



**Model Number**

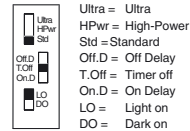
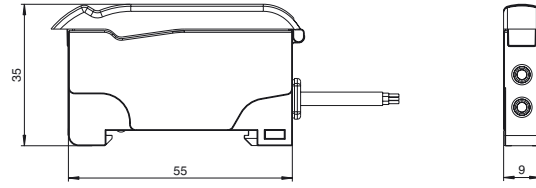
**SU18/35/40a/102/115/123**

Fiber optic sensor  
with fixed cable

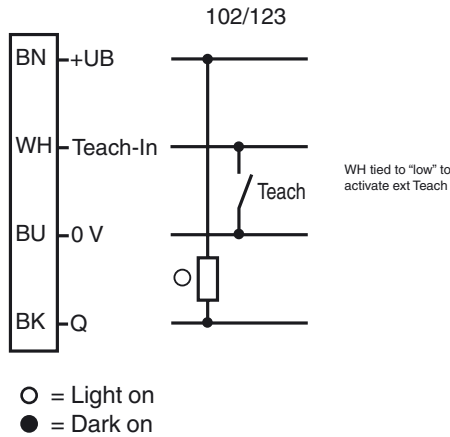
**Features**

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

**Dimensions**



**Electrical connection**



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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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**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 %

**Indicators/operating means**

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 stability control
Control elements	Teach-In key 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

**Electrical specifications**

Operating voltage	U <sub>B</sub>	10 ... 30 V DC
Ripple		10 %
No-load supply current	I <sub>0</sub>	≤ 30 mA

**Input**

Function input	external Teach-In
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**Output**

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 <sub>d</sub>	≤ 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

**Ambient conditions**

Ambient temperature	-10 ... 55 °C (14 ... 131 °F)
Storage temperature	-20 ... 70 °C (-4 ... 158 °F)

**Mechanical specifications**

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

**Compliance with standards and directives**

Standard conformity	
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007

**Approvals and certificates**

UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure
CCC approval	CCC approval / marking not required for products rated ≤36 V

