

PRODUCT CATALOGUE

Piezoelectric Pressure Sensors



BD|SENSORS
pressure measurement



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PRESSURE MEASUREMENT at the highest level

„Successful medium-sized companies aren't successful because they're active in many different areas, they're successful because they're better than anyone else in one specific area.“

That's our conviction. That's why we at **BD|SENSORS** have been committed to electronic pressure measurement technology from the very beginning. Our consistent product and quality strategy has led us to become one of the world's leading suppliers of electronic pressure sensors within only a few years. With about 260 employees at 4 different locations (Germany, Czech Republic, Russia and China) **BD|SENSORS** provides solutions from 0.1 to 8000 bar:

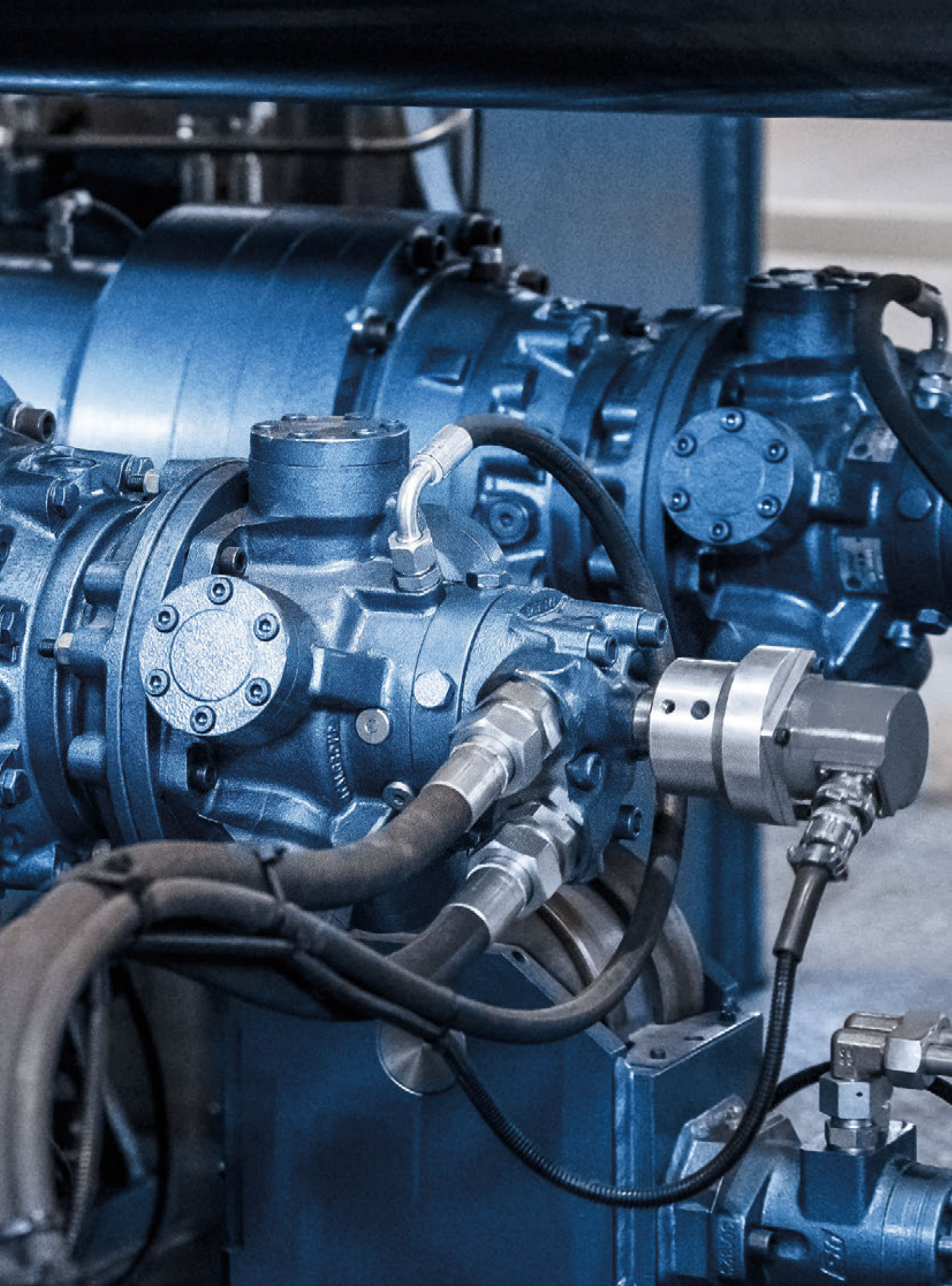
- Pressure sensors, transducers and transmitters
- Electronic pressure switches
- Pressure sensors with indicator and switching outputs
- Hydrostatic level transmitters

We started out with two pressure transmitters and a submersible probe using a stainless steel silicon sensor, and now we have a range of more than 100 standard products ranging from our low-priced OEM devices to our high-end products with HART® communication or fieldbus interfaces.

In addition, we've developed hundreds of tailor-made products for our customers, which spotlights our competence and flexibility. Our excellent price-performance ratio is proof that we meet the highest standards, which is to be THE problem solver for our customers.

Whether for a large series or just a few pieces; regardless of the medium, or under which external influences; with nearly every mechanical or electrical interface – we're the solution to whatever problem you may have.

FAST. FLEXIBLE. COST-EFFECTIVE.



PIEZOELECTRIC PRESSURE SENSORS

Solutions for dynamic pressure measurement in extreme environments

For applications involving pressure and level measurement, **BD|SENSORS** offers consulting and solutions like no other. Our extensive range of products focuses on customers with the highest demands on quality, durability and precision. This is solidified in our range of piezoelectric pressure measurement technology and through our cooperation with the Austrian sensor developer and manufacturer PIEZOCRYST.

With over 50 years experience in the area of piezoelectric measurement technology, Piezocryst has made a name for itself in highly precise sensors for extreme conditions and supplies well-known sensor manufacturers with their products. The company maintains its own crystal growing and processing facility and is the only manufacturer worldwide, who can produce and accurately process the single crystalline gallium phosphate (GaPO_4) as a basis for the production of piezoelectric sensors.

Through our collaboration with Piezocryst, **BD|SENSORS** ensures tailor-made solutions for highly dynamic pressure measurement in industrial environments, customizing the complete measuring chain to the application.

Extreme values like pressure peaks, as well as pressure surges and development can be accurately measured using the DAC series - for example, within the scope of explosion pressure measurement (air bag development), the high frequency measurement of compressors or for monitoring status.

Piezoelectric sensors are suitable for dynamic measurement of up to and beyond 100 kHz. They are extremely compact and easy to integrate into applications. To use a DAC series sensor, a charge amplifier is required, which turns the electrical charge into a corresponding output signal.

Single crystals made from GaPO_4 , which are both highly sensitive and reliable, are the foundation for pressure sensors.

They have extraordinary signal properties, a low temperature drift, as well as a high temperature application range. These pressure sensors can be used uncooled in temperature ranges of up to 400 ° C (in special series up to 700 ° C). Therefore, the piezoelectric pressure sensors in the DAC series perfectly complement our existing product range.

Features

- Pressure ranges up to 8,000 bar
- Temperatures up to 400 ° C without cooling
- Measurement over 100 kHz
- High resolution of approx. 1 mbar with a 500 bar measuring range
- Compact and robust

Q&A

What is gallium phosphate GaPO_4 ?

Gallium phosphate is a patented, unique, high temperature resistant crystal with a long life expectancy and excellent properties for the construction of robust sensors for extreme applications.

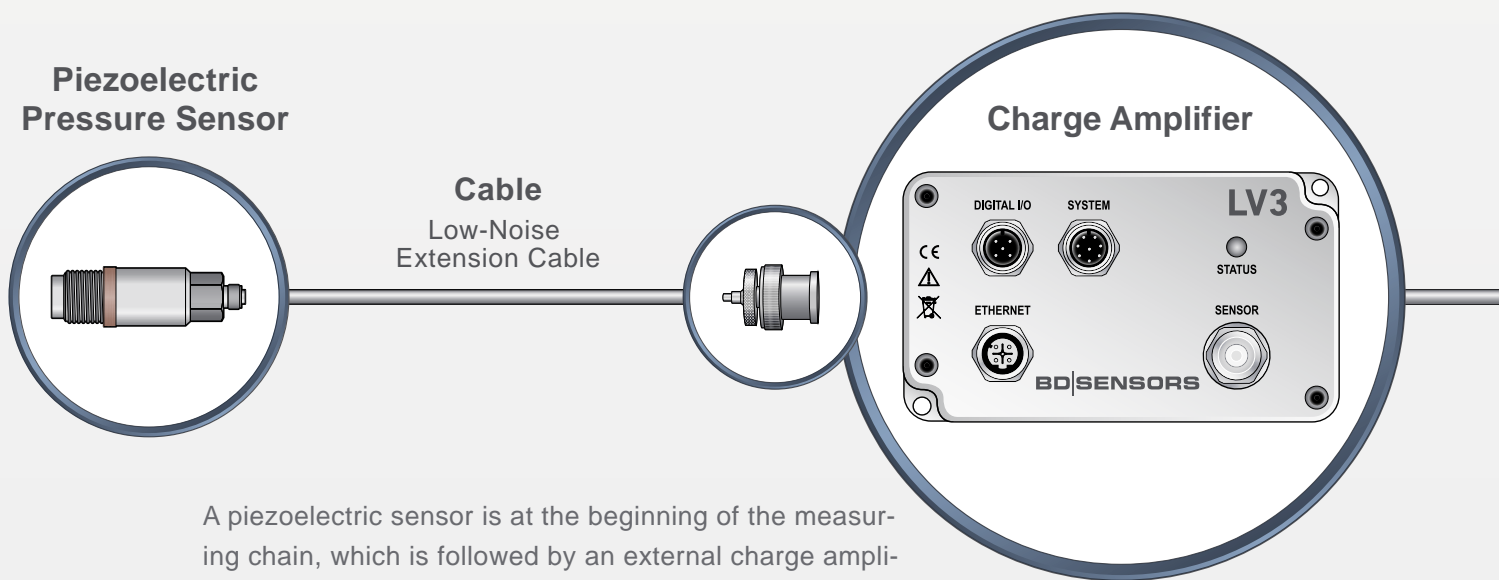
For highly dynamic pressure measurement under extreme thermal and mechanical loads, it is probably the most suitable piezoelectric material available, allowing an excellent signal-to-noise ratio at extreme temperatures and offering a combination of several unique features. Contrary to many other piezoelectric materials, gallium phosphate is not pyro-electric, resulting in undisturbed measurement at high thermal gradients and offering an extremely high internal resistance. This results in low drift and fewer sensitivity changes within the temperature and is the basis for highly linear sensors with an excellent signal-to-noise ratio. These properties make GaPO_4 the most suitable material for high-precision, robust sensors for extreme application environments.

How does a piezoelectric pressure sensor actually measure?

The basic measurement principle of piezoelectric sensors is simple. The GaPO_4 crystals are placed in the sensor directly behind a thin membrane. This membrane then converts the pressure into a force onto the crystal, which then linearly reacts with a charge displacement, thus an electrical charge on the surface. This is a direct physical conversion of pressure into an electrical signal and as a result does not require any further sensor bridges, temperature compensation, etc. like other similar technology. Another advantage is that the thin membrane is protected by a high-strength sensor element and, as a result, is extremely durable and has a high overload capacity. Since the piezoelectric effect is a microscopic property of the crystal lattice, the sensor has outstanding response behavior and is particularly suitable for fast, dynamic pressure sensing and for measurement with a high base load. Thus, for example, a base load of 500 bar can still be converted to mbar.

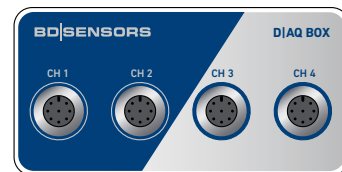
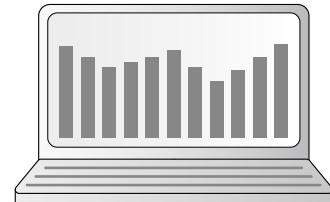
The crystal element charge is converted into an electrical signal by a charge amplifier or charge converter. In order to ensure a stable signal, piezoelectric sensors are usually equipped with a high-pass filter, which is why this technology is only minimally suitable for static measurement and only used for dynamic pressure measurement. For use in these applications however, they have incomparable advantages and open up numerous possibilities, which would not be available using other technology.

STRUCTURE OF THE MEASUREMENT CHAIN



A piezoelectric sensor is at the beginning of the measuring chain, which is followed by an external charge amplifier. The connection between the sensor and the charge amplifier must be transmitted using a special low-noise cable. The sensor discharges in the pico-coulombs, which is why the cable must be well protected and be specifically constructed for the prevention of triboelectric effects.

**D|AQ BOX with
Laptop (PC)**



Cable
M12x1
8-pin cable

The pC output signal is converted into measurable 0-10V voltage in the charge amplifier. This voltage can then be passed on through a standard cable. The data acquisition system is the last step in the measuring chain. This is not absolutely mandatory, but is used in most applications. Because piezoelectric sensors are usually used in fast pressure cycles in the kHz range, suitable data recording with high sampling rates is necessary.

**Own data collection
evaluation system**



APPLICATIONS for the DAC series

- Laboratory and testing technology
- Machine and plant construction
- Hydraulics
- Development and quality assurance
- Compressors and pumps
- Turbochargers
- Water turbines
- Pipe(line) monitoring (water hammer effect)
- Explosive pressure measurement



Explosive pressure measurement (airbag development)

Pressure sensors for precise and reliable measurement of extremely rapid pressure increases of more than 1000 bar/ μ s and, in some cases, the extreme maximum pressure of up to 8000 bar.

These high-pressure sensors are used, for example, in airbag development, medical technology, or even ballistic testing.



Hydro-Pulse Test Rigs (Endurance test)

These are used for the dynamic internal pressure pulsation of hydraulic components of all types with definable load profiles (load waveforms and frequencies), for example, for leak testing and leakage detection. Piezoelectric sensors are used to obtain the best possible results for test pressures of up to 1000 bar, test frequencies up to 30 kHz and for temperatures up to 150 °C.



Pressure peaks during switching operations (transmissions)

Transmissions are always subject to particular stress and must function under extreme operating conditions. During the development process, pressure peaks, among other things, are measured during switching operations. These measurement are used to draw conclusions about the future development of the transmission and the selection of components, for example, actuators, valves and control units.








Laboratory technology (Testing of rupture discs)

Rupture discs are implemented to, for example, protect steel bottles, pipes or containers from excess pressure, which could otherwise lead to an explosion. Testing is carried out in laboratories in order to dimension the appropriate rupture disc for each application. In these tests, piezoelectric pressure sensors are implemented, as they also have a very fine resolution at a higher base load and lower pressure fluctuation.

