TD3110 Single-Phase Multi-Function Standard Meter

1. Summary

TD3110 is a high-precision single-phase standard instrument that can simultaneously measure multiple electrical parameters in the circuit such as: voltage, current, frequency, phase, harmonics, active power / energy, reactive power / energy, apparent power, power factors etc. This instrument has a wide range of applications. It can be used as a standard meter for single-phase energy meter calibration devices that meet the new national standards and R46. It is also suitable for calibrating single-phase power standard sources/meters.

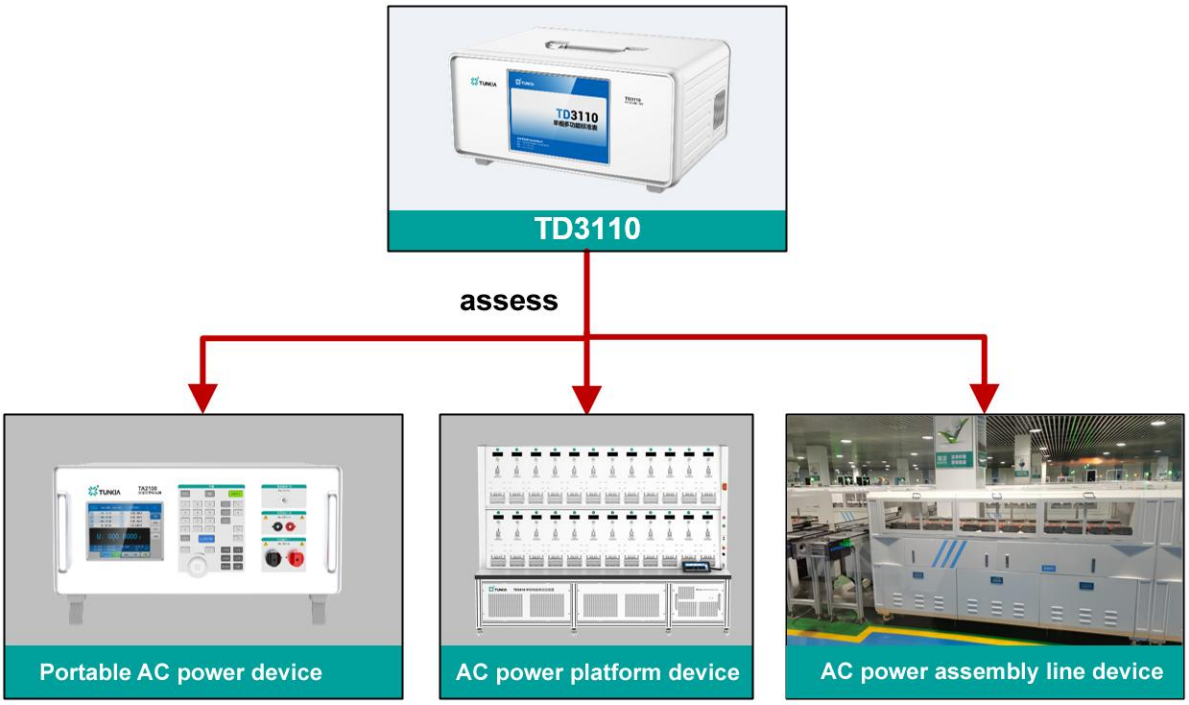
2. Features

- Power / energy measurement uncertainty: class 0.01.
- Voltage measurement range: 6 V ~ 528 V (a wider range can be customized).
- Current measurement range: 1 mA～120 A.
- Fundamental frequency: 45 Hz ~ 65 Hz (400Hz optional).
- The typical phase measurement uncertainty reaches 0.003°.
- Voltage and current support fully automatic range shifting.
- Both voltage and current support harmonic measurement from 2nd to 63rd order.
- It has the function of comprehensive statistical analysis of the measured power.
- Supports phasor diagram, spectrum diagram, trend diagram and other graphic displays.
- With standard power pulse input/output function.

- Communication interfaces: USB, RS232, LAN.
- Large-size LCD touch screen.

