TD3310 Three-phase Multi-function Standard Meter

1. Summary

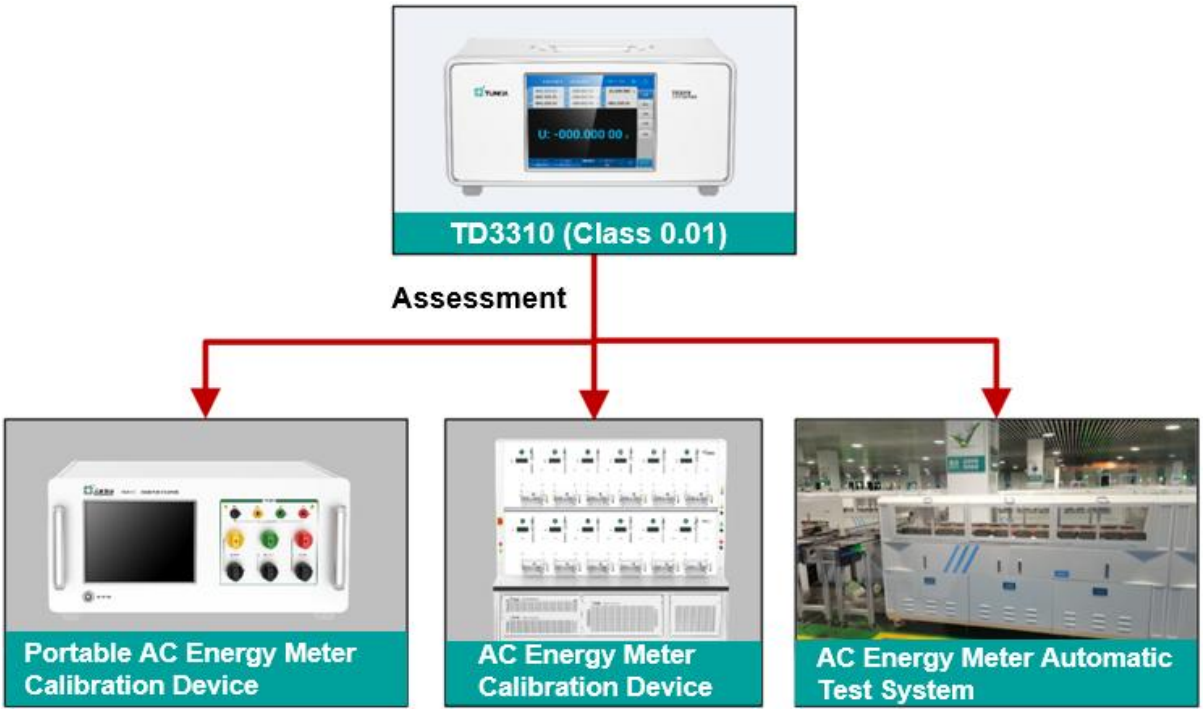
TD3310 is a high-precision three-phase standard instrument, which can simultaneously measure multiple electrical charges in the loop such as: voltage, current, frequency, phase, harmonics, active power/energy, reactive power/energy, apparent power, power factor, etc. in the three-phase Y-shaped/V-shaped wiring mode.

2. Features

- Power/energy accuracy up to class **0.01**.
- Voltage measurement: 6 V~528 V (wider range can be customized).
- Current measurement: 0.2 mA~120 A.
- Fundamental frequency: 45 Hz~65 Hz (optional 400Hz).
- Phase measurement uncertainty is typically 0.003°.
- Voltage and current support fully automatic range shifting.
- Voltage and current support 2~127th harmonic measurement.
- Support comprehensive statistical analysis of the measured electricity.
- Standard energy pulse input/output function.
- USB, RS232, and LAN interfaces.
- LCD touch screen.

