IT9000 Control Software

PV9100 User Manual

Notices

Manual Part Number

IT9000-PV9100-402482

Revision

1st Edition: JUN 16, 2016

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NOTE

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

Contents

Chapter1 Brief Introduction

1.1 Software Introduction

IT9000-PV9100 is a kind of easy-to-use and practicable control software designed by Itech Electronics Co., Ltd. It is applicable to Itech IT9100 Series power meter. With this software, you can take all operations for power meter front panel via computer control and enjoy great convenience in remote control. This software supports RS232, USB, GPIB and Ethernet serial port communication.

1.2 IT9000 Interface Introduction

After run IT9000，the software will initialize, in about 2 seconds, the below interface will appear:
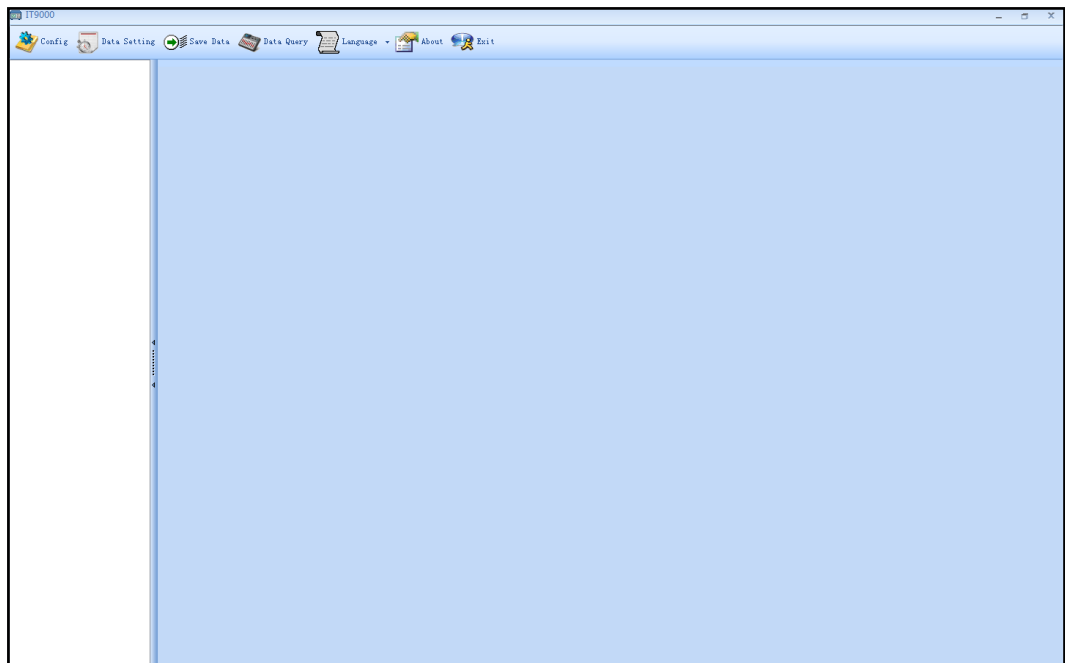
The interface is described as follows:
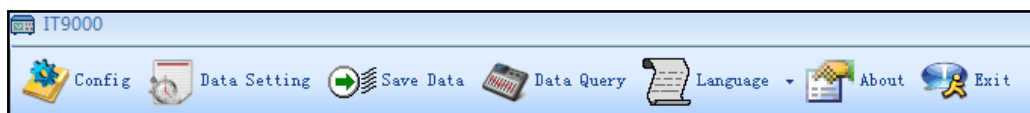
- **Config**
  Configuration function, to configure hardware information for control power meter device of IT9000 software control, including power meter device alias, device interface and interface parameter, and to configure sub-devices (e.g., channels) for each device.
- **Date Setting**
  Data setting, mainly to select numeric field to be saved, device alias and save interval before data saving.
- **Save Date**
  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.
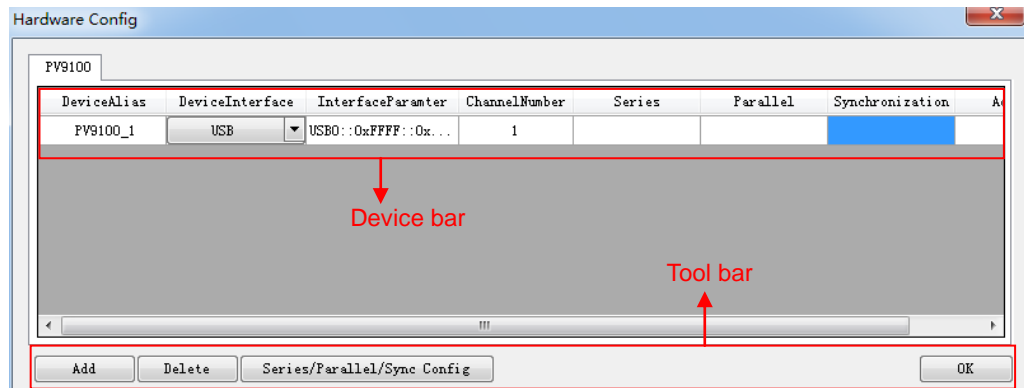- **Exit**

  To exit IT9000 software.

