Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

42JB VisiSight M20B Photoelectric Sensors

Catalog Numbers 42JB-D2MNA1-*xx*, 42JB-D2MPA1-*xx*, 42JB-B2MNB1-*xx*, 42JB-B2MPB1-*xx*, 42JB-B2MNB2-*xx*, 42JB-B2MPB2-*xx*, 42JB-B2MNA3-*xx*, 42JB-B2MPA3-*xx*, 42JB-N2MNA1-*xx*, 42JB-N2MPA1-*xx*, 42JB-P2MNB1-*xx*, 42JB-P2MPB1-*xx*, 42JB-P2MNA1-*xx*, 42JB-P2MPA1-*xx*, 42JB-C2MNA1-*xx*, 42JB-C2MPA1-*xx*, 42JB-E2EZB1-*xx*, 42JB-E2EZB2-*xx*, 42JB-R2MNB1-*xx*, 42JB-R2MPB1-*xx*, 42JB-R2MNB2-*xx*, 42JB-R2MPB2-*xx*

Overview

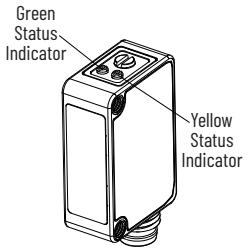
The Allen-Bradley® VisiSight™ M20B family offers a wide range of sensing modes and an adjustable knob that simplifies sensitivity adjustment for maximum application flexibility.

The VisiSight sensor offers an industry standard 20 mm (0.79 in.) depth housing ideal for compact housing installations.

Features

- 360° highly visible operation status indicators
- Visible light source offered on select models for ease of alignment
- Industry standard 25.4 mm (1 in.) side mounting holes
- Embedded IO-Link 1.1 communication protocol with enhanced parameters
- Input to disable light source on transmitted beam emitter
- IP67 rated enclosure
- -40...+65 °C (-40...+149 °F) operating temperatures

Status Indicators and User Interface



The following tables provide indicator status in the Run mode during operation. The sensor is always in Run mode except when being taught.

Table 1 - Standard I/O Operating Mode Indication

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

Table 2 - IO-Link Operation Mode Indication

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

Sensor User Interface

The green status indicator can also serve as a setup alignment aid that indicates that a margin of 1.5 has been reached. The sensor receives 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, that is, 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. When aligning diffuse mode sensors, verify that the sensitivity is set at its maximum setting; use the single-turn adjustment knob on the front panel. Pan the sensor left, right, up, and down to center the beam on the target. Decrease this setting to help prevent the sensor from detecting a background object. If this problem persists, the application requires the use of a background suppression, background reflection, or retroreflective sensing mode.

Sensor Alignment

1. Verify that the sensitivity knob is set at its maximum (factory default) setting.
2. Pan the sensor to the left, right, up, and down to center the beam on the sensed object (for diffuse), reflector (for retroreflective), or transmitter (for transmitted beam). Affix the sensor position when the green status indicator is ON (not flashing) and the yellow output indicator is ON (light sensed and L.O. output is energized).

   This configuration helps achieve a good margin and that the signal received is greater than twice the signal that is required to energize the L.O. output.
3. Depending on your application, do the following:
   a. For diffuse applications, remove the object being sensed and observe the green status indicator. If the green indicator is flashing (at 6 Hz), the sensor is receiving more than half the signal required to energize the L.O. output when there can be minimal or no received signal. It indicates that the sensor is getting close to detection of the background. Stability can be optimized by reducing the reflectivity of the background or reducing the sensitivity. Reduce the sensitivity to shorten the sensing range. If sensitivity is reduced, check that both the green and yellow indicators are on when the object is detected (step 2).

      In applications where the full range is needed, for example, sensitivity cannot be reduced, the green indicator can be left flashing.

   b. For retroreflective and transmitted beam applications, place the object to be sensed in the beam path and observe the green indicator. If the green indicator is flashing (at 6 Hz), that sensor is receiving more than half the signal required to energize the L.O. output when there can be minimal, or no signal received. It indicates that the object being detected is letting some light go through (semi-transparent or too small). Adjust sensitivity and repeat step 2.

Sensor Configuration

The 42JB VisiSight can be configured with the adjustment knob (all models) or via IO-Link (PNP model only).

