

F 55 – family of photoelectric sensors with high-quality housings

The compact class with long ranges



 made in Germany



Always sparkling clean

Neither bubble baths with aggressive chemicals nor high-pressure rinsing processes with jets of water or steam can damage the tightly sealed stainless steel housings of the F 55 series. No deposits can adhere during the cleaning process due to the completely smooth housing surface with flush inset operating elements.

TYPICAL F 55

- Glass-fibre-reinforced plastic or stainless steel housings (IP 69K / IP 67, Ecolab)
- Bright, easily visible, light spot with sharp contour even in daylight
- Precise background suppression and minimal black/white-shift
- User-friendly operation of all diffuse variants via electronic Teach-in button or control line
- 18-step potentiometer for precise adjustment of background suppression
- Laser or LED options
- Safe operation due to Laser Class 1
- Two dovetail guides for simple sensor alignment
- Well thought-out mounting accessories

SensoPart sets new standards in the compact class with its F 55 family of photoelectric sensors. The products in this series combine excellent performance data with a robust housing design and many user-friendly details. They guarantee reliable detection by means of focused laser light or red-light LED with precise background suppression.

The sensors of the F 55 series have a very high light intensity: the photoelectric proximity sensor with background suppression, for example, reaches a scanning distance of up to 1200 mm. The bright, sharply contoured light spot is still easily visible even at long distances and in intense daylight, considerably simplifying commissioning.

The F 55 sensors generally impress through their clever design details: there is, for example, no trouble at all mounting them when space is limited, thanks to the device plug that can be continuously rotated through 270° and the supplementary dovetail guides. Adjustment via potentiometer with an indicator scale or by teach-in is also easy and user-friendly. The F 55 series covers all standard applications in industrial automation: whether for part detection in the automotive industry or for sorting tasks in machine construction – the sensors excel everywhere with their excellent performance. The food industry-enabled tightly sealed stainless steel variants (IP 69K) with Ecolab certification – rounding out the comprehensive sensor programme – shine in all regards.

F 55 – Product Overview					
	Type of light	Adjustment	Scanning distance / range	Special features	Page
Photoelectric proximity sensors with background suppression					
FT 55- RLH	Laser 	Potentiometer	800 mm		246
FT 55-RL2H	Laser 	Potentiometer	1000 mm	Precise small-part detection at long scanning distances	248
FT 55B-RH	LED	Potentiometer	800 mm		250
FT 55-RH	LED	Potentiometer	1200 mm		252
FT 55-RHM	LED	Teach-in 	550 mm	Stainless steel housing	254
Photoelectric proximity sensors					
FT 55-RL2	Laser 	Teach-in 	1200 mm	Detection of slightest grey value differences	256
FT 55-R	LED	Teach-in 	2000 mm		258
FT 55-RM	LED	Teach-in 	1750 mm	Stainless steel housing	260
Retroreflective photoelectric sensors					
FR 55-RL	Laser 	Teach-in 	14 m		262
FR 55-R	LED	Teach-in 	14 m		264
FR 55-RM	LED	Teach-in 	13 m	Stainless steel housing	266
Through-beam photoelectric sensors					
FS/FE 55-RL	Laser 	Teach-in 	30 m		268
FS/FE 55-R	LED	Teach-in 	25 m		270
FS/FE 55-RM	LED	Teach-in 	20 m	Stainless steel housing	272

FT 55-RLH

Laser photoelectric proximity sensor with background suppression



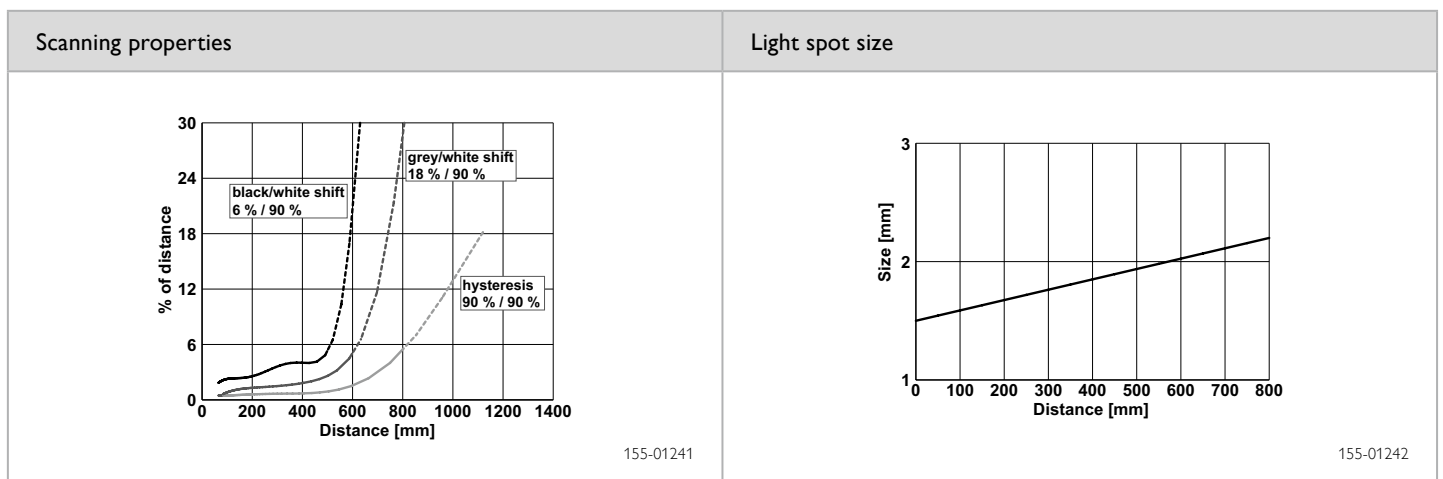
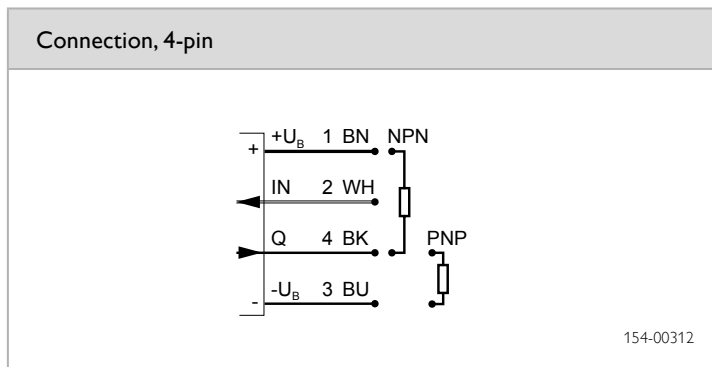
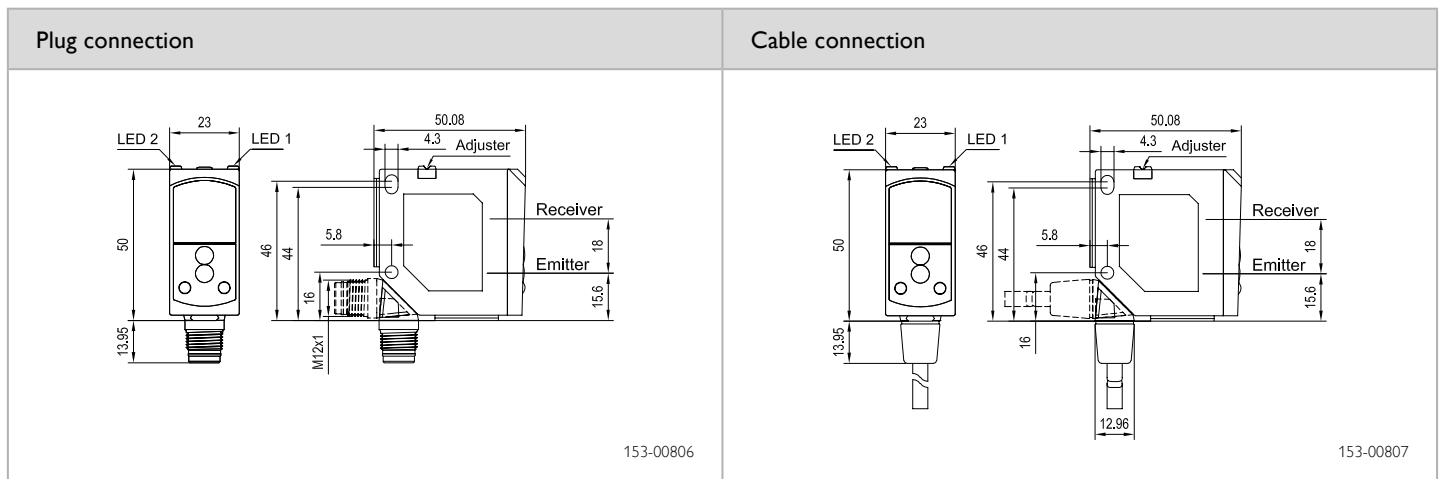
PRODUCT HIGHLIGHTS

- Precisely adjustable background suppression – reliable operation even with highly reflective and glossy backgrounds
- Particularly suitable for the detection of the smallest of objects
- Very small, easily visible laser light spot
- Precise scanning distance adjustment by means of potentiometer
- Plug and cable connection rotatable

Optical data		Functions	
Scanning distance	5 ... 800 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	Laser, red, 655 nm	Indicator LED, yellow	Switching output indicator / contamination indicator
Light spot size	See diagram	Scanning distance adjustment	Via potentiometer
Laser Class (DIN EN 60825-1: 2008-05)	1	Adjustment possibilities	N.O./N.C. via control input
		Default settings	Max. scanning distance (6 %)
Electrical data		Mechanical data	
Operating voltage, +U _B	12 ... 30V DC ²	Dimensions	50 × 50.08 × 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (cable device)	125 g
Response time	500 µs	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = N.C. -U _B / Open = N.O.		

¹ Reference material: white, 90 % reflectivity ² Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz ³ With connected IP 67 / IP 69K plug

Scanning distance	Switching output	Type of connection	Part number	Article number
5 ... 800 mm	PNP	Plug, M12x1, 4-pin	FT 55-RLH-PS-L4	623-11018
5 ... 800 mm	NPN	Plug, M12x1, 4-pin	FT 55-RLH-NS-L4	623-11019
5 ... 800 mm	PNP	Cable, 3 m, 4-wire	FT 55-RLH-PS-K4	623-11021
5 ... 800 mm	NPN	Cable, 3 m, 4-wire	FT 55-RLH-NS-K4	623-11022



Reference material	Detection range
White (90 %)	5 ... 800 mm
Grey (18 %)	10 ... 600 mm
Black (6 %)	30 ... 500 mm

Accessories	
Connection cables	From Page 670
Brackets	From Page 642

FT 55-RL2H

Laser photoelectric proximity sensor with background suppression



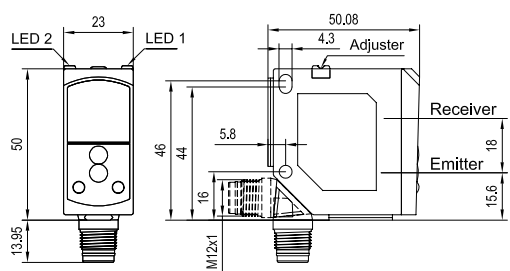
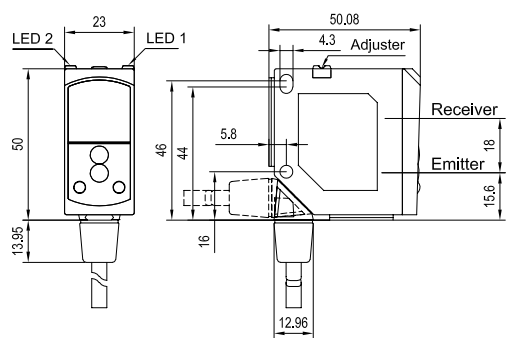
PRODUCT HIGHLIGHTS

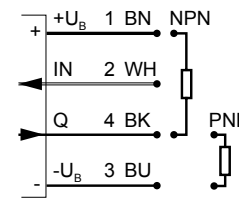
- Long scanning distance of 1 m combined with extremely accurate small-part detection
- Precisely adjustable background suppression – reliable operation even with highly reflective and glossy backgrounds
- Very small, easily visible laser light spot
- Precise scanning distance adjustment by means of potentiometer
- Integrated display window for scanning distance adjustment

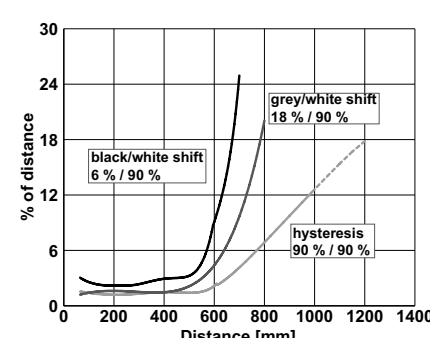
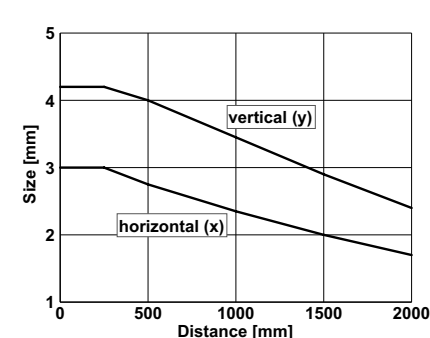
Optical data		Functions	
Scanning distance	5 ... 1000 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	Laser, red, 655 nm	Indicator LED, yellow	Switching output indicator / contamination indicator
Light spot size	See diagram	Scanning distance adjustment	Via potentiometer
Laser Class (DIN EN 60825-1:2008-5)	2	Adjustment possibilities	N.O./N.C. via control input
		Default settings	S _n = 500 mm (6 %)
Electrical data		Mechanical data	
Operating voltage, +U _B	12 ... 30V DC ²	Dimensions	50 × 50.08 × 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (cable device)	125 g
Response time	500 µs	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = N.C. -U _B / Open = N.O.		

¹ Reference material: white, 90 % reflectivity ² Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz ³ With connected IP 67 / IP 69K plug

Scanning distance	Switching output	Type of connection	Part number	Article number
5 ... 1000 mm	PNP	Plug, M12x1, 4-pin	FT 55-RL2H-PS-L4	623-11006
5 ... 1000 mm	NPN	Plug, M12x1, 4-pin	FT 55-RL2H-NS-L4	623-11007
5 ... 1000 mm	PNP	Cable, 3 m, 4-wire	FT 55-RL2H-PS-K4	623-11009
5 ... 1000 mm	NPN	Cable, 3 m, 4-wire	FT 55-RL2H-NS-K4	623-11010

Plug connection	Cable connection
	
153-00806	153-00807

Connection, 4-pin

154-00312

Scanning properties	Light spot size
	
155-01081	155-01083

Reference material	Detection range
White (90 %)	5 ... 1000 mm
Grey (18 %)	10 ... 800 mm
Black (6 %)	15 ... 700 mm

Accessories	
Connection cables	From Page 670
Brackets	From Page 642

FT 55B-RH

Photoelectric proximity sensor with background suppression



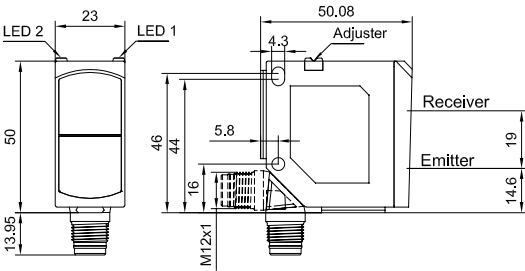
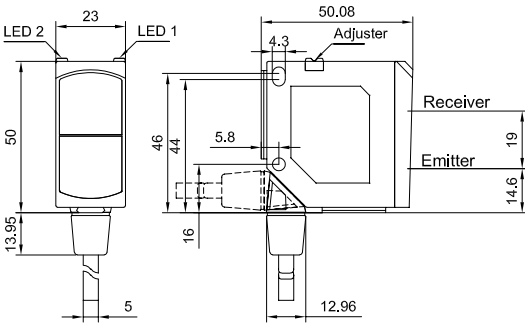
PRODUCT HIGHLIGHTS

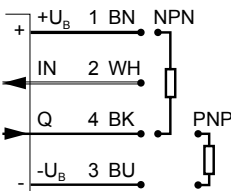
- Precisely adjustable background suppression
- Reliable switching despite differing object colours and surfaces
- Simple alignment thanks to easily visible light spot
- Plug and cable connection rotatable

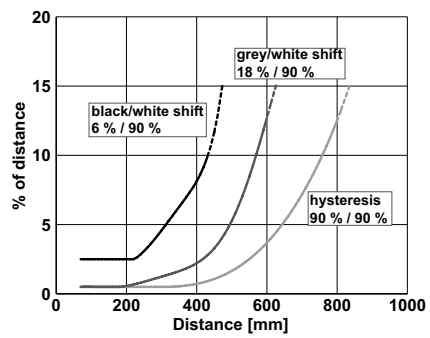
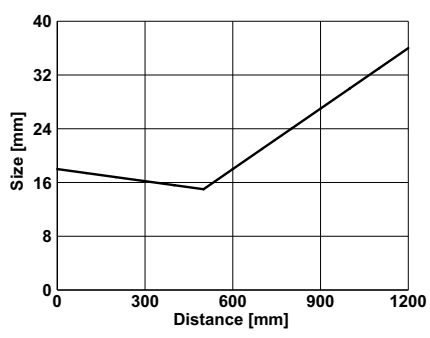
Optical data		Functions	
Scanning distance	3 ... 800 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	LED, red, 640 nm	Indicator LED, yellow	Switching output indicator / contamination indicator
Light spot size	See diagram	Scanning distance adjustment	Via potentiometer
		Adjustment possibilities	N.O./N.C. via control input
		Default settings	Max. scanning distance (6 %)
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	50 × 50.08 × 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 600 Hz	Weight (cable)	125 g
Response time	830 µs	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = N.C. -U _B / Open = N.O.		

¹ Reference material: white, 90 % reflectivity ² Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz ³ With connected IP 67 / IP 69K plug

Scanning distance	Switching output	Type of connection	Part number	Article number
3 ... 800 mm	PNP	Plug, M12x1, 4-pin	FT 55B-RH-PS-L4	623-11012
3 ... 800 mm	NPN	Plug, M12x1, 4-pin	FT 55B-RH-NS-L4	623-11013
3 ... 800 mm	PNP	Cable 3 m, 4-wire	FT 55B-RH-PS-K4	623-11014
3 ... 800 mm	NPN	Cable 3 m, 4-wire	FT 55B-RH-NS-K4	623-11015

Plug connection	Cable connection
	
153-00785	153-00784

Connection, 4-pin

154-00312

Scanning properties	Light spot size
	
155-01080	155-01082

Reference material	Detection range
White (90 %)	3 ... 800 mm
Grey (18 %)	5 ... 600 mm
Black (6 %)	15 ... 450 mm

Accessories	
Connection cables	From Page 670
Brackets	From Page 642

FT 55-RH

Photoelectric proximity sensor with background suppression



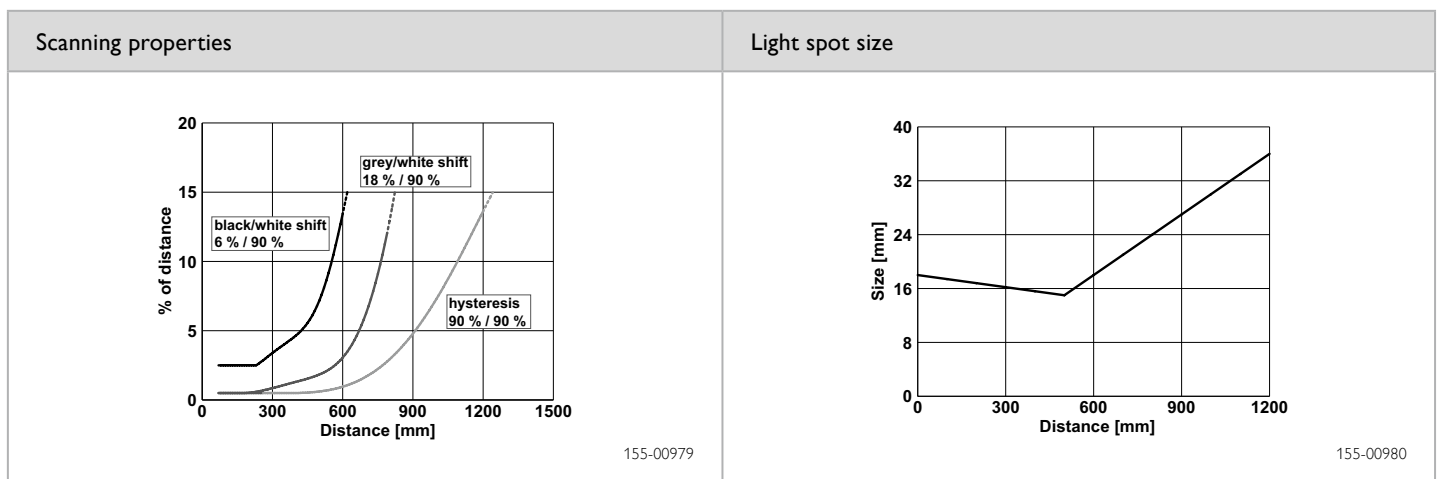
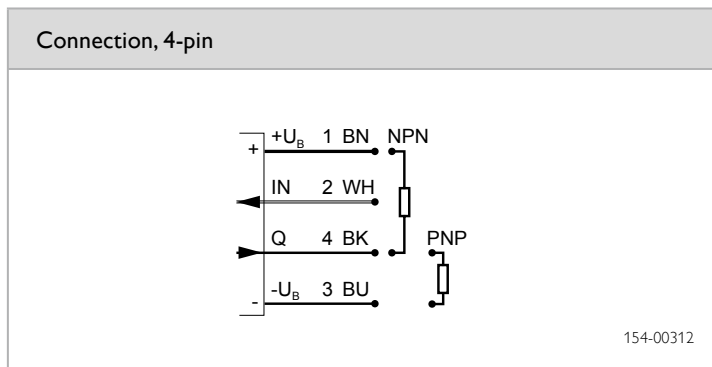
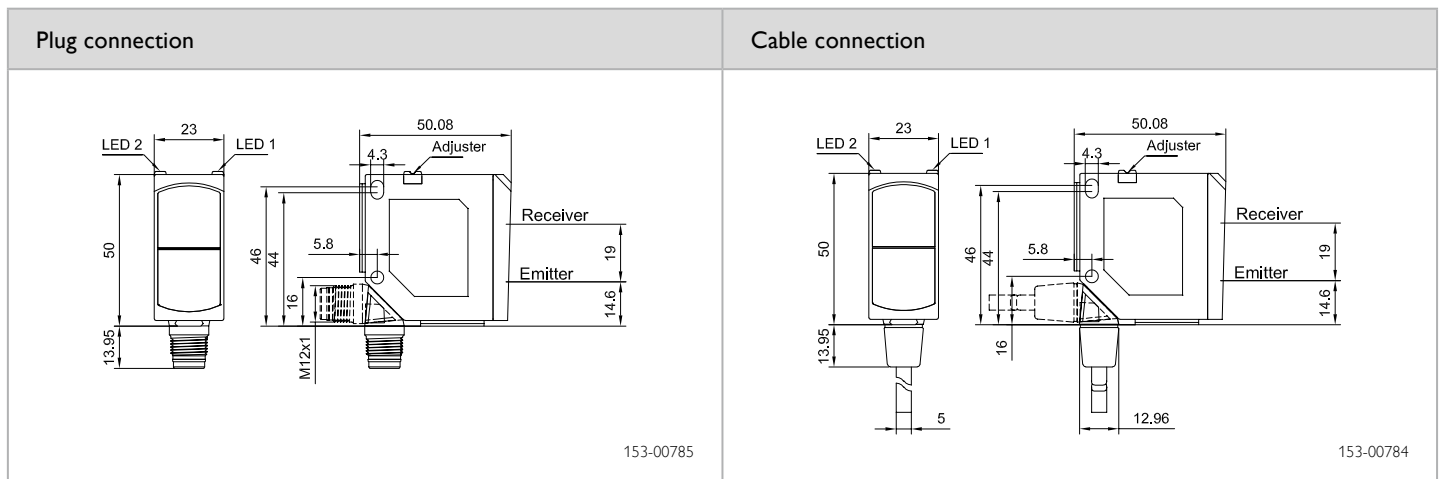
PRODUCT HIGHLIGHTS

- Long scanning distance of 1.20 m
- Precisely adjustable background suppression – reliable operation even with highly reflective and glossy backgrounds
- Reliable suppression of ambient light, such as sunlight and halogen lamps
- Precise scanning distance adjustment by means of potentiometer

Optical data		Functions	
Scanning distance	3 ... 1200 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	LED, red, 640 nm	Indicator LED, yellow	Switching output indicator / contamination indicator
Light spot size	See diagram	Scanning distance adjustment	Via potentiometer
		Adjustment possibilities	N.O./N.C. via control input
		Default settings	S _n = 500 mm (6 %)
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	50 × 50.08 × 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 600 Hz	Weight (cable device)	125 g
Response time	830 μs	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = N.C. -U _B / Open = N.O.		

¹ Reference material: white, 90 % reflectivity ² Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz ³ With connected IP 67 / IP 69K plug

Scanning distance	Switching output	Type of connection	Part number	Article number
3 ... 1200 mm	PNP	Plug, M12x1, 4-pin	FT 55-RH-PS-L4	623-11000
3 ... 1200 mm	NPN	Plug, M12x1, 4-pin	FT 55-RH-NS-L4	623-11001
3 ... 1200 mm	PNP	Cable, 3 m, 4-wire	FT 55-RH-PS-K4	623-11003
3 ... 1200 mm	NPN	Cable, 3 m, 4-wire	FT 55-RH-NS-K4	623-11004



Reference material	Detection range
White (90 %)	3 ... 1200 mm
Grey (18 %)	5 ... 800 mm
Black (6 %)	10 ... 600 mm

Accessories	
Connection cables	From Page 670
Brackets	From Page 642

FT 55-RHM

Photoelectric proximity sensor with background suppression – stainless steel housing



PRODUCT HIGHLIGHTS

- Minimum black / white-shift for reliable switching regardless of object colour and surface
- Stable stainless steel housing – ideal for use in hygiene zones
- Housing concept designed for intensive cleaning processes in the food industry
- Sensor adjustment via teach-in and control input

Optical data		Functions	
Scanning distance	3 ... 550 mm ¹	Indicator LED, green	Operating voltage indicator
Adjustment range	100 ... 550 mm ¹	Indicator LED, yellow	Switching output indicator / functional reserve indicator
Type of light	LED, red, 640 nm	Scanning distance adjustment	Via Teach-in button and control input
Light spot size	See diagram	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. scanning distance and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	52 x 50.07 x 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	Stainless steel, 316L
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Standby time	< 300 ms	Type of connection	(See Selection Table)
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: operation	-20 ... +60 °C
Output function	N.O./N.C.	Ambient temperature: storage	-20 ... +80 °C
Switching frequency, f (ti/tp 1:1)	≤ 400 Hz	Weight (plug device)	145 g
Response time	1.25 ms	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = teach-in -U _B = button locked Open = normal operation		

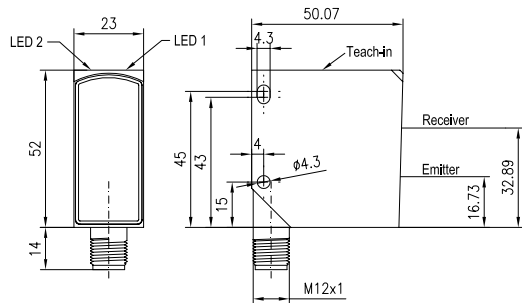
¹ Reference material: white, 90 % reflectivity

² Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz

³ With connected IP 67 / IP 69K plug

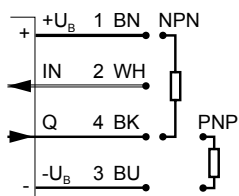
Scanning distance	Switching output	Type of connection	Part number	Article number
3 ... 550 mm	PNP	Plug, M12x1, 4-pin	FT 55-RHM-PS-L4	623-11025
3 ... 550 mm	NPN	Plug, M12x1, 4-pin	FT 55-RHM-NS-L4	623-11026

Plug connection



153-00800

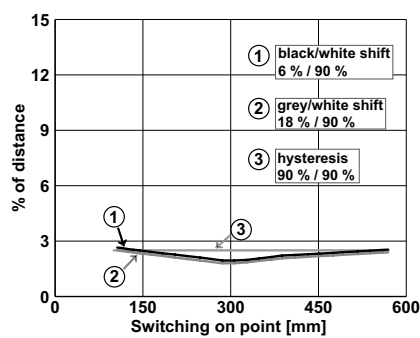
Connection, 4-pin



154-00312

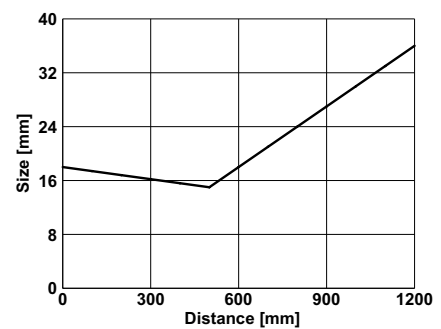
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Scanning properties



155-01286

Light spot size



155-00980

Reference material

Detection range

White (90 %)
 Grey (18 %)
 Black (6 %)

3 ... 550 mm
 12 ... 550 mm
 20 ... 550 mm

Accessories

Connection cables
 Brackets

From Page 670
 From Page 642

FT 55-RL2

Diffuse laser photoelectric proximity sensor



PRODUCT HIGHLIGHTS

- Differentiation of even the slightest of grey value differences
- Sensor adjustment via teach-in and control input
- Very small, easily visible laser light spot
- Plug and cable connection rotatable

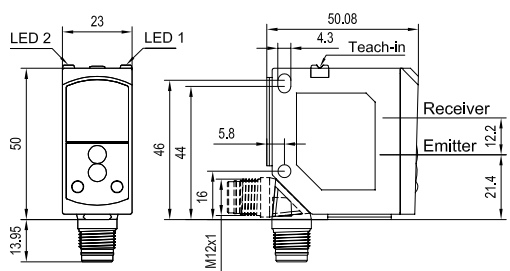
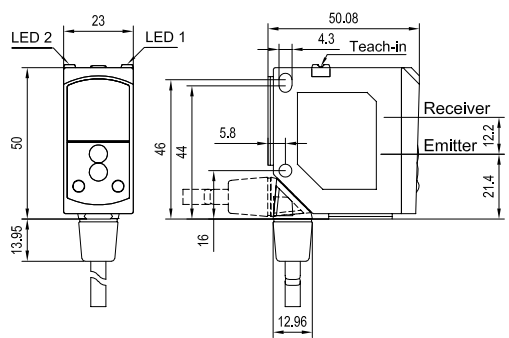
Optical data		Functions	
Scanning distance	5 ... 1200 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	Laser, red, 655 nm	Indicator LED, yellow	Switching output indicator / contamination indicator
Light spot size	See diagram	Sensitivity adjustment	Via Teach-in button and control input
Laser Class (DIN EN 60825-1:2008-5)	2	Teach-in modes	Mode 1: during running process Mode 2: during standing process
Hysteresis	≤ 15 %	Adjustment possibilities	N.O./N.C. via Teach-in button and control input Button lock via control input Max. scanning distance and N.O.
Electrical data		Default settings	
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	50 x 50.08 x 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 600 Hz	Weight (cable device)	125 g
Response time	830 μs	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = teach-in -U _B = button locked Open = normal operation		

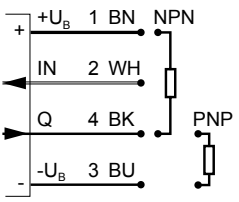
¹ Reference material: white, 90 % reflectivity

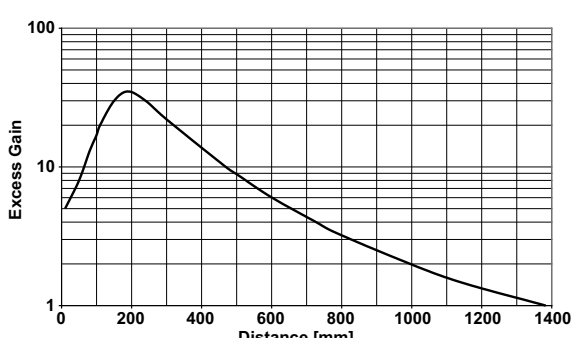
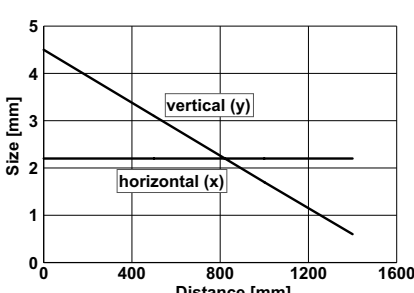
² Max. 10 % ripple, within U_B ~ 50 Hz / 100 Hz

³ With connected IP 67 / IP 69K plug

Scanning distance	Switching output	Type of connection	Part number	Article number
5 ... 1200 mm	PNP	Plug, M12x1, 4-pin	FT 55-RL2-PS-L4	622-21006
5 ... 1200 mm	NPN	Plug, M12x1, 4-pin	FT 55-RL2-NS-L4	622-21007
5 ... 1200 mm	PNP	Cable, 3 m, 4-wire	FT 55-RL2-PS-K4	622-21009
5 ... 1200 mm	NPN	Cable, 3 m, 4-wire	FT 55-RL2-NS-K4	622-21010

Plug connection	Cable connection
	
153-00848	153-00849

Connection, 4-pin

154-00312

Functional reserves	Light spot size
	
155-01238	155-01239

Reference material	Detection range
White (90 %)	5 ... 1200 mm
Grey (18 %)	10 ... 700 mm
Black (6 %)	100 ... 400 mm

Accessories	
Connection cables	From Page 670
Brackets	From Page 642

FT 55-R

Diffuse photoelectric proximity sensor



PRODUCT HIGHLIGHTS

- Differentiation of even the slightest of grey value differences
- Sensor adjustment via teach-in and control input
- Simple alignment thanks to easily visible light spot
- Plug and cable connection rotatable

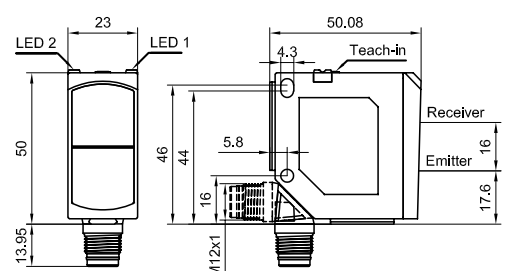
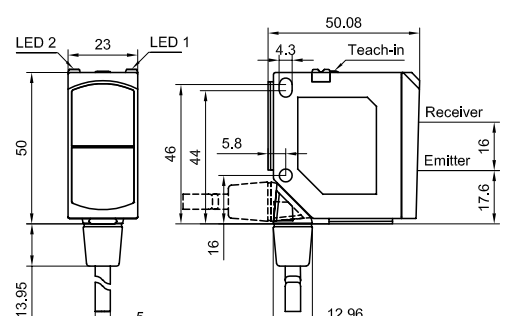
Optical data		Functions	
Scanning distance	5 ... 2000 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	LED, red, 640 nm	Indicator LED, yellow	Switching output indicator / contamination indicator
Light spot size	See diagram	Sensitivity adjustment	Via Teach-in button and control input
		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. scanning distance and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	50 x 50.08 x 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 600 Hz	Weight (cable device)	125 g
Response time	830 μs	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = teach-in -U _B = button locked Open = normal operation		

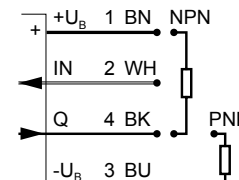
¹ Reference material: white, 90 % reflectivity

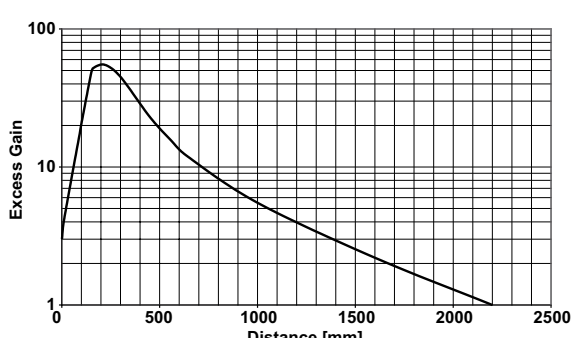
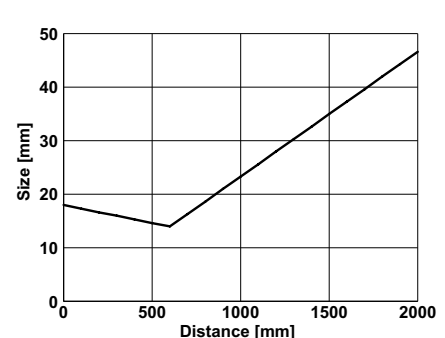
² Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz

³ With connected IP 67 / IP 69K plug

Scanning distance	Switching output	Type of connection	Part number	Article number
5 ... 2000 mm	PNP	Plug, M12x1, 4-pin	FT 55-R-PS-L4	622-21000
5 ... 2000 mm	NPN	Plug, M12x1, 4-pin	FT 55-R-NS-L4	622-21001
5 ... 2000 mm	PNP	Cable, 3 m, 4-wire	FT 55-R-PS-K4	622-21003
5 ... 2000 mm	NPN	Cable, 3 m, 4-wire	FT 55-R-NS-K4	622-21004

Plug connection	Cable connection
	
153-00782	153-00783

Connection, 4-pin

154-00312

Functional reserves	Light spot size
	
155-00982	155-00983

Reference material	Detection range
White (90 %)	5 ... 2000 mm
Grey (18 %)	10 ... 1200 mm
Black (6 %)	90 ... 600 mm

Accessories	
Connection cables	From Page 670
Brackets	From Page 642

FT 55-RM

Diffuse photoelectric proximity sensor – stainless steel housing



PRODUCT HIGHLIGHTS

- Stable stainless steel housing – ideal for use in hygiene zones, e.g. in the food and beverages industries
- Housing concept designed for intensive cleaning processes
- Sensor adjustment via teach-in and control input
- Simple alignment thanks to easily visible light spot

Optical data		Functions	
Scanning distance	0 ... 1750 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	LED, red, 640 nm	Indicator LED, yellow	Switching output indicator / contamination indicator
Light spot size	See diagram	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. scanning distance and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	52 x 50.07 x 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	Stainless steel, 316L
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Standby time	< 300 ms	Type of connection	(See Selection Table)
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: operation	-20 ... +60 °C
Output function	N.O./N.C.	Ambient temperature: storage	-20 ... +80 °C
Switching frequency, f (ti/tp 1:1)	≤ 600 Hz	Weight (plug device)	138 g
Response time	830 μs	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = teach-in -U _B = button locked Open = normal operation		

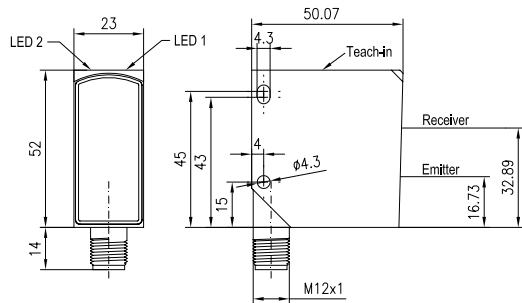
¹ Reference material: white, 90 % reflectivity

² Max. 10 % ripple, within U_B, ~ 50 Hz / 100 Hz

³ With connected IP 67 / IP 69K plug

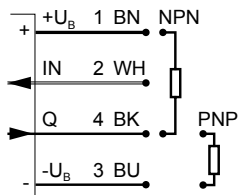
Scanning distance	Switching output	Type of connection	Part number	Article number
0 ... 1750 mm	PNP	Plug, M12x1, 4-pin	FT 55-RM-PS-L4	622-21012
0 ... 1750 mm	NPN	Plug, M12x1, 4-pin	FT 55-RM-NS-L4	622-21013

Plug connection



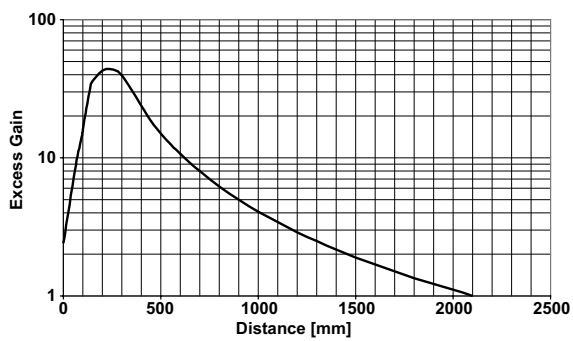
153-00800

Connection, 4-pin



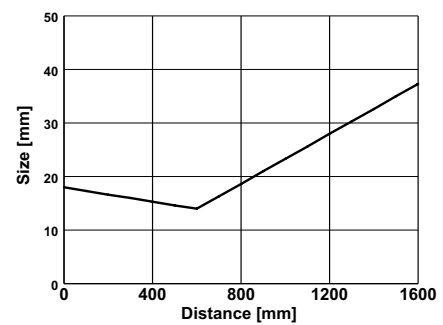
154-00312

Functional reserves



155-01163

Light spot size



155-01111

Reference material

Detection range

White (90 %)
Grey (18 %)
Black (6 %)

0 ... 1750 mm
15 ... 1100 mm
90 ... 550 mm

Accessories

Connection cables
Brackets

From Page 670
From Page 642

FR 55-RL

Laser retroreflective photoelectric sensor



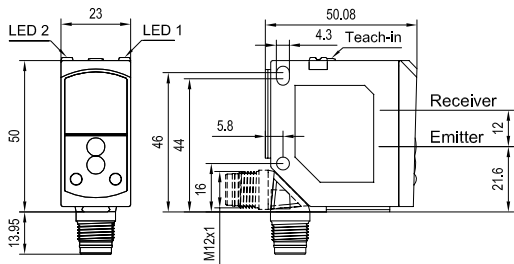
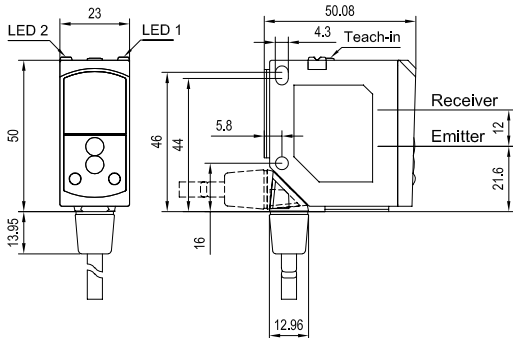
PRODUCT HIGHLIGHTS

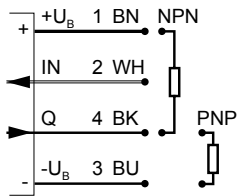
- Particularly suitable for the detection of the smallest of objects – smallest detectable part < 2 mm
- Bright, precise laser light spot in Laser Class 1
- Suitable for a wide variety of different reflectors
- Sensor adjustment via teach-in and control input

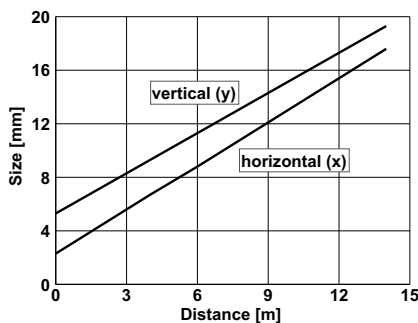
Optical data		Functions	
Limit range	0.3 ... 14 m ¹	Indicator LED, green	Operating voltage indicator
Operating range	0.3 ... 12 m ¹	Indicator LED, yellow	Switching output indicator / contamination indicator
Type of light	Laser, red, 655 nm	Sensitivity adjustment	Via Teach-in button and control input
Light spot size	See diagram	Teach-in modes	Mode 1: during running process
Laser Class (DIN EN 60825-1:2008-5)	1	Adjustment possibilities	Mode 2: during standing process
Polarising filter	Yes	Default settings	N.O./N.C. via Teach-in button and control input
			Button lock via control input
			Max. range and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	50 x 50.08 x 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 2000 Hz	Weight (cable device)	125 g
Response time	250 µs	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = teach-in - U _B = button locked Open = normal operation		

¹ Reference material: R5/L reflector ² Max. 10 % ripple, within U_B ~ 50 Hz / 100 Hz ³ With connected IP 67 / IP 69K plug

Operating range	Switching output	Type of connection	Part number	Article number
0.3 ... 12 m	PNP	Plug, M12x1, 4-pin	FR 55-RL-PS-L4	621-11006
0.3 ... 12 m	NPN	Plug, M12x1, 4-pin	FR 55-RL-NS-L4	621-11007
0.3 ... 12 m	PNP	Cable, 3 m, 4-wire	FR 55-RL-PS-K4	621-11009
0.3 ... 12 m	NPN	Cable, 3 m, 4-wire	FR 55-RL-NS-K4	621-11010

Plug connection	Cable connection
	
153-00804	153-00805

Connection, 4-pin

154-00312

Functional reserves

155-01114

Reflector / reflective foil*	Operating range
R5/L	0.3 ... 12 m
RF-230 KL*	0.2 ... 6 m

Accessories	
Reflectors	From Page 654
Connection cables	From Page 670
Brackets	From Page 642

FR 55-R

Retroreflective photoelectric sensor



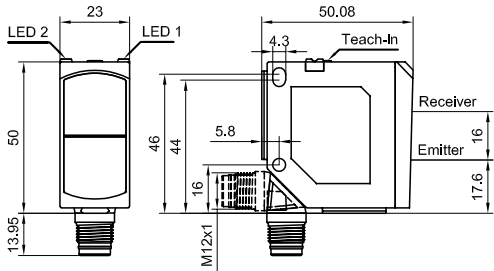
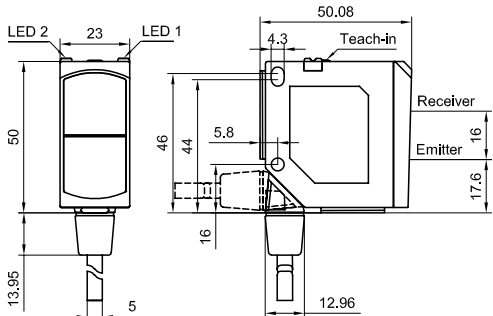
PRODUCT HIGHLIGHTS

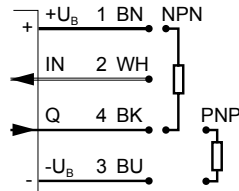
- Simple alignment thanks to easily visible light spot
- Suitable for a wide variety of different reflectors
- Sensor adjustment via teach-in and control input
- Plug and cable connection rotatable

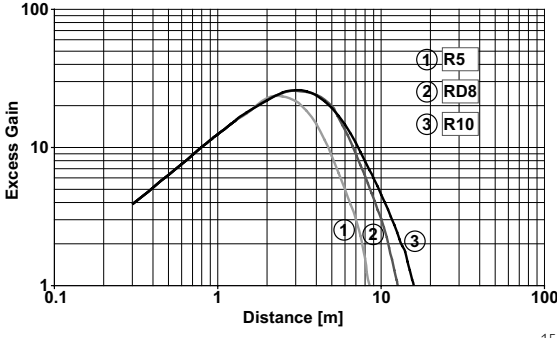
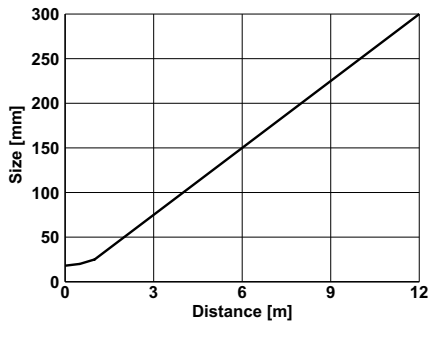
Optical data		Functions	
Limit range	0.3 ... 14 m ¹	Indicator LED, green	Operating voltage indicator
Operating range	0.3 ... 12 m ¹	Indicator LED, yellow	Switching output indicator / contamination indicator
Type of light	LED, red, 640 nm	Sensitivity adjustment	Via Teach-in button and control input
Light spot size	See diagram	Teach-in modes	Mode 1: during running process
Polarising filter	Yes	Adjustment possibilities	Mode 2: during standing process
		Default settings	N.O./N.C. via Teach-in button and control input
			Button lock via control input
			S _n = 8 m and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	50 x 50.08 x 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 600 Hz	Weight (cable device)	125 g
Response time	830 μs	Vibration and impact resistance	EN 60947-5-2
Control input, I _N	+U _B = teach-in -U _B = button locked Open = normal operation		

¹ Reference material: R10 reflector ² Max. 10 % ripple, within U_B ~ 50 Hz / 100 Hz ³ With connected IP 67 / IP 69K plug

Operating range	Switching output	Type of connection	Part number	Article number
0.3 ... 12 m	PNP	Plug, M12x1, 4-pin	FR 55-R-PS-L4	621-11000
0.3 ... 12 m	NPN	Plug, M12x1, 4-pin	FR 55-R-NS-L4	621-11001
0.3 ... 12 m	PNP	Cable, 3 m, 4-wire	FR 55-R-PS-K4	621-11003
0.3 ... 12 m	NPN	Cable, 3 m, 4-wire	FR 55-R-NS-K4	621-11004

Plug connection	Cable connection
	
153-00782	153-00783

Connection, 4-pin

154-00312

Functional reserves	Light spot size
	
155-00985	155-00984

Reflector / reflective tape*	Operating range	Accessories
R10	0.3 ... 12 m	Reflectors
RD8	0.3 ... 10 m	Connection cables
R5	0.3 ... 6 m	Brackets
RF-230 KL *	0.25 ... 6 m	
		From Page 654
		From Page 670
		From Page 642

FR 55-RM

Retroreflective photoelectric sensor – stainless steel housing



PRODUCT HIGHLIGHTS

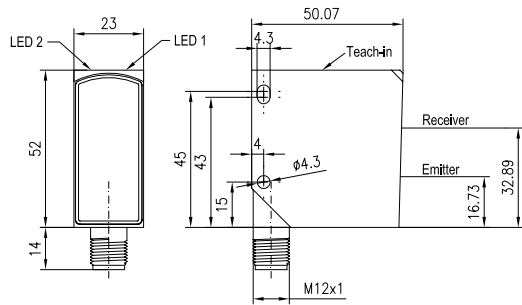
- Stable stainless steel housing – ideal for use in hygiene zones, e.g. in the food and beverages industries
- Housing concept designed for intensive cleaning processes
- Sensor adjustment via teach-in and control input
- Simple alignment thanks to easily visible light spot

Optical data		Functions	
Limit range	0.4 ... 13 m ¹	Indicator LED, green	Operating voltage indicator
Operating range	0.4 ... 11 m ¹	Indicator LED, yellow	Switching output indicator / contamination indicator
Type of light	LED, red, 640 nm	Sensitivity adjustment	Via Teach-in button and control input
Light spot size	See diagram	Teach-in modes	Mode 1: during running process
Polarising filter	Yes	Adjustment possibilities	Mode 2: during standing process
		Default settings	N.O./N.C. via Teach-in button and control input
			Button lock via control input
			S _n = 8 m and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	52 x 50.07 x 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ³
Output current, I _e	≤ 100 mA	Material, housing	Stainless steel, 316L
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Standby time	< 300 ms	Type of connection	(See Selection Table)
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: operation	-20 ... +60 °C
Output function	N.O./N.C.	Ambient temperature: storage	-20 ... +80 °C
Switching frequency, f (ti/tp 1:1)	≤ 600 Hz	Weight (plug device)	138 g
Response time	830 µs	Vibration and impact resistance	EN 60947-5-2
Control input, IN	+U _B = teach-in -U _B = button locked Open = normal operation		

¹ Reference material: R10 reflector ² Max. 10 % ripple, within U_B ~ 50 Hz / 100 Hz ³ With connected IP 67 / IP 69K plug

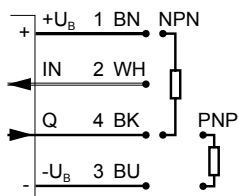
Operating range	Switching output	Type of connection	Part number	Article number
0.4 ... 11 m	PNP	Plug, M12x1, 4-pin	FR 55-RM-PS-L4	621-11012
0.4 ... 11 m	NPN	Plug, M12x1, 4-pin	FR 55-RM-NS-L4	621-11013

Plug connection



153-00800

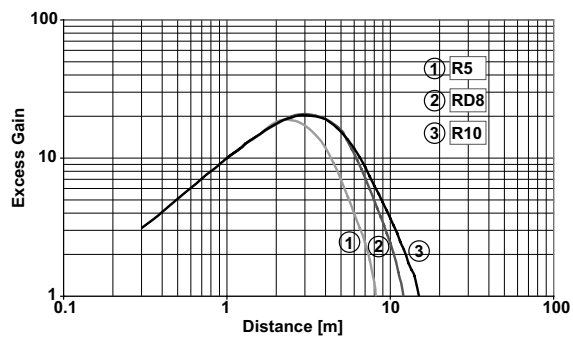
Connection, 4-pin



154-00312

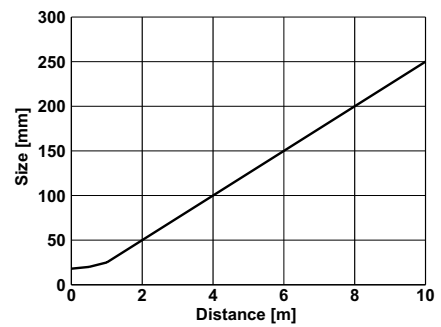
8

Functional reserves



155-01162

Light spot size



155-01112

Reflector	Operating range	Accessories	
R10	0.4 ... 11 m	Reflectors	From Page 654
RD8	0.4 ... 9 m	Connection cables	From Page 670
R5	0.4 ... 6 m	Brackets	From Page 642

FS/FE 55-RL

Laser through-beam photoelectric sensor



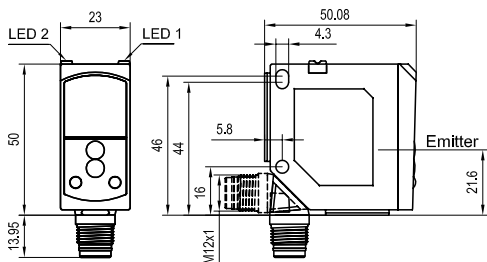
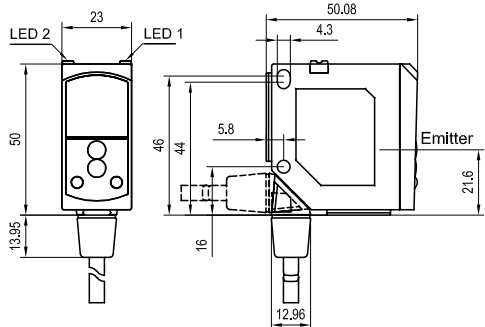
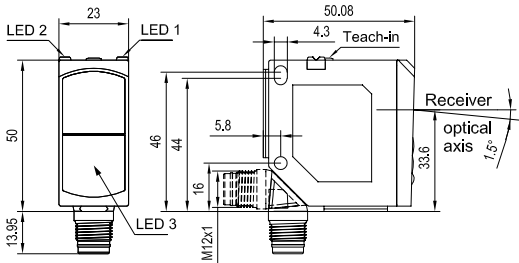
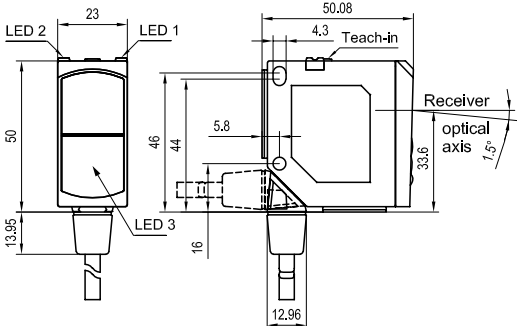
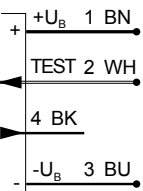
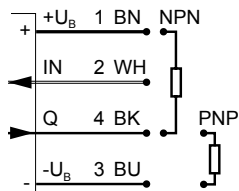
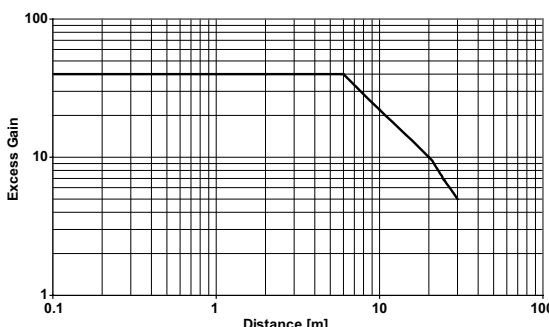
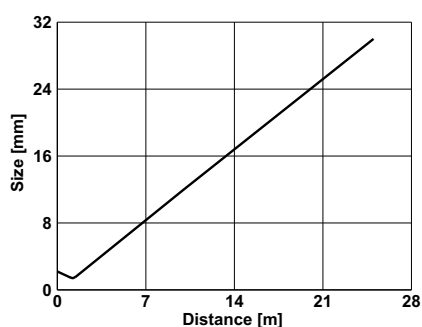
PRODUCT HIGHLIGHTS

- Long range combined with precise laser light spot for extremely accurate small-part detection
- High switching frequency for the reliable detection of even the most rapid processes
- Sensor adjustment via teach-in and control input
- Plug and cable connection rotatable

Optical data		Functions	
Limit range	0 ... 30 m	Indicator LED, green	Operating voltage indicator
Operating range	0 ... 25 m	Indicator LED, yellow	Switching output indicator / contamination indicator
Type of light	Laser, red, 655 nm	Indicator LED, red (receiver)	Alignment indicator
Light spot size	See diagram	Sensitivity adjustment (receiver)	Via Teach-in button and control input
Laser Class (DIN EN 60825-1:2008-5)	1	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
		Default settings	Button lock via control input
			Max. range and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ¹	Dimensions	50 x 50.08 x 23 mm ³
No-load current, I ₀	≤ 30mA	Enclosure rating	IP 69K & IP 67 ²
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 3500 Hz	Weight (cable device)	125 g
Response time	140 µs	Vibration and impact resistance	EN 60947-5-2
Control input, IN (receiver)	+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		

¹ Max. 10 % ripple, within U_B ~ 50 Hz / 100 Hz ² With connected IP 67 / IP 69K plug

Operating range	Switching output	Type of connection	Part number	Article number
0 ... 25 m	PNP	Plug, M12x1, 4-pin	FE 55-RL-PS-L4	620-21006
0 ... 25 m	NPN	Plug, M12x1, 4-pin	FE 55-RL-NS-L4	620-21007
0 ... 25 m	–	Plug, M12x1, 4-pin	FS 55-RL-L4	620-11002
0 ... 25 m	PNP	Cable, 3 m, 4-wire	FE 55-RL-PS-K4	620-21009
0 ... 25 m	NPN	Cable, 3 m, 4-wire	FE 55-RL-NS-K4	620-21010
0 ... 25 m	–	Cable, 3 m, 4-wire	FS 55-RL-K4	620-11003

Plug connection (transmitter)		Cable connection (transmitter)	
			
153-00808		153-00809	
Plug connection (receiver)		Cable connection (receiver)	
			
153-00812		153-00813	
Connection, transmitter, 4-pin		Connection, receiver, 4-pin	
			
154-00315		154-00312	
Functional reserves		Light spot size	
			
155-01138		155-01139	
Accessories			
Connection cables		From Page 670	Brackets
			From Page 642

FS/FE 55-R

Through-beam photoelectric sensor



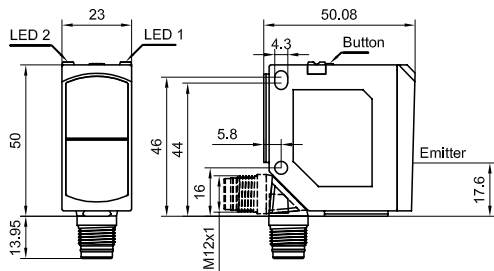
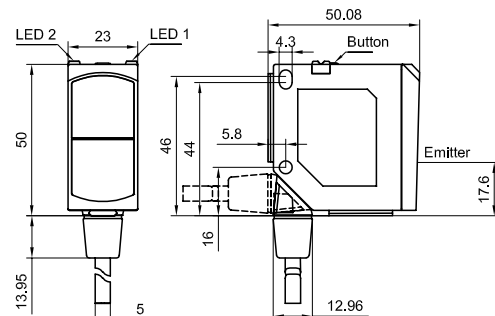
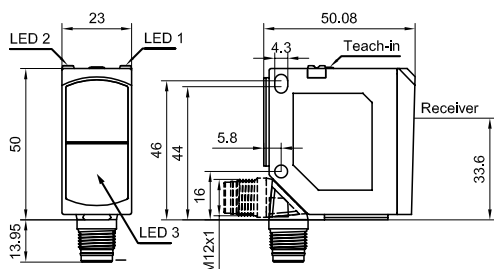
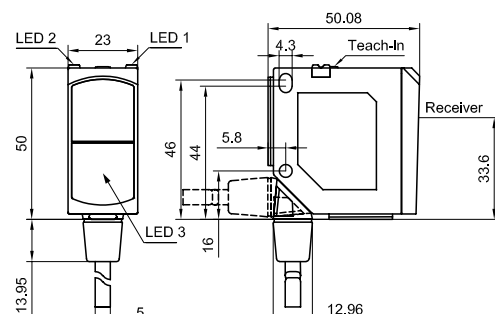
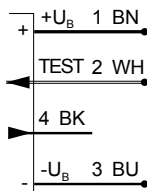
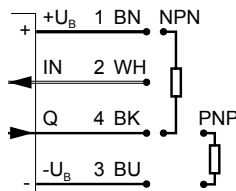
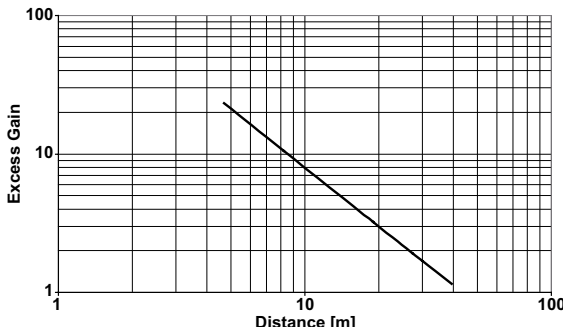
PRODUCT HIGHLIGHTS

- Alignment indicator and easily visible light spot for simple alignment of the through-beam system
- Test input to check sensor pair function
- Sensor adjustment via teach-in and control input
- Plug and cable connection rotatable

Optical data		Functions	
Limit range	0 ... 25 m	Indicator LED, green	Operating voltage indicator
Operating range	0 ... 20 m	Indicator LED, yellow	Switching output indicator / contamination indicator
Type of light	LED, red, 640 nm	Indicator LED, red (receiver)	Alignment indicator
Light spot size	See diagram	Sensitivity adjustment (receiver)	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		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ¹	Dimensions	50 x 50.08 x 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ²
Output current, I _e	≤ 100 mA	Material, housing	PC-ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Protection Class	2	Type of connection	(See Selection Table)
Standby time	< 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	35 g
Switching frequency, f (ti/tp 1:1)	≤ 500 Hz	Weight (cable device)	125 g
Response time	1 ms	Vibration and impact resistance	EN 60947-5-2
Control input, IN (receiver)	+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		

¹ Max. 10 % ripple, within U_B ~ 50 Hz / 100 Hz ² With connected IP 67 / IP 69K plug

Operating range	Switching output	Type of connection	Part number	Article number
0 ... 20 m	PNP	Plug, M12x1, 4-pin	FE 55-R-PS-L4	620-21000
0 ... 20 m	NPN	Plug, M12x1, 4-pin	FE 55-R-NS-L4	620-21001
0 ... 20 m	—	Plug, M12x1, 4-pin	FS 55-R-L4	620-11000
0 ... 20 m	PNP	Cable, 3 m, 4-wire	FE 55-R-PS-K4	620-21003
0 ... 20 m	NPN	Cable, 3 m, 4-wire	FE 55-R-NS-K4	620-21004
0 ... 20 m	—	Cable, 3 m, 4-wire	FS 55-R-K4	620-11001

Plug connection (transmitter)		Cable connection (transmitter)	
			
153-00787		153-00786	
Plug connection (receiver)		Cable connection (receiver)	
			
153-00790		153-00791	
Connection, transmitter, 4-pin		Connection, receiver, 4-pin	
			
154-00315		154-00312	
Functional reserves		Light spot size	
			
155-00986		155-00994	
Accessories			
Connection cables		From Page 670	Brackets
			From Page 642

FS/FE 55-RM

Through-beam photoelectric sensor – stainless steel housing



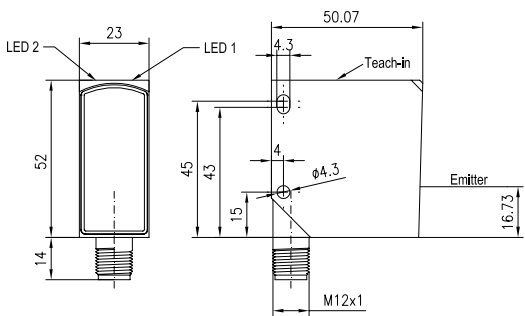
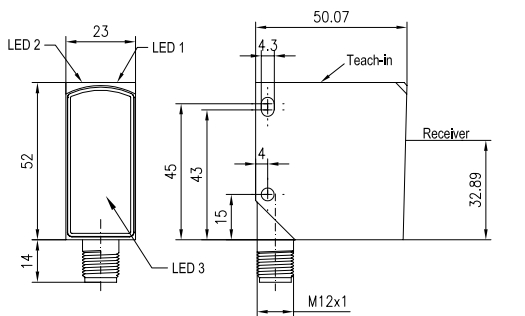
PRODUCT HIGHLIGHTS

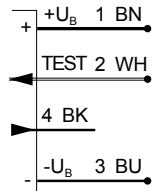
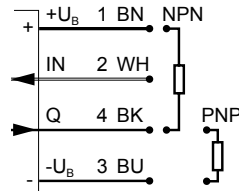
- Stable stainless steel housing – ideal for use in hygiene zones, e.g. in the food and beverages industries
- Housing concept designed for intensive cleaning processes
- Sensor adjustment via teach-in and control input
- Simple alignment thanks to easily visible light spot and alignment indicator

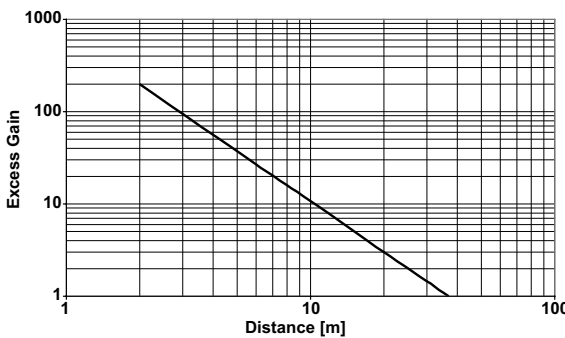
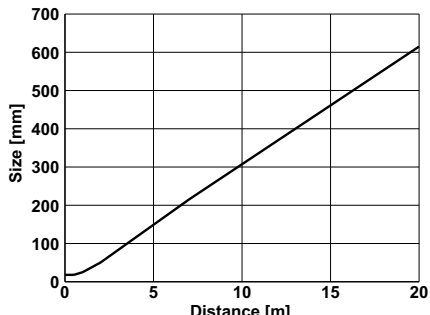
Optical data		Functions	
Limit range	0 ... 20 m	Indicator LED, green	Operating voltage indicator
Operating range	0 ... 15 m	Indicator LED, yellow	Switching output indicator / contamination indicator
Type of light	LED, red, 640 nm	Indicator LED, red (receiver)	Alignment indicator
Light spot size	See diagram	Sensitivity adjustment (receiver)	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		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ¹	Dimensions	52 x 50.07 x 23 mm ³
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 69K & IP 67 ²
Output current, I _e	≤ 100 mA	Material, housing	Stainless steel, 316L
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Material, front screen	PMMA
Standby time	< 300 ms	Type of connection	(See Selection Table)
Switching output, Q	PNP/NPN (see Selection Table)	Ambient temperature: operation	-20 ... +60 °C
Output function	N.O./N.C.	Ambient temperature: storage	-20 ... +80 °C
Switching frequency, f (ti/tp 1:1)	≤ 500Hz	Weight (plug device)	138 g
Response time	1 ms	Vibration and impact resistance	EN 60947-5-2
Control input, IN (receiver)	+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		

¹ Max. 10 % ripple, within U_B ~ 50 Hz / 100 Hz ² With connected IP 67 / IP 69K plug

Operating range	Switching output	Type of connection	Part number	Article number
0 ... 15 m	PNP	Plug, M12x1, 4-pin	FE 55-RM-PS-L4	620-21012
0 ... 15 m	NPN	Plug, M12x1, 4-pin	FE 55-RM-NS-L4	620-21013
0 ... 15 m	–	Plug, M12x1, 4-pin	FS 55-RM-L4	620-11004

Plug connection (transmitter)	Plug connection (receiver)
 153-00802	 153-00801

Connection, transmitter, 4-pin	Connection, receiver, 4-pin
 154-00315	 154-00312

Functional reserves	Light spot size
 155-01165	 155-01166

Accessories	
Connection cables	From Page 670
Brackets	From Page 642