ONMEAS®

Rev.B1.0

AT3310

Digital Power Meter



User's Guide

Scan QR code for operation video

Safety Notice

⚠Warning ⚠Danger:If any of the following abnormal conditions occurs, stop operation immediately and disconnect the power cord. Contact the Onmeas sales department immediately for repair. Otherwise, a fire may occur or the operator may be exposed to a potential electric shock hazard.

- The instrument operates abnormally.
- The instrument produces abnormal noise, odor, smoke, or flashes during operation.
- The instrument generates high temperature or electric shock during operation.
- The power cord, power switch, or power socket is damaged.
- Foreign matter or liquid has entered the instrument.

Safety Information

⚠Warning⚠Danger: To avoid possible electric shock and ensure personal safety, follow the guidelines below during operation.

Disclaimer	Please read the following safety information carefully before using the instrument. Onmeas assumes no liability for any personal injury or property damage caused by the user's failure to comply with the following provisions.
Instrument Grounding	To prevent electric shock hazard, connect the power ground wire properly.
Do Not Use the Instrument in Explosive Gas Atmospheres	Do not use the instrument in an environment containing flammable or explosive gases, vapors, or excessive dust. Using any electronic equipment in such an environment poses a risk to personal safety.
Do Not Open the Instrument Case	Non-professional maintenance personnel must not open the instrument enclosure in an attempt to repair the instrument. Charge that has not been fully discharged may remain inside the instrument for some time after it is switched off, which may cause an electric shock hazard to persons.

Do Not Use the instrument in a strong magnetic field environment

Do not use this instrument in places with strong magnetic or electric fields; electromagnetic pulses can cause instrument malfunction and fire.

Do Not Use a Malfunctioning Instrument	If the instrument is not operating normally, the hazards are unpredictable. Disconnect the power cord, do not use the instrument again, and do not attempt to repair it yourself.

Do Not Use the Instrument Beyond the Methods Specified in This Manual	Beyond the specified scope, the protective measures provided by the instrument will become ineffective.

Limited Warranty and Limitation of Liability

Onmeas Ltd. (hereinafter referred to as Onmeas) warrants that every AT3310 you purchase is fully compliant in terms of quality and metrology. This warranty does not cover the fuse, nor damage caused by negligence, misuse, contamination, accident, or abnormal conditions of use. This warranty applies only to the original purchaser and is not transferable.

From the date of shipment, Onmeas provides one-year free warranty, which also covers the VFD or LCD. If the instrument is damaged due to improper operation of the user during the one-year free warranty period, the repair costs shall be borne by the user. After one year and until the end of the instrument's service life, Onmeas will provide repairs on a chargeable basis. For replacement of the VFD or LCD, the cost will be charged at the current cost price.

If the product is found damaged, please contact Onmeas to obtain information and approval for return or exchange. Then send the product to the dealer for return or exchange. Be sure to state the cause of the product damage, and prepay the postage and insurance to the destination. For repair or replacement of a product within the warranty period, Onmeas will bear the return shipping costs. For repair of a product not under warranty, Onmeas will estimate the repair cost and carry out the repair only after obtaining your consent; all costs arising from the repair shall be borne by the user, including the return shipping costs.

This warranty is the only warranty provided by Onmeas and is your sole and exclusive remedy. Beyond this, there are no other express or implied warranties (including fitness for a particular purpose), and all other warranties are expressly disclaimed. Neither Onmeas nor any of its agents has made any oral or written representation to establish a warranty or to expand the scope of this warranty in any way. Onmeas assumes no liability for any special, indirect, incidental, or consequential damage or loss (including loss of data) arising from any cause beyond the scope of the specifications. If any provision of this warranty conflicts with local regulations, or if a particular jurisdiction does not permit the exclusion or limitation of implied warranties, local regulations shall prevail, and therefore such provision may not apply to you. However, the ruling on such a provision does not affect the validity and enforceability of the other provisions.

People's Republic of China
Jiangsu Province
Onmeas Ltd.
October 2009
Rev.A3

Contents

Safety Notice 2
Safety Information 2
Limited Warranty and Limitation of Liability 3
Contents 6
List of Figures 9
List of Tables 9
1. Installation and Setup Guide 10
1.1 Packing List 10
1.2 Power Requirements 10
1.3 Operating Environment 10
1.4 Cleaning 10
1.5 Instrument Handle 11
2. Overview 13
2.1 Introduction 13
2.2 Main Specifications 13
2.3 Main Features 14
3. Getting Started 15
3.1 Getting to Know the Front Panel 15
3.1.1 Front Panel Description 15
3.1.2 Getting to Know the Rear Panel 16
3.2 Power-On Startup 16
3.2.1 Powering On 16
3.2.2 Warm-up Time 16
3.3 Preparing for Test 17
3.3.1 Safety Precautions for Measuring High-Voltage Lines 17
3.3.2 Voltage Measurement Connection 17
3.3.3 Current Measurement Connection Method 17
3.3.4 Power Measurement Connection Method 18
4. [Meas] Measurement Display Page 19
4.1 <Measurement Display> Page 19
4.1.1 Measurement [Mode] 19
4.1.2 Measurement [Function] 20
4.1.3 [V-Range] 20
4.1.4 [I-Range] 21
4.1.5 Open Zeroing 22
4.1.6 Power Factor “Sign” Description 22
5. [Setup] Settings Page 23
5.1 Measurement Settings 23
5.1.1 [Power Compare] 24
5.1.2 [Power Upper Limit] and [Power Lower Limit] 24
5.1.3 [Current Compare] 24
5.1.4 [Current Upper Limit] and [Current Lower Limit] 24

5.1.5 Beeper 25
6. System Configuration 26
6.1 System Configuration Page 26
6.1.1 Changing the System Language [LANGUAGE] 26
6.1.2 Setting the Date and Time 27
6.1.3 Account Settings 27
6.1.4 [Remote] Setting 28
6.1.5 [Baud Rate] Setting 28
6.1.6 Command Handshake 29
6.1.7 Result Send 29
6.2 System Information Page 29
7. Remote Communication 30
7.1 RS-232C 30
7.1.1 RS232C Connection 30
7.2 Handshake Protocol 31
7.3 SCPI Language 32
8. SCPI Command Reference 33
8.1 Command String Parsing 33
8.1.1 Command Parsing Rules 33
8.1.2 Symbol Conventions and Definitions 33
8.1.3 Command Tree Structure 34
8.2 Commands and Parameters 34
8.2.1 Commands 34
8.2.2 Parameters 34
8.2.3 Separators 35
8.3 Command Summary 35
8.4 Display Display Page Subsystem 36
8.4.1 DISPlay:PAGE 36
8.4.2 DISP:LINE 36
8.5 Function Measurement Function Subsystem 36
8.5.1 FUNCtion: MODE 37
8.5.2 FUNCtion: TYPE 37
8.5.3 FUNCtion: VRANGe 37
8.5.4 FUNCtion: VRANGe:Mode 37
8.5.5 FUNCtion: IRANGe 38
8.5.6 FUNCtion: IRANGe:Mode 38
8.6 COMParator Sorting Subsystem 38
8.6.1 COMParator:PMODE 39
8.6.2 COMParator:PLIMit 39
8.6.3 COMParator:IMODE 39
8.6.4 COMParator:ILIMit 39
8.6.5 COMParato:Beep 40
8.7 SYSTem Subsystem 40
8.7.1 SYSTem:LANGuage System Language 40
8.7.2 SYSTem:SHAKhand Communication Handshake Command 40
8.7.3 SYSTem:SENDmode Acquisition Mode Command 40

8.8 FETCh Subsystem 41
8.9 IDN? Subsystem 41
9. Specifications 42
9.1 Technical Specifications 42
9.2 General Specifications 42
9.3 Environmental Requirements 43
9.4 Dimensions 43

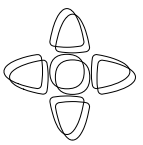
List of Figures

Figure 1- 1 Instrument Handle (Schematic; the panel drawing differs from the actual unit) 11
Figure 3- 1 Front Panel 15
Figure 3- 2 Rear Panel 16
Figure 3- 3 Power Measurement Connection Method 18
Figure 4- 1 <Measurement Display> Page 19
Figure 5- 1 <Measurement Settings> Page 23
Figure 6- 1 <System Configuration> Page 26
Figure 7- 1 RS-232 Interface on the Rear Panel 31
Figure 8- 1 Command Tree Structure 34
Figure 8- 2 DISPlay Subsystem Tree 36
Figure 8- 3 Function Subsystem Tree 36
Figure 8- 4 COMParator Sorting Subsystem Tree 38
Figure 8- 5 SYSTem Subsystem Tree 40
Figure 8- 6 FETCh? Subsystem Tree 41
Figure 8- 7 IDN? Subsystem Tree 41

List of Tables

Table 2- 1 AT3310 Main Functions 13
Table 3- 1 Front Panel Function Description 15
Table 3- 2 Rear Panel Function Description 16
Table 4- 1 Voltage Range Variation 20
Table 4- 2 Voltage Test Range Description 20
Table 4- 3 Current Range Variation 21
Table 4- 4 Current Test Range Description 21
Table 8- 1 Common RS-232 Signals 30
Table 8- 2 Minimum Subset of the RS-232 Standard 30
Table 9- 1 Multiplier Abbreviations 35

1.Installation and Setup Guide



Thank you for purchasing our company's product! Please read this chapter carefully before use. In this chapter you will learn the following:

- Main Functions Packing List
- Power Requirements
- Operating Environment
- Cleaning
- Fuse Replacement
- Instrument Handle

1.1 Packing List

Before formally using the instrument, please first:

1. Inspect the appearance of the product for defects such as damage or scratches;
2. Check the instrument accessories against the packing list for any missing items.

