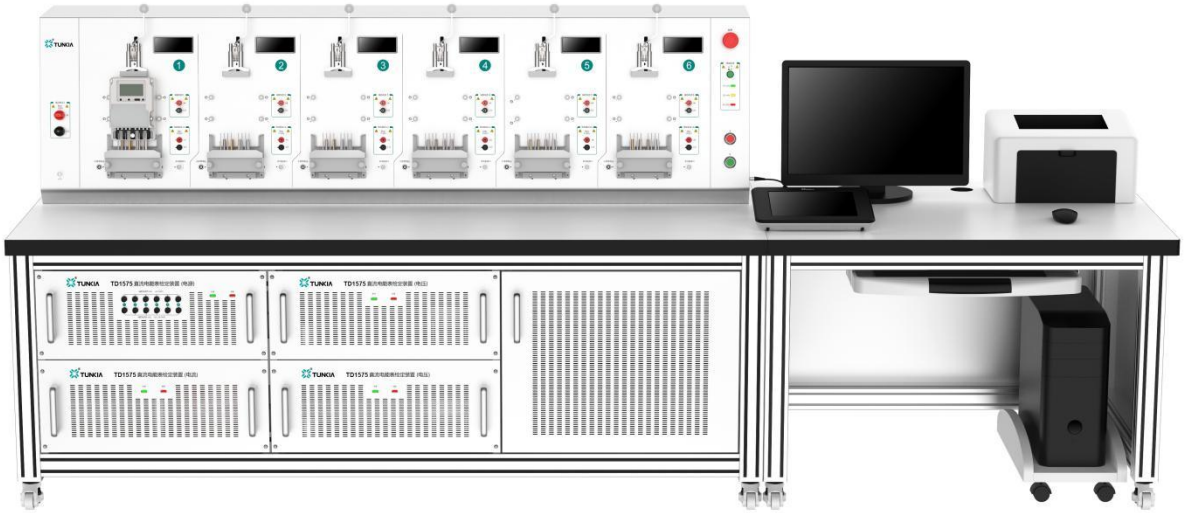
TD1575 DC Energy Meters Verification Device



* This is for your reference only，the configuration and details may vary depending on the application scenarios

1. Summary

TD1575 is a platform device dedicated to the verification of DC energy meters, which consists of DC voltage standard source, DC current standard source, DC small signal voltage standard source (corresponding to the voltage of the shunt), multi meter position verification platform, verification software, etc. Support verification of direct connected and indirect connected DC energy meters at the same time.

2. Features

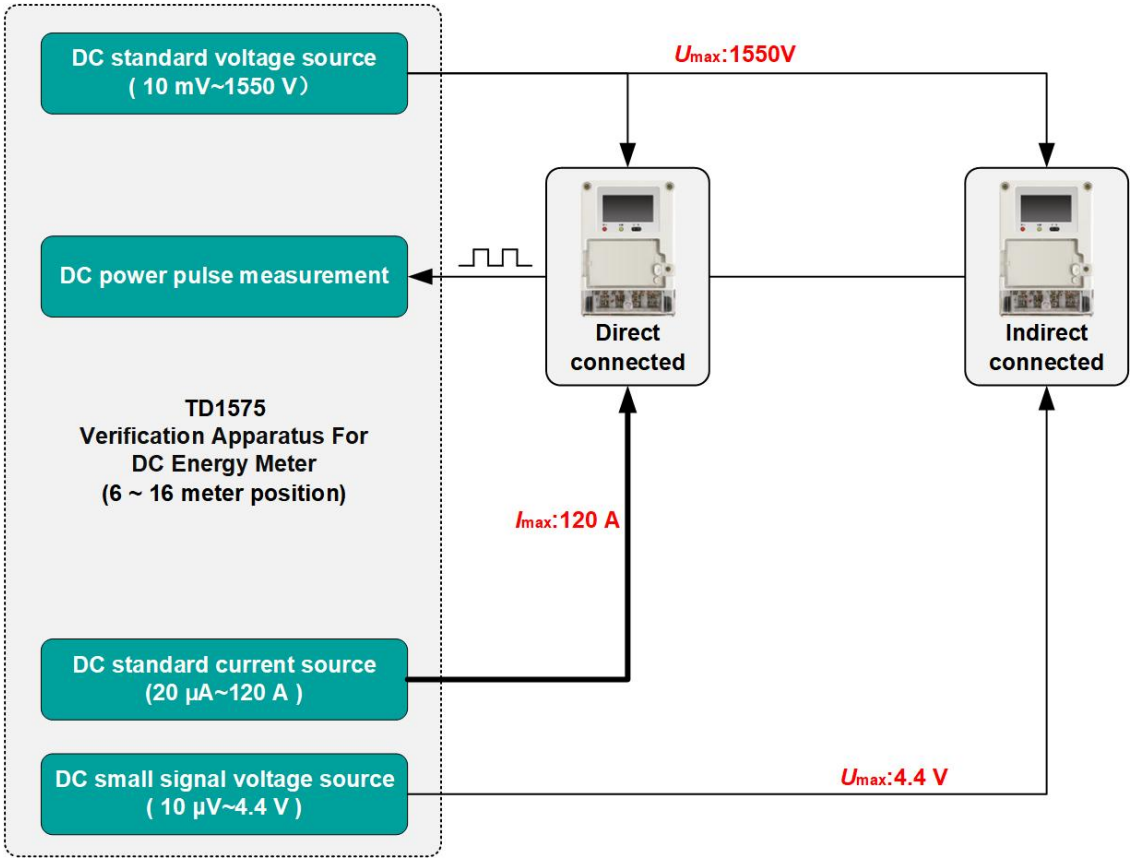
- Power/energy measurement: class 0.02, class 0.05。
- DC standard voltage source：10 mV～1150 V / 1550 V（option）
- DC standard current source：20 μA～120 A
- DC four wire small signal voltage source：10 μV～4.4 V
- Optional 6/12/16 meter position indirect connected DC energy meters verification platform.
- Standard energy pulse input/output, used to detect the working error of energy meter
- Auxiliary power supply is used to supply power for electronic meters for measuring DC electrical energy(type A).
- Standard second pulse measurement is used to detect the daily timing error of the energy

