

YSCL Circular Gear Flow Meter

User Manual



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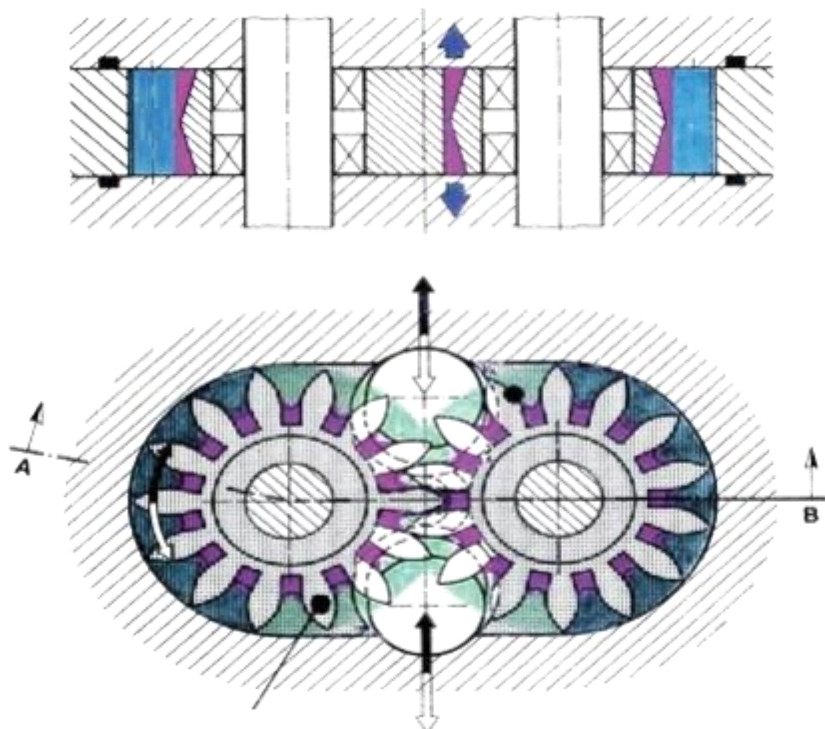
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I. Product Introduction:

The Circular Gear Flow Meter is an upgraded version developed based on the gear motor principle; it represents a novel positive-displacement flow meter that combines high precision with exceptional adaptability. Leveraging the technical expertise of the company's modern machining centers, precision testing equipment, and professional R&D team, this product is specifically designed to meet the precise metering requirements of industrial applications. It enables both continuous and intermittent measurement of liquids in pipelines, while accurately capturing both instantaneous and cumulative flow rate data.

Operating Principle and Structure:

The flowmeter chamber contains a pair of intermeshing gears serving as the rotor; these two gears, together with the chamber, each define a fixed volume known as the standard volume. The flow rate is measured by calculating the number of times the fluid passes through this standard volume within a given time interval. See the figure below:



II. Product Features:

- The YYPFM series gear-type flowmeter can measure various fluids across a range of applications by utilizing different clearances, bearing types, and materials.
- With a wide measurement range and various specifications, it can meet a variety of application requirements.
- The measurement is unaffected by viscosity within the specified range.
- Low pressure drop, low noise
- High-sensitivity measurement
- High voltage and extreme temperature resistance
- High-precision measurement with outstanding repeatability
- Over a wide temperature range, the output signal remains
 - unaffected by temperature; high accuracy is still maintained even at the lower limit of the low flow rate measurement range.
- High operational reliability of electronic components
- The pre-amplifier terminal is easy to use.

