

# FFRS Series IP69K-rated Photoelectric Sensors



**FFRS-BN-1E**

## M18 (18 mm) stainless steel - DC

- 8 models, 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

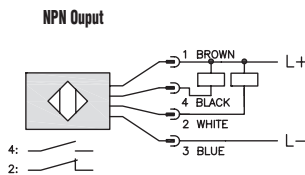


18 mm FFRS Series Photoelectric Sensors Selection								
Part Number	Price	Voltage Range	Sensing Range	Switching Frequency	Sensing Beam	Output Type	Connection Type	Wiring
FFRS-BN-1E	\$80.00	10 to 30 VDC	30 to 130 mm adjustable	1 kHz	Red (660 nm)	NPN NO + NC complementary	M12 quick disconnect (purchase cable separately)	Diagram 3
FFRS-BP-1E	\$80.00					PNP NO + NC complementary		Diagram 4
FFRS-ON-1E	\$80.00					NPN NO + NC selectable		Diagram 1
FFRS-OP-1E	\$80.00					PNP NO + NC selectable		Diagram 2
FFRS-BN-1E77	\$86.00		For shiny objects 60 to 100 mm adjustable	400 Hz		NPN NO + NC complementary		Diagram 3
FFRS-BP-1E77	\$86.00					PNP NO + NC complementary		Diagram 4
FFRS-ON-1E77	\$64.00					NPN NO + NC selectable		Diagram 1
FFRS-OP-1E77	\$86.00					PNP NO + NC selectable		Diagram 2

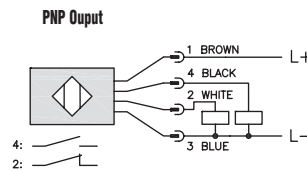
## Wiring Diagrams

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

**Diagram 1**



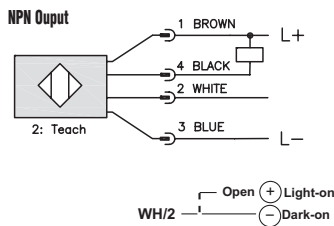
**Diagram 2**



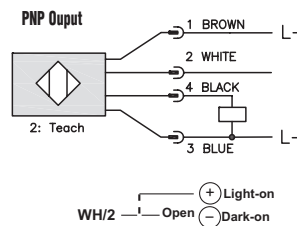
**Connector**



**Diagram 3**



**Diagram 4**



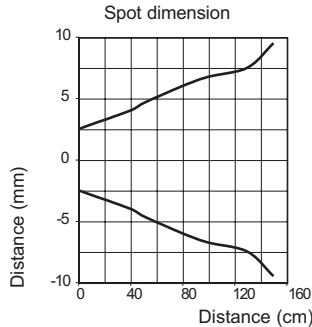
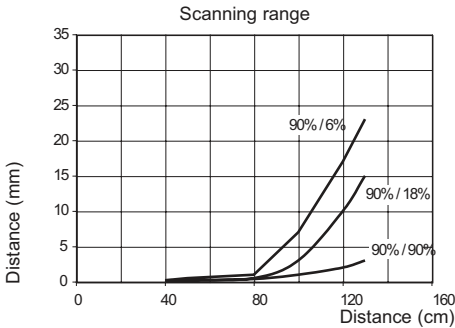
*Note: In case of combined load, resistive and capacitive, the maximum admissible capacity (C) is 0.1 µF for maximum output voltage and current.*

**NOTE: CLASS 2 POWER SUPPLY REQUIRED**

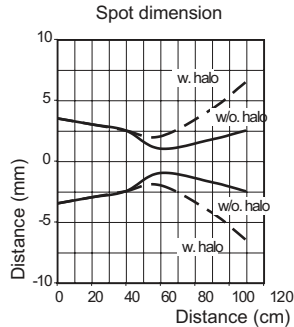
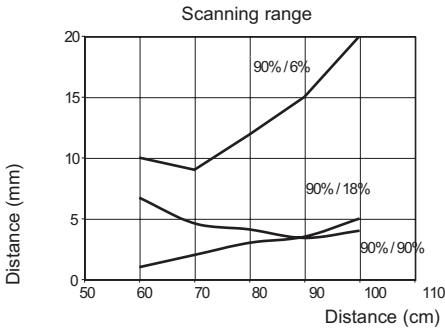
# FFRS Series IP69K-rated Photoelectric Sensors

