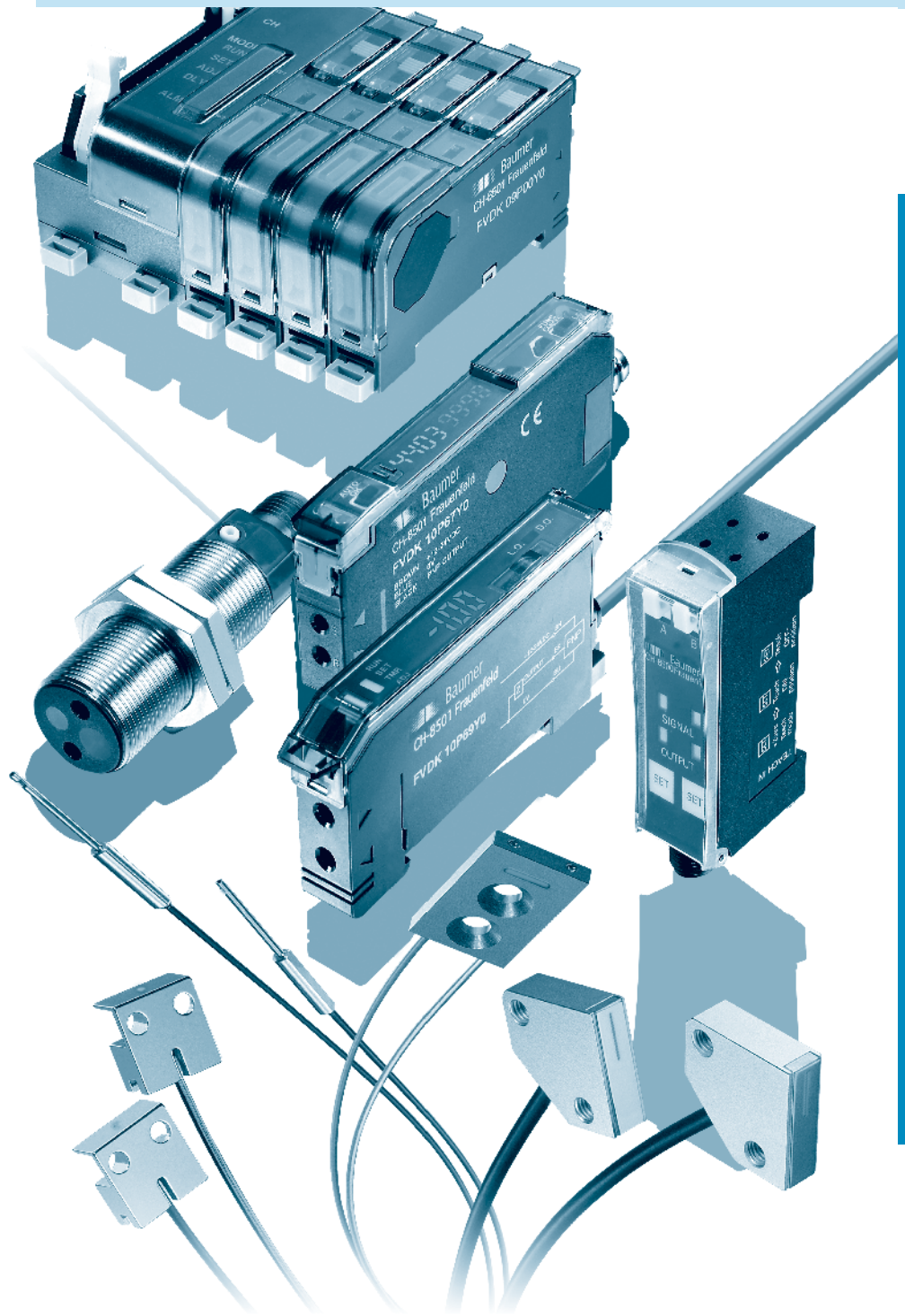
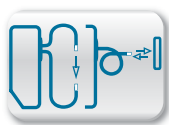


# Fiber optics and fiber optic sensors



Plastic fiber optic sensors  
Plastic fiber optics  
Glass fiber optic sensors  
Glass fiber optics

