

# TH2000 Vector Voltage Analyzer



## 1. Summary

TH2000 is a high-precision vector voltage analyzer, it can measure the ratio error and phase displacement between two channel voltage. With the function of measuring and analyzing various electrical parameters, such as voltage, current, frequency, phase, harmonic, power, etc., TH2000 is suitable for wideband electrical measurement scenarios.

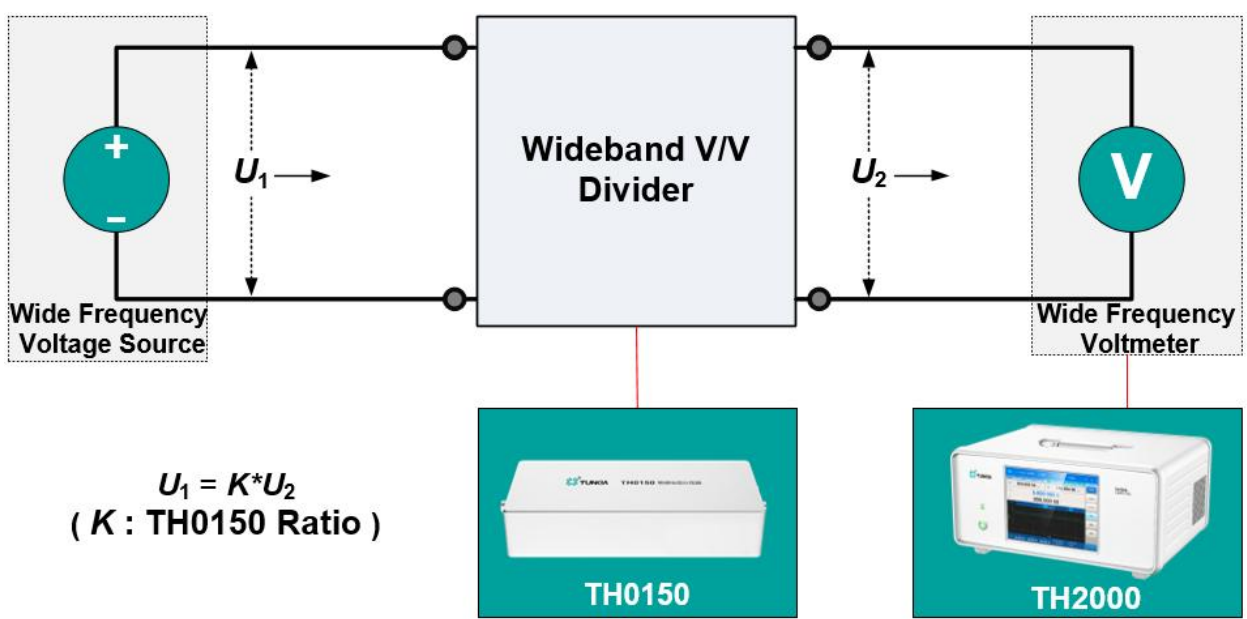
## 2. Features

- Dual channel voltage measurement range: 0.5 mV ~ 6 V.
- Frequency measurement range: DC, AC 10 Hz ~ 20 kHz.
- The best uncertainty of voltage and power are 50ppm and 100ppm.
- The best uncertainty of phase displacement is 0.0005°.
- Supporting dual channel voltage multiplication and division operation.
- Can measure and analyze the 2<sup>nd</sup>~256<sup>th</sup> harmonics.
- Can display harmonic content, total harmonic distortion and spectrum diagram.
- Statistical analysis of the measured electrical parameters.
- Supporting both internal and external synchronization.
- Supporting battery power supply, to improve CMRR.
- USB, RS232 and LAN communication interfaces.
- Equipped with LCD touch screen.

### 3. Applications

- Measuring wideband voltage
- Measuring wideband current
- Measuring wideband electrical parameters of dual channel
- Building wideband power / electrical energy measurement system
- Calibrating wideband power source / meter and power analyzer
- Calibrating the ratio error and phase displacement of wideband current transformer / transducer
- Calibrating the ratio error and phase displacement of wideband voltage divider / transducer

