

Miniature Cavity Temperature Sensors



- Optimized for use in injection molds
- Small dimensions
- Extremely fast response time
- Waterproof
- Hardened sensor front (option)

Description and Application

Along with the cavity pressure sensor, the cavity temperature sensor plays an important role in monitoring and controlling the injection molding process. Thereby the melt front is automatically detected when it reaches the temperature sensor and used for controlling functions. In order to react as quick as possible, the reaction rate of the sensors has been optimized.

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

The cavity temperature sensors are provided with a triaxial connector, which in practice is connected easily and without positioning, and which simultaneously provides a high level on safety concerning the signal quality.

Engineering – Suggestion for Sensor Positioning

In most applications the cavity temperature sensors were mounted in the end of the flow path e.g. for mold filling detection and for automatic hot runner balancing. For special purposes e.g. for cascade controlling they were specifically placed in positions where it is beneficial to have a sensor to control molding functions. 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.

We gladly offer assistance in determining the best sensor location.

Application	Mounting place suggestion
Automatic, viscosity independent switchover to holding pressure Automatic hot runner balancing and controlling Fill time and balancing time monitoring Automatic venting control Automatic shut-off nozzle control (e.g. LSR)	on the verge of the end of the flow path
Mold filling monitoring („Short Shots“)	in the absolute end of the flow path
Monitoring and controlling of the viscosity	after the cavity pressure sensor
Cavity temperature control	in any order
Core pull control Control of coining, gas-water-injection, etc.	on special position, depending on the application
Melt front depending cascade control	previous to the shut-off nozzles
Monitoring and control of the shrinkage	around the pressure sensor

Sensor Mounting

The mounting of the sensors occurs with a distance sleeve (standard), mounting nut or PRIAFIT® mounting sleeve.

During the mold design, it is important to ensure that the sensor cable is not too short so that the connector can be mounted on the side of the mold. The excess cable length must be placed in the cable channel. By using the PRIAMUS® Multi Channel Connecting Boxes the remaining cable length can be placed into the connecting box.

The sensor connections should not be placed under the connections of the water lines.

The angles in the mold, around which the cables are placed, must be added with a phase ($3 \times 45^\circ$) 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 parting line of the mold so the connector does not 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
Thermocouple (not insulated)	type	N
Colors / polarity according to IEC 584-3	pink (NiCrSi) white (NiSi)	positive negative
Class		1
Maximum deviations according to IEC 584-3	(-40 ... 1000 °C)	$dT = \pm 0.004 \times T$ or $\pm 1.5 \text{ K}$
Standard operating temperature (sensor front)	°C	up to 600
Operating temperature range (cable)	°C	0...200
Operating pressure range	bar	0...2'000
Response time switchover to holding pressure and sequential control with PRIAMUS® amplifier (envelope curve procedure resp. absolute measuring procedure)	ms	4
Bending radius	mm	min. 12 (4004C / 4006B / 4008B) min. 11 (4010B / 4012B / 4016A / 4018A)

Symbol Explanation

With hardened sensor front

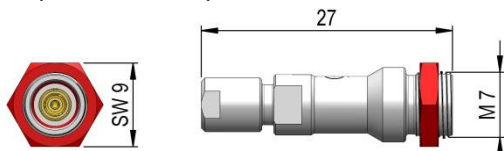
With machinable sensor front

Variants

Type	Connector	Bending radius [mm]	Cable length [m]	Connection to
4004Cx.x-101	Fischer KBE 101 fem., TRIAX	5	x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	Multi Channel Connecting Box 1194A-8T or Connecting cable 1141Ax 1149Bx Multi channel connecting cable 1145Ax 1146Bx 1147Bx 1159Bx
4004Csl-101			sl = special length	
4004Cx.x-101-H			x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	
4004Csl-101-H			sl = special length	
4006Bx.x-101			x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	
4006Bsl-101			sl = special length	
4006Bx.x-101-H			x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	
4006Bsl-101-H			sl = special length	
4008Bx.x-101			x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	
4008Bsl-101			sl = special length	
4008Bx.x-101-H			x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	
4008Bsl-101-H			sl = special length	
4010Bx.x-101			x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	
4010Bsl-101			sl = special length	
4012Bx.x-101			x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	
4012Bsl-101			sl = special length	
4016Ax.x-101-H			x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	
4016Asl-101-H			sl = special length	
4018Ax.x-101-H			x.x = 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 2.0 / 3.0 / 4.0 / 5.0	
4018Asl-101-H			sl = special length	

