SM3151DP/HP Differential Pressure/High Static Pressure Differential Pressure Transmitter

Description

Differential pressure/high static pressure differential pressure transmitter is a pressure signal measured at the reference end of the low-pressure side and has two ports connected to the process pipe.

The working principle of the metal capacitive differential pressure/high static pressure differential pressure transmitter is that when the pressure acts indirectly on the surface of the metal measuring diaphragm (elastic measuring element) of different thickness through the isolating diaphragm and the guiding medium, the diaphragm is slightly generated. The maximum deformation does not exceed 0.1mm. The high-precision circuit for measuring the deformation of the diaphragm transforms this tiny deformation into a voltage signal proportional to the pressure, through the linearization and temperature compensation, and then uses a dedicated chip to convert this voltage signal to an industry standard 4-20mA current signal or a 1-5V voltage signal.

The high sensitivity of the metal capacitive pressure sensor and the high precision integrated circuit used in the measurement diaphragm detection circuit contain linear and temperature compensation circuit, so the whole transmitter can achieve high precision and high stability.

The metal capacitive pressure sensor has extremely high overload resistance and excellent performance in micro-pressure measurement. It is also a must choice product in various complex industrial environments.

Technical Performance

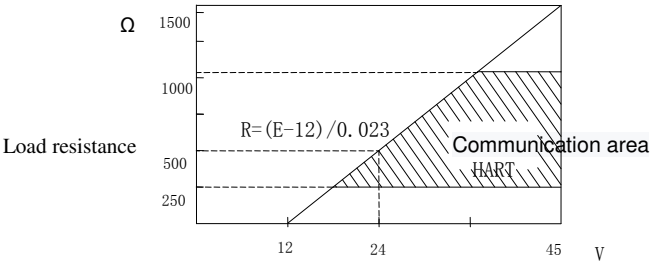
Use object: liquid, gas or steam

Measuring range: see the selection specification table

Output signal: 4-20mA dc. Output, superimposed HART protocol digital signal (two-wire system)

Power source: external power supply 24V dc. Power supply range 12V ~ 45V

Load characteristics:



The power supply voltage

Installation in dangerous places:

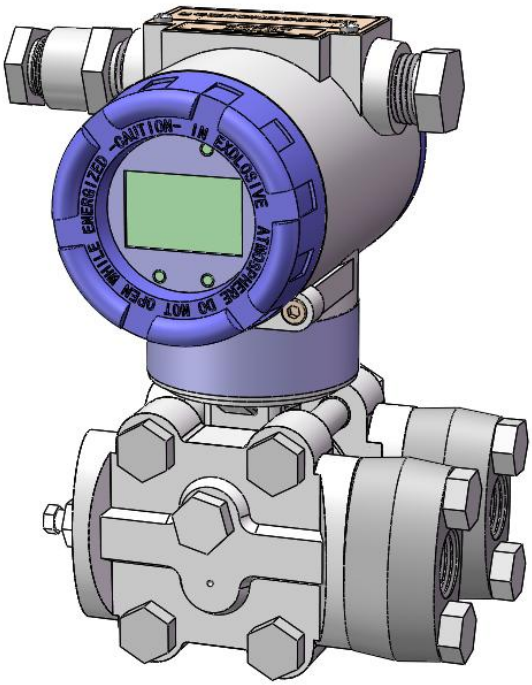
Flameproof ExdIIBT5Gb;(explosion-proof certificate no. :CE16.1163)

Intrinsically safe ExiaIICT4/T5/T6Ga;

（explosion-proof certificate no. : CE15.2354X）；

Migration features：

At the minimum range (the range compression ratio is 40:1), the maximum positive transfer zero point is 39/40 times the upper limit of the range, the maximum negative transfer zero point can be the lower limit of the range, the absolute pressure transmitter has no negative transfer.(regardless of the output form, the upper and lower limits of the range shall not exceed the limit of the range after positive and negative migration)



Temperature range:
ordinary silicone oil: -40~+150℃
Add cooling tablets: +15~+315℃,
Relative humidity: 0 ~ 95%
Overpressure limit: DP type, plus 0 (absolute pressure) ~ 13MPa (or 1.5 times the upper limit of the range) pressure transmitter is not damaged. High static pressure type with a static pressure or one-way pressure of up to 31 MPa.
Volume change: less than 0.16cm3
Damping：The time constant is adjustable from 0.2 to 32.0s.
Startup time: 3s, no preheating required.

