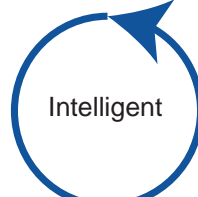
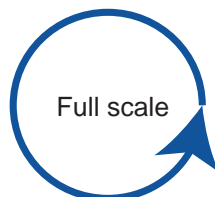
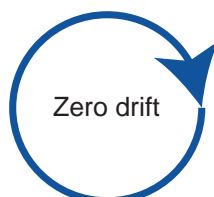
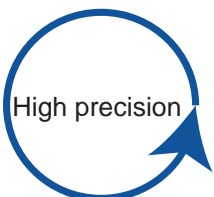




HY-PCT Series High precision current sensor



Application field

- Medical equipment: scanners, MRI
- Rail transportation: high-speed trains, subways, trolleybuses
- Aerospace: satellites, rockets
- Instrumentation: power analyzer, high-precision power supply
- Smart grid: power generation, battery monitoring, medium and low voltage substations
- Industrial Control: Industrial Motor Drive, UPS, Welding, Robot, Crane, Elevator, Ski Lift
- Ships: Electric powered ships
- Electricity: converter, inverter
- Metrology: Verification and Calibration
- Car : Electric car
- New energy: photovoltaic, wind energy



Industrial medical and electrical testing equipment

- It can measure instantaneous current and voltage value in isolation state, and can measure current in non-contact mode, and the measurement range is from 0.1A to 5000A.

Electric vehicle field

- It can be used for power management and motor drive of cars, buses and trucks.
- Contribute to energy saving and environmental protection, and reduce energy consumption through current control in high energy consumption applications.



High-speed EMU field

- Measure instantaneous current and voltage values in isolation.
- Select the non-contact method to measure the current, the measurement range is from 0.1A to 5000A.
- The highly flexible modular design of installation can meet different market demands of railway systems.
- Reach high performance indicators, the accuracy is from 5-20ppm, and the short-circuit response is real-time response.
- Wide temperature range, high insulation withstand voltage and electromagnetic compatibility design, meet the railway standards of different countries.

Energy equipment field

- Combines advanced AC and DC sensing technology and signal conditioning circuitry (rms, true, threshold detection, etc.).
- Output switch signal, relay forming signal, electrical isolation standard model (such as DC 0-5V, DC 0-10V or 4-20mA), can be directly connected to programmable controller or monitoring equipment.
- Using advanced technology and craftsmanship, it is adjusted and calibrated many times in the production process to make the product meet the performance and quality standards required by the market.



HY-PCT Series High precision current sensor

After years of technical precipitation, Hangyu Power has always been committed to the research and development and production of high-end high-precision sensors, continuously improving the quality of sensors in terms of measurement accuracy, temperature characteristics, response time, stability, reliability, etc., and launched the HY-PCT series of high-precision sensors. , not only for AC and DC, but also has the advantages of high precision, low zero drift, low temperature drift, intelligence, etc., reducing the purchase cost and meeting the needs of bulk purchases to expand production.

Core Technology

- Excitation flux closed-loop control technology
- Self-excited demagnetization technology
- Multi-point zero-flux technology
- Multi-level range automatic switching technology
- Temperature control compensation technology

Performance characteristics

- Primary and secondary side isolation measurement
- Excellent linearity and accuracy
- Strong anti-electromagnetic interference ability
- Wide frequency band and low response time

