

ZLG



# High-accuracy Digital Power Meter

PA310H/PA333H for high-voltage and high-current testing

PA310/PA323 for low-power and low-current testing

For more information, please visit  
[www.zlg.com](http://www.zlg.com)

# Product Introduction

Power meter is a basic electrical power measuring instrument, which is mainly used in home appliances, motors, power supplies and other industries. It can measure the electrical power and power consumption visually in the R&D testing or production-line testing. With a growing demand for industry testing, the tests of different industries have become different obviously. ZHIYUAN Electronics can provide users with a wide selection for different industries, including PA310H/PA333H high-voltage and high-current testing power meter, PA310/PA323 low-power and low-current testing power meter and PM100 dedicated production-line testing power meter.



## Product Selection

Model Type	High voltage, high current		Low power, low current		Production-line
	PA310H	PA333H	PA310	PA323	PM100
Input element	Single-element	Three-element	Single-element	Three-element	Single-element
Basic accuracy (50Hz/60Hz)	0.1% reading +0.05% range	0.1% reading +0.05% range	0.1% reading +0.05% range	0.1% reading +0.05% range	0.1% reading +0.10% range
Input bandwidth	DC, 0.1Hz-300kHz	DC, 0.1Hz-300kHz	DC, 0.1Hz-300kHz	DC, 0.1Hz-100kHz	DC, 0.5Hz-10kHz
Sampling rate	500KS/s	200KS/s	500KS/s	200KS/s	20KS/s
Data update cycle	100ms, 250ms, 500ms, 1s, 2s, 5s, 10s, 20s, automatic	100ms, 250ms, 500ms, 1s, 2s, 5s, 10s, 20s, automatic	100ms, 250ms, 500ms, 1s, 2s, 5s, 10s, 20s	100ms, 250ms, 500ms, 1s, 2s, 5s, 10s, 20s, automatic	100ms, 250ms, 500ms, 1s, 2s, 5s
Harmonics measurement	Standard configuration, IEC61000-4-7	Standard configuration, IEC61000-4-7	Standard configuration, IEC61000-4-7	Standard configuration, IEC61000-4-7	/
THD calculation order	1st-50th	1st-50th	1st-50th	1st-50th	/
Voltage range	15V, 30V, 60V, 150V, 300V, 600V, 1000V	15V, 30V, 60V, 150V, 300V, 600V, 1000V	15V, 30V, 60V, 150V, 300V, 600V	15V, 30V, 60V, 150V, 300V, 600V	15V, 30V, 60V, 150V, 300V, 600V
Current range of direct input	1A, 2A, 5A, 10A, 20A, 50A	1A, 2A, 5A, 10A, 20A, 50A	5mA, 10mA, 20mA, 50mA, 100mA, 200mA, 0.5A, 1A, 2A, 5A, 10A, 20A	0.5A, 1A, 2A, 5A, 10A, 20A	5mA, 10mA, 20mA, 50mA, 100mA, 200mA, 0.5A, 1A, 2A, 5A, 10A, 20A
External sensor input	100mV, 200mV, 400mV, 1V, 2V, 5V, 10V	100mV, 200mV, 400mV, 1V, 2V, 5V, 10V	50mV, 100mV, 200mV, 500mV, 1V, 2V, 2.5V, 5V, 10V	50mV, 100mV, 200mV, 500mV, 1V, 2V, 2.5V, 5V, 10V	/
Communication interfaces	Standard configuration GPIB (In accordance with IEEE488.2), LAN, RS-232, USB-Host	Standard configuration GPIB, LAN, RS-232, USB-Host, USB-Device	Standard configuration GPIB (In accordance with IEEE488.2), LAN, RS-232, USB-Host	Standard configuration GPIB (In accordance with IEEE488.2), LAN, RS-232, USB-Host	RS-232, IO detection

