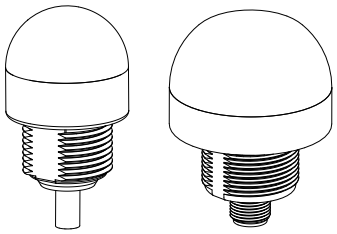
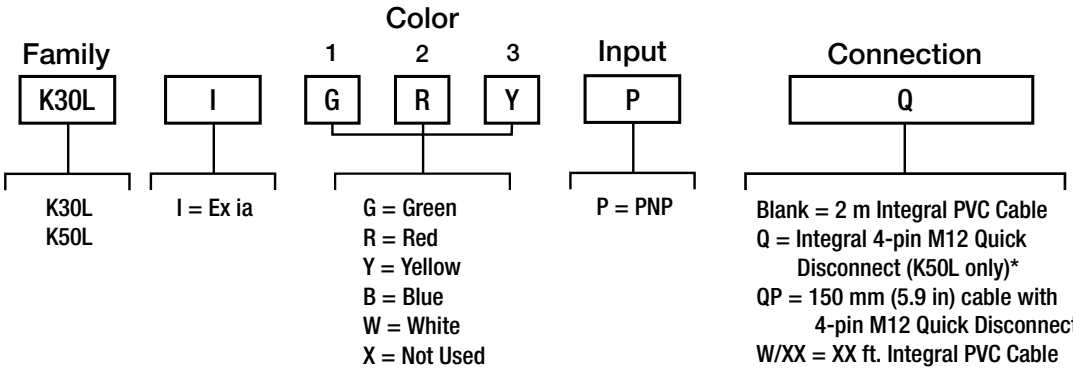
K30L and K50L Intrinsically Safe Indicators

Datasheet



- For use in hazardous areas with suitable zener barriers or galvanic isolators
- ATEX, CSA c/us, UKCA, and IECEx
- Fully sealed and rated to IP67/IP69K per DIN 40050-9
- 1-, 2-, or 3-color models available with 5 available colors

Models



*Models with a quick disconnect require a mating cordset

K30L Models

Model	LED Function
K30LIGXXPQP	1 Color: Green
K30LIYXXPQP	1 Color: Yellow
K30LIRXXPQP	1 Color: Red
K30LIBXXPQP	1 Color: Blue
K30LIWXXPQP	1 Color: White
K30LIGRXPQP	2 Color: Green, Red
K30LIGYXPQP	2 Color: Green, Yellow
K30LIGYXPQP	2 Color: Red, Yellow
K30LIGRYPQP	3 Color: Green, Red, Yellow

K50L Models

Model [1]	LED Function
K50LIGXXPQ	1 Color: Green
K50LIYXXPQ	1 Color: Yellow
K50LIRXXPQ	1 Color: Red
K50LIBXXPQ	1 Color: Blue
K50LIWXXPQ	1 Color: White
K50LIGRXPQ	2 Color: Green, Red
K50LIGYXPQ	2 Color: Green, Yellow
K50LIGRXPQ	2 Color: Red, Yellow
K50LIGRYPQ	3 Color: Green, Red, Yellow

[1] 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, K50LIGXXPQP. Models with a quick disconnect require a mating cordset.

Installation Instructions

Ex/HazLoc Applications

WARNING:
- **Explosive Atmospheres/Hazardous Locations**
- It is the user's responsibility to ensure that all local, state, and national laws, rules, codes, or regulations relating to the installation and use of this device in any particular application are satisfied. This device must be installed by a Qualified Person [2], in accordance with this document and applicable regulations.

WARNING:
- **Explosion Hazard**
- Do not disconnect equipment unless the power has been switched off or the area is known to be non-hazardous.

CAUTION:
- **Electrostatic Discharge (ESD) Special Conditions for Safe Use**
- Parts of the enclosure are non-conducting and can generate an ignition-capable level of ESD.
- Clean the equipment with only a damp cloth.