Rockwell Automation

Background Suppression Models (42JB-B2xxA3-xx)

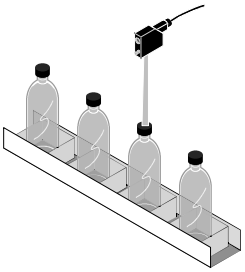
Once securely installed, the sensing range of the sensor must be set using the knob on the top cover. This knob is used to set the cutoff point (the point at which the background is suppressed) of the sensor.

To teach the sensor:

1. Apply power to the sensor and verify that the green power/stability is ON.
2. With a screwdriver, adjust the sensor background cutoff point to its minimum setting by turning the knob counterclockwise until you reach the stop.
3. Present the target at the desired distance.
4. Set the background cutoff point by rotating the knob clockwise until the orange status indicator turns ON, which indicates that the target has been sensed and the sensor has suppressed the background. If the indicator does not turn ON, it means that the target is beyond the background cutoff point and is ignored.

The sensor is now configured to detect targets between 30 mm (1.18 in.) and this cutoff point. The reflectivity of the target influences the distance between the target and the cutoff point. As illustrated in the image below, a nonreflective target requires a greater gap due to the smaller amount of light being returned to the sensor.

Figure 1 - Background Suppression Application Example



Background Reflection Models (42JB-N2xxA1-xx)

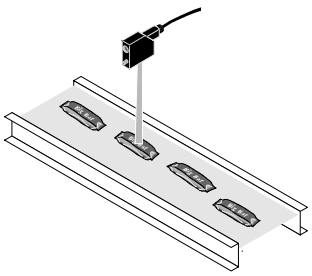
Once securely installed, the sensing range of the sensor must be set using the knob on the top cover. This knob is used to set the cutoff point (the point at which the background is suppressed) of the sensor.

To teach the sensor:

1. Apply power to the sensor and verify that the green power/stability is ON.
2. With a screwdriver, adjust the sensor background cutoff point to its minimum setting by turning the knob counterclockwise until you reach the stop.
3. Present the background to the sensor.
4. Set the background reflection cutoff point by rotating the knob clockwise until the orange status indicator turns ON.
5. Rotate the adjustment knob counterclockwise until the orange status indicator turns OFF. The background reflection cutoff point is now set. When an object is placed between the sensor lens and this point, it is detected due to the absence of reflected light.

As with the background suppression sensing mode, the reflectivity of the target influences the gap between the background and the cutoff point.

Figure 2 - Background Reflection Application Example



Crosstalk Avoidance

For applications of transmitted beam sensors that require adjacent pairs to be mounted close, use sensors with two different working frequencies (F1 and F2).

Two sensor pairs that are adjacent with F1 and F2 transmitter next to each other:

- 30 mm (1.2 in.) for sensing range up to 2 m (6.6 ft)
- 10 mm (0.4 in.) for sensing range greater than 2 m (6.6 ft)

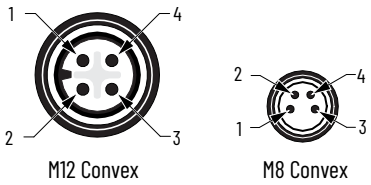
Two adjacent pairs with the same working frequency: 250 mm (9.8 in.)

Four pairs can be mounted within the same spacing by alternating the transmitter/receiver position.

Wiring Diagrams

The quick-disconnect connector is shown in the following diagrams. The pin numbers correspond to convex connectors on the sensor.

Figure 3 - Micro (M12) Convex QD on Pigtail and Integral Pico (M8) Convex QD Pinout



Output Wiring

Figure 4 - PNP Complementary Models

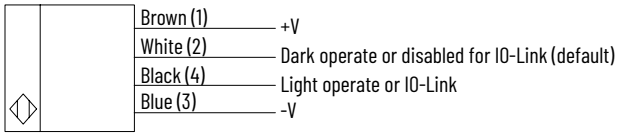
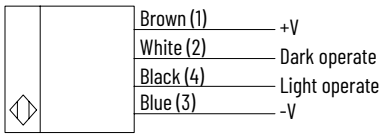
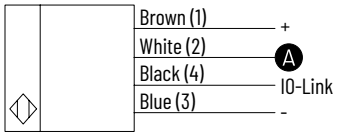


Figure 5 - NPN Complementary Models



Transmitted Beam Emitter



Item	Description
A	For normal operation, the black wire (Pin 4) needs no connection. To deactivate the light source, connect the black wire (Pin 4) to +V.

