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Cavity Pressure Sensor

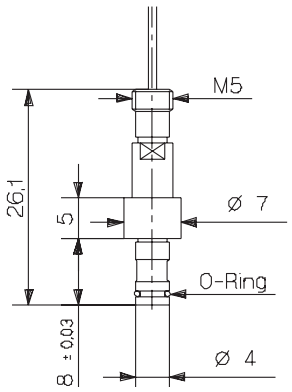
HighSens with front ø4 mm

Type 6177B...

Patent No. US 6,212,963

Quartz sensor for low pressure processes for injection molding of plastics with cavity pressures up to 200 bar.

- ideally suited for industrial applications
- sensor front can be machined to adapt to the cavity wall (except for coated versions of the sensor)
- exchangeable cable



Description

The HighSens quartz sensor for mold cavity pressure Type 6177B… has a front diameter of 4 mm. An O-ring seals the annular gap of <10 µm between sensor and mounting bore and thereby also center aligns the sensor in the bore.

The pressure acts over the entire front of the sensor and is transmitted to the quartz measuring element, which produces a proportional electric charge (pC = Picocoloumb). This is converted into a 0 ... 10 V output from a standard charge amplifier.

All parts of the sensor are corrosion resistant. The exchangeable cable is screwed to the sensor with a tight seal. The connector is self-locking and splash-proof.

For multi cavity applications the sensor Type 6177B... is used without the single-wire connector Type 1839. For 4-channel applications the sensor Type 6177B... is mounted with the Multi-Channel Connector Type 1722A4... and for 8 channel applications with the Multi-Channel Connector Type 1722A8... .

This sensor is available with several types of connecting cables (see page 2).

Application

This diaphragm-free sensor measures mold cavity pressures up to 200 bar during injection molding. It is particularly suitable for optimizing, monitoring and controlling the injection molding process of thermoplastics, elastomers, thermosets and SMC.

For abrasive melts (e.g. filled with glass fibers or carbon fibers, thermosets, BMC/SMC), these sensors are available as Types 6177BC… with a hardcoated front.

Technical Data

Range	bar	0 ... 200
Overload	bar	300
Sensitivity	pC/bar	–45
Linearity, all ranges	% FSO	≤±1
Operating temperature range		
Mold (sensor, cable)	°C	200
Melt (at the front of the sensor)	°C	<450
Connector	°C	0 ... 200*
Insulation resistance		
at 20 °C	TΩ	>100
at 300 °C	TΩ	>0,01

* During machine down time the mold temperature may rise up to 240 °C, without causing any damage to the sensor. Note that measuring errors may temporarily result.

