bar

MDM3051S-DP

Intelligent Pressure Transmitter

FEATURES

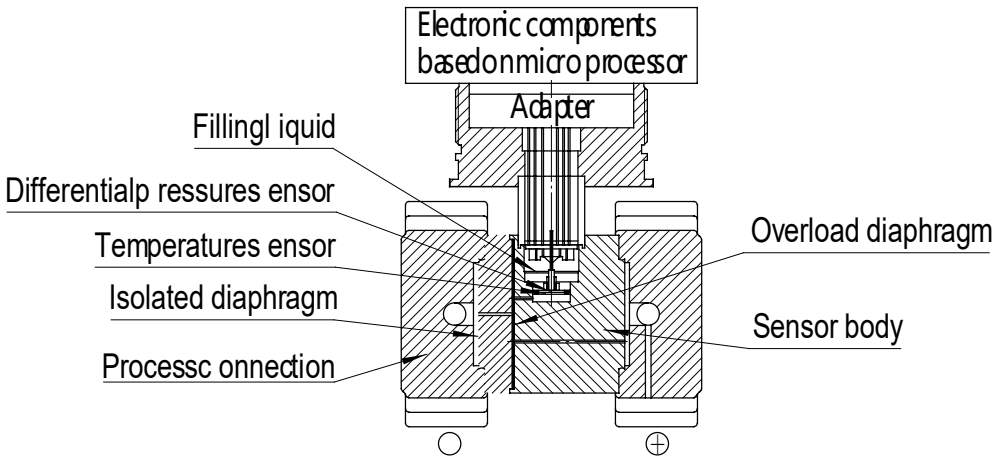
- The central sensing element of transmitter uses the world's leading high- Accuracy silicon sensor technology, Basic error is ±0.075%
- Working pressure of transmitter has three levels--160bar, 250bar and 400bar, the highest one-way overpressure is 400bar
- Excellent static pressure performance, optimal static pressure error ≤±0.1%/100bar
- The inner of pressure sensor integrates high sensitive temperature sensor
- Excellent temperature performance, optimum≤± (0.20 ×TD+0.10)%×Span / -20°C ~65°C
- All stainless steel 316L, silicone oil filling with welded sealing construction
- Stable and reliable, optimal long-term drift performance: ±0.1%/year, 5-year maintenance-free
- Wide measured range: 1mbar~30bar
- Max. 100:1 pressure range proportion adjustable
- EMC conforms to GB/T 18268.1-2008 standard

INTRODUCTION

Differential Pressure Transmitter (DP)

- Measured media: gas, steam, liquid
- Measured range(with no shift): 0mbar~1mbar...30bar
- Basic error: ±0.075%
- Diaphragm contacting with liquid: Stainless Steel 316L, Hast-alloy C

WORKING PRINCIPLE



Differential pressure transmitter includes two functional units:
*Main unit
*Auxiliary unit

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Main unit includes sensor and process connection, working principle as followed: The sensor module uses whole welded technology, in which has a compact overload diaphragm, a differential pressure sensor and a temperature sensor. The temperature is taken as a reference for temperature compensation. The positive end of the differential pressure sensor is connected with high pressure chamber of sensor capsule; the negative end is connected with low pressure chamber of sensor capsule. Through the isolated diaphragm and filling liquid, the differential pressure is transmitted to silicon die in the inner of differential pressure sensor, which makes the resistor of sensor die change. So the detection system outputs different voltage. The output voltage is in proportion to the pressure variation, and then it is transmitted to standard output by adapter and amplifier.

Differential Pressure Transmitter (DP) MDM3051S-DP Differential Pressure Transmitter is used for level, density, pressure and flow measurement of liquid, gas and steam. Then it will output 4mA~20mA DC HART signal and also it could be connected to MSHART375 hand communicator or RSM295 Modem to do the specification setting and process control.

Standard Specification (Standard zero as the reference calibration range, Stainless steel 316L diaphragm, filling liquid is silicone oil)

PERFORMANCE SPECIFICATION

Reference Basic error for range calibration(including linearity, hysteresis and repeatability from zero):
± 0.075%
If TD>10 (TD=Max. Pressure range/calibration range), the Basic error is ±(0.0075×TD)%
The Basic error of square root output is 1.5 times of above reference Basic error.