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**Sb = 90 mm**  
**Tw = 25 mm**

- analog output 1 ... 5 VDC
- adjustable resolution

**general data**

actual range Sb (FSE 200C1002)	90 mm
sensing distance Tw (FUE 200C1003)	25 mm
light source	pulsed red LED
alignment / soiled lens indicator	LED red
output indicator	LED green
adjustment	potentiometer
resolution	0,3 ... 6 % (Full Scale)
wave length	680 nm

**electrical data**

response time / release time	1 ... 50 ms (adjustable)
voltage supply range +Vs	10,8 ... 26,4 VDC
current consumption max. (no load)	40 mA
output circuit	analog 1 ... 5 VDC
load resistance	> 10 kOhm
short circuit protection	yes
reverse polarity protection	yes

**mechanical data**

width / diameter	10 mm
height / length	29,7 mm
depth	60 mm
type	rectangular
housing material	polycarbonate/ABS
connection types	cable, 2 m

**ambient conditions**

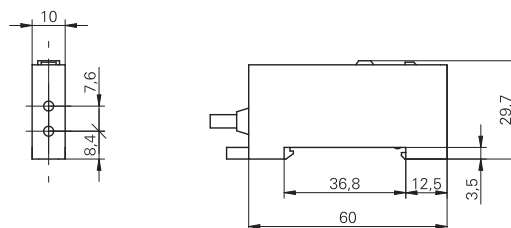
operating temperature	-20 ... +60 °C
protection class	IP 40

**order reference**

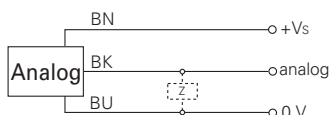
**FWDK 10U84Y0**



**dimension drawing**



**connection diagram**



FWDK 84 Sb = 90 mm, Tw = 25 mm

Plastic fiber optic sensors



# Plastic fiber optics Reflective types

Series 10

Series 82/81/83

Series 84

Legend of operating modes

HS High Speed

FT fast

nL Standard

HP High Sensitivity

Series 12/22

Series 66

Series 67

Model Features	Shape R = min. bending radius	Part number	TW = sensing distance [mm]
<b>Standard M6</b> Sensing head: brass	 R = 15 mm Operating temperature: -30...+70 °C	<b>FUE 200C1003</b>	
<b>Standard ø 6 mm</b> Smooth sensing head without thread Sensing head: aluminum	 R = 15 mm Operating temperature: -30...+70 °C	<b>FUE 200C2003</b>	
<b>Standard M4</b> Sensing head: brass	 R = 8 mm Operating temperature: -30...+70 °C	<b>FUE 200C1004</b>	
<b>Standard ø 4 mm</b> Smooth sensing head without thread Sensing head: aluminum	 R = 8 mm Operating temperature: -30...+70 °C	<b>FUE 200C2004</b>	
<b>Standard M3</b> Sensing head: stainless steel	 R = 15 mm Operating temperature: -30...+70 °C	<b>FUE 200D1Y00</b>	
<b>Standard ø 3 mm</b> Smooth sensing head without thread Sensing head: stainless steel	 R = 15 mm Operating temperature: -30...+70 °C	<b>FUE 200D2Y00</b>	
<b>Long-distance M6</b> Longer sensing distance than with the standard version. With integrated lens. Sensing head: stainless steel	 R = 20 mm Operating temperature: -30...+70 °C	<b>FLE 200C1Y00</b>	
<b>Long-distance M4</b> Longer sensing distance than with the standard version. With integrated lens. Sensing head: stainless steel	 R = 15 mm Operating temperature: -30...+70 °C	<b>FLE 200D1Y00</b>	
<b>Ultra flexible M6</b> Ultra flexible type with bending radius of 2 mm Sensing head: stainless steel	 R = 2 mm Operating temperature: -30...+70 °C	<b>FUE 200E1Y00</b>	

Reflective types

Plastic fiber optics

# Plastic fiber optics Reflective types

Series 10

Series 82/81/83

Series 84

Legend of operating modes  
 HS High Speed  
 FT fast  
 nL Standard  
 HP High Sensitivity

