

# Mold Cavity Pressure Sensor

with Front:  $\varnothing$  2,5 mm

Type 6159A...

Patent No. US 6,212,963

Quartz sensor for cavity pressures up to 2 000 bar for injection molding of plastics.

- Suitable for industrial use
- Sensor front can be machined to adapt to the cavity wall (except for coated versions of the sensor)
- Exchangeable cable

## Description

The quartz sensor for mold cavity pressure Type 6159A... has a front of 2,5 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 pressure acts over the entire front of the sensor and is transmitted to the quartz measuring element, which produces a proportional electric charge (pC = Picocolomb). This is converted into a voltage 0 ... 10 V in the amplifier and is then available as an amplifier output.

All parts of the sensor are corrosion-resistant. The exchangeable cable is screwed to the sensor with a tight seal.

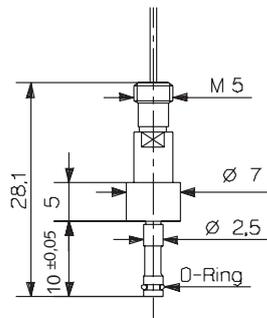
For multi cavity applications the sensor Type 6159A... is used without the single-wire connector Typ 1839. The Multi Cavity Set Type 6829A... and the Multi Sensor System Type 6831A... are described in the appropriate data sheets.

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

## Application

The diaphragm-free sensor measures mold cavity pressures up to 2 000 bar in injection molding. It is particularly suitable for industrial applications for monitoring and open and closed loop control in the injection molding of thermoplastics.

For abrasive melts (e.g. filled with glass fibers or carbon fibers), the sensors are available as Types 6159A...U6 with a coated front.



## Technical Data

Range	bar	0 ... 2 000
Overload	bar	2 500
Sensitivity	pC/bar	$\approx -2,5$
Linearity, all ranges	% FSO	$\leq \pm 1$
Operating temperature range		
Mold (sensor, cable, connector)	°C	0 ... 200*
Melt (at front of sensor)	°C	$< 450$
Insulation resistance		
at 20 °C	T $\Omega$	$\geq 100$
at 200 °C	T $\Omega$	$\geq 1$

\* During machine down time, the mold temperature may rise to 240 °C without damaging the sensor. However, measuring errors may occur.

**Pressure Sensor Type 6159A...**

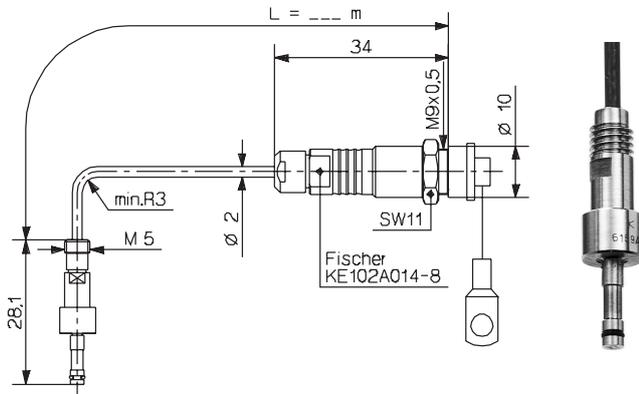


Fig. 1: Quartz sensor for mold cavity pressures up to 2 000 bar for the injection molding of plastics.

The sensor Type 6159AE... 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... and Multi Sensor Set Type 6831A... (described in data sheet 6829A\_000-046e and 6831A\_000-547e), the sensor basic type is supplied with a single-wire cable, but without connector and mounting plate.

**Installation**

The sensor is normally fixed in the mounting bore with the mounting nut (Type 6457).

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

**Pressure Sensor Type 6159AE...**

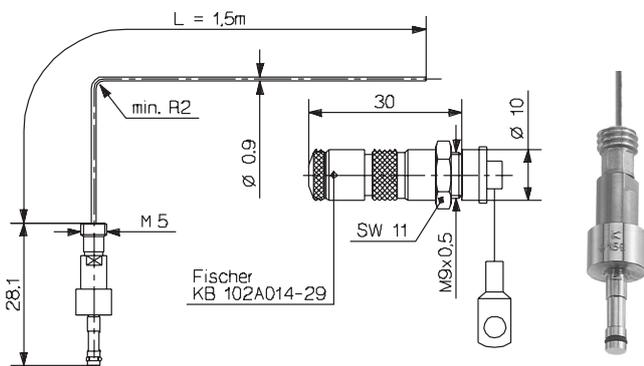


Fig. 2: Alternative version of sensor Type 6159A... with single-wire technique.

