

RightSight™ PHOTOSWITCH® Photoelectric Sensors

Catalog Numbers 42EF-*

Topic	Page
RightSight IO-Link PHOTOSWITCH Photoelectric Sensors	2
RightSight PHOTOSWITCH Photoelectric Sensors with Teach Function	4
LaserSight RightSight PHOTOSWITCH Photoelectric Sensors	6
RightSight PHOTOSWITCH Photoelectric Sensors	8
ClearSight RightSight PHOTOSWITCH Photoelectric Sensors	10
RightSight DeviceNet PHOTOSWITCH Photoelectric Sensors	12

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

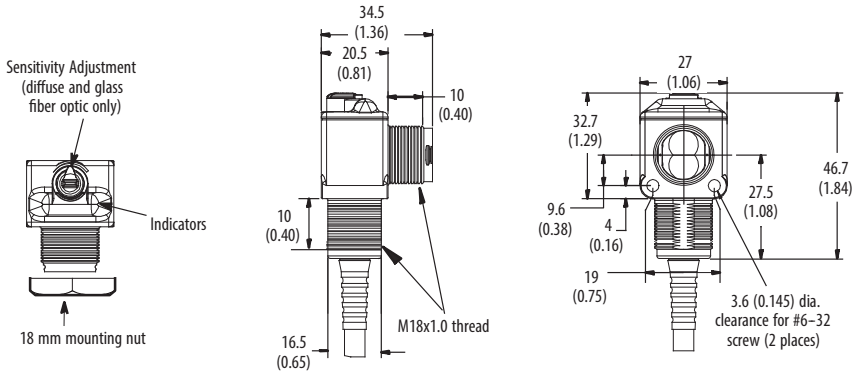
LISTEN.
THINK.
SOLVE.®

RightSight IO-Link PHOTOSWITCH Photoelectric Sensors

Specifications

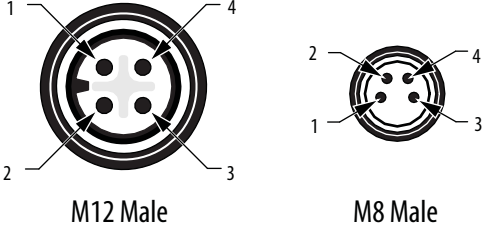
	42EF-*2J*	42EF-*2K*	42EF-*2M*
Certifications	cULus Listed and CE Marked for all applicable directives		
Vibration	10...55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2		
Shock	30 G with 1 ms pulse duration, meets or exceeds IEC 60947-5-2		
Relative Humidity	5...95% (noncondensing)		
Ambient Light Immunity	Incandescent light: 5000 lux Sunlight: 20,000 lux		
User Interface			
Indicator LEDs	Green LED (power and margin), Orange LED (output)		
Electrical			
Adjustments	Fixed or adjustment knob by cat. no.		
Voltage	10...30V DC, I-O link: 18...30V DC		
Current consumption	30 mA maximum		
Sensor Protection	False pulse, reverse polarity, overload, short circuit		
Outputs			
Response time	1 ms		
Output type	PNP and NPN	PNP or NPN (based on cat. no.)	
Load Current	100 mA		
Leakage Current	PNP: 0.1 mA, NPN: 0.3 mA, maximum		
Mechanical			
Housing Material	Mindel		
Lens Material	Acrylic		
Cover Material	Udel		
Supplied Accessories	Supplied 18 mm mounting nut		
Environmental			
Enclosure Type Rating	NEMA 4X, 6P, IP67, IP69K; 1200 psi (8270 kPa) washdown		
Operating Temperature [C (F)]	-25...+70° (-13...+158°)		
Connection Type	2 m cable, 4-pin DC micro (M12) QD on 150 mm pigtail; 4-pin DC pico (M8) QD on 150 mm pigtail		

Approximate Dimensions [mm (in.)]