Note

About the detailed function of IT9121/IT9121E, please refer to IT9121/IT9121E User Manual.

Chapter2 Basic Operation

2.1 Hardware Configuration

2.1.1 Function Introduction

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

- The "Device bar" includes settings for device alias, device interface, interface parameter and channel number:
  - Device Alias: the alias of a device, used to distinguish devices of 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.
  - 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 power meter communication address (used for devices with frame format protocol).
- Main toolbar functions:
  - Add: to add hardware device.
  - Delete: to delete specific device.
  - Series/Parallel/sync Config
 - OK: to confirm hardware configuration information.

📖 Note

IT9121/IT9121E does not support parallel and synchronous operation.

2.1.2 Configuring Hardware

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.

Operation steps

1. Run IT9000 software and click "Configure" icon.

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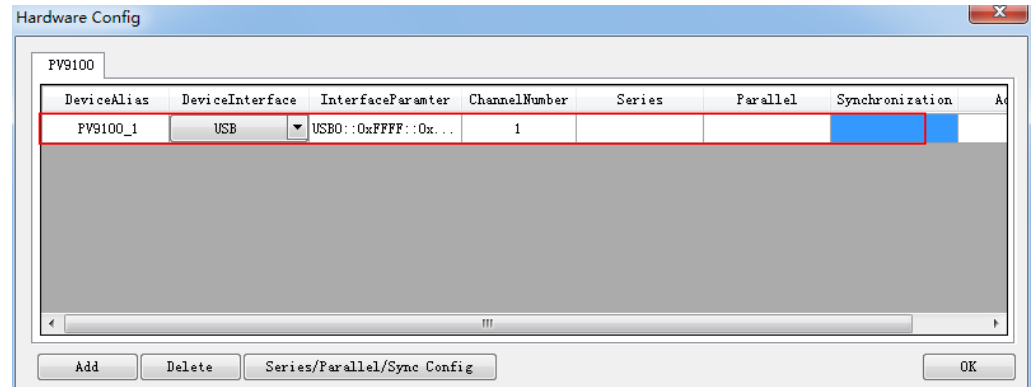
To change default parameter of hardware device (e.g., device interface, interface parameter and channel number), you may click the parameter for change.

● 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 "Communication Interfaces of Configuration 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.
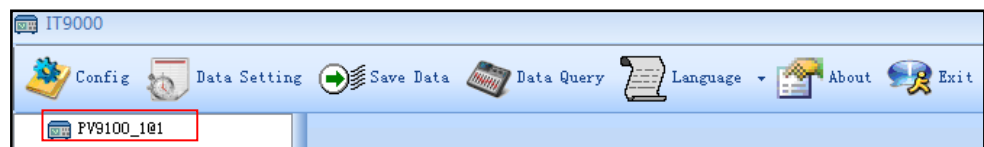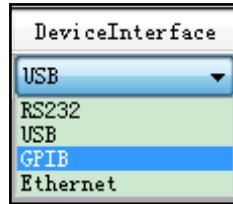

2.1.3 Configuring Interface of Device

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.
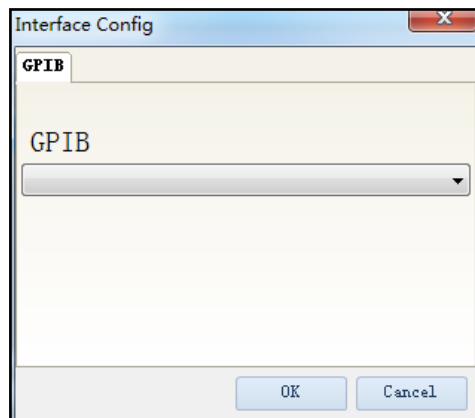
- RS232 Interface Parameter Configuration
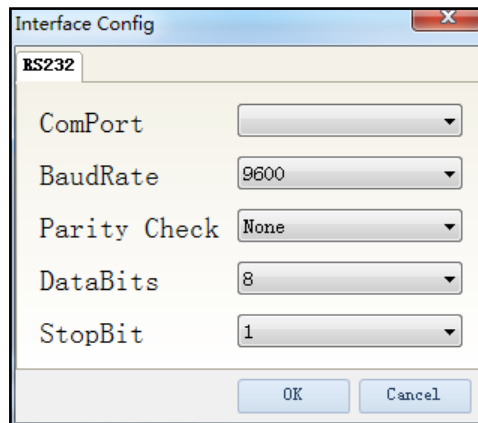
Serial interface: to select serial interface, i.e., the serial interface number occupied by RS232 communication cable interface.
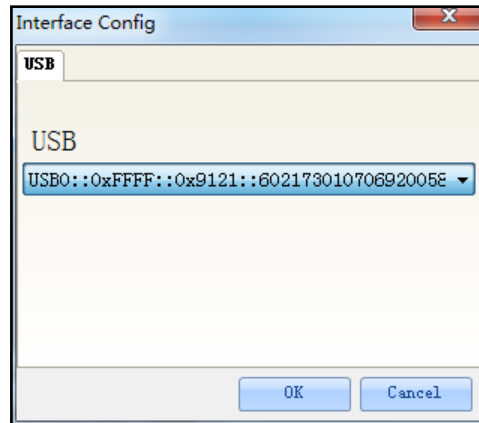
Baud rate, parity check bit, data bits and stop bit must be configured consistently with those in menu setup.
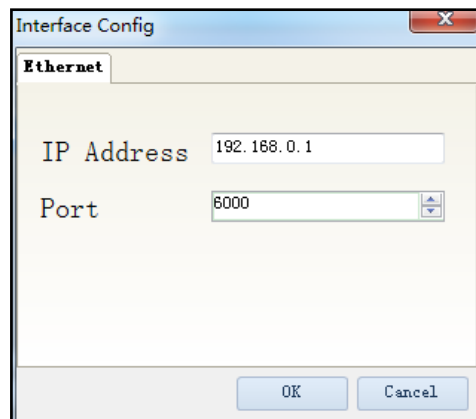
- GPIB Interface Parameter Configuration