## AC/DC Current Clamp (Optional)

Model Type	ZY-CTS100	ZY-CTS500	C117	LF 205-S/SP3	LF 205-S	LF 505-S	LF 1005-S
Appearance							
Current measurement range	100Arms (AC)	500Arms (AC)	1000Arms (AC)	100Arms (DC/AC)	200Arms (DC/AC)	500Arms (DC/AC)	1000Arms (DC/AC)
Accuracy	±0.3%	±0.3%	±0.3%	±0.5%	±0.5%	±0.6%	±0.4%
Bandwidth	45Hz-5kHz	45Hz-5kHz	30Hz-5KHz	DC-100KHz	DC-100KHz	DC-100KHz	DC-150KHz
Transformation ratio	1 mV/A	1mV/A	1mV/A	1:1000	1:2000	1:5000	1:5000

## Junction box (Optional)

Model Type	JXH10A
Appearance	
Maximum operating voltage	250V
Maximum operating current	10A

# PA310H and PA333H power meter for high-voltage and high-current testing

PA310H (single-element) and PA333H (three-element) high-accuracy digital power meters are specially used for high power home appliances, motors, R&D production testing and other high-voltage, high-current testing fields. They are able to measure 1000V high voltage and 50A high current directly so as to meet the needs of a wide range of production, test, evaluation and R&D applications.

## Exclusive support for 1000V, 50A direct input without current sensors

PA310H and PA333H power meters apply dual-shunt technology, which can measure up to 1000V voltage and 50A current directly without using the external sensors and meet the needs of up to 50kW high-power testing with ease.



# PA310 and PA323 power meter for low-power and low-current testing

PA310 high-accuracy single-element digital power meter is specially used for low-power measurement field. It can measure the minimum current as low as 50 $\mu$ A at the range of 5mA, which is the best choice for standby power consumption testing. PA323 high-accuracy three-element digital power meter is widely used and is very suitable for the applications that need to measure three elements at the same time.

## Ultra-low standby power measurement with 0.1% high accuracy

PA310 digital power meter carries out a number of optimized low-power measurements with brand new design architecture. It can measure the minimum current as low as 50 $\mu$ A, as well as the power consumption as low as 0.01W, which complies with the international standards (IEC62301, Energy Star and SPECpower).



# General Features

## Simplified wiring for power consumption testing of the complete machine

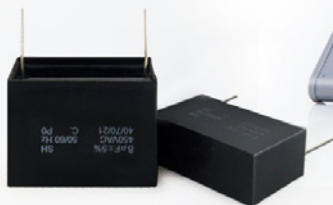
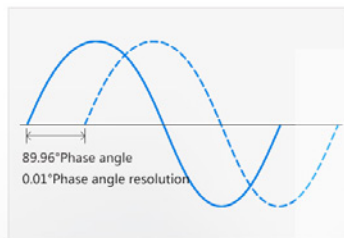
PA300 series digital power meter can be used with the well-designed JXH10A junction box to solve the problem of low efficiency and unsafe in wiring connection or disconnection when testing the power consumption of the complete machine. It helps test engineers to connect easily and complete the test quickly.



## Ensure high-accuracy measurement in low power factor

PA300 series digital power meter uses the 100MHz synchronous clock with high stability temperature compensation, and the resolution of phase angle is up to  $0.01^\circ$ . It can still ensure high-accuracy measurement of 0.1% even in the power factor as low as 0.0005 so as to meet the testing needs of transformers, capacitors and other low power factor occasions.