Series 12/22

Series 66

Series 67

Model Features	Shape R = min. bending radius	Part number	TW = sensing distance [mm]
<b>Ultra flexible, pliable M3</b> Highly flexible, extremely pliable fiber with a min. bending radius of 4 mm. Suitable for drag chains.  Sensing head: stainless steel	<p>R = 4 mm      Operating temperature: -30...+70 °C</p>	FUE 200F1Y00	□ 6 ■ 6/12/20 - □ 15 ■ 10/18 ■ 5/40/50
<b>Coaxial M6</b> Suitable for positioning  Sensing head: stainless steel	<p>R = 20 mm      Operating temperature: -30...+70 °C</p>	FCE 200C1Y00	□ 45 ■ 30/70/120 ■ 25 □ 90 ■ 65/110 ■ 33/260/300
<b>Coaxial M4</b> Suitable for positioning  Sensing head: stainless steel	<p>R = 15 mm      Operating temperature: -30...+70 °C</p>	FCE 200C1Y01	□ 16 ■ 12/20/40 ■ 8 □ 25 ■ 20/35 ■ 12/80/110
<b>Coaxial M3</b> Suitable for positioning. Spot sizes of 0.1 mm possible with doubling lens (see fiber optic accessories).  Sensing head: stainless steel	<p>R = 15 mm      Operating temperature: -30...+70 °C</p>	FCE 200D1Y00	□ 10 ■ 8/15/30 ■ 5 □ 20 ■ 16/28 ■ 8/65/95
<b>Coaxial M3</b> Suitable for positioning. Spot sizes of 0.1 mm possible with doubling lens (see fiber optic accessories).  Sensing head: stainless steel	<p>R = 15 mm      Operating temperature: -30...+70 °C</p>	FCE 200D1Y01	□ 10 ■ 8/15/30 ■ 5 □ 20 ■ 16/28 ■ 8/65/95
<b>Coaxial M3</b> Suitable for positioning. Spot sizes of 0.1 mm possible with doubling lens (see fiber optic accessories).  Sensing head: stainless steel	<p>R = 15 mm      Operating temperature: -30...+70 °C</p>	FCE 050C1Y10	□ 10 ■ 8/15/30 ■ 5 □ 20 ■ 13/22 ■ 6/50/70
<b>Coaxial, ultra flexible M3</b> Ultra flexible. Suitable for positioning. Spot sizes of 0.1 mm possible with doubling lens (see fiber optic accessories).  Sensing head: stainless steel	<p>R = 1 mm (emitter)                      R = 4 mm (receiver)      Operating temperature: -30...+70 °C</p>	FCE 200E1Y00	□ 8 ■ 6/13/26 ■ 4 □ 18 ■ 13/22 ■ 6/50/70
<b>Side view ø 2 mm</b> Smaller outside diameter, suitable for constrained conditions.  Sensing head: stainless steel	<p>R = 15 mm      Operating temperature: -30...+70 °C</p>	FUE 200C4Y00	□ 5 ■ 3/9/14 - □ 10 ■ 8/13 ■ 4/30/45
<b>Smaller sensing head, flexible</b> Chrome nickel sensing head which can be bent once. R > 7.5 mm. Other sensing head lengths on request.  Sensing head: chrome nickel/brass	<p>R = 8 mm      Operating temperature: -30...+70 °C</p>	FUE 200C1012	□ 18 ■ 12/25/45 ■ 10 □ 35 ■ 26/45 ■ 12/100/120

