

Pressure sensor module

Up to 25 bar gauge and absolute

Model MPR-1

WIKA data sheet PE 81.64

Applications

- Sensor integration projects
- Data logger
- Battery-operated applications
- Vacuum control

Special features

- 19 mm spanner width for limited mounting space
- No calibration necessary, due to compensated output signal
- Low-power version for long battery life
- Additional temperature output to monitor the internal sensor temperature



Fig. left: With threaded connection
Fig. right: With radial O-ring

Description

Compact, accurate and flexible

Even with the smallest dimensions, the MPR-1 offers a compensated and standardised output signal with high accuracy.

The internal adjustment is made digitally. As output signals, there are both analogue and digital versions to choose from (e.g. I²C).

In addition to the variants described in the data sheet, customer-specific versions are available on request.

Durable and with wide range of applications

The stainless steel measuring cell is welded to the process connection and is particularly well suited for use with corrosive media. On request, an oxygen-compatible version can be selected.

Typical use cases are found in applications in measurement and control technology, in which a high level of integration of pressure measurement is needed.

Specifically, the low-power version with digital signal is especially suitable for battery-operated data logger applications (e.g. wireless applications).

The minimum lot size is 50 pcs.

Diagnostic function

By means of the output signal, fault conditions can be detected and evaluated via software. It is possible to differentiate between permanent and temporary faults.

Measuring ranges

Gauge pressure						
bar	0 ... 0.4	0 ... 1	0 ... 1.6	0 ... 2.5	0 ... 4	0 ... 6
	0 ... 10	0 ... 16	0 ... 25			
psi	0 ... 5	0 ... 15	0 ... 30	0 ... 70	0 ... 150	0 ... 300

Absolute pressure						
bar	0 ... 0.4	0 ... 1	0 ... 1.6	0 ... 2.5	0 ... 4	0 ... 6
	0 ... 10	0 ... 16	0 ... 25			
psi	0 ... 5	0 ... 15	0 ... 30	0 ... 70	0 ... 150	0 ... 300

Vacuum and +/- measuring range		
bar	-0.2 ... +0.2	-1 ... 0

Temperature	
°C	-40 ... +125
°F	-40 ... +257

Special measuring ranges between 0 ... 0.4 and 0 ... 40 bar [0 ... 5 to 0 ... 600 psi] are available on request.

Special measuring ranges can have a reduced long-term stability and a higher temperature error.

Overload safety

Measuring ranges ≤ 16 bar [150 psi]: 3-fold

Measuring range 25 bar [300 psi]: 2.5-fold

Higher overload safety on request.

The overload safety is based on the selected measuring range. Depending on the selected process connection and sealing, restrictions in overload safety can result.

A higher overload safety will result in a higher temperature error.

Vacuum tightness

Yes

Output signals

Signal type	Signal
Current (2-wire)	4 ... 20 mA
Voltage (3-wire)	DC 1 ... 10 V
Ratiometric (3-wire)	DC 0.5 ... 4.5 V
Digital	I ² C

Other output signals on request.

Signal clamping (option for analogue signals)

Signal type	Signal	Zero point	Full scale
Current (2-wire)	4 ... 20 mA	3.6 mA	21 mA
Ratiometric (3-wire)	DC 0.5 ... 4.5 V	DC 0.25 V	DC 4.75 V

Diagnostic function (option for analogue signals)

Permanent errors in the electronics and temporary over- or underpressures can be output through defined constant output signals. A permanent error signal signifies a sensor defect and cannot be reset. The temporary error signal is reset as soon as the system pressure once again lies within the defined error limits. In the application, one can therefore realise an efficient system diagnosis.

Load in Ω

Signal type	Load
Current (2-wire)	$\leq (\text{power supply} - 7.8 \text{ V}) / 0.022 \text{ A}$ $\leq (\text{power supply} - 20 \text{ V}) / 0.022 \text{ A}$ (at temperatures $> 100 \text{ }^\circ\text{C}$ [$212 \text{ }^\circ\text{F}$] and power supply $> \text{DC } 20 \text{ V}$)
Voltage (3-wire)	$\leq 10 \text{ k}\Omega$
Ratiometric (3-wire)	$\leq 4.5 \text{ k}\Omega$

Communication protocol I²C

The MPR-1 is designed as a slave in the I²C bus and sends a pressure value to the master when it requests this. If no interrogation occurs, the MPR-1 switches to the power-saving "sleep mode".

