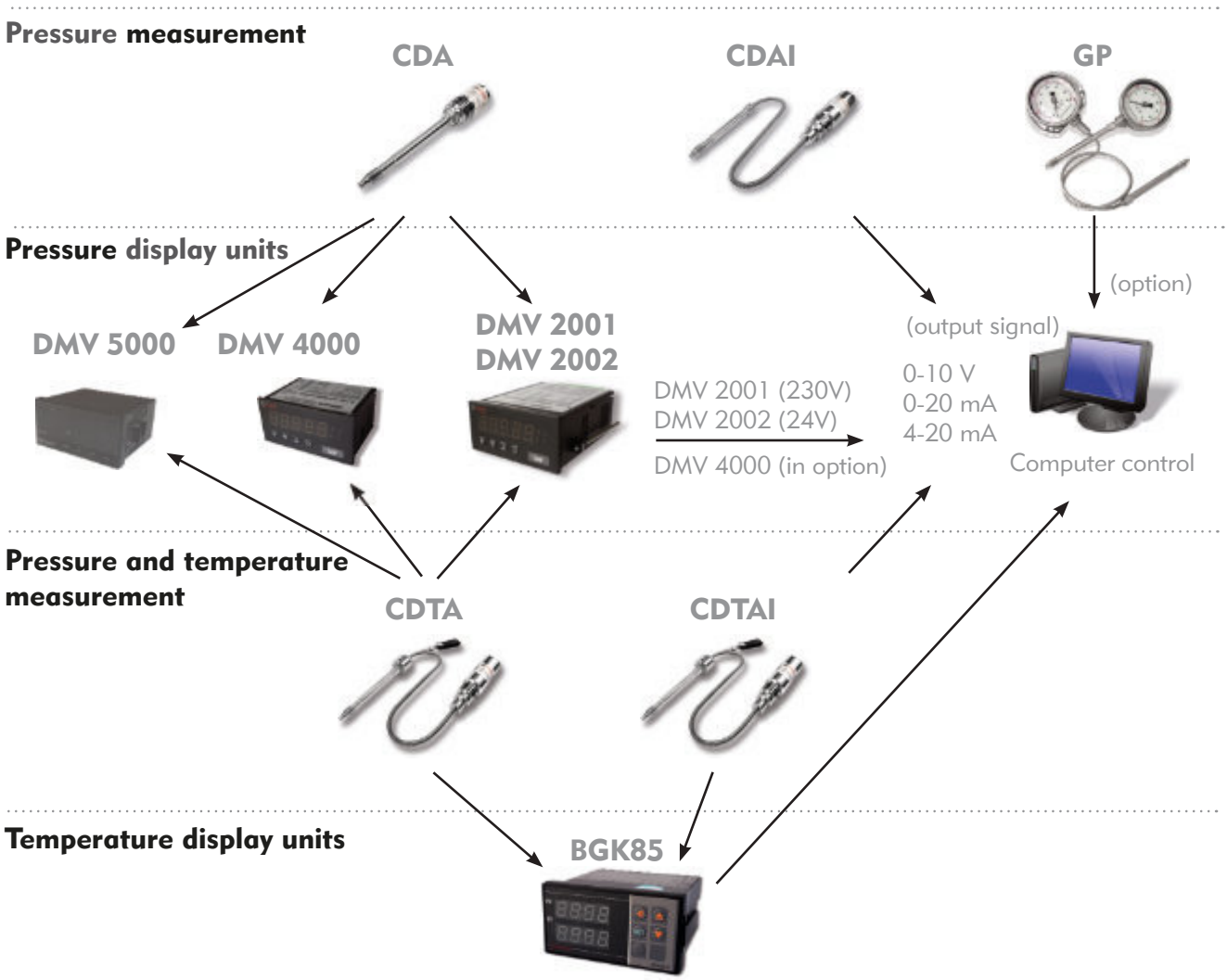
Pressure Measurement

Example of connections of particular elements



Melt pressure control and measurement

The security of the process and the quality assurance are the basic problems of the modern production in plastic processing industry. In order to meet this philosophy, our company does its best to support our dear customers in maintaining technically the most up-to-date level.

High repetition rate transducers and easy to operate displays (pressure gauges and regulators) serve the above mentioned purpose. All these needs are satisfied by our measurement technology. Thanks to the use of high quality materials and continuous technical control, our products are qualified as the best on the global market.

The constant innovation and new products launching, as well as our Customer's satisfaction are and will be our the most important objectives.

