



# Fiber optic sensor

## SU18/16/35/40a/102/115/126a

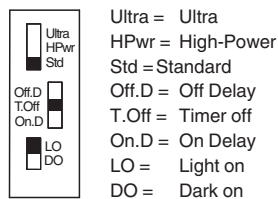
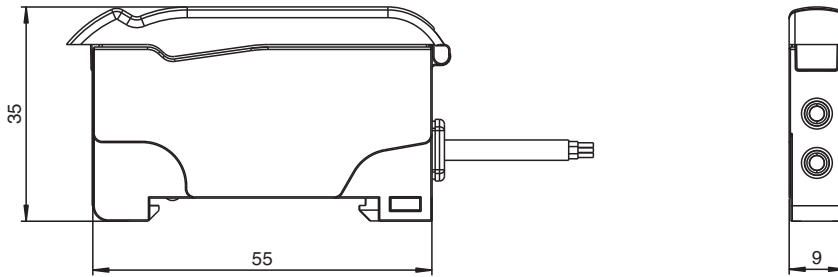


- Basic line for DIN rail installation
- High power version
- Sleek design
- 3 response times selectable
- Protected against mutual interference (no cross-talk)
- Self diagnosis function

Fiber optic sensor for glass fiber optics and plastic fiber optics



### Dimensions



### Technical Data

#### General specifications

Sensor range	up to 460 mm (KLR-C02-2,2-2,0-K146)
Detection range	up to 1500 mm (KLE-C01-2,2-2,0-K116)
Light source	LED
Light type	modulated visible red light , 640 nm
Ambient light limit	10000 Lux

#### Functional safety related parameters

MTTF <sub>d</sub>	690 a
Mission Time (T <sub>M</sub> )	20 a
Diagnostic Coverage (DC)	0 %

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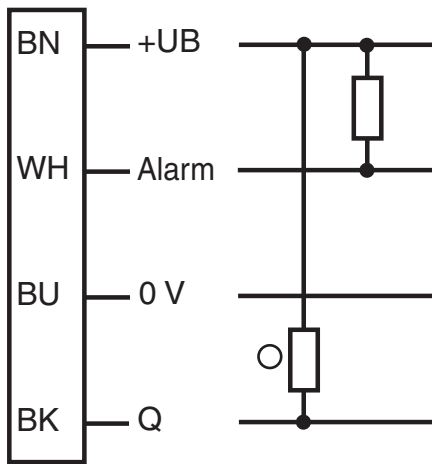
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## Technical Data

<b>Indicators/operating means</b>		
Operation indicator		LED green, statically lit Power on , Undervoltage indicator: Green LED, pulsing (approx. 0.8 Hz) , short-circuit : LED green flashing (approx. 4 Hz)
Function indicator		LED yellow: static illumination switching state, flashes when falling short of the operating reserve
Control elements		Potentiometer for setting sensitivity slide switch 2 positions: light/dark switching slide switch 3 positions: timer function - timer off, on delay 40 ms, off-delay 40 ms slide switch 3 positions: operating mode - Standard, High Power, Ultra
<b>Electrical specifications</b>		
Operating voltage	$U_B$	10 ... 30 V DC
Ripple		10 %
No-load supply current	$I_0$	≤ 30 mA
<b>Output</b>		
Stability alarm output		1 NPN, short-circuit protected open collector
Switching type		light/dark on, switchable
Signal output		1 NPN, short-circuit protected open collector
Switching voltage		max. 30 V DC
Switching current		max. 100 mA , resistive load
Voltage drop	$U_d$	≤ 2 V DC at 100 mA ; ≤ 0.7 V at 10 mA
Switching frequency	$f$	Standard mode: 3 kHz , High power mode: 1 kHz , Ultra mode: 100 Hz
Response time		Standard mode: 160 μs , High power mode: 500 μs , Ultra mode: 5 ms
Repeat accuracy	$R$	≤ 0.5 % of adjusted sensor range
<b>Conformity</b>		
Product standard		EN 60947-5-2
<b>Approvals and certificates</b>		
UL approval		cULus Listed, Class 2 Power Source, Type 1 enclosure
CCC approval		CCC approval / marking not required for products rated ≤36 V
<b>Ambient conditions</b>		
Ambient temperature		-10 ... 55 °C (14 ... 131 °F)
Storage temperature		-20 ... 70 °C (-4 ... 158 °F)
<b>Mechanical specifications</b>		
Housing width		9 mm
Housing height		34.5 mm
Housing depth		62.3 mm
Degree of protection		IP50
Connection		2 m PVC cable, 4 x 0,14 mm <sup>2</sup>
Material		
Housing		PC
Mass		45 g

