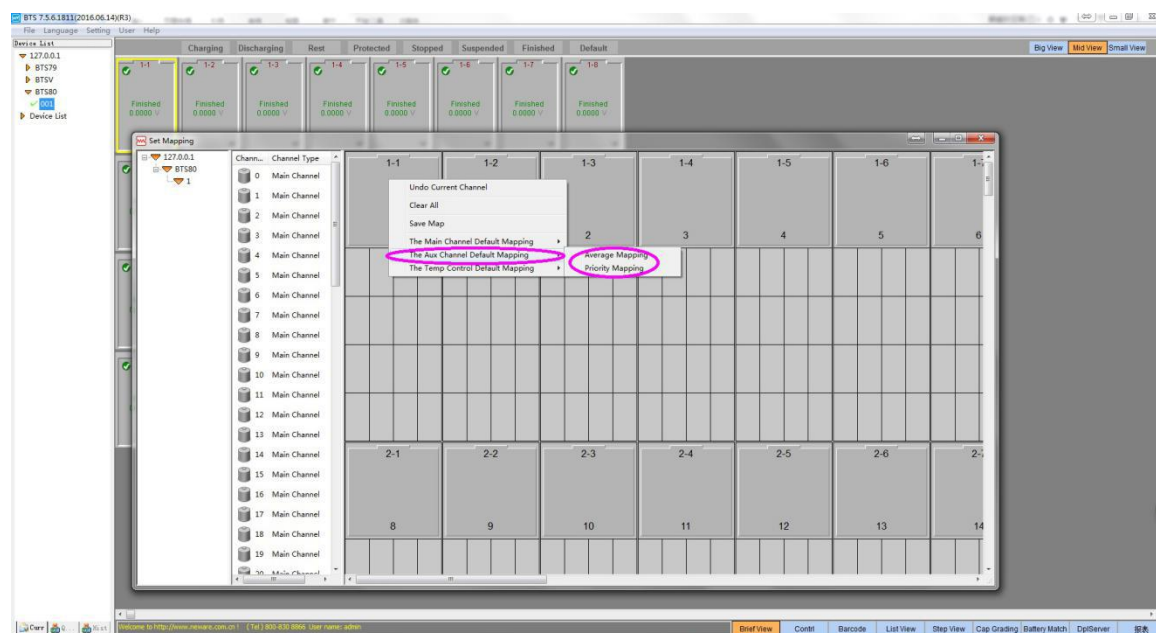


Save the mapping after finish above operations, and the battery graphics will be displayed on the main interface.

Note: If the product is configured with Aux Channels, the AUX channels also needs to be selected when do mapping.

Right-click the primary channel in the mapping interface, choose “Aux channel mapping”, There

are two ways “priority” and “average”. “Priority” is to connect all the AUX channels with the selected primary channel. “Average” is to distribute the AUX channels to each primary channel, respectively.