0.0005 | 0.01°  
Minimum power factor | Phase angle resolution



## IEC61000-4-7 international harmonics measurement standard

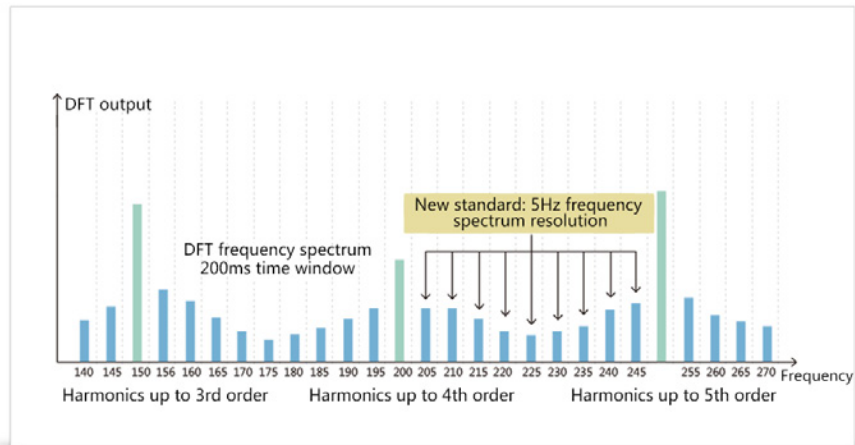
PA300 series power meter uses a pure hardware analog filter and PLL technology. The function of harmonics measurement fully complies with the international standard IEC61000-4-7: 2002. According to the fundamental frequency, voltage and current can be measured with harmonics up to 50th order respectively. No matter for total harmonic distortion (THD) or fundamental component, each harmonic content, phase difference and harmonic ratio, all of them can be measured.



Harmonics up to 50th order



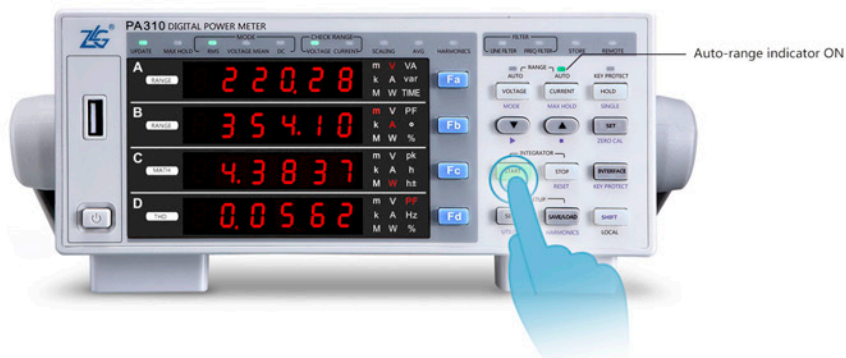
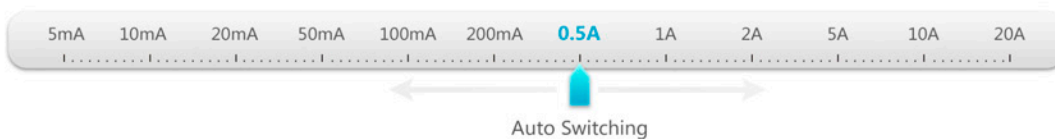
IEC61000-4-7



## Auto range function of integration measurement

Generally, the measurement range should be fixed while using the integration function of power meter to measure the power consumption or standby power consumption. However, if the input voltage exceeds the maximum value of selected range, the measurement results will be wrong and need to be repeated testing at a higher range. PA300 series power meter can automatically switch the range with high speed in the integration mode without needing to repeat testing.

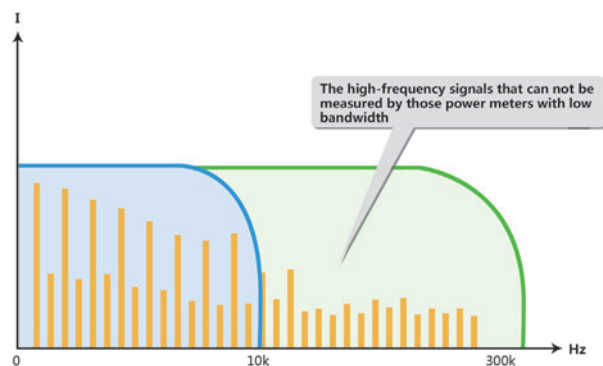
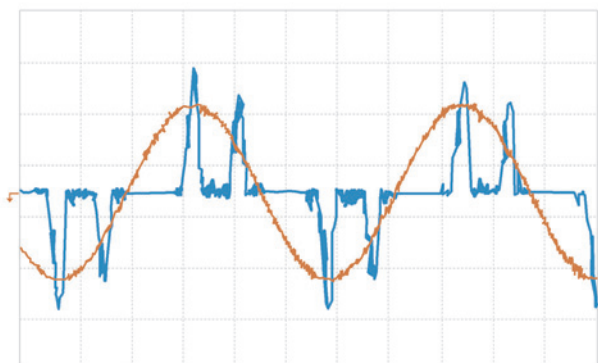
**Switch the range automatically with high speed**  
in the integration mode without needing to repeat testing



