

# Cavity Pressure Sensor

Type 6183C...

## with Front $\varnothing 1$ mm

Miniaturized piezoelectric sensor with single-wire technology for mold cavity pressures up to 2 000 bar in the injection molding of plastics.

- Ideally suited for industrial applications
- Designed without a diaphragm and with a level, machinable front face
- Also available with chromed face for abrasive plastics
- Exchangeable cable
- With venting slot for degassing plastics

### Description

The miniaturized sensor for mold cavity pressure Type 6183C... has a 1 mm diameter front face. The very small crosssectional area of the single-wire cable allows flexibility of installation. Shielding in the single-wire technology is provided by the mold. It is therefore essential for the cable and connector to be integrated in the mold.

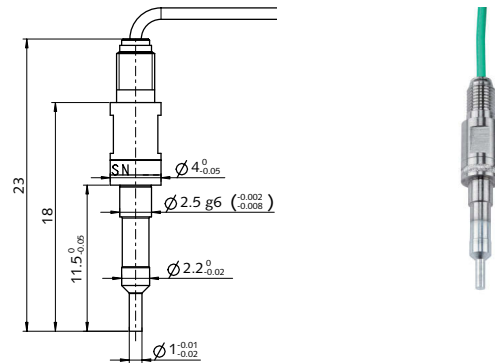
In the uncoated versions, the front face can be machined up to 0,5 mm in order to adapt it to the contour of the mold cavity. For these Types, it is thus possible to mount a keyway-pin which prevents the sensor rotating in the mounting bore.

For multi cavity applications the sensor Type 6183C...G is used without the single-wire connector Type 1839.

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

### Application

It is mainly suitable for industrial applications for monitoring and open-looped and closed-looped control in thermoplastic injection molding.

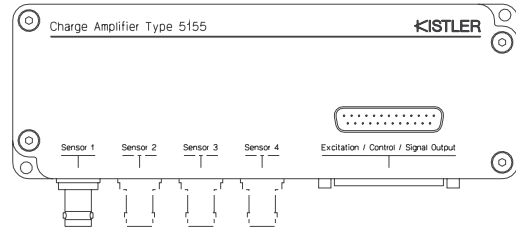
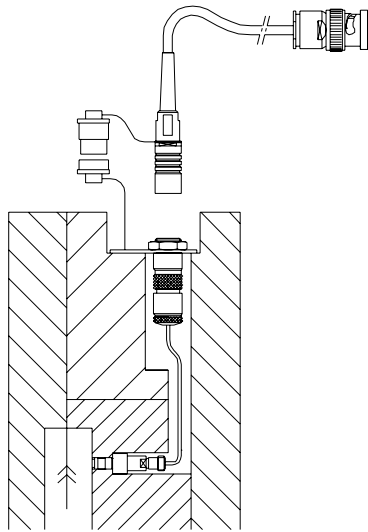


### Technical Data

Range	bar	0 ... 2 000
Overload	bar	2 500
Sensitivity	pC/bar	≈2,5
Linearity, all ranges	% FSO	≤±1
Operating temperature range		
Mold (Sensor, cable, connector)	°C	0 ... 200*
Melt (on sensor front face)	°C	<450
Insulation resistance		
at 20 °C	TΩ	>10
at 200 °C	TΩ	>1

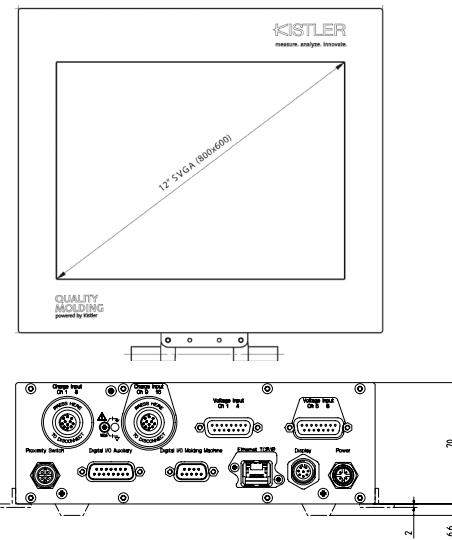
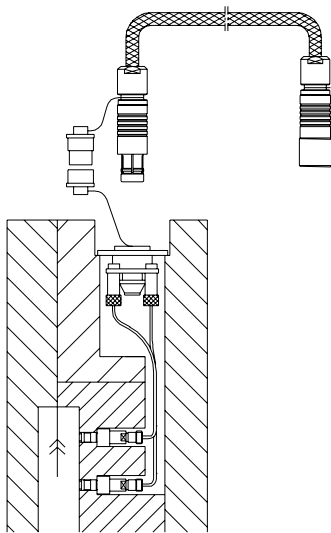
\* During machine down-time, the mold temperature may be allowed to rise to 240 °C without damaging the sensor. However, measuring errors may occur

**Cable and Amplifier for Measuring Chain with Sensor Type 6183C...**



<b>Cable Type 1667B... (BNC connector)</b>
Type 5155Axx2x/Axx4x/Axx8x

Fig. 1: Sensor Type 6183C... with Charge Amplifier Type 5155A...



<b>4-channel cable Type 1995A... to connector Type 1708B..</b>	<b>8-channel cable Type 1997A... on connector Type 1710B...</b>
Type 2869B0xx	Type 2869B2xx
Type 2869B1xx	Type 2869B3xx

Fig. 2: Sensor Type 6183C... with Monitoring System CoMo Injection Type 2869...

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**Installation Examples**

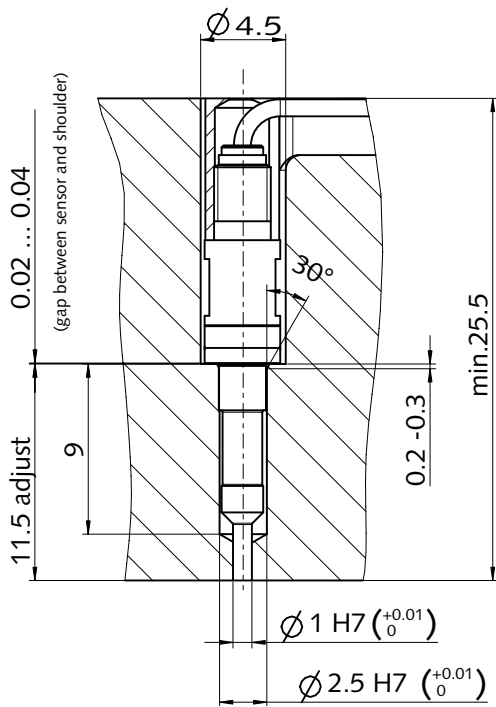


Fig. 3: Installation with spacer sleeve Type 6464A1

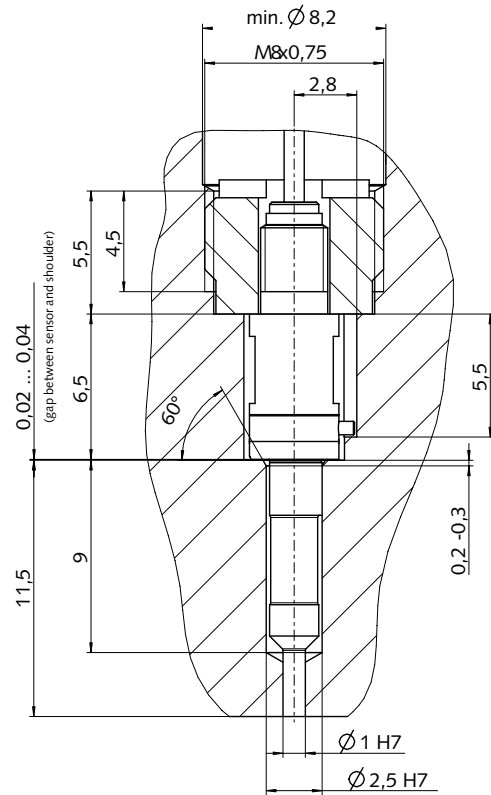


Fig. 4: Optional installation with mounting nut Type 6460A1 and key way pin Type 65001430

**Installation Examples**

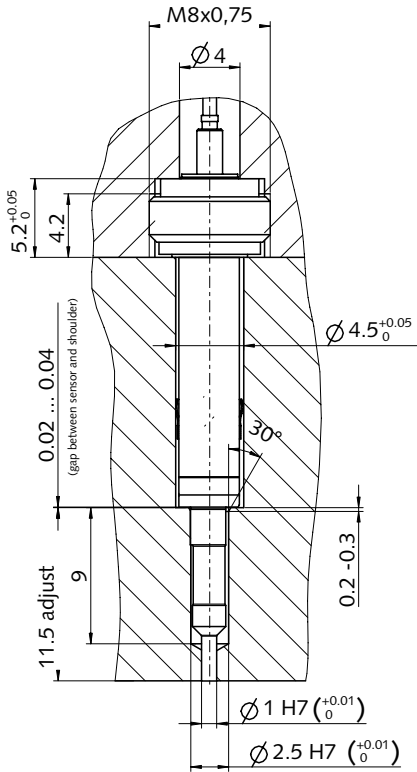


Fig. 5: Installation of the Types 6183C...N... with conducting spacer sleeve

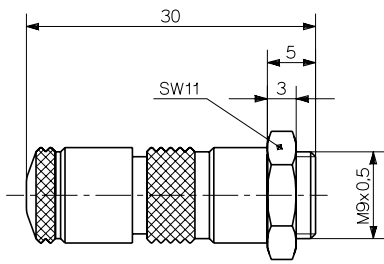


Fig. 7: Connector Type 1839

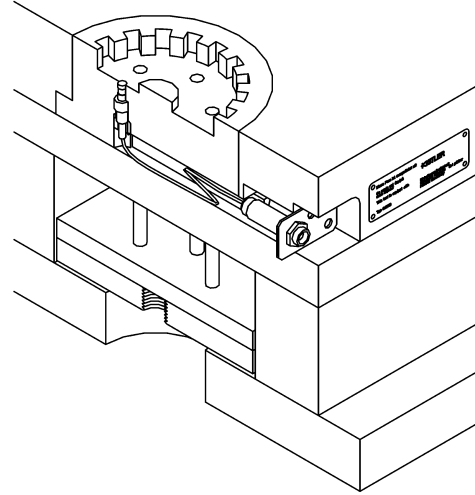


Fig. 6: Sensor, cable, mounting plate and identification plate

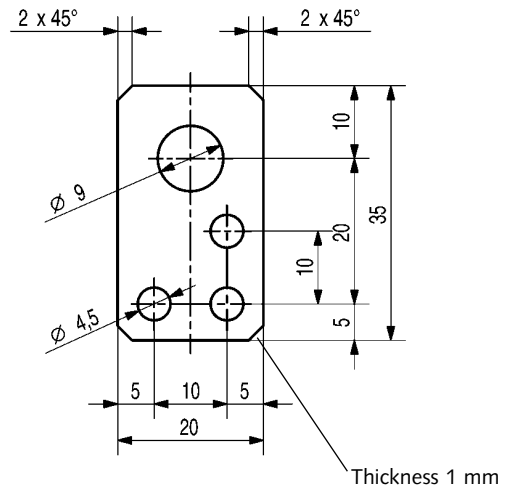


Fig. 8: Mounting plate (Mat. No. 65005208)

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### Installation

The sensor is preferably fitted in the mounting bore with the spacer sleeve (Type 6464A1). In case of installation with a keyway pin, however, the mounting nut Type 6460A1 should be used.

The front face of the sensor forms part of the cavity wall. The sensor must therefore be installed in such a way that its front face is exactly flush with the wall.

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. The insulation of the cable must not be stripped prior to insertion into the connector. This connector is fitted in the mounting plate and this secured in a recess in the mold. The identification plate should be fixed nearby, indicating the type of sensor and its sensitivity.

### Ordering Key

#### Sensor

Sensor front uncoated, with venting slot and keyway pin	<b>A</b>
Sensor front chromed, with venting slot	<b>C</b>

#### Cabel

Sensor with single-wire-cable (L = 1,5 m)	<b>E</b>
Sensor with single-wire-cable (L = 5 m)	<b>E1</b>
Sensor with single-wire-cable, without connector (L = 1,5 m)	<b>G</b>
Sensor with single-wire-cable, without connector (L = 5 m)	<b>G1</b>

#### For contact elements Types 1712A... and 1714A...

Sensor with single-wire-cable and crimped pin (Mat. Nr. 65003747). Cable with special lengths. Specify L in m. ( $L_{\min} = 0,04$ m/ $L_{\max} = 1,5$ m)	<b>Zsp</b>
Sensor with conducting spacer sleeve Type 1720A1 and contact element Type 1712A1	<b>NE</b>
Sensor with conducting spacer sleeve Type 1720A1 and contact element Type 1712A1, without connector	<b>NG</b>

Type 6183C□□



### Accessories Included

	Mat. No./Type
• Spacer sleeve (L = 50 mm)	6464A1
• Conducting spacer sleeve (L = 40 mm)	1720A1
• Mounting plate	65005208
• Connector (with cap)	1839
• Checking tool	65000144
• Identification plate	65005416

### Optional Accessories

	Mat. No./Type
• Replacement cable single wire 1,5 m	1900A17L1,5
• Replacement cable single wire 5 m	1900A17L5
• Dummy sensor	6456A
• Extraction tool	1358A
• Mounting nut	6460A1
• Keyway pin	65001430
• 4-channel connector for Type 6183C...G and 6183C...G1	1708B...
• 8-channel connector for Type 6183C...G and 6183C...G1	1710B...
• Contact elements 1 channel for Type 6183C...Zsp	1712A0
• Contact elements 4 channels for Type 6183C...Zsp	1714A0
• Crimped pin	65003747
• Crimpset with tools	1381A0

# Mold Cavity Pressure Sensor

## with Front $\varnothing 1,2$ mm

Type 6184A...

### Introduction

Miniaturized crystal sensor with single-wire technique for mold cavity pressure up to 2 000 bar used in the injection molding of plastics.

- Minimum size for installation in a mold insert
- Ideal for multi-cavity applications
- Diaphragm-free design with flat, machinable measuring front
- Version with chrome-plated available

### Description

This miniaturized quartz sensor for mold cavity pressure Type 6184A... has a protruding pin with a front face of 1,2 mm diameter. The integral single-wire cable with a very small cross-sectional area is designed to allow flexibility of mounting. With the single-wire technique, electrical shielding is guaranteed by the mold. It is therefore essential for the cable and connector to be integrated in the mold.

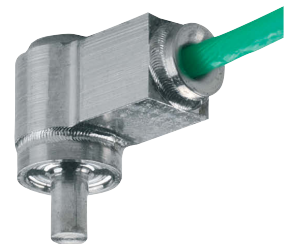
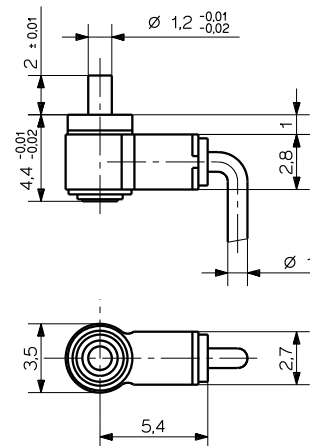
The pressure acts directly on the entire front face of the sensor and is transferred to the quartz force link, which produces an electric charge (pC = picocoulomb) proportional to the pressure. This is converted in an amplifier into a voltage of 0 ... 10 V which is available at the amplifier output.

For multi-cavity applications the sensor Type 6184AAG or Type 6184ACG, without connector is used. The multichannel connectors Type 1708A... and 1710A... connect up to 4, respectively 8 sensors.

### Application

The sensor is primarily suitable for industrial applications in optimising, monitoring and controlling injection molding of thermoplastics.

This miniature sensor has been specially developed for mounting in multi-cavity molds where there is limited space. Because of the lateral cable outlet the sensor can be mounted radially or axially directly into a mold insert or a slider. At the side, the sensor is secured via the case against rotation allowing the sensor front to be adapted in situ to the cavity. The spacer sleeve supplied protects the sensor against damage and guarantees optimum sensor mounting.



### Technical Data

Range	bar	0 ... 2 000
Overload	bar	2 500
Sensitivity	pC/bar	$\approx -1,2$
Linearity	%FSO	$\leq \pm 1$
Operating temperature range		
mold (sensor, cable, connector)	°C	0 ... 200 *
melt (at the front of the sensor)	°C	<450
Insulation resistance		
at 20 °C	$\Omega$	$>10^{13}$
at 120 °C	$\Omega$	$>10^{12}$

\* During machine malfunctions, the mold temperature can be allowed to reach 240 °C without the sensor being damaged. However measuring errors may occur.

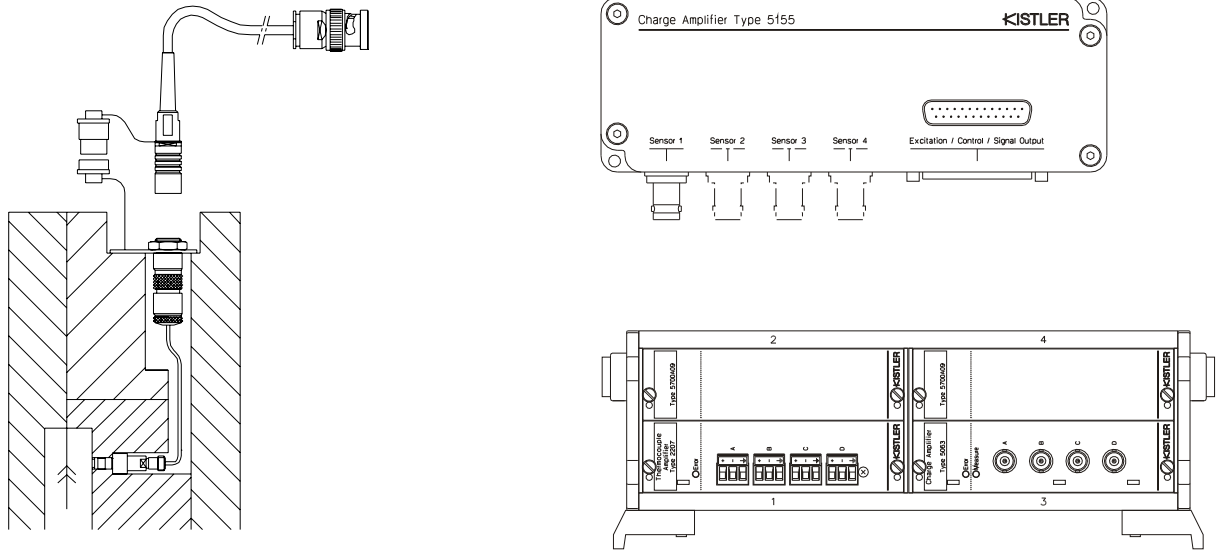
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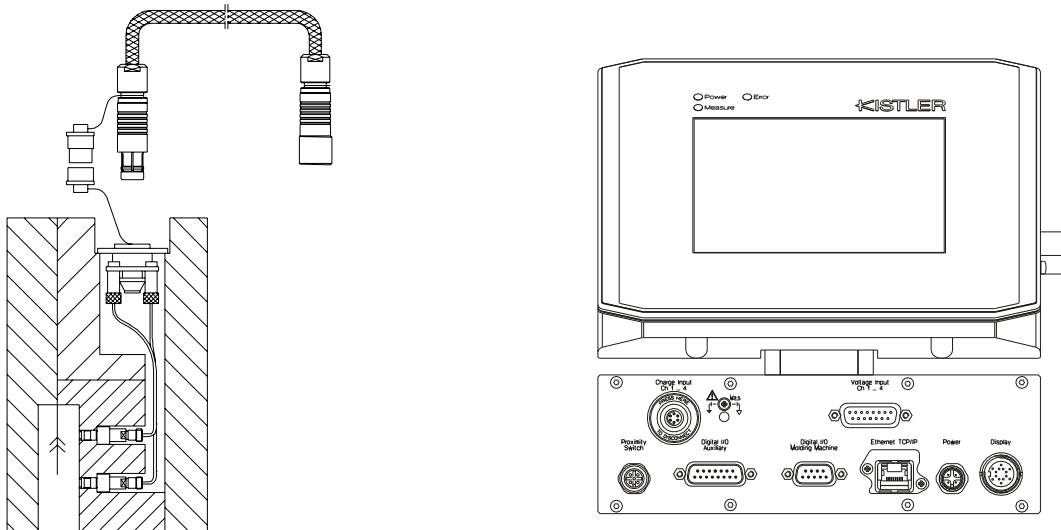
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**Cable and Amplifier for Measuring Chain with Sensor Type 6184A...**



Cable Type 1667B... or 1661A... (BNC connector)	Cable Type 1672B... or 1662A... (TNC connector)
Type 5039Axx2	Type 5039Axx1
Type 5049Axx2	Type 5049Axx1
Type 5155Axx2x/Axx4x/Axx8x	Type 5155Axx1x/Axx3x/Axx7x
Type 5063A1 in Type 2853A.../2859A.../2865A.../2865B...	

