

Pressure sensor

For highest pressure applications to 15,000 bar [217,500 psi]

Model HP-2

WIKA data sheet PE 81.53



for further approvals
see page 6



Applications

- Test bench construction
- Water jet cutting
- High-pressure pasteurisation
- High-pressure cleaning

Special features

- High number of load cycles due to patented design
- Exchangeable process connection in case of an hair line crack
- Suitable for highly dynamic pressure due to diaphragm protection system
- Reduced recalibration costs due to excellent long term stability



Pressure sensor model HP-2

Description

For highest pressures

The model HP-2 pressure sensor has been specifically developed for demanding high-pressure applications up to 15,000 bar [217,500 psi]. This makes it one of the few pressure measuring instruments in the world that can reliably measure pressures of this magnitude.

High accuracy

This pressure sensor features a very high long-term stability and offers extremely high accuracy for the highest pressures. Measuring ranges up to and including 0 ... 10,000 bar [145,000 psi] can, as an option, be supplied with an even higher accuracy of 0.25 %.

Long service life

Thanks to its excellent load cycle stability, the model HP-2 has a particularly long service life, even with dynamic pressure profiles.

A protection against cavitation and pressure spikes, specifically developed for highly dynamic pressure profiles, further extends the service life. For water as a medium, this protection is particularly recommended.

Versions

Model HP-2-S

Standard version

Model HP-2-D

Additionally with DIPS - diaphragm impact protection system

DIPS protects the pressure sensor from cavitation and micro-diesel effects; it is particularly recommended for use with water as a medium.

Further details on request.

Model HP-2-E

Additionally with EPC - exchangeable pressure connection

EPC enables the changing of the process connection without having to change the entire pressure sensor.

This system is particularly recommended when hairline cracks can occur.

Further details on request.

Measuring ranges

Gauge pressure						
bar	Measuring range	0 ... 1,600	0 ... 2,500 ¹⁾	0 ... 4,000 ¹⁾	0 ... 5,000 ¹⁾	0 ... 6,000
	Overload safety	2,300	3,500	5,000	6,000	7,000
	Burst pressure	4,000	6,000	8,000	10,000	11,000
	Measuring range	0 ... 7,000	0 ... 8,000	0 ... 10,000 ¹⁾	0 ... 12,000 ¹⁾	0 ... 15,000 ^{1) 2)}
	Overload safety	8,000	10,000	11,000	12,500	15,500
	Burst pressure	11,000	12,000	12,000	14,000	16,000
psi	Measuring range	0 ... 23,000	0 ... 36,000	0 ... 58,000	0 ... 72,000	0 ... 87,000
	Overload safety	33,300	50,500	72,500	87,000	101,500
	Burst pressure	58,000	87,000	116,000	145,000	159,500
	Measuring range	0 ... 100,000	0 ... 115,000	0 ... 145,000	0 ... 217,500 ^{1) 2)}	
	Overload safety	116,000	145,000	159,000	224,750	
	Burst pressure	159,500	174,000	174,000	232,000	

1) Optionally also with a measuring cell from Elgiloy®

2) Adjustment at max. 12,500 bar (181,250 psi), 15,000 bar (217,500 psi) is calculated.

The given measuring ranges are also available in MPa.

On request, special measuring ranges between the listed ranges 0 ... 1,600 and 0 ... 10,000 bar are possible.

These special measuring ranges, however, have a higher temperature error and a reduced long-term stability.

Service life

On request, since the service life depends on the actual pressure profile.

Output signals

Signal type	Signal
Current (2-wire)	4 ... 20 mA
Voltage (3-wire)	DC 0 ... 5 V DC 0 ... 10 V
USB	USB 2.0

Other output signals on request.

