

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
- 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

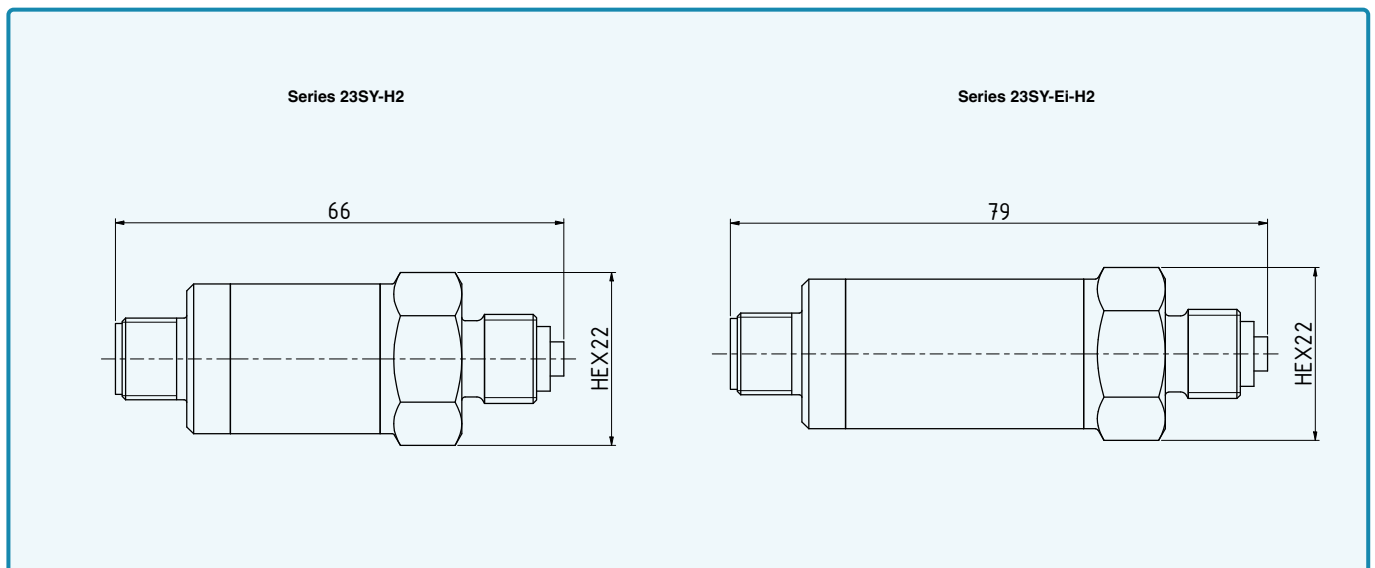
±0,25 %FS

Total error band

±0,7 %FS @ -10...80 °C

Pressure ranges

0...4 to 0...900 bar



Series 23SY-H2 – Specifications

Standard pressure ranges

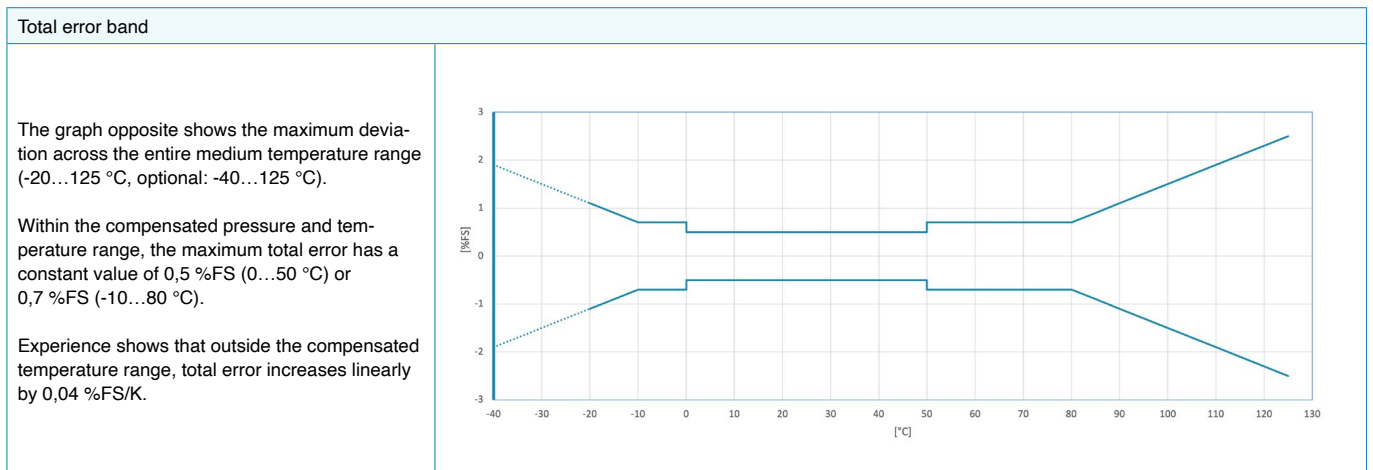
| Relative pressure PR | Relative pressure PR | Proof pressure |
|--|-------------------------|-----------------------------|
| 0...4 | -1...4 | 12 |
| 0...6 | -1...6 | 18 |
| 0...10 | -1...10 | 30 |
| 0...16 | -1...16 | 48 |
| 0...25 | -1...25 | 75 |
| bar rel. | | bar |
| Reference pressure at atmospheric 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 | |
| 0...250 | 0...250 | 500 |
| 0...350 | 0...350 | 800 |
| 0...400 | 0...400 | |
| 0...600 | 0...600 | 1200 |
| 0...700 | 0...700 | |
| 0...900 | 0...900 | |
| 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 | Other, optional temperature ranges within -40...125 °C possible. |
| Long-term stability | $\leq \pm 0,2\%FS$ | Per year under reference conditions, annual recalibration recommended. |
| Position dependency | $\leq \pm 1,5\text{ mbar}$ | Calibrated in vertical installation position with pressure connection facing downwards. |



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 |
|---------------------------------------|---|

