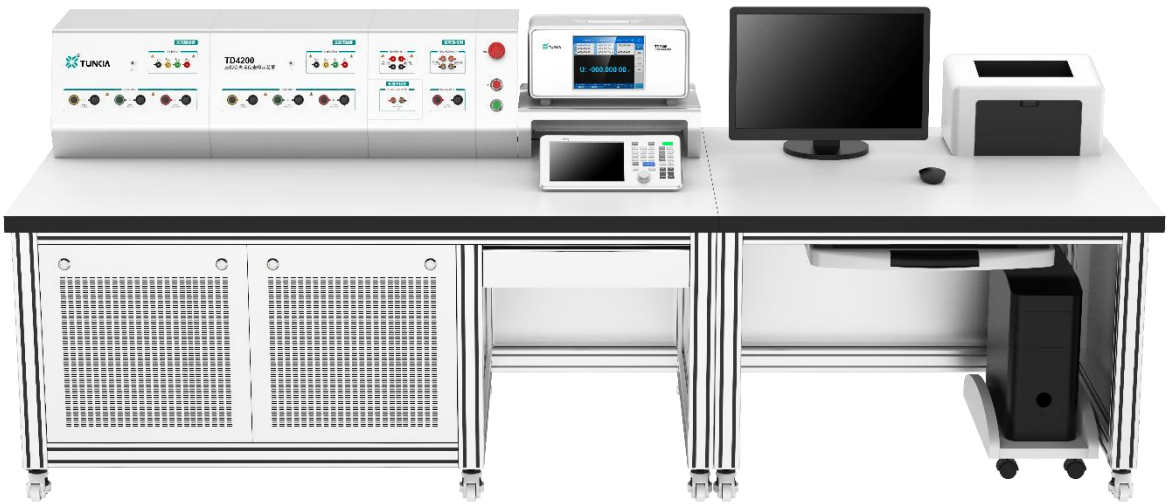
TD4200 Testing Device for Three-phase and DC Meters