One Pin TRIAX Connector

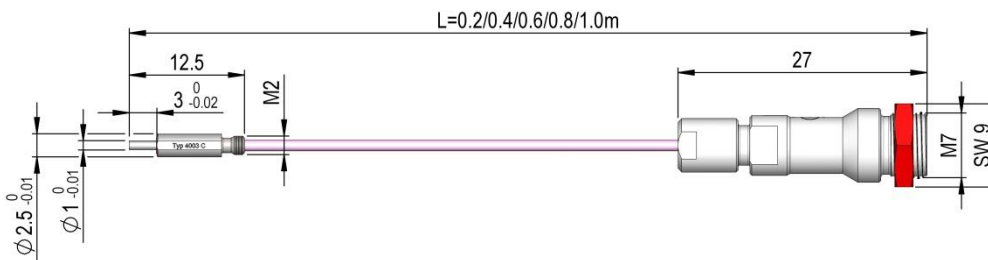
Easy connection by TRIAX format



Fischer Type KBE 101 female TRIAX

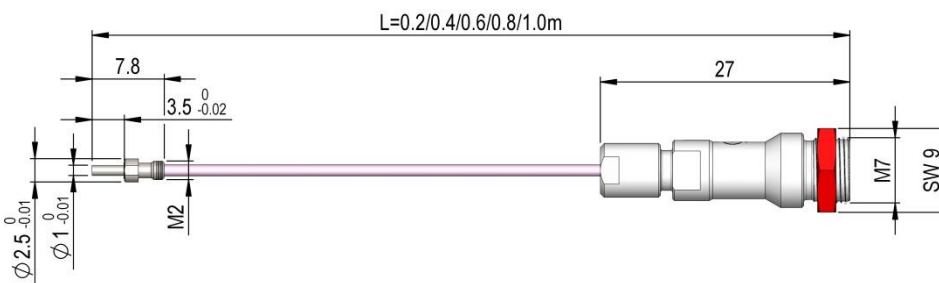
Dimensions Miniature Cavity Temperature Sensors with Cable and Connector

Type 4004Cx.x-101(-H)

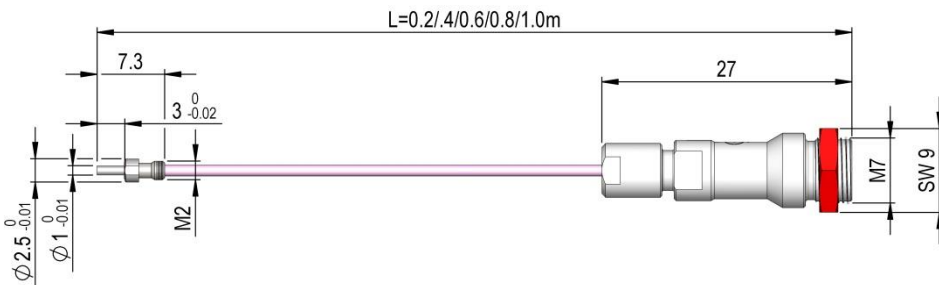


Type 4006Bx.x-101(-H) with machinable sensor front

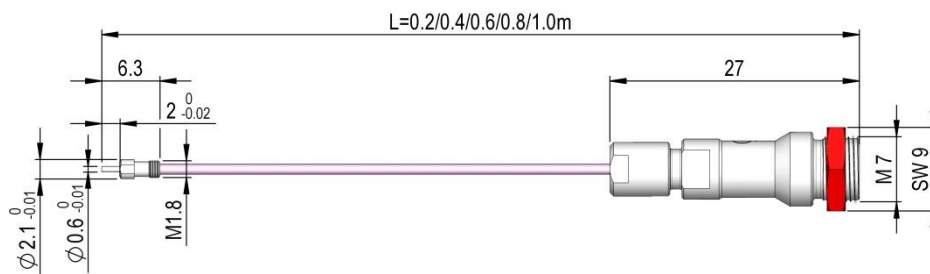
The dimension from the lowest point of manufacturing to the sensor shoulder must imperatively be manufactured 3.1 mm +0.1/-0.



