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SPT3051S Smart Pressure Transmitter

Contents

Brief Introduction

Gauge Pressure Transmitter (GP)

Absolute Pressure Transmitter (AP)

Measured media: gas, steam, liquid

Measured range(with no shift): 0Pa~600Pa…100MPa

Basic error: ±0.075%，±0.1%

Diaphragm contacting with liquid: Stainless Steel 316L, Hast-alloy, etc.

1 Gauge Pressure Transmitter (GP)

Absolute Pressure Transmitter (AP)

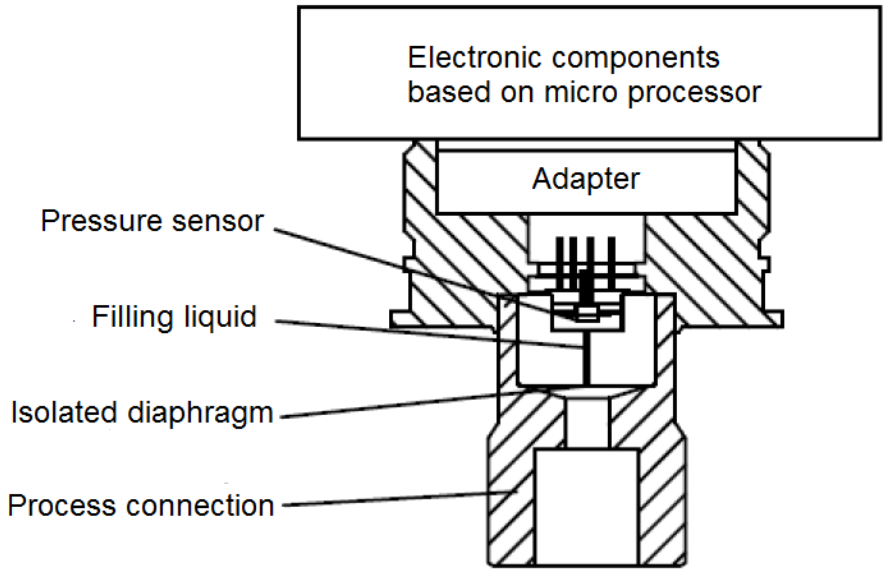


Chart 2 Gauge (GP)pressure transmitter/Absolute（AP）pressure transmitter

Pressure transmitter includes two functional units:

※ Main unit

※ Auxiliary unit

Main unit includes sensor and process connection, working principle as followed:

Through corrugated, isolated diaphragm and filling oil, process media is pressurized to diaphragm of pressure sensor. The other end of pressure sensor diaphragm is connected to the air (for gauge measurement) or vacuum(for absolute measurement). In such way, it makes the resistor of sensor die change so that 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.

SPT3051S-GP Pressure Transmitter

SPT3051S-AP Differential Pressure Transmitter

SPT3051S series gauge/absolute smart pressure transmitter is used for level, density, pressure and flow measurement of liquid, gas or steam. It will outputs 4mA~20mA DC HART signal and also it could be connected to handing communicator or 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)

1 Performance Specification

Reference Basic error for range calibration (including linearity, hystersis 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
B/L	±(0.30×TD+0.20)%×Span
others	±(0.20×TD+0.10)%×Span
Range code	-40℃~-20℃ and 65℃~85℃ total effect value
B/L	±(0.30×TD+0.20)%×Span
others	±(0.20×TD+0.10)%×Span

Over pressure effect: ±0.075%×Span

Long-term stability

Range Code	Effect value
B/L	±0.2%×Span/1 year
other	±0.1%×Span/1 year

Power effect

±0.001% /10V (12V~36V DC),negligible.

2 Functional Specification

Pressure range and limits (SPT3051S-GP Gauge Pressure)

range/limits		kPa	bar
B	range	0.6~6	(6~60)mbar
	limits	-6~6	(-60~60)mbar
C	range	2~40	0.02~0.4

	limits	-40~40	-0.4~0.4
D	range	2.5~250	0.025~2.5
	limits	-100~250	-1~2.5
F	range	30~3000	0.3~30
	limits	-100~3000	-1~30
G	range	(0.1~10)MPa	1~100
	limits	(-0.1~10)MPa	-1~100
H	range	(0.21~21)MPa	2.1~210
	limits	(-0.1~21)MPa	-1~210
I	range	(0.4~40)MPa	4~400
	limits	(-0.1～40)Mpa	-1~400
J	range	(0.6~60)MPa	6~600
	limits	(-0.1~60)MPa	-1~600
K	range	(0.8~80)MPa	8~800
	limits	(-0.1~80)MPa	-1~800
L	range	(1~100)MPa	1~1000
	limits	(-1~100)MPa	-1~1000

Pressure range and limits (SPT3051S-AP Absolute Pressure)

range/limits		kPa	bar
M	range	2~40	0.02~0.4
	limits	0~40	0~0.4
O	range	2.5~250	0.025~2.5
	limits	0~250	0~2.5
P	range	30~3000	0.3~30
	limits	0~3000	0~30

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 adjust to any value within the measured range 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 <0.25kPa for range C and <0.15kPa for other ranges 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

Alarm Current

Low alarm mode(min.): 3.7mA

High alarm mode(max.): 21mA

No alarm mode(holding): holding the active current value before failure

Standard alarm current mode: High alarm mode

Response time

The damping constant of amplifier parts is 0.1s, time constant of sensor is 0.1s～1.6s, which is depended on the pressure range and pressure range proportion.

