

Product information

single crystal silicon dual remote differential pressure transmitter



The single crystal silicon dual remote differential pressure transmitter adopts single crystal silicon resonant sensor technology. The dual flange capillary structure achieves mechanical isolation and thermal isolation, and can handle complex corrosive media, high-temperature media, and other on-site situations. Suitable for measuring liquid level, volume, density, and differential pressure of liquids, gases, or vapors. It has multiple explosion-proof functions, including intrinsic safety, dust intrinsic safety, explosion-proof, and explosion-proof dust.

Range: 0-4kPa~1MPa (see range selection table for details)
Output: 4-20mA Hart
Power supply: 12-32VDC, 15-24VDC
Accuracy: ± 0.2% SPAN, ± 0.5% SPAN

In addition, we can also provide customized products that meet the application needs of our customers in a short period of time based on their applications.

- Typical applications
- ▲Chemical Equipment and Petrochemical
 - ▲Oil and Gas
 - ▲Closed tank liquid level measurement

Instructions for use

The series is suitable for measuring the liquid level, volume, density, and differential pressure of liquids, gases, or vapors. For small ranges, there is also good measurement accuracy, and operators are responsible for verifying whether the equipment is suitable for the operating conditions of the application. If you have any questions, please contact our sales department to ensure the correct application of the transmitter. We do not assume any responsibility for any impact caused by improper selection. The user must ensure that the tested medium is compatible with the contact material of the transmitter.

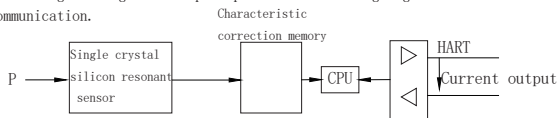
Warning!
Improper use can lead to danger!

Product features

- a) Parameters such as range, zero point, damping, etc. can be changed on site with hart communication function
- b) Integrated chip, wide voltage power supply
- c) Multiple explosion-proof options
- d) Frequency cutoff design, strong anti-interference ability, and lightning protection
- e) Current limiting, voltage limiting, and reverse connection protection
- f) High precision and reliability

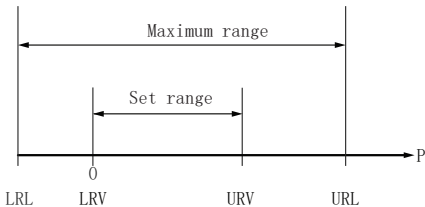
operational principle

The two H-shaped vibration beams on the single crystal silicon resonant sensor convert the differential pressure and pressure signals into frequency signals, which are sent to the pulse counter. The difference between the two frequencies is then directly transmitted to the CPU (microprocessor) for data processing. The D/A converter converts it into an output signal of 4-20mA corresponding to the input signal, and a Hart digital signal is superimposed on the analog signal for communication.



Noun interpretation

- URL: Maximum Range Limit
- LRL: Minimum Range Lower Limit
- URV: Set upper range limit (calibrate upper range limit)
- LRV: Set Lower Range Limit (Calibrate Lower Range Limit)
- SPAN: Set Range (URV-LRV)
- TD: Range ratio (TD=URL/SPAN)



-Example of Range Ratio Calculation

Nominal range: 40kPa

Maximum Range Limit (URL): 40kPa

Lower Range Limit (LRL): -40kPa

Set upper range limit (URV): 20kPa

Set Lower Range Value (LRV): 0kPa

Range ratio (TD):

$$TD = \frac{URL}{URV - LRV}$$
$$TD = \frac{40kPa}{20kPa - 0kPa}$$

In this example, the range ratio (TD) is 2:1.

Technical parameter

Measurement medium: liquid or gas (compatible with contact materials)

Pressure method: differential pressure

Medium temperature: depends on the filling liquid

Silicone oil (conventional medium, suitable for medium temperature of -40~205 ℃)

High temperature silicone oil (conventional medium, suitable for medium temperature of -40~300 ℃)

Mineral oil (sanitary filling fluid, suitable for medium temperature of -20~170 ℃)

Fluorine oil (oxygen specific filling fluid, suitable for medium temperature of -40~170 ℃)

Output signal: 4-20mA Hart protocol

Power supply range: 12~32VDC, 15~24VDC (intrinsic safety and explosion-proof only)

Maximum power: ≤ 0.02Us (W)

Connection time: 20ms

Stability performance: ± 0.05% URL/year

Explosion proof level: Explosion proof type Ex db II C T6 Gb

Explosion proof dust type Ex tb IIIC T80 ℃ Db

Intrinsically safe Ex ia IIC T6 Ga

Dust intrinsic safety type Ex ia III C T200 80 ℃ Da

Note: Intrinsic safety requires power supply through safety barriers or intrinsic safety sources

Protection level: IP66

Note: The above protection levels refer to the level achieved after the electrical connection is complete

Response frequency: The time constant is adjustable, increasing by 0.1 seconds, from small to 32 seconds.