meter

- Mobile measurement and control station, which can observe or control the output through the LCD touch screen

3. Applications

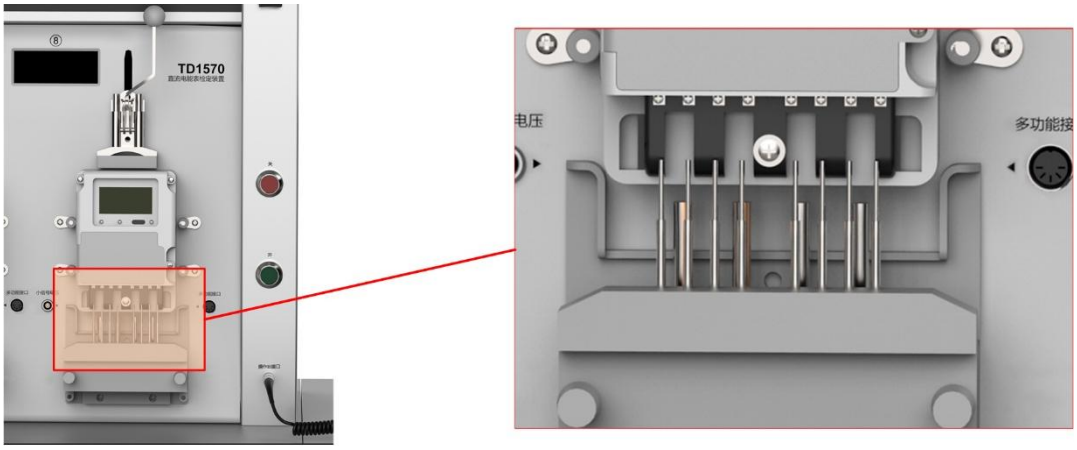
☆ Verification of DC Energy Meter



- **Application Scenario 1:** The maximum DC voltage output is 1550 V, meeting the requirements of 1.15 Un voltage test of 1 kV DC energy meters; The maximum DC current output is 120 A, meeting the requirements of 1.2 In current test of 100 A DC energy meters. With the power pulse measurement function, the test of direct connected DC energy meters can be completed.
- **Application Scenario 2：** The instrument has 10 μV~4.4 V four wire small signal voltage source, with 1550 V DC voltage source and energy pulse measurement function, can carry out relevant testing work of in direct connected DC energy meters.