During GPIB communication of power meter device, the address setting range is: 1-30.

- 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.

2.2 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.
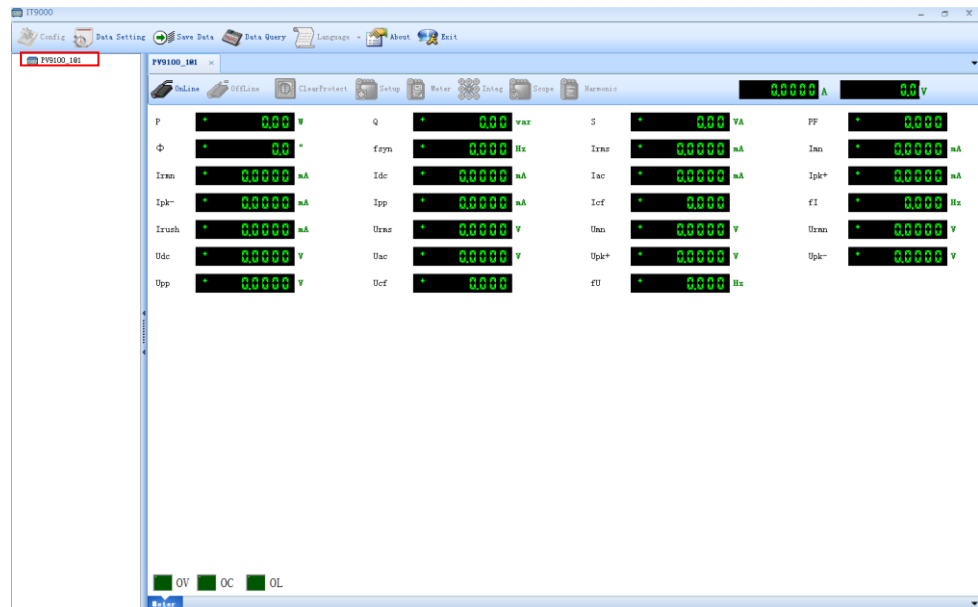
2. Click "Data Setting" icon to enter the Data Setting Interface.
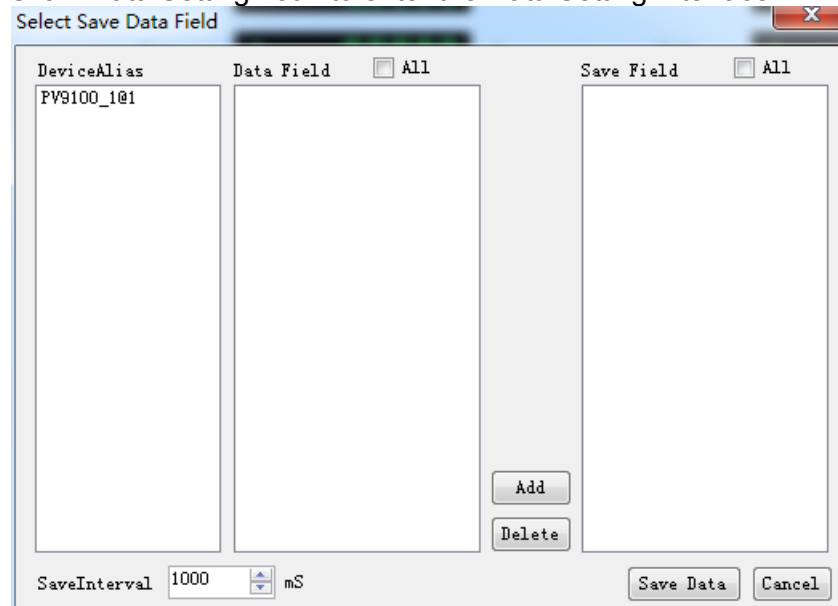
3. Click the alias of the device requiring data saving.

