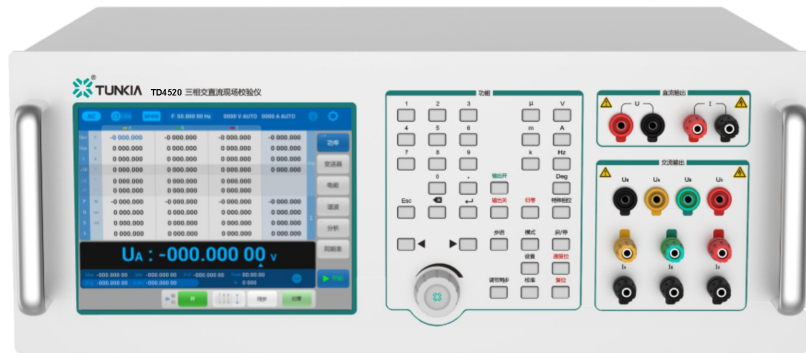# TD4520 Portable Three-phase and DC Calibrator
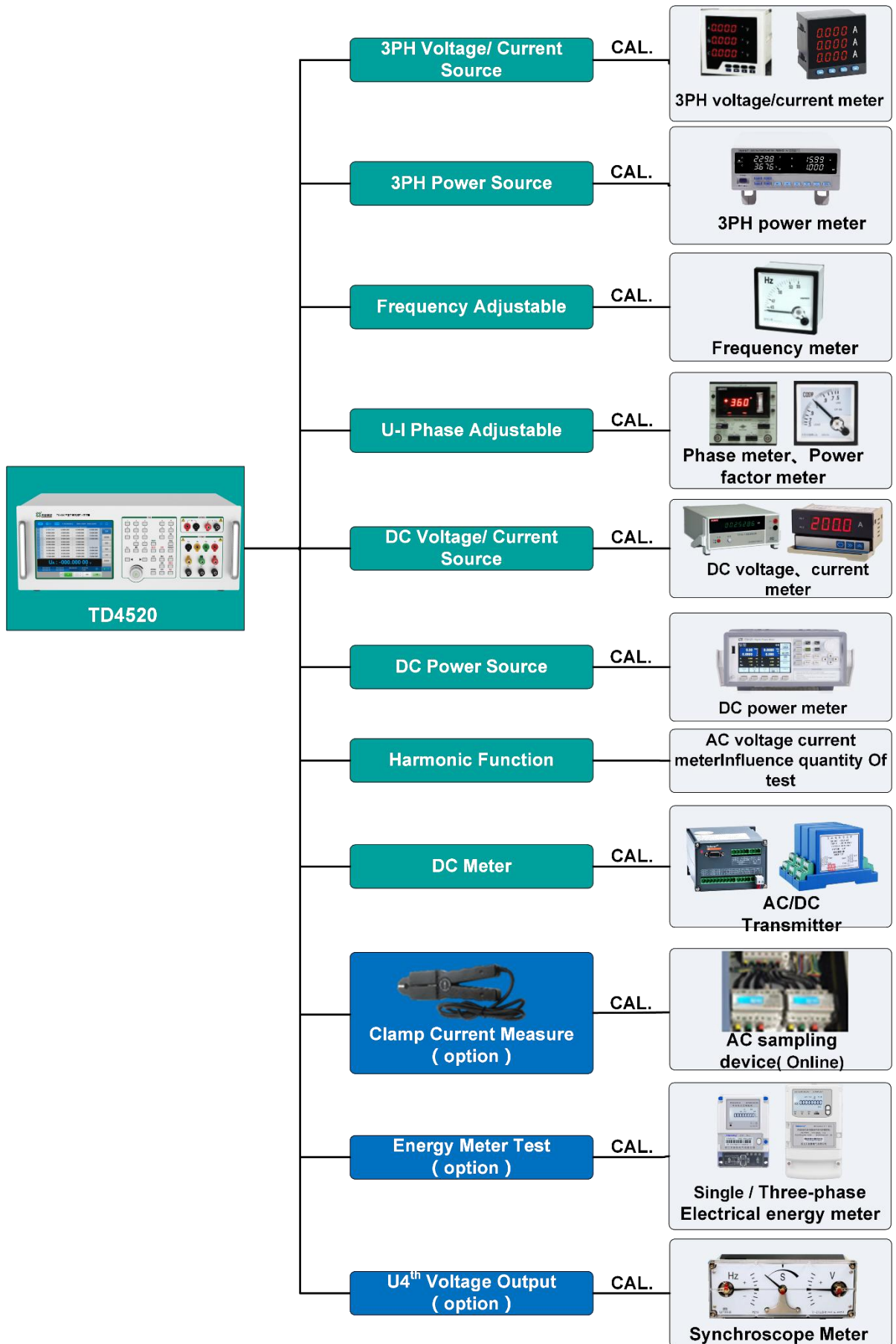

