RS-YC-N01-2D Differential Pressure Transmitter User's Manual

Document version：V1.0

Directory

1. Product Introduction

Differential pressure transmitter use MEMS pressure sensor and special conditioning chip,it use the current advanced pressure sensor technology and highly integrated,low power consumption and high precision digital processing technology to provide the completed pressure calibration and temperature compensation.

The product uses 485 communication interface standard ModBus-RTU communication protocol,the maximum communication distance can be 2000 meters.It can seamlessly access to the site PLC,configuration software,configuration screen,industrial controller. It can also access to the network concentrator that matched by our company,monitoring host can upload the data to our monitoring cloud plat for m with free.Then you can review the real-time data,historical data and alarm records etc. by the browser or mobile APP.

Differential pressure transmitter can be used to detect the differential pressure and gauge pressure.So it be widely use in medical,clean room,boiler,dust collector,vacuum cleaner,power plant,air conditioning,and other environment pressure measurement.

1.1 Functional characteristics

- Wide coverage of measurement range,from -10kPa to 10kPa is optional;
- Aluminium alloy shell,protection level IP54;
- Reverse polarity protection and instant over-current&over-voltage protection, meet the EMI protection requirements;
- Pressure over-pressure protection, can withstand 2.5 times over-pressure in an instant;
- Automatic temperature compensation, automatic correction of temperature drift;
- 485 communication interface standard ModBus-RTU communication protocol;
- With liquid crystal display, can display pressure difference value in real-time

1.2 Main technical parameters

|	
DC Power Supply	DC10~30V
Power consumption	0.1W
Output signal	RS485
Measurement Range	-10kPa~10kPa
Operating temperature and humidity of the sensor circuit	-40℃～+60℃，0%RH～95%RH（Non condensation）
LCD operating temperature	-20℃～+60℃

Measurement accuracy	±1%FS
Long-term stability	+0.2%FS
Compensation temperature	-5℃~65℃
Connector	Pagoda connectorφ6mm
Measurement media	Gas that can compatible with the contact material

1.3 Product dimensions

With display：
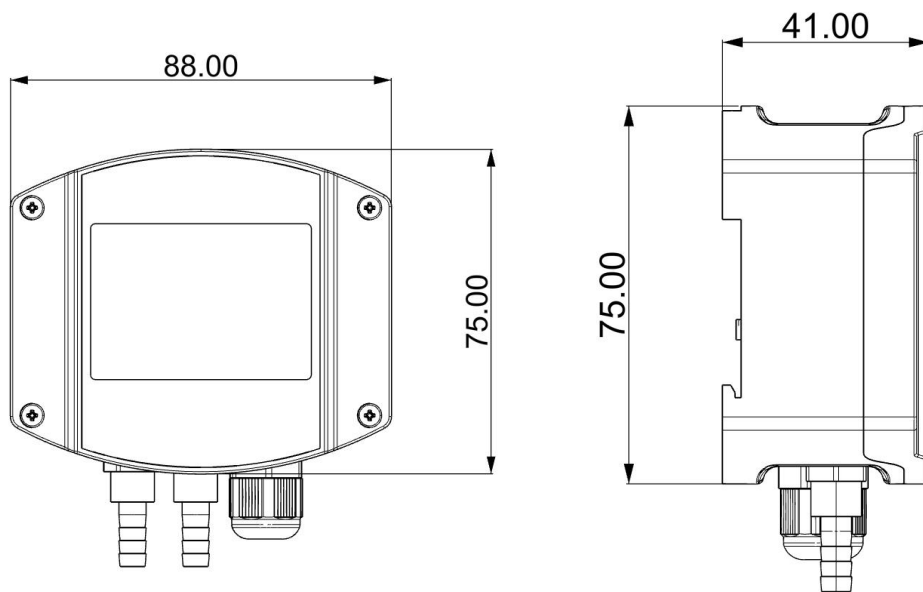
Without display：
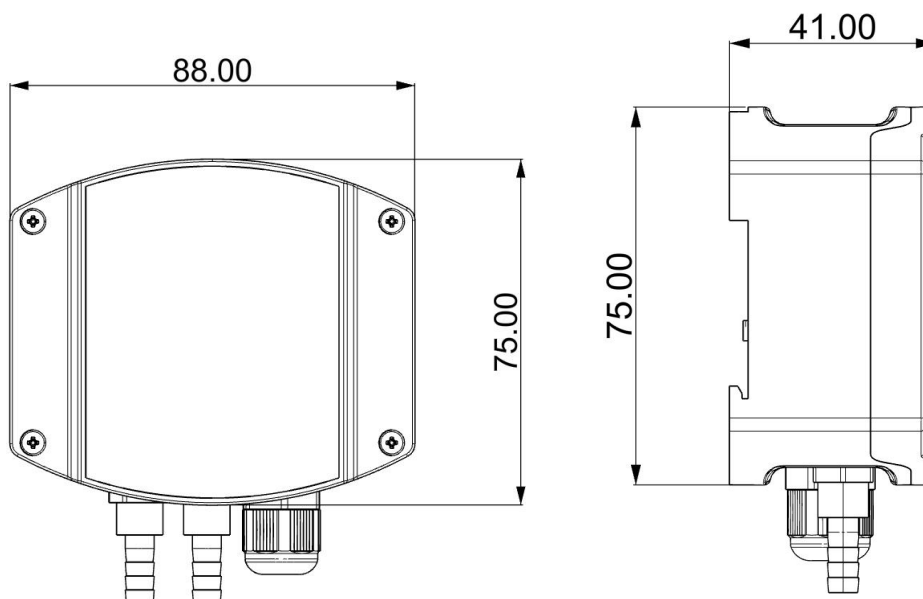
2. Product Selection

