



HMI-501 Current Sensor

Product User Manual

A1.0

Thank you for choosing the YINHE ELECTRIC Current Sensor

This manual is provided by HUNAN YINHE ELECTRIC Co., Ltd. for the current sensor. It offers users relevant precautions for installation and debugging, operation and use, as well as daily maintenance. Please read it carefully before installation and use. This manual is provided with the product and should be kept properly for reference and maintenance purposes.

Statement

We have compiled this manual with great care. However, we do not guarantee the complete accuracy of the content in this manual. Since our products are continuously being improved and updated, we reserve the right to modify the content of this manual at any time without prior notice. We are not liable for any direct, indirect, intentional, or unintentional damage and potential hazards caused by the improper use of the content included in this manual.

Safety Operation Knowledge

- ◆ Before using the product, please read the user manual carefully.
- ◆ When moving the product, please disconnect the power supply and remove all connected cables first.
- ◆ If you find any damage to the casing, fasteners, power cord, connecting cables, or connected equipment, please immediately disconnect the device from the power source.
- ◆ If there is any doubt about the safe operation of the equipment, please immediately shut down the device and its accessories, and contact our company's technical support department as soon as possible to resolve the issue.

1. Product Overview

The HMI-501 is a current sensor that can measure direct current (DC), alternating current (AC), pulse, and various irregular waveform currents under the condition of complete isolation between the primary and secondary sides. It is mainly used in fields that require high accuracy, such as metrology verification and calibration, as well as in fields that demand high sensitivity, stability, and reliability, including power quality analysis, power analyzers, medical, aerospace, and naval vessels.

2. Technical Features

- Extremely high accuracy
- Excellent linearity
- High stability
- High sensitivity
- High resolution
- Low temperature drift
- Low offset current
- Low insertion loss
- Strong anti-interference capability
- Fast response speed
- Low noise
- Minimal phase difference
- Wide bandwidth
- Analog output

3. Application Scenarios

- Metrological verification and calibration
- Laboratory current measurement
- Instrumentation(e.g.,power analyzers)
- Medical equipment (e.g., MRI)
- Battery pack inspection
- Power control
- Power supplies
- Ships
- New energy
- Rail transit
- Aerospace
- Industrial measurement

4. Electrical Performance

The following performance indicators are specified at a default ambient temperature (T_A) of 25°C ($\pm 5^{\circ}\text{C}$), supply voltage (U_C) of $\pm 18\text{V}$, and a load resistance (R_M) of 200Ω . Special conditions are noted separately.

Item	Symbol	Test Conditions	Value			Unit
			Minimum	Nominal	Maximum	
Primary rated current(DC)	$I_{PN\ DC}$	--	-500	--	500	A
Primary Rated Current (AC rms)	$I_{PN\ AC}$	--	--	353.6	--	A
Primary Overload Current	$I_{P\ OL}$	1 minute/hour	-600	--	600	A
Supply Voltage (DC)	U_C	Full range	± 15	--	± 18	V
Current Consumption	I_C	Within $I_{P\ OL}$ range	± 20	± 190	± 220	mA
Current Ratio	K_N	Input: Output	3000:1			--
Rated Output Current	I_{SN}	Primary rated current	--	± 166.667	--	mA
Measurement Resistance	R_M	$U_C: \pm 15\text{ V}, I_{PN\ DC}: \pm 500\text{ A}$	0	--	10	Ω
		$U_C: \pm 18\text{ V}, I_{PN\ DC}: \pm 500\text{ A}$	0	--	20	Ω

5. Precision - Dynamic Parameters

Item	Symbol	Test Conditions	Value			Unit
			Minimum	Nominal	Maximum	
Accuracy	X_e	Input DC	--	--	200	$\mu\text{A/A}$
Linearity	ϵ_L	--	--	--	20	$\mu\text{A/A}$
Zero Offset Current	I_o	$25\pm 10^{\circ}\text{C}$	--	--	3	μA
Zero Offset Current	I_{oT}	Within the entire operating temperature range	--	--	5	μA
Response Time	t_r	--	--	--	1	μs
Current Following Speed	di/dt	--	100	--	--	$\text{A}/\mu\text{s}$

Bandwidth (-3 dB)	BW	--	0	--	80	kHz
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Note: All "%" and "μA/A" refer to the full-scale secondary current.

6. General Characteristics

Item	Symbol	Test Conditions	Value			Unit
			Minimum	Nominal	Maximum	
Working Temperature Range	T_A	--	-40	--	+85	°C
Storage Temperature Range	T_S	--	-45	--	+90	°C

7. Security features

Item		Symbol	Test Conditions	Value			Unit
				Minimum	Nominal	Maximum	
Withstand Voltage	Between Primary and Secondary Sides Between Secondary Side and Enclosure	U_d	50Hz, 1min	--	5	--	kV
Transient Isolation Voltage	Between Primary and Secondary Sides	U_w	50μs	--	10	--	kV
Comparative Tracking Index (CTI)		CTI	IEC-60112	--	275	--	V

8. Outline Dimensions and Port Definitions

8.1、Outline Dimensions (Unit: mm)

