

F 04/05/12/18/30 – photoelectric sensors and diffuse sensors in barrel type housings

All-round performance




















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 04/05/12/18/30 series differ in the diameter of the integrated metal threaded sleeve (4, 5, 12, 18 or 30 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 04/05/12/18/30

- Robust housings
- Very easy installation
- Straight or angled optics options
- Metric threads in 5 sizes: 4, 5, 12, 18 or 30 mm
- Red-light / infrared LED or laser light options
- FMF 18 for detection of liquid limit levels
- FT 04 and FT 05 the smallest sensors with IO-Link

F 04/05/12/18/30 – Product Overview					
	Type of light	Adjustment	Scanning distance / range	Special features	Page
Photoelectric diffuse sensors with background suppression					
FT 12 RH	Red	Teach-in 	10 ... 60 mm	M12 housing, dynamic teach-in	490
FMH 18	Red	Potentiometer 	40 ... 120 mm	M18 housing, very precise detection	492
FT 12 RF	Red	None	24 mm	M12 housing	494
Photoelectric diffuse sensors					
FT 04	Red	IO-Link 	10 ... 50 mm	Smallest sensor format Ø 4 mm with IO-Link	498
FT 05	Red	IO-Link 	10 ... 50 mm	Smallest sensor format M5 with IO-Link	496
FT 12 R	Red	Potentiometer 	1 ... 300 mm		500
FT 18-2	Red / infrared	Potentiometer 	0 ... 800 mm	M18 metal housing	502
FT 18-2	Red / infrared	Potentiometer 	0 ... 800 mm	M18 plastic housing	504
FMS 18-34 B	Infrared	Potentiometer 	5 ... 400 mm	M18 housing	506
FMS 30-34 B	Infrared	Potentiometer 	5 ... 1000 mm	M30 housing, long operating range	508
Photoelectric retro-reflective sensors					
FR 12 R	Red	Potentiometer 	60 ... 1500 mm	M12 housing	510
FR 18-2	Red	Potentiometer 	3.0 m	M18 metal housing	512
FR 18-2	Infrared	Potentiometer 	3.6 m	M18 plastic housing	514
Photoelectric through-beam sensors					
FS/FE 12 RL	Laser 	Control line	0 ... 5 m	M12 housing	516
FSE 18-2	Infrared		10 m	M18 housing	518
FS/FE 18 RL	Laser 	Control line	0 ... 50 m	M18 housing	520
FL 18 W	Laser 	Potentiometer 	0 ... 50 m	M18 housing, adjustable transmission beam size	522
FL 18 WM	Laser 	Potentiometer 	0 ... 5 m	air tube prevents malfunction	524
FL 18	Laser 	Potentiometer 	0 ... 50 m	M18 housing, adjustable transmission beam size	526
Filling level sensor					
FMF 18-34	Infrared	Fixed		M18 housing, detection of liquids	528

FT 12 RH

Photoelectric diffuse sensor with background suppression



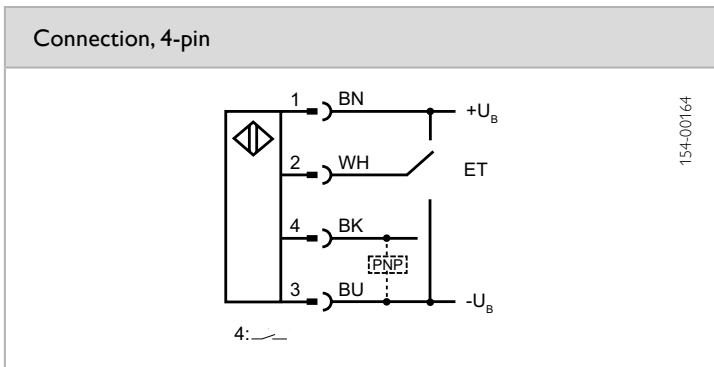
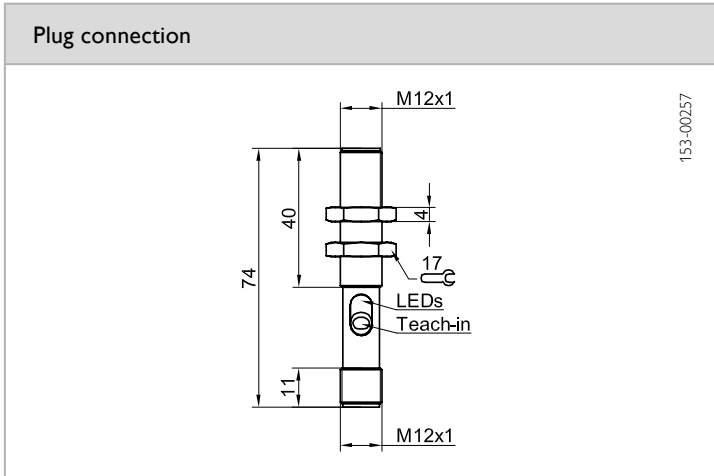
PRODUCT HIGHLIGHTS

- Adjustable background suppression
- Dynamic teach-in via button / control line without machine stoppage
- Lockable Teach-in button

Optical data		Functions	
Scanning distance	10 ... 60 mm ¹	Indicator LED, green	Stability indicator
Type of light	Red, 660 nm	Indicator LED, yellow	Switching state indicator
Light spot size	5 x 5 mm ²	Scanning distance adjustment	Via Teach-in button and control input
Grey value shift (90 % white / 18 % grey)	< 6 %	Adjustment possibilities	Control line for setting or locking N.O./N.C. selectable
		Default settings	Max. scanning distance, PNP and N.O.
Electrical data		Mechanical data	
Operating voltage, +U _b	10 ... 30V DC	Dimensions (cable devices)	M12 x 74 mm
No-load current, I ₀	≤ 25 mA	Enclosure rating	IP 67 ³
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
Switching output, Q	PNP	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)	1000 Hz	Weight (plug device)	30 g
Response time	≤ 500 μs		
Control input, ET	+U _b = teach-in -U _b = button locked Open = normal operation		

¹ Reference material: Kodak white, 90 % reflectivity ² At scanning distance of 50 mm ³ With connected IP 67 plug

Type of connection	Part number	Article number
Plug, M12x1, 4-pin	FT 12 RH-PSL4	506-11000



Accessories

Connection cables	From Page A-46
Brackets	From Page A-4

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

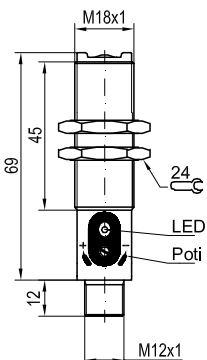
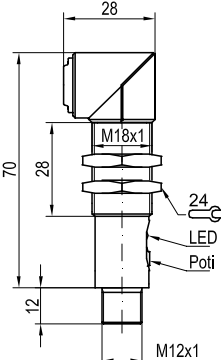
Optical data		Functions	
Scanning distance	40 ... 120 mm ¹	Indicator LED, yellow	Switching state indicator
Type of light	Red, 660 nm	Scanning distance adjustment	Via 18-step potentiometer
Light spot size	8 x 10 mm ²		
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ³	Dimensions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

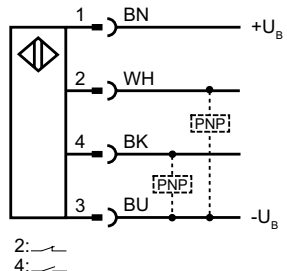
¹ Reference material: Kodak grey, 18 % reflectivity ² At scanning distance of 100 mm ³ 10 % ripple, within U_B ⁴ With connected IP 67 plug

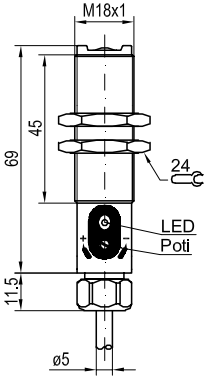
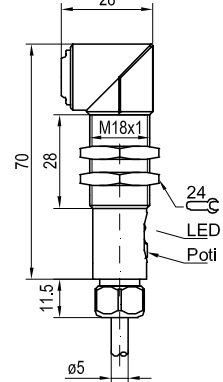
Scanning distance	Light exit	Switching output	Type of connection	Part number	Article number
40 ... 120 mm	Straight	PNP, antivalent	Plug, M12, 4-pin	FMH 18-L4	518-51505
40 ... 120 mm	90° angle	PNP, antivalent	Plug, M12, 4-pin	FMH 18W-L4	518-51507
40 ... 120 mm	Straight	PNP, antivalent	Cable, 3 m, 4-wire	FMH 18	518-51504
40 ... 120 mm	90° angle	PNP, antivalent	Cable, 3 m, 4-wire	FMH 18W	518-51506

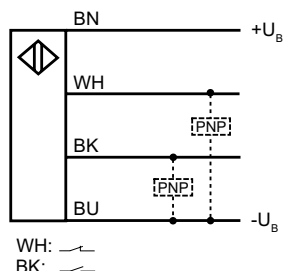
Accessories

Connection cables	From Page A-46
Brackets	From Page A-4

<p>Plug connection, FMH 18-L4</p>	<p>Plug connection, FMH 18W-L4</p>
 <p style="text-align: right;">153-00029</p>	 <p style="text-align: right;">153-00030</p>

<p>Connection, 4-pin</p>	
 <p style="text-align: right;">154-00193</p>	7

<p>Cable connection, FMH 18</p>	<p>Cable connection, FMH 18W</p>
 <p style="text-align: right;">153-00027</p>	 <p style="text-align: right;">153-00028</p>

