Intrinsically Safe Pressure Transmitter for Industrial Use

Main features

- Measuring ranges 0...10 mbar to 0...2000 bar
- Explosion-proof certificate for zone 0
  II 1G Ex ia IIB T4 Ga or II 1G Ex ia IIC T4 Ga
- Explosion-proof certificate for zone 1
  II 2G Ex ia IIC T4 Gb
- Output signal 4...20 mA
- Highly reliable
- Digital version: ZERO function, down scale 4:1

Applications

- Chemical industry
- Oil and gas industry
- Food and drug industry
- Plant engineering and automation technology

Description

The SMX2 can be configured in both zone 0 and zone 1 and meets the requirements of Directive IEx U 10 Atex 1014. Appropriate protective circuits guarantee inverse-polarity protection, overvoltage resistance and limitation of capacity loss in the event of any failure. Its widely ranging industrial applications are guaranteed by its high precision and robust and compact design.

A wide range of pressure transducers is on offer with the possibility of combining various mechanical and electrical connections.

zone 0  An area where an explosive atmosphere of a mix of air and combustible gases, vapours or sprays is permanently, over long periods or frequently prevails.
zone 1  An area where an explosive atmosphere of a mix of combustible materials in the form of gas, vapour or spray with air occurs occasionally in normal operation.

Safety Note:

When fitting, commissioning and operating this pressure transmitter, please observe relevant national safety regulations by all means.
## Specifications

### PRESSURE RANGE

<table>
<thead>
<tr>
<th>Measuring range*, silicon technology</th>
<th>p [mbar]</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>25</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload pressure</td>
<td>p [mbar]</td>
<td>50</td>
<td>80</td>
<td>100</td>
<td>125</td>
<td>200</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>p [mbar]</td>
<td>100</td>
<td>160</td>
<td>200</td>
<td>250</td>
<td>400</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring range*, silicon technology</th>
<th>p [mbar]</th>
<th>60</th>
<th>100</th>
<th>160</th>
<th>200</th>
<th>250</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload pressure</td>
<td>p [mbar]</td>
<td>120</td>
<td>200</td>
<td>360</td>
<td>400</td>
<td>500</td>
<td>800</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>p [mbar]</td>
<td>180</td>
<td>300</td>
<td>480</td>
<td>600</td>
<td>750</td>
<td>1200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring range*, stainless steel diaphragm</th>
<th>p [bar]</th>
<th>1,0</th>
<th>1,6</th>
<th>2,0</th>
<th>2,5</th>
<th>4,0</th>
<th>6,0</th>
<th>10,0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload pressure</td>
<td>p [bar]</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>10</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>p [bar]</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>15</td>
<td>30</td>
<td>30</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring range*, stainless steel diaphragm</th>
<th>p [bar]</th>
<th>16</th>
<th>20</th>
<th>25</th>
<th>40</th>
<th>60</th>
<th>100</th>
<th>160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload pressure</td>
<td>p [bar]</td>
<td>40</td>
<td>40</td>
<td>100</td>
<td>100</td>
<td>200</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>p [bar]</td>
<td>60</td>
<td>60</td>
<td>150</td>
<td>150</td>
<td>300</td>
<td>300</td>
<td>600</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Measuring range*, stainless steel diaphragm</th>
<th>p [bar]</th>
<th>200</th>
<th>250</th>
<th>400</th>
<th>600</th>
<th>1000</th>
<th>1600</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload pressure</td>
<td>p [bar]</td>
<td>400</td>
<td>750</td>
<td>750</td>
<td>840</td>
<td>1200</td>
<td>2400</td>
<td>2400</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>p [bar]</td>
<td>600</td>
<td>1000</td>
<td>1000</td>
<td>1050</td>
<td>1500</td>
<td>3000</td>
<td>3000</td>
</tr>
</tbody>
</table>