Reflective types

Plastic fiber optics

# Plastic fiber optics Reflective types

Series 10

Series 82/81/83

Series 84

Legend of operating modes

HS High Speed

FT fast

nL Standard

HP High Sensitivity

Series 12/22

Series 66

Series 67

Model Features	Shape R = min. bending radius	Part number	TW = sensing distance [mm]
<b>Small sensing head ø 1,5 mm</b> Highly flexible, extremely pliable fiber with a min. bending radius of 4 mm. Suitable for drag chains.  Sensing head: stainless steel		<b>FUE 100E2Y00</b>	□ 6 ■ 6/12/20 - □ 15 ■ 10/18 ■ 5/40/50
<b>Small sensing head ø 1,5 mm</b> Suitable for small spaces  Sensing head: stainless steel		<b>FUE 200C2Y00</b>	□ 18 ■ 12/25/45 ■ 9 □ 35 ■ 26/45 ■ 12/90/120
<b>Small sensing head ø 0,82 mm</b> Suitable for small spaces  Sensing head: stainless steel		<b>FUE 050C2Y10</b>	□ 3 ■ 2/5/12 - □ 8 ■ 5/9 ■ 3/20/30
<b>Parallel beam M5</b> Sharp beam eliminates the influence of reflections from periphery. Spot size 3 mm at a distance of 20 mm.  Sensing head: stainl. steel / Al		<b>FKE 200D1Y00</b>	□ 10 ■ 8/15/30 ■ 5 □ 20 ■ 13/22 ■ 8/60/70
<b>Focus</b> Suitable for detection of highly transparent objects (glass, foils) Sensing distance: 2,5 mm ±0,5  Sensing head: aluminum		<b>FFE 200D6Y00</b>	□ 2.5 ■ 2.5 (Series 81/83) - □ 2.5 ■ 2.5 ■ 2.5
<b>Array</b> Reliably detects small, thin or vibrating workpieces in an area of 10,85 mm.  Sensing head: brass, Ni plated		<b>FUE 200C6Y00</b>	□ 45 ■ 30/70/120 ■ 20 □ 80 ■ 50/85 ■ 30/200/270
<b>Heat resistant M6</b> Heat resistant up to +105 °C  Sensing head: stainless steel		<b>FUA 200C1Y00</b>	□ 40 ■ 25/50/100 ■ 18 □ 70 ■ 47/80 ■ 27/200/220
<b>Heat and cold resistant M6</b> Continuous use from -60 °C up to +150 °C  Sensing head: stainless steel		<b>FUB 200C1Y00</b>	□ 45 ■ 40/80/160 ■ 28 □ 110 ■ 75/130 ■ 42/300/400

Reflective types

Plastic fiber optics

# Plastic fiber optics Reflective types

Series 10

Series 82/81/83

Series 84

**Legend of operating modes**  
**HS** High Speed  
**FT** fast  
**nL** Standard  
**HP** High Sensitivity

Series 12/22

Series 66

Series 67

Model Features	Shape R = min. bending radius	Part number	TW = sensing distance [mm]
<p><b>Chemical proof</b></p> <p>For use in chemically aggressive environments. Fiber optic sensor is fully sheathed in PFA.</p> <p>Sensing head: stainless steel / PFA</p>	<p>R = 80 mm      Operating temperature: -30...+70 °C</p>	<p><b>FUC 200C2Y00</b></p>	
<p><b>Level recognition</b></p> <p>Detection of diverse liquids. Resistant to chemicals due to PFA sheath. Heat resistant up to +105 °C</p> <p>Sensing head: PFA</p>	<p>R = 15 mm / 30 mm tip to 40 mm length      Operating temperature: -30...+105 °C</p>	<p><b>FUL 200D2Y00</b></p>	<p>Switches when immersed in liquid. Recommend fiber optic sensor Series 67. Do not use with Series 82!</p> <p>More information about liquid level recognition or leak detection, see chapter «level monitoring and leak detecting sensors».</p>
<p><b>Leak monitoring</b></p> <p>Detects liquids escaping from tanks and trays. Resistant to chemicals due to PFA sheath.</p> <p>Sensing head: PFA</p>	<p>R = 20 mm      Operating temperature: -30...+70 °C</p>	<p><b>FOC 500C6Y00</b></p>	<p>Fiber optic sensor is mounted directly on the floor or a base and switches on contact with escaping liquids. Recommend fiber optic sensor Series 67. Do not use with Series 82!</p> <p>More information can be found in chapter «Level and leak sensors».</p>