The additional adjustable time constant is 0.1s~60s.

Warm-up time < 15s

Environmental temperature -40℃~85℃

With LCD display and viton sealing ring, the temperature is -20℃~65℃.

Storage temperature/ transportation temperature

-50℃~85℃；with LCD display：-40℃~85℃

Pressure limit It is from vacuum to Max. Pressure range.

Overpressure Limit

Pressure range	6kPa(B)	40kPa(C/L)	250kPa(D/M)	3MPa(F/O)
Overpressure limit	0.2MPa	1MPa	4MPa	16MPa
Overpressure range	10MPa(G)	21MPa(H)	40MPa(I)	60MPa(K)
Overpressure limit	20MPa	50MPa	50MPa	70MPa

3 Installation

Power and load condition

Power supply: 24V DC, R≤(Us-12V)/Imax （kΩ）

Imax=23mA

Max. Voltage supply: 36V DC

Min. Voltage supply: 12V DC, 15V DC(Backlit LCD display)

Digital communication load resistance range: 230Ω～600Ω

Electric Connection

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

Process connection

Standard process connection: NPT 1/2 female, which can be transferred to NPT 1/2 male, G1/2 male, M20×1.5 male and KF16 vacuum port etc.

4 Physical Specification

Material

Diaphragm: Stainless Steel 316L, Hast-alloy C

Process Connection: Stainless steel 316L

Filling liquid: silicone oil

Sealing ring: NBR, FKM, PTFE

Transmitter housing: Aluminum alloy material, epoxy resin glue spraying on the surface

Housing sealing ring: NBR

Nameplate: Stainless steel 304

Weight

1.6kg (not including LCD display, mounting support and process connection)

Housing protection

IP67

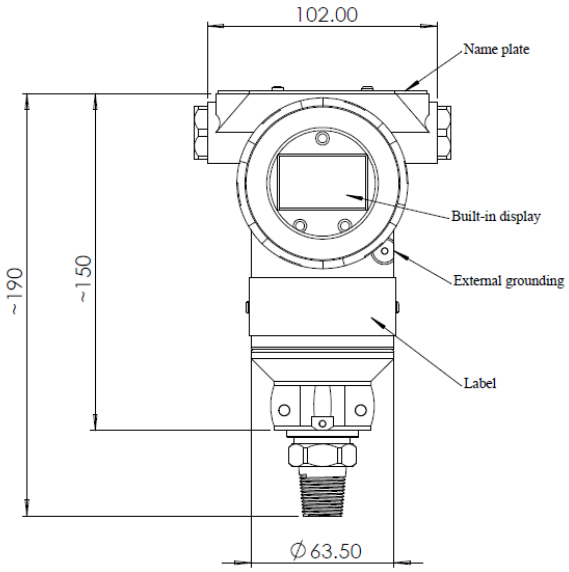
EMC Table

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	Radio frequency 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

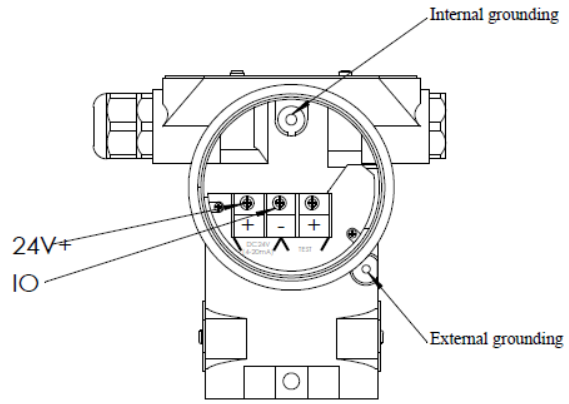
Note: (1) A degree：performance is normal within the technical standard range during testing.

(2) B degree: During testing, 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.

Outline Dimension (Unit: mm)



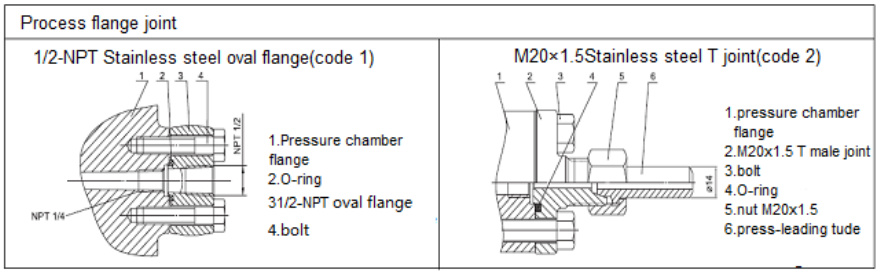
5 Electric connection chart

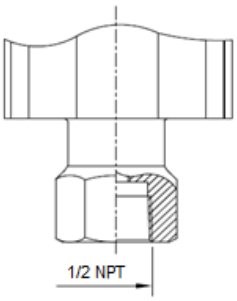


Note: the function of shortcut interface is equal to signal terminal.