If there is damage or missing accessories, contact the Onmeas instrument sales department or your dealer immediately.

1.2 Power Requirements

The AT3310 can only be used under the following power conditions:
Voltage: 85VAC~250VAC
Frequency: 50Hz~400Hz



Warning: To prevent electric shock hazard, connect the power ground wire properly
If the user replaces the power cord, ensure that the ground of the power cord is reliably connected.

1.3 Operating Environment

The AT3310 must be used under the following environmental conditions:

Temperature: 0°C~55°C,
Humidity: below 70%RH at 23°C

1.4 Cleaning

To prevent electric shock hazard, disconnect the power cord before cleaning.

Use a clean cloth moistened with a small amount of clean water to clean the enclosure and panel.

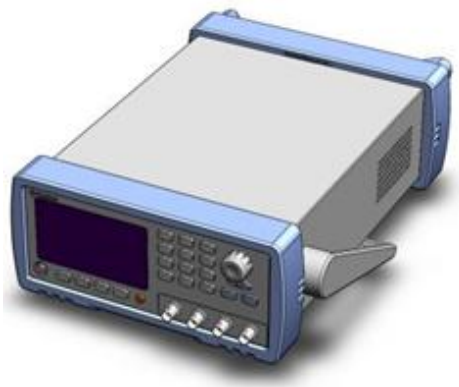
Do not clean the interior of the instrument.

Note: Do not use solvents (such as alcohol or gasoline) to clean the instrument.

1.5 Instrument Handle

The instrument handle is adjustable. Hold both sides of the handle with both hands, pull it gently outward, and then rotate the handle. The handle can be adjusted to four positions, as shown in the figure below:

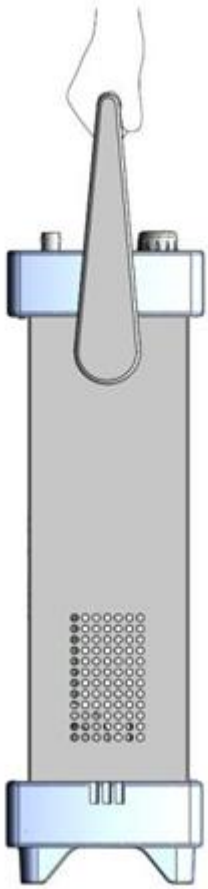
Figure 1-1 Instrument Handle (Schematic; the panel drawing differs from the actual unit)



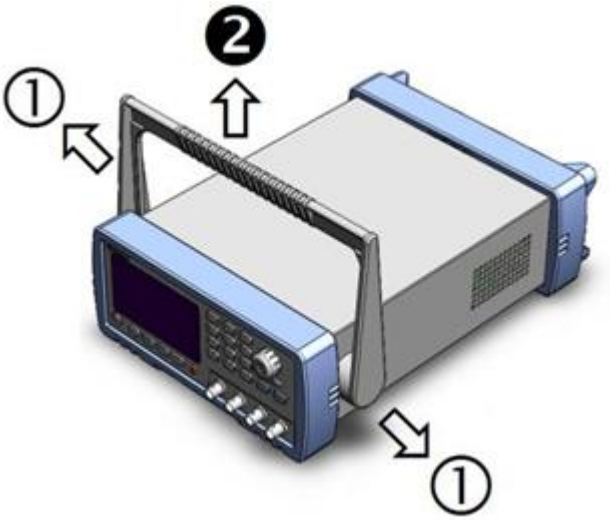
Viewing position 1 [Hold both sides of the handle with both hands and pull it gently outward until it can rotate freely, then switch to viewing position 2]



Viewing position 2 [Hold both sides of the handle with both hands and pull it gently outward until it can rotate freely, then switch to the carrying position]

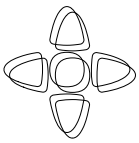


Carrying position



Position for removing the handle. (Pull at both sides ① until the handle is removed.)

2.Overview



In this chapter you will learn the following:

- Introduction
- Main Specifications
- Main Features

2.1 Introduction

Thank you for purchasing the AT3310 digital power meter.

The AT3310 digital power meter is controlled by a high-performance ARM microprocessor and displays on a TFT color LCD. The AT3310 AC/DC electrical parameter analyzer measures AC, DC and AC+DC signals, and provides current/power upper and lower limit setting, judgment and alarm functions. The clean front-panel design gives you quick access to the desired measurement functions; test parameters are shown on the LCD, and the combination of functions brings greater convenience to testing.

The instrument has a built-in RS-232C interface and a USB-232 interface, effectively usable for remote control and data acquisition and analysis.

The computer remote-control commands are compatible with SCPI (Standard Commands for Programmable Instruments), efficiently accomplishing remote control and data acquisition.

The AT3310 digital power meter can be used for home-appliance testing, motor and power-tool testing, generator-set testing, power products and the energy-saving industry.

2.2 Main Specifications

The AT3310 technical specifications include the basic technical specifications of the instrument and the ranges allowed for instrument testing. These specifications are what the instrument can achieve at the factory.

Table 2- 1 AT3310 Main Functions

Model	AT3310	
LCD display	V, A, W/PF/Hz	
Input voltage	1.0V~400V (AC)	1.0V~400V (DC)
Input current	10mA~20A	
Range switching	Auto / Manual	
Power factor	-1.000~+1.000	
Measurement mode	AC/DC/AC+DC	
Frequency range	DC / AC: 45Hz~130Hz, bandwidth: 5kHz	
Accuracy	±(0.4% reading + 0.1% range + 1 digit)	
Upper/lower limit	Current and power upper/lower limit setting, judgment	

judgment function	and alarm functions; ideal for production-line measurement.
Communication	RS-232 interface, USB

2.3 Main Features

- **3.5-inch true-color LCD**

- **Basic measurement functions**

voltage, current, active power and frequency measurement functions,and power factor measurement; AC and DC signal measurement both supported

- **RS232 interface**

Built-in RS232 interface: compatible with the SCPI command set, ASCII transmission, completing all instrument functions

- **Keyboard lock setting**
- **Data hold function**
- **Chinese/English switching**
- **Date and time settings**
- **Administrator and user accounts; a password can be set for the administrator**
- **Remote operation**

Supports a baud rate of up to 115200bps, compatible with the SCPI protocol, ASCII transmission

3.Getting Started

In this chapter you will learn the following:

- Getting to know the front panel — includes an introduction to the keys and test terminals.
- Rear panel — introduces the power supply and interface information.
- Power-on startup — includes the power-on self-test process, instrument defaults, and instrument warm-up time.
- Starting a test — including how to connect to the test terminals

3.1 Getting to Know the Front Panel

3.1.1 Front Panel Description

Figure 3- 2 Front Panel

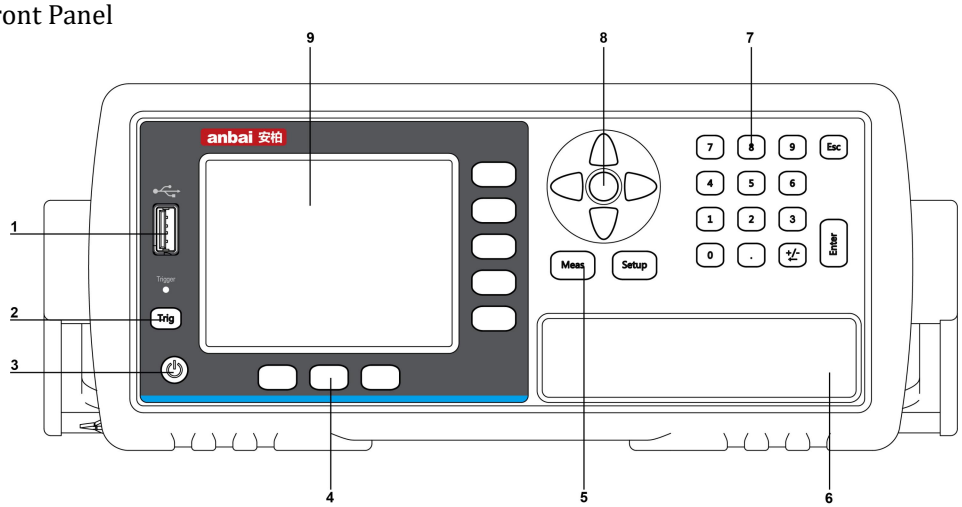


Table 3- 2 Front Panel Function Description

No.	Function
1	USB disk interface
2	Manual trigger key
3	Power switch (tact switch)
4	System function keys
5	Main function keys: Measure and Setup
6	Test terminals (the AT3310 terminals are on the rear panel)
7	Numeric keypad
8	Cursor keys
9	3.5-inch LCD display window