Fig. 1: Sensor Type 6184A... with Charge Amplifier Typ 5155A... or Signal Conditioner Type 2859/2865...



4-channel cable Type 1995A... to connector Type 1708A..	8-channel cable Type 1997A... on connector Type 1710A...
Type 2869A0xx	Type 2869A2xx/2869B2xx
Type 2869A1xx/2869B1xx	Type 2869B3xx

Fig. 2: Sensor Type 6184A... with Monitoring System CoMo Injection Type 2869...

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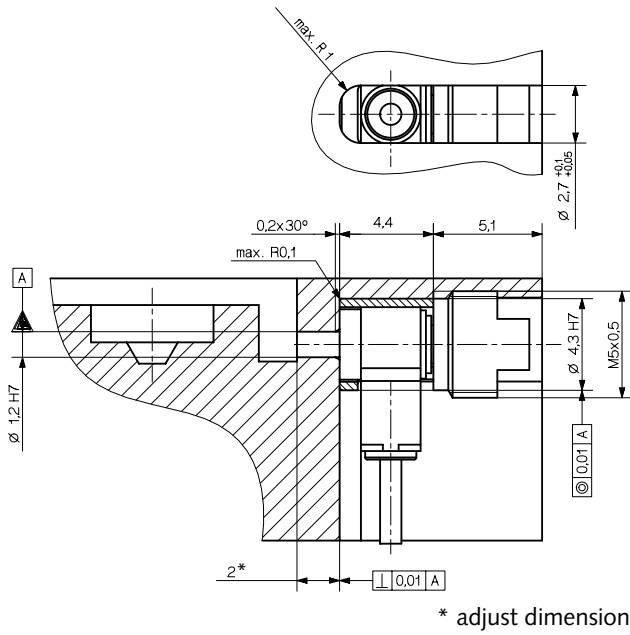


Fig. 3: Mounting with spacer sleeve Type 6466 and mounting nut Type 6465

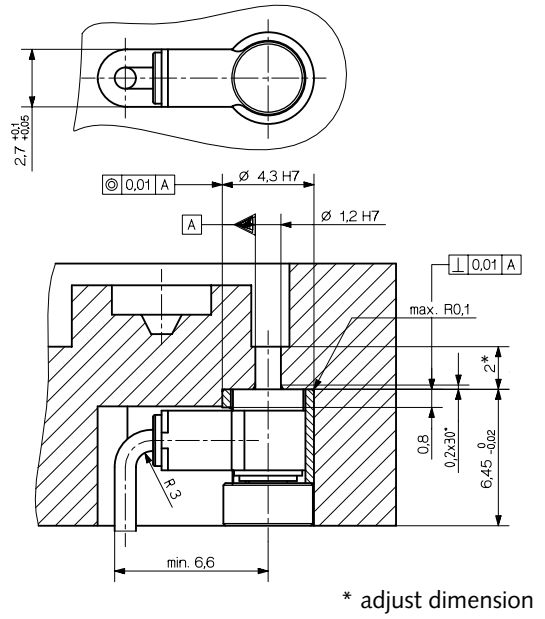


Fig. 4: Mounting with spacer sleeve Type 6466 and thrust washer Type 6470

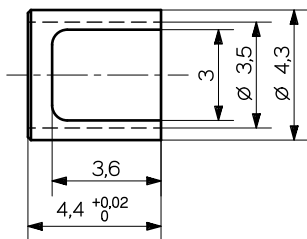


Fig. 5: Spacer sleeve Type 6466

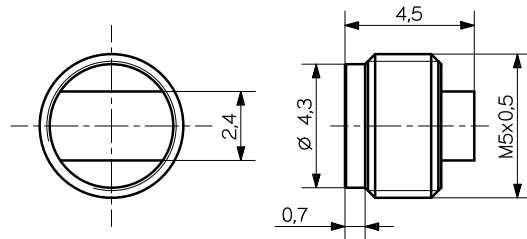


Fig. 6: Mounting nut Type 6465

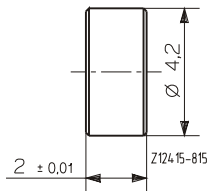


Fig. 7: Thrust washer Type 6470

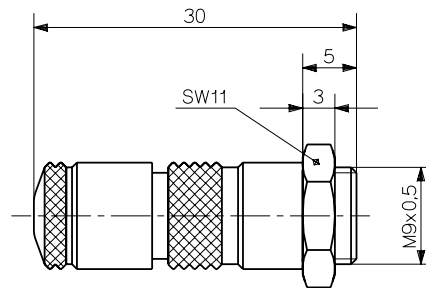


Fig. 8: Connector Type 1839

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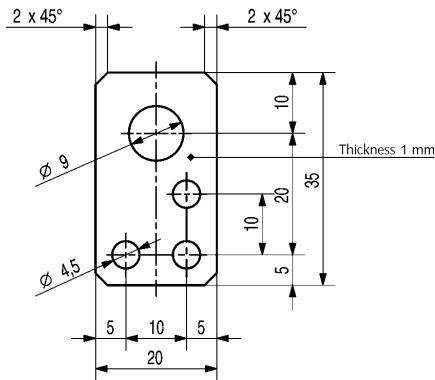


Fig. 9: Mounting plate (Mat. No. 65005208)

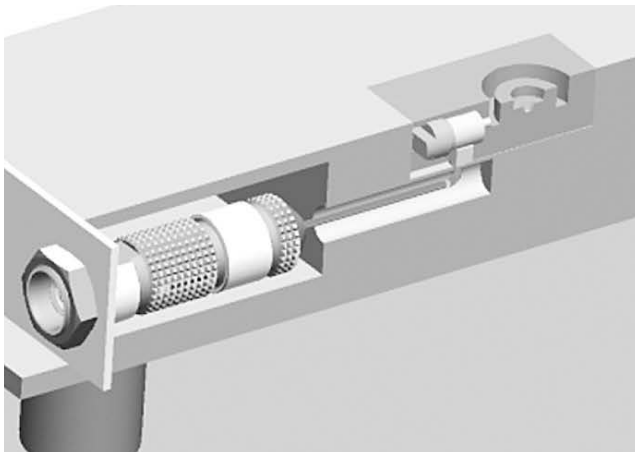


Fig. 10: Installation from the side, sensor, cable, connector and mounting plate

### Mounting

The sensor is always installed in the mounting hole with a spacer sleeve Type 6466 along with a mounting nut or thrust washer. Since the sensor forms part of the cavity wall, it must be installed in such a way that its front face is exactly flush. The front face of Type 6184AA... can be machined up to 0,3 mm (The front of the chrome-plated Type 6184AC... may not be machined).

With flat inserts in which the cavities are not very deep, the sensor is installed from the side with the mounting nut. When it is installed from underneath, the sensor is mounted with a dimensionally adapted thrust washer. With both types of mounting, the spacer sleeve prevents the sensor from being deformed.

The single-wire cable must be mounted completely in the mold. The connector supplied must be mounted with the single-wire cable cut to size but with its insulation intact. This is then inserted with the mounting plate in the mold and secured. The identifica-

tion plate should also be affixed alongside it giving details of the type of sensor and its sensitivity.

### Accessories Included

- Spacer sleeve
- Mounting nut
- Thrust washer
- Mounting plate
- Connector with short-circuit cap
- Checking tool
- Identification plate

### Type/Art. No.

6466  
6465  
6470  
65005208  
1839  
65000144  
65005416

### Optional Accessories

- Socket wrench for mounting nut
- 4-Channel Connector for Types 6184AAG and ACG
- 8-Channel Connector for Types 6184AAG and ACG
- Contact elements 1 channel
- Contact elements 4 channels
- Crimped pin
- Crimpset with tools

### Type/Art. No.

1363  
1708A...  
1710A...  
1712A0  
1714A0  
65003747  
1381A0

### Ordering Key

Type 6184A

Sensor with machinable front, single-wire cable Length 1,5 m, with connector	AE	↑
Sensor Type 6184AAE without connector	AG	
Sensor with chrome-plated front, single-wire cable Length 1,5 m, with connector	CE	
Sensor Type 6183ACE, without connector	CG	
<b>For contact elements Types 1712A... and 1714A...</b>		
Sensor with single-wire cable and crimped pin (Mat. No. 65003747). Cable with special length. Specify cable length $l$ in m. $L_{min} = 0,04$ m/ $L_{max} = 1,5$ m	Zsp	
Sensor with chromed face, single-wire cable and crimped pin (Mat. No. 65003747). Cable with special length. Specify cable length $l$ in m. $L_{min} = 0,04$ m/ $L_{max} = 1,5$ m	CZsp	

# Cavity Pressure Sensor

with Front  $\varnothing 2,5$  mm

Type 6182C...

Miniaturized quartz sensor with single-wire technology for mold cavity pressures up to 2000 bar encountered in the injection molding of plastics.

- Ideally suited for industrial applications
- Designed without a diaphragm and with a flat, machinable front face
- Also available with chromed face for abrasive plastics
- Exchangeable cable

### Description

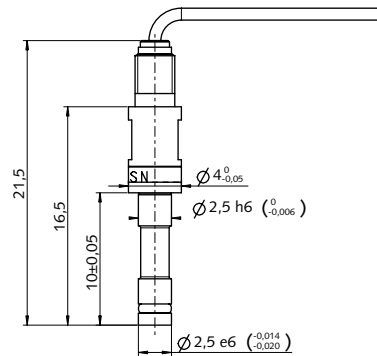
The miniaturized quartz sensor for mold cavity pressure Type 6182C... has a 2,5 mm diameter front face. The small cross-sectional area of the single-wire cable allows flexibility of installation. Shielding in the single-wire technology is provided by the mold. It is therefore essential for the cable and connector to be integrated in the mold.

For multi cavity applications the sensor Type 6182C... is used without the single-wire connector Typ 1839.

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 voltage 0 ... 10 V when used with a charge amplifier.

### Application

It is designed for industrial applications for monitoring and open-looped and closed-looped control in thermoplastic injection molding.

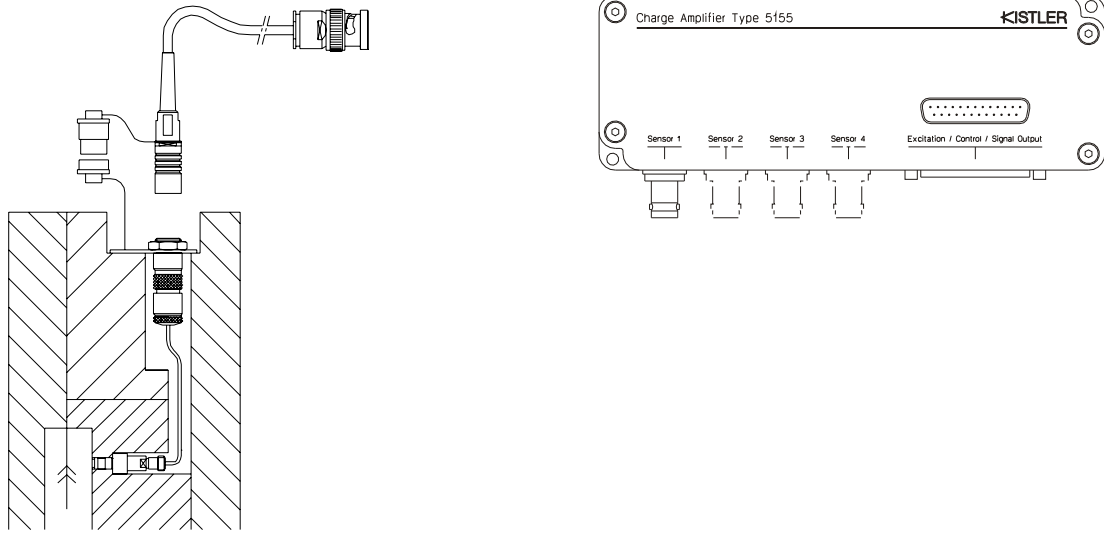


### Technical Data

Measuring range	bar	0 ... 2 000
Overload	bar	2 500
Sensitivity	pC/bar	≈2,5
Linearity, all ranges	% FSO	≤±1
Operating temperature range		
Mold (sensor, cable, connector)	°C	*0 ... 200
Melt (on sensor front face)	°C	<450
Insulation resistance		
at 20 °C	TΩ	>10
at 200 °C	TΩ	>1

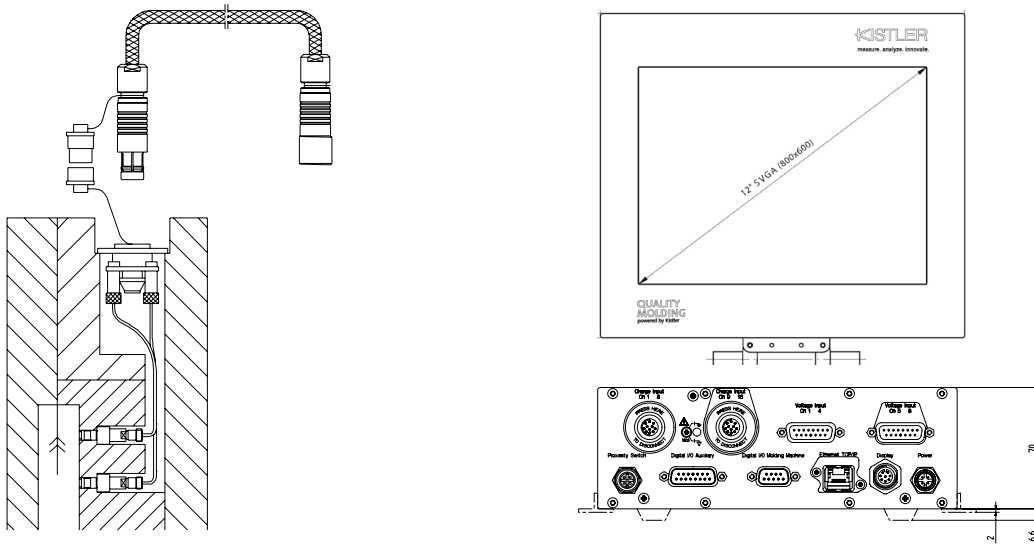
\* During machine down time, the mold temperature may be allowed to rise to 240 °C without damaging the sensor. However, measuring errors may occur

**Cable and Amplifier for Measuring Chain with Sensor Type 6182C...**



<b>Cable Type 1667B... (BNC Connector)</b>
Type 5155Axx2x/Axx4x/Axx8x

Fig. 1: Sensor Type 6182C... with Charge Amplifier Typ 5155A...



<b>4-Channel Cable Type 1995A... to Connector Type 1708B..</b>	<b>8-Channel Cable Type 1997A... on Connector Type 1710B...</b>
Type 2869B0xx	Type 2869B2xx
Type 2869B1xx	Type 2869B3xx

Fig. 2: Sensor Type 6182C... with Monitoring System CoMo Injection Typ 2869...