2. Battery Testing

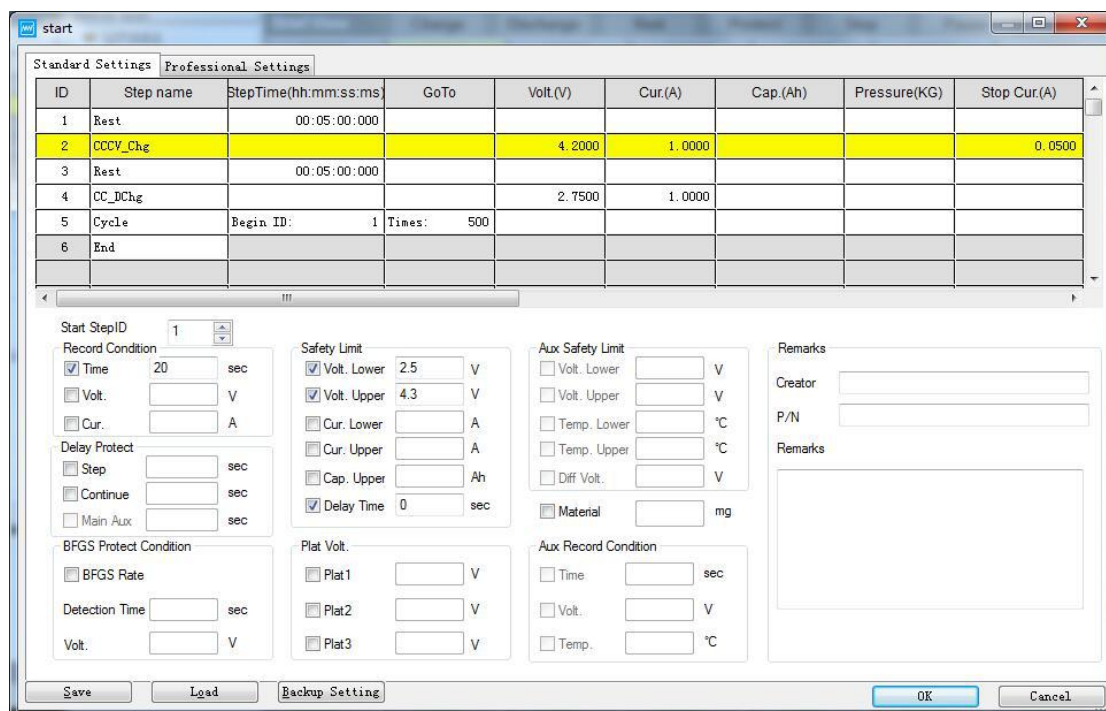
2.1 Run the channels

- Hold the batteries on the clamps

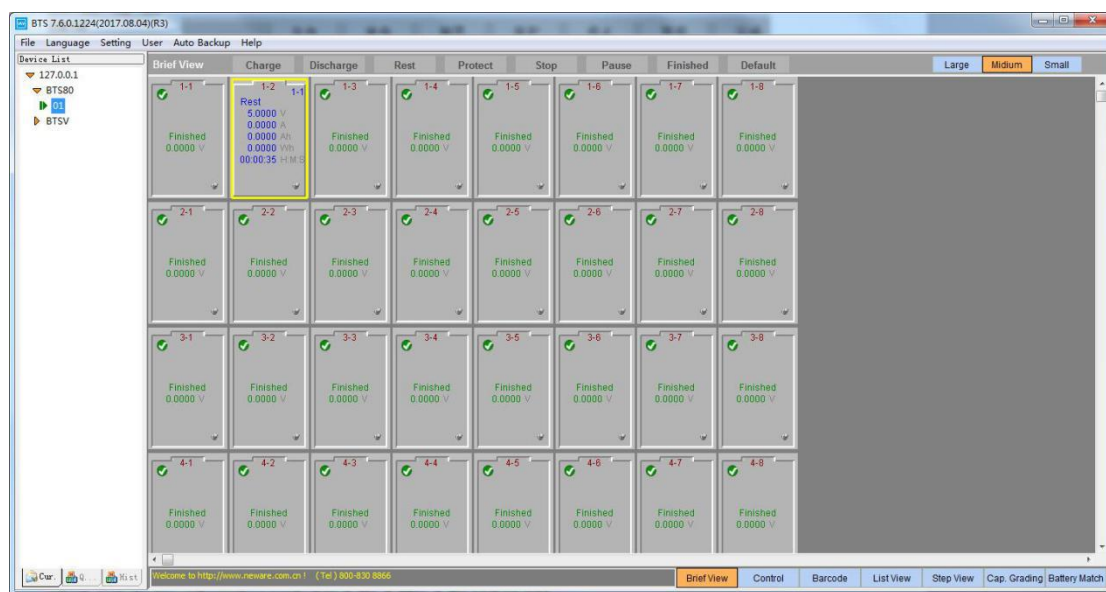
There are many types of battery clamps, including coin battery clamps, polymer clamps, alligator clamps, cylinder battery clamps.

Please find the brochure and website pictures for reference.

- Select the channels to run, then the yellow box around channel indicates the selected state. Right click and select the “Single Start” .

