

# **IT9000 Control Software**

## **PV3300 User Manual**

## Notices

© Itech Electronic, Co., Ltd. 2020

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior permission and written consent from Itech Electronic, Co., Ltd. as governed by international copyright laws.

### Manual Part Number

IT9000-PV3600

### Revision

1st Edition: March.26, 2020

Itech Electronic, Co., Ltd.

### Trademarks

Pentium is U.S. registered trademarks of Intel Corporation.

Microsoft, Visual Studio, Windows and MS Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries and regions.

## Warranty

The materials contained in this document are provided “as is”, and is subject to change, without prior notice, in future editions. Further, to the maximum extent permitted by applicable laws, ITECH disclaims all warrants, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. ITECH shall not be held liable for errors or for incidental or indirect damages in connection with the furnishing, use or application of this document or of any information contained herein. Should ITECH and the user enter into a separate written agreement with warranty terms covering the materials in this document that conflict with these terms, the warranty terms in the separate agreement shall prevail.

### Technology Licenses

The hardware and/or software described herein are furnished under a license and may be used or copied only in accordance with the terms of such license.

## Restricted Rights Legend

Restricted permissions of the U.S. government. Permissions for software and technical data which are authorized to the U.S. Government only include those for custom provision to end users. ITECH provides this customary commercial license in software and technical data pursuant to FAR 12.211 ( Technical Data) and 12.212 ( Computer Software) and, for the Department of Defense, DFARS 252.227-7015 ( Technical Data – Commercial Items) and DFARS 227.7202-3 ( Rights in Commercial Computer Software or Computer Software Documentation)

## Safety Notices

### CAUTION

A CAUTION sign denotes a hazard. It calls attention to an operating procedure or practice that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

### WARNING

A WARNING sign denotes a hazard. It calls attention to an operating procedure or practice that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.



### NOTE

A NOTE sign denotes important hint. It calls attention to tips or supplementary information that is essential for users to refer to.

## Content

<b>Chapter1</b>	<b>Brief Introduction .....</b>	<b>1</b>
1.1	Software Introduction .....	1
1.2	Initial Interface Introduction .....	1
<b>Chapter2</b>	<b>Basic Operation .....</b>	<b>3</b>
2.1	Hardware Configuration .....	3
2.1.1	Interface Introduction .....	3
2.1.2	Configure Hardware Information .....	4
2.1.3	Configure Communication Interface of Device .....	5
2.1.4	Parallel and Synchronization Configuration .....	7
2.2	Multiple Devices .....	9
2.3	Data Setting and Saving .....	11
2.4	Data Query .....	12
<b>Chapter3</b>	<b>Load Control Interface .....</b>	<b>14</b>
4.1	Introduction of Control Interface .....	14
4.2	System Setup .....	15
4.3	Setting Voltage or Current Value .....	17
4.5	Program Function .....	18
4.6	GO/NG .....	20
4.7	List .....	22
4.8	Battery Test .....	25
4.9	Curve Zoom In and Translation .....	26

# Chapter1 Brief Introduction

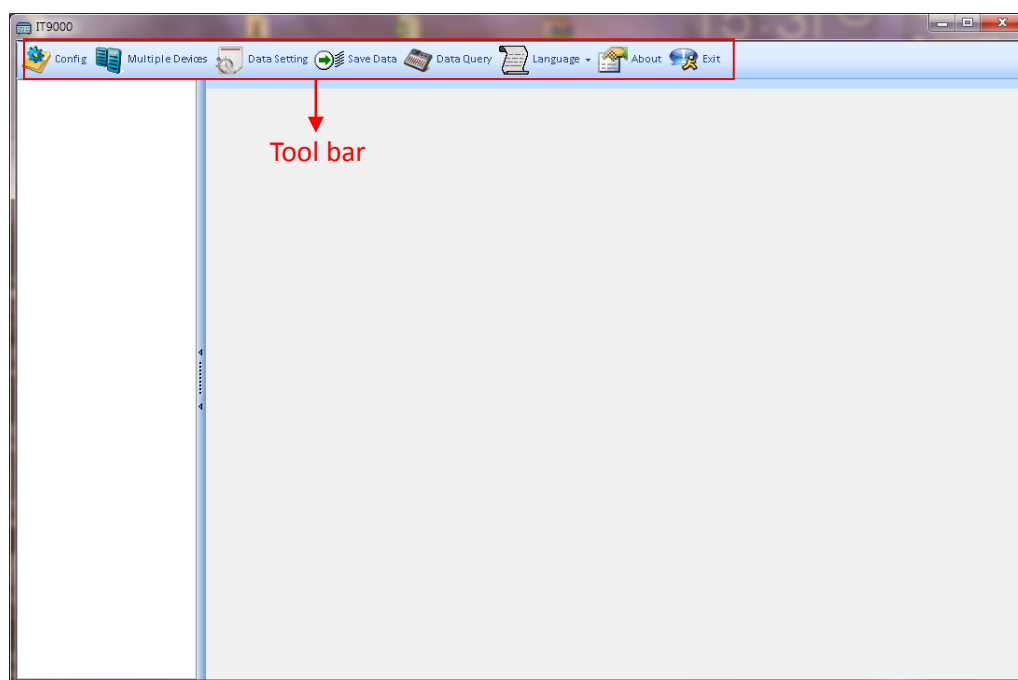
## 1.1 Software Introduction

IT9000 series software is a kind of easy-to-use and practicable control software designed by Itech Electronic Co., Ltd. It can work with IT-M3300 power supply, All the instrument models in the following interface show 3600, the user does not need to pay attention and instrument can be controlled normally.

Using IT9000 software you can make it simple to connect multiple IT-M3300 series power supplies with no programming, rapidly configure the most commonly used controls and measurements and record and view multiple measurements simultaneously. In addition, you can analyze results with built-in data export function in computer.

## 1.2 Initial Interface Introduction

When you run IT9000 software for the first time, the default UI language is English. You can click **[Language]** to set the desired language if needed.



The descriptions of each item in the tool bar are as follows.

- **Config**  
Configuration function, to configure hardware information for the device controlled by IT9000 software, including device alias, device interface and interface parameter, and to configure sub-devices (e.g., channels) for each device.
- **Multiple Devices**  
Multiple devices, to select multiple devices connected to IT9000 and control them in the same interface.
- **Data Setting**  
Data setting, mainly to select numeric field to be saved, device alias and

save interval before data saving.

- **Save Data**

Data saving, mainly to save current test data. Before data saving, please set data at first.

- **Date Query**

Data query, to open the data file saved before.

- **Language**

To select software language version, including Simplified Chinese, Chinese-traditional and English.

- **About**

To list related information of software, including Company website.

- **Exit**

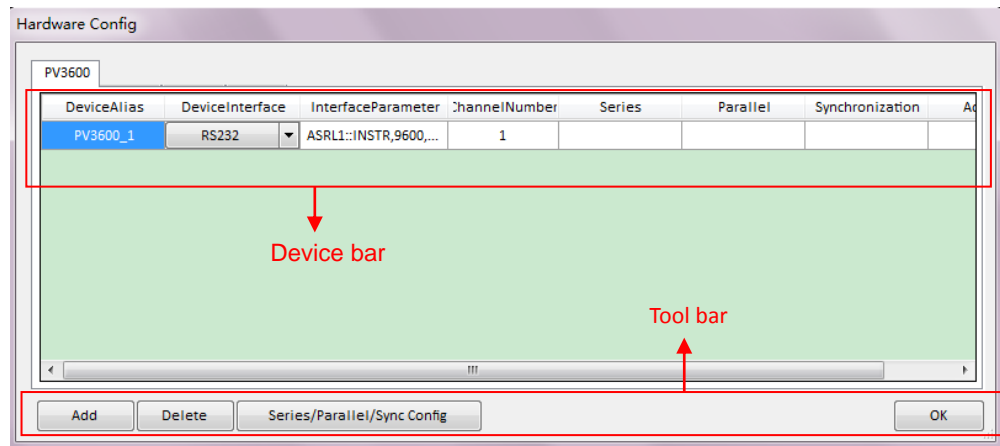
To exit IT9000 software.

## Chapter2 Basic Operation

### 2.1 Hardware Configuration

#### 2.1.1 Interface Introduction

The hardware configuration interface of IT9000 software is as shown below.