RS -							Company Code
	YC-						Differential pressure transmitter
		N01-					485（ModBus protocol）output
			2D-				Industrial wall hanging shell
				空-			Without display
				LCD -			With display
					P201-		Range 0-200Pa
					P501-		Range 0-500Pa
					P102-		Range 0-1kPa
					D201-		Range -200Pa-200Pa
					D501-		Range -500Pa-500Pa
					D102-		Range -1kPa-1kPa
					N201-		Range -200Pa-0
					N501-		Range -500Pa-0
					N102-		Range -1ka-0
						A10	Accuracy ±1%FS

3. Equipment Installation Instructions

### 3.1Pre equipment inspection be for e installation

■ Differential pressure transmitter equipment 1pc

■ Certification, warranty card, etc

■ Expansion screw kit

■ gas-guide tube 2pcs

■ silicone hose tube（optional）

■ 12V/2AWaterproof power supply 1pc（optional）

■ SB convert to 485（optional）

3.2 Installation instructions
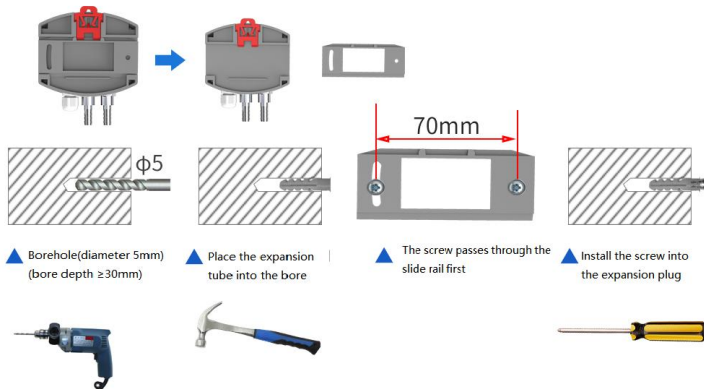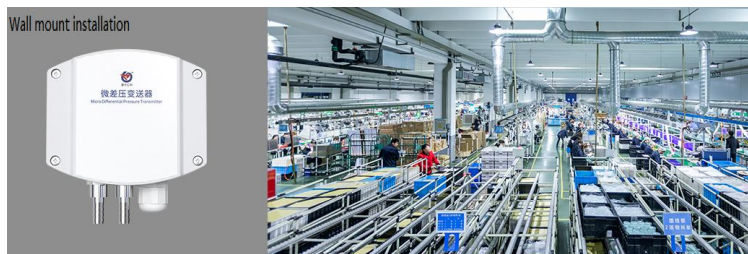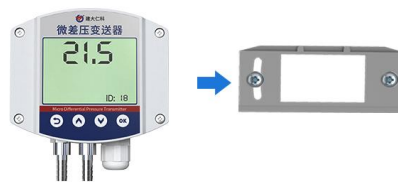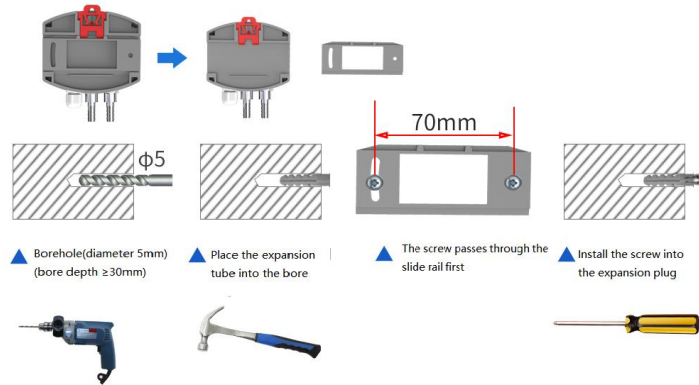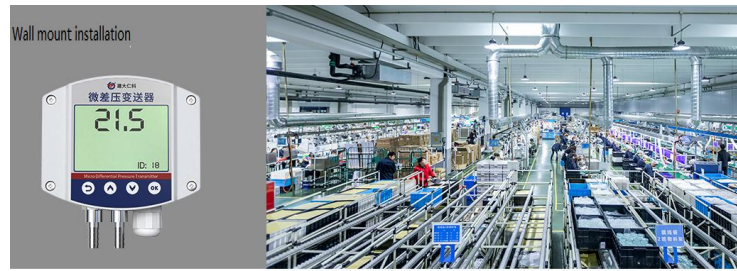
The port on the left is a high voltage port, and the port on the right is a low voltage port. for example, if you want to measure the pressure difference, you can connect the two bottom ports to the two places which you want to measure respectively. And if you want to measure the pressure difference between indoor and outdoor, pass the high pressure port into the indoor and the low pressure port into the outdoor.
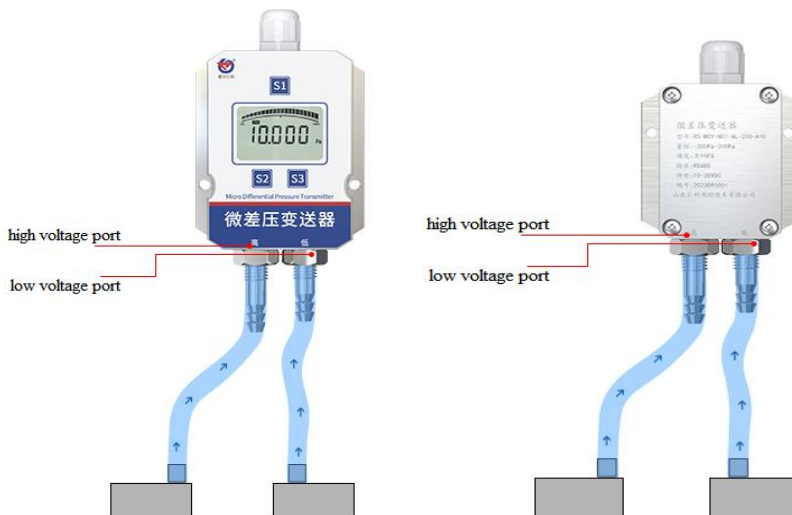
Wide voltage power input which 10~30V DC can be used. When connecting the 485 signal cable, ensure that the A and B cables are not reversed, and that the addresses of multiple devices on the bus do not conflict.
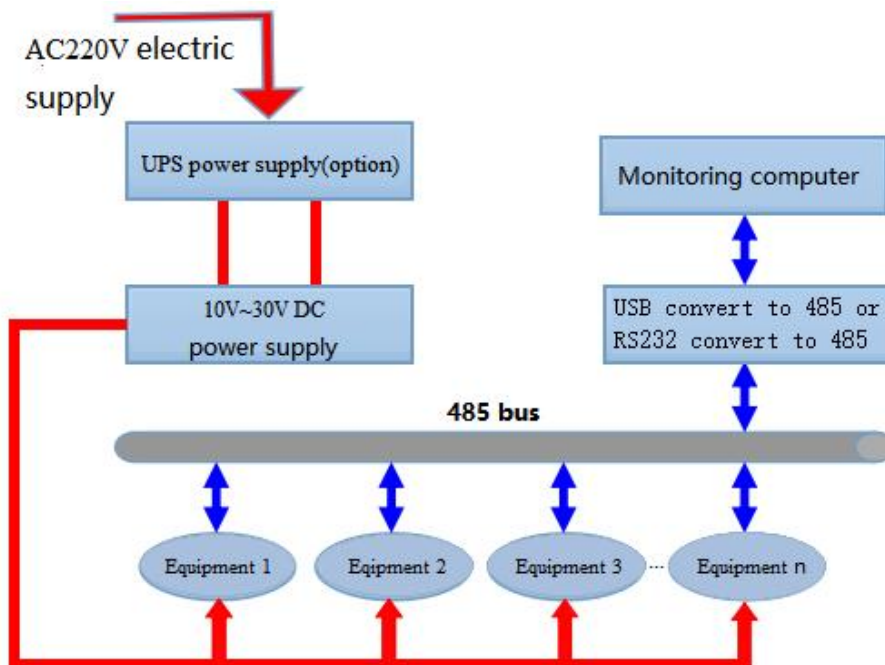
3.3 Wiring

