



8. Installation and precautions

- ⚠Warning!
- a) Installation of equipment without pressure or power supply.
- ⚠Warning!
- b) Prohibit measurement of media incompatible with transmitter contact material.
- 🔧c) When receiving the product, please check whether the package is in good condition, and check whether the transmitter model and specifications are in conformity with the products you choose.
- ! d) No modifications or changes can be made to the equipment.
- ! e) Do not throw the transmitter at will. Do not use brute force when installing the transmitter.

🔧f) If the transmitter is installed in a bad site and will encounter dangerous damage such as lightning strike or overvoltage, we recommend that the user protect against lightning strike and overvoltage between the distribution box or power supply and the transmitter.

🔧g) The gas collecting cylinder of the transmitter shall be installed vertically. It shall be ensured that impurities such as sediment are not buried or blocked in the probe part of the transmitter. The capillary should avoid sharp bending and be installed vertically as far as possible to prevent the capillary from being blocked or broken.

🔧h) When the medium fluctuates greatly, measures should be taken to fix the probe part of the transmitter, such as adding a fixed tube sleeve to the transmitter, inserting or installing a steel pipe or PVC pipe larger than the diameter of the probe in water, and opening a number of small holes about 5 mm at different reverse heights of the pipe in the direction of water flow, so that water enters the pipe. As shown in Figure 7-1

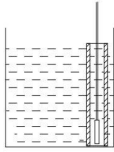


Figure 7-1

🔧i) This product belongs to weak current equipment. It should be separated from strong power cables when wiring. It should be wired in accordance with the relevant national wiring standards (GB/T50312-2016).

🔧j) Ensure that the supply voltage of the power supply meets the requirements of the power supply of the transmitter.

🔧k) The sensor is a precise device. Users should not disassemble it by themselves, let alone touch the diaphragm, so as to avoid damage to the product.