The sensor is center aligned in the diameter 2,5 H7 bore.

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

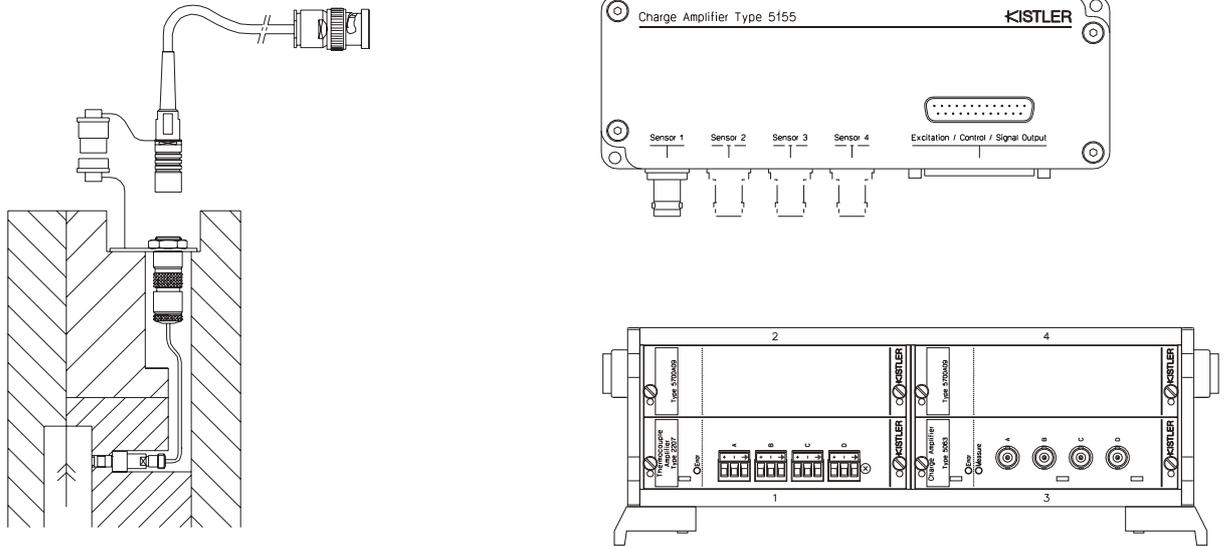
For installing the sensor Type 6159AE... equipped with single-wire technique, the following additional points must be observed. The single-wire cable must be installed completely in the mold. The connector supplied must be installed with the single-wire cable cut to length but without removal of the 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 (Type 6457) and the identification label (Art. No. 3.520.842) are included in the parts supplied. For the sensors Type 6159AE..., the connector (Type 1839) is included in the scope of delivery.

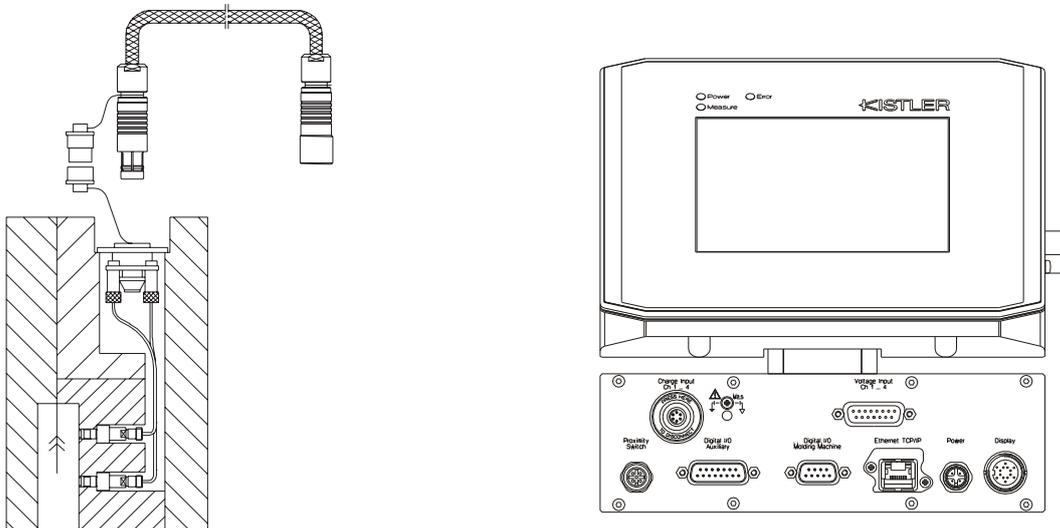
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**Cable and Amplifier for Measuring Chain with Sensor Type 6159A...**



