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 688	**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 LP Two-piece system with 14 or 25 mm resolution provides finger, hand and ankle detection. page 694	**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 702	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 703	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 708	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

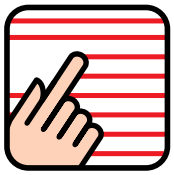
1 Select Hazard Level

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.

2 Select Resolution

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

3 Select Housing

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 688

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 694

Grids & Points

Point and Grid systems allow one-, two-, three- or four-beam perimeter and access guarding.
See page 702

Select Hazard Level

1

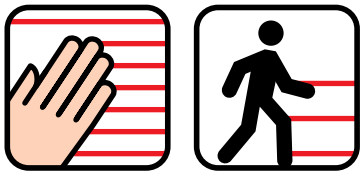
Type 2

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



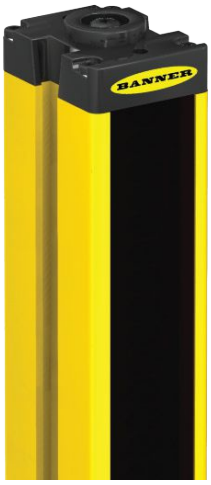
30 mm resolution for bump, bruise or knock-down detection

Select Housing

3

Standard

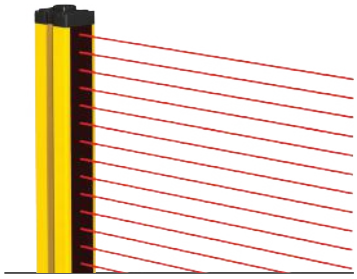
Inexpensive, compact optical safeguarding solution designed for lower-risk applications where risk of injury is limited but some guarding is necessary.
See page 708



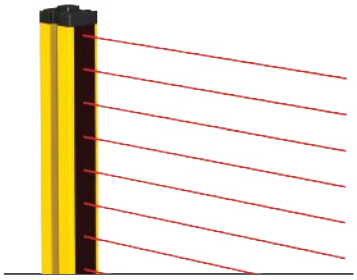
EZ-SCREEN
Safety Light Screens

EZ-SCREEN point-of-operation systems provide finger, hand and ankle detection in a robust housing and metal endcaps.

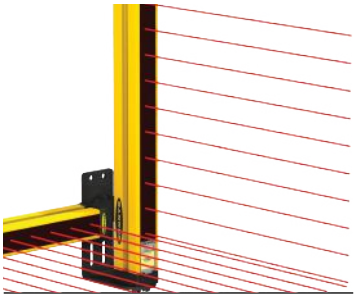
- Operating range up to 18 m
- Displays operating status, configuration error codes, and blocked beams
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cULus NIPF, and CE certified to Type 4, Cat 4 PLe, and SIL3
- Resists impact, twisting, and abusive environments with durable aluminum housing or nickel-plated ESD-safe housing for protection against electrostatic discharges
- Available in 14 or 30 mm resolution
- Cordsets and brackets see page 691



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, 14 mm Resolution Model Key, 24 V DC

Example Model Number **SLSP14-150Q88**

Model Style

SLS | **P**

SLS = Light Screen
SLSC = Cascading Light Screen

E = Emitter
R = Receiver
P = Pair***

Resolution

14

14 = 14 mm

Defined Area

150

	Housing Length	Response Time†
150* =	262 mm	11 ms
300 =	372 mm	15 ms
450 =	522 mm	19 ms
600 =	671 mm	23 ms
750 =	821 mm	27 ms
900 =	971 mm	32 ms
1050 =	1120 mm	36 ms
1200 =	1270 mm	40 ms
1350 =	1420 mm	43 ms
1500 =	1569 mm	48 ms
1650 =	1719 mm	52 ms
1800 =	1869 mm	56 ms

Finish

Blank = Yellow powder coat
N = Nickel-plated ESD**
A = Clear Anodized Aluminum
S = Nickel-plated (silver)

Connection

Emitter/Receiver or **Pair*****

Q8 = 8-pin QD
P8 = 8-pin Pigtail QD

Q88 = Emitter with 8-pin QD
Receiver with 8-pin QD
P88 = Emitter with 8-pin pigtail QD
Receiver with 8-pin pigtail QD

