

Series 36XS

Piezoresistive level probe with excellent accuracy

Features

- Slender design with a diameter of only 16 mm
- RS485 interface can be combined with analog interface
- Analog interface scaleable by RS485 interface (turn-down)
- Modbus RTU protocol for process values and configuration
- Excellent long-term stability
- For many years of maintenance-free operation

Technology

- Insulated and encapsulated piezoresistive pressure sensor chip
- High-quality pressure transducer and tried-and-tested mathematical compensation
- Fully welded design with no internal seals
- Robust stainless-steel housing

Typical applications

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

Accuracy

± 0,05 %FS

Total error band

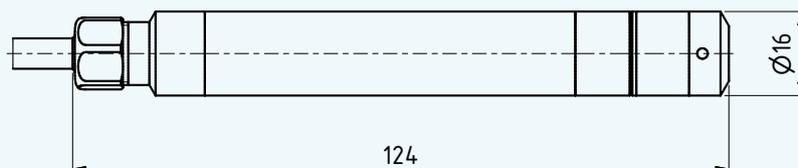
± 0,2 %FS @ 0...50 °C

Pressure ranges

0...1 to 0...30 bar



Series 36XS



Series 36XS – Specifications

Standard pressure ranges

Water column approx.	Relative pressure PR	Absolute pressure PAA	Proof pressure
0...10	0...1		3
		0,8...2	9
0...30	0...3	0,8...4	9
0...60	0...6	0,8...7	30
0...100	0...10	0,8...11	30
0...160	0...16	0,8...17	90
0...300	0...30	0,8...31	90
mH ₂ O	bar rel.	bar abs.	bar
Analog interface also scaleable to other units	Reference pressure at atmospheric pressure	Reference pressure at 0 bar abs. (vacuum)	In relation to reference pressure
Note	PAA 0,8...2 bar: For installations at altitudes greater than 2000 m above sea level, special measuring ranges are required. Higher pressure ranges with special design available on request.		

Performance

Pressure

Digital non-linearity	$\leq \pm 0,02$ %FS	Best fit straight line (BFSL)
Accuracy @ RT (20...25 °C)	$\leq \pm 0,05$ %FS	Non-linearity (best fit straight line, BFSL), pressure hysteresis, non-repeatability, zero point deviation and amplification deviation
Total error band (0...50 °C)	$\leq \pm 0,2$ %FS	Max. deviation within the compensated pressure and temperature range. Experience shows that, outside the compensated temperature range, the total error band in the ambient temperature range is expanded by 0,1 %FS.
Compensated temperature range	0...50 °C	
Analog interface additional deviation	$\leq \pm 0,05$ %FS	With reference to accuracy @ RT and the total error band.
Long-term stability	0,15 %FS	Per year under reference conditions, annual recalibration recommended.
Position dependency	$\leq \pm 2$ mbar	Calibrated in vertical installation position with pressure connection facing downwards.
Resolution	0,002 %FS	Digital
Signal stability	0,0025 %FS	Digital noise-free
Internal measurement rate	≥ 1800 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.

Temperature

Accuracy	$\leq \pm 1,5$ °C	The temperature is measured on the pressure sensor (silicon chip) that sits behind the metallic diaphragm.
Resolution	$\leq 0,01$ °C	
Internal measurement rate	≥ 10 Hz	
Note	The data applies within the compensated temperature range.	

Series 36XS – Specifications

Electrical data

Connectivity	digital	2-wire + digital
Analog interface		4...20 mA
Digital interface	RS485	RS485
Voltage supply	3,2...32 VDC	10...32 VDC
Power consumption (without communication)	< 8 mA	3,5...22,5 mA
RS485 voltage insulation	± 32 VDC	± 18 VDC
Note	Disturbance of the analog interface occurs during communication via the digital interface. Simultaneous operation of the analog and digital interface is not recommended.	

