Series 26X

High-precision piezoresistive level probe

Features

- RS485 interface can be combined with an analog interface
- Analog interface can be ranged via RS485 interface (turn-down)
- Modbus RTU protocol for process values and configuration
- Excellent long-term stability
- For many years of maintenance-free operation

Technology

- Media isolated piezoresistive pressure sensor
- High-quality pressure transducer and tried-and-tested mathematical compensation
- Robust stainless-steel housing

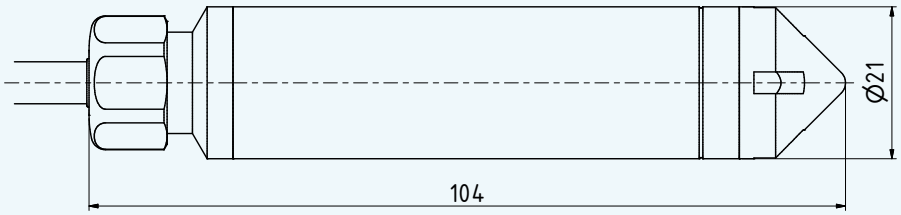
Typical applications

- Hydrostatic pressure measurement
- Level measurement: groundwater, surface water
- Fill level measurement: water tanks, fuel tanks

Accuracy
± 0,1 %FS

Total error band
± 0,25 %FS @ 0…50 °C

Pressure ranges
from 0…0,1 to 0…25 bar



Series 26X – Specifications

Standard pressure ranges

Water column approx.	Relative pressure PR	Absolute pressure PAA	Proof pressure
0…1	0…0,1		3
0…1,6	0…0,16		
0…2,5	0…0,25		
0…4	0…0,4		
0…6	0…0,6		
0…10	0…1		
		0,8…2	9
0…16	0…1,6	0,8…2.6	
0…25	0…2,5	0,8…3.5	
0…40	0…4	0,8…5	30
0…60	0…6	0,8…7	
0…100	0…10	0,8…11	
0…160	0…16	0,8…17	40
0…250	0…25	0,8…26	
mH2O	bar rel.	bar abs.	bar
Analog interface also rangeable to other units	Reference pressure at ambient pressure	Reference pressure at 0 bar abs. (vacuum)	Based on reference pressure
Note	PAA 0.8...2 bar: Special measuring ranges are required for installations above 2000 m a.s.l..		

Performance

Pressure

Accuracy @ RT (20…25 °C)	≤ ± 0,1 %FS	Non-linearity (best fitted straight line BFSL), pressure hysteresis, non-repeatability, zero point deviation and amplification deviation.
Total error band (0…50 °C)	≤ ± 0,25 %FS	Max. deviation within the compensated pressure and temperature range. Experience shows that, outside the compensated temperature range, the total error band is expanded by 0,1 %FS .
Compensated temperature range	0…50 °C	Other temperature ranges within -20…85 °C possible as an option.
Long-term stability	≤ ± 0,15 %FS	Per year under reference conditions, annual recalibration recommended.
Degree of dependency on location	≤ ± 1,5 mbar	Calibrated in vertical installation position with pressure connection facing downwards.
Resolution	0,002 %FS	Digital
Signal stability	0,01 %FS	Digital noise-free
Internal measurement rate	≥ 1800 Hz	For version «3-wire + digital (0…10 V. 0…5 V)» > 6000 Hz
Pressure range reserve	± 10 %	Outside the pressure range reserve, +Inf/-Inf is displayed. If there is an error in the device, NaN is displayed.
Note	For pressure ranges < 1 bar, all data apply with reference to a full-range signal (FS) of 1 bar.	

Temperature

Accuracy	≤ ± 1,5 °C	The temperature is measured on the media-isolated pressure sensor (silicon chip). The specifications apply within the compensated temperature range.
Resolution	≤ 0,01 °C	
Internal measurement rate	> 10 Hz	
Note	The specifications apply within the compensated temperature range.	