Features



Full scale

Various types
Various models



High precision

Precision: 2PPM, 5PPM
10PPM, 50PPM can be selected



AC and DC universal

Can measure AC, DC,
pulse current



Zero drift

Drift: 2PPM



Small temperature drift, good consistency

Temperature influence:
1PPM/10 degrees



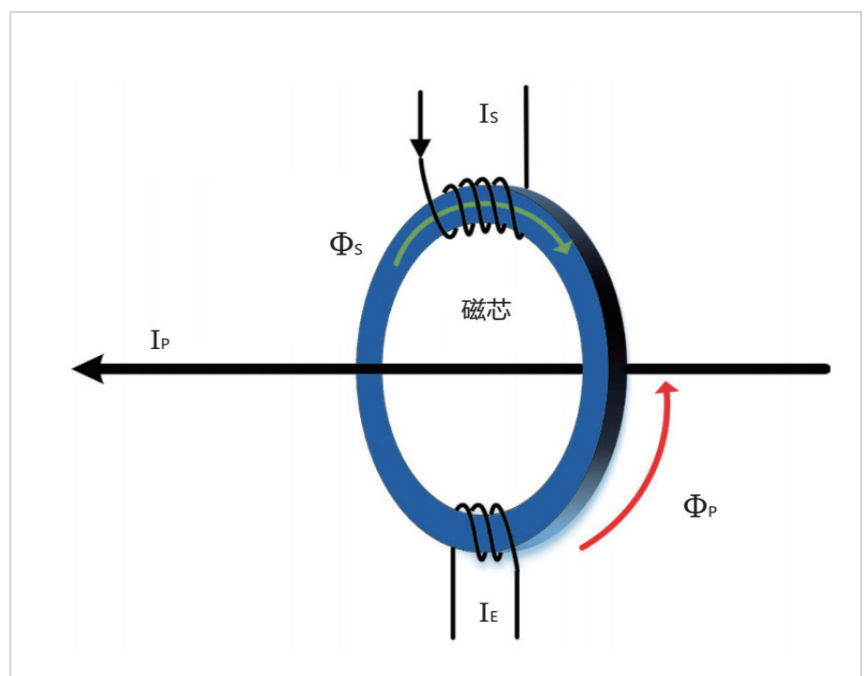
Intelligent

Start with load
Overload protection,
self-recovery

Technical principle

The magnetic core is excited by IE to reach a state of magnetic equilibrium. The introduction of the primary current IP breaks the magnetic balance and generates a flux linkage Φ_P . Based on this, one or more currents in opposite directions are applied to the magnetic core to generate opposite The directional flux linkage Φ_S finally makes the total magnetic flux in the magnetic core 0. It is known that the number of turns of the coil applying the IS current is N, then: $I_P = N I_S$

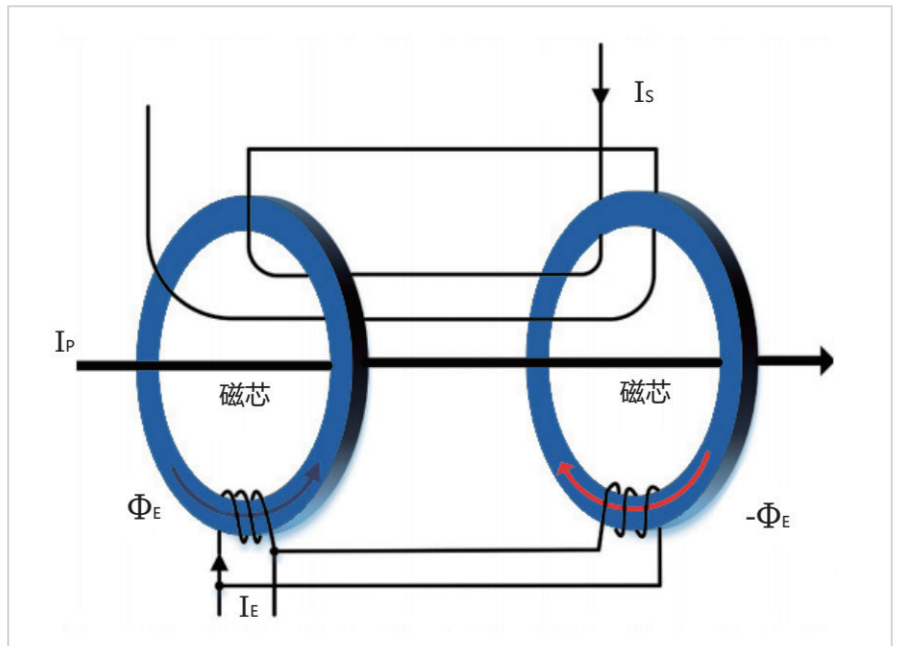
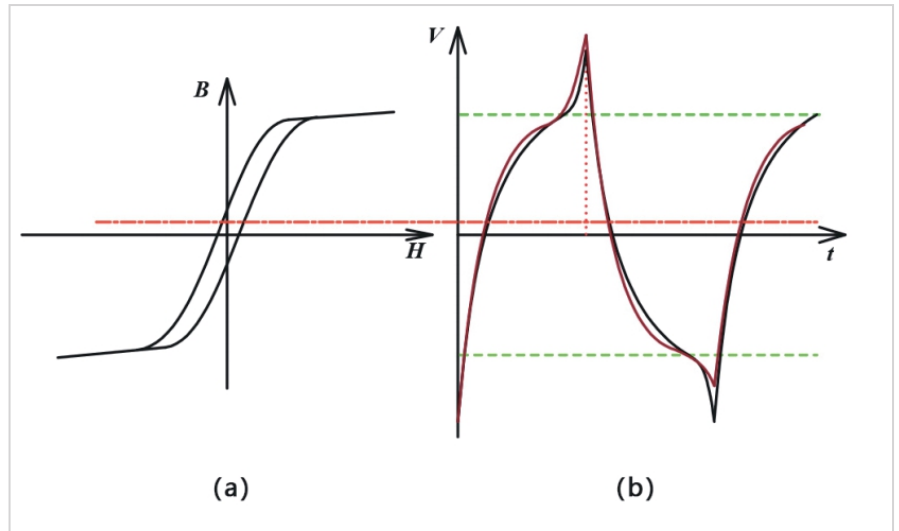
The basis of this theory is the need for a precise zero-flux detector. In order to ensure the linearity, stability, noise figure, frequency response and other technical parameters of the entire system, the zero-flux detector must be sensitive enough and not easily detected by other flux linkage interference.



