

Absolute pressure transmitter

Model: SMT2003

Spec. sheet no. SD02-03

Service intended

The high performance pressure transmitter SMT2003 is suitable to measure liquid, gas, or steam flow as well as liquid level, density and pressure.

The key features include quick response, remote set-up using communications, self-diagnostics and optional status output for pressure high/low alarm.



Degree of protection

EN60529/IEC529/IP66
EN60529/IEC529/IP67

Standard features

Accuracy

±0.05 % of calibrated span
±0.075 % of calibrated span

Range limits

40 kPa ~ 3 MPa

Turn down

Adjustable up to 100:1 range ability

Temperature compensation

High sensitivity temperature sensor packaged in the sensor

Measured value number

Max.7-digit character string comprising letters and numbers.

Isolating diaphragm

Stainless steel 316L
Hastelloy C
Stainless steel 316L with Gold Plated

Measurement medium

Gas, Steam and liquid

Stability

10 years stability
0.15 % of URL

Output

4 ~ 20 mA with HART protocol

WISE[®]

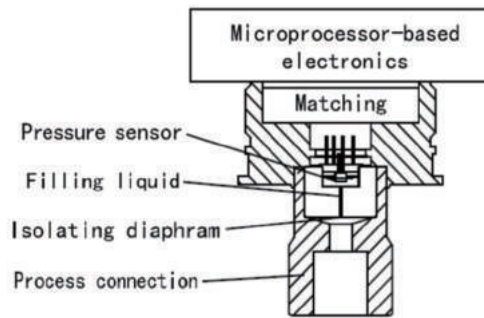
Principle of operation

Main unit includes sensor and Process connection,
Works as follows.
The process medium through a flexible, corrosion resistance of the isolation diaphragm and the fill fluid pressure is applied on the measuring silicon pressure chip.

A termination of the chip connected at the atmosphere (for a gauge pressure measurement) or vacuum (for absolute pressure measurement).

The absolute pressure sensor, which is only exposed to the pressure at the high pressure side, acts as a reference value to compensate for the static pressure.

The temperature sensor as a temperature compensated reference value to compensate for the temperature drift.



Main specification

- The gauge pressure transmitter utilize the world's leading high stability silicon sensor, the highest Reference Accuracy is $\pm 0.05\%$
- High sensitivity temperature sensor packaged in the sensor. The minimum of the temperature error is $\leq \pm 0.05\% / 10\text{ K}$
- Stainless steel 316L and silicone oil filling welded seal structure
- Long stability is $\leq \pm 0.1\%$ / 3 years, 10 years of maintenance-free
- Adjustable up to 100:1 range ability
- The remote seal transmitter utilize ultra-high temperature(400 °C) patented technology.

Standard Specifications

Performance Specifications

Reference Accuracy of Calibrated Span (includes terminal-based linearity, hysteresis, and repeatability)
 $\pm 0.075\%$. If $TD > 10$, $\pm(0.075 \times TD)\%$ $TD = \text{Nominal Pressure Range} / \text{Adjusted}$

The square root accuracy is 1.5 times of reference accuracy of calibrated span.

Ambient Temperature Effects

$-20 \sim 65\text{ }^{\circ}\text{C} : \pm(0.2 \times TD + 0.05)\% \times \text{Span}$

Every $10\text{ }^{\circ}\text{C}$ is $\pm 0.08\% \times \text{Span}$ ($TD=1$)

$-40 \sim -20\text{ }^{\circ}\text{C}$ and $65 \sim 85\text{ }^{\circ}\text{C} : \pm(0.3 \times TD + 0.1)\% \times \text{Span}$

Overpressure Effects

$\pm 0.075\% \times \text{Span}$

Stability

$\pm 0.1\% \times \text{Span} / 3\text{ years}$

Power Supply Effects

$\pm 0.001\% / 10\text{ V}$ ($12 \sim 42\text{ V DC}$)