# Application

## Assessment and testing of switching power supplies and frequency-conversion home appliances

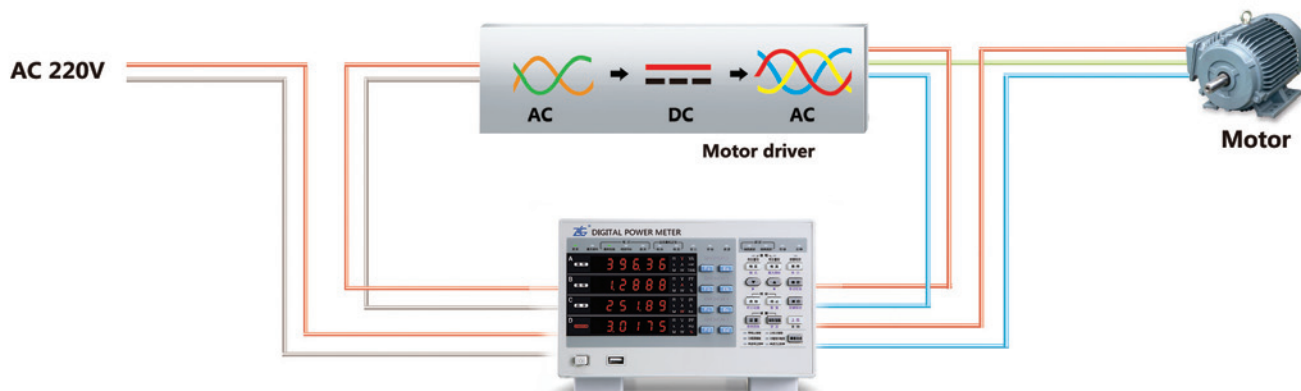
The input waveforms of switching power supplies and frequency-conversion home appliances are usually distortional waveform signals such as pulse, triangle wave, square wave, trapezoidal wave and so on, in which there are abundant high frequency harmonic components. Due to the limitations of bandwidth and sampling rate, the conventional power meters are not able to measure these high frequency harmonic components and the measured results are totally different from the actual values. PA310 digital power meter features 300kHz bandwidth and 500ks/s sampling rate, enabling it to measure such high frequency signals and thereby accurately measure their power factor and power.



## Motor drivers efficiency testing

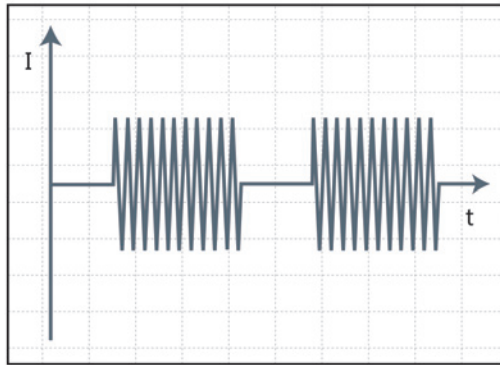
Generally, the motor drivers have single-phase AC inputs (or single-phase DC inputs) and three-phase AC outputs. In order to measure input/output power and efficiency of these input signals simultaneously, 4-element power inputs are required in the common measuring solutions.

PA333H digital power meter supports two-wattmeter power measuring, using 2-element power inputs to measure the three-phase output power of motor drivers. The single-phase input power and three-phase output power can be measured simultaneously by one PA333H three-phase power meter, and the efficiency of drivers can be displayed visually.