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**Connection Assignment**

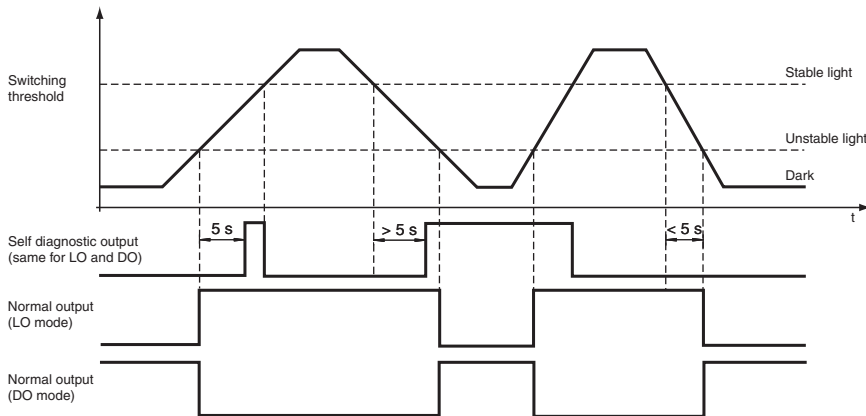


○ = Light on  
● = Dark on

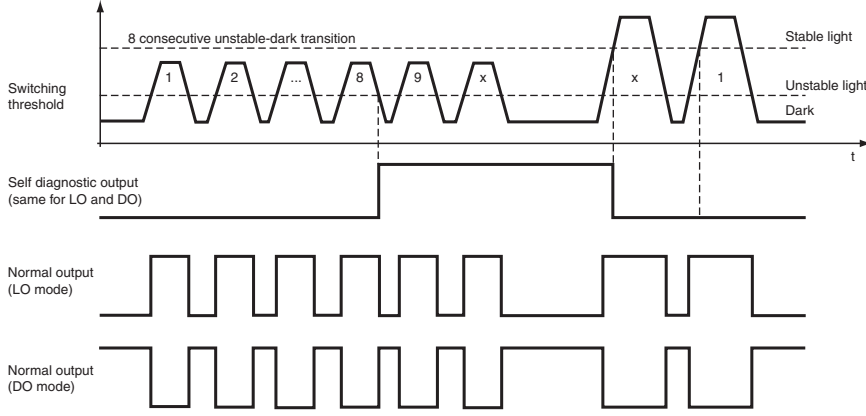
**Characteristic Curve**

**Self-Diagnostic definition and operation:**

5 sec. rule for light-ON (LO) and dark-ON (DO) mode



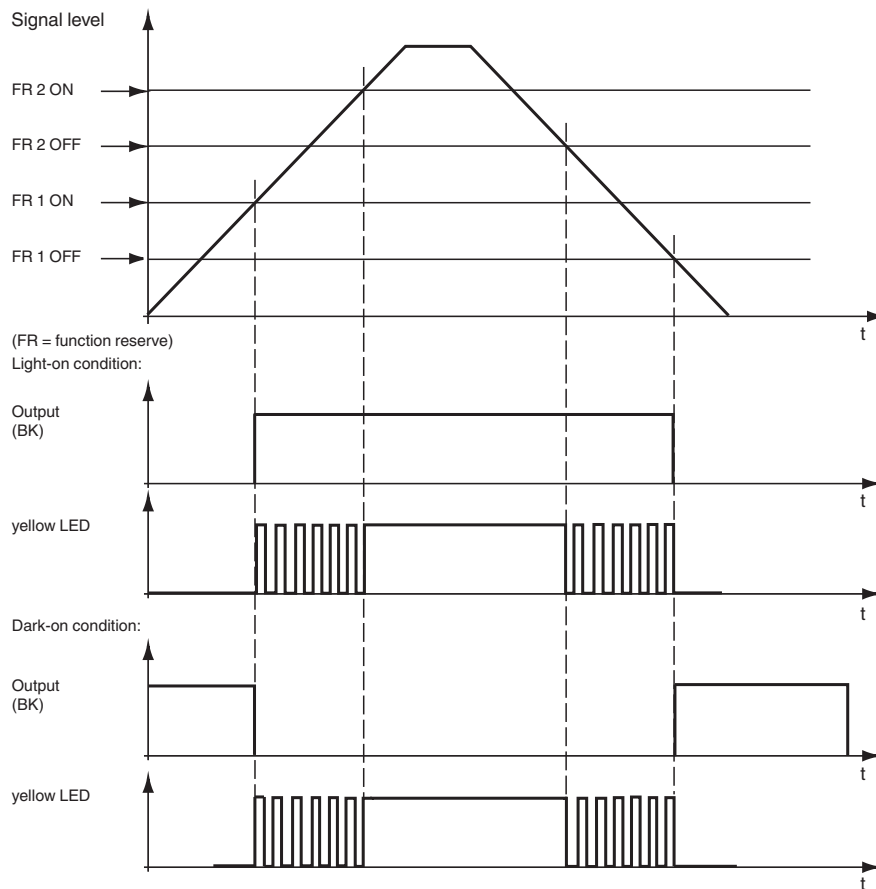
8 cyc. rule for light-ON (LO) and dark-ON (DO) mode



