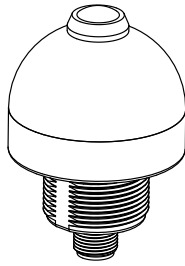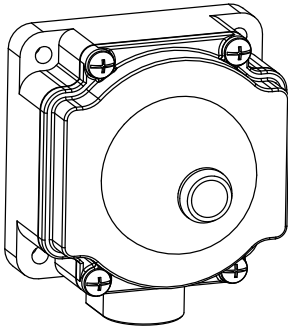# EZ-LIGHT® K50 and K80 Series Pick-to-Light Sensors

Compact, single-point devices for error-proofing of bin-picking operations

For the latest technical information about this product, including specifications, dimensions, and wiring, see *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 an 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; see specifications
- Immune to ambient light, EMI, and RFI interference
- 12 to 30V dc operation

Standard Models — 1 Color

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

Model	Sensing Mode / LED*	Housing	Range	Cable*	Output***	Job Light
K50APLPGXDQ	Polarized retroreflective, visible red, 680 nm	50 mm dome 30 mm mount polycarbonate	2 m (6 ft)	Integral 4-pin Euro QD	PNP, N.O.	Green
K50RPLPGXDQ					PNP, N.C.	
K50ANLPGXDQ					NPN, N.O.	
K50RNLPGXDQ					NPN, N.C.	
K50APFF50GXDQ	Fixed field, infrared, 880 nm		50 mm cutoff		PNP, N.O.	
K50RPFF50GXDQ					PNP, N.C.	
K50ANFF50GXDQ					NPN, N.O.	
K50RNFF50GXDQ					NPN, N.C.	
K50APFF100GXDQ			100 mm cutoff		PNP, N.O.	
K50RPFF100GXDQ					PNP, N.C.	
K50ANFF100GXDQ					NPN, N.O.	
K50RNFF100GXDQ					NPN, N.C.	
K50APPBGXDQ	Push button	50 mm dome Flat or DIN- mount polycarbonate	—		PNP, N.O.	
K50RPPBGXDQ					PNP, N.C.	
K50ANPBGXDQ					NPN, N.O.	
K50RNPBGXDQ					NPN, N.C.	
K80APPBGXDQ					PNP, N.O.	
K80RPPBGXDQ					PNP, N.C.	
K80ANPBGXDQ					NPN, N.O.	
K80RNPBGXDQ					NPN, N.C.	

* Only 4-pin integral Euro-style QD models are listed. For 2 m (6 ft) PVC cable model, omit suffix "**Q**" from model number (e.g., **K50APLPGXD**). For 9 m (30 ft) PVC cable model, replace suffix "**Q**" with "**W/30**" (e.g., **K50APLPGXD W/30**). For 150 mm (5.9 in) PVC pigtail with 4-pin Euro-style fitting, replace suffix "**Q**" with "**QP**" (e.g., **K50APLPGXDQP**).

A model with a QD requires a mating cable (see *page 4*).

**N.O. = Normally Open; N.C. = Normally Closed

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	Sensing Mode / LED*	Housing	Range	Cable*	Output***	Job Light
K50APLPGRCQ	Polarized retroreflective, visible red, 680 nm	50 mm dome 30 mm mount polycarbonate	2 m (6 ft)	Integral 4-pin Euro QD	PNP, N.O.	Green (Red)
K50RPLPGRCQ					PNP, N.C.	
K50ANLPGRCQ					NPN, N.O.	
K50RNLPGRCQ					NPN, N.C.	
K50APFF50GRCQ	Fixed field infrared, 880 nm		50 mm cut-off		PNP, N.O.	
K50RPFF50GRCQ					PNP, N.C.	
K50ANFF50GRCQ					NPN, N.O.	
K50RNFF50GRCQ					NPN, N.C.	
K50APFF100GRCQ			100 mm cut-off		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 dome Flat or DIN-mount polycarbonate			PNP, N.O.	
K80RPPBGRCQ					PNP, N.C.	
K80ANPBGRCQ					NPN, N.O.	
K80RNPBGRCQ					NPN, N.C.	

* Only 4-pin integral Euro-style QD models are listed. For 2 m (6 ft) PVC cable model, omit suffix "**Q**" from model number (e.g., **K50RPLPGRC**). For 9 m (30 ft) PVC cable model, replace suffix "**Q**" with "**W/30**" (e.g., **K50RPLPGRC W/30**). For 150 mm (5.9 in) PVC pigtail with 4-pin Euro-style fitting, replace suffix "**Q**" with "**QP**" (e.g., **K50RPLPGRCQP**).