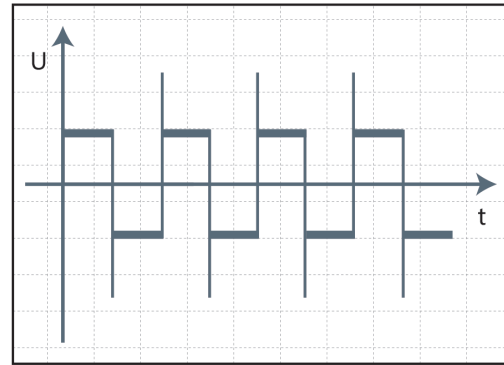


## Welding machines and HID power supplies testing

The special waveforms including pulses and distortional waveforms may occur in the welding machines and HID power supplies. PA300 series can accurately measure the RMS value of these devices with its frequency range of DC, 0.1Hz~300kHz, providing correct power consumption data for power fluctuation devices such as pulse operation instruments through the average active power measuring function, and thereby accurately measures distortional waveforms without any special mode settings.



Special waveform

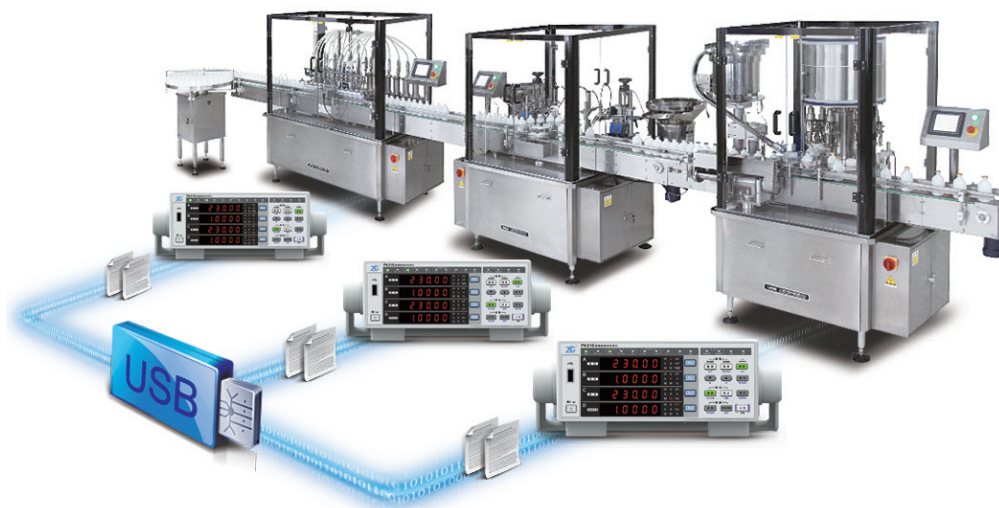


DC, 0.1Hz~300kHz

Average active power

## Automated testing

PA300 series power meter comes with USB-Host, USB-Device, Ethernet, RS-232 and GPIB interfaces, through which the secondary development of power meter can be carried out to realize the automated testing. In addition, it supports the import and export of parameter settings for users to copy these settings to the external memory such as U Flash disk, guaranteeing the consistence of parameter settings while improving efficiency, reducing the probability of repetitive parameter setting error and providing more reliable measurement results.



Consistence of parameter settings

Import and export of parameter settings

# PM100 Series Digital Power Meter

PM100 series power meter is specially used for production-line testing and system integration. Based on mature design experience, it reduced its volume and added easy installation and dustproof grade, thereby becomes a new generation of dedicated testing power meter with up to 0.1% accuracy for production and system integration. With its excellent performance, stability, high efficiency, small size, compact design (half rack) and easy installation, PM100 series power meter becomes the preferred product-line testing instrument for various system integration suppliers and home appliance production.



## System integration testing

For system integration, PM100 provides I/O detection interface for users to set the upper and lower limits of voltage, current, power and other parameters and to judge, and also provides alarm function, effectively avoiding fatigue, misjudgment and inefficiency problems caused by traditional manual judgment.





## Production-line testing of power supplies and home appliances

With its 0.1% power measurement accuracy, PM100 digital power meter is able to accurately measure the power of home appliances such as television, air-conditioner, refrigerator and so on as well as power products such as switching power supply, charger and so on, effectively assessing whether the device is working properly, and whether the device is stable enough.

