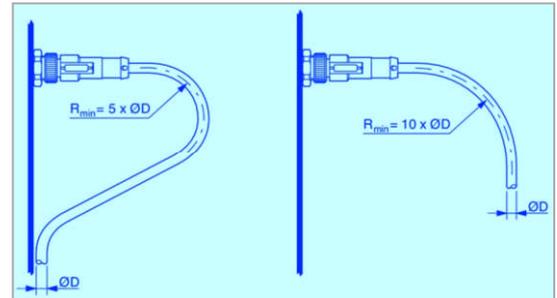


### Passive Connectivity: System sales, a term became fashionable. What does that mean for the sensor business?

A possible answer might be: A system is only as good as the weakest component of the system. If we look at it this way the quality and knowledge of accessories such as connectivity will gain importance. One more reason for taking a closer look on the world of connectivity within this Newsletter issue.

#### What does bend radius mean?

In cable terminology, bend radius refers to the smallest curve that a cable may have when laid without changing the characteristics of the cable. Bend radii ( $R_{min}$ ) are specified in relation to the cable diameter (D) (see picture 1).



Picture 1: Bend radii

#### What does halogen-free mean?

Cables and wires are defined as halogen-free if they are made of materials that do not contain salt-forming chlorine, fluorine, bromine and iodine. The insulation and cladding of these cables are made of polymers based on pure hydrocarbons. When these materials burn, no corrosive or toxic gases, only water vapor and carbon dioxide are emitted.

The use of halogen-free cables becomes more and more compulsory with increasing numbers of buildings where people gather or everywhere, where safety consciousness to protect human life and valuable materials take a special significance.

Halogen free cables are used in:

- Hospitals, airports, stores, hotels, theaters, schools, multistory buildings, fire warning plants, alarm systems, ventilation systems, escalators, elevators etc.

#### Humid Areas or maximum flexibility, use PUR cables!

Various industries e.g. Machinery-, plant- or tool making industries are working particularly with mineral oils, alkalis and aggressive coolant emulsions and under difficult environmental working conditions. Due to these conditions the electrical cables have to perform to exceptionally high standards. Flexibility, abrasion and oil resistance have to be guaranteed.

#### Material durability, PUR

Flexible, silicone- and halogen-free cable with PUR outer sheath polypropylene conductor insulation. Oil and flame resistant in accordance with VDE 0472. Can be used in dragchain applications with minimal bend radius. This cable is very well suited for flexible applications in robotics, machine tools and metal-cutting manufacturing.

#### Material durability, PVC

Pure PVC cable, suitable for medium mechanical stress for packaging machine applications as well as assembly and production lines. Good resistance to acids and alkalis and therefore ideally suited for use in the food and beverage industry. Limited abrasion behavior and limited resistant to oil and chemicals.

## Tips & Tricks

### IP enclosure rating:

IP enclosure ratings define the degree of protection (ingress protection) of the housing against contact, impurities and water. The first digit indicates the protection against mechanical impurities and the second digit indicates protection against water.

An important factor for reaching the indicated IP-enclosure rating plays the adherence to the proper tightening torque of the milled nut of the connection cable.

- IP65: Protection against access with a wire, dust tight, protection against water jets (nozzle) from any angle.
- IP67: Protection against access with a wire, dust tight, Protection against temporary immersion in water (depth of 1 m, 30min).
- IP68: Protection against access with a wire, dust tight, Protection against continuous immersion in water (requirements must be higher than IP67).
- IP69K: Protection against access with a wire, dust tight, Protection against water in high-pressure/steam cleaning applications (100 bar at 80°C) at various angles.

### Important note:

Up to enclosure rating IP X6, all lower enclosure ratings are automatically covered. For higher enclosure ratings, this does not automatically apply to water protection ratings 7, 8 and 9K. If the inclusion of a lower enclosure rating is required, this must be specified with a dual designation.

### Overview:

Attribute	Standard PVC	Standard PUR	F&B M8	F&B M12
Material cable	PVC	PUR	TPE-O (PP)	PVC
Material housing	TPU	TPU	PP	PVC
Material nut	Brass	Zinc, nickel-plated	stainless steel 1.4404	stainless steel 1.4404
Temperature range cable				
<i>not moved</i>	-40°C ... +80°C	-40°C ... +80°C	-40°C ... +105°C	-40°C ... +80°C
<i>moved</i>	+5°C ... +80°C	-25°C ... +80°C	-25°C ... +105°C	-5°C ... +80°C
Temperature range connector				
M8	-40°C ... +90°C	-25°C ... +90°C	-40°C ... +105°C	-
M12	-25°C ... +80°C	-25°C ... +90°C	-	-25°C ... +70°C
Bend radius				
<i>not moved</i>				
<i>moved</i>	min. 10 x d	min. 5 x d	min. 5 x d min. 10 x d	min. 5 x d min. 10 x d
Bend cycles	2 Mio. (10 x d)	> 4 Mio. (10 x d)	> 4 Mio. (10 x d)	2 Mio. (10 x d)
IP enclosure rating	IP67	IP65, IP68	IP67, IP69K	IP67, IP69K
Resistance detergents	-	-	Ecolab	-
Tightening torque				
M8	0,3 Nm	0,2 Nm	0,6 Nm	-
M12	0,5 Nm	0,4 Nm	-	0,7 Nm

For more details please see the sales organizer finder and our expert forum.



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