Cable Type 1667B... (BNC connector)	Cable Type 1672B... (TNC connector)
Type 5039Axx2	Type 5039Axx1
Type 5049Axx2	Type 5049Axx1
Type 5155Axx2x/Axx4x/Axx8x	Type 5155Axx1x/Axx3x/Axx7x
Type 5063A1 in Type 2859A.../2865A...	

Fig. 3: Sensor Type 6159A... with Charge Amplifier Typ 5155A... or Signal Conditioner Type 2859/2865A...



4-channel cable Type 1995A... to connector Type 1708A..	8-channel cable Type 1997A... on connector Type 1710A...
Type 2869A0xx	Type 2869A2xx
Type 2869A1xx	

Fig. 4: Sensor Type 6159A... with Monitoring System CoMo® Injection Typ 2869A...

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**Mounting Example**

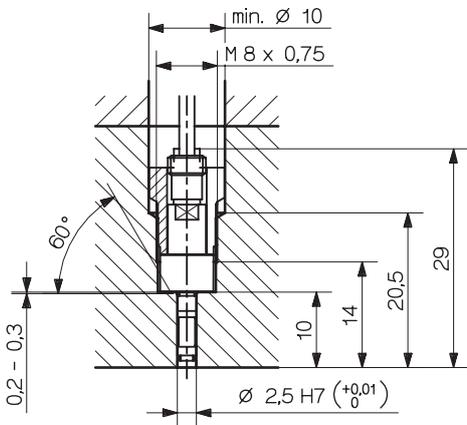


Fig. 5: Installation with mounting nut Type 6457

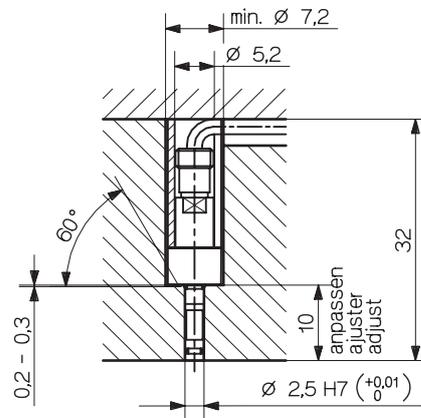


Fig. 6: Installation with spacer sleeve Type 6459

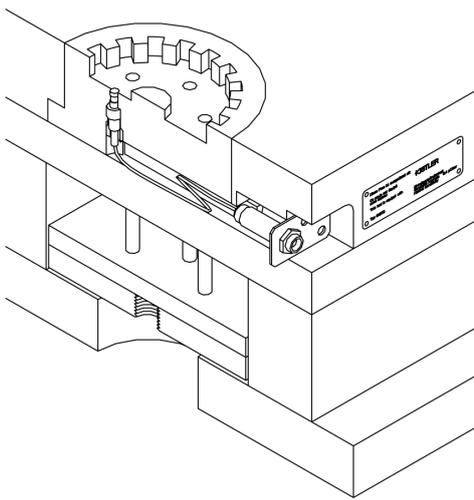


Fig. 7: Sensor, cable, mounting plate (Art. No. 3.520.328) and identification label (Art. No. 3.520.842)

