

PIEZORESISTIVE OEM PRESSURE TRANSDUCERS

SERIES 9

SEALED GAUGE, ABSOLUTE, VENTED GAUGE, DIFFERENTIAL

The Series 9 pressure sensor is the most economic version for pressure ranges from 100 mbar to 200 bar. The standard version is supplied with connecting pins (leadouts are fitted only on request) and the serial number is not engraved.

A high-sensitivity piezoresistive silicon chip is used for pressure sensing. The chip is protected against ambient influences by a stainless steel housing sealed with a concentrically corrugated diaphragm. The housing is filled with silicone oil for the transfer of the pressure from the diaphragm to the sensing component.

All metal parts in contact with the pressure media are made of stainless steel 316 L. The fully welded housing is vacuum-tight. The connecting pins allow direct PCB mounting or can be used for connecting cables.

Typical Applications: Measurement of altitude, aviation electronics, meteorology, servo controls, robotics, hydraulics, sanitary and pharmaceutical engineering, underground mining, injection engineering...

Rugged, Small Dimensions, Light Weight

The piezoresistive chip immersed in silicone oil is welded into a housing made of stainless steel 316L. Diameter 19 mm; Height 5 mm; Weight 8 grammes.

High Sensitivity

A nominal signal of 200 mV is obtained at a supply current of 1 mA for standard pressure ranges above 2 bar.

Ranges from 0,1 to 200 bar

Absolute pressure, sealed gauge, differential, barometric, vented gauge and wet/wet differential.

Quality

Each pressure transducer is subjected to comprehensive tests for its pressure response and temperature characteristics, and is delivered with an individual calibration certificate stating the characteristics as well as the results of all tests which were performed. Special testing is available if demanded by the customer.

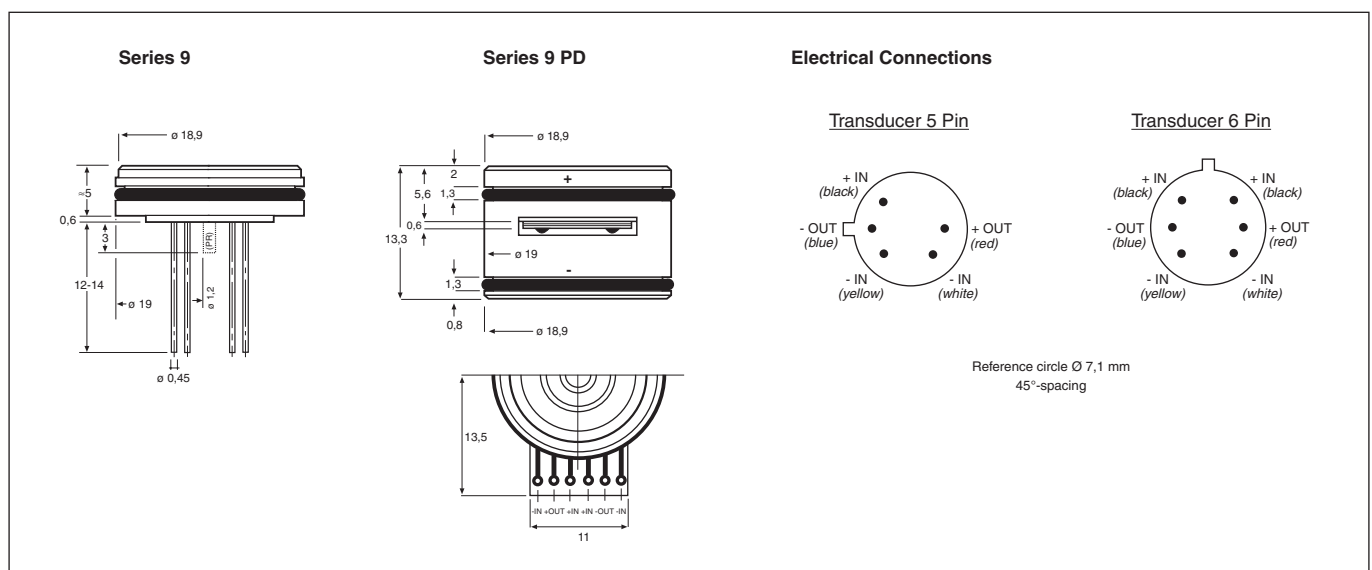
The Series 9 can also be delivered with a laser welded media isolation diaphragm (see data sheet Series 3 L - 10 L). The new technique for laser welding stainless steel diaphragms further improves the resistency against crevice corrosion and still retains all the traditional performance, stability and quality for which KELLER is renowned.



Series 9



Series 9 PD



Subject to alterations

02/07

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Specifications

Excitation I = 1 mA

Pressure Ranges (FS) and Overpressure in Bar. Signal Output in mV.

PR-9	-1	-0,5	-0,2	-0,1	0,1	0,2	0,5	1	2	5	10	20					
PD-9					0,1	0,2	0,5	1	2	5	10	20					
PAA-9					0,1	0,2	0,5	1	2	5	10	20					
PA-9								1	2	5	10	20	50	100	200		
Signal Output typ.*	100	60	30	15	15	30	60	100	140	200	225	225	225	225	225		
Overpressure	-1	-1	-1	-1	2,5	2,5	2,5	3	4	7	15	30	100	200	300		
PD, neg. Overpressure -					1	1	1	1	2	3	5	5					
PD, Line Pressure	≤ 100 bar																

PAA: Absolute. Zero at vacuum PA: Sealed Gauge. Zero at atmospheric pressure (at calibration day) PR: Vented Gauge. Zero at atmospheric pressure PD: Differential * ± 40%

