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Просим Вас указывать в заявке:

- название предприятия, факс, контактный телефон, контактное лицо;
- полное наименование и количество товара;
- возможность замены или аналоги;

Каталог Banner

Автоматизация

Banner в Беларуси

**Euro-Style**

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

4-Pin

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

5-Pin

MQDC1-506
2 m (6.5')
MQDC1-515
5 m (15')
MQDC1-530
9 m (30')

Additional information is available
See page 758

**SMBLSTDQ26****SMBLSTQ26**

Additional bracket information is available
See page 725

Reflectors

Additional information is available
See page 790

Apertures

Additional information is available
See page 816

**QM26 Specifications**

Supply Voltage and Current	10 to 30 V dc (10% maximum ripple within specified limits); supply current (exclusive of load current) less than 20mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Most Models: Complementary PNP or NPN by model number
Output Rating	100 mA max OFF-state leakage current for load: NPN less than 200 μ A; PNP less than 500 μ A ON-state saturation voltage: less than 2 V @ 100 mA
Output Protection Circuitry	Protected against false pulse at power-up and continuous overload or short circuit of outputs
Output Response Time	500 microseconds ON and OFF
Repeatability	Opposed mode: 110 microseconds All other mode: 150 microseconds
Indicators	Green steady: Power ON Yellow steady: Light sensed Yellow flashing: Light sensed but marginal signal
Construction	316L stainless steel housing; acrylic window
Operating Conditions	Temperature: -30 to +70 °C Relative Humidity: Periodic exposure to 100% humidity and washdown cleaning
Environmental Rating	IP67 & IP69K, Ecolab® compatible
Vibration and Shock	IEC60947-5-2
Certifications	



With Class 2 power

ECOLAB® chemical compatibility pending on some models; contact Banner Engineering for details

QMH26 Series

Hygienic Sensors



- The QMH26 is designed with minimal grooves and crevices, making it easy to clean and ideal for clean-in-place (CIP) applications
- Rugged, chemically resistant and food safe 316L stainless steel housing
- Reliably detects clear materials in harsh environments
- IP69K rated for use in harsh 1500 psi and 80° C washdown
- High chemical resistance for the most demanding photoelectric sensing environments

Polar Retro QMH26

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 POLAR RETRO	3 m	4-pin Pico QD	QMH26VNLPQ7	QMH26VPLPQ7

Coaxial Polar Retro QMH26

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 COAXIAL POLAR RETRO	2.6 m	4-pin Pico QD	QMH26ENXLPCQ7	QMH26EPXLPCQ7

Background Suppression QMH26

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 BACKGROUND SUPPRESSION	Adjustable between 5-400 mm	4-pin Pico QD	QMH26VNAF400Q7	QMH26VPAF400Q7

Foreground Suppression QMH26

Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FOREGROUND SUPPRESSION	Adjustable between 5-200 mm	4-pin Pico QD	QMH26VNAF200Q7	QMH26VPAF200Q7

Connection options: A model with a QD requires a mating cordset.

For a 5 m cable, replace Q7 with -5M in the model number (example, QMH26VNLP-5M)

**Pico QD (for Q models)**

Straight connector models listed; for right-angle, **W** replaces **G** in the model number. (example, **PKW3M-2**)

4-Pin

PKG4M-2
2 m (6')
PKG4M-5
5 m (15')
PKG4M-9
9 m (30')

**SMBLSTDLQ26****SMBLSTQ26****SMBQMH26-SS-150**

Additional cordset information is available
See page 758

Additional bracket information is available
See page 725

Reflectors

Additional information is available
See page 790

Apertures

Additional information is available
See page 816

**QMH26 Specifications**

Supply Voltage and Current	10 to 30 V dc (10% maximum ripple within specified limits); supply current (exclusive of load current) less than 20mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Most Models: Complementary PNP or NPN by model number QMH26E...XLPC models: Single PNP or NPN on pin 4 (black wire) with remote teach input on pin 2 (white wire)
Output Rating	100 mA max OFF-state leakage current for load: NPN less than 200 μ A; PNP less than 500 μ A ON-state saturation voltage: less than 2 V @ 100 mA
Output Protection Circuitry	Protected against false pulse at power-up and continuous overload or short circuit of outputs
Output Response Time	500 microseconds ON and OFF
Repeatability	Opposed mode: 110 microseconds All other mode: 150 microseconds
Indicators	Green steady: Power ON Yellow steady: Light sensed Yellow flashing: Light sense but marginal signal
Construction	316L stainless steel housing; acrylic window
Operating Conditions	Temperature: -30 to +70 °C Relative Humidity: Periodic exposure to 100% humidity and washdown cleaning
Environmental Rating	IP67 & IP69K, ECOLAB® compatible
Vibration and Shock	IEC60947-5-2

Certifications

With Class 2 power

ECOLAB® chemical compatibility pending on some models; contact Banner Engineering for details

M25U

Stainless Steel Ultrasonic Sensors



- Cleans easily with no thread, gaps or seams to trap debris
- The M25U Ultrasonic Sensor features a smooth 316 series stainless steel construction to withstand the toughest sanitary challenges
- Constructed with FDA approved materials and rated to IP69K, IEC IP67 (NEMA 6) with fully encapsulated electronics

M25U

Range*	Frequency	Connection	Output	Response Time	Models
Normal Speed:500 mm High Speed:250 mm	140 kHz	4-pin Euro QD	—	—	M25UEQ8 Emitter
Normal Speed:500 mm High Speed:250 mm	140 kHz	5-pin Euro QD	Bipolar NPN/PNP	Normal Speed: 4.0 ms High Speed: 3.0 ms	M25URBQ8 Receiver

 Connection options: A model with a QD requires a mating cordset

* M25U receivers may be wired for either of two speed modes: Normal or High, depending on hookup. The Normal-Speed mode offers a sensing range of 500 mm. The Normal-Speed mode maximizes sensing energy, as is required in demanding environments. The High-Speed mode offers a sensing range of 250 mm. The High-Speed mode maximizes sensing response, as is needed in high-speed counting applications.

**Euro-Style with Shield**

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-506RA**)

5-Pin

MQDEC2-506
2 m (6.5')
MQDEC2-515
5 m (15')
MQDEC2-530
9 m (30')

Washdown **Euro-Style**
Straight connector models listed

**5-Pin**

MQDCWD-506
2 m (6.5')
MQDCWD-530
9 m (30')

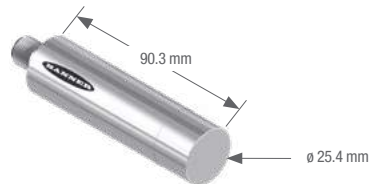
Additional cordset information is available
See page 758



SMBM25A



SMBM25B



Additional bracket information is available
See page 725

M25U Specifications

Sensing Range	Normal Speed: 500 mm High Speed: 250 mm 140KHz
Supply Voltage and Current	Emitter: 10 to 30 V dc (10% max. ripple) at less than 85 mA Receiver: 10 to 30 V dc (10% max. ripple) at less than 38 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Receiver Output Configuration	Bipolar (1 NPN & 1 PNP) solid-state output; Normally Open (output is activated when an object blocks the sensing beam)
Output Rating	100 mA (each output) with short circuit protection; see Note 1 OFF-state leakage current: NPN: < 200 μ A sinking ON-state saturation voltage: NPN: < 1.6 V @ 100 mA PNP: < 10 μ A sourcing PNP: < 3.0 V @ 100 mA
Output Protection Circuitry	Protected against short circuit conditions
Output Response Time	Normal Speed: 4.0 milliseconds High Speed: 3.0 milliseconds
Repeatability	1 millisecond
Delay at Power-up	< 250 milliseconds
Delay for Switching Between Normal and High Speed	20 milliseconds
Indicators	Green Power LED: indicates Power ON Amber Output LED: indicates output activated
Construction	Housing: 316 Stainless Steel LED window: Polysulfone
Environmental Rating	Leakproof design, rated IEC IP67 (NEMA 6), IP69K
Operating Conditions	Temperature: -20 to +70 °C Max. Relative Humidity: 95% at 50 °C non-condensing
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max. amplitude 0.06", max. acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration.
Certifications	CE
Notes	1. NPN < 200 μ A for load impedance > 3 K Ω ; for load current of 100 mA, leakage < 1% of load current 2. When mounting the M25U, care should be taken to acoustically isolate the emitter and receiver to eliminate sound energy coupling between the sensor pair. This is best accomplished with elastomeric materials between the sensor and rigid mounting brackets.

SM30

High-Power, Long-Range, Opposed-Mode
Barrel Sensors

- The SM30 is a powerful sensor with a long range for different frequencies and the stainless steel model can be used in abusive environments
- Available with ac or dc supply voltages
- Ideal in equipment washdown environments

SM30 Emitters, 10-30 V DC or 12-240 V AC, Frequency A[†]

⇒ Infrared LED

Sensing Mode	Housing	Range	Connection	Output Type	Models
	Plastic	150 m	2 m 3-Pin Mini QD	N/A	SMA30PEL SMA30PELQD
	Stainless Steel	150 m	2 m 3-Pin Mini QD	N/A	SMA30SEL SMA30SELQD

SM30 Receivers, 10-30 V DC Frequency A[†]

⇒ Infrared LED

Sensing Mode	Housing	Range	Connection	Output Type	Models
	Plastic	150 m	2 m 4-Pin Mini QD	Bi-Modal™ NPN or PNP	SM30PRL SM30PRLQD
	Stainless Steel	150 m	2 m 4-Pin Mini QD	Bi-Modal™ NPN or PNP	SM30SRL SM30SRLQD

SM30 Receivers, 24-240 V AC, Frequency A[†]

⇒ Infrared LED

Sensing Mode	Housing	Range	Connection	Output Type	Models
	Plastic	150 m	2 m	LO	SM2A30PRL
			3-Pin Mini QD		SM2A30PRLQD
	Stainless Steel	150 m	2 m	LO	SM2A30SRL
			3-Pin Mini QD		SM2A30SRLQD
	Plastic	150 m	2 m	DO	SM2A30PRLNC
3-Pin Mini QD			SM2A30PRLNCQD		
Stainless Steel	150 m	2 m	DO	SM2A30SRLNC	
			3-Pin Mini QD		SM2A30SRLNCQD



Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix W/30 to the 2 m model number (example, SM30PR W/30).

† Modulation frequency "A" is standard; frequencies "B" and "C" are also available to minimize optical crosstalk potential between adjacent pairs and are specified by adding "B" or "C" at the end of the standard model number (example, SM30PRLB or SM30PRLC).

Mini QD
Straight connector
models listed



3-Pin
SM30CC-306
2 m (6.5')
SM30CC-312
3 m (12')

4-Pin
MBCC-406
2 m (6.5')
MBCC-412
3 m (12')

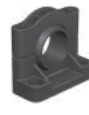
Additional cordset information is available
See page 758



SMB30A



SMB30FA..



SMB30SC



SMBAMS30P

Additional bracket information is available
See page 724

Apertures



Additional information is available
See page 816



Opposed Models—All Frequencies
Suffix E and R

SM30 Specifications

Supply Voltage and Current	Emitters: 12 to 240 V ac (50/60 Hz) or 10 to 30 V dc (10% max. ripple) at 20 mA DC Receivers: 10 to 30 V dc (10% max. ripple) at 10 mA max, exclusive of load AC Receivers: 24 to 240 V ac (50/60 Hz)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	DC Receivers: Bi-Modal™ output (PNP sourcing or NPN sinking). Selection of sourcing or sinking configuration depends upon receiver's power supply hookup polarity. Once wired, the unit performs as a solid-state switch. AC Receivers: Solid-state switch offer Light Operate (LO) or Dark Operate (DO) by model
Output Rating	DC Receivers: 250 mA continuous Output saturation voltage: (PNP & NPN configuration) less than 1 volt at 10 mA; less than 2 volts at 250 mA OFF-state leakage current: less than 10 μ A AC Receivers: Max. steady-state load capability is 500 mA Inrush capability: 10 amps for 1 second (non-repeating) OFF-state leakage: current less than 1.7 mA rms ON-state voltage drop: less than 3.5 volts rms across a 500 mA load; less than 5 volts rms across a 15 mA load
Output Protection Circuitry	Outputs of dc receivers are short circuit protected
Output Response Time	10 milliseconds ON/OFF
Repeatability	"A" frequency units: 1 millisecond "B" frequency units: 1.5 milliseconds "C" frequency units: 2.3 milliseconds
Indicators	Internal Red LED, visible through the lens or from side of the sensor. Emitters: Red "Power ON" indicator LED DC Receivers: Lights whenever receiver sees its modulated light source AC Receivers: Lights whenever receiver's output is conducting
Construction	Fully epoxy-encapsulated tubular threaded housing, positive sealed at both ends, quad-ring sealed acrylic lens 30 mm diameter 303 stainless steel housing and jam nuts
Environmental Rating	Exceeds NEMA 6P; IEC IP67 standards
Operating Conditions	Temperature: -40 to +70 °C Relative humidity: 90% at 50 °C (non-condensing)

Certifications



ECOLAB® Chemical Compatibility Certified

VSM Series

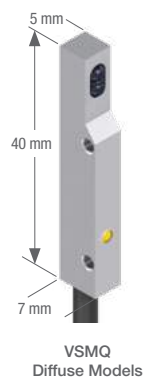
Self-Contained Metal Sensors



- Heavy-duty, compact, metal sensors that are ideal for use in confined areas.
- Sapphire lens
- Tough 300 series stainless steel body withstands a wide variety of chemicals and cutting fluids
- Smooth barrel models are ideal for hygienic applications that require frequent cleaning
- Advanced optical design provides high performance with repeatable sensing

VSMQ (Flat-Pack, Side-Looker)

Infrared LED



Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
DIFFUSE	20-50 mm	2 m	LO	VSMQAN6CV20	VSMQAP6CV20
DIFFUSE	50-140 mm	2 m	LO	VSMQAN6CV50	VSMQAP6CV50
DIFFUSE	90-200 mm	2 m	LO	VSMQAN6CV90	VSMQAP6CV90

VSM4 (4 mm Smooth Barrel)

Infrared LED

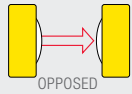
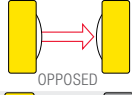
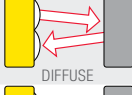
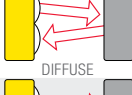
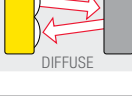


Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
OPPOSED	250 mm	2 m	—	VSM46E Emitter	
	250 mm	3-Pin Pico QD	—	VSM46EQ7 Emitter	
OPPOSED	250 mm	2 m	DO	VSM4RN6R	VSM4RP6R
	250 mm	3-Pin Pico QD		VSM4RN6RQ7	VSM4RP6RQ7
DIFFUSE	10-30 mm	2 m	LO	VSM4AN6CV10	VSM4AP6CV10
	10-30 mm	3-Pin Pico QD		VSM4AN6CV10Q7	VSM4AP6CV10Q7
DIFFUSE	20-50 mm	2 m	LO	VSM4AN6CV20	VSM4AP6CV20
		3-Pin Pico QD		VSM4AN6CV20Q7	VSM4AP6CV20Q7
DIFFUSE	50-140 mm	2 m	LO	VSM4AN6CV50	VSM4AP6CV50
		3-Pin Pico QD		VSM4AN6CV50Q7	VSM4AP6CV50Q7

Connection options: A model with a QD requires a mating cordset.

VSM5 (5 mm Threaded Barrel)

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models NPN	Models PNP
 OPPOSED	250 mm	2 m 3-Pin Pico QD	—	VSM56E Emitter VSM56EQ7 Emitter	
 OPPOSED	250 mm	2 m 3-Pin Pico QD	DO	VSM5RN6R VSM5RN6RQ7	VSM5RP6R VSM5RP6RQ7
 DIFFUSE	10-30 mm	2 m 3-Pin Pico QD	LO	VSM5AN6CV10 VSM5AN6CV10Q7	VSM5AP6CV10 VSM5AP6CV10Q7
 DIFFUSE	20-50 mm	2 m 3-Pin Pico QD	LO	VSM5AN6CV20 VSM5AN6CV20Q7	VSM5AP6CV20 VSM5AP6CV20Q7
 DIFFUSE	50-140 mm	2 m 3-Pin Pico QD	LO	VSM5AN6CV50 VSM5AN6CV50Q7	VSM5AP6CV50 VSM5AP6CV50Q7


 Connection options: A model with a QD requires a mating cordset.

Pico QD (for Q models)

Straight connector models listed;
for right-angle, **W** replaces **G** in
the model number.
(example, **PKW3M-2**)



3-Pin

PKG3M-2
2 m (6')
PKG3M-5
5 m (15')
PKG3M-9
9 m (30')



SMBVSM4

Additional cordset information is available
See page 758

VSM Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Single-output: 1 NPN or 1 PNP, Light Operate (LO) or Dark Operate (DO), depending on model
Output Rating	100 mA max. OFF-state leakage current: less than 1 μ A ON-state saturation voltage: less than 2 V @ 100 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs Overload trip point \geq 100 mA
Response Time	2.5 milliseconds
Delay at Power-up	20 milliseconds
Repeatability	1 millisecond
Indicators	Yellow LED: light sensed
Construction	300 series stainless steel with PVC cable CV10 & CV20: sapphire lens CV50 & Opposed: Glass lens
Environmental Rating	IP67
Connections	2 m PVC-jacketed cable or 3-pin Pico-style integral QD (Q7), depending on model. QD cordsets ordered separately.
Operating Conditions	Operating temperature: 0° to +55 °C

Certification



M18-4

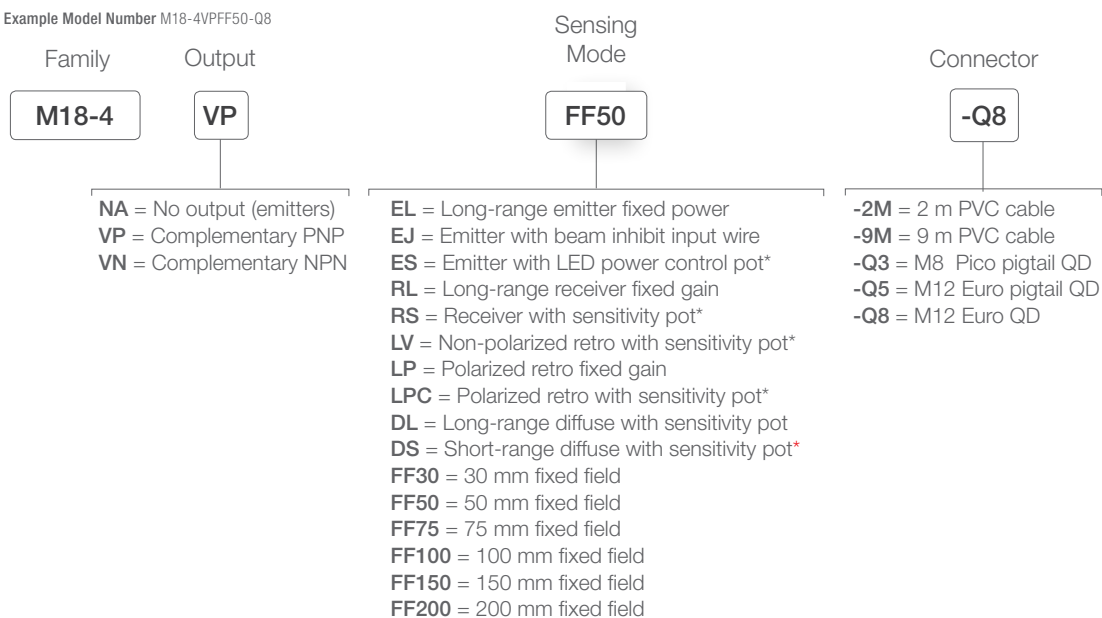
Heavy-Duty 18 mm Metal Barrel-Mount



- Chemically robust stainless steel sensors for washdown applications
- Robust housing is sealed against fluid ingress and exposure to harsh chemicals
- Powerful and bright visible red emitter beam for easy alignment and setup
- Highly visible output and dual-function power and stability indicators
- Advanced ASIC technology is resistant to fluorescent light and offers exceptional cross talk immunity
- Robust 250° adjustment potentiometer on select models
- Available in Emitter/Receiver, Polarized Retroreflective, Retroreflective, Diffuse, and Fixed Field models

M18-4

Example Model Number M18-4VPFF50-Q8



* Sensitivity adjustment

 Connection options: A model with a QD requires a mating cordset.

† Retroreflective range is specified using one model BRT-3 retroreflector, unless otherwise noted.

Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

**Euro-Style Cordsets**

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

4-Pin

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

**M12/Euro-Style Washdown (IP69K)**

Straight connector models only

4-Pin

MQDC-WDSS-0406
2 m (6.5')
MQDC-WDSS-0415
5 m (15')
MQDC-WDSS-0430
9 m (30')

Additional cordset information is available
See page 758

**SMB18FA..****SMB18A****SMB18SF**

Additional bracket information is available
See page 725

Reflectors**Apertures**

Additional information is available
See page 790

Additional information is available
See page 816

**M18-4 Specifications**

Supply Voltage and Current	10 V to 30 V dc for ambient temperature $\leq 55^\circ\text{C}$	10 V to 24 V dc for ambient temperature $> 55^\circ\text{C}$
Supply Protection Circuitry	Protected against reverse polarity and transient voltages	
Output Configuration	Solid-state complementary dc switch; NPN (current sinking) or PNP (current sourcing), depending on model The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply	
Output Rating	≤ 50 mA total current for ambient temperatures $> 55^\circ\text{C}$ OFF-State Leakage Current: < 50 μA at 30 V dc	≤ 100 mA total current through both outputs $\leq 55^\circ\text{C}$ ON-State Saturation Voltage: < 1.5 V at 10 mA; < 3.0 V at 100 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous short circuit of outputs. Short circuit protection at elevated temperature may require a power cycle to reset.	
Output Response Time	Opposed, Fixed Field: 1.5 milliseconds ON, 1.5 milliseconds OFF Polarized Retroreflective, Retroreflective, Fixed-field and Diffuse: 1.5 milliseconds ON, 0.75 milliseconds OFF Delay on Power-up: 100 milliseconds; outputs do not conduct during this time	
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time	
Repeatability	Opposed: 170 microseconds Polarized Retroreflective, Retroreflective, Diffuse, Fixed Field: 100 microseconds Repeatability and response are independent of signal strength	
Indicators	Three LEDs (1 green, 2 amber) Green solid: indicates power applied and sensor ready Green flashing: indicates marginal sensing signal Amber solid: indicates Pin 4 (black wire) output conducting	
Emitter LED	Visible red	
Construction	Housing: 316L stainless steel Front window: PMMA	Indicator windows: Clear polysulfone (PSU) Indicator cover and gain pot driver: Black PSU
Environmental Rating	IEC 60529 IP67, IP68, and IP69K	
Operating Conditions	Temperature: -40° to $+70^\circ\text{C}$	Relative humidity: 95% at 50°C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06 in acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)	
Certifications		



Clear Object

Clear object detection sensors reliably and quickly detect clear, transparent and mirror-like surfaces with various visible red laser or ultrasonic sensor models for high precision detection.

Series	Description	Max Sensing Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	QS18 The QS18E features a polarized coaxial optical design to ensure reliable detection of clear targets and has a fast 400 microsecond response time. page 312	3 m	34.5 x 15 x 31 mm	IP67	ABS	10 to 30 V dc
	Q4X COD The Q4X sensor solves many challenging applications and comes in a rugged IP69K rating with FDA food grade stainless steel casing. page 314	300 mm	44 x 22 x 33 mm	IP67 IP68 IP69K	Stainless Steel	12 to 30 V dc
	QS30 The QS30 reliably detects clear, translucent and opaque objects faster than other clear object detection sensor options. page 316	Retro: 2 m	44 x 22 x 33 mm	IP67	ABS	10 to 30 V dc
	Q26 Coaxial optics enable reliable detection of clear, translucent or opaque objects including mirror-like surfaces. page 318	Coaxial Polar Retro: 800 mm	52.3 x 45 x 25 mm	IP67	ABS	12 to 30 V dc
	OMNI-BEAM Modular self-contained photoelectric sensors can be customized for specific applications and offer reliable clear object detection. page 320	Polar Retro: 4 m	H (varies by model) 44.5 x 54.6 mm	IP66	Thermoplastic polyester	10 to 30 V dc
	MINI-BEAM Universal housing design with 18 mm threaded lens; an ideal replacement for other sensor styles. page 322	Polar Retro: 1 m	33.3 x 12.53.1 mm	IP67	Thermoplastic polyester	10 to 30 V dc

OTHER AVAILABLE MODELS



QS18U page 236



Q4X page 34



T18U page 226



T30UX page 224



QM26 page 298



QMH26 page 300

QS18

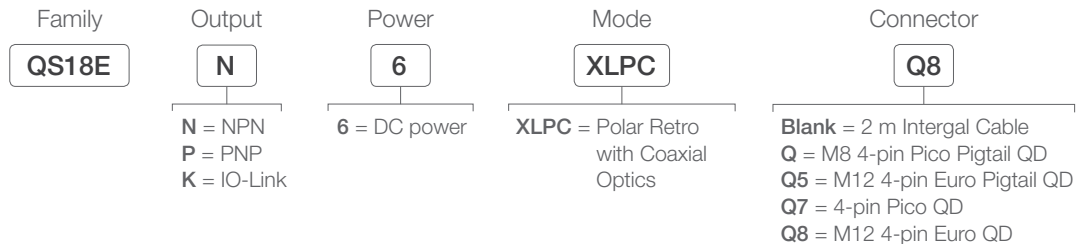
Clear Object Detection Sensor



- Polarized coaxial optical design ensures reliable detection of transparent, translucent, and opaque targets at any distance between sensor and reflector
- Suitable for low contrast sensing application: PET bottles, glass containers, shrink wrap
- Detect surfaces such as: LCD panels with built in polarizing films, solar panels, and semiconductor wafers
- IO-Link option available

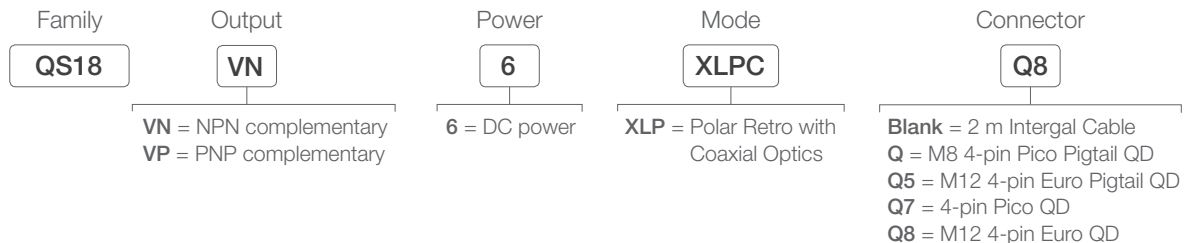
QS18 COD *Expert*

Example Model Number: QS18EN6XLPCQ8



QS18 COD with Potentiometer

Example Model Number: QS18VN6XLPCQ8



Connection options: A model with a QD requires a mating cordset.

Euro QD
(for ..Q8 or ..Q5 models)
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)



4-Pin
MQDC-406
2 m (6')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Pico QD
Straight connector models listed; for right-angle, change **G** to **W** (example, **PKW4M-2**)



4-Pin
PKG4M-2
2 m (6')
PKG4M-5
5 m (15')
PKG4M-9
9 m (30')



Additional cordset information is available
See page 758



SMB18A



SMBQ4XFA
Includes 3/8" bolt for mounting

SMBQ4XFAM10
Includes 10 mm bolt for mounting

SMBQ4XFAM12
Clamps directly onto industry standard bracket systems of 1/2" or 12 mm rods

Reflectors



Additional information is available
See page 790

Additional bracket information is available
See page 722

QS18 Clear Object Specifications

Supply Voltage	10 to 30 V dc (10% max. ripple) at less than 35 mA, exclusive of load; 10 to 24 V dc @ greater than 55° C
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state NPN (current sinking) or PNP (current sourcing), depending on model Light (LO) or Dark Operate (DO) selectable Selectable 30 millisecond output OFF-delay Rating: 100 mA max. OFF-state leakage current: less than 50 µA @ 30 V dc ON-state saturation voltage: less than 1.5 V (2 m cable); 1.7 V (9 m cable) Protected against false pulse on power-up and continuous overload or short circuit of output
Output Response Time	400 microseconds ON/OFF
Delay at Power-up	Momentary delay on power-up; outputs do not conduct during this time
Repeatability	100 microseconds
Adjustments	Thresholds: Push-button/remote-wire configurable Expert™-style TEACH and SET options: Light/Dark Operate: selectable by programming order (load output follows the first taught target condition) Push-button enable/disable: remote wire only See datasheet for detailed information
Indicators	2 LED indicators: Green: RUN mode, output short-circuit Yellow: Output ON/marginal, TEACH mode
Construction	ABS housing
Environmental Rating	Meets NEMA 6; IEC IP67; UL Type 1
Operating Conditions	Temperature: -20 to +70 °C Relative humidity: 90% @ 50 °C (non-condensing)
Certifications	



Q4X Series

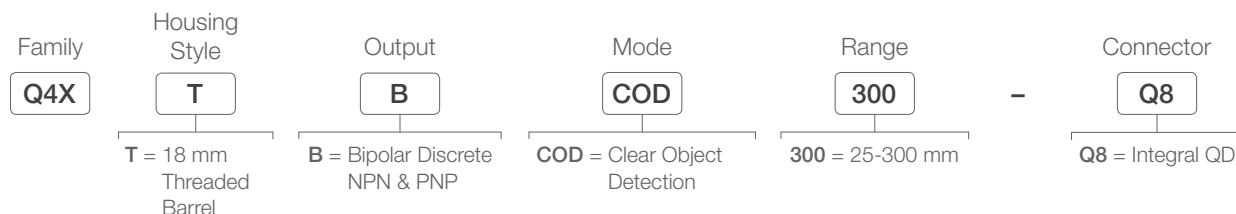
Clear Object Detection Sensor



- A simple user experience from installation to setup
 - Bright spot alignment
 - Three push buttons simplify setup
 - Intuitive menus
- Four-digit display shows percent match
- FDA-grade stainless steel is suitable for IP69K washdown environments

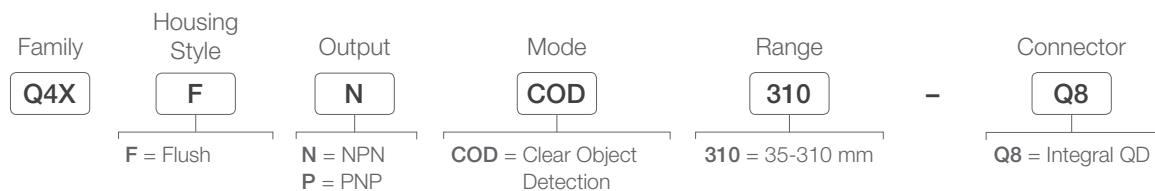
Q4X COD Threaded Barrel

Example Model Number: Q4XTBCOD300-Q8

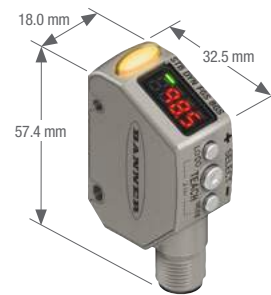


Q4X COD Flush Mount

Example Model Number: Q4XFNCOD310-Q8



Q4XT.. models



Q4XF.. models

Connection options: A model with a QD requires a mating cordset.

**M12/Euro-Style**

Straight connector models listed; for right-angle, add RA to the end of the model number (example, MQDC1-506RA)

5-Pin

MQDC1-506
2 m (6.5')
MQDC1-515
5 m (15')
MQDC1-530
9 m (30')



M12/Euro-Style Washdown (IP69K)
Straight connector models only

5-Pin

MQDC-WDSS-0506
2 m (6.5')
MQDC-WDSS-0515
5 m (15')
MQDC-WDSS-0530
9 m (30')

Additional cordset information is available
See page 758

**SMB18A****SMBAMS18P****SMBAMS18RA****SMB46L2**




SMBQ4XFA
includes 3/8" bolt for mounting

SMBQ4XFAM10
includes 10 mm bolt for mounting

SMBQ4XFAM12
clamps directly onto industry standard bracket systems of 1/2" or 12 mm rods

Additional bracket information is available
See page 722

Q4X Specifications

Supply Voltage and Current	10 to 30 V dc		
Laser Characteristics	Wavelength: Class 1 Laser: 655 nm visible red		
Beam Spot Size	Distance (mm)	Size (Horizontal x Vertical)	
	25/35	2.4 mm x 1.0 mm	
	50/60	2.32mm x 0.9 mm	
	100/110	1.8 mm x 0.7 mm	
Output Response Time	User selectable: 50 ms, 25 ms, 10 ms, 3 ms and 1.5 msw		
Excess Gain	HIGH Excess Gain (STANDARD Excess Gain)		
		Excess Gain (90% white card)	
	Response Speed (ms)	25/35 mm	300/310 mm
	1.5	200	20
	3	200	20
	10	1000 (500)	100 (50*)
	25	2500 (1000)	250 (100*)
	50	5000 (2500)	500 (250*)
Construction	Housing 316 L stainless steel; PMMA acrylic lens cover, Polysulfone lightpipe and display window		
Ambient Light Immunity	Greater than 5000 lux		
Environmental Rating	IP67 per IEC60529; IP68 per IEC60529; IP69K per DIN40050-9		
Operating Conditions	Temperature: -10 to +55 °C Humidity: 35% to 95% relative humidity		
Certifications	  		

QS30

Right-Angle Clear Object Detection Sensors



- The QS30 reliably detects clear, translucent and opaque objects faster than other clear object detection sensor options
- Three selectable thresholds based on type of target being detected
- Easy configuration of sensor via push buttons or remote wire
- Rugged housing rated to IP67 NEMA 6

QS30 Expert™, 10-30 V DC

Visible Red LED

Sensing Mode	Laser Class	Range	Connection	Model Bipolar NPN/PNP
	—	100 mm to 2 m†	2 m	QS30ELVC
			5-pin Euro QD	QS30ELVCQ

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS30ELVC W/30).

† BRT-2X2LVC and BRT40X19A retroreflectors are included with sensor.



Euro-Style Cordsets

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC1-506RA**)

5-Pin

MQDC1-506
2 m (6.5')
MQDC1-515
5 m (15')
MQDC1-530
9 m (30')



SMB30A



SMBQS30L



SMBQS30YL



SMBQS30Y

Additional cordset information is available
See page 758

Additional bracket information is available
See page 722

Reflectors



Additional information is available
See page 790

Apertures



Additional information is available
See page 816



Retroreflective Expert Models
Suffix ELVC

QS30 Expert™ Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 25 mA, exclusive of load
Output Protection Circuitry	Protected against output short-circuit, continuous overload, transient over-voltages and false pulse on power-up
Sensing Beam	660 nm visible Red
Supply Protection Circuitry	Protected against reverse polarity; over voltage and transient voltages
Output Configuration	Bipolar: One NPN (current sinking) and one PNP (current sourcing); Light Operate (LO) or Dark Operate (DO) configurable
Output Response Time	500 microseconds
Delay at Power-up	250 milliseconds; outputs do not conduct during this time
Repeatability	150 microseconds
Adjustments	2 push buttons and remote wire for TEACH programming and configuration See data sheet for detailed information
Indicators	2 LEDs: Green: Power ON Yellow: Output conducting See data sheet for more detailed information
Construction	PC/ABS housing with acrylic lens cover
Environmental Rating	IEC IP67 (NEMA 6); PW12 1200 PSI washdown
Operating Conditions	Temperature: -10 to +55 °C Relative humidity: 95% @ 55 °C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz max., double amplitude 0.06-inch acceleration 10G). Also meets IEC 947-5-2 requirements: 30G, 11 milliseconds duration, half-sine wave.
Application Note	If supply voltage is > 24 V dc, derate maximum output current 1 mA/°C above 25° C
Certification	CE


Q26

Clear Object Sensors



- Coaxial optics enable reliable detection of clear, translucent or opaque objects including mirror-like surfaces
- Simple setup with a single turn sensitivity adjustment potentiometer
- Compact design ideal when space is limited
- Rugged ABS housing with glass window

Q26

Sensing Mode	Range	Connection	Models NPN	Models PNP
 COAXIAL POLAR RETRO	5-800 mm sensor to reflector distance with no detection	4-pin Pico QD	Q26NXLPQ7	Q26PXLQ7
		4-pin Euro Pigtail QD	Q26NXLPQ5	Q26PXLQ5

 Connection options: A model with a QD requires a mating cordset.

For a 9 m cable, add suffix W/30 to the 2 m model number (example, Q26NXLPQ7 W/30)

CLEAR OBJECT

TEMPERATURE

HAZARDOUS AREA



Euro-Style Cordsets

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

4-Pin

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Used with: Q models



Pico-Style Cordsets

Straight connector models listed; for right-angle, replace the **G** with a **W** in the model number (example, **PKW4M-2**)

4-Pin

PKG4M-2
2 m (6.5')
PKG4M-5
5 m (15')
PKG4M-9
9 m (30')

Used with: Q7 models

Additional cordset information is available
See page 758



SMBLSTDLQ26



SMBLSTQ26

Additional bracket information is available
See page 725

Reflectors



Apertures



Additional information is available
See page 790

Additional information is available
See page 816



Q26 Specifications

Supply Voltage and Current	12 to 30 V dc (10% maximum ripple within specified limits); supply current (exclusive of load current): 15mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Primary output (pin 2) NPN or PNP (current sinking or sourcing), depending on model; second output (pin 4) is a Health mode output
Output Rating	100 mA max OFF-state leakage current: less than 1 microamp @ 30 V dc ON-state saturation voltage: less than 1 V @ 10 mA dc; less than 1.5 V @ 150 mA dc
Output Protection Circuitry	Protected against false power-up and continuous overload or short circuit of outputs
Output Response Time	250 μ S ON and OFF
Repeatability	50 microseconds
Indicators	Green steady: Power ON Yellow steady: Output conducting
Construction	ABS plastic housing; glass window
Operating Conditions	Temperature: -10 ° to +55 °C Relative Humidity: 90% at 50 °C; non-condensing
Environmental Rating	Leakproof design rated IP67
Vibration and Shock	EN60068-2-6 and EN60068-2-27

Certifications



OMNI-BEAM™

Rectangular Modular Sensors

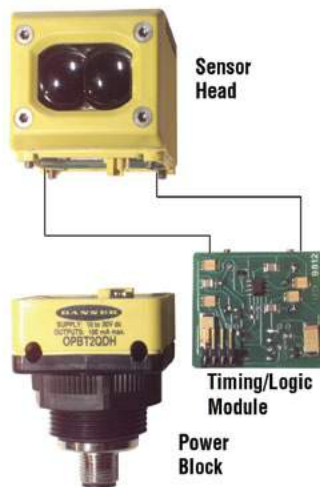


- Modular self-contained photoelectric sensors can be customized for specific applications and offer reliable clear object detection
- Includes a sensor head and power block with optional timing logic module
- Offers interchangeable AC or DC power blocks
- Features exclusive multiple-LED system that display received signal strength, sensing contrast and seven different warnings

OMNI-BEAM™ Sensor Heads

Visible Red LED

Sensing Mode	Range	Supply Voltage	Response & Repeatability	Models
	4 m†	Provided by Power Block	Response: 4 ms Repeatability: 0.2 ms	OSBLVAGC



- STEP 1:** Choose a power block for the required sensor power (ac or dc) and interface.
- STEP 2:** Choose an timing logic module (Optional)
- STEP 3:** Plug and bolt components together without interwiring.

OMNI-BEAM modular components are sold separately. The three modular components, and the lenses, can be replaced in the field.

OMNI-BEAM™ Power Blocks

Connection	Supply Voltage	Output Type	Models
2 m	10-30 V dc	Bi-Modal™ NPN or PNP Two outputs: Load and Alarm	OPBT2
4-Pin Mini QD			OPBT2QD
4-Pin Euro QD			OPBT2QDH
2 m	10-30 V dc	No output: for powering emitter-only sensor heads	OPBTE
4-Pin Mini QD			OPBTEQD
4-Pin Euro QD			OPBTEQDH
2 m	105-130 V ac	SPST solid-state ac relay Two outputs: Load and Alarm	OPBA2
5-Pin Mini QD			OPBA2QD
2 m			OPBB2
5-Pin Mini QD	210-250 V ac		OPBB2QD
2 m	105-130 V ac	No output: for powering emitter only sensor heads	OPBAE
5-Pin Mini QD			OPBAEQD
2 m			OPBBE
5-Pin Mini QD	210-250 V ac		OPBBEQD

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on efficiency and reflective area of the retroreflector in use. See Accessories for more information.
NOTE: Sensor heads require a power block.

OMNI-BEAM™ Timing Logic Modules

Type	Logic Function	Timing Ranges	Models
Delay Timer Logic Module	ON-DELAY or OFF-DELAY or ON/OFF DELAY	ON-Delay: 0.01-1 sec., 0.15-15 sec., or none OFF-Delay: 0.01-1 sec., 0.15-15 sec., or none	OLM5
Pulse Timer Logic Module	ONE-SHOT pulse timer or DELAYED ONE-SHOT logic timer	Delay: 0.01-1 sec., 0.15-15 sec., or none Pulse: 0.01-1 sec., 0.15-15 sec.	OLM8

For information on Timing Diagrams, see data sheet



Connection options: A model with a QD requires a mating cordset.
For 9 m cable, add suffix W/30 to the 2 m model number (example, OPBT2 W/30).



Euro-Style Cordsets
Straight connector models listed;
for right-angle, add **RA** to the end
of the model number (example,
MQDC-406RA)

4-Pin
MQDC-406 2 m (6.5')
MQDC-415 5 m (15')
MQDC-430 9 m (30')



Mini-Style Cordsets
Straight connector models listed

4-Pin	5-Pin
MBCC-406 2 m (6.5')	MBCC-506 2 m (6.5')
MBCC-415 5 m (15')	MBCC-515 5 m (15')
MBCC-430 9 m (30')	MBCC-530 9 m (30')

Additional cordset information is available
See page 758



SMB30A



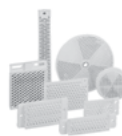
SMB30FA..



SMB30SC

Additional bracket information is available
See page 737

Reflectors



Additional information is available
See page 790

OMNI-BEAM™ Specifications

See website for more details www.bannerengineering.com

MINI-BEAM®

Clear Object Sensor with Mounting Versatility



- Universal housing design with 18 mm threaded lens; an ideal replacement for hundreds of other sensor styles. Available in eight modes with a compact housing for limited space setups
- Versatile sensor with several mounting options
- Meets IP67 and NEMA 6 standards for harsh environment
- Universal housing design

MINI-BEAM® Expert, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output	Models
	1 m	2 m	Bipolar NPN/PNP	SME312LPC*
		5-Pin Euro QD		SME312LPCQD*

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix W/30 to the 2 m model number (example, SME312D W/30).

* NOTE: For clear object detection, sensing range varies, according to the efficiency and reflective area of the retroreflector(s) used.

For these low-contrast applications, the model BRT-2X2 reflector is recommended and is included with each SME312LPC(QD) sensor.

- For applications with high vibration, the model BRT-51X51BM, with its micro-prism geometry, is recommended.
- For long-range applications, the BRT-77X77C reflector provides a range up to 2 m.
- SME312LPC(QD) are for use with corner cube type reflectors only; reflective tape is not recommended.

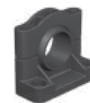
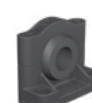
**Euro-Style Cordsets**

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, MQDC-406RA)

5-Pin

MQDC1-506
2 m (6.5')
MQDC1-515
5 m (15')
MQDC1-530
9 m (30')

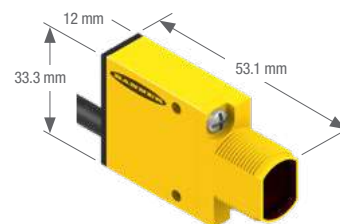
Additional cordset information is available
See page 758

**SMB18A****SMB18FA..****SMB18SF****SMB312B****SMB3018SC**

Additional bracket information is available
See page 722

Reflectors

Additional information is available
See page 790

**MINI-BEAM dc**
Suffix EPD and RPD**MINI-BEAM® Expert™ Specifications**

Supply Voltage and Current	10 to 30 V dc (10% max. ripple) at less than 45 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Bipolar: One current sourcing (PNP) and one current sinking (NPN) open-collector transistor Configuration in TEACH sequence for Light Operate (LO) or Dark Operate (DO)
Output Rating	150 mA max. each output at 25 °C, derated to 100 mA at 70 °C (derate \approx 1 mA per °C) OFF-state leakage current: less than 5 μ A @ 30 V dc Output saturation voltage (PNP output): less than 1 V at 10 mA and less than 2 V at 150 mA Output saturation voltage (NPN output): less than 200 mV at 10 mA and less than 1 V at 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
Output Response Time	Sensors will respond to either a "light" or a "dark" signal of 500 microseconds or longer duration, 1 kHz max.
Delay at Power-up	1 second; outputs do not conduct during this time
Repeatability	100 microseconds (all models)
Adjustments	Push-button TEACH mode sensitivity setting; remote TEACH mode input is provided (gray wire)
Indicators	Two LEDs: Yellow and Bicolor Green/Red Green: power ON Red: OFF when no signal is received Yellow (TEACH Mode): ON to indicate sensor is ready to learn output ON condition OFF to indicate sensor is ready to learn output OFF condition Yellow (RUN Mode): ON when outputs are conducting See data sheet for more detailed information
Construction	Reinforced thermoplastic polyester housing, totally encapsulated, o-ring seal, acrylic lenses, and stainless steel screws
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12, and 13; IEC IP67
Operating Conditions	Temperature: -20 to +70 °C Relative humidity: 90% at 50 °C (non-condensing)
Application Notes	The first condition presented during TEACH mode becomes the output ON condition

Certifications



Temperature

Temperature sensors are passive, non-contact sensors that are able to detect a change as small as 3 °C.

Series	Description	Temperature Measurement Range	Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	M18T A small, self-contained design with easy to use TEACH mode programming. page 326	0 to 300 °C	H (varies by model) ø18 mm	IP67	304 Stainless Steel	10 to 30 V dc

OTHER AVAILABLE MODELS



M12F page 264

M18T

Rugged Temperature Sensors



- The M18T has a small, self-contained design and has easy-to-use TEACH mode programming
- Rugged, encapsulated design for harsh environments
- Remote Teach available in both Static and Dynamic modes

Discrete M18T, 10-30 V DC

Sensing Mode	D:S Ratio*	Sensing Face	Connection	Output	Models
	8:1	Integrated lens	2 m 5-Pin Euro QD	Bipolar (NPN and PNP)	M18TB8 M18TB8Q
	6:1	Enclosed plastic face (for food industry use)	2 m 5-Pin Euro QD	Bipolar (NPN and PNP)	M18TB6E M18TB6EQ
	14:1	Germanium lens	2 m 5-Pin Euro QD	Bipolar (NPN and PNP)	M18TB14 M18TB14Q

Analog M18T, 12-30 V DC

Sensing Mode	D:S Ratio*	Sensing Face	Connection	Output	Models
	8:1	Integrated lens	2 m 5-Pin Euro QD	0 to 10 V dc analog, plus PNP Alarm	M18TUP8 M18TUP8Q
	6:1	Enclosed plastic face (for food industry use)	2 m 5-Pin Euro QD	0 to 10 V dc analog, plus PNP Alarm	M18TUP6E M18TUP6EQ
	14:1	Germanium lens	2 m 5-Pin Euro QD	0 to 10 V dc analog, plus PNP Alarm	M18TUP14 M18TUP14Q
	8:1	Integrated lens	2 m 5-Pin Euro QD	4 to 20 mA analog, plus PNP Alarm	M18TIP8 M18TIP8Q
	6:1	Enclosed plastic face (for food industry use)	2 m 5-Pin Euro QD	4 to 20 mA analog, plus PNP Alarm	M18TIP6E M18TIP6EQ
	14:1	Germanium lens	2 m 5-Pin Euro QD	4 to 20 mA analog, plus PNP Alarm	M18TIP14 M18TIP14Q

Connection options: A model with a QD requires a mating cordset.

For 9 m cable, add suffix W/30 to the 2 m model number (example, **M18TB8 W/30**).

* For D:S ratio information see page 327

**Euro-Style with Shield**

Straight connector models listed;
for right-angle, add **RA** to the end
of the model number (example,
MQDEC2-506RA)

5-Pin

MQDEC2-506
2 m (6.5')
MQDEC2-515
5 m (15')
MQDEC2-530
9 m (30')

Additional cordset information is available
See page 758

**SMB18A****SMB18SF**

Additional bracket information is available
See page 723


**M18T Specifications**

Supply Voltage and Current	Discrete models: 10 to 30 V dc (10% max. ripple) Analog models: 12 to 30 V dc (10% max. ripple)																																														
Supply Protection Circuitry	Protected against short circuit conditions																																														
Output Rating	Analog Voltage: 2.5 k Ω minimum load resistance Analog Current: 1 k Ω max. @ 24 V input; max. load resistance = $[(V_{cc} - 4)/0.02]\Omega$ For current output (4-20mA models): Ideal results are achieved when the total load resistance $R = [(V_{in} - 4)/0.02]\Omega$ Example, at $V_{in} = 24$ V dc, $R \approx 1$ k Ω (1 watt) Alarm: Off-state leakage: < 10 microamps; Saturation: < 1.2 V @ 10 mA and < 1.6 V @ 100 mA																																														
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs																																														
Sensing Field of View	Distance from Sensor Face Versus Sport Size <table border="1"> <thead> <tr> <th>D:S ratio</th> <th>100</th> <th>200</th> <th>300</th> <th>400</th> <th>500</th> <th>600</th> <th>700</th> <th>800</th> <th>900</th> <th>1000</th> <th>Distance (mm)</th> </tr> </thead> <tbody> <tr> <td>6:1</td> <td>17</td> <td>33</td> <td>50</td> <td>67</td> <td>83</td> <td>100</td> <td>117</td> <td>133</td> <td>150</td> <td>167</td> <td rowspan="3">Spot size (mm)</td> </tr> <tr> <td>8:1</td> <td>13</td> <td>25</td> <td>38</td> <td>50</td> <td>63</td> <td>75</td> <td>88</td> <td>100</td> <td>113</td> <td>125</td> </tr> <tr> <td>14:1</td> <td>7</td> <td>14</td> <td>21</td> <td>39</td> <td>36</td> <td>43</td> <td>50</td> <td>57</td> <td>64</td> <td>71</td> </tr> </tbody> </table>	D:S ratio	100	200	300	400	500	600	700	800	900	1000	Distance (mm)	6:1	17	33	50	67	83	100	117	133	150	167	Spot size (mm)	8:1	13	25	38	50	63	75	88	100	113	125	14:1	7	14	21	39	36	43	50	57	64	71
D:S ratio	100	200	300	400	500	600	700	800	900	1000	Distance (mm)																																				
6:1	17	33	50	67	83	100	117	133	150	167	Spot size (mm)																																				
8:1	13	25	38	50	63	75	88	100	113	125																																					
14:1	7	14	21	39	36	43	50	57	64	71																																					
Construction	Threaded Barrel: 304 stainless steel Push Button Housing: ABS/PC Push Button: Santoprene																																														
Environmental Rating	IEC IP67; NEMA 6																																														
Operating Conditions	Temperature: -20 to +70 °C																																														
Certification	CE (some models pending. Contact factory for additional information)																																														



Hazardous Area

Sensors for hazardous areas are ideal for environments or locations with possibility of fire or explosion. Extensive approvals ensure sensors are safe to use in classified areas or zones.

Series	Description	Max Sensing Range		Dimensions H x W x D	Protection Rating	Housing Material	Power Supply
	MINI-BEAM® NAMUR Ideal for hazardous environments with approved switching amplifiers that have intrinsically safe input circuits. page 330	Opposed: Retro: Retro Polarized: Convergent: Diffuse: Glass/Plastic Fiber:	6 m 5 m 2 m 43 mm 380 mm Varies	30.7 x 12.2 x 66 mm	IP67	Thermoplastic Polyester	5 to 15 V dc
	Q45 NAMUR A specialized sensor for explosive environments meeting intrinsically safe standards to ensure it is safe for use in hazardous areas. page 336	Opposed: Retro: Retro Polarized: Convergent: Diffuse: Glass/Plastic Fiber:	6 m 9 m 6 m 100 mm 1 m Varies	87.6 x 44.5 (D varies by model)	IP67	Thermoplastic Polyester	5 to 15 V dc
	SMI30 An extremely rugged and powerful intrinsically safe barrel sensor designed for the most demanding hazardous area sensing applications. page 338	Opposed:	140 m	ø30 x 102 mm	IP67	Thermoplastic Polyester	10 to 30 V dc

MINI-BEAM® NAMUR

Compact Sensors for Hazardous Areas



- The MIAD9 series NAMUR models are ideal for hazardous environments with approved switching amplifiers that have intrinsically safe input circuits
- Available in opposed, retroreflective, convergent, diffuse and fiber optic modes
- Infrared or visible red sensing beam
- Industry standard mounting holes

Opposed MINI-BEAM®

Infrared LED

Sensing Mode	Range	Connection	Output	Models
 OPPOSED	6 m	2 m 4-Pin Euro QD	—	MI9E Emitter MI9EQ Emitter
 OPPOSED	6 m	2 m 4-Pin Euro QD	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9R MIAD9RQ

Retro & Polar Retro MINI-BEAM®

Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 RETRO	5 m	2 m 4-Pin Euro QD	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9LV MIAD9LVQ
 POLAR RETRO	50 mm - 2 m	2 m 4-Pin Euro QD	Constant Current: ≤1.2 mA dark ≥2.1 mA light	MIAD9LVAG MIAD9LVAGQ

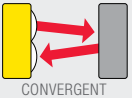
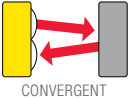
For more specifications see page 333.

Connection options: A model with a QD requires a mating cordset (see page 332).

For 9 m cable, add suffix W/30 to the 2 m model number (example, MIAD9LV W/30).

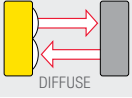
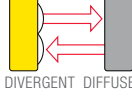
Convergent MINI-BEAM®

 Visible Red LED

Sensing Mode	Range	Connection	Output	Models
 CONVERGENT	16 mm	2 m 4-Pin Euro QD	Constant Current: ≤ 1.2 mA dark ≥ 2.1 mA light	MIAD9CV MIAD9CVQ
 CONVERGENT	43 mm	2 m 4-Pin Euro QD	Constant Current: ≤ 1.2 mA dark ≥ 2.1 mA light	MIAD9CV2 MIAD9CV2Q

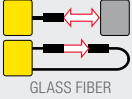
Diffuse MINI-BEAM®

 Infrared LED

Sensing Mode	Range	Connection	Output	Models
 DIFFUSE	380 mm	2 m 4-Pin Euro QD	Constant Current: ≤ 1.2 mA dark ≥ 2.1 mA light	MIAD9D MIAD9DQ
 DIVERGENT DIFFUSE	75 mm	2 m 4-Pin Euro QD	Constant Current: ≤ 1.2 mA dark ≥ 2.1 mA light	MIAD9W MIAD9WQ

MINI-BEAM® NAMUR

 Infrared LED

Sensing Mode	Range	Connection	Output	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current: ≤ 1.2 mA dark ≥ 2.1 mA light	MIAD9F MIAD9FQ

For more specifications see page 333.

 Connection options: A model with a QD requires a mating cordset (see page 332).

For 9 m cable, add suffix W/30 to the 2 m model number (example, MIAD9LV W/30).

SPECIAL PURPOSE

BARCODE READERS

REGISTRATION, COLOR & LUMINESCENCE

STAINLESS STEEL

NAMUR Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQD9-406RA**)



4-Pin
MQD9-406
2 m (6.5')
MQD9-415
5 m (15')

Additional cordset information is available
See page 758



SMB312PD



SMB18FA



SMB312B

Additional bracket information is available
See page 722

Reflectors

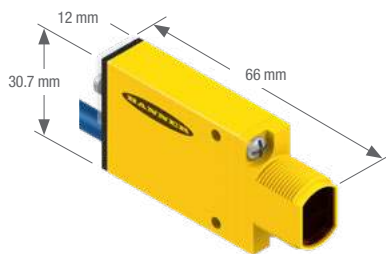


Additional information is available
See page 821

Apertures








Additional information is available
See page 816



MINI-BEAM® NAMUR
Retroreflective, Diffuse and
Convergent Models
Suffix E, R, LV, D and CV

MINI-BEAM® NAMUR Specifications

Supply Voltage	5 to 15 V dc (provided by the amplifier to which the sensor is connected)
Output	Constant current output: ≤ 1.2 mA in the "dark" condition and ≥ 2.1 mA in the "light" condition
Output Response Time	Opposed receiver: 2 milliseconds ON/400 microseconds OFF All others: 5 milliseconds ON/OFF (does not include amplifier response)
Adjustments	GAIN (sensitivity) adjustment potentiometer
Indicators	Red LED Alignment Indicator Device (AID) located on rear panel lights when the sensor sees a "light" condition; pulse rate is proportional to signal strength (the stronger the signal, the faster the pulse rate).
Construction	Reinforced thermoplastic polyester housing, totally encapsulated, o-ring sealing, acrylic lenses and stainless steel screws
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12 and 13; IEC IP67
Operating Conditions	Temperature: -40 to +70 °C Relative humidity: 90% at 50 °C (non-condensing)
Design Standards	MIAD9 Series sensors comply with the following standards: DIN 19 234, EN 50 014 Part 1. 1977, EN50 020 Part 7. 1977, Factory Mutual #3610 and 3611, CSA 22.2 #157-92 and 22.2 #213-M1987
Certifications	    

APPROVALS

CSA: #LR 41887	Intrinsically Safe, with Entity for: Class I, Groups A-D Class I, Div. 2, Groups A-D	FM: #J.I. 5Y3A4.AX	Intrinsically Safe, with Entity for: Class I, II, III, Div. 1, Groups A-G Class I, II, III, Div. 2, Groups A-D and G
KEMA: #03ATEX1441X	II IG EEx ia IIC T6	ETL: #553868	

Q45 NAMUR

Rectangular Sensors for Hazardous Areas



- The Q45 NAMUR is a specialized sensor for explosive environments meeting intrinsically safe standards to ensure it is safe for use in hazardous areas
- Intrinsically safe dc models for potentially explosive environments
- For use with approved DIN 19 234 switching amplifiers

Opposed Q45, 5-15 V DC

Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
 OPPOSED	6 m	2 m	Constant Current ≤ 1.2 mA dark ≥ 2.1 mA light	Q459E Emitter
		4-Pin Euro QD		Q459EQ Emitter
		2 m		Q45AD9R
		4-Pin Euro QD		Q45AD9RQ

Retro & Polar Retro Q45, 5-15 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 RETRO	9 m [†]	2 m	Constant Current ≤ 1.2 mA dark ≥ 2.1 mA light	Q45AD9LV
		4-Pin Euro QD		Q45AD9LVQ
 POLAR RETRO	6 m [†]	2 m	Constant Current ≤ 1.2 mA dark ≥ 2.1 mA light	Q45AD9LP
		4-Pin Euro QD		Q45AD9LPQ

For more specifications see page 337.

Connection options: A model with a QD requires a mating cordset (see page 336).

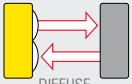
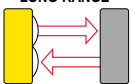
For 9 m cable, add suffix W/30 to the 2 m model number (example, Q459E W/30).

[†] Retroreflective range is specified using one model BRT-3 retroreflector.

Actual sensing range may differ, depending on efficiency and reflective area of the retroreflector in use. See Accessories for more information.

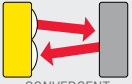
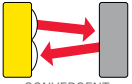
Diffuse Q45, 5-15 V DC

 Infrared LED

Sensing Mode	Range	Connection	Output Type	Models
 DIFFUSE	300 mm	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9D Q45AD9DQ
LONG-RANGE  DIFFUSE	1 m	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9DL Q45AD9DLQ


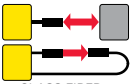
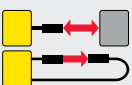
Convergent Q45, 5-15 V DC

 Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 CONVERGENT	38 mm	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9CV Q45AD9CVQ
 CONVERGENT	100 mm	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9CV4 Q45AD9CV4Q

Glass & Plastic Fiber Q45, 5-15 V DC

 Infrared LED
  Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9F Q45AD9FQ
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9FV Q45AD9FVQ
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Euro QD	Constant Current ≤1.2 mA dark ≥2.1 mA light	Q45AD9FP Q45AD9FPQ

For more specifications see page 337.

 Connection options: A model with a QD requires a mating cordset (see page 336).

For 9 m cable, add suffix W/30 to the 2 m model number (example, Q459E W/30).

SPECIAL PURPOSE

BARCODE READERS

REGISTRATION, COLOR & LUMINESCENCE

STAINLESS STEEL



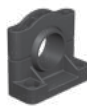
4-Pin

Euro-Style NAMUR
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQD9-406RA**)

MQD9-406
2 m (6.5')
MQD9-415
5 m (15')



SMB30MM



SMB30SC

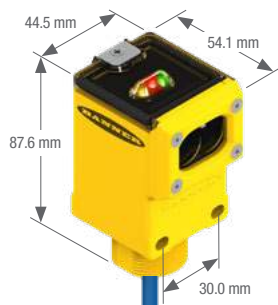
Additional cordset information is available
See page 758

Additional bracket information is available
See page 722

Reflectors



Additional information is available
See page 790



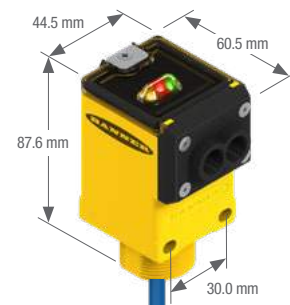
Opposed, Retroreflective and Diffuse Models
Suffix E, R, D, DL, LV and LP



Convergent Models
Suffix CV and CV4








Plastic Fiber Model
Suffix FP



Glass Fiber Models
Suffix F and FV

Q45 NAMUR Specifications

Supply Voltage and Current	5 to 15 V dc. Supply voltage is provided by the amplifier to which the sensor is connected.	
Output	Constant current output: ≤ 1.2 mA in the dark condition and ≥ 2.1 mA in the light condition	
Output Response Time	Opposed receiver: 2 milliseconds ON/0.4 milliseconds OFF All others: 5 milliseconds ON/OFF (does not include amplifier response)	
Adjustments	Multi-turn sensitivity control on top of sensor	
Indicators	Power (Red): LED (emitters only) lights whenever 5 - 15 V dc power is applied Signal (Red): LED lights whenever the sensor sees its modulated light source	
Construction	Molded thermoplastic polyester housing, o-ring sealed transparent Lexan® top cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown. The base of cabled models has a ½" NPS integral internal conduit thread.	
Environmental Rating	IP67; NEMA 6P	
Operating Conditions	Temperature: -40 to +70 °C	Relative humidity: 90% at 50 °C (non-condensing)
Design Standards	Q45AD9 Series sensors comply with the following standards: DIN 19234, EN 50 014: 1977, EN 50 020: 2002	
Certifications	    	

Lexan® is a registered trademark of General Electric Co.

APPROVALS

CSA: #LR 41887

Intrinsically Safe, with Enty for
Class I, Groups A-D
Class I, Div. 2, Groups A-D

KEMA: #03 ATEX 1441x

II IG EEx ia IICTC

FM: #J.I. 5Y3A4.AX

Intrinsically Safe, with Enty for
Class I, II, III, Div. 1, Groups A-G
Class I, II, III, Div. 2, Groups A-D and G

ETL: #558044 Tested per FM and CSA as shown above

SMI30

Long-Range Barrel Sensors for Hazardous Areas



- The SMI30 is an extremely rugged and powerful intrinsically safe barrel sensor designed for the most demanding hazardous area sensing applications
- Certified as intrinsically safe for use in hazardous atmospheres as defined by Article 500 of the National Electrical Code, when used with approved "positive input" intrinsic safety barriers
- Certified by Factory Mutual and CSA as non-incendive devices when used in Division 2 locations (except Groups E and F) without intrinsic safety barriers

SMI30 Frequency A[†]

Infrared LED

Sensing Mode	Range	Connection	Output Type	Response Time	Models
OPPOSED	140 m	3-Pin Mini QD	— NPN/LO NPN/DO	10 ms	SMI306EQ SMI30AN6RQ SMI30RN6RQ
OPPOSED	60 m	3-Pin Mini QD	— NPN/LO NPN/DO	1 ms	SMI306EYQ SMI30AN6RYQ SMI30RN6RYQ

Intrinsic Safety Kits for Use with SMI30 Intrinsically Safe Sensors

Model	Description
C12BK-1	Includes a C13RC2 current amplifier, one RS-11 socket, one DIN-rail mount and one single-channel intrinsically safe barrier
C12BK-2	Includes a C13RC2 current amplifier, one RS-11 socket, one DIN-rail mount and one dual-channel intrinsically safe barrier
C13RC2	Current trip point amplifier
C1B-1	Single channel intrinsic safety barrier
C12B-1	Dual channel intrinsic safety barrier

Connection options: A model with a QD requires a special Mini-style mating cordset.

[†] Modulation frequency "A" is standard; frequencies "B" and "C" are also available to minimize optical crosstalk potential between adjacent pairs and are specified by adding "B" or "C" at the end of the standard model number (example, SMI306EBQ or SMI306ECQ).



Mini-Style
Straight connector models listed

3-Pin	4-Pin
SMICC-306 2 m (6.5')	MBCC-406 2 m (6.5')
SMICC-312 4 m (12')	MBCC-412 4 m (12')
SMICC-330 9 m (30')	MBCC-430 9 m (30')

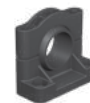
Additional cordset information is available
See page 758



SMB30A



SMB30FA..



SMBAMS30P

Additional bracket information is available
See page 724

Reflectors



Additional information is available
See page 790

Apertures



Additional information is available
See page 816



SMI30 Specifications

Supply Voltage and Current	Emitters: 10 to 30 V dc at 25 mA Receivers: 10 to 30 V dc at 15 mA max. Division 1 use, with barriers, requires minimum system supply voltage of 10 V.
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Receivers: Current sinking NPN open-collector transistor
Output Rating	Three-wire hookup sinks 15 mA max. continuous, 10 to 30 V dc. Two-wire hookup sinks ≤10 mA
Output Protection Circuitry	Outputs are short circuit protected
Output Response Time	10 milliseconds or 1 millisecond ON/OFF, depending on models; independent of signal strength
Repeatability	"A" frequency units: 10 millisecond receiver is 1 milliseconds and 1 millisecond receiver is 360 microseconds "B" frequency units: 1.6 milliseconds "C" frequency units: 10 millisecond receiver is 2.3 milliseconds and 1 millisecond receiver is 210 microseconds Repeatability is independent of signal strength
Indicators	Internal Red LED lights whenever the receiver sees the emitter's modulated light source. Emitters have Red "power on" indicator LED. All indicators are visible through the lens or from side of the sensor.
Construction	30 mm diameter tubular threaded thermoplastic polyester housing, fully epoxy-encapsulated, positive sealing at both ends, quad-ring sealed acrylic lens. Two thermoplastic polyester jam nuts provided.
Environmental Rating	IP67; NEMA 6P
Operating Conditions	Temperature: -40 to +70 °C Relative humidity: 90% at 50° C (non-condensing)
Certifications	
Hookup Diagrams	See data sheet for detailed Hookup Diagrams.



Vision

Banner's extensive line of vision sensors helps you find defects earlier in the manufacturing process. Banner offers standard and high-resolution gray scale and color vision sensors. Add inspection capabilities where you need them.

VISION

VISION SENSORS **page 342**

SMART CAMERAS **page 348**

VISION CONTROLLERS **page 358**

VISION LIGHTING **page 364**

iVu TG and iVu Plus TG

Image Sensor



- Image sensor combines the simplicity of a photoelectric sensor and the intelligence of a vision sensor, providing high-performance inspection capabilities at your fingertips
- All-inclusive image sensor with lens, light, IO and touch screen programming
- Optional remote touch screen for programming
- Profinet® communication protocol to simplify communications with some of the most commonly used industrial controllers in factory automation
- iVu Plus TG supports the ability to obtain results and command rapid product changeovers over TCP/IP, EtherNet/IP, Modbus/TCP protocols or PROFINET
- Ability to change parameters on the fly
- iVu Plus TG models have additional sort tools, multi-tool and the ability to store up to 30 inspections

- No PC required to configure, change or monitor
- Built-in or remote touch screen
- Self-contained sensor with easy configuration and convenient monitoring right on the sensor



Installation and configuration in four easy steps

1
2
3
4

1. Install and connect the sensor
2. Select the sensor or bar code type, depending on model
3. Acquire a good image
4. Set inspection parameters

Intuitive operation with menu driven tools to guide you through setup

- Define region of interest
- Adjust intensity/contrast
- Define the pass criteria



iVu TG Sensor Types

Sensor Type



Match Sensor — Compares a part to a reference to determine if there is a match

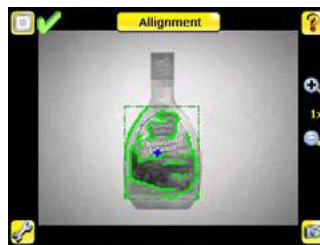


Area Sensor — Detects whether a particular feature (features) are present

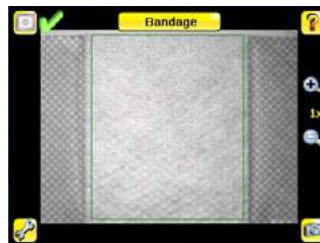


Blemish Sensor — Finds flaws on parts

Screen Interface Pass



Screen Interface Fail



iVu TG





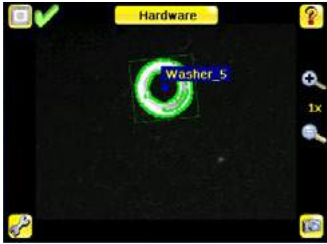

Example Model Number: IVU2PTGR04



* Remote display is required for set up and viewing of sensors with a remote touch screen. See page 346.

** Requires C-mount lens. See page 362.

Additional iVu Plus TG (in addition to Standard TG Sensor Types)

Sensor Type	Screen Interface Pass	Screen Interface Fail
		
Multi-Point Inspection (Plus only) — Use seven to nine sensors in the same inspection		
		
Sort Sensor (Plus only) — Recognize and sort up to ten different patterns in the same inspection		

For more specifications see page 345.

Display and cordsets ordered separately.
† Barcode models available. See page 272.

Power
M12/Euro-Style with Shield

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC2S-1206RA**)



8-Pin
MQDC2S-806 2 m (6.5')
MQDC2S-815 5 m (15')
MQDC2S-830 9 m (30')
MQDC2S-850 15 m (50')

Used With: TG Models

12-Pin
MQDC2S-1206 2 m (6.5')
MQDC2S-1215 5 m (15')
MQDC2S-1230 9 m (30')
MQDC2S-1250 15 m (50')

TG Plus Models

USB

Straight connector models listed



8-Pin Euro**
MQDEC-8005-USB 0.15 m (0.5')
MQDEC-801-USB 0.3 m (1')
MQDEC-803-USB 0.9 m (3')
MQDEC-810-USB 3 m (10')

Used with: TG with Integrated Touch Screen

** For right-angle, add **RA** in the middle of the model number (example, **MQDEC-801RA-USB**)

4-Pin Pico
PSG-4M-4005-USB 0.15 m (0.5')
PSG-4M-401-USB 0.3 m (1')
PSG-4M-403-USB 0.9 m (3')
PSG-4M-410-USB 3.0 m (10')

TG with Remote Touch Screen

TG Plus with Remote or Integrated Touch Screen

Ethernet

RJ45 to 4-Pin Pico QD



4-Pin

IVUC-E-406 2 m (6.5')	IVUC-E-450 12 m (50')
IVUC-E-415 5 m (15')	IVUC-E-475 23 m (75')
IVUC-E-430 9 m (30')	

Used with: TG Plus only

Additional cordset information is available. See page 758



SMBIVURAL



SMBIVURAR



SMBIVUU



SMBIVUB
TG model only



SMBRD35



SMBKS



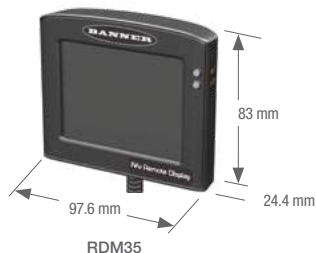
SMBRDM35

Used with: Remote Display Screens

Additional bracket information is available. See page 726



Sensors with Integrated Touch Screen (Standard iVu model shown)





RDM35

RD35 Remote Touch Screen (sold separately)



Sensors with Remote Touch Screen

iVu & iVu Plus Specifications

General	
Supply Voltage	10-30 V dc
Demo Mode	Full tool functionality on canned images
Sensor Lock	Optional password protection
Integrated Ring Light	Red, IR, Green, Blue, White, UV or no integrated ring light
Imager	1/3 inch CMOS 752 x 480 pixels; adjustable Field-of-View (FOV)
Lens Mount	M12 X 1 mm thread (c-mount lens); microvideo lens 4.3, 6, 8, 12, 16, 25 mm
Output Rating	150 mA
Exposure Time	0.1 milliseconds to 1.049 seconds
Construction	Black Valox™ sensor housing; acrylic window iVu Plus Integrated: Die cast zinc and Black Valox™
External Strobe Output	+ 5 V dc
Environmental Rating	IP67
Model Specific	
Power Connection	iVu TG (integrated and remote touch screen): 8-pin Euro-style (M12) male connector Accessory cordset required for operation; QD cordsets are ordered separately. iVu Plus TG (integrated and remote touch screen): 12-pin Euro-style (M12) male connector
Supply Current	iVu TG: 800 mA max. (exclusive of I/O load) iVu Plus TG: 850 mA max. (exclusive of I/O load)
USB 2.0 Host	iVu TG (integrated touch screen): 8-pin Euro-style (M12) female connector iVu TG (remote touch screen): 4-pin Pico-style (M8) female connector iVu Plus TG (integrated and remote touch screen): 4-pin Pico-style (M8) female connector Optional USB cordset required for operation of USB Thumb Drive. QD cordsets are ordered separately.
Ethernet Connection	iVu Plus TG: 4-pin Pico-style (M8) male connector. Ethernet cordsets are ordered separately.
Output Configuration	NPN or PNP, software on-screen selectable
Tools	iVu TG: Area, Blemish and Match iVu Plus TG: Area, Blemish, Match and Sort
Display	Integrated touch screen: 68.5 mm (2.7") LCD Color Integrated Display 320 x 240 pixels Remote touch screen: See RD35 Remote Display specifications
Acquisition	iVu TG: 100 fps (frames per second) max. iVu Plus TG: 100 fps (frames per second) max.
Operating conditions	Stable Ambient Temperature: TG: 0 to + 50 °C iVu Plus TG (integrated touch screen): 0 to +45 °C iVu Plus TG (remote touch screen): 0 to +40 °C
Remote Display connection (Remote Touch Screen Models Only)	8-pin Euro-style (M12) female connector Accessory cordset required for remote display; QD cordsets are ordered separately.
Certifications	 NOTE: iVu Plus remote must use Euro QD power cordset for CE compliance. 

iVu Remote Display Specifications

Screen Size	3.5" diagonal
LCD Aspect Ratio	4:3
Display Resolution	320 x 240 RGB
Viewing Angle	60 degrees left, and 60 degrees right, 50 degrees up, and 55 degrees down
Housing Material	Zinc Zamac #3 (RDM35), Polycarbonate (RD35)
Bracket Material	Delrin (RD35), ABS (RDM35)
Stylus	Delrin
Display Weight	4.8 oz (RD35), 12 oz (RDM35)
Bracket & Stylus Weight	1.1 oz
Connection	Molex HandyLink connector
Operating Temperature	0° to + 40° C

Remote Display Touch Screen

Description	Model
3.5" diagonal remote touch screen — Machine-mountable	RDM35
3.5" diagonal remote touch screen — Handheld	RD35

RDM35 Accessory Kits

Description	Straight	Right-Angle
1 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-803	IVURDM-QDK-803RA
2 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-806	IVURDM-QDK-806RA
5 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-815	IVURDM-QDK-815RA
9 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-830	IVURDM-QDK-830RA
16 m cordset, bracket/docking station, stylus and hardware	IVURDM-QDK-850	IVURDM-QDK-850RA



RDM35
Machine-mountable Remote Display
Used for programming & monitoring

RD35 Accessory Kits

Description	Straight	Right-Angle
1 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-803	IVURD-MXK-803RA
2 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-806	IVURD-MXK-806RA
5 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-815	IVURD-MXK-815RA
9 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-830	IVURD-MXK-830RA
16 m cordset, bracket/docking station, stylus and hardware	IVURD-MXK-850	IVURD-MXK-850RA



RD35
Handheld Remote Display
Used for programming

Cordsets for Remote Display

Hand Held Remote Display (RD35)		Machine Mountable Remote Display (RDM35)	
8-Pin		8-Pin	
Double Ended M12/Euro-Style Straight connector models listed; for right-angle, add RA to the end of the model number (example, IVURD-QD-803RA)	IVURD-QD-803 1 m (3') IVURD-QD-806 2 m (6') IVURD-QD-815 5 m (15') IVURD-QD-830 9 m (30') IVURD-QD-850 16 m (50')	Euro-Style to Molex Straight connector models listed; for right-angle, add RA to the end of the model number (example, IVURD-MX-803RA)	IVURD-MX-803 1 m (3') IVURD-MX-806 2 m (6') IVURD-MX-815 5 m (15') IVURD-MX-830 9 m (30') IVURD-MX-850 16 m (50')

*Additional cordset information is available
See page 758*



SMBRD35



SMBKS



SMBRDM35

Lenses



Lens	Model
4.3 mm	LMF04
6 mm	LMF06
8 mm	LMF08
12 mm	LMF12
16 mm	LMF16
25 mm	LMF25*

Used with: iVu and iVu Plus

* 25 mm filter holder is purchased separately.

