# Safety Light Screens

**EZ-SCREEN®** . . . . . **page 20**

- Provides point-of-operation, area, access and perimeter safeguarding.
- Protects personnel from injury and equipment from damage.
- Offered with 14 and 30 mm resolution, single-beam points, or multi-beam grids.
- Requires no controller.
- Rated Type 4.
- Available with optional ESD-safe housing, pigtail connectors and cascading on some models.
- Reduced resolution and fixed blanking on EZ-SCREEN Type 4.


**PICO-GUARD™** . . . . . **page 36**

- Provides access and short-range perimeter guarding.
- Offers low-cost alternative to cumbersome machine guarding methods.
- Combines fiber optic and photoelectric technologies.
- Uses fiber optic technology for intrinsically safe guarding in explosive or harsh environments.
- Installs easily using inexpensive plastic fiber optics.

**MICRO-SCREEN®** . . . . . **page 42**

- Designed for light- to medium-duty production machinery.
- Features ultra-compact emitters and receivers ranging from 102 to 1829 mm long, depending on series and model.
- Offered with optional ESD-safe housing.
- Includes floating blanking and optional fixed blanking.
- Controllers offered with DeviceNet™, E-stop input and muting.

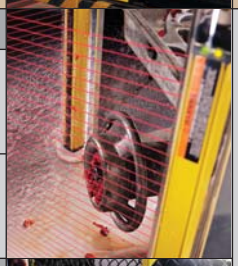
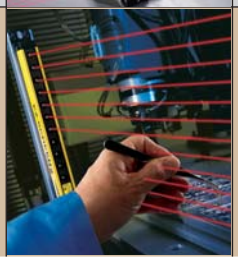
**MINI-SCREEN®** . . . . **page 58**

- Suitable for heavy-duty machine guarding applications—extra robust housing available.
- Features rugged, compact emitters and receivers ranging from 114 to 1829 mm long, depending on series and model.
- Includes floating blanking and selectable auto power-up.
- Offers optional fixed-beam blanking and muting.
- Offered with yellow or black housing on emitters and receivers.

**EZ-SCREEN® Type 2** . **page 78**

- Designed for lower-risk applications.
- Provides economical, compact optical safeguarding.
- Meets Type 2 requirements per IEC 61496-1/-2.
- Offered with 30 mm resolution and 15 m range.

# SAFETY LIGHT SCREEN SELECTION

| Type | Model | | Catalog Page | Safety Category | Resolution | Supply Voltage | Maximum Range |
|---|---|---|---|---|---|---|---|
| EZ-SCREEN® | Standard Systems |  | Page 20 | 4 | 14 & 30 mm | 24V dc | 18 m |
| | Cascade Systems | | | | 14 & 30 mm | | 18 m |
| | Grid & Point Systems | | | | 300 to 584 mm (beam spacing) | | 70 m |
| PICO-GUARD™ | Grid Systems |   | Page 36 | 4 | 300 to 584 mm (beam spacing) | 24V dc | 31 m |
| | Point Systems | | | | — | | |
| MICRO-SCREEN® | Emitters & Receivers |  | Page 42 | 4 | | | |
| | Standard Series | | | | 19 mm | Supplied by controller | 9 m |
| | V-Series | | | | 32 mm | | |
| | Controllers |  | | | N/A | 24V dc, 115 or 230V ac | N/A |
| | Metal Box Controllers | | | | | | |
| | DIN Module Controllers | | | | | 24V dc | |
| MINI-SCREEN® | Emitters & Receivers |  | Page 58 | 4 | | | |
| | Standard Series | | | | 19 & 25 mm | Supplied by controller | 18 m |
| | Heavy-Duty Series | | | | 38 mm | | |
| | Controllers |  | | | N/A | 24V dc, 115V ac or 230V ac | N/A |
| | Metal Box Controllers | | | | | | |
| | DIN Module Controllers | | | | | 24V dc | |
| EZ-SCREEN® Type 2 | Type 2 Systems |  | Page 78 | 2 | 30 mm | 24V dc | 15 m |

NC = Normally Closed Relay, NO = Normally Open Relay

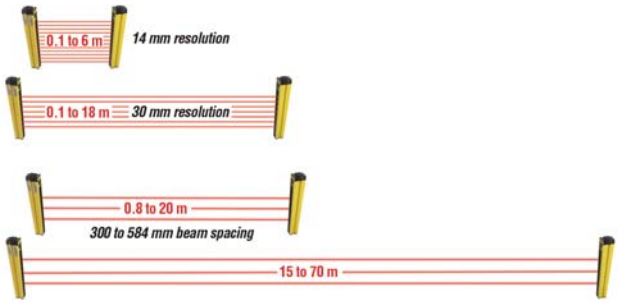
| Safety Output | Blanking | Muting Option | Output Response Time | Housing Material | Environmental Rating |
|---|---|---|---|---|---|
| **2 PNP OSSD (Trip /Latch Selectable)** | Reduced Resolution (floating) 2-beam & Fixed | Optional Accessory (see page 123) | 9 to 56 ms | Aluminum housing with yellow polyester powder finish or nickel-plated ESD | IEC IP65 |
| | | | 11 to 56 ms | | |
| | — | | ≤ 24 ms | | |
| **2 PNP OSSD (Trip /Latch Selectable) See page 108 for controller** | — | Optional Accessory (see page 123) | 13 ms See page 108 for controller | Black aluminum housing, tempered glass window | IEC IP65 |
| | | | | **12 mm threaded barrel:** Black polycarbonate plastic housing **30 mm threaded barrel:** Stainless steel housing, glass window. | IEC IP67 |
| — | Reduced Resolution (floating) 1- or 2-beam & Fixed | — | < 38 ms (< 48 ms for muting) | Aluminum housing with yellow polyester powder finish or nickel-plated ESD | IEC IP65 |
| **2 NO (Trip or Latch)** | | Yes | | Welded steel box with black polyester powder paint finish | IEC IP64 |
| **2 or 4 NO (Trip or Latch)** | | Optional Accessory (see page 123) | | Gray polycarbonate | IEC IP20 |
| — | Reduced Resolution (floating) 1- or 2-beam & Fixed | — | < 48 to < 72 ms (< 58 to < 82 ms for muting) | Aluminum housing with black anodized or yellow polyester painted finish | IEC IP65 |
| **2 NO (Trip or Latch)** | | Yes | | Welded steel box with black polyester powder paint finish | IEC IP64 |
| | | Optional Accessory (see page 123) | | Gray polycarbonate | IEC IP20 |
| **2 PNP OSSD (Trip or Latch)** | — | Optional Accessory (see page 123) | 11 to 25 ms | Aluminum housing with yellow polyester powder finish | IEC IP65 |

# EZ-SCREEN®
## Safety Light Screens

- Simple, two-piece integrated system has no control box.
- High-resolution 14 and 30 mm EZ-SCREEN® point-of-operation systems provide finger, hand and ankle detection.
- EZ-SCREEN Point and Grid systems allow one-, two-, three- or four-beam perimeter and access guarding.
- Superior optical design and finely focused ±2.5° beam make systems extremely easy to align and maintain.
- Status indicators and diagnostics show when alignment is complete and if there are problems with the installation.
- Redundant microprocessor-controlled, self-checking design exceeds control reliability requirements and is certified per CE (Type 4/Category 4) and cULus (NIPF, UL 61496, UL 1998).
- Unique cascading models (patent-pending) allow up to four systems of any length and resolution to be wired together to form a single safety device.
- Systems have ranges up to 70 m, with power and range for all types of applications including long-range perimeter guarding.

QD CABLES 8-Pin Euro + 3- & 8-Pin Mini PAGE 176
INDICATORS PAGE 187
BRACKETS PAGE 190
MIRRORS PAGE 204
STANDS PAGE 209
LENS SHIELDS PAGE 213
ENCLOSURES PAGE 216

### A complete family of machine guarding products.





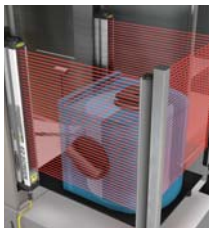

**Point of operation.**
- Finger, hand or ankle detection at the point of operation.
- Use 14 or 30 mm EZ-SCREEN.

**Area.**
- Mount horizontally to eliminate safety mats and area scanners.
- Manually reset Latch output when area is clear.

**Perimeter.**
- Guard mulitple sides of a dangerous area up to 70 m long.
- Expand guarding with optional corner mirrors and mounting stands.

**Long-range single sided.**
- EZ-SCREEN Grid systems provide 2, 3 or 4 beams.
- Beam spacing is from 300 to 584 mm.

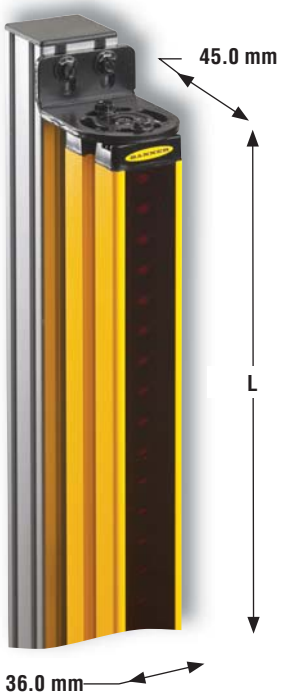
**Single point access.**
- Use with angled mirrors to simulate a 2-beam system.
- Use multiple units for custom beam patterns.



**ESD applications.**
- Dissipate electrostatic discharges.
- Ideal for microelectronic applications.

# EZ-SCREEN® Systems

- *7-segment diagnostic display*
- *Blocked beam zone indicators*
- *System status and system reset status*
- *Integral or pigtail Euro-style QD connection*
- *Durable aluminum housing to resist twisting*
- *Metal end caps for added durability*
- *User configurable trip or latch outputs and Scan Code 1 or 2*
- *Fixed or 2-beam reduced resolution (floating) blanking*
- *EDM input and optional TEST** function*




**EZ-SCREEN Systems**

MORE INFO ONLINE Detailed Dimensions

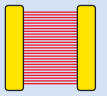
**Full View of Available Finishes**

**Yellow Painted Aluminum**

**Nickel-Plated ESD**

## EZ-SCREEN® Systems, 14 mm Resolution

MORE INFO ONLINE Download PDF

| Models* | Resolution | Range | Defined Area | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time | Connec-tion** | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
| **SLSP14-150Q88†**<br>**SLSE14-150Q8**<br>**SLSR14-150Q8** |  <br>14 mm Resolution | 0.1 to 6 m | 150 mm | 262 mm | 24V dc | **2 PNP OSSD** | ≤ 11 ms | 8-pin Euro QD | 112852 |
| **SLSP14-300Q88†**<br>**SLSE14-300Q8**<br>**SLSR14-300Q8** | | | 300 mm | 372 mm | | | ≤ 15 ms | | |
| **SLSP14-450Q88†**<br>**SLSE14-450Q8**<br>**SLSR14-450Q8** | | | 450 mm | 522 mm | | | ≤ 19 ms | | |
| **SLSP14-600Q88†**<br>**SLSE14-600Q8**<br>**SLSR14-600Q8** | | | 600 mm | 671 mm | | | ≤ 23 ms | | |
| **SLSP14-750Q88†**<br>**SLSE14-750Q8**<br>**SLSR14-750Q8** | | | 750 mm | 821 mm | | | ≤ 27 ms | | |
| **SLSP14-900Q88†**<br>**SLSE14-900Q8**<br>**SLSR14-900Q8** | | | 900 mm | 971 mm | | | ≤ 32 ms | | |
| **SLSP14-1050Q88†**<br>**SLSE14-1050Q8**<br>**SLSR14-1050Q8** | | | 1050 mm | 1120 mm | | | ≤ 36 ms | | |

 14 mm Resolution

* Nickel-plated emitters and receivers used for ESD safe applications are available by adding "N" in the model number (example, **SLSE14-150NQ8**).

** 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 300 mm Euro pigtail QD, replace "Q" with "P" in models numbers (example, **SLSP14-150P88**). A model with a QD requires a mating cable (see page 176).

† A pair includes an emitter and receiver (example, **SLSP14-150Q88**). Emitters (example, **SLSE14-150Q8**) and receivers (example, **SLSR14-150Q8**) are also sold separately.

## EZ-SCREEN® Systems, 14 mm Resolution (cont'd)

| Models* | Resolution | Range | Defined Area | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time | Connection** | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
| SLSP14-1200Q88†<br>SLSE14-1200Q8<br>SLSR14-1200Q8 |  <br>14 mm Resolution | 0.1 to 6 m | 1200 mm | 1270 mm | 24V dc | 2 PNP OSSD | ≤ 40 ms | 8-pin Euro QD | 112852 |
| SLSP14-1350Q88†<br>SLSE14-1350Q8<br>SLSR14-1350Q8 | | | 1350 mm | 1420 mm | | | ≤ 43 ms | | |
| SLSP14-1500Q88†<br>SLSE14-1500Q8<br>SLSR14-1500Q8 | | | 1500 mm | 1569 mm | | | ≤ 48 ms | | |
| SLSP14-1650Q88†<br>SLSE14-1650Q8<br>SLSR14-1650Q8 | | | 1650 mm | 1719 mm | | | ≤ 52 ms | | |
| SLSP14-1800Q88†<br>SLSE14-1800Q8<br>SLSR14-1800Q8 | | | 1800 mm | 1869 mm | | | ≤ 56 ms | | |

## EZ-SCREEN® Systems, 30 mm Resolution

| Models* | Resolution | Range | Defined Area | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time | Connection** | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
| SLSP30-150Q88†<br>SLSE30-150Q8<br>SLSR30-150Q8 |  <br>30 mm Resolution | 0.1 to 18 m | 150 mm | 262 mm | 24V dc | 2 PNP OSSD | ≤ 9 ms | 8-pin Euro QD | 112852 |
| SLSP30-300Q88†<br>SLSE30-300Q8<br>SLSR30-300Q8 | | | 300 mm | 372 mm | | | ≤ 11 ms | | |
| SLSP30-450Q88†<br>SLSE30-450Q8<br>SLSR30-450Q8 | | | 450 mm | 522 mm | | | ≤ 13 ms | | |
| SLSP30-600Q88†<br>SLSE30-600Q8<br>SLSR30-600Q8 | | | 600 mm | 671 mm | | | ≤ 15 ms | | |
| SLSP30-750Q88†<br>SLSE30-750Q8<br>SLSR30-750Q8 | | | 750 mm | 821 mm | | | ≤ 17 ms | | |

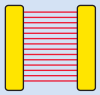
 14 mm Resolution  30 mm Resolution

* Nickel-plated emitters and receivers used for ESD safe applications are available by adding "N" in the model number (example, **SLSE14-1200NQ8**).

** For an emitter with TEST function, replace Q8 with Q5 on emitter model numbers (example, **SLSE14-1200Q5**) and Q88 with Q85 on pair model numbers (example, **SLSP14-1200Q85**). For a 300 mm Euro pigtail QD, replace "Q" with "P" in models numbers (example, **SLSP14-1200P88**). A model with a QD requires a mating cable (see page 176).

† A pair includes an emitter and receiver (example, **SLSP14-1200Q88**). Emitters (example, **SLSE14-1200Q8**) and receivers (example, **SLSR14-1200Q8**) are also sold separately.

# EZ-SCREEN® Systems, 30 mm Resolution (cont'd)

| Models* | Resolution | Range | Defined Area | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time | Connec-tion** | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
| **SLSP30-900Q88†**<br>**SLSE30-900Q8**<br>**SLSR30-900Q8** |  <br>30 mm Resolution | 0.1 to 18 m | 900 mm | 971 mm | 24V dc | **2 PNP OSSD** | ≤ 19 ms | 8-pin Euro QD | 112852 |
| **SLSP30-1050Q88†**<br>**SLSE30-1050Q8**<br>**SLSR30-1050Q8** | | | 1050 mm | 1120 mm | | | ≤ 21 ms | | |
| **SLSP30-1200Q88†**<br>**SLSE30-1200Q8**<br>**SLSR30-1200Q8** | | | 1200 mm | 1270 mm | | | ≤ 23 ms | | |
| **SLSP30-1350Q88†**<br>**SLSE30-1350Q8**<br>**SLSR30-1350Q8** | | | 1350 mm | 1420 mm | | | ≤ 25 ms | | |
| **SLSP30-1500Q88†**<br>**SLSE30-1500Q8**<br>**SLSR30-1500Q8** | | | 1500 mm | 1569 mm | | | ≤ 27 ms | | |
| **SLSP30-1650Q88†**<br>**SLSE30-1650Q8**<br>**SLSR30-1650Q8** | | | 1650 mm | 1719 mm | | | ≤ 30 ms | | |
| **SLSP30-1800Q88†**<br>**SLSE30-1800Q8**<br>**SLSR30-1800Q8** | | | 1800 mm | 1869 mm | | | ≤ 32 ms | | |

 30 mm Resolution

* Nickel-plated emitters and receivers used for ESD safe applications are available by adding "N" in the model number (example, **SLSE30-900NQ8**).

** For an emitter with TEST function, replace Q8 with Q5 on emitter model numbers (example, **SLSE30-900Q5**) and Q88 with Q85 on pair model numbers (example, **SLSP30-900Q85**). For a 300 mm Euro pigtail QD, replace "Q" with "P" in models numbers (example, **SLSP30-900P88**). A model with a QD requires a mating cable (see page 176).

† A pair includes an emitter and receiver (example, **SLSP30-900Q88**). Emitters (example, **SLSE30-900Q8**) and receivers (example, **SLSR14-900Q8**) are also sold separately.

# EZ-SCREEN® Cascade Systems, 14 mm Resolution

| Models* | Resolution | Range | Defined Area | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time** | Connection*** | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
| **SLSCP14-300Q88†**<br>**SLSCE14-300Q8**<br>**SLSCR14-300Q8** |  <br>14 mm Resolution | 0.1 to 6 m | 300 mm | 372 mm | 24V dc | **2 PNP OSSD** | ≤ 15 ms | 8-pin Euro QD | 112852 |
| **SLSCP14-450Q88†**<br>**SLSCE14-450Q8**<br>**SLSCR14-450Q8** | | | 450 mm | 522 mm | | | ≤ 19 ms | | |
| **SLSCP14-600Q88†**<br>**SLSCE14-600Q8**<br>**SLSCR14-600Q8** | | | 600 mm | 671 mm | | | ≤ 23 ms | | |
| **SLSCP14-750Q88†**<br>**SLSCE14-750Q8**<br>**SLSCR14-750Q8** | | | 750 mm | 821 mm | | | ≤ 27 ms | | |
| **SLSCP14-900Q88†**<br>**SLSCE14-900Q8**<br>**SLSCR14-900Q8** | | | 900 mm | 971 mm | | | ≤ 32 ms | | |
| **SLSCP14-1050Q88†**<br>**SLSCE14-1050Q8**<br>**SLSCR14-1050Q8** | | | 1050 mm | 1120 mm | | | ≤ 36 ms | | |
| **SLSCP14-1200Q88†**<br>**SLSCE14-1200Q8**<br>**SLSCR14-1200Q8** | | | 1200 mm | 1270 mm | | | ≤ 40 ms | | |
| **SLSCP14-1350Q88†**<br>**SLSCE14-1350Q8**<br>**SLSCR14-1350Q8** | | | 1350 mm | 1420 mm | | | ≤ 43 ms | | |
| **SLSCP14-1500Q88†**<br>**SLSCE14-1500Q8**<br>**SLSCR14-1500Q8** | | | 1500 mm | 1569 mm | | | ≤ 48 ms | | |
| **SLSCP14-1650Q88†**<br>**SLSCE14-1650Q8**<br>**SLSCR14-1650Q8** | | | 1650 mm | 1719 mm | | | ≤ 52 ms | | |
| **SLSCP14-1800Q88†**<br>**SLSCE14-1800Q8**<br>**SLSCR14-1800Q8** | | | 1800 mm | 1869 mm | | | ≤ 56 ms | | |

 14 mm Resolution

* Nickel-plated emitters and receivers used for ESD safe applications are available by adding "N" in the model number (example, **SLSCE14-300NQ8**).

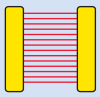
** **Cascading system response time:** To the response time of the slowest pair, add 2 ms for each additional pair. Example: slowest pair's response time is 15 ms, and the system has three additional pairs (four pairs total), so the system maximum response time is 15 ms + 6 ms (3 pairs x 2 ms) = 21 ms.

*** For an emitter with TEST function, replace Q8 with Q5 on emitter model numbers (example, **SLSCE14-300Q5**) and Q88 with Q85 on pair model numbers (example, **SLSCP14-300Q85**). For a 300 mm Euro pigtail QD, replace "Q" with "P" in models numbers (example, **SLSCP14-300P88**). A model with a QD requires a mating cable (see page 176).

† A pair includes an emitter and receiver (example, **SLSCP14-300Q88**). Emitters (example, **SLSCE14-300Q8**) and receivers (example, **SLSCR14-300Q8**) are also sold separately.

