

Explosion-proof Display Pressure Transmitter
Manual
SP05V2
V1.1



1.Product Overview	3
1.1 Introduction.....	3
1.2 Working Principle	3
1.3 Technical Parameter	3
2. Wiring	4
3. Primary Variable Clearing	5
4. Communication Protocol.....	6
4.1 Serial Data Format.....	6
4.2 Communication Format.....	6
4.3 Commands Supported by Integer Numbers and Meanings.....	7

1.Product Overview

1.1 Introduction

SP05V2 pressure transmitter adopts imported pressure sensor with international advanced level, coupled with high-precision electronic components, and assembled through strict process. The product is small, light, sensitive and has stable and reliable performance. It can be used for liquid, gas, steam pressure measurement and liquid level measurement.

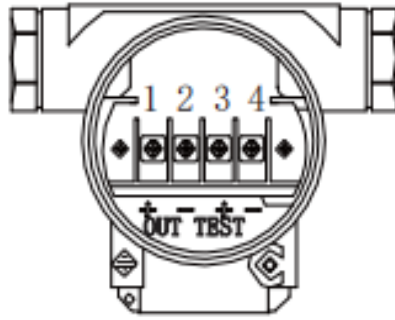
1.2 Working Principle

The measured pressure directly acts on the front of the diaphragm of the pressure sensor, causing a slight deformation of the diaphragm, so that the sensor generates a highly linear voltage signal proportional to the pressure and proportional to the excitation voltage. The voltage signal output by the sensor is differential. After the output of the normalizing amplifier is amplified, it is transformed into a corresponding current signal through the conversion of voltage and current. The current signal is compensated by the nonlinear correction loop, which produces a 0-5V or 4-20mA standard signal output.

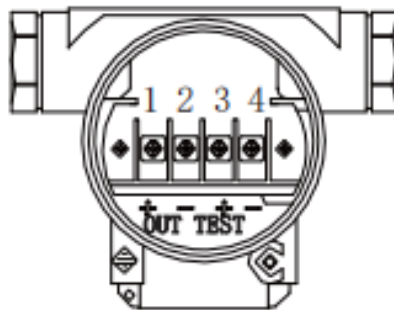
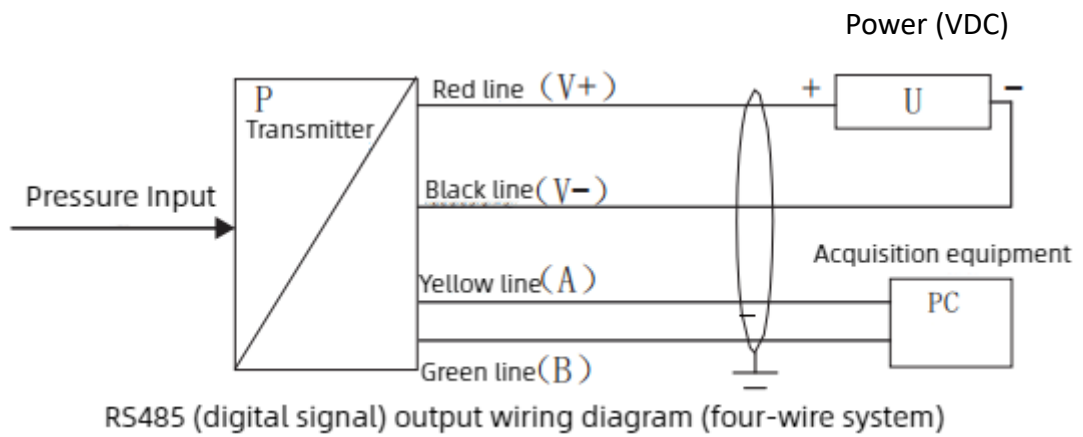
1.3 Technical Parameter

Measured medium	liquid, gas, steam
Screen display	LCD screen
Measuring range	0-1.6MPA, 0-2.5MPA, 0-50MPA (customizable)
Accuracy class	±0.2%FS
Long-term stability	≤0.2%FS/ year
Temperature drift	≤0.02% FS / °C (in the range of 0-70 °C)
Ambient temperature	-20°C+85°C
Storage temperature	-55°C~+125 °C
Output signal	4-20mA 、 0-5VDC、 RS485
Supply voltage	24V
Allowable overload	2 times of rated pressure
Explosion-proof class	Intrinsically safe ia II C T5 Explosion-proof dII C T5
Wetted parts material	316 stainless steel and 1Gr18Ni9Ti
Housing material	Die-casting alloy aluminum, surface epoxy spraying