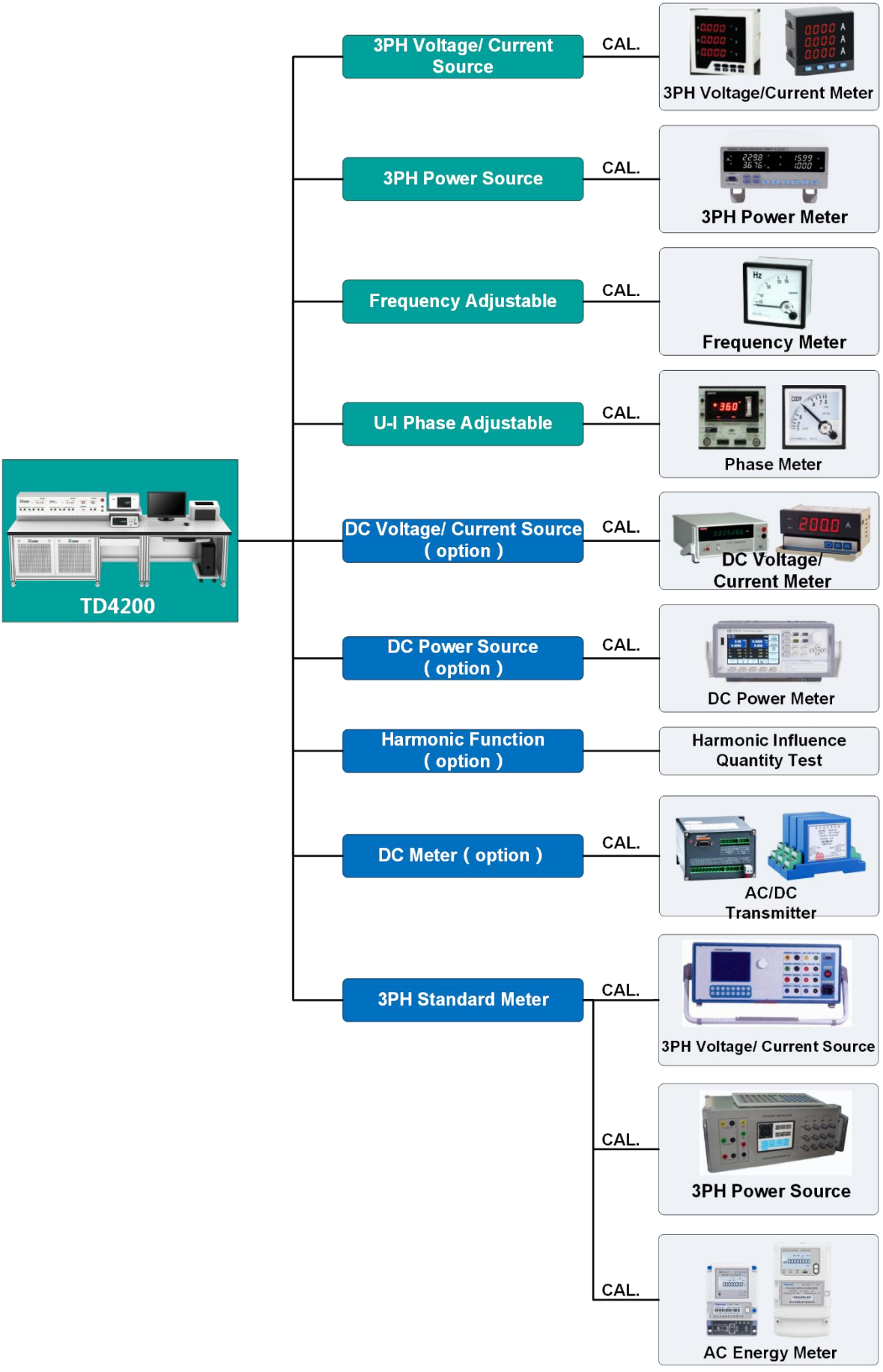
1. Summary

TD4200 is a multi-function comprehensive test-bed for the calibration of electrical measuring instruments. It integrates precision 3PH standard source, high-precision 3PH standard meter, precision DC standard source, test-bed, computer and special software. Can be used to calibrate three-phase AC/DC meter, AC standard source, AC/DC transmitter, etc.