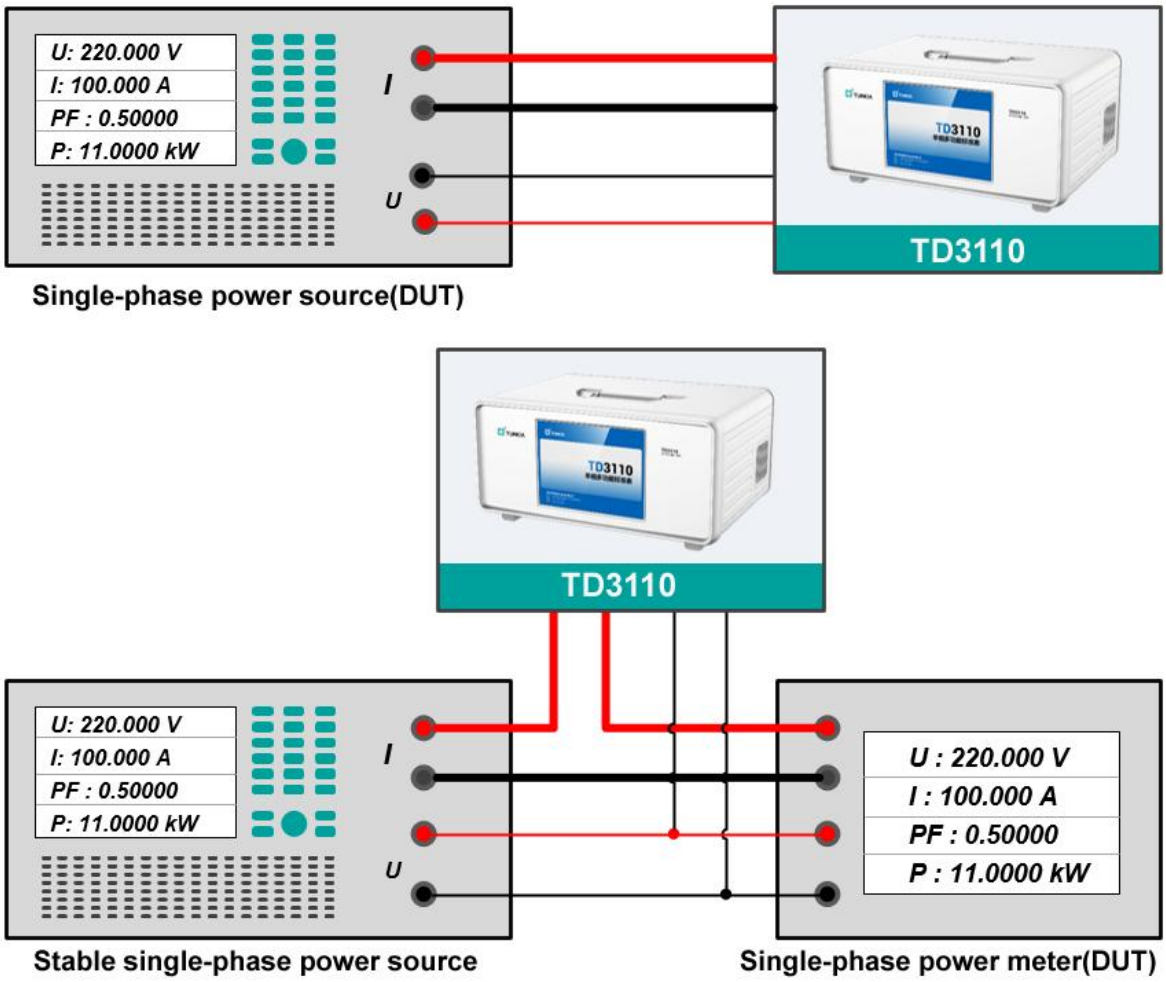
3. Application

☆ Assessment of AC Power Measurement Standards



- On-site assessment of single-phase electric energy meter calibration devices and single-phase standard electric energy meters that meet the R46 directive for level 0.02 and below

