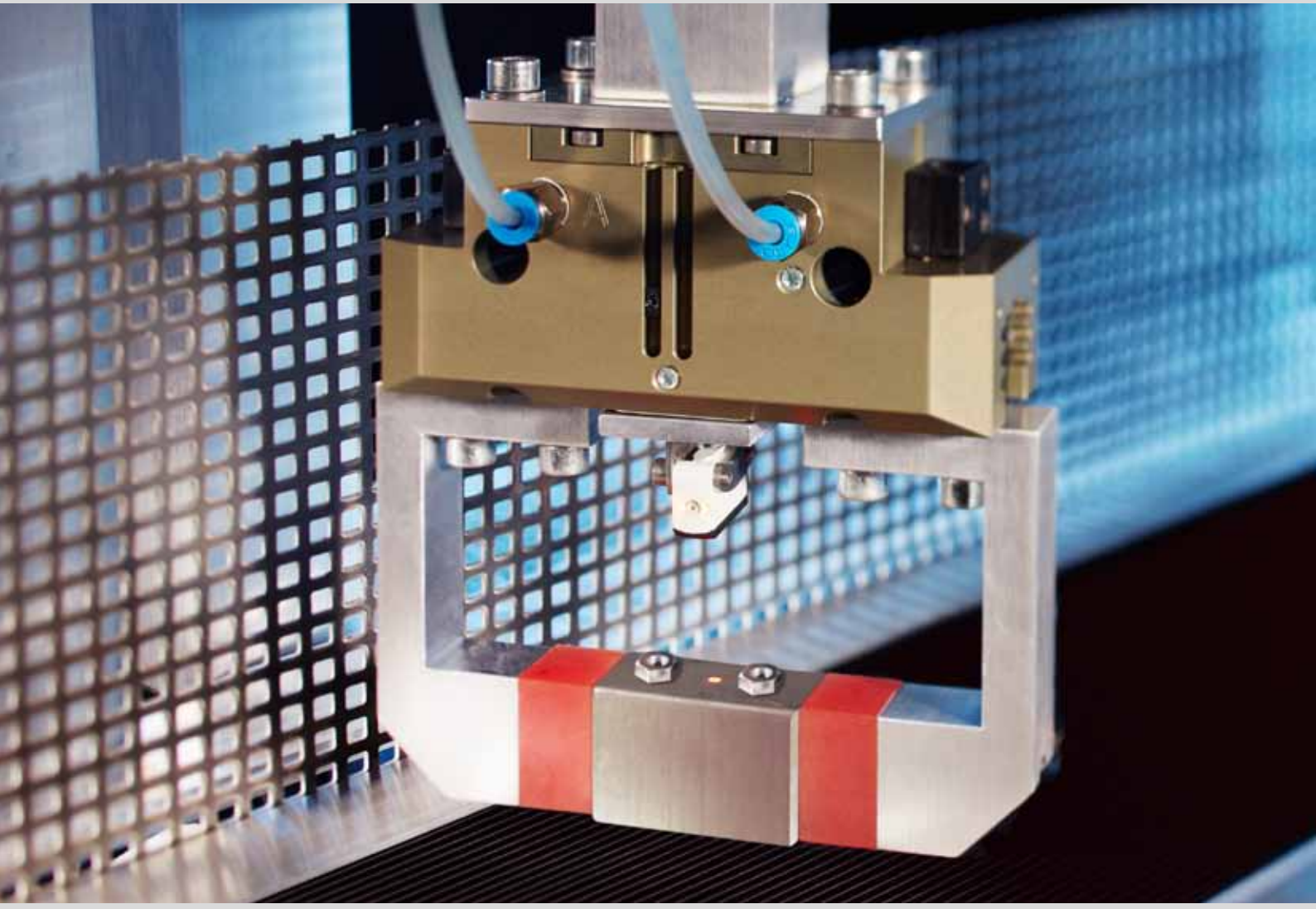
SENSOPART

Our smallest

F 10 – fits in every robot arm

Small multi-talent

There's always space for a sensor from the F 10 family



In the robot's arm: *Thanks to its miniaturised housing and low weight the sensors of the F 10 series are predestined for use where space is very limited – integrated in a robot arm, for example.*

Applications

- Where space is limited
- In handling and assembly systems
- In highly integrated machines
- As an alternative to fibre-optic systems

Typical sectors

- Special machine construction
- Semiconductor and electronics production
- Laboratory automation
- Pharmaceutical industry and medical technology
- Solar industry
- Packaging machines
- Print and paper industry

Blue light:
The new F 10 Bluelight radiates enhanced process stability, especially for monitoring the presence of solar wafers and strongly light-absorbing objects.

The smart alternative:
Instead of a transmitter and a receiver, as frequently required in a fibre-optic system, the proximity sensors of the F 10 family require no counterpart – and can therefore offer considerably easier and more space-saving mounting.

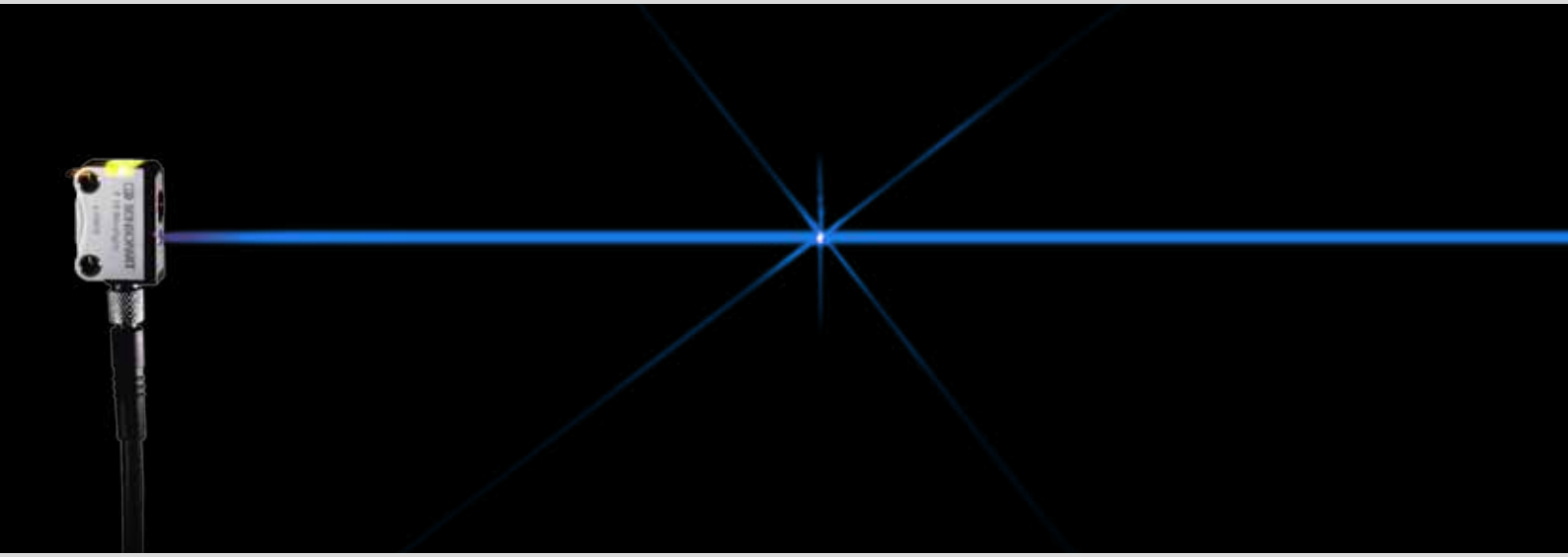
Installation made easy:
The sensors of the F 10 series can be sunk into a profile to save space. They are thus protected and perfectly integrated in the machine design.

There is simply no space for conventional sensors in many applications. No problem for the F 10. It fits into almost any space. Whether in handling and positioning applications, during the production of solar cells, or for the placement of semiconductor components – an F 10 is capable of maximum performance even in the most difficult of installation situations. Thus the photoelectric proximity sensor with background suppression – just 21.1 x 14.6 x 8 mm³ in size and weighing only 3 grams – even fits into a robot gripper without being a burden. Its precisely adjustable background suppression allows flexible teach-in for the most varied of applications, and nothing can distract it from the target object. Even bright or highly reflective machine parts in the background have no effect on switching behaviour. F 10 sensors have all the robustness of bigger sensors thanks to their glass-fibre-reinforced plastic housings and tension-resistant cables.

With their small dimensions and powerful features, as well as the great variety of functional principles, the laser and LED sensors of the F 10 series not only open up completely new application potentials, but also represent an alternative to considerably more expensive fibre-optic systems. They are at home wherever high demands must be met in the most restricted of spaces.

Small housings – great performance

F 10 sensor with bluelight



The F 10 Bluelight sensor originally developed for the solar industry is a true all-rounder.

Thanks to its blue LED emitter, the F 10 Bluelight sensor series guarantees much greater detection reliability in special applications - whether with very dark or transparent objects - as application tests have proved. The F 10 Bluelight series comprises two fixed focus devices which can detect objects between 2 to 30 mm and 2 to 50 mm respectively, with expert precision. Backgrounds are ignored thanks to SensoPart's background suppression technology.

TYPICAL F 10

F 10 Bluelight with extra reliable detection with:

- very dark objects
- transparent objects
- large scanning angles

BlueLight

From production to further processing and final inspection
Missing or non-moulded inserts can often cause costly tool damage.