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**Installation Examples**

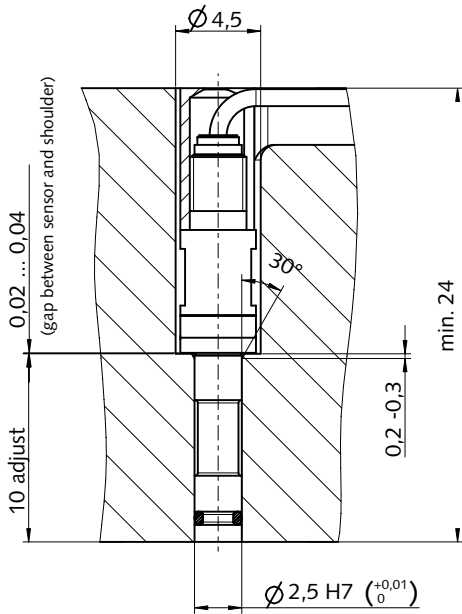


Fig. 3: Installation with spacer sleeve Type 6464A1

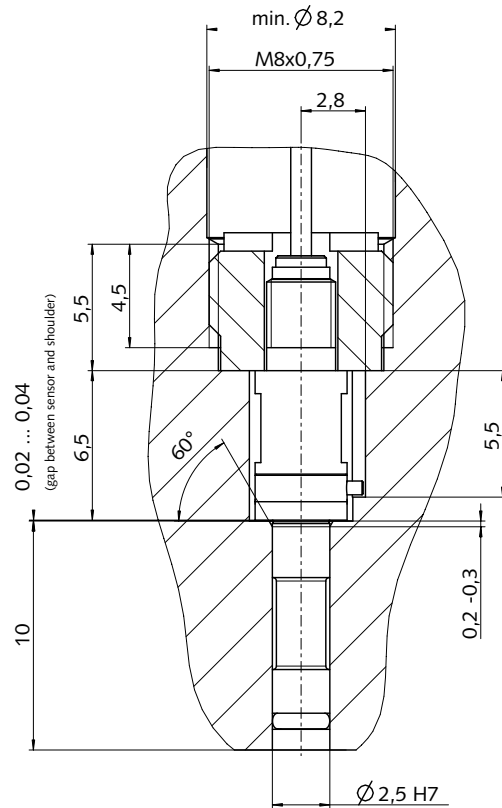


Fig. 4: Optional installation with mounting nut Type 6460A1 and key way pin Type 65001430

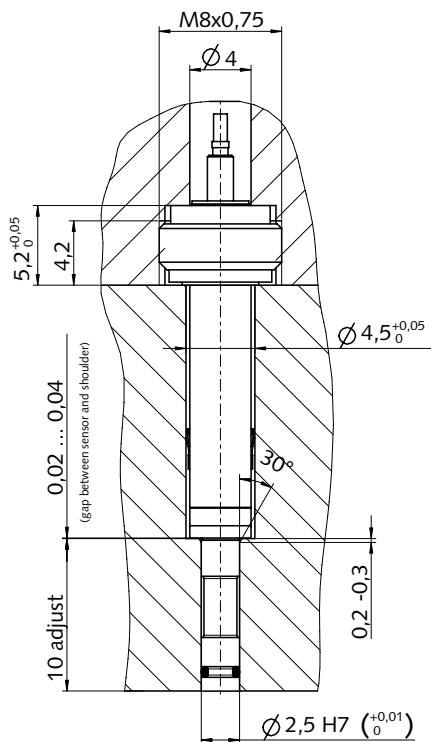


Fig. 5: Installation of the Types 6182C...N... with conducting spacer sleeve

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**Accessories Included**

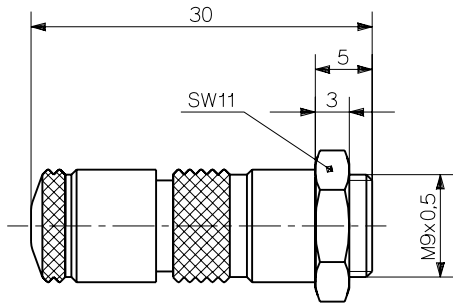


Fig. 6: Single-wire connector Type 1839

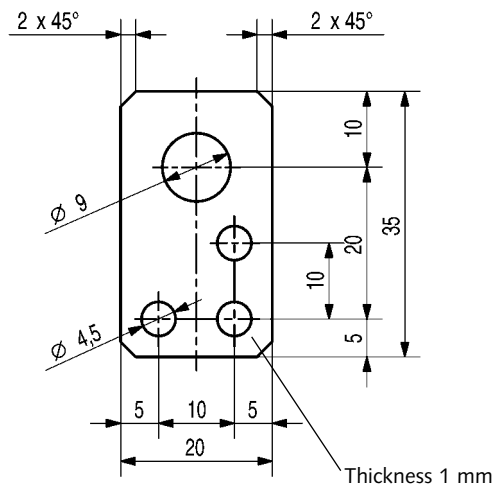


Fig. 7: Mounting plate Mat. No. 65005208

**Pressure Sensor Type 6182CA**

This standard sensor with machinable front is suitable for unfilled plastics. The front can be re-machined to suit the cavity wall.

**Pressure Sensor Type 6182CC**

For abrasive melts (e.g. with glass or carbon fibers) this type with a coated front is recommended. The front face of coated sensors must not be re-machined.

**Mounting**

The sensor is preferably installed in the mounting bore with the spacer sleeve (Art. No. 6464A1). The front face of the sensor forms part of the cavity wall. The sensor must therefore be installed in such a way that its front face is exactly flush with the wall.

The sensor front face from Type 6182CA... can be machined up to 0,5 mm. Coated variants Type 6182CC... must not be machined.

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. The insulation of the cable must not be stripped prior to insertion into the connector. This connector is attached in the mounting plate and this secured in a recess in the mold. The identification plate should be located nearby, indicating the type of sensor and its sensitivity.

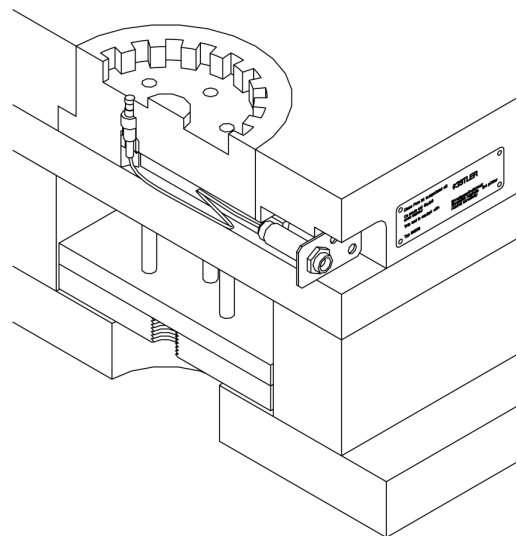


Fig. 8: Sensor, cable, mounting plate and identification plate

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**Accessories Included** **Mat. No./Type**

- Spacer sleeve (L = 50 mm) 6464A1
- Conducting spacer sleeve (L = 40 mm) 1720A1
- Mounting plate 65005208
- Connector (with cap) 1839
- Checking tool 65000146
- Identification plate 65005416
- O-ring 1100A55

**Optional Accessories** **Mat. No./Type**

- Replacement cable singlewire 1,5 m 1900A17L1,5
- Replacement cable singlewire 5 m 1900A17L5
  
- Dummy sensor 6454A
- Extraction tool 1358A
- Mounting nut 6460A1
- Keyway pin 65001430
  
- 4-channel connector for Type 6182C...G and 6182C...G1 1708B...
- 8-channel connector for Type 6182C...G and 6182C...G1 1710B...
  
- Contact elements 1 channel for Type 6182C...Zsp 1712A0
- Contact elements 4 channels for Type 6182C...Zsp 1714A0
  
- Crimped pin 65003747
- Crimpset with tools 1381A0

**Ordering Key**

Type 6182C

**Sensor**

Sensor front uncoated, with venting slot and keyway pin	<b>A</b>
Sensor front chromed, with venting slot	<b>C</b>

**Cabel**

Sensor with single-wire-cable (L = 1,5 m)	<b>E</b>
Sensor with single-wire-cable (L = 5 m)	<b>E1</b>
Sensor with single-wire-cable, without connector (L = 1,5 m)	<b>G</b>
Sensor with single-wire-cable, without connector (L = 5 m)	<b>G1</b>

**For contact elements Types 1712A... and 1714A...**

Sensor with single-wire-cable and crimped pin (Mat. Nr. 65003747). Cable with special lengths. Specify L in m. (L <sub>min</sub> = 0,04 m/L <sub>max</sub> = 1,5 m)	<b>Zsp</b>
Sensor with conducting spacer sleeve Type 1720A1 and contact element Type 1712A1	<b>NE</b>
Sensor with conducting spacer sleeve Type 1720A1 and contact element Type 1712A1, without connector	<b>NG</b>

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# 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.

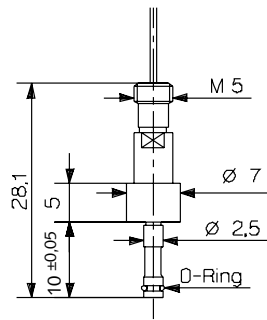
For multi cavity applications the sensor Type 6159A... is used without the single-wire connector Typ 1839. The Multi Cavity Set Type 6829A... and the Multi Sensor System Type 6831A... are described in the appropriate data sheets.

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	TΩ	$\geq 100$
at 200 °C	TΩ	$\geq 1$

\* 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...

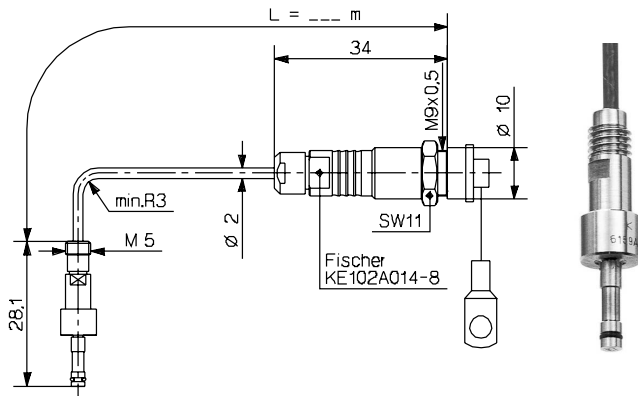


Fig. 1: Quartz sensor for mold cavity pressures up to 2 000 bar for the injection molding of plastics.

## Pressure Sensor Type 6159AE...

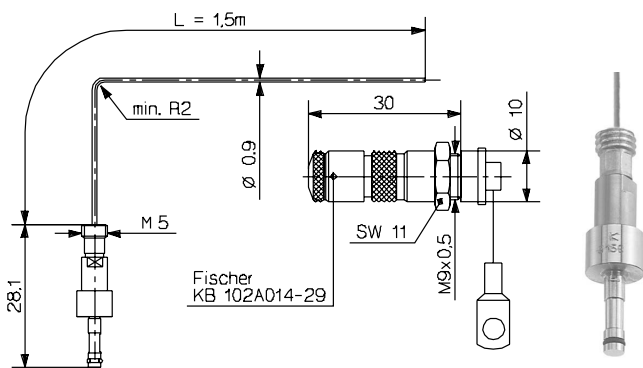


Fig. 2: Alternative version of sensor Type 6159A... with single-wire technique.

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.

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.

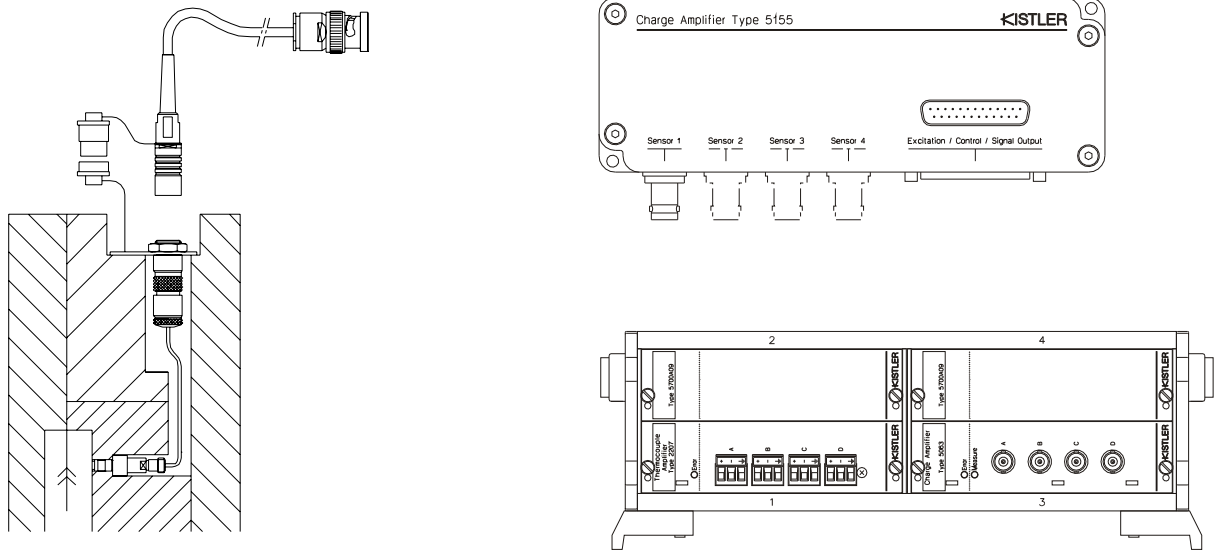
For installing the sensor Type 6159AE... equipped with single-wire technique, the following additional points must be observed. The single-wire cable must be installed completely in the mold. The connector supplied must be installed with the single-wire cable cut to length but without removal of the 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.

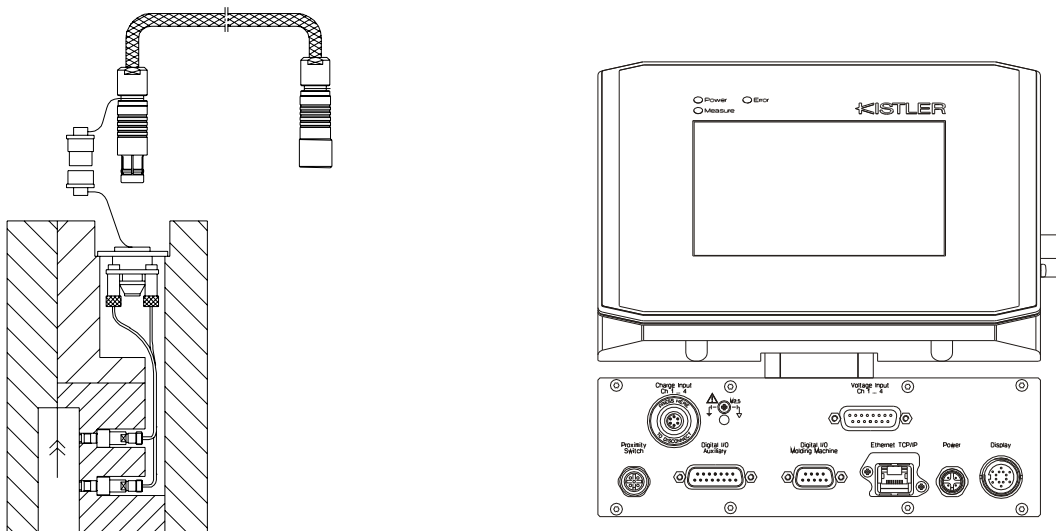


**Cable and Amplifier for Measuring Chain with Sensor Type 6159A...**



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...

6159A\_000-032e-01.07

**Mounting Example**

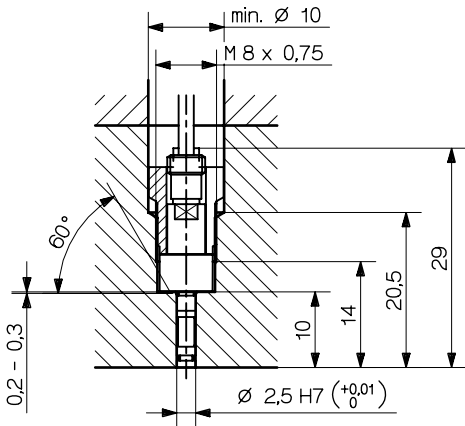


Fig. 5: Installation with mounting nut Type 6457

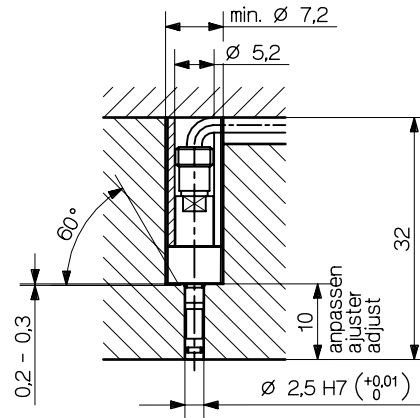


Fig. 6: Installation with spacer sleeve Type 6459

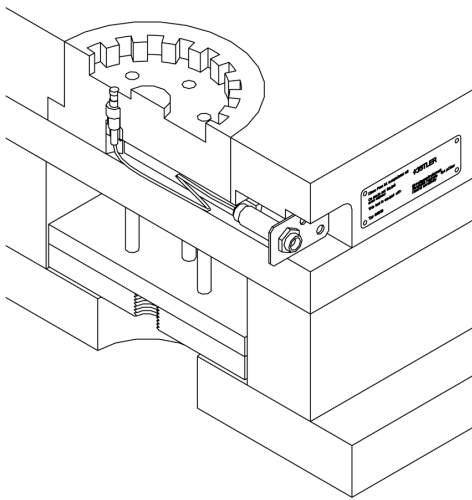


Fig. 7: Sensor, cable, mounting plate (Art. No. 3.520.328) and identification label (Art. No. 3.520.842)

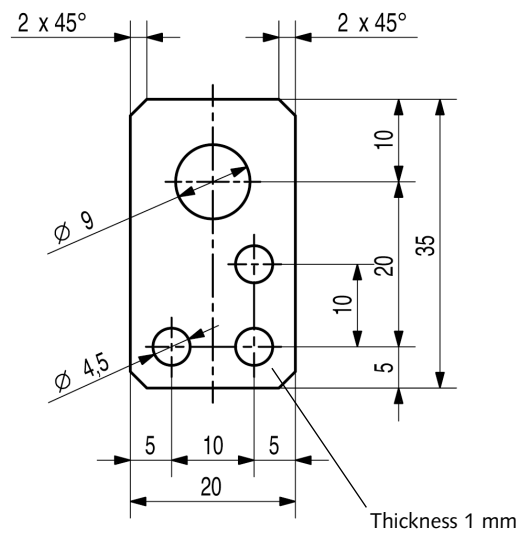


Fig. 8: Mounting plate (Art. No. 3.520.328)

6159A\_000-032e-01.07

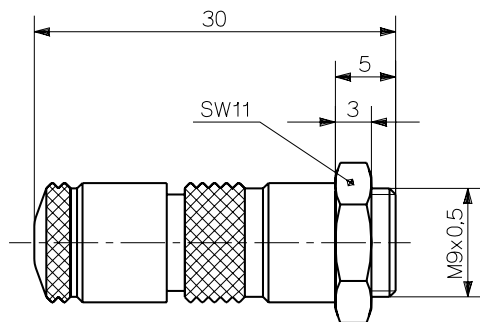


Fig. 9: Connector Type 1839

**Accessories Included**

• Mounting nut (for sensor with cable only)	Art. No./Type	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	Type	6459
• High temperature extension cable, Viton®, Fischer SE102A014 – TNC pos., Length 2 m		1672B2
Length 5 m		1672B5
• High temperature extension cable, Viton®, Fischer SE102A014 – BNC pos., Length 2 m		1667B2
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	Art. No.	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	Type	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>
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Type 6159A  

# Mold Cavity Pressure Sensor

## HighSens with Front $\varnothing 2,5$ mm

Type 6178A...

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)

### Description

The HighSens quartz sensor for mold cavity pressure Type 6178A... has a front diameter of 2,5 mm.

The small cross sectional area of the integrated single wire cable allows flexibility of installation. Shielding in the single wire technology is provided by the mold. It is therefore essential for the cable and connector to be integrated in the mold.

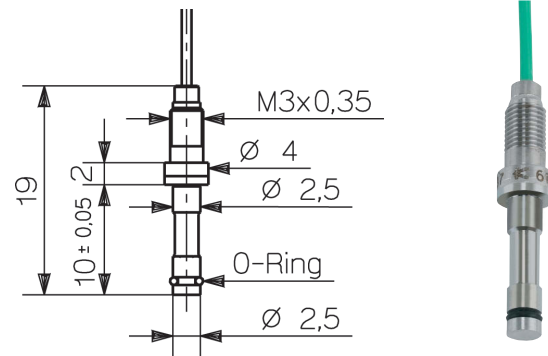
The pressure acts over the entire front of the sensor and is transmitted to the quartz measuring element, which produces a proportional electric charge (pC = Picocolomb). This is converted into a 0 ... 10 V output from a standard charge amplifier.

For multi cavity applications the sensor Type 6178A 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.

All parts of the sensor are corrosion resistant. The connector is self locking and splash proof.