The zero-flux detector relies on the nonlinear relationship between the magnetic field strength H and the magnetic flux density B near the magnetic field saturation of the ferromagnetic material, as shown in the right figure (a).

The current waveform in the magnetic core is shown in Figure (b), the area shown by the peak is that the coil is in a near-saturated state, the AC impedance decreases, and the current in the coil increases or decreases exponentially. When the primary current $I_P \neq 0$, the magnetic flux Φ_S generated by I_P will break the balance. Yes, the magnetic induction intensity in the direction of the magnetic flux linkage of the coil I_P increases, and the current increases. On the other hand, the current decreases. Get the current I_P size.

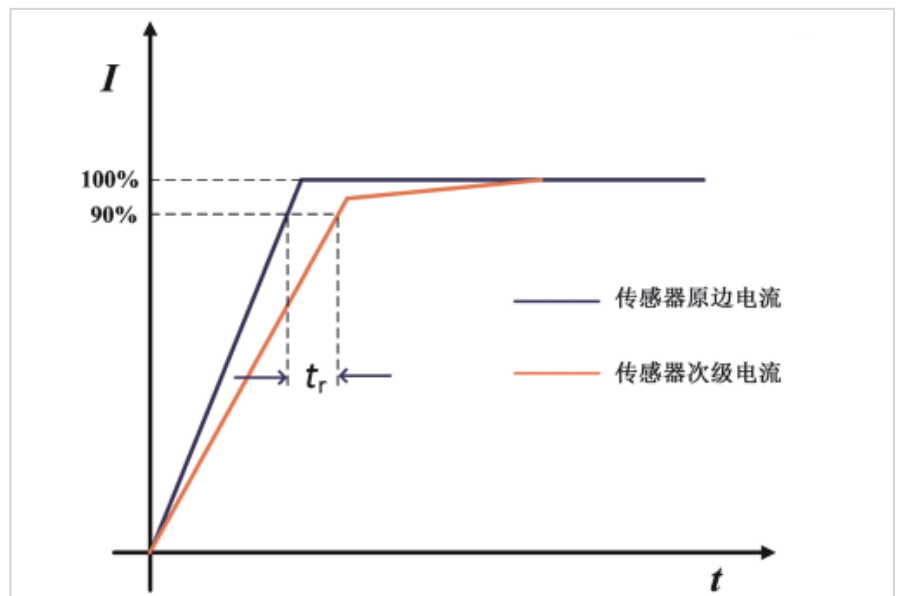
At the same time, due to the transformer effect, the I_E will induce a current on the I_P , which will affect the measurement results. In order to reduce this error source, an additional magnetic core of the same size as the excitation signal is added, and an excitation signal of equal size and opposite direction is applied, so the induced magnetic field This is greatly reduced, thereby eliminating the perturbation on the primary conductor, as shown in the figure on the right, adding an AC response winding dedicated to improving the entire detection system can extend the frequency response of the entire sensor to hundreds of kHz.



