

TH0420 Reference Coaxial Current Shunt



1. Summary

TH0420 is a set of precision coaxial shunts with ultra-low power coefficients. Each set includes 12 different current range specifications, capable of converting nominal currents from 0.1 A to 500 A into nominal voltage outputs of 1 V or 0.5 V.

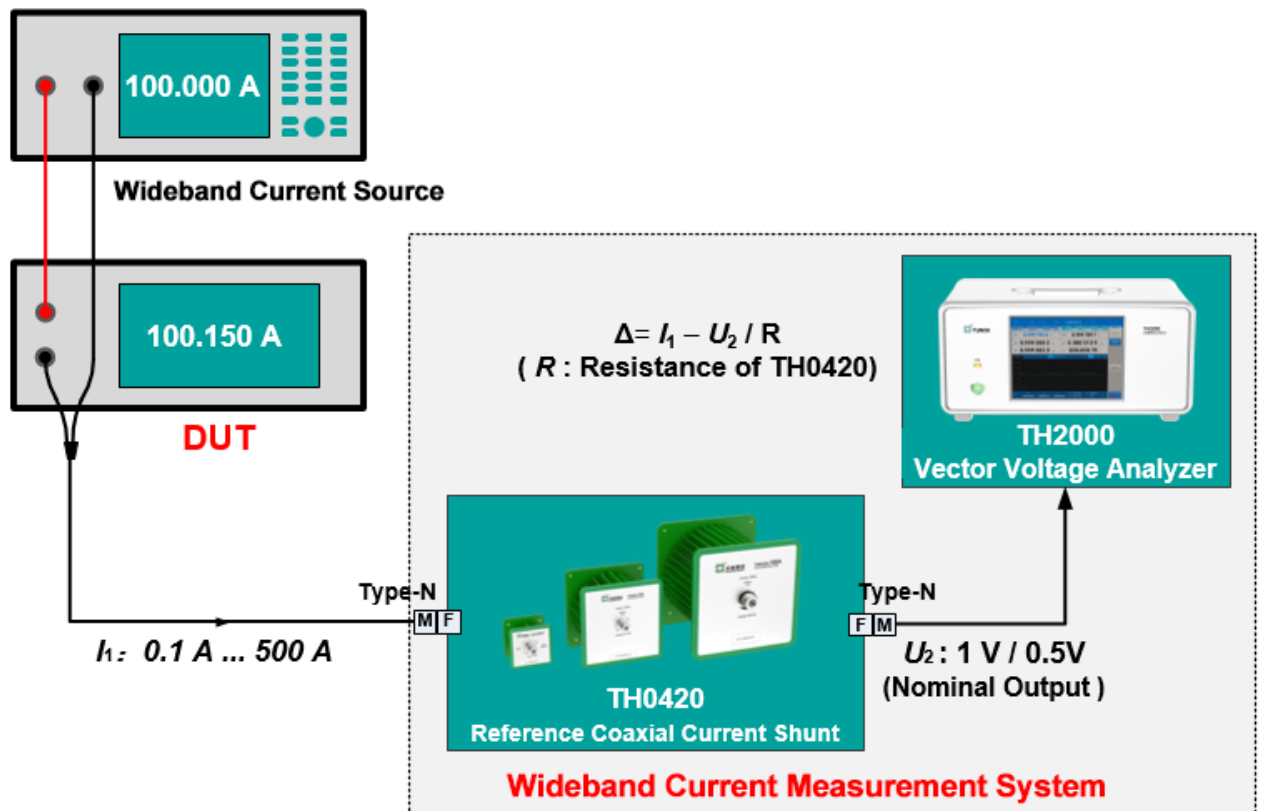
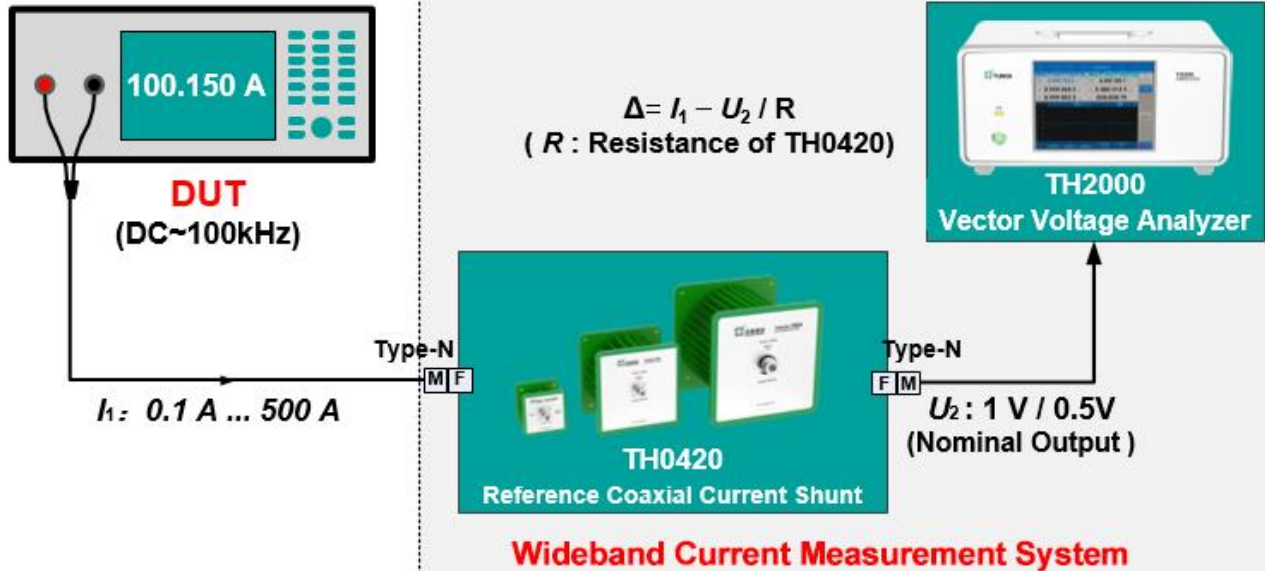
TH0420 features an ultra-low power coefficient—for example, the power coefficient of the TH0420-100A does not exceed 10 ppm even when operating at 100 W, making it highly suitable for fast measurements of a wide range of AC and DC currents.