1. Summary

TD4520 is a multi-function 3PH power calibrator. Class 0.02 / class 0.05 available. It integrates AC/DC power output function, 3PH measuring function, harmonic function, transmitter test function, U4th voltage output function, AC energy meter test function. Can be used to calibrate AC/DC voltmeter, AC/DC ammeter, AC/DC power meter electric energy meter and transmitter, etc.
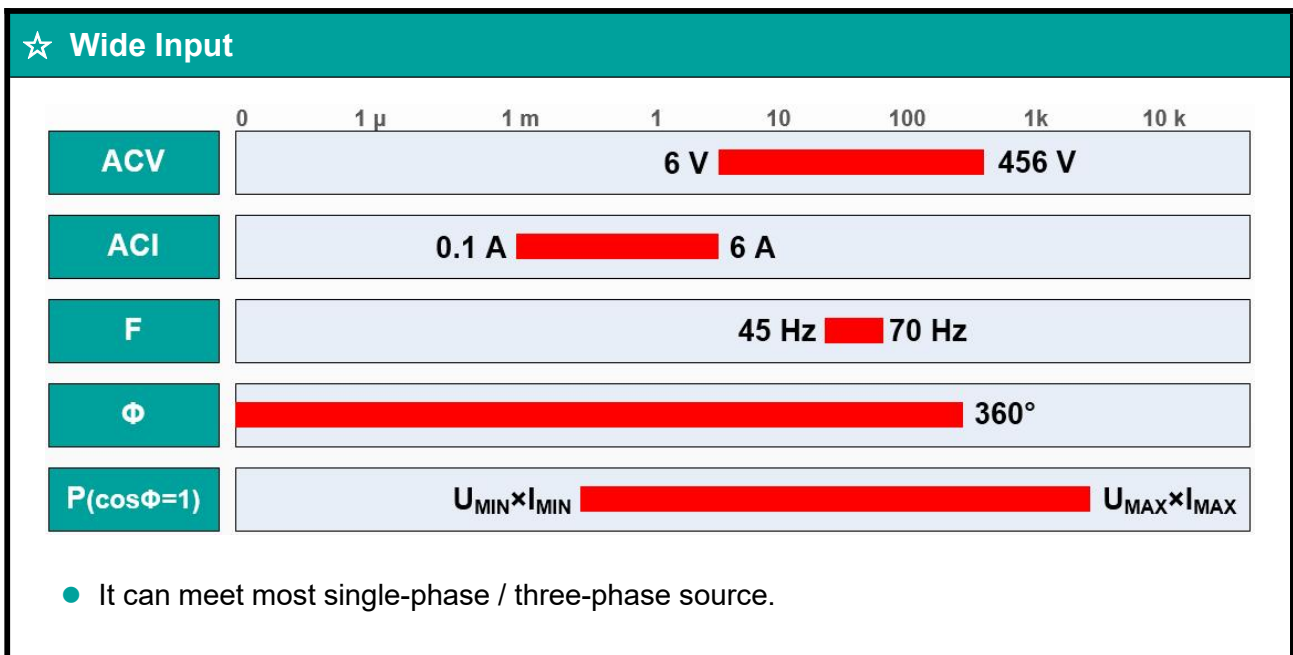
2. Features

- 3PH voltage output：6 V～456 V

- 3PH current output：20 mA～24 A

- 3PH voltage meter：6 V～456 V；

- 3PH current meter：0.1 A～6 A

- Frequency：45 Hz～70 Hz

- U-I phase：0°～360°

- DC voltage output：10 mV～660 V

- DC current output：0.1 mA～22 A

- Accuracy class: 0.02, 0.05.