- The parameters in “Device bar” are described as follows.
  - ◆ Device Alias: the alias of a device, used to distinguish devices of the same model.
  - ◆ Device Interface: drop-down options include RS232, GPIB, USB and Ethernet.
  - ◆ Interface Parameter: the interface parameter corresponding to device interface.
  - ◆ Channel Number: to set the channel number of sub-device. The user needs to set on the software based on the corresponding channel number displayed when the device is powered on. If wrong channel number is configured, the device will buzz.
  - ◆ Series: to display series configuration name in series connection of devices.
  - ◆ Parallel: to display parallel configuration name in parallel connection of devices.
  - ◆ Synchronization: to display synchronization configuration name in synchronization of devices.
  - ◆ Address: to set load communication address (used for devices with frame format protocol).
- The main function in tool bar are described as follow.
  - ◆ Add: to add hardware device.
  - ◆ Delete: to delete specific device.
  - ◆ Series/Parallel/sync Config: to configure multiple devices to series connection, parallel connection or synchronization operation.
  - ◆ OK: to confirm hardware configuration information.

## 2.1.2 Configure Hardware Information

This function enables the user to create new hardware information or modify existing hardware device information. Detailed operation steps will be given below taking creation of new device information as example.

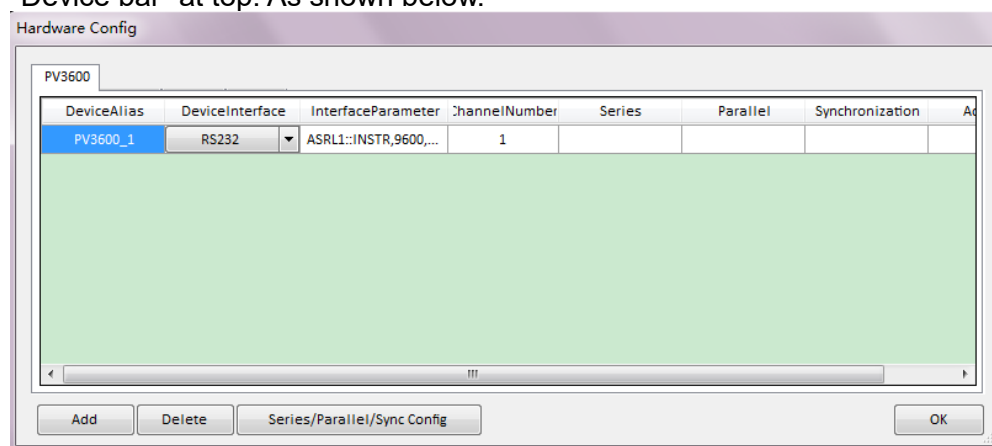
### Preparation

IT9000 software supports RS232, USB, GPIB and Ethernet serial port communication. The user need to connect the device and computer installing IT9000 software via communication interfaces at first.

1. Before configuring hardware information, ensure that the communication in the device side is consistent with that of the software side.  
The methods for querying the communication mode and parameters are as follows:
  - a) Power on the device.
  - b) Press the **[Shift] + [Save]** (System) keys to enter the system menu interface.
  - c) Select Comm and press **[Enter]**. The parameter becomes to be edited.  
The interface will automatically display the corresponding interfaces information according to the actual assembled communication board.
  - d) Use left or right arrow keys or rotate the knob to adjust the communication method to be consistent with actual application and press **[Enter]** to confirm.
2. Connect the device and computer using communication cables.

### Procedures

1. Run IT9000 software and click **[Config]**.
2. Click **[Add]** button in the configuration interface and display the currently added hardware device information and default parameter of device in the "Device bar" at top. As shown below.



To change default parameter of hardware device (e.g., device interface, interface parameter and channel number), you may click the parameter for change.

- Device Alias: double click to edit device alias.
- Device Interface: to select from the drop-down box.
- Interface Parameter: double click to configure in the Configure Dialog. For details, refer to Section 2.1.3 "Configure Communication Interface of Device".

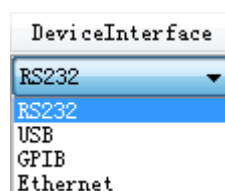
- Channel Number: set the channel number of sub-device. The channel number is changeable.
3. Click [OK] to save the configuration information of current hardware device. At this time, the device name (device alias @ channel number) will be displayed at top left of the interface. To pop up the Control Interface, you need to double click the Device Name.

### 2.1.3 Configure Communication Interface of Device

IT9000 software is installed in PC and interacts with matching hardware devices via different communication interfaces. This software supports interfaces like USB, RS232, GPIB and Ethernet interface. When configuring the hardware device, configure different interface types based on actual needs and set corresponding interface parameters for different interfaces.

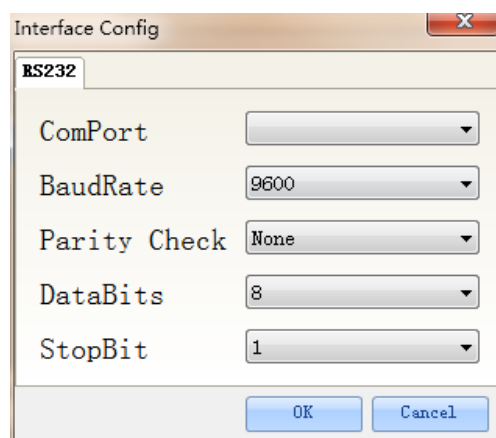
#### Operation steps

1. Select the device interface corresponding to the hardware device to be edited from the Hardware Configuration Interface, and select the interface type from the drop-down list.



2. After selecting the device interface, double click corresponding "Interface Parameter" column. The system will pop up "Interface Configuration" window.

#### ● RS232 Interface Parameter Configuration

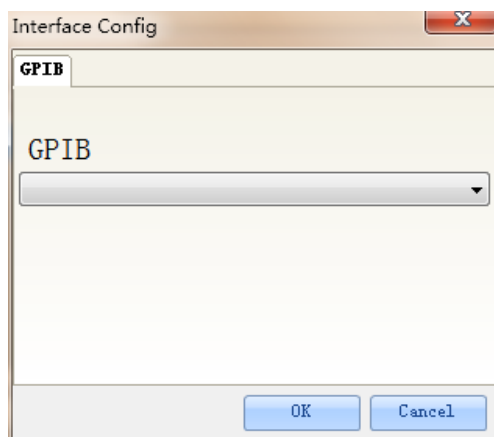


Serial interface: to select serial interface, i.e., the serial interface number occupied by RS232 communication cable interface.

Baud rate, parity check bit, data bits and stop bit must be configured consistently with those in menu setup.

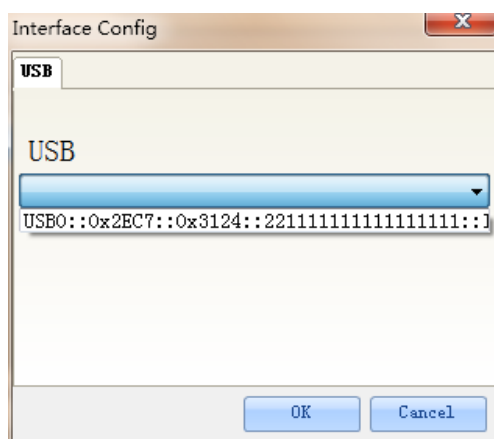


- GPIB Interface Parameter Configuration



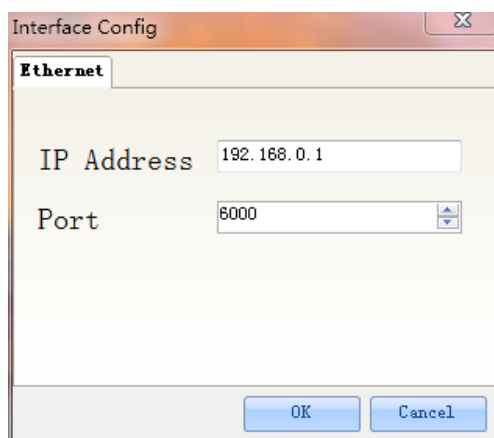
During GPIB communication of load device, the address setting range is: 0 to 30.

- USB Interface Parameter Configuration



- LAN Interface Parameter Configuration

If LAN interface is used for communication, both computers and device are connected via HUB (or, the device and computer are directly connected via cross network cable). The computer and device IP setting should be in a same network segment.