Response time

The response time of the sensor refers to the speed of Changan's secondary current settling time. As shown in the figure on the right, the measurement of the sensor's secondary current lags behind the primary current settling time. When the measured current of the sensor reaches 90% of the nominal value of the current, the time difference obtained by comparing it with the current establishment curve of the primary side is the response time of the sensor.

The faster the response time of the sensor, the better its performance.



Product model

Product number	Primary side rated current RMS	Overload capacity	Secondary rated signal	Precision	Supply voltage ($\pm 5\%$)	Bandwidth (kHz)	Aperture (mm)
HY-PCT6000	$\pm 6000\text{A}$	$\pm 6600\text{A}$	1000mA	50ppm	$\pm 220\text{V}$	300	$\varnothing 90$
HY-PCT5000	$\pm 5000\text{A}$	$\pm 5500\text{A}$	1000mA	50ppm	$\pm 220\text{V}$	300	$\varnothing 90$
HY-PCT4000	$\pm 4000\text{A}$	$\pm 4400\text{A}$	1000mA	50ppm	$\pm 220\text{V}$	300	$\varnothing 70$
HY-PCT3000	$\pm 3000\text{A}$	$\pm 3300\text{A}$	1000mA	50ppm	$\pm 220\text{V}$	300	$\varnothing 70$
HY-PCT2000	$\pm 2000\text{A}$	$\pm 2200\text{A}$	1000mA	50ppm	$\pm 220\text{V}$	300	$\varnothing 50$
HY-PCT1500	$\pm 1500\text{A}$	$\pm 1600\text{A}$	1500mA	10ppm	$\pm 15\text{V}$	500	$\varnothing 38$
HY-PCT1000	$\pm 1000\text{A}$	$\pm 1200\text{A}$	667mA	10ppm	$\pm 15\text{V}$	500	$\varnothing 38$
HY-PCT600	$\pm 600\text{A}$	$\pm 720\text{A}$	400mA	10ppm	$\pm 15\text{V}$	500	$\varnothing 38$
HY-PCT500	$\pm 500\text{A}$	$\pm 600\text{A}$	333mA	10ppm	$\pm 15\text{V}$	500	$\varnothing 38$
HY-PCT400	$\pm 400\text{A}$	$\pm 480\text{A}$	200mA	10ppm	$\pm 15\text{V}$	500	$\varnothing 26$
HY-PCT300	$\pm 300\text{A}$	$\pm 360\text{A}$	150mA	10ppm	$\pm 15\text{V}$	500	$\varnothing 26$
HY-PCT200	$\pm 200\text{A}$	$\pm 240\text{A}$	200mA	10ppm	$\pm 15\text{V}$	500	$\varnothing 26$
HY-PCT60	$\pm 60\text{A}$	$\pm 72\text{A}$	100mA	10ppm	$\pm 15\text{V}$	500	$\varnothing 26$

Electrical performance

Item	Symbol	Test Conditions	Minimum	Nominal	Maximum	Unit
Primary rated DC current	IPN_DC	—	—	± 500	—	Adc
Primary rated AC current*	IPN	—	—	353	—	Aac
Primary overload current	IPM	1min	—	—	± 600	Adc
Operating Voltage	VC	—	± 14.2	± 15	± 15.8	V
Power consumption current	IPWR	Primary side rated current	± 30	± 363	± 430	mA
Current transformation ratio	KN	Input: Output	1500:1	1500:1	1500:1	—
Rated output current	ISN	Primary side rated current	—	± 0.333	—	A
Measuring resistance	RM	See picture 1	0	3	10	Ω