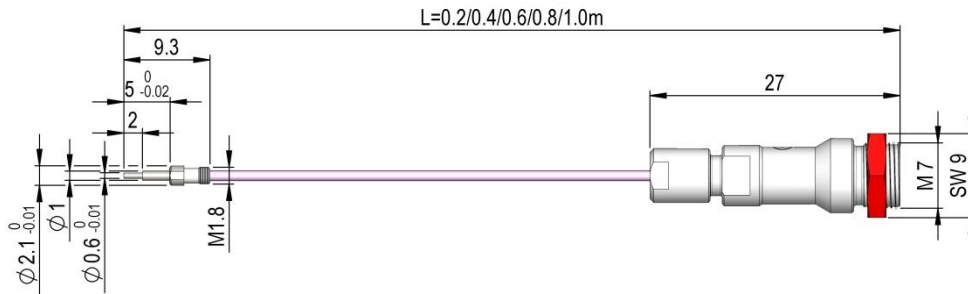
Type 4008Bx.x-101(-H)



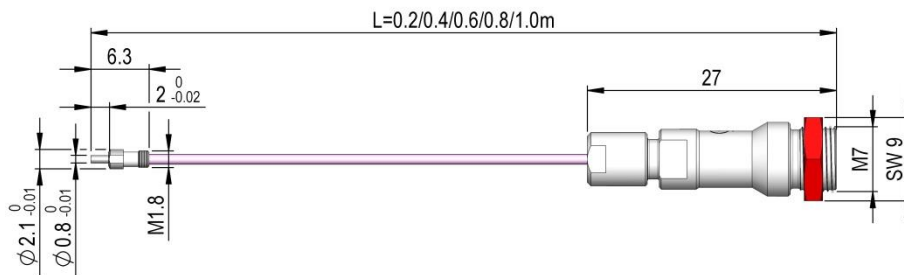
Type 4010Bx.x-101



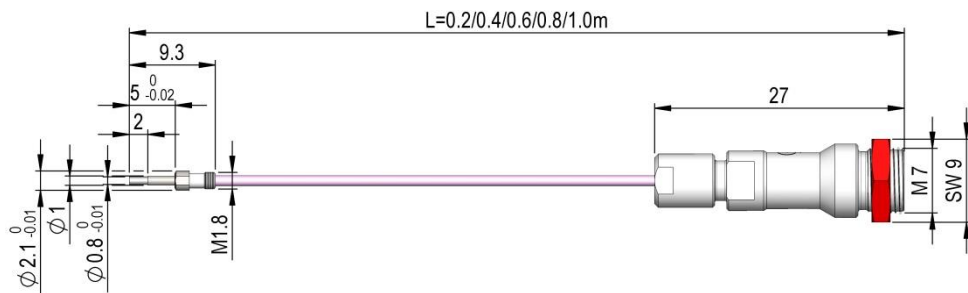
Type 4012Bx.x-101



Type 4016Ax.x-101-H

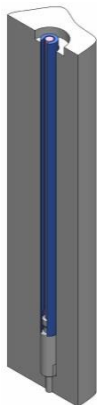


Type 4018Ax.x-101-H

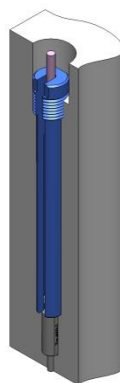


Examples for Installation Situation

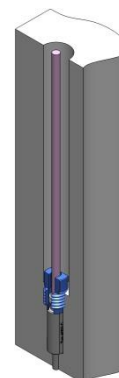
**Standard
Distance sleeve**



**Alternative 1
PRIAFIT® Mounting sleeve**

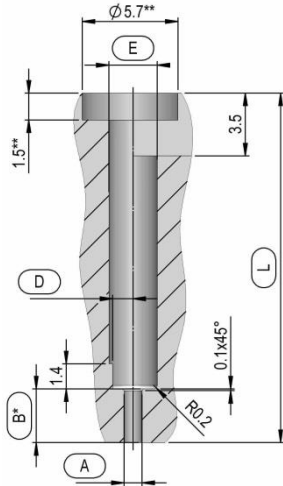


**Alternative 2
Mounting nut**



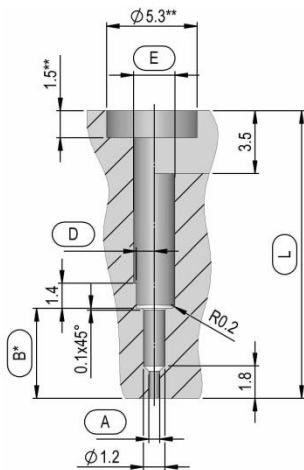
Mounting Holes Standard with Distance Sleeve

Cavity temperature sensors include a distance sleeve in the scope of delivery. Distance sleeves should be trimmed to the desired length.



