

F 04/05/12/18 – photoelectric sensors and diffuse sensors in barrel type housings

All-round performance



made in Germany

Sensors in barrel type housings have several special aspects compared to those with cubic housings. They are not only particularly robust but also, thanks to their integrated thread, offer easy and space-saving installation. Special designs that can “see around corners” are also available: they are equipped with a special optical system that deflects the transmission and reception beams around the sensor axis by 90°, expanding the mounting options available.

The sensors of the F 04/05/12/18 series differ in the diameter of the integrated metal threaded sleeve (4, 5, 12 or 18 mm). Each series offers the usual functional variants: through-beam and Photoelectric retro-reflective sensors, energetic scanners, and scanners with background suppression. The sensors are optionally available with red-light or infrared LED or with pulsed red-light laser. Variants with potentiometer, teach-in operation or IO-Link are also available.

TYPICAL F 04/05/12/18

- Robust housings
- Very easy installation
- Straight or angled optics options
- Metric threads in 4 sizes: 4, 5, 12 or 18 mm
- Red-light / infrared LED or laser light options
- FT 04 and FT 05 the smallest sensors with IO-Link

F 04/05/12/18 – Product Overview					
	Type of light	Adjustment	Scanning distance / range	Special features	Page
Photoelectric diffuse sensors with background suppression					
FMH 18	Red	Potentiometer 	40 ... 120 mm	M18 housing, very precise detection	453
Photoelectric diffuse sensors					
FT 04	Red	IO-Link 	10 ... 50 mm	Smallest sensor format Ø 4 mm with IO-Link	455
FT 05	Red	IO-Link 	10 ... 50 mm	Very small size M5 with IO-Link	457
FT 05	Infrared	Fixed	10 ... 50 mm	Very small size M5	459
FT 12 R	Red	Potentiometer 	1 ... 300 mm		461
FT 18-2	Red / infrared	Potentiometer 	0 ... 800 mm	M18 metal housing	463
FT 18-2	Red / infrared	Potentiometer 	0 ... 800 mm	M18 plastic housing	465
Photoelectric retro-reflective sensors					
FR 12 R	Red	Potentiometer 	60 ... 1500 mm	M12 housing	467
FR 18-2	Red	Potentiometer 	3.0 m	M18 metal housing	469
FR 18-2	Infrared	Potentiometer 	3.6 m	M18 plastic housing	471
Photoelectric through-beam sensors					
FS/FE 12 RL	Laser 	Control line	0 ... 5 m	M12 housing	473
FSE 18-2	Infrared		10 m	M18 housing	475
FS/FE 18 RL	Laser 	Control line	0 ... 50 m	M18 housing	477
FL 18 W	Laser 	Potentiometer 	0 ... 50 m	M18 housing, adjustable transmission beam size	479
FL 18 WM	Laser 	Potentiometer 	0 ... 5 m	air tube prevents malfunction	481
FL 18	Laser 	Potentiometer 	0 ... 50 m	M18 housing, adjustable transmission beam size	483

FMH 18

Photoelectric diffuse sensor with background suppression



PRODUCT HIGHLIGHTS

- Scanning distance: 40 ... 120 mm
- Red light, 660 nm
- Background suppression
- Robust metal housing
- Metal M18 threaded sleeve
- Antivalent switching outputs

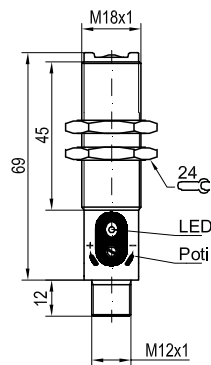
Optical data		Functions	
Scanning distance	40 ... 120 mm ¹	Indicator LED, yellow	Switching state indicator
Type of light	Red, 660 nm	Scanning distance adjustment	Via 18-step potentiometer
Light spot size	8 x 10 mm ²		
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ³	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 67 ⁴
Output current, I _e	200 mA	Material, housing	Brass, nickel-plated
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, front screen	Glass
Protection Class	2	Type of connection	See selection table
Power On Delay	≤ 300 ms	Ambient temperature: operation	-20 ... +60 °C
Switching output, Q	PNP	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (plug device)	60 g
Switching frequency, f (ti/tp 1:1)	600 Hz	Weight (cable device)	160 g
Connection, BK	N.O.		
Connection, WH	N.C.		

¹ Reference material: Kodak grey, 18 % reflectivity ² At scanning distance of 100 mm ³ 10 % ripple, within U_B ⁴ With connected IP 67 plug

Scanning distance	Light exit	Switching output	Type of connection	Part number	Article number
40 ... 120 mm	Straight	PNP, antivalent	Plug, M12, 4-pin	FMH 18-L4	518-51505
40 ... 120 mm	Straight	PNP, antivalent	Cable, 3 m, 4-wire	FMH 18	518-51504

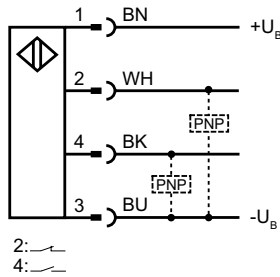
Accessories	
Connection cables	www.sensopart.com/en/accessories
Brackets	

Plug connection, FMH 18-L4



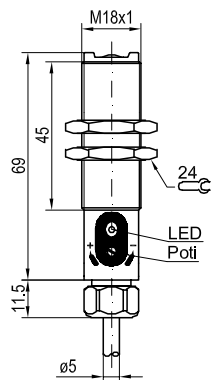
153-00029

Connection, 4-pin



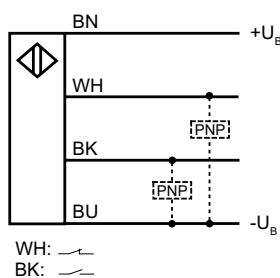
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Cable connection, FMH 18



153-00027

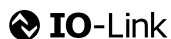
Connection, 4-wire



154-00193

FT 04

Photoelectric diffuse sensor



PRODUCT HIGHLIGHTS

- Smallest sensor format with IO-Link
- Diameter 4 mm
- Parameterisation via IO-Link (i.a. sensitivity, switching frequency, N.O. / N.C., teach-in)
- No mutual interference

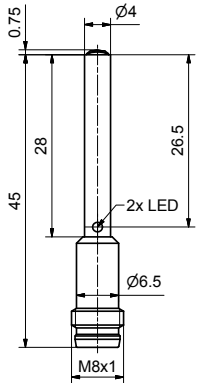
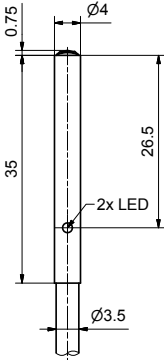
Optical data		Functions	
Maximum range	0 ... 60 mm ¹	Indicator LED, green	Switching state indicator
Scanning distance	0 ... 50 mm ¹	Indicator LED, yellow	Functional reserve indicator
Type of light	Red, 630 nm	Sensitivity adjustment	20 ... 60 mm, IO-Link
Light spot size	See diagram	IO-Link	1.0
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions (plug device)	Ø 4 x 45 mm
No-load current, I ₀	≤ 12 mA	Dimensions (cable device)	Ø 4 x 35 mm
Output current, I _e	≤ 100 mA	Enclosure rating	IP 67 ³
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, housing	Stainless steel, V2A
Power On Delay	120 ms	Material, front screen	PBT / PMMA
Switching output, Q	PNP max. 100 mA / high ≤ (U _B - 2.0V) / approx. 0V	Type of connection	See selection table
Output function	N.O. ² / N.C. ²	Ambient temperature: operation	-25 ... +65 °C
Switching frequency, f (ti/tp 1:1)	≤ 500 Hz / ≤ 1 kHz ² / ≤ 2,5 kHz	Ambient temperature: storage	-25 ... +65 °C
Response time ²	≤ 200 µs / ≤ 500 µs ² / ≤ 1 ms	Weight (plug device)	4 g
		Weight (cable device)	30 g
		Vibration and impact resistance	IEC 60947-5-2
IO-Link			
Communication mode	COM 2		
Min. cycletime	2.3 ms		
SIO mode	Compatible		
Length process data	2-bit input		
Specification	1.0		

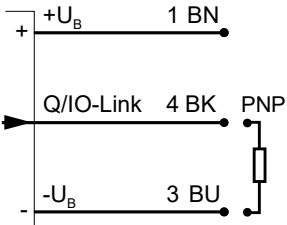
¹ Reference material: Kodak white, 90 % reflectivity