## Characteristic curves

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



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

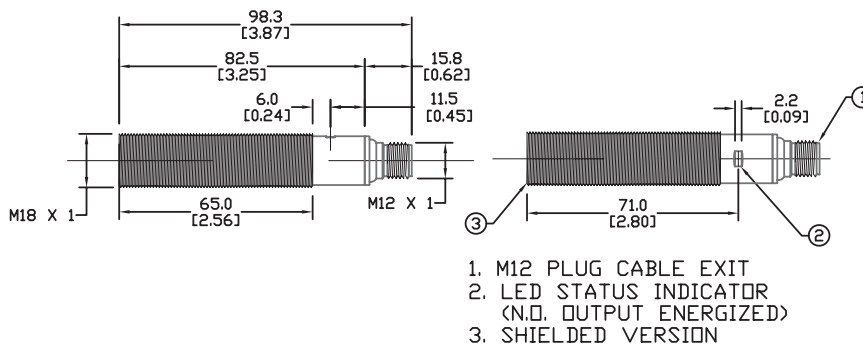


# FFRS Series IP69K-rated Photoelectric Sensors

FFRS Series 18 mm Photoelectric Sensors Specifications		
Type	Background Suppression	
	Standard	For Shiny Objects
Model Series	FFRS	FFRS**77
Sensing Distance	30 to 130 mm	60 to 100 mm
Light Spot Diameter	13 mm @ 100 mm	
Emission	Red 660 nm	
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 30 VDC	
Voltage Drop	2V max at 100mA	
Switching Frequency	1 KHz	400 Hz
Ripple	≤10%	
Time Delay Before Availability (tv)	200ms	
Short-Circuit Protection	Yes, switch autoresets after load is removed	
Operating Temperature	-13°F to 176°F (-25°C 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 Output state - O models*; Yellow ON: Light state - B models*	
Housing Material	316L stainless steel	
Lens Material	Poly methyl methacrylate (PMMA), FDA certified	
Exit Connector Material	Grilamid	
Shock/Vibration	See terminology section	
Tightening Torque	50 Nm (36.88 lb-ft)	
Weight	200g (7.05 oz)	
Connectors	M12 plug	
Approvals	CE, cULus file E187310, ECOLAB, RoHS, Johnson Diversey	

## Dimensions

mm(in)



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

# Accessories for 18mm Sensors

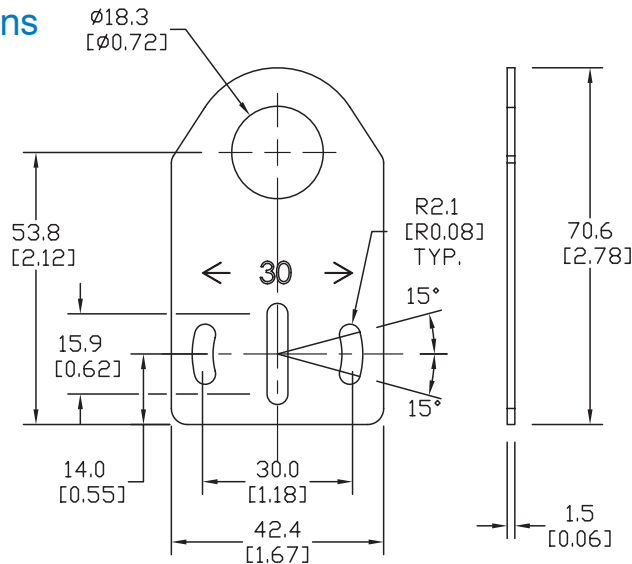
## Axial Mounting Bracket

Axial mounting bracket for use with 18mm sensors. 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.

Accessories for 18mm Sensors			
Part Number	Price	Description	Weight [lb]
ST18A	\$1.25	Mounting bracket, axial, zinc-plated steel. For use with 18mm sensors. 1/pk.	0.06
ST18A7W	\$6.00	Mounting bracket, axial, 316L stainless steel. For use with 18mm sensors. 1/pk.	0.06

### Dimensions

mm [inches]