OVERVIEW MATRIX

for the DAC series

Product		Pressure Range (bar)	Temperature Range (°C)	Sensitivity (pC/bar)	Mechanical Connection	Preferred Application	Page
DAC 102		0 ... 250	-40 ... 400	35	M7x0.75	For precision measurement, Front flush installation (Shoulder sealing)	7 – 8
DAC 103		0 ... 250	-40 ... 400	16	M5x0.5	For highly vibrating systems, acceleration compensated	9 – 10
DAC 105		0 ... 500	-50 ... 120	19	M5x0.5	For high pressure at moderate temperatures	11 – 12
DAC 105G		0 ... 250	-40 ... 400	19	M5x0.5	An all-round sensor for dynamic pressure without any special additional requirements	13 – 14
DAC 105K		0 ... 300	-40 ... 400	19	M5x0.5		15 – 16
DAC 106G		0 ... 250	-40 ... 400	19	M5x0.5	An all-round sensor for dynamic pressure without any special additional requirements	17 – 18
DAC 106K		0 ... 300	-40 ... 400	19	M5x0.5		19 – 20
DAC 106L		0 ... 500	-40 ... 400	10	M5x0.5	For high pressure at high temperatures	21 – 22
DAC 106U		0 ... 650	-40 ... 350	1.5	M5x0.5	An extremely fast sensor for high pressure	23 – 24

Product		Pressure Range (bar)	Temperature Range (°C)	Sensitivity (pC/bar)	Mechanical Connection	Preferred Application	Page
DAC 107		0 ... 250	-40 ... 400	45	M8x0.75	Precision measurement, Front flush installation (Shoulder sealing)	25 – 26
DAC 109		0 ... 250	-40 ... 350	20	M14x1.25	Very robust construction for continuous use	27 – 28
DAC 120		0 ... 2000	-50 ... 200	5.2	M10x1.0	High pressure sensor for extreme pressure peaks	29 – 30
DAC 160		0 ... 6000	-50 ... 200	3	M10x1.0	High-pressure sensor for extreme pressure peaks	31 – 32
DAC 180		0 ... 8000	-50 ... 200	2.3	M10x1.0	High-pressure sensor for extreme pressure peaks	33 – 34

DAC 102

Piezoelectric Pressure Sensors

- High output signal
- Internal heat transfer elements for high thermal stress capacity
- High linearity over the entire pressure and temperature range
- High temperature resistance (400 °C / 752 °F)
- Continuous sensitivity over total life span



APPLICATIONS

- All-round sensor
- For pumps, compressors and water turbines

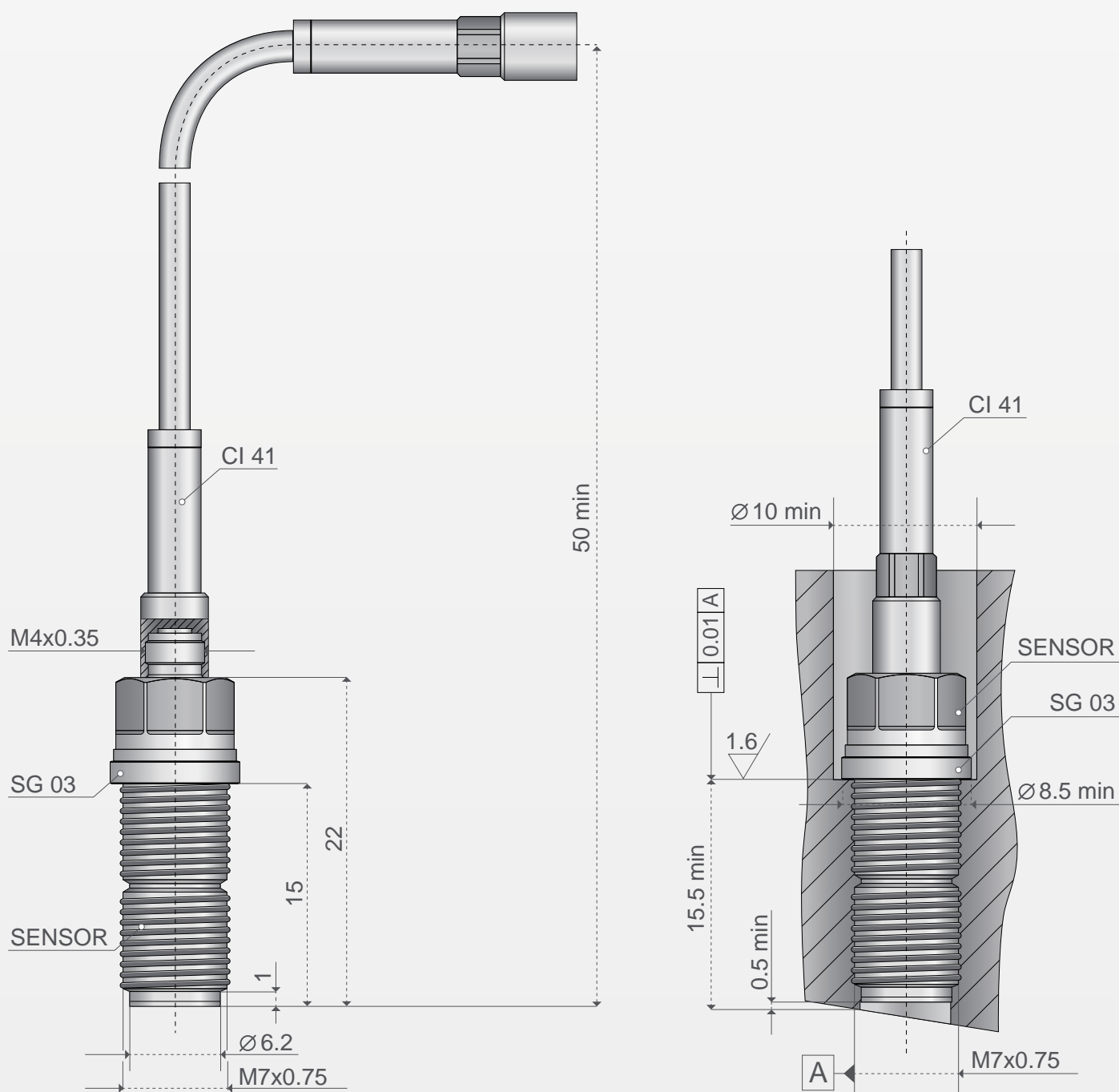
DESCRIPTION

This versatile sensor was developed for dynamic and quasi-static pressure monitoring of up to 250 bar. The sensor element with Crystal Match™ technology allows for extraordinary signal readings over the entire tempera-

ture range. The single crystal GaPO₄ sensor element allows for constant sensitivity ensuring excellent performance at high temperatures.

TECHNICAL SPECIFICATIONS

Operating principle	Piezoelectric	Insulation Resistance (Ω)	> 10 ¹³ (25 °C / 77 °F) > 10 ⁹ (400 °C / 752 °F)
Sensor element	GaPO ₄ (Gallium-Phosphate)	Acceleration sensitivity (Type)	axial: ≤ 2 mbar/g (0.03 psi/g) radial: ≤ 0.2 mbar/g (0.003 psi/g)
Nominal pressure range (bar)	0 ... 250 (0 ... 3625 psi)	Natural Frequency (kHz)	85
Overload (bar)	300 (4350 psi)	Capacity (nominal) (pF)	8
Sensitivity (pC / bar)	35 (2.4 pC/psi)	Tightening torque (Nm)	3
Linearity (% / FSO)	≤ ± 0.3 (0 ... 250 bar, 0 ... 3625 psi)	Housing material	Stainless steel, hermetically sealed
Operating temperature (° C)	-40 ... 400 (-40 ... 752 °F)		
Sensitivity coefficient (° C⁻¹)	-1.5*10 ⁻⁵		



The sensor can be connected directly to the object of measurement. The back of the sensor ($\varnothing 8.45$ mm) is sealed to the mounting hole. Rapid pressure changes are best recorded when the volume in front of the membrane is kept as minimal as possible.

All cables are detachable. Piezoelectric input cables - Teflon (1 m) and 1 sealing ring are included in the delivery.

DAC 103

Piezoelectric Pressure Sensor

- Active acceleration compensation
- High temperature resistance (400 ° C / 752 ° F)
- High natural frequency
- Continuous sensitivity over the total life span



APPLICATIONS

- For highly vibrating systems
- For high mechanical stress
- Turbocharger, closing valves

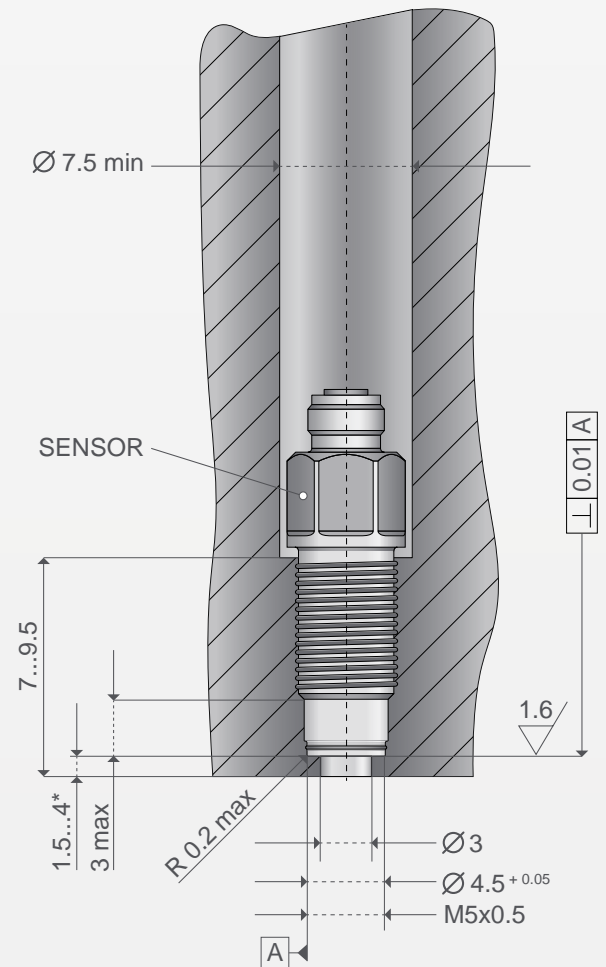
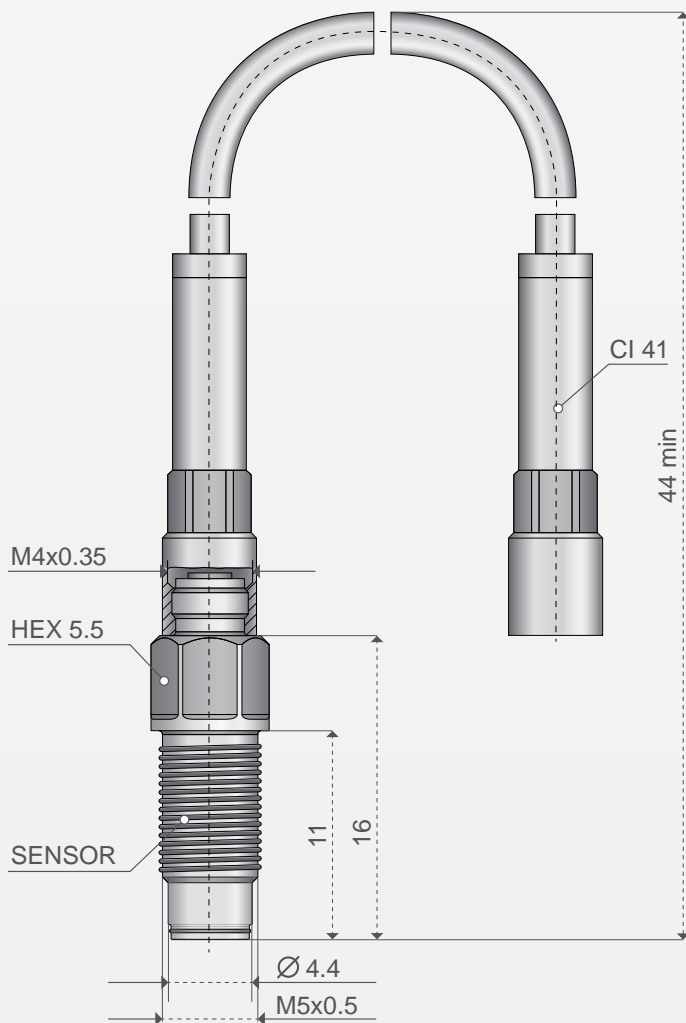
DESCRIPTION

The sensor was developed for dynamic and quasi-static pressure sensing up to 250 bar. Due to its active acceleration compensation, this sensor sends an accurate signal even in highly vibrating systems. Because of its size

(M5x0.5 thread) and temperature resistance of up to 400 ° C, this sensor is suitable for a wide range of applications.

TECHNICAL SPECIFICATIONS

Operating principle	Piezoelectric	Insulation Resistance (Ω)	$> 10^{13}$ (25 °C / 77 °F) $> 10^9$ (400 °C / 752 °F)
Sensor element	GaPO ₄ (Gallium-Phosphate)	Acceleration sensitivity (Type)	axial: ≤ 0.05 mbar/g (0.0007 psi/g) radial: ≤ 0.15 mbar/g (0.0002 psi/g)
Nominal pressure range (bar)	0 ... 250 (0 ... 3625 psi)	Shock (g)	> 7000
Overload (bar)	300 (4350 psi)	Natural Frequency (kHz)	165
Sensitivity (pC / bar)	16 (1.1 pC/psi)	Capacity (nominal) (pF)	8.5
Linearity (% / FSO)	$\leq \pm 0.3$ (0 ... 250 bar, 0 ... 3625 psi)	Tightening torque (Nm)	1.5
Operating temperature (° C)	-40 ... 400 (-40 ... 752 °F)	Housing material	Stainless steel, hermetically sealed
Sensitivity coefficient (° C⁻¹)	$-2.1 \cdot 10^{-4}$		



* 1.5 mm steel, 4 mm gray cast iron or aluminum

The sensor can be connected directly to the object of measurement. The front of the sensor (Ø 4,4 mm) is sealed to the mounting hole. Rapid pressure changes are best recorded when the volume in front of the membrane is kept as minimal as possible.

All cables are detachable. Piezoelectric input cables - Teflon (1 m) and 1 sealing ring are included in the delivery.

DAC 105

Piezoelectric Pressure Sensor

- Compact design
- High output signal with extended pressure range
- High natural frequency
- Continuous sensitivity over the total life span



APPLICATIONS

- Laboratory applications
- Test rigs

DESCRIPTION

The sensor was developed for dynamic and quasi-static pressure sensing up to 500 bar. The sensor element with Crystal Match™ technology allows for extraordinary signal readings over the entire temperature range. The

single crystal GaPO₄ sensor element allows for constant sensitivity ensuring excellent performance. Due to its size (M5x0.5 threads) and pressure range, this sensor is suitable for a wide range of applications.