* Refers to AC RMS

Accuracy measurement

Item	Symbol	Test Conditions	Minimum	Nominal	Maximum	Unit
Accuracy	X _G	Input DC, 25±10°C	—	—	10	ppm
Linearity	ε _L	—	—	—	2	ppm
Temperature stability	T _c	—	—	—	0.1	ppm/K
Time stability	T	—	—	—	0.2	ppm/month
Power supply anti-interference	T _v	—	—	—	1	ppm/V
Zero offset current	I _o	@25°C	—	—	1 (User adjustable)	μA
Ripple current	I _N	DC-10Hz	—	—	0.5	ppm
Dynamic response time	t _r	di/dt=100A/μs, up to 90%IPN	—	—	1	μ
Current rate of change	di/dt	—	100	—	—	A/μs
Bandwidth (-3dB)	F	—	0	—	500	kHz
Zero offset current	I _{OT}	Full temperature range	—	—	±5	μA

Safety features

Item	Symbol	Test Conditions	Value	Unit
Isolation voltage / between primary and secondary	V _d	50Hz, 1min	5	KV
Transient isolation withstand voltage / between primary and secondary	V _w	50μs	10	KV
Creepage distance / between primary and enclosure	dC _p	—	11	mm
Clearance distance / between primary and housing	dC _i	—	11	mm
Compared with the tracking index	CTI	IEC-60112	600	V

General Features

Item	Symbol	Test Conditions	Minimum	Nominal	Maximum	Unit
Range of working temperature	T _A	—	-40	—	+85	°C
Storage temperature range	T _s	—	-40	—	+85	°C
Relative humidity	RH	—	20	—	80	%
Quality	M	—		1150±80		g

Instructions for use of load resistors

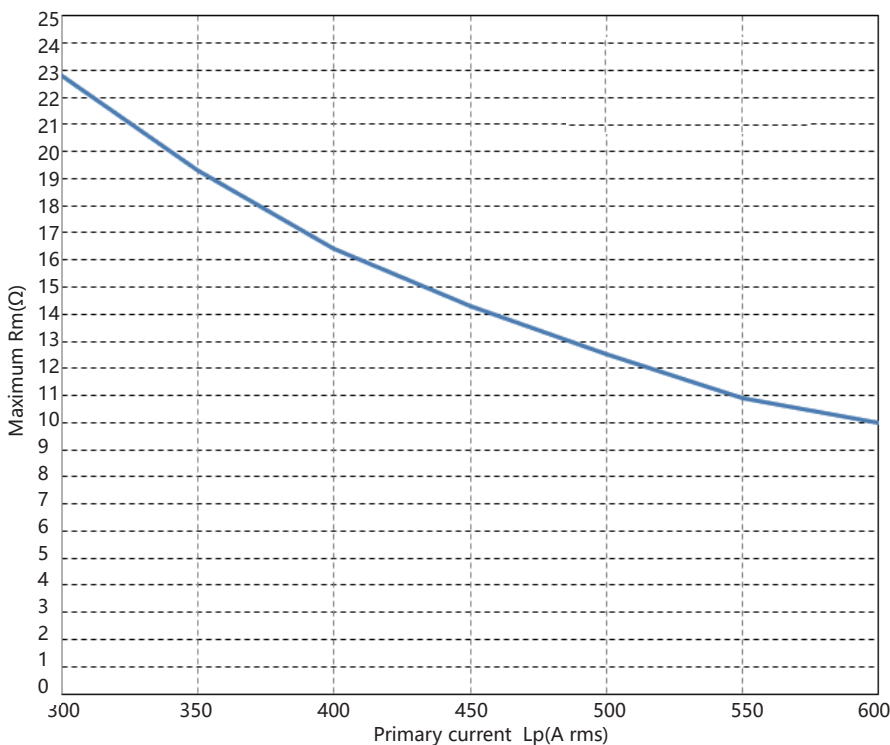


Figure 1: Graph of load resistance versus measured current.