General Notes and Conditions for Use

- See Specifications and Wiring Diagrams for important information concerning entity parameters, permissible locations, electrical connections and certifications.
- In addition to the warning above concerning user responsibility, the installation must comply with the following:
  - All installations must comply with all manufacturer's instructions.
  - U.S. Installations: The relevant requirements of the National Electrical Code® (ANSI/NFPA-70 (NEC®) and when appropriate ANSI/ISA-RP12.06.01 Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations.
  - Canadian Installations: The relevant requirements of the Canadian Electrical Code (CSA C22.1).
  - ATEX and IECEx Installations: The relevant requirements of EN IEC 60079-14 and applicable National regulations.
  - For quick disconnect (QD) models only: Use Banner **MQDC-4##** cordsets (see Cordsets on page 6), or suitable M12 quick disconnect cordsets with threaded retaining nut (see Specifications on page 5). The cordset must be securely fastened using the M12×1 quick disconnect retaining nut to prevent disconnection. Maximum connector torque: 6 ft·lbs.
- Do not attempt any repairs to this device; it contains no field-replaceable parts or components. Tampering and/or replacement with non-factory components may adversely affect the safe use of the system.
- Approved Apparatus entity parameters must meet the following requirements:
  - V_{oc} or $V_t \leq V_{max}$
  - $C_a \geq C_i + C_{cable}$
  - I_{sc} or $I_t \leq I_{max}$
  - $La \geq L_i + L_{cable}$
- Device and Cable Entity Parameters: See Wiring Diagram on page 3 and Configuration on page 3
- The ambient operating temperature range of the device:
  - EPL Ga & Ma:
    - Pi = 2.8W: Ta = –40 °C to +50 °C (–40 °F to +122 °F)
    - Pi = 3.4W: Ta = –40 °C to +40 °C (–40 °F to +104 °F)
  - EPL Da:
    - Pi = 2.2W: Ta = –40 °C to +50 °C (–40 °F to +122 °F)
    - Pi = 2.7W: Ta = –40 °C to +40 °C (–40 °F to +104 °F)
- For intrinsically safe installations, device must be used with certified intrinsically safe switching amplifiers and barriers (Approved Apparatus) with intrinsically safe circuits that limit supply voltage and current in the event of failures.
- Intrinsic safety ground, if required for the Associated Apparatus, shall be less than 1 ohm.
- The dust rating of enclosures/panels may be invalidated by the installation of the EZ-LIGHT(s). The installation of the EZ-LIGHT(s) in a particular enclosure/panel is subject to the evaluation/acceptance of the applicable approval agency.
- The nonconducting materials of this device may be susceptible to ignition-capable level of electrostatic charging and precautions must be taken to avoid this. The user/installer shall ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which are conducive to creating a build-up of electrostatic charges.
- Clean with a damp cloth only.
- If the equipment is likely to come into contact with aggressive substances [3], then it is the responsibility of the user to take suitable precautions [4] that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

[2] A Qualified Person is a person who, by possession of a recognized degree or certificate of professional training, or who, by extensive knowledge, training and experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work.
[3] Aggressive substances—for example, acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

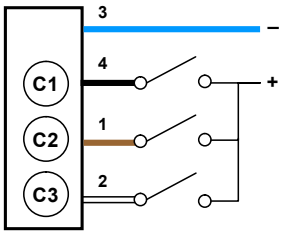
- For indicators with multiple colors, only one color is intended to be on at a time.
- When more than one intrinsically safe supply (e.g. two or three barriers) is connected to an LED indicator (input) the combined electrical parameters of the supply must remain intrinsically safe.

Wiring Diagram

The device is intrinsically safe ONLY when used with certified intrinsically safe switching amplifiers and barriers (Approved Apparatus) with intrinsically safe circuits.

Banner does not manufacture such devices; however, Banner applications engineers can refer you to suppliers of certified devices that will interface with the Banner device.