A model with a QD requires a mating cable (see *4-pin Euro-Style Cordsets*).

**N.O. = Normally Open; N.C. = Normally Closed

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

Model	Sensing Mode / LED*	Housing	Range	Cable*	Output***	Job Light
K50APLPGREQ	Polarized retroreflective, visible red, 680 nm	50 mm dome 30 mm mount polycarbonate	2 m (6 ft)	Integral 4-pin Euro QD	PNP, N.O.	Green (Red)
K50RPLPGREQ					PNP, N.C.	
K50ANLPGREQ					NPN, N.O.	
K50RNLPGREQ					NPN, N.C.	
K50APFF50GREQ	Fixed field infrared, 880 nm		50 mm cut-off		PNP, N.O.	
K50RPFF50GREQ					PNP, N.C.	
K50ANFF50GREQ					NPN, N.O.	
K50RNFF50GREQ					NPN, N.C.	
K50APFF100GREQ			100 mm cut-off		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 dome Flat or DIN-mount polycarbonate			PNP, N.O.	
K80RPPBGREQ					PNP, N.C.	
K80ANPBGREQ					NPN, N.O.	
K80RNPBGREQ					NPN, N.C.	

* Only 4-pin integral Euro-style QD models are listed. For 2 m (6 ft) PVC cable model, omit suffix "**Q**" from model number (e.g., "**K50RPLPGRE**"). For 9 m (30 ft) PVC cable model, replace suffix "**Q**" with "**W/30**" (e.g., "**K50RPLPGRE W/30**"). For 150 mm (5.9 in) PVC pigtail with 4-pin Euro-style fitting, replace suffix "**Q**" with "**QP**" (e.g., "**K50RPLPGREQP**").

A model with a QD requires a mating cable (see *4-pin Euro-Style Cordsets*).

**N.O. = Normally Open; N.C. = Normally Closed

⚠ **WARNING: Not To Be Used for Personnel Protection**
Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death. This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Overview

The solid-state output 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 sensor senses that the part was removed and it sends an output signal to the controller. The controller then verifies if the correct part was taken and may respond by turning that job light OFF, 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.

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 will be easy for the user and/or supervisor to see the indicator and will be comfortable for the user to press the push-button.

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

Specifications

Supply Voltage and Current
12 to 30V dc (10% max. ripple)
< 75 mA max current at 12V dc (exclusive of load)
< 40 mA max. current at 30V dc (exclusive of load)

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

Output Configuration
1 current sinking (NPN) transistor or 1 current sourcing (PNP) transistor, depending on model

Output Rating
Max load: 150 mA
ON-state saturation voltage: < 2V at 10 mA dc; < 2.5V at 150 mA dc
OFF-state leakage current: < 10 µA at 30V 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

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
Sinking - Input low < 1.0V
Sourcing - Input high > 7V

Construction
Base: Polycarbonate
Translucent Dome: Polycarbonate
Push Button: Thermoplastic
Lens: Polycarbonate or acrylic

Connections
Integral 4-pin Euro-style QD fitting, PVC-jacketed 2 m (6.5 ft) or 9 m (30 ft) cable or 150 mm (5.9 in) PVC pigtail with 4-pin Euro-style QD fitting, depending on model
Accessory QD cables required for QD models, see *4-pin Euro-Style Cordsets*
QPMA-style PUR pigtail models are also available; contact Factory for more information

Ambient Light Immunity
Up to 5,000 lux

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

Environmental Rating
Fully encapsulated; IEC IP67
Integral QD models: DIN 40050 (IP69K) when using IP679K-rated cables
Pigtail and cable models: IP69K when mounted with conduit

