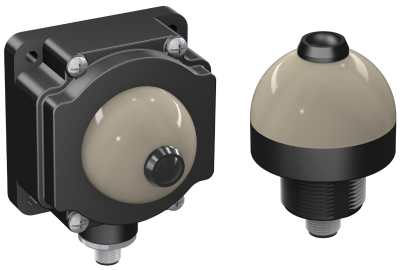
Features

Compact, Single-Point Devices for Error-Proofing of Bin-Picking Operations

To view or download the latest technical information about this product, including specifications, dimensions, accessories, and wiring, go to www.bannerengineering.com.



- Rugged, cost-effective, and easy-to-install solutions for error-proofing and parts-verification applications
- Compact devices are completely self-contained, no controller needed
- Illuminated dome provides and easy-to-see green job light; some models also light red for alternate operation
- Push-button and passive-actuation models available
- Choose NPN or PNP output, depending on model
- Fully encapsulated IP67 construction — ideal for use in abusive environments; rated to IP69K depending on installation
- Immune to ambient light, EMI, and RFI interference
- 12 V DC to 30 V DC operation

WARNING:
- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

Standard Models — 1 Color

- Green job light is ON at all times while job input is active
- Presence of hand (or pressing push button) activates output

Model[1]	Sensing Mode/LED	Housing	Range	Output[2]
K50APLPGXDQ	Polarized retroreflective, visible red, 680 nm	50 mm (1.9 in) dome, 30 mm (1.1 in) mount, polycarbonate	2 m (6 ft)	PNP, N.O.
K50RPLPGXDQ				PNP, N.C.
K50ANLPGXDQ				NPN, N.O.
K50RNLPGXDQ				NPN, N.C.
K50APFF50GXDQ	Fixed field, infrared, 880 nm		50 mm (1.9 in) cutoff	PNP, N.O.
K50RPFF50GXDQ				PNP, N.C.
K50ANFF50GXDQ				NPN, N.O.
K50RNFF50GXDQ				NPN, N.C.
K50APFF100GXDQ			100 mm (3.9 in) cutoff	PNP, N.O.
K50RPFF100GXDQ				PNP, N.C.
K50ANFF100GXDQ				NPN, N.O.
K50RNFF100GXDQ				NPN, N.C.
K50APPBGXDQ	Push button		—	PNP, N.O.
K50RPPBGXDQ				PNP, N.C.

Continued on page 2

[1] Integral 4-pin M12 quick disconnect models are listed.
- To order the 2 m (6.5 ft) PVC cable model, omit the suffix "Q" in the model number. For example, K50APLPGXD.
- To order the 9 m (30 ft) PVC cable model, replace the suffix "Q" with "W/30" in the model number. For example, K50APLPGXD W/30.
- To order the 150 mm (6 in) PVC cable model with a 4-pin M12 quick disconnect, replace the suffix "Q" with "QP" in the model number. For example, K50APLPGXDQP.
- Models with a quick disconnect require a mating cordset.

[2] N.O. = Normally Open; N.C. = Normally Closed

Original Instructions
30-Jun-25

126441
p/n: 126441 Rev. K

Continued from page 1

Model	Sensing Mode/LED	Housing	Range	Output
K50ANPBGXDQ				NPN, N.O.
K50RNPBGXDQ				NPN, N.C.
K80APPBGXDQ		50 mm (1.9 in) dome, Flat or DIN- mount, polycarbonate		PNP, N.O.
K80RPPBGXDQ				PNP, N.C.
K80ANPBGXDQ				NPN, N.O.
K80RNPBGXDQ				NPN, N.C.

C-Series 2-Color Models

- Job light is green at all times while job input is active (unless hand is present)
- Presence of hand (or pressing push button) activates output and overrides job light (turns red) for visual verification that action was sensed
- Retroreflective models: To simplify alignment, sensor provides red signal when retroreflecive target is not correctly aligned