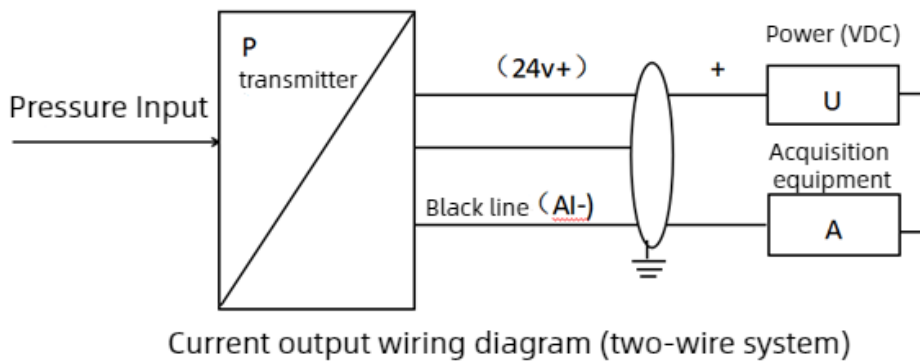
2. Wiring



- 1、 RS485A (A)
- 2、 RS485B (B)
- 3、 24V (+)
- 4、 GND



- 3、 24V (+)
- 4、 AI (+)



The transmitter is a standard 2-wire instrument, the power (signal) terminal is located on the wiring side of the instrument case, the power is sent to the transmitter through the signal line, no additional line is required. Signal wires should use shielded wires or two twisted-pair wires twisted together, and try not to pass through wire tubes or open wire slots together with other power wires, and do not pass near high-power equipment.

There are wiring holes on the instrument case, which should be sealed with seals to prevent water from entering the instrument case. The signal line can be floating or grounded at any point in the signal circuit. The transmitter shell can be grounded or not. The power supply voltage requirements Not high, even if the voltage fluctuates by a few volts, the effect on the output signal is negligible. In order to maintain the explosion-proof function of the installed transmitter, the following items must be noticed:

- (1) The cover must be tightened firmly, but the thread must not be damaged;
- (2) The transition piece must be tightened;
- (3) The wiring hole must be sealed with a seal;
- (4) If the wiring hole on the other side of the instrument shell is not used, it must be tightened with a threaded metal plug;
- (5) The isolation layer on the circuit side and wiring side of the housing must not be damaged, and the wiring terminals must be intact;
- (6) Power must be cut off when opening the case.

Intrinsically safe type: explosion-proof mark iaIICT5, intrinsically safe instruments must be used in conjunction with associated equipment (safety barriers) to form an intrinsically safe explosion-proof system.

3. Primary Variable Clearing

Primary variable clearing means PV clearing, which is the zero point under the relative atmospheric pressure, not the zero point of the sensor range. Put the transmitter directly under the atmospheric pressure, press and hold the "M" key to enter the main variable clearing function, as shown in the right figure, the menu area displays "CLR", select the desired value by pressing the

"S" key and "Z" key operation, the prompt area will display accordingly:

"NO" does not clear the main variable;

"YES" to clear the main variable;

"RESET" restores the zero point before the reset operation;

If there is no key operation within 30 seconds, the meter will return to the measurement mode.

This function is forbidden to be used in the production process and is suitable for use in the field



4. Communication Protocol

This agreement complies with the MODBUS communication protocol, and adopts the subset RTU mode in the MODBUS protocol. RS485 half-duplex working mode.

4.1 Serial Data Format

Serial port settings: no parity, 8 data bits, 1 stop bit.

Example: 9600,N,8,1 Meaning: 9600bps, no parity, 8 data bits, 1 stop bit. The serial port baud rate supported by this transmitter: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

CRC check polynomial: 0xA001.

The communication protocol can transmit signed integers and floating-point data.