<p>Connection, 4-wire</p>	
 <p style="text-align: right;">154-00193</p>	

FT 12 RF

Fixed focus photoelectric diffuse sensor with background suppression



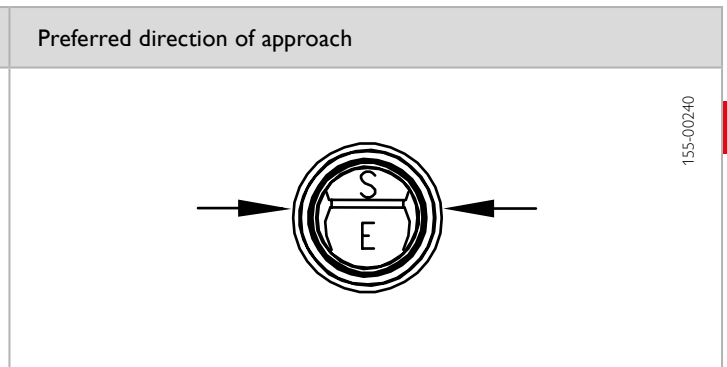
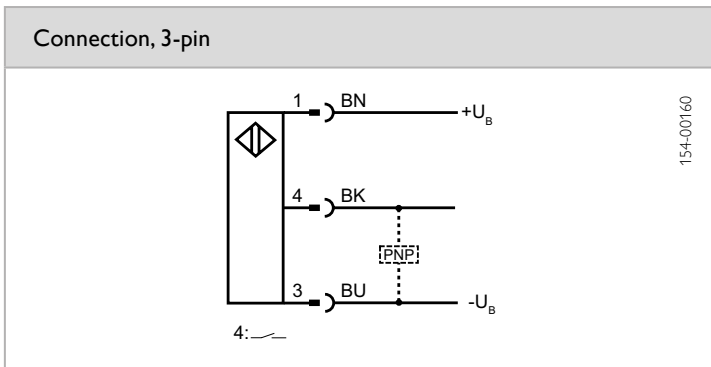
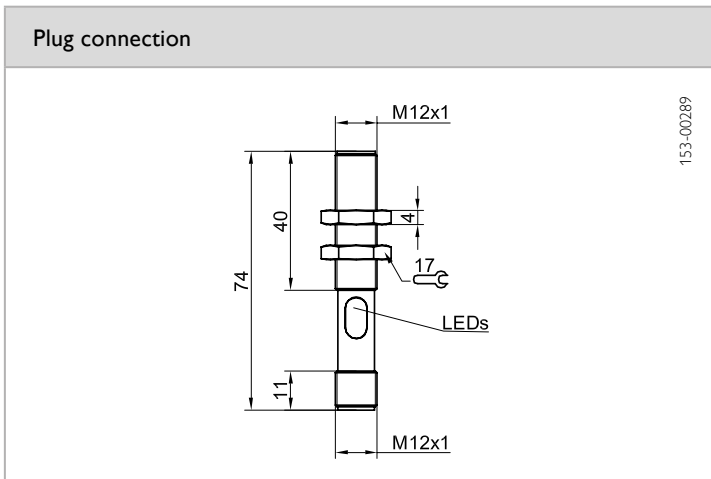
PRODUCT HIGHLIGHTS

- Simple installation thanks to standard M12 metal thread
- High immunity to dirt due to high signal reserves
- Indicator for detection stability

Optical data		Functions	
Scanning distance	24 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	Red, 660 nm	Indicator LED, yellow	Switching state indicator
Hysteresis (18 %)	< 5 %	Scanning distance adjustment	Fixed setting
Grey value shift (90 % white / 18 % grey)	< 5 %	Default settings	PNP N.O.
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC	Dimensions	M12 x 74 mm
No-load current, I ₀	≤ 25 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
Switching output, Q	PNP	Ambient temperature: operation	-20 ... +60 °C
Output function	N.O.	Ambient temperature: storage	-20 ... +80 °C
Switching frequency, f (ti/tp 1:1)	1000 Hz	Weight (plug device)	30 g
Response time	≤ 500 μs		

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

Type of connection	Part number	Article number
Plug, M12x1, 4-pin	FT 12 RF-PSL4	506-11004



Accessories

Connection cables	From Page A-46
Brackets	From Page A-4

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.	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		

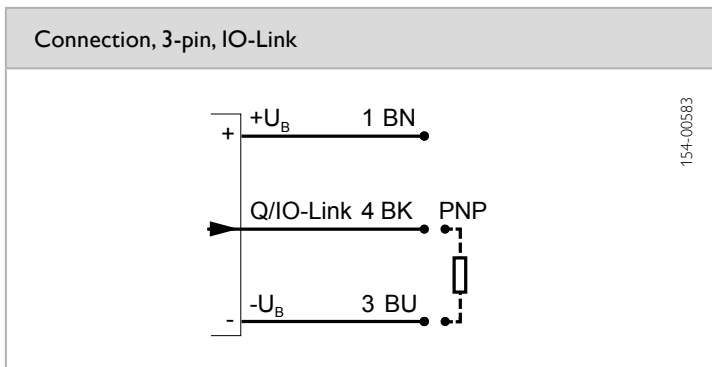
¹ Reference material: Kodak white, 90 % reflectivity

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
<p>153-13579</p>	<p>153-13580</p>



7

Functional reserves	Light spot size
<p>155-03319</p>	<p>155-03363</p>

Reference material	Scanning distance	Accessories	
White (90 %)	50 mm	Connection cables	From Page A-46
Grey (18 %)	30 mm	Brackets	From Page A-4
Black (6 %)	12 mm		

FT 05

Photoelectric diffuse sensor



CE

IP
67

IO-Link

PRODUCT HIGHLIGHTS

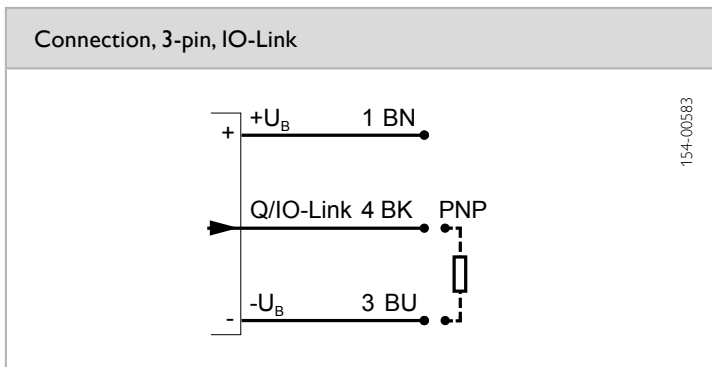
- Smallest sensor format with IO-Link
- Parameterisation via IO-Link (i.a. sensitivity, switching frequency, N.O. / N.C., teach-in)
- No mutual interference

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 (cable device)	M5 x 45 mm
No-load current, I ₀	≤ 12 mA	Dimensions (plug 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



7

Functional reserves	Light spot size

Reference material	Scanning distance	Accessories	
White (90 %)	50 mm	Connection cables	From Page A-46
Grey (18 %)	30 mm	Brackets	From Page A-4
Black (6 %)	12 mm		

FT 12 R

Photoelectric diffuse sensor



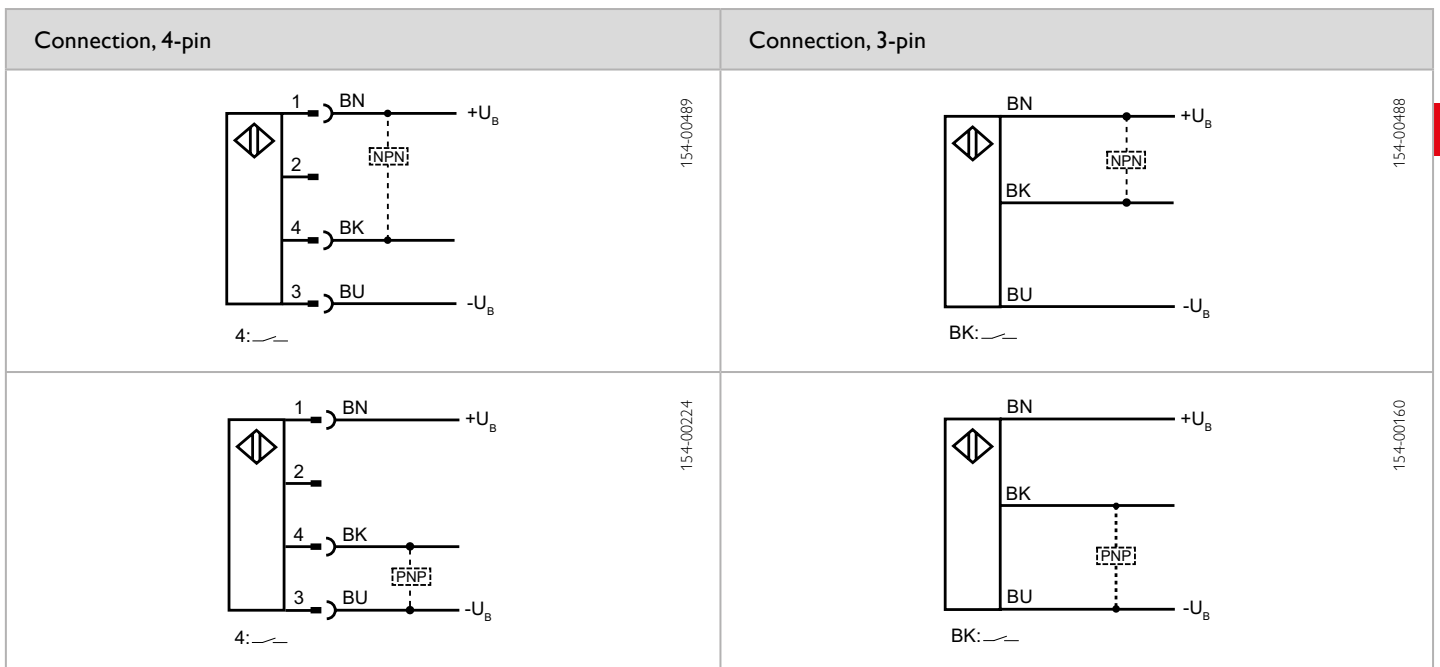
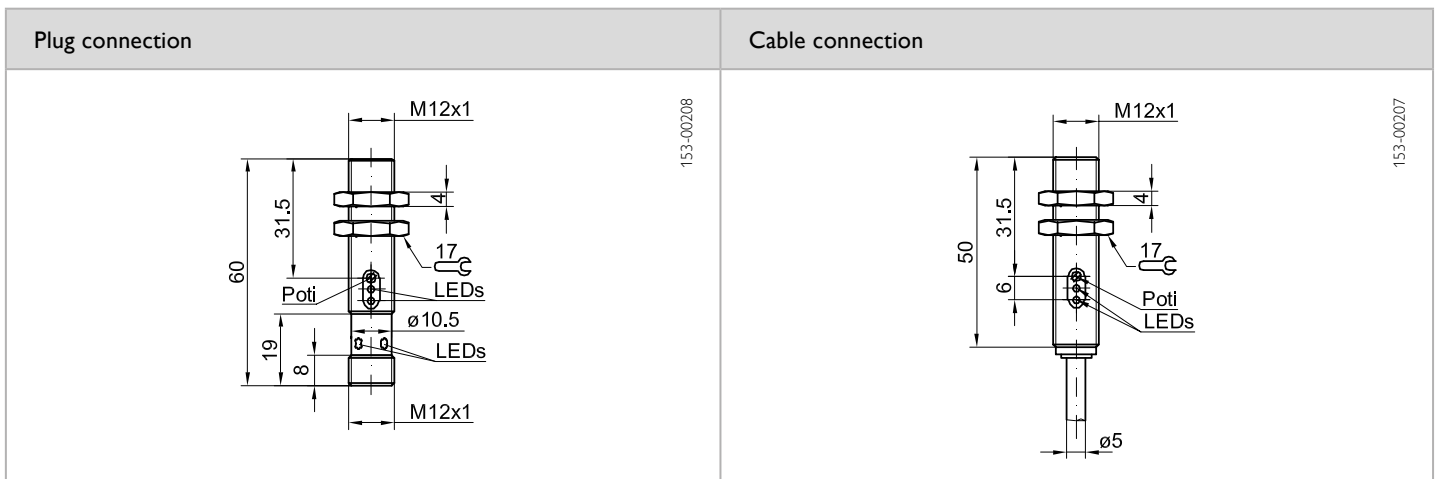
PRODUCT HIGHLIGHTS