9. Wiring installation

9.1 Installation indication

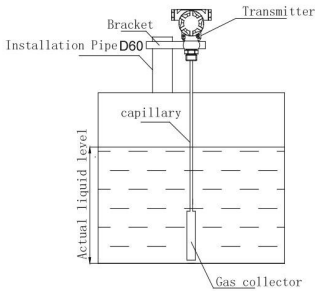


Figure 9-1 Bracket Installation Diagram

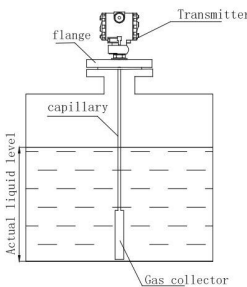


Figure 9-2 Flange Installation Diagram

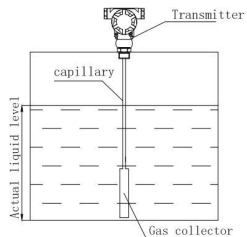


Figure 9-3 Thread Installation Diagram

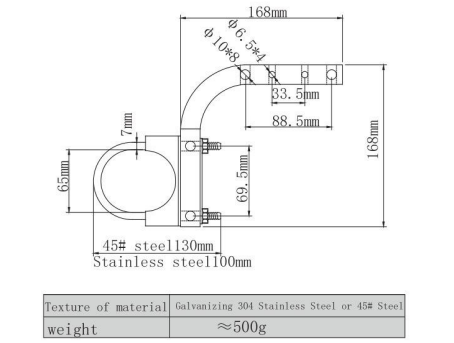


Figure 9-4 Dimension Diagram of Installation Bracket

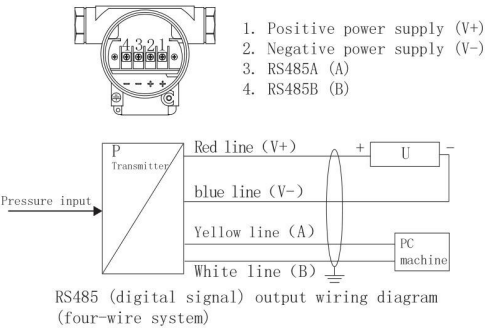
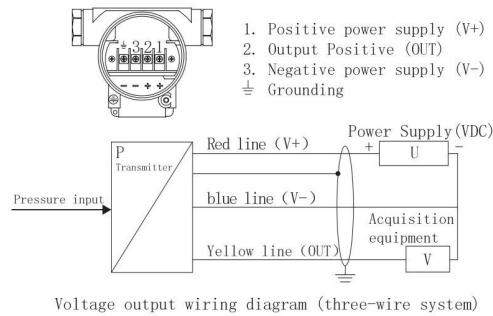
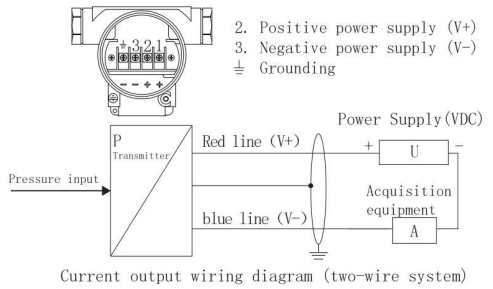
Serial path	Flange outer diameter (A)	Bolt pitch (B)	Bolt hole diameter (C)	Number of bolt holes	Flange thickness (D)	Weight
DN15	95	65	14	4	18	
DN20	105	75	14	4	18	
DN25	115	85	14	4	18	
DN32	140	100	18	4	18	
DN40	150	110	18	4	18	
DN50	165	125	18	4	18	
DN65	185	145	18	4	18	
DN80	200	160	18	8	18	
DN100	220	180	18	8	18	

(Unit: mm) Material: 304 stainless steel

Fig. 9-5 Dimension Diagram of Installation Flange

Note: Installation bracket and flange should be selected separately.

9.2connection



- 🔧 Represents the shielding line, all the marked grounding points shall be effectively grounded.
- 🔧 Only the current output has reverse protection (no damage but no work), current limiting and voltage limiting protection. Reverse connection of other output signals will cause damage to the transmitter.
- 🔧 Users should ensure that the diameter of the cable used is within the allowable range of the jacket. In addition, it is necessary to ensure that the cable is firmly and seamlessly installed in the jacket.
- 🔧 Be sure to tighten the thread lock mother to ensure the protection level.

10. Specification Selection

CYW18 gas collector type input level transmitter selection table									
CYW	Liquid level transmitter								
	Code Transmitter type								
	18 Input type of gas collector								
	Code display								
	X display								
	P No display								
	Code Range Range (Default Capillary Length Corresponding Range)								
	L1 1m								
	L2 2m								
	L3 3m								
	L5 5m								
	L10 10m								
	DZ Custom								
	Code signal output								
	A1 4-20mA Two-wire system								
	RS RS485 Communication Interface (Standard Modbus-RTU Protocol) Four-wire System								
	DZ Custom								
	Code Accuracy Level								
	B 0.25%FS Routine (range≥10m)								
	C 0.5%FS routine (1m≤range<10m)								
	Code Power supply voltage								
	G0 24VDC intrinsic safety explosion-proof dedicated								
	G 12-36VDC routine								
	G2 15-36VDC routine (With display or output-10VDC)								
	G3 3-5VDC Customization (Note 1)								
	DZ Custom								
	Code Explosion-proof type								
	B Intrinsically Safe Type (See 4)								
	F Essentially Safe Dist. Current Limited Output								
	N0 Standard type (no explosion-proof)								
	Code Custom								
	D Other customization requirements								
	No								
CR	18	X	L3	A1	C	G2	Examples of Type Selection		
For example: CYW18-X-L3-A1-C-G2(Gas collector type input liquid level transmitter, with display, measuring range 0-3 meters, capillary 3 meters, output 4-20 mA, accuracy 0.5, Power supply 15-36 VDC, standard type).									
Note 1: The output is 0.5-2.5 VDC/RS485, which can not be displayed.									