# EZ-SCREEN® Cascade Systems, 30 mm Resolution

MORE INFO ONLINE Download PDF

| Models* | Resolution | Range | Defined Area | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time** | Connec-tion*** | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
| **SLSCP30-300Q88†**<br>**SLSCE30-300Q8**<br>**SLSCR30-300Q8** |  <br>30 mm Resolution | 0.1 to 18 m | 300 mm | 372 mm | 24V dc | **2 PNP OSSD** | ≤ 11 ms | 8-pin Euro QD | 112852 |
| **SLSCP30-450Q88†**<br>**SLSCE30-450Q8**<br>**SLSCR30-450Q8** | | | 450 mm | 522 mm | | | ≤ 13 ms | | |
| **SLSCP30-600Q88†**<br>**SLSCE30-600Q8**<br>**SLSCR30-600Q8** | | | 600 mm | 671 mm | | | ≤ 15 ms | | |
| **SLSCP30-750Q88†**<br>**SLSCR30-750Q8**<br>**SLSCR30-750Q8** | | | 750 mm | 821 mm | | | ≤ 17 ms | | |
| **SLSCP30-900Q88†**<br>**SLSCE30-900Q8**<br>**SLSCR30-900Q8** | | | 900 mm | 971 mm | | | ≤ 19 ms | | |
| **SLSCP30-1050Q88†**<br>**SLSCE30-1050Q8**<br>**SLSCR30-1050Q8** | | | 1050 mm | 1120 mm | | | ≤ 21 ms | | |
| **SLSCP30-1200Q88†**<br>**SLSCE30-1200Q8**<br>**SLSCR30-1200Q8** | | | 1200 mm | 1270 mm | | | ≤ 23 ms | | |
| **SLSCP30-1350Q88†**<br>**SLSCE30-1350Q8**<br>**SLSCR30-1350Q8** | | | 1350 mm | 1420 mm | | | ≤ 25 ms | | |
| **SLSCP30-1500Q88†**<br>**SLSCE30-1500Q8**<br>**SLSCR30-1500Q8** | | | 1500 mm | 1569 mm | | | ≤ 27 ms | | |
| **SLSCP30-1650Q88†**<br>**SLSCE30-1650Q8**<br>**SLSCR30-1650Q8** | | | 1650 mm | 1719 mm | | | ≤ 30 ms | | |
| **SLSCP30-1800Q88†**<br>**SLSCE30-1800Q8**<br>**SLSCR30-1800Q8** | | | 1800 mm | 1869 mm | | | ≤ 32 ms | | |

 30 mm Resolution

* Nickel-plated emitters and receivers used for ESD safe applications are available by adding "N" in the model number (example, **SLSCE30-300NQ8**).

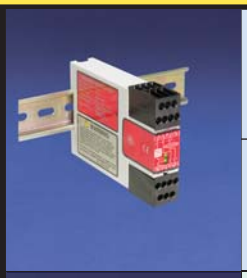
** **Cascading system response time:** To the response time of the slowest pair, add 2 ms for each additional pair. Example: slowest pair's response time is 15 ms, and the system has three additional pairs (four pairs total), so the system maximum response time is 15 ms + 6 ms (3 pairs x 2 ms) = 21 ms.

*** For an emitter with TEST function, replace Q8 with Q5 on emitter model numbers (example, **SLSCE30-300Q5**) and Q88 with Q85 on pair model numbers (example, **SLSCP30-300Q85**). For a 300 mm Euro pigtail QD, replace "Q" with "P" in models numbers (example, **SLSCP30-300P88**). A model with a QD requires a mating cable (see page 176).

† A pair includes an emitter and receiver (example, **SLSCP30-300Q88**). Emitters (example, **SLSCE30-300Q8**) and receivers (example, **SLSCR30-300Q8**) are also sold separately.

# EZ-SCREEN® Interfacing Products

MORE INFO ONLINE Download PDF

| Models | | Description | Product Information | Data Sheet |
|---|---|---|---|---|
| Interface Modules |  | **IM-T-9A** (3 NO)<br>**IM-T-11A** (2 NO/1 NC) | • Interface modules provide two or three normally open force-guided relay outputs rated at 6 A.<br>• EZ-SCREEN monitors these interface modules when they are connected to the EZ-SCREEN External Device Monitoring (EDM) inputs.<br>• Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included. | Page 132 | 62822 |
| Muting Modules |  | **MM-TA-12B**<br>**MMD-TA-12B**<br>**MMD-TA-11B** | • The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery.<br>• The module uses redundant microcontroller-based logic. | Page 123 | 63517<br>116390 |
| Receiver AC Interface Boxes |  | **EZAC-R9-QE8**<br>**EZAC-R11-QE8**<br>**EZAC-R15A-QE8-QS83**<br>**EZAC-R8N-QE8-QS53**<br>**EZAC-R10N-QE8-QS53** | • Versatile power supplies allow EZ-SCREEN systems to connect to AC power sources.<br>• Models are available to accommodate receivers only, emitters only, or both.<br>• Receiver models include 8 amp safety relay output. | Page 184 | 120321 |
| Emitter AC Interface Boxes |  | **EZAC-E-QE8**<br>**EZAC-E-QE5**<br>**EZAC-E-QE8-QS3**<br>**EZAC-E-QE5-QS5** | | | |
| Contactors |  | **Mechanically Linked Contactors**<br>**11-BG00-31-D-024**<br>**11-BF16C01-024**<br>**Aux. Contacts**<br>**11-BGX10-40**<br>**11-G484-30**<br>**Suppressors**<br>**11-BGX77-048**<br>**11-G318-48** | • Pairs of contactors create safety stop circuits with two normally open contacts in series.<br>• EZ-SCREEN can monitor the circuit because of the contacts' force-guided mechanically linked design.<br>• Contactors add 10 or 16 amp current carrying capability to any safety system.<br>• Auxiliary contacts add 3 or 4 normally open contacts.<br>• Suppressors extend the life of an actuating device that uses a contactor.<br>• Modular design simplifies assembly and installation. | Page 186 | 111881 |

# EZ-SCREEN® 14 & 30 mm Resolution Kits

You can purchase a kit that contains an emitter and receiver of equal length and resolution; brackets; and optional interfacing solution and quick-disconnect cables. Detailed information about individual kit components is as follows.


- Emitter and Receivers . . . . . Page 21
- Interfacing Options . . . . . 26
- Cables . . . . . 176
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Sensor Housing: Yellow | Sensor Housing: Nickel-Plated | Cascading | Protected Height | Resolution | Range | Supply Voltage | No. of Outputs | Output Options | Emitter & Receiver Connection | Interfacing Options | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SLSK14-600Q88-1RE25 | • | | No | 600 mm | 14 mm | 6 m | 24V dc | 2 OSSD | Trip/ Latch Select-able | Integral Euro QD without Test | IM-T-9A, 1 each | 8 m, 2 each |
| SLSK30-600Q88-1RE25 | | | | | 30 mm | 18 m | | | | | | |
| SLSK14-600NQ88-1RE25 | | • | | | 14 mm | 6 m | | | | | | |
| SLSK30-600NQ88-1RE25 | | | | | 30 mm | 18 m | | | | | | |
| SLSCK14-600Q88-1RE25 | • | | Yes* | | 14 mm | 6 m | | | | | | |
| SLSCK30-600Q88-1RE25 | | | | | 30 mm | 18 m | | | | | | |
| SLSCK14-600NQ88-1RE25 | | • | | | 14 mm | 6 m | | | | | | |
| SLSCK30-600NQ88-1RE25 | | | | | 30 mm | 18 m | | | | | | |

* For cascading systems, order one kit; up to three additional emitter/receiver pairs; and two double-ended cables per additional emitter/receiver pair. Opposed pairs must be the same length and resolution (see page 24).

# Kit Model Key

| Model Style | Kit | Resolution | | Protected Height | Finish | QD Options | | Interfacing Options | QD Cabling Length Options |
|---|---|---|---|---|---|---|---|---|---|
| S L S | K | 1 4 | — | 6 0 0 | | Q 8 8 | — | 1 | R E 2 5 |

**Model Style**
- **SLS** = Safety Light Screen
- **SLSC** = Cascading Safety Light Screen

**Kit**
- **K** = Kit

**SLS Resolution**
- **14** = 14 mm
- **30** = 30 mm

**Protected Height**
- 150 mm
- 300 mm
- 450 mm
- 600 mm
- 750 mm
- 900 mm
- 1050 mm
- 1200 mm
- 1350 mm
- 1500 mm
- 1650 mm
- 1800 mm

**Sensor Finish**
- **Blank** = Yellow powder coat
- **N** = Nickel plated ESD

**Receiver & Emitter QD Options**
- **Q85** = Receiver with integral 8-pin Euro-style QD; Emitter with integral 5-pin Euro-style QD with Test
- **Q88** = Receiver with integral 8-pin Euro-style QD; Emitter with integral 8-pin Euro-style QD
- **P85** = Receiver with integral 8-pin Euro-style pigtail QD; Emitter with integral 5-pin Euro-style pigtail QD with Test
- **P88** = Receiver with integral 8-pin Euro-style pigtail QD; Emitter with integral 8-pin Euro-style pigtail QD

**Interfacing Options**
- **1** = IM-T-9A Interface Module, 1 each
- **2** = IM-T-11A Interface Module, 1 each
- **3** = 11-BG00-31-D-024 Contactors (10A), 2 each
- **4** = 11-BF16C01-024 Contactors (16A), 2 each
- **5** = EZAC-R9-QE8 = AC Interface Box (3 NO), 1 each
- **6** = EZAC-R11-QE8 = AC Interface Box (2 NO/1 NC), 1 each

**QD Cabling Length Options**
- **RE15** = 5 m, 2 each
- **RE25** = 8 m, 2 each
- **R15E25** = 5 m (Receiver) & 8 m (Emitter)
- **R25E15** = 8 m (Receiver) & 5 m (Emitter)
- **RE50** = 15 m, 2 each
- **R15E50** = 5 m (Receiver) & 15 m (Emitter)
- **R50E15** = 15 m (Receiver) & 5 m (Emitter)
- **R25E50** = 8 m (Receiver) & 15 m (Emitter)
- **R50E25** = 15 m (Receiver) & 8 m (Emitter)
- **RE75** = 23 m, 2 each
- **RE100** = 30 m, 2 each

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

# EZ-SCREEN® Grid & Point Systems

- *One to four beam models for access or perimeter guarding applications*
- *Range from 0.8 to 20 m or 15 to 70 m, depending on model*
- *7-segment diagnostic display*
- *Bi-color status indicator*
- *IEC 61496-1 Type 4*
- *User configurable trip or latch outputs and Scan Code 1 or 2*
- *Configuration access port*
- *Models with integral Mini and Euro QD, or wiring terminal chamber*
- *QD cables ordered separately (see page 179)*

EZ-SCREEN Grid


EZ-SCREEN Point

MORE INFO ONLINE Detailed Dimensions

Full View


EZ-SCREEN Grid


EZ-SCREEN Point

## EZ-SCREEN® Grid & Point Systems

MORE INFO ONLINE Download PDF

| Models | Beam Spacing | Range | Protected Height | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time | Connection* | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
| **SGP4-300Q83**† | 300 mm | 0.8 to 20 m | 900 mm | 1084 mm | 24V dc | 2 PNP OSSD | ≤ 24 ms | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | 68410 |
| **SGE4-300Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR4-300Q8** | | | | | | | | 8-pin Mini QD | |
| **SGXLP4-300Q83**† | | 15 to 70 m | | | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | |
| **SGXLE4-300Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR4-300Q8** | | | | | | | | 8-pin Mini QD | |
| **SGP3-400Q83**† | 400 mm | 0.8 to 20 m | 800 mm | 984 mm | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | |
| **SGE3-400Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR3-400Q8** | | | | | | | | 8-pin Mini QD | |
| **SGXLP3-400Q83**† | | 15 to 70 m | | | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | |
| **SGXLE3-400Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR3-400Q8** | | | | | | | | 8-pin Mini QD | |

4-Beam Grid  3-Beam Grid

* For emitters and receivers with a wiring terminal chamber, remove the Q3, Q8 or Q83 from the model number (example, **SGE4-300**). For an emitter with TEST function, replace Q3 with Q5 on emitter model numbers (example, **SGE4-300Q5**) and Q83 with Q85 on pair model numbers (example, **SGP4-300Q85**). For emitters and receivers with an 8-pin integral Euro QD, replace Q3 with Q8E on model numbers (example, **SGE4-300Q8E**) and Q83 with Q88E on pair model numbers (example, **SGP4-300Q88E**). A model with a QD requires a mating cable (see page 178).

† A pair includes an emitter and receiver (example, **SGP4-300Q83**). Emitters (example, **SGE4-300Q3**) and receivers (example, **SGR4-300Q8**) are also sold separately.

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

MORE INFO ONLINE Download PDF

| Models | Beam Spacing | Range | Protected Height | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time | Connection* | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
| **SGP3-533Q83†** |  533 mm | 0.8 to 20 m | 1066 mm | 1251 mm | 24V dc | **2 PNP OSSD** | ≤ 24 ms | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | 68410 |
| **SGE3-533Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR3-533Q8** | | | | | | | | 8-pin Mini QD | |
| **SGXLP3-533Q83†** | | 15 to 70 m | | | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | |
| **SGXLE3-533Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR3-533Q8** | | | | | | | | 8-pin Mini QD | |
| **SGP2-500Q83†** |  500 mm | 0.8 to 20 m | 500 mm | 684 mm | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | |
| **SGE2-500Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR2-500Q8** | | | | | | | | 8-pin Mini QD | |
| **SGXLP2-500Q83†** | | 15 to 70 m | | | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | |
| **SGXLE2-500Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR2-500Q8** | | | | | | | | 8-pin Mini QD | |
| **SGP2-584Q83†** |  584 mm | 0.8 to 20 m | 584 mm | 768 mm | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | |
| **SGE2-584Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR2-584Q8** | | | | | | | | 8-pin Mini QD | |
| **SGXLP2-584Q83†** | | 15 to 70 m | | | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | |
| **SGXLE2-584Q3** | | | | | | | | 3-pin Mini QD | |
| **SGR2-584Q8** | | | | | | | | 8-pin Mini QD | |
| **SPP1Q83†** |  1-BEAM | 0.8 to 20 m | N/A | 149 mm | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | 68413 |
| **SPE1Q3** | | | | | | | | 3-pin Mini QD | |
| **SPR1Q8** | | | | | | | | 8-pin Mini QD | |
| **SPXLP1Q83†** | | 15 to 70 m | | | | | | Emitter, 3-pin Mini QD Receiver, 8-pin Mini QD | |
| **SPXLE1Q3** | | | | | | | | 3-pin Mini QD | |
| **SPR1Q8** | | | | | | | | 8-pin Mini QD | |

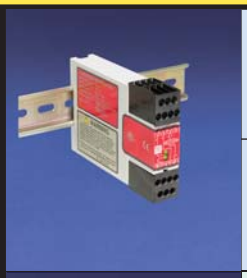
3-Beam Grid 2-Beam Grid 1-Beam Point

** For emitters and receivers with a wiring terminal chamber, remove the Q3, Q8 or Q83 from the model number (example, **SGE3-533**). For an emitter with TEST function, replace Q3 with Q5 on emitter model numbers (example, **SGE3-533Q5**) and Q83 with Q85 on pair model numbers (example, **SGP3-533Q85**). For emitters and receivers with an 8-pin integral Euro QD, replace Q3 with Q8E on model numbers (example, **SGE3-533Q8E**) and Q83 with Q88E on pair model numbers (example, **SGP3-533Q88E**). A model with a QD requires a mating cable (see page 178).

† A pair includes an emitter and receiver (example, **SGP3-533Q83**). Emitters (example, **SGE3-533Q3**) and receivers (example, **SGR3-533Q8**) are also sold separately.

# EZ-SCREEN® Grid & Point Interfacing Products

MORE INFO ONLINE Download PDF

| | | Models | Description | Product | Data Sheet |
|---|---|---|---|---|---|
| Interface Modules |  | **IM-T-9A** (3 NO)<br>**IM-T-11A** (2 NO/1 NC) | • Interface modules provide two or three normally open force-guided relay outputs rated at 6 A.<br>• EZ-SCREEN monitors these interface modules when they are connected to the EZ-SCREEN External Device Monitoring (EDM) inputs.<br>• Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included. | Page 132 | 62822 |
| Muting Modules |  | **MM-TA-12B**<br>**MMD-TA-12B**<br>**MMD-TA-11B** | • The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery.<br>• The module uses redundant microcontroller-based logic. | Page 123 | 63517<br>116390 |
| Receiver AC Interface Boxes |  | **EZAC-R9-QE8**<br>**EZAC-R11-QE8**<br>**EZAC-R15A-QE8-QS83**<br>**EZAC-R8N-QE8-QS53**<br>**EZAC-R10N-QE8-QS53** | • Versatile power supplies allow EZ-SCREEN systems to connect to AC power sources.<br>• Models are available to accommodate receivers only, emitters only, or both.<br>• Receiver models include 8 amp safety relay output. | Page 184 | 120321 |
| Emitter AC Interface Boxes |  | **EZAC-E-QE8**<br>**EZAC-E-QE5**<br>**EZAC-E-QE8-QS3**<br>**EZAC-E-QE5-QS5** | | | |
| Contactors |  | **Mechanically Linked Contactors**<br>**11-BG00-31-D-024**<br>**11-BF16C01-024**<br>**Aux. Contacts**<br>**11-BGX10-40**<br>**11-G484-30**<br>**Suppressors**<br>**11-BGX77-048**<br>**11-G318-48** | • Pairs of contactors create safety stop circuits with two normally open contacts in series.<br>• EZ-SCREEN can monitor the circuit because of the contacts' force-guided mechanically linked design.<br>• Contactors add 10 or 16 amp current carrying capability to any safety system.<br>• Auxiliary contacts add 3 or 4 normally open contacts.<br>• Suppressors extend the life of an actuating device that uses a contactor.<br>• Modular design simplifies assembly and installation. | Page 186 | 111881 |

# EZ-SCREEN® Grid Kits

You can purchase a kit that contains an emitter and receiver of equal length and beam spacing; brackets; and optional interfacing solution and quick-disconnect cables. Detailed information about individual kit components is as follows.


- Emitter and Receivers . . . . . Page 28
- Interfacing Options. . . . . 30
- Cables . . . . . 178 & 179
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Beams | Beam Spacing | Protected Height | Range | Supply Voltage | No. of Outputs | Output Options | Emitter & Receiver Connection | Interfacing Options | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|---|
| SGK4-300Q83-1RE25 | 4 | 300 mm | 900 mm | 20 m | 24V dc | 2 OSSD | Trip/Latch Selectable | Integral Mini QD without Test | IM-T-9A, 1 each | 8 m, 2 each |
| SGXLK4-300Q83-1RE25 | | | | 70 m | | | | | | |
| SGK3-400Q83-1RE25 | 3 | 400 mm | 800 mm | 20 m | | | | | | |
| SGXLK3-400Q83-1RE25 | | | | 70 m | | | | | | |
| SGK3-533Q83-1RE25 | | 533 mm | 1066 mm | 20 m | | | | | | |
| SGXLK3-533Q83-1RE25 | | | | 70 m | | | | | | |
| SGK2-500Q83-1RE25 | 2 | 500 mm | 500 mm | 20 m | | | | | | |
| SGXLK2-500Q83-1RE25 | | | | 70 m | | | | | | |
| SGK2-584Q83-1RE25 | | 584 mm | 584 mm | 20 m | | | | | | |
| SGXLK2-584Q83-1RE25 | | | | 70 m | | | | | | |

# Kit Model Key

| Model Style | Kit | No. of Beams | | Beam Spacing | QD Options | | Interfacing Options | QD Cabling Length Options |
|---|---|---|---|---|---|---|---|---|
| S G | K | 4 | — | 3 0 0 | Q 8 3 | — | 1 | R E 2 5 |

**Model Style**
- **SG** = Safety Grid
- **SGXL** = Safety Grid Long Range

**Kit**
- **K** = Kit

**No. of Beams**
- **2** = two beams
- **3** = three beams
- **4** = four beams

**Beam Spacing**
- 300 mm
- 400 mm
- 500 mm
- 533 mm
- 584 mm

**Receiver & Emitter QD Options**
- **Blank** = Receiver and emitter with wiring terminal chamber
- **Q85** = Receiver with integral 8-pin Mini-style QD Emitter with integral 5-pin Mini-style QD with Test
- **Q83** = Receiver with integral 8-pin Mini-style QD Emitter with integral 3-pin Mini-style QD
- **Q88E** = Receiver and emitter with integral 8-pin Euro-style QD

**Interfacing Options**
- **1** = IM-T-9A Interface Module, 1 each
- **2** = IM-T-11A Interface Module, 1 each
- **3** = 11-BG00-31-D-024 Contactors (10A), 2 each
- **4** = 11-BF16C01-024 Contactors (16A), 2 each

**QD Cabling Length Options**
- **RE15** = 5 m, 2 each
- **RE25** = 8 m, 2 each
- **R15E25** = 5 m (Receiver) & 8 m (Emitter)
- **R25E15** = 8 m (Receiver) & 5 m (Emitter)
- **RE50** = 15 m, 2 each
- **R15E50** = 5 m (Receiver) & 15 m (Emitter)
- **R50E15** = 15 m (Receiver) & 5 m (Emitter)
- **R25E50** = 8 m (Receiver) & 15 m (Emitter)
- **R50E25** = 15 m (Receiver) & 8 m (Emitter)
- **RE75** = 23 m, 2 each
- **RE100** = 30 m, 2 each

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

# EZ-SCREEN® Point Kits

You can purchase a kit that contains an emitter and receiver of equal length; brackets; and optional interfacing solution and quick-disconnect cables. Detailed information about individual kit components is as follows.


