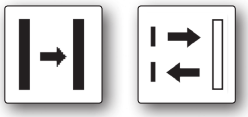
design	**Ø6mm to Ø 8.5mm** **length 20mm to 95mm**	
dif. reflection sensor	sensing range	**2mm to 170mm**
through beam sensor	operating distance	**120mm to 1500mm**

- ✓ **sensing heads in many designs (e.g. angle sensing head)**
- ✓ **robust, vibration-proof and high flexible**
- ✓ **for temperatures from -40°C to +180°C**
- ✓ **special versions with metal-sheath and special adhesive from -40°C to +300°C**
- ✓ **applications in ex-ranger possible**
- ✓ **resistant against magnetic and high frequency fields**

smallest glass-fiber sensing heads high variety of versions



description

The use of fiber-optics in optical electronics is very useful. The ***ipf fiber glass system*** consists of a functional unit made of a flexible glass fiber optic cable and the optoelectronic amplifier. The exceptional advantages of glass fiber technology are used in connection with a series of high-grade amplifiers as versatile glass fiber through-beam sensors and glass fiber diffuse reflection sensors.

ipf fiber optics consist of a bundle of individual glass fibers, each around 50µm thick. The respective fiber optic amplifiers transmit modulated IR light. This is conveyed through the fiber optic glass fibers according to the principle of total reflection. The individual glass fibers consist of core and cladding glass. The beam of light entering into the core is conducted through the glass fibers by means of reflection on the contact surfaces core/cladding (see respective illustration).

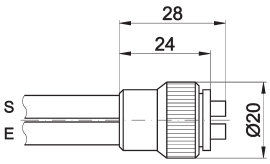
Due to the exceptional optical and mechanical properties of ***ipf fiber optics***, this technology is particularly suitable for automated and manufacturing processes, in the field of detecting small parts as well as wherever installation and environmental conditions cause particular difficulties.

Glass fiber optic cables have a variety of applications in all sectors of industry, including mechanical engineering, chemistry, pharmacy, ceramics as well as plastics processing.

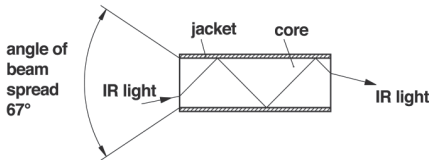
application examples

- contact-free detection, counting, controlling and positioning where space is limited
- scanning of small parts in processing stations, supply systems and machines
- application in extreme operational areas, e.g. in welding systems

adaptor

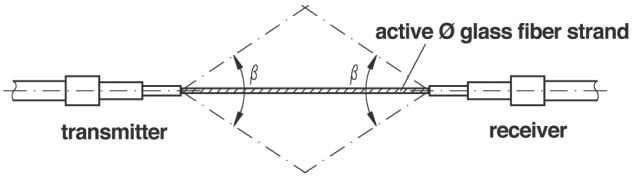


reflection in a glass fiber

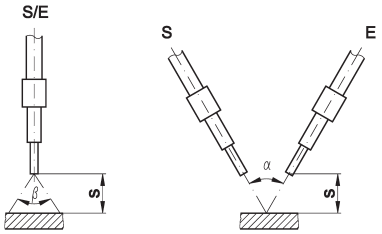


notes
The glass fiber cables can be combined with the series OL 40 fiber optic amplifiers. The fiber glass cable adaption is M18x1.

through-beam sensor



retro-reflective sensor



The angle "β" with approx. 67° results of the emitting and/or the reception angle of the glass fiber. β is a constant and not depending on the active diameter of the glass fiber or the sensing head design. The sensing range "s" depends on the glass fiber diameter, the reflectivity (surface condition of the object as well as the angle "α".

The through-beam sensor principle:
In each case, the transmitter and receiver side are individually (two-armed optic cable) connected so that they lead from the adapter. The sensing ranges or operating distance have been established using the optical cable amplifier design 40. The active switching range corresponds to the diameter of the glass fiber bundle.

The diffuse reflection sensor principle:
Glass fibers on the transmitter and receiver side are bought together in a protective hose (single-armed optic cable).

Assembly:
VA stainless steel inner coil, braided glass fibers (strain relief), silicone casing.

Ambient temperature
-40°C to +180°C. Optic cable for heavy duty mechanical stresses such as stretching, bending, periodic vibrations, use in damp areas with acid and alkaline solutions and in the food industry.

The **bending radius** should be at least 6 times the diameter of the hose during movement and at least 3 times the diameter of the hose in static application.

Special embodiments for an increased ambient temperature with a special adhesive, temperature range: -40°C to +300°C.

Protect glass fibres from mechanical damage at the light outlet!