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, metallicity sealed |

Other materials

| | |
|---------------------------------|--------------|
| Pressure transducer oil filling | Silicone oil |
|---------------------------------|--------------|

Further details

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

Series 23SY-H2 – Specifications

Environmental conditions

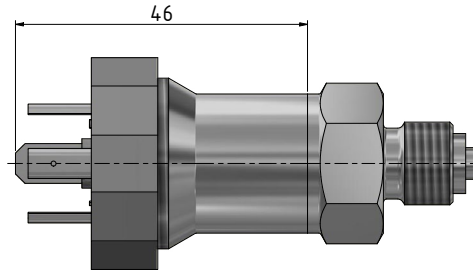
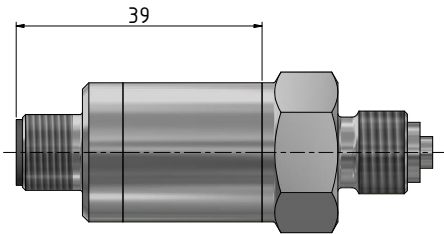
| | | | |
|--------------------------------------|--|--|---|
| Medium temperature range | -40...125 °C | | |
| Ambient temperature range 23SY-H2 | -40...85 °C | | Icing not permitted |
| Ambient temperature range 23SY-Ei-H2 | See operating instructions | | |
| Storage temperature range | -20...85 °C | | |
| 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 | <ul style="list-style-type: none"> 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, 11 ms | IEC 60068-2-27 | |
| Load cycles @ RT (20...25 °C) | 10 m. pressure cycles | ≤ 400 bar | 0...100 %FS |
| | 4 m. pressure cycles | > 400...600 bar | |
| | 1 m. pressure cycles | > 600...900 bar | |


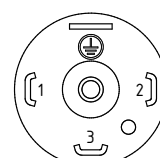
Explosion protection 23SY-Ei-H2

| | | |
|--|---|--|
| 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 XEx-V21UKEX1017X | 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 options