- Emitter and Receivers . . . . . Page 28
- Interfacing Options. . . . . 30
- Cables . . . . . 178 & 179
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Beams | Beam Spacing | Range | Supply Voltage | No. of Outputs | Output Options | Emitter & Receiver Connection | Interfacing Options | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|
| SPK1-Q83-1RE25 | 1 | N/A | 20 m | 24V dc | 2 OSSD | Trip/Latch Selectable | Integral Mini QD without Test | IM-T-9A, 1 each | 8 m, 2 each |
| SPXLK1-Q83-1RE25 | | | 70 m | | | | | | |

# Kit Model Key

| Model Style | Kit | No. of Beams | | QD Options | | Interfacing Options | | QD Cabling Length Options |
|---|---|---|---|---|---|---|---|---|
| S P | K | 1 | — | Q 8 3 | — | 1 | | R E 2 5 |

**Model Style**
- **SP** = Safety Point
- **SPXL** = Safety Point Long Range

**Kit**
- **K** = Kit

**No. of Beams**
- **1** = one beam

**Receiver & Emitter QD Options**
- **Blank** = Receiver and emitter with wiring terminal chamber
- **Q85** = Receiver with integral 8-pin Mini-style QD Emitter with integral 5-pin Mini-style QD with Test
- **Q83** = Receiver with integral 8-pin Mini-style QD Emitter with integral 3-pin Mini-style QD
- **Q88E** = Receiver and emitter with integral 8-pin Euro-style QD

**QD Cabling Length Options**
- **RE15** = 5 m, 2 each
- **RE25** = 8 m, 2 each
- **R15E25** = 5 m (Receiver) & 8 m (Emitter)
- **R25E15** = 8 m (Receiver) & 5 m (Emitter)
- **RE50** = 15 m, 2 each
- **R15E50** = 5 m (Receiver) & 15 m (Emitter)
- **R50E15** = 15 m (Receiver) & 5 m (Emitter)
- **R25E50** = 8 m (Receiver) & 15 m (Emitter)
- **R50E25** = 15 m (Receiver) & 8 m (Emitter)
- **RE75** = 23 m, 2 each
- **RE100** = 30 m, 2 each

**Interfacing Options**
- **1** = IM-T-9A Interface Module, 1 each
- **2** = IM-T-11A Interface Module, 1 each
- **3** = 11-BG00-31-D-024 Contactors (10A), 2 each
- **4** = 11-BF16C01-024 Contactors (16A), 2 each

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model numbers.

# EZ-SCREEN® 14 & 30 mm Resolution Specifications

| | |
|---|---|
| **Supply Voltage at the Device*** | 24V dc ±15% (SELV), ± 10% max. ripple |
| **Supply Current** | **Emitter:** 100 mA max.<br>**Receiver:** 275 mA max., exclusive of OSSD1 and OSSD2 loads (up to an additional 0.5A each) |
| **Response Time** | 9 to 56 milleseconds<br>**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 3V 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. (See p/n 112852 for more information.)<br>**High signal:** 10 to 30V dc<br>**Low signal:** 0 to 3V dc<br>**Input current:** 35 mA inrush, 10 mA max. |
| **Wavelength of Emitter Elements** | Infrared LEDs, 950 nm at peak emission |
| **EDM Input** | +24V dc signals from external device contacts can be monitored (one-channel, two-channel or no monitoring) via EDM1 and EDM2 terminals in the receiver. Monitored devices must respond within 200 milliseconds of an output change.<br>**High signal:** 10 to 30V dc at 30 mA typical<br>**Low signal:** 0 to 3V dc<br>**Dropout time:** 200 milliseconds max. |
| **Reset Input** | The Reset input must be high for 0.25 to 2 seconds and then low to reset the receiver.<br>**High signal:** 10 to 30V dc at 30 mA typical<br>**Low signal:** 0 to 3V dc<br>**Closed switch time:** 0.25 to 2 seconds |
| **Safety Outputs** | Two redundant solid-state 24V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.)<br>Capable of the Banner "Safety Handshake".<br>**ON-State voltage:** ≥ Vin-1.5V dc<br>**OFF-State voltage:** 1.2V dc max. (0-1.2V dc)<br>**Max. load capacitance:** 1.0 µF<br>**Max. load inductance:** 10 H<br>**Leakage current:** 0.50 mA maximum<br>**Cable resistance:** 10 Ω maximum<br>**OSSD test pulse width:** 100 to 300 microseconds<br>**OSSD test pulse period:** 5 to 27 milliseconds (varies with number of beams)<br>**Switching current:** 0-0.5 A |
| **Controls and Adjustments** | **Emitter:**<br>**Scan Code selection:** 2-position switch (code 1 or 2). Factory default position is code 1.<br>**Receiver:**<br>**Scan Code selection:** 2-position switch (code 1 or 2). Factory default position is code 1.<br>**Trip/Latch Output selection:** Redundant switches. Factory default position is T (Trip).<br>**EDM/MPCE monitor selection:** 2-position switch selects between 1- or 2-channel monitoring. Factory default position is 2.<br>**Reduced Resolution (2-beam Floating Blanking):** Redundant switches to enable. Factory default is OFF. |
| **Short Circuit Protection** | All inputs and outputs are protected from short circuits to +24V dc or dc common* |
| **Electrical Safety Class (IEC 61140: 1997)** | III |
| **Safety Rating** | Type 4 per IEC 61496-1, -2; Category 4 per ISO 13849-1 (EN 954-1) |
| **Operating Range** | **14 mm models:** 0.1 m to 6 m<br>**30 mm models:** 0.1 m to 18 m<br>Range decreases with use of mirrors and/or lens shields:<br>**Lens shields** – approximately 10% less range per shield.<br>**Glass-surface mirrors** – approximately 8% less range per mirror.<br>See Accessory section for more information on a specific mirror, page 204. |
| **Ambient Light Immunity** | > 10,000 lux at 5° angle of incidence |
| **Effective Aperture Angle (EAA)** | Meets Type 4 requirements per IEC 61496-2, ± 2.5° @ 3 m |

*The external voltage supply must be capable of buffering brief mains interruptions of 20 milliseconds, as specified in IEC/EN 60204-1.

## EZ-SCREEN® 14 & 30 mm Resolution Specifications (cont'd)

| | |
|---|---|
| **Enclosure** | **Materials:** Extruded aluminum housing with yellow polyester powder or nickel-plated finish and well-sealed, rugged die-cast zinc end caps, acrylic lens cover, copolyester access cover<br>**Rating:** IEC IP65 |
| **Operating Conditions** | **Temperature:** 0° to +55° C **Relative humidity:** 95% (non-condensing) |
| **Status Indicators** | **Emitter:**<br>**One Bi-color (Red/Green) Status Indicator –** indicates operating mode, Lockout or power OFF condition<br>**7-segment Diagnostic Indicator (1 digit) –** indicates proper operation, scan code or error code<br><br>**Receiver:**<br>**Yellow Reset Indicator –** indicates whether system is ready for operation or requires a reset<br>**Bi-Color (Red/Green) Status Indicator –** indicates general system and output status<br>**Bi-Color (Red/Green) Zone Status Indicators –** indicates condition (clear or blocked beam) of a defined group of beams<br>**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 systems 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). |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | WD001, WD002, WD003, WD004, WD009, WD010, WD011, WD012, WD013, WD014, WD015, WD016 (pp. 246-254) |

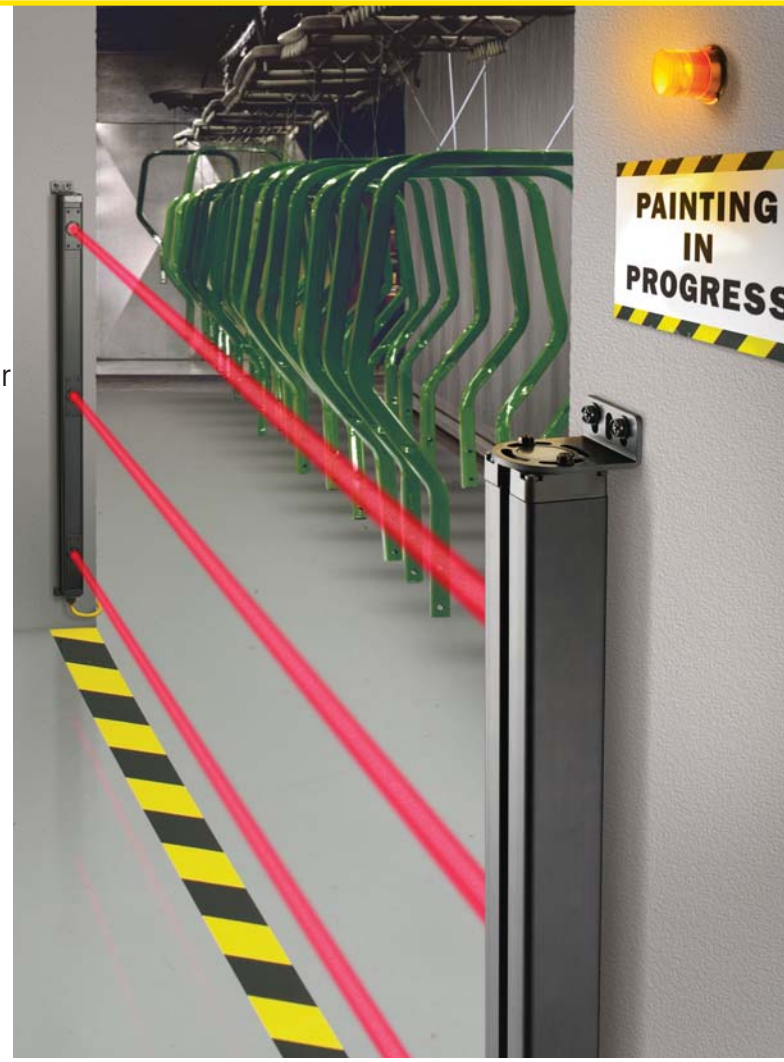
## EZ-SCREEN® Grid & Point Specifications

| | |
|---|---|
| **Supply Voltage (V in)** | 24V dc ±15%, 10% max. ripple |
| **Supply Current** | **Emitter:** 150 mA max.<br>**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 +24V 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 |
| **Safety Rating** | Type 4 per IEC 61496-1, -2; Category 4 per ISO 13849-1 (EN 954-1) |
| **EDM Input** | +24V 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 30V dc at 30 mA) for 0.25 to 2 seconds and then low (less than 3V dc) to reset the receiver. |
| **Remote Test Input** | Test mode is activated either by applying a low signal (less than 3V 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 30V 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. |
| **Safety Outputs** | Two diverse-redundant solid-state 24V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.)<br>**ON-State voltage:** ≥Vin-1.5V dc<br>**OFF-State voltage:** 1.2V dc max.<br>**Max. load resistance:** 1000 ohm<br>**Max. load capacitance:** 0.1 µF |
| **Controls and Adjustments** | **Emitter:**<br>**Scan code selection:** 2-position switch (code 1 or 2). Factory default position is 1.<br>**Receiver:**<br>**Scan code selection:** 2-position switch (code 1 or 2). Factory default position is 1.<br>**Trip/latch output selection:** redundant switches. Factory default position is L (latch)<br>**EDM/MPCE monitor selection:** redundant switches select between 1- or 2-channel monitoring. Factory default position is 2. |

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

| | |
|---|---|
| **Emitter/Receiver Operating Range** | **Short-range models:** 0.8 m to 20 m<br>**Long-range models:** 15 m to 70 m<br>Range decreases with use of mirrors and/or lens shields. |
| **Beam Spacing** | **Model SG...4-300:** 300 mm<br>**Model SG...3-400:** 400 mm<br>**Model SG...2-500:** 500 mm<br>**Model SG...3-533:** 533.4 mm<br>**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<br>**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<br>**Rating:** NEMA 4, 13; IEC 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 and -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**<br>**Dash (–)** = System is OK<br>**Error Codes** = See product manuals (p/n 68410 or 68413) for code definitions and recommended action<br>**Scan code setting** (C1 or C2) = Appears during power-up or after scan code is changed. (Temporary indication; normal display resumes within a few seconds.)<br>**Emitter:** One bi-color (red/green) Status indicator<br>**Green steady** = RUN mode<br>**Green single flashing** = TEST mode<br>**Red single flashing** = Lockout<br>**OFF** = No power to sensor<br><br>**Receiver:** Two System Status indicators, plus one bi-color (red/green) Beam Status indicator for each beam<br>**Yellow Reset Indicator**<br>**ON steady** = RUN mode<br>**Double flashing** = Waiting for manual reset after power-up<br>**Single flashing** = Waiting for manual latch reset<br>**OFF** = No power to sensor or system is not ready for operation<br>**Bi-Color (Red/Green) Status Indicator**<br>**Green steady** = Outputs ON<br>**Red steady** = RUN mode, outputs OFF<br>**Red single flashing** = Lockout<br>**OFF** = No power to sensor or system is not ready for operation<br>**Bi-Color (Red/Green) Beam Status Indicators**<br>**Green steady** = Clear beam, strong signal<br>**Green flickering** = Clear beam, weak signal<br>**Red steady** = Beam blocked<br>**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.; Pg13.5 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. |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | WD005, WD006, WD007, WD008, WD009, WD010, WD011, WD012, WD013, WD014, WD015, WD016 (pp. 248-254) |

# PICO-GUARD™
## Grids & Points




- Fiber optic elements are for use with PICO-GUARD Controllers and fiber optic cables in personnel safety and equipment-protection applications.
- Choices include compact 12 or 30 mm non-contact fiber optic Point elements, or Grid systems for perimeter and access guarding.
- Each fiber optic channel uses one Grid or Point pair (up to 4 pairs per controller).
- Grid system features rugged anodized aluminum construction, with 2, 3 or 4 beams and beam spacing from 300 to 584 mm.
- Each Point or Grid element can function as emitter or receiver, depending on installation.
- 12 mm Point has impact-resistant polycarbonate plastic construction.
- 30 mm Point has robust 304 stainless steel housing with tempered glass lens window.
- Models are available for use with three types of integral plastic optical fiber, in four lengths.
- Environmental rating is IEC IP65 for Grids and IP67 for Points.
- Grids and Points meet Type 4 per IEC 61496-2 and Safety Category 4 per ISO 13849-1 applications when used with a PICO-GUARD controller.
- Multiple mounting bracket options allow easy installation.
- Grid and Points are ATEX and FM approved for use in explosive environments when used with a PICO-GUARD controller.

CABLE GLANDS PAGE 189
BRACKETS PAGE 190
MIRRORS PAGE 204
STANDS PAGE 209

FM APPROVED

# PICO-GUARD™ Grid Systems

- *Two-, three- or four-beam models*
- *Polished-end 7 mm PVC-coated integral fiber cable*
- *IEC IP65 rated*
- *Robust black anodized housing with field replaceable window*
- *MEK-resistant housing for paint booth applications*
- *Optional MEK-resistant conduit and cable gland (see page 189)*
- *Interchangeable as emitter or receiver with PICO-GUARD controller*
- *A complete system requires a controller (see page 108)*


PICO-GUARD Grid

MORE INFO ONLINE Detailed Dimensions

Full View

Black Anodized Aluminum

## PICO-GUARD™ Grid Systems

MORE INFO ONLINE Download PDF

| Model* | Beam Spacing | Protected Height | Housing Length (L) | Fiber Description** | Fiber Length | Maximum Range*** | Data Sheet |
|---|---|---|---|---|---|---|---|
| SFG4-300C8 | 300 mm | 900 mm | 1084 mm | Integral Polished-End, PVC Coated Fibers 7 mm diameter | 2.4 m | 31 m | 69762 |
| SFG4-300C15 | | | | | 4.5 m | 27 m | |
| SFG4-300C25 | | | | | 7.5 m | 23 m | |
| SFG4-300C50 | | | | | 15 m | 15 m | |
| SFG4-300C100 | | | | | 30 m | 7.0 m | |
| SFG3-400C8 | 400 mm | 800 mm | 984 mm | | 2.4 m | 31 m | |
| SFG3-400C15 | | | | | 4.5 m | 27 m | |
| SFG3-400C25 | | | | | 7.5 m | 23 m | |
| SFG3-400C50 | | | | | 15 m | 15 m | |
| SFG3-400C100 | | | | | 30 m | 7.0 m | |
| SFG3-533C8 | 533 mm | 1066 mm | 1251 mm | | 2.4 m | 31 m | |
| SFG3-533C15 | | | | | 4.5 m | 27 m | |
| SFG3-533C25 | | | | | 7.5 m | 23 m | |
| SFG3-533C50 | | | | | 15 m | 15 m | |
| SFG3-533C100 | | | | | 30 m | 7.0 m | |

4-Beam Grid  3-Beam Grid

* Order any two Grid optical elements with the same housing length.
** MEK-resistant conduit is available to protect fiber (see page 189).
*** Maximum range is based on using an emitter and receiver with the same length fiber. Using an emitter and receiver with different length fibers may decrease or increase range. Using corner mirrors reduces range. See specifications on page 41 for detailed range information.

# PICO-GUARD™ Grid Systems (cont'd)

MORE INFO ONLINE Download PDF

| Model* | Beam Spacing | Protected Height | Housing Length (L) | Fiber Description** | Fiber Length | Maximum Range*** | Data Sheet |
|---|---|---|---|---|---|---|---|
| SFG2-500C8 |  500 mm | 500 mm | 684 mm | Integral Polished-End, PVC Coated Fibers 7 mm diameter | 2.4 m | 31 m | 69762 |
| SFG2-500C15 | | | | | 4.5 m | 27 m | |
| SFG2-500C25 | | | | | 7.5 m | 23 m | |
| SFG2-500C50 | | | | | 15 m | 15 m | |
| SFG2-500C100 | | | | | 30 m | 7.0 m | |
| SFG2-584C8 |  584 mm | 584 mm | 768 mm | | 2.4 m | 31 m | |
| SFG2-584C15 | | | | | 4.5 m | 27 m | |
| SFG2-584C25 | | | | | 7.5 m | 23 m | |
| SFG2-584C50 | | | | | 15 m | 15 m | |
| SFG2-584C100 | | | | | 30 m | 7.0 m | |

2-Beam Grid

* Order any two Grid optical elements with the same housing length.
** MEK-resistant conduit is available to protect fiber (see page 189).
*** Maximum range is based on using an emitter and receiver with the same length fiber. Using an emitter and receiver with different length fibers may decrease or increase range. Using corner mirrors reduces range. See specifications on page 41 for detailed range information.

# PICO-GUARD™ Point Systems

- *12 or 30 mm threaded barrel fiber optic interchangeable as emitter or receiver with PICO-GUARD controller*
- *Multiple Points create customized grid system*
- *Polished-end coated integral fiber*
- *Moisture and dirt resistant*
- *304 stainless steel (30 mm) or impact-resistant polycarbonate (12 mm) housing*
- *Type 4 effective aperture angle (EAA)*
- *IEC IP67 rated*
- *A complete system requires a controller (see page 108)*

MORE INFO ONLINE Detailed Dimensions


**PICO-GUARD Point (30 mm Barrel)**


**PICO-GUARD Point (12 mm Barrel)**

# PICO-GUARD™ Point Systems

MORE INFO ONLINE Download PDF

| Model* | Housing Material | Orientation/Type | | Fiber Description | Fiber Length | Maximum Range** | Data Sheet |
|---|---|---|---|---|---|---|---|
| SFP30SXP8 | 304 Stainless Steel | Straight 30 mm Barrel Mounting (25 mm beam diameter) |  | Integral Polished-End, PVC Coated Fibers 5 mm Diameter | 2.4 m | 29 m | 111390 |
| SFP30SXP15 | | | | | 4.5 m | 24 m | |
| SFP30SXP25 | | | | | 7.5 m | 22 m | |
| SFP30SXP50 | | | | | 15 m | 14 m | |
| SFP30SXP100 | | | | | 30 m | 8.5 m | |
| SFP30SXT8 | | | | Integral Polished-End, PTFE Coated Fibers 2.2 mm Diameter | 2.4 m | 29 m | |
| SFP30SXT15 | | | | | 4.5 m | 24 m | |
| SFP30SXT25 | | | | | 7.5 m | 22 m | |
| SFP30SXT50 | | | | | 15 m | 14 m | |
| SFP30SXT100 | | | | | 30 m | 8.5 m | |
| SFP30SS8 | | | | Integral Polished-End, Polyetheylene Coated Fibers 2.2 mm Diameter | 2.4 m | 29 m | |
| SFP30SS15 | | | | | 4.5 m | 24 m | |
| SFP30SS25 | | | | | 7.5 m | 22 m | |
| SFP30SS50 | | | | | 15 m | 14 m | |
| SFP30SS100 | | | | | 30 m | 8.5 m | |
| SFP12PXP8 | Plastic | Straight 12 mm Barrel Mounting (9 mm beam diameter) |  | Integral Polished-End, PVC Coated Fibers 5 mm Diameter | 2.4 m | 6.4 m | 111389 |
| SFP12PXP15 | | | | | 4.5 m | 4.8 m | |
| SFP12PXP25 | | | | | 7.5 m | 3.4 m | |
| SFP12PXP50 | | | | | 15 m | 1.5 m | |
| SFP12PXT8 | | | | Integral Polished-End, PTFE Coated Fibers 2.2 mm Diameter | 2.4 m | 6.4 m | |
| SFP12PXT15 | | | | | 4.5 m | 4.8 m | |
| SFP12PXT25 | | | | | 7.5 m | 3.4 m | |
| SFP12PXT50 | | | | | 15 m | 1.5 m | |
| SFP12PS8 | | | | Integral Polished-End, Polyethylene Coated Fibers 2.2 mm Diameter | 2.4 m | 6.4 m | |
| SFP12PS15 | | | | | 4.5 m | 4.8 m | |
| SFP12PS25 | | | | | 7.5 m | 3.4 m | |
| SFP12PS50 | | | | | 15 m | 1.5 m | |

* Order any two Point optical elements with the same beam diameter.