Explosion protection

■ ATEX, IECEx Flameproof enclosures

Ex db IIC T4 / T5 / T6 Gb

Ex tb IIIC T80°C / T90°C / T130°C Db

Ta = $-40\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$

ATEX Cert. : CML 17ATEX1235X

IECEX Cert. : IECEx CML 17.0157X

■ KCs Flameproof enclosures

Ex d IIC T6

Ta = $-40\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$

KCs Cert. : 19-KA2BO-0013X

■ KCs, ATEX, IECEx Intrinsic safety

Ex ia IIC T4...T6 Ga

Ex ia IIC T4...T6 Ga Ex ia IIIC T80°C / T90°C / T130°C Da

ATEX Cert. : CML 19ATEX2502X

IECEX Cert. : IECEx CML 19.0190X

■ KCs Intrinsic safety

Ex ia IIC T4/T5/T6

Ex iaD 20 T80°C / T90°C / T130°C

KCs Cert. : 20-AV2BO-0595X / 20-AV2BO-0596X

■ FM Approvals

CL 1, DIV 1, GPS ABCD T6...T4;

CL II, III, DIV 1, GPS EFG T6...T4

CL1, ZN 1, AEx/Ex db IIC T6...T4 Gb

ZN 21 AEx/Ex tb IIIC T85°C...135°C Db

Ta = $-40\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$ with Silicone o-ring

Ta = $-20\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$ with NBR o-ring

IP66/67

TYPE 4X (Only when using stainless steel housing)

FM Cert. : FM23US0038X / FM23CA0028X

Functional Specifications

Span and Range Limits

Sensor	C	D	E
Pressure range (bar)	400 mbar	2.5 bar	30 bar
Setting limits (offset and span in this range freely adjustable)	0 ... 400 mbar	0 ... 2.5 bar	0 ... 30 bar
Lowest permissible span	20 mbar	25 mbar	0.3 bar
Overpressure limit	10 bar	40 bar	150 bar
Range ability turndown (with respect to the differential pressure range)	20:1	100:1	100:1

Standard Specifications

Turn-down Accuracy

If the Accuracy is (%) : 0.075

If Turn-down $\leq 10:1$, ± 0.075 % FSO

If Turn-down $> 10:1$, $\pm [0.0075 \times \text{Turn-down}]$ % FSO

Turn-down = Nominal Pressure Range / Adjusted Range (FSO = Full Scale Output)

Zero Adjustment Limits

Zero can be fully elevated or suppressed, within the lower and upper range limits of the capsule.

External Zero Adjustment

External zero is continuously adjustable with 0.01 % incremental resolution of span. Re-range can be done locally using the range setting switch.

Mounting Position Effects

Rotation in diaphragm plane has no effect. Tilting up to 90° will cause zero shift up to 0.25 kPa which can be corrected by the zero adjustment.

Output

2 wire 4~20 mADC output with digital communications, linear or square root programmable.

HART FSK protocol are superimposed on the 4~20 mA DC signal. Output range: 3.9 mA to 20.5 mA.

Failure Alarm (the mode can be selected)

Low Alarm Mode (min) : 3.7 mA

High Alarm Mode (max) : 21 mA

Alarm Off (Keep) : Keep the effective value before the fault.

* Error signal (NAMUR NE43): High/Low (Adjustable)

* Note : The standard setting of failure alarm is High Mode.

Response Time

The amplifier damping constant is 0.1 sec.

The sensor damping constant is 0.1~1.6 sec, it depends on the range and range compression ratio.

Amplifier damping time constant is adjustable from 0.1 to 60 sec by software and added to response time.

Warm Up Time

< 15s

Permissible Temperatures

Environment / storage without display : -40 to 85 °C

with display : -20 to 65 °C

Media wetted parts / Filled oil : -40 to 100 °C

(Info: +125°C short time, max. 30 min.)

Standard Specifications

HART digital communication and 4 to 20 mA output Power Supply

The transmitter operates from 12 to 42 V DC with no load and is protected against reverse polarity connection
Minimum operating voltage increase to 12 V DC with surge protector