	Wire color	Illustrate
Power	brown	Power supply positive (10~30V DC)
	black	Power supply positive
Communication	yellow	485-A
	blue	485-B

3.4 485 site wiring instruction

There are certain standard requirements for 485 field wiring, please refer to the information package "485 Equipment Field Wiring Manual" for details.

4. Equipment Operating Instruction

4.1 Panel Schematic Description

4.2 Key operation introduction

1）Short press [OK] to enter the password input interface,short press [▼]、[▲]、

[OK] can input the password(default password is 000). After that,long press

again to enter setting main interface.It will show ERR if the password incorrect.

2）After entering the setting main menu,short press or to flip page, short press to enter the parameter setting interface.

3 ） Short press 、 、 can modify parameter. Once parameter modification is finished,short press ,the parameter will autosave in system.

4）Press can cancel current operating during setting process,and press again can back to main interface.

4.3 Function display item description

No.	Project	Scope and Description	Default	Authority
1	--H	The upper limit of pressure difference alarm value can be modified: -100 ~100 (the value is reduced by 10 times), ,the upper limit alarm main interface shows "H" under the pressure difference value.	100	read and write
2	--L	The lower limit of pressure difference alarm value can be modified: -100 ~100 (the value is reduced by 10 times), and the upper limit of the alarm main interface shows "L" under the pressure difference value.	-100	read and write
3	AdJ	The device calibration ranges value,can be modified from -100 to 100.	0	read and write
4	COd	Password,can be modified from 000 to999.	000	read and write
5	--U	Unit,0-8 represent in turn: Pa、kPa、Mpa、 mmHg、mbar、bar、PSI 、kg/cm^2、 mmH2O、 mH2O，	Pa	read only
8	-ΓH	The upper limit of the current device range	/	read only
9	-ΓL	The lower limit of the current device range	/	read only

10	Add	1~254	1	read and write
11	bAd	1200~115200,can be set 可设置	4800	read and write

5. Configure Software Installation & Use

5.1 Software selection

Open the data package and select "Debugging Software" - "485 Parameter

Configuration Software",find out　V5.0.7.12.　and open it.

