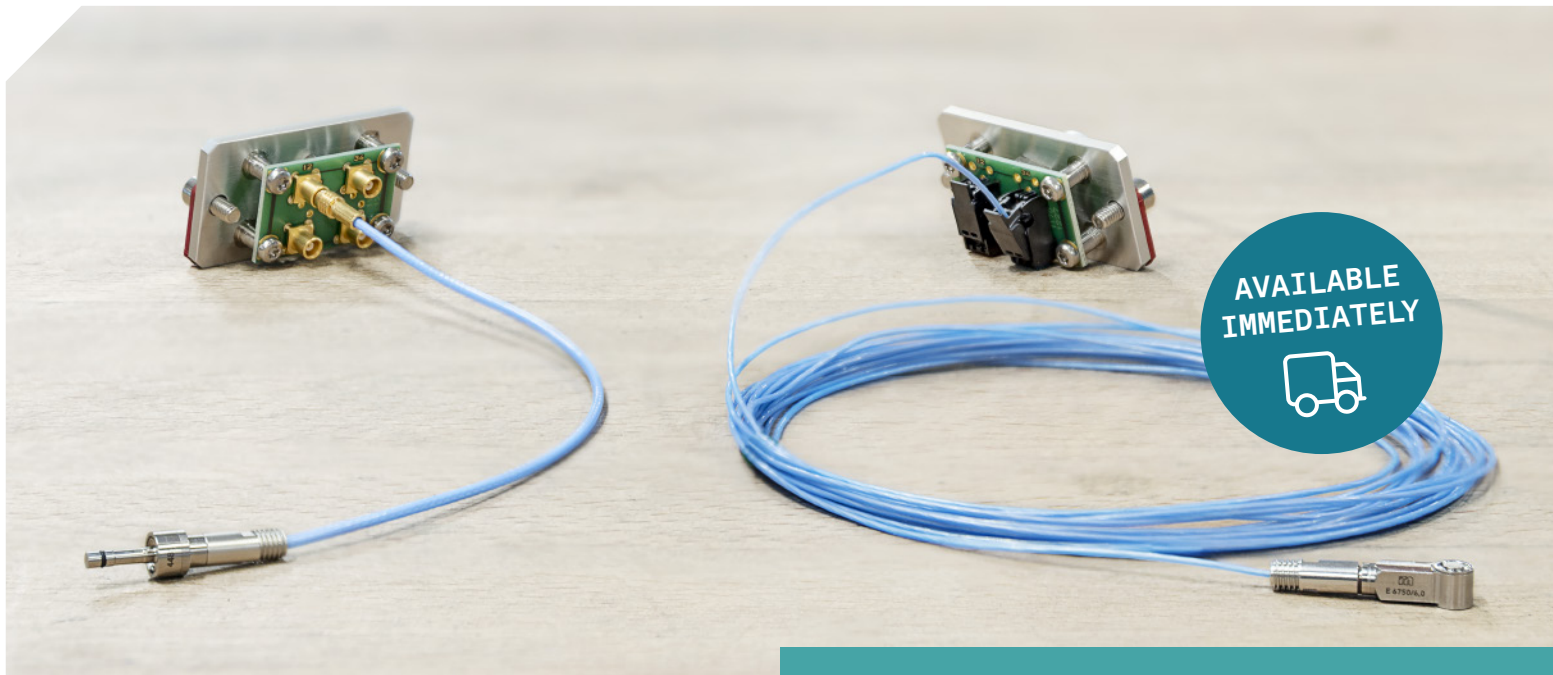


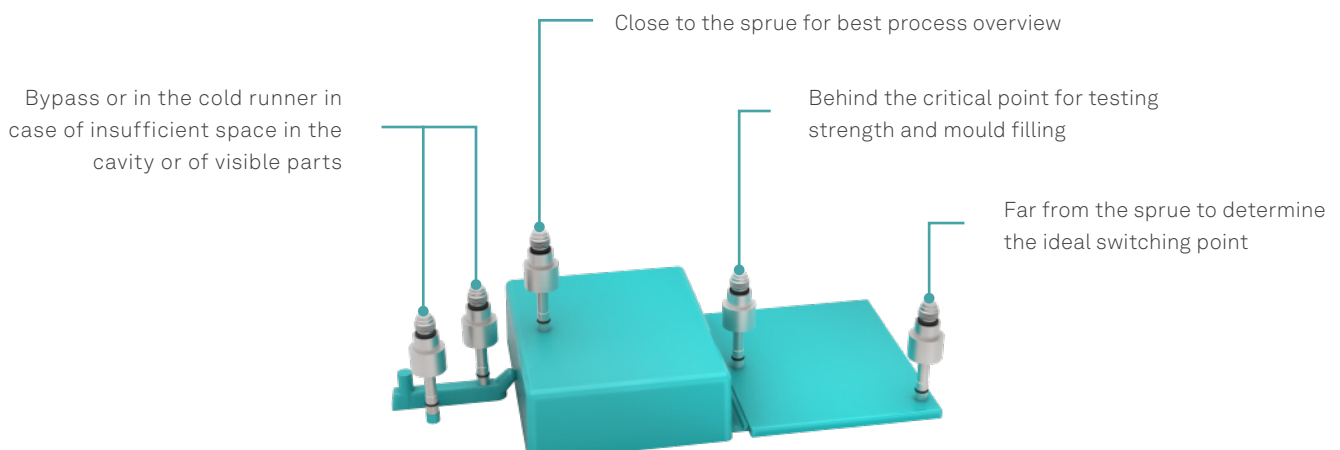
# Cavity pressure sensors



The cavity pressure is an important parameter in process monitoring in injection moulding. Pressure sensors are therefore indispensable for comprehensive mould monitoring: the use of high-quality sensors leads to optimal process quality and sustainably increases part quality.

Cavity pressure sensors enable the conversion of the pressure in the cavity to a measurable charge by means of the piezoelectric effect. The sensors are equipped with high-precision quartz crystals ( $\text{SiO}_2$  or  $\alpha$ -quartz), which release a charge under the influence of pressure or force. This charge, amplified by a charge amplifier, provides precise information about the pressure applied to the sensor, thereby enabling exact cavity pressure monitoring in the injection moulding process.

The ideal installation position in the mould depends on the application. Typical applications are strength monitoring and monitoring or controlling viscosity, compression or shrinkage.



# Direct and indirect cavity pressure measurement

Depending on the application, there are two types of pressure sensors: direct and indirect sensors, which are used for direct or indirect pressure measurement.

## Direct cavity pressure measurement

For direct measurement, the pressure sensor is inserted directly into the cavity, so the cavity pressure can be measured directly in the respective area.

When pressure is applied, the sensor delivers an electric charge (pC), which is then converted into a change of pressure (bar) through the specified sensor sensitivity (pC/bar).



### Cavity pressure sensor, direct E 6740

- › Direct measurement of the cavity pressure
- › In contact with the plastic melt
- › Sensor front machinable
- › Measuring range: 0–2,000 bar
- › Max. mould temperature: 200 °C

## Indirect cavity pressure measurement

The indirect measurement of the cavity pressure is carried out via a force sensor, which is located outside the cavity and is indirectly actuated by a force.

Unlike with direct sensors, the cavity pressure is transmitted to the sensor as a force via an ejector pin. In response to this force, the sensor emits an electric charge (pC), which is then converted into a change of force (N) through the specified sensor sensitivity (pC/N). This change of force combined with the front surface of the ejector is used to calculate the pressure change.



### Cavity pressure sensor, indirect E 6750

- › Indirect measurement of the cavity pressure via the ejector pin
- › A force is applied to the sensor via the ejector
- › Measuring range: 250–2,500 N
- › Max. operating temperature: 150–200 °C



### Information:

Each sensor is supplied with a certificate of calibration and an identification label.

