# Pressure sensor
# For medical gases
# Model MG-1



## Applications

- Distribution and storage of medical gases
- Oxygen treatment for patients in hospitals, at home and in ambulances

## Special features

- Measuring ranges from 0 … 6 to 0 … 16 bar and from 0 … 200 to 0 … 400 bar
- Output signals 4 … 20 mA, DC 0 … 10 V, DC 0 … 5 V, DC 1 ... 5 V, DC 0.5 … 4.5 V ratiometric
- Oxygen clean in accordance with international standards
- Available in four levels of cleanliness
- Three packaging variants


**Pressure sensor model MG-1**

## Description

The model MG-1 pressure sensor has been developed for the pressure measurement of medical gases and for oxygen applications. Only materials that are suitable for oxygen applications are used.

In order to ensure the required level of cleanliness, any contamination of the components during production is avoided. The model MG-1 is manufactured under controlled conditions, then it is marked for use in oxygen applications and packed with special care.

In line with international directives, different levels of cleanliness, different packaging and different instrument markings are available.

The MG-1 pressure sensor offers a solution which is optimised for your application.

## Measuring ranges

| Gauge pressure | | | | | | | |
|---|---|---|---|---|---|---|---|
| **bar** | **Measuring range** | **0 ... 6** | **0 ... 10** | **0 ... 16** | **0 ... 200** | **0 ... 300** | **0 ... 400** |
| | Overload safety | 20 | 20 | 32 | 500 | 800 | 800 |
| | Burst pressure | 25 | 25 | 160 | 1,200 | 1,700 | 1,700 |
| **psi** | **Measuring range** | **0 ... 100** | **0 ... 150** | **0 ... 200** | **0 ... 3,000** | **0 ... 4,000** | **0 ... 5,000** |
| | Overload safety | 290 | 290 | 460 | 7,200 | 11,000 | 11,000 |
| | Burst pressure | 1,450 | 1,450 | 2,300 | 17,000 | 24,000 | 24,000 |

The given measuring ranges are also available in kg/cm², MPa and kPa.
Vacuum and +/- measuring ranges are also available.

**Vacuum tightness**
Yes

## Output signals

| Signal type | Signal |
|---|---|
| **Current (2-wire)** | 4 ... 20 mA |
| **Voltage (3-wire)** | DC 0 ... 10 V<br>DC 0 ... 5 V<br>DC 1 ... 5 V |
| **Ratiometric (3-wire)** | DC 0.5 ... 4.5 V |

Depending on the signal the following loads apply:

| Signal | Load in Ω |
|---|---|
| **4 ... 20 mA** | ≤ (power supply - 8 V) / 0.02 A |
| **DC 0 ... 10 V**<br>**DC 0 ... 5 V**<br>**DC 1 ... 5 V**<br>**DC 0.5 ... 4.5 V ratiometric** | > max. signal / 1 mA |

## Voltage supply

The permissible power supply depends on the corresponding output signal.

| Output signal | Power supply |
|---|---|
| **4 ... 20 mA** | DC 8 ... 30 V |
| **DC 0 ... 10 V** | DC 14 ... 30 V |
| **DC 0 ... 5 V** | DC 8 ... 30 V |
| **DC 1 ... 5 V** | DC 8 ... 30 V |
| **DC 0.5 ... 4.5 V ratiometric** | DC 5 ± 0.5 V |

**Total current consumption**
maximum 10 mA (except for 2-wire signals)

## Accuracy

**Accuracy at reference conditions**
≤ ±2 % of span

Including non-linearity, hysteresis, zero offset and end value deviation (corresponds to measured error per IEC 61298-2). Calibrated in vertical mounting position with process connection facing downwards.

**Non-linearity**
≤ ±0.5 % of span BFSL (per IEC 61298-2)

**Temperature error**
≤ ±2.0 % of span

**Long-term drift (per IEC 61298-2)**
≤ 0.3 % of span/year

**Settling time**
≤ 2 ms

## Operating conditions

**Ingress protection (per IEC 60529)**
IP67

The stated ingress protection only applies when plugged in using a mating connector that has the appropriate ingress protection.

