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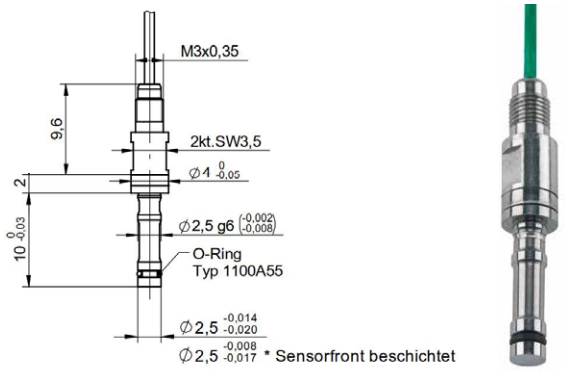
Cavity Pressure Sensor

Type 6178C...

with front ø2,5 mm

Miniaturized quartz sensor with single-wire technology for mold cavity pressures up to 200 bar encountered in the injection molding of plastics.

- Ideally suited for industrial applications
- Designed without a diaphragm and with a flat, machinable front face
- Available with TiCN coated front face
- Exchangeable cable
- IP67 protected
- With unified sensitivity



Description

The cavity pressure sensor Type 6178C... is a direct measuring piezoelectric sensor with a front surface of 2.5 mm diameter. Its front surface is installed with contact to the melt. For abrasive melts (glass fibers etc.) a TiCN coated version is offered. On the uncoated versions, the front can be machined up to 0,5 mm to be flush with the cavity wall contour. For these types there is the possibility to mount a keyway pin to prevent the sensor from rotating in the mounting bore. Type 6178C... is delivered with unified sensitivity. The maximum deviations of the sensitivities are ±3 % of the nominal sensitivity (12 pC/bar). This simplifies the interchangeability of sensors, as the nominal sensitivity can be used. All versions with replaceable cable are IP67 protected. Type 6178C... is available in several different mounting styles as well as different cable types, so that an easy and flexible integration in each mold environment can be achived. See page 3

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 … 200
Overload	bar	300
Sensitivity	pC/bar	≈-12
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

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Cable and amplifier for measuring chains with sensor Type 6178C

