

# Cavity pressure sensor

Type 6157C...

## Unisens with front $\varnothing 4$ mm

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 cavity pressure Type 6157C... 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.

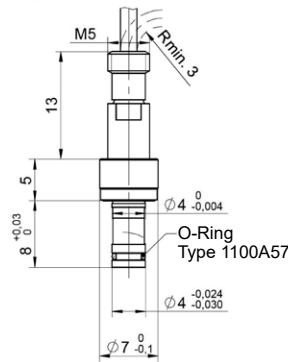
All parts of the sensor are corrosion-resistant. The exchangeable cable is screwed to the sensor with a tight seal. The connector is self-locking and splash-proof.

For multi cavity applications the sensor Type 6157C... is used without the single-wire connector Type 1839. For 4 channel applications the sensor Type 6157C... is mounted with the Multi-Channel Connector Type 1722A4... and for 8 channel applications with the Multi-Channel Connector Type 1722A8... .

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

### Application

This diaphragm-free sensor measures 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 and elastomers.



For abrasive melts (e.g. filled with glass fibers or carbon fibers, thermosets, BMC/SMC), these sensors are available as Types 6157CC... ( $0 \dots 200 \text{ }^\circ\text{C}$ )/CD... ( $0 \dots 300 \text{ }^\circ\text{C}$ ) with a coated 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 6157CA.../CC...	$^\circ\text{C}$	200
Type 6157CB.../CD...	$^\circ\text{C}$	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.

**Sensor variants**

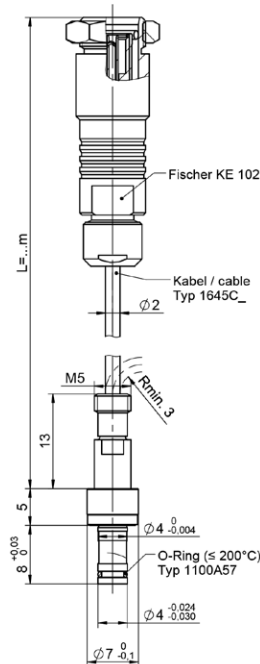


Fig. 1: Pressure sensor Type 6157C with coaxial cable

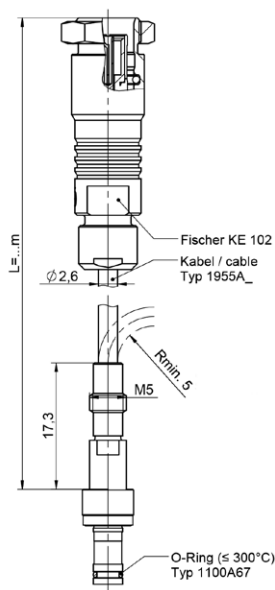


Fig. 2: Pressure sensor Type 6157C for high temperature applications with coaxial cable

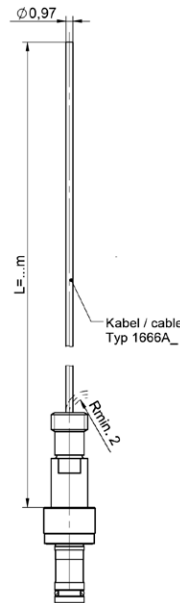


Fig. 3: Pressure sensor Type 6157C with single-wire cable

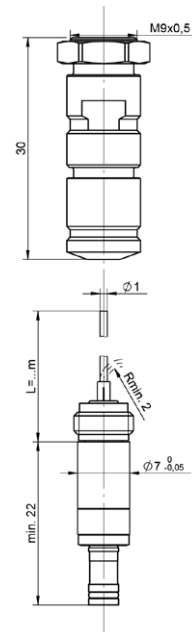


Fig. 4: Pressure sensor Type 6157C with conductive spacer sleeve

**Fig. 1: Pressure sensor Type 6157C with coaxial cable**

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

**Fig. 2: Pressure sensor Type 6157C for high temperature applications with coaxial cable**

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

**Fig. 3: Pressure sensor Type 6157C with single-wire cable**

Alternative version of the sensor with single-wire technique for simplified and flexible installation in the mold. The sensor Type 6157C...S... is equipped with a single-wire cable with a very small cross-section. The single-wire cable is exchangeable and can be cut to length as required by the user. With the single-wire technique the electrical shielding is provided by the mold. Both the cable and the connector therefore have to be completely integrated into the mold. For easy installation a connector is supplied which is self locking and splash proof.