- 2nd~21st harmonic output

- Transmitter test function

- U4th AC voltage output function（option）

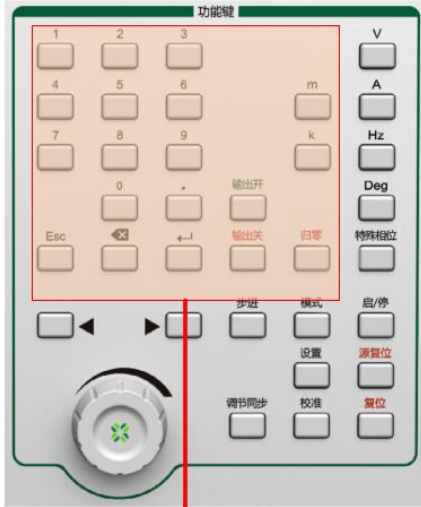- Energy meter test function（option）

- Test software（option）

3. Application

3PH Voltage/ Current Source	CAL.
	3PH voltage/current meter
3PH Power Source	CAL.
	3PH power meter
Frequency Adjustable	CAL.
	Frequency meter
U-I Phase Adjustable	CAL.
	Phase meter、Power factor meter
DC Voltage/ Current Source	CAL.
	DC voltage、current meter
DC Power Source	CAL.
	DC power meter
Harmonic Function	**AC voltage current meterInfluence quantity Of test**
DC Meter	CAL.
	AC/DC Transmitter
Clamp Current Measure (option)	CAL.
	AC sampling device(Online)
Energy Meter Test (option)	CAL.
	Single / Three-phase Electrical energy meter
U4th Voltage Output (option)	CAL.
	Synchroscope Meter

TD4520

4. Characteristics

☆ Wide Output

	0	1 μ	1 m	1	10	100	1k	10 k
ACV				6 V ▬▬▬▬ 456 V				
ACI			20 mA ▬▬▬ 6 A					
F						45 Hz ▬ 70 Hz		
Φ	▬▬▬▬▬▬▬▬▬▬▬ 360°							
P(cosΦ=1)			$U_{MIN} \times I_{MIN}$ ▬▬▬▬▬▬▬ $U_{MAX} \times I_{MAX}$					
DCV			10 mV ▬▬▬▬▬ 660 V					
DCI			0.1 mA ▬▬▬▬ 11 A					

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

☆ Wide Input

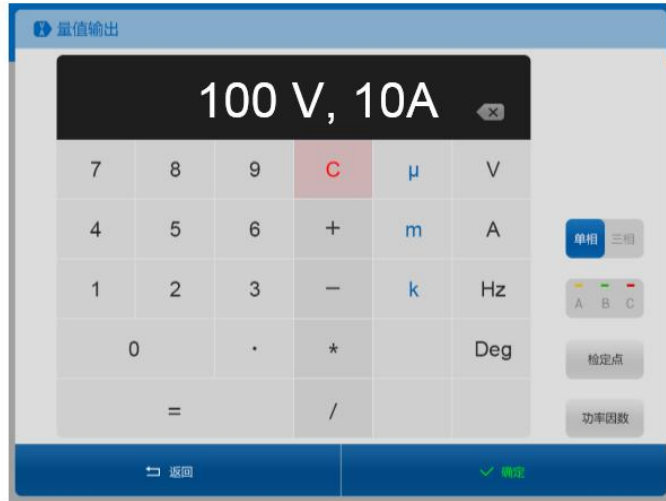|	0	1 μ	1 m	1	10	100	1k	10 k
ACV				6 V ▬▬▬▬ 456 V				
ACI			0.1 A ▬▬▬ 6 A					
F						45 Hz ▬ 70 Hz		
Φ	▬▬▬▬▬▬▬▬▬▬▬ 360°							
P(cosΦ=1)			$U_{MIN} \times I_{MIN}$ ▬▬▬▬▬▬▬ $U_{MAX} \times I_{MAX}$					

