

# 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						
<b>bar</b>	<b>Measuring range</b>	<b>0 ... 1,600</b>	<b>0 ... 2,500 <sup>1)</sup></b>	<b>0 ... 4,000 <sup>1)</sup></b>	<b>0 ... 5,000 <sup>1)</sup></b>	<b>0 ... 6,000</b>
	Overload safety	2,300	3,500	5,000	6,000	7,000
	Burst pressure	4,000	6,000	8,000	10,000	11,000
	<b>Measuring range</b>	<b>0 ... 7,000</b>	<b>0 ... 8,000</b>	<b>0 ... 10,000 <sup>1)</sup></b>	<b>0 ... 12,000 <sup>1)</sup></b>	<b>0 ... 15,000 <sup>1) 2)</sup></b>
	Overload safety	8,000	10,000	11,000	12,500	15,500
	Burst pressure	11,000	12,000	12,000	14,000	16,000
<b>psi</b>	<b>Measuring range</b>	<b>0 ... 23,000</b>	<b>0 ... 36,000</b>	<b>0 ... 58,000</b>	<b>0 ... 72,000</b>	<b>0 ... 87,000</b>
	Overload safety	33,300	50,500	72,500	87,000	101,500
	Burst pressure	58,000	87,000	116,000	145,000	159,500
	<b>Measuring range</b>	<b>0 ... 100,000</b>	<b>0 ... 115,000</b>	<b>0 ... 145,000</b>	<b>0 ... 217,500 <sup>1) 2)</sup></b>	
	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 $\Omega$

- Current output (2-wire):  
 $\leq (\text{power supply} - 10 \text{ V}) / 0.02 \text{ A}$
- Voltage output (3-wire):  
> maximum output signal / 1 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:  $\pm 5$  % of spanAdjustment 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

- $\leq 0.1$  % of span/year
- $\leq 0.2$  % 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 <sup>1)</sup>

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 <sup>2</sup>	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 <sup>2</sup> (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<sub>+</sub> vs. 0V

### Reverse polarity protection

U<sub>B</sub> vs. 0V


### Overvoltage protection


- DC 36 V
- DC 5.25 V with USB output


### Insulation voltage

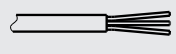
DC 500 V

### Connection diagrams

Angular connector DIN 175301-803 A			
		2-wire	3-wire
	U <sub>B</sub>	1	1
	0V	2	2
	S <sub>+</sub>	-	3

Circular connector M12 x 1 (4-pin)			
		2-wire	3-wire
	U <sub>B</sub>	1	1
	0V	3	3
	S <sub>+</sub>	-	4

USB connector type A		
	+5V	1
	GND	4
	D <sub>+</sub>	3
	D <sub>-</sub>	2

Cable outlet			
		2-wire	3-wire
	U <sub>B</sub>	brown	brown
	0V	green	green
	S <sub>+</sub>	-	white

#### Legend

U<sub>B</sub>, +5V Positive power supply  
 0V, GND Reference potential  
 S<sub>+</sub> Positive output terminal  
 D<sub>+</sub>, D<sub>-</sub> 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
	<b>EU declaration of conformity</b> <ul style="list-style-type: none"> <li>■ EMC directive</li> <li>■ Pressure equipment directive</li> <li>■ RoHS directive</li> </ul>	European Union
	<b>EAC</b> EMC directive	Eurasian Economic Community
	<b>KazInMetr</b> Metrology, measurement technology	Kazakhstan
	<b>BelGIM</b> Metrology, measurement technology	Belarus
	<b>UkrSEPRO</b> Metrology, measurement technology	Ukraine
	<b>Uzstandard</b> Metrology, measurement technology	Uzbekistan
-	<b>CRN</b> 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

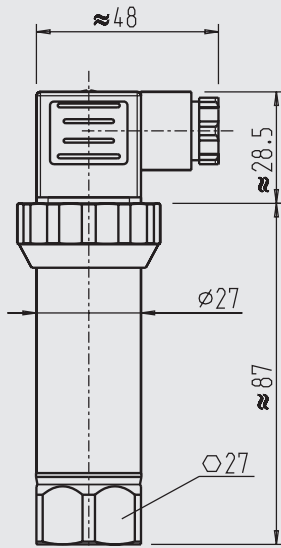
- 3.1 factory calibration certificate
- DKD/DAkkS calibration certificate