Technical Index

(non-removable, 316 stainless steel isolation diaphragm and other standard test conditions.)

Accuracy: ± 0.1%, ±0.2%
Stability: ±0.25%/6 months of maximum range
Temperature: including zero and range for maximum temperature error of ±0.2%/20℃
Static pressure effect:
(DP type in linear output) zero point error: after adding static pressure 140kgf/cm2, the zero error of range 4, 5 is + 0.25% of the maximum range, and the zero error of range 3, 6, 7, 8 is + 0.5% of the maximum range.This is the system error. Before installation, the transmitter zero point can be adjusted according to the actual static pressure to eliminate this error.
(HP type in linear output)Zero point error: when static pressure is added to 31.2MPa, the zero error is less than ±2.0% of the maximum range. This is the system error. Before installation, the transmitter zero point can be adjusted according to the actual static pressure to eliminate this error.
Power supply impact: less than 0.005% / V of the output range.
Vibration effect: in any axial direction, the frequency is 200Hz, and the error is ±0.05% / g of the maximum range.
Load effect: as long as the input transmitter voltage is higher than 12V, there is no load effect in the load working area.
Influence of installation location: zero error of no more than 0.25kPa can be generated at the maximum, which can be eliminated by correction without any impact on the range; The measuring body has no influence on relative flange rotation.

Application and type selection：

Common differential pressure transmitter is the most commonly used test instrument in industrial process control. It is widely used in various automatic control systems, such as aerospace, military, petrochemical, chemical, oil Wells, electric power, ships, building materials, pipelines and many other industries.Generally used in liquid, gas or steam differential pressure, flow measurement, medium temperature is not too high, corrosion is not strong, viscosity is not high, not easy to crystallize and other environments.If the working static pressure exceeds 13MPa, a high static differential pressure transformer should be selected.

Attention to type selection:

Before selecting the type, the user shall make clear the temperature, corrosion, measuring range, use, whether the medium under test is explosion-proof, whether the oil shall be forbidden, whether the medium is easy to crystallize or thicken, whether the diaphragm flange connection is needed, etc.

SM3151DP/HP Differential Pressure/High Static Pressure Differential Pressure Transmitter Selection Specifications Table

<table>
<tr><td>Model</td><td colspan="4">Transmitter type</td></tr>
<tr><td>SM3151DP
SM3151HP</td><td colspan="4">Differential Pressure transmitter
Absolute pressure transmitter</td></tr>
<tr><td>Code</td><td colspan="4">Scale range</td></tr>
<tr><td>2
3
4
5
6
7
8
9
0</td><td colspan="4">0-0.10～3.5kPa(0-10～350mmH_2O)
0-0.8～8.0kPa(0-80～800mmH_2O)
0-4.0～40kPa(0-400～4000mmH_2O)
0-20～200kPa(0-2000～20000mmH_2O)
0-70～700kPa(0-0.7～7kgf/cm^2)
0-210～2100kPa(0-2.1～21kgf/cm^2)
0-700～7000kPa(0-7.0～70kgf/cm^2)
0-2.1～21MPa(0-21～210kgf/cm^2)
0-4.1～41MPa(0-41～4100kgf/cm^2)</td></tr>
<tr><td>Code</td><td colspan="4">Output form</td></tr>
<tr><td>E</td><td colspan="4">Linear output 4-20mAdc</td></tr>
<tr><td>SF</td><td colspan="4">Linear/square root output 4-20mAdc +HART signal,， Full function buttons on site</td></tr>
<tr><td>F</td><td colspan="4">MODBUS-485 signal</td></tr>
<tr><td rowspan="2">Code</td><td colspan="4">Structural materials</td></tr>
<tr><td>Flange connector</td><td>Exhaust/Drain valve</td><td>Isolation diaphragm</td><td>Filling liquid</td></tr>
<tr><td>22</td><td>316 Stainless steel</td><td>316 Stainless steel</td><td>316 Stainless steel</td><td>Silicone oil</td></tr>
</table>