Ripple

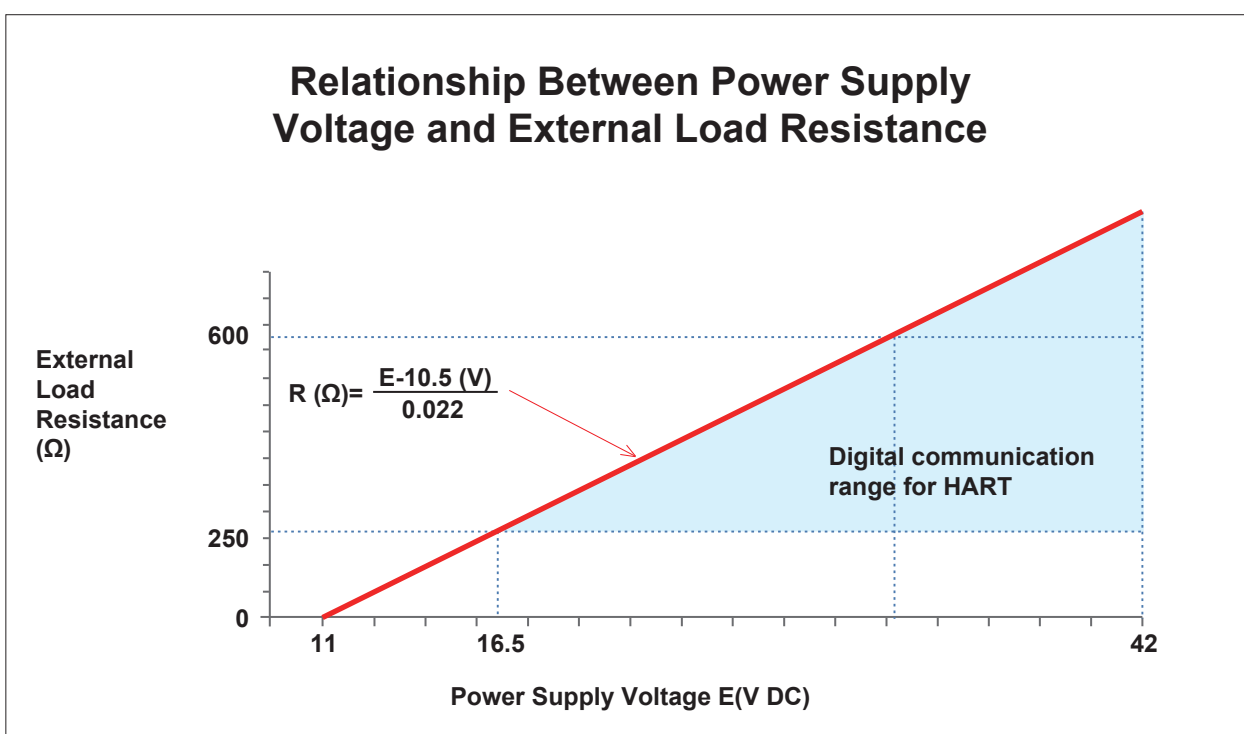
20 mV max on a 250 Ω load as per HART specifications.

Load limitations

4 to 20 mA and HART total loop resistance :

$$R \text{ (k}\Omega\text{)} = \frac{\text{Supply voltage} - \text{min. operating voltage (V DC)}}{22 \text{ mA}}$$

A minimum of 250 Ω is required for HART communication.



Supply and Load Requirements

24 VDC supply, $R \leq (U_s - 12 \text{ V}) / I_{\text{max}}$ k Ω , $I_{\text{max}} = 23 \text{ mA}$.

Maximum voltage limited: 42 VDC

Minimum Voltage limited: 11 VDC without LCD display

Minimum Voltage limited: 12 VDC with LCD display

250 Ω to 600 Ω for digital communication

Electrical protection

Short –circuit protection is permanent.

Reverse polarity protection is not damage, but also is no function.

Electrical Connection

The electrical connection is made via cable entry $\frac{1}{2}$ NPT(F)

The screw terminals are suitable for wire cross-sections up to 2.5 mm².

Standard Specifications

Process Connection

Default Process Connection : ½ NPT female thread

Electromagnetic field

Meets all the requirements of EN 61326 and NAMUR NE-21. it can be changed to ½ NPT, G½, M20x1.5 male thread and KF16 vacuum Connection with Union.

Load

Within load/voltage specified limits the total effect is negligible

Install

The transmitter housing can be rotated about 360 degrees relative to the transmitter module without affecting the performance and internal wiring.

Transmitter can be operated Through the PC machine or notebook computer via modem.

Modem can be connected in parallel to the signal circuit at arbitrary point.

The modem communicates with the transmitter through an AC signal superimposed on the 4~20 mA output signals. This modulation does not change in the mean values, so does not affect the measurement signal.