ST18A

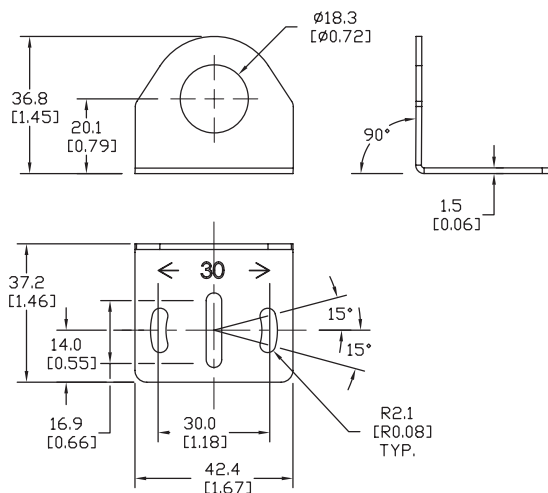
## Right-angle Mounting Bracket

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]
ST18C	\$1.25	Mounting bracket, right angle, zinc-plated steel. For use with 18mm sensors. 1/pk.	0.06
ST18C7W	\$6.00	Mounting bracket, right angle, 316L stainless steel. For use with 18mm sensors. 1/pk.	0.06

### Dimensions

mm [inches]



ST18C

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings

# Accessories for 18mm Sensors

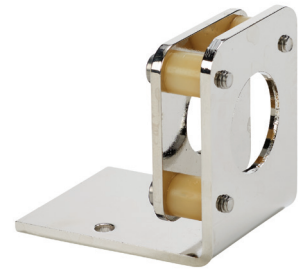
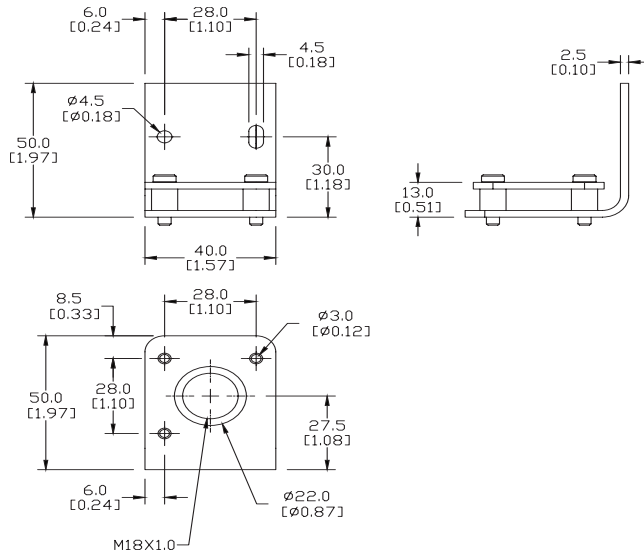
## Right-angle Fine Tune Mounting Bracket

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	Weight [lb]
OPT2036	\$30.00	Mounting bracket, right-angle, fine tune vertical and horizontal adjustment, nickel-plated steel. For use with 18mm sensors.	0.02

### Dimensions

mm [inches]



OPT2036

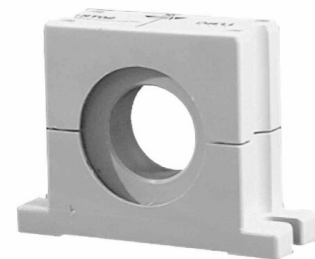
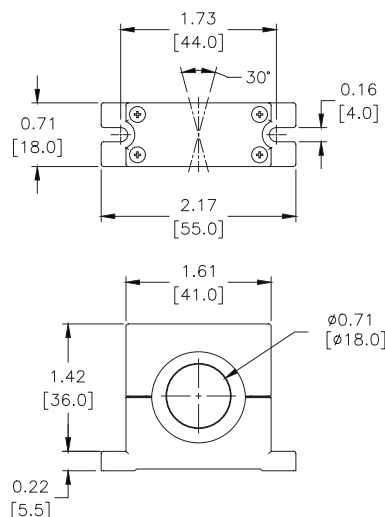
## Swivel Mounting Bracket

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	\$8.25	Mounting bracket, ball swivel, plastic. For use with 18mm sensors.	0.06

### Dimensions

mm [inches]



ST02

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings

# 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.

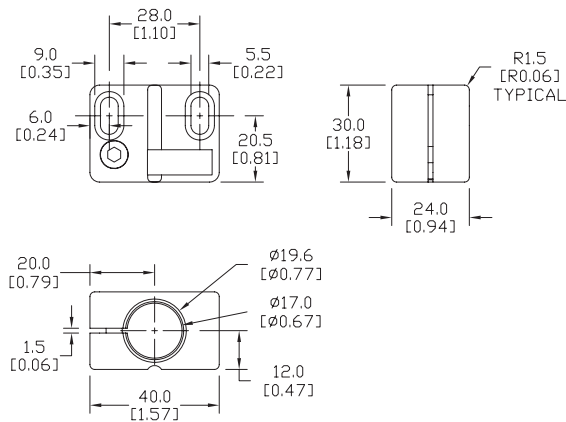
Accessories for 18mm Sensors				
Part Number	Price	Description	Weight [lb]	
<b>OPT2104</b>	\$8.00	Mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 18mm sensors.	0.06	
<b>OPT2105</b>	\$8.00	Mounting bracket, right-angle, plastic. For use with 18mm sensors.	0.06	