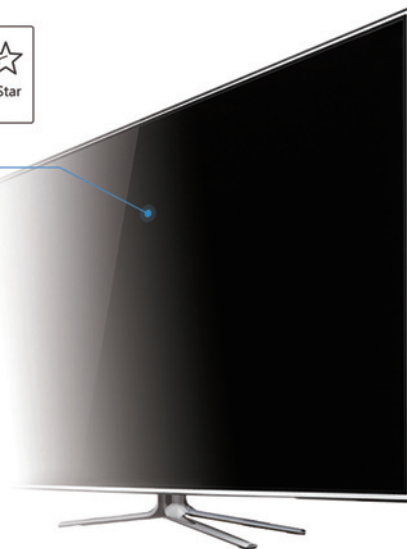


## Suitable for standby power consumption measurement

PM100 series power meter can measure the minimum current as low as  $50\mu\text{A}$  and the ultra-low standby power consumption of  $0.01\text{W}$ , which complies with the international standards (IEC62301, Energy Star, SPECpower).



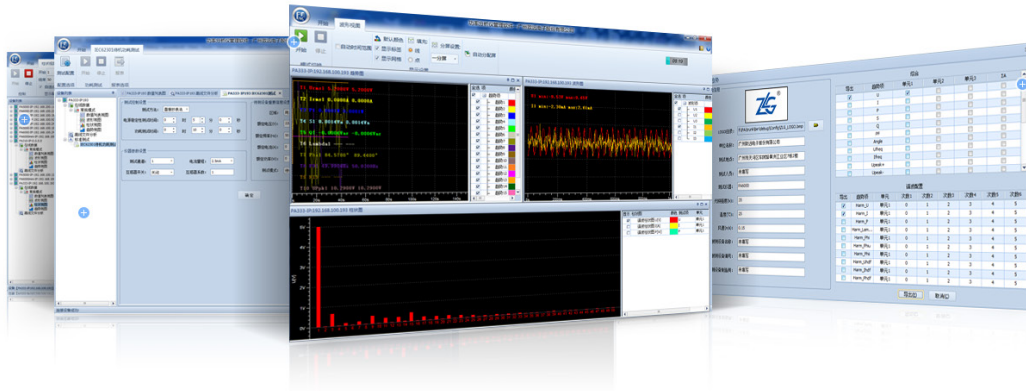
Suitable for standby power consumption measurement



# PAM Management Software

## High-efficiency visual data analysis software

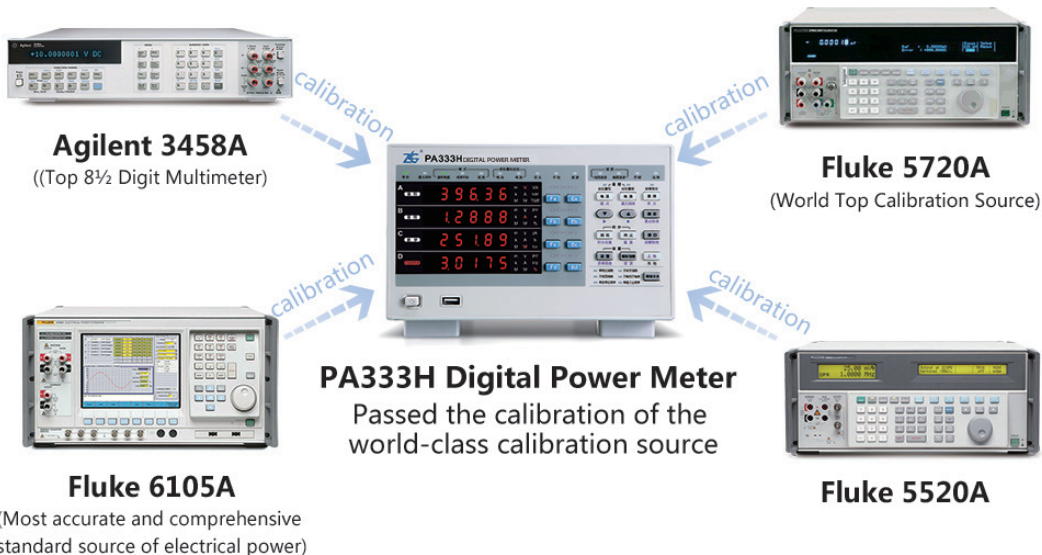
PAM management software has powerful data processing and analyzing capability, which supports the real-time display of all measured parameter values and generates each harmonics data, harmonics histograms, trend graphs and waveform graphs. It also supports simultaneous display and report export, and complies with IEC62301 international testing standard, realizing automated testing of standby power consumption (Only PA300 series power meter supports).