Physical Specifications

Isolating Diaphragm

Stainless steel 316L

Hastelloy C

Stainless steel 316L with Gold Plated

Mounting Bracket

stainless steel 304

Carbon steel galvanized

Process Connection

½" NPT (Female)

½" NPT (Male) with Union

M20 x 1.5P (Male) with Union

G ½" (Male) with Union

½" PF (Male) with Union

¼" NPT (Male) with Union

Others

Conduit Connection

½NPT(F)

M20 x 1.5P (Option)

Name plate and tag

Stainless steel 304

Fill fluid

Silicone oil

Fluorinated oil

Weight

1.6 kg

Degrees of Protection

IP66/IP67

Amplifier Housing

Aluminium with epoxy resin coat

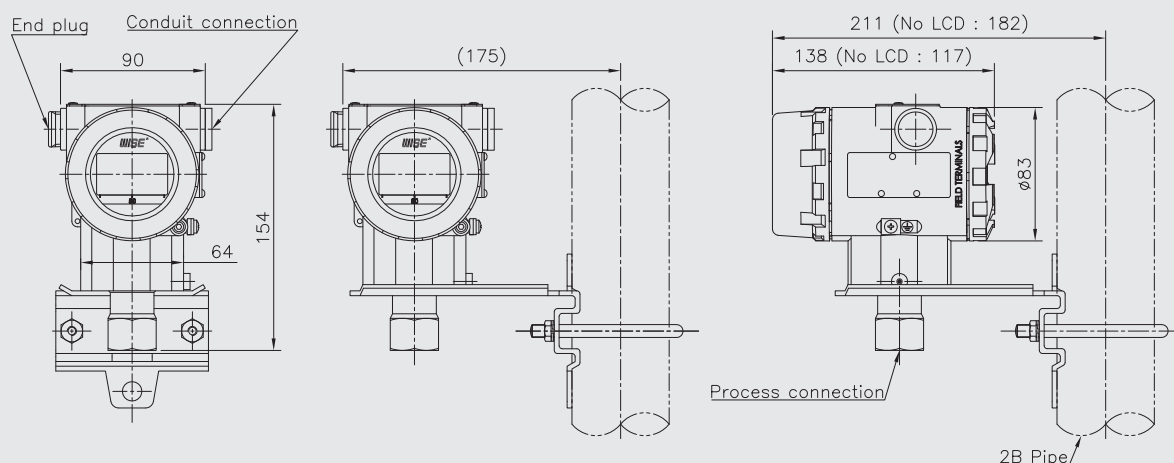
Stainless steel 316

CE conformity EMC directive

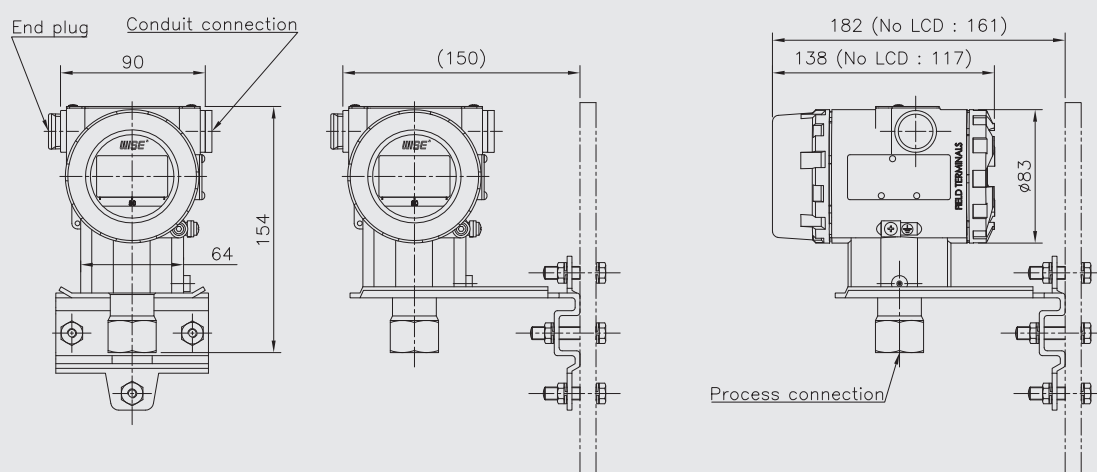
EN 61000-6-2:2005

EN 61000-6-4:2007/A1:2011

SMT2003 : Type of Mounting



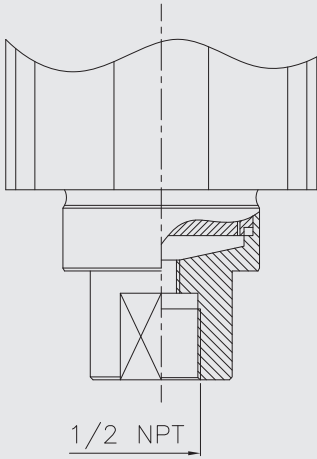
2" MOUNTING TYPE



WALL MOUNTING TYPE

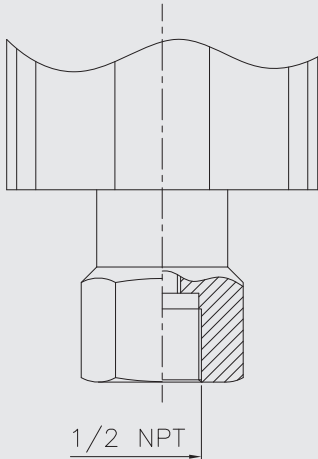
Process Connections Description Default Process Connection

B/C/D Span



SMT2003 A

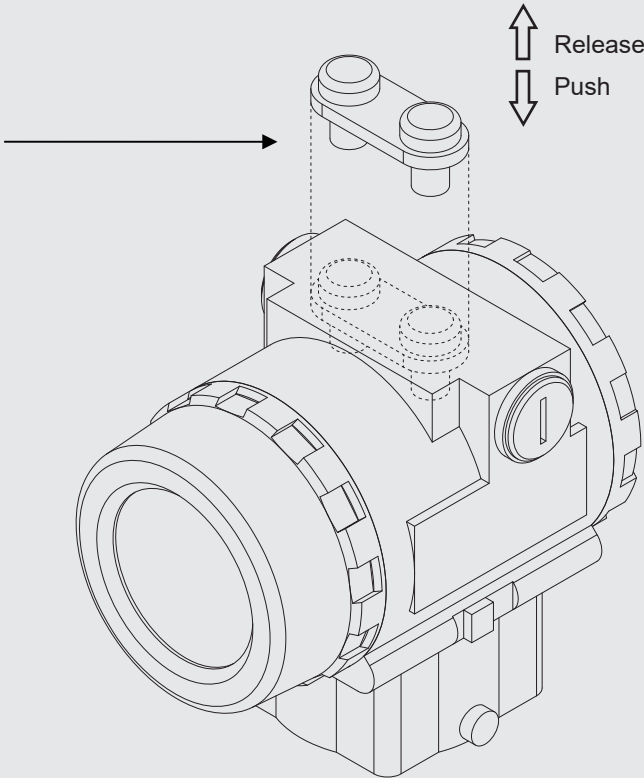
E/F/G/H Span



SMT2003 B

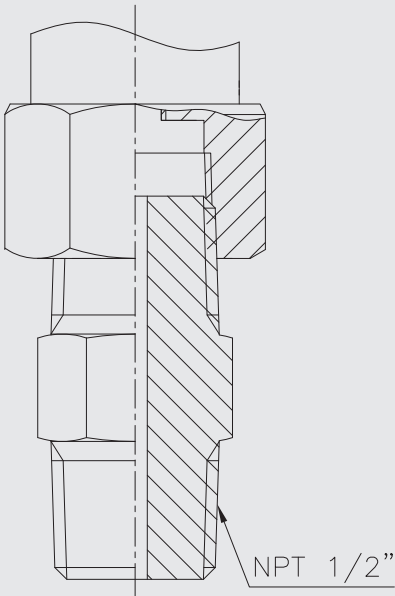
Local Set Button

Magnetic button
Component (Two in one)