**Accessories****HPF-D032**

**KLR-C02-2,2-2,0-K146**  
Plastic fiber optic - diffuse

**KLR-C02-2,2-2,0-K70**  
Plastic fiber optic - diffuse

**KLR-C02-1,0-2,0-K75**  
Plastic fiber optic - diffuse

**KLR-C09-1,25-2,0-K76**  
Plastic fiber optic - diffuse

**KLR-C09-1,25-2,0-K74**  
Plastic fiber optic - diffuse

**KLR-C16-2,2-2,0-K71**  
Plastic fiber optic - diffuse

**KLR-A32-2,2-2,0-K83**  
Plastic fiber optic - diffuse

**KHR-C02-2,2-2,0-K131**  
Plastic fiber optic - diffuse

**KHTR-C02-2,2-2,0-K88**  
Plastic fiber optic - diffuse

**LHR 00-0,8-1,0-20M4**  
Glass fiber optic - diffuse with silicon covering

**KLE-C01-2,2-2,0-K116**  
Plastic fiber optic - thru-beam

**KLE-C01-2,2-2,0-K103**  
Plastic fiber optic - thru-beam

**KLE-C01-2,2-2,0-K102**  
Plastic fiber optic - thru-beam

**KLE-C01-2,2-2,0-K100**  
Plastic fiber optic - thru-beam

**KLE-C01-2,2-2,0-K101**  
Plastic fiber optic - thru-beam

**KLE-C01-2,2-2,0-K113**  
Plastic fiber optic - thru-beam

**KLE-C01-1,0-2,0-K120**  
Plastic fiber optic - thru-beam

**KHE-C01-2,2-2,0-K122**  
Plastic fiber optic - thru-beam

**KHTE-C01-2,2-2,0-K118**  
Plastic fiber optic - thru-beam

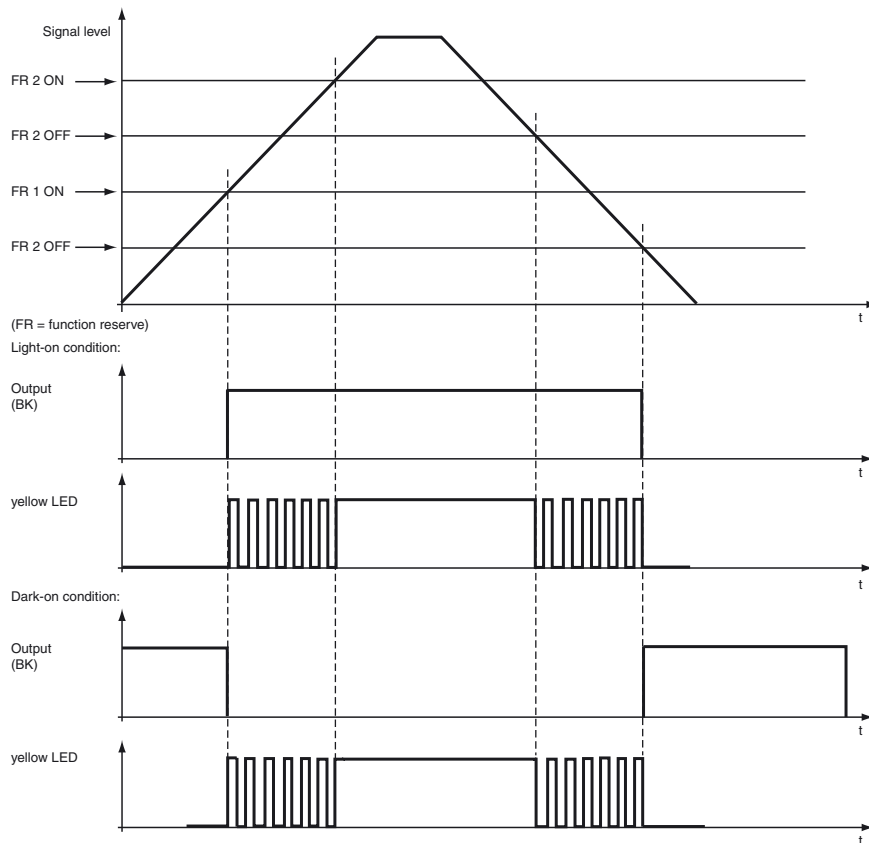
**LHE 00-1,1-1,0-20M4**  
Glass fiber optic - thru-beam with silicon covering

**Bracket SU**  
Mounting bracket for DIN rail

Other suitable accessories can be found at  
[www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

## Curves/Diagrams

### LED indicators and operating chart:



## Teach-in procedures

### 2-Point Teach\*:

1. Place the first target to be learned.
2. Press and hold the Teach button for > 2 seconds to enter Teach mode.
3. Press for another 3 second, both LEDs switch off for 1 second to indicate that you are now in 2-point teach mode.
4. Remove the target (to teach the background) or move the target further away.
5. Press the Teach button for < 2 seconds to end Teach mode.

Both LEDs will indicate fast in-phase blinking and then alternate blinking to signal end of Teach mode. 2-Point Teach is completed.

\* Remarks: The 2-point Teach-in can be used for thru-beam and diffuse mode applications.

The teach-in takes in this case in the reverse order.

1. Object absent (light path free).
4. Object present.

### Dynamic Teach:

1. Press and hold the Teach button for > 2 seconds to enter Teach mode. Both LEDs will indicate fast in-phase blinking follow by slow in-phase blinking.
2. Pass a moving target.
3. Press and hold the Teach button for < 2 seconds to end Teach mode. Both LEDs will indicate alternate blinking to signal end of Teach mode.

### Maximum Teach:

1. Remove target
2. Press and hold the Teach button for > 2 seconds to enter Teach mode. Both LEDs will indicate fast in-phase blinking follow by slow in-phase blinking.
3. Press and hold the Teach button for > 2 seconds to end Teach mode. Both LEDs will indicate fast in-phase blinking and then alternate blinking to signal end of Teach mode.

