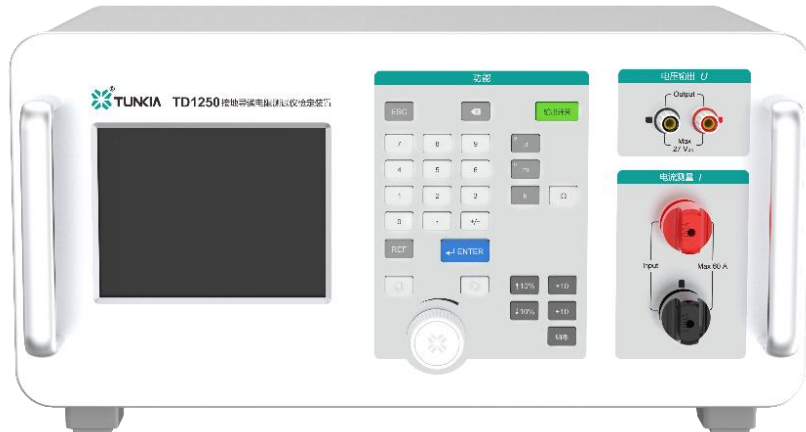# TD1250 Verification Device for Earth Continuity Testers
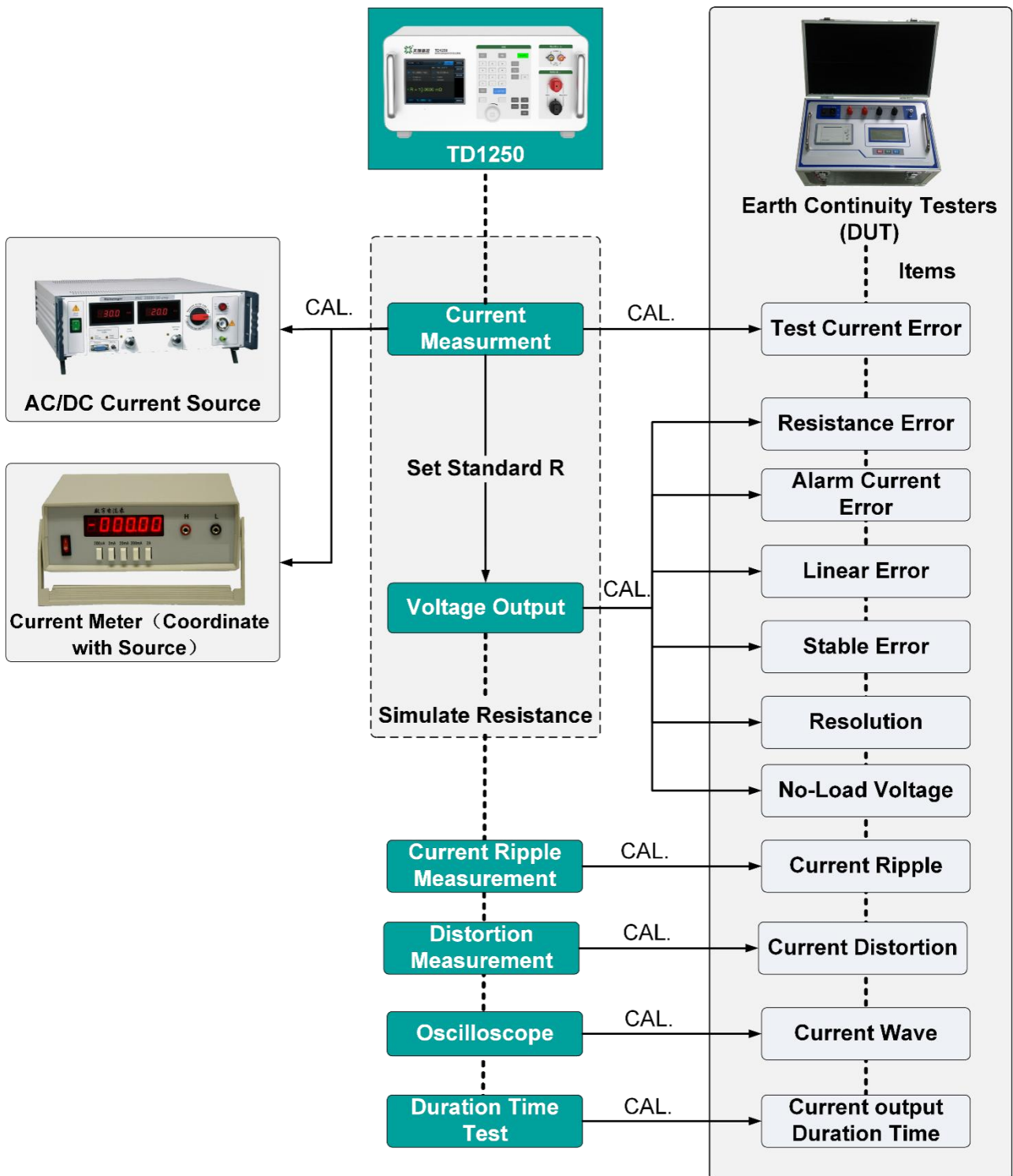
1. Summary