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

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 x 60 mm
No-load current, I ₀	≤ 15 mA	Dimensions (cable device)	M12 x 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 x 0.34 mm ² , 2 m	FT 12 R-PSK3	701-21002
NPN	Cable, PVC, 3 x 0.34 mm ² , 2 m	FT 12 R-NSK3	701-21003



Accessories	
Connection cables	From Page A-46
Brackets	From Page A-4

FT 18-2

Photoelectric diffuse sensor



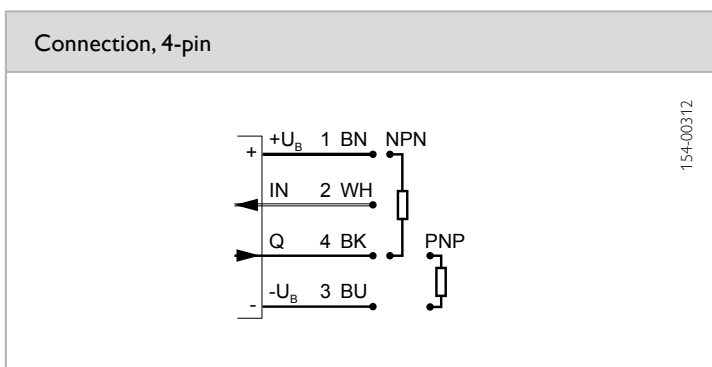
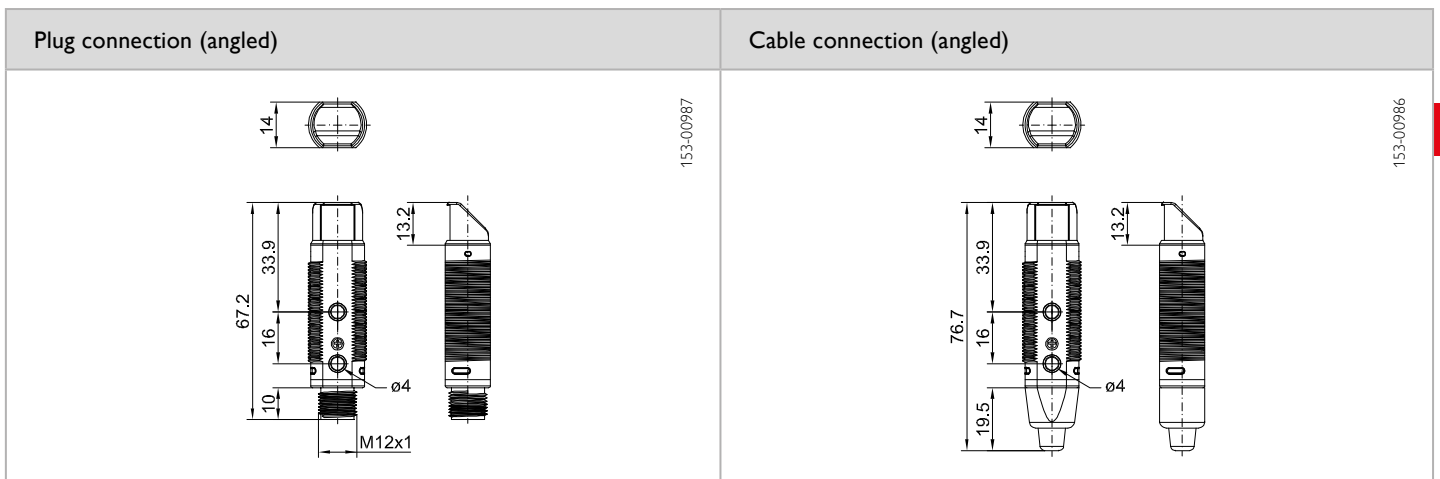
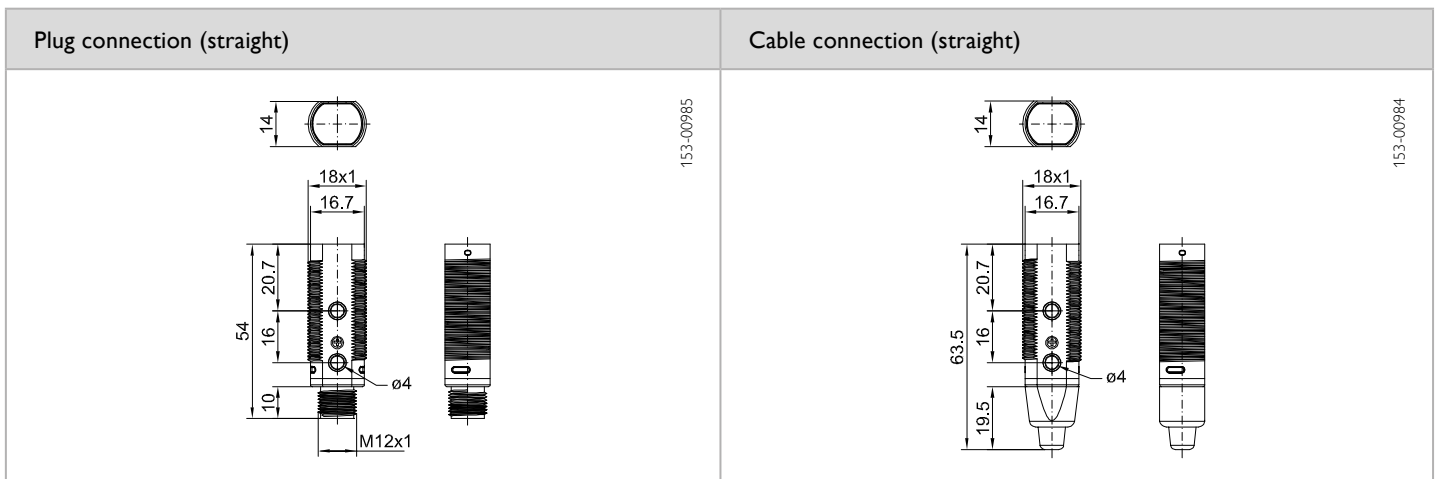
PRODUCT HIGHLIGHTS

- 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
Control input, IN	+U _B = teach-in -U _B = button locked open = normal operation	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



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	From Page A-46
2 x securing nuts	Brackets	From Page A-4

FT 18-2

Photoelectric diffuse sensor



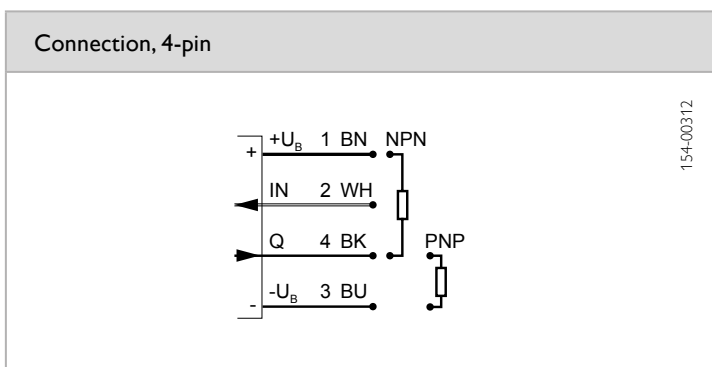
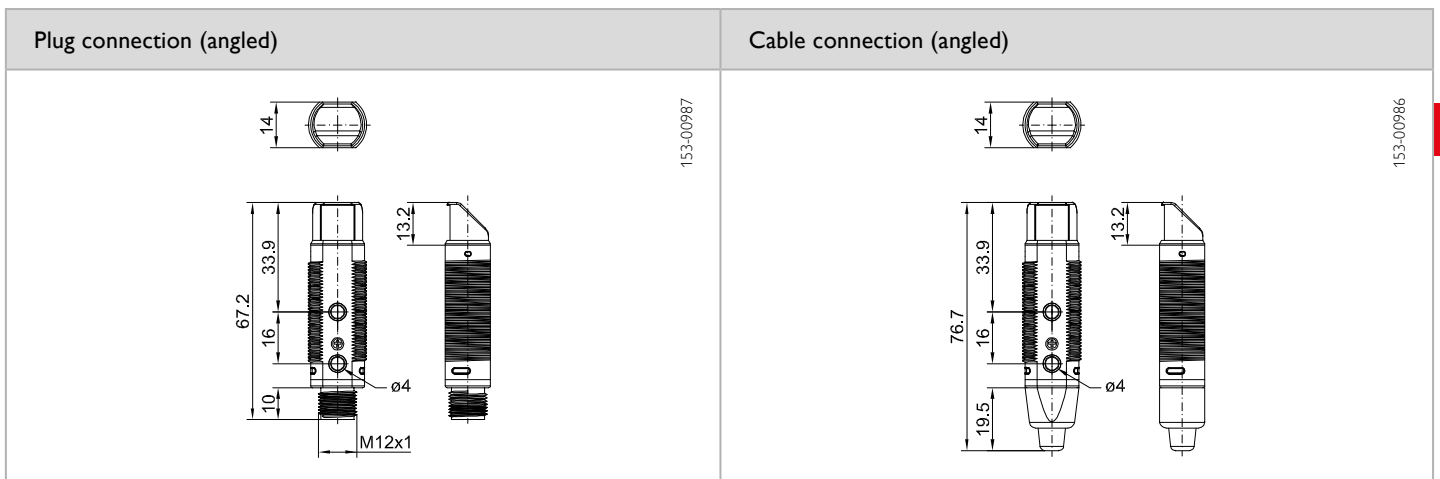
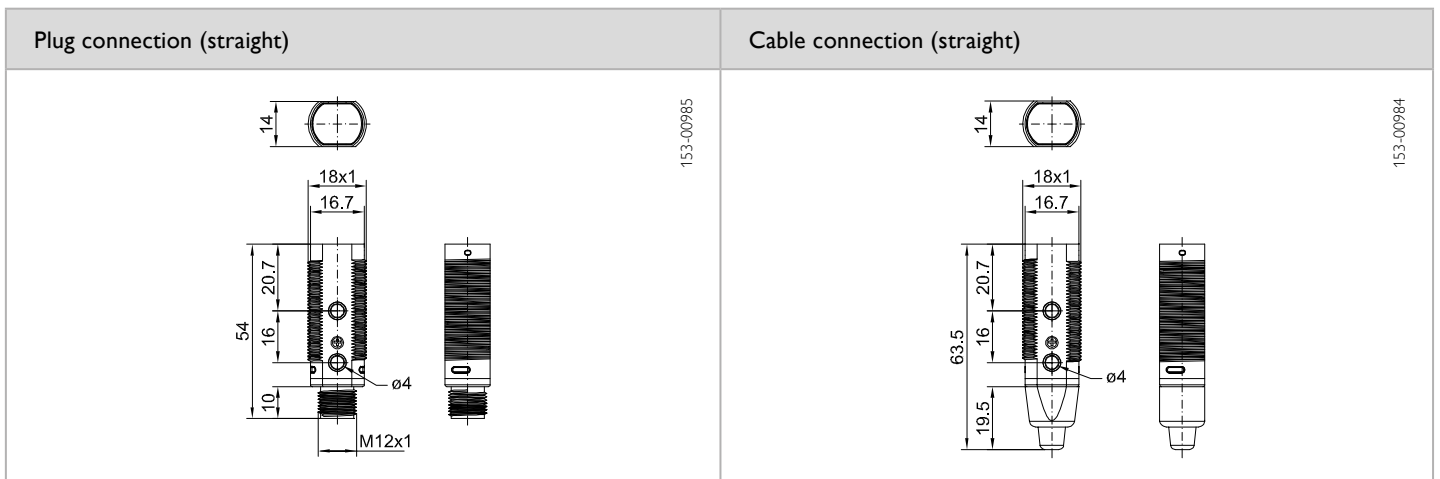
PRODUCT HIGHLIGHTS

