

Series 23SY-H2

Piezoresistive pressure transmitter for hydrogen applications



Features

- Stainless steel with increased nickel content for a lower embrittlement rate
- Gold-plated diaphragm for minimal H₂ diffusion
- Compensated over the entire temperature range
- Excellent long-term stability
- Optional: intrinsically safe version 23SY-Ei-H2 available for use in explosive environments

Technology

- Insulated and encapsulated piezoresistive pressure sensor chip
- Fully welded design with no internal seals
- Direct analog signal path with high bandwidth

Typical applications of hydrogen

- Manufacturing / production
- Transport
- Containment / storage
- Petrol stations

Accuracy

±0,25 %FS

Total error band

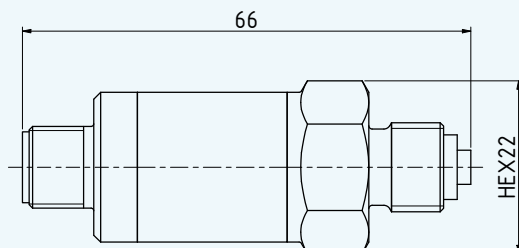
±0,7 %FS @ -10...80 °C

Pressure ranges

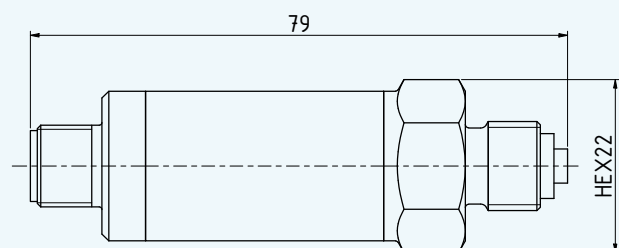
0...4 to 0...1000 bar



Series 23SY-H2



Series 23SY-Ei-H2



Series 23SY-H2 – Specifications

Standard pressure ranges

Relative pressure PR	Relative pressure PR	Proof pressure
0...4	-1...4	12
0...6	-1...6	18
0...10	-1...10	30
0...16	-1...16	48
0...25	-1...25	75
bar rel.		bar
Reference pressure at atmospheric pressure		Based on reference pressure

Absolute pressure PAA	Absolute pressure PA	Proof pressure
0...4	0...4	12
0...6	0...6	18
0...10	0...10	30
0...16	0...16	48
0...25	0...25	75
0...40	0...40	120
0...60	0...60	180
0...100	0...100	300
0...160	0...160	500
0...250	0...250	
0...350	0...350	800
0...400	0...400	
0...600	0...600	1200
0...700	0...700	
0...900	0...900	
0...1000	0...1000	
bar abs.	bar	bar
Reference pressure at 0 bar abs. (vacuum)	Reference pressure at 1 bar abs.	Based on reference pressure

Performance

Pressure

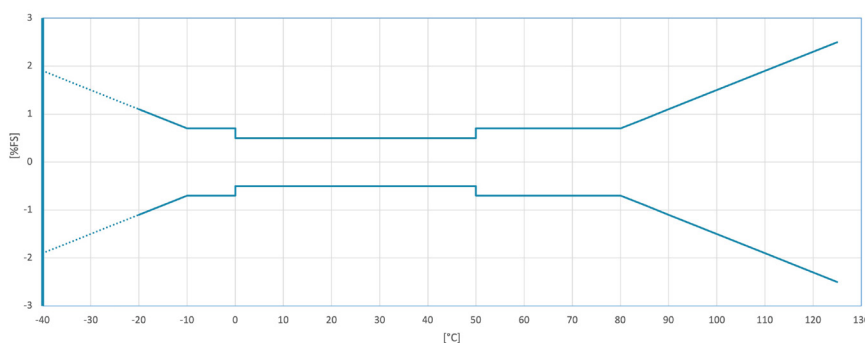
Accuracy	$\leq \pm 0,25\ \%FS$	Non-linearity (best fitted straight line BFSL), pressure hysteresis, non-repeatability
Total error band (0...50 °C)	$\leq \pm 0,5\ \%FS$	Maximum deviation within the compensated pressure and temperature range.
Total error band (-10...80 °C)	$\leq \pm 0,7\ \%FS$	
Compensated temperature range	-10...80 °C	
Long-term stability	$\leq \pm 0,2\ \%FS$	Per year under reference conditions, annual recalibration recommended.
Position dependency	$\leq \pm 1,5\ mbar$	Calibrated in vertical installation position with pressure connection facing downwards.

