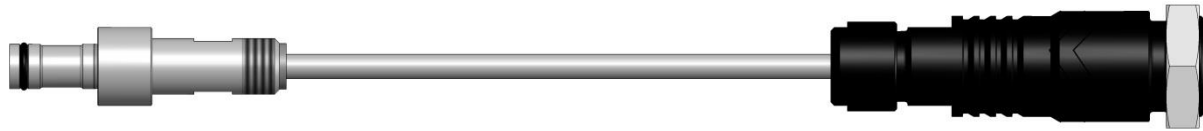


Cavity Pressure Sensors



- For the optimization, quality monitoring, and control of the injection molding process
- Automatic sensor and sensitivity detection
- Robust and temperature-resistant
- Sensor front can be adapted to the cavity
- Suitable for all melt temperatures
- Piezoelectric measuring principle
- Compatible to all charge amplifiers respectively injection molding machines
- All sensors with separable cable
- Measuring range up to 2000 bar
- Available with hardened sensor front

Description and Application

The piezoelectric cavity pressure sensors are the standard for industrial monitoring and control in injection molding. For decades sensors of this kind have been used to determine – and to change if necessary – the physical properties of a molded part even during production.

Piezoelectric measuring technology has established such large monitoring applications because the sensor is so well suited for these applications. Due to the fast injection processes, certain requirements occur which can only be met by very compact and stiff sensor designs. The reason for this is the high resulting natural frequency. The piezoelectric sensor is an active sensor, that means no power supply and electronics in the sensor are needed. Therefore these sensors can also be used at high temperatures as they occur during the injection molding process. Other technologies, e.g. strain gauge, do not fulfill these requirements.

Variations of cavity pressure sensors are available with a hardened sensor front, which increases the durability especially with the usage of abrasive and chemical aggressive melts

Special Technologies: PRIASED® and PRIASAFE®

A cavity pressure sensor is a highly sensitive measuring instrument which can – if not mounted properly or by deformation from the injection mold – give wrong measuring results. A possible cause is the so called force shunt, which generates a sensitivity loss of the sensor when the sensor front touches the bore.

To prevent this, the PRIASAFE® cavity pressure sensors are mounted into housing first and calibrated after that. This procedure has the advantage that the sensitivity does not change after the sensor has been installed into the mold because it is “protected” by the housing.

PRIASED® cavity pressure sensors have the advantage of having the sensitivity saved inside the sensor by use of a hardware code. With the help of this hardware code the sensor sensitivity can be detected automatically without being influenced by the sensor installation. Therefore the sensor is easy to use and is most suitable for industrial production. Confusion or false correlation of the sensor sensitivity as well as incorrect entries are eliminated.

Engineering – Suggestion for Mounting Places

For general applications the cavity pressure sensors were mounted on the beginning of the flow path. Differing therefrom for special purpose they were also placed on other positions, where relevant properties of an injection molding part should be detected, for example mold filling detection, consistency monitoring etc. By using existing molds, error images of parts, filing studies, new projects, and filling simulations are a helpful way to correctly determinate the best sensor location.

Gladly we offer the assistance by the sensor selection and placing.

Application	Mounting place suggestion
Process optimization General monitoring	- near the gate - on thick wall thickness - before first baffle
Consistency monitoring	on the relevant position
Monitoring and control of viscosity and compression	previous of the cavity temperature sensor
Monitoring and control of shrinkage	around the cavity temperature sensor
Mold filling control („Short Shots“)	on the end of the flow path

Sensor Mounting

The cavity pressure sensors are mounted in the mold insert with mounting nut (standard), PRIAFIT® mounting sleeve or distance sleeve. The sensor cable should be displaced in the mold platen in a channel, which are at least covered by a thin plate to avoid damages. The angles in the mold, around which the cables are placed, must be added with a phase (3 x 45°) or a radius (R2), therewith the cable will not be damaged.

The protecting cap has to be fixed on the mounting plate of the connector and should not be placed too close to the junction of the mold therewith the connector doesn't get crushed by the mold closing.

Handling and Cleaning

The contact plug must be kept clean and dry to avoid false signals.

In the not connected status the protecting cap for the sensor must be plugged on. In the connected status the protecting cap will be connected with the cap of the connecting cable, therewith defilements in the protection caps will be avoided.

The sensors with mounted connecting cable can be cleaned in an ultrasonic bath (aqueous tenside solution) if a sealed protecting cap for the connector is used. The cleaning of the sensor front with dry ice is also possible.