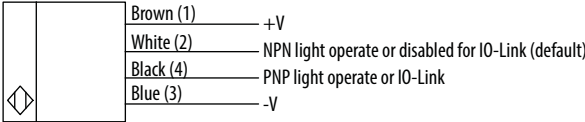


Wiring Diagram

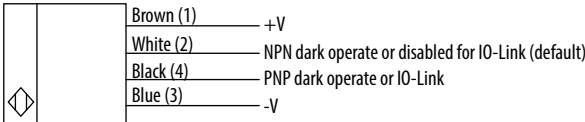
Micro (M12 Male QD on Pigtail and Integral Pico (M8) Male QD



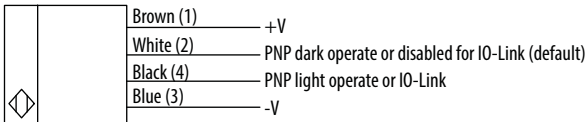
Light Operate PNP and NPN Models (42EF-D2JBAK-1, 42EF-P2JBB-1)



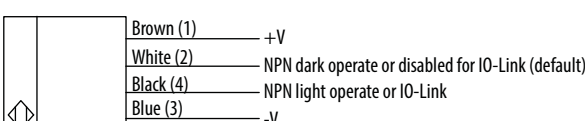
Dark Operate PNP and NPN Models (42EF-D2KBAK-1, 42EF-P2KBB-1)



PNP Complementary Models (42EF-D2MPAK-1, 42EF-P2MPB-1)



NPN Complementary Models (42EF-D2MNAK-1, 42EF-P2MNB-1)

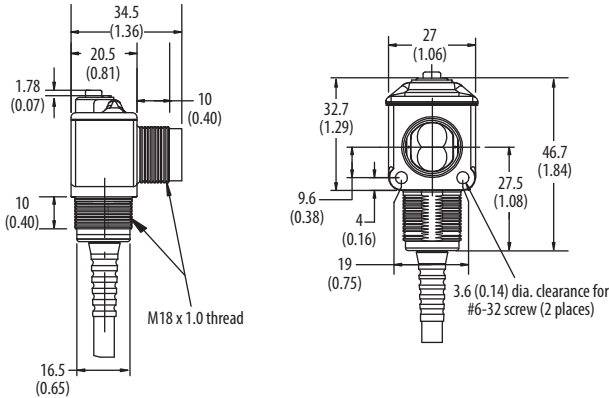


RightSight PHOTOSWITCH Photoelectric Sensors with Teach Function

Specifications

		Standard Diffuse	Fixed Focus Diffuse—White	Fixed Focus Diffuse—Red	Fixed Focus Diffuse—Green
Cat No.	Dark Operate	42EF-D1KBCK-a	42EF-FSKBC-a	42EF-F2KBC-a	42EF-F3KBC-a
	Light Operate	42EF-D1JBCK-a	42EF-FSJBCK-a	42EF-F2JBCK-a	42EF-F3JBCK-a
Optical	Sensing Distance	700 mm (27.5 in.)	43 mm (1.7 in.)		
	Field of View	5°	Not applicable		
	Spot Size	Not applicable	4 mm (0.15 in.)		
	Transmitting LED	Infrared 880 nm	Visible white	Visible red 660 nm	Visible green 525 nm
	Sensitivity Adjustment	Teach button with 5 second lock out			
Mechanical	Housing Material	Mindel			
	Lens Material	Acrylic			
	Cover Material	Udel®			
	Connection Type	(-A2) 2 m PVC, 300V cable, (-F4) 4-pin DC micro QD on 6-inch pigtail			
	LED Indicators	See table below			
	Supplied Accessories	One 18 mm mounting nut			
Environmental	Operating Temperature	-25...+70°C (-13...+158°F)			
	Operating Environment	NEMA 3R, 4X, 6P, IP67; 8270 kPa (1200 psi) washdown			
	Vibration/Shock	5 g, 10...55 Hz, 1 mm amplitude, meets or exceeds IEC 947-5-2/30 G, 1 ms pulse duration, meets or exceeds IEC 947-5-2			
	Relative Humidity	95%			
	Approvals	UL, CSA, CE Marked for all applicable directives			
Electrical	Voltage/Current/Power Consumption	10.8...30V DC @ 30 mA maximum (1 W maximum)			
	Sensor Protection	Input reverse polarity, over voltage, false pulse protected, output short-circuit (SCP) to 100 mA, overload			
	Output Type	Dual NPN and PNP, light or dark operate by catalog number			
	Output Rating	30V DC @ 100 mA maximum			
	Output Leakage Current	0.1 mA maximum			
	Response Time	1 ms maximum			
	Power ON Delay	< 1 s			

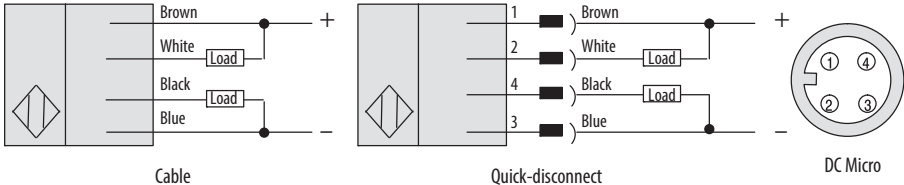
Approximate Dimensions [mm (in.)]



