Technical Data

Original Instructions

RightSight M30

Catalog Numbers 42AF-P2MAB1-F4, 42AF-P2MAB1-D4, 42AF-P2RHB1-G4, 42AF-E1EZB1-F4, 42AF-E1EZB1-D4, 42AF-R1MAB1-D4, 42AF-R1MAB1-F4, 42AF-R1RHB1-G4, 42AF-E1UZB1-G4, 42AF-P2CHB1-A2, 42AF-R1CHB1-A2, 42AF-E1UZB1-A2, 42AF-P2SHB1-G4, 42AF-R1SHB1-G4, 42AF-P2CHB1-M5, 42AF-R1CHB1-M5, 42AF-E1UZB1-M4

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated Description	1
Updated Available Models list	1
Updated Features	2
Updated Product Selection table and Connection Options Important table that follows	3
Updated Figure 2, Figure 3, Figure 4, and Figure 9 titles	4 and 5
Updated Figure 12	5

Description

The RightSight™ M30 family of photoelectric sensors offers high-performance general-purpose sensing in a robust flexible package. They are designed for applications where simplified installation and maintenance are required.

Designed to withstand the rigors of material handling and packaging environments, the RightSight M30 standard models can withstand IP69K high-pressure washdowns.

This family also offers a background reflection/foreground suppression sensing mode that allows you to use the surface of a background (for example, a conveyor) as a reflector. The detection of a target occurs once an object blocks the visual path between the sensor and the background (for example, conveyor).

Available Models

- Polarized retroreflective
- Transmitted beam
- Background suppression
- Background reflection

Status Indicators

Features

- Maximum sensing distance
  - Background suppression without physical adjustments [a]: 400 mm (15.7 in.) and 600 mm (23.6 in.)
  - Background suppression with push button teach [a]: 1.2 m (3.94 ft)
  - Background reflection with push button teach [a]: 800 mm (31.5 in.)
  - Polarized retroreflective: 10 m (32.8 ft) with 92-125 reflector
  - Transmitted beam: 80 m (262.5 ft)
- High powered light source for ease of alignment
- 360° highly visible user interface helps operators verify the proper operation, regardless of the sensor installation location
- Background suppression performance helps minimize false detections due to highly reflective backgrounds
- Dual Auto PNP/NPN helps streamline inventory by reducing the number of catalog numbers to stock
- Push button lock helps prevent unauthorized operators from changing the sensor settings
- Embedded IO-Link 1.1 communications protocol
- Adjustable sensing ranges and response time via IO-Link provides additional flexibility to detect targets at longer or shorter distances depending on the application requirements.
- IP67 and IP69K rated enclosure.

(a) All models can be taught to detect targets up to 4 m (13.1 ft.) when using IO-Link to adjust the response time

Specifications

Attribute	Value
Certifications	c-UL-us and CE Marked for all applicable directives
Vibration	10...55 Hz, 1 mm (0.04 in.) amplitude, meets, or exceeds 60947-5-2
Shock	30 g (1.1 oz) with 1 ms pulse duration per IEC 60947-5-2
Ambient light immunity	• Direct Illumination: 20,000 lux • Indirect Illumination: 5000 lux • Sunlight immunity; 108,000 lux
User Interface	
Status indicators	Green and orange light-emitting diodes (LED)
Electrical	
Adjustments	No physical adjustment. IO-Link adjustable
Operating voltage	• DC models: 10...30V DC, IO-Link: 18...30V • AC/DC models: AC: 24...250V AC/DC: 20...250V DC
Current consumption	35 mA max
Sensor protection	DC: Reverse polarity and short circuit; AC/DC: Reverse polarity
Discrete Output	
Response time	• DC: 1 ms • AC/DC: 15 ms max
Output type	• DC: Dual Auto PNP or NPN • AC/DC: EM Relay
Load current	• DC: 100 mA max • AC/DC SPDT: 10...30V DC: 3 A; 31...125V DC: 200 mA; 24...250V AC: 3 A
IO-Link	
Communications mode	COM2
Cycle time, min	2 ms
Process data bit length	32 bits (4 bytes)
Specifications	1.1
Mechanical	
Housing material	PBT
Lens material	PMMA
Cover material	Polysulfone
Reliability Data	
Transmitted Beam and Polarized Retroreflective AC/DC	
MTTFd (hours)	6548788.474
T10d	78.76
Transmitted Beam and Polarized Retroreflective DC	
MTTFd (hours)	9310986.965
T10d	111.9875
Transmitted Beam Emitter AC/DC	
MTTFd (hours)	24271844.66
T10d	291.9285467
Transmitted Beam Emitter DC	
MTTFd (hours)	24271844.66
T10d	291.9285467
Environmental	
Enclosure type rating	IP67 and IP69K per ISO 20653 rated enclosure
Operating temperature	-40...+70 °C (31...158 °F) [1]
Connection type	• 2 m (6.5 ft) cable • 4-pin Integral M12 QD • 4-pin M12 QD on a 150 mm (5.9 in.) pigtail • 4-pin mini QD on 150 mm (5.9 in.) pigtail • 5-pin mini QD on 150 mm (5.9 in.) pigtail