#### Key

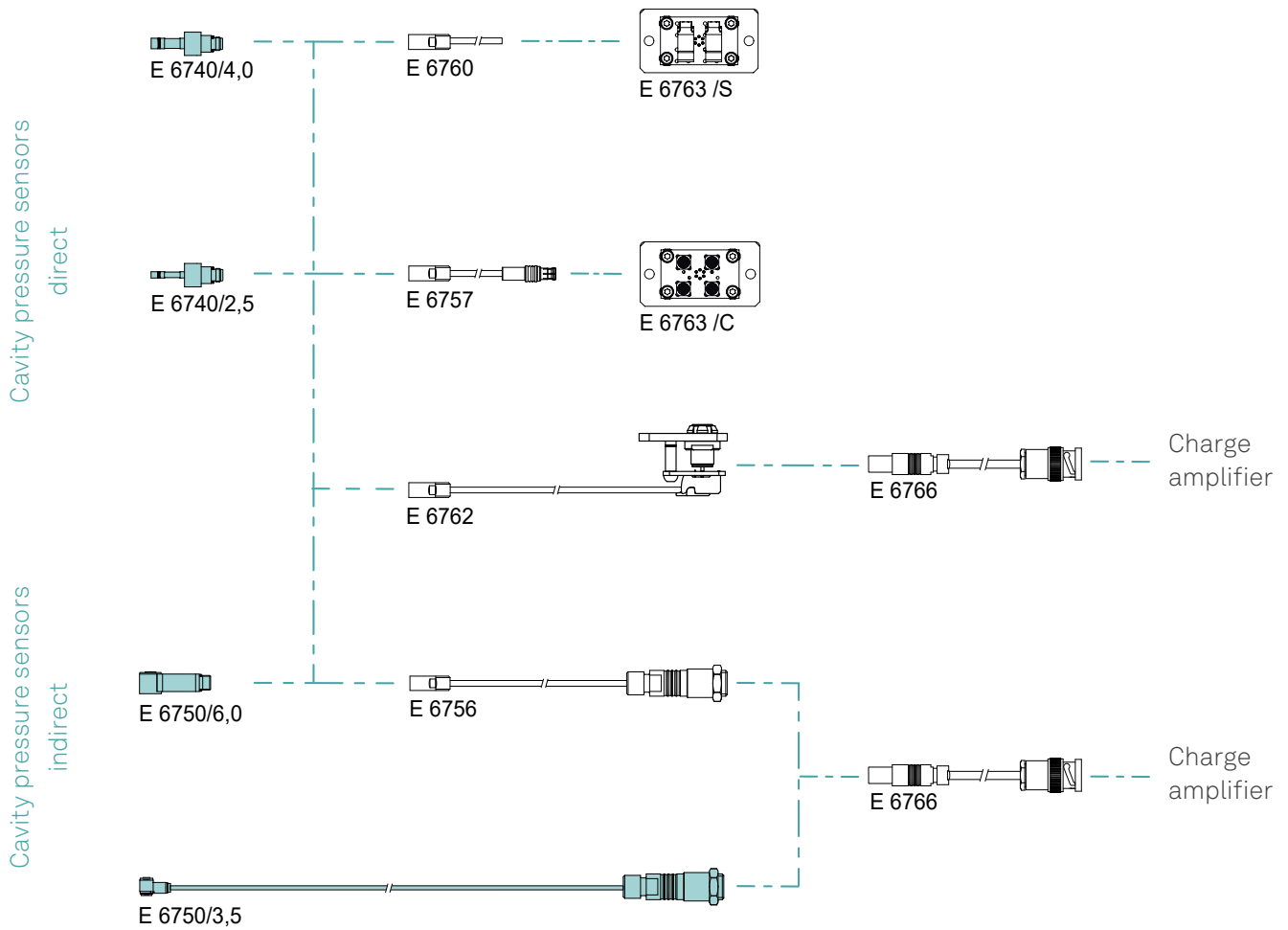
pC  
Electric charge in picocoulombs  
Coulomb: unit for electric charge

pC/bar  
Sensor sensitivity for direct sensors  
Change in the electric charge (pC) in relation to the applied pressure (bar)

pC/N  
Sensor sensitivity for indirect sensors  
Change in the electric charge (pC) in relation to the applied force (N)

# Connection options

The signal from the cavity pressure sensor is output as a charge and needs to be converted into a digital signal or an analogue voltage signal by a charge amplifier.



# Cable technology

Two different technologies are available on the market for charge transfer: the sensors can be connected via single-wire cables, with electrical shielding provided by the injection mould, or via coaxial cables, which are themselves electrically shielded.



## Single-wire

The single-wire cable has a very small cable diameter, so it can be routed flexibly with minimal bending radii in cable slots and holes, and shortened as required. Single-wire cabling is the ideal solution for moulds with limited space and offers compact and efficient connection options that are also cost-effective.



## Coaxial

The coaxial cable is characterised by optimum shielding against external signals thanks to its steel sheath. The use of cavity pressure sensors with a coaxial cable is therefore ideally suited for moulds with a high number of electrical components, such as hot runner components or monitoring equipment. This variant is also used if the cables are not completely surrounded by the steel of the mould.