## Calibration

### Comprehensive and reliable calibration system

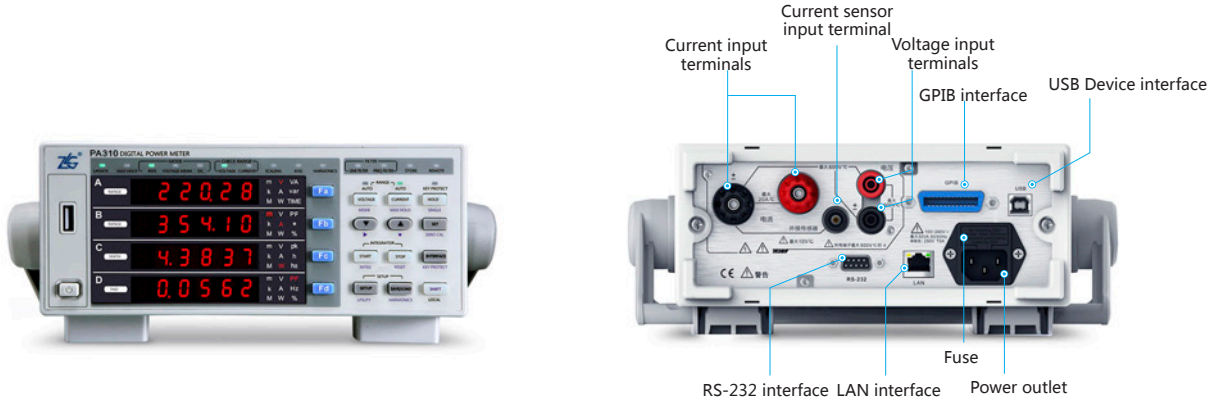
The accuracy, gain, frequency response, power, harmonics of PA300 voltage and current has passed the calibration of international authoritative calibrators such as Fluke 5520A, Fluke 5720A, Fluke 6105A and Agilent 3458A, and therefore the high accuracy and reliability of measurement can be fully guaranteed.



# Interface

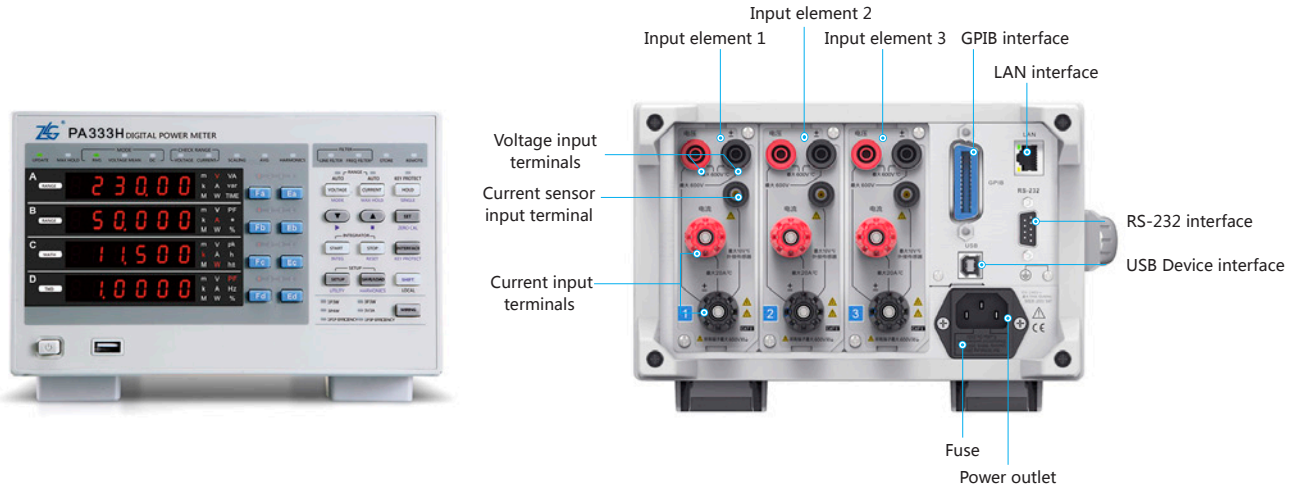
## Interfaces of PA310, PA310H single-element digital power meter

