FFRS Series IP69K-rated Photoelectric Sensors

M18 (18mm) stainless steel - DC

- Diffuse with background suppression
- Choose from 30/130 mm adjustable maximum reading distance, or 60/100 mm adjustable maximum reading distance for shiny objects
- M12 quick-disconnect (purchase cable separately)
- 316L stainless steel housing

- Supply voltage: 10 - 30 VDC
- LED light status indicators: yellow (output), green (teach function)
- IP69K rated for food and beverage applications
- Complete protection against electrical damage
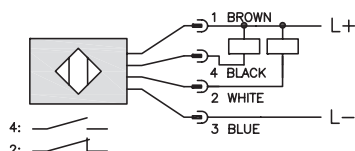- M18 mounting hex nuts included

NEED CABLES?

FFRS-BN-1E

18mm FFRS Series Photoelectric Sensors Selection

Part Number	Price	Drawing Link	Voltage Range	Sensing Range	Switching Frequency	Sensing Beam	Output Type	Connection Type	Wiring
FFRS-BN-1E	$94.00	PDF	10 to 30 VDC	30-130mm [1.18-5.11 in] adjustable	1 kHz	Red [660mm]	NPN N.O. + N.C. complementary	M12 quick-disconnect (purchase cable separately)	Diagram 1
FFRS-BP-1E	$94.00	PDF					PNP N.O. + N.C. complementary		Diagram 2
FFRS-0N-1E	$94.00	PDF					NPN N.O. + N.C. selectable		Diagram 3
FFRS-0P-1E	$94.00	PDF					PNP N.O. + N.C. selectable		Diagram 4
FFRS-BN-1E77	Retired	PDF		For shiny objects 60-100mm [2.36-3.93 in] adjustable	400 Hz		NPN N.O. + N.C. complementary		Diagram 1
FFRS-BP-1E77	$101.00	PDF					PNP N.O. + N.C. complementary		Diagram 2
FFRS-0N-1E77	Retired	PDF					NPN N.O. + N.C. selectable		Diagram 3
FFRS-0P-1E77	$101.00	PDF					PNP N.O. + N.C. selectable		Diagram 4

Wiring Diagrams

Diagram 1
NPN Output

1 BROWN — L+
4 BLACK
2 WHITE
3 BLUE — L−

4:
2:

Diagram 2
PNP Output

1 BROWN
4 BLACK
2 WHITE
3 BLUE

4:

Diagram 3
NPN Output

1 BROWN — L+
4 BLACK
2 WHITE
3 BLUE — L−

2: Teach

WH/2 — Open (+) Light-on / (−) Dark-on

Diagram 4
PNP Output

1 BROWN — L+
2 WHITE
4 BLACK
3 BLUE — L−

2: Teach

WH/2 — (+) Light-on / Open (−) Dark-on
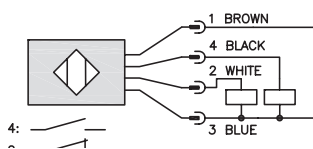
Connector
M12 Connector

2 1
3 4
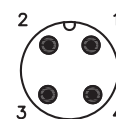
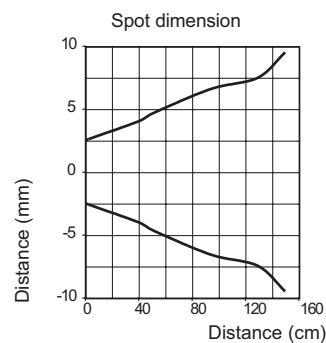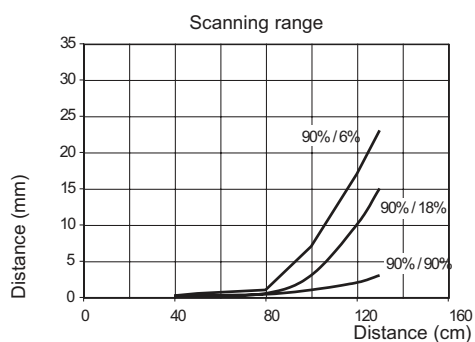| N.O.	Light ON
N.C.	Dark ON
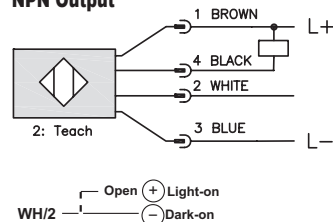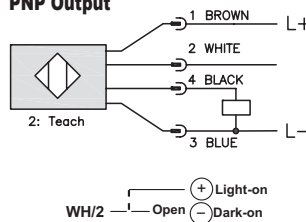
Note: Class 2 power supply required

