

## DIFFERENTIAL PRESSURE TRANSMITTERS

WITH HIGH OVERLOAD RESISTANCE AND LINE PRESSURE OUTPUT

### Series PRD-33 X

The Series PRD-33 X was developed for applications that require a high accuracy differential pressure measurement together with high overload resistance in differential pressure ranges as low as 350 mbar.

The Series PRD-33 X is the result of ongoing development of the KELLER PD-33 X differential pressure transmitter. Thanks to a second integrated pressure sensor, the line, or common mode,

pressure can now be measured along with the differential pressure, resulting in several notable features not found in traditional differential pressure transmitters.

For example, compensation for line pressure effect is now accomplished during factory calibration. Moreover, both differential and line (absolute) pressure may be read by the user. In addition, the PRD-33 X features high differential overload resistance; e.g.,  $\pm 35$  bar with a differential measuring range of only 350 mbar (100:1).

The internal differential pressure sensor element is isolated from the High (+) side media by a compliant stainless steel diaphragm, while the Low (-) side media impinges directly on the back side of the silicon measuring cell. Also isolated from the High (+) side media is the line (absolute)

pressure sensor. The floating sensor assembly guarantees maximum decoupling from external mechanical forces.

Another notable feature of the Series PRD-33 X is the robust digital RS485 bi-directional communication interface. Information such as serial number, pressure range, filter settings and process values for both differential and line (absolute) pressures and their temperatures are easily obtained.

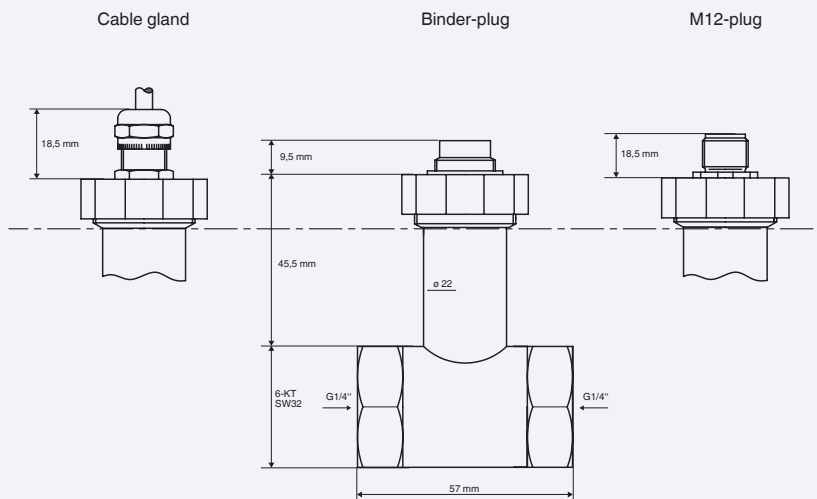
This combination of features enables certain measurements not possible with traditional differential pressure transmitters. For example, filling levels in liquefied gas storage tanks, including oxygen, nitrogen, carbon dioxide and argon can now be measured safely, accurately and at reasonable cost.

#### Features

- High-accuracy differential pressure measurement with compensated line pressure dependency
- Pressure- and temperature-compensated
- Independent line (absolute) pressure output
- High overload resistance
- RS485 communication interface
- Configurable via RS485 interface
- Compact structural design

#### Applications

- Level measurement of technical gases in liquefied gas tanks
- Differential pressure measurement in case of high unilateral overload resistance



#### PIN ASSIGNMENTS

Function	Cable	Binder Serie 723	M12 A-coded
GND	white	1	1
n.c.	red	2	2
Supply	black	3	3
RS485A	blue	4	4
RS485B	yellow	5	5
Case	Shielding	Thread	Thread

use shielded cable





## Specifications

### Differential pressure measurement (P1):

Pressure Range*	0...350 mbar	0...1 bar	0...3 bar
Accuracy**	± 0,1 %FS	± 0,05 %FS	± 0,05 %FS
Resolution	0,01 %FS ± 1	0,005 %FS	0,005 %FS
Total Error Band (-30...+ 60 °C)***	%FS	± 0,4 %FS	± 0,2 %FS
Common mode / line pressure range	0...40 bar abs	0...40 bar abs	0...40 bar abs
Proof pressure	± 35 bar	± 35 bar	± 35 bar
Burst pressure	± 80 bar	± 80 bar	± 80 bar

\*Other pressure ranges on request

\*\* Includes Linearity (BFSL) + Repeatability + Hysteresis

\*\*\* Includes Accuracy, Temperature error, Static line dependence

### Line / Absolute Pressure Measurement (P2) (1):

Pressure Range	0...40 bar absolute
Accuracy**	0,1 %FS
Resolution	0,005 %FS
Total Error Band (-30...+ 60 °C)***	0,3 %FS

Measured at the High (+) pressure connection

Type	Standard	Low Voltage
Interface	RS485	RS485
Supply voltage	8...32 VDC	3,2...32 VDC
Voltage insulation RS485	± 32 VDC	-7...+ 12 VDC
Power Consumption	< 8 mA	< 3 mA

Pressure connections	G-1/4" female
Electrical connection	Binder 723, M12, Cable, other connections are available as option
Output	RS485 half-duplex, 9600 or 115200 baud
Start-up Time (Supply ON)	< 600 ms
Conversion time for all channels	8 ms (continuous measurement)
Compensated Temperature Range	-30...+ 60 °C
Storage-/Operating Temperature Range	-40...+ 80 °C
Insulation	> 10 MOhm at < 300 VDC
Protection	IP 65, optional IP 67 or IP 68
	Reverse Polarity and Overvoltage Protection integrated
	EN 61000-6-1 to 6-4 / EN 61326-1 / EN 61326-2-3

### CE-Conformity (EMC)

### Material in Contact with Media

### Compatibility of media

### Weight

Stainless Steel AISI 316L, silicone O-ring  
On the negative pressure connection additionally gold/tin and silicon/glass  
Oxygen, Argon, Nitrogen, Nitrous oxide, CO<sub>2</sub>  
On the positive pressure connection also aggressive mediums  
ca. 400 g

**Signal processing** This series features microcontroller-based electronic evaluation to ensure maximum accuracy. Each transmitter is gauged across the entire pressure and temperature range. This measurement data is used to calculate a mathematical model that enables correction of all reproducible errors. In this way, KELLER can guarantee high accuracy on the basis of an error bandwidth within the overall compensated pressure and temperature range. Differential pressure, line pressure and temperatures can be read easily, safely and lossless via the digital interface.

**Interface** The digital interface is designed as a robust RS485 half-duplex for 9'600 and 115'200 baud. It can be used to implement bus systems with 128 subscribers and line lengths of up to 1'400 m.

Communication protocol: MODBUS RTU and KELLER Bus. The measuring channels are defined as follows: P1: differential pressure, P2: absolute pressure, TOB1, TOB2: sensor temperatures.

Details about the communication protocol are available at: [www.keller-druck.com](http://www.keller-druck.com).

The transmitters can be configured and measured values can be recorded with the CCS30 software and a K-114 interface converter.