Technical Data

Properties	Unit	Specifications
Measuring range	bar	0 ... 2000
	psi	0 ... 29008
	MPa	0 ... 200
Overload	bar	2500
	psi	36259
	MPa	250
Sensitivity ¹⁾	pC / bar	ca. -10 (6001A/B) ca. -5 (6002B) ca. -5 (6003A/B) ca. -2 (6006BC / 6007BC / 6008AA / 6010BC)
Maximum melt temperature (plastics) in the cavity ²⁾	°C / °F	no limitation
Maximum mold temperature ³⁾	°C	200
	°F	392
Deviation of linearity	%	< ± 1
Natural frequency ⁴⁾	kHz	> 80
Insulation resistance	Ω	> 10 ¹³ (at 20 °C)
Sensor front		machinable


¹⁾ The exact sensitivity is provided on a separate calibration sheet.


²⁾ The plastic melt cools immediately after contacting the cavity wall. The melt temperature is therefore without any practical meaning for the sensor (thermoplastics). For thermosets and elastomers the permanent melt temperatures are usually below 200 °C.

³⁾ The permanent temperature of the sensor body can be higher than the specified value of the mold temperature. The temperature at the cable connector however is limited. In practice there are no mold temperatures higher than 200 °C expected.

⁴⁾ The actual natural frequency of the sensor is far higher than the frequency spectrum of the effective signal.



Symbol Explanation

With hardened sensor front 

With machinable sensor front 

Variants

Cavity pressure sensors 

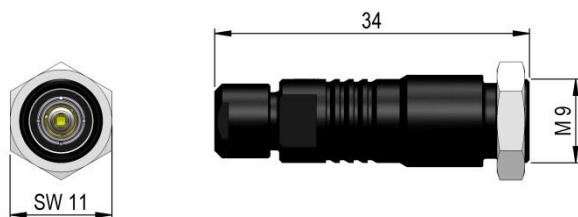
Type	Automatic sensitivity detection	Connector	Sensor cable	Cable length in [m]
6001A	-	-	-	-
6001Ax.x-102	-	Fischer KBE 102 fem., TRIAX	1002D Bending radius: 9 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6001Asl-102	-			sl = special length
6001A-H 	-	-	-	-
6001Ax.x-102-H 	-	Fischer KBE 102 fem., TRIAX	1002D Bending radius: 9 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6001Asl-102-H 	-			sl = special length
6001B	PRIASED®	-	-	-
6001Bx.x-102	PRIASED®	Fischer KBE 102 fem., TRIAX	1009B Bending radius: 9 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6001Bsl-102	PRIASED®			sl = special length
6001B-H 	PRIASED®	-	-	-
6001Bx.x-102-H 	PRIASED®	Fischer KBE 102 fem., TRIAX	1009B Bending radius: 9 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6001Bsl-102-H 	PRIASED®			sl = special length
6002B	PRIASAFE® PRIASED®	-	-	-
6002Bx.x-102	PRIASAFE® PRIASED®	Fischer KBE 102 fem., TRIAX	1009B Bending radius: 9 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6002Bsl-102	PRIASAFE® PRIASED®			sl = special length
6003A	-	-	-	-
6003Ax.x-102	-	Fischer KBE 102 fem., TRIAX	1002D Bending radius: 9 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6003Asl-102	-			sl = special length
6003A-H 	-	-	-	-
6003Ax.x-102-H 	-	Fischer KBE 102 fem., TRIAX	1002D Bending radius: 9 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6003Asl-102-H 	-			sl = special length
6003B	PRIASED®	-	-	-
6003Bx.x-102	PRIASED®	Fischer KBE 102 fem., TRIAX	1009B Bending radius: 9 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6003Bsl-102	PRIASED®			sl = special length
6003B-H 	PRIASED®	-	-	-
6003Bx.x-102-H 	PRIASED®	Fischer KBE 102 fem., TRIAX	1009B Bending radius: 9 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6003Bsl-102-H 	PRIASED®			sl = special length

Miniature cavity pressure sensors

Type	Automatic sensitivity detection	Connector	Sensor cable	Cable length in [m]
6006BC	PRIASAFE® PRIASED®	-	-	-
6006BCx.x-102	PRIASAFE® PRIASED®	Fischer KBE 102 fem., TRIAX	1010C Bending radius: 5 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6006BCsl-102	PRIASAFE® PRIASED®			sl = special length
6007BC	PRIASAFE® PRIASED®	-	-	-
6007BCx.x-102	PRIASAFE® PRIASED®	Fischer KBE 102 fem., TRIAX	1010C Bending radius: 5 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6007BCsl-102	PRIASAFE® PRIASED®			sl = special length
6008AA	-	-	-	-
6008AAx.x-102	-	Fischer KBE 102 fem., TRIAX	1011A Bending radius: 5 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6008AAsl-102	-			sl = special length
6010BC	PRIASAFE® PRIASED®	-	-	-
6010BCx.x-102	PRIASAFE® PRIASED®	Fischer KBE 102 fem., TRIAX	1010C Bending radius: 5 mm	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2
6010BCsl-102	PRIASAFE® PRIASED®			sl = special length