☆ Calibrating Single-Phase Power Source/Meter



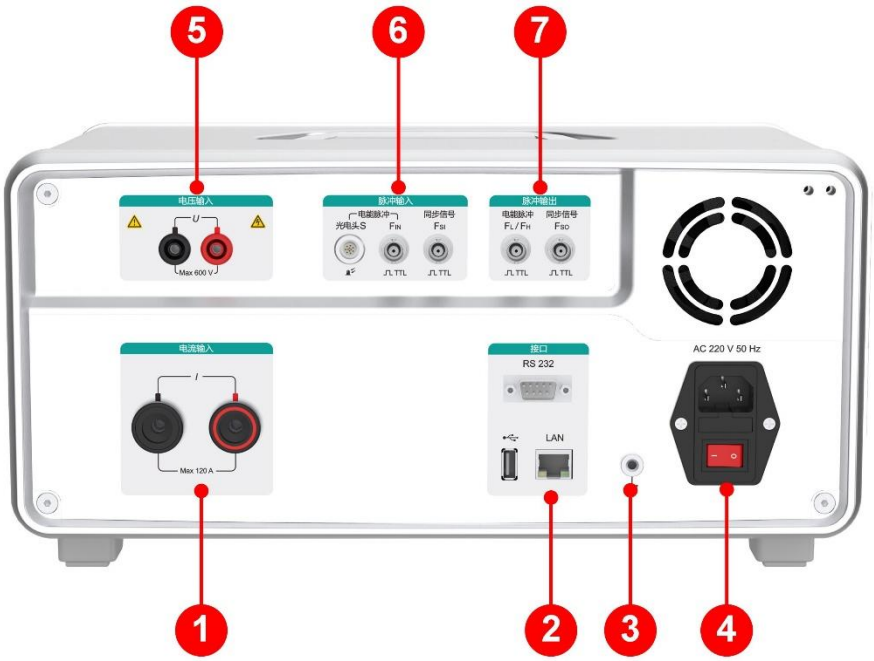
- Suitable for calibrating single/three-phase power sources, power meters/standard energy meters of level 0.02 and below (requires a stable power source).

4. Instrument Appearance

☆ Front Panel

S/N	Function
1	Handle
2	LCD touch screen.
3	Foldable feet.

☆ Rear Panel



S/N	Function
1	**Current terminal:** A wide range of current measurement from 1 mA to 120 A can be achieved with one connection.
2	**Communication interfaces:** including RS232, USB, and LAN, making it easy for users to set up a fully automatic test system.
3	Make sure that the device is reliably grounded before testing.
4	**Power interface:** AC 220V power input interface with switch and fuse.
5	**Voltage terminal block:** A wide range of voltage measurement from 6 V to 528 V can be achieved with one connection.
6	**Pulse input terminal:** From left to right are photoelectric pulse, electric energy pulse, and synchronization signal.
7	**Pulse output terminal:** From left to right are the electric energy pulse F_L / F_H and synchronization signal.

5. Features

☆ Wide Current Measurement Range

Each phase is equipped with a pair of quick-connect terminals and wires. Through direct plugging, a wide range of AC current measurement from 1 mA to 120 A can be achieved, simplifying wiring operations.

Fully automatic range switching.

The minimum measurement limit is 1mA, which can assess the accuracy and stability of the power / electric energy of the electrical energy device and its standard meter at the minimum starting current.

