

## Product information

### Cyw12 protective input liquid level transmitter



Cyw12 protective input liquid level transmitter adopts double isolation diaphragm inside and integral welding process outside, which makes it have superior anti condensation function. It is mainly used in liquid level measurement sites with large medium temperature changes and humid environment.

Range: 0 ~ 1 ~ 200mm<sup>2</sup>o

Output: 4 ~ 20mA, RS485

Power supply: 9 ~ 36VDC


In addition, we can also provide customized products that meet the application needs of customers in a short time according to their applications.

#### Typical application


- ▲River Hubo water level measurement
- ▲Water level measurement of containers and storage systems
- ▲Water treatment plant
- ▲water cycle
- ▲Water well level measurement


## Instructions

The input liquid level transmitter is designed to continuously measure the change of liquid level. The operator is responsible for checking whether the equipment is suitable for the working conditions of the application. If you have any questions, please contact our sales department to ensure the correct application of the transmitter. The company does not assume any responsibility for the impact caused by improper model selection. The user must ensure that the measured medium is compatible with the contact material of the transmitter.


 **Warning!**  
Improper use can lead to danger!


## Icon description

 **Danger!** - A dangerous situation that could result in death or serious injury.


 **Warning!** - A potentially hazardous situation that could result in death or serious injury.

**! Be careful!** - A potentially hazardous situation that may result in minor injury.

 **Reminder!** - A potentially hazardous situation that may cause personal injury.

 **Tips!** - Tips and information to ensure trouble free operation of the equipment.

User

 **Warning!** This information is applicable to technicians.

## Product features

- a) Diaphragm isolation technology using diffused silicon pressure sensor
- b) Cable connection, direct use, easy installation
- c) The amplifier circuit adopts integrated chip and wide voltage supply
- d) Anti blocking and anti scaling
- e) Lightning protection, frequency cut-off interference design and strong anti-interference ability
- f) Wiring reverse and overvoltage protection, current limiting protection (current limiting output)
- g) Good stability and fast response

## Product overview

This liquid level transmitter adopts OEM pressure sensor with stainless steel isolation diaphragm as signal measuring element, which has been automatically tested by computer and compensated for zero point and sensitivity temperature in a wide temperature range by laser resistance adjustment process. The amplification circuit is located in the stainless steel shell, which converts the sensor signal into standard output signal, gives full play to the technical advantages of the sensor, and makes cyw11 series liquid level transmitter have excellent performance. It has the advantages of anti-interference, small temperature drift, high stability and high measurement accuracy. It is an ideal liquid level measuring instrument in the field of industrial automation.

## Working principle

The formula of the pressure on the liquid level of the sensor is:  $P = \rho GH + P_0$ , where:

P: Pressure on the liquid surface of the sensor (hereinafter referred to as pressure for convenience of understanding)

$\rho$ : Measured liquid density (1g / cm by default during commissioning) <sup>3)</sup>

g: Gravity acceleration (9.8m/s by default during commissioning) <sup>2)</sup>

P<sub>0</sub>: atmospheric pressure above the liquid level

h: Depth of liquid input into the sensor

When the sensor is put into a certain depth of the measured liquid, the pressure of the measured medium is introduced into the positive pressure chamber of the sensor, and the atmospheric pressure P<sub>0</sub> on the liquid level is connected with the negative pressure chamber of the sensor through the cable air duct to offset the P<sub>0</sub> on the front of the sensor, so that the pressure measured by the sensor is:  $\rho GH$ , obviously, the liquid level depth can be obtained by measuring the pressure P.