TD1250 is a precision AC/DC artificial resistance, integrated a AC/DC ammeter. Applied for calibrating earth continuity tester and other AC/DC low resistance instruments. It can calibrate max permissible error, alarm setting error, test current setting error etc.
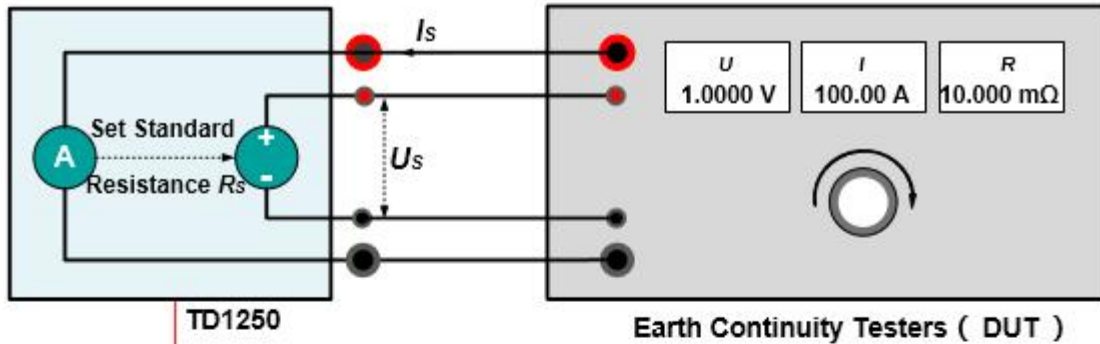
2. Features

- DC resistance simulation:200 μΩ (100 μΩ optional)～20 Ω.

- AC resistance simulation：500 μΩ (300 μΩ optional)～15 Ω.

- AC/DC current measurement：0.5 A～36 A(60A option）.

- Accuracy class：0.02/ 0.05/ 0.1.

- Harmonic and ripple function.

- Current waveform display function.

- With data statistics and analysis, stability test function.

- LCD touch screen.

- Setting output values by keys.

3. Applications

	TD1250	**Earth Continuity Testers (DUT)**
		Items
AC/DC Current Source	CAL. — **Current Measurment** — CAL.	**Test Current Error**
		Resistance Error
	Set Standard R	**Alarm Current Error**
		Linear Error
Current Meter（Coordinate with Source）	**Voltage Output** CAL.	**Stable Error**
		Resolution
	Simulate Resistance	**No-Load Voltage**
	Current Ripple Measurement CAL.	**Current Ripple**
	Distortion Measurement CAL.	**Current Distortion**
	Oscilloscope CAL.	**Current Wave**
	Duration Time Test CAL.	**Current output Duration Time**