Series 26X – Specifications

Electrical data

Connectivity	digital	2-wire + digital	3-wire + digital	
Analog interface		4…20 mA	0…10 V	0…5 V
Digital interface	RS485	RS485	RS485	RS485
Power supply	3,2…32 VDC	8…32 VDC	13…32 VDC	8…32 VDC
Power supply with lightning protection	4.5…32 VDC	10…32 VDC	N/A	N/A
Power consumption (without communication)	< 8 mA	3,5…22.5 mA	< 8 mA	< 8 mA
RS485 voltage insulation	± 32 VDC	± 18 VDC	± 32 VDC	± 32 VDC
Note	During communication via the digital interface, the analogue interface is disturbed. Simultaneous operation of analogue and digital interfaces is not recommended.			

Start-up time (power supply ON)	< 250 ms
Overvoltage protection and reverse polarity	± 32 VDC
GND case insulation	> 10 MΩ @ 300 VDC

Analog interface

Load resistance	< (U - 8 V)/25 mA	2-wire
	> 5 kΩ	3-wire
Limiting frequency	≥ 300 Hz	2-wire
	≥ 1000 Hz	3-wire (0…10 V, 0…5 V)
Note	Filter properties can be adjusted by the customer	

Digital interface

Type	RS485	Half-duplex
Communication protocols	Modbus RTU	
	KELLER bus protocol	Proprietary
Identification	Class.Group: 5.24	Standard settings: bus address 1, baud rate 9600 bit/s Other default settings available on request. Can be reconfigured via software by the customer later.
Unit of pressure	bar	
Unit of temperature	°C	
Data type	Float32 and Int32	
Baud rates	9600 and 115’200 bit/s	
Lines up to	1,2 km	

Electrical connection

Cable for water applications	PR: polyethylene (PE) ø 5,8 mm	Integrated capillary
	PAA: polyolefin (PE-based) ø 5,8 mm	
Cable for fuel applications	PR: TPE-E ø 6,1 mm	Integrated capillary
	PAA: TPE-E ø 4,7 mm	
Standard cable lengths	5 m, 10 m, 15 m, 25 m, 40 m	Others on request

Electromagnetic compatibility

CE conformity as per 2014/30/EU (EMC)	EN IEC 61326-1 / EN IEC 61326-2-3 / EN IEC 61000-6-1 / EN IEC 61000-6-2 / EN IEC 61000-6-3 / EN IEC 61000-6-4	
Shock voltage protection according to EN 61000-4-5	Standard	Line-Line: 50 A @ 8/20 µs
		Line-CASE: 200 A @ 8/20 µs
Lightning protection (extended surge protection) according to EN 61000-4-5	Optional	Line-Line: 10 kA @ 8/20 µs
		Line-CASE: 2 kA @ 8/20 µs

Series 26X – Specifications

Mechanical data

Wetted parts

Housing and optional pressure connection	Stainless steel AISI 316L	Others on request
Pressure transducer separating diaphragm	Stainless steel AISI 316L	
Pressure transducer seal (internal)	FKM	
Cable gland seal (internal)	FKM	
End cap	POM	
Cable sheath	PR: polyethylene (PE)	Medium: water
	PAA: polyolefin (PE-based)	
	PR/PAA: TPE-E	Medium: fuels

Other materials

Pressure transducer oil filling	Silicone oil	Others on request

Further details

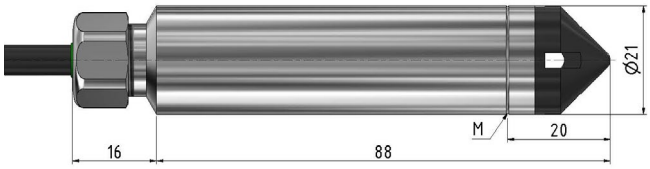
Pressure connection	None (end cap), optional G1/4	See Dimensions and options
Diameter × length	ø 21 mm × approx. 104 mm	
Weight (excluding cable)	approx. 100 g	