** Maximum range is based on using an emitter and receiver with the same length fiber. Using an emitter and receiver with different length fibers may decrease or increase range. Using corner mirrors reduces range. See specifications on page 41 for detailed range information.

## PICO-GUARD™ Controller (required for a complete system)

| Models | | Description | Product Information | Data Sheet |
|---|---|---|---|---|
|  | **SFCDT-4A1**<br>**SFCDT-4A1C** | • The four-optical-channel controller is available with or without auxiliary channel outputs.<br>• Two dual-channel Universal Safety Stop Interface (USSI) inputs can connect to other safeguarding devices or controllers.<br>• Two solid-state diverse-redundant 0.5 A maximum safety outputs (OSSDs).<br>• Redundant DIP switches determine whether power-up is auto or manual and whether output operation is trip or latch.<br>• Optional external device monitoring (EDM) allows the system to monitor the status of external devices such as MPCEs.<br>• If not needed, up to three optical channels can be disabled. | Page 108 | 69761 |

## PICO-GUARD™ Interfacing Products

| | Models | | Description | Product Information | Data Sheet |
|---|---|---|---|---|---|
| Interface Modules |  | **IM-T-9A** (3 NO)<br>**IM-T-11A** (2 NO/1 NC) | • Interface modules provide two or three normally open force-guided relay outputs rated at 6 A.<br>• PICO-GUARD monitors these interface modules when they are connected to the PICO-GUARD External Device Monitoring (EDM) inputs.<br>• Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included. | Page 132 | 62822 |
| Muting Modules |  | **MM-TA-12B**<br>**MMD-TA-12B**<br>**MMD-TA-11B** | • The Muting Module can be used with PICO-GUARD systems and can temporarily inhibit a Grid or Point so materials can safely pass through the beams without stopping the machinery.<br>• The module uses redundant microcontroller-based logic. | Page 123 | 63517<br>116390 |
| Contactors |  | **Mechanically Linked Contactors**<br>**11-BG00-31-D-024**<br>**11-BF16C01-024**<br>**Aux. Contacts**<br>**11-BGX10-40**<br>**11-G484-30**<br>**Suppressors**<br>**11-BGX77-048**<br>**11-G318-48** | • Pairs of contactors create safety stop circuits with two normally open contacts in series.<br>• PICO-GUARD can monitor the circuit because of the contacts' force-guided mechanically linked design.<br>• Contactors add 10 or 16 amp current carrying capability to any safety system.<br>• Auxiliary contacts add 3 or 4 normally open contacts.<br>• Suppressors extend the life of an actuating device that uses a contactor.<br>• Modular design simplifies assembly and installation. | Page 186 | 111881 |

# PICO-GUARD™ Grid & Point Systems Specifications

**Operating Range**

Range information is based on use of the integral polished fibers. The use of SFA-FS Fiber Splice reduces range by 20%. Do not cut polished fiber ends unless absolutely necessary (if the end is damaged or contaminated, or must be cut to length). Use only the Model PFC-2 Fiber Cutter to cut fibers, when necessary. If a polished end is cut, the excess gain is reduced, the advantage of polishing is lost, and the operating range is reduced.

**12 mm Point:**
**Minimum operating range:** 150 mm
**Maximum operating range:** see table at right

**12 mm Point Maximum Operating Range**

| | SFP12..8 | SFP12..15 | SFP12..25 | SFP12..50 |
|---|---|---|---|---|
| SFP12..8 | 6.4 m | 5.5 m | 4.6 m | 3 m |
| SFP12..15 | 5.5 m | 4.8 m | 4 m | 2.7 m |
| SFP12..25 | 4.6 m | 4 m | 3.4 m | 2.1 m |
| SFP12..50 | 3 m | 2.7 m | 2.1 m | 1.5 m |

**30 mm Point:**
**Minimum operating range:** 800 mm
**Maximum operating range:** see table at right

**30 mm Point Maximum Operating Range**

| | SFP30..8 | SFP30..15 | SFP30..25 | SFP30..50 | SFP30..100 |
|---|---|---|---|---|---|
| SFP30..8 | 28.7 m | 25.9 m | 23.2 m | 20.1 m | 13.7 m |
| SFP30..15 | 25.9 m | 24.4 m | 22.9 m | 19.5 m | 12.8 m |
| SFP30..25 | 23.2 m | 22.9 m | 21.9 m | 17.1 m | 12.2 m |
| SFP30..50 | 20.1 m | 19.5 m | 17.1 m | 14.0 m | 11.0 m |
| SFP30..100 | 13.7 m | 12.8 m | 12.2 m | 11.0 m | 8.5 m |

**Grids:**
**Minimum operating range:** 800 mm
**Maximum operating range:** see table at right

**Grid Maximum Operating Range**

| | SFG..8 | SFG..15 | SFG..25 | SFG..50 | SFG..100 |
|---|---|---|---|---|---|
| SFG..8 | 31.1 m | 29.0 m | 26.5 m | 21.6 m | 14.9 m |
| SFG..15 | 29.0 m | 27.1 m | 24.7 m | 20.1 m | 14.0 m |
| SFG..25 | 26.5 m | 24.7 m | 22.6 m | 18.3 m | 12.8 m |
| SFG..50 | 21.6 m | 20.1 m | 18.3 m | 14.9 m | 10.4 m |
| SFG..100 | 14.9 m | 14.0 m | 12.8 m | 10.4 m | 7.0 m |

**Beam Diameter**

**12 mm Point:** 9 mm
**30 mm Point:** 25 mm
**Grids:** 25 mm

**Effective Aperture Angle (EAA)**

Type 4 per IEC 61496-2; ±2.5° @ 3 m when used with SFCDT-..

**Environmental Rating**

**Points:** IEC IP67
**Grids:** IEC IP65

**Operating Conditions**

**Temperature:** 0° to +70° C **Relative humidity:** 95% (non-condensing)

**Construction**

**12 mm Point:** black polycarbonate plastic housing; polyethylene, PVC or PTFE coated fibers
**30 mm Point:** 304 stainless steel housing, glass window; polyethylene, PVC or PTFE coated fibers
**Grids:** black anodized aluminum housing and label; tempered glass window; zinc end caps; PVC coated fibers

**Certifications**

For a list of certifications see page 236.

# PICO-GUARD™ Fiber Optic Controller Specifications

**See page 110.**

# MICRO-SCREEN®

## Safety Light Screens

- Family is designed for light- to medium-duty production machinery.
- Full system includes emitter, receiver, controller and interconnecting cables. Order QD cable separately.
- Emitters and receivers feature ultra-compact housing with 19 or 32 mm resolution.
- Optional ESD-resistant housing is available.
- System includes floating blanking (one or two beam), selectable auto power-up, E-stop input and optional fixed blanking with push-button TEACH mode programming.
- Controllers offered with DeviceNet™ or muting

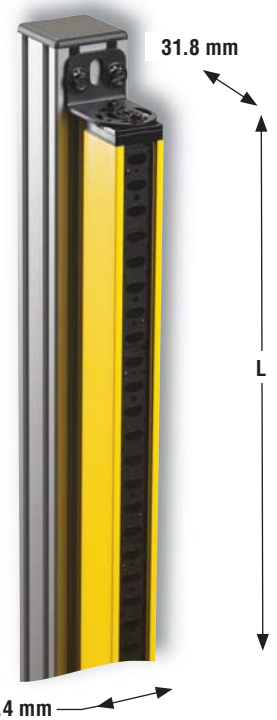
QD CABLES 5-Pin Euro PAGE 175
INDICATORS PAGE 187
BRACKETS PAGE 190
MIRRORS PAGE 204
STANDS PAGE 209
LENS SHIELDS PAGE 213
ENCLOSURES PAGE 217

DeviceNet™ is a trademark of Rockwell Automation.




## MICRO-SCREEN® Emitters & Receivers

- *Ultra-compact housing to fit existing machinery*
- *Swivel bracket for easy alignment*
- *Twelve heights for Standard Series; seven for V Series*
- *5-pin Euro QD connection standard*
- *QDU-... 5-pin Euro QD cables with "twisted pair" (see page 175)*
- *NEMA 4, 13; IEC IP65 housing*




**MICRO-SCREEN Emitters & Receivers**

MORE INFO ONLINE Detailed Dimensions

**Full View of Available Finishes**

**Yellow Painted Aluminum**

**Nickel-Plated ESD**

# MICRO-SCREEN® Series, Emitters & Receivers - 19 mm Resolution

MORE INFO ONLINE Download PDF

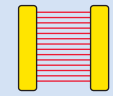
| Model* | Resolution | Defined Area | Housing Length (L) | Range | Connection** | Data Sheet |
|---|---|---|---|---|---|---|
| **USE424Y**<br>**USR424Y** |  <br>19 mm Resolution | 102 mm | 137 mm | 9 m | 5-Pin Euro QD | 48753 |
| **USE824Y**<br>**USR824Y** | | 203 mm | 239 mm | | | |
| **USE1224Y**<br>**USR1224Y** | | 305 mm | 340 mm | | | |
| **USE1624Y**<br>**USR1624Y** | | 406 mm | 442 mm | | | |
| **USE2024Y**<br>**USR2024Y** | | 508 mm | 544 mm | | | |
| **USE2424Y**<br>**USR2424Y** | | 610 mm | 645 mm | | | |
| **USE2824Y**<br>**USR2824Y** | | 711 mm | 747 mm | | | |
| **USE3224Y**<br>**USR3224Y** | | 813 mm | 848 mm | | | |
| **USE3624Y**<br>**USR3624Y** | | 914 mm | 950 mm | | | |
| **USE4024Y**<br>**USR4024Y** | | 1016 mm | 1052 mm | | | |
| **USE4424Y**<br>**USR4424Y** | | 1118 mm | 1153 mm | | | |
| **USE4824Y**<br>**USR4824Y** | | 1219 mm | 1255 mm | | | |

 19 mm Resolution

* Nickel-plated emitters and receivers used for ESD safe applications are available. Replace "Y" with "N" in the model number (example, **USE424N**).
** For a 7.6 m integral cable, add I to model number (example, **USE424YI**).
For a 300 mm 5-Pin Euro Pigtail QD, add P2 to model number (example, **USE424YP2**). A model with a QD requires a mating cable (see page 175).
Note: Emitters (example, **USE424Y**) and receivers (example, **USR424Y**) are sold separately.

# MICRO-SCREEN® V-Series, Emitters & Receivers - 32 mm Resolution

MORE INFO ONLINE Download PDF

| Model* | Resolution | Defined Area | Housing Length (L) | Range | Connection** | Data Sheet |
|---|---|---|---|---|---|---|
| **USE2412Y**<br>**USR2412Y** |  <br>32 mm Resolution | 610 mm | 645 mm | 9 m | 5-Pin Euro QD | 48753 |
| **USE3212Y**<br>**USR3212Y** | | 813 mm | 848 mm | | | |
| **USE4012Y**<br>**USR4012Y** | | 1016 mm | 1052 mm | | | |
| **USE4812Y**<br>**USR4812Y** | | 1219 mm | 1255 mm | | | |
| **USE5612Y**<br>**USR5612Y** | | 1422 mm | 1458 mm | | | |
| **USE6412Y**<br>**USR6412Y** | | 1626 mm | 1661 mm | | | |
| **USE7212Y**<br>**USR7212Y** | | 1829 mm | 1864 mm | | | |

 32 mm Resolution

* Nickel-plated emitters and receivers used for ESD safe applications are available. Replace "Y" with "N" in the model number (example, **USE2412N**).
** For a 7.6 m integral cable, add I to model number (example, **USE2412YI**).
For a 300 mm 5-Pin Euro Pigtail QD, add P2 to model number (example, **USE2412YP2**). A model with a QD requires a mating cable (see page 175).
Note: Emitters (example, **USE2412Y**) and receivers (example, **USR2412Y**) are sold separately.

# MICRO-SCREEN® Metal Box Controllers

- *Welded steel box with polyester powder paint finish*
- *115/230V ac or 24V dc supply voltage*
- *One- or two-beam floating blanking and selectable power-up*
- *Optional fixed blanking, muting and External Device Monitoring (EDM)*
- *Latch or trip output*
- *NEMA 13, IEC IP64 housing*
- *E-stop input*

MORE INFO ONLINE Detailed Dimensions


MICRO-SCREEN Metal Box Controller (USCD-1T2 shown)


MICRO-SCREEN Metal Box Controller with Muting (USCC-1L2M shown)

# MICRO-SCREEN® Series, Metal Box Controllers

MORE INFO ONLINE Download PDF

| Models | | Supply Voltage | Output Type | Safety Outputs | Output Rating | Aux. Outputs** | Floating Blanking | Fixed Blanking | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
|  | **USCT-2T2** | 24V dc | Trip | **2 NO** | 4 amps | — | 1- or 2-beam | Yes | 51597 |
| | **USCT-2T3** | | | | 6 amps | 1 NC | | Yes | 51597 & 59664 |
| | **USCD-1T2** | 115/ 230V ac | Trip | | 4 amps | — | | No | 51597 |
| | **USCD-1T3** | | | | 6 amps | 1 NC | | No | 51597 & 59664 |
| | **USCD-2T2** | | | | 4 amps | — | | Yes | 51597 |
| | **USCD-2T3** | | | | 6 amps | 1 NC | | Yes | 51597 & 59664 |
| | **USCD-2T3E*** | | | | 6 amps | 1 NC | | Yes | |
| | **USCD-1L2** | | Latch | | 4 amps | — | | No | 67173 |
| | **USCD-2L2** | | | | 4 amps | — | | Yes | |

NC = Normally Closed Relay, NO = Normally Open Relay
* The suffix "E" adds external device monitoring input
** All models contain one Reed Relay (see specifications page 53).

# MICRO-SCREEN® Series, Metal Box Controllers with Muting

MORE INFO ONLINE Download PDF

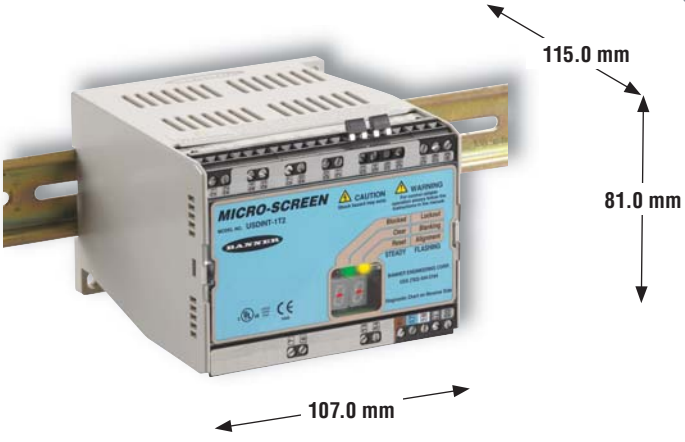
| Models | | Supply Voltage | Output Type | Safety Outputs | Output Rating | Aux. Outputs* | Floating Blanking | Fixed Blanking | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
|  | **USCC-1T2M** | 115/ 230V ac or 24V dc | Trip | 2 NO | 4 amps | — | 1- or 2-beam | No | 67690 |
| | **USCC-1T3M** | | | | 6 amps | 1 NC | | No | 67690 & 59664 |
| | **USCC-2T2M** | | | | 4 amps | — | | Yes | 67690 |
| | **USCC-2T3M** | | | | 6 amps | 1 NC | | Yes | 67690 & 59664 |
| | **USCC-1L2M** | | Latch | | 4 amps | — | | No | 58764 |
| | **USCC-2L2M** | | | | 4 amps | — | | Yes | 58764 |
| | **USCC-2L3M** | | | | 6 amps | 1 NC | | Yes | 58764 & 59644 |

NC = Normally Closed Relay, NO = Normally Open Relay
* All models contain two Reed Relays (see specifications page 54-55).
Note: External Device Monitoring (EDM) standard on all controllers with muting.

# MICRO-SCREEN® DIN Module Controllers

- *Polycarbonate housing with clear cover*
- *24V dc supply voltage*
- *One- or two-beam floating blanking and selectable auto power-up*
- *Optional fixed blanking and External Device Monitoring (EDM)*
- *E-Stop input and latch or trip output*
- *NEMA 1; IP20 housing*
- *DeviceNet™ compatible*
- *Up to 4 normally open contacts to control up to two hazards*

MORE INFO ONLINE Detailed Dimensions




**MICRO-SCREEN DIN Module Controller (USDINT-1T2 shown)**

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# MICRO-SCREEN® Series, DIN Module Controllers

MORE INFO ONLINE Download PDF

| Models | | Supply Voltage | Output Type | Safety Outputs** | Output Rating | Floating Blanking | Fixed Blanking | Data Sheet |
|---|---|---|---|---|---|---|---|---|
|  | USDINT-1T2 | 24V dc | Trip | 2 NO | 4 amps | 1- or 2-beam | No | 48753 |
| | USDINT-1T2E* | | | 2 NO | | | | 53229 |
| | USDINT-1T4 | | | 4 NO | | | | 48753 & 55631 |
| | USDINT-2T2 | | | 2 NO | | | Yes | 48753 |
| | USDINT-2T4 | | | 4 NO | | | | 48753 & 55631 |
|  | USDINT-1L2 | | Latch | 2 NO | | | No | 54202 |
| | USDINT-1L4 | | | 4 NO | | | | 54202 & 55631 |
| | USDINT-2L2 | | | 2 NO | | | Yes | 54202 |
| | USDINT-2L4 | | | 4 NO | | | | 54202 & 55631 |
|  | USDINT-1T2D | | Trip plus DeviceNet™ | 2 NO | | | No | 48753 & 51699 |
| | USDINT-1T4D | | | 4 NO | | | | 48753, 51699 & 55631 |
| | USDINT-2T2D | | | 2 NO | | | Yes | 48753 & 51699 |
| | USDINT-2T4D | | | 4 NO | | | | 48753, 51699 & 55631 |
|  | USDINT-1L2D | | Latch plus DeviceNet™ | 2 NO | | | No | 54202 & 54205 |
| | USDINT-1L4D | | | 4 NO | | | | 54202, 54205 & 55631 |
| | USDINT-2L2D | | | 2 NO | | | Yes | 54202 & 54205 |
| | USDINT-2L4D | | | 4 NO | | | | 54202, 54205 & 55631 |

NC = Normally Closed Relay, NO = Normally Open Relay
* The suffix "E" adds external device monitoring input
** In addition to safety outputs, all models contain one non-safety Reed Relay auxiliary output (see specifications pages 55-57).

DeviceNet™ is a trademark of Rockwell Automation.

# MICRO-SCREEN® Interfacing Products

MORE INFO ONLINE Download PDF

| | | Models | Description | Product Information | Data Sheet |
|---|---|---|---|---|---|
| Muting Modules |  | MM-TA-12B | • The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery.<br>• The module uses redundant microcontroller-based logic. | Page 123 | 63517 |
| | | MMD-TA-12B | | | 116390 |
| | | MMD-TA-11B | | | |
| Contactors |  | **Mechanically Linked Contactors** | • Pairs of contactors create safety stop circuits with two normally open contacts in series.<br>• MICRO-SCREEN can monitor the circuit because of the contacts' force-guided mechanically linked design.<br>• Contactors add 10 or 16 amp current carrying capability to any safety system.<br>• Auxiliary contacts add 3 or 4 normally open contacts.<br>• Suppressors extend the life of an actuating device that uses a contactor.<br>• Modular design simplifies assembly and installation. | Page 186 | 111881 |
| | | 11-BG00-31-A12060 | | | |
| | | 11-BG00-31-D-024 | | | |
| | | 11-BF1601-12060 | | | |
| | | 11-BF16C01-024 | | | |
| | | **Aux. Contacts** | | | |
| | | 11-BGX10-40 | | | |
| | | 11-G484-30 | | | |
| | | **Suppressors** | | | |
| | | 11-BGX77-048 | | | |
| | | 11-BGX77-240 | | | |
| | | 11-G318-48 | | | |
| | | 11-G477-240 | | | |

# MICRO-SCREEN® Metal Box Controller Kits

You can purchase a kit that contains an emitter and receiver of equal length and range; standard mounting brackets; and a pair of quick-disconnect cables. Detailed information about individual kit components is as follows.