For a detailed description, see "MPR-1 I²C protocol" at www.wika.com

Voltage supply

Signal type	Signal	Power supply	Total current consumption
Current (2-wire)	4 ... 20 mA	DC 8 ... 30 V	$\leq 25 \text{ mA}$
Voltage (3-wire)	DC 1 ... 10 V	DC 12 ... 30 V	$\leq 3.5 \text{ mA}$
Ratiometric (3-wire)	DC 0.5 ... 4.5 V	DC 5 V $\pm 10 \%$	$\leq 3.5 \text{ mA}$
Digital (I ² C)	I ² C	DC 2.3 ... 3.6 V	$\leq 2 \text{ mA}$ with measurement $\leq 2 \text{ }\mu\text{A}$ in sleep mode

Time response

Settling time per EN 61298-2

Analogue signals: 1 ms

Digital signal (I²C): max. 6 ms

Switch-on time

Analogue signals: 20 ms

Digital signal (I²C): 2.5 ms

Response time I²C

3 ms with a pulse frequency of ≥ 400 kHz

Switch-on drift

200 ms

Reference conditions (per IEC 61298-1)

Temperature: 15 ... 25 °C [59 ... 77 °F]

Atmospheric pressure: 860 ... 1,060 mbar [12.5 ... 15.4 psi]

Air humidity: 45 ... 75 % r. h.

Power supply: DC 24 \pm 0.24 V

DC 5 \pm 0.05 V with ratiometric output

DC 3 \pm 0.03 V with I²C output

Mounting position: Calibrated in vertical mounting position with process connection facing downwards.

Accuracy specifications (pressure)

	Non-linearity (per IEC 61298-2)	Accuracy ^{1) 2)}
Standard	$\leq \pm 0.25$ % of span (BFSL)	$\leq \pm 0.5$ % of span
Option ³⁾	$\leq \pm 0.125$ % of span (BFSL)	$\leq \pm 0.25$ % of span

1) Including non-linearity, hysteresis, zero offset and end value deviation (corresponds to measured error per IEC 61298-2).

2) 4 ... 20 mA: $\leq \pm 1$ %

3) Not for measuring ranges < 1 bar [15 psi]

Non-repeatability (per IEC 61298-2): ≤ 0.1 % of span

Long-term stability (per DIN 16086:2006-01): $\leq \pm 0.2$ % of span ($\leq \pm 0.25$ % of span with measuring range 0.4 bar [5 psi])

Long-term drift (per IEC 61298-2): $\leq \pm 0.1$ % of span ($\leq \pm 0.20$ % of span with measuring range 0.4 bar [5 psi])

Signal noise: $\leq \pm 0.2$ % of span

Accuracy specifications (temperature, only possible with I²C output signal)