Electrical connections

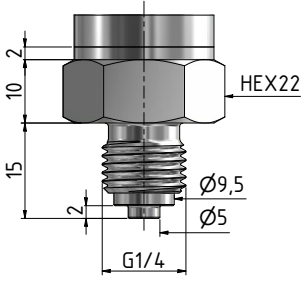
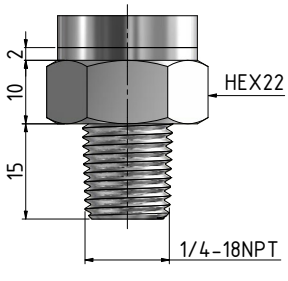
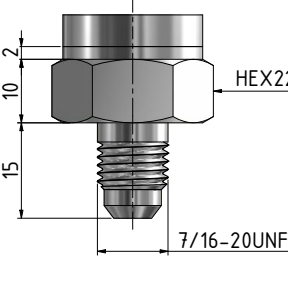
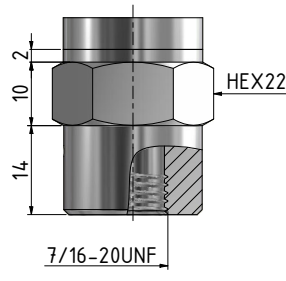


| Round plug | 2-wire | | 3-wire | | Valve plug | 2-wire | | 3-wire | |
|---|-----------|---------|----------|------|--|-----------|---------|----------|------|
| M12 × 1 | 4...20 mA | | 0...10 V | | Form A DIN EN 175301-803-A (formerly DIN 43650) | 4...20 mA | | 0...10 V | |
|  | 1 | n.c. | 1 | GND |  | 1 | n.c. | 1 | GND |
| | 2 | OUT/GND | 2 | +OUT | | 2 | OUT/GND | 2 | +OUT |
| | 3 | +Vs | 3 | +Vs | | 3 | +Vs | 3 | +Vs |
| | 4 | n.c. | 4 | n.c. | | ↓ | Case | ↓ | Case |

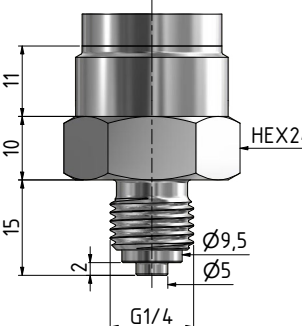
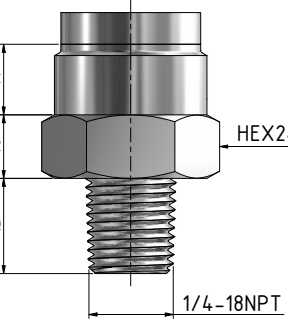
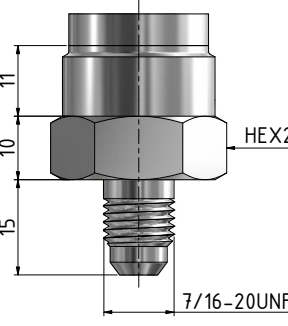
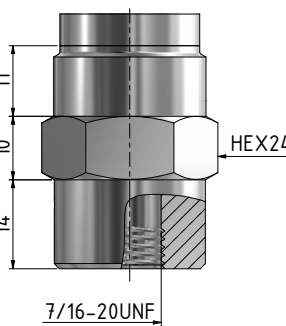
Series 23SY-H2 – Dimensions and options

Available pressure connections

Pressure ranges ≤ 160 bar

| G1/4 "Mano" with centring pin | 1/4-18NPT male | 7/16-20 UNF 2A male thread cone | 7/16-20 UNF 2B female |
|---|---|--|---|
|  |  |  |  |
| DIN EN837 | ASME/ANSI B 120.1 | SAE J512 | Autoclave SF250CX20 |

Pressure ranges > 160 bar

| G1/4 "Mano" with centring pin | 1/4-18NPT male | 7/16-20 UNF 2A male thread cone | 7/16-20 UNF 2B female |
|---|---|--|---|
|  |  |  |  |
| DIN EN837 | ASME/ANSI B 120.1 | SAE J512 | Autoclave SF250CX20 |



Other pressure connections available on request.

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.
- OEM series 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 | Female connector to valve plug, form A DIN EN 175301-803-A |
|  |  |

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. | Deviation at room temperature with hysteresis. Issued by KELLER. | Issued by an external calibration laboratory accredited by DakkS or SAS. | <ul style="list-style-type: none"> • Angled socket, cable 5 m <i>PN 602515.0093</i> • Angled socket, cable 2 m <i>PN 602515.0094</i> • Female connector, cable 5 m <i>PN 602515.0095</i> • Female connector, cable 2 m <i>PN 602515.0096</i> |