- Metal Box Controllers . . . . . Page 45
- Emitter and Receivers . . . . . 43
- Cables . . . . . 175
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Sensor Housing: Yellow | Sensor Housing: Nickel-Plated | Defined Area | Resolution | Beams Per Foot | Range | Supply Voltage | Blanking | Output Type | Number of Outputs | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|---|---|
| USK2T24243C5Y | • | | 610 mm | 19 mm | 24 | 9 m | 24V dc | Fixed & Floating | Trip | 2 NO Safety Outputs & 1 NC Aux. | 8 m, 2 each |
| USK2T24123C5Y | | | | 32 mm | 12 | | | | | | |
| USK2T24243C5N | | • | | 19 mm | 24 | | | | | | |
| USK2T24123C5N | | | | 32 mm | 12 | | | | | | |
| USK2D24243C5Y | • | | | 19 mm | 24 | | 115/230V ac | | | | |
| USK2D24123C5Y | | | | 32 mm | 12 | | | | | | |
| USK2D24243C5N | | • | | 19 mm | 24 | | | | | | |
| USK2D24123C5N | | | | 32 mm | 12 | | | | | | |

NC = Normally Closed Relay, NO = Normally Open Relay

## Kit Model Key

| Model Style | Kit | Fixed-Beam Blanking | Supply Voltage | Options | Defined Area | Beams Per Foot | Output Type | No. of Outputs | QD Cables | Finish | Sensor Cable Termination |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U S | K | 2 | D | E | 2 4 | 1 2 | | 3 | C 5 | Y | P 2 |

**Model Style**
**US** = MICRO-SCREEN

**Kit**
**K** = Kit

**Fixed-Beam Blanking**
**Blank** = Without
**2** = With

**Supply Voltage**
**D** = 115/230V ac
**T** = 24V dc

**Options**
**E** = With External Device Monitoring (EDM)
**Blank** = Without

**Defined Area**
**4** = 102 mm
**8** = 203 mm
**12** = 305 mm
**16** = 406 mm
**20** = 508 mm
**24** = 610 mm
**28** = 711 mm
**32** = 813 mm
**36** = 914 mm
**40** = 1016 mm
**44** = 1118 mm
**48** = 1219 mm
**56** = 1422 mm
**64** = 1626 mm
**72** = 1829 mm

**Beams per Foot**
**24** = Standard Series
**12** = V-Series

**Output Type**
**Blank** = Trip
**L** = Latch

**Number of Outputs**
**Blank**= 2 NO Safety Outputs
**3** = 2 NO Safety Outputs & 1 NC Aux.

**Quick-Disconnect Cables**
**C4** = 2 x 5 m
**C5** = 2 x 8 m
**C6** = 1 x 5 m plus 1 x 8 m
**Blank** = Integral 8 m cables

**Sensor Finish**
**Y** = Yellow polyester paint
**N** = Nickel plated ESD

**Sensor Cable Termination**
**I** = Integral 8 m cable
**Blank** = Integral QD connector
**P2** = Pigtail QD connector

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model number.

# MICRO-SCREEN® Metal Box Controller with Muting Kits

You can purchase a kit that contains an emitter and receiver of equal length and range; standard mounting brackets; and a pair of quick-disconnect cables. Detailed information about individual kit components is as follows.


- Metal Box Controllers with Muting . . . . . Page 46
- Emitter and Receivers . . . . . 43
- Cables . . . . . 175
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Sensor Housing: Yellow | Sensor Housing: Nickel-Plated | Defined Area | Resolution | Beams Per Foot | Range | Supply Voltage | Blanking | Output Type | Number of Outputs | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|---|---|
| USK2CM2424L3C5Y | • | | 610 mm | 19 mm | 24 | 9 m | 115/230V ac or 24V dc | Fixed & Floating | Latch | 2 NO Safety Outputs & 1 NC Aux. | 8 m, 2 each |
| USK2CM2412L3C5Y | • | | | 32 mm | 12 | | | | | | |
| USK2CM2424L3C5N | | • | | 19 mm | 24 | | | | | | |
| USK2CM2412L3C5N | | • | | 32 mm | 12 | | | | | | |

NC = Normally Closed Relay, NO = Normally Open Relay

# Kit Model Key

| Model Style | Kit | Fixed-Beam Blanking | Supply Voltage | Muting | Defined Area | Beams Per Foot | Output Type | No. of Outputs | QD Cables | Finish | Sensor Cable Termination |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U S | K | 2 | C | M | 2 4 | 1 2 | L | 3 | C 5 | Y | P 2 |

**Model Style**
**US** = MICRO-SCREEN

**Kit**
**K** = Kit

**Fixed-Beam Blanking**
**Blank** = Without
**2** = With

**Supply Voltage**
**C** = 115/230V ac or 24V dc

**Muting**
**M** = With

**Defined Area**
**4** = 102 mm
**8** = 203 mm
**12** = 305 mm
**16** = 406 mm
**20** = 508 mm
**24** = 610 mm
**28** = 711 mm
**32** = 813 mm
**36** = 914 mm
**40** = 1016 mm
**44** = 1118 mm
**48** = 1219 mm
**56** = 1422 mm
**64** = 1626 mm
**72** = 1829 mm

**Beams per Foot**
**24** = Standard Series
**12** = V-Series

**Output Type**
**Blank** = Trip
**L** = Latch

**Number of Outputs**
**Blank** = 2 NO Safety Outputs
**3** = 2 NO Safety Outputs & 1 NC Aux.

**Quick-Disconnect Cables**
**C4** = 2 x 5 m
**C5** = 2 x 8 m
**C6** = 1 x 5 m plus 1 x 8 m
**Blank** = Integral 8 m cables

**Sensor Finish**
**Y** = Yellow polyester paint
**N** = Nickel plated ESD

**Sensor Cable Termination**
**I** = Integral 8 m cable
**Blank** = Integral QD connector
**P2** = Pigtail QD connector

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model number.

# MICRO-SCREEN® DIN Module Controller Kits

You can purchase a kit that contains an emitter and receiver of equal length and range; standard mounting brackets; and a pair of quick-disconnect cables. Detailed information about individual kit components is as follows.


- Metal DIN Box Controllers. . . . . Page 47
- Emitter and Receivers . . . . . 43
- Cables . . . . . 175
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Sensor Housing: Yellow | Sensor Housing: Nickel-Plated | Defined Area | Resolution | Beams Per Foot | Range | Supply Voltage | Blanking | Output Type | Number of Outputs | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|---|---|
| USDK2T2424C5Y | • | | 610 mm | 19 mm | 24 | 9 m | 24V dc | Fixed & Floating | Trip | 2 NO Safety Outputs | 8 m, 2 each |
| USDK2T2412C5Y | | | | 32 mm | 12 | | | | | | |
| USDK2T2424C5N | | • | | 19 mm | 24 | | | | | | |
| USDK2T2412C5N | | | | 32 mm | 12 | | | | | | |
| USDK2T2424C5Y | • | | | 19 mm | 24 | | | | | | |
| USDK2T2412C5Y | | | | 32 mm | 12 | | | | | | |
| USDK2T2424C5N | | • | | 19 mm | 24 | | | | | | |
| USDK2T2412C5N | | | | 32 mm | 12 | | | | | | |

NC = Normally Closed Relay, NO = Normally Open Relay

# Kit Model Key

| Model Style | Kit | Fixed-Beam Blanking | Supply Voltage | Options | Defined Area | Beams Per Foot | Output Type | No. of Outputs | QD Cables | Finish | Sensor Cable Termination |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U S | D K | 2 | T | E | 2 4 | 1 2 | | | C 5 | Y | P 2 |

**Model Style**
**US** = MICRO-SCREEN

**Kit**
**DK** = Kit

**Fixed-Beam Blanking**
**Blank** = Without
**2** = With

**Supply Voltage**
**T** = 24V dc

**Options**
**E** = With External Device Monitoring (EDM)
**D** = With DeviceNet
**Blank** = Without

**Defined Area**
**4** = 102 mm
**8** = 203 mm
**12** = 305 mm
**16** = 406 mm
**20** = 508 mm
**24** = 610 mm
**28** = 711 mm
**32** = 813 mm
**36** = 914 mm
**40** = 1016 mm
**44** = 1118 mm
**48** = 1219 mm
**56** = 1422 mm
**64** = 1626 mm
**72** = 1829 mm

**Beams per Foot**
**24** = Standard Series
**12** = V-Series

**Output Type**
**Blank** = Trip
**L** = Latch

**Number of Outputs**
**Blank**= 2 NO Safety Outputs
**4** = 4 NO Safety Outputs

**Quick-Disconnect Cables***
**C4** = 2 x 5 m
**C5** = 2 x 8 m
**C6** = 1 x 5 m plus 1 x 8 m
**Blank** = Integral 8 m cables

**Sensor Finish**
**Y** = Yellow polyester paint
**N** = Nickel plated ESD

**Sensor Cable Termination**
**I** = Integral 8 m cable
**Blank** = Integral QD connector
**P2** = Pigtail QD connector

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model number.

# MICRO-SCREEN® Emitter & Receiver Specifications

| | |
|---|---|
| **Emitter/Receiver Separation** | **4" to 48" Emitters and Receivers:** 150 mm to 9 m<br>**56" to 72" Emitters and Receivers:** 150 mm to 6 m |
| **Minimum Object Sensitivity** | **Standard Series:**<br>19.1 mm floating blanking OFF<br>31.8 mm 1-beam floating blanking ON<br>44.5 mm 2-beam floating blanking ON<br>**V-Series:**<br>31.8 mm floating blanking OFF<br>57.5 mm 1-beam floating blanking ON<br>82.6 mm 2-beam floating blanking ON |
| **Response Time** | **Light Screens:** Less than 38 milliseconds (less than 48 milliseconds with muting option)<br>**E-Stop:** Less than 15 milliseconds |
| **Self-Checking Interval** | 20 milliseconds |
| **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 peak emission |
| **Status Indicators** | **Emitter:** Green LED indicator for power ON indication<br>**Receiver:** Red, yellow and green status indicators with the same functions as those on the left side of the control box (see Control Box Specifications, pages 53-57). Yellow also indicates alignment. Indicators are visible on three sides of receiver or emitter base. |
| **Emitter and Receiver Enclosures** | **Materials:** Aluminum extrusion with yellow polyester paint or nickel-plated finish<br>**Rating:** NEMA 4, 13; IEC IP65 |
| **Mounting Hardware** | Emitter and receiver each are supplied with a pair of swivel end mounting brackets. (Emitters and receivers 711 to 914 mm long are supplied with one center support bracket; emitters and receivers 1016 to 1829 mm long are supplied with two center brackets.) Mounting brackets are 13-gauge cold-rolled black zinc chromate finished steel. |
| **Cables** | **Emitters and Receivers with Integral Cables (USE/USRxxxxYI):**<br>Cables are 7.6 m long and measure 8.1 mm in diameter. Conductors are 20-gauge. Cables are shielded and PVC-jacketed.<br><br>**Emitters and Receivers with Integral (USE/USRxxxxY) or Pigtail (USE/USRxxxxYP2) Quick Disconnect:**<br>Pigtail QD connectors have a 300 mm long cable, terminated with a 5-pin Euro-style quick-disconnect fitting. Mating interconnect cables are ordered separately (unless a MICRO-SCREEN kit is ordered, see Models and Accessories, page 175), and are available in lengths of 4.5 m, 7.6 m, and 15 m.<br><br>NOTE: Contact factory when cable length exceeding 15 m is required. Use only Banner cables, which incorporate a shielded “twisted pair” for noise immunity on RS485 data communications lines. Use of other cables may result in “nuisance” trips or lockouts. |
| **Optical Performance** | This system meets ± 2.5° requirements of IEC 61496-2 section 5.2.9 (Type 4) |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing) |
| **Certifications** | For a list of certifications see page 236. |

# MICRO-SCREEN® Metal Box Controller Specifications

| | |
|---|---|
| **System Power Requirements** | **USCD-.. models:** 115/230V ac ±15% (50/60 Hz), 55 VA<br>**USCT-.. models:** 24V dc ±15% @ 1.5 amp max. |
| **Fuse Rating (F2)** | **115V ac:** 1 amp, 250V ac; **230V ac:** 0.5 amp, 250V<br>**24V dc:** 2 amp, 250V |
| **Response Time** | **Light Screens:** Less than 38 milliseconds<br>**E-Stop:** Less than 15 milliseconds |
| **Status Indicators** | **Control Box and Receiver:**<br>**Red** — Solid LED: BLOCKED/LATCHED — Flashing LED: LOCKOUT<br>**Green** — Solid LED: CLEAR — Flashing LED: BLANKING ON<br>**Yellow** — Solid LED: RESET — Flashing LED: Double Flash = Waiting for System Key RESET at Power-up; Single Flash = ALIGNMENT. Flash rate increases with the number of sensing beams "made", solid yellow when aligned and defined area is clear |
| **Diagnostic Indicator** | Two-digit numeric display indicates cause of lockout condition and total number of beams blocked. |
| **Controls and Adjustments** | Keyed RESET of system lockout and latched conditions<br>Floating blanking selection switches and fixed blanking programming switches<br>Auto Power-up On-Off switches |
| **E-Stop Switch Input** | The Emergency Stop switch must offer two normally closed contacts and be capable of switching 50 mA @ 30V dc. Total resistance, including wiring and all switches, must not exceed 30 Ω for proper operation. Functional stop category 0 per NFPA 79 and EN 418, Safety Category 4 per EN 954-1. Simultaneity requirement less than 100 milliseconds. |
| **External Device Monitoring (EDM) Input*** | Terminals must open within 200 milliseconds of the FSD outputs closing (i.e., a clear condition) and must close within 200 milliseconds of the FSD outputs opening (i.e., a blocked condition) or a lockout will occur. The monitoring contacts must be forced-guided (or captive contact) to maintain control reliability of the machine control circuit and must be capable of reliably switching 15 to 50V dc at 20 to 100 mA. |
| **Test Input** | Terminals must be closed for a minimum of 0.05 seconds in order to guarantee a test input signal. The switching device used must be capable of switching 15-50V dc at 20 to 100 mA. |
| **Reset Input** | Terminals must be closed for a minimum of 0.5 seconds in order to guarantee a reset. The switching device must be capable of switching 15-50V dc at 20-100 mA. |
| **Auxiliary Monitor Relay** | Reed relay; 125V ac or dc max., 500 mA max. (10 VA max., resistive load) |
| **Safety Outputs** | Forced-guided contact relay (resistive load).<br>**USCD-..2 & USCT-..2:** FSD1 & 2, SSD = 250V ac max., 4 amp max.<br>**USCD-..3 & USCT-..3:** FSD1 & 2, CNC = 250V ac max., 6 amp max.<br>SSD = 250V ac max., 4 amp max.<br>**Mechanical life:** 10,000,000 operations (minimum).<br>**Electrical life:** 100,000 operations (typical @ 1.0 kVA switching power).<br>*Arc suppression is recommended when switching inductive loads.* |
| **Enclosure** | **Material:** Welded steel box with black polyester powder paint finish<br>**Rating:** NEMA 13; IEC IP64 |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing) |
| **FMEA Tested** | Per requirements IEC 61496-1 (type 4) |
| **Applications Notes** | Use of fixed blanking requires sensors with 16 or more light beams. Up to 12 beams or 30% of the total number of beams in the array may be blanked, whichever is less. Call factory for applications assistance if a greater number of blanked beams is required. |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | **2 FSDs, 1 SSD and Power Monitoring:** WD017 (p. 255) |

* External Device Monitoring (EDM) models only.

# MICRO-SCREEN® Metal Box Controller with Muting Specifications

| | |
|---|---|
| **System Power Requirements** | 115V ac (50/60Hz) ± 15% @ 500 mA (50 VA),<br>230V ac (50/60Hz) ± 15% @ 250 mA (50 VA), or<br>24V dc ±15%, 10% max. ripple, @ 2.5 A (60 W) |
| **Fuse Rating (F2)** | **115V ac:** 1.0 A ac @ 250V ac (supplied)<br>**230V ac:** 500 mA @ 250V ac<br>**+24V dc:** Internal resettable |
| **Response Time** | **Light Screen:** Less than 48 milliseconds **E-Stop:** Less than 15 milliseconds |
| **Status LED Indicators** | **Light Screen Indicators (left column of LEDs):**<br>**Red** — Solid LED: BLOCKED/LATCHED — Flashing LED: LOCKOUT<br>**Green** — Solid LED: CLEAR — Flashing LED: BLANKING ON<br>**Yellow** — Solid LED: RESET — Flashing LED: Double Flash = Waiting for Single Flash = ALIGNMENT. Flash rate increases with the number of sensing beams "made", solid yellow when aligned and defined area is clear<br>**System Indicators (right column of LEDs):**<br>**Red** — Solid LED: OVERRIDE — Flashing LED: LOCKOUT<br>**Green** — Solid LED: OUTPUT ON (FSD1 & FSD2 closed) — Flashing LED: (Not Applicable)<br>**Yellow** — Solid LED: RESET (System) — Flashing LED: Double Flash = Waiting for System Key Reset at Power-up; Single Flash = Waiting for System Key Reset at latched condition (manual reset of system after blockage has been removed) |
| **Diagnostic Displays** | **Light Screen Diagnostic Display (left window)** is a two-digit numeric display that indicates the cause of lockout conditions and total number of beams blocked.<br><br>**System Diagnostic Display (right window)** is a two-digit numeric display that indicates the cause of lockout conditions and the amount of time, in seconds, remaining for the backdoor timer. |
| **Controls and Adjustments** | • Light Screen Key Reset after power-up and light screen lockouts<br>• Selection switches to enable floating blanking<br>• Program switches to enable fixed blanking (USCC-2.. only)<br>• Light Screen and System Auto Power-up selection switches<br>• System Key Reset after power-up, system lockouts, and latched conditions<br>• Selection switches for Monitored or Non-Monitored Muting indicator<br>• Selection switches for One-Way or Two-Way (directional/non-directional) Muting<br>• Selection switches for One-Channel or Two-Channel Monitoring (EDM)<br>• Selection switches for Backdoor Timer settings and Mute-on-Power-Up |
| **E-Stop Switch Input** | The Emergency Stop switch must offer two normally closed contacts and be capable of switching 50 mA @ 30V dc. Total resistance, including wiring and all switches, must not exceed 30 Ω for proper operation. Functional stop category 0 per NFPA 79 and EN 418, Safety Category 4 per EN 954-1. Simultaneity requirement less than 100 milliseconds. |
| **Light Screen Test Input** | Terminals must be closed for a minimum of 0.05 seconds in order to guarantee a test. The switching device must be capable of switching 15-50V dc at 20-100 mA. |
| **Light Screen and System Reset Inputs** | Terminals must be closed for a minimum of 0.5 seconds in order to guarantee a reset. The switching device must be capable of switching 15-50V dc at 20-100 mA. |
| **External Device Monitoring (EDM) Input(s)** | Two pairs of terminals are provided to monitor the state of external devices that are being controlled by the FSD outputs. The device must be capable of switching 15-50V dc at 20-100 mA. |
| **Mute Enable Input** | Terminals must be closed in order to start a mute; opening this input after mute has begun has no effect. The switching device must be capable of switching 15-50V dc at 20-100mA. |
| **Override Inputs** | The two-channel inputs must be closed within 3 seconds of each other (simultaneity requirement) and held closed during the 10-second Override. To initiate a subsequent Override, open both channels, wait 3 seconds, and then re-close both channels (within 3 seconds). The switching devices must be capable of switching 15-50V dc at 20-100 mA. |
| **Muting Device Input** | The muting devices work in pairs (M1 and M2, M3 and M4) and are required to be "closed" within 3 seconds of each other (simultaneity requirement) to initiate a mute (assuming all other conditions are met). Each muting device must be capable of switching 15-50V dc at 20-100 mA. |
| **Light Screen and System Aux. Monitor Relay Outputs** | Reed relay; 125V ac/dc max at 500 mA max. (10 VA maximum, resistive load) |

## MICRO-SCREEN® Metal Box Controller with Muting Specifications (cont'd)

| | |
|---|---|
| **Safety Outputs** | Forced-guided contact relay (resistive load).<br>**USCC-..2:** FSD1 & 2, SSD = 250V ac max., 4 amp max.<br>**USCC-..3:** FSD1 & 2, CNC = 250V ac max., 6 amp max.<br>SSD = 250V ac max., 4 amp max.<br>**Mechanical life:** 10,000,000 operations (minimum).<br>**Electrical life:** 100,000 operations (typical @ 1.0 kVA switching power).<br>*Arc suppression is recommended when switching inductive loads.* |
| **Mute Lamp Output** | A monitored or non-monitored (selectable) sinking output. If monitoring has been selected, the current draw must be within 10 mA to 360 mA.<br>**Max. switching voltage:** 30V dc<br>**Max. switching current:** 360 mA<br>**Max. switching current:** 10 mA<br>**Saturation voltage:** ≤ 1.5V dc |
| **Auxiliary DC Supply Output** | 24V dc ± 25%, 500 mA max |
| **Enclosure** | **Material:** Welded steel box with black polyester powder paint finish.<br>**Rating:** NEMA 13; IEC IP64 |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing) |
| **FMEA Tested** | Per requirements of IEC 61496-1 (type 4) |
| **Applications Notes** | Use of fixed blanking requires sensors with 16 or more light beams. Up to 12 beams or 30% of the total number of beams in the array may be blanked, whichever is less. Call factory for applications assistance if a greater number of blanked beams is required. |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | **2 FSDs and 2-Channel EDM:** WD018 (p. 255) |

## MICRO-SCREEN® DIN Module Controller Specifications

| | |
|---|---|
| **System Power Requirements** | 24V dc ±15%, 10% max. ripple, 1.5 amps max. |
| **Fuse Rating** | 2 amp, 250 V (3 AG or 5 x 20 mm slow blow) |
| **Response Time** | **Light Screens:** Less than 38 milliseconds<br>**E-Stop:** Less than 15 milliseconds |
| **Status Indicators** (on control module and receiver) | **Control Box and Receiver:**<br>**Red** — **Solid LED:** BLOCKED/LATCHED — **Flashing LED:** LOCKOUT<br>**Green** — **Solid LED:** CLEAR — **Flashing LED:** BLANKING ON<br>**Yellow** — **Solid LED:** RESET — **Flashing LED:** Double Flash = Waiting for System Key Reset at Power-up; Single Flash = ALIGNMENT. Flash rate increases with the number of sensing beams "made", solid yellow when aligned and defined area is clear |
| **Diagnostic Indicator** | Two-digit numeric display indicates cause of lockout condition and total number of beams blocked. |
| **Controls and Adjustments** | Keyed Reset of system lockout and latched conditions<br>Floating Blanking selection switches and Fixed Blanking programming switches<br>Auto Power-up On-Off switches |
| **E-Stop Switch Input** | The Emergency Stop switch must offer two normally closed contacts and be capable of switching 50 mA @ 30V dc. Total resistance, including wiring and all switches, must not exceed 30 Ω for proper operation. Functional stop category 0 per NFPA 79 and EN 418, Safety Category 4 per EN 954-1. Simultaneity requirement less than 100 milliseconds. |
| **External Device Monitoring (EDM) Input*** | Terminals must open within 200 milliseconds of the FSD outputs closing (i.e., a clear condition) and must close within 200 milliseconds of the FSD outputs opening (i.e., a blocked condition) or a lockout will occur.<br>The monitoring contacts must be forced-guided (or captive contact) to maintain control reliability of the machine control circuit and must be capable of reliably switching 15 to 50V dc at 20 to 100 mA. |
| **Test Input** (except EDM models) | Terminals must be closed for a minimum of 0.05 seconds in order to guarantee a test input signal. The switching device used must be capable of switching 15-50V dc at 20 to 100 mA. |
| **AUX Non-Safety Output Contact** | Reed relay; 125V ac or dc max., 500 mA max. (10 VA max., resistive load) |

* External Device Monitoring (EDM) models only.