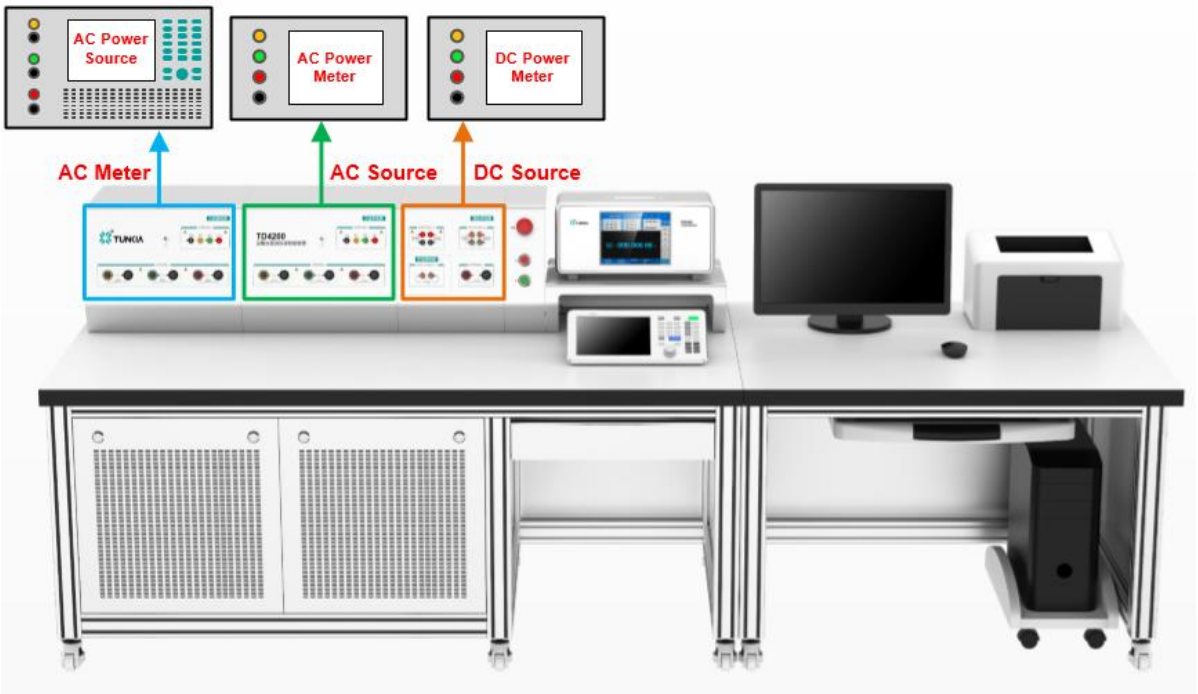
2. Features

- Accuracy class: 0.01, 0.02;
- 3PH voltage output：0.3 V～825 V;
- 3PH current output：0.3 mA～110 A;
- 3PH standard meter (option): Tunkia TD33 series three-phase multi-function standard meter;
  (Note: also support COM3003、RD33、K2006, etc.)
- DC power output (option): 1100 V / 33A or 110A;
- Frequency and phase adjustable;
- Harmonic function / AC energy meter test function;
- Test software.

3. Applications



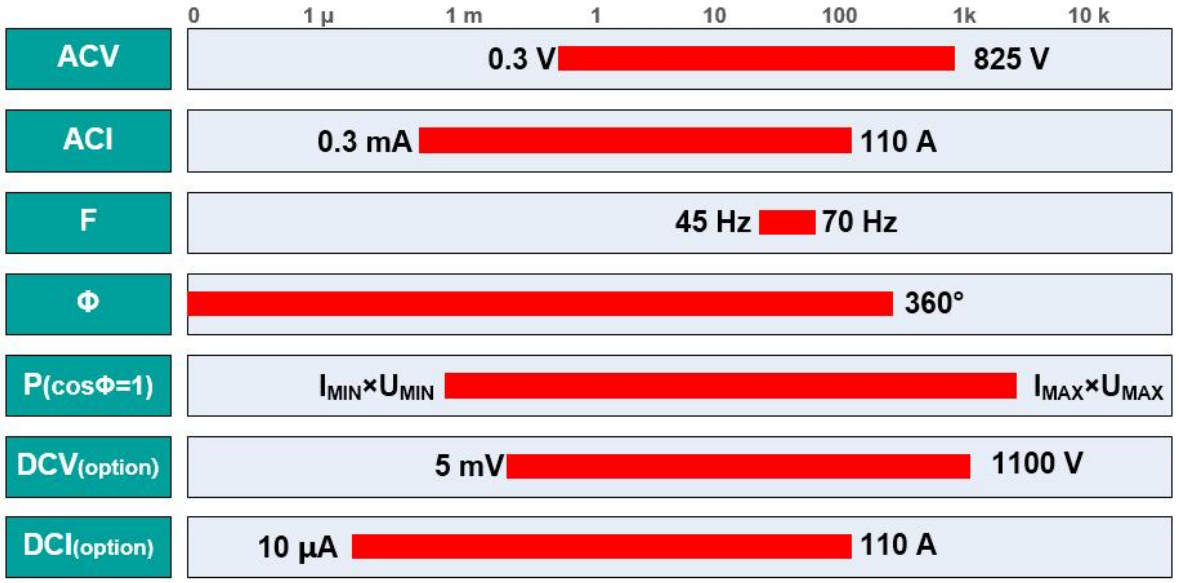
☆ Calibrate Meters or Sources



- **3PH voltage output:** 0.3 V～825 V @ 45 Hz～70 Hz.
- **3PH current output:** 0.3 mA～110 A @ 45 Hz～70 Hz.
- **3PH power output:** voltage and current combination.
- **DC voltage output:** 5 mV～1100 V (option).
- **DC current output:** 10 μA～110 A (option).
- **DC power output (option):** voltage and current combination.
- Applied to the calibration of AC/DC voltage and current meter, active power meter, DC power meter, reactive power meter, volt-ampere meter and power factor meter.
- **TD33 series standard meter (option):** the best accuracy of measurement for 3PH power and electrical energy could reach 100 ppm; Applied to the calibration of single-phase or three-phase power standard source.

