



CSA401-P030T01 Current Sensor

User Manual

V1.1

Thank you for choosing the YINHE ELECTRIC CSA401-P030T01 Current Sensor

This manual is the user manual for the CSA401-P030T01 Current Sensor produced by HUNAN YINHE ELECTRIC Co., Ltd. It provides users with relevant precautions for installation, commissioning, operation, and 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 carefully compiled this manual, but we do not guarantee that the content is entirely correct. 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 responsible for any direct, indirect, intentional, or unintentional damage or 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 housing, fasteners, power cord, connecting cables, or connected equipment, please immediately disconnect the device from the power source.
- ◆ If you find any damage to the housing, fasteners, power cord, connecting cables, or connected equipment, please immediately disconnect the device from the power source.

! Safety Warning

The current sensor must not be used in an open-circuit condition. That is, when there is current on the bus or the sensor is powered, the output terminal must not be disconnected. The current output terminal of the sensor can only be disconnected when there is no current on the bus and the sensor is not powered. Otherwise, there is a risk of induced high voltage and electric shock!

1. Product Overview

The CSA401-P030T01 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 equipment, aerospace, and naval vessels.

2. Technical Features

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

3. Applications

- Metrology verification and calibration
- Laboratory current measurement
- Instrumentation (e.g., power analyzers)
- Medical equipment (e.g., MRI)
- Battery pack testing
- Power control
- Power supply
- 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 ($\pm 5^\circ$ C), supply voltage (U_C) of $\pm 18V$, and a load resistance (R_M) of 18 Ω . Special conditions are noted separately.

Item	Symbol	Test Conditions	Value			Unit
			Minimum	Nominal	Maximum	
Primary rated current(DC)	$I_{PN\ DC}$	--	-400	--	400	A
Primary Rated Current (AC rms)	$I_{PN\ AC}$	--	--	282	--	A
Primary Overload Current	$I_{P\ OL}$	1 minute/hour	-480	--	480	A
Supply Voltage (DC)	U_C	Full range	± 15	--	± 18	V
Current Consumption	I_C	Within $I_{P\ OL}$ range	± 20	± 430	± 510	mA
Current Ratio	K_N	Input: Output	1000:1			--
Rated Output Current	I_{SN}	Primary rated current	--	± 400	--	mA
Measurement Resistance	R_M	$U_C: \pm 15\ V, I_{PN\ DC}: \pm 400\ A$	0	--	12	Ω
		$U_C: \pm 18\ V, I_{PN\ DC}: \pm 400\ A$	0	--	18	Ω

5. Precision - Dynamic Parameters

Item	Symbol	Test Conditions	Value			Unit
			Minimum	Nominal	Maximum	
Accuracy	X_e	Input DC	--	--	10	$\mu A/A$
Ratio Error	X_{Ge}	Input AC 50Hz/60Hz	--	--	100	$\mu A/A$
Phase Angle Error	$\Delta\phi$		--	--	0.3438	'
Linearity	ε_L	--	--	--	2	$\mu A/A$
Temperature Drift Coefficient	T_{COUT}	--	--	--	0.1	($\mu A/A$)/K
Time Drift Coefficient	TT	--	--	--	0.2	($\mu A/A$)/month
Power Supply Interference	TV	--	--	--	1	($\mu A/A$)/V
Zero Offset Current	I_o	25 $\pm 10^\circ C$	--	--	2	$\mu A/A$
Zero Offset Current	I_{oT}	Full operating temperature range	--	--	± 10	$\mu A/A$
Ripple Current	I_n	DC $\sim 10Hz$	--	--	0.5	$\mu A/A$
Dynamic Response Time	t_r	--	--	--	1	μs
Current Following Speed	di/dt	--	100	--	--	A/ μs
Bandwidth (-3 dB)	BW	--	0	--	300	kHz

Note: All "%" and " $\mu A/A$ " refer to the full-scale secondary current.

6. General Characteristics

Item	Symbol	Test Conditions	Value			Unit
			Minimum	Nominal	Maximum	
Working Temperature Range	T_A	--	-10	--	+70	°C
Storage Temperature Range	T_S	--	-25	--	+85	°C
Output Status Indicator Signal	--	When the output status indicator signal (green LED) is on, it indicates that the product is working normally and the current input from the bus is within its capacity. At this time, the 8th pin of the DB9 socket connected to the OD gate circuit D terminal is at a low level. When the output status indicator signal is off, it indicates that the product is not working properly or the current input from the bus exceeds its capacity. At this time, the 8th pin of the DB9 socket is at a high level. That is, the product output signal is valid when the 8th pin of the DB9 socket is at a low level, and the product output signal is invalid when it is at a high level ^① .				
Mass	m	--	0.5±0.02			kg

注①：The 8th pin of the DB9 socket is connected to the drain (i.e., D terminal) of the built-in field-effect transistor. It forms an OD gate circuit (i.e., Open Drain output form) with the GND terminal. The voltage withstand value between the 8th pin and the GND terminal is 60V, and the maximum output current is 2mA.