☆ Measuring Wideband Voltage



Wide Frequency Voltage Source

Wideband V/V Divider

Wide Frequency Voltmeter

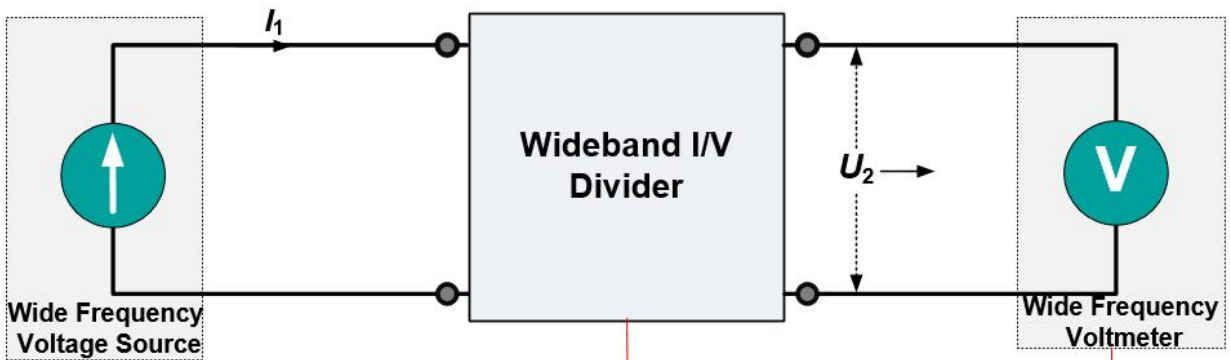
$U_1 = K \cdot U_2$   
( K : TH0150 Ratio )

TH0150

TH2000

- Equipped with wideband voltage divider (such as TH0150) to build a wideband voltage measurement system and calibrate a wideband voltage source / meter.