3.1.2 Getting to Know the Rear Panel

Figure 3- 3 Rear Panel

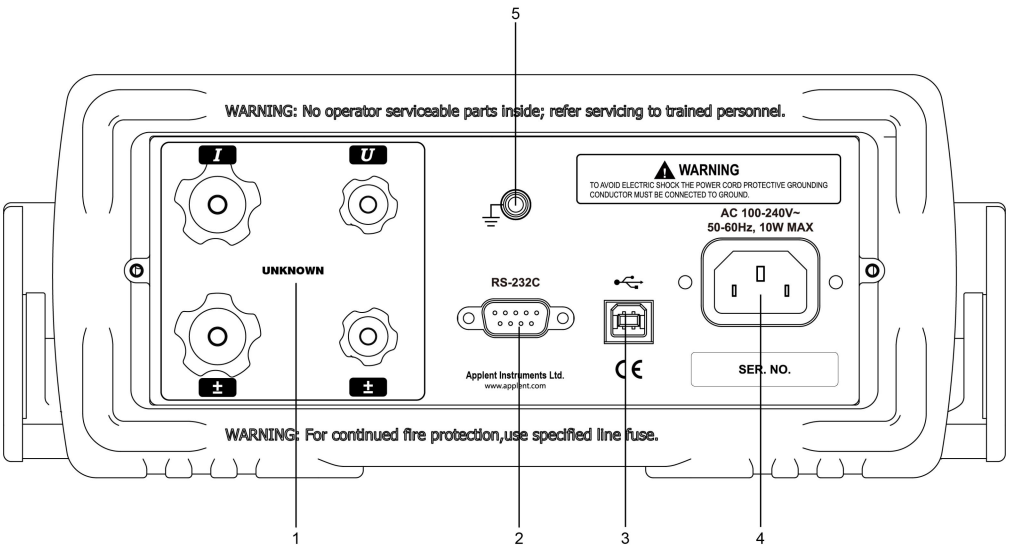


Table 3- 3 Rear Panel Function Description

No.	Function
1	Current and voltage measurement input interfaces
2	RS-232C interface
3	USB communication interface
4	Power socket (fuse not included; the fuse is inside the instrument)
5	Grounding post

3.2 Power-On Startup

3.2.1 Powering On

The key marked "+" at the lower left of the panel is the power switch. The AT3310 uses a soft-start method:

- Power on: press the Power key; when the POWER LED lights up (**green**), release the Power key.
- Power off: press the Power key; when the POWER LED lights up (**orange**), release the Power key.

Note: the interval between power-on and power-off must be greater than 1s;

3.2.2 Warm-up Time

To achieve the specified accuracy, the instrument needs to warm up for at least 30 minutes.

3.3 Preparing for Test

3.3.1 Safety Precautions for Measuring High-Voltage Lines

For safety, when measuring voltage in high-voltage lines, follow these precautions:

When measuring in high-voltage lines, be sure to use conductors and accessories meeting the following requirements:

- The test conductors and accessories must be fully insulated.
- In automatic testing, use conductors that can connect to the line, e.g. alligator clips, flat plugs, etc.
- Do not use test accessories that reduce the voltage clearance; doing so reduces the protection and creates an extremely dangerous condition.

Measure in the high-voltage line following these steps:

1. Use a standard disconnect device, such as a circuit breaker or main switch, for the line connection.
2. Connect to the line using test conductors and accessories within the safety specifications.
3. Set the instrument to the correct measurement function and range.
4. Energize the line using the switch described in step 1, then measure with the instrument. (At this time, never unplug the test conductors from the instrument input.)
5. Disconnect the line power using the switch described in step 1.
6. Separate the test connectors from the test unit of the high-voltage line.

3.3.2 Voltage Measurement Connection

With the instrument in the factory-set conditions, the operating procedure is as follows:

1. Connect the test conductors to the**U terminal and ± terminal**.
2. On the measurement display interface, select the DC voltage or AC voltage measurement function.
3. Select the range. After you start the measurement function, the system defaults to auto range.
4. If "-----" appears on the display, you are overrange; the system automatically selects a suitable range until a normal reading is shown.



Note: do not connect a voltage above 1000V (peak) to the instrument input, otherwise the instrument may be damaged.

3.3.3 Current Measurement Connection Method

With the instrument in the factory-set conditions, the operating procedure is as follows:

1. Connect the test conductors to the **I terminal and ± terminal**.
2. On the measurement display interface, select the DC current or AC current measurement function.
3. Select the range. After you start the measurement function, the system defaults to auto range.
4. If "-----" appears on the display, you are overrange; the system automatically selects a suitable range until a normal reading is shown.

Note: do not apply a current above 40A (peak) to the instrument input, otherwise the instrument may be damaged.

3.3.4 Power Measurement Connection Method

The AT3310 digital power meter has only one input unit and supports single-phase two-wire connection only.
When measuring the power of single-phase equipment, to minimize the influence of stray capacitance on measurement accuracy, connect the current input of the power meter to the point closest to the supply ground, as shown in Figure 3-3.

Figure 3- 4 Power Measurement Connection Method 1 — Connecting the Current Input Terminal to the Load Side

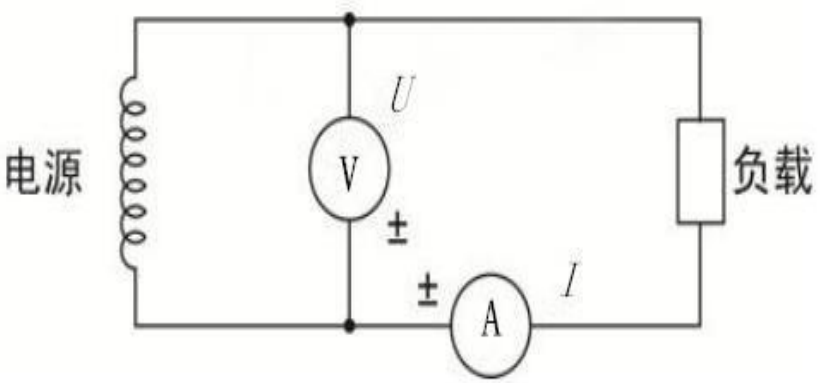
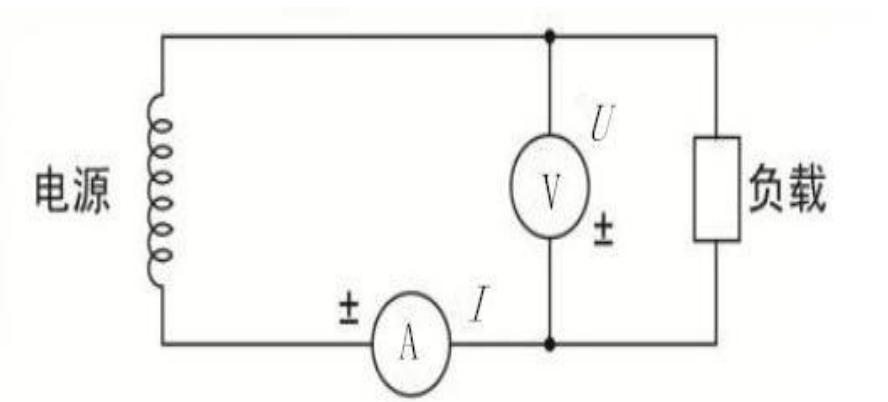


Figure 3- 5 Power Measurement Connection Method 2 — Connecting the Voltage Input Terminal to the Load Side



Since Method 1 and Method 2 inevitably involve some loss inside the instrument:

- when the**measured current is small, use power measurement connection method 1,** i.e. place the current input between the voltage input and the load;

- when the**when the measured current is large, use power measurement connection method 2,** i.e. place the voltage input between the current input and the load

4.[Meas] Page

In this chapter you will learn the following:

- Settings Related to the <Measure Display> Page

4.1 <Measure Display> Page

Press the [Meas] key to enter the [Measurement Display] page.

