



# Series 30X

HIGH ACCURACY O.E.M. PRESSURE TRANSMITTER

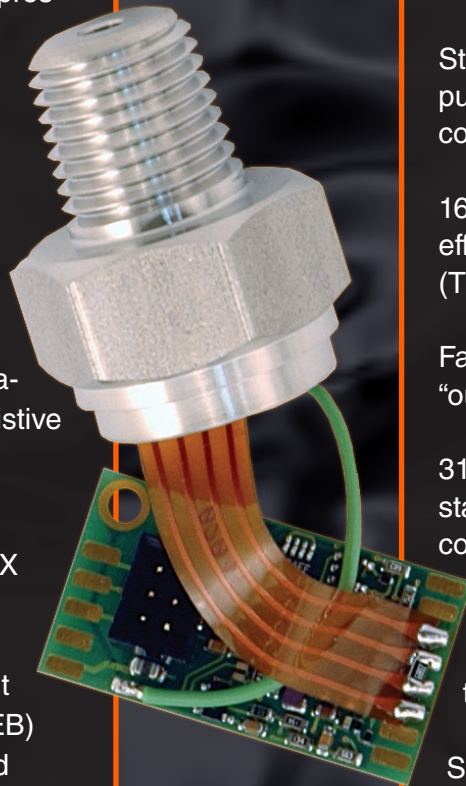
## DESCRIPTION

Whether embedded in an OEM product or simply packaged as a high-end pressure transmitter, the Series 30X enables the OEM to offer superior performance without the need for huge R&D or capital expenditures, and with minimum amount of on hand inventory.

Designed to be easily integrated into a wide variety of applications, the 30X features a flush-welded diaphragm and highly stable piezoresistive sensing element.

Combined with Keller's advanced signal-conditioning circuitry, the 30X features dual (analog & digital) outputs, re-rangeability and mathematical error correction. The result is outstanding Total Error Band (TEB) accuracy over a wide compensated temperature range.

For more information on the 30X, or any other Keller product, please contact Keller America, or view the entire Keller catalog at [www.kelleramerica.com/pdf-library/](http://www.kelleramerica.com/pdf-library/).



## FEATURES

Programmable analog outputs enables infinite range options

Standard dual (analog & RS485) outputs simplify interface to controls, data collection, and telemetry systems

16-bit internal digital correction for cost-effective low  $\pm 0.1\%$  Total Error Band (TEB) accuracy over  $-10\text{...}80^{\circ}\text{C}$

Factory calibrated for guaranteed "out-of-the-box" performance.

316L SS flush-diaphragm sensor standard - 1/4"-18 NPT male pressure connection.

RS485 modified-MODBUS compatible allows up to 128 transmitters on a single bus.

Separate output for temperature via RS485 interface.

Application specific mechanical designs are available.

**K E L L E R   A M E R I C A   I N C**

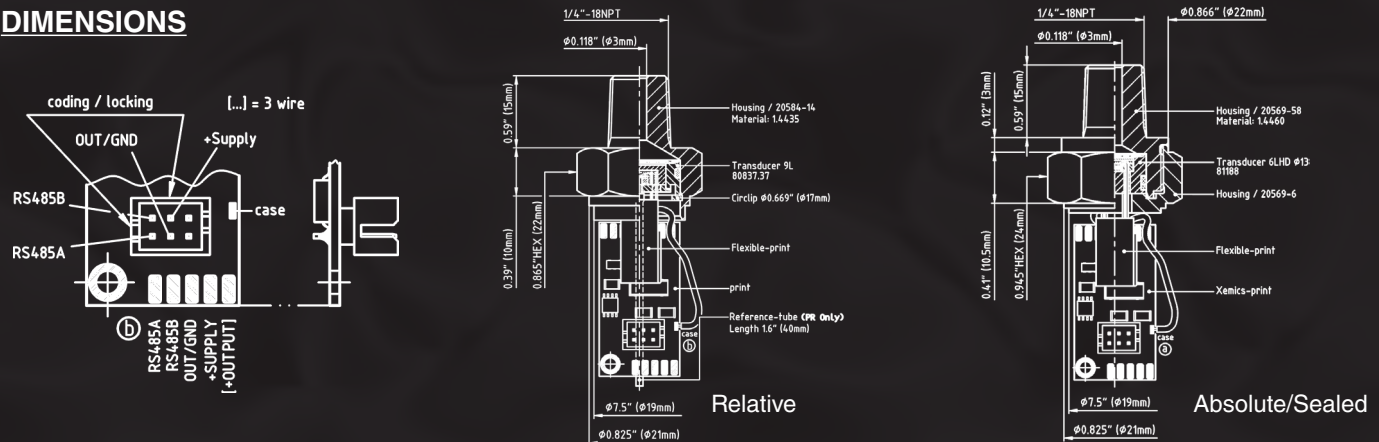
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## DIMENSIONS



