

TD1500 High-precision DC Testing System



1. summary

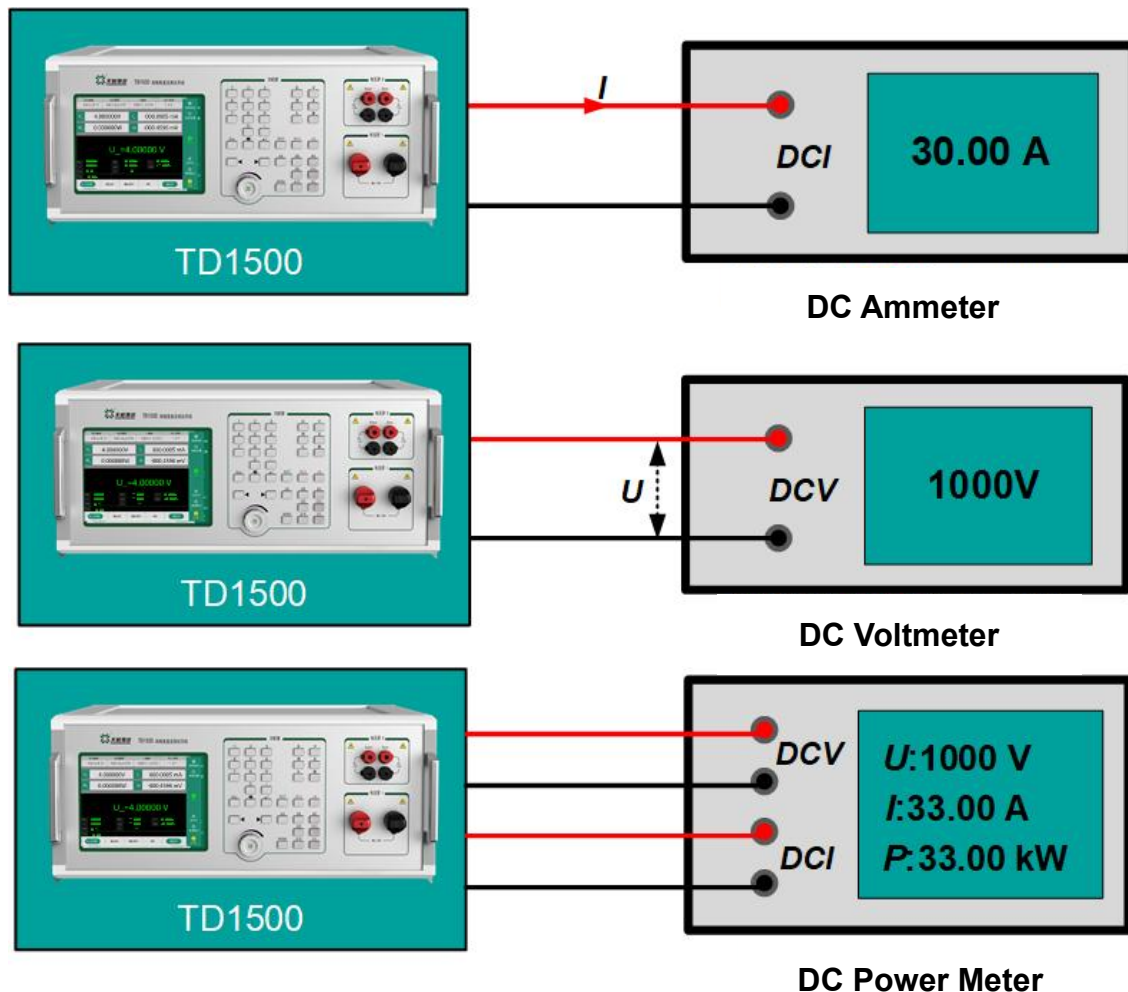
TD1500 is a wide range, high precision, multi-functional DC standard source precision instrument. It can directly output DC voltage, current, power and electric energy with high stability and high accuracy. The best measurement uncertainty has three specifications of Class 0.01 / Class 0.02 / Class 0.05, which is suitable for verification or calibration of various types of DC measuring instruments. The technical performance of the equipment is in the leading Class among similar products, and it is widely used in electric power, measurement, military industry, manufacturing, scientific research and other fields to establish DC measurement standards.