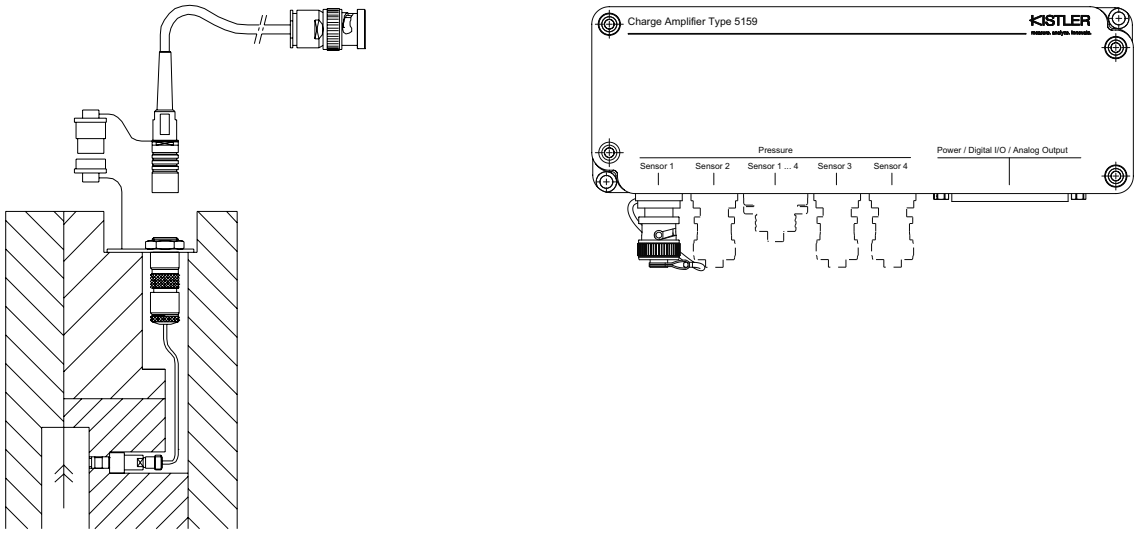
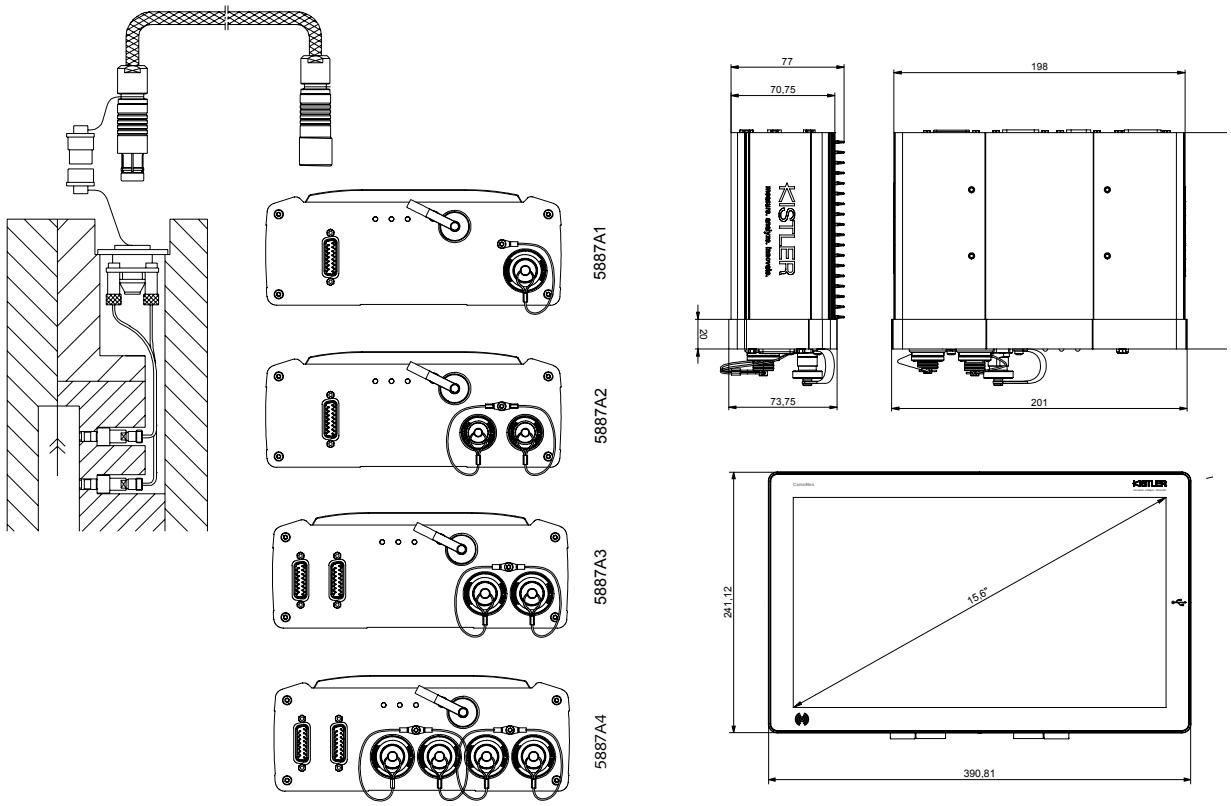


Fig. 1: Sensor Type 6178C with charge amplifier Type 5159A



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. 2: Sensor Type 6178C with ComoNeo monitoring system ComoNeo Typ 5887...

