

Gauge pressure transmitter

Model: SMT2002

Spec. sheet no. SD02-02

Service intended

The high performance pressure transmitter SMT2002 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.



Standard features

Accuracy

±0.05 % of calibrated span.
±0.075 % of calibrated span.
±0.1 % of calibrated span.

Range limits

0 ~ 6 kPa to 0 ~ 40 MPa

Turn down

Adjustable up to 100:1 range ability

Temperature compensation

High sensitivity temperature sensor packaged in the sensor

Isolating diaphragm

Stainless steel 316L / Hastelloy C

Measurement medium

Gas, steam and liquid

Stability

10 years stability
0.15 % of URL

Output

4 ~ 20 mA with HART protocol

Principle of operation

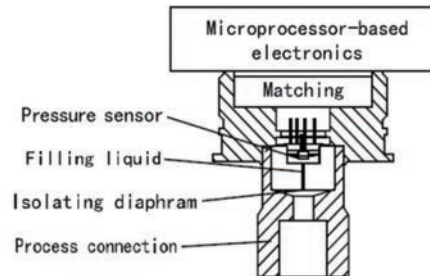
Main unit includes sensor and Process connection,
Works as follows.

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).

When the measured pressure through the measuring diaphragm and the filling liquid is transmitted to the sensor silicon chip, so that the silicon chip of the sensor resistance changes, resulting in change in output voltage of the detection system. this output voltage is proportional to the pressure change. The output is transfer into a standardized signal output by adapter unit and amplifier.

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 $\pm 0.05\%$
- The transmitter allowable over pressure is up to 50 MPa with GP sensor H
- 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 $TD > 10(TD = URL / SPAN)$, $\pm(0.005 \times TD)\%$

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

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

Explosion protection

Ex d IIC T4 / T5 / T6 Gb

Ex tb IIIC T80 °C / T90 °C / T130 °C Db

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

Temperature class Max. process temperature

T4 T130 °C 130 °C

T5 T90 °C 90 °C

T6 T80 °C 80 °C

Functional Specifications

Span and Range Limits

Sensor	B	C	D	E	F	G	H
Gauge pressure range (bar)	60 mbar	400 mbar	2.5 bar	30 bar	100 bar	210 bar	400 bar
Setting limits (offset and span in this range freely adjustable)	-60 ... 60 mbar	-400 ... 400 mbar	-1 ... 2.5 bar	-1 ... 30 bar	-1 ... 100 bar	-1 ... 210 bar	-1 ... 400 bar
Lowest permissible span	2 mbar	4 mbar	25 mbar	0.3 bar	1 bar	2.1 bar	4 bar
Overpressure limit	2 bar	10 bar	40 bar	150 bar	200 bar	500 bar	500 bar
Range ability turndown (with respect to the differential pressure range)	30:1	100:1	100:1	100:1	100:1	100:1	100:1

Zero Adjustment Limits

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

Standard Specifications

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 Mode (min) : 3.7 mA

High Mode (max) : 21 mA

No Mode (hold) : Keep the effective value before the fault.

* 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 UpTime

< 15s

Ambient Temperature Limits

-40 to 85 °C

-20 to 65 °C with LCD display or fluorine rubber sealing

Storage and Transportation Temperature Limits

-50 to 85 °C

-25 to 85 °C with LCD display

Standard Specifications

HART digital communication and 4 to 20 mA output Power Supply

The transmitter operates from 12 to 36 V DC with no load and is protected against reverse polarity connection
Minimum operating voltage increase to 12 V DC with surge protector