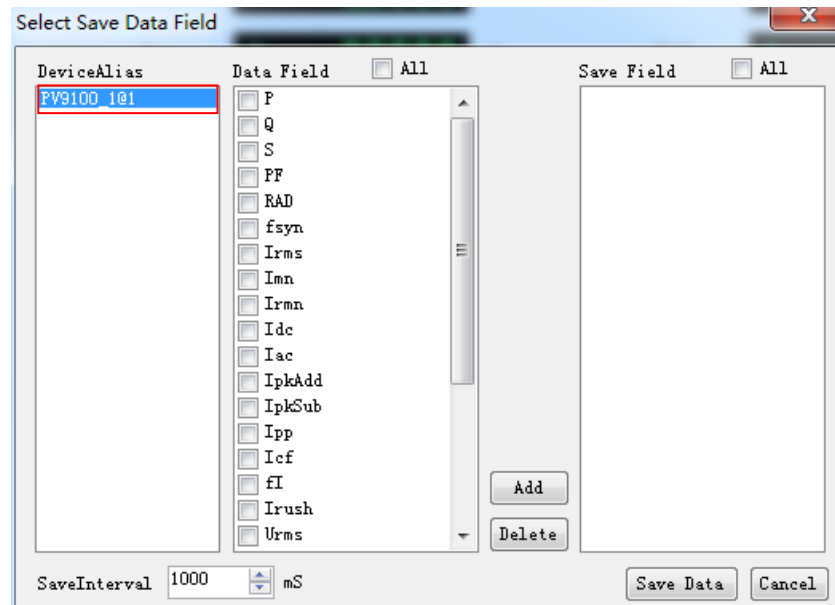4. In "Data Field" bar, check the box at front of Data Field (P, Q, S), and click "Add" button to enter the "Save Field" bar.
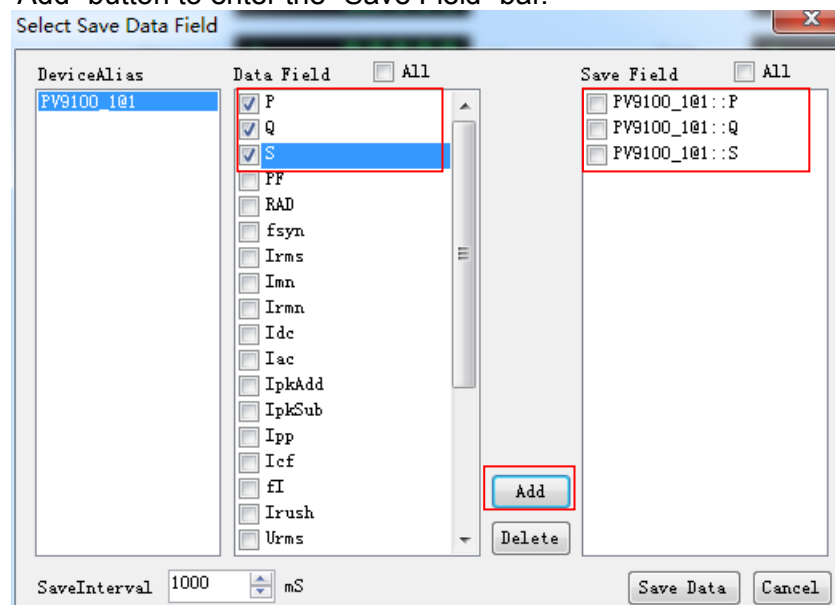
You may also click the Field Name in the Save Field bar. Click "Delete" button to delete the saved field.

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.
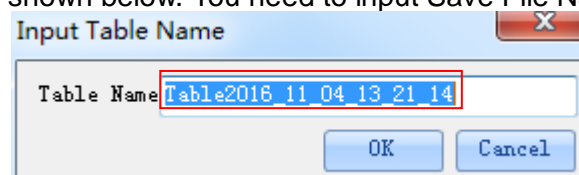
8. Click "OK" button in the figure above to start data save. Then, the icon will change to , and "Data Setting" and "Data Query" will be grayed

out. Click [Stop Save] icon to stop saving.

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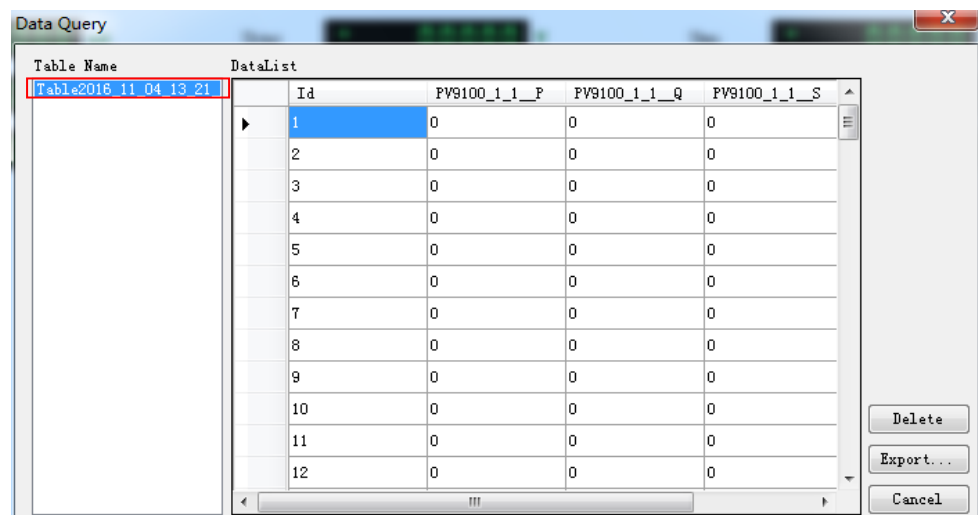
● Delete: to delete the data in current data list.
● Export: Click Export to export the data in current data list to EXCEL table. Saving path is optional.
● Cancel: to exit the Data Query Interface.