The IO-Link output Pin 4 (black) does not support the connection of multiple sensors in series (for example, one sensor powers the next sensor). The connection of multiple sensors in series can be achieved when using Pin 2 (white) outputs or by ordering a non-IO-Link catalog number.

Visit rok.auto/knowledgebase or contact your local Allen-Bradley distributor or Rockwell Automation sales office for specific ordering information.

Specifications

Attribute	Value
Certifications	CE Marked for all applicable directives, cULus Listed, KCC, RCM, UKCA Marked for all applicable regulations
EMC Directive	EN 60947-5-2
Standards	UL 60947-5-2
Ambient light immunity	EN 60697-5-2:2007+A:2012
For declarations of conformity and certification details, visit rok.auto/certifications.	
Functional Safety Parameters	
MTTFd	860 a
User Interface	
Status indicators	Green and orange
Adjustments	Adjustable knob depending on catalog number
Optical	
Light-emitting diode (LED)	Visible red on all models
Electrical	
Operating voltage	10 ...30V DC
Current consumption	Less than 35 mA
Sensor protection	Reverse polarity and short circuit
Output	
Output type	PNP or NPN by catalog number
Output mode	Light and dark operate
Response Time	
Diffuse, max	0.5 ms
Transmitted beam, max	0.5 ms
Polarized retroreflective, max	0.5 ms
Clear object detection, max	0.5 ms
Background suppression, max	0.66 ms
Background reflection, max	0.66 ms
Load Current	
Resistive load, max	100 mA
Mechanical	
Housing material	ABS
Lens material	Acrylic
Environmental	
Enclosure rating	IP67
Operating temperature	-40...+65 °C (-40...+149 °F)

Typical Response Curves

Diffuse

Figure 6 - 1.5 m (4.9 ft) Sensing Distance - Margin Curve

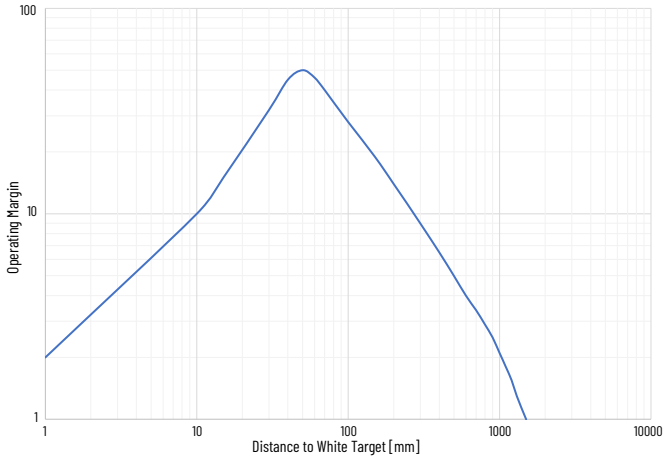
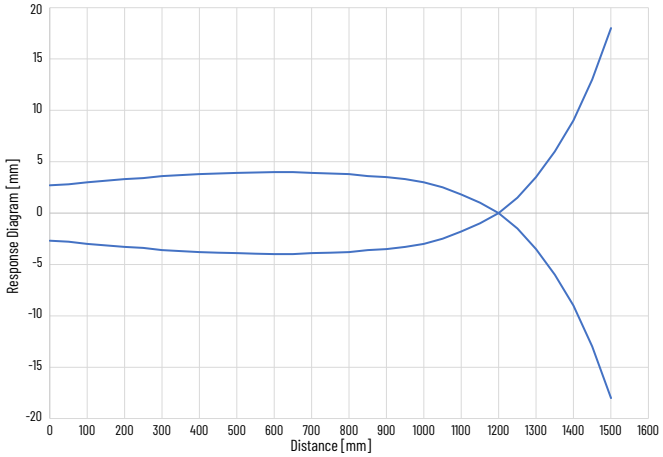