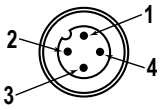
The user is responsible for proper installation and maintenance of this equipment, and must conform with the certification requirements relating to barriers and to maximum allowable capacitance and inductance of the field wiring. If in doubt about these requirements, Banner applications engineers can refer you to the appropriate authority.



Wiring Key
1 = Brown
2 = White
3 = Blue
4 = Black

Color Key
C1 = Color 1
C2 = Color 2
C3 = Color 3

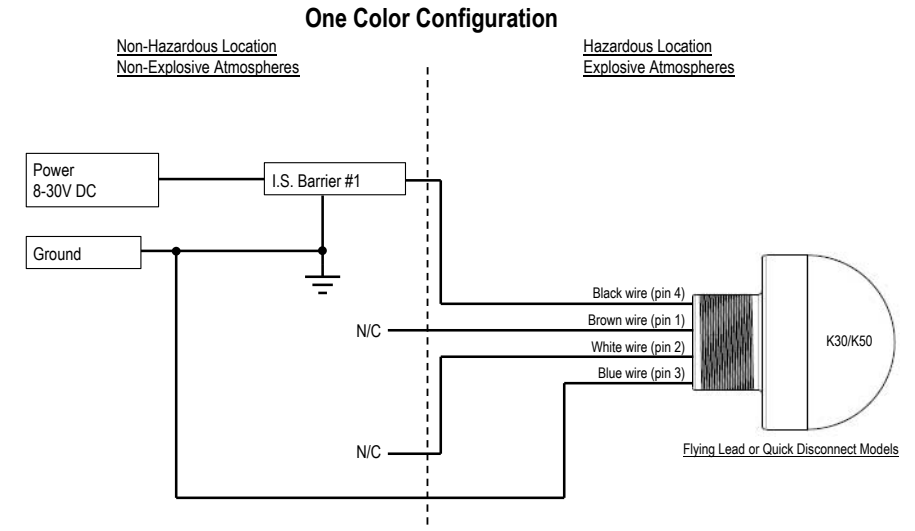
Pinout



See Configuration on page 3 for hazardous area wiring and installation notes.

Configuration

Figure 1. Control Drawing 1-Color Configuration



1. Safety parameters are as follows:
Ui/Vmax = 30V DC
Ii/Imax = 1A
EPL Ga & Ma:
Pi = 3.4W (Ta = -40 ˚C to +40 ˚C)
Pi = 2.8W (Ta = -40 ˚C to +50 ˚C)
Ci = 0
Li = 0
EPL Da:
Pi = 2.7W (Ta = -40°C to +40°C)
Pi = 2.2W (Ta = -40°C to +50°C)
Ci = 0
Li = 0

2. Choose approved barriers such that the following conditions are met with all barriers combined
Ui / Vmax ≥ Uo / Voc
Ii / Imax ≥ Io / Isc
Pi / Pmax ≥ Po
Co / Ca ≥ Ci + Ccable
Lo /La ≥ Li + Lcable

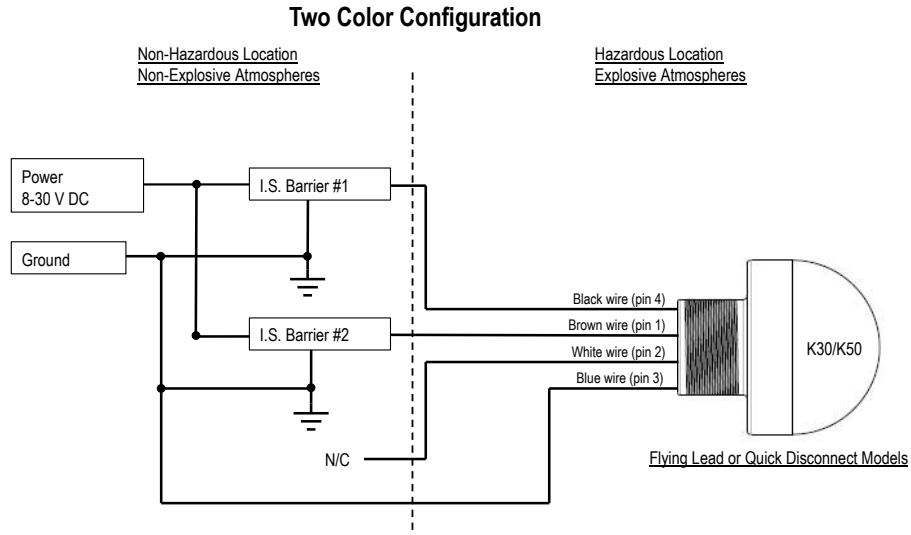
3. Install I.S. barriers in accordance with manufacturers instructions and local codes