4. Characteristics

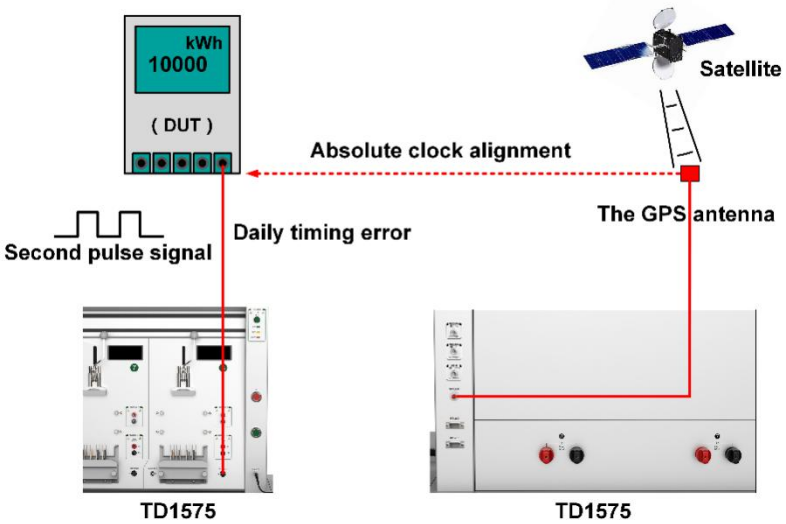
☆DC Energy Meter Frame



Indirect Connected DC Energy Meters Press Bracket

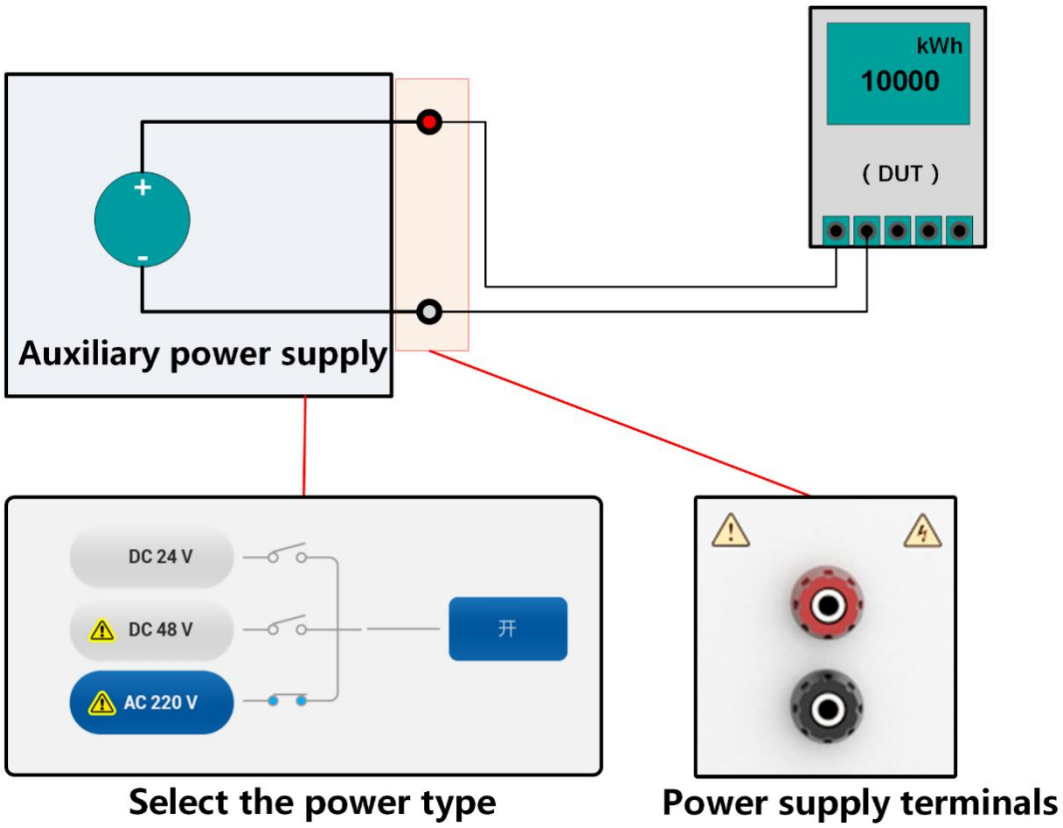
- **Indirect connected DC energy meters press bracket:** a metal terminal corresponding to the wiring hole of the DC energy meter is installed under the fixed meter position, and the wiring operation can be completed by pressing the handle.