☆ Measuring Wideband Current



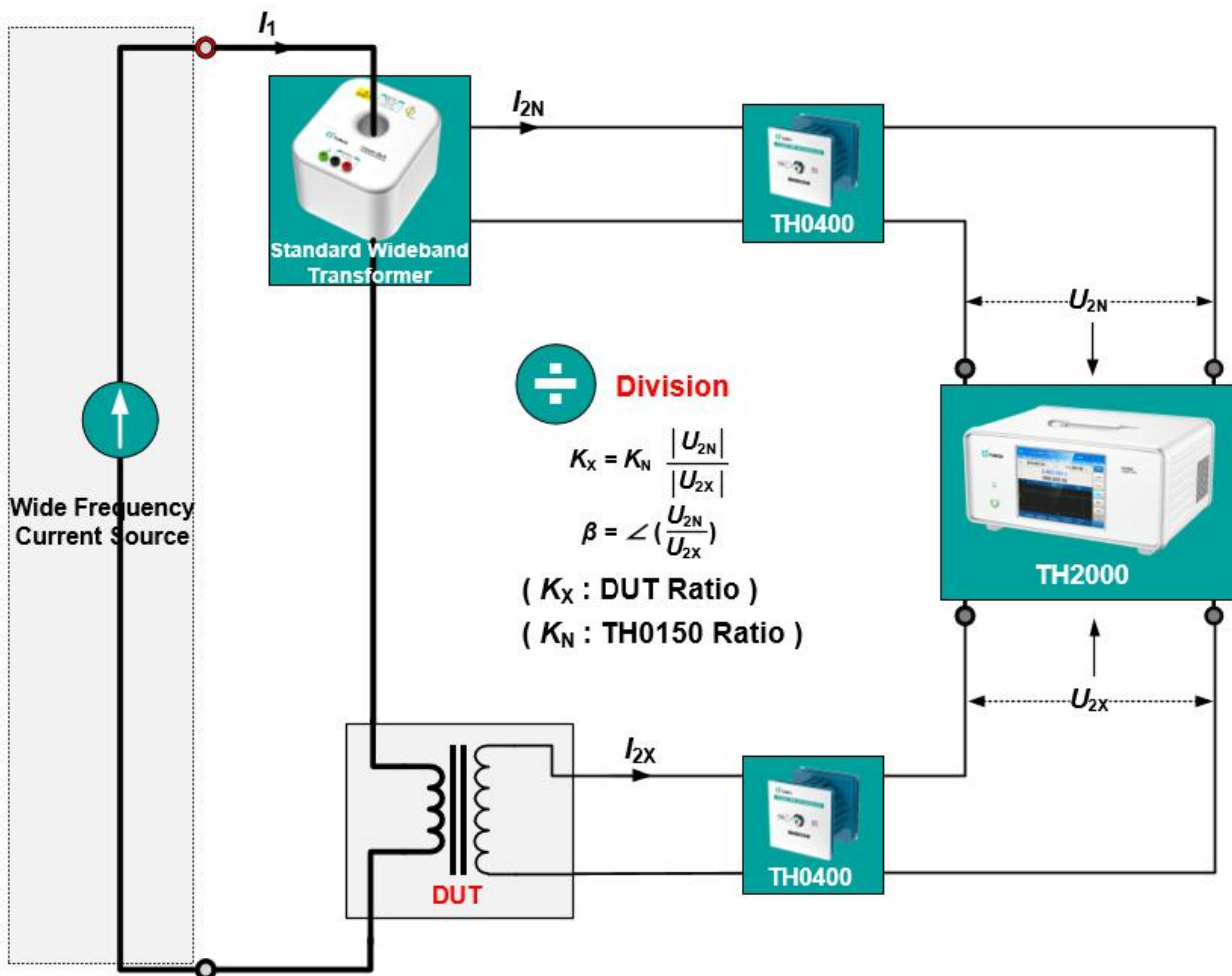
$$I_1 = K \cdot U_2$$

( K : TH0400 Ratio)



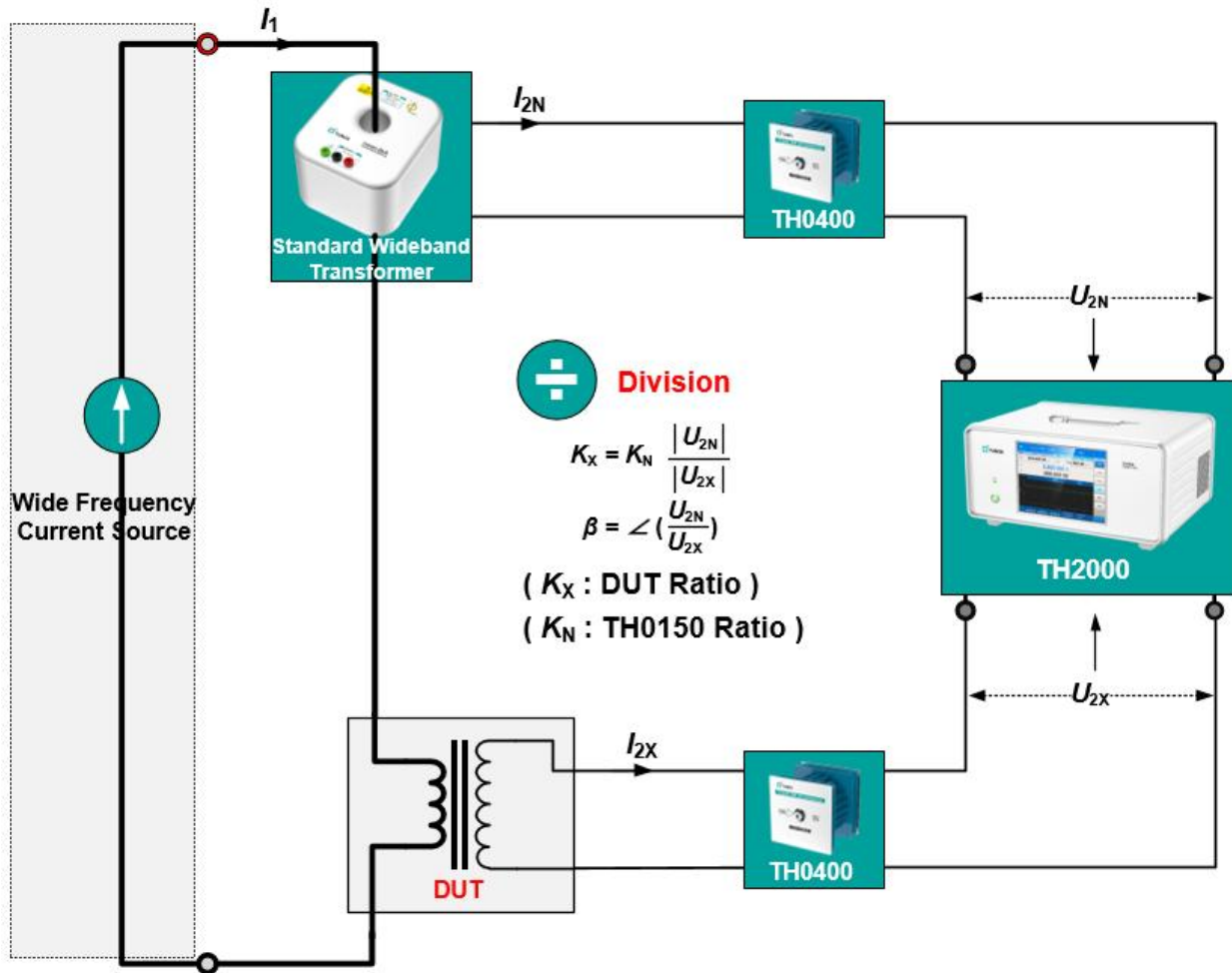
- Equipped with coaxial shunt (such as TH0400) to build a wideband current measurement system and calibrate a wideband current source / meter.