Ambient conditions

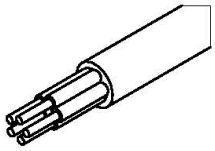
Media temperature range	-20…85 °C		Icing not permitted
Ambient temperature range	-20…85 °C		
Storage temperature range	-20…85 °C		
Protection	IP68	Cable Gland	For relative pressure, cable with integrated capillary
Vibration resistance	10 g, 10…2000 Hz, ± 10 mm	IEC 60068-2-6	
Shock resistance	50 g, 11 ms	IEC 60068-2-27	

Series 26X – Dimensions and options

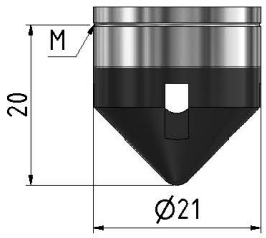
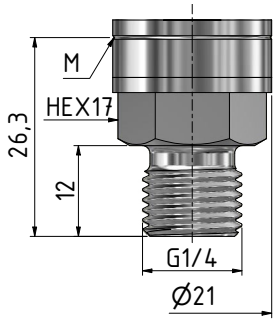
Electrical connections



M: marking of diaphragm position

Cable gland	2-wire		3-wire	
Cable	4…20 mA		0…max. 10 V	
	WH	OUT/GND	WH	GND
	RD	n.c.	RD	+OUT
	BK	+Vs	BK	+Vs
	BU	RS485A	BU	RS485A
	YE	RS485B	YE	RS485B
	Shield on CASE		Shield on CASE	

Available pressure connections

Standard	Optional
End cap	G1/4
	
Recessed diaphragm (M)	DIN EN ISO 1179-2

Customer-specific options

- Other compensated pressure ranges
- Other temperature ranges within -20…85 °C
- Other cable sheath materials
- Extended lightning protection
- Wetted parts available in Hastelloy C-276 and Titanium
- Integration of application-specific calculations: e.g. tank content calculations
- Modifications to customer-specific applications

Examples of similar products

- Series 26Xi: High-accuracy level probe with SDI-12 interface
- Series 36XW: Level probe with maximum performance with RS485 and analog interface
- Series 36XiW: Level probe with highest accuracy with SDI-12 interface
- Series 36XiW-CTD: Level probe with maximum performance (pressure, temperature and conductivity) with RS485 or SDI-12 interface
- OEM series: Pressure transducer with digital compensation electronics (e.g. 10LX or 20SX series with thread) for installation in own systems

Series 26X – Software, scope of delivery and accessories

Interface

The X-line products have a digital interface (RS485 half-duplex), which supports the MODBUS RTU and KELLER bus protocols. Details of the communication protocols can be found at www.keller-druck.com. Documentation, a Dynamic Link Library (DLL) and various programming examples are available for integrating the communication protocol into your own software.

Interface converter

The connection to a computer is established via an RS485-USB interface converter. To ensure smooth operation, we recommend the K-114 with the corresponding mating plug, robust driver module, fast RX/TX switching and connectable bias and terminating resistors.

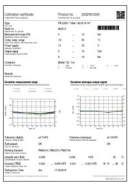
«CCS30» software

The licence-free software CCS30 is used to carry out configurations and record measured values.

Measurement collection
- Live visualisation
- Adjustable measuring and storage interval
- Export function
- Parallel recording in bus operation
- Up to 100 measured values per second

Configuration
- Call up of information (pressure and temperature range, software version, serial number etc.)
- Readjustment of zero point and amplification
- Rescaling of analog output (unit, pressure range)
- Adjustment of low-pass filter
- Selection of instrument address and baud rate

Scope of delivery

KELLER test report	USIT ring
	
Issued by KELLER.	With G1/4 pressure connection enclosed.

Accessories

Calibration certificate	Interface converter
	
Issued by an external, accredited calibration laboratory according to DAkkS or SAS.	K-114 • Analog measurement 0…10 V and 4…20 mA • 12 V measuring device supply via USB • USB interface electrically isolated • Bias and terminating resistors can be activated