23	316 Stainless steel	316 Stainless steel	Hastelloy C	Silicone oil
24	316 Stainless steel	316 Stainless steel	Monel	Silicone oil
25	316 Stainless steel	316 Stainless steel	Tantalum	Silicone oil
33	Hastelloy C	Hastelloy C	Hastelloy C	Silicone oil
35	Hastelloy C	Hastelloy C	Tantalum	Silicone oil
44	Monel	Monel	Monel	Silicone oil

Code	Shell material	Conduit inlet dimensions
A	Low copper aluminum alloy polyurethane coating	M20×1.5
B	Low copper aluminum alloy polyurethane coating	1/2-14 NPT
C	Stainless steel	M20×1.5
D	Stainless steel	1/2-14 NPT

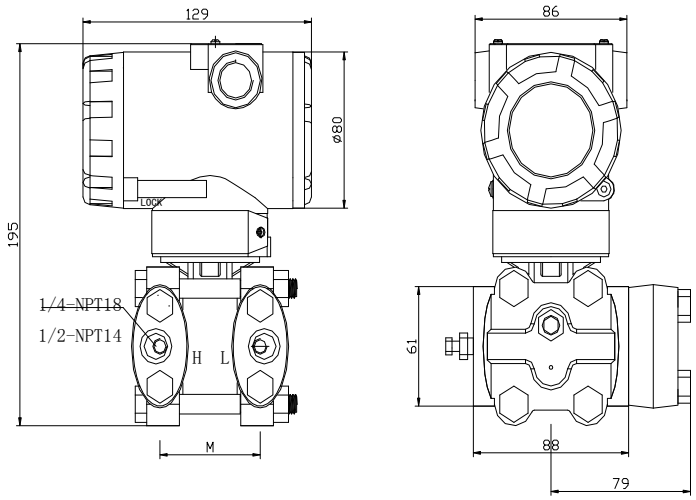
Code	Pressure connection
L1	1/4NPT-18 Internal thread（excluding waist joint standard）
L2	1/2NPT-14 Internal thread
L3	M20×1.5 External thread

Code	Optional parts
M4	LCD multi - power digital display head
B1	Pipe bending bracket
B2	Plate bending bracket
B3	Pipe mounting bracket
C02	M20×1.5 nut and Φ 14 pressure short tube
C12	1/2NPT-14 external thread and Φ14 pressure short tube
C22	1/4NPT-18 external thread and Φ14 pressure short tube
C32	1/4NPT-18 to M20×1.5 external thread
C42	1/2NPT-14 to M20×1.5 external thread
C43	1/2NPT-14 to 1/4NPT-18 internal thread
C44	1/2NPT-14 to 1/2NPT-14 external thread
C45	1/2NPT-14 to G1/2 external thread
D1	The side discharge valve is on the upper part
D2	The side discharge valve is on the upper part
X1	Oil ban
Da	Flameproof ExdIIBT5Gb;(explosion-proof certificate no. : CE16.1163)
Fa	Intrinsically safe ExiaIICT4/T5/T6Ga;(explosion-proof certificate no. : CE15.2354X)