One Pin TRIAX Connector

Easy connection by TRIAX format

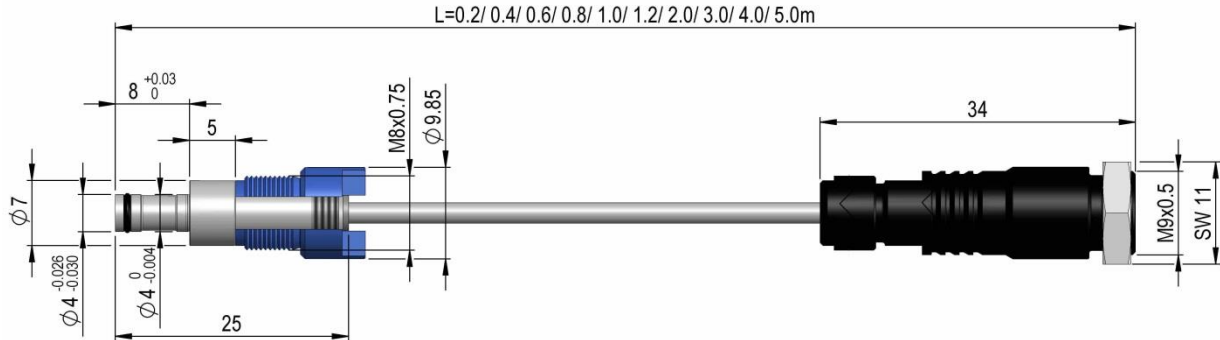


Fischer Type KBE 102 female TRIAX

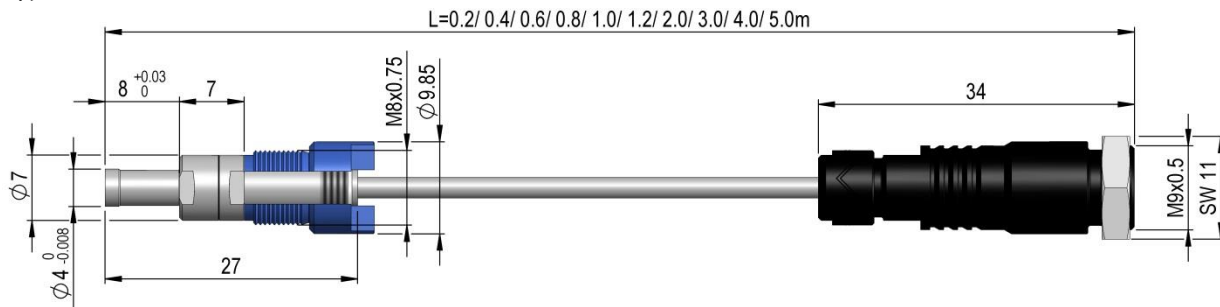
Dimensions

Cavity pressure sensors with cable and connector

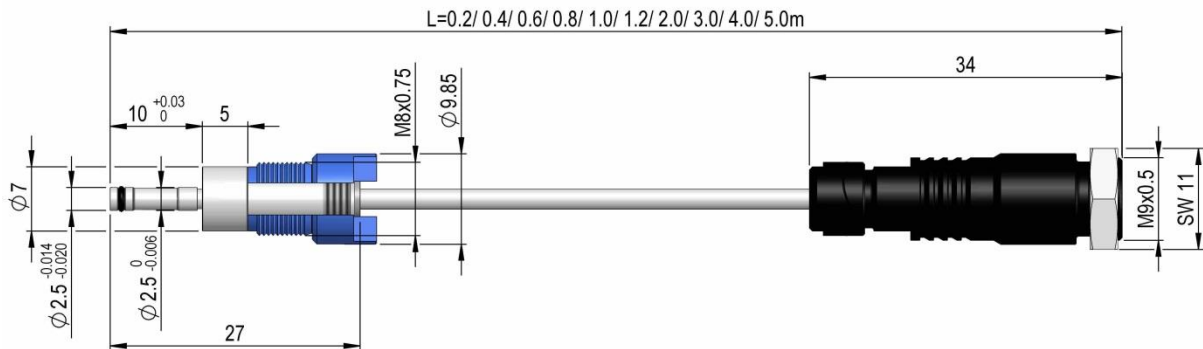
Type 6001Ax.x-102(-H) / 6001Bx.x-102(-H)