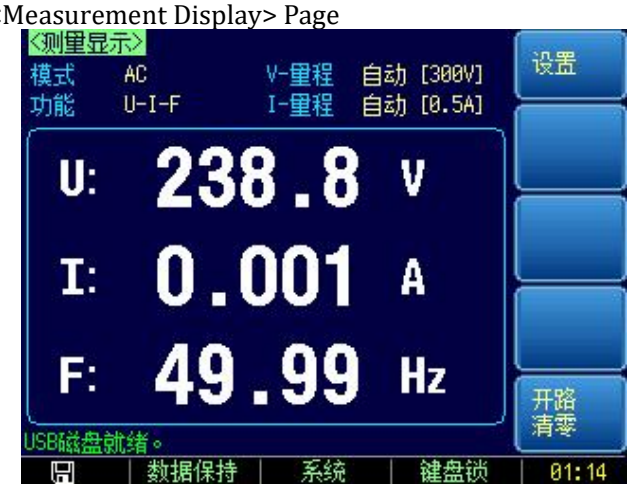
<**Measure Display**>page mainly displays the measurement results, test status and sorting result
The shortcut soft keys provide the following functions:

- Settings – enter the measurement settings page
- System – enter the system settings page
- Open zeroing – performs the open-circuit zeroing operation
- Keyboard lock – locks the keys on the keyboard
- Data hold – locks the displayed value; press again to release. When the display value is locked, the page prompt shows "HOLD"

Meanwhile, 4 frequently used functions can be set on this page:

- Mode – sets the current test mode to AC, DC or AC+DC
- Function – the parameters shown on the measurement display
- V-Range – voltage range setting
- I-Range – current range setting

Figure 4- 6 <Measurement Display> Page



4.1.1 Measurement [Mode]

The instrument has 3 measurement modes:

Function	Description
AC	For signals with a fundamental of 45Hz~130Hz and 5kHz bandwidth, this mode accurately measures and displays the electrical parameter values of their AC component. When the waveform of the object under test is a symmetric AC

	waveform, the AC measurement mode can be selected; the influence of the instrument zero is then eliminated.
DC	For DC fundamental signals, this mode accurately measures and displays the electrical parameter values of their DC component. When the waveform of the object is DC with very small ripple, the DC measurement mode can be selected; the influence of external AC signals is then eliminated. Before using this mode, zero the voltage and current channels of the instrument as appropriate.
AC+DC	For DC fundamental signals or signals with a fundamental of 45Hz~130Hz and 5kHz bandwidth, this mode accurately measures and displays the electrical parameter values (true RMS) of the measured signal. When the waveform is neither a symmetric AC waveform nor pure DC, or the waveform is unknown, the AC+DC measurement mode can be selected; the true RMS of the measured object is then measured accurately. Before using this mode, zero the voltage and current channels of the instrument as appropriate.

■ **Steps for setting the measurement mode:**

Step 1 Press [Meas] to enter the measurement page or [Setup] to enter the settings page;
Step 2 Use the cursor keys to select the [Mode] field;
Step 3 Use the soft keys to select.

Soft key	Function
AC	Selects the AC measurement mode
DC	Selects the DC measurement mode
AC+DC	Selects the AC+DC measurement mode

4.1.2 Measurement [Function]

The instrument supports multiple basic measurement functions: voltage, current, frequency, active power and power factor.
Voltage is the true RMS value, unit/symbol V; current is the true RMS value, unit/symbol A; active power unit/symbol W;
power factor unit/symbol PF; frequency is the voltage/current frequency, unit/symbol Hz;

■ **Steps for setting the test function:**

Step 1 Press [Meas] to enter the measurement page or [Setup] to enter the settings page;
Step 2 Use the cursor keys to select the [Function] field;
Step 3 Use the soft keys to select

Soft key	Function
U-I-P	Enters the voltage, current, active power measurement function
U-I-λ	Enters the voltage, current, power factor measurement function
U-I-F	Enters the voltage, current, frequency measurement function

4.1.3 [V-Range]

The AT3310 voltage has 4 ranges; the variation range of each range is as follows:

Table 4- 4 Voltage Range Variation

Range number	Range name	Range
0	35V	0V~38V
1	75V	0V~82V
2	150V	0V~165V
3	300V	0V~400V

There are 2 ranging modes:

Table 4- 5 Voltage Test Range Description

Range mode	Description	Advantage	Disadvantage
Auto	The instrument automatically selects the best test range	No user intervention is required	Auto ranging needs to predict the

	according to the nominal value; the range number in the range field is set automatically.		range, so the test speed is lower than in manual ranging mode.
Manual	The instrument always uses the range specified by the user for testing	The test speed is the fastest.	The user needs to participate in range selection

■ **Steps for setting the voltage range:**

Step 1 Press the [Meas] key to enter the measurement page or the [Setup] key to enter the settings page;

Step 2 Use the cursor keys to select the [V-Range] field;

Step 3 Use the soft keys to select auto or locked ranging

Soft key	Function
Auto range	The instrument will select the range automatically
Lock range	The instrument is locked on the current range
Increase +	Increases the range number, and the range is changed to lock
Decrease -	Decreases the range number, and the range is changed to lock

Note! In auto range, the instrument performs range prediction in every measurement cycle, so the test speed is slightly slower than with lock range. Moreover, during automatic measurement, frequent range changes slow down the response. Usually, when the instrument is used for sorting measurement, the auto range mode is not suitable. Users performing sorting should select the locked ranging mode.

4.1.4 [I-Range]

The AT3310 current has 4 ranges; the variation range of each range is as follows:

Table 4- 6 Current Range Variation

Range number	Range name	Range
0	0.5A	0A~0.55A
1	2A	0A~2.2A
2	8A	0A~8.8A
3	20A	0A~22A

There are 2 ranging modes:

Table 4- 7 Current Test Range Description

Range mode	Description	Advantage	Disadvantage
Auto	The instrument automatically selects the best test range according to the nominal resistance value; the range number in the range field is set automatically.	No user intervention is required	Auto ranging needs to predict the range, so the test speed is lower than in manual ranging mode.
Manual	The instrument always uses the range specified by the user for testing	The test speed is the fastest.	The user needs to participate in range selection

■ **Steps for setting the current range:**

Step 1 Press the [Meas] key to enter the measurement page or the [Setup] key to enter the settings page;

Step 2 Use the cursor keys to select the [I-Range] field;

Step 3 Use the soft keys to select auto or locked ranging

Soft key	Function

Auto range	The instrument will select the range automatically
Lock range	The instrument is locked on the current range
Increase +	Increases the range number, and the range is changed to lock
Decrease -	Decreases the range number, and the range is changed to lock

Note! In auto range, the instrument performs range prediction in every measurement cycle, so the test speed is slightly slower than with lock range. Moreover, during automatic measurement, frequent range changes slow down the response. Usually, when the instrument is used for sorting measurement, the auto range mode is not suitable.
Users performing sorting should select the locked ranging mode.

4.1.5 Open Zeroing

Performs the open-circuit zeroing operation. For high-accuracy measurement, zero calibration is required.

■ **Steps for setting open zeroing:**

Step 1 Press [Meas] to enter the measurement page or [Setup] to enter the settings page;
Step 2 Use the sidebar shortcut keys to select the [Open Zeroing] field;
Step 3 Select directly with the soft keys;

Soft key	Function
Enter	The instrument performs open zeroing for all ranges. If zeroing succeeds, the data is saved in memory.
Cancel	Abandons zeroing; the instrument returns to the testing state.

4.1.6 Power Factor "Sign" Description

Due to display intuitiveness requirements, when the active power is negative the minus sign is not shown (the sign can be judged from the power factor).

When the power factor is displayed as negative, cut off the signal input and swap the wiring at the two terminals of the voltage or current binding posts on the rear panel (**voltage and current must not be swapped at the same time**), and the power factor measurement becomes positive.

5.[Setup] Settings Page

In this chapter you will learn all the measurement-related settings

At any time, press the [Setup] key and the instrument will enter the Setup main page.

5.1 Measurement Settings

All measurement-related settings are made on the 〈Settings〉 page.
These settings include the following parameters:

- Mode – sets the current test mode to AC, DC or AC+DC
- Function – the parameters shown on the measurement display
- V-Range – voltage range setting
- I-Range – current range setting
- Power comparator – power sorting status
- Power upper limit – upper limit of the power comparator
- Power lower limit – lower limit of the power comparator
- Current comparator – current sorting status
- Current upper limit – upper limit of the current comparator
- Current lower limit – lower limit of the current comparator
- Beeper – beeper working status

The [Mode], [Function], [V-Range] and [I-Range] settings can also be made on the 〈Measurement Display〉 page; refer to the [Meas] Measurement Main Page chapter for setting these parameters.

Figure 5- 1 <Measurement Settings> Page



5.1.1 [Power Compare]

The instrument can compare the measured power value.

■ **Steps for setting the power comparison:**

Step 1 Enter the 〈Setup〉 page
Step 2 Use the cursor keys to select the [Power Compare] field;
Step 3 Use the soft keys to select

Soft key	Function

Off	Turns off the power comparator
On	Turns on the power comparator

5.1.2 [Power Upper Limit] and [Power Lower Limit]

The reference values for power sorting comparison.