Accuracy

-20 ... +60 °C [-4 ... +140 °F]: ±3.5 K

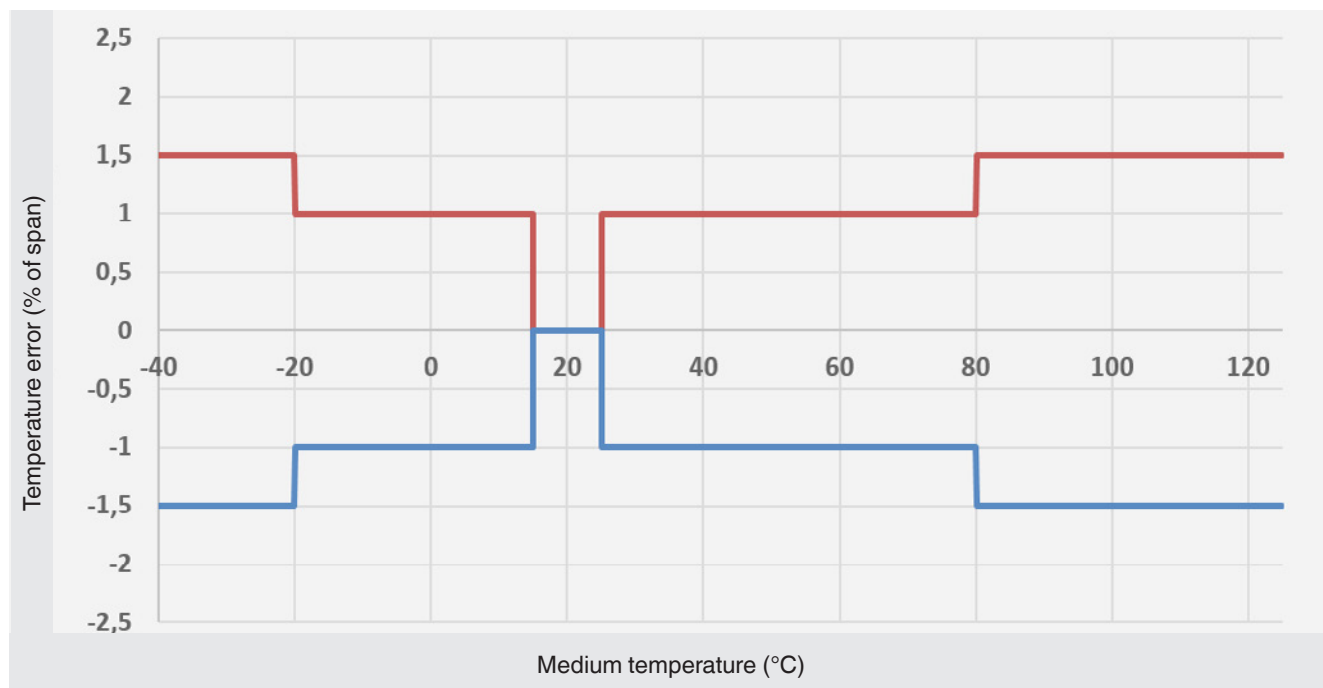
> 60 ... 80 °C [140 ... 176 °F]: ±4.75 K

> 80 ... 100 °C [176 ... 212 °F]: ±6 K

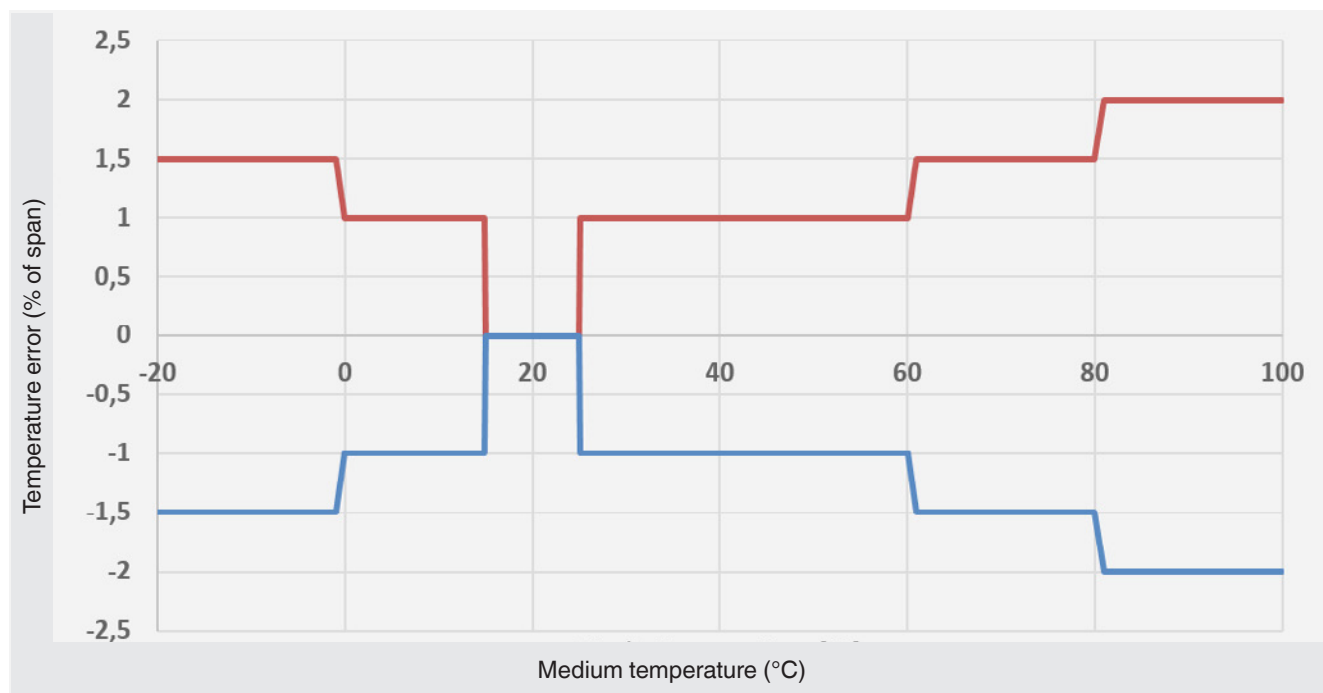
Temperature error (for calibration temperature 15 ... 25 °C [59 ... 77 °F])