### 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.

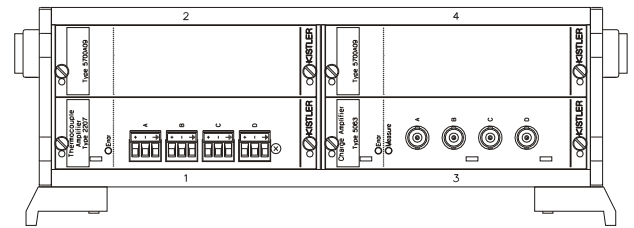
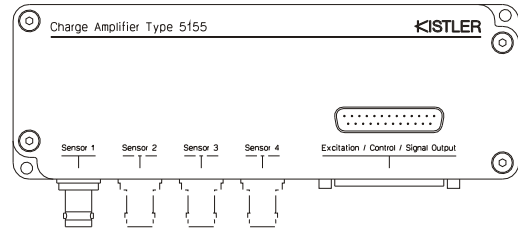
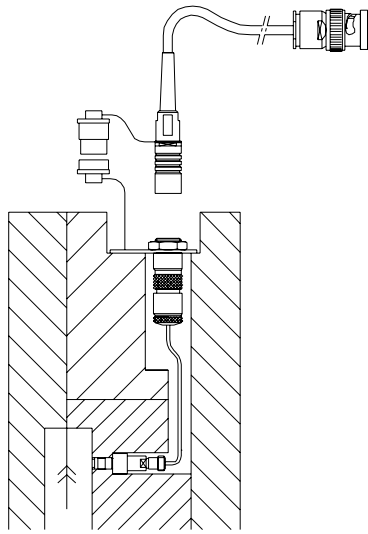


### Technical Data

Range	bar	0 ... 200
Overload	bar	300
Sensitivity	pC/bar	-12
Linearity, all ranges	% FSO	$\leq \pm 1$
Operating temperature range		
Mold (sensor, cable)	°C	0 ... 200
Melt (at the front of the sensor)	°C	<450
Connector	°C	*0 ... 200
Insulation resistance		
at 20 °C	T $\Omega$	>100
at 300 °C	T $\Omega$	>0,01

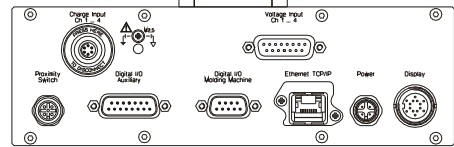
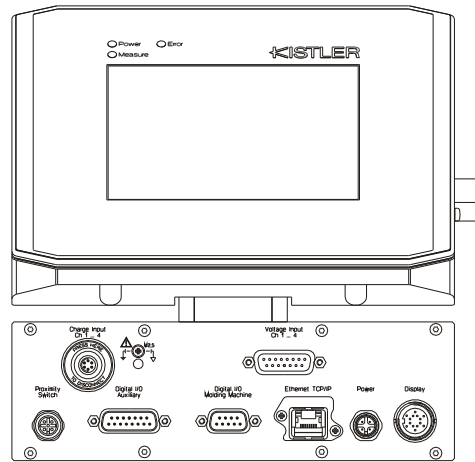
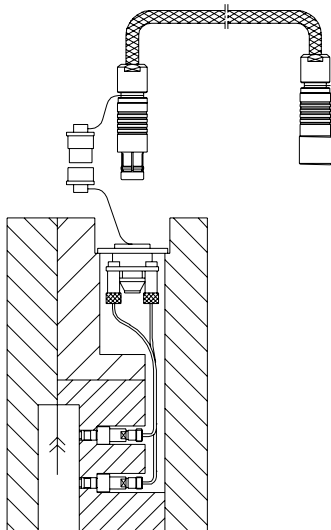
\* During machine down time the mold temperature may rise up to 240 °C, without causing any damage to the sensor. Note that measuring errors may temporarily result

**Cable and Amplifier for Measuring Chain with Sensor Type 6178A...**



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. 1: Sensor Type 6178A... with Charge Amplifier Type 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. 2: Sensor Type 6178A... with Monitoring System CoMo® Injection Type 2869A...

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**Installation Examples**

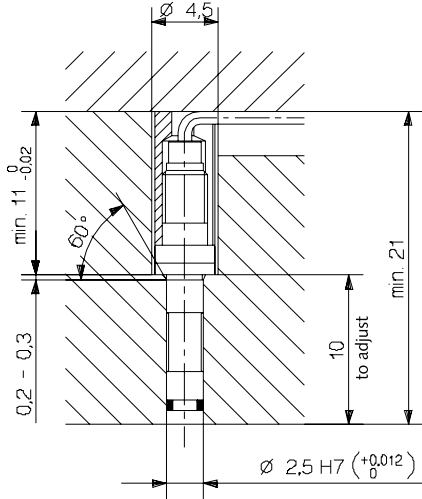


Fig. 3: Installation with spacer sleeve Type 6464

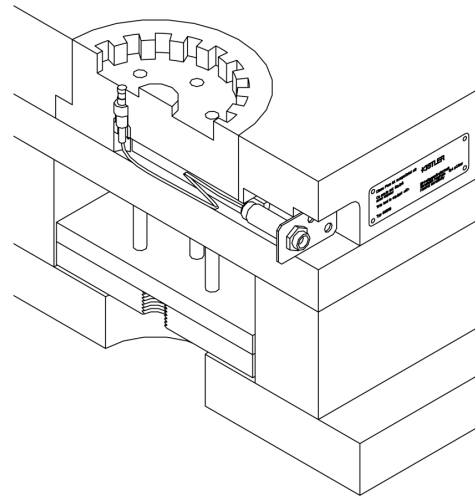


Fig. 4: Sensor, cable, mounting plate and identification plate

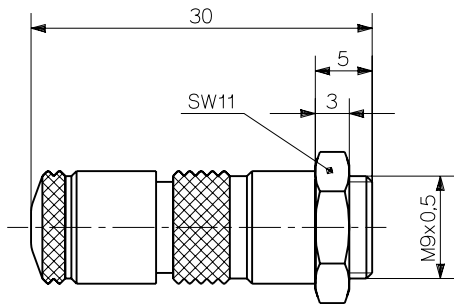


Fig. 5: Connector Type 1839

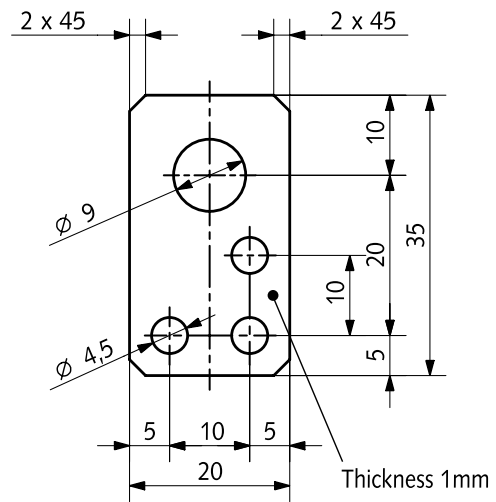


Fig. 6: Mounting plate

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### Installation

The sensor is preferably mounted in the mounting bore with the spacer sleeve (Type 6464A1). The front face of the sensor forms part of the cavity wall. The sensor must therefore be installed in such a way that its front face is exactly flush with the wall.

The sensor of Type 6178AE front face can be machined up to 0,5 mm.

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. The insulation of the cable must not be stripped prior to insertion into the connector. This connector is fitted in the mounting plate and this secured in a recess in the mold. The identification plate should be located nearby, indicating the Type of sensor and its sensitivity.

### Accessories Included

- Spacer sleeve (L = 50 mm)
- Mounting plate
- Connector with cap
- Checking tool
- Identification plate
- O-ring

### Type/Art. No.

- 6464A1
- 3.520.328
- 1839
- 3.050.243
- 3.520.842
- 1100A55

### Optional Accessories

- Dummy sensor
- Extraction tool
- Mounting nut
- Tubular socket wrench
- 4-channel connector for Type 6178AG/6178ACG
- 8-channel connector for Type 6178AG/6178ACG

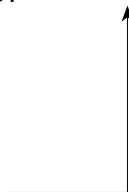
### Type

- 6558
- 1358A
- 6458
- 1356
- 1708A...
- 1710A...

### Ordering Key

Type 6178A

Standard sensor with single-wire cable Length 1,5 m and connector	E
Sensor with single-wire cable Length 1,5 m and coated front	CE
Sensor Type 6178AE without connector	G
Sensor Typ 6178ACE without connector	CG



# Mold Cavity Pressure Sensor

## Unisens® with Front $\varnothing 4$ mm

Type 6157B...

Patent No. US 6,212,963

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

- 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 Unisens quartz sensor for mold cavity pressure Type 6157B... has a front diameter of 4 mm. 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 ( $\text{pC} = \text{Picocoloumb}$ ). This is converted into a voltage  $0 \dots 10 \text{ V}$  in the amplifier and is then available as an amplifier output.

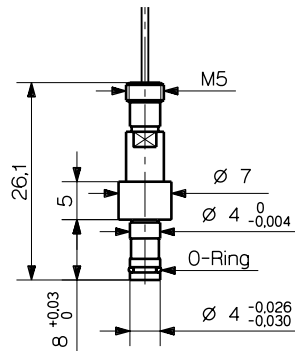
All parts of the sensor are corrosion-resistant. The exchangeable cable is screwed to the sensor with a tight seal. The connector is self-locking and splash-proof.

For multi cavity applications the sensor Type 6157B... is used without the singlewire connector Type 1839. For 4 channel applications the sensor Type 6157B... is mounted with the Multi-Channel Connector Type 1708... and for 8 channel applications with the Multi-Channel Connector Type 1710...

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

### Application

This diaphragm-free sensor measures mold cavity pressures up to 2 000 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 6157BCE ( $0 \dots 200 \text{ }^\circ\text{C}$ )/BD... ( $0 \dots 300 \text{ }^\circ\text{C}$ ) with a hardcoated front.

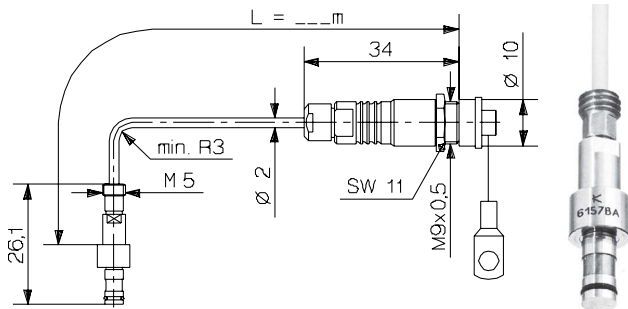
### Technical Data

Range	bar	0 ... 2 000
Overload	bar	2 500
Sensitivity	pC/bar	-9,4
Linearity, all ranges	% FSO	$\leq \pm 1$
Operating temperature range		
Mold (sensor, cable)		
Type 6157BA.../BC...	$^\circ\text{C}$	200
Type 6157BB.../BD...	$^\circ\text{C}$	300
Melt (at the front of the sensor)	$^\circ\text{C}$	$< 450$
Connector	$^\circ\text{C}$	0 ... 200*
Insulation resistance		
at $20 \text{ }^\circ\text{C}$	$\Omega$	$> 10^{13}$
at $200 \text{ }^\circ\text{C}$	$\Omega$	$> 10^{12}$
at $300 \text{ }^\circ\text{C}$	$\Omega$	$> 10^{10}$

\* During machine down time the mold temperature may rise up to  $240 \text{ }^\circ\text{C}$ , without causing any damage to the sensor. Note that measuring errors may temporarily result.



**Pressure Sensor Type 6157BA... and Type 6157BC...**



Sensor including an exchangeable high temperature cable with a connector for operating temperatures up to 200 °C.

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.

**Special Versions**

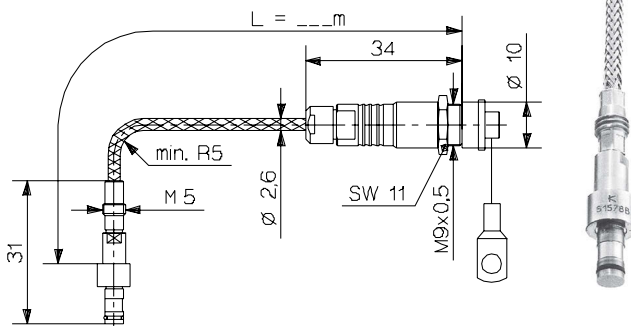
Coated front (abrasion protection)

- Type 6157BA... with coated front: Type 6157BC...
- Type 6157BB... with coated front: Type 6157BD...

**Installation**

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

**Pressure Sensor Type 6157BB... and Type 6157BD...**



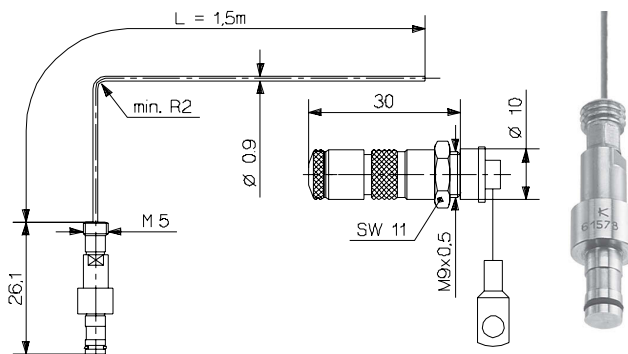
Sensor including an exchangeable steel-braided thermoset plastic cable (Polyimide) with connector for operating temperatures up to 300 °C (Connector 200 °C).

The sensor front forms part of the cavity wall. The sensor should therefore be adapted 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.

The single-wire cable must be installed completely in the mold. This connector is fitted in the mounting plate and this secured in a recess in the mold. The identification plate should be fixed nearby, indicating the type of sensor and its sensitivity.

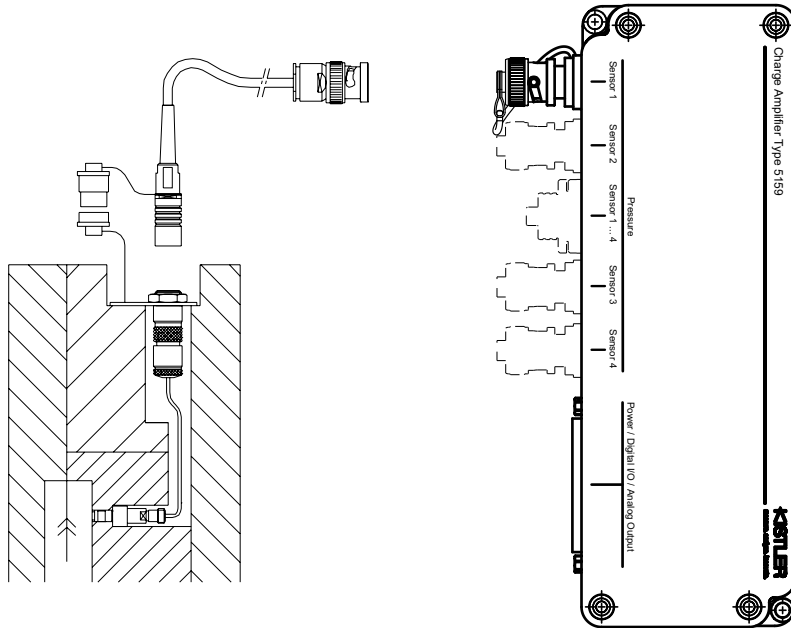
**Pressure Sensor Type 6157BAE and Type 6157BCE with Cut-and-Grip-Connector**



Alternative version of the sensor with single-wire technique for simplified and flexible installation in the mold. The sensor Type 6157B...E is equipped with a single-wire cable with a

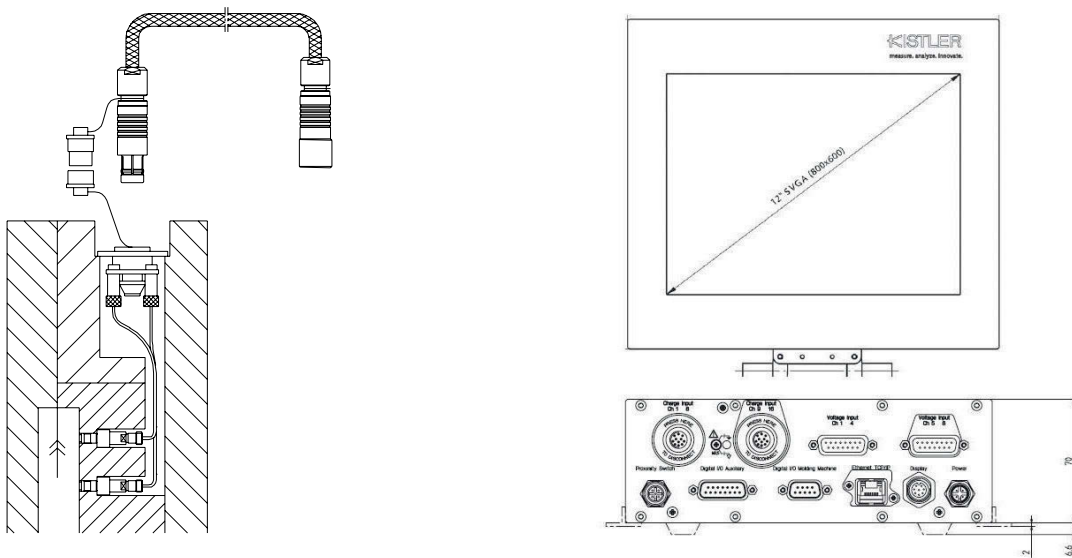
6157B\_000-030e-10.14

**Cable and Amplifier for Measuring Chain with Sensor Type 6157B...**



<b>Cable Type 1667B... (BNC Connector)</b>
Type 5159A

Fig. 1: Sensor Type 6157B... with Charge Amplifier Typ 5159A



<b>4-Channel Cable Type 1995A... to Connector Type 1708..</b>	<b>8-Channel Cable Type 1997A... on Connector Type 1710...</b>
Type 2869B0xx	Type 2869B2xx
Type 2869B1xx	Type 2869B3xx

Fig. 2: Sensor Type 6157B... with Monitoring System CoMo Injection Typ 2869B...

