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Fluxgate Closed Loop Current Sensor CYFGCS3000AIT

CYFGCS3000AIT is a current sensor based on the fluxgate closed-loop principle, and can be used for measuring DC, AC, pulse and various irregular waveform currents under galvanic isolation conditions.

The multi-point zero-flux technology is applied to existing high-precision DC sensor technology. By combining excitation flux closed-loop control, self-excitation flux gate technology, and multi-loop control, it achieves zero-flux closed-loop control of excitation flux, DC flux, and AC flux. Additionally, by establishing a high-frequency ripple sensing channel, it enables the detection of high-frequency ripple, thereby providing the sensor with high gain and measuring accuracy across the entire bandwidth.

Core Technologies

- Closed-loop excitation flux control technology
- Self-excitation demagnetization technology
- Multi-point zero-flux technology
- Multi-range automatic switching technology
- Temperature compensation technology

Performance Features

- Primary-to-secondary isolation measurement
- Excellent linearity and accuracy
- Extremely low temperature drift
- Extremely low zero drift
- Strong resistance to electromagnetic interference
- Wide bandwidth and fast response time

Technical Data

Parameters	Symbol	Test Conditions	Values	Unit
Supply Voltage	V_C		±24 (±5%)	V
Rated input current DC	I_{PN_DC}		±3000	A
Rated input current AC RMS	I_{PN-AC}		2121	A
Current measuring range	I_{PM}		0 ~ 1.1 x I_{PN}	A
Current to current ratio	K_N	Input : Output	3000 : 1000	A/mA
Rated output current DC	I_{OUT}	Rated input current	±1000	mA
Measuring resistance	R_M		0~1.5	Ω
Current consumption	I_C	Rated input current	±(50~150)+I_{OUT}	mA
Linearity	ε_L	Whole measuring range	≤±20	ppm
Accuracy (T_A=-25°C± 20°C)	X	DC input current	≤±50	ppm
Temperature stability	T_C		≤±0.1	ppm/°C
Time stability	T_T		≤±0.2	ppm/month
Power Supply Immunity	T_V		≤±1	ppm/V
Zero point offset current	I_O	T_A=25°C	<±1	ppm
Zero point offset current	I_{OT}	T_A=-40°C ~ 85°C	<±5	μA
Ripple Current	I_N	DC~10Hz	0.5	ppm
Following accuracy di/dt	di/dt		>100	A/μs
Response time	Tr	di/dt=100A/μs, 90% I_{PN}	<1	μs
Bandwidth (-3dB)	F		DC~200	kHz
Operating temperature	T_A		-40~+85	°C
Storage temperature	T_S		-55~+95	°C
Relative humidity	RH		20-80	%
Mass	m		7.2±0.5	kg

Safety Features

Parameters	Symbol	Test Conditions	Values	Unit
Isolation voltage	V_d	50Hz, 1min	5	kV
Transient isolation voltage	V_W	50μs	10	kV
Creepage distance	dCp	Primary side to enclosure	77.5	mm
Electrical Clearance	dCi	Primary side to enclosure	72.5	mm
Comparative tracking index	CTI	IEC-60112	600	V