Type 6002Bx.x-102

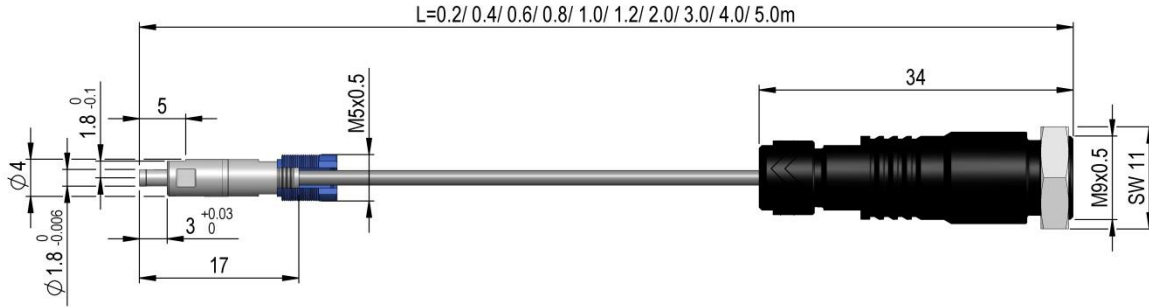


Type 6003Ax.x-102(-H) / 6003Bx.x-102(-H)

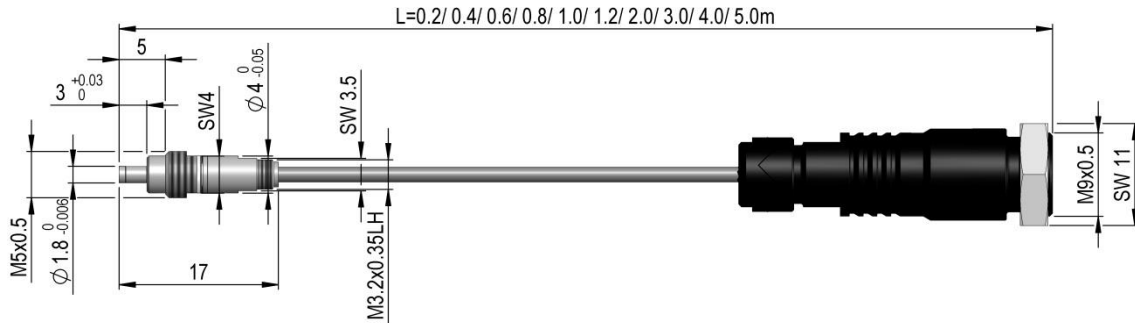


Miniature cavity pressure sensors with cable and connector

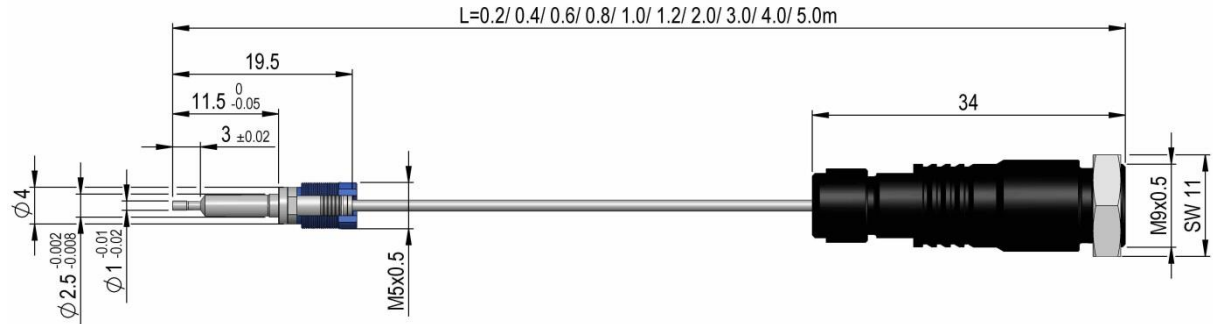
Type 6006BCx.x-102



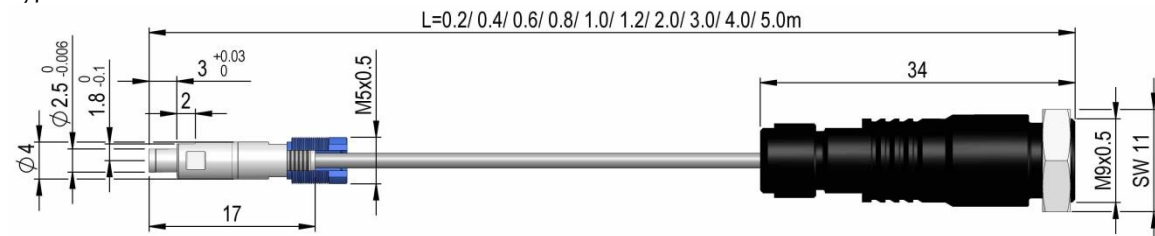
Type 6007BCx.x-102



Type 6008AAx.x-102

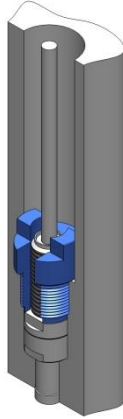


Type 6010BCx.x-102

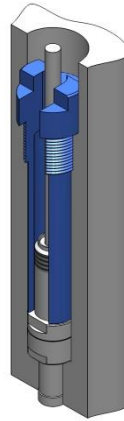


Examples for Installation Situation

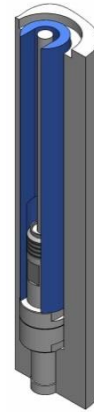
**Standard
Mounting nut**



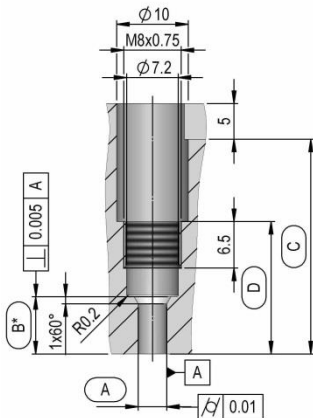
**Alternative 1
PRIAFIT® mounting sleeve**



**Alternative 2
Distance sleeve**



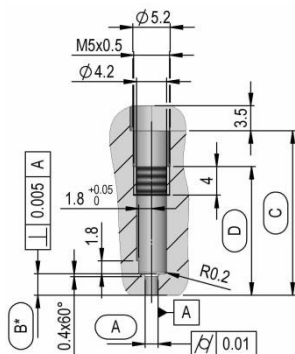
Mounting Holes Standard with Mounting Nut or Sensor-Thread



* = Adjust dimension

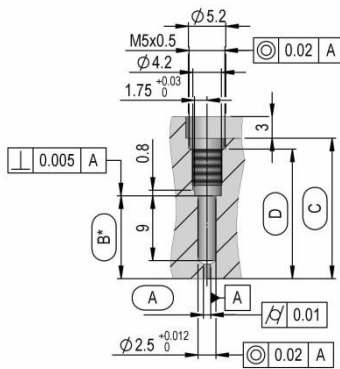
Optional the sensor front can be machined und the surface can be adapted to the cavity.