- 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
Control input, IN	+U _B = teach-in -U _B = button locked open = normal operation	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



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	From Page A-46
2 x securing nuts	Brackets	From Page A-4

FMS 18-34 B

Photoelectric diffuse sensor



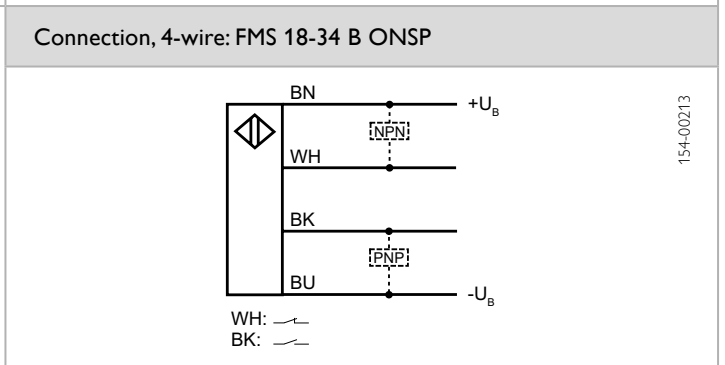
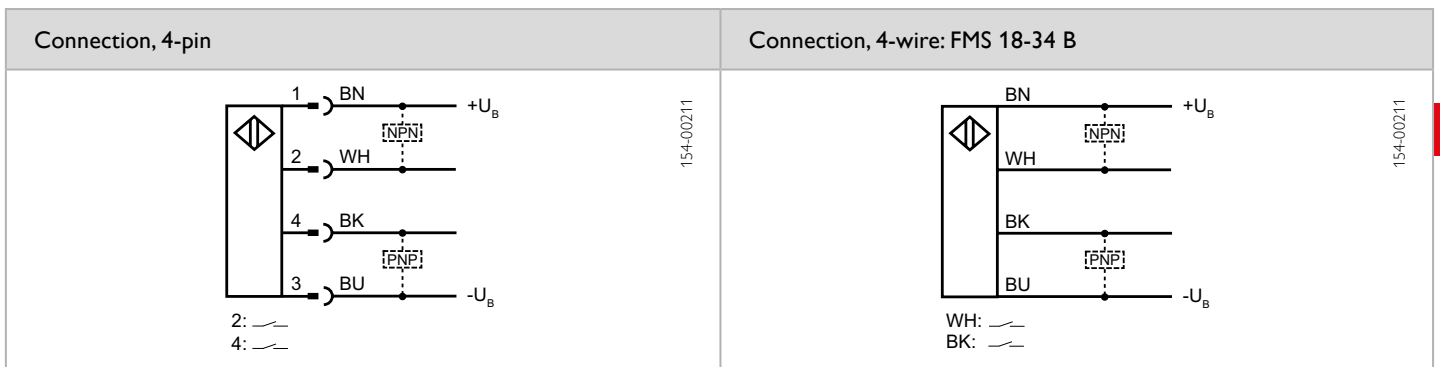
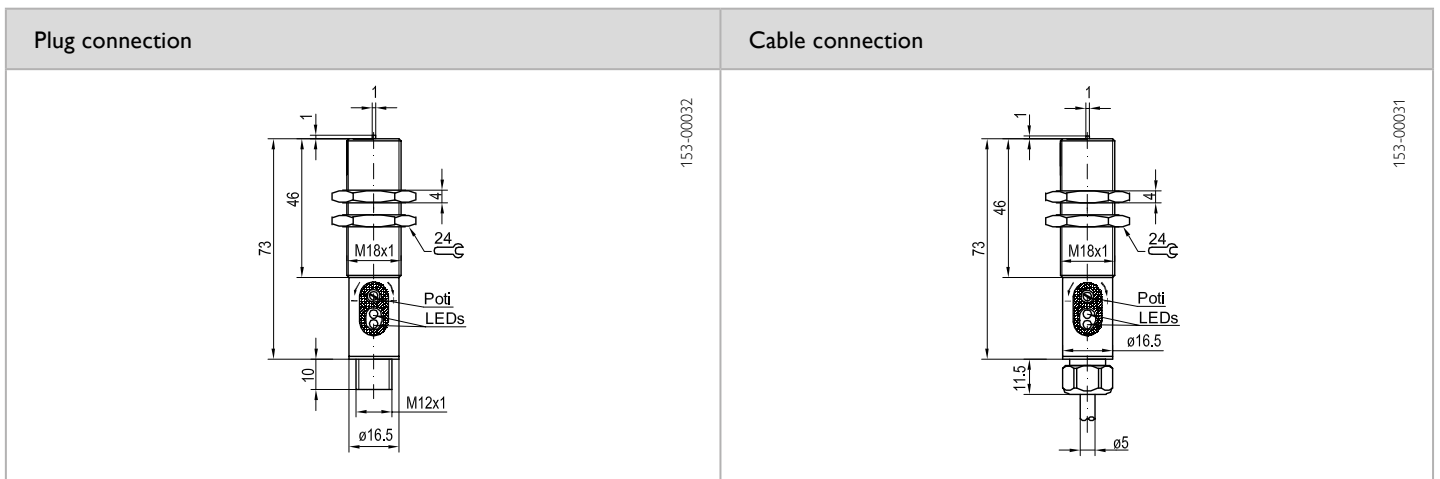
PRODUCT HIGHLIGHTS

- Scanning distance: 5 ... 400 mm, adjustable
- Wide beam (large aperture angle)
- Separating seam
- Metal M18 threaded sleeve
- Contamination indicator

Optical data		Functions	
Scanning distance	5 ... 400 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	Infrared, 880 nm	Indicator LED, yellow	Switching output indicator
Distance hysteresis	≤ 10 % of set scanning distance	Indicator LED, red	Contamination indicator
Aperture angle	25°	Sensitivity adjustment	Via 18-step potentiometer
		Default setting	Max. scanning distance
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 25 mA	Enclosure rating	IP 65 ³
Output current, I _e	≤ 200 mA	Material, housing	Brass, nickel-plated
Pull-up resistance	22 kΩ	Type of connection	See selection table
Pull-down resistance	22 kΩ	Ambient temperature: operation	-20 ... +60 °C
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Ambient temperature: storage	-40 ... +80 °C
Protection Class	2	Weight (plug device)	65 g
Power On Delay	≤ 300 ms	Weight (cable device)	165 g
Switching output, Q	See selection table	Vibration and impact resistance	EN 60947-5-2
Output function	See selection table		
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz		
Response time	500 μs		

¹ Reference material: Kodak white, 90 % reflectivity ² 10 % ripple, within U_B ³ With connected IP 65 plug

Scanning distance	Switching output	Type of connection	Part number	Article number
5 ... 400 mm	PNP (N.O.) / NPN (N.O.)	Plug, M12x1, 4-pin	FMS 18-34 B-L4	516-50781
5 ... 400 mm	PNP (N.O.) / NPN (N.O.)	Cable, 3 m, 4-wire	FMS 18-34 B	516-50782
5 ... 400 mm	PNP (N.O.) / NPN (N.C.)	Cable, 3 m, 4-wire	FMS 18-34 B ONSP	516-50783