If the damping time is 0, it defaults to 0.1 (the lowest is 0.1).

Range and limitations

Nominal range	Minimum range	Lower Range Limit (LRL)	Upper Range Limit (URL)	Static pressure range	Single end overload capacity
40kPa	4kPa	-40kPa	40kPa	16MPa	16MPa
100kPa	10kPa	-100kPa	100kPa	25MPa	16MPa
250kPa	25kPa	-250kPa	250kPa	25MPa	16MPa
1MPa	100kPa	-500kPa	1MPa	40MPa	16MPa
Note 1: Overpressure limit value: depends on the pressure value of the component with the weakest pressure bearing capacity, and this overload pressure is the maximum pressure that the sensor can withstand, It is not the maximum pressure that the product itself can withstand. Note 2: Anti vacuum (A) 0.2kPa.					

Reference accuracy

Nominal range	TD≤10	TD>10
40kPa、100kPa、250kPa、1MPa	±0.2% SPAN	±0.5% SPAN

Note 1: Reference conditions: temperature 15-25 ℃, atmospheric pressure 86-106 kPa, humidity 45-75% RH.

Note 2: Reference accuracy includes nonlinearity, hysteresis, and repeatability.

Note 3: The square root output accuracy is 1.5 times the reference accuracy mentioned above.

Static pressure effect

Zero point effect: ± 0.15% TD / 4 MPa
Full scale impact: ± 0.2% TD / 4 MPa

Temperature influence (ambient temperature or medium temperature)

Nominal range	error/10℃
40kPa、100kPa、250kPa、1MPa	(±0.03*TD+0.1)% SPAN

Note: Reference conditions include temperature of 15-25 ℃, atmospheric pressure of 86-106 kPa, and humidity of 45-75% RH.

Overall performance

The overall performance of the instrument includes reference accuracy, environmental temperature influence, and static pressure influence. The calculation formula is as follows:

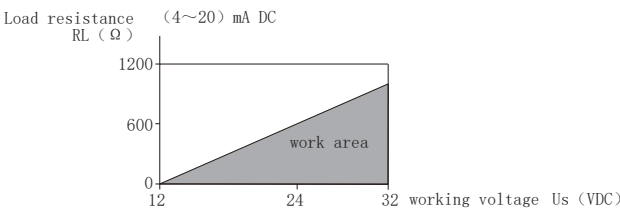
Overall performance=±√Q1²+ Q2²+ Q3²

Q1=reference accuracy Q2=environmental temperature influence

Q3=static pressure effect

Load characteristics

Hart current mode: Load ≤ {(Us-12) ÷ 0.02} Ω (Us=supply voltage)



Permissible load resistance: 0-600 Ω (at 24VDC)

Note: When communicating with a handheld communicator, a standard load resistor (250 Ω) is required.

environment condition

Environment temperature without LCD display: -40~85 ℃
Environmental temperature with LCD display: -20~70 ℃
Environmental humidity: 0%~95% RH (no condensation or condensation)

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(Contact), 8kV (air)	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	1kV(Between lines) 2kV(Between ground wires) (1.2us/50us)	B(Note 2)
8	Conducted interference immunity 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 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 condition, storage and data will not change.				

Overall material

Diaphragm: 316L stainless steel/Hastelloy C/tantalum (in contact with the tested medium)
Flange: 304/316L stainless steel
Chuck: 316L stainless steel
Clamp block: 304 stainless steel
Filler fluid: silicone oil, high-temperature silicone oil, mineral oil, fluorine oil
Bolt: 304 stainless steel
Shell: Die cast aluminum
Display window: ≈ 6mm explosion-proof glass

Mechanical stability

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

Electrical protection

Short circuit protection: permanent
Reverse protection: No damage, but does not work
Insulation resistance: ≥ 100M Ω 500VDC
Insulation strength: 500VAC



Output limitation

	Output minimum	Maximum output
4-20mA HART	3.8mA	22mA

Note: Other restrictions can be customized.