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## Characteristic Curve

### LED indicators and operating chart:



## Accessories

	<b>KLR-C02-2,2-2,0-K146</b>	Plastic fiber optic - diffuse
	<b>KLR-C02-2,2-2,0-K70</b>	Plastic fiber optic - diffuse
	<b>KLR-C02-1,0-2,0-K75</b>	Plastic fiber optic - diffuse
	<b>KLR-C09-1,25-2,0-K76</b>	Plastic fiber optic - diffuse
	<b>KLR-C09-1,25-2,0-K74</b>	Plastic fiber optic - diffuse
	<b>KLR-C16-2,2-2,0-K71</b>	Plastic fiber optic - diffuse
	<b>KLR-A32-2,2-2,0-K83</b>	Plastic fiber optic - diffuse
	<b>KHR-C02-2,2-2,0-K131</b>	Plastic fiber optic - diffuse

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## Accessories

	<b>KHTR-C02-2,2-2,0-K88</b>	Plastic fiber optic - diffuse
	<b>KLE-C01-2,2-2,0-K116</b>	Plastic fiber optic - thru-beam
	<b>KLE-C01-2,2-2,0-K103</b>	Plastic fiber optic - thru-beam
	<b>KLE-C01-2,2-2,0-K102</b>	Plastic fiber optic - thru-beam
	<b>KLE-C01-2,2-2,0-K101</b>	Plastic fiber optic - thru-beam
	<b>KLE-C01-2,2-2,0-K113</b>	Plastic fiber optic - thru-beam
	<b>KLE-C01-1,0-2,0-K120</b>	Plastic fiber optic - thru-beam
	<b>KHE-C01-2,2-2,0-K122</b>	Plastic fiber optic - thru-beam
	<b>KHTE-C01-2,2-2,0-K118</b>	Plastic fiber optic - thru-beam
	<b>LHE 00-1,1-1,0-20M4</b>	Glass fiber optic - thru-beam with silicon covering

Indication

Indications for the Green and Yellow LEDs in detection mode (normal operation):

- Yellow LED is stable ON to indicate that signal received is > FR2
- Yellow LED will flash at 4 Hz to indicate function reserve, FR1 < signal level < FR2
- Green LED stable ON to indicate power supply is ON, sensor is ready.
- Green LED will flash once for each key actuation, e.g. actuation of the Teach button
- Green LED will flash at 4 Hz to indicate a short-circuit fault at the output(s)
- Green LED will flash at 0.8 Hz to indicate an under voltage fault at the power supply

Selection table - thru-beam fiber optic cable

Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross section	minimum Object size	Fiber optic length	Bend radius	Dimensions	Special features
Highly precise										
Threaded	M3	KLE-C01-1.0-2.0-K120	PMMA	Ultra: 80 mm HiPwr: 45 mm Std: 20 mm	0.25 mm	0.05 mm	2 m	min. 10 mm		
Threaded	M4	KLE-C01-1.0-2.0-K119	PMMA	Ultra: 80 mm HiPwr: 45 mm Std: 20 mm	0.25 mm	0.05 mm	2 m	min. 10 mm		4 x high Detection range with Auxiliary lens K-LA01/ 8 x high Detection range with Auxiliary lens K-LA06/ Side view / Periscope with K-LA02
Threaded	M3 x 0.5	KLE-C04-1.0-2.0-K104	PMMA	Ultra: 300 mm HiPwr: 165 mm Std: 70 mm	4 x 0.25 mm	0.12 mm	2 m	min. 15 mm		
Cylindrical	dia. 2 mm	KLE-C01-1.0-2.0-K105	PMMA	Ultra: 80 mm HiPwr: 45 mm Std: 20 mm	0.25 mm	0.05 mm	2 m	min. 10 mm		
Cylindrical	dia. 1.5 mm	KLE-C01-1.0-2.0-K107	PMMA	Ultra: 80 mm HiPwr: 45 mm Std: 20 mm	0.25 mm	0.05 mm	2 m	min. 10 mm		
Cylindrical	dia. 1.5 mm	KLE-C04-1.0-2.0-K108	PMMA	Ultra: 300 mm HiPwr: 165 mm Std: 70 mm	4 x 0.25 mm	0.12 mm	2 m	min. 15 mm		
Cylindrical	dia. 2 mm	KLE-C04-1.0-2.0-K106	PMMA	Ultra: 300 mm HiPwr: 165 mm Std: 70 mm	4 x 0.25 mm	0.05 mm	2 m	min. 15 mm		
Highly flexible										
Threaded	M3	KHE-C01-1.0-2.0-K125	PMMA	Ultra: 210 mm HiPwr: 120 mm Std: 50 mm	0.5 mm	0.15 mm	2 m	min. 1 mm		only 1 mm Bend radius