Total error band

The graph opposite shows the maximum deviation across the entire medium temperature range (-20...125 °C, optional: -40...125 °C).

Within the compensated pressure and temperature range, the total error has a maximum value of 0,5 %FS (0...50 °C) or 0,7 %FS (-10...80 °C).

Experience shows that outside the compensated temperature range, total error increases linearly by 0,04 %FS/K.



Series 23SY-H2 – Specifications

Electrical data

Connectivity	2-wire	3-wire
Analog interface	4...20 mA	0...10 V
Signal output limitation	3,2...22,3 mA	-1,2...11,2 V
Voltage supply 23SY-H2	8...32 VDC	13...32 VDC
Voltage supply 23SY-Ei-H2	10...30 VDC	15...30 VDC
Power consumption		< 5 mA

Start-up time (power supply ON)	< 5 ms (0...99 %)
Overvoltage and reverse polarity protection	± 32 VDC
GND case insulation	> 10 MΩ @ 300 VDC

Analog interface

Load resistance 23SY-H2	< (U - 8 V) / 25 mA	2-wire
	> 5 kΩ	3-wire
Load resistance 23SY-Ei-H2	< (U - 10 V) / 25 mA	2-wire
	> 100 kΩ	3-wire
Limiting frequency	1 kHz	

Electrical connection

Standard plug	Round plug	M12 x 1	DIN EN 61076-2-101, A-coded, 4-pin
Alternative plug	Valve plug	Form A (18 mm)	DIN EN 175301-803-A (formerly DIN 43650)

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
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Mechanical data

Materials in contact with media

Pressure connection	Stainless steel AISI 316L / 1.4435
Pressure transducer diaphragm	Stainless steel AISI 316L / 1.4435, gold plating 6 µm
Pressure transducer seal (internal)	None
Pressure connection seal (external)	None, metallically sealed

Other materials

Pressure transducer oil filling	Silicone oil
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Further details

Pressure connection	G1/4 "Mano" with centring pin	See Dimensions and variants
	1/4-18NPT male	
	7/16-20UNF 2B female	
Diameter × length	ø 22 mm × approx. 70 mm	
Weight (excluding cable)	approx. 120 g	

Series 23SY-H2 – Specifications

Environmental conditions

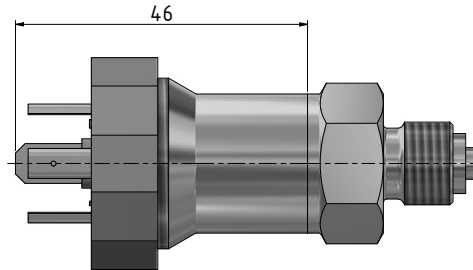
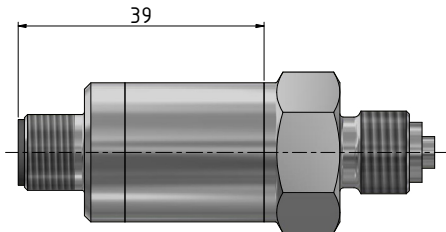
Medium temperature range	-40...125 °C		Icing not permitted
Ambient temperature range 23SY-H2	-40...85 °C		
Ambient temperature range 23SY-Ei-H2	See operating instructions		
Storage temperature range	-20...85 °C		
Protection	IP67	Round plug, M12 x 1	For relative pressure IP54
	IP65	Valve plug, form A, DIN EN 175301-803-A (formerly DIN 43650)	Included in delivery For relative pressure, use a cable with integrated capillary.
Notes	- Degrees of protection are only valid with the corresponding mating plug in the connected state. - The design implementation of the ventilation for relative pressure versions can be found in the respective technical drawing.		
Vibration resistance	10 g, 10...2000 Hz, ±10 mm	IEC 60068-2-6	
Shock resistance	50 g, 6 ms	IEC 60068-2-27	
Load cycles @ RT (20...25 °C)	10 m. pressure cycles	≤ 400 bar	0...100 %FS
	2 m. pressure cycles	> 400...600 bar	
	100'000 pressure cycles	> 600...1000 bar	

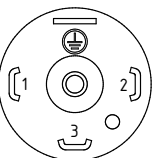
Explosion protection 23SY-Ei-H2

Intrinsically safe version in accordance with 2014/34/EU (ATEX), UKSI 2016/1107 (UKEX) and IECEx	IBExU 10 ATEX 1124 X IECEX IBE 14.0044 XExV21UKEX1017X	Ex II 1G Ex ia IIC T6-T4 Ga Ex II 1D Ex ia IIIC T 130 °C Da
Note	The conditions for safe use can be found in the operating instructions.	

