

Intelligent single crystal silicon pressure /Differential pressure transmitter

Product specification



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I. User's Notes

To ensure the safety of the person and the system and to achieve the best performance of the product, please fully read and understand the contents of this manual before installing, using and repairing the product, especially the warnings and precautions.

Warning

Important safety information, may lead to major accidents, serious property losses and personal casualties of the danger, must take safety precautions.

Pay attention to

Important information and general safety information related to product performance that may cause minor damage and property loss if not avoided.

1.1 Precautions for Safe Use

This instrument shall be installed by a specialized engineer or technician. The work described in the "transmitter installation" section is not allowed to be performed by the operator.

If working liquid high temperature, be careful of body and shell high temperature to avoid scalding. The instrument in use in the process is under pressure, do not loosen the process joint bolts to avoid the process of dangerous liquid injection. When discharging residue from the pressure gauge, be careful not to touch the skin, eyes and body, or inhale steam. due to residual process fluids may be toxic or harmful. Avoid contact with fluid and instrument interior when removing instrument from hazardous process.

The ambient limit temperature and the medium temperature of the installation position shall not exceed the operating temperature range of the transmitter. cannot apply more than the specified maximum working pressure, the components of the electronic circuit board are easy to be destroyed by static electricity, anti-static measures should be adopted in operation to avoid direct contact with the circuit board.

flameproof transmitter end cover must be fully meshed according to flameproof requirements, no live open cover, if you need to open the end cover, you must first power off and ensure safety before opening. For this type of transmitter, ensure that the circuit meets the corresponding essential safety specification requirements. When this type of transmitter is installed in the field, it should avoid having a high voltage impact on this safety circuit.

Qualified products are not allowed to be replaced and altered at will. The Company is not responsible for any malfunction or damage caused by the change of the instrument.

1.2 Quality Assurance; warranty

Pay attention to

The warranty period is the term referred to in the contract at the time of purchase, failure occurred during the warranty period, in principle free of charge maintenance. When the failure occurs, the user can contact the instrument seller or the company. When there is a failure, please inform the fault phenomenon and the environmental conditions when the failure occurs, including the model specification and factory number, any schematic, data and other information in the contact is very helpful, the responsible party for the maintenance costs should be determined by the company after investigation.

In the event of failure due to the following reasons, even during the warranty period, the user has to bear the cost of maintenance.

1. The place where the product is used does not conform to the standards specified by the company or due to incorrect or inappropriate maintenance by the user.
2. failure or damage caused by the wrong installation of the instrument.
3. failure or damage caused by incorrect operation, beyond the design requirements for use or custody.
4. Failure or damage caused by alteration or repair of a non-company or non-company designated maintenance unit.
5. damage caused by natural forces such as fire, earthquake, disturbance, riot, war or radiation pollution.

1.3 Confirmation of receipt

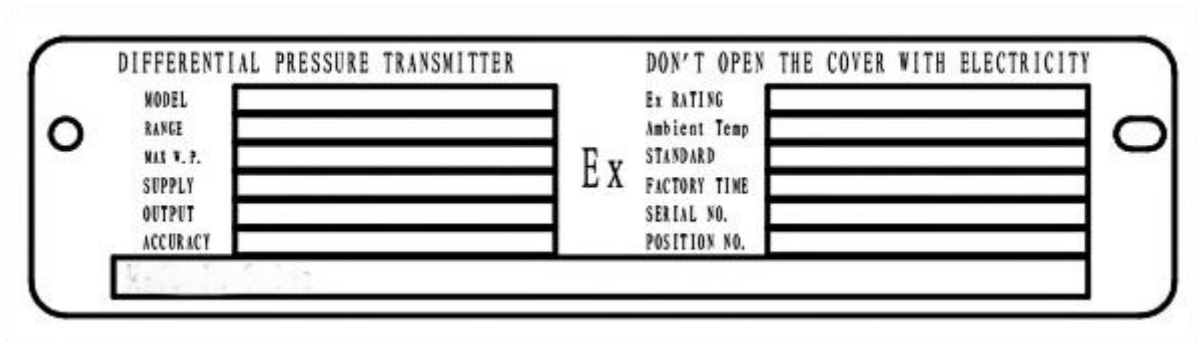
When opening the box, check that the outer packing is in good condition and the appearance of the transmitter is damaged. At the same time should confirm that the transmitter installation parts are complete. If the order specifies that no mounting bracket or process connector is required, no transmitter mounting parts are attached.

Differential pressure/pressure transmitter accessories :

1. Instructions 1
2. 1 product certificate
3. Plug, wiring Gran 1 set
4. 1 set of mounting bracket matching screws and U-shaped card

1.4 Model specification confirmation

Check the type and specification of the transmitter according to the order contract. The type and specification are engraved on the outside of the shell On the nameplate.



1.5 Installation site

The transmitter can work normally even under harsh environmental conditions. For long-term correct and stable use, choose Please pay attention to the following points when choosing the installation place.

Ambient temperature:

Please try to avoid installing in places with large temperature variations or obvious gradient temperatures. If exposed to thermal radiation shooting, heat insulation radiation and ventilation measures should be taken.

Air conditions:

Please avoid installation in corrosive environment. If used in corrosive environment, should be good ventilation, attention to avoid rain Immerse in the wire tube.

Shock and Vibration:

Transmitters should be installed wherever possible in less impact and less vibration (Although the transmitter is designed to withstand shock and vibration) .

II、 Intelligent pressure/differential pressure transmitter overview

2.1 Summary

Thank you using our company series intelligent pressure/differential pressure transmitter. The intelligent pressure/differential pressure transmitter adopts the microprocessor core in the circuit design and supports the modular design with the advanced digital isolation technology, which makes the instrument have high anti-interference and stability. At the same time, the transmitter is compensated by the built-in temperature sensor, which improves the measuring accuracy, reduces the temperature drift, has the characteristics of good long-term stability, high reliability and strong self-diagnosis ability. In the structure, the user can easily calibrate, set and configure the transmitter by HART operator.

2.2 Pressure / Differential Pressure Transmitter Features

1. Advanced monocrystalline silicon pressure, differential pressure sensor technology and packaging technology, carefully developed a leading technology of ultra-high performance pressure, differential pressure transmitter
2. One-way overvoltage up to 25 MPa
3. The microprocessor is designed with advanced digital isolation technology, which makes the instrument have high anti-interference and stability
4. Powerful 24-bit ADC for High Precision
5. The latest one-click zero-clearing function does not affect the level of electrical protection, more safe and faster.

2.3 Functional parameter

Range limit: within the upper and lower limits of the range, can be set arbitrarily, as long as the calibration range \geq set the range. It is recommended to select a range as low as possible to optimize performance.

Installation position effect: the change of installation position in the one-sided vertical direction with the membrane will not cause zero drift effect, if the change of installation position and membrane one-sided over 90° , there will be zero position effect in the range of <0.4 KPA, which can be corrected by zero adjustment, infinite range effect.

Output: Two-wire system 4-20mA, in accordance with NAMILNE43 specification, superimposed digital signal (Hart protocol) can choose linear or square root output.

Output signal limits : Low Alarm model I_{min} (minimum) : 3.9 mA
High Alarm model I_{max} (maximum) : 21 mA

Fault warning : If the sensor or circuit fails, the automatic diagnosis function automatically outputs 22.0mA

Response time : the damping constant of the amplifier component is 0.1 s; the sensor time constant is 0.1~1.6 s, depending on the range and range ratio. the additional adjustable time constant is:0 to 100 s.