(1) The sensing range for all sensing modes can be reduced up to 20% when operated between -40...-25 °C (-40...-13 °F).

Product Selection

Sensing Mode	Operating Voltage	Light Source	Sensing Distance	Sensitivity Adjustment	Output Function	Output Type	Cat. No.
Background Suppression	10...30V DC	Infrared	Default setting: 10...400 mm (0...15.7 in.)	No physical adjustment. IO-Link teach: 4 m (13.1 ft) (1)	Light and dark operate	Dual auto PNP or NPN	42AF-B1MAB1-D4
			Default setting: 10...600 mm (0...23.6 in.)	No physical adjustment. IO-Link teach: 4 m (13.1 ft) (1)			42AF-B1MAB2-D4
			Default setting: 10...1.2 m (0...3.9 ft)	Push button teach: 3 m (9.8 ft) IO-Link teach: 4 m (13.1 ft) (1)			42AF-B1MAC1-D4
Background Reflection	10...30V DC	Infrared	0...800 mm (0...31.5 in.)	Push button teach: 3 m (9.8 ft) IO-Link teach: 4 m (13.1 ft) (1)	Light and dark operate	Dual auto PNP or NPN	42AF-N1MAC1-D4
Polarized Retroreflective	10...30V DC	Visible red	0.025...10 m (0.03...33 ft) with 92-125 reflector	No adjustment (IO-Link adjustable)	Light and dark operate	Dual auto PNP or NPN	42AF-P2MAB1-D4
	20...250V DC 24...250V AC			No adjustment	Light operate	SPDT EM relay	42AF-P2RHB1-G4
					Dark operate		42AF-P2SHB1-G4
					Light and dark operate		42AF-P2CHB1-A2
Transmitted Beam	10...30V DC	Infrared	0...80 m (0...262 ft)	No adjustment (IO-Link adjustable)	Transmitted beam emitter	—	42AF-E1EZB1-D4
	20...250V DC 24...250V AC						42AF-E1UZB1-G4
	10...30V DC			No adjustment	Light and dark operate	Dual auto PNP or NPN	42AF-R1MAB1-D4
	20...250V DC 24...250V AC				Light operate	SPDT EM relay	42AF-R1RHB1-G4
					Dark operate		42AF-R1SHB1-G4
					Light and dark operate		42AF-R1CHB1-A2

(1) Sensor response time can be changed up to 75 ms to achieve distance of up to 4 m (13.1 ft). A higher distance between target and high reflectivity background may be needed when operating the sensors at distances greater than 2 m (6.6 ft).

