

# Mold Cavity Pressure Sensor

with front:  $\varnothing$  4 mm

Type 6167A...

Patent No. US 6,212,963

Quartz sensor for cavity pressure up to 200 bar in plastics injection molding.

- for low pressure injection molding
- Suitable for low viscosity materials
- Sensor with membrane

### Description

The quartz sensor for mold cavity pressure Type 6167A... has a front of 4 mm diameter. An O-ring seals the annular gap of  $<10 \mu\text{m}$  between sensor and mounting bore and thereby also center aligns the sensor in the bore.

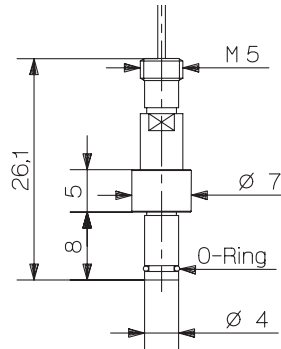
The electrical charge produced by the sensor ( $\text{pC} = \text{picocoulomb}$ ) is converted by the Kistler charge amplifier into a proportional voltage of 0 ... 10 V. The length of the sensor cable has no influence.

The pressure acts directly on the entire front of the sensor and is transferred to the quartz measuring element, which produces an electrical charge proportional to the pressure.

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.

This product complies with the **CE** standard 89/336/EEC.

The sensor 6167AE is provided with a single-wire cable with a very small cross-sectional area and can be installed flexibly in the injection mold. The single-wire cable is exchangeable and can be cut to length as required. With the single-wire technique, electrical shielding is provided by the mold. It is therefore essential for the cable and connector to be completely integrated in the mold. To ensure easy installation, a connector is included which is self-locking and splash-proof. With multi-cavity systems Type 6829A..., the sensor basic type is supplied with a single-wire cable, but without connector and mounting plate.



### Application

This sensor measures mold cavity pressures up to 200 bar; it is particularly suitable for industrial applications for monitoring and open and closed loop control of the process. The diaphragm design of the sensor prevents low viscosity melts between sensor and bore from affecting the measuring result.

Caution! This sensor may never be used for gases or liquids!

### Technical Data Type 6167A... and 6167AE

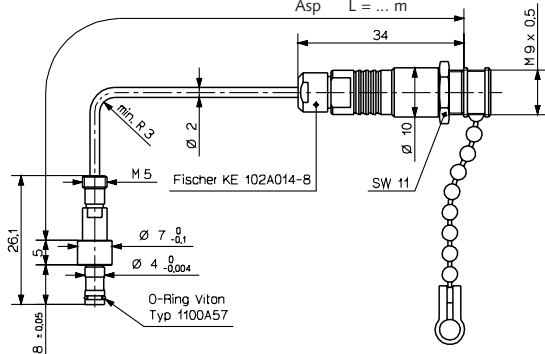
Range	bar	0 ... 200
Overload	bar	500
Sensitivity	$\text{pC}/\text{bar}$	$\approx -16,5$
Linearity, all ranges	% FSO	$\leq \pm 1$
Natural frequency	kHz	$\approx 150$
Operating temperature range		
Mold (sensor, cable, connector)	$^{\circ}\text{C}$	0 ... 200*
Melt (at front of sensor)	$^{\circ}\text{C}$	$< 450$
Temperature coefficient of sensitivity	%/ $^{\circ}\text{C}$	$\pm 0,02$
Insulation resistance		
at 20 $^{\circ}\text{C}$	$\text{T}\Omega$	$> 10$
at 200 $^{\circ}\text{C}$	$\text{T}\Omega$	$> 1$

\* During machine faults, the mold temperature may rise to 240  $^{\circ}\text{C}$  without damaging the sensor; however, this may lead to measuring errors.