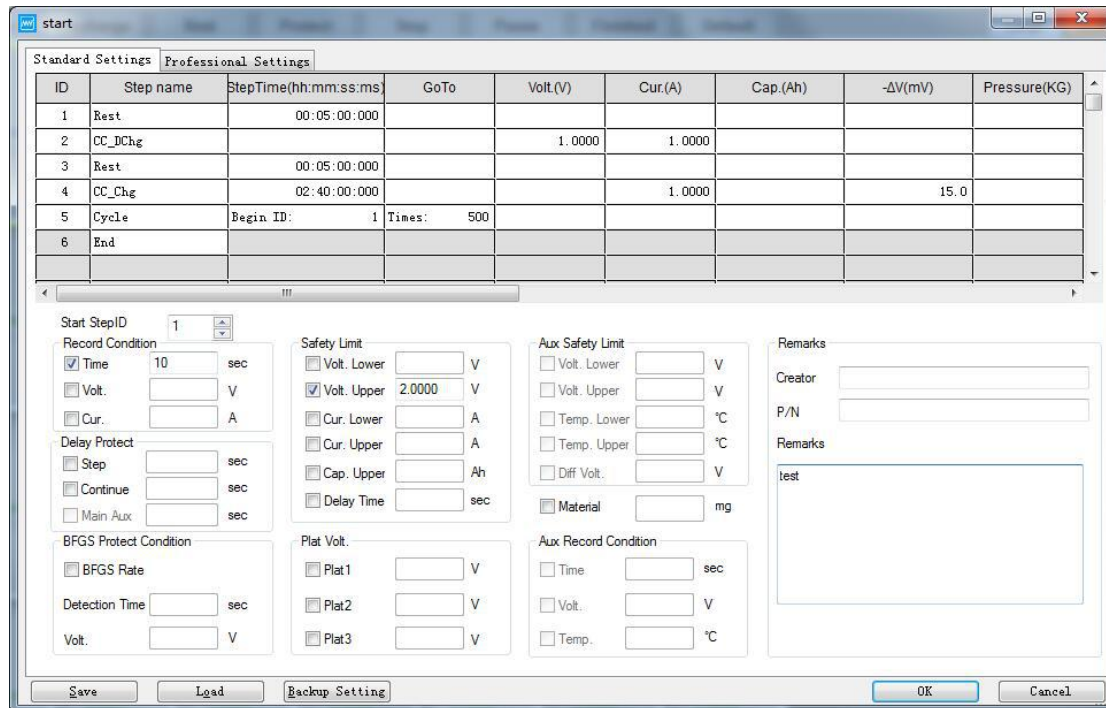


As above, a common Li-ion battery cycle life step setting. Click the "OK" to run.



Note: Please set the work step according to Li-ion battery parameters, for example, the voltage value setting of the CV step (like 4.2V, 4.35V, 4.4V, etc), Stop current value of CV is normally 0.02C.

Note: the Ni-MH battery working step setting example.



Note:

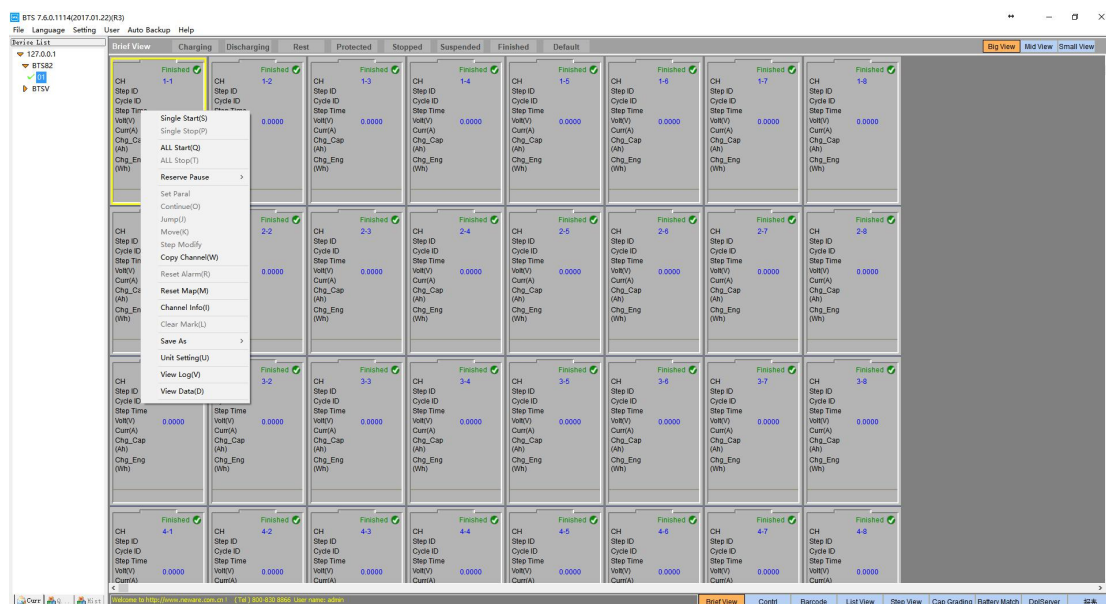
The difference between the work step “Standard Setting” and “Professional Setting”.

Standard Setting: on the lower part of the step setting interface, all the protection conditions (like “Record Condition”, “Safety Limit” .etc.) work on all steps you set.

Professional Setting: the protection conditions (like “Record Condition”, “Safety Limit” .etc.) work on single step, that means each step need to set protection conditions, like “Record Condition” can be set differently for each step.