Preheating time: < 15s

2.4 Performance parameter

Measuring media: gas, steam, liquid

Inaccuracy: $\pm 0.05\%$, $\pm 0.075\%$, $\pm 0.1\%$ (including linearity, return and repeatability from zero)

Stability: $\pm 0.1\%/3$ years

Ambient temperature effect: $\leq \pm 0.04\%$ URL/ 10°C

Static pressure effect: $\pm 0.05\%/10\text{MPa}$

Power supply: $15\sim 36\text{VDC}$

Power effect: $\pm 0.001\%/10\text{V}$, negligible

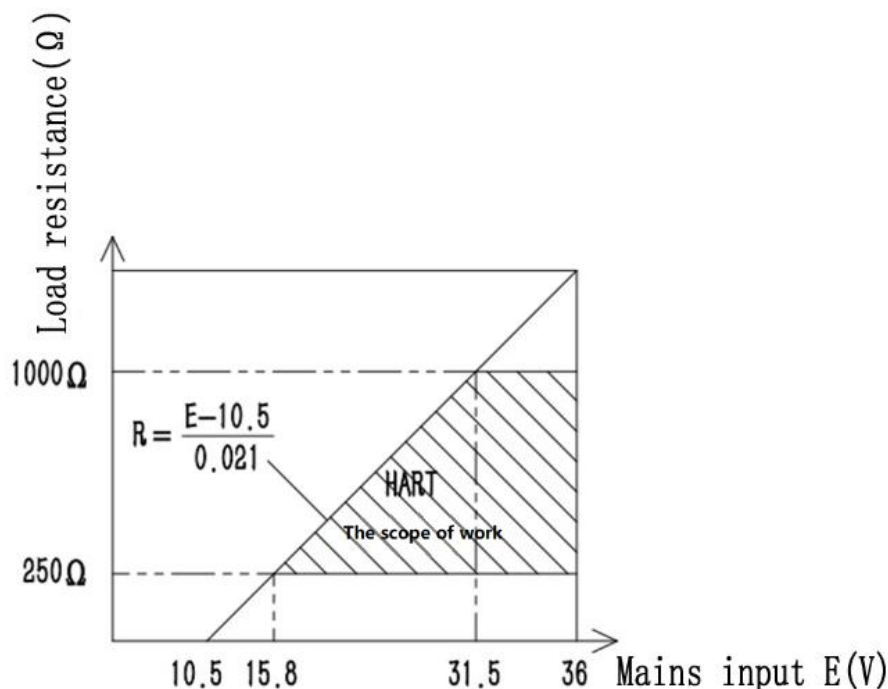
Ambient temperature: $-40^\circ\text{C} \sim 85^\circ\text{C}$

Measured medium temperature: $-40^\circ\text{C} \sim 120^\circ\text{C}$

Storage temperature: $-40^\circ\text{C} \sim 85^\circ\text{C}$

Show: LCD

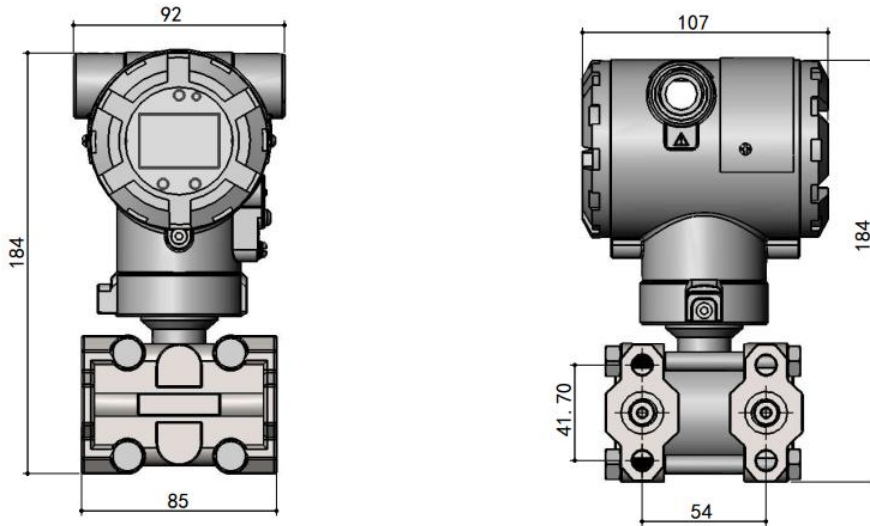
Display module temperature: $-20^\circ\text{C} \sim 70^\circ\text{C}$



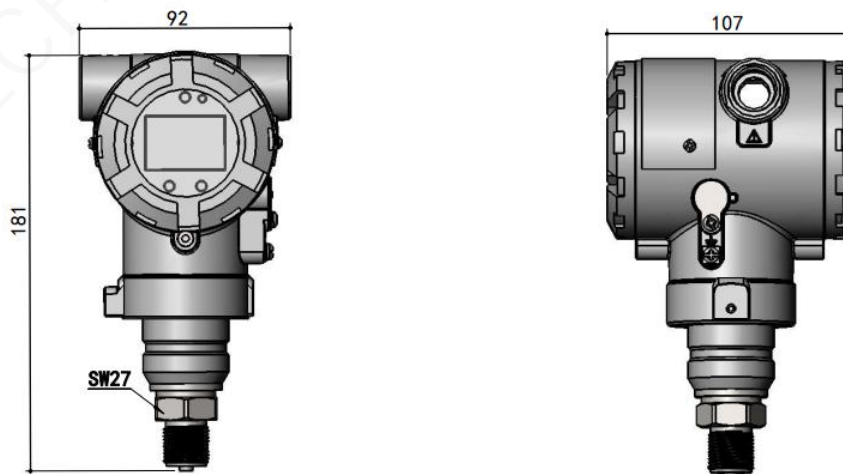
Power supply voltage and external load diagram

III、 Size and Weight of Transmitter

3.1 Outline dimension



Differential pressure transmitter dimension



Pressure Transmitter Size Chart

3.2 Weight

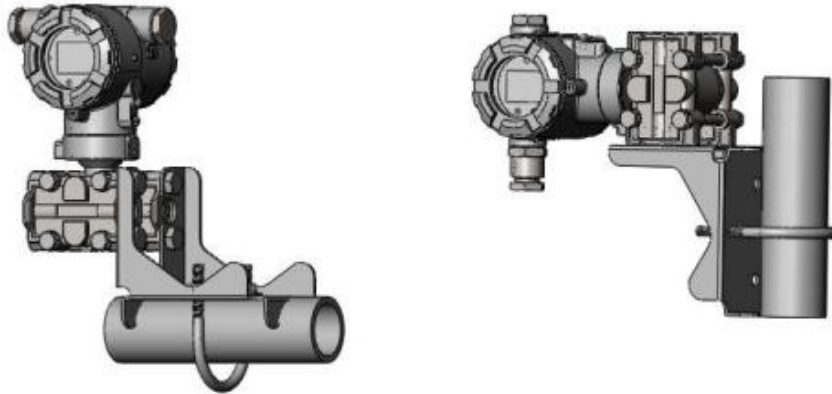
Differential pressure transmitter :2.8Kg

Pressure transmitter :1.1Kg

IV、 Transmitter installation

4.1 Differential pressure transmitter installation

The differential pressure transmitter can be mounted directly on the 2 inch tube or directly on the wall as well as on the dashboard.



Pipe mounting bracket

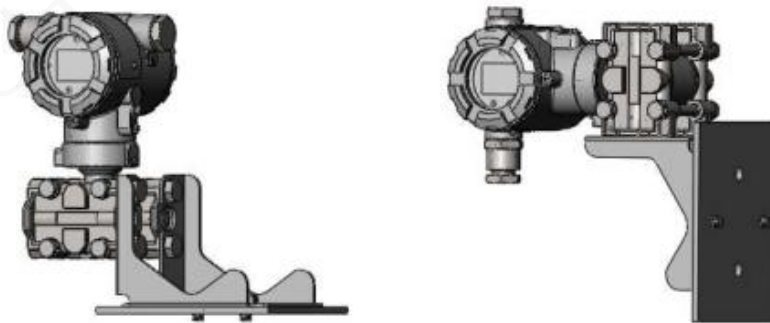
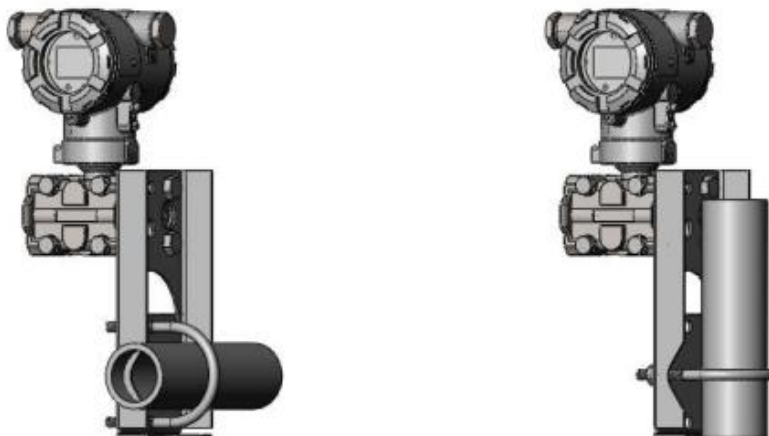
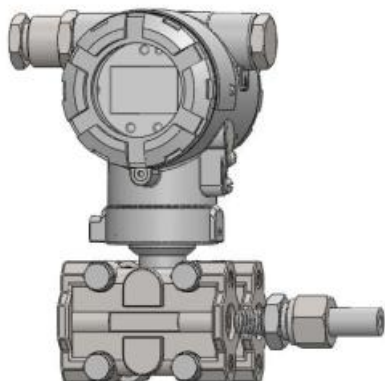