2. Features

- Operating Frequency: DC ~ 100 kHz
- Optimal AC-DC Difference: 5 ppm @ 53 Hz, 10 ppm @ 1 kHz, 25 ppm @ 100 kHz
- Nominal Output Voltage: 1 V or 0.5 V
- Typical Annual Drift: 5 ppm; Maximum Annual Drift: 16 ppm
- Ultra-low Power Coefficient
- Extremely Low Self-heating Power Coefficient and Temperature Coefficient
- High Current Carrying Capacity
- Capable of Withstanding Instantaneous Current Surges
- Designed with Efficient Heat Dissipation Structure

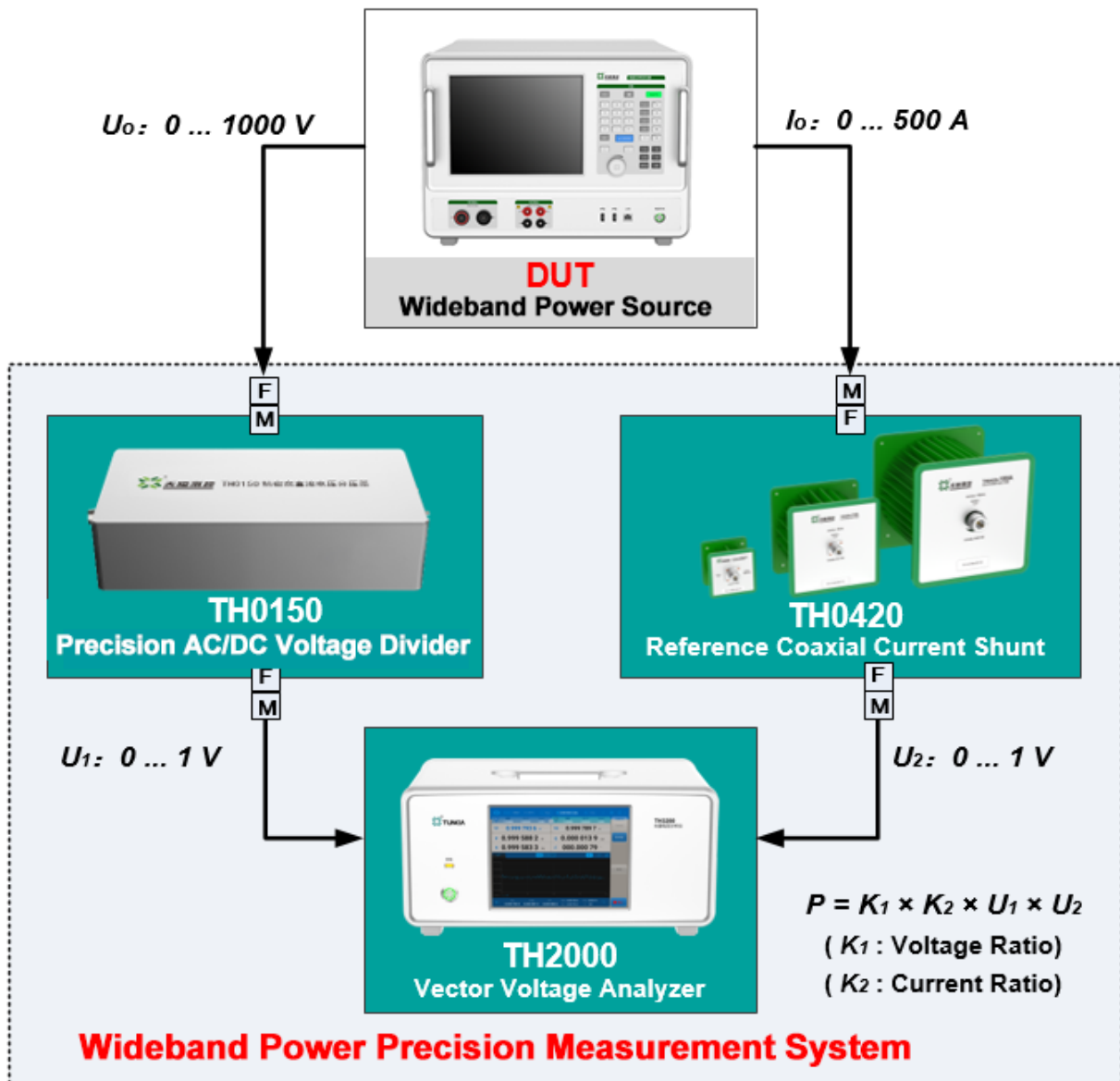
3. Applications

☆ Build Wideband Current Measurement System



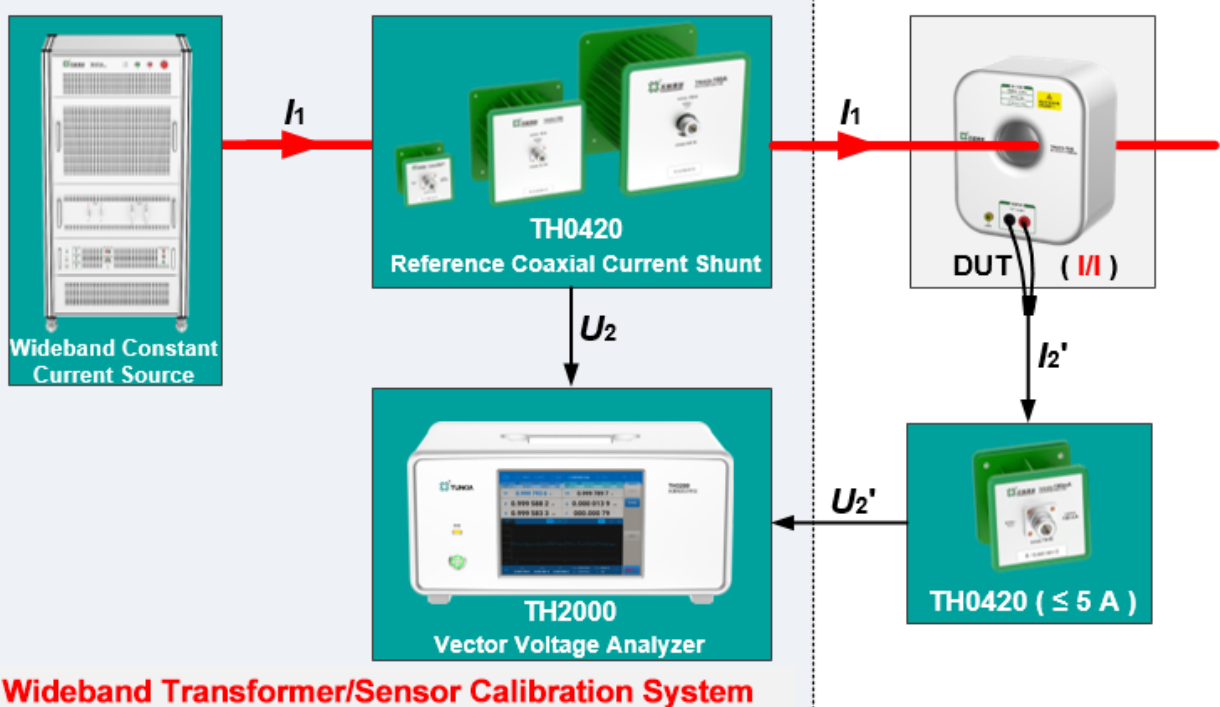