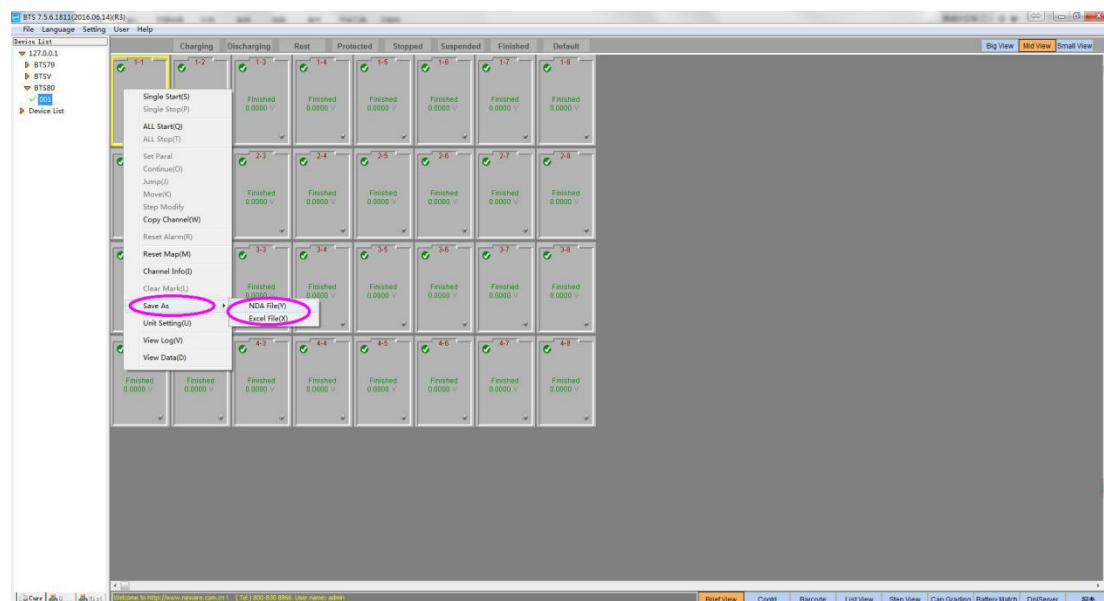
2.2 View Data

During the test or at the end of the test, choose the channel menu - “Channel Data”



2.2 Save as

- Right-click selected channel, choose "Save As"
- Open the data, select the "Save As" icon which under the interface, and save the data through the pop-up data dialog box.

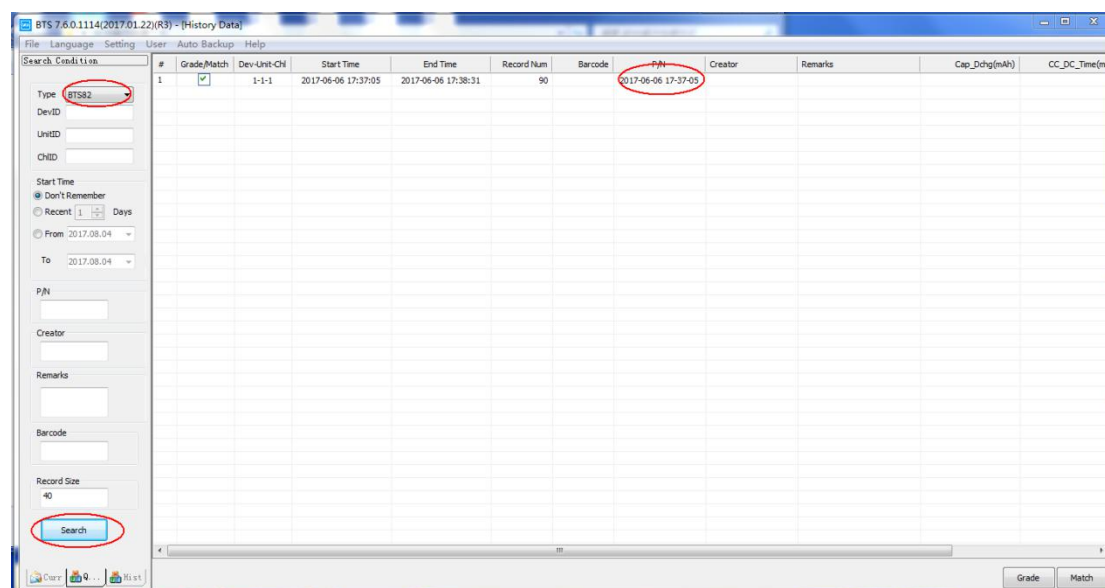


2.3 Historical Data

Whether or not the data has been saved, queries can be used to obtain the previously completed data.

Each time resending testing process, the current testing data automatically moved to historical data, it can only open the current test data in the current channel .

When starting the test, adding more notes to facilitate the historical data tracing.