6167A\_000-033e-10.04

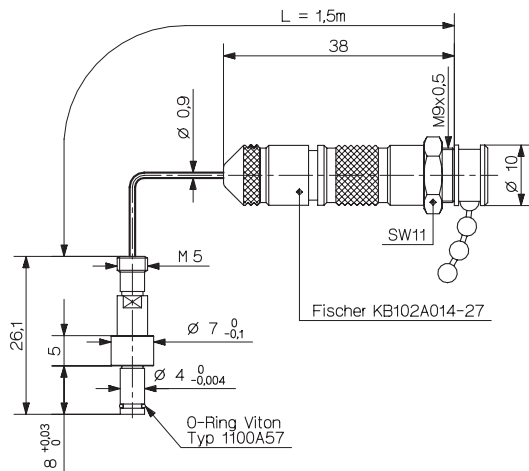
**Pressure sensor Type 6167A...**

6167 A0,2	L = 0,2 m
A0,4	L = 0,4 m
A0,6	L = 0,6 m
A0,8	L = 0,8 m
Asp	L = ... m



Quartz sensor for mold cavity pressures up to 200 bar for processing low-viscosity plastic melts (e.g. sheaths of IC components). Exchangeable high-temperature cable with connector.

**Pressure sensor Type 6167AE**



Alternative version of sensor Type 6167A... with single-wire technique. Simplified sensor installation thanks to the single-wire cable, which can be flexibly installed in the mold and cut to length as required. Both single-wire cable and connector are exchangeable.

**Installation**

The sensor is normally fixed in the mounting bore with the mounting nut (Type 6457), but a spacer sleeve can also be used.

The sensor front forms part of the cavity wall. The sensor must therefore be fitted so that its front comes exactly flush.

The sensor is center aligned in the 4 H7 bore.

If possible affix the connector to a protected part of the mold with the mounting plate (Art. No. 3.520.328) supplied.

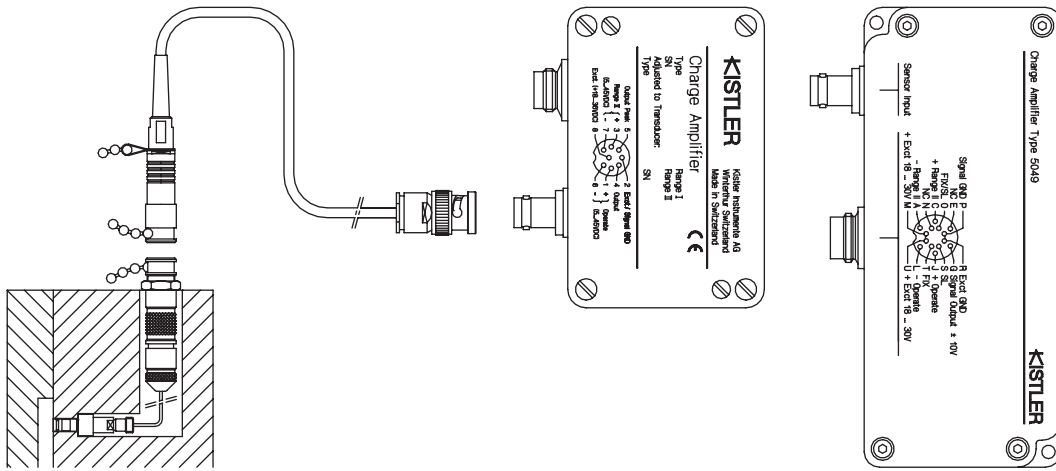
For installing the sensor 6167AE equipped with single-wire technique, the following additional points must be observed. The single-wire cable must be installed completely in the mold. The connector supplied must be installed with the single-wire cable cut to length but without removal of the insulation. The connector is fitted and secured in the mold with the mounting plate.

In addition, the identification label (Art. No. 3.520.842) supplied indicating the sensor type and its sensitivity must also be fitted.

The mounting plate (Art. No. 3.520.328), the mounting nut (Art. No. 6457) and the identification label (Art. No. 3.520.842) are included in the parts supplied. For the sensors 6167AE, the schedule of parts supplied is supplemented with the connector Type 1839.