TECHNICAL SPECIFICATIONS

Functional principle	Piezoelectric	Insulation Resistance (Ω)	$> 10^{13}$ (25 °C / 77 °F)
Sensor element	GaPO ₄ (Gallium-Phosphate)	Acceleration sensitivity (Type)	axial: ≤ 0.05 mbar/g (0.0004 psi/g) radial: ≤ 0.15 mbar/g (0.0002 psi/g)
Nominal pressure range (bar)	0 ... 500 (0 ... 7250 psi)	Shock (g)	> 2000
Overload (bar)	550 (8000 psi)	Natural Frequency (kHz)	170
Sensitivity (pC / bar)	19 (1.3 pC/psi)	Capacity (nominal) (pF)	7.5
Linearity (% / FSO)	$\leq \pm 0.3$ (0 ... 300 bar, 0 ... 4350 psi) $\leq \pm 0.5$ (0 ... 500 bar, 0 ... 7250 psi)	Tightening torque (Nm)	1.5
Operating temperature (° C)	-50 ... 120 (-58 ... 248 °F)	Housing material	Stainless steel, hermetically sealed
Sensitivity coefficient (° C⁻¹)	$-2.1 \cdot 10^{-4}$		



DAC 105 G

Piezoelectric Pressure Sensor

- Compact design
- High temperature resistance (400 ° C / 752 ° F)
- Continuous sensitivity over the total life span

APPLICATIONS

- Test rigs
- Development and quality assurance

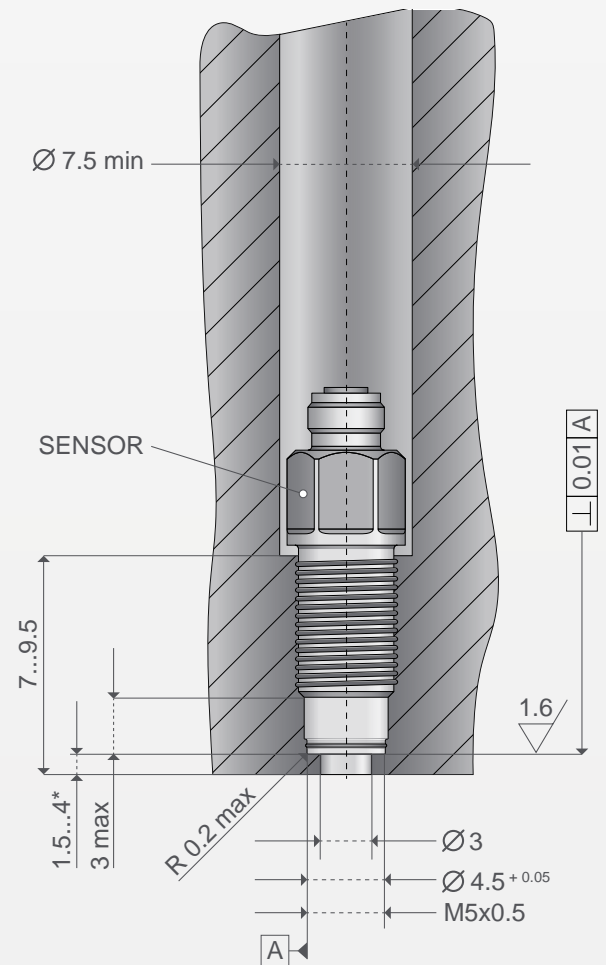
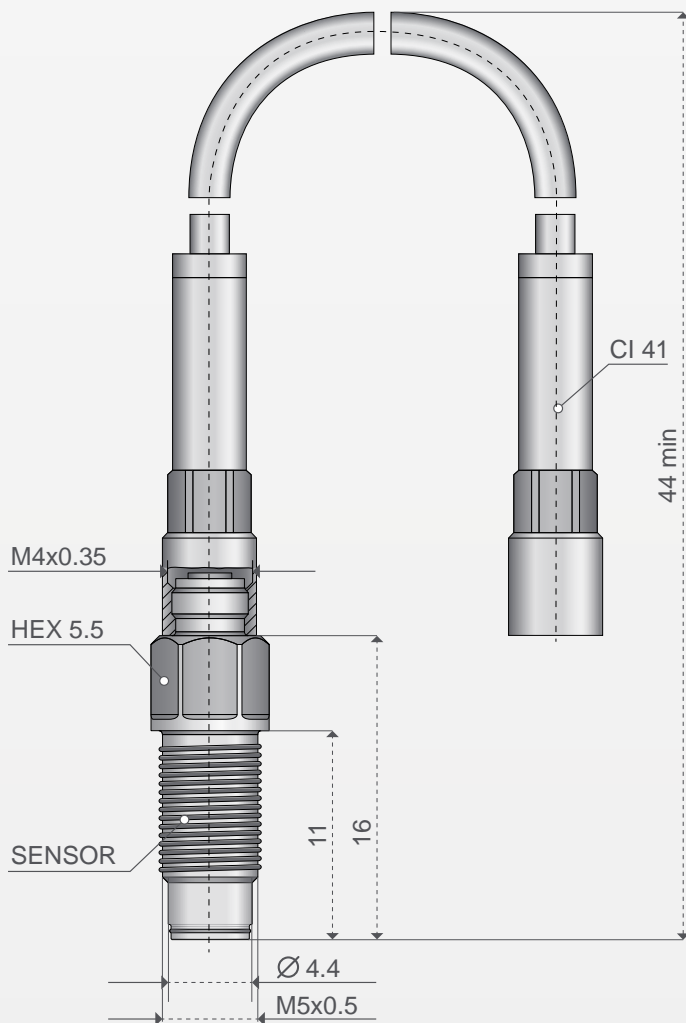
DESCRIPTION

The sensor was developed for dynamic and quasi-static pressure sensing up to 250 bar. The sensor element with Crystal Match™ technology allows for extraordinary signal readings over the entire temperature range. The single crystal GaPO₄ sensor element allows for constant

sensitivity ensuring excellent performance. Due to its size (M5x0.5 thread) and temperature resistance up to 400 °C, this sensor is suitable for a wide range of applications.

TECHNICAL SPECIFICATIONS

Operating principle	Piezoelectric	Insulation Resistance (Ω)	> 10 ¹³ (25 °C / 77 °F) > 10 ⁹ (400 °C / 752 °F)
Sensor element	GaPO ₄ (Gallium-Phosphate)	Acceleration sensitivity (Type)	axial: ≤ 0.03 mbar/g (0.004 psi/g) radial: ≤ 0.15 mbar/g (0.002 psi/g)
Nominal pressure range (bar)	0 ... 250 (0 ... 3625 psi)	Shock (g)	> 2000
Overload (bar)	300 (4350 psi)	Natural Frequency (kHz)	160
Sensitivity (pC / bar)	19 (1.3 pC/psi)	Capacity (nominal) (pF)	7.5
Linearity (% / FSO)	≤ ± 0.3 (0 ... 250 bar, 0 ... 3625 psi)	Tightening torque (Nm)	1.5
Operating temperature (° C)	-40 ... 400 (-40 ... 752 °F)	Housing material	Stainless steel, hermetically sealed
Sensitivity coefficient (° C⁻¹)	-2.1*10 ⁻⁴		



* 1.5 mm steel, 4 mm gray cast iron or aluminum

The sensor can be connected directly to the object of measurement. The front of the sensor ($\varnothing 4,4$ mm) is sealed to the mounting hole. Rapid pressure changes are best recorded when the volume in front of the membrane is kept as minimal as possible.

All cables are detachable. Piezoelectric input cables - Teflon (1 m) and 1 sealing ring are included in the delivery.

DAC 105 K

Piezoelectric Pressure Sensor

- Compact design
- Extended pressure range
- High temperature resistance (400 °C / 752 °F)
- High natural frequency
- Continuous sensitivity over the total life span



APPLICATIONS

- Test rigs
- Development and quality assurance

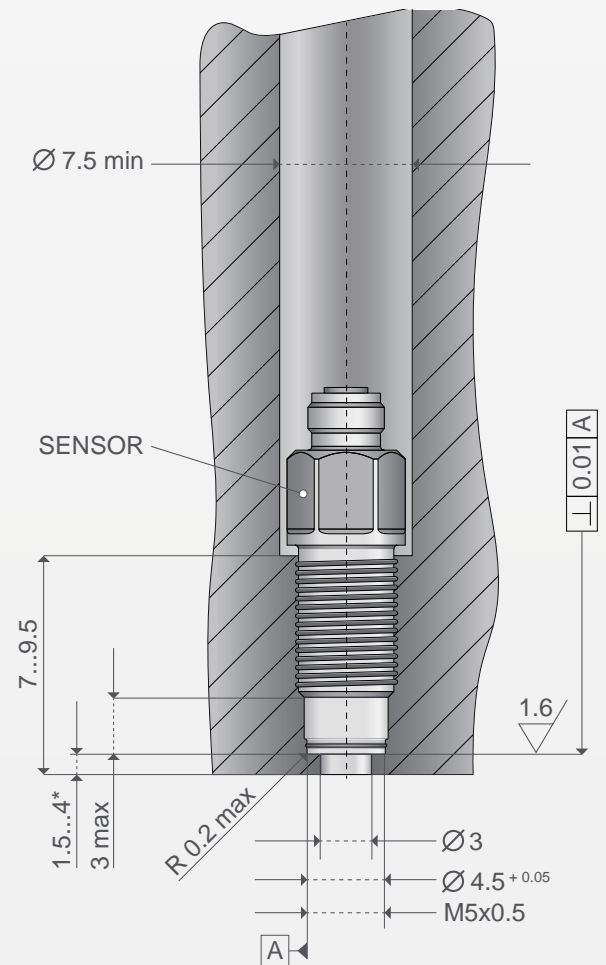
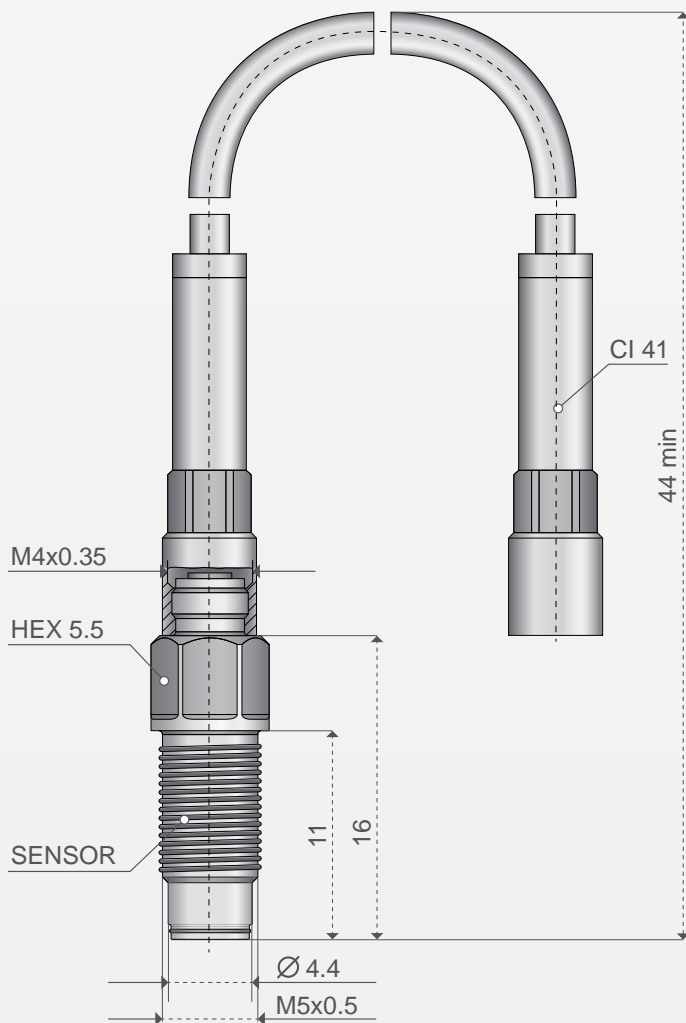
DESCRIPTION

The sensor was developed for dynamic and quasi-static pressure sensing up to 300 bar. The sensor element with Crystal Match™ technology allows for extraordinary signal readings over the entire temperature range. The single crystal GaPO₄ sensor element allows for constant

sensitivity ensuring excellent performance. Due to its size (M5x0.5 thread) and temperature resistance up to 400 °C, this sensor is suitable for a wide range of applications.

TECHNICAL SPECIFICATIONS

Operating principle	Piezoelectric	Insulation Resistance (Ω)	> 10 ¹³ (25 °C / 77 °F) > 10 ⁹ (400 °C / 752 °F)
Sensor element	GaPO ₄ (Gallium-Phosphate)	Acceleration sensitivity (Type)	axial: ≤ 0.03 mbar/g (0.004 psi/g) radial: ≤ 0.15 mbar/g (0.002 psi/g)
Nominal pressure range (bar)	0 ... 300 (0 ... 4350 psi)	Shock (g)	> 2000
Overload (bar)	350 (5075 psi)	Natural Frequency (kHz)	170
Sensitivity (pC / bar)	19 (1.3 pC/psi)	Capacity (nominal) (pF)	7.5
Linearity (% / FSO)	≤ ± 0.3 (0 ... 300 bar, 0 ... 3625 psi)	Tightening torque (Nm)	1.5
Operating temperature (° C)	-40 ... 400 (-40 ... 752 °F)	Housing material	Stainless steel, hermetically sealed
Sensitivity coefficient (° C⁻¹)	-2.1*10 ⁻⁴		



*1.5 mm steel, 4 mm gray cast iron or aluminum

The sensor can be connected directly to the object of measurement. The front of the sensor ($\varnothing 4,4$ mm) is sealed to the mounting hole. Rapid pressure changes are best recorded when the volume in front of the membrane is kept as minimal as possible.

All cables are detachable. Piezoelectric input cables - Teflon (1 m) and 1 sealing ring are included in the delivery.

DAC 106 G

Piezoelectric Pressure Sensor

- Narrow design due to an M3 cable connector
- High temperature resistance (400 ° C / 752 ° F)
- High natural frequency
- Continuous sensitivity over the total life span



APPLICATIONS

- Test rigs
- Development and quality assurance
- Confined spaces

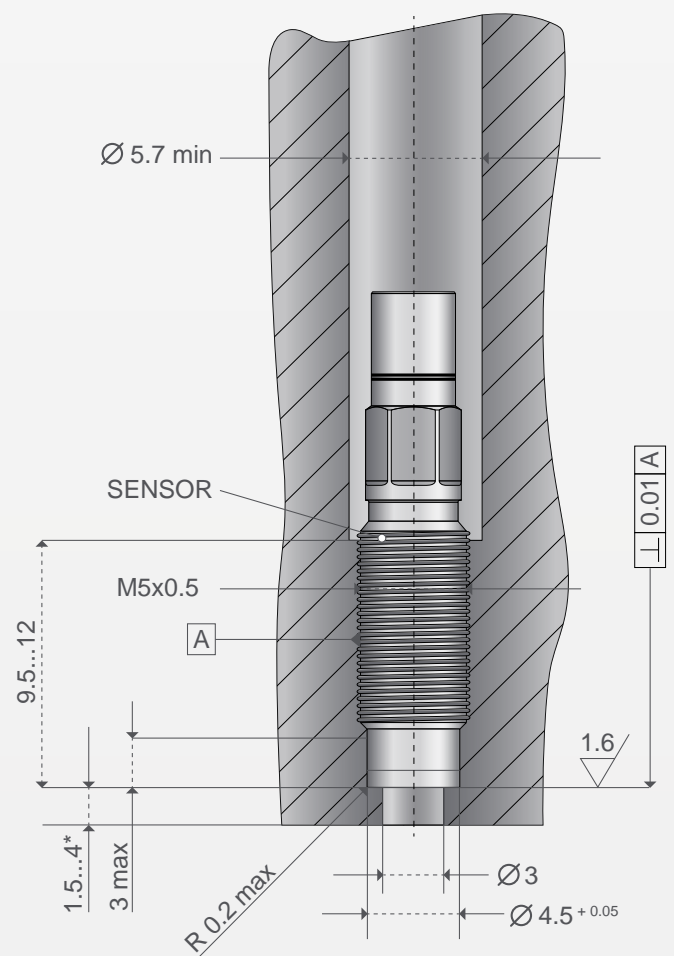
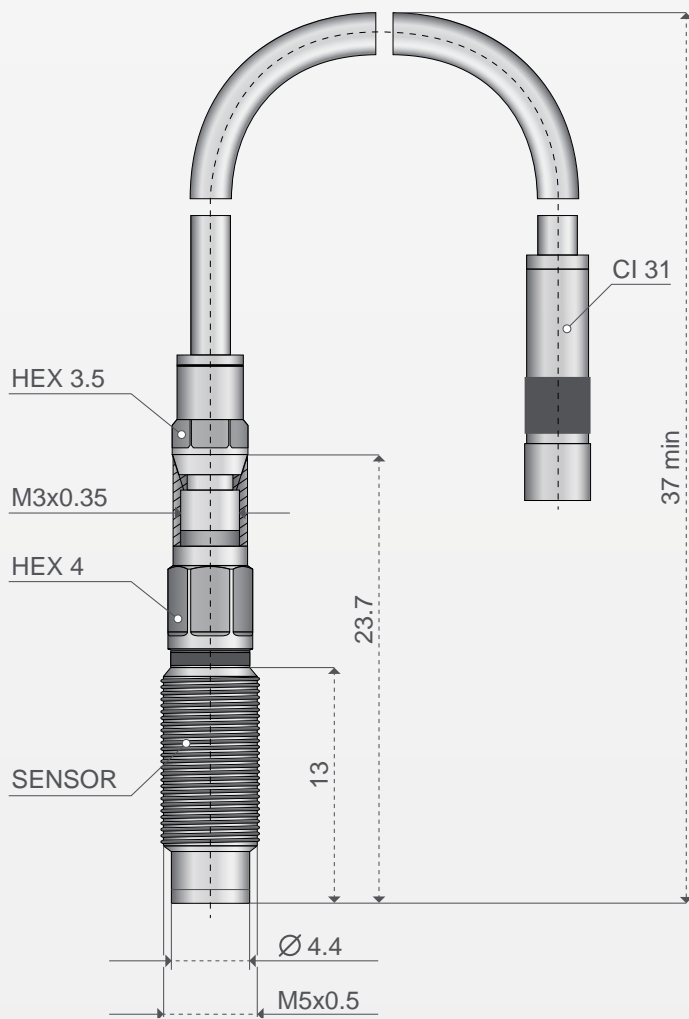
DESCRIPTION

The sensor was developed for dynamic and quasi-static pressure sensing up to 250 bar. The sensor element with Crystal Match™ technology allows for extraordinary signal readings over the entire temperature range. The single crystal GaPO₄ sensor element allows for constant

sensitivity ensuring excellent performance. Due to its size (M5x0.5 thread) and temperature resistance up to 400 °C, this sensor is suitable for a wide range of applications.

