

F 50 – photoelectric sensors and diffuse sensors in compact housings

The reliable standard series



 made in Germany



Well thought-out mounting accessories:
SensoPart offers the right mounting aid for almost every mounting situation. This considerably simplifies sensor installation and adjustment. Designs with a supplementary protective function are also available.












TYPICAL F 50

- Universal use in numerous automation applications
- Autocollimation variants with high precision and no blind zone
- Precise background suppression
- Laser, LED or infrared light transmitter options
- Simple adjustment via potentiometer, with numeric display
- Rotatable plug (270°)
- Well thought-out mounting accessories
- UL-certification

The photoelectric sensors and photoelectric diffuse sensors of the F 50 series are virtually synonymous with versatile use and particularly reliable products. They have guaranteed user-satisfaction in a wide variety of sectors from the automotive industry, through mechanical engineering and wood processing, to the packaging and print industries.

The F 50 sensors' reliable detection (with laser-light, red-light or infrared LED options) and precise background suppression are impressive. Automation tasks such as (small) part detection, checking presence and positioning are their usual areas of use. SensoPart also offers product variants for special applications: for example, the FR 50-R / RL autocollimation photoelectric sensor that can detect objects from a range of 0 mm.

The sensors of the F 50 series, however, not only offer very reliable operation, but also make users' lives easy. Thus mounting is considerably simplified by the connection plug that can be rotated through 270° and the well thought-out mounting accessories, while adjustment and commissioning are also easy and user-friendly thanks to the direct numeric display. You simply cannot go wrong with an F 50 device!

F 50 – Product Overview						
	Type of light		Adjustment	Scanning distance / range	Special features	Page
Photoelectric diffuse sensors with background suppression						
FT 50 RLH	Laser		Potentiometer 	150 mm	Most accurate small-part detection	355
FT 50 RLHD	Laser		Potentiometer 	300 mm	Most accurate small-part detection	357
FT 50 RH	LED		Potentiometer 	300 mm		359
FT 50 BH	LED, blue		Potentiometer 	300 mm	BlueLight technology	361
FT 50 IH	Infrared		Potentiometer 	600 mm		363
Photoelectric diffuse sensors						
FR 50 RL	Laser		Potentiometer 	25 m	Autocollimation	365
FR 50 R	LED		Potentiometer 	6 m	Autocollimation	367

FT 50 RLH

Diffuse laser sensor with background suppression



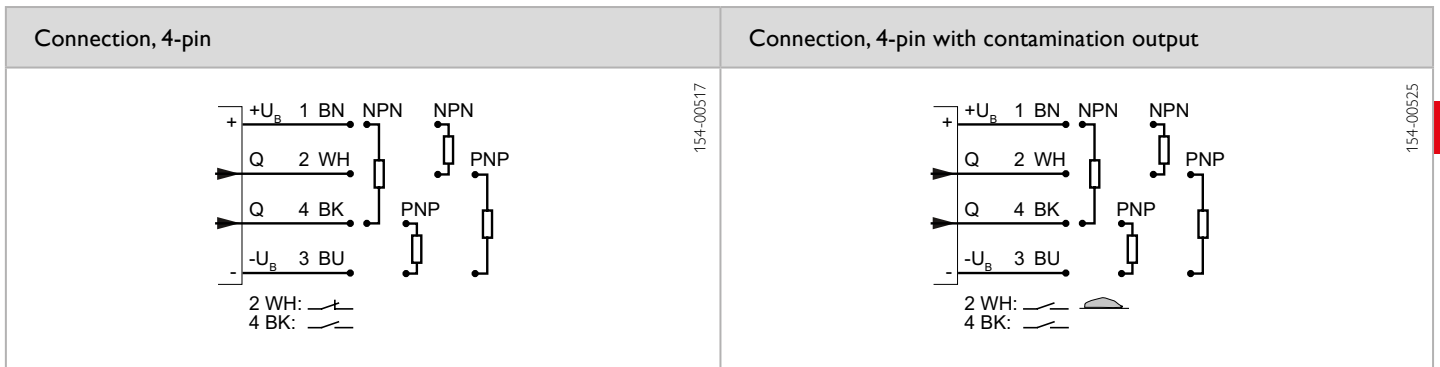
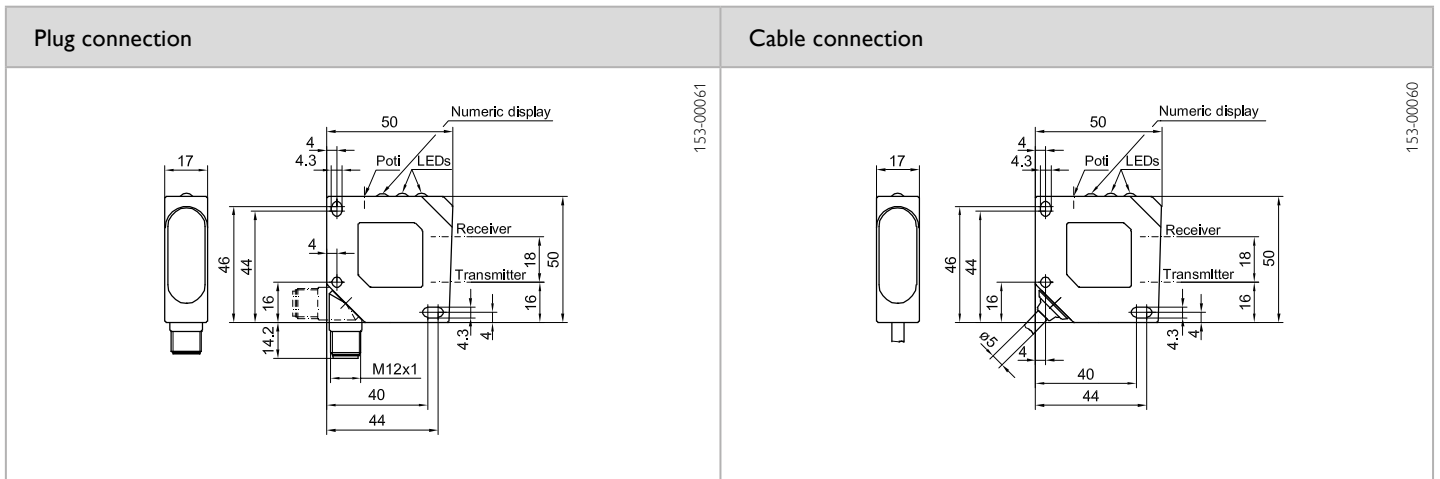
PRODUCT HIGHLIGHTS