6157B\_000-030e-10.14

**Installation Examples**

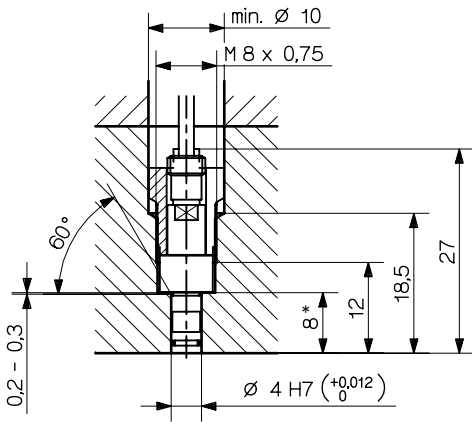


Fig. 3: Installation with mounting nut Type 6457  
\* Adjust length

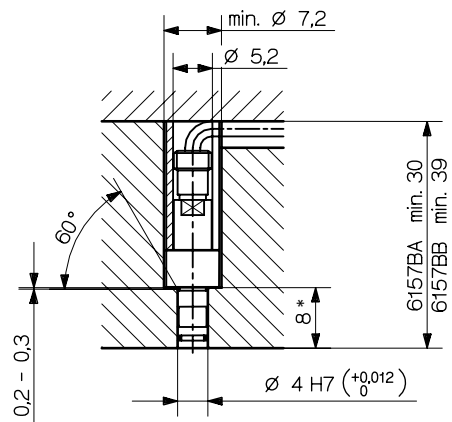


Fig. 4: Installation with spacer sleeve Type 6459  
\* Adjust length

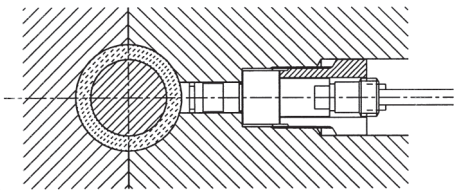


Fig. 5: Sensor with machined front (max. 0,5 mm)

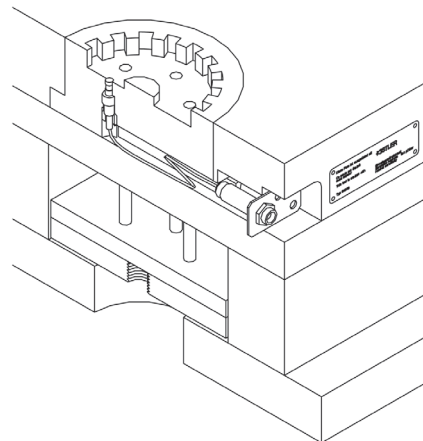


Fig. 6: Sensor, cable, mounting plate (Mat. No. 3.520.328) and identification label (Mat. No. 3.520.899)

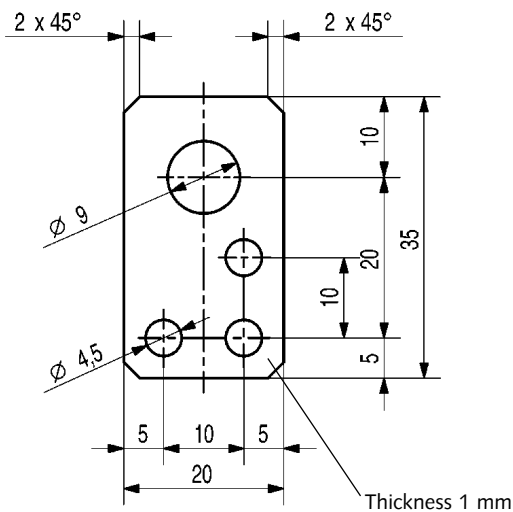


Fig. 7: Mounting plate (Mat. No. 3.520.328)

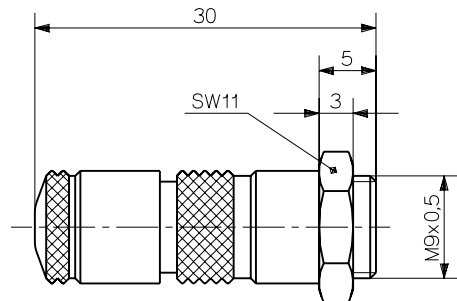


Fig. 8: Single-wire-Fischer-connector Type 1839

6157B\_000-030e-10.14

**Accessories Included**

	<b>Mat. No./Type</b>
• Mounting nut	6457
• Mounting plate (for sensor with cable only)	3.520.328
• Identification label	3.520.899
• Connector (for single-wire technique only) Type 6157BCE and Type 6157BAE)	1839
• O-ring, diameter 2,5x0,65 mm, (only for Type 6157BA...)	1100A57
• O-ring, diameter 2,5x0,65 mm, (only for Type 6157BB...)	1100A67

**Optional Accessories**

• O-ring tool for exchanging the cable	1364
• High temperature extension cable, Fluoropolymer, Fischer SE102A014 – BNC pos., Length 2 m	1667B2
Length 5 m	1667B5
• High temperature extension cable, sheathed in steel braiding, Fischer SE102A014 – TNC pos., Fluoropolymer, Length 2 m	1672B2
Length 5 m	1672B5
• Dummy sensor	6545
• Spacer sleeve (L = 70 mm)	6459
• 4-channel connector for Type 6157B...G and G1	1708...
• 8-channel connector for Type 6157B...G and G1	1710...
• Contact elements 1-channel for single-wire sensor only	1712A0
• Contact elements 4-channel for single-wire sensor only	1714A0
• Two-wire coaxial cable Fluoropolymer (Unisens green) 0 ... 200 °C as replacement cable for sensors Type 6157BA... and Type 6157BC...	1645C...

• Steel-braided two-wire-fluoropolymer cable 0 ... 200 °C as a wear resistant substitute for Type 1645C...	1963A...
• Steel-braided thermosetting plastic cable 0 ... 300 °C as replacement cable for sensors Type 6157BB... and Type 6157BD...	1955A...
• Single wire cable (Unisens green) with M4 connector, 1,5 m length	1666A2
• Single wire cable (Unisens green) with M4 connector, 5 m length	1666A4
• Crimped pin	65003747
• Crimpset with tools	1381A0

**Checking Tools**

• Limit plug gage, diameter 4 mm, tolerance H75.210.162	
• Checking tool	7.110.300

**Mounting Accessories**

	<b>Type</b>
• Extraction tool	1315A
• Mounting piece for connector	1401
• Mounting wrench	1383
• Extraction tool for Type 6157BB/BD...	1362A
• Dismounting cable auxiliary tool (incl. fork wrench SW4/SW5 5.210.164)	1300A32

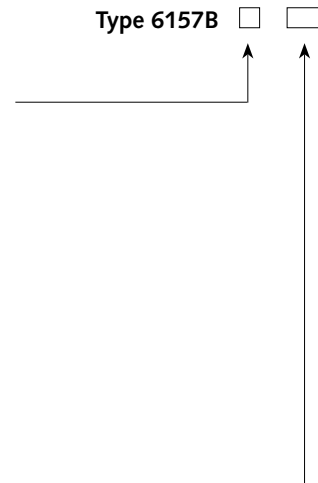
## Ordering Key

### Sensor

Up to 200 °C	<b>A</b>
Up to 300 °C	<b>B</b>
Up to 200 °C, sensor front coated	<b>C</b>
Up to 300 °C, sensor front coated	<b>D</b>

### Cable

Coaxial cable with special lengths, specify L in m ( $L_{\min} = 0,1$ m/ $L_{\max} = 5$ m, standard lengths 0,2/0,4/0,6/ 0,8/1,2 m, Type 6157BB... and Type 6157BD... standard only 0,4 m)	<b>sp</b>
With single-wire-cable available only for Type 6157BA... and Type 6157BC... (L = 1,5 m)	<b>E</b>
With single-wire-cable available only for Type 6157BA... and Type 6157BC... (L = 5 m)	<b>E1</b>
Type 6157BAE or 6157BCE (L = 1,5 m) without connector	<b>G</b>
Type 6157BAE1 or 6157BCE1 (L = 5 m) without connector	<b>G1</b>
<b>For Contact Elements Types 1712A... and 1714A...</b> (only for Types 6157BA... and 6157BC...)	
Sensor with single-wire-cable and crimped pin (Mat. No. 65003747). Cable with special lengths. Indicate L in m. $L_{\min} = 0,04$ m/ $L_{\max} = 1,5$ m)	<b>Zsp</b>



# 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.

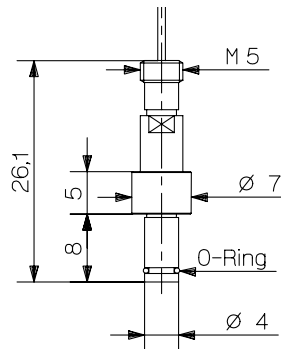
The electrical charge produced by the sensor ( $\text{pC} = \text{picocoulomb}$ ) is converted by the Kistler charge amplifier into a proportional voltage of 0 ... 10 V. The length of the sensor cable has no influence.

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

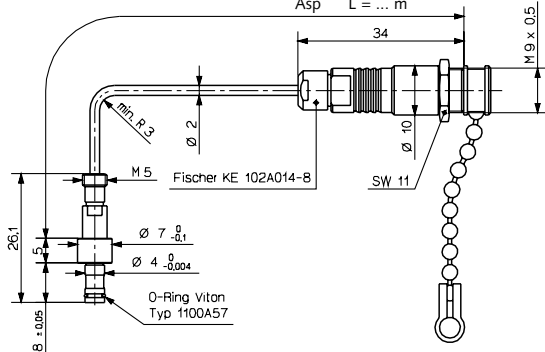
Range	bar	0 ... 200
Overload	bar	500
Sensitivity	$\text{pC}/\text{bar}$	$\approx -16,5$
Linearity, all ranges	% FSO	$\leq \pm 1$
Natural frequency	kHz	$\approx 150$
Operating temperature range		
Mold (sensor, cable, connector)	$^{\circ}\text{C}$	0 ... 200*
Melt (at front of sensor)	$^{\circ}\text{C}$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

**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.

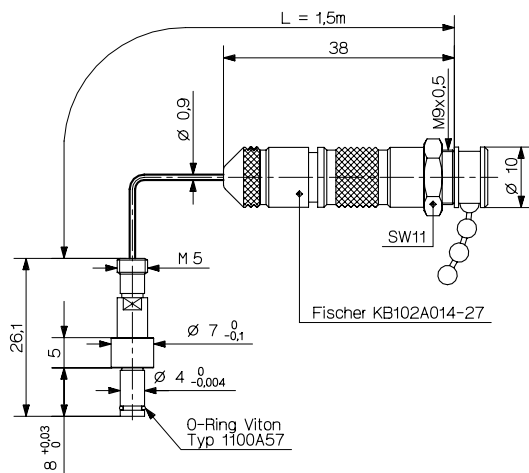
If possible affix the connector to a protected part of the mold with the mounting plate (Art. No. 3.520.328) supplied.

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.

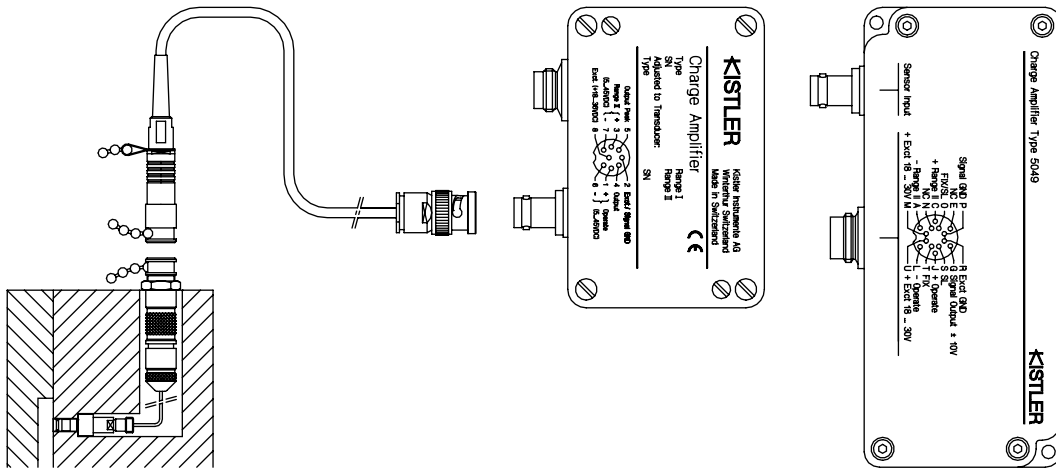
**Pressure sensor Type 6167AE**



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.

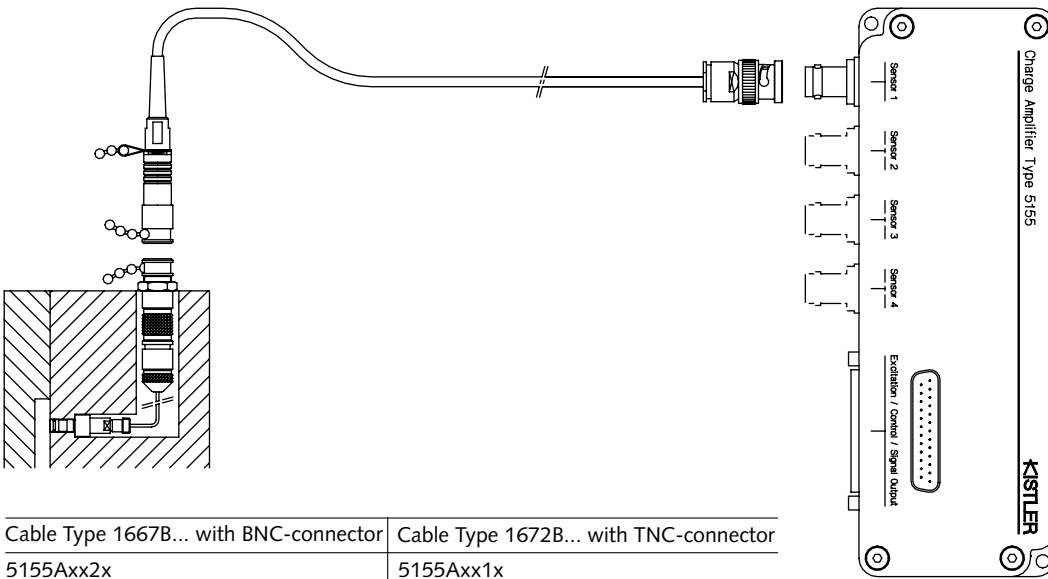
6167A\_000-033e-10.04

**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)

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**Installation Examples**

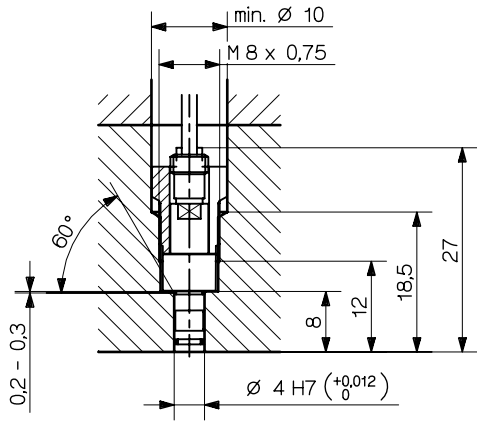


Fig. 1: Installation with mounting nut (Type 6457)

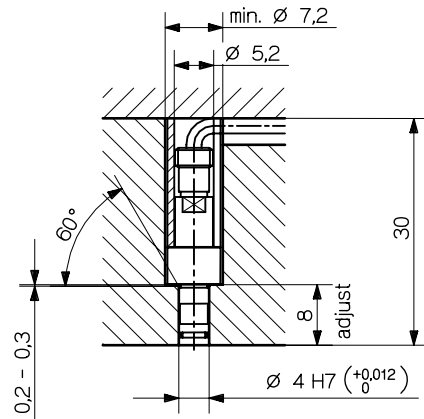


Fig. 2: Installation with spacer sleeve (Type 6459)

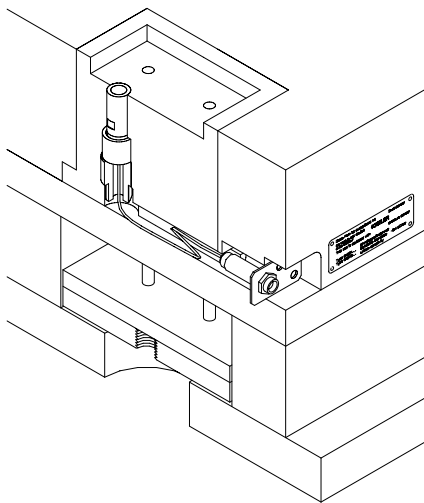


Fig. 3: Sensor, cable, mounting plate (Art. No. 3.520.328) and identification label (Art. No. 3.520.842)

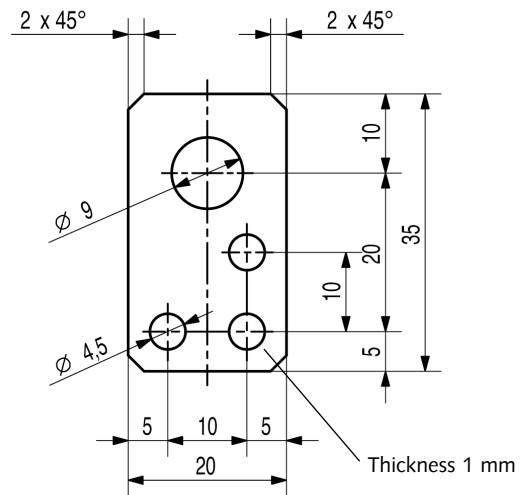


Fig. 4: Mounting plate (Art. No. 3.520.328)

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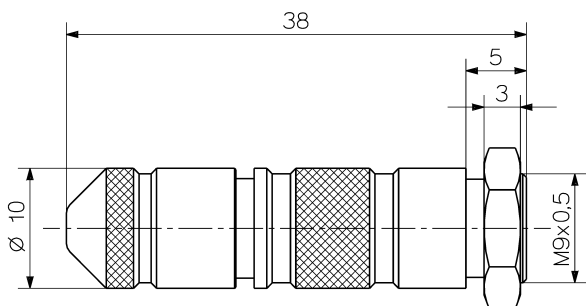


Fig. 5: Connector (Type 1839)

### Accessories Included

	Art. No.
• Mounting nut	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

	Type
• High temperature extension cable sheathed in steel braiding, Fischer SE102A014 – TNC pos., Length 2 m	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

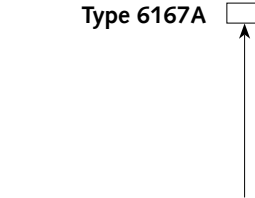
	Type
• Socket wrench	1383
• Extraction tool	1315A
• O-ring tool for exchanging the cable	1364

### 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



# Mold Cavity Pressure Sensor

## Unisens® with Front $\varnothing 6$ mm

Type 6152A...

Patent No. US 6,212,963

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

- 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 sensor Type 6152AE consists of the Unisens quartz sensor for mold cavity pressure Type 6157BE with exchangeable cable, fitted in a rugged adapter. The sensor Type 6157BE with 4 mm front diameter comes flush with the adapter front with an annular gap of  $<10 \mu\text{m}$  and measures the pressure directly.

The pressure acts over the entire front of the sensor and is transmitted to the quartz measuring element, which produces a proportional electric charge ( $\text{pC} = \text{Picocoloumb}$ ). This is converted into a voltage  $0 \dots 10 \text{ V}$  in the amplifier and is then available as an amplifier output.

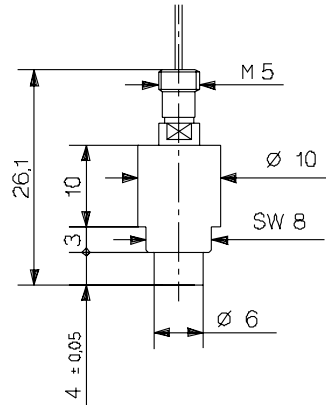
All parts of the sensor are corrosion-resistant. The exchangeable cable is screwed to the sensor with a tight seal. The connector is self-locking and splash-proof.

For multi cavity applications the sensor Types 6152AA... and 6152AC... are used without the single-wire connector Typ 1839. For 4 channel applications the sensor Type 6152A... is mounted with the Multi-Channel Connector Type 1708... and for 8 channel applications with the Multi-Channel Connector Type 1710... .