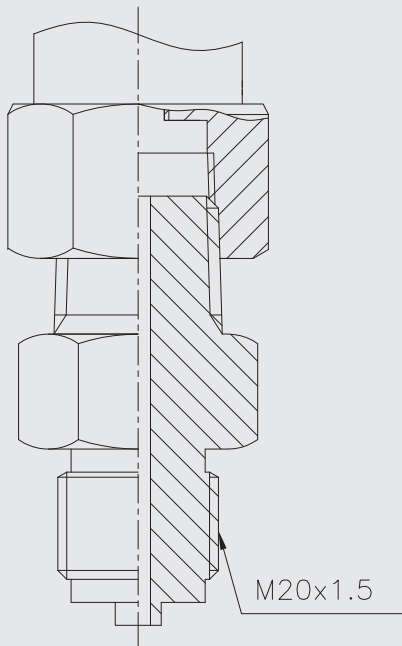


Unit : mm

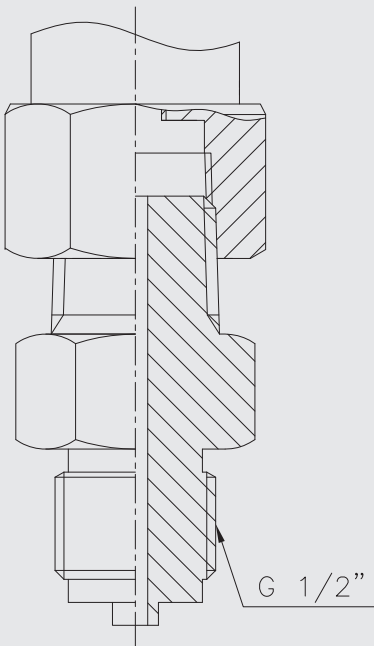
Other forms of
Process connector
1/2-NPT male thread