Plate bending bracket

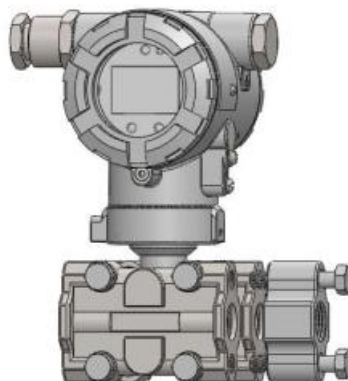


Pipe leveling support

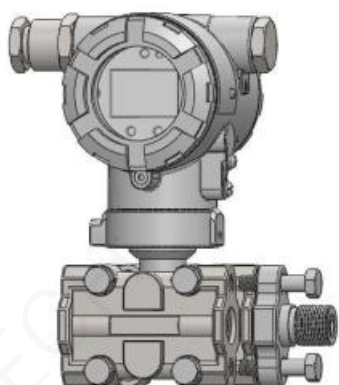
4.2 Differential pressure transmitter



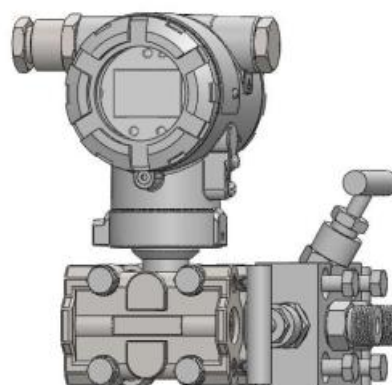
Welded pipe joints



Waist flange



T-joint



Three Valves Section

Installation of three valve groups:

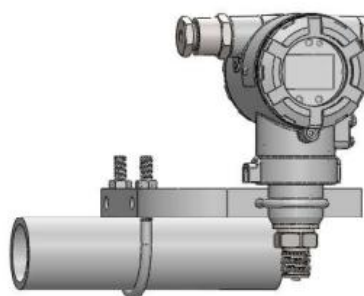
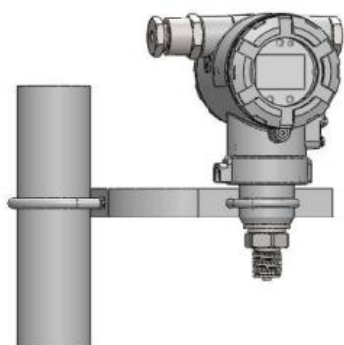
The three valve groups are installed to close the high and low end valves on both sides, open the middle balance valve, and after the differential pressure transmitter is cleared, open the high and low end valves on both sides to close the middle balance valve.

Remove differential pressure transmitter:

First open the middle balance valve, close the two sides of the high and low end valve middle balance valve open, you can remove the differential pressure transmitter.

4.3 Pressure transmitter installation

The pressure transmitter can be mounted directly on the pipe using M20*1.5 external threads or other threads, or through the pressure pipe and bracket mounting.



4.4 Pressure pipe installation

⚠ Pay attention to

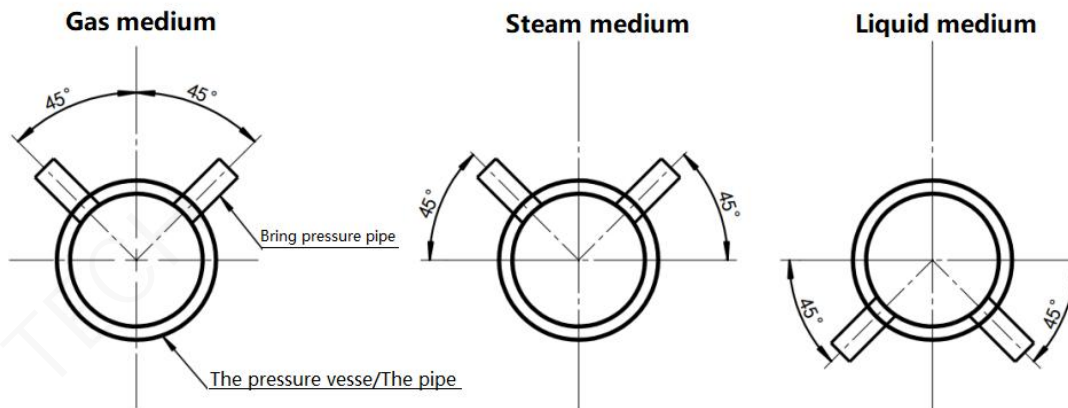
The pressure pipe should be as short as possible and installed in a position where temperature fluctuation is small and deposition is not easy to form.

In order to reduce the effect of friction and prevent blockage, a large enough caliber pressure tube should be used.

When measuring high pressure, the pressure tube should have sufficient strength to withstand high pressure.

The pressure riser shall be tilted mounted so that the gas is discharged from the liquid medium, or from the gas medium.

The pressure introduction angle in the process is shown below:



Pressure introduction angle

When measuring the gas medium, the inductor pressure pipe shall be installed in the range of 45° vertical upward and both sides, and the transmitter shall be installed above the side pressure extraction port for liquid to be discharged into the process pipe.

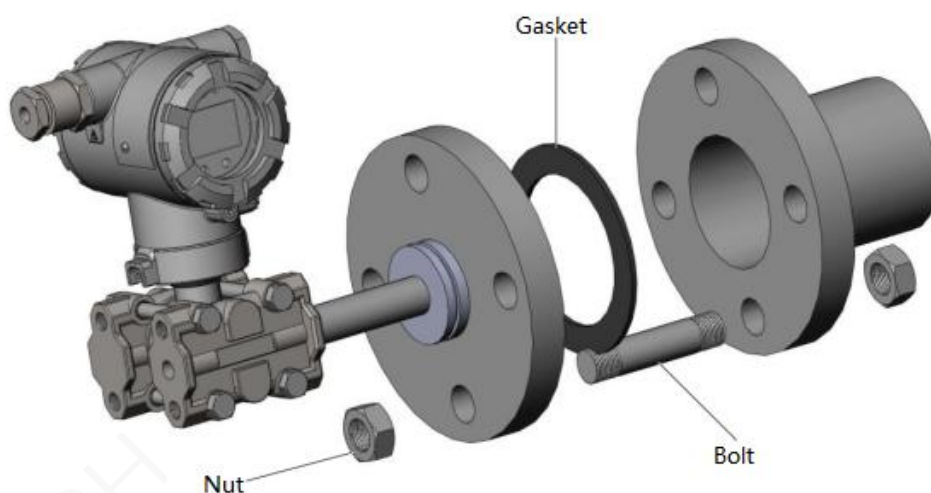
When measuring the steam medium, the pressure pipe should be installed in the range of 45° above the horizontal direction, and the transmitter should be installed under the side pressure extraction port so that the condensate can flow into the pressure pipe. It should be noted that when measuring steam or other high temperature media, it should not exceed the limit temperature of the transmitter.

When measuring the liquid medium, the induced pressure pipe shall be installed in the range of 45° below the horizontal direction, and the transmitter shall be installed under the side pressure extraction port for the gas to be discharged into the process pipe.