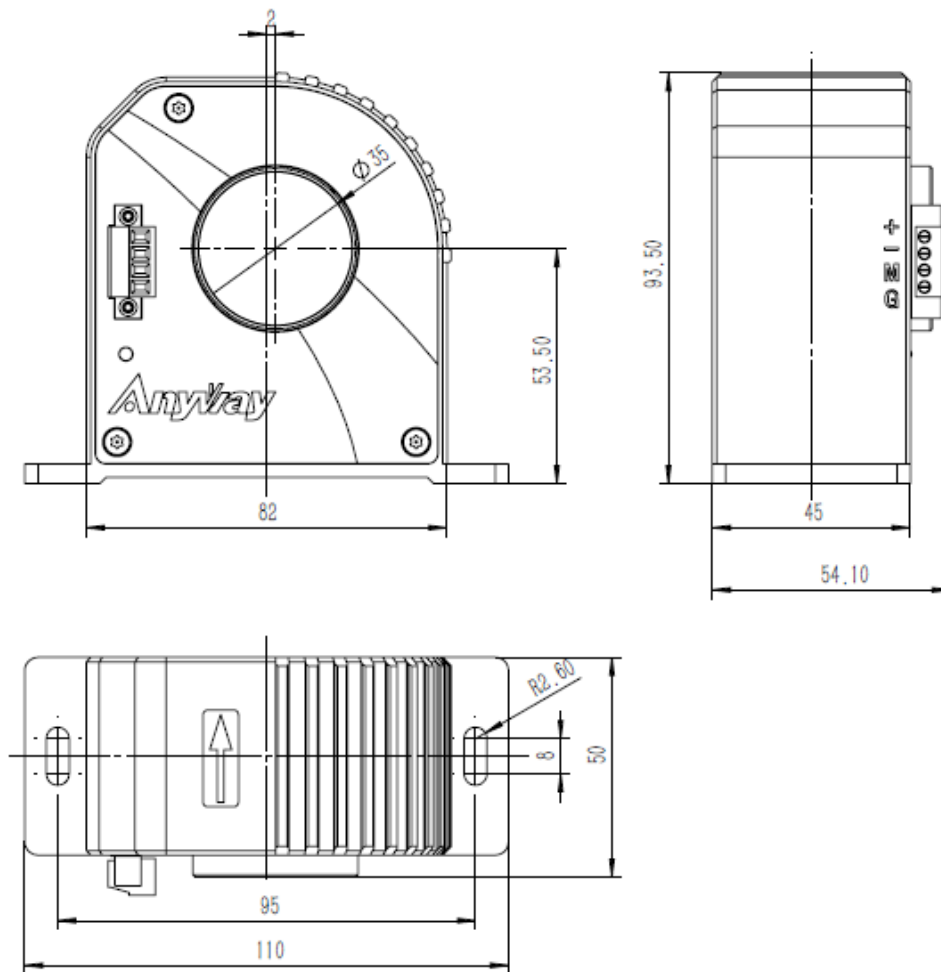


Figure 1: Outline Drawing

Description of the Outline Drawing: The outline dimensions and tolerance for installation positioning dimensions are in accordance with the Grade C standard of GB/T1804-2000.

8.2、Port Definitions

Output Terminal Pin Functions:

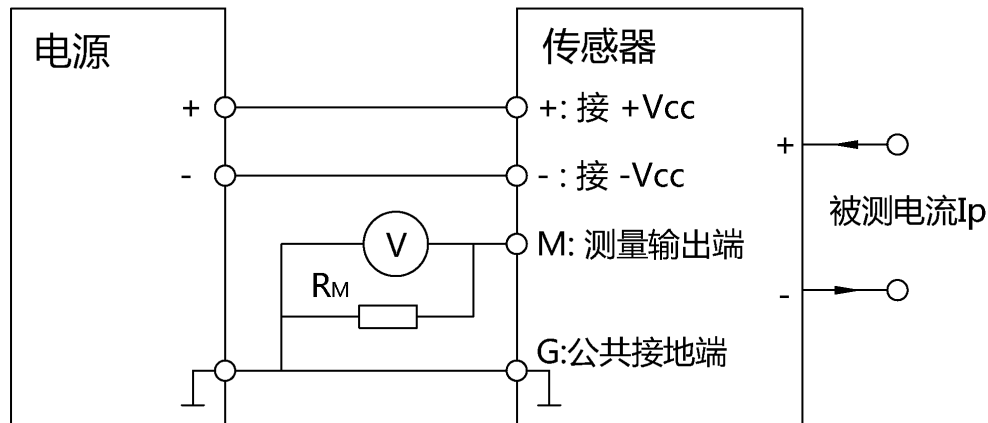
+ : $+V_{CC}$

- : $-V_{CC}$

M: Measurement Signal Output Terminal

0 or G: Common Ground Terminal

9. Application Connection and Description



Electrical connection diagram

Electrical connection diagram:

The primary current I_p can be obtained by measuring the current I_s flowing through R_M or the voltage drop U_R across R_M , according to the following formula:

$$I_p = K_N * I_s = K_N * (U_R / R_M)$$

LED Indicator Light Description:

Under normal operating conditions, the effective LED indicator light remains constantly on. If the indicator light goes out, it indicates that the current sensor is in a non-zero flux state, such as when the bus current exceeds the range. At this time, the sensor enters a scanning state, and the output current is no longer proportional to the input current signal. Once the bus current returns to within the range, the sensor will resume normal operation.

10. Packing List

Item No.	Name	Model and Specification	Quantity	Note
1	Current Sensor	HMI-501	1 piece	--
2	User Manual	HMI-501	1 copy	--

11. Precautions

- This module is a standard sensor. For special applications or requirements, please contact us.
- When the sensor is powered or connected to the measurement circuit current, the secondary side must not be left open-circuited.

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- We reserve the right to modify this sensor manual without prior notice.



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