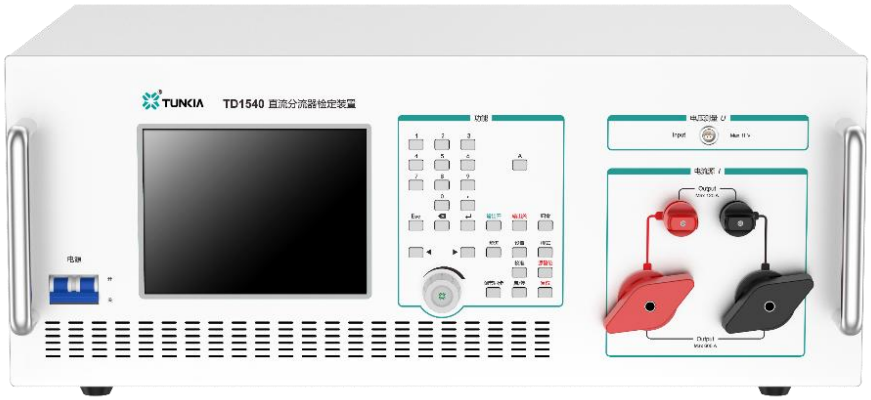
TD1540 DC Shunt Calibration Device



1. Summary

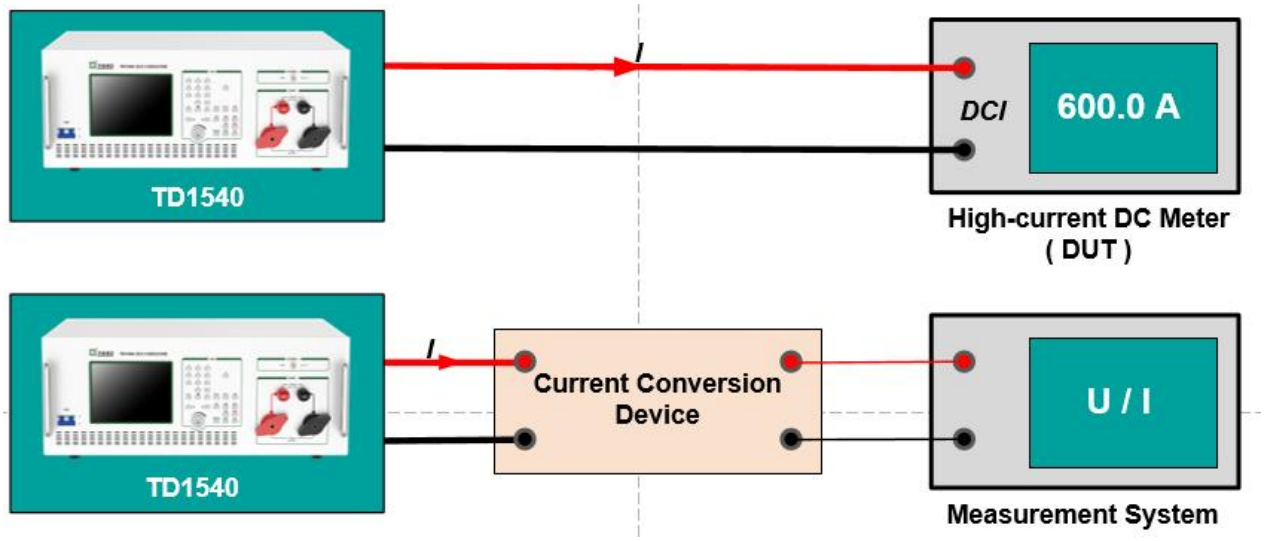
TD1540 is a set of instrument specially used for calibrating DC shunt, which is composed of DC standard large current source and precision DC voltmeter. It can be applied to the verification of DC shunt used for various measurements by metering and power departments at all levels, and also to the quality inspection of products by manufacturers.