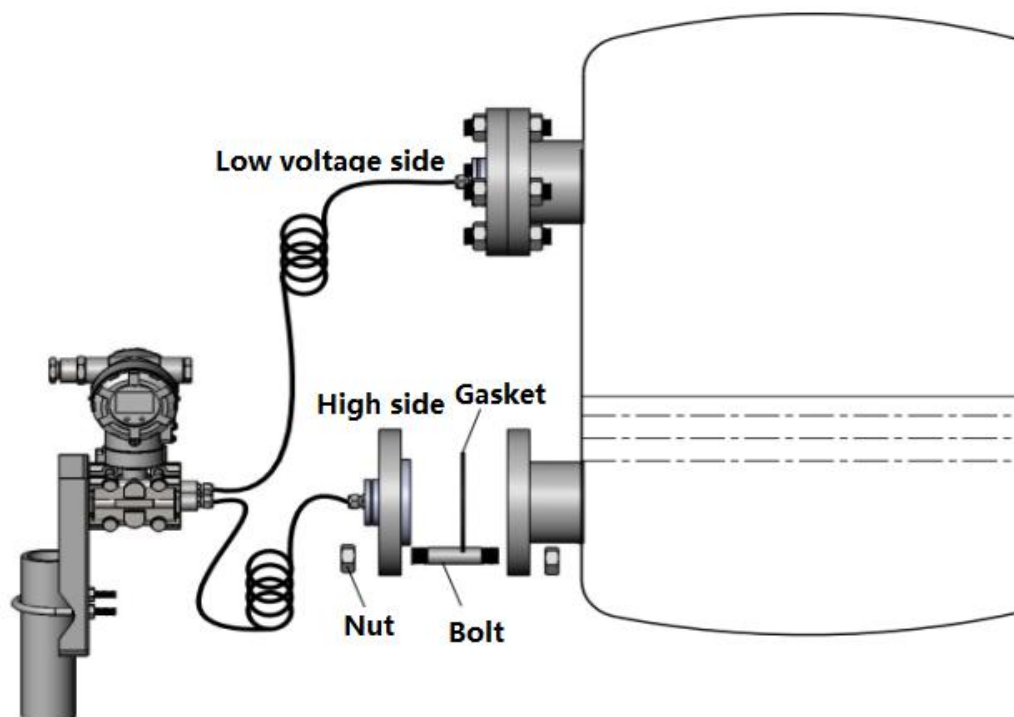
Use a transmitter with an exhaust/exhaust valve on the side. The pressure

outlet should be mounted on the side of the process pipe. When the working medium is liquid, the exhaust / drain valve is installed in the upper part of the flange to discharge the gas; when the working medium is gas, the exhaust / drain valve is installed in the lower part of the flange to discharge the liquid.

4.5 Flange level transmitter installation



4.6 Installation of remote flange pressure/differential pressure transmitter



⚠ Pay attention to

1. Make sure that the inner diameter of the gasket is greater than the inner diameter of the diaphragm seal if the inner diameter of the gasket is less than that of the diaphragm seal inner diameter, may affect the normal operation of the diaphragm, causing errors or damage to the diaphragm.

2. Be careful not to damage the surface of the diaphragm. If the membrane is placed one-sidedly, it may damage the surface of the diaphragm.

3. Don't twist, squeeze the capillary, and don't put too much pressure on it.

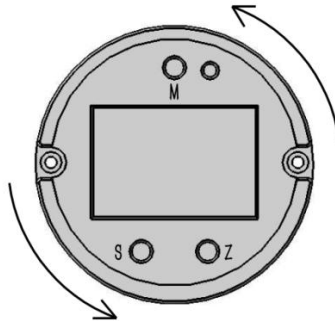
4. Do not loosen the four screws on the chamber flange (the transmitter will not work if the filling fluid leaks).

5. Install the flange diaphragm on the high and low pressure side of the liquid tank as shown in the H, L label.

6. To avoid the measurement error caused by temperature difference, the capillary can be bundled together. Capillary tubes must be securely secured on the wall of the tank to prevent the influence of wind and vibration, etc. If the capillary tube is too long, it should be rolled together with a clamp Yes.

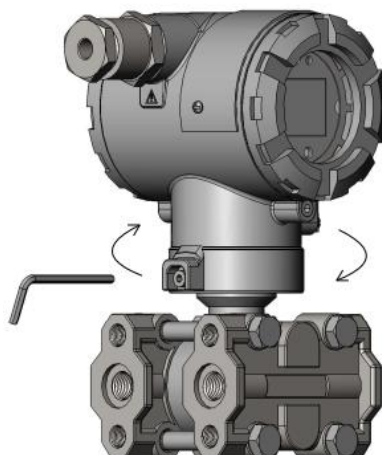
⚠ Pay attention to

Open the transmitter display cover, the display screen can be 330° rotation, after installation can be adjusted to ensure that the field display unit has the most Good readability. There is a connecting line behind the screen must not be excessive rotation.



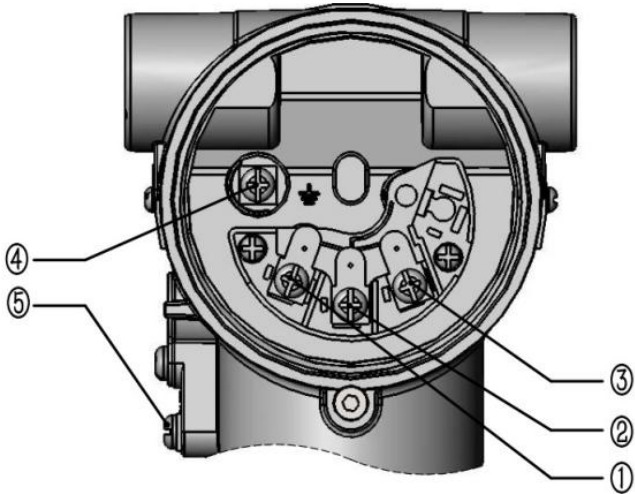
⚠ Pay attention to

There is a connecting wire in the connecting part of the transmitter housing and the sensor assembly. The shell can rotate 180° clockwise or counterclockwise, Do not over-rotate to cause internal connection line damage.



V、Electrical connection of transmitter

5.1 Second Line Terminal



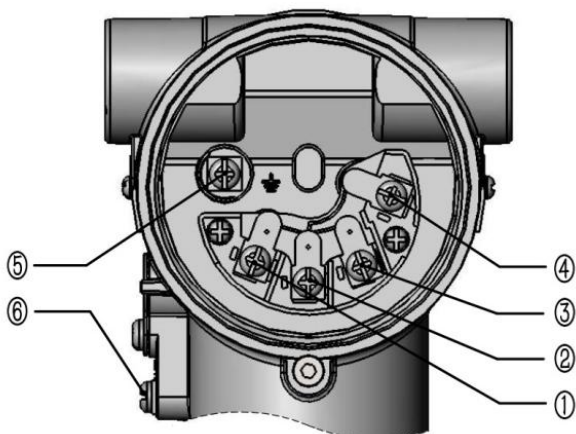
- ① Transmitter power supply
- ② Negative transmitter power
(4~20mA test terminal negative)
- ③ 4~20mA test terminal
- ④ Internal Grounding Screw
- ⑤ External earthing screws



Pay attention to

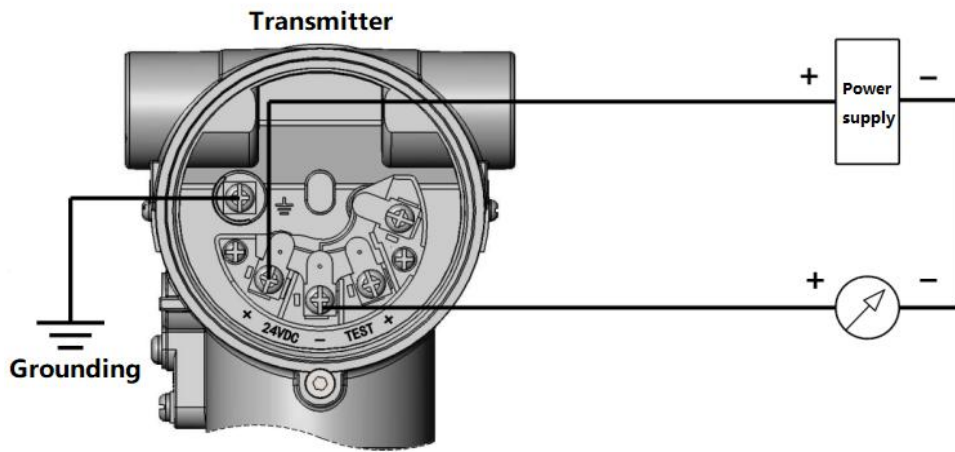
Do not attach the signal line with power to the test terminal, otherwise it will destroy the diode inside the test terminal. Such as diode misfortune Damage, the short connection test terminal can make the transmitter continue to work, but the machine cannot be connected to the external test table. Signal line no needs to be shielded, but the use of twisted wire is more effective. Don't line up signal lines with other power lines, or close to strong electricity Equipment.