# Plastic fiber optics Through beam types

Series 10

Series 82/81/83

Series 84

Legend of operating modes

HS High Speed

FT fast

nL Standard

HP High Sensitivity

Series 12/22

Series 66

Series 67

Model Features	Shape R = min. bending radius	Part number	Sb = actual range [mm]
<b>Standard M4</b> Sensing head: brass	 R = 15 mm Operating temperature: -30...+70 °C	<b>FSE 200C1002</b>	
<b>Standard M4</b> Shorter version Sensing head: stainless steel	 R = 20 mm Operating temperature: -30...+70 °C	<b>FSE 200C1Y00</b>	
<b>Standard ø 4 mm</b> Smooth sensing head without thread Sensing head: aluminum	 R = 15 mm Operating temperature: -30...+70 °C	<b>FSE 200C2002</b>	
<b>Standard M3</b> Sensing head: brass	 R = 8 mm Operating temperature: -30...+70 °C	<b>FSE 200C1004</b>	
<b>Standard ø 3 mm</b> Smooth sensing head without thread Sensing head: aluminum	 R = 8 mm Operating temperature: -30...+70 °C	<b>FSE 200C2004</b>	
<b>Standard ø 3 mm</b> Shorter version Smooth sensing head without thread Sensing head: stainless steel	 R = 20 mm Operating temperature: -30...+70 °C	<b>FSE 200C2Y00</b>	
<b>Long distance M4</b> Twice the range of an M4 standard fiber optic sensor with integrated lens Sensing head: stainless steel	 R = 20 mm Operating temperature: -30...+70 °C	<b>FWE 200C1Y00</b>	
<b>Long distance ø 3 mm</b> Smooth sensing head without thread, with integrated lens Sensing head: stainless steel	 R = 20 mm Operating temperature: -30...+70 °C	<b>FWE 200C2Y00</b>	
<b>Ultra flexible M4</b> Ultra flexible type with bending radius of 2 mm Sensing head: stainless steel	 R = 2 mm Operating temperature: -30...+70 °C	<b>FSE 200E1Y00</b>	



# Plastic fiber optics Through beam types

Series 10

Series 82/81/83

Series 84

**Legend of operating modes**  
 HS High Speed  
 FT fast  
 nL Standard  
 HP High Sensitivity

Series 12/22

Series 66

Series 67

Model Features	Shape R = min. bending radius	Part number	Sb = actual range [mm]
<b>Ultra flexible M3</b> Highly flexible fiber with a min. bending radius of 1 mm  Sensing head: stainless steel	<p>R = 1 mm      Operating temperature: -30...+70 °C</p>	FSE 200F1Y00	□ 12 ■ 10/23/43 ■ 8 □ 30 ■ 23/40 ■ 14/95/140
<b>Highly flexible, pliable M3</b> Highly flexible, extremely pliable fiber with a min. bending radius of 4 mm. Suitable for drag chains.  Sensing head: stainless steel	<p>R = 4 mm      Operating temperature: -30...+70 °C</p>	FSE 200D1Y50	□ 20 ■ 20/40/100 ■ 20 □ 45 ■ 29/50 ■ 18/120/180
<b>Ultra flexible, 3 mm</b> Highly flexible fiber with a min. bending radius of 2 mm  Sensing head: stainless steel	<p>R = 2 mm      Operating temperature: -30...+70 °C</p>	FSE 200E2Y00	□ 120 ■ 90/200/380 ■ 75 □ 270 ■ 170/300 ■ 100/700/920
<b>Side view M4</b>  Sensing head: brass	<p>R = 15 mm      Operating temp.: -30...+70 °C</p>	FSE 200C4002	□ 100 ■ 60/150/280 ■ 55 □ 200 ■ 150/260 ■ 80/600/750
<b>Side view ø 4 mm</b> Smooth sensing head without thread  Sensing head: aluminum	<p>R = 15 mm      Operating temp.: -30...+70 °C</p>	FSE 200C4001	□ 100 ■ 60/150/280 ■ 55 □ 200 ■ 150/260 ■ 80/600/750
<b>Side view ø 1 mm Small sensing head</b> Small target object detection  Sensing head: stainless steel	<p>R = 15 mm      Operating temperature: -30...+70 °C</p>	FSE 200D4Y00	□ 18 ■ 16/38/70 ■ 14 □ 50 ■ 32/55 ■ 20/130/160
<b>Side light exit, small sensing head 1 mm diameter, highly flexible</b> Small target object detection  Sensing head: stainless steel	<p>R = 1 mm      Operating temperature: -30...+70 °C</p>	FSE 200F4Y00	□ 8 ■ 5/11/22 ■ 4 □ 15 ■ 10/17 ■ 5/40/55
<b>Small sensing head ø 1,5 mm</b> Highly flexible, extremely pliable fiber with a min. bending radius of 4 mm. Suitable for drag chains.  Sensing head: stainless steel	<p>R = 4 mm      Operating temperature: -30...+70 °C</p>	FSE 200D2Y00	□ 20 ■ 18/40/80 ■ 15 □ 55 ■ 35/60 ■ 20/140/190
<b>Small sensing head ø 0,5 mm</b> Detection of very small objects. Light spot diameter 0,25 mm  Sensing head: stainless steel	<p>R = 15 mm      Operating temperature: -30...+70 °C</p>	FSE 200D2Y50	□ 8 ■ 5/11/21 ■ 4 □ 15 ■ 9/15 ■ 5/35/52