EZ-SCREEN® Systems, 30 mm Resolution Model Key, 24 V DC

Example Model Number **SLSP30-150Q88**

Model Style

SLS | **P**

SLS = Light Screen
SLSC = Cascading Light Screen

E = Emitter
R = Receiver
P = Pair***

Resolution

30

30 = 30 mm

Defined Area

150

	Housing Length	Response Time†
150* =	262 mm	9 ms
300 =	372 mm	11 ms
450 =	522 mm	13 ms
600 =	671 mm	15 ms
750 =	821 mm	17 ms
900 =	971 mm	19 ms
1050 =	1120 mm	21 ms
1200 =	1270 mm	23 ms
1350 =	1420 mm	25 ms
1500 =	1569 mm	27 ms
1650 =	1719 mm	30 ms
1800 =	1869 mm	32 ms
1950 =	2018 mm	34 ms
2100 =	2168 mm	36 ms
2250 =	2318 mm	38 ms
2400 =	2468 mm	40 ms

Finish

Blank = Yellow powder coat
N = Nickel-plated ESD**
A = Clear Anodized Aluminum
S = Nickel-plated (silver)

Connection

Emitter/Receiver or **Pair*****

Q8 = 8-pin QD
P8 = 8-pin Pigtail QD

Q88 = Emitter with 8-pin QD
Receiver with 8-pin QD
P88 = Emitter with 8-pin pigtail QD
Receiver with 8-pin pigtail QD

For more specifications see page 692.

QD models: A model with a QD requires a mating cordset (see page 691).

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.

EZ-SCREEN V-Series
Type 4 Safety Light Screens

The V-Series Safety Light Screens require no configuration and are pre-configured for Trip Output, Scan Code 1, and 2-Channel EDM.

- Provides external device monitoring (EDM) that can be deselected via wiring hookup
- 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 SIL 3
- Resists impact, twisting and abusive environments with a durable aluminum housing and metal endcaps

EZ-SCREEN® V-Series Systems, 30 mm Resolution Model Key, 24 V DC

Example Model Number **SLSVAP30-150Q88**

Model Style

SLSVA	P
SLSVA = V-series Safety Light Screen	**E** = Emitter **R** = Receiver **P** = Pair †

Resolution

30
30 = 30 mm

Defined Area

150

	Housing Length	Response Time
150 =	262 mm	9 ms
300 =	372 mm	11 ms
450 =	522 mm	13 ms
600 =	671 mm	15 ms
750 =	821 mm	17 ms
900 =	971 mm	19 ms
1050 =	1120 mm	21 ms
1200 =	1270 mm	23 ms
1350 =	1420 mm	25 ms
1500 =	1569 mm	27 ms
1650 =	1719 mm	30 ms
1800 =	1869 mm	32 ms

Connection

Emitter/Receiver | or | **Pair** †

	Q88
Q8 = 8-pin QD	**Q88** = Emitter with 8-pin QD Receiver with 8-pin QD

For more specifications see page 692.

QD models: A model with a QD requires a mating cordset (see page 691).

† A pair includes an emitter and receiver (example, **SLSVAP30-150Q88**)

Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

Cordsets

Euro QD

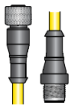
See page 911

Length	8-Pin QD Straight
4.57 m	QDE-815D
7.62 m	QDE-825D
15.3 m	QDE-850D
22.9 m	QDE-875D
30.5 m	QDE-8100D

Euro QD—Double-Ended

See page 912

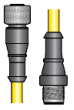
Length	8-Pin QD Straight
0.31 m	DEE2R-81D
0.91 m	DEE2R-83D
2.44 m	DEE2R-88D
4.57 m	DEE2R-815D
7.62 m	DEE2R-825D
15.3 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D



Euro QD Adaptor*

See page 912

Length	8-Pin/4-Pin Straight	8-Pin/5-Pin Straight
0.31 m	DEE8-41D	DEE8-51D
2.44 m	DEE8-48D	DEE8-58D
4.57 m	DEE8-415D	DEE8-515D
7.62 m	DEE8-425D	DEE8-525D

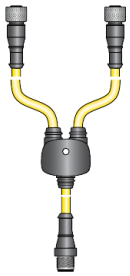


* For SLS/SLP sensors with Q8 or P8 connection to safety BUS gateway/node, "smart" self-monitored safety module, safety controller or safety PLC see page 912.