5.2 4-wire terminal (RS485)



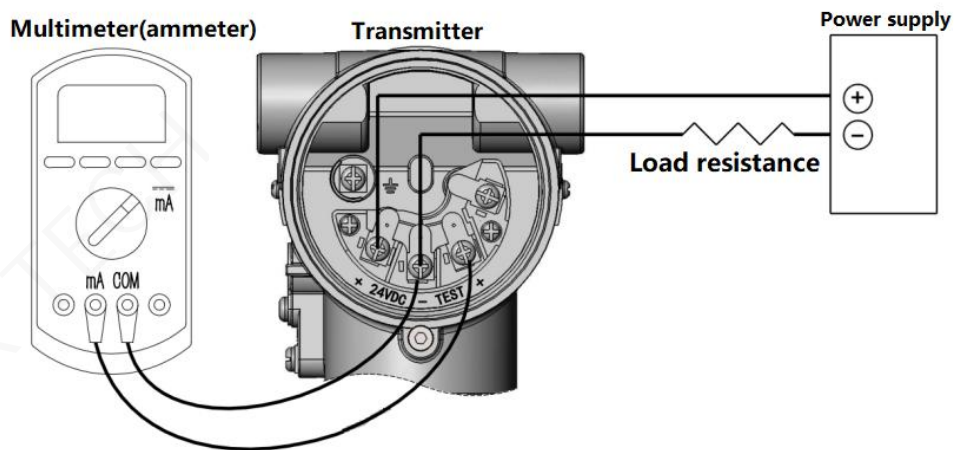
- ① Transmitter power supply
- ② Negative transmitter power supply
- ③ RS485 Communication Port A
- ④ RS485 Communication Port B
- ⑤ Internal Grounding Screw
- ⑥ External earthing screws