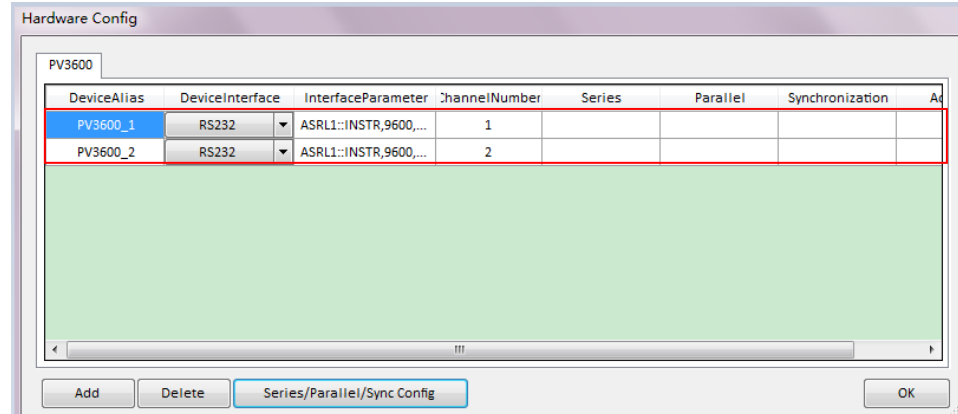


3. After interface parameter configuration, click "OK". Finish interface parameter configuration.

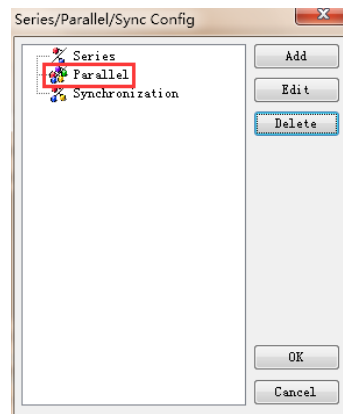
## 2.1.4 Parallel and Synchronization Configuration

### Parallel Configuration

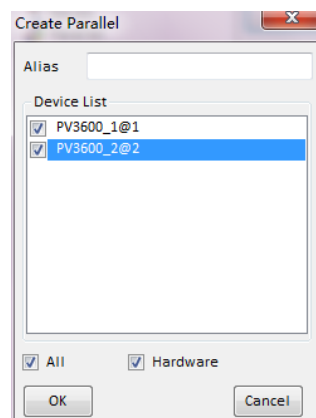
1. Follow the above steps to configure and connect 2 sets of IT-M3600 devices.



2. Click **[Series/Parallel/Synchronization]** button and click **[Parallel]** in the figure below.



3. Click **[Add]** button to create parallel.



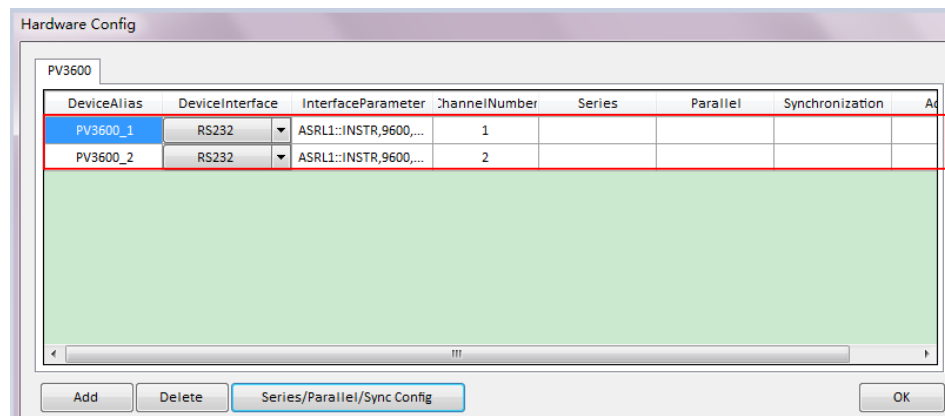
4. Name alias: IT3600. Click the box at front of PV3600\_1@1 and PV3600\_2@2 and select the devices for parallel, and also check the box at front of "Hardware".
5. Click **[OK]** button. The parallel configuration interface will display

configured device.

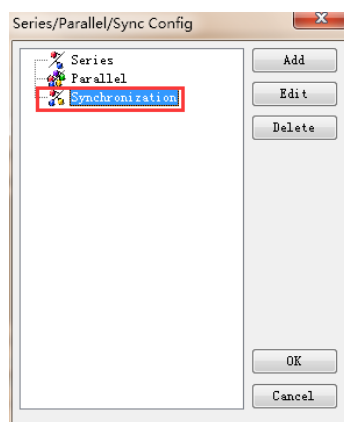
6. Click **[OK]** to save the current parallel configuration information. At this time, the parallel configuration name "IT3100\_2" will be displayed at the left top of the interface.

## Synchronization Configuration

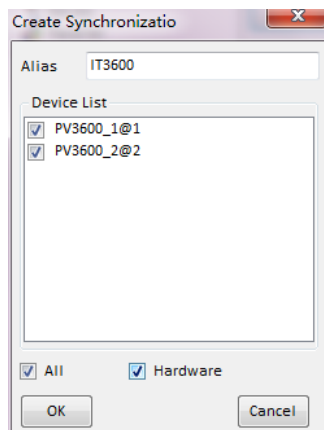
1. Follow the above steps to configure and connect 2 sets of IT-M3600 devices.



2. Click **[Series/Parallel/Synchronization]** button and click **[Synchronization]** in the figure below.



3. Click **[Add]** button to create synchronization.
4. Name alias: IT3600. Click the box at front of PV3600\_1@1 and PV3600\_2@2 and select the devices for synchronization, and also check the box at front of "Hardware".



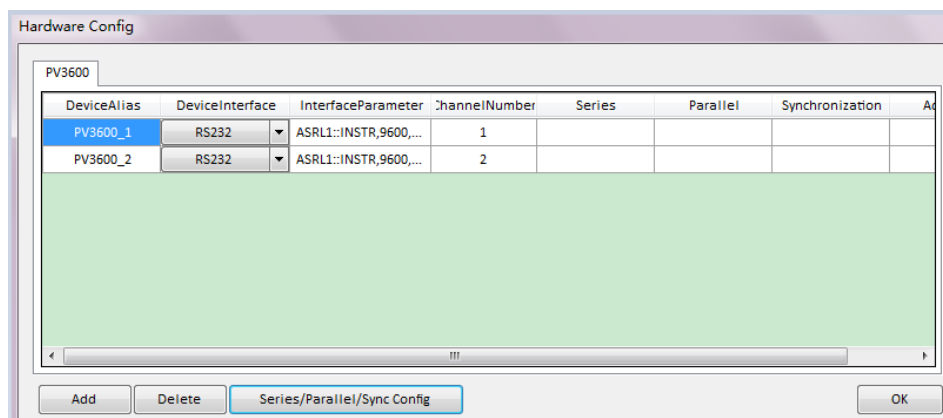
5. Click **[OK]** button. The synchronization configuration interface will display configured device.
6. Click **[OK]** to save the current synchronization configuration information. At this time, the synchronization configuration name "IT3600" will be displayed at the left top of the interface.
7. Double click IT3600 to display the Synchronization Control Interface

## 2.2 Multiple Devices

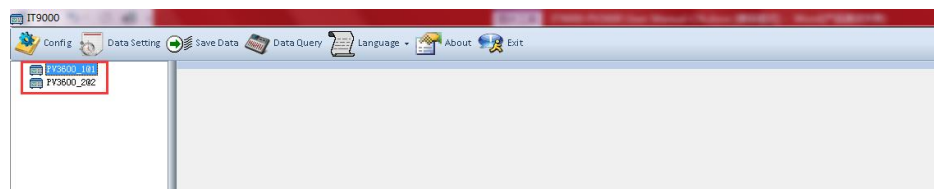
IT9000 software can control multiple devices on the same interface and rapidly configure the voltage value and current value and measurements and view multiple measurements simultaneously. Take two devices as an example to introduce the configuration procedures.