- It can meet most single-phase / three-phase source.
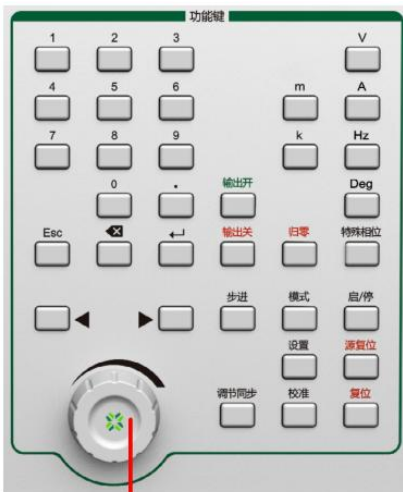
☆ Multiple Output Mode
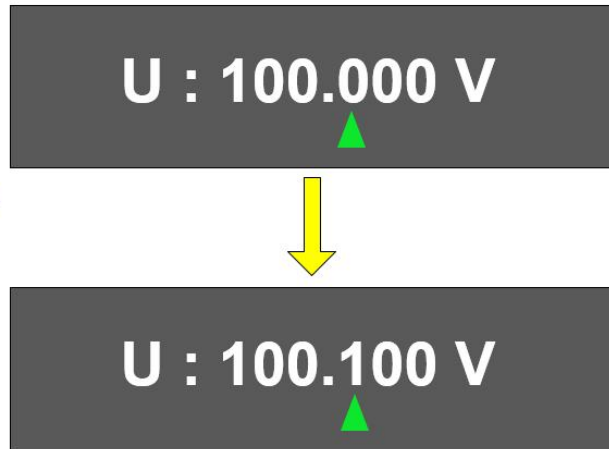

Keypad

Touch Screen Output

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

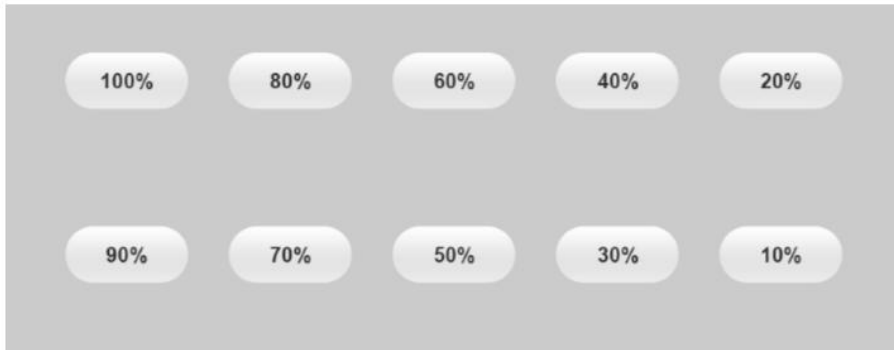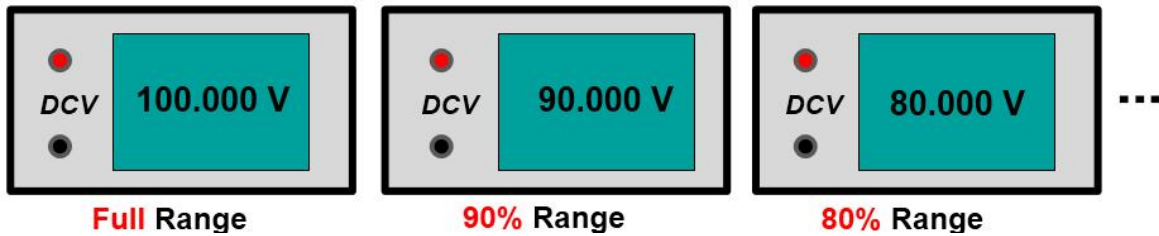- Three-phase unit adjustment or single phase adjustment.
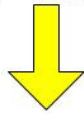