Figure 7 - 1.5 m (4.9 ft) Sensing Distance - Beam Pattern



Polarized Retroreflective

Figure 8 - 6 m (19.7 ft) Sensing Range - Margin Curve

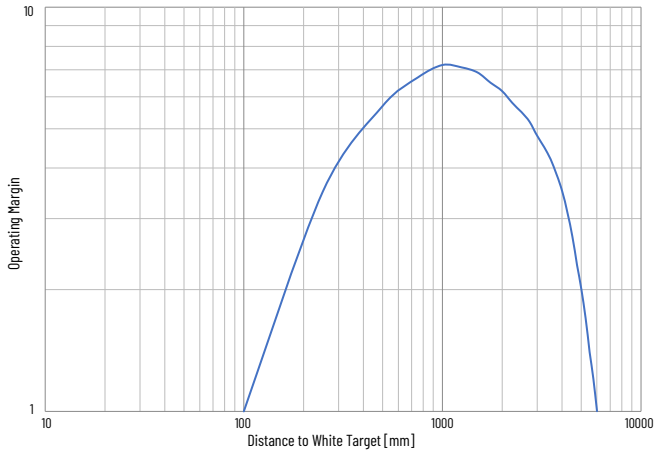
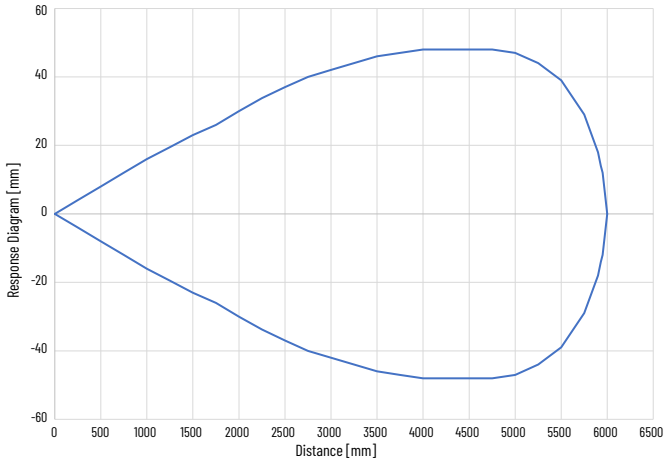