■ **Enter the limit values**

Step 1 Enter the 〈Measurement Settings〉 page
Step 2 Use the cursor keys to select the [Upper Limit] or [Lower Limit] field;
Step 3 Enter the data with the numeric keypad

How the Comparator Works
In the testing state, the current measured value is compared with the preset limit reference values. Sorting process:
Active power:

① Lower limit <= current value <= upper limit Power comparison PASS

② Current value < lower limit Power comparison FAIL displays**P-L**

③ Current value > upper limit Power FAIL displays**P-H**

5.1.3 [Current Compare]

The instrument can compare the measured current value.

■ **Steps for setting the current comparison:**

Step 1 Enter the 〈Setup〉 page
Step 2 Use the cursor keys to select the [Current Compare] field;
Step 3 Use the soft keys to select

Soft key	Function
Off	Turns off the current comparator
On	Turns on the current comparator

5.1.4 [Current Upper Limit] and [Current Lower Limit]

The reference values for current sorting comparison.

■ **Enter the limit values**

Step 1 Enter the 〈Measurement Settings〉 page
Step 2 Use the cursor keys to select the [Upper Limit] or [Lower Limit] field;
Step 3 Enter the data with the numeric keypad

How the Comparator Works
In the testing state, the current measured value is compared with the preset limit reference values. Sorting process:
Current:

① Lower limit <= current value <= upper limit Current comparison PASS

② Current value < lower limit Current comparison FAIL displays**I-L**

③ Current value > upper limit Current FAIL displays**I-H**

Note! When both the power comparison and the current comparison pass, the page prompt shows "PASS"; otherwise the page prompt shows "NG";

5.1.5 Beeper

The beeper function works only after the comparator function is turned on.
The beeper setting allows a PASS beep, a FAIL beep, or turning off the beeper.

■ **Steps for setting the beeper:**

Step 1 Enter the 〈Measurement Settings〉 page

Step 2 Use the cursor keys to select the [Beeper] field;

Step 3 Use the soft keys to select

Soft key	Function
Off	The beeper is turned off
PASS beep	The beeper sounds when the sorting result is pass. (both power and current comparisons pass)
FAIL beep	The beeper sounds when the sorting result is fail. (either power or current comparison fails)

6.System Configuration

In this chapter you will learn about the system configuration of the instrument:

- System Configuration Page
- System Information Page

Just press the [Meas] or [Setup] key and the [System] key appears in the bottom bar of the main page.

6.1 System Configuration Page

On the [Meas] or [Setup] main page, press [**System Configuration**] to enter the 〈System Configuration〉 page.
The System Configuration page includes the following settings:

- LANGUAGE
- Date/Time settings
- Account Settings
- Remote Control
- Baud rate settings
- Command Handshake
- Result Send

All settings on the 〈System Configuration〉 page are automatically saved in the system and automatically loaded at the next power-on.

Figure 6- 1 <System Configuration> Page



6.1.1 Changing the System Language [LANGUAGE]

Communication command:**SYSTem:LANGuage {ENGLISH,CHINESE,EN,CN}**
The instrument supports two languages: Chinese and English.

- Steps for changing the language

Step 1 Enter the <System Configuration> page

Step 2 Use the cursor keys to select [LANGUAGE].

Step 3 Use the soft keys to select the language:

Soft key	Function

Chinese [CHN]	
ENGLISH	English

6.1.2 Setting the Date and Time

The instrument uses a 24-hour clock.

- To change the date:

Step 1 Enter the <System Configuration> page

Step 2 Use the cursor keys to select the [Date] field.

Step 3 Use the soft keys to set the date:

Soft key	Function
Year +	+1 year
Year -	-1 year
Month +	+1 month
Day +	+1 day
Day -	-1 day

- To change the clock:

Step 1 Enter the <System Configuration> page

Step 2 Use the cursor keys to select the [Clock] field.

Step 3 Use the soft keys to set the clock:

Soft key	Function
Hour +	+1 hour
Hour -	-1 hour
Minute +	+1 minute
Minute -	-1 minute
Second +	+1 second
Second -	-1 second

6.1.3 Account Settings

The instrument provides two user modes for selection:

- Administrator – all functions are open to the administrator except the [System Service] page, and the parameters set by the administrator are saved to the system memory after a 5-second delay for loading at the next power-on.
- User – except for the [System Service] and [File] pages, users can operate the other functions; the data modified by the user is restored to the values set by the administrator at the next power-on.

- **Changing the account**:

Step 1 Enter the <System Configuration> page

Step 2 Use the cursor keys to select the [Account] field.

Step 3 Use the soft keys to change:

Soft key	Function
Administrator	All functions are open except the [System Service] page If the password is forgotten, please call the sales department of our company.
User	Functions other than those on the [System Service] page and [File] page can be operated, and the set data is not allowed to be saved.

■ Administrator password setting:

Step 1 Enter the <System Configuration> page

Step 2 Use the cursor keys to select the [Account] field.

Step 3 Use the soft keys to select:

Soft key	Function
Change Password	Enter a numeric password of up to 9 digits; the password contains only digits and symbols.
Delete Password	The administrator will not be password-protected

6.1.4 [Remote] Setting

The instrument has a built-in RS-232 interface and a USB communication interface. The instrument supports only one of them at a time; [Remote Setting] allows selecting one.
If the RS232 interface is selected, plug the communication cable into the RS-232C interface on the rear panel of the instrument.
If the USB interface is selected, plug the communication cable into the USB interface on the rear panel of the instrument.

■ **Selecting the communication interface type**

Step 1 Enter the〈System Configuration〉page

Step 2 Use the cursor keys to select the [Remote Setting] field;

Step 3 Use the soft keys to select

Soft key	Function
RS232	RS-232 interface
USB	USB communication interface

6.1.5 [Baud Rate] Setting

The instrument has a built-in RS-232 interface. When the instrument senses a signal change on the RS-232 interface, it immediately communicates with the host computer at the set baud rate, and the keyboard is locked at the same time.
To ensure correct communication, confirm that the baud rate is set correctly; the host computer and the instrument cannot communicate correctly if their baud rates are different.

The RS-232 interface of the instrument is programmed using the SCPI language.
The RS-232 configuration is as follows:

- Data bits: 8 bits
- Stop bits: 1 bit
- Parity: None
- Baud rate: configurable

■ **To set the baud rate:**

Step 1 Enter the <System Configuration> page

Step 2 Use the cursor keys to select the [Baud Rate] field;

Step 3 Use the soft keys to select

Soft key	Function
1200	If you use a communication converter with optocoupler isolation, please use this baud rate.
9600	
38400	
57600	
115200	For communication with the host computer, it is recommended that you use this high baud rate.

6.1.6 Command Handshake

When the Command Handshake is turned on, all commands sent by the host computer to the

instrument are returned to the host computer unchanged, and data is returned only afterwards.
When the Command Handshake is turned off, commands sent by the host computer to the instrument are processed immediately.

■ **Steps for setting the Command Handshake:**

Step 1 Enter the 〈System Configuration〉 page
Step 2 Use the cursor keys to select the [Command Handshake] field;
Step 3 Use the soft keys to select

Soft key	Function
Off	The Command Handshake is not used. Unless there are special requirements, set the Command Handshake to Off.
On	

6.1.7 Result Send

`Communication command: {FETCH,AUTO}`

The instrument supports automatically sending data to the host computer. After each test is completed, the data is automatically sent to the host computer without the host computer sending the FETCH? command.
After each test, the instrument sends the test result and the comparator result to the host; for the format refer to the FETCh? subsystem.

Steps for setting [Result Sending]:

Step 1 Enter the 〈System Configuration〉 page
Step 2 Use the cursor keys to select the [Result Sending] field;
Step 3 Use the soft keys to select

Soft key	Function
FETCH	Use the command FETCH? to obtain all measurement data
Auto	Automatically sent to the host computer after each test is completed

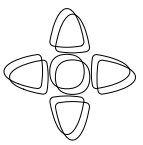
6.2 System Information Page

Press [Meas] or [Setup] to enter the main page, press the [System Configuration] key in the sidebar to enter the 〈System Configuration〉 page, and press the soft keys to select [System Information].
The System Information page has no user-configurable options.

Figure 6- 2 <System Information> Page



7.Remote Communication



You will learn about the following:

- Introduction to the RS-232 interface
- RS-232 connection.
- Selecting the baud rate.
- Software protocol.

The instrument uses the RS-232 interface (standard configuration) to communicate with a computer and perform all instrument functions. With standard SCPI commands, users can also conveniently develop various data acquisition systems of their own.

7.1 RS-232C

RS-232 is a serial communication standard widely used today, also called the asynchronous serial communication standard, used for data communication between computers and between computers and peripherals. RS is the English abbreviation of "Recommended Standard" (recommended standard), and 232 is the standard number. This standard was officially published in 1969 by the Electronic Industries Association (EIA) of the United States; it specifies that data is transmitted one bit at a time over a single data line.

