

# TD4510 Portable Three-phase and DC Calibrator



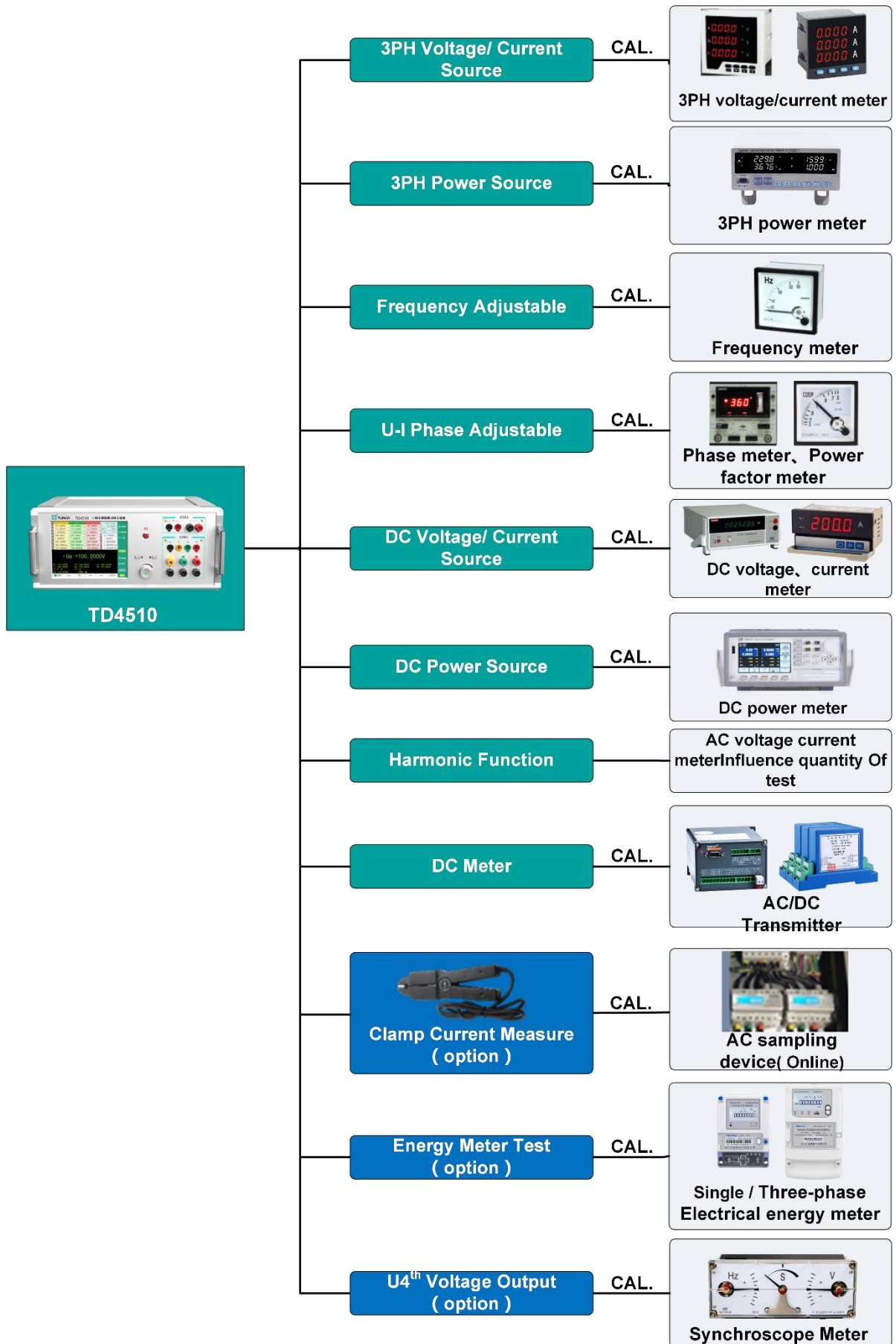
## 1. Summary

**TD4510** 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, U4<sup>th</sup> 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.

