

## CAPACITIVE PRESSURE TRANSMITTER

FROM 1 mbar FULL RANGE\* / RESOLUTION 1 µbar

The Series 41 X combines the ceramic measurement cell for low pressure ranges with the µP electronics of the digital Series 30 transmitter. The pressure values from the signals of the pressure and temperature sensors are determined by polynomial compensation (see reverse). The values can be displayed and stored on a PC via an RS485 interface and programming can also be carried out.

The transmitters are calibrated to the base range. The PROG30 software permits programming of the analog output signal in each section of the range within the base range (e.g. range 100 mbar. Output 4...20 mA for 20...60 mbar).

With KELLER RS converters K-100 Series, up to 128 transmitters can be hooked together into a bus system and read by means of a PC or laptop. READ30 software allows the current pressure of each transmitter to be read or the pressure activity of several transmitters to be recorded or stored whilst "on line".

This pressure transmitter is also available as intrinsically safe version (Series 41 X Ei). It is used in explosion exposed areas, where the categories 1 and 2 are required.



\*by splitting the 10 mbar range

**ELECTRICAL CONNECTIONS**

| Output             | Function    | Binder 723 | DIN 43650 | MIL C-264882 | Lumberg M12 | Cable        |
|--------------------|-------------|------------|-----------|--------------|-------------|--------------|
| 4...20mA<br>2 Wire | OUT/GND     | 1          | 1         | C            | 1           | white        |
|                    | +Vcc        | 3          | 3         | A            | 3           | black        |
| 0...10 V<br>3 Wire | GND         | 1          | 1         | C            | 1           | white        |
|                    | OUT<br>+Vcc | 2<br>3     | 2<br>3    | B<br>A       | 2<br>3      | red<br>black |
| Digital            | RS485A      | 4          |           | D            | 4           | blue         |
|                    | RS485B      | 5          |           | F            | 5           | yellow       |



# KELLER

## Specifications

|                                    | Standard FS Pressure Ranges                   |                           |
|------------------------------------|---|---------------------------|
| PR-41 X (relative) PD-41 X (diff.) | 30 100 300 mbar                               |                           |
| Overpressure / Neg. overpressure   | 10 x FS for ≤ 200 mbar, 5 x FS for > 200 mbar |                           |
|                                    | 2-Wire  | 3-Wire                    |
| Supply (U)                         | 8...28 VDC                                    | 13...28 VDC               |
| Analog Output (scaleable)          | 4...20 mA                                     | 0...10 V                  |
| Load (Ω)                           | < (U-8V)/0,02 A                               | > 5K                      |
| Stability                          | FS ≥ 100 mbar: ± 0,1 %FS                      | FS ≤ 100 mbar: ± 0,1 mbar |
| Operating Temperature              | -20...80 °C                                   |                           |
| Compensated Range                  | 10...50 °C                                    |                           |
| Error Band*                        | ± 0,1 %FS typ.                                | ± 0,2 %FS max.            |

\* Analogue output within the compensated temperature range

|                                |   |
|--------------------------------|---|
| Pressure Connection            | G1/4" male, Viton® flat seal  |
| Electrical Connection          | Binder Series 723 (5 pole)  |
| Material in Contact with Media | Stainless steel (AISI 316L), Nitril O-ring, gold-coated ceramic diaphragm   |
| PD-Reference side              | Non-aggressive dry gases  |
| Protection / Weight            | IP 40 / ca. 190 g   |
| Special Versions               | - IP 67<br>- Alternative plugs (see front page)<br>- Cable version<br>- Pressure ranges neg./pos.: Example: -10...+10 mbar<br>- Intrinsically safe version for use in explosion exposed areas |

All intermediate ranges for the analog output are realizable with no surcharge by spreading the standard ranges. Option: Adjustment directly to intermediate ranges (below 20 pieces against surcharge).

For higher pressure ranges and for "wet/wet"-differential applications, KELLER offers Series 33 X resp. Series 39 X.



PD-41 X  
Dimensions ø 50 x 62

## 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:

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

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.

When the pressure transmitter is in service, the microprocessor measures the signals (S) and (T), calculates the coefficients according to the temperature and produces the exact pressure value by solving the P(S,T) equation. Calculations and conversions are performed at least 400 times per second.

## Accessories Series 41 X

Each Series 41 X 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:

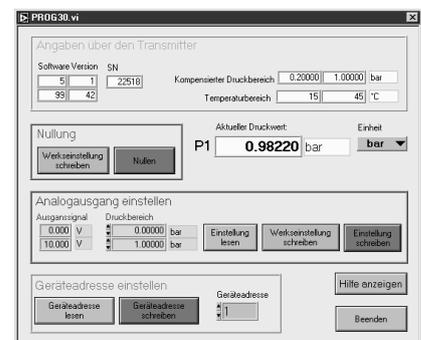
### PROG30: Instrument Settings

- 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)
- Programming of the switch output
- Changing the output rate

### 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 PROG30



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

Subject to alterations

11/06

KELLER AG für Druckmesstechnik  
KELLER Ges. für Druckmesstechnik mbH

St. Gallerstrasse 119  
Schwarzwaldstrasse 17

CH-8404 Winterthur  
D-79798 Jestetten

Tel. +41 (0)52 - 235 25 25  
Tel. +49 (0)7745 - 9214 - 0

Fax +41 (0)52 - 235 25 00  
Fax +49 (0)7745 - 9214 - 60