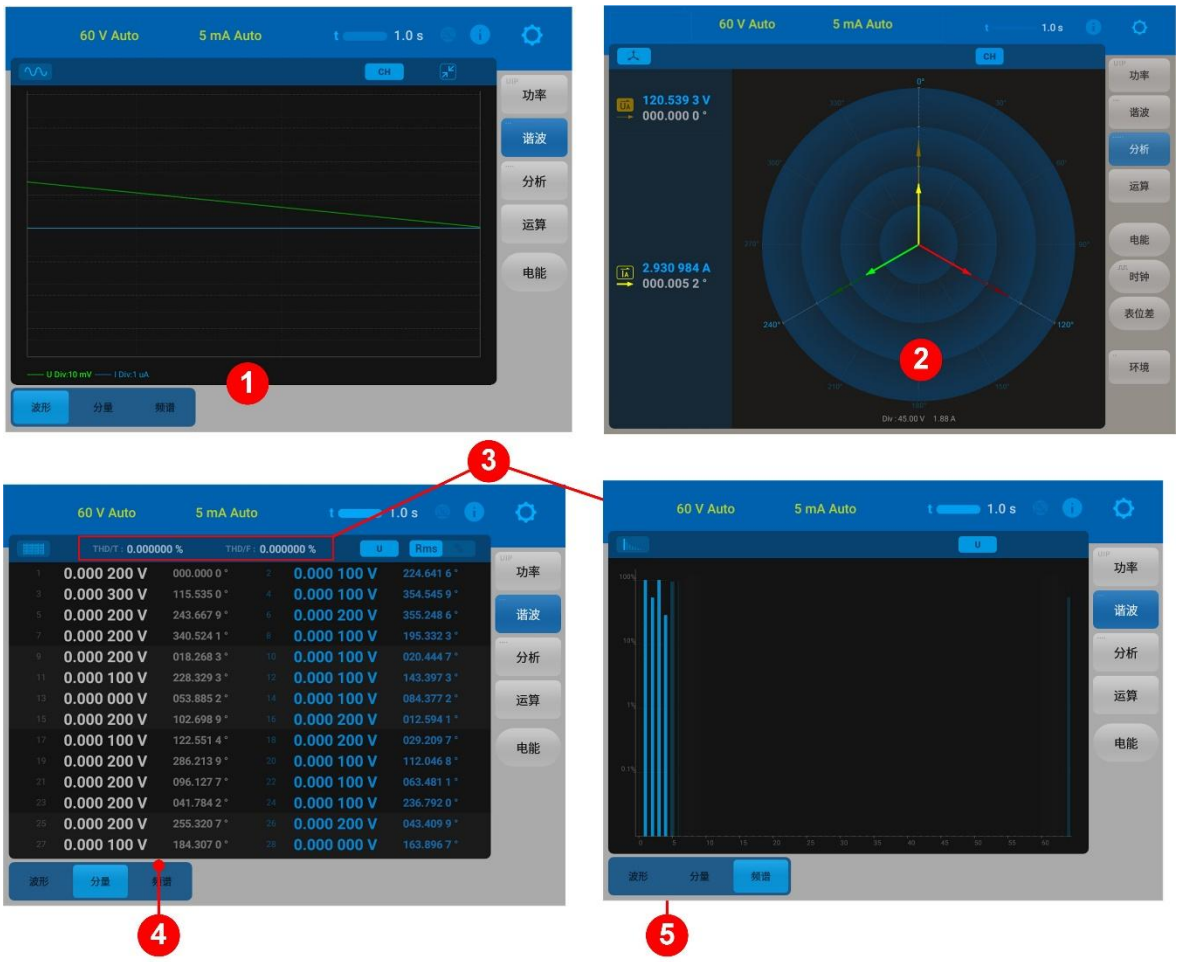
☆ High Reliability

- There is complete electrical isolation between voltage and current measurement circuits;
- Switching the machine on and off under extreme conditions (500 V, 100 A) will not damage the instrument, but also ensures accurate values.。