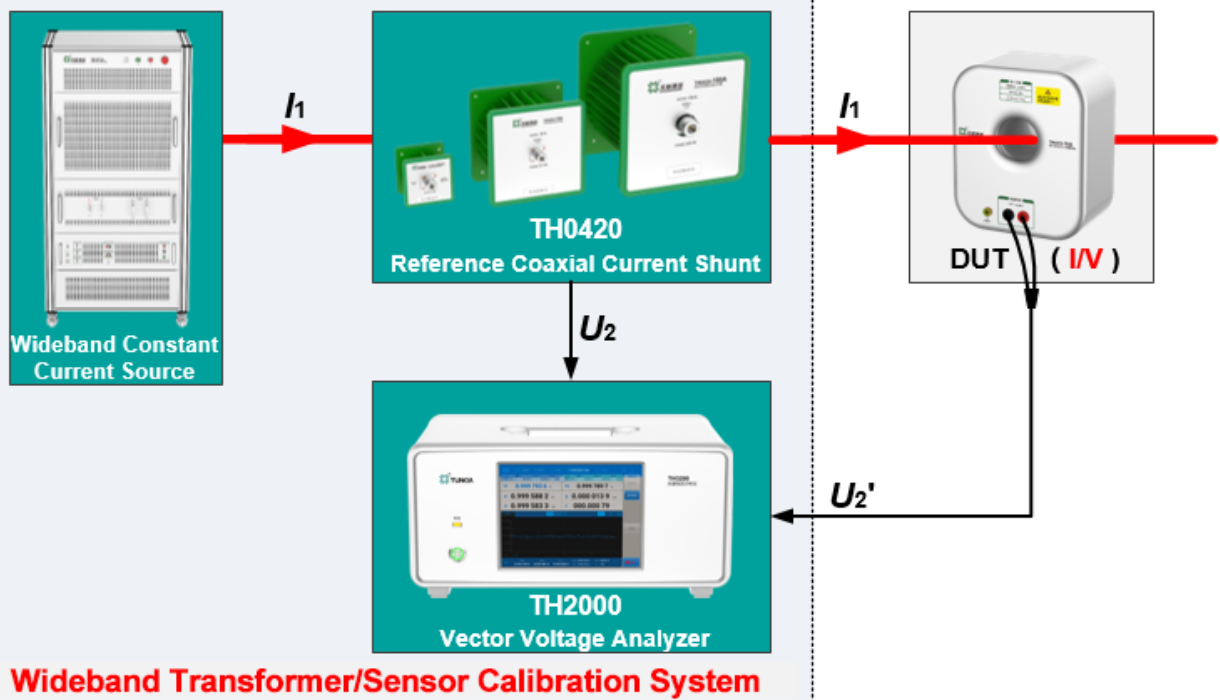
Set up wideband current measurement system with wideband current source and wideband standard voltmeter (such as TH2000 vector voltage analyzer), measure wideband current signal, and calibrate wideband current source and wideband ammeter, etc.