Series 23SY-H2 – Dimensions and variants

Electrical connections

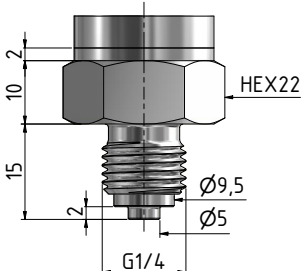
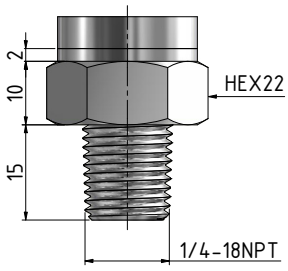
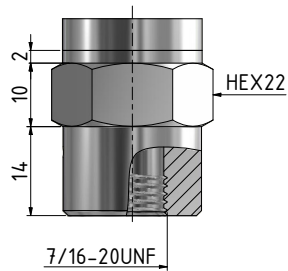


Round plug	2-wire		3-wire	
M12 × 1	4...20 mA		0...10 V	
	1	n.c.	1	GND
	2	OUT/GND	2	+OUT
	3	+Vs	3	+Vs
	4	n.c.	4	n.c.
Valve plug	2-wire		3-wire	
Form A	4...20 mA		0...10 V	
	1	n.c.	1	GND
	2	OUT/GND	2	+OUT
	3	+Vs	3	+Vs
	⊥	Case	⊥	Case

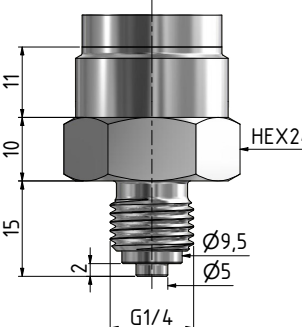
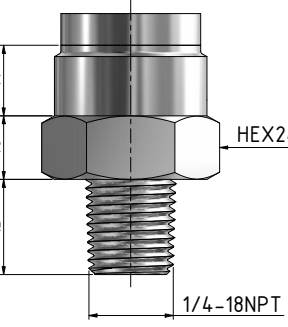
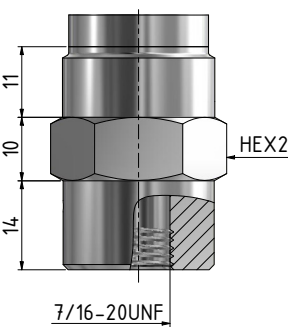
Series 23SY-H2 – Dimensions and variants

Available pressure connections

Pressure ranges ≤ 80 bar

G1/4 "Mano" with centring pin	1/4-18NPT male	7/16-20UNF 2B female
		
DIN EN837	ASME/ANSI B 120.1	Autoclave SF250CX20

Pressure ranges > 80 bar

G1/4 "Mano" with centring pin	1/4-18NPT male	7/16-20UNF 2B female
		
DIN EN837	ASME/ANSI B 120.1	Autoclave SF250CX20

Examples of similar products

- Series 23SX-H2: high-precision industrial transmitter for hydrogen applications.
- LEO-Record-H2: digital gauge with logger function for hydrogen applications.
- Pressure transmitter modules for hydrogen: pressure transducer with electronics (e.g. Series 10LY-H2 or 20SY-H2 with thread) for integration into one's own systems

Series 23SY-H2 – Accessories

Scope of delivery

Calibration certificate	Mating plug to valve plug, form A	Copper seal for G 1/4 «mano» with centering pin
		

Accessories

Calibration certificate with 5 measuring points	Calibration certificate with 11 measuring points	Calibration certificate	Mating plug to round plug M12
			
Deviation at room temperature. Issued by KELLER Pressure.	Deviation at room temperature with hysteresis. Issued by KELLER Pressure.	Issued by an external calibration laboratory accredited by DakkS or SAS.	• Angled socket, cable 5 m PN 602515.0093 • Angled socket, cable 2 m PN 602515.0094 • Female connector, cable 5 m PN 602515.0095 • Female connector, cable 2 m PN 602515.0096