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

### Application

This diaphragm-free sensor measures mold cavity pressures up to 2 000 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 6152ACE/ADE with a coated front.

With low viscosity melts (e.g. thermosets, SMC/BMC, IC sheaths), the silicone-filled Types 6152AAAE/ACAE must be used.

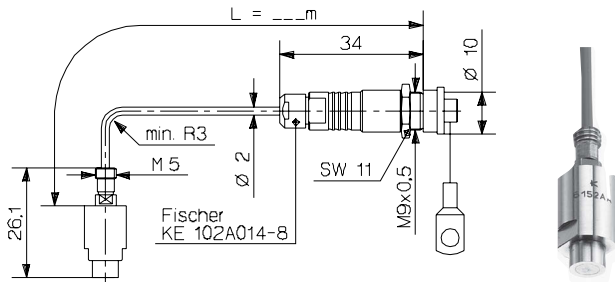
### Technical Data

Range	bar	0 ... 2000
Overload	bar	2500
Uniform sensitivity	pC/bar	-9,4
Linearity, all ranges	% FSO	$\leq \pm 1$
Operating temperature range		
Mold (Sensor, Cable)		
6152AA.../A...E/AA.../AC...	°C	200
6152AB.../AD...	°C	300
Melt (at front of sensor)	°C	$< 450$
Connector	°C	0 ... 200*
Insulation resistance		
at 20 °C	$\Omega$	$> 10^{13}$
at 200 °C	$\Omega$	$> 10^{12}$

\* During machine down time, the mold temperature may rise to 240 °C without damaging the sensor; however, this may lead to measuring errors.

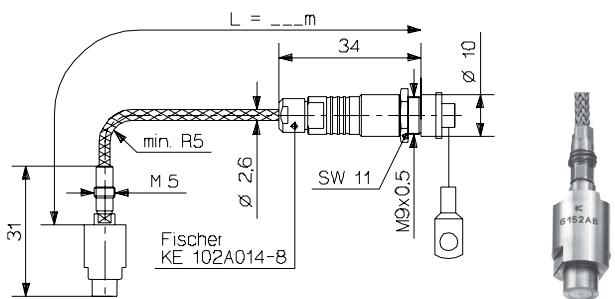
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**Pressure Sensor Type 6152AA.../AC...**



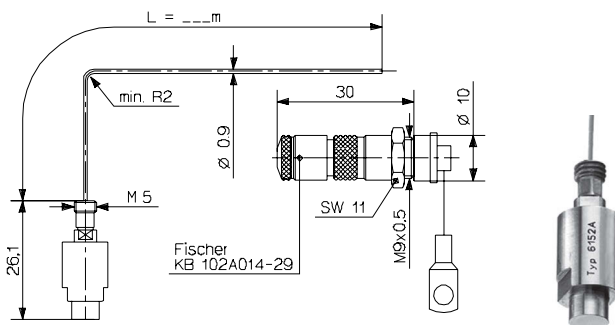
Sensor with coaxial cable for temperature up to 200 °C.

**Pressure Sensor Type 6152AB.../AD...**



Special version of the sensor Type 6152AE with extended operating temperature range up to 300 °C. This sensor is suitable for special materials. Exchangeable steel-braided polyamide cable (Kapton) with connector.

**Pressure Sensor Type 6152A...E**



Sensor using single-wire technique for easy installation. The sensor Type 6152AEE 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.

The following sensors with single-wire technique are available:

Types 6152AAE, 6152AAAE, 6152ACE and 6152ACAE

**Special versions**

Coated front (abrasion protection)

- Type 6152AAE with coated front: Type 6152ACE
- Type 6152ABE with coated front: Type 6152ADE

Silicone-filled gap

(not possible with Types 6152ABE and 6152ADE)

- Type 6152AAE gap filled with silicone: Type 6152AAAE
- Type 6152ACE gap filled with silicone: Type 6152ACAE

**Mounting**

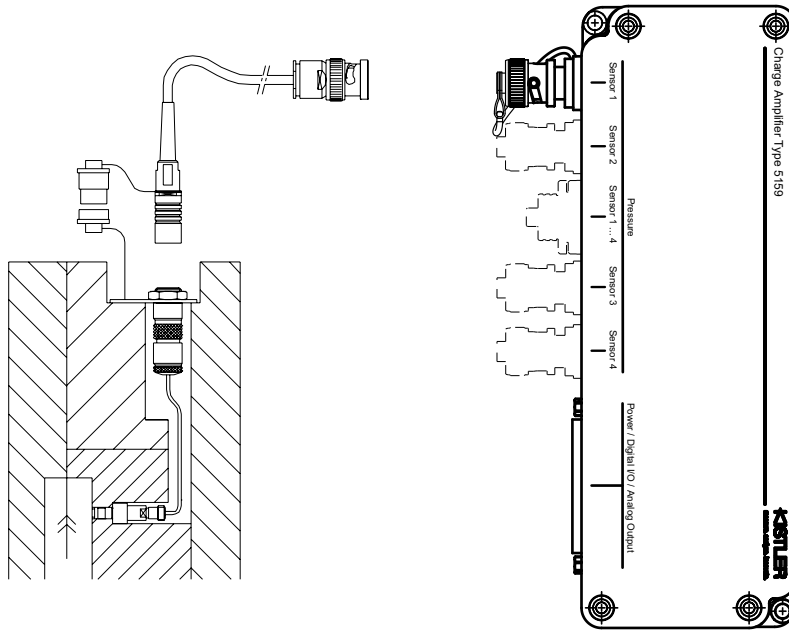
The sensor is normally fixed in the mounting bore with the mounting nut (Type 6453), but a spacer sleeve (Type 6459) can also be used.

The sensor front forms part of the cavity wall. The sensor must therefore be adapted so that its front comes exactly flush and leaves no impression on the molded part. The front can be further machined up to 0,5 mm (except with a coated front!). Full details may be found in the operating instructions.

The sensor is center aligned in the 6 H7 bore.

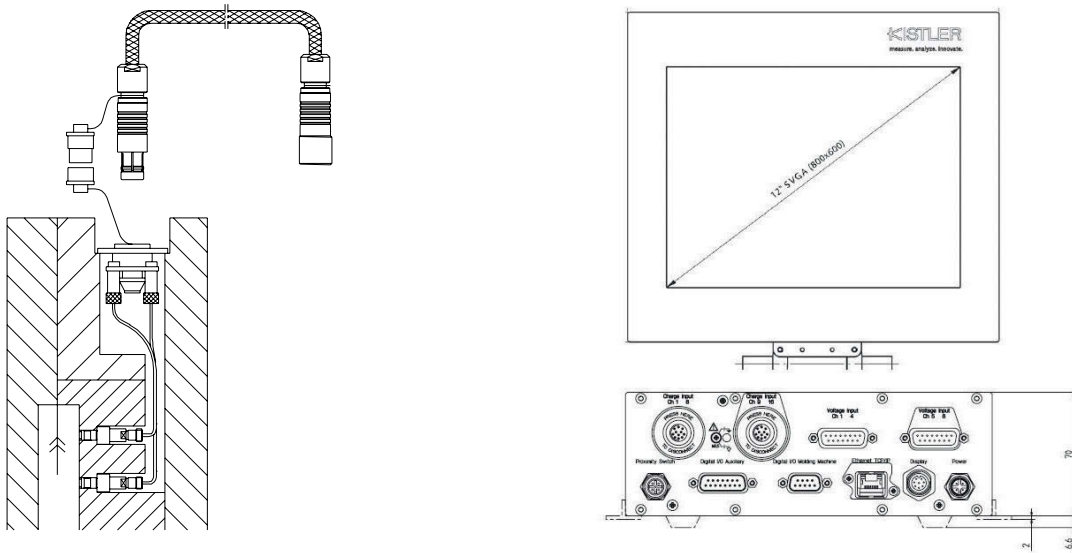
6152A\_000-028e-10.14

**Cable and Amplifier for Measuring Chain with Sensor Type 6152A...**



<b>Cable Type 1667B... (BNC Connector)</b>
Type 5159A

Fig. 1: Sensor Type 6152A... with Charge Amplifier Typ 5159A



<b>4-Channel Cable Type 1995A... to Connector Type 1708</b>	<b>8-Channel Cable Type 1997A... on Connector Type 1710</b>
Type 2869B0xx	Type 2869B2xx
Type 2869B1xx	Type 2869B3xx

Fig. 2: Sensor Type 6152A... with Monitoring System CoMo® Injection Typ 2869B...

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**Installation Examples**

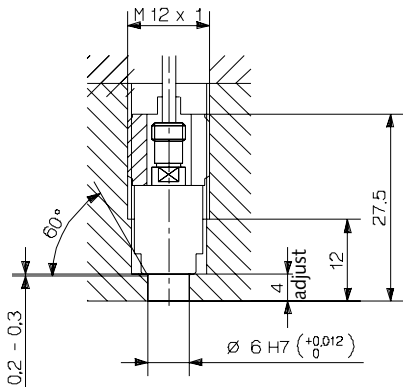


Fig. 3: Installation with mounting nut Type 6453

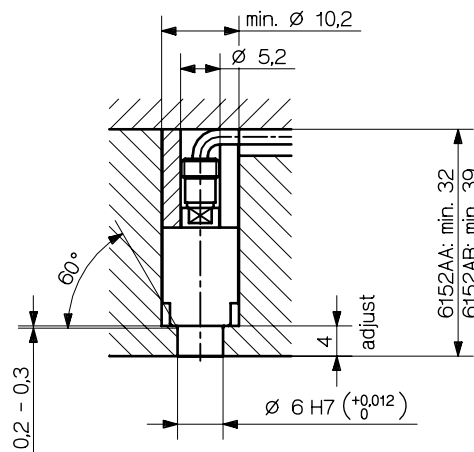


Fig. 4: Installation with spacer sleeve Type 6462

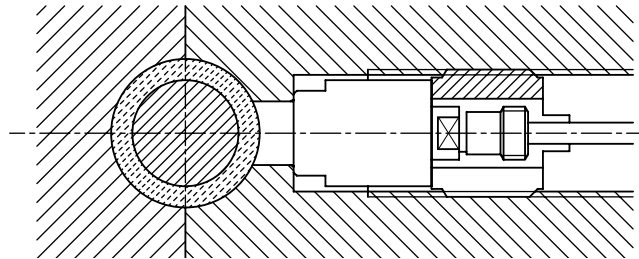


Fig. 6: Sensor with machined front  
(Types 6152AA... and 6152AB... only)

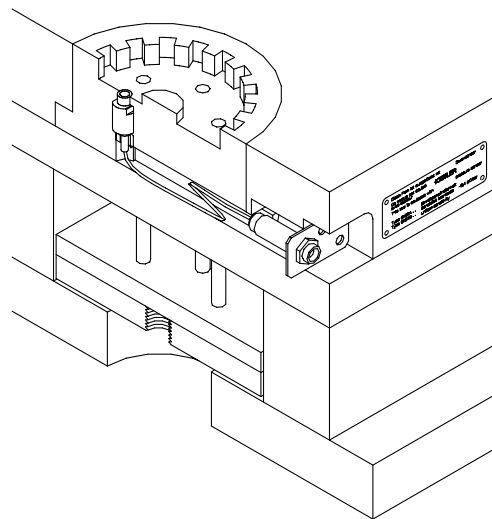


Fig. 7: Sensor, cable, mounting plate (Art. No. 3.520.328) and identification label (Art. No. 3.520.899)

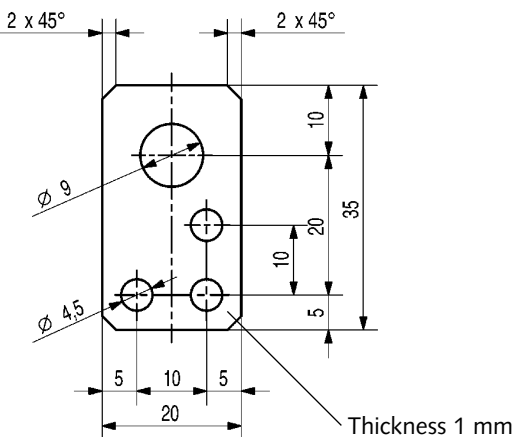


Fig. 5: Mounting plate (Art. No. 3.520.328)

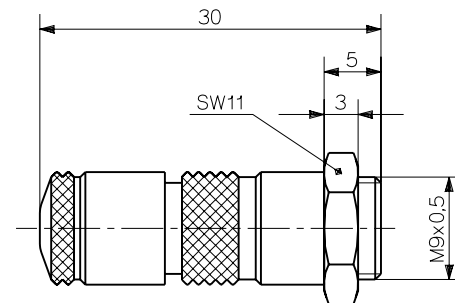


Fig. 8: Connector (Type 1839)

6152A\_000-028e-10.14

### Accessories Included

	Art. No./Type
• Mounting nut	6453
• Mounting plate (for sensor with cable only)	3.520.328
• identification label	3.520.899
• 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)	1666A1
• Single-wire cable, with the length of 5 m (ready installed with sensor, for single-wire technique only)	1666A3

### Optional Accessories

	Art. No./Type
• High temperature extension cable Fluoro- polymer, Fischer SE102A014 – BNC pos., Length 2 m	1667B2
Length 5 m	1667B5

• High temperature extension cable Fluoro- polymer, Fischer SE102A014 – TNC pos., Length 2 m	1672B2
Length 5 m	1672B5
• Spacer sleeve	6462
• 4 channel connector for Type 6152A...G and G1	1708
• 8 channel connector for Type 6152A...G and G1	1710
• Dummy sensor	6552
• O-ring, ø2,5x0,65 mm, (for Type 6152AAE only)	1100A57
• O-ring, ø2,5x0,65 mm, (for Type 6152ABE only)	1100A67

### Mounting Accessories

	Type
• Socket wrench	1383
• Extraction tool	1315A
• Key for mounting nut	1352
• Tap M 12x1	1355
• Mounting piece for connector	1401

### Ordering Key

#### Sensor

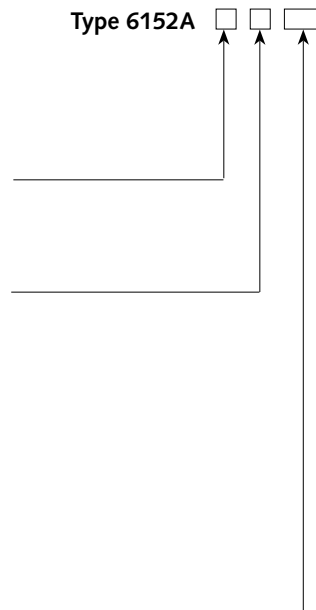
up to 200 °C	<b>A</b>
up to 300 °C	<b>B</b>
up to 200 °C, sensor front coated	<b>C</b>
up to 300 °C, sensor front coated	<b>D</b>

Gap between sensor adapter filled with Silicone (only for Types 6152AA... and 6152AC...)	<b>A</b>
---	----------

#### Cable

Coaxial cable with special lengths, specify L in m (L <sub>min</sub> = 0,1 m / L <sub>max</sub> = 5 m, standard lengths 0,2/0,4/0,6/ 0,8/1,2 m, Type 6152AB... and Type 6152AD... standard length only 0,4 m)	<b>sp</b>
with single-wire-cable available only for Type 6152AA... and Type 6152AC... (L = 1,5 m)	<b>E</b>
with single-wire-cable available only for Type 6152AA... and Type 6152AC... (L = 5 m)	<b>E1</b>
Type 6152AAE or 6152ACE (L = 1,5 m) without connector	<b>G</b>
Type 6152AAE1 or 6152ACE1 (L = 5 m) without connector	<b>G1</b>

Type 6152A



# Mold Cavity Pressure Sensor

Type 6162AA...

## for Low-Viscosity Crosslinking Molding Compounds with $\varnothing 6$ mm Front

Sensor for cavity pressures up to 200 bar during the processing and injection molding low-viscosity plastics and resins.

- Suitable for industrial use with conventional and high-pressure RTM, LSRs and SMCs
- Sensitive diaphragm sensor welded into sleeve
- Interchangeable cable

### Description

The sensor Type 6162A... consists of a sensitive  $\varnothing 4$  mm diaphragm design welded into a robust  $\varnothing 6$  mm sleeve. The welded ring gap prevents ingress of low-viscosity resins and falsification of the sensor signal by a force shunt. Interchangeable cables allow a choice of cable types and/or repairs.

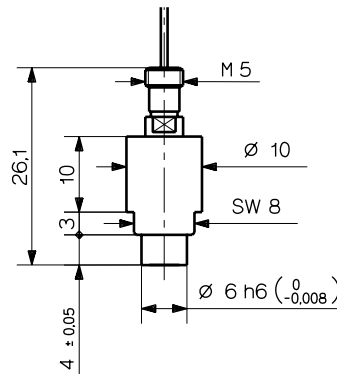
The pressure acts over the diaphragm front of the sensor and is transmitted to the measuring element, which produces a proportional electric charge ( $pC = \text{Picocoloumb}$ ). This is converted into a voltage of 0 ... 10 V in the amplifier and is then available as an amplifier output.

The sensor is available in two versions for different types of cable. The coaxial version uses high-insulation cables that do not necessarily have to be laid in the mold. The practical single-wire alternative is based on a cable that can be cut to any length. The cut-and-grip connector can be connected during mounting in the mold. This makes both installation and servicing easier.

### Applications

The robust sensor measures mold cavity pressures up to 200 bar during processing of crosslinking molding compounds in various low-pressure methods for lightweight plastic construction in the automobile and aerospace industries. It is primarily suitable for industrial monitoring, control and regulation of conventional and high-pressure resin transfer molding (RTM) and sheet molding compound (SMC) methods involving pressures up to 150 bar.

Other applications include processing of low-viscosity plastics such as silicones (LSRs) and elastomers in thick-walled parts.



The welded front prevents ingress of low-viscosity plastics in order to allow recording of minute changes in pressure. This is particularly important in long production runs, which require accurate monitoring.

### Technical Data

Range	bar	0 ... 200
Overload	bar	300
Sensitivity	pC/bar	≈-18,5
Linearity, all ranges	% FSO	≤±1
Operating temperature range		
Mold (Sensor, Cable)		
6162AA...	°C	200
Melt (at front of 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 to 240 °C without damaging the sensor; however, this may lead to measuring errors.

6162AA\_000-888e-02.11

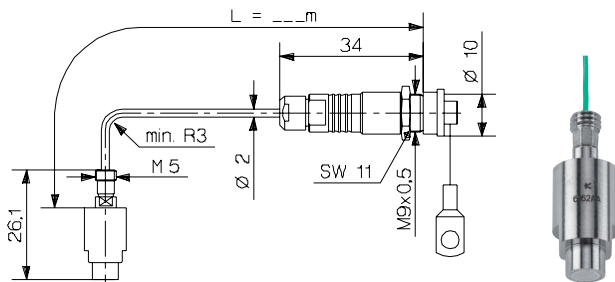
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**Pressure Sensor Type 6162AA...**



Sensor with coaxial cable

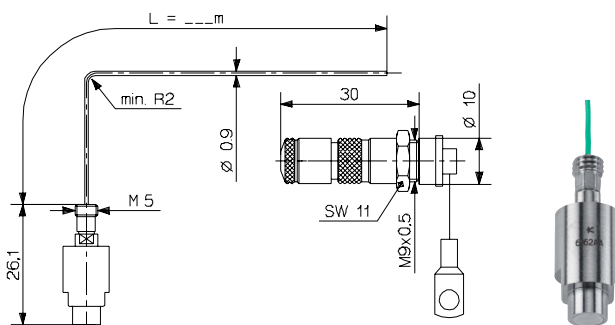
**Mounting**

The sensor is normally fixed in the mounting bore (Fig. 3) with the mounting nut (Type 6453), but a spacer sleeve (Type 6459) can also be used (Fig. 4).