ENVIRONMENTAL TEMPERATURE EFFECT

Range Code	-20℃ ~65℃ Total effect value
A	±(0.45×TD+0.25)%×Span
B	±(0.30×TD+0.20)%×Span
C/D/F	±(0.20×TD+0.10)%×Span

Range Code	-40~-20℃ , 65℃ ~85℃ Total effect value
A	±(0.45×TD+0.25)%×Span
B	±(0.30×TD+0.20)%×Span
C/D/F	±(0.20×TD+0.10)%×Span

Over range effect: ±0.075%×Span

STATIC PRESSURE EFFECT

Range Code	Effect value
A	±(0.5%Span)/40bar
B	±(0.3%Span)/100bar
C/D/F	±(0.1%Span)/100bar

OVERPRESSURE EFFECT

Range Code	Effect value
A	±0.5%×Span/40bar
B	±0.2%×Span/160bar
C/D/F	±0.1%×Span/160bar

LONG-TERM STABILITY

Range Code	Effect value
A	±0.5%×Span/1 year
B	±0.2%×Span/1 year
C/D/F	±0.1%×Span/1 year

Power effect ±0.001% /10V (12V~42V DC), negligible.

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FUNCTIONAL SPECIFICATION

Standard Specification

Range / Limits		mbar
A	range	1~10
	limits	-10~10
B	range	2~60
	limits	-60~60
C	range	4~400
	limits	-400~400
D	range	25~2500
	limits	-2500~2500
F	range	300~30000
	limits	-5000~30000

Pressure range limit
The pressure is adjustable within the upper and lower limit; It is recommended to choose the range code with the lowest pressure range proportion to optimize the performance specification;

Zero setting
The zero and pressure range could be adjusted to any value within the measured rang in the table, only the calibrated range ≥ Min. Range is valid;

Mounting position effect.
The change of mounting position parallel to diaphragm could not influence the zero drift. If the angle between mounting position and diaphragm is over 90°, the zero drift is <4mbar which could be calibrated by zero setting. No other effect on pressure range;

Output
2- wire, 4mA~20mA DC, HART communication protocol, linearity or square root output optional. Output signal limit: Imin=3.9mA, Imax=20.5mA;

Response time
The damping constant of amplifier parts is 0.1s, time constant of sensor is 0.1s~1.6s, which is decided by the pressure range and pressure range ratio. The additional adjustable time constant is 0.1s~60s. The non-linearity output(eg. Square root output) is influenced by this function and could be calculated by it;

Warm-up time
<15s

Environmental temperature
-40°C ~85°C
With LCD display and viton sealing ring, the temperature is -20°C ~65°C ;

Storage temperature/ transportation temperature
-50°C~85°C ;with LCD display: -40°C ~85°C;

Working pressure
Rated working pressure: 160bar, 250bar, 400bar

Static pressure limit
From 35mbar absolute pressure to rated pressure, protection pressure can be pressurized to both high and low side of transmitter; and it can be higher than 1.5 times of rated pressure.

One-way overpressure limit
One-way overpressure could reach the rated pressure

EMC
Please refer to next page "EMC table"

INSTALLATION

Power and load condition
Power supply:
24V DC, R≤(Us-12V)/Imax (kΩ) Imax=23mA
Max. Voltage supply: 42V DC
Min. Voltage supply:12V DC,15V DC(Backlit LCD display)
Digital communication load resistance range:250Ω~600Ω

Electrical Connection
M20×1.5 cable sealing buckle, terminals are suitable for (0.5~2.5)mm 2 wire.

Process connection
NPT 1/4 and UNF 7/16" female at both sides of process connection flange

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PHYSICAL SPECIFICATION

Material

Measuring capsule: Stainless Steel 316L
Diaphragm: Stainless Steel 316L, Hast-alloy C
Process flange: Stainless steel 304
Nut and bolt: Stainless steel(A4)
Filling liquid: silicone oil
Sealing ring: NBR, FKM, PTFE
Transmitter housing: Aluminum alloy material, epoxy resin glue sprays on the surface
Housing sealing ring: NBR
Nameplate: Stainless steel 304

Weight

3.3kg(not including LCD display, mounting support and process connection)