7. Security Features

Item		Symbol	Test Conditions	Value			Unit
				Minimum	Nominal	Maximum	
Transient Isolation Voltage	Between Primary and Secondary Sides	U_w	50μs	--	5	--	kV
Comparative Tracking Index (CTI)		CTI	IEC-60112	--	600	--	V

8. Outline Dimensions and Port Definitions

8.1. 8.1、Outline Dimensions (Unit: mm)

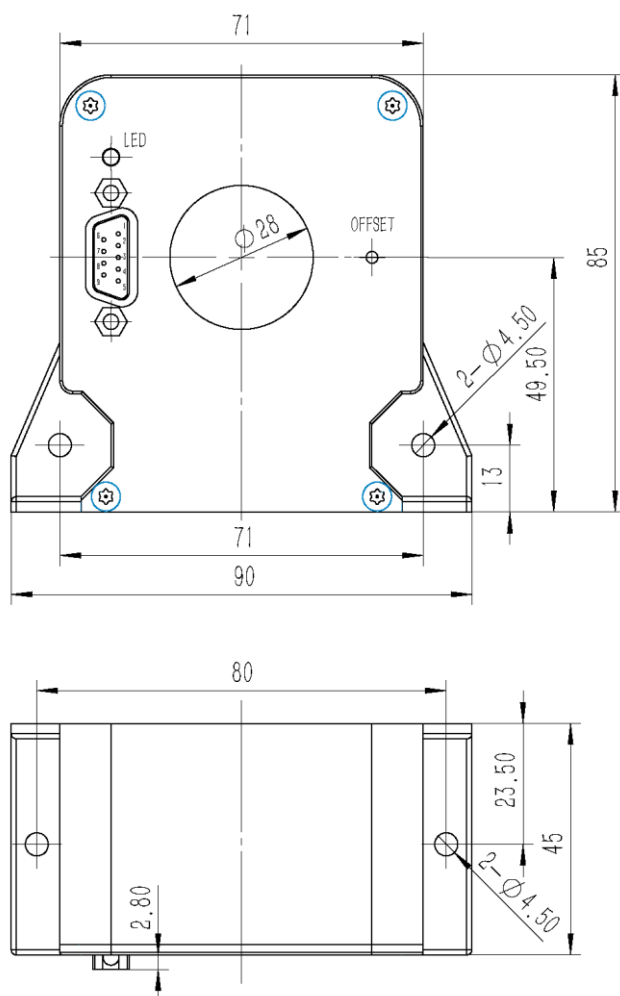


Figure 1: Dimensions

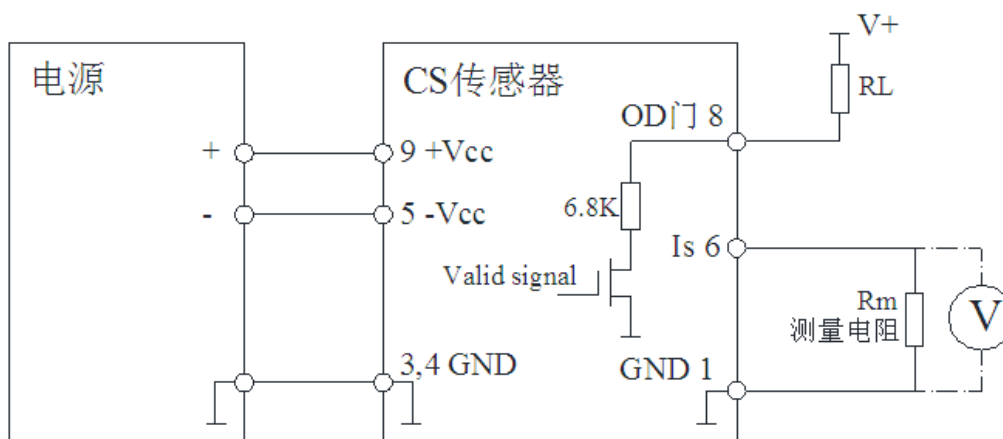
Notes:

- Tolerance: The tolerance for the dimensions and installation positioning dimensions is in accordance with the Grade C standard of GB/T1804-2000.
- Terminal Type: DB9 male connector.

8.2. DB9 Terminal Definitions

Pin	1、 3、 4	2、 7	5	6	8	9
Definition	GND Terminal	NC Terminal	-Vc Terminal	Is Output Terminal	Effective Indicator Terminal	+Vc 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:

$$I_P = K_N * I_S = K_N * (U_R / R_M)$$

The output status indicator signal terminal (8th pin of DB9) forms an OD gate circuit with the GND terminal. The maximum voltage it can withstand is 60V, and the maximum current is 2mA.

10. Packing List

Item No.	Name	Model and Specification	Quantity	Note
1	Current Sensor	CSA401-P030T01	1 piece	--
2	Connector	DB9 Female	1 piece	--
3	User Manual	CSA401-P030T01	1 copy	--

11. Precautions

- When powering up, the power supply for the current sensor must be connected first, followed by the measurement circuit current. When powering down, disconnect the measurement circuit current first, then the power supply for the current sensor. Failure to do so may result in decreased sensor accuracy or damage to the sensor.
- When the sensor is powered or connected to the measurement circuit current, the secondary side must not be left open-circuited.
- The output current I_S is positive when the direction of the input current I_P is consistent with the direction indicated by the arrow on the device.
- The primary conductor should be positioned as close to the center of the sensor's aperture as possible.
- The temperature of the primary conductor must not exceed 100°C.
- This module is a standard sensor. For special applications, please contact us.
- We reserve the right to modify this sensor manual without prior notice.



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