Euro QD Splitter

See page 907

Length	8-Pin QD Straight
0 m	CSB-M1280M1280
0.30 m	CSB-M1281M1281
2.50 m	CSB-M1288M1281
4.60 m	CSB-M12815M1281
7.60 m	CSB-M12825M1281
7.60 m	CSB-UNT825M1281



Additional cordset information available. See page 902

NOTE: See page 707 for interfacing solutions.
Additional accessories are listed on page 844.

Brackets

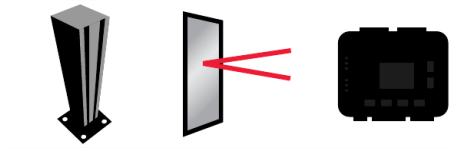
14 & 30 mm		Cascade	
See page 894	See page 894	See page 895	See page 895
EZA-MBK-12*	EZA-MBK-11*	EZA-MBK-20	EZA-MBK-21

Additional brackets and information available. See page "Banner Bracket Selection Chart" on page 852.

* Standard brackets included with emitter/receiver.

Other Accessories

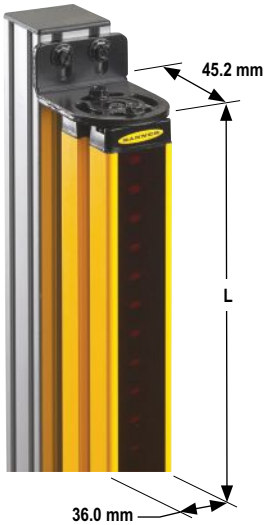
Stands	Mirrors	Interface
See page 944	See page 948	See page 962



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 Systems

EZ-SCREEN® 14 & 30 mm Resolution and V-Series Specifications

Supply Voltage at the Device	24 V dc ±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	± 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)	<table><tr><th></th><th>Beam 1 (Sync Beam)</th><th>All Other Beams</th></tr><tr><td>**14 mm Models**</td><td>109 to 800 ms</td><td>33 to 220 ms</td></tr><tr><td>**30 mm Models**</td><td>81 to 495 ms</td><td>25 to 152 ms</td></tr></table>
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:** ≥ Vin-1.5 V dc **OFF-State voltage:** 1.2 V dc max. (0-1.2 V dc) **Max. load capacitance:** 1.0 µF **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)

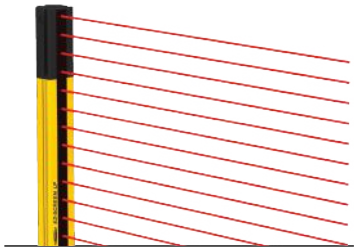
EZ-SCREEN® 14 & 30 mm Resolution and V-Series Specifications (cont'd)

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 692.
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, ± 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	CE c UL us LISTED

EZ-SCREEN Low-Profile (LP)
Type 4 Safety Light Screens

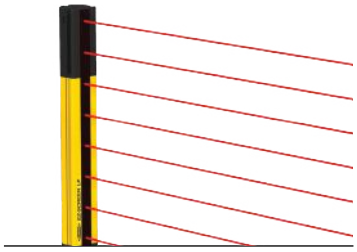
The Low-Profile Safety Light Screen provides a small, compact design with end-to-end sensing.

- 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 698



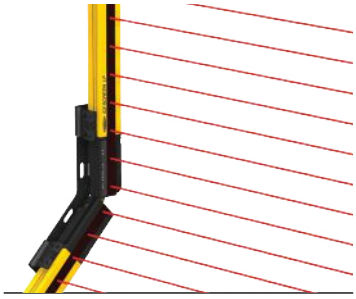
14 mm Resolution

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.



Cascading

Low-profile cascading 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, 14 mm Resolution Model Key, 24 V DC Example Model Number **SLPP14-270P88**

Model Style

SLP = Light Screen
SLPC = Cascading Light Screen

P = Pair***

Resolution

14 = 14 mm

Defined Area

	Housing Length	Response Time†
270*	270 mm	10.5 ms
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

Finish

Blank = Yellow powder coat
N = Nickel-plated ESD**
A = Clear Anodized Aluminum

Connection

Emitter/Receiver

Blank = Integral RD
P8 = 8-pin Pigtail QD

or

Pair***

Blank = Receiver with Integral RD Emitter with Integral RD
P88 = Receiver with 8-pin pigtail QD Emitter with 8-pin pigtail QD