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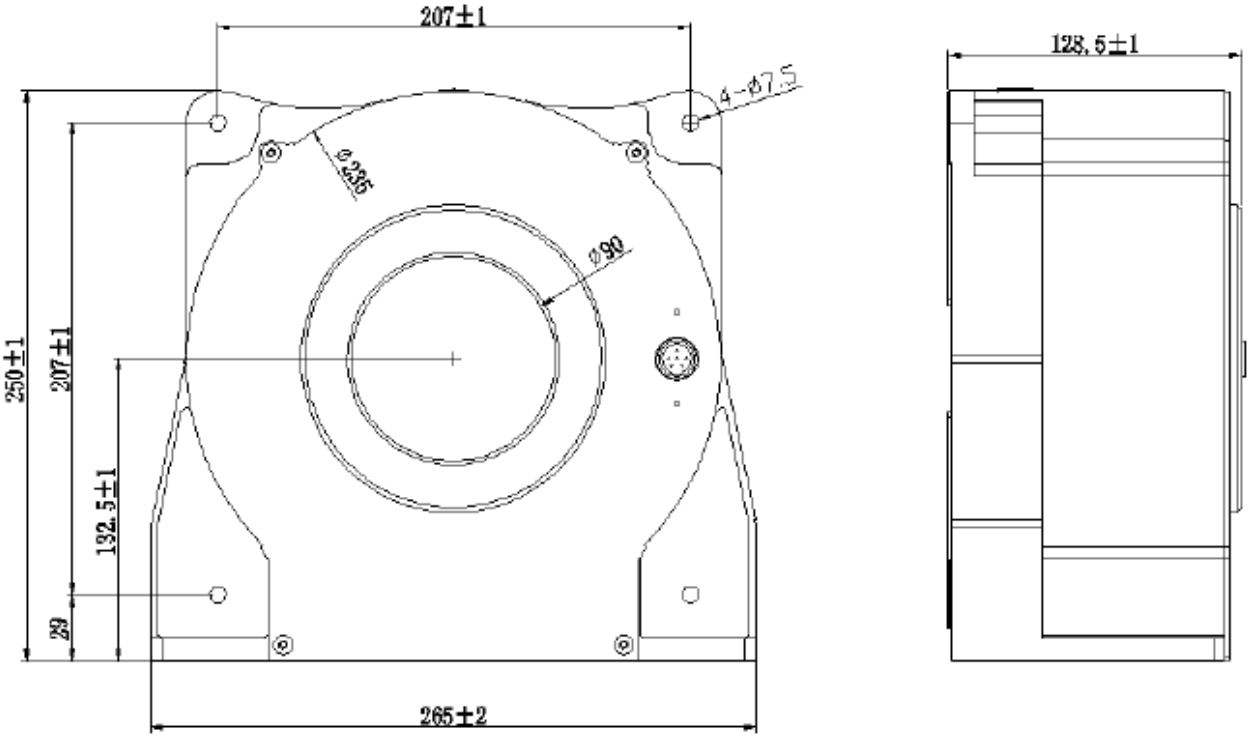
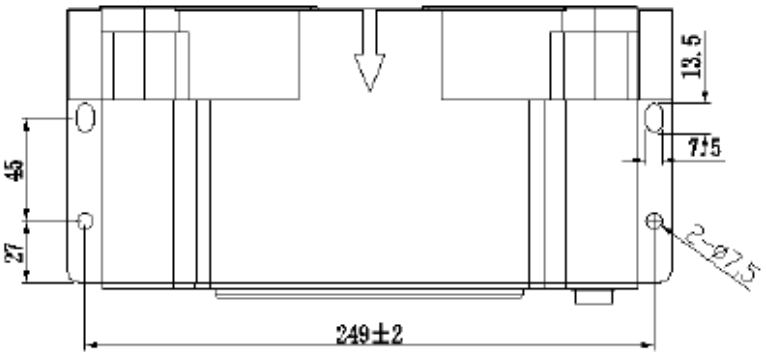
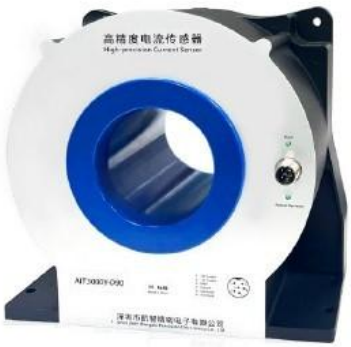
Case Style and Connection



Unit: mm

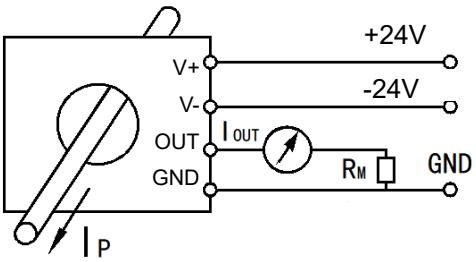




The housing of this product is a die-cast part made of ADC10 material. Unless otherwise specified, dimensional tolerances comply with the GB/T 15114-2009 and GB 6414-2017-DCTG7 standards.