Load in Ω

- Current output (2-wire):
 $\leq (\text{power supply} - 10 \text{ V}) / 0.02 \text{ A}$
- Voltage output (3-wire):
 $> \text{maximum output signal} / 1 \text{ mA}$

Voltage supply

Power supply

The power supply depends on the selected output signal

- 4 ... 20 mA: DC 10 ... 30 V
- DC 0 ... 5 V: DC 10 ... 30 V
- DC 0 ... 10 V: DC 14 ... 30 V
- USB 2.0: DC 5 V

Current supply

- Current output (2-wire): Signal current, max. 35 mA
- Voltage output (3-wire): 8 mA
- USB output: 40 mA

Reference conditions (per IEC 61298-1)

Temperature

15 ... 25 °C [59 ... 77 °F]

Atmospheric pressure

860 ... 1,060 mbar [12.47 ... 15.37 psi]

Humidity

45 ... 75 % gauge

Power supply

- DC 24 V
- DC 5 V with USB output

Mounting position

Calibrated in vertical mounting position with process connection facing downwards.

Accuracy specifications

Accuracy at reference conditions

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

Measuring ranges < 10,000 bar [145,000 psi]

Standard	$\leq \pm 0.50$ % of span
Option	$\leq \pm 0.25$ % of span

Measuring range = 10,000 bar [145,000 psi]

Standard	$\leq \pm 0.50$ % of span
Option	$\leq \pm 0.25$ % of span, typical

Measuring range = 12,000 or 15,000 bar [217,500 psi]

$\leq \pm 0.50$ % of span, typical

Adjustability of zero point and span

- Current and voltage output:
 - Zero point: ± 5 % of span
 - Adjustment is made using potentiometers inside the instrument
- USB output:
 - Zero point: -5 ... +20 % of span
 - Span: -50 ... +5 % of span
 - Adjustment is made via "EasyCom 2011" software

Temperature error at 0 ... 80 °C [32 ... 176 °F]

- typical: $\leq \pm 1.0$ % of span
- typical: $\leq \pm 2.0$ % of span (special measuring ranges)
- maximum: $\leq \pm 2.5$ % of span

Long-term stability at reference conditions

- ≤ 0.1 % of span/year
- ≤ 0.2 % of span/year (special measuring ranges)

Operating conditions

Ingress protection (per IEC 60529)

For ingress protection see "Electrical connections"
The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

Vibration resistance (per IEC 60068-2-6)

0.35 mm (10 ... 55 Hz)

Shock resistance (per IEC 60068-2-27)

100 g (2.4 ms)

Temperatures

- Medium: 0 ... +80 °C [32 ... 176 °F]
- Ambient: -20 ... +80 °C [-4 ... +176 °F]
- Storage: -40 ... +85 °C [-40 ... +185 °F]

Time response

Settling time

- Current and voltage output: < 1 ms
- USB output: < 10 ms ¹⁾

1) other value on request

Warming-up period

< 10 min

Electrical connections

Available connections

Electrical connection	Ingress protection	Wire cross-section	Cable diameter	Cable lengths
Angular connector DIN 175301-803 A	IP65	max. 1.5 mm ²	6 ... 8 mm	-
Circular connector M12 x 1 (4-pin)	IP67	-	-	-
USB connector type A	Instrument: IP67 Connector: IP 20	-	-	2 m
Cable outlet	IP67	0.5 mm ² (AWG 20)	6.8 mm	1.5 m

The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

Short-circuit resistance

S₊ vs. 0V

Reverse polarity protection

U_B vs. 0V


Overvoltage protection


- DC 36 V
- DC 5.25 V with USB output


Insulation voltage

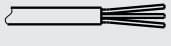
DC 500 V

Connection diagrams

Angular connector DIN 175301-803 A			
		2-wire	3-wire
	U _B	1	1
	0V	2	2
	S ₊	-	3

USB connector type A		
	+5V	1
	GND	4
	D ₊	3
	D ₋	2

Circular connector M12 x 1 (4-pin)			
		2-wire	3-wire
	U _B	1	1
	0V	3	3
	S ₊	-	4

Cable outlet			
		2-wire	3-wire
	U _B	brown	brown
	0V	green	green
	S ₊	-	white

Legend

- U_B, +5V Positive power supply
- 0V, GND Reference potential
- S₊ Positive output terminal
- D₊, D₋ Data link USB 2.0

Process connections

Process connection	Type of sealing	Maximum measuring range
M16 x 1.5 female, with sealing cone	60° sealing cone	0 ... 7,000 bar [100,000 psi]
M20 x 1.5 female, with sealing cone	60° sealing cone	0 ... 15,000 bar [217,500 psi]
9/16-18 UNF female	60° sealing cone	0 ... 7,000 bar [100,000 psi]

Other process connections on request.