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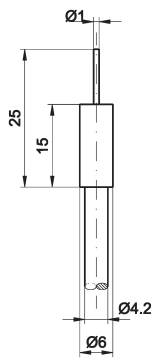
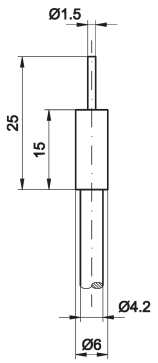
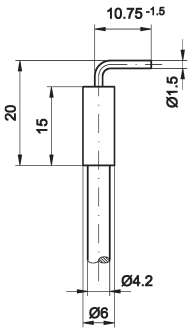
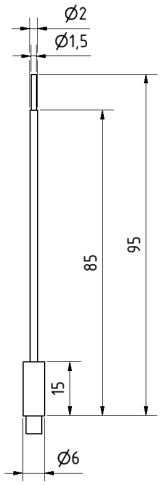
dif. reflection sensor				
article-no.	**LT030000**	**LT030101**	**LT030102**	**LT030103**
sensing range	**5.0mm**	**15.0mm**	**15.0mm**	**15.0mm**
length	**300mm**	**300mm**	**300mm**	**300mm**
article-no.	**LT060000**	**LT060101**	**LT060102**	**LT060103**
sensing range	**4.0mm**	**15.0mm**	**15.0mm**	**15.0mm**
length	**600mm**	**600mm**	**600mm**	**600mm**
article-no.	**LT100000**	**LT100101**	**LT100102**	**LT100103**
sensing range	**3.0mm**	**10.0mm**	**10.0mm**	**10.0mm**
length	**1000mm**	**1000mm**	**1000mm**	**1000mm**
article-no.	**LT150000**	**LT150101**	**LT150102**	**LT150103**
sensing range	**2.0mm**	**8.0mm**	**8.0mm**	**8.0mm**
length	**1500mm**	**1500mm**	**1500mm**	**1500mm**
through-beam sensor				
article-no.	**-**	**LS030101**	**LS030102**	**LS030103**
operating distance	**-**	**180mm**	**150mm**	**180mm**
length	**-**	**300mm**	**300mm**	**300mm**
article-no.	**-**	**LS060101**	**LS060102**	**LS060103**
operating distance	**-**	**180mm**	**150mm**	**180mm**
length	**-**	**600mm**	**600mm**	**600mm**
article-no.	**-**	**LS100101**	**LS100102**	**LS100103**
operating distance	**-**	**150mm**	**120mm**	**150mm**
length	**-**	**1000mm**	**1000mm**	**1000mm**
article-no.	**-**	**LS150101**	**LS150102**	**LS150103**
operating distance	**-**	**120mm**	**100mm**	**120mm**
length	**-**	**1500mm**	**1500mm**	**1500mm**









TECHNICAL DATA				
dimensions	Ø 1.0x10mm	Ø 1.5x10mm	Ø 1.5x10mm/90°	Ø 1.5x80mm
housing material	stainless steel	stainless steel	stainless steel	stainless steel
material (outside)	silicone jacket, stainl. steel-innerhelix braided glass fibres	silicone jacket, stainl. steel-innerhelix braided glass fibres	silicone jacket, stainl. steel-innerhelix braided glass fibres	silicone jacket, stainl. steel-innerhelix braided glass fibres
temperature (working)	-40 ... +180°C	-40 ... +180°C	-40 ... +180°C	-40 ... +180°C
system of protection (EN 60529)	IP67	IP67	IP67	IP67
connection	M18	M18	M18	M18
mounting accessories (clip)	**AY000009**	**AY000009**	**AY000009**	**AY000009**