Most serial port configurations are usually not strictly based on the RS-232 standard: a 25-pin connector is used on each port (today's computers mostly use a 9-pin connector). The most commonly used RS-232 signals are shown in the following table:

Table 7- 1 Common RS-232 Signals

Signal	Symbol	25-pin connector pin number	9-pin connector pin number
Request to send	RTS	4	7
Clear to send	CTS	5	8
Data set ready	DSR	6	6
Data carrier detect	DCD	8	1
Data terminal ready	DTR	20	4
Transmitted data	TXD	2	3
Received data	RXD	3	2
Ground	GND	7	5
Request to send	RTS	4	7

In addition, RS232 also has a minimum subset, which is the connection method adopted by the instrument.

Table 7- 2 Minimum Subset of the RS-232 Standard

Signal	Symbol	9-pin connector pin number
Transmitted data	TXD	2
Received data	RXD	3
Ground	GND	5

7.1.1 RS232C Connection

The RS-232 serial interface can be interconnected with the serial interface of a controller (for

example, a personal computer or an industrial computer) through a straight-through DB-9 cable.

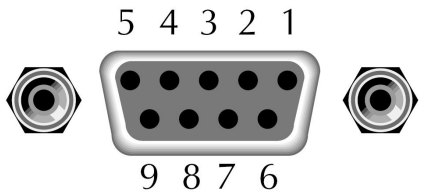
Note: The instrument cannot use a null modem cable.

You can make it yourself, or purchase a 9-corestraight-through cable yourself, or purchase one from Onmeas.

Note the following for a user-made 3-wire cable:

· When using the DB9 port built into the PC, pins 4-6 and 7-8 of the DB-9 connector (male) on the computer side may need to be shorted

Figure 7- 1 RS-232 Interface on the Rear Panel



Recommendation: To avoid electric shock, turn off the power of the instrument when plugging or unplugging connectors.

■ Default communication settings of the instrument:

Transmission mode: Full-duplex asynchronous communication with start and stop bits

Data bits: 8 bits

Stop bits: 1 bit

Parity: None

7.2 Handshake Protocol

Since the instrument uses the minimum subset of the RS-232 standard and does not use hardware handshake signals, the instrument can enable software handshake to reduce possible data loss or data errors during communication. High-level language software engineers should develop the computer communication software strictly according to the following handshake protocol:

- The command parser of the instrument accepts only ASCII format, and command responses are also returned as ASCII codes.
- **The command string sent by the host computer must end with NL('\n'), and the command parser of the instrument starts executing the command string only after receiving the terminator**.
- The instrument can enable command handshake: after receiving each character, the instrument immediately sends that character back to the host computer, and the host computer can continue to send the next character only after receiving this echoed character.

Tip: If the host computer cannot receive the data returned by the instrument, you can try the following methods to resolve the problem:

1. The software handshake is turned off; refer to the <System Settings> page of the instrument to turn it on.
2. Serial port connection fault; check the cable connections.
3. The communication format of the high-level language program on the computer side is incorrect. Try checking whether the serial port number and the communication format are correct, and whether the baud rate is the same as that set on the instrument.
4. If the instrument is parsing the previous command, the host computer cannot receive a response from the instrument either; please wait and try again.

<If the problem still cannot be solved, immediately consult the Onmeas technical engineers>

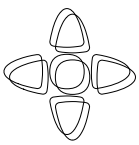
7.3 SCPI Language

SCPI (Standard Commands for Programmable Instruments) is a universal command set for test instruments adopted by Onmeas. SCPI, also known as TMSL (Test and Measurement System Language), was developed by Agilent Technologies as an extension of IEEE488.2 and has been widely adopted by test equipment manufacturers to date.

Reference: 

The built-in command parser of the instrument is responsible for parsing the various command formats entered by the user. Since the command parser is based on the SCPI protocol but is not fully consistent with SCPI, read the "SCPI Command Reference" chapter carefully before starting work.

8.SCPI Command Reference



This chapter includes the following topics:

- Command Parser — understand some rules of the command parser.
- Command Syntax — rules for writing command lines
- Query Syntax — rules for writing query commands
- Query Response — format of the query response
- Command Summary

This chapter provides all the SCPI commands used by the instrument. Through these SCPI commands, all functions of the instrument can be fully controlled.

8.1 Command String Parsing

The host computer can send a string of commands to the instrument, and the command parser of the instrument starts parsing after detecting the terminator (\n) or an input buffer overflow.

Example: Valid command string:

AAA:BBB CCC;DDD EEE;:FFF

The command parser of the instrument is responsible for the parsing and execution of all commands. Before writing a program, you must first understand its parsing rules.

8.1.1 Command Parsing Rules

1. The command parser only parses and responds to ASCII code data.
2. **The SCPI command string must take NL(' \n ' ASCII 0x0A) as its terminator**, and the command parser starts executing the command string only after receiving the terminator or when the buffer overflows.
3. If Command Handshake is enabled, the command parser immediately sends each received character back to the host computer; the host computer can continue to send the next character only after receiving this echoed character.
4. After parsing an error, the command parser immediately terminates parsing and the current command becomes invalid.
5. After parsing a query command, the command parser terminates parsing of the current command string, and the subsequent string is ignored.
6. The command parser is not case-sensitive when parsing command strings.
7. The command parser supports abbreviated command forms; for the abbreviation specifications, refer to the following chapters.

8.1.2 Symbol Conventions and Definitions

This chapter uses some symbols that are not part of the command tree; they are only intended to facilitate a better understanding of command strings.

< >	The text in angle brackets indicates the parameter of the command
[ ]	The text in square brackets indicates an optional command
{}	When the braces enclose several parameter items, it indicates that only one of the items may be selected.
( )	The abbreviated form of a parameter is placed in parentheses.

Uppercase letters The abbreviated form of a command.

8.1.3 Command Tree Structure

SCPI commands adopt a tree structure and can extend down three levels (Note: the command parser of this instrument can parse down any number of levels). The highest level here is called the subsystem command. Only after a subsystem command is selected are the commands below it valid. SCPI uses the colon (:) to separate higher-level commands from lower-level commands.

Figure 8- 1 Command Tree Structure

Example

ROOT:CCC:DDD ppp

ROOT Subsystem command

CCC Second level

DDD Third level

ppp Parameter

8.2 Commands and Parameters

A command tree consists of **a command and [parameters]**, separated by one space (ASCII: 20H).

Example

AAA:BBB 1.234

Command [Parameters]

8.2.1 Commands

Command words can be in long form or abbreviated form. The long form makes it easier for engineers to understand the meaning of the command string; the abbreviated form is convenient for writing.

8.2.2 Parameters

- A command with a single command word and no parameters.

  Example: AAA:BBB
- The parameter can be in the form of a string, and its abbreviation rules still follow the "command abbreviation rules" in the previous section.

  Example: AAA:BBB 1.23
- The parameter can be in numeric form
  - *<integer>* Integer 123, +123, -123
  - *<float>* Floating-point number
    1. <fixfloat>: fixed-point floating-point number: 1.23, -1.23
    2. <Scifloat>: floating-point number in scientific notation: 1.23E+4, +1.23e-4
    3. <mpfloat>: floating-point number expressed with a multiplier: 1.23k, 1.23M, 1.23G, 1.23u

Table 8- 2 Multiplier Abbreviations

Value	Multiplier
1E18 (EXA)	EX

1E15 (PETA)	PE
1E12 (TERA)	T
1E9 (GIGA)	G
1E6 (MEGA)	MA
1E3 (KILO)	K
1E-3 (MILLI)	M
1E-6 (MICRO)	U
1E-9 (NANO)	N
1E-12 (PICO)	P
1E-15 (PEMTO)	F
1E-18 (ATTO)	A



Tip: The multipliers are not case-sensitive, and their notation differs from the standard names.

8.2.3 Separators

The command parser of the instrument only accepts the permitted separators; for any other separator, the command parser will generate an "Invalid separator(illegal separator)" error. These separators include:

; Semicolon, used to separate two commands.

Example: AAA:BBB 100.0;CCC:DDD

: Colon, used to separate command trees or to restart the command tree.

Example: AAA:BBB:CCC 123.4;:DDD:EEE 567.8

? Question mark, used for queries.

Example: AAA?

□ Space, used to separate parameters.

Example: AAA:BBB□1.234

8.3 Command Summary

All commands are interpreted in the order of subsystem commands; all subsystems are listed below

- Display Display Page Subsystem
- Function Measurement Function Subsystem
- COMParator Sorting Subsystem
- SYSTem Subsystem
- FETCh Subsystem

Common commands:

- IDN? Instrument information query subsystem

8.4 Display Display Page Subsystem

The DISPlay subsystem can be used to switch between different display pages or to display a string of text on the page prompt bar.

Figure 8- 7 DISPlay Subsystem Tree

DISPlay	**:PAGE**	**{MEASurement(MEAS),SETUp(MSET),SYSTem(SYST), SYSTEMINFO(SINF)}**
	:LINE	**<string>**

8.4.1 DISPlay:PAGE

DISP:PAGE switches to the specified page.