4. Suggested I.S. barriers are as follows
MTL 7715+ (15V/100Ω)
MTL 7715P+ (15V/50 Ω)
Turck MZB15PX (15V/50 Ω)

	IIC	IIB	IIA
Ccable	66nF	0.56µF	1.82µF
Lcable	35µH	140µH	280µH

[4] Suitable precaution—for example, regular checks as part of routine inspections or establishing from the materials data sheet that it is resistant to specific chemicals.

Figure 2. Control Drawing 2-Color Configuration



I.S. Barrier Installation Notes

1. Safety Parameters are as follows:
Ui / Vmax = 30V DC
Ii / Imax = 1A
EPL Ga & Ma:
Pi = 3.4W (Ta = -40˚C to +40˚C)
Pi = 2.8W (Ta = -40˚C to +50˚C)
Ci = 0
Li = 0
EPL Da:
Pi = 2.7W (Ta = -40°C to +40°C)
Pi = 2.2W (Ta = -40°C to +50°C)
Ci = 0
Li = 0

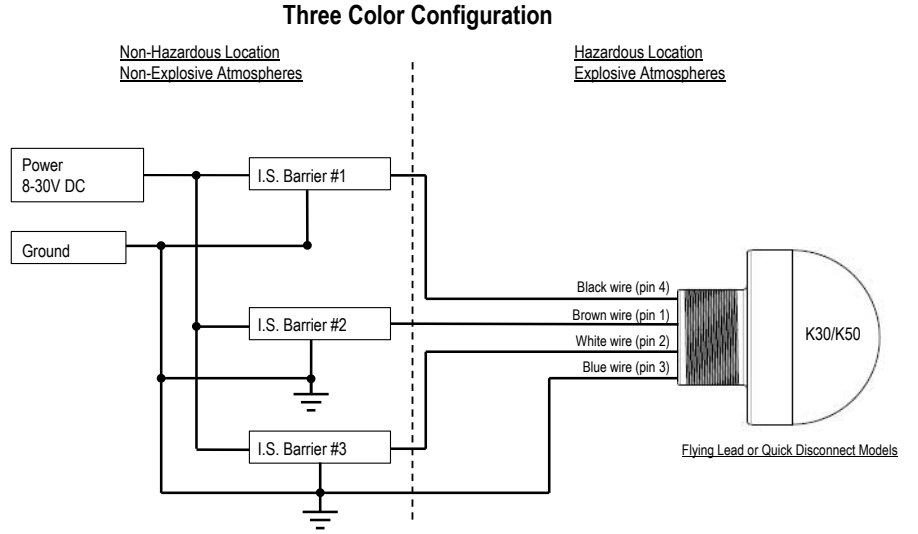
2. Choose approved barriers such that the following conditions are met with all barriers combined
Ui / Vmax ≥ Uo / Voc
Ii / Imax ≥ Io / Isc
Pi / Pmax ≥ Po
Co / Ca ≥ Ci + Ccable
Lo /La ≥ Li + Lcable