11. Protocol Description

(limited to RS485 signal output 485 all product addresses default to 01)

11.1. Basic technical parameters of the transmitter

(This protocol complies with the Modbus communication protocol, and uses a subset of the Modbus protocol which is RTU mode, RS485 half-duplex working mode)

- a) Output signal: RS485 (Maximum distance can be up to 1000 meters. Maximum connection 32 channels)
- b) Standard Modbus-RTU protocol
- (03 function reads data, 06 function inputs setting data)
- c) Data format: 9600, N, 8, 1 (9600bps, no parity, 8 data bits, 1 stop)
- d) Measurement range: 0-X (MPa, kPa,...)
- e) Resolution: 0.05%
- f) Output data: 0...2000 (other range customize)
- g) Response frequency: ≤ 5Hz
- h) Response speed: ≥ 10ms

11.2. Modbus-RTU Read Data 03 Command Description (Data is hexadecimal)

Protocol format description					
	Device address	Function code	Data address	Number of read data	Hex code (low before high after)
Host command	Address	03	00 00	CN	CRC0 CRC1
	Device address	Function code	Data byte	Sensor data	Hex code (low before high after)
Return data	Address	03	02*CN	S_1N , S_1N	CRC0 CRC1

Communication example (reading a sensor signal):

The sensor communication device address of 0-5m is set to 01, ie [Address]=01 (Address range 01-254);

And, CRC0=84, CRC1=0a. Then send and return data should be as follows:

Send: 01 03 00 00 00 01 84 0A

Back: 01 03 02 02 AC B9 59

02AC is hexadecimal, converted to decimal 684;

Data output: 0-2000 corresponds to 0-5m, so the current pressure is P=684/2000=1.7lm

Calculating formula: upper limit of range 2000\*current data = current liquid level value

Query example (read the current device address, only to be completed independently by a single sensor)

Send: FF 03 00 0F 00 01 A1 D7

Back: FF 03 02 00 01 50 50

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

11.3. Modbus-RTU input 06 command detailed description (data is hexadecimal)

Protocol format description					
	Device address	Function code	Data address	New address	Hex code (low before high after)
Host command	Address	06	00 0F	H L	CRC0 CRC1
	Device address	Function code	Data address	New address	Hex code (low before high after)
Return data	Address	06	00 0F	H L	CRC0 CRC1

Example of modification

For example, change 01 address to 09 address:

Send 01 06 00 0F 00 09 79 CF

Return 01 06 00 0F 00 09 79 CF

Then the original address 01 is modified to 09 successfully, and the modification of address can be done offline or online. It can work directly without re-powering at completion.



#### 11.4.Precautions for use

⚠ a) Single RS485 bus must adopt a “hand-to-hand” bus structure. Do not use a star connection or a fork connection. The address code is set from near to far, that is, the management computer is connected to the No. 1 controller, No. 2 is connected to No. 1, No. 3 is connected to No. 2, and so on...

#### ⚠ Warning!

b) The AC power supply and the case of the equipment must be grounded properly and well. There are many places where there are triangular sockets which in fact, have no grounding at all. Be alerted. When the grounded properly, the equipment to release the energy by combining with the lightning protection design when struck by the lightning surge and the static electricity, to protect the RS485 bus equipment and related chips from damage. Do not use the RS485 bus if there is no grounding or not properly grounded, to avoid equipment burnout and casualties.

⚠ c) Wire must use multi-strand shielded twisted pair cable with diameter of more than 0.3 mm<sup>2</sup> (multiple strands are for spare). Use PVC pipe separately to avoid lining with strong current to avoid interference from strong current.

⚠ d) 485 (A) and 485 (B) must be twisted together, because 485 communication uses differential mode communication principle, and twisted pair anti-interference performance is good. It is wrong not to use twisted pairs, and other types of cables.

⚠ e) Connect the RS485 converter and the reference ground GND (power supply negative) of all access controllers, and use the remaining one or all of the multiple twisted pair cables for the series GND; if the reference ground is not connected, it will also affect the communication time. Nowhere, high frequency radiation, mainly from distributed capacitance and inductance, produces a common mode effect.