Command syntax: **DISPlay:PAGE <page name>**

Parameters: <page name> includes:

MEASurement(MEAS)	Measurement display page
SETUp(MSET)	Setup page
SYSTem(SYST)	System Configuration Page
SYSTEMINFO(SINF)	System Information Page

Example: Send**>disp:page setup**<NL> //Switch to the setup page

Query syntax: **DISP:PAGE?**

Query response:

<page name> abbreviation
meas
mset
syst
sinf

Example:

Send**>disp:page?**

Return**>meas**

Send**>disp:page meas;page?**

Return**>meas**

8.4.2 DISP:LINE

DISP:LINE displays a string of text on the prompt bar at the bottom of the page. The text can display up to 30 characters and stays for 10s.

Command syntax: **DISPlay:LINE<*string*>**

Parameters: **<string>**up to 30 characters

Example: Send**>DISP:LINE "This is a Comment."**

Query syntax: **DISPlay:LINE?**

Query response: The prompt bar text on the screen; if the prompt bar is empty, NULL is returned.

8.5 Function Measurement Function Subsystem

The Function measurement function subsystem sets the instrument test functions, including test parameter and range settings

Figure 8- 8 Function Subsystem Tree

Function	*:MODE*	*{AC,DC,AC+DC}*	
	:TYPE	*{U-I-P, U-I-F, U-I-G}*	
	:VRANGe	*{<integer>,MIN,MAX}*	
		:mode	*{hold,auto}*
	:IRANGe	*{<integer>,MIN,MAX}*	
		:mode	*{hold,auto}*

8.5.1 FUNCtion: MODE

FUNCtion:MODE sets the measurement mode.

Command syntax: **FUNCtion:VOLTage** {AC,DC,AC+DC}

Parameters: {AC,DC,AC+DC}
Here, AC: alternating current; DC: direct current; AC+DC: AC+DC

Example: Send> **FUNCtion:MODE AC** //Set the measurement mode to AC
Send> **FUNCtion:MODE AC+DC** //Set the measurement mode to AC+DC

Query syntax: **FUNCtion:MODE?**

Query response: {AC,DC,AC+DC}

Example: Send**> FUNCtion:MODE?**
Return**> AC**

8.5.2 FUNCtion: TYPE

FUNCtion:TYPE sets the measurement function.

Command syntax: **FUNCtion:TYPE {U-I-P, U-I-F, U-I-G}**

Parameters: **{U-I-P, U-I-F, U-I-G}**
Here, **U-I-P:voltage-current-power U-I-F:voltage-current-frequency U-I-G:voltage-current-power factor**

Example: Send> **FUNCtion: TYPE U-I-F** //Set the measurement function to voltage-current-frequency

Query syntax: **FUNCtion: TYPE?**

Query response: **{U-I-P, U-I-F, U-I-λ}**

Example: Send**>FUNCtion: TYPE?**
Return**> U-I-λ** //The current measurement function is voltage-current-power factor

8.5.3 FUNCtion: VRANGe

FUNCtion:VRANGe sets the instrument voltage range number; if the current range is auto it switches to locked.

Command syntax: **FUNCtion:VRANGe {<integer>,MIN,MAX}**

Parameters: **{<integer>,MIN,MAX}**
Here,
<integer> is the voltage range number, integer 0-3
MIN: the minimum voltage range, =0
MAX: the maximum voltage range, =3

Example: Send> func:Vrang 2 //Set the current voltage range to range 2
Send> func:Vrang min //Set the current voltage range to range 0
Send> func:Vrang max //Set the current voltage range to range 3

Query syntax: **FUNCtion:VRANGe?**

Query response: **<integer>**
Voltage range number, integer 0-3

Example: Send**> FUNCtion:VRANGe?**
Return**>1**

8.5.4 FUNCtion: VRANGe:Mode

FUNCtion:VRANGe:MODE sets the voltage range to auto or locked.

Command syntax: **FUNCtion:VRANGe:Mode {Auto,Hold,Nom}**

Parameters: **{Auto,Hold}**
Here, Auto: auto; Hold: locked

Example: Send> FUNCtion:VRANGe:MODE Auto //Set the current voltage range to auto
Send> FUNCtion:VRANGe:MODE Hold //Set the current voltage range to locked

Query syntax: **FUNCtion:VRANGe:Mode?**

Query response:	**{auto,hold}**
Example:	Send**>FUNCtion:VRANGe:Mode?** Return>auto

8.5.5 FUNCtion: IRANGe

FUNCtion:IRANGe sets the instrument current range number; if the current range is auto it switches to locked.

Command syntax:	**FUNCtion:IRANGe {<integer>,MIN,MAX}**
Parameters:	**{<integer>,MIN,MAX}** **Here,** **<integer> is the voltage range number, integer 0-3** **MIN: the minimum voltage range, =0** **MAX: the maximum voltage range, =3**
Example:	Send> func:Irang 2 //Set the current current range to range 2 Send> func:Irang min //Set the current current range to range 0 Send> func:Irang max //Set the current current range to range 3
Query syntax:	**FUNCtion:IRANGe?**
Query response:	**<integer>** **Current range number, integer 0-3**
Example:	Send**> FUNCtion:IRANGe?** Return**>1**

8.5.6 FUNCtion: IRANGe:Mode

FUNCtion:IRANGe:MODE sets the current range to auto or locked.

Command syntax:	**FUNCtion:IRANGe:Mode {Auto,Hold,Nom}**
Parameters:	**{Auto,Hold}** Here, Auto: auto; Hold: locked
Example:	Send> FUNCtion:IRANGe:MODE Auto //Set the current current range to auto Send> FUNCtion:IRANGe:MODE Hold //Set the current current range to locked
Query syntax:	**FUNCtion:IRANGe:Mode?**
Query response:	**{auto,hold}**
Example:	Send**>FUNCtion:IRANGe:Mode?** Return>auto

8.6 COMParator Sorting Subsystem

The COMParator subsystem sets the comparator parameters, including the upper/lower limit reference values and the beeper settings.

Figure 8- 9 COMParator Sorting Subsystem Tree

COMParator	*:PMODE*	*{ON,OFF}*
	: PLimit	*{float1,float2}*
	:IMODE	*{ON,OFF}*
	: ILimit	*{float1,float2}*
	: Beep	*{ON,OFF}*

8.6.1 COMParator:PMODE

The COMParator:PMODE command sets whether the power comparator is on.

Command syntax:	**COMParator:PMODE {ON,OFF}**
Parameters:	**{ON,OFF}** Here, **ON**: comparator on **OFF**: comparator off

Example: Send> **COMParator:PMODE ON** //Select the power comparator on

Query syntax: **COMParator:PMODE?**

Query response: **{ON,OFF}**

Example: Send> **COMParator:PMODE?**
Return> **OFF**

8.6.2 COMParator:PLIMit

The COMParator:PLIMit command sets the comparator power upper/lower limits.

Command syntax: **COMParator:PLIMit *{float1,float2}***

Parameters: ***{float1,float2}***
Here,
float1: comparator power lower limit value
float2: comparator power upper limit value

Example: Send> **COMParator:PLimit 2,500** //Set the power comparison lower limit to 2W and the power comparison upper limit to 500W

Query syntax: **COMParator:PLIMit?**

Query response: ***{float1,float2}***

Example: Send> **COMParator:PLIMit?**
Return> **0.0,999.0**
Restriction: usable only when the power comparator is on.

8.6.3 COMParator:IMODE

The COMParator:IMODE command sets whether the current comparator is on.

Command syntax: **COMParator:IMODE {ON,OFF}**

Parameters: **{ON,OFF}**
Here, **ON**: comparator on
OFF: comparator off

Example: Send> **COMParator:IMODE ON** //Select the current comparator on

Query syntax: **COMParator:IMODE?**

Query response: **{ON,OFF}**

Example: Send> **COMParator:IMODE?**
Return> **OFF**

8.6.4 COMParator:ILIMit

The COMParator:ILIMit command sets the comparator current upper/lower limits.

Command syntax: **COMParator:ILIMit *{float1,float2}***

Parameters: ***{float1,float2}***
Here,
float1: comparator current lower limit value
float2: comparator current upper limit value

Example: Send> **COMParator:ILimit 1,15** //Set the current comparison lower limit to 1A and the current comparison upper limit to 15A

COMParator:ILIMit?

Query response: ***{float1,float2}***

Example: Send> **COMParator:ILIMit?**
Return> **1.0,15.0**
Restriction: usable only when the current comparator is on.

8.6.5 COMParato:Beep

The COMParator:BEEP command sets the comparator beeper switch.

Command syntax:	**COMParator:Beep {OFF,GD,NG}**
Parameters:	**{OFF,GD,NG}**Here, **OFF:** off **GD:** PASS beep; NG: FAIL beep
Example:	Send> **COMParator:Beep GD** //Select the beeper to sound on comparator pass
Query syntax:	**COMParator:Beep**?
Query response:	**{OFF,GD,NG}**
Example:	Send**> COMParator:Beep**? Return**> GD**

8.7 SYSTem Subsystem

The SYSTem subsystem sets system-related parameters.