## Technical parameter

Measuring medium: water (H<sub>2</sub>O) or liquid compatible with contact material  
 Measurement range: 0 ~ 1 ~ 200m<sup>2</sup>o (see range selection table for details)  
 Medium temperature: -40 ~ 85 °C  
 Response frequency: analog signal output ≤ 50Hz, digital signal output ≤ 5Hz  
 Stability: ± 0.1% FS / year  
 Power supply voltage: 9 ~ 36VDC  
 Signal output: 4 ~ 20mA, RS485  
 Overload capacity: 200% of full scale  
 Temperature compensation: -10 ~ 70 °C  
 Temperature drift: ± 0.01% FS / °C (within the temperature compensation range)  
 ± 0.05% FS / °C (outside the temperature compensation range)  
 Accuracy grade: 0.25% FS (range ≥ 10m), 0.5% FS (range < 10m)  
 Note: reference conditions: temperature 15 ~ 25 °C, atmospheric pressure 86 ~ 106kpa, humidity 45 ~ 75% RH.  
 Protection grade: IP68  
 Overall weight: probe ≈ 410g cable ≈ 60g per meter  
 Connection time: 400ms

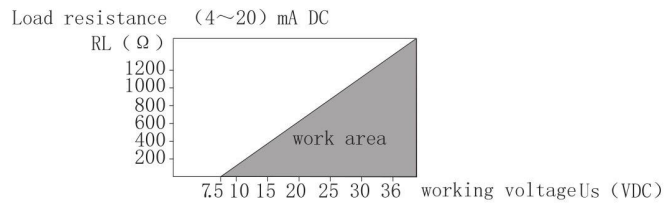
### Maximum power

output power	≤0.02Us(W)	≤0.015Us(W)
4~20mA	✓	
RS485		✓

Note: us= supply voltage.

### Load characteristics

Current type: load ≤ {(us-7.5) ÷ 0.02} Ω (us= supply voltage)



### Environment condition

Ambient temperature: -40 ~ 85 °C

### Electromagnetic compatibility(EMC)

Serial number	Test items	Basic standards	Test conditions	Performance level
1	Radiated interference (enclosure)	GB/T 9254/CISPR22	30MHz-1000MHz	qualified
2	Conducted interference (DC power port)	GB/T 9254/CISPR22	0.15MHz-30MHz	qualified
3	Electrostatic discharge (ESD)	GB/T 17626.2/IEC61000-4-2	4kV(触点), 8kV(空气)	B(Note 2)
4	Radio frequency electromagnetic field immunity	GB/T 17626.3/IEC61000-4-3	10V/m(80MHz-1GHz)	A(Note 1)
5	Power frequency magnetic field immunity	GB/T 17626.8/IEC61000-4-8	30A/m	A(Note 1)
6	Electrical fast transient burst immunity	GB/T 17626.4/IEC61000-4-4	2kV(5/50ns, 100kHz)	B(Note 2)
7	Surge immunity	GB/T 17626.5/IEC61000-4-5	500V(Between lines) 1kV(Between ground wires)(1.2us/50us)	B(Note 2)
8	Immunity to conducted interference induced by RF field	GB/T 17626.6/IEC61000-4-6	3V(150kHz-80MHz)	A(Note 1)

Note 1: when the performance grade is a, the performance is normal within the limits of the technical specifications.  
 Note 2: when the performance level is level B, the function or performance is temporarily reduced or lost, but can be recovered by itself, and the actual operation status, storage and data will not change.

### Overall material

Diaphragm: 316L stainless steel (contact with the measured medium)  
 Shell: 304 stainless steel (contact with the measured medium)  
 Seal: nitrile rubber (contact with the measured medium)  
 Cable: Polyurethane  $\phi$  7.2 air conducting cable (contact with the measured medium)

### Mechanical stability

Seismic performance: 10g (20... 2000Hz) in line with IEC60068-2-6 standard  
 Impact resistance: 500g/ms, complying with IEC60068-2-27 standard