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Sensor variants

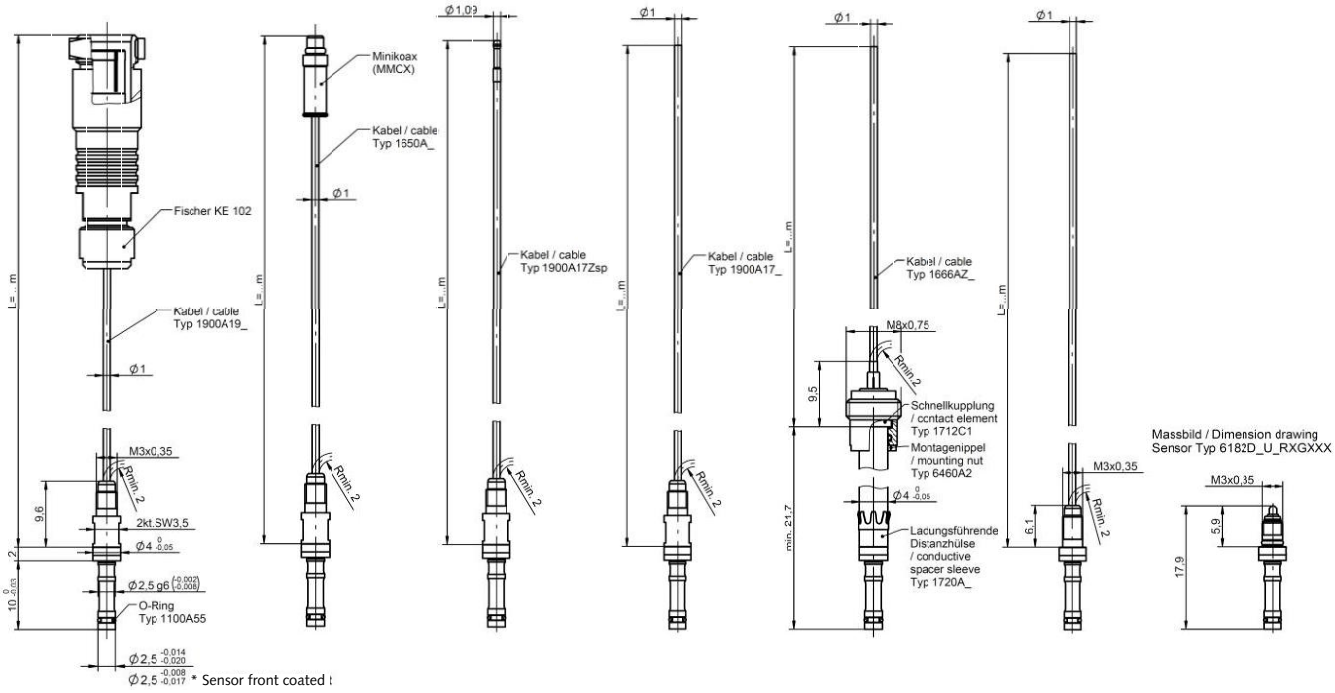

Fig. 3 Fig. 4 Fig. 5 Fig. 6 Fig. 7 Fig. 8 Fig. 9

Fig. 3: Pressure sensor Type 6178C... with coaxial cable
Sensor including replaceable coaxial cable and 1 channel Fischer connector (Cable K and connector F).

Fig. 4: Pressure sensor Type 6178C... with coaxial cable and MiniKoax connector.
This variant allows connection to the multichannel connector Type 1722A...MB with coaxial cables and MiniCoax connectors. The cable is interchangeable (Cable K and connector M).

Fig. 5: Pressure sensor Type 6178C... with Single-Wire cable and crimppin
Option of the sensor with replaceable single-wire cable and a crimppin for the connection to the contact elements Type 1712... and 1714.... The contact elements allow the use of interchangeable mold inserts or simplify the disassembly during tool maintenance processes (Cable S, connector G and cable design Zsp).

Fig. 6: Pressure sensor Type 6178C... with single-wire cable
This version allows the connection to the multi-channel connector Type 1722A... with single-wire cable technology. The Single-Wire cable has a very small cross-section and can be routed flexibly in the injection molding tool. The cable is replaceable and can be cut to any length or repaired. With the single-wire technique, the electrical shielding is ensured by the mold steel. For the connection to Type 1722A... the sensor is ordered without connector, but is also optionally available with 1-channel connector Type 1839 (Cable S, connector G and cable design Zsp).