☆ Build Wideband Power/Energy Precision Measurement System



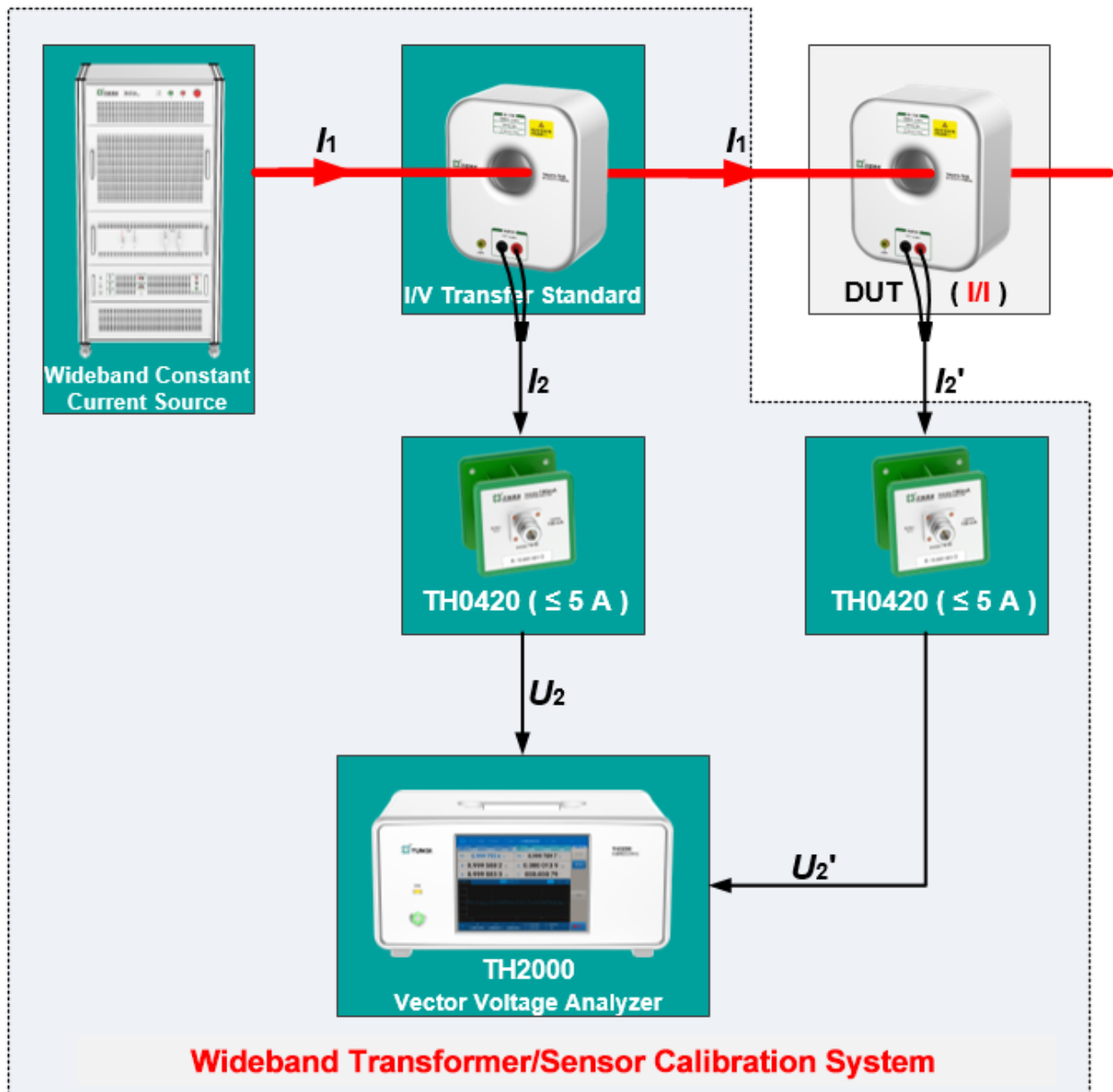
Set up wideband power/energy precision measurement system with high frequency V/V conversion standard and TH2000 vector voltage analyzer, measure wideband power/energy signal, calibrate wideband power source, wideband power meter, power analyzer and other equipment.