# Plastic fiber optics Through beam types

Series 10

Series 82/81/83

Series 84

Legend of operating modes

HS High Speed

FT fast

nL Standard

HP High Sensitivity

Series 12/22

Series 66

Series 67

Model Features	Shape R = min. bending radius	Part number	Sb = actual range [mm]
<b>Parallel beam M4, exit angle ± 2°</b> The small beam angle makes a precise, virtually parallel light beam. Sensing head: stainless steel	<p>R = 20 mm      Operating temperature: -30...+70 °C</p>	FPE 200C1Y00	
<b>Parallel beam M4, exit angle ± 1°</b> The small beam angle makes a precise, virtually parallel light beam. Sensing head: stainless steel	<p>R = 15 mm      Operating temperature: -30...+70 °C</p>	FPE 200D1Y00	
<b>Parallel beam, side view ± 2°</b> The small beam angle makes a precise, virtually parallel light beam. Sensing head: stainless steel	<p>R = 30 mm      Operating temperature: -30...+70 °C</p>	FPE 200C4Y00	
<b>Flat sensing head, highly flexible fiber</b> Can be mounted directly on a plate. Highly flexible fiber with a min. bending radius of 1 mm. Sensing head: brass, Ni plated	<p>R = 1 mm      Operating temperature: -30...+70 °C</p>	FSE 200F6Y00	
<b>Flat sensing head, highly flexible fiber</b> Highly flexible fiber with a min. bending radius of 1 mm. Sensing head: POM	<p>R = 1 mm      Operating temperature: -30...+70 °C</p>	FSE 100F6Y01	
<b>Array (fine light barrier)</b> Reliably detects small, thin or vibrating workpieces in a light curtain of 5,25 mm. Sensing head: brass, Ni plated	<p>R = 4 mm      Operating temperature: -30...+70 °C</p>	FSE 200C6Y00	
<b>Array (fine light barrier)</b> Reliably detects small, thin or vibrating workpieces in a light curtain: of 10,5, 15,75 and 21 mm. Sensing head: aluminum	<p>R = 4 mm      Operating temperature: -30...+70 °C</p>	1) FSE 200C6Y01 2) FSE 200C6Y15 3) FSE 200C6Y02	
<b>Small, bendable sensing head</b> Chrome nickel sensing head which can be bent once. R > 7.5 mm. Other sensing head lengths on request. Sensing head: chrome nickel / brass	<p>R = 8 mm</p>	FSE 200C1013	

Through beam types

Plastic fiber optics

# Plastic fiber optics Through beam types

Series 10

Series 82/81/83

Series 84

**Legend of operating modes**  
**HS** High Speed  
**FT** fast  
**nL** Standard  
**HP** High Sensitivity

Series 12/22


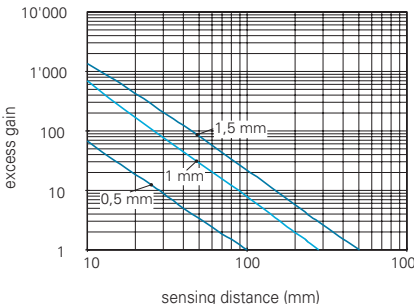
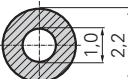
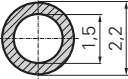
Series 66