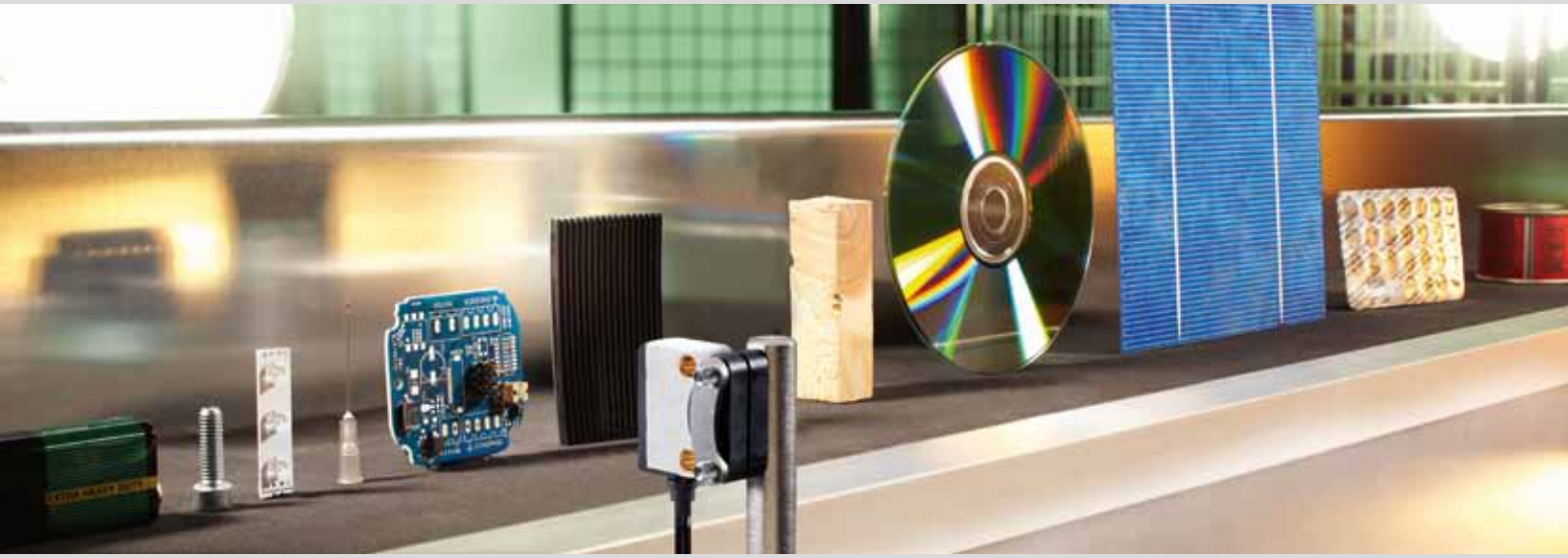
Optical presence detection of electronic trays
Insufficiently or incorrectly filled trays frequently cause malfunctions and downtimes during production.

Optical presence detection of black plastic tubes
The F 10 series plays a decisive role in the plastics industry when it comes to simple applications involving very dark or transparent objects, or installation in small spaces.

Automation with sensors
SensoPart offers a wide variety of photoelectric and proximity sensors, including special versions such as the F 10 Bluelight with blue LED emitter for the detection of poorly reflective objects, e.g. black injection-moulded parts.

Mastering challenges

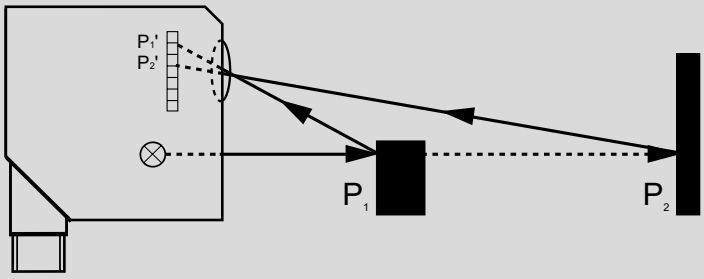
The F 10 family cannot be distracted from what matters – thanks to optimum adjustable background suppression

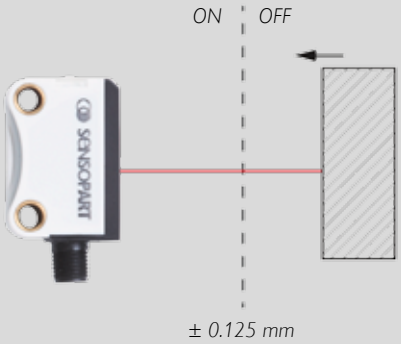


Polished panelling sheets on machines, blinking warning lamps on passing vehicles, moving machine parts, sunbeams through a window: all these are background effects that can make detecting the actual target object considerably more difficult and represent a challenge for any sensor. Even under these conditions, however, one can rely on the proximity sensors of the F 10 sub-miniature family with background suppression and the ASIC technology developed by SensoPart. Because the sensors only see what they are supposed to see: the object, regardless of its material, shape and colour – and nothing else!

Object detection by means of distance measurement

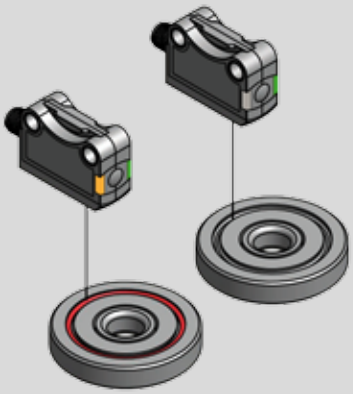
SensoPart proximity sensors with background suppression can always differentiate between the object and the background, even in strongly reflective environments. The sensor measures the distance to object P_1 and to any background P_2 using the triangulation process and not the object's reflectivity. The signal P_2' coming from the background is then suppressed.





Maximum switching accuracy

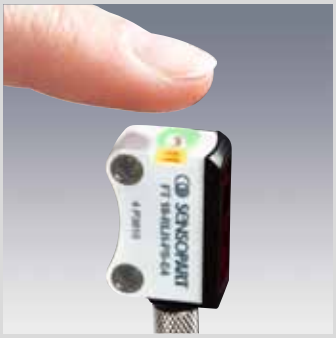
The F 10 sensors with background suppression can resolve a change in distance (object shift) of 0.25 mm in the switching point – a standard for maximum positioning accuracy regardless of the object's colour or surface.



Millimetre accuracy:
The FT 10-RLH even detects height differences of just 1 mm, found for example when monitoring the presence of a sealing washer, without difficulty.

Precise detection

Our laser sensors – with their precise, clearly contoured light spots – even detect minute parts reliably. Thus the F 10 series' sub-miniature photoelectric proximity sensor with background suppression easily detects a wire with a diameter of 0.5 mm from a distance of 60 mm.



Teach-in

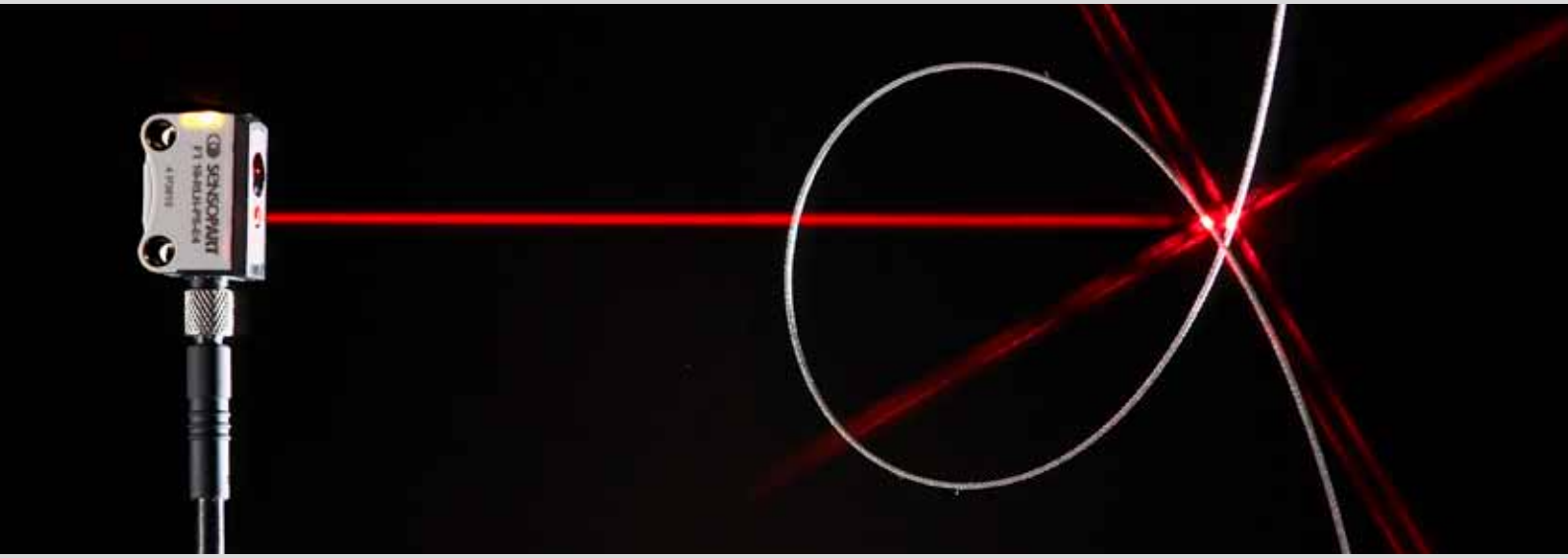
Mini-sensor with maximum user-friendliness:
Simple commissioning with an electronic teach-in button and easily visible status LEDs is far from normal at this size.

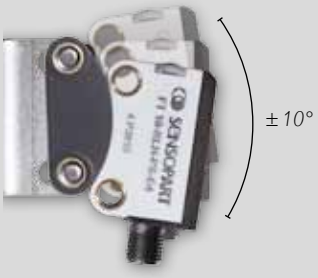
Teach-in – greater stability, greater reliability

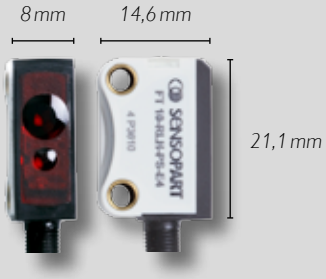
Despite the small, compact housing of the F 10 family it still offers the user-friendliness of its larger brothers: the entire F 10 series of sensors can be uniformly commissioned via teach-in. In addition, electronic data storage ensures that the switching point does not shift as a result of vibrations or impacts, as can occur when using devices adjusted by potentiometer. Moreover, the sensor can be adjusted and locked from a central control unit – and is therefore absolutely tamperproof.

F 10 – family of sub-miniature sensors

Small housings, great performance







Simple mounting:
Mounting using a dovetail that permits fine retro-adjustment of the sensor is particularly recommended when space is limited.