**Fig. 4: Pressure sensor Type 6157C with conductive spacer sleeve**

Sensor including a conductive spacer sleeve for cable-free connection onto a contact element.

**Special versions**

Coated front (abrasion protection)

- Type 6157CA... with coated front: Type 6157CC...
- Type 6157CB... with coated front: Type 6157CD...

**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.

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.

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**Cable and amplifier for measuring chains with sensor Type 6157C**

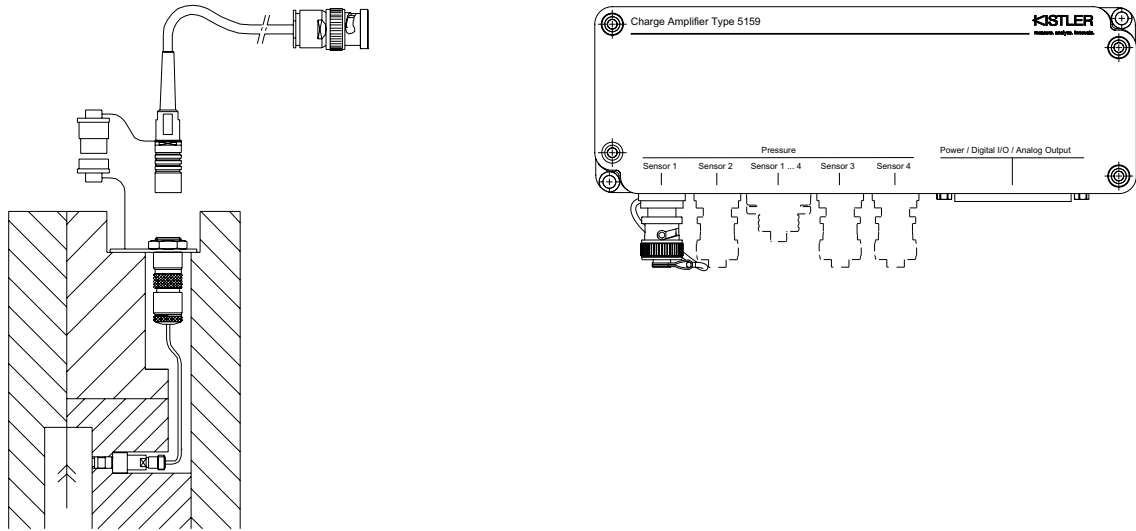
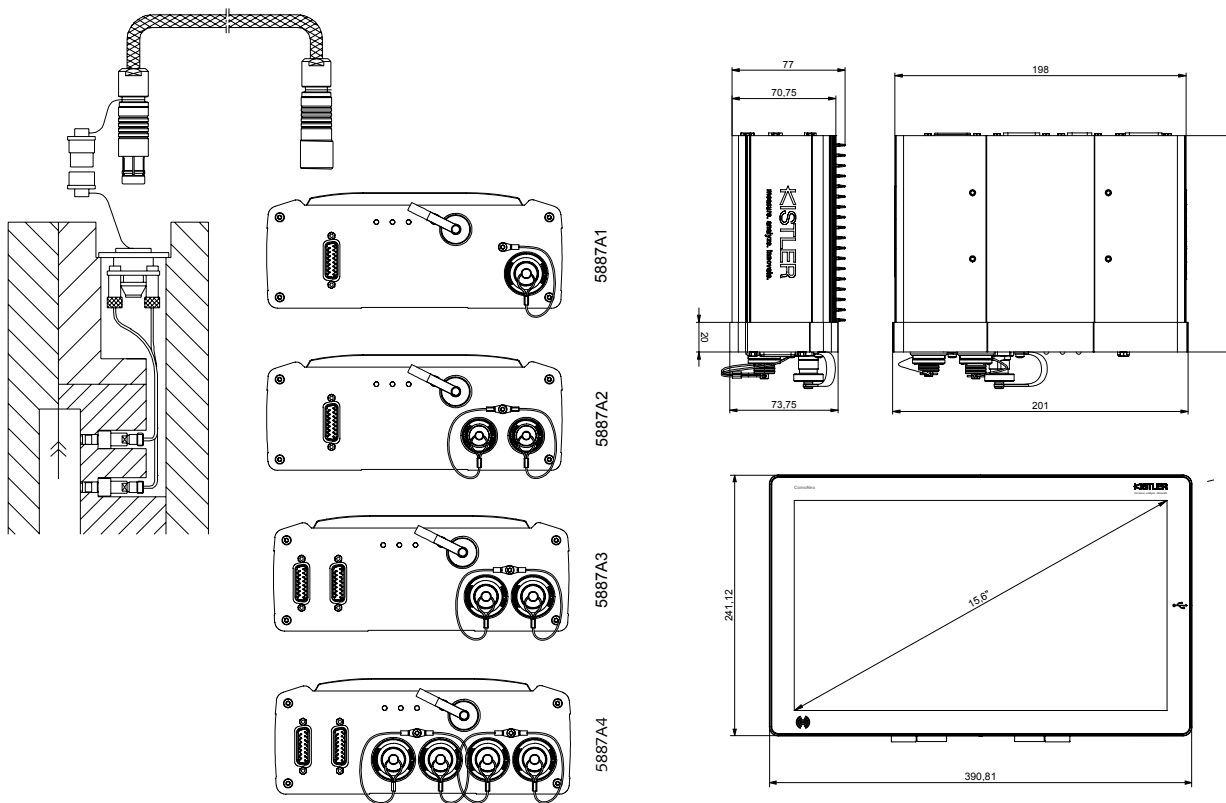