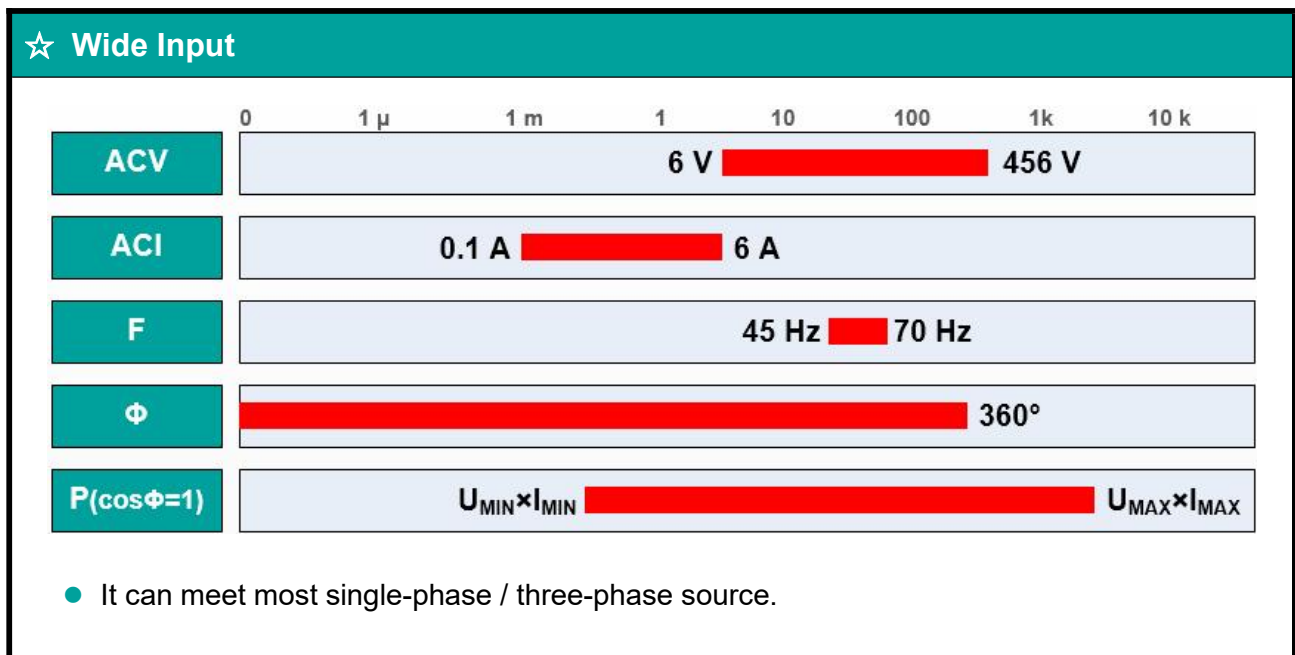
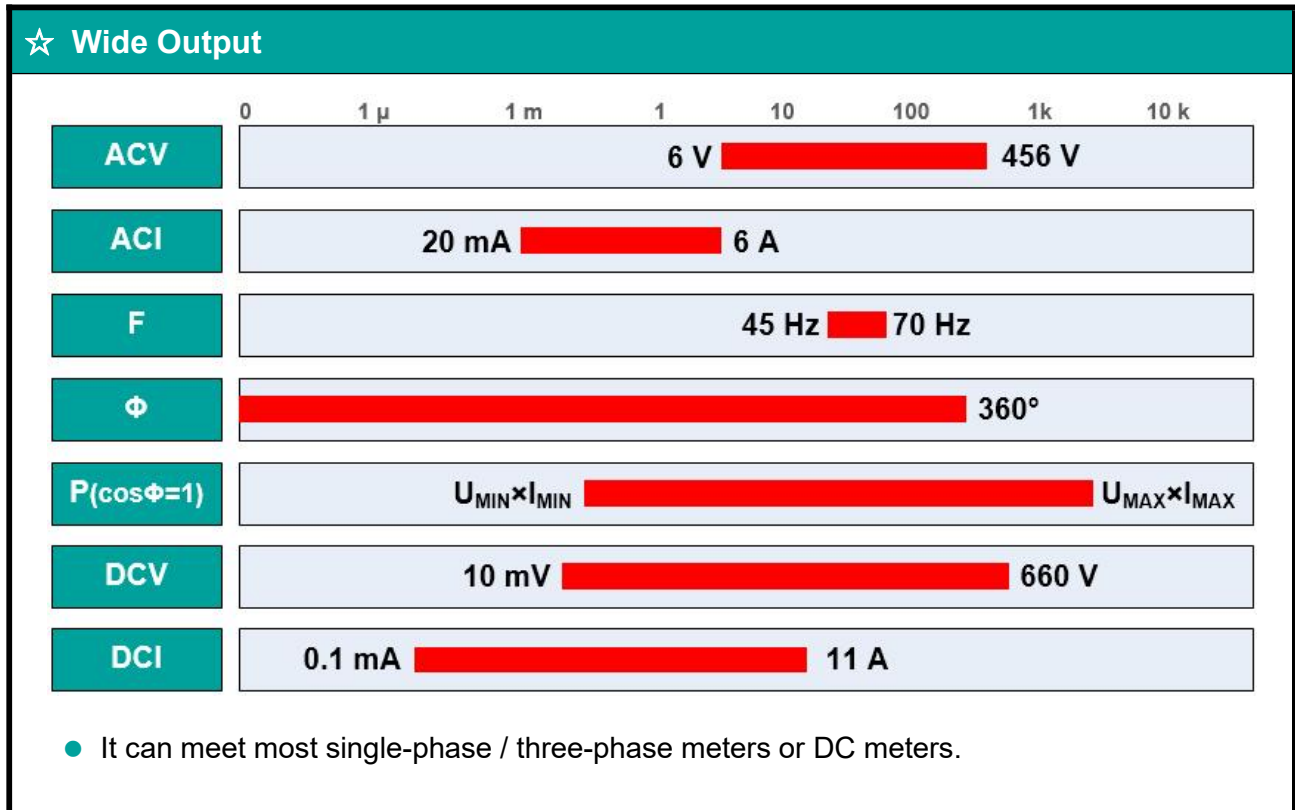
## 2. Features