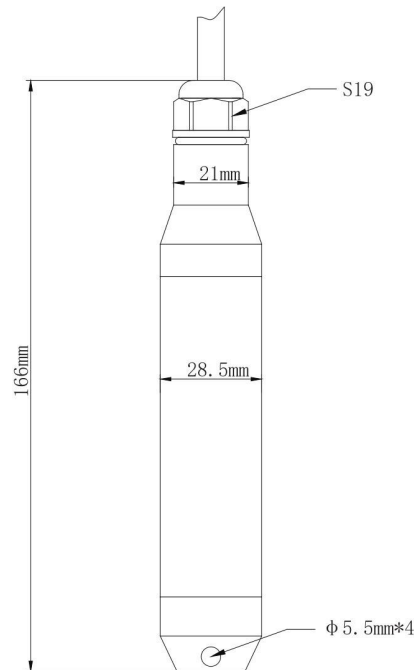
### Electrical protection

Short circuit protection: permanent  
 Reverse pole protection: no damage, but it does not work  
 Insulation resistance:  $\geq 100\text{m } \Omega$ , 500VDC  
 Insulation strength: 500VAC

### Output limit

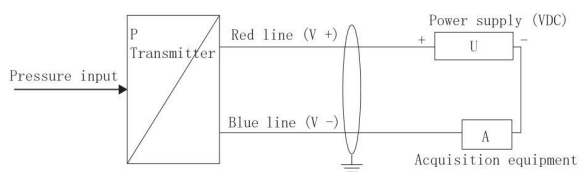
	Output minimum	Maximum output
4-20mA	4mA	20mA
RS485	0	2000

### Shape and dimension

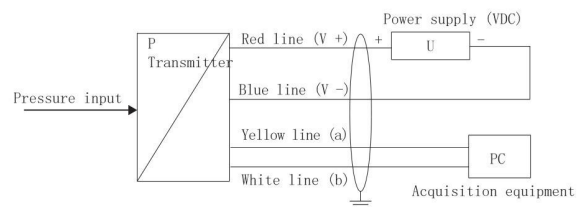



### Wiring diagram


Current output wiring diagram (two-wire system)



RS485 (digital signal) output wiring diagram (four wire system)



 Represents shielded wire, and all marked grounding points must be effectively grounded.

 If you need to install an extension cable, please ensure that the wiring part is dry and ventilated.

## Protocol description (limited to RS485 signal output, all product addresses are 01 by default, and the data is hexadecimal)

### Basic technical parameters of transmitter

- This protocol complies with Modbus communication protocol and adopts the centralized RTU mode in Modbus protocol.  
 RS485 half duplex working mode
- a) Output signal: RS485 (the distance can be up to 1000m. A total of 32 channels can be connected)
  - b) Standard Modbus RTU protocol (03 function reads data, 06 function writes setting data)
  - c) Data format: 9600, N, 8, 1 (9600bps, no verification, 8 data bits, 1 stop bit)
  - d) Measuring range: 0-x (M...)
  - e) Resolution: 0.05%
  - f) Output data: 0... 2000 (customized for other ranges)
  - g) Response frequency:  $\leq 5\text{Hz}$
  - h) Response speed:  $\geq 10\text{ms}$
- (if there is temperature output, the default range is  $-20 \sim 60\text{ }^\circ\text{C}$ , and the corresponding output data is 0... 800)

### Modbus RTU read data 03 command description

	Device address	Function code	Data address	Number of read data	16crc code (low front high rear)
Host command	Address	03	00 00	CN	CRC0 CRC1
	Device address	Function code	Data byte	Sensor data	16crc code (low front high rear)
Return from machine	Address	03	02*CN	S_HN , S_LN	CRC0 CRC1

### Communication examples

For example, the address of 0-5m sensor communication equipment is set to 01, that is [address]=01 (address range 01-254);  
 At this time, crc0=84, crc1=0a. Then the data sent and returned are as follows:  
 Send: 01 03 00 00 01 840a  
 Return: 010302 AC B9 59  
 02ac is hexadecimal, converted to decimal 684;  
 Data output: 0-2000 corresponds to 0-5m, so the current liquid level is  $p=5*684/2000=1.71\text{m}$

### Query example

Reading the current device address can only be completed independently by a single offline sensor

Send FF 03 00 0f 00 01 A1 D7  
 Return to FF 030200015050

Then: the address of this device is 01 (hexadecimal)

### Detailed description of Modbus RTU write 06 command

	Device address	Function code	Data address	New address	16crc code (low front high rear)
Host command	Address	06	00 0F	H L	CRC0 CRC1
	Device address	Function code	Data address	New address	16crc code (low front high rear)
Return from machine	Address	06	00 0F	H L	CRC0 CRC1

### Modification example

If the 01 address is changed to 09 address:

Send 01 06 00 0f 00 09 79 CF

Return to 01 06 00 0f 00 09 79 CF

Then the original address 01 is successfully changed to 09. The modified address can be modified offline or online. After completion, it can work directly without power on again.