Special characteristics:
The glass-fibre-reinforced plastic housing with its integrated mounting sleeve, dovetail guide on the back, and laser-marked indelible type code are characteristic of the F 10.

made in Germany

TYPICAL F 10

- Sub-miniature sensor for installation in the smallest of spaces and in moving machine parts
- The world's smallest laser sensor with background suppression, adjustable via teach-in
- Sensors as LED or laser versions
- F 10 Bluelight: specially designed for scanning solar wafers and strongly light-absorbing objects
- User-friendly commissioning via electronic teach-in button or control wire
- Well thought-out mounting accessories for rapid and simple integration

The sensors of the F 10 series, available as LED and laser versions, form one of the most comprehensive series on the market in sub-miniature housings. Their precise background suppression, adjustable via teach-in, makes the sensors unique. The light spot of the F 10 laser sensors also remains so focused that small parts in the millimetre range can still be reliably detected even at long distances – for example, a wire with a diameter of 0.5 mm at a distance of 60 mm. One highlight of the new F 10 LED sensors is the F 10 Bluelight with its blue transmission LED, specially developed for detecting solar wafers and strongly light-absorbing objects using the scanning principle.

The F 10 sensors not only impress through their excellent performance data, but also through their unmistakeable design with special features – unique in this size of housing. The dovetail mounting system considerably simplifies fine adjustment, particularly in difficult installation locations, and the various connection variants allow rapid commissioning and replacement. The mounting holes of the sub-miniature sensors are reinforced with metal eyelets. A small sensor that will give users great pleasure!

F 10 – Product Overview

	Type of light	Adjustment	Scanning distance/range	Special features	Page
Photoelectric proximity sensors with background suppression					
FT 10-RLH	Laser	Teach-in	60 mm	The only scanner with scanning distance adjustment	10
FT 10-RLHR	Laser	Teach-in	60 mm	Broad-beam light spot	12
FT 10-B-RLF	Laser	Fixed focus	15 mm/30 mm		14
FT 10-RH	LED	Teach-in	70 mm		16
FT 10-RF	LED	Fixed focus	15 mm/30 mm/50 mm		18
FT 10-BF Bluelight	LED, blue	Fixed focus	30 mm	Blue transmission LED for strongly light-absorbing objects	20
Retroreflective photoelectric sensors					
FR 10-RL	Laser	Teach-in	2 m	Long range, precise small-part detection	22
FR 10-R	LED	Teach-in	1,6 m	Long range	24
Through-beam photoelectric sensors					
FS/FE 10-RL	Laser	Teach-in	3 m	Sensor pair, very accurate object positioning	26
FS 10-RL/FE 10-RL	Laser	Teach-in	3 m	Transmitter/receiver, very accurate object positioning	28

FT 10-RLH

Laser photoelectric proximity sensor with background suppression

PRODUCT HIGHLIGHTS

- Sub-miniature sensor with laser light and adjustable background suppression
- Precise and reliable switching behaviour, even with varying object surfaces and colours
- Reliable operation even with highly reflective machine parts in the background, thanks to SensoPart ASIC technology
- Particularly suitable for detecting the smallest of parts and for installation in extremely confined spaces

Optical data		Functions	
Scanning distance	6 … 60 mm[1]	Indicator LED, green	Operating voltage indicator
Adjustment range	10 … 60 mm[1]	Indicator LED, yellow	Switching output indicator
Type of light	Laser, red, 655 nm	Scanning distance adjustment	Via Teach-in button and control input
Light spot size (total detection area)	1 x 3 mm[2]	Adjustment possibilities	Button lock via control input
Laser Class (DIN EN 60825-1:2008-5)	1	Default settings	Max. scanning distance and N.O.

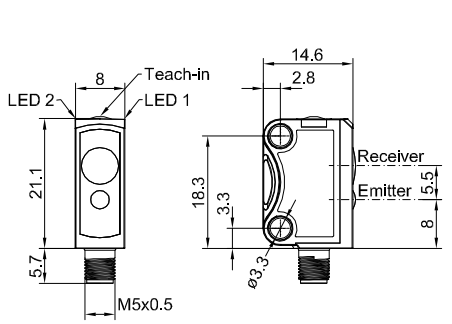
Electrical data		Mechanical data	
Operating voltage, $+U_B$	10 … 30 V DC[2]	Dimensions	21.1 x 14.6 x 8 mm
No-load current, I_0	≤ 12 mA	Enclosure rating	IP 67[3]
Output current, Ie	≤ 50 mA	Material, housing	PUR
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	See Selection Table
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: operation	-20 … +50 °C
Output function	N.O.	Ambient temperature: storage	-20 … +80 °C
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (plug device)	Ca. 3 g
Response time	500 µs	Weight (cable device)	Ca. 22 g
Control input, IN (only 4-pin design)	$+U_B$ = teach-in $-U_B$ = button locked Open = normal operation	Weight (pigtail)	Ca. 10 g

[1] Reference material white, 90 % reflectivity [2] Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz [3] With connected IP 67 plug

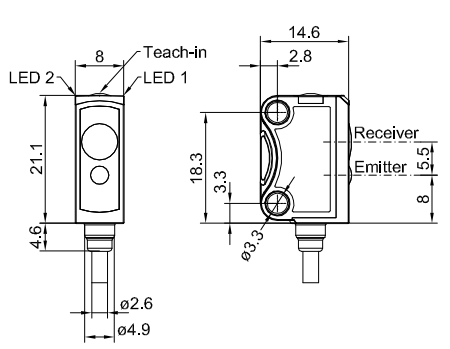
Scanning distance	Switching output	Type of connection	Part number	Article number
6 … 60 mm	PNP	Plug, M5x0.5, 4-pin	FT 10-RLH-PS-E4	600-11130
6 … 60 mm	NPN	Plug, M5x0.5, 4-pin	FT 10-RLH-NS-E4	600-11131
6 … 60 mm	PNP	Cable, 2 m, 4-wire	FT 10-RLH-PS-K4	600-11132
6 … 60 mm	NPN	Cable, 2 m, 4-wire	FT 10-RLH-NS-K4	600-11133
6 … 60 mm	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RLH-PS-KM4	600-11134
6 … 60 mm	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RLH-NS-KM4	600-11135
6 … 60 mm	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RLH-PS-KM3	600-11146
6 … 60 mm	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RLH-NS-KM3	600-11147
6 … 60 mm	PNP	Pigtail, 500 mm with M8 plug, 3-pin	FT 10-RLH-PS-KM3-X07	600-11158

Including dovetail clamp mounting MBD F 10 for all types

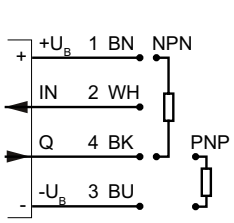
Plug connection



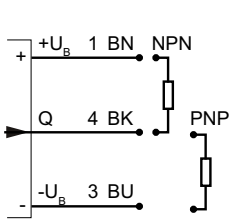
Cable connection



Connection, 4-pin



Connection, 3-pin



Reference material	Detection range
White (90 %)	6 … 60 mm
Grey (18 %)	7 … 60 mm
Black (6 %)	7 … 60 mm

Accessories

Connection cables	From page 30
Brackets	

FT 10-RLHR

Laser photoelectric proximity sensor with background suppression

PRODUCT HIGHLIGHTS

- Sub-miniature sensor with wide laser light spot and adjustable background suppression
- Precise and reliable switching behaviour, even with varying object surfaces and colours
- Reliable operation even with highly reflective machine parts in the background, thanks to SensoPart ASIC technology
- Particularly suitable for installation in the smallest of spaces
- Simple operation via electronic Teach-in button or control line

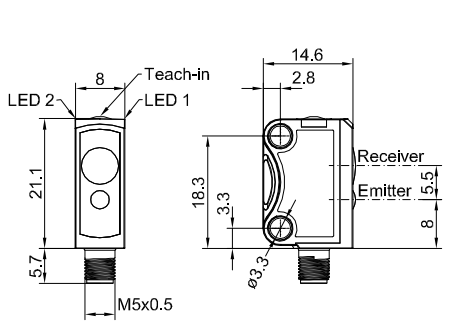
Optical data		Functions	
Scanning distance	6 … 60 mm[1]	Indicator LED, green	Operating voltage indicator
Adjustment range	10 … 60 mm[1]	Indicator LED, yellow	Switching output indicator
Type of light	Laser, red, 655 nm	Scanning distance adjustment	Via Teach-in button and control input
Light spot size	See diagram	Adjustment possibilities	Button lock via control input
Laser Class (DIN EN 60825-1:2008-5)	1	Default settings	Max. scanning distance and N.O.
Electrical data		**Mechanical data**	
Operating voltage, $+U_B$	10 … 30 V DC[2]	Dimensions	21.1 x 14.6 x 8 mm
No-load current, I_0	≤ 12 mA	Enclosure rating	IP 67[3]
Output current, Ie	≤ 50 mA	Material, housing	PUR
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	See Selection Table
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: operation	-20 … +50 °C
Output function	N.O.	Ambient temperature: storage	-20 … +80 °C
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (plug device)	Ca. 3 g
Response time	500 µs	Weight (cable device)	Ca. 22 g
Control input, IN (only 4-pin design)	$+U_B$ = teach-in $-U_B$ = button locked Open = normal operation	Weight (pigtail)	Ca. 10 g

[1] Reference material white, 90 % reflectivity [2] Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz [3] With connected IP 67 plug

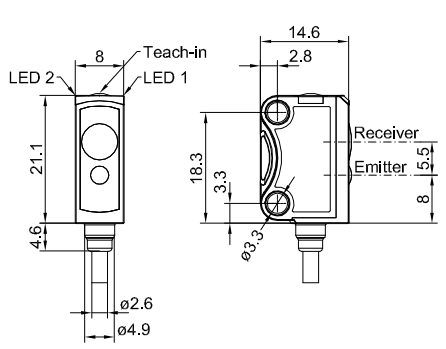
Scanning distance	Switching output	Type of connection	Part number	Article number
6 … 60 mm	PNP	Plug, M5x0.5, 4-pin	FT 10-RLHR-PS-E4	600-11136
6 … 60 mm	NPN	Plug, M5x0.5, 4-pin	FT 10-RLHR-NS-E4	600-11137
6 … 60 mm	PNP	Cable, 2 m, 4-wire	FT 10-RLHR-PS-K4	600-11138
6 … 60 mm	NPN	Cable, 2 m, 4-wire	FT 10-RLHR-NS-K4	600-11139
6 … 60 mm	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RLHR-PS-KM4	600-11140
6 … 60 mm	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RLHR-NS-KM4	600-11141
6 … 60 mm	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RLHR-PS-KM3	600-11148
6 … 60 mm	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RLHR-NS-KM3	600-11149