In this case the sensor has to be secured against twisting by a positioning surface. Both process steps can be operated by the mold maker (see operation instruction OI60xx_012e).

Type	A ^{0.018/0}	B*	C min.	D
6001A/Bx.x-102(-H)	4	8	30	18.5
6002Bx.x-102	4	8	32	20.5
6003A/Bx.x-102(-H)	2.5	10	32	20.5



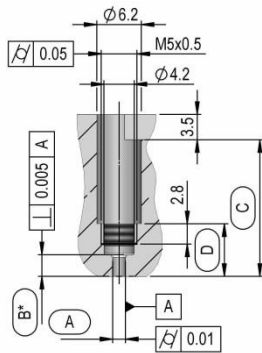
* = Adjust dimension

Type	A ^{0.012/0}	B*	C min.	D
6006BCx.x-102	1.8	3	23	18
6010BCx.x-102	2.5	3	23	18



* = Adjust dimension

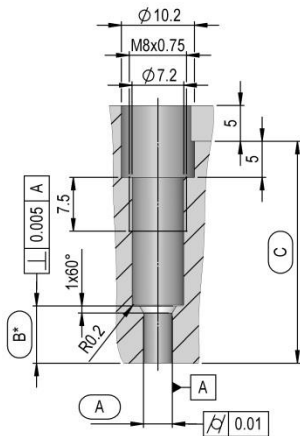
Type	A ^{0.012/0}	B*	C min.	D
6008AAx.x-102	1	11.5	19	18



* = Adjust dimension

Type	A ^{0.012/0}	B*	C min.	D
6007BCx.x-102	1.8	3	19	7.3

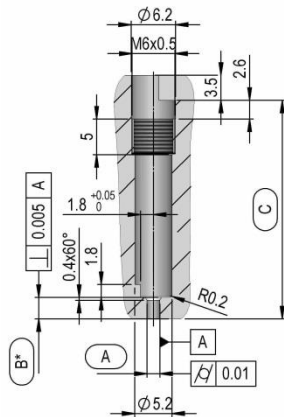
Mounting Holes Alternative 1 with PRIAFIT® Mounting Sleeve



* = Adjust dimension

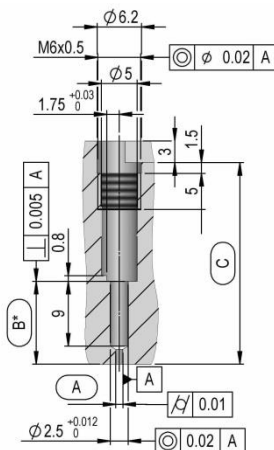
Optional the sensor front can be machined and the surface can be adapted to the cavity.
In this case the sensor has to be secured against twisting by a positioning surface. Both process steps can be operated by the mold maker (see operation instruction OI60xx_012e).

