# Piezoresistive OEM Pressure Transducers

## Laser Welded Diaphragm – Compatible With Corrosive Media

## Series 6L, 8L, 10LHP

6L

8L

10LHP

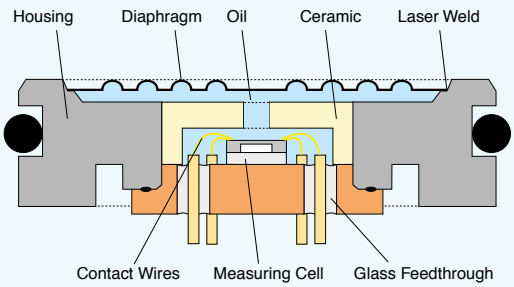
By logically developing the known laser welding process, it became possible to weld very thin stainless steel diaphragms to the housing body with absolutely no gaps. This welding technology for diaphragms improves resistance to corrosion in the gaps and the renowned stability of KELLER sensors.

The pressure transducers consist of a piezoresistive sensor, a silicon chip with diffused resistors, the middle part of which is thinned to form a diaphragm and sealed with a glass plate on its reverse. The actual sensor element is built on a glass feedthrough, with aluminium or gold bonding wires as contacts. Submerged in oil, this glass feedthrough is welded into the housing, which is sealed against the medium to be measured using a laser-welded diaphragm. When in use, the pressure of the medium is transferred to the sensor via this steel diaphragm and coupling medium practically without resistance.

The pressure transducers are subjected to pressure and temperature cycles in automated testing facilities. Each pressure transducer is delivered with a calibration certificate citing the values for sensitivity, linearity, zero offset for temperature, as well as values for compensation resistances for zero point and zero offset for temperature.

The pressure transducers are intended for float mounting with an O-ring. This installation guarantees the values measured in the test equipment will remain unchanged. If the transducers are under tension when installed, the measured values and stability of the sensors may change.

| Type | Dimensions (mm) | Ranges (bar) | Version |
|---|---|---|---|
| 6L | ø 13 x 4,5 | 20...200 | abs. |
| 8L | ø 17 x 7 | 0,2...200 | abs. / rel. (< 50 bar) |
| 10LHP | ø 19 x 15 | 200...1000 | abs. / rel. (< 50 bar) |

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**Specifications** Excitation I = 1 mA

Standard Pressure Ranges (FS) in bar

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PR | -1 | -0,5 | -0,2 | -0,1 | 0,1 | 0,2 | 0,5 | 1 | 2 | 5 | 10 | 20 | | | | | | |
| PD | | | | | 0,1 | 0,2 | 0,5 | 1 | 2 | 5 | 10 | 20 | 50 | | | | | |
| PAA | | | | | 0,1 | 0,2 | 0,5 | 1 | 2 | 5 | 10 | 20 | | | | | | |
| PA | | | | | | | | 1 | 2 | 5 | 10 | 20 | 50 | 100 | 200 | 400 | 600 | 1000 |
| Sensitivity typ. [mV / bar] | 80 | 130 | 130 | 130 | 130 | 130 | 130 | 80 | 53 | 32 | 16 | 8 | 3,2 | 1,6 | 1,0 | 0,40 | 0,27 | 0,16 |
| Overpressure | -1 | -1 | -1 | -1 | 2,5 | 2,5 | 2,5 | 3 | 4 | 7 | 15 | 30 | 100 | 200 | 300 | 600 | 900 | 1100 |

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

| | | |
|---|---|---|
| Bridge Resistance @ 25 °C | 3,5 kΩ | ± 20 % |
| Constant Current Supply | 1 mA nominal | 3 mA max. |
| Insulation @ 500 VDC | 100 MΩ | |
| Compensated Range (1) | -10...80 °C | |
| Storage- / Operating Temperature | -20...100 °C | |
| Vibration (20 to 5000 Hz) | 20 g | |
| Endurance @ 25 °C | > 10 Mio. FS cycles | |
| Housing and Diaphragm | Stainless steel, type 316L (1) | |
| O-Ring Material | Viton® (1) | |
| Oil Filling | Silicone oil (1) | |
| Dead Volume Change @ 25 °C | < 0,1 mm³ / FS | |