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Sensor variants

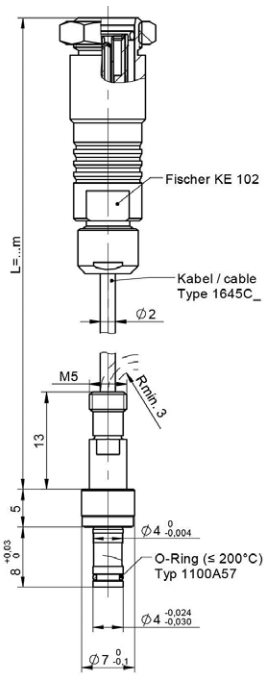

Fig. 1: Pressure sensor Type 6177B with coaxial cable

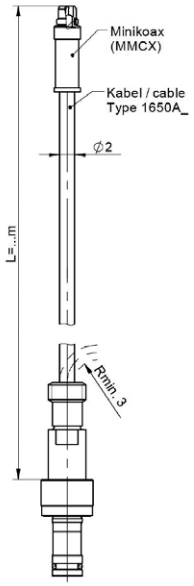

Fig. 2: Sensor Type 6177B with coaxial cable and minicoax connector

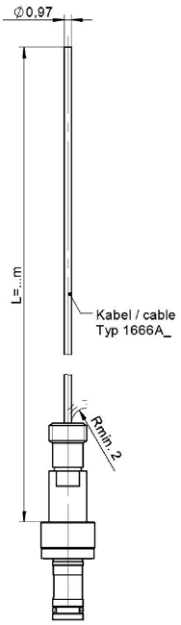

Fig 3: Pressure sensor Type 6177B with single-wire cable

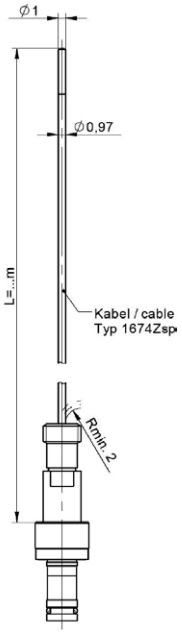

Fig. 4: Sensor Typ 6177B with single-wire cable and crimp pin

Fig. 1: Pressure sensor Type 6177B with coaxial cable
Sensor including an exchangeable high temperature cable with a connector for operating temperatures up to 200 °C.

Fig 2: Sensor Type 6177B with coaxial cable and minicoax connector
Sensor Type 6177B...M... can be connected with coax cables to the multi channel connectors Type 1722A4MB or 1722A8MB.

Fig. 3: Pressure sensor Type 6177B with single-wire cable
Alternative version of the sensor with single-wire technique for simplified and flexible installation in the mold. The sensor Type 6177B...S... is equipped with a single-wire cable with a very small cross-section. The single-wire cable is exchangeable and can be cut to length as required by the user. With the single-wire technique the electrical shielding is provided by the mold. Both the cable and the connector therefore have to be completely integrated into the mold. For easy installation a connector is supplied which is self locking and splash proof. Sensor can be connected to the multi channel connectors Type 1722A4SB /MB or 1722A8SB/MB.

Fig 4: Sensor Typ 6177B with single-wire cable and crimp pin
With this varaint the sensor can be connected to the contact elements Type 1712... and 1714... . The conact elements can be used for exchangable cavity platens.

Installation
The sensor is normally installed in the mounting bore with the mounting nut Type 6457, but a spacer sleeve Type 6459 can also be used.

The sensor front forms part of the cavity wall. The sensor should therefore be shaped so that its front comes exactly flush with the cavity wall. Its front can be machined up to 0,5 mm (except with a coated front!). Full details can be found in the operating instructions.

The sensor is center aligned in the 4 H7 bore.

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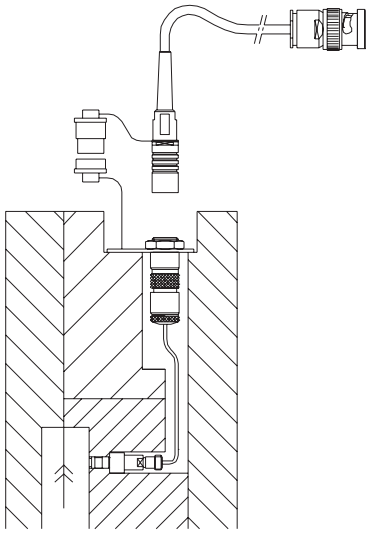
Cable and amplifier for measuring chains with sensor Type 6177B...