Accessories	
Connection cables	From Page A-46
Brackets	From Page A-4

FMS 30-34 B

Photoelectric diffuse sensor



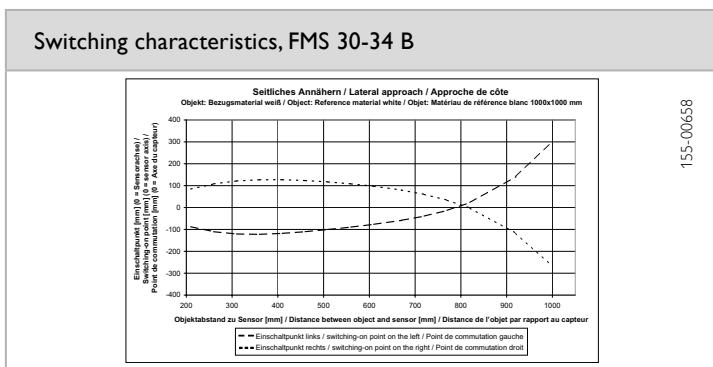
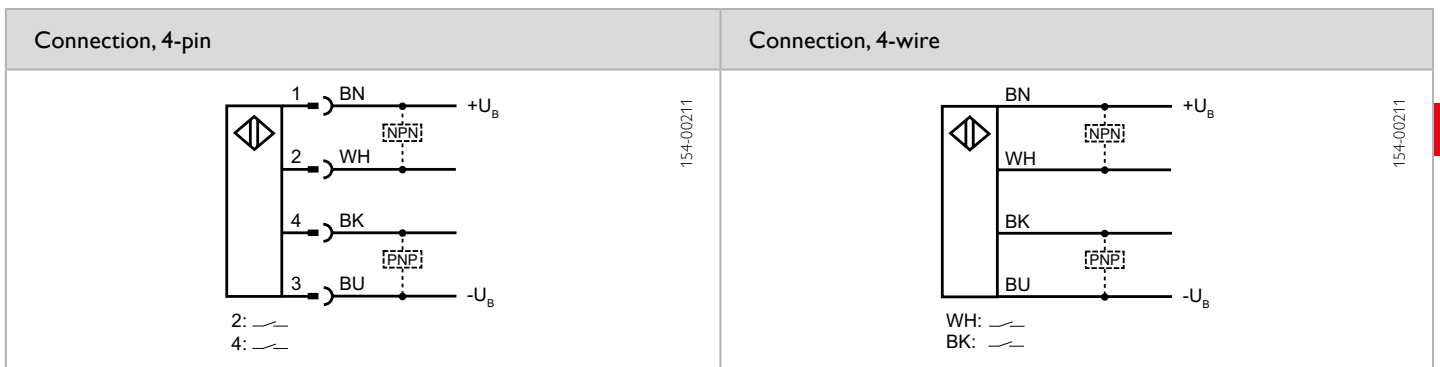
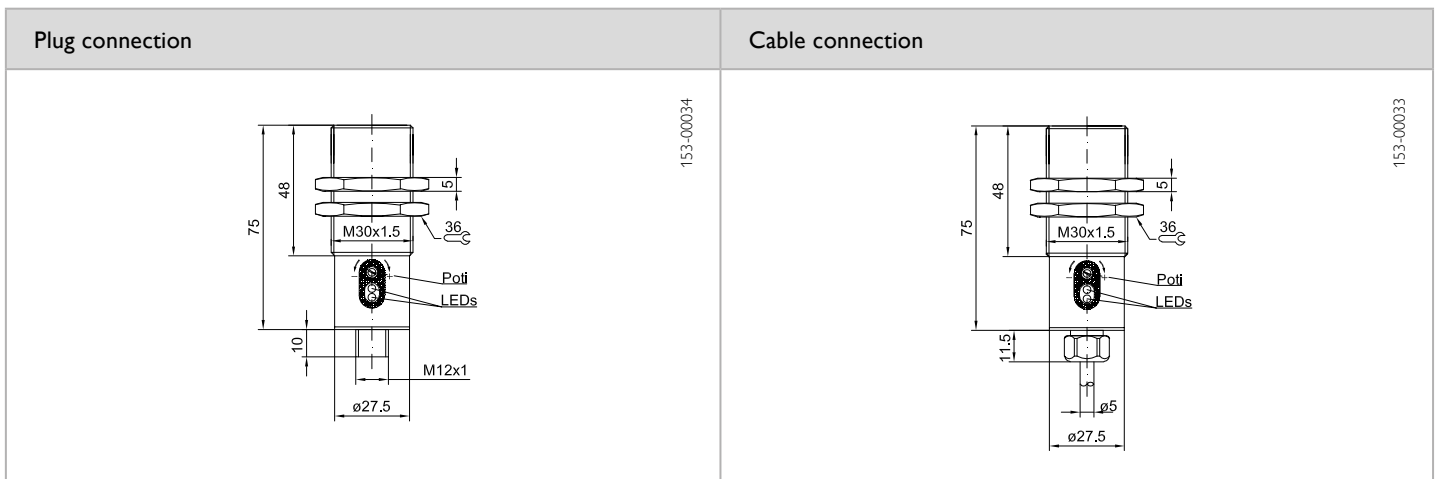
PRODUCT HIGHLIGHTS

- Scanning distance: 5 ... 1000 mm, adjustable
- Wide beam (large aperture angle)
- Separating seam
- Metal M30 threaded sleeve
- Contamination indicator

Optical data		Functions	
Scanning distance	5 ... 1000 mm ¹	Indicator LED, green	Operating voltage indicator
Type of light	Infrared, 880 nm	Indicator LED, yellow	Switching output indicator
Distance hysteresis	≤ 10 % of set scanning distance	Indicator LED, red	Contamination indicator
Aperture angle	50°	Sensitivity adjustment	Via 18-step potentiometer
Electrical data		Mechanical data	
Operating voltage, +U _B	10 ... 30V DC ²	Dimensions	See dimensional drawings
No-load current, I ₀	≤ 40 mA	Enclosure rating	IP 65 ³
Output current, I _e	≤ 200 mA	Material, housing	Brass, nickel-plated
Pull-up resistance	22 kΩ	Type of connection	See selection table
Pull-down resistance	22 kΩ	Ambient temperature: operation	-20 ... +60 °C
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection (Q)	Ambient temperature: storage	-40 ... +80 °C
Protection Class	2	Weight (plug device)	170 g
Power On Delay	≤ 300 ms	Weight (cable device)	280 g
Switching output, Q	PNP/NPN	Vibration and impact resistance	60947-5-2
Output function	N.O.		
Switching frequency, f (ti/tp 1:1)	50 Hz		

¹ Reference material: white, 90 % reflectivity ² 10 % ripple, within U_B ³ With connected IP 65 plug

Scanning distance	Type of connection	Part number	Article number
5 ... 1000 mm	Plug, M12x1, 4-pin	FMS 30-34 B-L4	550-51596
5 ... 1000 mm	Cable, 3 m, 4-wire	FMS 30-34 B	550-51595



Accessories	
Connection cables	From Page A-46
Brackets	From Page A-4

FR 12 R

Photoelectric retro-reflective sensor



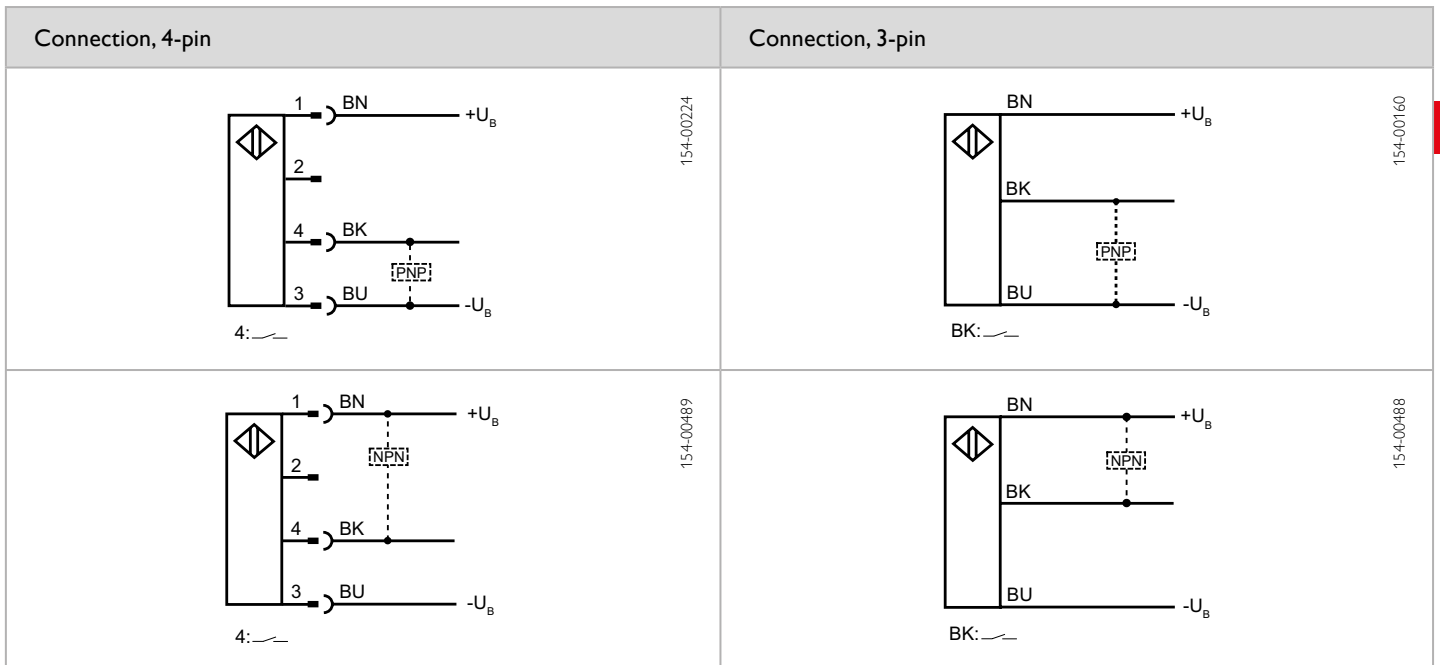
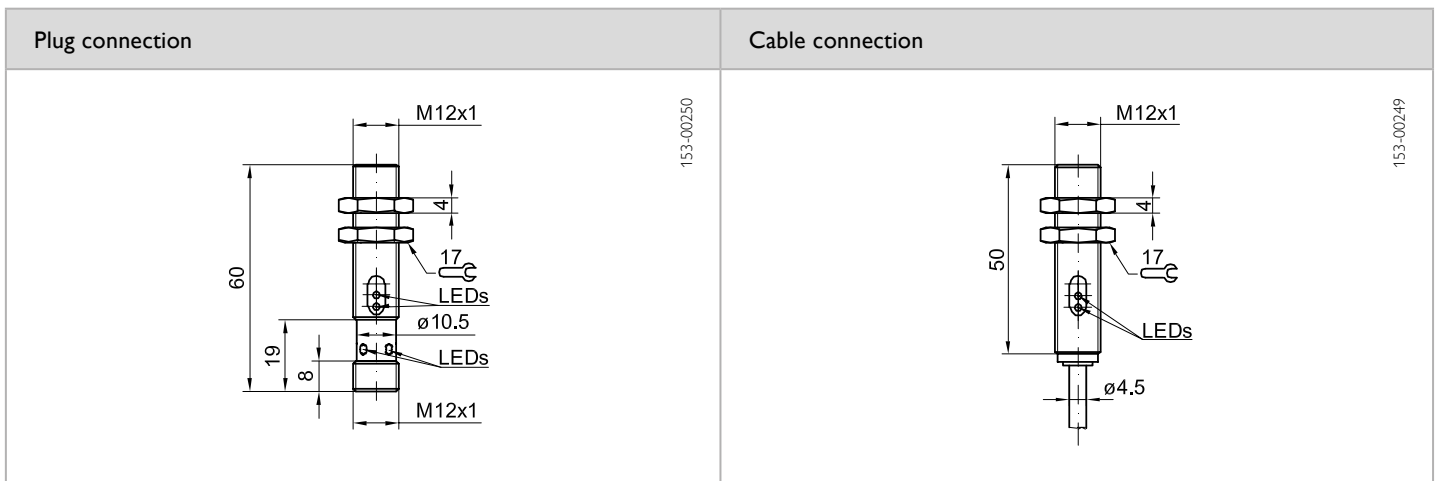
PRODUCT HIGHLIGHTS

- 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 ... 36V DC	Dimensions (plug device)	M12 x 60 mm
No-load current, I ₀	≤ 15 mA	Dimensions (cable device)	M12 x 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 x 0.34 mm ² , 2 m	FR 12 R-PSK3	703-11002
NPN	Cable, PVC, 3 x 0.34 mm ² , 2 m	FR 12 R-NSK3	703-11003