Filter Kits†



Filter	Model
Red	FLTMR2
Blue	FLTMB
Green	FLTMG
Infrared	FLTMI*

Used with: iVu and iVu Plus

* Infrared pass filters are preinstalled on infrared ring light models.

† Filter kits include 1 color and two sizes of filter holders.

Replacement Windows

Focusing ring with optically clear glass
Focusing ring with plastic window
Replacement cover for touch screen

Model
IVUW-G
IVUW
IVUBC

Used with: iVu and iVu Plus

Sensor Interface Module



IVUSIM
For simplified wiring of iVu sensors in an electrical box

2 GB USB Drive



IVU-USBFD2

Stylus



Model
STYLUS-1 (Qty 1)
STYLUS-10 (Qty 10)

C-Mount Lens Covers



Description	Model
Lens cover 50 mm — plastic window	IVUSLC50-P
Lens cover 75 mm — plastic window	IVUSLC75-P

Accessories for C-Mount Lenses*

Description



Description	Format Size	Model	Used With
Extension Kit (0.5, 1.0, 5.0, 10, 20 and 40 mm)	—	LEK	All Lenses
Extension Kit (0.25 and 0.5 mm)		LEKS	
Lens Extender (increases focal length 2X)		LCF2X	
UV Lens Filter, Clear Glass	2/3"	FLTUV	Tamron Megapixel Lenses

Bandpass Filters Example Model Number: FLTB470-27

Description	Model	Diameter
Blue	FLTB470-	25.5 27 30.5 34 43
Green	FLTG525-	
Infrared	FLT1850-	
Red	FLTR635-	
Dark Red	FLTBR660-	
Polarizing filter	FLTBR032-	

C-Mount Color Filters*






Color	Description	Plastic Models	Glass Models
Infrared	High-pass filter blocks visible light and passes infrared light. Included with all Banner Infrared light sources.	FLTI (> 760 nm)	FLT1850 (810-990 nm)
Blue	Band-pass filter improves quality by helping to reduce ambient light; it passes blue and infrared light.	FLTB (400-525 nm)	FLTB470 (435-490 nm)
Green	Band-pass filter improves quality by helping to reduce ambient light; it passes green and infrared light.	FLTG (400-575 nm)	FLTG525 (495-565 nm)
Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	FLTR (> 600 nm)	FLTR635 (600-660 nm)
Dark Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	—	FLTR660 (650-680 nm)

* For C-Mount lenses see page 362



Vision Cameras

Banner's Vision Cameras include a comprehensive family of vision systems that addresses a wide range of application needs, including high resolution and high speed inspections. One- or two-piece systems are available with a complete suite of location, inspection and analysis tools that can be used simultaneously for inspecting multiple features and solving complex applications.

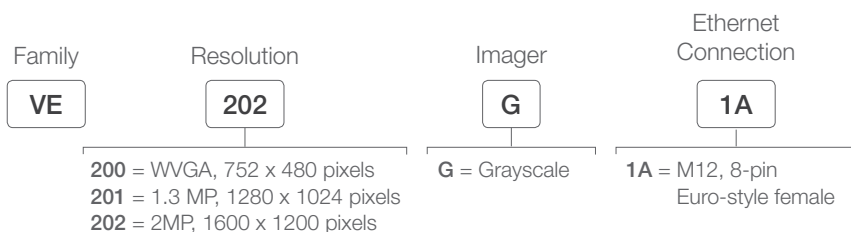
Series	Description	Integrated I/O	Memory	Protection Rating	Construction	Power Supply
	<p>VE Series Smart Camera Combine powerful inspection tools and capabilities with ease of use to maximize inspection uptime and facilitate rapid implementation. page 350</p>	6	500 MB	IEC IP67	<p>Housing: Aluminum Display Label: Polyester</p>	12 to 30 V dc
	<p>PresencePLUS P4 One piece sensor with a complete suite of location, inspection and analysis of tool can be used simultaneously for inspecting multiple features and solving complex applications. page 354</p>	7	64 MB	IEC IP20 NEMA 1 IP68	<p>Housing: Black anodized aluminum, die cast nickel-plated aluminum Lens: Glass</p>	10 to 30 V dc
	<p>PresencePLUS Pro II Camera Heads One part of a two piece system with a complete suite of location, inspection and analysis tools can be used simultaneously for inspecting multiple features and solving complex applications. page 358</p>	14	64 MB	Camera: IP20 or IP68 Controller: IP20	<p>Camera: Black anodized aluminum, Nickel-plated aluminum, 316 stainless Controller: Steel with zinc plating</p>	10 to 30 V dc

VE Series

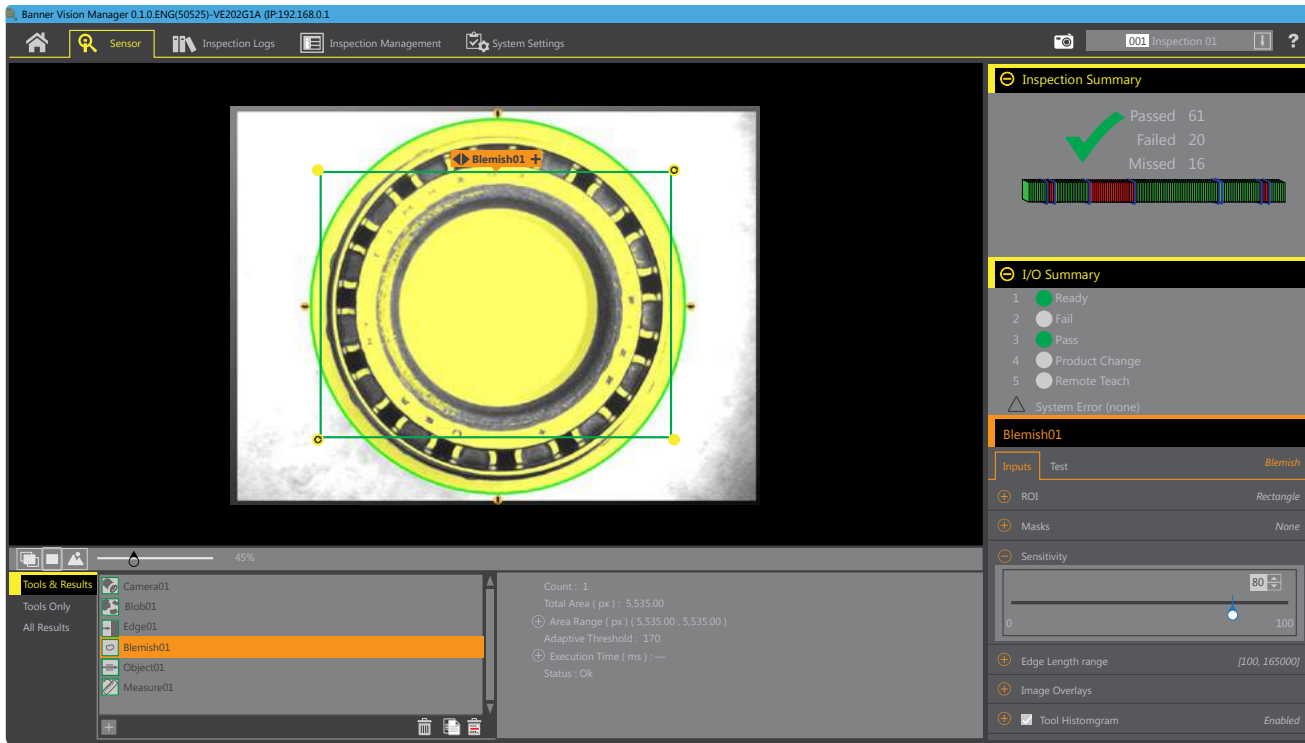
Versatile, Easy-To-Use Smart Cameras



- Available in 2MP (1600 x 1200 pixels), 1.3MP (1280 x 1024 pixels) and WVGA (752 x 480 pixels) models, all with the same powerful inspection capabilities
- Runtime editing capability reduces costly downtime and the software emulator allows for offline building and troubleshooting of applications
- Factory communications (EtherNet/IP, Modbus/TCP, PROFINET and RS-232 Serial) for integration on the manufacturing floor
- Two-line, eight-character onboard display provides inspection information and focus number and makes it easy to update sensor settings, facilitating fast product changeover
- Robust metal housing with optional lens covers to achieve IP67 rating for use in harsh environments with heat, vibration, or moisture

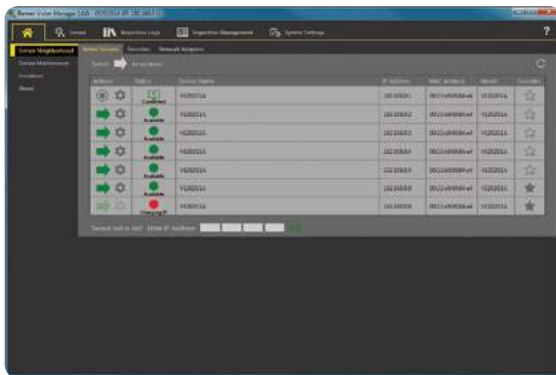


VE Vision Manager software: Easy configuration, powerful functions.



Runtime Editing

Easy-to-use configuration software with full runtime editing allows for changes to be made quickly with no costly downtime from stopping and starting inspections. Start using today by downloading at www.bannerengineering.com/vision-manager.



Full Software Emulator

Connect to multiple cameras or full software emulator for building inspections offline

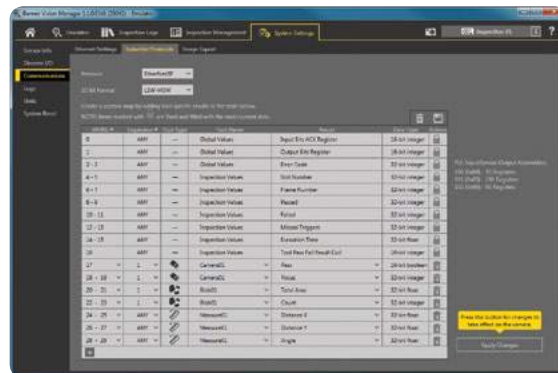


Inspection Analysis

Review past inspection results, view system logs, and quickly configure inputs and outputs

Factory Communications

Seamlessly interface with the factory floor using EtherNet/IP, Modbus/TCP, PROFINET and RS-232 Serial communications





12-Pin

- MQDC2S-1206**
2 m (6')
- MQDC2S-1215**
4 m (15')
- MQDC2S-1230**
9 m (30')
- MQDC2S-1250**
15 m (50')
- MQDC2S-1275**
23 m (75')

Euro QD with Open Shield

Straight connector models listed; for right-angle, add **RA** at the end of the model number (example, **MQDC2S-1206RA**)

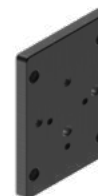


RJ45 to Ethernet 8-pin threaded M12 Euro (Cat5e shielded)

- STP-M12-806**
2 m (6')
- STP-M12-815**
4 m (15')
- STP-M12-830**
9 m (30')



SMBVERA



SMBVEMP
Mounting plate with M8x1.25, 10-32, and 1/2-20 adapter holes

Additional cordset information is available.
See page 758

Additional bracket information is available.
See page 726

Bandpass Filters

Example Model Number: FLTB470-27



Optional filters create additional contrast

Description	Model	Diameter
Blue	FLTB470-	25.5
Green	FLTG525-	27
Infrared	FLTI850-	30.5
Red	FLTR635-	34
Dark Red	FLTBR660-	43
Polarizing Filter	FLTPR032-	43

Used with: iVu, PresencePLUS, VE



Additional C-mount Lens information is available
See page page 362

Sealed Lens Covers

Type	Model
60 mm cover with polycarbonate window	VELC60-PC
60 mm cover with borosilicate glass window	VELC60-BG
85 mm cover with polycarbonate window	VELC85-PC
85 mm cover with borosilicate glass window	VELC85-BG





Display Cover

Type	Model
Protective display cover with borosilicate glass window	VEDC-BG



VE Series Specifications

Power	12 to 30 V dc Current: 400 mA maximum (exclusive of load and lights) Use only with a suitable Class 2 power supply, or current limiting power supply rated 12 V dc to 30 V dc, 1 A	
Discrete I/O	1 Trigger IN 5 programmable I/O	
Output Configuration	Optically isolated	
Output Rating	Output Resistance: < 2 Ω Programmable Output: 100 mA Off-State Leakage Current: < 100 μ A	Strobe Output Resistance: < 13 Ω External Strobe Output: 100 mA
External Light Max. Current Draw	600 mA	
Exposure Time	0.02 ms to 500 ms	
Imager	VE200G1A: 6.9 mm \times 5.5 mm, 8.7 mm diagonal (1/1.8-inch CMOS) VE202G1A: 7.2 mm \times 5.4 mm, 9.0 mm diagonal (1/1.8-inch CMOS)	VE201G1A: 6.9 mm \times 5.5 mm, 8.7 mm diagonal (1/1.8-inch CMOS) VE202G2A: 7.2 mm \times 5.4 mm, 9.0 mm diagonal (1/1.8-inch CMOS)
Lens	C-mount	
Pixel Size	VE200G1A: 5.3 μ m VE202G1A: 4.5 μ m	VE201G1A: 5.3 μ m VE202G2A: 4.5 μ m
Communication	10/100/1000 Mbps Ethernet, Serial RS-232	
Memory	Device Settings and Inspection Storage Memory: 500 MB Number of Inspection Files: 999	
Acquisition	256 grayscale levels Frames per Second: VE202G1A: 50 fps, max. depending on inspection settings VE202G2A: 50 fps, VE200G1A: 60 fps, VE201G1A: 60 fps Image Size: 752 x 480 pixels = VE200G1A 1280 x 1024 pixels = VE201G1A 1600 x 1200 pixels = VE202G1A, VE202G2A	
Construction	Housing: Aluminum Display Label: Polyester	
Connections	Communications: M12, 8-pin Euro-style male Light Connector: M8, 3-pin Pico-style female Power, Discrete I/O: M12, 12-pin Euro-style female	
Environmental Rating	IEC IP67 with optional lens cover	
Operating Conditions	Temperature: 0 $^{\circ}$ C to +50 $^{\circ}$ C (+32 $^{\circ}$ F to +122 $^{\circ}$ F) 95% maximum relative humidity (non-condensing) Stable Ambient Lighting: No large, quick changes in light level; no direct or reflected sunlight Storage Temperature: -30 to +70 $^{\circ}$ C (-22 to +158 $^{\circ}$ F)	
Vibration and Mechanical Shock	Meets EN 60947-5-2: 30 G Shock per IEC 60068-2-27; 1 mm amplitude from 10-60 Hz per IEC 60068-2-6	
Software Tools	Average Gray, Bead, Blemish, Blob, Edge, Locate, Logic, Match, Math, Measure, Object, Line Detect, Circle Detect	
Certifications	 	

P4 OMNI

Full-Featured Vision System



- Economical one-piece design
- Premium tools for enhanced inspection capabilities
- VGA, color and 1.3 MP models available
- Three bright bicolor LED indicators
- Seven configurable discrete I/O (NPN/PNP)
- Cordsets and brackets see page 356

P4 OMNI

Example Model Number: P40R-BD

Sensor

P40

P40 = 640 x 480 Gray Scale
 P401.3 = 1280 x 1024 Gray Scale
 P4CO = 752 x 480 Color & Gray Scale

Housing

R

R = Right-Angle
 I = In-Line

Premium Tools

BD

BC = Bar Code Reader
 BD = Bead Tool
 OC = OCR/OCV
 BCBD = Bar Code Reader & Bead Tool
 BCOC = BarCode & OCR/OCV
 BDOC = Bead Tool & OCR/OCV
 BCBDOC = Bar Code Reader,
 Bead Tool & OCR/OCV

P4 OMNI Sealed

Rugged Full-Featured Vision System



- Economical one-piece design
- IP68-rated nickel-plated aluminum housing
- Premium tools for enhanced inspection capabilities
- VGA, color and 1.3 MP models available
- Three bright bicolor LED indicators
- Seven configurable discrete I/O (NPN/PNP)
- Cordsets and brackets see page 356

IP68 P4 OMNI

Example Model Number: P4ORS-BD



VISION

VISION SENSORS

VISION CAMERAS

VISION CONTROLLERS



Euro QD
Straight connector
models listed

- 12-Pin**
- P4C06**
2 m (6.5')
 - P4C13**
4 m (13')
 - P4C23**
7 m (23')
 - P4C32**
10 m (32')
 - P4C50**
15 m (50')
 - P4C75**
23 m (75')
 - P4C110**
34 m (110')

Used for: Power (P4)



Euro QD
Straight connector
models listed; for
right-angle, add **RA**
at the end of the model
number
(ex, MQDC2S-1206RA)

- 12-Pin**
- MQDC2S-1206**
2 m (6.5')
 - MQDC2S-1215**
5 m (15')
 - MQDC2S-1230**
9 m (30')
 - MQDC2S-1250**
15 m (50')
 - MQDC2S-1275**
23 m (75')

Used for: Power (Sealed P4)

BNC to BNC

- BNC06**
2 m (6.5')
- BNC15**
5 m (16')
- BNC30**
9 m (30')
- BNC48**
15 m (49')

Used for: Video (P4)

QD to BNC

- PKG4M-2/CS**
2 m (6.5')
- PKG4M-5/CS**
5 m (16')
- PKG4M-9/CS**
9 m (30')

Used for: Video (Sealed P4)

RJ45 to RJ45

- | | |
|----------------------------|-------------------------------|
| Shielded | Shielded
Crossover |
| STP07
2 m (6.5') | STPX7
2 m (6.5') |
| STP25
7 m (23') | STPX25
7 m (23') |
| STP50
15 m (50') | STPX50
15 m (50') |
| STP75
23 m (75') | STPX75
23 m (75') |

Used for: Ethernet Communication (P4)

**RJ45 to
8-pin Euro QD—Sealed**
Straight connector models
listed; for right-angle, add
RA at the end of the model
number (example,
STP-MAQDC-806RA)

- STP-MAQDC-806**
2 m (6.5')
- STP-MAQDC-815**
5 m (15')
- STP-MAQDC-830**
9 m (30')

Used for: Ethernet Communication (Sealed P4)

Additional cordset information is available.
See page 758



IP68-Rated Right-Angle Models
(shown with cover and lens—sold separately)




Right-Angle Sensor Models
(shown with lens—sold separately)



In-line Sensor Models
(shown with lens—sold separately)

PresencePLUS® P4 OMNI Specifications

Supply Voltage and Current	10 to 30 V dc (24 V dc \pm 10% if the sensor powers a light source) P4OR, P4OI & P4ORS: less than 650 mA (exclusive of lights and I/O load) P4O1.3R, P4O1.3I, P4COR, P4COI, P4CORS & P4O1.3RS: less than 550 mA (exclusive of lights and I/O load)
Memory	32 MB or 64 mb Inspection (jobs): 999 max.
Input/Output Configuration	NPN (sinking) or PNP (sourcing) software selectable
Output Rating	150 mA max. each output OFF-state leakage current: less than 100 μ A ON-state saturation voltage: NPN—less than 1 V @ 150 mA max. PNP—greater than $V_+ - 2$ V
Bicolor Status Indicators	PASS/FAIL: Green ON steady—PASS POWER/ERROR: Green ON steady—POWER READY/TRIGGER: Green ON steady—READY Red ON steady—FAIL Red ON steady—ERROR Yellow ON steady—TRIGGER
Display Options	PC or NTSC video (uses 9 m max. BNC cordset)
Discrete I/O	1 Trigger IN 1 Strobe OUT 4 Programmable I/O 1 Product Change IN 1 Remote TEACH IN
Communications	10/100 Ethernet connection for running PresencePLUS P4 software and/or output inspection results P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: RJ-45 connector P4ORS, P4O1.3RS & P4CORS: 8-pin M12/Euro-style (female) connector RS-232 connection for output of inspection results
Imager Resolution	P4OR, P4OI & P4ORS: 640 x 480 pixels P4O1.3R, P4O1.3I & P4O1.3RS: 1280 x 1024 pixels P4COR, P4COI & P4CORS: 752 x 480 pixels
Pixel Size	P4OR, P4OI, P4COR, P4COI & P4ORS: 7.4 x 7.4 μ m P4O1.3R, P4O1.3I & P4O1.3RS: 6.7 x 6.7 μ m P4CORS: 6.0 X 6.0 μ m
Imager Size	P4OR, P4OI & P4ORS: 4.8 x 3.6 mm, 5.9 mm diagonal (1/3 inch CCD) P4O1.3R, P4O1.3I & P4O1.3RS: 8.6 x 6.9 mm, 11 mm diagonal (2/3 inch CMOS) P4COR, P4COI & P4CORS: 4.5 x 2.9 mm, 5.4 mm diagonal (1/3 inch CMOS)
Levels of Gray Scale or Color	P4OR, P4OI, P4O1.3R, P4O1.3I, P4ORS & P4O1.3RS: 256 Gray Scale P4COR, P4COI & P4CORS: 256 Red, Green and Blue
Exposure Time	P4OR, P4OI & P4ORS: 0.1 to 2830 milliseconds P4O1.3R, P4O1.3I & P4O1.3RS: 0.1 to 1670 milliseconds P4COR, P4COI & P4CORS: 0.1 to 1000 milliseconds
Full Image Acquisition	P4OR, P4OI & P4ORS: 48 frames per second max.* P4O1.3R, P4O1.3I & P4O1.3RS: 26.8 frames per second max.* P4COR, P4COI & P4CORS: 17 frames per second max.*
Lens Mount	Standard C-mount (1 inch—32 UN)
Construction	P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: Black anodized aluminum housing, glass lens P4ORS, P4O1.3RS & P4CORS: Die-cast nickel-plated aluminum housing, glass or acrylic window
Weight	P4OI, P4O1.3I & P4COI: 293 g P4OR, P4O1.3R & P4COR: 385 g P4ORS, P4O1.3RS & P4CORS: 430 g
Environmental Rating	P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: IEC IP20; NEMA 1 P4ORS, P4O1.3RS & P4CORS: IEC IP68
Operating Conditions	Stable ambient temperature: 0 to +50 °C Stable ambient lighting: No large, quick changes in light level; no direct or reflected sunlight Relative humidity: P4OR, P4OI, P4O1.3R, P4O1.3I, P4COR & P4COI: 35-90% (non-condensing)
Tools	Color Only: Average Color, Color Blob, Color Match Standard: Average Grayscale, Blob Detect, Edge, GEO Count, Object, Pattern Count, Circle Detect, Line Detect, GEO Find, Locate, Pattern Find, Blob Find, Communication, Math, Measure, Test, String Premium: Bar Code, Bead Tool, OCR/OCV
Certifications	

* A reduced Field-of-View (FOV) dramatically increases acquisition rates.



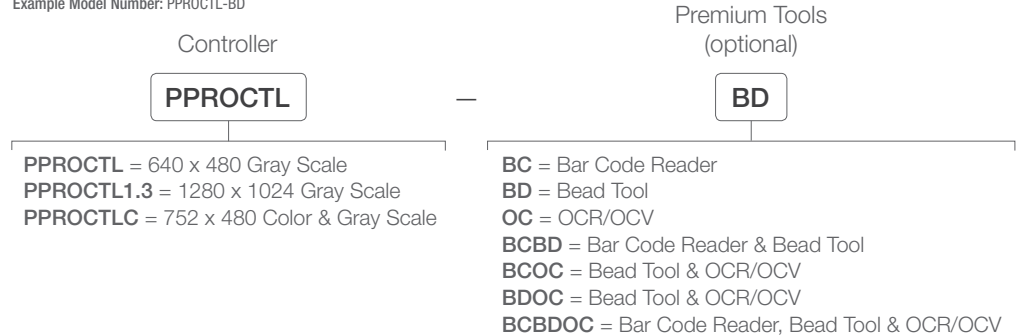
PresencePLUS[®] ProII

Full-Featured Vision System

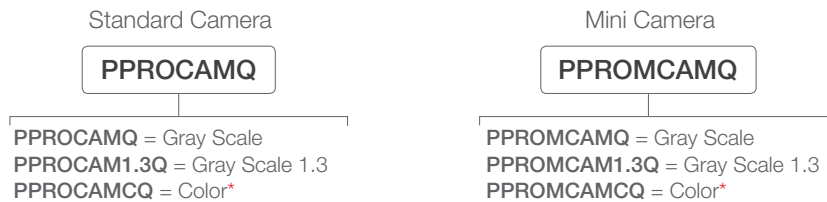
- Compact camera with separate DIN-mountable controller
- Ethernet, serial and flexible discrete I/O
- A choice of standard or mini anodized aluminum camera, or washdown, IP68-rated nickel-plated aluminum or stainless steel cameras
- VGA, color and 1.3 MP models available
- Six bright bicolor LED indicators
- Premium tools for enhanced inspection capabilities

ProII Controller

Example Model Number: PPROCTL-BD



ProII Camera



IP68 Sealed ProII Camera

Example Model Number: PPROCAMSC-G



* Color models only available with no light or white ring light

Euro QD to DB15

Straight connector models listed; for right-angle, add **RA** after the "S" in the model number (example, **PPC06SRAHF**)

12-Pin

- PPC06SHF**
2 m (6.5')
- PPC13SHF**
4 m (13')
- PPC23SHF**
7 m (23')
- PPC32SHF**
10 m (32')

Used for: Camera-to-Controller

BNC to BNC

- BNC06**
2 m (6.5')
- BNC15**
5 m (16')
- BNC30**
9 m (30')
- BNC48**
15 m (49')

Used for: Video

DB9 to DB9

- DB9P06**
2 m (6.5')
- DB9P15**
5 m (16')
- DB9P30**
9 m (30')

Used for: Serial Communication

RJ45 to RJ45

Shielded

- STP07**
2 m (6.5')
- STP25**
7 m (23')
- STP50**
15 m (50')
- STP75**
23 m (75')

Shielded Crossover

- STPX7**
2 m (6.5')
- STPX25**
7 m (23')
- STPX50**
15 m (50')
- STPX75**
23 m (75')

Used for: Ethernet Communication

Additional cordset information is available.
See page 758



Controller Models



Standard Camera Models
(shown with lens—sold separately)



Mini Camera Models
(shown with lens—sold separately)




IP68-Rated Camera Models
(shown with cover)




IP68 Rated Camera Models
(shown with ring light)

PresencePLUS® Proll Controller Specifications

Supply Voltage and Current	PPROCTL: 10 to 30 V dc @ less than 1.5 A (exclusive of load) PPROCTL1.3 & PPROCTL1.3S: 10 to 30 V dc @ less than 1.2 A (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Memory	Storage: 64 MB Inspections (jobs): 999 max.
Input/Output Configuration	NPN (sinking) or PNP (sourcing) software selectable
Output Rating	150 mA max. each output OFF-state leakage current: less than 100 μ A ON-state saturation voltage: NPN—less than 1 V @ 150 mA PNP—greater than $V+ -2$ V
Input Specifications	NPN: ON—less than 3 V OFF-state voltage—greater than 10 V @ 4 mA max PNP: ON—greater than $(+V -2)V$ @ 1 mA max. OFF-state voltage—less than 3 V @ 6 mA max.
Indicators	6 LED indicators: Trigger, Ready, Power, Pass, Fail, Error
Display Options	PC or NTSC video (uses 9 m max. BNC cordset)
Discrete I/O	1 Trigger IN (pin 3), 1 Strobe OUT (pin 4), 1 Remote TEACH IN (pin 6), 6 Programmable I/O (pins 9-14), 1 Product Change IN (pin 15), 4 Product Select IN (pins 16-19)
Communications	1 RJ-45 10/100 Ethernet connection for running <i>PresencePLUS</i> Pro software and/or output inspection results 1 RS-232 DB-9 port for output of inspection results
Construction	Steel with black zinc plating
Weight	Approx. 0.55 kg
Environmental Rating	IEC IP20; NEMA 1
Operating Conditions	Stable Ambient Temperature: 0 to +50 °C Relative Humidity: 90% (non-condensing) Stable Ambient Lighting: No large, quick changes in light level; no direct or reflected sunlight
Certifications	

PresencePLUS® Proll Camera Specifications

Image Resolution	PPROCAMQ & PPROCAMS(S): 640 x 480 pixels PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 752 x 480 pixels PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 1280 x 1024 pixels
Pixel Size	PPROCAMQ & PPROCAMS(S): 7.4 x 7.4 μ m PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 6.0 x 6.0 μ m PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 6.7 x 6.7 μ m
Imager Size	PPROCAMQ & PPROCAMS(S): 4.8 x 3.6 mm, 6 mm diagonal (1/3 inch CCD) PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 4.5 x 2.9 mm, 5.4 mm diagonal (1/3 inch CMOS) PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 8.6 x 6.9 mm, 11 mm diagonal (2/3 inch CMOS)
Levels of Gray Scale or Color	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROCAMS(S) & PPROCAM1.3S(S): 256 Gray Scale PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 256 Red, Green and Blue
Exposure Time	PPROCAMQ & PPROCAMS(S): 0.10 to 2830 milliseconds PPROMCAMQ, PPROMCAMCQ, PPROCAMCQ & PPROCAMCS(S): 0.10 to 1040 milliseconds PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 0.10 to 1670 milliseconds
Full Image Acquisition*	PPROMCAMQ, PPROCAMQ & PPROCAMS(S): 48 frames per second PPROMCAMCQ: 55 frames per second max. PPROCAMCQ & PPROCAMCS(S): 17 frames per second max. PPROMCAM1.3Q, PPROCAM1.3Q & PPROCAM1.3S(S): 18 frames per second max.
Interface	LVDS
Construction	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROMCAMCQ & PPROCAMCQ: black anodized aluminum and black painted die cast zinc PPROCAMS, PPROCAM1.3S & PPROCAMCS: nickel-plated aluminum (Lens covers and ring lights are nickel-plated aluminum with glass or polycarbonate window) PPROCAMSS, PPROCAM1.3SS & PPROCAMCSS: 316 stainless steel (Lens covers and ring lights are stainless steel with glass or polycarbonate window)
Environmental Rating	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROMCAMCQ & PPROCAMCQ: IEC IP20; NEMA 1 PPROCAMS, PPROCAM1.3S & PPROCAMCS: IEC IP68; NEMA 6P PPROCAMSS, PPROCAM1.3SS & PPROCAMCSS: IEC IP68; NEMA 6P and NEMA 4X
Outside Temperature	0 to +50 °C
Relative Humidity	PPROMCAMQ, PPROCAMQ, PPROMCAM1.3Q, PPROCAM1.3Q, PPROMCAMCQ & PPROCAMCQ: 90% (non-condensing)
Certifications	

* A reduced Field-of-View (FOV) dramatically increases acquisition rates.



SMBPPDH

Used with: Proll Controller



SMBPPDE



SMBPPLU



SMBPPRA



SMBPPU

Used with: Proll Cameras



SMBPPROMRA

Used with: Proll Mini Camera



SMBPPSU

Used with: Proll Camera



SMBP4RAB



SMBP4RAS

Used with: P4



SMBP4SRAF

Used with: Sealed P4

Additional bracket information is available
See page 726

Lens Covers



Length	Material	Works With	Model
50 mm	Nickel-plated aluminum	P4	P4SLC50-G
			P4SLC50-P
		Pro	PPSLC50-G
			PPSLC50-P
75 mm	Nickel-plated aluminum	Pro & P4	PPSLC75-G
			PPSLC75-P
50 mm	Stainless Steel	Pro	PPSSL50-G
			PPSSL50-P

Adjustable Mounting System



- 3" and 6" column, base and knuckle kits for positioning of sensor and lights
- Bogen arm with clamp for added flexibility in mounting
- 2" pivoting knuckle assembly for positioning spot light

Sensor Interface Modules and Power Supplies



- Sensor interface modules for simplified wiring of P4 sensors in an electrical box
- Lighting interface for strobe operation of Banner lighting with any vision sensor
- Strobe control module for control of specialty strobe lights

Video Monitor



Description	Model*
8" Flat Panel NTSC	PPM8

* Monitors require a BNC cordset for connection to a PresencePLUS Sensor (see page 356).

Enclosures



- Offers models for sensors and lights
- Provides protection in rugged or harsh environments
- Prevents tampering

Accessories for C-Mount Lenses*



Description	Format Size	Model	Used With
Extension Kit (0.5, 1.0, 5.0, 10, 20 and 40 mm)	—	LEK	All Lenses
Extension Kit (0.25 and 0.5 mm)		LEKS	
Lens Extender (increases focal length 2X)		LCF2X	
UV Lens Filter, Clear Glass	2/3"	FLTUV	Tamron Megapixel Lenses

Bandpass Filters

Example Model Number: FLTB470-27

Description	Model	Diameter
Blue	FLTB470-	
Green	FLTG525-	25.5
Infrared	FLIB850-	27
Red	FLTR635-	30.5
Dark Red	FLTBR660-	34
Polarizing filter	FLTPR032-	43


Used with: iVu & PresencePLUS, VE

C-Mount Color Filters*



Color	Description	Plastic Models	Glass Models
Infrared	High-pass filter blocks visible light and passes infrared light. Included with all Banner Infrared light sources.	FLTI (> 760 nm)	FLTI850 (810-990 nm)
Blue	Band-pass filter improves quality by helping to reduce ambient light; it passes blue and infrared light.	FLTB (400-525 nm)	FLTB470 (435-490 nm)
Green	Band-pass filter improves quality by helping to reduce ambient light; it passes green and infrared light.	FLTG (400-575 nm)	FLTG525 (495-565 nm)
Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	FLTR (> 600 nm)	FLTR635 (600-660 nm)
Dark Red	High-pass filter improves quality by helping to reduce ambient light; it passes red and infrared light.	—	FLTR660 (650-680 nm)

C-Mount Standard Lenses



Description	Format Size	Model	Used With
4 mm	1/3"	LCF04	Camera resolutions < 1 MP
8 mm		LCF08	
12 mm with Focus Locking		LCF12	
16 mm with Focus Locking		LCF16	
25 mm with Focus Locking (Goyo)	1"	LCF25R*	
25 mm with Focus and Aperture Locking, Metal Housing (Goyo)		LCF25LR**	
50 mm with Focus and Aperture Locking (Goyo)	2/3"	LCF50L1R**	
50 mm with Focus Locking, Metal Housing (Goyo)	1"	LCF50L2R*	
75 mm with Focus and Aperture Locking, Metal Housing (Goyo)		LCF75LR*	

C-Mount Specialty Lenses

Description



3.5 mm with Focus and Aperture Locking (Kowa)

6 mm with Focus and Aperture Locking (Kowa)

10 – 40 mm with Zoom, and Focus and Aperture Locking (Tamron)

50 mm Telecentric (Navitar)

Format Size

1/2"

2/3"

Model

LCF03LT**

LCF06LK**

LCF1040LT*

LCF50TELN*

Used With

Camera resolutions
< 1 MP

C-Mount Megapixel Lenses with Focus and Aperture Locking

Description



8 mm (Tamron)

16 mm (Tamron)

25 mm (Tamron)

50 mm (Tamron)

16 mm (Ricoh)

25 mm (Ricoh)

35 mm (Ricoh)

50 mm (Ricoh)

5 mm (Computar)

8 mm (Computar)

12 mm (Computar)

16 mm (Computar)

25 mm (Computar)

35 mm (Computar)

50 mm (Computar)

75 mm (Computar)

6 mm (Evetar)

8.5 mm (Evetar)

12 mm (Evetar)

16 mm (Evetar)

25 mm (Evetar)

35 mm (Evetar)

50 mm (Evetar)

75 mm (Evetar)

Format Size

1/1.8" (± 213")

2/3" (± 27.3 mm)

1/2"

2/3"

1/1.8"

1/1.8"

2/3"

2/3"

2/3"

2/3"

2/3"

1"

Model

LCF08LTMP**

LCF16LTMP**

LCF25LTMP**

LCF50LTMP†

LCF16LMP**

LCF25LMP**

LCF35LMP**

LCF50LMP**

LCF05LCMP*

LCF08LMP**

LCF12LMP**

LCF16LCMP**

LCF25LCMP**

LCF35LCMP†

LCF50LCMP†

LCF75LCMP†

LCF06LEVMP

LCF08LEVMP

LCF12LEVMP

LCF16LEVMP

LCF25LEVMP

LCF35LEVMP

LCF50LEVMP

LCF75LEVMP

Filter Diameter
(mm)

25.5

27.3

43

30.5

34

27

27

27

27

27

30.5

34

Used With

Camera resolutions
> 1 MP

* Lens will not fit in High Intensity Banner Ring Lights with aperture and/or focal ring thumb screws installed (example, LEDRR70XD5-XM)

** Lens will not fit inside any ring light or sealed camera lens cover as the lens body diameter is too large

† Lenses require a 75 mm cover when used with a Sealed Pro or P4 Camera (see page 361)



Vision Lighting

Vision lighting is the key to creating all-important contrast between the feature of interest and its background.



Ring Lights

Mounts directly to the sensor for easy setup and illuminates any object directly in front of the sensor
page 366



Area Lights

Provides even illumination in a concentrated area
page 378



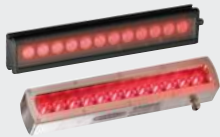
Backlights

Installs behind the target, directly facing the sensor; has a highly diffused surface and uniform brightness
page 370



Linear Array Backlights

Diffused backlights that can be used for any vision system or as a highly diffused area light
page 371



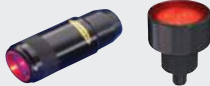
Linear Array Lights

Provides high-intensity illumination of large areas, at long distances
page 372



On-Axis Lights

Provides collimated illumination along the same optical path as the camera
page 373



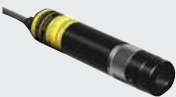
Spot Lights

Provides even illumination in a small concentrated spot
page 374



Low-Angle Ring Lights

Illuminates nearly perpendicular to the direction of an inspection
page 376



Laser Line Generator

Laser Line Generators have dynamic line balancing for repeatable performance
page 377

Ring Lights

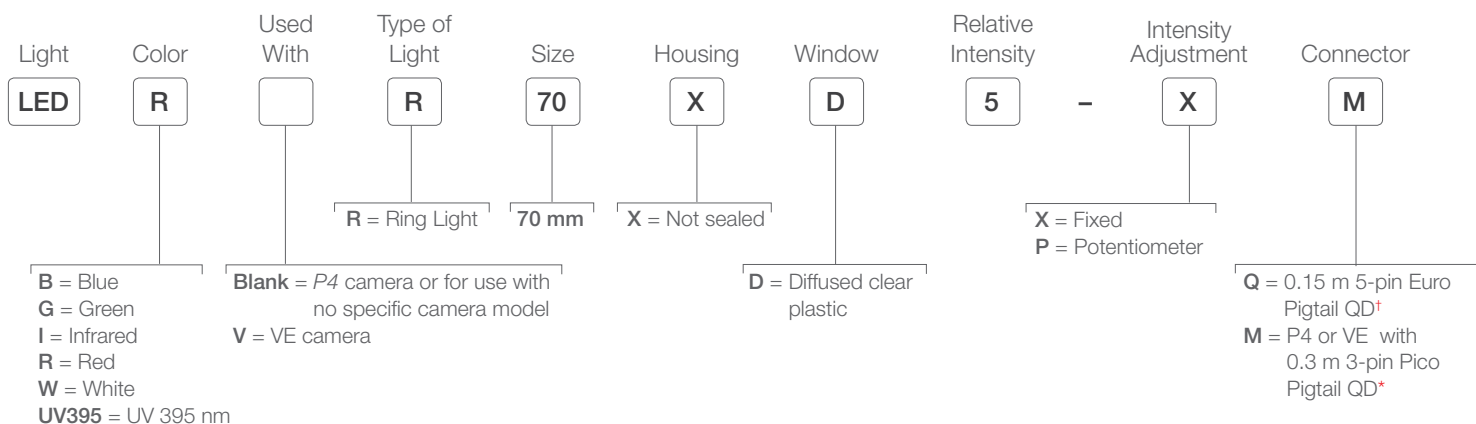
LED Vision Lights



- Connects directly to *PresencePLUS* or VE vision sensors or an external power supply
- Brightly illuminates small objects
- Mounts directly to the camera and centers the light on the image
- Includes models to withstand washdown environments (IP68 rated)
- Cordsets and brackets see page 378

IP50 High-Intensity

Example Model Number: LEDRR70XD5-XM



Connection options:

* Pico QD model required for P4 or VE sensors.

Pico QD models include a built-in mounting bracket for use with P4 or VE sensors.

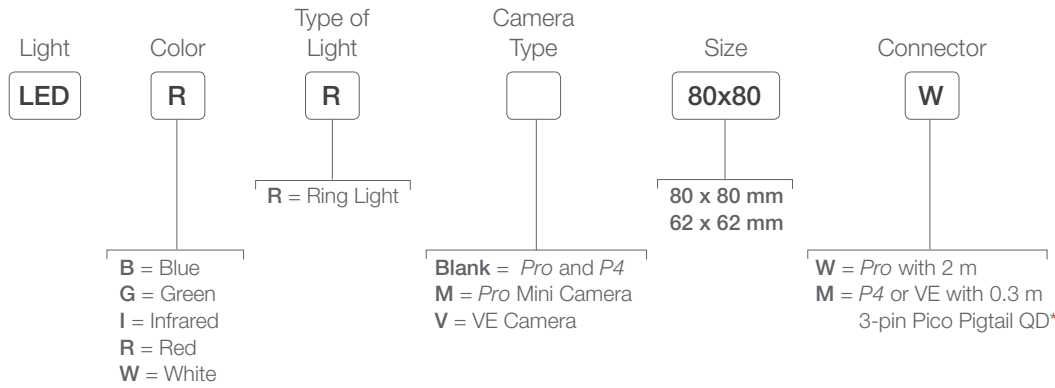
† Models require a mating cordset (see page 378).

Optional bracket SMBPPRHI required for use with Pro cameras (see page 378).

Optional bracket SMBPMPRHI required for use with Pro Mini cameras (see page 378).

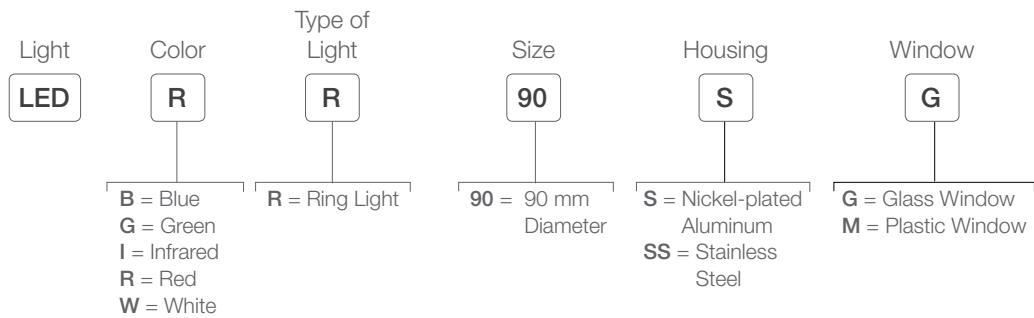
IP20 LED Ring Lights, 24 V DC

Example Model Number LEDRR80X80W



IP68 (for sealed Pro II and P4 Models)

Example Model Number LEDRR90S-G



Connection options:

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRR80X80W W/30).

For replacement windows and diffusers (see page 379).

* Splitter cordsets available for powering two lights (see page 378).

Area Lights

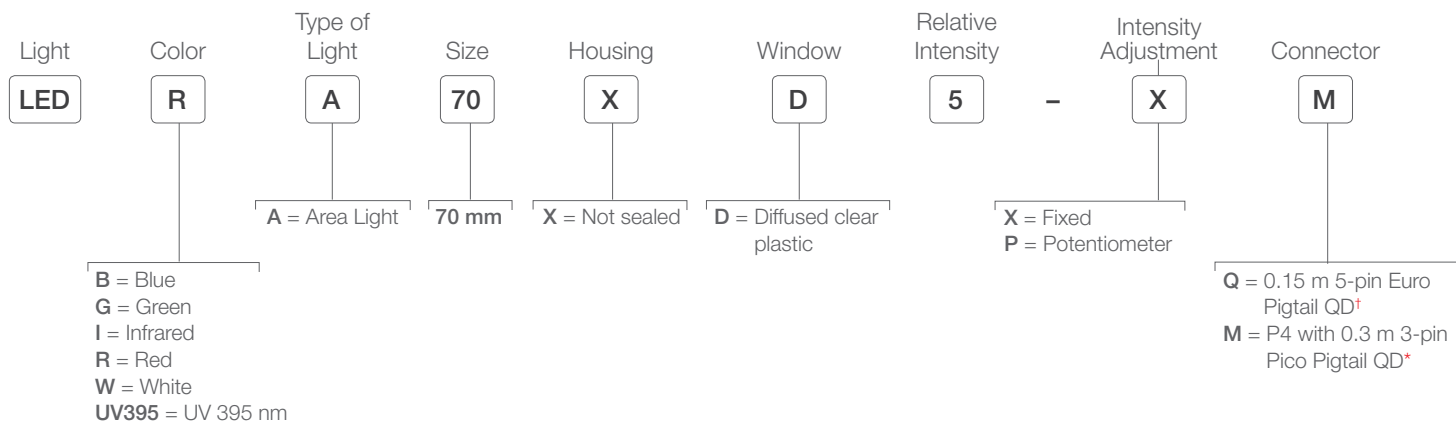
LED Vision Lights



- Provides even illumination in a concentrated area
- Creates shadows or glare to detect changes in depth, depending on mounting
- High-intensity lighting for distances greater than 12 inches
- Cordsets and brackets see page 378

IP50 High-Intensity Area Light

Example Model Number: LEDRA70XD5-XM

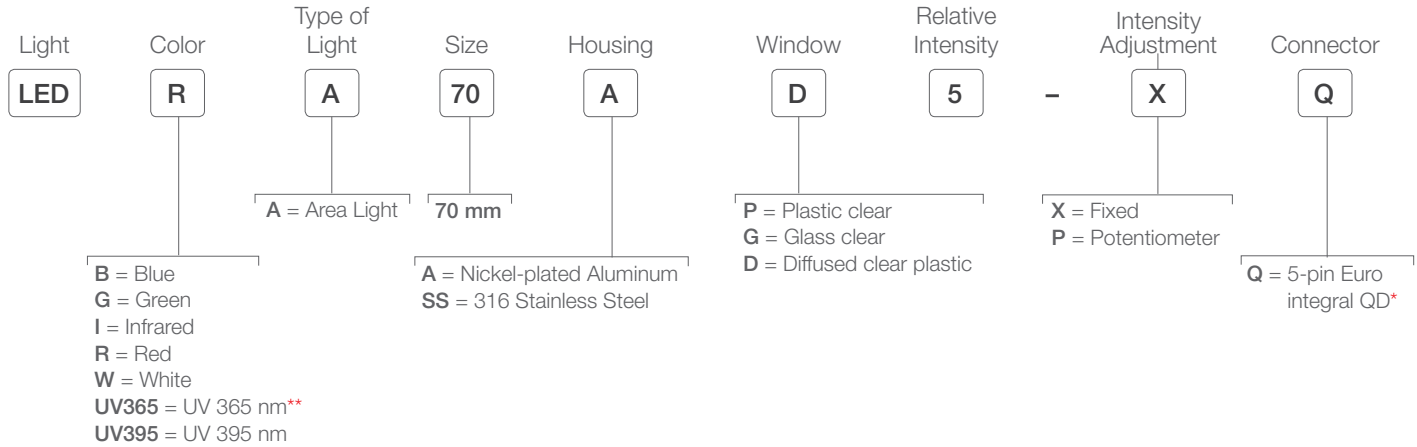


Connection options:

- * Pico QD model required for P4 or VE sensors.
- † Models require a mating cordset (see page 378).
- †† For replacement windows and diffusers (see page 379).

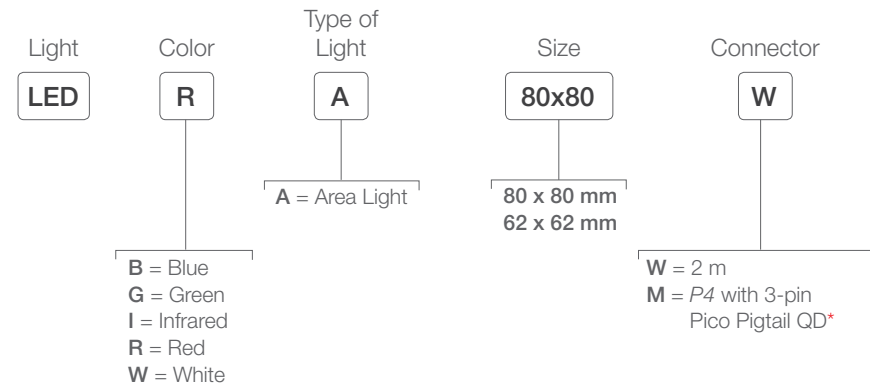
IP68 Sealed High-Intensity Area Light

Example Model Number: LEDRA70AD5-XQ



IP40 LED Area Light

Example Model Number LEDRA80X80W



Connection options:

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRA80X80W W/30).
 QD models can be connected directly to P4 sensors; splitter cordset available for powering two lights (see page 378).
 * Models require a mating cordset (see page 378)
 ** UV365 can only be used with glass window
 † For replacement windows and diffusers (see page 378)

Back Lights

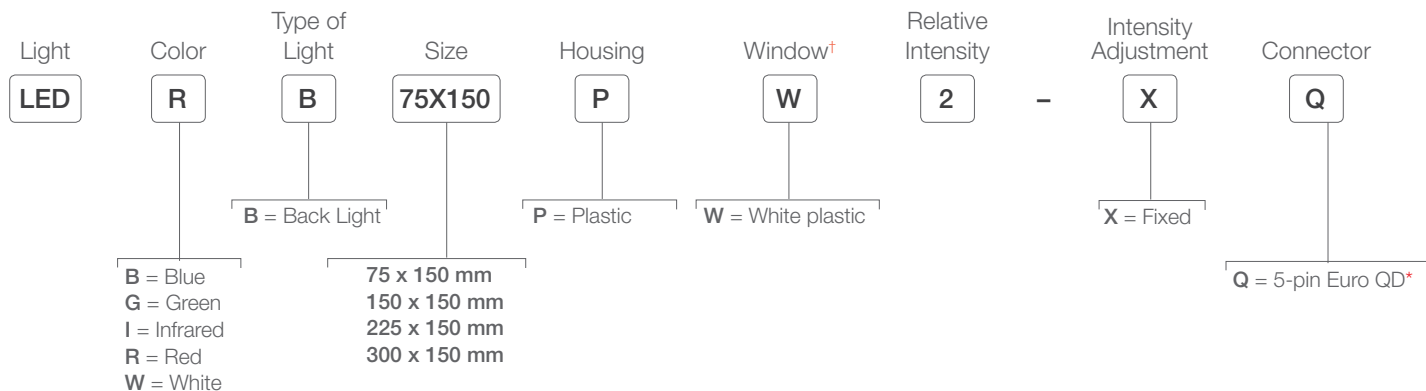
LED Vision Lights



- Determines the shape and size of target objects
- Offers a highly diffused surface and uniform brightness, with lower intensity than other lights
- Provides the most robust lighting for measuring and gauging
- Highlights through-holes in target objects
- Cordsets and brackets see page 378

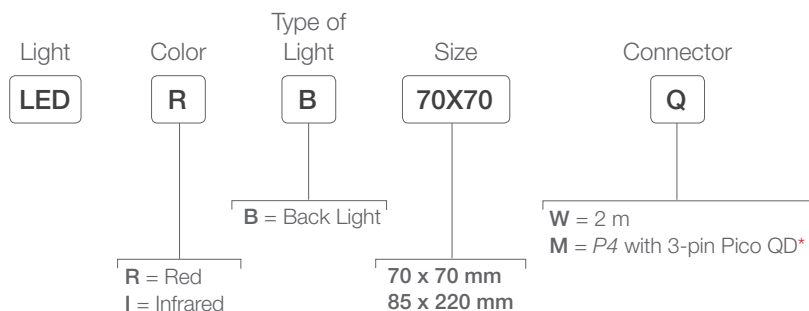
IP67 Sealed LED Backlights

Example Model Number LEDRB75X150PW2-XQ



IP40 LED Backlights

Example Model Number LEDRB70X70Q



Connection options: A model with a QD requires a mating cordset (see page 378).

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRB70X70W W/30).

QD models can be connected directly to P4 sensors; splitter cordsets available for powering two lights (see page 378).

* Models require a mating cordset (see page 378).

† For replacement windows and diffusers (see page 379).

Linear Array Backlights

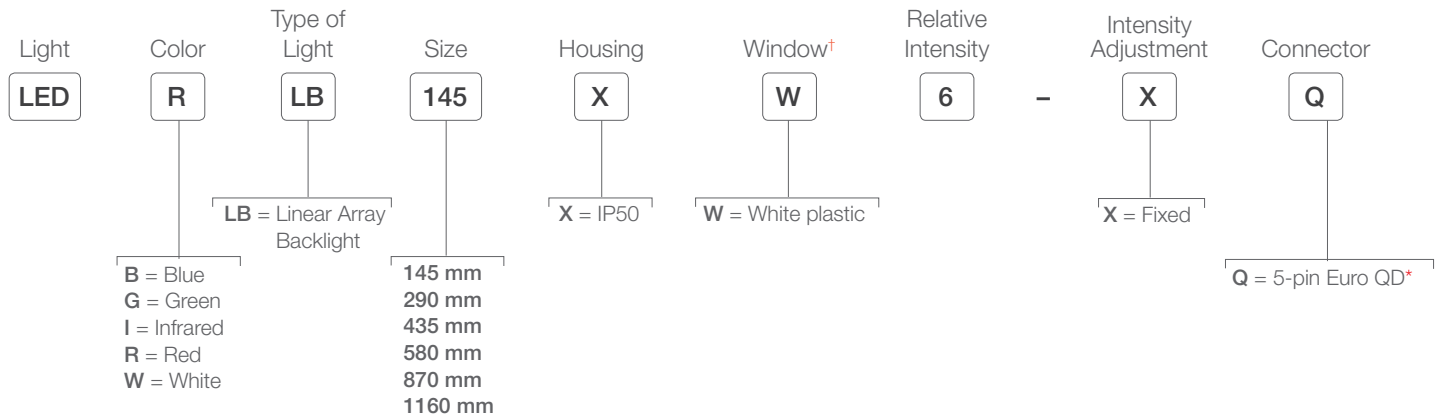
LED Vision Lights



- Built-in constant current regulation with very even light pattern
- Optically isolated strobe signal with selectable Active High or Active Low strobe option
- Maintenance-free, rugged construction
- Four high-intensity, visible wavelengths, plus IR
- Cordsets and brackets see page 378

IP50 High Power LED Linear Array Backlights

Example Model Number LEDRLB145XW6-XQ



Connection options: A model with a QD requires a mating cordset (see page 378).

* Models require a mating cordset (see page 378).

† For replacement windows and diffusers (see page 379).

Linear Array Lights

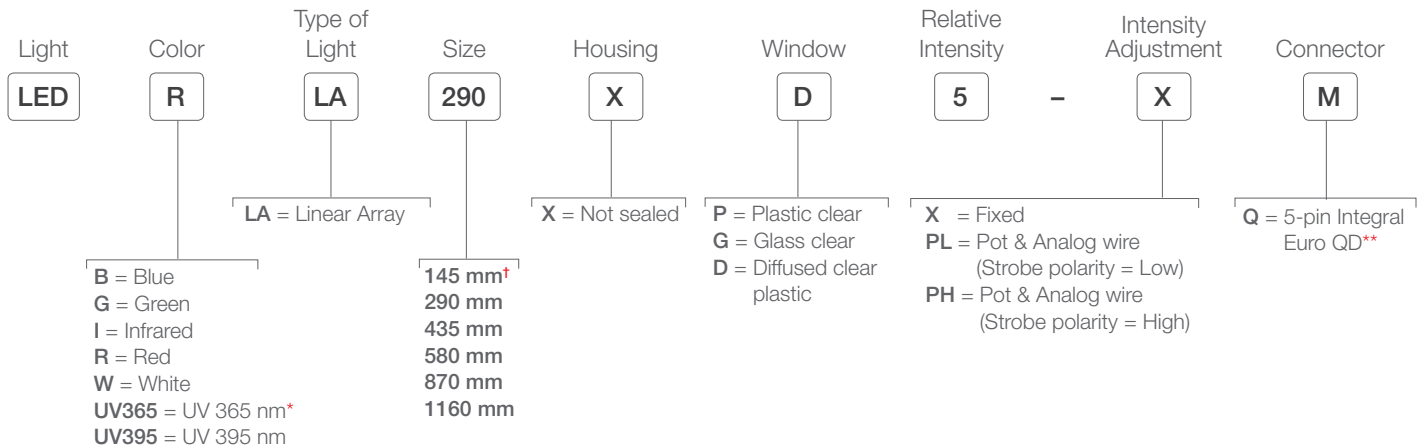
LED Vision Lights



- Provides maintenance-free LED illumination of large objects from far away
- Provides superior high-intensity illumination of large areas
- Available in sealed (IP68) nickel-plated and non-sealed (IP50) housings
- Provides optically isolated strobe signal
- Cordsets and brackets see page 378

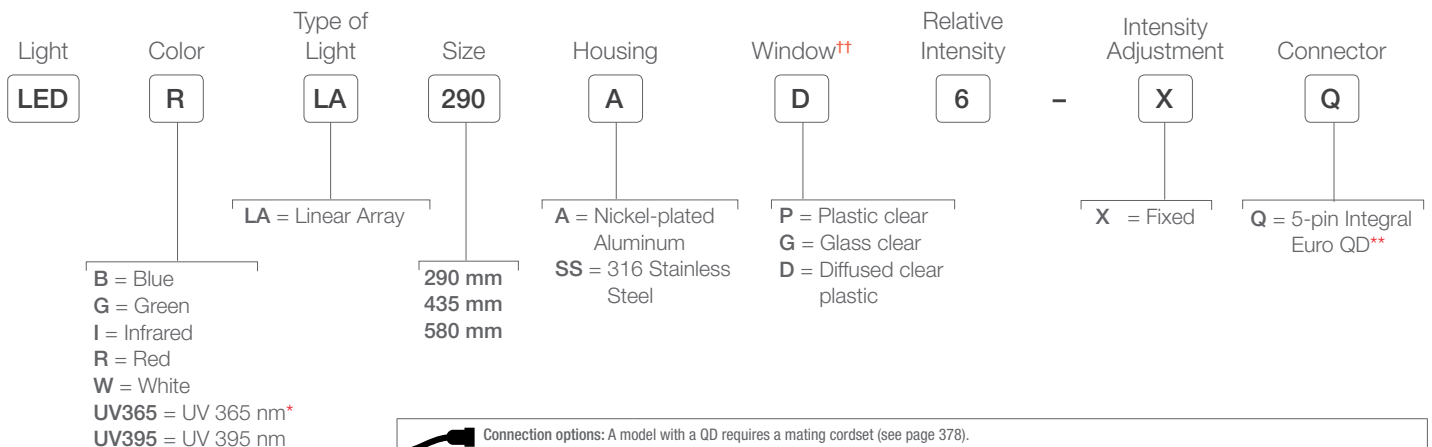
IP50 High-Intensity LED Linear Array

Example Model Number: LEDRA70XD5-XM



IP68 High-Intensity LED Linear Array

Example Model Number: LEDRA70XD5-XM



 Connection options: A model with a QD requires a mating cordset (see page 378).

- * UV365 can only be used with glass window
- ** Models require a mating cordset (see page 378).
- † Intensity adjustment not available on 145 mm length
- †† For replacement windows and diffusers (see page 379).

On-Axis Lights

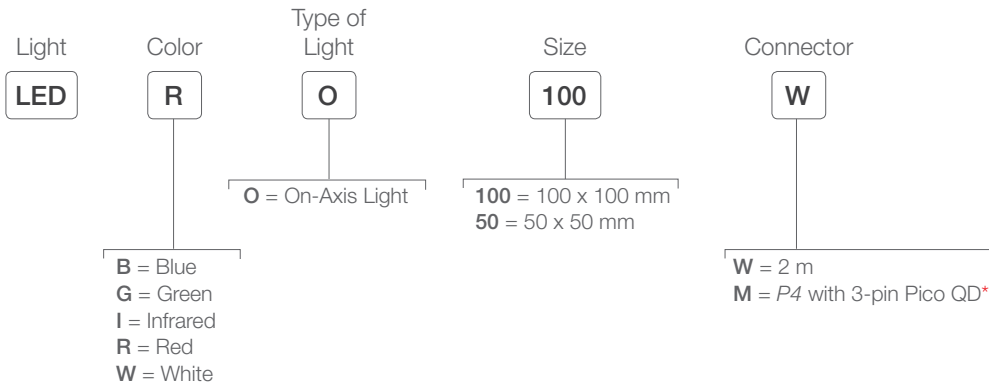
LED Vision Lights



- Provides more uniform illumination than a ring light
- Delivers collimated illumination in the same optical path as camera
- Evenly illuminates flat reflective surfaces
- Provides minimum useful life of 10,000 to 60,000 hours, depending on model
- Cordsets and brackets see page 378

IP40 LED On-Axis Light

Example Model Number LEDRA100W



Connection options: A model with a QD requires a mating cordset (see page 378).
 QD cordsets with flying leads are available for connecting to models other than P4 (see page 378).
 * Models require a mating cordset (see page 378).

Spot Lights

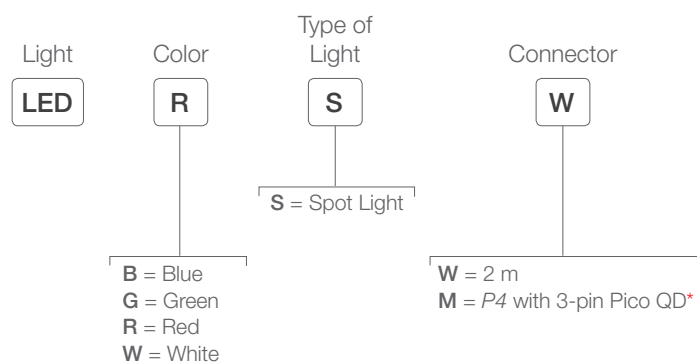
LED Vision Lights

- Low-cost, compact washdown spot lights for PresencePLUS® sensors
- Continuous or strobed operation is selectable via sensor software
- Provides extremely bright, even light with high-power LEDs
- Adjustable spot size
- Direct connection to *PresencePLUS® Pro* sensor or to an external power supply using 3 discrete wires
- Cordsets and brackets see page 378



IP68 Sealed LED Spot Light

Example Model Number LEDRSW



Connection options: A model with a QD requires a mating cordset (see page 378).

For 9 m cable, add suffix W/30 to the 2 m model number (example, LEDRSW W/30).

QD models can be connected directly to P4 sensors; splitter cordsets available for powering two lights (see page 378).

* Models require a mating cordset (see page 378).

High-Intensity Spot Lights

LED Vision Lights



- Provides more uniform illumination than a ring light
- Delivers collimated illumination in the same optical path as camera
- Evenly illuminates flat reflective surfaces
- Provides minimum useful life of 10,000 to 60,000 hours, depending on model
- Cordsets and brackets see page 378

IP69K Sealed High Intensity LED Spot Lights

Lens Angle	Color	Lumens	Lux		Connection	Models
			0.5 m	1 m		
± 5° (smaller, more focused spot)	Red	110	8,000	2,000	5-pin Euro integral QD connector (use with a 5-wire mating cordset)	LEDRS50L5-XQ
	White	295	13,780	3,445		LEDWS50L5-XQ
	Blue	85	4,880	1,220		LEDBS50L5-XQ
	Green	210	13,000	3,250		LEDGS50L5-XQ
	IR	760*	4.40**	1.10**		LEDIS50L5-XQ
	UV	480*	2.10**	0.52**		LEDUV395S50L5-XQ
± 11° (larger spot)	Red	105	2,500	625	5-pin Euro integral QD connector (use with a 5-wire mating cordset)	LEDRS50L11-XQ
	White	285	5,460	1,365		LEDWS50L11-XQ
	Blue	80	1,540	385		LEDBS50L11-XQ
	Green	200	3,900	975		LEDGS50L11-XQ
	UV	420*	0.78**	0.19**		LEDUV395S50L11-XQ
± 14° (larger spot)	IR	665*	1.16**	0.29**	5-pin Euro integral QD connector (use with a 5-wire mating cordset)	LEDIS50L14-XQ
± 20° (largest spot)	Red	100	1,040	260	5-pin Euro integral QD connector (use with a 5-wire mating cordset)	LEDRS50L20-XQ
	White	270	2,000	500		LEDWS50L20-XQ
	Blue	75	700	175		LEDBS50L20-XQ
	Green	190	1,700	425		LEDGS50L20-XQ
	UV	390*	0.42**	0.10**		LEDUV395S50L20-XQ

Connection options: A model with a QD requires a mating cordset (see page 378).

For 2 m cable, omit suffix XQ from model number (example, LEDRS50L5).

* Values listed in milliwatts

** Values listed in mW/cm²

Low Angle Ring Lights

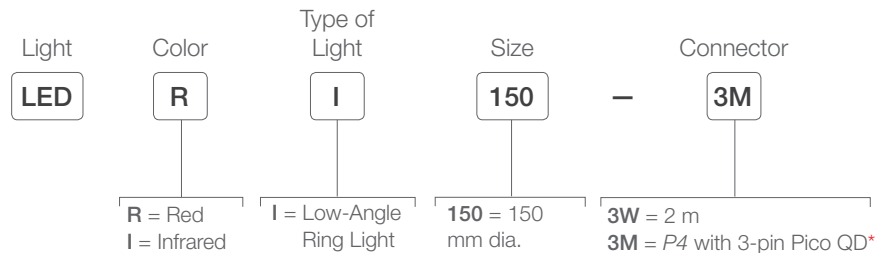
LED Vision Lights



- Highlights surface irregularities
- Highlights slight height differences such as etching, solder balls and embossing
- Illuminates from an angle nearly perpendicular to object
- Provides minimum useful life of 10,000 to 60,000 hours, depending on model
- Cordsets and brackets see page 378

LED Low Angle Ring Lights

Example Model Number LEDR11503M



Laser Line Generator



- Laser line uniformity up to 95% on 100% of the line
- External user focus mechanism
- Robust thermal management, providing better stability and longer lifetime
- Remote laser monitoring and control via RS232 communication
- Brackets see page 378

Laser Line Generator, 5-24 V DC

➔ Visible Red Laser

Description	Models
Laser Line Generator: 660 nm; 10mW, 60 degree fan angle Class II CDRH, RS232 Communication Flying leads	LLG660P10A60II
Laser Line Generator: 660 nm; 50mW, 60 degree fan angle Class IIIA CDRH Flying leads	LLG660P50A60III
Laser Line Power Supply Generator: 660 nm, 10 mW 60 degree fan angle, Class II CDRH Flying leads	PSLLG12V

Connection options: A model with a QD requires a mating cordset (see page 378).

QD cordsets with flying leads are available for connecting to models other than P4 (see page 378).

* Models require a mating cordset (see page 378).



Nickel-Plated Nut
MQDC20-506
 2 m (6.5')
MQDC20-515
 5 m (15')
MQDC20-530
 9 m (30')

M12/Euro-Style
 Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC20-506RA**)



Stainless Steel Nut
MQDC20SS-506
 2 m (6.5')
MQDC20SS-515
 5 m (15')
MQDC20SS-506
 9 m (30')

3-Pin Pico-Style
 Straight connector models listed

Nickel-Plated Nut
 —
PKG3M-5
 5 m (16')
PKG3M-7
 7 m (23')
PKG3M-10
 10 m (33')

Stainless Steel Nut
PKG3M-4
 4 m (13')
 —
PKG3M-7
 7 m (23')
PKG3M-10
 10 m (33')



Euro-Style
 Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC1-506RA**)

MQDC1-506
 2 m (6.5')
MQDC1-515
 5 m (15')
MQDC1-530
 9 m (30')



Pico-Style Splitter
 Straight connector models listed

CSB-M831M831†
 Branches = 0.20 m (0.65 ft)
 Trunk = 0.20 m (0.65 ft)



Pico-Style Splitter
 Straight connector models listed. One 3-pin Pico QD and one 4-Pin Euro QD.

CSB-UNT213M831F1241††
 Branches = 0.3 m (1ft)
 Trunk = Flying leads

† Powers 2 lights from one P4 sensor

†† Enables strobe signal from P4 while obtaining power from an external source



Pico-Style Double-Ended
 Straight connector models listed

PKG3M-.35-PSG3M
 0.35 m (1 ft)
PKG3M-2-PSG3M
 2 m (6.5 ft)

Additional cordset information is available. See page 758



SMBBSSM



SMBACM



SMBP42ASM

Used with: Area Lights & Backlights



SMBLASRA

Used with: Linear Array



SMBPMPRHI

Used with: Ring Lights



SMBP40AL..



SMBPPOAL..

Used with: On-Axis

Additional bracket information is available. See page 726

Polarizing Filters

Description	Models
Linear Polarizing filter kit for 62 x 62 Ring Lights	LEDRPFKS
Linear Polarizing filter kit for 80 x 80 Area Lights and 70 x 70 Backlights	LEDAPFK
Linear Polarizing filter kit for 62 x 62 Area Lights	LEDAPFKS
Linear Polarizing filter kit for Sealed Ring Lights	LEDRPFK90
Linear Kit with a variety of filters, diffusers and window replacements	LEDFLT
Linear Polarizing filter kit for 290 mm Linear Array Lights (IP68)	LEDLAPFK290S
Linear Polarizing filter kit for 580 mm Linear Array Lights (IP68)	LEDLAPFK580S
Linear Polarizing filter kit for 145 mm Linear Array Lights (IP50)	LEDLAPFK145

Polarizing Filters

Description	Models
Linear Polarizing filter kit for 290 mm Linear Array Lights (IP50)	LEDLAPFK290
Linear Polarizing filter kit for 435 mm Linear Array Lights (IP50)	LEDLAPFK435
Linear Polarizing filter kit for 580 mm Linear Array Lights (IP50)	LEDLAPFK580
Linear Polarizing filter kit for 870 mm Linear Array Lights (IP50)	LEDLAPFK870
Linear Polarizing filter kit for 1160 mm Linear Array Lights (IP50)	LEDLAPFK1160
Linear Polarizing filter kit for 70 mm High-Intensity Area Lights	LEDAPFK70
Linear Polarizing filter kit for 70 mm High-Intensity Ring Lights	LEDRPFK70
Linear Polarizing filter kit for 70 mm IP68 High-Intensity Area Lights	LEDAPFK70S
Linear Polarizing filter kit for 50mm High-Intensity Spot Lights	LEDS0PFK

Window Replacements and Lighting Diffusers

Use With	Models
Clear Plastic	
62 x 62 mm Ring Lights	LEDRCWS
80 x 80 mm Ring Lights	LEDRCW
62 x 62 mm Area Lights	LEDAWS
80 x 80 mm Area Lights	LEDAW
70 mm Sealed High-Intensity Area Lights	LEDA70SW-P
145 mm IP50 Linear Array Lights	LEDLA145XW-P
290 mm IP50 Linear Array Lights	LEDLA290XW-P
290 mm Sealed IP68 Linear Array Lights	LEDLA290SW-P
435 mm IP50 Linear Array Lights	LEDLA435XW-P
435 mm Sealed IP68 Linear Array Lights	LEDLA435SW-P
580 mm IP50 Linear Array Lights	LEDLA580XW-P
580 mm Sealed IP68 Linear Array Lights	LEDLA580SW-P
870 mm Sealed IP50 Linear Array Lights	LEDLA870XW-P
1160 mm IP50 Linear Array Lights	LEDLA1160XW-P
Clear Plastic Diffuse	
80 x 80 mm Ring Lights	LEDRCDW
62 x 62 mm Right Lights	LEDRCDWS
70 mm High-Intensity Ring Lights	LEDR70CDW
70 mm High-Intensity Area Lights	LEDA70CDW
70 mm Sealed IP68 High-Intensity Area Lights	LEDA70SCDW-P
145 mm IP50 Linear Array Lights	LEDLA145XCDW-P
290 mm IP50 Linear Array Lights	LEDLA290XCDW-P
290 mm Sealed IP68 Linear Array Lights	LEDLA290SCDW-P
435 mm IP50 Linear Array Lights	LEDLA435XCDW-P
435 mm Sealed IP68 Linear Array Lights	LEDLA435SCDW-P
580 mm IP50 Linear Array Lights	LEDLA580XCDW-P
580 mm Sealed IP68 Linear Array Lights	LEDLA580SCDW-P
870 mm IP50 Linear Array Lights	LEDLA870XCDW-P
1160 mm IP50 Linear Array Lights	LEDLA1160XCDW-P
Clear Glass	
70 mm Sealed IP68 High-Intensity Area Lights	LEDA70SW-G
145 mm IP50 Linear Array Lights	LEDLA145XW-G
290 mm IP50 Linear Array Lights	LEDLA290XW-G
290 mm Sealed IP68 Linear Array Lights	LEDLA290SW-G
435 mm IP50 Linear Array Lights	LEDLA435XW-G
435 mm Sealed IP68 Linear Array Lights	LEDLA435SW-G
580 mm IP50 Linear Array Lights	LEDLA580XW-G
580 mm Sealed IP68 Linear Array Lights	LEDLA580SW-G
870 mm IP50 Linear Array Lights	LEDLA870XW-G
1160 mm IP50 Linear Array Lights	LEDLA1160XW-G

Use With	Models
White Plastic	
70 x 70 mm Red Backlights	LEDBW
70 x 70 mm Infrared Backlights	LEDBIW
85 x 220 mm Red Backlights	LEDBWL
85 x 220 mm Infrared Backlights	LEDBIWL
White Plastic Diffuse	
62 x 62 mm Ring Lights	LEDRDWS
80 x 80 mm Ring Lights	LEDRDW
62 x 62 mm Area Lights	LEDADWS
80 x 80 mm Area Lights	LEDADW
70 mm Sealed High-Intensity Area Lights	LEDA70SWDW-P
145 mm IP50 Linear Array Lights	LEDLA145XWDW-P
290 mm IP50 Linear Array Lights	LEDLA290XWDW-P
290 mm Sealed IP68 Linear Array Lights	LEDLA290SWDW-P
435 mm IP50 Linear Array Lights	LEDLA435XWDW-P
435 mm Sealed IP68 Linear Array Lights	LEDLA435SWDW-P
580 mm IP50 Linear Array Lights	LEDLA580XWDW-P
580 mm Sealed IP68 Linear Array Lights	LEDLA580SWDW-P
870 mm IP50 Linear Array Lights	LEDLA870XWDW-P
1160 mm IP50 Linear Array Lights	LEDLA1160XWDW-P



Lighting & Indicators

Banner offers a wide variety of lighting and indicator solutions, including LED lighting, signal tower lights, indicators, touch buttons and pick-to-light indicators. With flexible designs, high-quality and energy-efficient LED products, Banner's lighting and indication selection offers a unique solution that suits many environmental, workplace efficiency and mounting needs.

LIGHTING & INDICATORS

LED LIGHTING	page 384
SIGNAL TOWER LIGHTS	page 412
INDICATORS	page 434
TOUCH BUTTONS	page 468
PICK-TO-LIGHT	page 482

Light Up the Visual Factory

Enhance your Visual Management Efforts with Banner's Lighting and Indicators.