- Particularly suitable for detecting the smallest of objects
- Precisely adjustable background suppression
- Simple scanning distance adjustment thanks to indicator scale
- High switching frequency of 2500 Hz

Optical data		Functions	
Scanning distance	30 ... 150 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	Laser, red, 650 nm	Indicator LED, yellow	Switching output indicator
Light spot size	See table	Indicator LED, red	Contamination indicator
Laser Class (IEC 60825-1)	1	Scanning distance adjustment	Via potentiometer
Hysteresis ²	< 5 %		
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ³	Dimensions	50 x 50 x 17 mm
No-load current, I ₀	≤ 50 mA ⁴	Enclosure rating	IP 67 ⁶
Output current, I _e	≤ 200 mA	Material, housing	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
Power On Delay	≤ 300 ms	Ambient temperature: operation	-20 ... +45 °C
Switching output, Q	PNP/NPN, antivalent (see selection table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C. (see selection table)	Weight (plug device)	40 g
Switching frequency, f (ti/tp 1:1)	≤ 2500 Hz	Weight (cable device)	130 g
Response time	200 μs	Vibration and impact resistance	EN 60947-5-2
Connection, BK	N.O.		
Connection, WH ⁵	N.C.		
Contamination output, WH (optional)	N.O. (see selection table)		

¹ Reference material: grey, 18 % reflectivity ² 18 % / 18 % ³ Max. 10 % ripple, within U_B ⁴ At 24V DC ⁵ Without contamination output ⁶ With connected IP 67 plug

Scanning distance	Switching output	Type of connection	Contamination output	Part number	Article number
30 ... 150 mm	PNP, antivalent	Plug, M12x1, 4-pin	No	FT 50 RLH-PAL4	572-51008
30 ... 150 mm	NPN, antivalent	Plug, M12x1, 4-pin	No	FT 50 RLH-NAL4	572-51011
30 ... 150 mm	PNP (N.O.)	Plug, M12x1, 4-pin	Yes	FT 50 RLH-PSVL4	572-51010
30 ... 150 mm	NPN (N.O.)	Plug, M12x1, 4-pin	Yes	FT 50 RLH-NSVL4	572-51012
30 ... 150 mm	PNP, antivalent	Cable, 3 m, 4-wire	No	FT 50 RLH-PAK4	572-51013
30 ... 150 mm	NPN, antivalent	Cable, 3 m, 4-wire	No	FT 50 RLH-NAK4	572-51015
30 ... 150 mm	PNP (N.O.)	Cable, 3 m, 4-wire	Yes	FT 50 RLH-PSVK4	572-51014
30 ... 150 mm	NPN (N.O.)	Cable, 3 m, 4-wire	Yes	FT 50 RLH-NSVK4	572-51016

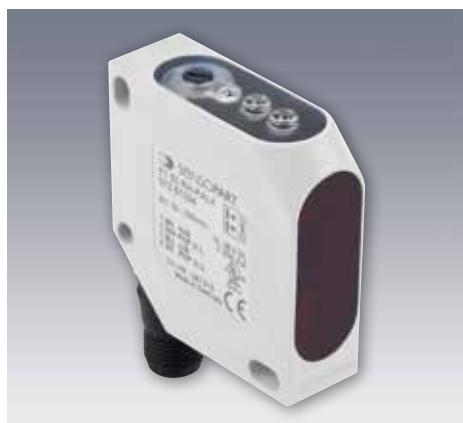


Light spot size					
Scanning distance (mm)	30	60	80	100	150
Light spot diameter (mm)	1.8	0.7	0.1	1.1	2.5