## MICRO-SCREEN® DIN Module Controller Specifications (cont'd)

| | |
|---|---|
| **Safety Outputs** | Forced-guided contact relays (resistive load).<br>FSD1 & 2, SSD = 250V ac max., 4 amps max.<br>**Mechanical life:** 10,000,000 operations (minimum).<br>**Electrical life (at full rated load):** 100,000 operations (typical).<br>*Arc suppression is recommended when switching inductive loads.*<br>Note: Controllers with model suffix "2" have two FSD output contacts and those with model suffix "4" have four FSD output contacts. |
| **Enclosure** | **Material:** gray polycarbonate, clear polycarbonate cover<br>**Rating:** NEMA 1; IP20 |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing) |
| **FMEA Tested** | Per requirements IEC 61496-1 |
| **Application Notes** | Use of fixed blanking requires sensors with 16 or more light beams. Up to 12 beams or 30% of the total number of beams in the array may be blanked, whichever is less. Call factory for applications assistance if a greater number of blanked beams is required. |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | **2 FSDs, 1 SSD and Power Monitoring:** WD019 (p. 256)<br>**2 FSDs, 1 SSD and 1-Channel EDM:** WD020 (p. 256)<br>**4 FSDs, 1 SSD and Power Monitoring:** WD021 (p. 257) |

## MICRO-SCREEN® DIN Module with DeviceNet™ Specifications

| | |
|---|---|
| **Device Net Power** | 11 to 25V dc; 80 mA - supplied by DeviceNet BUS Network |
| **Response Time** | **Light Screen:** Less than 38 milliseconds (all lengths)<br>**E-Stop:** Less than 15 milliseconds |
| **Status Indicators**<br>**(on control module and receiver)** | **Solid LED** / **Flashing LED**<br>**Red** BLOCKED/LATCHED / LOCKOUT<br>**Green** CLEAR / BLANKING ON<br>**Yellow** RESET / Double Flash = Waiting for System Key Reset at Power-up<br>Single Flash = ALIGNMENT. Flash rate increases with the number of sensing beams "made", solid yellow when aligned and defined area is clear<br><br>**Network status indicator:**<br>A bi-color (red/green) LED visible on the control module indicates network status:<br>**Green** Steady — On-line, connected to master<br>Flashing — On-line, not connected/allocated to master; if Autobaud is ON, address and baud rate OK<br>**Red** Steady — Critical network fault or duplicate mode address detected<br>Flashing — Connection time-out or no power to light screen<br>OFF — No network power or off-line<br>**Green/Red/OFF** — Autobaud detecting network baud rate |
| **Diagnostic Indicator** | Two-digit numeric display indicates cause of lockout condition and total number of beams blocked. |
| **Controls and Adjustments** | Keyed RESET of system lockout and latched conditions<br>Floating blanking selection switches and fixed blanking programming switches<br>Auto Power-up On-Off switches |
| **E-Stop Switch Input** | The Emergency Stop switch must offer two normally closed contacts and be capable of switching 50 mA @ 30V dc. Total resistance, including wiring and all switches, must not exceed 30 Ω for proper operation. Functional stop category 0 per NFPA 79 and EN 418, Safety Category 4 per EN 954-1. Simultaneity requirement less than 100 milliseconds. |
| **Test Input** | Terminals must be closed for a minimum of 0.05 seconds in order to guarantee a test input signal. The switching device used must be capable of switching 15-50V dc at 20 to 100 mA. |

DeviceNet™ is a trademark of Rockwell Automation.

# MICRO-SCREEN® DIN Module with DeviceNet™ Specifications (cont'd)

| | | | |
|---|---|---|---|
| **DeviceNet™ Configuration** | **Vendor Code** | 12 | (Banner Engineering Corp.) |
| | **Device Type** | 130 | (Safety Light Screen) |
| | **Product Code** | | |
| | **USDINT-1T2D/USDINT-1T4D** | 1 | |
| | **USDINT-2T2D/USDINT-2T4D** | 2 | |
| | **USDINT-1L2D/USDINT-1L4D** | 3 | |
| | **USDINT-2L2D/USDINT-2L4D** | 4 | |
| | **Connection Types Supported** | | Explicit Message, Poll, Change of State |
| | **Network Address** | | 0-63 (Manual Switches or Network configured) |
| | **Baud Rate Supported** | | Autobaud or Network configured (125K, 250K, 500K) (Factory setting is Autobaud ON) |
| | **EDS File Names** | | |
| | **USDINT-1T2D/USDINT-1T4D** | | 130_1_2.eds |
| | **USDINT-2T2D/USDINT-2T4D** | | 130_2_2.eds |
| | **USDINT-1L2D/USDINT-1L4D** | | 130_3_1.eds |
| | **USDINT-2L2D/USDINT-2L4D** | | 130_4_1.eds |
| | **Bit Map Icon File Name** | | 130.bmp |
| | EDS and Bitmap files on 3.5" floppy disk supplied with controller (p/n 52243) | | |
| **Poll and COS I/O Assembly Instances** | The MICRO-SCREEN device I/O assemblies consist of:<br>• **Poll:** One product specific input assembly containing operating mode, status of defined area, status of output relays, status of inputs (Key Reset, Test, and E-Stop), noise detected, number of sensor beams, number of beams blocked, Auto Power-up switch settings, COS trigger setting, autobaud setting, floating blanking switch settings and number of fixed beams (Fixed Blanking models only).<br>• **COS:** One product-specific input assembly containing the operating mode and defined area status. | | |
| **Auxiliary Monitor Relay** | Reed relay; 125V ac or dc max., 500 mA max. (10 VA max., resistive load) | | |
| **Safety Outputs** | Forced-guided contact relays (resistive load).<br>FSD1 & 2, SSD = 250V ac max., 4 amps max.<br>**Mechanical life:** 10,000,000 operations (minimum).<br>**Electrical life (at full rated load):** 100,000 operations (typical).<br>*Arc suppression is recommended when switching inductive loads.*<br>Note: Controllers with model suffix "2" have two FSD output contacts and those with model suffix "4" have four FSD output contacts. | | |
| **Enclosure** | **Material:** gray polycarbonate, clear polycarbonate cover<br>**Rating:** NEMA 1; IP20 | | |
| **Operating Conditions** | **Temperature:** 0° to +50° C | **Relative humidity:** 95% maximum (non-condensing) | |
| **FMEA Tested** | Per requirements IEC 61496-1 | | |
| **Application Notes** | Use of fixed blanking requires sensors with 16 or more light beams. Up to 12 beams or 30% of the total number of beams in the array may be blanked, whichever is less. Call factory for applications assistance if a greater number of blanked beams is required. | | |
| **Certifications** | For a list of certifications see page 236. | | |
| **Wiring Diagrams** | **2 FSDs, 1 SSD and Power Monitoring:** WD019 (p. 256)<br>**2 FSDs, 1 SSD and 1-Channel EDM:** WD020 (p. 256)<br>**4 FSDs, 1 SSD and Power Monitoring:** WD021 (p. 257) | | |

DeviceNet™ is a trademark of Rockwell Automation.

# MINI-SCREEN®

## Safety Light Screen Systems

- Family is designed for heavy-duty production machinery.
- Full system includes emitter, receiver, controller and interconnecting cables. Order QD cables separately.
- Standard or heavy-duty housing are available for emitters and receivers.
- Emitters and receivers feature compact housing with 19, 25 and 38 mm resolution.
- Explosion-proof enclosures are available.
- Systems include floating blanking (one- or two- beam), selectable auto power-up and optional fixed blanking.

QD CABLES 5-Pin Mini PAGE 179
INDICATORS PAGE 187
BRACKETS PAGE 190
MIRRORS PAGE 204
STANDS PAGE 209
LENS SHIELDS PAGE 213
ENCLOSURES PAGE 217

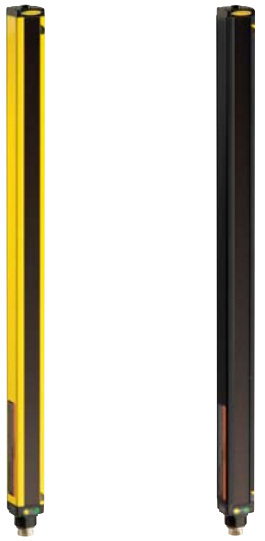


## MINI-SCREEN® Emitters & Receivers

- *19 mm resolution with maximum 9 m range or 25 mm resolution with maximum 18 m range*
- *Yellow painted or black anodized aluminum housing with rugged end caps*
- *Twelve heights from 114 to 1219 mm*
- *Status indicators*
- *Swivel brackets for easy alignment*
- *5-pin Mini QD connection standard*
- *QDS-... 5-pin Mini QD cables with "twisted pair" (see page 179)*
- *NEMA 4, 13; IEC IP65 housing*


MORE INFO ONLINE Detailed Dimensions

**Full View of Available Finishes**



**Yellow Painted Aluminum**

**Black Anodized Aluminum**

# MINI-SCREEN®, Emitters & Receivers - 19 mm Resolution

MORE INFO ONLINE Download PDF

| Model Number | Housing | Defined Area | Housing Length (L) | Range | Connection* | Data Sheet |
|---|---|---|---|---|---|---|
| MSE424Y<br>MSR424Y |  <br>19 mm Resolution | 114 mm | 153 mm | 9 m | 5-Pin Mini QD | 39022 |
| MSE424<br>MSR424 |  <br>19 mm Resolution | | | | | |
| MSE824Y<br>MSR824Y |  <br>19 mm Resolution | 215 mm | 254 mm | | | |
| MSE824<br>MSR824 |  <br>19 mm Resolution | | | | | |
| MSE1224Y<br>MSR1224Y |  <br>19 mm Resolution | 305 mm | 356 mm | | | |
| MSE1224<br>MSR1224 |  <br>19 mm Resolution | | | | | |
| MSE1624Y<br>MSR1624Y |  <br>19 mm Resolution | 406 mm | 457 mm | | | |
| MSE1624<br>MSR1624 |  <br>19 mm Resolution | | | | | |
| MSE2024Y<br>MSR2024Y |  <br>19 mm Resolution | 508 mm | 558 mm | | | |
| MSE2024<br>MSR2024 |  <br>19 mm Resolution | | | | | |
| MSE2424Y<br>MSR2424Y |  <br>19 mm Resolution | 610 mm | 659 mm | | | |
| MSE2424<br>MSR2424 |  <br>19 mm Resolution | | | | | |

 19 mm Resolution Yellow Housing  19 mm Resolution Black Housing

* For a 305 mm 5-Pin Mini Pigtail QD, add P to model number (example, **MSE424YP**). A model with a QD requires a mating cable (see page 179).
Note: Emitters (example, **MSE424Y**) and receivers (example, **MSR424Y**) are sold separately.

# MINI-SCREEN®, Emitters & Receivers - 19 mm Resolution (cont'd)

MORE INFO ONLINE Download PDF

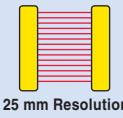
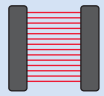
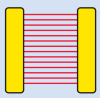
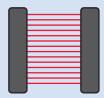
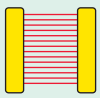
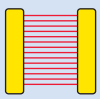
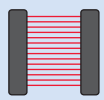
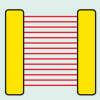
| Model Number | Housing | Defined Area | Housing Length (L) | Range | Connection* | Data Sheet |
|---|---|---|---|---|---|---|
| MSE2824Y<br>MSR2824Y |  <br>19 mm Resolution | 711 mm | 761 mm | 9 m | 5-Pin Mini QD | 39022 |
| MSE2824<br>MSR2824 |  <br>19 mm Resolution | | | | | |
| MSE3224Y<br>MSR3224Y |  <br>19 mm Resolution | 813 mm | 862 mm | | | |
| MSE3224<br>MSR3224 |  <br>19 mm Resolution | | | | | |
| MSE3624Y<br>MSR3624Y |  <br>19 mm Resolution | 914 mm | 963 mm | | | |
| MSE3624<br>MSR3624 |  <br>19 mm Resolution | | | | | |
| MSE4024Y<br>MSR4024Y |  <br>19 mm Resolution | 1016 mm | 1064 mm | | | |
| MSE4024<br>MSR4024 |  <br>19 mm Resolution | | | | | |
| MSE4424Y<br>MSR4424Y |  <br>19 mm Resolution | 1118 mm | 1166 mm | | | |
| MSE4424<br>MSR4424 |  <br>19 mm Resolution | | | | | |
| MSE4824Y<br>MSR4824Y |  <br>19 mm Resolution | 1219 mm | 1267 mm | | | |
| MSE4824<br>MSR4824 |  <br>19 mm Resolution | | | | | |

 19 mm Resolution Yellow Housing  19 mm Resolution Black Housing

* For a 305 mm 5-Pin Mini Pigtail QD, add P to model number (example, **MSE2824YP**). A model with a QD requires a mating cable (see page 179).
Note: Emitters (example, **MSE2824Y**) and receivers (example, **MSR2824Y**) are sold separately.

# MINI-SCREEN®, Emitters & Receivers - 25 mm Resolution

MORE INFO ONLINE Download PDF

| Model Number | Housing | Defined Area | Housing Length (L) | Range | Connection* | Data Sheet |
|---|---|---|---|---|---|---|
| MSXLE424Y<br>MSXLR424Y |  <br>25 mm Resolution | 114 mm | 153 mm | 18 m | 5-Pin Mini QD | 39022 |
| MSXLE424<br>MSXLR424 |  <br>25 mm Resolution | | | | | |
| MSXLE824Y<br>MSXLR824Y |  <br>25 mm Resolution | 215 mm | 254 mm | | | |
| MSXLE824<br>MSXLR824 |  <br>25 mm Resolution | | | | | |
| MSXLE1224Y<br>MSXLR1224Y |  <br>25 mm Resolution | 305 mm | 356 mm | | | |
| MSXLE1224<br>MSXLR1224 |  <br>25 mm Resolution | | | | | |
| MSXLE1624Y<br>MSXLR1624Y |  <br>25 mm Resolution | 406 mm | 457 mm | | | |
| MSXLE1624<br>MSXLR1624 |  <br>25 mm Resolution | | | | | |
| MSXLE2024Y<br>MSXLR2024Y |  <br>25 mm Resolution | 508 mm | 558 mm | | | |
| MSXLE2024<br>MSXLR2024 |  <br>25 mm Resolution | | | | | |
| MSXLE2424Y<br>MSXLR2424Y |  <br>25 mm Resolution | 610 mm | 659 mm | | | |
| MSXLE2424<br>MSXLR2424 |  <br>25 mm Resolution | | | | | |

 25 mm Resolution Yellow Housing  25 mm Resolution Black Housing

* For a 305 mm 5-Pin Mini Pigtail QD, add P to model number (example, **MSXLE424YP**). A model with a QD requires a mating cable (see page 179).
Note: Emitters (example, **MSXLE424Y**) and receivers (example, **MSXLR424Y**) are sold separately.

# MINI-SCREEN®, Emitters & Receivers - 25 mm Resolution (cont'd)

MORE INFO ONLINE Download PDF

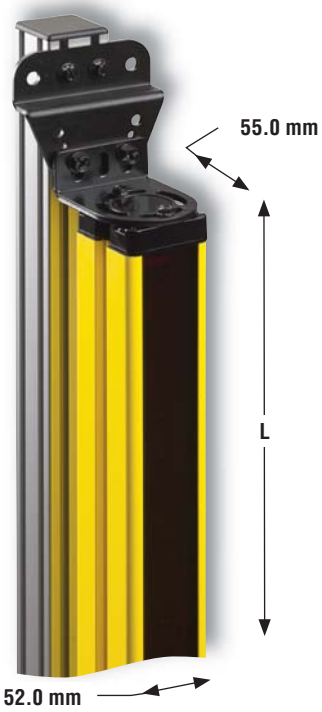
| Model Number | Housing | Defined Area | Housing Length (L) | Range | Connection* | Data Sheet |
|---|---|---|---|---|---|---|
| MSXLE2824Y<br>MSXLR2824Y |  <br>25 mm Resolution | 711 mm | 761 mm | 18 m | 5-Pin Mini QD | 39022 |
| MSXLE2824<br>MSXLR2824 |  <br>25 mm Resolution | | | | | |
| MSXLE3224Y<br>MSXLR3224Y |  <br>25 mm Resolution | 813 mm | 862 mm | | | |
| MSXLE3224<br>MSXLR3224 |  <br>25 mm Resolution | | | | | |
| MSXLE3624Y<br>MSXLR3624Y |  <br>25 mm Resolution | 914 mm | 963 mm | | | |
| MSXLE3624<br>MSXLR3624 |  <br>25 mm Resolution | | | | | |
| MSXLE4024Y<br>MSXLR4024Y |  <br>25 mm Resolution | 1016 mm | 1064 mm | | | |
| MSXLE4024<br>MSXLR4024 |  <br>25 mm Resolution | | | | | |
| MSXLE4424Y<br>MSXLR4424Y |  <br>25 mm Resolution | 1118 mm | 1166 mm | | | |
| MSXLE4424<br>MSXLR4424 |  <br>25 mm Resolution | | | | | |
| MSXLE4824Y<br>MSXLR4824Y |  <br>25 mm Resolution | 1219 mm | 1267 mm | | | |
| MSXLE4824<br>MSXLR4824 |  <br>25 mm Resolution | | | | | |

 25 mm Resolution Yellow Housing  25 mm Resolution Black Housing

* For a 305 mm 5-Pin Mini Pigtail QD, add P to model number (example, **MSXLE2824YP**). A model with a QD requires a mating cable (see page 179).
Note: Emitters (example, **MSXLE2824Y**) and receivers (example, **MSXLR2824Y**) are sold separately.