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Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross section	minimum Object size	Fiber optic length	Bend radius	Dimensions	Special features
Threaded	M3	KHE-C01-2.2-2.0-K122	PMMA	Ultra: 800 mm HiPwr: 480 mm Std: 200 mm	1 mm	0.25 mm	2 m	min. 2 mm		only 2 mm Bend radius
Threaded	M4 x 0.7 / M2.6	KHE-C01-1.0-2.0-K124	PMMA	Ultra: 210 mm HiPwr: 120 mm Std: 50 mm	0.5 mm	0.15 mm	2 m	min. 1 mm		4 x high Detection range with Auxiliary lens K-LA01/ 8 x high Detection range with Auxiliary lens K-LA06 Side view / Periscope with K-LA02/ only 1 mm Bend radius
Threaded	M6	KHE-C01-2.2-2.0-K121	PMMA	Ultra: 800 mm HiPwr: 480 mm Std: 200 mm	1.0 mm	0.25 mm	2 m	min. 2 mm		only 2 mm Bend radius
Cylindrical	dia. 1.5 mm	KHE-C01-1.0-2.0-K139	PMMA	Ultra: 210 mm HiPwr: 120 mm Std: 50 mm	0.5 mm	0.05 mm	2 m	min. 1 mm		only 1 mm Bend radius
Cylindrical	dia. 3 mm	KHE-C01-2.2-2.0-K126	PMMA	Ultra: 210 mm HiPwr: 120 mm Std: 50 mm	0.5 mm	0.15 mm	2 m	min. 1 mm		only 1 mm Bend radius
Cylindrical	dia. 3 mm	KHE-C01-2.2-2.0-K123	PMMA	Ultra: 800 mm HiPwr: 480 mm Std: 200 mm	1 mm	0.25 mm	2 m	min. 2 mm		only 2 mm Bend radius
Right angle	dia. 15 x 5	KHE-C01-2.2-2.0-K137	PMMA	Ultra: 140 mm HiPwr: 80 mm Std: 35 mm	0.5 mm	0.15 mm	2 m	min. 1 mm		only 1 mm Bend radius
Right angle	dia. 15 x 5	KHE-C01-2.2-2.0-K140	PMMA	Ultra: 600 mm HiPwr: 350 mm Std: 150 mm	1 mm	0.25 mm	2 m	min. 2 mm		only 2 mm Bend radius
Flexible										
Threaded	M3 x 0.5 / M2.6	KLE-C01-1.3-2.0-K112	PMMA	Ultra: 800 mm HiPwr: 480 mm Std: 200 mm	1 mm	0.25 mm	2 m	min. 25 mm		4 x high Detection range with Auxiliary lens K-LA01/ 8 x high Detection range with Auxiliary lens K-LA06 Side view / Periscope with K-LA02
Threaded	M3 x 0.5	KLE-C01-2.2-2.0-K103	PMMA	Ultra: 920 mm HiPwr: 520 mm Std: 220 mm	1 mm	0.25 mm	2 m	min. 25 mm		

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Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross section	minimum Object size	Fiber optic length	Bend radius	Dimensions	Special features
Threaded	M4 x 0.7 /M2.6	KLE-C01-2.2-2.0-K102	PMMA	Ultra: 920 mm HiPwr: 520 mm Std: 220 mm	1 mm	0.25 mm	2 m	min. 25 mm		4 x high Detection range with Auxiliary lens K-LA01/ 8 x high Detection range with Auxiliary lens K-LA06 Side view / Periscope with K-LA02
Threaded	M6	KLE-C01-2.2-2.0-K100	PMMA	Ultra: 920 mm HiPwr: 520 mm Std: 220 mm	1 mm	0.32 mm	2 m	min. 25 mm		
Threaded	M2.6	KLE-C01-2.2-2.0-K113	PMMA	Ultra: 800 mm HiPwr: 480 mm Std: 200 mm	1 mm	0.25 mm	2 m	min. 25 mm		4 x high Detection range with Auxiliary lens K-LA01/ 8 x high Detection range with Auxiliary lens K-LA06 Side view / Periscope with K-LA02
Cylindrical	dia. 2 mm	KLE-C01-1.3-2.0-K114	PMMA	Ultra: 920 mm HiPwr: 520 mm Std: 220 mm	1 mm	0.25 mm	2 m	min. 25 mm		
Cylindrical	dia. 5 mm	KLE-C01-2.2-2.0-K101	PMMA	Ultra: 920 mm HiPwr: 520 mm Std: 220 mm	1 mm	0.32 mm	2 m	min. 25 mm		
<b>Bendable tip</b>										
Threaded	M4	KLE 00-2.2-2.0-K55	PMMA	Ultra: 872 mm HiPwr: 500 mm Std: 228 mm	1 mm		2 m	min. 25 mm		
<b>High detection range</b>										
Threaded	M3	KLE-C01-2.2-2.0-K116	PMMA	Ultra: 1500 mm HiPwr: 950 mm Std: 450 mm	1.5 mm	0.35 mm	2 m	min. 40 mm		
Threaded	M6	KLE-C01-2.2-2.0-K115	PMMA	Ultra: 1500 mm HiPwr: 950 mm Std: 450 mm	1.5 mm	0.35 mm	2 m	min. 40 mm		
Threaded	M8 x 1	FEF-PLT1	PMMA	Ultra: 25620 mm HiPwr: 15070 mm Std: 6000 mm calculated values related on 2 m Fiber optic length	1 mm		1 m	min. 25 mm		Narrow beam
Threaded	M8 x 1	FEF-PLT1-L2	PMMA	Ultra: 25620 mm HiPwr: 15070 mm Std: 6000 mm calculated values related on 2 m Fiber optic length	1 mm		2 m	min. 25 mm		Narrow beam
Threaded	M8 x 1	FEF-PLT1-L5	PMMA	Ultra: 25620 mm HiPwr: 15070 mm Std: 6000 mm calculated values related on 2 m Fiber optic length	1 mm		4 m	min. 25 mm		Narrow beam