Fig. 7: Pressure sensor Type 6178C... with charge conducting spacer sleeve
The variants with charge conducting spacer sleeves are ideal for tools with exchangeable mold inserts, since the sensor can be easily replaced without having to loosen the wiring. But even a flexible tool concept or easier maintenance can be achieved with this mounting and connection style (Mounting N or L).

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Fig. 8: Pressure sensor Type 6178C... with integrated Single-Wire cable
The variants with integrated Single-Wire cable are aimed at customers who need a 1:1 replacement for the sensors Type 6178A. The slightly shorter installation length allows installation in very short mold inserts. If there is enough space, an old Type 6178A sensor can be replaced by a new Type 6178C sensor with replaceable cable. For this purpose, only the spacer sleeve must be shortened. However, if Type 6178A is to be fitted with mounting nut Type 6460A1, this version is to be preferred (Sensor X or Y, cable S and connector G or E).

Fig. 9: Pressure sensor Type 6178C... without cable
This version serves as a replacement sensor. No cable or other accessories are supplied except the spacer sleeve, the calibration certificate and the identification plate.

Mounting examples

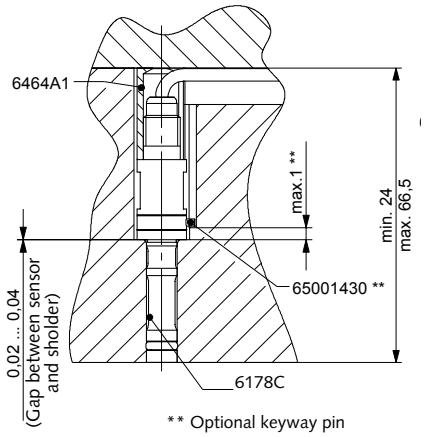

Fig. 10: Installation Type 6178C...USR... with spacer sleeve

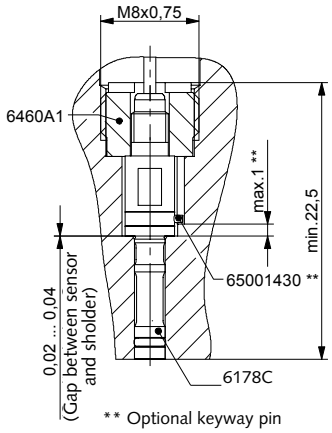

Fig. 11: Installation Type 6178C...UMR... with mounting nut

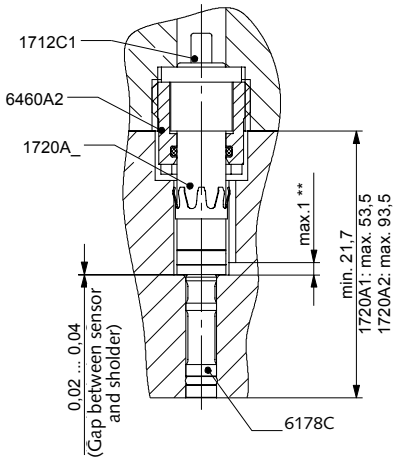

Fig. 12: Installation Type 6178C...UNR... resp. Type 6178C_ULR_ with charge conducting spacer sleeve

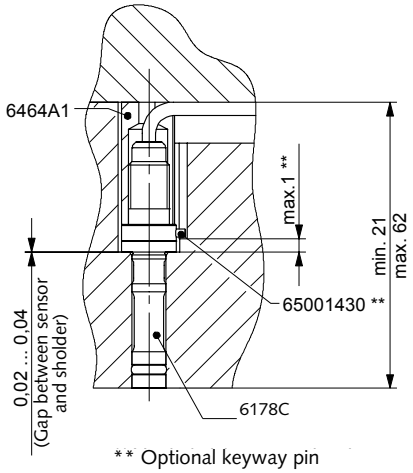

Figure 13: Installation of Type 6178CXUSRS... or 6178CYUSRS... with spacer sleeve