Including dovetail clamp mounting MBD F 10 for all types

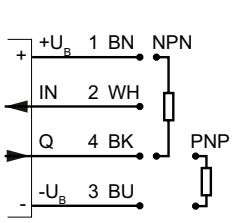
Plug connection



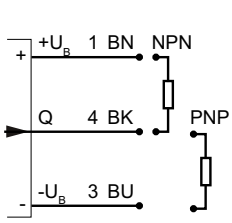
Cable connection



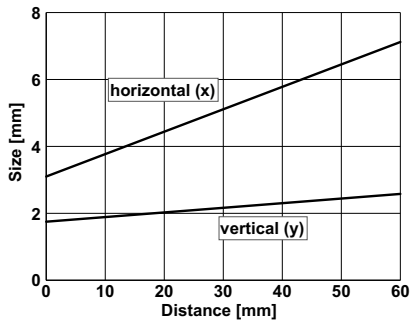
Connection, 4-pin



Connection, 3-pin



Light spot size



Reference material	Detection range
White (90 %)	6 … 60 mm
Grey (18 %)	7 … 60 mm
Black (6 %)	7 … 60 mm

Accessories

Connection cables	From page 30
Brackets	

FT 10-B-RLF

Laser photoelectric proximity sensor with background suppression, fixed focus

PRODUCT HIGHLIGHTS

- Sub-miniature sensor with laser light and precise fixed background suppression
- Reliable switching behaviour even with varying object surfaces and colours
- Particularly suitable for detecting the smallest of parts and for installation in extremely confined spaces
- Tamper-proof sensor design – no misalignment possible
- Robust, glass-fibre-reinforced plastic housings

Optical data		Functions	
Scanning distance	6 … 15 mm[1] 6 … 30 mm[1]	Indicator LED, green	Operating voltage indicator
Type of light	Laser, red, 655 nm	Indicator LED, yellow	Switching output indicator
Light spot size (total detection area)	1 x 3 mm[2]	Adjustment possibilities	N.O. / N.C. via control input
Laser Class (DIN EN 60825-1:2008-5)	1		

Electrical data		Mechanical data	
Operating voltage, $+U_B$	10 … 30 V DC[2]	Dimensions	21.1 x 14.6 x 8 mm
No-load current, I_0	≤ 12 mA	Enclosure rating	IP 67[3]
Output current, Ie	≤ 50 mA	Material, housing	PUR
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	See Selection Table
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: operation	-20 … +50 °C
Output function	N.O. /N.C.	Ambient temperature: storage	-20 … +80 °C
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (plug device)	Ca. 3 g
Response time	500 µs	Weight (cable device)	Ca. 22 g
Control input, IN (only 4-pin design)	$+U_B$ = N.C. $-U_B$ / Open = N.O.	Weight (pigtail)	Ca. 10 g

[1] Reference material white, 90 % reflectivity [2] Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz [3] With connected IP 67 plug

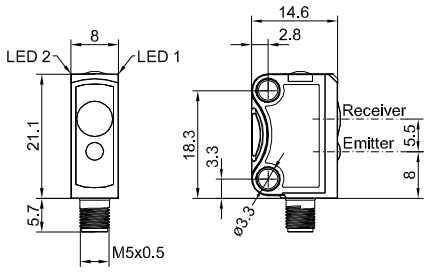
Operating range	Switching output	Type of connection	Part number	Article number
6 … 15 mm	PNP	Plug, M5x0.5, 4-pin	FT 10-B-RLF1-PS-E4	600-11100
6 … 15 mm	NPN	Plug, M5x0.5, 4-pin	FT 10-B-RLF1-NS-E4	600-11101
6 … 30 mm	PNP	Plug, M5x0.5, 4-pin	FT 10-B-RLF2-PS-E4	600-11106
6 … 30 mm	NPN	Plug, M5x0.5, 4-pin	FT 10-B-RLF2-NS-E4	600-11107
6 … 15 mm	PNP	Cable, 2 m, 4-wire	FT 10-B-RLF1-PS-K4	600-11102
6 … 15 mm	NPN	Cable, 2 m, 4-wire	FT 10-B-RLF1-NS-K4	600-11103
6 … 30 mm	PNP	Cable, 2 m, 4-wire	FT 10-B-RLF2-PS-K4	600-11108
6 … 30 mm	NPN	Cable, 2 m, 4-wire	FT 10-B-RLF2-NS-K4	600-11109
6 … 15 mm	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-B-RLF1-PS-KM4	600-11104
6 … 15 mm	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-B-RLF1-NS-KM4	600-11105
6 … 30 mm	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-B-RLF2-PS-KM4	600-11110
6 … 30 mm	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-B-RLF2-NS-KM4	600-11111

Operating range	Switching output	Type of connection	Part number	Article number
6 … 15 mm	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-B-RLF1-PS-KM3	600-11142
6 … 15 mm	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-B-RLF1-NS-KM3	600-11143
6 … 30 mm	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-B-RLF2-PS-KM3	600-11144
6 … 30 mm	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-B-RLF2-NS-KM3	600-11145

Including dovetail clamp mounting MBD F 10 for all types

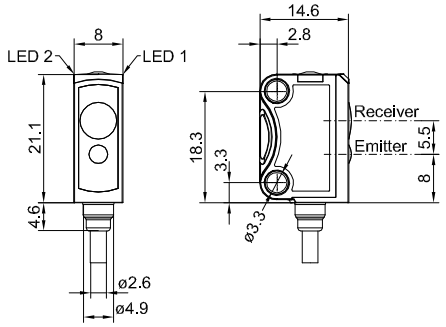
Plug connection

153-00909



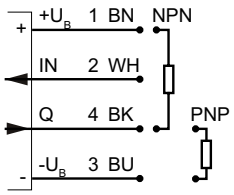
Cable connection

153-00910



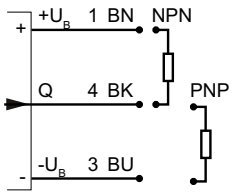
Connection, 4-pin

154-00508



Connection, 3-pin

154-00509



Reference material	Detection range
White (90 %)	6 … 15 mm / 30 mm
Grey (18 %)	7 … 15 mm / 30 mm
Black (6 %)	7 … 15 mm / 30 mm

Accessories

Connection cables	From page 30
Brackets	

FT 10-RH

Photoelectric proxmity sensor with background suppression

PRODUCT HIGHLIGHTS

- Sub-miniature sensor with precise adjustable background suppression
- Precise and reliable switching behaviour even with varying object surfaces and colours
- Reliable operation even with highly reflective machine parts in the background, thanks to SensoPart ASIC technology
- Static and dynamic teach-in via electronic teach-in button or control line

Optical data	
Scanning distance	5 … 70 mm[1]
Adjustment range	10 … 70 mm[1]
Used light	LED, red, 650 nm
Light spot size	See diagram
Repeatability	0,45 mm[2, 3]
Hysteresis	≤ 2 mm[2]
Grey/white shift (18%/90%)	≤ 3 mm[2]
Black/white shift (6%/90%)	≤ 4 mm[2]

Functions	
Indicator LED, green	Operating voltage indicator
Indicator LED, yellow	Switching output indicator
Scanning distance adjustment	Via Teach-in button and control input[5]
Teach-in modes	Mode 1: during running process Mode 2: during standing process
Adjustment possibilities	N.O./N.C. via Teach-in button and control input[5] Button lock via control input[5]
Default settings	Max. range and N.O.

Electrical data	
Operating voltage, $+U_B$	10 … 30 V DC[4]
No-load current, I_0	≤ 20 mA
Output current, Ie	≤ 50 mA
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)
Protection class	2
Power On Delay	< 300 ms
Switching output, Q	PNP/NPN
Output function	N.O. /N.C.
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz
Response time	500 µs
Control input, IN[3]	$+U_B$ = teach-in $-U_B$ = button locked Open = normal operation

Mechanical data	
Dimensions	21,1 x 14,6 x 8 mm
Enclosure rating	IP 67[6]
Material, housing	PUR
Material, front screen	PMMA
Type of connection	See Selection Table
Ambient temperature: operation	-20 … +60 °C
Ambient temperature: storage	-20 … +80 °C
Weight (plug device)	approx. 3 g
Weight (cable device)	approx. 22 g
Weight (pigtail)	approx. 10 g

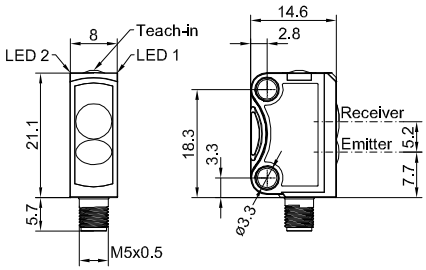
[1] Reference material white, 90 % reflectivity [2] At maximum scanning distance [3] In constant environmental conditions [4] Max. 10 % ripple within U_B, ~ 50 Hz / 100 Hz
[5] Only 4-pin design [6] With connected IP 67 plug

Scanning distance	Switching output	Type of connection	Part number	Article number
5 … 70 mm[1]	PNP	Plug, M5x0.5, 4-pin	FT 10-RH-PS-E4	600-11000
5 … 70 mm[1]	NPN	Plug, M5x0.5, 4-pin	FT 10-RH-NS-E4	600-11004
5 … 70 mm[1]	PNP	Cable, 2 m, 4-wire	FT 10-RH-PS-K4	600-11001
5 … 70 mm[1]	NPN	Cable, 2 m, 4-wire	FT 10-RH-NS-K4	600-11005
5 … 70 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RH-PS-KM4	600-11002
5 … 70 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RH-NS-KM4	600-11006
5 … 70 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RH-PS-KM3	600-11003
5 … 70 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RH-NS-KM3	600-11007