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Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross section	minimum Object size	Fiber optic length	Bend radius	Dimensions	Special features
Cylindrical	dia. 3 mm	KLE-C01-2.2-2.0-K117	PMMA	Ultra: 1360 mm HiPwr: 820 mm Std: 400 mm	1.5 mm	0.35 mm	2 m	min. 25 mm		
Side view / Periscope										
Cylindrical	dia. 4.75 mm	KHE-C01-2.2-2.0-K136	PMMA	Ultra: 200 mm HiPwr: 110 mm Std: 50 mm	0.5 mm	0.15 mm	2 m	min. 1 mm		only 1 mm Bend radius
Array										
Rectangular	3 x M2 x 0.5	KLE-A16-2.2-2.0-K109	PMMA	Ultra: 420 mm HiPwr: 240 mm Std: 100 mm	16 x 0.25 mm	0.05 mm	2 m	min. 25 mm		
Rectangular	3 x M3 x 0.5	KLE-A16-2.2-2.0-K110	PMMA	Ultra: 420 mm HiPwr: 240 mm Std: 100 mm	16 x 0.25 mm	0.05 mm	2 m	min. 25 mm		
Rectangular	3 x M3 x 0.5	KLE-A16-2.2-2.0-K111	PMMA	Ultra: 420 mm HiPwr: 240 mm Std: 100 mm	16 x 0.25 mm	0.05 mm	2 m	min. 25 mm		
Rectangular	2 x 3.2 m	KLE-A32-2.2-2.0-K142	PMMA	Ultra: 140 mm HiPwr: 80 mm Std: 35 mm	32 x 0.25 mm		2 m	min. 25 mm		
High temperature resistance										
Cylindrical	dia. 3 mm	KHTE-C01-2.2-2.0-K118	PMMA	Ultra: 475 mm HiPwr: 270 mm Std: 115 mm	1 mm	0.35 mm	2 m	min. 25 mm		-55°C ... +115 °C
Sturdy design										
Threaded	M3	LHE 00-1.1-1.0-14M3	glass	Ultra: 710 mm HiPwr: 420 mm Std: 195 mm	1.1 mm		1 m	4 mm static		-40°C ... +180 °C
Threaded	M4 x 0.7 / M2.6	LHE 00-1.1-1.0-20M4	glass	Ultra: 710 mm HiPwr: 420 mm Std: 195 mm	1.1 mm		1 m	4 mm static		4 x high Detection range with Auxiliary lens K-LA01/ 8 x high Detection range with Auxiliary lens K-LA06 Side view / Periscope with K-LA02/ -40°C ... +180 °C
Threaded	M6	LHE 00-1.1-1.0-G	glass	Ultra: 710 mm HiPwr: 420 mm Std: 195 mm	1.1 mm		1 m	4 mm static		-40°C ... +180 °C

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Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross section	minimum Object size	Fiber optic length	Bend radius	Dimensions	Special features
Cylindrical	dia. 1.5 mm	LHE 00-1.1-1.0-10C1.5	glass	Ultra: 710 mm HiPwr: 420 mm Std: 195 mm	1.1 mm		1 m	4 mm static		-40°C ... +180°C
Cylindrical	dia. 3 mm	LHE 00-1.1-1.0-15C3	glass	Ultra: 710 mm HiPwr: 420 mm Std: 195 mm	1.1 mm		1 m	4 mm static		-40°C ... +180°C
Right angle	Bar 3 mm	LHE 00-1.1-1.0-WC3	glass	Ultra: 710 mm HiPwr: 420 mm Std: 195 mm	1.1 mm		1 m	4 mm static		-40°C ... +180°C
Right angle	Bar 10 mm	LHE 00-1.1-1.0-K9	glass	Ultra: 710 mm HiPwr: 420 mm Std: 195 mm	1.1 mm		1 m	4 mm static		-40°C ... +180°C
<b>Special design</b>										
Rectangular	2 x 2.2 m m	KHE-A01-1.0-2.0-K138	PMMA	Ultra: 100 mm HiPwr: 60 mm Std: 25 mm	0.5 mm	0.05 mm	2 m	min. 1 mm		only 1 mm Bend radius
Slot	2 x 3.2 m m	KLE-C02-1.25-2.0-K134	PMMA	5 mm	2 x 0.25 m m		2 m	min. 10 mm		
Slot	2 x 3.2 m m	KLE-C02-1.25-2.0-K135	PMMA	10 mm	2 x 0.25 m m		2 m	min. 10 mm		