2. Features

- Accuracy: class 0.02 / 0.05
- DC standard current：0.5 A～600 A
- Precision DC voltage measurement: 100 μV~11 V
- Resistance measurement range: 200 nΩ~6 Ω
- A variety of quantity output adjustment methods
- Measuring the resistance value and basic error of the shunt, drawing R (I) and R (t) curve
- Professional test software (option)

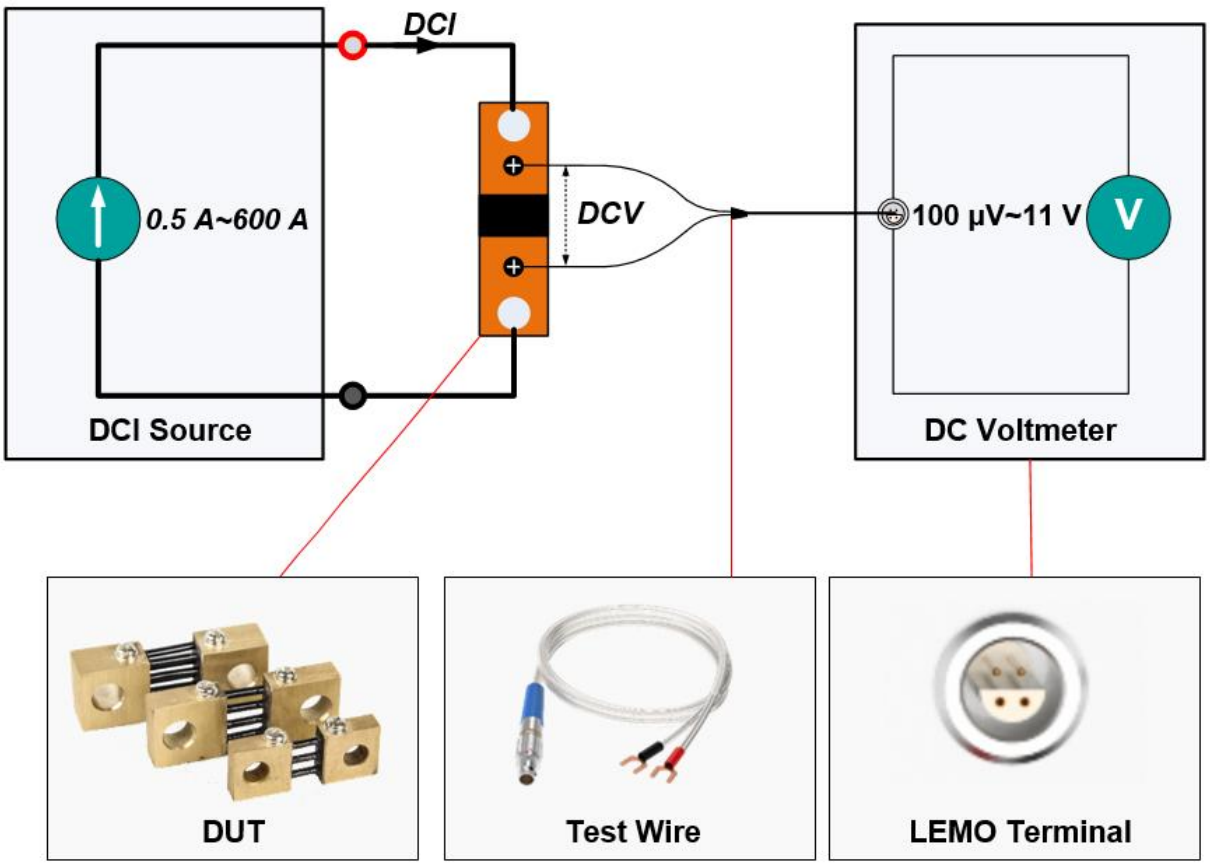
3. Applications

☆ Calibrate High-current DC Meter



- The device has a built-in DC current standard source with an output range of 0.5 A~600 A, and the current accuracy of the class 0.02 device reaches class 0.01, which is suitable for calibrating the DC large ammeter of class 0.05 and below.
- The device can provide 600 A large current for the primary side of current conversion devices (such as transformer, I/I conversion, I/V conversion, etc.).