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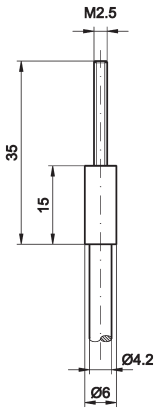
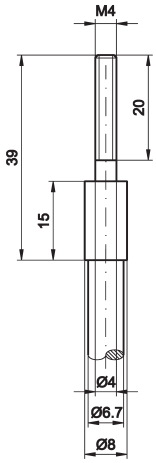
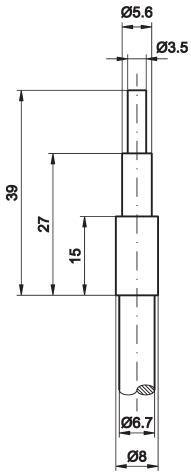
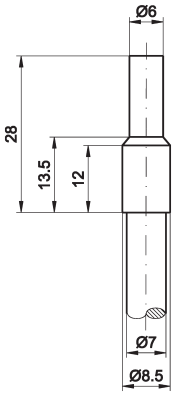
dif. reflection sensor				
article-no.	**LT030204**	**LT030305**	**LT030309**	**LT030510**
sensing range	**30mm**	**70mm**	**70mm**	**170mm**
length	**300mm**	**300mm**	**300mm**	**300mm**
article-no.	**LT060204**	**LT060305**	**LT060309**	**LT060510**
sensing range	**30mm**	**70mm**	**70mm**	**150mm**
length	**600mm**	**600mm**	**600mm**	**600mm**
article-no.	**LT100204**	**LT100305**	**LT100309**	**LT100510**
sensing range	**25mm**	**60mm**	**60mm**	**130mm**
length	**1000mm**	**1000mm**	**1000mm**	**1000mm**
article-no.	**LT150204**	**LT150305**	**LT150309**	**LT150510**
sensing range	**20mm**	**50mm**	**50mm**	**110mm**
length	**1500mm**	**1500mm**	**1500mm**	**1500mm**
through-beam sensor				
article-no.	**LS030204**	**LS030305**	**LS030309**	**LS030510**
operating distance	**200mm**	**300mm**	**300mm**	**300mm**
length	**300mm**	**300mm**	**300mm**	**300mm**
article-no.	**LS060204**	**LS060305**	**LS060309**	**LS060510**
operating distance	**500mm**	**700mm**	**700mm**	**700mm**
length	**600mm**	**600mm**	**600mm**	**600mm**
article-no.	**LS100204**	**LS100305**	**LS100309**	**LS100510**
operating distance	**500mm**	**600mm**	**700mm**	**1500mm**
length	**1000mm**	**1000mm**	**1000mm**	**1000mm**
article-no.	**LS150204**	**LS150305**	**LS150309**	**LS150510**
operating distance	**400mm**	**500mm**	**600mm**	**1500mm**
length	**1500mm**	**1500mm**	**1500mm**	**1500mm**









TECHNICAL DATA

dimensions	M2.5x20mm	M4.0x20mm	Ø 3.5x12mm	Ø 6.0x14.5mm
housing material	VA	VA	VA	VA
material (outside)	silicone jacket, stainl. steel-innerhelix braided glass fibres	silicone jacket, stainl. steel-innerhelix braided glass fibres	silicone jacket, stainl. steel-innerhelix braided glass fibres	silicone jacket, stainl. steel-innerhelix braided glass fibres
temperature (working)	-40 ... +180°C	-40 ... +180°C	-40 ... +180°C	-40 ... +180°C
system of protection (EN 60529)	IP67	IP67	IP67	IP67
connection	M18	M18	M18	M18
mounting accessories	2x screw nut M2.5	2x screw nut M4	-	-
mounting accessories (clip)	-	-	**AY000008**	**AY000009**

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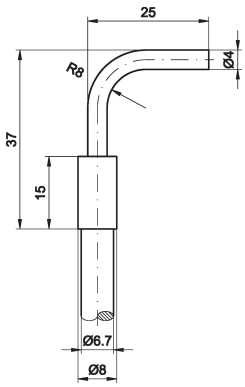
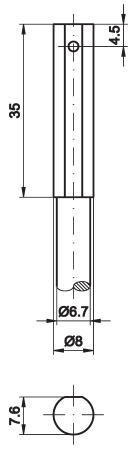
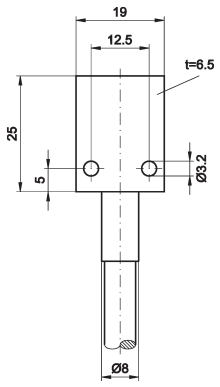
dif. reflection sensor			
article-no.	**LT030311**	**LT030312**	**LT030920**
sensing range	**60mm**	**50mm**	**120mm**
length	**300mm**	**300mm**	**300mm**
article-no.	**LT060311**	**LT060312**	**LT060920**
sensing range	**60mm**	**50mm**	**110mm**
length	**600mm**	**600mm**	**600mm**
article-no.	**LT100311**	**LT100312**	**LT100920**
sensing range	**50mm**	**40mm**	**90mm**
length	**1000mm**	**1000mm**	**1000mm**
article-no.	**LT150311**	**LT150312**	**LT150920**
sensing range	**45mm**	**30mm**	**70mm**
length	**1500mm**	**1500mm**	**1500mm**
through-beam sensor			
article-no.	**LS030311**	**LS030312**	**LS030920**
operating distance	**300mm**	**300mm**	**300mm**
length	**300mm**	**300mm**	**300mm**
article-no.	**LS060311**	**LS060312**	**LS060920**
operating distance	**600mm**	**400mm**	**800mm**
length	**600mm**	**600mm**	**600mm**
article-no.	**LS100311**	**LS100312**	**LS100920**
operating distance	**600mm**	**400mm**	**700mm**
length	**1000mm**	**1000mm**	**1000mm**
article-no.	**LS150311**	**LS150312**	**LS150920**
operating distance	**500mm**	**300mm**	**600mm**
length	**1500mm**	**1500mm**	**1500mm**