III. Technical Specifications:

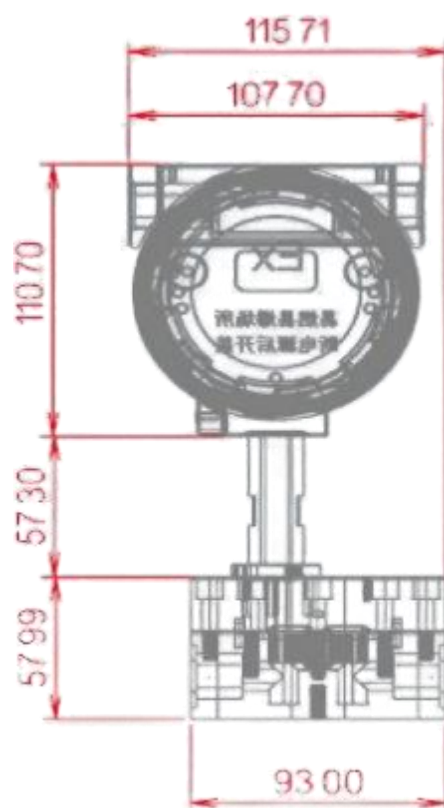
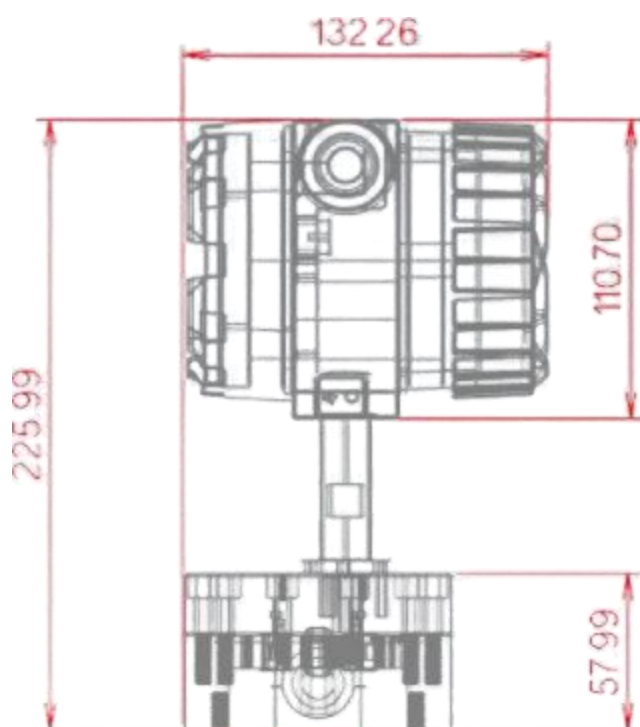
Technical Specifications	DN6	DN8	DN10	DN15	DN20
Stainless steel base surface operating pressure	40MPa	40MPa	40MPa	40MPa	40MPa
Aluminum alloy-based gauge operating pressure	2MPa	2MPa	2MPa	2MPa	2MPa
temperature range	-60℃~150℃	-60℃~150℃	-60℃~150℃	-60℃~150℃	-60℃~150℃
Viscosity range	1-100,000cSt	1-100,000cSt	1-10,000cSt	1-8,000cSt	1-8,000cSt
accuracy	±0.5% measurement value (viscosity> 20 cSt)	±0.5% measured value (viscosity> 30 cSt)	±0.5% measured value (viscosity> 30 cSt)	±0.5% measurement value (viscosity> 30 cSt)	±0.5% measurement value (viscosity> 30 cSt)
repeatability precision	±0.05% (under identical operating conditions)				
Traffic Range	0.0028 –0.56 L/min	0.012 –2.4 L/min	0.05– 10 L/min	0.2–40 liters per minute	0.6-120 RPM
sealing material	FPM	FPM	FPM	FPM	FPM
Maximum allowable impurity particle size	20µm	30µm	30µm	30µm	30µm
Reference coefficient L/P	10300	3800	1290	343	158

pay attention to:

■When placing an order, please specify the medium and the minimum flow rate; the minimum flow rate range may vary depending on the viscosity of the medium.

■The gear mechanism contains a magnet; when measuring media containing iron ions■, there is a risk of jamming – please use with caution.
Accuracy specification: Range ratio 1:10; Accuracy: 0.5%

IV. External Dimensional Drawing:

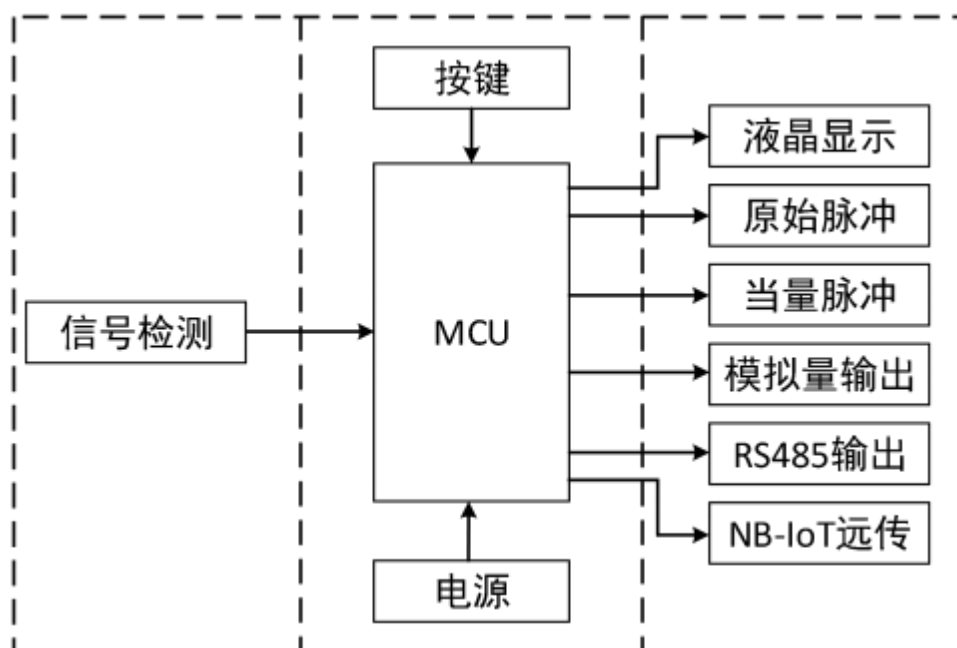


Note: All other dimensions can be customized.