Figure 9 - 6 m (19.7 ft) Sensing Range - Beam Pattern



Background Suppression

Figure 10 - 50 mm (1.97 in.) Sensing Range - Margin Curves

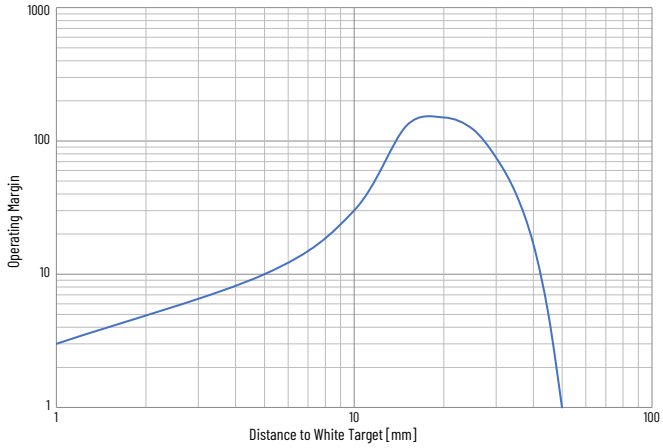


Figure 11 - 50 mm (1.97 in.) Sensing Range - Beam Pattern

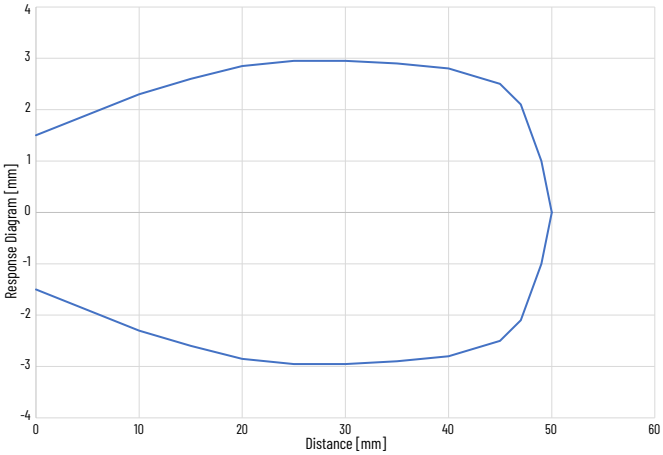


Figure 12 - 100 mm (3.94 in.) Sensing Range - Margin Curves

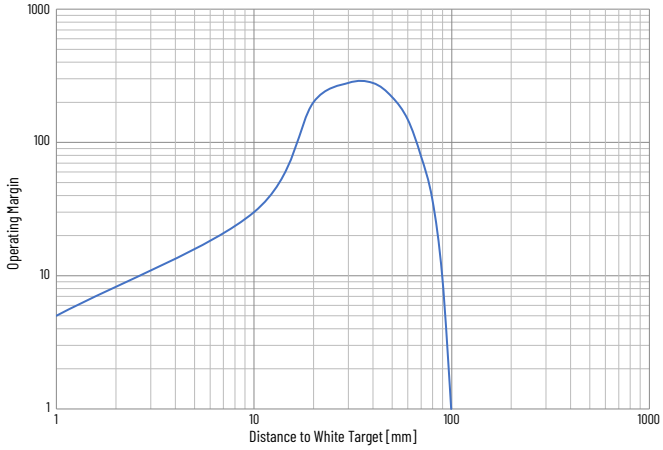


Figure 13 - 100 mm (3.94 in.) Sensing Range - Beam Pattern

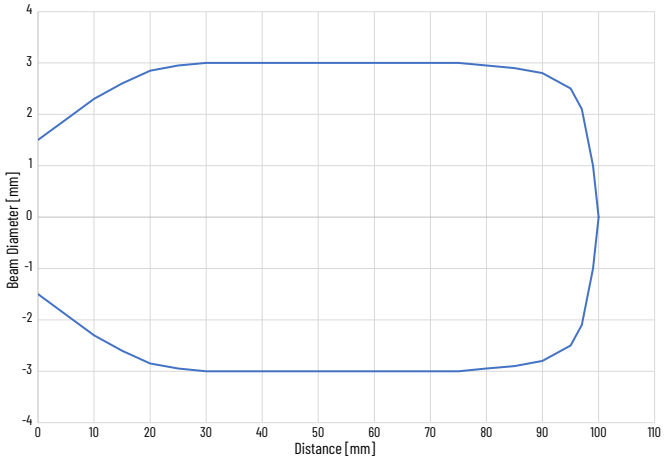


Figure 14 - 250 mm (9.84 in.) Sensing Range - Margin Curves

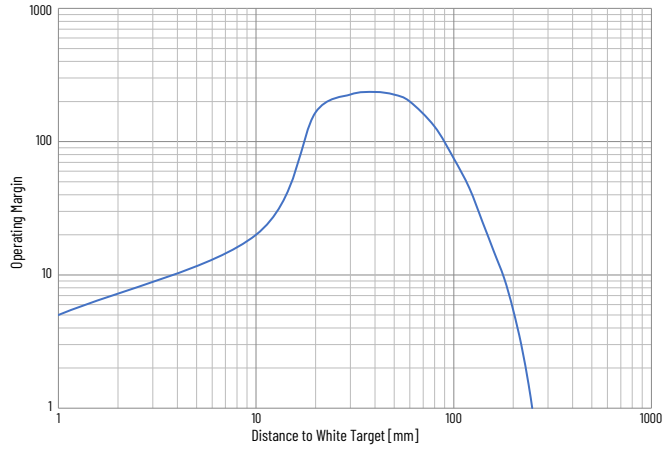
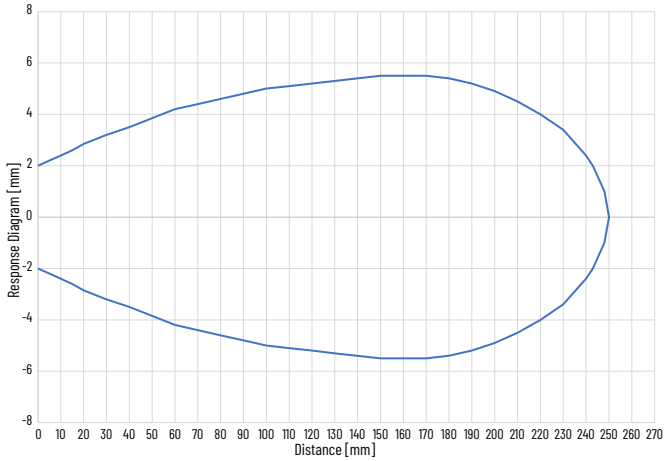