Chapter3 PV9100 Control Interface

3.1 Introduction of Control Interface
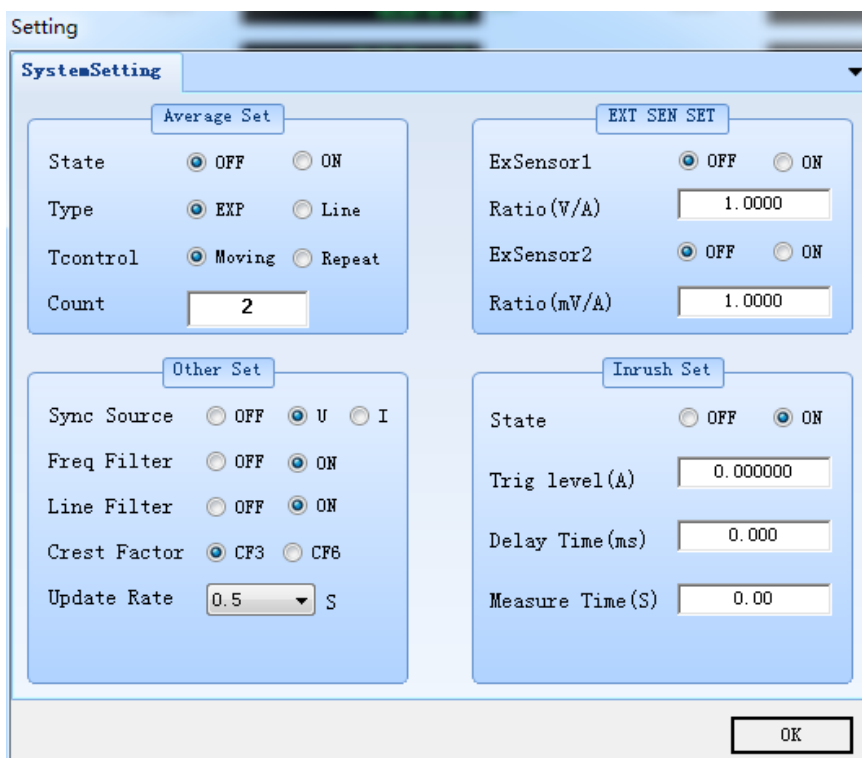
The PV9100 Control Interface of IT9000 software is as shown below.
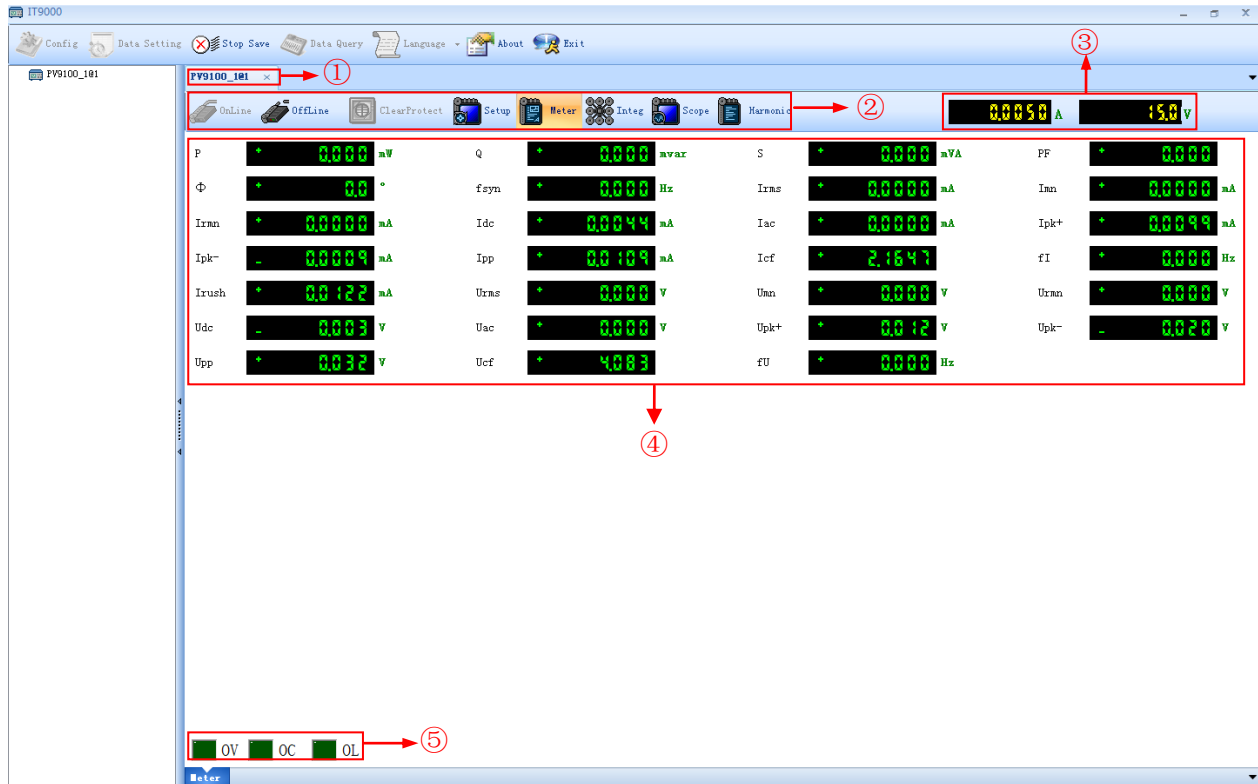
1. Tab bar, to switch the display of Control Interfaces of different devices.