⚠ f) The shield of the network communication line is grounded. It is required for grounding, otherwise the potentially danger of the bus is unknown.

⚠ g) If multiple machines or cables are too long for communication, add 120 ohm matching resistors between 485 (A) and 485 (B) at the head and end of the 485 bus, to improve the communication performance quality. (Must be pair twisted)

⚠ h) The transmission rate, number of load nodes and transmission distance should be reasonably arranged, to achieve remote low-node for low-speed, short distance multi-node for high-speed principle.

i) The data communication shall be verified to protect the transmission accuracy. Generally, the Modbus-RTU is verified by the crc-16 verification mode, and the error rate is less than 1/1billion.

j) If necessary, choose the company's isolated type model 485, the price is generally higher.

#### 11.5. 16CRC verify

The 16CRC verification is a standard error check method used by the Modbus protocol. Generally, it has detailed descriptions and procedures, which is not explained here.

#### 12.Initial start

##### ⚠ Warning!

a) Before starting, it is a must to check if the transmitter is installed correctly, and if there is any obvious damage.

##### ⚠ Warning!

b) The transmitter must be operated by professional technicians who read and understood this operating manual.

##### ⚠ Warning!

c) The transmitter is only suitable for working conditions that meet the technical requirements!

#### 13.After sales service

a) The company is responsible for all the maintenance costs during the warranty period, after inspected by the technician of the company and confirmed there is quality failure.

##### ⚠ Warning!

b) Please clean the residual media before returning, especially substances that is harmful to human health, such as corrosive, toxic, carcinogenic or radioactive substances;

c) Please keep the warranty card and certificate in a safe place, and return with the product when there is need of repairing;

d) If there is any faulty with the transmitter, please contact our after-sales service. If you need to send the transmitter back to the company for repair after confirming the problem. Please attach the following information:  
Description of the site environment;  
Fault phenomenon;  
Delivery address and contact information;

#### 13.1.Common fault analysis and elimination

Fault phenomenon	Cause analysis	Elimination method
• The transmitter has no output signal.	• The transmitter is not powered. • Fault connection.	• Supply power to transmitter correctly according to the wiring diagram.
• Irregular output jump at constant liquid level	• Strong RF interference on site • No shielded cable applied	• Use shielded cable and ground the shield
• When the transmitter does not sense the liquid level, the corresponding output value is incorrect.	• The transmitter is not operating in required environment	• Move the transmitter to the specified environment or take action to ensure that the environment meets the requirements
• The transmitter output does not match with the measured level	• The supply voltage is incorrect. • The external load is too large	• Whether it is within the power supply range • Adjust the external load

If the fault phenomenon does not fall within the above range, please contact our after-sales.

#### 13.2 Calibration

Zero and full-scale drift may occur during the use of the transmitter. If the above phenomenon occurs after long time use, it is recommended to send the transmitter back to us for calibration to ensure high accuracy.

#### 14. Transportation and storage

The transmitter should be kept in a sturdy cardboard box (large device requires a wooden box), free move in the box is not allowed, be careful when handling, do not handle with roughly. Store area should meet the following conditions:

⚠ a) Protect from rain and moisture.

⚠ b) Free from mechanical shock or shock.

⚠ c) Temperature range -20 ~ 55 ° C.

⚠ d) The relative humidity is not more than 80%.

⚠ e) No corrosive gas in the environment.

#### 15.Unpacking precautions

⚠ a) After unpacking, check the packing list to confirm if the documents and accessories are complete.  
The packed documents are:

A copy of the instruction manual.

A product certificate.

A warranty card.

⚠ b) Observe if there is any damage caused during transportation, for proper following up.

c) We hope that the user can safely keep the “warranty card”, please don't misplace it, otherwise you can't return to the factory for free repair!

#### 16.Instructions for ordering

##### ⚠ Warning!

When purchasing the pressure transmitter, the user should select the appropriate model to make sure it meets specifications of the contact media, such as the pressure, temperature, protection level and environmental conditions