



CSA302-P042T01 / SP2 Current Sensor

User Manual

A1.0

Thank you for choosing the YINHE ELECTRIC current sensor

This manual is the user manual for the CSA302-P042T01/SP2 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 CSA302-P042T01 / SP2 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 ($\pm 5^{\circ}\text{C}$), supply voltage (U_C) of $\pm 28\text{V}$, and a load resistance (R_M) of 2Ω . Special conditions are noted separately.

Item	Symbol	Test Conditions	Value			Unit
			Minimum	Nominal	Maximum	
Primary rated current(DC)	$I_{PN\ DC}$	--	-3000	--	3000	A
Primary Rated Current (AC rms)	$I_{PN\ AC}$	--	--	2121	--	A
Primary Overload Current	$I_{P\ OL}$	1 minute/hour	-3600	--	3600	A
Supply Voltage (DC)	U_C	Full range	--	± 28	--	V
Current Ratio	K_N	Input: Output	3000:1			--
Rated Output Current	I_{SN}	Primary rated current	--	± 1.0	--	A
Measurement Resistance	R_M	--	0	--	2	Ω

5. Precision - Dynamic Parameters

Item	Symbol	Test Conditions	Value			Unit
			Minimum	Nominal	Maximum	
Accuracy	X_e	Input DC	--	--	50	$\mu\text{A/A}$
Ratio Error	X_{Ge}	Input AC 50Hz/60Hz	--	--	100	$\mu\text{A/A}$
Phase Angle Error	$\Delta\phi$		--	--	0.3438	'
Linearity	ε_L	--	--	--	5	$\mu\text{A/A}$
Temperature Drift Coefficient	T_{COUT}	--	--	--	1	$(\mu\text{A/A}) / \text{K}$
Time Drift Coefficient	TT	--	--	--	0.2	$(\mu\text{A/A}) / \text{month}$
Power Supply Interference	TV	--	--	--	1	$(\mu\text{A/A}) / \text{V}$
Zero Offset Current	I_o	$25\pm 10^{\circ}\text{C}$	--	--	2	$\mu\text{A/A}$
Zero Offset Current	I_{oT}	Full operating temperature range	--	--	± 10	$\mu\text{A/A}$
Ripple Current	I_n	DC $\sim 10\text{Hz}$	--	--	0.5	$\mu\text{A/A}$
Dynamic Response Time	t_r	--	--	--	1	μs
Current Following Speed	di/dt	--	200	--	--	$\text{A}/\mu\text{s}$

Bandwidth (-3 dB)	BW	--	0	--	30	kHz
-------------------	-----------	----	---	----	----	-----

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	--	-10	--	+70	°C
Storage Temperature Range	T_S	--	-25	--	+85	°C
Mass	m	--	4.9±0.1			kg

7. Security Features

Item		Symbol	Test Conditions	Value			Unit
				Minimum	Nominal	Maximum	
Transient Isolation Voltage	Between Primary and Secondary Sides	U_w	50μs	--	7.5	--	kV
Comparative Tracking Index (CTI)		CTI	IEC-60112	--	1	--	kV

8. Outline Dimensions and Port Definitions

8.1 Current Sensor Appearance and Dimension Drawing

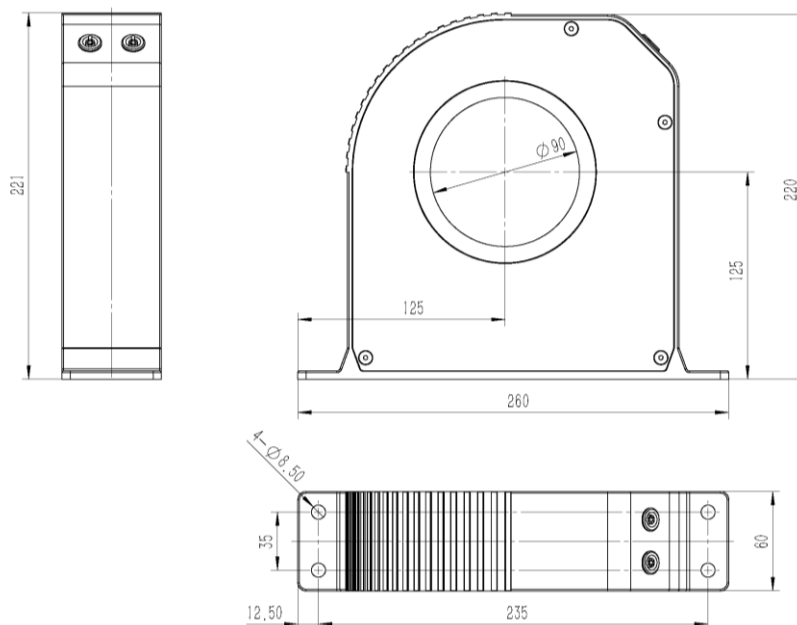


Figure 1: Product Appearance and Dimension Drawing (Unit: mm)

Explanation of Appearance Drawing:

- Tolerance: The tolerance for the overall dimensions and installation positioning dimensions shall be in accordance with the Grade C standard of GB/T1804-2000.