**Vibration resistance**
20 g (20 ... 2,000 Hz, 2 h) per IEC 60068-2-6

**Shock resistance**
40 g (6 ms) per IEC 60068-2-27 (mechanical shock)

**Temperatures**

| Permissible temperature ranges | | |
|---|---|---|
| **Rated temperature range** | -20 ... +70 °C | -4 ... +158 °F |
| **Ambient** | -20 ... +70 °C | -4 ... +158 °F |
| **Medium** | -20 ... +70 °C | -4 ... +158 °F |
| **Storage** | -25 ... +80 °C | -13 ... +176 °F |

## Reference conditions (per IEC 61298-1)

**Temperature**
15 ... 25 °C

**Atmospheric pressure**
860 … 1,060 mbar (665 ... 800 mmHg)

**Air humidity**
45 ... 75 % relative, non-condensing

**Power supply**
- DC 24 V
- DC 5 V with ratiometric output

**Mounting position**
as required

## Process connections

| Standard | Thread size |
|---|---|
| **EN 837** | G ⅛ B<br>G ¼ B |
| **DIN 3852-E** | G ¼ A [1)] |
| **ANSI/ASME B1.20.1** | ⅛ NPT<br>¼ NPT |
| **ISO 7** | R ¼ |
| **KS** | ¼ PT |
| **SAE** | 7/16-20 UNF-2A, O-ring BOSS [1)] |

1) Sealing ring from FKM

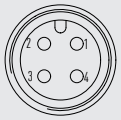
## Electrical connections

**Short-circuit resistance**
$S_+$ vs. 0V

**Reverse polarity protection**
$U_B$ vs. 0V

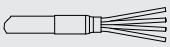
**Insulation voltage**
DC 500 V

**Connection diagrams**

| Circular connector M12 x 1 | | | |
|---|---|---|---|
| | | 2-wire | 3-wire |
|  | **$U_B$** | 1 | 1 |
| | **0V** | 3 | 3 |
| | **$S_+$** | - | 4 |

| Cable outlet, unshielded | | | |
|---|---|---|---|
| | | 2-wire | 3-wire |
|  | **$U_B$** | brown | brown |
| | **0V** | green | green |
| | **$S_+$** | - | white |

Wire cross-section 3 x 0.14 mm²
Cable diameter 3.2 mm
Cable length 2 m

| Cable outlet, shielded | | | |
|---|---|---|---|
| | | 2-wire | 3-wire |
|  | **$U_B$** | brown | brown |
| | **0V** | blue | blue |
| | **$S_+$** | - | black |

Wire cross-section 3 x 0.14 mm²
Cable diameter 4.3 mm
Cable length 2 m

## Cleanliness specifications

| Level of cleanliness | Measuring range < 30 bar/435 psi | Measuring range > 30 bar/435 psi |
|---|---|---|
| **Breathing gas** | Oil and grease free | Oil and grease free |
| ■ Residual hydrocarbons | < 1,000 mg/m² | < 1,000 mg/m² |
| **Medical standard** | per ISO 15001 | per ISO 15001 |
| ■ Residual hydrocarbons | < 550 mg/m² | < 220 mg/m² |
| ■ Particle size | not applicable | on request |
| **Industrial standard** | Oil and grease free for oxygen per ASTM G93 level D/E | Oil and grease free for oxygen per ASTM G93 level D/E |
| ■ Residual hydrocarbons | < 550 mg/m² | < 220 mg/m² |
| **High industrial standard** | Oil and grease free for oxygen per ASTM G93 level C | Oil and grease free for oxygen per ASTM G93 level C |
| ■ Residual hydrocarbons | < 66 mg/m² | < 66 mg/m² |

## Packaging

For the individual levels of cleanliness of the model MG-1 the following types of packaging are available.