For measuring ranges < 1 bar [15 psi], special measuring ranges and instruments with an increased overload safety the respective temperature error increases by 0.5 % of span in the range -40 ... -20 °C [-40 ... -4 °F] and 80 ... 125 °C [176 ... 257 °F].

■ Analogue signals



■ Digital signal (I²C)



Operating conditions

Permissible temperature ranges

Medium and ambient (analogue signals): -40 ... +125 °C [-40 ... +257 °F]

Medium and ambient (digital signal I²C): -20 ... +100 °C [-4 ... +212 °F]

Storage and transport: -40 ... +80 °C [-40 ... +176 °F]

Depending on the choice of sealing on the process connection and the electrical connection, there may be limitations in the medium and ambient temperatures (for restrictions see "Process connections, sealings" and "Electrical connections").

Vibration resistance

20 g, 10 ... 2,000 Hz (per IEC EN 60068-2-6)

Shock resistance

100 g, 6 ms (per IEC EN 60068-2-27)

Free-fall test (following IEC 60721-3-2)

Multiple packaging: 0.5 m [1.6 ft]

Process connections

Standard	Thread size	Sealing	
		Standard	Option
EN 837	G ½ B	Copper -40 ... +125 °C [-40 ... +257 °F]	Stainless steel -40 ... +125 °C [-40 ... +257 °F]
	G ¼ B		
DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ½ A	FPM/FKM -40 ... +125 °C [-40 ... +257 °F]	-
SAE J514 E	7/16-20 UNF-2A, O-ring BOSS	NBR -40 ... +100 °C [-40 ... +212 °F]	FPM/FKM -20 ... +125 °C [-4 ... +257 °F]
-	Radial O-ring	EPDM -40 ... +125 °C [-40 ... +257 °F]	-
ANSI/ASME B1.20.1	¼ NPT	-	-

Others on request.

Electrical connections

Designation	Ingress protection	Permissible temperature range
JST connector, 6-pin	none	-40 ... +125 °C [-40 ... +257 °F]

Others on request.

Electrical protective measures

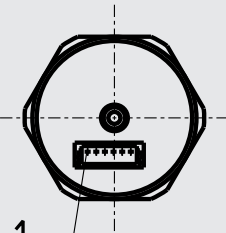
Short-circuit resistance: S+ vs. U-

Reverse polarity protection: U+ vs. U-

Overvoltage protection: DC 30 V (not valid with I²C output)

Insulation voltage: DC 500 V

Connection diagram

JST connector, 6-pin				
		2-wire	3-wire	I ² C
 <p>Pin 1</p>	U+	1	1	1
	U-	4	4	-
	S+	-	2	-
	GND	-	-	4
	SDA	-	-	5
	SCL	-	-	6
	EOC	-	-	2
	Reset	-	-	3

Other pin assignments on request.