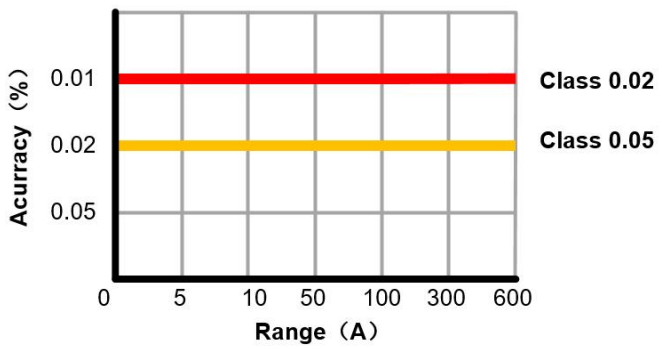
☆ Verification of DC Shunt



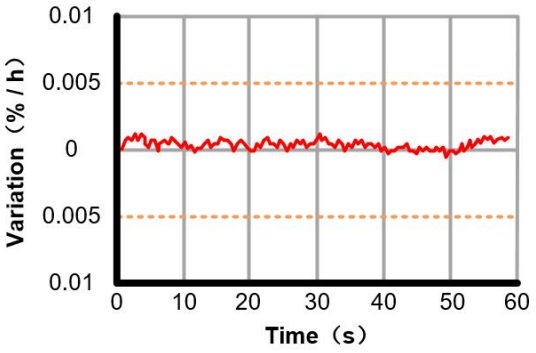
- **DC high current standard source:** Maximum output is 600 A, which can be used as the primary current input of the DC shunt.
- **DC small signal voltmeter:** Support voltage input range is 100 μV~11 V, which can measure the secondary output voltage of the shunt.
- **Verification and test of DC shunt (option):** Can measure the resistance value and basic error of the diverter, draw R (I) and R (t) curves.

4. Functional Features

☆ High accuracy and stability of current output



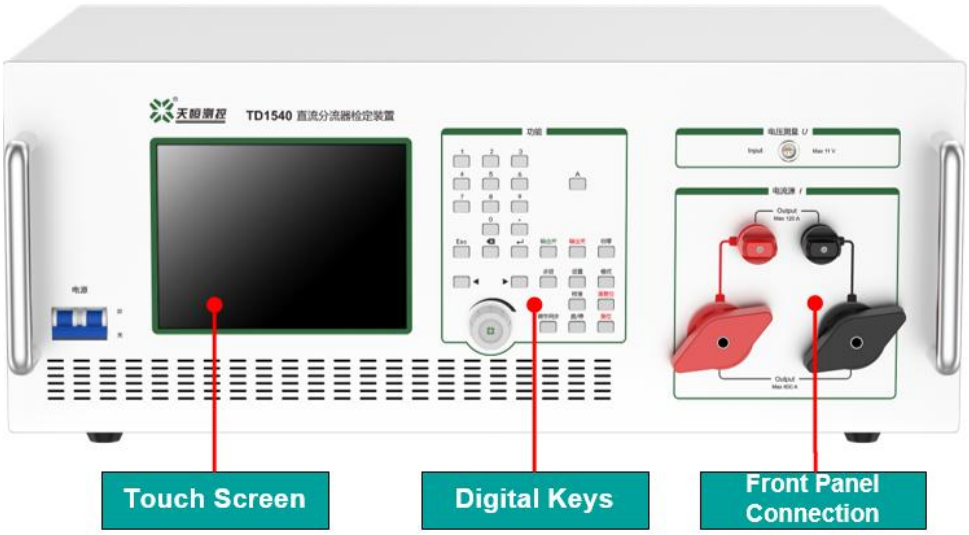
Figure（a）Measurement Accuracy



Figure（b）Short-term Stability

- Precise integrated circuit devices are used to ensure the long-term accuracy of the system.
- Adopt the design principle of closed-loop negative feedback system to ensure the stability of output.

☆ Convenience of Operation



- **Digital programmable keys:** It can realize fixed-point output, rotary encoder, step adjustment and multiple input modes.