TECHNICAL SPECIFICATIONS

Operating principle	Piezoelectric	Insulation Resistance (Ω)	> 10 ¹³ (25 °C / 77 °F) > 10 ⁹ (400 °C / 752 °F)
Sensor element	GaPO ₄ (Gallium-Phosphate)	Acceleration sensitivity (Type)	axial: ≤ 0.03 mbar/g (0.0004 psi/g) radial: ≤ 0.15 mbar/g (0.0002 psi/g)
Nominal pressure range (bar)	0 ... 250 (0 ... 3625 psi)	Shock (g)	> 2000
Overload (bar)	300 (4350 psi)	Natural Frequency (kHz)	160
Sensitivity (Nominal) (pC / bar)	19 (1.3 pC/psi)	Capacity (nominal) (pF)	7.5
Linearity (% / FSO)	≤ ± 0.3 (0 ... 250 bar, 0 ... 3625 psi)	Tightening torque (Nm)	1.5
Operating temperature (° C)	-40 ... 400 (-40 ... 752 °F)	Housing material	Stainless steel, hermetically sealed
Sensitivity coefficient (° C⁻¹)	-2.1*10 ⁻⁴		



* 1.5 mm steel, 4 mm gray cast iron or aluminum

The sensor can be connected directly to the object of measurement. The front of the sensor (Ø 4,4 mm) is sealed to the mounting hole. Rapid pressure changes are best recorded when the volume in front of the membrane is kept as minimal as possible.

All cables are detachable. Piezoelectric input cables - Teflon (1 m) and 1 sealing ring are included in the delivery.

DAC 106 K

Piezoelectric Pressure Sensor

- Compact design
- Extended pressure range
- High temperature resistance (400 °C / 752 °F)
- High natural frequency
- Continuous sensitivity over the total life span



APPLICATIONS

- Test rigs
- Development and quality assurance
- Confined spaces

DESCRIPTION

The sensor was developed for dynamic and quasi-static pressure sensing up to 300 bar. The sensor element with Crystal Match™ technology allows for extraordinary signal readings over the entire temperature range. The single crystal GaPO₄ sensor element allows for constant

sensitivity ensuring excellent performance. Due to its size (M5x0.5 thread) and temperature resistance up to 400 °C, this sensor is suitable for a wide range of applications.

TECHNICAL SPECIFICATIONS

Operating principle	Piezoelectric	Insulation Resistance (Ω)	> 10 ¹³ (25 °C / 77 °F) > 10 ⁹ (400 °C / 752 °F)
Sensor element	GaPO ₄ (Gallium-Phosphate)	Acceleration sensitivity (Type)	axial: ≤ 0.03 mbar/g (0.0004 psi/g) radial: ≤ 0.15 mbar/g (0.0002 psi/g)
Nominal pressure range (bar)	0 ... 300 (0 ... 4350 psi)	Shock (g)	> 2000
Overload (bar)	350 (5075 psi)	Natural Frequency (kHz)	170
Sensitivity (Nominal) (pC / bar)	19 (1.3 pC/psi)	Capacity (nominal) (pF)	7.5
Linearity (% / FSO)	≤ ± 0.3 (0 ... 300 bar, 0 ... 3625 psi)	Tightening torque (Nm)	1.5
Operating temperature (° C)	-40 ... 400 (-40 ... 752 °F)	Housing material	Stainless steel, hermetically sealed
Sensitivity coefficient (° C⁻¹)	-2.1*10 ⁻⁴		

DAC 106 L

Piezoelectric Pressure Sensor

- Compact design
- Extended pressure range
- High temperature resistance (400 ° C / 752 ° F)
- High natural frequency
- Continuous sensitivity over the total life span



APPLICATIONS

- High pressure and high thermal loads
- Laboratory applications

DESCRIPTION

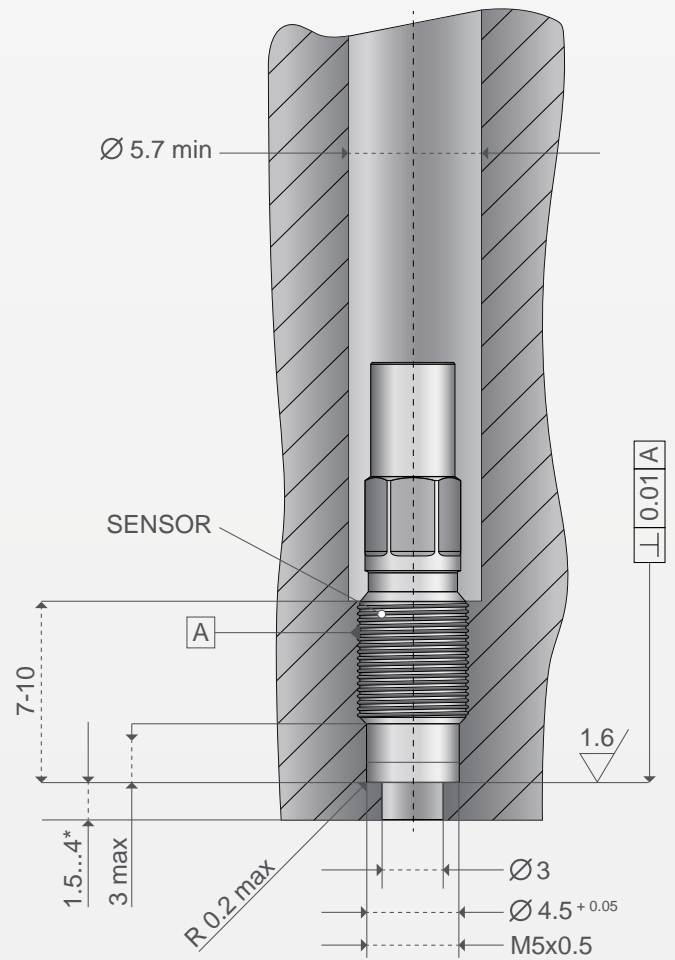
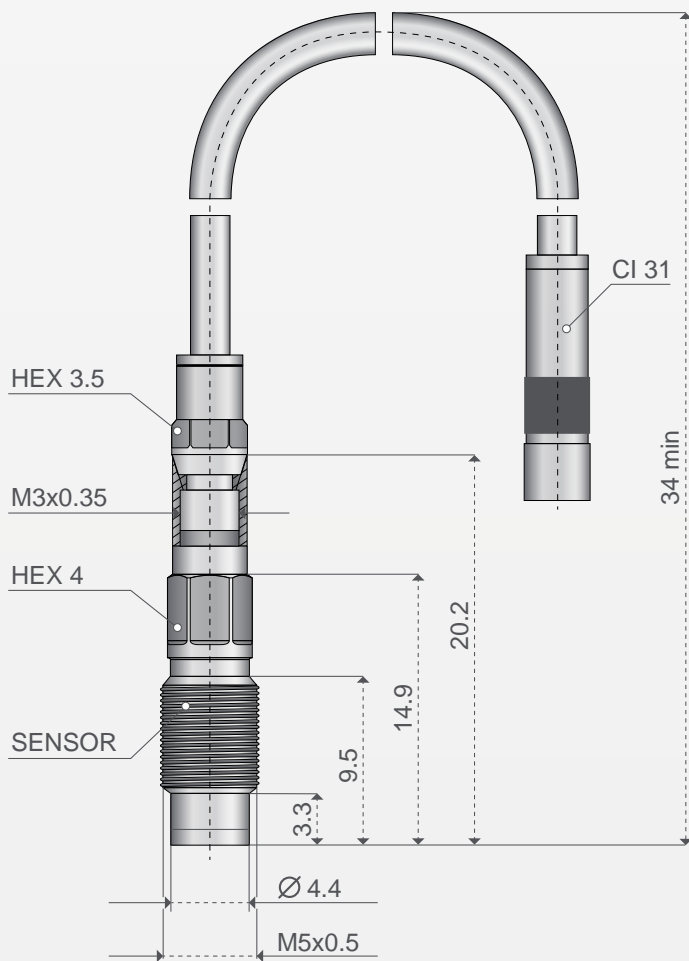
The DAC 106 L has a very slim design due to the M3 cable connector and allows for very accurate measurement with a size M5 sensor. The excellent performance is achieved through thermally optimized piezoelectric

crystal elements and the special Double Shell™ Design. By design, the piezoelectric elements can be separated from the negative influences of heat expansion and other mechanical stress factors.

TECHNICAL SPECIFICATIONS

Nominal pressure range (bar)	0 ... 500 (0 ... 7250 psi)
Overload (bar)	600 (8700 psi)
Sensitivity (Nominal) (pC / bar)	10 (0.7 pC/psi)
Linearity (% / FSO)	≤ ± 0.5
Operating temperature (° C)	-40 ... 400 (-40 ... 752 °F)
Insulation Resistance at 20 °C (Ω)	≥ 10 ¹³
Acceleration sensitivity (Type)	approx. 0.0005 bar/g (axial)
Shock (g)	≥ 2000

Natural Frequency (kHz)	approx. 170
Capacity (nominal) (pF)	7.5
Tightening torque (Nm)	1.5
Thermal sensitivity	≤ 1 % 20 ... 400 °C ≤ ± 0.35 % 250 ± 100 °C
Thread diameter (Front sealing)	M5x0.5
Cable connection (negative)	M3x0.35
Weight (without cable) (g)	1.6
Housing material	Stainless steel, hermetically sealed



*1.5 mm steel, 4 mm gray cast iron or aluminum

The sensor can be connected directly to the object of measurement. The front of the sensor (Ø 4,4 mm) is sealed to the mounting hole. Rapid pressure changes are best recorded when the volume in front of the membrane is kept as minimal as possible.

All cables are detachable. Piezoelectric input cables - Teflon (1 m) and 1 sealing ring are included in the delivery.

DAC 106 U

Piezoelectric Pressure Sensor

- Compact design
- High temperature resistance (400 °C / 752 °F)
- High natural frequency
- Continuous sensitivity over the total life span



APPLICATION

- High-pressure measurement with extreme pressure peaks in very confined spaces

DESCRIPTION

The sensor was developed for dynamic and quasi-static pressure sensing up to 650 bar. The single crystal GaPO₄ sensor element allows for constant sensitivity ensuring excellent performance. The sensor's Double Shell™ design separates the measuring crystals from mechanical stress

factors, resulting in accurate measurement in different situations possible. Due to its size (M5x0.5 thread) and pressure range, this sensor is suitable for a wide range of applications.

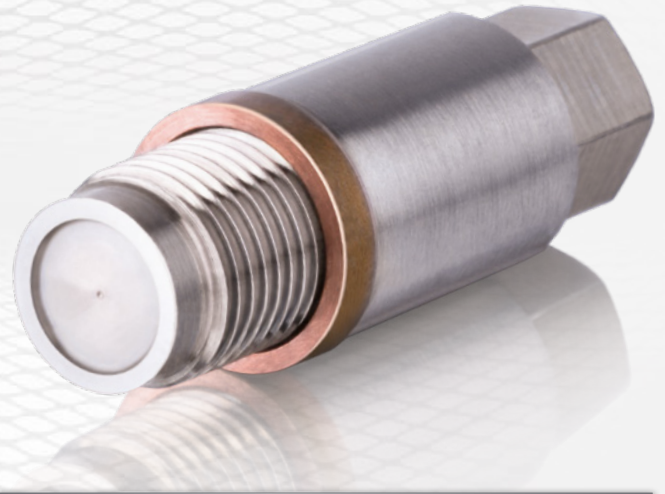
TECHNICAL SPECIFICATIONS

Operating principle	Piezoelectric	Acceleration sensitivity	< 0.5 mbar/g (0.0007 psi/g)
Sensor element	GaPO ₄ (Gallium-Phosphate)	Shock (g)	≥ 2000
Nominal pressure range (bar)	0 ... 650 (0 ... 1200 psi)	Natural Frequency (kHz)	> 400
Overload (bar)	1000 (14500 psi)	Capacity (pF)	4
Lifetime	10 ⁸	Tightening torque (Nm)	1.5 (1.1 lbft)
Sensitivity (Nominal) (pC / bar)	approx. 1.5 (0.1 pc/psi)	Thermal Sensitivity	≤ 1 % 20 ... 400 °C
Linearity (% / FSO)	≤ ± 0.3 0 ... 150 bar FSO (0 ... 2200 bar psi FSO) ≤ ± 0.5 0 ... 300 bar FSO (0 ... 4400 bar psi FSO)	Thread diameter (Front sealing)	≤ ± 0.35 % 250 ± 100 °C
Operating temperature (°C)	-40 ... 350 (-40 ... 662 °F)	Cable connection (negative)	M3x0.35
Insulation Resistance at 20 °C (Ω)	≥ 10 ¹³	Weight (without cable) (g)	1.5 g (0.05 oz.)
		Housing material	Nickel superalloy, hermetically sealed

DAC 107

Piezoelectric Pressure Sensor

- High output signal
- High linearity through out entire pressure and temperature range
- High temperature resistance (400 °C / 752 °F)
- Continuous sensitivity over the total life span



APPLICATIONS

- High-precision measurement under difficult thermal conditions
- Thermodynamic analysis