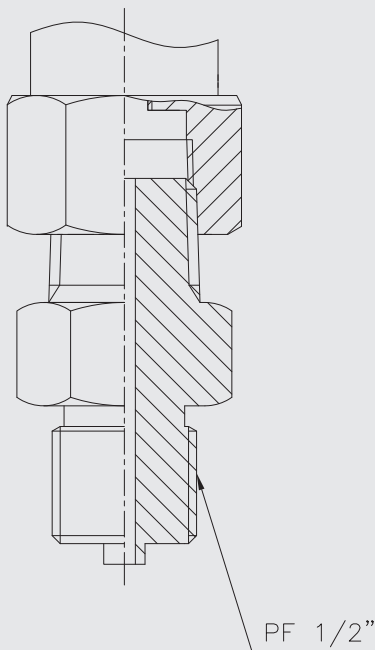
M20 x 1.5 male thread



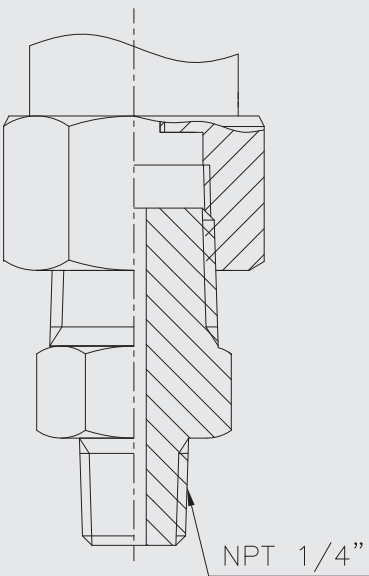
G1/2 male thread

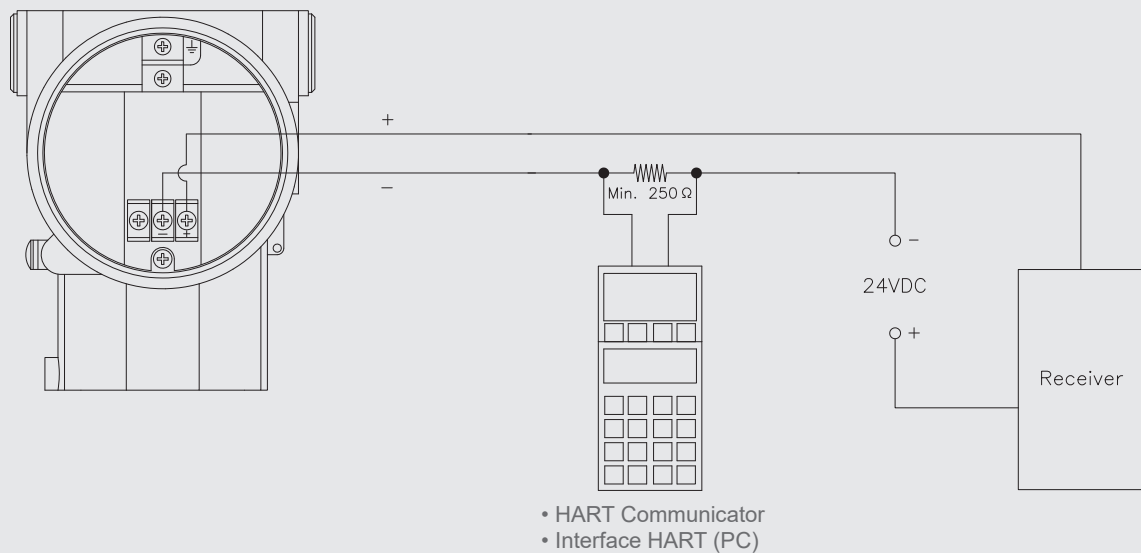


PF1/2 male thread

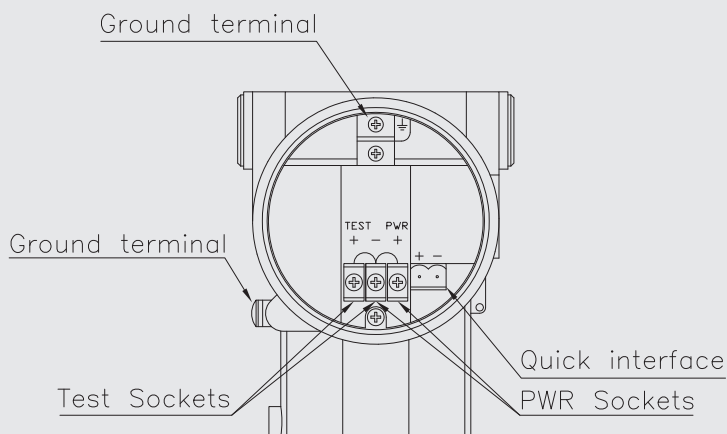


1/4-NPT male thread

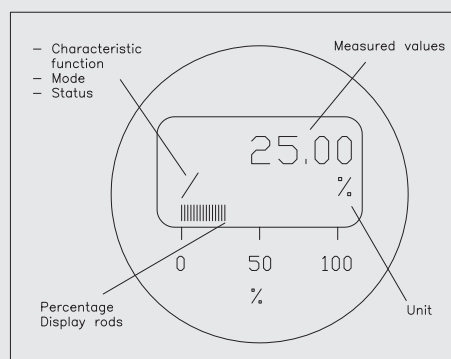




Electrical Connection Diagram



Terminal Configuration



LCD Display

1. Base model**SMT2003** Absolute Pressure Transmitter**2. Measuring Span**

- C** 20 ~ 400 mbar (Only available accuracy 0.075 %)
D 25 ~ 2500 mbar
E 0.3 ~ 30 bar

3. Accuracy

- 5** 0.05 % (Only D~E Sensor)
7 0.075 % (Only C~E Sensor)

4. Indication

- N** None
D Display (LCD)

5. Wetted parted materials (Seal diaphragm/Sensor body)

- L** 316L SS / 316SS
H Hastelloy C-276 / 316SS
G 316L SS with Gold Plated / 316SS

6. Filled by fluid

- S** Silicone oil
F Fluorinated oil

7. Explosion protection

- N** None
A Ex ia (ATEX)
B Ex ia (IECEX)
C Ex ia (KCS)
D Ex d (ATEX)
E Ex d (IECEX)
F Ex d (KCS)
G Ex d & tb (FM)

8. Housing material

- A** Aluminium 1/2"NPT(F) (STD)
B Aluminium M20*1.5P(F)
S 316SS 1/2"NPT(F) (STD)
T 316SS M20*1.5P(F)

9. Mounting bracket material

- 5** Carbon steel galvanized
4 304SS
0 None
9 Other

10. Process connection

- F** 1/2" NPT (Female)
M 1/2" NPT (Male) with Union
G G 1/2" (Male) with Union
S 1/2" PF (Male) with Union
Q 1/4" NPT (Male) with Union
Z Other

11*. Accessory

- N** None
V Manifold valve
O Other

* Note : Refer to A080's Specification and order valve(A080) separately. It's separate option.

12. End plug

- 1** Plug_Ni Plated Brass (Only Ex proof)
2 Plug_Stainless Steel (316SS) (Only Ex proof)
3 Plug (Without explosion protection)

Sample ordering code

1	2	3	4	5	6	7	8	9	10	11	12
SMT2003	C	5	N	L	S	N	A	5	F	N	1

Optional specification

This catalog provides additional optional information beyond the main ordering information for the basic models of SMT200X

1. Select option code for marine approvals

If marine approvals is required, please select the code below.

Type	Description	Code
Classification (Marine approvals)	KR (Korean Register of Shipping)	KR
	ABS (American Bureau of Shipping)	AB
	DNV (Det Norske Veritas)	DN
	LR (Lloyd's Register)	LR
	BV (Bureau Veritas)	BV

[Example]

SMT2001 X X X X X X X X X X X X X X _ KR