Pin arrangement:

V+: +24V
V-: -24V
OUT: I_{OUT}
GND: 0V (power ground)



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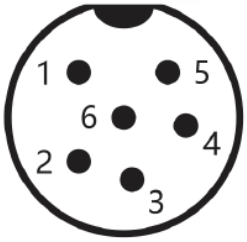
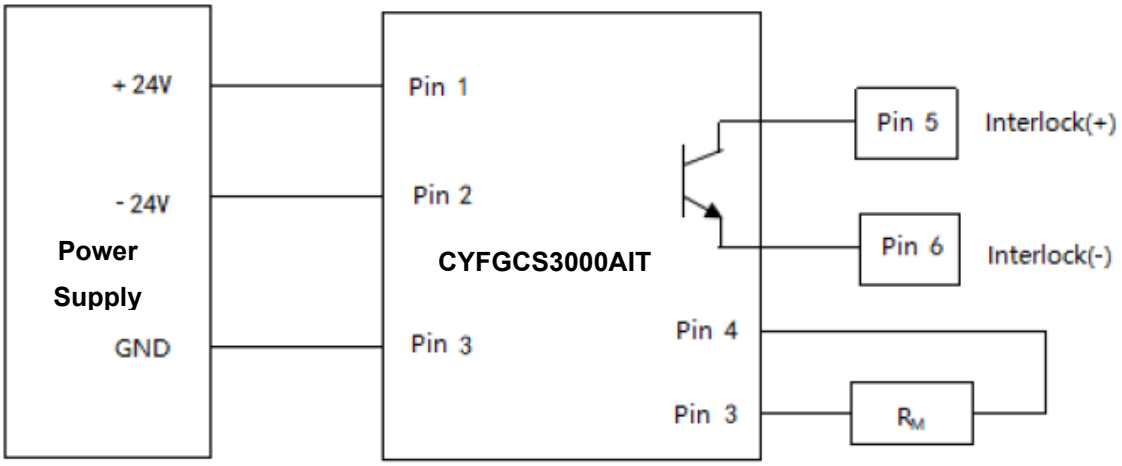
Pin Arrangement

Pin	1 (V+)	2 (V-)	3 (GND)	4 (OUT)	5	6
Definition	+24V	-24V	GND	Output	Interlock+	Interlock-

1、+24V
2、- 24V
3、GND
4、Output
5、Interlock+
6、Interlock-





Operating Status Description

◇ When the sensor is powered normally, the power indicator light remains on:
If the power indicator light is off after the device is powered on, first check whether the wiring between the power supply and the sensor is correct.

◇ When pins 5 and 6 of the aviation connector are used in conjunction with an external circuit, they can transmit the sensor's operational status signal to an external controller. For external circuit design methods, see the "Interlock Port Connection Instructions" below.

◇ When the sensor is operating normally, the operation status indicator remains lit:
After powering on the device, when it is functioning normally, the green indicator light remains lit, and pins 5 and 6 of the aviation connector are conductive.

◇ The green indicator turns off during current overload or power supply abnormalities:
If the green indicator is off, first check whether the sensor's power supply is functioning normally.

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If the power supply is normal but the green indicator is off, this indicates that the current sensor is in a non-zero flux state. If the bus input current exceeds the sensor's specified range at this point, the sensor enters overload mode, and the output current is no longer proportional to the input current signal. In overload mode, the sensor's output current remains at the maximum output level, and the green indicator light turns off. Once the input current returns to the specified measuring range, the sensor's output current returns to normal, and the green indicator light remains on.

◇ In overload mode, pins 5 and 6 of the aviation connector are disconnected.