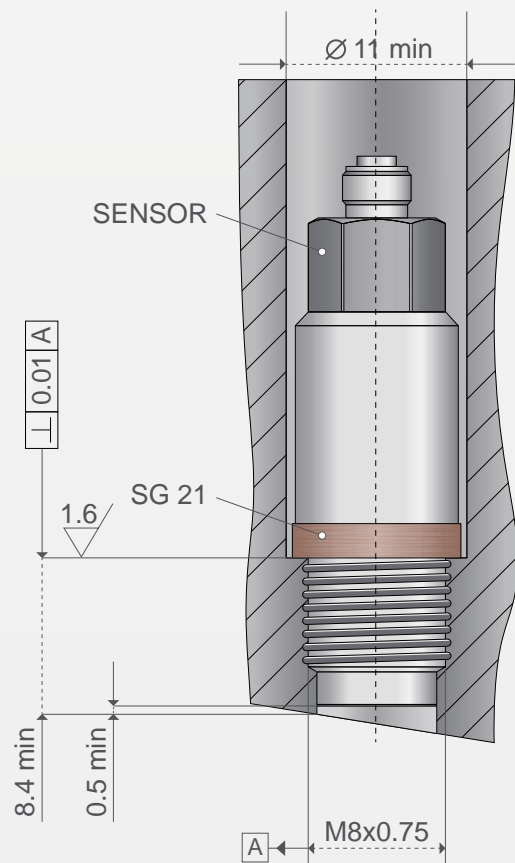
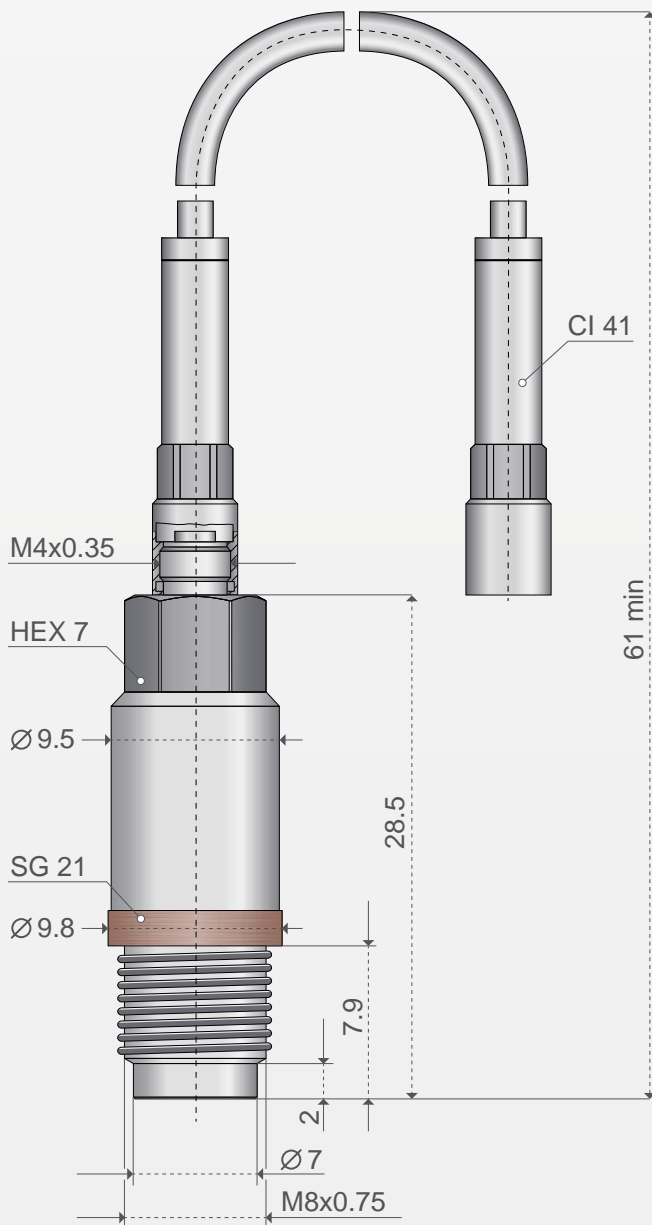
DESCRIPTION

The DAC 107 is a sensor that combines easy installation with an M8 thread, essential to high accuracy for precise thermodynamic analysis. The Double Shell™ design pro-

vides a high mechanical level of separation from the effects of the mounting hole. Special piezoelectric elements are used to achieve excellent output signal linearity.

TECHNICAL SPECIFICATIONS

Nominal pressure range (bar)	0 ... 250 (0 ... 3625 psi)	Capacity (pF)	8
Overload (bar)	300 (4350 psi)	Tightening torque (Nm)	6
Lifetime (Load change)	10 ⁸	Thermal Sensitivity	≤ 1 % 20 ... 400 °C ≤ ± 0.25 % 250 ± 100 °C
Sensitivity (Nominal) (pC / bar)	45 (3.1 pC/psi)	Thread diameter (Shoulder sealing)	M8x0.75 (stepped grommet seal)
Linearity (% / FSO)	≤ ± 0.3	Cable connection (negative)	M4x0.35
Operating temperature (° C)	-40 ... 400 (-40 ... 752 °F)	Weight (without cable) (g)	14
Insulation Resistance at 20 °C (Ω)	≥ 10 ¹³		
Acceleration sensitivity (type)	≤ 0.0002 (axial)		
Shock (g)	≥ 2000		
Natural frequency (kHz)	approx. 92		



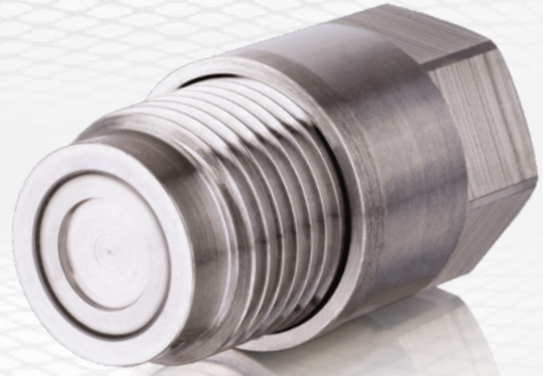
The sensor can be connected directly to the object of measurement. The back of the sensor ($\varnothing 9,5$ mm) is sealed to the mounting hole. Rapid pressure changes are best recorded when the volume in front of the membrane is kept as minimal as possible.

All cables are detachable. Piezoelectric input cables - Teflon (1 m) and 1 sealing ring are included in the delivery.

DAC 109

Piezoelectric Pressure Sensor

- Robust design for long-term operation
- Internal pre-tensioning element
- High linearity over the entire pressure-temperature range
- High temperature resistance (350 °C / 662 °F)
- Continuous sensitivity over total life span



APPLICATIONS

- Continuous test rigs
- Status monitoring

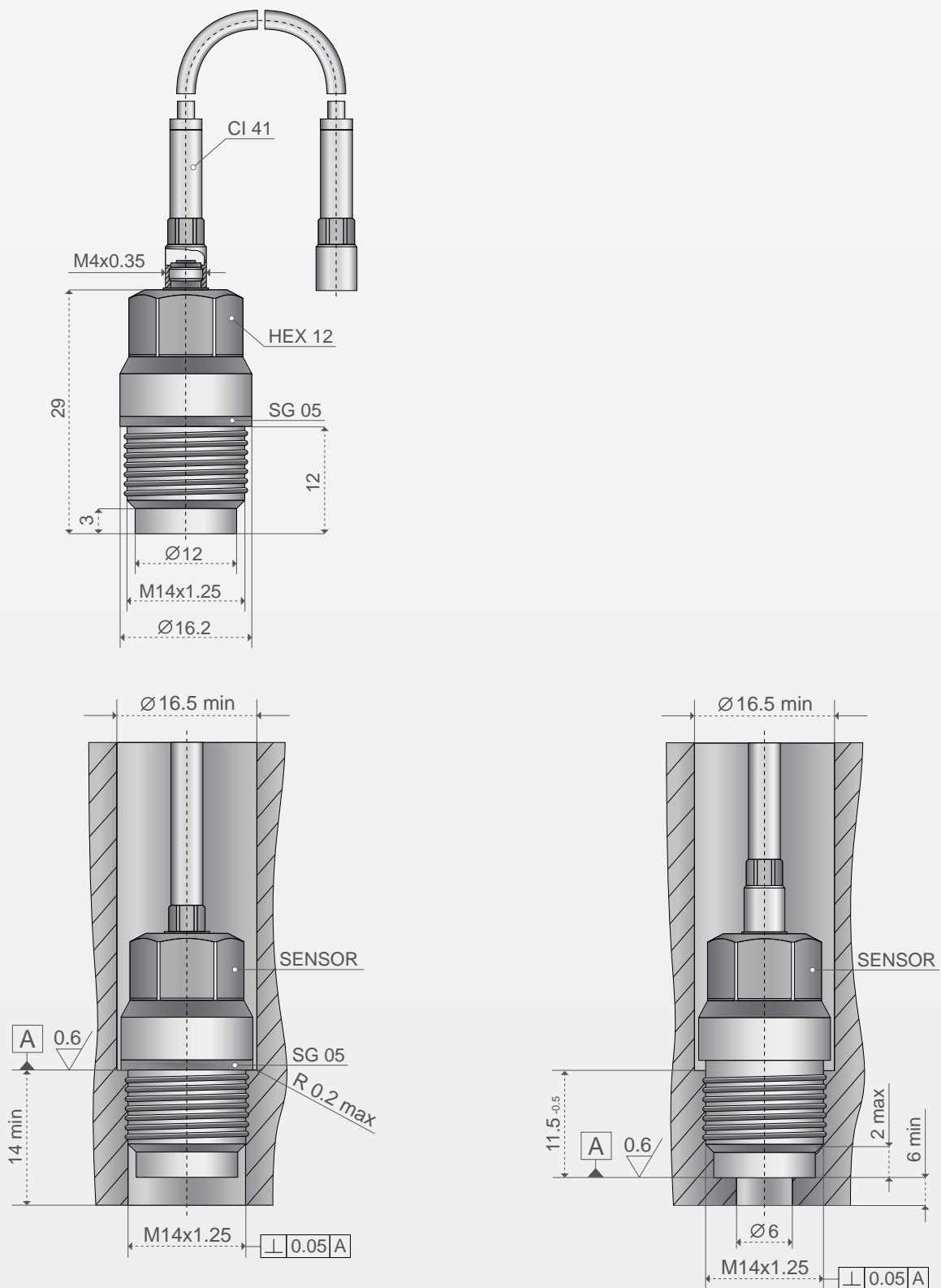
DESCRIPTION

The DAC 109 is a highly durable sensor for continuous pressure monitoring in a difficult environment. Mounting with an M14 thread, different sealing options and an internal leader element allow for continuous, non-stop

operation. The Double Shell™ design provides a high mechanical level of separation from the effects of the mounting hole.

TECHNICAL SPECIFICATIONS

Nominal pressure range (bar)	0 ... 250 (0 ... 3625 psi)	Natural frequency (kHz)	approx. 90
Overload (bar)	300 (4350 psi)	Capacity (pF)	7
Lifetime (Load change)	10 ⁸	Tightening torque (Nm)	20 ... 25
Sensitivity (Nominal) (pC / bar)	20 (1.4 pC/psi)	Thermal Sensitivity	≤ 0.5 % 20 ... 350 °C ≤ ± 0.2 % 250 ± 100 °C
Linearity (% / FSO)	≤ ± 0.5	Thread diameter (Shoulder sealing)	M14x1.25 (stepped grommet seal)
Operating temperature (° C)	-40 ... 350 (-40 ... 662 °F)	Cable connection (negative)	M4x0.35
Insulation Resistance at 20 °C (Ω)	≥ 10 ¹³	Weight (without cable) (g)	34
Acceleration sensitivity (type)	≤ 0.0002 (axial)		
Shock (g)	≥ 2000		



The sensor can be connected directly to the object of measurement. The back of the sensor ($\varnothing 16,2$ mm, $\varnothing 12,0$ mm) is sealed to the mounting hole. Rapid pressure changes are best recorded when the volume in front of the membrane is kept as minimal as possible.

All cables are detachable. Piezoelectric input cables - Teflon (1 m) and 1 sealing ring are included in the delivery.

DAC 120

Piezoelectric High-Pressure Sensor

- High pressure up to 2000 bar
- High sensitivity
- Excellent long-term stability



APPLICATIONS

- Hydraulic systems
- Pipe(line) monitoring (water hammer effect)
- Valves

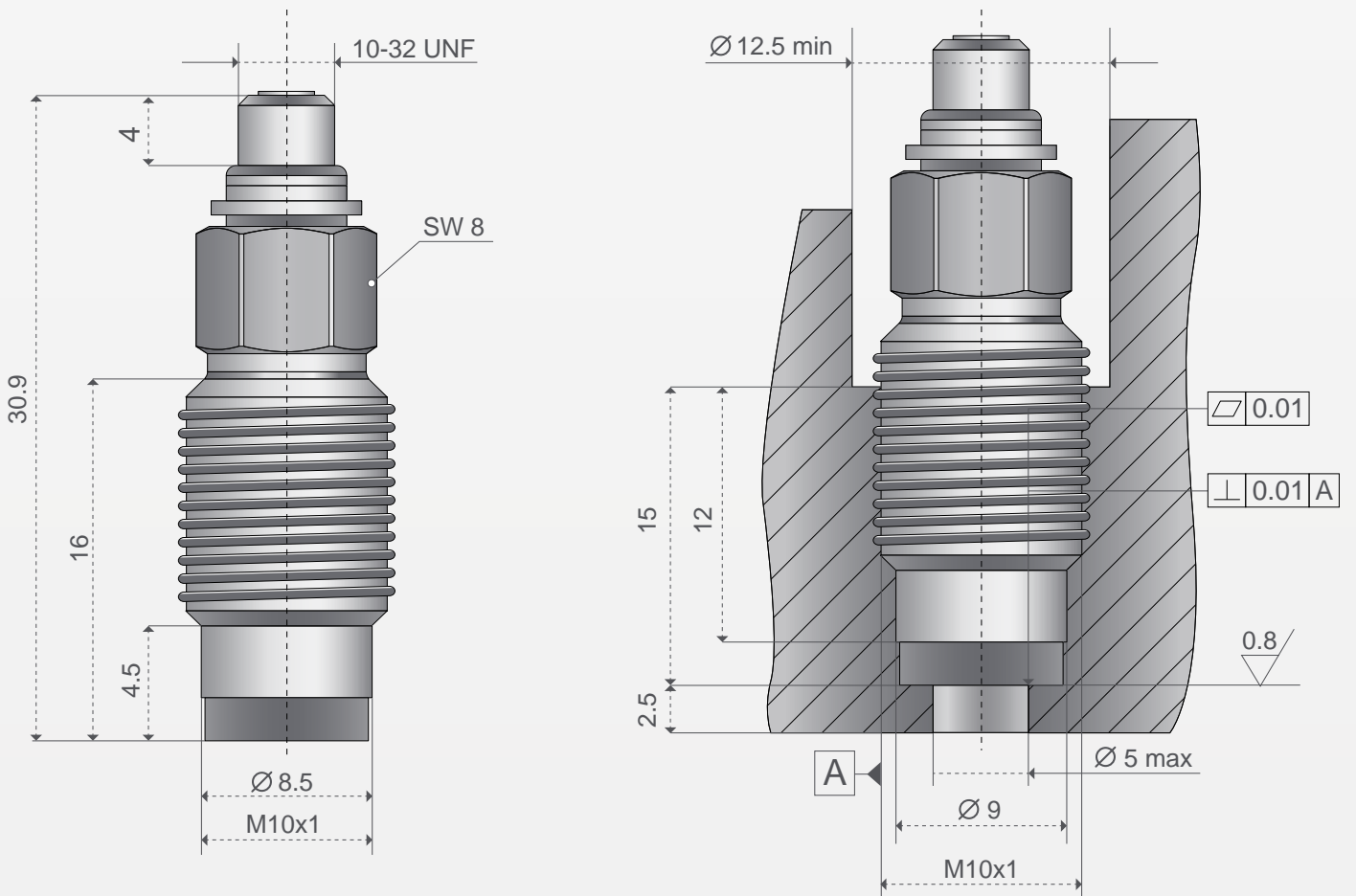
DESCRIPTION

The DAC 120 was developed to record dynamic pressure changes in hydraulic systems up to 2000 bar. The unique GaPO₄ sensor element allows a sensitivity of 5.2 pC / bar, making it perfectly suited for small changes

in pressure throughout the entire pressure range. The sensor (front-sealing) used with a compression fitting is not influenced by either the assembly or the installation process.