Illuminate the Work Area with LED Lighting

- Boost Worker Productivity
- Improve Product Quality
- Reduce Energy Costs

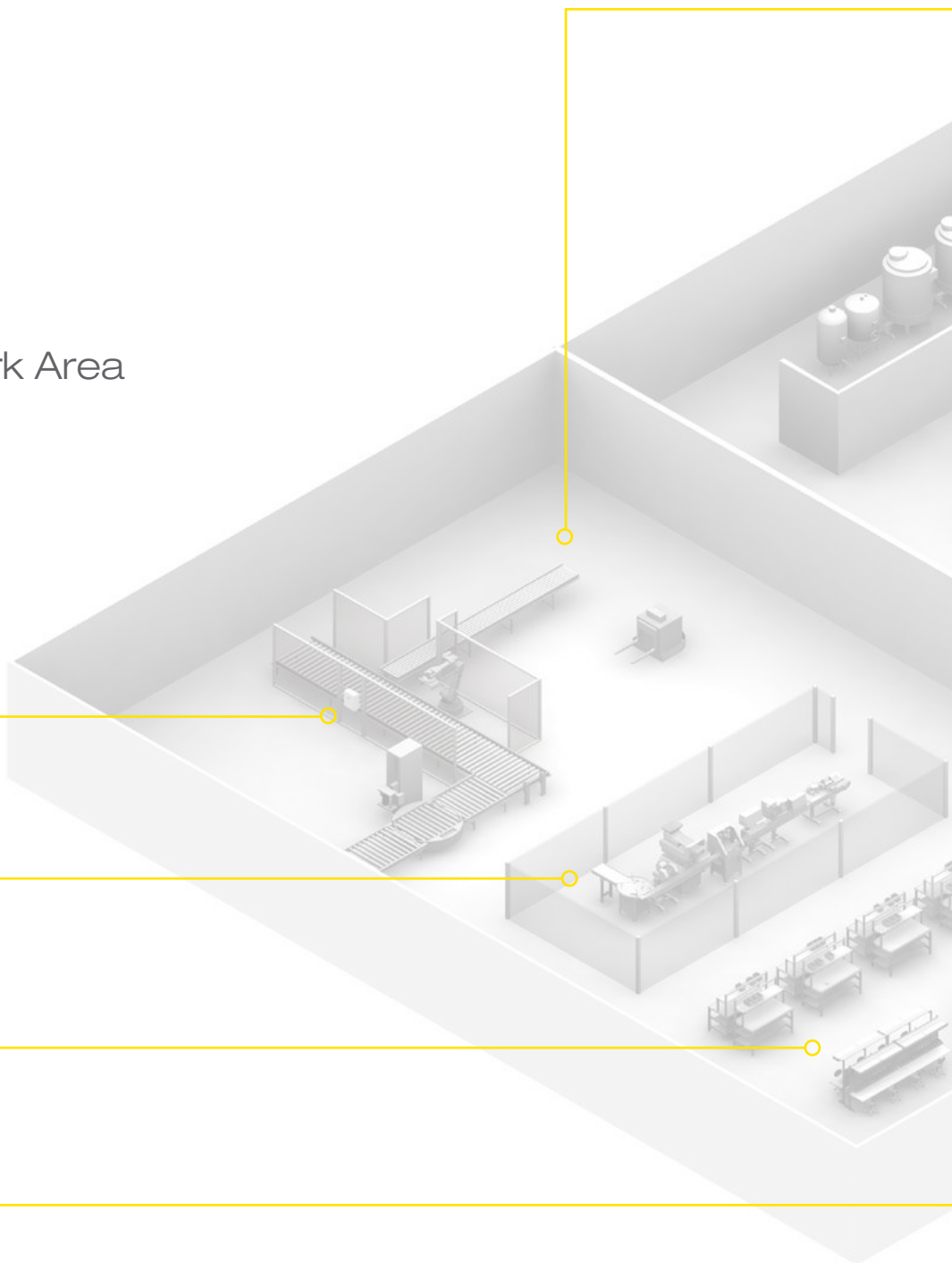
Electrical Panel Lighting

Machine Lighting

Workstation Lighting

Visual Inspection Station

Sensor Emulation



Communicate Status

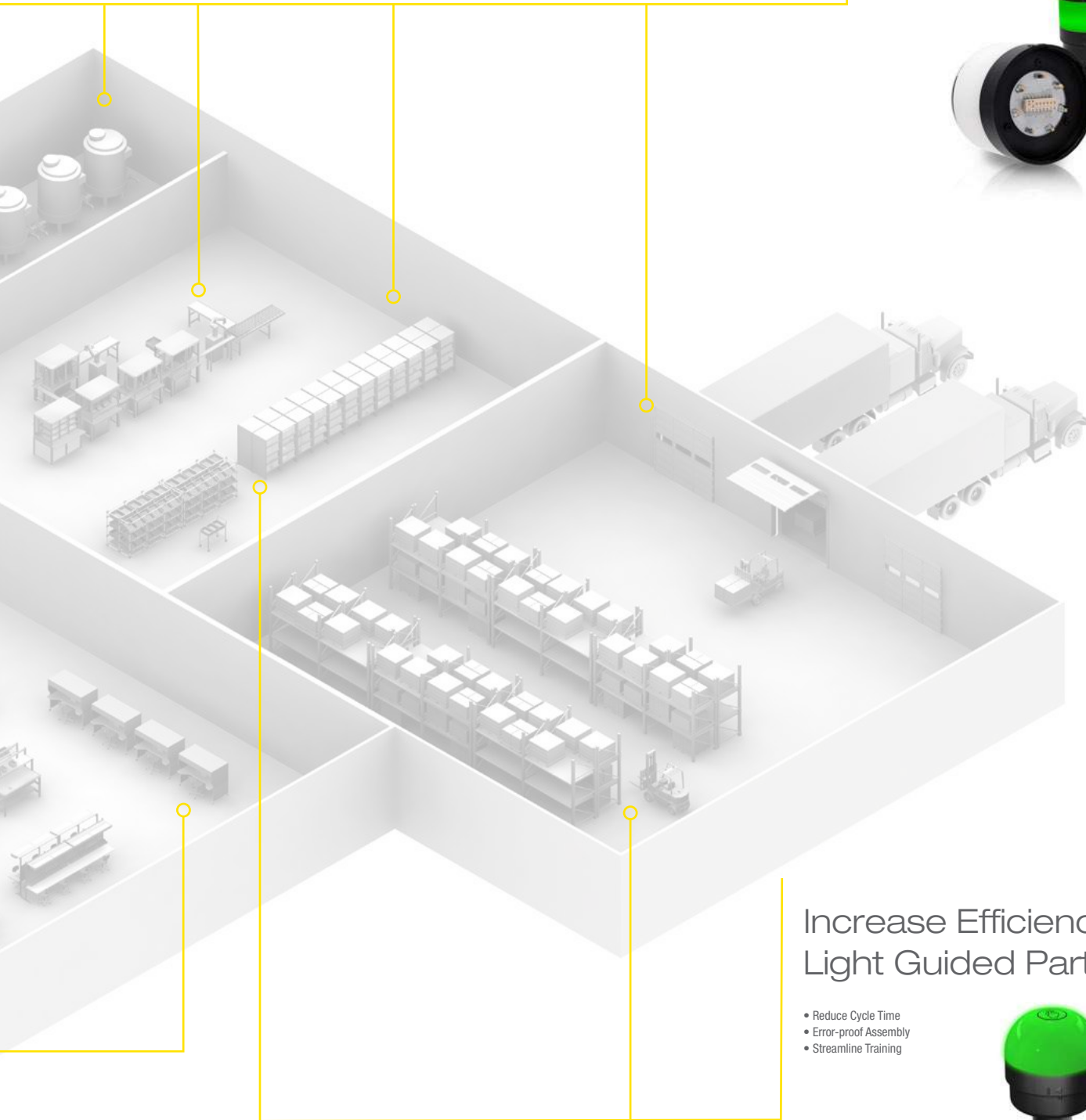
- Empower Operators
- Alert Supervisors
- Accelerate Resolution



Machine and Process Status

Call for Parts

Loading Dock/Bay Communication



Pick-to-Light for Assembly and Kitting

Pick-to-Light for Warehouse and Logistics

Increase Efficiency with Light Guided Part Picking

- Reduce Cycle Time
- Error-proof Assembly
- Streamline Training





LED Lighting

Banner's LED lighting offers high-quality, energy-efficient products that provide bright illumination for up to 50,000 hours. Robust, vibration-resistant housings and sleek designs make Banner's LED lighting ideal for a wide range of industrial and mobile applications, including machine lighting, enclosure lighting, visual inspection illumination and work cell lighting.

Series	Description	Available Colors	Dimensions (L x W x D)	Housing Material	Power Supply
	WLS28-2 Banner's LED Strip Light has a sturdy aluminum housing, shatterproof window and a low-profile, space-saving design. page 386	Cool White Warm White Red Green Blue Yellow UV365 UV395	Length varies by model Unlensed: 21 x 28 mm Lensed: 32.2 x 28 mm	Clear anodized aluminum	12 to 30 V dc
	WLS15 Banner's LED Strip Light has a low-profile, space-saving design and is perfect for cabinet lighting. page 390	Daylight White Cool White	Length varies by model 30.6 x 15.5 mm	Clear anodized aluminum inner housing	12 V dc or 24 V dc
	WLB32 Banner's WLB32 is a bright LED fixture that features an even light output for a no glare 'glow.' page 392	Daylight White	Length varies by model 32 x 46 mm	Anodized aluminum	12 to 30 V dc, 90 to 264 V ac
	WLB92 Banner's WLB92 is an ultra-bright LED fixture that features an even light output. page 394	Daylight White Warm White Red Green Blue Yellow	Length varies by model 97.4 x 103.6 mm	Anodized aluminum	24 V dc, 100 to 277 V ac
	WLS27 Protected by a shatterproof copolyester shell and a redundant sealing method prevents water ingress. Each strip light provides brilliant, even illumination. page 396	Cool White Warm White Red Green Blue Yellow UV395	Lighted length varies by model ø 27 mm	FDA-grade copolyester outer housing	12 to 30 V dc
	WLC60 The WLC60 Heavy-Duty LED Light is engineered to withstand harsh environments making it the first choice for a machine lighting solution. page 398	Cool White	Base mount: (339 or 638) x 60.9 x 31.3 mm Flush mount: 367 x 88 x 30.8 mm	Nickel-plated aluminum or 316 Stainless Steel	12 to 30 V dc
	WLC90 Extremely compact and bright, making them an excellent choice for machining centers and food processing equipment. page 400	Cool White	89.0 x 91.0 x 28.2 mm	Nickel-plated aluminum	12 to 30 V dc
	WLA Area Lights provide high intensity, uniform light with low energy consumption and a small footprint. page 402	Cool White Warm White Red Green Blue Yellow	Length varies by model 25.8 x 180.1 mm	PBT	12 to 30 V dc
	WL50S These lights are rugged and water-resistant, making them a good choice for machine lighting, food and beverage applications and mobile applications. page 404	Cool White, Green, Red	WL50S: 65.8 x ø 50 mm WL50S (stainless): 71 x ø 56 mm	WL50S: Black anodized aluminum SS models: Stainless Steel	12 to 30 V dc



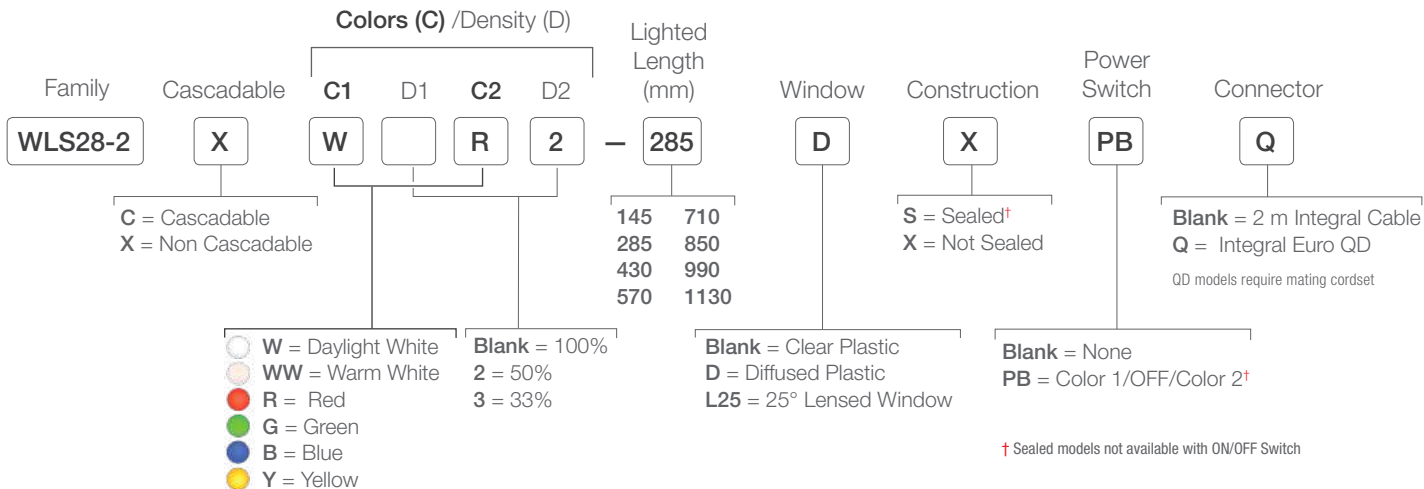
WLS28-2 Series

LED Strip Lights

- Sturdy aluminum housings, shatterproof windows and a low-profile, space-saving design
- Enhanced light quality with bright, densely-spaced LEDs (8 color options available)
- Rugged, water-resistant IP69K models
- Magnetic mount options available for easy installation
- Can be cascaded end-to-end to minimize wiring
- Dimmable models available see page 408

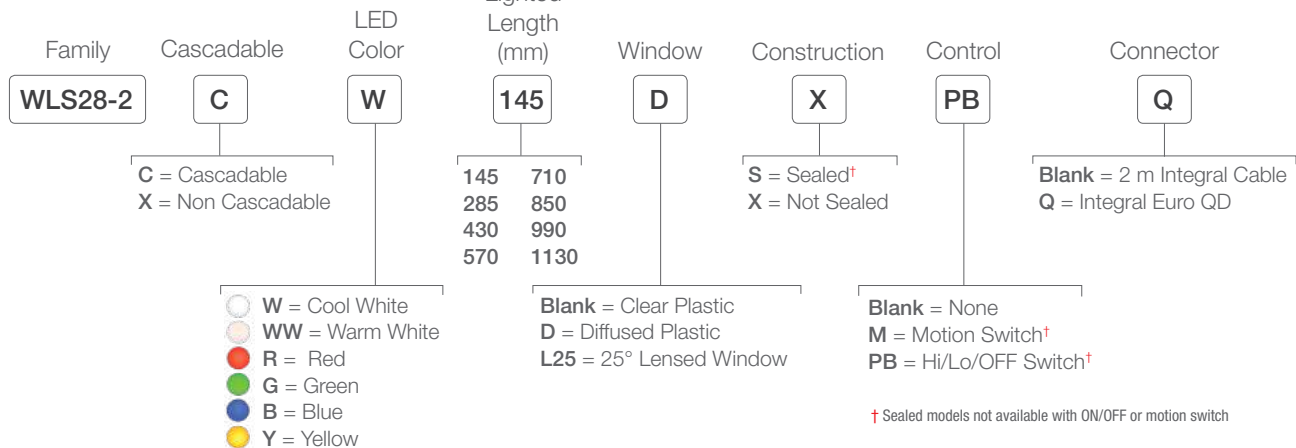
Dual-Color WLS28-2

Example Model Number: WLS28-2XWR2-285DXPBQ



1-Color WLS28-2

Example Model Number: WLS28-2CW145DXPBQ

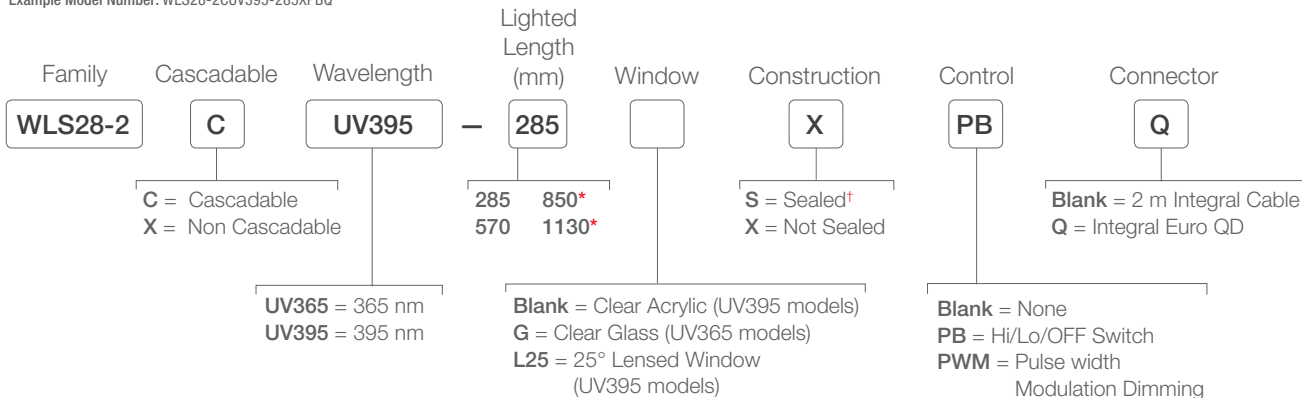


For more specifications see page 389.

Connection options: A model with a QD requires a mating cordset

UV WLS28-2

Example Model Number: WLS28-2CUV395-285XPBQ



* Not available in UV365 models

† Sealed models not available with ON/OFF Switch

For more specifications see page 389.

Connection options: A model with a QD requires a mating cordset

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)



4-Pin

MQDC-406	2 m (6.5')
MQDC-415	5 m (15')
MQDC-430	9 m (30')

Euro-Style QD Double-Ended



4-Pin Straight/Straight

MQDEC-401SS	0.31 m (1')
MQDEC-403SS	0.91 m (3')
MQDEC-406SS	2 m (6.5')
MQDEC-412SS	3 m (12')
MQDEC-420SS	6 m (20')
MQDEC-430SS	9 m (30')
MQDEC-450SS	15 m (50')

4-Pin Straight/Right-Angle

MQDEC-403RS	0.91 m (3')
MQDEC-406RS	2 m (6.5')
MQDEC-412RS	3 m (12')
MQDEC-420RS	6 m (20')
MQDEC-430RS	9 m (30')
MQDEC-450RS	15 m (50')

Euro-Style QD Splitter



Length

Branches	Trunk	4-Pin
0 m	0 m	CSB-M1240M1240
0.3 m	0 m	CSB-M1240M1241
0.3 m	0.3 m	CSB-M1241M1241
0.3 m	2.5 m	CSB-M1248M1241
0.3 m	4.6 m	CSB-M12415M1241
0.3 m	7.6 m	CSB-M12425M1241
0.3 m	7.6 m	CSB-UNT425M1241

Additional cordset information is available. See page 758



SMBWLS28RA



SMBWLS28SM



SMBWLSMAG
Set of magnets & screws



SMBWLSMAGR
Protective cover to prevent scratches to painted surface



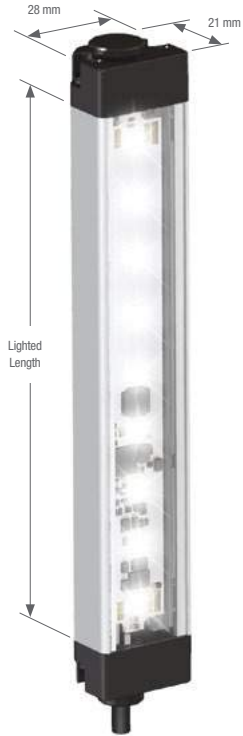
PSD-24-4
Class 2 Power Supply
Input: 90-264 V ac 1.5A
Output: 24 V dc 3.9A
2 m 4-Pin Euro



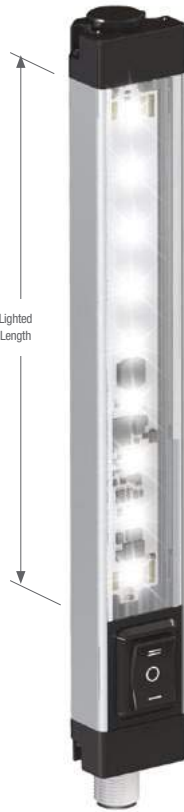
WLS28-2PBQ
In-Line Switch with M12 connector



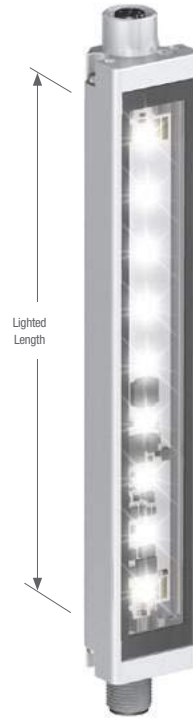
WLS28-2MQ
In-Line Motion Detection Switch with M12 connector



Stand Alone Cabled Models



Stand Alone Push Button QD Models



Sealed Cascadable Models








Lensed Cascade Models



Stand Alone Motion Detection QD Models

WLS28-2 Specifications

Supply Voltage and Current	12 to 30 V dc										
	Max. current per length: 1-Color WLS28-2 (for Dual-color models, contact factory)										
	Lighted Length					Lumens* (Typical @ 25° C)					
		12 V dc	24 V dc	30 V dc	Max. Current (A)	Cool White	Warm White	Green	Red	Yellow	Blue
	145 mm	0.33 A	0.15 A	0.12 A	0.4	325	325	180	55	50	40
	285 mm	0.66 A	0.30 A	0.24 A	0.8	650	650	360	110	100	80
	430 mm	1.01 A	0.46 A	0.36 A	1.2	975	975	540	165	150	120
	570 mm	1.36 A	0.61 A	0.48 A	1.6	1300	1300	720	220	200	160
	710 mm	1.75 A	0.77 A	0.60 A	2.0	1625	1625	900	275	250	200
	850 mm	2.13 A	0.92 A	0.73 A	2.4	1950	1950	1080	330	300	240
	990 mm	2.59 A	1.08 A	0.85 A	2.8	2275	2275	1260	385	350	280
	1130 mm	3.04 A	1.24 A	0.97 A	3.2	2600	2600	1440	440	400	320
* Lumen values are reduced by 25% on diffuse window models											
Light Characteristics	Color Temperature (CCT): 1-Color: Daylight White: 6,000–7,100 K Warm White: 2,850–3,250 K Dual-Color: Daylight White: 4,700–5,300 K Warm White: 2,850–3,250 K										
Construction	Clear anodized aluminum housing; painted zinc end caps; clear polycarbonate window; zinc plated steel brackets										
Mounting	(2) swivel brackets and (4) screws included										
Environmental Rating	IP50, IP67/IP69K										
Operating Conditions	Temperature: –40 to +70 °C Storage Temperature: –40 to +70 °C										
Application Notes	When connecting cascable lights in series it is important not to exceed maximum current limitations: Maximum length of light at 12 V dc = 1.5 m Maximum length of light at 24 V dc = 3.0 m Maximum length of light at 30 V dc = 3.1 m										
Certifications	    										



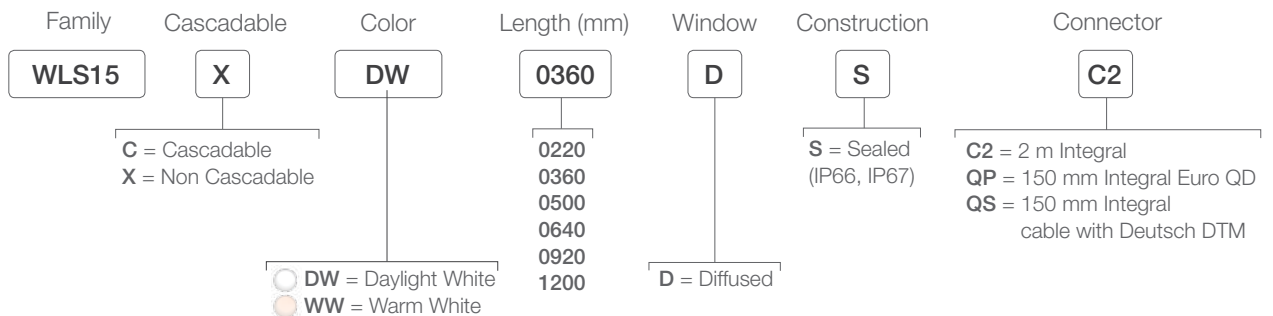
WLS15 Series

LED Strip Lights

- Low-profile space-saving design
- Rugged, water-resistant design
- Available in six lengths from 220 mm to 1200 mm
- Daisy chain power to multiple lights
- Optional snap clips for easy installation and repositioning
- Capability to dim lights using PWM input
- Operates on 12 V dc or 24 V dc in one model

WLS15

Example Model Number: WLS15XDW0360DSC2



 Connection options: A model with a QD requires a mating cordset

TOUCH BUTTONS

PICK-TO-LIGHT

Euro-Style
Straight connector models listed;
for right-angle, add **RA** to the end
of the model number (example,
MQDC-406RA)



4-Pin
MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Euro-Style QD Double-Ended



4-Pin Straight/Straight
MQDEC-401SS
0.31 m (1')
MQDEC-403SS
0.91 m (3')
MQDEC-406SS
2 m (6.5')
MQDEC-412SS
3 m (12')
MQDEC-420SS
6 m (20')
MQDEC-430SS
9 m (30')
MQDEC-450SS
15 m (50')

4-Pin Straight/Right-Angle
-
MQDEC-403RS
0.91 m (3')
MQDEC-406RS
2 m (6.5')
MQDEC-412RS
3 m (12')
MQDEC-420RS
6 m (20')
MQDEC-430RS
9 m (30')
MQDEC-450RS
15 m (50')



Euro-Style QD Splitter

Length	Length		4-Pin
	Branches	Trunk	
0 m	0 m	0 m	CSB-M1240M1240
0.3 m	0 m	0 m	CSB-M1240M1241
0.3 m	0.3 m	0.3 m	CSB-M1241M1241
0.3 m	0.3 m	2.5 m	CSB-M1248M1241
0.3 m	0.3 m	4.6 m	CSB-M12415M1241
0.3 m	0.3 m	7.6 m	CSB-M12425M1241
0.3 m	0.3 m	7.6 m	CSB-UNT425M1241

Additional cordset information is available.
See page 758



LMBWLS15



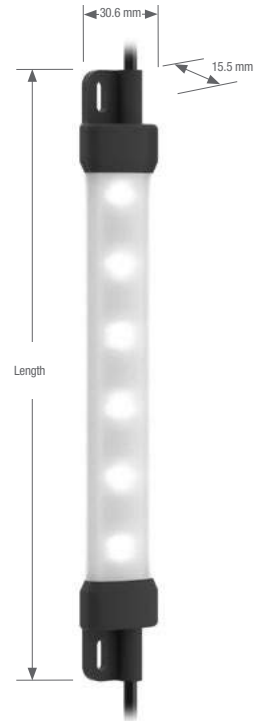
LMBWLS15-150S



LMBWLS15MAG

WLS15 Specifications

Supply Voltage and Current	12 V dc or 24 V dc nominal Absolute operational limits of 10 V dc to 15 V dc and 20 V dc to 27 V dc Use only with a suitable Class 2 power supply (UL) or a SELV power supply (CE) Light can be PWM dimmed between 25% to 100% with a frequency up to 1000 Hz						
	Light Length (mm)	Typical Current (A) at 25 °C		Maximum Current (A) at -40 °C		Lumens	
		12 V dc	24 V dc	12 V dc	24 V dc	Daylight White	Warm White
	0220	0.19	0.10	0.24	0.12	175	170
	0360	0.38	0.20	0.48	0.24	350	340
	0500	0.57	0.30	0.72	0.36	525	510
	0640	0.76	0.40	0.96	0.48	700	680
	0920	1.14	0.60	1.44	0.72	1050	1020
1200	1.52	0.80	1.92	0.96	1400	1360	
Light Characteristics	Color Temperature (CCT): Daylight white: 5,000 K Warm white: 3,000 K CRI: 80 minimum						
Construction	Clear anodized aluminum inner housing; Polycarbonate outer housing, Polyamide end caps						
Mounting	Integral mounting slots for M4 (#8) screws, tighten to 5 in·ibf max torque Multiple bracket options available						
Environmental Rating	Rated IEC IP66 and IEC IP67 Suitable for wet locations per UL 2108						
Operating Conditions	Temperature: -40 to +70 °C Storage Temperature: -40 to +70 °C						
Application Notes	When connecting cascable lights in series it is important not to exceed maximum current limitations: Maximum length of light at 12 V dc = 2.4 m Maximum length of light at 24 V dc = 6 m						
Certifications							



WLB32 Series

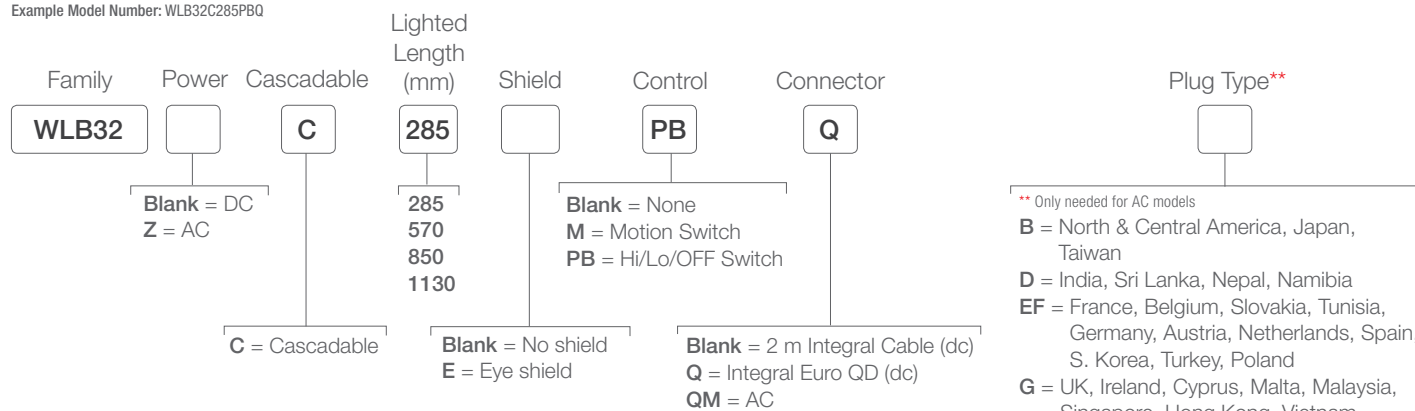
LED Light Bar



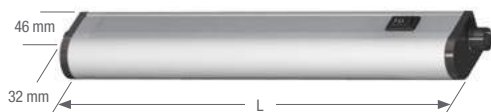
- Banner's WLB32 is an ultra-bright LED fixture that features an even light output for a no glare 'glow'
- Highly energy efficient for overall cost savings
- High/Low/OFF switch
- Daisy chain power to multiple lights
- Metal housing, shatterproof window
- Easy installation with snap clips, or a choice of magnetic or angle brackets

WLB32

Example Model Number: WLB32C285PBQ



 Connection options: A model with a QD requires a mating cordset



Length (L)	AC Models	DC Models
298 mm	WLB32ZC285PBQM	WLB32C285PBQ
580 mm	WLB32ZC570PBQM	WLB32C570PBQ
862 mm	WLB32ZC850PBQM	WLB32C850PBQ
1144 mm	WLB32ZC1130PBQM	WLB32C1130PBQ



Cordsets for DC Models

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)



4-Pin

- MQDC-406
2 m (6.5')
- MQDC-415
5 m (15')
- MQDC-430
9 m (30')

Cordsets for AC Models

Double-Ended

NEMA 5-15 grounded (IEC Type B)



- LQMAC-306B
2 m (6.5')

Euro-Style QD Double-Ended
For cascading



4-Pin Straight/Straight

- MQDEC-401SS
0.31 m (1')
- MQDEC-403SS
0.91 m (3')
- MQDEC-406SS
2 m (6.5')
- MQDEC-412SS
3 m (12')
- MQDEC-420SS
6 m (20')
- MQDEC-430SS
9 m (30')
- MQDEC-450SS
15 m (50')

4-Pin Straight/Right-Angle

- MQDEC-403RS
0.91 m (3')
- MQDEC-406RS
2 m (6.5')
- MQDEC-412RS
3 m (12')
- MQDEC-420RS
6 m (20')
- MQDEC-430RS
9 m (30')
- MQDEC-450RS
15 m (50')

Double-Ended For Cascading



Straight/Straight

- LQMAEC-3005SS
0.15 m (0.5')
- LQMAEC-301SS
0.31 m (1')
- LQMAEC-303SS
0.91 m (3')
- LQMAEC-306SS
2 m (6.5')
- LQMAEC-312SS
3 m (12')
- LQMAEC-320SS
6 m (20')
- LQMAEC-330SS
9 m (30')

Euro-Style QD Splitter



Length	Branches		Trunk
	0 m	0.3 m	
0.3 m	0 m	0 m	0 m
0.3 m	0.3 m	0.3 m	0.3 m
0.3 m	0.3 m	2.5 m	0.3 m
0.3 m	0.3 m	4.6 m	0.3 m
0.3 m	0.3 m	7.6 m	0.3 m
0.3 m	0.3 m	7.6 m	0.3 m

4-Pin

- CSB-M1240M1240
- CSB-M1240M1241
- CSB-M1241M1241
- CSB-M1248M1241
- CSB-M12415M1241
- CSB-M12425M1241
- CSB-UNT425M1241



LMBWLB32



LMBWLB32-180S



LMBWLB32MAG



LMBWLB32U



LMBWLB32UT

Additional cordset information is available. See page 758

WLB32 Specifications

Supply Voltage and Current	12 to 30 V dc 90 to 264 V ac								
	Lighted Length (mm)	Max Current Draw (A)		Typical Current Draw (A)					Lumens
DC		AC (at 90 V ac)	12 V DC	24 V DC	30 V DC	120 V ac	230 V ac		
285	0.8	0.125	0.66	0.31	0.24	0.075	0.045	650	
570	1.6	0.250	1.36	0.62	0.48	0.150	0.080	1300	
850	2.4	0.375	2.19	0.93	0.72	0.225	0.115	1950	
1130	3.2	0.500	3.02	1.24	0.96	0.300	0.150	2600	
Light Characteristics	Color: Daylight white Color temperature (CCT): 5000K (±300K)								
Useful Life	Lumen Maintenance - L70 When operating within specifications, output will decrease less than 30% after 50,000 hours.								
Push Button	II = 100% intensity I = 50% intensity 0 = Off								
Construction	Anodized aluminum housing; polycarbonate window and end caps; stainless steel mounting brackets								
Mounting	Snap clips; magnetic mount or swivel bracket accessories available								
Environmental Rating	IEC IP50								
Operating Conditions	DC models: -40 C to 70 °C AC models: -25 to 45 °C								
Certifications									

WLB92 Series

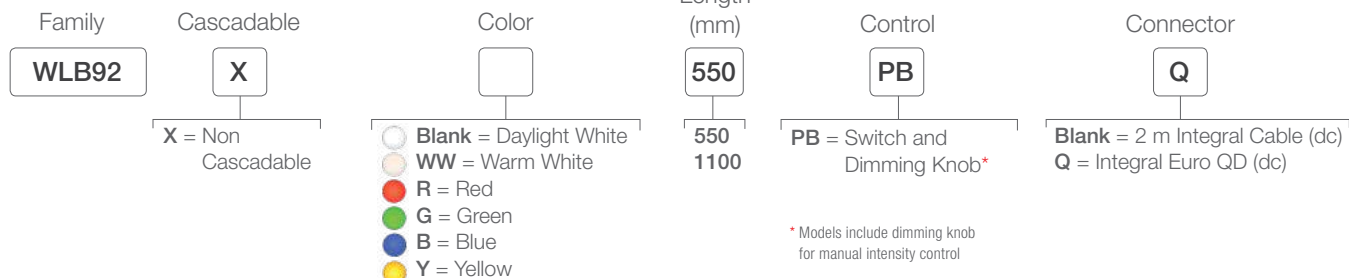
LED Light Bar



- Increase worker productivity and ergonomics with bright, high-quality, uniform light
- Durable light stands up in your environment with a rugged metal housing and shatterproof light cover
- No maintenance time or cost with long-life, energy-efficient LEDs
- Flexibility to place light where needed with ac and dc models
- Easy installation with variety of mounting options: surface, swivel, snap and hanging brackets
- AC models are DLC certified and have a five year warranty
- Dimmable models available see page 408

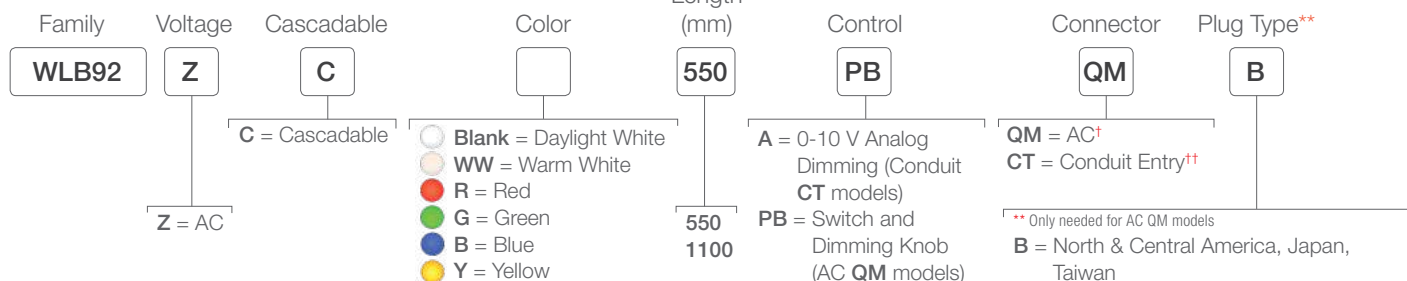
WLB92, 24 V DC

Example Model Number: WLB92X550PBQ



WLB92, 100-277 V AC

Example Model Number: WLB92ZC550PBQMB



† Models with a connector include ON/OFF switch as well as a dimming knob for intensity control

†† Conduit entry models include dimmability via a 0 to 10 V input circuit

** Only needed for AC QM models

B = North & Central America, Japan, Taiwan
D = India, Sri Lanka, Nepal, Namibia
EF = France, Belgium, Slovakia, Tunisia, Germany, Austria, Netherlands, Spain, S. Korea, Turkey, Poland
G = UK, Ireland, Cyprus, Malta, Malaysia, Singapore, Hong Kong, Vietnam
I = Australia, New Zealand, Papua New Guinea, Argentina, China
N = Brazil, South Africa
C = AC connector with flying leads
Blank = AC (no power cord)

Connection options: A model with a QD requires a mating cordset

Cordsets for DC Models

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)



4-Pin
MQDC-406
 2 m (6.5')
MQDC-415
 5 m (15')
MQDC-430
 9 m (30')

Additional cordset information is available. See page 758

Cordsets for AC Models

Double-Ended
 For Cascading



Straight/Straight
LQMAEC-3005SS
 0.15 m (0.5')
LQMAEC-301SS
 0.31 m (1')
LQMAEC-303SS
 0.91 m (3')
LQMAEC-306SS
 2 m (6.5')
LQMAEC-312SS
 3 m (12')
LQMAEC-320SS
 6 m (20')
LQMAEC-330SS
 9 m (30')

Double-Ended
 NEMA 5-15 grounded
 (IEC Type B)



LQMAC-306B
 2 m (6.5')



LMBWL B92



LMBWL B92CLIP



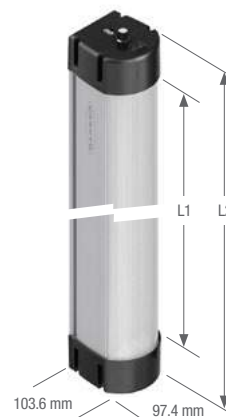
LMBWL B92HK5



LMBWL B92S



LMBWL B92RAS



Length (L1)	Length (L2)	Model
543 mm	665 mm	WLB92...550..
1098 mm	1220 mm	WLB92...1100..

WLB92 Specifications

Supply Voltage and Current	24 V dc +/- 10% 100 to 277 V ac						
	Lighted Length (mm)	Max Current Draw (A)		Typical Current Draw (A)			Lumens
		DC	AC (at 90 V ac)	24 V DC	120 V ac	230 V ac	
550	1.75 A	0.425 A	1.45 A	0.295 A	0.160 A	0.145 A	3130
1100	3.5 A	0.850 A	2.9 A	0.590 A	0.310 A	0.260 A	6500
Light Characteristics	Color: Daylight white Color temperature (CCT): 5000K (±300K)			Color: Warm white Color temperature (CCT): 3,000 K			
Useful Life	Lumen Maintenance - L70 When operating within specifications, output will decrease less than 30% after 50,000 hours.						
Construction	Anodized aluminum housing; polycarbonate window and end caps						
Mounting	Several options available; see above and datasheet						
Environmental Rating	IEC IP40						
Operating Conditions	See datasheet						
Certifications	AC daylight white models only						

WLS27 Series

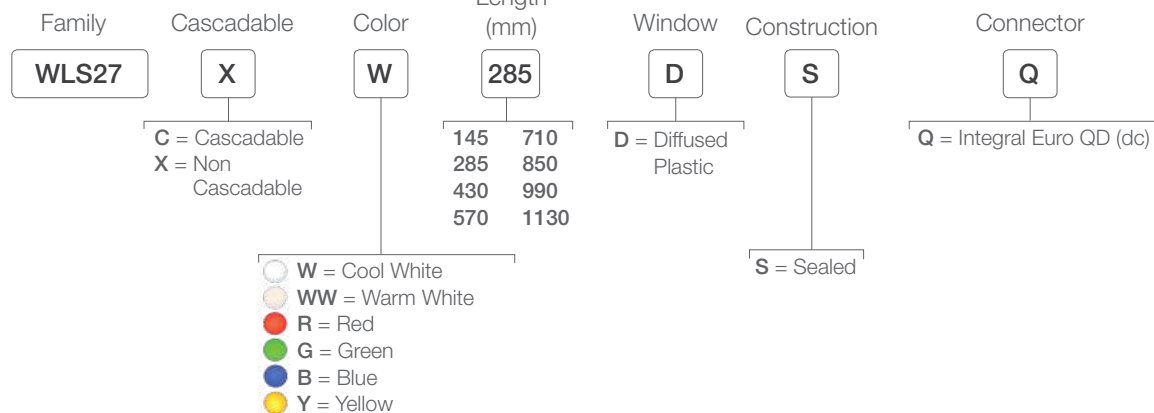
LED Light Bar



- Sturdy internal aluminum housings, encased in shatterproof, UV-stabilized, copolyester shells
- Round shape makes them suitable for laminar airflow applications
- Rugged, water-resistant IP66, IP67 and IP69K design
- Daisy chain power to multiple lights
- Capability to dim lights using the wiring pinout (Hi/Lo/Off)
- Automatic temperature protection built into the unit extends the product life
- Single- and dual-colored models available
- Dimmable models available see page 408

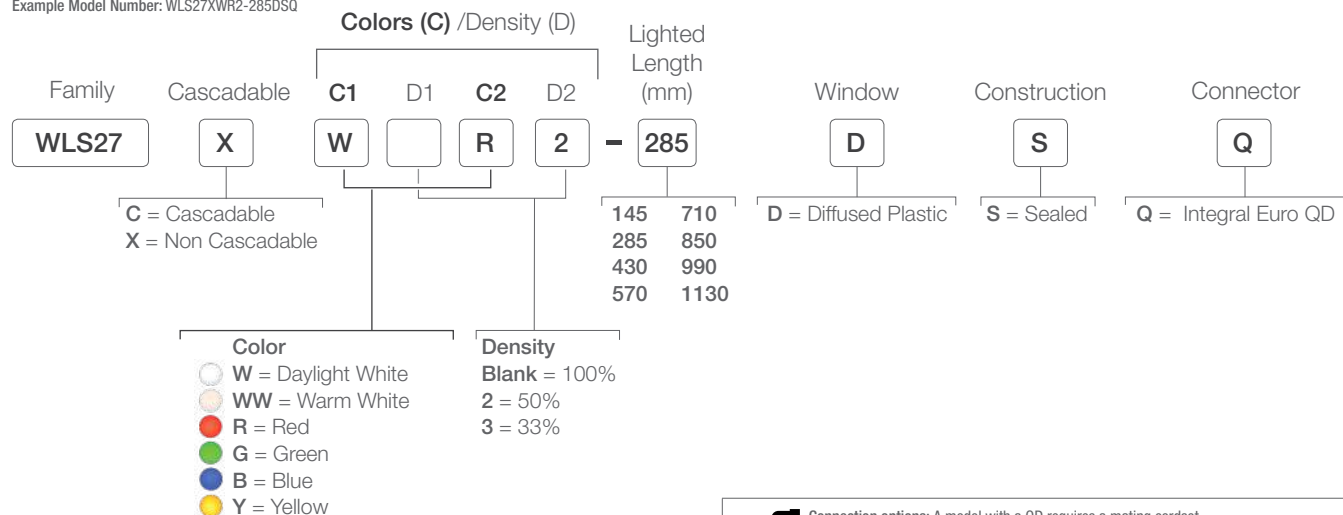
WLS27

Example Model Number: WLS27XW285DSPWMQ



Dual-Color WLS27

Example Model Number: WLS27XWR2-285DSQ



Connection options: A model with a QD requires a mating cordset

Standard

Euro-Style
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)



4-Pin
MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Euro-Style QD Double-Ended



4-Pin Straight/Straight
MQDEC-401SS
0.3 m (1')
MQDEC-403SS
1 m (3')
MQDEC-406SS
2 m (6.5')



Euro-Style QD Splitter

Length	Length		4-Pin
	Branches	Trunk	
0.3 m	0.3 m		CSB-M1241M1241

IP69K Washdown

M12 Euro-Style Washdown Cordset
Straight connector models only



4-Pin
MQDC-WDSS-0406
2 m (6.5')
MQDC-WDSS-0415
5 m (15')
MQDC-WDSS-0430
9 m (30')

Euro-Style QD Double-Ended Washdown



4-Pin Straight/Straight
MQDEC-WDSS-401SS
0.3 m (1')
MQDEC-WDSS-403SS
1 m (3')
MQDEC-WDSS-406SS
2 m (6.5')

Additional cordset information is available. See page 758



WLS28-2PBQ
In-Line Switch with M12 connector



WLS28-2MQ
In-Line Motion Detection Switch with M12 connector



LMBWLS27EC



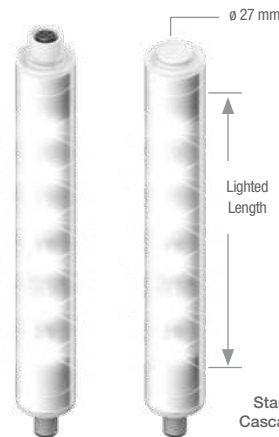
LMBWLS27H



LMBWLS27U



LMBWLS27SP



First or Middle of Cascade

Stand-Alone or Cascade End Light

Length (mm)	One-Color WLS27 Lumens (Typical @ 25 °C)						Typical Wattage* (Watts)
	Cool White	Warm White	Red	Green	Blue	Yellow	
145	325	325	55	180	40	50	3.6
285	650	650	110	360	80	100	7.2
430	975	975	165	540	120	150	11.0
570	1300	1300	220	720	160	200	14.6
710	1625	1625	275	900	200	250	18.5
850	1950	1950	330	1080	240	300	22.1
990	2275	2275	385	1260	280	350	25.9
1130	2600	2600	440	1440	320	400	29.8

*Typical operating wattage is measured at 24 V dc

WLS27 Specifications

Supply Voltage and Current	12 to 30 V dc									
	Lighted Length (mm)	Typical Current Draw (A)			Max. Current (A)	Lighted Length (mm)	Typical Current Draw (A)			Max. Current (A)
		12 V dc	24 V dc	30 V dc			12 V dc	24 V dc	30 V dc	
	145	0.33 A	0.15 A	0.12 A	0.4	710	1.75 A	0.77 A	0.60 A	2.0
	285	0.66 A	0.30 A	0.24 A	0.8	850	2.13 A	0.92 A	0.73 A	2.4
	430	1.01 A	0.46 A	0.36 A	1.2	990	2.59 A	1.08 A	0.85 A	2.8
	570	1.36 A	0.61 A	0.48 A	1.6	1130	3.04 A	1.24 A	0.97 A	3.2
Light Characteristics	Color: Cool white Color temperature (CCT): 6000–7100K									
Useful Life	Lumen Maintenance - L70 When operating within specifications, output will decrease less than 30% after 50,000 hours.									
Construction	Clear anodized aluminum housing; FDA-grade copolyester outer housing									
Mounting	Bracket LMBWLS27EC included (2 for lights up to 570 mm or 3 for lights 710 mm and longer); see datasheet for additional options									
Environmental Rating	IEC IP66, IP67, and IP69K, per DIN 40050									
Operating Conditions	–40 to +70 °C									
Certifications										

WLC60 Series

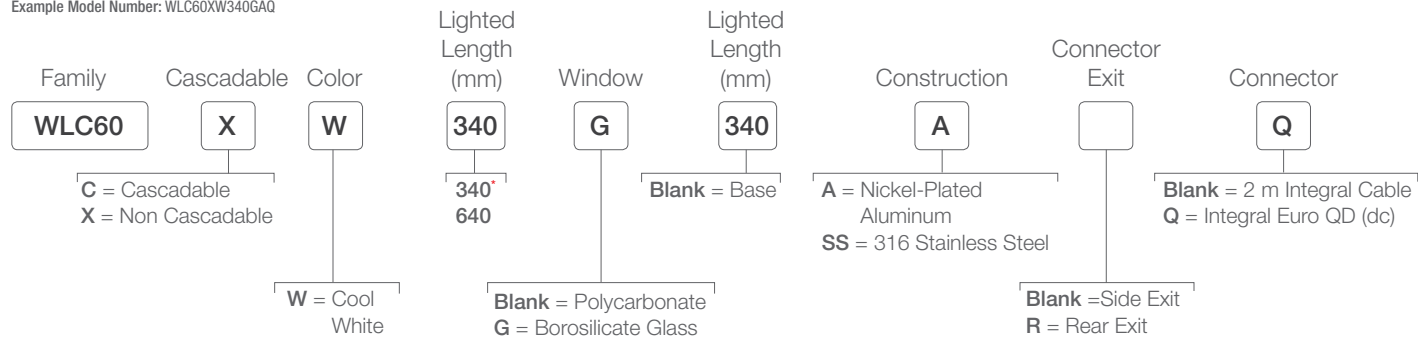
Heavy-Duty LED Light



- LED technology delivers best in class brightness
- Oil, chemical and water resistant with IP67, IP68g and IP69K ratings
- High brightness paired with advanced glare-reducing optics
- Easy to install with a wide variety of mounting solutions
- Highly resistant to vibration and shock
- All models have three discrete intensity level settings
- Dimmable models available see page 409

WLC60

Example Model Number: WLC60XW340GAQ



* Flush mount, rear exit, and stainless steel options are only available in 340 mm length

Connection options: A model with a QD requires a mating cordset

Standard

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)



4-Pin

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Euro-Style QD
Double-Ended



4-Pin
Straight/Straight

MQDEC-401SS-PUR
0.3 m (1')
MQDEC-403SS-PUR
1 m (3')
MQDEC-406SS-PUR
2 m (6.5')

IP69K
Washdown

M12 Euro-Style Washdown Cordset
Straight connector models only



4-Pin

MQDC-WDSS-0406
2 m (6.5')
MQDC-WDSS-0415
5 m (15')
MQDC-WDSS-0430
9 m (30')

Additional cordset information is available.
See page 758



LMBWLC60F



LMBWLC60RA



LMBWLC60RA

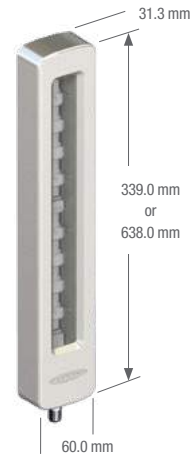


LMBWLC60MAG



PSD-24-4

Class 2 Power Supply
Input: 90-264 V ac 1.5A
Output: 24 V dc 3.9A
2 m 4-Pin Euro



Base Mount

WLC60 Specifications

Supply Voltage and Current	12 to 30 V dc Max. current per length:					
	Light Length	12 V dc	24 V dc	30 V dc	Watts	Lumens (Typical @ 25° C) Cool White
	340 mm	1.4 A	0.7 A	0.56 A	16.8	1300
	640 mm	3.1 A	1.53 A	1.22 A	37.2	2600
Light Characteristics	Color: Cool white Color temperature (CCT): 6,000–7,100K					
Construction	Nickel plated aluminum or 316 stainless steel housing, polycarbonate or borosilicate glass window					
Environmental Rating	IEC IP67/IP68g / IP69K per DIN 40050					
Connections	Integral 4-pin Euro style QD or 2 m integral cable, depending on model. QD cordsets are ordered separately.					
Operating Conditions	Temperature: Max intensity -40 to +50 °C Dim settings -40 to +70 °C Storage Temperature: -40 to +70 °C					
Application Notes	When connecting cascadable lights in series, it is important not to exceed the maximum current limitation of 4 Amps. See datasheet for more information.					
Certifications						

WLC90 Series

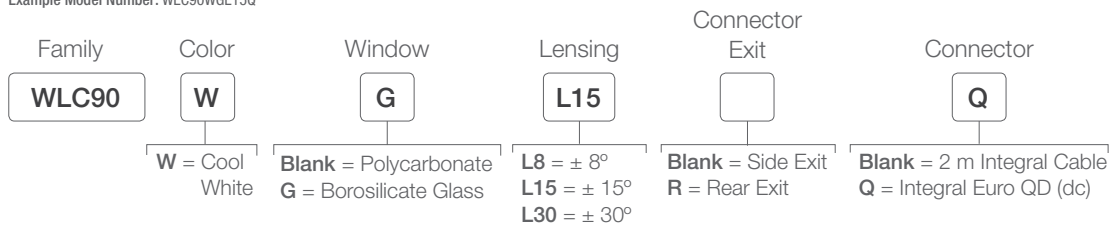
Heavy-Duty LED Light



- Rugged housing resists water, coolants, oils and detergent with IP67, IP68g and IP69K and ratings
- Wide operating temperature range with an internal monitoring circuit that will dim the LEDs to a safe level at extreme temperatures
- Three lens options to suit many application needs
- Pan and tilt brackets for versatile mounting to direct light in any direction
- All models have three discrete intensity level settings
- Dimmable models available see page 409

WLC90

Example Model Number: WLC90WGL15Q



Connection options: A model with a QD requires a mating cordset

Standard



4-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

- MQDC-406**
2 m (6.5')
- MQDC-415**
5 m (15')
- MQDC-430**
9 m (30')

IP69K Washdown



4-Pin

M12 Euro-Style
Washdown cordset straight connector models only

- MQDC-WDSS-0406**
2 m (6.5')
- MQDC-WDSS-0415**
5 m (15')
- MQDC-WDSS-0430**
9 m (30')

Additional cordset information is available. See page 758



LMBWLC90PT



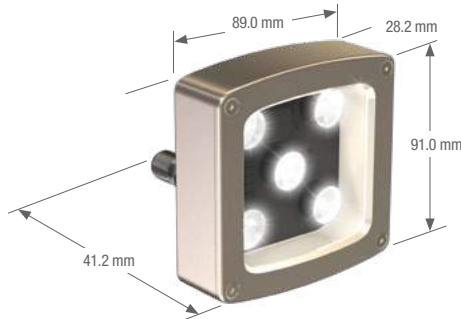
SMBAMS70AS



PSD-24-4
Class 2 Power Supply
Input: 90-264 V ac 1.5A
Output: 24 V dc 3.9A
2 m 4-Pin Euro



Side Exit



Rear Exit

WLC90 Specifications

Supply Voltage and Current	12 to 30 V dc Max. current: 850 mA at 12 V dc 410 mA at 24 V dc 330 mA at 30 V dc Max. input power: 10.2 Watts
Light Characteristics	Color: Cool white Color temperature (CCT): 6,000–7,100K
Construction	Nickel plated aluminum housing, polycarbonate or borosilicate glass window
Environmental Rating	IEC IP67/IP68g / IP69K per DIN 40050
Operating Conditions	Temperature: Max intensity –40 to +70 °C Storage Temperature: –40 to +70 °C
Certifications	

WLA Series

LED Area Light



- Up to 2200 lumens for extremely bright illumination
- Encapsulated models available for enhanced resistance to chemicals, vibration and shock
- Choice of clear or diffuse window for reduced glare
- Optical lensed options create more focused illumination
- Rugged housing rated to IP69K for high-pressure, high-temperature washdown applications
- Dimmable models available see page 409

WLA

Example Model Number: WLAW105X180DL11Q



* Encapsulated models only available in cool white with no lens

 Connection options: A model with a QD requires a mating cordset

Standard



4-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

- MQDC-406**
2 m (6.5')
- MQDC-415**
5 m (15')
- MQDC-430**
9 m (30')

IP69K Washdown



4-Pin

M12 Euro-Style
Washdown Cordset
Straight connector models only

- MQDC-WDSS-0406**
2 m (6.5')
- MQDC-WDSS-0415**
5 m (15')
- MQDC-WDSS-0430**
9 m (30')

Additional cordset information is available. See page 758



SMBBSSM



SMBBSRA



SMBWLAMAG
Set of four magnets & screws



PSD-24-4
Class 2 Power Supply
Input: 90-264 V ac 1.5A
Output: 24 V dc 3.9A
2 m 4-Pin Euro



WLA Specifications

Supply Voltage and Current	12 to 30 V dc (10% max. ripple) Max. current per length:									
						Lumens* (Typical @ 25° C)				
Size	12 V dc	24 V dc	30 V dc	Watts	Cool White	Warm White	Green	Red	Yellow	Blue
WLAW105X180	0.8A	0.5A	0.32A	9.6	550	435	325	125	275	95
WLAW190X180	1.6A	0.8A	0.64A	19.2	1100	870	650	250	550	190
WLAW275X180	2.4A	1.2A	0.96A	28.8	1650	1305	975	375	825	285
WLAW360X180	3.2A	1.6A	1.28A	38.4	2200	1740	1300	500	1100	380
* Diffuse models have 35% less Lumens										
Light Characteristics	Color Temperature (CCT): Cool White: 6,000-7,100K, Warm White: 2,800-3,200K									
Construction	PBT housing; acrylic window, nickel-plated brass connector									
Environmental Rating	IP69K and IP67									
Operating Conditions	Temperature: -20 to +50 °C Relative Humidity: 95% (non-condensing) Storage Temperature: -40 to +70 °C									

Certifications



WL50S Series

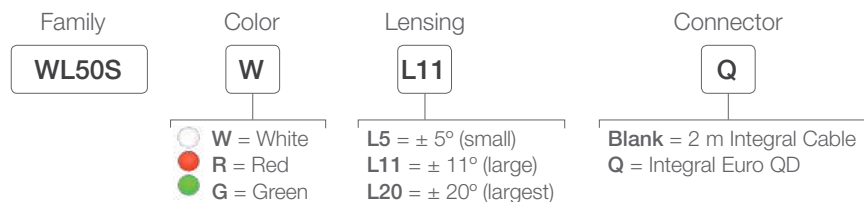
LED Spot Work Light



- Three lens options to suit many application needs
- Rugged, sealed housing rated to IP69K
- 50 mm diameter with flat profile and 30 mm mounting base
- Stainless steel version with FDA-grade silicone gasket and Viton® O-Ring seal
- Many bracket options for simple mounting and alignment
- Dimmable models available contact factory

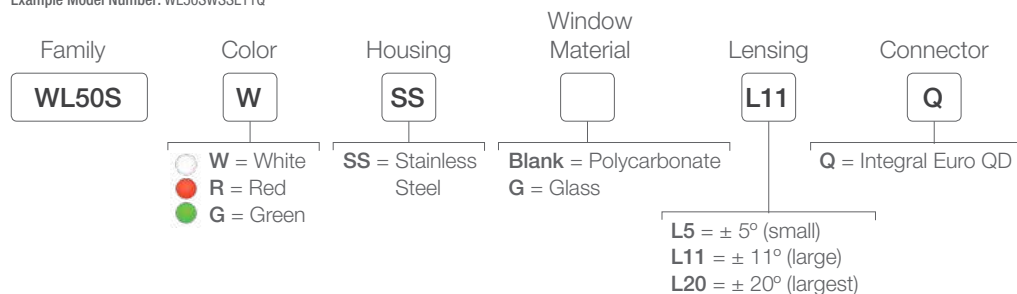
WLS50

Example Model Number: WL50SWL11Q



WLS50, Stainless Steel

Example Model Number: WL50SWSSL11Q



Connection options: A model with a QD requires a mating cordset



4-Pin

Euro-Style
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

- MQDC-406**
2 m (6.5')
- MQDC-415**
5 m (15')
- MQDC-430**
9 m (30')



5-Pin

Euro-Style
Stainless steel for washdown. Straight connector models only

- MQDCWD-506**
2 m (6.5')
- MQDCWD-530**
9 m (30')

Additional cordset information is available
See page 758.



SMB30A



SMB30SC

Additional bracket information is available
See page 727.



FLX18

Additional flex arm information is available
See page 410



WL50S



WL50S Stainless Steel

WL50S Specifications

Supply Voltage and Current	12 to 30 V dc, 400 mA max.				
Light Characteristics (Aluminum and Stainless Steel models)	Lens Angle	Model	LED Color	Window Material	Lumens* (Typical @ 25° C)
	±5° (smaller, more focused spot)	WL50SWL5Q	White	Polycarbonate	295
		WL50SRL5Q	Red	Polycarbonate	110
		WL50SGL5Q	Green	Polycarbonate	210
	±11° (larger spot)	WL50SWL11Q	White	Polycarbonate	285
		WL50SRL11Q	Red	Polycarbonate	105
		WL50SGL11Q	Green	Polycarbonate	200
	±20° (largest spot)	WL50SWL20Q	White	Polycarbonate	270
		WL50SRL20Q	Red	Polycarbonate	100
		WL50SGL20Q	Green	Polycarbonate	190
Color Temperature (CCT): White: 5,000-8,300 K					
Supply Protection Circuitry	Protected against reverse polarity and transient voltages				
Construction	WL50S..: Black anodized aluminum housing; polycarbonate window; nickel-plated QD connector or PVC-jacketed cable; black zinc-plated steel mounting nut WL50SS..: 316 stainless steel housing, polycarbonate or glass window with Viton seal, 316 stainless steel M30 mounting nut, FDA grade silicone base gasket				
Useful Life	When operating within specifications, output will decrease less than 30% after 50,000 hours				
Environmental Rating	IEC IP67, IP69K per DIN 40050-9				
Operating Conditions	Temperature: -20 to +50 °C Relative Humidity: 95% (non-condensing) Storage Temperature: -40 to +70 °C				
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration, half sine wave.				
Certification					

WL50 Series

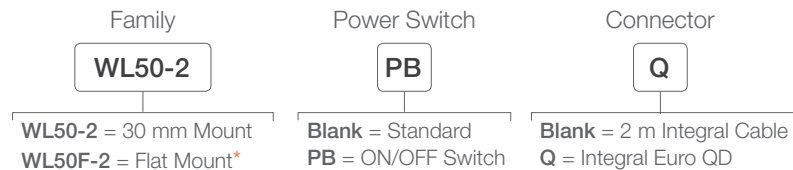
LED Work Light



- Low power consumption
- Aesthetic shape that sheds debris and moisture
- Rugged, water-resistant IP69K models
- VELCRO® brand VELCOIN® fasteners included for quick mounting and convenient repositioning of light
- Long-lasting LED technology for zero maintenance after installation
- Dimmable models available contact factory

WL50-2

Example Model Number: WL50-2Q



 Connection options: A model with a QD requires a mating cordset

For 9 m cable, add suffix W/30 to 2 m model number (example, WL50F W/30).

QD models: For a 4-pin 150 mm Euro-style pigtail QD, add suffix QP to 2 m model number (example, WL50FQP).

* Flat-mount models include a 48 mm circular Velcro® mounting kit for easy mounting.

Euro-Style

Straight connector models listed;
for right-angle, add **RA** to the end
of the model number (example,
MQDC-406RA)

**4-Pin**

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')




**FLX18**

Additional flex arm
information is available
See page 410

Additional cordset information is available
See page 758.



WL50-2 Specifications

Supply Voltage	12 to 30 V dc Max. current: 233 mA @ 12 V dc; 110 mA @ 24 V DC, 90 mA @ 30 V dc Max. input power: 2.8 watts
Light Characteristics	Color temperature (CCT): 6,000 to 7,100 K Color: Cool white Lumens: 185
Power-up Response Time	Light ON: 1 millisecond max. (models without push button)
Construction	Polycarbonate housing; Nickel-plated QD connector or PVC-jacketed cable
Environmental Rating	Standard models: IP67, IP69K per DIN 40050 Push button models: IEC IP67
Operating Conditions	Temperature: -40° to +50° C Relative Humidity: 95% (non-condensing) Storage Temperature: -40° to +70° C
Application Note	Push button models: When power is initially applied to the device, or following a power interruption and the light is off, push the push button to turn the light on.
Certification	  

LC65P1T

LED Dimming Controller



The LED Pulse-Width Modulation (PWM) Dimming Controller allows an operator to dim an LED light source without loss of accuracy.

- Paired with Banner's LED lighting helps further increase energy savings, helping to reduce overall energy costs
- Ability to dim light at an operator station
- Works with special models of the strip lights, heavy-duty lights, area lights, spot lights and work lights
- Allows for control of multiple lights with one module
- Compact and easy to install
- Model keys below configured for use with Dimming Controller (LC65P1T ordered separately)

WLS27 LED Strip Light

Family	Cascadable	Color	Lighted Length (mm)	Window	Construction	Intensity Control	Connector
WLS27	X	W	285	D	S	PWM	Q
	C = Cascadable X = Non Cascadable	W = Daylight White	145 710 285 850 430 990 570 1130	D = Diffused Plastic	S = Sealed	PWM = Dimmable via Pulse Width Modulation	Q = Integral Euro QD



page 396

WLS28-2 LED Strip Lights

Family	Cascadable	LED Color	Lighted Length (mm)	Window	Construction	Intensity Control	Connector
WLS28-2	C	W	145		X	PWM	Q
	C = Cascadable X = Non Cascadable	W = Cool White	145 570 990 285 710 430 850	Blank = Clear Plastic D = Diffused Plastic L25 = 25° Lensed Window	S = Sealed X = Not Sealed	PWM Dimming	Blank = 2 m Integral Cable Q = Integral Euro QD



page 386

WLB92 Light Bar

Family	Cascadable	Color	Lighted Length (mm)	Control	Connector
WLB92	X		550	PWM	Q
	X = Non Cascadable	Blank = Daylight White	550 1100	PWM = Dimmable via Pulse Width Modulation	Blank = 2 m Integral Cable (dc) Q = Integral Euro QD (dc)

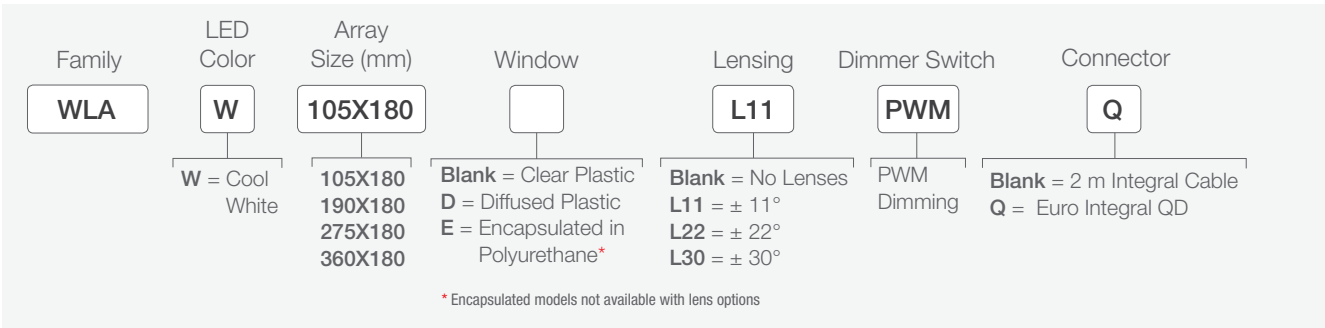


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WLA LED Area Lights



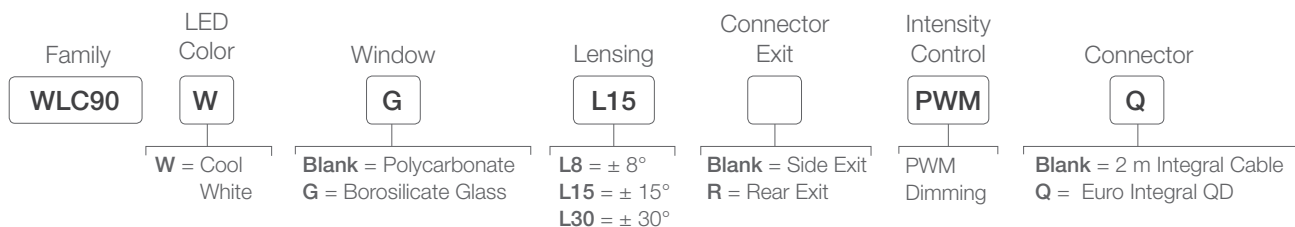
page 402



WLC90 Heavy-Duty LED Light



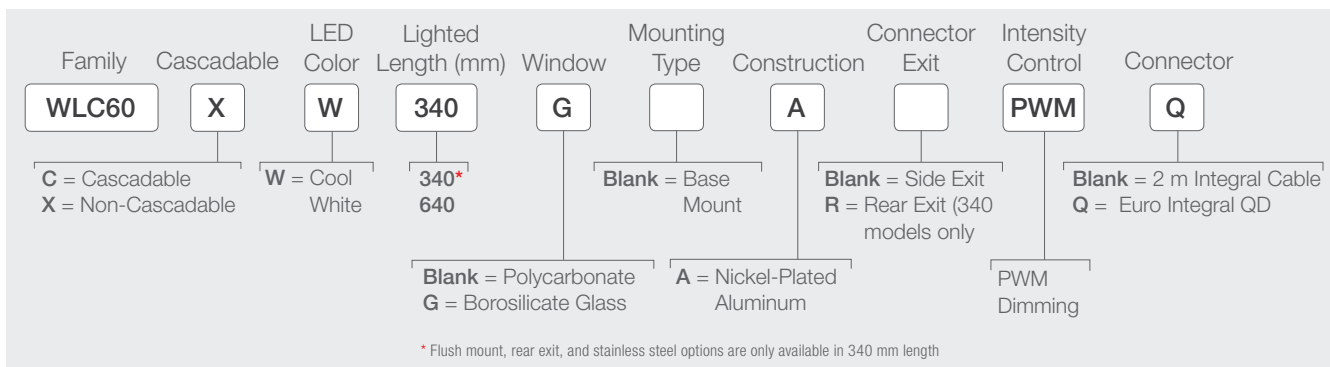
page 400



WLC60 Heavy-Duty LED Light



page 398



page 404



page 406

WL50S and WL50-2 also have the PWM option available. Contact factory for more information

Connection options: A model with a QD requires a mating cordset

Flex Arm

For Work Lights



Banner's Flex Arm Mounting Accessories provide versatile mounting options to easily direct lighting where it is needed, whether in a work station or along a manufacturing line. The Flex Arm is available for use with spot lights, work lights and vision spot lights.

- Versatile mounting options including magnetic mount, clamp mount and flange mount
- Vinyl coated to protect against moisture
- Adjustable arm allows for easy repositioning of light to suit many application needs
- Concentrate light exactly where needed
- Portability with magnetic and clamp mount options



Models	Base Connection	Light Connection	Brackets		
FLX18-1212	 1/2-14 NPSM	 1/2-14 NPSM (Male) Use with: WL50-2 WL50-2PB	 SMB22	 SMBFLXMAG	 LMB12RA
FLX18-F12	 3-Hole Flange	 1/2-14 NPSM (Male) Use with: WL50-2 WL50-2PB	Direct Mount		
FLX18-12M30	 1/2-14 NPSM	 M30 x 1.5 (Female) Use with: WL50-2 WL50-2PB WL50S	 SMB22	 SMBFLXMAG	 LMBE12RA
FLX18-DM30	 2 x 1/4-20W 1.375 spacing	 M30 x 1.5 (Female) Use with: WL50-2 WL50-2PB WL50S	 SMBFLXCLAMPD	 SMBFLXMAGD	
FLX18-FM30	 3-Hole Flange	 M30 x 1.5 (Female) Use with: WL50-2 WL50-2PB WL50S	Direct Mount		



Tower Lights

Banner's Tower Lights are designed to be exceptionally bright with a long, visible indication range, providing excellent operational status for workers and supervisors. Several models are available for use in a variety of environments, including options with audible alerts.