Wiring Diagram

10.8–30V DC Sensors

Models with dual NPN and PNP outputs



Note: All wire colors on quick-disconnect models shown. Refer to Rockwell Automation cordsets.

LaserSight™ RightSight PHOTOSWITCH Photoelectric Sensors

Specifications

Environmental

Certifications	cULus and CE marked for all applicable directives
Operating Environment	IP54
Operating Temperature [C (F)]	-10...+40° (14...+104°)
Vibration	10...55 Hz, 1.5 mm amplitude, meets or exceeds IEC 60947-5-2
Shock	30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2
Relative Humidity	5...95% (noncondensing)

Optical

Model	Sensing Range	Spot Size
Diffuse	0.0...300 mm (0.0...11.81 in.)	2 x 3.5 mm @ 300 mm
Polarized Retroreflective	0.05...15 m (0.0...49.2 ft)	16 x 20 mm (0.63 x 0.79 in.)
Transmitted Beam	0.0...40 m (0.0...131.2 ft)	50 x 70 mm (1.97 x 2.76 in.)
Adjustments	Adjustment knob or teach button per catalog number	

Electrical

Voltage	24V DC \pm 10%
Current Consumption	30 mA maximum
Sensor Protection	Reverse polarity, short-circuit, false pulse, overload

Outputs

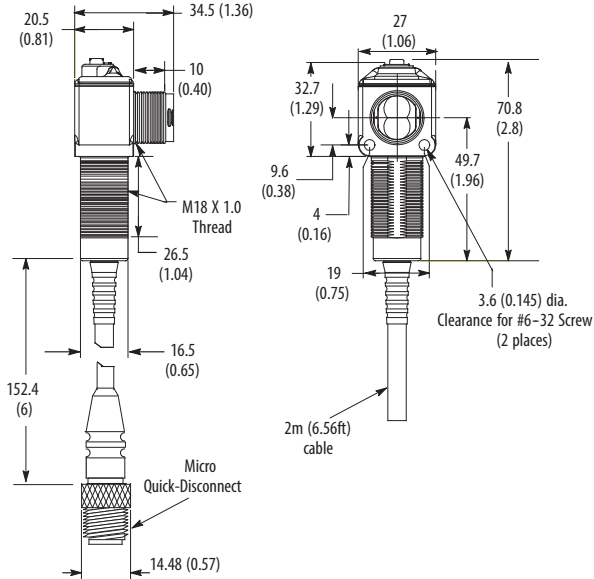
Response Time	1 ms max. (4 ms for transmitted beam)
Output Type	PNP and NPN
Output Mode	Light operate or dark operate by catalog number
Output Current	100 mA max.

Mechanical

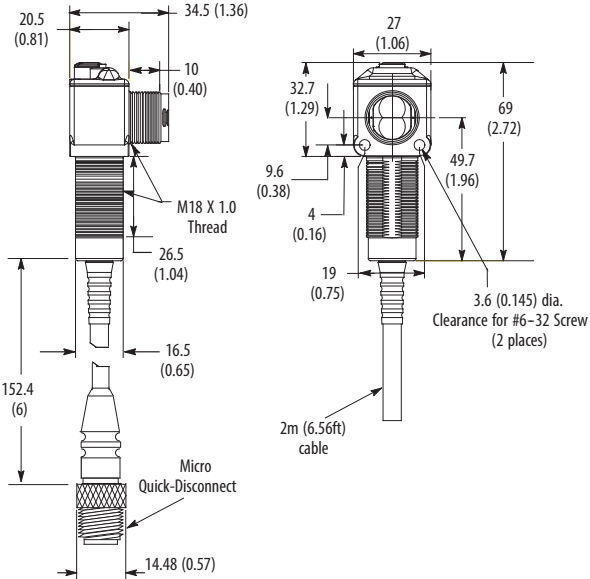
Housing Material	Mineral
Lens Material	Acrylic
Connection Type	2 m cable, 4-pin DC micro (M12) pigtail
Supplied Accessories	None
Optional Accessories	Mounting brackets and cordsets

Approximate Dimensions [mm (in.)]