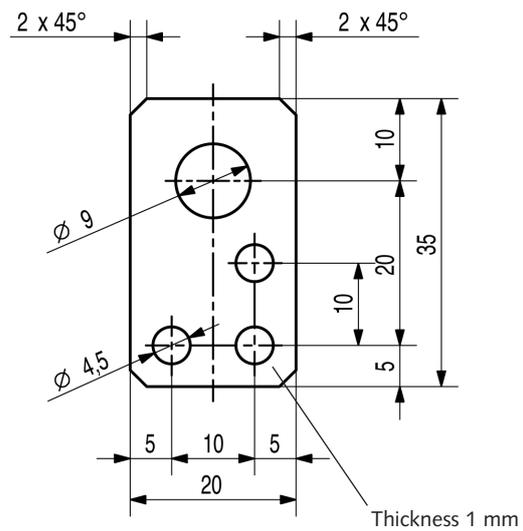


Fig. 8: Mounting plate (Art. No. 3.520.328)

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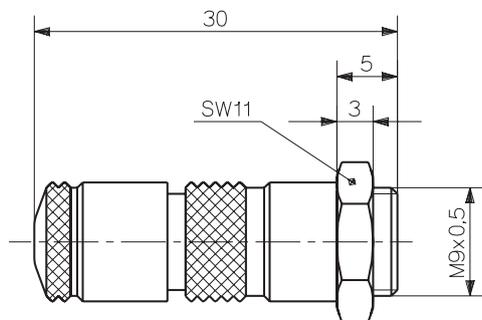


Fig. 9: Connector Type 1839

**Accessories Included**

- Mounting nut (for sensor with cable only) 6457
- Mounting plate 3.520.328
- Identification label 3.520.842
- Connector (only for single-wire sensor only Type 6159AE...) 1839
- Single-wire cable with connection 1,5 m (for single-wire sensor only Type 6159AE...) 1666A2
- O-ring, diameter 1,2x0,6 mm 1100A55

**Optional Accessories**

- Spacer sleeve 6459
- High temperature extension cable, Viton®, Fischer SE102A014 – TNC pos., Length 2 m 1672B2
- High temperature extension cable, Viton®, Fischer SE102A014 – TNC pos., Length 5 m 1672B5
- High temperature extension cable, Viton®, Fischer SE102A014 – BNC pos., Length 2 m 1667B2
- High temperature extension cable, Viton®, Fischer SE102A014 – BNC pos., Length 5 m 1667B5
- Dummy sensor 6549
- Two-wire-Teflon® cable (green) 0 ... 200 °C as replacement cable for sensors Type 6159A... 1645C...
- Steel-braided two-wire-Teflon® cable 0 ... 200 °C as a wear resistant substitute for Types 1645C... 1963A...

**Set of Accessories Type 1300A83 consisting of: Art. No.**

- Step drill, diameter 7,2/3,35 5.210.157
- Countersink 5.210.158
- Twist drill, diameter 10 mm 5.210.159
- Reamer, diameter 2,5H7 5.210.160
- Tap M8x0,75 5.210.161
- Finishing tool 7.110.296
- Hexagonal socket wrench 5.210.118
- Lapping tool 7.110.299
- Limit plug gage, diameter 2,5H7 5.210.163
- Checking tool 7.110.300
- Exchange pin 3.050.172
- Clamp 3.050.175
- Fork wrench SW4/SW5 5.210.164

**Mounting Accessories**

- Socket wrench 1383
- Extraction tool 1315A
- Mounting piece for connectors 1401

**Ordering Key**

Cable version	
Sensor only	–
Cable length 0,2 m	<b>0,2</b>
Cable length 0,4 m	<b>0,4</b>
Cable length 0,6 m	<b>0,6</b>
Cable length 0,8 m	<b>0,8</b>
Single-wire cable length 1,5 m	<b>E</b>
Sensor Type 6159AE without connector	<b>G</b>
Coaxial cable with special lengths, specify L in m (L <sub>min</sub> = 0,1 m / L <sub>max</sub> = 5 m)	<b>sp</b>
Sensor version	
Coated front	<b>U6</b>

Type 6159A □ □



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