Figure 15 - 250 mm (9.84 in.) Sensing Range - Beam Pattern



Background Reflection

Figure 16 - 250 mm (9.84 in.) Sensing Range - Margin Curves

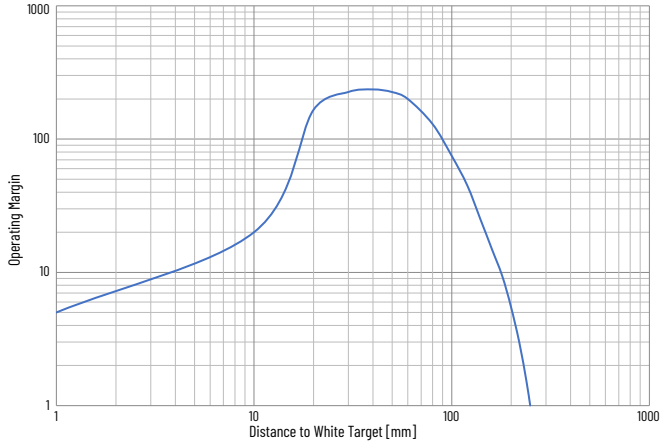
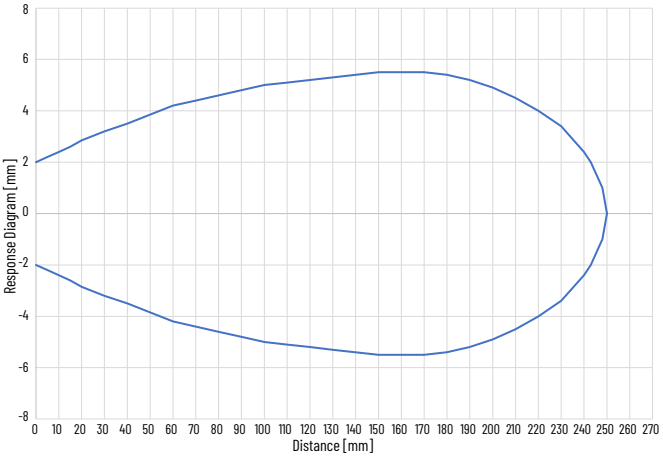
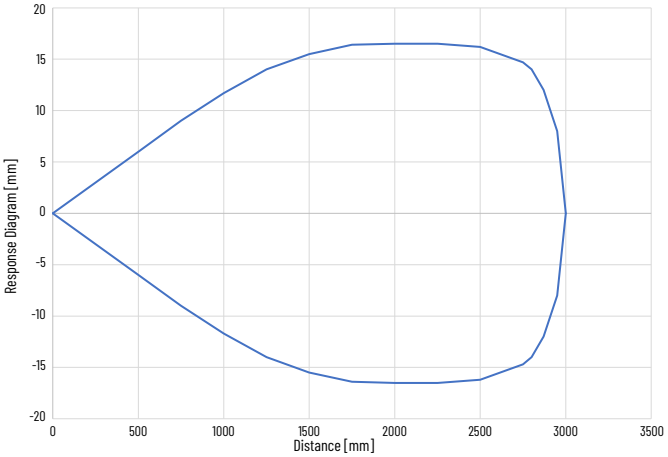