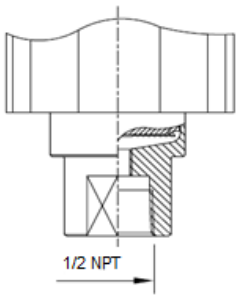
6 Process connection instruction

6.1 Standard version（code 1）



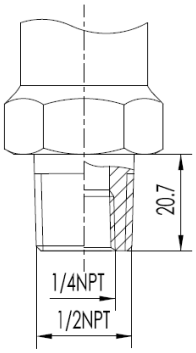


Pressure port for range D/M/F/G/H/I/K/O

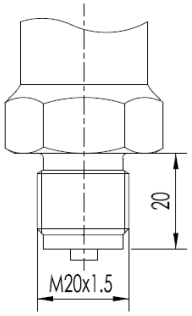


Pressure port for range B/C/L

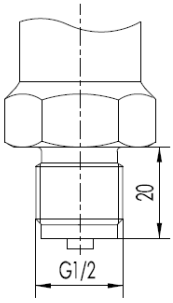
6.2 Derived threads



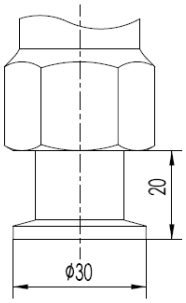
1/2 NPT male (code 2)



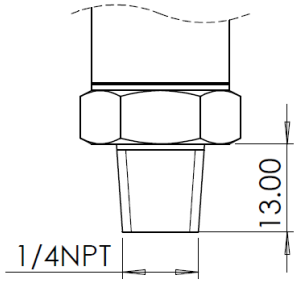
M20×1.5 male (code 3)



G1/2 male EN837 (code 4) /DIN3852-E



Vacuum port DIN 28403 KF16 / ISO 2861(code 5)



1/4NPT male (code 6)

7 Model and Specification Code Table

SPT3051S	Smart Pressure Transmitter

Code	Output
H	4mA ~ 20mADC with HART
N	4mA ~ 20mADC analog output

Code	Pressure range
Gauge	
B	-6kPa~0kPa…0.6kPa~6kPa（-600mm~0mm…60mm~600 mm H_2O）/(-60mbar~0mbar…6mbar~60mbar)
C	-40kPa…2kPa~40kPa /（-4000mm~0mm…200mm~4000 mm H_2O）/(-400mbar 0mbar…20mbar~400mbar)
D	-100kPa~0kPa…2.5kPa~250kPa /（-25m~0m…0.25m~25 m H_2O） /(-2500mbar~0mbar…25mbar~2500mbar)
F	-100kPa~0kPa…30kPa~3MPa /（-300kPa~0m…3m~300 m H_2O） /(-30bar~0bar…0.3bar~30bar)
G	-0.1MPa~0MPa…0.1MPa~10MPa /(-1bar~0bar…1bar~100bar)
H	-0.1MPa~0MPa…0.21MPa~21MPa /（-1bar~0bar…2.1bar~210bar）
I	-0.1MPa~0MPa…0.4MPa~40MPa /（-1bar~0bar…4bar~400bar）
J	-0.1MPa~0MPa…0.6MPa~60MPa /（-1bar~0bar…6bar~600bar）
K	-0.1MPa~0MPa…0.8MPa~80MPa /（-1bar~0bar…8bar~800bar）
L	-0.1MPa~0MPa…1MPa~100MPa /（-1bar~0bar…10bar~1000bar）
Absolute	
M	0kPa…2kPa~40kPa /（0mm…200mm~4000mm H_2O）/(0mbar…20mbar~400mbar)
O	0kPa…2.5kPa~250kPa /(0mbar…25mbar~2500mbar)
P	0kPa…30kPa~3MPa /(0bar…0.3bar~30bar)

Code	Diaphragm material	Filling
A	Stainless steel316L	silicone oil
C	Hastelloy C	silicone oil
X	Special material to be mentioned in order	

Code	Process connection
C1	M20x1.5 male
C3	G1/2 male
C5	1/4 NPT male
C6	1/2 NPT male
C16	Vacuum connector DIN 28403 KF16 / ISO 2861[1]
C22	1/2 NPT female
CX	Other thread

Code	Process connection parts
N	None
O	No oil processing (For oxygen measurement: fluorocarbon oil filling, viton sealing ring)

Code	Mounting bracket

N	None
1	Stainless steel
2	Galvanized Carbon Steel

Code	Display
N	No display
1	LCD
2	LCD with back-light

Code	Others
N	None
A	Intrinsic safe
D	Exd
E	Exd version with Explosion-proof cable joint

SPT3051S	H	L	A	C1	N	N	1	N	The whole spec

Note: [1]Vacuum port DIN 28403 KF16 / ISO 2861 is only suitable for pressure range within 2.5bar.