Note: In case of combined load, resistive and capacitive, the maximum admissible capacity (C) is 0.1 μF for maximum output voltage and current.

Warning: These products are not safety sensors and are not suitable for use in personal safety applications.
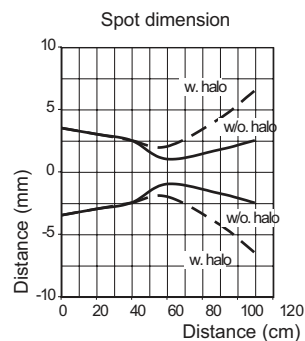
FFRS Series IP69K-rated Photoelectric Sensors

Characteristic curves

FFRS-**-** Standard Version

Scanning range

90% / 6%
90% / 18%
90% / 90%

Distance (mm)
Distance (cm)

Spot dimension

Distance (mm)
Distance (cm)

FFRS-**-**77 Special model for shiny object

Scanning range

90% / 6%
90% / 18%
90% / 90%

Distance (mm)
Distance (cm)

Spot dimension

w. halo
w/o. halo
w/o. halo
w. halo

Distance (mm)
Distance (cm)

Photoelectric Sensors tSEN-34
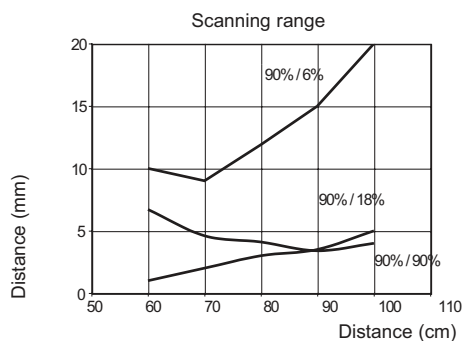
FFRS Series IP69K-rated Photoelectric Sensors

FFRS Series 18 mm Photoelectric Sensors Specifications		
Type	Background Suppression	
	Standard	For Shiny Objects
Model Series	FFRS	FFRS**77
Sensing Distance	30 to 130mm	60 to 100mm
Light Spot Diameter	13mm @ 100mm	
Emission	Red 660nm	
Sensitivity	Teach	
Output Type	See individual parts in Selection Guide	
Operating Voltage	10-30VDC	
No-load Supply Current	≤ 50mA	
Operating (Load) Current	≤ 100mA	
Off-state (Leakage) Current	≤10mA at 30VDC	
Voltage Drop	2V max at 100mA	
Switching Frequency	1KHz	400Hz
Ripple	≤ 10%	
Time Delay Before Availability (tv)	200ms	
Short-Circuit Protection	Yes, switch auto-resets after load is removed	
Operating Temperature	-13 to 176°F [-25 to 80°C]; short exposure 15 minutes, to 212°F [100°C]	
Protection Degree (DIN 40050)	IEC IP68, IP69K	
LED Indicators - Switching Status	Green ON: teach function available Green OFF: teach function blocked Green Slow Flashing: teach in progress Yellow ON: Output state - O models*; Yellow ON: Light state - B models*	
Housing Material	316L stainless steel	
Lens Material	Polymethyl methacrylate (PMMA), , FDA certified	
Exit Connector Material	Grilamid	
Shock/Vibration	See terminology section	
Tightening Torque	50 N•m [36.88 lb-ft]	
Weight	200g [7.05 oz]	
Connectors	M12 plug	
Approvals	CE, cULus file E187310, ECOLAB, RoHS, Johnson Diversey	