Approvals and certificates, see website

## Dimensions in mm

### Model HP-2-S

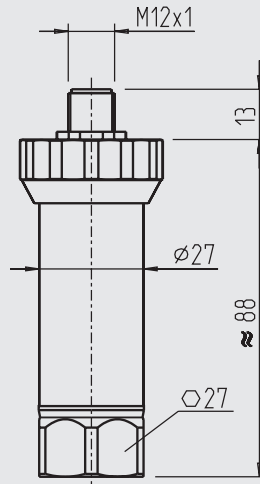
with angular connector  
DIN 175301-803 A



Weight: approx. 300 g [0.035 oz]

### Model HP-2-S

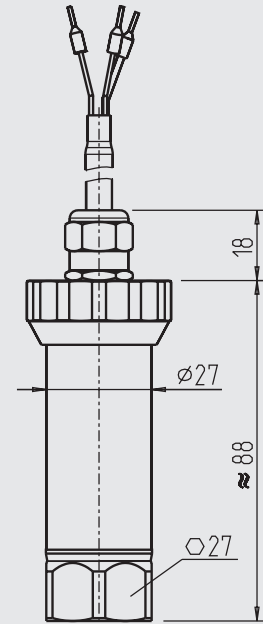
with circular connector M12 x 1  
(4-pin)



Weight: approx. 300 g [0.035 oz]

### Model HP-2-S

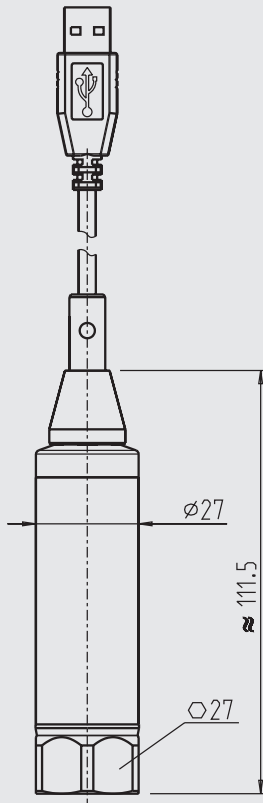
with cable outlet with 1.5 m length



Weight: approx. 300 g [0.035 oz]

### Model HP-2-S

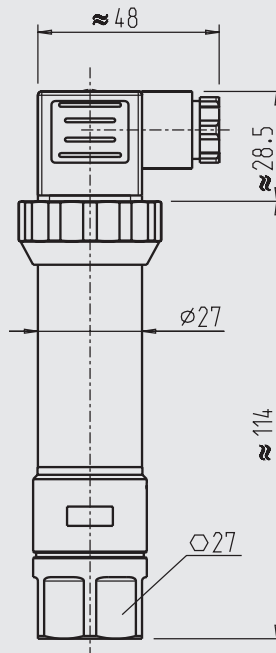
with USB connector type A



Weight: approx. 300 g [0.035 oz]

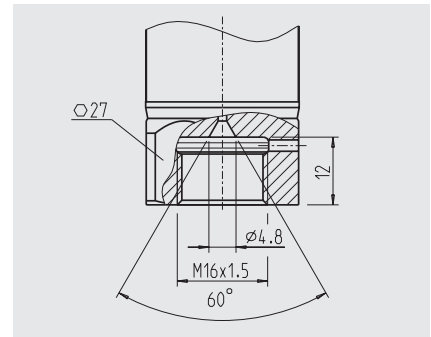
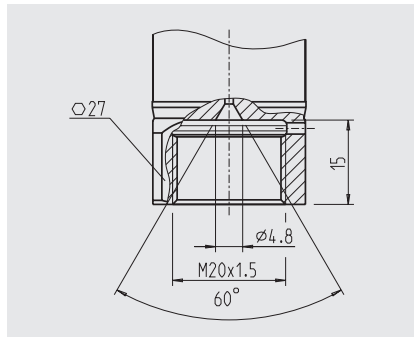
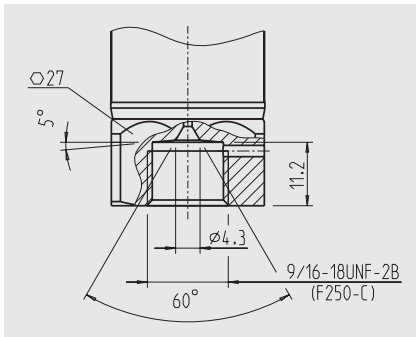
### Model HP-2-D Model HP-2-E

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]
<b>Angular connector DIN 175301-803 A</b>			
■ with gland, metric	11427567	11225793	11250186
■ with gland, conduit	11022485	-	-
<b>Circular connector M12 x 1, 4-pin</b>			
■ 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](http://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

© 07/2008 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.  
The specifications given in this document represent the state of engineering at the time of publishing.  
We reserve the right to make modifications to the specifications and materials.