- 3PH AC voltage output: 6 V~456 V
- 3PH AC current output: 20 mA~12 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~11 A
- Accuracy class: 0.02, 0.05.
- 2<sup>nd</sup>~21<sup>st</sup> harmonic output
- Transmitter test function
- U4 AC voltage output function (option)
- Energy meter test function (option)
- Test software (option)

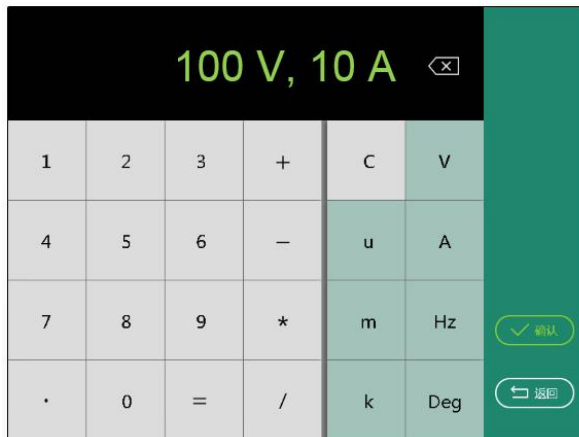
### 3. Application



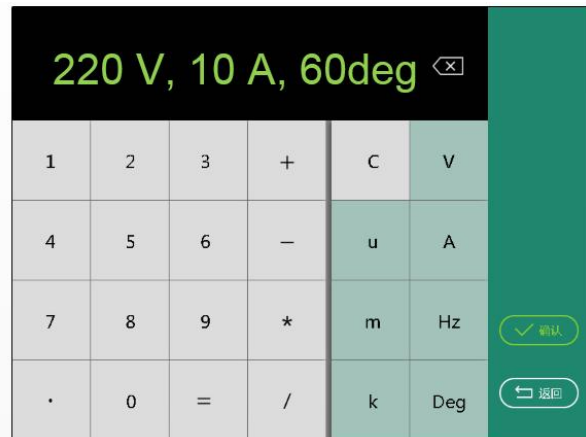
## 4. Characteristics



### ☆ Multiple Output Mode



(a) DC Power Output



(b) AC Power Output

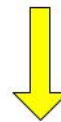
- “**Direct output**”mode, User can set output value by touch screen.
- Three-phase unit adjustment or single phase adjustment.