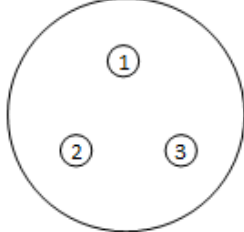
- Connection Terminals:

POW: Power connection terminal (three-core aviation plug);

AO: Output connection terminal (seven-core aviation plug).

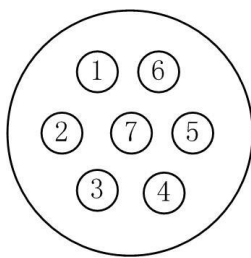
8.2 Pin Definitions for Connection Terminals

POW Interface Pin Definitions:



Pin	Definitions
1	VSS
2	GND
3	VCC

AOAO Interface Pin Definitions:



Pin	Definitions	Pin	Definitions
1	NC	5	NC
2	NC	6	M_V+
3	GND	7	M_V-
4	M_A	--	--

Pin Definitions:

- VCC: Positive terminal of the sensor's operating power supply;
- VSS: Negative terminal of the sensor's operating power supply;
- GND: Power ground;
- M_V+: Positive terminal for voltage differential output signal (not applicable for this sensor);
- M_V-: Negative terminal for voltage differential output signal (not applicable for this sensor);
- Signal terminal for current single-ended output.

8.3 Power Supply Appearance and Dimension Drawing (Unit: mm)

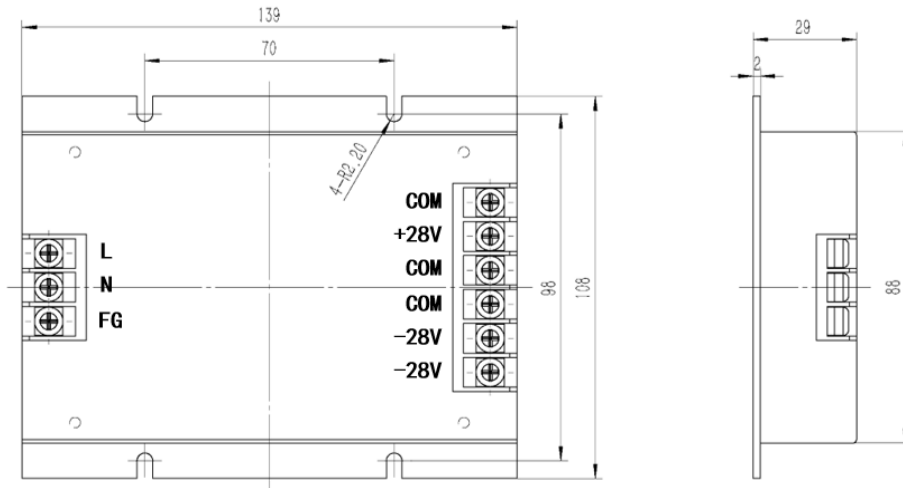


Figure 2: Power Supply Appearance and Dimension Drawing (Unit: mm)

Function	L	N	FG	COM	+28V	COM	COM	-28V	-28V
Definitions	Live Wire	Neutral Wire	Earth	Common Terminal	28V Output Positive	Common Terminal	Common Terminal	28V Output Negative	28V Output Negative

9. Application Connection and Description

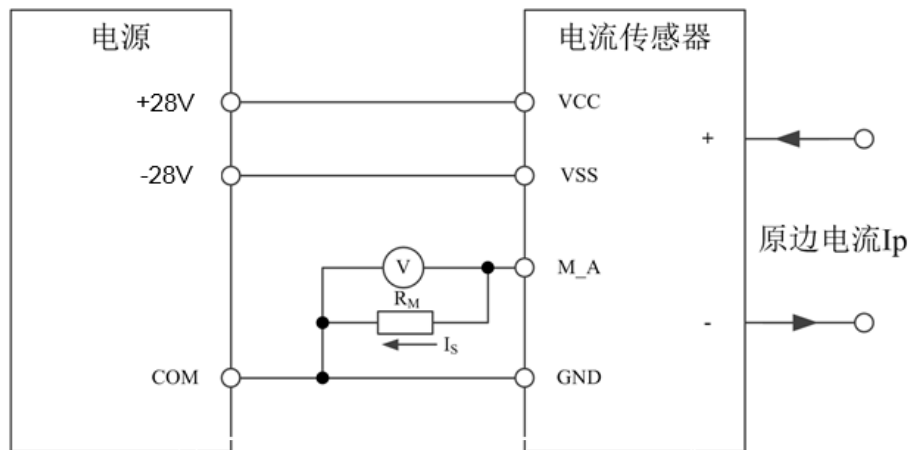


Figure3: Electrical connection

Testing Instructions:

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:

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

10. Packing List

Item No.	Name	Model and Specification	Quantity	Note
1	Current Sensor Host	CSA302-P042T01 / SP2	1 piece	--
2	Current Sensor Power Supply	--	1 piece	--
3	Power Connection Cable	Three-core	1 piece	--
4	AO Connection Cable	Seven-core	1 piece	--
5	Product User Manual	CSA302-P042T01 / SP2	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.



地址：湖南省长沙市经济技术开发区开元路 17 号湘商世纪鑫城 43 楼
邮编：410073
前台：0731-8839 2988
传真：0731-8839 2900
商务：0731-8839 2955
技术咨询：0731-8839 2611
售后服务：0731-8839 2988-218
网址：www.vfe.ac.cn