### Procedures

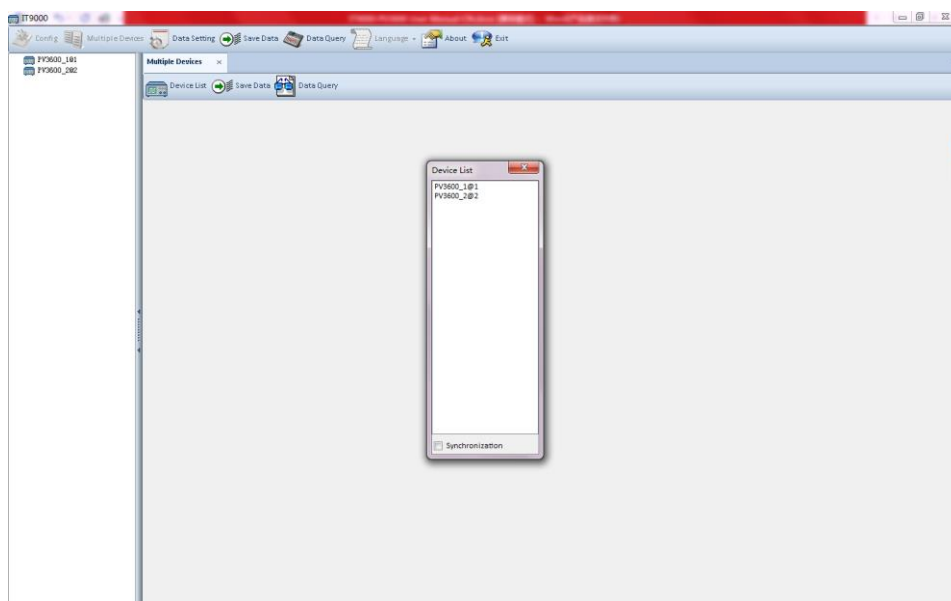
1. Follow the above steps to configure and connect 2 sets of IT-M3600 devices.



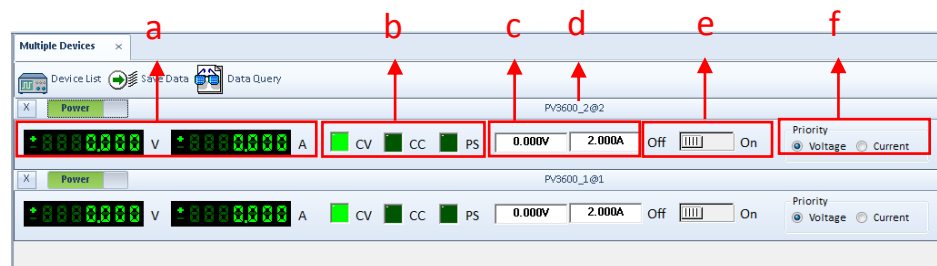
2. Click **[OK]** to save the current configuration information. At this time, the configuration names of each device (PV3600\_1@1 and PV3600\_2@2) are displayed on the top right of the interface.



- Click [Multiple Devices] to enter the following interface.




- Double click the PV3600\_1@1 and PV3600\_2@2 to select the devices needed.



The descriptions for each parameter on the interface are as follows.

- Alias: the alias for the connected devices.
- Measure voltage: to display the voltage measurement value of the device.
- Voltage: double-click to set the voltage setting value of the device.
- Set: when the setting in the software is finished, the voltage setting value doesn't take effect in the device until click Set.
- Measure current: to display the current measurement value of the device.
- Current: double-click to set the current setting value of the device.
- Set: when the setting in the software is finished, the current setting value doesn't take effect in the device until click Set.
- Output switch: to turn the output of all devices on or off.
- Save interval: to set the interval for the data save during the multiple devices test.

Save data: to save the voltage measurement value and current measurement value of all the devices in this interface.

The Power or Load button is used to switch the mode of instrument to power mode or load mode. And click the  button to remove the instrument.



### Note

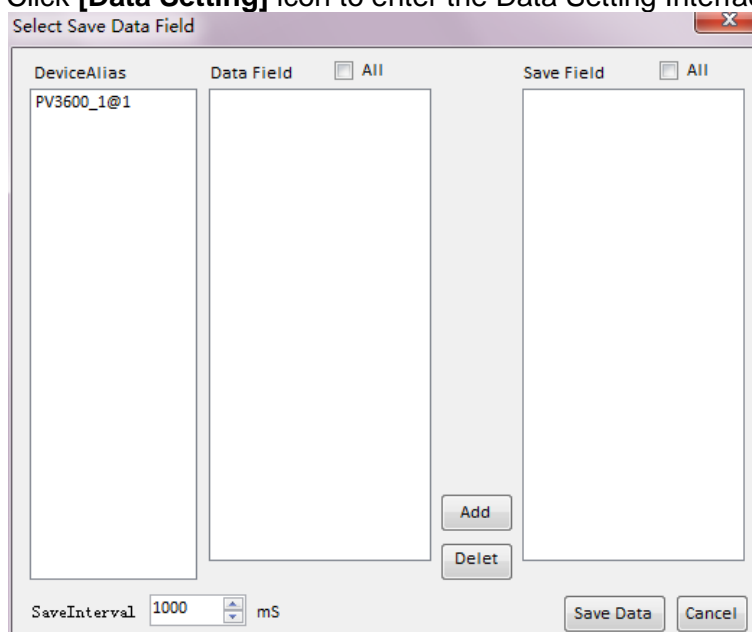
When the voltage setting value or current setting value exceeds the rated value of the device, click **[Set]** and the device issues an error and emits a short beep.

## 2.3 Data Setting and Saving

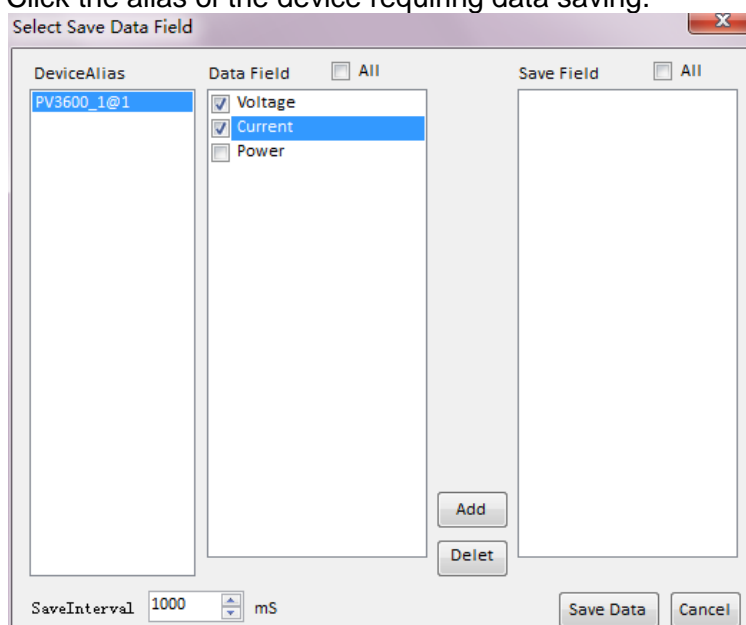
IT9000 can save test data. Before data saving, select the data field to be saved. Select the device alias for saving and the save interval.

### Operation steps

1. After device hardware configuration is finished, double click the device name (device alias @ channel number) displayed at top left of the interface. At this time, Device Control Interface will be displayed. As shown below.
2. Click **[Data Setting]** icon to enter the Data Setting Interface.

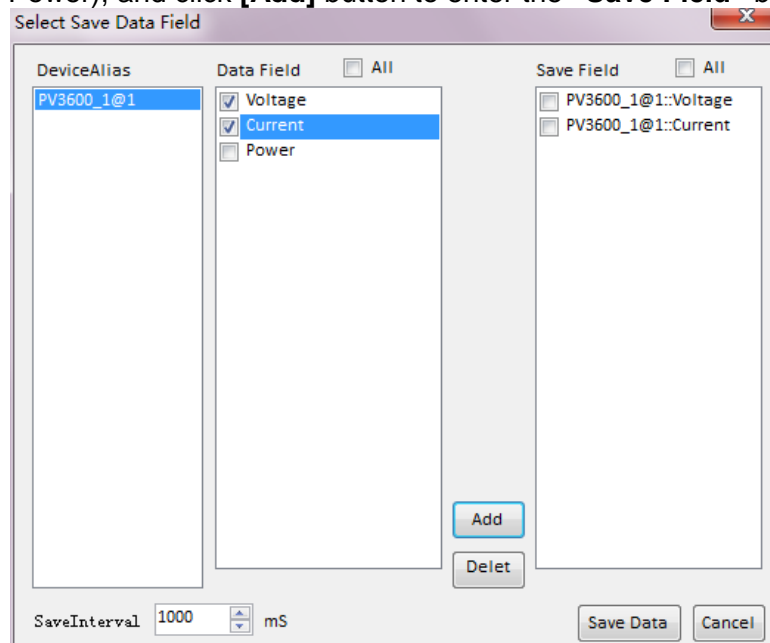


3. Click the alias of the device requiring data saving.




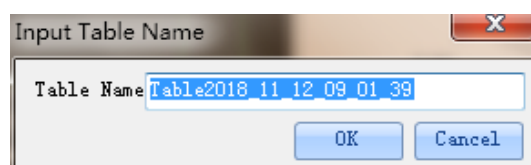
4. In **"Data Field"** bar, check the box at front of Data Field (Voltage, Current,


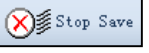
Power), and click **[Add]** button to enter the “Save Field” bar.