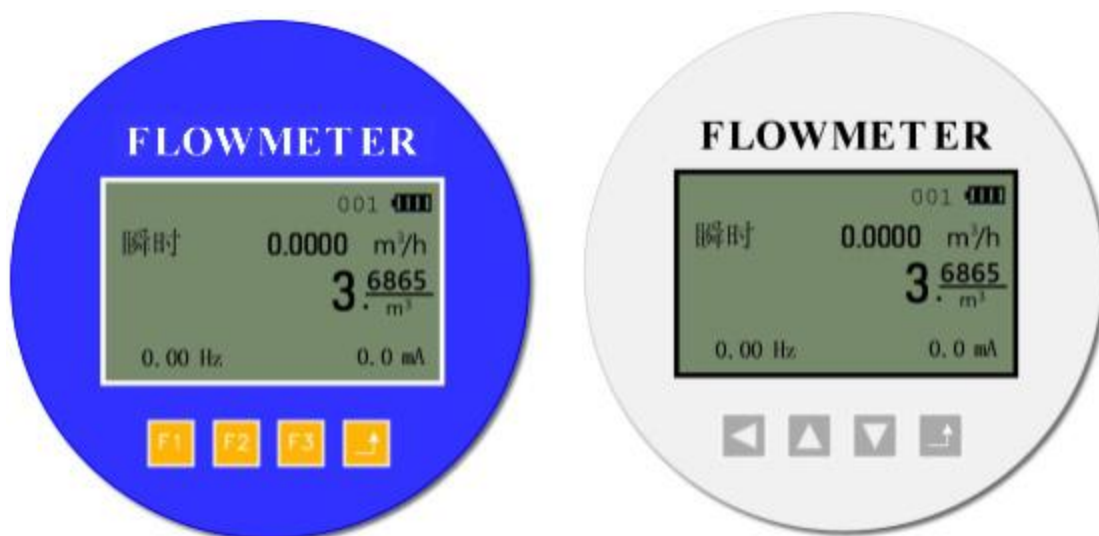
V. Overview

The electronic flowmeter head features a full-Chinese LCD display, designed for signal measurement, flow rate calculation, and display of turbine flowmeters. It offers adaptive measurement range, high measurement accuracy, and low operating power consumption; it supports switching between external power supply and internal battery power supply, making it suitable for turbine flowmeter measurement applications.

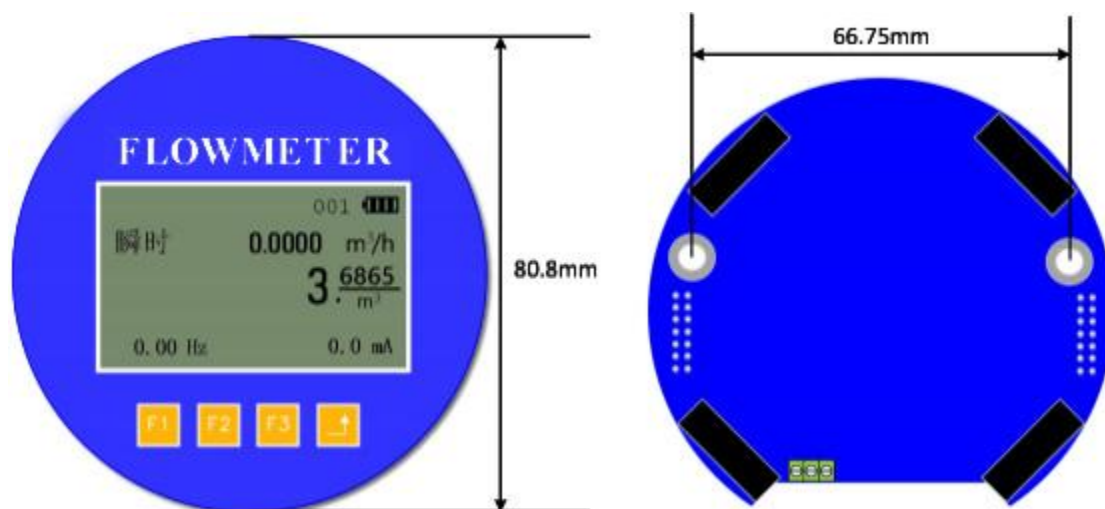
5.1 Overall Block Diagram



5.2 Appearance and Dimensions



Two exterior color options available



5.3 Performance Parameters

Power supply: 24 V DC or 3.6 V lithium battery (automatic switching)