(Vacuum, relative pressure, +– or absolute pressure are available). Please note: > 1000 bar with thread M18x1,5

### ELECTRICAL PARAMETER

- Output signal*: 2-wire
- Supply voltage: $U_i \ [V_{ref}] = 20…27$
- Load resistor: $R_i \ [\Omega] = < (U_i - 20V)/0.02 A$
- Responde time: $t \ [\text{ms}] = \geq 4$ (digital) \ $\geq 1$ (analog)
- Maximum supply current: $I_i \ [mA] = 23 mA$
- Isolation voltage: $U_{[\text{Vac}]} = 500 VAC$

### ACCURACY

- Pressure range 1 bar to 2000 bar: $\leq 0.50\%$ of the range, option 0.25
- Pressure range 10 mbar to 600 mbar: $\leq 1.00\%$ of the range, option 0.5

### ACCEPTABLE TEMPERATURE RANGES

- Zone 0: -20...-60°C, -40...-100°C
- Zone 1: -20...-60°C, -40...-85°C

### MECHANICAL PARAMETER

- Parts in contact with the measuring medium*: stainless steel for pressure range of 1 bar to 2000 bar
- Housing*: stainless steel for pressure range of 10 mbar to 600 mbar

### Approval

- Intrinsically Safe Pressure Transmitter for Industrial Use
- IBEgxU10ATEX1014

### Type of grounding protection

- II 1G Ex ia IIC T4 Ga
- II 1G Ex ia IIB T4 Ga (for connector M12x1 only)

### Underlying standards

- EN 60079-0, EN 60079-11, EN 60079-26, EN 60079-14 (both zones)

### Maximum connected power

- Temperature class T4 (Ambience -20...+60°C) T4 (Ambience -40...+85°C)

### Total error

- % of the range: -20°C 1,00% digital: -40°C 1,00% analog: -40°C 2,00%
- % of the range: 60°C 1,00% digital: 85°C 1,00% analog: 85°C 2,00%

### Directive ATEX

- Zone 0**
- Zone 1***
- **cabel output max. 3 m (at longer than 3 m = level probe)

### Parts in contact with the measuring medium* stainless steel

- Shock resistance: g 1000 acc. to DIN EN 60068-2-32 – free fall
- Vibration resistance: g 20 acc. to DIN EN 60668-2-6 – vibration sinusoidal
- G-Force: g 50 acc. to DIN EN 60668-2-27 – shock

### Mass

- m [g] = ~150 depending on design

### Approval

- IBEgxU10ATEX1014

- IP system of protection (IEC 60529) up to IP69K

* customer specific configurations available
Specifications

**PRESSURE RANGE**

Measuring range* silicon technology

\[ \text{p [mbar]} \]

<table>
<thead>
<tr>
<th>10</th>
<th>16</th>
<th>20</th>
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<th>40</th>
</tr>
</thead>
</table>

Overload pressure \[ \text{p [mbar]} \]

<table>
<thead>
<tr>
<th>50</th>
<th>80</th>
<th>100</th>
<th>125</th>
<th>200</th>
</tr>
</thead>
</table>

Burst pressure \[ \text{p [mbar]} \]

<table>
<thead>
<tr>
<th>100</th>
<th>160</th>
<th>200</th>
<th>250</th>
<th>400</th>
</tr>
</thead>
</table>

Measuring range* stainless steel diaphragm

\[ \text{p [bar]} \]

<table>
<thead>
<tr>
<th>1,0</th>
<th>1,6</th>
<th>2,0</th>
<th>2,5</th>
<th>4,0</th>
<th>6,0</th>
<th>10,0</th>
</tr>
</thead>
</table>

Overload pressure \[ \text{p [bar]} \]

<table>
<thead>
<tr>
<th>6</th>
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<th>6</th>
<th>6</th>
<th>10</th>
<th>20</th>
<th>20</th>
</tr>
</thead>
</table>