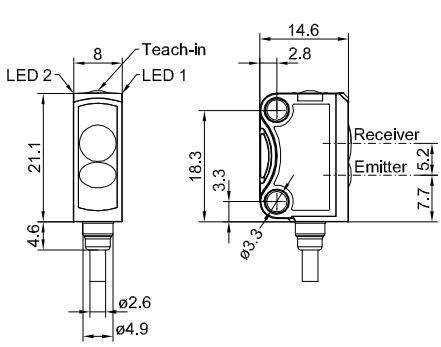
Including dovetail clamp mounting MBD F 10 for all types

Version: 10/2015. Subject to changes; diagrams similar

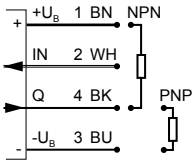
Plug connection



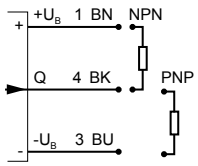
Cable connection



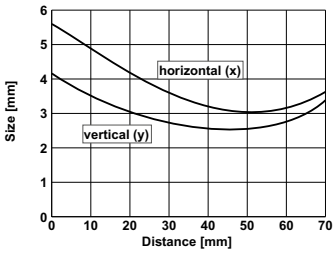
Connection, 4-pin



Connection, 3-pin



Light spot size



Reference material	Detection range
White (90 %)	5 … 70 mm
Grey (18 %)	8 … 70 mm
Black (6 %)	8 … 70 mm

Accessories

Connection cables	From page 30
Brackets	

FT 10-RF

Photoelectric proxmity sensor with background suppression, fixed focus

PRODUCT HIGHLIGHTS

- Sub-miniature sensor with precise fixed background suppression
- Economical multi-purpose sensor
- Reliable switching behaviour even with varying object surfaces and colours
- Tamper-proof sensor design – no misalignment possible
- Simple mounting and adjustment through innovative dovetail clamp mounting

Optical data	
Scanning distance	2 … 15 mm[1] 2 … 30 mm[1] 2 … 50 mm[1]
Used light	LED, red, 650 nm
Light spot size	See diagram

Functions	
Indicator LED, green	Operating voltage indicator
Indicator LED, yellow	Switching output indicator
Adjustment possibilities	N.O. / N.C. via control input[3]

Electrical data	
Operating voltage, $+U_B$	10 … 30 V DC[2]
No-load current, I_0	≤ 20 mA
Output current, Ie	≤ 50 mA
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)
Protection class	2
Power On Delay	< 300 ms
Switching output, Q	PNP/NPN (see Selection Table)
Output function	N.O. /N.C.
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz
Response time	500 µs
Control input, IN[3]	$+U_B$ = N.C. $-U_B$ / Open = N.O.

Mechanical data	
Dimensions	21,1 x 14,6 x 8 mm
Enclosure rating	IP 67[4]
Material, housing	PUR
Material, front screen	PMMA
Type of connection	See Selection Table
Ambient temperature: operation	-20 … +60 °C
Ambient temperature: storage	-20 … +80 °C
Weight (cable device)	approx. 22 g
Weight (pigtail)	approx. 10 g

[1] Reference material white, 90 % reflectivity [2] Max. 10 % ripple within U_B, ~ 50 Hz / 100 Hz [3] Only 4-pin design [4] With connected IP 67 plug

Scanning distance	Switching output	Type of connection	Part number	Article number
2 … 15 mm[1]	PNP	Cable, 2 m, 4-wire	FT 10-RF1-PS-K4	600-11008
2 … 15 mm[1]	NPN	Cable, 2 m, 4-wire	FT 10-RF1-NS-K4	600-11011
2 … 30 mm[1]	PNP	Cable, 2 m, 4-wire	FT 10-RF2-PS-K4	600-11014
2 … 30 mm[1]	NPN	Cable, 2 m, 4-wire	FT 10-RF2-NS-K4	600-11017
2 … 50 mm[1]	PNP	Cable, 2 m, 4-wire	FT 10-RF3-PS-K4	600-11020
2 … 50 mm[1]	NPN	Cable, 2 m, 4-wire	FT 10-RF3-NS-K4	600-11023
2 … 15 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RF1-PS-KM4	600-11009
2 … 15 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RF1-NS-KM4	600-11012
2 … 30 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RF2-PS-KM4	600-11015
2 … 30 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RF2-NS-KM4	600-11018
2 … 50 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RF3-PS-KM4	600-11021
2 … 50 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-RF3-NS-KM4	600-11024
2 … 15 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RF1-PS-KM3	600-11010
2 … 15 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RF1-NS-KM3	600-11013

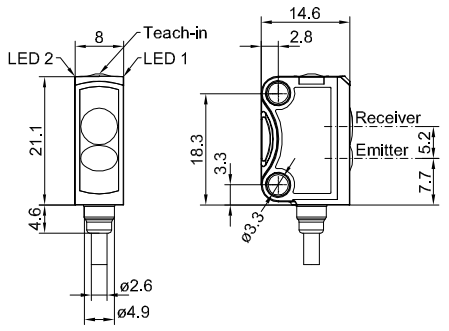
Version: 10/2015. Subject to changes; diagrams similar

Scanning distance	Switching output	Type of connection	Part number	Article number
2 … 30 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RF2-PS-KM3	600-11016
2 … 30 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RF2-NS-KM3	600-11019
2 … 50 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RF3-PS-KM3	600-11022
2 … 50 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-RF3-NS-KM3	600-11025

Including dovetail clamp mounting MBD F 10 for all types

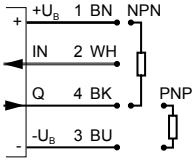
Cable connection

153-01110



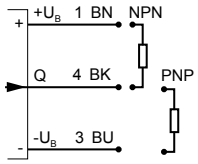
Connection, 4-pin

154-00312



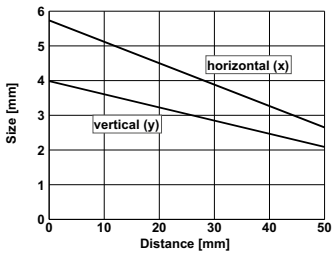
Connection, 3-pin

154-00311



Light spot size

155-01769



Reference material

white (90 %)
grey (18 %)
black (6 %)

Detection range

FT 10-RF1	FT 10-RF2	FT 10-RF3
2 … 15 mm	2 … 30 mm	2 … 50 mm
3 … 15 mm	4 … 30 mm	5 … 50 mm
4 … 15 mm	5 … 30 mm	7 … 50 mm

Accessories

Connection cables	From page 30
Brackets	

FT 10-BF

Bluelight photoelectric proxmity sensor with background suppression, fixed focus

PRODUCT HIGHLIGHTS

- Sub-miniature sensor with blue transmission LED and precise fixed background suppression
- Reliable switching behaviour with strongly light-absorbing objects, e.g. solar wafers
- Reliable operation without reflector - even with critical surfaces
- Tamper-proof sensor design - no misalignment possible
- Simple mounting and adjustment through innovative dovetail clamp mounting

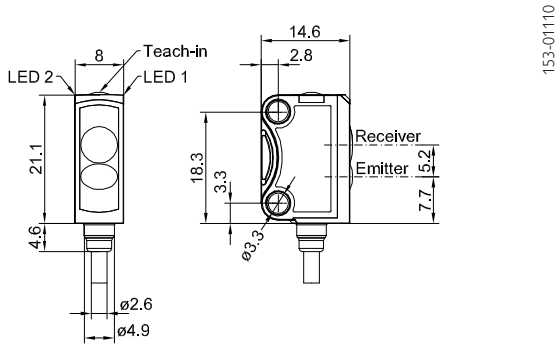
Optical data		Functions	
Scanning distance	2 … 30 mm[1] / 2 … 50 mm[1]	Indicator LED, green	Operating voltage indicator
Optimum scanning distance	15 … 20 mm	Indicator LED, yellow	Switching output indicator
Used light	LED, blue, 450 nm	Adjustment possibilities	N.O. / N.C. via control input[3]
LED risk group (DIN 62471)	2		
Light spot size	See diagram		
Electrical data		**Mechanical data**	
Operating voltage $+U_B$	10 … 30 V DC[2]	Dimensions	21,1 x 14,6 x 8 mm
No-load supply current I_0	≤ 20 mA	Enclosure rating	IP 67[4]
Output current Ie	≤ 50 mA	Material, housing	PUR
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)	Material, front screen	PMMA
		Type of connection	See Selection Table
Protection class	2	Ambient temperature: operation	-20 … +50 °C
Power On Delay	< 300 ms	Ambient temperature: storage	-20 … +80 °C
Switching output, Q	PNP/NPN (see Selection Table)	Weight (cable device)	approx. 22 g
Output function	N.O. /N.C.	Weight (pigtail)	approx. 10 g
Switching frequency, f (ti/tp 1:1)	800 Hz		
Response time	625 µs		
Control input, IN[3]	$+U_B$ = N.C. $-U_B$ / Open = N.O.		