## SPECIFICATIONS

Available ranges <sub>1,2</sub>	
Relative	1, 3, 10, and 30 bar
Absolute	1, 3, 10, and 30 bar
Sealed	100, 300, and 1000 bar
Proof Pressure	1 bar: 3X BR, 3...100 bar: 2X BR, 300 bar: 1.5X BR, 1000 bar: 1.1x BR
Accuracy, TEB <sub>3</sub>	Analog: $\pm 0.15\%$ FS TEB Digital: $\pm 0.1\%$ FS TEB
Operating Temperature Range	-40...100°C
Compensated Temp. Range	-10...80°C
Output	4...20mA + RS485 0...10VDC + RS485
Resolution	0.002% BR
Analog Update Rate	400hz
Supply	
Voltage Output	13...28 VDC
Current Output	8...28 VDC
RS485 Only	8...28 VDC <sub>4</sub>
Load Resistance	
Current	$<(\text{Supply}-8\text{V})/0.02\text{A}$
Voltage	$>5\text{k ohm}$
Electrical Connectivity	Solder pads or Molex Milli-grid (2mm)
Bus Compatibility	Modified-MODBUS protocol, up to 128 devices
Construction Materials	316L Stainless Steel Viton O-ring
Specifications and dimensions are subject to change without notice.	

## 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:

$$A(T) = A0 \cdot T0 + A1 \cdot T1 + A2 \cdot T2 + A3 \cdot T3$$

$$B(T) = B0 \cdot T0 + B1 \cdot T1 + B2 \cdot T2 + B3 \cdot T3$$

$$C(T) = C0 \cdot T0 + C1 \cdot T1 + C2 \cdot T2 + C3 \cdot T3$$

$$D(T) = D0 \cdot T0 + D1 \cdot T1 + D2 \cdot T2 + D3 \cdot T3$$

Finally the exact pressure value is calculated according to:

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

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

## NOTES

- Basic units are stated in units of bar. Basic ranges also available in intermediate / higher pressure ranges on request. Keller America uses the conversion of 14.504 psi/bar/
- Scalability of analog output recommended limits: 10 - 110% of basic range.
- TEB: Total Error Band; Includes the combined effects of non-linearity, hysteresis and non-repeatability as well as thermal dependencies, over the compensated temperature range.
- If using digital RS485 output only, the unit can be factory configured for a supply as low as 3.3 VDC.
- Keller READ30/PROG30 software can be provided on CD or via free download at [www.kelleramerica.com](http://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.
- Installation recommendations: a) Housing bore:  $\phi 0.750 \pm 0.003$ - 0, 32RMS b) Sensor axial clearance:  $+0.005/+0.010$  c) Potting of circuit board: Low viscosity, medium hardness silicone rubber with less than 0.1% shrinkage during cure.
- Typical turn-on time, measured at PC board connector, is approximately 500mS – 1S.
- 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.