The maximum permissible pressure at the installation point is dependent on the high-pressure pipes used. For the valid values, see the high-pressure pipe manufacturer's documentation.







Materials

Wetted parts

- Process connection: Stainless steel 1.4534
- Sensor: Stainless steel 1.4534 or 2.4711 Elgiloy®

Where the medium is hydrogen, contact the manufacturer.

Approvals

Logo	Description	Country
	EU declaration of conformity <ul style="list-style-type: none"> ■ EMC directive ■ Pressure equipment directive ■ RoHS directive 	European Union
	EAC EMC directive	Eurasian Economic Community
	KazInMetr Metrology, measurement technology	Kazakhstan
	BelGIM Metrology, measurement technology	Belarus
	UkrSEPRO Metrology, measurement technology	Ukraine
	Uzstandard Metrology, measurement technology	Uzbekistan
-	CRN Safety (e.g. electr. safety, overpressure, ...)	Canada

Certificates (option)

Supplied documents

- Test report, 5 measuring points
- Operating instructions

The required documents can be ordered separately.

■ 2.2 test report

- State-of-the-art manufacturing
- Material proof, wetted metal parts
- Confirmation of the class and indication accuracy

■ 3.1 inspection certificate

- Material proof, wetted metal parts
- Material proof, wetted metal parts with suppliers' certificate (melting analysis)
- Confirmation of the class and indication accuracy

■ Calibration certificate

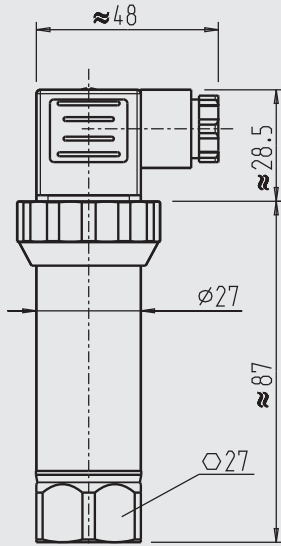
- 3.1 factory calibration certificate
- DKD/DAkkS calibration certificate

Approvals and certificates, see website

Dimensions in mm

Model HP-2-S

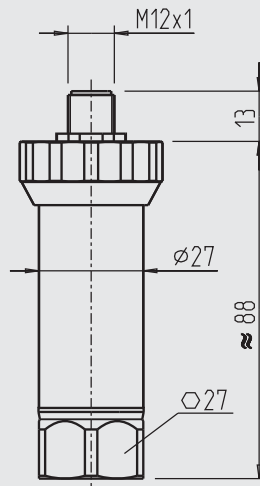
with angular connector
DIN 175301-803 A



Weight: approx. 300 g [0.035 oz]

Model HP-2-S

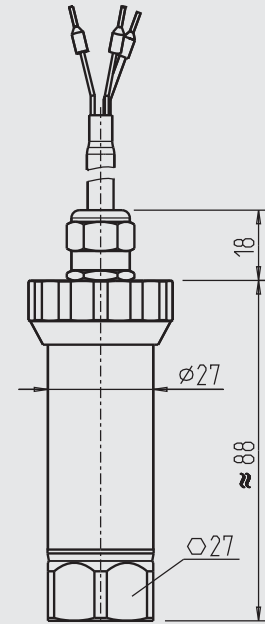
with circular connector M12 x 1
(4-pin)



Weight: approx. 300 g [0.035 oz]