Ripple

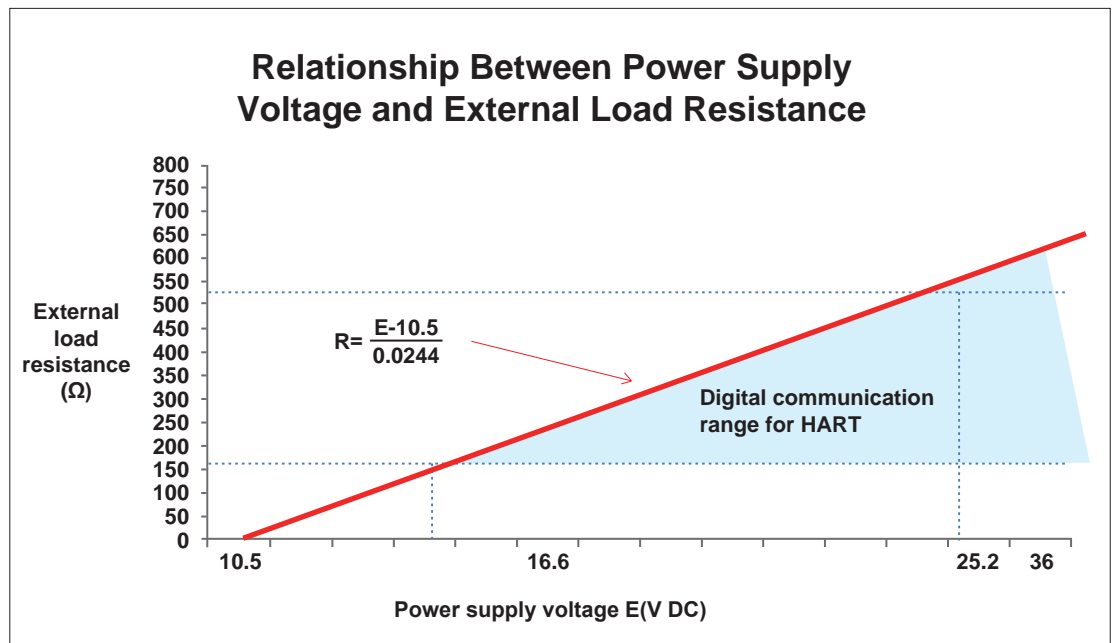
20 mV max on a 250 Ω load as per HART specifications.

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: 12 VDC without LCD display

Minimum Voltage limited: 15 VDC with LCD display

230 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 M20x1.5.

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

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

Amplifier Housing

Aluminium with epoxy resin coat

Process Connection

½ NPT (Female)