2. Toolbar, main functions include:

   Online: remote control, to set the power meter to Remote Control mode.

   Offline: local switch, to return the power meter back to Local Mode from Remote Mode.

   Clear Protect: to clear power meter protection status.

   Setup: set-up function tab.

   Meter: measurement function tab.

   Integ: Integral function tab.

   Scope: wave function tab.

   Harmonic: harmonic function tab.

3. Display the voltage and current measurement range.

4. Display real-time value.

5. Display power meter status (over-voltage protection (OV), over-current protection (OC)、over load (OL)).

3.2 Setting Function

Click "Setup" tab to display Setting function interface.

Average Set

Character	Function description
State	Set the status of the averaging function. When "ON" is selected, the averaging function is enabled. When "OFF" is selected, the averaging function is disabled.
Type	Set the linear averaging type. EXP: index averaging, often used for analysis of the non-stationary process. LINE: linear averaging, often used for measurement and analysis of the stationary random process. The deviation relative to the standard can be reduced by increasing the averaging times.
Tcontrol	Set the mode of the averaging function. MOVING: moving averaging REPEAT: repeated averaging
Count	Set the times of the averaging function. If the mode of the averaging function is set as EXP (index averaging), the attenuation constant can be set. If the mode of the averaging function is set as LINE (linear averaging), the averaging times can be set.

EXT SEN SET

Character	Function description
ExSensor 1	Set the external current sensor 1: ON/OFF
Ratio(V/A)	Set the conversion ratio of the external current sensor 1
ExSensor 2	Set the external current sensor 2: ON/OFF
Ratio(mV/A)	Set the conversion ratio of the external current sensor 2

Other Set

Character	Function description

| Character	Function description
Sync Source	Select the synchronization source: U/I/OFF.
Freq Filter	Set the status of the frequency filter. When "ON" is selected, the frequency filter is turned on. When "OFF" is selected, the frequency filter is turned off.
Line Filter	Set the status of theline filter. When "ON" is selected, the line filter is turned on. When "OFF" is selected, the line filter is turned off.
Crest Factor	Set the crest factor: CF3/CF6
Update Rate	Data Updating Rate Setting key: when this key is pressed, the capture interval of the voltage, current, power and other data, i.e. data updating rate, can be set. When the data updating rate is increased, rapid load changes of the power system can be obtained. When the data updating rate is decreased, relative low-frequency signals can be measured. Options of the data updating rate: 0.1s/0.25s/0.5s/1s/2s/5s

Inrush Set

Character	Function description
State	Set the status
Trig level(A)	Set the trigger level
Delay time(ms)	Set the delay time
Measure time(s)	Set the measuring time

3.3 Meter Function

Click "Meter" tab to display Meter function interface.
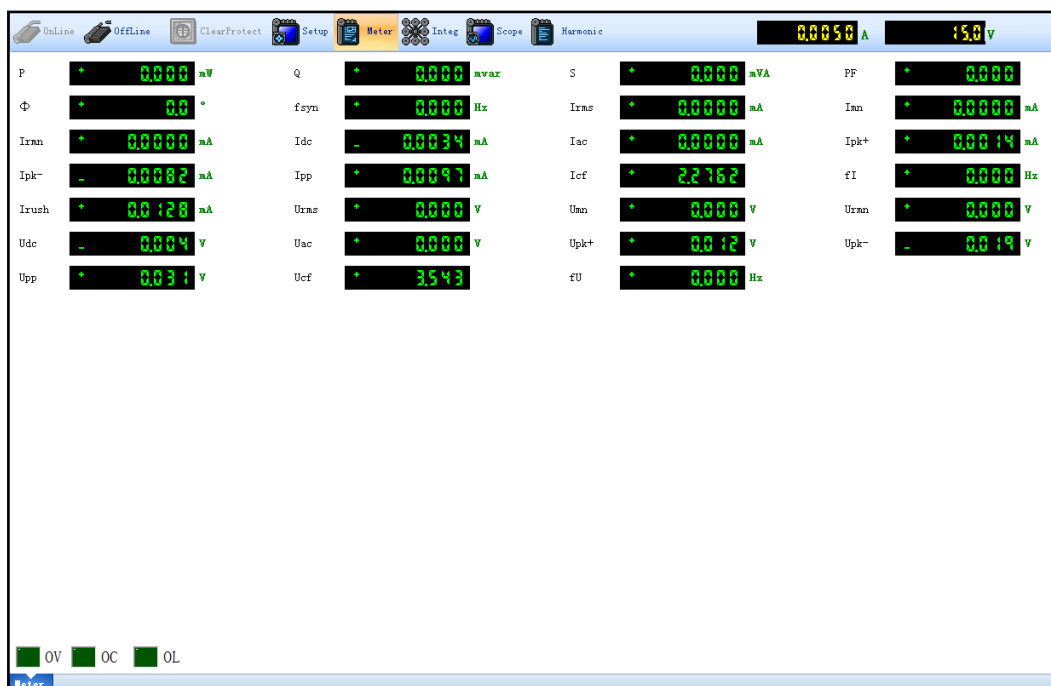
Measured parameters