RD = Removable disconnect

EZ-SCREEN® Low-Profile Systems, 25 mm Resolution Model Key, 24 V DC Example Model Number **SLPP25-270P88**

Model Style

SLP = Light Screen
SLPC = Cascading Light Screen

P = Pair***

Resolution

25 = 25 mm

Defined Area

	Housing Length	Response Time†
270*	270 mm	8 ms
410	410 mm	9.5 ms
550	549 mm	11 ms
690	689 mm	12.5 ms
830	829 mm	14 ms
970	969 mm	15.5 ms
1110	1108 mm	17 ms
1250	1248 mm	18.5 ms
1390	1388 mm	20 ms
1530	1528 mm	21 ms
1670	1667 mm	22.5 ms
1810	1807 mm	24 ms

Finish

Blank = Yellow powder coat
N = Nickel-plated ESD**
A = Clear Anodized Aluminum

Connection

Emitter/Receiver

Blank = Integral RD
P8 = 8-pin Pigtail QD

or

Pair***

Blank = Receiver with Integral RD Emitter with Integral RD
P88 = Receiver with 8-pin pigtail QD Emitter with 8-pin pigtail QD

RD = Removable disconnect

For more specifications see page 698.

QD models: A model with a QD requires a mating cordset (see page 698).

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..M1281**; see page 698).
Integral RD models require mating cordsets with a removable disconnect connector (such as **RDLP-8..D** or **DELPE-8..D**; see page 698).

* 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

The EZ-SCREEN® with Muting 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 certiffed to Type 4, Cat 4 PLe, and SIL 3
- Cordsets and brackets see page 698

EZ-SCREEN® Low-Profile with Muting Systems, 14 and 25 mm Resolution Model Key, 24 V DC

Example Model Number **SLPMP14-410P128**

Model Style

SLPMP

- **SLPE** = Emitter
- **SLPMR** = Muting Receiver
- **SLPMP** = Muting LP Pair

Resolution

14

- **14** = 14 mm
- **25** = 25 mm

Defined Area

410

	Housing Length	Response Time(14 mm)	Response Time(25 mm)
410 =	410 mm	13.5 ms	9.5 ms
550 =	549 mm	16.5 ms	111 ms
690 =	689 mm	19.5 ms	12.5 ms
830 =	829 mm	22.5 ms	14 ms
970 =	969 mm	25.5 ms	15.5 ms
1110 =	1108 mm	28.5 ms	17 ms
1250 =	1248 mm	31.5 ms	18.5 ms
1390 =	1388 mm	34.5 ms	20 ms
1530 =	1528 mm	37.5 ms	21 ms
1670 =	1667 mm	40.5 ms	22.5 ms
1810 =	1807 mm	43.5. ms	24 ms

Finish

- **Blank** = Yellow powder coat
- **N** = Nickel-plated ESD
- **A** = Clear Anodized Aluminum

Connection

Emitter/Receiver

- **Blank** = Integral RD
- **P8** = 8-pin Pigtail QD (SLP Emitter)
- **P12** = 12-pin Pigtail QD (SLPM Receiver)

or

Pair*

P128

- **Blank** = Receiver with Integral RD Emitter with Integral RD
- **P128** = Emitter with 8-pin pigtail QD Receiver with 12-pin pigtail QD (SLPM Receiver)

RD = Removable disconnect

For more specifications see page 700.

QD models: A model with a QD requires a mating cordset (see page 698).

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**; see page 698).
Integral RD models require mating cordsets with a removable disconnect connector (such as **RDLP-8..D** or **RDLP-11..E**; see page 698).

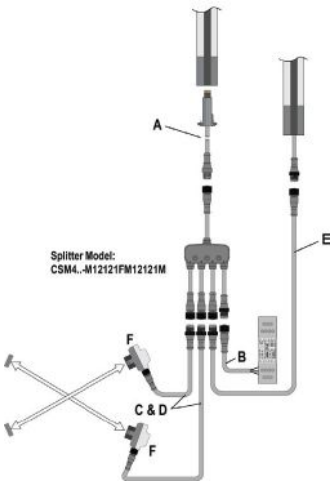
* A pair includes an emitter and receiver (example, **SLPMP14-410P128**)

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')