Power consumption: <1.5 mW

Output signal: 1) Original pulse signal

2) Equivalent pulse signal

3) Two-wire system – 4–20 mA signal (optional)

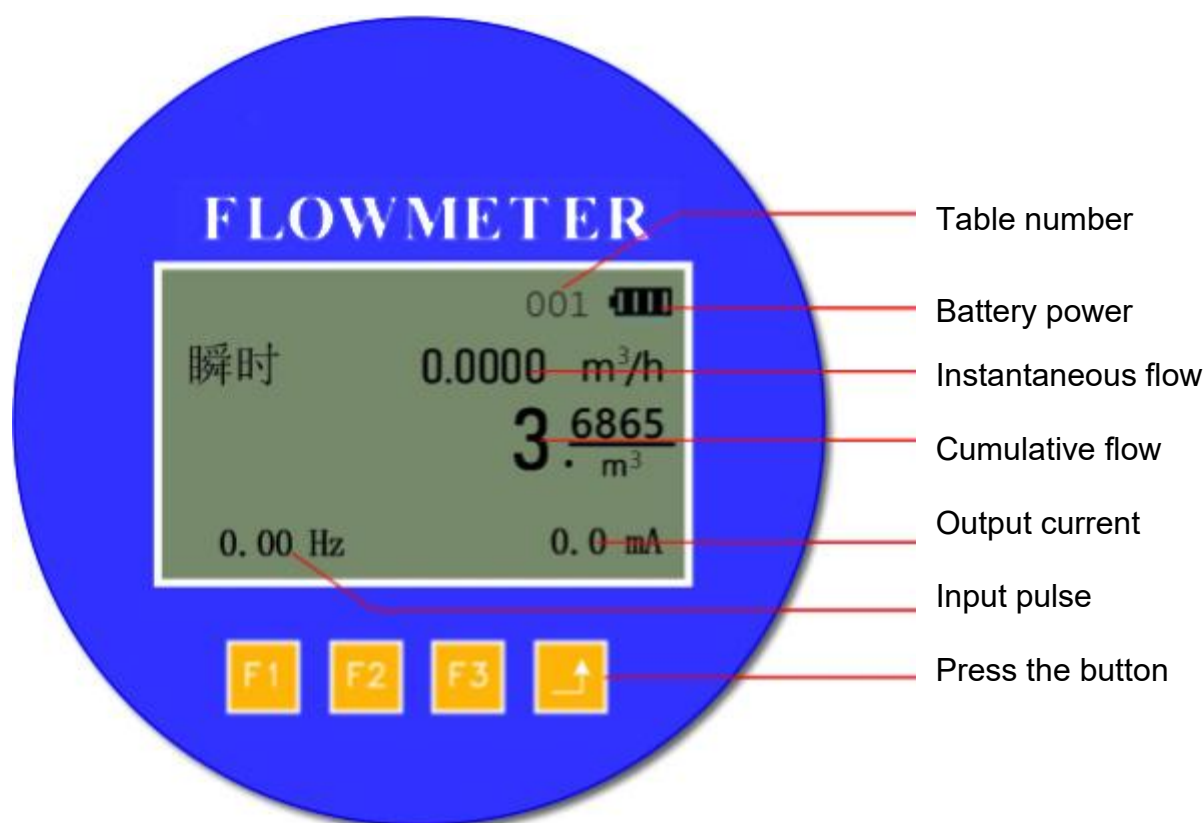
4) Three-wire system – 4–20 mA signal (optional)

5) RS485 (Optional)

Input sensor: Hall effect sensor (magnetic sensing element) or coil.

Note: When using the device on battery power, it is recommended to replace the battery with a new original manufacturer's battery after approximately 2 years to ensure measurement accuracy.

VI. Display Interface



Note: 1) The input pulse refers to the frequency signal captured by the circuit board.

2) The table number serves as the address for 485 communication.

3) When powered by a battery, the interface displays a battery icon; when powered by a DC24V source, the interface displays "External Power".

Electric symbol. When both power supply sources are present, the system will prioritize the DC24V power supply; the two power supply modes will switch automatically.

4) When powered by a battery, the instrument does not have a current output function.

5) The cumulative flow is divided into two parts: the left part represents the integer component, and the right part represents the decimal component.