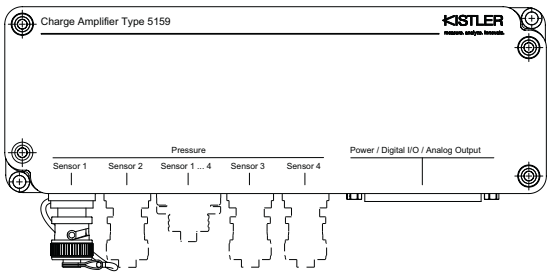
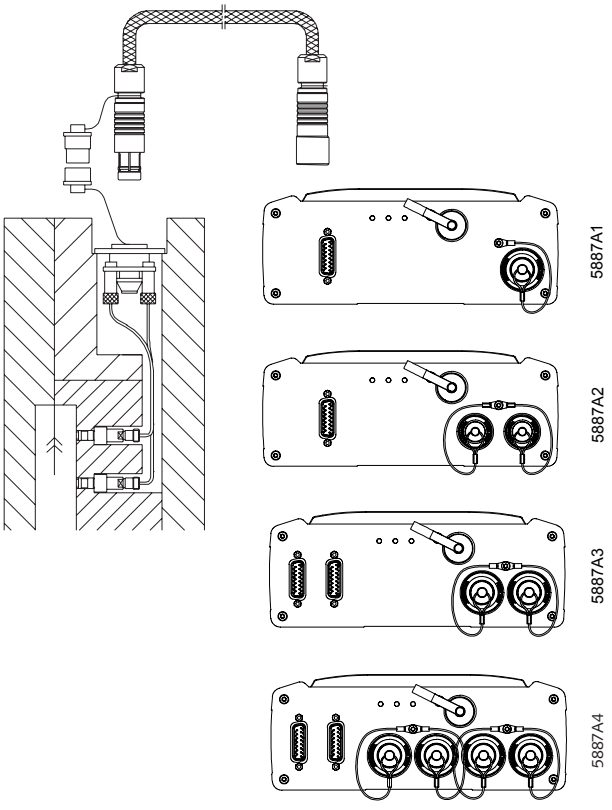
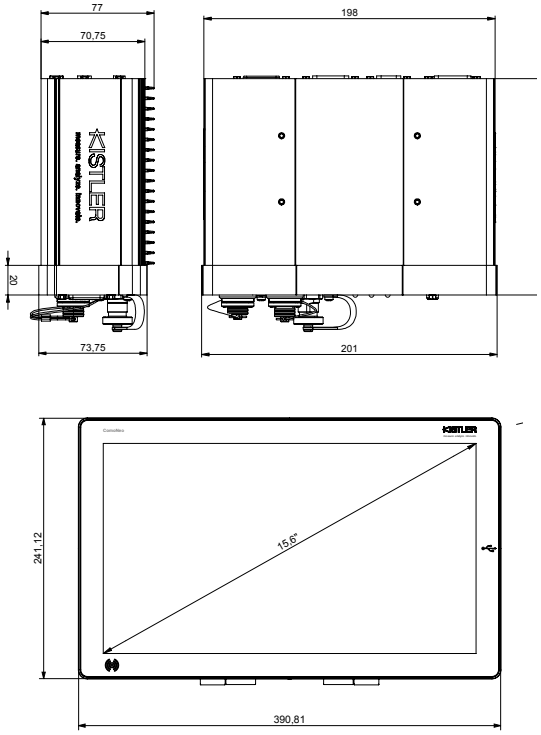


Fig. 5: Sensor Type 6177B... with charge amplifier Type 5159A





4-channel cable Type 1995A... on connector Type 1722A4...	8-channel cable Type 1997A... on connector Type 1722A8...
Type 5887A1	Type 5887A2
	Type 5887A3
	Type 5887A4

Fig. 6: Sensor Type 6177B... with ComoNeo monitoring system ComoNeo Typ 5887...