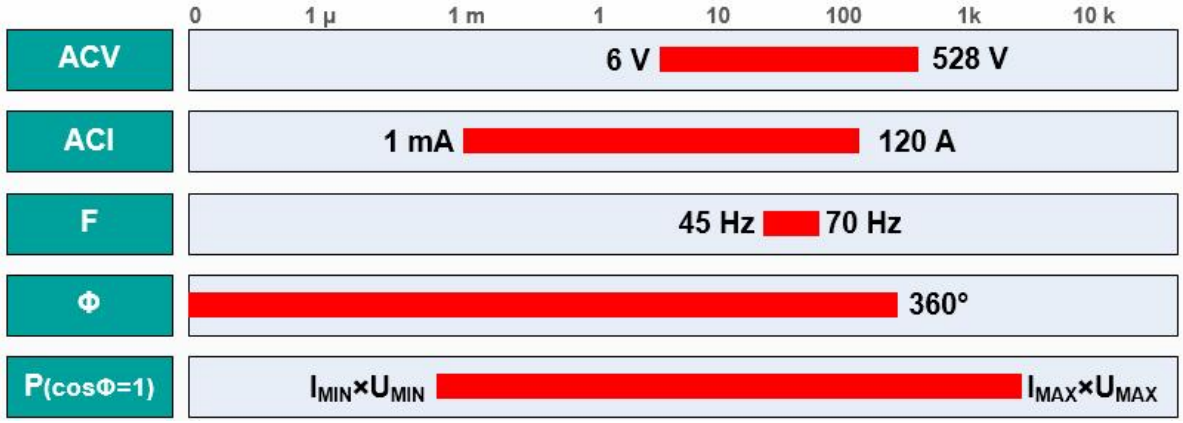
4. Characteristics

☆ Wide Output



- It can meet most single-phase / three-phase meters or DC meters.

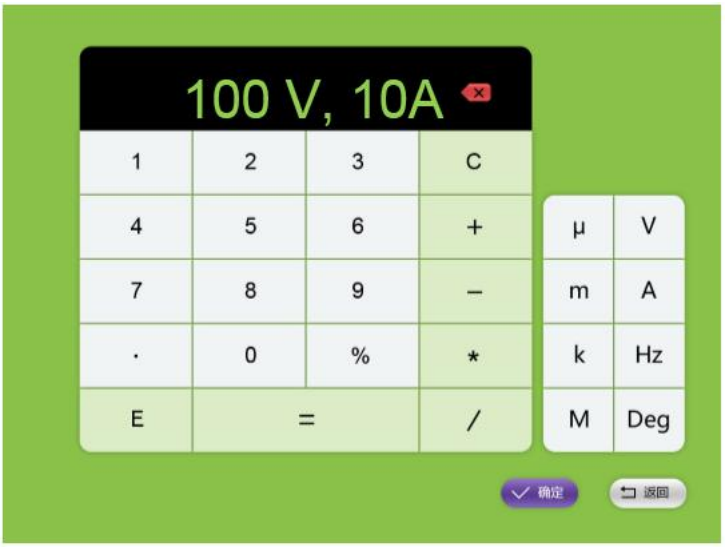
☆ Wide Input (TD33 series option)



- It can meet most single-phase / three-phase meters or DC source.