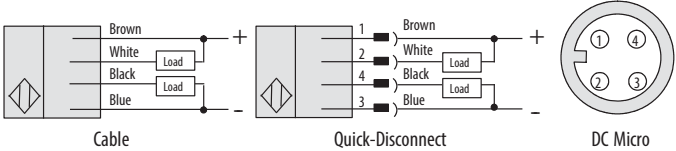
Teach Function Models



Adjustable Models



Wiring Diagram



For Allen-Bradley programmable controller compatible interface, refer to publication 42-2.0. All wire colors on quick-disconnect models refer to Allen-Bradley 889D cordsets.

RightSight PHOTOSWITCH Photoelectric Sensors

Specifications

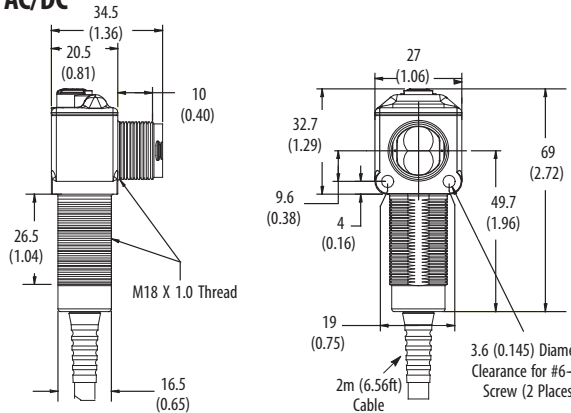
Description	Polarized Retroreflective	Standard Retroreflective	Diffuse	Sharp Cutoff Diffuse	Background Suppression		Glass Fiber Optic	Transmitted Beam			
					50 mm (2 in.)	100 mm (4 in.)		20 m Receiver	4 m Receiver		
Optical	Sensing Distance	3 m (9.8 ft)	4.5 m (14.7 ft)	500 mm (20 in.)	<127 mm (5 in.)	50 mm (2 in.)	100 mm (4 in.)	Varies w/FO cable	20 m (60 ft)	4 m (13 ft)	
	Field of View	7°	2.5°	5°	7°	20°	8°	Varies w/FO cable	7°	7°	
	Transmitted LED	Visible Red 660	Visible Red 660	Infrared 880 nm							
	Sensitivity Adjustment	no	no	yes	no	yes	no				
Mechanical	Housing/Lens Material	Specially formulated polymer/Acrylic									
	Connection Type	Connection Type									
	LED Indicators	See table below									
	Supplied Accessories	One 18 mm mounting nut, two on fiber optic models									
	Optional Accessories	See accessories for mounting brackets, reflectors, apertures, fiber optic cables, cordsets, and patchcords									
Environmental	Operating Temperature	-25...+55°C (-13...+131°F), 132V AC/DC; -25...+70°C (-13...+158°F), 132V AC/DC									
	Operating Environment	NEMA 3R, 4X, 6P, IP67; 8270 kPa (1200 psi) washdown									
	Vibration/Shock	5 g, 10...55 Hz, 1 mm amplitude, meets or exceeds IEC 947-5-2/30g, 1 ms pulse duration, meets or exceeds IEC 947-5-2									
	Relative Humidity	95%									
	Certifications	UL, CSA, CE for all applicable directives									
DC Sensors	Catalog Number Complementary LO & DO	42EF-P2MNB-a	—	42EF-D1MNAK-a	42EF-S1MNA-a	42EF-B1MNBC-a	42EF-B1MNB-a	42EF-G1MNA-a	42EF-R9MNB-a	42EF-R9MNBV-a	
	Complementary LO & DO	42EF-P2MPB-a	—	42EF-D1MPAK-a	42EF-S1MPA-a	42EF-B1MPBC-a	42EF-B1MPBE-a	42EF-G1MPA-a	42EF-R9MPB-a	42EF-R9MPBV-a	
	DO NPN & PNP	42EF-P2KBB-a	42EF-U2KBB-a	42EF-D1KBAK-a	42EF-S1KBA-a	42EF-B1KBBC-a	42EF-B1KBBE-a	42EF-G1KBA-a	42EF-R9KBB-a	42EF-R9KBBV-a	
	LO NPN & PNP	42EF-P2JBB-a	42EF-U2JBB-a	42EF-D1JBAK-a	42EF-S1JBA-a	42EF-B1JBBC-a	42EF-B1JBBE-a	42EF-G1JBA-a	42EF-R9JBB-a	42EF-R9JBV-a	
	Voltage/Current/Power	10.8...30V DC @ 35 mA maximum (1 W maximum)									
DC Sensors	Sensor Protection	Input reverse polarity, over voltage, false pulse protected, output short-circuit (SCP) to 100 mA, overload									
	Output Type	NPN, PNP, Dual NPN and PNP									
	Output Rating	30V DC @ 100 mA maximum (SCP protected)									
	Output Leakage Current	0.1 mA maximum									
	Response Time	1 ms typical, 4 ms for transmitted beam models									
AC/DC Sensors	Catalog Number MOSFET, Dark operate	42EF-P2SCB-b	42EF-U2SCB-b	42EF-D1SCAK-b	42EF-S1SCA-b	42EF-B1SCBC-b	42EF-B1SCBE-b	42EF-G1SCA-b	42EF-R9SCB-b	42EF-R9SCBV-b	
	MOSFET, Light operate	42EF-P2RCB-b	42EF-U2RCB-b	42EF-D1RCAK-b	42EF-S1RCA-b	42EF-B1RCBC-b	42EF-B1RCBE-b	42EF-G1RCA-b	42EF-R9RCB-b	42EF-R9RCBV-b	
	MOSFET, Dark operate	42EF-P2SFB-b	42EF-U2SFB-b	42EF-D1SFAK-b	42EF-S1SFA-b	42EF-B1SFBC-b	42EF-B1SFBE-b	42EF-G1SFA-b	42EF-R9SFB-b	42EF-R9SFBV-b	
	MOSFET, Light operate	42EF-P2RFB-b	42EF-U2RFB-b	42EF-D1RFAK-b	42EF-S1RFA-b	42EF-B1RFCF-b	42EF-B1RFBE-b	42EF-G1RFA-b	42EF-R9RFB-b	42EF-R9RFBV-b	
	Voltage/Current/Power	21.6...264V AC/DC @ 25 mA maximum (1 VA maximum) 21.6...132V AC/DC for 42EF-xxxFx-a models									
	Sensor Protection	Input reverse polarity, over voltage, false pulse protected, output short-circuit (SCP) to 100 mA, overload									
	Output Type	Light/dark operate (N.O./N.C.) MOSFET output									
	Output Rating	264V AC/DC (132V AC/DC for 42EF-xxxFx-a models) @ 100 mA maximum (SCP protected)									
Output Leakage Current	0.4 mA maximum										
Response Time	8.3 ms typical, 16 ms for transmitted beam models										