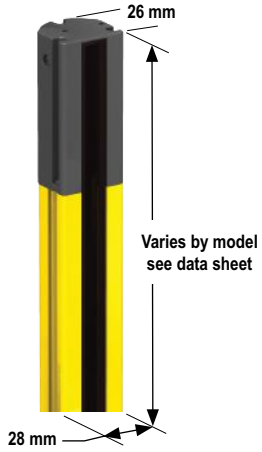
"**A**" (Receiver cordset): On RD models = DELPE-12xxE; On P12 models cordset "A" is a preinstalled DELPE-121E.
"**B**": Machine interface cordset = QDE-12xxE.
"**C**" and "**D**": Muting Sensor cordsets = DEE2R-515D. Ensure sensors connected to Cordsets C & D are PNP output with Dark Operate on pin 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



EZ-SCREEN LP Systems

Cordsets

For 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**).

RD

See page 916

Length	8-Wire*	11-Wire
4.57 m	RDLP-815D	RDLP-1115E
7.62 m	RDLP-825D	RDLP-1125E
15.2 m	RDLP-850D	RDLP-1150E
22.9 m	RDLP-875D	RDLP-1175E
30.5 m	RDLP-8100D	RDLP-11100E

RD to Euro QD**

See page 916

Length	8-Pin Male	12-Pin Male	8-Pin Female
0.31 m	DELPE-81D	DELPE-121E	DELPEF-81D
0.91 m	DELPE-83D	DELPE-123E	DELPEF-83D
2.44 m	DELPE-88D	DELPE-128E	DELFEF-88D
4.57 m	DELPE-815D	DELPE-1215E	DELPEF-815D
7.62 m	DELPE-825D	DELPE-1225E	—
15.2 m	DELPE-850D	DELPE-1250E	—
22.9 m	DELPE-875D	DELPE-1275E	—
30.5 m	DELPE-8100D	DELPE-12100E	—

RD to RD

See page 917

Length	Cascade
0.05 m	DELP-110E
0.30 m	DELP-111E
0.91 m	DELP-113E
2.44 m	DELP-118E
4.57 m	DELP-1115E
7.62 m	DELP-1125E
15.2 m	DELP-1150E
22.9 m	DELP-1175E
30.5 m	DELP-11100E

* For connection of E-Stop or other hard/relay contacts see page 916 .

** 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 697 for EZ-SCREEN® LPM cordset overview.

For use with models with
Pigtail QD and **DELPE-8xxD** connections.

Euro QD–Double-Ended

See page 912

Length	8-Pin*
0.31 m	DEE2R-81D
0.91 m	DEE2R-83D
2.44 m	DEE2R-88D
4.57 m	DEE2R-815D
7.62 m	DEE2R-825D
15.2 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D

Euro QD

See page 911

Length	8-Pin	12-Pin
4.57 m	QDE-815D	QDE-1215E
7.62 m	QDE-825D	QDE-1225E
15.3 m	QDE-850D	QDE-1250E
22.9 m	QDE-875D	QDE-1275E
30.5 m	QDE-8100D	QDE-12100E

Euro QD Splitter

See page 914

Length	8-Pin
0 m	CSB-M1280M1280
0.30 m	CSB-M1281M1281
2.50 m	CSB-M1288M1281
4.60 m	CSB-M12815M1281
7.60 m	CSB-M12825M1281
7.60 m	CSB-UNT825M1281

* For connection to safety BUS gateway/node, a "smart" self-monitored safety module, safety controller or safety PLC see page 912.

Additional cordset information available. See page 902

Note: See page 707 for interfacing solutions, additional accessories are listed on page 844.

Brackets

Low-Profile 14 & 25 mm

See page 896	See page 896	See page 897	See page 898
LPA-MBK-11*	LPA-MBK-12*	LPA-MBK-20	LPA-MBK-22

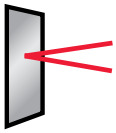
Low-Profile 14 & 25 mm–Cascade

See page 898	See page 898	See page 897	See page 897
LPA-MBK-21	LPA-MBK-90	LPA-MBK-120	LPA-MBK-135

Additional brackets and information available. See page "Banner Bracket Selection Chart" on page 852.

* Standard brackets included with emitter/receiver.