4. Characteristics

☆ Resistance Output

Standard Resistance $R_s = U_s / I_s$

Resistance(DUT) $R_x = U_x / I_x$

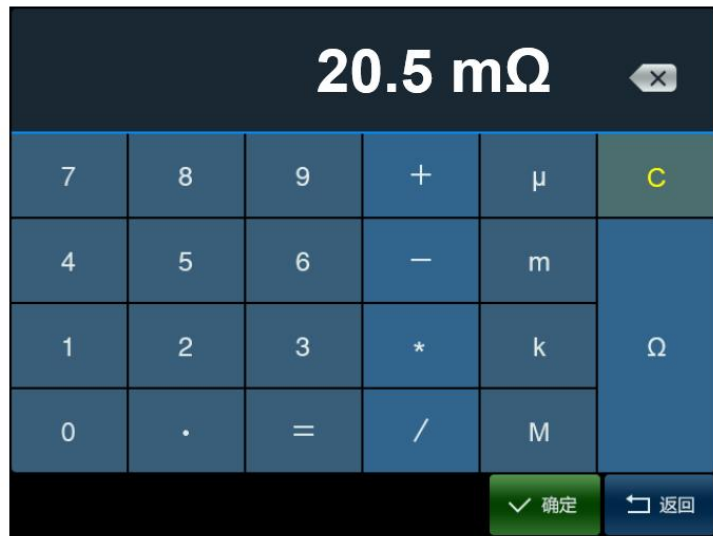Absolute Error $\triangle = R_x - R_s$

● Using four-terminals connections, can effective eliminate the measurement error introduced by the lead resistance.
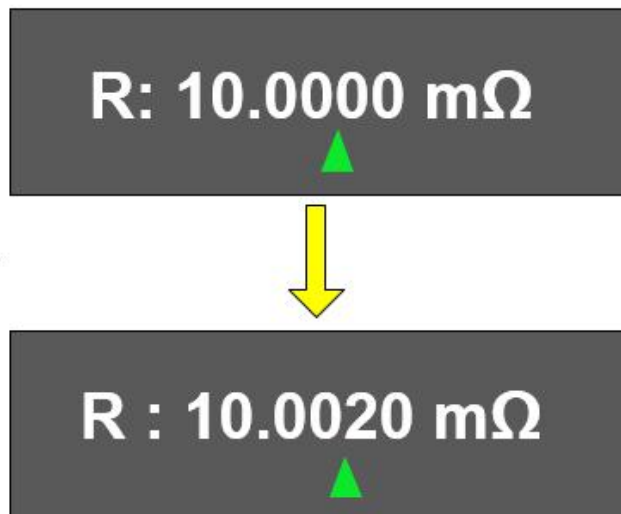
☆ **Multiple Output Mode**

Keypad

20.5 mΩ

Touch Screen Output

● "**Direct output**"mode，User can set output value by physical key or touch screen.

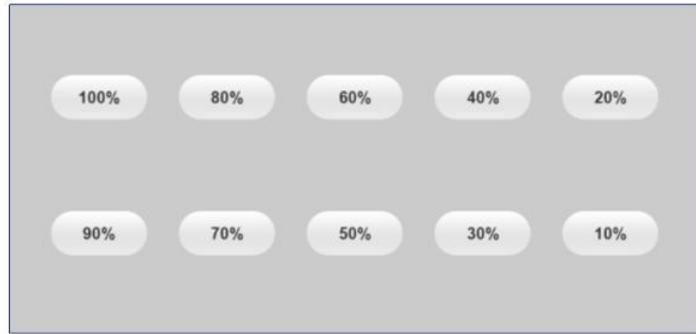**Rotary Knob**

R: 10.0000 mΩ

R : 10.0020 mΩ

● "**Rotary Knob**"mode，User can setting in clockwise direction or anticlockwise direction.

