



MAIN FEATURES	APPLICATION
<ul style="list-style-type: none"><li>■ Tiny relative pressure sensing modules with resistive Wheatstone bridge</li><li>■ Titanium sensor body made as one piece part</li><li>■ Resolution 0.01%span</li><li>■ Nominal pressure ranges from 4 MPa to 150 MPa</li><li>■ Operating temperature range from -45°C up to +200°C</li><li>■ Dielectric strength 700 VAC</li></ul>	<ul style="list-style-type: none"><li>▲ Tight space applications</li><li>▲ Hydraulics and pneumatics</li><li>▲ Chemical industries</li><li>▲ Machine construction</li><li>▲ Pumping stations and compressors</li></ul>

**DESCRIPTION**

*New solutions in pressure measurement by Silicon on Sapphire technology*

The highly sensitive element of this tiny pressure sensor family is a two-layer sapphire-titanium membrane with monocrystalline silicon resistive strain gauges. Due to a stable connection with titanium the monocrystalline sapphire membrane is a perfect elastic element that acquires the best quality at high deformation levels and preserves its elastic and insulating properties at temperatures up to 400°C. Monocrystalline silicon resistive strain gauges are atomically connected to the sapphire and provide almost no hysteresis or fatigue effects. Exceptional insulating properties and radiation resistance of sapphire enable utilization of the sensitive element within the temperature range from -200°C to +350°C even under the impact of high electromagnetic interferences and radiation. Our strain gauge elements are manufactured by solid-state microelectronic methods and provide high quality and long term stable repeatability.



**TECHNICAL DATA**

STANDARD PRESSURE RANGES

Nominal pressure range	[MPa]	<b>4</b>	<b>6</b>	<b>10</b>	<b>16</b>	<b>25</b>	<b>40</b>	<b>60</b>	<b>100</b>	<b>150</b>
Under pressure <sup>1)</sup>	[MPa]	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Over pressure	[MPa]	8	12	20	32	50	80	120	150	165
Burst pressure	[MPa]	12	18	30	48	75	120	180	200	225

Note

1) Reverse pressure

All values relating to relative pressure. Customer specific pressure ranges on request.  
1 MPa = 10 bar

TEMPERATURE RANGES

Standard operating temperature range, option 1	(-45 to +125)°C
Extended operating temperature range, option 2	(-45 to +155)°C
High operating temperature range, option 3	(-45 to +200)°C

ELECTRICAL PARAMETERS

If not otherwise mentioned valid in the specified operating temperature ranges.

Parameter	Min.	Typ.	Max.	Unit
Bridge offset voltage <sup>1)</sup>	-10		+10	mV
Offset TC	-0.05		+0.05	%span/K
Full scale output signal <sup>1)</sup>	100	150	200	mV
Span TC	-0.05		+0.05	%span/K
Signal resolution			0.01	%span
Nonlinearity (best fit straight line)	-0.15		+0.15	%span
Hysteresis			0.05	%span
Output signal repeatability	-0.05		+0.05	%span
Bridge resistance <sup>2)</sup>	3.4	4.0	4.6	kΩ
Bridge resistance TC	1650		1850	ppm/K
Dielectric strength	700			VAC

Isolation resistance at room temperature	100			MΩ
Isolation resistance over operating temperature range	20			MΩ
Bridge supply voltage, DC	5		10	V
Long term stability of sensitivity	-0.15		0.15	%span/ year
Additional offset error caused by vibration impact <sup>3)</sup>	-0.05		0.05	%span
Additional offset error caused by overload pressures	-0.25		0.25	%span
Additional sensitivity error caused by overload pressures	-0.1		0.1	%span

Notes

- 1) At 10 V bridge supply voltage, 25°C and ambient pressure
- 2) At 25°C and ambient pressure
- 3) For condition details see section mechanical parameters

MECHANICAL PARAMETERS

Material of process media wetted sensor part	Titanium alloy with 87% titanium
Ingress protection	IP 40
Module weight	6 g including wires
Min. vibration proofness (sinus) according to IEC 68-2-6 and IEC 68-2-38	500 m/s <sup>2</sup> at (10 to 5000) Hz
Min. multiple shock proofness according to IEC 68-2-32	1000 m/s <sup>2</sup> Shock pulse width 2 ms
Max. mounting torque <sup>4)</sup>	30 Nm

Notes

- 4) Only with proper tools at flat side areas allowed

**SENSOR BRIDGE CIRCUITS**

Modules with flexible wires		
Sensor bridge type/ wire mapping	Circuit diagram	Notes
<p><b>Closed</b></p> <p>white: output minus red: supply plus black: output plus blue: supply minus</p>		<p>All wires with cross-sections of 0.09 mm and PTFE insulation</p>
<p><b>Open</b></p> <p>white: output minus red: supply plus black: output plus 1 green: output plus 2 blue: supply minus</p>		<p>All wires with cross-sections of 0.09 mm and PTFE insulation</p>

**PRESSURE PORT**

Pressure modules with flexible wires		
Designation	Pressure port drawing	Recommendation for mounting
<p><b>Code: PT</b></p> <p>Thread: M8x1-8g</p> <p>Mounting square: 8</p> <p>Weight: 6 g</p> <p>For nominal pressures <math>\leq 25</math> MPa <math>L_{MAX} = 36</math> mm</p> <p>For nominal pressures <math>&gt; 25</math> MPa <math>L_{MAX} = 34</math> mm</p>	<p><b>D-01</b></p>	

**RECOMMENDED PROCESS MEDIA**

All gases and liquids and their mixtures which are not aggressive against titanium alloys like air, sea water, 5% vitriol acid, chlorine water, chloride solutions, mineral oils, ethyne etc.

**ORDERING CODES**

	Product family	Pressure range	Temperature range	Sensor bridge circuit	Electrical connection
<b>Tiny pressure sensor module</b>	L-PT				

**Standard pressure ranges**

(0 to 4 MPa)	4
(0 to 6) MPa	6
(0 to 10) MPa	10
(0 to 16) MPa	16
(0 to 25) MPa	25
(0 to 40) MPa	40
(0 to 60) MPa	60
(0 to 100) MPa	100
(0 to 150) MPa	150

**Media temperature range**

-45°C to +125°C	1
-45°C to +155°C	2
-45°C to +200°C	3

**Sensor bridge circuit**

Closed bridge	0
Open bridge	1

**Electrical connection**

Solderable flexible wires with 80 mm length (standard)	L
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In case other wire lengths are wished please add the required length to the wire code L in millimeters. For example L100 for 100 mm wire length.

Product family	Pressure range	Temperature range	Sensor bridge circuit	Electrical connection
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Ordering example

High pressure sensor module for (0 to 1000) bar and (0 to 100) MPa resp., operating temperature range (-45 to +155)°C with closed sensor bridge and a wire length of 20 mm

L-PT      100      2      0      L20

EN

Your order code according to this example would be:

L-PT-100-20-L20

PRODUCT MARKING

All pressure sensor modules are marked on hex including the product code and a 6 digit serial number like shown on the right side in the picture below.