☆ Build Wideband Transformer/Sensor Calibration System



Set up a wideband transformer/sensor measurement system with wideband constant-current source and wideband sensor tester (such as TH2000 vector voltage analyzer) to calibrate the tested transformer or sensor with nominal current ≤ 500 A.

☆ Build Wideband Transformer/Sensor Calibration System



For the calibration of transformer/sensor whose nominal current is greater than 500 A, TH0420 is used as the standard and the secondary signal I/V converter of the equipment under inspection, and a wideband transformer/sensor measurement system is established with a wideband constant current source and a wideband sensor tester (such as TH2000 vector voltage analyzer).

4. Specifications

4.1 Resistance Specification

Specification	Nominal Resistance (Ω)	Initial Deviation ^[1] ($\pm\mu\Omega/\Omega$) @ (23 $\pm$ 1) $^{\circ}$ C	Annual Stability ($\pm\mu\Omega/\Omega$)	Temperature Coefficient ($\pm$ ppm/K)	Power factor ^[2] ($\pm$ ppm/Rated power)
TH0420-0.1A	10	30	12	2.0	1
TH0420-0.2A	5	30	12	2.0	1
TH0420-0.5A	2	30	12	2.0	2
TH0420-1A	1	30	12	2.0	3
TH0420-2A	0.5	30	12	2.5	5
TH0420-5A	0.2	30	12	2.5	5
TH0420-10A	0.1	30	12	2.5	5
TH0420-20A	0.05	30	12	2.5	8
TH0420-50A	0.02	30	12	3.0	10
TH0420-100A	0.01	30	12	3.0	10
TH0420-250A	0.002	30	16	3.5	
TH0420-500A	0.001	30	16	3.5	

Note [1]: Initial deviation is the maximum deviation of the resistance under DC conditions, usually the guaranteed value provided by the manufacturer.

Note [2]: When the coaxial shunt is used to measure DCI, the resistance's own heat will lead to the change of resistance value under different input currents, thus introducing the error. The calculation formula is as follows:

$$\gamma = \text{power coefficient} \times [1 - (\text{current measurement} / \text{nominal current value})^2]$$

4.2 Current Measurement

Specification	Nominal Input Current (A)	Nominal Output Current (V)	Maximum AC/DC Difference ^[3] (k=2,±ppm)			
			53 Hz	1 kHz	10 kHz	100 kHz
TH0420-0.1A	0.1	1	20	25	25	25
TH0420-0.2A	0.2	1	20	25	25	25
TH0420-0.5A	0.5	1	20	25	25	25
TH0420-1A	1	1	20	25	25	30
TH0420-2A	2	1	20	30	35	50
TH0420-5A	5	1	20	30	50	80
TH0420-10A	10	1	20	30	50	100
TH0420-20A	20	1	20	30	50	100
TH0420-50A	50	1	30	50	80	150
TH0420-100A	100	1	30	50	100	200
TH0420-250A	250	0.5				
TH0420-500A	500	0.5				

Note [3]: The measured value of AC current should be calculated according to the following formula, and the unit of the difference between AC and DC is ppm:

Ac current measurement value =(voltage measurement value/calibration resistance value)×(1+ AC-DC difference /(1 000 000))

