KELLER AMERICA

Low Total Error Band O.E.M. Pressure Transmitters **Series 9LX™**

Programmable analog output

▶ *Enables infinite range selection / lower inventory*

Dual (analog & digital) outputs standard

▶ *Guarantees compatibility with existing equipment*

Factory Calibrated

▶ *Guaranteed "out-of-the-box" performance*

316 SS flush-diaphragm sensor standard

▶ *Optional Hastelloy C-276 for severe applications*

RS485 MODBUS-compatible outputs

▶ *Up to 128 transmitters on a single bus*

Separate output for temperature via RS485 interface

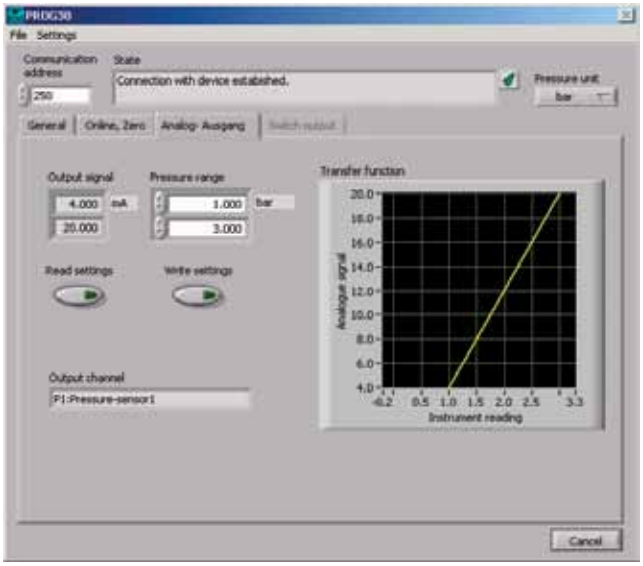
▶ *Eliminates the cost of separate temperature measurement*

Application-specific mechanical designs are available

▶ *Can be configured for many special requirements*

Temperature dependency & non-linearity are mathematically corrected

▶ *Enables Total Error Band performance of ±0.1% Basic Range over -10 – 80ºC temperature span*



Above: A screen shot of our free downloadable READ30/ PROG30 software. This particular screen is utilized for reprogramming the analog output of the Series 9LX.

Competitive markets dictate quick time-to-market as well as short lead times coupled with low inventories. Whether embedded in an OEM product or simply packaged as a high-end pressure transmitter, the Series 9LX enables the OEM to offer superior performance without the need for huge R&D or capital expenditures, and with a minimum amount of on-hand inventory.

Designed to be easily integrated into a wide variety of applications, the 19mm O.D. sensor features a flush-welded diaphragm and highly stable piezoresistive sensing element. For aggressive media, Hastelloy C-276 may be substituted for the standard 316 S.S.

Coupled to this sensor is Keller's advanced signal-conditioning circuitry, featuring dual (analog & digital) outputs, re-rangeability and mathematical error correction (see reverse for more details on mathematical modeling). Therefore, overall accuracy is now defined in terms of Total Error Band, which includes the combined effects of nonlinearity, hysteresis, non-repeatability and all thermal dependencies, over the specified temperature range. The Full Scale pressure range can be re-scaled within the limits of 10 – 110% of the Basic Range, enabling the production of a large number of end products from a relatively small selection of basic "building blocks".

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Series 7LY - 10LY

Specifications

Basic pressure range[1]	*Gage*	15	45	150	450	PSIG
	Absolute	800 – 1200 mbar	45	150	450	PSIA
Proof Pressure		30	75	300	900	PSI
Scalability of analog output, recommended limits:		10 – 110% Basic Range				

Output		RS485	4 – 20mA (2 wire)	0 – 10V (3 wire)
Supply		8 – 28 VDC[4]	8 – 28 VDC	13 – 28 VDC
Accuracy, T.E.B.[2]	*(10 – 40ºC)*	± .05% BR	± .10% BR	± .10% BR
	(-10 – 80ºC)	± .10% BR	± .15% BR	± .15% BR
Optional precision[3]	*(10 – 40ºC)*	± .025% BR	—	—

Operating Temperature Range	-40 – 120ºC
Analog update rate	200hz
Resolution	0.002% BR
Load resistance	2 wire: < (Supply - 7V) / 0.02A [Ω (ohms)] 3 wire: > 5,000Ω (ohms)
Electrical connection	Solder pads or Molex Milli-Grid (2mm)[7]
Bus compatibility	Modified MODBUS protocol, up to 128 devices
O-ring	15.6mm ID x 1.78mm WALL, 70 Shore A Viton
Options	– Materials, oil-filling, switch output – Calculations: density, flow, differential pressure

Notes:

1. Basic pressure range also available in intermediate / higher pressure ranges.

2. TEB: Total Error Band; includes the combined effects of non-linearity, hysteresis, non-repeatability as well as thermal dependencies, over the specified temperature range. Expressed as a percent of the Basic Range.

3. Precision relative to commercially-available secondary standards, at constant temperature and immediately following a re-zero.

4. If using digital RS485 output only, unit can be factory configured for a supply as low as 3.3VDC.

5. Keller READ30/PROG30 software can be provided on CD or via free download at www.kelleramerica.com. It may be used for all RS485 communication, including configuration setup (scaling, online re-zero, etc.) and data acquisition. Also available, for those who wish to develop in-house communication software, are the DLL file and protocol documentation.