Type	A ^{0.018/0}	B*	C with 6530A	C with 6530A0.08	C with 6530A0.12	C with 6530A0.16
6001A/Bx.x-102(-H)	4	8	37 - 56	37 - 96	37 - 136	37 - 176
6002Bx.x-102	4	8	39 - 58	39 - 98	39 - 138	39 - 178
6003A/Bx.x-102(-H)	2.5	10	39 - 58	39 - 98	39 - 138	39 - 178



* = Adjust dimension

Type	A ^{0.012/0}	B*	C with 6531A	C with 6531A0.08	C with 6531A0.12	C with 6531A0.16
6006BCx.x-102	1.8	3	29 – 56	29 – 96	29 – 136	29 – 176
6010BCx.x-102	2.5	3	29 – 56	29 – 96	29 – 136	29 – 176



* = Adjust dimension

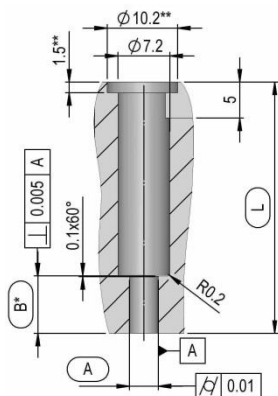
Type	A ^{0.012/0}	B*	C with 6531A	C with 6531A0.08	C with 6531A0.12	C with 6531A0.16
6008AAx.x-102	1	11.5	30 – 54	30 – 94	30 – 134	30 – 174

Mounting of Cavity Pressure Sensors with Thread, Mounting Nut or PRIAFIT® Mounting Sleeve

By mounting with mounting nut, PRIAFIT® mounting sleeve or sensor-thread the sensors were put on with the following tightening torques.

Sensor	Tightening torques
6001A/B(-H) 6002B(-H) 6003A/B(-H)	3.5 Nm (with mounting nut type 6541A and PRIAFIT® mounting sleeve type 6530A)
6006BC 6008AA	1.0 Nm (with mounting nut type 6544B and PRIAFIT® mounting sleeve type 6531A)
6010BC	1.2 Nm (with mounting nut type 6544B and PRIAFIT® mounting sleeve type 6531A)
6007BC	1.0 Nm (sensor-thread)

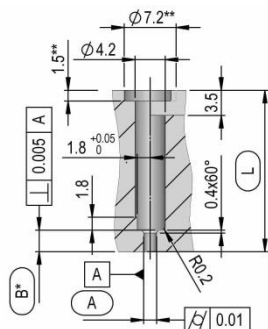
Mounting Holes Alternative 2 with Distance Sleeve



Optional the sensor front can be machined und the surface can be adapted to the cavity.
In this case the sensor has to be secured against twisting by a positioning surface. Both process steps can be operated by the mold maker (see operation instruction OI60xx_012e).

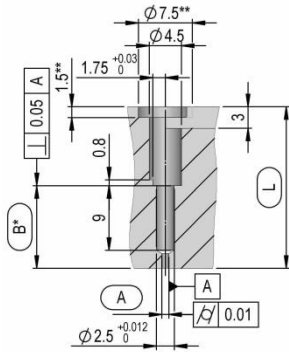
- * = Adjust dimension
- ** = We recommend creating a recessed hole around the distance sleeve so that it is possible to remove the distance sleeve after it is installed.

Type	A ^{0.018/0}	B*	L with 6522A	L with 6522A0.08	L with 6522A0.12	L with 6522A0.16
6001A/Bx.x-102(-H)	4	8	30 – 53	30 – 93	30 – 133	30 – 173
6002Bx.x-102	4	8	32 – 55	32 – 95	32 – 135	32 – 175
6003A/Bx.x-102(-H)	2.5	10	32 - 55	32 - 95	32 - 135	32 - 175



- * = Adjust dimension
- ** = We recommend creating a recessed hole around the distance sleeve so that it is possible to remove the distance sleeve after it is installed.