Test Instructions

By measuring the output current I_{OUT} flowing through the R_M, or the voltage U_R across the measuring resistor R_M, the primary current I_P can be determined by:

$$I_P = K_N * I_{OUT} = K_N * (U_R / R_M)$$

Interlock Terminal Connection Instructions

Depending on the user's specific application, there are two design options for the Interlock terminal connection, as shown in Figures A and B, respectively:

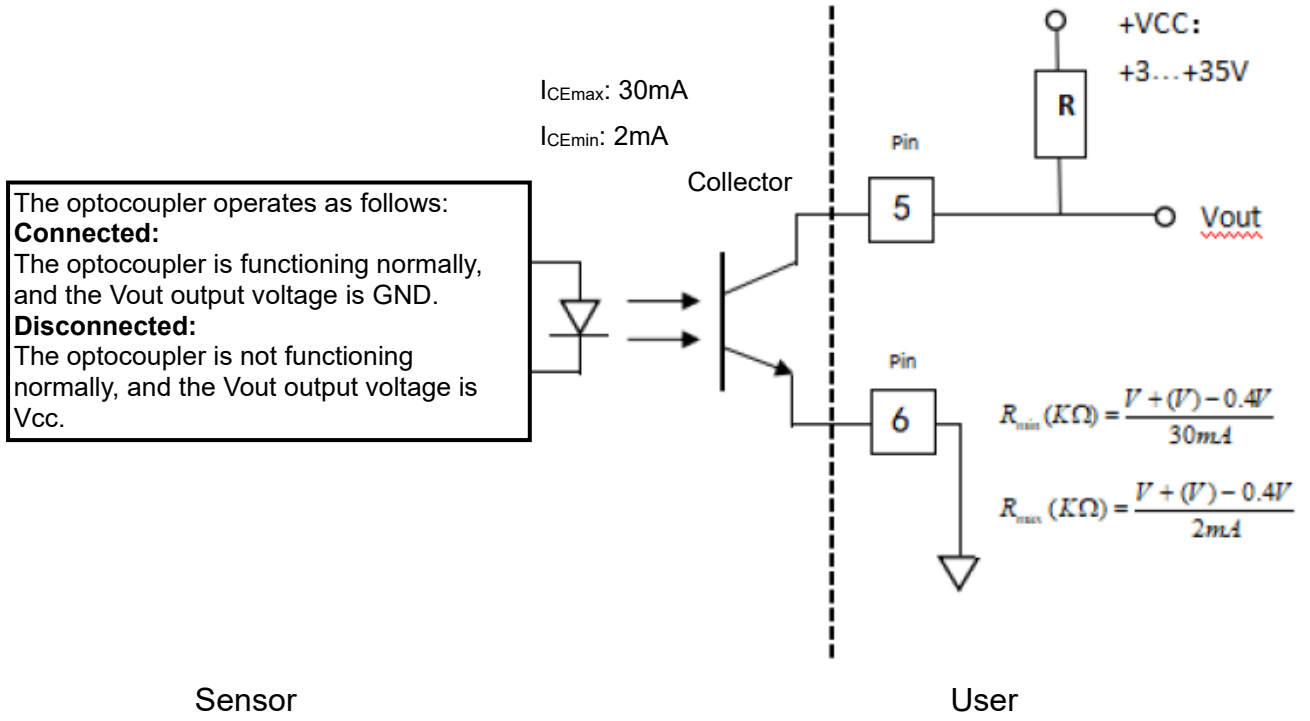

Figure A: Low-level output when the sensor is operating normally

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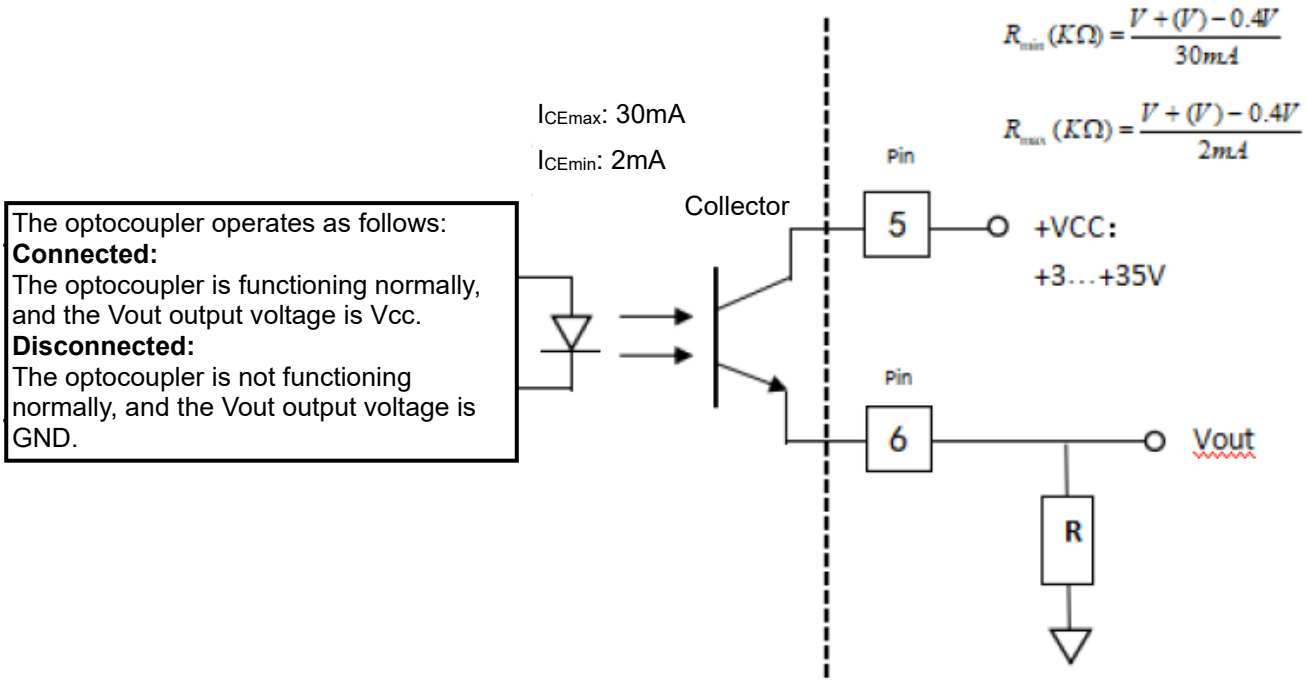

Figure B: High-level output when the sensor is operating normally

The output of the optocoupler pin Vout at the interlock port depends on the user's circuit design, as shown in the table below:

Item	Vout	Description
Figure A	< 0.2V	The sensor is operating normally.
	Vcc	The sensor is not operating normally; it is in overload mode or the power supply is abnormal
Figure B	< 0.2V	The sensor is not operating normally; it is in overload mode or the power supply is abnormal
	Vcc	The sensor is operating normally.

Application Note

1. Incorrect wiring may cause damage to the sensor. After the sensor is powered on, the same-phase voltage value can be measured at the output terminal when the measured current passes through the sensor in the direction of the arrow.
2. When taking measurements with the sensor, configure the measuring resistor according to the specifications in the data sheet. Additionally, ensure that the measuring resistor is securely connected to the sensor's output terminal to prevent an open circuit in the sensor output, which could cause product malfunction.

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3. The sensor must be powered with two voltage supplies. The operating voltage of the power supplies must comply with the requirements, and the supply current for both the positive and negative terminals must be no less than the maximum power consumption current specified in this data sheet, with a margin of safety.
4. The temperature of the primary measuring wire or copper rod should not exceed 95°C.

Application Areas

- Medical Equipment: Scanners, MRI
- Power: Converters, Inverters
- New Energy: Photovoltaics, Wind Power
- Automotive: Electric Vehicles
- Naval: Electric-powered Ships
- Aerospace: Satellites, Rockets
- Metrology: Verification and Calibration
- Rail Transit: High-speed Trains, Subways, Trams and Trolleys
- Test and measuring instruments: Power analyzers, high-precision power supplies
- Smart grid measurement: Power generation, battery monitoring, medium- and low-voltage substations
- Industrial control: Industrial motor drives, welding, robotics, cranes, elevators, ski lifts

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