Housing protection

IP67

EMC TABLE

Code	Test terms	Standard	Test condition	Performance degree
1	Radiated interference(housing)	GB/T 9254-2008 table5	30MHz~1000MHz	qualified
2	Transmission interference (DC power port)	GB/T 9254-2008 table1	0.15MHz~30MHz	qualified
3	ESD immunity	GB/T 17626.2-2006	4kV(contact) 8kV(air)	B
4	Radiofrequency electromagnetic field immunity	GB/T 17626.3-2006	10V/m (80MHz~1GHz)	A
5	Power frequency magnetic field immunity	GB/T 17626.8-2006	30A/m	A
6	EFT immunity	GB/T 17626.4-2008	2kV(5/50ns,5kHz)	B

NOTES:

1. A degree: Performance is normal within the technical standard range during testing.
2. B degree: During, the function or performance is lowered or lost temporarily, but it could be recovered by itself. Actual operation state, storage and data will keep the same.

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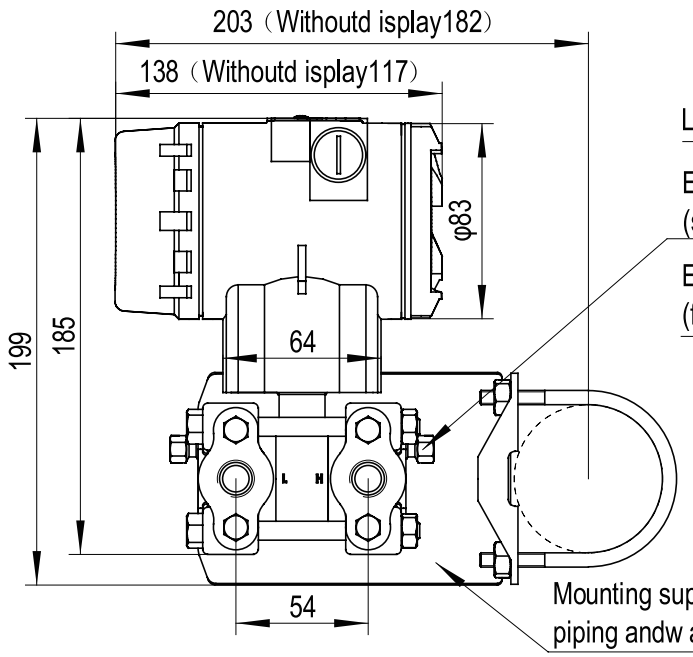
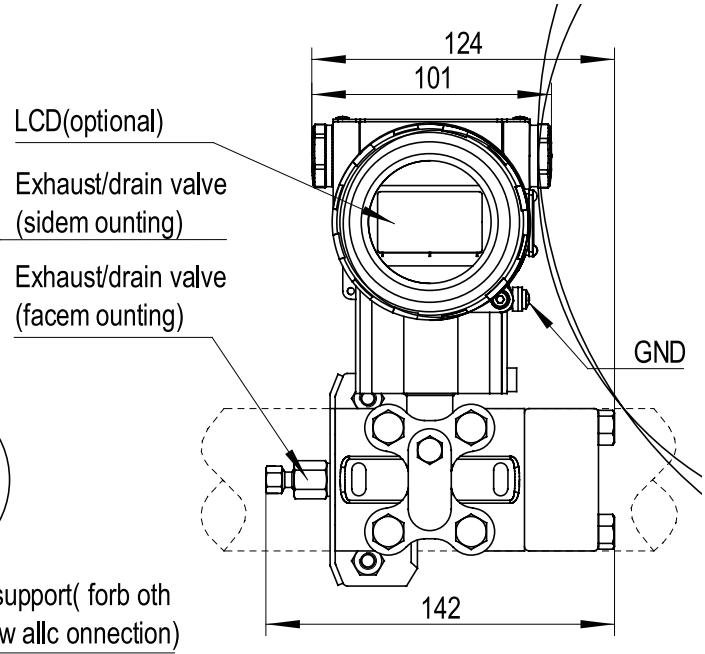
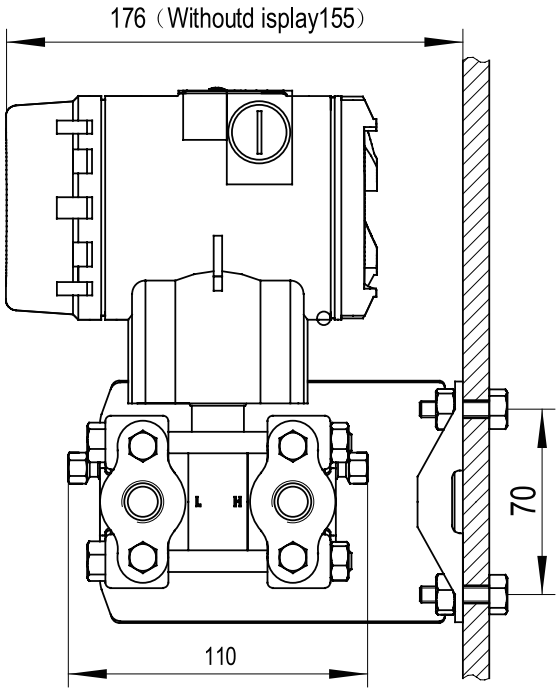
OUTLINE DIMENSION (Unit: mm)