For standard transducers regulators and filter screens, we assure the delivery of the ordered products within 24 hours from the moment of order placement

Pressure measurement

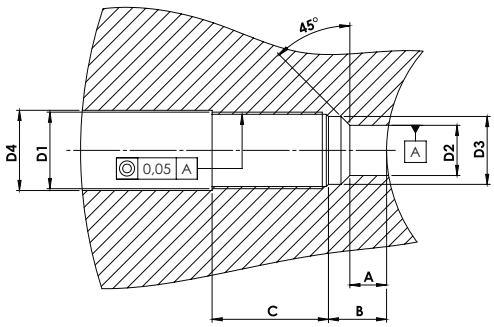
Melt pressure transducers were used for the first time in 1950s. Until recently they were protected by patent which affected their availability and price on the market. Nowadays, they are available and produced by different manufacturers. Used for constant pressure measurement. Principles of transducer operation are based on tensometric technology. Pressure transmission from built-in membrane flow canal takes place through closed capillary system filled with mercury, NaK or oil. The capillary is finished with a second membrane with a built-in tensometer which changes linearly electrical resistance accompanied by the pressure change. The proportional resistance change is used to make measurements. For transducers with built-in amplifiers we obtain normalised final signals (0-10 VDC, 0-20 mA or 4-20 mA).
Pressure transducers function as security devices for extruders in case of dangerous pressure excess which may lead to the extruder damage. Through border signals the extruder's driving system may be switched off once the pre-defined pressure is exceeded.

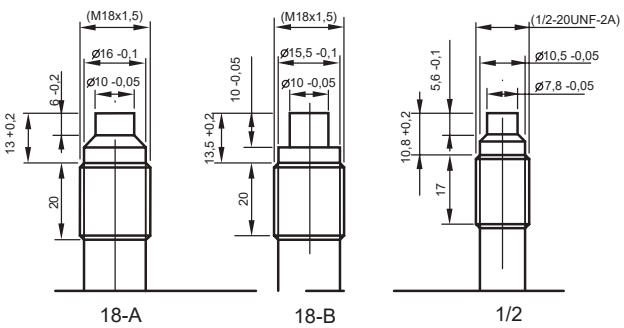
For this reason, every production line, for its own security, should be equipped with at least one pressure transducer or one rupture disc.

Transducer installation

To make a hole to install the transducer, special tools and high skills are required.
High tolerance and surface quality maintenance is difficult. For this reason, we suggest using reducer sleeves.

Dimension	Thread		
	M18 x 1.5 mm	M14 x 1.5 mm	1/2 - 20UNF-2A
	M18 x 1.5 mm	M14 x 1.5 mm	1/2" - 20UNF-2A
D2	Ø 10.1 +0.1	Ø 7.9 +0.1	Ø 7.9 +0.1
D3	Ø 16.1 +0.2	Ø 12 +0.1	Ø 10.7 +0.1
D4	Ø 20 +0.2	Ø 14.5 +0.2	Ø 13 +0.2
A	6.1 -0.1	6 -0.1	5.7 -0.1
B	10 -0.2	4 -0.2	3.2 -0.2
C	25	19	19





Transcuder installation

Screen changer - through the measurement of pressure differences before and after changes, we are sure when filter screen change should take place. A transducer installed at the end of the extruder allows to plan the moment of screen change (e.g. after extrusion of the necessary section length).

Melt pump – when using pumps, pressure differences must be always measured before and after the pump. A correct pressure measurement protects the pump against damages and it helps to increase the extruder's performance.

Die – an optimum place to install the transducer. In the die, the transducer indicates pressure necessary to obtain a correct section. Pressure and temperature are the main parameters influencing the material flow and quality. We use both parameters to control material changes, quality, screw and barrel consumption and thermal technology changes. Pressure change has a predominant impact on final product dimensions.

Warning !

Before the transducer installation, the dimensions of the mounting thread should be controlled in regard to correct dimension maintenance and tolerance. Additionally, the hole should not contain any contamination or material remnants. We recommend using the plug before screwing in the transducer in order to check the thread and copper paste for easier transducer unscrewing during the disassembly. The transducer should be screwed in sealing surface without using a spanner.
The moment of transducer installation for ½"-20UNF thread is 5 Nm, for M18x1,5 thread – 10 Nm.

Pressure transducer disassembly

Transducer disassembly should be carried out in a heated state (in the temperature of material melting).

