

# FFRS Series IP69K-rated Photoelectric Sensors



**FFRS-BN-1E**

## 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

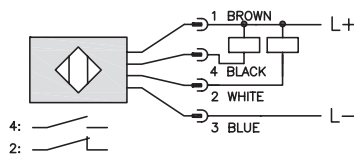


18mm FFRS Series Photoelectric Sensors Selection									
Part Number	Price	Drawing Link	Voltage Range	Sensing Range	Switching Frequency	Sensing Beam	Output Type	Connection Type	Wiring
<a href="#">FFRS-BN-1E</a>	\$94.00	<a href="#">PDF</a>	10 to 30 VDC	30-130mm [1.18-5.11 in] adjustable	1 kHz	Red [660mm]	NPN N.O. + N.C. complementary	M12 quick-disconnect (purchase cable separately)	Diagram 1
<a href="#">FFRS-BP-1E</a>	\$94.00	<a href="#">PDF</a>					PNP N.O. + N.C. complementary		Diagram 2
<a href="#">FFRS-ON-1E</a>	\$94.00	<a href="#">PDF</a>					NPN N.O. + N.C. selectable		Diagram 3
<a href="#">FFRS-OP-1E</a>	\$94.00	<a href="#">PDF</a>					PNP N.O. + N.C. selectable		Diagram 4
<a href="#">FFRS-BN-1E77</a>	Retired	<a href="#">PDF</a>		For shiny objects 60-100mm [2.36-3.93 in] adjustable	400 Hz		NPN N.O. + N.C. complementary		Diagram 1
<a href="#">FFRS-BP-1E77</a>	\$101.00	<a href="#">PDF</a>					PNP N.O. + N.C. complementary		Diagram 2
<a href="#">FFRS-ON-1E77</a>	Retired	<a href="#">PDF</a>					NPN N.O. + N.C. selectable		Diagram 3
<a href="#">FFRS-OP-1E77</a>	\$101.00	<a href="#">PDF</a>					PNP N.O. + N.C. selectable		Diagram 4

## Wiring Diagrams

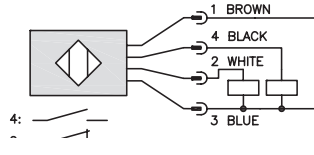
**Diagram 1**

**NPN Output**



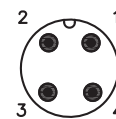
**Diagram 2**

**PNP Output**



**Connector**

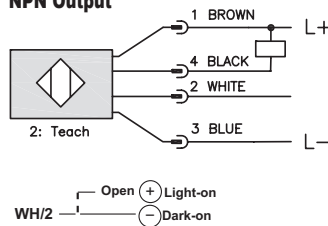
**M12 Connector**



<b>N.O.</b>	Light ON
<b>N.C.</b>	Dark ON

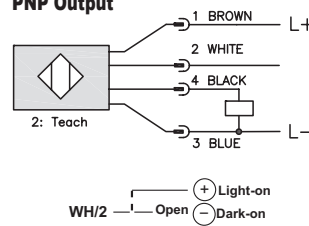
**Diagram 3**

**NPN Output**



**Diagram 4**

**PNP Output**



*Note: Class 2 power supply required*

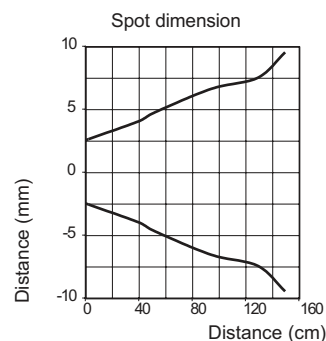
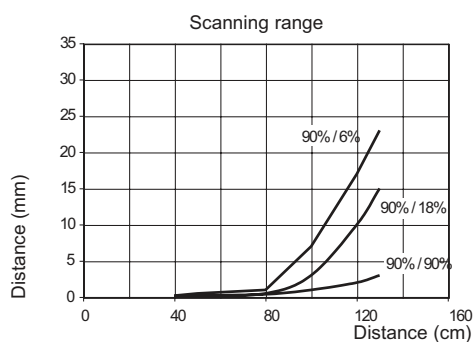
*Note: In case of combined load, resistive and capacitive, the maximum admissible capacity (C) is 0.1 µF for maximum output voltage and current.*

**Warning: These products are not safety sensors and are not suitable for use in personal safety applications.**

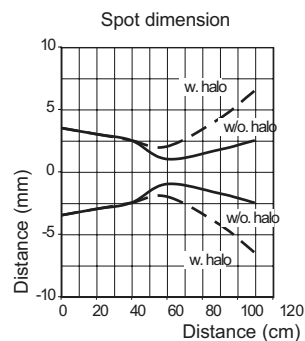
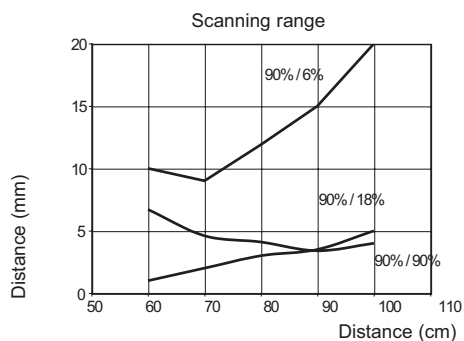
# FFRS Series IP69K-rated Photoelectric Sensors

## Characteristic curves

### FFRS-\*\*-\*\* Standard Version



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



# FFRS Series IP69K-rated Photoelectric Sensors

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

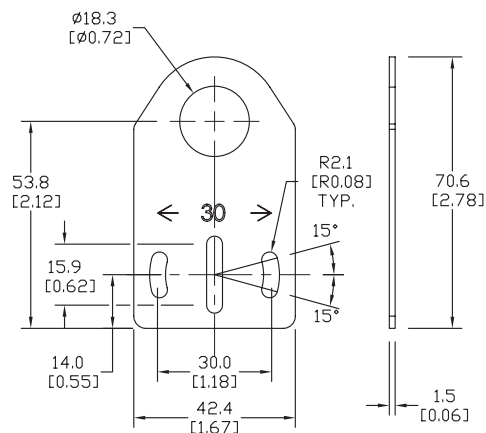
Axial mounting bracket available in zinc plated steel or 316L stainless steel. Has two mounting holes (use 4mm screws) and allows for rotation of an optical axis for right-beam-angle-adaptor sensors. Hexagonal nuts not included. For use with 18mm sensors.