Series	Description	Number of Segments	Brightness	Dimensions	Power Supply	Communication
	TL70 Designed to be exceptionally bright with a long, visible indication range, providing excellent operational status for workers and supervisors. page 414	1 to 6	High-Brightness	30 mm base Height varies by model	DC or AC models available	Wireless option
	TL50 Designed to be exceptionally bright with a long, visible indication range, providing excellent operational status for workers and supervisors. page 418	1 to 7	Standard or High-Brightness	30 mm base Height varies by model	DC or AC models available	IO-Link option
	TL50C Compact design makes them ideal for status indication on small to mid-size pieces of equipment. page 422	1 to 7	Standard	30 mm base Height varies by model	DC or AC models available	NA
	TL50BL Extremely rugged and built for use in the toughest industrial environments. With a sleek and stylish design, the TL50 Beacon's housing is UV stabilized, making it suitable for use in outdoor environments. page 426	1 to 5	Daylight Visible	30 mm base Height varies by model	DC or AC models available	NA
	CL50 Illumination provides easy-to-see operator guidance and equipment status indication for workers and supervisors. page 430	1	Standard	30 mm base Height varies by model	DC or AC models available	NA

TL70 Series

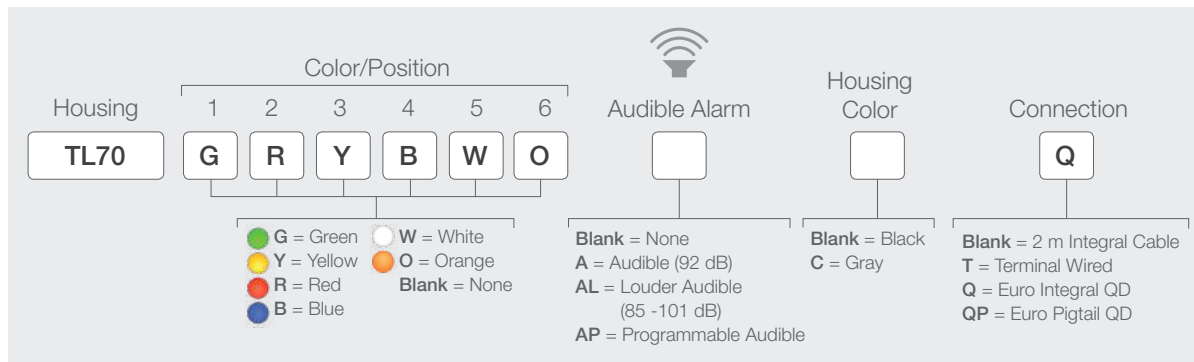
Tower Lights



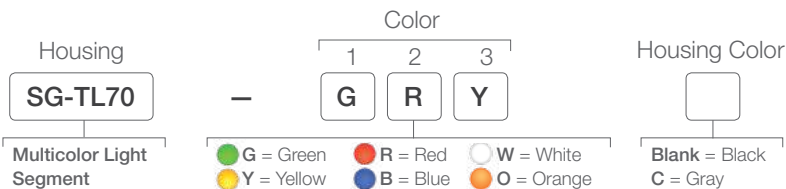
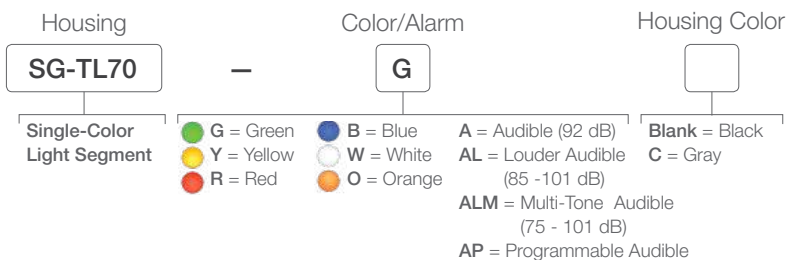
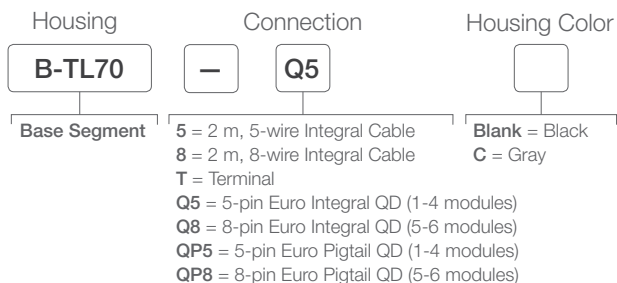
- Light segments have user-selectable solid ON or flashing
- Up to light segments (six color options) or five segments plus an audible in one device
- Rugged, water-resistant IP65 housing with UV stabilized material
- Bright, uniform indicator segments appear gray when off to eliminate false indication from ambient light
- Cordsets and brackets see page 432

LASER MARKING AVAILABLE

Preassembled TL70 DC Tower Lights



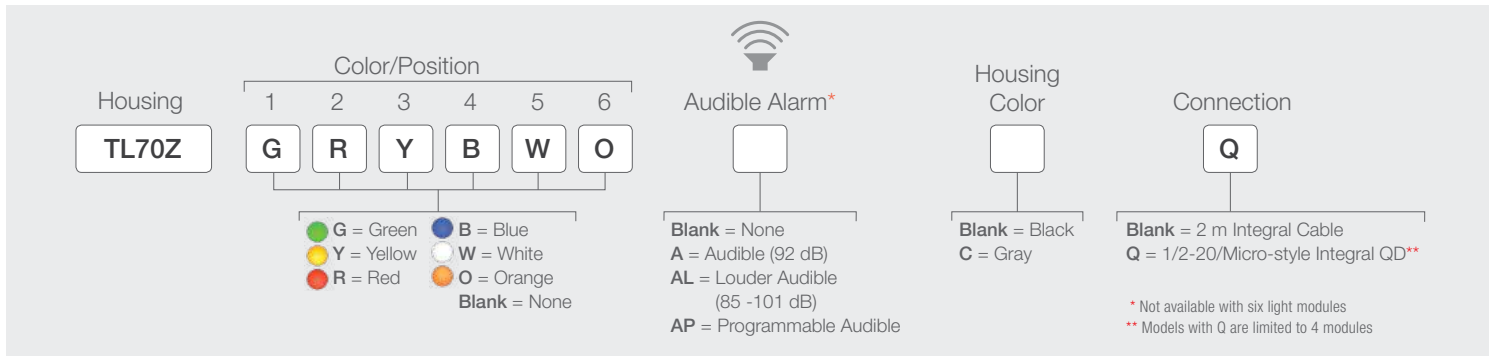
Build Your Own TL70 DC Tower Lights



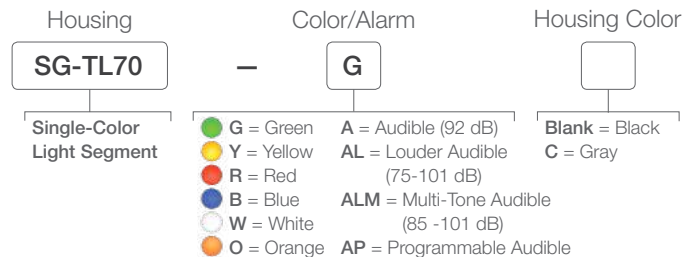
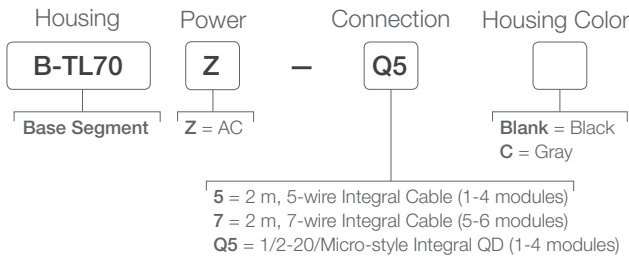
For more specifications see page 417.

Connection options: A model with a QD requires a mating cordset (see page 432).

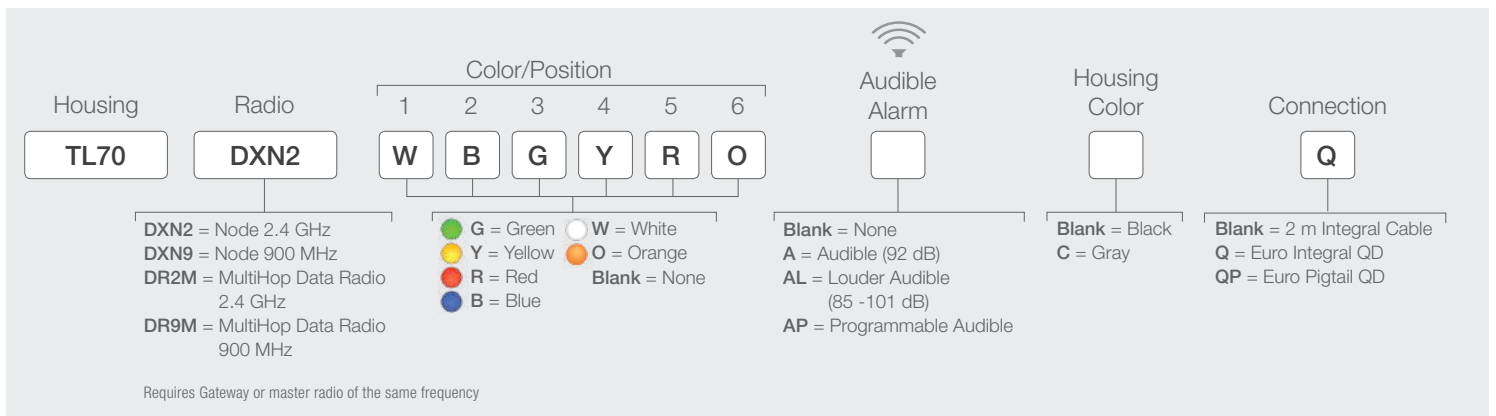
Preassembled TL70 AC Tower Lights



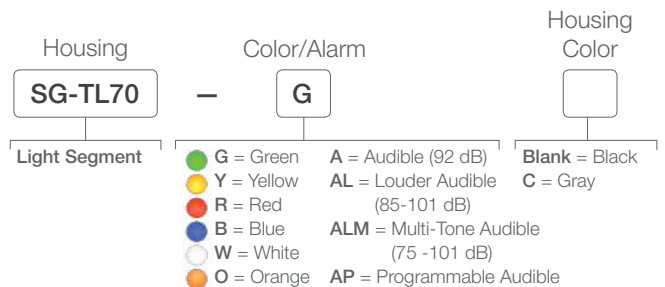
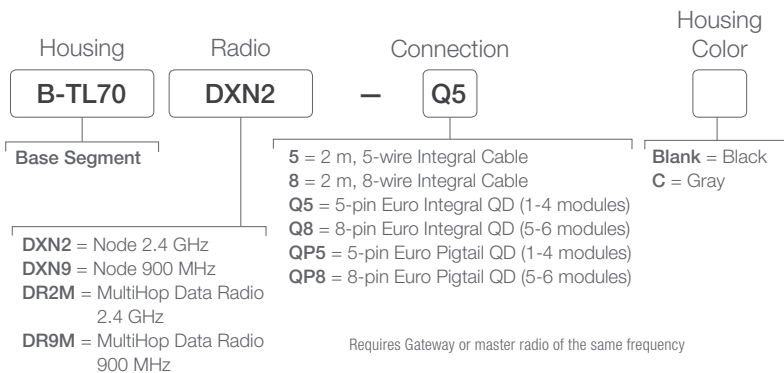
Build Your Own TL70 AC Tower Lights



Preassembled TL70 Wireless Tower Lights



Build Your Own TL70 Wireless Tower Lights



For more specifications see page 417.

Connection options: A model with a QD requires a mating cordset (see page 432).

Building a Tower Light

www.bannerengineering.com/towerlights

Choose Type

1



Standard dc, Wireless, or ac

Audible or No Audible

2



Sealed Omni-Directional Audible

Number of Lighting Segments

3



Position 6 (Light or Audible)

Position 5

Position 4

Position 3

Position 2

Position 1

Base

Connections

4



Integral QD



Euro Pigtail



Integral Cable



Terminal Wired

Housing Color

5







TL70

Color Count	AC Tower Height (H)	AC Tower Height with Audible (H)	DC Tower Height (H)	DC Tower Height with Audible (H)
1	155.6 mm	212.3 mm	87.6 mm	144.3 mm
2	205.3 mm	262.0 mm	137.3 mm	194.0 mm
3	255.0 mm	311.7 mm	187.0 mm	243.7 mm
4	304.7 mm	361.4 mm	236.7 mm	293.4 mm
5	354.4 mm	411.1 mm	286.4 mm	343.1 mm
6	404.1 mm	NA	336.1 mm	NA

TL70 Specifications

Supply Voltage and Current	12 to 30 V dc Indicators—Maximum current per LED color: Blue, Green, White: 420 mA at 12 V dc; 145 mA at 30 V dc Red, Yellow, Orange: 285 mA at 12 V dc; 120 mA at 30 V dc Audible: Standard: 30 mA at 12 to 30 V dc Loud: 350 mA at 12 V dc; 110 mA at 30 V dc Multitone: 270 mA at 12 V dc; 110 mA at 30 V dc Programmable: 250 mA at 12 V dc; 110 mA at 30 V dc	100 to 240 V ac; 50/60 Hz Maximum current per color or audible module: 70 mA at 120 V ac and 60 Hz 50 mA at 230 V ac and 50 Hz
Supply Protection Circuitry	Protected against reverse polarity and transient voltages	
Indicator Response Time	DC models: OFF Response: 150 μ s (maximum) at 12 to 30 V dc ON Response: 180 ms (maximum) at 12 V dc; 50 ms (maximum) at 30 V dc	AC models: OFF Response: 150 μ s (maximum) at 12 to 30 V dc ON Response: 180 ms (maximum) at 12 V dc; 50 ms (maximum) at 30 V dc
Audible Alarm	2.6 KHz \pm 250 Hz oscillation frequency; maximum intensity 92 dB at 1 m (3.3 ft) (typical)	
Audible Adjustments	Rotate the cover until the desired volume is reached Change in sound intensity from fully open to fully closed is 8 dB	
Radio Range* (Wireless Models)	900 MHz, 1 Watt (Internal antenna): Up to 3.2 km (2 miles) 2.4 GHz, 65 mW (Internal antenna): Up to 1000 m (3280 ft) with line of sight	
Minimum Separation Distance (Wireless Models)	900 MHz, 1 Watt: 4.57 m (15 ft) 2.4 GHz, 65 mW: 0.3 m (1 ft)	
Construction	Bases, segments and Covers: Polycarbonate	
Environmental Rating	IEC IP65	
Operating Conditions	-40 to +50 °C Relative Humidity: 95% @ 50 °C (non-condensing) Storage Temperature: -40 to +70 °C	
Certifications	 	

* Radio range significantly decreases without line of sight. Always verify your wireless network's range by running a site survey.

TL50 Series

Tower Lights



- Exceptionally bright with a long, visible indication range
- Install quickly and easily with no assembly required
- Clearly evident on/off status
- Versatile mounting options
- Compact, sleek, rugged design with IP67 models available
- Audible alert: continuous, pulsed and staccato models available
- Models available with IO-Link communication
- Cordsets and brackets see page 432

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TL50 Tower Light



For more specifications see page 421.

Connection options: A model with a QD requires a mating cordset (see page 432).



All models available in black or gray

TL50

Color Count	Tower Height (H) General-Purpose IP67	Tower Height (H) Audible† IP50	Tower Height (H) Sealed Audible IP67	Tower Height (H) Sealed Omni-Directional IP67	Tower Height (H) AC
0	—	92.0 mm	74.4 mm	88.4 mm	Add 69 mm to any of these heights to get total height
1	61.2 mm	92.0 mm	115.1 mm	129.1 mm	
2	101.9 mm	132.7 mm	155.8 mm	169.8 mm	
3	142.6 mm	173.4 mm	196.5 mm	210.5 mm	
4	183.3 mm	214.1 mm	237.2 mm	—	
5	224.0 mm	254.8 mm	277.9 mm	291.1 mm	—
6	264.7 mm	298.5 mm	318.6 mm	332.6 mm	
7	305.4 mm	—	—	—	—

† Tower height (H) with top unscrewed approximately 3.5 mm to allow sound to escape.



Audible
max. intensity 92 db
@ 1 meter (typical)



Sealed Audible
max. intensity 94 db
@ 1 meter (typical)



Sealed Omni-Directional Audible
max. intensity 99 db
@ 1 meter (typical)

Sure Cross® Wireless I/O & EZ-LIGHT® Indicators Machine monitoring enables an entirely new category of applications and machine diagnostics free from wired limitation. Contact factory for information.



Building a Tower Light

www.bannerengineering.com/towerlights

Choose Type


1



Standard
High Intensity
Daylight Visible
Standard with IO-Link

Audible or No Audible

2



Audible
max. intensity 92 db @ 1 meter (typical)

Sealed Audible
max. intensity 94 db @ 1 meter (typical)

Sealed Omnidirectional Audible
max. intensity 99 db @ 1 meter (typical)

Lighting Options/Function

3



Position 7 (not available with audible)

Position 6

Position 5

Position 4

Position 3

Position 2

Position 1

Base

Color availability varies between models

Connections

4




Integral QD Euro Pigtail Integral Cable

Housing Color

5

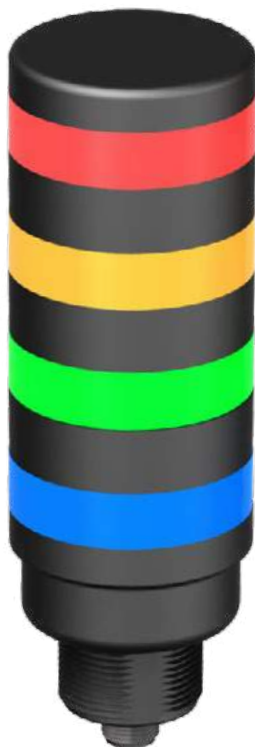


TL50 Specifications

Supply Voltage and Current	<p>DC models: 18 to 30 V dc (10% max. ripple); or 21 to 27 V ac</p> <p>Standard Brightness: Indicators: 45 mA max. current per LED color Standard Audible Alarm (IP50): @ 25 mA max. current Sealed Audible Alarm (IP67): 35 mA max. current Omni-Directional Sealed Audible Alarm: 45 mA max. current</p> <p>High Brightness: max. current per LED color: Indicators: 18 V dc—100 mA; 30 V dc—60 mA; 21 V ac—80 mA; 27 V ac—70 mA Standard Audible (IP50): 25 mA max. current Sealed Audible Alarm (IP67): 35 mA max. current</p> <p>Audible only: @ 45mA max.</p> <p>AC models: 100 to 240 V ac; 50 or 60 Hz</p>
Indicators	LEDs are independently selected— Green, Yellow, Red, Blue, White, Turquoise, Orange, Violet, Sky Blue or Magenta; 1-7 colors depending on model
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Input Response Time	<p>Indicators ON/OFF (dc): 10 milliseconds (max.) Indicators ON/OFF (ac): 500 milliseconds (max.)</p>
Audible Alarm	<p>Audible measurements are made in the direction sound exits the device. For standard audible models, this is the top of the unit (when mounted vertically, sound is directed toward the ceiling). For sealed audible models (IP67), sound exits the vented openings in the side of the unit, which should be oriented so that the sound is directed toward the machine operator(s). In environments with high ambient noise levels or high ceilings that absorb sound, the sealed version is recommended.</p> <p>Standard Audible Alarm: 2.7 KHz ± 500 Hz oscillation frequency; max. intensity 92 db @ 1 meter (typical) Sealed Audible Alarm: 29 KHz to 250 Hz oscillation frequency; max. intensity 94 db @ 1 meter (typical) Omni-Directional Sealed Audible Alarm with Intensity Adjustment: 2.1 KHz ± 250 Hz oscillation frequency; max intensity 95 dB at 1 meter (3.3 ft) (typical)</p>
Audible Adjustments	<p>Standard Audible Alarm: Unscrew the cover (up to 1.5 turns max.) to adjust the audible intensity. (Do not exceed 1.5 turns or the cover may detach during operation.) For max. intensity, rotate the center plug 180° counterclockwise to remove it. Sealed Audible Alarm and Omni-Directional Sealed Audible Alarm with Intensity Adjustment: Rotate the front cover until the desired intensity is reached.</p>
Construction	<p>Bases and Covers: ABS Light Segment: Polycarbonate</p>
Environmental Rating	<p>General-Purpose: IEC IP67 Audible: IEC IP50 or IEC IP67, depending on model</p>
Operating Conditions	<p>General-Purpose: -40 to +50 °C Audible: -20 to +50 °C Relative Humidity: 95% @ 50 °C (non-condensing) Storage Temperature: -40 to +70 °C</p>
Certifications	

TL50C Series

Compact Tower Lights



- Displays up to seven colors in one tower
- Half the height of standard TL50 models
- Bright, uniform lighted segments with 10 color choices available
- Available with standard, sealed or Omni-Directional audible
- Compact, sleek, rugged design with IP67 models available
- DC models work down to 12 volts, allowing for use in battery-powered mobile equipment
- Audible alert: continuous, pulsed and staccato models available
- Cordsets and brackets see page 432

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TL50C Compact Tower Light



For more specifications see page 425.

Connection options: A model with a QD requires a mating cordset (see page 432).



All models available in black or gray

TL50C

Color Count	Tower Height (H) General-Purpose IP67	Tower Height (H) Audible† IP50	Tower Height (H) Sealed Audible IP67	Tower Height (H) Sealed Omni-Directional IP67	Tower Height (H) AC
1	46.2 mm	77.1 mm	100.2 mm	114.2 mm	Add 69 mm to any of these heights to get total height
2	72.0 mm	102.9 mm	126.0 mm	140.0 mm	
3	97.8 mm	128.7 mm	151.8 mm	165.8 mm	
4	123.6 mm	154.5 mm	177.6 mm	191.6 mm	
5	149.4 mm	180.3 mm	203.4 mm	217.4 mm	
6	175.2 mm	206.1 mm	229.2 mm	243.4 mm	—
7	201.0 mm	—	—	—	—

† Tower height (H) with top unscrewed approximately 3.5 mm to allow sound to escape.

Audible Types



Audible
max. intensity 92 db
@ 1 meter (typical)



Sealed Audible
max. intensity 94 db
@ 1 meter (typical)



Sealed Omni-Directional Audible
max. intensity 99 db
@ 1 meter (typical)

Building a Tower Light

www.bannerengineering.com/towerlights

Choose Type

1



Compact

Audible or No Audible

2



Audible
max. intensity 92 db @ 1 meter (typical)



Sealed Audible
max. intensity 94 db @ 1 meter (typical)



Sealed Omni-Directional Audible
max. intensity 99 db @ 1 meter (typical)

Lighting Options/Function

3



Position 7 (not available with audible)

Position 6

Position 5

Position 4

Position 3

Position 2

Position 1

Base



Color availability varies between models

Connections

4



Integral QD



Euro Pigtail





Integral Cable

Housing Color

5



TL50C Specifications

Supply Voltage and Current	<p>DC models: 12 to 30 V dc; or 21 to 27 V ac</p> <p>Indicators: Max. current per LED color: at 12 V: 135 mA at 24 V: 55 mA at 30 V: 45 mA</p> <p>Standard Audible Alarm: 25 mA max. current Sealed Audible Alarm: 35 mA max. current Omni-Directional Sealed Audible Alarm: 45 mA max. current</p>
Indicators	LEDs are independently selected, 1 to 7 colors depending on model
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Input Response Time	<p>Indicators ON/OFF (dc): 10 milliseconds (max.) Indicators ON/OFF (ac): 500 milliseconds (max.)</p>
Audible Adjustments	<p>Standard Audible Alarm: Unscrew the cover (up to 1.5 turns max.) to adjust the audible intensity. (Do not exceed 1.5 turns or the cover may detach during operation.) For max. intensity, rotate the center plug 180° counterclockwise to remove it.</p> <p>Sealed Audible Alarm and Omni-Directional Sealed Audible Alarm with Intensity Adjustment: Rotate the front cover until the desired intensity is reached.</p> <p>Omni-Directional Sealed Audible Alarm: No adjustment</p>
Construction	Bases and Covers: ABS Light Segment: Polycarbonate
Environmental Rating	<p>Non-Audible and Sealed Audible: IEC IP67 Standard Audible: IEC IP50</p>
Operating Conditions	<p>General-Purpose: -40 to +50 °C Audible: -20 to +50 °C Relative Humidity: 95% @ 50 °C (non-condensing) Storage Temperature: -40 to +70 °C</p>
Certifications	 

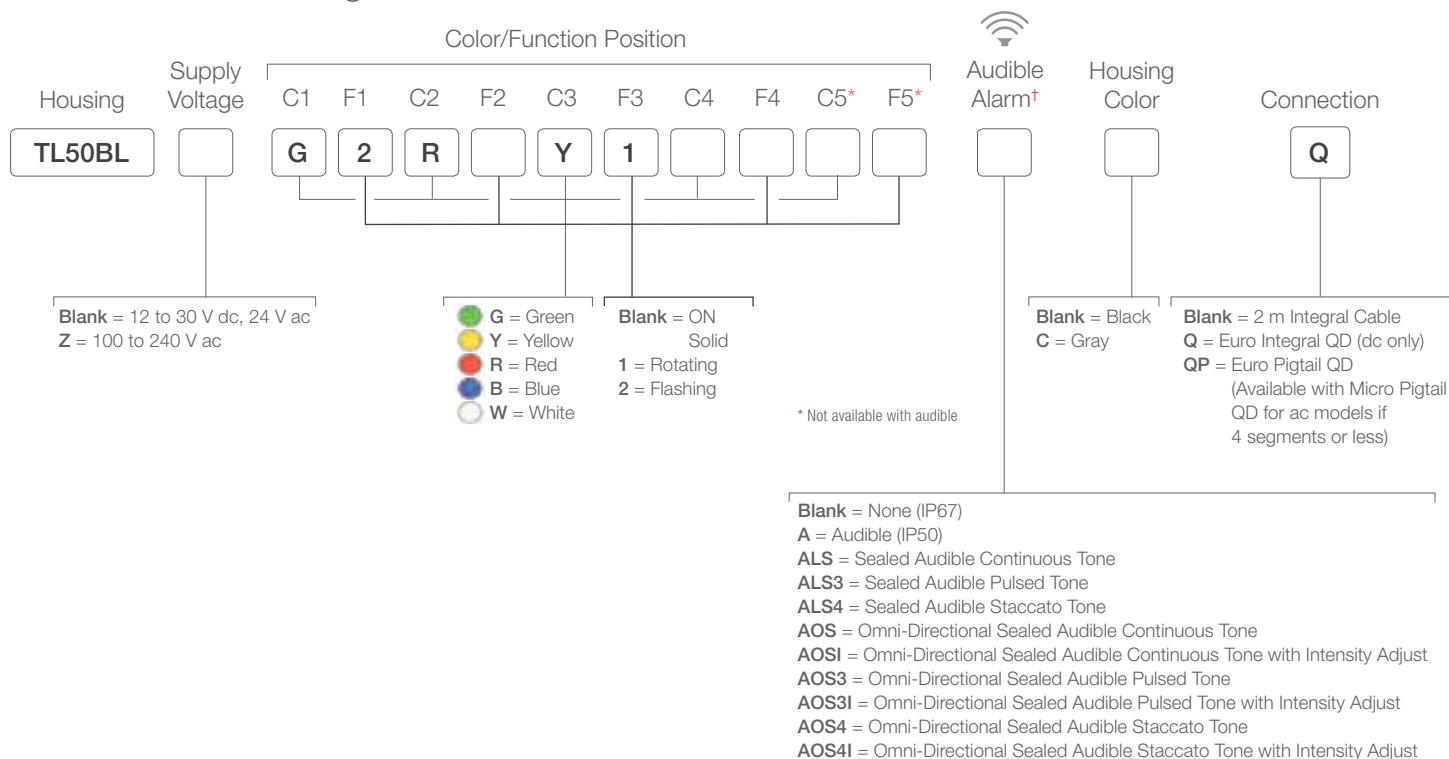
TL50BL Series

Beacon Tower Lights



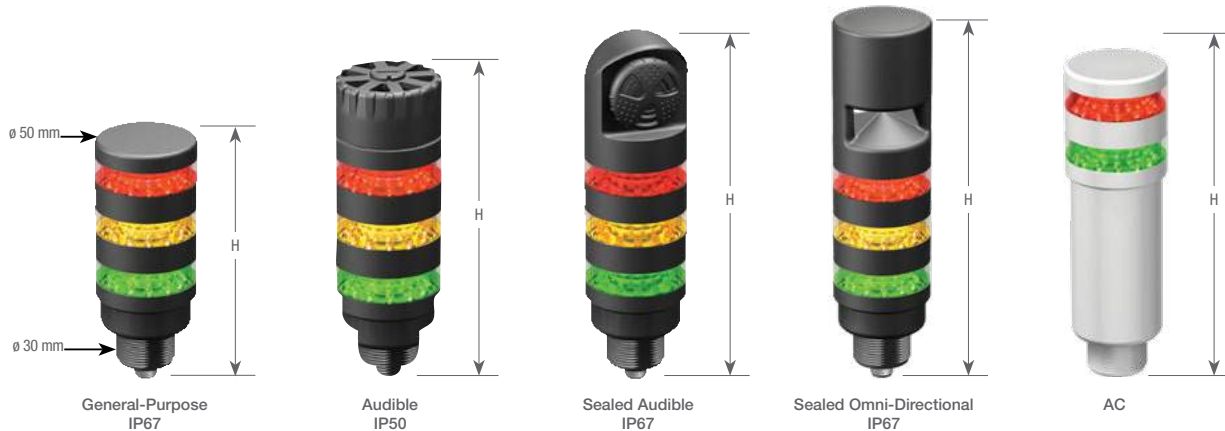
- Highly visible indication for indoor or outdoor applications
- Compact, stylish design with rotating and flashing options
- Audible alert: continuous, pulsed and staccato models available
- Omni-Directional audible models provide clear annunciation in the noisiest environments
- Models available with rugged, water-resistant IP67 housing
- Cordsets and brackets see page 432

TL50BL Beacon Tower Light



For more specifications see page 430.

Connection options: A model with a QD requires a mating cordset (see page 432).



All models available in black or gray

TL50BL

Color Count	Tower Height (H) General-Purpose IP67	Tower Height (H) Audible [†] IP50	Tower Height (H) Sealed Audible IP67	Tower Height (H) Sealed Omni-Directional IP67	Tower Height (H) AC
1	46.2 mm	77.1 mm	100.2 mm	129.1 mm	Add 69 mm to any of these heights to get total height
2	72.0 mm	102.9 mm	126.0 mm	169.8 mm	
3	97.8 mm	128.7 mm	151.8 mm	210.5 mm	
4	123.6 mm	154.5 mm	177.6 mm	—	
5	149.4 mm	—	—	—	

[†] Tower height (H) with top unscrewed approximately 3.5 mm to allow sound to escape.

Audible Types



Audible
max. intensity 92 db
@ 1 meter (typical)



Sealed Audible
max. intensity 94 db
@ 1 meter (typical)



Sealed Omni-Directional Audible
max. intensity 99 db
@ 1 meter (typical)

Building a Tower Light

www.bannerengineering.com/towerlights

Choose Type


1




Daylight Visible

Audible or No Audible


2



Audible
max. intensity 92 db
@ 1 meter (typical)



Sealed Audible
max. intensity 94 db
@ 1 meter (typical)



Sealed Omni-Directional Audible
max. intensity 99 db
@ 1 meter (typical)

Lighting Options/
Function

3



Position 5 (not available with audible)

Position 4

Position 3

Position 2

Position 1

Base



Connections

4



Integral QD



Euro Pigtail




Integral Cable

Housing Color

5




TL50 Beacon Specifications

Supply Voltage and Current	<p>DC models: 12 to 30 V dc (10% max. ripple); or 21 to 27 V ac</p> <p>Indicators — max. current per LED color:</p> <ul style="list-style-type: none"> @ 12 V dc: 125 mA @ 30 V dc: 60 mA @ 21 V ac: 80 mA @ 27 V ac: 70 mA <p>Standard Audible Alarm: 25 mA max. current Sealed Audible Alarm: 35 mA max. current AC models: 100 to 240 V ac</p>
Indicators	1-5 colors depending on model; Green, Red, Yellow, Blue and White LEDs are independently selected
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Input Response Time	<p>Indicators ON/OFF (dc): 1 milliseconds (max.) Indicators ON/OFF (ac): 500 milliseconds (max.)</p>
Audible Alarm	<p>Audible measurements are made in the direction sound exits the device. For standard audible models, this is the top of the unit (when mounted vertically, sound is directed toward the ceiling). For sealed audible models, sound exits the vented openings in the side of the unit, which should be oriented so that the sound is directed toward the machine operator(s). In environments with high ambient noise levels or high ceilings that absorb sound, the sealed version is recommended.</p> <p>Standard Audible Alarm: 2.7 KHz ± 500 Hz oscillation frequency; max. intensity 92 db @ 1 meter (typical) Sealed Audible Alarm: 2.9 KHz ± 250 Hz oscillation frequency; max. intensity 94 db @ 1 meter (typical)</p>
Audible Adjustments	<p>Standard Audible Alarm: Unscrew the cover (up to 1.5 turns max.) to adjust the audible intensity. (Do not exceed 1.5 turns or the cover may detach during operation.) For max. intensity, rotate the center plug 180° counterclockwise to remove it.</p> <p>Sealed Audible Alarm and Omni-Directional Sealed Audible Alarm with Intensity Adjustment: Rotate the front cover until the desired intensity is reached.</p>
Construction	<p>Bases and Covers: ABS Light Segment: Polycarbonate</p>
Environmental Rating	<p>Standard Audible: IEC IP50 Non Audible and Sealed Audible: IEC IP67</p>
Operating Conditions	<p>Temperature:</p> <ul style="list-style-type: none"> General-Purpose: -40 to +50 °C Standard and Sealed Audible: -20 to +50 °C <p>Max. Rel. Humidity: 95% @ 50 °C (non-condensing) Storage Temperature: -40 to +70 °C</p>
Certifications	

CL50 Series

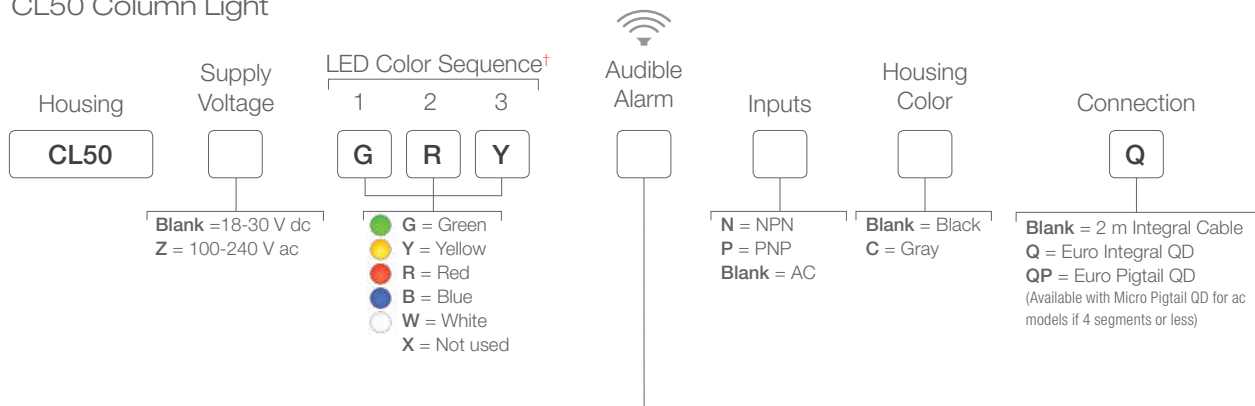
Column Lights



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- Up to three colors in one device for multiple status indication
- Ideal for machine process status indication and visual guidance
- Install quickly and easily, no tools required
- Large surface area can be easily seen from long distances
- Audible models available with standard or sealed audible element
- Cordsets and brackets see page 432

CL50 Column Light



Audible
max. intensity 92 db
@ 1 meter (typical)



Sealed Audible
max. intensity 94 db
@ 1 meter (typical)



Sealed Omni-Directional Audible
max. intensity 99 db
@ 1 meter (typical)

Blank = None (IP67)
A = Audible (IP50)
ALS = Sealed Audible Continuous Tone
ALS3 = Sealed Audible Pulsed Tone
ALS4 = Sealed Audible Staccato Tone
AOS = Omni-Directional Sealed Audible Continuous Tone
AOSI = Omni-Directional Sealed Audible Continuous Tone with Intensity Adjust
AOS3 = Omni-Directional Sealed Audible Pulsed Tone
AOS3I = Omni-Directional Sealed Audible Pulsed Tone with Intensity Adjust
AOS4 = Omni-Directional Sealed Audible Staccato Tone
AOS4I = Omni-Directional Sealed Audible Staccato Tone with Intensity Adjust

Connection options: A model with a QD requires a mating cordset (see page 432).

† Contact factory for other colors and color combinations



All models available in black or gray

CL50 Specifications

Supply Voltage and Current	18 to 30 V dc (10% max. ripple) 100 mA max. current @ 18 V dc; 70 mA max. current @ 30 V dc Standard Audible Alarm: 25 mA max. current Sealed Audible Alarm: 35 mA max. current Omni-Directional Sealed Audible Alarm: 45 mA max. current AC models: 100 to 240 V ac
Indicators	Green, Red, Yellow, Blue and White; 1-3 colors, depending on model LEDs or audible alarm are independently selected
Supply Protection Circuitry	Protected against reverse polarity and transient voltage
Input Response Time	Indicators ON/OFF (dc): 10 milliseconds (max.) Indicators ON/OFF (ac): 500 milliseconds (max.)
Audible Alarm	Standard Audible Alarm: 2.7 KHz \pm 500 Hz oscillation frequency; max. intensity 92 db @ 1 meter (typical) Sealed Audible Alarm: 2.9 KHz \pm 250 Hz oscillation frequency; max. intensity 94 db @ 1 meter (typical)
Audible Adjustments	Standard Audible Alarm: Unscrew the cover (up to 1.5 turns max.) to adjust the audible intensity. (Do not exceed 1.5 turns or the cover may detach during operation.) For max. intensity, rotate the center plug 180° counterclockwise to remove it. Sealed Audible Alarm: Rotate the front cover until the desired intensity is reached. Omni-Directional Sealed Audible Alarm: No adjustment
Construction	Bases and Covers: ABS Light Segment: Polycarbonate
Environmental Rating	Standard Audible: IEC IP50 General-Purpose and Sealed Audible: IEC IP67
Connections	Integral 4-pin or 5-pin M12/Euro-style QD, 150 mm PVC pigtail with QD, or 2 m (6.5') integral cable, 4-pin or 5-pin Micro-style QD pigtail, depending on model
Operating Conditions	Temperature: Standard and Sealed Audible: -20 to +50 °C General-Purpose: -40 to +50 °C Relative humidity: 95% @ 50 °C (non-condensing) Storage Temperature: -40 to +70 °C
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration, half sine wave.
Certifications	



Euro-Style
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

3 Lights/4-Pin	4 Lights/5-Pin	5+ Lights/8-Pin
MQDC-406 2 m (6.5')	MQDC1-506 2 m (6.5')	MQDC2S-806 2 m (6.5')
MQDC-415 5 m (15')	MQDC1-515 5 m (15')	MQDC2S-815 5 m (15')
MQDC-430 9 m (30')	MQDC1-530 9 m (30')	MQDC2S-830 9 m (30')



Micro-Style
For AC models

3-Lights/4-Pins	4 Lights/5-Pin
MQAC2-406 2 m (6.5')	MQAC2-506 2 m (6.5')
MQAC2-415 4 m (12')	MQAC2-515 4 m (12')
MQAC2-430 9 m (30')	MQAC2-530 9 m (30')

Additional cordset information is available
See page 758



SMB30A



SMB30MM



SMBAMS30P



SMB30RAVK

Additional bracket information is available
See page 727



Laser Marking

Light sections can be permanently marked with custom text or images (all models except TL50BL Beacon)

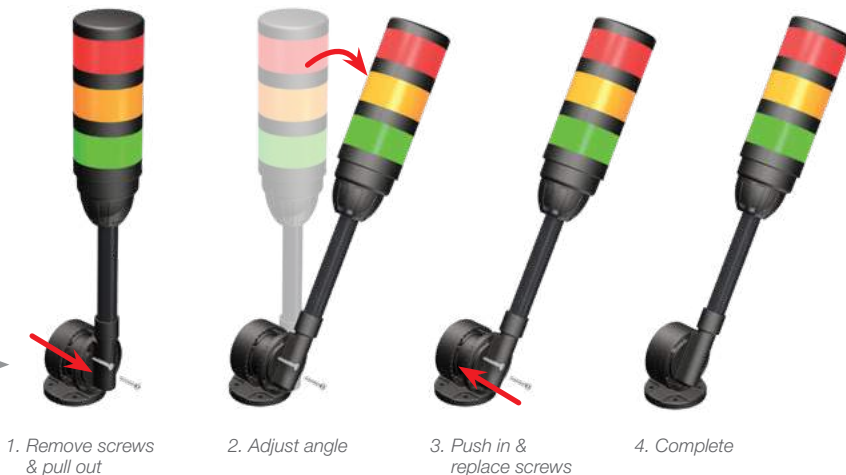
Flush Foldable Bracket

for use with elevated mount systems



SA-FFB12 Black
SA-FFB12C Gray


To change position



Elevated Mount System




Features	Model			Components	
<ul style="list-style-type: none"> Streamlined black acetal or white UHMW stand-off pipe adapter/cover Connects to 30 mm light base Mounting hardware included 	use with TL50 and CL50 models	SA-M30TE12 (black ABS)	SA-M30TE12C (white TL50 ABS)		
	Use with TL70 Models	SA-M30 (black ABS)	SA-M30C (white ABS)		
<ul style="list-style-type: none"> Elevated-use stand-off pipe (1/2 in. NPSM/DN15) Polished 304 stainless steel, black anodized aluminum, or clear anodized aluminum surface 1/2 in. NPT thread at both ends Compatible with most industrial environments 	Polished 304 Stainless Steel	Black Anodized Aluminum	Clear Anodized Aluminum		
	SOP-E12-150SS 150 mm (6") long	SOP-E12-150A 150 mm (6") long	SOP-E12-150AC 150 mm (6") long		
	SOP-E12-300SS 300 mm (12") long	SOP-E12-300A 300 mm (12") long	SOP-E12-300AC 300 mm (12") long		
	SOP-E12-900SS 900 mm (36") long	SOP-E12-900A 900 mm (36") long	SOP-E12-900AC 900 mm (36") long		
<ul style="list-style-type: none"> Streamlined black acetal or white UHMW mounting base adapter/cover Connects between 1/2 in. NPSM/DN15 pipe and 30 mm (1-3/16 in) drilled hole Mounting hardware included 		SA-E12M30 (black zinc and ABS)			
		SA-E12M30C (white zinc and ABS)			




EZ-LIGHT® Controllers

Description	Function	Model	
5 toggle switches	ON-OFF-FLASH	LC80T	

12 position rotary switch	ON-OFF-FLASH	LC80R	
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EZ-LIGHT® Sealed Right-Angle Brackets

Description	Model		
Bracket kit with base, 1/2-14 pipe adapter, set screw, fasteners, o-rings and gaskets. For use with stand-off pipe (listed and sold separately).	LMBE12RA		
	LMBE12RAC		

Bracket kit with base, 30 mm adapter, set screw, fasteners, o-rings and gaskets	LMB30RA		
	LMB30RAC		

INDICATORS

BASE MOUNT

page 436

BARREL/T-STYLE MOUNT

page 448








FLAT MOUNT

page 456



Base-Mount Indicators

Base-mount indicators provide a wide variety of indicators for general purpose indication applications. They have a sleek design, audible or daylight visible options available, and most appear gray when off for clear indication of on/off status.

Series	Description	Number of Colors	Brightness	Dimensions	Power Supply	Communication
	K30L These small dome indicators have long-life LEDs for zero maintenance after installation. page 438	K30L: 1 to 3 9 color options K30L2: 7 color options	Standard	Base: 22 mm Dome: 30 mm	10 to 30 V dc	NA
	K50L These indicators are completely epoxy encapsulated, which protects the electronics from the harshest environments. page 439	K50L: 1 to 3 9 color options K50L2: 7 color options	Standard	Base: 30 mm Dome: 50 mm	18 to 30 V dc, 85 to 130 V ac	I/O Link Option ModBus Option
	K70L Bright, uniform indicators in a rugged, water-resistant housing. page 442	1 to 5 (5 color options)	Standard	Base: 30 mm Dome: 70 mm	12 to 30 V dc	Wireless Option
	K90L These indicators are rugged, 90 mm indicator lights that provide extremely bright and uniform illumination. page 443	1 to 5 (5 color options)	High-Brightness	Base: 30 mm Dome: 90 mm	12 to 30 V dc	NA
	K50BL Beacon Extremely bright and ideal for indoor and outdoor areas with high levels of ambient light. page 444	1 or 2 (5 color options)	Day Light Visible	Base: 30 mm	12 to 30 V dc, 85 to 250 V ac	ModBus Option
	K50LD Daylight Features a brightly illuminated base for enhanced visual indication. page 445	AC: 1 DC: 1 or 3 (5 color options)	Day Light Visible	Base: 30 mm	15 to 30 V dc, 85 to 130 V ac	ModBus Option
	K50L & K30L Hazardous Area Indicator Lights for hazardous areas are safe to use in every classified zone or area with extensive intrinsically safe approvals. page 446	1 to 3 (5 color options)	Standard	K50 Base: 30 mm Dome: 50 mm K30 Base: 22 mm Dome: 30 mm	10 to 30 V dc	NA

OTHER AVAILABLE MODELS



Barrel/T-Style Mount

448



Flat Mount

456

K30L2 Series

Domed Indicator

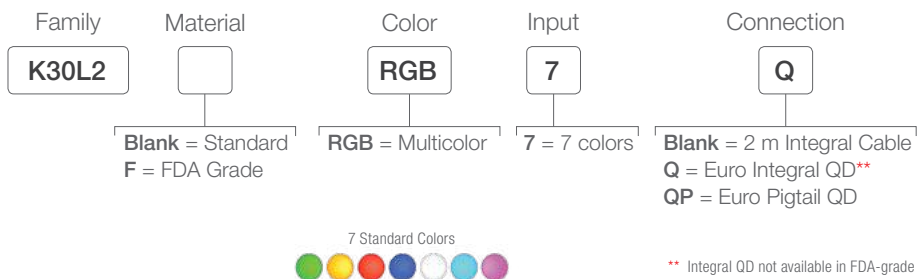


- Bright 30 mm diameter polycarbonate dome gives uniform illumination from all directions
- Seven colors in one device (green, red, yellow, cyan, blue, magenta, white)
- Neutral color when in the OFF condition eliminates false indication from surrounding ambient light
- Rugged IP66, IP67, IP69K and UL Type 4x, 13 design
- Models available in FDA grade materials (not Type 13)
- Bimodal inputs (PNP or NPN)
- Cordsets and brackets available see page 447

LASER
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AVAILABLE

K30L2

Example Model Number: K30L2RGB7Q




** Integral QD not available in FDA-grade material



K30L Models

For more specifications see page 445.

 Connection Option: A model with a QD requires a mating cordset (see page 447).

K50L2 Series

Domed Indicator

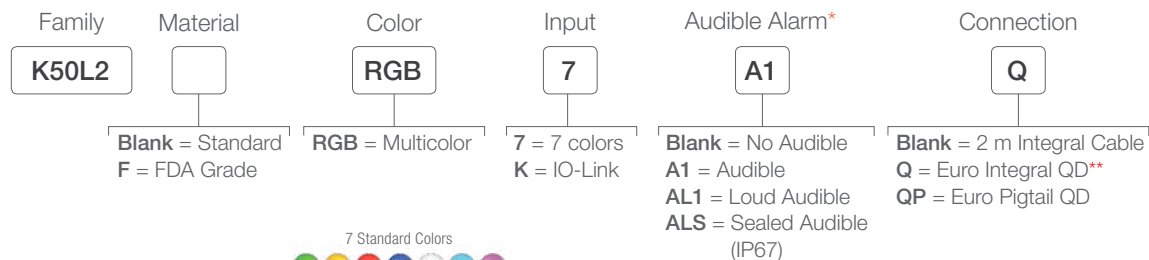


- Bright 50 mm diameter polycarbonate dome gives uniform illumination from all directions
- Seven colors in one device (green, yellow, red, blue, white, cyan, magenta)
- Neutral color when in the OFF condition eliminates false indication from surrounding ambient light
- Rugged IP66, IP67, IP69K and UL Type 4x, 13 design
- Models available in FDA grade materials (not Type 13)
- Bimodal inputs (PNP or NPN)
- Models with integrated alarm available
- Cordsets and brackets available see page 447

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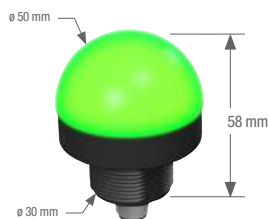
K50L2

Example Model Number: K50L2RGB7A1Q

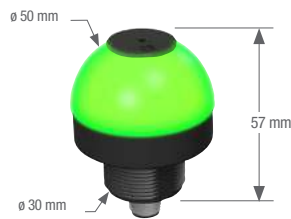


* Audible models not available in FDA-grade material

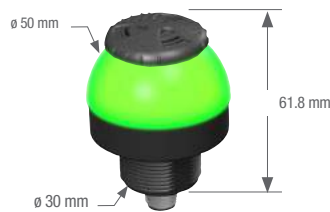
** Integral QD not available in FDA-grade material



K50L2 Models




K50L2 Audible Models
(A1, AL1)



K50L2 Adjustable Audible Models
(ALS)

For more specifications see page 445.

 Connection Option: A model with a QD requires a mating cordset (see page 447).

K30L and K50L Series

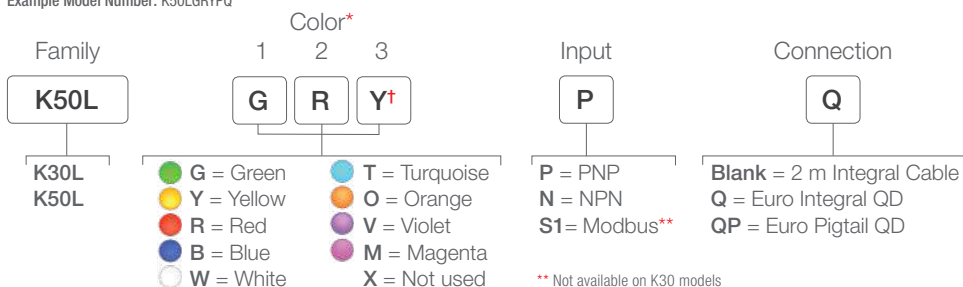
Domed Indicator



- Smooth 30 or 50 mm diameter dome gives uniform illumination from all directions.
- The neutral color when in the OFF condition eliminates false indication from surrounding ambient light
- Up to three colors in one device with many different color combinations
- Modbus option as well as NPN, PNP
- Long-lasting, energy-efficient LEDs for years of operation with zero maintenance
- Many models rated to IP69K to handle high-pressure washdown environments
- Multifunction models available; contact factory
- Cordsets and brackets available see page 447

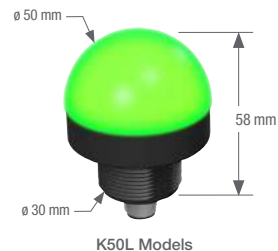
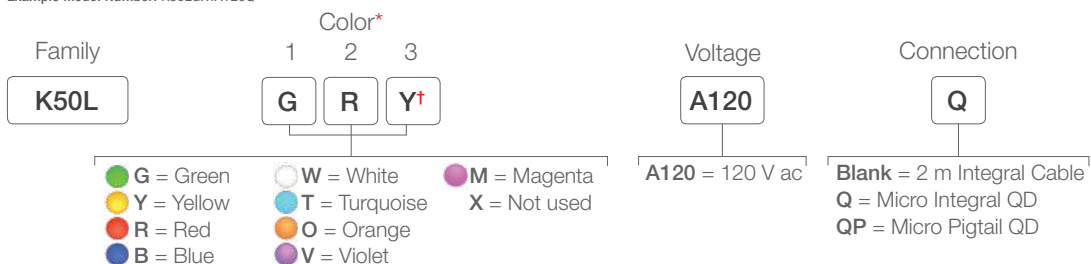
K30L (10-30 V dc) and K50L (18-30V dc) One-, Two-, or Three-Color

Example Model Number: K50LGRYPQ



K50L (85-130 V ac) One-, Two-, or Three-Color

Example Model Number: K50LGRYA120Q



For more specifications see page 445.

 Connection Option: A model with a QD requires a mating cordset (see page 447).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators (example, K30LGYX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

K50L Audible Series

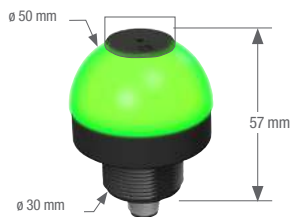
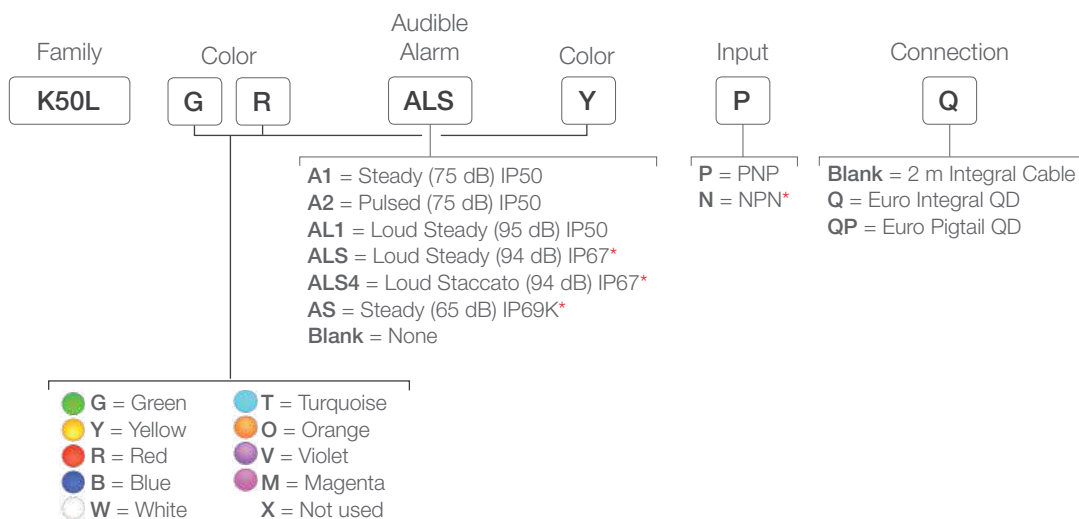
Audible Domed Indicator



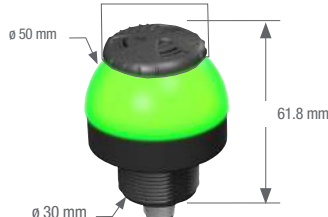
- 50 mm diameter dome gives uniform illumination from all directions and an audible alarm with several tones and intensity levels
- Completely epoxy encapsulated, protecting the electronics from the harshest environments, making them nearly indestructible.
- The neutral color when in the OFF condition eliminates false indication from surrounding ambient light
- Up to three colors in one device with many different color combinations
- Long-lasting, energy-efficient LEDs for years of operation with zero maintenance
- Many models rated to IP69K to handle high-pressure washdown environments
- Cordsets and brackets available see page 447

K50L One-, Two-, or Three-Color Audible

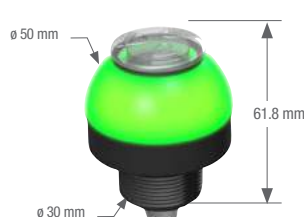
Example Model Number: K50LGRALSYDQ



K50L Audible Models
(A1, A2, AL1)



K50L Adjustable Audible Models
(ALS, ALS4)



K50L Sealed Audible Models
(AS)

For more specifications see page 446.

Connection Option: A model with a QD requires a mating cordset (see page 447).

* NPN not available on these models

K70L Series

Medium-Sized Domed Indicator

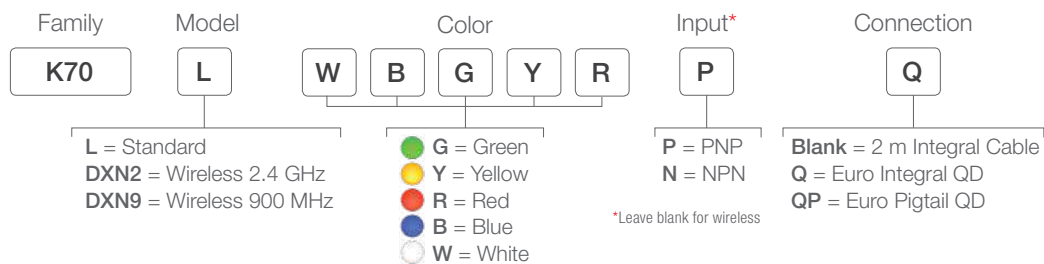


- Bright, uniform indicator light
- All models have flashing input control
- Models are available with up to five colors in one device
- Rugged, water-resistant IP65-rated design
- 12 V to 30 V dc operations
- Wireless options available in either 900 MHz and 2.4 GHz ISM Bands
- Cordsets and brackets available see page 447

LASER
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AVAILABLE

K70 Standard and Wireless

Example Model Number: K70LWBGYRPQ



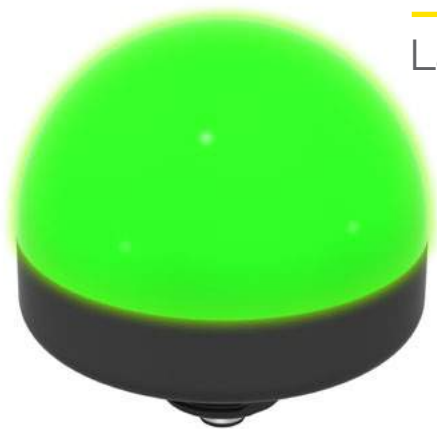
For more specifications see page 445.



Connection Option: A model with a QD requires a mating cordset (see page 447).

K90L and K90TL Series

Large Domed Indicator

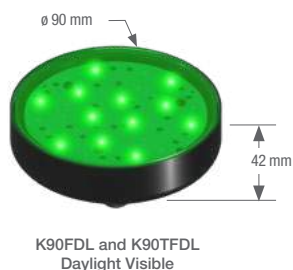
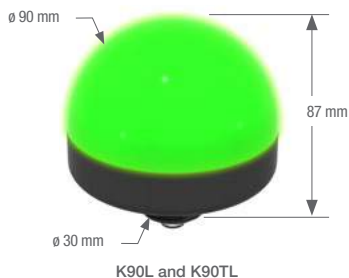
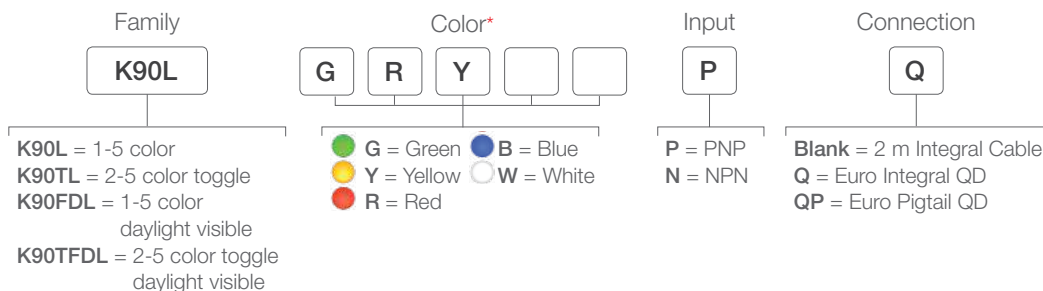


- Rugged, 90 mm indicator lights that provide extremely bright and uniform illumination from all directions and longer distances.
- The K90L models have a separate input wire for internally controlled flashing
- Daylight visible models are available in both the standard and toggle models
- Illuminated dome provides easy-to-see operator guidance
- Up to five colors in one device to communicate multiple statuses
- Rugged design with an IP67-rating
- Cordsets and brackets available see page 447

LASER
MARKING
AVAILABLE

K90L One to Five Color

Example Model Number: K90LGRYPQ



For more specifications see page 447.

Connection Option: A model with a QD requires a mating cordset (see page 447).

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

K50 Beacon Series

High-intensity Indicator



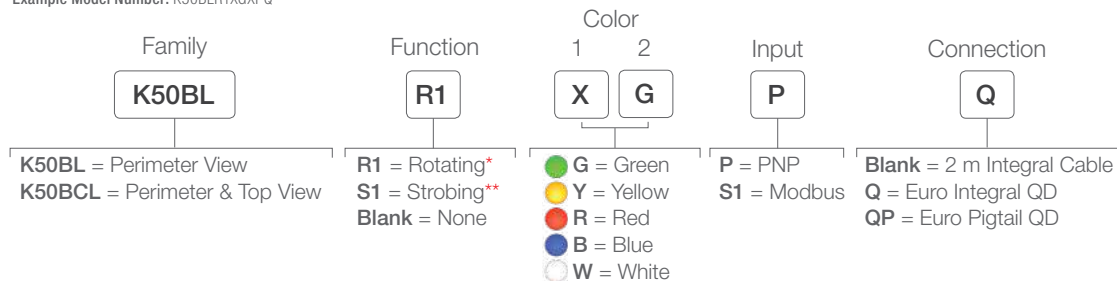
- Extremely bright, making them ideal for indoor and outdoor areas with high levels of ambient light.
- UV-stabilized polycarbonate housing and epoxy encapsulated electronics allow for years of maintenance-free operation.
- They are available in five colors and a wide range of voltage levels
- Continuous, strobing and rotating models available
- 12-30 V dc models are ideal for battery-powered mobile applications
- Models with LEDs emitting from the top in addition to the perimeter
- Rugged, sealed housing rated to IP69K for high-pressure washdown
- Models for 120 V and 230 V ac operation
- Cordsets and brackets available see page 447



K50BL Beacon Models

K50BL & K50BCL One or Two Color, 12-30 V DC

Example Model Number: K50BLR1XGXPQ



K50BCL Beacon Models

K50BL & K50BCL One Color, 85-250 V AC

Example Model Number: K50BLGA120Q



 Connection Option: A model with a QD requires a mating cordset (see page 447).

* Rotating only available on K50BL models.

** Strobing only available on K50BCL models.

K50 Daylight Visible Series

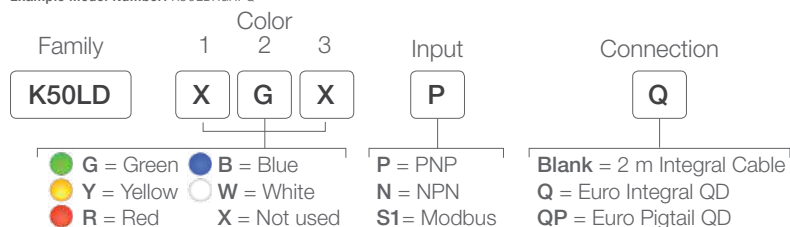
Directional Indicator



- Flat 50 mm profile with high-intensity LEDs that clearly show status indication
- Intense levels of light output for outdoor environments or in areas with high levels of ambient light
- Easy-to-install 30 mm threaded base mount, no tools required
- Up to three colors in one device to communicate multiple statuses
- Rugged design for many years of operation
- Completely self-contained, no controller needed
- Cordsets and brackets available see page 447

K50LD One- or Three- Color, 12-30 V DC

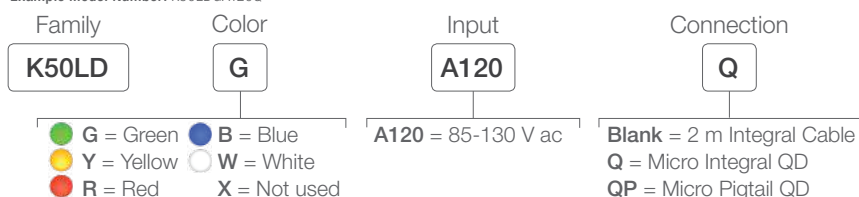
Example Model Number: K50LDXGXPO



K50L Daylight Models

K50LD One Color, 85-130 V AC

Example Model Number: K50LDGA120Q



K30L, K50L, K70L, K90L Base-Mount Specifications

Supply Voltage and Current	K90L: 12 to 30 V dc; 475 mA Max. at 12 V dc; 175 mA Max. at 30 V dc K70L: 12 V to 30 V dc; 200 mA Max. at 12 V dc; 90 mA Max. at 30 V dc K50L: 18 to 30 V dc (10% max. ripple) Indicators: 65 mA at 12 V dc; 35 mA at 30 V dc max. current per color Audible: 35 mA max. current K50LD: 15 to 30 V dc; 85 to 130 V ac or 75 to 120 V dc @ 16 mA max.	K50BL: 12 to 30 V dc; 85 to 130 V ac or 75 to 120 V dc; 100 to 250 V ac or 90 to 240 V dc K30L: 10 to 30 V dc K50L2: 10 to 30 V dc; 220mA Max. at 10 V dc; 100mA Max. at 30 V dc K30L2: 10 to 30 V dc; 60mA Max. at 10 V dc; 30mA Max. at 30 V dc
Supply Protection Circuitry	Protected against reverse polarity, transient voltages	
Construction	Polycarbonate housing	
Environmental Rating	K90L: IEC IP67 K70L: IEC IP65 K30L, K30L2: IEC IP67/IP69K	K50L, K50L2: IEC IP67/IP69K Audible Models: Standard: IEC IP50 Sealed: IEC IP67/IP69K K50LD, K30LD, K50BL: IEC IP67/IP69K
Operating Temperature	-40 to 50 °C	
Certifications	K90L, K70L, K30L, K50L: K90L, K70L, K30L, K50L: (Depending on model)	

Connection Option: A model with a QD requires a mating cordset (see page 447).

K30L and K50L Hazardous Area

Domed Indicator



- 30 and 50 mm models rated to IP67 and IP69K for use in harsh environments, making them nearly indestructible
- Extensive approvals ensure indicator lights are safe to use in every classified zone or area
- Up to three colors in one device and five colors to choose from
- Long-lasting LED technology for years of maintenance-free operation
- Unique design appears gray when off, eliminating false indication from ambient light
- Worldwide IECEx approval for quicker access into countries outside Europe and North America

K30L and K50L Hazardous Area

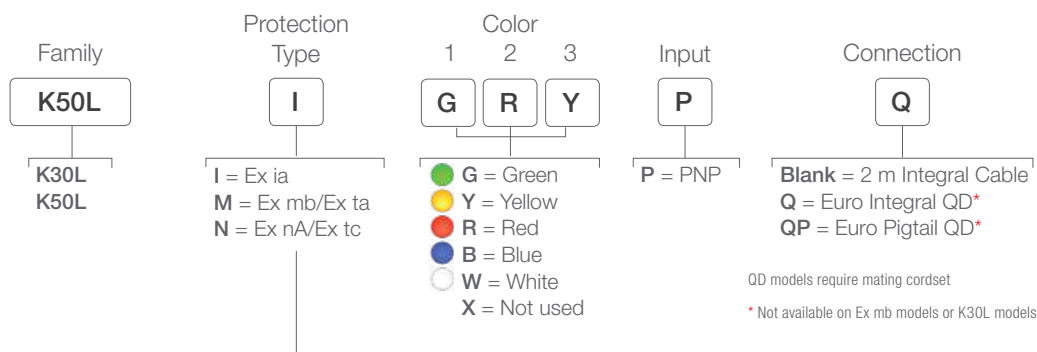
Example Model Number: K50LIGRYPQ



K30L Models







K50L Models



Indicator Family	Protection Method	Suitable for ATEX	Suitable for NEC & CEC
Ex ia	Intrinsically Safe	Gas Zones: 0, 1, & 2 Dust Zones: 20, 21, & 22 mines	Gas zones: 0, 1, & 2 Class I Division 1 & 2 Class II/III Division 1 & 2
Ex mb/Ex ta	Encapsulation/ Enclosure	Gas Zones: 1 & 2 Dust Zones: 20, 21 & 22	Gas zones: 1 & 2 Class I Division 2 Class II/III Division 1 & 2
Ex nA/Ex tc	Non-Sparking/ Enclosure	Gas Zones: 2 Dust Zones: 22	Gas zones: 2 Class I Division 2 Class II/III Division 2

K50L & K30L Hazardous Area Specifications

Supply Voltage and Current	Exia: 8-30 V dc Ex mb/Ex ta and Ex nA/Ex tc: 10-30 V dc
Supply Protection Circuitry	Protected against reverse polarity, transient voltages
Construction	Polycarbonate housing
Environmental Rating	IEC IP67 and IP69K
Operating Temperature	-40 to +50 °C
Certifications	   

 Connection Option: A model with a QD requires a mating cordset.

TOUCH BUTTONS

PICK-TO-LIGHT



4-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

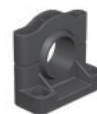
Additional cordset information is available. See page 758



SMB30FA



SMB22FVK



SMB30SC



SMB30A

Additional bracket information is available. See page 727

Flush Foldable Bracket

Description	Model
Black	SA-FFB12
Gray	SA-FFB12C



EZ-LIGHT® Controllers

Description	Function	Model
5 toggle switches	ON-OFF-FLASH	LC80T
12 position rotary switch	ON-OFF-FLASH	LC80R



Elevated Mount System

Features	Model	Components
<ul style="list-style-type: none"> Streamlined black acetal or white UHMW stand-off pipe adapter/cover Connects between 30 mm light base and ½ in. NPSM/DN15 pipe Mounting hardware included 	<p>SA-M30TE12 (black acetal)</p> <p>SA-M30TE12C (white UHMW)</p>	
<ul style="list-style-type: none"> Elevated-use stand-off pipe (½ in. NPSM/DN15) Polished 304 stainless steel, black anodized aluminum, or clear anodized aluminum surface ½ in. NPT thread at both ends Compatible with most industrial environments 	<p>Polished 304 Stainless Steel</p> <p>SOP-E12-150SS 150 mm (6") long</p> <p>SOP-E12-300SS 300 mm (12") long</p> <p>SOP-E12-900SS 900 mm (36") long</p>	<p>Black Anodized Aluminum</p> <p>SOP-E12-150A 150 mm (6") long</p> <p>SOP-E12-300A 300 mm (12") long</p> <p>SOP-E12-900A 900 mm (36") long</p>
		<p>Clear Anodized Aluminum</p> <p>SOP-E12-150AC 150 mm (6") long</p> <p>SOP-E12-300AC 300 mm (12") long</p> <p>SOP-E12-900AC 900 mm (36") long</p>
<ul style="list-style-type: none"> Streamlined black acetal or white UHMW mounting base adapter/cover Connects between ½ in. NPSM/DN15 pipe and 30 mm (1-3/16 in) drilled hole Mounting hardware included 	<p>SA-E12M30 (black acetal)</p> <p>SA-E12M30C (white UHMW)</p>	



Barrel/T-Style Indicators

T-Style indicators come in Banner's most popular sensor housings, using the same easy-to-mount brackets and style. They come in a variety of sizes for simple setup and many application uses.

Series	Description	Number of Colors	Brightness	Dimensions	Power Supply
	S18L Standard intensity and high intensity daylight visible models available in a variety of colors with 18 mm bases. page 450	1 to 3 (9 color options)	Varies by model	Base: 18 mm	10 to 30 V dc
	S22L Standard intensity and high intensity daylight visible models available in a variety of colors with 22 mm bases. page 451	1 to 3 (9 color options)	Varies by model	Base: 22 mm	10 to 30 V dc
	T8L The T8L Indicators have a low profile, ideal for simple panel mounting or use on a machine. page 454	1 or 2 (3 color options)	Standard	8 mm light	10 to 30 V dc

OTHER AVAILABLE MODELS



Base Mount

436



Flat Mount

456

S18L Series

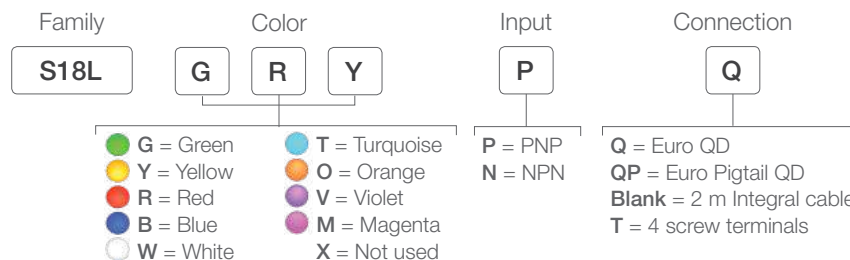
Barrel-Mount Indicator



- Designed for panel-mount or stand-alone applications
- Daylight visible models available for use in outdoor applications or in areas with high levels of ambient light
- Up to three colors available in one device allowing one S18L to replace three conventional panel indicators
- Compact and light weight, extremely rugged; overmolded IP69K-rated design
- Terminal connection models have color-coded screw heads for quick, error-free wiring
- Cordsets and brackets available see page 452

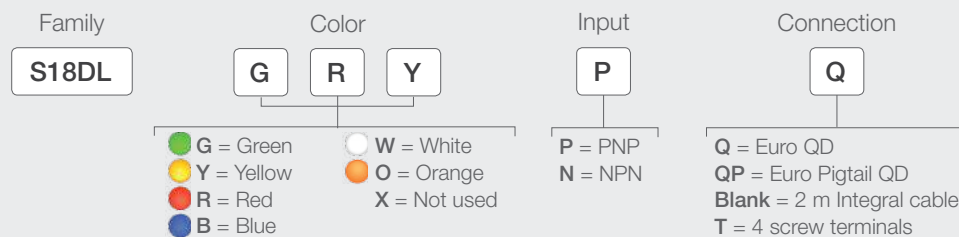
S18L Multi-Color General-Purpose

Example Model Number: S18LGRYPq



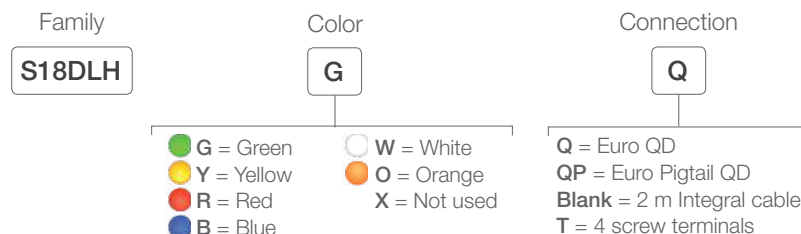
S18DL Daylight Visible General Purpose

Example Model Number: S18DLGRYPQ



S18DLH Daylight Visible High-Intensity

Example Model Number: S18DLHGQ



For more specifications see page 453.



Connection Option: A model with a QD requires a mating cordset (see page 452).

Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

S22L Series

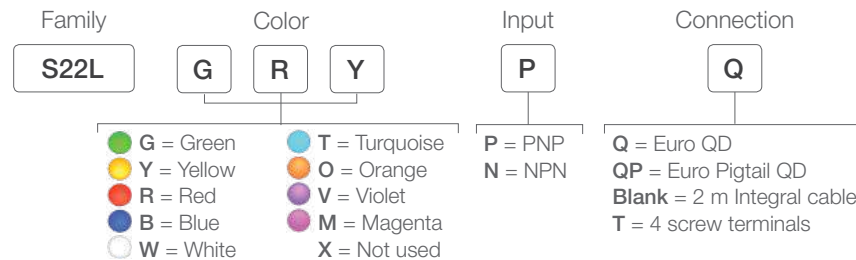
Barrel-Mount Indicator



- Designed for panel-mount or stand-alone applications
- Daylight visible models available for use in outdoor applications or in areas with high levels of ambient light
- Up to three colors available in one device allowing one S22L to replace three conventional panel indicators
- Compact and light weight, extremely rugged; overmolded IP69K-rated design
- Terminal connection models have color-coded screw heads for quick, error-free wiring
- Cordsets and brackets available see page 452

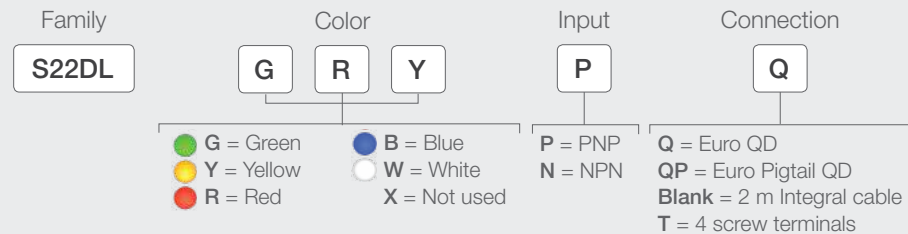
S22L Multi-Color General Purpose

Example Model Number: S22LGRYPQ



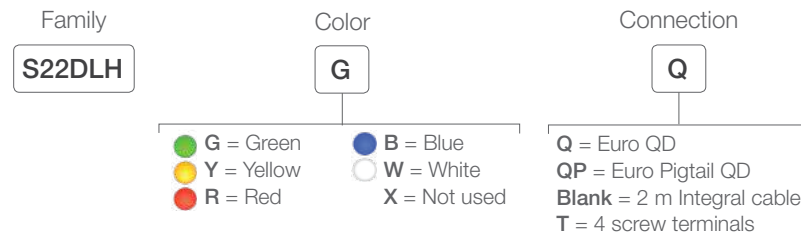
S22DL Daylight Visible General Purpose

Example Model Number: S22DLGRYPQ



S22DLH Daylight Visible High Intensity

Example Model Number: S22DLHGQ



For more specifications see page 453.

Connection Option: A model with a QD requires a mating cordset (see page 452).

Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.



4-Pin

Euro-Style
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

- MQDC-406**
2 m (6.5')
- MQDC-415**
5 m (15')
- MQDC-430**
9 m (30')

Additional cordset information is available.
See page 758



SMB18A



SMBAMS18P



SMB18FA



SMBAMS18RA

Additional bracket information is available.
See page 723



S18L Cabled



S18L QD



S18L Field Wired



S22L Cabled





S22L QD



S18L Field Wired

Barrel Mount Specifications

Supply Voltage and Current	10 to 30 V dc @ 25 mA max. per LED color S18DLH and S22DLH: 9 to 30 V dc
Supply Protection Circuitry	Protected against reverse polarity, transient voltages
Construction	Polycarbonate
Environmental Rating	S18L.. and S22L..: IEC IP67 and IP69K
Operating Temperature	S18L and S22L: -40 to +50 °C S18DLH and S22DLH: -40 to +60 °C
Certifications	 

T8L Series

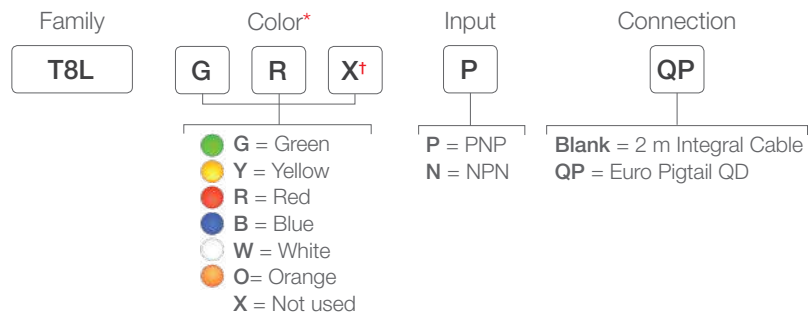
T-Style Indicator



- T-style mount indicators with a low profile, ideal for simple panel mounting or use on a machine
- Can be easily assembled into a punched hole with the included mounting hardware, no additional hardware needed.
- Up to two colors in one device with an 8 mm threaded nose
- Designed for panel-mount or stand-alone applications
- Right-angle wiring exit for low profile applications
- Ideal for operator guidance and equipment status indication
- Rugged design rated to IP67

T8L One or Two Color General-Purpose

Example Model Number: T8LGRXP



Connection Option: A model with a QD requires a mating cordset.

* Single-color models are available. Colors are independently selectable. Contact factory for other colors and color combinations.

† Add 7 after last color option for Sensor Emulators (example, T8LGYX7PQP). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.



4-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

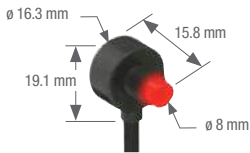
- MQDC-406**
2 m (6.5')
- MQDC-415**
5 m (15')
- MQDC-430**
9 m (30')



SMB8MM

Additional cordset information is available.
See page 758

Additional bracket information is available.
See page 727



T8 Models








T-Style Mount Specifications

Supply Voltage and Current	10 to 30 V dc @ 20 mA max.
Supply Protection Circuitry	Protected against reverse polarity, transient voltages
Construction	Polycarbonate/ABS housing; Thermoplastic diffuser
Environmental Rating	IEC IP67
Operating Temperature	-40 to +50 °C
Certifications	CE



Flat Mount Indicators

Flat-mount indicators have large faces for clear indication, even at long distances. Flat-mount indicators come in a variety of styles, including a sleek domed design, daylight visible models for outdoor indication and all models are easy to mount to flat surfaces, such as walls and panels.

Series	Description	Number of Colors	Brightness	Dimensions	Power Supply
	K80L Easy to mount to flat surfaces such as walls and panels page 458	1 to 5	Standard	80 mm housing ø 50 mm light	18 to 30 V dc
	K80 Call Light Portable, battery-powered lights provide operational status indication for personnel and are ideal in locations where power is limited or unavailable page 460	1	Standard	80 mm housing ø 50 mm light	Two 9 V batteries
	K50FL Ideal for operator guidance and equipment status indication page 461	1 to 5	Standard	60 x 40 mm ø 50 mm light	18 to 30 V dc
	K80FL Extremely bright indicator with selectable flash rates page 462	1 to 3	Standard or Daylight Visible	80 mm housing ø 66 mm light	12 to 30 V dc
	K80 Segmented Up to four individual segments that can be lighted separately page 464	1 to 4	Standard	80 mm housing ø 66 mm light	18 to 30 V dc
	SP Signal Lights Rugged and easy-to-install signal lights that provide high visibility outdoors page 465	1 to 3	Daylight Visible	Varies by model	15 to 30 V dc, 85 to 130 V ac
	TL30F A low-profile, flat-mount indicator with multiple color segments can be lit simultaneously page 466	3 or 5	Standard	H (varies) 30 x 19 mm	18 to 30 V dc

OTHER AVAILABLE MODELS



Base Mount

436



Barrel/T-Style Mount

448

K80L Flat-Mount Series

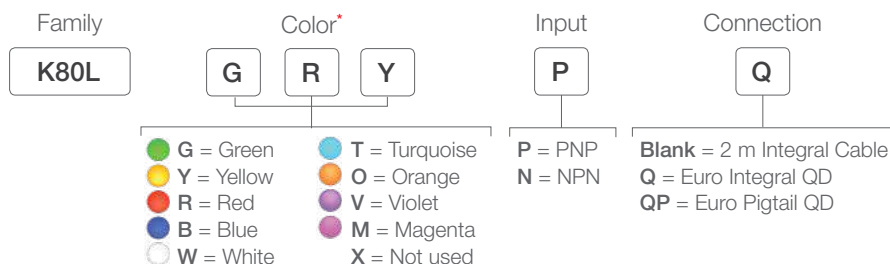
Domed Indicator



- Rugged, cost-effective, flat-mount indicators that provide easy-to-see operator guidance with a 50 mm dome.
- Easy to mount to flat surfaces such as walls or panels
- High-intensity LEDs give highly visible indication and provide zero-maintenance operation
- Rugged, fully encapsulated design rated to IP67
- Up to five colors in one device to communicate multiple statuses
- Multifunction models available; contact factory

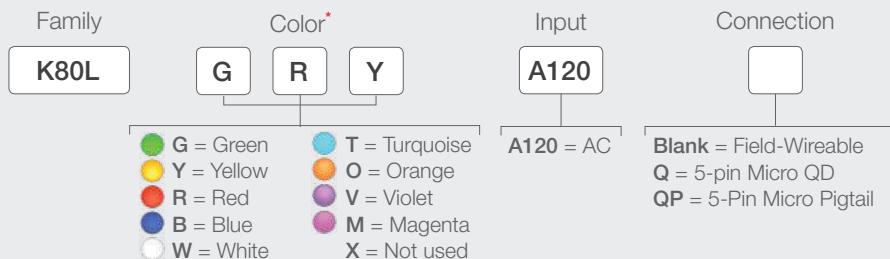
K80L One, Two or Three Color, 18-30 V DC

Example Model Number: K80LGRYPQ



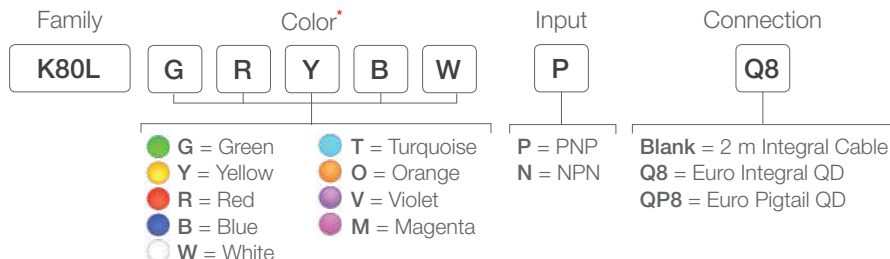
K80L One, Two or Three Color, 85-130 V AC

Example Model Number: K80LGRYA120



K80L Four- to Five-Color, 18-30 V DC

Example Model Number: K80LGRYBWQ



For more specifications see page 455.



Connection Option: A model with a QD requires a mating cordset (see page 467).

* Add 7 after last color option for Sensor Emulators (example, K80LGRY7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

K80L Audible Flat-Mount Series

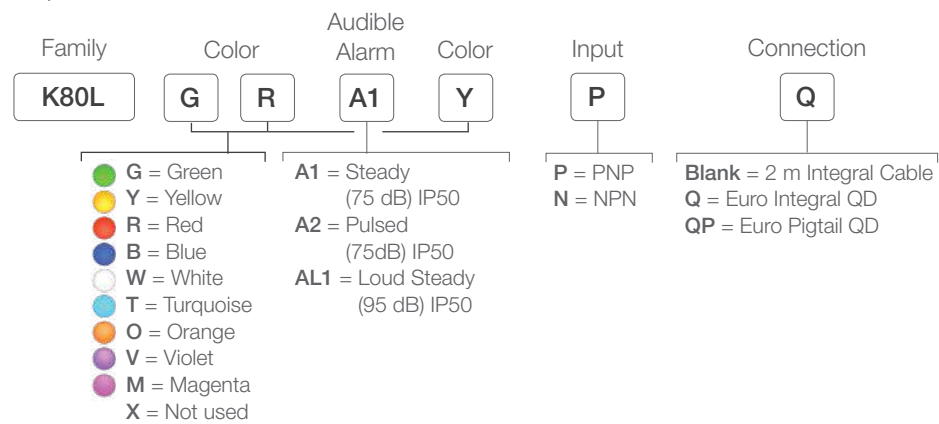
Domed Indicator



- Rugged, cost-effective, and easy-to-install indicators
- Steady or pulsed sound indication
- Illuminated dome provides a big, easy-to-see job light
- Compact devices are completely self-contained—no controller needed
- Choose NPN or PNP input, depending on model
- Immune to EMI and RFI interference
- Three color LED function

K80L One, Two or Three Color, 18-30 V DC

Example Model Number: K80LGRA1YPQ



K80L Audible Models

For more specifications see page 467.

Connection Option: A model with a QD requires a mating cordset (see page 467).

K80CL Call Light

Battery-Operated Indicator



- Ideal in locations where power is limited or unavailable
- Flashes ON/OFF
- Switch activated
- No assembly required
- Rugged and easy to install
- Long-life LED technology gives up to 100 hours of operation on two 9 V batteries (included)

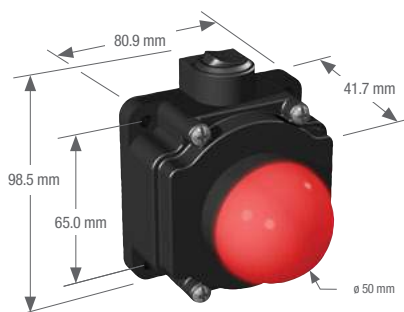
Family

K80CL

Color

R

● G = Green ● R = Red
● Y = Yellow ● B = Blue



K80 Call Light

K50FL Flat-Mount Series

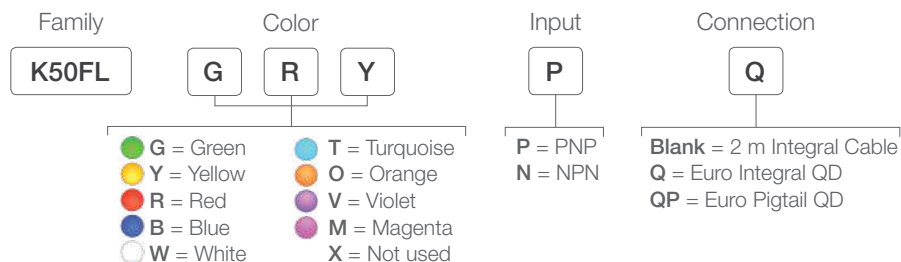
Domed Indicator



- Bright, highly visible illuminated dome
- Flat-pack mounting allows for indicators to be mounted on any flat surface
- Fully encapsulated indicators with most models rated to IP69K for high-pressure washdown environments
- Display up to five colors in a single device with many colors and color combinations available
- Long-lasting LED technology with low power consumption

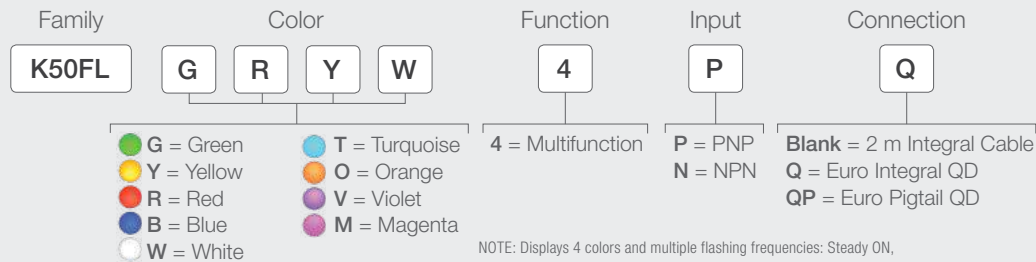
K50FL One-, Two- or Three-Color

Example Model Number: K50FLGRYPQ



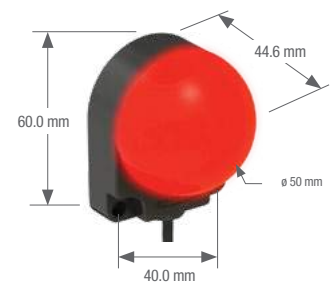
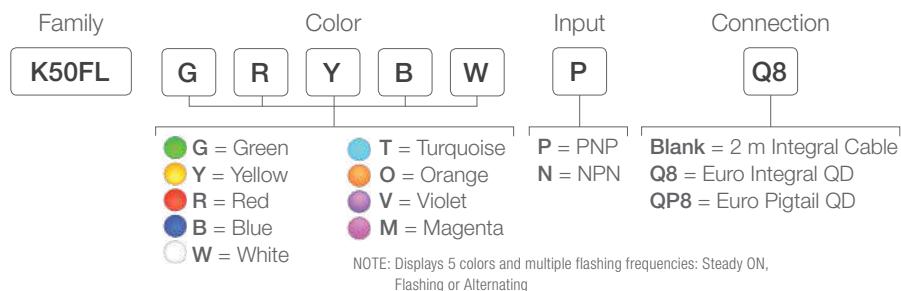
K50FL Four-Color , Multifunction

Example Model Number: K50FLGRYW4PQ



K50FL Five-Color

Example Model Number: K50FLGRYBWPQ



K50FL Models

For more specifications see page 467.

Connection Option: A model with a QD requires a mating cordset (see page 467).

† Add 7 after last color option for Sensor Emulators (example, K50FLGYX7PQ). Use with discrete output of photoelectric and proximity sensors to duplicate the sensor's Green and Yellow indicator function. When the sensor is powered, the Green LED is ON. When the sensor's output is energized, the Yellow LED is ON.

K80FL Series

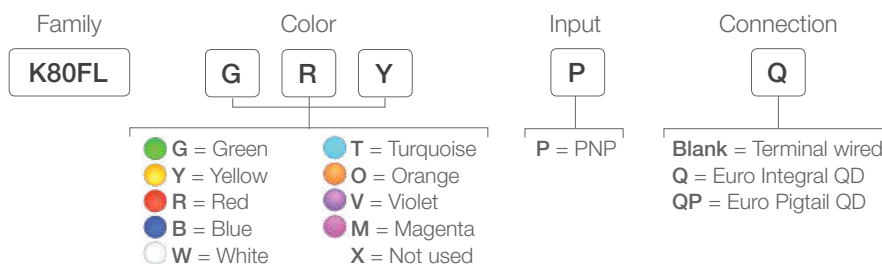
Flat-Mount Indicator



- Extremely bright indicator with selectable flash rates
- Up to three colors in one device with a choice of many colors or color combinations
- Large flat face allows for clear indication from farther distances
- Easy to mount to flat surfaces such as walls or panels
- Long-lasting LED technology with low power consumption

K80FL One-, Two- or Three Color

Example Model Number: K80FLGRYPQ



K80FL Models

For more specifications see page 467.



Connection Option: A model with a QD requires a mating cordset (see page 467).

K80FDL Daylight Visible

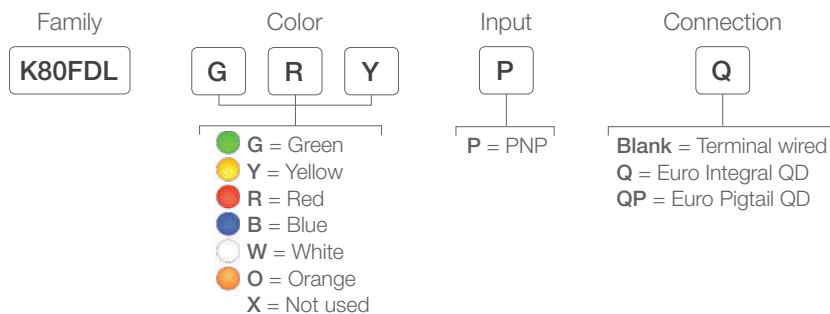
Flat-Mount Indicator



- Extremely bright indicator for outdoor use
- Up to three colors in one device with a choice of many colors or color combinations
- Large flat face allows for clear indication from farther distances
- Easy to mount to flat surfaces such as walls or panels
- Long-lasting LED technology with low power consumption

K80FDL One-, Two- or Three Color

Example Model Number: K80FDLGRYPQ



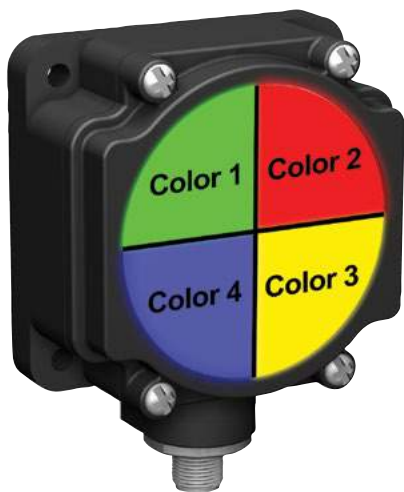
K80FDL
Daylight Visible Models

For more specifications see page 467.

Connection Option: A model with a QD requires a mating cordset (see page 467).

K80L Segmented Series

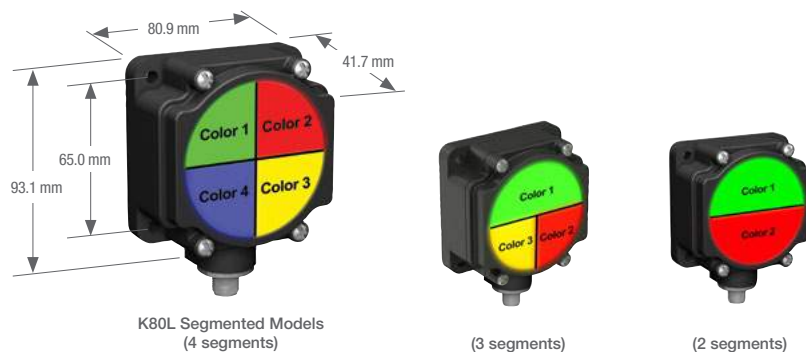
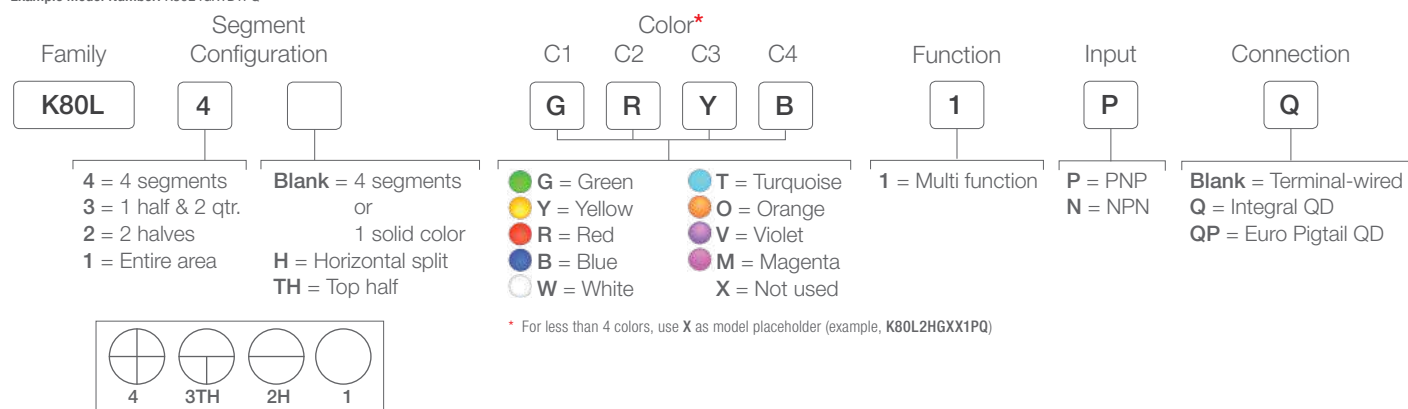
Flat-Mount Indicator



- Easily mounted on flat surfaces
- Up to four individual color segments can show status of items simultaneously or in combination
- Optional, customizable labels available for enhanced segment identification
- Highly visible color segments allow for quick and easy identification of statuses

K80L Segmented

Example Model Number: K80L4GRYB1PQ

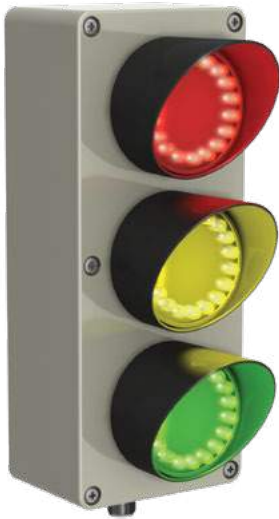


For more specifications see page 467.

Connection Option: A model with a QD requires a mating cordset (see page 467).

SP Series Signal Light

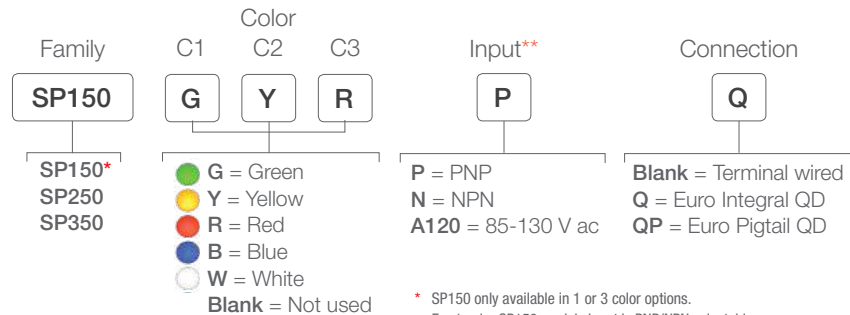
Flat-Mount Indicator



- Preassembled with up to three indicators per unit
- Rugged housing is designed to withstand wet and dirty environments.
- Intense levels of light output for use outdoors or in environments with high levels of ambient light
- Controlled field-of-view for signage and narrow lane use
- Shock, vibration and impact resistant
- Convenient Euro quick-disconnect option for easy installation
- 15 to 30 V dc or 85 to 130 V ac supply voltage, depending on model

SP Signal Light

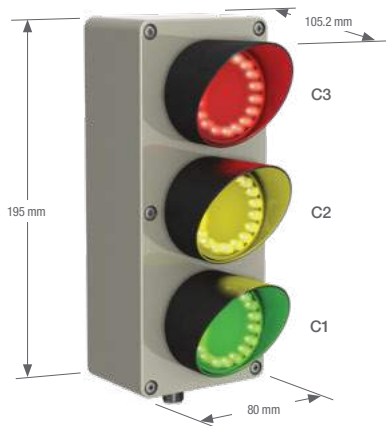
Example Model Number: SP150GYRPQ



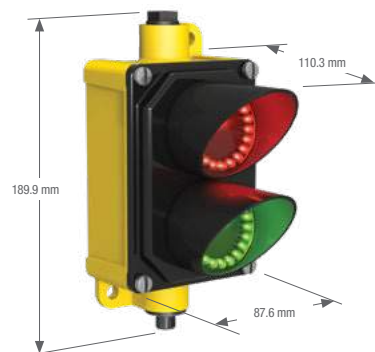
* SP150 only available in 1 or 3 color options.

For 1 color SP150 models input is PNP/NPN selectable

** A120 models are only available with field-wired connection
SP150 models only available in PNP



SP350 Models



SP250 Models



SP150 Models

For more specifications see page 467.

Connection Option: A model with a QD requires a mating cordset (see page 467).

TL30F Series

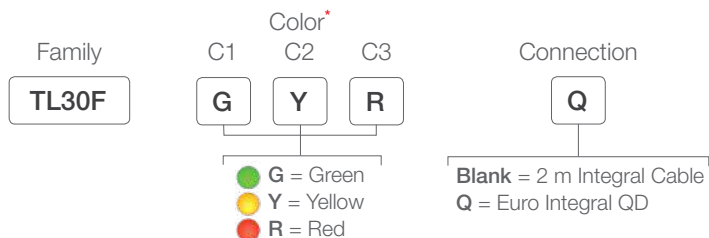
Segmented Flat-Mount Indicators



- Multiple color segments can be lit simultaneously, making this a useful option for operator guidance or machine indication
- Frequently used with pick-to-light products to give operators additional visual indication such as number of parts to pick or color-coded part picking
- Displays three or five colors in single device
- Durable, rugged metal housing rated to IP65
- Easily mounts on horizontal or vertical work centers or automation machinery
- Compact devices easily fit on work stations
- 18 to 30 V dc bimodal (NPN or PNP) and 21 to 27 V ac inputs

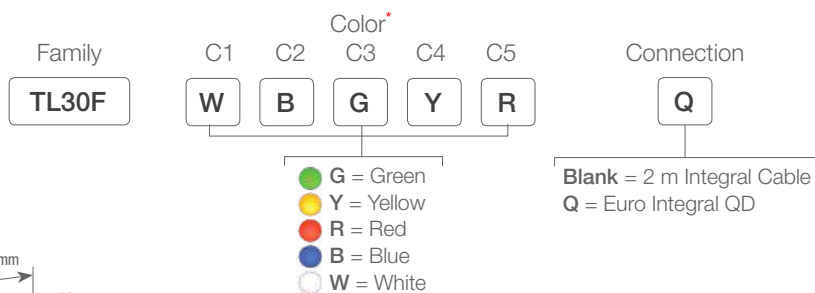
TL 30F Three-Color

Example Model Number: TL30FGYRQ

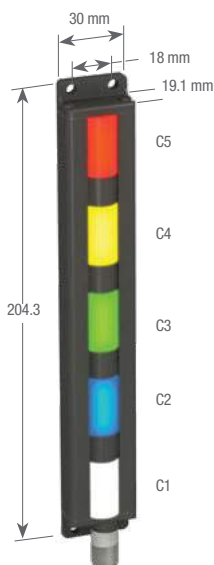


TL 30F Five-Color

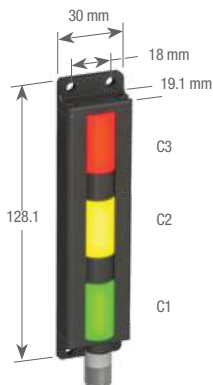
Example Model Number: TL30FWBGYRQ



* TL30F are pre-configured in three- or five-colors. Positions are set as pictured below(above). For other color combinations, please contact the factory.



Five Color
General-Purpose
IP65



Three Color
General-Purpose
IP65

 Connection Option: A model with a QD requires a mating cordset.

TOUCH BUTTONS

PICK-TO-LIGHT



Euro-Style
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDEC2-506RA**)

4-Pin
MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

5-Pin
MQDC1-506
2 m (6.5')
MQDC1-515
5 m (15')
MQDC1-530
9 m (30')

8-Pin
MQDC2-806
2 m (6.5')
MQDC2-815
5 m (15')
MQDC2-830
9 m (30')



Micro-Style
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-306RA**)

3-Pin
MQDC-306
2 m (6.5')
MQDC-315
4 m (12')
MQDC-330
9 m (30')

5-Pin
MQVR3S-506
2 m (6.5')
MQVR3S-515
4 m (12')
MQVR3S-530
9 m (30')

Additional cordset information is available.
See page 758



SMBDX80DIN
use with K80L



DIN-35...
use with K80L



SMBPVA1
use with TL30F



SMBPVA2
use with TL30F



SMBPVA6
use with TL30F

Additional bracket information is available.
See page 727

Flat-Mount Specifications

Supply Voltage and Current	<p>K80L: 18-30 V dc K80CL: 18 V (two batteries) K80FL: 12-30 V dc K80FDL: 12-30 V dc K80 Segmented displays: 18-30 V dc K80L4: @ 35 mA max. per LED color, @ 90 mA max. with all LEDs ON; K80L3: @ 50 mA max. with color 1 ON, @ 35 mA max. with colors 2 or 3 ON, @ 90 mA max. with all LEDs ON; K80L2: @ 50 mA max. with colors 1 or 2 ON, @ 90 mA max. with all LEDs ON; K80L1: @ 90 mA max SP150, SP250, SP350: 15-30 V dc 1-Color: @ 120 mA max. per LED color; 3-Color: @ 40 mA max. per LED color K50FL: 18-30 V dc TL30F: 18-30 V dc (10% max. ripple) or 21-27 V ac @ 18mA max. per LED color</p>
Supply Protection Circuitry	Protected against reverse polarity, transient voltages
Environmental Rating	<p>K80L: IP67 K80L: Audible: IP50 K80CL: IP50 K80FL: IP67 K80FDL: IP67 K80 Segmented displays: IP67 SP150: IP67 SP250, SP350: IP65 K50FL: IP69K TL30F: IP65</p>
Operating Temperature	<p>-40 to +50 °C Audible models: -20 to 50 °C K80CL: -20 to 50 °C</p>
Certifications	



Touch Buttons

Banner is the leader in ergonomic, visual and sealed operator touch buttons for industrial applications. Since Banner's Touch Buttons can have multiple colors and I/O capabilities, they can replace several conventional buttons, making them ideal in lean manufacturing environments. Buttons have superior immunity to direct water spray and have the ability to be used while wearing gloves.

Series	Description	Number of Colors	Dimensions	Power Supply	Communications
	K30 Versatile family that combines a small, bright indicator with solid-state switching capability activated by a simple touch. page 468	1 to 3 (9 color options)	Base: 22 mm Dome: 30 mm	12 to 30 V dc	
	K50 Versatile family that combines a large, bright indicator with solid-state switching capability activated by a simple touch. page 472	1 to 3 (9 color options)	Base: 30 mm Dome: 50 mm	12 to 30 V dc	Modbus Option
	K70 Large, easy to activate solid state switch and high visibility indicator. Ideal for use in pick-to-light, call button and general industrial applications. page 474	1 to 3 (5 color options)	Base: 30 mm Dome: 70 mm	12 to 30 V dc	Wireless Option
	K30L Features a brightly illuminated base for enhanced visual indication. page 476	1 to 3 (9 color options)	Base: 22 mm Dome: 30 mm	10 to 30 V dc	
	K50L Features a brightly illuminated base for enhanced visual indication. page 476	1 to 3 (9 color options)	Base: 30 mm Dome: 50 mm	12 to 30 V dc	Modbus Option
	OTB/LTB The industry standard for ergonomic touch buttons and are ideal as replacements for mechanical pushbuttons. page 478	—	74.2 x 59.9 x 43.2 mm Base: 30 mm	10 to 30 V dc, 20 to 30 V dc, 105 to 130 V ac, 210 to 250 V ac	
	VTB Features a brightly illuminated base for enhanced visual indication. page 480	2 (3 color options)	73.3 x 59.9 x 43.2 mm Base: 30 mm	12 to 30 V dc	

K30 Touch Series

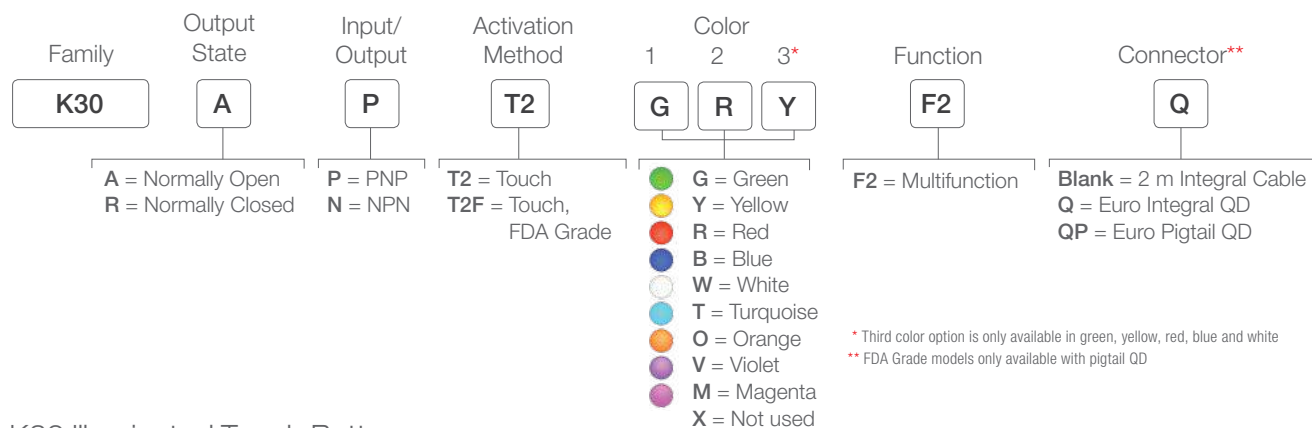
Touch Buttons



- Totally independent of the touch activated output, making these devices flexible for use in countless applications.
- Up to three independent colors in one unit with many color options available
- Momentary versions remain activated as long as touch is present, while latching versions toggle between activated and not activated states on successive touches
- Excellent immunity to false triggering by water spray, detergents, oils, and other foreign materials
- Rugged, water-resistant IP69K design for washdown environments
- Ergonomically designed to eliminate hand, wrist and arm stresses, requiring no physical pressure to operate and can be actuated with bare hands or work gloves

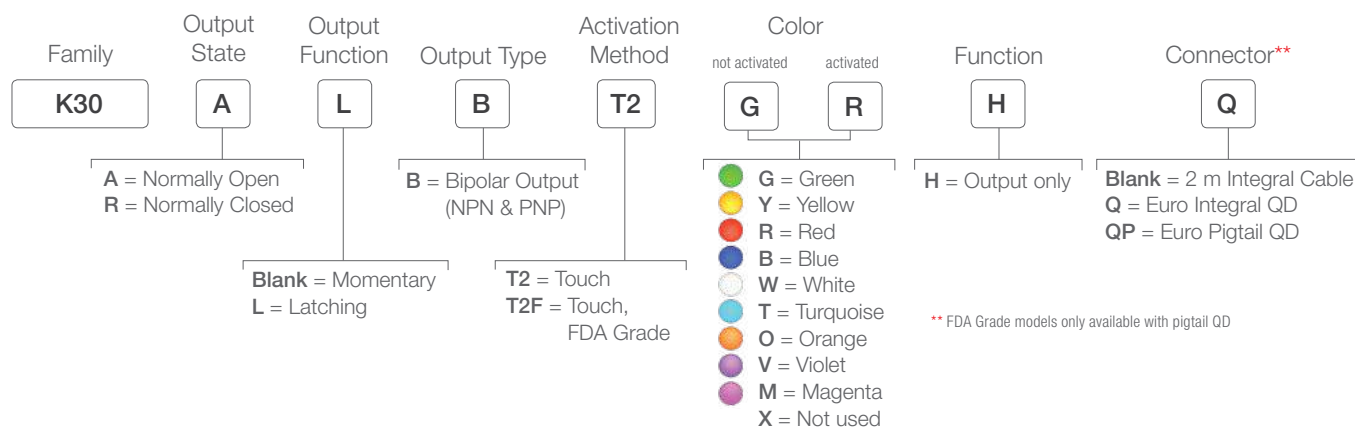
K30 Multipurpose Touch Button, One-, Two- or Three Color,

Example Model Number: K30APT2GRYF2Q



K30 Illuminated Touch Button,

Example Model Number: K30ALBT2GRHQ



Connection Option: A model with a QD requires a mating cordset.



4-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Additional cordset information is available.
See page 758



SMB22A



SMB22FVK



SMBAMS22P



SMB22RAVK

Additional bracket information is available.
See page 727




K30



K30 with Food-Grade Housing

K30 Touch Specifications

Supply Voltage	12 to 30 V dc
Supply Current	55 mA max current (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Construction	Housing: Polycarbonate or FDA Grade Polycarbonate, depending on model Translucent dome: Polycarbonate or FDA Grade Polycarbonate, depending on model Mounting Nut: PBT
Environmental Rating	Standard: UL Type 4x, 13 FDA Grade: UL Type 4x IEC IP67, IP69K per DIN 40050-9 Cabled models also meet IP69K if the cable and cable entrance are protected from high-pressure spray
Connections	Integral 4-pin Euro style QD, or 2 m PVC integral cable, or 4-pin 150 mm Euro-style PVC pigtail QD
Operating Conditions	Temperature: -40 to +50 °C Max. Relative Humidity: 90% @ +50 °C max. relative humidity (non-condensing) Storage Temperature: -40 to +70 °C
Certifications	CE 

K50 Touch Series

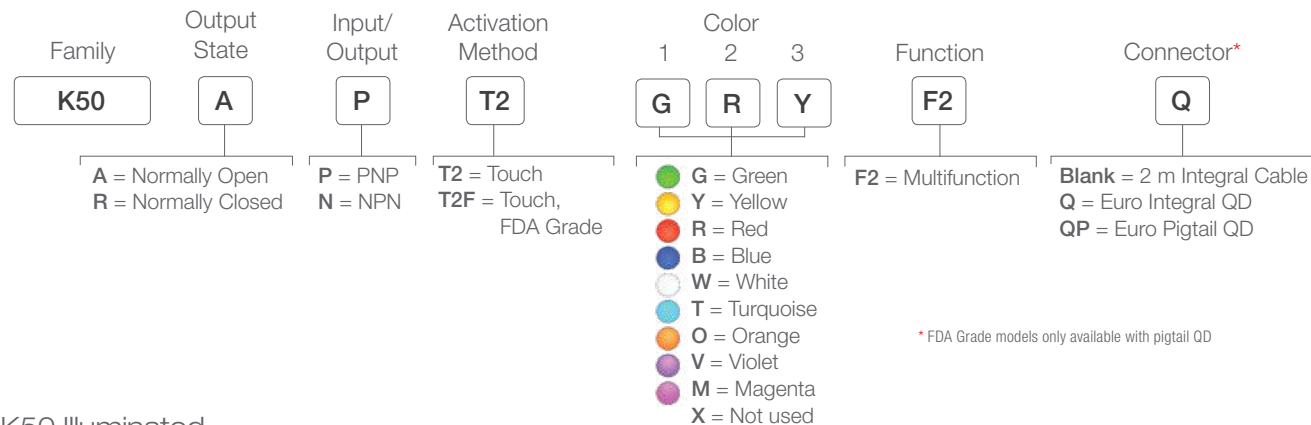
Touch Buttons



- Inputs are totally independent of the touch activated output, making these devices flexible for use in countless applications.
- Up to three independent colors in one unit with many color options available
- Momentary versions remain activated as long as touch is present, while latching versions toggle between activated and not activated states on successive touches
- Excellent immunity to false triggering by water spray, detergents, oils, and other foreign materials
- Rugged, water-resistant IP69K design for washdown environments
- Ergonomically designed to eliminate hand, wrist and arm stresses, requiring no physical pressure to operate and can be actuated with bare hands or work gloves

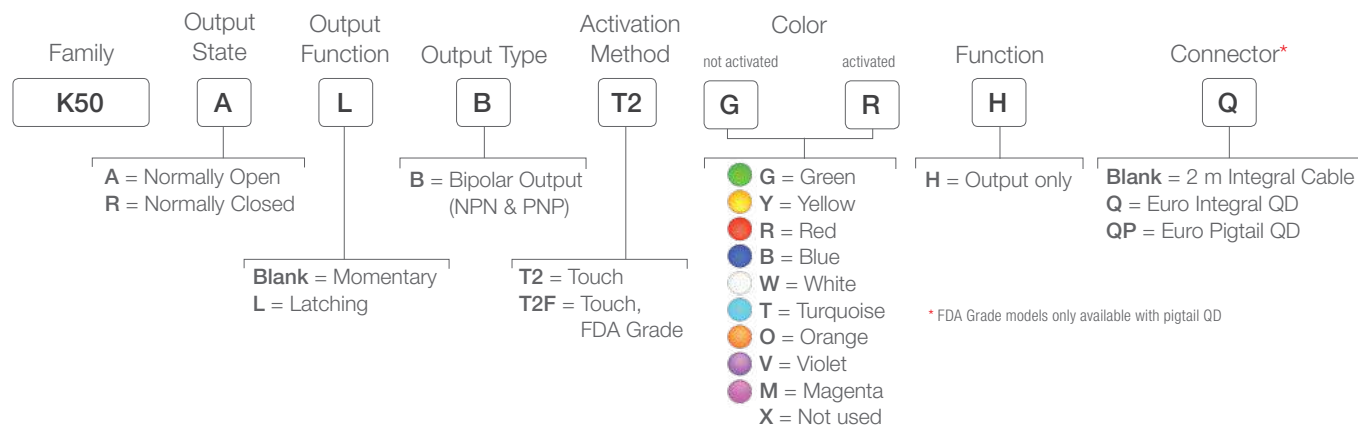
K50 Multipurpose

Example Model Number: K50APT2GRYF2Q



K50 Illuminated

Example Model Number: K50ALBT2GRHQ



Connection Option: A model with a QD requires a mating cordset.

TOUCH BUTTONS

PICK-TO-LIGHT



5-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC1-506RA**)

MQDC1-501.5
0.5 m (1.6')
MQDC1-506
2 m (6.5')
MQDC1-515
5 m (15')
MQDC1-530
9 m (30')



8-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC2-806RA**)

MQDC2-806
2 m (6.5')
MQDC2-815
5 m (15')
MQDC2-830
9 m (30')
MQDC2-850
15 m (50')

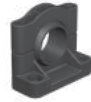
Additional cordset information is available.
See page 758



SMB30A

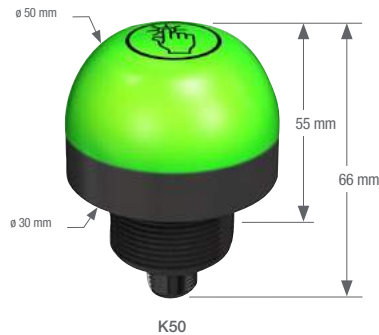


SMB30MM



SMB30SC

Additional bracket information is available.
See page 727



K50



K50 with Food-Grade Housing



Custom laser marking available

K50 Touch Specifications

Supply Voltage	12 to 30 V dc
Supply Current	Less than 75 mA max current at 12 V dc (exclusive of load) Less than 50 mA max current at 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Construction	Housing: Polycarbonate or FDA Grade Polycarbonate, depending on model Translucent dome: Polycarbonate or FDA Grade Polycarbonate, depending on model Mounting Nut: PBT
Environmental Rating	Standard: UL Type 4x, 13 FDA Grade: UL Type 4x IEC IP67, IP69K per DIN 40050-9. Cabled models also meet IP69K if the cable and cable entrance are protected from high-pressure spray
Connections	Integral 5-pin Euro style QD, or 2 m PVC integral cable, or 5-pin 150 mm Euro-style PVC pigtail QD
Operating Conditions	Temperature: -40 to +50 °C Max. Relative Humidity: 90% @ +50 °C max. relative humidity (non-condensing) Storage Temperature: -40 to +70 °C
Certifications	

K70 Touch Series

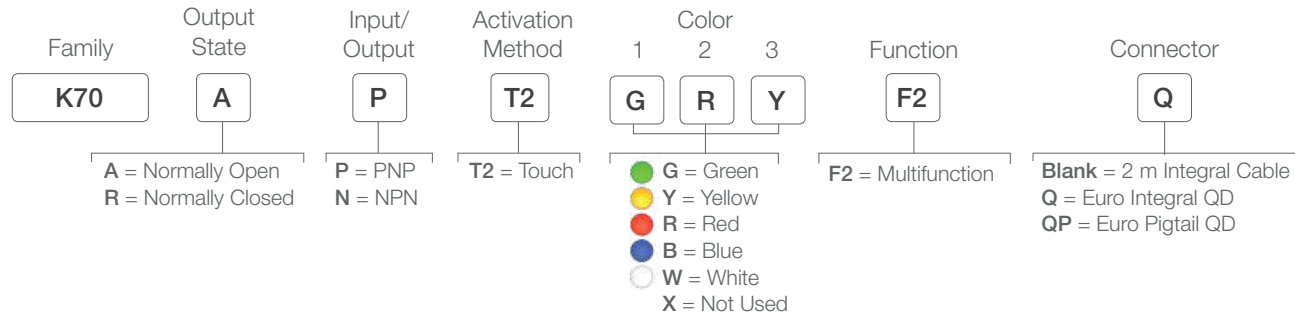
Illuminated Touch Buttons



- Excellent immunity to false triggering by water spray, detergents, oils, and other foreign materials
- Ergonomically designed to eliminate hand, wrist, and arm stresses associated with repeated switch operation; require no physical force to operate
- Can be actuated with bare hands or in gloves
- Rugged IP65 polycarbonate construction
- Momentary versions remain activated as long as touch is present
- Latching versions start up not activated and toggle between activated and not activated on successive touches
- Available in five color options and one-, two- and three-color models

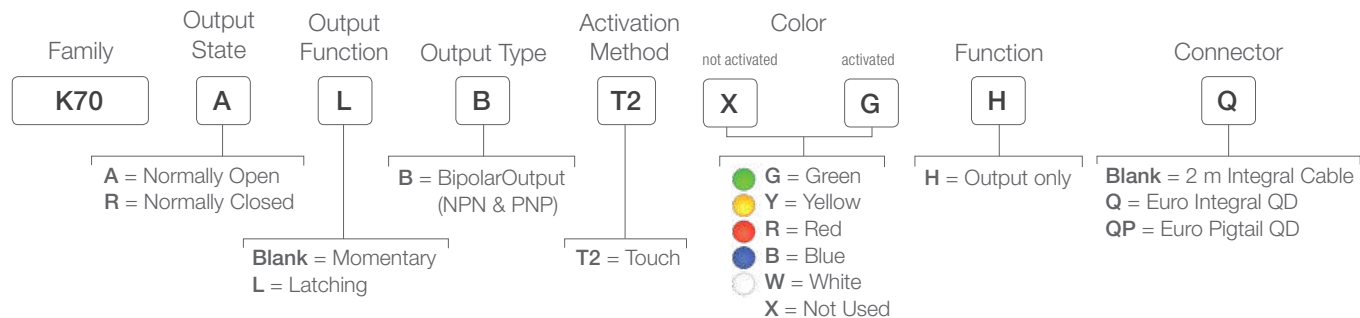
K70 Multipurpose Touch Button

Example Model Number: K70APT2GRYF2Q



K70 Illuminated Touch Button

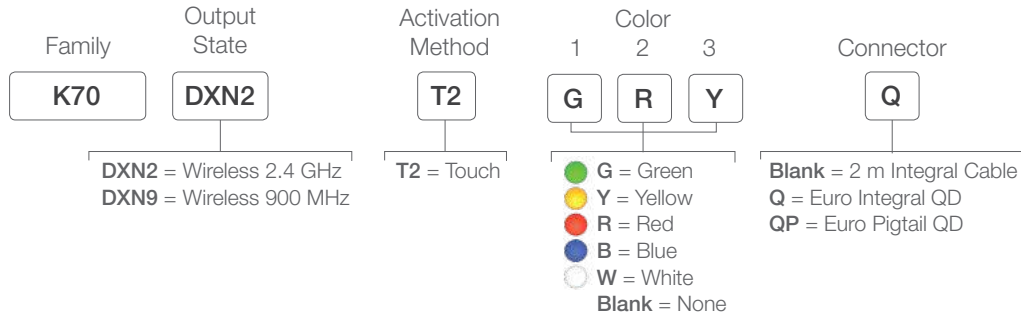
Example Model Number: K70ALBT2XGHQ



 Connection Option: A model with a QD requires a mating cordset.

K70 Wireless Touch Button

Example Model Number: K70DXN2T2GRYQ



5-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC1-506RA**)

MQDC1-501.5
0.5 m (1.6')
MQDC1-506
2 m (6.5')
MQDC1-515
5 m (15')
MQDC1-530
9 m (30')



SMB30A



SMB30MM



SMBAMS30P



SSA-MBK-EEC1

Additional cordset information is available.
See page 758

Additional bracket information is available.
See page 727

K70 Touch Specifications

Supply Voltage	12 to 30 V dc
Supply Current	< 220 mA maximum current at 12 V dc < 110 mA maximum current at 30 V dc
Supply Protection Circuitry	Protected against transient voltages
Radio Range* (Wireless Models)	900 MHz, 1 Watt (Internal antenna): Up to 3.2 km (2 miles) 2.4 GHz, 65 mW (Internal antenna): Up to 1000 m (3280 ft) with line of sight
Separation Distance (Wireless Models)	900 MHz, 1 Watt: 4.57 m (15 ft) 2.4 GHz, 65 mW: 0.3 m (1 ft)
Construction	Housing: Polycarbonate Translucent dome: Polycarbonate Mounting Nut: PBT
Environmental Rating	IEC IP65
Connections	Integral 5-pin Euro style QD, or 2 m PVC integral cable, or 5-pin 150 mm Euro-style PVC pigtail QD
Operating Conditions	Temperature: -40 to +50 °C Max. Relative Humidity: 95% @ +50 °C max. relative humidity (non-condensing)
Certifications	

* Radio range significantly decreases without line of sight. Always verify your wireless network's range by running a site survey.

K30L and K50L Series

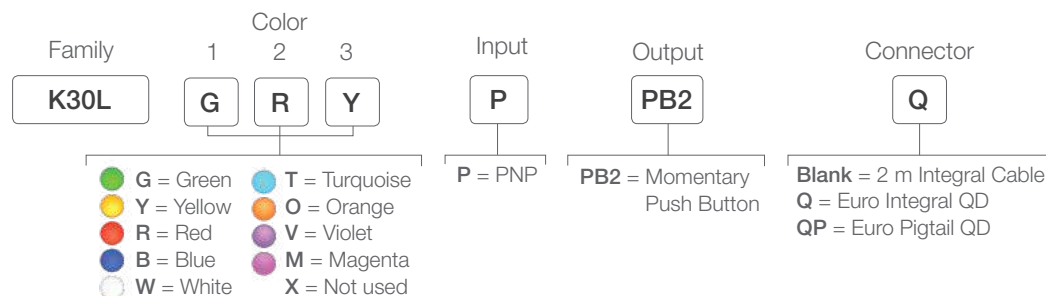
Illuminated Push Buttons



- Feature sealed push button that can withstand washdown applications
- Extremely bright and can be seen from all directions due to their unique shape
- Rugged, encapsulated construction allows them to be used as stand alone devices without an enclosure
- Up to three colors in one device with a variety of colors for customized indication
- Quick-disconnect models for easy installation
- Dry contact switch output is completely isolated from the LED indicator input
- Designed for panel-mount or stand-alone applications

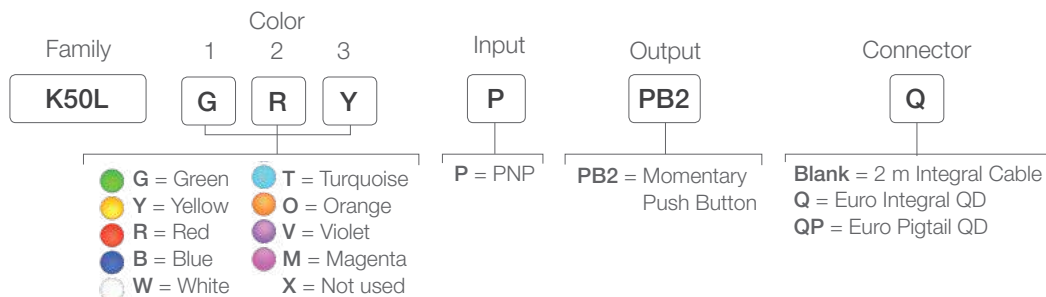
K30L Push Button

Example Model Number: K30LGRYPPB2Q



K50L Push Button

Example Model Number: K50LGRYPPB2Q



 Connection Option: A model with a QD requires a mating cordset.



5-Pin

MQDC1-501.5
0.5 m (1.6')
MQDC1-506
2 m (6.5')
MQDC1-515
5 m (15')
MQDC1-530
9 m (30')

Euro-Style

Straight connector models listed;
for right-angle, add **RA** to the end
of the model number (example,
MQDC1-506RA)

*Additional cordset information is available.
See page 758*



8-Pin

MQDC2-806
2 m (6.5')
MQDC2-815
5 m (15')
MQDC2-830
9 m (30')
MQDC2-850
15 m (50')

Euro-Style

Straight connector models listed;
for right-angle, add **RA** to the end
of the model number (example,
MQDC2-806RA)

**SMB22A**

for use with K30

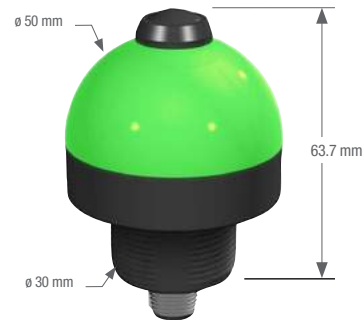
**SMB30A**

for use with K50

*Additional bracket information is available.
See page 727*



K30L Push Models



K50L Push Models

K30L and K50L Illuminated Push Button Specifications

Supply Voltage and Current	K30: 10 to 30 V dc @ 40 mA max. per LED color K50: 12 to 30 V dc 65 mA @ 12 V dc; 35 mA @ 30 Vdc max. per LED color
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of output
Construction	Base: Polycarbonate Translucent dome: Polycarbonate Push button: Thermoplastic
Environmental Rating	IEC IP65
Connections	Integral Euro-style QD fitting, PVC-jacketed 2 m cable or 150 mm PVC pigtail with QD, depending on model
Operating Conditions	Temperature: -40 to +50 °C Max. Relative Humidity: 90% @ +50 °C max. relative humidity (non-condensing) Storage Temperature: -40 to +70 °C
Certifications	CE

OTB/LTB Series

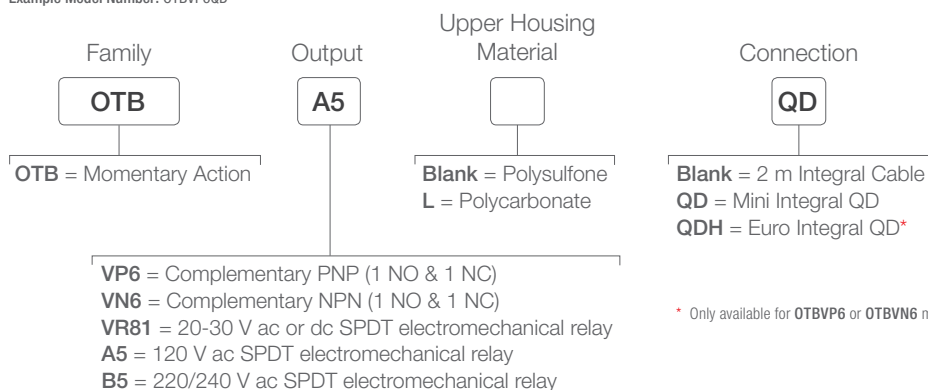
Optical Touch Buttons



- LED indicators to signal “power on” and “output active” conditions.
- Optimized for easy mounting with 30 mm threaded base
- Ergonomic design eliminates hand, wrist and arm stress
- Momentary and alternate action models available
- Available in a wide variety of voltage ranges and output types to suit any application
- Field covers (black) included to prevent inadvertent activation from loose clothing, debris, etc.

OTB

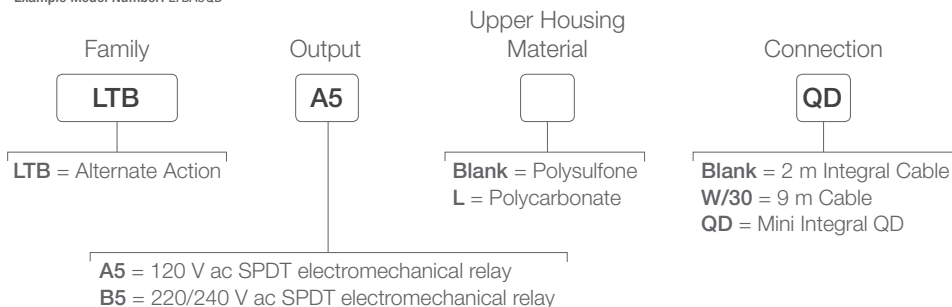
Example Model Number: OTBVP6QD



* Only available for OTBVP6 or OTBVN6 models

LTB

Example Model Number: LTBA5QD



Connection Option: A model with a QD requires a mating cordset.

TOUCH BUTTONS

PICK-TO-LIGHT

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)



4-Pin

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Mini-Style

Straight connector models only



4-Pin

MBCC-406
2 m (6.5')
MBCC-412
4 m (12')
MBCC-415
9 m (30')

5-Pin

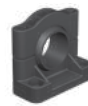
MBCC-506
2 m (6.5')
MBCC-512
4 m (12')
MBCC-515
9 m (30')



SMB30A



SMB30MM



SMB30SC

Additional cordset information is available. See page 758

Additional bracket information is available. See page 728

Field Covers



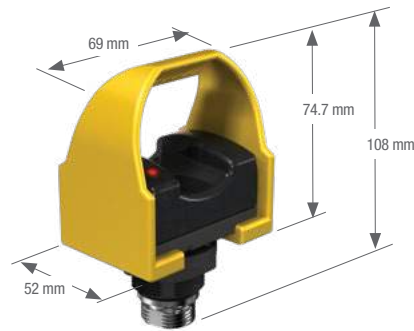
OTC-1-BK
Black
OTC-1-GN
Green
OTC-1-RD
Red
OTC-1-YW
Yellow



OTCL-1-BK
Black
OTCL-1-GN
Green
OTCL-1-RD
Red
OTCL-1-YW
Yellow



OTB and LTB Models



OTB and LTB Models with cover

OTB/LTB Specifications

Supply Voltage and Current	<p>OTBVR81 models: 20 to 30 V ac/dc OTBA5 & LTBA5 models: 105 to 130 V ac, 50-60 Hz</p> <p>All models require less than 25 mA (exclusive of load)</p>	<p>OTBB5 & LTBB5 models: 210 to 250 V ac, 50-60 Hz OTBVN6/VP6 models: 10 to 30 V dc</p>
Supply Protection Circuitry	Protected against reverse polarity and transient voltages	
Output Configuration	<p>OTBVR81, OTBA5, OTBB5 and all LTB models: SPDT electromechanical relay OTBVN6 models: Complementary NPN (sinking) open-collector transistor; 1 normally open (NO) and 1 normally closed (NC) OTBVP6 models: Complementary PNP (sourcing) open-collector transistors; 1 normally open (NO) and 1 normally closed (NC)</p>	
Output Rating	<p>Electromechanical relay models: Max. switching current: 7 amps (resistive load), 1 HP max. Min. load: 0.05 watts (dc), 0.05 VA (ac) Mechanical life of relay: 50,000,000 operations (min.) Electrical life of relay: 100,000 operations (min.) at full resistive load Transient suppression is recommended when switching inductive loads</p>	<p>Solid-state output models: 150 mA max. load (each output) ON-state saturation voltage: less than 1 volt at signal levels; less than 1.5 volts at full load OFF-state leakage current: less than 1 μA</p>
Response Time	100 milliseconds ON/OFF	
Output Protection	All models protected against false pulse on power-up; Models with solid-state outputs have overload and short circuit protection	
Indicators	Two Red indicator LEDs: one lights whenever power is applied; the other lights whenever the switch is activated making the normally-open (NO) output conduct	
Construction	Totally encapsulated, non-metallic enclosure. Black polysulfone or red polycarbonate upper housing (see Application Notes below); fiber-reinforced thermoplastic polyester base. Electronics fully epoxy-encapsulated. Supplied with a field cover of polypropylene (TP).	
Environmental Rating	Meets NEMA standards 1, 3, 4, 4X, 12 and 13; IEC IP66	
Ambient Light Immunity	120,000 lux (direct sunlight)	
EMI/RFI Immunity	Immune to both single and mixed EMI and RFI noise sources	
Operating Conditions	Temperature: -20 to +50 °C Relative humidity: 90% at 50 °C (non-condensing)	
Application Notes	<p>Environmental considerations for models with polysulfone upper housings: The polysulfone upper housing will become embrittled with prolonged exposure to outdoor sunlight. Window glass effectively filters longer wavelength ultraviolet light and provides excellent protection from sunlight.</p> <p>Environmental considerations for models with polycarbonate upper housings: Avoid prolonged exposure to hot water and moist high-temperature environments above 66 °C. Avoid contact with aromatic hydrocarbons (such as xylene and toluene), halogenated hydrocarbons and strong alkalis. Clean periodically using mild soap solution and a soft cloth. Avoid strong alkaline materials.</p>	

Certifications



VTB Series

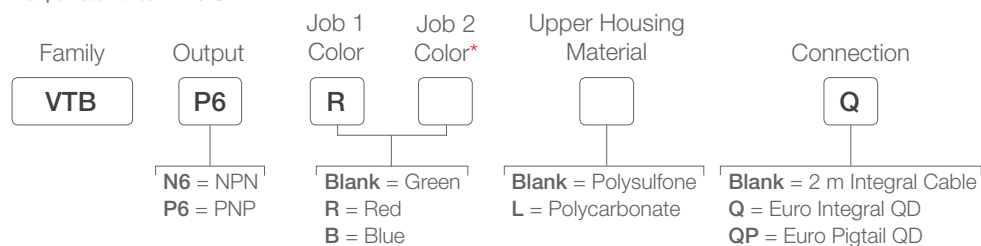
Optical Touch Buttons



- Illuminated version of the Optical Touch Button
- Ergonomic design eliminates hand, wrist and arm stress
- Provides bright, easy-to-see status indication that can be seen in almost any environment
- One- and two-color models available
- 30 mm threaded base for convenient mounting

VTB One- or Two Color

Example Model Number: VTBP6RQ



* Leave Job Color 2 blank for one-color model



Connection Option: A model with a QD requires a mating cordset.



4-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

MQDC-406

2 m (6.5')

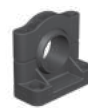
MQDC-415

5 m (15')

MQDC-430

9 m (30')

Additional cordset information is available.
See page 758

**SMB30FA****SMB30MM****SMB30SC**

Additional bracket information is available.
See page 728

**Field Covers****OTC-1-BK**

Black

OTC-1-GN

Green

OTC-1-RD

Red

OTC-1-YW

Yellow

OTCL-1-BK

Black

OTCL-1-GN

Green

OTCL-1-RD

Red

OTCL-1-YW

Yellow

VTB Specifications

Supply Voltage and Current	12 to 30 V dc (10% max. ripple) Single-color models: Less than 120 mA max. current @ 12 V dc (exclusive of load) Less than 70 mA max. current @ 30 V dc (exclusive of load) Two-color models: Less than 67 mA max. current @ 12 V dc (exclusive of load) Less than 40 mA max. current @ 24 V dc (exclusive of load) Less than 35 mA max. current @ 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against transient voltages (fast-transient and over-voltage) and reverse polarity
Output Configuration	Choose 1 current sinking (NPN) open collector transistor or 1 current sourcing (PNP) open collector transistor, depending on model
Output Rating	Max. load: 150 mA ON-state saturation voltage: less than 1.5 V @ 150 mA OFF-state leakage current: less than 10 µA
Output Protection	All models protected against false pulse on power-up (outputs held OFF for 1 second at power-up). Models with solid-state outputs have overload and short-circuit protection.
Response Time	100 milliseconds ON/OFF
Indicators	2 Red LED indicators: Power ON and Output Conducting Base: Lights green, red, blue, or green and red as a job light when input line is enabled. One-color models may be wired for flashing rather than solid color operation.
Construction	Totally encapsulated, non-metallic enclosure. Black polysulfone or red polycarbonate upper housing (see Application Note); translucent white polycarbonate base. Electronics fully epoxy-encapsulated.
Environmental Rating	IEC IP66 ; NEMA 1, 3, 4, 4X, 12
Connections	2 m or 9 m attached cable, or 4-pin (single color) or 5-pin (two color) Euro-style QD fitting. QD cordsets are ordered separately.
Ambient Light Immunity	Up to 120,000 lux (direct sunlight)
EMI/RFI Immunity	Immune to EMI and RFI noise sources, per IEC 947-5-2.
Operating Conditions	Temperature: -20° to +50° C Relative humidity: 90% @ +50° C (non-condensing)

Certifications





Pick-to-Light

Banner offers the most extensive line of light-guided assembly solutions. Pick-to-Light products have unique, rugged packages with a choice of verification functions and are easy to mount for quick installation.

Series	Description	Number of Colors	Dimensions H x W x D	Power Supply	Communication
	K30 A versatile family that combines a small, bright indicator with solid-state switching capability activated by a simple touch. page 484	1 to 3 (9 color options)	ø 22 mm base with ø 30 mm light	12 to 30 V dc	NA
	K50 A versatile family that combines a large, bright indicator with solid-state switching capability activated by a simple touch. page 486	1 to 3 (9 color options)	ø 30 mm base with ø 50 mm light	12 to 30 V dc	Modbus Option
	K70 A versatile family that combines a large, bright indicator with solid-state switching capability activated by a simple touch. page 488	1 to 3 (5 color options)	ø 30 mm base with ø 70 mm light	12 to 30 V dc	Wireless Option
	K50 A reliable photoelectric sensing for non-contact part-picking applications. page 490	1 or 3 (9 color options)	ø 30 mm base with ø 50 mm light	12 to 30 V dc	Modbus Option
	K30, K50 & K80 Push Buttons 30 or 50 mm translucent dome containing one to three colored lights and a push button. page 492	1 to 3 (9 color options)	K30: ø 22 mm base with ø 30 mm light K50: ø 30 mm base with ø 50 mm light K80: 80 mm housing with ø 50 mm light	12 to 30 V dc	NA
	VTB Features a brightly illuminated base for enhanced visual indication. page 494	1 (3 color options)	57 x 60 43 mm	12 to 30 V dc	NA
	PVD A compact, one-piece solutions useful in many part assembly, pick-to-light and error-proofing applications. page 496	2	H (137.8 or 266.4) 30 x 16.4 mm	12 to 30 V dc	NA
	PVL A retroreflective sensor that offers a reliable, cost-effective solution for bin-picking processes. page 498	2	H (225 or 500) 32.9 x 37.3 mm	12 to 30 V dc	NA
	PVA Helps reduce missed and misassembled parts for increased quality and reduced production costs. page 500	1	H (varies by model) 30 x 15 mm	12 to 30 V dc	NA

K30 Touch Series

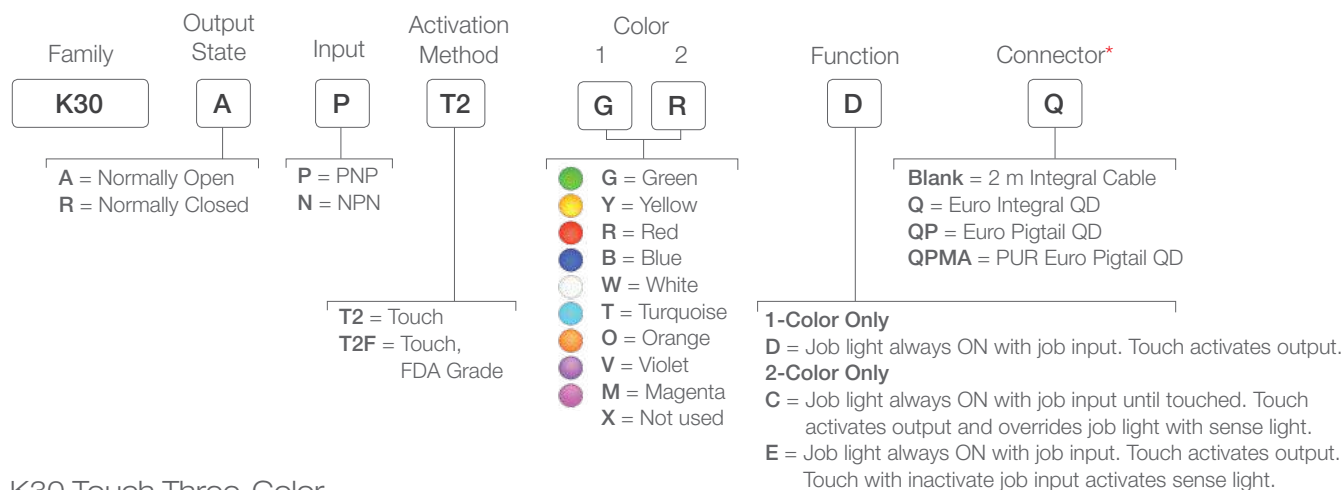
Pick-to-Light Sensor



- Ergonomic design requires no physical pressure to operate, preventing stress on hands and wrists
- Rugged indicator with 22 mm threaded base to fit into industry standard punched holes making it ideal for error proofing of bin-picking and parts-verification applications
- Simple operation with the touch of a finger, hand or whole palm with or without gloves
- One- and two-color models available with a variety of colors and option of custom laser surface marking
- Rugged, water-resistant IP69K housing
- Excellent immunity to false triggering by water spray, detergents, oils, and other foreign materials

K30 Touch One or Two Color,

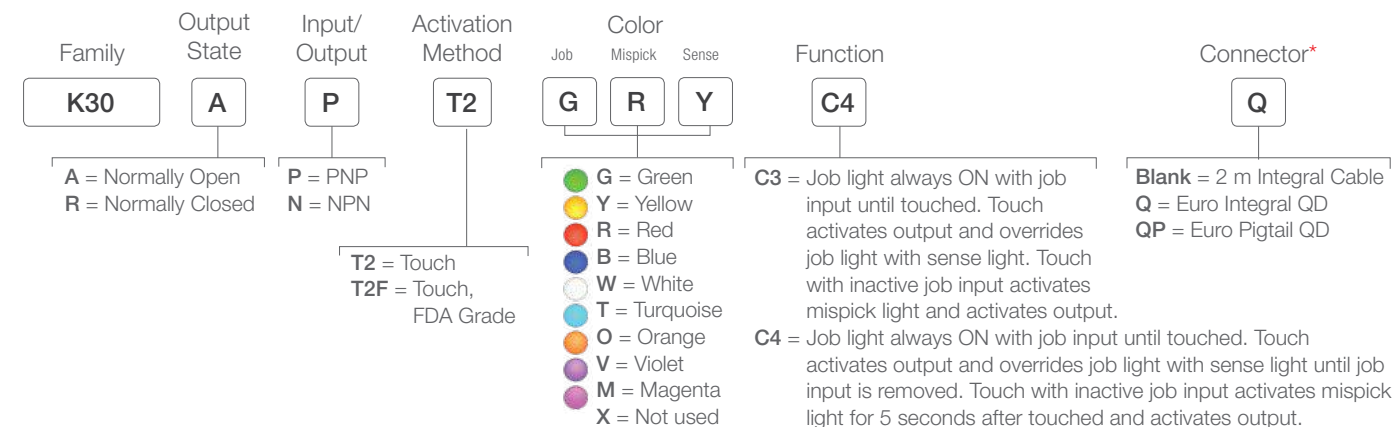
Example Model Number: K30APT2GRDQ



* FDA Grade models only available with pigtail QD

K30 Touch Three-Color

Example Model Number: K30APTGRYC4Q



* FDA Grade models only available with pigtail QD

Connection options: A model with a QD requires a mating cordset.

TOUCH BUTTONS

PICK-TO-LIGHT

Euro-Style

Straight connector models listed;
for right-angle, add **RA** to the end
of the model number (example,
MQDC-406RA)



4-Pin

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Additional cordset information is available.
See page 758



SMB22A



SMB22FVK



SMBAMS22P



SMB22RAVK



Additional bracket information is available.
See page 727



K30

K30 with Food-Grade
Housing

K30 Touch Specifications

Supply Voltage	12 to 30 V dc
Supply Current	55 mA max current (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Construction	Housing: Polycarbonate or FDA Grade Polycarbonate, depending on model Translucent dome: Polycarbonate or FDA Grade Polycarbonate, depending on model Mounting Nut: PBT
Environmental Rating	Standard: UL Type 4x, 13 FDA Grade: UL Type 4x IEC IP67, IP69K per DIN 40050-9 Cabled models also meet IP69K if the cable and cable entrance are protected from high-pressure spray
Connections	Integral 4-pin Euro style QD, or 2m PVC integral cable
Operating Conditions	Temperature: -40 to +50 °C Max. Relative Humidity: 90% @ +50 °C max. relative humidity (non-condensing) Storage Temperature: -40 to +70 °C
Certifications	 

K50 Touch

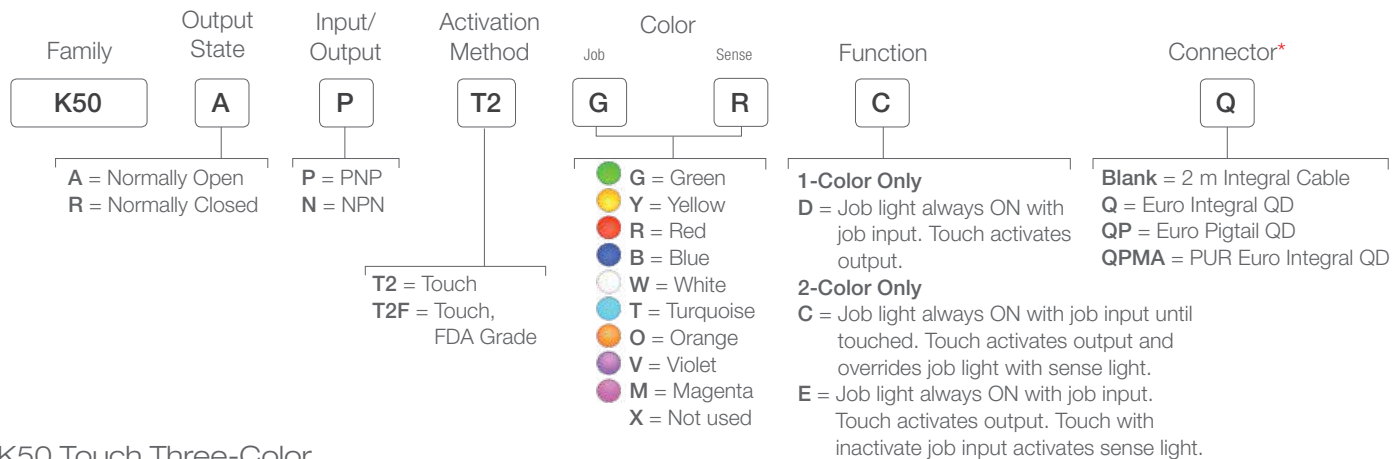
Pick-to-Light Sensor



- Easy-to-use lighted touch button indicators allow for increased productivity with highly visible indication.
- Ergonomic design requires no physical pressure to operate, preventing stress on hands and wrists
- Ideal for efficient pick-to-light applications where a rugged device is needed
- Simple operation with the touch of a finger, hand or whole palm with or without gloves
- Excellent immunity to false triggering by water spray, detergents, oils, and other foreign materials
- One-, two- and three-color models available with a variety of colors and option of custom laser surface marking
- Rugged, water-resistant IP69K housing

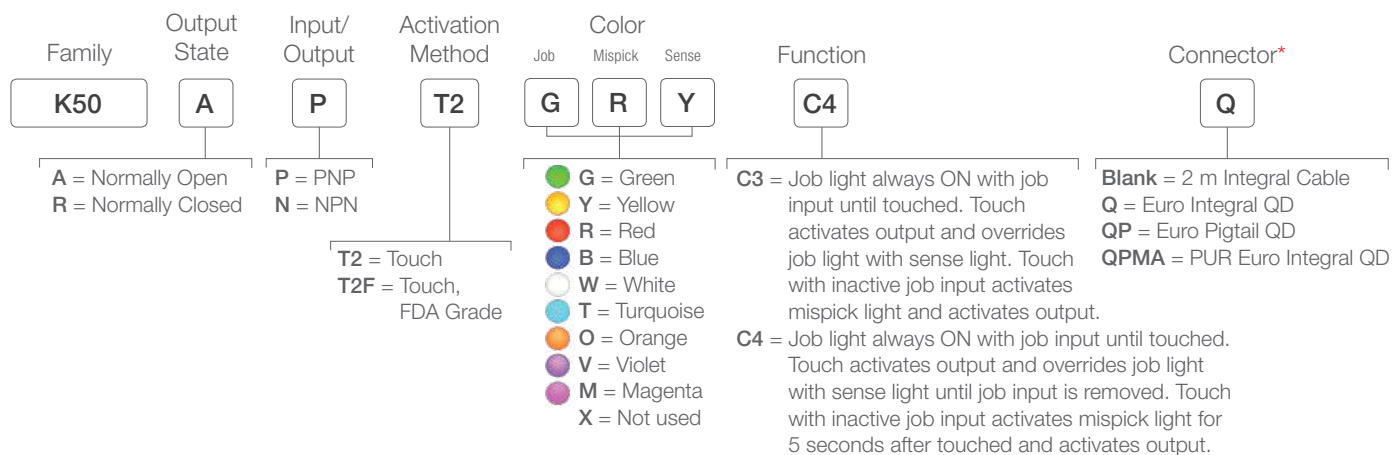
K50 Touch One- or Two-Color

Example Model Number: K50APT2GRCQ



K50 Touch Three-Color

Example Model Number: K50APT2GRYCQ



* FDA Grade models only available with pigtail QD

* FDA Grade models only available with pigtail QD

Connection options: A model with a QD requires a mating cordset.



5-Pin

Euro-Style

Straight connector models listed;
for right-angle, add **RA** to the end
of the model number (example,
MQDC1-506RA)

MQDC1-506

2 m (6.5')

MQDC1-515

5 m (15')

MQDC1-530

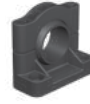
9 m (30')



SMB30A



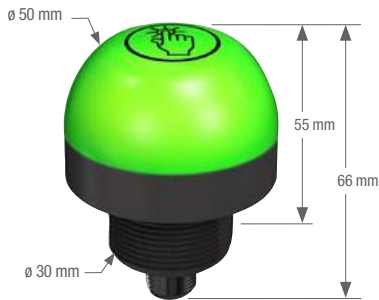
SMB30MM



SMB30SC

Additional cordset information is available.
See page 758

Additional bracket information is available.
See page 727





K50

K50 with Food-Grade
Housing

Custom laser marking available

K50 Touch Specifications

Supply Voltage	12 to 30 V dc
Supply Current	Less than 75 mA max current at 12 V dc (exclusive of load) Less than 50 mA max current at 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Construction	Housing: Polycarbonate or FDA Grade Polycarbonate, depending on model Translucent dome: Polycarbonate or FDA Grade Polycarbonate, depending on model Mounting Nut: PBT
Environmental Rating	Standard: UL Type 4x, 13 FDA Grade: UL Type 4x IEC IP67, IP69K per DIN 40050-9 Cabled models also meet IP69K if the cable and cable entrance are protected from high-pressure spray
Connections	Integral 5-pin Euro style QD, or 2 m PVC integral cable, or 5-pin 150 mm Euro-style PVC pigtail QD
Operating Conditions	Temperature: -40 to +50 °C Max. Relative Humidity: 90% @ +50 °C max. relative humidity (non-condensing) Storage Temperature: -40 to +70 °C
Certifications	 

K70 Touch Series

Pick-to-Light Sensor



- Excellent immunity to false triggering by water spray, detergents, oils, and other foreign materials
- Ergonomically designed to eliminate hand, wrist, and arm stresses associated with repeated switch operation; require no physical force to operate
- Can be actuated with bare hands or in gloves
- Rugged IP65 polycarbonate construction
- Momentary versions remain activated as long as touch is present
- Latching versions start up not activated and toggle between activated and not activated on successive touches
- Available in nine color options and one-, two- and three-color models

K70 Pick-to-Light

Example Model Number: K70APT2GXDQ



K70 Specialty Pick-to-Light

Example Model Number: K70APT2GRYC4Q



Connection Option: A model with a QD requires a mating cordset.



4-Pin

Euro-Style

Straight connector models listed;
for right-angle, add **RA** to the end
of the model number (example,
MQDC-406RA)

MQDC-406

2 m (6.5')

MQDC-415

5 m (15')

MQDC-430

9 m (30')

Additional cordset information is available.
See page 758



SMB30A



SMB30MM



SMBAMS30P





SSA-MBK-EEC1

Additional bracket information is available.
See page 727



K70 Touch Specifications

Supply Voltage	12 to 30 V dc
Supply Current	< 220 mA maximum current at 12 V dc < 110 mA maximum current at 30 V dc
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Construction	Housing: Polycarbonate Translucent dome: Polycarbonate Mounting Nut: PBT
Environmental Rating	IEC IP65
Connections	Integral 5-pin Euro style QD, or 2 m PVC integral cable, or 5-pin 150 mm Euro-style PVC pigtail QD
Operating Conditions	Temperature: -40 to +50 °C Max. Relative Humidity: 95% @ +50 °C max. relative humidity (non-condensing)
Certifications	 

K50 Optical Series

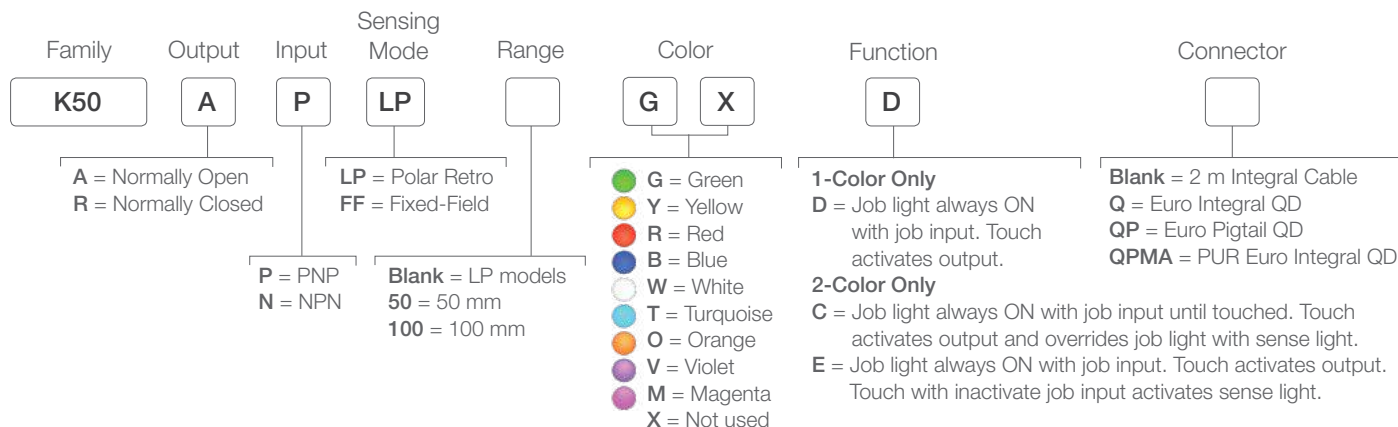
Pick-to-Light Sensor



- The K50FF and K50LP use reliable photoelectric sensing for non-contact part-picking applications.
- Photoelectric pick acknowledgment
- Fixed-field or polarized retroreflective depending on model
- Simple, one-piece, cost-effective installations
- Easily mounted on any type of tube rack or shelving
- Several logic functions available to customize the operation of the application and control system

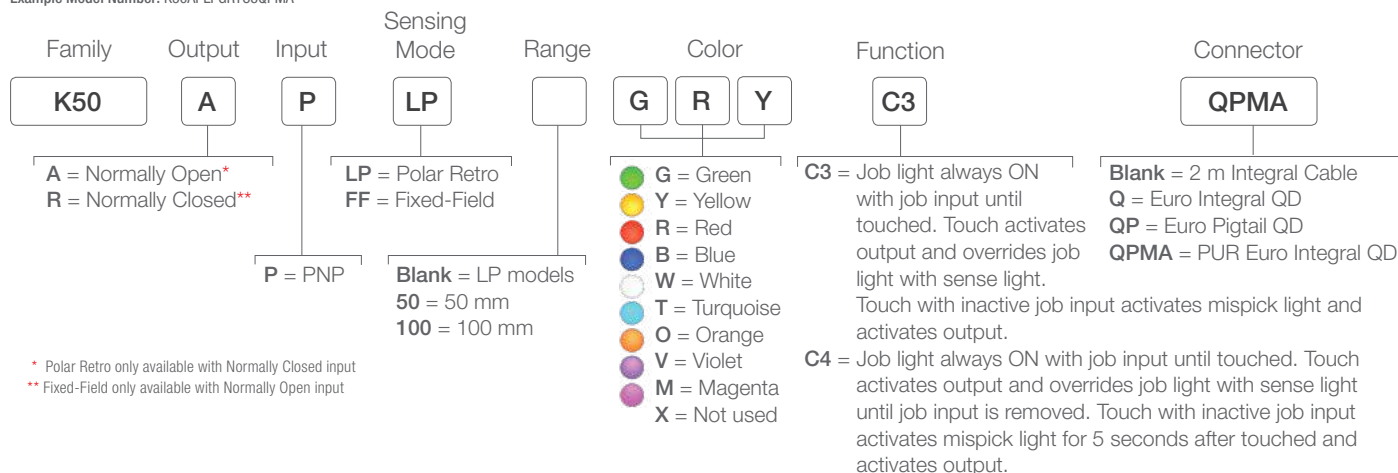
K50 One- or Two-Color

Example Model Number: K50APLPGX



K50 Three-Color

Example Model Number: K50APLPGRYC3QPMA



* Polar Retro only available with Normally Closed input

** Fixed-Field only available with Normally Open input

Connection options: A model with a QD requires a mating cordset.

**Euro-Style**

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

4-Pin

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

5-Pin

MQDC-506
2 m (6.5')
MQDC-515
5 m (15')
MQDC-530
9 m (30')

Additional cordset information is available.
See page 758

Reflectors

Additional information is available.
See page 790

**SMB30A****SMB30FA..****SMB30RAVK**

Additional bracket information is available.
See page 727

Andon Rope Pull Brackets

SMBARPL30
(Left Side)
SMBARPR30
(Right Side)
SMBARPB30
(Both Sides)

**K50 Specifications**

Supply Voltage and Current	12 to 30 V dc, (10% max. ripple)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Output Configuration	PNP or NPN (depending on model)
Output Rating	150 mA max. C3 and C4 models: ON-state saturation voltage: PNP models: Less than 2 V @ 10 mA dc; less than 2.5 V @ 150 mA dc NPN models: Less than 1.5 V @ 10 mA dc; less than 2 V @ 150 mA dc OFF-state leakage current: Less than 10 µA @ 30 V dc All others: OFF-state leakage current: Less than 10 µA @ 30 V dc ON-state voltage: less than 2 V @ 10 mA dc; less than 2.5 V @ 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of output
Output Response Time	C3 and C4 models: 5 milliseconds ON/OFF All others: 3 milliseconds ON/OFF
Indicators	C3 models: Entire translucent dome provides indicator light. Job ("Pick") indicator–Green Pick Sensed indicator–Yellow Mispick indicator–Red All others: 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: 8000Ω Sinking–Input low less than 1.5 V Sourcing–Input high greater than 7 V
Construction	Base and translucent dome: Polycarbonate Lens: Polycarbonate or acrylic Push Button: Thermoplastic
Environmental Rating	Fully encapsulated; IEC IP67 Integral QD models: IP69K when using IP69K-rated cordsets Pigtail and cable models: IP69K when mounted with conduit
Connections	C3 and C4 models: 5-pin 150 mm PUR pigtail Euro-style QD (QPMA). QD cordsets are ordered separately. All others: 2 m or 9 m 4-wire attached cable, 4-pin integral Euro-style QD (Q) or 4-pin 150 mm PVC pigtail Euro-style QD (QP), depending on model QD cordsets are ordered separately.
Ambient Light Immunity	Up to 5,000 lux
EMI/RFI Immunity	Immunity to EMI and RFI noise sources per IEC 947-5-2
Operating Conditions	Temperature: –40 to +50 °C Relative Humidity: 90% at 50 °C (non-condensing)

Certifications

K30, K50 & K80

Pick-to-Light Push Button



- Requires no external controller to operate; completely self-contained
- Indicates job pick status with 30 & 50 mm translucent dome containing one, two or three colored lights
- Shows correct order for selecting parts using a green job light in all models
- Models available with a red light to indicate detection of operator action or mispick
- Models available with 30 mm, Flat or DIN-rail mounting
- Ideal for use in abusive environments—fully encapsulated IP67 construction; some models rated to IP69K depending on installation
- QPMA model options also available

K30, K50, K80 One- or Two-Color

Example Model Number: K30APPBGXD

- Job light is ON at all times while job input is active.
- Pressing push button initiates output change of state.



K50 and K80 Three-Color C-Series

Example Model Number: K50APLPGRYC#QPMA

- Job light is ON at all times while job input is active (unless hand is present)
- Presence of hand (or pressing button) activates output and turns job light Yellow for visual verification that action was sensed
- Presence of hand (or pressing button) while job input is not active turns light Red signaling mispick



Connection options: A model with a QD requires a mating cordset.

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)



4-Pin

- MQDC-406**
2 m (6.5')
- MQDC-415**
5 m (15')
- MQDC-430**
9 m (30')

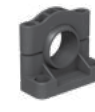
5-Pin

- MQDC-506**
2 m (6.5')
- MQDC-515**
5 m (15')
- MQDC-530**
9 m (30')

Additional cordset information is available. See page 758

K50

K30



SMB30A

SMB30FA..

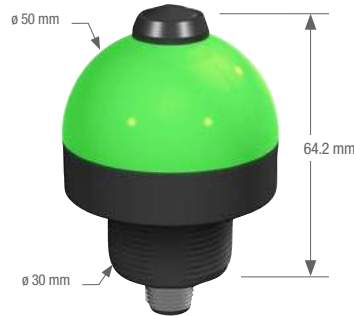
SMB30SC

SMB22A

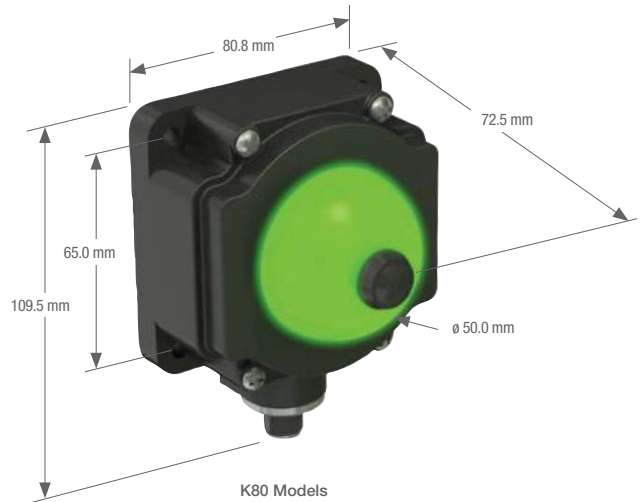
Additional bracket information is available. See page 727



K30 Push Models



K50 Push Models



K80 Models

K30, K50 & K80 Specifications

Supply Voltage and Current	12 to 30 V dc, (10% max. ripple)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (fast transient and over-voltage) and reverse polarity
Output Configuration	PNP or NPN (depending on model)
Output Rating	150 mA max. C3 models: ON-state saturation voltage: PNP models: Less than 2 V @ 10 mA dc; less than 2.5 V @ 150 mA dc NPN models: Less than 1.5 V @ 10 mA dc; less than 2 V @ 150 mA dc OFF-state leakage current: Less than 10 µA @ 30 V dc All others: OFF-state leakage current: Less than 10 µA @ 30 V dc ON-state voltage: less than 2 V @ 10 mA dc; less than 2.5 V @ 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of output
Output Response Time	C3 and C4 models: 5 milliseconds ON/OFF All others: 3 milliseconds ON/OFF
Indicators	C3 and C4 models: Entire translucent dome provides indicator light. Job ("Pick") indicator–Green Pick Sensed indicator–Yellow Mispick indicator–Red All others: 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: 8000Ω Sinking–Input low less than 1.5 V Sourcing–Input high greater than 7 V
Construction	Base and translucent dome: polycarbonate Lens: polycarbonate or acrylic Push Button: thermoplastic or stainless steel
Environmental Rating	Fully encapsulated; IEC IP67 Integral QD models: IP69K when using IP69K-rated cordsets Pigtail and cable models: IP69K when mounted with conduit
Connections	C3 and C4 models: Integral 5-pin Euro style QD, or 2 m PVC integral cable, 5-pin 150 mm Euro-style PVC pigtail QD, or 150 mm PUR pigtail Euro-style QD (QPMA). All others: 2 m or 9 m 4-wire attached cable, 4-pin integral Euro-style QD (Q) or 4-pin 150 mm PVC pigtail Euro-style QD (QP), depending on model.
Ambient Light Immunity	Up to 5,000 lux
EMI/RFI Immunity	Immunity to EMI and RFI noise sources per IEC 947-5-2
Operating Conditions	Temperature: –40 to +50 °C Relative Humidity: 90% at 50 °C (non-condensing)

Certifications



VTB Series

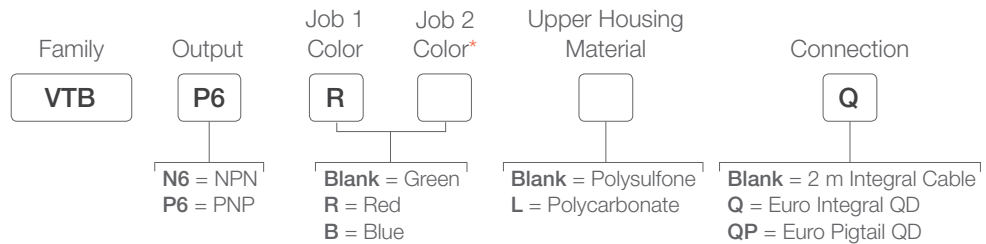
Optical Touch Buttons



- Illuminated version of the Optical Touch Button
- Ergonomic design eliminates hand, wrist and arm stress
- Provides bright, easy-to-see status indication that can be seen in almost any environment
- One- and two-color models available
- 30 mm threaded base for convenient mounting

VTB One- or Two Color

Example Model Number: VTBP6RQ



* Leave Job 2 color box empty for a one color model



Connection Option: A model with a QD requires a mating cordset.

TOUCH BUTTONS

PICK-TO-LIGHT



4-Pin

Euro-Style
Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

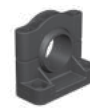
Additional cordset information is available.
See page 758



SMB30FA



SMB30MM



SMB30SC

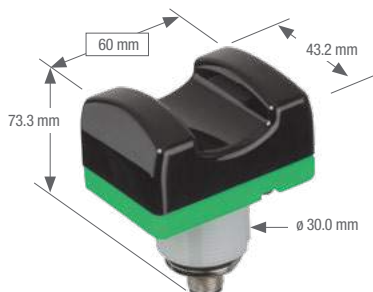
Additional bracket information is available.
See page 728



Field Covers

OTC-1-BK
Black
OTC-1-GN
Green
OTC-1-RD
Red
OTC-1-YW
Yellow

OTCL-1-BK
Black
OTCL-1-GN
Green
OTCL-1-RD
Red
OTCL-1-YW
Yellow



VTB Specifications

Supply Voltage and Current	12 to 30 V dc (10% max. ripple) Single-color models: Less than 120 mA max. current @ 12 V dc (exclusive of load) Less than 70 mA max. current @ 30 V dc (exclusive of load) Two-color models: Less than 67 mA max. current @ 12 V dc (exclusive of load) Less than 40 mA max. current @ 24 V dc (exclusive of load) Less than 35 mA max. current @ 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against transient voltages (fast-transient and over-voltage) and reverse polarity
Output Configuration	Choose 1 current sinking (NPN) open collector transistor or 1 current sourcing (PNP) open collector transistor, depending on model
Output Rating	Max. load: 150 mA ON-state saturation voltage: less than 1.5 V @ 150 mA OFF-state leakage current: less than 10 µA
Output Protection	All models protected against false pulse on power-up (outputs held OFF for 1 second at power-up). Models with solid-state outputs have overload and short-circuit protection.
Response Time	100 milliseconds ON/OFF
Indicators	2 Red LED indicators: Power ON and Output Conducting Base: Lights green, red, blue, or green and red as a job light when input line is enabled. One-color models may be wired for flashing rather than solid color operation.
Construction	Totally encapsulated, non-metallic enclosure. Black polysulfone or red polycarbonate upper housing (see Application Note); translucent white polycarbonate base. Electronics fully epoxy-encapsulated.
Environmental Rating	IEC IP66 ; NEMA 1, 3, 4, 4X, 12
Connections	2 m or 9 m attached cable, or 4-pin (single color) or 5-pin (two color) Euro-style QD fitting. QD cordsets are ordered separately.
Ambient Light Immunity	Up to 120,000 lux (direct sunlight)
EMI/RFI Immunity	Immune to EMI and RFI noise sources, per IEC 947-5-2.
Operating Conditions	Temperature: -20 to +50 °C Relative humidity: 90% @ +50 °C (non-condensing)

Certifications



PVD Series

Parts Verification Array



- Compact, one-piece solution useful in many part assembly, pick-to-light and error-proofing applications
- Innovative, low-profile design with auto-configuration feature for diffuse or retroreflective modes
- Ideal for bin picking in tube rack or shelving applications
- Green light for pick and red light for misspick with selectable control features
- Rugged housing for high durability
- Protective mounting brackets available

PVD

Example Model Number: PVD100Q

Family	Sensing Length	Connection
PVD	100	Q
	100 = 100 mm 225 = 225 mm	Blank = 2 m Integral Cable W/30 = 9 m Integral Cable Q = 2 m Euro Pigtail QD

NOTE: Green job light to indicate user action



Length (L)	Models
137.8 mm	PVD100
266.4 mm	PVD225

 Connection options: A model with a QD requires a mating cordset.



5-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC1-506RA**)

MQDC1-506
2 m (6.5')
MQDC1-515
5 m (15')
MQDC1-530
9 m (30')



SMBPVD...



SMBPVA..C



SMBPVA6

Reflectors



Additional cordset information is available.
See page 758

Additional bracket information is available.
See page 728

Additional information is available
See page 790

PVD Specifications

Sensing Range	Retroreflective applications: 2 m, using 25 mm wide retroreflective tape Diffuse applications: 400 mm, with 18% reflectivity gray card target
Sensing Beam	630 nm, Visible red
Beam Spacing	28.6 mm
Sensing Height	4-channel models: 111 mm 8-channel models: 240 mm
Supply Voltage and Current	Input Voltage: 12 to 30 V dc (10% max. ripple @ 10% duty cycle) Input Current: less than 40 mA @ 24 V dc and less than 70 mA @ 12 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient over-voltage
Sensing Resolution	Retroreflective: 51 mm at 406 mm range, 100 mm at 2 m Diffuse: 55 mm dia. at 400 mm range
Output Configuration	User-selectable via DIP switch: 1 open-collector PNP (current sourcing) or 1 open-collector NPN (current sinking)
Output Rating	150 mA max. OFF-state leakage current: less than 10 μ A ON-state saturation voltage: NPN: less than 1.0 V dc at 150 mA PNP: less than 2.0 V dc at 150 mA
Output Protection Circuitry	Protected against false pulse at power-up and short circuit of outputs
Output Response Time	400 milliseconds (Includes standard 100 milliseconds ON-delay and 100 milliseconds OFF-delay)
Delay at Power-Up	Less than 1.0 second
Indicators	Green: LED to indicate power ON/OFF Yellow: LED to indicate output ON/OFF Job Light: (Diffused Green LED) Turned ON and OFF by applying an external signal to the Job input (white wire). The job lights will be active high or active low, depending on user selection of DIP switch 4. Error Light: (Diffused Red LED) Turned ON and OFF by detection of an output event when job light is not ON.
Adjustments	4 DIP switches, located behind access panel (*denotes default setting): 1. PNP*/NPN output 2. Normally Open operation†/Normally Closed 3. Job light ON solid*/Job light flashing 4. Job light input high*/Job light input low
Construction	Black painted aluminum housing; acrylic lenses; thermoplastic polyester end caps; thermoplastic elastomer programming switch cover; stainless steel mounting brackets and hardware
Environmental Rating	NEMA 2; IEC IP62
Connections	5-conductor PVC-jacketed 2 m cable which is either unterminated or terminated with a 5-pin Euro-style quick-disconnect connector, depending on model. Cable diameter is 3.3 mm. QD cordsets are ordered separately.
Operating Conditions	Temperature: 0° to +50° C Relative humidity: 90% relative humidity @ 50° C (non-condensing)
Certifications	

PVL Series

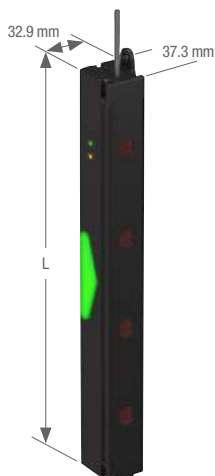
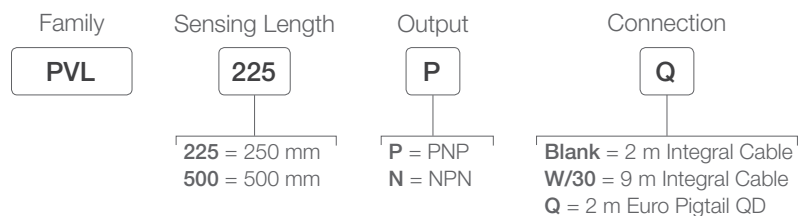
Parts Verification Array



- Compact, one-piece solution useful in many part assembly, pick-to-light and error-proofing applications
- Innovative, low-profile design with auto-configuration feature for diffuse or retroreflective modes
- Ideal for bin picking in tube rack or shelving applications
- Green light for pick and red light for misspick with selectable control features
- Rugged housing for high durability
- Protective mounting brackets available

PVL

Example Model Number: PVL225PQ



Length (L)	Models
327.5 mm	PVL225
608 mm	PVL500

 Connection options: A model with a QD requires a mating cordset.



4-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

MQDC-406
2 m (6.5')
MQDC-415
5 m (15')
MQDC-430
9 m (30')

Additional cordset information is available.
See page 758



SMBPVL1

SMBPVL2-(225 or 500)

SMBPVL3-(225 or 500)

SMBPVL4

SMBPVL5

Additional bracket information is available.
See page 728

Reflectors



Additional information is available
See page 790

PVL Specifications

Sensing Range	1.5 m, using 25 mm wide retroreflective tape
Sensing Beam	630 nm, Visible red
Beam Spacing	70 mm
Supply Voltage and Current	Input Voltage: 12 to 30 V dc (10% max. ripple) PLV225; Input Current: less than 140 mA @ 12 V dc and less than 70 mA @ 30 V dc (exclusive of load) PVL500; Input Current: less than 220 mA @ 12 V dc and less than 100 mA @ 30 V dc (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient over-voltage
Output Rating	150 mA max. OFF-state leakage current: less than 10 μ A ON-state saturation voltage: NPN: less than 1.5 V at 10 mA dc PNP: less than 2.0 V dc at 10 mA NPN: less than 2.0 V at 150 mA dc PNP: less than 2.5 V dc at 150 mA
Output Response Time	Less than 2 milliseconds ON and OFF
Delay at Power-Up	Less than 1.0 second
Indicators	Green: LED to indicate power ON/OFF Yellow: LED to indicate output ON/OFF Job Light: (Diffused Green LED) Turned ON and OFF by applying an external signal to the Job input (white wire). The job lights will be active high or active low, depending on user selection of DIP switch 4. Error Light: (Diffused Red LED) Turned ON and OFF by detection of an output event when job light is not ON.
Construction	Black anodized aluminum housing, painted zinc end caps, thermoplastic front face and lenses
Environmental Rating	IEC IP50
Connections	2 m PVC-jacketed cable which is either unterminated or terminated, depending on model. QD cordsets are ordered separately.
Operating Conditions	Temperature: 0 to +50 °C Relative humidity: 90% relative humidity @ 50 °C (non-condensing)

Certifications



PVA Series

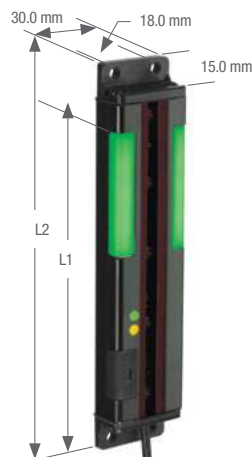
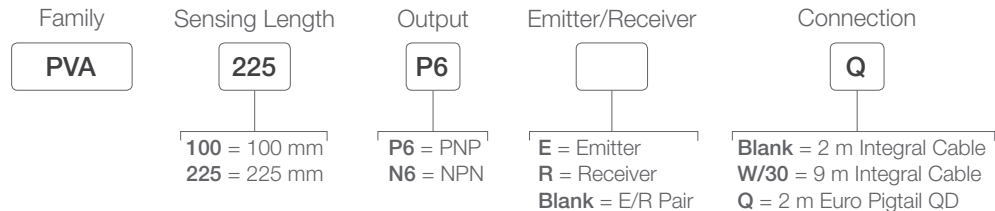
Parts Verification Array



- Help reduce missed and misassembled parts for increased quality and reduced production costs
- Highly visible job lights provides the most reliable solution for error proofing
- Emitter/receiver arrays for high resolution sensing
- Four lengths to cover a variety of openings and applications
- Highly reliable sensing over a long operating range
- Wide field-of-view makes alignment easy
- Protective mounting brackets available

PVA

Example Model Number: PVA100P6EQ



Models	No. of Beams	Length (L1)	Length (L2)
PVA100	5	100	137.8 mm
PVA225	10	225	266.4 mm
PVA300	13	300	341.4 mm
PVA375	16	375	416.6 mm

Connection options: A model with a QD requires a mating cordset.



4-Pin

Euro-Style

Straight connector models listed; for right-angle, add **RA** to the end of the model number (example, **MQDC-406RA**)

MQDC-406

2 m (6.5')

MQDC-415

5 m (15')

MQDC-430

9 m (30')



SMBPVA...



SMBPVA..C



SMBPVA2





SMBPVA6

Additional cordset information is available.
See page 758

Additional bracket information is available.
See page 728

PVA Specifications

Beam Spacing	25.0 mm		
Sensing Height	100, 225, 300 or 375 mm, depending on emitter and receiver models		
Supply Voltage and Current	12 to 30 V dc (10% max. ripple) at less than 62 mA for the emitter and 50 mA for the receiver (exclusive of load)		
Supply Protection Circuitry	Protected against reverse polarity		
Output Configuration	Receivers have one solid-state dc output, programmable for Light or Dark Operate: Models PVA...N6R have current sinking (NPN) open-collector transistor Models PVA...P6R have current sourcing (PNP) open-collector transistor		
Output Rating	150 mA max. OFF-state leakage current: less than 2 μ A ON-state saturation voltage: less than 1 V dc at 10 mA and less than 1.5 V dc at 100 mA		
Output Response Time	Sensor Size	Standard	With Crosstalk from Adjacent Units
	100 mm	20 milliseconds	30 milliseconds max.
	225 mm	40 milliseconds	60 milliseconds max.
	300 mm	52 milliseconds	78 milliseconds max.
	375 mm	64 milliseconds	96 milliseconds max.
Output Protection Circuitry	Protected against false pulse at power-up and continuous overload or short circuit of outputs		
Sensing Resolution	35 mm min. diameter		
Status Indicators	Emitter: One Green LED to indicate power ON/OFF One Red LED to indicate frequency selected Receiver: One Green LED to indicate power ON/OFF One Yellow LED to indicate output state Emitter & Receiver: Both have two highly visible "job lights" which are turned ON/OFF by applying an external signal to the white wire. The job lights may be programmed for steady or flashing green.		
Construction	Black painted aluminum housing; acrylic lenses; PBT polyester end caps; thermoplastic elastomer programming switch cover; stainless steel mounting brackets and hardware		
Environmental Rating	IEC IP62; NEMA 2		
Connections	Emitter: 3-conductor PVC-jacketed 2 m cable which is either unterminated or terminated with a 4-pin Euro-style quick-disconnect connector, depending on model. Cable diameter is 3.3 mm. Receiver: 4-conductor PVC-jacketed 2 m cable which is either unterminated or terminated with a 4-pin Euro-style quick-disconnect connector, depending on model. Cable diameter is 3.3 mm.		
Operating Temperature	0 to +50 °C		
Certifications	 		



Wireless

Banner Engineering's SureCross wire replacement products are designed to be easy to use. The most basic network includes a Gateway and one Node. Many of these simple-to-use models include pre-defined I/O mapping between two devices.

WIRELESS

SIMPLE WIRE REPLACEMENT **page 504**

WIRELESS SENSORS **page 512**

NETWORK RADIOS **page 522**

WIRELESS CONTROLLERS **page 528**

OTHER AVAILABLE MODELS

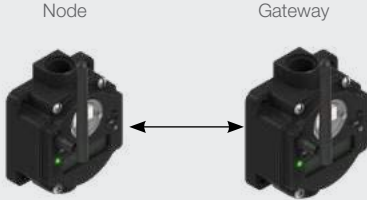
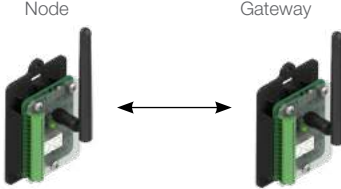
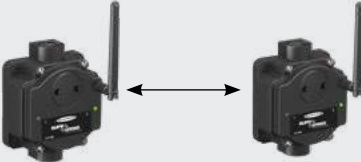




TL70 **page 414**

Simple Wire Replacement

Extend your range and eliminate the need for wires for the most common communication signals including discrete, analog, serial and Ethernet.

- Easy to apply, use and support
- Simple yet highly expandable
- Easy to deploy

Model	Inputs/Outputs		Inputs/Outputs	Page
PM Series	PM2: 4 selectable discrete/ 2 analog inputs 4 selectable discrete/ 2 analog outputs	Node 	PM2: 4 selectable discrete/ 2 analog inputs 4 selectable discrete/ 2 analog outputs	505
	PM8: 6 sourcing discrete inputs 6 sourcing discrete outputs		PM8: 6 sourcing discrete inputs 6 sourcing discrete outputs	506
PB2	2 selectable discrete & 2 analog inputs 2 selectable discrete & 2 analog outputs	Node 	2 selectable discrete & 2 analog inputs 2 selectable discrete & 2 analog outputs	508
Serial Radio	RS-232 or RS-485	Slave 	RS-232 or RS-485	509
Ethernet Radio	Ethernet TCP/IP, RS-232 or RS-485	Slave 	Ethernet TCP/IP, RS-232 or RS-485	510
DXER9	Ethernet TCP/IP	Slave 	Ethernet TCP/IP	511

PM2 Series

Digital Wire Replacement



- The Sure Cross® PM Series radios easily replaces Discrete and Analog signal wires, and with no setup software needed, the radios are easy to apply, use and support.
- Simple yet highly expandable
- Eight LCD menu selectable I/O mapping options
- IP67 rated housing for use in demanding environments

PM2 Gateway, 10-30 V DC

	Frequency	Range*	Environmental Rating	Models
Inputs: Four selectable discrete & Two 0-20 mA analog	900 MHz	6 miles	IP67, NEMA 6	DX80G9M6S-PM2
Outputs: Four sourcing discrete & Two 0-20 mA analog	2.4 GHz	2 miles	IP67, NEMA 6	DX80G2M6S-PM2

PM2 Node, 10-30 V DC

	Frequency	Range*	Environmental Rating	Models
Inputs: Four selectable discrete & Two 0-20 mA analog	900 MHz	6 miles	IP67, NEMA 6	DX80N9X6S-PM2
Outputs: Four sourcing discrete & Two 0-20 mA analog	2.4 GHz	2 miles	IP67, NEMA 6	DX80N2X6S-PM2

PM2 Kits (Includes PM2 Gateway & PM2 Node, 10-30 V DC)

	Frequency	Range*	Environmental Rating	Models
Inputs: Four selectable discrete & Two 0-20 mA analog	900 MHz	6 miles	IP67, NEMA 6	DX80K9M6-PM2
Outputs: Four sourcing discrete & Two 0-20 mA analog	2.4 GHz	2 miles	IP67, NEMA 6	DX80K2M6-PM2

For accessories see page 530.

* Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See accessories page 530.

PM8 Series

Digital Wire Replacement



- The Sure Cross® PM Series radios easily replaces Discrete and Analog signal wires, and with no setup software needed, the radios are easy to apply, use and support.
- Simple yet highly expandable
- Eight LCD menu selectable I/O mapping options
- IP67 rated housing for use in demanding environments
- One Gateway can support up to 6 nodes

PM8 Gateway, 10-30 V DC

	Frequency	Range [†]	Environmental Rating	LCD Screen	Models
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	900 MHz	6 miles	IP67, NEMA 6	Yes	DX80G9X6S-PM8
	2.4 GHz	2 miles	IP67, NEMA 6	Yes	DX80G2M6S-PM8

PM8 Node, 10-30 V DC

	Frequency	Range [†]	Environmental Rating	LCD Screen	Models
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	900 MHz*	6 miles	IP67, NEMA 6	Yes	DX80N9X6S-PM8
	2.4 GHz**	2 miles	IP67, NEMA 6	Yes	DX80N2X6S-PM8

PM8L Node, 10-30 V DC

	Frequency	Range [†]	Environmental Rating	LCD Screen	Models
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	900 MHz*	6 miles	IP67, NEMA 6	No	DX80N9X6S-PM8L
	2.4 GHz**	2 miles	IP67, NEMA 6	No	DX80N2X6S-PM8L

PM8 Kits (Includes one PM8 Gateway, and one PM8 Node), 10-30 V DC

	Frequency	Range [†]	Environmental Rating	Models
Inputs: Six sourcing discrete Outputs: Six sourcing discrete	900 MHz	6 miles	IP67, NEMA 6	DX80K9M6-PM8
	2.4 GHz	2 miles	IP67, NEMA 6	DX80K2M6-PM8

For accessories see page 530.

* Must be used with 900 MHz Gateway

** Must be used with 2.4 GHz Gateway

† Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See accessories page 530.



PM Series Specifications

Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Radio Range	900 MHz: Up to 9.6 kilometers (6 miles)* 2.4 GHz: Up to 3.2 kilometers (2 miles)* * Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 530.
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Network Size	1 Gateway and 1 Node, pre-mapped from factory Other advanced options available. See data sheet for more information.
I/O	Discrete and Analog depending on model
Power Consumption	900 MHz Consumption: Maximum current draw is <100 mA and typical current draw is <50 mA at 24 V dc (2.4 GHz consumption is less)
Environmental Rating	IEC IP67; NEMA 6

See Bannerengineering.com for more detailed specifications.

PB2 Board Module

Discrete & Analog Wire Replacement



- Easy-to-Use
- Simple yet highly expandable
- Supports Point to Point and Star network topologies
- One Gateway can support up to 2 nodes

PB2 Gateway, 10-30 V DC

I/O	Frequency	Range*	Environmental Rating	Models
Inputs: Two sourcing discrete & Two 0-20 mA analog	900 MHz	6 miles	IP67, NEMA 6	DX80G9M6S-PB2
Outputs: Two sourcing discrete & Two 0-20 mA analog	2.4 GHz	2 miles		DX80G2M6S-PB2

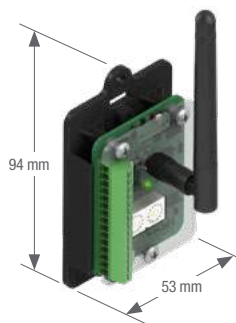
PB2 Node, 10-30 V DC

I/O	Frequency	Range*	Environmental Rating	Models
Inputs: Two sourcing discrete & Two 0-20 mA analog	900 MHz	6 miles	IP67, NEMA 6	DX80N9X6S-PB2
Outputs: Two sourcing discrete & Two 0-20 mA analog	2.4 GHz	2 miles		DX80N2X6S-PB2

For accessories see page 530.

* Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See accessories page 530.

PB2 Specifications



Range	900 MHz: Up to 9.6 kilometers (6 miles)* 2.4 GHz: Up to 3.2 kilometers (2 miles)* * Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 530.
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EI
Network Size	1 Gateway and 1 Node, pre-mapped from factory Other advanced options available. Contact factory for more information.
I/O	Discrete, Analog
Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Power Consumption	900 MHz, 1 Watt: Approx. 30 mA 900 MHz, 250 mW: Approx. 25 mA 2.4 GHz, 65 mW: Approx. 20 mA

See Bannerengineering.com for more detailed specifications.

Serial Data Radio

Serial Wire Replacement



- Easy-to-Use
- DIP switches select operational modes
- FHSS radios operate and synchronize automatically
- Support RS-232 or RS-485

SR 900 MHz, 10-30 V DC

Environmental Rating	Protocol	Range [†]	Models [*]
IP67, NEMA 6	RS-232 or RS-45	6 miles	DX80SR9M-H

SR 2.4 GHz, 10-30 V DC

Environmental Rating	Protocol	Range [†]	Models ^{**}
IP67, NEMA 6	RS-232 or RS-45	2 miles	DX80SR2M-H

For accessories see page 530.

* Must be used with 900 MHz Serial Data Radio

** Must be used with 2.4 GHz Serial Data Radio

† Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See accessories page 530.

Serial Radio Specifications

Range	900 MHz: Up to 9.6 kilometers (6 miles)* 2.4 GHz: Up to 3.2 kilometers (2 miles)* * Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See page 530.
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EI
Network Size	One Master Radio and multiple Slave radios per network. Other advanced options available. Contact factory for more information.
Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Environmental Rating	IEC IP67; NEMA 6

See Bannerengineering.com for more detailed specifications.



Ethernet Data Radio

Ethernet & Serial Wire Replacement



- Sure Cross® MultiHop Ethernet Data Radios are wireless industrial communication devices used to extend the range of serial communication networks.
- No IP address configuration is required
- Built-in site survey mode enables rapid assessment of a location's RF transmission properties

ER 900 MHz, 10-30 V DC

Environmental Rating	Protocol	Range	Models*
IP20, NEMA 1	Ethernet	6 miles†	DX80ER9M-H

* Must be used with 900 MHz models

ER 2.4 GHz, 10-30 V DC

Environmental Rating	Protocol	Range	Models**
IP20, NEMA 1	Ethernet	2 miles†	DX80ER2M-H

For accessories see page 530.

* Must be used with 900 MHz Ethernet Data Radio

** Must be used with 2.4 GHz Ethernet Data Radio

† Line of sight with included 2 dB antenna. High-gain antennas available for increased range. See accessories page 530.

Ethernet Radio Specifications

Range	900 MHz: Up to 9.6 kilometers (6 miles)† 2.4 GHz: Up to 3.2 kilometers (2 miles)† † Line of sight with included 2 dB antenna.
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EI
Network Size	One Master Radio and multiple Slave radios per network. Other advanced options available. Contact factory for more information.
Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Environmental Rating	IP20, NEMA 1

See Bannerengineering.com for more detailed specifications.



DXER9 Ethernet Data Radio

Ethernet Wire Replacement



- The Sure Cross® Ethernet radio is an industrial grade, long range, 900 MHz radio used to create point to multipoint configurations of wireless Ethernet networks.
- DIP switches select operational modes
- FHSS radios operate and synchronize automatically

DXER9 900 MHz, 10-30 V DC

Environmental Rating	Transmit Power	Range	Models*
IP55	125 mW	40 miles LOS with 15 dBi antenna	DXER9

For accessories see page 530.

* Available in 900 MHz frequency only. Must be used with 900 MHz Gateway

** Must be used with 2.4 GHz Gateway

† Line of sight with included 15 dBi antenna. High-gain antennas available for increased range. See accessories page 530.

DXER9 Specifications

Range	900 MHz: Up to 40 miles† † Line of sight with included 15 dBi antenna.
Output Power	+21 dBm (4 Watts EIRP used with 15 dBi antenna)
Power Consumption	Transmit: 1.7 Watts Receiver: 0.8 Watts
Power	10 to 30 V dc (For European applications: 12 to 24 V dc, +/- 10%)
Environmental Rating	IP65

See Bannerengineering.com for more detailed specifications.



Wireless Q45 Series

Digital Wire Replacement



- Solve challenging applications or add sensing to existing industrial systems
- First self-contained wireless standard sensor solution designed for your most challenging control and monitoring applications
- Simple yet highly expandable
- IP67 rated housing for use in demanding environments

Wireless Q45 Series

Description	I/O	Range	Environmental Rating	Models
900 MHz Remote Device	Inputs: two discrete or one NAMUR proximity sensor	up to 3.2 km	IP67, NEMA 6	DX80N9Q45RD
2.4 GHz Remote Device	Inputs: two discrete or one Namur proximity sensor	up to 1,000 m	IP67, NEMA 6	DX80N2Q45RD
900 MHz Push Button	Inputs: one button Outputs: two color light	up to 3.2 km	IP67, NEMA 6	DX80N9Q45BL-RYGB
2.4 GHz Push Button	Inputs: one button Outputs: two color light	up to 1,000 m	IP67, NEMA 6	DX80N2Q45BL-YG DX80N2Q45BL-RY DX80N2Q45BL-RG DX80N2Q45BL-RG-L
Temperature & Humidity	Inputs: temp & humidity Outputs: 4 – 20 mA	up to 3.2 km	IP67, NEMA 6	M12FTH4Q + DX80N9Q45TH
Temperature & Humidity	Inputs: temp & humidity Outputs: 4 – 20 mA	up to 1,000 m	IP67, NEMA 6	M12FTH4Q + DX80N2Q45TH
Temperature	Inputs: temperature Outputs: 4 – 20 mA	up to 3.2 km	IP67, NEMA 6	M12FT4Q + DX80N9Q45TH
Temperature	Inputs: temperature Outputs: 4 – 20 mA	up to 1,000 m	IP67, NEMA 6	M12FT4Q + DX80N2Q45TH

For accessories see page 530

† With included 2 dB antenna and a Q45 Wireless Node. High-gain antennas available for increased range. See accessories page 530



Q45 Remote Device



Q45 Push Button



Q45 Temp & Humidity

Q45 Wireless Specifications

Range	900 MHz: Up to 3.2 km* 2.4 GHz: Up to 1,000 m* * With line of sight
Transmit Power	900 Mhz: 25 dBm conducted 2.4 GHz: 65 mW EIRP
Network Size	1 Gateway and 1 Node, pre-mapped from factory Other advanced options available. Contact factory for more information.
Power	Two lithium AA batteries
Environmental Rating	IEC IP67; NEMA 6

See Bannerengineering.com for more detailed specifications.

Wireless Q120 Node

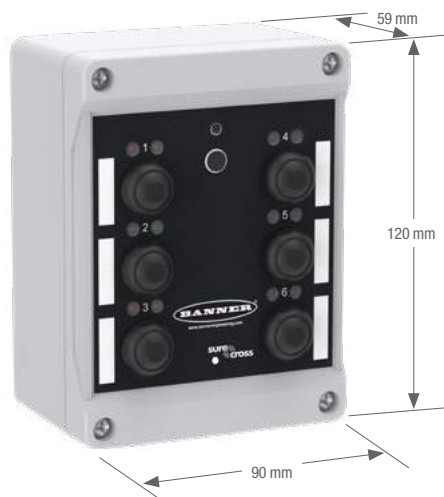
Six-Button and Light Pendant



- DIP switch configurable
- Six push-button inputs with momentary or toggle operation
- Six sets of red and green LED indicator lights with solid or flashing operation
- Reliable, field-proven Sure Cross wireless architecture operates in the globally accepted 2.4 GHz frequency band or the long-range 900 Mhz frequency band, depending upon model

Q120 Node

Frequency	Range	Models*
900 MHz	Up to 3.2 km	DX80N9Q120BL-RG
2.4 GHz	Up to 1000 m	DX80N2Q120BL-RG



Q120 Specifications

Power Supply	Integrated Battery; D-Cell lithium
Typical Battery Life	Up to 3 years, typical
Range	900 MHz: Up to 3.2 km 2.4 GHz: Up to 1,000 m
Indicators	Red and Green LEDs
Operating Conditions	-40 to +70 °C (-40 to +158 °F) 90% at +50 °C maximum relative humidity (non-condensing)
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)

See Bannerengineering.com for more detailed specifications.

QM42VT

Vibration and Temperature Sensor



- Avoid machine failures and delays by detecting problems early
- Paired with a Banner wireless node, it can monitor remote machines and provide local indication, wirelessly send the signal to a central location, and send the vibration and temperature data to the Gateway for collection and trending
- Reduce downtime and plan maintenance more efficiently
- Monitor a variety of machines to suit your needs

Sensor with Serial Interface

Description	Model
Vibration and temperature sensor via a 1-wire serial interface	QM42VT1
Vibration and temperature sensor that functions as a modbus slave device via RS-485	QM42VT2





5-Pin

Euro-Style
Double-ended
male/female

DEE2R-51D
0.3 m (1')
DEE2R-53D
0.9 m (3')
DEE2R-58D
2.4 m (8')

Adapter Cables
USB to RS-485

BWA-HW-006

USB-to-RS-232 1-Wire

BWA-USB1WIRE-001

Additional cordset information is available.
See page 758



BWA-BK-002



BWA-BK-001

QM42VT Vibration and Temperature Sensor Specifications

Supply Voltage	3.6 to 5.5 V dc	
Current	QM42VT1 Active comms: 11.9 mA at 5.5 V dc	QM42VT2 Active comms: 8.8 mA at 24 V dc
Communication Hardware	QM42VT1 Interface: 1-wire serial interface Baud rates: 9.6k, 19.2k (default), or 38.4k Data format: 8 data bits, no parity (default), 1 stop bit (even or odd parity available)	QM42VT2 Interface: RS-485 serial Baud rates: 9.6k, 19.2k (default), or 38.4k Data format: 8 data bits, no parity (default), 1 stop bit (even or odd parity available)
Communication Protocol	QM42VT1: Sure Cross® DX80 Sensor Node 1-wire serial Interface QM42VT2: Modbus RTU	
Communications Line	Level Receive ON: Greater than 2 V Level Receive OFF: Less than 0.7 V	Level Transmit ON: 2.7 to 3 V Level Transmit OFF: 0 V (pulldown resistor of 10 kOhm)
Vibration Sensor	QM42VT1 mounted base resonance: 5.5 kHz nominal QM42VT1 frequency range: 10–1000 Hz Measuring Range: 0–46 mm/sec or 0–1.8 in/sec Accuracy: ±10% and 25 °C	QM42VT2 mounted base resonance: 4.5 kHz nominal QM42VT2 frequency range: 10–4 kHz Measuring Range: 0–46 mm/sec or 0–1.8 in/sec Accuracy: ±10% and 25 °C
Connector	3 m cable with 5-pin M12 fitting	
Indicators	Green flashing: Power ON	Amber flicker: Serial Tx
Temperature Sensor	Measuring range: –40 to +105 °C (–40 to +221 °F) Resolution: 0.1 °C Accuracy: ± 3 °C	
Environmental Rating	NEMA 6P, IEC IP67	
Operating Conditions	QM42VT1: –40 to 85 °C (–40 to +185 °F)	QM42VT2: –40 to 105 °C (–40 to +221 °F)
Shock and Vibration	400G	
Mounting Options	Can be mounted using a variety of methods, including 1/4 inch 28 hex screw, epoxy, thermal tape, or magnetic mount	

K50U Series

Wireless Ultrasonic Sensor



- Provides a distance measurement from the target to the sensor
- Three meter sensing range with a 300 mm dead zone
- Built-in temperature compensation
- Rugged design for demanding sensing environments; rated IEC IP67, NEMA 6P
- Two sensor models available; one with a 1-wire serial interface and one that functions as a Modbus slave via RS-485

K50U Ultrasonic Sensor

Description	Models
Ultrasonic sensor with 1-wire serial interface	K50UX1RA
Ultrasonic sensor that functions as a modbus slave device via RS-485	K50UX2RA



Euro-Style
Double-ended
male/female

5-Pin
DEE2R-51D
0.3 m (1')
DEE2R-53D
0.9 m (3')
DEE2R-58D
2.4 m (8')

Additional cordset information is available.
See page 758



BWA-BK-006
shown with: K50U and Q45U



BWA-BK-004
use with: K50U and DX80 or Q45U



K50U Ultrasonic Sensor Specifications

Supply Voltage	3.6 to 5.5 V dc or 10 to 30V dc	
Current	K50UX1A active comms: 3.3 mA	K50UX2A active comms: 11.3 mA
Communication Hardware	K50UX1A Interface: 1-wire serial interface Baud rates: 9.6k, 19.2k (default), or 38.4k Data format: 8 data bits, no parity (default), 1 stop bit (even or odd parity available)	K50UX2A Interface: RS-485 serial Baud rates: 9.6k, 19.2k (default), or 38.4k Data format: 8 data bits, no parity (default), 1 stop bit (even or odd parity available)
Communication Protocol	K50UX1A: Sure Cross® DX80 Sensor Node 1-wire serial Interface	K50UX2A: Modbus RTU
Communications Line	Level Receive ON: Greater than 2 V Level Receive OFF: Less than 0.7 V	Level Transmit ON: 2.7 to 3 V Level Transmit OFF: 0 V (pulldown resistor of 10 kOhm)
Connector	Integral 5-pin M12/Euro-style male quick disconnect (QD)	
Indicators	Two LEDs	
Construction	Housing: PBT polyester Transducer: epoxy/ceramic composite	
Environmental Rating	Leakproof design, rated IEC IP67 (NEMA 6)	
Operating Conditions	Temperature: -40 to 70 °C (-40 to 158 °F)	Relative humidity: 95% at +50 °C maximum (non-condensing)
Shock and Vibration	All models meet Mil Std. 202F requirements. Method 201A (vibration: 10 Hz to 60 Hz max., double amplitude 0.06 inch, maximum acceleration 10G). Also m meets IEC 947-5-2 requirements: 30G 11 ms duration, half sine wave	



Temp and Humidity Solutions

1-Wire Serial or Modbus RTU, RS-485 interface

- Reliable environmental measurements without the need for costly wiring runs to the monitoring points
- Achieves humidity accuracy of $\pm 2\%$ relative humidity and temperature accuracy of ± 0.3 °C.
- Temperature and relative humidity sensing elements housed in a robust stainless steel probe
- Traceable to NIST standards
- Available in 900 MHz and 2.4 GHz

Sensors with a Serial Interface

Description	Models
Temperature sensor with 1-wire serial interface	M12FT4Q
Temperature and humidity sensor with 1-wire serial interface	M12FTH4Q

Sensors with a Modbus RTU, RS-485 interface

Description	Models
Temperature sensor with Modbus RTU, RS-485 interface	M12FT3Q
Temperature and humidity sensor with Modbus RTU, RS-485 interface	M12FTH3Q

For accessories see page 530.

Replacement Filters

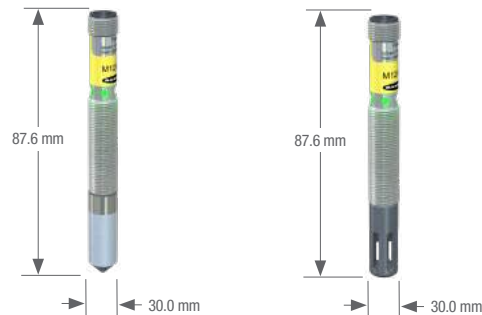


FTH-FIL-001



FTH-FIL-002

Additional accessory information is available.
See page 541



M12 Wireless 1-wire Serial interface Specifications

Supply Voltage	3.6 to 5.5 V dc
Current	Default sensing: 28 μ Amps Disabled sensing: 15 μ Amps Active comms: 4.7 mA
Mounting Threads	M12 x 1
Temperature	Measuring range: -40 to +85 °C (-40 to +185 °F) Resolution: 0.1 °C Accuracy: \pm 0.3 °C at 25 °C
Humidity*	Measuring range: 0 to 100% relative humidity Resolution: 0.1% relative humidity Accuracy: \pm 2% relative humidity at 25 °C
Environmental Rating	IEC IP67, NEMA 6
Operating Temperature**	-40 to +85 °C (-40 to +185 °F)
Shock & Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz

M12 Wireless Modbus Specifications

Supply Voltage	12 to 24 V dc OR 3.6 to 5.5 V dc low power option
Current	Default sensing: 45 μ Amps Disabled sensing: 32 μ Amps Active comms: 4 mA
Mounting Threads	M12 x 1
Temperature	Measuring range: -40 to +85 °C (-40 to +185 °F) Resolution: 0.1 °C Accuracy: \pm 0.3 °C at 25 °C
Humidity*	Measuring range: 0 to 100% relative humidity Resolution: 0.1% relative humidity Accuracy: \pm 2% relative humidity at 25 °C
Environmental Rating	IEC IP67; NEMA 6
Operating Temperature**	-40 °C to +85 °C (-40 °F to +185 °F)
Shock & Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz

* M12FTH3Q and M12FTH4Q only

** Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

See Bannerengineering.com for more detailed specifications.

DX80 Performance Series

Gateways and Nodes



- Create point to multi point networks that distribute I/O over large areas.
- Input and output types include discrete (dry contact, PNP/ NPN), analog (0 to 10 V dc, 0 to 20 mA), temperature (thermocouple and RTD), and pulse counter.
- Enhanced gateways and nodes offer increased range in the 900 MHz frequency band
- High density I/O capacity provides up to 12 discrete inputs or outputs or a mix of discrete and analog I/O
- Universal analog inputs allow current or voltage to be selected in the field

DX80 Performance Gateways, 10-30 V DC

I/O	Frequency	Housing	Models
N/A	900 MHz	Low Profile	DX80G9M2S-P
	2.4 GHz		DX80G2M2S-P
Inputs: Four selectable discrete, two 0–20 mA or 0–10 V analog Outputs: Four sourcing discrete, two 0–20mA analog	900 MHz	IP67	DX80G9M6S-P2
	2.4 GHz		DX80G2M6S-P2
Inputs/Outputs: Up to 12 NPN inputs or up to 12 NMOS outputs, or a mix of inputs and outputs not exceeding 12 I/O points	900 MHz	IP67	DX80G9M2S-P7
	2.4 GHz		DX80G2M2S-P7
Inputs/Outputs: Up to 12 PNP inputs or up to 12 PNP outputs, or a mix of inputs and outputs not exceeding 12 I/O points	900 MHz	IP67	DX80G9M6S-P8
	2.4 GHz		DX80G2M6S-P8

DX80 Performance Gateways, board only models, 10-30 V DC

I/O	Frequency	Housing	Models
Inputs: Two sourcing discrete, two 0-20 mA analog Outputs: Two sourcing discrete, two 0-20 mA analog	900 MHz	Board Module	DX80G9M6S-PB2
	2.4 GHz		DX80G2M6S-PB2

DX80 Performance nodes, board only models, 10-30 V DC

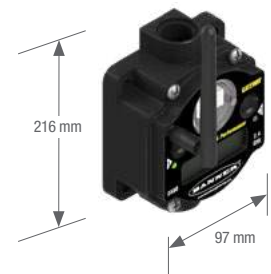
I/O	Frequency	Housing	Models
Inputs: Two NPN discrete, two 0-20 mA analog Outputs: Two NMOS discrete Switch Power: Two	900 MHz	Board Module	DX80N9X2S-PB1
	2.4 GHz		DX80N2X2S-PB1
Inputs: Two PNP discrete, two 0-20 mA analog Outputs: Two PNP discrete, two 0-20 mA analog	900 MHz	Board Module	DX80N9X6S-PB2
	2.4 GHz		DX80N2X6S-PB2

DX80 Performance nodes, 10-30 V DC (“E” models have integrated batteries)

I/O	Frequency	Models*
Discrete Mode Inputs: Two selectable discrete and two thermistor Outputs: Two NMOS discrete Switch Power: Two	900 MHz	DX80N9X2S-P1
	2.4 GHz	DX80N2X2S-P1
Analog Mode Inputs: Two selectable discrete, two analog (0-20 mA or 0-10 V), and two thermistor Outputs: Two NMOS discrete Switch Power: One	900 MHz	DX80N9X1S-P1E
	2.4 GHz	DX80N2X1S-P1E
Inputs: Four selectable discrete, two 0-20 mA or 0-10 V (universal) analog Outputs: Four PNP discrete, two 0-20mA analog	900 MHz	DX80N9X6S-P2
	2.4 GHz	DX80N2X6S-P2
Inputs: Two selectable discrete, four thermocouple, one thermistor for CJC Outputs: One NMOS discrete	900 MHz	DX80N9X2S-P3
	2.4 GHz	DX80N2X2S-P3
	900 MHz	DX80N9X1S-P3E
	2.4 GHz	DX80N2X1S-P3E
Inputs: Four 3-wire RTDs	900 MHz	DX80N9X2S-P4
	2.4 GHz	DX80N9X1S-P4E
Inputs: Two NPN discrete, four selectable analog (0-20 mA or 0-10 V) Outputs: Two NMOS discrete Switch Power: Two	900 MHz	DX80N9X2S-P5
	2.4 GHz	DX80N2X2S-P5
Inputs: 1-Wire serial interface for one serial sensing device	900 MHz	DX80N9X1S-P6
	2.4 GHz	DX80N2X1S-P6
Inputs/Outputs: Up to 12 NPN inputs or up to 12 NMOS outputs, or a mix of inputs and outputs not exceeding 12 I/O points	900 MHz	DX80N9X2S-P7
	2.4 GHz	DX80N2X2S-P7
Inputs/Outputs: Up to 12 PNP inputs or up to 12 PNP outputs, or a mix of inputs and outputs not exceeding 12 I/O points	900 MHz	DX80N9X6S-P8
	2.4 GHz	DX80N2X6S-P8
Discrete Mode Inputs: One configurable discrete, one thermistor, one asynchronous counter Switch Power Outputs: One Analog Mode: Inputs: One configurable discrete, one configurable analog, one thermistor, one asynchronous counter Switch Power Outputs: One	900 MHz	DX80N9X1S-P14
	2.4 GHz	DX80N2X1S-P14
Inputs: Two selectable discrete Outputs for DC Latch: DC Latch	900 MHz	DX80N9X2S-DCLATCHE
	2.4 GHz	DX80N2X2S-DCLATCHE

DX80 Performance Series Specifications

Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles) 2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft) 2.4 GHz 65 mW: 0.3 m (1 ft)
Transmission Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Communication Hardware (RS-485)	Interface: 2-wire half-duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k Data format: 8 data bits, no parity, 1 stop bit
Supply Voltage	10 to 30 V dc
Interface	Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD
Operating Conditions	-40 to +85 °C (-40 to +185 °F) (Electronics); -20 to +80 °C (-4 to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)
Environmental Rating	DX80 Models: IEC IP67; NEMA 6 “C” Models: IP20; NEMA 1 “E” Models: IP65; NEMA 4X

See Bannerengineering.com for more detailed specifications.

MultiHop Modbus

Modbus Radios and Boards with I/O



- MultiHop Modbus data radios extend the range of Modbus or other Serial communication networks
- Models are available with built in discrete and analog I/O, which can be accessed using the Modbus protocol
- Self-healing, auto routing RF network with multiple hops extends the network's range
- Flexible: dip switch selectable to be a master, repeater or slave
- User selectable communication between RS-485 and RS-232

MultiHop Modbus Radios with I/O, 10-30 V DC
("E" and "H6" models have integrated batteries)


I/O	Frequency	Housing	Models
Inputs: Four discrete, two 0-20 mA analog, one thermistor, one counter Outputs: Two NMOS discrete Switch Power: Two Serial interface: RS-485	900 MHz	IP67	DX80DR9M-H1
		IP54	DX80DR9M-H1E
	2.4 GHz	IP67	DX80DR2M-H1
		IP54	DX80DR2M-H1E
Inputs: Four discrete, two 0-20 mA analog Outputs: Four sourcing discrete, two 0-20 mA analog Serial interface: RS-485	900 MHz	IP67	DX80DR9M-H2
		IP67	DX80DR2M-H2
	2.4 GHz	IP67	DX80DR9M-H2
		IP67	DX80DR2M-H2
Inputs: Two discrete, four thermocouple, one thermistor (internal) Outputs: Two NMOS discrete Serial interface: RS-232	900 MHz	IP67	DX80DR9M-H3
		IP54	DX80DR9M-H3E
	2.4 GHz	IP67	DX80DR2M-H3
		IP54	DX80DR2M-H3E
Inputs: Four 3-wire Pt100 RTD Serial interface: RS-232	900 MHz	IP67	DX80DR9M-H4
		IP54	DX80DR9M-H4E
	2.4 GHz	IP67	DX80DR2M-H4
		IP54	DX80DR2M-H4E
Inputs: Four sinking discrete, four 0-20 mA analog Outputs: Two NMOS discrete Switch Power: Two Serial Interface: RS-485	900 MHz	IP67	DX80DR9M-H5
	2.4 GHz		DX80DR2M-H5
Inputs: 1-Wire serial interface for one 1-wire serial sensing device	900 MHz	IP67	DX80DR9M-H6
	2.4 GHz		DX80DR2M-H6
Inputs: Two discrete, two 0-20 mA analog, one thermistor, one SDI-12 or counter Outputs: Two NMOS discrete Switch Power: Two Serial interface: RS-485	900 MHz	IP67	DX80DR9M-H12
	2.4 GHz		DX80DR2M-H12
Inputs: Two sinking discrete Outputs for DC Latch: DC Latch	900 MHz	IP54	DX80DR9M-DCLATCHE
	2.4 GHz		DX80DR2M-DCLATCHE



Board level MultiHop Modbus Data Radios with I/O

I/O	Frequency	Models
Inputs: Two NPN discrete, two 0 to 20 mA analog Outputs: Two NMOS discrete Switch Power Outputs: Two	900 MHz	DX80DR9M-HB1
	2.4 GHz	DX80DR2M-HB1
Inputs: Two PNP discrete, two 0 to 20 mA analog Outputs: Two PNP discrete, two 0 to 20 mA analog	900 MHz	DX80DR9M-HB2
	2.4 GHz	DX80DR2M-HB2

MultiHop Modbus Specifications

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Power	<p>FlexPower models: 10 to 30 V dc (Outside the USA: 12 to 24 V dc, $\pm 10\%$) on the brown wire, or 3.6 to 5.5 V dc low power option on the gray wire 6</p> <p>Integrated battery models: 3.6 V dc low power option from an internal battery or 10 to 30 V dc</p> <p>Master radio consumption (900 MHz): Maximum current draw is < 100 mA and typical current draw is < 30 mA at 24 V dc (2.4 GHz consumption is less)</p> <p>Repeater/slave radio consumption (900 MHz): Maximum current draw is < 40 mA and typical current draw is < 20 mA at 24 V dc (2.4 GHz consumption is less)</p>	
Compliance	<p>900 MHz Compliance (1 Watt) FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247 IC: 7044A-RM1809</p>	<p>2.4 GHz Compliance FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247 ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-04) IC: 7044A-DX8024</p>
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N-m (4 lbf-in)	
Interface	Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD	
Communication Hardware (MultiHop RS-485)	<p>Interface: 2-wire half-duplex RS-485</p> <p>Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Tool</p> <p>Data format: 8 data bits, no parity, 1 stop bit</p>	
Packet Size (MultiHop)	900 MHz: 175 bytes (85 Modbus registers)	2.4 GHz: 75 bytes (37 Modbus registers)
Intercharacter Timing (MultiHop)	3.5 milliseconds	
Housing	<p>Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers</p> <p>Weight: 0.26 kg (0.57 lbs)</p> <p>M-Hx and M-HxC models: Mounting: #10 or M5 (SS M5 hardware included)</p> <p>M-HxE models: Mounting: 1/4-in or M7 (SS M7 hardware included)</p> <p>Max. Tightening Torque: 0.56 N-m (5 lbf-in)</p>	
Wiring Access	<p>M-Hx models: Four PG-7, One 1/2-in NPT, One 5-pin threaded M12/Euro-style male quick-disconnect</p> <p>M-HxC models: External terminals</p> <p>M-HxE models: Two 1/2-in NPT ports</p>	
Environmental Rating	<p>M-Hx: IEC IP67; NEMA 6</p> <p>"C" Housing Models: IEC IP20; NEMA 1</p> <p>"E" Housing Models: IEC IP65; NEMA 4X</p>	
Operating Conditions	<p>M-Hx and M-HxC models: -40 to +85 °C (-40 to +185 °F) (Electronics); -20 to +80 °C (-4 to +176 °F) (LCD)</p> <p>M-HxE models: -40 to +65 °C (-40 to +149 °F) (Electronics); -20 to +80 °C (-4 to +176 °F) (LCD)</p> <p>95% maximum relative humidity (non-condensing)</p> <p>Radiated Immunity: 10 V/m (EN 61000-4-3)</p>	
Shock and Vibration	<p>IEC 68-2-6 and IEC 68-2-27</p> <p>Shock: 30g, 11 millisecond half sine wave, 18 shocks</p> <p>Vibration: 0.5 mm p-p, 10 to 60 Hz</p>	
Certifications		



Sure Cross® DX99

Intrinsically Safe Star I/O Network Nodes



- Both 900 MHz 150 mW and 2.4 GHz 63 mW models are available
- Networks formed using DX80 Performance Gateways installed beyond the hazardous area and one or more Nodes operating in the same frequency band
- The DX99 is a state-of-the-art combination of wireless communication, battery technology and intrinsically safe electronics
- All models are certified for operation in Class I, Division 1 and ATEX Zone 0 locations

DX99 Nodes, FlexPower™—Class I, Div 1 and Zone 0 (Metal Housing)

I/O	Frequency	Boost Power	Models*
Discrete: Two inputs Analog: Two inputs (0-20 mA)	900 MHz	10 V	DX99N9X1S2N0M2X0D1
		18 V	DX99N9X1S2N0M2X0D2
Discrete: Two inputs Analog: Two inputs (0-10 V)	900 MHz	10 V	DX99N9X1S2N0V2X0D1
		18 V	DX99N9X1S2N0V2X0D2
Discrete: Two inputs Analog: Two inputs (0-20 mA)	2.4 GHz	10 V	DX99N2X1S2N0M2X0D1
		18 V	DX99N2X1S2N0M2X0D2
Discrete: Two inputs Analog: Two inputs (0-10 V)	2.4 GHz	10 V	DX99N2X1S2N0V2X0D1
		18 V	DX99N2X1S2N0V2X0D2
Thermocouple: Three inputs, one thermistor input Discrete: Two (NPN) inputs	900 MHz	n/a	DX99N9X1S2N0T4X0D0
	2.4 GHz		DX99N2X1S2N0T4X0D0
RTD: Four inputs	900 MHz	n/a	DX99N9X1S0N0R4X0D0
	2.4 GHz		DX99N2X1S0N0R4X0D0
Bridge: Two inputs Discrete: Two inputs	900 MHz	n/a	DX99N9X1S2N0B2X0D0
	2.4 GHz		DX99N2X1S2N0B2X0D0
Inputs (Modbus Mode): One RS-485 Inputs (Voltage Mode): Two analog, one discrete	900 MHz	13V	DX99N9X1S1S0V2X0D4
	2.4 GHz		DX99N2X1S1S0V2X0D4
Inputs: One analog input with a 29 second warm-up time; one sinking discrete Additional Input Configurations: One 3-wire 100-Ohm Platinum RTD, one sinking discrete, and two analog (0-20 mA)	900 MHz	19V	DX99N9X1S1N0M3X0D5
	2.4 GHz		DX99N2X1S1N0M3X0D5

Metal housing models are only available with external antennas and are powered by a 3.6 V D cell lithium battery integrated into the housing. Mounting and intrinsically safe antenna installation accessories are available for the metal housing models.

Sure Cross® DX99 Specifications

Range	900 MHz: Up to 4.8 kilometers (3 miles) 2.4 GHz: Up to 3.2 kilometers (2 miles)	
Transmit Power	900 MHz: 150 mW (21 dBm Conducted) 2.4 GHz: 65 mW (18 dBm Conducted)	
Network Size	One Gateway and up to 47 remotely located Nodes (SureCross Performance or SureCross DX80 Gateway required)	
I/O	Discrete, Analog, Temperature, Bridge	
Gateway Communications	Sure Cross Performance or Sure Cross DX80 Gateway required	
Power	3.6 V low power option from an internal battery	
Power Consumption	Application Dependent	
Environmental Rating	IEC IP68	
Certifications	DX99, Intrinsically Safe, Metal Housing Class I, Division 1, Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1 Ex ia IIC T4 AEx ia IIC T4 LCIE/ATEX Zone 0 (Group IIC) and Zone 20 (Group II) II 1 GD Ex ia IIC T4 Ex iaD 20 IP68 T82°C	
	Certificate 2008243(LR 41887)  c us	Certificate LCIE 08 ATEX 6098X 

See Bannerengineering.com for more detailed specifications.



DXM100 Wireless Controller

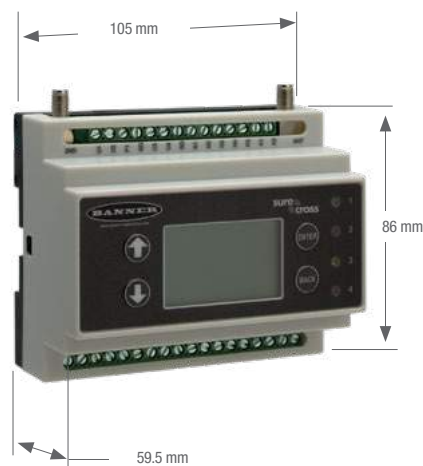
Industrial Wireless Controller




- ISM radios available in 900 MHz and 2.4 GHz for local wireless network
- Converts Modbus RTU to Modbus TCP/IP or Ethernet I/P
- Logic controller can be programmed using action rules and text language methods
- Cellular connectivity
- Micro SD card for data logging
- Email and text alerts
- Local I/O options: universal inputs, NMOS outputs, and analog outputs
- Powered by 12 to 30 V dc, 12 V dc solar panel, or battery backup
- RS-232, RS-485, and Ethernet communications ports; and a USB configuration port
- LCD display for I/O information and user programmable LED's

DXM Controllers

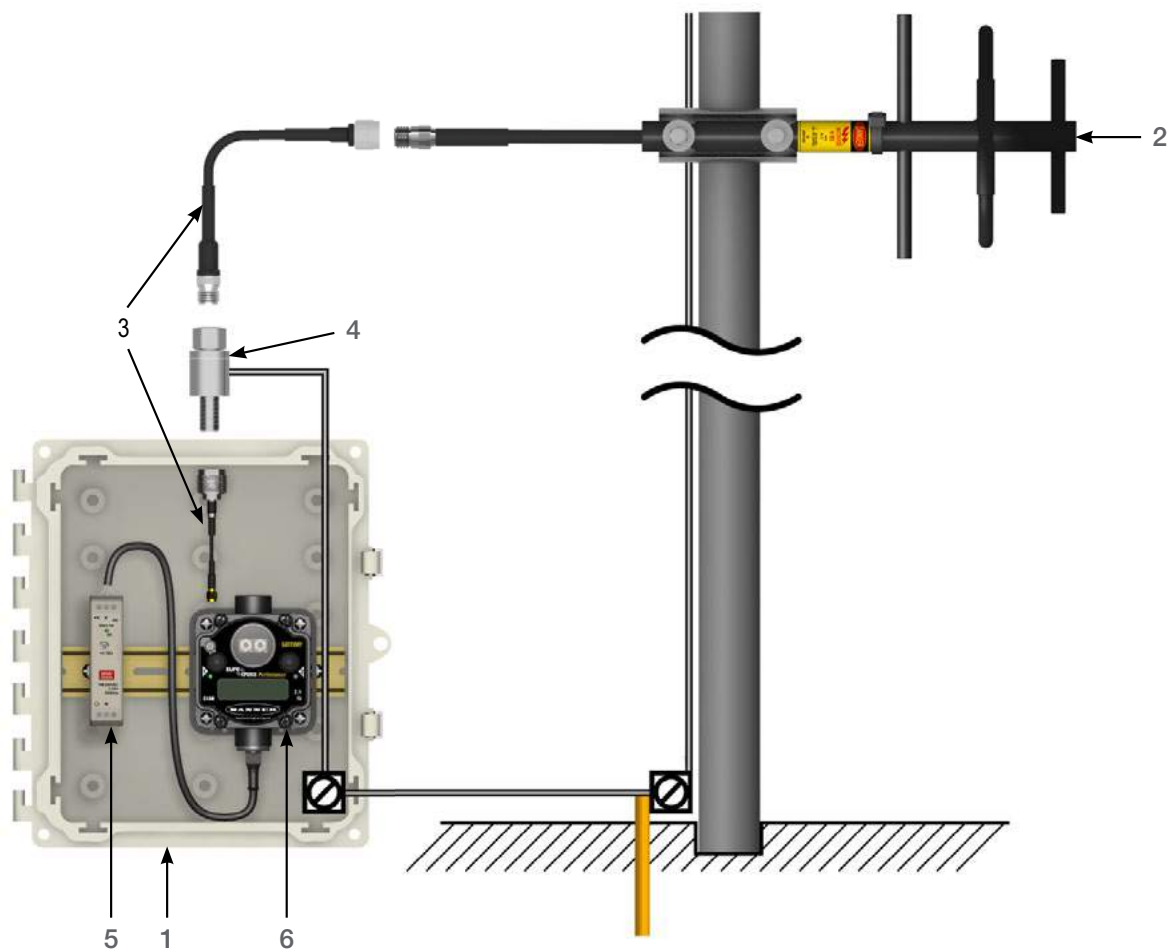
Description	Frequency	Models
DXM100 Controller, with DX80 Gateway, preconfigured as a protocol converter	900 MHz	DXM100-B1R1
DXM100 Controller, with DX80 Gateway, preconfigured as a protocol converter	2.4 GHz	DXM100-B1R3
DXM100 Controller with MultiHop Data Radio	900 MHz	DXM100-B1R2
DXM100 Controller with MultiHop Data Radio	2.4 GHz	DXM100-B1R4
DXM100 Controller with DX80 Gateway and CDMA cellular module, preconfigured as a protocol converter	900 MHz	DXM100-B1C1R1
DXM100 Controller with DX80 Gateway and CDMA cellular module, preconfigured as a protocol converter	2.4 GHz	DXM100-B1C1R2



DXM100 Controllers

Supply Voltage	12 to 30 V dc or 12 V dc solar panel and 12 V sealed lead acid battery	
Power Consumption	35 mA average at 12 V	
Solar Power Battery Charging	1 Amp maximum with 20 Watt solar panel	
Radio (ISM Band) Transmit Power	900 MHz at 1 Watt	2.4 GHz at 65 mW
Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N-m (4 lbf-in)	
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 Watt) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW EIRP)
Compliance	900 MHz Compliance (1 Watt) FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247 IC: 7044A-RM1809	2.4 GHz Compliance FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247 ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-04) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Logging	8 GB maximum; removable Micro SD card format	
Protocols	Modbus RTU Master/Slave, Modbus TCP, and Ethernet/IP	
Construction	Polycarbonate; DIN rail mount option	
Communication Hardware (RS-732)	4-wire full duplex; flow control -15 to +15 Volts signaling Baud rates: 9.6k, 19.2k (default), or 38.4k Data format: 8 data bits, no parity, 1 stop bit	
Communication Hardware (RS-485)	2-wire half duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k Data format: 8 data bits, odd, even or no parity, 1 stop bit	
Universal Inputs	Discrete sinking/sourcing, 0 to 20 mA analog, 0 to 10 V analog, 10k thermistor, counter	
Courtesy Power	One; output at 5 volts , 500 mA maximum	
Switched Power Outputs	5 V/400 mA maximum; 16 V/125 mA maximum	
Environmental Rating	IP20	
Operating Conditions	-40 to +85 °C (-40 to +185 °F) (Electronics); -20 to +80 °C (-4 to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m, 80-2700 MHz (EN 61000-4-3)	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: .5 mm p-p, 10 to 60 Hz	
Analog Outputs	0 to 20 mA or 0 to 10 V dc output Accuracy: 0.1% of full scale +0.01% per °C Resolution: 12 bit	
NMOS Outputs	Less than 1 A max current at 30 V dc ON-state saturation: less than 0.7 V at 20 mA ON condition: Less than 0.7 V Off condition: Open	
Certifications		

Accessories



NOTE: The Sure Cross® radio installation shown includes wireless accessories available from Banner. It is for illustration purposes only. Installations may vary.

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(1) Enclosures



Polycarbonate Enclosures

BWA-AH664	Enclosure, Polycarbonate, with Opaque Cover, 6 × 6 × 4 in
BWA-AH864	Enclosure, Polycarbonate, with Opaque Cover, 8 × 6 × 4 in
BWA-AH1084	Enclosure, Polycarbonate, with Opaque Cover, 10 × 8 × 4 in
BWA-AH12106	Enclosure, Polycarbonate, with Opaque Cover, 12 × 10 × 6 in
BWA-AH14126	Enclosure, Polycarbonate, with Opaque Cover, 14 × 12 × 6 in
BWA-AH16148	Enclosure, Polycarbonate, with Opaque Cover, 16 × 14 × 8 in
BWA-AH181610	Enclosure, Polycarbonate, with Opaque Cover, 18 × 16 × 10 in
BWA-AH664C	Enclosure, Polycarbonate, with Clear Cover, 6 × 6 × 4 in
BWA-AH864C	Enclosure, Polycarbonate, with Clear Cover, 8 × 6 × 4 in
BWA-AH1084C	Enclosure, Polycarbonate, with Clear Cover, 10 × 8 × 4 in
BWA-AH12106C	Enclosure, Polycarbonate, with Clear Cover, 12 × 10 × 6 in
BWA-AH14126C	Enclosure, Polycarbonate, with Clear Cover, 14 × 12 × 6 in
BWA-AH16148C	Enclosure, Polycarbonate, with Clear Cover, 16 × 14 × 8 in
BWA-AH181610C	Enclosure, Polycarbonate, with Clear Cover, 18 × 16 × 10 in

Swing Panel Kits

BWA-AH66SPK	Swing Panel Kit, 6 × 6 in, Includes Mounts, Screws, and Panel
BWA-AH86SPK	Swing Panel Kit, 8 × 6 in, Includes Mounts, Screws, and Panel
BWA-AH108SPK	Swing Panel Kit, 8 × 10 in, Includes Mounts, Screws, and Panel
BWA-AH1210SPK	Swing Panel Kit, 12 × 10 in, Includes Mounts, Screws, and Panel
BWA-AH1412SPK	Swing Panel Kit, 14 × 12 in, Includes Mounts, Screws, and Panel
BWA-AH1614SPK	Swing Panel Kit, 16 × 14 in, Includes Mounts, Screws, and Panel
BWA-AH1816SPK	Swing Panel Kit, 18 × 16 in, Includes Mounts, Screws, and Panel

Back Panel Kits

BWA-BP66A	Back Panel, aluminum, 6 × 6 in
BWA-BP86A	Back Panel, aluminum, 8 × 6 in
BWA-BP108A	Back Panel, aluminum, 8 × 10 in
BWA-BP1210A	Back Panel, aluminum, 12 × 10 in
BWA-BP1412A	Back Panel, aluminum, 14 × 12 in
BWA-BP1614A	Back Panel, aluminum, 16 × 14 in
BWA-BP1816A	Back Panel, aluminum, 18 × 16 in

(1) Enclosures, continued



Fiberglass Enclosures

BWA-EF14128	Enclosure Fiberglass Hinged 14 × 12 × 8 in
BWA-EF1086	Enclosure Fiberglass Hinged 10 × 8 × 6 in
BWA-EF866	Enclosure Fiberglass Hinged 8 × 6 × 6 in
BWA-PA1412	Panel, 14 × 12 in
BWA-PA108	Panel, 10 × 8 in
BWA-PA86	Panel, 8 × 6 in
BWA-PM12	Pole Mount, 12 in
BWA-PM8	Pole Mount, 8 in
BWA-PM6	Pole Mount, 6 in

Mounting Accessories

BWA-AHSNK	Slot Nut Kit, Includes 2 Nuts and 2 Screws
BWA-AHSPM	Swing Panel Mounts (4 per Kit)
BWA-AHLK	Latch Kit, 2 Latches per Kit, Replacement Only
BWA-AHAK	Accessory Kit, Includes all screws, inserts, and mounting feet (Replacement Only)
BWA-AHTBS	Screw 10-32 X .375 Phl Ph Zinc Self-threading

DIN Rail Kits

BWA-AH6DRK	DIN Rail Kit, 6 in, Includes 2 Nuts, 2 Screws, and DIN Rail
BWA-AH8DRK	DIN Rail Kit, 8 in, Includes 2 Nuts, 2 Screws, and DIN Rail
BWA-AH10DRK	DIN Rail Kit, 10 in, Includes 2 Nuts, 2 Screws, and DIN Rail
BWA-AH12DRK	DIN Rail Kit, 12 in, Includes 2 Nuts, 2 Screws, and DIN Rail
BWA-AH14DRK	DIN Rail Kit, 14 in, Includes 2 Nuts, 2 Screws, and DIN Rail
BWA-AH16DRK	DIN Rail Kit, 16 in, Includes 2 Nuts, 2 Screws, and DIN Rail
BWA-AH18DRK	DIN Rail Kit, 18 in, Includes 2 Nuts, 2 Screws, and DIN Rail

DIN Rail Kits

BWA-AH6DR	Din Rail Kit 6 in (Includes 2 Tribolar Screws and DIN Rail)
BWA-AH8DR	Din Rail Kit 8 in (Includes 2 Tribolar Screws and DIN Rail)
BWA-AH10DR	Din Rail Kit 10 in (Includes 2 Tribolar Screws and DIN Rail)
BWA-AH12DR	Din Rail Kit 12 in (Includes 2 Tribolar Screws and DIN Rail)
BWA-AH14DR	Din Rail Kit 14 in (Includes 2 Tribolar Screws and DIN Rail)
BWA-AH16DR	Din Rail Kit 16 in (Includes 2 Tribolar Screws and DIN Rail)
BWA-AH18DR	Din Rail Kit 18 in (Includes 2 Tribolar Screws and DIN Rail)

(2) Antennas



Omni-Directional Antennas with RP-SMA Male Connections

BWA-902-C	900 MHz	2 dBi, Rubber swivel (ships with 900 MHz radios)	
BWA-905-C		5 dBi, Rubber swivel	

BWA-202-C	2.4 GHz	2 dBi, Rubber swivel, 3 1/4 in (ships with 2.4 GHz radios)	
BWA-205-C		5 dBi, Rubber swivel, 6 1/2 in	
BWA-207-C		7 dBi, Rubber swivel, 9 1/4 in	

BWA-902-RA	900 MHz	2 dBi, Rubber fixed right-angle	
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BWA-201-001	2.4 GHz	1 dBi, Rubber, 1 inch tall	
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Omni-Directional Dome Antennas

BWA-902-D	900 MHz	2 dBi, 18 inch cable	RP-SMA Box Mount
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BWA-202-D	2.4 GHz	2 dBi, 18 inch cable	RP-SMA Box Mount
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Other

BWA-205-M	2.4 GHz	5 dBi, Magnetic whip antenna, 12 ft cable	RP-SMA Male
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(2) Antennas, continued



Omni-Directional Fiberglass Antennas with N-Type Female Connections

BWA-906-A	900 MHz	2 dBi, Rubber swivel (ships with 900 MHz radios)
BWA-208-A	2.4 GHz	8.5 dBi, Fiberglass, 24 in
BWA-206-A		6 dBi, Fiberglass, 16 in (shown)
BWA-906-AS	900 MHz	6 dBi, Fiberglass, 1/4 Wave, 23.6 in (1.3 inch diameter)
BWA-908-AS		8 dBi, Fiberglass, 3/4 Wave, 63 in (1.5 inch diameter)



Directional (Yagi) Antennas with N-Type Female Connection

BWA-9Y6-A	900 MHz	6.5 dBd, 6.8 × 13 inches Outdoor
BWA-9Y10-A	900 MHz	10 dBd, 6.8 × 24 inches Outdoor

(3) Antenna Cables



Antenna Cables: RP-SMA to RP-SMA

BWC-1MRSFRSB0.2	RG58, RP-SMA Male to RP-SMA Female Bulkhead, 0.2 m
BWC-1MRSFRSB1	RG58, RP-SMA Male to RP-SMA Female Bulkhead, 1 m
BWC-1MRSFRSB2	RG58, RP-SMA Male to RP-SMA Female Bulkhead, 2 m
BWC-1MRSFRSB4	RG58, RP-SMA Male to RP-SMA Female Bulkhead, 4 m
BWC-2MRSFRS3	LMR200, RP-SMA Male to RP-SMA Female, 3 m
BWC-2MRSFRS6	LMR200, RP-SMA Male to RP-SMA Female, 6 m
BWC-2MRSFRS9	LMR200, RP-SMA Male to RP-SMA Female, 9 m
BWC-2MRSFRS12	LMR200, RP-SMA Male to RP-SMA Female, 12 m



Antenna Cables: RP-SMA to N-Type

BWC-1MRSMN05	LMR100 RP-SMA to N-Type Male, 0.5 m
BWC-1MRSMN2	LMR100 RP-SMA to N-Type Male, 2 m



Antenna Cables: N-Type

BWC-4MNFN3	LMR400 N-Type Male to N-Type Female, 3 m
BWC-4MNFN6	LMR400 N-Type Male to N-Type Female, 6 m
BWC-4MNFN15	LMR400 N-Type Male to N-Type Female, 15 m
BWC-4MNFN30	LMR400 N-Type Male to N-Type Female, 30 m

(4) Surge Suppressors



BWC-LFNBMN-DC

Surge Suppressor, bulkhead, N-Type Female, N-Type Male, dc Blocking



BWC-LMRSFRPB

Surge Suppressor, bulkhead, RPSMA to RP-SMA

(5) Power Supplies

DC Power Supplies



PS24W

DC Power Supply, 500 mA, 24 V dc, Demo kit power supply



PSDINP-24-06

DC Power Supply, 0.63 Amps, 24 V dc, with DIN Rail Mount, Class I Division 2 (Groups A, B, C, D) Rated

PSDINP-24-13

DC Power Supply, 1.3 Amps, 24 V dc, with DIN Rail Mount, Class I Division 2 (Groups A, B, C, D) Rated

PSDINP-24-25

DC Power Supply, 2.5 Amps, 24 V dc, with DIN Rail Mount, Class I Division 2 (Groups A, B, C, D) Rated

FlexPower Supplies and Replacement Batteries



DX81-LITH

Battery Supply Module with mounting hardware

DX81H

Battery Supply Module with mounting hardware, for DX99 polycarbonate housing



DX81P6

Battery Supply Module, six "D" cells, with mounting hardware

BWA-BATT-001

Lithium "D" cell, single, for DX81-LITH and DX81H Battery Supply Module



BWA-BATT-006

Lithium "AA" cell, single, for Wireless Q45 Sensors for DX81x models

(5) Power Supplies, continued



Solar Panels

BWA-SOLAR PANEL 3W	Solar Panel, 12 V, 3 W, Multicrystalline, 188 × 195 × 15, Wall/ Pole clamp style mounting bracket included
BWA-SOLAR PANEL 5W	Solar Panel, 12 V, 5 W, Multicrystalline, 270 × 222 × 17, Wall/ Pole clamp style mounting bracket included
BWA-SOLAR PANEL 20W	Solar Panel, 12 V, 20 W, Multicrystalline, 573 × 357 × 30, "L" mounting bracket included
BWA-SOLAR CNTRL-12V	Solar Controller, 6 A Load Current 12 V System Voltage, recommended for 20 watts or less solar panel AND Sealed Lead Acid Battery (SLA)

Relays



IB6RP	Interface Relay Box, 18 to 26 V dc inputs, isolated relay outputs (not shown)
BWA-RELAY-12V	Relay, Blade Style with Base, 12 V
BWA-RELAY-24V	Relay, Blade Style with Base, 24 V
BWA-RH1B-UDC12V	Relay, Blade Style, No Base, 12 V (replacement part)
BWA-RH1B-UDC24V	Relay, Blade Style, No Base, 24 V (replacement part)
BWA-SH1B-05	Relay Base Only (replacement part)

(6) Brackets

Mounting Kit

BWA-HW-001

- Screw, M5-0.8 x 25 mm, SS (4)
- Screw, M5-0.8 x 16 mm, SS (4)
- Hex nut, M5-0.8 mm, SS (4)
- Bolt, #8-32 x 3/4-in, SS (4)

Brackets



SMBDX80DIN

- Black reinforced thermoplastic bracket for mounting on a 35 mm DIN rail



BWA-HW-034

- DIN rail clip, black plastic
- Used with the M-HBx MultiHop and -PBx Performance board modules



SMBAMS18RA

- Right-angle SMBAMS series bracket with 18 mm hole
- 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 19.0



DIN-35-70 = 70 mm
 DIN-35-105 = 105 mm
 DIN-35-140 = 140 mm

- 35 mm DIN Rail

Hole center spacing: 35.1
 Hole size: 25.4 x 5.3

Cables

Ethernet Cables

Use a crossover cable to connect the GatewayPro or DX83 Ethernet Bridge to a host system without using an Ethernet switchbox or hub. When using a switchbox or hub, use a straight cable.

BWA-E2M	Ethernet cable, RSCD RJ45 440, 2 m
BWA-E8M	Ethernet cable, RSCD RJ45 440, 8 m
BWA-EX2M	Ethernet cable, crossover, RSCD RJ45CR 440, 2 m

Adapter Cables



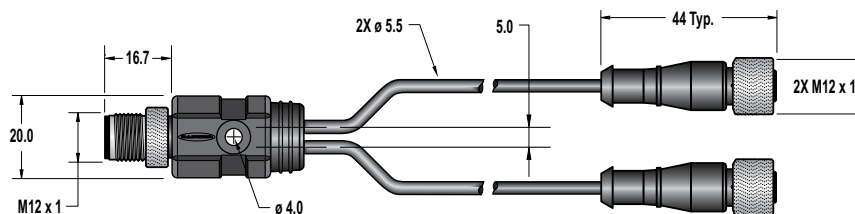
BWA-HW-006	Adapter cable, USB to RS-485, for use with the User Configuration Tool software (UCT)
BWA-UCT-900 (shown)	Adapter cable with power, USB to RS-485, for use with the User Configuration Tool software (UCT), supplies power to 1 Watt radios

Splitter Cables

Use **CSRB-M1250M125.47M125.73** to split power between two *FlexPower*® or solar powered devices. DO NOT use this cable to connect a *FlexPower* device to a 10 to 30 V dc powered device.

Use **CSRB-M1253.28M1253.28M1253.28** to connect one *FlexPower* device (data radio, *FlexPowered* Gateway, etc) to two power sources, such as the *FlexPower* Solar Supply and **DX81P6** Battery Pack.

Model	Length	Style	Pinout
CSRB-M1250M125.47M125.73	Trunk: 0 m (male) Branches: 0.14 m and 0.22 m (female)	Straight	<p>1 = Brown 2 = White 3 = Blue 4 = Black 5 = Green/Yellow</p>
CSRB-M1253.28M1253.28M1253.28	Trunk: 1 m (female) Branches: 1 m (male)		

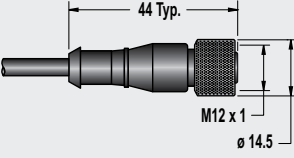
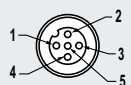
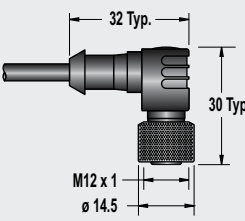


Cordsets

Euro-Style — Single-Ended

When facing the Node or Gateway toward you and the quick-disconnect connection is facing down, the right-angle cables exit to the right.

When using the *FlexPower*® Node with integrated battery, use a double-ended cordset. When using a *FlexPower* Node with external power supply, use a single-ended cordset. If using the communication lines, the cable length cannot exceed 3 meters (10 ft).

Model	Length	Style	Dimensions	Pinout
MQDC1-501.5	0.50 m (1.5 ft)	Straight		<p>Female</p>  <p>1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray</p>
MQDC1-506	1.83 m (6 ft)			
MQDC1-515	4.57 m (15 ft)			
MQDC1-530	9.14 m (30 ft)	Right-Angle		
MQDC1-506RA	1.83 m (6 ft)			
MQDC1-515RA	4.57 m (15 ft)			
MQDC1-530RA	9.14 m (30 ft)			

Model	Length	Style	Description
BWA-QD5.5	—	—	Prewired 5-pin Euro connector, 1/2-14 NBSM
BWA-QD8.5	—	—	Prewired, 8-pin Euro connector, 1/2-14 NBSM
BWA-QD12.5	—	—	Prewired 12-pin Euro connector, 1/2-14 NBSM
FIC-M12F4	—	Straight	Euro-Style Field-Wireable Connector 4-pin Female Straight
MQDMC-401	0.5 m	Straight	Cordset, 4-pin Euro-style, single ended, male, longer pigtailed for DX80...C models

Cordsets, continued

Euro-Style — Double-Ended

When using the *FlexPower*® Node with integrated battery, use a double-ended cordset. When using a *FlexPower* Node with external power supply, use a single-ended cordset. If using the communication lines, the cable length cannot exceed 3 meters (10 feet).

Model	Length	Style	Dimensions	Pinout
DEE2R-51D	0.31 m (1 ft)	Female Straight/ Male Straight		<p>1 = Brown 2 = White 3 = Blue 4 = Black 5 = Green/Yellow</p>
DEE2R-53D	0.91 m (3 ft)			
DEE2R-58D	2.44 m (8 ft)			

Other Cordsets

BWA-RIBBON-001	Ribbon cable, 20-pin DBL socket
BWA-HW-010	Cable, <i>FlexPower</i> Current Monitoring

Hardware and Replacement Parts

Model	Description
BWA-HW-002	DX80 Access Hardware Kit: Plastic threaded plugs, PG-7 (4) Nylon gland fittings, PG-7 (4) Hex nuts, PG-7 (4) Plug, 1/2-in NPT Nylon gland fitting, 1/2-in NPT
BWA-HW-003	PTFE Tape, 1/4-in wide, 600-in long
BWA-HW-004	Replacement Seals: O-ring, rotary access cover, PG21 (2) O-ring, body gasket (2) Access cover, rotary dials, clear plastic (2)
BWA-HW-009	Solar assembly hardware pack, includes brackets, bolts, and set screws
BWA-HW-007	Housing Kit, DX80, top and bottom, 10 pieces
BWA-HW-008	Housing Kit, DX81, top and bottom, 10 pieces
BWA-HW-044	Terminal header for the MultiHop Ethernet Data Radio
BWA-HW-011	Terminal Block Headers, IP20, 2 pack
BWA-HW-012	DX99 Antenna Extension Pack: Screw, M4-0.7 x 20, pan head, black steel Flexible Antenna Cable, 12 in, SMA male to SMA female
BWA-HW-032	Access hardware for the E housing, one 1/2-in plug, one 1/2-in gland
BWA-HW-037	Clear plastic retaining ring for DX99 metal housings, 10 pack

Replacement Filters



Model	Description
FTH-FIL-001	Aluminum grill filter cap (factory default, ships with M12FT*Q sensors)
FTH-FIL-002	Stainless steel, sintered to 10 micrometer porosity (for high dust environments)

Cable Glands and Plugs

Model	Description
BWA-HP5-10	Dummy Hole Plugs, 1/2-in NPT, 10 pieces
BWA-HW-031	Vent Plug, 1/2-in NPT, IP67
BWA-CG.5-10	Cable Glands, 1/2-in NPT, Cordgrip for 3 holes of 2.8 to 5.6 mm diameter, 10 Pack
BWA-CG.5-3X5.6-10	Solar assembly hardware pack, includes brackets, bolts, and set screws
BWA-CG.5-2X2.5-10	Cable Glands, 1/2-in NPT, Cordgrip for 2 holes of 1.2 to 2.5 mm diameter, 10 Pack
BWA-CG.5-6X4.0-10	Cable Glands, 1/2-in NPT, Cordgrip for 6 holes of 2 to 4 mm diameter, 10 Pack
BWA-CG.5-6X3.0-10	Cable Glands, 1/2-in NPT, Cordgrip for 6 holes of 1.5 to 3 mm diameter, 10 Pack

Metal Housing Accessories



Model	Description
BWA-HW-016	Antenna Feedthrough, Stainless Steel, 1/2-in NPT
BWA-HW-017	Antenna Feedthrough, Stainless Steel, 3/4-in NPT
BWA-HW-012	DX99 Antenna Extension Pack (M4-0.7 x 20 black steel pan head screw, flexible antenna cable 12-in SMA male to SMA female)
BWA-HW-037	Clear plastic retaining ring for DX99 metal housings (10 pack)
BWA-AXFS0130	AXF™ Explosion-Proof Antenna Coupler

Omni-Directional Dome Antennas



Models	Frequency	Description	Connection
BWA-9O2-001	900 MHz	2 dBi, 18 inch cable	1/2-in SS NPT Port
BWA-9O2-002			3/4-in SS NPT Port
BWA-2O2-001	2.4 GHz		1/2-in SS NPT Port
BWA-2O2-002			3/4-in SS NPT Port

OTHER AVAILABLE MODELS



Q45 Wireless

[see website](#)

Sure Cross® Wireless Q45 Sensors combine the best of Banner's flexible Q45 sensor family with its reliable, field-proven, Sure Cross® wireless architecture.



Safety

Banner produces a wide range of safety-related products, including safety light screens, safety interlock switches, e-stop modules and two-hand control safety modules that protect personnel and equipment.

SAFETY

LIGHT SCREENS **page 552**

CONTROLLERS **page 582**

EMERGENCY STOP &
STOP CONTROL **page 609**

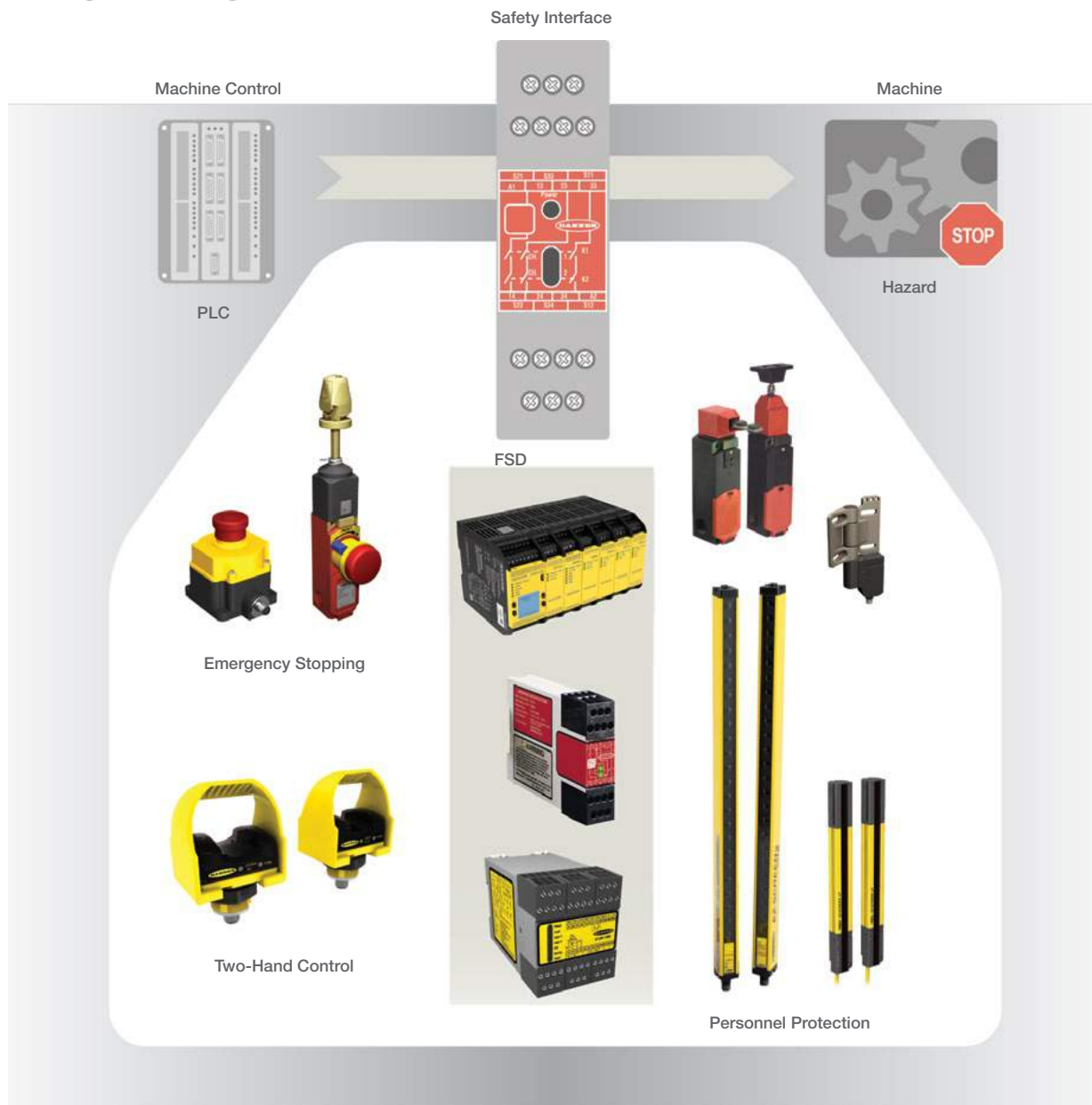
INTERLOCK SWITCHES **page 640**

TWO-HAND CONTROL **page 680**

LASER SCANNERS **page 692**

MODULES **page 698**

Safeguarding Basics



Basics of Safeguarding

Machine and personnel safeguarding refers to the combination of requirements, methods and solutions used to protect people who come in contact with dangerous machines in the industrial environment.

Requirements

National and regional governmental bodies have regulations, mandates, standards and recommendations for implementing a safety method or a solution.

Key regulations regarding general machine guarding include the following:

- Machinery Directive - EU
- OSHA General Duty Clause – USA

Device Requirements

Safety devices must be able to consistently and reliably bring a machine hazard to an orderly stop.

To be considered a safety device, the following methods must be used to ensure reliable operation: fault exclusion, redundancy and self-checking.

Safety Circuit Requirements

A safety stop circuit typically comprises 2 normally-open contact from mechanically-linked relays. The circuit is monitored to detect certain failures that could lead to the loss of the safety function.

Methods: Risk Assessment

The Risk Assessment Process in machine safeguarding is a process used to identify hazards through each phase of the machine's life cycle and to minimize dangers to personnel and equipment.

The basic steps in a Risk Assessment Process:

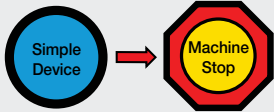

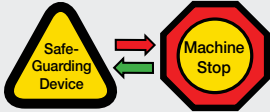

1. Identify hazards and where they occur.
2. Assess risk by severity of harm and probability of occurrence.
3. Reduce the risk through the use of protective measures.
4. Validate and document results.

Risk Assessment Standards





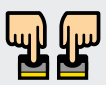



- OSHA 3071, Job Hazard Analysis
- MIL-STD-8820, US DOD System Safety Program
- ANSI B11.0 General (Safety) Requirements and Risk Assessment
- ISO 12100, General Principles for Design, Risk Assessment and Risk Reduction
- SEMI S10, Risk Assessment, Semiconductor Manufacturing Equipment

Methods: Safety Circuits

Depending on the level of risk associated with the machine or operations, an appropriate level of control circuitry performance must be incorporated into safety device design.

	Basic	Single	Single with Monitoring	Dual with Monitoring
	<p>Stop Command</p> 	<p>Protective Command</p> 	<p>Protective Command Monitoring Signal</p> 	<p>Redundant (Safety) Stop Commands Monitoring Signal</p> 
Generic	<ul style="list-style-type: none"> • Non safety-rated components • Integrated in accordance with relevant standards • Reliability depends on robust components • Redundancy not required 	<ul style="list-style-type: none"> • Safety-rated components • Integrated in accordance with safety principles and design • Redundancy not required 	<ul style="list-style-type: none"> • Safety-rated components • Conducts periodic test of system • Normal operation allowed if no faults are found • If unsafe fault is found, system will default to safe state or indicate that unsafe system exists 	<ul style="list-style-type: none"> • Safety-rated components • Greatest degree of fault tolerance • Redundancy and self-checking • Single failure cannot cause loss of safety function • Faults detected immediately or at next demand on system
Fault	Possible loss of safety function	Greater reliability, but possible loss of safety function	Fault detected at each test	Safety function is ensured with a single fault. An accumulation of faults is detected or not possible.
Risk	Very Low Minor bump or bruise with no lost time	Low Minor first aid, infrequent exposure or high likelihood of avoiding the hazard	Mid Range Injuries that are slight or normally reversible, requiring normal healing or only first aid	High or Very High Normally reserved for hand-fed applications where injuries could be severe to irreversible
ANSI / B11	—	—	—	Control Reliable ANSI B11.19 (Clause 6.1 and Annex C) Category 3 or 4 and/or PL d or PL e per ISO 13849-1 satisfy Control Reliability requirements
ANSI / RIA	Simple	Single Channel	Single Channel with Monitoring	Typically, a minimum of PL=d with Category 3 per ISO 13849-1:2006 or control reliable (see ANSI B11.19 TR6 or ANSI B11.19)
ISO / EN	Category B ISO 13849-1/EN 954-1	Category 1 ISO 13849-1/EN 954-1	Category 2 ISO 13849-1/EN 954-1	Category 3 & 4 ISO 13849-1/EN 954-1

Solutions: Comparing Guards and Devices*

Type	Safety Function	Advantages	Limitations	Requirements	Standards
Guards: protective physical barrier used to prevent access.					
Fixed Guard 	Provides a fixed barrier to the hazard	<ul style="list-style-type: none"> • Low maintenance • Long life • Low cost for small areas • Protects all individuals • Can contain ejected materials 	<ul style="list-style-type: none"> • Poor ergonomics • Limited visibility • Limited access • Costly for large areas • Maintenance may require removal of guard 	<ul style="list-style-type: none"> • Protect from identified hazard • Prevent user from reaching over, under, around or through the barrier • Provide safe openings 	<ul style="list-style-type: none"> • ANSI B11.19 • ISO 14120 • ISO 13857
Interlocked Guard 	Interrupts power to machine when guard is opened	<ul style="list-style-type: none"> • Low initial investment • Can be placed close to hazard • Protects all individuals • Can contain ejected materials 	<ul style="list-style-type: none"> • Costly for large areas • Increased maintenance 	<ul style="list-style-type: none"> • Must be difficult to defeat • Guard may open only after machine has stopped—or must be installed at a safe distance 	<ul style="list-style-type: none"> • ANSI B11.19 • NFPA 79 • ISO 14119 • ISO 14120 • IEC 60204-1 • ISO 13857 • ISO 13855
Safeguarding Devices: components, attachments or mechanisms designed to perform a specific safeguarding function.					
Safety Light Screen 	Arrests power to machine when sensing field is interrupted	<ul style="list-style-type: none"> • Excellent ergonomics • Allows frequent access • Protects all individuals • Cost effective for large areas • Allows for good visibility 	<ul style="list-style-type: none"> • Limited to machines that can be stopped quickly • No protection from ejected parts • May require the use of additional guards • May create a pass-through hazard 	<ul style="list-style-type: none"> • Initiate immediate stop when sensing field is interrupted • Appropriate resolution required to detect objects the size of a torso, ankle, hand or finger 	<ul style="list-style-type: none"> • ANSI B11.19 • IEC 61496 • ISO 13855
Multiple-Beam System: <ul style="list-style-type: none"> • Grids • Points 	Arrests power to machine when sensing field is interrupted	<ul style="list-style-type: none"> • Low initial investment • Allows frequent access • Allows for good visibility • Protects all individuals 	<ul style="list-style-type: none"> • Limited to machines that can be stopped quickly • No protection from ejected parts • Large safety distance • May create a pass-through hazard 	<ul style="list-style-type: none"> • Initiate immediate stop when sensing field is interrupted • Appropriate resolution required to detect objects the size of a torso 	<ul style="list-style-type: none"> • ANSI B11.19 • IEC 61496 • ISO 13855
Two-Hand Control 	Operator must use both hands to actuate machine motion hereby preventing operator access to hazardous area	<ul style="list-style-type: none"> • Operator's hands are away from hazardous area • Low initial investment • Low maintenance 	<ul style="list-style-type: none"> • Potential ergonomic impact • Provides protection only for operator • No protection from ejected parts 	<ul style="list-style-type: none"> • Concurrent actuation within 1/2 second • Release and reactivation required before machine motion may be reinitiated 	<ul style="list-style-type: none"> • ANSI B11.19 • NFPA 79 • ISO 13851 • IEC 60204-1 • ISO 13855
Safety Mat Monitor 	Interrupts power to machine when a minimum pressure is applied	<ul style="list-style-type: none"> • Excellent ergonomics • Protects all individuals • Allows for good visibility 	<ul style="list-style-type: none"> • Costly for large areas • Maintenance intensive • Large safety distance 	Minimum object sensitivity of 66 lbs on and 3-1/8" surface to detect a foot	<ul style="list-style-type: none"> • ANSI B11.19 • ISO 13855 • ISO 13856
Complementary (Safety) Equipment: used to supplement/augment safeguarding.					
E-Stop <ul style="list-style-type: none"> • Button • Rope Pull  	Operator activates button in emergency situation to shut off power to machine	<ul style="list-style-type: none"> • Immediate response • Safe shutdown of machine process 	<ul style="list-style-type: none"> • Not considered a safeguard • Requires conscious act of operator • Limits injury or machine damage but typically does not prevent it 	<ul style="list-style-type: none"> • Overrides all other functions and operations • Reset of E-stop doesn't initiate machine motion • Button must be red with yellow background • Should be located at each operation station • Final removal of power done by electromechanical components 	<ul style="list-style-type: none"> • ANSI B11.19 • NFPA 79 • ISO 12100 • IEC 60204-1 • ISO 13850

*This represents a partial list of available safeguards & devices.

Solutions: Choosing and Locating a Safeguard

When choosing a safeguard, ask yourself the following questions:

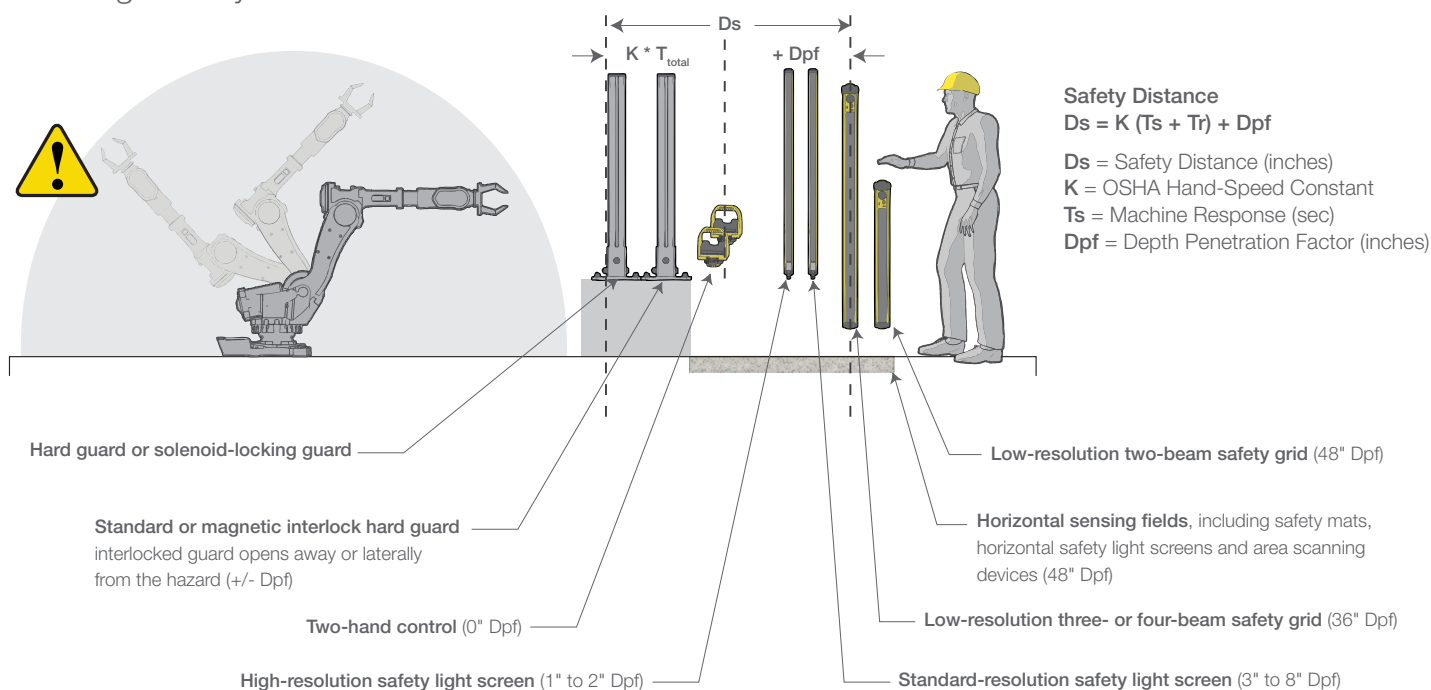
1) is it safe, 2) is it legal and 3) does it make sense for the application?

Choosing a Safety Product

- Who will use it?
- How will they use it?
- What hazards are associated with which task?
- What are the types of hazards?
- Where will the safeguard be located?

Guarding Solutions	Maintenance \$	Frequent Access	Infrequent Access	Locate Close to Hazard	Long Machine Stop Time	Ergonomic	Visibility	Multiple Operators	Guards Against Ejected Material	Comments
Fixed Hard Guard	P	P	E	E	E	P	P	E	E	<ul style="list-style-type: none"> Limited access Limited visibility to the machine Costly for large areas Costly to maintain and fix
Locking Guard	P	P	E	E	E	P	P	E	E	
Interlock Guard	P	P	A	E	A	P	P	E	E	
Two-Hand Control	A	A	A	A	A	A	A	P	P	<ul style="list-style-type: none"> Only protects operator(s)
High-Resolution SLS	E	E	P	E	P	E	E	E	X	<ul style="list-style-type: none"> Locate closer to hazard
Low-Resolution SLS	E	E	P	E	P	E	E	E	X	<ul style="list-style-type: none"> Costs less than high resolution SLS
3- or 4-Beam Perimeter	E	A	A	P	A	E	E	E	X	<ul style="list-style-type: none"> Takes less space than 2-beam
2-Beam Perimeter	E	A	A	P	A	E	E	E	X	<ul style="list-style-type: none"> Costs less than 3- or 4-beam
Safety Mats	P	A	A	P	A	E	E	E	X	<ul style="list-style-type: none"> Maintenance-intensive

Locating a Safety Product



NOTE: Illustration examples are based upon the described safeguards being used as the primary safeguarding device, all examples having identical stopping time, and following generally accepted industrial engineering practices that are found within ANSI B11.19 safety standard.



EZ-SCREEN Safety Light Screens

- Type 4 models exceed control reliability requirements
- Type 2 models available for lower-risk applications
- Available in standard or cascadable models and with integrated muting



TL70 Modular LED Tower Light

- Up to five colors plus an audible module in one device
- Bright, easy-to-see indicator segments for clear status indication
- Segments appear gray when OFF to eliminate false indication from ambient light



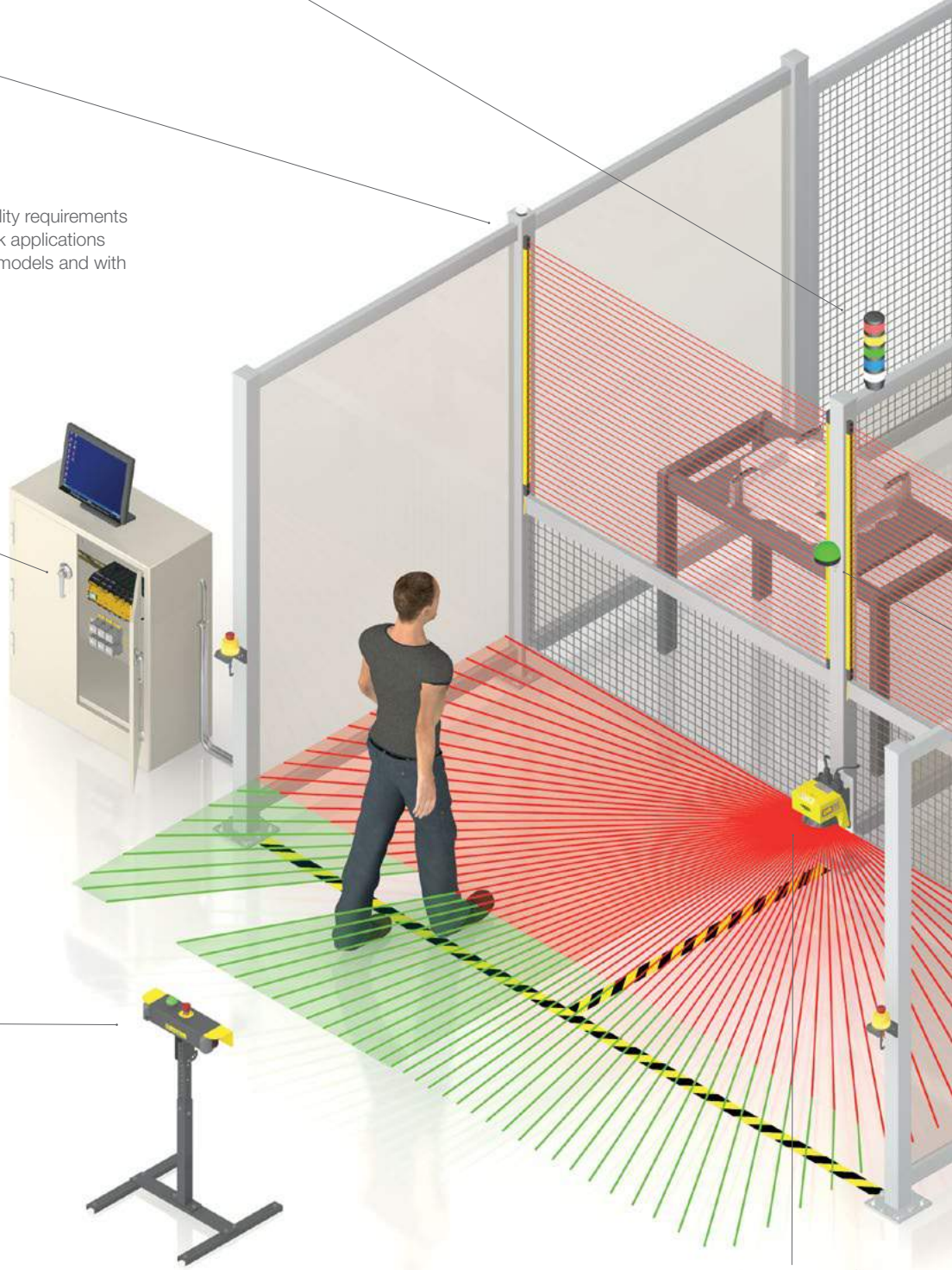
XS26-2 Expandable Safety Controller

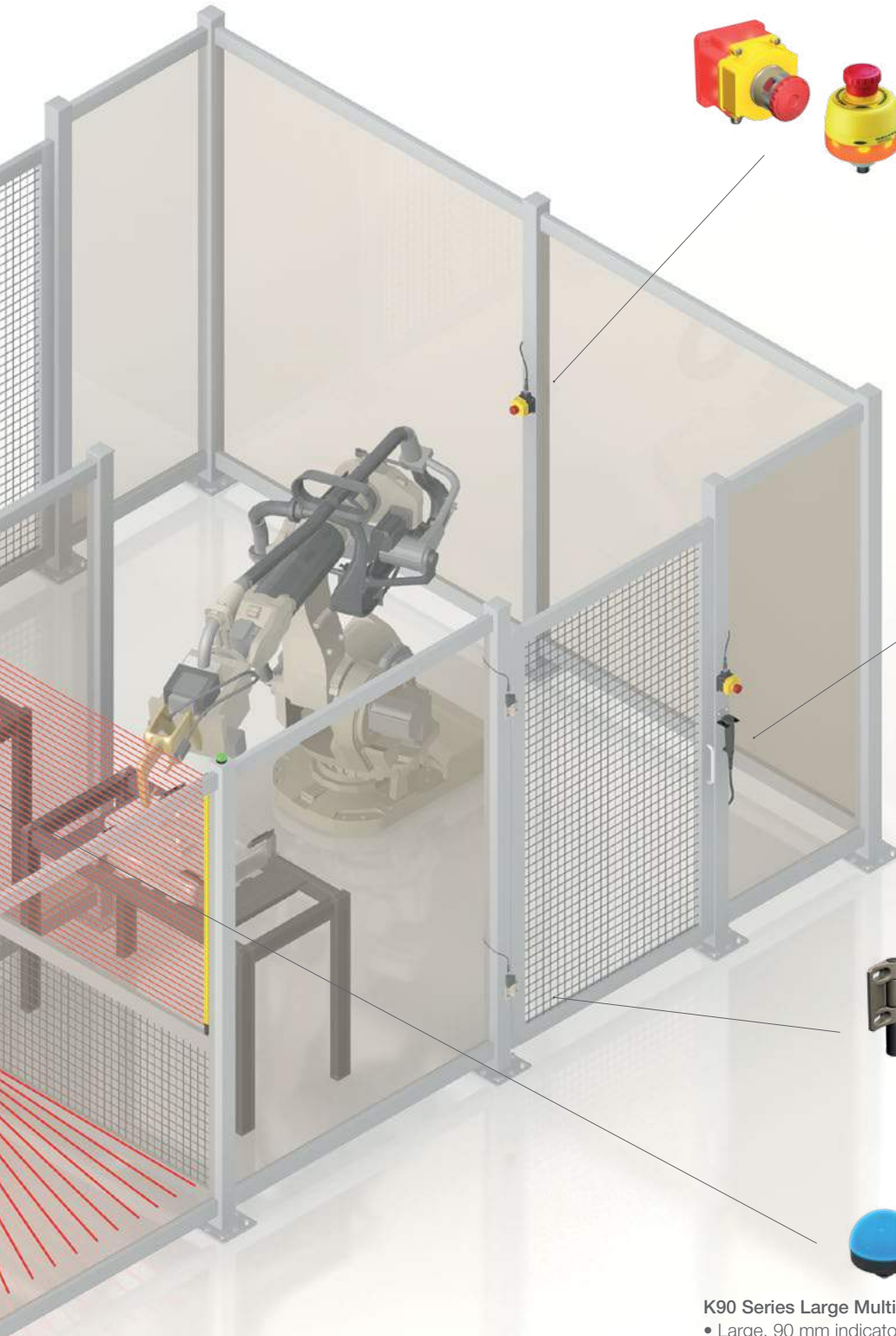
- Up to eight expansion I/O modules can be added as your safety application grows or changes
- Begin programming right away using our intuitive, easy-to-use configuration software
- Simulator functionality allows users to test their configurations without being connected to a controller



Two-Hand Control

- Ergonomic design reduces risk of repetitive strain injury
- Optional run bar stand
- Add EZ-LIGHTs for status indication in lean manufacturing
- Provides highest level of safety for two-hand control input devices





Emergency Stop and Stop Control

- Available as panel mount or as pre-assembled enclosures
- Illuminated models help operators quickly identify actuated buttons
- Easy-to-mount enclosures install using M12 cables for quick wiring



Enabling Devices

- Provides safety function when user either squeezes or releases the handle grip switch
- Ergonomic design with a detented enable position



Safety Interlock Switches

- Load bearing hinge switch with 270° range
- Safety switching point is adjustable and repositionable
- Stainless or zinc die-cast



K90 Series Large Multicolor EZ-LIGHT

- Large, 90 mm indicator lights provide extremely bright and uniform illumination from all directions and over longer distances
- Up to five colors in a single device
- Rugged IP67 design

Safety Scanner

- Two-dimensional laser scanner with easy-to-use software
- Programming of irregular shaped warning and detection zones
- 190° scanning angle with selectable resolutions (30 mm, 40 mm, 50 mm, 70 mm and 150 mm) and a 4 m or 6.25 m range



Light Screens

Safety light screens protect personnel from injury and machines from damage by guarding points of operation, access, areas and perimeters. Type 4 safety light screens provide control reliability and high levels of fault tolerance and Type 2 safety light screens are cost effective for guarding lower-risk applications.

Series	Description	Max. Sensing Range	Defined Area	Safety Rating	Dimensions H x W x D	Power Supply
	EZ-SCREEN® Two-piece system with 14 or 30 mm resolution provides finger, hand and ankle detection. page 556	14 mm: 6 m 30 mm: 18 m	150 to 1800 mm 150 to 2400 mm	Type 4 /Category 4/PLe	H (varies by model) 35 x 45.2 mm	24 V dc
	EZ-SCREEN® LS Intuitive, easy-to-use safety light screens with 14, 23, and 40 mm resolution to provide finger, hand and ankle detection. page 560	12 m	280 to 1820 mm	Type 4 /Category 4/PLe	H (varies by model) 45 x 42.5 mm	24 V dc
	EZ-SCREEN® LP Two-piece system with 14 or 25 mm resolution provides finger, hand and ankle detection. page 564	14 or 25 mm: 7 m	270 to 1810 mm	Type 4 /Category 4/PLe	H (varies by model) 28 x 26 mm	24 V dc
	EZ-SCREEN® Grids Two-piece perimeter guarding system with up to four beams of torso detection. page 572	70 m	500 to 1066 mm	Type 4 /Category 4/PLe	H (varies by model) 52 x 55 mm	24 V dc
	EZ-SCREEN® Points Two-piece perimeter guarding system with 1 beam of torso detection. page 573	70 m	25 mm beam diameter	Type 4 /Category 4/PLe	149 x 52 x 55 mm	24 V dc
	EZ-SCREEN® Type 2 Suited for lower risk applications where the result is only a slight injury. page 578	15 m	150 to 1800 mm	Type 2 /Category 2/PLe	H (varies by model) 25.2 x 31.8 mm	24 V dc

Choosing a Safety Light Screen Model

Select Hazard Level

1

Type 4

Protect personnel from injury and machines from damage by guarding points of operation, access, areas and perimeters. With self-checking circuitry, Type 4 light curtains provide control reliability and high levels of fault tolerance.

Select Resolution

2

Finger



14 mm resolution for finger, hand and ankle detection

Hand



lower resolution for hand and ankle detection

Body



2, 3, or 4 beams to protect personnel and machinery

Select Housing

3

Standard



Non-contact machine guarding systems protect fingers, hands and ankles, and guard perimeters and access, using self-contained emitters and receivers without a separate control box. See page 556

LS



The Lean & Simple design combines Machine Safety and the notion of Lean Manufacturing by focusing on features that provide high-value for most applications while eliminating those that unnecessarily add cost and complicate the installation, use, and maintenance of the device. See page 560

Low-Profile



The space-saving, compact profile is ideal for smaller machines, yet robust enough to meet the demands of large power presses. See page 564

Grids & Points



Point and Grid systems allow one-, two-, three- or four-beam perimeter and access guarding. See page 572

Select Hazard Level

1

Type 2

Used for lower-risk applications, where the result of an accident is only a slight injury. Type 2 Light curtains feature a large field of view and use fault exclusion to ensure the integrity of safeguarding.

Select Resolution

2

Hand/Body



30 mm resolution for bump, bruise or knock-down detection

Select Housing

3

Standard



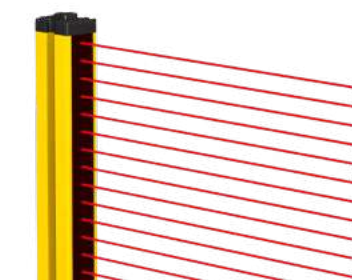
Inexpensive, compact optical safeguarding solution designed for lower-risk applications where risk of injury is limited but some guarding is necessary. See page 578

EZ-SCREEN®

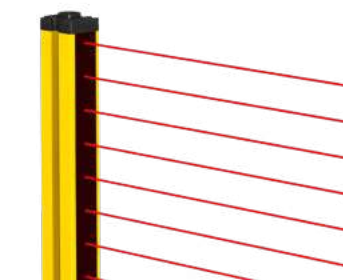
Safety Light Screens



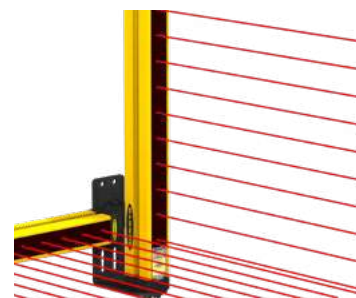
- EZ-SCREEN® point-of-operation systems provide finger, hand and ankle detection in a robust housing and metal endcaps.
- Operating range up to 18 m
- Displays operating status, configuration error codes, and blocked beams
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cULus NIPF, and CE certified to Type 4, Cat 4 PLe, and SIL3
- Resists impact, twisting, and abusive environments with durable aluminum housing or nickel-plated ESD-safe housing for protection against electrostatic discharges
- Available in 14 or 30 mm resolution
- Cordsets and brackets see page 578

**14 mm Resolution**

14 mm resolution safety light screens can be used for finger, hand and ankle protection.

**30 mm Resolution**

30 mm resolution safety light screens can be used for hand and ankle protection.

**Cascade**

Cascading models allow four systems of any length and resolution to be connected in a series, forming a single safety device.

Some of the Available Finishes

Yellow Painted
Aluminum



Clear Anodized
Aluminum



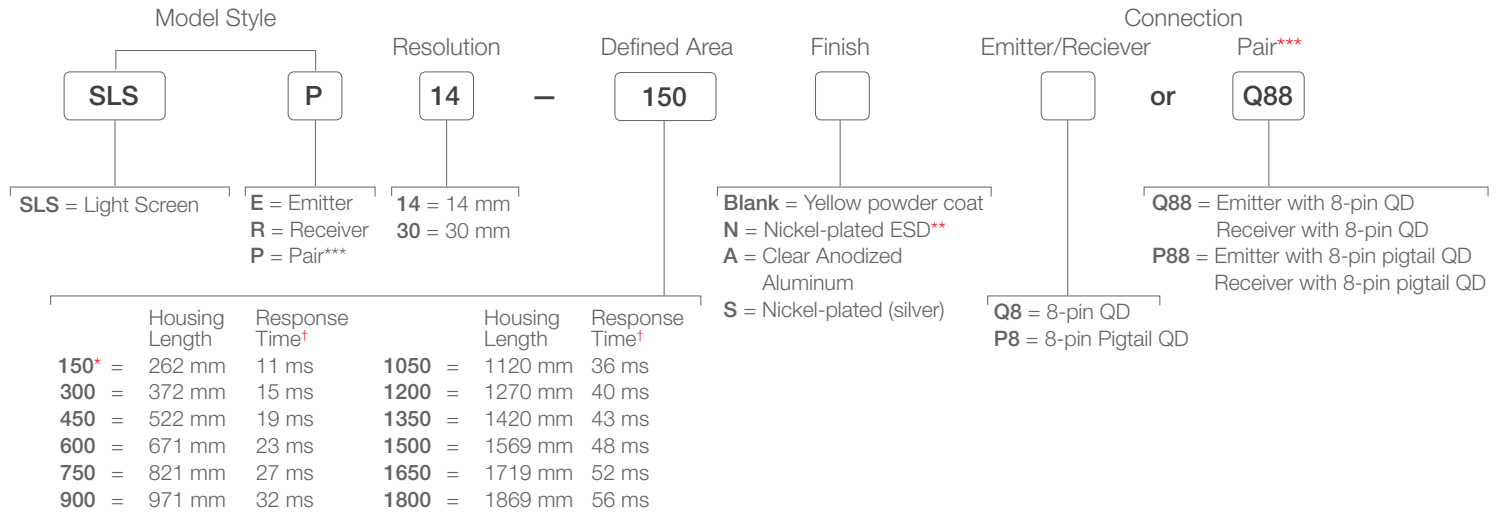
Nickel-Plated
ESD



EZ-SCREEN Systems

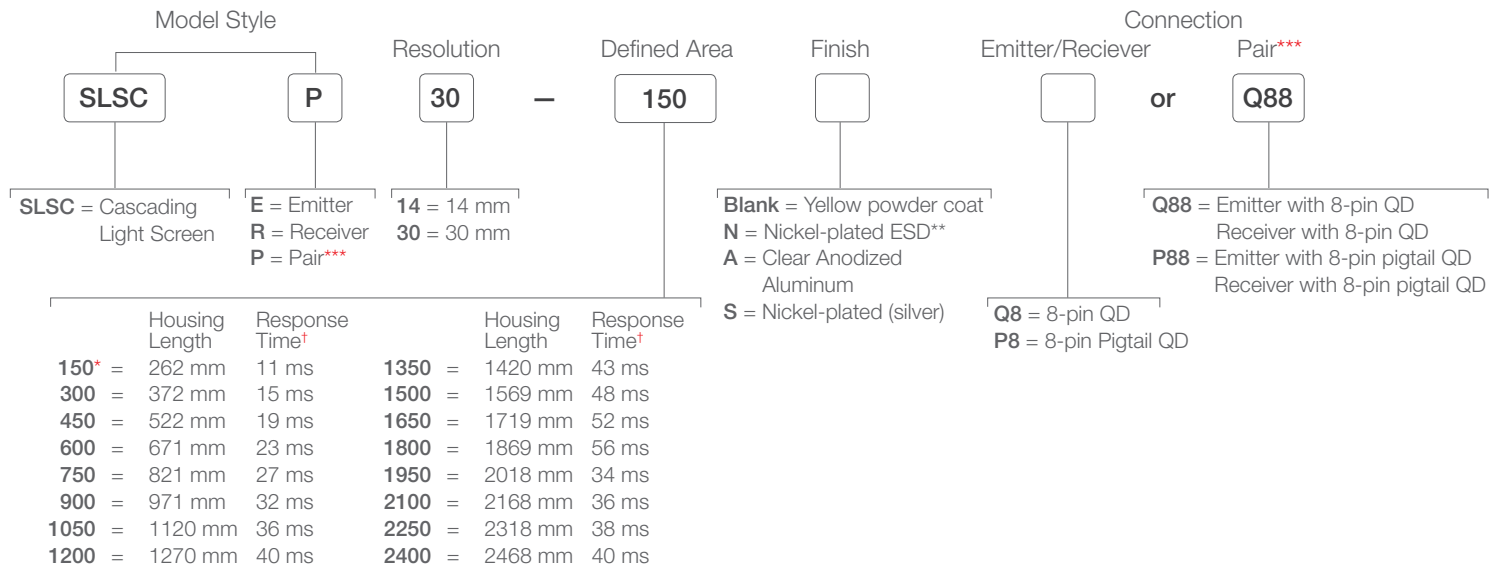
EZ-SCREEN® Systems, Non-Cascade

Example Model Number SLSP14-150Q88



EZ-SCREEN® Systems, Cascade

Example Model Number SLSCP30-150Q88



For more specifications see page 559.

QD models: A model with a QD requires a mating cordset (see page 578).

For an emitter with TEST function, replace Q8 with Q5 on emitter model numbers (example, SLSE14-150Q5) and Q88 with Q85 on pair model numbers (example, SLSP14-150Q85).

For a 5-pin 300 mm M12/Euro pigtail QD with No EDM or TEST functions, replace Q8 with P5NT on emitter or receiver (example, SLSE14-150P5NT) and Q88 with P55NT on pair model numbers (example, SLSP14-150P55NT).

For a 4-pin 300 mm M12/Euro pigtail QD with no EDM or TEST functions (GND/PE via mounting), replace Q8 with P4NT or Q88 with P44NT (example, SLSP14-150P4NT or SLSP14-150P44NT).

* 150 mm not available in cascade models

** ESD-safe models are not available with the pigtail QD option

*** A pair includes an emitter and receiver (example, SLSP30-150Q88)

† Cascading system response time: To the response time of the slowest pair, add 2 ms for each additional pair.

Example: slowest pair's response time is 15 ms, and the system has three additional pairs (four pairs total), so the system maximum response time is 15 ms + 6 ms (3 pairs x 2 ms) = 21 ms.

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

SAFETY

LIGHT SCREENS

CONTROLLERS

EMERGENCY STOP & STOP CONTROL



8-Pin

- QDE-815D
4.5 m (15')
- QDE-825D
7.6 m (25')
- QDE-850D
15.3 m (50')
- QDE-875D
22.9 m (75')
- QDE-8100D
30.5 m (100')

M12/Euro-Style
Straight connector
models listed



8-Pin

- | | |
|---------------------------|------------------------------|
| DEE2R-81D
0.3 m (1') | DEE2R-825D
7.6 m (25') |
| DEE2R-83D
0.9 m (3') | DEE2R-850D
15.3 m (50') |
| DEE2R-88D
2.4 m (8') | DEE2R-875D
22.9 m (75') |
| DEE2R-815D
4.5 m (15') | DEE2R-8100D
30.5 m (100') |

Euro-Style
Double-ended
male/female

Euro-Style
Adaptor
male/female

8-Pin/4-Pin*

- DEE8-41D
0.3 m (1')
- DEE8-48D
2.4 m (8')
- DEE8-415D
4.5 m (15')
- DEE8-425DD
7.6 m (25')

8-Pin/5-Pin*

- DEE8-51D
0.3 m (1')
- DEE8-58D
2.4 m (8')
- DEE8-515D
4.5 m (15')
- DEE8-525DD
7.6 m (25')

* For SLS/SLP sensors with Q8 or P8 connection to safety BUS gateway/ node, "smart" self-monitored safety module, safety controller or safety PLC see page 771.

NOTE: See page 577 for interfacing solutions.
Additional accessories are listed on page 686.



8-Pin

- CSB-M1280M1280
- CSB-M1281M1281
- CSB-M1288M1281
- CSB-M12815M1281
- CSB-M12825M1281
- CSB-UNT825M1281

Euro-Style
Straight splitter



EZA-MBK-12** EZA-MBK-11** EZA-MBK-20

Used with: 14 and 30 mm



EZA-MBK-21

Cascade

Additional cordset information is available.
See page 758

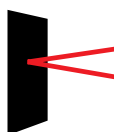
Additional bracket information is available.
See page 729

Stands



see page 802

Mirrors



see page 806

Interface





see page 820

Replacement Parts

Model	Description
EZA-ADE-1	Copolyester access cover with label for 14 or 30 mm resolution emitters
EZA-ADE-2	Copolyester access cover with inverted label for 14 or 30 mm resolution emitters
EZA-ADR-1	Copolyester access cover with label for 14 or 30 mm resolution receiver
EZA-ADR-2	Copolyester access cover with inverted label for 14 or 30 mm resolution receiver
EZA-MBK-12	Center bracket kit (includes 1 bracket and hardware to mount to MSA Series stands) for 14 or 30 mm resolution EZ-SCREEN
EZA-MBK-11	Standard bracket kit with hardware (includes 2 end brackets and hardware to mount to MSA Series stands) for 14 or 30 mm resolution EZ-SCREEN
EZA-TP-1	Access cover security plate (includes 2 screws, wrench) for 14 or 30 mm resolution EZ-SCREEN
EZA-RR-1	External normally open reset switch with 8-pin/M12 Euro-style QD
MGA-K-1	Replacement key for switch MGA-KS0-1
MGA-KS0-1	Panel-mount keyed normally open reset switch
EZA-HK-1	Wrench, Security
EZA-RTP-1	Terminator plug for cascade receiver
STP-13	14 mm test piece (14 mm resolution systems)
STP-14	30 mm test piece (14 mm resolution systems with 2-beam Reduced Resolution and for 30 mm resolution systems)
STP-15	60 mm test piece (30 mm resolution systems with 2-beam Reduced Resolution)

NOTE: See Installation manual p/n 112852 for complete list of replacement parts and accessories.

EZ-SCREEN® 14 & 30 mm Resolution Specifications

Supply Voltage at the Device	24 V dc \pm 15% (use a SELV-rated supply according to EN IEC 60950) (The external voltage supply must be capable of buffering brief mains interruptions of 20 ms, as specified in EN/IEC 60204-1.)		
Residual Ripple	\pm 10% maximum		
Supply Current	Emitter: 100 mA max., 40 mA at 24 V dc typical Receiver: 275 mA max., 160 mA at 24 V dc typical, exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each) and AUX output load (up to 75 mA)		
Response Time	9 to 56 milliseconds (see model number tables) Cascade Safety Stop Interface (CSSI): 40 milliseconds max.		
Remote Test Input (Optional – available only on model SLSE...Q5 emitters)	Test Mode is activated either by applying a low signal (less than 3 V dc) to emitter TEST #1 terminal for a minimum of 50 milliseconds, or by opening a switch connected between TEST #1 and TEST #2 for a minimum of 50 milliseconds. Beam scanning stops to simulate a blocked condition. A high signal at TEST #1 deactivates Test Mode. High signal: 10 to 30 V dc Low signal: 0 to 3 V dc Input current: 35 mA inrush, 10 mA max.		
Wavelength of Emitter Elements	Infrared LEDs, 950 nm at peak emission		
Recovery Time—Blocked to clear (OSSDs turn ON; varies with total number of sensing beams and whether Sync beam is blocked)		Beam 1 (Sync Beam)	All Other Beams
	14 mm Models	109 to 800 ms	33 to 220 ms
	30 mm Models	81 to 495 ms	25 to 152 ms
EDM Input	+24 V dc signals from external device contacts can be monitored (one-channel, two-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver High signal: 10 to 30 V dc at 30 mA typical Low signal: 0 to 3 V dc		
Reset Input	The Reset input must be high for 0.25 to 2 seconds and then low to reset the receiver High signal: 10 to 30 V dc at 30 mA typical Low signal: 0 to 3 V dc Closed switch time: 0.25 to 2 sec		
Safety Outputs (OSSDs)	Two redundant solid-state 24 V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner "Safety Handshake" ON-State voltage: \geq V_{in} -1.5 V dc OFF-State voltage: 1.2 V dc max. (0-1.2 V dc) Max. load capacitance: 1.0 μ F Max. load inductance: 10 H Leakage current: 0.50 mA maximum Cable resistance: 10 Ω maximum OSSD test pulse width: 100 to 300 microseconds OSSD test pulse period: 10 to 27 milliseconds (varies with number of beams) Switching current: 0-0.5 A		
Auxiliary (Aux.) Output Switching Capacity	Current-sourcing (PNP) solid-state output, 24 V dc at 75mA max that follow the safety outputs (lockout function optional)		
Controls and Adjustments	Emitter: Scan Code selection: 2-position switch (code 1 or 2). Factory default position is code 1 Receiver: Scan Code selection: 2-position switch (code 1 or 2). Factory default position is code 1 Trip/Latch Output selection: Redundant switches. Factory default position is T (Trip). EDM/MPCE monitor selection: 2-position switch selects between 1- or 2-channel monitoring. Factory default position is 2 Reduced Resolution (2-beam Floating Blanking): Redundant switches. Factory default is OFF		
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common		
Electrical Safety Class (IEC 61140)	III		
Operating Range	14 mm models: 0.1 m to 6 m 30 mm models: 0.1 m to 18 m Range decreases with use of mirrors and/or lens shields: Lens shields – approximately 10% less range per shield Glass-surface mirrors – approximately 8% less range per mirror See Accessory section for more information on a specific mirror, page 559.		
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence		
Strobe Light Immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe		
Effective Aperture Angle (EAA)	Meets Type 4 requirements per IEC 61496-2, \pm 2.5° @ 3 m		
Enclosure	Materials: Extruded aluminum housing with yellow polyester powder (optional black or white or nickel-plated silver finish) and well-sealed, rugged die-cast zinc end caps, acrylic lens cover, copolyester access cover. Endcaps on silver models are also nickel-plated. Rating: IP65		
Operating Conditions	Temperature: 0 to +55 °C Relative humidity: 95% (non-condensing)		
Status Indicators	Emitter: One Bi-color (Red/Green) Status Indicator – indicates operating mode, Lockout or power OFF condition 7-segment Diagnostic Indicator (1 digit) – indicates proper operation, scan code or error code Receiver: Yellow Reset Indicator – indicates whether system is ready for operation or requires a reset Bi-Color (Red/Green) Status Indicator – indicates general system and output status Bi-Color (Red/Green) Zone Status Indicators – indicates condition (clear or blocked beam) of a defined group of beams 7-Segment Diagnostic Indicator (3-digit) – indicates proper operation, scan code or error code, total number of blocked beams		
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end-mounting brackets. Models longer than 900 mm also include a swivel center-mount bracket. Mounting brackets are 8-gauge cold-rolled steel, black zinc finish.		
Shock and Vibration	EZ-SCREEN® components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).		
Design Standards	Designed to comply with Type 4 per IEC 61496; Category 4 PLe per EN ISO 13849-1; SIL 3 per IEC 61508, SIL CL 3 per IEC 62061; Type 4 per UL 61496-1/-2		
Certifications	 		

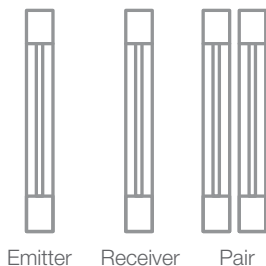
EZ-SCREEN® LS

Rugged Safety Light Screen with Enhanced Features

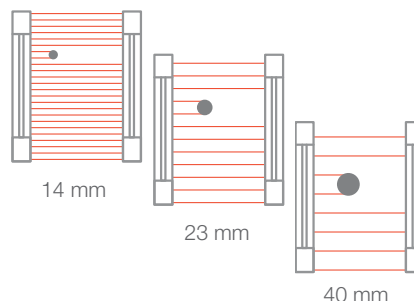


- Alignment indicators are highly visible and intuitive diagnostics simplify setup, facilitate troubleshooting and streamline installation
- No blind zone design provides end-to-end sensing to eliminate gaps in detection
- Metal end caps, thick aluminum housing and a recessed window to avoid damage from impact
- Standard pairs, cascade systems and extensive accessories to suit a wide variety of safeguarding configurations
- Cordsets and brackets see page 562

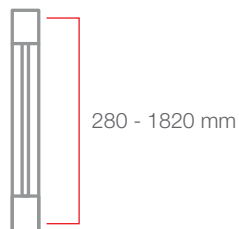
1. Choose one



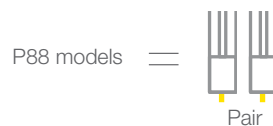
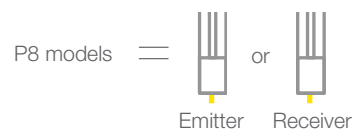
2. Choose your resolution



3. Choose your defined area



4. Choose your machine interface connection



Use DELS-.. cordset for connection between cascade pairs

Build a Standard (Non-Cascade) Pair

- Use standard models for a lower cost safety solution
- Cascade models allow for future flexibility and use of optional indicators (see "Build a Cascade System")

Family	System Type	Resolution	Defined Area		Connector*
SLL	P	14	-	770	P88
	E = Emitter only R = Receiver only P = Pair (Emitter and Receiver)	14 = 14 mm 23 = 23 mm 40 = 40 mm	280 = 280 mm 350 = 350 mm 420 = 420 mm 490 = 490 mm 560 = 560 mm 630 = 630 mm 700 = 700 mm 770 = 770 mm 840 = 840 mm 910 = 910 mm 980 = 980 mm 1050 = 1050 mm	1120 = 1120 mm 1190 = 1190 mm 1260 = 1260 mm 1330 = 1330 mm 1400 = 1400 mm 1470 = 1470 mm 1540 = 1540 mm 1610 = 1610 mm 1680 = 1680 mm 1750 = 1750 mm 1820 = 1820 mm	P8 = 300 mm pigtail, 8-Pin M12 QD (individual Emitter or Receiver models) P88 = 300 mm pigtail, 8-Pin M12 QD (on BOTH Emitter and Receiver models) Blank = no pigtail, RD connection (for RDLS-8..D cordset)
					* 5-pin M12 QD options available (P5 or P55)

Build a Cascade System


- Determine the configuration of the first EZ-SCREEN® LS pair ("master" connected to the machine control)
- Determine the remaining (second, third or fourth) pairs ("slaves" connected to the master using a DELS-.. cordset)

Family	Cascadable	System Type	Resolution	Defined Area		Connector*
SLL	C	P	14	-	770	P88
	C = Cascadable	E = Emitter only R = Receiver only P = Pair (Emitter and Receiver)	14 = 14 mm 23 = 23 mm 40 = 40 mm	350 = 350 mm 420 = 420 mm 490 = 490 mm 560 = 560 mm 630 = 630 mm 700 = 700 mm 770 = 770 mm 840 = 840 mm 910 = 910 mm 980 = 980 mm 1050 = 1050 mm	1120 = 1120 mm 1190 = 1190 mm 1260 = 1260 mm 1330 = 1330 mm 1400 = 1400 mm 1470 = 1470 mm 1540 = 1540 mm 1610 = 1610 mm 1680 = 1680 mm 1750 = 1750 mm 1820 = 1820 mm	P8 = 300 mm pigtail, 8-Pin M12 QD (individual Emitter or Receiver models) P88 = 300 mm pigtail, 8-Pin M12 QD (on BOTH Emitter and Receiver models) Blank = no pigtail, RD connection (for RDLS-8..D cordset)
						* 5-pin M12 QD options available (P5 or P55)

For more specifications see page 563.

 QD models: A model with a QD requires a mating cordset (see page 578).

Machine Interface Connections



RD Cordsets


8-Pin

RDLS-815
4.6 m (15')

RDLS-825
8 m (26')

RDLS-860
15 m (60')

M12/Euro-Style
Straight connector models listed



8-Pin

QDE-815D
4.5 m (15')

QDE-825D
7.6 m (25')

QDE-850D
15.3 m (50')

QDE-875D
22.9 m (75')

QDE-8100D
30.5 m (100')

Euro-Style
Straight splitter



8-Pin

CSB-M1280M1280


CSB-M1281M1281

CSB-M1288M1281

CSB-M12815M1281

CSB-M12825M1281

Euro-Style
Double-ended male/female



8-Pin*

DEE2R-81D
0.3 m (1')

DEE2R-83D
0.9 m (3')

DEE2R-88D
2.4 m (8')

DEE2R-815D
4.5 m (15')

DEE2R-825D
7.6 m (25')


DEE2R-850D
15.3 m (50')

DEE2R-875D
22.9 m (75')

DEE2R-8100D
30.5 m (100')

NOTE: 5-pin options available

Cascading Connections



Double-ended RD to RD

DELS-110E
0.05 m (0.2')

DELS-111E
0.3 m (1')

DELS-113E
1 m (3.3')

DELS-118E
2.5 m (8.2')

DELS-1115E
4.6 m (15')

DELS-1125E
8 m (26')

DELS-1150E
15.3 m (50')

Additional cordset information is available.
See page 758



EZLSA-MBK-11



EZLSA-MBK-12



EZLSA-MBK-16



EZLSA-MBK-20

Additional bracket information is available.
See page 729



EZLSA-K30LGR
Connects directly to **SLLCR...** cascade receiver



K30LGRXPQ
requires 4-pin QD



K50LGRXPQ
requires 4-pin QD



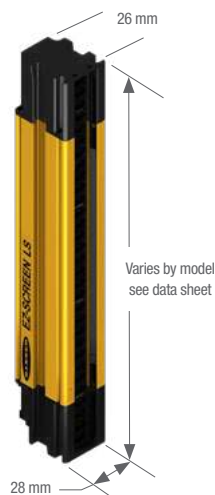
TL50GRQ
requires 4-pin QD



RD to Euro-Style*
Connects indicators to a cascade receiver



- DELSEF-40D**
0.5 m (0.02')
- DELSEF-41D**
0.3 m (1')
- DELSEF-43D**
1 m (3.3')
- DELSEF-48D**
2.5 m (8.2')
- DELSEF-415D**
4.6 m (15.1')

NOTE: For Remote Fixed Blanking use **DELSEF-81D**



EZ-SCREEN LS Systems

EZ-SCREEN LS Specifications

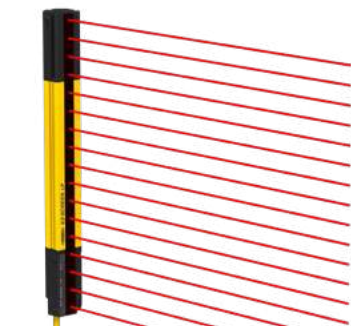
Supply Voltage at the Device	24 V dc $\pm 15\%$ (use a SELV-rated power supply according to EN IEC 60950). The external voltage supply must be capable of buffering brief mains interruptions of 20 ms, as specified in IEC/EN 60204-1.
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common
Supply Protection Circuitry	
Output Configuration	Off-state leakage current: less than 10 μ A PNP On-state saturation voltage: less than 200 mV at 10 mA load and less than 1.0 V at 100 mA NPN On-state saturation voltage: less than 1.0 V at 10 mA load and less than 2.0 V at 100 mA
Effective Aperture Angle (EAA)	Meets Type 4 requirements per IEC 61496-2
Residual Ripple	$\pm 10\%$ maximum
Electrical Safety Class	III (per IEC 61140: 1997)
Operating Range	0.1 m to 12 m (4 in to 39 ft) — Range decreases with use of mirrors and/or lens shields: <ul style="list-style-type: none"> • Lens shields — approx 10% less range per shield • Glass-surface mirrors — approx 8% less range per mirror See the specific mirror datasheet for more information
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end-mounting brackets (EZLSA-MBK-11). Models 980 mm and longer are supplied with an additional center-mount bracket (EZLSA-MBK-12) for center support in applications with significant vibration. Mounting brackets are 8-gauge cold-rolled steel, black zinc finish.
Resolution	14 mm, 23 mm, or 40 mm, depending on model
Enclosure	Extruded aluminum housing with yellow polyester powder finish standard and well-sealed, rugged die-cast zinc end caps, acrylic lens cover
Safety Rating	Type 4 per IEC 61496-1, -2 Category 4 PL e per EN ISO13849-1 SIL3 per IEC 61508; SIL CL3 per IEC 62061
Environmental Rating	IEC IP65/IEC IP67
Shock and Vibration	Components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm (0.014 in) single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).
Operating Conditions	-20 to +55 °C (-4 to +131 °F) 95% maximum relative humidity (non-condensing)
Certifications	 

EZ-SCREEN® Low Profile (LP)

Type 4 Safety Light Screens

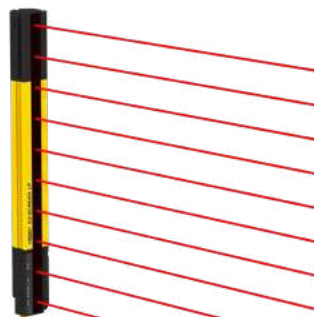


- Small, compact design with end-to-end sensing.
- Operating range up to 7 m
- Features seven-segment display for diagnostic information and number of blocked beams
- Offers reduced resolution and fixed blanking to ignore tooling or constant inflow of materials
- Identifies clear and blocked beams using zone indicators
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cTUVus, and CE certified to Type 4, Cat 4 PLe, and SIL 3
- Cordsets and brackets see page 568



14 mm Resolution

14 mm resolution safety light screens can be used for finger, hand and ankle protection.