	<p>Std: Standard Mode, 160 µs HiPwr: HighPower Mode, 500 µs Ultra: Ultra Mode, 5 ms</p>
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**Selection table - diffuse mode fiber optic cable**

Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross section	Fiber optic length	Bend radius	Dimensions	Special features	
<b>Highly precise</b>										
Threaded	M3 x 0.5	KLR-C02-1.0-2.0-K75	PMMA	Ultra: 12 mm HiPwr: 6 mm Std: 4 mm	2 x 0.25 m	2 m	min. 10 mm			
Threaded	M4 x 0.7	KLR-C02-1.0-2.0-K73	PMMA	Ultra: 12 mm HiPwr: 6 mm Std: 4 mm	2 x 0.25 mm	2 m	min. 10 mm			

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Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross-section	Fiber optic length	Bend radius	Dimensions	Special features
Threaded	M3 x 0.5	KLR-C04-1.25-2.0-K78	PMMA	Ultra: 25 mm HiPwr: 18 mm Std: 8 mm	4 x 0.25 mm	2 m	min. 15 mm		
Cylindrical	dia. 2.0 mm	KLR-C02-1.0-2.0-K91	PMMA	Ultra: 12 mm HiPwr: 6 mm Std: 4 mm	2 x 0.25 mm	2 m	min. 10 mm		
Cylindrical	dia. 3.0 mm	KLR-C02-1.0-2.0-K90	PMMA	Ultra: 12 mm HiPwr: 6 mm Std: 4 mm	2 x 0.25 mm	2 m	min. 10 mm		
Cylindrical	dia. 1.5 mm	KLR-C04-1.25-2.0-K80	PMMA	Ultra: 25 mm HiPwr: 18 mm Std: 8 mm	4 x 0.25 mm	2 m	min. 15 mm		
Cylindrical	dia. 1.5 mm	KLR-C04-1.0-2.0-K133	PMMA	Ultra: 25 mm HiPwr: 18 mm Std: 7 mm	4 x 0.25 mm	2 m	min. 15 mm		
Cylindrical	dia. 2.0 mm	KLR-C02-1.0-2.0-K87	PMMA	Ultra: 85 mm HiPwr: 52 mm Std: 25 mm	2 x 0.5 mm	2 m	min. 15 mm		
Cylindrical	dia. 3.0 mm	KLR-C04-1.25-2.0-K79	PMMA	Ultra: 25 mm HiPwr: 18 mm Std: 8 mm	4 x 0.25 mm	2 m	min. 15 mm		
Coaxial									
Threaded	M3 x 0.5	KLR-C09-1.25-2.0-K76	PMMA	Ultra: 100 mm HiPwr: 60 mm Std: 30 mm	1 x 0.5 mm Emitter 9 x 0.25 mm Receiver	2 m	min. 15 mm		only 0.5 mm light spot at 8 mm with auxiliary lens K-LA03
Threaded	M4 x 0.7 /M2.6	KLR-C09-1.25-2.0-K74	PMMA	Ultra: 100 mm HiPwr: 60 mm Std: 30 mm	1 x 0.5 mm Emitter 9 x 0.25 mm Receiver	2 m	min. 15 mm		only 0.7 mm light spot at 10 mm with auxiliary lens K-LA04/ 2 x high Detection range with Auxiliary lens K-LA01/ 3 x high Detection range with Auxiliary lens K-LA06
Threaded	M6 x 0.75	KLR-C16-2.2-2.0-K71	PMMA	Ultra: 300 mm HiPwr: 190 mm Std: 85 mm	1 x 1.0 mm Emitter 16 x 0.25 mm Receiver	2 m	min. 25 mm		
Cylindrical	dia. 1.0 mm	KLR-C06-1.25-2.0-K81	PMMA	Ultra: 70 mm HiPwr: 45 mm Std: 20 mm	1 x 0.25 mm Emitter 6 x 0.25 mm Receiver	2 m	min. 15 mm		