Other Accessories

Stands	Mirrors	Interface
See page 944	See page 948	See page 962
		

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 ±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

± 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	33 to 220 ms
25 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 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: ≥ Vin-1.5 V dc
OFF-State voltage: 1.2 V dc max. (0-1.2 V dc)
Max. load capacitance: 1.0 µF
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

EZ-SCREEN® Low-Profile 14 & 25 mm Resolution Specifications (cont'd)

Electrical Safety Class (IEC 61140)	III
Operating Range	0.1 to 7 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 the Accessory section for more information on a specific mirror page 948, for further information.
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, ± 2.5° @ 3 m
Enclosure	**Materials:** Extruded aluminum housing with yellow polyester powder finish standard (optional clear anodized aluminum or nickel-plated silver finish) and well-sealed, rugged die-cast zinc end caps, acrylic lens cover, copolyester access cover. End caps on silver models are also nickel-plated. ESD-safe models have static-dissipative acrylic lens cover. **Rating:** IP65
Operating Conditions	**Temperature:** 0° to +55° C **Max. Relative Humidity:** 95% maximum relative humidity (non-condensing)
Status Indicators	**Emitter:** **One Bicolor (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 **Bicolor (Red/Green) Status indicator** – indicates general system and output status **Bicolor (Red/Green) Zone Status indicators** – indicate condition (clear or blocked beam) of a defined group of beams **7-Segment Diagnostic indicator (1 digit)** – indicates proper operation, scan code, or error code, total number of blocked beams **Yellow Mute Device Input Indicators** – indicates status of mute device inputs (SLPMR models only)
Mounting Hardware	Emitter and receiver each are supplied with a pair of swivel end-mounting brackets and two swivel side-mounting brackets. Models longer than 690 mm also include one or more additional side-mount brackets for center support.
Shock and Vibration	EZ-SCREEN LP 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 61496-1/-2; Category 4 PLe per EN ISO 13849-1; SIL 3 per IEC 61508, SIL CL3 per IEC 62061
Certifications	CE TÜVRheinland C US — TUV Rheinland of North America, a Nationally Recognized Test Laboratory (NRTL) in the United States according to OSHA 29 CFR 1910.7, and accredited by the Standards Council of Canada to test and certify products to Canadian National Standards, has certified the EZ-SCREEN Low Profile to all applicable U.S. and Canadian National Standards. The cTUVus mark is recognized throughout the United States and Canada by OSHA and the SCC. C US — Actual certification mark on EZ-SCREEN Low Profile product labels. This simplified certification mark is used on the product labels due to limited space.

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 704

EZ-SCREEN® Grid Systems Model Key, 24 V DC Example Model Number **SGP3-533Q88E**

Model Style

SG = Safety Grid (Receiver & Short Range Emitters)
SGXL = Safety Grid (Long Range Emitters & Pairs)

P = Pair†
E = Emitter
R = Receiver

Number of Beams — **Beam Spacing (mm)**

2-500 = 2 beams, 500 mm spacing (500 mm protected height)
2-584 = 2 beams, 584 mm spacing (584 mm protected height)
3-400 = 3 beams, 400 mm spacing (800 mm protected height)
3-533 = 3 beams, 533 mm spacing (1066 mm protected height)
4-300 = 4 beams, 300 mm spacing (900 mm protected height)

Connection Emitter/Receiver or **Pair** †

Q8E = 8-pin QD

Q88E = Emitter with 8-pin QD
Receiver with 8-pin QD

For more specifications see page 705.

A model with a QD requires a mating cordset (see page 704).

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 704

EZ-SCREEN® Point Systems Model Key, 24 V DC Example Model Number **SPP1Q88E**

Model Style

- **SP** = Safety Point (Receiver & Short Range Emitters)
- **SPXL** = Safety Point (Long Range Emitters & Pairs)

P

- **E** = Emitter
- **R** = Receiver
- **P** = Pair †

Number of Beams

1 = Point Models

Connection

Emitter/Receiver

Q8E = 8-pin QD

or

Pair †

Q88E = Emitter with 8-pin QD Receiver with 8-pin QD

For more specifications see page 705.

A model with a QD requires a mating cordset (see page 704).

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.