To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

Accessories for 18mm Sensors

Axial Mounting Bracket

Axial mounting bracket available in zinc plated steel or 316L stainless steel. Has two mounting holes (use 4mm screws) and allows for rotation of an optical axis for right-beam-angle-adapter sensors. Hexagonal nuts not included. For use with 18mm sensors.
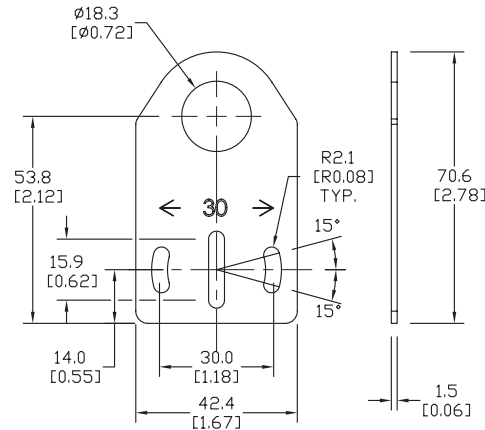
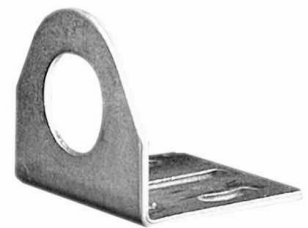| Accessories for 18mm Sensors			
Part Number	**Price**	**Description**	**Weight lb [g]**
ST18A	$2.00	Micro Detectors mounting bracket, axial, zinc plated steel. For use with 18mm sensors.	0.06 [27.2]
ST18A7W	$7.25	Micro Detectors mounting bracket, axial, 316L stainless steel. For use with 18mm sensors.	0.06 [27.2]

ST18A

Dimensions

mm [inches]

Right-angle Mounting Bracket

Right-angle mounting bracket for use with 18mm sensors. Has two mounting holes (use 4mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal nuts not included.
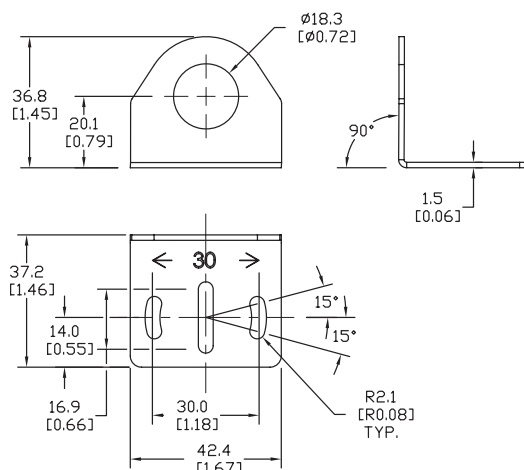
Accessories for 18mm Sensors			
Part Number	**Price**	**Description**	**Weight lb [g]**
ST18C	$2.00	Micro Detectors mounting bracket, right-angle, zinc plated steel. For use with 18mm sensors.	0.06 [27.2]
ST18C7W	$7.25	Micro Detectors mounting bracket, right-angle, 316L stainless steel. For use with 18mm sensors.	0.06 [27.2]

**ST18C**

Dimensions

mm [inches]

Accessories for 18mm Sensors

Right-angle Fine Tune Mounting Bracket

Mounting bracket, right-angle, fine tune vertical and horizontal adjustment, nickel-plated steel. For use with 18mm sensors. Allows for fine tuning vertical and horizontal placement.

Accessories for 18mm Sensors				
Part Number	Price	Description	Drawing Link	Weight [lb]
OPT2036	$38.50	Wenglor mounting bracket, right-angle, fine tune vertical and horizontal adjustment, nickel plated steel. For use with 18mm sensors.	PDF	0.02
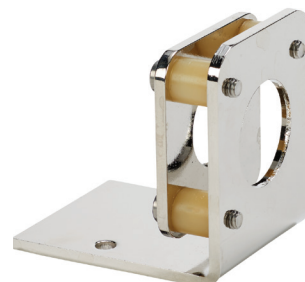
**OPT2036**

Swivel Mounting Bracket

Mounting bracket, ball swivel, plastic. For use with 18mm sensors. Has a ball-joint and set screws to adjust sensor orientation. Allows angular orientation up to 15 degrees (from center) in all directions for photoelectric sensors (Will not work with C18 series).