Legend

U+	Positive power supply terminal
U-	Negative power supply terminal
S+	Analogue output
GND	Ground/Shielding
SDA	Data signal
SCL	Clock
EOC	End of Conversation
Reset	Reset

Materials

Wetted parts

Process connection and sensor: Stainless steel 316L
Sealing: see "Process connection"

Non-wetted parts

Case: Stainless steel 316 Ti
Potting: Polyurethane
Pressure transmission medium: Synthetic oil

Options for specific media

Medium	Option
Food	Food-compatible transmission fluid
Oil and grease free	Residual hydrocarbon: < 1,000 mg/m ² Packaging: Protection cap on the process connection
Oxygen, oil and grease free	Packaging: Protection cap on the process connection, instrument sealed in a PE bag Maximum permissible temperature -20 ... +60 °C [-4 ... +140 °F] Elastomer sealing: Only FKM possible, max. -15 ... +60 °C [5 ... 140 °F] and max. 30 bar [435 psi] measuring range.

Packaging and marking

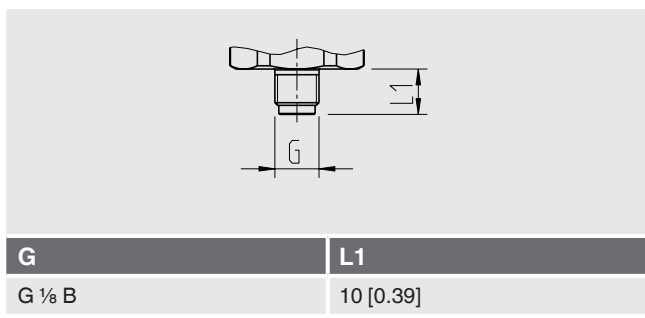
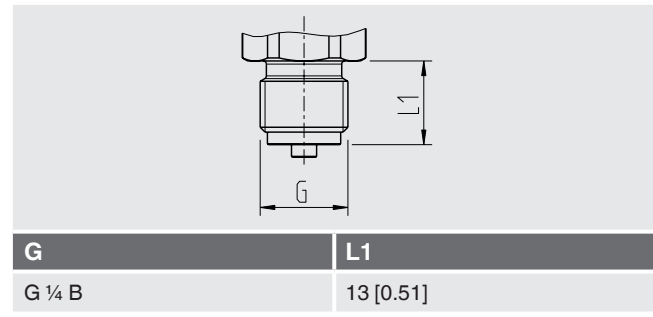
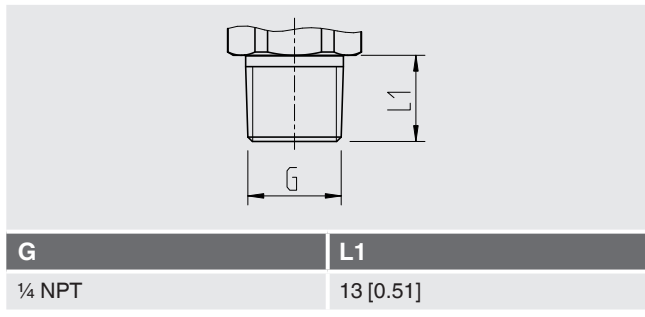
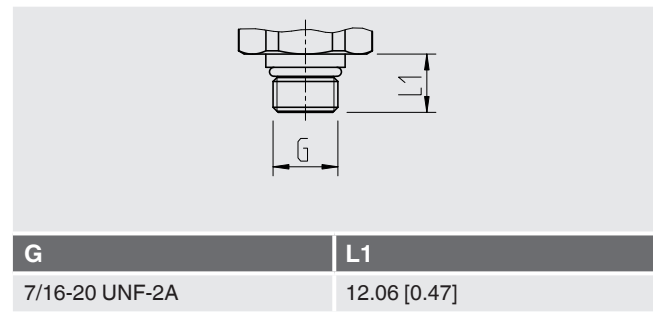