Fig. 5: Sensor Type 6157C with charge amplifier Type 5159A



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

Fig. 6: Sensor Type 6157C with ComoNeo monitoring system ComoNeo Typ 5887...

**Installation examples**

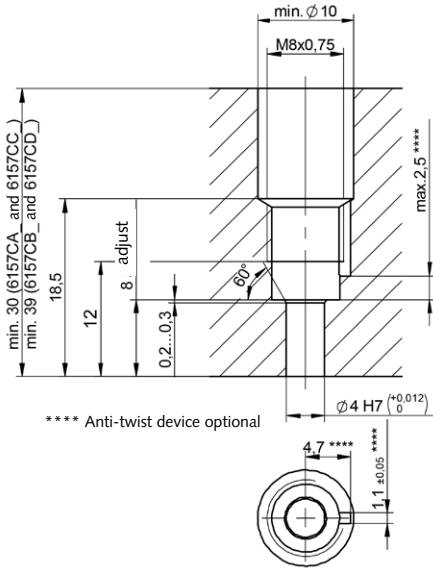


Fig. 7: Installation with mounting nut Type 6457  
\* Adjust length

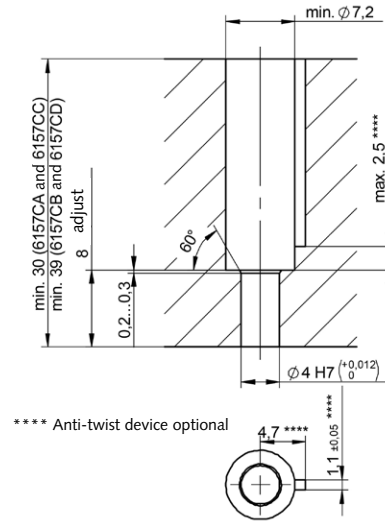


Fig. 8: Installation with spacer sleeve Type 6459  
\* Adjust length

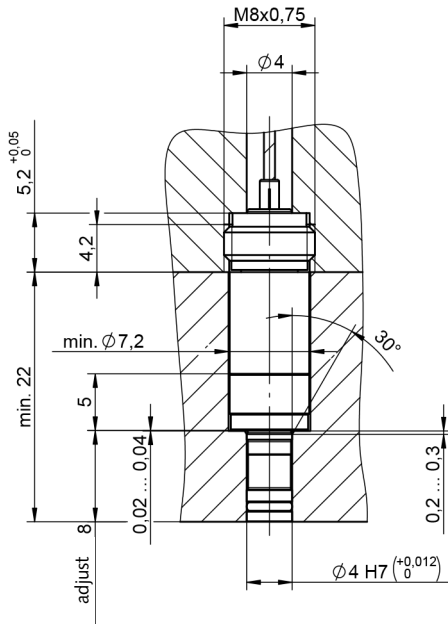


Fig. 9: Installation with conductive spacer sleeve

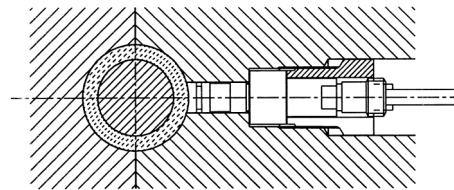


Fig. 10: Sensor with machined front (max. 0,5 mm)

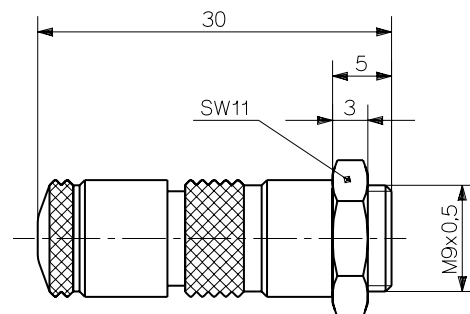


Fig. 11: Single-wire-Fischer-connector Type 1839

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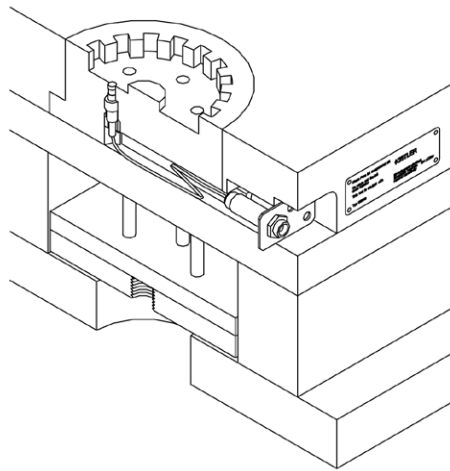


Fig. 12: Sensor, cable, mounting plate (Mat. No. 3.520.328) and identification label (Mat. No. 3.520.899)