Rotary Knob



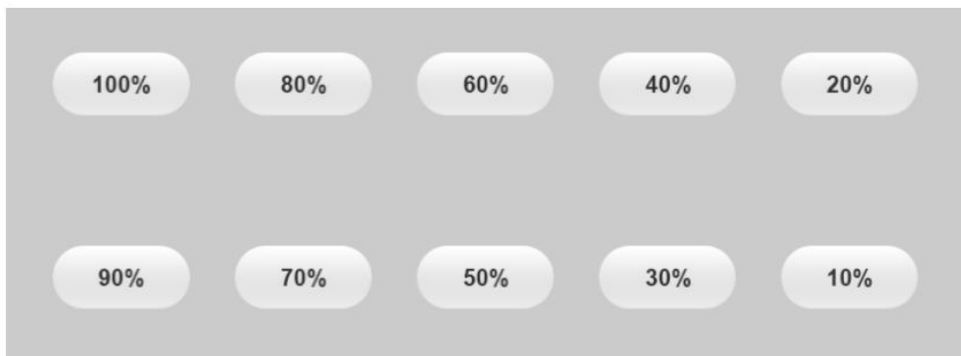
U : 100.000 V



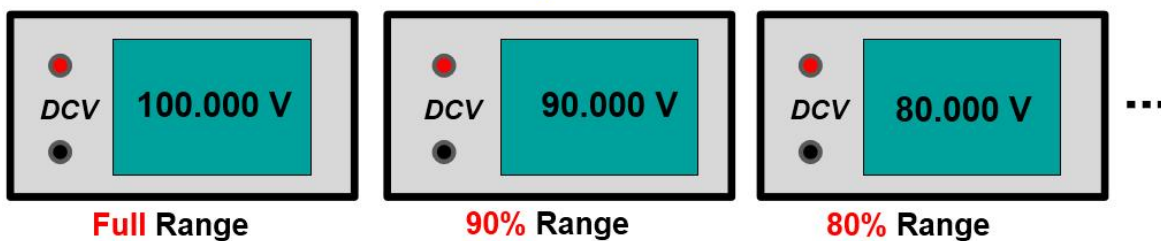
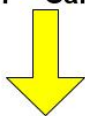
U : 100.100 V

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

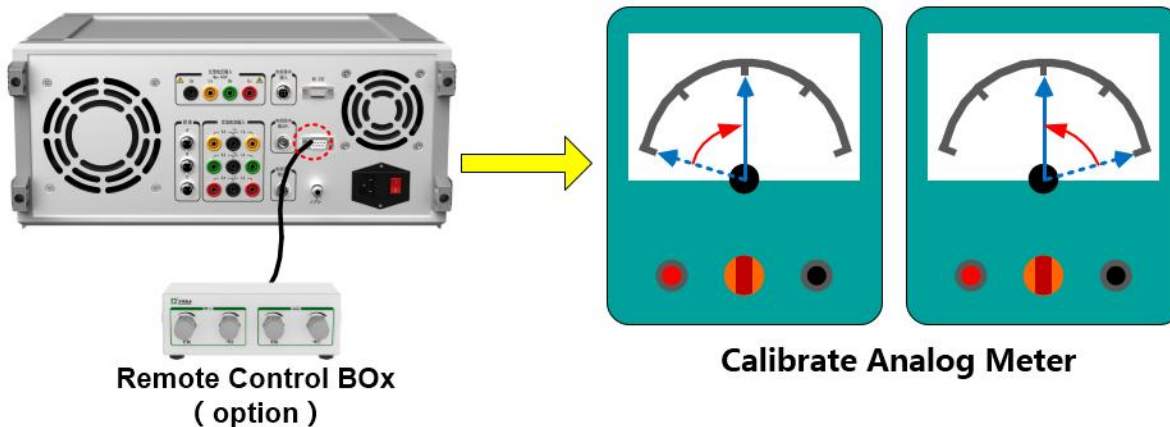
☆ Multiple Output Mode



Touch Screen "Calibration Points"