The sensor front forms part of the cavity wall. The hole must therefore be adapted so that the sensor front comes exactly flush and leaves no impression on the molded part. The front cannot be re-machined, as this would damage the diaphragm.

The sensor is center aligned in the 6 H7 bore.

**Pressure Sensor Type 6162A...E**



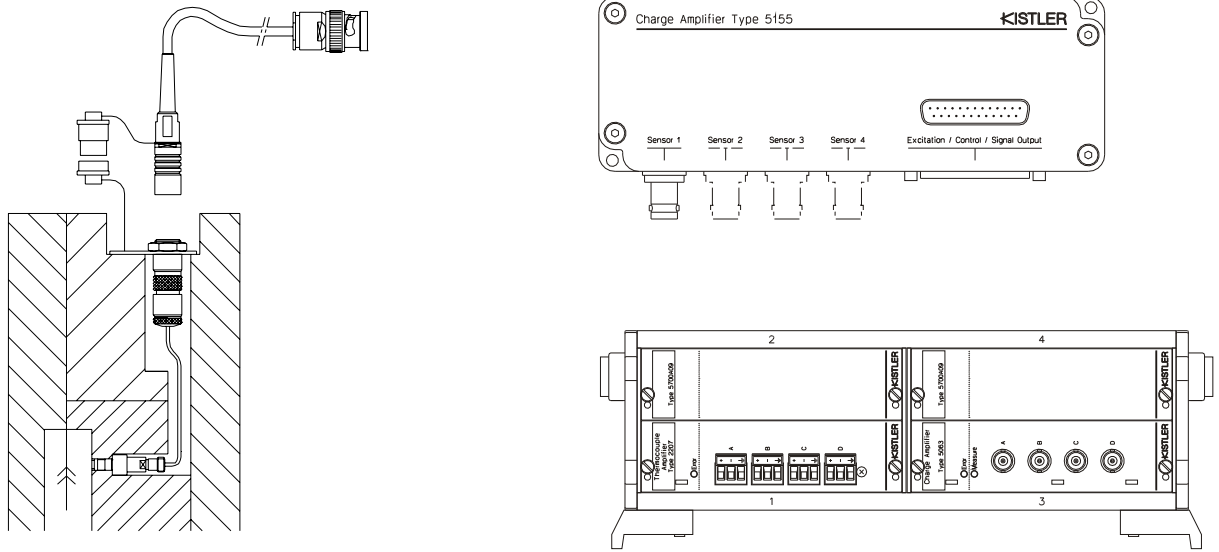
Sensor uses single-wire technique for easy installation. The sensor Type 6162A...E is provided with a single-wire cable with a very small cross-sectional area and can be installed flexibly in the injection mold. The single-wire cable Type 1666A... is interchangeable and can be cut to length as required. 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, for Types 6162A...E... a connector is included which is self-locking and splash-proof.

The following sensors with single-wire technique are available:

Types 6162AAE... and 6162AAG... .

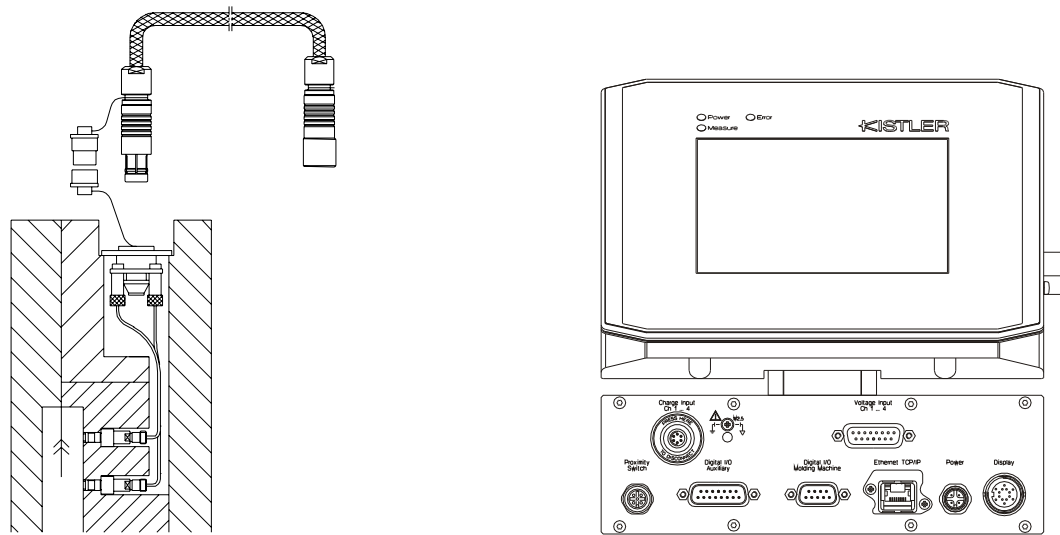
6162AA\_000-888e-02.11

**Cable and Amplifier for Measuring Chain with Sensor Type 6162AA...**



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.../2865B...	

Fig. 1: Sensor Type 6162AA... with Charge Amplifier Type 5155A... or Signal Conditioner Type 2859/2865...



4-Channel Cable Type 1995A... to Connector Type 1708A..	8-Channel Cable Type 1997A... on Connector Type 1710A...
Type 2869A0xx	Type 2869A2xx/2869B2xx
Type 2869A1xx/2869B1xx	Type 2869B3xx

Fig. 2: Sensor Type 6162AA... with Monitoring System CoMo Injection Type 2869...

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**Installation Examples**

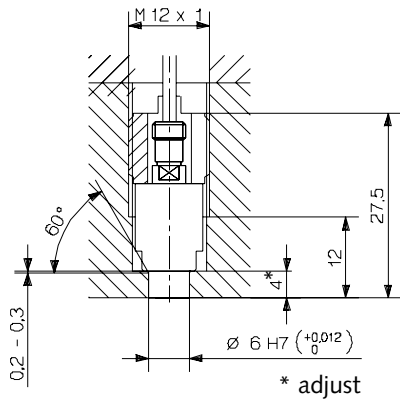


Fig. 3: Installation with mounting nut Type 6453

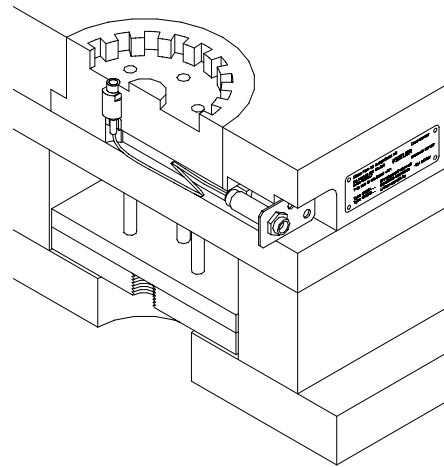


Fig. 6: Sensor, cable, mounting plate (Art. No. 3.520.328) and identification label (Art. No. 3.520.842)

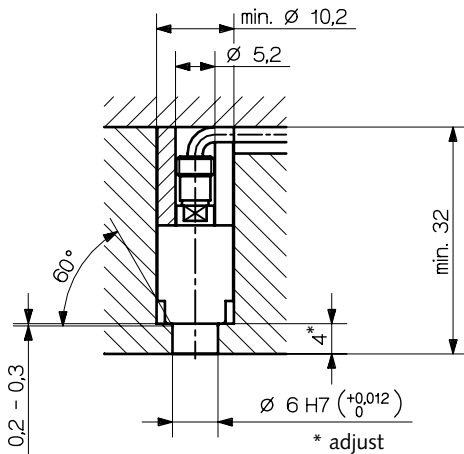


Fig. 4: Installation with spacer sleeve Type 6462

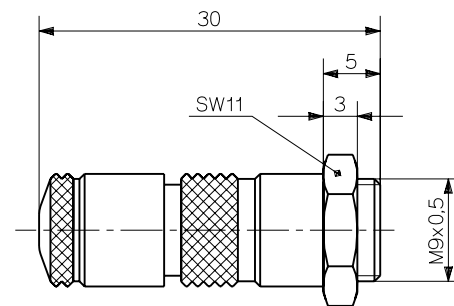


Fig. 7: Connector (Type 1839)

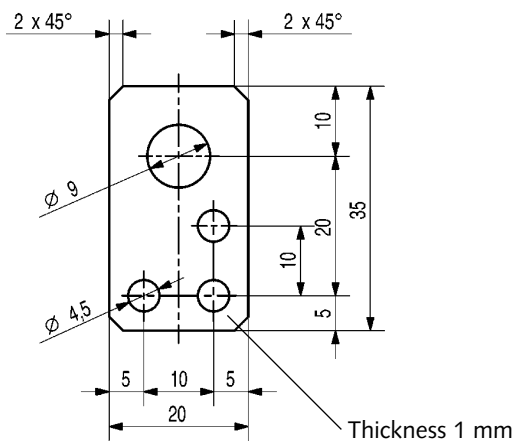


Fig. 5: Mounting plate (Art. No. 3.520.328)

6162AA\_000-888e-02.11

### Accessories Included

	Art. No./Type
• Mounting nut	6453
• Mounting plate (for sensor with cable only)	3.520.328
• identification label	3.520.842

### Sensor with coaxial cable

• High temperature extension cable (Type 6162AA 0,2/0,4/0,6/0,8 und sp)	1645C...
--	----------

### Sensor with single-wire cable

• Connector (for single-wire technique only)	1839
• Single-wire cable, with the length of 1,5 m (Types 6162A...E... and A...G...)	1666A2
• Single-wire cable, with the length of 5 m (Types 6162A...E... and A...G...)	1666A4

### Optional Accessories

	Art. No./Type
• High temperature extension cable Viton® Fischer SE102A014 – BNC pos., Length 2 m	1667B2
Length 5 m	1667B5

• High temperature extension cable Viton Fischer SE102A014 – TNC pos., Length 2 m	1672B2
Length 5 m	1672B5
• Spacer sleeve	6462
• 4 channel connector for Type 6162A...G and G1	1708A...
• 8 channel connector for Type 6162A...G and G1	1710A...
• Dummy sensor	6552

### Mounting Accessories

	Type
• Socket wrench	1383
• Extraction tool	1315A
• Tap M12x1	1355
• Mounting piece for connector (not for Types 6162AAE... and AAG...)	1401

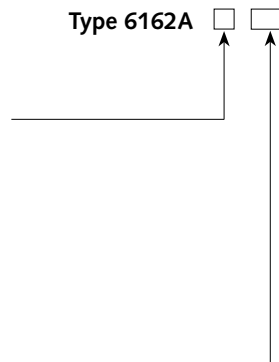
### Ordering Key

#### Sensor

up to 200 °C	<b>A</b>
--------------	----------

#### Cable

Coaxial cable, L in m	<b>0,2</b>
	<b>0,4</b>
	<b>0,6</b>
	<b>0,8</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>
with single-wire-cable (L = 1,5 m)	<b>E</b>
with single-wire-cable (L = 5 m)	<b>E1</b>
Type 6162AAE (L = 1,5 m), without connector	<b>G</b>
Type 6162AAE1 (L = 5 m), without connector	<b>G1</b>



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# Mold Cavity Pressure Sensor

Type 6163AA...

## for Low-Viscosity Thermosetting Materials and Rubbers with $\varnothing 6$ mm Front

Sensor for cavity pressures up to 1 000 bar during the pressing and injection molding of low-viscosity plastics and resins.

- Suitable for industrial use in compression molding and in processing of thermosetting materials and rubbers
- Sensitive diaphragm sensor welded into sleeve
- Interchangeable cable

### Description

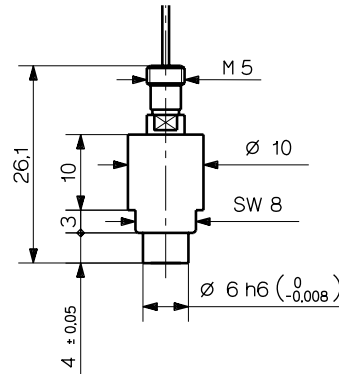
The sensor Type 6163A... consists of a sensitive  $\varnothing 4$  mm diaphragm design welded into a robust  $\varnothing 6$  mm sleeve. The welded ring gap prevents ingress of low-viscosity resins and falsification of the sensor signal by a force shunt. Interchangeable cables allow a choice of cable types and/or repairs.

The pressure acts over the diaphragm front of the sensor and is transmitted to the measuring element, which produces a proportional electric charge ( $pC = \text{Picocolomb}$ ). This is converted into a voltage of 0 ... 10 V in the amplifier and is then available as an amplifier output.

The sensor is available in two versions for different types of cable. The coaxial version uses high-insulation cables that do not necessarily have to be laid in the mold. The practical single-wire alternative is based on a cable that can be cut to any length. The cut-and-grip connector can be connected during mounting in the mold. This makes both installation and servicing easier.

### Applications

The robust sensor measures mold cavity pressures up to 1 000 bar during various methods of processing of crosslinking molding compounds. It is mainly suitable for industrial use in monitoring, controlling and regulating compression molding processes such as those used for thermosetting materials, bulk molding compounds, free-flowing resins (melamine) and vulcanizable rubber compounds. These processes give rise to cavity pressures between 200 and 1 000 bar.



The welded front prevents ingress of low-viscosity plastics in order to allow recording of minute changes in pressure. This is particularly important in long production runs, which require accurate monitoring.

### Technical Data

Range	bar	0 ... 1 000
Overload	bar	1 200
Sensitivity	pC/bar	≈-3,9
Linearity, all ranges	% FSO	≤±1
Operating temperature range		
Mold (Sensor, Cable)		
6163AA...	CC	200
Melt (at front of 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 to 240 °C without damaging the sensor; however, this may lead to measuring errors.

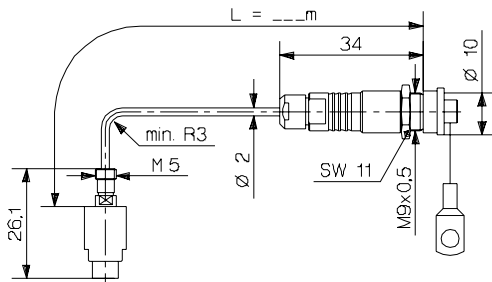
6163AA\_000-889e-02.11

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**Pressure Sensor Type 6163AA...**



Sensor with coaxial cable

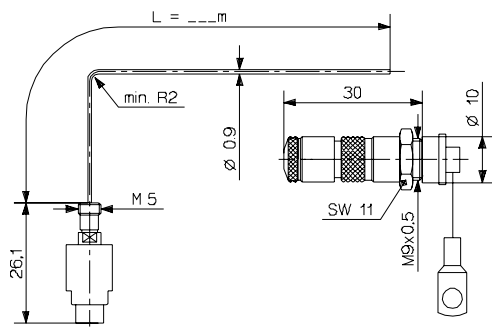
**Montage**

The sensor is normally fixed in the mounting bore (Fig. 3) with the mounting nut (Type 6453), but a spacer sleeve (Type 6459) can also be used (Fig. 4).

The sensor front forms part of the cavity wall. The hole must therefore be adapted so that the sensor front comes exactly flush and leaves no impression on the molded part. The front cannot be re-machined, as this would damage the diaphragm.

The sensor is center aligned in the  $\varnothing 6$  H7 bore.

**Pressure Sensor Type 6163A...E**



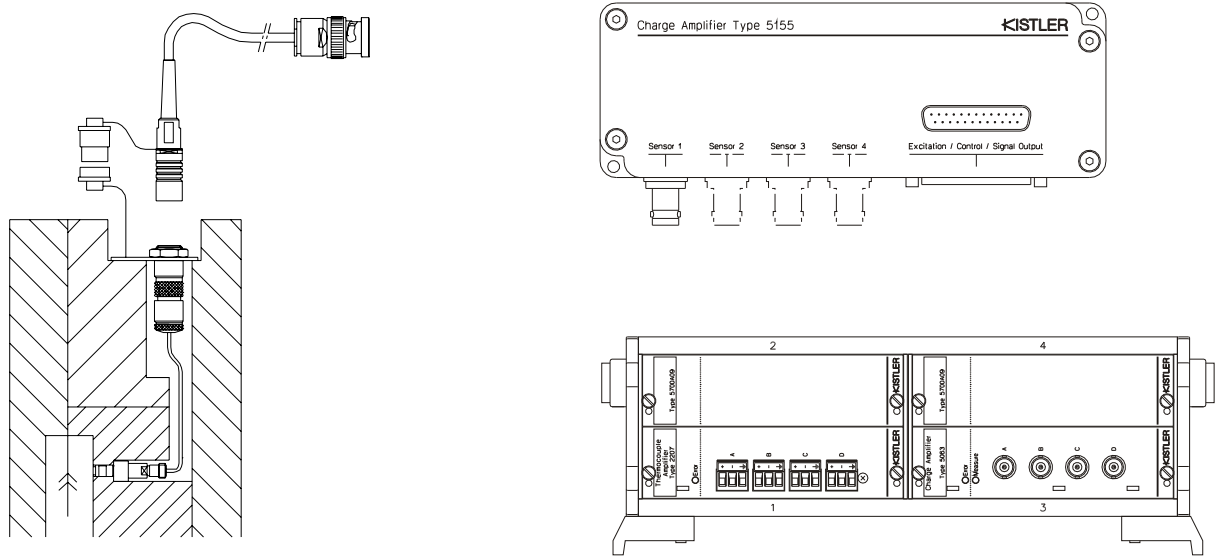
Sensor uses single-wire technique for easy installation. The sensor Type 6163A...E is provided with a single-wire cable with a very small cross-sectional area and can be installed flexibly in the injection mold. The single-wire cable Type 1666A... is interchangeable and can be cut to length as required. 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 for Types 6163A...E... which is self-locking and splash-proof.

The following sensors with single-wire technique are available:

Types 6163AAE... and 6163AAG... .