4.2 Communication Format

Signed integer output:

A. Send read command format:

Address	Function code	Data start (H)	Data start (L)	Number of data (H)	Number of data (L)	CRC16 (L)	CRC16 (H)
0X01	0X03	0X00	0X00	0X00	0X01	0X84	0X0A

B. Return read data format(example)

Address	Function code	Data Length	Data (H)	Data (L)	CRC16(L)	CRC16(H)
0X01	0X03	0X02	0X00	0X01	0X79	0X84

A. Write command format (06 function code) example

Address	Function code	Data start (H)	Data start (L)	Number of data (H)	Number of data (L)	CRC16(L)	CRC16(H)
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

B. Return read data format(example)

Address	Function code	Data start (H)	Data start (L)	Data(H)	Data (L)	CRC16(L)	CRC16(H)
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

Exception response return

Address	Function code	exception code	CRC16(L)	CRC16(H)
0X01	0X80+	0x01 (illegal function)		
	Function code	0x02 (illegal data address)		
	code	0x03 (illegal data)		

4.3 Commands Supported by Integer Numbers and Meanings

Function code	Data offset (decimal)	Number of data	Bytes	Data range	Command meaning
0x03 function code read data					
Integer reading range					
0x03	0	1	2	1-255	read slave address
0x03	1	1		0-1200	Read baud rate

			2		
				1-2400 2-4800 3-9600 4-19200 5-38400 6-57600 7-115200	
0x03	2	1	2	no parity Odd parity even parity	Communication check mode
0x03	3	1	2	0.Kpa 1.1.Mpa 2.Ma 2.3- % 3.Inh2o 4.Fth2o 5.MmH2O 6.MmHg 7.PSI 8.Bar 9.Mbar 10. Kg/cm2 11. Pa 12. Torr 13. Atm 14. Null 15. M 16. Cm 17. Mm 18. inHg 19. mHg 20. Mh2O	Pressure unit

0x03	4	1	2	0-#### 1-###.# 2-##.## 3-#.### 4-#.####	The decimal points represent 0-4 decimal places respectively.
0X03	5	1	2	0-30	Filter coefficient
0x03	6	1	2	0-current display 1-Pressure display 2- Percentage display	Home Display Mode
0x03	7	1	2	0 - do not display 1- Display temperature	Dual screen display mode
0x03	10	1	2	-32768-32767	Pressure output (integer)

The enumeration of shaping data user needs is complete

Float reading range

Function code (hexadecimal)	Offset address (decimal)	Number of data	Bytes	Data range	Note
0x03	20-21	2	4	0-20.000	Theoretical current output
0x03	22-23	2	4	-19999-99999	Pressure output (float)
0x03	24-25	2	4	-19999-99999	host variable offset
0x03	26-27	2	4	-19999-99999	Low point of transmission range
0x03	28-29	2	4	-19999-99999	High point of transmission range
0x03	30-31	2	4	-19999-99999	Low point of sensor range
0x03	32-33	2	4	-19999-99999	High point of sensor range
0x03	42-43	2	4	0-1.00000	Primary variable gain coefficient
0X03	181-182	2	4	-40-120℃	internal temperature sensor

The above is the range of floating point reading data.					
0x06 Function code write data					
0x06	0	1	2	1-255	rewrite slave address
0x06	1	1	2	0-1200 1-2400 2-4800 3-9600 4-19200 5-38400 6-57600 7-115200	Modify baud rate
0x06	2	1	2	0. No parity 1. Odd parity 0-even parity	Modify verification mode
0x06	24-25	2	4	19999-99999	Zero offset value. Pressure output value = Calibration measurement value + zero offset value
Save					
0x06	65535	1	2	0- save to user area	

For the transmission of floating-point numbers, please refer to the regulations on the transmission of multi-byte floating-point numbers in the MODBUS-RTU protocol.

Example of reading pressure command: (hex)

Tx:01 03 00 16 00 02 25 CF

01 slave address, 03 function code, 00 16 offset address, 00 02 the number of data read.

RX:01 03 04 BE 40 E6 12 15 A2

01 slave address, 03 function code, 04 byte number, BE 40 E6 12 is IEEE754's floating point numbers.



Pay attention to distinguish the data system in the protocol, such as the offset address 22 (decimal system), and the hexadecimal system is 16, pay attention to distinguish this difference.