

Series 23SY

Piezoresistive pressure transmitter for increased requirements

Features

- Compensated over the entire temperature range
- Excellent long term stability
- Robust stainless steel housing
- Optional: Intrinsically safe version 23SY-Ei 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

- Industrial applications
- Machinery and plant manufacturing
- Agriculture
- Mobile hydraulics
- Railway industry

Accuracy

± 0,25 %FS

Total error band

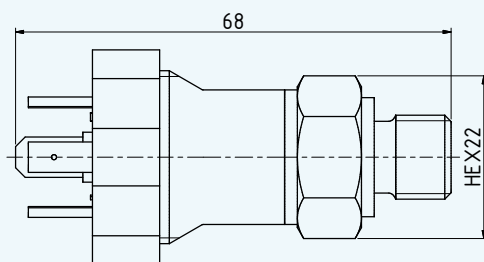
± 0,7 %FS @ -10...80 °C

Pressure ranges

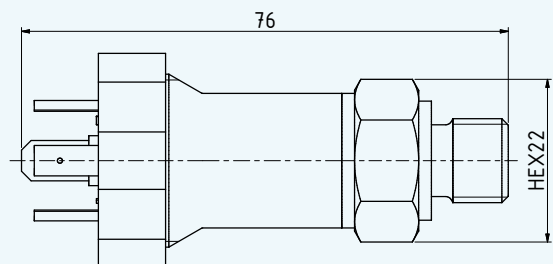
0...0,1 to 0...1000 bar



Series 23SY



Series 23SY-Ei



Series 23SY – Specifications

Standard pressure ranges

Relative pressure PR	Relative pressure PR	Proof pressure
0...0,1	-0,1...0,1	3
0...0,16	-0,16...0,16	
0...0,25	-0,25...0,25	
0...0,4	-0,4...0,4	
0...0,6	-0,6...0,6	
0...1	-1...0	
	-1...1	9
0...1,6	-1...1,6	
0...2,5	-1...2,5	
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
0,5...1,1		3
0...1		
0...1,6		9
0...2,5		
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...400	0...400	800
0...600	0...600	1200
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	$\leq \pm 0,25\text{ \%FS}$	$> 0,3...1000\text{ bar}$	Non-linearity (best fitted straight line BFSL), pressure hysteresis, non-repeatability
	$\leq \pm 0,5\text{ \%FS}$	$> 0,15...0,3\text{ bar}$	
	$\leq \pm 1,0\text{ \%FS}$	$0,1...0,15\text{ bar}$	
Total error band 0...50 °C	$\leq \pm 0,5\text{ \%FS}$	$\geq 2...1000\text{ bar}$	Maximum deviations within the compensated pressure and temperature range
Total error band -10...80 °C	$\leq \pm 0,7\text{ \%FS}$		
Compensated temperature range	-10...80 °C		
Long term stability	$\leq \pm 0,2\text{ \%FS}$	$> 2\text{ bar}$	Per year under reference conditions
	$\leq \pm 4\text{ mbar}$	$\leq 2\text{ bar}$	
Position dependency	$\leq \pm 1,5\text{ mbar}$	Calibrated in vertical installation position with pressure connection facing downwards	
Vacuum resistance	For operating pressures $\leq 0,1\text{ bar abs.}$, a vacuum-optimised version is recommended		

Series 23SY – Specifications

Performance

Total error band

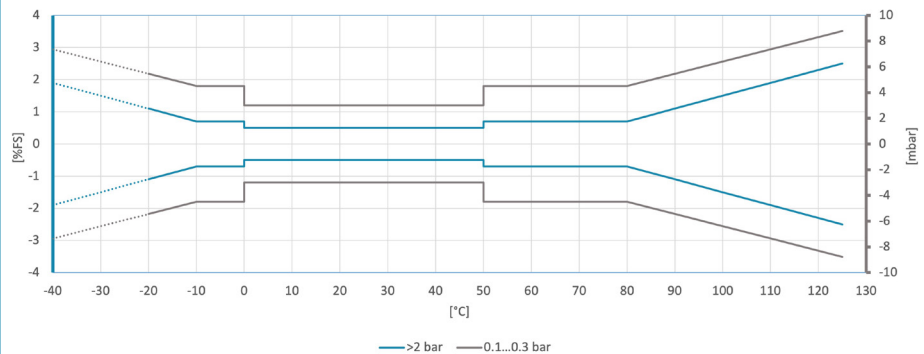
The graph shows the maximum deviation over the entire medium temperature range (-20...125 °C, optional: -40...125 °C).