**OPT2104, OPT2105**

## Dimensions

mm [inches]



## 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	Weight [lb]
<b>OPT2116</b>	\$9.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with 18mm sensors.	Aluminum	304 Stainless Steel	0.15
<b>OPT2117</b>	\$16.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with 18mm sensors.	304 Stainless Steel	304 Stainless Steel	0.28

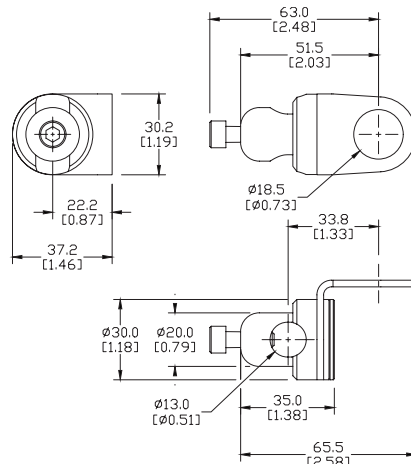
**Note: 304 Stainless steel mounting rods sold separately: OPT2109 (200mm length), OPT2110 (300mm length), and OPT2111 (500mm length).**



**OPT2116, OPT2117**

## Dimensions

mm [inches]



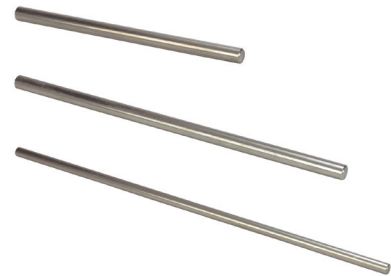
See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings

# Mounting Rods

## Mounting Rods

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

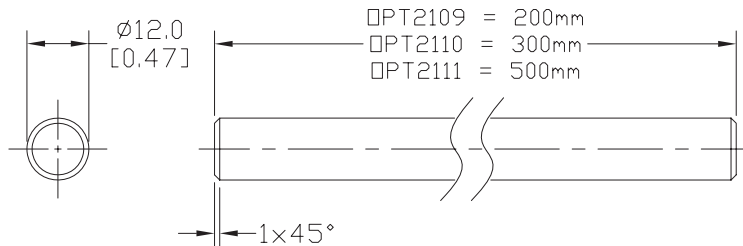
Mounting Rods for OPT2112-2127 Swivel Mounting Brackets			
Part Number	Price	Description	Weight [lb]
<b>OPT2109</b>	\$10.00	Mounting rod, 12mm diameter, 200mm length, 304 stainless steel.	0.41
<b>OPT2110</b>	\$12.00	Mounting rod, 12mm diameter, 300mm length, 304 stainless steel.	0.60
<b>OPT2111</b>	\$16.00	Mounting rod, 12mm diameter, 500mm length, 304 stainless steel.	0.98



**OPT2109, OPT2110, OPT2111**

## Dimensions

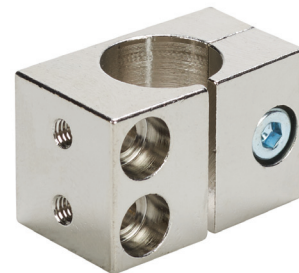
mm [inches]



## Right-angle Mounting Bracket

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

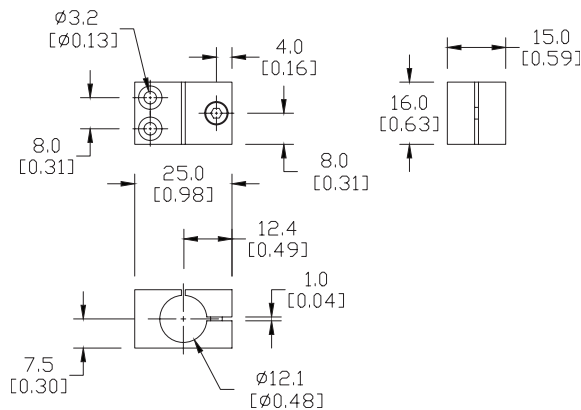
Accessories for 12mm Sensors			
Part Number	Price	Description	Weight [lb]
<b>OPT2108</b>	\$12.00	Mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.	0.07



**OPT2108**

## Dimensions

mm [inches]



See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings