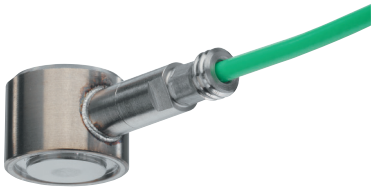
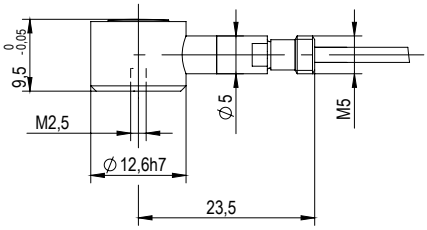
PinSens Force Sensor Head

Type 9204B...

for Mold Cavity Pressure with diameter 12,6 mm

Quartz force sensor for the measuring range from 0 ... 10 000 N or for measuring mold cavity pressure of up to >3 000 bar during injection molding of plastics.





Description

The 9204B… sensor offers high resolution and a rugged, weld-ed case. The charge signal (pC = pico coulombs) output by the force sensor is converted in the Kistler charge amplifier or in a monitoring unit into a proportional output voltage that is largely independent of the length of the sensor cable. The maximum possible output voltage from the standard ampli-fier is 10 V. In the most sensitive range this gives 1 N/V.

Application

Although the mold cavity pressure in industrial applications is normally measured directly in the cavity, there are situations in which this is not possible, for example for reasons of space. The sensor is positioned under the ejector pin in the ejector plate, and measures the force curve by means of the ejector. This allows calculation of the actual mold cavity pressure.

Technical Data

Measuring range	N	0 ... 10 000
Calibrated partial range	N	0 ... 1 000
Overload	N	12 000
Threshold	mN	30
Sensitivity	pC/N	–1,6
Linearity, all ranges	%FSO	≤±2
Operating temperature range	°C	–40 ... 200
Insulation resistance		
at 20 °C	Ω	$\geq 10^{13}$
at 120 °C	Ω	$\geq 10^{12}$

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This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.

Diameter ejector pin [mm]	Sensivity [pC/bar]	Masimum pressure [bar]
1,6	–0,32	>3 000
2	–0,50	
2.5	–0,78	
3	–1,13	
4	–2,01	
5	–3,14	
6	–4,52	
8	–8,04	2 000
10	–12,56	1 300
12	–18,09	900
14	–24,62	650

Force Sensor Type 0.4
Birect measuring sensor with replaceable coaxial connecting cable in lengths of 0,4 or 1m

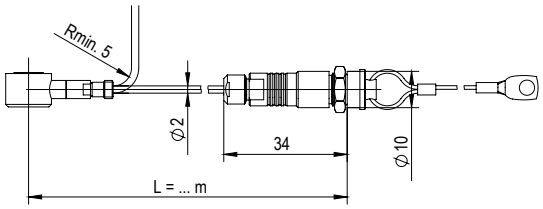


Fig. 2: Force Sensor Type 9204B0

Computation of sensitivity for the pressure measurement
The front face of the ejector pin must be taken into account when mounting the force sensor for pressure measurement. The nominal sensor sensitivity (pC/N) is converted into a corresponding pressure sensitivity using the following formula.

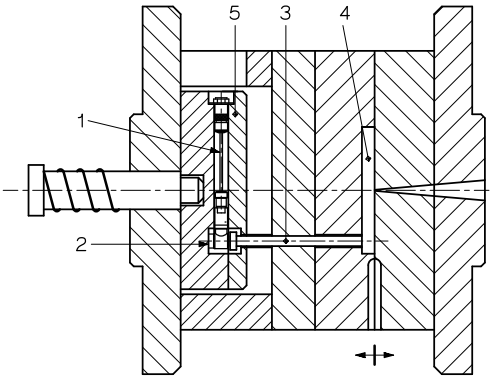
Calculated pressure sensitivity [pC/bar] =
Nominal force sensitivity [pC/N] · area of ejector pin [mm²] · 0,1

The measuring range of the sensor must be taken into account when choosing the ejector pins. The larger the ejector pin area the higher the force on the sensor.

The following table shows the calculated sensitivity with the nominal sensitivity of the Type 9204B... and the maximum pressure for a selection of ejector pins.

Mounting
The PinSens force sensor has a precision ground face. The bearing surface of the ejector pin must also be finely machined, flat, rigid and exactly parallel. The sensor can be mounted with a M2,5-screw and a spring washer. Once mounted the sensor must not have any preload. A clearance of 0,03 ... 0,05 mm is recommended.