2. Product characteristics

- Standard source: 1 mV ~ 1100 V (1150 V @ electric energy selection)
- Standard source: 1 μ A ~33 A / 100 A (optional)
- Standard source of DC voltage: 100 μ V~4.4 V (optional)
- Measurement function of DC voltage: 10 μ V ~ 4.4 V (optional)
- A variety of quantity and value output mode
- Special automatic test software (optional)
- Support for remote control adjustment output (optional)
- Verification of DC electricity meter (functional option)
- Secondary signal measurement of the transmitter (functional option)

3. Main Application

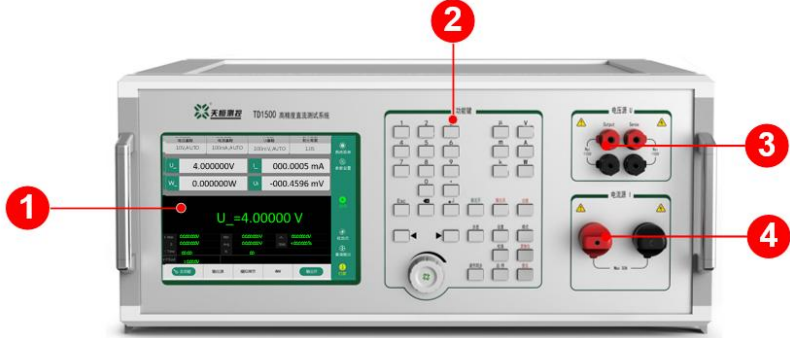
☆ Calibrate DC electrical measuring meter



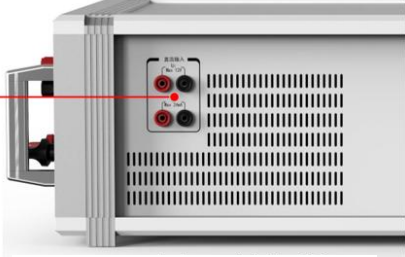
- DC voltage standard source (DCV) output range: 1 mV ~ 1100 V (power type up to 1150 V)
- **DC current standard source (DCI) output range: 1 μ A ~ 33 A / 110 A (optional) (power type up to 120 A)**
- Class 0.01 specification instrument: suitable for calibrating DC voltmeter and ammeter of Class 0.05 and below, and suitable for calibrating DC power meter of Class 0.1 and below.
- Class 0.02 specification instrument: suitable for calibrating DC voltmeter and ammeter of Class 0.1 and below, and suitable for calibrating DC power meter of Class 0.2 and below.
- Class 0.05 specification instrument: suitable for calibrating DC voltmeter and ammeter of Class 0.2 and below, and suitable for calibrating DC power meter of Class 0.5 and below.