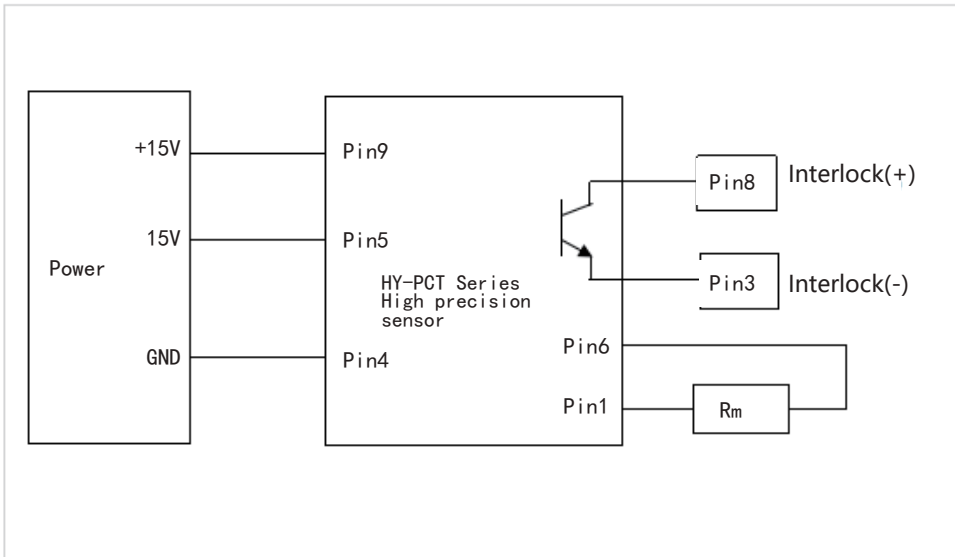
Description of running status

- ◇ During normal operation, the green light is always on:
After the device is powered on, when the device is working normally, the green indicator is always on, and the 3rd and 8th pins of the D-Sub9 interface are connected.
- ◇ When the current is overloaded or the power supply is abnormal, the green light goes out:
When the green light is not on, you should first check whether the power supply of the sensor is normal.
When the power supply is normal, if the green indicator light is off, the current sensor is in a non-zero flux state. At this time, if the input current amplitude of the bus exceeds the specified range of the sensor, the sensor enters the overload working mode, and the output current is no longer proportional to the input current signal. In overload mode, the sensor output current is kept at the maximum output state, and the green indicator light is off. When the input current returns to the specified measured current range, the sensor output current returns to normal, and the green indicator light is always on.
- ◇ In overload mode, pins 3 and 8 of the D-Sub9 interface are disconnected.

Application Connections and Instructions

1 D-Sub9 Connection terminal pin function definition

Pin number	1	2, 7	3	4	5	6	8	9
Definition	I_Output return	N.C	Interlock(-)	GND	-15V Supply	I_Output	Interlock(+)	+15V Supply



Test instruction:

By measuring the test current I_S flowing through R_M , or the voltage U_R across R_M ,

Primary current can be obtained

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

2. Interlock port connection instructions:

Interlock port connection method, according to the actual application of the user, there are two design methods as follows:

As shown in Figure A and Figure B, respectively:

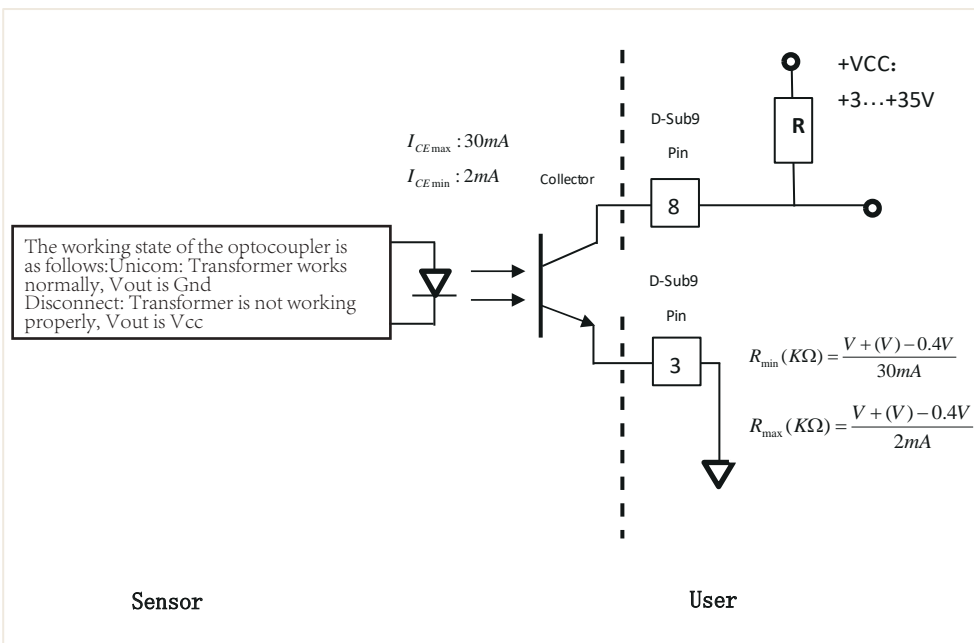


Figure A: Low level output during normal sensor operation

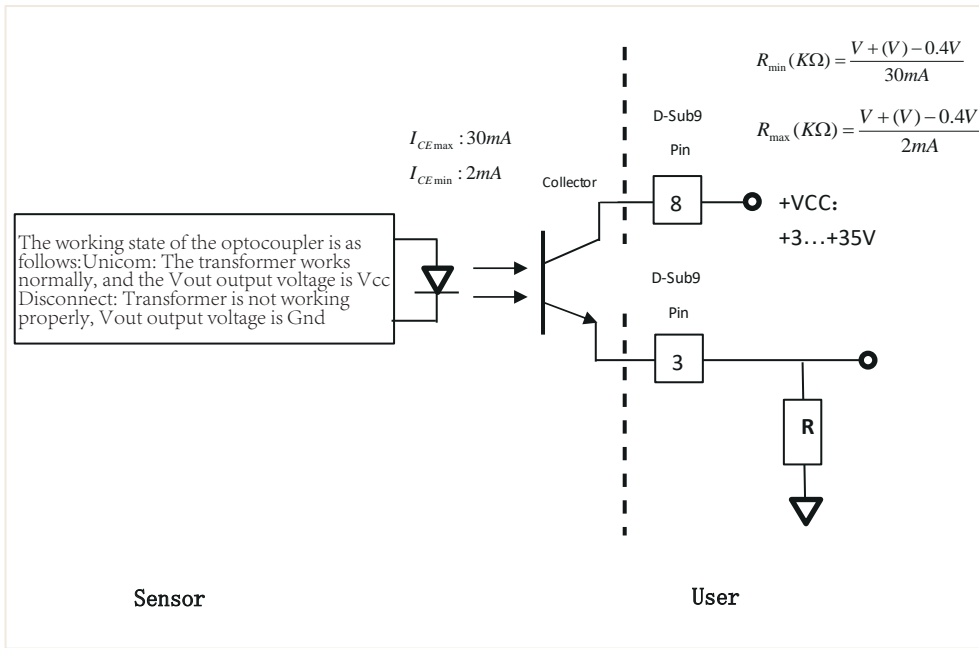
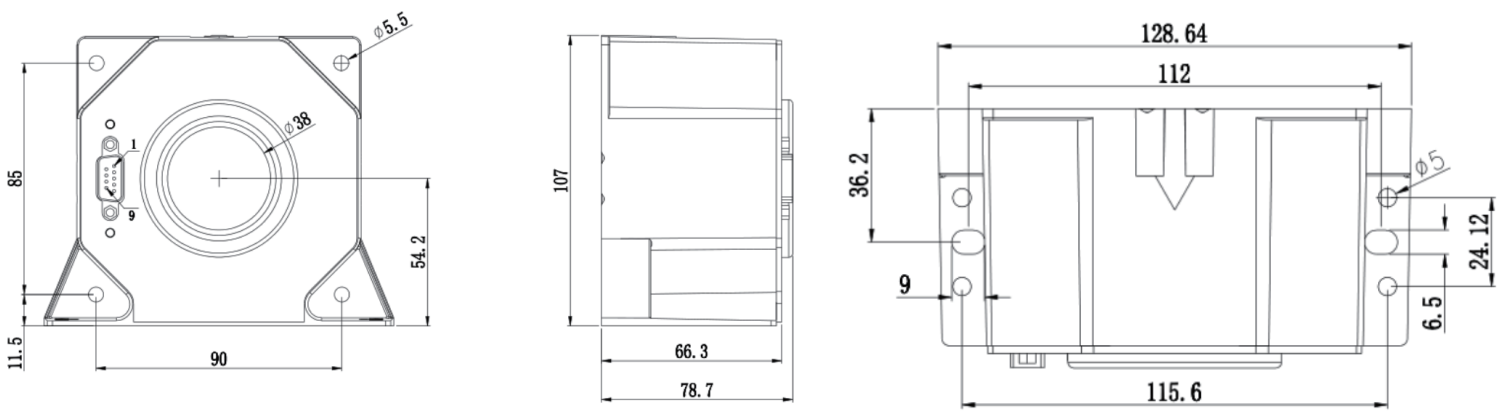