IMPORTANT Connection Options (1): The following suffixes describe the available connection options:

- D4: Describes an integral 4-pin DC micro (M12) quick-disconnect for DC models.
- G4: Describes a 4-pin AC micro (M12) quick-disconnect on a 150 mm (6 in.) length pigtail on AC/DC models.
- F4: Describes a 4-pin DC micro (M12) quick-disconnect on a 150 mm (6 in.) length pigtail on DC models.
- A2: Describes a 2 m (6.6 ft) PVC cable.
- M4: Describes a 4-pin mini quick-disconnect on a 150 mm (6 in.) length pigtail. Transmitted beam emitter only.
- M5: Describes a 5-pin mini quick-disconnect on a 150 mm (6 in.) length pigtail on AC/DC models. Polarized retroreflective and transmitted beam receivers only.

(1) Additional connection options may be available. See the ProposalWorks™ tool for available options by sensing mode.

Table 1 - Standard I/O (Auto PNP/NPN) Operating Mode Indication

Color	Status	Description
Green	OFF	Power is off
	ON	Power is on
	Flash (6 Hz)	Unstable light: 0.8 X <margin<1.5X
	Flash (1.4 Hz)	Output short circuit protection active
Orange	OFF	Output de-energized
	ON	Output energized

Table 2 - IO-Link Operating Mode Indication

Color	Status	Description
Green	OFF	Power is off
	Flash (1 Hz)	Power is on
Orange	OFF	Output de-energized
	ON	Output energized

See https://ab.rockwellautomation.com/Sensors-Switches/Photoelectric-Sensors for additional details about the operation of the RightSight M30 in IO-Link mode.

Sensor User Interface

The green status indicator can also serve as a setup alignment aid. As the sensor is adjusted,

- A flashing green indicator shows that the sensor has detected a margin of 0.8 X
- A flashing green indicator and steady orange output indicator shows a margin greater than 1
- Steady green and orange indicators show a margin greater than 1.5. This status means that the sensor is receiving at least 1.5 times the signal strength back from the target that is required to trigger an output signal.

In general, it is desirable to have a higher margin to help overcome any deteriorating environmental conditions (dust build-up on the sensor lens). When aligning the sensor, the optimum performance can be obtained if this margin indicator is illuminated with the target in place.

Table 3 provides indicator status in the RUN mode, during operation. The sensor is always in run mode except when being taught.

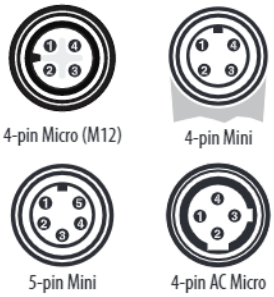
Table 3 - Connection Types

Description	Cat. No. Suffix
2 m (6.56 ft) cable	-A2
4-pin DC micro (M12) QD on 150 mm (6 in.) pigtail	-F4
Integral 4-pin DC micro (M12) QD	-D4
4-pin AC micro on 150 mm (6 in.) pigtail	-G4
4-pin mini QD on 150 mm (6 in.) pigtail	-M4
5-pin mini QD on 150 mm (6 in.) pigtail	-M5

Wiring

The quick-disconnect connector is shown in Figure 1. The pin numbers correspond to the male connectors on the sensor.

Figure 1 - Pinouts



DC Models

Figure 2 - Polarized Retroreflective (42AF-P2MAB1-F4 and 42AF-P2MAB1-D4) Light Operate and Dark Operate (Auto PNP or NPN)

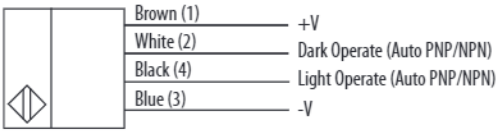


Figure 3 - Transmitted Beam Receiver (42AF-R1MAB1-F4 and 42AF-R1MAB1-D4) Light Operate and Dark Operate (Auto PNP or NPN)

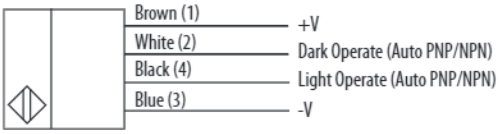
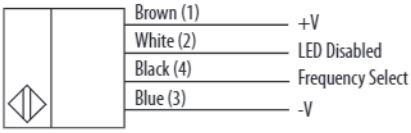


Figure 4 - Transmitted Beam Emitter (42AF-E1EZB1-F4 and 42AF-E1EZB1-D4)



Item	Description
LED Disable	For normal operation, the white wire needs no connection. To disable the light source, connect the white wire to +V.
Frequency Select	For normal operation, the white wire needs no connection. To change the emitter operating frequency, connect the black wire to +V. This feature is supported in future firmware revisions of the Transmitted Beam Receiver.