5.2 Parameter settings

① Select the correct COM port (view the COM port in "My Computer - Properties - Device Manager - Port"). The following figure lists the driver names of several different 485 converters.
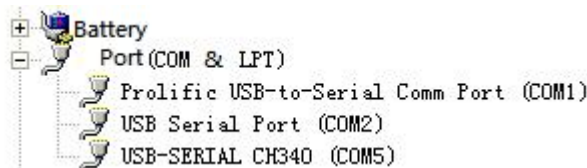
② Connect one device separately and power it on. Click on the software's test baud rate, and the software will test the baud rate and address of the current device. The default baud rate is 4800bit/s, and the default address is 0x01.
③ Modify the address and baud rate according to usage needs, while also querying the current functional status of the device.
④ If the test is not successful, please recheck the equipment wiring and 485 driver installation.
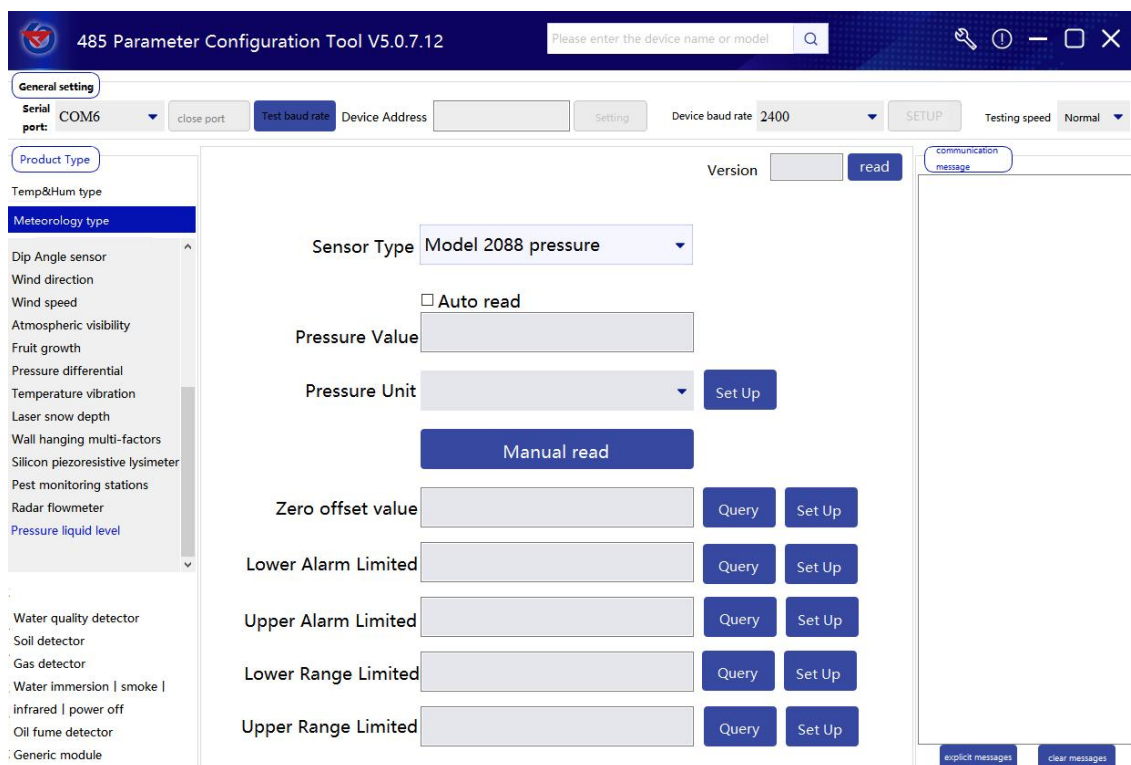
6. Communication Protocol