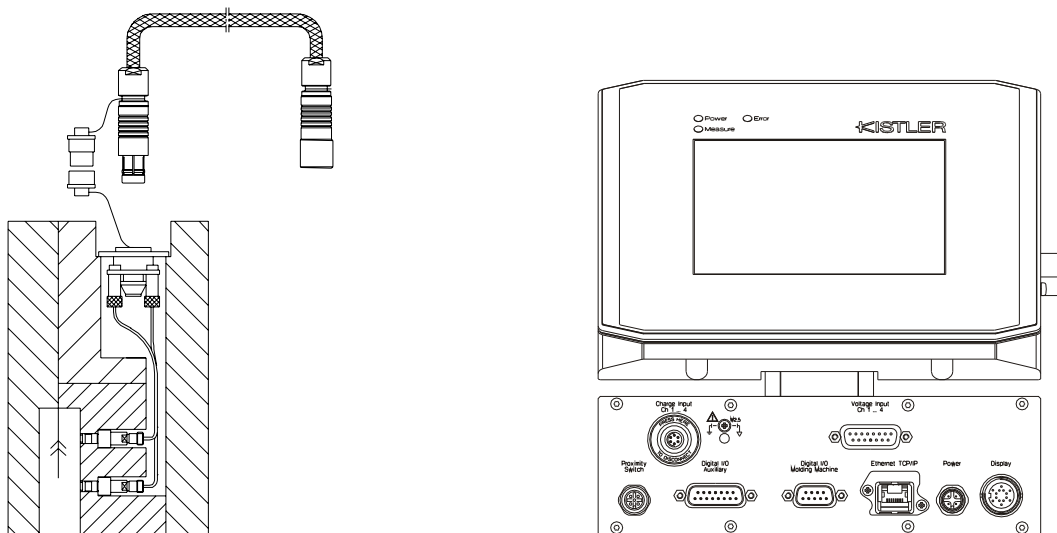
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**Cable and Amplifier for Measuring Chain with Sensor Type 6163AA...**



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.../2865B...	

Fig. 1: Sensor Type 6163AA... with Charge Amplifier Type 5155A... or Signal Conditioner Type 2859/2865...



4-Channel Cable Type 1995A... to Connector Type 1708A..	8-Channel Cable Type 1997A... on Connector Type 1710A...
Type 2869A0xx	Type 2869A2xx/2869B2xx
Type 2869A1xx/2869B1xx	Type 2869B3xx

Fig. 2: Sensor Type 6152A... with Monitoring System CoMo Injection Typ 2869...

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**Installation Examples**

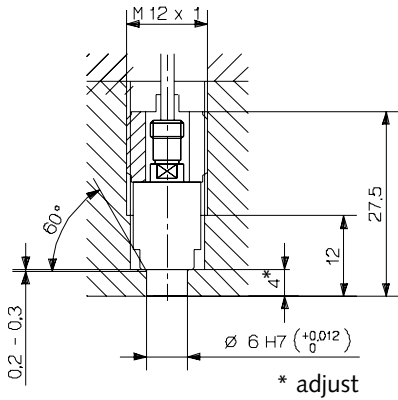


Fig. 3: Installation with mounting nut Type 6453

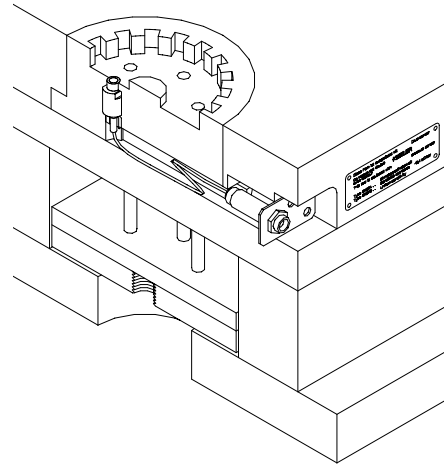


Fig. 6: Sensor, cable, mounting plate (Art. No. 3.520.328) and identification label (Art. No. 3.520.842)

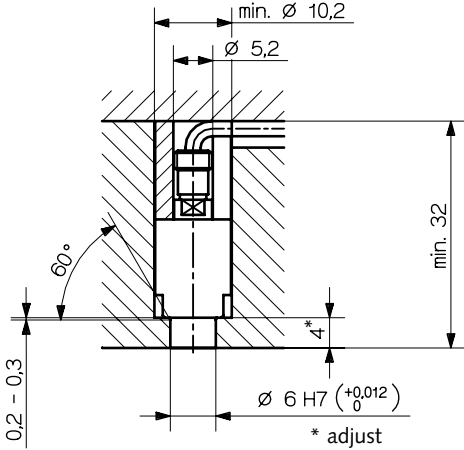


Fig. 4: Installation with spacer sleeve Type 6462

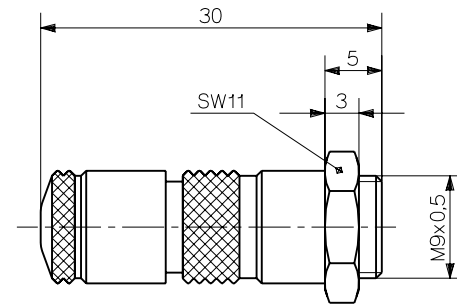


Fig. 6: Connector (Type 1839)

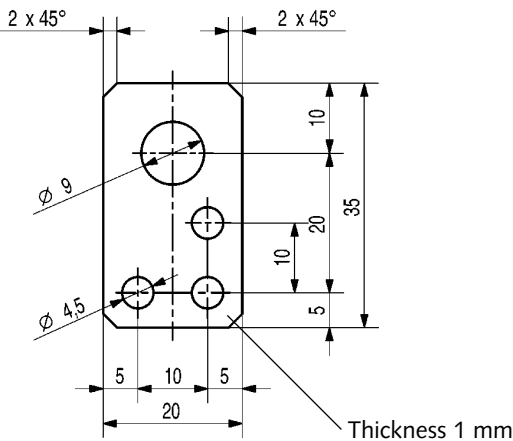


Fig. 5: Mounting plate (Art. No. 3.520.328)

6163AA\_000-889e-02.11



### Accessories Included

• Mounting nut	<b>Art. No./Type</b> 6453
• Mounting plate (for sensor with cable only)	3.520.328
• Identification label	3.520.842

### Sensor with coaxial cable

• High temperature connecting cable (Type 6163AA 0,2/0,4/0,6/0,8 and sp)	1645C...
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### Sensor with single-wire cable

• Connector (at Type 6163A...E...)	1839
• Single-wire cable, with the length of 1,5 m (Types 6163A...E... and A...G...)	1666A2
• Single-wire cable, with the length of 5 m (Types 6163A...E... and A...G...)	1666A4

### Optional Accessories

• High temperature extension cable Viton® Fischer SE102A014 – BNC pos., Length 2 m	<b>Art. No./Type</b> 1667B2
Length 5 m	1667B5

• High temperature extension cable Viton® Fischer SE102A014 – TNC pos., Length 2 m	1672B2
Length 5 m	1672B5
• Spacer sleeve	6462
• 4 channel connector (for Type 6163A...G and G1)	1708A...
• 8 channel connector (for Type 6163A...G and G1)	1710A...
• Dummy sensor	6552

### Mounting Accessories

• Socket wrench	<b>Type</b> 1383
• Extraction tool	1315A
• Tap M 12x1	1355
• Mounting piece for connector (not for Types 6163AAE... and AAG)	1401

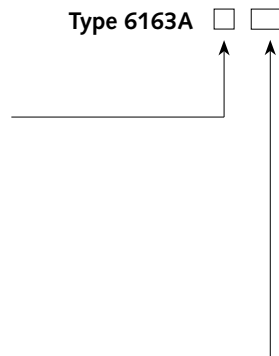
### Ordering Key

#### Sensor

up to 200 °C	<b>A</b>
--------------	----------

#### Cable

Coaxial cable, L in m	<b>0,2</b>
	<b>0,4</b>
	<b>0,6</b>
	<b>0,8</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>
with single-wire-cable (L = 1,5 m)	<b>E</b>
with single-wire-cable (L = 5 m)	<b>E1</b>
Type 6163AAE (L = 1,5 m), without connector	<b>G</b>
Type 6163AAE1 (L = 5 m), without connector	<b>G1</b>



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# Mold Cavity Pressure Sensor for RTM Method with $\varnothing 9$ mm Front

Typ 6161AA...

Sensor for mold cavity pressure up to 200 bar during the processing and injection molding of low-viscosity plastics and resins.

- Particularly suited to industrial use in HP-RTM tools
- Sensitive diaphragm sensor welded into cartridge
- Design with O-ring allows a vacuum to be created in the cavity. Integrated thread designed for straightforward mounting and removal
- Exchangeable cable

### Description

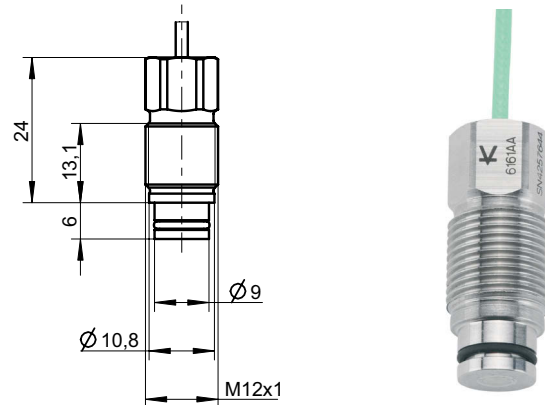
The Type 6161AA... sensor comprises a sensitive 4 mm diaphragm sensor welded into a robust 9 mm cartridge. The welded annular gap prevents penetration by low-viscosity resins and sensor signal distortion as the result of a force shunt. An O-ring ensures that a vacuum can be achieved inside the tool while preventing low-viscosity resin from entering the gap. Cables are exchangeable to facilitate repair.

The pressure acts directly on the front of the diaphragm and is in turn conveyed to the measuring element, which then emits an electric charge proportional to the pressure exerted. This is converted by an amplifier into a voltage ranging from 0 ... 10 V that is then present on the amplifier output.

### Application

The robust sensor measures mold cavity pressures of up to 200 bar while processing cross-linked molding compounds in various low-pressure processes for lightweight plastic constructions in automotive and aviation engineering. It is particularly well suited to industrial applications for monitoring, controlling and regulating RTM (Resin Transfer Molding), high-pressure RTM (HP-RTM) and SMC (Sheet Molding Compound) methods exhibiting pressures of up to 150 bar.

Additional applications include processing of low-viscosity plastics such as silicone (LSR) and elastomers in thick-walled parts.



The welded front prevents penetration by low-viscosity plastics and therefore enables detection of the slightest of pressure changes. This is extremely important in long production runs that require precision monitoring.

### Technical Data

Range	bar	0 ... 200
Overload	bar	300
Sensitivity	pC/bar	≈-18,5
Linearity, all ranges	% FSO	≤±1
Operating temperature range		
Tool (sensor, cable)		
Type 6161AA...	°C	200
Melt temperature (on front of sensor)	°C	<450
Connector	°C	0 ... 200*
Insulation resistance		
at 20 °C	TΩ	>10
at 200 °C	TΩ	>1

\* The tool temperature can reach 240 °C during machine malfunctions without risking sensor damage. However, measurement accuracy at this temperature cannot be guaranteed.

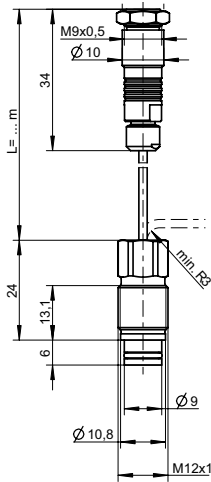
6161AA\_003-053e-04.13

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**Pressure Sensor Type 6161AA2 & SP**



**Mounting**

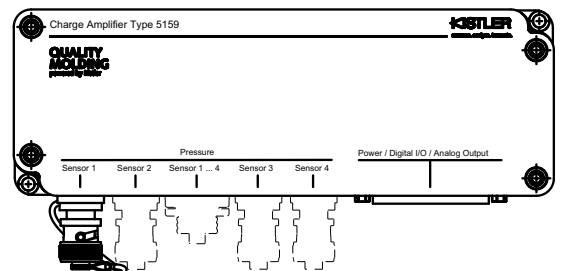
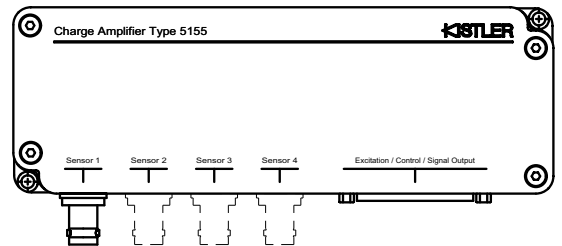
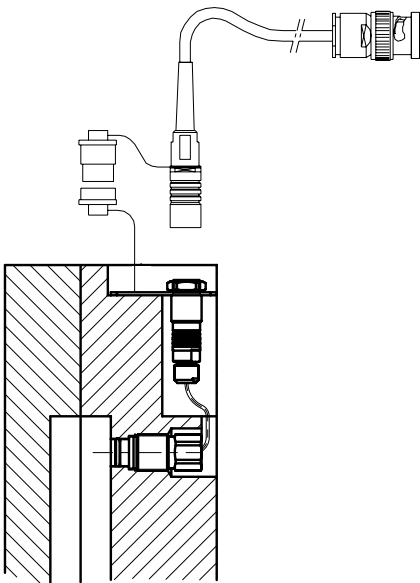
The sensor is screwed directly into the M12 internal thread of the mounting bore using an integral external thread. This also allows the safe dismantling of the sensor during tool servicing or cleaning work.

The sensor front forms part of the cavity wall. As a result the sensor must be fitted in such a way that its front forms a flush seal. No rework is permitted on the front owing to the risk of damage to the diaphragm.

The sensor is centered in the 9 H7 bore.

Fig. 1: Type 6161AA... with coaxial cable

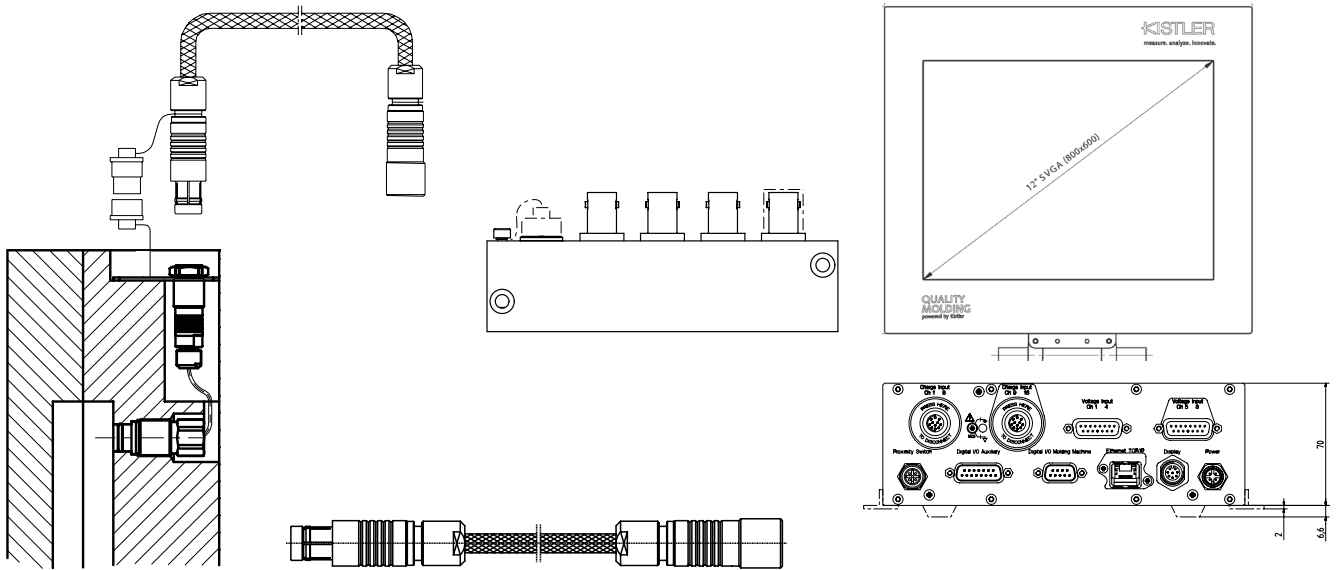
**Cable and Amplifier for Measuring Chains Using the Type 6161AA... Sensor**



- \_\_\_\_\_ Type 1667B... cable (BNC connector)
- \_\_\_\_\_ Type 5159A
- \_\_\_\_\_ Type 5155Axx2x/Axx4x/Axx8x

Fig. 2: Type 6161AA... sensor with Type 5155A... or Type 5159A... charge amplifier

6161AA\_003-053e-04.13



Type 1667A... on Type 5415A1 adapter on Type 1995A...

Type 2869B0xx

Type 2869B1xx

Type 1667A... on Type 5415A2 adapter on Type 1997A...

Type 2869B2xx

Type 2869B3xx

Fig. 3: Type 6161AA... sensor with Type 2869B... CoMo Injection monitoring system

**Mounting Examples**

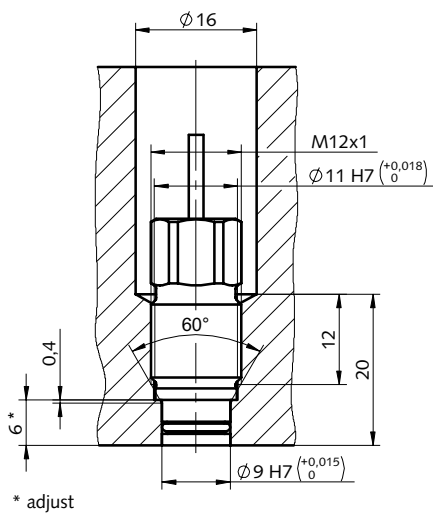


Fig. 4: Installation of Type 6161AA...

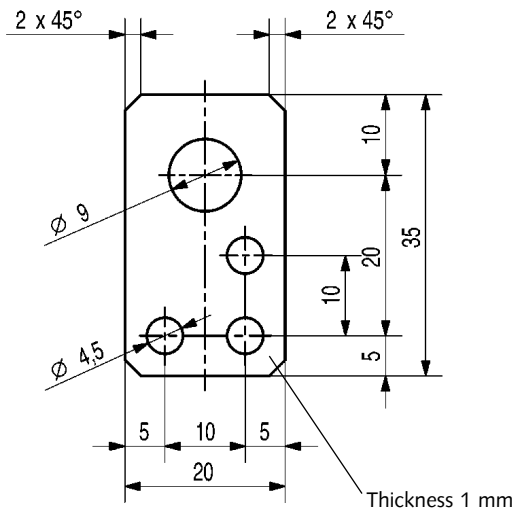


Fig. 5: Mounting plate (Mat. no. 65005208)

6161AA\_003-053e-04.13

<b>Included Accessories</b>	<b>Mat. No./Type</b>
• Mounting plate	65005208
• Identification plate	65005416
• High temperature connecting cable	1653A

<b>Optional Accessories</b>	<b>Type</b>
• Fluoroelastomer high temperature extension cable, Fischer SE102A014 – BNC pos., Length 2 m	1667B2
Length 5 m	1667B5
• O-ring (optional)	65007525
• Dummy sensor	6570

<b>Mounting Accessories</b>	<b>Type</b>
• Mounting tool L = 100 ... 800 mm, specify when ordering	1387sp
• M12x1 screw tap	1355
• Clamping piece for connector	1401
• Mounting tool for cable	1300A49

### Ordering Key

Type 6161AA

Coaxial cable L in m	<b>2</b>
Coaxial cable in special lengths, specify L in m (L <sub>min</sub> = 0,1 m / L <sub>max</sub> = 5 m)	<b>sp</b>