☆ Multiple Output Mode

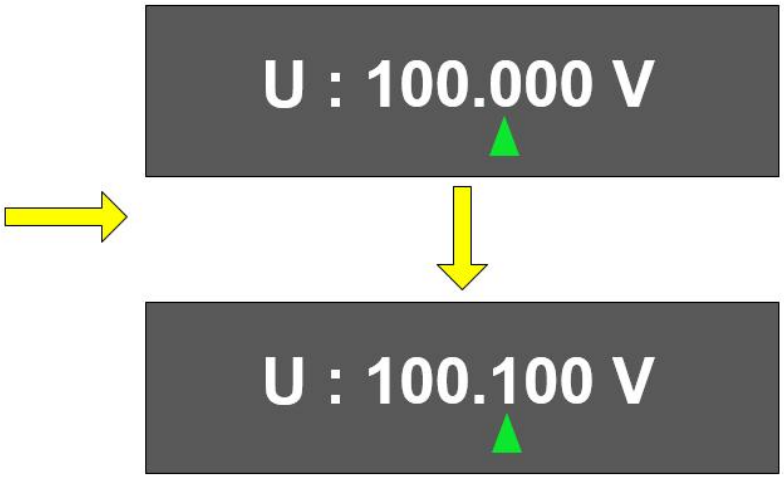
Keypad



Touch Screen Output

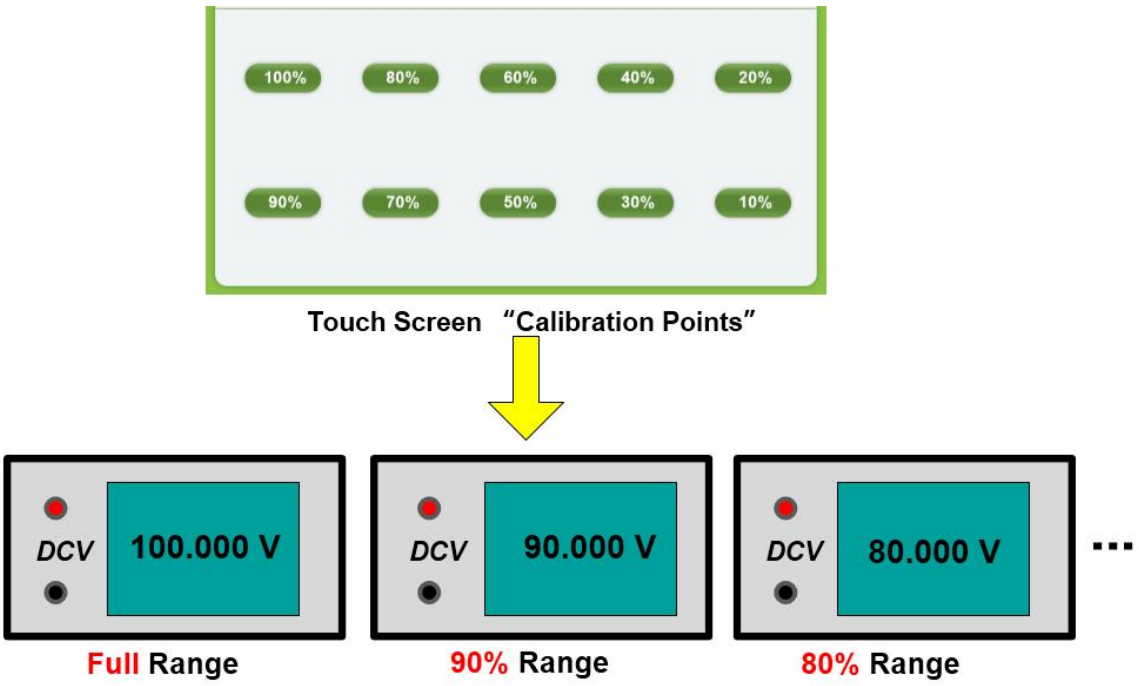
- "**Direct output**"mode，User can set output value by physical key or touch screen.
- Three-phase unit adjustment or single phase adjustment.

Rotary Knob



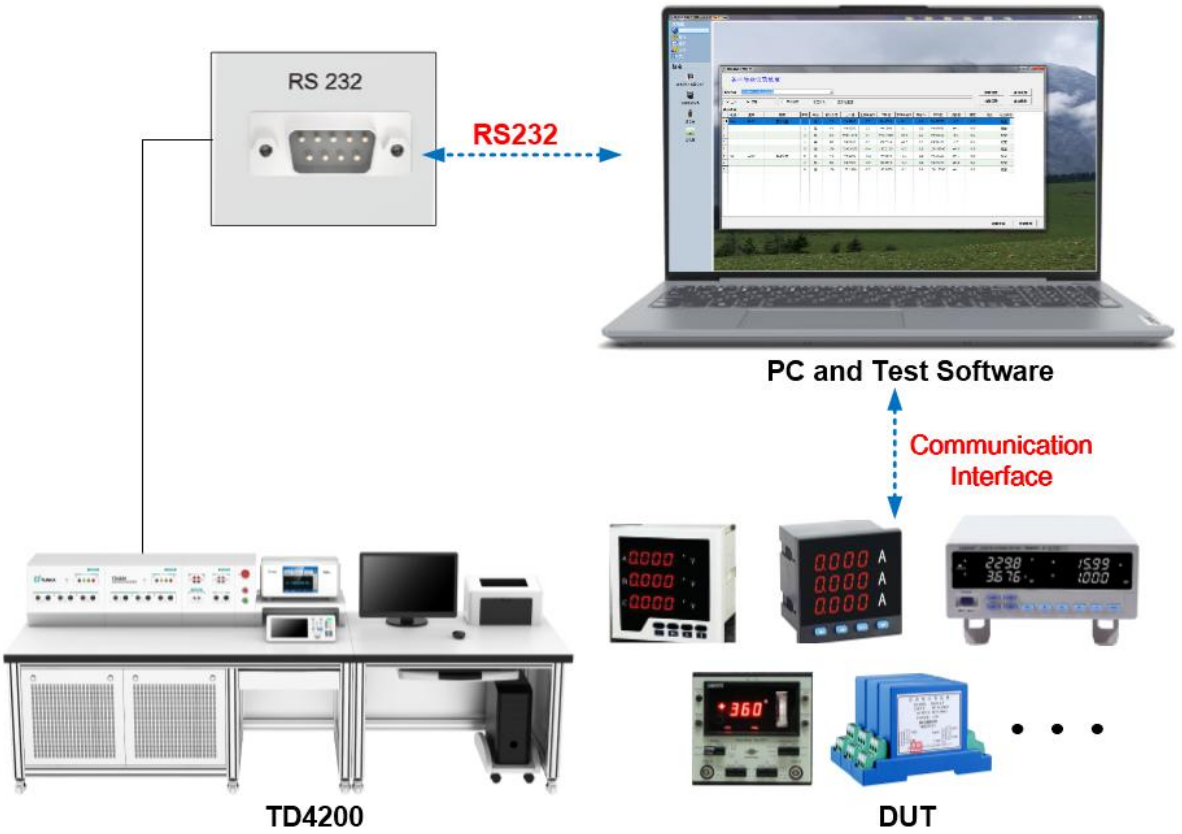
- "**Rotary Knob**"mode，User can setting in clockwise direction or anticlockwise direction.