5.3 2-wire power cord connection



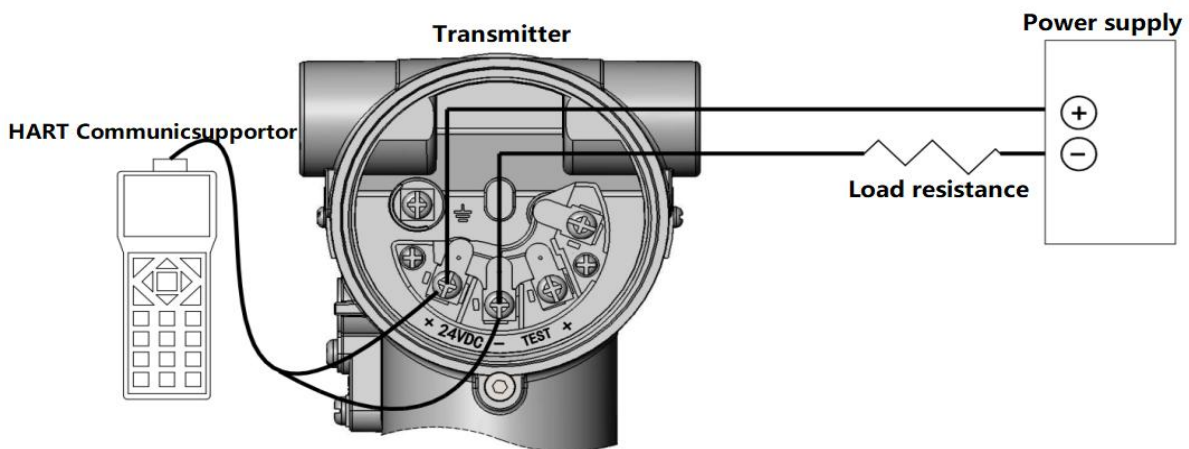
Transmitter power connection diagram

5.4 Second Line Current Testing Instrument Connection

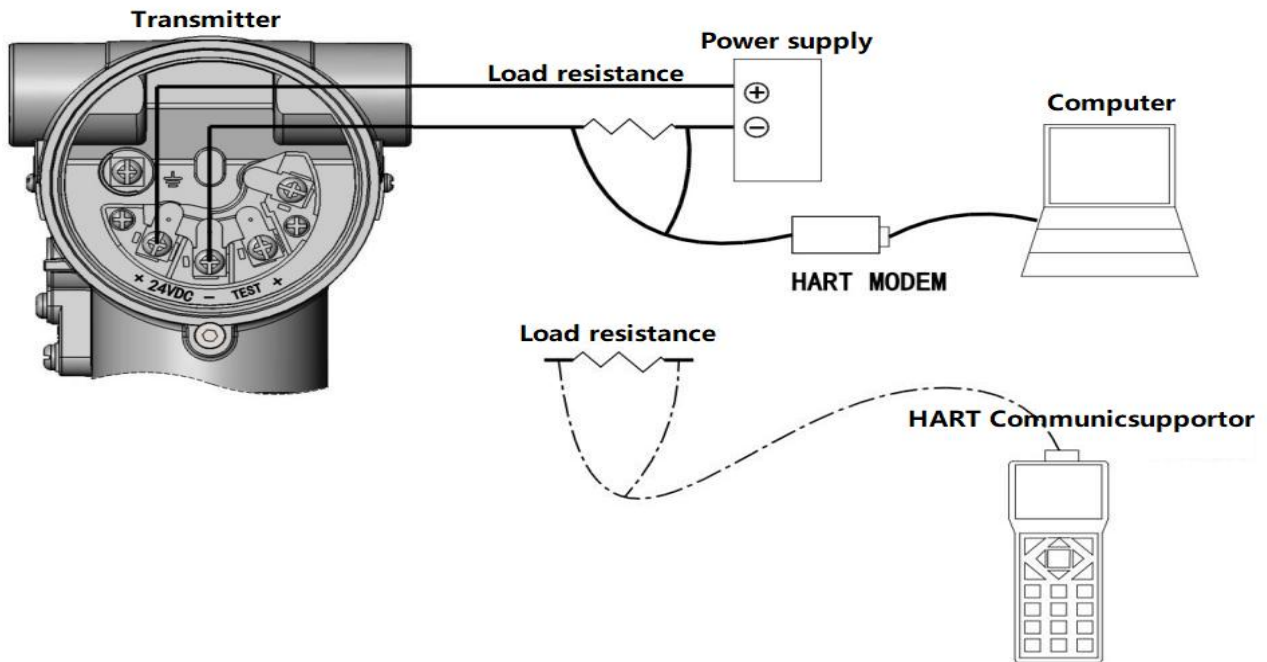


Transmitter power connection diagram

5.5 Second Line Hart Communication Connection

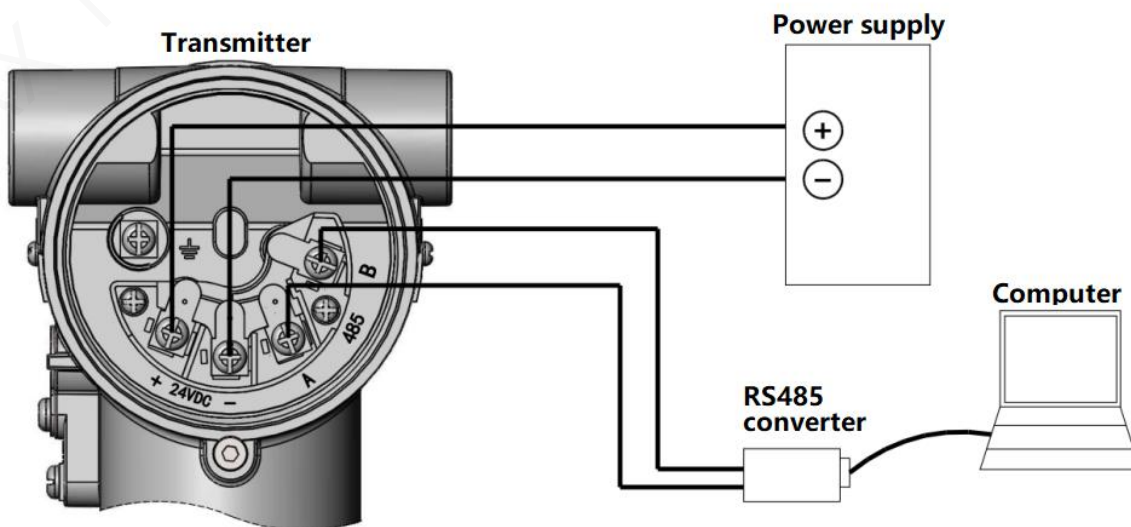


Hart Communicator Connection at Transmitter End



A computer or Hart communication device connected to a two-wire power supply

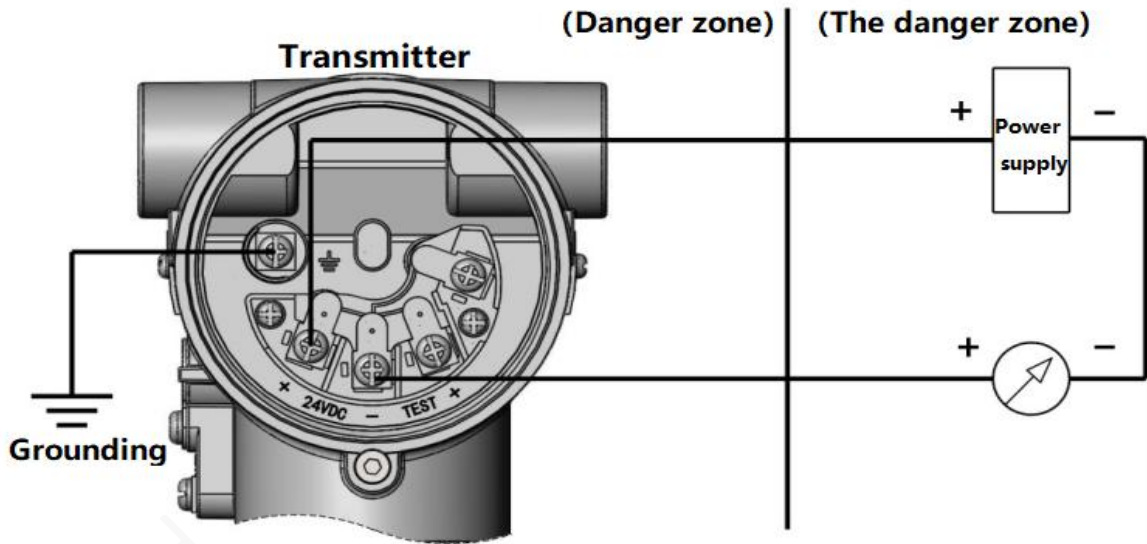
5.6 Four-line RS485 communication connection



5.7 Connection description of flameproof transmitter

⚠ Pay attention to

The replacement of structural components affecting explosion-proof performance is not permitted



Power connection diagram of explosion-proof transmitter

The structure and parts of the flameproof transmitter are strictly inspected and tested according to the flameproof explosion-proof standard, which conforms to GB3836.2-2010 Part 2: Equipment for the protection of the electrically insulated outer shell "d", marked Exd IICT6Gb.

Transmitter users should be reliably grounded in use, using an ambient temperature range of $-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$.

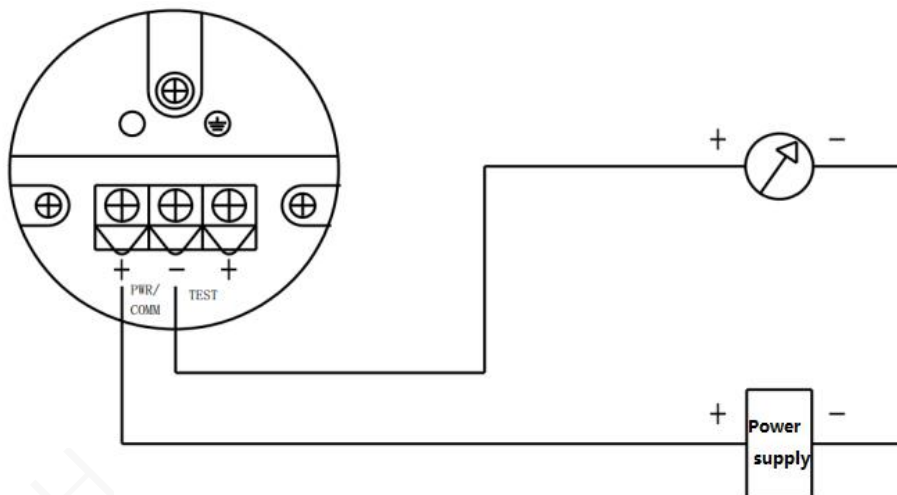
The flameproof transmitter should pay attention to the measures to protect the explosion-proof joint surface and explosion-proof when installed, the end cover must be rotated to the end and lock the anti-loosening device; the parts of the plane gap should prevent the plane collision and scratch to make the gap bigger when loading and unloading; the shell should prevent the collision and damage, so as not to reduce the strength; all the screws, housing and wiring after the instrument maintenance inspection must be fastened, cannot be damaged, or lose the explosion-proof performance.

flameproof transmitter is strictly forbidden to open or loosen the end cap or shell under the condition of field electrification.

One of the two outlet ports of the flameproof transmitter adopts the cable connection, and its cable joint adopts the special pressure nut type flameproof introduction device of our company. Hollow bolts, gaskets,

sealing rubber traps on the outer diameter of the cable, the cable should choose the outer diameter of the cable 8mm, the mounting interface is tight, the sealing ring must be guaranteed to be tightly wrapped on the outer diameter of the cable, and the hollow bolts must be rotated above 6 wire buckles. Another outlet must also be fitted with a sealed rubber ring, solid bolts, solid bolts must be tightened, the screw must also be more than 6 threads.

5.8 Wiring instructions for explosion-proof transmitter



The connection diagram of the power cord of the explosion-proof transmitter



Ben'an wiring diagram

Explosion-proof safety performance conforms to GB3836.1-2010 Explosive Environment Part 1: General Equipment Requirements and GB3836.4-2010 Explosive Environment Part 4: Equipment protected by the intrinsically safe type "I", the product explosion proof mark is Exia IICT4Ga.

Ben'an parameter: $U_i = 28V$ $I_i = 93mA$ $P_i = 0.65W$ $C_i = 52nF$ $L_i = 138.6\mu H$

Transmitter users should be reliably grounded in use, using an ambient temperature range of $-20^{\circ}C \sim 60^{\circ}C$.

This type of safety transmitter must be connected with the safety gate identified by the explosion-proof inspection organization when it is installed and used in the field. The safety grid must be placed in a non-hazardous location and its installation and use must comply with the instructions for the use of the safety grid.

The connecting cable between transmitter and safety gate safety end is two core shielded cable (cable must have cable sheath). The cross section area of the core wire is more than 0.5 mm², and its shield layer is grounded at the single end of the safe place and insulated from the product housing; the cable wiring should eliminate the influence of electromagnetic interference as much as possible, and the cable distribution parameters should be controlled within 0.06 μF/1mH.

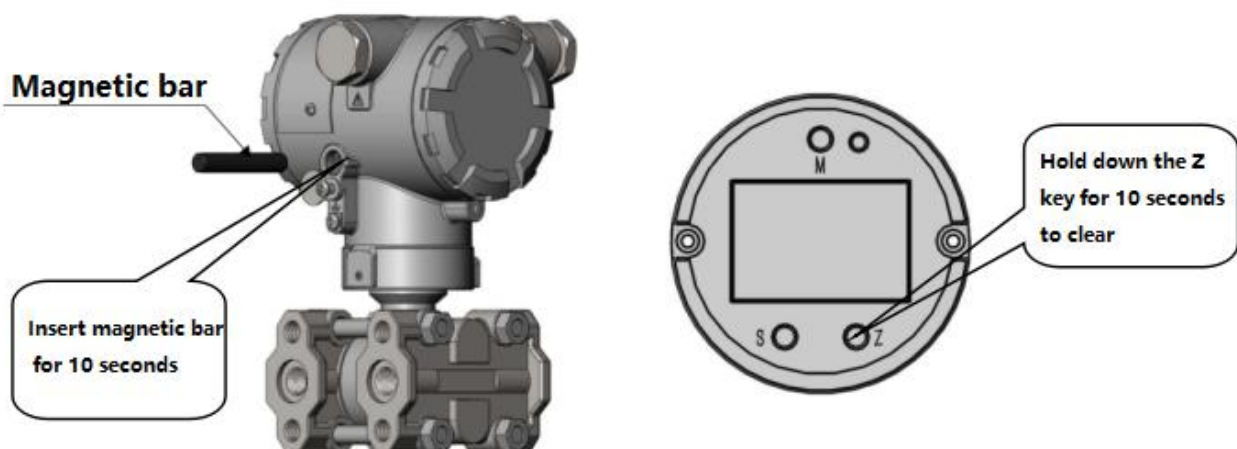
VI. Key Instructions

6.1 Shell external one-click PV zero clearing function

The installation may result in a deviation of the measured value, which can direct the transmitter to the atmosphere and zero in the following 1,2 items without measuring the pressure. If the three valve groups are installed in the field, first close the high and low end valves on both sides, open the middle balance valve, the differential pressure transmitter press the following 1,2 items to clear zero, and then open the high and low end valves on both sides to close the middle balance valve.