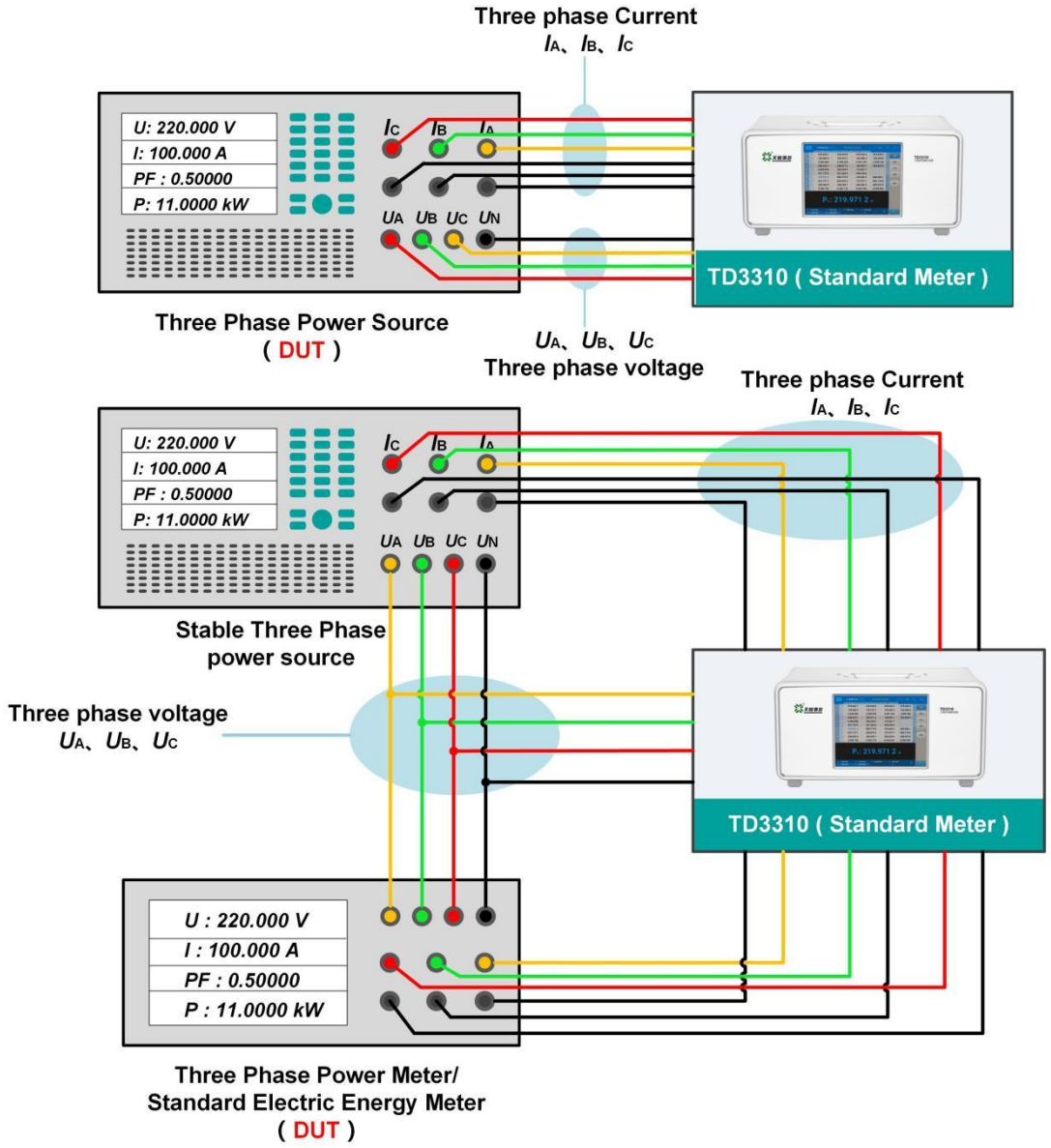
3. Applications

☆ Assessment of electric energy meter device



- On-site assessment of verification systems and reference energy meters for AC electricity meters of accuracy class 0.02 or below, in compliance with R46 directive.

☆ Calibrate Single Three Phase Power Source /Meter



- The TD3310 three-phase power/energy has an optimal measurement uncertainty of class **0.01**.
- Suitable for calibrating single/three-phase power sources with class 0.02 and below, power meters/standard energy meters (with stable power sources).
- Suitable for calibrating single/three-phase voltage standard sources and voltage standard meters of class 0.02 and below (with stable voltage sources).
- Suitable for calibrating single/three-phase current standard sources and current standard meters of class 0.02 and below (with stable current sources).

☆ Wide current measurement range

Each phase is equipped with a pair of quick-connect terminals and cables, enabling wide-range AC current measurement from 0.2 mA to 120 A via direct plug-in connection, simplifying wiring operations.

The system features fully automatic range switching, requiring no manual shifting on the primary side of the current transformer. Sudden input of high current at any range will neither cause damage nor affect measurement accuracy.

With a minimum measurable current of 0.2 mA, it allows for the assessment of the accuracy and stability of energy measurement systems and their reference meters at the minimum starting current.