Series 67

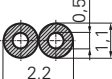
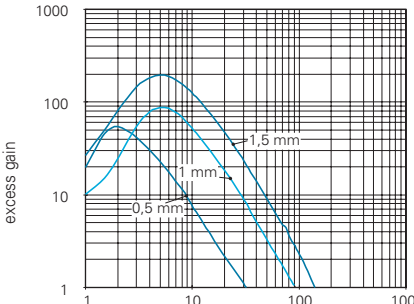
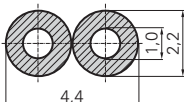
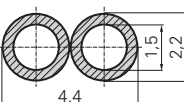
Model Features	Shape R = min. bending radius	Part number	Sb = actual range [mm]
<b>Heat resistant M4</b> Heat resistant up to +105 °C  Sensing head: stainless steel	<p>R = 25 mm      Operating temperature: -30...+105 °C</p>	FSA 200C1Y00	
<b>Heat and cold resistant M4</b> Continuous use from -60 °C up to +150 °C  Sensing head: stainless steel	<p>R = 35 mm      Operating temperature: -60...+150 °C</p>	FSB 200C1Y00	
<b>Heat and cold resistant M4</b> Continuous use from -60 °C up to +350 °C (Glass fiber optics)  Sensing head: stainless steel	<p>R = 25 mm      Operating temperature: -60...+350 °C</p>	FSG 200C1Y00	
<b>Chemical and oil proof</b> For use in chemically aggressive environments. Fiber optic sensor is fully sheathed in PFA.  Sensing head: stainless steel / PFA	<p>R = 80 mm      Operating temperature: -30...+70 °C</p>	FSC 200C2Y00	
<b>Chemical and oil proof</b> For use in chemically aggressive environments. Fiber optic sensor is fully sheathed in PFA.  Sensing head: stainless steel / PFA	<p>R = 20 mm      Operating temperature: -30...+70 °C</p>	FLC 200D2Y00	
<b>Chemical and oil proof, side view</b> For use in chemically aggressive environments. Fiber optic sensor is fully sheathed in PFA.  Sensing head: stainless steel / PFA	<p>R = 20 mm      Operating temperature: -30...+70 °C</p>	FSC 200C4Y00	
<b>Contact-free level detection</b> Detects liquids in (semi-)transparent stand pipes/hoses with 3-13 mm diameter.  Sensing head: PFI / PC	<p>R = 4 mm      Operating temperature: -30...+70 °C</p>	FSL 500C6Y00	Fiber optic sensor is mounted directly on the hose/stand pipe and switches on contact with escaping liquids. Recommend fiber optic sensor Series 69 and 67. Do not use with Series 82! More information can be found in chapter «Level and leak sensors».

Through beam types

Plastic fiber optics

through-beam types	fiber ø	fiber mm <sup>2</sup>	min. bending radius	part nr. <sup>1)</sup>	excess gain curve (2 m cut fiber)
	0,5 mm	≈ 0,2 mm <sup>2</sup>	8 mm	10114158	 <p>reduction of sensing distance: 4 % per meter (valid up to 10 m)</p>
	1 mm	≈ 0,8 mm <sup>2</sup>	15 mm	10114157	
	1,5 mm	≈ 1,8 mm <sup>2</sup>	25 mm	10123729	

Highly flexible version on demand.

reflective types	fiber ø	fiber mm <sup>2</sup>	min. bending radius	part nr. <sup>1)</sup>	excess gain curve (2 m cut fiber)
	2 x 0,5 mm	≈ 2 x 0,2 mm <sup>2</sup>	8 mm	10114594	 <p>reduction of sensing distance: 4 % per meter (valid up to 10 m)</p>
	2 x 1 mm	≈ 2 x 0,8 mm <sup>2</sup>	15 mm	10114595	
	2 x 1,5 mm	≈ 2 x 1,8 mm <sup>2</sup>	25 mm	10124878	

Highly flexible version on demand.

<sup>1)</sup> order designation in meters