3. Work Step Setting

3.1 Standard Setting and Professional Setting Selection

For Standard Setting, all the protection conditions (like “Record Condition”, “Safety Limit” .etc.) work on all steps you set.

For Professional Setting, all the protection conditions (like “Record Condition”, “Safety Limit” .etc.) work on single step

For example: the first step in the process needs the record rate of 1 second, and the second step requires a record rate of 10 seconds, and you can set record condition accordingly professional step .

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	R(Ω)	Cap(Ah)
1	Rest						
2	End						

Start StepID: 1

Record Condition

☒ Time: 0.1 sec

☐ Volt: V

☐ Curr: mA

Delay Protect

☐ Step: sec

☐ Continue: sec

☐ Main Aux: sec

BFGS Protect Condition

☐ BFGS Rate

Detection: sec

Volt: V

Safety Limit

☐ Volt Lowe: V

☐ Volt Uppe: V

☐ Curr Lowe: mA

☐ Curr Uppe: mA

☐ Cap Upper: Ah

☒ Delay Tim: 0 sec

Aux Safety Limit

☐ Volt Lowe: V

☐ Volt Uppe: V

☐ Temp Lower: °C

☐ Temp Upper: °C

☐ Diff Volt: V

☐ Material: mg

Plat Volt

☐ Plat1: V

☐ Plat2: V

☐ Plat3: V

Aux Record Condition

☐ Time: sec

☐ Volt: V

☐ Temp: °C

Remarks

Creator:

P/N:

Remarks:

Buttons: Save, Load, Backup Setting, OK, Cancel

3.2 Explanation of Nouns in Step Setting Table

- **Step number:** Display the number of step.
- **Step name:** Step type.
- **Time:** The total time to limit running is not necessarily set in the charge / discharge step.
- **Voltage:** Represents constant voltage value in CVC step; represents the cut-off voltage value in CC step. This value must be set in charge and discharge steps.
- **Current:** Setting the output current value, limits the maximum current output value of the channel in the CVC step, the value must be set in the charging and discharging step.
- **Capacity:** Limit the maximum capacity of this step, as one of the the end conditions, not essential items.
- **Energy:** Limit the maximum energy of this step, as one of the the end conditions, not essential items.

- **— ΔV :** Represents the negative change rate of the charging step voltage, and it begins to fall when the recording voltage goes through an extremely high value, which is one of the end conditions of the channel, and is generally used as one of the charging end conditions of Ni-H battery.
- **Power:** Only used for constant power charging and discharging step, as the setting condition of step operation, the value must be set in constant power step.
- **Load:** Only for CRD step, as the setting condition of step operation, the value must be set in constant resistance step.
- **Cut-off Current:** In the CC&CVC step (including discharge) and CPD step, as the cut-off condition of constant voltage process. this value must be set in CC&CV step.
- **Aux Volt H:** When the channel supports the auxiliary voltage measurement function, as the end of the step, and the value indicates the maximum value of the allowed cell;
- **Aux Volt L:** When the channel supports the auxiliary voltage measurement function, as the end of the step, the value indicates the minimum value of the allowed monomer, and the step ends when the voltage of the cells not in this range;
- **Aux Temp H:** When the channel has auxiliary temperature measurement function, as the end of the step condition, the value indicates the maximum value of the allowed cell ;
- **Aux Temp L:** When the channel has auxiliary temperature measurement function, as the end of the step condition, the value indicates the minimum value of the allowed cell, and when the cell's temperature is not in this interval, the step is over;
- **Single Volt:** The voltage of a single cell is used to control the total voltage of the battery pack into the constant voltage process and which is only available when using battery pack CC&CVC step. When the voltage of the cells reaching this value in the CC&CVC step, the total voltage of the battery goes into constant voltage condition immediately. As the selection condition of the CC&CVC step test of the battery pack. When the condition is not set, the battery pack will do CVC according to the total constant voltage value.
- **Voltage Upper/Lower limit:** protection condition setting of current step.
- **Voltage Increasing/Decreasing rate:** customization functions , not available.

3.3 Explanation of Nouns in Step name drop-down list:

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	Cap(Ah)	Pressure(t)
1	CC_DChg			2.8000	1200.0		

CCD: The channel discharges at constant current, and the battery voltage drops, in which the cut-off voltage and the constant current value must be set. Time, capacity, energy are alternative conditions . It means “or” logically relations among them. The figure above indicates that the battery discharges from the beginning of 1200mA current to the end of the 2.8V.