# MINI-SCREEN® Heavy-Duty Emitters & Receivers

- *Robust, impact-resistant housing*
- *38 mm resolution with 18 m range*
- *Seven heights from 610 to 1829 mm*
- *High immunity to ambient light interference*
- *Status indicators*
- *Swivel bracket for easy alignment*
- *5-pin Mini QD connection standard*
- *QDS-... 5-pin Mini QD with "twisted pair" (see page 179)*
- *NEMA 4, 13; IEC IP65 housing*




MINI-SCREEN Heavy-Duty Emitters & Receivers

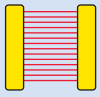
MORE INFO ONLINE Detailed Dimensions

Full View

Yellow Painted Aluminum

## MINI-SCREEN® Heavy-Duty Emitters & Receivers - 38 mm Resolution

MORE INFO ONLINE Download PDF

| Model Number | Resolution | Defined Area | Housing Length (L) | Range | Connection* | Data Sheet |
|---|---|---|---|---|---|---|
| **MSXLHDE2412Y**<br>**MSXLHDR2412Y** |  <br>38 mm Resolution | 610 mm | 625 mm | 18 m | 5-Pin Mini QD | 69018 |
| **MSXLHDE3212Y**<br>**MSXLHDR3212Y** | | 813 mm | 826 mm | | | |
| **MSXLHDE4012Y**<br>**MSXLHDR4012Y** | | 1016 mm | 1029 mm | | | |
| **MSXLHDE4812Y**<br>**MSXLHDR4812Y** | | 1219 mm | 1229 mm | | | |
| **MSXLHDE5612Y**<br>**MSXLHDR5612Y** | | 1422 mm | 1433 mm | | | |
| **MSXLHDE6412Y**<br>**MSXLHDR6412Y** | | 1626 mm | 1633 mm | | | |
| **MSXLHDE7212Y**<br>**MSXLHDR7212Y** | | 1829 mm | 1836 mm | | | |

38 mm Resolution

* For a 305 mm 5-Pin Mini Pigtail QD, add P to model number (example, **MSXLHDE2412YP**). A model with a QD requires a mating cable (see page 179).
Note: Emitters (example, **MSXLHDE2412Y**) and receivers (example, **MSXLHDR2412Y**) are sold separately.

# MINI-SCREEN® Metal Box Controllers

- *Welded steel box with polyester powder paint finish*
- *115/230V ac or 24V dc supply voltage*
- *Floating blanking and selectable auto power-up*
- *Optional fixed blanking, muting and External Device Monitoring (EDM)*
- *Latch or trip output*
- *NEMA 13, IEC IP64 housing*


MINI-SCREEN Metal Box Controller (MSCA-1 shown)


MINI-SCREEN Metal Box Controller with Muting (MSCC-2T2M shown)

## MINI-SCREEN® Series, Metal Box Controllers

MORE INFO ONLINE Download PDF

| Models | | Supply Voltage | Output Type | Safety Outputs* | Output Rating | Aux. Outputs** | Floating Blanking | Fixed Blanking | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
|  | MSCT-1 | 24V dc | Trip | 2 NO | 4 amps | — | 2-beam | No | 39022 |
| | MSCT-1T3 | | | | 6 amps | 1 NC | | | 59664 & 39022 |
| | MSCT-2 | | | | 4 amps | — | 1- or 2-beam | Yes | 47295 |
| | MSCT-2T3 | | | | 6 amps | 1 NC | | | 59664 & 47295 |
| | MSCA-1 | 115V ac | Trip | | 4 amps | — | 2-beam | No | 39022 |
| | MSCA-1T3 | | | | 6 amps | 1 NC | | | 59664 & 39022 |
| | MSCA-1L2 | | Latch | | 4 amps | — | | | 55702 |
| | MSCA-1L3 | | | | 6 amps | 1 NC | | | 59664 & 55702 |
| | MSCA-1L3E* | | | | 6 amps | 1 NC | | | 46904 & 55702 |
| | MSCA-1S2E* | | Trip/Latch Selectable | | 4 amps | — | | | 39022 |
| | MSCA-1S3E* | | | | 6 amps | 1 NC | | | 39022 |
| | MSCB-1 | 230V ac | Trip | | 4 amps | — | | | 39022 |
| | MSCB-1T3 | | | | 6 amps | 1 NC | | | 59664 & 39022 |
| | MSCB-1L2 | | Latch | | 4 amps | — | | | 55702 |
| | MSCD-2 | 115/230V ac | Trip | | 4 amps | — | 1- or 2-beam | Yes | 47295 |
| | MSCD-2T3 | | | | 6 amps | 1 NC | | | 59644 & 47295 |

NC = Normally Closed Relay, NO = Normally Open Relay
* The suffix "E" adds external device monitoring input
** All models contain one Reed Relay (see specifications page 73)

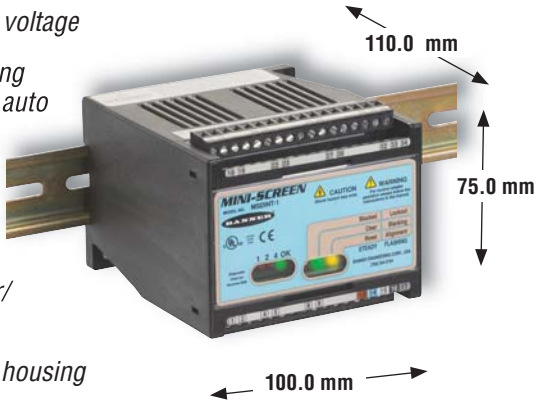
## MINI-SCREEN® Series, Metal Box Controllers with Muting

| Models | | Supply Voltage | Output Type | Safety Outputs | Output Rating | Aux. Outputs** | Floating Blanking | Fixed Blanking | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|
|  | MSCC-2T2M | 115/230V ac or 24V dc | Trip | 2 NO | 4 amps | — | 1- or 2-beam | Yes | 64723 |
| | MSCC-2T3M | | | | 6 amps | 1 NC | | | |
| | MSCC-2L2M | 115/230V ac or 24V dc | Latch | | 4 amps | — | | | 61409 |
| | MSCC-2L3M | | | | 6 amps | 1 NC | | | |

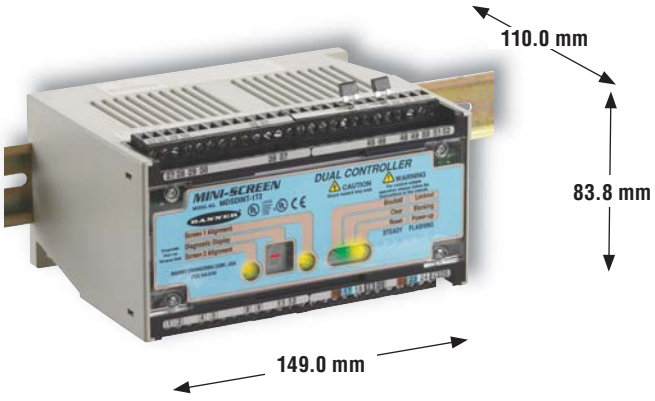
NC = Normally Closed Relay, NO = Normally Open Relay
* All models contain two Reed Relays (see specifications pages 74-75)
Note: External Device Monitoring (EDM) standard on all controllers with muting.

## MINI-SCREEN® DIN Module Controllers

- *Polycarbonate housing with removable terminal blocks and clear cover*
- *24V dc supply voltage*
- *Floating blanking and selectable auto power-up*
- *Latch or trip output*
- *Dual models for two emitter/ receiver pairs*
- *NEMA 1; IP20 housing*

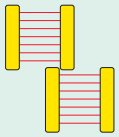



**MINI-SCREEN DIN Module Controller (MSDINT-1 shown)**




**MINI-SCREEN Dual DIN Module Controller (MDSDINT-1T2 shown)**

## MINI-SCREEN Series, DIN Module Controllers

| Models | | Supply Voltage | Output Type | Safety Outputs* | Output Rating | Floating Blanking | Fixed Blanking | E-Stop Input | Light Screen Pairs/Controller | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|---|
|  | MSDINT-1 | 24V dc | Trip | 2 NO | 4 amps | 2-beam | No | No |  1 Pair | 44895 |
| | MSDINT-1L2 | | Latch | | | | | | | |
|  | MDSDINT-1T2 | | Trip | | | 1- or 2-beam | | Yes |  2 Pairs | 47297 & 60159 |
| | MDSDINT-1L2 | | Latch | | | | | | | |

NC = Normally Closed Relay, NO = Normally Open Relay
* In addition to safety outputs, all models contain either one or two non-safety Reed Relay auxiliary outputs (see specifications pages 76-77).

# MINI-SCREEN® Interfacing Products

MORE INFO ONLINE Download PDF

| | | Models | Description | Product Information | Data Sheet |
|---|---|---|---|---|---|
| Muting Modules |  | MM-TA-12B | • The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery.<br>• The module uses redundant microcontroller-based logic. | Page 123 | 63517 |
| | | MMD-TA-12B | | | 116390 |
| | | MMD-TA-11B | | | |
| Contactors |  | **Mechanically Linked Contactors** | • Pairs of contactors create safety stop circuits with two normally open contacts in series.<br>• MINI-SCREEN can monitor the circuit because of the contacts' force-guided mechanically linked design.<br>• Contactors add 10 or 16 amp current carrying capability to any safety system.<br>• Auxiliary contacts add 3 or 4 normally open contacts.<br>• Suppressors extend the life of an actuating device that uses a contactor.<br>• Modular design simplifies assembly and installation. | Page 186 | 111881 |
| | | 11-BG00-31-A12060 | | | |
| | | 11-BG00-31-D-024 | | | |
| | | 11-BF1601-12060 | | | |
| | | 11-BF16C01-024 | | | |
| | | **Aux. Contacts** | | | |
| | | 11-BGX10-40 | | | |
| | | 11-G484-30 | | | |
| | | **Suppressors** | | | |
| | | 11-BGX77-048 | | | |
| | | 11-BGX77-240 | | | |
| | | 11-G318-48 | | | |
| | | 11-G477-240 | | | |

# MINI-SCREEN® Metal Box Controller Kits - Floating Blanking

You can purchase a kit that contains an emitter and receiver of equal length and range; standard mounting brackets; and a pair of quick-disconnect cables. Detailed information about individual kit components is as follows.


- Metal Box Controllers – Floating Blanking . . . . . Page 64
- Emitter and Receivers . . . . . 59-63
- Cables . . . . . 179
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Sensor Housing: Yellow | Sensor Housing: Black | Sensor Housing: Heavy-Duty Yellow | Defined Area | Resolution | Beams Per Foot | Range | Supply Voltage | Output Type | Number of Outputs | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MSKT24243C2 | | ● | | 610 mm | 19 mm | 24 | 9 m | 24V dc | Trip | 2 NO Safety Outputs & 1 NC Aux. | 8 m, 2 each |
| MSKT24243C2Y | ● | | | | | | | | | | |
| MSXLKT24243C2 | | ● | | | 25 mm | | 18 m | | | | |
| MSXLKT24243C2Y | ● | | | | | | | | | | |
| MSXLHDKT24123C2Y | | | ● | | 38 mm | 12 | 18 m | | | | |
| MSKA24243C2 | | ● | | | 19 mm | 24 | 9 m | 115V ac | | | |
| MSKA24243C2Y | ● | | | | | | | | | | |
| MSXLKA24243C2 | | ● | | | 25 mm | | 18 m | | | | |
| MSXLKA24243C2Y | ● | | | | | | | | | | |
| MSXLHDKA24123C2Y | | | ● | | 38 mm | 12 | 18 m | | | | |
| MSKB24243C2 | | ● | | | 19 mm | 24 | 9 m | 230V ac | | | |
| MSKB24243C2Y | ● | | | | | | | | | | |
| MSXLKB24243C2 | | ● | | | 25 mm | | 18 m | | | | |
| MSXLKB24243C2Y | ● | | | | | | | | | | |
| MSXLHDKB24123C2Y | | | ● | | 38 mm | 12 | 18 m | | | | |

NC = Normally Closed Relay, NO = Normally Open Relay

## Kit Model Key

| Model Style | Emitter/Receiver Separation | Kit | Supply Voltage | Options | Defined Area | Beams Per Foot | Output Type | Output Configuration | QD Cables | Finish | Sensor Cable Termination |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M S | X L | K | A | | 2 4 | 2 4 | | 3 | C 2 | Y | P |

**Model Style**
**MS** = MINI-SCREEN

**Max. Emitter/Receiver Separation**
**Blank** = 9 m
**XL** = 18 m
**XLHD** = Heavy-Duty 18 m

**Kit**
**K** = Kit

**Supply Voltage**
**A** = 115V ac
**B** = 230V ac
**T** = 24V dc

**Options**
**E** = With External Device Monitoring (EDM)
**Blank** = Without

**Defined Area**
**4** = 114 mm
**8** = 215 mm
**12** = 305 mm
**16** = 406 mm
**20** = 508 mm
**24** = 610 mm
**28** = 711 mm
**32** = 813 mm
**36** = 914 mm
**40** = 1016 mm
**44** = 1118 mm
**48** = 1219 mm

**Beams per Foot**
**24** = Standard & Long-Range Series
**12** = Heavy-Duty Series

**Output Type**
**Blank** = Trip
**L** = Latch
**S** = Trip/Latch Selectable

**Output Configuration**
**Blank**= 2 NO Safety Outputs
**3** = 2 NO Safety Outputs & 1 NC Aux.

**Quick-Disconnect Cables**
**C1** = 2 x 5 m
**C2** = 2 x 8 m
**C3** = 1 x 5 m plus 1 x 8 m

**Sensor Finish**
**Blank** = Black anodized
**Y** = Yellow polyester paint

**Sensor Cable Termination**
**Blank** = Integral QD connector
**P** = Pigtail QD

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model number.

# MINI-SCREEN® Metal Box Kits - Floating & Fixed Blanking

You can purchase a kit that contains an emitter and receiver of equal length and range; standard mounting brackets; and a pair of quick-disconnect cables. Detailed information about individual kit components is as follows.


- Metal Box Controllers – Floating & Fixed Blanking . . . . . Page 64
- Emitter and Receivers . . . . . 59-63
- Cables . . . . . 179
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Sensor Housing: Yellow | Sensor Housing: Black | Sensor Housing: Heavy-Duty Yellow | Defined Area | Resolution | Beams Per Foot | Range | Supply Voltage | Output Type | Number of Outputs | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **MSK2T24243C2** | | ● | | 610 mm | 19 mm | 24 | 9 m | 24V dc | Trip | 2 NO Safety Outputs & 1 NC Aux. | 8 m, 2 each |
| **MSK2T24243C2Y** | ● | | | | | | | | | | |
| **MSXLK2T24243C2** | | ● | | | 25 mm | | 18 m | | | | |
| **MSXLK2T24243C2Y** | ● | | | | | | | | | | |
| **MSXLHDK2T24123C2Y** | | | ● | | 38 mm | 12 | 18 m | | | | |
| **MSK2D24243C2** | | ● | | | 19 mm | 24 | 9 m | 115/230V ac | | | |
| **MSK2D24243C2Y** | ● | | | | | | | | | | |
| **MSXLK2D24243C2** | | ● | | | 25 mm | | 18 m | | | | |
| **MSXLK2D24243C2Y** | ● | | | | | | | | | | |
| **MSXLHDK2D24123C2Y** | | | ● | | 38 mm | 12 | 18 m | | | | |

NC = Normally Closed Relay, NO = Normally Open Relay

## Kit Model Key

| Model Style | Emitter/Receiver Separation | Kit | Blanking | Supply Voltage | Defined Area | Beams Per Foot | Output Configuration | QD Cables | Finish | Sensor Cable Termination |
|---|---|---|---|---|---|---|---|---|---|---|
| M S | X L | K | 2 | D | 2 4 | 2 4 | 3 | C 2 | Y | P |

**Model Style**
**MS** = MINI-SCREEN

**Max. Emitter/Receiver Separation**
**Blank** = 9 m
**XL** = 18 m
**XLHD** = Heavy-Duty 18 m

**Kit**
**K** = Kit

**Blanking**
**2** = Floating & Fixed Blanking

**Supply Voltage**
**D** = 115/230V ac
**T** = 24V dc

**Defined Area**
**4** = 114 mm
**8** = 215 mm
**12** = 305 mm
**16** = 406 mm
**20** = 508 mm
**24** = 610 mm
**28** = 711 mm
**32** = 813 mm
**36** = 914 mm
**40** = 1016 mm
**44** = 1118 mm
**48** = 1219 mm

**Beams per Foot**
**24** = Standard & Long-Range Series
**12** = Heavy-Duty Series

**Output Configuration**
**Blank**= 2 NO Safety Outputs
**3** = 2 NO Safety Outputs & 1 NC Aux.

**Quick-Disconnect Cables**
**C1** = 2 x 5 m
**C2** = 2 x 8 m
**C3** = 1 x 5 m plus 1 x 8 m

**Sensor Finish**
**Blank** = Black anodized
**Y** = Yellow polyester paint

**Sensor Cable Termination**
**Blank** = Integral QD connector
**P** = Pigtail QD

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model number.

# MINI-SCREEN® Metal Box with Muting Kits - Floating & Fixed Blanking

You can purchase a kit that contains an emitter and receiver of equal length and range; standard mounting brackets; and a pair of quick-disconnect cables. Detailed information about individual kit components is as follows.


- Metal Box Controllers with Muting – Floating & Floating Blanking . . . . . Page 65
- Emitter and Receivers . . . . . 59-63
- Cables . . . . . 179
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Sensor Housing: Yellow | Sensor Housing: Black | Sensor Housing: Heavy-Duty Yellow | Defined Area | Resolution | Beams Per Foot | Range | Supply Voltage | Output Type | Number of Outputs | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MSK2CM24243C2 | | ● | | 610 mm | 19 mm | 24 | 9 m | 115/230V ac or 24V dc | Trip | 2 NO Safety Outputs & 1 NC Aux. | 8 m, 2 each |
| MSK2CM24243C2Y | ● | | | | | | | | | | |
| MSXLK2CM24243C2 | | ● | | | 25 mm | | 18 m | | | | |
| MSXLK2CM24243C2Y | ● | | | | | | | | | | |
| MSXLHDK2CM24123C2Y | | | ● | | 38 mm | 12 | 18 m | | | | |

NC = Normally Closed Relay, NO = Normally Open Relay

## Kit Model Key

| Model Style | Emitter/Receiver Separation | Kit | Blanking | Supply Voltage | Muting | Defined Area | Beams Per Foot | Output Type | No. of Outputs | QD Cables | Finish | Sensor Cable Termination |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M S | X L | K | 2 | C | M | 2 4 | 2 4 | | | C 2 | Y | P |

**Model Style**
**MS** = MINI-SCREEN

**Kit**
**K** = Kit

**Max. Emitter/Receiver Separation**
**Blank** = 9 m
**XL** = 18 m
**XLHD** = Heavy-Duty 18 m

**Blanking**
**2** = Floating & Fixed Blanking

**Supply Voltage**
**C** = 115/230V ac or 24V dc

**Muting Function**
**M** = Muting

**Defined Area**
**4** = 114 mm
**8** = 215 mm
**12** = 305 mm
**16** = 406 mm
**20** = 508 mm
**24** = 610 mm
**28** = 711 mm
**32** = 813 mm
**36** = 914 mm
**40** = 1016 mm
**44** = 1118 mm
**48** = 1219 mm

**Beams per Foot**
**24** = Standard & Long-Range Series
**12** = Heavy-Duty Series

**Output Type**
**Blank** = Trip
**L** = Latch

**Number of Outputs**
**Blank**= 2 NO Safety Outputs
**3** = 2 NO Safety Outputs & 1 NC Aux.

**Quick-Disconnect Cables**
**C1** = 2 x 5 m
**C2** = 2 x 8 m
**C3** = 1 x 5 m plus 1 x 8 m

**Sensor Finish**
**Blank** = Black anodized
**Y** = Yellow polyester paint

**Sensor Cable Termination**
**Blank** = Integral QD connector
**P** = Pigtail QD

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model number.

# MINI-SCREEN® DIN Module Controller Kits - Floating Blanking

You can purchase a kit that contains an emitter and receiver of equal length and range; standard mounting brackets; and a pair of quick-disconnect cables. Detailed information about individual kit components is as follows.


- DIN Module Controllers – Floating Blanking. . . . . Page 65
- Emitter and Receivers . . . . . 59-63
- Cables . . . . . 179
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Sensor Housing: Yellow | Sensor Housing: Black | Sensor Housing: Heavy-Duty Yellow | Defined Area | Resolution | Beams Per Foot | Range | Supply Voltage | Output Type | Number of Outputs | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MSDKT2424C2 | | • | | 610 mm | 19 mm | 24 | 9 m | 24V dc | Trip | 2 NO Safety Outputs | 8 m, 2 each |
| MSDKT2424C2Y | • | | | | | | | | | | |
| MSXLDKT2424C2 | | • | | | 25 mm | | 18 m | | | | |
| MSXLDKT2424C2Y | • | | | | | | | | | | |
| MSXLHDKT2412C2Y | | | • | | 38 mm | 12 | 18 m | | | | |

NC = Normally Closed Relay, NO = Normally Open Relay

## Kit Model Key

| Model Style* | Emitter/Receiver Separation | Kit | Supply Voltage | Defined Area | Beams Per Foot | Output Type | QD Cables | Finish | Sensor Cable Termination |
|---|---|---|---|---|---|---|---|---|---|
| M S | X L | D K | T | 2 4 | 2 4 | | C 2 | Y | P |

**Model Style***
**MS** = MINI-SCREEN

**Kit**
**DK** = DIN-style controller Kit

**Supply Voltage**
**T** = 24V dc

**Max. Emitter/Receiver Separation**
**Blank** = 9 m
**XL** = 18 m
**XLHD** = Heavy-Duty 18 m

**Defined Area**
**4** = 114 mm
**8** = 215 mm
**12** = 305 mm
**16** = 406 mm
**20** = 508 mm
**24** = 610 mm
**28** = 711 mm
**32** = 813 mm
**36** = 914 mm
**40** = 1016 mm
**44** = 1118 mm
**48** = 1219 mm

**Beams per Foot**
**24** = Standard & Long-Range Series
**12** = Heavy-Duty Series

**Output Type**
**Blank** = Trip
**L** = Latch

**Quick-Disconnect Cables**
**C1** = 2 x 5 m
**C2** = 2 x 8 m
**C3** = 1 x 5 m plus 1 x 8 m

**Sensor Finish**
**Blank** = Black anodized
**Y** = Yellow polyester paint

**Sensor Cable Termination**
**Blank** = Integral QD connector
**P** = Pigtail QD

* Kits are not available for Dual DIN Modules. A controller, two emitter/receiver pairs and the appropriate cables are sold separately (see page 179).
NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model number.