☆ Multiple Output Mode
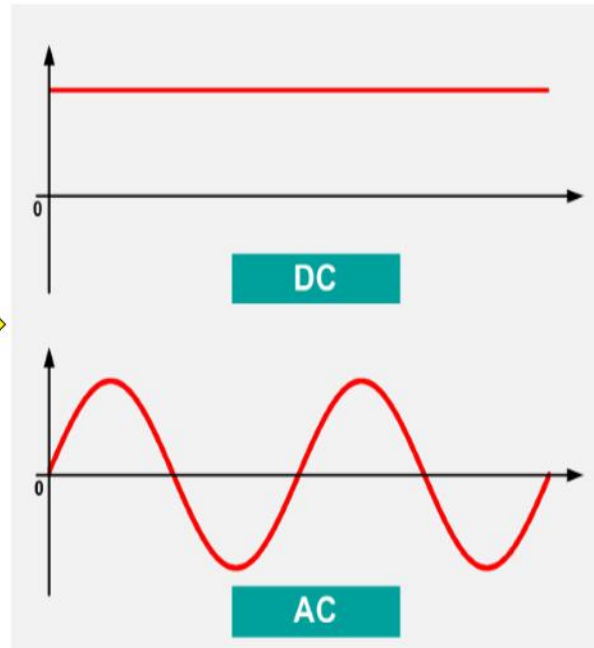

% Setting

Touch Screen "Calibration Points"

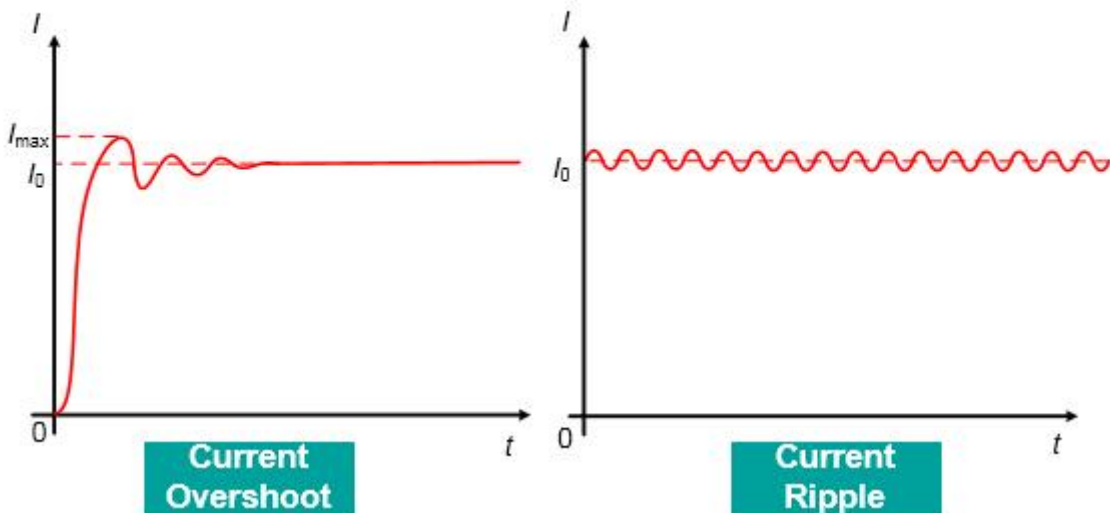| DCR 10.000 mΩ	DCR 9.000 mΩ	DCR 8.000 mΩ	...
Full Range	**90%** Range	**80%** Range	

