



PIEZORESISTIVE OEM PRESSURE TRANSDUCERS

SEALED GAUGE, ABSOLUTE, VENTED GAUGE, DIFFERENTIAL

The Series 10 pressure transducers cover all pressure ranges from 100 mbar to 1000 bar. They have been produced for over 35 years and are the premium product of the KELLER OEM-line. They are delivered with engraved serial number and electrical leadouts. Several millions of these pressure transducers are in use world-wide in a variety of different applications. Main fields of application are: Level technology, pneumatics, hydraulics, avionics.

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 so as to ensure 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.

A Rugged Pressure Transducer

The piezoresistive chip immersed in silicone oil is welded into a housing made of stainless steel 316 L.

High Sensitivity

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

Flexibility

Versions: absolute pressure, sealed gauge, barometric, vented gauge and wet/wet differential. 18 nominal measurement ranges from 0,1 to 1000 bar. Different materials (Hastelloy, Platinum, Inconel, Monel among others). Various kinds of oil filling (olive oil, fluorinated oil, low temperature oil etc.)

Quality

Each pressure transducer is subjected to comprehensive tests as to its pressure response and temperature characteristic, 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 10 can also be delivered with a laser welded media isolation diaphragm (see data sheet Series 3 L - 10 L). The technique for laser welding stainless steel diaphragms further improves the resistancy against crevice corrosion and still retains all the traditional performance, stability and quality for which KELLER is renowned.

SERIES 10



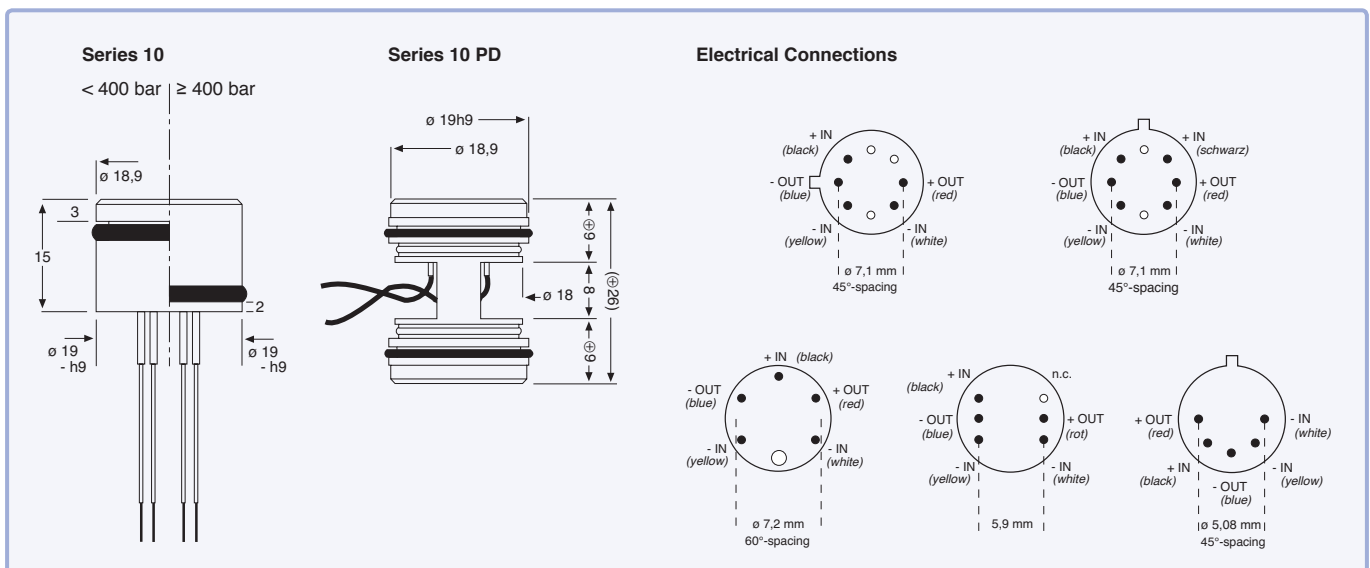
Series 10



Series 10 HD



Series 10 PD





Specifications

Pressure Ranges (FS)

PR-10	-1	-0,5	-0,2	-0,1	0,1	0,2	0,5	1	2	5	10	20						bar		
PD-10					0,1	0,2	0,5	1	2	5	10	20						bar		
PAA-10					0,1	0,2	0,5	1	2	5	10	20						bar		
PA-10								1	2	5	10	20	50	100	200	400	600	1000	bar	
Signal Output typ.* @ 1 mA	75	50	25	15	15	30	60	100	140	200	200	200	200	200	200	200	200	200	200	mV
Overpressure (bar)	-1	-1	-1	-1	2,5	2,5	2,5	3	4	10	20	40	100	200	300	600	900	1100	bar	
PD, neg. Overpressure [-]					1	1	1	2	3	5	7	10							bar	
PD, Line Pressure	≤ 200 ⁽¹⁾																		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	3,5 kΩ	± 20%
Constant Supply	1 mA nominal	3 mA max.
Insulation @ 500 VDC	100 MΩ	
Storage-/Operating Temperature	-20...100 °C	optional -55...150 °C
Compensated Range	-10...80 °C ⁽¹⁾	
Vibration (20 up to 5000 Hz)	20 g	
Endurance @ 25 °C	> 10 Mio. FS Cycles	