① Provide NPN output when wired as DC circuit.
 ② Provide PNP output when wired as DC circuit.
 Contact factory for availability of 8 m range receivers.
 Transmitted beam source models: 42EF-E1EZB-a (DC) and 42EF-E1QZB-b (AC/DC)

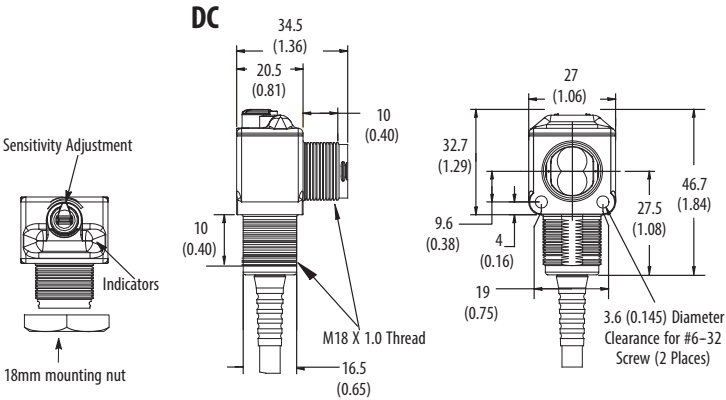
a = (-A2) 2 m PVC, 300V cable, (-F4) 4-pin DC micro QD on six-inch pigtail
 b = (-A2) 2 m PVC, 300V cable, (-G4) 4-pin AC micro QD on six-inch pigtail

Approximate Dimensions [mm (in.)]

AC/DC

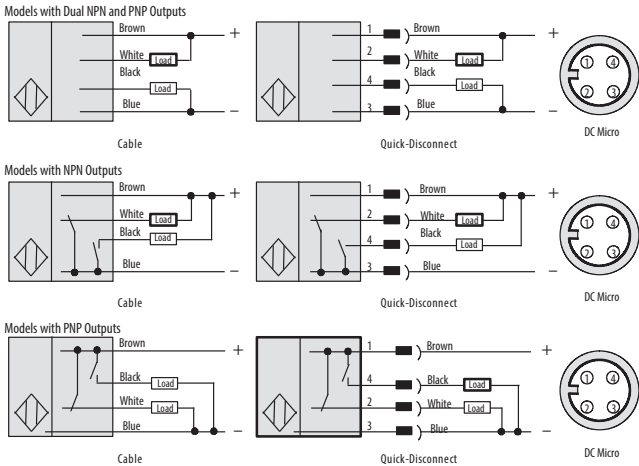


DC

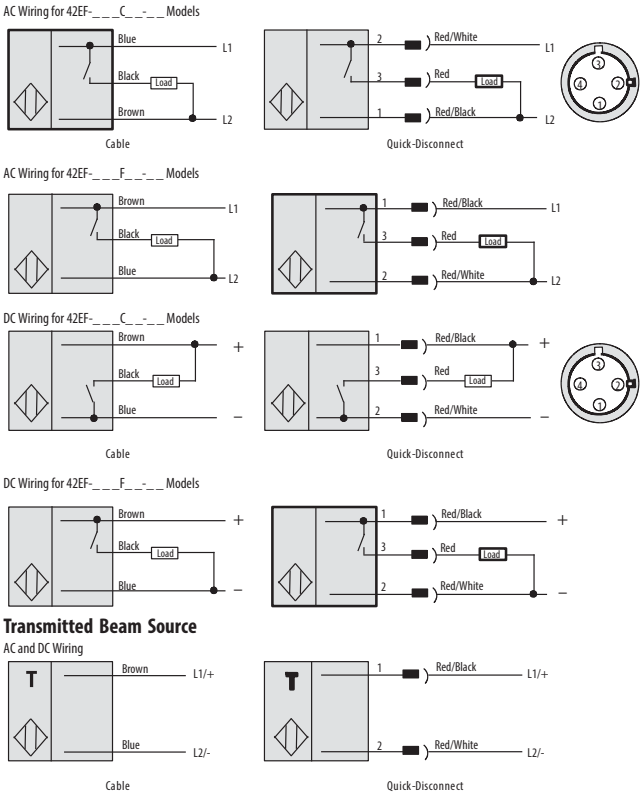


Wiring Diagram

10.8-30V DC Sensors



21.6-264V AC/DC Sensors



Note: All wire colors on the quick-disconnect mode are shown. Refer to Allen-Bradley cordsets.

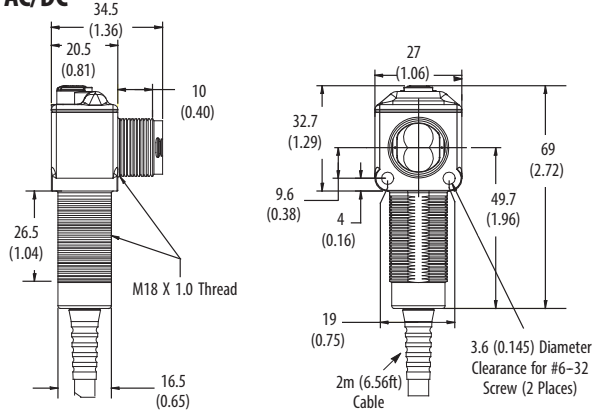
ClearSight™ RightSight PHOTOSWITCH Photoelectric Sensors

