KELLER

Programmable Level Pressure Transmitter

Series 36 X S (stretto line)

digitally compensated / rangeable / digital and analog output

This pressure transmitter is designed for level measurement in narrow downhole applications where highest accuracy is required.

Product Benefits:

- Only **16 mm** diameter
- Mathematically compensated
- Programmable, assisting inventory reduction
- Filtering function 2 ms...30 sec
- Improved surge protection
- Bus-system capabilty (up to 128 transmitters)

36 X S level transmitter is available in two different versions:

• PAA-36 X S Absolute Pressure, Zero at Vacuum

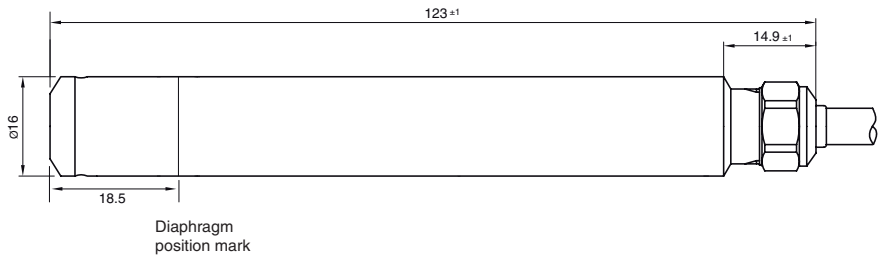
This probe is applied when the atmospheric pressure is measured by a separate barometer and when the water level is calculated as the difference between the absolute value and the ambient pressure. Venting of the electrical cable to atmosphere does not have to be considered for these installations.

• PR-36 X S Relative Pressure, Zero at ambient Pressure

This probe is fitted with a durable cable with an integral vent tube to the atmosphere. To prevent the formation of internal condensation caused by installations in cold water on warm, humid days, it is important to ensure only dry air enters the transmitter enclosure via the vent tube. If the vent tube is not terminated in a warm, dry enclosure, KELLER recommends and can supply a purpose built cartridge filled with a silica gel which is fitted at the end of the reference tube.

Programming

With the KELLER software READ30 and PROG 30, a RS485 converter (i.e. K-102, K-104 or K-107 from KELLER) and a PC (Laptop), the pressure can be displayed, the units changed, and new gain or zero set. The analog output can be set to any range within the compensated range.



Electrical Connections

Output	Function	Wire Color
4...20 mA / RS485	OUT/GND	white
	+Vcc	black
Digital	RS485A	blue
	RS485B	yellow

CE

Subject to alterations 08/07

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Specifications

Standard Pressure Range FS and Overpressure in Bar			
PR-36 X S	1	3	10
PAA-36 X S		0,8…3	0,8…10
Overpressure	3	5	20

PAA: Absolute. Zero at vacuum PR: Vented Gauge. Zero at atmospheric pressure

Note: The ranges 100, 200 or 500 mbar are realized with the 1 bar range. Accuracy for these ranges is ±2 mbar (0...50°C)

All intermediate ranges for the analog output are realizable with no surcharge by spreading the standard ranges. The Errorband rises proportionally.

Output	4...20 mA / RS485
Supply (U)	10...30 Vcc
Compensated Temperature Range	0…50 °C
Error Band *	0,2 %FS (within compensated temperature range)
Linearity (best straight line)	0,025 %FS
True Output Rate	200 Hz
Resolution	0,002 %FS
Long Term Stability typ.	Range ≤ 1 bar: 2 mbar
	Range > 1 bar: 0,2 %FS

* Linearity + Hysteresis + Repeatability + Temp. Coeff. + Zero + Span Tolerance

Load Resistance (Ω)	< (U-10V) / 0,02A (2 wire)
Electrical Connection	Cable: PR-Version: Ø 5,8 mm, PE, vented
	PAA-Version: Ø 4,7 mm, PUR, double-coated
Insulation	> 100 MΩ / 500 V
Storage- / Operating Temperature Range	-20…80 °C
Vibration Endurance, IEC 68-2-6	20 g (5...2000 Hz, max. amplitude ± 3 mm)
Shock Endurance	20 g (11 ms)
Protection	IP68
CE-Conformity	EN 61000-6-1 to -6-4
Surge	Supply and RS485 200A @ 8/20 µs
	GND/CASE 2'000A @ 8/20 µs
Material in Contact with Media	Stainless Steel AISI 316L / Viton® / PE
Weight (without cable)	≈ 200 g

Polynomial Compensation

This uses a mathematical model to derive the precise pressure value (P) from the signals measured by the pressure sensor (S) and the temperature sensor (T). The microprocessor in the transmitter calculates P using the following polynomial:

$$P(S,T) = A(T)\cdot S^0 + B(T)\cdot S^1 + C(T)\cdot S^2 + D(T)\cdot S^3$$

With the following coefficients A(T)…D(T) depending on the temperature:

$$A(T) = A_0\cdot T^0 + A_1\cdot T^1 + A_2\cdot T^2 + A_3\cdot T^3$$
$$B(T) = B_0\cdot T^0 + B_1\cdot T^1 + B_2\cdot T^2 + B_3\cdot T^3$$
$$C(T) = C_0\cdot T^0 + C_1\cdot T^1 + C_2\cdot T^2 + C_3\cdot T^3$$
$$D(T) = D_0\cdot T^0 + D_1\cdot T^1 + D_2\cdot T^2 + D_3\cdot T^3$$

The transmitter is factory-tested at various levels of pressure and temperature. The corresponding measured values of S, together with the exact pressure and temperature values, allow the coefficients A0...D3 to be calculated. These are written into the EEPROM of the microprocessor.

Note: - Disturbance of the 4...20 mA signal can occur during communication through RS485

Options: - Special calculations with pressure and temperature
- Different housing-material, oil filling or pressure thread

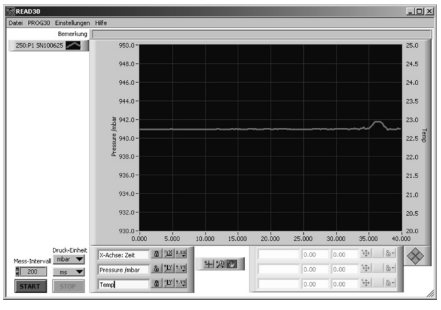
Accessories Series 30

Each Series 30 transmitter also integrates a digital interface (RS485 halfduplex) which the user can make use of. The transmitter is being connected via a converter RS232-RS485 (i.e. K-102, K-104 or K-107) to a PC or Laptop. Two programs are offered:

PROG30: Instrument Settings
- Call up of information (pressure- and temperature range, version of software etc.)
- Indication of actual pressure value
- Selection of the units
- Setting of a new zero and gain for the transmitter
- Reprogramming of the analog output (i.e. different unit, other pressure range)
- Setting of the instrument address (for Bus-operation)
- Low-Pass Filter adjusting possibility

READ30: Data collection with graphs
- Fast read-out and viewing of the pressure signals in a graph
- Documentation of dynamic measurements
- Up to 16 transmitters on one serial connection (Bus-operation)

Software READ30



You can also tie up the transmitters into your own software. You have then a documentation,a DLL and numerous examples at your disposal.

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