### Meusburger cable technology – compact summary:

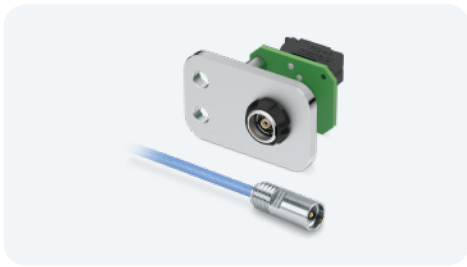
	<b>Single-wire sensor cables E 6760, E 6762</b>	<b>Coaxial sensor cables E 6756, E 6757</b>
Shielding	<ul style="list-style-type: none"> <li>› Cable routing inside the mould for electrical shielding</li> <li>› Cables must be completely surrounded by steel to prevent interference</li> </ul>	<ul style="list-style-type: none"> <li>› Optimum electrical shielding thanks to steel braiding</li> <li>› Ideal when complete shielding by the mould is not possible</li> </ul>
Flexibility	<ul style="list-style-type: none"> <li>› Very flexible, small bending radii possible</li> <li>› Ideal for confined spaces</li> </ul>	<ul style="list-style-type: none"> <li>› Insensitive to kinking</li> <li>› Ideal for moulds with electrical interference, e.g. from hot runner cables</li> </ul>
Installation	Connection via easy-to-install insulation displacement contacts	<ul style="list-style-type: none"> <li>› Pre-assembled cables with connector</li> <li>› Plug &amp; Play</li> </ul>
Cable lengths	<ul style="list-style-type: none"> <li>› 2,000 and 5,000 mm</li> <li>› Can be easily cut to length as required</li> </ul>	Graduated lengths from 200 to 1,000 mm

# Signal transmission options

## Transmission of a single sensor signal

This type of signal transmission is used for moulds where only one sensor is installed or an individual connection of each sensor to the charge amplifier is required.

### Single-wire sensor cable, with single-channel connector E 6762



The sensor is connected to the single-channel connector via the user-friendly insulation displacement contact. The connector itself is mounted on the outer wall of the mould to connect to the connecting cable E 6766.

- › Cable can be easily cut to individual lengths
- › Quick connection via easy-to-install insulation displacement contacts
- › Removing the cable insulation is not necessary

### Coaxial sensor cable E 6756



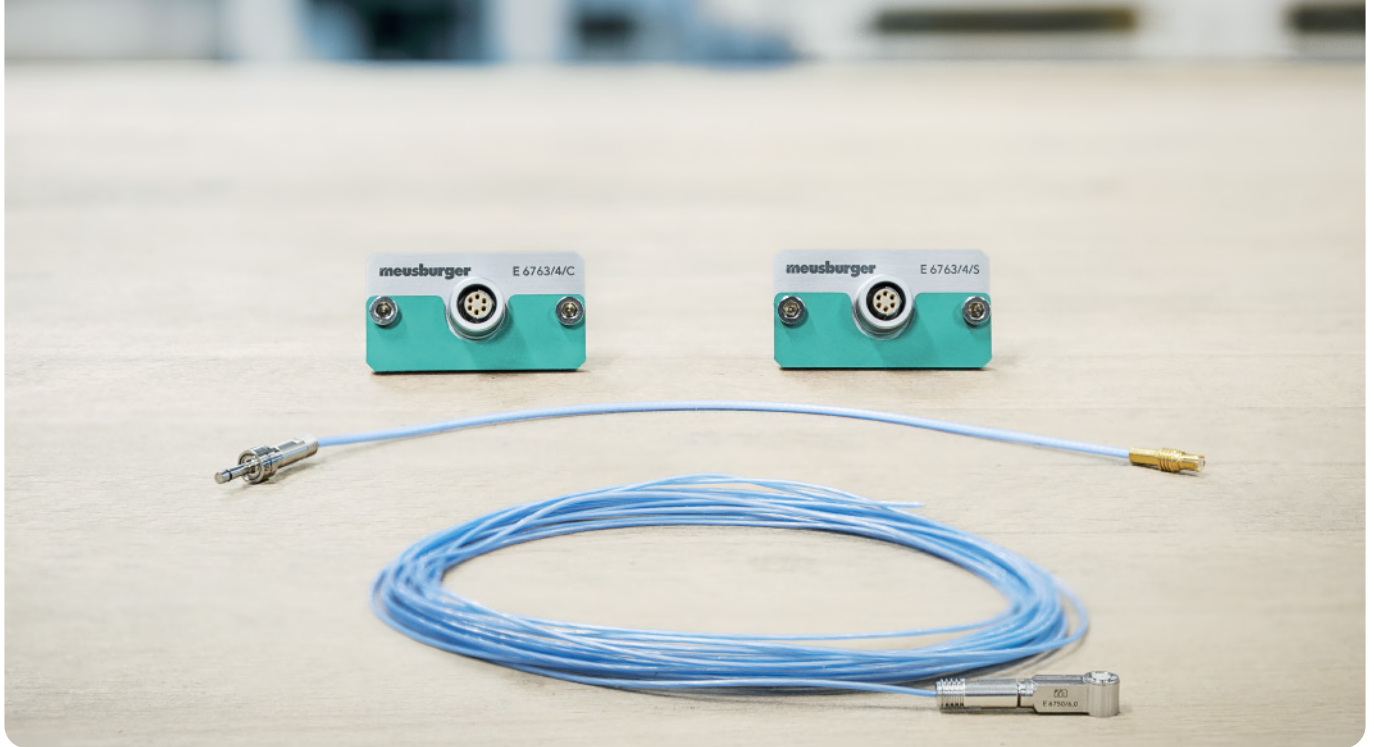
The sensor cable with integrated connector at its end is directly connected to the connecting cable E 6766 and attached to the outer wall of the mould by means of a retainer plate.