4. Panel Features


☆ Front \Side Panel



Front Panel



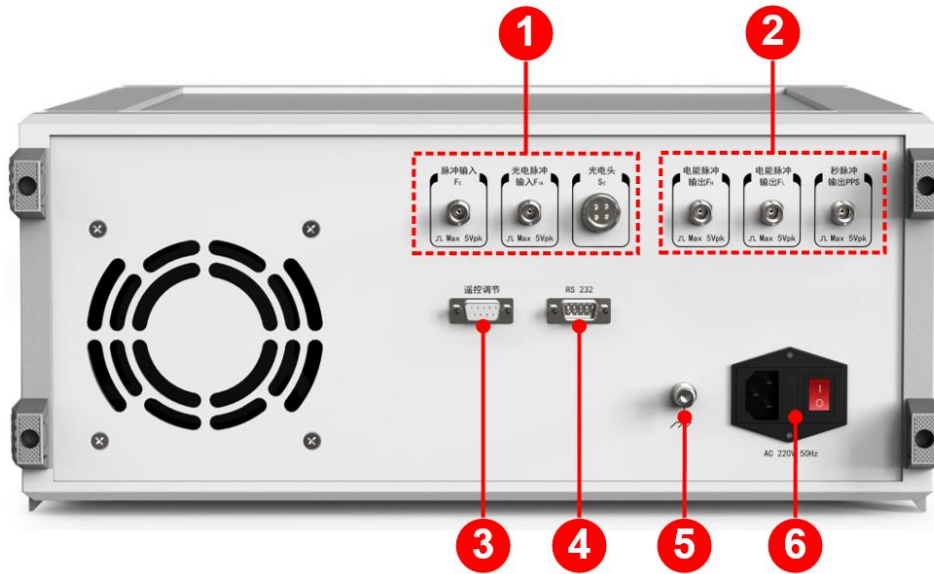
Right Side Panel



Left Side Panel

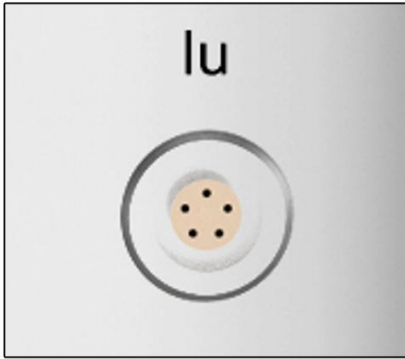
order number	function declaration
1	LCD touch color screen, more power intuitive display, full touch operation, greatly improve the ease of usability of the instrument.
2	Key operation panel, a variety of value input / adjustment mode, greatly improve the operation convenience of the instrument.
3	DC voltage output terminal supports maximum 1150 V voltage output.
4	DC current output terminal supports maximum 120 A current output.
5	The secondary signal input terminal of the DC transmitter supports the input of the maximum DC 24 mA or 12 V signal.
6	DC small signal voltage output / measurement terminal, with support output / measurement range of $\pm (100 \mu V \sim 4.4 V)$.

☆ Rear panel of the instrument

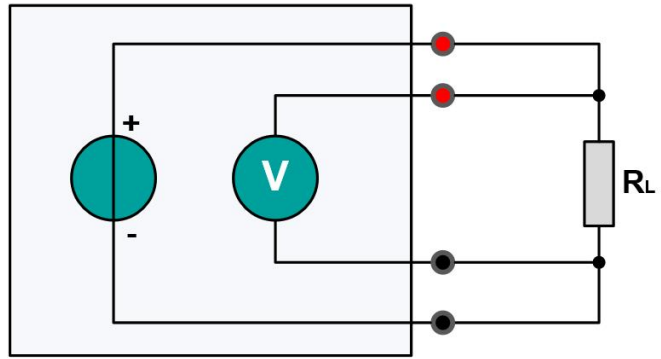


order number	function declaration
1	Pulse input terminal: power pulse F_C from left to right, photoimpact F_{IN} , photometer head S_C
2	Pulse output terminal: from left to right is the electric energy pulse F_L/ F_H , Clock pulse PPS.
3	Remote control adjustment interface: the remote control adjustment box (option) can be connected to facilitate the calibration of the analog pointer instrument.
4	RS232 communication interface: realize communication with computer, facilitate users to establish automatic test system.
5	Shell ground: Make that the casing ground is reliably grounded before use
6	Power interface: AC 220V power input interface with switch and safety pipe