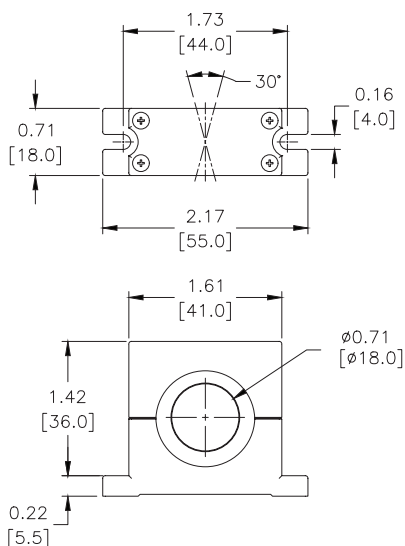| Accessories for 18mm Sensors			
Part Number	Price	Description	Weight [lb]
ST02	$9.50	Micro Detectors mounting bracket, ball swivel, plastic. For use with 18mm sensors.	0.06
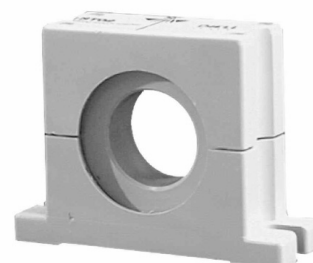
ST02

Dimensions

mm [inches]

Accessories for 18mm Sensors

Right-angle Mounting Brackets

Mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 18mm sensors. Available with or without fixed insertion stop.

OPT2104, OPT2105

Accessories for 18mm Sensors				
Part Number	Price	Description	Drawing Link	Weight lb [g]
OPT2104	$10.50	Wenglor mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 18mm sensors.	PDF	0.06 [27.2]
OPT2105	$10.50	Wenglor mounting bracket, right-angle, plastic. For use with 18mm sensors.	PDF	0.06 [27.2]

Right-angle Swivel Mounting Systems

Mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 12mm rod mount. For use with 18mm sensors. Available in all 304 stainless steel or with an aluminum head and a stainless steel mounting plate.

OPT2116, OPT2117

Accessories for 18mm Sensors					
Part Number	Price	Description	Mounting Head	Mounting Plate	Drawing Link	Weight lb [g]
OPT2116	$11.50	Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with 18mm sensors.	Aluminum	304 Stainless steel	PDF	0.15 [68.0]
OPT2117	$21.00	Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with 18mm sensors.	304 Stainless steel	304 Stainless steel	PDF	0.28 [127.0]

Note: 304 Stainless steel mounting rods sold separately: OPT2109 (200mm [7.87 in] length), OPT2110 (300mm [11.81 in] length), and OPT2111 (500mm [19.69 in] length).

Mounting Rods and Brackets

Mounting Rods

304 Stainless steel rods for mounting swivel brackets OPT2112 - OPT2127
Available in three lengths: 200mm, 300mm, and 500mm. 12mm diameter.

	Mounting Rods for OPT2112-2127 Swivel Mounting Brackets				
Part Number	**Price**	**Description**	**Drawing Link**	**Weight lb (g)**	
OPT2109	$13.00	Wenglor mounting rod, 12mm diameter, 200mm length, 304 stainless steel.	PDF	0.41 [185.97]	
OPT2110	$16.00	Wenglor mounting rod, 12mm diameter, 300mm length, 304 stainless steel.	PDF	0.60 [272.16]	
OPT2111	$21.00	Wenglor mounting rod, 12mm diameter, 500mm length, 304 stainless steel.	PDF	0.98 [444.52]	

Right-angle Mounting Bracket

Mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.

	Right-angle Mounting Brackets for 12mm Sensors			
Part Number	**Price**	**Description**	**Drawing Link**	**Weight lb [g]**
OPT2108	$16.00	Wenglor mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.	PDF	0.07 [31.8]