Explosion proof instructions

Explosion proof type

Complies with standards GB/T3836.1-2021、GB/T3836.2-2021
Explosion proof sign: Ex db II C T6 Gb
Explosion proof certificate number: CLEx26.1083

Explosion proof dust type

Complies with standards GB/T 3836.1-2021, GB/T 3836.2-2021, GB/T 3836.31-2021
Explosion proof sign: Ex tb IIIC T80 °C Db
Explosion proof certificate number: CLEx26.1083

Intrinsic safety type

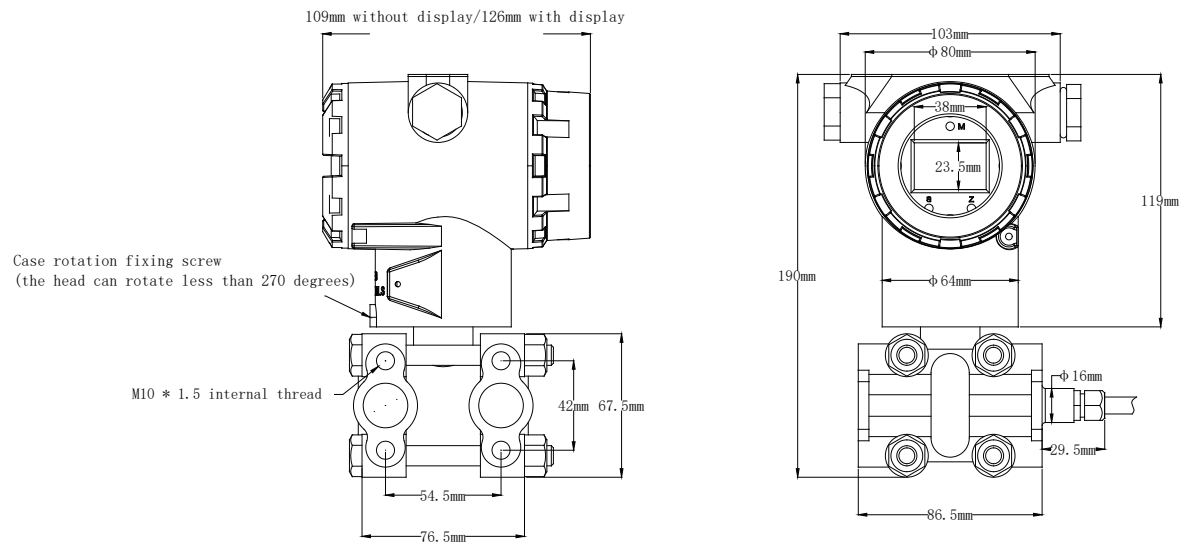
Complies with standards GB/T 3836.1-2021 and GB/T 3836.4-2021
Explosion proof sign: Ex ia IIC T6 Ga
Intrinsic safety parameters: Ui: 28V, Ii: 93mA, Ci: 10nF, Li: 0mH, Pi: 0.65W
Associated device parameters: $U_o \leq U_i$ $I_o \leq I_i$ $P_o \leq P_i$ $C_o=C_c+C_i$ $L_o=L_c+L_i$ (U_o , I_o , P_o , C_o , L_o are safety barrier parameters, C_c , L_c are distribution parameters for connecting cables)
Explosion proof certificate number: CMExC23.4181XG

Dust intrinsic safety type

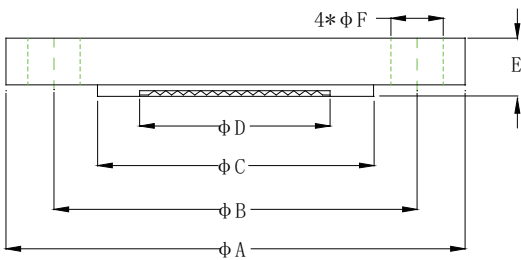
Complies with standards GB/T 3836.1-2021 and GB/T 3836.4-2021
Explosion proof mark: Ex ia III C T20080 °C Da
Intrinsic safety parameters: Ui: 28V, Ii: 93mA, Ci: 10nF, Li: 0mH, Pi: 0.65W
Associated device parameters: $U_o \leq U_i$ $I_o \leq I_i$ $P_o \leq P_i$ $C_o=C_c+C_i$ $L_o=L_c+L_i$ (U_o , I_o , P_o , C_o , L_o are safety barrier parameters, C_c , L_c are distribution parameters for connecting cables)
Explosion proof certificate number: CMExC23.4181XG

