TH3300 Three-phase Multi-function Standard Meter

1. Summary

TH3300 is a reference-level three-phase power/energy measurement standard instrument. The instrument uses the world's top devices and advanced measurement self-calibration technologies to ensure that the annual change rate of standard measurement is less than U:20 ppm @ 30 V ~ 480 V; I: 30 ppm @ 50 mA～120 A; P/E: 50 ppm @ (30 V～480 V, 50 mA～120 A). This instrument can meet the test requirements for electric energy measurement under dynamic waveform conditions such as broadband and complex harmonics and under low current conditions, and solves the traceability problem of R46 electric energy measurement.

2. Features

- Power/electric energy accuracy class: **0.005**.
- Voltage measurement range: 1.2 V ~ 528 V.
- Current measurement range: 0.2 mA～120 A.
- Fundamental frequency range: 45 Hz ~ 1 kHz.
- The typical phase measurement uncertainty reaches 0.001°.
- Voltage and current support fully automatic range shifting.
- The current is input through a pair of binding posts, no need to change wires.
- Both voltage and current support 2~127 measurements.
- It has the function of comprehensive statistical analysis of the measured power.
- Supports phasor diagram, spectrum diagram, trend diagram and other graphic displays.
- With standard power pulse input/output function.

- Communication interfaces: USB, RS232, LAN.
- LCD touch screen.

3. Application

- **Calibrating Standard Source:** Calibrate three-phase voltage sources, current sources, power sources, etc. of class 0.01 and below.
- **Calibrating Electrical Measuring Instruments:** It can be used as a standard meter to match highly stable power source to measure or to calibrate single/three-phase voltmeters, ammeters, power meters, power factor meters, frequency meters, phase meters, transmitters, sensors, etc. below class 0.01.
- **Calibrating Electric Energy Metering Device:** It can be used as a high-level electric energy standard meter to assess three-phase electric energy meter verification devices, standard electric energy meters, charging pile testers, etc. that meet the requirements of the new national standard and the R46 directive at class 0.01 and below.

4. Specifications

4.1 AC Voltage Measurement

Range	Resolution	Measurement Uncertainty at different frequencies (Hz)(k = 2) (ppm*RD + ppm*RG) @(23±5)°C			Temperature Coefficient ppm*RD/°C @ (15 ~ 30)°C
		45 ≤ F < 80	80 ≤ F < 400	400 ≤ F < 1 k	
12 V	1 μV	24 + 16	48 + 32	100 + 60	< 0.5
60 V	1 μV	12 + 8	24 + 16	48 + 32	< 0.4
120 V	10 μV	12 + 8	24 + 16	48 + 32	< 0.4
240 V	10 μV	12 + 8	24 + 16	48 + 32	< 0.4
480 V	10 μV	12 + 8	24 + 16	48 + 32	< 0.4
Note: ① RD is the reading value, RG is the range value, the same below					

4.2 AC Current Measurement

Range	Resolution	Measurement Uncertainty at different frequencies (Hz) (k = 2) (ppm*RD + ppm*RG) @(23±5)°C			Temperature Coefficient ppm*RD/°C @ (15 ~ 30)°C
		45 ≤ F < 80	80 ≤ F < 400	400 ≤ F < 1 k	
2 mA	0.1 nA	200 + 100	600 + 300	1200 + 600	< 6.0
5 mA	0.1 nA	100 + 50	300 + 150	600 + 300	< 3.0
10 mA	1 nA	50 + 25	150 + 75	300 + 150	< 1.5
20 mA	1 nA	40 + 20	120 + 60	240 + 120	< 0.8
50 mA	1 nA	20 + 10	60 + 30	120 + 60	< 0.4
100 mA	10 nA	20 + 10	60 + 30	120 + 60	< 0.4
200 mA	10 nA	20 + 10	60 + 30	120 + 60	< 0.4
500 mA	10 nA	20 + 10	60 + 30	120 + 60	< 0.4
1 A	0.1 μA	20 + 10	60 + 30	120 + 60	< 0.4
2 A	0.1 μA	20 + 10	60 + 30	120 + 60	< 0.4
5 A	0.1 μA	20 + 10	60 + 30	120 + 60	< 0.4
10 A	1 μA	20 + 10	60 + 30	120 + 60	< 0.4
20 A	1 μA	20 + 10	60 + 30	120 + 60	< 0.4
50 A	1 μA	20 + 10	60 + 30	120 + 60	< 0.4
100 A	10 μA	20 + 10	60 + 30	120 + 60	< 0.4

