



MAIN FEATURES	APPLICATION
<ul style="list-style-type: none">■ Relative flush pressure sensing modules with resistive Wheatstone bridge	▲ Heavy industrial applications
<ul style="list-style-type: none">■ Titanium sensor body made as one piece part	▲ Hydraulics and pneumatics
<ul style="list-style-type: none">■ Resolution 0.01%span	▲ Chemical industries
<ul style="list-style-type: none">■ Nominal pressure ranges from 0.16 MPa to 40 MPa	▲ Machine construction
<ul style="list-style-type: none">■ Operating temperature range from -40°C up to +200°C	▲ Pumping stations and compressors
<ul style="list-style-type: none">■ Dielectric strength 700 VAC	

DESCRIPTION

New solutions in pressure measurement by Silicon on Sapphire technology

The highly sensitive element of this 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]	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6
Under pressure ¹⁾	[MPa]	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Over pressure	[MPa]	0.32	0.5	0.8	1.2	2	3.2	5	8	12
Burst pressure	[MPa]	0.48	0.75	1.2	1.8	3	4.8	7.5	12	18

Nominal pressure range	[MPa]	10	16	25	40
Under pressure ¹⁾	[MPa]	-0.1	-0.1	-0.1	-0.1
Over pressure	[MPa]	20	32	50	80
Burst pressure	[MPa]	30	48	75	100

Note

1) Reverse pressure

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

TEMPERATURE RANGES

Standard operating temperature range, option 1	(-40 to +100)°C
Extended operating temperature range, option 2	(-20 to +155)°C
High operating temperature range, option 3	(-20 to +200)°C

Notes

Recommended O-ring material for option 1 is ethylene propylene rubber (Keltan®) and for the other options the recommended material is fluoroc rubber (Viton®).

ELECTRICAL PARAMETERS

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

Parameter	Min.	Typ.	Max.	Unit
Bridge offset voltage ¹⁾	-10		+10	mV
Offset TC for nominal pressure range ≤1 MPa for nominal pressure range >1 MPa	0 -0.05		+0.1 +0.05	%span/K
Full scale output signal ¹⁾ for nominal pressure range 0.16 MPa in D19 for nominal pressure range 0.25 MPa in D17 for all other versions	60 60 100	95 95 150	130 130 200	mV
Span TC	-0.05		+0.05	%span/K
Signal resolution			0.01	%span
Nonlinearity (best fit straight line)	-0.2		+0.2	%span
Hysteresis			0.05	%span
Output signal repeatability	-0.1		+0.1	%span
Bridge resistance ³⁾	3.4	4.0	4.6	kΩ
Bridge resistance TC for modification V (see bridge power supply) for modification C (see bridge power supply)	1650 1000		1850 1400	ppm/K
Dielectric strength	700			VAC
Isolation resistance at room temperature	100			MΩ
Isolation resistance over operating temperature range	20			MΩ
Bridge power supply stabilized constant DC voltage, Modification V stabilized constant DC current, Modification C	5 1		10 2	V mA
Long term stability of sensitivity for nominal pressure range ≤1 MPa for nominal pressure range >1 MPa	-0.25 -0.15		+0.25 +0.15	%span/ year
Additional offset error caused by overload	-0.25		+0.25	%span
Additional sensitivity error caused by overload	-0.1		+0.1	%span
Additional offset error caused by vibration impact ⁴⁾	-0.05		+0.05	%span