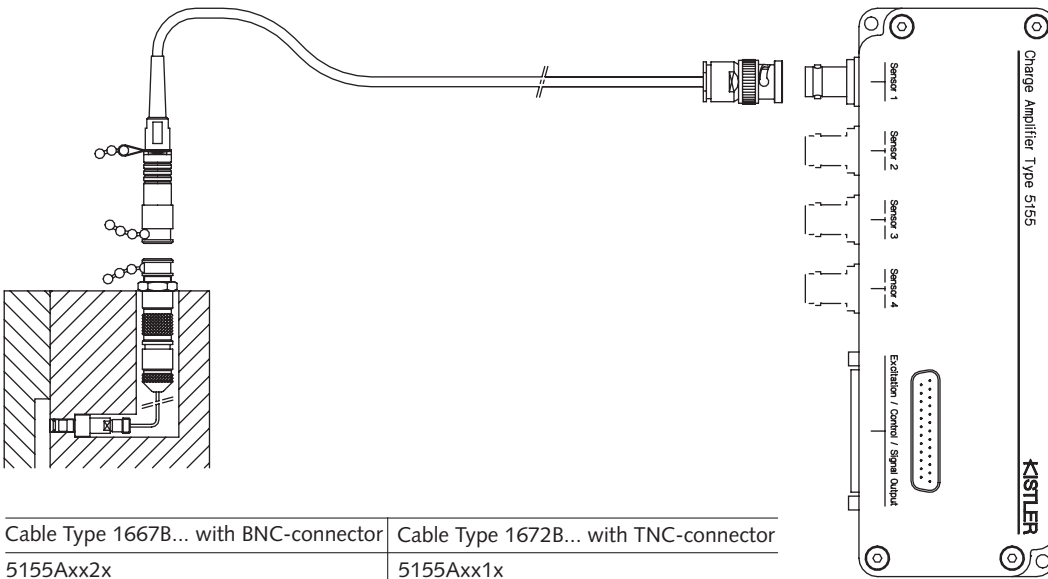
6167A\_000-033e-10.04

**Measuring Chain with Sensor Type 6167A... and Machine-Integrated Charge Amplifier**



Cable Type 1667B... with BNC-connector	Cable Type 1672B... with TNC-connector
5039Axx2	5039Axx1
5049Axx2	5049Axx1

Fig. 1: Sensor Type 6167A... with charge amplifier Type 5039A... (1-channel) or with charge amplifier Type 5049A... (1-channel with SmartAmp)



Cable Type 1667B... with BNC-connector	Cable Type 1672B... with TNC-connector
5155Axx2x	5155Axx1x
5155Axx4x	5155Axx3x
5155Axx8x	5155Axx7x
5155AxxBx	5155AxxAx
5155AxxDx	5155AxxCx

Fig. 2: Sensor Type 6167A... with charge amplifier Type 5155A... (1-, 2- or 4-channel; SmartAmp optional on one channel)

6167A\_000-033e-10.04

**Installation Examples**

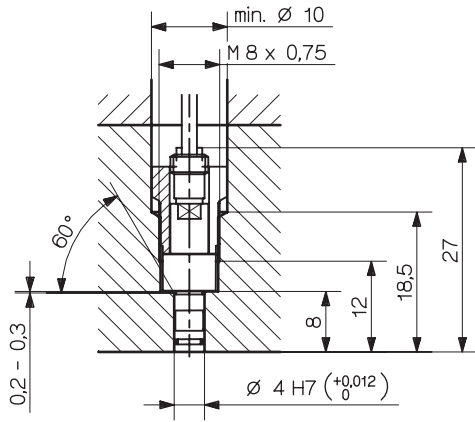


Fig. 1: Installation with mounting nut (Type 6457)

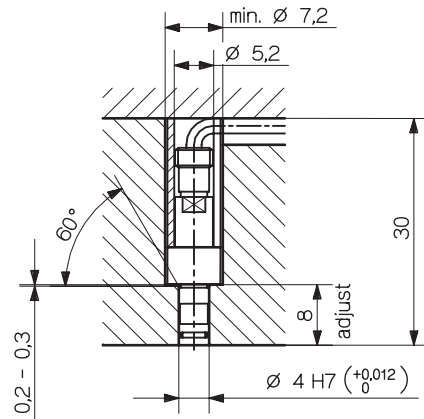


Fig. 2: Installation with spacer sleeve (Type 6459)