TECHNICAL SPECIFICATIONS

Nominal pressure range (bar)	0 ... 2000 (0 ... 29000 psi)	Natural Frequency (kHz)	> 240
Overload (bar)	2200 (31900 psi)	Capacity (pF)	8
Sensitivity (pC / bar)	5.2 (0.36 pC/psi)	Tightening torque (Nm)	20
Linearity (% / FSO)	≤ ± 1	Thermal Sensitivity	± 0.02
Operating temperature (° C)	-50 ... 200 (-58 ... 392 °F)	Rise time (µs)	1
Insulation Resistance at 20 °C (Ω)	> 1*10 ¹³	Connector	10-32 UNF
Acceleration sensitivity (type)	axial: < 0.002 bar/g radial: < 0.005 bar/g	Weight (without cable) (g)	12
Shock (g)	25.000 g / 10.000 g		



All cables are detachable.

Piezoelectric input cables UNF (1 m) and 10 sealing rings are included in the delivery.

DAC 160

Piezoelectric High-Pressure Sensor

- Single crystalline gallium phosphate GaPO_4
- High pressure up to 6000 bar
- High sensitivity
- Excellent long-term stability



APPLICATIONS

- Hydraulic systems
- Pipe(line) monitoring (Water Hammer Effect)

- Valves

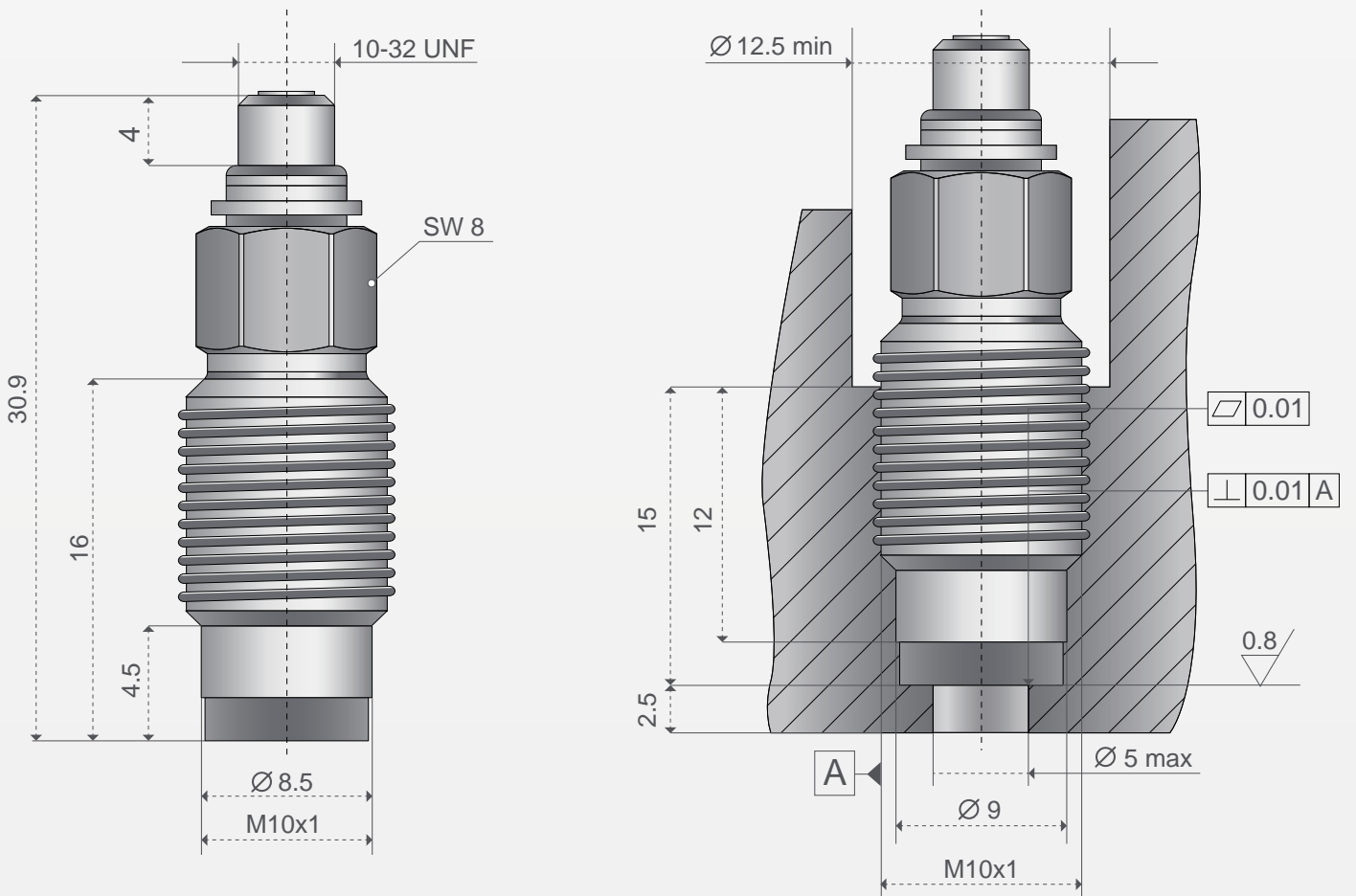
DESCRIPTION

The DAC 160 was developed to record dynamic pressure changes in hydraulic systems up to 6000 bar. The unique GaPO_4 sensor element allows a sensitivity of 3 pC/bar, making it perfectly suited for small changes in pres-

sure throughout the entire pressure range. The sensor (front-sealing) used with a compression fitting is not influenced by either the assembly or the installation process.

TECHNICAL SPECIFICATIONS

Nominal pressure range (bar)	0 ... 6000 (0 ... 87000 psi)	Natural Frequency (kHz)	> 240
Overload (bar)	6600 (95700 psi)	Capacity (pF)	8
Sensitivity (pC / bar)	3 (0.2 pC/psi)	Tightening torque (Nm)	20
Linearity (% / FSO)	$\leq \pm 1$	Thermal Sensitivity (° C)	± 0.02
Operating temperature (° C)	-50 ... 200 (-58 ... 392 °F)	Rise time (µs)	1
Insulation Resistance at 20 °C (Ω)	$> 1 \cdot 10^{13}$	Connector	10-32 UNF
Acceleration sensitivity (type)	axial: < 0.002 bar/g radial: < 0.005 bar/g	Weight (without cable) (g)	approx. 12
Shock (g)	25.000 g / 10.000 g		



All cables are detachable.

Piezoelectric input cables UNF (1 m) and 10 sealing rings are included in the delivery.

DAC 180

Piezoelectric High-Pressure Sensor

- High sensitivity
- Suitable for dynamic pressure changes of up to 8000 bar
- Long life span and excellent long-term stability



APPLICATIONS

- Hydraulic systems
- Pipe(line) monitoring (Water Hammer Effect)

- Valves

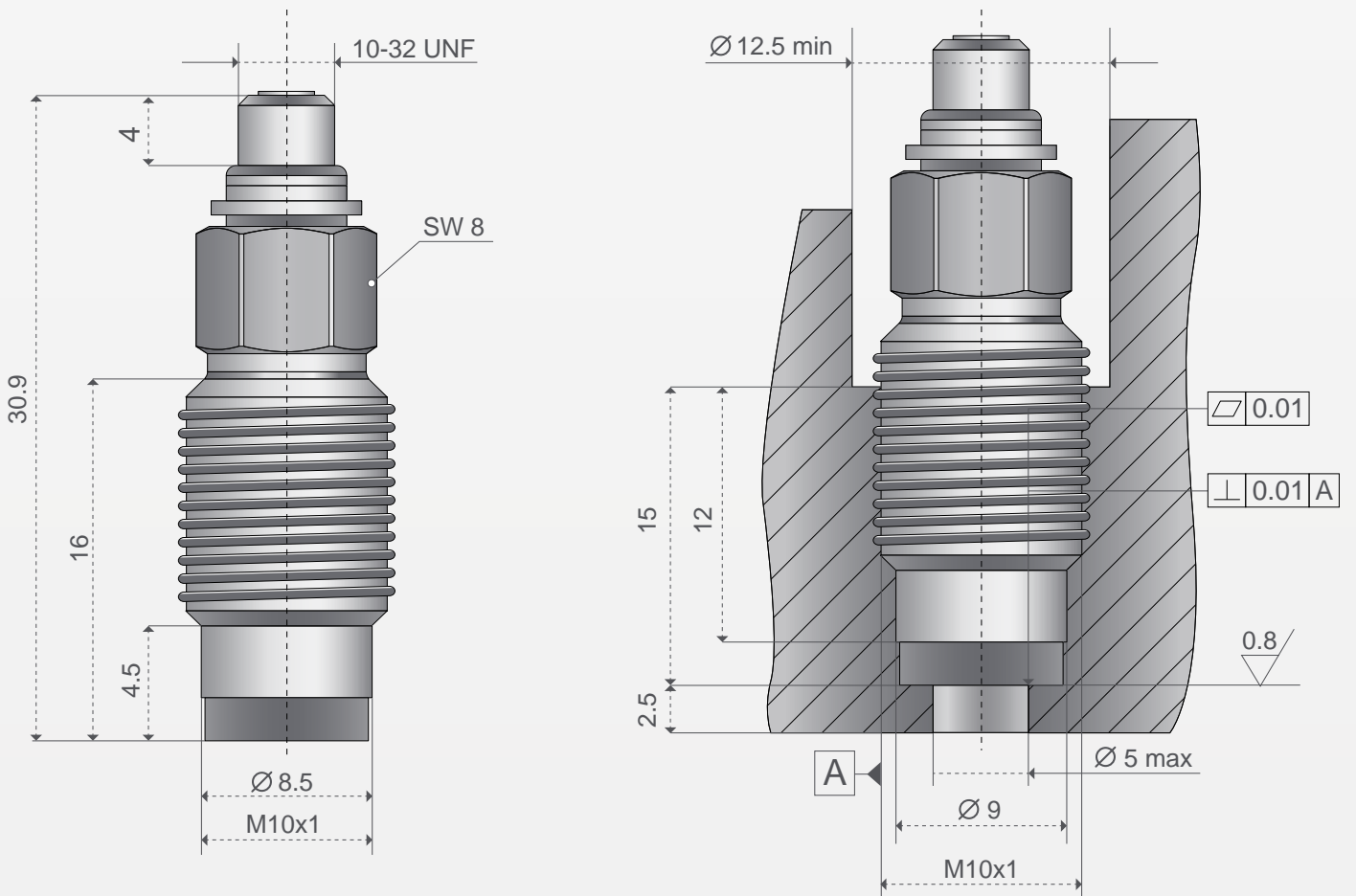
DESCRIPTION

This piezoelectric pressure sensor was developed to record dynamic pressure changes in hydraulic systems up to 8000 bar. The unique GaPO_4 sensor element allows a sensitivity of 2,3 pC/bar, making it perfectly suited for

small changes in pressure throughout the entire pressure range. The sensor (front-sealing) used with a compression fitting is not influenced by either the assembly or the installation process.

TECHNICAL SPECIFICATIONS

Nominal pressure range (bar)	0 ... 8000 (0 ... 116000 psi)	Natural Frequency (kHz)	> 240
Overload (bar)	8800 (127600 psi)	Capacity (pF)	8
Sensitivity (pC / bar)	2.3 (0.2 pC/psi)	Tightening torque (Nm)	20
Linearity (% / FSO)	$\leq \pm 1$	Thermal Sensitivity (° C)	± 0.02
Operating temperature (° C)	-50 ... 200 (-58 ... 392 °F)	Rise time (µs)	1
Insulation Resistance at 20 °C (Ω)	$> 1 \cdot 10^{13}$	Connector	10-32 UNF
Acceleration sensitivity (typ.)	axial: < 0.002 bar/g radial: < 0.005 bar/g	Weight (without cable) (g)	approx. 12
Shock (g)	25.000 g / 10.000 g		



All cables are detachable.

Piezoelectric input cables UNF (1 m) and 10 sealing rings are included in the delivery.

LV 3

Charge amplifier

- Charge amplifier for piezoelectric pressure sensors
- Measuring range freely selectable
- Signal output ± 10 V
- Ethernet interface
- Compact and robust



TECHNICAL SPECIFICATIONS

Number of input connections	1
Measuring range (pC)	$\pm 50 \dots \pm 600\,000$
Calibrated measuring range (% F_{nom})	100

OUTPUT SIGNAL, ANALOGUE

Output voltage (V)	$-10 \dots +10$
Max. Output voltage (V)	± 11.5
Max. Output current – short circuit proof (mA)	10
Output Resistance (Ω)	< 5
Activation time (ms)	375
Interference between input and output (GND) (GND) (0 ... 1000 Hz) (dB)	< 60
Interference output signal (0.1 Hz ... 1 MHz)	< 30
Peak to peak; over the entire measuring range $\pm 50 \dots \pm 600\,000$ pC up to 30 kHz filter frequency (mV)	

ACCURACY

Accuracy at 25 °C (%)	$< \pm 0.5$
Repeatability at 25 °C (% FS)	$< \pm 0.05$
Reset / Measure (operate) step (pC)	$< \pm 2$ (typ. < 1)
Drift at 20 °C (pC / s)	$< \pm 0.05$

FREQUENCY OF ANALOGUE SIGNAL OUTPUT BANDWIDTH (-3DB)

Measuring range 50 pC to 32.000 pC (kHz)	30
Measuring range 32.000 pC to 40.000 pC (kHz)	24
Measuring range 40.000 pC to 60.000 pC (kHz)	16

FREQUENCY OF ANALOGUE SIGNAL OUTPUT BANDWIDTH (-3DB)

Measuring range 60.000 pC to 80.000 pC (kHz)	12
Measuring range 80.000 pC to 100.000 pC (kHz)	9.6
Measuring range 100.000 pC to 120.000 pC (kHz)	8
Measuring range 120.000 pC to 180.000 pC (kHz)	5.3
Measuring range 180.000 pC to 250.000 pC (kHz)	3.8
Measuring range 250.000 pC to 400.000 pC (kHz)	2.4
Measuring range 400.000 pC to 600.000 pC (kHz)	1.6
Low pass filter, selectable up to 20 kHz (Hz)	1 ... 20000; 30000
High pass filter, selectable (Hz)	0.15; 1.5; out
Filter properties	Bessel, 5th Order

OFFSET

Output voltage (V)	± 10
Resolution (mV)	10

DIGITAL OUTPUT SIGNAL

Resolution (bit)	12
Accuracy (% FS)	$< \pm 1$
High-speed sampling rate (kHz)	10

SIGNAL CONTROL (GALVANIC ISOLATION)

Input voltage range	
High (V)	12 ... 30
Low (V)	0 ... 5
Input current (mA)	4 (<i>with 24 V supply</i>)

LED DISPLAYS

IP address not configured	green-blue, flashing
Connection via Ethernet	constant, blue
Measurement	constant, green
Reset to default	constant, red
Overload	red-blue or red-green, flashing
Learning function in the range 600000 pC	yellow, flashing, 1 Hz
Learning function in the range 6000 pC	yellow, flashing, 2 Hz
Firmware update	white, flashing, 2 Hz
Bootloader mode	red, flashing, 1 Hz

LV 3 – TECHNICAL SPECIFICATIONS

CONNECTIONS

System Input / Output	M12 connector, 8-pin
Digital input / output	M12 socket, 5-pin, with protective cap
Ethernet	M12 socket, 4-pole, with protective cap
Sensor input	BNC connector