Model[3]	Sensing Mode/LED	Housing	Range	Output[4]
K50APLPGRCQ	Polarized retroreflective, visible red, 680 nm	50 mm (1.9 in) dome, 30 mm (1.1 in) mount, polycarbonate	2 m (6 ft)	PNP, N.O.
K50RPLPGRCQ				PNP, N.C.
K50ANLPGRCQ				NPN, N.O.
K50RNLPGRCQ				NPN, N.C.
K50APFF50GRCQ	Fixed field infrared, 880 nm		50 mm (1.9 in) cutoff	PNP, N.O.
K50RPFF50GRCQ				PNP, N.C.
K50ANFF50GRCQ				NPN, N.O.
K50RNFF50GRCQ				NPN, N.C.
K50APFF100GRCQ			100 mm (3.9 in) cutoff	PNP, N.O.
K50RPFF100GRCQ				PNP, N.C.
K50ANFF100GRCQ				NPN, N.O.
K50RNFF100GRCQ				NPN, N.C.
K50APPBGRCQ	Push button		—	PNP, N.O.
K50RPPBGRCQ				PNP, N.C.
K50ANPBGRCQ				NPN, N.O.
K50RNPBGRCQ				NPN, N.C.
K80APPBGRCQ		50 mm (1.9 in) dome, Flat or DIN- mount, polycarbonate		PNP, N.O.
K80RPPBGRCQ				PNP, N.C.
K80ANPBGRCQ				NPN, N.O.
K80RNPBGRCQ				NPN, N.C.

E-Series 2-Color Models

- Job light is green at all times while job input is active
- Presence of hand (or pressing push button) activates output
- Presence of hand (or pressing push button) while job input is inactive causes unit to light red, providing visual verification that sensor is functioning properly

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[3] Integral 4-pin M12 quick disconnect models are listed.
- To order the 2 m (6.5 ft) PVC cable model, omit the suffix "Q" in the model number. For example, K50APLPGXD.
- To order the 9 m (30 ft) PVC cable model, replace the suffix "Q" with "W/30" in the model number. For example, K50APLPGXD W/30.
- To order the 150 mm (6 in) PVC cable model with a 4-pin M12 quick disconnect, replace the suffix "Q" with "QP" in the model number. For example, K50APLPGXDQP.
- Models with a quick disconnect require a mating cordset.

[4] N.O. = Normally Open; N.C. = Normally Closed

Model[5]	Sensing Mode / LED	Housing	Range	Output[6]
K50APLPGREQ	Polarized retroreflective, visible red, 680 nm	50 mm (1.9 in) dome, 30 mm (1.1 in) mount, polycarbonate	2 m (6 ft)	PNP, N.O.
K50RPLPGREQ				PNP, N.C.
K50ANLPGREQ				NPN, N.O.
K50RNLPGREQ				NPN, N.C.
K50APFF50GREQ	Fixed field infrared, 880 nm		50 mm (1.9 in) cutoff	PNP, N.O.
K50RPFF50GREQ				PNP, N.C.
K50ANFF50GREQ				NPN, N.O.
K50RNFF50GREQ				NPN, N.C.
K50APFF100GREQ			100 mm (3.9 in) cutoff	PNP, N.O.
K50RPFF100GREQ				PNP, N.C.
K50ANFF100GREQ				NPN, N.O.
K50RNFF100GREQ				NPN, N.C.
K50APPBGREQ	Push button		—	PNP, N.O.
K50RPPBGREQ				PNP, N.C.
K50ANPBGREQ				NPN, N.O.
K50RNPBGREQ				NPN, N.C.
K80APPBGREQ		50 mm (1.9 in) dome, Flat or DIN- mount, polycarbonate		PNP, N.O.
K80RPPBGREQ				PNP, N.C.
K80ANPBGREQ				NPN, N.O.
K80RNPBGREQ				NPN, N.C.

Overview

The K50 & K80 Pick-to-Light Sensors are suited to many part assembly and bin picking (pick-to-light) applications.

The entire translucent dome provides the green job light or other indication (depending on model), for high visibility. The solid-state output easily interfaces to a system controller, which is pre-programmed for a specific sequence of tasks. Mounted in or near each bin in an assembler's work station, the sensor job light signals the assembler:

- Which bins contain items to be picked in a given operation; and
- In what order they should be picked.

As the assembler takes a part in sequence, the K50 or K80 senses a hand in the bin and its output sends a signal to the controller. (For push-button models, the sensing occurs when the button is pushed. For other models, no action other than reaching for the part is required for the sensor to detect when a pick is made.)

The system controller then verifies if the correct part was taken and may respond by turning that job light OFF and activating the job light of the next bin in the sequence. If multiple parts are to be removed from one bin, the job light may remain ON until the appropriate number of signals is returned to the controller. If an incorrect part is selected, the control system may be wired to signal an alarm for the assembler and/or a supervisor, or it may be programmed to interpret the action as a call for parts.

The job light system results in increased efficiency (due to simplified job training), increased quality control (no skipped components), and reduced rework and inspections. It speeds the resumption of work after breaks and other distractions and is ideal for multilingual workplaces where communication is an issue.

The fixed-field and retroreflective-mode models require no interaction to operate, and so eliminate the hand, wrist, and arm stresses associated with mechanical push buttons. All models are immune to EMI, RFI, and ambient light interference. The polycarbonate and nylon housing is capable of absorbing high impact (even at low temperatures) and is resistant to abrasion and to damage by most chemicals. Its domed construction allows most dust and debris to slide easily off the sensor housing, simplifying maintenance. The 30 mm threaded base on all models provides easy mounting. Indicator behavior is shown in the table below.

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[5] Integral 4-pin M12 quick disconnect models are listed.
- To order the 2 m (6.5 ft) PVC cable model, omit the suffix "Q" in the model number. For example, K50APLPGXD.
- To order the 9 m (30 ft) PVC cable model, replace the suffix "Q" with "W/30" in the model number. For example, K50APLPGXD W/30.
- To order the 150 mm (6 in) PVC cable model with a 4-pin M12 quick disconnect, replace the suffix "Q" with "QP" in the model number. For example, K50APLPGXDQP.
- Models with a quick disconnect require a mating cordset.

[6] N.O. = Normally Open; N.C. = Normally Closed

Indicator and Output Behavior

NOTE: D-, C-, and E-Series models as referenced in the table pertain to a part of the product model number, immediately preceding the Q designation.

Models	Sensor Conditions		Job Light	Alternate Indicator	Output Signal Status
Standard (D-Series)	Job input active	Hand/pick absent	ON Green	—	OFF
		Hand/pick present	ON Green	—	ON
	No job input	Hand/pick absent	—	—	OFF
		Hand/pick present	—	—	ON
C-Series	Job input active	Hand/pick absent	ON Green	—	OFF
		Hand/pick present	—	ON Red	ON
	No job input	Hand/pick absent	OFF	OFF	OFF
		Hand/pick present	—	ON Red	ON
E-Series	Job input active	Hand/pick absent	ON Green	—	OFF
		Hand/pick present	ON Green	—	ON
	No job input	Hand/pick absent	OFF	—	OFF
		Hand/pick present	—	ON Red	ON

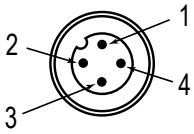
Installation

For push-button models, install the sensor at such a height and in a location that is easy for the user and/or supervisor to see the indicator and is comfortable for the user to press the push-button.

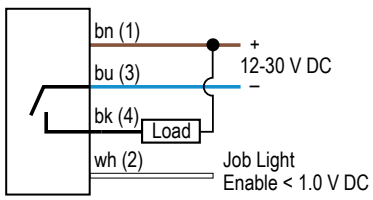
For other models, install the sensor in a location that is comfortable for the user to break the beam when reaching for the required part. When multiple sensors are located in close proximity (for example, to monitor multiple bins), mount all the sensors in a similar sensing position (for example, all mounted at the tops of the bins and pointing down). This may reduce potential optical crosstalk, where one sensor detects another sensor's beam.

Wiring Diagrams

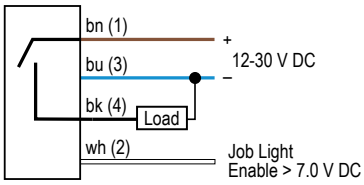
4-pin M12 Male Quick-Disconnect Connector



NPN Models



PNP Models



NOTE: Cabled wiring diagrams are shown. Quick-disconnect wiring diagrams are functionally identical.

Specifications

Supply Voltage and Current

12 V DC to 30 V DC (10% max. ripple)

< 75 mA max current at 12 V DC (exclusive of load)

< 40 mA max. current at 30 V DC (exclusive of load)

Supply Protection Circuitry

Protected against transient voltages (fast-transient and over-voltage) and reverse polarity

Output Configuration

1 current NPN transistor or 1 current PNP transistor, depending on model

Output Rating

Max load: 150 mA

ON-state saturation voltage: < 2 V DC at 10 mA DC; < 2.5 V DC at 150 mA

OFF-state leakage current: < 10 µA at 30 V DC

Output Protection Circuitry

Protected against false pulse on power-up and continuous overload or short-circuit of output

Output Response Time

3 milliseconds ON and OFF

Power-Up Output Delay Time

100 ms

EMI/RFI Immunity

Immune to EMI and RFI noise sources, per IEC 947-5-2

Environmental Rating

Fully encapsulated; IP67

Integral QD models: ISO 20653 (IP69K) when using IP679K-rated cables

Cabled models: IP69K when mounted with conduit

K50 models only: NEMA/UL Type 4X, 13

Operating Conditions

–40 °C to +50 °C (–40 °F to +122 °F)