Current quick-connect terminals and wires

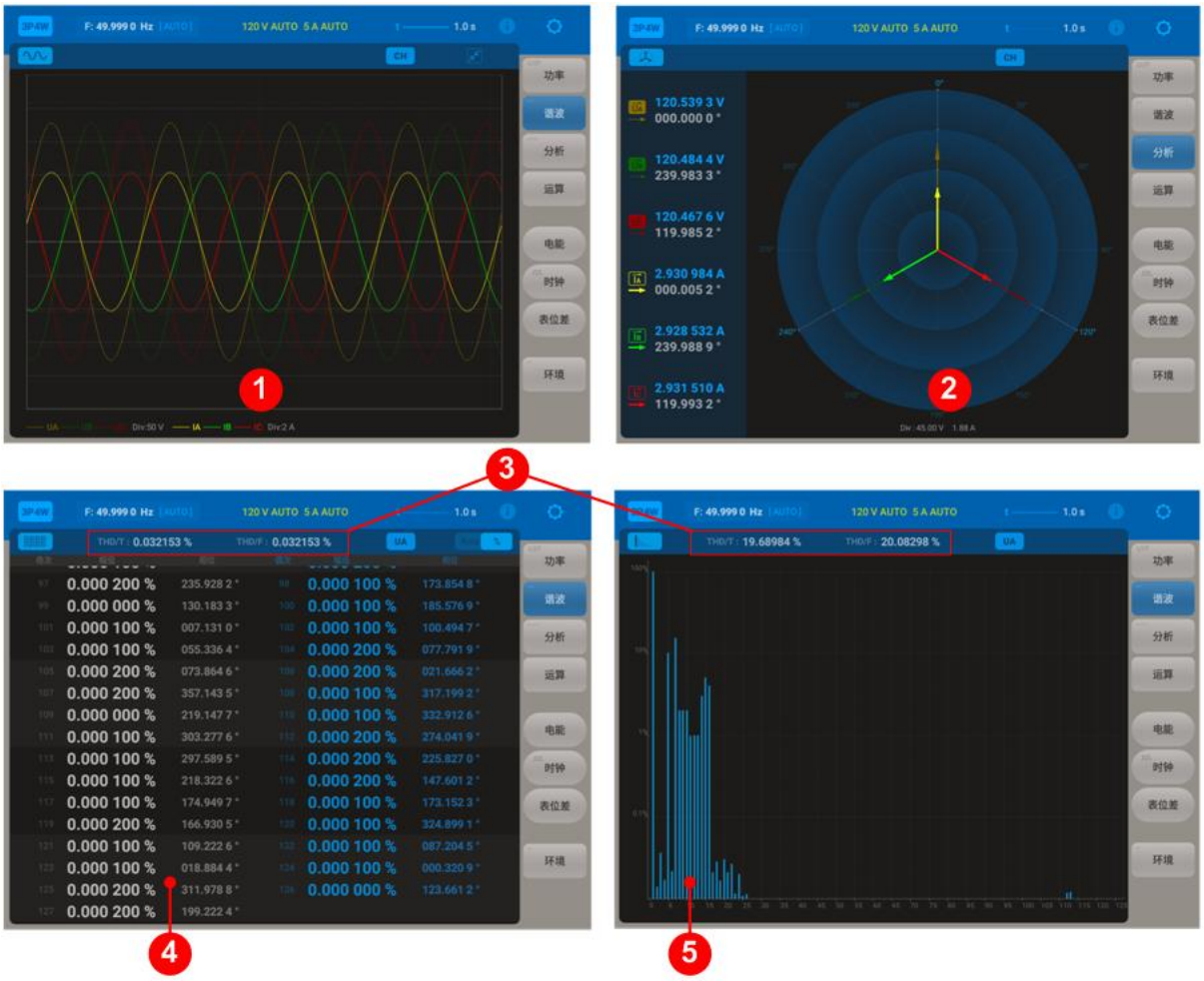
☆ High reliability of the instrument

- The voltage and current measurement circuits are completely electrically isolated;
- Switching the device on and off under extreme conditions (500 V, 100 A) will not damage the device and ensure accurate values.

☆ Convenience of on-site use

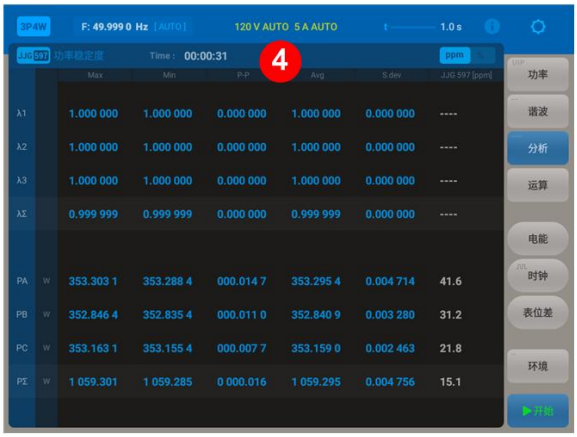
The device weighs 9.1 kg and is equipped with a special trolley case, in which the device and test leads can be placed, making transportation very convenient.