Model HP-2-S

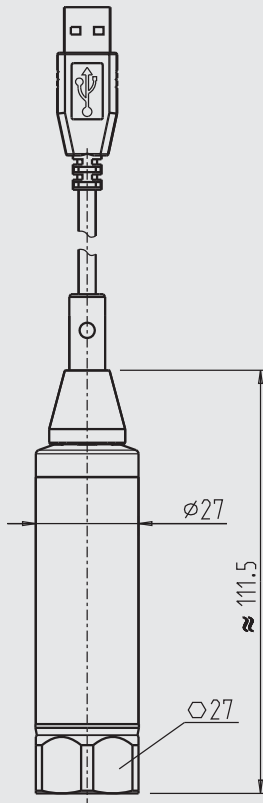
with cable outlet with 1.5 m length



Weight: approx. 300 g [0.035 oz]

Model HP-2-S

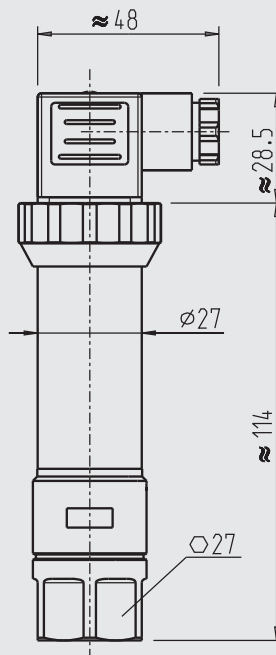
with USB connector type A



Weight: approx. 300 g [0.035 oz]

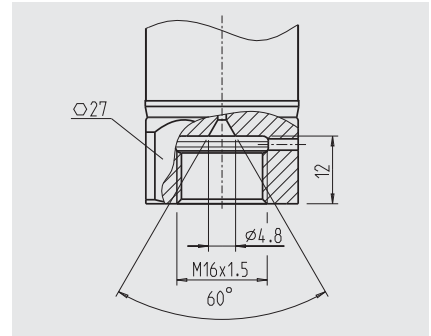
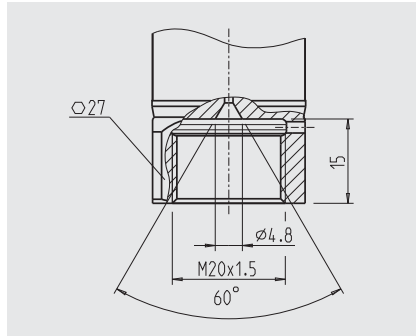
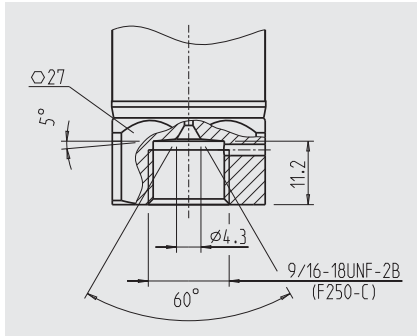
Model HP-2-D Model HP-2-E

with optional cavitation and pressure-
spike protection



Weight: approx. 300 g [0.035 oz]

Process connections



Accessories and spare parts

Mating connector

Designation	Order number		
	without cable	with 2 m cable [6.5 ft]	with 5 m cable [16.4 ft]
Angular connector DIN 175301-803 A			
■ with gland, metric	11427567	11225793	11250186
■ with gland, conduit	11022485	-	-
Circular connector M12 x 1, 4-pin			
■ straight	2421262	11250780	11250259
■ angled	2421270	11250798	11250232

Sealings for mating connectors

Designation	Order number
Angular connector DIN 175301-803 A	1576240

Spare part kit for models HP-2-D and HP-2-E

Consisting of a replacement connection thread, replacement sealing disc and a mounting aid.
Spare part kit suitable for the following process connections:

Process connection	Order number	
	Model HP-2-D	Model HP-2-E
M16 x 1.5 female	14039895	14050403
M20 x 1.5 female	13319923	14050404

Software

The full software is available to download as freeware from www.wika.com.
The software is also available on CD (order code: 11478901).

Ordering information

Model / Measuring range / Output signal / Accuracy at reference conditions / Electrical connection / Process connection

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