Transducers connection

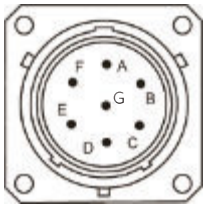
Transducers electric connection is made by stable plug equipped in rotate-and-lock coupling.

Transducers electrical connection

CDA and CDTA series

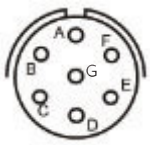
A	B	C	D	E	F
S+	S-	E+	E-		C

Transducer socket



*G-for7PINsensors

Plug



CDAI and CDTAI series

Output signal	A	B	C	D	E	F	G
4-20 mA (2 wires)	S+	S-	–	–	C	C	–
4-20 mA (4 wires)	S+	S-	E+	E-	C	C	–
4-20 mA (7 PIN - Relay)	C	E- / S-	S+	R	C	E+	R
0-10 VDC (4 wires)	S+	S-	E+	E-	C	C	–
0-10 VDC (3 wires)	S+	E- / S-	E+	–	C	C	–
0-10 VDC (7 PIN - Relay)	C	E- / S-	S+	R	C	E+	R

S - signal, E - power, C - calibration, R - relay

Warning!!
Melt pressure transducers can be used only under stable pressure e.g. in extruders.

High quality standard pressure transducers

series CDA

CDA line pressure transducers are characterized by high quality and relatively low price in comparison to product merits.
Thanks to standard protective titanium nitride coating diaphragm, the pressure transducer offer high resistance to wearing providing necessary sensitivity at the same time. One-piece resistant stem of the pressure converter makes it the instrument extremely resistant. These transducers are the ideal standards to measure pressure in the plastic processing sector in the whole world. The precision of the pressure measurement goes hand in hand with accuracy ±0,5% of the max. ranges.

Technical data	
Pressure range	0-100 to 0-1500 bar
Total measurement error in % of maximum indication	± 0.5
Accuracy of indications in %	± 0.2
Range of indications	Unlimited
Maximum overload of the rated value	2x measuring range
Membrane material	Titanium nitride 1.4541
Resistance of tensiometric sensor	350 Ohm DMS
Output signal	3.33 mV/V
Power supply	6 - 10 VDC
Calibration point in % of the range	80
Insulation resistance	1000 MOhm przy 50 VDC
Maximum temp. at membrane	410°C
Max. temp. at electronic part	85°C
Max. allowed mounting torque	1/2" - 20UNF - 2A = 5Nm M18 x 1.5 = 10Nm

Special features of the pressure transducer:

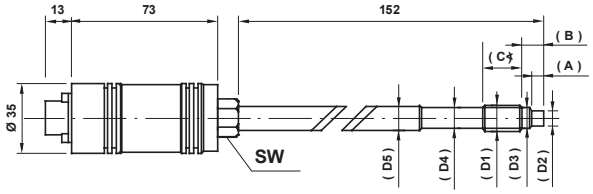
- Standard mercury-free transducers
- Accuracy better than 0.5%
- Good stability and repeatability
- Long transducer's life-span
- Available version with and without mercury
- Membrane coated titanium nitride
- Electromagnetic compatibility
- Sensitivity 2 mV/V and 3,33 mV/V
- Range of pressure measurement 100/200/350/500/600/700/1000/1500 bar
- Temperature 30-390°C
- Energy supply max. 10 VDC
- Perfect quality for the offered price

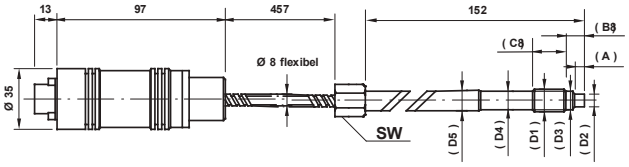
High quality standard pressure transducers

series CDA

Rigid stem

Flexible capillary





D1	D2	D3	D4	D5	A	B	C	SW
M18 x 1.5	10	16	16	16	6	14	20	22/19
1/2-20UNF-2A	7.8	10.5	10.5	12.5	5.6	10.8	17	17/19

How to order

Series | Accuracy | Thread | Pressure range | Type

CDA [ ][ ]**0** — [ ][ ] — [ ][ ][ ] — [ ] — [ ][ ][ ][ ]

Pressure range: Bar / MPa / PSI

Special execution

Thread
1/2 = 1/2"-20UNF-2A
14 = M14x1.5
18 = M18x1.5

Type
0 = standard 156mm
1 = flexible 457mm
2 = special

Output signal
1 = 1mV/V
0 = 2mV/V
5 = 3.33mV/V

Accuracy
1 = 0.25%
2 = 0.5%

Example: CDA250-1/2-500-0
Melt pressure transducers, accuracy 0.5%, output signal 3.33 mV/V, thread 1/2"-20UNF, pressure range 500 bar, standard 156 mm.