| Level of cleanliness | Type of packaging |
|---|---|
| **Breathing gas** | Protection cap on the process connection |
| **Medical standard** | ■ Standard: Protection cap on the process connection, instrument sealed in a plastic bag<br>■ Option: Protection cap on the process connection, instrument sealed in two plastic bags |
| **Industrial standard** | |
| **High industrial standard** | |

## Materials

**Wetted parts**

- Process connection from stainless steel 316L and 13-8 PH
- Sealing ring from FKM (if available)

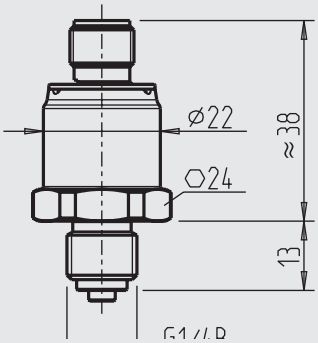
**Non-wetted parts**

- Case from stainless steel 316L
- Electrical connection from highly resistant, glass-fibre reinforced plastic PBT GF 30

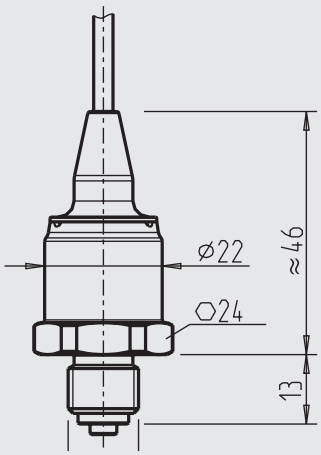
## Dimensions in mm

**Pressure sensor**

with M12 x 1 circular connector




with cable outlet

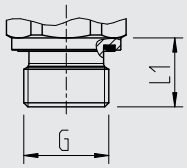


## Approvals

| Logo | Description | Country |
|---|---|---|
| CE | **EU declaration of conformity**<br>■ EMC directive, EN 61326 emission (group 1, class B) and immunity (industrial application)<br>■ Pressure equipment directive<br>■ RoHS directive | European Union |
| EAC | **EAC**<br>EMC directive | Eurasian Economic Community |
| | **KazInMetr**<br>Metrology, measurement technology | Kazakhstan |
| - | **MTSCHS**<br>Permission for commissioning | Kazakhstan |
| | **Uzstandard**<br>Metrology, measurement technology | Uzbekistan |
| - | **CRN**<br>Safety (e.g. electr. safety, overpressure, ...) | Canada |

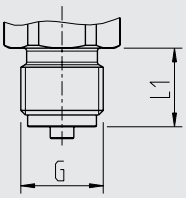
## Process connections

DIN EN ISO 1179-2
DIN EN ISO 9974-2
(formerly DIN 3852-E)



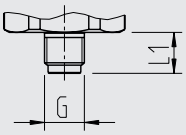

| G | L1 |
|---|---|
| G ¼ A | 14 |

EN 837



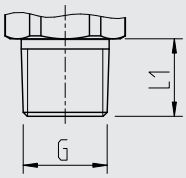

| G | L1 |
|---|---|
| G ¼ B | 13 |

EN 837



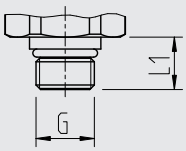

| G | L1 |
|---|---|
| G ⅛ B | 10 |

ANSI/ASME B1.20.1
KS
ISO 7




| G | L1 |
|---|---|
| ⅛ NPT | 10 |
| ¼ NPT | 13 |
| R ¼ | 13 |
| PT ¼ | 13 |

SAE J514 E




| G | L1 |
|---|---|
| 7/16-20 UNF-2A | 12.06 |

For information on tapped holes and welding sockets, see Technical information IN 00.14 at www.wika.com.

## Ordering information

Model / Measuring range / Output signal / Electrical connection / Process connection / Level of cleanliness / Type of packaging





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