Specification	Maximum Operating Current (A)	Instantaneous Current (<5s)	Specification	Maximum Operating Current (A)	Instantaneous Current (<5s)
TH0420-0.1A	0.2 A	1.5 A	TH0420-10A	11 A	30 A
TH0420-0.2A	0.5 A	2 A	TH0420-20A	22 A	50 A
TH0420-0.5A	1 A	3 A	TH0420-50A	55 A	100 A
TH0420-1A	1.5 A	4 A	TH0420-100A	110 A	200 A

TH0420-2A	2.5 A	6 A	TH0420-250A		
TH0420-5A	5.5 A	20 A	TH0420-500A		

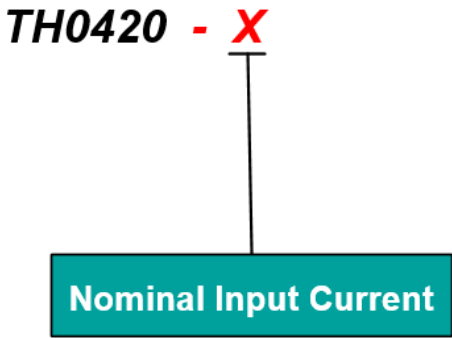
4.3 Phase Displacement

Specification	Maximum Phase Displacement ($k=2, \pm\mu\text{rad}$)				
	53 Hz	1 kHz	10 kHz	50 kHz	100 kHz
TH0420-0.1A	5	10	30	150	300
TH0420-0.2A	5	10	30	150	300
TH0420-0.5A	5	10	30	150	300
TH0420-1A	5	10	30	150	300
TH0420-2A	10	15	50	300	600
TH0420-5A	10	25	100	500	1200
TH0420-10A	10	40	150	800	1600
TH0420-20A	10	50	200	1000	2000
TH0420-50A	10	65	300	1500	3000
TH0420-100A	20	80	400	2000	4000
TH0420-250A					
TH0420-500A					

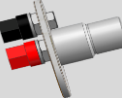
5. General Specifications

Power Supply	——
Temperature Performance	Operating temperature: 13 °C ~ 33 °C; Calibration temperature: 18°C~28°C; Storage temperature: 5 °C to 45 °C Note: When stored in a harsh temperature environment, the resistance value may change temporarily and be restored to the original resistance value within the following 30 days.
Humidity Performance	Operating humidity: < 50% R·H Storage humidity :(15%~80%) R·H, no condensation

6. Ordering Information

 TH0420 - X Nominal Input Current	Specification	Nominal Current
	TH0420-0.1A	0.1 A
	TH0420-0.2A	0.2 A
	TH0420-0.5A	0.5 A
	TH0420-1A	1 A
	TH0420-2A	2 A
	TH0420-5A	5 A
	TH0420-10A	10 A
	TH0420-20A	20 A
	TH0420-50A	50 A
	TH0420-100A	100 A
	TH0420-250A	250 A
	TH0420-500A	500 A

7. Accessories

S/N	Pic	Name	Specification	Qty	Remark
1		Adapter	LC male-LC male, 100 A	1	Optional
2		Adapter	LC male-N female, 20 A	1	Optional
3		Current Connection Cable	N male-N male	2	Optional
4		Adapter	N male-terminal block	2	Optional
5		Adapter	LC male-terminal block	1	Optional
6		High Current T-Connector	LC male connector, 100 A	1	Optional
7		Low Current T-Connector	N female connector, 20 A	1	Optional
8		Adapter	N male-BNC female	2	Optional
9		Voltage Test Lead	BNC male-BNC male	2	Optional
10		Adapter	BNC male-dual banana	2	Optional
11		Adapter	BNC female-BNC female	2	Optional
12		Voltage test lead	N male-N male	2	Optional
13		Precision wideband buffer	100kHz, N female input-N male output	1	Optional

S/N	Pic	Name	Specification	Qty	Remark
14		Adapter	N female-N female	2	Optional
15		Voltage Test Lead	BNC male-dual banana plug	2	Optional
16		Adapter	BNC male-dual banana	2	Optional
17		Packing Box	Portable storage box	1	Optional

Note: The above is the quantity included in the complete set of accessories, users can also purchase them separately. The ordering information must be specified in the contract.