☆ Suitable for On-site Testing

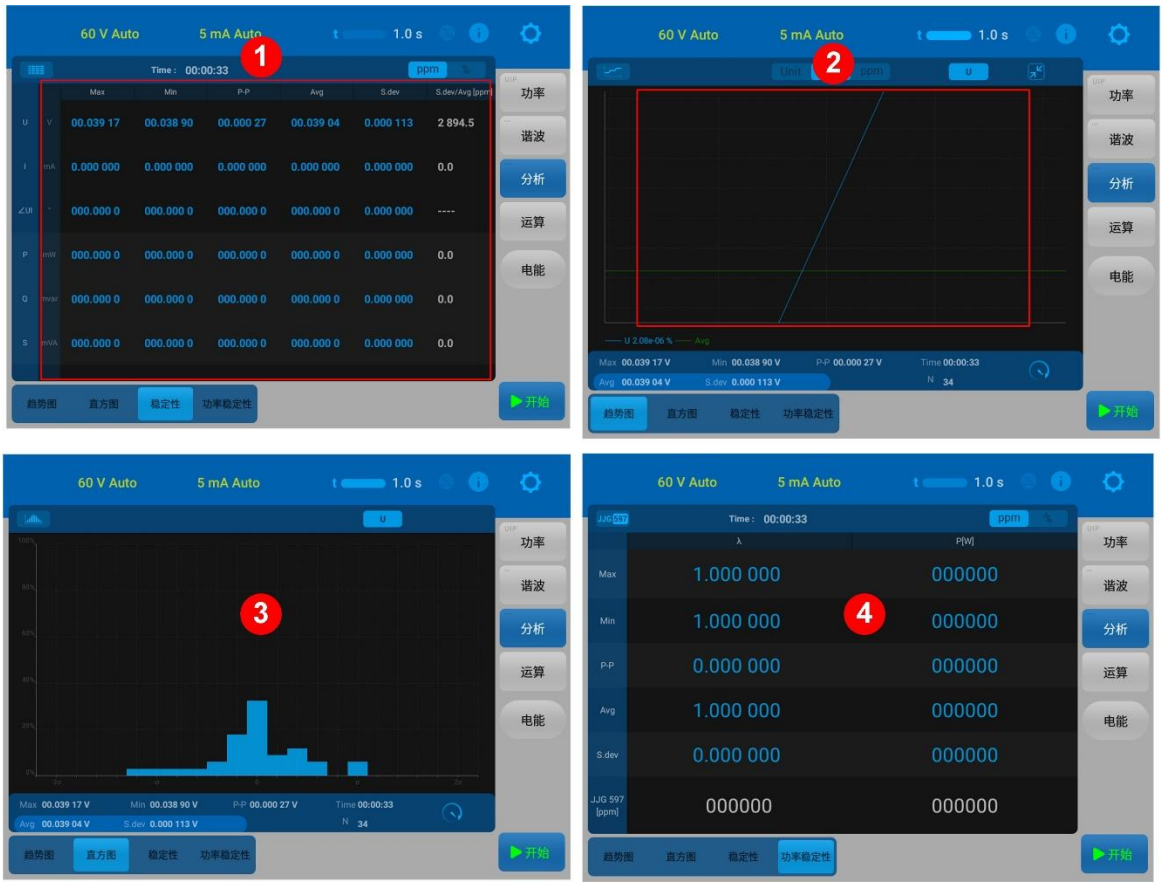
Light weight (approx 9kg) with trolley type instrument case facilitates easy transportation and on-site testing.

☆ Comprehensive Analysis of AC Power



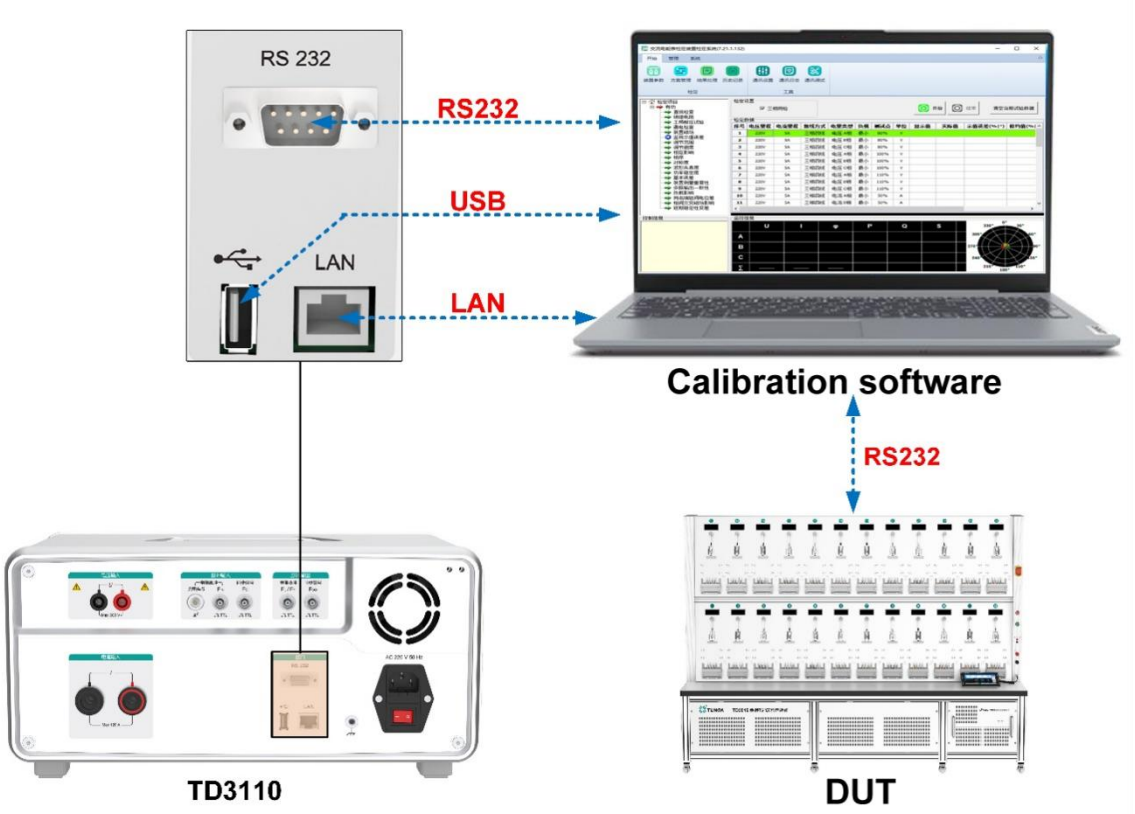
S/N	Function
1	Oscilloscope function: Display the waveform of the measured power in real time.
2	Accurately measure the phase between each phase voltage and current, and display it intuitively in the form of a phasor diagram.
3	Calculate two types of harmonic distortion: THD/T (harmonic relative to full wave) and THD/F (harmonic relative to fundamental).
4	The amplitude (RMS), content (%), and phase of the 2nd to 63rd harmonics of each phase voltage or current can be analyzed in real time.
5	The spectrum of each harmonic is visually displayed in the form of a histogram (the fundamental wave is 100%).