Pressure transducers with integrated amplifier

series CDAI

CDAI series transducers equipped in a 2, 3 or 4 wired amplifier. It means that the single of the analogue output may be processed directly e.g. without amplifying. The amplifier is integrated with the main converter and provides an output signal of 0-20 mA, 4-20 mA or 0-10 V and 2-10 V (4-wired). Long successfully used system 2–wired is provided with the 4-20 mA output signal.

Technical data	
Pressure range	0-100 to 0-1500 bar
Total measurement error in % of maximum indication	± 0.5
Accuracy of indications in %	± 0.2
Range of indications	Unlimited
Maximum overload of the rated value	2x measuring range
Membrane material	Titanium nitride 1.4541
Resistance of tensiometric sensor	350 Ohm DMS
Output signal	0-10V; 2-10V or 0-20mA; 4-20 mA
Power supply	19 - 32 VDC
Calibration point in % of the range	80
Insulation resistance	1000 MOhm at 50 VDC
Maximum temp. at membrane	410°C
Max. temp. at electronic part	85°C
Max. allowed mounting torque	1/2"-20UNF - 2A = 5 Nm M18 x 1.5 = 10 Nm

Special features of pressure transducer:

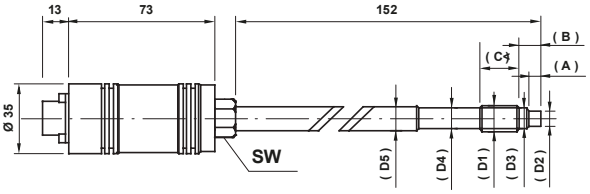
- Standard mercury-free transducers
- Integrated with the 2,3 or 4-wired amplifier
- Elastic or hard capillary
- Membrane made of titanium nitrides coating
- Electromagnetic compatibility
- Customised products available
- Longlife design
- Substitute 1:1 with transducers available on maket
- Perfect price for the offered quality

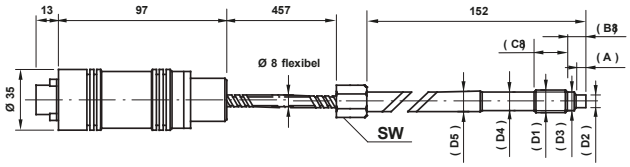
Pressure transmitter with integrated amplifier

seria CDAI

Rigid stem

Flexible capillary





D1	D2	D3	D4	D5	A	B	C	SW
M18 x 1.5	10	16	16	16	6	14	20	19/22
1/2-20UNF-2A	7.8	10.5	10.5	12.5	5.6	10.8	17	17/19

How to order

Series: **CDAI**

Accuracy: **0 0**
- 1 = 0.25%
- 2 = 0.5%

Thread:
- 1/2 = 1/2"-20UNF-2A
- 14 = M14x1.5
- 18 = M18x1.5

Pressure range: Bar / MPa / PSI

Type:
- 0 = standard 156 mm
- 1 = flexible 457mm
- 2 = special

Output signal:
- 1 = 0-10 VDC (4-wire)
- 2 = 2-10 VDC (4-wire)
- 3 = 0-20 mA (4-wire)
- 4 = 4-20 mA (4-wire)
- 5 = 4-20 mA (2-wire)
- 6 = 0-10 V (3-wire)

Special execution

Example: CDAI200-1/2-500-1-5
Melt pressure transducers with integrated amplifier, accuracy 0.5%, output signal 4-20 mA - 2 wire, thread 1/2"-20UNF, pressure range 500 bar, flexible 457 mm.

Pressure and temperature transducers

series CDTA / CDTAI

CDTA / CDTAI series pressure transducers with built-in thermocouple are characterized by high quality and relatively low price in comparison to product's merits. Thanks to standard protective titanium nitride coating diaphragm, these transducers offer high resistance to wearing, providing necessary sensitivity at the same time. These transducers are ideal standards to measure pressure in plastic processing sector in the whole world. The precision of the pressure measurement goes hand in hand with accuracy ±0,5% of the max. ranges. Additional characteristic features of this series is the measurement of polymer melting temperature.