Type	A ^{0.012/0}	B*	L with 6523B	L with 6523B0.08	L with 6523B0.12	L with 6523B0.16
6006BCx.x-102	1.8	3	19 – 55	19 – 95	19 – 135	19 – 175
6010BCx.x-102	2.5	3	19 - 55	19 - 95	19 - 135	19 - 175

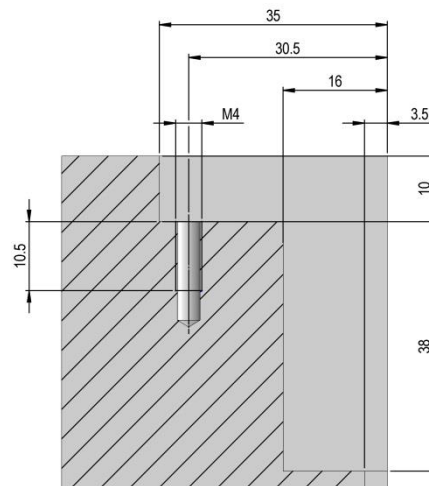
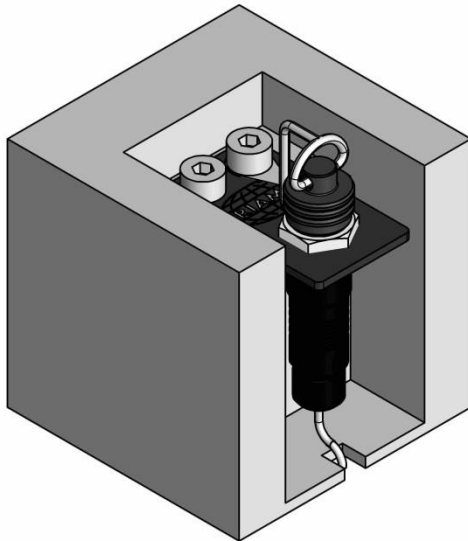


* = Adjust dimension

** = We recommend creating a recessed hole around the distance sleeve so that it is possible to remove the distance sleeve after it is installed.

Type	A ^{0.012/0}	B*	L with 6523B	L with 6523B0.08	L with 6523B0.12	L with 6523B0.16
6008AAx.x-102	1	11.5	19.5 – 53.5	19.5 – 93.5	19.5 – 133.5	19.5 – 173.5

Installation Situation – Connector with Mounting Plate



Scope of Delivery

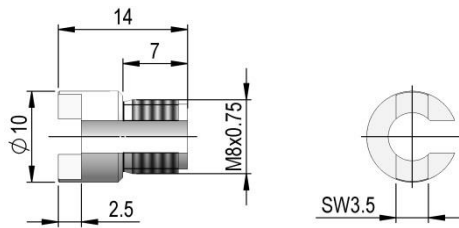
Cavity pressure sensors

Article	Type	Article	Type
Mounting nut	6541A	Identification plate	-
Mounting plate	6581B	Sensor cable for - 600xAx.x-102(-H) - 600xBx.x-102(-H)	1002D 1009B

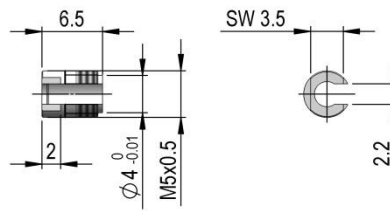
Miniature cavity pressure sensors

Article	Type	Article	Type
Mounting nut for 6006BC, 6008AA, 6010BC	6544B	Identification plate	-
Mounting plate	6581B	Sensor cable for - 60xxBCx.x-102 - 6008AAx.x-102	1010C 1011A

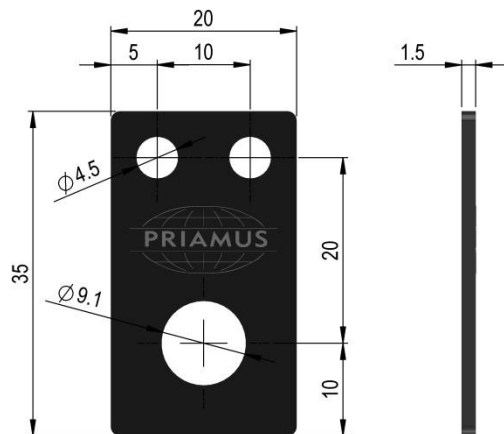
Mounting nut type 6541A



Mounting nut type 6544B



Mounting plate type 6581B



Accessories (Optional)

Connecting and extension cables

Type	Coat	Sensitivity detection	Bending radius [mm] (* bundled)	Connector (1)TRIAX / (2)Code 1)
Connecting cables:				
1041A	Plastic	with and without	12	Fischer Type S 102 male ¹⁾ – Fischer Type S 102 male ¹⁾
1049B	Metal hose	with and without	20	Fischer Type S 102 male ¹⁾ – Fischer Type S 102 male ¹⁾
Multi pin connecting cables:				
1045B	Plastic	with and without	12 (25*)	Fischer Type S 104 fem. 16-pin ²⁾ – 4 x Fischer Type S 102 male ¹⁾
1046B	Plastic	with and without	9 (40*)	Fischer Type S 104 fem. 16-pin ²⁾ – 8 x Fischer Type S 102 male ¹⁾
1047A	Plastic	with and without	12	Fischer Type S 104 fem. 16-pin ²⁾ – 1 x Fischer Type S 102 male ¹⁾
1048B	Plastic	with and without	12 (20*)	Fischer Type S 104 fem. 16-pin ²⁾ – 2 x Fischer Type S 102 male ¹⁾
1054B	Plastic	with and without	50	Fischer Type S 104 fem. 16-pin ²⁾ – Fischer Type S 104 fem. 16-pin ²⁾
Extension cable:				
1043B	Metal hose	with and without	20	Fischer Type S 102 male ¹⁾ – Fischer Type KBE 102 fem. ¹⁾