3. Install I.S. barriers in accordance with manufacturers instructions and local codes

4. Suggested I.S. barriers are as follows
MTL 7715+ (15V/100Ω)
MTL 7715P+ (15V/50 Ω)
Turck MZB15PX (15V/50 Ω)

	IIC	IIB	IIA
Ccable	66nF	0.56µF	1.82µF
Lcable	35µH	140µH	280µH

Figure 3. Control Drawing 3-Color Configuration



I.S. Barrier Installation Notes

1. Safety Parameters are as follows:
Ui / Vmax = 30V DC
Ii / Imax = 1A
EPL Ga & Ma:
Pi = 3.4W (Ta = -40˚C to +40˚C)
Pi = 2.8W (Ta = -40˚C to +50˚C)
Ci = 0
Li = 0
EPL Da:
Pi = 2.7W (Ta = -40°C to +40°C)
Pi = 2.2W (Ta = -40°C to +50°C)
Ci = 0
Li = 0

2. Choose approved barriers such that the following conditions are met with all barriers combined
Ui / Vmax ≥ Uo / Voc
Ii / Imax ≥ Io / Isc
Pi / Pmax ≥ Po
Co / Ca ≥ Ci + Ccable
Lo /La ≥ Li + Lcable

3. Install I.S. barriers in accordance with manufacturers instructions and local codes

4. Suggested I.S. barriers are as follows
MTL 7715+ (15V/100Ω)
MTL 7715P+ (15V/50 Ω)
Turck MZB15PX (15V/50 Ω)

	IIC	IIB	IIA
Ccable	66nF	0.56µF	1.82µF
Lcable	35µH	140µH	280µH

Specifications

Supply Voltage and Current

See Configuration for safety parameters

Indicators

Entire translucent diffuser or dome provides indication. LEDs are independently selected: Green, Red, or Amber; 2 or 3 colors, depending on model. For other colors/combinations, contact Banner Engineering for availability.

Environmental Rating

IEC IP67/IEC IP69K

Approvals

CSA-c/us

Gas and Vapors: Class I Zone 0 AEx/Ex ia IIC T4 Ga / Class I Div 1 Groups ABCD
Dust: Class II Zone 20 AEx/Ex ia IIIC T130°C Da / Class II Div 1 Groups EFG, Class III Div 1
CSA 14.2679646

ATEX/IECEx/UKCA

Gas and Vapors: II 1 G Ex ia IIC T4 Ga (Group IIC Zone 0)
Dust: II 1 D Ex ia IIIC T_{200} 130°C Da (Group IIIC Zone 20)
Mines: I M1 Ex ia I Ma (Methane)
Sira 13ATEX2058X
IECEx SIR 13.0020X
CSAE 21UKEX2681X
ATEX/UKCA: EN IEC 60079-0:2018 & EN 60079-11:2012
IECEx: IEC 60079-0:2017 Ed.7 & IEC 60079-11:2011 Ed.6

Construction

Base: polycarbonate
Translucent dome: polycarbonate

Connections

Maximum cable length 29 m per parameters list in Figure 1 on page 3, Figure 2 on page 4, and Figure 3 on page 4.

Connecting 4-pin M12 QD Cordsets (see Cordsets on page 6): Female single-ended Multiconductor cable (at minimum): UL Style 2517, 24 AWG wire, rated ≥ 80 °C; M12 quick disconnect connector: per IEC 61076-2-101, must have threaded M12 × 1 retaining nut.