Rotary Knob

U : 100.000 V

U : 100.100 V

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

☆ **Multiple set value output mode**

| 100% | 80% | 60% | 40% | 20% |
| 90% | 70% | 50% | 30% | 10% |

Touch Screen "Calibration Points"

| DCV **100.000 V** | DCV **90.000 V** | DCV **80.000 V** | ... |
| **Full** Range | **90%** Range | **80%** Range | |

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

Remote Control Box
(option)

Calibrate Analog Meter
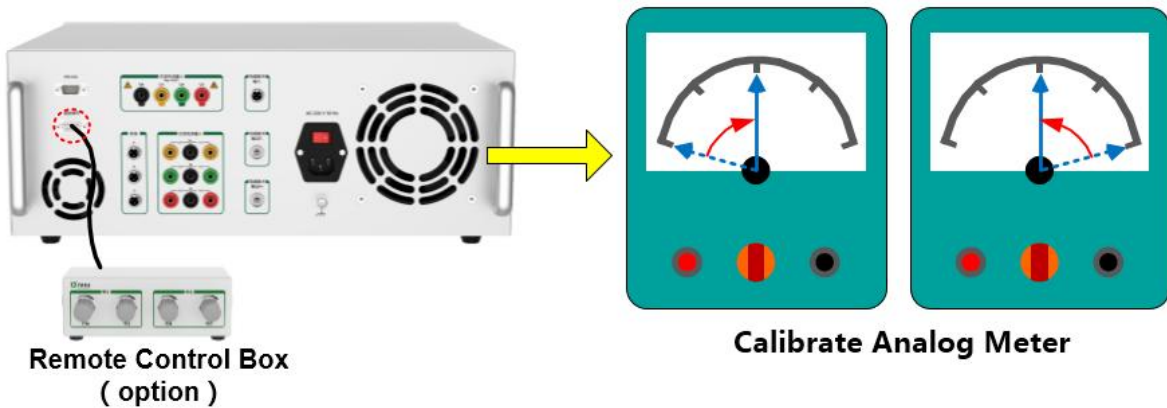
● "**Remote Control Box（option）**", by operation of coarse tuning—fine tuning，can calibrate analog meter.