Technical data	
Pressure range	0-100 to 0-1500 bar
Total measurement error in % of maximum indication	± 0.5
Accuracy of indications in %	± 0.1
Range of indications	Unlimited
Maximum overload of the rated value	2x measurement range
integrated	FeCuNi type J/NiCrNi type K*/ PT100 2, 3, 4 wire*
Membrane material	Titanium nitride 1.4541
Resistance of tensiometric sensor	350 Ohm DMS
Output signal: CDTA CDTAI	 3.33 mV/V 4-20mA or 0-10V
Power supply: CDTA CDTAI	 6 - 10 VDC 19 - 32 VDC
Calibration point in % of the range	80
Insulation resistance	1000 MOhm przy 50 VDC
Max. temperature at membrane	410°C
Max. temp. at electronic part	120°C
Max. allowed mounting torque	1/2" - 20UNF - 2A = 5 Nm M18 x 1.5 = 10 Nm

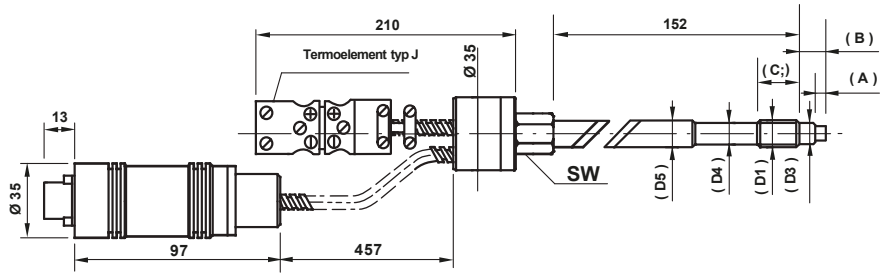
* = oprional

Special features of pressure and temperature transducers:

- Integrated melt temperature and pressure transducer
- Integrated amplifier within CDTAI line
- The most realistic measurement
- Longlife design
- Compatibility with standard converters
- Membrane coated with titanium nitrides
- Fineness of the measurement ranges ±0,5%
- Thermo-element according DIN 43710, J-type
- Rigid stem with flexible components

Pressure and temperature transducers

seria CDTA



D1	D2	D3	D4	D5	A	B	C	SW
M18 x 1.5	10	16	16	16	6	14	20	19/22
1/2-20UNF-2A	7.8	10.5	10.5	12.5	5.6	10.8	17	17/19

How to order

Output signal

Series | Accuracy | Thread | Pressure range | Type | Thermocouple

CDTA [ ][ ][0] — [ ][ ] — [ ][ ][ ] — [1] — [ ] — [ ][ ][ ][ ]

Bar / MPa
PSI

Special execution

Thermocouple
1J - Thermocouple type J
1L - Thermocouple typ L
PT - Thermocouple type PT100

Thread
1/2 = 1/2"-20UNF-2A
14 = M14x1.5
18 = M18x1.5

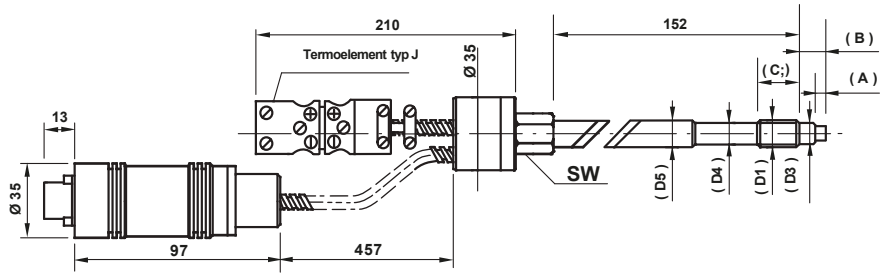
Output signal
1 = 1mV/V
0 = 2mV/V
5 = 3.33mV/V

Accuracy
1 = 0.25%
2 = 0.5%

Type
1 = flexible 457mm

Example: CDTA250-1/2-500-1-1J
Pressure and temperature transducer, accuracy 0.5%, output signal 3.33 mV/V, thread 1/2"-20UNF, pressure range 500 bar, flexible 457mm, integrated thermocouple type J.

seria CDTAI



D1	D2	D3	D4	D5	A	B	C	SW
M18 x 1.5	10	16	16	16	6	14	20	19/22
1/2-20UNF-2A	7.8	10.5	10.5	12.5	5.6	10.8	17	17/19

How to order

Series: **CDTAI**

Accuracy: **2** _ **0**

Thread: _ _

Pressure range: _ _ _ (Bar / MPa, PSI)

