

design	$\varnothing 6\text{mm to } \varnothing 8.5\text{mm}$ 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 $+180^{\circ}\text{C}$
- ✓ special versions with metal-sheath and special adhesive from -40°C to $+300^{\circ}\text{C}$
- ✓ 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 $50\mu\text{m}$ 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).

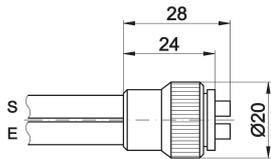
Due to the exceptional optical and mechanical properties of **ipf fiber optics**, this technology is particularly suitable for automated and manufacturing processes, in the field of detecting small parts as well as wherever installation and environmental conditions cause particular difficulties.

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.

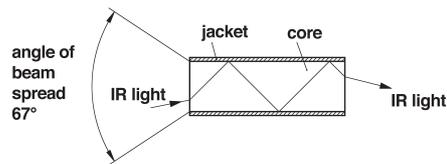
application examples

- ▶ 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



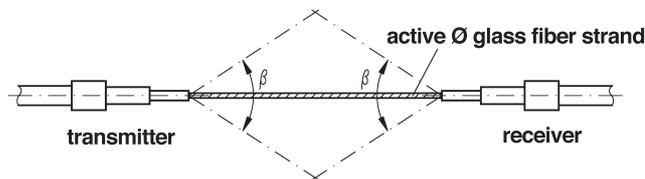
reflection in a glass fiber



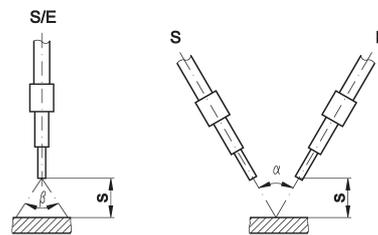
notes

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 adaptor. 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). Glass fiber optical cable with a silicone/metal protective hose, end sleeve VA stainless steel.

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. Glass fiber optical cable with a plastic /metal protective hose, PUR casing, end sleeve VA stainless steel.

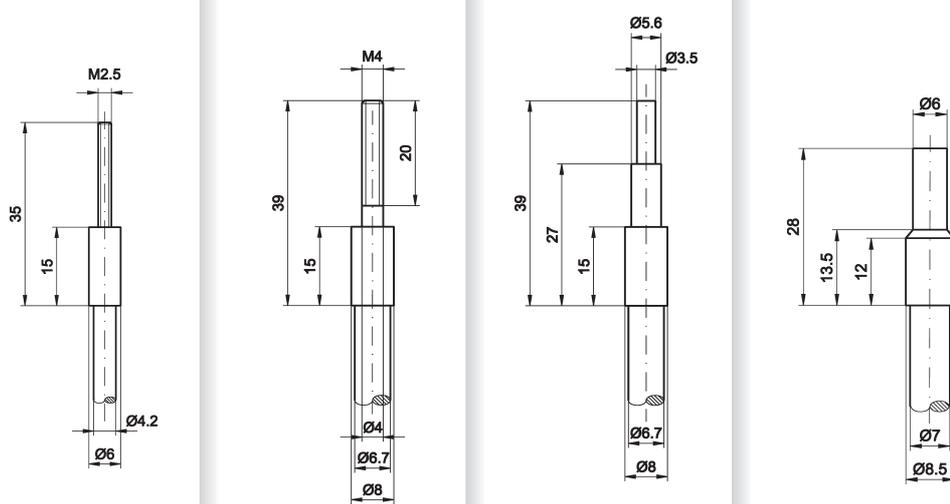
Protect glass fibres from mechanical damage at the light outlet!

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			
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

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

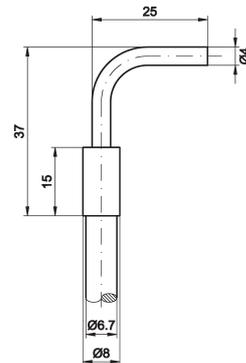
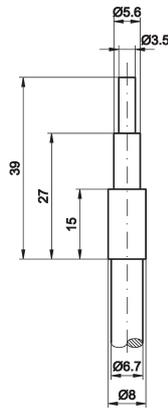
through-beam sensor				
article-no.	LS030204	LS030305	LS030309	LS030510
operating distance	200mm	300mm	300mm	300mm
length	300mm	300mm	300mm	300mm
article-no.	LS060204	LS060305	LS060309	LS060510
operating distance	500mm	700mm	700mm	700mm
length	600mm	600mm	600mm	600mm
article-no.	LS100204	LS100305	LS100309	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			
temperature (working)	-40 ... +180°C			
system of protection (EN 60529)	IP67			
connection	M18			
mounting accessories	2x screw nut M2.5	2x screw nut M4	-	-
mounting accessories (clip)	-	-	AY000008	AY000009

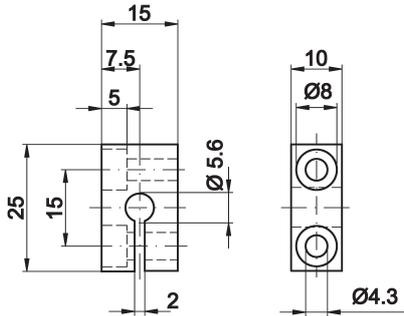
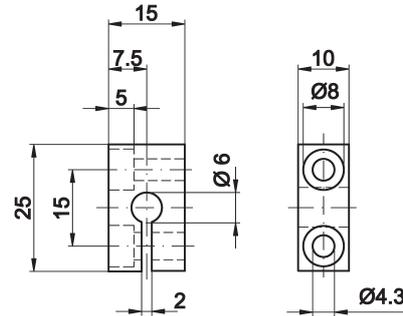
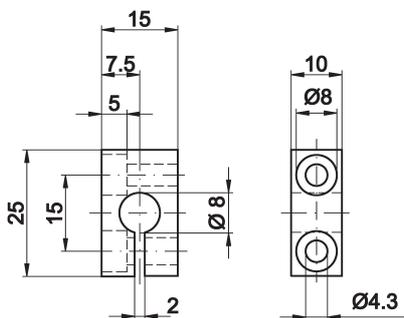
dif. reflection sensor			
article-no.	LT030311	LT030312	LT030920
sensing range	60mm	50mm	120mm
length	300mm	300mm	300mm
article-no.	LT060311	LT060312	LT060920
sensing range	60mm	50mm	110mm
length	600mm	600mm	600mm
article-no.	LT100311	LT100312	LT100920
sensing range	50mm	40mm	90mm
length	1000mm	1000mm	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

mounting accessories
AY000008

AY000009

AY000010

ACCESSORIES

article-no.	description	material
AY000008	mounting clip \varnothing 5.6mm	aluminium
AY000009	mounting clip \varnothing 6mm	aluminium
AY000010	mounting clip \varnothing 8mm	aluminium

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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