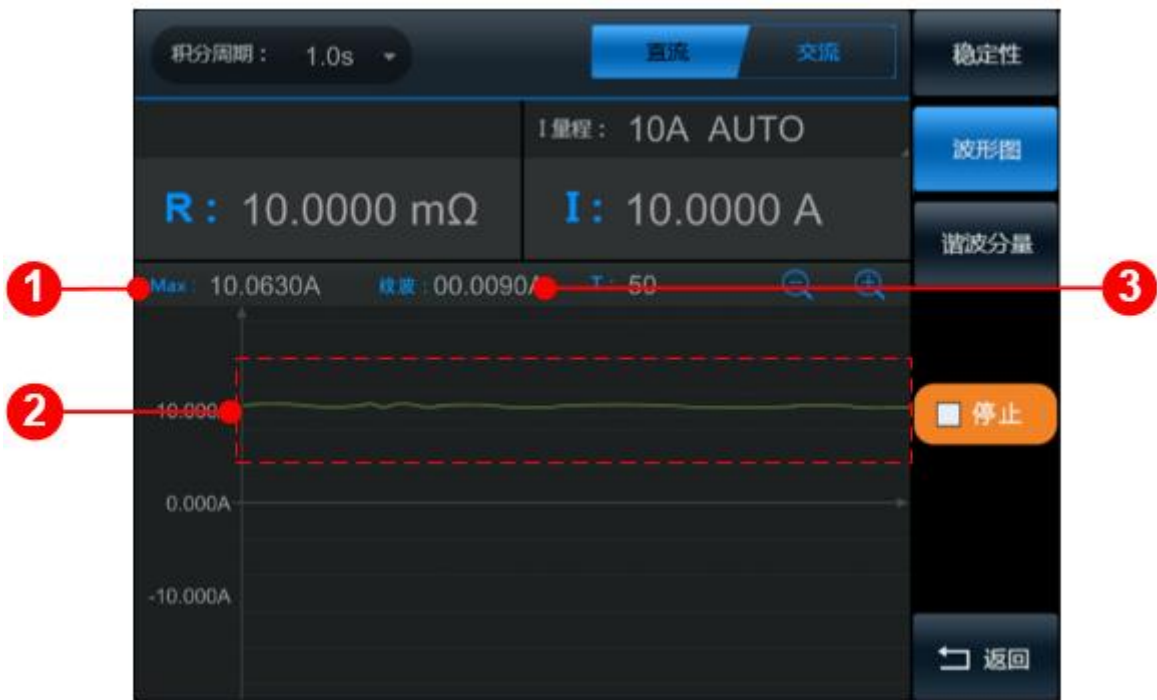● Touch "**Calibration point**"of screen for "% setting".

☆ AC+DC Measurement

- Support DC/AC）measurement mode. AC frequency range：45 Hz ~ 65 Hz.

- Distortion and ripple test，max bandwidth of DC ripple reaches 1 kHz. Supports 2nd~32nd harmonics.

☆ DC Characteristic Analysis

Current Overshoot

Current Ripple

Serial Number	Explanation
1	**Current overshoot** : The maximum value of the test current is displayed in DC mode, which is used to calculate the operating current overshoot;
2	**Waveform display**：With oscilloscope function ,can real time display of measured current waveform.
3	**Ripple measurement**：the instrument directly displays the ripple measurement results on the screen for users to read.

☆ **AC Characteristic Analysis**
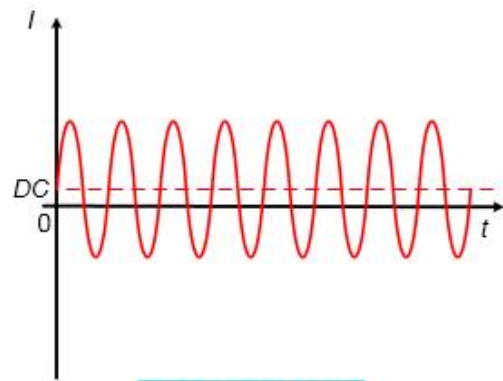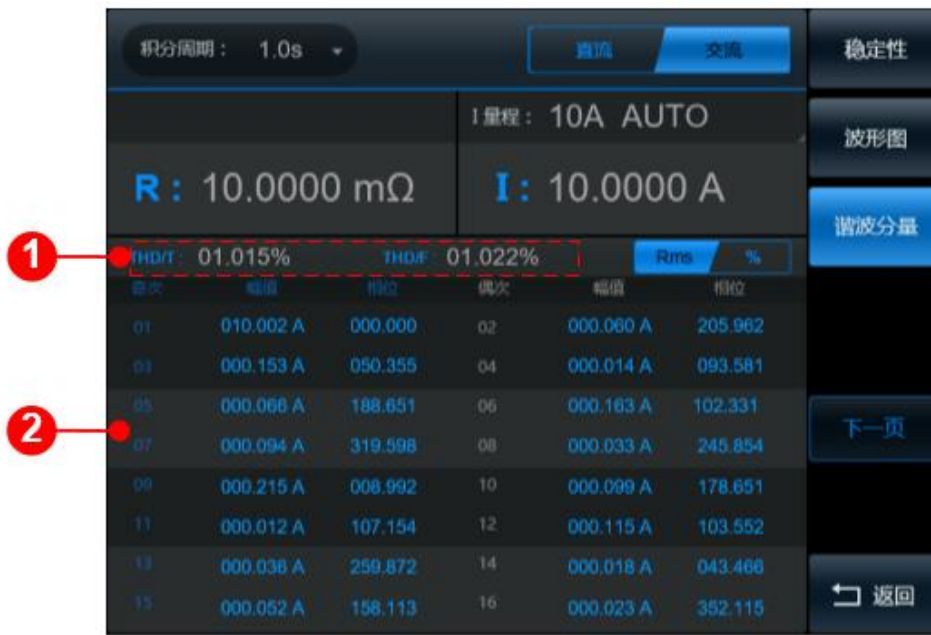
DC Component