Figure 17 - 250 mm (9.84 in.) Sensing Range - Beam Patterns



Clear Object Detection

Figure 18 - 3 m (9.8 ft) Sensing Range - Beam Patterns



Transmitted Beam

Figure 19 - 25 m (82 ft) Sensing Range - Margin Curves

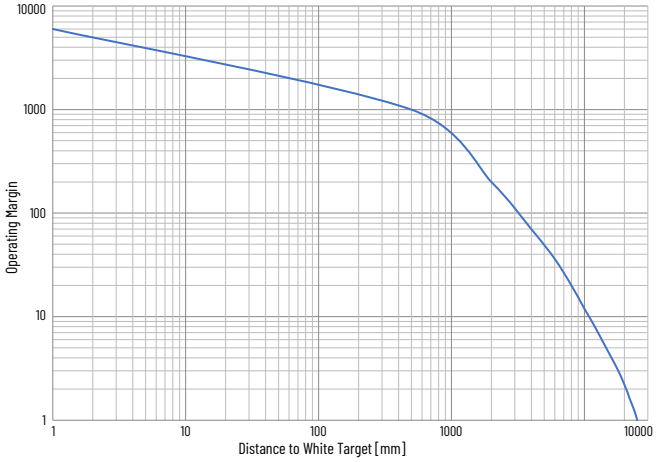
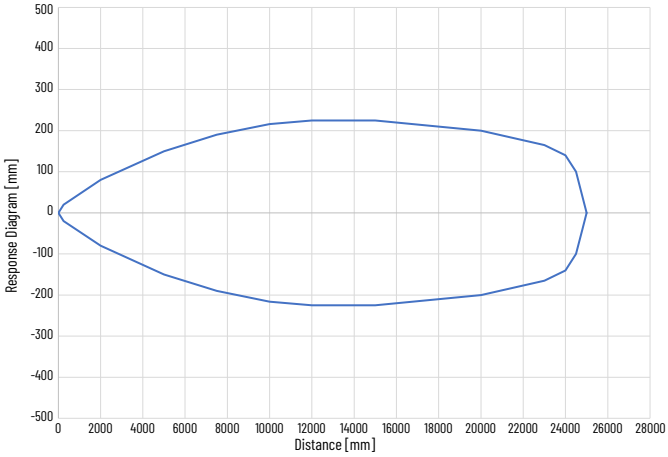
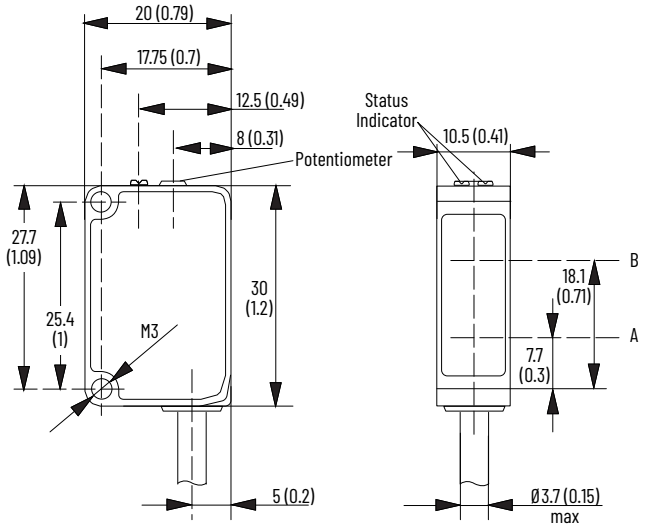


Figure 20 - 25 m (82 ft) Sensing Range - Beam Pattern



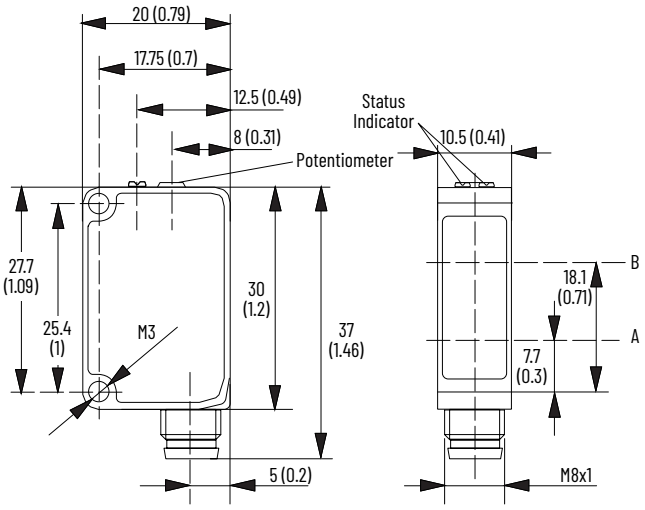
Approximate Dimensions

Figure 21 - 2 m (6.6 ft) Cable Models



Item	Description
A	Emitter axis
B	Receiver axis

Figure 22 - Integral M8 Pico QD Models



Item	Description
A	Emitter axis
B	Receiver axis

Table 3 - Emitter and Receiver Axis Position

Sensing Mode	A [mm (in.)]	B [mm (in.)]
Diffuse	7.7 (0.3)	18.1 (0.71)
Background suppression	7.7 (0.3)	18.1 (0.71)
Background reflection	7.7 (0.3)	18.1 (0.71)
Polarized retroreflective	7.7 (0.3)	18.1 (0.71)
Clear object detection	7.7 (0.3)	18.1 (0.71)
Transmitted beam emitter	16.3 (0.64)	
Transmitted beam receiver	16.3 (0.64)	

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 compliance information on its website at rok.auto/pec.

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