Selection example：3151DP4SF22AL2M4B3X1　　0～20kPa

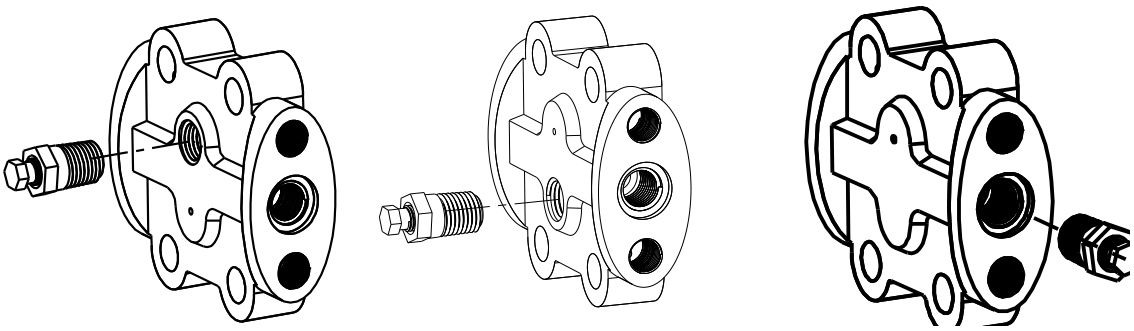
SM3151HP/DP differential pressure/high static pressure differential pressure transmitter shape and installation dimensions

Dimensional drawing



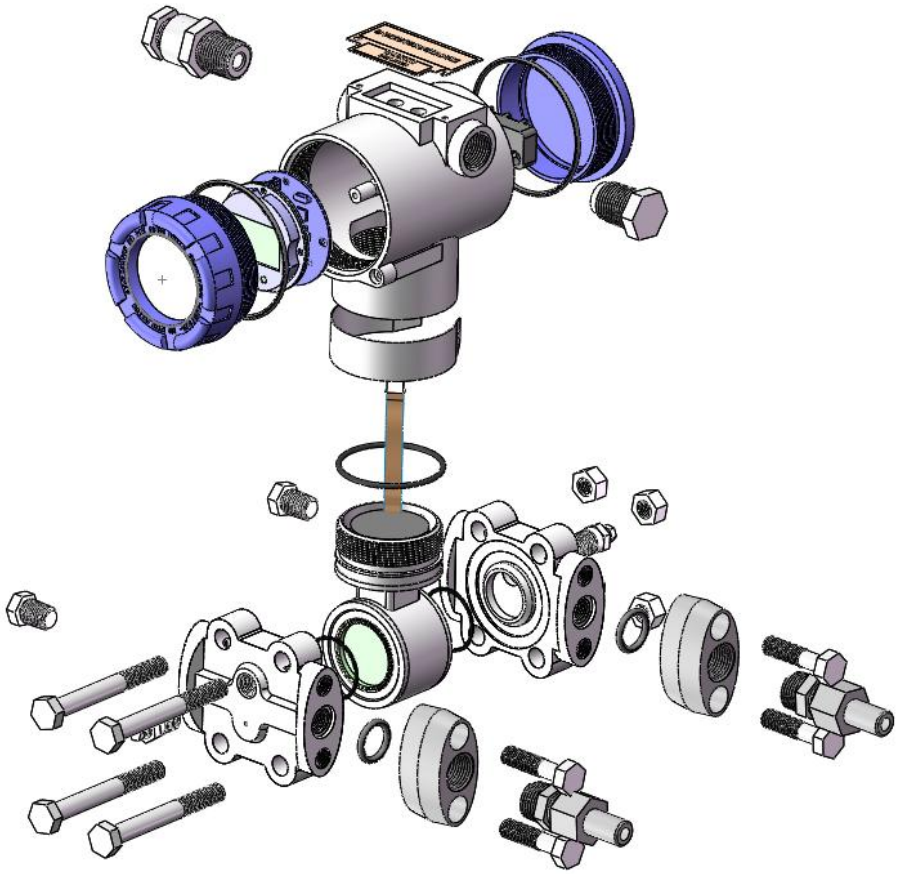
Range Code	2、3、4、5	6	7	8	9
M(mm)	54	55.4	55.8	57.4	58.5