Figure 8- 10 SYSTem Subsystem Tree

SYSTem	*:LANGuage*	*{ENGLISH,CHINESE,EN,CN}*
	:SHAKEHAND(SHAK)	*{ON,OFF}*
	:SENDmode	*{Auto,Fetch}*

8.7.1 SYSTem:LANGuage System Language

Sets the instrument language.

Command syntax:	**SYSTem:LANGuage {ENGLISH,CHINESE,EN,CN}**
Example:	Send**>SYST:LANG EN** //Set to English display
Query syntax:	**SYST:LANG?**
Query response:	**{ENGLISH,CHINESE}**
Query response:	**{OFF,ON}**

8.7.2 SYSTem:SHAKhand Communication Handshake Command

With the communication handshake on, the instrument echoes the received command back to the host as-is before returning the data.

Command syntax:	**SYSTem:SHAKhand {ON,OFF}**
Example:	Send**>SYST:SHAK ON**
Query syntax:	**SYSTem:SHAKhand?**
Query response:	**{on,off}**

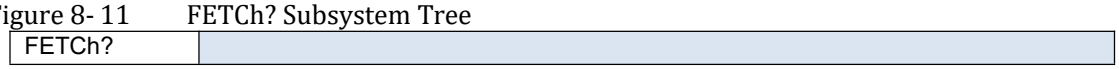
8.7.3 SYSTem:SENDmode Acquisition Mode Command

Sets the measurement result acquisition mode.

Command syntax:	**SYSTem:SENDmode {auto,Fetch}**
Parameters:	**{auto,Fetch}** Here, **auto:** automatically returns the result **Fetch:** returns the result via FETCH?
Example:	Send> SYSTem:SENDmode Auto
Query syntax:	**SYSTem:SENDmode**?
Query response:	**{auto,Fetch}**
Example:	Send**> SYSTem:SENDmode**? Return**> auto**

8.8 FETCh Subsystem

Figure 8- 11 FETCh? Subsystem Tree



FETCh? is used to obtain test data.
Before using this command, set the [Result Send] field on the 〈System Configuration〉 page to [FETCH].

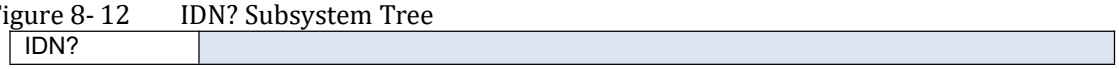
Command syntax: **FETCh?**

Parameters:
```
According to the measurement parameters: <float>,<float>,<float>,<float>
Here,  <float> voltage true RMS floating point (4 bytes, no unit)
       <float> current true RMS floating point (4 bytes, no unit)
       <float> power factor floating point (4 bytes, no unit, unsigned)
       <float> frequency floating point (4 bytes, no unit)
       <float> power floating point (4 bytes, no unit)
```

Example:
Send> **FETCh?**
Receive> 238. 9, 0. 001, 0. 963, 49. 99, 0. 2
Restriction: valid only in the testing state.

8.9 IDN? Subsystem

Figure 8- 12 IDN? Subsystem Tree



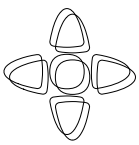
The IDN? subsystem is used to return the version number of the instrument.

Query syntax: **IDN?**

Query response: **<Manufacturer>,<MODEL>,<SN>,<Revision>**
Manufacturer, model, serial number, instrument version

Example:
Send**> IDN?** *<NL>*
Return> **Onmeas,AT3310,0000000,REV A1.0***<NL>*

9.Specifications



You will learn about the following:

- Technical Specifications
- General Specifications
- Environmental Requirements
- Dimensions

9.1 Technical Specifications

The following data are measured under the following conditions:
Temperature condition: 23℃±5℃
Humidity condition: 65% R.H.
Zero adjustment: open zeroing before testing
Warm-up time: >60 minutes
Calibration interval: 12 months

9.2 General Specifications

	AT3310 Digital Power Meter
Input	Single-phase 2-wire
Measurement mode	AC/DC/AC+DC
Measured items	Voltage, current, active power, power factor, frequency
Input voltage	1.0V~400V (AC) | 1.0V~600V (DC)
Voltage range	35V/75V/150V/300V
Voltage resolution	0.01V on the 35V range 0.1V on other ranges
Input current	10mA~20A
Current Range	0.5A/2A/8A/20A
Current resolution	1mA
Range switching	Auto / Manual
Power factor	-1.000~+1.000
Frequency range	DC / AC: 45Hz~130Hz, bandwidth: 5kHz
Voltage, current and active power accuracy	±(0.4% reading + 0.1% range + 1 digit)
Power factor accuracy	±(0.004 + 0.001/reading + 1 digit)
Frequency accuracy	±(0.1% reading + 1 digit)
Upper/lower limit judgment function	Current and power upper/lower limit setting, judgment and alarm functions; ideal for production-line measurement.
USB disk data logging function	Yes

Host data acquisition software	Optional
Standard interfaces	RS-232 communication interface, USB-232 interface
Display	3.5-inch TFT color screen; three values displayed simultaneously
Others	Chinese/English menu switching

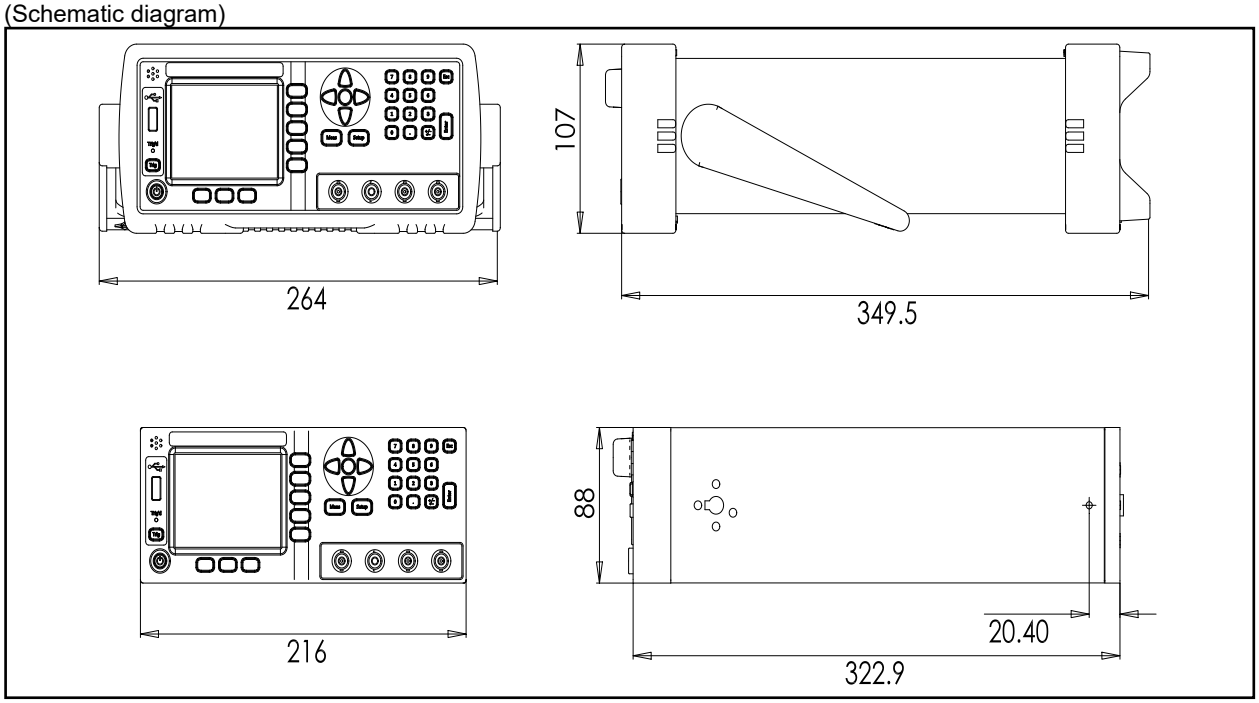
9.3 Environmental Requirements

Environment: Specifications: Temperature 18℃~28℃ Humidity ≤ 65% RH
Operation: Temperature 10℃~40℃ Humidity 10~80% RH
Storage: Temperature 0℃~50℃ Humidity 10~90% RH

Power: 198V~252VAC 48.5Hz~52.5Hz
Fuse: 250V 1A slow-blow
Power consumption: Max. 30VA
Weight: Approx. 3 kg.

9.4 Dimensions

(Schematic diagram)



©2005-2018 Copyright: Onmeas Ltd.
Onmeas Ltd.

Onmeas Ltd.
#14,No. 9 Caoxi Road, Wujin district, Changzhou, Jiangsu province, China.

400-600-1217

TEL：0519-88805550

https://www.onmeas.com

Sales Service Email: sales@onmeas.com

Tech Support Email: tech@onmeas.com

©2005-2026 Onmeas Ltd.

Specifications are subject to change without prior notice.

All are trademarks or registered trademarks of Onmeas Ltd.