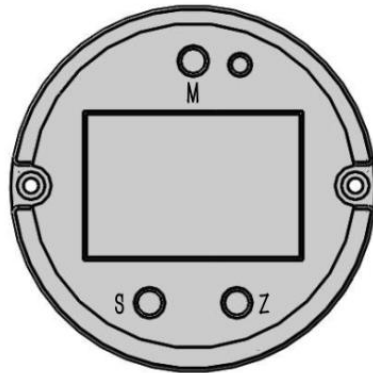
1. explosion-proof products: screw the side screw of the shell with a screwdriver to loosen, spin the baffle, insert the magnetic rod into the bottom contact, protect, Hold for more than 10 seconds, display to zero and then take out the magnetic rod, then put the gear back to tighten.

2. Non-explosion-proof products: unscrew the display cover, press the Z key for 10 seconds, the display becomes zero before loosening the button.



6.2 Basic mode of key operation

1. Hold down the M key continuously for 5 seconds, enter the key setting mode;
2. After entering the first display is the various settings menu, press S key or Z key to achieve menu up and down;
3. When you find the page you need to set, press and hold the M key for 2 seconds to enter the menu settings.
4. In the Settings menu, hold down the S or Z keys to implement the up and down of the options. (Head button diagram).



6.3 Key to modify menu data operation

1. Positive and negative sign setting: When the number of symbols is set, the symbol bit flashes; when the number is negative, the "-" flashes; when the number is positive, the "▲;" flashes; hold down the S key to switch, hold down the Z key to confirm the saving symbol. Then the cursor switches to the first digital flicker.

2. Digital modification: After entering the menu, in the menu that needs data modification, holding down the S key when the number flashes can be accumulated from the "0-9" cycle, holding down the Z key to confirm the save. Note: Digital modification must not exceed the upper and lower limits of the range, otherwise the setting is not successful.

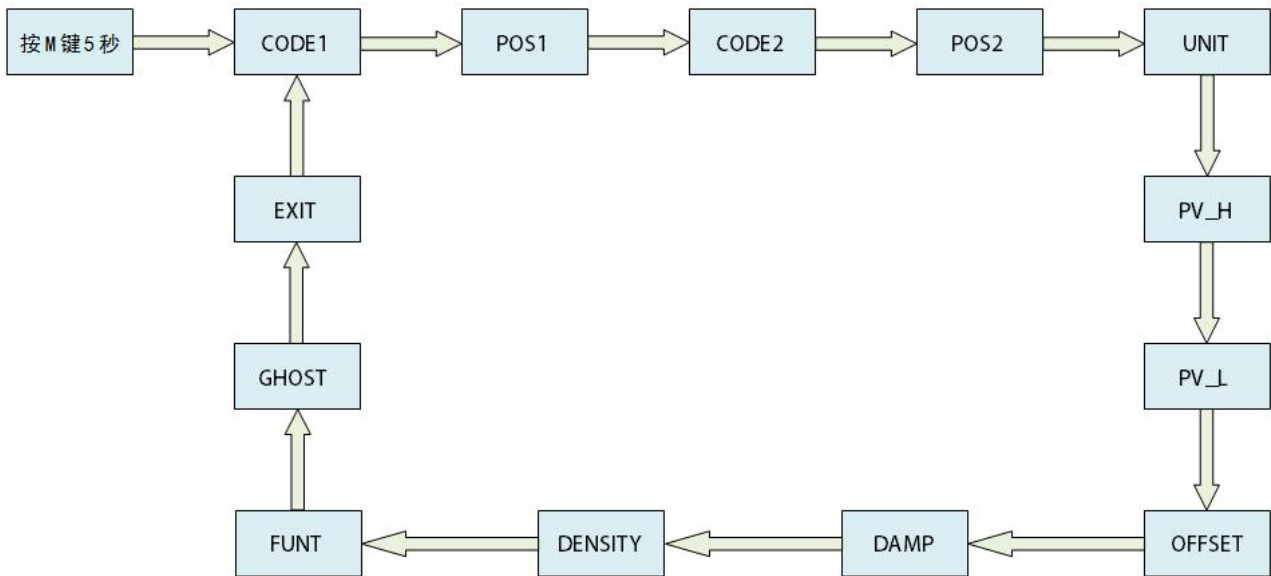
3. Decimal point setting: hold down the s key when the decimal point after the number flashes; hold down the m key setting successfully when the next number flashes, otherwise the setting is not successful. Note: The decimal point setting must not exceed the upper and lower limits of the range, otherwise the setting is not successful.

6.4 Combination button operation

1. Zero point migration: apply zero point pressure to the sensor at the same time hold down the M key and Z key for 5 seconds, the display below the display screen ZERO

display screen starts to flicker, when the display screen central display SAVE operation is completed, release the key.

2. Full migration: apply full pressure to the sensor and hold down the M and S keys for 5 seconds. The bottom of the display screen starts to flicker. When the center of the display screen shows SAVE, loosen the button .