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Installation Examples

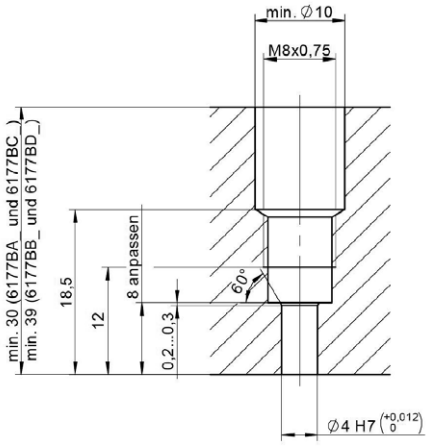

Fig. 7: Installation with mounting nut Type 6457

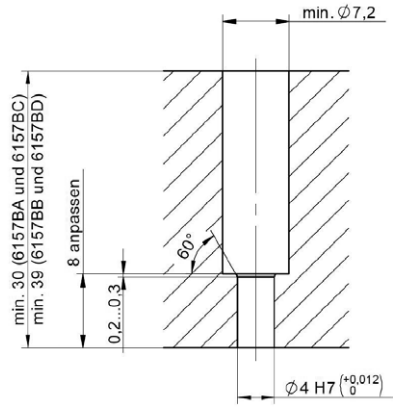

Fig. 8: Installation with spacer sleeve Type 6459

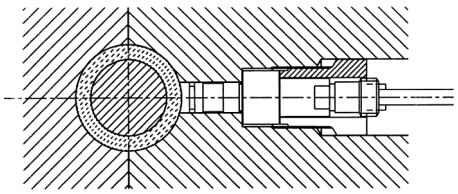

Fig. 9: Sensor with machined front face

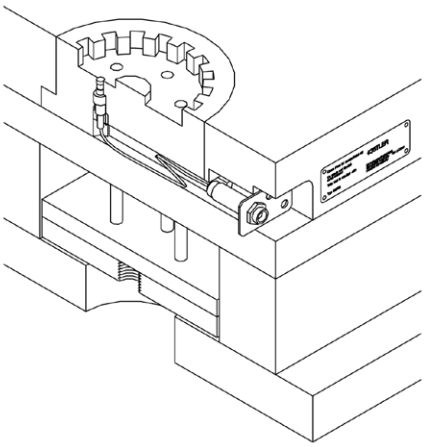

Fig. 10: Sensor, cable, connector, mounting plate (Mat. No. 65005208) and identification label (Mat. No. 18031414)

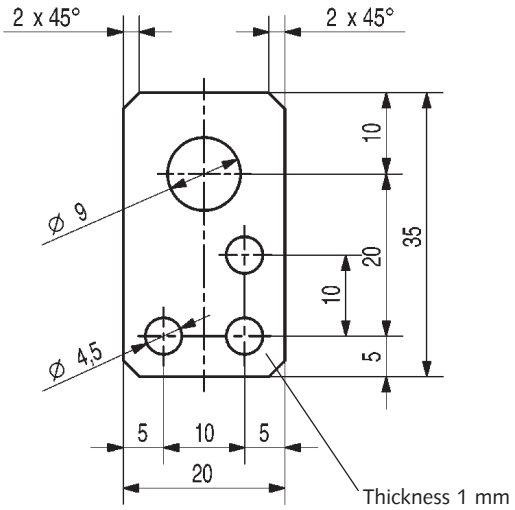

Fig. 11: Mounting plate (Mat. No. 65005208)

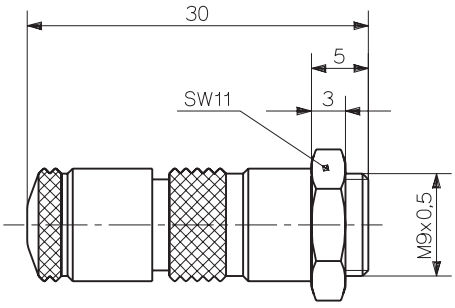

Fig. 12: Single-wire Fischer connector Type 1839

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Accessories	Mat. Nr./Typ
• Sensor	6152BA, BC
• O-ring, diameter 2,5x0,65 mm, (for variants up to 200 °C)	1100A57
• Identification plate	18031414
Accessories according to selected variant	
• Mounting nut	6457
• Spacer sleeve (L = 100 mm)	6459
• Conductive spacer sleeve (L = 70 mm)	1720A3
Cable and connectors	
• Single-wire cable with M4 connector L = 1,5 m	1666A2
• Single-wire cable with M4 connector L = 5 m	1666A4
• Connector (for single-wire variants with connector)	1839
• Crimp pin for single-wire (Connection Type 1712 und 1714)	65003747
• Coaxial cable 0 ... 200 °C with M4 connector and Fischer connector	1645C...
• Coaxial cable 0 ... 200 °C with M4 connector and Fischer connector	1650A4P...
• Mounting plate for connector	65005208