ETHERNET COMMUNICATION INTERFACE

System interface for parameterization of amplifiers and transmission of measured values up to max. 1 kHz transmission rate

Transmission protocol (MBit / s)	TCP / IP can be networked via IEEE802
Max. Transmission rate (MBit / s)	10
Topology (twisted pairs)	2
Socket Connection	M12 socket with protective cap
Cable type	UTP Category 5 or Shielded Twisted Pair (STP)

DIGITAL SIGNAL CONTROLS

System Input / Output	Voltage supply, reset / measure, analogue output signal
Ethernet input	PC / PLC connection, measured value streaming

DIGITAL INPUT

Quantity	1
Response time (ms)	0.1
Active input level selectable (V) (High / Low)	0 or 24
Voltage range (V)	0 ... 30

SWITCHING VOLTAGES

High level (V)	12 ... 30
Low level (V)	0 ... 5
Input current at 24 V (mA)	4
Protection against polarity reversal (V)	-30 ... 0
Galvanic isolation of output and supply voltage, functional, typ. (V _{DC})	100
Latency time of the digital input (ms)	2

DIGITAL OUTPUT

Quantity	2
Switching operations, any combination for each Output selectable	limit switch 1 or 2, overload, manual, system error, parameter changeover
Response time (ms)	0.1
Voltage level (V) Selectable for each output (High / Low)	0 or 24
Output voltage (V) (Corresponds to the mains voltage), nom.	24
Max. Voltage (V)	1
Output current at operating temperature (mA)	350
Short circuit current (A)	0.7
Short-circuit duration	unlimited
Galvanic isolation (VDC) of supply voltage and bus potential isolation, functional, typ.	100
Latency of the Electronic-digital input (ms)	2

EMC CONFORMITY

According to EN61326-1: 2007, EN61326-2-3: 2007 in an industrial environment

GENERAL DATA

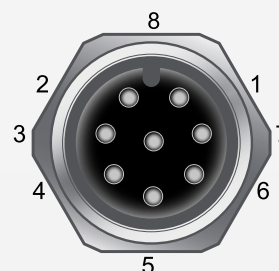
Supply voltage (V_{DC}) Overvoltage and polarity protection	24 (18 ... 30)
Galvanic isolation (V_{DC}) functional, typ.	100
Supply at 24 V (mA)	120
Vibration resistance (m / s ²) 20 ... 2000 Hz; Duration 16 min; Cycle 2 min.	100
Impact; Duration 1 ms (m / s ²)	2000
Nominal temperature range (°C) non-condensing	0 ... 60
Working temperature range (° C) non-condensing	-40 ... 80
Max. Humidity (%) non-condensing	93, at 40 °C 2 °C
Dimension (L x W x H) (mm)	115 x 64 x 35
Weight (g)	350
Housing material	die-cast aluminum
Protection class, with connected cable or protective caps	IP60

LV 3 – TECHNICAL SPECIFICATIONS

CONNECTION TABLES

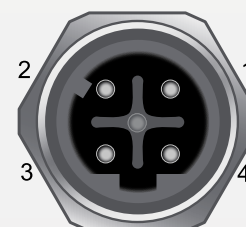
SYSTEM CONNECTION INPUT / OUTPUT

Pin	Signal name	Description	Values
1	Ground power Supply		
2	Not used		
3	Reset / Measure	Digital input, active high	+12 ... +30 V
4	Not used		
5	Charge out	Output signal	±10 V
6	Output screen	Output signal (ground)	
7	Not used		
8	Power supply	Power supply between pin 8 and 1	+18 ... +30 V



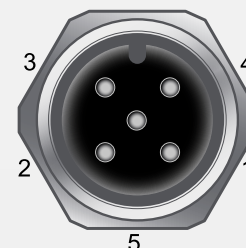
ETHERNET CONNECTION

Pin	Signal name
1	TX +
2	RX +
3	TX -
4	RX -

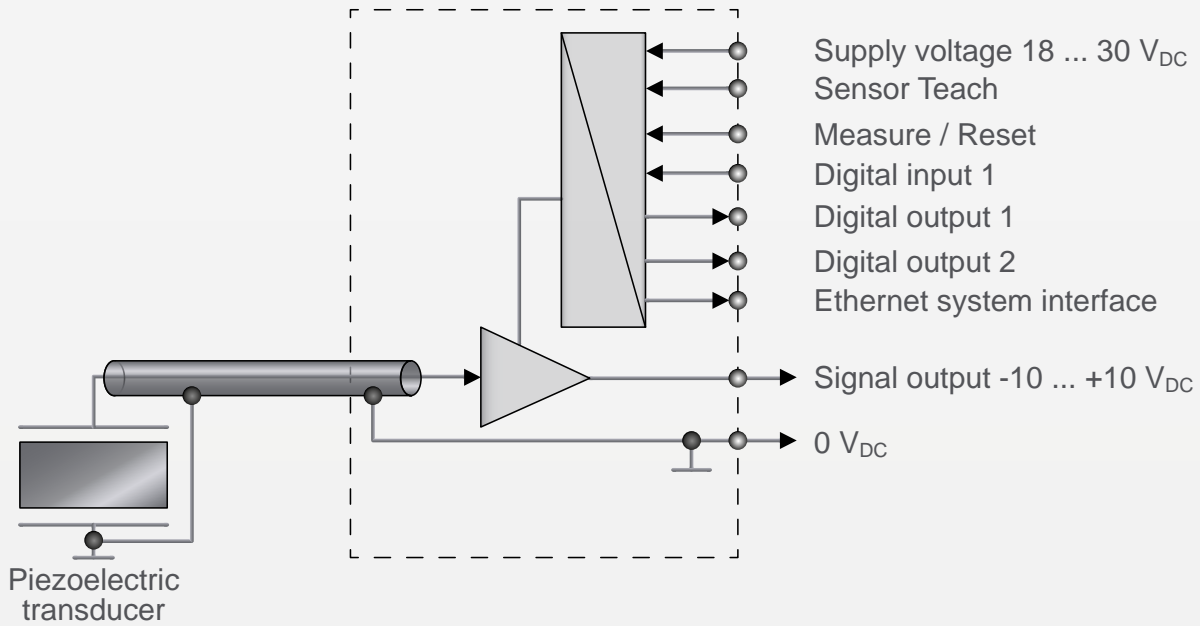


PLUG, DIGITAL INPUT / OUTPUT

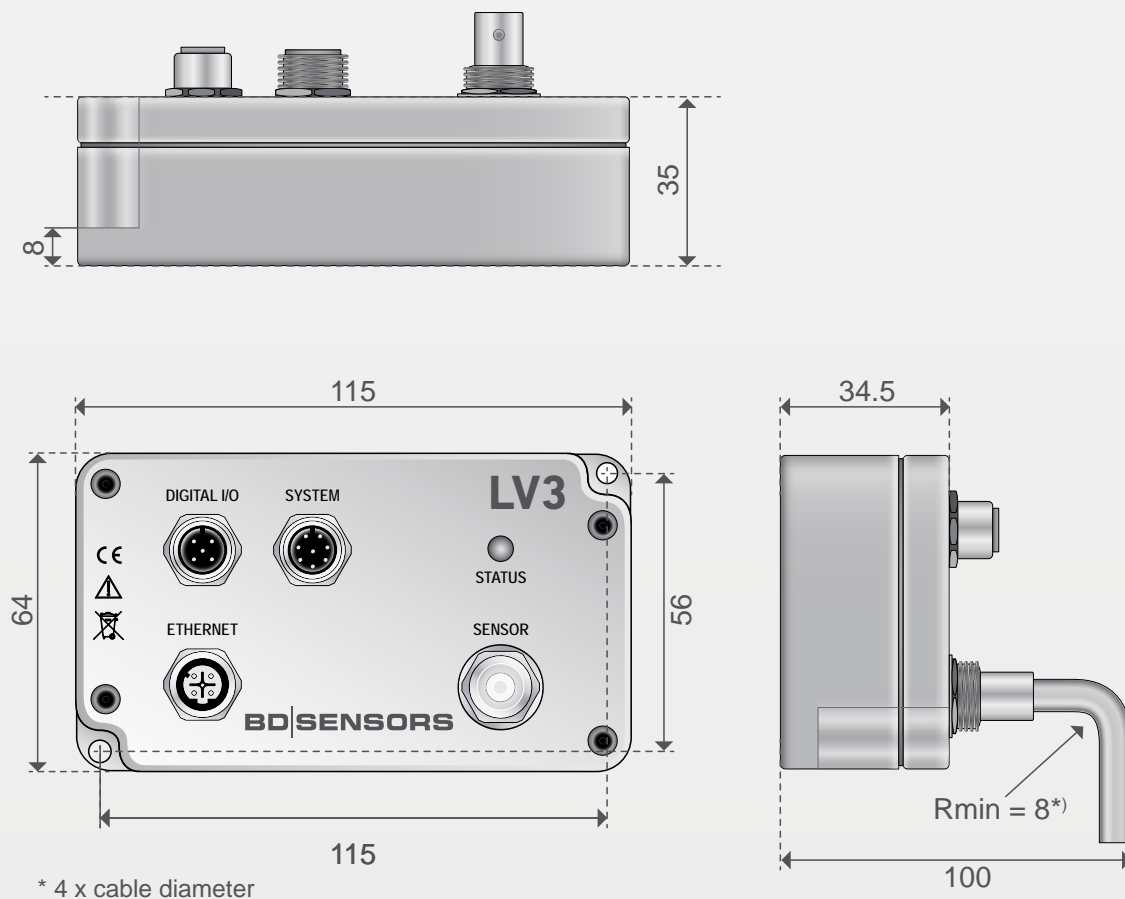
Pin	Signal name	Description	Values
1	VCC	Digital output or input 1	VCC/350 mA
2	Digital Out	Supply for digital output 1, 2	+18 ... +30 V
3	Digital Out	Digital output 2	VCC/350 mA
4	Digital In	Digital input 1	+12 ... +30 V
5	Ground Power Supply		



BLOCK DIAGRAM



DIMENSIONS IN MM



D|AQ BOX

4-channel data logger

- Reset option for piezoelectric pressure sensors
- up to 100 kHz sampling rate



APPLICATION

- Data collection for fast and highly dynamic sensors

DESCRIPTION

The D | AQ-BOX is a data acquisition device from **BD|SENSORS**. It is ideal for fast and highly dynamic sensors, for example, the piezoelectric DMC and DAC series or the DMP 320.

With a maximum sampling rate of 100 kHz, it is fast enough to perfectly read the sensor data flow in almost all applications. For piezoelectric sensors, a reset option has been installed which can be triggered with a few simple button clicks.

The software BDS-PDS was specifically developed for the D | AQ-BOX. It's fast, user-friendly and easy to handle. The software was made to meet the needs of D | AQ-BOX and when combined, they make for a fast, reliable and efficient data acquisition system.

All necessary cables and connections are included in the D | AQ-BOX. The unrestricted operation of this data acquisition device is only possible with a Windows PC or another Windows device.

TECHNICAL SPECIFICATIONS

Supply	18 ... 30 V _{DC}
Input (sensor)	0 ... 10 V _{DC}
Channels	4
Sampling rate	100 kHz (maximum sampling rate; when using more than one channel, it's divided, for example, into 4 channels 25 kHz / channel)
Connection	USB-B
Outgoing supply	24 V _{DC}

EMC CONFORMITY

EMC conformity

according to EN61326-1: 2007, EN61326-2-3: 2007
in industrial environments

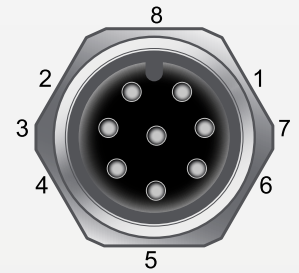
Protection class

IP40

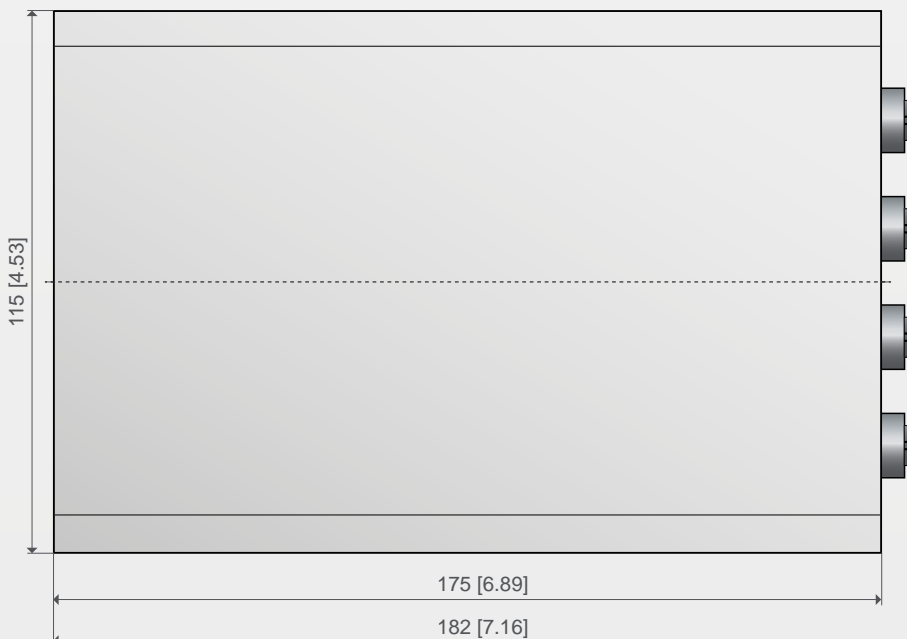
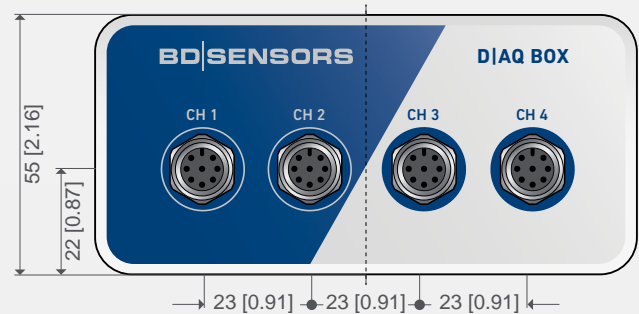
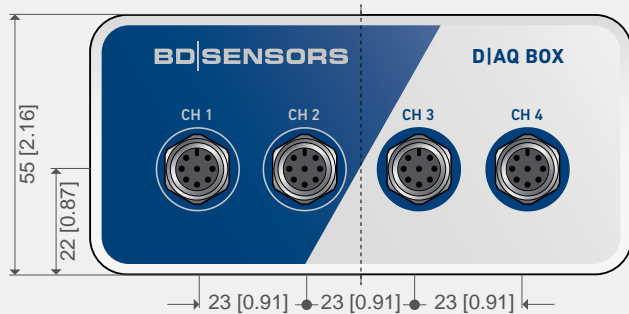
CONNECTION CONFIGURATION TABLES