Discharge valve position corresponds to order information



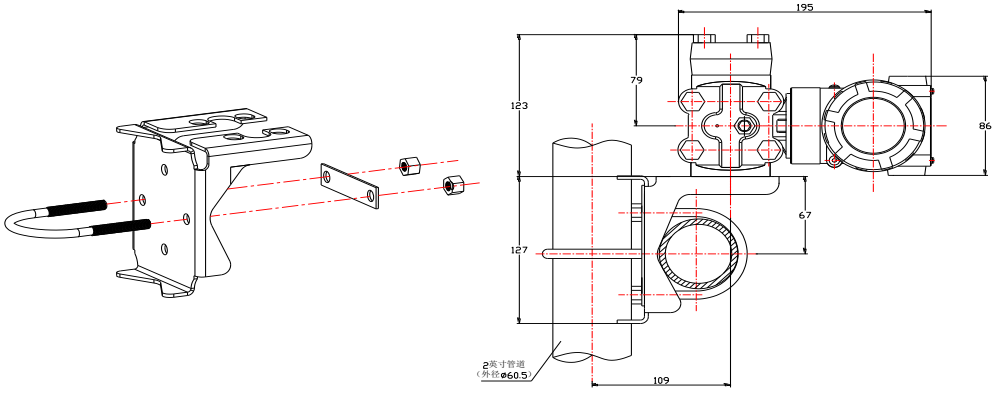
The discharge valve is on the top	The discharge valve is at the bottom	The discharge valve is at the end
Corresponding model D1	Corresponding model D2	Corresponding model D0

Internal decomposition diagram

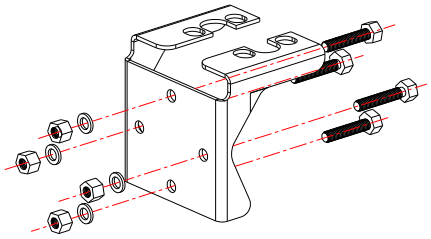


Field installation and external connection dimensions

Mounting bracket size and three mounting modes are suitable for GP, DP, HP, DR and AP products, as shown in the figure:



Schematic diagram of pipe bending bracket installation, corresponding to ordering model B1



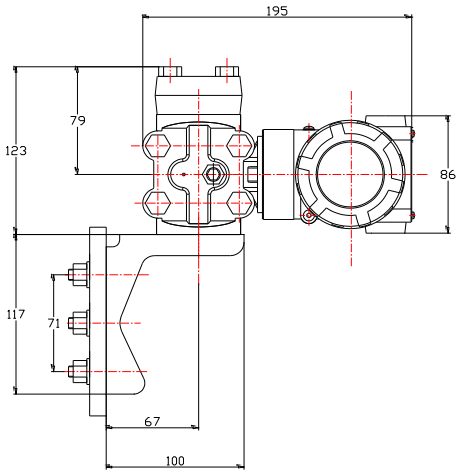
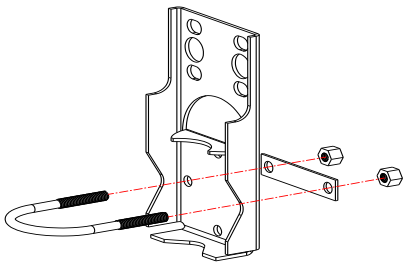
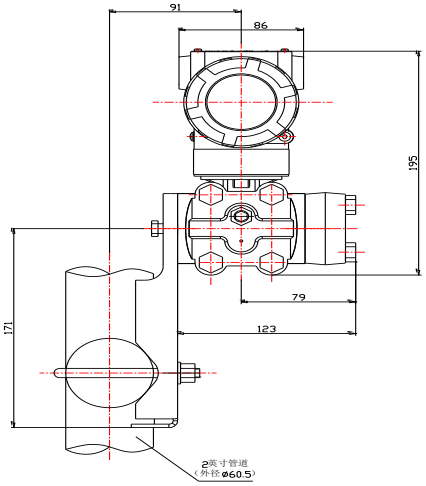


Plate bending bracket installation schematic diagram, corresponding to the order model B2





Schematic diagram of pipe mounting flat bracket installation, corresponding to ordering model B3