[1] Reference material white, 90 % reflectivity [2] Max. residual ripple 10 %, within U_B, approx. 50 Hz/100 Hz [3] Only 4-pin design [4] With connected IP 67 plug

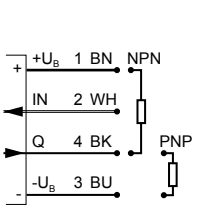
Scanning distance	Switching output	Type of connection	Part number	Article number
2 … 30 mm[1]	PNP	Cable, 2 m, 4-wire	FT 10-BF2-PS-K4	600-11026
2 … 30 mm[1]	NPN	Cable, 2 m, 4-wire	FT 10-BF2-NS-K4	600-11029
2 … 30 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-BF2-PS-KM4	600-11027
2 … 30 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-BF2-NS-KM4	600-11030
2 … 30 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-BF2-PS-KM3	600-11028
2 … 30 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-BF2-NS-KM3	600-11031
2 … 50 mm[1]	PNP	Cable, 2 m, 4-wire	FT 10-BF3-PS-K4	600-11036
2 … 50 mm[1]	NPN	Cable, 2 m, 4-wire	FT 10-BF3-NS-K4	600-11039
2 … 50 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-BF3-PS-KM4	600-11037
2 … 50 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FT 10-BF3-NS-KM4	600-11040
2 … 50 mm[1]	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-BF3-PS-KM3	600-11038
2 … 50 mm[1]	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FT 10-BF3-NS-KM3	600-11041

Including dovetail clamp mounting MBD F 10 for all types

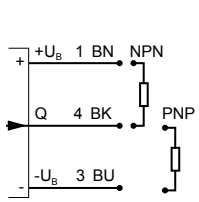
Cable connection



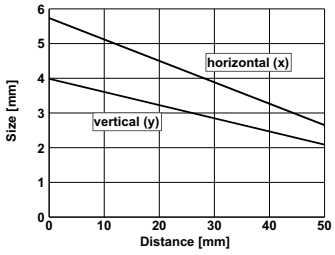
Connection, 4-pin



Connection, 3-pin



Light spot size



Accessories

Connection cables	From page 30
Brackets	

FR 10-RL

Laser retroreflective photoelectric sensor

PRODUCT HIGHLIGHTS

- Sub-miniature sensor for installation in the smallest of spaces
- Bright, precise laser light spot for optimum small-part detection and simple alignment
- Suitable for numerous different reflectors
- User-friendly operation via electronic Teach-in button or control line
- Robust, glass-fibre-reinforced plastic housings

Optical data	
Limit range	0.1 … 2.5 m[1]
Operating range	0.1 … 2 m[1]
Type of light	Laser, red, 655 nm
Light spot size	See diagram
Laser Class (DIN EN 60825-1:2008-5)	1

Functions	
Indicator LED, green	Operating voltage indicator
Indicator LED, yellow	Switching output indicator
Sensitivity adjustment	Via Teach-in button and control input
Teach-in modes	Mode 1: during running process Mode 2: during standing process
Adjustment possibilities	N.O. / N.C. via Teach-in button and control input Button lock via control input
Default settings	Max. range and N.O.

Electrical data	
Operating voltage, $+U_B$	10 … 30 V DC[2]
No-load current, I_0	≤ 12 mA
Output current, Ie	≤ 50 mA
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)
Protection Class	2
Switching output, Q	PNP/NPN (see Selection Table)
Output function	N.O. /N.C.
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz
Response time	500 µs
Control input, IN (only 4-pin design)	$+U_B$ = teach-in $-U_B$ = button locked Open = normal operation

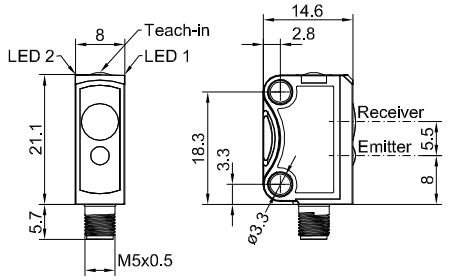
Mechanical data	
Dimensions	21.1 x 14.6 x 8 mm
Enclosure rating	IP 67[3]
Material, housing	PUR
Material, front screen	PMMA
Type of connection	See Selection Table
Ambient temperature: operation	-20 … +50 °C
Ambient temperature: storage	-20 … +80 °C
Weight (plug device)	Ca. 3 g
Weight (cable device)	Ca. 22 g
Weight (pigtail)	Ca. 10 g

[1] Reference material: R5/L reflector [2] Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz [3] With connected IP 67 plug

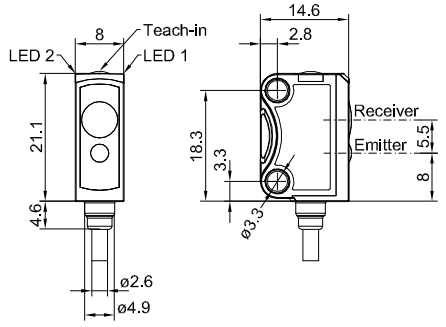
Operating range	Switching output	Type of connection	Part number	Article number
0.1 … 2 m	PNP	Plug, M5x0.5, 4-pin	FR 10-RL-PS-E4	603-31000
0.1 … 2 m	NPN	Plug, M5x0.5, 4-pin	FR 10-RL-NS-E4	603-31001
0.1 … 2 m	PNP	Cable, 2 m, 4-wire	FR 10-RL-PS-K4	603-31002
0.1 … 2 m	NPN	Cable, 2 m, 4-wire	FR 10-RL-NS-K4	603-31003
0.1 … 2 m	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FR 10-RL-PS-KM4	603-31004
0.1 … 2 m	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FR 10-RL-NS-KM4	603-31005
0.1 … 2 m	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FR 10-RL-PS-KM3	603-31006
0.1 … 2 m	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FR 10-RL-NS-KM3	603-31007

Including dovetail clamp mounting MBD F 10 for all types

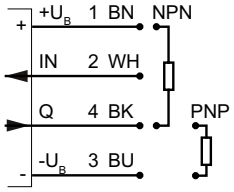
Plug connection



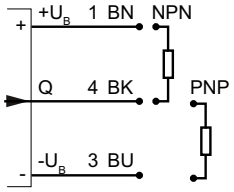
Cable connection



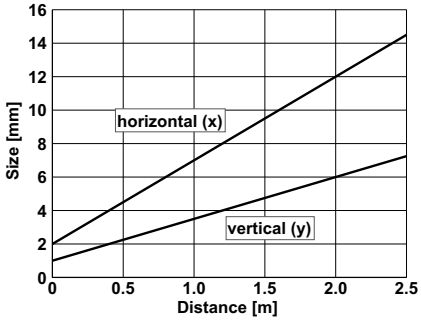
Connection, 4-pin



Connection, 3-pin



Light spot size



Reflector / Reflective foil*	Operating range
R5/L	0.1 … 2 m
R2-2LB	0.1 … 2 m
R3-2LK	0.1 … 2 m
RF-50 KL*	0.06 … 0.75 m
RF-100 KL*	0.1 … 2 m

Accessories	
Reflectors	From page 30
Connection cables	
Brackets	

FR 10-R

Retroreflective photoelectric sensor

PRODUCT HIGHLIGHTS

- Sub-miniature sensor for installation in the smallest of spaces
- Despite very small sensor housing very long operating range of 1.6 m
- Fast response time: only 500 µs
- Static and dynamic teach-in via electronic teach-in button or control line
- Simple mounting and adjustment through innovative dovetail clamp mounting

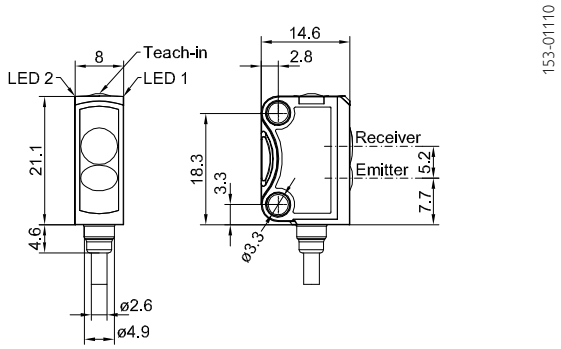
Optical data		Functions	
Operating range	0.1 … 1.6 m[1]	Indicator LED green	Operating voltage indicator
Used light	LED, red, 650 nm	Indicator LED yellow	Switching output indicator
Light spot size	See diagram	Sensitivity adjustment	Via Teach-in button and control input[3]
Polarising filter	Yes	Teach-in modes	Mode 1: during running process Mode 2: during standing process
		Adjustment possibilities	N.O./N.C. via Teach-in button and control input[3] Button lock via control input[3]
		Default settings	Max. range and N.O.
Electrical data		**Mechanical data**	
Operating voltage, $+U_B$	10 … 30 V DC[2]	Dimensions	21,1 x 14,6 x 8 mm
No-load current, I_0	≤ 20 mA	Enclosure rating	IP 67[4]
Output current, Ie	≤ 50 mA	Material, housing	PUR
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)	Material, front screen	PMMA
		Type of connection	See Selection Table
Protection class	2	Ambient temperature: operation	-20 … +60 °C
Power On Delay	< 300 ms	Ambient temperature: storage	-20 … +80 °C
Switching output, Q	PNP/NPN (see Selection Table)	Weight (cable device)	approx. 22 g
Output function	N.O. /N.C.	Weight (pigtail)	approx. 10 g
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz		
Response time	500 µs		
Control input, IN[3]	$+U_B$ = teach-in $-U_B$ = button locked Open = normal operation		

[1] Reference material reflector R5 [2] Max. 10 % ripple within U_B, ~ 50 Hz / 100 Hz [3] Only 4-pin design [4] With connected IP 67 plug

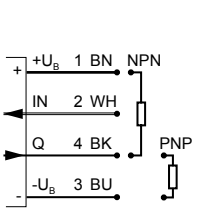
Operating range	Switching output	Type of connection	Part number	Article number-Nr.
0.1 … 1.6 m[1]	PNP	Cable, 2 m, 4-wire	FR 10-R-PS-K4	603-11001
0.1 … 1.6 m[1]	NPN	Cable, 2 m, 4-wire	FR 10-R-NS-K4	603-11004
0.1 … 1.6 m[1]	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FR 10-R-PS-KM4	603-11002
0.1 … 1.6 m[1]	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FR 10-R-NS-KM4	603-11005
0.1 … 1.6 m[1]	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FR 10-R-PS-KM3	603-11003
0.1 … 1.6 m[1]	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FR 10-R-NS-KM3	603-11006

Including dovetail clamp mounting MBD F 10 for all types

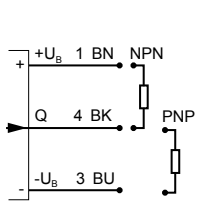
Cable connection



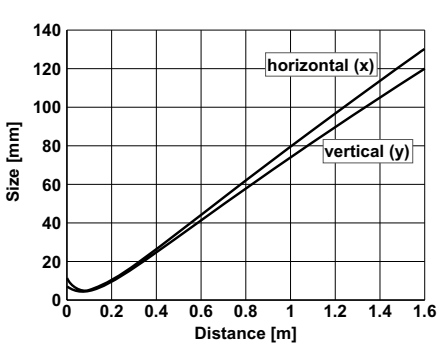
Connection, 4-pin



Connection, 3-pin



Light spot size



Reflector / Reflective foil*	Operating range (min./max. reflector distance)	Accessories	
R5	0.1 … 1.6 m	Reflectors	From page 30
R1	0.1 … 1 m	Brackets	
R2-2LB1	0,15 … 0,5 m		
R3-2LK1	0,15 … 0,5 m		
RF-100 KL*	0,15 … 1 m		

FS/FE 10-RL

Laser through-beam photoelectric sensor

PRODUCT HIGHLIGHTS

- Sub-miniature sensor for installation in the smallest of spaces
- Bright, precise laser light spot for optimum small-part detection and simple alignment
- High switching frequency for detection in even the fastest processes
- User-friendly operation via electronic Teach-in button or control line
- Robust, glass-fibre-reinforced plastic housings

Optical data	
Limit range	0 … 5 m
Operating range	0 … 3 m
Type of light	Laser, red, 655 nm
Light spot size	See diagram
Laser Class (DIN EN 60825-1:2008-5)	1

Functions	
Indicator LED, green	Operating voltage indicator
Indicator LED, yellow	Switching output indicator
Sensitivity adjustment	Via Teach-in button and control input
Teach-in modes	Mode 1: during running process Mode 2: during standing process
Adjustment possibilities (receiver)	N.O. / N.C. via Teach-in button and control input Button lock via control input
Default settings	Max. range and N.O.