☆ Building Wideband Power / Electrical Energy Measurement System



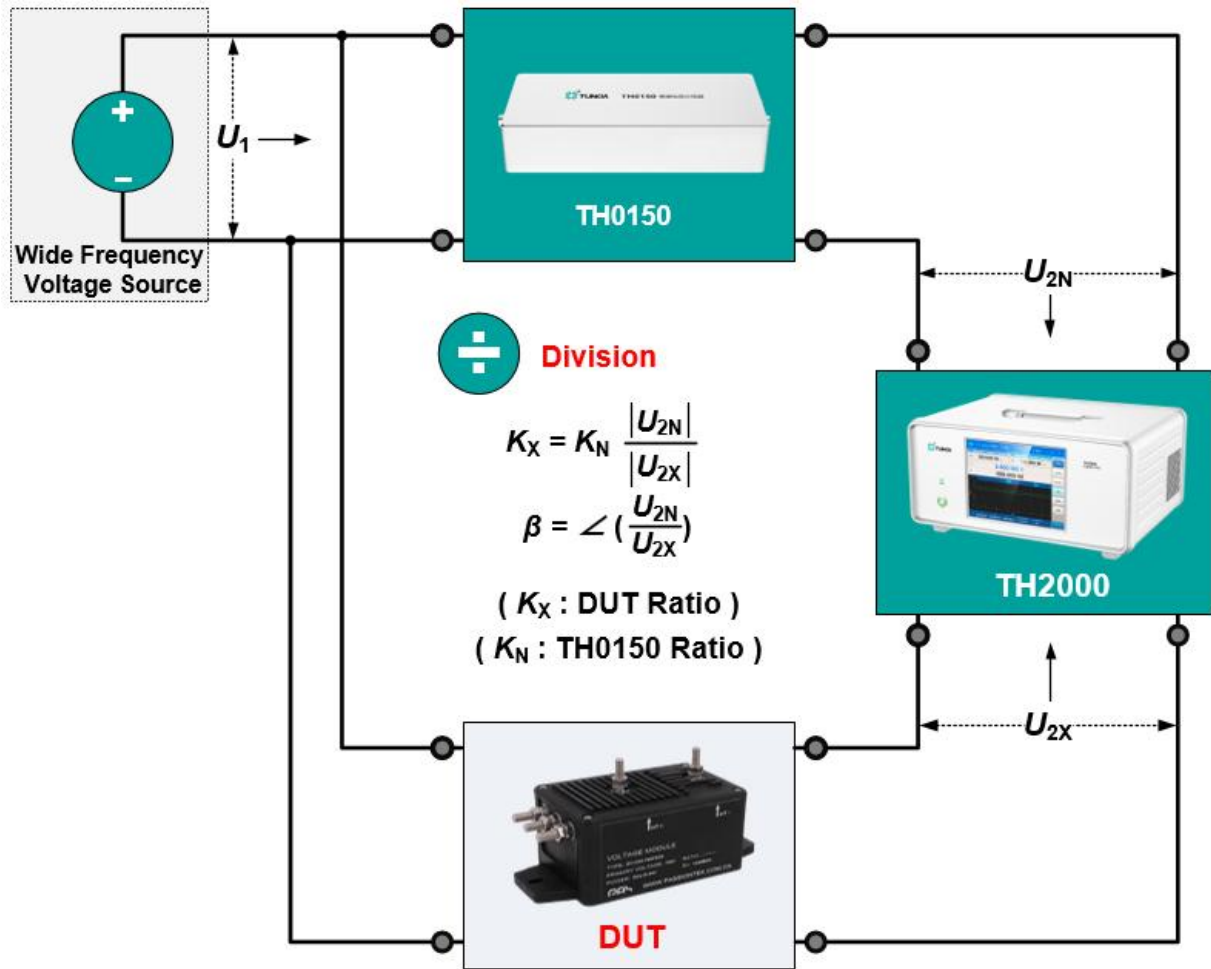
- Equipped with wideband V / V conversion device (such as TH0150) and wideband I / V conversion device (such as TH0400) to build a wideband power / electrical energy measurement system and calibrate a wideband power source / meter and power analyzer.