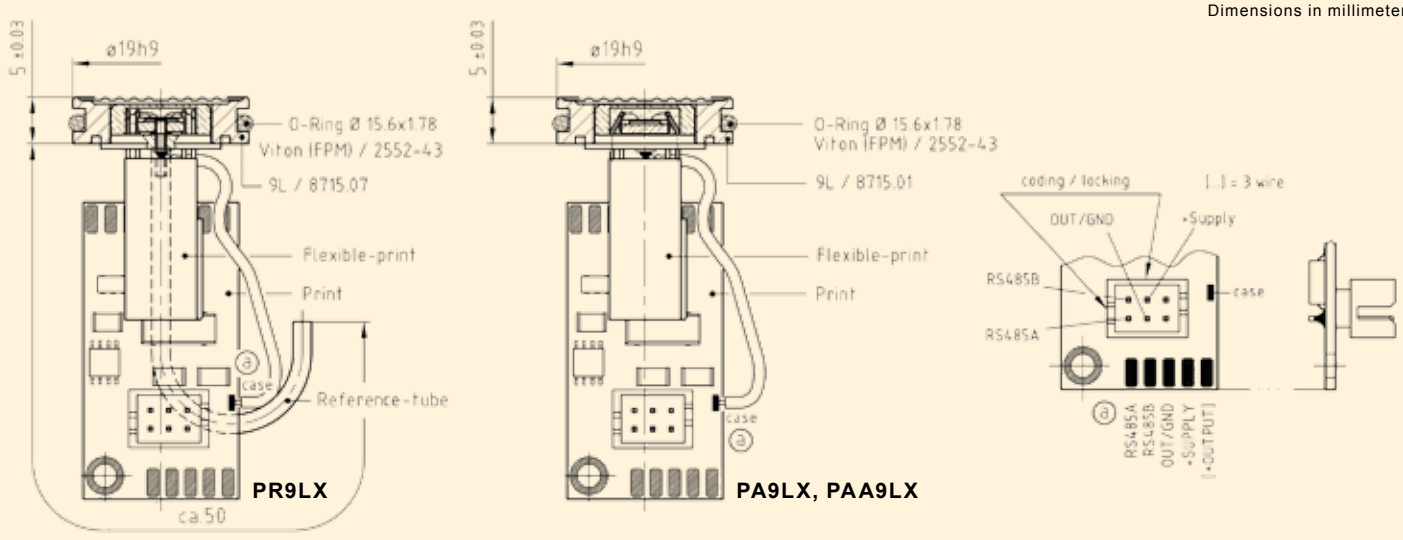
6. Installation recommendations:
a) Housing bore: Ø.750+.003/-0, 32RMS
b) Sensor axial clearance: +.005/+.010
c) Potting of circuit board: Low viscosity, medium hardness silicone rubber with less than 0.1% shrinkage during cure.

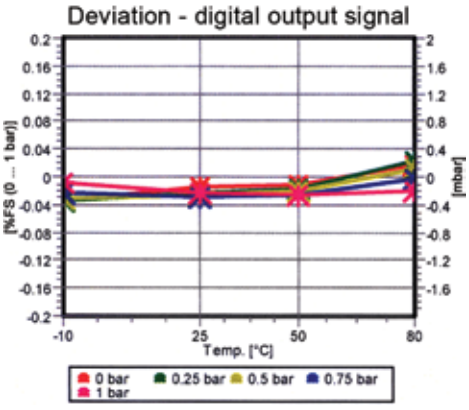
7. Typical turn-on time, measured at PC board connector, is approximately 500mS – 1S.

8. Details can be provided for Molex crimp pins, shell and crimp tool, or Keller America can supply mating connectors with wires attached for an additional charge.

Drawing & Dimensions

Dimensions in millimeters





Mathematical Modeling

An error correction technique whereby the internal microprocessor utilizes stored coefficients to calculate the precise pressure value. The transmitter is factory-tested over a matrix of pressure and temperature that fully encompasses the basic pressure, as well as the compensated temperature, ranges. The measured pressure signal (S), together with the corresponding known values for pressure and temperature are used to calculate coefficients A0 – D3. These are written into the EEPROM.

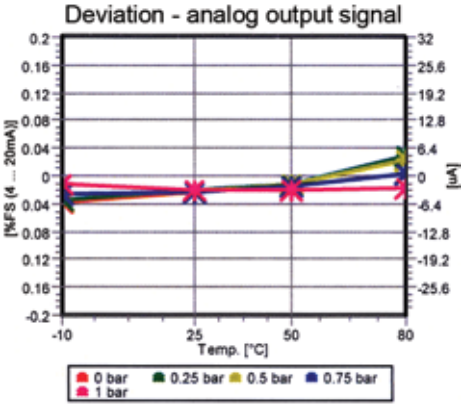
The microprocessor measures the signal for the pressure (S) and temperature (T) and calculates coefficients A(T) – D(T) according to:

A(T) = A0•T0 + A1•T1 + A2•T2 + A3•T3
B(T) = B0•T0 + B1•T1 + B2•T2 + B3•T3
C(T) = C0•T0 + C1•T1 + C2•T2 + C3•T3
D(T) = D0•T0 + D1•T1 + D2•T2 + D3•T3

Finally the exact pressure value is calculated according to:

P(S,T) = A(T)•S0 + B(T)•S1 + C(T)•S2 + D(T)•S3

The pressure output is updated at a rate of 400Hz, in order to effectively maintain correction accuracy even during thermal transients.



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