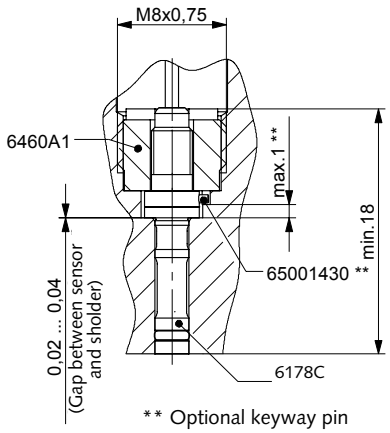

Fig. 14: Installation of Type 6178CXUSRS... or 6178CYUSRS... with mounting nut

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Mounting bores

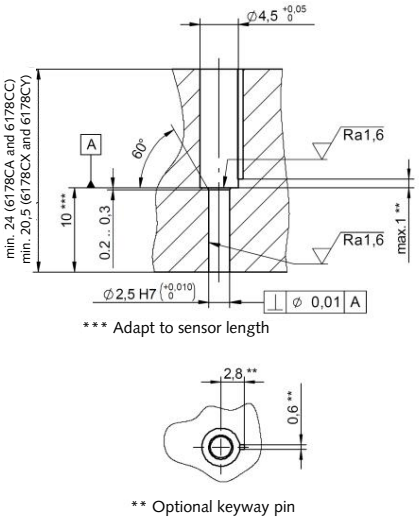

Fig. 15: Mounting bore for installation with spacer sleeve.

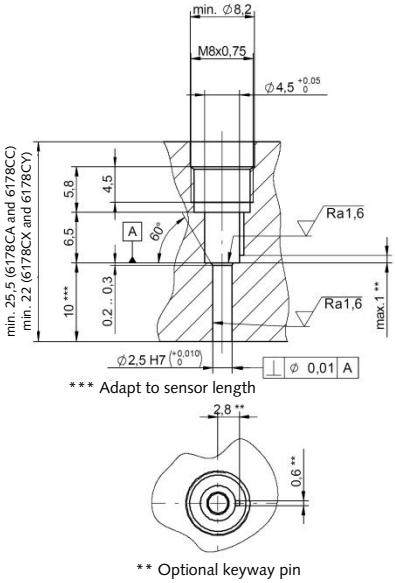

Fig. 16: Mounting bore for installation with mounting nut

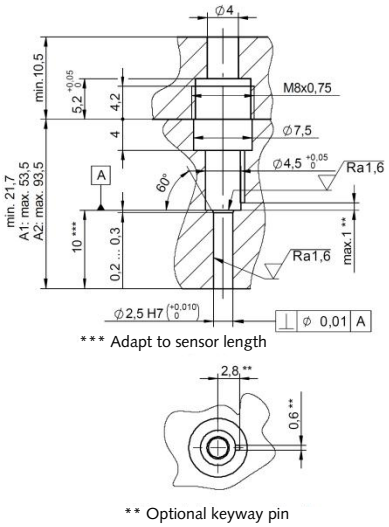

Fig. 17: Mounting bore for installation with charge conducting spacer sleeve

Mounting

The sensor is preferably installed in the mounting bore with the spacer sleeve (Type 6464A1) It can also be installed with mounting nut (Type 6460A1) or charge conducting spacer sleeve (Type 1720A1 or 1720A2). 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 front of the uncoated version can be reworked up to 0,5 mm. The coated version must not be machined, otherwise the coating is removed.

When using the Single-Wire cable it must be taken care of that the whole cable including the connector is routed only in the mold or metalic housing and not outside of it. The mold steel serves as a shield for the cable. The Single-Wire cable can easily be shortened or repaired and can be routed to smallest bores and channels. It can be connected to the multi-channel connector Type 1722A... or the single channel Fischer connector Type 1839. For both connections the isolation on the end of the cable must not be stripped. Coaxial cables must be ordered in the right length. All cables should be protected from mechanical damage by a cover plate.