☆ Comprehensive Analysis of AC Power



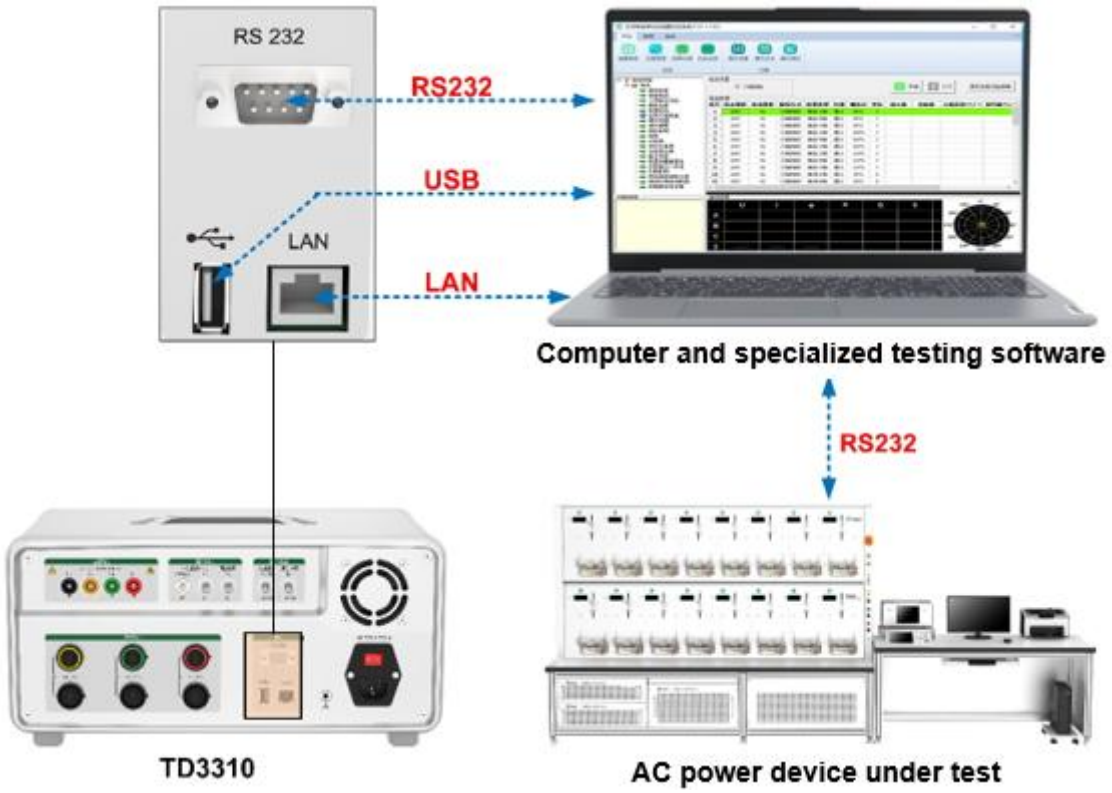
S/N	Function
1	The measuring channel has the function of oscilloscope, which can display the waveform of the measured power in real time.
2	Accurately measure the phase between the voltage and current of each phase, and visually display it through the form of phasor diagram.
3	Two types of harmonic distortion, THD/T (harmonic relative to full wave) and THD/F (harmonic relative to fundamental wave), are calculated.
4	The amplitude (RMS), content (%) and phase of the 2nd ~ 127th harmonic wave of each phase voltage or current can be analyzed in real time.; It is used to check whether the harmonic content and phase of complex waveform output of R46 device meet the requirements of the regulation.
5	The spectrum of each harmonic is visually displayed in the form of a bar chart (the fundamental wave is 100%).

☆ Data Statistical Analysis Function



S/N	Function
1	**Statistical analysis of data:** calculate the maximum value (Max), minimum value (Min), peak-peak value (P-P), average value (Avg), standard variance (S.dev), etc.
2	**Power stability test:** In the test cycle, real-time plot the curve of power change with time.
3	**Normal distribution histogram:** Displays the distribution of the collected power within a test period.
4	**Power stability test:** According to the algorithm of JJG 597-2005 "Verification Regulation of AC Watt-hour Meter Verification Device", the output power stability of the inspected electric energy device can be calculated automatically.