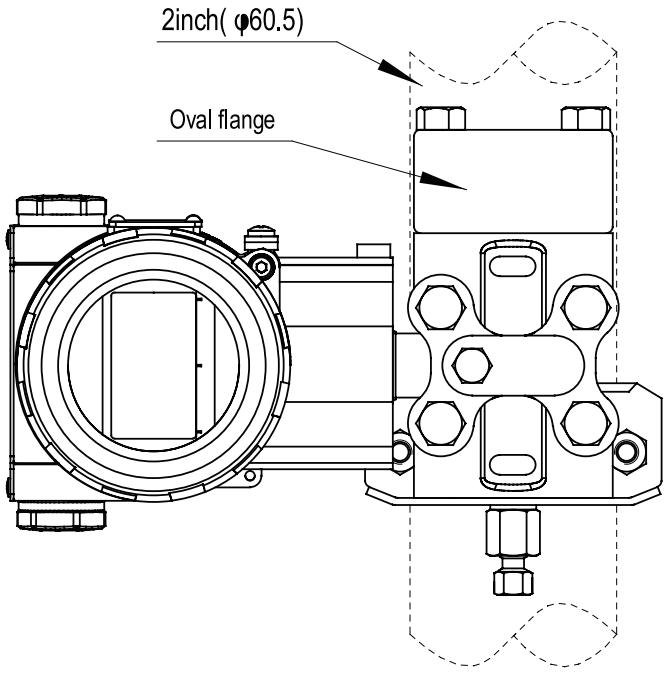
Horizontal Piping Installation (side view)



Horizontal Piping Installation (front view)



Wall Installation



Vertical Piping Installation

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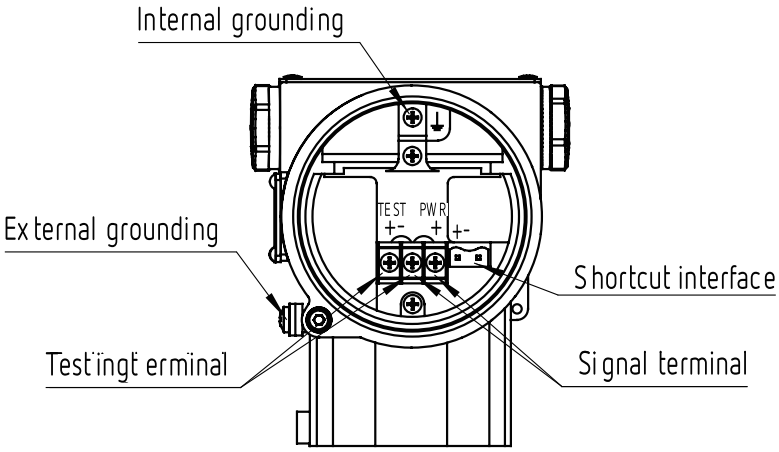
ELECTRICAL CONNECTION

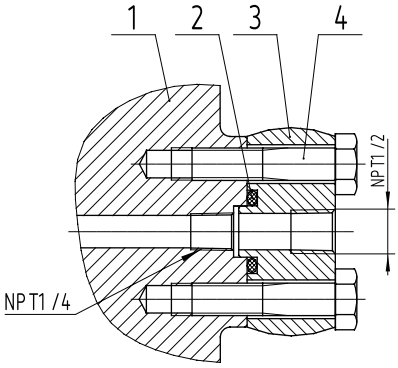


Note: the function of shortcut interface is equal to signal terminal.