☆ Four-wire Small Signal Voltage Source



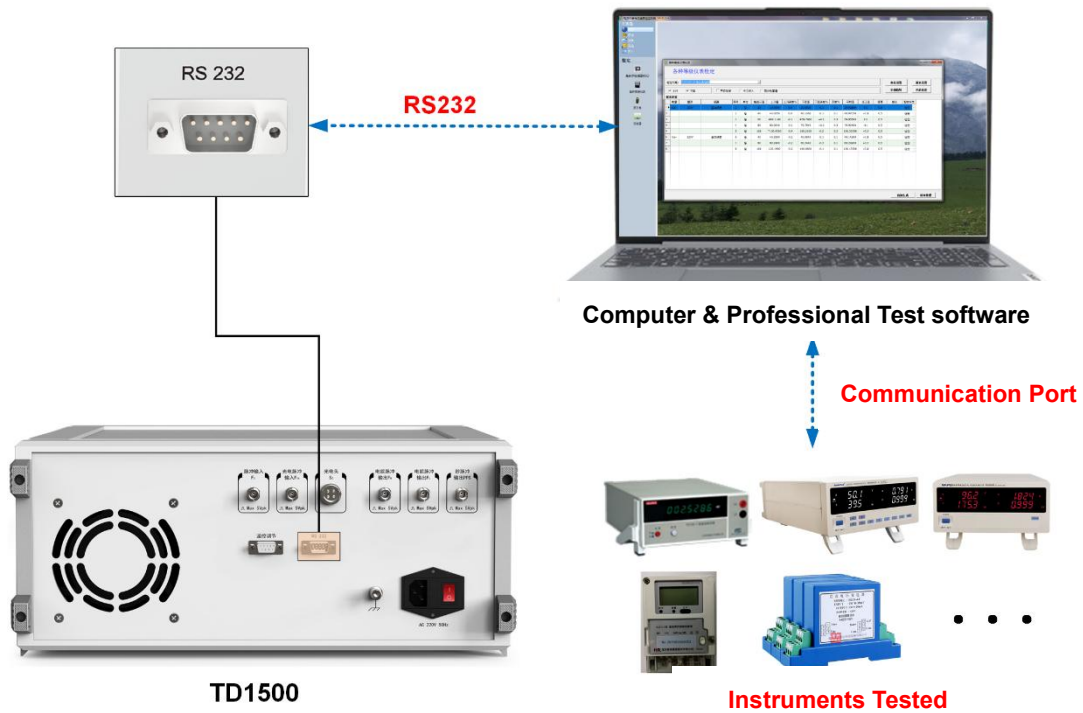
LEMO small signal voltage terminal



Four-wire Voltage connection Diagram

- Four-wire small signal voltage source: can accurately output $\pm (10 \mu V \sim 4.4 V)$ small signal voltage signal, as the current input of indirect access DC electricity meter (the shunt specification can be set, and displayed according to its primary current).
- Scheme value: using the four-wire Kelvin connection mode, and equipped with low thermal potential terminal and wire, compared with the traditional two-wire voltage source, can effectively eliminate the influence of wire resistance, contact potential and thermal potential on the measurement.

☆ Professional Test Software (optional)



- Equipped with automatic verification software, it can adapt to all kinds of electrical measuring instruments, refer to JJG 124-2005 ammeter, voltage meter, power meter, JJF 1587-2016 digital multimeter calibration specification, JJG 842-2017 electronic DC electricity meter, and automatically generate the detection report to improve the detection efficiency.
- Support for test data recording, analysis, management, and certificate export.
- Software functions can be customized according to customer needs, and support subsequent software upgrades required by adding new procedures for testing.

5. Technical specifications

5.1 DC Voltage Output DCV

Range	Short-Term Stability (%/Min)			Optimum Measurement Uncertainty (k=2) (Ppm*Rd+Ppm *Rg) ^①			Maximum Load Current (mA)
	Class 0.05	Class 0.02	Class 0.01	Class 0.05	Class 0.02	Class 0.01	
10 mV	0.01	0.005	0.003	200 + 5 μ V	100 + 5 μ V	100 + 5 μ V	100
30 mV	0.01	0.005	0.003	200 + 5 μ V	100 + 5 μ V	100 + 5 μ V	100
100 mV	0.01	0.005	0.003	200 + 5 μ V	100 + 5 μ V	100 + 5 μ V	100
300 mV	0.01	0.005	0.003	200 + 5 μ V	100 + 5 μ V	100 + 5 μ V	100
1 V	0.005	0.005	0.002	200 + 100	100 + 50	60 + 40	500
3 V	0.005	0.005	0.002	200 + 100	100 + 50	60 + 40	500
10 V	0.005	0.005	0.002	200 + 100	100 + 50	60 + 40	500
30 V	0.005	0.005	0.002	300 + 200	120 + 80	60 + 40	800
100 V	0.005	0.005	0.002	300 + 200	120 + 80	60 + 40	300
300 V	0.005	0.005	0.002	300 + 200	120 + 80	60 + 40	100
600 V	0.005	0.005	0.002	300 + 200	120 + 80	60 + 40	50
1000 V	0.005	0.005	0.002	300 + 200	120 + 80	60 + 40	30

Note ①: RD is the read value and RG is the range value

- Voltage output range: 1 mV ~ 1100 V (or 1150 V @ power type option)
- Coripple coefficient: <0.5%, 7-bit decimal display
- Protection function: short-circuit protection, overload protection

5.2 DC current output DCI

Range	Short-Term Stability (%/Min)			Optimum Measurement Uncertainty (k=2) (Ppm*Rd+Ppm *Rg) ^②			Maximum Load Voltage (V)
	Class 0.05	Class 0.02	Class 0.01	Class 0.05	Class 0.02	Class 0.01	
10 μA	0.01	0.01	0.01	300 + 200	300 + 200	300 + 200	11
30 μA	0.01	0.005	0.005	300 + 200	120 + 80	120 + 80	11
100 μA	0.01	0.005	0.005	300 + 200	120 + 80	120 + 80	11
300 μA	0.01	0.005	0.005	300 + 200	120 + 80	120 + 80	11
1 mA	0.01	0.005	0.003	300 + 200	120 + 80	100 + 50	11
3 mA	0.01	0.005	0.003	300 + 200	120 + 80	100 + 50	11
10 mA	0.01	0.005	0.003	300 + 200	120 + 80	100 + 50	11
30 mA	0.01	0.005	0.003	300 + 200	120 + 80	100 + 50	11
100 mA	0.01	0.005	0.003	300 + 200	120 + 80	100 + 50	11
300 mA	0.01	0.005	0.002	300 + 200	120 + 80	60 + 40	11
1 A	0.01	0.005	0.002	300 + 200	120 + 80	60 + 40	11
3 A	0.01	0.005	0.002	300 + 200	120 + 80	60 + 40	4
10 A	0.01	0.005	0.002	300 + 200	120 + 80	60 + 40	4
30 A	0.01	0.005	0.002	300 + 200	120 + 80	60 + 40	3
100 A ^③	0.01	0.005	0.002	300 + 200	120 + 80	60 + 40	3