☆ Calibrating Wideband Transformer / Transducer



- Equipped with wideband current transformer / sensor and coaxial shunt to build a wideband measurement system and calibrate the ratio error and phase displacement of a wideband transformer, transducer or I/V conversion standard.

☆ Calibrating Wideband Voltage Divider/ Transformer



- Equipped with voltage divider to build a wideband measurement system and calibrate the ratio error and phase displacement of a wideband voltage divider, transformer or transducer.

## 5. Specifications

### 5.1 Wideband voltage measurement

Range	Accuracy					
	$\pm$ (ppm of reading + ppm of range) <sup>[1]</sup> @ ( 23 $\pm$ 5 )°C					
	DC	10 ~ 20	20 ~ 40	40 ~ 1 k	1 k ~ 5 k	5 k ~ 20 k
2 mV	500 + 10	300 + 8.0	300 + 5.0	500 + 3.0	600 + 3.0	800 + 3.0
5 mV	300 + 10	200 + 5.0	300 + 3.0	200 + 2.0	250 + 2.0	250 + 2.5
10 mV	100 + 10	250 + 5.0	250 + 2.0	200 + 1.5	250 + 1.5	250 + 2.0
20 mV	80 + 10	200 + 10	200 + 2.0	200 + 1.5	300 + 1.5	300 + 2.0
50 mV	60 + 10	300 + 10	200 + 2.0	150 + 1.8	200 + 1.8	250 + 2.0
100 mV	50 + 15	300 + 15	150 + 2.0	80 + 1.8	120 + 1.8	150 + 2.0
200 mV	50 + 20	300 + 20	120 + 2.0	60 + 1.8	90 + 1.8	120 + 2.0
500 mV	50 + 30	300 + 30	100 + 3.0	50 + 2.5	60 + 2.5	120 + 3.0
1 V	45 + 30	300 + 30	100 + 5.0	45 + 3.5	60 + 3.5	80 + 5.0
2 V	45 + 35	300 + 30	100 + 10	45 + 6	60 + 6	90 + 10
5 V	45 + 50	300 + 50	100 + 20	45 + 15	60 + 15	80 + 20

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

- Measuring range: 0.5 mV ~ 6 V, manual / automatic range shifting.
- Minimum resolution: 10 nV, 8-dights decimal display.
- Frequency range: DC ~ 20 kHz, signal bandwidth  $\geq$  1MHz, maximum sampling rate:1 Msp/s.
- Input impedance: about 10 M $\Omega$  // 100 pF
- Synchronization mode: internal and external synchronization (by BNC).
- Each channel can realize the conversion of electrical parameters by setting the coefficient K.
- Voltage input: BNC female socket.

### 5.2 Frequency / Phase Measurement

<b>Frequency</b>	Measuring range	10.000 000 Hz~20.000 000 kHz
	Minimum resolution	1 μHz
	Accuracy	0.005%*RD
<b>Phase</b>	Measuring range	000.000 00° ~ 359.999 99°
	Minimum resolution	0.000 01°
	Accuracy	± 0.001°@45 Hz~1 kHz ± 0.003°@1 kHz~5 kHz