☆ Multiple Output Mode



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

☆ Testing Software（Option）



- RS232 communication interface，software customizable.

5. Specifications

5.1 Three-Phase Power Source

5.1.1 Three-Phase Voltage Output

Voltage Range	Resolution	Stability (%/min)		Accuracy ±(ppm of reading + ppm of range) [1]		Max Burden (mA)
		Class 0.02	Class 0.01	Class 0.02	Class 0.01	
3 V	0.01 mV	0.005	0.003	120 + 80	60 + 40	500 mA
10 V	0.1 mV	0.005	0.003	120 + 80	60 + 40	500 mA
30 V	0.1 mV	0.005	0.003	120 + 80	60 + 40	500 mA
100 V	0.1 mV	0.005	0.003	120 + 80	60 + 40	350 mA
300 V	1 mV	0.005	0.003	120 + 80	60 + 40	120 mA
600 V	1 mV	0.005	0.003	120 + 80	60 + 40	50 mA
750 V	10 mV	0.005	0.003	120 + 80	60 + 40	40 mA
Note [1] : (ppm = parts per million) (e.g., 10ppm = 0.001%).						

- Output range: 0.3 V～825 V, distortion: < 0.2%;
- Short circuit and overload protection.

5.1.2 Three-Phase Current Output

Current Range	Resolution	Stability (%/min)		Accuracy ±(ppm of reading + ppm of range) [1]		Max Burden (V)
		Class 0.02	Class 0.01	Class 0.02	Class 0.01	
3 mA	0.01 μA	0.005	0.003	120 + 80	60 + 40	50 V
10 mA	0.1 μA	0.005	0.003	120 + 80	60 + 40	50 V
30 mA	0.1 μA	0.005	0.003	120 + 80	60 + 40	50 V
100 mA	1 μA	0.005	0.003	120 + 80	60 + 40	50 V
300 mA	1 μA	0.005	0.003	120 + 80	60 + 40	50 V
1 A	10 μA	0.005	0.003	120 + 80	60 + 40	50 V
3 A	10 μA	0.005	0.003	120 + 80	60 + 40	30 V
10 A	0.1 mA	0.005	0.003	120 + 80	60 + 40	6 V

30 A	0.1 mA	0.005	0.003	120 + 80	60 + 40	2.5 V
100 A	1 mA	0.005	0.003	120 + 80	60 + 40	1.2 V

- Output range: 0.3 mA～110 A, distortion: < 0.2%;
- Open circuit and overload protection.