Accessories	
Connection cables	From Page A-46
Brackets	From Page A-4

FR 18-2

Photoelectric retro-reflective sensor



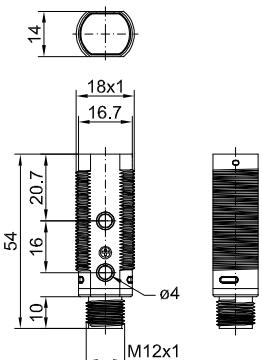
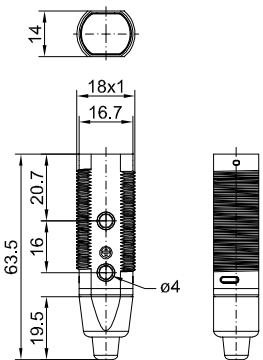
PRODUCT HIGHLIGHTS

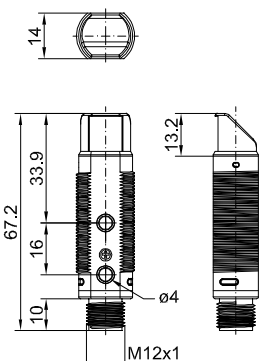
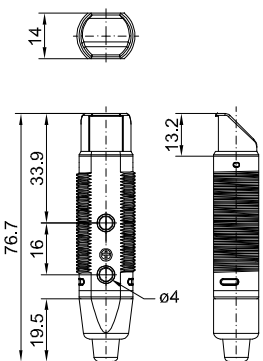
- Economical solution for numerous applications
- Range of up to 3.0 m
- Variants with angled light exit
- Polarisation filter for reliable detection of highly reflective surfaces
- Simple adjustment via potentiometer
- 2 through holes as additional mounting possibility

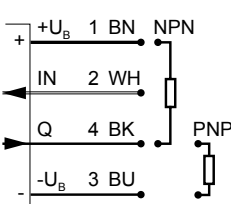
Optical data		Functions	
Operating range	See selection table ¹	Indicator LED, green	Operating voltage indicator
Type of light	See selection table	Indicator LED, yellow	Switching output indicator
Polarising filter	Yes	Sensitivity adjustment	Via potentiometer
		Adjustment possibilities	N.O./N.C. via control 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
Control input, IN	+U _B = teach-in -U _B = button locked open = normal operation	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)
 <p style="text-align: right;">153-00985</p>	 <p style="text-align: right;">153-00984</p>

Plug connection (angled)	Cable connection (angled)
 <p style="text-align: right;">153-00987</p>	 <p style="text-align: right;">153-00986</p>

Connection, 4-pin
 <p style="text-align: right;">154-00312</p>

Scope of delivery	Accessories	
Sensor	Reflectors	From Page A-18
Reflector: 53.4 x 53.4 mm ²	Connection cables	From Page A-46
2 x securing nuts	Brackets	From Page A-4

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
Control input, IN	+U _B = teach-in -U _B = button locked open = normal operation	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)
<p style="text-align: right;">153-00985</p>	<p style="text-align: right;">153-00984</p>

Plug connection (angled)	Cable connection (angled)
<p style="text-align: right;">153-00987</p>	<p style="text-align: right;">153-00986</p>

Connection, 4-pin
<p style="text-align: right;">154-00312</p>

Scope of delivery	Accessories	
Sensor	Reflectors	From Page A-18
Reflector: 53.4 x 53.4 mm ²	Connection cables	From Page A-46
2 x securing nuts	Brackets	From Page A-4

FS/FE 12 RL

Laser photoelectric through-beam sensor



CE

IP 67



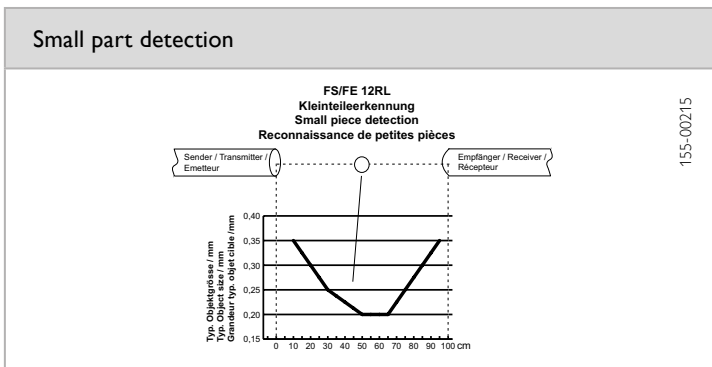
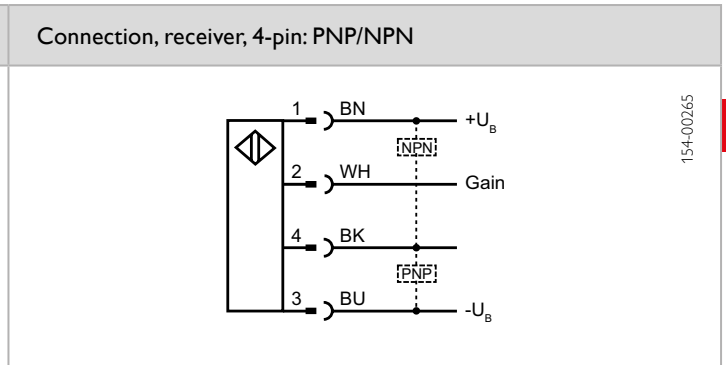
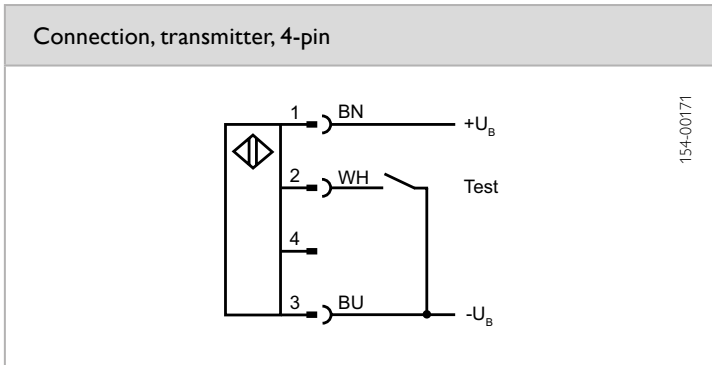
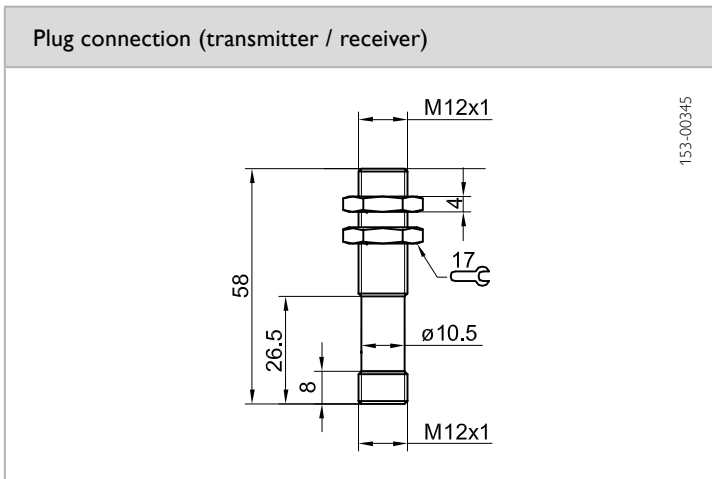
PRODUCT HIGHLIGHTS

- 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



Accessories

Connection cables	From Page A-46
Brackets	From Page A-4

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

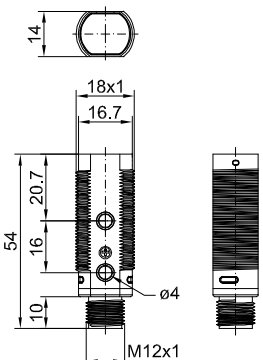
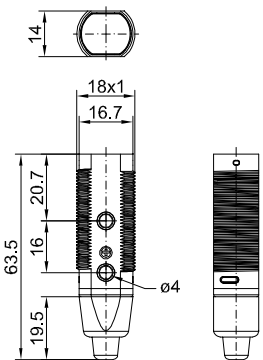
Optical data		Functions	
Operating range	10 m	Indicator LED, green	Operating voltage indicator
Type of light	See selection table	Indicator LED, yellow	Switching output indicator
		Sensitivity adjustment	Via potentiometer
		Adjustment possibilities	N.O./N.C. via control input (IN)
		Default settings	Max. 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

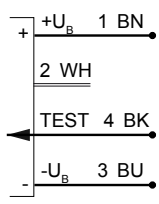
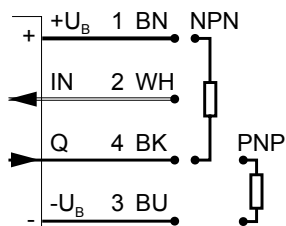
¹ With connected IP 67 plug

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
 <p style="text-align: right;">153-00985</p>	 <p style="text-align: right;">153-00984</p>

Connection, 4-pin (transmitter)	Connection, 4-pin (receiver)
 <p style="text-align: right;">154-00516</p>	 <p style="text-align: right;">154-00312</p>