Serial Number	Explanation
❶	**Harmonic distortion**：Display THD/T（harmonic vs. full wave）、THD/F(harmonic vs. fundamental）. Easy for users to real intuitively.
❷	**Harmonic data**：Display the amplitude (RMS), content(%), phase of the 2nd~32nd harmonic, facilitate user analysis.
❸	**DC component**：Display the DC component in the AC current signal. Easy for users to real intuitively.
❹	**Waveform display**：with waveform display function, real time display of measured current waveform.

☆ Statistical Analysis

Serial Number	Function Description
1	**Scoring cycle**：0.5 s ~ 20 s integration period can be set(1s by default）; it is convenient for users to set sampling data according to actual needs.
2	**Statistical analysis**：Real time record and statistics of current test data, including Max, Min, Avg, Span, Stab, S.dev, Time, test times N,etc; Easy for users to real intuitively.

5. Specifications

5.1 DC Current Measurement

Range	Resolution	Accuracy ±(ppm of reading + ppm of range) [1]		
		Class 0.1	Class 0.05	Class 0.02
1 A	10 µA	0.05 + 1.5	0.02 + 1.0	0.01 + 0.5
2 A	10 µA	0.05 + 1.5	0.02 + 1.0	0.01 + 0.5
5 A	10 µA	0.05 + 1.5	0.02 + 1.0	0.01 + 0.5
10 A	100 µA	0.05 + 1.5	0.02 + 1.0	0.01 + 0.5
20 A	100 µA	0.05 + 2.5	0.02 + 2.0	0.01 + 1.0
30 A	100 µA	0.05 + 5.0	0.02 + 3.0	0.01 + 2.0
50 A [2]	100 µA	0.05 + 5.0	0.02 + 3.0	0.01 + 2.0
Note [1] : (ppm = parts per million) (e.g.， 10ppm = 0.001%). Note [2]: 50 A Range is optional Accessories				

- Measuring range(TD1250-30A specification, max range:30 A）:0.5 A～36 A.

- Measuring range(TD1250-50A specification, max range: 50 A）:0.5 A～60 A.

- Ripple frequency bandwidth: 1 Hz ~ 1 kHz, accuracy: ±0.02%*RG，effective value.

5.2 AC Current Measurement

Range	Resolution	Accuracy ±(ppm of reading + ppm of range) [1]		
		Class 0.1	Class 0.05	Class 0.02
1 A	10 µA	0.10 + 3.0	0.05 + 2.0	0.02 + 1.0
2 A	10 µA	0.10 + 3.0	0.05 + 2.0	0.02 + 1.0
5 A	10 µA	0.10 + 3.0	0.05 + 2.0	0.02 + 1.0
10 A	100 µA	0.10 + 3.0	0.05 + 2.0	0.02 + 1.0
20 A	100 µA	0.10 + 5.0	0.05 + 3.0	0.02 + 2.0
30 A	100 µA	0.10 + 10	0.05 + 5.0	0.02 + 5.0
50 A[2]	100 µA	0.10 + 10	0.05 + 5.0	0.02 + 5.0

- Measuring range（TD1250-30A specification, max range:30 A）：0.5 A～36 A.

- Measuring range（TD1250-50A specification, max range: 50 A）：0.5 A～60 A.

● AC frequency: 45 Hz ~ 65 Hz, accuracy: ±0.01 Hz, harmonic measurement: 2nd~32nd.

5.3 DC Simulated Resistance

Current Range	Setting Range of Resistance Value R	Adjustment Fineness	Accuracy ±(A%*reading+R_0)		
			Class 0.1	Class 0.05	Class 0.02
50 A [2]	100 µΩ ≤ R ≤ 4 mΩ	20 nΩ	0.1 + 3 µΩ	0.08 + 1.5 µΩ	0.04 + 0.8 µΩ
	4 mΩ < R ≤ 40 mΩ	200 nΩ	0.1 + 3 µΩ	0.06 + 1.5 µΩ	0.03 + 0.8 µΩ
	40 mΩ < R ≤ 400 mΩ	2 µΩ	0.1	0.05	0.02
30A	200 µΩ ≤ R ≤ 6 mΩ	30 nΩ	0.1 + 5 µΩ	0.08 + 3 µΩ	0.04 + 1.5 µΩ
	6 mΩ < R ≤ 60 mΩ	300 nΩ	0.1 + 5 µΩ	0.06 + 3 µΩ	0.03 + 1.5 µΩ
	60 mΩ < R ≤ 600 mΩ	3 µΩ	0.1	0.05	0.02
20A	400 µΩ ≤ R ≤ 10 mΩ	100 nΩ	0.1 + 6 µΩ	0.08 + 5 µΩ	0.04 + 2.5 µΩ
	10 mΩ < R ≤ 100 mΩ	1 µΩ	0.1 + 6 µΩ	0.06 + 5 µΩ	0.03 + 2.5 µΩ
	100 mΩ ≤ R ≤ 1 Ω	10 µΩ	0.1	0.05	0.02
10A	800 µΩ ≤ R ≤ 20 mΩ	100 nΩ	0.1 + 15 µΩ	0.08 + 6 µΩ	0.04 + 3 µΩ
	20 mΩ < R ≤ 200 mΩ	1 µΩ	0.1 + 15 µΩ	0.06 + 6 µΩ	0.03 + 3 µΩ
	200 mΩ < R ≤ 2 Ω	10 µΩ	0.1	0.05	0.02
5A	1.6 mΩ ≤ R ≤ 40 mΩ	200 nΩ	0.15 + 30 µΩ	0.09 + 15 µΩ	0.045 + 6 µΩ
	40 mΩ < R ≤ 400 mΩ	2 µΩ	0.12 + 30 µΩ	0.07 + 15 µΩ	0.035 + 6 µΩ
	400 mΩ < R ≤ 4 Ω	20 µΩ	0.1	0.05	0.025
2A	4 mΩ ≤ R ≤ 100 mΩ	1 µΩ	0.20 + 50 µΩ	0.10 + 30 µΩ	0.055 + 15 µΩ
	100 mΩ < R ≤ 1 Ω	10 µΩ	0.20 + 50 µΩ	0.10 + 30 µΩ	0.045 + 15 µΩ
	1 Ω < R ≤ 10 Ω	100 µΩ	0.1	0.05	0.035
1A	8 mΩ ≤ R ≤ 200 mΩ	1 µΩ	0.30 + 90 µΩ	0.15 + 50 µΩ	0.08 + 30 µΩ
	200 mΩ < R ≤ 2 Ω	10 µΩ	0.30 + 90 µΩ	0.15 + 50 µΩ	0.07 + 30 µΩ
	2 Ω < R ≤ 20 Ω	100 µΩ	0.2	0.1	0.06
Note [2]: 50 A Range is optional Accessories					

● Simulated resistance range （TD1250-30A specification, maximum range: 30 A）：200 µΩ～20 Ω

Simulated resistance range （TD1250-50A specification, maximum range: 50 A）：100 µΩ～20 Ω

● Display Digits:6-digit decimal display, set the resistance value through the number keys.

5.4 AC Simulated Resistance

Current Range	Setting Range of Resistance Value R	Adjustment Fineness	Accuracy $\pm(A\%*reading+R_0)$		
			Class 0.1	Class 0.05	Class 0.02
50 A [2]	300 µΩ ≤ R ≤ 3 mΩ	20 nΩ	0.3 + 5 µΩ	0.15 + 3 µΩ	0.08 + 1.5 µΩ
	3 mΩ < R ≤ 30 mΩ	200 nΩ	0.24 + 5 µΩ	0.12 + 3 µΩ	0.06 + 1.5 µΩ
	30 mΩ < R ≤ 300 mΩ	2 µΩ	0.2	0.1	0.04
30A	500 µΩ ≤ R ≤ 5 mΩ	30 nΩ	0.3 + 8 µΩ	0.15 + 5 µΩ	0.08 + 2.5 µΩ
	5 mΩ < R ≤ 50 mΩ	300 nΩ	0.24 + 8 µΩ	0.12 + 5 µΩ	0.06 + 2.5 µΩ
	50 mΩ < R ≤ 500 mΩ	3 µΩ	0.2	0.1	0.04
20A	750 µΩ ≤ R ≤ 7.5 mΩ	50 nΩ	0.3 + 10 µΩ	0.15 + 6 µΩ	0.08 + 4 µΩ
	7.5 mΩ < R ≤ 75 mΩ	500 nΩ	0.24 + 10 µΩ	0.12 + 6 µΩ	0.06 + 4 µΩ
	75 mΩ ≤ R ≤ 750 mΩ	5 µΩ	0.2	0.10	0.04
10A	1.5 mΩ < R ≤ 15 mΩ	100 nΩ	0.3 + 20 µΩ	0.15 + 12 µΩ	0.08 + 8 µΩ
	15 mΩ < R ≤ 150 mΩ	1 µΩ	0.24 + 20 µΩ	0.12 + 12 µΩ	0.06 + 8 µΩ
	150 mΩ < R ≤ 1.5 Ω	10 µΩ	0.2	0.1	0.04
5A	3 mΩ ≤ R ≤ 30 mΩ	200 nΩ	0.3 + 20 µΩ	0.2 + 15 µΩ	0.1 + 12 µΩ
	30 mΩ < R ≤ 300 mΩ	2 µΩ	0.3 + 20 µΩ	0.15 + 15 µΩ	0.07 + 12 µΩ
	300 mΩ < R ≤ 3 Ω	20 µΩ	0.2	0.1	0.05
2A	7.5 mΩ ≤ R ≤ 75 mΩ	5 µΩ	0.4 + 80 µΩ	0.2 + 50 µΩ	0.11 + 30 µΩ
	75 mΩ < R ≤ 750 mΩ	50 µΩ	0.4 + 80 µΩ	0.2 + 50 µΩ	0.09 + 30 µΩ
	750 mΩ < R ≤ 7.5 Ω	500 µΩ	0.2	0.14	0.07
1A	15 mΩ ≤ R ≤ 150 mΩ	1 µΩ	0.6 + 150 µΩ	0.3 + 90 µΩ	0.16 + 60 µΩ
	150 mΩ < R ≤ 1.5 Ω	10 µΩ	0.6 + 150 µΩ	0.3 + 90 µΩ	0.14 + 60 µΩ
	1.5 Ω < R ≤ 15 Ω	100 µΩ	0.4	0.2	0.12
Note [2]: 50 A Range is optional Accessories					

- Simulated resistance range（TD1250-30A specification, maximum range: 30 A）：500 µΩ～15 Ω.

  Simulated resistance range（TD1250-50A specification, maximum range: 50 A）：300 µΩ～15 Ω.

- Display Digits:6-digit decimal display, set the resistance value through the number keys.

- AC frequency: 45 Hz ~ 65 Hz, accuracy: ±0.01 Hz.

6. General Specifications

Power Supply	AC（220 ± 22）V，（50 ± 2）Hz
Temperature Performance	Working temperature：0°C~45°C; Storage temperature：-20°C~70°C
Humidity Performance	Working humidity：< 80% @ 30°C，< 70% @ 40°C，< 40% @ 50°C Storage humidity：(20%~80%) R·H，non-condensing
Interface	RS232

7. Ordering Information

TD1250 - ▢ - ▢

Class	
Code	**Note**
1 k	Class 0.1
500	Class 0.05
200	Class 0.02

Max Current Range	
Code	**Note**
30A	30 A
50A	50 A

e.g.：**TD1250-500-50A** note for Class **0.05**，max current range **50 A**.