VII. Parameter Settings

7.1 Primary Menu

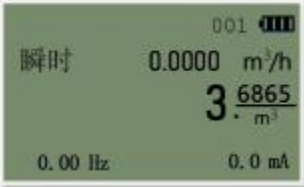
video display	operating steps	explain
	Press  'Next' to proceed to the next screen.	main interface

	Press the [Confirm] button to proceed to the next screen.	- Enter the password "100000" and press the [Confirm] button to access the primary menu interface. - Entering an incorrect password will trigger a corresponding prompt and return you to the main interface.
	Press the [Switch Item] button to proceed to the next screen.	- Use the [Translate] and [Modify] buttons to modify parameters. - The form number corresponds to the 485 communication address. - Press the [Back] button to return to the main interface. - Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.
	Press the [Switch Item] button to proceed to the next screen.	- Use the [Translate] and [Modify] buttons to modify parameters. - Cumulative flow unit (optional): m³ or L. - Instantaneous flow rate units (optional): m³/h, L/h, L/min, mL/min, mL/s. - Press the [Back] button to return to the main interface. - Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.
	Press the [Switch Item] button to proceed to the next screen.	- Use the [Translate] and [Modify] buttons to modify parameters. - The lower cutoff frequency represents the minimum frequency at which the system can calculate flow rate. - The filtering coefficient determines the system's maximum detection frequency; the corresponding relationship is shown in the table below. - Press the [Back] button to return to the main interface. - Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.
	Press the [Switch Item] button to proceed to the next screen.	- Use the [Translate] and [Modify] buttons to modify parameters. - The measurement range corresponds to a 4 –20 mA current output; for example, if the range is set to 100, a instantaneous flow rate of 100 corresponds to a 20 mA current output, while an instantaneous flow rate of 0 corresponds to a 4 mA current output. - Press the [Back] button to return to the

		main interface. d. Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.
	Press the [Switch Item] button to proceed to the next screen.	a. Use the [Translate] and [Modify] buttons to modify parameters. b. The equivalent pulse represents the incremental increase in cumulative flow rate; for example, if the equivalent pulse value is set to 1, each time the downstream device receives an equivalent pulse, it indicates an increase of 1 m³ in the cumulative flow rate. c. The unit of the equivalent pulse varies depending on the unit of the cumulative flow rate. d. The number of equivalent pulses per second shall not exceed 30. e. Press the [Back] button to return to the main interface. f. Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.

	Press the [Switch Item] button to proceed to the next screen.	- Use the [Translate] and [Modify] buttons to modify parameters. - When the instantaneous flow rate under operating conditions exceeds the upper limit alarm threshold, an upper-limit alarm signal will be issued, and a corresponding prompt will appear on the interface. - When the instantaneous flow rate under operating conditions falls below the lower limit alarm threshold, a lower-limit alarm signal will be issued, and a corresponding prompt will appear on the interface. - Press the [Back] button to return to the main interface. - Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.
	Press the [Switch Item] button to proceed to the next screen.	- Use the [Translate] and [Modify] buttons to modify parameters. - Press the [Back] button to return to the main interface. - Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.

7.2 Secondary Menu

video display	operating steps	explain
	Press  'Next' to proceed to the next screen.	main interface
	Press the [Confirm] button to proceed to the next screen.	- Enter the password "200000" and press the [Confirm] button to access the secondary menu interface. - Entering an incorrect password will trigger a corresponding prompt and return you to the main interface.
	Press the [Switch Item] button to proceed to the	- Use the [Translate] and [Modify] buttons to modify parameters. - The calibration segment is divided into 10 segments, corresponding to sequence numbers 0–9. - Set the "Frequency" and "Coefficient" values based on the data from the calibration device. - Press the [Back] button to return to the

	next screen.	main interface. e. Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.
	Press the [Switch Item] button to proceed to the next screen.	a. Use the [Translate] and [Modify] buttons to modify parameters. b. When the flow rate calibration involves only a single section, the average coefficient shall be identical to the calibration coefficient; when the flow rate calibration involves multiple sections, the average coefficient shall be set based on the data obtained from the calibration device. c. Press the [Back] button to return to the main interface. d. Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.
	Press the [Switch Item] button to proceed to the next screen.	a. Use the [Translate] and [Modify] buttons to modify parameters. b. This interface allows for the setting and modification of cumulative data usage. c. Press the [Back] button to return to the main interface. d. Use the [Change Item] and [Back] buttons to switch between interfaces; the configured parameters will be automatically saved.

7.3 Password Description

	interface	Password Instructions
1		Primary Menu

2		second-level menu
3		Reset cumulative flow data
4		Clear Flow Calibration Factor
5		Calibrated output current

8. Calibration

8.1 Current Calibration

Enter the password "110000" on the main interface, then press the [Confirm] button to access the current calibration interface, as shown in the figure below.



Calibration Procedure:

- 1) Ensure that the current calibration equipment is correctly connected to this instrument.
- 2) Press the [Shift] key to move the inverse cursor to the compensation value, as shown in the figure below.