☆ Various communication interfaces



- The rear panel is equipped with rich communication interfaces such as RS232, USB, LAN, etc., which is convenient for building a fully automatic test system.

4. Specifications

4.1 Three-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

4.2 Three-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	
5 mA	1 nA	120 + 80	240 + 160	480 + 320	5 + 5
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: 0.2 mA~120 A, 7-digit display, manual/automatic range shifting

4.3 Frequency/phase measurement

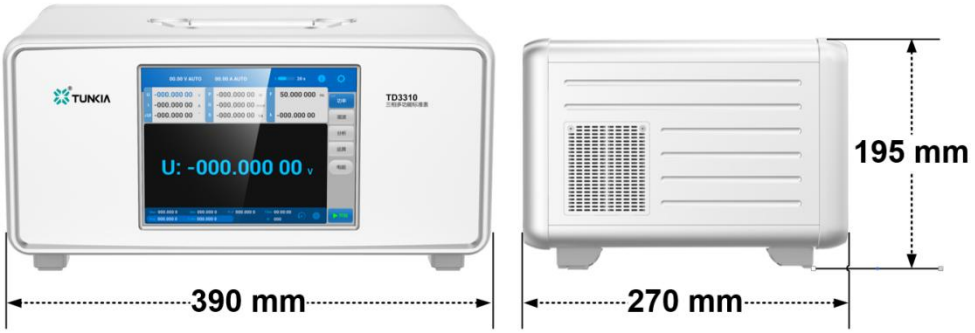
Measurement type			TD3310	TD3310-R
Frequency	Measuring range		45 Hz~65 Hz	45 Hz~400 Hz
	Minimum resolution		0.000 01 Hz	0.000 01 Hz
	Measurement uncertainty (k=2)		0.005%*RD	0.005%*RD
Phase	Measuring range		0~360°(I ≥ 50mA)	0~360°(I ≥ 50mA)
	Minimum resolution		0.000 1°	0.000 1°
	Measurement uncertainty (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°

4.4 Power / Energy Measurement

Voltage range	Current range	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		
	3 mA ≤ I < 10 mA	1	0.02%*RD	-	-
		0.5L~1~0.5C	0.04%*RD	-	-
	0.2 mA ≤ I < 3 mA	1	0.02%*RD×3mA/I	-	-

- Power/energy measurement range: a combination of AC voltage range and AC current range
- Power factor measurement range: -1.000 000... 0.000 000... 1.000 000
- Standard energy pulse output: 60 kHz for high-frequency full-scale values and 6 Hz for low-frequency full-scale values
- Standard energy pulse input: frequency≤ 200 kHz, voltage: 0... 3.3 V... 24 V

5. General Specifications

Power Supply	AC (220 ± 22) V，(50 ± 2) Hz
Maximum power Consumption	60 VA
Warm-up time	30 minutes
Temperature performance	Working temperature: 5°C~45°C; Storage temperature: -10 °C ~ 55 °C
Humidity performance	Operating humidity: < 80% @ 30°C, < 70% @ 40°C, < 40% @ 50°C Storage humidity: (20%~80%) R· H, no condensation
altitude	< 3000 m
Quality	Approx. 9.1 kg
Communication interface	RS232、USB、LAN
Size	390 mm(W) × 271 mm(D) × 195 mm(H)
	

6. Ordering Information

TD3310 – ■

Fundamental Frequency	
Code	**Note**
Empty	45 Hz~65 Hz
R	45 Hz~400 Hz

E.g. *TD3310-R means that the fundamental frequency is 45 Hz~400 Hz.*

7. Accessories List

S/N	Picture	Name	Specification	Quantity	Note
1		Voltage Combination Test Leads	3m/1.6mm²/Φ4 banana plug -Φ4 banana plug	Yellow 1 Green 1 Red 1 Black 1	Standard Accessory
2		Current Quick-Connect Test Lead	1.5 m / 25 mm² / Φ12 Tab to MC Quick-Connect Test Lead	Yellow 1 Green 1 Red 1 Black 3	Standard Accessory
3		Diameter-Reducing Adapter Plug	MC Adapter Plug	Red 6	Standard Accessory
4		Power Cable	AC 220V, 10A	1	Standard Accessory
5		Glass Fuse	F3A, 250V	3	Standard Accessory
6		Energy Pulse Signal Lead	1.5 m / BNC Male - Alligator Clip Two Wires	1	Standard Accessory

7		Signal Test Leads	1.5 m / BNC Male- BNC Male	1	Standard Accessory
8		Portable Instrument Case	Waterproof, Shock-Resistant, and Antistatic	1	Standard Accessory