² Standard: N.O. / 1 kHz / 500 µs, further values parameterizable via IO-Link

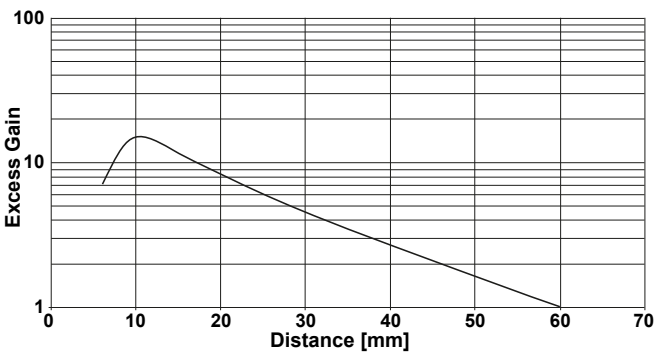
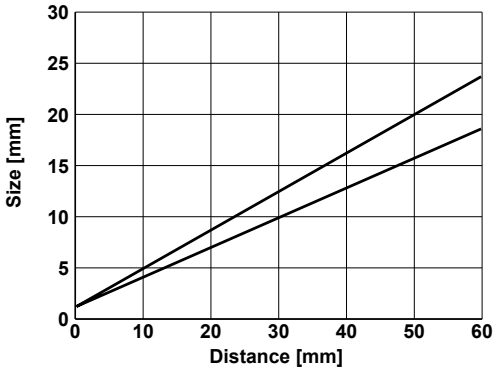
³ With connected IP 67 plug

Switching output	Type of connection	Part number	Article number
PNP / IO-Link	Plug, M8, 3-pin	FT 04 R-PSL-M3	719-21000
PNP / IO-Link	Cable, PUR, 3-wire, 2 m	FT 04 R-PSL-K3	719-21001

Plug connection	Cable connection
	

Connection, 3-pin, IO-Link


7

Functional reserves	Light spot size
	

Reference material	Scanning distance	Accessories
White (90 %)	50 mm	Connection cables
Grey (18 %)	30 mm	Brackets
Black (6 %)	12 mm	

www.sensopart.com/en/accessories

FT 05

Photoelectric diffuse sensor



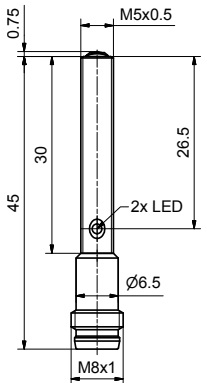
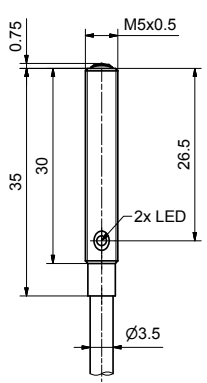
PRODUCT HIGHLIGHTS

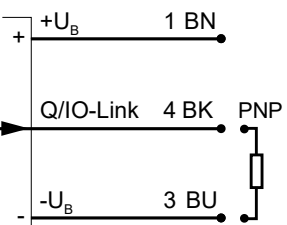
- Very small size with IO-Link
- Parameterisation via IO-Link (i.a. sensitivity, switching frequency, N.O. / N.C., teach-in)
- No mutual interference

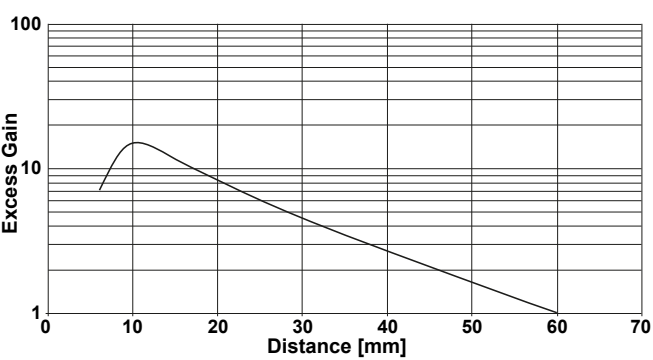
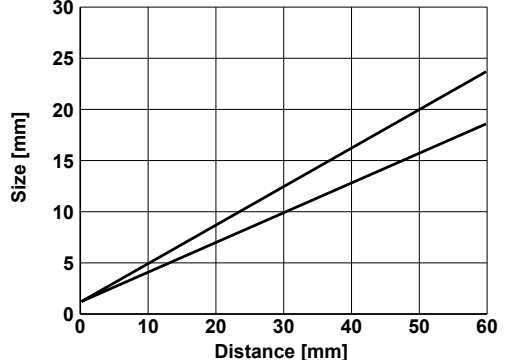
Optical data		Functions	
Maximum range	0 ... 60 mm ¹	Indicator LED, green	Switching state indicator
Scanning distance	0 ... 50 mm ¹	Indicator LED, yellow	Functional reserve indicator
Type of light	Red, 630 nm	Sensitivity adjustment	20 ... 60 mm, IO-Link
Light spot size	See diagram	IO-Link	1.0
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions (plug device)	M5 x 45 mm
No-load current, I ₀	≤ 12 mA	Dimensions (cable device)	M5 x 35 mm
Output current, I _e	≤ 100 mA	Enclosure rating	IP 67 ³
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, housing	Stainless steel, V2A
Power On Delay	120 ms	Material, front screen	PBT / PMMA
Switching output, Q	PNP max. 100 mA / high ≤ (U _B - 2.0V) / approx. 0V	Type of connection	See selection table
Output function	N.O. ² / N.C.	Ambient temperature: operation	-25 ... +65 °C
Switching frequency, f (ti/tp 1:1)	≤ 500 Hz / ≤ 1 kHz ² / ≤ 2,5 kHz	Ambient temperature: storage	-25 ... +65 °C
Response time ²	≤ 200 µs / ≤ 500 µs ² / ≤ 1 ms	Weight (plug device)	4 g
		Weight (cable device)	30 g
		Vibration and impact resistance	IEC 60947-5-2
IO-Link			
Communication mode	COM 2		
Min. cycletime	2.3 ms		
SIO mode	Compatible		
Length process data	2-bit input		
Specification	1.0		

¹ Reference material: Kodak white, 90 % reflectivity ² Standard: N.O. / 1 kHz / 500 µs, further values parameterizable via IO-Link ³ With connected IP 67 plug

Switching output	Type of connection	Part number	Article number
PNP / IO-Link	Plug, M8, 3-pin	FT 05 R-PSL-M3	719-21002
PNP / IO-Link	Cable, PUR, 3-wire, 2 m	FT 05 R-PSL-K3	719-21003

Plug connection	Cable connection
	

Connection, 3-pin, IO-Link


Functional reserves	Light spot size
	

Reference material	Scanning distance	Accessories
White (90 %)	50 mm	Connection cables
Grey (18 %)	30 mm	Brackets
Black (6 %)	12 mm	

www.sensopart.com/en/accessories

FT 05

Photoelectric diffuse sensor IR



PRODUCT HIGHLIGHTS

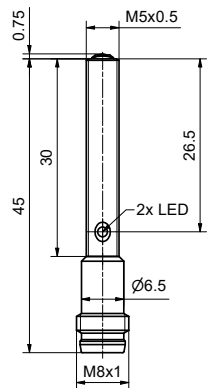
- Very small size: cylindrical housing M5
- Simple installation thanks to standard threads
- Infrared light

Optical data		Functions	
Maximum range	0 ... 60 mm ¹	Indicator LED, green	Switching state indicator
Scanning distance	0 ... 50 mm ¹	Indicator LED, yellow	Functional reserve indicator
Type of light	Infrared, 850 nm		
Light spot size	See diagram		
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions	M5 x 45 mm
No-load current, I ₀	≤ 12 mA	Enclosure rating	IP 67 ²
Output current, I _e	≤ 100 mA	Material, housing	Stainless steel, V2A
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, front screen	PBT / PMMA
Power On Delay	120 ms	Type of connection	See selection table
Switching output, Q	NPN max. 100 mA / high ≤ (U _B - 2.0V) / approx. 0V	Ambient temperature: operation	-25 ... +65 °C
Output function	N.O.	Ambient temperature: storage	-25 ... +65 °C
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight	4 g
Response time	≤ 500 µs	Vibration and impact resistance	IEC 60947-5-2

¹ Reference material: Kodak white, 90 % reflectivity ² With connected IP 67 plug

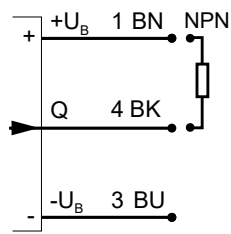
Switching output	Type of connection	Part number	Article number
NPN	Plug, M8, 3-pin	FT 05 IR-NS-M3	719-21004

Plug connection



153-13675

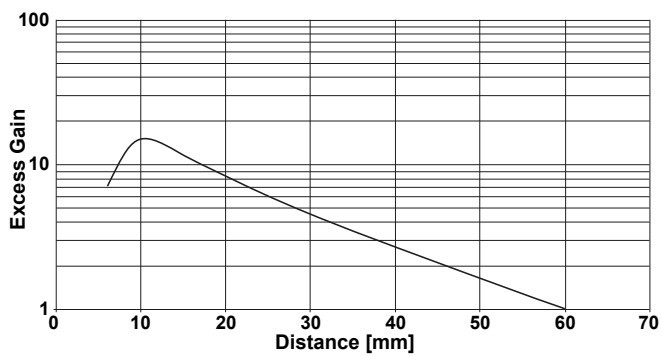
Connection, 3-pin



154-00591

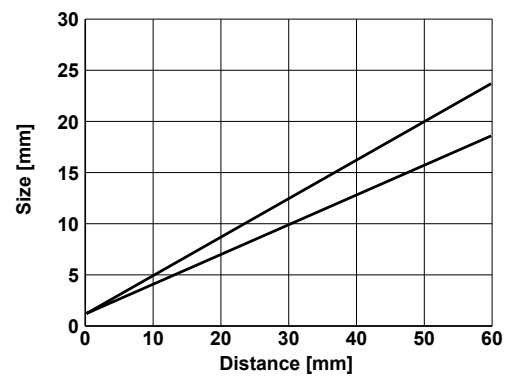
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Functional reserves



155-03319

Light spot size



155-03363

Reference material	Scanning distance	Accessories	
White (90 %)	50 mm	Connection cables	www.sensopart.com/en/accessories
Grey (18 %)	30 mm	Brackets	
Black (6 %)	12 mm		

FT 12 R

Photoelectric diffuse sensor



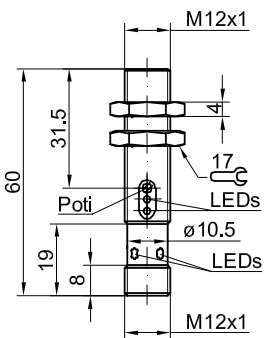
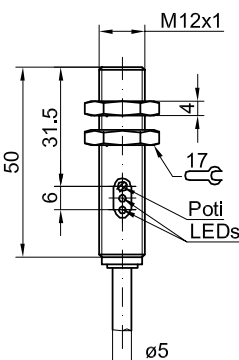
PRODUCT HIGHLIGHTS

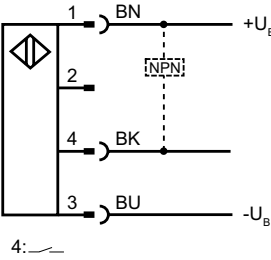
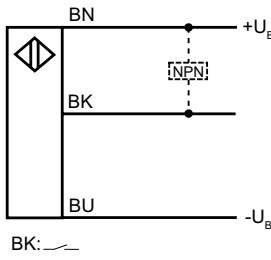
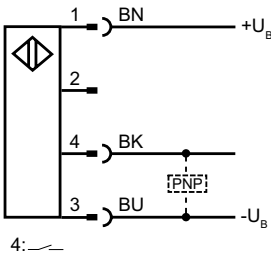
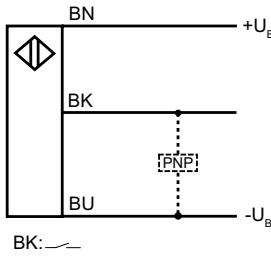
- Scanning distance: 1 ... 300 mm, adjustable
- Red light, 660 nm
- Easy installation thanks to standard M12 metal thread
- Functional reserve indicator

Optical data		Functions	
Scanning distance	1 ... 300 mm ¹	Indicator LED, green	Functional reserve indicator
Type of light	Red, 660 nm	Indicator LED, yellow	Switching state indicator
Light spot size	Ø 5 mm ²	Scanning distance adjustment	Via potentiometer
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 36 V DC	Dimensions (plug device)	M12 × 60 mm
No-load current, I ₀	≤ 15 mA	Dimensions (cable device)	M12 × 50 mm
Output current, I _e	≤ 200 mA	Enclosure rating	IP 67 ³
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, housing	Brass, chromium-plated
Protection Class	2	Material, front screen	Glass
Power On Delay	60 msec	Type of connection	See selection table
Switching output, Q	PNP/NPN / max. 200 mA	Ambient temperature: operation	-25 ... +55 °C
Output function	N.O.	Weight (plug device)	20 g
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (cable device)	100 g
Response time	≤ 500 µs	Vibration and impact resistance	IEC 60947-5-2

¹ Reference material: Kodak white, 90 % reflectivity ² At scanning distance of 10 mm ³ With connected IP 67 plug

Switching output	Type of connection	Part number	Article number
PNP	Plug, M12, 4-pin	FT 12 R-PSL4	701-21000
NPN	Plug, M12, 4-pin	FT 12 R-NSL4	701-21001
PNP	Cable, PVC, 3 × 0.34 mm ² , 2 m	FT 12 R-PSK3	701-21002
NPN	Cable, PVC, 3 × 0.34 mm ² , 2 m	FT 12 R-NSK3	701-21003

Plug connection	Cable connection
 153-00208	 153-00207

Connection, 4-pin	Connection, 3-pin
 154-00489	 154-00488
 154-00224	 154-00160

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

FT 18-2

Photoelectric diffuse sensor



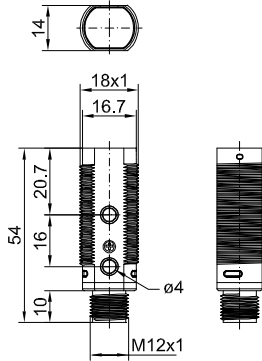
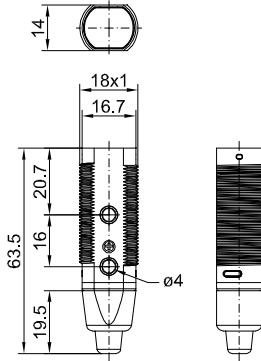
PRODUCT HIGHLIGHTS

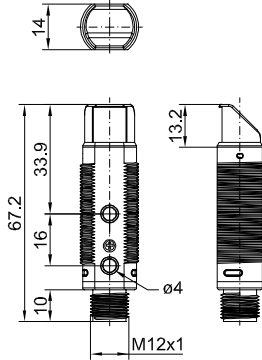
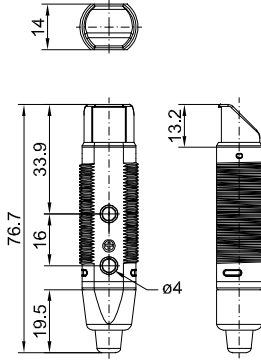
- Economical solution for numerous applications
- Scanning distance of up to 800 mm, adjustable via potentiometer
- Red light or infrared
- Variants with angled light exit
- Simple adjustment via potentiometer
- 2 through holes as additional mounting possibility

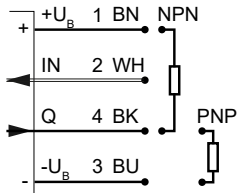
Optical data		Functions	
Scanning distance	See selection table	Indicator LED, green	Operating voltage indicator
Type of light	See selection table	Indicator LED, yellow	Switching output indicator
Light spot size	See selection table	Sensitivity adjustment	Via potentiometer
		Adjustment possibilities	N.O./N.C. via control input (IN)
		Default settings	Max. scanning distance and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 67 ¹
Output current, I _e	≤ 100 mA	Material, housing	Brass, nickel-plated
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, front screen	PMMA
Switching output, Q	PNP/NPN (see selection table)	Type of connection	See selection table
Output function	N.O./N.C.	Ambient temperature: operation	-25 ... +55 °C
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (plug device)	23 g ² / 25 g ³
Response time	≤ 1 ms	Weight (cable device)	63 g ² / 65 g ³
		Max. tightening torque	3 Nm

¹With connected IP 67 plug ²Straight light exit variant ³Angled light exit variant

Scanning distance	Type of light	Light exit	Switching output	Type of connection	Part number	Article number
0 ... 400 mm	Red light	Straight	PNP	Metal plug, M12, 4-pin	FT 18-2 RM-PS-L4	740-21021
0 ... 400 mm	Red light	Straight	NPN	Metal plug, M12, 4-pin	FT 18-2 RM-NS-L4	740-21022
0 ... 400 mm	Red light	Straight	PNP	Cable, 2 m, 4-wire	FT 18-2 RM-PS-K4	740-21023
0 ... 400 mm	Red light	Straight	NPN	Cable, 2 m, 4-wire	FT 18-2 RM-NS-K4	740-21024
0 ... 320 mm	Red light	90° angle	PNP	Metal plug, M12, 4-pin	FT 18-2 RWM-PS-L4	740-21025
0 ... 320 mm	Red light	90° angle	NPN	Metal plug, M12, 4-pin	FT 18-2 RWM-NS-L4	740-21026
0 ... 320 mm	Red light	90° angle	PNP	Cable, 2 m, 4-wire	FT 18-2 RWM-PS-K4	740-21027
0 ... 320 mm	Red light	90° angle	NPN	Cable, 2 m, 4-wire	FT 18-2 RWM-NS-K4	740-21028
0 ... 800 mm	Infrared	Straight	PNP	Metal plug, M12, 4-pin	FT 18-2 IDM-PS-L4	740-21029
0 ... 800 mm	Infrared	Straight	NPN	Metal plug, M12, 4-pin	FT 18-2 IDM-NS-L4	740-21030
0 ... 800 mm	Infrared	Straight	PNP	Cable, 2 m, 4-wire	FT 18-2 IDM-PS-K4	740-21031
0 ... 800 mm	Infrared	Straight	NPN	Cable, 2 m, 4-wire	FT 18-2 IDM-NS-K4	740-21032

Plug connection (straight)	Cable connection (straight)
 153-00985	 153-00984

Plug connection (angled)	Cable connection (angled)
 153-00987	 153-00986

Connection, 4-pin
 154-00508

Light spot size	Straight		90° angle	
Scanning distance (mm)	200	400	150	300
Light spot diameter (mm)	Ø 14	Ø 27	Ø 14	Ø 25

Scope of delivery	Accessories	
Sensor	Connection cables	www.sensopart.com/en/accessories
2 x securing nuts	Brackets	

FT 18-2

Photoelectric diffuse sensor



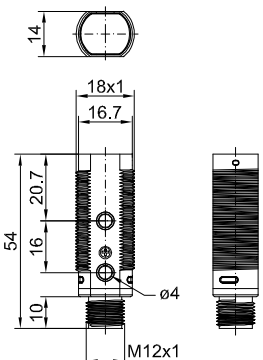
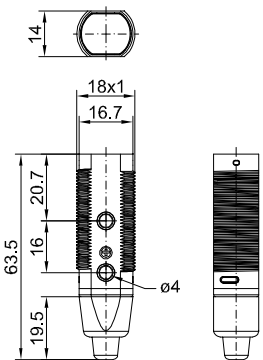
PRODUCT HIGHLIGHTS

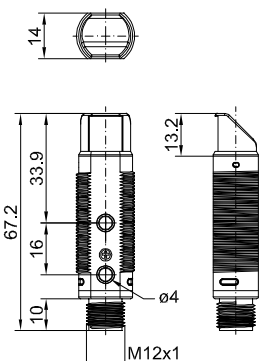
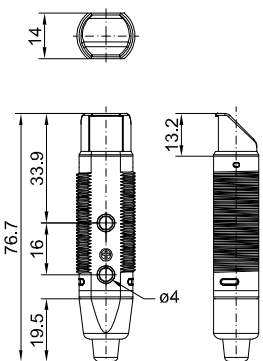
- Economical solution for numerous applications
- Scanning distance of up to 800 mm, adjustable via potentiometer
- Red light or infrared
- Variants with angled light exit
- Simple adjustment via potentiometer
- 2 through holes as additional mounting possibility

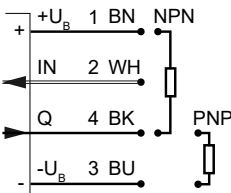
Optical data		Functions	
Scanning distance	See selection table	Indicator LED, green	Operating voltage indicator
Type of light	See selection table	Indicator LED, yellow	Switching output indicator
Light spot size	See selection table	Sensitivity adjustment	Via potentiometer
		Adjustment possibilities	N.O./N.C. via control input (IN)
		Default settings	Max. scanning distance and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 67 ¹
Output current, I _e	≤ 100 mA	Material, housing	ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, front screen	PMMA
Switching output, Q	PNP/NPN (see selection table)	Type of connection	See selection table
Output function	N.O./N.C.	Ambient temperature: operation	-25 ... +55 °C
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (plug device)	11 g ² / 13 g ³
Response time	≤ 1 ms	Weight (cable device)	55 g ² / 57 g ³
		Max. tightening torque	3 Nm

¹With connected IP 67 plug ²Straight light exit variant ³Angled light exit variant

Scanning distance	Type of light	Light exit	Switching output	Type of connection	Part number	Article number
0 ... 400 mm	Red light	Straight	PNP	Plug, M12, 4-pin	FT 18-2 R-PS-L4	740-21033
0 ... 400 mm	Red light	Straight	NPN	Plug, M12, 4-pin	FT 18-2 R-NS-L4	740-21034
0 ... 400 mm	Red light	Straight	PNP	Cable, 2 m, 4-wire	FT 18-2 R-PS-K4	740-21020
0 ... 400 mm	Red light	Straight	NPN	Cable, 2 m, 4-wire	FT 18-2 R-NS-K4	740-21035
0 ... 320 mm	Red light	90° angle	PNP	Plug, M12, 4-pin	FT 18-2 RW-PS-L4	740-21036
0 ... 320 mm	Red light	90° angle	NPN	Plug, M12, 4-pin	FT 18-2 RW-NS-L4	740-21037
0 ... 320 mm	Red light	90° angle	PNP	Cable, 2 m, 4-wire	FT 18-2 RW-PS-K4	740-21038
0 ... 320 mm	Red light	90° angle	NPN	Cable, 2 m, 4-wire	FT 18-2 RW-NS-K4	740-21039
0 ... 800 mm	Infrared	Straight	PNP	Plug, M12, 4-pin	FT 18-2 ID-PS-L4	740-21040
0 ... 800 mm	Infrared	Straight	NPN	Plug, M12, 4-pin	FT 18-2 ID-NS-L4	740-21041
0 ... 800 mm	Infrared	Straight	PNP	Cable, 2 m, 4-wire	FT 18-2 ID-PS-K4	740-21042
0 ... 800 mm	Infrared	Straight	NPN	Cable, 2 m, 4-wire	FT 18-2 ID-NS-K4	740-21043

Plug connection (straight)	Cable connection (straight)
	

Plug connection (angled)	Cable connection (angled)
	

Connection, 4-pin


Light spot size	Straight	90° angle
Scanning distance (mm)	200	400
Light spot diameter (mm)	Ø 14	Ø 27

Scope of delivery	Accessories
Sensor	Connection cables
2 x securing nuts	Brackets

FR 12 R

Photoelectric retro-reflective sensor



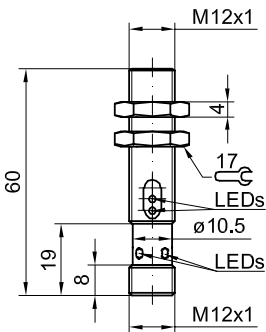
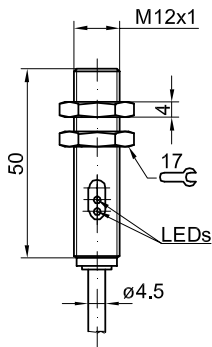
PRODUCT HIGHLIGHTS

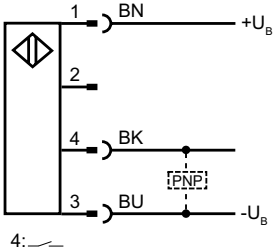
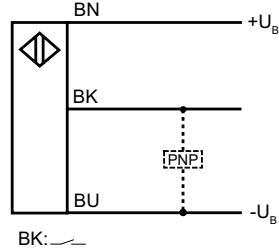
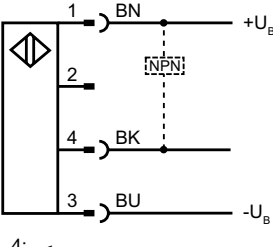
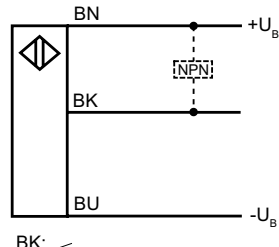
- Robust M12 metal housings with short mounting lengths
- Operating range: 60 ... 1500 mm
- Red light, 660 nm
- Switching state and functional reserve indicators

Optical data		Functions	
Scanning distance	60 ... 1500 mm ¹	Indicator LED, green	Functional reserve indicator
Type of light	Red, 660 nm	Indicator LED, yellow	Switching state indicator
Light spot size	Ø 10 mm ²	Scanning distance adjustment	Fixed setting
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 36 V DC	Dimensions (plug device)	M12 × 60 mm
No-load current, I ₀	≤ 15 mA	Dimensions (cable device)	M12 × 50 mm
Output current, I _e	≤ 200 mA	Enclosure rating	IP 67 ³
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, housing	Brass, chromium-plated
Protection Class	2	Material, front screen	Glass
Power On Delay	20 msec	Type of connection	See selection table
Switching output, Q	PNP/NPN / max 200 mA	Ambient temperature: operation	-25 ... +55 °C
Output function	N.O.	Weight (plug device)	20 g
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (cable device)	100 g
Response time	≤ 500 µs	Vibration and impact resistance	IEC 60947-5-2

¹ Reference material: RD8 reflector; Ø 84 mm ² At scanning distance of 50 mm ³ With connected IP 67 plug

Switching output	Type of connection	Part number	Article number
PNP	Plug, M12, 4-pin	FR 12 R-PSL4	703-11000
NPN	Plug, M12, 4-pin	FR 12 R-NSL4	703-11001
PNP	Cable, PVC, 3 × 0.34 mm ² , 2 m	FR 12 R-PSK3	703-11002
NPN	Cable, PVC, 3 × 0.34 mm ² , 2 m	FR 12 R-NSK3	703-11003

Plug connection	Cable connection
 153-00250	 153-00249

Connection, 4-pin	Connection, 3-pin
 154-00224	 154-00160
 154-00489	 154-00488

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

FR 18-2

Photoelectric retro-reflective sensor



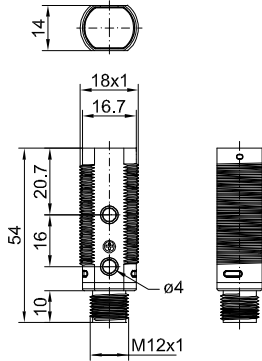
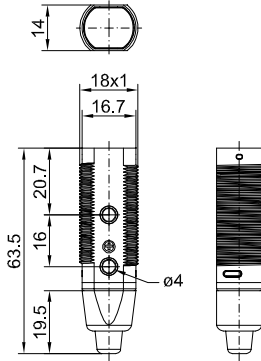
PRODUCT HIGHLIGHTS

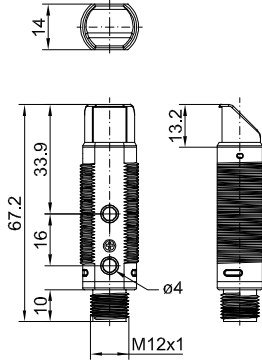
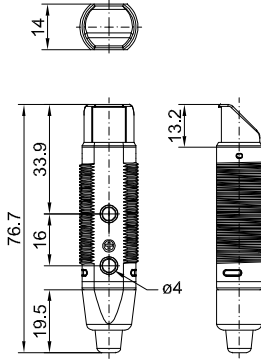
- Economical solution for numerous applications
- Range of up to 3.0 m
- Variants with angled light exit
- Polarisation filter for reliable detection of highly reflective surfaces
- Simple adjustment via potentiometer
- 2 through holes as additional mounting possibility

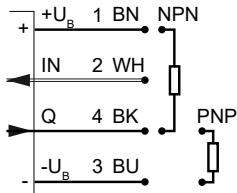
Optical data		Functions	
Operating range	See selection table ¹	Indicator LED, green	Operating voltage indicator
Type of light	See selection table	Indicator LED, yellow	Switching output indicator
Polarising filter	Yes	Sensitivity adjustment	Via potentiometer
		Adjustment possibilities	N.O./N.C. via control input (IN)
		Default settings	Max. scanning distance and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 67 ²
Output current, I _e	≤ 100 mA	Material, housing	Brass, nickel-plated
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, front screen	PMMA
Switching output, Q	PNP/NPN (see selection table)	Type of connection	See selection table
Output function	N.O./N.C.	Ambient temperature: operation	-25 ... +55 °C
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (plug device)	34 g ³ / 36 g ⁴
Response time	≤ 1 ms	Weight (cable device)	74 g ³ / 76 g ⁴
		Max. tightening torque	3 Nm

¹ Reference material: R5 reflector ² With connected IP 67 plug ³ Straight light exit variant ⁴ Angled light exit variant

Operating range	Type of light	Light exit	Switching output	Type of connection	Part number	Article number
3.0 m	Red light	Straight	PNP	Metal plug, M12, 4-pin	FR 18-2 RM-PS-L4	741-11014
3.0 m	Red light	Straight	NPN	Metal plug, M12, 4-pin	FR 18-2 RM-NS-L4	741-11015
3.0 m	Red light	Straight	PNP	Cable, 2 m, 4-wire	FR 18-2 RM-PS-K4	741-11016
3.0 m	Red light	Straight	NPN	Cable, 2 m, 4-wire	FR 18-2 RM-NS-K4	741-11017
2.4 m	Red light	90° angle	PNP	Metal plug, M12, 4-pin	FR 18-2 RWM-PS-L4	741-11018
2.4 m	Red light	90° angle	NPN	Metal plug, M12, 4-pin	FR 18-2 RWM-NS-L4	741-11019
2.4 m	Red light	90° angle	PNP	Cable, 2 m, 4-wire	FR 18-2 RWM-PS-K4	741-11020
2.4 m	Red light	90° angle	NPN	Cable, 2 m, 4-wire	FR 18-2 RWM-NS-K4	741-11021

Plug connection (straight)	Cable connection (straight)
	

Plug connection (angled)	Cable connection (angled)
	

Connection, 4-pin


Scope of delivery	Accessories
Sensor Reflector: 53.4 x 53.4 mm ² 2 x securing nuts	Reflectors Connection cables Brackets

FR 18-2

Photoelectric retro-reflective sensor



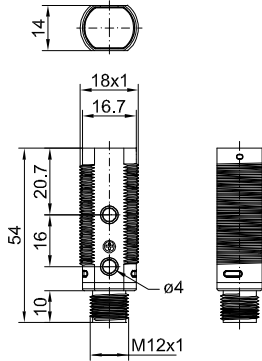
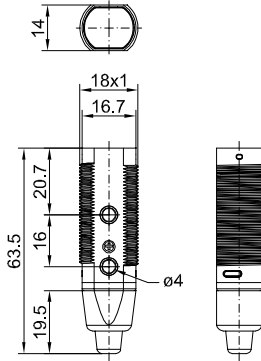
PRODUCT HIGHLIGHTS

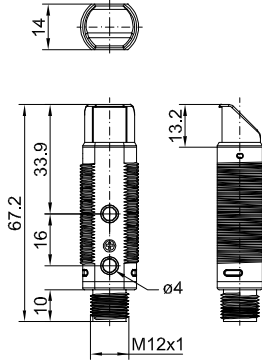
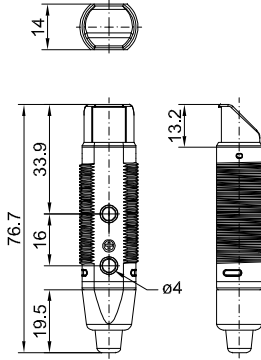
- Economical solution for numerous applications
- Range of up to 3.60 m
- Variants with angled light exit
- Simple adjustment via potentiometer
- 2 through holes as additional mounting possibility

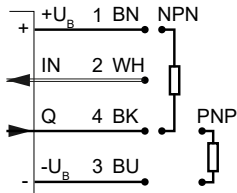
Optical data		Functions	
Operating range	See selection table ¹	Indicator LED, yellow	Switching output indicator
Type of light	See selection table	Sensitivity adjustment	Via potentiometer
Polarising filter	No	Adjustment possibilities	N.O./N.C. via control input (IN)
		Default settings	Max. scanning distance and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 67 ²
Output current, I _e	≤ 100 mA	Material, housing	ABS
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, front screen	PMMA
Switching output, Q	PNP/NPN (see selection table)	Type of connection	See selection table
Output function	N.O./N.C.	Ambient temperature: operation	-25 ... +55 °C
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (plug device)	11 g ³ / 13 g ⁴
Response time	≤ 1 ms	Weight (cable device)	55 g ³ / 57 g ⁴
		Max. tightening torque	3 Nm

¹ Reference material: R5 reflector ² With connected IP 67 plug ³ Straight light exit variant ⁴ Angled light exit variant

Operating range	Type of light	Light exit	Switching output	Type of connection	Part number	Article number
3.6 m	Infrared	Straight	PNP	Plug, M12, 4-pin	FR 18-2 I-PS-L4	741-11022
3.6 m	Infrared	Straight	NPN	Plug, M12, 4-pin	FR 18-2 I-NS-L4	741-11023
3.6 m	Infrared	Straight	PNP	Cable, 2 m, 4-wire	FR 18-2 I-PS-K4	741-11024
3.6 m	Infrared	Straight	NPN	Cable, 2 m, 4-wire	FR 18-2 I-NS-K4	741-11025
2.5 m	Infrared	90° angle	PNP	Plug, M12, 4-pin	FR 18-2 IW-PS-L4	741-11026
2.5 m	Infrared	90° angle	NPN	Plug, M12, 4-pin	FR 18-2 IW-NS-L4	741-11027
2.5 m	Infrared	90° angle	PNP	Cable, 2 m, 4-wire	FR 18-2 IW-PS-K4	741-11028
2.5 m	Infrared	90° angle	NPN	Cable, 2 m, 4-wire	FR 18-2 IW-NS-K4	741-11029

Plug connection (straight)	Cable connection (straight)
	

Plug connection (angled)	Cable connection (angled)
	

Connection, 4-pin


Scope of delivery	Accessories
Sensor Reflector: 53.4 x 53.4 mm ² 2 x securing nuts	Reflectors Connection cables Brackets

FS/FE 12 RL

Laser photoelectric through-beam sensor



PRODUCT HIGHLIGHTS

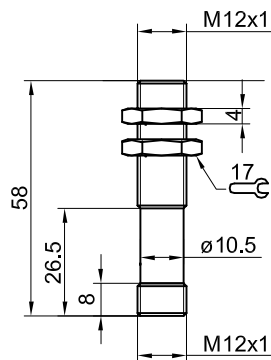
- Fine, parallel light beam
- Small part detection to 0.2 mm at a max. distance of 1 m
- Simple installation thanks to standard M12 metal thread
- Control line for setting of 3 sensitivity levels
- Test input

Optical data		Functions	
Range	0 ... 5 m	Indicator LED, yellow	Switching state indicator
Type of light	Laser, red, 650 nm	Sensitivity adjustment	Via control line
Laser Class (IEC 60825-1)	1		
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions	M12 × 58 mm
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 67 ²
Output current, I _e	≤ 100 mA	Material, housing	Brass, nickel-plated
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	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 (see selection table)	Ambient temperature: storage	-20 ... +80 °C
Output function	N.O./N.C.	Weight (transmitter / receiver)	30 g
Switching frequency, f (ti/tp 1:1)	10 kHz		
Control input, Test, transmitter	-U _B : transmitter = off +U _B or Open: transmitter = on		
Control input, Gain, receiver ¹	1 Open= medium sensitivity 2 -U _B = high sensitivity 3 +U _B = low sensitivity		

¹ Change in Gain setting is only effective after renewed switch on / switch off ² With connected IP 67 plug

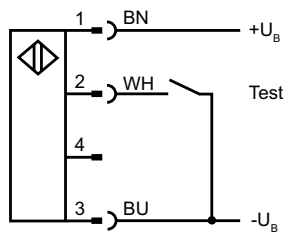
Transmitter / receiver	Switching output	Type of connection	Part number	Article number
Receiver	PNP N.O.	Plug, M12, 4-pin	FE 12 RL-PS-L4	580-51402
Receiver	PNP N.C.	Plug, M12, 4-pin	FE 12 RL-PO-L4	580-51403
Receiver	NPN N.C.	Plug, M12, 4-pin	FE 12 RL-NS-L4	580-51405
Transmitter	—	Plug, M12, 4-pin	FS 12 RL-L4	580-51401

Plug connection (transmitter / receiver)



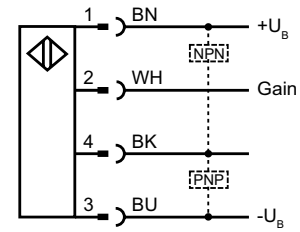
153-00345

Connection, transmitter, 4-pin



154-00171

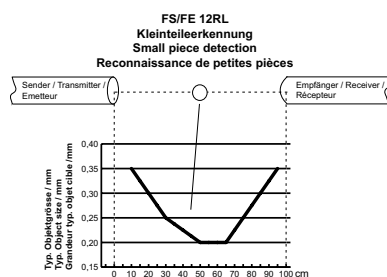
Connection, receiver, 4-pin: PNP/NPN



154-00265

7

Small part detection



155-00215

Accessories

Connection cables
Brackets

www.sensopart.com/en/accessories

FSE 18-2

Photoelectric through-beam sensor



PRODUCT HIGHLIGHTS

- Economical solution for numerous applications
- Long range of up to 10 m
- Simple adjustment via potentiometer
- 2 through holes as additional mounting possibility

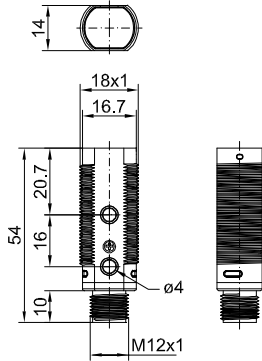
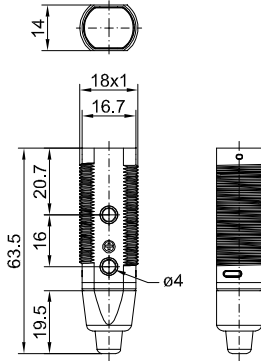
Optical data		Functions	
Operating range	10 m	Indicator LED, green	Operating voltage indicator
Type of light	See selection table	Indicator LED, yellow	Switching output indicator
		Sensitivity adjustment	Via potentiometer
		Adjustment possibilities	N.O./N.C. via control input (IN)
		Default settings	Max. scanning distance and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 67 ¹
Output current, I _e	≤ 100 mA	Material, housing	Brass, nickel-plated
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Material, front screen	PMMA
Switching output, Q	PNP/NPN (see selection table)	Type of connection	See selection table
Output function	N.O./N.C.	Ambient temperature: operation	-25 ... +55 °C
Switching frequency, f (ti/tp 1:1)	≤ 400 Hz	Weight (plug device)	46 g
Response time	≤ 2.5 ms	Weight (cable device)	130 g
Control input, IN	+U _B = Test (transmitter off) -U _B / open = normal operation	Max. tightening torque	3 Nm

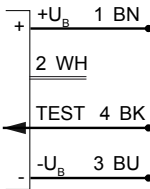
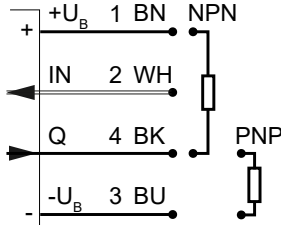
¹ With connected IP 67 plug

Transmitter / receiver	Type of light	Light exit	Switching output	Type of connection	Part number	Article number
Transmitter / receiver	Infrared	Straight	PNP	Metal plug, M12, 4-pin	FSE 18-2 IM-PS-L4	742-51004
Transmitter / receiver	Infrared	Straight	NPN	Metal plug, M12, 4-pin	FSE 18-2 IM-NS-L4	742-51005
Transmitter / receiver	Infrared	Straight	PNP	Cable, 2 m, 4-wire	FSE 18-2 IM-PS-K4	742-51006
Transmitter / receiver	Infrared	Straight	NPN	Cable, 2 m, 4-wire	FSE 18-2 IM-NS-K4	742-51007

Scope of delivery

Transmitter & receiver
2 x securing nuts

Plug connection	Cable connection
 153-00985	 153-00984

Connection, 4-pin (transmitter)	Connection, 4-pin (receiver)
 154-00516	 154-00508

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

FS/FE 18 RL

Through-beam laser sensor



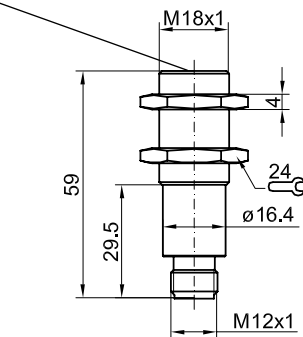
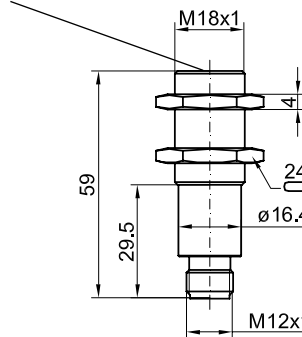
PRODUCT HIGHLIGHTS

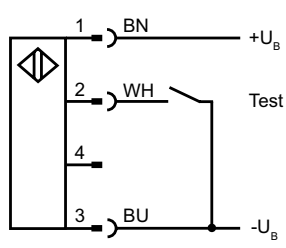
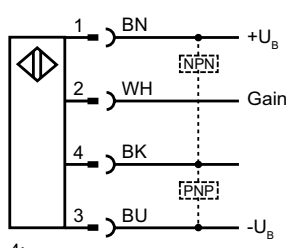
- Operating range: 50 m
- Small housings
- Red light laser, 650 nm
- Control line for setting of 3 sensitivity levels
- Test input

Optical data		Functions	
Operating range	0 ... 50 m	Indicator LED, yellow	Switching output indicator
Type of light	Laser, pulsed, red, 650 nm	Sensitivity adjustment	Via control line
Laser Class (IEC 60825-1)	1		
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions (plug device)	M18x1 x 59 mm
No-load current, I ₀	≤ 30 mA	Enclosure rating	IP 67 ²
Output current, I _e	≤ 100 mA	Material, housing	Brass, nickel-plated
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	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 (transmitter / receiver)	70 g
Output function	N.O.		
Switching frequency, f (ti/tp 1:1)	≤ 10000 Hz		
Response time	50 µs		
Control input, Test	Test input (transmitter) -U _B : transmitter = off +U _B or Open: transmitter = on		
Control input, Gain	Open: medium sensitivity – medium distance ¹ -U _B : high sensitivity – high distance ¹ +U _B : low sensitivity – low distance		

¹ Change in Gain setting is only effective after renewed switch on / switch off ²With connected IP 67 plug

Transmitter / receiver	Switching output	Type of connection	Part number	Article number
Receiver	PNP	Plug, M12x1, 4-pin	FE 18 RL-PS-L4	580-51400
Receiver	NPN	Plug, M12x1, 4-pin	FE 18 RL-NS-L4	580-51399
Transmitter	–	Plug, M12x1, 4-pin	FS 18 RL-L4	580-51398

Plug connection (transmitter)	Plug connection (receiver)
Laser exit aperture  153-00351	Yellow LED: ON = light path free  153-00351

Connection, 4-pin (transmitter)	Connection, 4-pin (receiver)
 154-00171	 154-00265

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

FLS 18W / FLE 18W

Through-beam laser sensor



PRODUCT HIGHLIGHTS

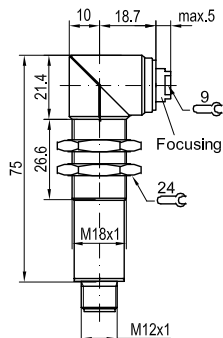
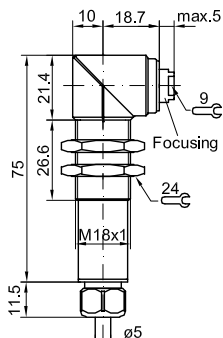
- Operating range: 50 m
- Red light laser, 650 nm
- Transmitter beam can be focused according to application
- Accuracy adjustable via beam spot size
- Smallest detectable part: 0.03 mm
- Switching frequency, 6000 Hz
- Metal M18 threaded sleeve

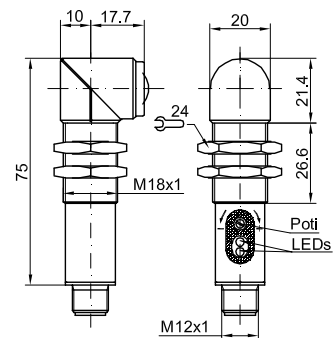
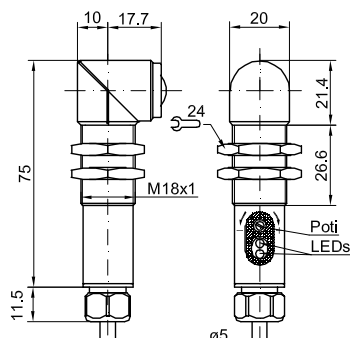
Optical data		Functions	
Operating range	0 ... 50 m	Indicator LED, green	Operating voltage indicator
Type of light	Laser, red, 650 nm	Indicator LED, yellow	Switching output indicator
Laser Class (IEC 60825-1)	1	Indicator LED, red	Contamination indicator
		Sensitivity adjustment	Via 18-step potentiometer
		Default settings	Max. operating range
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ¹	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 25 mA	Enclosure rating	IP 65 ²
Output current, I _e	≤ 200 mA	Material, housing	Brass, nickel-plated
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Type of connection	See selection table
Protection Class	2	Ambient temperature: operation	-10 ... +50 °C
Power On Delay	≤ 300 ms	Ambient temperature: storage	-20 ... +80 °C
Switching output, Q	PNP	Weight (plug device)	85 g
Output function	N.O./N.C. (see selection table)	Weight (cable device)	190 g
Switching frequency, f (ti/tp 1:1)	≤ 6000 Hz		
Response time	83 μs		
Control input, Test	< 2V: transmitter off > 10V or Open: transmitter on		

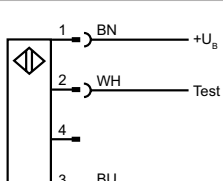
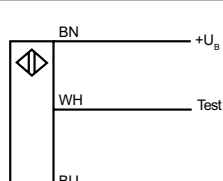
¹ 10 % ripple, within U_B ²With connected IP 65 plug

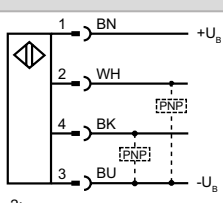
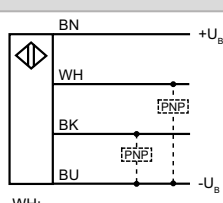
Transmitter / receiver	Switching output	Type of connection	Part number	Article number
Transmitter	–	Plug, M12x1, 4-pin	FLS 18W-L4	580-51408
Receiver	PNP (N.O./N.C.)	Plug, M12x1, 4-pin	FLE 18W-L4	580-51414
Receiver	PNP (N.C.)	Plug, M12x1, 4-pin	FLE 18W-L4-15	580-51415
Transmitter	–	Cable, 3 m, 4-wire	FLS 18W	580-51409
Receiver	PNP (N.O./N.C.)	Cable, 3 m, 4-wire	FLE 18W	580-51416
Receiver	PNP (N.C.)	Cable, 3 m, 4-wire	FLE 18W-15	580-51417

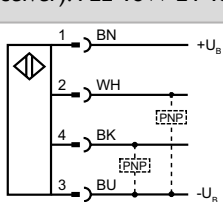
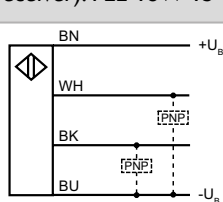
Accessories	
Connection cables	www.sensopart.com/en/accessories
Brackets	

Plug connection (transmitter): FLS 18W-L4	Cable connection, (transmitter): FLS 18W
	

Plug connection (receiver): FLE 18W-L4 / FLE 18W-L4-15	Cable connection, (receiver): FLE 18W / FLE 18W-15
	

Connection, 4-pin (transmitter)	Connection, 4-wire (transmitter)
	

Connection, 4-pin (receiver): FLE 18W	Connection, 4-wire (receiver): FLE 18W
	

Connection, 4-pin (receiver): FLE 18W-L4-15	Connection, 4-wire (receiver): FLE 18W-15
	

FLS 18WM / FLE 18WM

Through-beam laser sensor with air tube



CE

IP 65



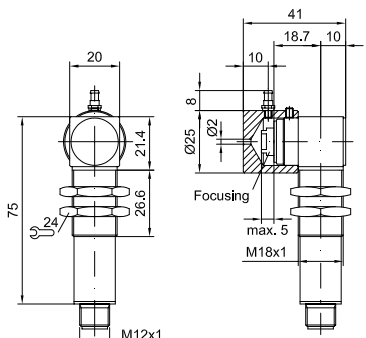
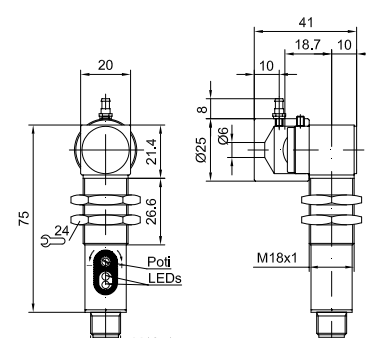
PRODUCT HIGHLIGHTS