You may also click the Field Name in the Save Field bar. Click **[Delete]** button to delete the saved field.

5. Set **[Save Interval]**.
6. Click **[Save Data]** button to save data setting.
7. In the Control Interface, click  icon to appear the interface as shown below. You need to input Save File Name.




8. Click **[OK]** button in the figure above to start data save. Then, the icon will change to , and “Data Setting” and “Data Query” will be grayed out. Click  icon to stop saving.

## 2.4 Data Query

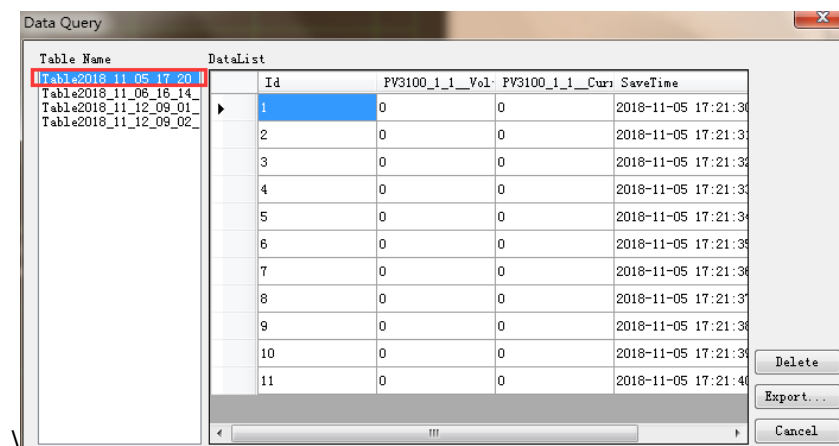
IT9000 software provides query function for measured data. You can query measured data at different periods of time and export and save these measured data.

### Operation steps

1. Click  icon to enter the Data Query Interface.



2. In Data Query Interface, select and click the “Table Name” of data saving, and the test data will be displayed in the data list. As shown below.



- Delete: to delete the data in current data list.
- Export: Click Export to export the data in current data list to EXCEL table. Saving path is optional.
- Cancel: to exit the Data Query Interface.

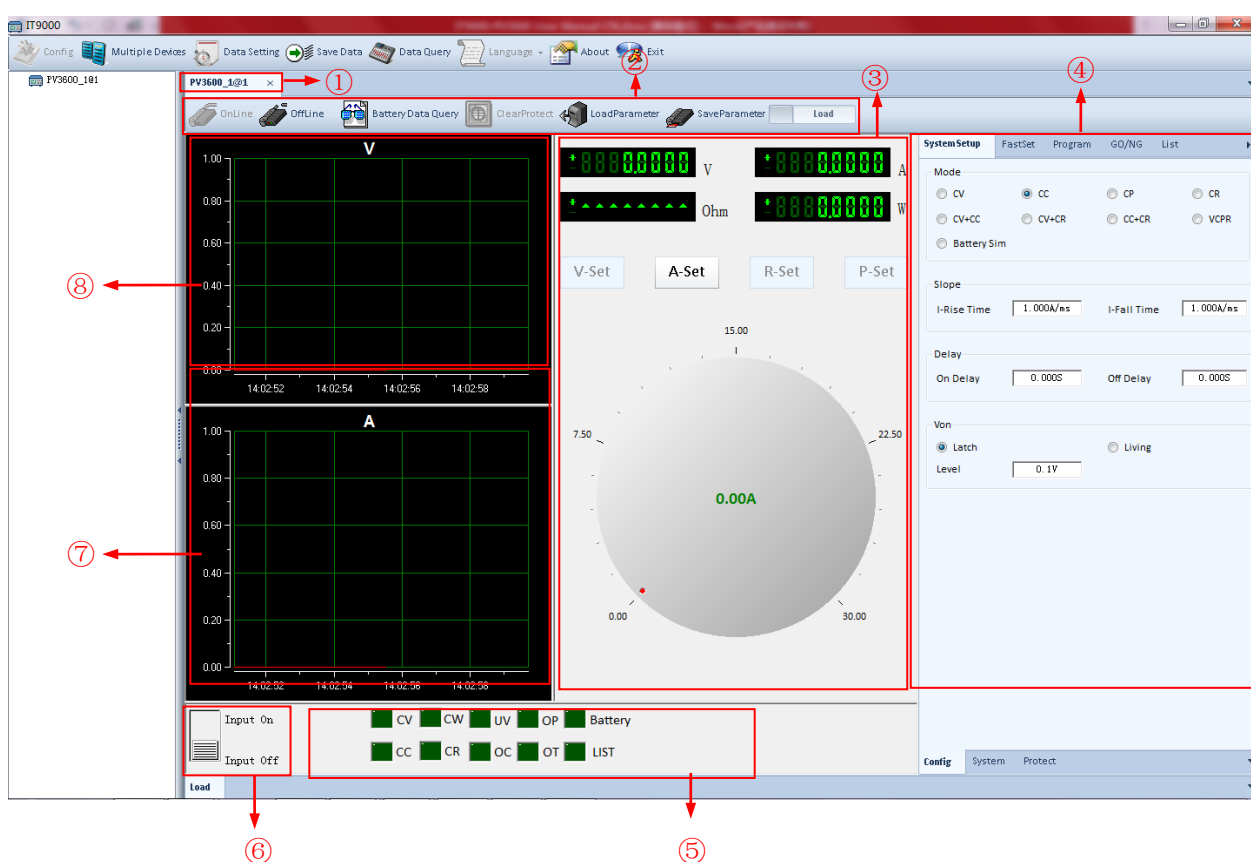


## Chapter3 Load Control Interface

IT9000 software can automatically identify instrument model and display model-based functions. For specific functions, refer to user manual of corresponding model. This chapter provides description of Load control functions of IT9000 software based on IT-M3632. The screenshot information varies from different models, so please take the actual interfaces of instrument and software.

### 4.1 Introduction of Control Interface

The Control Interface of IT9000 software (after clicking "Online") is as shown below.



1. Tab bar, to switch the display of Control Interfaces of different devices.

2. Toolbar, main functions include:

- **Online:** remote control, to set the instrument to Remote Control mode.
- **Offline:** local switch, to return the instrument back to Local Mode from Remote Mode.
- **Battery Data Query:** query the test data saved when the Battery Test function is running.
- **Clear Protect:** to clear instrument protection status.
- **Load Parameter:** to recall the parameter settings stored in a file suffixed with .it36, including the parameters in the program, scan, and List

interface.

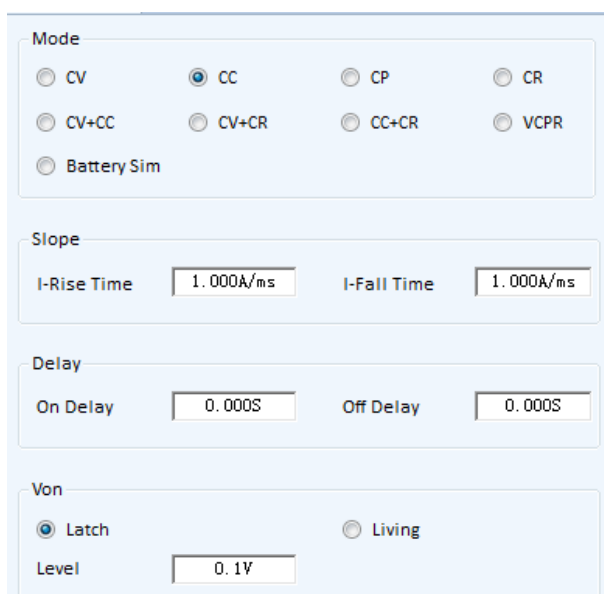
- **Save Parameter:** to save the parameters in the program and List interface to a file with a .it36 suffix for users to quickly and easily use.
3. Display the measurement power, voltage and current value, and use the rotary knob to adjust the voltage and current setting value.
  4. SystemSetup, FastSet, Program, GO/NG, List and battery test.
  5. Status indicators, the descriptions are as follows.
    - ◆ CV: the input is turned on and the device is in constant voltage mode.
    - ◆ CC: the input is turned on and the device is in constant current mode.
    - ◆ CW: the input is turned on and the device is in constant power mode.
    - ◆ CR: the input is turned on and the device is in constant resistance mode.
    - ◆ OP: over-power protection.
    - ◆ OT: over-temperature protection.
    - ◆ UV: under-voltage protection.
    - ◆ OC: Over-current protection.
    - ◆ Battery: battery test operation.
    - ◆ LIST: list operation.
  6. Output On/Off switch
  7. Current curve graph
  8. Voltage curve graph

## 4.2 System Setup

IT9000 software provides configuration function. User can configure the most commonly used controls and measurements in the Config menu, System menu and Protect menu of the device. Please refer to IT-M3300 user manual for more information about the detailed introduction.