* = 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 ^{0.01/0}	B*	L with 4521A	L with 4521A0.08	L with 4521A0.12	L with 4521A0.16	D ^{0.05/0}	E
4004Cx.x-101(-H)	1	3	16 – 50	16 – 90	16 – 130	16 – 170	1.15	2.7
4006Bx.x-101(-H)	1	3.5	11 – 45	11 – 85	11 – 125	11 – 165	1.15	2.7
4008Bx.x-101(-H)	1	3	10.5 – 44.5	10.5 – 84.5	10.5 – 124.5	10.5 – 164.5	1.15	2.7
Type	A ^{0.01/0}	B*	L with 4522A	L with 4522A0.08	L with 4522A0.12	L with 4522A0.16	D ^{0.05/0}	E
4010Bx.x-101	0.6	2	9.5 – 43.5	9.5 – 83.5	9.5 – 123.5	9.5 – 163.5	1	2.3
4016Ax.x-101-H	0.8	2	9.5 – 43.5	9.5 – 83.5	9.5 – 123.5	9.5 – 163.5	1	2.3

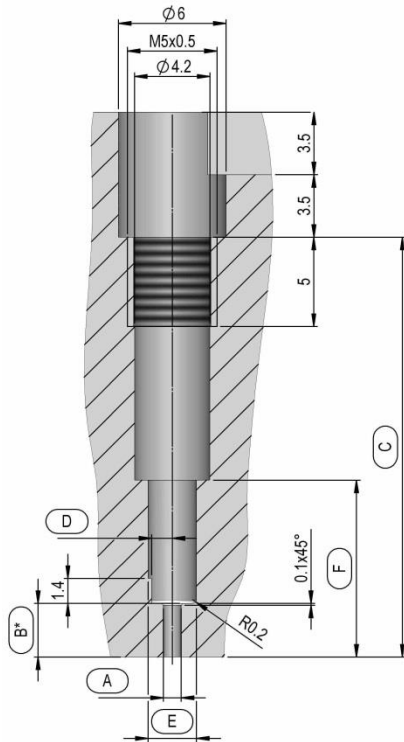


* = Adjust dimension
 ** = We recommend creating a recessed hole around the distance sleeve so that it is possible to remove the distance sleeve after it is installed.

Type	A ^{0.01/0}	B*	L with 4522A	L with 4522A0.08	L with 4522A0.12	L with 4522A0.16	D ^{0.05/0}	E
4012Bx.x-101(-H)	0.6	5	12.5 – 46.5	12.5 – 86.5	12.5 – 126.5	12.5 – 166.5	1	2.3
4018Ax.x-101(-H)	0.8	5	12.5 – 46.5	12.5 – 86.5	12.5 – 126.5	12.5 – 166.5	1	2.3

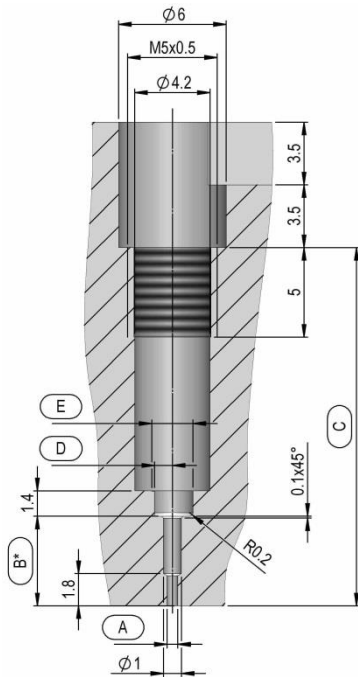
Mounting Holes Alternative 1 with PRIAFIT® Mounting Sleeve

PRIAFIT® mounting sleeves are a combination of a distance sleeve and a mounting nut. They simplify the mounting of the cavity temperature sensors by adding the benefits of both the distance sleeve and the mounting nut. They eliminate the need of having the distance sleeve be a defined fit, and also allow threads to be added to the bore hole mouth.