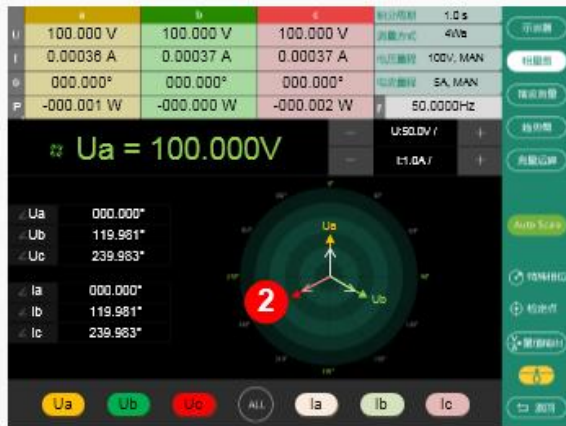
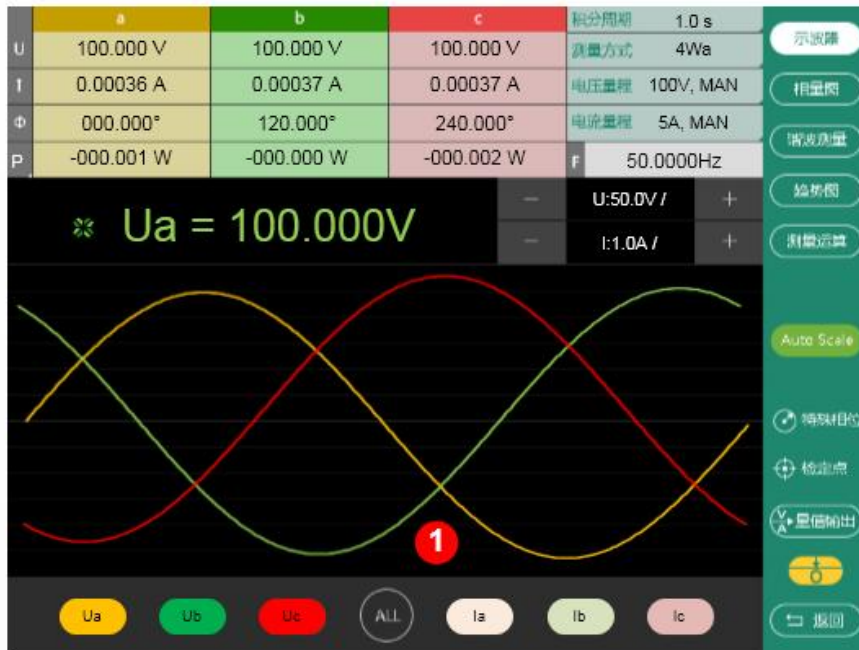


- Touch "Calibration point" of screen for "% setting".



- "Remote Control Box (option)", by operation of coarse tuning—fine tuning, can calibrate analog meter.

☆ Graphics Features



S/N	Function declaration
1	Oscilloscope function, user can observe voltage and current waves.
2	Precise display phase for voltage and current.
3	Trend variation display.

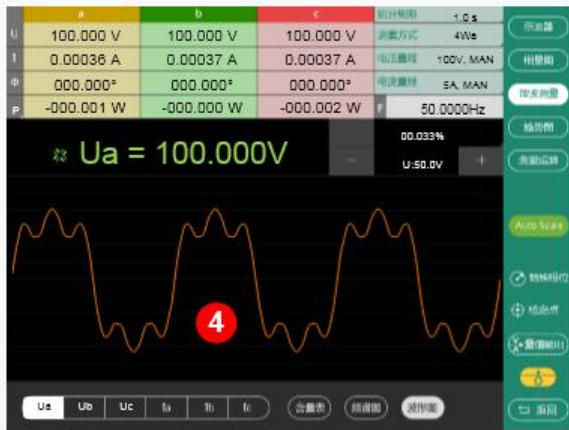


☆ Harmonics Function

电压谐波设置				电流谐波设置			
谐波次数	谐波幅值	谐波相位	谐波开关	谐波次数	谐波幅值	谐波相位	谐波开关
02	00.00%	000.00	off	02	00.00%	000.00	off
03	20.00%	000.00	on	03	00.00%	000.00	off
04	00.00%	000.00	off	04	00.00%	000.00	off
05	15.00%	000.00	on	05	00.00%	000.00	off
06	00.00%	000.00	off	06	00.00%	000.00	off
07	10.00%	000.00	on	07	00.00%	000.00	off
08	00.00%	000.00	off	08	00.00%	000.00	off
09	00.00%	000.00	off	09	00.00%	000.00	off
10	00.00%	000.00	off	10	00.00%	000.00	off
11	00.00%	000.00	off	11	00.00%	000.00	off
12	00.00%	000.00	off	12	00.00%	000.00	off