### Config

In the Config menu interface, the user can configure the mode of load, and current rising and falling time, input-on and input-off delay time, Von state and level.

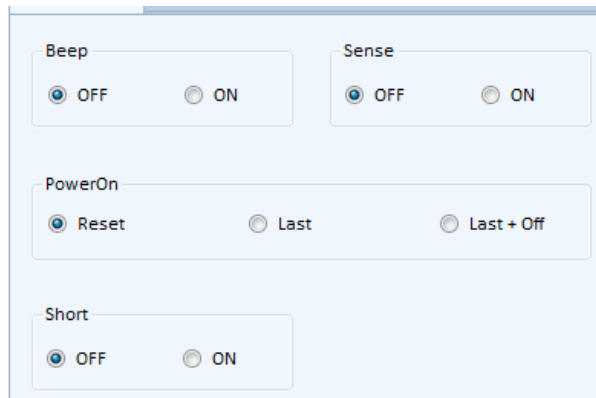


The screenshot displays the Config menu interface with the following settings:

- Mode:**
  - ☐ CV
  - ☒ CC
  - ☐ CP
  - ☐ CR
  - ☐ CV+CC
  - ☐ CV+CR
  - ☐ CC+CR
  - ☐ VCPR
  - ☐ Battery Sim
- Slope:**
  - I-Rise Time: 1.000A/ms
  - I-Fall Time: 1.000A/ms
- Delay:**
  - On Delay: 0.000S
  - Off Delay: 0.000S
- Von:**
  - ☒ Latch
  - ☐ Living
  - Level: 0.1V

## System Menu Interface

In the System menu interface, the user can turn the beeper sound on or off, set sense state, short function state, and specify the power-on state.

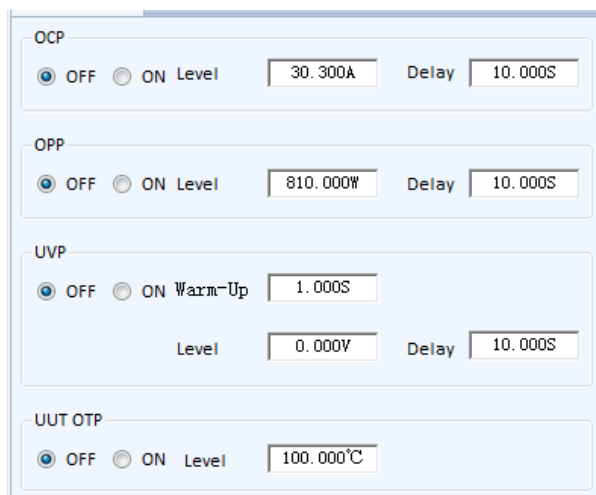


The System Menu Interface is a web-based control panel with a light blue background. It contains four main sections, each with a title and a set of radio buttons:

- Beep:** Two radio buttons labeled "OFF" (selected) and "ON".
- Sense:** Two radio buttons labeled "OFF" (selected) and "ON".
- PowerOn:** Three radio buttons labeled "Reset" (selected), "Last", and "Last + Off".
- Short:** Two radio buttons labeled "OFF" (selected) and "ON".

## Protect Menu Interface

You can set the following functions in the Protect menu interface.



The Protect Menu Interface is a web-based control panel with a light blue background. It contains four main sections, each with a title and a set of controls:

- OCP:** Two radio buttons labeled "OFF" (selected) and "ON". To the right are two input fields: "Level" with the value "30.300A" and "Delay" with the value "10.000S".
- OPP:** Two radio buttons labeled "OFF" (selected) and "ON". To the right are two input fields: "Level" with the value "810.000W" and "Delay" with the value "10.000S".
- UVP:** Two radio buttons labeled "OFF" (selected) and "ON". To the right are three input fields: "Warm-Up" with the value "1.000S", "Level" with the value "0.000V", and "Delay" with the value "10.000S".
- UUT OTP:** Two radio buttons labeled "OFF" (selected) and "ON". To the right is one input field: "Level" with the value "100.000°C".

## 4.3 Setting Voltage or Current Value

You can set voltage or current value by the following three methods.



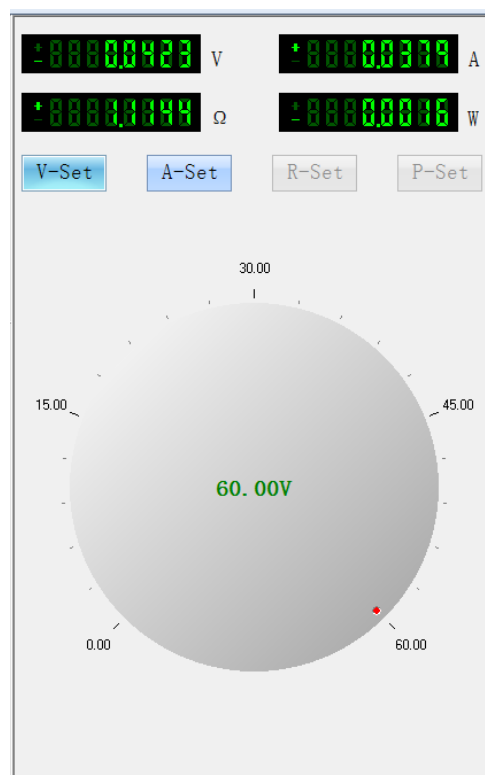
### Note

When setting the set value with software, be sure that you have clicked **[Online]** to set the power supply to Remote Control status. "Online" status is gray, click "Offline" to disconnect Remote Control status.

### Simulated Pulsating Knob

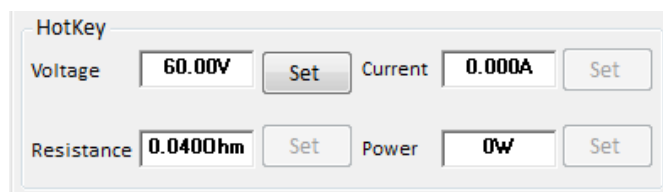
Move the mouse to Simulated Pulsating Knob. Click and rotate the mouse to set the value. The displayed power, voltage, current and resistance values are the real-time measurement values.

Voltage and current ranges differ from models. The figures below are only for reference.



### Fast Setting Function

Using Simulated Pulsating Knob can't set the value accurately. If you want to set accurately, you can enter the desired voltage, current, power or resistance values in the following fast set boxes. Click **[Set]** and then the setting value will take effect.



The image shows a 'Fast Setting Function' interface. It has a 'HotKey' label at the top. Below it, there are four input fields with 'Set' buttons: Voltage (60.00V), Current (0.000A), Resistance (0.0400hm), and Power (0W). Each input field has a 'Set' button next to it.

## Scan Function

The user can use scan function to create a test program made of multiple scan steps. Under the specified mode such as CC/CV/CR/CW, set the start value, stop value and the step value. The device will input according to the setting values, from start value to stop value and increase by the step value. You can also set the delay time and repetition counts for each step.

The operation steps to edit the scan test program are as follows.

1. Click **[Add]** to add a group of scan data in the scan edit area.

(Click **[Delete]** to delete the selected step.)