Accessories	
Connection cables	www.sensopart.com/en/accessories
Brackets	

FT 50 RLHD

Diffuse laser sensor with background suppression



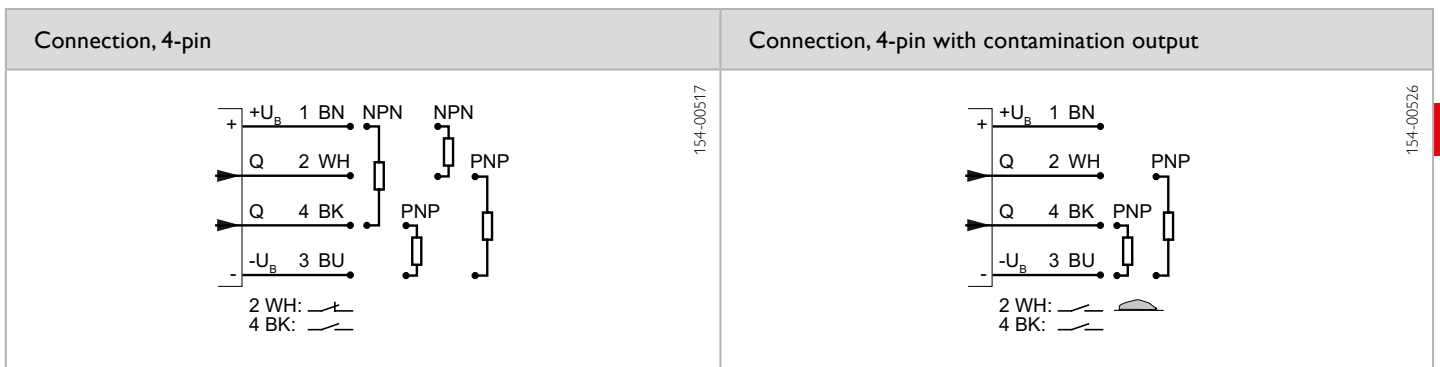
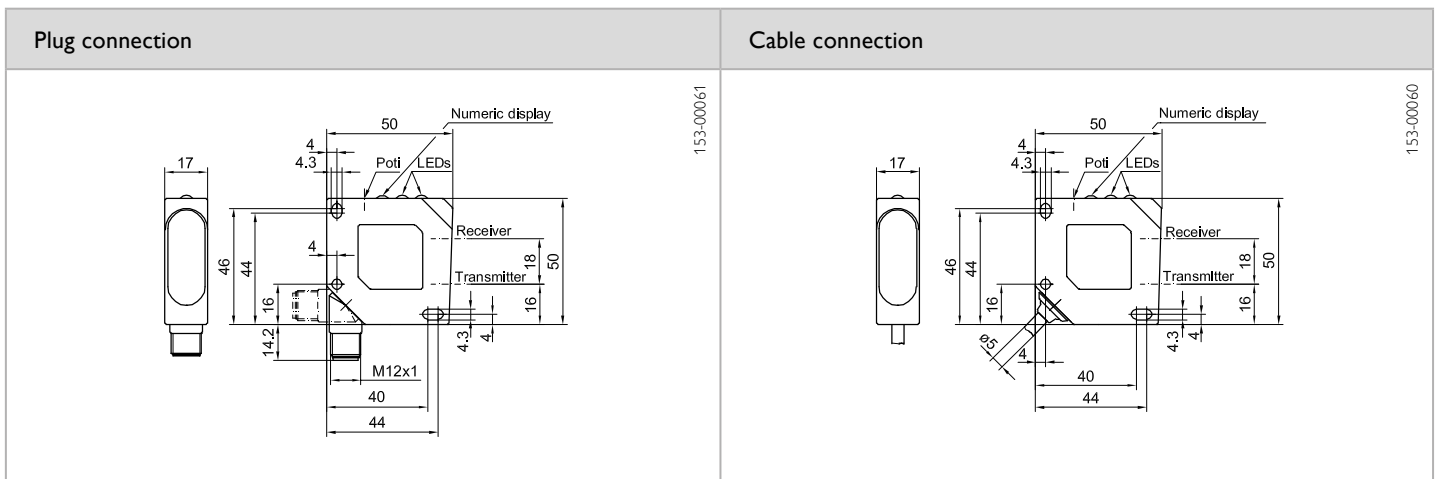
PRODUCT HIGHLIGHTS

- Precise small part detection even at long scanning distances of up to 300 mm
- Very small, easily visible laser light spot
- Precisely adjustable background suppression
- High switching frequency of 2500 Hz

Optical data		Functions	
Scanning distance	50 ... 300 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	Laser, red, 650 nm	Indicator LED, yellow	Switching output indicator
Light spot size	See table	Indicator LED, red	Contamination indicator
Laser Class (IEC 60825-1)	1	Scanning distance adjustment	Via potentiometer
Hysteresis ²	< 5 %		
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ³	Dimensions	50 x 50 x 17 mm
No-load current, I ₀	≤ 50 mA ⁴	Enclosure rating	IP 67 ⁶
Output current, I _e	≤ 200 mA	Material, housing	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
Power On Delay	≤ 300 ms	Ambient temperature: operation	-20 ... +45 °C
Switching output, Q	PNP/NPN, antivalent (see selection table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C. (see selection table)	Weight (plug device)	40 g
Switching frequency, f (ti/tp 1:1)	≤ 2500 Hz	Weight (cable device)	130 g
Response time	200 μs	Vibration and impact resistance	EN 60947-5-2
Connection, BK	N.O.		
Connection, WH ⁵	N.C.		
Contamination output, WH (optional)	N.O. (see selection table)		

¹ Reference material: grey, 18 % reflectivity ² 18 % / 18 % ³ Max. 10 % ripple, within U_B ⁴ At 24V DC ⁵ Without contamination output ⁶ With connected IP 67 plug

Scanning distance	Switching output	Type of connection	Contamination output	Part number	Article number
50 ... 300 mm	PNP, antivalent	Plug, M12x1, 4-pin	No	FT 50 RLHD-PAL4	572-51062
50 ... 300 mm	NPN, antivalent	Plug, M12x1, 4-pin	No	FT 50 RLHD-NAL4	572-51063
50 ... 300 mm	PNP (N.O.)	Plug, M12x1, 4-pin	Yes	FT 50 RLHD-PSVL4	572-51051
50 ... 300 mm	PNP, antivalent	Cable, 3 m, 4-wire	No	FT 50 RLHD-PAK4	572-51064
50 ... 300 mm	NPN, antivalent	Cable, 3 m, 4-wire	No	FT 50 RLHD-NAK4	572-51065



Light spot size								
Scanning distance (mm)	50	80	100	150	180	200	250	300
Light spot diameter (mm)	5 × 1.75	4.8 × 1.75	4.5 × 1.5	4 × 1.5	3.8 × 1.5	3.8 × 1.2	3.2 × 1	3 × 1

Accessories	
Connection cables	www.sensopart.com/en/accessories
Brackets	

FT 50 RH

Photoelectric diffuse sensor with background suppression



PRODUCT HIGHLIGHTS

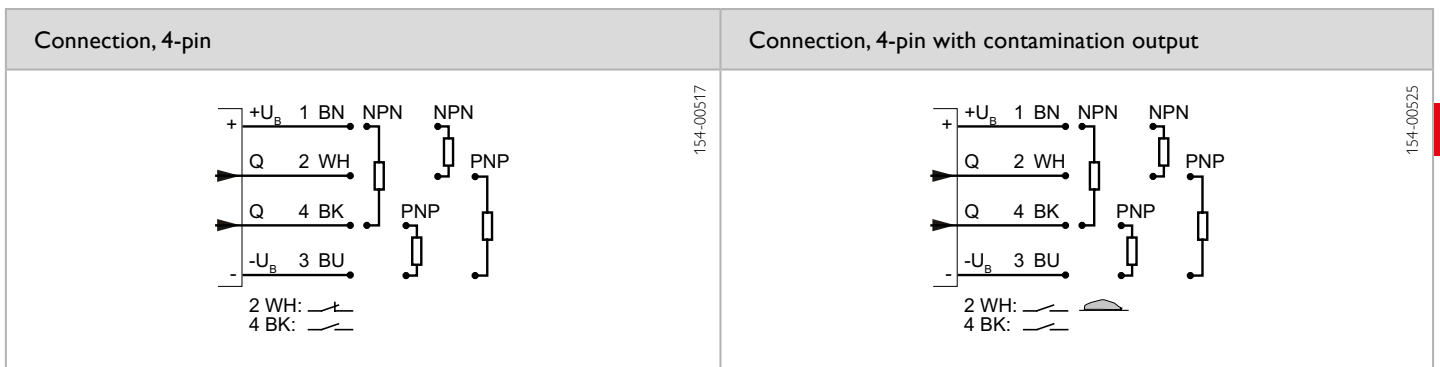
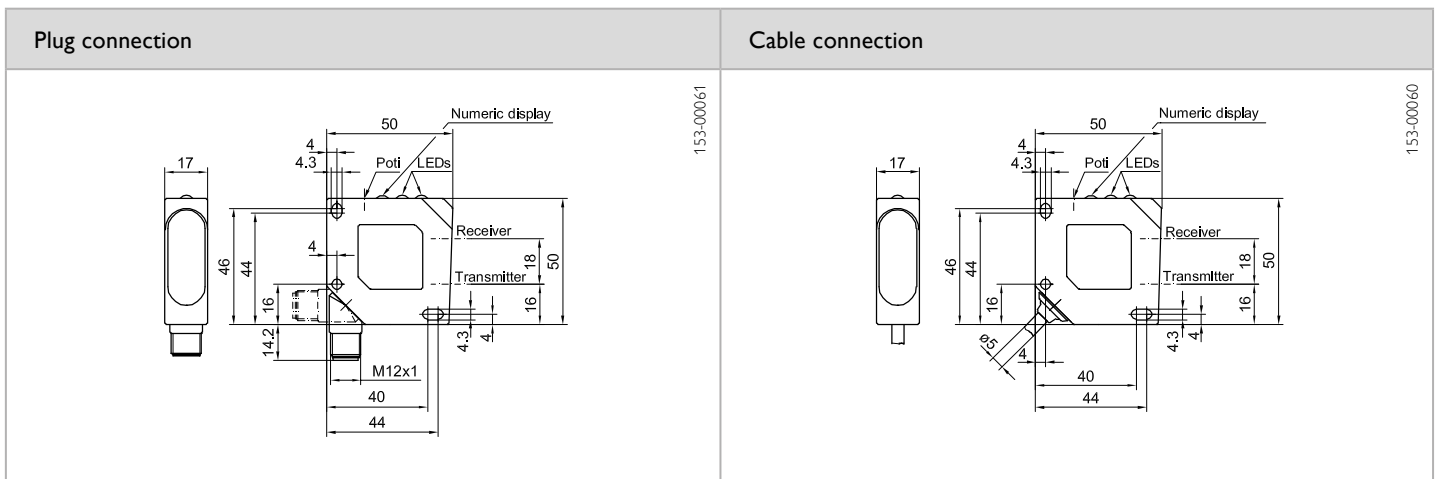
- Precisely adjustable background suppression
- Simple scanning distance adjustment thanks to indicator scale
- Optional contamination output
- Plug connector rotatable

Optical data		Functions	
Scanning distance	30 ... 300 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	LED, red, 660 nm	Indicator LED, yellow	Switching output indicator
Light spot size ²	8 x 8 mm ²	Indicator LED, red	Contamination indicator
		Scanning distance adjustment	Via potentiometer
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ³	Dimensions	50 x 50 x 17 mm
No-load current, I ₀	≤ 35 mA ⁴	Enclosure rating	IP 67 ⁶
Output current, I _e	≤ 200 mA	Material, housing	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
Power On Delay	≤ 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN, antivalent (see selection table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C. (see selection table)	Weight (plug device)	40 g
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (cable device)	130 g
Response time	500 μs	Vibration and impact resistance	EN 60947-5-2
Connection, BK	N.O.		
Connection, WH ⁵	N.C.		
Contamination output, WH (optional)	N.O. (see selection table)		

¹ Reference material: grey, 18 % reflectivity ² At scanning distance of 200 mm ³ Max. 10 % ripple, within U_B ⁴ At 24V DC ⁵ Without contamination output

⁶ With connected IP 67 plug

Scanning distance	Switching output	Type of connection	Contamination output	Part number	Article number
30 ... 300 mm	PNP, antivalent	Plug, M12x1, 4-pin	No	FT 50 RH-PAL4	572-51004
30 ... 300 mm	NPN, antivalent	Plug, M12x1, 4-pin	No	FT 50 RH-NAL4	572-51005
30 ... 300 mm	PNP (N.O.)	Plug, M12x1, 4-pin	Yes	FT 50 RH-PSVL4	572-51006
30 ... 300 mm	NPN (N.O.)	Plug, M12x1, 4-pin	Yes	FT 50 RH-NSVL4	572-51007
30 ... 300 mm	PNP, antivalent	Cable, 3 m, 4-wire	No	FT 50 RH-PAK4	572-51000
30 ... 300 mm	NPN, antivalent	Cable, 3 m, 4-wire	No	FT 50 RH-NAK4	572-51001
30 ... 300 mm	PNP (N.O.)	Cable, 3 m, 4-wire	Yes	FT 50 RH-PSVK4	572-51002
30 ... 300 mm	NPN (N.O.)	Cable, 3 m, 4-wire	Yes	FT 50 RH-NSVK4	572-51003



Accessories	
Connection cables	www.sensopart.com/en/accessories
Brackets	

FT 50 BH

BlueLight-Photoelectric diffuse sensor with background suppression



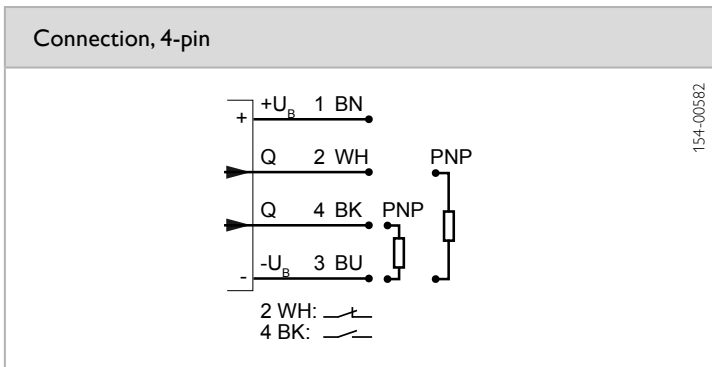
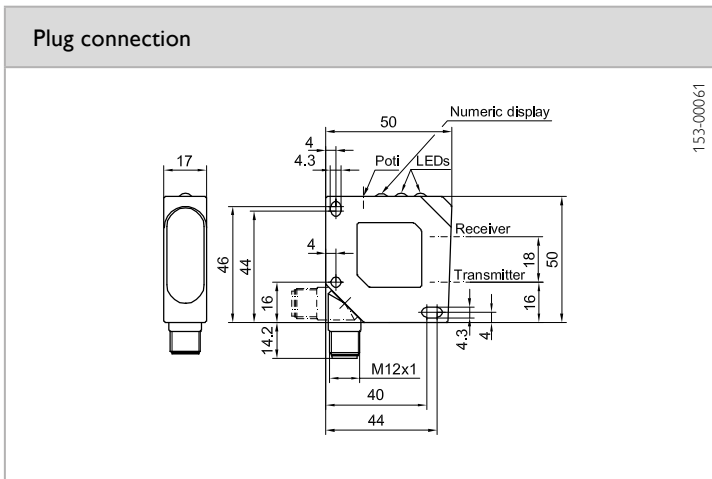
PRODUCT HIGHLIGHTS

- Precisely adjustable background suppression
- Simple scanning distance adjustment thanks to indicator scale
- Plug connector rotatable

Optical data		Functions	
Scanning distance	40 ... 300 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	LED, blue, 450 nm	Indicator LED, yellow	Switching output indicator
Light spot size ²	5 x 5 mm ²	Indicator LED, red	Contamination indicator
		Scanning distance adjustment	Via potentiometer
Electrical data		Mechanical data	
Operating voltage, +U _b	10 ... 30V DC ³	Dimensions	50 x 50 x 17 mm
No-load current, I ₀	≤ 35 mA ⁴	Enclosure rating	IP 67 ⁵
Output current, I _e	≤ 200 mA	Material, housing	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
Power On Delay	≤ 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN, antivalent (see selection table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C. (see selection table)	Weight (plug device)	40 g
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (cable device)	130 g
Response time	500 μs	Vibration and impact resistance	EN 60947-5-2
Connection, BK	N.O.		
Connection, WH	N.C.		
Contamination output, WH (optional)	N.O. (see selection table)		

¹ Reference material: grey, 18 % reflectivity ² At scanning distance of 200 mm ³ Max. 10 % ripple, within U_b ⁴ At 24V DC ⁵ With connected IP 67 plug

Scanning distance	Switching output	Type of connection	Part number	Article number
40 ... 300 mm	PNP, antivalent	Plug, M12x1, 4-pin	FT 50 BH-PAL4	572-51070



7

Accessories

Connection cables	www.sensopart.com/en/accessories
Brackets	

FT 50 IH

Diffuse infrared sensor with background suppression



PRODUCT HIGHLIGHTS

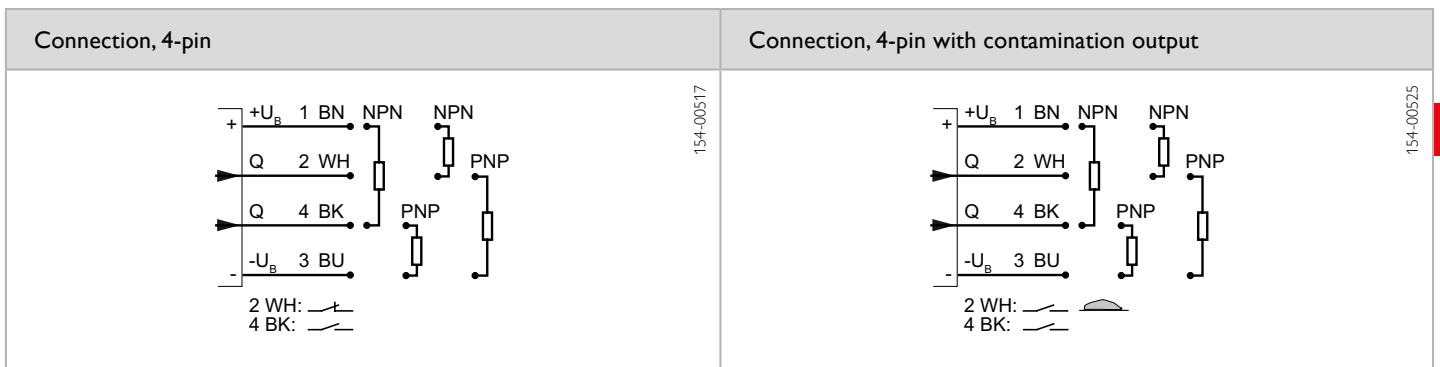
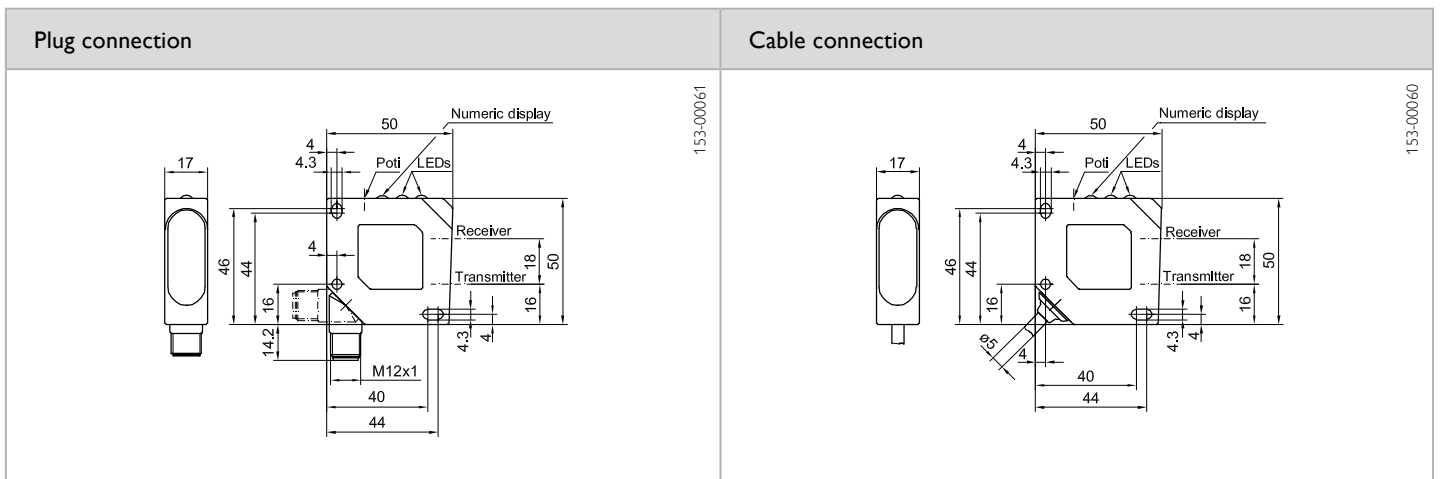
- Long scanning distance of 600 mm
- Precisely adjustable background suppression
- Simple scanning distance adjustment thanks to indicator scale
- Optional contamination output

Optical data		Functions	
Scanning distance	150 ... 600 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	LED, infrared, 880 nm	Indicator LED, yellow	Switching output indicator
Light spot size ²	20 x 20 mm ²	Indicator LED, red	Contamination indicator
Hysteresis ³	< 5 %	Scanning distance adjustment	Via potentiometer
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ⁴	Dimensions	50 x 50 x 17 mm
No-load current, I ₀	≤ 70 mA ⁵	Enclosure rating	IP 67 ⁷
Output current, I _e	≤ 200 mA	Material, housing	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
Power On Delay	≤ 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN, antivalent (see selection table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C. (see selection table)	Weight (plug device)	40 g
Switching frequency, f (ti/tp 1:1)	≤ 800 Hz	Weight (cable device)	130 g
Response time	625 μs	Vibration and impact resistance	EN 60947-5-2
Connection, BK	N.O.		
Connection, WH ⁶	N.C.		
Contamination output, WH (optional)	N.O. (see selection table)		

¹ Reference material: grey, 18 % reflectivity ² At scanning distance of 400 mm ³ 18 % / 18 % ⁴ Max. 10 % ripple, within U_B ⁵ At 24V DC ⁶ Without contamination output

⁷ With connected IP 67 plug

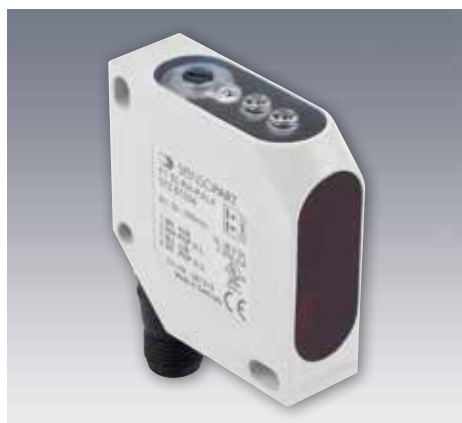
Scanning distance	Switching output	Type of connection	Contamination output	Part number	Article number
150 ... 600 mm	PNP, antivalent	Plug, M12x1, 4-pin	No	FT 50 IH-PAL4	572-51029
150 ... 600 mm	NPN, antivalent	Plug, M12x1, 4-pin	No	FT 50 IH-NAL4	572-51038
150 ... 600 mm	PNP (N.O.)	Plug, M12x1, 4-pin	Yes	FT 50 IH-PSVL4	572-51031
150 ... 600 mm	NPN (N.O.)	Plug, M12x1, 4-pin	Yes	FT 50 IH-NSVL4	572-51058
150 ... 600 mm	PNP, antivalent	Cable, 3 m, 4-wire	No	FT 50 IH-PAK4	572-51032
150 ... 600 mm	NPN, antivalent	Cable, 3 m, 4-wire	No	FT 50 IH-NAK4	572-51037
150 ... 600 mm	PNP (N.O.)	Cable, 3 m, 4-wire	Yes	FT 50 IH-PSVK4	572-51033
150 ... 600 mm	NPN (N.O.)	Cable, 3 m, 4-wire	Yes	FT 50 IH-NSVK4	572-51057



Accessories	
Connection cables	www.sensopart.com/en/accessories
Brackets	

FR 50 RL

Retro-reflective laser sensor



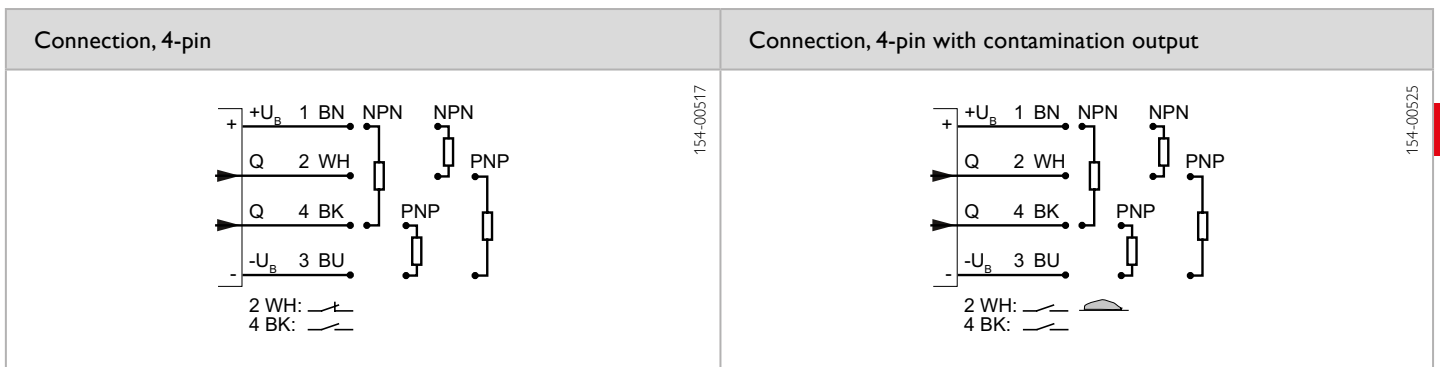
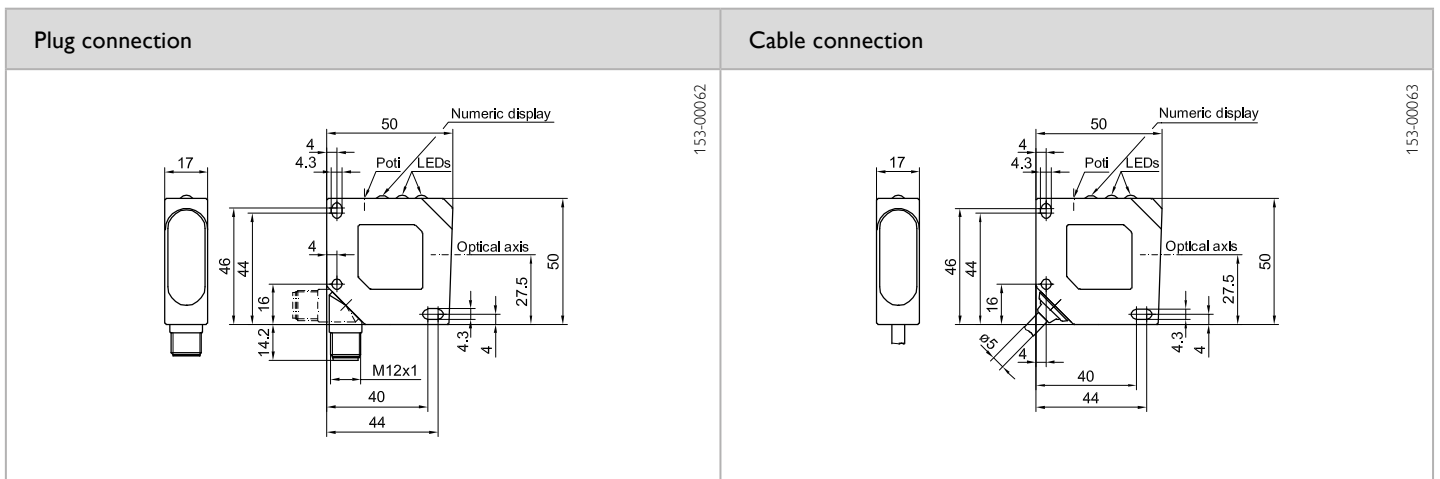
PRODUCT HIGHLIGHTS