PROCESS CONNECTION INSTRUCTION

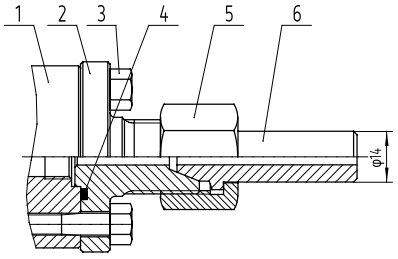
Process flange joint

NPT1/2 Stainless steel oval flange(Code1)



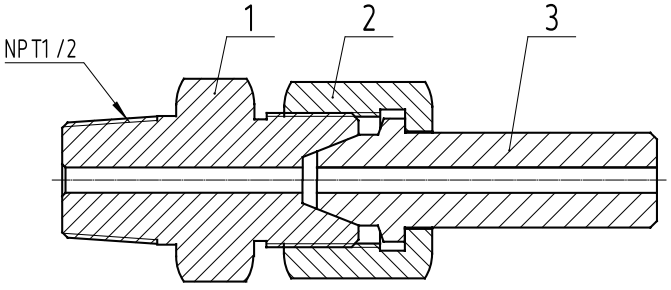
1. Pressure chamber flange
2. O-ring
3. 1/2-NPT oval flange
4. Bolt

M20x1.5 Stainless steel T joint(Code2)



1. Pressure chamber flange
2. M20x1.5T male joint
3. bolt
4. O-ring
5. Nut M20x1.5
6. Press-leading tube

NPT1/2 male with bolts and pressure tube, SS304(Code3)



1. NPT1/2 and core connection joint
2. Nut M20x1.5
3. Pressure leading tube, welded, SS304

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ORDER GUIDE

MDM3051S-DP	Intelligent Pressure Transmitter

Code	Output
H	4mA~20mA DC with HART

Code	Pressure Range
A	0mmH_2O~10mmH_2O...100 mmH_2O/ (0mbar~1mbar...10mbar)
B	0mmH_2O~20mmH_2O...600 mmH_2O/ (0mbar~2mbar...60mbar)
C	0mmH_2O~40mmH_2O...4000 mmH_2O/ (0mbar~20mbar...400mbar)
D	0mH_2O~0.25mH_2O...25 mH_2O/ (0mbar~25mbar...2500mbar)
F	0mH_2O~3mH_2O...300 mH_2O/ (0bar~0.3bar...30bar)

Code	Diaphragm material	Filling
A	Stainless steel316L	silicone oil
C	Hastelloy C	silicone oil

Code	Rated working pressure
0	2bar (only for range A)
7	70bar (only for range A)
1	160bar
2	250bar
3	400bar

Code	Process connection
N	1/4 NPT and 7/16 UNF thread hole without release valve
B	1/4 NPT and 7/16 UNF thread hole, release valve mounting in the end-face of flange back
U	1/4 NPT and 7/16 UNF thread hole, release valve mounting in upper flange side
D	1/4 NPT and 7/16 UNF thread hole, release valve mounting in lower flange side

Code	Sealing materials contacting with liquid
N	NBR
F	FKM
P	PTFE

Code	Additional function
N	None
F	Square root output
O	No oil processing (For oxygen measurement: fluorocarbon oil filling, viton sealing ring,<60bar,<60℃)

Code	Mounting bracket
N	None
1	Stainless steel
2	Galvanized Carbon Steel

Code	Process connection parts
N	None
1	1/2 NPT Female with stainless steel oval flange
2	M20×1.5 male with stainless steel T joint
3	1/2-14NPT guiding pressure transition joint and rear welding guiding pressure tube (SS)

Code	Display
N	None
1	LCD with back-light

Code	Others
N	None
A	Intrinsic safe
D	Exd version with Explosion-proof cable joint
S	Stainless steel 316 plate
T	Ship-use

MDM3051S-DP	H	[0~0.2]bar	A	1	B	N	F	1	1	1	A	The whole spec.

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The information provided herein is to the best of our knowledge true and accurate, it is provided for guidance only. All specifications are subject to change without prior notification.

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