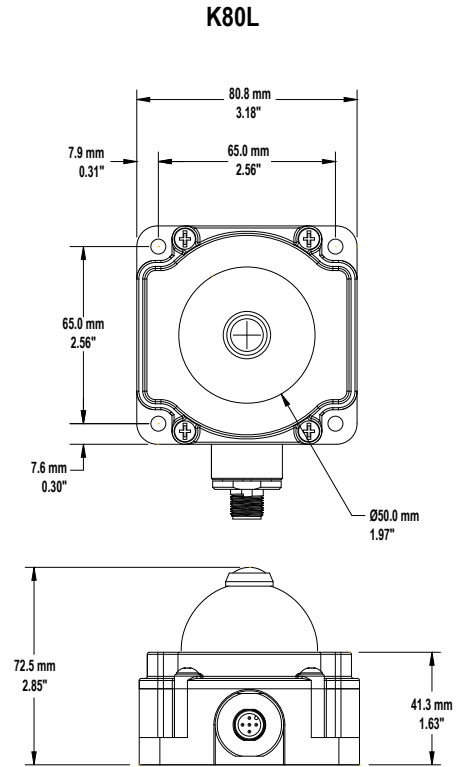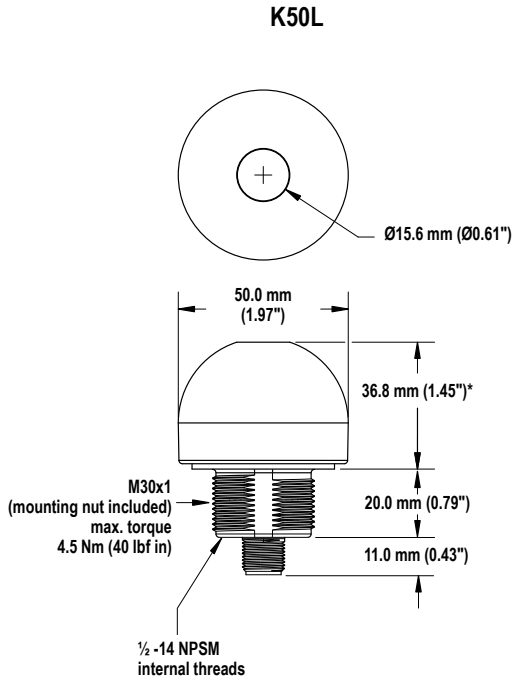**Operating Conditions**
Temperature: -40º to +50º C (-40º to +122º F)
Max. Relative Humidity: 90% at +50º C (non-condensing)

Certifications

CE ℅UL US LISTED

K50 models: All models except push buttons

K80 models: CE

Dimensions

K50L

K80L

Ø15.6 mm (Ø0.61")

50.0 mm
(1.97")

36.8 mm (1.45")*

M30x1
(mounting nut included)
max. torque
4.5 Nm (40 lbf in)

20.0 mm (0.79")

11.0 mm (0.43")

½ -14 NPSM
internal threads

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

80.8 mm
3.18"

7.9 mm
0.31"

65.0 mm
2.56"

65.0 mm
2.56"

7.6 mm
0.30"

Ø50.0 mm
1.97"

72.5 mm
2.85"

41.3 mm
1.63"

Wiring

NOTE: Cabled hookups only are shown. Wiring is functionally identical for cabled and quick-disconnect models.

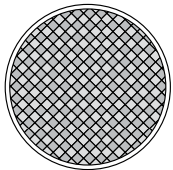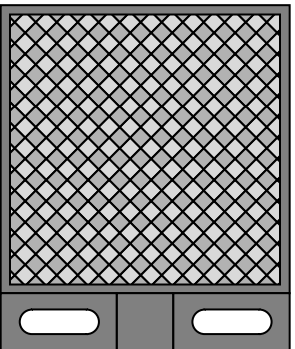| NPN (Sinking) Output Models	PNP (Sourcing) Output Models	Wiring Key	Pinout
1 + 12-30V dc 3 − 4 Load 2 Job Light Enable < 1.0V dc	1 + 12-30V dc 3 − 4 Load 2 Job Light Enable > 7V dc	1 = Brown 2 = White 3 = Blue 4 = Black	
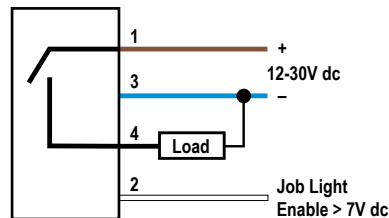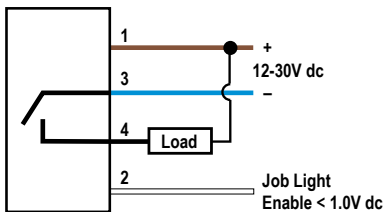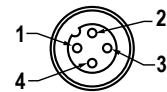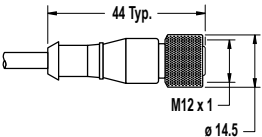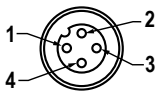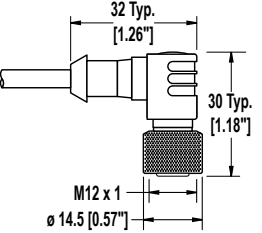
Accessories
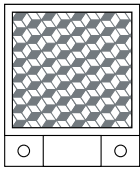
Cordsets