Note ②: RD is the read value and RG is the range value

Note ③: The 100 A range is optional

- Current output range: 1 μ A ~33 A, ripple coefficient: <0.5%, 7-bit decimal display
- Optional 100 A current output option to extend the current output range to 1 μ A to 110 A (or 120 A @ power type option)
- Protection function: open-circuit protection, overload protection

5.3 DC Power / Energy Specification (power optional)

Dc Power / Power	Output Range	A combination of a DC voltage and a DC current (or a small DC signal voltage)
	Uncertainty Of Measurement	Voltage measurement uncertainty + uncertainty of current measurement (or uncertainty of small DC signal voltage measurement)
Electric Energy Pulse	Standard Electrical Energy Pulse Input	The high-frequency full range value corresponds to 60 kHz; The low-frequency full range value corresponds to 6 Hz;
	Pulse Output Frequency	The output frequency jitter time was <math><10 \mu s</math>
	Annual Stability Of The Clock Frequency	Better than ± 50 ppm
	Standard Electrical Energy Pulse Input	Signal amplitude is 5V, with a TTL Class; capable ≤ 200 kHz; FH = 60 kHz power value / voltage range value / current range value FL = 60 kHz power value / voltage range value / current range value / 10000
	Electric Energy Error Display	Automatically displayed with a resolution of 0.0001%

5.4 DC small signal voltage output (optional)

Range	Short-term Stability (%/min)	Measurement Uncertainty (k=2) (ppm*RD+ppm *RG/ μ V) ^③	Maximum Load Current (mA)
1 mV	1 μ V	120 + 2 μ V	≤ 10
3 mV	1 μ V	120 + 2 μ V	≤ 10
10 mV	1 μ V	120 + 2 μ V	≤ 10

30 mV	1 μ V	120 + 2 μ V	≤ 10
100 mV	0.005	120 + 80	≤ 10
300 mV	0.005	120 + 80	≤ 10
1 V	0.005	120 + 80	≤ 10
4 V	0.005	120 + 80	≤ 10
Note ③: RD is the read value and RG is the range value			

- Output range: \pm (100 μ V~4.4 V), four-wire Kelvin connection
- Note: This function can be used as a current input for the indirect access DC electricity meter (corresponding to the shunt voltage)

5.5 Small DC signal measurement (optional)

Voltage / Current range	Measuring Range	Optimum Measurement Uncertainty (k=2) (ppm*RD+ppm *RG)
1 V	$\pm(0\sim 1.2)$ V	60 + 40
10 V	$\pm(0\sim 12)$ V	60 + 40
2 mA	$\pm(0\sim 2.4)$ mA	60 + 40
20 mA	$\pm(0\sim 24)$ mA	60 + 40

Note : RD is the reading value and RG is the range value

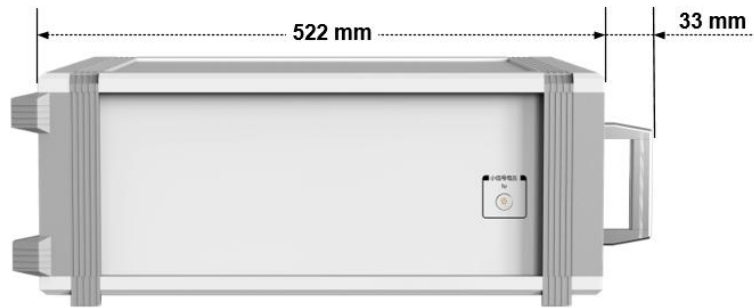
6. General technical specifications

Power Supply	AC (220 \pm 22) V , (50 \pm 2) Hz
Preheating time	30 Minutes
Max. Power dissipation	700 VA
Temperature Performance	Operating temperature: 0 $^{\circ}$ C~40 $^{\circ}$ C; Calibration temperature: 18 $^{\circ}$ C~28 $^{\circ}$ C; Storage temperature: -20 $^{\circ}$ C~70 $^{\circ}$ C
Humidity Performance	Working Humidity: <80% @ 30 $^{\circ}$ C, <70% @ 40 $^{\circ}$ C, and <40% @ 50 $^{\circ}$ C Storage humidity: (20%~80%) R · H, no condensation
Altitude	< 3000 m
Weight	About 17.5kg
Connect mode	The RS232 interface
Outline	446 mm (W) \times 522 mm (D) \times 197 mm (H)

Dimension



Front Panel



Side Panel