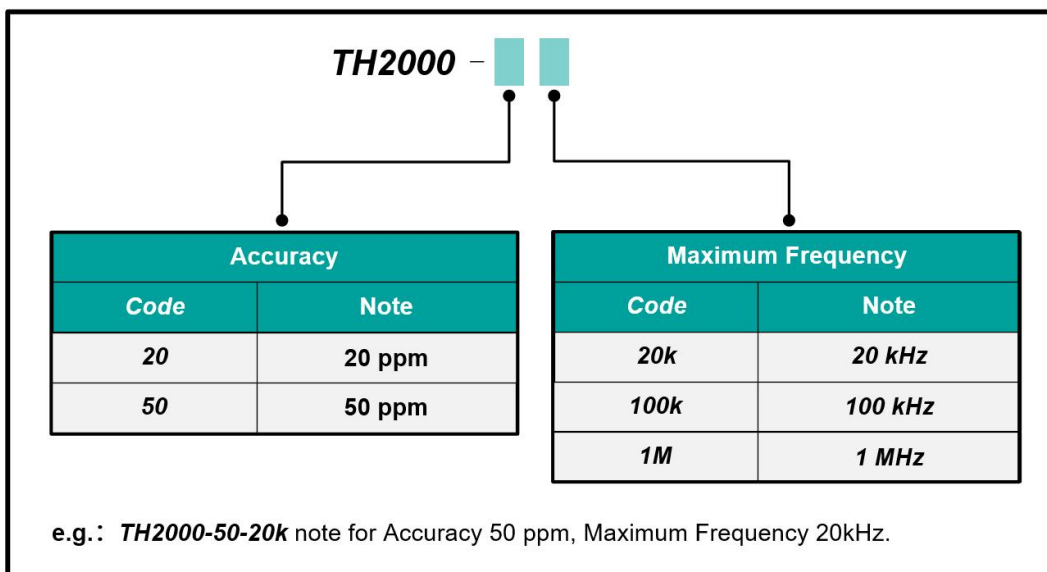
### 5.3 Ratio Error Measurement

<b>Accuracy</b>	45 Hz ~ 1 kHz	60 ppm
	1 kHz ~ 5 kHz	100 ppm
<b>Note</b>	0.2 V ~ 6 V, $U_1 / U_2 \approx 1$	

### 5.4 Energy Pulse

- The full-scale value corresponds to 60 kHz when high-frequency pulse is output
- The full-scale value corresponds to 6 Hz when low-frequency pulse is output
- Energy pulse input: frequency ≤ 10 kHz, voltage: 0 ~ 3.3 V...24 V

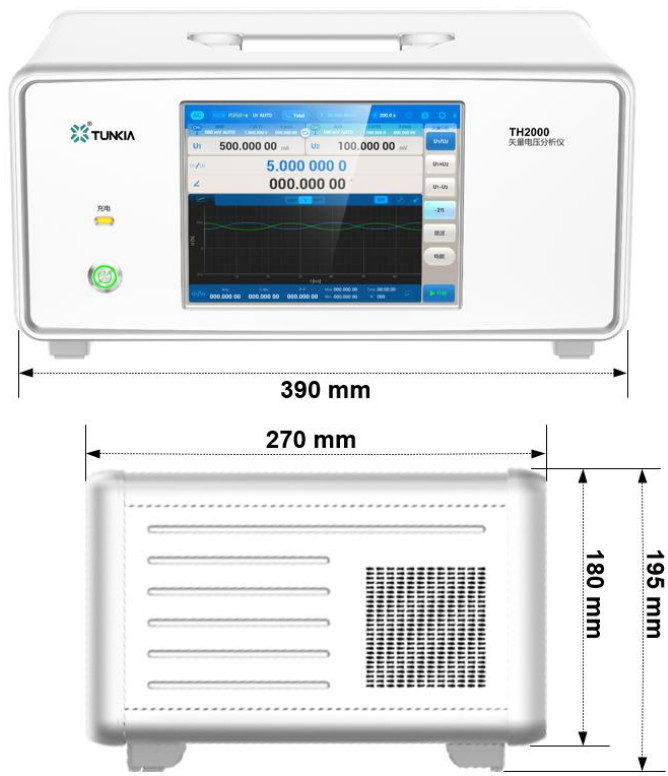
## 6. Ordering Information



Note: the specifications of accuracy 20ppm, frequency 100kHz and 1MHz are customized products.



## 7. General Specifications

<b>Power Supply</b>	AC: 195 V ~ 242 V / 47 Hz ~ 63 Hz Lithium battery (built-in)
<b>Maximum Power Consumption</b>	30 W (under non-charging condition)
<b>Warm-up Time</b>	30 minutes, shall not be less than twice the shutdown time
<b>Operation Environment</b>	Temperature: 10°C ~ 40°C Humidity: 20% R·H ~ 85% R·H, non-condensing
<b>Storage Environment</b>	Temperature: -20°C~70°C Humidity: < 95% R·H, non-condensing
<b>Communication Interface</b>	RS232×1, LAN×1, USB×1
<b>Screen</b>	8.4 inch color LCD display
<b>Dimensions</b>	390 mm (W) × 270 mm (D) × 180 mm (H), without feet  
<b>Weight</b>	About 10 kg