☆ Clock Check Function



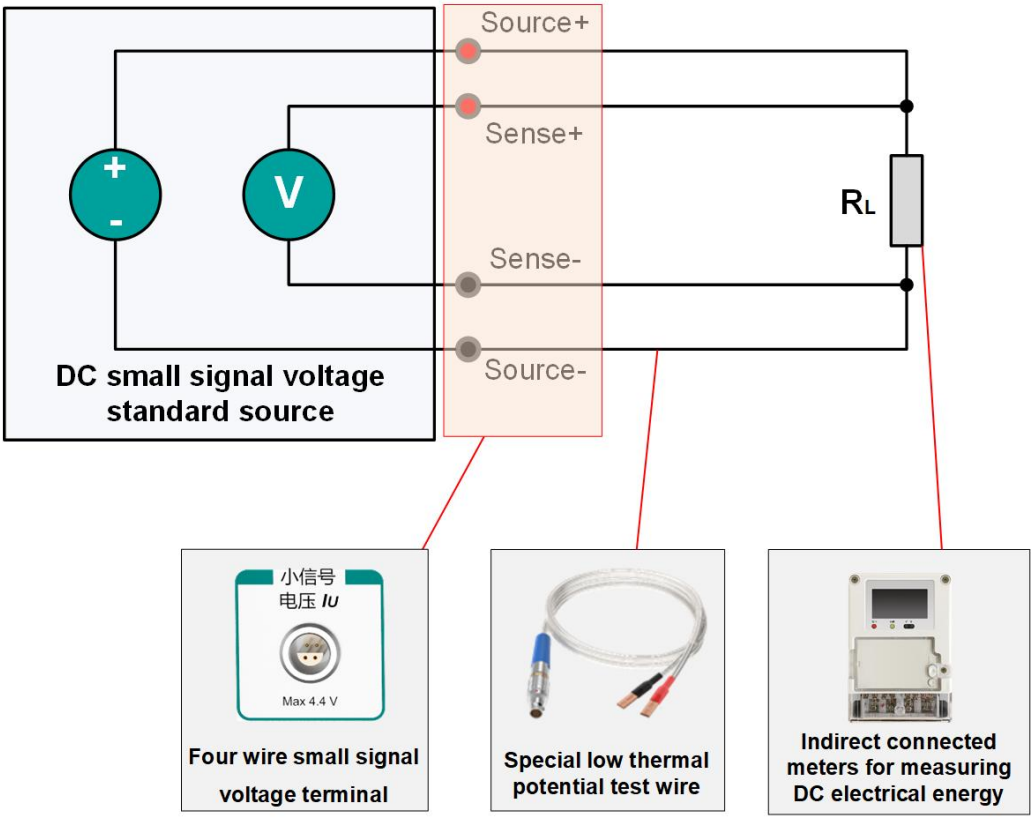
- Built in clock module with precision up to 0.2 ppm, which can measure the second pulse signal for daily timing error test
- Built in GPS module and antenna can receive GPS standard clock signal.

☆ Auxiliary Power Supply



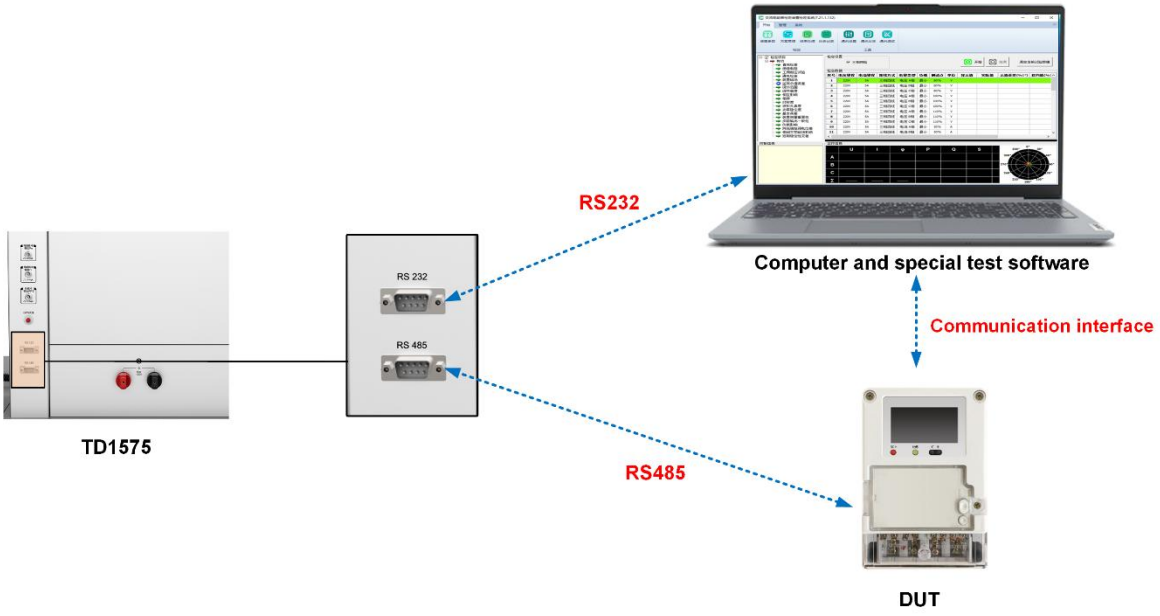
- Each meter position has built-in auxiliary power supply, which can provide DC 24 V or AC 220 V power supply for electronic meters for measuring DC electrical energy(type A).