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Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross-section	Fiber optic length	Bend radius	Dimensions	Special features
Cylindrical	dia. 3.0 mm	KLR-C09-1.25-2.0-K77	PMMA	Ultra: 110 mm HiPwr: 60 mm Std: 30 mm	1 x 0.5 mm Emitter 9 x 0.25 mm Receiver	2 m	min. 15 mm	<p>Technical drawing of KLR-C09-1.25-2.0-K77 showing dimensions: 15, 10.5, 15, 1.25, 1.25, 1.3, 0.2, 0.2. Labels include <math>\varnothing 0.5</math> fiber optic core x 1 (emitter) and <math>\varnothing 0.25</math> fiber optic core x 9 (receiver).</p>	
Cylindrical	dia. 5.0 mm	KLR-C16-2.2-2.0-K72	PMMA	Ultra: 300 mm HiPwr: 190 mm Std: 85 mm	1 x 1.0 mm Emitter 16 x 0.25 mm Receiver	2 m	min. 25 mm	<p>Technical drawing of KLR-C16-2.2-2.0-K72 showing dimensions: 17, 10.5, 15, 1.0, 0.2. Labels include <math>\varnothing 1.0</math> fiber optic core x 1 (emitter) and <math>\varnothing 0.25</math> fiber optic core x 16 (receiver).</p>	
Highly flexible									
Threaded	M3	KHR-C02-1.0-2.0-K96	PMMA	Ultra: 40 mm HiPwr: 25 mm Std: 12 mm	2 x 0.5 mm	2 m	min. 1 mm	<p>Technical drawing of KHR-C02-1.0-2.0-K96 showing dimensions: 17, 2000, 10.5, 15, 1.0, 1.0, 0.2, 0.2. Labels include <math>\varnothing 0.50</math> fiber optic core x 2, Conduit <math>\varnothing 3.3</math>, <math>M3 \times 0.5</math>, and <math>\varnothing 2.8</math>.</p>	
Threaded	M4	KHR-C02-1.0-2.0-K95	PMMA	Ultra: 40 mm HiPwr: 25 mm Std: 12 mm	2 x 0.5 mm	2 m	min. 1 mm	<p>Technical drawing of KHR-C02-1.0-2.0-K95 showing dimensions: 12, 2000, 10.5, 15, 1.0, 1.0, 0.2, 0.2. Labels include <math>\varnothing 0.5</math> fiber optic core x 2, Conduit <math>\varnothing 3.5</math>, <math>M4 \times 0.7</math>, and <math>\varnothing 2.8</math>.</p>	
Threaded	M4	KHR-C02-1.3-2.0-K92	PMMA	Ultra: 210 mm HiPwr: 130 mm Std: 60 mm	2 x 1.0 mm	2 m	min. 2 mm	<p>Technical drawing of KHR-C02-1.3-2.0-K92 showing dimensions: 10, 2000, 10.5, 15, 1.3, 1.3, 0.2, 0.2. Labels include <math>\varnothing 1</math> Faser Kern x 2, Conduit <math>\varnothing 3.5</math>, <math>M4 \times 0.7</math>, and Schutzrohr <math>\varnothing 3.5</math>.</p>	
Threaded	M6	KHR-C02-2.2-2.0-K94	PMMA	Ultra: 40 mm HiPwr: 25 mm Std: 12 mm	2 x 0.5 mm	2 m	min. 1 mm	<p>Technical drawing of KHR-C02-2.2-2.0-K94 showing dimensions: 14, 2000, 10.5, 15, 0.5, 0.5, 0.2, 0.2. Labels include <math>\varnothing 0.5</math> fiber optic core x 2, <math>M6 \times 0.75</math>, and <math>\varnothing 2.8</math>.</p>	
Cylindrical	dia. 3.0 mm	KHR-C02-1.3-2.0-K93	PMMA	Ultra: 200 mm HiPwr: 130 mm Std: 60 mm	2 x 1.0 mm	2 m	min. 2 mm	<p>Technical drawing of KHR-C02-1.3-2.0-K93 showing dimensions: 17, 2000, 10.5, 15, 1.3, 1.3, 0.2, 0.2. Labels include <math>\varnothing 1</math> fiber optic core x 2, <math>\varnothing 3.3</math>, and <math>\varnothing 3.5</math>.</p>	
Flexible									
Threaded	M6 x 0.75	KLR-C02-2.2-2.0-K70	PMMA	Ultra: 280 mm HiPwr: 180 mm Std: 80 mm	2 x 1.0 mm	2 m	min. 25 mm	<p>Technical drawing of KLR-C02-2.2-2.0-K70 showing dimensions: 23, 2000, 10.5, 15, 1.0, 1.0, 0.2, 0.2. Labels include <math>\varnothing 1.0</math> fiber optic core x 2, <math>M6 \times 0.75</math>, and <math>\varnothing 2.8</math>.</p>	
Cylindrical	dia. 3.0 mm	KLR-C02-1.3-2.0-K86	PMMA	Ultra: 280 mm HiPwr: 180 mm Std: 80 mm	2 x 1.0 mm	2 m	min. 25 mm	<p>Technical drawing of KLR-C02-1.3-2.0-K86 showing dimensions: 17, 2000, 10.5, 15, 1.3, 1.3, 0.2, 0.2. Labels include <math>\varnothing 1</math> fiber optic core x 2, <math>\varnothing 3.3</math>, and <math>\varnothing 3.5</math>.</p>	
Cylindrical	dia. 5.0 mm	KLR-C02-2.2-2.0-K85	PMMA	Ultra: 280 mm HiPwr: 180 mm Std: 80 mm	2 x 1.0 mm	2 m	min. 25 mm	<p>Technical drawing of KLR-C02-2.2-2.0-K85 showing dimensions: 17, 2000, 10.5, 15, 1.0, 1.0, 0.2, 0.2. Labels include <math>\varnothing 1</math> fiber optic core x 2, <math>\varnothing 3.3</math>, and <math>\varnothing 3.5</math>.</p>	
Bendable tip									
Threaded	M3 x 0.5	KLR 00-1.0-2.0-K58	PMMA	Ultra: 68 mm HiPwr: 40 mm Std: 20 mm		2 m	min. 15 mm	<p>Technical drawing of KLR 00-1.0-2.0-K58 showing dimensions: 80, 15, 2000, 0.5, 1.0, 1.0, 0.2, 0.2. Labels include <math>\varnothing 1.5</math>, <math>\varnothing 1.5</math>, <math>\varnothing 2.5</math>, <math>M3 (P = 0.5)</math>, and <math>\varnothing 2.8</math>.</p>	