5.1.3 Frequency/Phase/Harmonic

Symmetry	Voltage superior to 0.2%; Current superior to 0.5%; Phase superior to 0.5°
Frequency	Range：45 Hz～70 Hz； Adjustment fineness：0.001 Hz； **Accuracy**：±0.01Hz (class 0.02), ±0.005Hz (class 0.01).
Phase	Range：0.000 0°～359.999 9°； Adjustment fineness：0.001°； **Accuracy**：±0.01° (class 0.02), ±0.005° (class 0.01).
Harmonic	2^{nd}～21^{st} harmonic； Amplitude 0～25% adjustable； Phase 0～359.99°adjustable

5.1.4 Three-Phase Power Output

Type	Current range	Stability (%/min)		Accuracy (± %*FS)[2]	
		Class 0.02	Class 0.01	Class 0.02	Class 0.01
active power $\lvert cos\varphi \rvert \geq 0.5$	100 mA…100 A	0.01	0.005	0.02	0.01
	10 mA…50 mA	0.01	0.005	0.05	0.02
reactive power $\lvert sin\varphi \rvert \geq 0.5$	100 mA…100 A	0.01	0.005	0.05	0.02
	10 mA…50 mA	0.02	0.01	0.1	0.05
apparent power	100 mA…100 A	0.01	0.005	0.05	0.02
	10 mA…50 mA	0.02	0.01	0.1	0.05
power factor	100 mA…100 A	0.01	0.005	0.05	0.02
	10 mA…50 mA	0.02	0.01	0.1	0.05
Note [2] :FS= voltage range ×current range					

- Range of power factor: -1.000 000…0.000 000…1.000 000.

5.2 Three-Phase Standard Meter (option, TD33 series)

5.2.1 Three-Phase Voltage Input

Range	Resolution	Accuracy ±(ppm of reading + ppm of range) [1]		Temperature Coefficient @ (15~30)°C (ppm*RD+ppm*RG) /°C	
		Class 0.02	Class 0.01	Class 0.02	Class 0.01
60 V	10 μV	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
120 V	0.1mV	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
240 V	0.1mV	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
480 V	0.1mV	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25

- Measuring range: 6 V～528 V (support customized wider range), 7 digit display, manual / automatic range.

5.2.2 Three-Phase Current Input

Range	Resolution	Accuracy ±(ppm of reading + ppm of range) [1]		Temperature Coefficient @ (15~30)°C (ppm*RD+ppm*RG) /°C	
		Class 0.02	Class 0.01	Class 0.02	Class 0.01
5 mA	1 nA	240 + 160	120 + 80	10 + 10	5 + 5
10 mA	10 nA	120 + 80	60 + 40	5 + 5	3 + 3
20 mA	10 nA	120 + 80	60 + 40	1.25 + 1.25	0.75 + 0.75
50 mA	10 nA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
100 mA	0.1 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
200 mA	0.1 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
500 mA	0.1 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
1 A	1 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
2 A	1 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
5 A	1 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
10 A	10 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
20 A	10 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25
50 A	10 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25

100 A	100 μA	60 + 40	30 + 20	0.5 + 0.5	0.25 + 0.25

- Measuring range: 0.2 mA～120 A, 7 digit display, manual / automatic range.

5.2.3 Frequency / Phase

Type		Class 0.02	Class 0.01
Frequency	Range	45 Hz～65 Hz	45 Hz～65 Hz
	Resolution	0.000 01 Hz	0.000 01 Hz
	Accuracy	± 0.005%*RD	± 0.005%*RD
Phase	Range	0～360°（I ≥ 50mA）	0～360°（I ≥ 50mA）
	Resolution	0.000 1°	0.000 1°
	Accuracy	± 0.006°	± 0.003°

5.2.4 Three-Phase Power Input

Voltage Range	Current Range	Power Factor	Accuracy	
			Class 0.02	Class 0.01
30 V ≤ U ≤ 480 V	50 mA ≤ I ≤120 A	0.5L～1～0.5C	± 0.02%*reading	± 0.01%* reading
	10 mA ≤ I < 50 mA	1	± 0.02%* reading	± 0.01%* reading
		0.5L～1～0.5C	± 0.04%* reading	± 0.02%* reading
	3 mA ≤ I < 10 mA	1	± 0.04%* reading	± 0.02%* reading
		0.5L～1～0.5C	± 0.08%* reading	± 0.04%* reading
	0.2 mA ≤ I < 3 mA	1	± 0.04%*reading ×3mA/I	± 0.02%*reading ×3mA/I

- Power / electrical energy input range: combine AC voltage range and AC current range;
- Power factor input range: -1.000 000…0.000 000…1.000 000;
- Output pulse of standard electrical energy: at full scale, the high frequency correspond to 60 kHz and low frequency correspond to 6 Hz;
- Input pulse of standard electrical energy: frequency≤ 200 kHz, voltage: 0…3.3 V…24 V.