3) Use the [Shift] or [Modify] keys to set an appropriate compensation value so that the current value displayed by the current calibration device is 4 mA. For example, if the calibration device displays a current of 4.50 mA, set the compensation value to -0.5.

4) Press the [Confirm] button to complete the current zero-point calibration. Steps 3 and 4 may be repeated multiple times to achieve greater accuracy of the current zero-point.

- 5) Press the [Shift] or [Edit] button to change "Zero Point" to "Full Scale", as shown in the figure below.



6) Press the [Shift] key to move the inverted cursor to the compensation value position, as shown in the figure below.



7) Similar to Step 3, use the [Shift] or [Modify] keys to set an appropriate compensation value so that the current value displayed by the current calibration device is 20 mA. For example, if the calibration device displays a current of 18.9 mA, set the compensation value to +1.1.

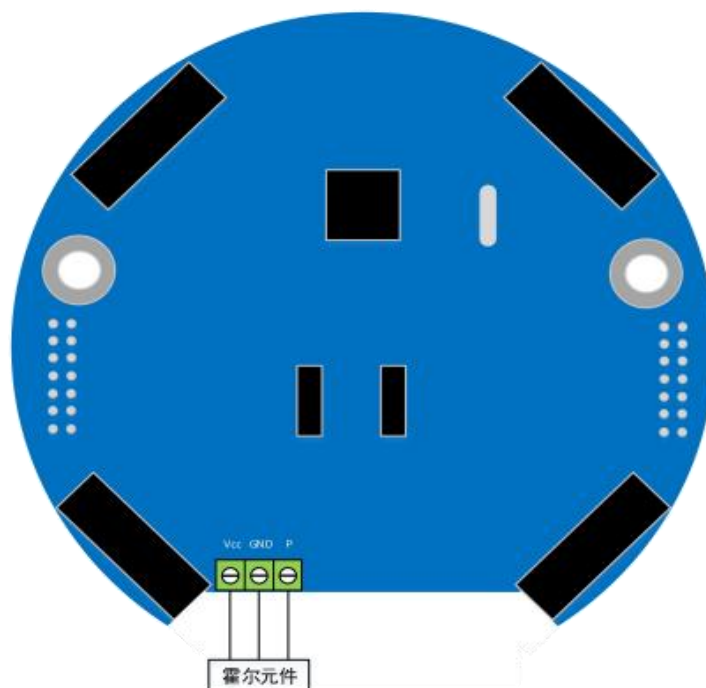
8) Press the [Confirm] button to complete the full-scale current calibration. Steps 7 and 8 may be repeated multiple times to achieve more accurate full-scale current measurement.

9) Press the [Return] key to exit the current calibration interface; parameters will be automatically saved, and the current calibration is complete.