Accessories for 18mm Sensors			
Part Number	Price	Description	Weight lb [g]
<u><a href="#">ST18A</a></u>	\$2.00	Micro Detectors mounting bracket, axial, zinc plated steel. For use with 18mm sensors.	0.06 [27.2]
<u><a href="#">ST18A7W</a></u>	\$7.25	Micro Detectors mounting bracket, axial, 316L stainless steel. For use with 18mm sensors.	0.06 [27.2]



**ST18A**

mm [inches]



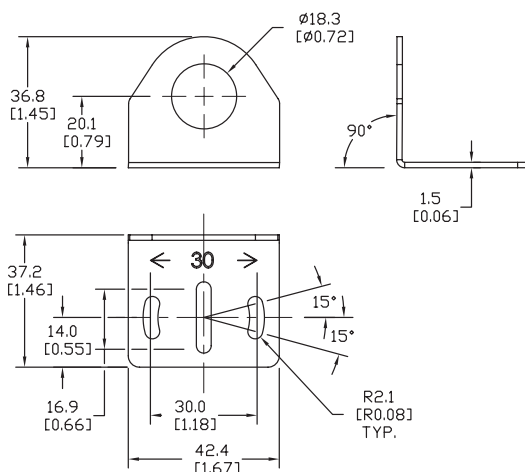
Right-angle mounting bracket for use with 18mm sensors. Has two mounting holes (use 4mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal nuts not included.

Accessories for 18mm Sensors			
Part Number	Price	Description	Weight lb [g]
<u><b>ST18C</b></u>	\$2.00	Micro Detectors mounting bracket, right-angle, zinc plated steel. For use with 18mm sensors.	0.06 [27.2]
<u><b>ST18C7W</b></u>	\$7.25	Micro Detectors mounting bracket, right-angle, 316L stainless steel. For use with 18mm sensors.	0.06 [27.2]



**ST18C**

mm [inches]

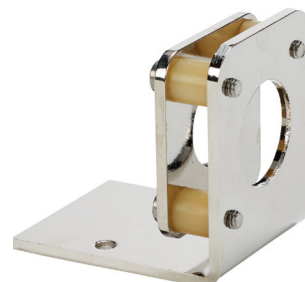


# Accessories for 18mm Sensors

## 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]
<a href="#"><u>OPT2036</u></a>	\$38.50	Wenglor mounting bracket, right-angle, fine tune vertical and horizontal adjustment, nickel plated steel. For use with 18mm sensors.	<a href="#"><u>PDF</u></a>	0.02

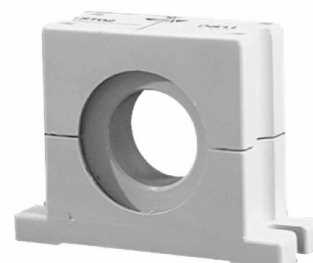


[OPT2036](#)

## 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).

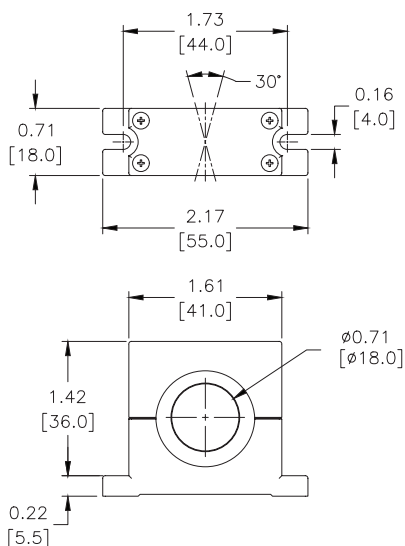
Accessories for 18mm Sensors			
Part Number	Price	Description	Weight [lb]
<a href="#"><u>ST02</u></a>	\$9.50	Micro Detectors mounting bracket, ball swivel, plastic. For use with 18mm sensors.	0.06



[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.

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



[OPT2104](#), [OPT2105](#)

## 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.

Accessories for 18mm Sensors						
Part Number	Price	Description	Mounting Head	Mounting Plate	Drawing Link	Weight lb [g]
<a href="#">OPT2116</a>	\$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	<a href="#">PDF</a>	0.15 [68.0]
<a href="#">OPT2117</a>	\$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	<a href="#">PDF</a>	0.28 [127.0]



[OPT2116](#), [OPT2117](#)

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)
<a href="#">OPT2109</a>	\$13.00	Wenglor mounting rod, 12mm diameter, 200mm length, 304 stainless steel.	<a href="#">PDF</a>	0.41 [185.97]
<a href="#">OPT2110</a>	\$16.00	Wenglor mounting rod, 12mm diameter, 300mm length, 304 stainless steel.	<a href="#">PDF</a>	0.60 [272.16]
<a href="#">OPT2111</a>	\$21.00	Wenglor mounting rod, 12mm diameter, 500mm length, 304 stainless steel.	<a href="#">PDF</a>	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]
<a href="#">OPT2108</a>	\$16.00	Wenglor mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.	<a href="#">PDF</a>	0.07 [31.8]