Specifications

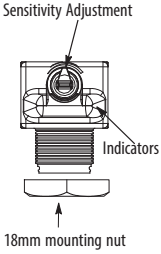
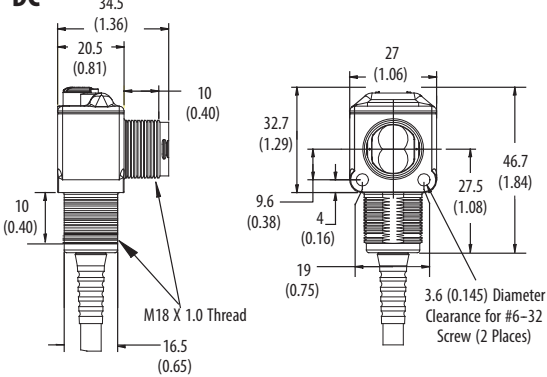
Optical	Sensing Mode	Clear object
	Sensing Distance	1.2 m
	Field of View	1.5°
	Transmitting LED	Visible Red 660 nm
	Sensitivity Adjustment	Yes, single turn
Electrical	Supply Voltage	10.8...30V DC (DC models), 21.6...264V AC/DC (AC/DC models)
	Current Consumption	35 mA maximum
	Protection	False pulse on power up, reverse polarity, output short-circuit protection, overvoltage
	Output Type	Dual NPN and PNP (DC models), MOSFET (AC/DC models)
	Output Load Voltage/Current	100 mA @ 30V DC (DC models), 100 mA @ 264V AC/DC (AC/DC models)
	Output Energized	Light/Dark operate by catalog number
	Output Response Time	0.5 ms (DC models), 1 ms (AC/DC models)
Mechanical	Housing Material	Mindel®
	Lens Material	Acrylic
	Indicators	Yellow: Output, Green: Power, Orange: Margin/SCP
Environmental	Operating Temperature	-25...+70°C (-13...+158°F)
	Operating Environment	NEMA 3R, 4X, 6P; IP67 1200 psi washdown
	Vibration	10...55Hz, 1 mm amplitude, Meets or exceeds IEC 947-5-2
	Shock	30 G with 1 ms pulse duration, Meets or exceeds IEC 947-5-2
	Relative Humidity	Up to 95%
	Approvals	UL, CSA, CE Marked for all applicable directives
Accessories	Supplied	92-90 Reflector
		18 mm locknut
	Optional	889D-F4AC-2 cordset (DC models), 889R-F4AEA-2 cordset (AC/DC models) 60-2649 Tilt/Swivel Mounting Bracket; 60-2657 Mounting bracket, metal

Approximate Dimensions [mm (in.)]

AC/DC



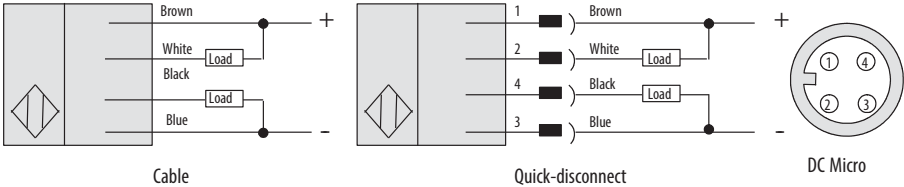
DC



Wiring Diagram

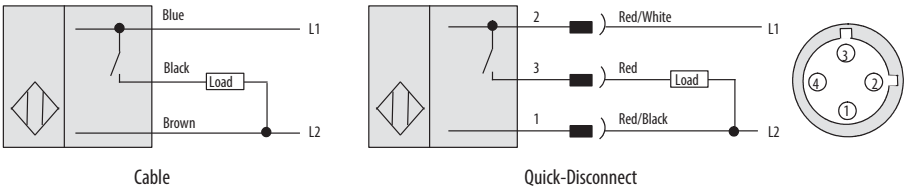
10.8-30V DC Sensors

Models with Dual NPN and PNP Outputs

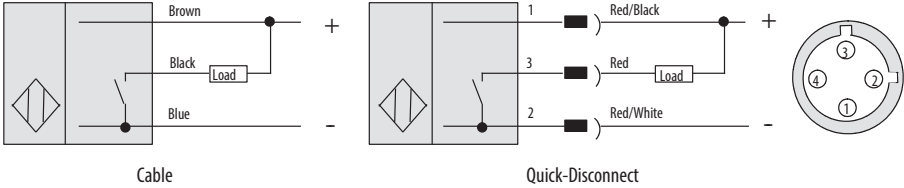


21.6-264V AC/DC Sensors

AC Wiring for 42EF-__C__ Models



DC Wiring for 42EF-__C__ Models



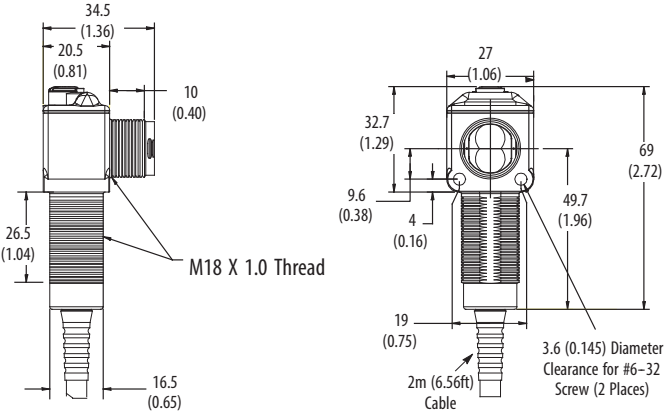
Note: All wire colors on quick-disconnect models shown refer to Allen-Bradley cordsets.