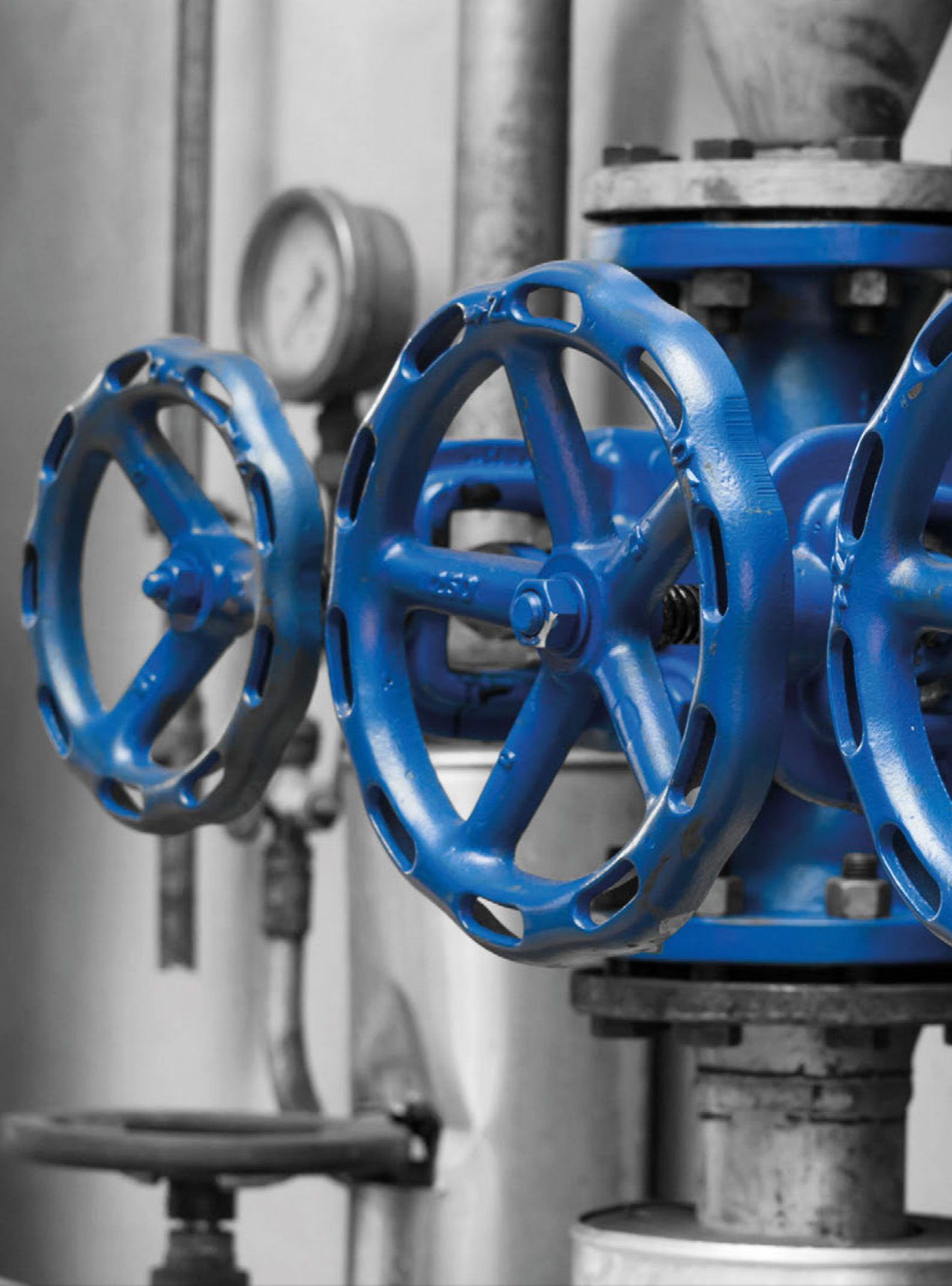
SYSTEM CONNECTION INPUT / OUTPUT 4 X M12X1, 8 POLE

Pin	Signal name	Description	Values
1	Ground power supply		
2	Not used		
3	Reset	Digital input, active high	+12 ... +30 V
4	Not used		
5	Charge out	Input signal	± 10 V
6	Output screen	Input signal (grounding)	
7	Not used	Power supply	
8	Power supply	between pin 8 and 1	+18 ... +30 V



DIMENSIONS IN MM / INCHES





DMC SERIES

Piezoelectric pressure transducers

The development of a piezoelectric pressure transducer is in the final stages - this will provide a combination of piezoelectric pressure sensor and charge amplifier in a compact housing.

The sensors used are fitted with highly sensitive and reliable single crystals made of gallium phosphate (GaPO_4) supplied by the company PIEZOCRYST.

It has an analogue output signal of 0 ... 10 V, as well as standardized mechanical connections. Combined with an integrated charge amplifier, the first member of the DMC series works with an external charge amplifier and specialized

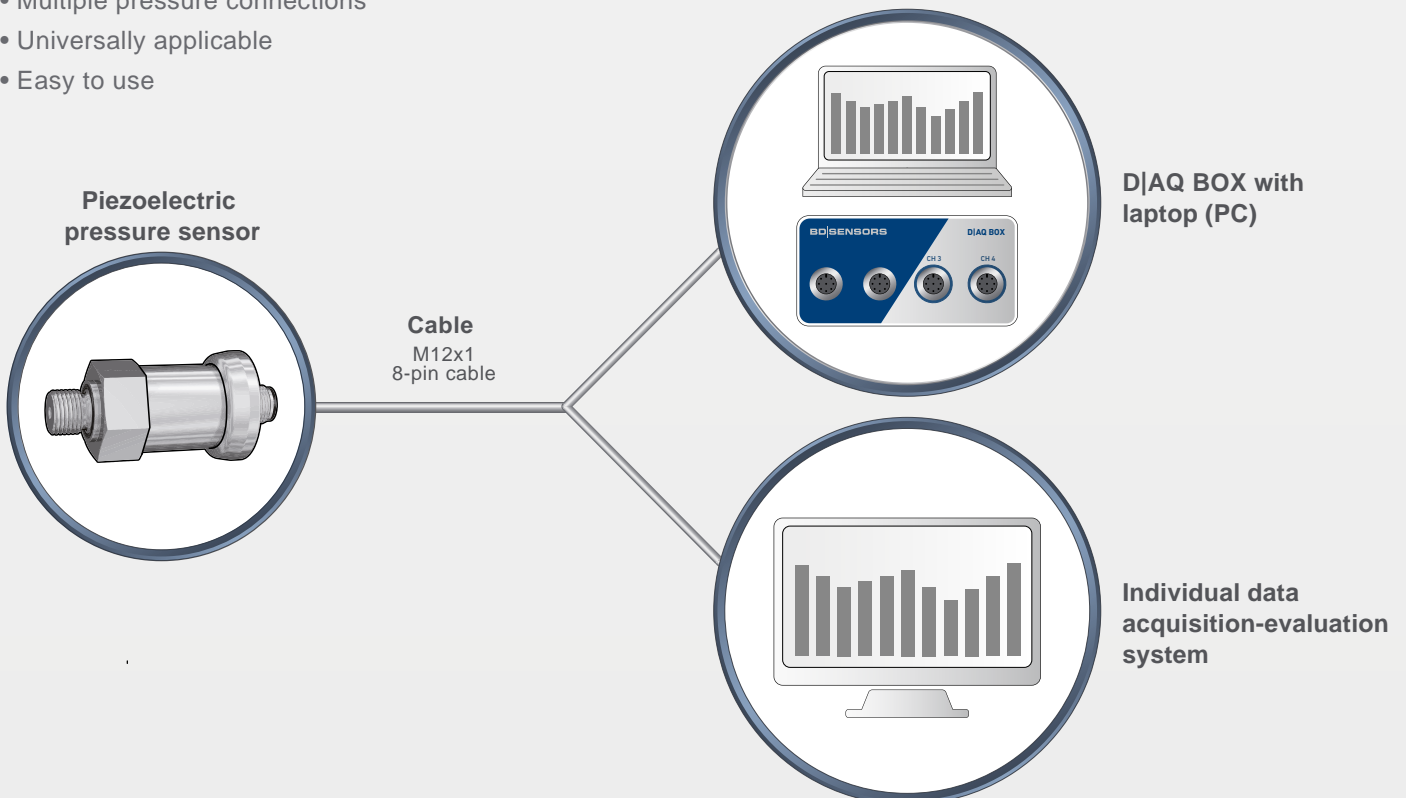
cables, so there's no need for expensive, elaborate cabling. The device reliably detects extremely fast pressure curves and stands out with a highly dynamic, galvanic isolated reset-input, supply and output signal of up to 50 kHz. Measured values in extreme situations, such as the recording of pressure peaks or pressure surges, for example, during pipe(line) monitoring (water hammer effect), in laboratory applications or in the case of test rigs can be accurately recorded. With its stable and reliable measuring results, this device is an interesting alternative to conventional measurement setups for industrial applications.

Characteristics

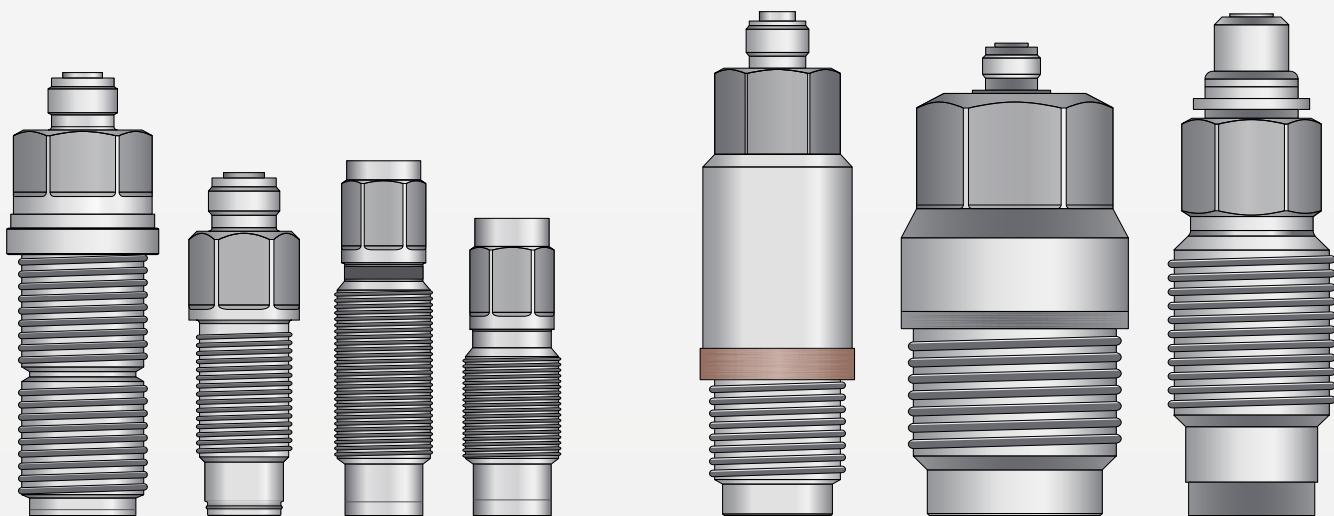
- Pressure ranges of 250 bar, 500 bar, 2,000 bar
- A single crystal made from gallium phosphate (GaPO_4)
- Highly dynamic pressure detection up to 50 kHz
- Output signal 0 ... 10 V
- High temperature resistance
- Excellent long-term stability
- Compact design
- Multiple pressure connections
- Universally applicable
- Easy to use

Applications

- Short - term measurement, data logging in critical situations
- Detection of pressure peaks, pressure surges, water hammer effect pipe(line) monitoring)
- Testing and laboratory technology
- Machine and plant construction



ACCESSORIES



ACCESSORIES FOR: DAC 102 | DAC 103 | DAC 105 | DAC 106 | DAC 107 | DAC 109

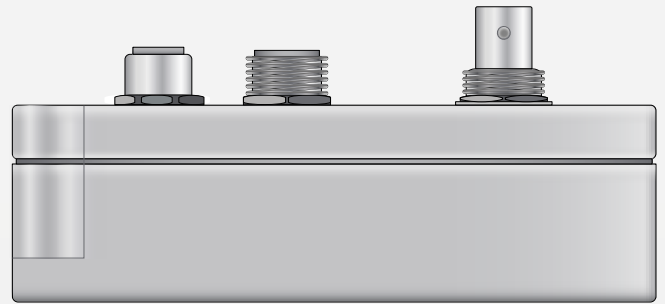
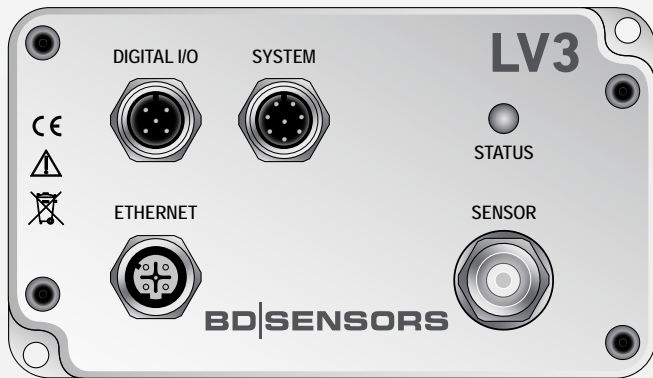
Description	Unit Quantity	Order number
Piezo input cable Teflon	2 m	BDV4712
Piezo input cable Teflon	3 m	BDV5041
Piezo input cable Steelflex	1 m	BDV2444
Piezo input cable Steelflex	2 m	BDV2446
Piezo input cable Steelflex	3 m	BDV4954
Piezo input cable Viton®	1 m	BDV4707
Piezo input cable Viton®	2 m	BDV4708
Piezo input cable Viton®	3 m	BDV5806
M4 / 0.35 for BNC coupling	Single unit	BDU2077

® Viton is a registered trademark of DuPont Performance Elastomers.

ACCESSORIES FOR: DAC 120 | DAC 160 | DAC 180

Description	Unit Quantity	Order number
Piezo input cable UNF	2 m	BDU0065
Piezo input cable UNF	3 m	BDU0066
M4 / 0.35 to BNC coupling piece	Single unit	BDU2077
Membrane protection piece	Single unit	YF0753

ACCESSORIES



ACCESSORIES FOR: LV 3 (NOT INCLUDED IN THE DELIVERY)

Description	Unit Quantity	Order number
Ethernet cable	2 m	BDV4650
Lumberg system cable	10 m	BDV4631

4 ARGUMENTS IN FAVOR OF BD SENSORS

EXPERTISE

Industrial Pressure Measurement
from 0.1 mbar to 8000 bar

- Pressure transducers, electronic pressure switches and hydrostatic level transmitters
- OEM to high-end products
- Standard products or tailor-made solutions

BD|SENSORS has the right pressure measurement device for you, both technically and economically.

RELIABILITY

Scheduled delivery times and
strict compliance with deadlines.

For short delivery times and binding delivery dates, as well as customized designs, **BD|SENSORS** is a reliable partner for its customers, helping you reduce your stock and increases your value.

PRICE-PERFORMANCE RATIO

Pressure measurement technology
at the highest level

Concentrating on the components relating to “electronic pressure measurement “ has led to extraordinary efficiency and value.

BD|SENSORS is convinced that it is among the most economical suppliers worldwide, both technically and commercially.

FLEXIBILITY

We have the solution to meet your
individual needs.

We'll get your industrial pressure measurement job done quickly and economically, either for a large series or just a few pieces.

Flexibility at **BD|SENSORS** is particularly evident when technical support and quick help for either a service call or a rush order is needed.

**SALES AND DISTRIBUTION WORLDWIDE
HEADQUARTERS BD|SENSORS GROUP**

BD | SENSORS GmbH
BD-Sensors-Straße 1
95199 THIERSTEIN
GERMANY

Tel.: +49 9235 9811-0
Fax: +49 9235 9811-11

www.bdsensors.de
info@bdsensors.de

SALES AND DISTRIBUTION EASTERN EUROPE

BD | SENSORS s.r.o.
Hradištská 817
687 08 BUCHLOVICE
CZECH REPUBLIC

Tel.: +420 572 411-011
Fax: +420 572 411-497

www.bdsensors.cz
sale@bdsensors.cz