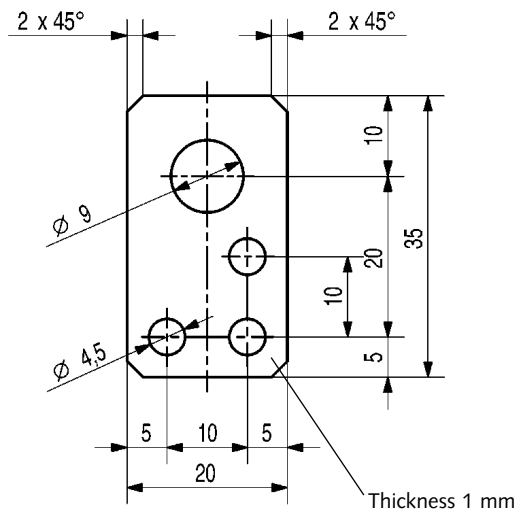


Fig. 13: Mounting plate (Mat. No. 3.520.328)

**Accessories included**

- Mounting nut 6457
- Spacer sleeve (L = 70 mm) 6459
- Conductive spacer sleeve (L = 70 mm) 1720A3
- Mounting plate 3.520.328
- Identification label 3.520.899
- Connector (for single-wire Types with connector) 1839
- O-ring, diameter 2,5x0,65 mm, (for Types up to 200 °C) 1100A57
- O-ring, diameter 2,5x0,65 mm, (for Types up to 300 °C) 1100A67

**Optional accessories**

- Dummy sensor 6545
- 4-channel connector up to 120 °C (for MiniCoax and single-wire cable) 1722A4...
- 8-channel connector up to 120 °C (for MiniCoax and single-wire cable) 1722A8...
- 4-channel connector 120 ... 200 °C (for single-wire cable) 1708
- 8-channel connector 120 ... 200 °C (for single-wire cable) 1710
- Contact elements 1-channel for single-wire types 1712B0
- Contact elements 4-channel for single-wire types 1714B0