Electrical data	
Operating voltage, $+U_B$	10 … 30 V DC[1]
No-load current, I_0	≤ 12 mA
Output current, Ie	≤ 50 mA
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)
Protection Class	2
Switching output, Q	PNP/NPN (see Selection Table)
Output function	N.O. /N.C.
Switching frequency, f (ti/tp 1:1)	≤ 4000Hz
Response time	125 µs
Control input, IN (receiver) (only 4-pin design)	$+U_B$ = teach-in $-U_B$ = button locked Open = normal operation
Control input, Test (transmitter)	$+U_B$ = Test (transmitter off) $-U_B$ / Open = normal operation

Mechanical data	
Dimensions	21.1 x 14.6 x 8 mm
Enclosure rating	IP 67[2]
Material, housing	PUR
Material, front screen	PMMA
Type of connection	See Selection Table
Ambient temperature: operation	-20 ... +50 °C
Ambient temperature: storage	-20 ... +80 °C
Weight (plug device)	Ca. 6 g
Weight (cable device)	Ca. 44 g
Weight (pigtail)	Ca. 20 g

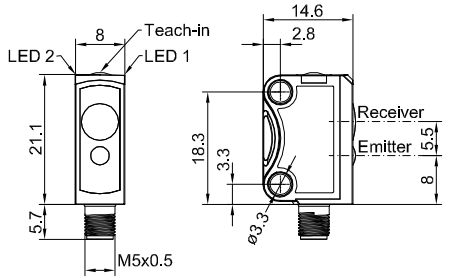
[1] Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz [2] With connected IP 67 plug

Operating range	Switching output	Type of connection	Part number	Design	Article number
1 … 3 m	PNP	Plug, M5x0.5, 4-pin	FS/FE 10-RL-PS-E4	Sensor pair (transmitter & receiver)	611-51000
1 … 3 m	NPN	Plug, M5x0.5, 4-pin	FS/FE 10-RL-NS-E4	Sensor pair (transmitter & receiver)	611-51001
1 … 3 m	PNP	Cable, 2 m, 4-wire	FS/FE 10-RL-PS-K4	Sensor pair (transmitter & receiver)	611-51002
1 … 3 m	NPN	Cable, 2 m, 4-wire	FS/FE 10-RL-NS-K4	Sensor pair (transmitter & receiver)	611-51003
1 … 3 m	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FS/FE 10-RL-PS-KM4	Sensor pair (transmitter & receiver)	611-51004
1 … 3 m	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FS/FE 10-RL-NS-KM4	Sensor pair (transmitter & receiver)	611-51005
1 … 3 m	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FS/FE 10-RL-PS-KM3	Sensor pair (transmitter & receiver)	611-51006
1 … 3 m	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FS/FE 10-RL-NS-KM3	Sensor pair (transmitter & receiver)	611-51007

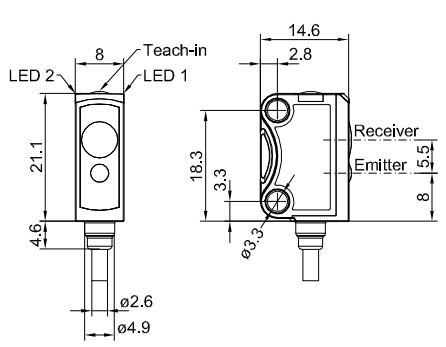
Including dovetail clamp mounting MBD F 10 for all types

Version: 10/2015. Subject to changes; diagrams similar

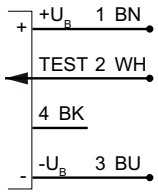
Plug connection



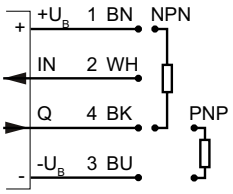
Cable connection



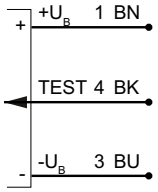
Connection, transmitter, 4-pin



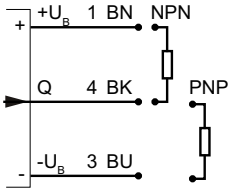
Connection, receiver, 4-pin



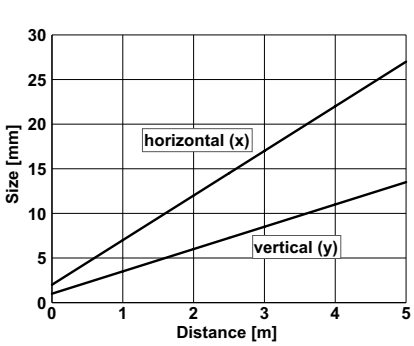
Connection, transmitter, 3-pin



Connection, receiver, 3-pin



Light spot size



Accessories

Connection cables	From page 30
Brackets	

FS 10-RL / FE 10-RL

Laser through-beam photoelectric sensor

PRODUCT HIGHLIGHTS

- Sub-miniature sensor for installation in the smallest of spaces
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Optical data	
Limit range	0 … 5 m
Operating range	0 … 3 m
Type of light	Laser, red, 655 nm
Light spot size	See diagram
Laser Class (DIN EN 60825-1:2008-5)	1

Functions	
Indicator LED, green	Operating voltage indicator
Indicator LED, yellow	Switching output indicator
Sensitivity adjustment	Via Teach-in button and control input
Teach-in modes	Mode 1: during running process Mode 2: during standing process
Adjustment possibilities (receiver)	N.O. / N.C. via Teach-in button and control input; Button lock via control input
Default settings	Max. range and N.O.

Electrical data	
Operating voltage, $+U_B$	10 … 30 V DC[1]
No-load current, I_0	≤ 12 mA
Output current, Ie	≤ 50 mA
Protective circuits	Reverse-polarity protection, U_B / short-circuit protection (Q)
Protection Class	2
Switching output, Q	PNP/NPN (see Selection Table)
Output function	N.O. /N.C.
Switching frequency, f (ti/tp 1:1)	≤ 4000Hz
Response time	125 µs
Control input, IN (receiver) (only 4-pin design)	$+U_B$ = Teach-in; $-U_B$ = button locked; Open = normal operation
Control input, Test (transmitter)	$+U_B$ = Test (transmitter off) $-U_B$ / Open = normal operation

Mechanical data	
Dimensions	21.1 x 14.6 x 8 mm
Enclosure rating	IP 67[2]
Material, housing	PUR
Material, front screen	PMMA
Type of connection	See Selection Table
Ambient temperature: operation	-20 … +50 °C
Ambient temperature: storage	-20 … +80 °C
Weight (plug device)	Ca. 6 g
Weight (cable device)	Ca. 44 g
Weight (pigtail)	Ca. 20 g

[1] Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz [2] With connected IP 67 plug

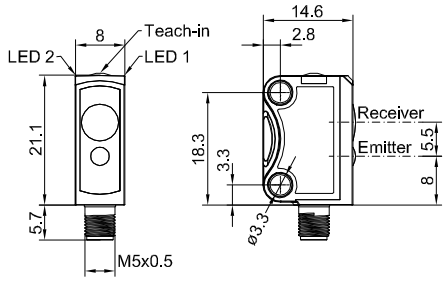
Operating range	Switching output	Type of connection	Part number	Design	Article number
1 ... 3 m	PNP	Plug, M5x0.5, 4-pin	FE 10-RL-PS-E4	Receiver	602-71000
1 ... 3 m	–	Plug, M5x0.5, 4-pin	FS 10-RL-E4	Transmitter	601-61000
1 ... 3 m	NPN	Plug, M5x0.5, 4-pin	FE 10-RL-NS-E4	Receiver	602-71001
1 ... 3 m	PNP	Cable, 2 m, 4-wire	FE 10-RL-PS-K4	Receiver	602-71002
1 ... 3 m	–	Cable, 2 m, 4-wire	FS 10-RL-K4	Transmitter	601-61002
1 ... 3 m	NPN	Cable, 2 m, 4-wire	FE 10-RL-NS-K4	Receiver	602-71003
1 ... 3 m	PNP	Pigtail, 200 mm with M8 plug, 4-pin	FE 10-RL-PS-KM4	Receiver	602-71004
1 ... 3 m	–	Pigtail, 200 mm with M8 plug, 4-pin	FS 10-RL-KM4	Transmitter	601-61004
1 ... 3 m	NPN	Pigtail, 200 mm with M8 plug, 4-pin	FE 10-RL-NS-KM4	Receiver	602-71005
1 ... 3 m	PNP	Pigtail, 200 mm with M8 plug, 3-pin	FE 10-RL-PS-KM3	Receiver	602-71006
1 ... 3 m	–	Pigtail, 200 mm with M8 plug, 3-pin	FS 10-RL-KM3	Transmitter	601-61005