* = Adjust dimension

Type	A ^{0.01/0}	B*	C for 4530A	C for 4530A0.08	C for 4530A0.12	C for 4530A0.16	D ^{0.05/0}	E	F
4004Cx.x-101(-H)	1	3	23.5 – 48	23.5 – 88	23.5 – 128	23.5 – 168	1.15	2.7	9.9
4006Bx.x-101(-H)	1	3.1-3.5	18.5 – 43	18.5 – 83	18.5 – 123	18.5 – 163	1.15	2.7	4.9
4008Bx.x-101(-H)	1	3	18 – 42.5	18 – 82.5	18 – 122.5	18 – 162.5	1.15	2.7	4.4
4010Bx.x-101	0.6	2	17 – 41.5	17 – 81.5	17 – 121.5	17 – 161.5	1	2.3	3.4
4016Ax.x-101-H	0.8	2	17 – 41.5	17 – 81.5	17 – 121.5	17 – 161.5	1	2.3	3.4

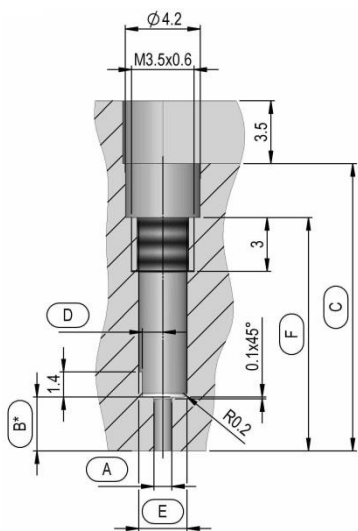


* = Adjust dimension

Type	A ^{0.01/0}	B*	C for 4530A	C for 4530A0.08	C for 4530A0.12	C for 4530A0.16	D ^{0.05/0}	E
4012Bx.x-101(-H)	0.6	5	17 – 44	17 – 84	17 – 124	17 – 164	1	2.3
4018Ax.x-101(-H)	0.8	5	17 – 44	17 – 84	17 – 124	17 – 164	1	2.3

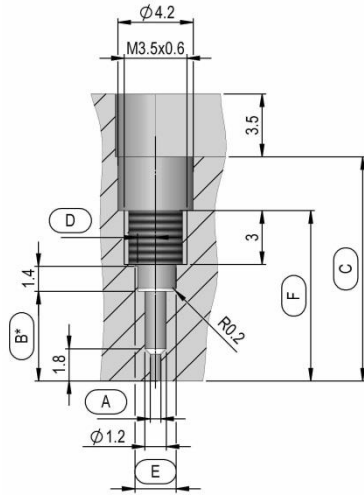
Mounting Holes Alternative 2 with Mounting Nut

Especially by mounting of cavity temperature sensors in mobile mold parts, for example gates, mounting nuts are used primarily.



* = Adjust dimension

Type	A ^{0.01/0}	B*	C min.	D ^{0.05/0}	E	F
4004Cx.x-101(-H)	1	3	16	1.15	2.7	13
4006Bx.x-101(-H)	1	3.1-3.5	11	1.15	2.7	8
4008Bx.x-101(-H)	1	3	10.5	1.15	2.7	7.5
4010Bx.x-101	0.6	2	9.5	1	2.3	6.5
4016Ax.x-101-H	0.8	2	9.5	1	2.3	6.5