☆ Multiple Output Methods

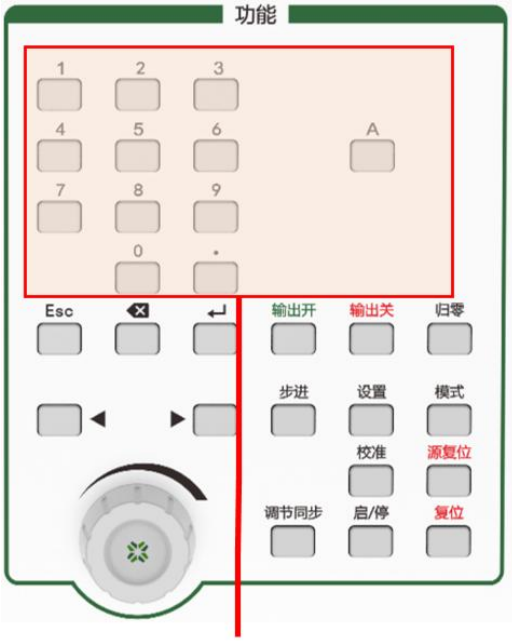


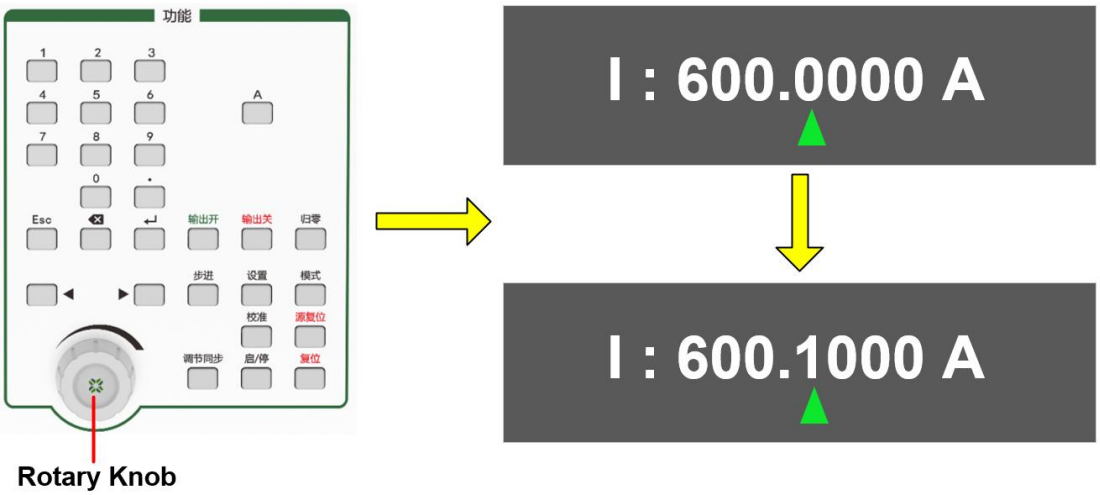
Figure (a) Digital button

Figure (b) Value Output

- The instrument has a "**fixed-point output**" mode. The required output value can be directly set by pressing the number keys on the console or clicking the touch screen, and the instrument will automatically switch to the optimal range output;

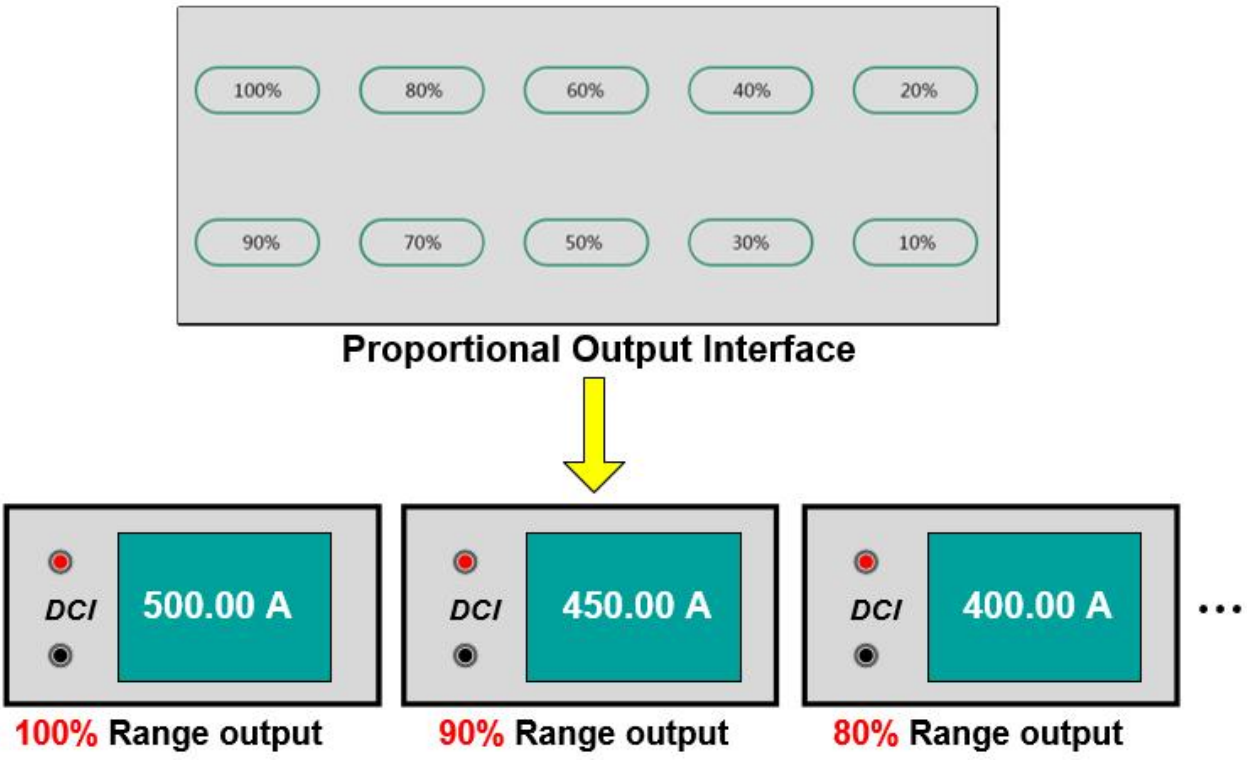
- In particular, when setting the current, input the current value directly.

