

S E R I E S 39X Subsea Pressure Transmitter

Subsea DIFFERENTIAL PRESSURE TRANSMITTER

BASED ON TWO ABSOLUTE SENSORS

DP & Static Pressure Ranges up to 600 Bar - External Case Pressure up to 400 Bar

In applications where the differential pressure is more than 5% of the maximum standard pressure range, differential pressure measurement with two absolute pressure sensors offers major advantages over conventional methods of differential pressure measurement (such as the Series PD-10).

The Series PD-39 X does not measure the differential pressure directly - instead, it uses two absolute pressure sensors to take the measurement indirectly. As well as reducing costs, this differential pressure transmitter is also more robust in relation to unbalanced (one-sided) overloading. The differential pressure range should be at least 5% of the standard pressure range. Each pressure side has two pressure connections, so the PD-39 X is easy to use in pressure lines. So that the differential pressure can also be measured exactly if the standard pressure range/ differential pressure ratio is high, this series also features the tried-and-tested microprocessor based technology that is used in Series 30 X. All reproducible pressure sensor errors (i.e. nonlinearities and temperature dependencies) are entirely eliminated thanks to mathematical error compensation. The sensor signals are measured with a 16-bit A/D converter, so the individual standard pressure ranges can be measured to an accuracy of 0,05%FS throughout the entire pressure and temperature range.

Digital Interface

The transmitters have a bus-compatible two-wire RS485 half-duplex interface which is modelled on the "MODBUS RTU". KELLER offers interface converters to RS232 or USB for use here. The READ30/PROG30 program and the protocol are freely available. The interface offers these capabilities:

- Readout of pressure and temperature values for both sensors. This allows readout of the differential pressure as well as the two standard pressure ranges.
- Calibration of zero points and amplification.
- Scaling of the analog output to different pressure ranges or units.
- Configuration settings such as measurement rate, low-pass (LP) filter, bus address, etc.
- Readout of information such as serial number, compensated pressure and temperature ranges, etc.

Analog Output

The analog output is freely scalable via the interface. For flow measurements, the root of the differential pressure can also be outputted. The calculated value can be outputted via an analog interface (0...10 V or 4...20 mA).

SPECIFICATIONS

Pressure Ranges (FS) and Overpressure in Bar

Version Series	39 X Low Pressure			Series 39 X Medium Pressure		
Standard Pressure Ranges *	3	10	25	100	300	600
Overpressure	10	20	40	200	450	600

Differential Pressure Ranges All ranges are scalable within standard pressure range.

Error band calculation for differential pressure see box

* max. measurable pressure per pressure connection

Storage-/Operating Temperature	-40...100 °C
Compensated Standard Range	-10...80 °C
Error Band ^{(1),(2)}	≤ 0,05 %FS typ. ≤ 0,1 %FS max.
True Output Rate	200 Hz
Resolution ⁽²⁾	≤ 0,002 %
Long Term Stability typ. ⁽²⁾	0,1 %

⁽¹⁾ Linearity + Hysteresis + Repeatability + Temperature Error

⁽²⁾ Accuracy and Resolution referred to Standard Pressure Range

Output Signal	4...20 mA, 2-wire 0...10 V, 3-wire
Supply (U)	8...28 Vcc 13...28 Vcc
Load Resistance	(U-7 V) / 0,02 A > 5'000 Ω
Electrical Connection	- Subcon BH series (5 pole)
Programming	RS485 half-duplex
Insulation	10 MΩ / 50 V



Error Band Differential Pressure Range

The error band of the differential pressure (in % of the differential pressure measuring range) is calculated as follows:

Error band of the differential pressure range =

Max. Error Band of X $\frac{\text{Standard Press Range}}{\text{Stand. Press. Range}}$ $\frac{\text{Diff. Press Range}}{\text{Diff. Press Range}}$

Example: Standard Pressure = 10 bar
 Differential Pressure = 4 bar.
 Error Band (in %FS) of the diff. pressure = $0,1 \times 10/4 = 0,25\%$



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S E R I E S 39X Subsea Pressure Transmitter

Pressure Endurance	10 Mio. Pressure Cycles 0...100 %FS at 25 °C
Vibration Endurance	20 g, 20 to 5'000 Hz
Shock Endurance	20 g sinus 11 msec.
Protection	IP68 - suitable for subsea use, external case pressure up to 400 bar
CE-Conformity	EN 61000-6-1 to -4 (with screened cable)
Material in Contact with Media	Stainless Steel 316L (DIN 1.4435)
Dead Volume Change	< 0,1 mm ³
Pressure Ports	G1/4 female (2 per pressure side)

Kabelbelegung (Print 91076)

Kabelbelegung (Stecker)

Ansicht A

(a)	24.04.01	PW	Länge 84mm NEU 94mm		
Änd-Index :	Datum :	Vls. :	Änderung :	Werkstoff :	gez. 09.04.01 PW
Transmitter			Massstab: 1 : 1 / 1,5:1 A3	gepr. 19.03.04 cle	
Serie : PD-39				80946.8	
80946.8		druckmesstechnik KELLER		Tel : 052 / 238 28 28 Fax : 052 / 238 28 28 Info : www.keller-druck.de	

ACCESSORIES SERIES 30

Each Series 30 transmitter also integrates a digital interface (RS485 half duplex) which you can make use of: Connect the transmitter to a PC or Laptop via the converter K106 (RS232-RS485). Two programmes are offered:

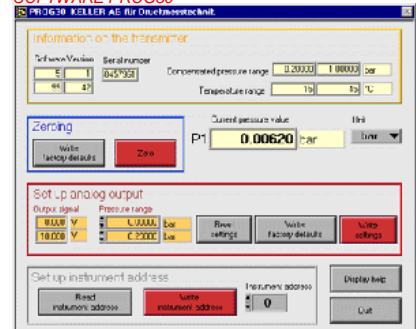
PROG30:

- 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 for the transmitter
- Reprogramming of the analog output (i.e. different unit, other pressure range)
- Setting of the instrument address (for Bus-operation)

You can also tie up the transmitters into your own software. You have then a documentation, a DLL and LabView VI's at your disposal.

- ### READ30:
- Data collection with up to ten Series 30 pressure transmitters with graphs
 - Fast read-out and viewing of the pressure signals in a graph
 - Documentation of dynamic measurements
 - Up to 10 transmitters on one serial connection (Bus-operation)

SOFTWARE PROG30



CHANGING THE PLUG CONNECTOR (optional)

Laboratory applications require the same transmitter to be used at different measurement points with different electrical connection arrangements. To accommodate such applications, KELLER can supply different connectors matching with the internal standard plug.



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