### Parameter selection

CYW	Liquid level transmitter						
	Code	Transmitter type					
	12	Protective input type					
		Code	Range 0 ~ 200mh2o (optional in the middle)				
		LX	(LX) x: is the required range (Note 1)				
			Code	Cable length			
			BX	(BX) x: is the cable length (Note 2)			
			Code	signal output			
			A1	4-20mA		Two wire system	
			RS	RS485 communication interface (standard Modbus RTU protocol) four wire system			
			DZ	customized			
			Code	Accuracy class			
			B	0.25%FS			
			C	0.5%FS			
			Code	Supply voltage			
			G5	9-36VDC			
			DZ	customized			
			Code	customized			
			D	Other customization requirements			
			No	customized			

CYW 12 L5 B7 A1 C G5 Example of model selection

For example: cyw12-15-b7-a1-c-g5 (protective input liquid level transmitter, range 0-5m, cable 7m, output 4-20mA, accuracy 0.5, power supply 9-36vdc).

Note 1: (LX) x: is the required range, such as 0-5m range, and the code should be L5.

The following table shows the recommended range selection

Note 2: default BX (line length) =lx (range) +2 meters

Normal range (MHz0)	0-1m	0-2m	0-3m	0-5m	0-8m	0-10m
Conventional line length (m)	3m	4m	5m	7m	10m	12m

## Ordering instructions

**⚠ Warning!**

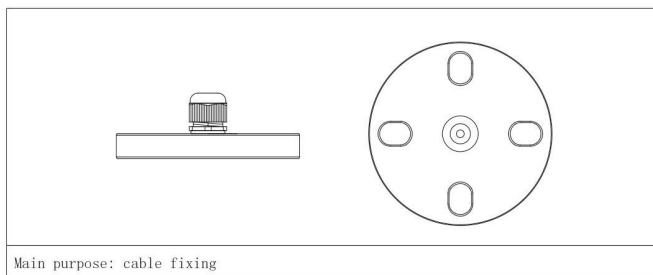
When ordering the transmitter, users should pay attention to selecting the appropriate specification according to the temperature of the medium and environmental conditions.

ordering information

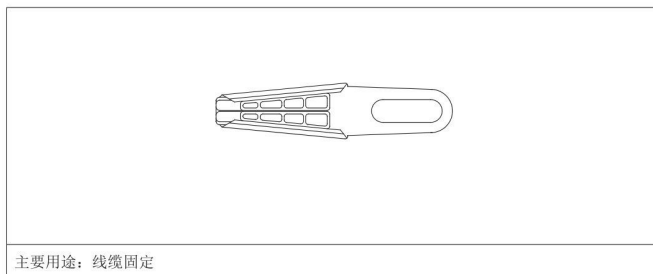
Model / range / cable length / output signal / accuracy level / power supply voltage / Customization

## Accessories (to be purchased separately)

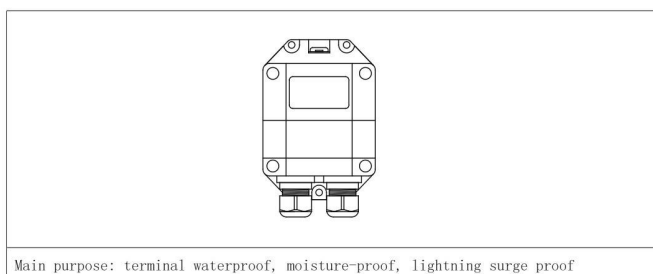
### Cable fixing flange-f103



### Cable fixing hanger-x01



### Waterproof and breathable junction box - FSH



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