1½ NPT (male) with union

G ½ (male) with union

¼ NPT (male) with union

M20 x 1.5 (male) with union

others

Mounting Gasket

Stainless steel 304 / 1.4301

Stainless steel 316 / 1.4401

Carbon steel galvanized

Fill fluid

Silicone oil / Fluorinated oil

Weight

1.6 kg

Name plate and tag

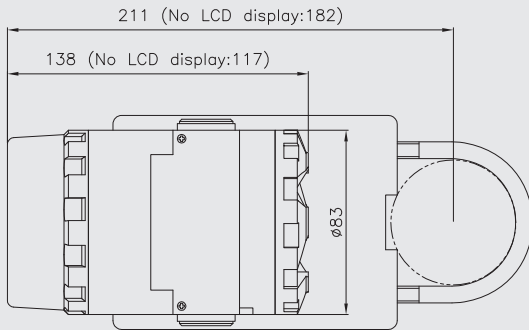
Stainless steel 304

Degrees of Protection

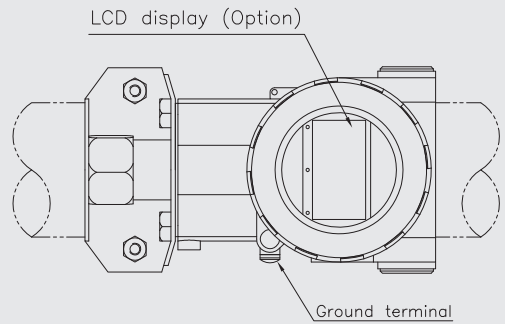
IP67

Unit : mm

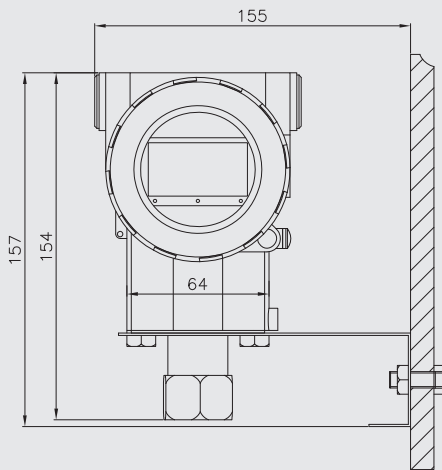
**Horizontal Impulse Piping Type
(Side face)**



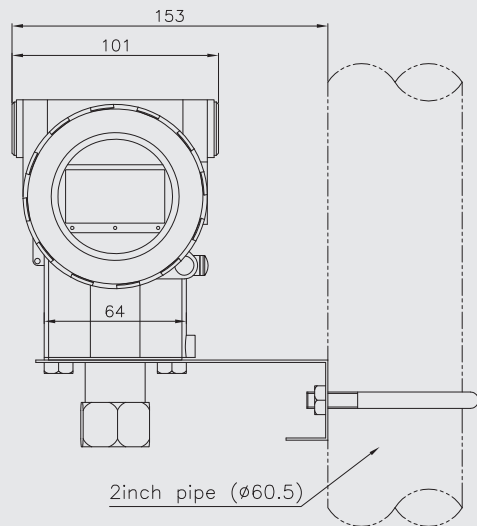
**Horizontal Impulse Piping Type
(Front side)**



Horizontal Impulse Wall mounting Type

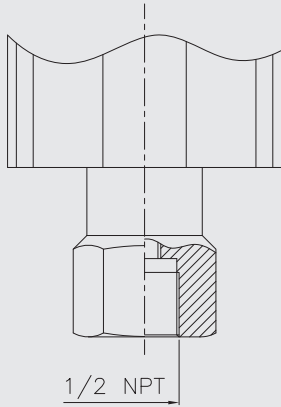


Vertical Impulse Piping Type

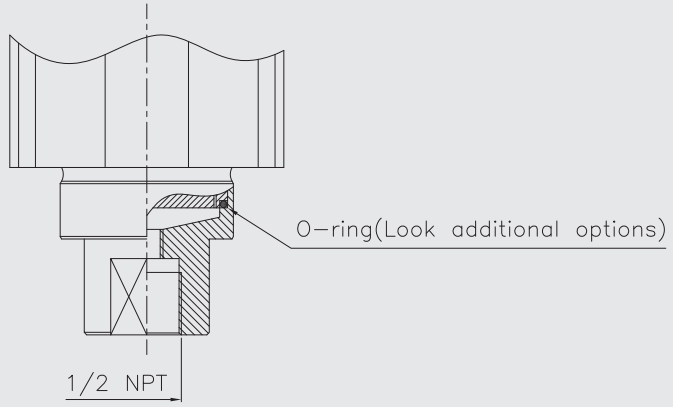


Process Connections Description Default Process Connection

F/G/H/I Span

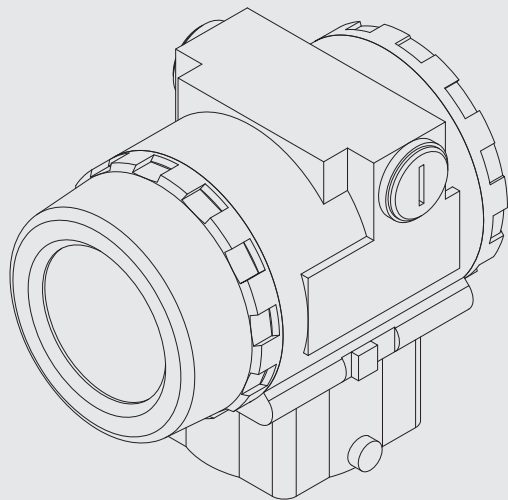
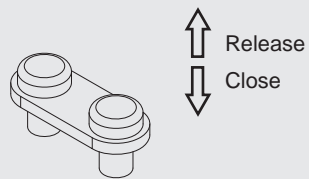
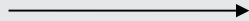