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	Cap(Ah)	Pressure(t)
1	CC_Chg			4.2000	1200.0		

CCC: The channel is charged with a constant current value, and the battery voltage is raised. The cut-off voltage and the constant current value must be set. Time, capacity, energy are the

conditions of choice, it means “or” logically relations among them. The figure above indicates that the battery charges from the beginning of 1200mA current to the end of the 4.2V.

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	Cap(Ah)	Pressure(t
1	Rest	00:00:05:000					

Rest: The channel is rest. The step time must be set. The picture above indicates that the channel will rest for 5 seconds.

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	Cap(Ah)	Pressure(t
1	Rest	00:00:05:000					
2	CC_DChg			2.7500	1200.0		
3	Cycle	Begin ID: 1 Times: 5					

Cycle: Define multiple steps for cycling . The figure above indicates that step 1 or step 2 will be performed 5 times from the first step.

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	Cap(Ah)	Pressure(t
1	CCCV_Chg			4.2000	1200.0	50.0000	

CC&CVC: When the battery voltage is below the set voltage value, the device charges the battery in a constant current mode until the battery reaches the set constant voltage value and then enters a CV process. The figure above shows that the battery is charged by 1200mA, and the battery enters the CV process at 4.2V, where the voltage remains constant and the current drops slowly until the current goes down to 50mA. Lithium battery charging and CV-Chg to CC-Chg process, the step voltage, current, off current must be set.

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	Power(W)	Cap(Ah)
1	CP_DChg			2.8000		10.0000	

CP-DChg: The channel is equivalent to a battery with a constant power load, and the current in the discharge increases with the decrease of the voltage. The product of current and voltage at any time is equal to the set power value. As shown above, the battery discharges at constant power of 10W until the end of the 2.8V (assuming that the battery voltage is 5V, the discharge current = 2A, and when the voltage drops to 4V, the current should be 2.5A). The cut-off voltage and power value must be set.

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	R(Ω)	Cap(Ah)
1	CR_DChg			2.8000		5.0000	

CR-DChg: Relative to the channel load, cell is compare to a constant value (external battery equivalent of a resistor), during the discharge process, the current will decrease with the voltage . relationship between current and voltage in accordance with Ohm's law in anytime. As shown above, the battery discharges at 5 Ω resistance until ends at the 2.8V (assuming that the battery voltage is 5V, the discharge current = 1A, and when the voltage drops to 4V, the current should be

0.8A). The cut-off voltage and resistance should be set.

ID	Step name	StepTime(hh:mm:ss:ms)	Volt(V)	Curr(A)	Stop Curr(A)	Power(W)	R(Ω)
1	CP_Chg		4.2000			4.2000	

CP_Chg: Charge according to the setting power, and the current will decrease with the increase of the voltage, because the product of the current and the voltage is always equal to the setting power. As shown above, the battery is charged at a constant power of 4.2W until the voltage becomes 4.2V (assuming the battery voltage is 4V, the current should be 1.05A, and when the voltage rises to 4.2V, the current should be 1A). The cut-off voltage and power must be set in this step.

ID	Step name	StepTime(hh:mm:ss:ms)	Volt(V)	Curr(A)	Cap(Ah)	Pressure(KG)	
1	CP_Chg		4.2000				
	IF	Volt	>=	0.0000V	Goto:Finish		

IF: The insertion of this step in any step is supported, and judge the direction of the step goto by its parameters. As shown below, you can add voltage, step time, environment temp and current, then you can choose Goto to the target step.

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(A)	Cap(Ah)
1	Rest	01:00:00:000				
	IF		Voltage	>=	0.0000V	Goto:Finish
2	End		Voltage			
			StepTime			
			Main channel te			
			Current			

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	Cap(Ah)	Pressure(KG)
1	CCCV_Chg			4.2000	1200.0		
	IF		Curr	<	100.0mA	And(&)	
	IF		StepTime	>=	30sec	Goto:Finish	
2	Rest	00:01:00:000					
3	End						

As shown above, in the CCCV_Chg step, when the current is less than 100mA and lasting more than 30 seconds, the step 1 switches to the end step without performing the second step.

ID	Step name	StepTime(hh:mm:ss:ms)	GoTo	Volt(V)	Curr(mA)	Cap(Ah)
1	Rest	01:00:00:000				
	Record	Time Section	> 100sec <= 200sec		Time: 2sec Curr: 0.0 mA	
2	End					

Start StepID

Record Condition

☒ Time sec

☐ Volt V

☐ Curr mA

Safety Limit

☐ Volt Lower V

☐ Volt Upper V

☐ Curr Lower mA

Aux Safety Limit

☐ Volt Lower V

☐ Volt Upper V

☐ Temp Lower °C

Remarks

Creator

P/N

Record: The insertion of this step in any step as a supplement to the main record condition is supported. As shown above, during the 1 hour's rest, when running to the period of 101-200

seconds, the record condition changes to 1 record every 2 seconds, the “Volt” and “Curr” in Record Condition can be also selected.