☆ Data Statistical Analysis



S/N	Function
1	Data statistical analysis: Calculate Max, Min, P-P, Avg, S.dev, etc. of the measured power.
2	Power stability test: The curve of power change with time is drawn in real time.
3	Normal distribution histogram: Displays the distribution of the statistical power during the test period.
4	Power stability test: The output power stability of the tested electrical energy device can be automatically calculated.

☆ Communication Interfaces



- Communication interfaces: RS232, USB and LAN.

6. Specification

6.1 Single-phase Voltage Measurement

Range	Resolution	Measurement Uncertainty (k = 2) (ppm*RD + ppm*RG) [1]	Temperature Coefficient @ (15~30)°C (ppm*RD+ppm*RG) /°C
60 V	10 μV	30 + 20	0.25 + 0.25
120 V	0.1mV	30 + 20	0.25 + 0.25
240 V	0.1mV	30 + 20	0.25 + 0.25
480 V	0.1mV	30 + 20	0.25 + 0.25
Note [1]: RD is the reading value, RG is the range value, the same below.			

- Measuring range: 6 V~528 V (wider range can be customized), 7-digit display, manual/automatic range shifting

6.2 Single-phase Current Measurement

Range	Resolution	Measurement Uncertainty at Different Frequencies (Hz) (k = 2) (ppm*RD + ppm*RG)			Temperature Coefficient @ (15~30)°C (ppm*RD+ppm*RG) /°C
		45 ≤ F ≤ 65	65 < F ≤ 200	200 < F ≤ 400	Class 0.01
10 mA	10 nA	60 + 40	120 + 80	240 + 160	3 + 3
20 mA	10 nA	60 + 40	120 + 80	240 + 160	0.75 + 0.75
50 mA	10 nA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
100 mA	0.1 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
200 mA	0.1 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
500 mA	0.1 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
1 A	1 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
2 A	1 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
5 A	1 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
10 A	10 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
20 A	10 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
50 A	10 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25
100 A	100 μA	30 + 20	60 + 40	120 + 80	0.25 + 0.25

- Measuring range: 1 mA~120 A, 7-digit display, manual/automatic range shifting

6.3 Frequency / Phase Measurement

Measurement Type			TD3110	TD3110-R
Frequency	Measuring Range		45 Hz～65 Hz	45 Hz～400 Hz
	Minimum Resolution		0.000 01 Hz	0.000 01 Hz
	Measurement Uncertainty (k=2)		0.005%*RD	0.005%*RD
Phase	Measuring Range		0～360°（I ≥ 50mA）	0～360°（I ≥ 50mA）
	Minimum Resolution		0.000 1°	0.000 1°
	Measurement Uncertainty (k=2)	45 Hz ≤ F ≤ 65 Hz	0.003°	0.003°
		65 Hz < F ≤ 200 Hz	——	0.01°
		200 Hz < F ≤ 400 Hz	——	0.02°