| | Compensated Range **0...50 °C** | | Compensated Range **-10...80 °C** | |
|---|---|---|---|---|
| | TK (Zero) max. (4) [mV/°C] | Stability typ. [mV] | TK (Zero) max. [mV/°C] | Stability typ. [mV] |
| Series 6L, 8L, 10LHP | 0,025 | 0,50 | 0,050 | 0,75 |

| | | |
|---|---|---|
| Accuracy (2) | 0,25 %FS typ. (1) | 0,5 %FS max. |
| Offset at 25 °C | < 5 mV (compensated with R5 of 20 Ω (3)) | |
| Temperature Coefficient Sensitivity | 0,02 %/°C typ. (0…50 °C) | |
| | 0,05 %/°C typ. (-10…80 °C) | |
| 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 is not supplied.
(4) Temperature-Coefficients of Zero

## Options

- Oil for low temperatures. Oxygen-compatible oil. Olive oil.
- Integrated temperature sensor (version PA, PAA, PR)
- Special characteristics: Linearity, overpressure, lower TC-zero resp. TC-sensitivity
- Extended temperature range from -55 to 150 °C (except 6L)
- All pressure ranges between 0,1 and 1000 bar
- Compensation PCB fitted
- Mathematical modelling: See data sheet Series 30X

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**PA-10L/20 BAR/81838.3** (1) SN E133755 (2)

| (3) Temp [°C] | (4) Zero [mV] | (5) +1000 [mV] | (6) Comp [mV] | (7) dZero [mV] |
|---|---|---|---|---|
| -9.8 | 0.0 | -2.6 | 0.4 | 0.2 |
| -0.6 | 0.1 | -2.6 | 0.4 | 0.1 |
| 21.8 | 0.2 | -2.8 | 0.2 | 0.0 |
| 49.4 | 0.5 | -2.9 | 0.0 | -0.2 |
| 79.6 | 0.8 | -3.2 | -0.2 | -0.4 |

----------L1
COMP R1 1000 kOhm, (8) R4 12.0 Ohm (8)
RB 3465 Ohm (8)
ZERO 0.2 mV (9) P_atm 965 mbar (10)
**SENS 8.43 mV/bar at 1.000 mA** (11)

| (12) [bar] | (13) [mV] | (14) Lnorm [%FS] | (15) Lbfsl [%FS] |
|---|---|---|---|
| 0.000 | 0.0 | 0.00 | -0.11 |
| 5.000 | 42.4 | 0.14 | 0.07 |
| 10.000 | 84.5 | 0.15 | 0.11 |
| 15.000 | 126.5 | 0.04 | 0.04 |
| 20.000 | 168.3 | -0.15 | -0.11 |

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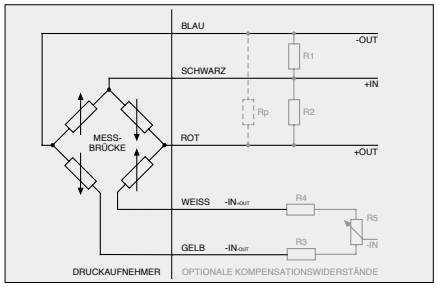
Long Term Stability Ok (16)
Lot 70590 (17)
Test 500 Volt ok (18)
**Supply 1.000 mA** (19)
20.06.15 (20) ---------- PH02.A03DqK (20)

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

1. Type (PA-10L) and range (20 bar) of pressure sensor
2. Serial number of pressure sensor (not standard)
3. Test temperatures
4. Uncompensated zero offset in mV
5. Zero offset values, in mV, with test resistance (1000 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. Ambient pressure, zero reference for absolute sensors < 20 bar
11. Sensitivity of pressure sensor
12. Pressure test points
13. Signal at pressure test points
14. Linearity (best straight line through zero)
15. Linearity (best straight line)
16. Results of long term stability
17. Lot-type (on request, identification of silicon chip)
18. Voltage insulation test
19. Excitation (constant current)
20. 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. Sensor and resistors can be exposed to different temperatures.
- The sensors may be ordered with integrated compensation resistors (surcharge).

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