K30: 2 m (6.5 ft) PVC integral cable, or 150 mm (5.9 in) PVC cable with 4-pin M12 quick disconnect connector
K50: 4-pin M12 integral quick disconnect connector, 2 m (6.5 ft) PVC integral cable, or 150 mm (5.9 in) PVC cable with 4-pin M12 quick disconnect connector

Operating Conditions

EPL Ga & Ma:

- Pi = 2.8W: Ta = –40 °C to +50 °C (–40 °F to +122 °F)
- Pi = 3.4W: Ta = –40 °C to +40 °C (–40 °F to +104 °F)

EPL Da:

- Pi = 2.2W: Ta = –40 °C to +50 °C (–40 °F to +122 °F)
- Pi = 2.7W: Ta = –40 °C to +40 °C (–40 °F to +104 °F)

See Figure 1 on page 3, Figure 2 on page 4, and Figure 3 on page 4

Certifications

2809

1725

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

Turck Banner LTD
Blenheim House, Blenheim
Court, Wickford, Essex
SS11 8YT, Great Britain

IEC IECEx SIR 13.0020X
ATEX Sira 13ATEX2058X
CSAE 21UKEX2681X
CSA CoC 2679646

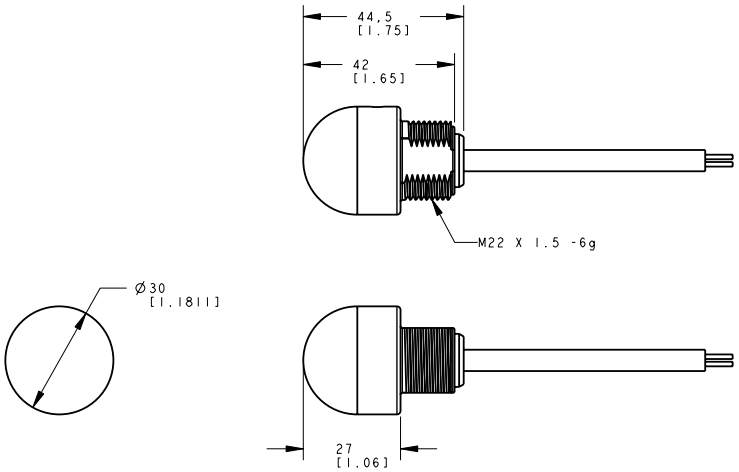
Figure 4. K30L Product Label

Figure 5. K50L Product Label

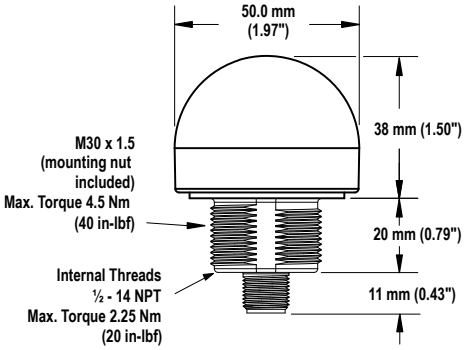
Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise.

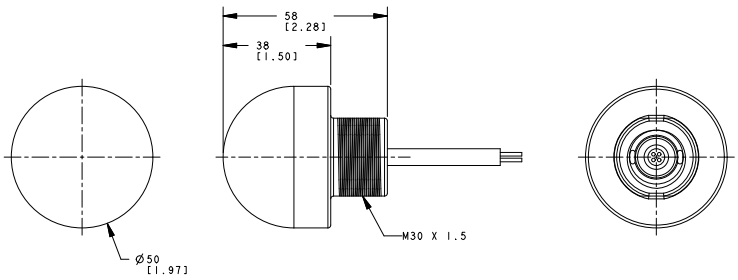
K30L Cabled Models



K50L Quick Disconnect Models

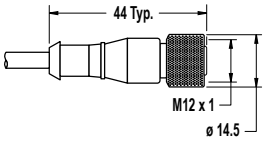
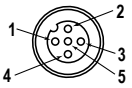
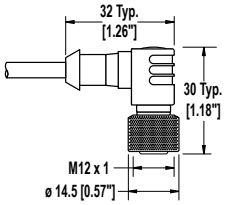
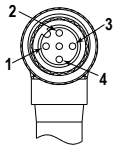


K50L Cabled Models



Accessories

Cordsets

4-Pin Threaded M12 Cordsets—Single Ended					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-406	2 m (6.56 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
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)				

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