IMPORTANT For transmitted beam emitter only:
Do not connect pin 2 and pin 4 for normal operation. Unless a change in frequency is required when working with a receiver, these two pins remain unconnected when wiring the transmitted beam emitter sensor to an ArmorBlock® I/O module.

AC/DC Models

Figure 5 - Polarized Retroreflective and Transmitted Beam Emitter Light Operate (42AF-P2RHB1-G4 and 42AF-R1RHB1-G4)

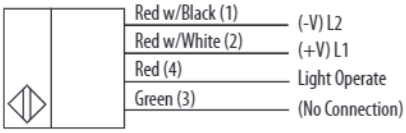


Figure 6 - Dark Operate (42AF-P2SHB1-G4 and 42AF-R1SHB1-G4)

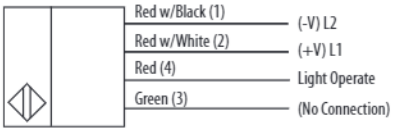


Figure 7 - Polarized Retroreflective and Transmitted Beam (42AF-P2CHB1-A2 and 42AF-R1CHB1-A2)

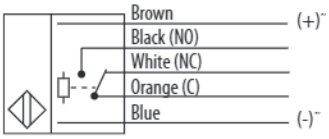


Figure 8 - Polarized Retroreflective and Transmitted Beam (42AF-P2CHB1-M5 and 42AF-R1CHB1-M5)

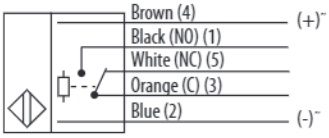


Figure 9 - Transmitted Beam Emitter (42AF-E1UZB1-A2 and 42AF-E1UZB1-G4)

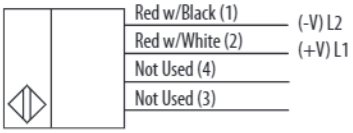


Table 4 - UL508 Overcurrent Protection

Conductor Size		Ampere Rating of the Overcurrent Protection, Max
AWG	mm^2	
20	0.52	5
22	0.32	3
24	0.20	2
26	0.13	1
28	0.08	0.8
30	0.05	0.5

Approximate Dimensions

Figure 10 - Integral M12 Connector [mm (in.)]

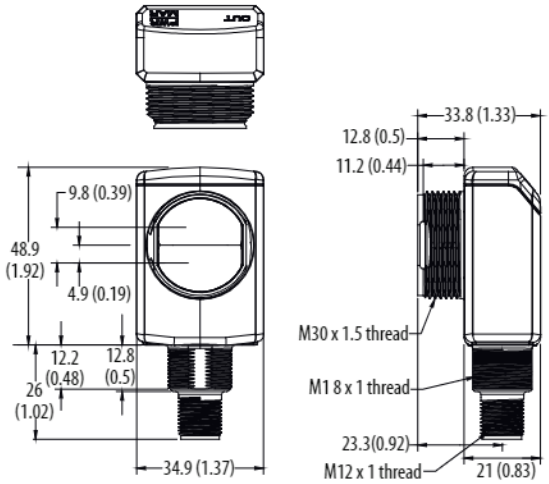
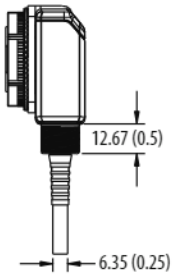


Figure 11 - M12 Pigtail and Cable Models [mm (in.)]



Typical Response Curves

Figure 12 - Visible Red Polarized Retroreflective — 10 m (32.81 ft) Margin Curve

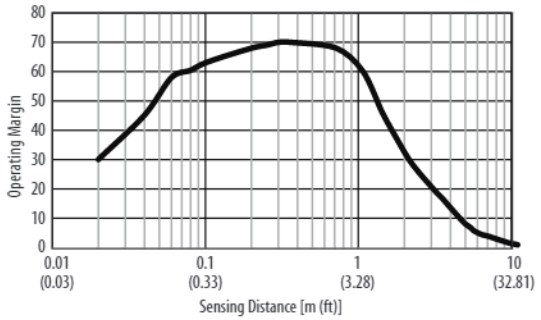


Figure 13 - Visible Red Polarized Retroreflective — 10 m (32.81 ft) Beam Pattern

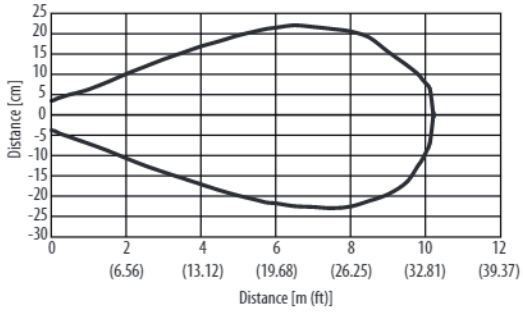


Figure 14 - Infrared Transmitted Beam Emitter — 80 m (262.5 ft) Margin Curve

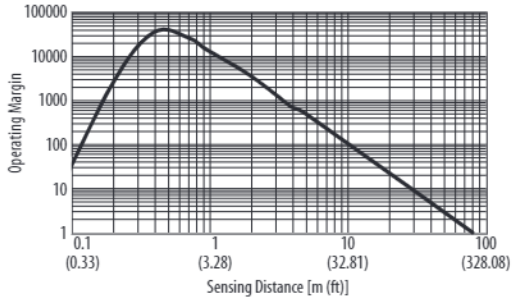
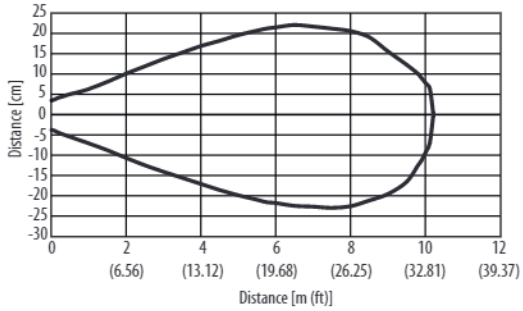


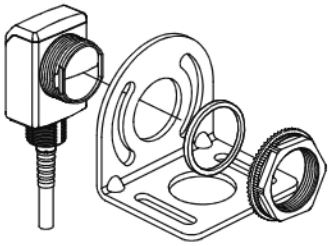
Figure 15 - Infrared Transmitted Beam Emitter — 80 m (262.5 ft) Beam Pattern



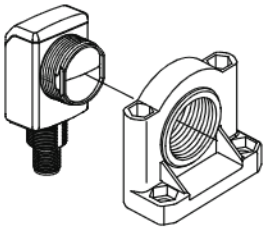
Accessories

Figure 16 - 30 mm (1.2 in.) Right Angle Mounting Bracket

Cat. No. 60-2421



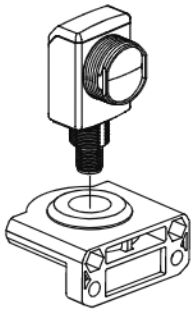
Cat. No. 60-2439



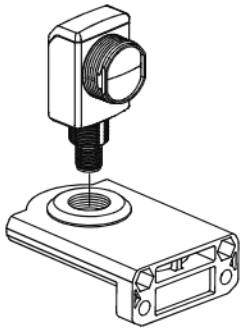
IMPORTANT For polarized retroreflective sensors only: For optimal detection performance, when highly reflective targets pass between the emitter and the reflector, we recommend that you always install the rubber washer that is provided with the polarized sensor.

Figure 17 - 18 mm (0.7 in.) Swivel/Tilt Mounting Bracket

Cat. No. 60-2649



Cat. No. 60-2681



Description	Cat. No.
4-pin DC micro, 2 m (6.5 ft) cordset	889D-F4AC-2
18 mm (0.7 in.) straight bracket	60-2656
18 mm (0.7 in.) right angle bracket	60-2657
30 mm (1.2 in.) stainless steel mounting bracket	60-2421
30 mm (1.2 in.) swivel/tilt bracket	60-2439
18 mm (0.7 in.) swivel/tilt bracket	60-2649
Extended 18 mm (0.7 in.) swivel/tilt bracket	60-2681
76 mm (3 in.) diameter reflector	92-39
47 mm (1.85 in.) diameter reflector	92-47
84 mm (3.3 in.) diameter reflector	92-125
18 mm (0.7 in.) base mount, U-shaped protective bracket	60-BAF-US
18 mm (0.7 in.) base mount bracket, stainless steel	60-BAF-BM
30 mm (1.2 in.) nose mount bracket, stainless steel	60-BAF-SM
Aperture, 5 x 17 mm (0.2 x 0.67 in.) vertical slot, stainless steel	60-AAF1-VS
Aperture, 5 x 12 mm (0.2 x 0.47 in.) horizontal slot, stainless steel	60-AAF1-HS
Aperture, 2.5 x 12 mm (0.1 x 0.47 in.) horizontal slot, stainless steel	60-AAF2-HS
Aperture, 5 mm (0.2 in.) diameter, stainless steel	60-AAF1-DS
Aperture, 2.5 mm (0.1 in.) diameter, stainless steel	60-AAF2-DS
U-shaped protective bracket	60-BAF-US
18 mm (0.7 in.) base mount bracket, stainless steel	60-BAF-BM
30 mm (1.2 in.) nose mount bracket, stainless steel	60-BAF-SM
Aperture, 5 x 17 mm (0.2 x 0.67 in.) vertical slot, stainless steel	60-AAF1-VS
Aperture, 5 x 12 mm (0.2 x 0.47 in.) horizontal slot, stainless steel	60-AAF1-HS
Aperture, 2.5 x 12 mm (0.1 x 0.47 in.) horizontal slot, stainless steel	60-AAF2-HS
Aperture, 5 mm (0.2 in.) diameter, stainless steel	60-AAF1-DS
Aperture, 2.5 mm (0.1 in.) diameter, stainless steel	60-AAF2-DS