- Coaxial cable 0 ... 200 °C with M4 and Fischer connector. 1645C...
- Steel braided coaxial cable 0 ... 200 °C with M4 and Fischer connector (wear resistant substitute) 1963A...
- Coaxial cable 0 ... 200 °C with M4 and MiniCoax connector 1650A4P...
- Hightemperature coaxial cable 0 ... 300 °C with M4 and Fischer connector 1955A...
- Single-wire cable with M4 connector L = 1,5 m 1666A2
- Single-wire cable with M4 connector L = 5 m 1666A4
- Crimped pin 65003747
- Crimpset with tools 1381A0

**Checking Tools**

- Limit plug gage, diameter 4 mm, tolerance H7 65007799
- Checking tool 65014072

**Mounting Accessories**

- Extraction tool for Types up to 200 °C 1315A
- Extraction tool for Types up to 300 °C 1362A
- Mounting piece for connector 1401
- Mounting wrench 1383B
- Dismounting cabel auxiliary tool (incl. fork wrench SW4/SW5 5.210.164) 1300A32

**Ordering key**

**Sensor**

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

**Sensor and mounting**

Unisens	<b>U</b>
Mounting with mounting nut Type 6457	<b>M</b>
Mounting with spacer sleeve Type 6459	<b>S</b>
Mounting with conductive spacer sleeve	<b>N</b>
Reserve	<b>R</b>

**Cable**

Single-wire-cable (PTFE)	<b>S</b>
Coaxial cable (PFA D2)	<b>K</b>
High temperature cable	<b>H</b>
without cable	<b>X</b>

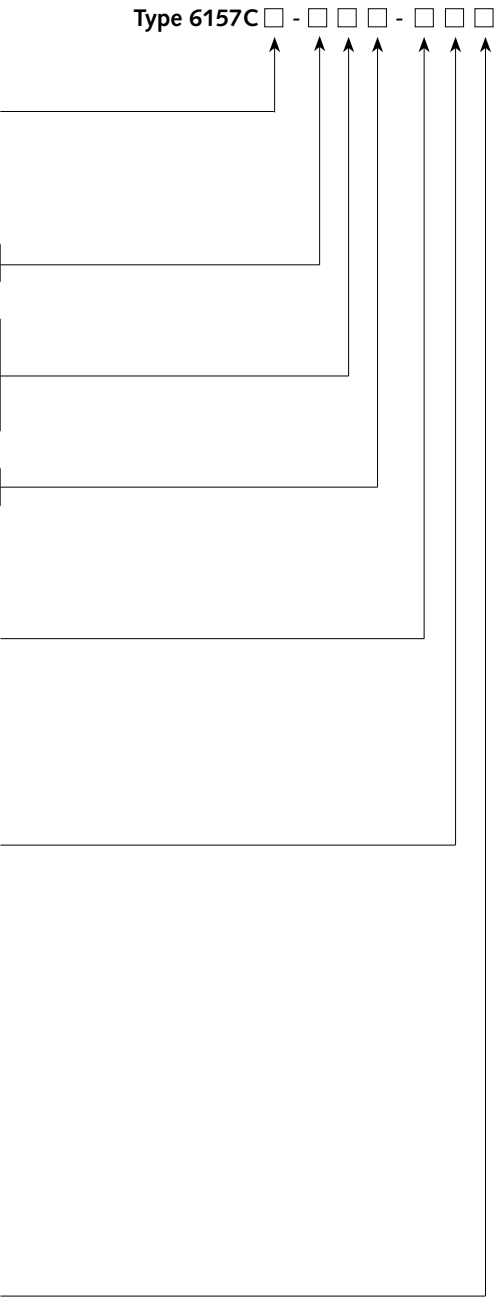
**Connector**

Fischer KE102 (coaxial cable, M4 KIAG)	<b>F</b>
MiniKoax (M4 KIAG – MMCX)	<b>M</b>
with connector type 1839 in scope of delivery (cable S)	<b>E</b>
without connector type 1839 in scope of delivery (cable S)	<b>G</b>

**Cable design**

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

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