### Position Teach:

1. Place a target.
2. Press and hold the Teach button for > 2 second to enter Teach mode. Both LEDs will indicate fast in-phase blinking follow by slow in-phase blinking. If the target is too near (strong signal), the fast blinking will last slightly longer follow by slow blinking.
3. Press and hold the Teach button for > 2 seconds to end Teach mode. Both LEDs will indicate fast in-phase blinking and then



Head shape	Moun-ting	Model number	Core	Detection distance *	Fiber cross section	minimum Object size	Fiber optic length	Bend radius	Dimensions	Special features
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
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

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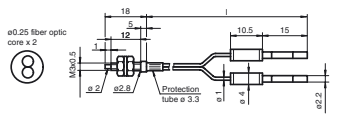
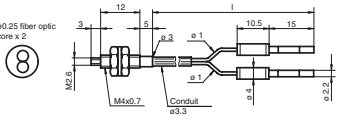
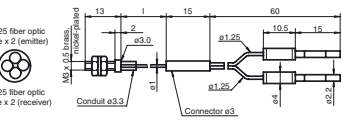
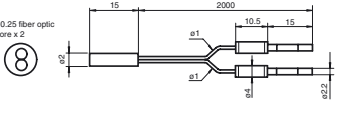
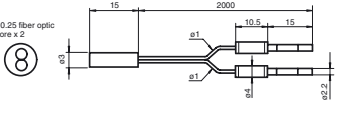
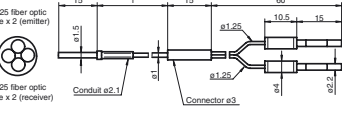
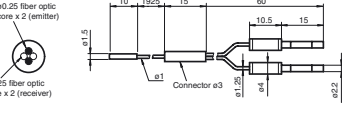
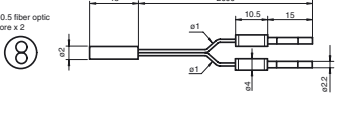
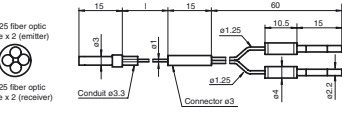
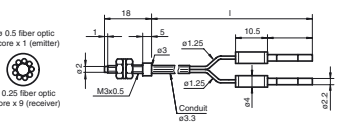
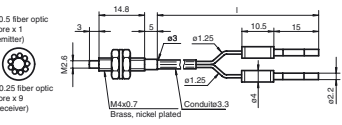
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Head shape	Mounting	Model number	Core	Detection distance *	Fiber cross-section	Fiber optic length	Bend radius	Dimensions	Special features
<b>Highly precise</b>									
Threaded	M3 x 0.5	KLR-C02-1.0-2.0-K75	PMMA	Ultra: 12 mm HiPwr: 6 mm Std: 4 mm	2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

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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. 5.0 mm	KHTR-C02-2.2-2.0-K89	PMMA	Ultra: 280 mm HiPwr: 180 mm Std: 80 mm	2 x 1.0 mm	2 m	min. 25 mm		- 55°C ... + 115°C
<b>Sturdy design</b>									
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
<b>Special design</b>									
Rectangular		KHR-C02-1.0-2.0-K129	PMMA	5 ~ 10 mm	2 x 0.5 mm	2 m	min. 1 mm		<b>crossed beam to background blanking</b> <b>only 1 mm Bend radius</b>
Rectangular		KLR-C02-1.3-2.0-K130	PMMA	1 ~ 8 mm	2 x 1.0 mm	2 m	min. 25 mm		<b>crossed beam to background blanking</b>
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		<b>only 2 mm Bend radius</b>
Rectangular		KLR-C02-1.25-2.0-K128	PMMA	4-26 mm	2 x 0.5 mm	2 m	min. 15 mm		<b>Level measurement</b>

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Cylindrical		KLR-C02-1,25-2,0-K147	PMMA			2 m	mind. 40 mm		Fluid detection

	<p>Std: Standard Mode, 160 <math>\mu</math>s                      HiPwr: HighPower Mode, 500 <math>\mu</math>s                      Ultra: Ultra Mode, 5 ms</p>
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