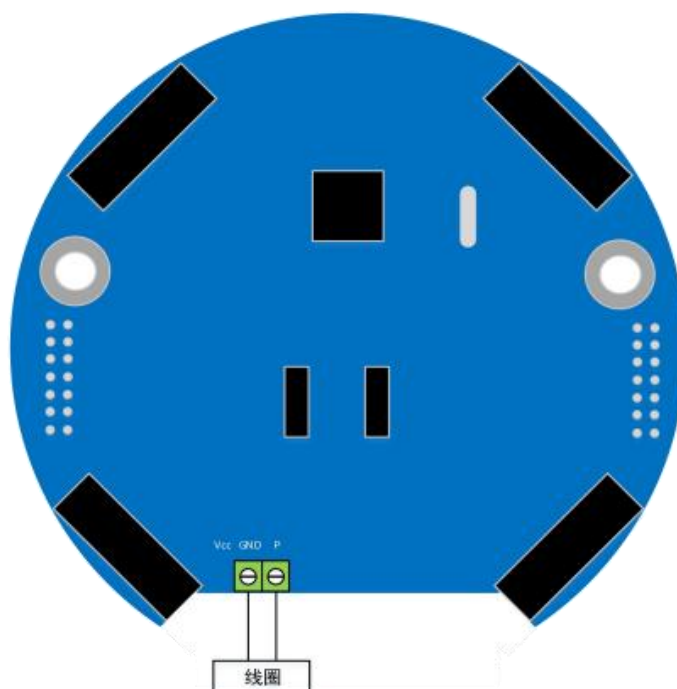
IX. Electrical Wiring

9.1 Sensor Wiring Instructions

1) Hall effect sensor

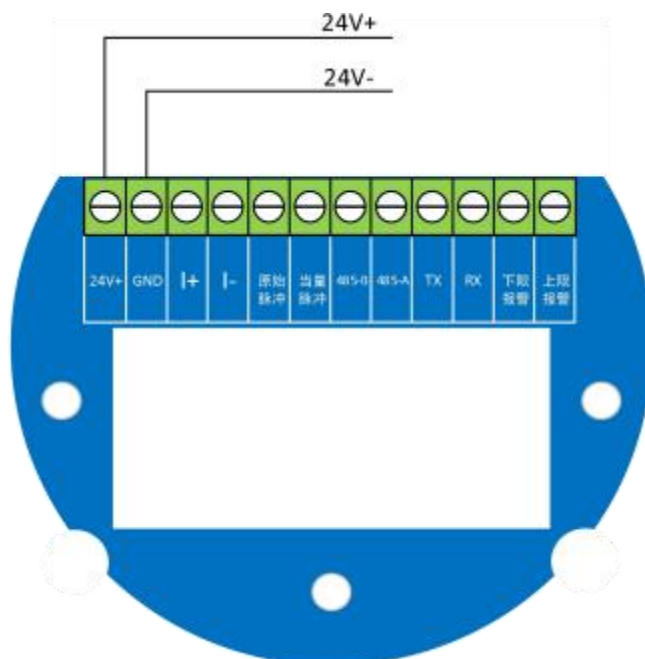


2) Coil Sensor

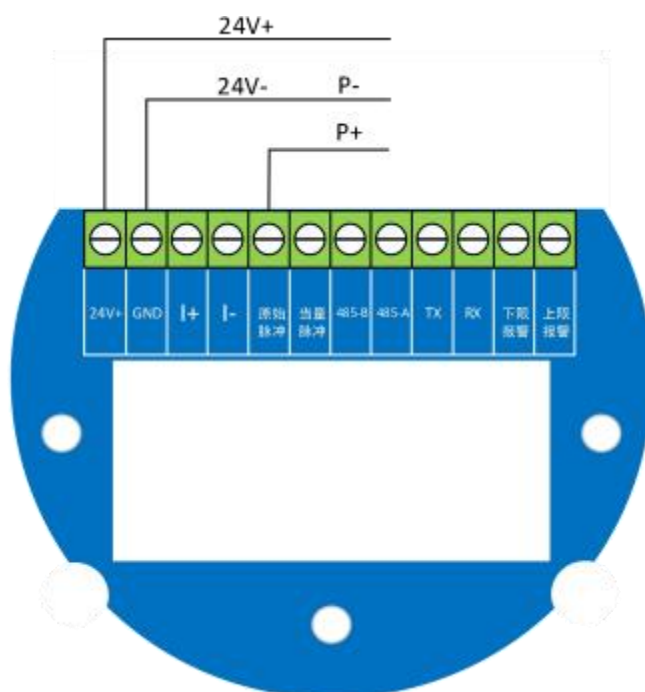


9.2 Output Terminal Block Wiring Instructions

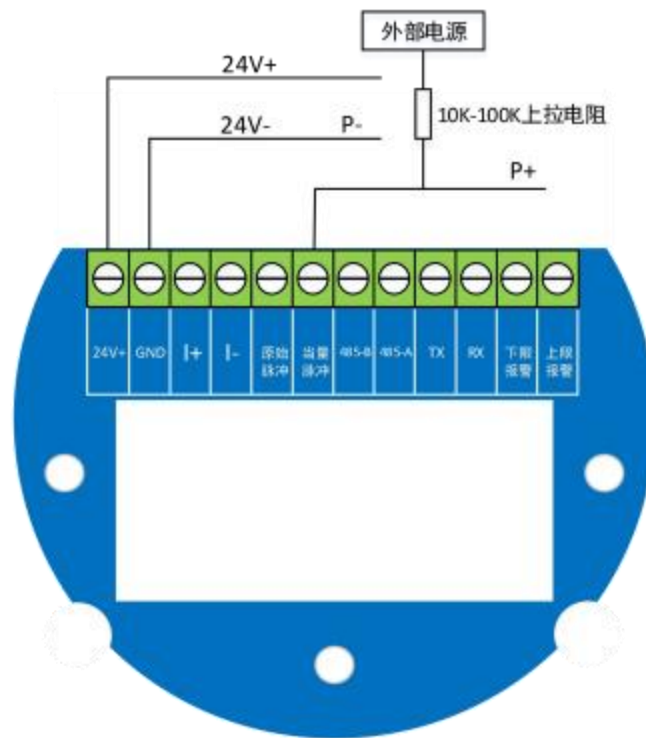
1) Power supply wiring



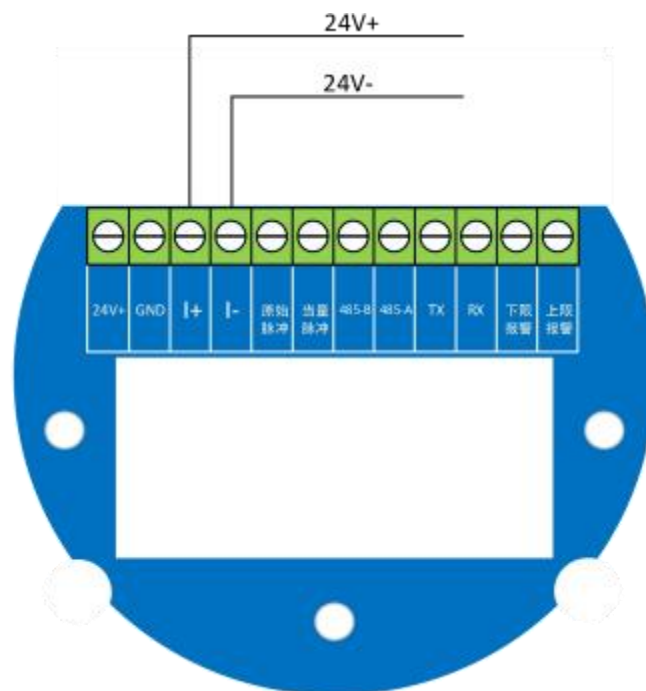
2) Original pulse wiring



3) Equivalent Pulse Wiring

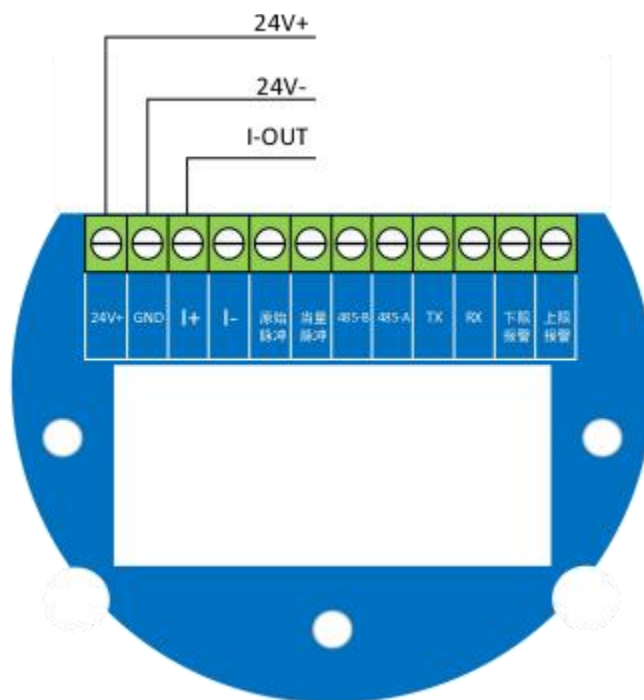


4) Two-wire system (4–20 mA wiring)

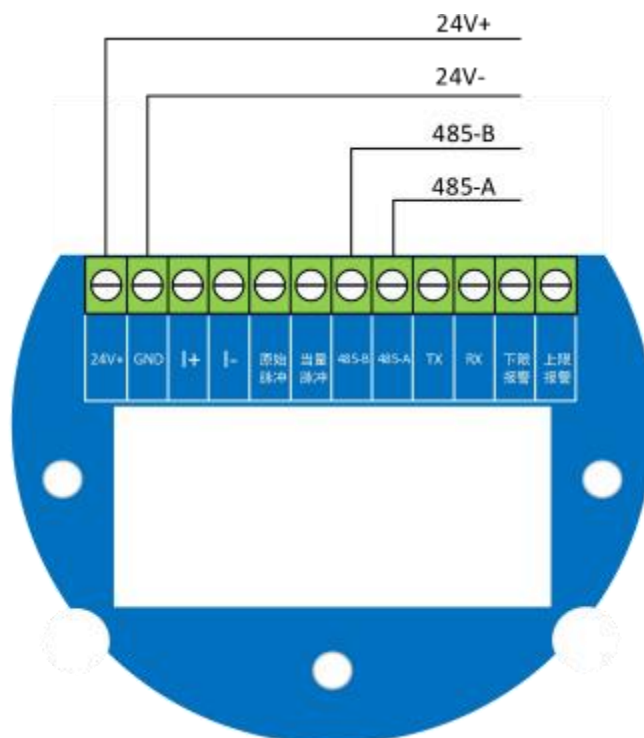


Note: The two-wire current output cannot be used simultaneously with RS485 communication.

5) Three-wire system (4–20 mA wiring)



6) RS485 wiring



X. Important Notes

1. When connecting circuit board wires, pay attention to the positive and negative polarity of the power supply and signals; do not connect them in reverse.
2. When using this device, please adhere to the operating procedures; disconnect the power supply before performing any wiring or other operations.
3. The violent installation of circuit boards, as well as throwing or smashing them, is strictly prohibited.
4. It is strictly prohibited to use sharp objects to scratch or damage circuit boards.
5. When handling a circuit board, be sure to discharge any static electricity from your hands in advance.