Series 36XW

Piezoresistive level probe with highest accuracy

Features

- RS485 interface can be combined with analog interface
- Analog interface rangeable 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

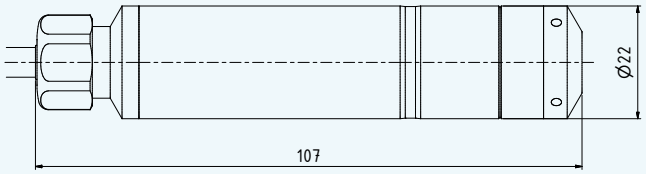
- Insulated and encapsulated piezoresistive pressure sensor
- High-quality pressure transducer and tried-and-tested mathematical compensation
- Robust stainless-steel housing

Typical applications

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

Accuracy
± 0,05 %FS
Total error band
± 0,1 %FS @ 0…50 °C
Pressure ranges
0…0,3 to 0…30 bar

Series 36XW



Edition 01/2023
Subject to alterations
info@keller-druck.com

Series 36XW – Specifications

Standard pressure ranges

Water column approx.	Relative pressure PR	Absolute pressure PAA	Proof pressure
0…3	0…0,3		3
0…10	0…1		
		0,8…2	9
0…30	0…3	0,8…4	
0…60	0…6	0,8…7	18
0…100	0…10	0,8…11	30
0…160	0…16	0,8…17	40
0…300	0…30	0,8…31	40
mH2O	bar rel.	bar abs.	bar
Analog interface also rangeable to other units	Reference pressure at atmospheric pressure	Reference pressure at 0 bar abs. (vacuum)	With reference to reference pressure
Note	PAA 0,8...2 bar: Special measuring ranges are required for installations above 2000 m a.s.l.		

Performance

Pressure

Digital nonlinearity	≤ ± 0,02 %FS	Best fit straight line (BFSL)
Accuracy @ RT (20…25 °C)	≤ ± 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)	≤ ± 0,1 %FS	Maximum deviation within the specified 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	Other temperature ranges between -20…85 °C are possible as an option
Analog interface additional deviation	≤ ± 0,05 %FS	With reference to accuracy @ RT and the total error band
Long-term stability	typ. ± 0,05 %FS	Per year under reference conditions, annual recalibration recommended
	max. ± 0,1 %FS	
Position dependency	≤ ± 2 mbar	Calibrated in vertical installation position with pressure connection facing downwards
Resolution	0,0005 %FS	Digital
Signal stability	0,0025 %FS	Digital noise-free
Internal measurement rate	≥ 1800 Hz	≥ 6000 Hz in the case of the “3-wire + digital (0…10 V, 0…5 V)” version
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	

Series 36XW – Specifications

Temperature

Accuracy	≤ ± 1,5 °C	The temperature is measured on the pressure sensor (silicon chip) that sits behind the metallic separating diaphragm
Optional	≤ 0,1 °C	The temperature is also measured by a Pt1000 sensor behind the pressure transducer
Resolution	≤ 0,01 °C	
Internal measurement rate	≥ 10 Hz	
Note	The data apply within the compensated temperature range	

Electrical data

Connectivity	digital	2-wire + digital	3-wire + digital		
Analog interface		4…20 mA	0…10 V	0…5 V	0,1…2,5 V
Digital interface	RS485	RS485	RS485	RS485	RS485
Voltage supply	3,2…32 VDC	8…32 VDC	13…32 VDC	8…32 VDC	3,2…32 VDC
Power consumption (without communication)	< 8 mA	3,5…22,5 mA	< 8 mA	< 8 mA	< 8 mA
RS485 voltage insulation	± 32 VDC	± 18 VDC	± 32 VDC	± 32 VDC	± 32 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)	< 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
		3-wire (0,1…2,5 V)
	≥ 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
Pressure unit	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

Series 36XW – Specifications

Electromagnetic compatibility

CE conformity as per 2014/30/EU (EMC)	EN 61326-1 / EN 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

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	Others on request
Cable gland seal (internal)	FKM	
End cap	POM	Stainless steel 316L optional
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

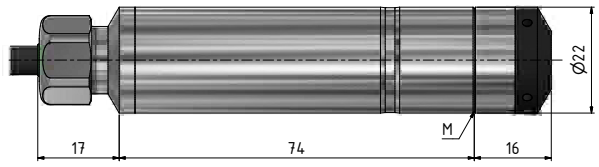
Pressure connection	None (end cap), optional G1/4	See Dimensions and options
Diameter × length	ø 22 mm × approx. 106 mm	
Weight (excluding cable)	approx. 150 g	

Environmental conditions

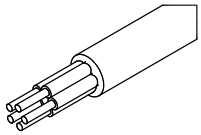
Medium temperature range	-20…85 °C		Icing not permitted
Ambient temperature range	-20…85 °C		
Storage temperature range	-20…85 °C		
Protection	IP68	Cable gland	for relative pressure, use a cable with integrated capillary
Vibration resistance	10 g, 10…2000 Hz, ± 10 mm	IEC 60068-2-6	
Shock endurance	50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

Series 36XW – Dimensions and options

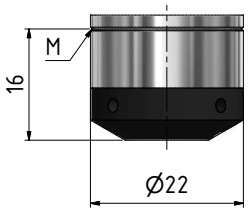
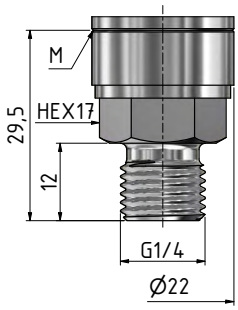
Electrical connections



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 228-1

Customer-specific options

- Other compensated pressure ranges
- Other compensated temperature ranges within -20…85 °C
- Other cable sheath materials
- Extended lightning protection
- Metal parts that come into contact with media made from Hastelloy C-276 or titanium
- O-Rings made of other materials
- Integration of application-specific calculations: e.g. tank content calculations
- Modifications to customer-specific applications

Examples of similar products

- Series 26X: Highly accurate level probe with RS485 and analog interface
- Series 26Xi: Highly accurate level probe with SDI-12 interface
- Series 36XiW: Level probe with excellent accuracy with SDI-12 interface
- Series 36XiW-CTD: Level probe with excellent accuracy with RS485 or SDI-12 interface
- OEM series: Pressure transducers with digital compensation electronics (e.g. series 10LX or 20SX with thread) for integration in one's own systems

Series 36XW – 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-druck.com. Documentation, a Dynamic Link Library (DLL) and various programming examples are available for integrating the communication protocol into your own software.

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 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