90% at +50 °C maximum relative humidity (non-condensing)

Construction

Base: Polycarbonate

Translucent dome: Polycarbonate

Push button: Thermoplastic

Lens: Polycarbonate or acrylic

Connections

Integral 4-pin M12 male quick-disconnect connector, 2 m (6.5 ft) or 9 m (30 ft) PVC-jacketed cable, or 150 mm (5.9 in) PVC-jacketed cable with 4-pin M12 male quick-disconnect connector, depending on model

Mating cable required for models with quick disconnect

QPMA-style PUR cabled models are also available; contact Banner Engineering for more information

Ambient Light Immunity

Up to 5,000 lux

Indicators

Entire translucent dome provides indicator light; either Job or Pick Sensed indicator inhibits the other light, depending on model

Job "Pick" Indicator: Green

Pick Sensed Indicator: Red or OFF, depending on model

Job Light Enable Input

Input Impedance: 8000 ohms

PNP: Input low < 1.0 V

NPN: Input high > 7 V

Required Overcurrent Protection

WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to www.bannerengineering.com.

Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	1.0	30	0.5

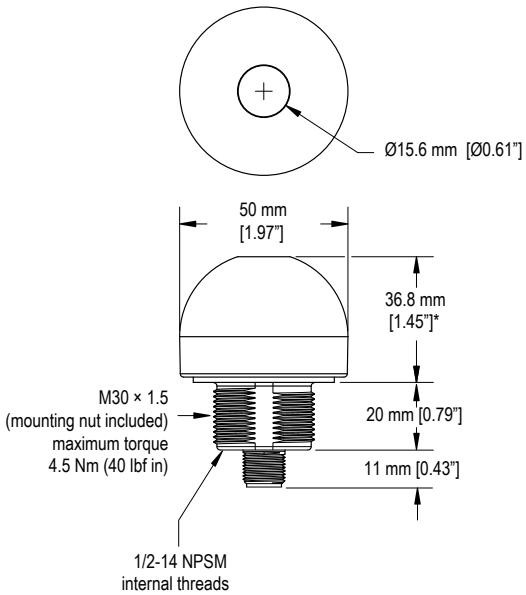
Certifications

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM

Dimensions

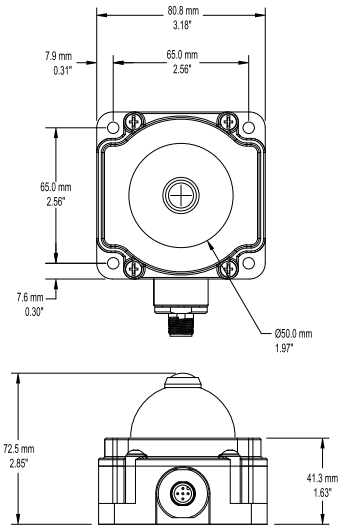
All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

K50L Models



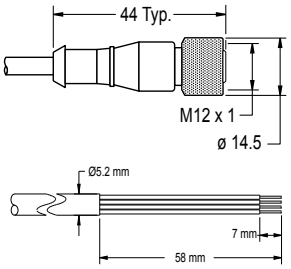
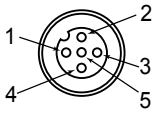
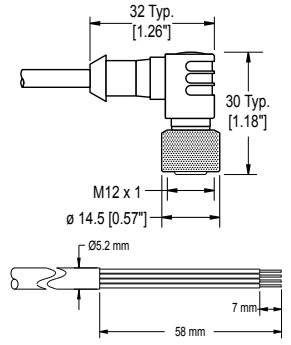
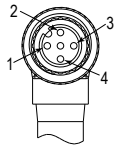
*For push-button models, this dimension is 44.2 mm (1.74 in)

K80L Models



Accessories

Cordsets

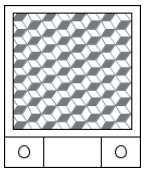
4-Pin Single-Ended M12 Female Cordsets					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-406	2 m (6.56 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Not used
MQDC-415	5 m (16.4 ft)				
MQDC-430	9 m (29.5 ft)				
MQDC-450	15 m (49.2 ft)				
MQDC-406RA	2 m (6.56 ft)	Right-Angle			
MQDC-415RA	5 m (16.4 ft)				
MQDC-430RA	9 m (29.5 ft)				
MQDC-450RA	15 m (49.2 ft)				

Retroreflective Targets

NOTE: For a complete selection of retroreflective targets, see http://www.bannerengineering.com.