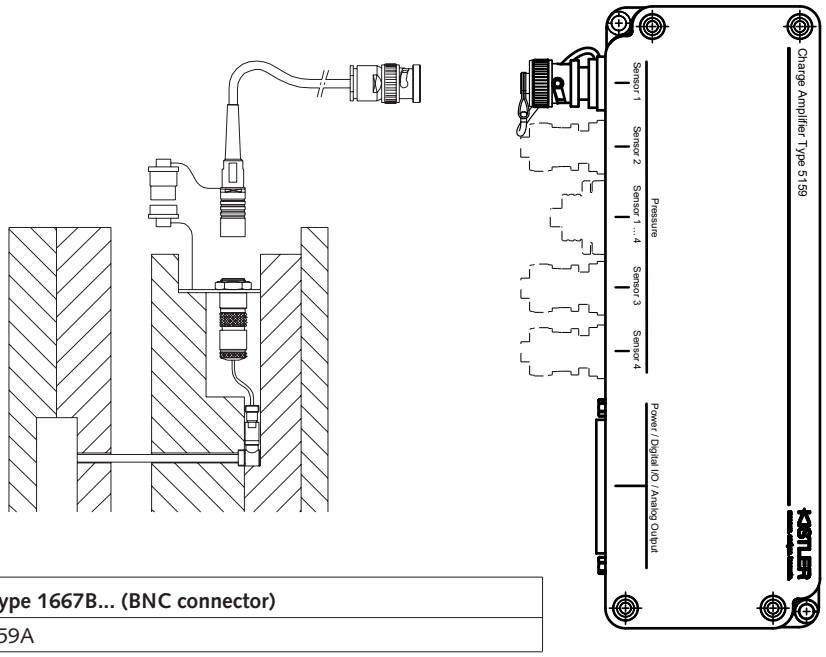
Principle of Function



1 Force sensor
2 Thrust washer
3 Ejector pin
4 Cavity
5 Ejector plate

Fig. 3: Force sensor for indirect measurement of mold cavity pressure behind an ejector pin in the mold using the example of the Type 9211.

Cable and Amplifier for Measuring Chains with Sensor Type 9204B...



Cabel Type 1667B... (BNC connector)
Type 5159A

Fig. 4: Sensor Type 9204B

Mounting Examples

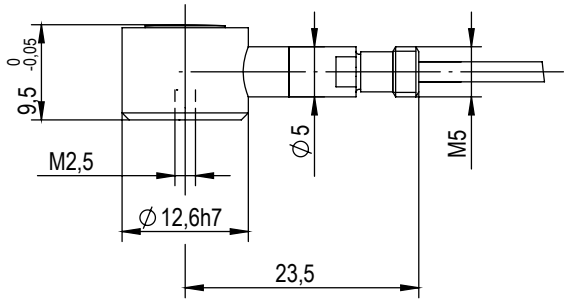


Fig. 6: Sensor Type 9204

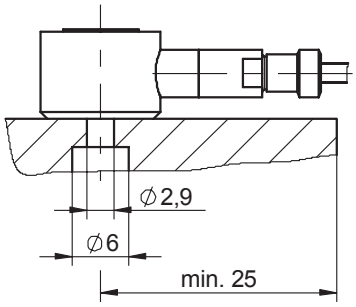


Fig. 7 : Mounting in retaining plate

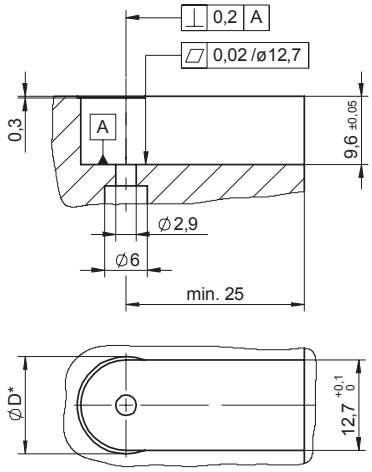
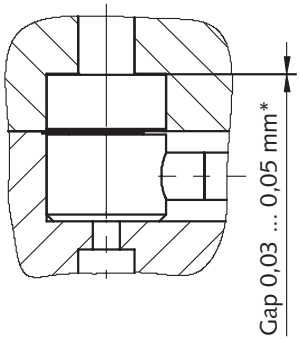


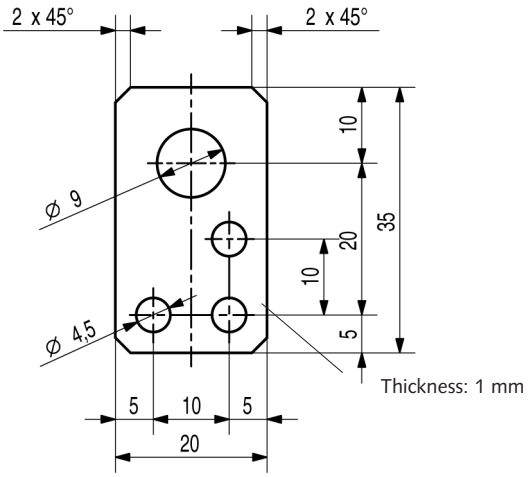
Fig. 8: Mounting bore



* Sensor should not be preloaded. Consider this value as a minimum during construction and realisation of the mold. Depending on deformation, it could be necessary to have a bigger gap. Check clearance before mounting the sensor.

Fig. 9: Mounting sensor Type 9213 with ejector pin

Accessories included



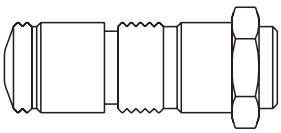


Fig. 10: Mounting plate Art. No. 3.520.328