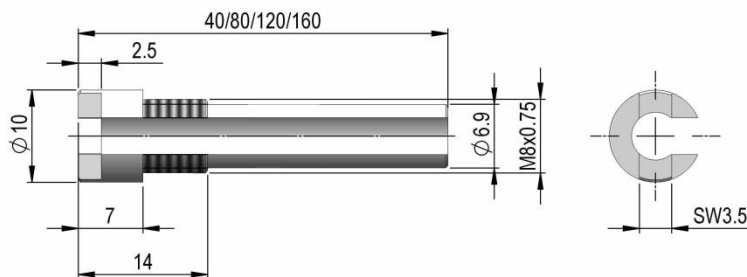
Cavity pressure sensors

Article	Type	Article	Type
PRIAFIT® mounting sleeve l = 0.04 m l = 0.08 m l = 0.12 m l = 0.16 m	6530A 6530A0.08 6530A0.12 6530A0.16	Distance sleeve l = 0.04 m l = 0.08 m l = 0.12 m l = 0.16 m	6522A 6522A0.08 6522A0.12 6522A0.16
Mounting / extraction tool for sensor	6561A	Assembly tool for mounting nut and mounting sleeve	6562B
Dummy for - 6001A/B(-H) - 6002B - 6003A/B(-H)	6501A 6502A 6503A	Multi channel connecting box	1195A-8p
BlueLine amplifier	5080A-xp	BlueLine amplifier	5070A-2p2T

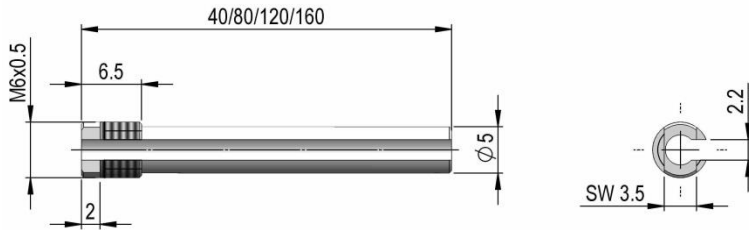
Miniature cavity pressure sensors

Article	Type	Article	Type
PRIAFIT® mounting sleeve for 6006BC, 6008AA, 6010BC l = 0.04 m l = 0.08 m l = 0.12 m l = 0.16 m	6531A 6531A0.08 6531A0.12 6521A0.16	Distance sleeve for 6006BC, 6008AA, 6010A l = 0.04 m l = 0.08 m l = 0.12 m l = 0.16 m	6523B 6523B0.08 6523B0.12 6523B0.16
Mounting / extraction tool for sensor for 6006BC, 6007BC, 6010BC	6569A	Assembly tool for mounting nut and mounting sleeve for 6006BC, 6008AA, 6010BC	6567C
Mounting / extraction tool for sensor for 6008AA	6568A	Mounting tool to tighten the sensor for 6007BC	6570A
Assembling aid for 6008AA	6585A	Dummy for - 6006BC - 6007BC - 6008AA - 6010BC	6512A 6513A 6508A 6514A
Multi channel connecting box	1195A-8p	BlueLine amplifier	5080A-xp
BlueLine amplifier	5070A-2p2T		

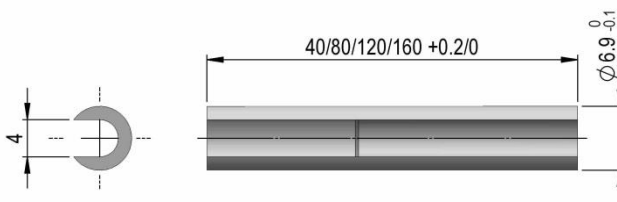
PRIAFIT® mounting sleeve type 6530A / 6530A0.08 / 6530A0.12 / 6530A0.16



PRIAFIT® mounting sleeve type 6531A / 6531A0.08 / 6531A0.12 / 6531A0.16



Distance sleeve type 6522A / 6522A0.08 / 6522A0.12 / 6522A0.16



Distance sleeve type 6523B / 6523B0.08 / 6523B0.12 / 6523B0.16