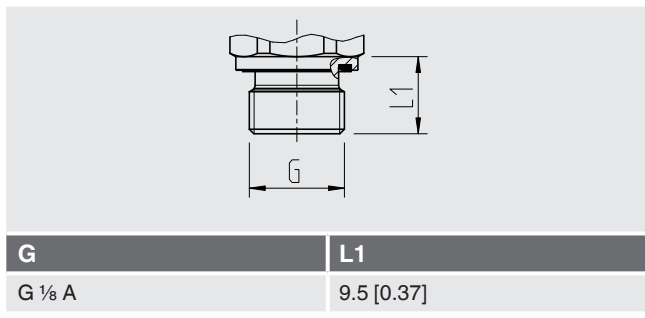
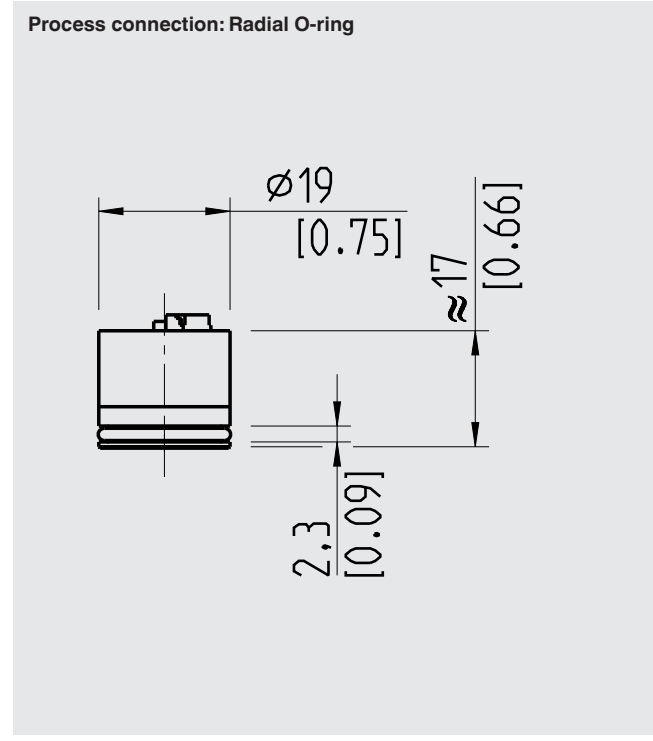
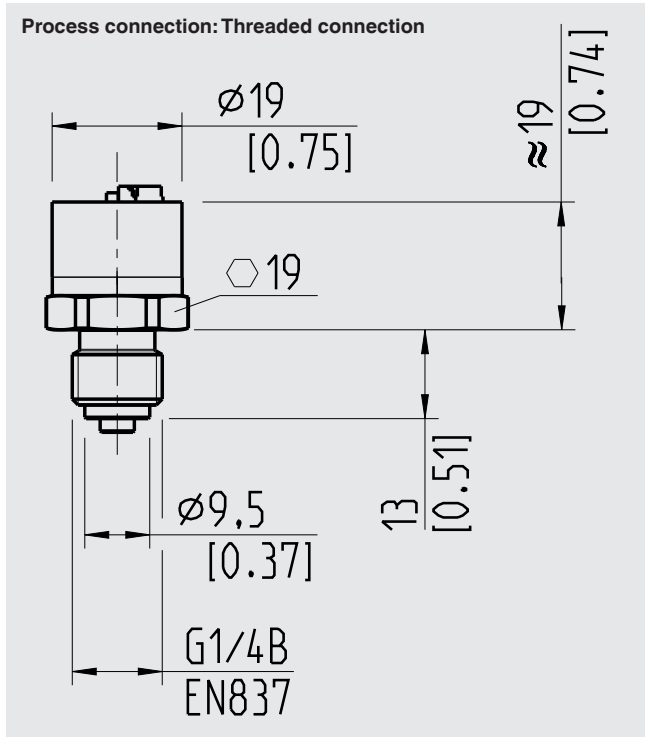
Packaging	
Standard	Individual packaging
Option	Multiple packaging (up to 50 pieces)

Marking	
Standard	WIKA product label (lasered)
Option	Customer-specific product label

Scope of delivery

- Sensor module model MPR-1
- Test report, 5 items (option)

Dimensions in mm [in]



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

Certificates (option)

- 2.2 test report

Approvals and certificates, see website

Accessories and spare parts

Sealing for process connection	Order number				
	Copper	Stainless steel	NBR	FKM	EPDM
G 1/8 B	11251051	-	-	-	-
G 1/4 B	11250810	11250844	-	-	-
G 1/8 A	-	-	-	14170413	-
7/16-20 UNF-2A, O-ring BOSS	-	-	14057554	11472022	-
Radial O-ring	-	-	-	-	11425326

Ordering information

Model / Measuring range / Output signal / Non-linearity / Process connection / Sealing / Electrical connection / Certificates / Accessories and spare parts

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