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Accessories	**Mat. Nr./Type**
• Sensor	6178C...
• O-ring, diameter 1,75x0,6 mm FPM	65007546
• Identification plate	
• Checking tool	65000146

Included accessories according to selected variant

Type of mounting

• Mounting nut	6460A1
• Spacer sleeve (L = 50 mm)	6464A1
• Conducting spacer sleeve L = 40 mm	1720A1
• Conducting spacer sleeve L = 80 mm	1720A2
• Mounting nut for contact element Type 1712C1 with charge conducting spacer sleeve	6460A2

Cable and connectors

• Single-Wire cable with M3 connector L = 1,5/5,0 m	1900A17L…
• Single-Wire cable with M3 connector and crimp pin Type 1700A41 pre-installed L = min 0,04 m bis max = 1,5 m	1900A17Zsp
• Connector (for Single-Wire variants with connector)	1839
• Crimp pin for Single-Wire (Connection Types 1712... and 1714...	1700A41
• Coaxial cable 0 ... 200 °C Type with M3 connector and Fischer connector (L = 0,2/0,4/0,6/0,8/1,0/1,2/1,5/sp)	1900A19L...
• Coaxial cable 0 ... 200 °C with M3 connector and MiniCoax connector (L = 0,2/0,4/0,6/0,8/1,2)	1650A3P...
• Mounting plate for connector Type 1839 or coaxial cable with Fischer connector	65005208

Accessories (optionally orderable)

Mounting tools

• Extraction tool	1358A
• Fixation for Fischer connector	1401
• Socket wrench for mounting for mounting nut Type 6460A	1300A131
• Tools for cable exchange (inkl. fork wrench SW3,5)	1300A30
• Dummy sensor 6178CA/CC	6454A
• Dummy sensor 6178CX/CY	6558
• Keyway pin	65001430
• Sensor testerr	5495C…

Multichannel connectors and contact elements

• 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 up to 200 °C (for single-wire cable)	1708...
• 8-channel connector up to 200 °C (for single-wire cable)	1710...
• Contact elements 1-channel for single-wire types	1712...
• Contact elements 4-channel for single-wire types	1714...
• Crimpset with tools (Mounting of crimp pin Type 1700A41 or 2241A for connection to Types 1712... and 1714...)	1381A0

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Ordering key

Type 6178C □□ □□ □□ □

Sensor	
up to 200 °C	**A**
up to 200 °C, sensor front coated	**C**
up to 200 °C, integrated cable	**X**
up to 200 °C, integrated cable, sensor front coated	**Y**

Sensitivity	
Unisens	**U**

Mounting	
Mounting with mounting nut Type 6460A1	**M**
Mounting with spacer sleeve Type 6464A1	**S**
Mounting with conductive spacer sleeve Type 1720A1 (40 mm), only sensor A and C	**N**
Mounting with conductive spacer sleeve Type 1720A2 (80 mm), only sensor A and C	**L**

Reserve	**R**

Cable	
Single-wire-cable (PTFE)	**S**
Coaxial cable (PFA D2), only sensor A and C, **mounting** M and S	**K**
without cable	**X**

Connector	
Fischer KE102 (cable K)	**F**
MiniKoax (cable K)	**M**
with connector type 1839 in scope of delivery (cable S)	**E**
without connector type 1839 in scope of delivery (cable S)	**G**

Cable design	
No cable	**XXX**
L = 0,2 m, only cable K, connector M (coaxial)	**0,2**
L = 0,4 m, only cable K, connector F or M (coaxial)	**0,4**
L = 0,6 m, only cable K, connector F or M (coaxial)	**0,6**
L = 0,8 m, only cable K, connector F or M (coaxial)	**0,8**
L = 1,0 m, only cable K, connector F (coaxial)	**1,0**
L = 1,2 m, only cable K, connector F or M (coaxial)	**1,2**
L = 1,5 m, cable K, connector F or M cable S, connector E or G	**1,5**
L = 5 m, cable S, connector G or E	**5,0**
L = 0,10 ... 5 m, only cable K or H (coaxial)	**-sp**
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	**Zsp**

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