Burst pressure \[ \text{p [bar]} \]

<table>
<thead>
<tr>
<th>9</th>
<th>9</th>
<th>9</th>
<th>9</th>
<th>15</th>
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<th>60</th>
<th>100</th>
<th>160</th>
</tr>
</thead>
</table>

Overload pressure \[ \text{p [bar]} \]

<table>
<thead>
<tr>
<th>40</th>
<th>40</th>
<th>100</th>
<th>100</th>
<th>200</th>
<th>200</th>
<th>400</th>
</tr>
</thead>
</table>

Burst pressure \[ \text{p [bar]} \]

<table>
<thead>
<tr>
<th>60</th>
<th>60</th>
<th>150</th>
<th>150</th>
<th>300</th>
<th>300</th>
<th>600</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>200</th>
<th>250</th>
<th>400</th>
<th>600</th>
<th>1000</th>
<th>1600</th>
<th>2000</th>
</tr>
</thead>
</table>

Overload pressure \[ \text{p [bar]} \]

<table>
<thead>
<tr>
<th>400</th>
<th>750</th>
<th>750</th>
<th>840</th>
<th>1200</th>
<th>2400</th>
<th>2400</th>
</tr>
</thead>
</table>

Burst pressure \[ \text{p [bar]} \]

<table>
<thead>
<tr>
<th>600</th>
<th>1000</th>
<th>1000</th>
<th>1050</th>
<th>1500</th>
<th>3000</th>
<th>3000</th>
</tr>
</thead>
</table>

(Vacuum, relative pressure, +- or absolute pressure are available), Please note: > 1000 bar with thread M18x1.5

**ACCEPTABLE TEMPERATURE RANGES**

zone 0

Measuring medium \[ T [°C] \]

-20…60

Ambience \[ T [°C] \]

-20…85

Storage \[ T [°C] \]

-40…120

Compensated range* \[ T [°C] \]

-20…60

-20…85

Mean TC offset \% of the range

≤ 0,15 / 10K

Mean TC range \% of the range

≤ 0,15 / 10K

Total error \% of the range

-20°C    1,00% digital: -40°C    1,00%

60°C     1,00% digital: 85°C     2,00%

**Directive ATEX Zone 0**

***

Zone 1

***

cable output max. 3 m

**Type of ignition protection**

II 1G Ex ia IIB T4 Ga

II 2G Ex ia IIC T4 Gb

(at longer than 3 m = level probe)

II 1G Ex ia IIC T4 Ga

(for connector M12x1 only)

**Underlying standards**

EN 60079-0, EN 60079-11, EN 60079-26, EN 60079-14 (both zones)

**Maximum connected power**

27 V, 125mA, 0,85 W

Temperature class T4

(Ambience -20…+60° C)

(Ambience -40…+85° C)

**MECHANICAL PARAMETER**

Parts in contact with the measuring medium*

- stainless steel for pressure range of 1 bar to 2000 bar

- silicon for pressure range of 10 mbar to 600 mbar

Housing*

- stainless steel

**Shock resistance**

\( g \) 1000 acc. to DIN EN 60068-2-32 – free fall

**Vibration resistance**

\( g \) 20 acc. to DIN EN 60068-2-6 – vibration sinusoidal

**G-Force**

\( g \) 50 acc. to DIN EN 60068-2-27 – shock

**Mass**

\( m \) \[ g \]

~150 depending on design

**Approval**

IBExU10ATEX1014

* customer specific configurations available

**ELECTRICAL PARAMETER**

- 2-wire

- Output signal* 4...20 mA

- Supply voltage \( U \) \[ V \]

20…27

- Load resistor \( R \) \[ \Omega \]

acc. to \( RA = \frac{(US–20V)}{0,02} \)

- Respond time \( t \) \[ ms \]

≥ 4 (digital)                 ≥ 1 (analog)

- Maximum supply current \( I \) \[ mA \]