Accessories (optionally orderable)	
Mounting tools	
• Extraction tool for variants up to 200 °C	1315A
• Fixation for Fischer connector	1401
• Socket wrench for mounting with mounting nut Type 6457	1383B
• Tools for cable exchange (inkl. fork wrench SW4/SW5 65007801)	1300A32
• Dummy sensor	6545
Multi channel connectors and contact elements	
• 4-channel connector up to 120 °C (for MiniCoax and single-wire cable)	1722A4...
• 8-channel connector up to 120 °C (for MiniCoax and single-wire cable)	1722A8...
• 4-channel connector 120 ... 200 °C (for single-wire cable)	1708...
• 8-channel connector 120 ... 200 °C (for single-wire cable)	1710...
• Contact elements 1-channel for single-wire types	1712…
• Contact elements 4-channel for single-wire types	1714…
• Crimp pin	65003747
• Crimpset with tools	1381A0

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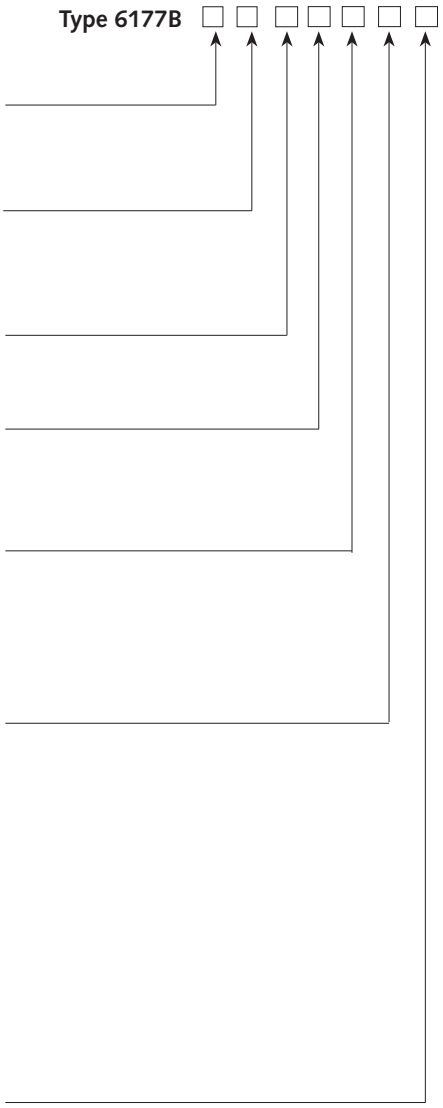
Ordering key



Sensor Type	
up to 200 °C	**A**
up to 200 °C, sensor front coated	**C**

Sensor and mounting	
Highsens	**H**

Mounting	
Mounting with mounting nut Type 6457	**M**
Mounting with spacer sleeve Type 6459	**S**
Mounting with conductive spacer sleeve	**N**

Reserve	**R**

Cable	
Single-wire-cable (PTFE), only sensor Type Aund C	**S**
Coaxial cable (PFA D2), only sensor Type A und C	**K**
without cable	**X**

Connector	
Fischer KE102 (cable K)	**F**
MiniKoax (cable K)	**M**
with connector type 1839 in scope of delivery (cable S)	**E**
without connector type 1839 in scope of delivery (cable S)	**G**

Cable design	
No cable	**XXX**
L = 0,2 m, only cable K, connector F or M (coaxial)	**0,2**
L = 0,4 m, cable K, connector F or M (coaxial)	**0,4**
L = 0,6 m, only cable K, connector F or M (coaxial)	**0,6**
L =0 ,8 m, only cable K, connector F or M (coaxial)	**0,8**
L = 1,0 m, only cable K, connector F (coaxial)	**1,0**
L =1 ,2 m, only cable K, connector F or M (coaxial)	**1,2**
L = 1,5 m, cable K, connector F or M cable S, connector E or G	**1,5**
L = 1,6 m, only cable K, connector F or M (coaxial)	**1,6**
L = 2,0 m, only cable K, connector F or M (coaxial)	**2,0**
L = 2,5 m, only cable K, connector F or M (coaxial)	**2,5**
L = 3,0 m, only cable K, connector F or M (coaxial)	**3,0**
L=5,0 m, only cable S (Single-wire)	**5,0**
L = 0,10 ... 5 m, only cable K coaxial)	**-sp**
Single-wire cable, M4 – crimp pin, L= 0,04 ... 1,5 m contact element Type 1712… and 1714…), only for cable S and connector G	**Zsp**

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