- › Connection from the sensor to the outer wall of the mould
- › Plug & play solution thanks to pre-assembled cable
- › Graduated cable lengths from 200 mm to 1,000 mm in the product range

### Connecting cable, single-channel, BNC E 6766



The connecting cable E 6766 connects the sensor cables E 6762 and E 6756 to the charge amplifier. It is extremely robust thanks to its fine steel braid sheath. The BNC connector with bayonet fitting enables a quick and secure connection to the charge amplifier.



## Transmission of multiple sensor signals

Multi-channel connectors enable the simple and efficient merging of up to 8 cavity pressure sensors, which minimises the amount of cables required.

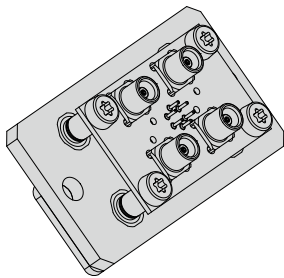
### Multi-channel connector E 6763

Depending on the version, the multi-channel connectors have insulation displacement contacts for the single-wire cable (version S) or mini coaxial female connectors for the mini coaxial cable (version C).

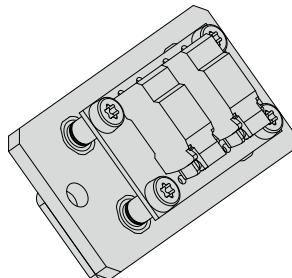
The integrated mould recognition enables high process reliability during mould changes. In addition, the sensor data can be easily identified with the supplied labelling plate.

### Benefits:

- › High process reliability thanks to integrated chip for mould recognition
- › Labelling plate included for identifying the sensor data
- › Easy cable connection



Version C



Version S

## Comparison of the two versions for multi-channel connectors available at Meusburger

	<b>Single-wire sensor cable E 6760</b>	<b>Mini coaxial sensor cable E 6757</b>
Signal	Can be disturbed by external signals in case of insufficient shielding (noise)	No signal disturbance thanks to shielding against environmental influences through steel sheath
Flexibility	<ul style="list-style-type: none"> <li>› Very flexible, small bending radii possible</li> <li>› Danger of kinking</li> </ul>	<ul style="list-style-type: none"> <li>› Insensitive to kinking</li> <li>› Less flexible than single-wire cables</li> </ul>
Installation	Easy to install thanks to the insulation displacement contact on the multi-channel connector	Easy to install thanks to mini coaxial female connector on the multi-channel connector
Cable lengths	<ul style="list-style-type: none"> <li>› 2,000 and 5,000 mm</li> <li>› Can be easily cut to length as required</li> </ul>	Graduated lengths from 200 to 1,000 mm
Cable diameter	1.2 mm	1.9 mm

## Information on the variants of the multi-channel connector

Depending on the design of the multi-channel connector (4- or 8-fold), different connector types are required for the connecting cable.

	<b>4-fold</b>	<b>8-fold</b>
Connector type for the multi-channel connector	Fischer DB 103 A056-139	Fischer DB 104 A056-139
Connector type on the charge amplifier	See data sheet from the manufacturer of the charge amplifier	



### Information:

Some of the installation accessories are included in the delivery or available online as spare parts. More information is provided in the portal.



# Installation instructions



## **Cavity pressure sensor, direct E 6740**

[www.meusburger.com/installation-E6740-EN](http://www.meusburger.com/installation-E6740-EN)



## **Cavity pressure sensor, indirect E 6750**

[www.meusburger.com/installation-E6750-EN](http://www.meusburger.com/installation-E6750-EN)

# Selection guide

We offer a practical selection guide for simple and targeted selection of the right sensor type and the matching connection components.



## **Download now**

[www.meusburger.com/selection-guide-cavity-pressure](http://www.meusburger.com/selection-guide-cavity-pressure)

# Checklists

In addition to the installation instructions, you will find checklists for design and installation in the portal.



## **Download now**

[www.meusburger.com/checklists-cavity-pressure](http://www.meusburger.com/checklists-cavity-pressure)