5.3 DC Power Source (option)

5.3.1 DC Voltage Output

Voltage Range	Resolution	Stability (%/min)		Accuracy ±(ppm of reading + ppm of range) [1]		Max Burden (mA)
		Class 0.02	Class 0.01	Class 0.02	Class 0.01	
10 mV	0.1 μV	0.005	0.003	100 + 5 μV	100 + 5 μV	100 mA
30 mV	0.1 μV	0.005	0.003	100 + 5 μV	100 + 5 μV	100 mA
100 mV	1 μV	0.005	0.003	100 + 5 μV	100 + 5 μV	100 mA
300 mV	1 μV	0.005	0.003	100 + 5 μV	100 + 5 μV	100 mA
1 V	10 μV	0.005	0.002	100 + 50	60 + 40	500 mA
3 V	10 μV	0.005	0.002	100 + 50	60 + 40	500 mA
10 V	0.1 mV	0.005	0.002	100 + 50	60 + 40	500 mA
30 V	0.1 mV	0.005	0.002	120 + 80	60 + 40	800 mA
100 V	1 mV	0.005	0.002	120 + 80	60 + 40	300 mA
300 V	1 mV	0.005	0.002	120 + 80	60 + 40	100 mA
600 V	10 mV	0.005	0.002	120 + 80	60 + 40	50 mA
1000 V	10 mV	0.005	0.002	120 + 80	60 + 40	30 mA

- DC voltage output: 1 mV～1100 V, ripple ratio: < 1%;
- Short circuit and overload protection.

5.3.2 DC Current Output

Current Range	Resolution	Stability (%/min)		Accuracy ±(ppm of reading + ppm of range) [1]		Max Burden (V)
		Class 0.02	Class 0.01	Class 0.02	Class 0.01	
10 μA	0.1 nA	0.01	0.01	300 + 200	300 + 200	11 V
30 μA	0.1 nA	0.005	0.005	120 + 80	120 + 80	11 V
100 μA	1 nA	0.005	0.005	120 + 80	120 + 80	11 V
300 μA	1 nA	0.005	0.005	120 + 80	120 + 80	11 V
1 mA	10 nA	0.005	0.003	120 + 80	100 + 50	11 V

3 mA	10 nA	0.005	0.003	120 + 80	100 + 50	11 V
10 mA	0.1 μA	0.005	0.003	120 + 80	100 + 50	11 V
30 mA	0.1 μA	0.005	0.003	120 + 80	100 + 50	11 V
100 mA	1 μA	0.005	0.003	120 + 80	100 + 50	11 V
300 mA	1 μA	0.005	0.002	120 + 80	60 + 40	11 V
1 A	10 μA	0.005	0.002	120 + 80	60 + 40	11 V
3 A	10 μA	0.005	0.002	120 + 80	60 + 40	4 V
10 A	100 μA	0.005	0.002	120 + 80	60 + 40	4 V
30 A [3]	100 μA	0.005	0.002	120 + 80	60 + 40	3 V
100 A [3]	1 mA	0.005	0.002	120 + 80	60 + 40	3 V

- DC current output: 1 μA～33 A or 100 A optional, ripple ratio: < 1%;
- Open circuit and overload protection.

5.3.3 DC Power Output

DC power output	Range	Combine DC voltage and current range
	Accuracy	Addition of voltage and current accuracy.

5.3.4 DC Meter (Transmitter)

Range	Measuring Range	Accuracy	Ripple Measuring Range	Ripple Accuracy
1 V	± (0～1.2) V	± 0.01%*range	0～30 mV	± 1 mV
10 V	± (0～12) V	± 0.01%* range	0～300 mV	± 10 mV
2 mA	±(0～2.4) mA	± 0.01%* range	0～60 μA	± 2 μA
20 mA	± (0～24) mA	± 0.01%* range	0～600 μA	± 20 μA

- Response time: range: 0～1000 ms, accuracy: ±40 ms.

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

Class	
Code	**Note**
100	Class 0.01
200	Class 0.02

Test Mode	
Code	**Note**
S	3PH Source
MS	3PH Source &Meter

Harmonic	
Code	**Note**
Empty	-
H	√

DC Source	
Code	**Note**
Empty	-
33A	I_{max}=33 A
110A	I_{max}=110 A

e.g. : *TD4200-200-S* note for class 0.02, with only 3PH Source.