The blue line shows the total error band for pressure ranges $\geq 2...1000$ bar:
 $\pm 0,5$ %FS (0...50 °C)
 $\pm 0,7$ %FS (-10...80 °C)

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

For pressure ranges between 0,3 and 2 bar, the blue line is multiplied by a factor of 2:
 $\pm 1,0$ %FS (0...50 °C)
 $\pm 1,5$ %FS (-10...80 °C)

The grey line (secondary axis, absolute values) shows the TEB for small pressure ranges (0,1...0,3 bar):
 ± 3 mbar (0...50 °C)
 $\pm 4,5$ mbar (-10...80 °C).



Electrical data

Connectivity	2-wire	3-wire		
Analog interface	4...20 mA	0...10 V	0...5 V	0,5...4,5 V
Signal output limitation	3,2...22,3 mA	-1,2...11,2 V	-0,6...5,6 V	0,1...4,9 V
Voltage supply 23SY	8...32 VDC	13...32 VDC	8...32 VDC	8...32 VDC
Voltage supply 23SY-Ei	10...30 VDC	15...30 VDC	10...30 VDC	10...30 VDC
Power consumption		< 5 mA	< 5 mA	< 4 mA
Note	Pressure ranges $\leq 0,15$ bar: Signal output limitation higher than listed, but max. 31,5 mA Signal output 0,5...4,5 V not possible			

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

Analog interface

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

Electrical connection

Plug	Round plug	M12 $\times$ 1	DIN EN 61076-2-101, A-coded, 4-pin
	Round plug 423 - 723 - 425	M16 $\times$ 0,75	DIN EN 61076-2-106, 5-pin
	Valve plug	Form A (18 mm)	DIN EN 175301-803-A (DIN 43650)
Cable	$\varnothing$ 5,8 mm, PE sheath	Cable gland	
Standard cable lengths	2 m, 5 m	Others on request	

Series 23SY – Specifications

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
Pressure transducer separating diaphragm	Stainless steel AISI 316L
Pressure transducer seal (internal)	None
Pressure connection seal (external)	FKM (75 Shore, -20...200 °C)

Other materials

Pressure transducer oil filling	Silicone oil
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Further details

Pressure connection	G1/4 male	See Dimensions and variants
	G1/4 female	
	1/4-18NPT male	
	G1/2 male	
Diameter × length	ø 21 mm × approx. 70 mm	
Weight (excluding cable)	approx. 120 g	

Environmental conditions

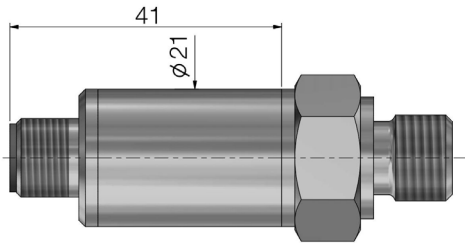
Medium temperature range	-20...125 °C	Optional -40...125 °C	Icing not permitted
Ambient temperature range 23SY	-20...85 °C	Optional -40...85 °C	
Ambient temperature range 23SY-Ei	See operating instructions		
Storage temperature range	-20...85 °C	Optional -40...85 °C	
Protection	IP67	Round plug, M12 × 1	For relative pressure IP54
	IP40	Round plug 423 - 723 - 425	IP67 optional For relative pressure use a cable with integrated capillary.
	IP65	Valve plug, Form A	For relative pressure use a cable with integrated capillary.
	IP68	Cable gland	For relative pressure use a cable with integrated capillary.
Notes	- Degrees of protection are valid only with the corresponding mating plug. - 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 million pressure cycles	0...100 %FS	For pressures > 450 bar on request

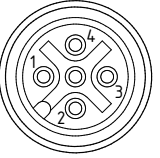
Explosion protection 23SY-Ei

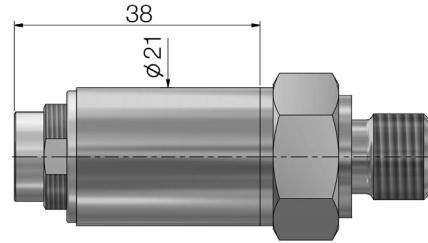
Intrinsically safe version in accordance with 2014/34/EU (ATEX), UKSI 2016/1107 (UKEX) and IECEx	IBExU 10 ATEX 1124 X IECEx IBE 14.0044 X ExV21UKEX1017X	23SY-Ei	Ex II 1G Ex ia IIC T6-T4 Ga Ex II 1D Ex ia IIIC T 130 °C Da
Note	The conditions for safe use can be found in the operating instructions.		