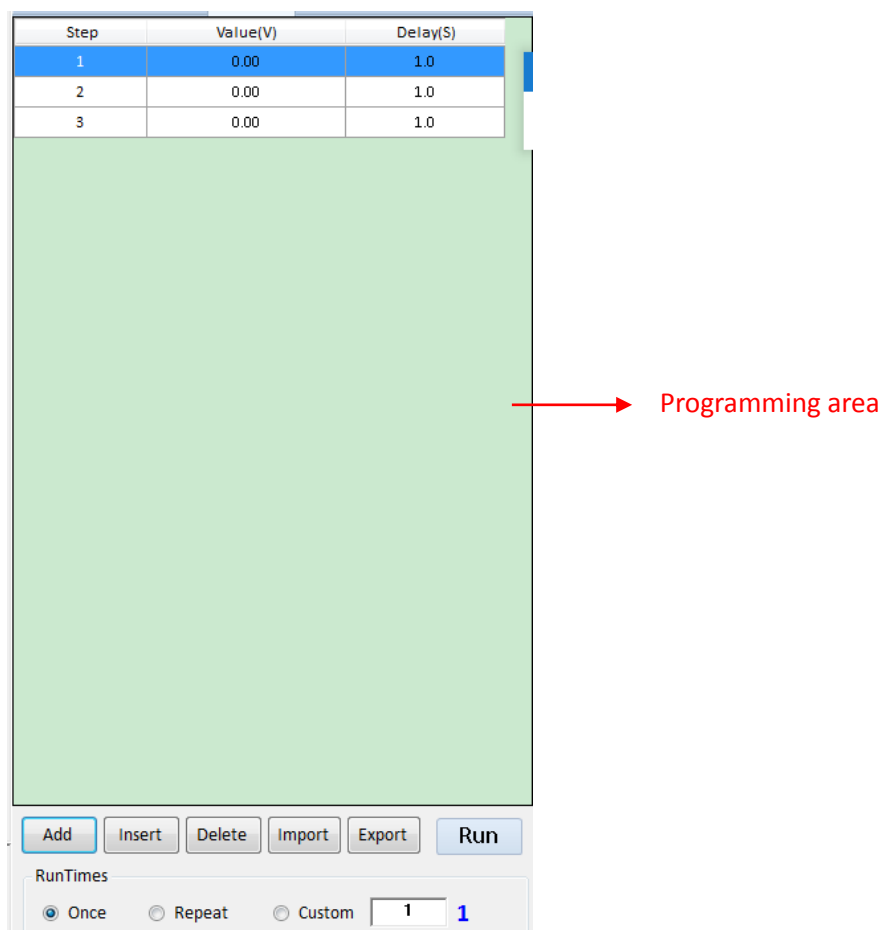
Start(V)	Stop(V)	Step(V)	Delay(S)	
0.00	60.00	0.10	1.00	1
0.00	60.00	0.10	1.00	1
0.00	60.00	0.10	1.00	1

2. Double click the value corresponding to scan data (Start, Stop, Step, Delay, Loop). Set them to required values.
3. If needed, repeat steps 1 through 2 to continue to add the scan step.
4. After finishing the edit, click **[Run]** to execute the scan operation.

The **[Run]** button will change to **[Stop]** button once the operation starts. Click **[Stop]** to pause the scan operation.

## 4.5 Program Function

The user can use program function to create a test program made of multiple steps. The user need to set the value and delay time for each step, and can also set the repeat times for the test program. In addition, the user can save the test program by exporting it to PC and can also import it from PC.



## Program Interface Introduction

**Add:** Add a step. Click this button to add 1 step.

**Insert:** Insert a step. Click this button to insert 1 step before current step.

**Delete:** Delete a step. Click this button to delete current step.

**Import:** Import external program documents.

**Export:** Export program file being edited.

**Run Times:** Run times of List programs, which can be set as Once, Repeat or Custom. When it is customized, you need to enter the run times.

**Run:** Run program.

## Edit Program

1. Click [Program] tab to enter Fast Programming page.
2. At the bottom of Programming page, click [Add] button to add the first step of program.

Step	Value(V)	Delay(S)
1	0.00	1.0
2	0.00	1.0
3	0.00	1.0

3. Double click the value corresponding to program step. Set them to required

values.

4. If needed, repeat step 2 through 3 to add steps.

## Import File from Externals

IT9000 software supports import function of program files. The user can finish the editing of program file in Excel and import it into the software. This function simplifies the program file edit and facilitates user operation. Detailed operation steps are as below:

1. Create a new Excel document on local PC and name it program.
2. Open the Excel document and save it as in "other formats" i.e. "(\*.csv)".
3. Open the *program.csv* document and edit the program. Set every step of the program and corresponding parameters. After setting, save and close the document.

Value(V)	Delay(S)
0	1
0	1
0	1
0	1

4. Click **[Import]** button. Select and open *program.csv* file. Finish import of the program file.

Step	Value(V)	Delay(S)
1	0.00	1.0
2	0.00	1.0
3	0.00	1.0

## Run Program File

1. Follow the steps above to edit program file.
2. Set Run Times, including Once, Repeat or Custom. When Custom is selected, you may set the repetition count of programs.

RunTimes
☒ Once
☐ Repeat
☐ Custom
1



### Note

The blue number is the current execute count. Once the operation executes once, the number increases by one.

3. Click **[Run]** to execute the program operation.

The **[Run]** button will change to **[Stop]** button once the operation starts. Click **[Stop]** to pause the operation.

## 4.6 GO/NG

With this function, you can test whether the selected electronic load meets required specifications.



Step	Short	Mode	Set(A/V/Ohm/W)	Measure(A/V/Ohm/W)
1	<input type="checkbox"/>	CV	60.0000	0.0000
2	<input type="checkbox"/>	CV	60.0000	0.0000
3	<input type="checkbox"/>	CV	60.0000	0.0000

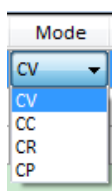
Edit area

Add Insert Delete Import Export Run

## Interface Introduction

**Short Short:** to select whether short circuit test is required. If so, click the box.

**Mode Mode:** to select load mode. Click the drop-down arrow in Mode bar to pop up the mode list as shown below. Select the required mode.



Mode

CV

CC

CR

CP

**Set(A/V/Ω/W) Set(A/V/Ω/W):** to set the set value under specific mode, like CC 3A.

**Measure(A/V/Ω/W) Measure(A/V/Ω/W):** this option is a read-back value and requires no setting.

**Type Type:** This option is measured value type. Setting method is same as mode selection. Options include V, I, R, W.

**Max(A/V/Ω/W):** to set maximum read-back value.

**Min(A/V/Ω/W):** to set minimum read-back value.



Delay(S) Delay(S): to test the delay time of each step.

Pass: to judge test results. This option cannot be set.

### Edit the GO/NG

1. Click "GO/NG" tab to enter Test page.
2. At the bottom of Test page, click "Add" button to add the first step of Test procedure.
3. Set short circuit, mode and type.
4. Double click the value corresponding to test program step (Set, Max, Min, Delay). Set them to required values and click OK.
5. Repeat steps 2-4 to set other four steps of Test Procedure.

### External import of GO/NG program

1. Create a new Excel document on local PC and name it Test 1.
2. Open the Excel document and save it as in "other formats" in (\*.csv).
3. Open the Test 1.csv document and edit the Test. Set every step of the Test and corresponding parameters.

You can also "Export" a .csv file template and edit based on this template.

4. Click "Import" button. Select and open Test 1.csv file. Finish import of the Test file.

### Run GO/NG Program

1. Follow the steps above to edit Test file.
2. Click "Run" to run program file. Click "Stop" to stop operation.
3. After running is completed, click "Export" to save the test results to Excel.
4. Name the file as Test. Open Test to display measured value and test result.

## 4.7 List

The user can use list function to create a test program made of multiple steps. Each list program can be made of up to 100 steps. The user need to set voltage or current, slope and dwell time for each step. The user also can set repeat times, end state and so on for each list program.



- Step: The number of the voltage/current point in the List waveform. No settings are required here.
- Value: The set value of the voltage/current point.
- Slope: The slope of the rise or fall from the previous voltage/current point to the currently set point.
- Time: The duration of the currently set voltage/current point.
- Add: Add a step.
- Insert: Insert a step before the currently selected step.
- Delete: Delete the currently selected step.
- Import: Import the edited List waveform file (.csv format) from the outside.
- Export: Export the currently edited List waveform to a file in .csv format.
- Repeat: The number of repetitions of the List waveform. The default 0 means that after the user clicks "Run", the waveform will be output repeatedly until the user clicks "Stop" to stop the output.
- Mode: select the list mode.
- End State: Indicates the working status of the instrument after the List waveform output ends
  - Normal: Returns to the state before the List waveform was output.
  - Last: Stays in the state of the last voltage/current/resistance/power point of the List waveform.

- FileIndex Select the name of the List waveform file.
- Load: Recall the List waveform file which is saved in the instrument to the software interface.
- Download: Save the List waveform file currently edited in the software interface to the inside of the instrument.
- Run: Run to output the currently edited waveform.

## Edit the List

1. Click "List" tab to enter Fast Programming page.
2. At the bottom of Programming page, click "Add" button to add the first step of program.
3. Double click the value corresponding to program step (Value, Slope, Time). Set them to required values and click OK.
4. Repeat step 2-3 to set other four steps in List file.
5. Set parameters such as "Mode", "End State", and "Repeat".