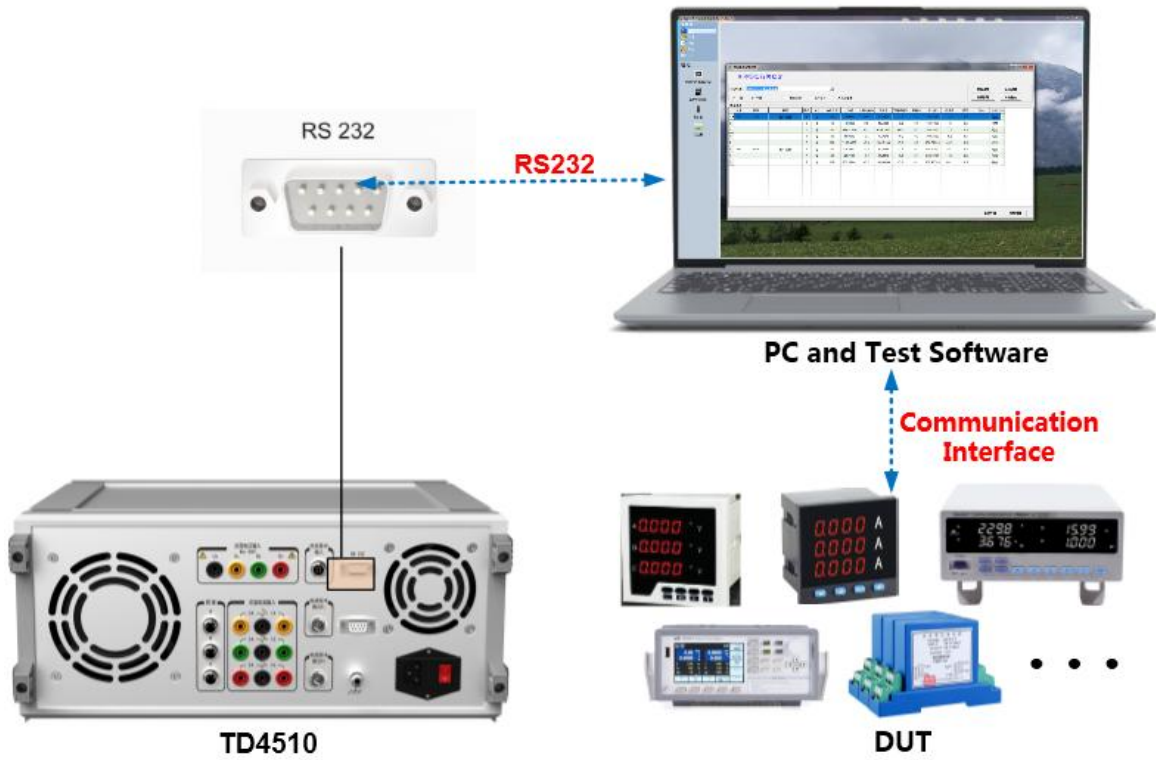
Ua Ub Uc    上一页    下一页    Ia Ib Ic

谐波测量    三相    谐波全关    相位全归零    幅值全归零    谐波输出    返回



S/N	Function declaration
1	Set amplitude of harmonic.
2	Set phase of harmonic (fundamental wave).
3	Choose 2 <sup>nd</sup> ~21 <sup>st</sup> 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 communication interface, software customizable.



## 5. Specifications

### 5.1 Three-Phase Voltage / Current Output

Voltage Range	Resolution	Stability ( %/min )		Accuracy $\pm$ (ppm of reading + ppm of range) <sup>[1]</sup>		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 $\pm$ (ppm of reading + ppm of range) <sup>[1]</sup>		Max Burden (V)
		Class 0.05	Class 0.02	Class 0.05	Class 0.02	
200 mA	1 $\mu$ A	0.01	0.005	300 + 200	120 + 80	20
500 mA	1 $\mu$ A	0.01	0.005	300 + 200	120 + 80	10
1 A	10 $\mu$ A	0.01	0.005	300 + 200	120 + 80	10
2 A	10 $\mu$ A	0.01	0.005	300 + 200	120 + 80	2
5 A	10 $\mu$ A	0.01	0.005	300 + 200	120 + 80	2
10 A	0.1 mA	0.01	0.005	300 + 200	120 + 80	2

- Three-phase voltage output : 6 V~456 V, Degree of distortion: <0.2%
- Three-phase current output: 20 mA~12 A, Degree of distortion: <0.2%
- Voltage short circuit, current open-circuit and overload protection