Figure 18 - Apertures

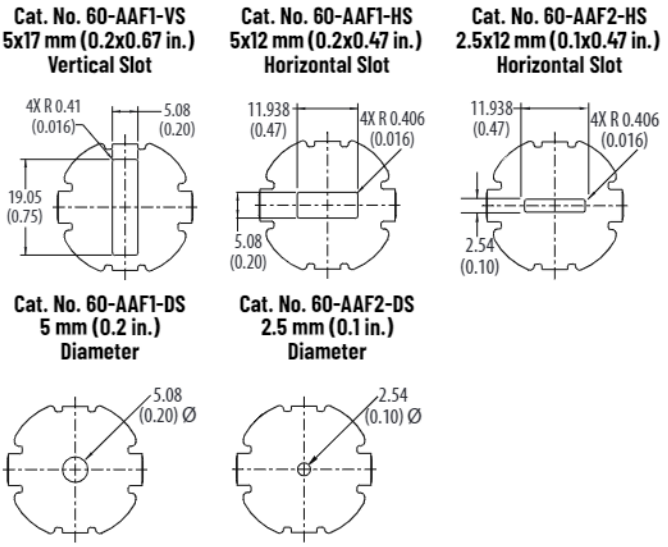


Figure 19 - Cat. No. 60-BAF-US 18 mm (0.7 in.) Mounting Bracket

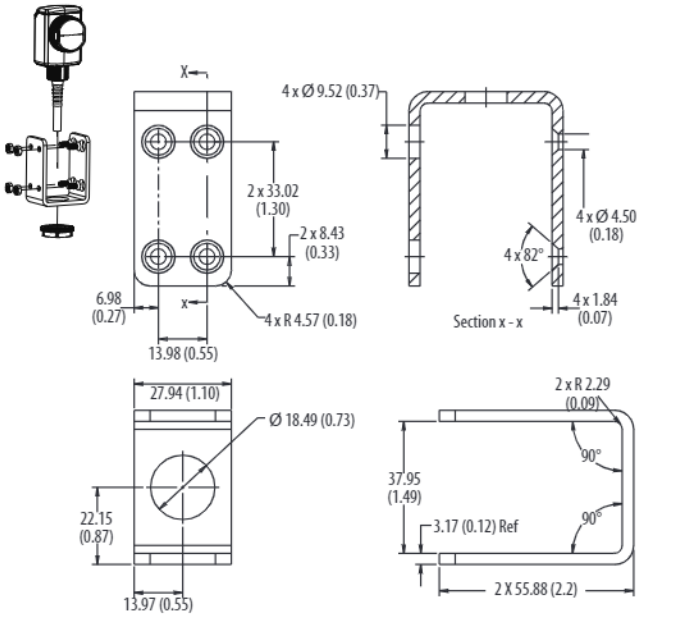


Figure 20 - Cat. No. 60-BAF-SM 30 mm (1.2 in.) Bracket Side

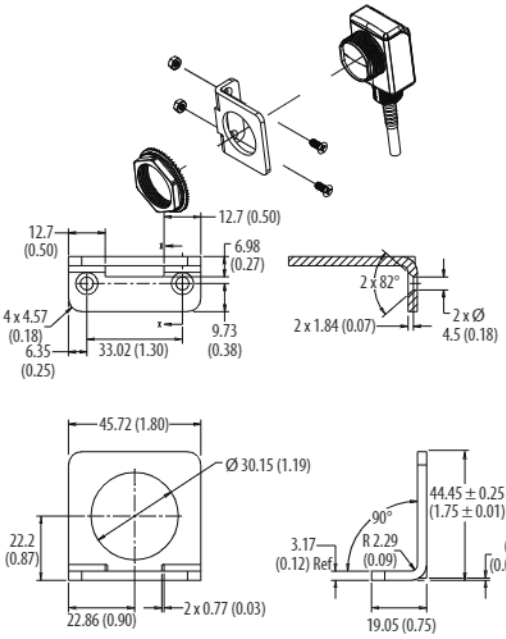
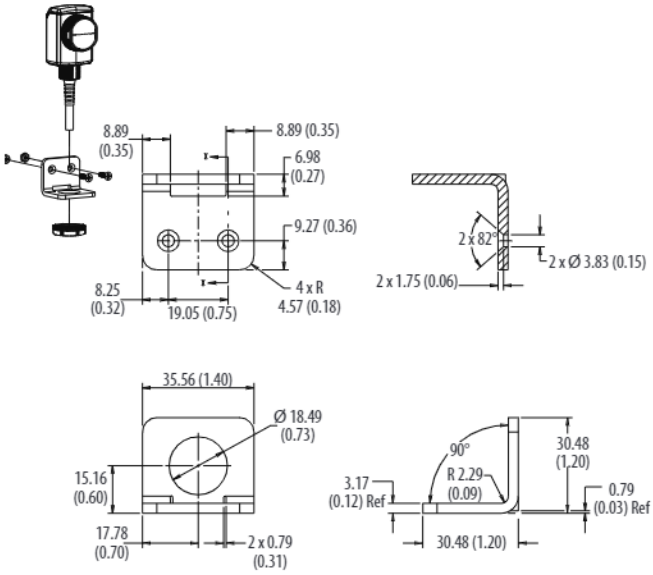


Figure 21 - Cat. No. 60-BAF-BM 18 mm (0.7 in.) Bracket Back



Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	rok.auto/pcdc

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Your comments help us serve your documentation needs better. If you have any suggestions on how to improve our content, complete the form at rok.auto/docfeedback.

Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental information on its website at rok.auto/pec.

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