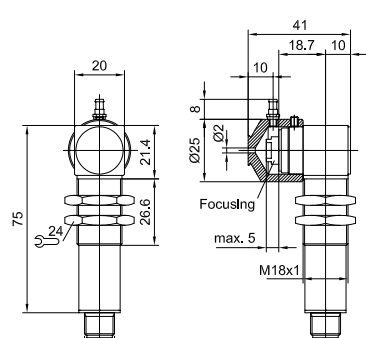
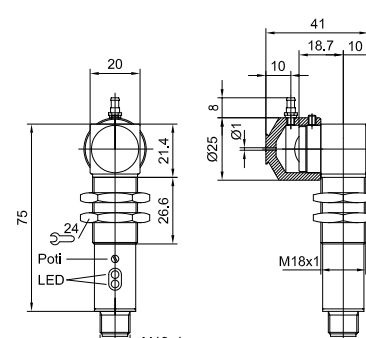
- Ideal for drill breakage control
- Air tube prevents malfunction
- Easily visible and focusable laser light spot
- Minimum detectable drill 1 mm
- High switching frequency, 6000 Hz

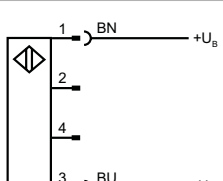
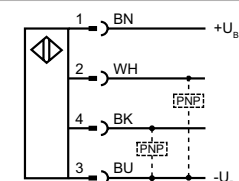
Optical data		Functions	
Operating range	< 5 m	Indicator LED, green (receiver FLE)	Operating voltage indicator
Type of light	Laser, red, 650 nm	Indicator LED, yellow (receiver FLE)	Switching output indicator
Laser Class (IEC 60825-1)	1	Indicator LED, red (receiver FLE)	Contamination indicator
Max. resolution	0.3 mm	Sensitivity adjustment	Via 18-step potentiometer
		Default settings	Max. operating range
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ¹	Dimensions	See dimensional drawings
No-load current, I ₀ (transmitter FLS)	≤ 10 mA	Enclosure rating	IP 65 ³
No-load current, I ₀ (receiver FLE)	≤ 15 mA	Material, housing	Brass, nickel-plated
Output power (transmitter FLS)	< 1 mW	Material air tube	Aluminium, black anodized
Output current, I _e (receiver FLE)	≤ 200 mA	Type of connection	Plug, M12x1, 4-pin
Voltage drop at signal output (receiver)	≤ 2,4V	Connection air tube	Tube, inside Ø-3 mm
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Ambient temperature: operation (transmitter FLS)	-10 ... +50 °C
Protection Class	2 ²	Ambient temperature: operation (receiver FLE)	-10 ... +60 °C
Power On Delay	≤ 300 ms	Ambient temperature: storage	-20 ... +80 °C
Switching output, Q	PNP, antivalent	Weight	approx. 85 g
Output function	N.O./N.C.		
Switching frequency, f (ti/tp 1:1)	≤ 6000 Hz		
Response time/drop-out delay (transmitter)	83 µs		
Connection BK	N.C.		
Connection WH	Contamination output: N. O.		

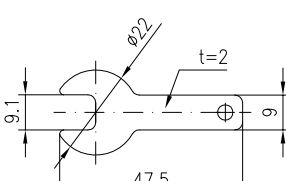
¹ Max. 10 % ripple, within U_B ² U_{imp} = 500V ³ With connected IP 65 plug

Transmitter / receiver	Switching output	Type of connection	Part number	Article number
Receiver	PNP, antivalent	Plug, M12x1, 4-pin	FLE 18WM-L4-X01	580-51440
Transmitter	—	Plug, M12x1, 4-pin	FLS 18WM-L4-X01	580-51439
Receiver	PNP, antivalent	Plug, M12x1, 4-pin	FLE 18WM-L4-X02	580-51447
Transmitter	—	Plug, M12x1, 4-pin	FLS 18WM-L4-X02	580-51446

Plug connection (transmitter): FLS 18WM-L4-X01	Plug connection, (receiver): FLE 18WM-L4-X01
 153-00769	 153-00770

Plug connection (transmitter): FLS 18WM-L4-X02	Plug connection, (receiver): FLE 18WM-L4-X02
 153-00767	 153-00768

Connection, 4-pin (transmitter)	Connection, 4-pin (receiver)
 154-00455	 154-00464

Focus key
 154-01124

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

FLS 18 / FLE 18

Through-beam laser sensor



PRODUCT HIGHLIGHTS

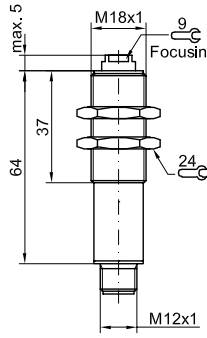
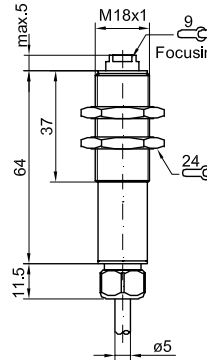
- Operating range: 50 m
- Red light laser, 650 nm
- Transmitter beam can be focused according to application
- Accuracy adjustable via beam spot size
- Smallest detectable part: 0.03 mm
- Switching frequency, 6000 Hz
- Metal M18 threaded sleeve

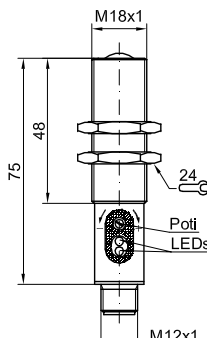
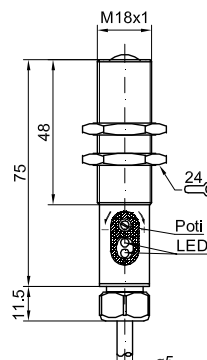
Optical data		Functions	
Operating range	0 ... 50 m	Indicator LED, green	Operating voltage indicator
Type of light	Laser, red, 650 nm	Indicator LED, yellow	Switching output indicator
Laser Class (IEC 60825-1)	1	Indicator LED, red	Contamination indicator
		Sensitivity adjustment	Via 18-step potentiometer
		Default settings	Max. operating range
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ¹	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 25 mA	Enclosure rating	IP 65 ²
Output current, I _e	≤ 200 mA	Material, housing	Brass, nickel-plated
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Type of connection	See selection table
Protection Class	2	Ambient temperature: operation	-10 ... +50 °C
Power On Delay	≤ 300 ms	Ambient temperature: storage	-20 ... +80 °C
Switching output, Q	PNP	Weight (plug device)	85 g
Output function	N.O./N.C. (see selection table)	Weight (cable device)	190 g
Switching frequency, f (ti/tp 1:1)	≤ 6000 Hz		
Response time	83 μs		
Control input, Test	< 2V: transmitter off > 10V or Open: transmitter on		

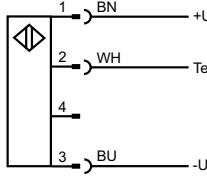
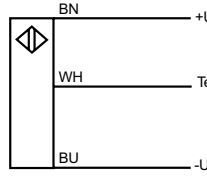
¹ 10 % ripple, within U_B ²With connected IP 65 plug

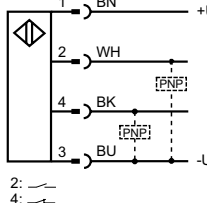
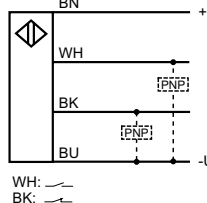
Transmitter / receiver	Switching output	Type of connection	Part number	Article number
Transmitter	–	Plug, M12x1, 4-pin	FLS 18-L4	580-51406
Receiver	PNP (N.O./N.C.)	Plug, M12x1, 4-pin	FLE 18-L4	580-51410
Receiver	PNP (N.C.)	Plug, M12x1, 4-pin	FLE 18-L4-15	580-51411
Transmitter	–	Cable, 3 m, 4-wire	FLS 18	580-51407
Receiver	PNP (N.O./N.C.)	Cable, 3 m, 4-wire	FLE 18	580-51412
Receiver	PNP (N.C.)	Cable, 3 m, 4-wire	FLE 18-15	580-51413

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

Plug connection (transmitter): FLS 18-L4	Cable connection, (transmitter): FLS 18
	

Plug connection (receiver): FLE 18-L4 / FLE 18-L4-15	Cable connection, (receiver): FLE 18 / FLE 18-15
	

Connection, 4-pin (transmitter)	Connection, 4-wire (transmitter)
	

Connection, 4-pin (receiver): FLE 18-L4	Connection, 4-wire (receiver): FLE 18
	

Connection, 4-pin (receiver): FLE 18-L4-15	Connection, 4-wire (receiver): FLE 18-15