Parameters	Parameter descriptions	Parameters	Parameter descriptions

Parameters	Parameter descriptions	Parameters	Parameter descriptions
P	Active power [W]	Imn	Average rectified value after the current is calibrated to the effective value
Q	Reactive power [var]	Idc	Average current
S	Apparent power [VA]	Ipk+	Positive current peak value [A]
λ	Power factor	Ipk-	Negative current peak value [A]
φ	Phase difference of voltage and current	Ipp	Current peak-to-peak value [A]
Fsyn	Synchronization source frequency	Icf	Current crest factor
Irms	Current effective value [VA]	fI	Current frequency (Hz)
Iac	AC current component	Irush	Inrush current
Irmn	Average rectified current [A]	Urms	Voltage effective value [VA]
Umn	Average rectified value after the voltage is calibrated to the effective value	Urmn	Average rectified value of voltage [V]
Udc	Average voltage [V]	Uac	AC voltage component
Upk+	Positive voltage peak value [V]	Upk-	Negative voltage peak value [V]
Upp	Voltage peak-to-peak value [V]	Ucf	Voltage crest factor
fU	Voltage frequency (Hz)		

3.4 Integral Function

Click "Integ" tab to display Integral function interface.

1. Integral Measurement Configuration.

   Start: set in the MANUAL mode or TIME mode.

   Stop: set in the MANUAL mode, TIME mode and TINTerval mode.

Auto Cal: used for enabling (ON) or disabling (OFF) the function of automatic integral calibration.

Auto Clear: used for enabling (ON) or disabling (OFF) the function of automatic zero clearing of the integral.

WP type: used for selecting the integral mode for positive and negative watt hours. There are four integral modes: Charge/Discharge, Sold/Bought.

q type: used for selecting the current integration mode. Options of the current integration mode are as follows: Rms, Mn, Dc, Rmn, Ac.

Reset Clear: Reset clearing of integral.

2. Integral operation.

Active power integral: WP (watt hours, the sum of positive and negative watt hours), WP+ (the consumption of positive watt hours) and WP- (the negative watt hours of feedback power).

Current integral: q (ampere hours, the sum of positive and negative ampere hours), q+ (the consumption of positive ampere hours) and q- (the negative ampere hours of feedback power).

Average active power integral: WPAV (average active power integral).

**Integration time:** in the format of hhhh:mm:ss.

3. Switch tab for wave display screens of parameters WP, q and WPAV.

4. Integral Start button. In the manual start mode, the integral function can be enabled by pressing the soft key corresponding to this parameter.

5. Integral Stop button. In the manual start mode, the integral function can be disabled by pressing the soft key corresponding to this parameter.

3.5 Scope Function

Click "Scope" tab to display Scope function interface.
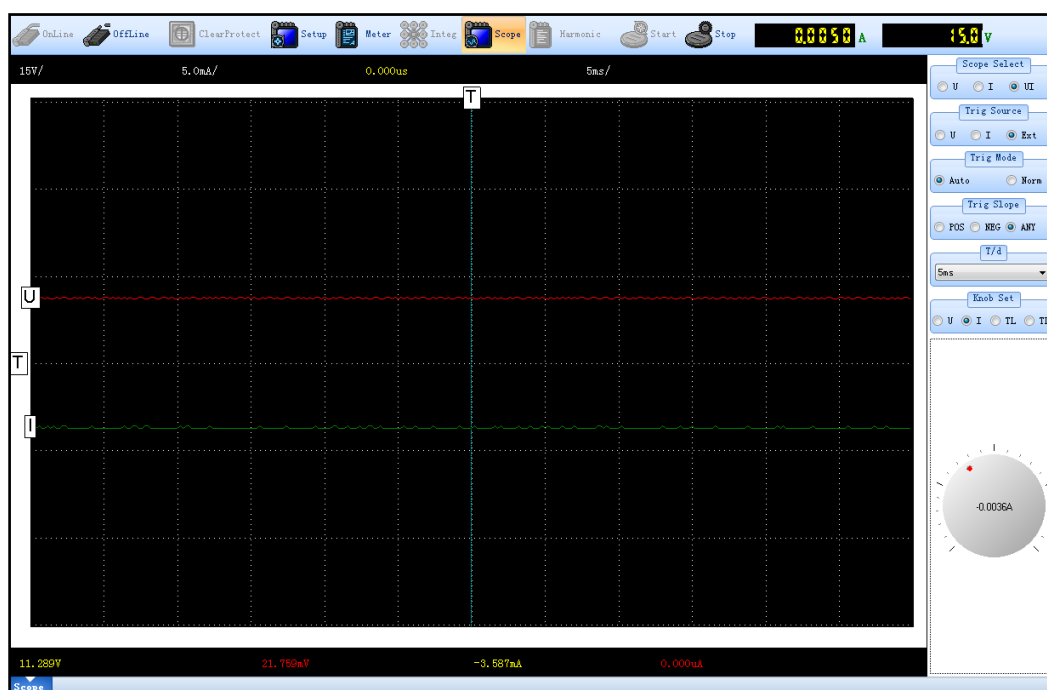
Scope select: Select the waveform to be displayed on the interface: voltage/current/voltage and current.