ID	Step name	StepTime(hh:mm:ss:ms)	Volt(V)	Curr(mA)	Stop Cur(mA)	Single Volt(V)
1	PCCCV_Chg		5.0000	1200.0	20.0	

PCCCV_Chg: Compared with CCCV_Chg, this step adds the option of “Single Volt”. When there is no value in the “Single Volt”, the pack charges in a constant voltage of the setting voltage (total voltage) ; when setting a value in the “Single Volt”, if the voltage of a cell reaches the setting value, the pack will begin CVC (even if the total voltage doesn’t reach the setting value). As shown above, assuming there is a pack with 4 hydrogen cells, each cell is 1.2V. According to the above step, if the voltage of one cell reaches 1.5V, the pack will begin CVC; if the cell voltage doesn’t reach 1.5V and the total voltage reaches 5V, the pack will charge in a constant voltage of the total voltage .

ID	Step name	StepTime(hh:mm:ss:ms)	Volt(V)	Curr(mA)	Stop Cur(mA)	Eng(Wh)
1	CV_DChg		3.0000	2000.0	200.0	

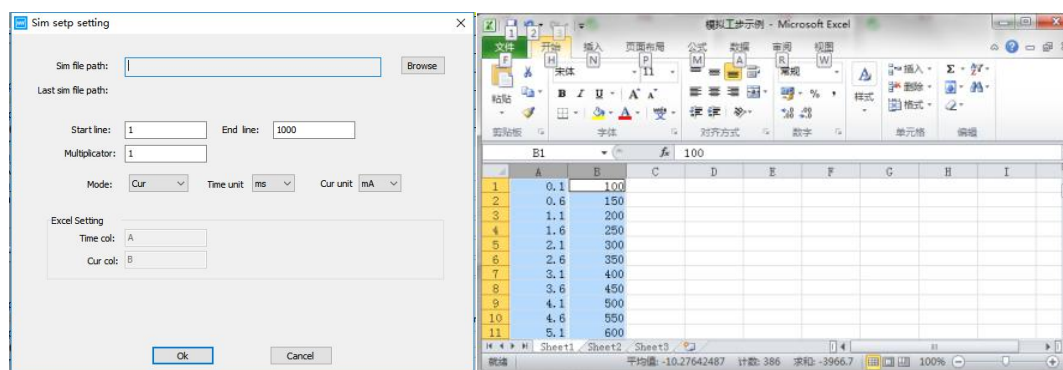
CV_DChg: Adopt it when the voltage required to be constant during the discharge, and the discharge current will gradually decrease. As shown above, the battery discharges at the maximum 2000mA (if less than 2000mA, discharges at the actual value, which depends on the battery voltage) until the voltage reaches 3.0V, then the voltage remains constant and the current begins to decrease, and the step will finish when the current falls to 200mA. If the current value is not set in this step, the starting current discharge value may reach the full scale current (depending on the initial voltage). This step requires hardware support (currently only XWJ_7.5.3D and 7.4.XS support this function).

ID	Step name	StepTime(hh:mm:ss:ms)	Volt(V)	Curr(mA)	ap(A) sure	Stop Cur(mA)
1	CCCV_DChg		3.5000	1200.0		10.0

CCCV_DChg: Discharge at a constant current value, when the voltage drops to the setting voltage, the voltage remains constant, the current gradually decreases, and then the step comes to the end when it drops to the cut-off current. As shown above, the battery discharges at 1200mA and decreases when voltage reaches by 3.5V, then the step finishes when current drops to 10mA (currently only XWJ_7.5.3D and 7.4.XS support this functionality).

ID	Step name	StepTime(hh:mm:ss:ms)	Volt(V)	Curr(mA)	Cap(Ah)	Pre
1	SIM	File path	Cur mode	Multiplicator: 1		

SIM: Compared with CCC and CCD steps, providing the step setting whose output current can vary by time. Compile the parameter in the table file, then load and execute. As shown below, create a new EXCEL file, select the column A for setting time value, column B for setting current value. In the simulation step settings, select the “Start line” and the “End line”, choose “cur” mode with “Time unit” for “s” and “Cur unit” for “mA”, then click “OK”. At this point, the channel changes by every 0.5 seconds per second, and the current continues for 0.5 seconds. Add “-” before the current in column B to indicate the reverse direction of the current (discharge).