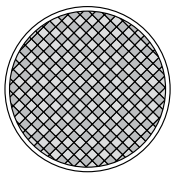
BRT-35X35B

- Square, acrylic target
- Reflectivity Factor: 1.3
- Temperature:
- Approximate size: 35 mm × 35 mm



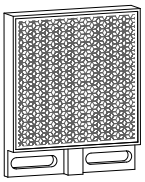
BRT-50D

- Round, acrylic target with mounting stud
- Reflectivity factor: 1.0
- Temperature:
- Optional brackets are available
- Size: 50.8 mm diameter



BRT-2X2

- Square, acrylic target
- Reflectivity factor: 1.0
- Max. temperature: +50 °C (+122 ºF)
- Optional brackets are available
- Approximate size: 51 mm × 51 mm



BRT-100X18A

- Rectangular, acrylic target
- Reflectivity factor: 1.4
- Temperature:
- Approximate size: 18.5 mm × 120 mm

Retroreflective Tape

Model	Reflectivity Factor	Maximum Temperature	Size
BRT-THG-1-100	0.7	+60 °C (+140 °F)	25 mm (1 in) wide, 2.5 m (100 in) long
BRT-THG-2-100	0.7	+60 °C (+140 °F)	50 mm (2 in) wide, 2.5 m (100 in) long
BRT-THG-3-100	0.7	+60 °C (+140 °F)	75 mm (3 in) wide, 2.5 m (100 in) long

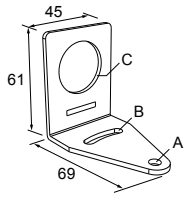
Mounting Brackets

All measurements are in mm.

SMB30A

- Right-angle bracket with curved slot for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor
- 12-gauge stainless steel

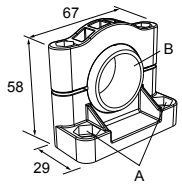
Hole center spacing: A to B=40
Hole size: A=ø 6.3, B= 27.1 × 6.3, C=ø 30.5



SMB30SC

- Swivel bracket with 30 mm mounting hole for sensor
- Black reinforced thermoplastic polyester
- Stainless steel mounting and swivel locking hardware included

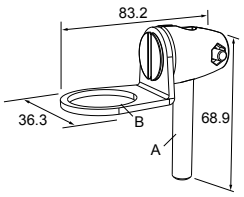
Hole center spacing: A=ø 50.8
Hole size: A=ø 7.0, B=ø 30.0



SMB30FA

- Swivel bracket with tilt and pan movement for precise adjustment
- Mounting hole for 30 mm sensor
- 12-gauge 304 stainless steel
- Easy sensor mounting to extrude rail T-slot
- Metric- and inch-size bolt available

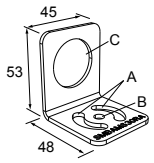
Bolt thread: SMB30FA, A= 3/8 - 16 × 2 in; SMB30FAM10, A= M10 - 1.5 × 50
Hole size: B= ø 30.1



SMBAMS30RA

- Right-angle SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-gauge (2.6 mm) cold-rolled steel

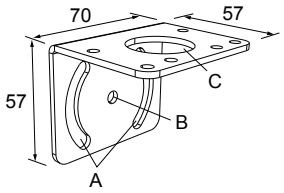
Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 × 7.0, B=ø 6.5, C=ø 31.0



SMB30MM

- 12-gauge stainless steel bracket with curved mounting slots for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor

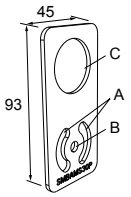
Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 × 7, B = ø 6.4, C = ø 30.1



SMBAMS30P

- Flat SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-gauge 300 series stainless steel

Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 × 7.0, B=ø 6.5, C=ø 31.0



Product Support and Maintenance

Clean with Mild Detergent and Warm Water

Wipe down the device with a soft cloth dampened with a mild detergent and warm water solution. Do not use any other chemicals for cleaning.

Repairs

Contact Banner Engineering for troubleshooting of this device. **Do not attempt any repairs to this Banner device; it contains no field-replaceable parts or components.** If the device, device part, or device component is determined to be defective by a Banner Applications Engineer, they will advise you of Banner's RMA (Return Merchandise Authorization) procedure.

> **IMPORTANT:** If instructed to return the device, pack it with care. Damage that occurs in return shipping is not covered by warranty.

Contact Us

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For worldwide locations and local representatives, visit www.bannerengineering.com.

Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

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