Version: 10/2015. Subject to changes; diagrams similar

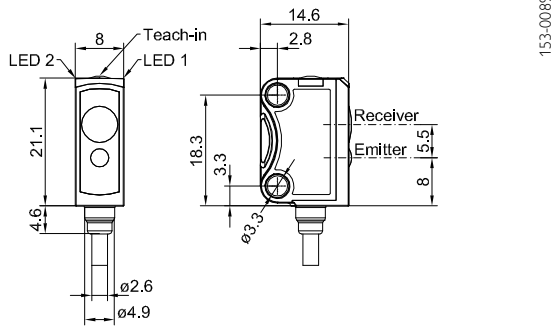
Operating range	Switching output	Type of connection	Part number	Design	Article number.
1 ... 3 m	NPN	Pigtail, 200 mm with M8 plug, 3-pin	FE 10-RL-NS-KM3	Receiver	602-71008

Including dovetail clamp mounting MBD F 10 for all types

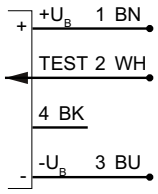
Plug connection



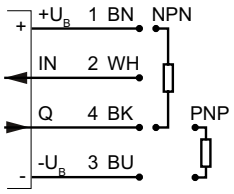
Cable connection



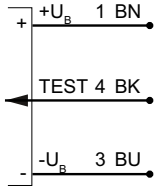
Connection, transmitter, 4-pin



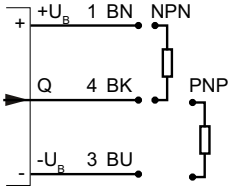
Connection, receiver, 4-pin



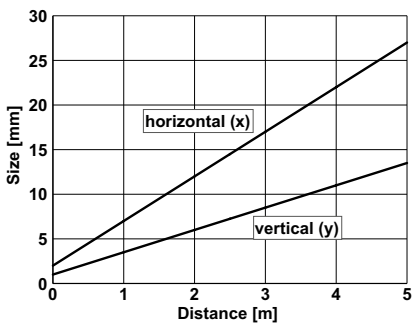
Connection, transmitter, 3-pin



Connection, receiver, 3-pin



Light spot size



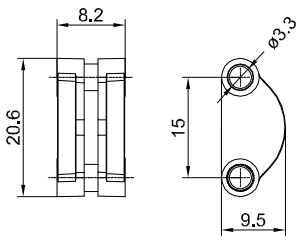
Accessories

Connection cables	From page 30
Brackets	

Accessories

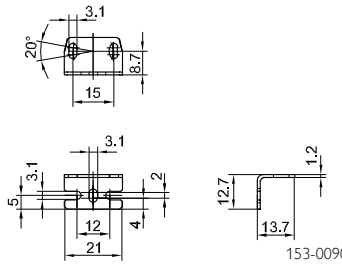
Brackets

Brackets



153-00899

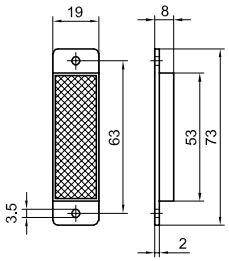
Part number / Article number	MBD F10 / 660-01001
Description	Dovetail clamp mounting, adjustable ± 10°, with screws Material: PBT
Suitable for	F 10



153-00907

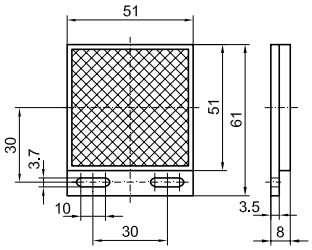
Part number / Article number	MS F 10 / 660-01000
Description	Mounting bracket with screws 1x mounting plate M3 1x mounting plate ø 3.1 mm Material: stainless steel V2A
Suitable for	F 10

Reflectors for retroreflective photoelectric sensor



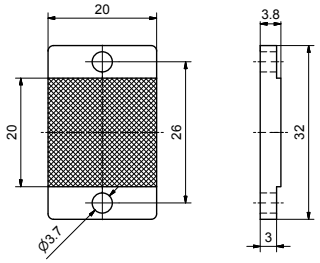
153-00068

Part number / Article number	R1 / 904-51532
Description	Reflector in housing
Dimensions	19 x 73 x 8 mm³
Mounting	2 mounting holes M3
Temperature range	-20 … +60 °C
Suitable for	Retroreflective photoelectric sensor (LED)



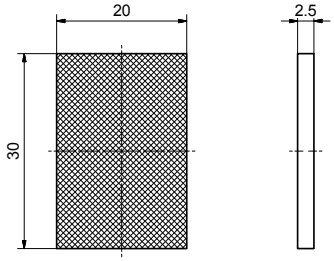
153-00069

Part number / Article number	R5 / 904-51533
Description	Reflector in housing
Dimensions	51 x 61 x 8 mm³
Mounting	2 mounting holes
Temperature range	-20 … +60 °C
Suitable for	Retroreflective photoelectric sensor (LED)



153-001046

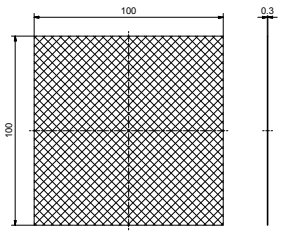
Part number / Article number	R2-2LB1 / 904-51595
Description	Reflector in housing,with very fine structure
Dimensions	20 x 32 x 3.8 mm³
Mounting	2 mounting holes
Temperature range	-20 … +60 °C
Suitable for	Retroreflective photoelectric sensor (LED)



153-01047

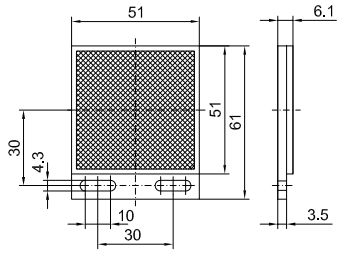
Part number / Article number	R3-2LK1 / 904-51596
Description	Reflector in housing with very fine structure
Dimensions	20 x 30 x 2.5 mm³
Mounting	Self-adhesive
Temperature range	-20 … +60 °C
Suitable for	Retroreflective photoelectric sensor (LED)

Reflectors for retroreflective photoelectric sensor



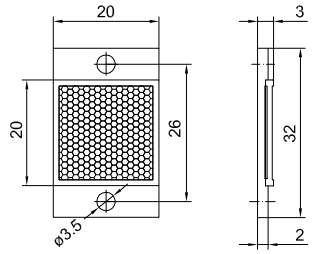
153-01125

Part number / Article number	RF-100 KL / 904-51644
Description	Reflective tape 100 x 100 mm, to cut to size
Dimensions	100 x 100 mm²
Mounting	Self-adhesive
Temperature range	-40 … +70 °C
Suitable for	Retroreflective photoelectric sensor (LED & laser)



153-00242

Part number / Article number	R5/L / 904-51543
Description	Reflector in housing
Dimensions	51 x 61 x 6.1 mm³
Mounting	2 mounting holes (slots)
Temperature range	-20 … +60 °C
Suitable for	Retroreflective photoelectric sensor (laser)



153-00773

Part number / Article number	R2-2LB / 904-51586
Description	Reflector in housing
Dimensions	20 x 32 x 3 mm³
Mounting	2 mounting holes
Temperature range	-20 … +60 °C
Suitable for	Retroreflective photoelectric sensor (laser)

Connection cables

Part number	Article number	Description
M5, 4-pin		
CN4 FG-2m-PUR	902-51793	2 m, straight, PUR
CN4 FG-5m-PUR	902-51791	5 m, straight, PUR
CN4 FW-2m-PUR	902-51794	2 m, 90°, PUR
CN4 FW-5m-PUR	902-51792	5 m, 90°, PUR
M8, 3-pin		
K3-2m-G-PUR	902-50679	2 m, straight, PUR
K3-5m-G-PUR	902-51614	5 m, straight, PUR, suitable for drag chains
K3-10m-G-PUR	902-50694	10 m, straight, PUR, suitable for drag chains
K3-2m-W-PUR	902-50681	2 m, 90°, PUR, suitable for drag chains
K3-5m-W-PUR	902-51615	5 m, 90°, PUR, suitable for drag chains
K3-2m-W-PL-PUR	902-50683	2 m, 90°, PUR, with indicator LED
K3-5m-W-PL-PUR	902-51616	5 m, 90°, PUR, with indicator LED, suitable for drag chains
K3-10m-W-PL-PUR	902-50693	10 m, 90°, PUR, with indicator LED, suitable for drag chains
M8, 4-pin		
K4-2m-G-PUR	902-50801	2 m, straight, PUR, suitable for drag chains
K4-5m-G-PUR	902-51617	5 m, straight, PUR, suitable for drag chains
K4-10m-G-PUR	902-51610	10 m, straight, PUR, suitable for drag chains
K4-2m-W-PUR	902-50803	2 m, 90°, PUR, suitable for drag chains
K4-5m-W-PUR	902-51618	5 m, 90°, PUR, suitable for drag chains
K4-10m-W-PUR	902-51629	10 m, 90°, PUR, suitable for drag chains
K4-2m-W-PL-PUR	902-51642	2 m, 90°, PUR, with indicator LED
K4-5m-W-PL-PUR	902-51643	5 m, 90°, PUR, with indicator LED

We look ahead

Yesterday, today and in the future

SENSOPART

"We gauge ourselves not by what is possible today, but by our vision of what can be achieved" – this has been our motto since the foundation of SensoPart in 1994. Our goal is to always be a step ahead and to be able to offer our customers the most innovative sensor for industrial automation.

With our easy to integrate VISOR® Vision sensors and our compact laser sensors with an amazing background suppression made in Germany, we stick up to this motto.

Get ready – we still have a lot of ideas for the future.

SENSOR TECHNOLOGY

- Light barriers
- Proximity switches
- Laser sensors
- Miniature sensors
- Distance sensors
- Colour sensors
- Contrast sensors
- Anti-collision sensors
- Slot sensors
- Fibre-optic amplifiers
- Inductive sensors
- Capacitive sensors
- Ultrasonic sensors

VISION

- Vision sensors
- Smart cameras
- Vision systems
- Object detection
- Object measurement
- Colour detection
- Code reading
- Lighting
- Lenses

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