☆Four Wire Small-signal Voltage Source



- **Four wire small-signal voltage source：** Precise output ± (10 μ V ～ 4.4 V) small signal voltage signal is used as the current input of indirect access DC watt hour meter (the specification of shunt can be set and displayed according to its primary current).

☆ Professional Test Software



- With RS232 communication interface, software functions can be customized according to customer needs

5. Specifications

5.1 DC Voltage Output

Range	Resolution	Short Term Stability (% / min)		Accuracy (k=2) (ppm of reading + ppm of range) [1]		Maximum Burden Current (mA)	Ripple (%)
		Class 0.05	Class 0.02	Class 0.05	Class 0.02		
100 mV	1 μV	0.005	0.002	120 + 80	80 + 20	50	< 0.2
300 mV	1 μV	0.005	0.002	120 + 80	80 + 20	50	< 0.2
1 V	10 μV	0.005	0.002	120 + 80	80 + 20	50	< 0.2
3 V	10 μV	0.005	0.002	120 + 80	80 + 20	50	< 0.2
10 V	0.1 mV	0.005	0.002	120 + 80	80 + 20	50	< 0.2
30 V	0.1 mV	0.005	0.002	120 + 80	80 + 20	50	< 0.2
100 V	1 mV	0.005	0.002	120 + 80	80 + 20	50	< 0.2
300 V	1 mV	0.005	0.002	120 + 80	80 + 20	30	< 0.2
600 V	1 mV	0.005	0.002	120 + 80	80 + 20	10	< 0.2
1000 V	10 mV	0.005	0.002	120 + 80	80 + 20	10	< 0.2
1500 V [2]	10 mV	0.005	0.002	120 + 80	80 + 20	10	< 0.2

Note [1] : (ppm = parts per million) (e.g.， 10ppm = 0.001%).

[2]：1500V range is an option.

- Output range：10 mV～1150 V, 6-bit display
- 1500 V voltage output option can be selected to expand the voltage output range to 10 mV ～ 1550 V
- Protection function: Short circuit protection, overload protection

5.2 DC Current Output [3]

Range	Resolution	Short Term Stability (% / min)		Accuracy (k=2) (ppm of reading + ppm of range)		Maximum Burden Voltage (V)	Ripple (%)
		Class 0.05	Class 0.02	Class 0.05	Class 0.02		
200 μA	1 nA	0.03 μA	0.02 μA	120+0.06 μA	60+0.04 μA	12	< 0.5
500 μA	1 nA	0.05 μA	0.03 μA	120+0.10 μA	60+0.06 μA	12	< 0.5
1 mA	10 nA	0.08 μA	0.04 μA	120+0.15 μA	60+0.08 μA	12	< 0.5
2 mA	10 nA	0.005	0.002	120 + 80	60 + 40	12	< 0.5
5 mA	10 nA	0.005	0.002	120 + 80	60 + 40	12	< 0.5
10 mA	0.1 μA	0.005	0.002	120 + 80	60 + 40	12	< 0.5
20 mA	0.1 μA	0.005	0.002	120 + 80	60 + 40	12	< 0.5
50 mA	0.1 μA	0.005	0.002	120 + 80	60 + 40	12	< 0.5
100 mA	1 μA	0.005	0.002	120 + 80	60 + 40	12	< 0.5
200 mA	1 μA	0.005	0.002	120 + 80	60 + 40	12	< 0.5
500 mA	1 μA	0.005	0.002	120 + 80	60 + 40	3.5	< 0.5
1 A	10 μA	0.005	0.002	120 + 80	60 + 40	3	< 0.5
2 A	10 μA	0.005	0.002	120 + 80	60 + 40	3	< 0.5
5 A	10 μA	0.005	0.002	120 + 80	60 + 40	3	< 0.5
10 A	0.1 mA	0.005	0.002	120 + 80	60 + 40	3	< 0.5
20 A	0.1 mA	0.005	0.002	120 + 80	60 + 40	3	< 0.5
50 A	0.1 mA	0.005	0.002	120 + 80	60 + 40	3	< 1.0
100 A	1 mA	0.005	0.002	120 + 80	60 + 40	3	< 1.0
Note: [3] As the current input of the direct connected DC energy meters							