Cordsets

Euro QD

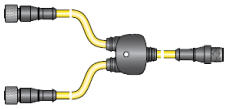
See page 911

Length	8-Pin
4.57 m	QDE-815D
7.62 m	QDE-825D
15.3 m	QDE-850D
22.9 m	QDE-875D
30.5 m	QDE-8100D

Euro QD Splitter

See page 914

Length	8-Pin
0 m	CSB-M1280M1280
0.30 m	CSB-M1281M1281
2.50 m	CSB-M1288M1281
4.60 m	CSB-M12815M1281
7.60 m	CSB-M12825M1281
7.60 m	CSB-UNT825M1281



Euro QD–Double-Ended

See page 912

Length	8-Pin*
0.31 m	DEE2R-81D
0.91 m	DEE2R-83D
2.44 m	DEE2R-88D
4.57 m	DEE2R-815D
7.62 m	DEE2R-825D
15.2 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D

* For connection to safety BUS gateway/node, a "smart" self-monitored safety module, safety controller or safety PLC see page 912.

Additional cordset information available. See page 902

Brackets

Grids & Points–Type 4

See page 894	See page 895	See page 896	See page 894	See page 895	See page 896
EZA-MBK-1*	EZA-MBK-3	EZA-MBK-9	EZA-MBK-2**	EZA-MBK-4	EZA-MBK-5

Points–Type 4

Additional brackets and information available. See page "Banner Bracket Selection Chart" on page 852.

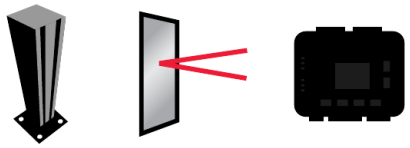
* Standard brackets included with emitter/receiver.

** One EZA-MBK-2 adapter bracket kit required per sensor when mounting to MSA series stands.

NOTE: See page 706 for interfacing solutions.

Other Accessories

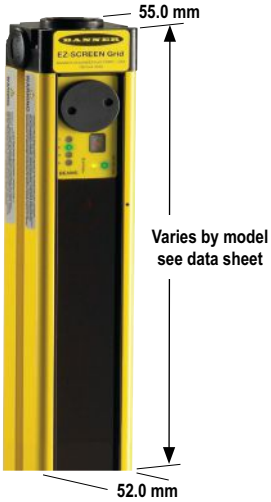
Stands	Mirrors	Interface
See page 944	See page 948	See page 962



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

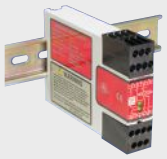
Supply Voltage	24 V dc ±15%, 10% max. ripple
Supply Current	**Emitter:** 150 mA max. **Receiver:** 500 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each)
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24 V dc or dc common (except Emitter 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:** ≥Vin-1.5 V dc **OFF-State voltage:** 1.2 V dc max. **Max. load resistance:** 1000 Ω **Max. load capacitance:** 0.1 µF **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.

Continued on next page

EZ-SCREEN® Grid & Point Specifications (cont'd)

Beam Spacing	**Model SG...4-300:** 300 mm **Model SG...3-400:** 400 mm **Model SG...2-500:** 500 mm **Model SG...3-533:** 533.4 mm **Model SG...2-584:** 584.2 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	**7-Segment Diagnostic Indicators, Both Emitter and Receiver** **Dash (–)** = System is OK **Error Codes** = See product manuals (p/n 68410 or 68413) for code definitions and recommended action **Scan code setting** = Appears during power-up or after scan code is changed. (C1 or C2) (Temporary indication; normal display resumes within a few seconds.) **Emitter:** One bicolor (red/green) Status indicator **Green steady** = RUN mode **Green single flashing** = TEST mode **Red single flashing** = Lockout **OFF** = No power to sensor **Receiver:** Two System Status indicators, plus one bi-color (red/green) Beam Status indicator for each beam **Yellow Reset Indicator** **ON steady** = RUN mode **Double flashing** = Waiting for manual reset after power-up **Single flashing** = Waiting for manual latch reset **OFF** = No power to sensor or system is not ready for operation **Bicolor (Red/Green) Status Indicator** **Green steady** = Outputs ON **Red steady** = RUN mode, outputs OFF **Red single flashing** = Lockout **OFF** = No power to sensor or system is not ready for operation **Bicolor (Red/Green) Beam Status Indicators** **Green steady** = Clear beam, strong signal **Green flickering** = Clear beam, weak signal **Red steady** = Beam blocked **OFF** = No power to sensor or no scanning
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	CE c UL us LISTED **Important Notice:** **European Community Machinery Directive 2006/42/EC** 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.