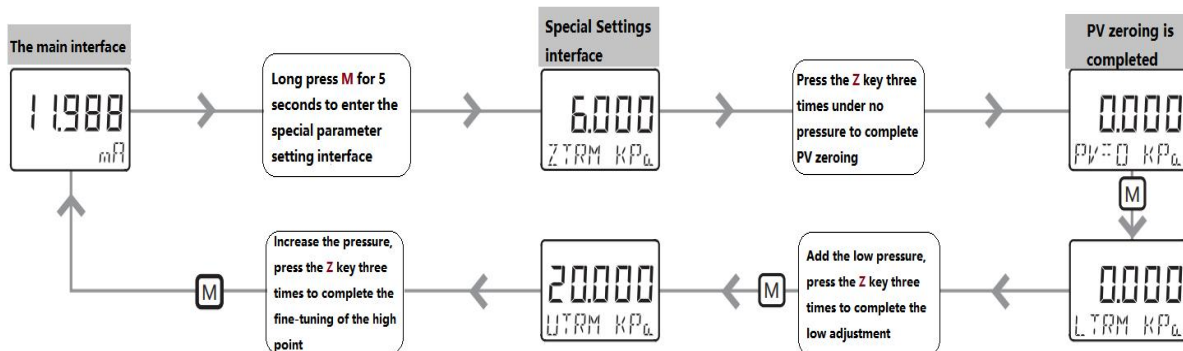


Key function table

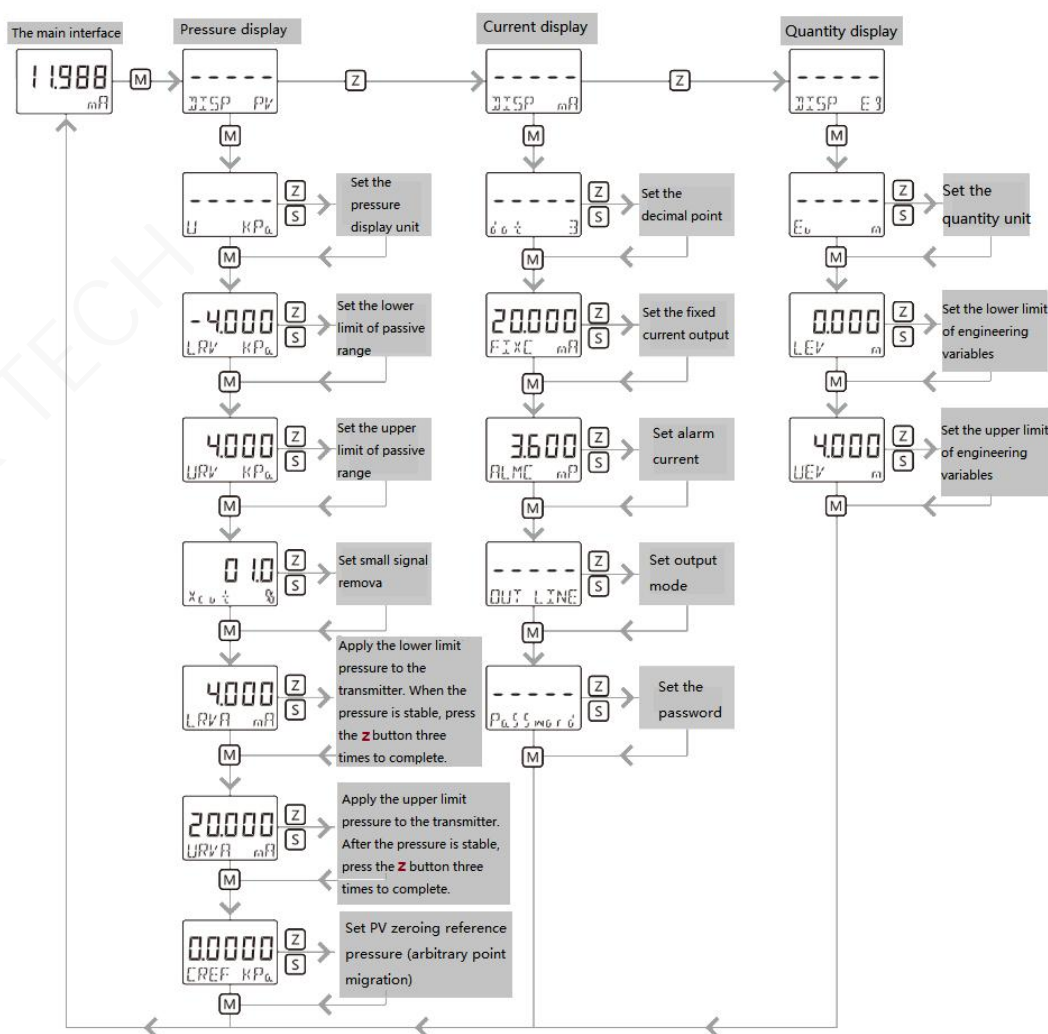
Menu Display	function	content	M key	S key	Z key
CODE1	Set Display Variable 1	mA、%、PV	Entry/Exit (Save)	Cycle Switching	Cycle Switching
POS1	sets the number of decimal points displayed by the display variable 1	0、1、2、3、4	Entry/Exit (Save)	Cycle Switching	Cycle Switching
CODE2	Set Display Variable 2	mA、%、PV	Entry/Exit (Save)	Cycle Switching	Cycle Switching
POS2	Sets the number of decimal points displayed by the display variable 2	0、1、2、3、4	Entry/Exit (Save)	Cycle Switching	Cycle Switching
UNIT	set up Unit of primary variables	Pa、KPa、MPa mmH2O、mH2O、m	Entry/Exit (Save)	Cycle Switching	Cycle Switching
PV_H	set up Range ceiling		Entry/Exit (Save)	Adjustment values	loop shows each position, confirm the decimal point.
PV_L	set up Range Limits		Entry/Exit (Save)	Adjustment values	loop shows each position, confirm the decimal point.
OFFSET	master variable Output bias		Entry/Exit (Save)	Adjustment values	loop shows each position, confirm the decimal point.
DAMP	damp	[0-100] seconds	Entry/Exit (Save)	Adjustment values	loop shows each position, confirm the decimal point.
DENSITY	master variable density coefficient	[0.1-10] defaults to 1	Entry/Exit (Save)	Adjustment values	loop shows each position, confirm the decimal point.
FUNT	Output mode	Line: Linear SQRT: Opening party	Entry/Exit (Save)	Cycle Switching	Cycle Switching
GHOST	data recovery	YES: Data recovery exit NO: Exit	Entry/Exit (Save)	Cycle Switching	Cycle Switching
EXIT	withdraw from		Exit button Set Mode		

6.5 Operation instructions for keys of the safety explosion-proof transmitter

1. PV zero and high and low point fine-tuning settings



2. General parameter settings



3. Restoration of factory settings



VII、 User maintenance

7.1 Maintenance

Soft maintenance

The transmitter is an intelligent product, the parameters are open to the user, the user can adjust the zero point according to the actual situation, set the range, set the damping, and even re-calibrate. This will also cause confusion in parameter settings or soft failure due to modification of the core parameters. Please refer to the previous section for debugging to get it back to normal.

Hard maintenance

In general, the sensor components, the main circuit board and the display head are not repairable on site, and the hardware maintenance of the user is limited to circuit connection inspection, transmitter cleaning, replacement. The pressure transfer system of the flange transmitter is filled with liquid filling, the positive and negative sides of the transmitter cannot be loosened or removed, otherwise it will fail due to leakage of liquid filling; the basic characteristics of the transmitter should be checked regularly after operation, and the invalid seals should be replaced. Smart transmitter needs to be lightly held to prevent damage to diaphragm and other accessories. If damaged need to be repaired, should return to our company. Return Be careful to protect the diaphragm of the transmitter, do not cause damage in transit, the whole assembly packaged in seismic materials shipped back to our company.

7.2 Debugging

Phenomenon: high output

Potential causes and exclusions:

Pressure tube: Check for blockage. Check that the globe valve is fully open. Check if there is any liquid in the gas or gas pipeline. Check that the specific gravity of the liquid in the pressure tube is changed.

Circuit partial check: Show whether the pressure value matches the current output, otherwise the current is reset.

Power: Check the output of the power supply. Phenomenon: unstable output

Potential causes and exclusions:

Parameter check: Check that zero migration and range settings are correct.

Circuit wiring: Check that the voltage sent to the transmitter is normal. Check intermittent short circuit break and multi-point grounding.

measured medium pulsation: adjusting the damping value.

Pressure pipe: Check for any liquid in a gas or gas pipe.

Circuit partial detection: check whether the pressure value is stable through the head, thus judging whether the instability is caused by the sensor and the main circuit board.

Symptoms: Low output or no output

Potential causes and exclusions:

Parameter check: Check that zero migration and range settings are correct. primary components: check the sensor installation and working conditions.

any change in the characteristics of the measured medium will affect the output.

Circuit wiring: Check that the voltage sent to the transmitter is normal, check the short circuit and multi-point grounding, check whether the polarity is connected correctly, and check the circuit impedance.

VIII The appendix A unit of pressure or pressure

	MPa	kPa	Pa	bar	mbar	Kgf/cm ²	mmH ₂ O	mmHg	in. Hg0	in. Hg	mmHg (torr)	Psi (bf/in ²)	atm
MPa	1	1000	1000000	10	10000	10.1972	101.972	101972	4014.65	295.301	7500.62	145.038	9.86923
kPa	0.001	1	1000	0.01	10	0.010197	0.10197	101.972	4.01465	0.2953	7.50062	0.14504	0.00987
Pa	0.000001	0.001	1	0.00001	0.01	0.00001	0.000102	0.10197	0.00401	0.00029	0.0075	0.000145	0.00001
Bar	0.1	100	100000	1	1000	1.01972	10.1972	10197.2	401.463	29.53	750.064	14.5038	0.98692
mbar	0.0001	0.1	100	0.001	1	0.00102	0.0102	10.1972	0.40146	0.02953	0.75006	0.01450	0.00099
Kgf/cm ²	0.09807	98.0665	98066.5	0.98067	980.665	1	10	10000	393.701	28.959	735.556	14.2233	0.96784
mmH ₂ O	0.009806	9.80665	9806.65	0.09807	98.0665	0.1	1	1000	39.3701	2.8959	73.5561	1.42233	0.09678
mmH ₂ O	0.00001	0.00981	9.80665	0.00010	0.09807	0.0001	0.001	1	0.03937	0.0029	0.07355	0.00142	0.0001
in. H ₂ O	0.00025	0.24909	249.089	0.00249	2.49089	0.00254	0.0254	25.4	1	0.07356	1.86833	0.03613	0.00246
in. Hg	0.00339	3.38639	3386.39	0.03386	33.8639	0.03453	0.34532	345.32	13.5951	1	25.4	0.49115	0.03342
mmHg (torr)	0.00013	0.13332	133.322	0.00133	1.33322	0.00136	0.01359	13.5951	0.53524	0.03937	1	0.01934	0.00132
Psi (bf/in ²)	0.00689	6.89476	6894.76	0.06894	68.9476	0.07031	0.70307	703.07	27.6799	2.03602	51.7151	1	0.06805
atm	0.10132	101.325	101325	1.01325	1013.25	1.03323	10.3323	10332.3	406.782	29.9213	760	14.6959	1