Appearance and dimensions

Main body size



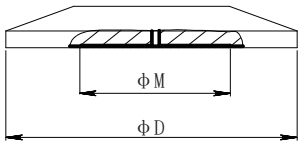
Conventional flange size



Nominal diameter	Outer diameter of flange(A)	Bolt hole spacing (B)	Bolt hole diameter (F)	Number of bolt holes	Convex diameter (C)	Diaphragm diameter (D)	Thickness of flange (E)	Pressure resistance (MPa)
DN50	165	125	18	4	95	60	18	1.6
DN80	200	160	18	8	127	84	20	1.6
DN100	220	180	18	8	157	84	20	1.6

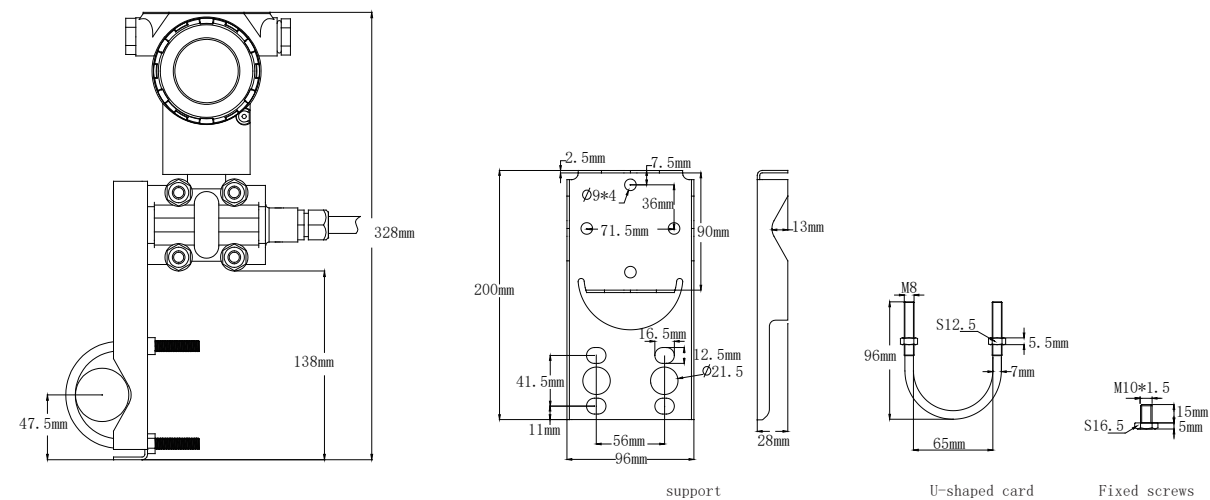
Execution standard HG/20592-2009 Unit: mm (millimeters)

chuck size



size (ϕD)	Diaphragm size (ϕM)	Voltage resistance (MPa)
50.5	29	4
64	37	2
77.5	55	1
91	61	1