- Autocollimation principle for maximum precision even at long ranges
- No blind zone – detection from range of 0 mm
- Particularly suitable for detecting the smallest of objects
- High switching frequency of 2500 Hz
- Very small, easily visible laser light spot

Optical data		Functions	
Limit operating range	0 ... 25 m ¹	Indicator LED, green	Operating voltage indicator
Operating range	0 ... 20 m ¹	Indicator LED, yellow	Switching output indicator
Type of light	Laser, red, 650 nm	Indicator LED, red	Contamination indicator
Light spot size	See table	Sensitivity adjustment	Via potentiometer
Laser Class (IEC 60825-1)	1		
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	50 x 50 x 17 mm
No-load current, I ₀	≤ 40 mA ³	Enclosure rating	IP 67 ⁵
Output current, I _e	≤ 200 mA	Material, housing	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
Power On Delay	≤ 300 ms	Ambient temperature: operation	-20 ... +45 °C
Switching output, Q	PNP/NPN, antivalent (see selection table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C. (see selection table)	Weight (plug device)	40 g
Switching frequency, f (ti/tp 1:1)	≤ 2500 Hz	Weight (cable device)	130 g
Response time	200 μs	Vibration and impact resistance	EN 60947-5-2
Connection, BK	N.O.		
Connection, WH ⁴	N.C.		
Contamination output, WH (optional)	N.O. (see selection table)		

¹ Reference material: R5/L reflector ² Max. 10 % ripple, within U_B ³ At 24V DC ⁴ Without contamination output ⁵ With connected IP 67 plug

Operating range	Switching output	Type of connection	Contamination output	Part number	Article number
0 ... 20 m	PNP, antivalent	Plug, M12x1, 4-pin	No	FR 50 RL-PAL4	571-50009
0 ... 20 m	NPN, antivalent	Plug, M12x1, 4-pin	No	FR 50 RL-NAL4	571-50011
0 ... 20 m	PNP (N.O.)	Plug, M12x1, 4-pin	Yes	FR 50 RL-PSVL4	571-50010
0 ... 20 m	NPN (N.O.)	Plug, M12x1, 4-pin	Yes	FR 50 RL-NSVL4	571-50012
0 ... 20 m	PNP, antivalent	Cable, 3 m, 4-wire	No	FR 50 RL-PAK4	571-50013
0 ... 20 m	NPN, antivalent	Cable, 3 m, 4-wire	No	FR 50 RL-NAK4	571-50015
0 ... 20 m	PNP (N.O.)	Cable, 3 m, 4-wire	Yes	FR 50 RL-PSVK4	571-50014
0 ... 20 m	NPN (N.O.)	Cable, 3 m, 4-wire	Yes	FR 50 RL-NSVK4	571-50016



Light spot size			
Operating range (m)	4	12	20
Light spot diameter (mm)	5	15	24

Accessories	
Reflectors	www.sensopart.com/en/accessories
Connection cables	
Brackets	

FR 50 R

Photoelectric retro-reflective sensor



PRODUCT HIGHLIGHTS

- Autocollimation principle for maximum precision even at long ranges
- No blind zone – detection from range of 0 mm
- Plug connector rotatable

Optical data		Functions	
Limit operating range	0 ... 6 m ¹	Indicator LED, green	Operating voltage indicator
Operating range	0 ... 5.5 m ¹	Indicator LED, yellow	Switching output indicator
Type of light	LED, red, 660 nm	Indicator LED, red	Contamination indicator
Light spot size	See table	Sensitivity adjustment	Via potentiometer
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	50 x 50 x 17 mm
No-load current, I ₀	≤ 30 mA ³	Enclosure rating	IP 67 ⁵
Output current, I _e	≤ 200 mA	Material, housing	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
Power On Delay	≤ 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP/NPN, antivalent (see selection table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C. (see selection table)	Weight (plug device)	40 g
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (cable device)	130 g
Response time	500 μs	Vibration and impact resistance	EN 60947-5-2
Connection, BK	N.O.		
Connection, WH ⁴	N.C.		
Contamination output, WH (optional)	N.O. (see selection table)		

¹ Reference material: RD8 reflector ² Max. 10 % ripple, within U_B ³ At 24 V DC ⁴ Without contamination output ⁵ With connected IP 67 plug

Operating range	Switching output	Type of connection	Contamination output	Part number	Article number
0 ... 5.5 m	PNP, antivalent	Plug, M12x1, 4-pin	No	FR 50 R-PAL4	571-50004
0 ... 5.5 m	NPN, antivalent	Plug, M12x1, 4-pin	No	FR 50 R-NAL4	571-50005
0 ... 5.5 m	PNP (N.O.)	Plug, M12x1, 4-pin	Yes	FR 50 R-PSVL4	571-50006
0 ... 5.5 m	NPN (N.O.)	Plug, M12x1, 4-pin	Yes	FR 50 R-NSVL4	571-50007
0 ... 5.5 m	PNP (N.C.)	Plug, M12x1, 4-pin	Yes	FR 50 R-POVL4	571-50033
0 ... 5.5 m	PNP, antivalent	Cable, 3 m, 4-wire	No	FR 50 R-PAK4	571-50000
0 ... 5.5 m	NPN, antivalent	Cable, 3 m, 4-wire	No	FR 50 R-NAK4	571-50001
0 ... 5.5 m	PNP (N.O.)	Cable, 3 m, 4-wire	Yes	FR 50 R-PSVK4	571-50002
0 ... 5.5 m	NPN (N.O.)	Cable, 3 m, 4-wire	Yes	FR 50 R-NSVK4	571-50003