* = Adjust dimension

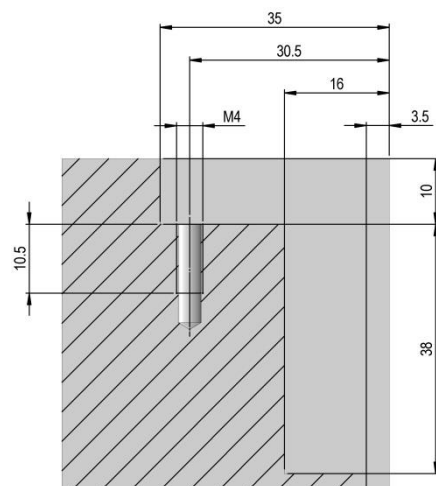
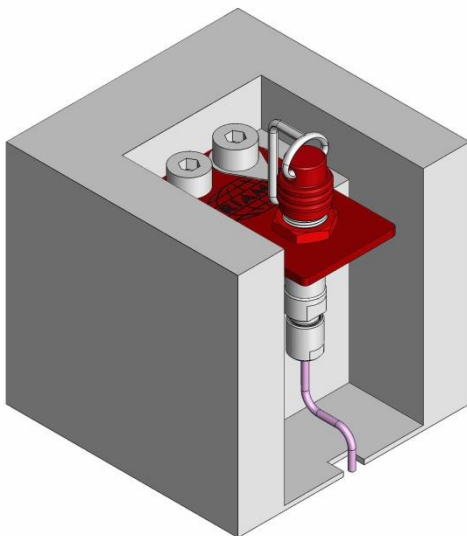
Type	A ^{0.01/0}	B*	C min.	D ^{0/0.05}	E	F
4012Bx.x-101	0.6	5	12.5	1	2.3	9.5
4018Ax.x-101-H	0.8	5	12.5	1	2.3	9.5

Mounting of the Temperature Sensors with Mounting Nut or PRIAFIT® Mounting Sleeve

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

Sensor	Tightening torques
4004Cx.x-101(-H) 4006Bx.x-101(-H) 4008Bx.x-101(-H)	1.0 Nm (with mounting nut type 4541A and PRIAFIT® mounting sleeve type 4530A)
4010Bx.x-101 4012Bx.x-101 4016Ax.x-101-H 4018Ax.x-101-H	1.0 Nm (with mounting nut type 4543B and PRIAFIT® mounting sleeve type 4530A)

Installation Situation – Connector with Mounting Plate



Scope of Delivery

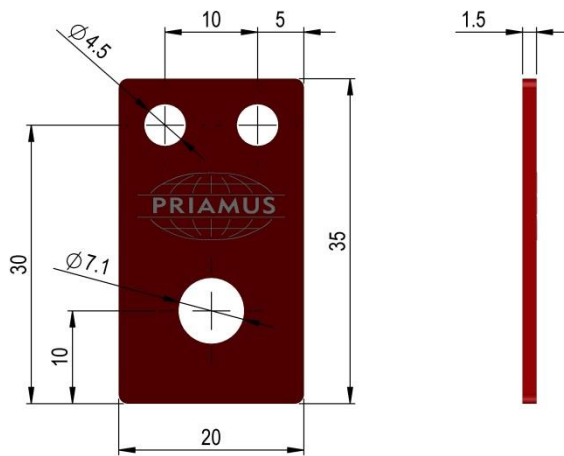
4004Cx.x-101(-H) / 4006Bx.x-101(-H) / 4008Bx.x-101(-H)

Article	Type	Article	Type
Distance sleeve (l = 0.04 m)	4521A	Identification plate	-
Mounting plate	4584A		

4010Bx.x-101 / 4012Bx.x-101 / 4016Ax.x-101-H / 4018Ax.x-101-H

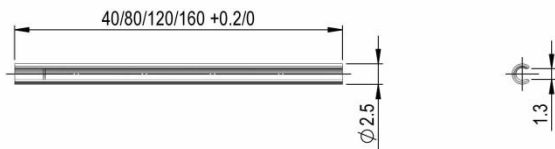
Article	Type	Article	Type
Distance sleeve (l = 0.04 m)	4522A	Identification plate	-
Mounting plate	4584A		

Mounting plate type 4584A



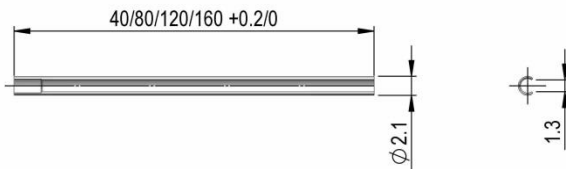
Distance sleeve type 4521A

(4521A0.08 / 4521A0.12 / 4521A0.16 not included in the scope of delivery, see accessories)



Distance sleeve type 4522A

(4522A0.08 / 4522A0.12 / 4522A0.16 not included in the scope of delivery, see accessories)