EZ-SCREEN® Interfacing Products

		Description	Models	Product Information
Interface Modules and Controllers		• Interface modules provide two or three normally open force-guided relay outputs rated at 6 A (-9A) or 7A (-11A) • 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	**IM-T-9A** (3 NO) **IM-T-11A** (2 NO/1 NC)	Page 746
		• 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 714
		• 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 722
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 740
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 963
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 962
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 964

EZ-SCREEN Type 2
Type 2 Safety Light Screens

A low-cost solution is 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 Model Key, 24 V DC

Example Model Number **LS2TP30-150Q88**

Model Style

LS2 **TP**

- **E** = Emitter
- **TR** = Trip Receiver
- **TP** = Trip Pair†
- **LR** = Latch Receiver
- **LP** = Latch Pair†

Resolution

30

- **30** = 30 mm

Defined Area

150

	Housing Length	Response Time
150 =	215 mm	11 ms
300 =	365 mm	13 ms
450 =	515 mm	14 ms
600 =	665 mm	16 ms
750 =	815 mm	17 ms
900 =	964 mm	19 ms
1050 =	1114 mm	21 ms
1200 =	1264 mm	22 ms
1350 =	1414 mm	24 ms
1500 =	1563 mm	25 ms
1650 =	1713 mm	27 ms
1800 =	1863 mm	29 ms

Connection

Emitter/Receiver | **or** | **Pair** †

Q8

- **Q8** = 8-pin QD

Q88

- **Q88** = Receiver with 8-pin QD
  Emitter with 8-pin QD

For more specifications see page 711.

A model with a QD requires a mating cordset (see page 709).

† 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.

Cordsets

Euro QD

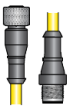
See page 911

Length	8-Pin QD Straight
4.57 m	QDE-815D
7.62 m	QDE-825D
15.3 m	QDE-850D
22.9 m	QDE-875D
30.5 m	QDE-8100D

Euro QD—Double-Ended

See page 912

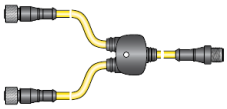
Length	8-Pin QD Straight
0.31 m	DEE2R-81D
0.91 m	DEE2R-83D
2.44 m	DEE2R-88D
4.57 m	DEE2R-815D
7.62 m	DEE2R-825D
15.3 m	DEE2R-850D
22.9 m	DEE2R-875D
30.5 m	DEE2R-8100D



Euro QD Splitter

See page 914

Length	8-Pin
0 m	CSB-M1280M1280
0.30 m	CSB-M1281M1281
2.50 m	CSB-M1288M1281
4.60 m	CSB-M12815M1281
7.60 m	CSB-M12825M1281
7.60 m	CSB-UNT825M1281



Additional cordset information available. See page 902.

NOTE: See page 693 for interfacing solutions.
Additional accessories are listed on page 844.

Brackets

30 mm—Type 2

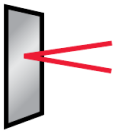
See page 897	See page 897	See page 898	See page 898
USCMB-..**	USMB-1*	USMB-6	USMB-8

Additional brackets and information available. See page 852

NOTE: See page 706 for interfacing solutions.
** USCMB-1/-2 are dependent on length
* USMB-1 brackets are supplied

Other Accessories

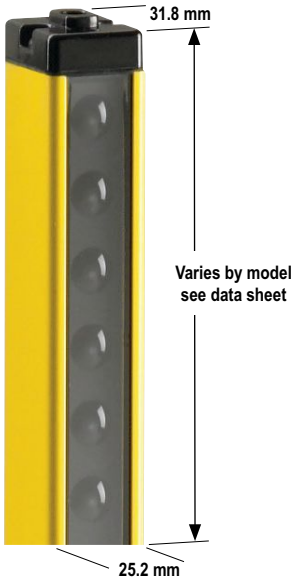
Stands	Mirrors	Interface
See page 944	See page 948	See page 705



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 ±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 956
Effective Aperture Angle (EAA)	Meets Type 2 requirements per IEC 61496-2; ± 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 708
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:** > Vin-1.5 V dc **OFF-State voltage:** 0.2 V dc max. **Max. load capacitance:** 0.1 µF **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	CE c UL us LISTED