Bridge Resistance @ 25 °C	Ω	3500	± 20%
Constant Current Supply	mA	1 nominal	5 max.
Insulation @ 500 VCC	MΩ	100	
Operating Temperature	°C	-30...100	-55...150 (optional)
Compensated Range	°C	0...50 ⁽¹⁾	-10...80 ⁽¹⁾
Storage Temperature	°C	-40...100	-60...150
Vibration (20...5000 Hz)	g	20	
Endurance (FS @ 25 °C)	Cycles	> 100 x 10 ⁶	FS

Housing and Diaphragm	Stainless steel, AISI 316 L
Seal Ring	Viton ⁽¹⁾ , Ø 17 x 1 mm
Oil Filling	Silicone Oil ⁽¹⁾
Weight	8 g (PA/PAA/PR), 15 g (PD)
Dead Volume Change @ 25 °C	< 0,1 mm ³ / FS
Electrical Wires (optional)	0,09 mm ² , 12 x Ø 0,1 mm, silicone sheathed, øØ 1,2 mm, Length 7 cm ⁽¹⁾

Accuracy ⁽²⁾	%FS	0,5 typ. ⁽¹⁾	1 max.	
Offset at 25 °C	mV	< 5 mV (compensated with R5 of 20 Ω ⁽³⁾)		
Temperature Error		0...50 °C	-10...80 °C	-55...150 °C
- Zero	mV / °C	< 0,025	< 0,05	< 0,075
- Sensitivity	% / °C	< 0,02	< 0,05	< 0,07
Long Term Stability typ.	mV	0,5	0,75	1,25
Line Pressure Influence	mV/bar	< 0,0125 (PD 9)		
Natural Frequency (Resonance)	kHz	> 30		

⁽¹⁾ Others on request.

⁽²⁾ Including linearity, hysteresis and repeatability. Linearity calculated as best straight line through zero.

Note: Generally, accuracy and overload is improved by factor of 2 to 4 if the sensor is used in the range of 0...50 %FS

⁽³⁾ External compensation, potentiometer not supplied.

Options

- Platinum- or Hastelloy C-276 diaphragm. Transducer all Hastelloy C-276
- Flush diaphragm
- Oil for low temperatures. Fluorinated oil. Olive oil
- Special characteristics: Linearity, overpressure, lower TC-zero
- Special tests
- All pressure ranges between 0,1 and 200 bar
- Other temperature ranges
- Compensation PCB fitted

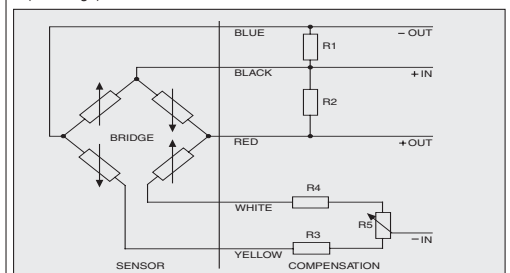
926				
PA-9/10 bar/81336.2^(a)				
^(b) Temp [°C]	^(c) Zero [mV]	^(d) -1000 [mV]	^(e) Comp [mV]	^(f) dZero [mV]
-8.9	-10.9	-7.9	0.3	-0.2
0.6	-11.0	-7.9	0.3	-0.2
25.6	-11.1	-7.7	0.5	0.0
49.8	-11.3	-7.5	0.8	0.2
79.5	-11.6	-7.2	1.1	0.5
L1				
COMP	R2 = 1000 kOhm ^(g)	R4 = 33.0 Ohm ^(g)		
ZERO	0.5 mV ^(b)	P_atm 958 mbar ⁽ⁱ⁾		
SENS	18.03 mV/bar at 1.000 mA^(j)			
SENS	72.12 mV/bar at 4.000 mA ^(j)			
LIN	^(k) [bar]	^(l) [mV]	^(m) Lnorm [%Fs]	⁽ⁿ⁾ Lbfs [%Fs]
	0.000	0.0	0.00	-0.23
	5.000	90.7	0.31	0.23
	10.000	179.7	-0.31	-0.23
Long Term Stability Ok ^(o)				
Lot 3.2132.00 ^(p)				
Test 500 Volt Ok ^(q)				
Supply 1.000 mA^(r)				
23.06.06 ^(s) ----- GOLI.C03CqK ^(s)				

Each sensor is delivered with a calibration sheet with the following data:

- (a) Type (PA-9) and range (10 bar) of pressure sensor
- (b) Test temperatures
- (c) Uncompensated zero offset in mV
- (d) Zero offset values, in mV, with resistance R1 (+) or R2 (-), in kΩ (for factory computation only)
- (e) Zero offset, in mV, with calculated compensation resistors
- (f) Temp. zero error, in mV, with compensation resistors
- (g) Compensation resistor values R1 / R2 and R3 / R4
- (h) Offset with compensation resistors R1/ R2 and R3 / R4 fitted (fine adjustment of zero with R5 potentiometer)
- (i) Ambient pressure, zero reference for absolute sensors < 20 bar
- (j) Sensitivity of pressure sensor
- (k) Pressure test points
- (l) Signal at pressure test points
- (m) Linearity (best straight line through zero)
- (n) Linearity (best straight line)
- (o) Results of long term stability
- (p) Lot (on request, identification of silicon chip)
- (q) Voltage insulation test
- (r) Excitation (constant current)
- (s) Date of test ----- Test equipment

Remarks:

- The indicated specifications only apply for constant current supply. The sensor should be excited between 0,5 and 5 mA. The sensor signal is proportional to the current.
- If exposed to extreme temperatures, the compensation resistors should have a temperature coefficient of < 50 ppm/°C. Sensor and resistors can be exposed to different temperatures.
- The sensors may be ordered with integrated compensation resistors (surcharge).



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