Start-up time (power supply ON)	< 60 ms
Overvoltage protection and reverse polarity protection	± 32 VDC
GND case insulation	> 10 MΩ @ 500 VDC

Analog interface

Load resistance	< (U - 10 V) / 25 mA
Limiting frequency	≥ 300 Hz
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	
Unit of pressure	bar	Standard settings: bus address 1, baud rate 9600 bit/s
Unit of temperature	°C	
Data type	Float32 and Int32	Can be reconfigured via software by the customer later.
Baud rates	9600 and 115'200 bit/s	
Cable lengths	Up to 1,2 km	

Electrical connection

Cable	polyethylene (PE) ø 5,8 mm	Integrated capillary
	PAA: polyolefin (PE-based) ø 5,8 mm	
Standard cable lengths	10 m, 15 m, 25 m, 40 m, 100 m	Others available 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	
Lightning protection (advanced surge protection) in accordance with EN 61000-4-5	Line-line: 200 A @ 8/20 µs Line-line: 50 A @ 8/20 µs	2-wire + digital digital
	Line-CASE: 2 kA @ 8/20 µs	

Series 36XS – Specifications

Mechanical data

Materials in contact with media

Housing	Stainless steel AISI 316L	
Pressure transducer diaphragm	Stainless steel AISI 316L	
Pressure transducer seal (internal)	none	
Cable gland seal (internal)	FKM	
End cap	POM	
Cable sheath	PR: polyethylene (PE)	Medium: water
	PAA: polyolefin (PE-based)	

Other materials

Pressure transducer oil filling	Silicone oil
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Further details

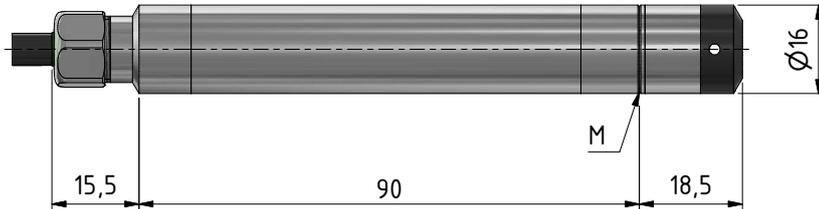
Pressure connection	None (end cap)	See Dimensions and options
Diameter × length	Ø 16 mm × approx. 124 mm	
Weight (excluding cable)	approx. 70 g	

Environmental conditions

Medium 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, use a cable with integrated capillary.
Vibration resistance	10 g, 10...2000 Hz, ± 10 mm	IEC 60068-2-6	
Shock resistance	50 g, 6 ms	IEC 60068-2-27	

Series 36XS – Dimensions and options

Electrical connections



M: marking of diaphragm position

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

Available pressure connections

End cap
Restored diaphragm (M)

Customised configurations on request

- Other compensated pressure ranges
- Integration of application-specific calculations
- Modifications to customer-specific applications

Examples of similar products

- Series 36XW: Level probe with maximum performance and RS485 and analog interface
- Series 36XiW: Level probe with maximum performance and SDI-12 interface
- Series 27X: Highly accurate level probe in slender design (19 mm diameter) with RS485 and analog interface
- Series 26X: Highly accurate level probe with RS485 and analog interface

Series 36XS – Software, scope of delivery and accessories

Modbus 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-pressure.com. To integrate the communication protocol into your own software, documentation, a Dynamic Link Library (DLL) and various program examples are available.

Interface converters

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 CCS30 software has no licence costs and is used to perform configurations and record measured values.

Record of measured values

- Live visualisation
- Configurable 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

Calibration certificate

Issued by KELLER Pressure.

Accessories

Calibration certificate	Interface converter
	
Issued by an external calibration laboratory accredited by DakkS or SAS.	K-114 <ul style="list-style-type: none"> • Analog measurement 0...10 V and 4...20 mA • 12 V measuring device supply via USB • USB interface galvanically isolated • Bias and terminating resistors can be activated