RightSight DeviceNet™ PHOTOSWITCH Photoelectric Sensors

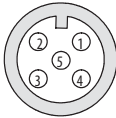
Specifications

Sensing Mode		Polarized Retroreflectiv	Diffuse	Sharp Cutoff Diffuse	Background Suppression		Glass Fiber Optic	Transmitted Beam		
Version					50 mm (2 in.)	100 mm (4 in.)		20 m Receiver	4 m Receiver	Source
Cat No.	5-pin micro QD	42EF-P2LDB-F5	42EF-D1LDAK-F5	42EF-SIMDA-F5	42EF-B1LDBC-F5	42EF-B1LDBE-F5	42EF-G1LDA-F5	42EF-R9LDB-F5	42EF-R9LDBV-F5	42EF-E1EDZB-F5
	2m cable	Consult factory								42EF-E1EZB-A2
Optical	1 Sensing Distance	3m (9.8 ft)	500 mm (20 in.)	<127mm (5 in.)	50 mm (2 in.)	100 mm (4 in.)	Varies with fiber optic cable	20m (60 ft)	4 m (13 ft)	20 m (60 ft)
	2 Field of View	1.5°	5°	7°	20°	8°		7°	Not applicable	
	3 Transmitting LED	Visible Red 660 nm	Infrared 880 nm					Not applicable		Infrared 880 nm
	4 Sensitivity Adjustment	No	Yes		No		Yes	No		
Electrical	5 Supply Voltage	11...25V DC								
	6 Current Consumption	65 mA maximum								
	7 Power Consumption	1.6 W maximum								
	8 Response Time	3 ms	3 ms	3 ms	3 ms	3 ms	3 ms	3 ms	11 ms	11 ms
9 Protection	Output: short circuit protected, Power: Reverse polarity, False Pulse (300ms power ON delay)									Power: Reverse polarity
Mechanical	10 Housing Material	Mindel								
	11 Lens Material	Acrylic								
	12 Indicators	See Table 1.								Green: Power
Environmental	13 Operating Temperature	-25...+70°C (-13...+158°F)								
	14 Operating Environment	NEMA 4X, 6P, IP67; 8270 kPa (1200 psi) washdown								
	15 Vibration	10...55 Hz, 1 mm amplitude, meets or exceeds IEC 947-5-2								
	16 Shock	30 G, meets or exceeds IEC 947-5-2								
	17 Relative Humidity	95%								
	18 Approvals	UL, CSA, CE Marked for all applicable directives, DeviceNet conformance tested								
	DeviceNet	19 Network Interface	DeviceNet							
20 Protocol		Selectable Change-of-State (COS) or Strobing								
21 Operating Mode		Selectable Light/Dark Operate								
22 Autobaud Detect		Selectable ON/OFF								
23 Communication Rate		Selectable 125 kb, 250 kb, 500 kb								
24 Supported Node Address		Selectable 0...63 (63 factory default)								
25 Timer		ON Delay and OFF Delay/One Shot (0...65,535 ms, 1 or 10 ms time base)								
26 Counter		Adjustable with output bit (0...65,535 counts)								
27 Motion Detect		Adjustable with output bit (0...65,535 ms, 1 ms time base)								
28 Margin Diagnostic		Selectable with dual thresholds (0.7...1.5 and 0.7...2.0)								
29 Margin Diagnostic Type		Selectable static or dynamic								

Approximate Dimensions [mm (in.)]



Wiring Diagram



Pin	Function	Color
1	drain	Bare
2	V+	Red
3	V-	Black
4	CAN_H	White
5	CAN_L	Blue

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

Allen-Bradley, Rockwell Software, Rockwell Automation, and LISTEN. THINK. SOLVE are trademarks of Rockwell Automation, Inc.
Trademarks not belonging to Rockwell Automation are property of their respective companies.

Rockwell Otomasyon Ticaret A.Ş., Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846