☆ Rotary Knob Adjustment Output



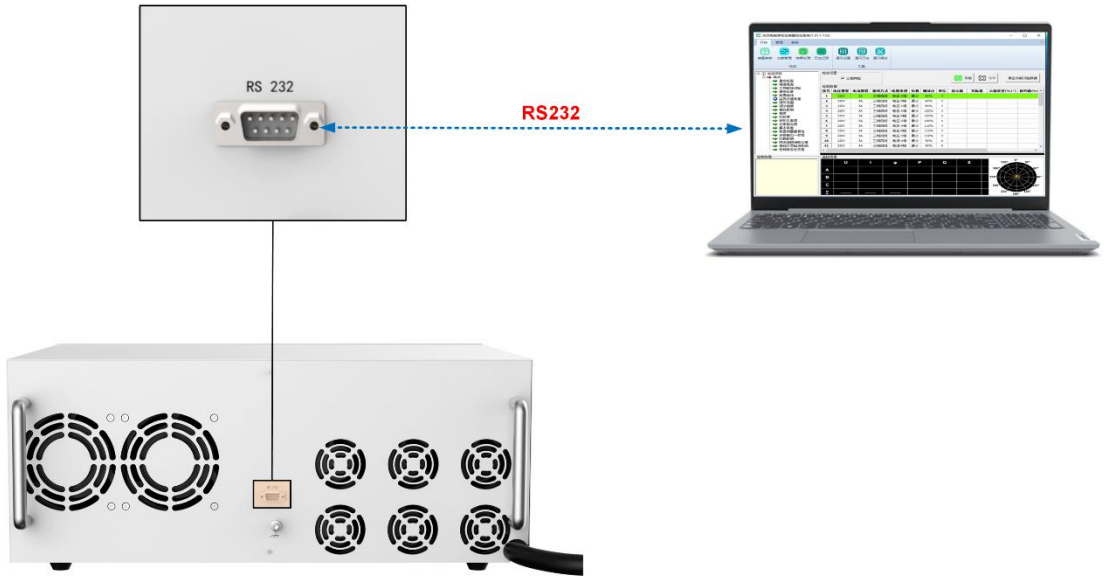
- The key operation area is equipped with a "**rotary knob**", which can increase or decrease the value output by rotating clockwise or counterclockwise.

☆ Proportional Output



- When calibrating electrical measuring instruments, it is usually necessary to select calibration points according to the proportion of each range of the meter being tested;
- The user can select the calibration point of the tested meter through the "percentage verification point" on the touch screen of the instrument.

☆ Professional Test Software (Option)



- The device has RS232 communication interfaces, and its software functions can be customized according to customer needs.

5. Specifications

5.1 DC current output DCI

Range	Short-term Stability (% / min)		Accuracy (± ppm of reading + ppm of range) [1]		Maximum load (V)
	Class 0.05	Class 0.02	Class 0.05	Class 0.02	
5 A	0.005	0.003	120 + 80	60 + 40	3.5
10 A	0.005	0.003	120 + 80	60 + 40	3.5
20 A	0.005	0.003	120 + 80	60 + 40	3.5
50 A	0.005	0.003	120 + 80	60 + 40	3.5
100 A	0.005	0.003	120 + 80	60 + 40	3.5
200 A	0.005	0.003	120 + 80	60 + 40	3.5
500 A	0.005	0.003	120 + 80	60 + 40	3.5
Note [1] : (ppm = parts per million) (e.g., 10ppm = 0.001%).					

- Output range：0.5A～600 A, Ripple coefficient: < 0.5 %
- 7-digits display, Regulating fineness: 0.001%*RG
- Protection function: Open circuit protection, Overload protection

5.2 DC small signal voltage measurement DCV

Range	Accuracy (± ppm of reading + ppm of range)		Temperature coefficient @ (15~30) °C (ppm*RG/°C)	
	Class 0.05	Class 0.02	Class 0.05	Class 0.02
1 mV	150 + 1	80 + 0.5	<30	<15
10 mV	150 + 3	80 + 1.5	<10	<5
100 mV	150 + 10	80 + 5	<10	<5
1 V	150 + 20	80 + 10	<5	<2
10 V	150 + 100	80 + 50	<5	<2

- Measuring range: ± (100 μV~11 V), Manual/automatic range switching, 7-digits display
- Input resistance: >1 GΩ, Input protection: 50 V_{pk}, continuously

5.3 DC resistance measurement

Test Current	Voltage Range	Measuring Range of Resistance	Accuracy @ Full scale voltage value②	
			0.05	0.02
5 A	(0.1~1) mV	20 μΩ ≤ R ≤ 200 μΩ	0.135%	0.068%
	(1~10) mV	200 μΩ < R ≤ 2 mΩ	0.065%	0.033%
	(10~100) mV	2 mΩ < R ≤ 20 mΩ	0.045%	0.023%
	(0.1~1) V	20 mΩ < R ≤ 200 mΩ	0.037%	0.019%
	(1~3) V	200 mΩ < R ≤600 mΩ	0.036%	0.019%
10 A	(0.1~1) mV	10 μΩ ≤ R ≤ 100 μΩ	0.135%	0.068%
	(1~10) mV	100 μΩ < R ≤ 1 mΩ	0.065%	0.033%
	(10~100) mV	1 mΩ < R ≤ 10 mΩ	0.045%	0.023%
	(0.1~1) V	10 mΩ < R ≤ 100 mΩ	0.037%	0.019%
	(1~3) V	100 mΩ < R ≤300 mΩ	0.036%	0.019%
20 A	(0.1~1) mV	5 μΩ ≤ R ≤ 50 μΩ	0.135%	0.068%
	(1~10) mV	50 μΩ < R ≤ 500 μΩ	0.065%	0.033%
	(10~100) mV	500 μΩ < R ≤ 5 mΩ	0.045%	0.023%
	(0.1~1) V	5 mΩ < R ≤ 50 mΩ	0.037%	0.019%
	(1~3) V	50 mΩ < R ≤ 150 mΩ	0.036%	0.019%
50 A	(0.1~1) mV	2 μΩ ≤ R ≤ 20 μΩ	0.135%	0.068%
	(1~10) mV	20 μΩ < R ≤ 200 μΩ	0.065%	0.033%
	(10~100) mV	200 μΩ < R ≤ 2 mΩ	0.045%	0.023%
	(0.1~1) V	2 mΩ < R ≤ 20 mΩ	0.037%	0.019%
	(1~3) V	20 mΩ < R ≤ 60 mΩ	0.036%	0.019%
100 A	(0.1~1) mV	1 μΩ ≤ R ≤ 10 μΩ	0.135%	0.068%
	(1~10) mV	10 μΩ < R ≤ 100 μΩ	0.065%	0.033%
	(10~100) mV	100 μΩ < R ≤ 1 mΩ	0.045%	0.023%
	(0.1~1) V	1 mΩ < R ≤ 10 mΩ	0.037%	0.019%
	(1~3) V	10 mΩ < R ≤ 30 mΩ	0.036%	0.019%

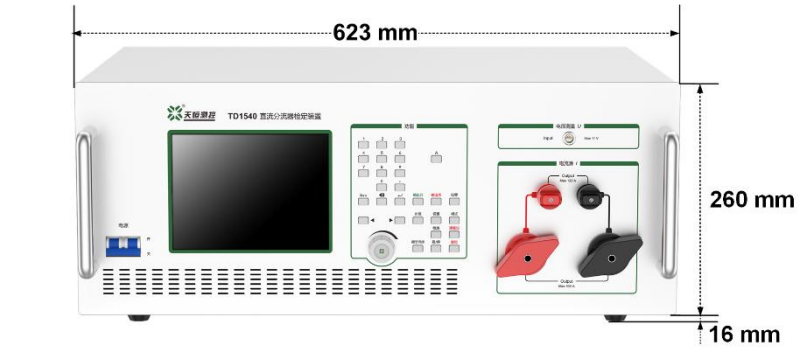
200 A	(0.1~1) mV	500 nΩ ≤ R ≤ 5 μΩ	0.135%	0.068%
	(1~10) mV	5 μΩ < R ≤ 50 μΩ	0.065%	0.033%
	(10~100) mV	50 μΩ < R ≤ 500 μΩ	0.045%	0.023%
	(0.1~1) V	500 μΩ < R ≤ 5 mΩ	0.037%	0.019%
	(1~3) V	5 mΩ< R ≤ 15 mΩ	0.036%	0.019%
500 A	(0.1~1) mV	200 nΩ ≤ R ≤ 2 μΩ	0.135%	0.068%
	(1~10) mV	2 μΩ < R ≤ 20 μΩ	0.065%	0.033%
	(10~100) mV	20 μΩ < R ≤ 200 μΩ	0.045%	0.023%
	(0.1~1) V	200 μΩ < R ≤ 2 mΩ	0.037%	0.019%
	(1~3) V	2 mΩ< R ≤ 6 mΩ	0.036%	0.019%

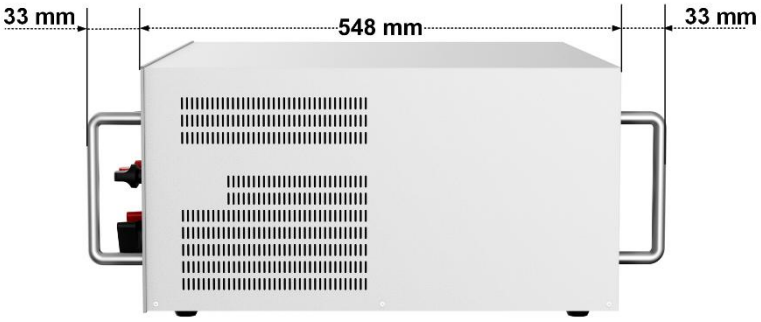
Note②: Accuracy of resistance measurement corresponding to other voltage values =($\Delta U/U_0+\Delta I/I_0$), U_0 and I_0 are the reading values of current voltage and current respectively, ΔU and ΔI are the absolute error values of current measured voltage and current respectively.

- Resistance measurement range: 200 nΩ~6 Ω, 6-digits display, Minimum resolution: 1 pΩ
- The current test point can be set through the number keys, and the voltage range: manual/automatic switching
- After loading the test current, the R (t) change curve can be tested

6. General Specifications

Power supply	AC (220 ± 22) V，(50 ± 2) Hz;
Warm up time	2h;
Maximum power consumption	4.8 kVA
Sampling rate	0.5 sps
Temperature performance	Operating temperature: 15 °C~30 °C; Storage temperature: -20 °C ~ 70 °C;
Humidity performance	Operating humidity: (20 % ~ 50%) R·H, No condensation; Storage humidity: (15 % ~ 80%) R·H, No condensation;
Altitude	< 3000 m
Weight	About 49.5 kg
Communication interface	RS 232
Unit size	623 mm (W) × 548 mm (D) × 260 mm (H) (Excluding handle and support foot)


623 mm
260 mm
16 mm


33 mm
548 mm
33 mm

7. Ordering Information

TD1540 – ■

Class	
Code	Note
200	Class 0.02
500	Class 0.05

e.g.: ***TD1540-200*** note for Class 0.02.