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Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross-section	Fiber optic length	Bend radius	Dimensions	Special features			
Threaded	M6	KLR-00-2.2-2.0-K57	PMMA	Ultra: 210 mm HiPwr: 130 mm Std: 60 mm		2 m	min. 15 mm					
		High detection range										
		KLR-C02-2.2-2.0-K146		Ultra: 460 mm HiPwr: 270 mm Std: 150 mm					2 m	mind. 40 mm		
KLR-C10-1.25-2.0-K144	Ultra: 95 mm HiPwr: 60 mm Std: 30 mm		2 m	mind. 15 mm								
Side view / Periscope												
Threaded	M6	KHR-C02-2.2-2.0-K131				PMMA	Ultra: 210 mm HiPwr: 135 mm Std: 60 mm	2 x 1.0 mm	2 m	min. 2 mm		only 2 mm Bend radius
			Ultra: 52 mm HiPwr: 33 mm Std: 15 mm	2 x 0.5 mm	min. 1 mm			only 1 mm Bend radius				
Rectangular	3 x M2 x 0.5	KLR-A18-1.3-2.0-K82	PMMA	Ultra: 86 mm HiPwr: 55 mm Std: 25 mm	18 x 0.25 m	2 m	min. 25 mm					
				Ultra: 120 mm HiPwr: 78 mm Std: 35 mm	10.85 mm				min. 25 mm			
				Ultra: 120 mm HiPwr: 78 mm Std: 35 mm	16 x 0.25 mm				mind. 25 mm			
High temperature resistance												
Threaded	M6	KHTR-C02-2.2-2.0-K88	PMMA	Ultra: 280 mm HiPwr: 180 mm Std: 80 mm	2 x 1.0 mm	2 m	min. 25 mm		- 55°C ... + 115°C			
				Ultra: 280 mm HiPwr: 180 mm Std: 80 mm	2 x 1.0 mm				min. 25 mm			
Sturdy design												

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Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross-section	Fiber optic length	Bend radius	Dimensions	Special features
Threaded	M3 x 0.5	LHR 00-0.8-1.0-14M3	glass	Ultra: 195 mm HiPwr: 100 mm Std: 40 mm	0.8 mm	1 m	4 mm static		-40°C ... +180°C
Threaded	M4 x 0.7	LHR 00-0.8-1.0-20M4	glass	Ultra: 195 mm HiPwr: 100 mm Std: 40 mm	0.8 mm	1 m	4 mm static		-40°C ... +180°C
Threaded	M6	LHR 00-1.1-1.0-G	glass	Ultra: 230 mm HiPwr: 156 mm Std: 70 mm	1.1 mm	1 m	4 mm static		-40°C ... +180°C
Cylindrical	dia. 3 mm	LHR 00-1.1-1.0-Z1	glass	Ultra: 230 mm HiPwr: 156 mm Std: 70 mm	1.1 mm	1 m	4 mm static		-40°C ... +180°C
Cylindrical	dia. 4.5 mm	LHR 00-1.1-1.0-K1	glass	Ultra: 230 mm HiPwr: 156 mm Std: 70 mm	1.1 mm	1 m	4 mm static		-40°C ... +180°C
Right angle	10 mm Bar	LHR 00-1.1-1.0-K9	glass	Ultra: 230 mm HiPwr: 156 mm Std: 70 mm	1.1 mm	1 m	4 mm static		-40°C ... +180°C
Special design									
Rectangular		KHR-C02-1.0-2.0-K129	PMMA	5 ~ 10 mm	2 x 0.5 mm	2 m	min. 1 mm		crossed beam to background blanking only 1 mm Bend radius
Rectangular		KLR-C02-1.3-2.0-K130	PMMA	1 ~ 8 mm	2 x 1.0 mm	2 m	min. 25 mm		crossed beam to background blanking
Rectangular	3 x M3 x 0.5	KHR-A02-2.2-2.0-K127	PMMA	Ultra: 175 mm HiPwr: 112 mm Std: 50 mm	2 x 1.0 mm	2 m	min. 2 mm		only 2 mm Bend radius
Rectangular		KLR-C02-1.25-2.0-K128	PMMA	4~26 mm	2 x 0.5 mm	2 m	min. 15 mm		Level measurement
Cylindrical		KLR-C02-1,25-2,0-K147	PMMA			2 m	mind. 40 mm		Fluid detection

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	Std: Standard Mode, 160 $\mu$ s HiPwr: HighPower Mode, 500 $\mu$ s Ultra: Ultra Mode, 5 ms
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