Accessories	
Connection cables	From Page A-46
Brackets	From Page A-4

FS/FE 18 RL

Through-beam laser sensor



CE

IP
67



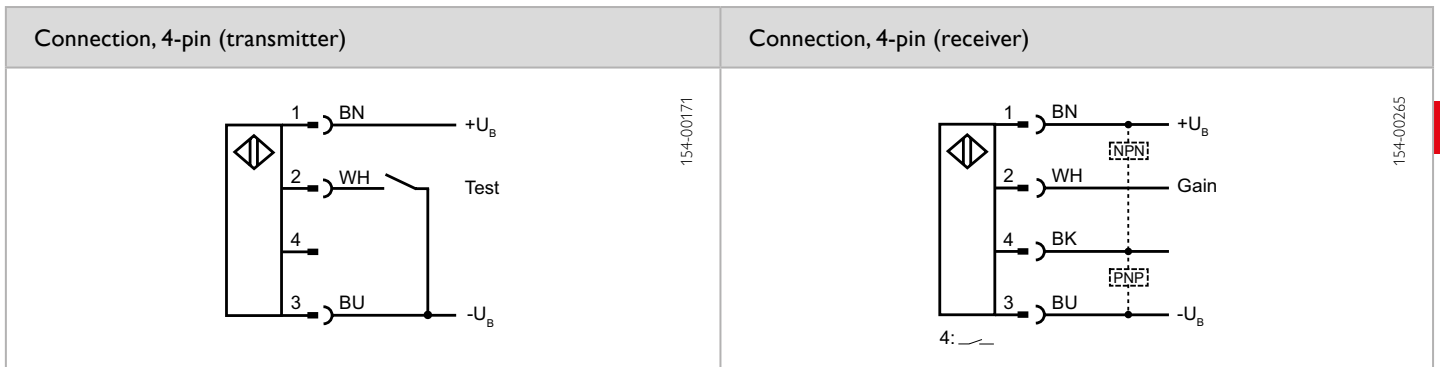
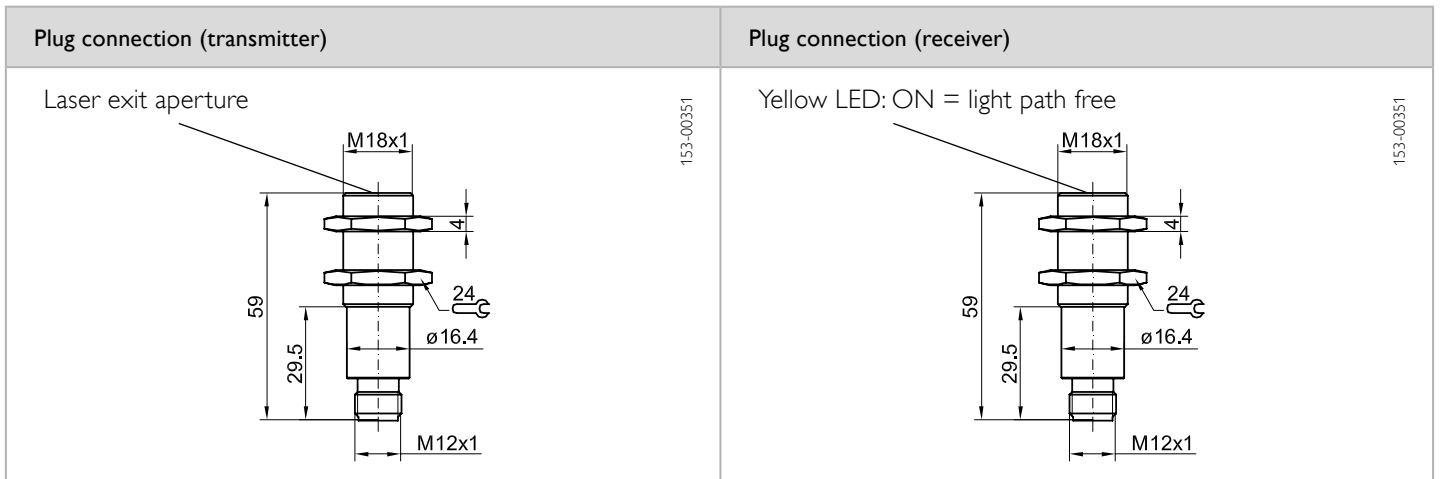
PRODUCT HIGHLIGHTS

- 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



Accessories	
Connection cables	From Page A-46
Brackets	From Page A-4

FLS 18W / FLE 18W

Through-beam laser sensor



PRODUCT HIGHLIGHTS

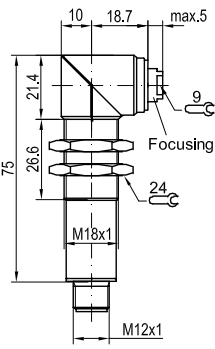
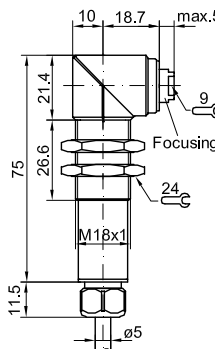
- Operating range: 50 m
- Red light laser, 650 nm
- Transmitter beam can be focused according to application
- Accuracy adjustable via beam spot size
- Smallest detectable part: 0.03 mm
- Switching frequency, 6000 Hz
- Metal M18 threaded sleeve

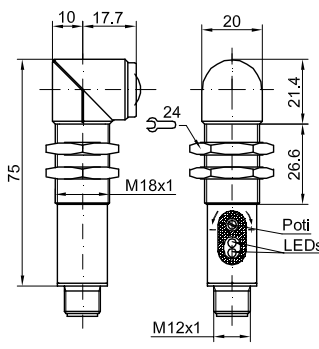
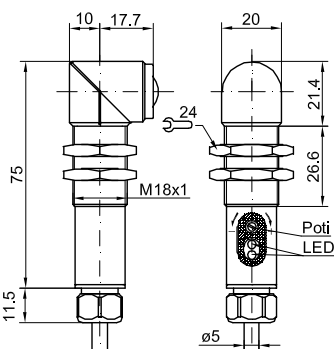
Optical data		Functions	
Operating range	0 ... 50 m	Indicator LED, green	Operating voltage indicator
Type of light	Laser, red, 650 nm	Indicator LED, yellow	Switching output indicator
Laser Class (IEC 60825-1)	1	Indicator LED, red	Contamination indicator
		Sensitivity adjustment	Via 18-step potentiometer
		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		

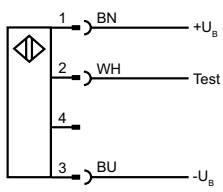
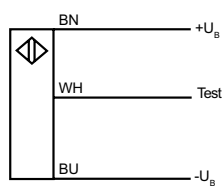
¹ 10 % ripple, within U_B ²With connected IP 65 plug

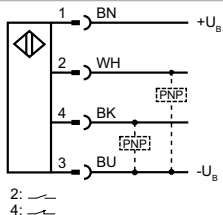
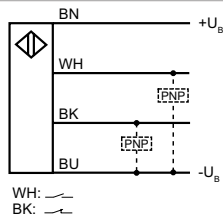
Transmitter / receiver	Switching output	Type of connection	Part number	Article number
Transmitter	–	Plug, M12x1, 4-pin	FLS 18W-L4	580-51408
Receiver	PNP (N.O./N.C.)	Plug, M12x1, 4-pin	FLE 18W-L4	580-51414
Receiver	PNP (N.C.)	Plug, M12x1, 4-pin	FLE 18W-L4-15	580-51415
Transmitter	–	Cable, 3 m, 4-wire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

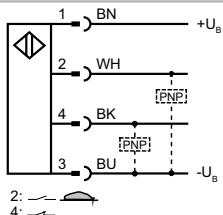
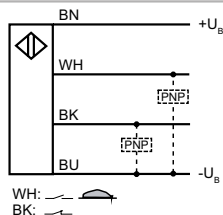
Accessories	
Connection cables	From Page A-46
Brackets	From Page A-4

<p>Plug connection (transmitter): FLS 18W-L4</p>	<p>Cable connection, (transmitter): FLS 18W</p>
 <p>153-00052</p>	 <p>153-00050</p>

<p>Plug connection (receiver): FLE 18W-L4 / FLE 18W-L4-15</p>	<p>Cable connection, (receiver): FLE 18W / FLE 18W-15</p>
 <p>153-00053</p>	 <p>153-00051</p>

<p>Connection, 4-pin (transmitter)</p>	<p>Connection, 4-wire (transmitter)</p>
 <p>154-00231</p>	 <p>154-00231</p>

<p>Connection, 4-pin (receiver): FLE 18W</p>	<p>Connection, 4-wire (receiver): FLE 18W</p>
 <p>154-00230</p>	 <p>154-00230</p>

<p>Connection, 4-pin (receiver): FLE 18W-L4-15</p>	<p>Connection, 4-wire (receiver): FLE 18W-15</p>
 <p>154-00464</p>	 <p>154-00464</p>

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

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

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

<p>Connection, 4-pin (transmitter)</p>	<p>Connection, 4-pin (receiver)</p>
<p>154-00455</p>	<p>154-00464</p>

<p>Focus key</p>	<p>154-01124</p>

<p>Accessories</p>	
<p>Connection cables</p>	<p>From Page A-46</p>
<p>Brackets</p>	<p>From Page A-4</p>