These single-element digital power meters support one voltage input element, one current input element and one current sensor input element, and come with GPIB, RS-232, LAN and USB interfaces.

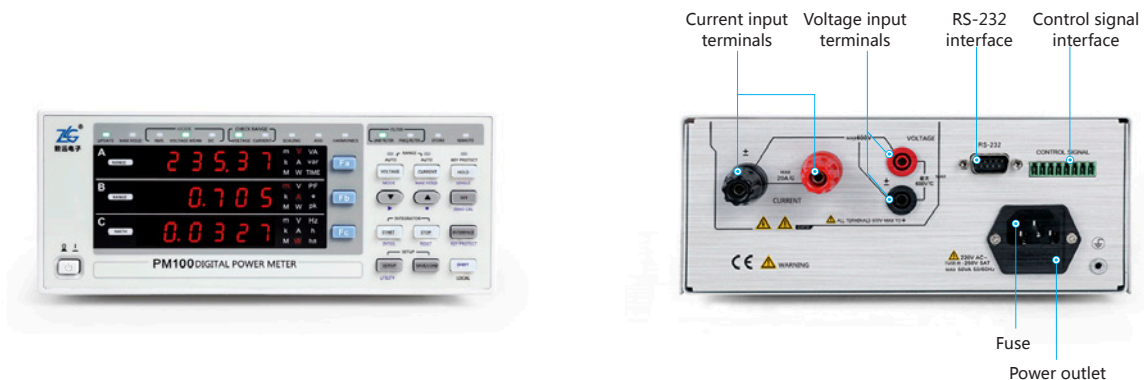


## Interfaces of PA323, PA333H three-element digital power meter

These three-element digital power meters support three-element voltage and current inputs and three-element current sensor inputs, and come with GPIB, RS-232, LAN and USB interfaces.



## Interfaces of PM100 digital power meter



# Successful Applications

## Testing and Certification Laboratories



天祥检测集团



必维国际检测集团



瑞士通用公证行



方圆检测认证



**CETC 中国电子科技集团公司**

中国电子科技集团公司

## Power Consumption Detection of Home Appliances



青岛海尔



远大空调



广东品胜电子股份有限公司



合肥质量监督检测所



广州市中崎商业机器股份有限公司



宜昌瑞英机电有限公司

## System Integration



湖南湘仪



四川诚邦测控技术有限公司



杭州威格电子科技有限公司



新界泵业（杭州）有限公司



苏州通润驱动设备股份有限公司



株洲普赛斯测控

## LED Luminaries Detection



广州市浩洋电子有限公司



杭州浙大三色仪器有限公司



杭州士兰微电子股份有限公司



杭州中为光电技术股份有限公司



上海酷蓝电子科技有限公司



浙江鑫通电子有限公司

## Electrical Power Industry



国家电网



上海上电电气科技有限公司



保定卓正电气科技有限公司



光一科技股份有限公司  
EleFirst Science & Tech Co., Ltd.

光一科技

## New Energy Detection



北京群曼能源科技有限公司



北京南斗智拓科技有限公司



艾伏新能源科技有限公司



卡威汽车

## Colleges and Universities



上海交通大学



东南大学



南京航空航天大学



沈阳工业大学



成都大学



安徽财经大学



天津商业大学



浙江大学宁波理工学院



桂林航天工业学院  
-高等院校



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