☆ Harmonics Function
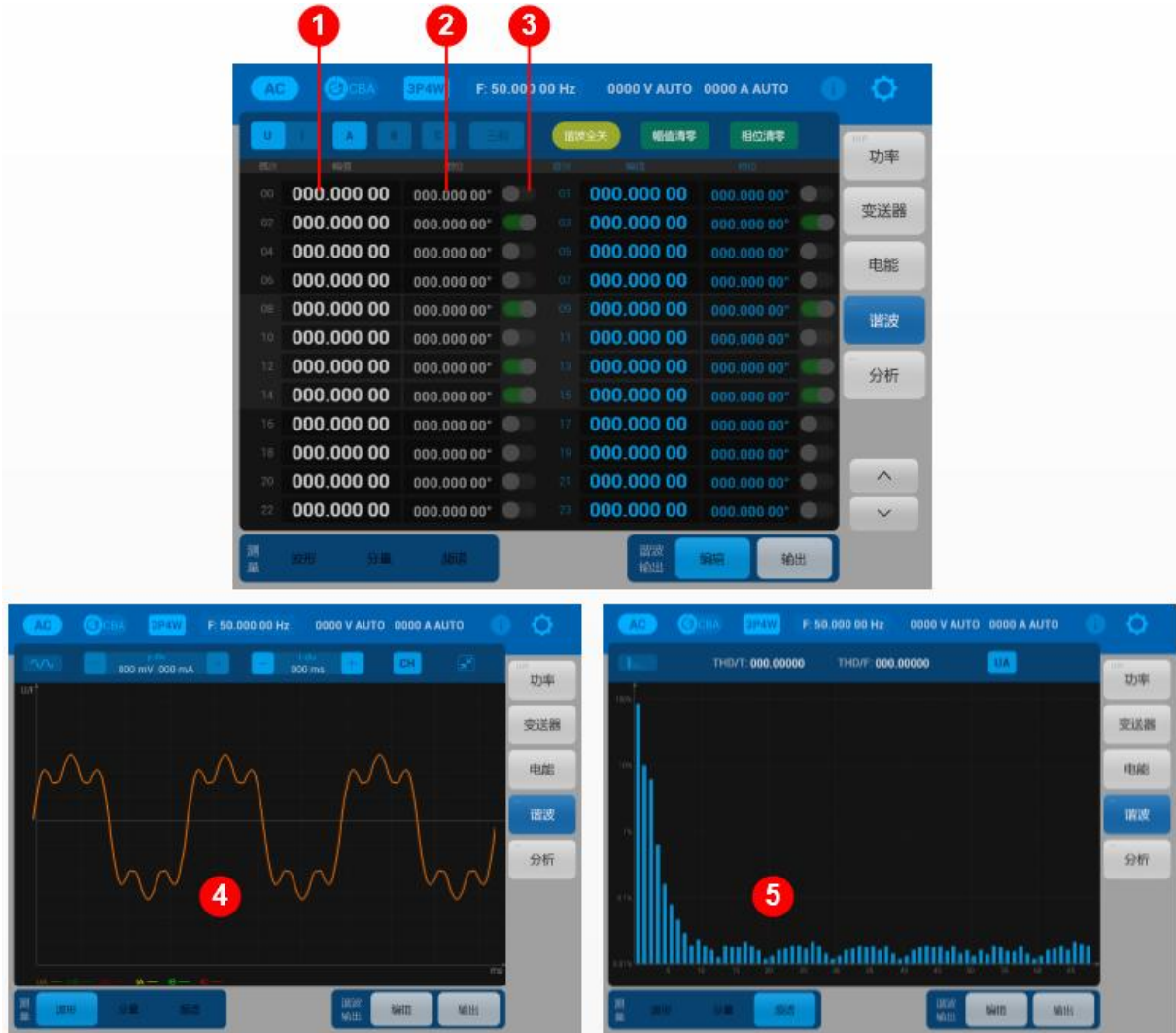
序号	功能说明
1	Set amplitude of harmonic.
2	Set phase of harmonic（fundamental wave）。
3	Choose 2nd～21st harmonics channel output.
4	Oscilloscope function, user can observe voltage and current waves.
5	Display frequency spectrum of harmonic by histogram.(fundament wave is 100%)

☆ Test software（option）

RS232

PC and Test Software

Communication Interface

DUT

RS 232

TD4520
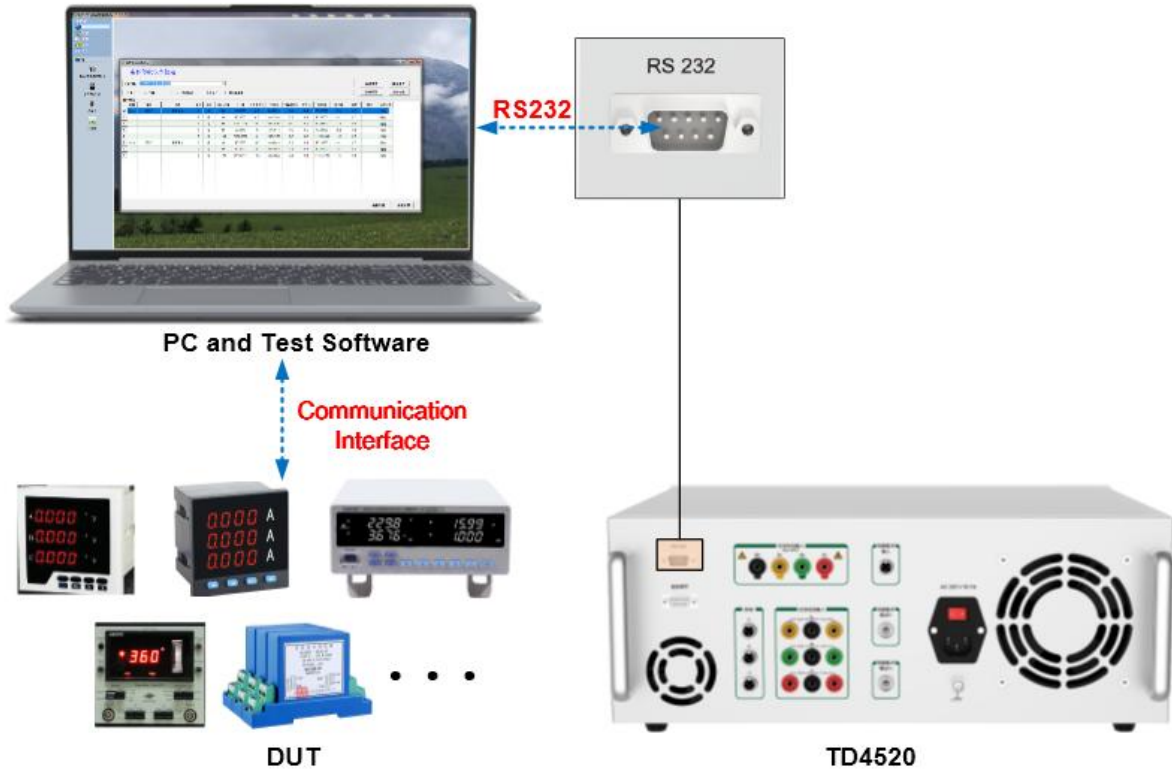
● RS232 communication interface，software customizable.