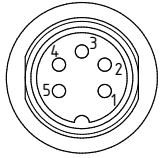
Series 23SY – Dimensions and variants

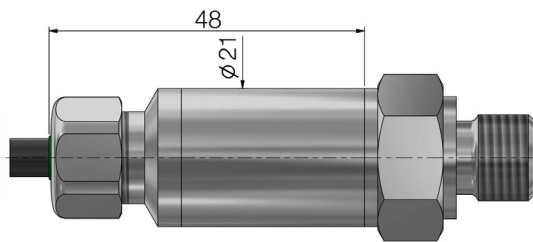
Electrical connections

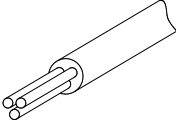


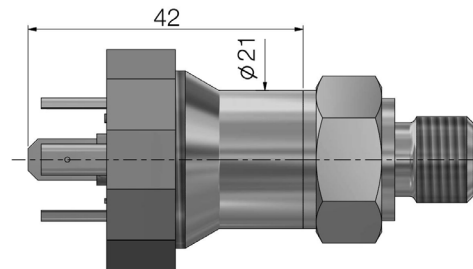
Round plug	2-wire		3-wire	
M12 × 1	4...20 mA		0...max. 10 V	
	1	n.c.	1	GND
	2	OUT/GND	2	+OUT
	3	+Vs	3	+Vs
	4	n.c.	4	n.c.

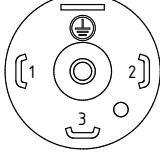


Round plug	2-wire		3-wire	
M16 × 0,75	4...20 mA		0...max. 10 V	
	1	n.c.	1	GND
	2	OUT/GND	2	+OUT
	3	+Vs	3	+Vs
	4	n.c.	4	n.c.
	5	n.c.	5	n.c.



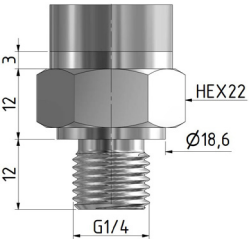
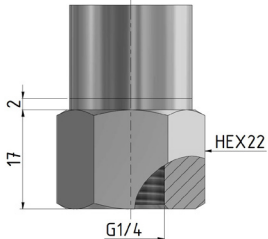
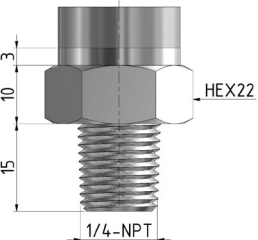
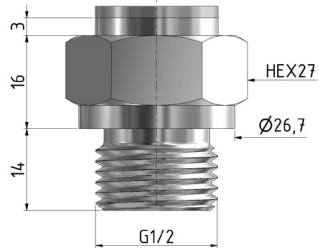
Cable gland	2-wire		3-wire	
Cable Ø 5,8	4...20 mA		0...max. 10 V	
	WH	n.c.	WH	GND
	RD	OUT/GND	RD	+OUT
	BK	+Vs	BK	+Vs
	Shield on CASE		Shield on CASE	



Valve plug	2-wire		3-wire	
Form A (18mm)	4...20 mA		0...max. 10 V	
	1	n.c.	1	GND
	2	OUT/GND	2	+OUT
	3	+Vs	3	+Vs
	⬇	CASE	⬇	CASE

Series 23SY – Dimensions and variants

Available pressure connections

G1/4 male 	G1/4 female 
DIN EN ISO 1179-2	DIN EN ISO 1179-2
1/4-18NPT male 	G1/2 male 
ASME/ANSI B 120.1	DIN EN ISO 1179-2

Customised configurations on request

- Other compensated pressure ranges
- Other compensated temperature ranges within -40...125 °C
- Other electrical connections
- O-rings made of other materials
- Other oil filling types for pressure transducers
- Vacuum-optimised version for operating pressures $\leq 0,1$ bar abs.
- Modifications to customer-specific applications

Examples of similar products

- Series 25SY: Front-flush pressure transmitter
- Series 21Y: Pressure transmitter for confined spaces
- Pressure transmitter modules: Pressure transducer with electronics (e.g. Series 9LY or 20SY with thread) for integration into one's own systems

Series 23SY – Accessories

Scope of delivery

Calibration certificate	Mating plug to round plug 581 - 680 - 682, IP40	Mating plug to valve plug, form A
		

Accessories

Calibration certificate with 5 measuring points	Calibration certificate with 11 measuring points	Calibration certificate	Mating plug to M12	Mating plug to round plug 423 - 723 - 425, IP67
				
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	Mating plug for increased protection demands PN 508405.0004