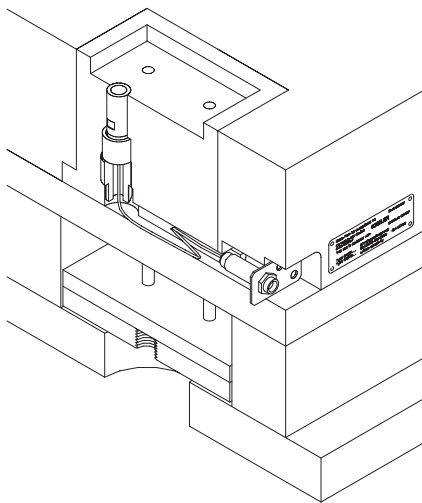


Fig. 3: Sensor, cable, mounting plate (Art. No. 3.520.328) and identification label (Art. No. 3.520.842)

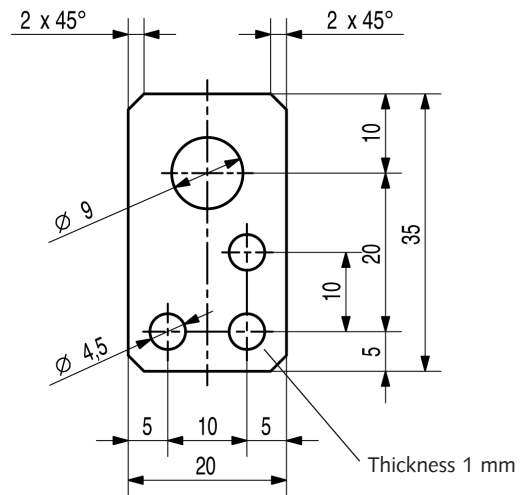


Fig. 4: Mounting plate (Art. No. 3.520.328)

6167A\_000-033e-10.04

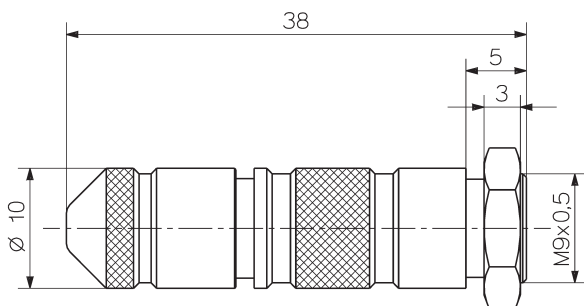


Fig. 5: Connector (Type 1839)

### Accessories Included

• Mounting nut	Art. No.	6457
• Mounting plate		3.520.328
• Identification label		3.520.842
• Connector (for single-wire technique only)		1839
• Single-wire cable, with the length of 1,5 m (ready installed with sensor, for single-wire technique only)		1666A2
• O-ring, diameter 2,5 x 0,65 mm		1100A57

### Optional Accessories

• High temperature extension cable sheathed in steel braiding, Fischer SE102A014 – TNC pos., Length 2 m	Type	1672A2
Length 5 m		1672A5
• High temperature extension cable, Teflon Fischer SE102A014 – BNC pos., Length 2 m		1667B2
Length 5 m		1667B5
• Mounting piece for connectors		1401
• Dummy sensor		6545
• Spacer sleeve		6459

### Set of accessories Type 1300A81 consisting of: Art. No.

• Step drill, diameter 7,2/3,85	5.210.156
• Countersink	5.210.158
• Twist drill, diameter 10 mm	5.210.159
• Reamer, diameter 4H7	5.210.155
• Tap M8 x 0,75	5.210.161
• Finishing tool	7.110.296
• Hexagonal socket wrench	5.210.118
• Lapping tool	7.110.298
• Limit plug gage, diameter 4H7	5.210.162
• Checking tool	7.110.300
• Clamp	3.050.175
• Fork wrench SW4/SW5	5.210.164

### Mounting Accessories

• Socket wrench	Type	1383
• Extraction tool		1315A
• O-ring tool for exchanging the cable		1364

### Ordering Key

#### Cable

Coaxial cable, L in m	0,2
	0,4
	0,6
	0,8
Coaxial cable with special lengths, specify L in m (L <sub>min</sub> = 0,1 m / L <sub>max</sub> = 5 m)	sp
with single-wire cable (L = 1,5 m)	E
with single-wire cable (L = 5 m)	E1

Type 6167A 