Trig Source: select trigger source, voltage signal, current signal and External clock signal.

Trig Mode: select trigger mode: Auto or Normal.

Trig Slope: select trigger slope: Positive, Negative or Any.

T/d: horizontal (time/grid) setting.

Knob Set: set parameters that can be adjusted by knob. Rotate the knob to change corresponding value of the parameter in the parameter. Use Knob to adjust the five parameters below:
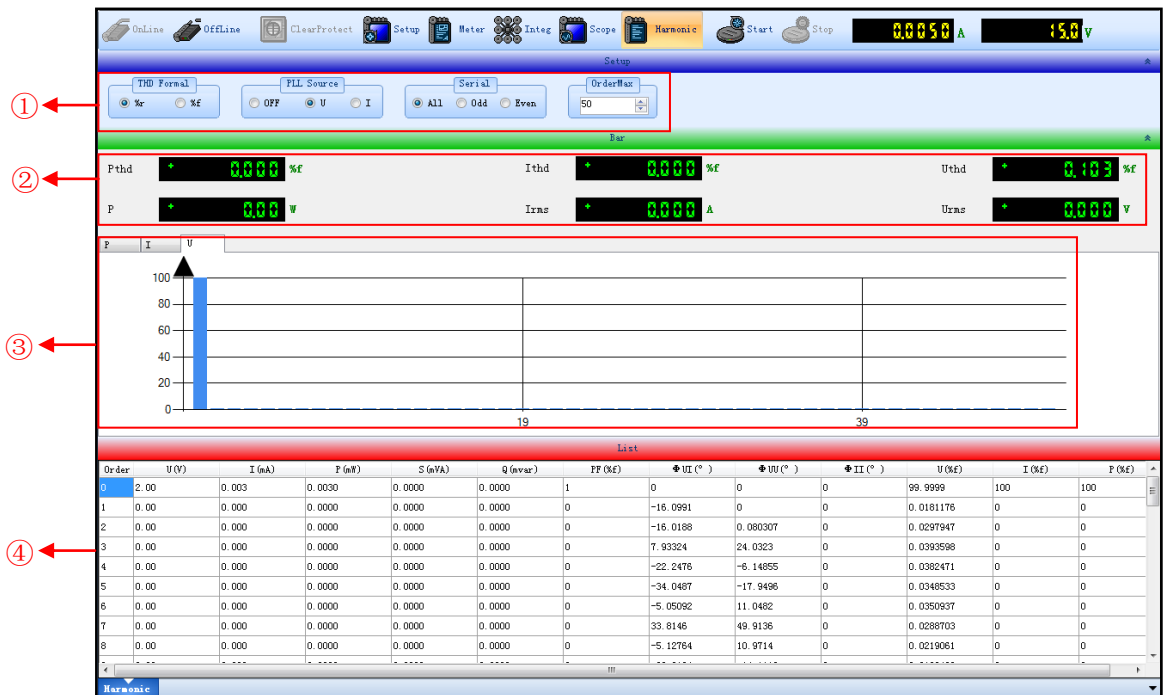
- U: grounding level of voltage channel;
- A: grounding level of current channel;
- TL: trigger level;
- TD: trigger delay.

Start: Press this button to run Wave.

Stop: Press this button to stop Wave running.

3.6 Harmonic Function

Click "Harmonic" tab to display Harmonic function interface.

1. Harmonic Measurement Configuration.

   THD Formal: Distortion factor calculation formula.

   - **% r:** displaying harmonics in the form of percentage to the overall current (voltage, power) amplitude of all harmonics.
   - **% f:** displaying harmonics in the form of percentage to the fundamental wave current (voltage, power).

   PLL Source: Select the PLL (Phase Locked Loop) source: U/I/OFF.

   Serial: Select the Harmonic sequence: whole sequence/odd sequence/even sequences

Order Max: Set the harmonic analysis orders (1-50). You can specify the harmonic measurement range.

2. **Harmonic measurement parameter:** Pthd/Ithd/Uthd/P/Irms/Urms

3. **Harmonic bar chart:** display percentage of each harmonic.

4. **Harmonic list:** This list is used for showing the voltage, current, active power, reactive power, phase and total harmonic distortion (THD) factor of different harmonics.

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