Type: **1**

Signal: _

Thermocouple: _

Special execution: _ _ _ _

Thread
1/2 = 1/2"-20UNF-2A
14 = M14x1.5
18 = M18x1.5

Thermocouple
1J - Thermocouple type J
1L - Thermocouple typ L
PT - Themperature sensor PT100

Analog output (CDTAI)
1 = 0-10 VDC (4-wire)
2 = 2-10 VDC (4-wire)
3 = 0-20 mA (4-wire)
4 = 4-20 mA (4-wire)
5 = 4-20 mA (2-wire)
6 = 0-10 V (3-wire)

Accuracy
1 = 0.25%
2 = 0.5%

Amplifier
I = with integrated amplifier

Type
1 = flexible 457mm

Example: CDTAI200-1/2-500-1-5-1J
Pressure and temperature transducer with integrated amplifier, accuracy 0.5%, output signal 4-20 mA(2-wire), thread 1/2"-20UNF, pressure range 500 bar, flexible 457mm, integrated thermocouple type J.

High quality mechanic pressure sensor

seria GP

Mechanic GP line pressure transducers are characterized by high quality and relatively low price in comparison to product's merits. Thanks to standard protective titanium nitride coating diaphragm, these transducers offer high resistance to wearing providing necessary sensitivity at the same time. Starr resistant shaft of the pressure transducers renders the instrument extremely resistant. These transducers are ideal standards to measure pressure in plastic processing sector in the whole world. The precision of the measurement goes hand in hand with accuracy.

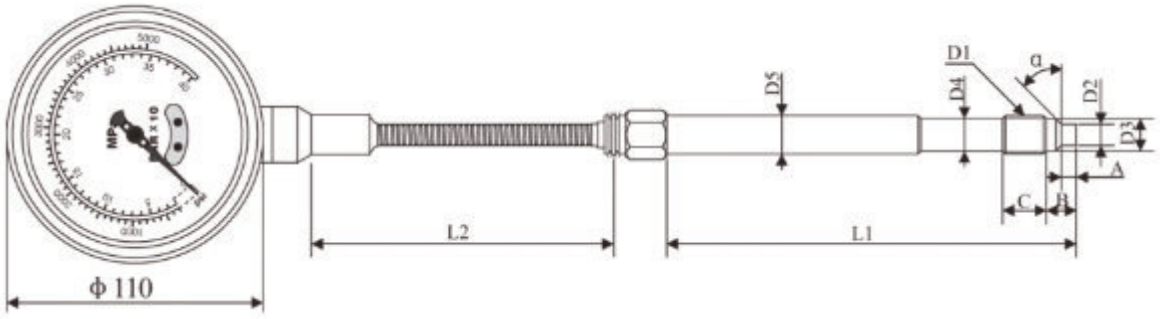
Technical data	
Pressure range	0-1000 bar
Total measurement error in % of maximum indication	± 1.0
Accuracy of indications in %	± 1.0
Range of indications	Unlimited
Maximum overload of the rated value	2x measurement range
Membrane material	Titanium nitride 1.4541
Max. temperature at membrane	410°C
Max. allowed mounting torque	1/2" - 20UNF - 2A = 5 Nm M18 x 1.5 = 10 Nm

Special features of pressure sensor:

- Good stability and repeatability
- Long transducer's life-design
- Membrane titanium nitride cover
- Range of pressure measurement 1-1000 bar
- Temperature 350-550°C
- Excellent price to performance ratio

High quality mechanic pressure sensor

series GP



D1	D2	D3	D4	D5	A	B	C	SW	L1	L2
M18 x 1.5	8.5	15.5	16	18	6	12	18	19/22	70/150/250	300-3000*
1/2-20UNF-2A	7.8	10.5	10.5	12.7	5.5	11	16	17	70/150/250	300-3000*

*300; 470; 700; 1000; 2000; 3000;

How to order

Series — Thread — Pressure range — Tip

GP — □□ — □□□ — □

Bar / MPa/PSI

Thread
1/2 = 1/2"-20UNF-2A
14 = M14x1.5
18 = M18x1.5

Tip
0 = standard 156 mm
1 = flexible 457mm
2 = special

Example: GP-1/2-500-0
Mechanical pressure sensor, thread 1/2"-20UNF, pressure range 500 bar, standard 156 mm.