C/S/D Span

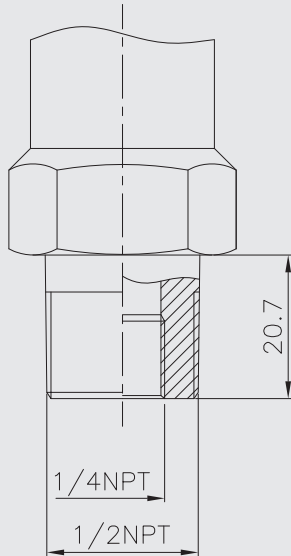


Control Button

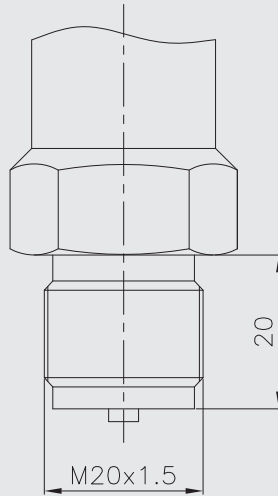
Magnetic button
Component (Two in one)



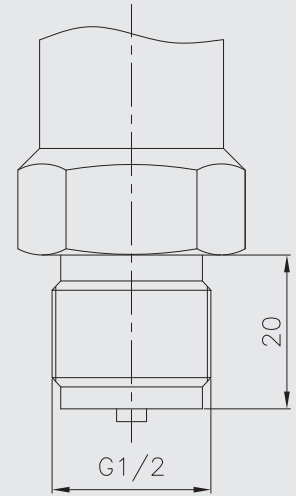
Other forms of
Process connector
1/2-NPT male thread