25 mm Resolution

25 mm resolution safety light screens can be used for hand and ankle protection.



Cascade

Low-profile models allow four systems of any length and resolution to be connected in a series, forming a single safety device.



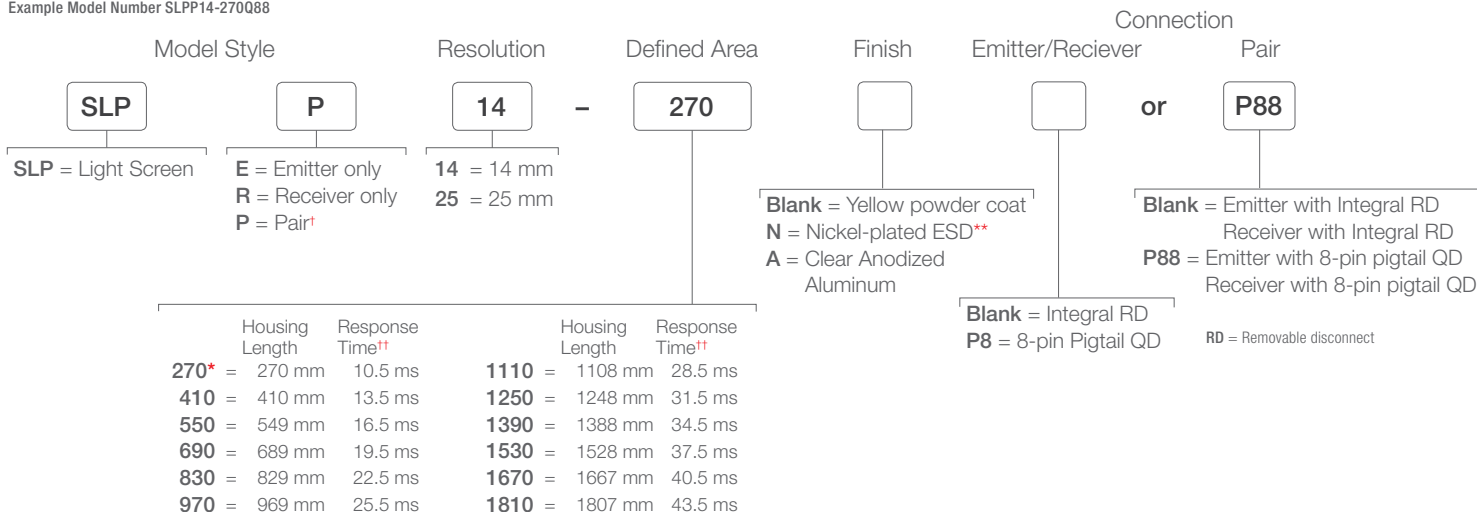
Yellow Painted
Aluminum

Clear Anodized
Aluminum

Nickel-Plated
ESD

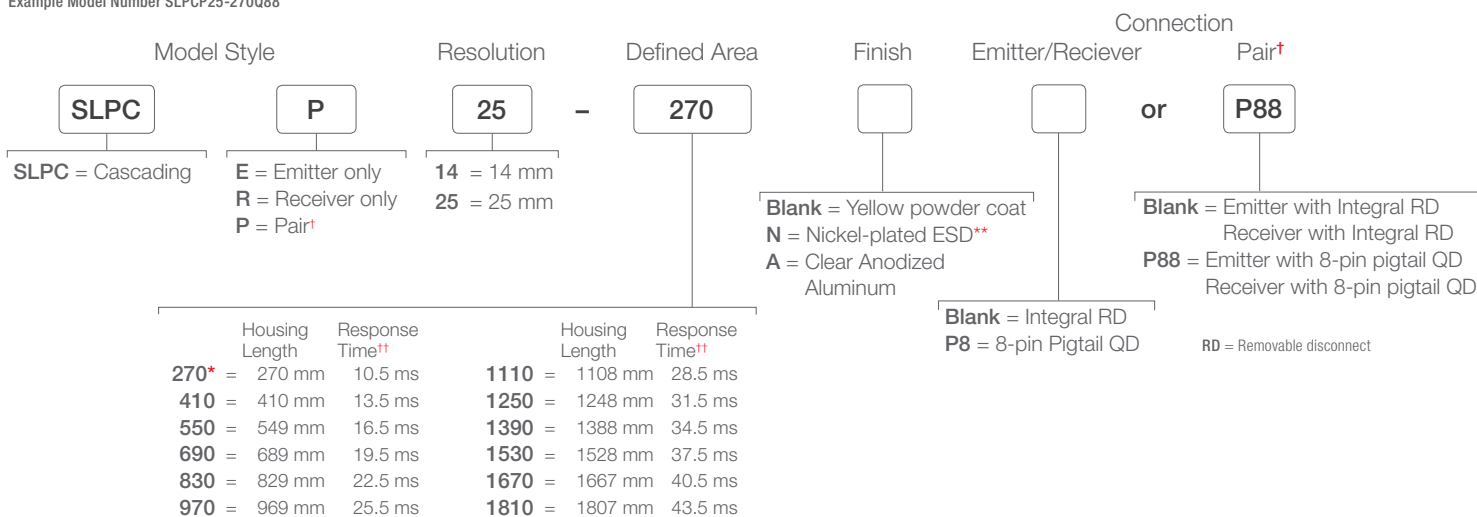
EZ-SCREEN® Low-Profile Systems, Non-Cascade

Example Model Number SLPP14-270Q88



EZ-SCREEN® Low-Profile Systems, Cascadable

Example Model Number SLPCP25-270Q88



For more specifications see page 570.

QD models: A model with a QD requires a mating cordset (see page 570).

QD models: Pigtail QD models require mating cordsets with an 8-pin M12/Euro-style connector (such as QDE-8..D, DEE2R-8..D or CSB-M128..M1261; see page 568).
Integral RD models require mating cordsets with a removable disconnect connector (such as RDLP-8..D or DELPE-8..D; see page 568).

* 270 mm not available in cascade models

** ESD-safe models are not available with the pigtail QD option

† A pair includes an emitter and receiver (example, SLSP30-150Q88)

†† Cascading system response time: To the response time of the slowest pair, add 2 ms for each additional pair.
Example: slowest pair's response time is 15 ms, and the system has three additional pairs (four pairs total), so the system maximum response time is 15 ms + 6 ms (3 pairs x 2 ms) = 21 ms.

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

EZ-SCREEN® Low Profile (LP)

With Muting—Type 4 Safety Light Screens



- Has a built-in muting function with no third box required.
- Eight pre-defined muting configuration options including Bypass, Mute-Dependent Override, Mute Enable, and Mute-cycle time extensions (four seconds) for “L”-style cell exit applications
- Mute Lamp and Status Outputs to EZ-LIGHT (or other indicating devices)
- Lower power consumption allows for energy savings and fewer/smaller power supplies
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cTUVus, and CE certified to Type 4, Cat 4 PLe, and SIL 3
- Cordsets and brackets see page 568

EZ-SCREEN® Low-Profile with Muting Systems, 25 mm Resolution

Example Model Number SLPMP14-410Q128

Model Style	Resolution	Defined Area	Finish	Emitter/Receiver	Connection Pair*																																				
SLPMP	14	410			or P128																																				
SLPE = Emitter SLPR = Receiver SLPMP = Muting LP Pair*	14 = 14 mm 25 = 25 mm	<table border="1"> <thead> <tr> <th>Defined Area</th> <th>Housing Length</th> <th>Response Time††</th> </tr> </thead> <tbody> <tr><td>410</td><td>410 mm</td><td>13.5 ms</td></tr> <tr><td>550</td><td>549 mm</td><td>16.5 ms</td></tr> <tr><td>690</td><td>689 mm</td><td>19.5 ms</td></tr> <tr><td>830</td><td>829 mm</td><td>22.5 ms</td></tr> <tr><td>970</td><td>969 mm</td><td>25.5 ms</td></tr> <tr><td>1110</td><td>1108 mm</td><td>28.5 ms</td></tr> <tr><td>1250</td><td>1248 mm</td><td>31.5 ms</td></tr> <tr><td>1390</td><td>1388 mm</td><td>34.5 ms</td></tr> <tr><td>1530</td><td>1528 mm</td><td>37.5 ms</td></tr> <tr><td>1670</td><td>1667 mm</td><td>40.5 ms</td></tr> <tr><td>1810</td><td>1807 mm</td><td>43.5 ms</td></tr> </tbody> </table>	Defined Area	Housing Length	Response Time††	410	410 mm	13.5 ms	550	549 mm	16.5 ms	690	689 mm	19.5 ms	830	829 mm	22.5 ms	970	969 mm	25.5 ms	1110	1108 mm	28.5 ms	1250	1248 mm	31.5 ms	1390	1388 mm	34.5 ms	1530	1528 mm	37.5 ms	1670	1667 mm	40.5 ms	1810	1807 mm	43.5 ms	Blank = Yellow powder coat N = Nickel-plated ESD A = Clear Anodized Aluminum	Blank = Integral RD P8 = 8-pin Pigtail QD (SLP Emitter) P12 = 12-pin Pigtail QD (SLPM Receiver)	Blank = Receiver with Integral RD Emitter with Integral RD P128 = Emitter with 8-pin pigtail QD Receiver with 12-pin pigtail QD (SLPM Receiver)
Defined Area	Housing Length	Response Time††																																							
410	410 mm	13.5 ms																																							
550	549 mm	16.5 ms																																							
690	689 mm	19.5 ms																																							
830	829 mm	22.5 ms																																							
970	969 mm	25.5 ms																																							
1110	1108 mm	28.5 ms																																							
1250	1248 mm	31.5 ms																																							
1390	1388 mm	34.5 ms																																							
1530	1528 mm	37.5 ms																																							
1670	1667 mm	40.5 ms																																							
1810	1807 mm	43.5 ms																																							

RD = Removable disconnect

For more specifications see page 570.

QD models: A model with a QD requires a mating cordset (see page 568).

QD models: Pigtail QD models require mating cordsets with an 8 or 12-pin M12/Euro-style connector (such as QDE-8..D, QDE-12..E, DEE2R-8..D). Integral RD models require mating cordsets with a removable disconnect connector (such as RDLP-8..D or RDLP-11..E).

* A pair includes an emitter and receiver (example, SLPMP14-410P128)

Contact Banner Engineering Corp. for additional information and/or verification of valid model numbers.

EZ-SCREEN® LPM Cordset Overview*

Muting Splitter Cordsets

3-Branch models Banner sensors (PNP)

CSM3DO-M12121FM12121M Dark Operate (pin 2)

CSM3LO-M12121FM12121M Light Operate (pin 4)

4-Branch models (With Emitter hookup)

CSM4DO-M12121FM12121M Dark Operate (pin 2)

CSM4LO-M12121FM12121M Light Operate (pin 4)

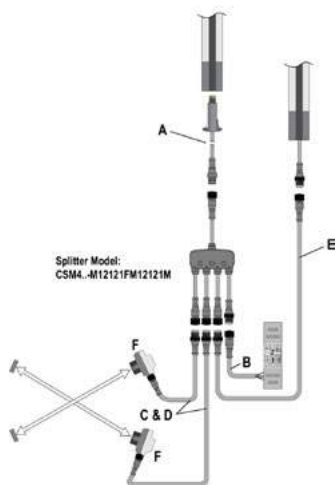
Muting Sensor Cordsets (C & D) Length

DEE2R-51D 0.3 m (1')

DEE2R-53D 1 m (3')

DEE2R-58D 2.5 m (8')

DEE2R-815D 4.5 m (15')



* "A" (Receiver cordset): On RD models = **DELPE-12xxE**; On P12 models cordset "A" is a preinstalled **DELPE-121E**.

"B": Machine interface cordset = **QDE-12xxE**.

"C" and "D": Muting Sensor cordsets = **DEE2R-515D**. Ensure sensors connected to Cordsets C & D are PNP output with Dark Operate on pin 2 or Light Operate on pin 4.

"E" (Emitter cordset): On RD models = **DELPE-12xxE**; On P8 models (shown), use a **DEE2R-8xxD** double-ended cordset. If using a 3-Branch Muting Splitter cordset, use appropriate Emitter cordset.

"F": **QS18VP6LPQ8** (4-pin M12/Euro QD) sensor shown as example. Other sensors or switches may be used.

* NOTE: See EZ-SCREEN® Low Profile with Muting manual (p/n 150216) for complete information.

EZ-SCREEN® Muting Indicators

TL50WQ Single Color (White)

DELPEF-40D Single Color Cordset 0.05 m

DELPEF-41D Single Color Cordset 0.3 m

DELPEF-43D Single Color Cordset 1 m

K50LGRW2PQ-18886 Three Color (Green/Red/White)

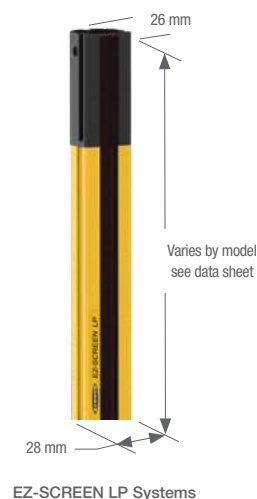
TL50GYRWQ Four Color (Green/Yellow/Red/White)

DELPEF-50D Multi-Color Cordset 0.05 m

DELPEF-51D Multi-Color Cordset 0.3 m

DELPEF-53D Multi-Color Cordset 1 m

LPA-MBK-15 Optional mounting bracket (Used with DELPEF-..0D cordset)



Additional Indicators available, see EZS LPM manual

SAFETY

LIGHT SCREENS

CONTROLLERS

EMERGENCY STOP & STOP CONTROL



8-Wire*

RD Cordsets

RDLP-815D
4.5 m (15')
RDLP-825D
7.6 m (25')
RDLP-850D
15.3 m (50')
RDLP-875D
22.9 m (75')
RDLP-8100D
30.5 m (100')

11-Wire

RDLP-1115E
4.5 m (15')
RDLP-1125E
7.6 m (25')
RDLP-1150E
15.3 m (50')
RDLP-1175E
22.9 m (75')
RDLP-11100E
30.5 m (100')



RD to Euro QD**

8-Pin Male

DELPE-81D
0.3 m (1')
DELPE-83D
0.9 m (3')
DELPE-88D
2.4 m (8')
DELPE-815D
4.5 m (15')
DELPE-825D
7.6 m (25')
DELPE-850D
15.3 m (50')
DELPE-875D
22.9 m (75')
DELPE-8100D
30.5 m (100')

12-Pin Male

DELPE-81E
0.3 m (1')
DELPE-83E
0.9 m (3')
DELPE-88E
2.4 m (8')
DELPE-815E
4.5 m (15')
DELPE-825E
7.6 m (25')
DELPE-850E
15.3 m (50')
DELPE-875E
22.9 m (75')
DELPE-8100E
30.5 m (100')

8-Pin Female

DELPEF-81E
0.3 m (1')
DELPEF-83E
0.9 m (3')
DELPEF-88E
2.4 m (8')
DELPEF-815E
4.5 m (15')



RD to RD

DELPE-110E
0.05 m (0.2')
DELPE-110E
0.3 m (1')
DELPE-110E
1 m (3.3')
DELPE-118E
2.5 m (8.2')
DELS-1115E
4.6 m (15')
DELS-1125E
8 m (26')
DELS-1150E
15.3 m (50')
DELS-1175E
23 m (75')
DELS-11100E
30 m (100')

Use with: models with integral RD connections. All standard cordsets are yellow PVC with black overmold. For black PVC cable and overmold, add suffix **B** to model number (example, **RDLP-815DB**).

* For connection of E-Stop or other hard/relay contacts see page 774.

** Requires mating 8-pin M12/Euro cordset. 8-pin Male used for Machine Interface connection (indicator end of sensor). 8-pin Female used for cascade connection when using M12/Euro QDs.

See page 567 for EZ-SCREEN® LPM cordset overview.



8-Pin*

Euro-Style
Double-ended
male/female

DEE2R-81D	DEE2R-825D
0.3 m (1')	7.6 m (25')
DEE2R-83D	DEE2R-850D
0.9 m (3')	15.3 m (50')
DEE2R-88D	DEE2R-875D
2.4 m (8')	22.9 m (75')
DEE2R-815D	DEE2R-8100D
4.5 m (15')	30.5 m (100')



8-Pin

M12/Euro-Style
Straight connector
models listed

QDE-815D
4.5 m (15')
QDE-825D
7.6 m (25')
QDE-850D
15.3 m (50')
QDE-875D
22.9 m (75')
QDE-8100D
30.5 m (100')



8-Pin

Euro-Style
Straight splitter

CSB-M1280M1280
4.5 m (15')
CSB-M1281M1281
7.6 m (25')
CSB-M1288M1281
15.3 m (50')
CSB-M12815M1281
22.9 m (75')
CSB-M12825M1281
30.5 m (100')

Use with: models with Pigtail QD and DELPE-8xxD connections.

* For connection to safety BUS gateway/node, a "smart" self-monitored safety module, safety controller or safety PLC see page 771.

Additional cordset information is available.

See page 758



LPA-MBK-11*



LPA-MBK-12*



LPA-MBK-20



LPA-MBK-22



LPA-MBK-21



LPA-MBK-90



LPA-MBK-120



LPA-MBK-135

* Standard brackets included with emitter/receiver.

Use with: Low-Profile 14 & 25 mm

Use with: Low-Profile 14 & 25 mm-Cascade

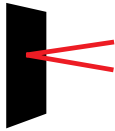
Additional bracket information is available.

See page 729

Stands



Mirrors



Interface



Additional interfacing and accessory information is available.
See page 802

Remote Fixed Blanking Switch



Allows frequent configuration of a fixed blanked area, without using the receiver DIP switches.

EZA-RBK-1

Replacement Parts

Model	Description
STP-13	14 mm test piece (for 14 mm resolution systems)
STP-16	25 mm test piece (for 25 mm resolution systems)
STP-17	34 mm test piece (for 14 mm resolution systems with 2-beam reduced resolution enabled)
STP-18	65 mm test piece (for 25 mm resolution systems with 2-beam reduced resolution enabled)
LPA-TP-1	Terminator plug, for SLPC... emitter/receiver (included with sensor)
EZA-RR-1	External normally open reset switch with 8-pin M12/Euro-style QD
MGA-KSO-1	Panel-mount keyed normally open reset switch

Model	Description
MGA-K-1	Replacement key for switch MGA-KSO-1
DELPE-81D	Replacement for M12-terminated pigtail QD, as shipped with standard pigtail QD models; 8-conductor cable, 22 AWG; 0.3 m long
LPA-MBK-11	End-cap bracket kit (includes 2 end brackets and hardware to mount one sensor to MSA series stands; 360° sensor rotation; 14 ga (1.9 mm) steel, black zinc plated; die-cast zinc end-cap plate
LPA-MBK-12	Side-mount bracket kit (includes 1 bracket and hardware to mount to MSA Series stands; +10°/ -30° sensor rotation; 14 ga (1.9 mm) steel, black zinc plated; die-cast zinc clamp

NOTE: See installation manual p/n 112852 for complete list of replacement parts and accessories.

EZ-SCREEN® Low-Profile 14 & 25 mm Resolution Specifications

Supply Voltage at the Device	24 V dc \pm 15% (use a SELV-rated supply according to EN IEC 60950) (The external voltage supply must be capable of buffering brief mains interruptions of 20 milliseconds, as specified in EN IEC 60204-1.)	
Residual Ripple	\pm 10% maximum	
Supply Current	Emitter: 60 mA max., exclusive of fault load Receiver: 150 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each) and Aux Output load (up to an additional 0.25A)	
Response Time	8 to 43.5 milliseconds (see model number tables) Cascade safety stop interface (CSSI): 40 milliseconds max. (contacts must be open for 60 milliseconds min.)	
Remote Test Input	Test mode is activated either by applying a low signal (less than 3 V dc) to emitter Test/Reset terminal for a minimum of 50 milliseconds, or by opening a switch connected between Test/Reset and 24 V dc for a minimum of 50 milliseconds. Beam scanning stops to simulate a blocked condition. A high signal at Test/Reset deactivates Test Mode. High Signal: 10 to 30 V dc Low Signal: 0 to 3 V dc Input Current: 35 mA inrush, 10 mA max.	
Wavelength of Emitter Elements	Infrared LEDs, 850 nm at peak emission	
Recovery Time—Blocked to clear (OSSDs turn ON; varies with total number of sensing beams and whether Sync beam is blocked)	Beam 1 (Sync Beam)	All Other Beams
	14 mm Models	109 to 800 ms
	30 mm Models	81 to 495 ms
		33 to 220 ms
		25 to 152 ms
EDM Input	+24 V dc signals from external device contacts can be monitored (one-channel, two-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver High Signal: 10 to 30 V dc at 30 mA typical Low Signal: 0 to 3 V dc	
Reset Input	The Reset input must be high for 0.25 to 2 seconds and then low to reset the receiver High Signal: 10 to 30 V dc at 30 mA typical Low Signal: 0 to 3 V dc Closed Switch Time: 0.25 to 2 seconds	
Safety Outputs (OSSDs)	Two redundant solid-state 24 V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner "Safety Handshake" ON-State voltage: \geq V_{in} -1.5 V dc OFF-State voltage: 1.2 V dc max. (0-1.2 V dc) Max. load capacitance: 1.0 μ F Max. load inductance: 10 H Leakage Current: 0.50 mA maximum Cable Resistance: 10 Ω maximum OSSD test pulse width: 100 to 300 microseconds OSSD test pulse period: 10 to 22 milliseconds (varies with number of beams) Switching Current: 0-0.5 A	
Auxiliary (Aux.)/Fault Output Switching Capacity	Current-sourcing (PNP) Solid-state output, 24 V dc at 250 mA max. that follow safety outputs or lock out status (configurable)	
External Remote Indicator Outputs (SLPMR models only)	Current sourcing (PNP), solid-state, 24 V dc outputs for the connection of remote indicator lamps such as EZ-LIGHTs. See EZ-LIGHT™ for EZ-SCREEN® Low Profile with Muting in manual 150216 for compatible EZ-LIGHTs and associated cordsets. Rated Current: 100 mA maximum at 24 V dc	
Controls and Adjustments	Emitter: Scan Code selection: 2-position switch (code 1 or 2). Factory default position is code 1. Test/Reset: 2-position switch. Factory default position is Reset. Invert Display: 2-position switch. Factory default position is OFF (Standard display). Fault: 2-position switch. Factory default position is OFF. Receiver: Scan Code selection: 2-position switch (code 1 or 2). Factory default position is code 1. Trip/Latch Output selection: Redundant switches. Factory default position is T (trip). EDM/MPCE monitor selection: 2-position switch selects between 1- or 2-channel monitoring. Factory default position is 2-channel monitoring. (SLPMR models: 1-channel monitoring only) Mute Lamp Monitoring: ON/OFF switch. Factory default position is ON (SLPMR models only) Reduced Resolution: Redundant switches. Factory default position is OFF. Aux/Fault: 2-position switch. Factory default position is Aux. Invert Display: 2-position switch. Factory default position is OFF.	
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common	
Electrical Safety Class (IEC 61140)	III	

EZ-SCREEN® Grids

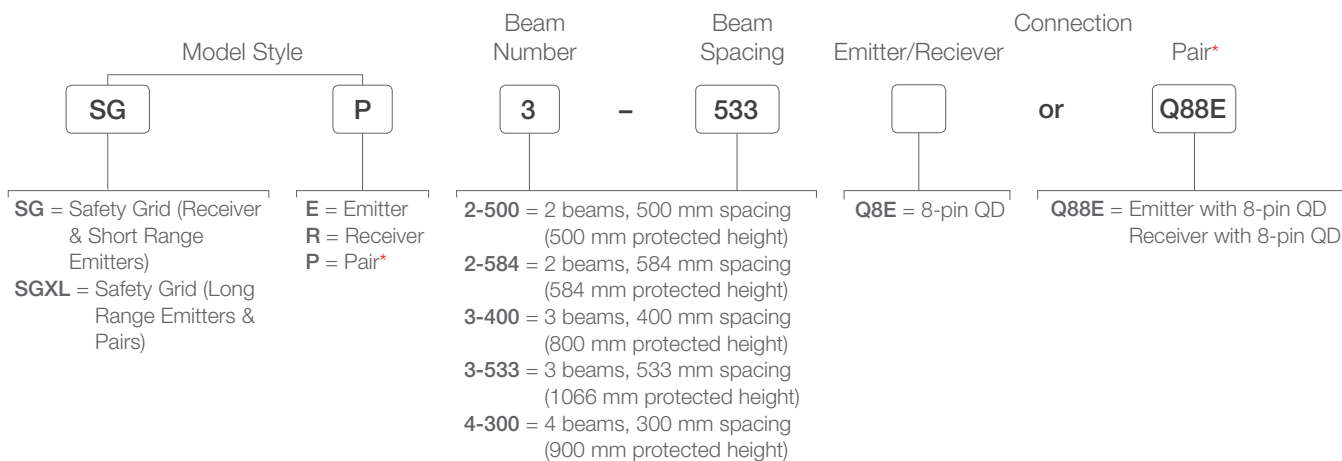
Type 4 Multi-Beam Systems



- The EZ-SCREEN® Grids have strong, durable housings and are an optically synchronized, opposed-mode optoelectronic light grid, requiring no external controller.
- Operates in range up to 70 m
- Resists impact, twisting and abusive environments with a durable aluminum housing
- Exceeds OSHA/ANSI Control Reliability requirements and is certified to cULus NIPF, and complies with Type 4 (IEC 61496) and Category 4 (EN 954)
- Includes blocked beam zone indicators
- Can be combined with other devices, such as mirrors and Points, for a custom configuration
- Cordsets and brackets see page 574

EZ-SCREEN® Grid Systems

Example Model Number SGP3-533Q88E



For more specifications see page 575.

A model with a QD requires a mating cordset (see page 574).

For emitters and receivers with a wiring terminal chamber, remove the Q8E or Q88E from the model number (example, SGE4-300).

For an emitter with a 5-pin Mini QD and TEST function, replace Q8E with Q5 on emitter model numbers (example, SGE4-300Q5) and Q88E with Q85 on pair model numbers (example, SGP4-300Q85).

For emitters with a 3-pin Mini QD, replace Q8E with Q3 (example, SGE4-300Q3); and for receivers with an 8-pin Mini QD, replace Q8E with Q8 on model numbers (example, SGR4-300Q8); or for a pair replace Q88E with Q83 (example, SGP4-300Q83).

* A pair includes an emitter and receiver (example, SGP3-533Q88E)

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

EZ-SCREEN® Points

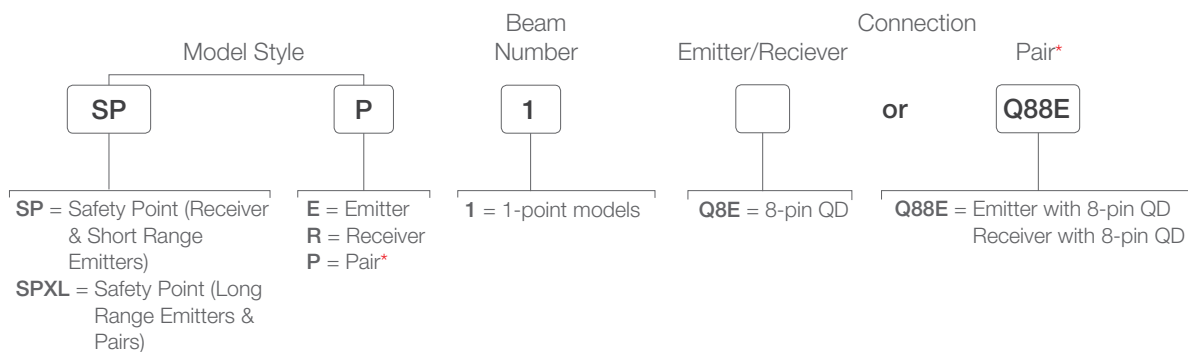
Type 4 Single-Beam Systems



- EZ-SCREEN® Point systems have strong, durable housings and are a synchronized, opposed-mode single optoelectronic light beam, requiring no external controller.
- Operates in range up to 70 m
- Resists impact, twisting and abusive environments with a durable aluminum housing
- Exceeds OSHA/ANSI Control Reliability requirements and is certified to cULus NIPF, and complies with Type 4 (IEC 61496) and Category 4 (EN 954)
- Includes blocked beam zone indicators
- Can be combined with other devices, such as mirrors and Points, for a custom configuration
- Cordsets and brackets see page 574

EZ-SCREEN® Point Systems

Example Model Number SP3-533Q88E



For more specifications see page 575.

 A model with a QD requires a mating cordset (see page 574).

For emitters and receivers with a wiring terminal chamber, remove the Q8E or Q88E from the model number (example, SPE1).

For an emitter with a 5-pin Mini QD and TEST function, replace Q8E with Q5 on emitter model numbers (example, SPE1Q5) and Q88E with Q85 on pair model numbers (example, SP1Q85).

For emitters with a 3-pin Mini QD, replace Q8E with Q3 (example, SPE1Q3); and for receivers with an 8-pin Mini QD, replace Q8E with Q8 on model numbers (example, SPR1Q8); or for a pair replace Q88E with Q83 (example, SPP1Q83).

* A pair includes an emitter and receiver (example, SPP1Q88E)

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

SAFETY

LIGHT SCREENS

CONTROLLERS

EMERGENCY STOP & STOP CONTROL



8-Pin*

Euro-Style
Double-ended
male/female

DEE2R-81D 0.3 m (1')	DEE2R-825D 7.6 m (25')
DEE2R-83D 0.9 m (3')	DEE2R-850D 15.3 m (50')
DEE2R-88D 2.4 m (8')	DEE2R-875D 22.9 m (75')
DEE2R-815D 4.5 m (15')	DEE2R-8100D 30.5 m (100')



8-Pin

M12/Euro-Style
Straight connector
models listed

QDE-815D 4.5 m (15')
QDE-825D 7.6 m (25')
QDE-850D 15.3 m (50')
QDE-875D 22.9 m (75')
QDE-8100D 30.5 m (100')



8-Pin

Euro-Style
Straight splitter

CSB-M1280M1280
CSB-M1281M1281
CSB-M1288M1281
CSB-M12815M1281
CSB-M12825M1281

* For connection to safety BUS gateway/node, a "smart" self-monitored safety module, safety controller or safety PLC see page 771.

Additional cordset information is available.
See page 758



EZA-MBK-1*

EZA-MBK-3

EZA-MBK-9

* Standard brackets included with emitter/receiver.



EZA-MBK-2**

EZA-MBK-4

EZA-MBK-5

** One EZA-MBK-2 adapter bracket kit required per sensor when mounting to MSA series stands.

Use with: Grids & Points—Type 4

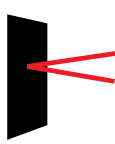
Use with: Points—Type 4

Additional bracket information is available.
See page 729

Stands



Mirrors



Interface



Additional interfacing and accessory information is available.
See page 802

Replacement Parts

Model	Description
EZA-AP-1	Access port plug with o-ring
EZA-CP-13	Pg13.5 plug with o-ring
EZA-ECE-1	Emitter wiring chamber end cap (with gasket, captive screws, 3 plugs with o-rings, terminal block)
EZA-ECR-1	Receiver wiring chamber end cap (with gasket, captive screws, 3 plugs with o-rings, terminal block)
EZA-SW-1	Spanner wrench for Grid and Point
EZA-TBE-1	Emitter terminal block
EZA-TBR-1	Receiver terminal block
MGA-K-1	Replacement key for switch MGA-KS0-1
MGA-KS0-1	Panel-mount keyed normally open reset switch
STP-3	Specified test piece, 45 mm dia.

NOTE: See installation manual p/n 112852 for complete list of replacement parts and accessories.



EZ-SCREEN® Grid Systems



EZ-SCREEN® Point Systems

EZ-SCREEN® Grid & Point Specifications

Supply Voltage	24 V dc \pm 15%, 10% max. ripple
Supply Current	Emitter: 150 mA max. Receiver: 500 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each)
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common (except Emitter AUX power connections)
Response Time	24 milliseconds or less from interruption of light grid beam to safety outputs going to OFF-state
EDM Input	+24 V dc signals from external device contacts can be monitored (single-channel, dual-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver. Monitored devices must respond within 200 milliseconds of an output change.
Reset Input	The Reset input must be high (10 to 30 V dc at 30 mA) for 0.25 to 2 seconds and then low (less than 3 V dc) to reset the receiver.
Remote Test Input (optional- available only on certain models)	Test mode is activated either by applying a low signal (less than 3 V dc) to emitter TEST1 terminal for a minimum of 50 milliseconds, or by opening a switch connected between TEST1 and TEST2 terminals for a minimum of 50 milliseconds. Beam scanning stops to simulate a blocked condition. A high signal (10 to 30 V dc, 35 mA inrush, 10 mA max.) at TEST1 terminal deactivates Test mode and allows the emitter to operate normally. TEST1 and TEST2 are factory jumpered on models with wiring chamber.
Safety Outputs	Two diverse-redundant solid-state 24 V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Capable of the Banner "Safety Handshake." ON-State voltage: \geq Vin-1.5 V dc OFF-State voltage: 1.2 V dc max. Max. load resistance: 1000 Ω Max. load capacitance: 0.1 μ F OSSD test pulse width: 250 microseconds OSSD test pulse period: 6 milliseconds
Controls and Adjustments	Emitter: Scan code selection: 2-position switch (code 1 or 2). Factory default position is 1. Receiver: Scan code selection: 2-position switch (code 1 or 2). Factory default position is 1. Trip/latch output selection: redundant switches. Factory default position is L (latch) EDM/MPCE monitor selection: redundant switches select between 1- or 2-channel monitoring. Factory default position is 2.
Emitter/Receiver Operating Range	Short-range models: 0.8 m to 20 m Long-range models: 15 m to 70 m Range decreases with use of mirrors and/or lens shields.

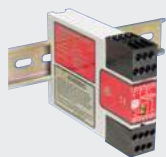
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EZ-SCREEN® Grid & Point Specifications (cont'd)

Beam Spacing	Model SG...4-300: 300 mm Model SG...2-500: 500 mm Model SG...2-584: 584.2 mm	Model SG...3-400: 400 mm Model SG...3-533: 533.4 mm
Beam Diameter	25 mm	
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence	
Strobe Light Immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe	
Emitter Elements	Infrared LEDs, 880 nm at peak emission	
Effective Aperture Angle (EAA)	Meets Type 4 requirements per IEC 61496-2 Short-range models: ± 2.5° @ 3 m Long-range models: ± 2.5° @ 15 m	
Enclosure	Materials: Extruded aluminum housings with yellow polyester powder finish and well-sealed, rugged molded PBT end caps, acrylic lens cover Rating: NEMA 4, 13; IP65	
Operating Conditions	Temperature: 0° to +50 °C Relative humidity: 95% (non-condensing)	
Shock and Vibration	EZ-SCREEN® systems have passed vibration and shock tests according to IEC 61496-1/-2. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).	
Status Indicators	<p>7-Segment Diagnostic Indicators, Both Emitter and Receiver</p> <p>Dash (-) = System is OK</p> <p>Error Codes = See product manuals (p/n 68410 or 68413) for code definitions and recommended action</p> <p>Scan code setting = Appears during power-up or after scan code is changed.</p> <p>(C1 or C2) (Temporary indication; normal display resumes within a few seconds.)</p> <p>Emitter: One bicolor (red/green) Status indicator</p> <p>Green steady = RUN mode</p> <p>Green single flashing = TEST mode</p> <p>Red single flashing = Lockout</p> <p>OFF = No power to sensor</p> <p>Receiver: Two System Status indicators, plus one bi-color (red/green) Beam Status indicator for each beam</p> <p>Yellow Reset Indicator</p> <p>ON steady = RUN mode</p> <p>Double flashing = Waiting for manual reset after power-up</p> <p>Single flashing = Waiting for manual latch reset</p> <p>OFF = No power to sensor or system is not ready for operation</p> <p>Bicolor (Red/Green) Status Indicator</p> <p>Green steady = Outputs ON</p> <p>Red steady = RUN mode, outputs OFF</p> <p>Red single flashing = Lockout</p> <p>OFF = No power to sensor or system is not ready for operation</p> <p>Bicolor (Red/Green) Beam Status Indicators</p> <p>Green steady = Clear beam, strong signal</p> <p>Green flickering = Clear beam, weak signal</p> <p>Red steady = Beam blocked</p> <p>OFF = No power to sensor or no scanning</p>	
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end mounting brackets. Mounting brackets are 8-gauge cold-rolled steel, black zinc finish.	
Cables and Connections	Cables are user-supplied. Wiring terminals accommodate one 22 to 16 ga. wire or two wires up to 18 ga.; Pg 13.5 wiring chamber access port capacity varies, depending on cable gland or strain relief fitting used. Supplied cable gland is for a cable diameter of 6 to 12 mm.	
Design Standards	Designed to comply with Type 4 per IEC 61496-1, -2; Type 4 per UL 61496-1/-2; Category 4 per ISO 13849-1 (EN 954-1)	
Certifications	 	<p>Important Notice:</p> <p>European Community Machinery Directive 2006/42/EC</p> <p>EZ-SCREEN® grids and points comply with Machinery Directive 98/37/EC, but not with Machinery Directive 2006/42/EC. Therefore, the EZ-SCREEN® grids and points can only be installed as a replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.</p>

EZ-SCREEN® Interfacing Products

Interface Modules and Controllers



Description

- Interface modules provide two or three normally open force-guided relay outputs rated at 6 A (-9 A) or 7 A (-11 A)
- EZ-SCREEN monitors these interface modules when they are connected to the EZ-SCREEN External Device Monitoring (EDM) inputs
- Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included

Models

- IM-T-9A (3 NO)
- IM-T-11A (2 NO/1 NC)

Product Information

Page 698



- Control system monitors a variety of input devices such as e-stop buttons, rope pulls, enabling devices, protective safety stops, interlocked guards or gates, optical sensors, two-hand controls and safety mats
- Intuitive programming environment for easy implementation
- Configure inputs, outputs and functionality of the controller for more usability
- Base controller allows eight of the 26 inputs to be configured as outputs for efficient terminal utilization
- Ethernet models available providing up to 64 virtual status outputs, fault diagnostic codes and messages

- SC26-2, XS26-2
- SC26-2D, XS26-2D
- SC26-2E, XS26-2E
- SC26-2DE, XS26-2DE

Page 582



- One controller provides configurable monitoring of multiple safety devices
- 22 input terminals can monitor both contact-based and PNP solid-state input devices
- 3 pairs of independent solid-state safety outputs can be used with selectable one- or two-channel external device monitoring
- Ten configurable non-safety status outputs track inputs, outputs, lockout, I/O status and other functions
- All SC22-3 modules use 24 V dc
- 10/100 Base TX Ethernet communication option using EtherNet/IP and Modbus TCP protocols (SC22-3E models)

- SC22-3-S...
- SC22-3-C...
- SC22-3E-S...
- SC22-3E-C...

Page 592

Muting Modules



- The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery
- The module uses redundant microcontroller-based logic
- MMD Modules can be used as dual controllers when muting function is not used

- MMD-TA-12B
- MMD-TA-11B

Page 710

Receiver AC Interface Boxes



- Versatile power supplies allow EZ-SCREEN systems to connect to AC power sources
- Models are available to accommodate receivers only, emitters only or both
- Receiver models include 8 amp safety relay output

- EZAC-R9-QE8
- EZAC-R11-QE8
- EZAC-R15A-QE8-QS83
- EZAC-R8N-QE8-QS53
- EZAC-R10N-QE8-QS53

Page 821

Emitter AC Interface Boxes



- Versatile power supplies allow EZ-SCREEN systems to connect to AC power sources
- Models are available to accommodate emitters only
- Receiver models include 8 amp safety relay output

- EZAC-E-QE8
- EZAC-E-QE5
- EZAC-E-QE8-QS3
- EZAC-E-QE5-QS5

Page 821

Contactors



- Pairs of contactors create safety stop circuits with two normally open contacts in series
- EZ-SCREEN can monitor the circuit because of the contacts' force-guided mechanically linked design
- Contactors add 10 or 18 amp current carrying capability to any safety system
- Auxiliary contacts add 3 or 4 normally open contacts
- Suppressors extend the life of an actuating device that uses a contactor.
- Modular design simplifies assembly and installation

- Mechanically Linked Contactors
- 11-BG00-31-D-024
- BF1801L-024
- Aux. Contacts
- 11-BGX10-40
- 11-G484-30
- Suppressors
- 11-BGX77-048
- 11-G318-48

Page 822

EZ-SCREEN® Type 2

Type 2 Safety Light Screens



- A low-cost solution suited to lower risk applications where the result is only a slight injury.
- Operating range up to 15 m
- Simple, two-piece system requires no control box
- System meets all requirements for Type 2 devices per IEC 61496 and Cat 2 PL d per EN ISO 13849-1 (CE certified) and cULus NIPF
- Fast response times of 11 to 29 milliseconds shutdown machinery quickly
- Dedicated models eliminate selectable functions, DIP switches and programming

EZ-SCREEN® Type 2 Systems, 30 mm Resolution

Example Model Number LS2TP30-150Q88



For more specifications see page 581.

A model with a QD requires a mating cordset.


† A pair includes an emitter and receiver (example, LS2TP30-150Q88)
 Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

NETWORK SWITCHES

FUNCTIONAL CONTROL

LASER SCANNERS

MODULES



Euro-Style
Double-ended male/female

8-Pin*	
DEE2R-81D 0.3 m (1')	DEE2R-825D 7.6 m (25')
DEE2R-83D 0.9 m (3')	DEE2R-850D 15.3 m (50')
DEE2R-88D 2.4 m (8')	DEE2R-875D 22.9 m (75')
DEE2R-815D 4.5 m (15')	DEE2R-8100D 30.5 m (100')



M12/Euro-Style
Straight connector models listed

8-Pin
QDE-815D 4.5 m (15')
QDE-825D 7.6 m (25')
QDE-850D 15.3 m (50')
QDE-875D 22.9 m (75')
QDE-8100D 30.5 m (100')



Euro-Style
Straight splitter

8-Pin
CSB-M1280M1280
CSB-M1281M1281
CSB-M1288M1281
CSB-M12815M1281
CSB-M12825M1281

* For connection to safety BUS gateway/node, a "smart" self-monitored safety module, safety controller or safety PLC see page 771.

Additional cordset information is available.
See page 758


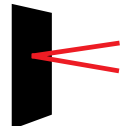






USCMB-..** **USMB-1*** **USMB-6** **USMB-8**

* USMB-1 brackets are supplied
** USCMB-1/-2 are dependent on length

Additional bracket information is available.
See page 729

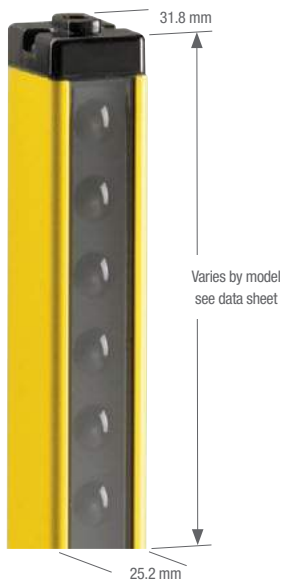
Stands **Mirrors** **Interface**

Additional interfacing and accessory information is available.
See page 802

Replacement Parts



Description	Model
Replacement key for switch MGA-KS0-1	MGA-K-1
Panel-mount keyed normally open reset switch	MGA-KS0-1
30 mm test piece	STP-14
Standard end brackets with hardware to mount to MSA series stands	USMB-1
Center bracket kit and standard end brackets with hardware to mount to MSA series stands (1 bracket, for 600 to 900 mm long sensors)	USCMB-1
Center bracket kit and standard end brackets with hardware to mount to MSA series stands (2 brackets, for 1050 to 1500 mm long sensors)	USCMB-2

NOTE: See installation manual p/n **112852** for complete list of replacement parts and accessories.



EZ-SCREEN®
Type 2 Systems

EZ-SCREEN® Type 2 Specifications

Supply Voltage at the Device	24 V dc \pm 20% (PELV) (The external voltage supply must be capable of buffering brief mains interruptions of 20 milliseconds as specified in EN/IEC 60204-1.)
Supply Current	Emitter: 50 mA max. Receiver: 90 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each)
Wavelength of Emitter Elements	Infrared LEDs, 950 nm at peak emission
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common
Electrical Safety Class (IEC 61140)	III
Operating Range	0.2 m to 15 m Range decreases with use of mirrors and/or lens shields: Lens shields – approximately 10% less range per shield Glass-surface mirrors – approximately 8% less range per mirror See Accessory section for more information on a specific mirror, page 806
Effective Aperture Angle (EAA)	Meets Type 2 requirements per IEC 61496-2; \pm 5° @ 3 m
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence
Strobe Light Immunity	Immune as per IEC 61496-2
Response Time	Dependent on number of beams; see Models key on page 578
EDM Input	"Power Monitoring" accomplished via Reset/Remote Test input
Reset Input / Remote Test Input	Connect to +24 V dc via a normally closed (NC) reset switch Auto Rest (Trip Output) Models: Test/Reset Manual Rest (Latch Output) Models: Test/Restart/Reset
Safety Outputs	Two redundant solid-state 24 V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.) Not compatible with the Banner "Safety Handshake" ON-State voltage: > V_{in} -1.5 V dc OFF-State voltage: 0.2 V dc max. Max. load capacitance: 0.1 μ F Min. load resistance: 48 Ω Open ground leakage current: 0.65 mA max. OSSD test pulse width: 0.2 - 0.25 milliseconds OSSD test pulse period: 260 milliseconds typical
Enclosure	Materials: Extruded aluminum housing with yellow polyester powder finish and well-sealed, rugged die-cast zinc end caps, acrylic lens cover Rating: IP65
Operating Conditions	Temperature: 0 to +55 °C Relative humidity: 95% maximum (non-condensing)
Shock and Vibration	EZ-SCREEN® Type 2 components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles).
Design Standards	Designed to comply with Type 2 per IEC 61496-1/-2; Category 2 PI d per EN ISO 13849-1; SIL 2 per IEC 61 508; Type 2 per UL 61496-1/-2
Certifications	 



Safety Controllers

Industrial safety controllers and modules provide an interface between safety devices and the machines; monitoring those devices for an easy-to-use safety control solution.

SC26-2

Safety Controller



- Easy to program, install and allows for more flexibility of how the safety controller is used and configured
- Lower cost option for smaller jobs and applications
- Monitors a variety of input devices such as E-stop buttons, rope pulls, enabling devices, protective safety stops, interlocked guards or gates, optical sensors, two-hand controls and safety mats
- Intuitive programming environment for easy implementation
- Configure inputs, outputs and functionality of the controller for more usability
- Base controller allows eight of the 26 inputs to be configured as status outputs for efficient terminal utilization
- Ethernet models available providing up to 256 status outputs and non-safety virtual outputs
- Accessories see page 586

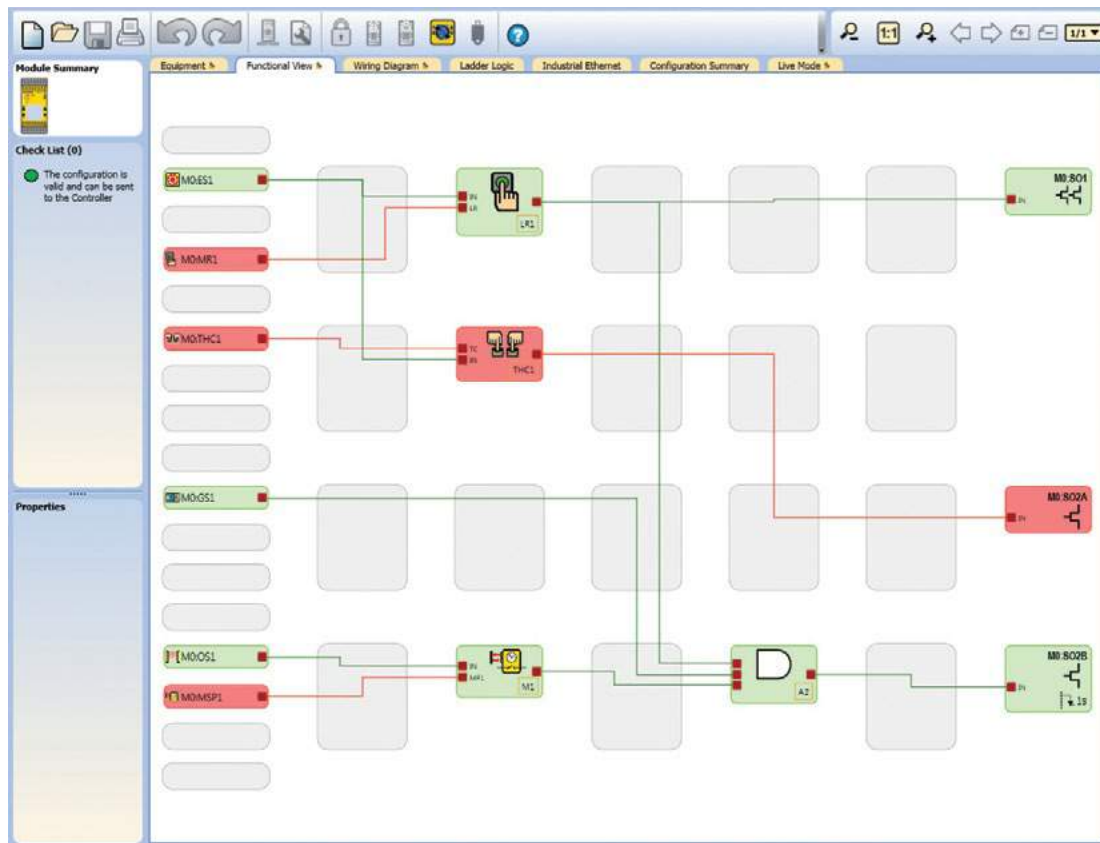
SC26-2 Safety Controller

Description	Model
NO Display & NO Ethernet	SC26-2
Display	SC26-2d
Ethernet	SC26-2e
Display + Ethernet	SC26-2de

Start using the software today

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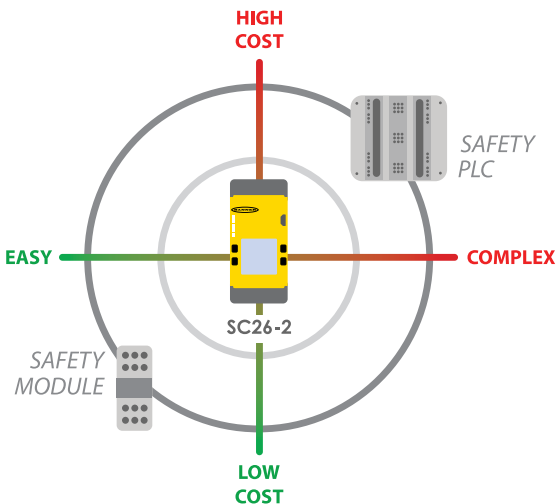
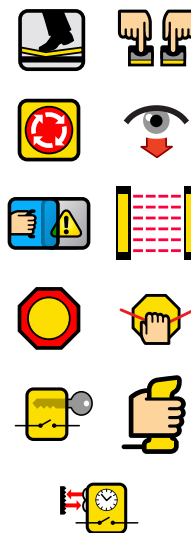
The next level in machine safety control...



Target Equipment

- End-of-line packaging equipment
- Robotic automation
- Safety retrofits
- Welding stations
- Assembly machines

Safety Input Devices





SC-XM2
Memory Card



SC-XMP2
Programming Tool



SC-USB2
USB Cable







SC-TC2
Spring Terminal Block Set

*Additional Interfacing Products
see page 595*



SC26-2 Safety Controller Specifications

Power	24 V dc, $\pm 20\%$ Ethernet models: add 40 mA Display models: add 20 mA
Safety Inputs (and Convertible I/O when used as inputs)	Input On threshold: > 15 V dc (guaranteed on), 30 V dc max. Input Off threshold: < 5 V dc and < 2 mA, -3 V dc min. Input On current: 5 mA typical at 24 V dc, 50 mA peak contact cleaning current at 24 V dc Input lead resistance: 300 Ω max. (150 Ω per lead) Input requirements for a 4-wire Safety Mat: <ul style="list-style-type: none"> • Max. capacity between plates: 0.22μF • Max. capacity between bottom plate and ground: 0.22μF • Max. resistance between the 2 input terminals of one plate: 20 Ω
Solid State Safety Outputs	0.5 A max. at 24 V dc (1.0 V dc max. drop) Output OFF threshold: 1.7 V dc typical (2.0 V dc max.) Output leakage current: 50 μ A max. with open 0V Load: 0.1 μ F max., 1 H max., 10 Ω max. per lead
Response and Recovery Times	See Configuration Summary in the data sheet
Environmental Rating	NEMA 1 (IEC IP20), for use inside NEMA 3 (IEC IP54) or better enclosure
Operating Conditions	Temperature range: 0 to +55 °C
Mechanical Stress	Shock: 15g for 11 milliseconds, half sine, 18 shocks total (per IEC 61131-2) Vibration: 3.5 mm occasional /1.75 mm continuous @ 5Hz to 9Hz, 1.0g occasional and 0.5g continuous @ 9Hz to 150Hz: all at 10 sweep cycles per axis (per IEC 61131-2)
Removable Terminals	Important: Clamp terminals are designed for 1 wire only. If more than 1 wire is connected to a terminal, a wire could loosen or become completely disconnected from the terminal, causing a short. Wire size: 24 to 16 AWG (0.20 to 1.31 mm ²) Wire strip length: 8.00 mm (0.315 in)
Design Standards	<ul style="list-style-type: none"> • SIL CL 3 per IEC 62061 Safety of Machinery – Functional Safety of Safety-Related Electrical, Electronic and Programmable Electronic Control Systems • SIL 3 per IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems • Category 4 per ISO 13849-1 • Category 4 Performance Level (PL) e per ISO 13849-1 • Complies with Machinery Directive 2006/42/EC • IEC 61131-2 Programmable Controllers, Part 2: Equipment Requirements and Tests • UL 508 Industrial Control Equipment • ANSI NFPA 79 Electrical Standards for Industrial Machinery • IEC 60204-1 Electrical Equipment of Machines: General Requirements • ISO 13851 (EN574) Safety of Machinery – Two-Hand Control Devices – Functional Aspects and Design Principles • ISO 13850 (EN418) Emergency Stop Devices
Certifications	   

XS26-2

Safety Controller



- Easy to both program and install while providing scalable flexibility to meet your growing automation needs.
- Allows up to eight expansion modules
- Configuration software free of charge
- Real-time live display feedback
- Intuitive functional diagram configuration; logic function blocks including AND, OR, XOR, NAND, NOR, SR Flip-flop, RS Flip-flop
- Ethernet models available providing up to 256 status outputs and non-safety virtual outputs
- Accessories see page 590

XS26-2 Safety Controller, 24 V DC

Description	Model
Expandable	XS26-2
Expandable + Display	XS26-2d
Expandable + Ethernet	XS26-2e
Expandable + Display + Ethernet	XS26-2de

Expansion Modules

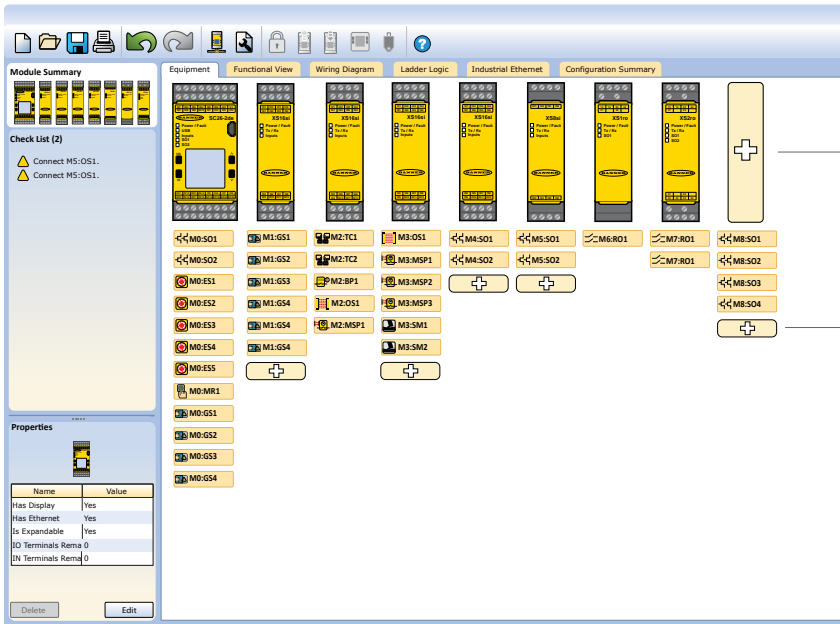
Description	Output Configuration	Model*
8 Pin Safety input module	NA	XS8si
16 Pin Safety input module	NA	XS16si
Safety output module	2 dual channel PNP	XS2so
Solid-state safety output module	4 dual channel PNP	XS4so
Safety relay output module	2 NO/1NC	XS1ro
Safety relay output module	4 NO/2 NC	XS2ro

* All models come with screw terminals

Build System and Select Equipment

Start using the software today. Go to bannerengineering.com/xs26-2

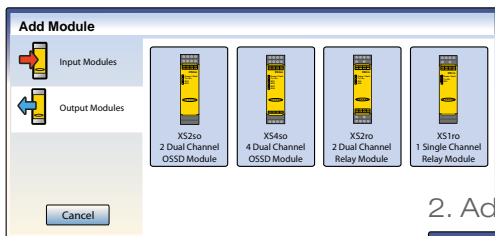
Equipment View



Add modules

Add safety devices

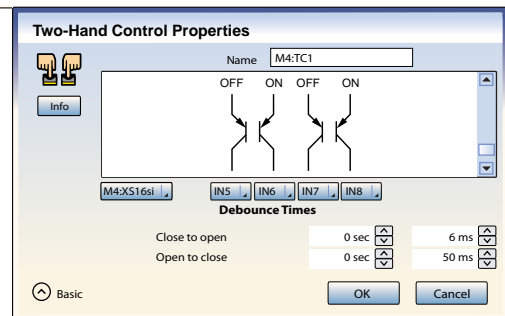
1. Add up to 8 modules



2. Add safety devices



3. Select safety device properties





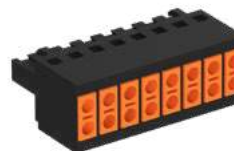
SC-XM2
Memory Card



SC-XMP2
Programming Tool



SC-USB2
USB Cable









SC-TC2
Spring Terminal Block Set

*Additional Interfacing Products
see page 595*



XS26-2 Safety Controller Specifications

Power	24 V dc, $\pm 20\%$ Ethernet models: add 40 mA Display models: add 20 mA Expandable models: add 3.6 A max. bus load
Safety Inputs (and Convertible I/O when used as inputs)	Input On threshold: > 15 V dc (guaranteed on), 30 V dc max. Input Off threshold: < 5 V dc and < 2 mA, -3 V dc min. Input On current: 5 mA typical at 24 V dc, 50 mA peak contact cleaning current at 24 V dc Input lead resistance: 300 Ω max. (150 Ω per lead) Input requirements for a 4-wire Safety Mat: <ul style="list-style-type: none"> • Max. capacity between plates: 0.22μF • Max. capacity between bottom plate and ground: 0.22μF • Max. resistance between the 2 input terminals of one plate: 20 Ω
Solid State Safety Outputs	Input On threshold: > 15 V dc (guaranteed on), 30 V dc max. Input Off threshold: < 5 V dc and < 2 mA, -3 V dc min. Input On current: 5 mA typical at 24 V dc, 50 mA peak contact cleaning current at 24 V dc Input lead resistance: 300 Ω max. (150 Ω per lead) Input requirements for a 4-wire Safety Mat: <ul style="list-style-type: none"> • Max. capacity between plates: 0.22 μF • Max. capacity between bottom plate and ground: 0.22 μF • Max. resistance between the 2 input terminals of one plate: 20 Ω
Response and Recovery Times	See Configuration Summary in the data sheet
Environmental Rating	NEMA 1 (IEC IP20), for use inside NEMA 3 (IEC IP54) or better enclosure
Operating Conditions	Temperature range: 0 to +55 $^{\circ}$ C
Mechanical Stress	Shock: 15g for 11 milliseconds, half sine, 18 shocks total (per IEC 61131-2) Vibration: 3.5 mm occasional / 1.75 mm continuous @ 5Hz to 9Hz, 1.0g occasional and 0.5g continuous @ 9Hz to 150Hz: all at 10 sweep cycles per axis (per IEC 61131-2)
Removable Terminals	Important: Clamp terminals are designed for 1 wire only. If more than 1 wire is connected to a terminal, a wire could loosen or become completely disconnected from the terminal, causing a short. Wire size: 24 to 12 AWG (0.20 to 3.13 mm ²) Wire strip length: 7 to 8 mm (0.275 in to 0.315 in)
Design Standards	Category 4, PL e (EN ISO 13849) SIL CL 3 (IEC 62061, IEC 61508)
Certifications	     

SC22-3/-3E

Safety Controller



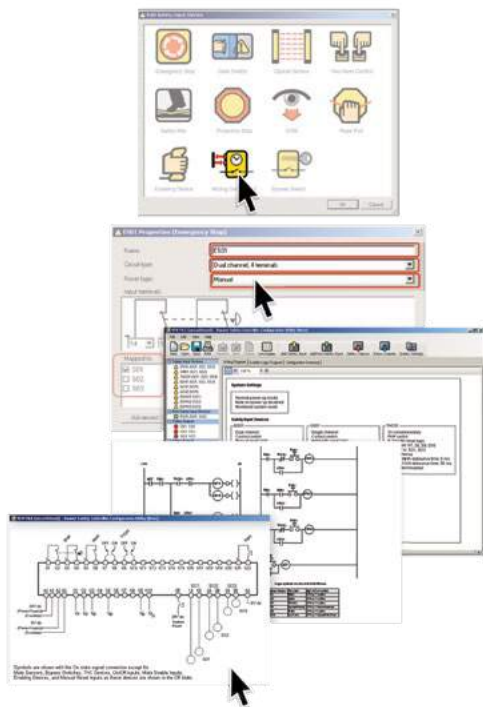
- The SC22-3 Safety Controller is a completely configurable and flexible safety controller that can easily replace multiple dedicated safety modules
- Input terminals can monitor both contact-based or PNP solid-state outputs
- Ten configurable auxiliary status outputs track inputs, outputs, lockout, I/O status and other functions
- Three pairs of solid-state safety outputs with ON-Delay, OFF-Delay and cancel OFF-Delay
- SC22-3E models provide diagnostic information using EtherNet/IP, Modbus TCP and PCCC
- Safety Controller is designed to meet stringent standards including Safety Integrity Level (SIL) 3 per IEC 61508, SIL CL 3 per IEC 62061 and Category 4 Performance Level (PL e) per EN ISO 13849-1
- Accessories see page 594

SC22-3/-3E Safety Controller, 24 V DC

Terminal Type	Safety Outputs	USB Cable	Output Rating	Aux. Outputs	XM Card	XM Programming Tool	Communication Protocol	Model
Screw	3 pairs (6 PNP)	1.8 m	0.75 amps each output	10 status (I/O, mute, lockout, fault and reset)	Yes	Yes	—	SC22-3-SU1
Clamp								SC22-3-CU1
Screw	3 pairs (6 PNP)	—	0.75 amps each output	10 status (I/O, mute, lockout, fault and reset)	Yes	—	—	SC22-3-S
Clamp								SC22-3-C
Screw	3 pairs (6 PNP)	1.8 m	0.5 amps each output	10 status (I/O, mute, lockout, fault and reset) plus 32 virtual status	Yes	Yes	EtherNet/IP (with PCCC) & Modbus/TCP	SC22-3E-SU1
Clamp								SC22-3E-CU1
Screw	3 pairs (6 PNP)	—	0.5 amps each output	10 status (I/O, mute, lockout, fault and reset) plus 32 virtual status	Yes	—	EtherNet/IP & Modbus/TCP	SC22-3E-S
Clamp								SC22-3E-C

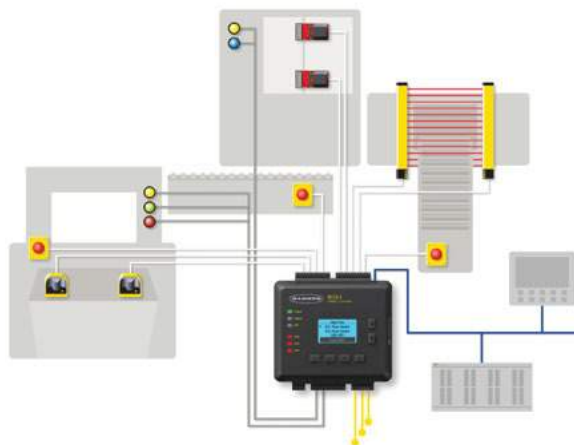
Intuitive free software for point-and-click configuration

1. Select the type of safety input device
2. Map functions and properties from a pull down list
3. Wiring and ladder logic diagrams autopopulate along with configuration summary
 - View and track status using front panel display or PC "Live Display"
 - Includes fault history with time/date stamp
 - Use INFO button to link to software and manual for quick reference to devices and safety category 2, 3 or 4 hookup

**22 input terminals for monitoring safety and non-safety devices**

Versatile input circuitry accommodates a wide range of inputs from Banner devices or any other manufacturer, including:

E-stop Buttons	Safety Mats and Edges	Interlocking Switches
Two-Hand Controls	Enabling Devices	Laser Scanners
Safety Light Screens	Muting Sensors	Value monitoring
Rope Pulls	Bypass Switches	



Ethernet Communication



Shielded
STP07
 2 m (7')
STP25
 7 m (25')
STP50
 15 m (50')
STP75
 23 m (75')

**Shielded
Crossover**
STPX07
 2 m (7')
STPX25
 7 m (25')
STPX50
 15 m (50')
STPX75
 23 m (75')

*Additional cordset information is available
See page 758*



DIN-35..

*Additional bracket information is available
See page 729*

Miscellaneous



Description	Model
SC22-3 replacement controller (without terminals)	SC-SC22-3
SC22-3E replacement controller (without terminals), Ethernet compatible	SC-SC22-3E
External memory card (XM card)	SC-XM1
Bulk pack of 5 XM Cards	SC-XM1-5
Screw terminal replacement set	SC-TS1
Clamp terminal replacement set	SC-TC1
USB A/B cable, 1.8 m	SC-USB1
XM card USB programming tool	SC-XMP

SC22-3/-3E Interface Modules

Description	Supply Voltage	Inputs (Safety Controller Outputs)	Safety Outputs	Output Rating	EDM Contacts	Model
For use with 1-dual channel SC22-3 safety output	24 V dc (Controller supplied)	1 Pair (SO1)	3 NO	10 amps	1 NC pair per output	SC-IM9A
For use with 2-dual channel SC22-3 safety outputs	24 V dc (Controller supplied)	2 Pair (SO1 and SO2)	Total of 6 (3 NO per output)	10 amps	1 NC pair per output	SC-IM9B
For use with 3-dual channel SC22-3 safety outputs	24 V dc (Controller supplied)	3 Pair (SO1, SO2 and SO3)	Total of 9 (3 NO per output)	10 amps	1 NC pair per output	SC-IM9C

NOTE: External device monitoring (EDM) is required to be wired separately to the NC contacts to comply with ISO 13849-1 categories and ANSI/OSHA control reliability.

Additional Interfacing Products

	Description	Models	Product Information
Interface Modules	 <ul style="list-style-type: none"> Interface modules provide two or three normally open force-guided relay outputs rated at 6 A Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included 	IM-T-9A (3 NO)	Page 698
		IM-T-11A (2 NO/1 NC)	
Mechanically Linked Contactors	 <ul style="list-style-type: none"> Contactors add 10 or 18 amp current carrying capability to any safety system Suppressors extend the life of an actuating device that uses a contactor Modular design simplifies assembly and installation 	11-BG00-31-D-024	Page 822
		BF1801L-024	


NC = Normally closed, NO = Normally open

NOTE: External device monitoring (EDM) is required to be wired separately to the NC contacts to comply with ISO 13849-1 categories and ANSI/OSHA control reliability.

SC22-3/-3E Safety Controller Specifications

Power	24 V dc, $\pm 20\%$ SC22-3 models: 0.4 A (controller only), 5.9 A (all outputs ON @ full rated load) SC22-3E models: 0.4 A (controller only), 4.9 A (all outputs ON @ full rated load) The Controller should be connected only to a SELV (safety extra-low voltage, for circuits without earth ground) or a PELV (protected extra-low voltage, for circuits with earth ground) power supply	
Safety and Non-Safety Inputs (22 terminals)	Input ON threshold: > 15 V dc (guaranteed on), 30 V dc max. Input OFF threshold: < 5 V dc (guaranteed off with any 1 fault), -3 V dc min. Input ON current: 8 mA typical @ 24 V dc, > 2 mA (guaranteed with 1 fault) 50 mA peak contact cleaning current @ 24 V dc Sourcing current: 30 mA minimum continuous (3 V dc max. drop) Input lead resistance: 300 Ω max. (150 Ω per lead) Input requirements for a 4-wire safety mat: Max. capacity between plates: 0.5 μ F Max. capacity between bottom plate and ground: 0.5 μ F Max. resistance between the 2 input terminals of one plate: 20 Ω	
Safety Outputs (6 terminals, 3 redundant outputs)	Rated output current: SC22-3 models: 0.75 A max. each output (1.0 V dc max drop) SC22-3E models: 0.5 A max. each output (1.0 V dc max drop) Output OFF threshold: 0.6 V dc typical (1.2 V dc max. guaranteed with 1 fault) Output leakage current: 50 μ A max. with open 0 V Load: 0.1 μ F max., 1 H max., 10 Ω max. per lead	
Status Outputs (10 terminals)	Rated output current: 0.5A @ 24 V dc (individual), 1.0 A @ 24 V dc (total of all outputs) O1 to O8 (General Purpose) — Output OFF voltage: < 0.5 V dc (no load), 22 K Ω pull down to 0 V O9 and O10 (General Purpose or Monitored Mute Lamp) — Output OFF voltage: Internal 94 K Ω pull up to 24 V dc supply Output ON/OFF threshold: 15 V dc +/-4 V dc @ 24 V dc supply NOTE: For O9 and O10 (if configured as monitored mute lamp output only), if a short circuit or other fault condition causes the output to drop below this threshold while the output is ON, a lockout will occur. If an open circuit or other fault condition causes the output to rise above this threshold while the output is OFF, a lockout will occur.	
Network Interface (SC22-3E only)	Ethernet 10/100 Base-T/TX, RJ45 modular connector Selectable auto negotiate or manual rate and duplex Auto MDI/MDIX (Auto cross) Protocols: EtherNet/IP (with PCCC), Modbus TCP Data: 32 configurable virtual status outputs; fault diagnostic codes and messages; access to fault log	
Response and Recovery Times	Response time (ON to OFF): 10 milliseconds max. (with standard 6 milliseconds debounce; this can increase if debounce time increases. Refer to the configuration summary for actual response time.) Recovery time (OFF to ON): 400 milliseconds max. (with manual reset option) Recovery time (OFF to ON): 400 milliseconds max. plus input debounce time (auto reset)	
Onboard LCD Information Display— Password Requirements	Password is not required: Run mode (I/O status) Fault (I/O fault detection and remedial steps) Review configuration parameters (I/O properties and terminals)	Password is required: Configuration mode (create/modify/confirm/download configurations)
Environmental Rating	NEMA 1 (IEC IP20), for use inside NEMA 3 (IEC IP54) or better enclosure	
Operating Conditions	Temperature range: 0 to +55 $^{\circ}$ C	
Mechanical Stress	Shock: 15g for 11 milliseconds, half sine, 18 shocks total (per IEC 61131-2) Bump: 10g for 16 milliseconds, 6000 cycles total (per IEC 61496-1) Vibration: 3.5 mm occasional / 1.75 mm continuous @ 5Hz to 9Hz, 1.0g occasional and 0.5g continuous @ 9Hz to 150Hz: (per IEC 61131-2) and 0.35 mm single amplitude / 0.70 mm peak-to-peak @ 10 to 55Hz (per IEC 61496-1), all @ 10 sweep cycles per axis	
EMC	Meets or exceeds all EMC requirements in IEC 61131-2, IEC 61496-1 (Type 4), and IEC 62061 Annex E, Table E.1 (increased immunity levels)	

SC22-3/-3E Safety Controller Specifications (cont'd)

<p>Removable Terminals</p>	<p>Screw terminals Wire sizes: 16, 18, 20, 22 or 24 AWG (0.20 – 1.31 mm²) Wire strip length: 5.00 mm Tightening torque: 0.23 Nm (2 in. lbs) nominal Tightening torque: 0.34 Nm (3.0 in. lbs) maximum</p> <p>Clamp terminals Wire size: 16, 18, 20, 22, or 24 AWG (0.20 – 1.31 mm²) Wire strip length: 9.00 mm Important: Clamp terminals are designed for 1 wire only. If more than 1 wire is connected to a terminal, a wire could loosen or become completely disconnected from the terminal, causing a short.</p>
<p>Design Standards</p>	<ul style="list-style-type: none"> • SIL CL 3 per IEC 62061 Safety of Machinery – Functional Safety of Safety-Related Electrical, Electronic and Programmable Electronic Control Systems • SIL 3 per IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems • Category 4 per ISO 13849-1 • Category 4 Performance Level (PL) e per ISO 13849-1 • Complies with Machinery Directive 2006/42/EC • IEC 61131-2 Programmable Controllers, Part 2: Equipment Requirements and Tests • UL 508 Industrial Control Equipment • UL 1998 Software in Programmable Components • ANSI NFPA 79 Electrical Standards for Industrial Machinery • IEC 60204-1 Electrical Equipment of Machines: General Requirements • ISO 13851 (EN574) Safety of Machinery – Two-Hand Control Devices – Functional Aspects and Design Principles • ISO 13850 (EN418) Emergency Stop Devices
<p>Certifications</p>	



Emergency Stop Buttons

Push-to-stop/twist-to-release Emergency Stop palm buttons are available in panel-mount or remotely located IP65 enclosures. Illuminated models help operators quickly identify actuated buttons, allowing for a quick return to normal operations.

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