IT9000 software supports import function of list files. The user can finish the editing of list file in Excel and import it into the software. This function simplifies the list file edit and facilitates user operation. Detailed operation steps are as below:

1. Create a new Excel document on local PC and name it List 1.
2. Open the Excel document and save it as in "other formats" i.e. "(\*.csv)".
3. Open the *List 1.csv* document and edit the list file. Set every step of the list file and corresponding parameters. After setting, save and close the document.

Value	Slope(S)	Time(S)
1	0.001	0.001
2	0.001	0.001
3	0.001	0.001

4. Click [Import] button. Select and open List 1.csv file. Finish import of the list file.

## Load the List File from Device to Software

IT9000 software supports load function of list files. The user can load the list file from device to software. Detailed operation steps are as below:

1. Edit the list file on the device and save as List5.
2. Click the drop-down arrow next to the file index and select FILE5.
3. Click **[Load]** and the list page will display the list5 file.

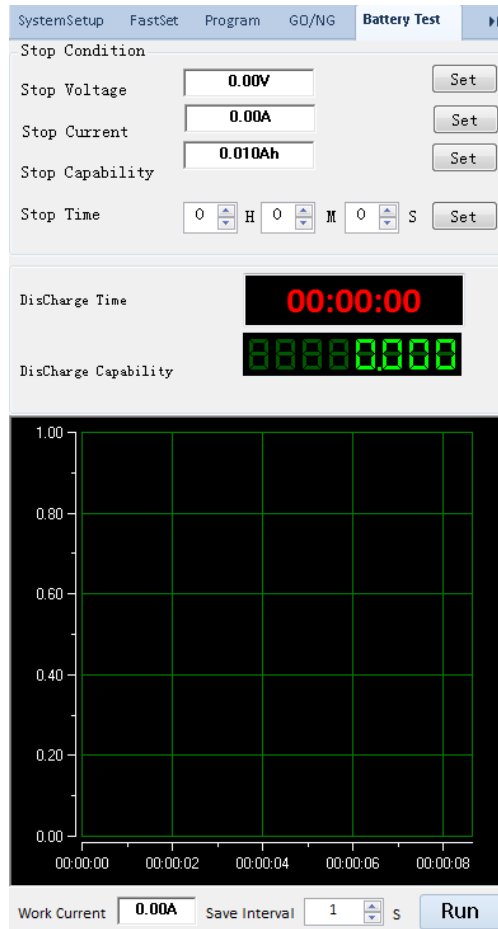
## Run List File

1. Follow the steps above to edit list file.
2. Set end state and trig out state.
3. Set the number of list repetitions.

1. Click **[Run]** to execute the list file. And Clicking **[Stop]** can pause the test.

## 4.8 Battery Test

When the DUT is a battery, the electronic load will discharge the battery in constant current, constant power or constant resistance mode. The user needs to set the stop voltage, stop capacity and stop time. The interface will display discharge time and discharge capacity. Details are as shown below.



The screenshot shows the 'Battery Test' tab in the software interface. It includes sections for 'Stop Condition' with input fields for Stop Voltage (0.00V), Stop Current (0.00A), Stop Capability (0.010Ah), and Stop Time (0 H 0 M 0 S). Below these are digital displays for 'DisCharge Time' (00:00:00) and 'DisCharge Capability' (8888.0000). A graph area shows a grid with the y-axis ranging from 0.00 to 1.00 and the x-axis from 00:00:00 to 00:00:08. At the bottom, there are controls for 'Work Current' (0.00A), 'Save Interval' (1 s), and a 'Run' button.

- Stop Voltage: Stop the test when the battery voltage is the set value.
- Stop Current: Stop the test when the battery current is the set value.
- Stop Capability: Stop the test when the capacity reaches the set value.
- Stop Time: Stop the test when the test duration reaches the set value.
- DisCharge Time: Display the battery discharge time.
- Discharge Capability: Display the battery discharge capacity.
- Work Current: The current value of load.
- Save Interval The time interval for saving battery discharge test data.
- Run: Start running the battery discharge test. After clicking "Run", the interface prompts as shown below.

### Procedure:

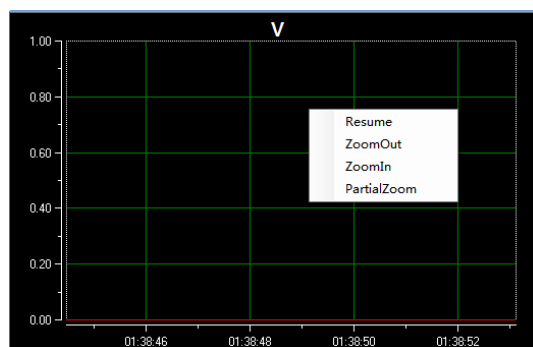
1. Click **[Battery Test]** and enter into the battery test page.
2. Set the stop conditions, including stop voltage, stop current, stop capacity

and the stop time. Click **[Set]** next to the input box and the setting value will take effect.

3. Set the work voltage, work current and saving interval.
4. Click [Run] to execute the battery test.

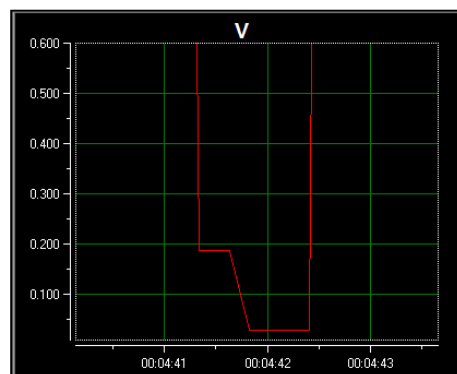
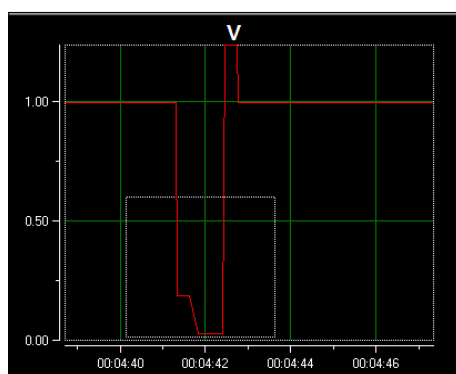
## 4.9 Curve Zoom In and Translation

In the IT9000 software, voltage and current curve graphs have such functions as Resume, Zoom Out, Zoom In and Partial Zoom. Right click any one at the curve graph, as shown below.



### Curve zoom out

1. Right click the curve graph and select “Partial Zoom”. At the bottom of cursor will display a small rectangle box.
2. Move the cursor of small rectangle box to pull out a bigger rectangle box to define the location which you need enlarge the partial wave.
3. Release the mouse left key and the image will be promptly zoomed out.

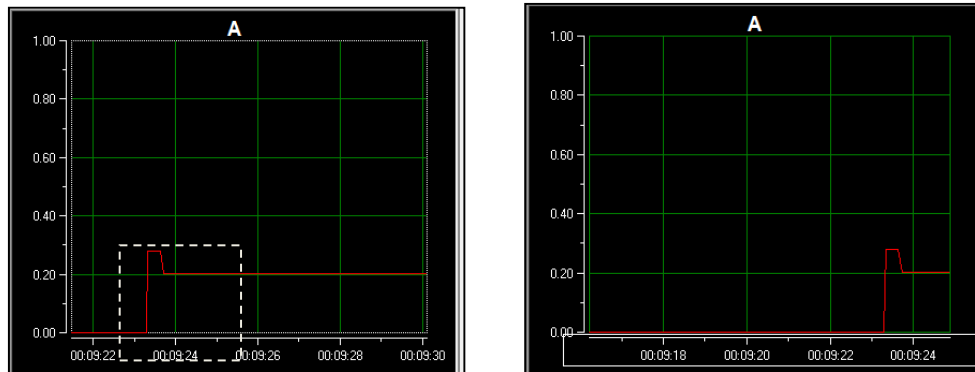


4. To resume dynamic records, right click the curve graph and choose “Resume”.

### Translation view

1. Move the cursor shape to any position of the horizontal coordinate axis (Time Axis) and the mouse will change to be a hand.
2. Hold down the mouse left key to move the mouse. When moving left, you will see the curve after the current time; when moving right, you will see the curve before the current time.

3. Similarly, you can translate the voltage/current coordinate to view curve.



To resume dynamic records, right click the curve graph and choose “Resume”.

## 联系我们

感谢您购买 ITECH 产品，如果您对本产品有任何疑问，请根据以下步骤联系我们：

1. 请查阅随箱附带的资料光盘相关手册。
2. 访问艾德克斯网站 [www.itechate.com](http://www.itechate.com)。
3. 选择您最方便的联系方式后进一步咨询。