Housing and Diaphragm	Stainless Steel, Type 316 L
Seal Ring Low Pressure	Viton [®] ⁽¹⁾ Ø 15,6 x 1,78 mm (PA/PAA/PR) Ø 17 x 1 mm (PD)
Seal Ring High Pressure	Viton [®] ⁽¹⁾ Ø 15 x 2 mm (PA)
Support Ring High Pressure	PTFE ⁽¹⁾ Ø 19 x 16 x 1 mm
Oli Filling	Silicone Oil ⁽¹⁾
Weight	26 g (PA/PAA/PR), 36 g (PD)
Dead Volume Change @ 25 °C	< 0,1 mm ³ / FS
Electrical Wires	0,09 mm ² (12 x Ø 0,1 mm), Silicone sheathed Ø 1,2 mm, Länge: 7 cm / 10 cm (PD) (1)

Accuracy ⁽²⁾	0,25 %FS typ. ⁽¹⁾	0,5 %FS max.	
Offset at 25 °C	< 5 mV (compensatable with R5 of 20 Ω ⁽³⁾)		
Temperature Coefficient	0...50 °C	-10...80 °C	-55...150 °C
- Zero max.	0,0125 mV/°C	0,025 mV/°C	0,04 mV/°C
- Sensitivity typ. ⁽⁴⁾	0,01 %/°C	0,02 %/°C	0,05 %/°C
Long Term Stability typ.	0,25 mV	0,5 mV	0,75 mV
Line Pressure Influence	< 0,0125 mV/bar (PD)		
Natural Frequency (Resonance)	> 30 kHz		

The sensor characteristics may be influenced by installation conditions. Please follow the installation instructions on our product-specific web pages.

- (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.
 (4) On request, a maximal TC Sensitivity can be guaranteed or the value for the compensation resistor (Rp) can be indicated.

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 and/or TC-sensitivity
- All pressure ranges between 0,1 and 1000 bar resp. up to 2000 bar
- Compensation PCB fitted
- Mathematical modelling: See data sheet Series 30 X

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PR-10/0,5 bar/81634.7 ⁽¹⁾		SN F098637 ⁽²⁾		
⁽³⁾ Temp [°C]	⁽⁴⁾ Zero [mV]	⁽⁵⁾ +270 [mV]	⁽⁶⁾ Comp [mV]	⁽⁷⁾ dZero [mV]
-9.8	-3.1	-13.2	-1.5	-0.5
0.3	-2.5	-13.0	-1.3	-0.3
25.1	-1.0	-12.8	-1.1	0.0
50.0	0.3	-13.0	-1.3	-0.2
80.1	1.7	-13.6	-1.9	-0.8
-----1				
COMP R1	270 kOhm ⁽⁸⁾	R4	47.0 Ohm ⁽⁸⁾	
RB	3583 Ohm ⁽⁸⁾			
ZERO	-1.1 mV ⁽⁹⁾			
SENS	119.7 mV/bar at 1.000 mA ⁽¹⁰⁾			
LIN		⁽¹¹⁾ Lnorm	⁽¹²⁾ LbfsI	
⁽¹³⁾ [bar]	⁽¹⁴⁾ [mV]	[%Fs]	[%Fs]	
0.000	0.0	0.00	-0.21	
0.125	15.1	0.22	0.08	
0.250	30.1	0.27	0.21	
0.375	45.0	0.12	0.12	
0.500	59.7	-0.27	-0.21	

Long Term Stability Ok ⁽¹⁵⁾				
Lot 11-016 ⁽¹⁶⁾				
Test 500 Volt Ok ⁽¹⁷⁾				
Supply 1.000 mA ⁽¹⁸⁾				
13.06.15 ⁽¹⁹⁾ ----- PH04.D03HeK ⁽¹⁹⁾				

- Each sensor is delivered with a calibration sheet with the following data:
1. Type (PR-10) and range (5 bar) of pressure sensor
 2. Serial number of pressure sensor
 3. Test temperatures
 4. Uncompensated zero offset in mV
 5. Zero offset values, in mV, with test resistance R1 (+) or R2 (-), in kΩ (for factory computation only)
 6. Zero offset, in mV, with calculated compensation resistors
 7. Temp. zero error, in mV, with compensation resistors
 8. Compensation resistor values R1 / R2 and R3 / R4, RB: Bridge resistance
 9. Offset with compensation resistors R1/ R2 and R3 / R4 fitted. (Fine adjustment of zero with R5 potentiometer)
 10. Sensitivity of pressure sensor
 11. Linearity (best straight line through zero)
 12. Linearity (best straight line)
 13. Pressure test points
 14. Signal at pressure test points
 15. Results of long term stability
 16. Lot-type (on request, identification of silicon chip)
 17. Voltage insulation test
 18. Excitation (constant current)
 19. Date of test ----- Test equipment

- Remarks:
- The indicated specifications apply only for constant current supply of 1 mA. The sensor must not be supplied more than 3 mA. The output voltage is proportional to the current supply (excitation). By using excitation unlike the calibrated excitation the output signal can deviate from the calibrated values.
 - If exposed to extreme temperatures, the compensation resistors should have a temperature coefficient of < 50 ppm/°C. Note: Sensor and resistors can be exposed to different temperatures.
 - The sensors may be ordered with integrated compensation resistors (surcharge).