Figure B: High level output during normal operation of the sensor

3.The output of pin Vout in the optocoupler is related to the user-end design circuit, as shown in the following table:

Item	Vout	Description
Figure A	<0.2V	The sensor is operating normally
	Vcc	The sensor is running abnormally, in overload mode or the power supply is abnormal
Figure B	<0.2V	The sensor is running abnormally, in overload mode or the power supply is abnormal
	Vcc	The sensor is operating normally

Dimensions and Specifications



Unit:mm

This product is an aluminum die casting, the material is ADC10, and the shape and dimensional tolerances are implemented according to GB/T15114-2009 and GB6414-2017 - DCTG7 standards

About us

Founded in 2011, Hangyu Power System (Shanghai) Co., Ltd. is a national high-tech enterprise located in Songjiang, the source of the G60 Science and Technology Innovation Corridor in the Yangtze River Delta. For more than ten years, it has been committed to providing customers with accurate, intelligent and convenient test power solutions. Hangyu power series products cover aviation, aerospace, airborne, shipborne, weapons, ships, radar, communications, automotive electronics, rail transit, power electronics, low-voltage electrical appliances, sensors, capacitors and inductors, smart grid, medical, semiconductor and other testing and In other scientific research fields, it has perfectly realized import substitution, military quality and excellent service, and has won unanimous praise from users.

Contact us

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Website: www.hangyupower.com

- 2009 ● Establish electronic brand Shanghai Ozu.
- 2010 ● Successful delivery of 400KVA high-power AC power supply.
- 2011 ● Hangyu power supply was established and officially put into operation three-phase precision AC power supply and military gyroscope test power supply to replace Russian products.
- 2012 ● The program-controlled variable frequency power supply and AC constant current source were officially put into operation.
- 2013 ● Officially put into production programmable AC/DC power supply, HY-AE excitation power supply
- 2014 ● Officially put into production high-power bipolar test power supply
- 2015 ● Officially put into production HY-PM series, HY-GT series new dual-phase/three-phase gyro power supply
- 2016 ● Officially put into production HY-HP series programmable high-power DC power supply
- 2017 ● Officially put into production HY-HV series programmable high-voltage DC power supply
- 2018 ● HY-CTL/CTS capacitor test high frequency high current test power supply and successfully delivered 100kHz, 100Arms
- 2019 ● Officially put into production high-speed power supply for automotive electronics testing within 500kHz
- 2020 ● Officially put into production LV123 new energy vehicle test high voltage ripple test power supply
- 2021 ● Officially put into production HY-UHS series ultra-high stability magnet power supply
- 2022 ● Officially put into production HY-HVL series linear high voltage programmable DC power supply