## 5.2 Frequency / Phase / Harmonic

<b>Symmetry</b>	Voltage superior to 0.2%; Current superior to 0.5%; Phase superior to 0.5°
<b>Frequency</b>	Range: 45 Hz~70 Hz; Adjustment fineness: 0.001 Hz; <b>Accuracy:</b> ±0.02 Hz (class 0.05), ±0.01 Hz(class 0.02)
<b>Phase</b>	Range: 0.000 0°~359.999 9°; Adjustment fineness: 0.001°; <b>Accuracy:</b> ±0.02° (class 0.05), ±0.01°(class 0.02)
<b>Harmonic</b>	2 <sup>nd</sup> ~21 <sup>st</sup> harmonic; Amplitude 0~25% adjustable; Phase 0~359.99°adjustable

## 5.3 Three-Phase Power Output

Current Range	Stability (%/min)		Accuracy (±%*FS) <sup>[2]</sup>	
	Class 0.05	Class 0.02	Class 0.05	Class 0.02
Active power $ \cos\phi \geq 0.5$	0.01	0.005	0.05	0.02
Reactive power $ \sin\phi \geq 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) <sup>[1]</sup>	
			Direct Input	Clamp Current Input <sup>[3]</sup>
AC Voltage <b>ACV</b>	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 <b>ACI</b>	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 $\pm$ (ppm of reading + ppm of range) <sup>[1]</sup>		Max Burden (mA)
		Class 0.05	Class 0.02	Class 0.05	Class 0.02	
75 mV	0.1 $\mu$ V	0.005	0.005	300 + 200	120 + 80	10
1 V	10 $\mu$ V	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 $\pm$ (ppm of reading + ppm of range) <sup>[1]</sup>		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	3
5 mA	10 nA	0.01	0.005	300 + 200	120 + 80	3
20 mA	100 nA	0.01	0.005	300 + 200	120 + 80	3
100 mA	1 $\mu$ A	0.01	0.005	300 + 200	120 + 80	3
1 A	10 $\mu$ A	0.01	0.005	300 + 200	120 + 80	3
3 A	10 $\mu$ A	0.01	0.005	300 + 200	120 + 80	3
10 A	0.1 mA	0.01	0.005	300 + 200	120 + 80	3

- DC voltage output: 10 mV~660 V, ripple factor: < 1%;
- DC current output: 0.1 mA~11 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	$\pm (0 \sim 1.2) \text{ V}$	$\pm 0.01\% \cdot \text{RG}$	0~30 mV	$\pm 1 \text{ mV}$
10 V	$\pm (0 \sim 12) \text{ V}$	$\pm 0.01\% \cdot \text{RG}$	0~300 mV	$\pm 10 \text{ mV}$
2 mA	$\pm (0 \sim 2.4) \text{ mA}$	$\pm 0.01\% \cdot \text{RG}$	0~60 $\mu\text{A}$	$\pm 2 \mu\text{A}$
20 mA	$\pm (0 \sim 24) \text{ mA}$	$\pm 0.01\% \cdot \text{RG}$	0~600 $\mu\text{A}$	$\pm 20 \mu\text{A}$

- Response time: measurement range: 0~1000 ms, accuracy:  $\pm 40 \text{ ms}$

### 5.8 Test Energy Meter (option)

Type	Accuracy	
	Class 0.05	Class 0.02
Active electrical energy	$\pm 0.1\% \cdot \text{reading}$	$\pm 0.05\% \cdot \text{reading}$
Reactive electrical energy	$\pm 0.2\% \cdot \text{reading}$	$\pm 0.1\% \cdot \text{reading}$

- 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:  $(0 \sim 110)\% \cdot \text{RG}$
- Accuracy:  $\pm 0.05\% \cdot \text{RG}$
- Max output power: 10 VA
- Frequency range: 45 Hz~55 Hz
- The function is used to test Synchrometer.

## 6. General Specifications

<b>Power Supply</b>	AC ( 220 ± 22 ) V, ( 50 ± 2 ) Hz
<b>Temperature Performance</b>	Working temperature: 0°C~45°C; Storage temperature: -20°C~70°C
<b>Humidity Performance</b>	Working humidity: < 80% @ 30°C, < 70% @ 40°C, < 40% @ 50°C Storage humidity: (20%~80%) R·H, non-condensing
<b>Interface</b>	RS232

## 7. Ordering Information