6.1 Basic communication parameters

Encode	8-bit binary
Data bits	8 bits
Parity bit	-
Stop bit	1 bit
Error verification	CRC（Cyclic Redundancy Check）
Baud rate	2400bit/s、4800bit/s、9600 bit/s,can be set ex factory default baud rate is 4800bit/s

6.2 Definition of data frame format

Adopting Modbus-RTU communication protocol, the for mat is as follows:

Initial structure ≥ 4 bytes in time

Address code=1 byte

Function code=1 byte

Data area=N bytes

Error check=16 bit CRC code

End structure ≥ 4 bytes in time

Address code: The address of the transmitter, which is unique in the communication network (factory default 0x01).

Function code: The instruction function indication issued by the host, this transmitter only uses function

code 0x03 (reading register data).

Data area: The data area is specific communication data, please note that the high byte of 16bits data comes first!

CRC code: A two byte check code.

Host asks frame structure：

Address code	function code	Register Start Address	register length	Check code low bit	Check code high bit
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Slave response frame structure:

Address code	function code	Effective Bytes	Data Zone 1	Second data area	Nth data area	Check Code
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes

6.3 Register address

Register address	content	Instruction	Permission
0000H	High pressure differential byte		read only
0001H	Low pressure differential byte		read only
0002H	Pressure unit	0 for Pa （default） 1 for kPa 2 for MPa 3 for Bar 4 for mmHg 4 for Mbar 5 for kg/cm^2 6 for psi 7 for mh_2o 8 for mmh_2o	ready/write
0021H	Upper alarm limit high byte		ready/write
0022H	Upper alarm limit low byte		ready/write
0023H	Lower alarm limit high byte		ready/write
0024H	Lower alarm limit low byte		ready/write
0025H	Calibration value high		ready/write

	byte		
0026H	Calibration value low byte		ready/write
0028H	Range upper limit high byte		ready/write
0029H	Range upper limit low byte		ready/write
002AH	Range lower limit high byte		ready/write
002BH	Range lower limit low byte		ready/write

6.4 Communication protocol examples and explanation

6.4.1 Example: Reading the real-time values of device address 0x01

Inquiry frame:(hexadecimal):

Address code	function code	Start address	Length	Check code low bit	Check code high bit
0x01	0x03	0x00 0x00	0x00 0x02	0xC4	0x0B

Reply frame(hexadecimal):(The unit is Pa for example)

Address code	Function code	Return the number of valid bytes	Real-time value	Check code low bit	Check code high bit
0x01	0x03	0x04	0x42 0xC8 0x00 0x00	0xF8	0x6D

Real-time value:42C80000 H=100 => Pressure value 100Pa

6.4.2 Set the offset value for device address 0x01

Inquiry frame:(hexadecimal):

Address code	Function code	Start address	Effective address	Effective bytes	Modifying values	Check code low bit	Check code high bit
0x01	0x10	0x00 0x25	0x00 0x02	0x04	0x3F 0x80 0x00 0x00	0x3C	0x74

Reply frame(hexadecimal):(Write offset 1 as an example)

Address code	Function code	Start address	Effective address	Check code low bit	Check cod high bit
0x01	0x10	0x00 0x25	0x00 0x02	0x50	0x03

Offset：3F800000 H=> offset value = 1

7. Common problems and solutions

The device cannot be connected to a PLC or computer.

Possible reasons:

1)The computer has multiple COM ports, and the selected port is incorrect.

2)The device address is incorrect, or there are devices with duplicate addresses (factory default is all 1)

3)Baud rate, verification method, data bits, stop bit error.

4)The 485 bus is disconnected, or wires A and B are connected in reverse

5)If there are too many devices or the wiring is too long, power should be supplied to the nearby area, add a 485 booster and a 120Ω terminal resistor .

6)USB to 485 driver is not installed or damaged

7)Equipment damage.

8. Contact information

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9. Document History

V1.0   Document establishment