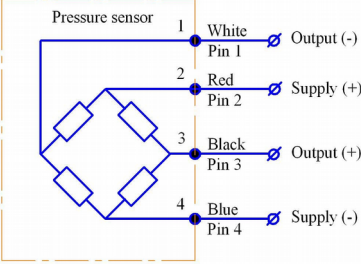
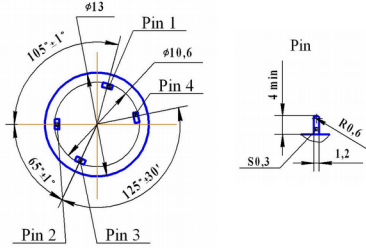
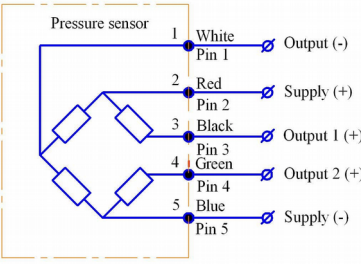
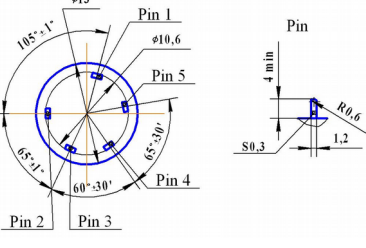
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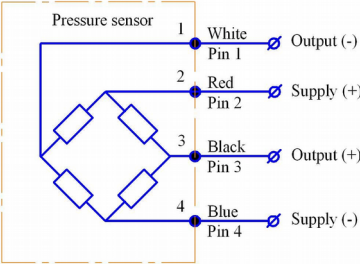
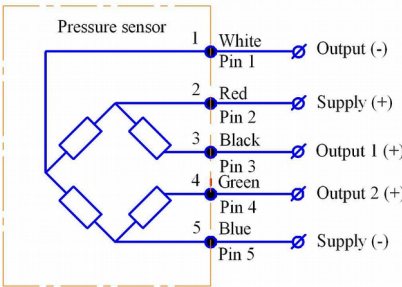
- 1) At 10 V bridge supply voltage, 25°C and ambient pressure.
- 2) D17 and D19 is a housing diameter related information. For dimensional details see section pressure module models.
- 3) At 25°C and ambient pressure.
- 4) For condition details see section mechanical parameters.

MECHANICAL PARAMETERS

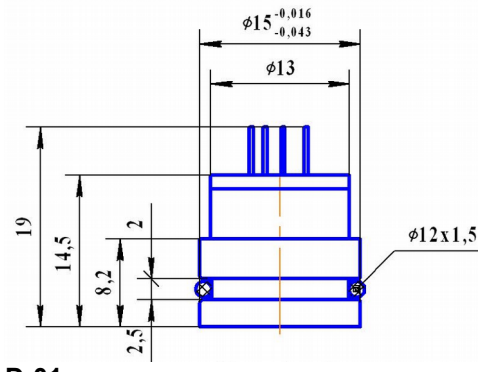
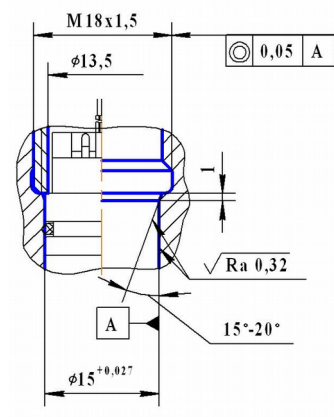
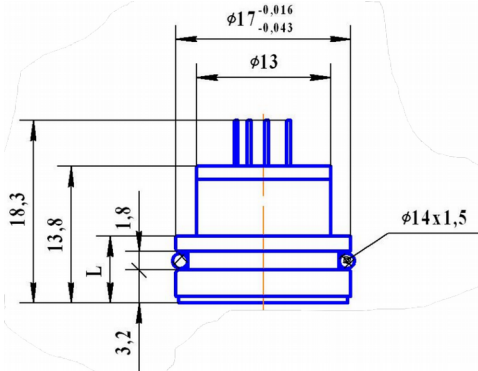
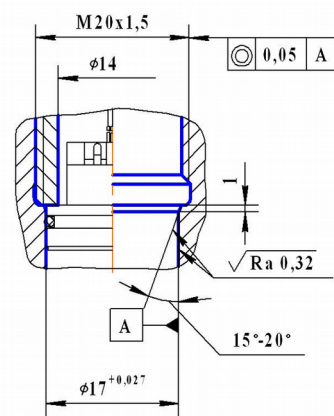
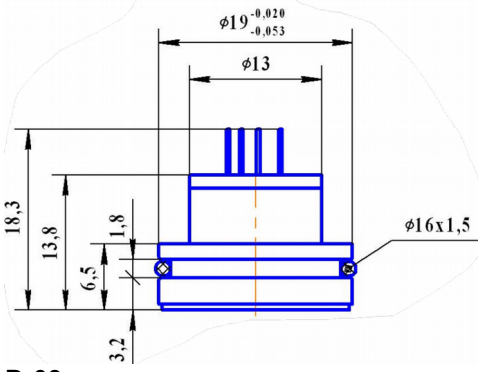
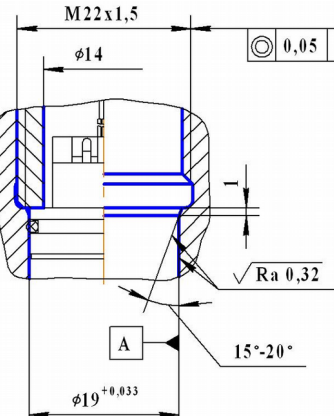
Material of process media wetted sensor part	Titanium alloy with 87% titanium
Ingress protection	IP 40
Min. vibration proofness (sinus) according to IEC 68-2-6 and IEC 68-2-38	500 m/s ² at (10 to 5000) Hz
Min. multiple shock proofness according to IEC 68-2-32	1000 m/s ² Shock pulse width 2 ms