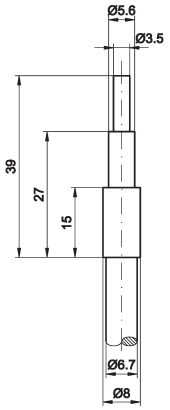


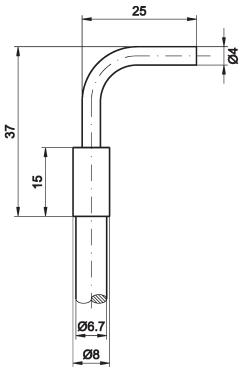




TECHNICAL DATA			
dimensions	Ø 4.0x22mm/90°	Ø 7.5x35mmn, lateral	25x19x6.5mm
housing material	VA	VA	Aluminium
material (outside)	silicone jacket, stainless steel-innerhelix braided glass fibres	silicone jacket, stainless steel-innerhelix braided glass fibres	silicone jacket, stainless steel-innerhelix braided glass fibres
temperature (working)	-40 ... +180°C	-40 ... +180°C	-40 ... +180°C
system of protection (EN 60529)	IP67	IP67	IP67
connection	M18	M18	M18
mounting accessories	2x screw nut M2.5	2x screw nut M4	-
mounting accessories (clip)	**AY000010**	**AY000010**	-

double dif. reflection sensor		
article-no.	LV030309	LV030311
operational sensing range	60mm	60mm
length	300mm	300mm
article-no.	LV060309	LV060311
operational sensing range	50mm	50mm
length	600mm	600mm
article-no.	LV100309	LV100311
operational sensing range	40mm	40mm
length	1000mm	1000mm
article-no.	LV150309	LV150311
operational sensing range	30mm	30mm
length	1500mm	1500mm





TECHNICAL DATA		
dimensions	Ø 3.5mmx12mm	Ø 4.0x22mm/90°
housing material	VA	VA
material (outside)	silicone jacket, stainless steel-innerhelix braided glass fibres	silicone jacket, stainless steel-innerhelix braided glass fibres
temperature (working)	-40 ... +180°C	-40 ... +180°C
system of protection (EN 60529)	IP67	IP67
connection	M18	M18
mounting accessories	-	-
mounting accessories (clip)	**AY000008**	**AY000010**

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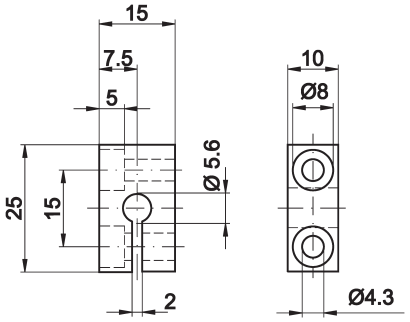
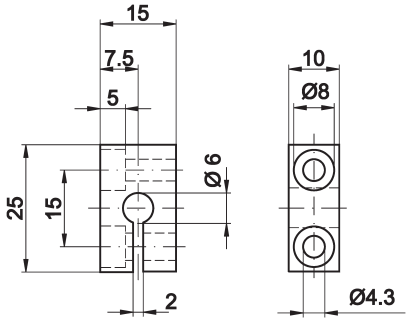
mounting accessories

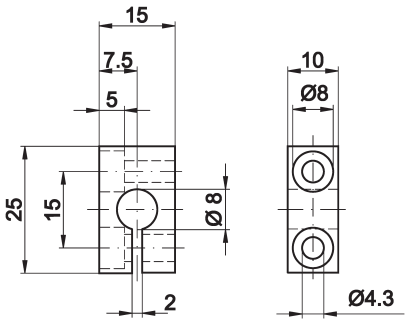
AY000008



AY000009



AY000010



2

ACCESSORIES

article-no.	description	material
AY000008	mounting clip Ø 5.6mm	aluminum
AY000009	mounting clip Ø 6mm	aluminum
AY000010	mounting clip Ø 8mm	aluminum

mounting clips or screw nuts included in the scope of delivery!

Warning: Never use these devices in applications where the safety of a person depends on their functionality.

You also find this data sheet, as well as contact details under www.ipf-electronic.com

NOTES

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