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		

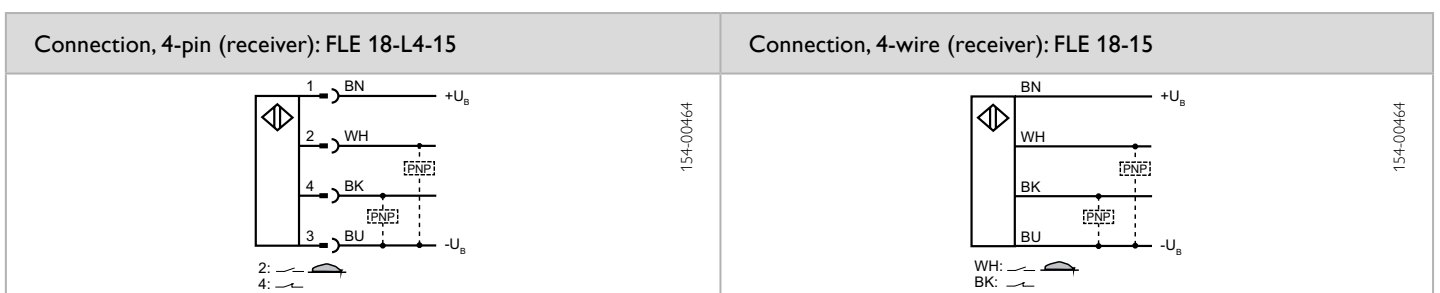
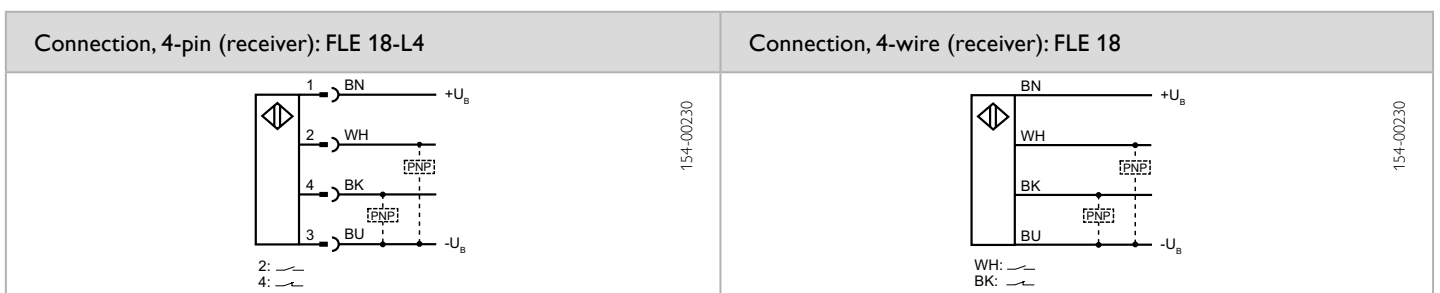
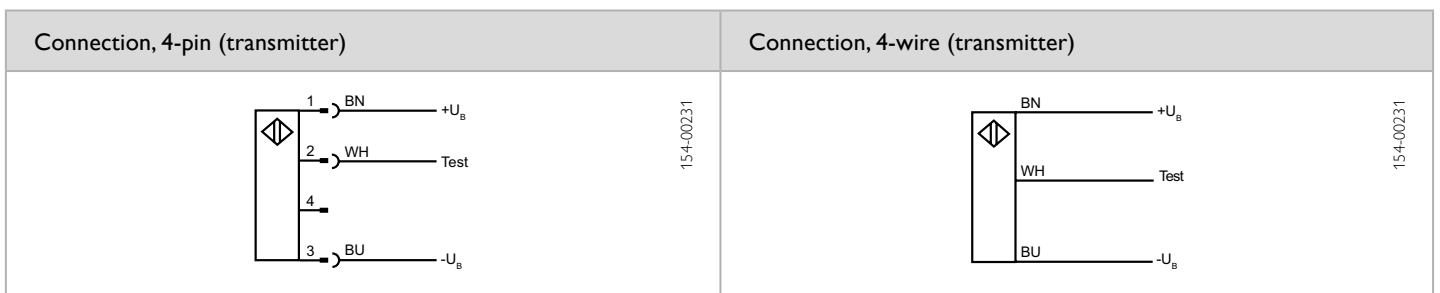
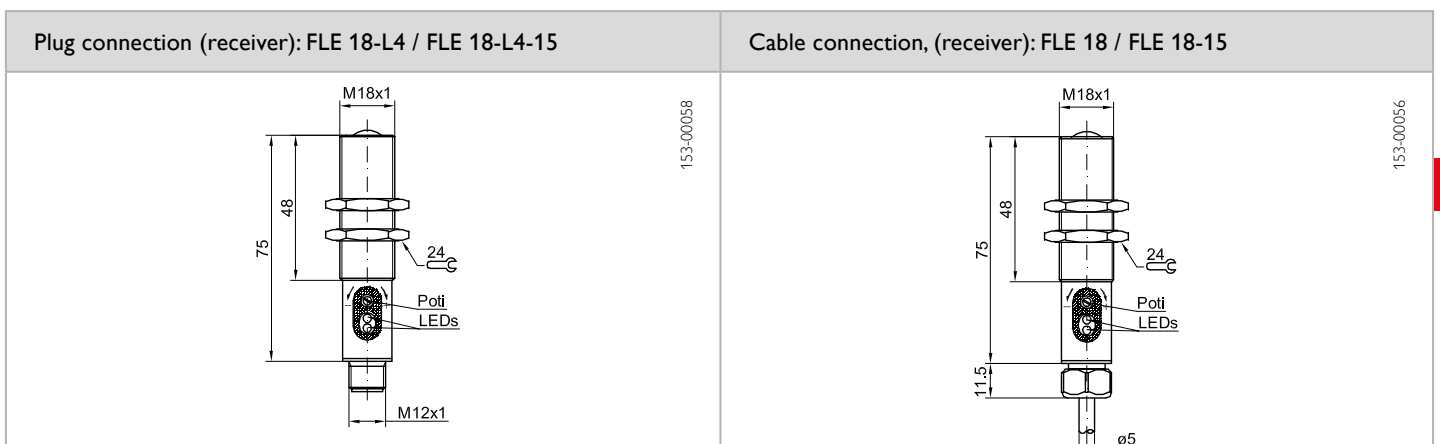
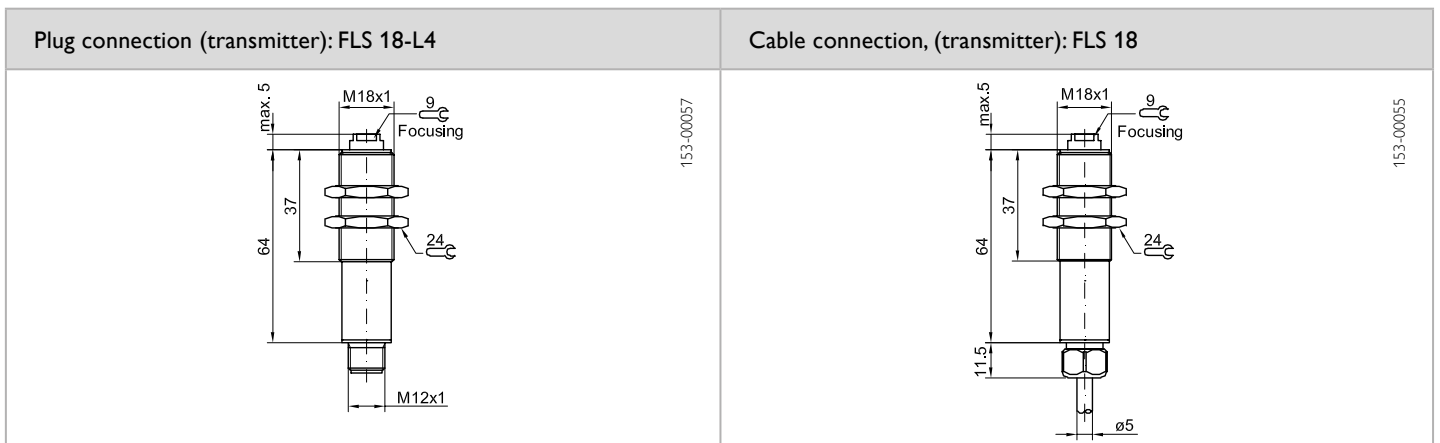
¹ 10 % ripple, within U_B ² With connected IP 65 plug

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
Brackets

From Page A-46
From Page A-4



FMF 18-34

Filling level sensor



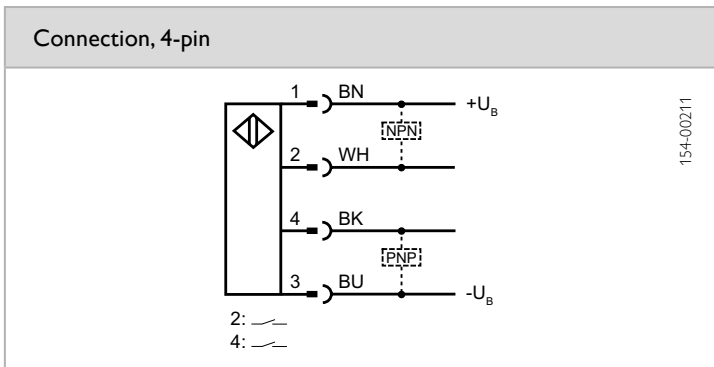
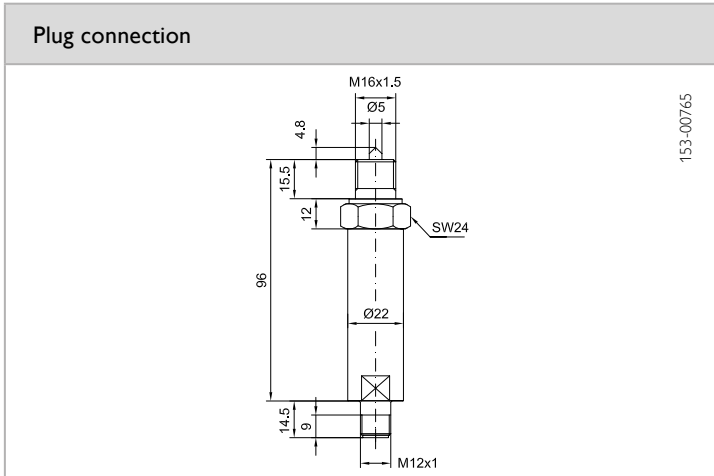
PRODUCT HIGHLIGHTS

- Sensor with glass rod prism for detecting liquids
- M16 x 1.5 thread for screwing into containers and pipes
- Reliable differentiation between liquids and foam
- Stainless steel

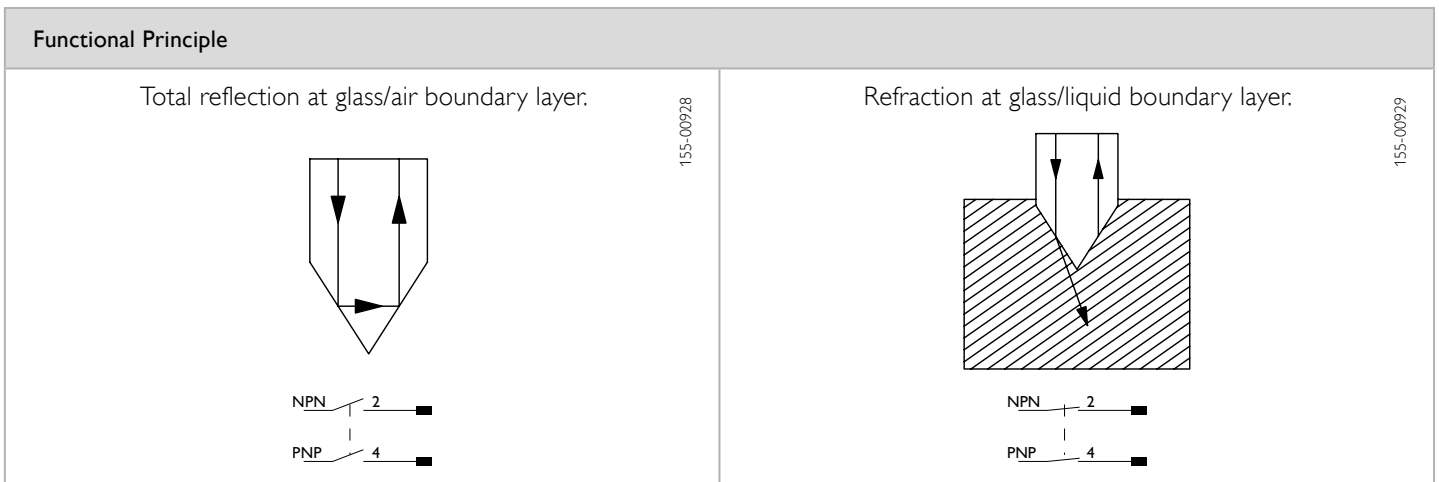
Optical data		Functions	
Scanning distance	(See Functional Principle)	Default settings	Switching process on submersion in a medium
Type of light	Infrared, pulsed, 880 nm	Condition	The refractive index of a liquid must be at least 1.20 Examples: reference air = 880 nm air = approx. 1.00 water = approx. 1.33 benzene = approx. 1.50 alcohol = approx. 1.32
Ambient light limit	1200 Lux		
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	Stainless steel, V2A
Pull-up resistance	22 kΩ	Material, front screen	Glass
Pull-down resistance	22 kΩ	Type of connection	See selection table
Protective circuits	Reverse-polarity protection, U _B / short-circuit protection	Pressure resistance	10 bar
Protection Class	2	Impact resistance	EN 60947-5-2
Switching output, Q	PNP/NPN, antivalent	Ambient temperature: operation	-20 ... +60 °C
Output function	N.O.	Ambient temperature: storage	-40 ... +80 °C
Switching frequency, f (ti/tp 1:1)	≤ 1000 Hz	Weight (plug device)	140 g
Response time	500 μs		

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

Scanning distance	Type of connection	Part number	Article number
(See Functional Principle)	Plug, M12x1, 4-pin	FMF 18-34 L4-SP	504-50929



7



Accessories

Connection cables	From Page A-46
Brackets	From Page A-4