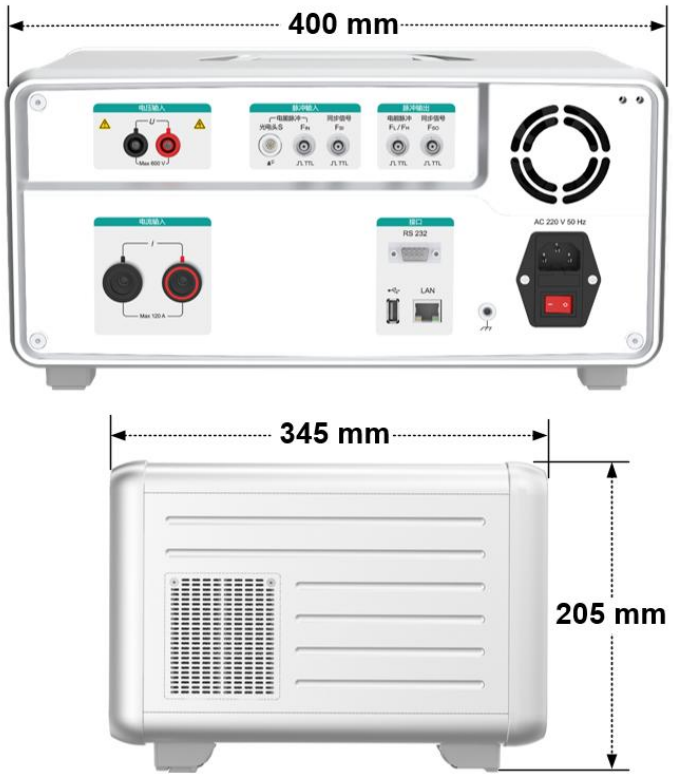
6.4 AC Power / Energy Measurement

Voltage Range	Current Range	Power Factor	Measurement Uncertainty at Different Frequencies (Hz) (k = 2)		
			45 ≤ F ≤ 65	65 < F ≤ 200	200 < F ≤ 400
30 V ≤ U ≤ 480 V	50 mA ≤ I ≤120 A	0.5L~1~0.5C	0.01%*RD	0.02%*RD	0.04%*RD
	10 mA ≤ I < 50 mA	1	0.01%*RD	0.03%*RD	0.08%*RD
		0.5L~1~0.5C	0.02%*RD		
	5 mA ≤ I < 10 mA	1	0.02%*RD	——	——
		0.5L~1~0.5C	0.04%*RD	——	——
	1 mA ≤ I < 5 mA	1	0.02%*RD×5mA/I	——	——

- Power / energy measurement range: combination of AC voltage range and AC current range
- Power factor measurement range: -1.000 000…0.000 000…1.000 000
- Standard electric energy pulse output: high frequency full scale value corresponds to 60 kHz, low frequency full scale value corresponds to 6 Hz
- Standard power pulse input: frequency ≤ 200 kHz, voltage: 0…3.3 V…24 V

7. General Specification

Power Supply	AC (220 ± 22) V，(50 ± 2) Hz
Maximum Power Consumption	60 VA
Warm-up Time	30mins
Temperature Performance	Working temperature：5°C~45°C； Storage temperature：-10°C~55°C
Humidity Performance	Working humidity: < 80% @ 30°C, < 70% @ 40°C, < 40% @ 50°C Storage humidity: (20%~80%) R·H, non-condensing
Altitude	< 3000 m
Weight	Approx 9 kg
Communication Interface	RS232、USB、LAN
Size	400 mm(W) × 345 mm(D) × 205 mm(H)



8. Ordering Information

TD3110 – ☐

Fundamental Frequency	
Code	Note
I	45 Hz~65 Hz
R	45 Hz~400 Hz

E.g: TD3110-R measn the fundemental frequency of the device is 45Hz~400Hz.