ID	Step name	StepTime(hh:mm:ss.ms)	Volt(V)	Curr(mA)	Cap(Ah)	Pressure(KG)	Stop Cur
1	Rest	00:10:00:000					
2	Pause						
3	CC_Chg		4.2000	1000.0			
4	End						

Pause: Support inserting this step behind any other steps, when the step automatic running to pause, channel stops charging & discharging and moves on until continuing manual operation. As shown above, pause the test after resting 10 minutes, and start the next step of CCC.
(For example, if it needs to test the internal resistance of the battery for 150 cycles, setting a pause will automatically stop after 150 cycles, and then continuing after the test of internal resistance.)

Control Step: Support automation equipment linkage, and hardware support is needed.
Settings: Not available now.

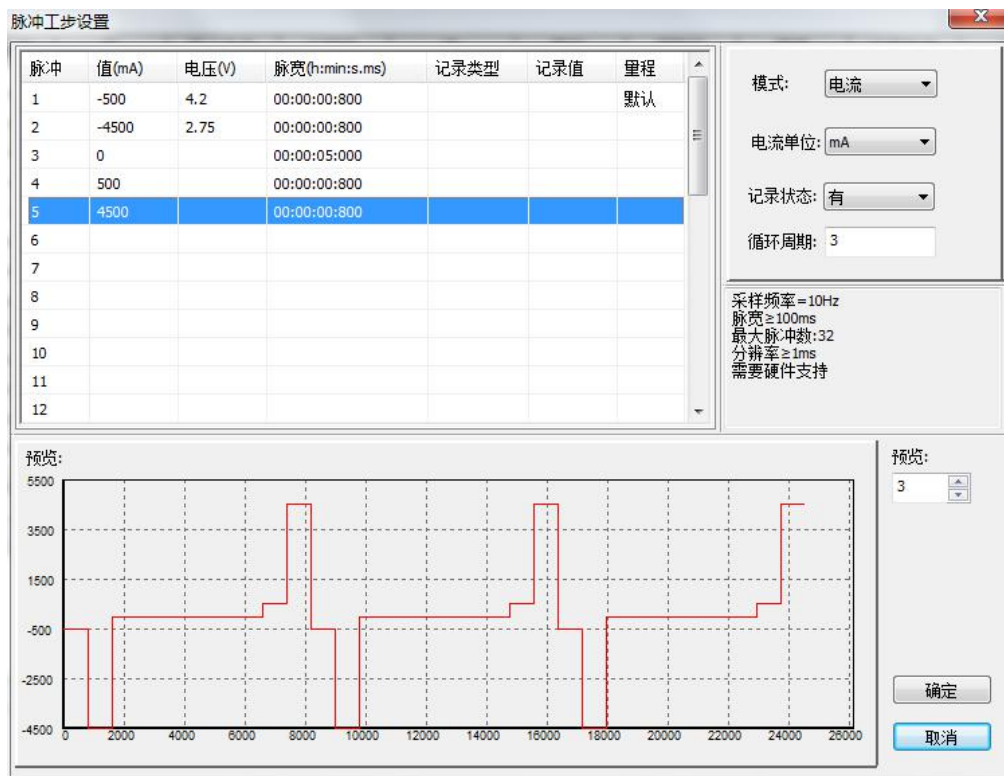
4. BuildTest.exe Operation

ID	Step name	StepTime(hh:mm:ss.ms)	GoTo	Volt(V)	Curr(mA)	Cap(Ah)	Pressure(KG)
1	Rest	10:10:00:000					
2	Control	Control type			Set Value		Compare value
3	End						
			Temperature output				
			Pump output				
			DisPump output				

4.1 Pulse Step Setting

Run BuildTest.exe in the desktop, create a new advanced step, select "Pulse", click the step parameter and the pulse step pops up, then set the interface.

Add "-" before the value to indicate the direction of the discharge current, the direction of the charging current is "+" (omitted), and arrange a set of voltage cut-off ranges in the voltage column. Set the record condition below the interface and save it, then select the channel through the client, load the pulse step and it can start to work.

**Note:**

BuildTest.exe is another step editor which can be divided into two types. The first is standard step mode, and the standard step setting is the same in the start-up interface, then save it separately after set. The second is advanced step mode, the pulse step needs to be set in the advanced step, each step is set independently in the record condition of advanced step.

4.2 Simulation Step Setting

Select the channel, click "start", choose simulation step, and double-click the "File path" to load parameters. File parameter is in the first two columns of EXCEL table, the first column is usually set as time column while the second column is set as value column, the units of these parameters are selected in the simulation step setting, then load and click "OK" to make the channel work after finishing the set. As shown below.