5. Specifications

5.1 Three-Phase Voltage / Current Output

Voltage Range	Resolution	Stability (%/min)		Accuracy ±(ppm of reading + ppm of range) [1]		Max Burden (mA)
		Class 0.05	Class 0.02	Class 0.05	Class 0.02	
57.7 V	0.1 mV	0.01	0.005	300 + 200	120 + 80	250
100 V	1 mV	0.01	0.005	300 + 200	120 + 80	150
220 V	1 mV	0.01	0.005	300 + 200	120 + 80	60
380 V	1 mV	0.01	0.005	300 + 200	120 + 80	40
Note [1] : (ppm = parts per million) (e.g.， 10ppm = 0.001%).						

Current Range	Resolution	Stability (%/min)		Accuracy ±(ppm of reading + ppm of range) [1]		Max Burden (V)
		Class 0.05	Class 0.02	Class 0.05	Class 0.02	
200 mA	1 µA	0.01	0.005	300 + 200	120 + 80	30
500 mA	1 µA	0.01	0.005	300 + 200	120 + 80	15
1 A	10 µA	0.01	0.005	300 + 200	120 + 80	15
2 A	10 µA	0.01	0.005	300 + 200	120 + 80	4
5 A	10 µA	0.01	0.005	300 + 200	120 + 80	4
20 A	0.1 mA	0.01	0.005	300 + 200	120 + 80	1

● Three-phase voltage output: 1 V～660 V, Degree of distortion:< 0.5%

● Three-phase current output：20 mA～30 A，Degree of distortion：< 0.2%；

● Voltage short circuit, current open-circuit and overload protection

5.2 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**：±0.02 Hz (class 0.05), ±0.01 Hz(class 0.02)
Phase	Range：0.000 0°～359.999 9°； Adjustment fineness：0.001°； **Accuracy**：±0.02° (class 0.05), ±0.01°(class 0.02)
Harmonic	2nd～21st harmonic； Amplitude 0～25% adjustable； Phase 0～359.99°adjustable

5.3 Three-Phase Power Output

Current Range	Stability (%/min)		Accuracy (± %*FS)[2]	
	Class 0.05	**Class 0.02**	**Class 0.05**	**Class 0.02**
Active power *|cosφ|≥0.5*	0.01	0.005	0.05	0.02
Reactive power *|sinφ|≥0.5*	0.02	0.01	0.1	0.05
Apparent power	0.02	0.01	0.1	0.05
Power factor	0.02	0.01	0.1	0.05
Note [2] :FS= voltage range ×current range				