- Output range：20 μA～120 A，6-bit display
- Protection function: open circuit protection, overload protection
- The device has no automatic short circuit function, and the meter position short circuit terminal is reserved.

5.3 DC Small-signal Voltage Output[4]

Range	Resolution	Short Term Stability (% / min)	Accuracy (k=2) (ppm of reading + ppm of range)	Maximum Burden Current (mA)	Ripple (%)
1 mV	10 nV	0.1 μVrms	120 + 0.3 μV	—	< 0.2
3 mV	10 nV	0.3 μVrms	120 + 1 μV	—	< 0.2
10 mV	0.1 μV	1 μVrms	120 + 3 μV	—	< 0.2
30 mV	0.1 μV	0.002	120 + 80	—	< 0.2
100 mV	1 μV	0.002	120 + 80	—	< 0.2
300 mV	1 μV	0.002	120 + 80	≤ 10	< 0.2
1 V	10 μV	0.002	120 + 80	≤ 10	< 0.2
4 V	10 μV	0.002	120 + 80	≤ 10	< 0.2
Note: [4] When the indirect connected DC energy meters is verified separately, it can be used as its current input (corresponding to the shunt voltage)					

- Output range：± (10 μV～4.4 V)，6-bit display
- The specification and current voltage ratio of the shunt can be set, and the output value can be displayed according to the voltage or current converted by the shunts.
- Multiple small signal DC voltages are isolated from each other and high voltage circuits

5.4 Daily Timing Error

- Annual measurement uncertainty of device standard clock：2×10^{-7}
- Daily timing error supports two error display modes: s/d and ppm/ppb

5.5 DC Energy Index

DC Power/Energy	Range	Combination of DC voltage and DC current (or DC small signal voltage)
	Accuracy	Uncertainty of voltage measurement+uncertainty of current measurement (or uncertainty of DC small signal voltage measurement)
Energy Pulse	Standard Energy Pulse Output	High frequency full range value corresponds to 60 kHz; Low frequency full range value corresponds to 6 Hz;
	Pulse Output Frequency	Output frequency jitter time<10 μ s
	Standard Energy Pulse Input	Signal amplitude is 5V, TTL level; Able to receive high-frequency pulses ≤ 150 kHz; FH=60 kHz × Power value ÷ voltage range value ÷ current range value FL=60 kHz × Power value ÷ voltage range value ÷ current range value ÷ 10000
	Energy Error Display	Automatic display, resolution 0.0001%
Difference At Different meter position		< ± 0.025%

5.6 Auxiliary power supply

DC Power Output	Output Voltage	24 V / 48 V
	Maximum Burden Current	120 mA / meter position
	Protection Function	Replaceable fuse protection
AC Power Output	Output Voltage	220(Isolated)
	Maximum Burden Current	20 mA / meter position
	Protection Function	Replaceable fuse protection

Note: Other types of power supply can be customized.

6. General Specifications

Power Supply	AC (220±22) V，(50±2) Hz
Temperature Performance	Working temperature：0°C～45°C； Calibration temperature：18°C～28°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，No condensation
Interface	RS232

7. Ordering Information

TD1575 – ▯ ▯ ▯

Class	
Code	Note
200	Class 0.02
500	Class 0.05

Maximum Voltage Ranges	
Code	Note
1kV	*1 kV*
1.5kV	*1.5 kV*

Meter Position	
Code	Note
6	*6* outputs
12	*12* outputs
16	*16* outputs

e.g.:***TD1575-200-1.5kV-16*** note for class 0.02, 16 outputs, maximum voltage ranges is 1.5 kV