4-Pin Threaded M12/Euro-Style Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout**
MQDC-406	1.83 m (6 ft)	Straight	44 Typ. — M12 x 1 — ø 14.5	1 = Brown 2 = White 3 = Blue 4 = Black
MQDC-415	4.57 m (15 ft)			
MQDC-430	9.14 m (30 ft)			
MQDC-450	15.2 m (50 ft)			
MQDC-406RA	1.83 m (6 ft)	Right-Angle	32 Typ. [1.26"] — 30 Typ. [1.18"] — M12 x 1 — ø 14.5 [0.57"]	
MQDC-415RA	4.57 m (15 ft)			
MQDC-430RA	9.14 m (30 ft)			
MQDC-450RA	15.2 m (50 ft)			

Retroreflective Targets

NOTE: For a complete selection of retroreflective targets, see *www.BannerEngineering.com*.

BRT-35X35B

- Square, acrylic target
- Reflectivity Factor: 1.3
- Temperature: –20° to +60° C (−4° to +140° F)
- Approximate size: 35 mm x 35 mm

BRT-50D

- Round, acrylic target with mounting stud
- Reflectivity factor: 1.0
- Temperature: -20° to +60° C
- Optional brackets are available
- Approximate size: 50 mm diameter

BRT-2X2

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

BRT- 100X18A

- Rectangular, acrylic target
- Reflectivity factor: 1.4
- Temperature: –20° to +60° C (−4° to +140° F)
- Approximate size: 18.5 mm x 120 mm

Retroreflective Tape

📝 **NOTE:** For maximum adhesion of all tape products, surfaces must be clean.

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 in mm

SMB30A

- Right-angle bracket with curved slot for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor
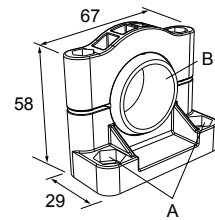- 12-ga. stainless steel
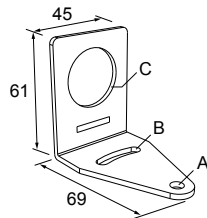
Hole center spacing: A to B=40

Hole size: A=ø 6.3, B= 27.1 x 6.3, C=ø 30.5

SMB30SC

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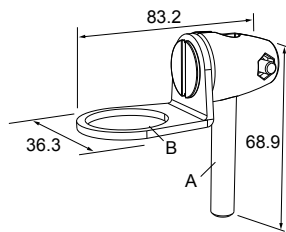- Stainless steel mounting and swivel locking hardware included

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-ga. 304 stainless steel
- Easy sensor mounting to extrude rail T-slot
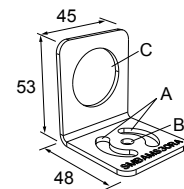- Metric and inch size bolt available

Bolt thread: SMB30FA, A= 3/8 - 16 x 2 in; SMB30FAM10, A= M10 - 1.5 x 50

Hole size: B= ø 30.1

SMBAMS30RA

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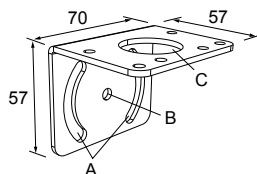- 12-ga. (2.6 mm) cold-rolled steel

Hole center spacing: A=26.0, A to B=13.0

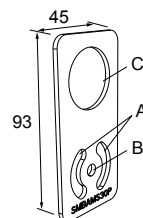**Hole size:** A=26.8 x 7.0, B=ø 6.5, C=ø 31.0

SMB30MM

- 12-ga. stainless steel bracket with curved mounting slots for versatile orientation
- Clearance for M6 (¼ in) hardware

SMBAMS30P

- Flat SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90+° rotation

- Mounting hole for 30 mm
  sensor

Hole center spacing: A = 51, A to B = 25.4

Hole size: A = 42.6 x 7, B = ø 6.4, C = ø 30.1

- 12-ga. 300 series stainless
  steel

Hole center spacing: A=26.0, A to B=13.0

Hole size: A=26.8 x 7.0, B=ø 6.5, C=ø 31.0

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.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (IN-CLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. **IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPEN-SES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WAR-RANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.**

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