● Power factor setting range：-1.000 000…0.000 000…1.000 000

5.4 Three-Phase Voltage / Current Input

Type	Range	Resolution	Accuracy ±(ppm of reading + ppm of range) [1]	
			Direct Input	Clamp Current Input [3]
AC Voltage **ACV**	57.7 V	0.1 mV	300 + 200	——
	100 V	1 mV	300 + 200	——
	220 V	1 mV	300 + 200	——
	380 V	1 mV	300 + 200	——
AC Current **ACI**	1 A	10 µA	300 + 200	——
	5 A	10 µA	300 + 200	0.2%*RG
Note [3]：Clamp is option，if it be need, it must remark in order contract，**Same as below**。				

- Voltage input：6 V～456 V，Current input：0.1 A～6 A

- Frequency：45 Hz～70 Hz，Accuracy：± 0.01 Hz

- Phase：0.000°～359.999°，Accuracy：± 0.02°

5.5 Three-Phase Power Input

Type	Accuracy	
	Direct Input	Clamp Current Input
Active power	± 0.05%*FS	± 0.2%*FS
Reactive power	± 0.1%*FS	± 0.5%*FS
Apparent power	± 0.1%*FS	± 0.5%*FS
Power factor	± 0.1%	± 0.5%

5.6 DC Voltage / Current Output

Voltage Range	Resolution	Stability (%/min)		Accuracy ±(ppm of reading + ppm of range) [1]		Max Burden (mA)
		Class 0.05	Class 0.02	Class 0.05	Class 0.02	
75 mV	0.1 µV	0.005	0.005	300 + 200	120 + 80	10
1 V	10 µV	0.005	0.005	300 + 200	120 + 80	10
10 V	0.1 mV	0.005	0.005	300 + 200	120 + 80	10
30 V	0.1 mV	0.005	0.005	300 + 200	120 + 80	500
100 V	1 mV	0.005	0.005	300 + 200	120 + 80	150
300 V	1 mV	0.005	0.005	300 + 200	120 + 80	50
600 V	1 mV	0.005	0.005	300 + 200	120 + 80	25

Current Range	Resolution	Stability (%/min)		Accuracy ±(ppm of reading + ppm of range) [1]		Max Burden (V)
		Class 0.05	Class 0.02	Class 0.05	Class 0.02	
1 mA	10 nA	0.01	0.005	300 + 200	120 + 80	10
5 mA	10 nA	0.01	0.005	300 + 200	120 + 80	10
20 mA	100 nA	0.01	0.005	300 + 200	120 + 80	10
100 mA	1 µA	0.01	0.005	300 + 200	120 + 80	10
1 A	10 µA	0.01	0.005	300 + 200	120 + 80	10
3 A	10 µA	0.01	0.005	300 + 200	120 + 80	10
20 A	0.1 mA	0.01	0.005	300 + 200	120 + 80	10

● DC voltage output range：10 mV～660 V，ripple factor：< 1%；

● DC current output range：0.1 mA～22 A，ripple factor：< 1%

● Voltage short circuit, current open-circuit and overload protection

5.7 DC Meter（Transmitter）

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

● Response time：measurement range：0～1000 ms, accuracy：± 40 ms

5.8 Test Energy Meter（option）

Type	Accuracy	
	Class 0.05	Class 0.02
Active electrical energy	± *0.1%*reading*	± *0.05%** reading*
Reactive electrical energy	± *0.2%* reading*	± *0.1%* reading*

● Energy pulse output：full range for 60 kHz

● Energy pulse input：max frequency is 1 kHz, pulse level：3 V～12 V

● Constant setting of Electrical energy meter：1…1000000 imp./kwh or 1…1000000 imp./ws

5.9 U4 Voltage Output（option）

● Voltage range：100 V、380 V

● Output range：(0～110)%*RG

● Accuracy：± 0.05%*RG

● Max output power：10 VA

● Frequency range：45 Hz～55 Hz

● The function is used to test Synchrometer.

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

TD4520 - ☐ - ☐ - ☐

Class	
Code	Note
200	0.02 class
500	0.05 class

Energy Meter Test	
Code	Note
Empty	-
E	√

Synchrometer Test	
Code	Note
Empty	-
S	√

e.g. : **TD4520-500-S** note for class 0.05, only with synchrometer test fUnction, no energy meter test function.