Accessories (optional)

Connecting and extension cables

Type	Coat	Bending radius [mm] (* bundled)	Connector (¹ TRIAx / ² Code 2)	Number of channels
Connecting cables:				
1141A	Plastic	11	Fischer Type S 101 male ¹⁾ – Fischer Type S 101 male ¹⁾	1
1149B	Metal hose	20	Fischer Type S 101 male ¹⁾ – Fischer Type S 101 male ¹⁾	1
Multi pin connecting cables:				
1144A	Plastic	50	Fischer Type S 104 fem. 19-pin ²⁾ – Fischer Type S 104 fem. 19-pin ²⁾	8
1145A	Plastic	11	Fischer Type S 104 fem. 19-pin ²⁾ – 1 x Fischer Type S 101 male ¹⁾	1
1146B	Plastic	11 (20*)	Fischer Type S 104 fem. 19-pin ²⁾ – 2 x Fischer Type S 101 male ¹⁾	2
1147B	Plastic	11 (25*)	Fischer Type S 104 fem. 19-pin ²⁾ – 4 x Fischer Type S 101 male ¹⁾	4
1159B	Metal shield	8 (35*)	Fischer Type S 104 fem. 19-pin ²⁾ – 8 x Fischer Type S 101 male ¹⁾	8
Extension cable:				
1142B	Metal hose	20	Fischer Type S 101 male ¹⁾ – Fischer Type KBE 101 fem ¹⁾	1

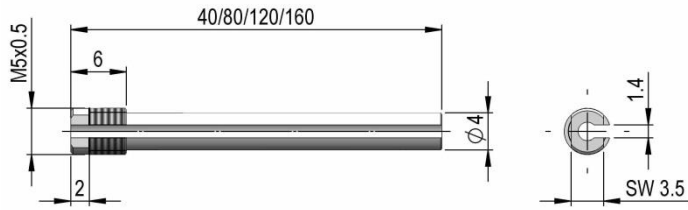
4004Cx.x-101(-H) / 4006Bx.x-101(-H) / 4008Bx.x-101(-H)

Article	Type	Article	Type
PRIAFIT® mounting sleeve l = 0.04 m	4530A	Distance sleeve l = 0.08 m	4521A0.08
l = 0.08 m	4530A0.08	l = 0.12 m	4521A0.12
l = 0.12 m	4530A0.12	l = 0.16 m	4521A0.16
l = 0.16 m	4530A0.16		
Mounting nut	4541A	Mounting / extraction tool for sensor	4561B
Assembly tool for mounting sleeve	4575B	Assembly tool for mounting nut	4562A
Dummy for - 4004Cx.x-101(-H) - 4006Bx.x-101(-H) - 4008Bx.x-101(-H)	4503A 4505A 4501B	Multi channel connecting box	1194A-8T
BlueLine amplifier	5080A-xT	BlueLine amplifier	5070A-2p2T

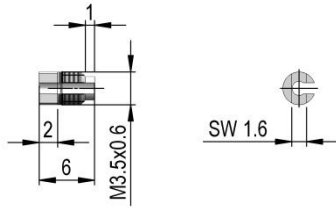
4010Bx.x-101 / 4012Bx.x-101 / 4016Ax.x-101-H / 4018Ax.x-101-H

Article	Type	Article	Type
PRIAFIT® mounting sleeve l = 0.04 m	4530A	Distance sleeve l = 0.08 m	4522A0.08
l = 0.08 m	4530A0.08	l = 0.12 m	4522A0.12
l = 0.12 m	4530A0.12	l = 0.16 m	4522A0.16
l = 0.16 m	4530A0.16		
Mounting nut	4543A	Mounting / extraction tool for sensor	4567A
Assembly tool for mounting sleeve	4575B	Assembly tool for mounting nut	4562A
Dummy for - 4010Bx.x-101 - 4012Bx.x-101 - 4016Ax.x-101-H - 4018Ax.x-101-H	4509A 4511A 4515A 4517A	Multi channel connecting box	1194A-8T
BlueLine amplifier	5080A-xT	BlueLine amplifier	5070A-2p2T

PRIAFIT® mounting sleeve type 4530A / 4530A0.08 / 4530A0.12 / 4530A0.16



Mounting nut type 4541A



Mounting nut type 4543A