- Measurement range: 0.2 mA～120 A
- 8-digit display, manual/automatic range shifting
- Fundamental frequency range: 45 Hz ~ 1 kHz
- Long-term stability: 15 ppm/year @ 50 mA～120 A

4.3 Frequency/Phase Measurement

Frequency	Range	45.000 000 Hz～1000.000 0 Hz
	Minimum Resolution	0.000 001 Hz
	Measurement Uncertainty (k=2)	0.001%*RD

Phase	Range	0.000 00°～ 359.999 99°(50 mA ≤ I ≤ 120 A)
	Minimum Resolution	0.000 01°
	Measurement Uncertainty (k=2)	0.001°

4.4 Power/Energy Measurement

Measured power	Voltage Range	Current Range	Measurement Uncertainty at different frequencies (Hz) (k = 2)		
			45 ≤ F ≤ 80	80 < F ≤ 400	400 < F ≤ 1 k
Active power/ electric energy③ Reactive power/ electric energy④ Apparent power/ electrical energy	30 V...1000 V	50 mA ≤ I ≤120 A	0.005%*RD	0.015%*RD	0.03%*RD
		10 mA ≤ I < 50 mA	0.01%*RD	0.03%*RD	0.06%*RD
		2 mA ≤ I < 10 mA	0.02%*RD	0.06%*RD	0.12%*RD
		0.2 mA ≤ I < 2 mA	0.05%*FS③	0.15%*FS	0.3%*FS
Note ②: FS = voltage range value × current range value ③ Active power |cos φ| ≥0.5; ④ Reactive power |cos φ| ≥0.5					

- Power/electric energy measurement range: combination of AC voltage range and AC current range
- Power factor measurement range: -1.000 000 0…0.000 000 0…1.000 000 0
- Standard electric energy pulse output: high frequency full scale value corresponds to 120 kHz, low frequency full scale value corresponds to 6 Hz
- Standard power pulse input: frequency ≤ 200 kHz, voltage: 0…3.3 V…24 V
- Long-term stability: 30 ppm/year @ (30V~480V, 50 mA~120 A).

5. General Specification

- Power supply: AC (220 ± 22) V, (50 ± 2) Hz; maximum power consumption: 120 VA
- Working environment: 18℃～28℃, 20%～85% R·H, non-condensing
- Storage environment: 0℃～40℃, < 95% R·H, non-condensing
- Communication interface: RS232, USB, LAN

6. Accessory List

S/N	Pic	Name	Specification	Quantity	Note
1		Voltage combination test leads	3m/1.6mm^2/Φ4 socket-Φ4 socket	4	Standard Accessory
2		Current quick plug test lead	1.5m/25mm2/Φ12 insert→MC quick plug test line	6 Yellow 1 Green 1 Red 1 Black 3	Standard Accessory
3		Reducing plug	MC adapter plug	Red 6	Standard Accessory
4		Power cable	AC 220V、10A	1	Standard Accessory
5		Glass fuse	F3A、250V	3	Standard Accessory
6		Electric energy pulse signal line	1.5 m / BNC male - alligator clip two wires	1	Standard Accessory
7		Signal test leads	1.5 m / BNC Male- BNC Male	1	Standard Accessory
8		Portable case	Waterproof, shockproof, antistatic	1	Standard Accessory