SENSOR BRIDGE CIRCUITS

Modules with solder pins		
Sensor bridge type/ pin mapping	Circuit diagram	Mechanical drawing of pin configuration
<p>Closed</p> <p>Pin 1: output minus Pin 2: supply plus Pin 3: output plus Pin 4: supply minus</p>		
<p>Open</p> <p>Pin 1: output minus Pin 2: supply plus Pin 3: output plus 1 Pin 4: output plus 2 Pin 5: supply minus</p>		

Modules with flexible wires		
Sensor bridge type/ wire mapping	Circuit diagram	Notes
<p>Closed</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>Open</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 MODULE MODELS

Pressure modules with solder pins		
Designation	Model drawing	Recommendation for mounting
<p>Diameter Code: D15</p> <p>Nominal pressure ranges: from 1.6 MPa to 40 MPa</p>	 <p>D-01</p>	
<p>Diameter Code: D17</p> <p>Nominal pressure ranges: from 0.25 MPa to 40 MPa</p>	 <p>D-02</p>	
<p>Diameter Code: D19</p> <p>Nominal pressure ranges: from 0.16 MPa to 1 MPa</p>	 <p>D-03</p>	

Pressure modules with flexible wires		
Designation	Model drawing	Recommendation for mounting
<p>Diameter Code: D15</p> <p>Nominal pressure ranges: from 1.6 MPa to 40 MPa</p>		
<p>Diameter Code: D17</p> <p>Nominal pressure ranges: from 0.25 MPa to 40 MPa</p> <p>for nominal pressure ranges from 0.25 MPa to 1 MPa L = 6.5 mm</p> <p>for nominal pressure ranges from 1.6 MPa to 40 MPa L = 7.5 mm</p>		
<p>Diameter Code: D19</p> <p>Nominal pressure ranges: from 0.16 MPa to 1 MPa</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	Power supply modification	Housing diameter	Electrical connection
Flush pressure sensor module	L-P						

EN

Standard pressure ranges

(0 to 0.16 MPa)	0.16
(0 to 0.25) MPa	0.25
(0 to 0.4) MPa	0.4
(0 to 0.6) MPa	0.6
(0 to 1) MPa	1
(0 to 1.6) MPa	1.6
(0 to 2.5) MPa	2.5
(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

Media temperature range

-40°C to +100°C	1
-20°C to +155°C	2
-20°C to +200°C	3

Sensor bridge circuit

Closed bridge	0
Open bridge	1

Power supply modification

DC voltage supply	V
DC current supply	C

Housing diameter

Diameter 15 mm (drawing D-01, D-04)	D15
Diameter 17 mm (drawing D-01, D-04)	D17
Diameter 19 mm (drawing D-01, D-04)	D19

	Product family	Pressure range	Temperature range	Sensor bridge circuit	Power supply modification	Housing diameter	Electrical connection
Electrical connection							
Solderable flexible wires with 80 mm length (standard)							L
Solder pins with 4 mm height							P

EN

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	Power supply modification	Housing diameter	Electrical connection
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Ordering example

Flush pressure sensor module for (0 to 10) bar and (0 to 1) MPa resp., operating temperature range (-20 to +200)°C with outside diameter of 15 mm acc. to D-01 and solder pins, sensor bridge closed for current supply

L-P 1 3 0 C D15 P

Your order code according to this example would be:

L-P-1-30-C-D15-P

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.

P 0,4-10-V 000000