23 mA

- Isolation voltage \( U \) \[ V \]

500 VACDC

**ACCURACY pressure range 1 bar to 2000 bar**

Accuracy @ RT \% of the range

≤ 0,50** option  0,25

**pressure range 10 mbar to 600 mbar**

≤ 1,00** option

≤ 0,5** incl. nonlinearity, hysteresis, repeatability, Non-linearity BFSL

- Stability/year \% of the range

≤ 0,15 S DC

**IP system of protection (IEC 605029) up to IP69K**

The IP system of protection as specified in the data sheets generally applies,

with appropriate mating plug connected.

**Configuration examples**

SMX2 with M12x1 (S763)

**Electrical connections**

- male socket

  M12x1 (S763) (IP67)

- cable output

  plastic (IP67/IP69k)

  cable output with bend protection

- MVS/A

  DIN EN 175301-803 (IP65)

- MVS/C

  DIN EN 175301-803 (IP65)

**Pressure Connections**

- G ¼ A; Form E

- G ¼ B

- G ½ B

- ¼ NPT

* configurations as specified in the data sheets generally apply

* customer specific configurations available
**Main Features**

- Measuring ranges 0…10 mbar to 0…2000 bar
- Explosion-proof certificate for zone 0: II 1G Ex ia IIB T4 Ga or II 1G Ex ia IIC T4 Ga
- Explosion-proof certificate for zone 1: II 2G Ex ia IIC T4 Gb
- Output signal 4…20 mA
- Highly reliable
- Digital version: ZERO function, downslope 4:1

**Applications**

- Chemical industry
- Oil and gas industry
- Food and drug industry
- Plant engineering and automation technology

**Electrical Connections**

<table>
<thead>
<tr>
<th>Plug M12x1</th>
<th>Cable port</th>
<th>DIN EN 175301-803-A</th>
<th>DIN EN 175301-803-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-wire</td>
<td>4-wire cable ventilated and unventilated red: Loop + black: Loop – white: (clk) green: (dat)</td>
<td>2-wire</td>
<td>2-wire</td>
</tr>
<tr>
<td>1: UB+</td>
<td>1: UB+</td>
<td>2: out</td>
<td>1: UB+</td>
</tr>
<tr>
<td>2: nc</td>
<td>2: out</td>
<td>3: nc</td>
<td>3: nc</td>
</tr>
<tr>
<td>3: out</td>
<td>2: out</td>
<td>nc</td>
<td>nc</td>
</tr>
<tr>
<td>4: nc</td>
<td>3: nc</td>
<td>nc</td>
<td>nc</td>
</tr>
</tbody>
</table>


cn = not connected

The electrical connection must be made in accordance with the respective connection diagram unless otherwise agreed upon.

Signals clk and dat must not be assigned for operation within explosion zones.

*custom-made adjustments are possible*

**Connectors**

- MVC/A DIN EN 175301-803 II 1G Ex ia IIB T4
- Round connector DIN 75585 3-/4- contacts II 1G Ex ia IIB T4
- Cable output steel II 1G Ex ia IIB T4
- Cable output plastic II 1G Ex ia IIB T4
- Cable gland II 1G Ex ia IIB T4
- Deutsch-connector 2-contacts II 1G Ex ia IIB T4
- Deutsch-connector 3-contacts II 1G Ex ia IIB T4
- Deutsch-connector 4-contacts II 1G Ex ia IIB T4
- Superseal II 1G Ex ia IIB T4
- Junior-Timer connector II 1G Ex ia IIB T4
- Packard connector II 1G Ex ia IIB T4
- MVS/C DIN EN 175301-803 II 1G Ex ia IIB T4
- Male Socket M12x1 (S763) II 1G Ex ia IIC T4

**Safety Note:**

When fitting, commissioning and operating this pressure transmitter, please observe relevant national safety regulations by all means.

**Subject to change due to technical progress.**

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