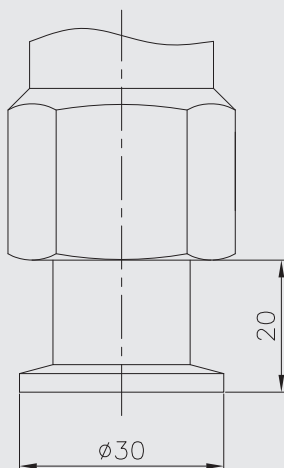
M20 x 1.5 male thread



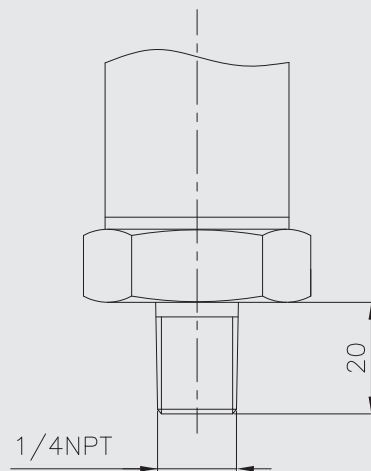
G1/2 male thread



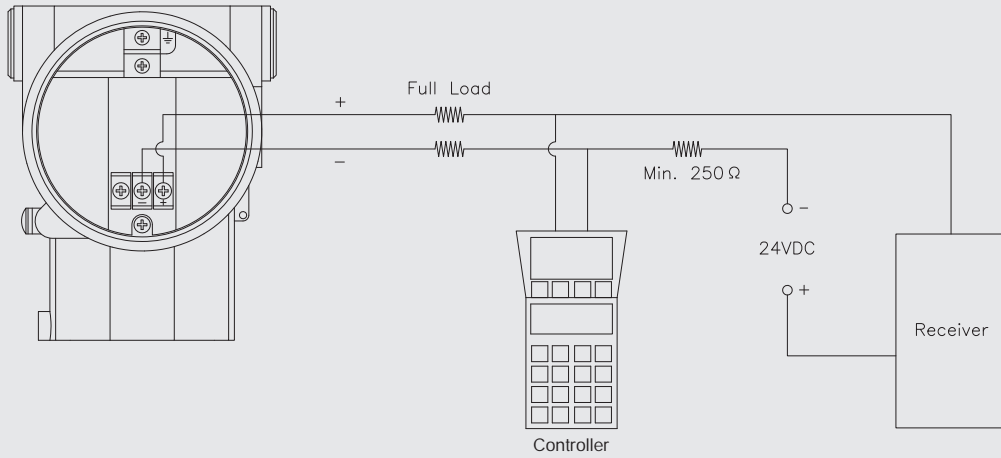
Vacuum Connection
DIN 28403 KF16 / ISO 2861



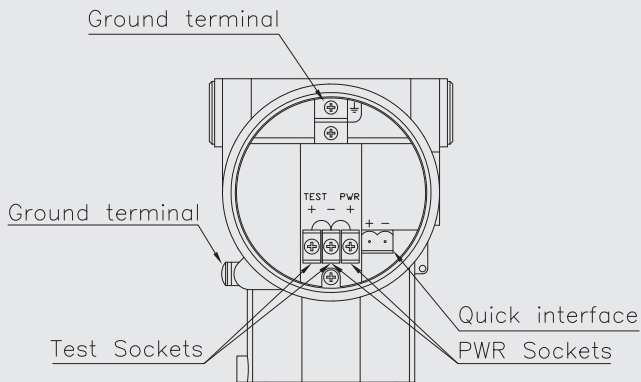
1/4-NPT male thread



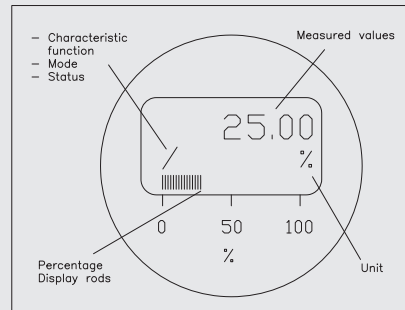
Electrical Connection Diagram



Terminal Configuration



LCD Display



1. Base model**SMT2002** Gauge Pressure Transmitter**2. Measuring Span**

B	6 ~ 60 mbar (Accuracy 0.075 %)
C	20 ~ 400 mbar
D	25 ~ 2500 mbar
E	0.3 ~ 30 bar
F	1 ~ 100 bar
G	2.1 ~ 210 bar
H	4 ~ 400 bar

3. Output / Accuracy

5	0.05 % (Only C-E Sensor, 4 ~ 20 mA with HART)
7	0.075 % (Only B-E Sensor, 4 ~ 20 mA with HART)

4. Wetted parted materials (Seal diaphragm/Process connection)

L	316L SS / Stainless steel
H	Hastelloy C-276 / Stainless steel
G	316L SS coated by Gold / Stainless steel

5. Filled by fluid

S	Silicone oil
F	Fluorinated oil

6. Explosion protection

N	None
A	Ex ia
D	Ex d

7. Housing material

A	Aluminium
S	304SS

8. Conduit connection

M	M20 * 1.5
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9. Mounting bracket material

5	Carbon steel galvanized
4	304SS
6	316SS

10. Process connection

F	1/2" NPT (Female)
M	1/2" NPT (Male) with Union
G	G 1/2" (Male) with Union
Q	1/4" NPT (Male) with Union
P	M20 * 1.5 (Male) with Union
Z	Other

11. Accessory

N	None
R	With manifold valve

1	2	3	4	5	6	7	8	9	10	11	Sample ordering code
SMT2002	B	5	L	S	N	A	M	5	F	N	

Large empty rectangular area for writing the memo content.