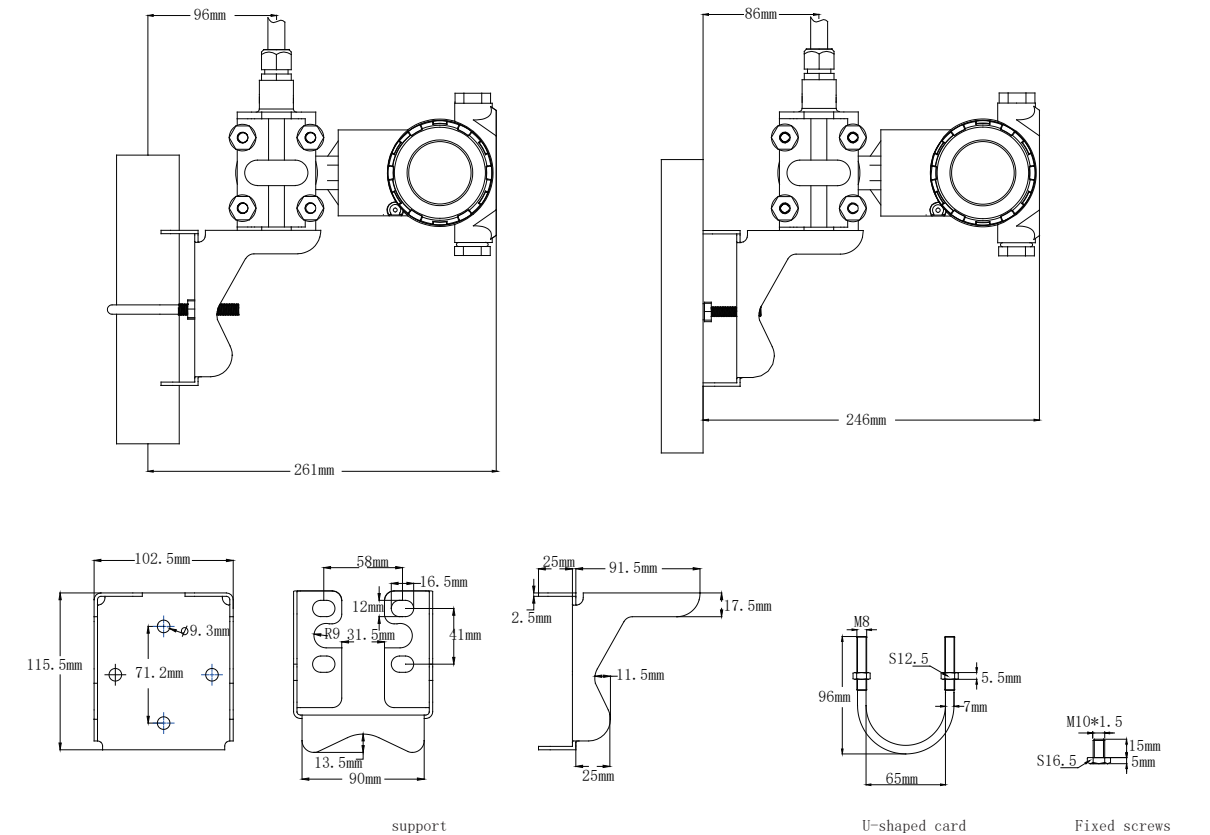
Pipe mounted flat bracket



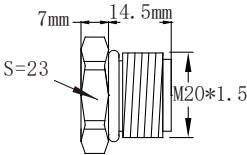
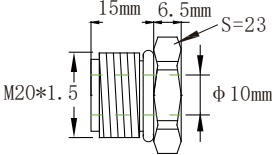
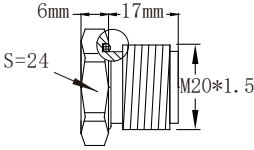
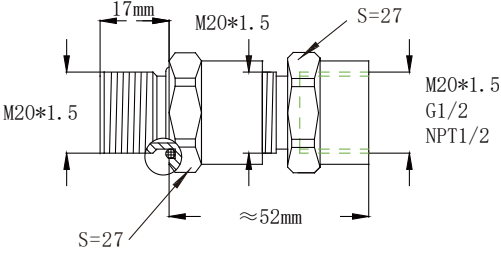
Pipe bending bracket

-Pipe bending bracket

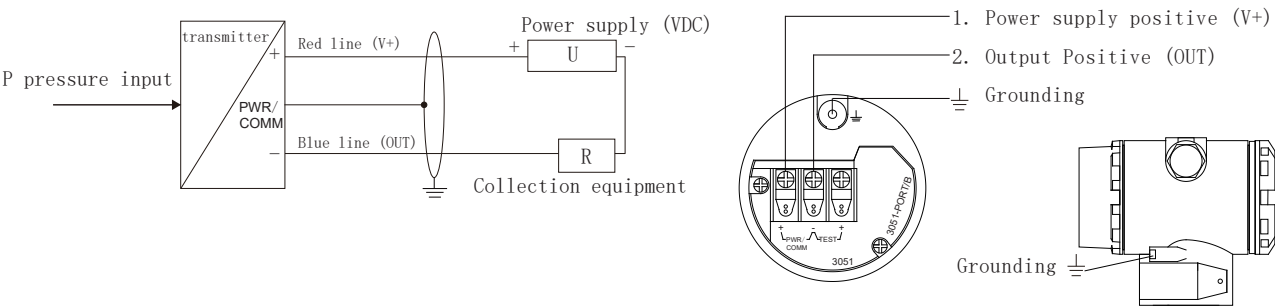
-Board/wall mounted bending bracket



Plug and electrical interface

Applicable standard type, intrinsic safety type, and dust intrinsic safety type	
Plug	Electrical interface
 Material: 304 stainless steel	 Material: 304 stainless steel Lock wire diameter 5-9mm
Suitable for explosion-proof and dustproof types	
Plug	Electrical interface
 Material: 304 stainless steel	 Material: 304 stainless steel Lock wire diameter 5-6mm

Wiring diagram



TEST is used to connect indicator instruments or for testing purposes. The power supply is sent to the transmitter through a signal line and does not require additional wires. Be careful not to connect the power signal line to the testing end, otherwise it may burn out the diode. If it is burnt out, in order to ensure the normal operation of the transmitter, the two test terminals can be short circuited.

Due to the fact that the transmitter is grounded with a capacitor, a high-voltage megohmmeter cannot be used to check the insulation resistance. Only voltage not exceeding 100V is allowed for circuit inspection.