# MINI-SCREEN® Emitter & Receiver Specifications

| | |
|---|---|
| **Emitter/Receiver Separation** | **19 mm Resolution Emitters and Receivers:** 150 mm to 9 m<br>**25.4 mm Resolution Emitters and Receivers:** 150 mm to 18 m |
| **Minimum Object Sensitivity** | **19 mm Resolution:**<br>19.1 mm floating blanking OFF<br>31.8 mm 1-beam floating blanking ON<br>44.5 mm 2-beam floating blanking ON<br>**25.4 mm Resolution:**<br>25.4 mm floating blanking OFF<br>38.1 mm 1-beam floating blanking ON<br>50.8 mm 2-beam floating blanking ON |
| **Response Time** | Less than 48 milliseconds using emitter/receiver with 114 to 406 mm defined area<br>Less than 60 milliseconds using emitter/receiver with 508 to 813 mm defined area<br>Less than 72 milliseconds using emitter/receiver with 914 to 1219 mm defined area |
| **Self-Checking Interval** | 20 milliseconds |
| **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 peak emission |
| **Status Indicators** | **Emitter:** Green LED for power ON<br>**Receiver:** Red, yellow and green status indicators with the same functions as those on the left side of the control box (see individual Control Box Specifications, pages 73-77). Yellow also indicates alignment. Indicators are visible on three sides of receiver or emitter base. |
| **Emitter and Receiver Enclosures** | **Materials:** Aluminum extrusion with black anodized or yellow polyester painted finish; acrylic lens cover<br>Mounting hardware supplied<br>**Rating:** NEMA 4, 13; IEC IP65 |
| **Mounting Hardware** | Emitter and receiver are each supplied with a pair of mounting brackets. Mounting brackets are 11-gauge cold-rolled black zinc chromate finished steel. A set of four vibration dampening mounts is also supplied. |
| **Cables** | **Emitters and Receivers with Pigtail (MSE/MSRxxxxYP) Quick Disconnect:**<br>Pigtail QD connectors have a 305 mm long cable, terminated with a 5-pin Mini-style quick-disconnect fitting. Mating interconnect cables are ordered separately (unless a MINI-SCREEN kit is ordered, see Models and Accessories, page 179), and are available in lengths of 4.5 m, 7.6 m, 15 m, 30 m and 45 m.<br><br>NOTE: Contact factory when cable length exceeding 53 m is required. Use only Banner cables, which incorporate a shielded “twisted pair” for noise immunity on RS485 data communications lines. Use of other cables may result in “nuisance” trips or lockouts. |
| **Optical Performance** | This system meets ± 2.5° requirements of IEC 61496-2, section 5.2.9 (Type 4) |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing) |
| **Certifications** | For a list of certifications see page 236. |

# MINI-SCREEN® Heavy-Duty Emitter & Receiver Specifications

| | |
|---|---|
| **Emitter/Receiver Separation** | 150 mm to 18 m |
| **Minimum Object Sensitivity** | 38 mm floating blanking OFF<br>62 mm 1-beam floating blanking ON<br>89 mm 2-beam floating blanking ON |
| **Response Time** | Less than 48 milliseconds for 610 mm and 813 mm emitter/receiver<br>Less than 60 milliseconds for 1016 mm to 1626 mm emitter/receiver<br>Less than 72 milliseconds for 1829 mm emitter/receiver |
| **Self-Checking Interval** | 20 milliseconds |
| **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 peak emission |
| **Status Indicators** | **Emitter:** Green LED for power ON<br>**Receiver:** Red, yellow and green status indicators with the same functions as those on the left side of the control box (see individual Control Box Specifications, pages 73-77). Yellow also indicates alignment. Indicators are visible on three sides of receiver or emitter base. |
| **Emitter and Receiver Enclosures** | **Materials:** Aluminum extrusion with yellow polyester painted finish; acrylic lens cover. Mounting hardware supplied.<br>**Rating:** NEMA 4, 13; IEC IP65 |
| **Mounting Hardware** | Emitter and receiver are each supplied with a pair of mounting brackets. Mounting brackets are 8-gauge cold-rolled black zinc chromate finished steel. |
| **Cables** | **Emitters and Receivers with Pigtail (MSXLHDE/MSXLHDRxxxxYP) Quick Disconnect:**<br>Pigtail QD connectors have a 305 mm long cable, terminated with a 5-pin Mini-style quick-disconnect fitting. Mating interconnect cables are ordered separately (unless a MINI-SCREEN kit is ordered, see Models and Accessories, page 179), and are available in lengths of 4.5 m, 7.6 m, 15 m, 30 m and 45 m.<br><br>NOTE: Contact factory when cable length exceeding 53 m is required. Use only Banner cables, which incorporate a shielded “twisted pair” for noise immunity on RS485 data communications lines. Use of other cables may result in “nuisance” trips or lockouts. |
| **Optical Performance** | This system meets ± 2.5° requirements of IEC 61496-2, section 5.2.9 (Type 4) |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing) |
| **Certifications** | For a list of certifications see page 236. |

# MINI-SCREEN® Metal Box Controller Specifications

| | |
|---|---|
| **System Power Requirements** | **MSCA-.. models:** 115V ac ± 15% (50/60 Hz), 55 VA<br>**MSCB-.. models:** 230V ac ± 15% (50/60 Hz), 55 VA<br>**MSCT-.. models:** 24V dc ±15%, 10% max. ripple, 1.5 amps max.<br>**MSCD-.. models:** 115/230V ac ±15% (50/60 Hz), 55 VA |
| **Fuse Rating** | **MSCA-1.. models:** ½ amp, 250V (3 AG or 5x20 mm slow blow)<br>**MSCB-1.. models:** ¼ amp, 250V (3 AG or 5x20 mm slow blow)<br>**MSCT-1.. models:** 2 amp, 250V (3 AG or 5x20 mm slow blow)<br>**MSCD-2.. models:** 115V ac: 1 amp, 250V; 230V ac: 1/2 amp, 250V<br>**MSCT-2.. models:** 2 amp, 250V (all fuses 3 AG or 5x20 mm slow blow) |
| **Response Time** | **Standard and Long-Range Emitters/Receivers:**<br>Less than 48 milliseconds using emitter/receiver with 114 mm to 406 mm defined area<br>Less than 60 milliseconds using emitter/receiver with 508 mm to 813 mm defined area<br>Less than 72 milliseconds using emitter/receiver with 914 mm to 1219 mm defined area<br><br>**Heavy-Duty Emitters/Receivers:**<br>Less than 48 milliseconds using emitter/receiver with 610 mm to 813 mm defined area<br>Less than 60 milliseconds using emitter/receiver with 1016 mm to 1626 mm defined area<br>Less than 72 milliseconds using emitter/receiver with 1829 mm defined area |
| **Status Indicators** (on control box and receiver) | **Red** — Solid LED: BLOCKED/LATCHED; Flashing LED: LOCKOUT<br>**Green** — Solid LED: CLEAR; Flashing LED: BLANKING ON<br>**Yellow** — Solid LED: RESET; Flashing LED: Double Flash = Waiting for Power-up Key Reset<br>Single Flash = ALIGNMENT. Flash rate increases with the number of sensing beams "made", solid yellow when aligned and defined area is clear |
| **Diagnostic Indicators** | **MSCT-2.. & MSCD-2..:**<br>Two-digit numeric display indicates cause of lockout condition.<br>Display is visible through a window in the control box cover.<br><br>**MSCA-1.., MSCB-1.. & MSCT-1..:**<br>Four LEDs indicate cause of lockout condition.<br>Diagnostic LEDs are visible through a window in the control box cover. |
| **Controls and Adjustments** | Keyed Reset of system lockout or latched conditions<br>Floating Blanking selection switches and Fixed Blanking programming switches<br>Auto Power Up On-Off switches |
| **Test Input** | Terminals must be closed for a minimum of 0.05 seconds in order to guarantee a test input signal. The switching device used must be capable of switching 15-50V dc at 20 to 100 mA. |
| **External Device Monitoring (EDM) Input** | Terminals must be closed before controller attempts to reset (close) the FSD outputs after clearing an interruption of the defined area. The EDM input should open when the FSD outputs close (a clear condition), but this is not required. The EDM input must be closed within 200 milliseconds of the FSD outputs opening (a blocked condition) or a lockout condition will occur. The contacts of the monitored device must be capable of switching 15-50V dc at 20 to 100 mA. |
| **Auxiliary Monitor Relay** | Reed relay; 125V ac or dc max., 500 mA max. (10 VA max., resistive load) |
| **Safety Outputs** | Forced-guided contact relay (resistive load).<br>**MSC..-..2:** FSD1 & 2, SSD = 250V ac max., 4 amp max.<br>**MSC..-..3:** FSD1 & 2, CNC = 250V ac max., 6 amp max.; SSD = 250V ac max., 4 amp max<br>**Mechanical life:** 10,000,000 operations (minimum).<br>**Electrical life:** 100,000 operations (typical @ 1.0 kVA switching power).<br>*Arc suppression is recommended when switching inductive loads.* |
| **Enclosure** | **Material:** Welded steel box with black polyester powder paint finish.<br>**Rating:** NEMA 13, IEC IP64 |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing) |
| **FMEA Tested** | Per requirements IEC 61496-1 (type 4) |
| **Application Notes** | Use of fixed blanking requires sensors with 16 or more light beams. Up to 12 beams or 30% of the total number of beams in the array may be blanked, whichever is less. Call factory for applications assistance if a greater number of blanked beams is required. |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | **2 FSDs, 1 SSD and Power Monitoring:** WD022 (p. 258) |

# MINI-SCREEN® Metal Box Controller with Muting Specifications

| | |
|---|---|
| **System Power Requirements** | 115V ac (50/60Hz) ± 15% @ 500 mA (50 VA),<br>230V ac (50/60Hz) ± 15% @ 250 mA (50 VA), or<br>24V dc ±15%, 10% max. ripple, @ 2.5 A (60 W) |
| **Fuse Rating** | **115V ac:** 1.0 A @ 250V ac (supplied)<br>**230V ac:** 500 mA @ 250V ac<br>**+24V dc:** Internal resettable |
| **Response Time** | **Standard and Long-Range Emitters/Receivers:**<br>Less than 58 milliseconds using emitter/receiver with 114 mm to 406 mm defined area<br>Less than 70 milliseconds using emitter/receiver with 508 mm to 813 mm defined area<br>Less than 82 milliseconds using emitter/receiver with 914 mm to 1219 mm defined area<br><br>**Heavy-Duty Emitters/Receivers:**<br>Less than 58 milliseconds using emitter/receiver with 610 mm to 813 mm defined area<br>Less than 70 milliseconds using emitter/receiver with 1016 mm to 1626 mm defined area<br>Less than 82 milliseconds using emitter/receiver with 1829 mm defined area |
| **Status Indicators**<br>(on control box and receiver) | **Standard models:**<br>**Light Screen Indicators (left column of LEDs):**<br>**Red** — **Solid LED:** BLOCKED/LATCHED — **Flashing LED:** LOCKOUT<br>**Green** — **Solid LED:** CLEAR — **Flashing LED:** BLANKING ON<br>**Yellow** — **Solid LED:** RESET — **Flashing LED:** Double Flash = Waiting for Light Screen Key Reset at Power-up; Single Flash = ALIGNMENT. Flash rate increases with the number of sensing beams "made", solid yellow when aligned and defined area clear<br>**System Indicators (right column of LEDs):**<br>**Red** — **Solid LED:** OVERRIDE — **Flashing LED:** LOCKOUT<br>**Green** — **Solid LED:** OUTPUT ON (FSD1 & FSD2 closed) — **Flashing LED:** (Not Applicable)<br>**Yellow** — **Solid LED:** RESET (System) — **Flashing LED:** Double Flash = Waiting for System Key Reset at Power-up; Single Flash = Waiting for System Key Reset at latched condition (manual reset of system after blockage has been removed) |
| **Diagnostic Indicators** | **Light Screen Diagnostic Display (left window)** is a two-digit numeric display that indicates the cause of lockout conditions.<br>**System Diagnostic Display (right window)** is a two-digit numeric display that indicates the cause of lockout conditions and the amount of time, in seconds, remaining for the backdoor timer. |
| **Controls and Adjustments** | • Light Screen Key Reset after power-up and light screen lockouts<br>• Selection switches to enable floating blanking<br>• Program switches to enable fixed blanking<br>• Light Screen and System Auto Power-up selection switches<br>• System Key Reset after power-up, system lockouts, and latched conditions<br>• Selection switches for Monitored or Non-Monitored Muting Indicator<br>• Selection switches for One-Way or Two-Way (directional/non-directional) Muting<br>• Selection switches for One-Channel, Two-Channel Monitoring or No Monitoring (EDM)<br>• Selection switches for Backdoor Timer settings and Mute-on-Power-Up |
| **Light Screen and System Reset Inputs** | Terminals must be closed for a minimum of 0.05 seconds in order to guarantee a reset. The switching device must be capable of switching 15-50V dc at 20-100 mA. |
| **External Device Monitoring (EDM) Input(s)** | Two pairs of terminals are provided to monitor the state of external devices that are being controlled by the FSD outputs. The device must be capable of switching 15-50V dc at 20-100 mA. |
| **Mute Enable Input** | Terminals must be closed in order to start a mute; opening this input after mute has begun has no effect. The switching device must be capable of switching 15-50V dc at 20-100 mA. |
| **Override Inputs** | The two-channel inputs must be closed within 3 seconds of each other (simultaneity requirement) and held closed during the 10-second Override. To initiate a subsequent Override, open both channels, wait 3 seconds, and then re-close both channels (within 3 seconds). The switching devices must be capable of switching 15-50V dc at 20-100 mA. |
| **Muting Device Input** | The muting devices work in pairs (M1 and M2, M3 and M4) and are required to be "closed" within 3 seconds of each other (simultaneity requirement) to initiate a mute (assuming all other conditions are met). Each muting device must be capable of switching 15-50V dc at 20-100 mA. |
| **Light Screen and System Aux. Monitor Relay Outputs** | Reed relay; 125V ac/dc max. at 500 mA max. (10 VA maximum, resistive load) |

# MINI-SCREEN® Metal Controller Box with Muting Specifications (cont'd)

| | |
|---|---|
| **CNC Aux. Monitor Relay Outputs** (Model MSCC-2T3M/-2L3M) | Forced-guided contact relay, 250V ac at 6 amps max. (resistive load) |
| **Safety Outputs** | Forced-guided contact relay (resistive load).<br>**MSCC-..2:** FSD1 & 2, SSD = 250V ac max., 4 amp max.<br>**MSCC-..3:** FSD1 & 2, CNC = 250V ac max., 6 amp max.;<br>SSD = 250V ac max., 4 amp max.<br>**Mechanical life:** 10,000,000 operations (minimum).<br>**Electrical life:** 100,000 operations (typical @ 1.0 kVA switching power).<br>*Arc suppression is recommended when switching inductive loads.* |
| **Mute Lamp Output** | A monitored or non-monitored (selectable) sinking output. If monitoring has been selected, the current draw must be within 10 mA to 360 mA.<br>**Max. switching voltage:** 30V dc<br>**Max. switching current:** 360 mA<br>**Min. switching current:** 10 mA<br>**Saturation voltage:** ≤ 1.5V dc |
| **Auxiliary DC Supply Output** | 24V dc ± 25%, 500 mA max |
| **Enclosure** | **Material:** Welded steel box with black polyester powder paint finish.<br>**Rating:** NEMA 13; IEC IP64 |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% max. (non-condensing) |
| **FMEA Tested** | Per requirements IEC 61496-1 (Type 4) |
| **Application Notes** | Use of fixed blanking requires sensors with 16 or more light beams. Up to 12 beams or 30% of the total number of beams in the array may be blanked, whichever is less. Call factory for applications assistance if a greater number of blanked beams is required. |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | **2 FSDs, 1 SSD and 2-Channel EDM:** WD023 (p. 258) |

# MINI-SCREEN® DIN Module Controller Specifications

| | |
|---|---|
| **System Power Requirements** | 24V dc ±15%, 10% max. ripple, 1.5 amps. max. |
| **Fuse Rating** | 2 amp, 250V (3 AG or 5x20 mm slow blow) |
| **Response Time** | **Standard Emitters/Receivers:**<br>Less than 48 milliseconds using emitter/receiver with 114 mm to 406 mm defined area<br>Less than 60 milliseconds using emitter/receiver with 508 mm to 813 mm defined area<br>Less than 72 milliseconds using emitter/receiver with 914 mm to 1219 mm defined area<br><br>**Heavy-Duty Emitters/Receivers:**<br>Less than 48 milliseconds using emitter/receiver with 610 mm to 813 mm defined area<br>Less than 60 milliseconds using emitter/receiver with 1016 mm to 1626 mm defined area<br>Less than 72 milliseconds using emitter/receiver with 1829 mm defined area |
| **Status Indicators**<br>(on control box and receiver) | **Red** — Solid LED: BLOCKED/LATCHED — Flashing LED: LOCKOUT<br>**Green** — Solid LED: CLEAR — Flashing LED: BLANKING ON<br>**Yellow** — Solid LED: RESET — Flashing LED: Double Flash = Waiting for Power-up Key Reset; Single Flash = ALIGNMENT. Flash rate increases with the number of sensing beams "made", solid yellow when aligned and defined area is clear |
| **Diagnostic Indicators** | Four LEDs indicate cause of lockout conditions.<br>Diagnostic LEDs are visible through a window in the control module cover. |
| **Controls and Adjustments** | Keyed Reset of system lockout and latched conditions<br>Blanking selection switches<br>Auto Power Up On-Off switches |
| **Auxiliary Monitor or Alarm Relay** | Reed relay; 125V ac or dc max., 500 mA max. (10 VA max., resistive load) |
| **Safety Outputs** | Forced-guided contact relays (resistive load)<br>FSD1 & 2, SSD = 250V ac max., 4 amps max.<br>**Mechanical life:** 10,000,000 operations (minimum)<br>**Electrical life:** 100,000 operations (typical @ 1.0 kVA switching power)<br>*Arc suppression is recommended when switching inductive loads.* |
| **Enclosure** | **Material:** polycarbonate<br>**Rating:** NEMA 1; IEC IP20 |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing) |
| **FMEA Tested** | Per requirements of proposed first edition of IEC 61496-1 (Type 4) |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | **2 FSDs, 1 SSD and Power Monitoring:** WD024 (p. 259) |

# MINI-SCREEN® Dual DIN Module Controller Specifications

| | |
|---|---|
| **System Power Requirements** | 24V dc ±15%, 10% max. ripple, 2.5 amps max. |
| **Fuse Rating** | 2 amp, 250V (3 AG or 5x20 mm slow blow) |
| **Response Time** | **Standard and Long-Range Emitters/Receivers:**<br>Less than 48 milliseconds using emitter/receiver with 114 mm to 406 mm defined area<br>Less than 60 milliseconds using emitter/receiver with 508 mm to 813 mm defined area<br>Less than 72 milliseconds using emitter/receiver with 914 mm to 1219 mm defined area<br><br>**Heavy-Duty Emitters/Receivers:**<br>Less than 48 milliseconds using emitter/receiver with 610 mm to 813 mm defined area<br>Less than 60 milliseconds using emitter/receiver with 1016 mm to 1626 mm defined area<br>Less than 72 milliseconds using emitter/receiver with 1829 mm defined area<br><br>**E-Stop:** Less than 15 milliseconds |
| **Status Indicators**<br>(on control box and receiver) | **Red** — Solid LED: BLOCKED/LATCHED; Flashing LED: LOCKOUT<br>**Green** — Solid LED: CLEAR; Flashing LED: BLANKING ON<br>**Yellow** — Solid LED: RESET; Flashing LED: Double Flash = Waiting for Power-up Key Reset<br>Single Flash = ALIGNMENT. Flash rate increases with the number of sensing beams "made", solid yellow when aligned and defined area is clear |
| **Diagnostic Indicator** | Single-digit alphanumeric display indicates cause of lockout condition. |
| **Controls and Adjustments** | Keyed Reset of system lockout and latched conditions<br>Blanking selection switches<br>Auto Power Up On-Off switches |
| **E-Stop Switch Input** | Emergency stop switch must offer two normally closed contacts and be capable of switching 50 mA @ 30V dc. Simultaneity less than 100 milliseconds. Total resistance, including wiring and all switches, must not exceed 30Ω for proper operation. Functional stop category 0 per NFPA 79 and EN 418, Safety Category 4 per EN 954-1. |
| **Auxiliary Monitor Relay (x2)** | Reed relay; 125V ac or dc max., 500 mA max. (10 VA max., resistive load) |
| **Safety Outputs** | Forced-guided contact relays (resistive load)<br>FSD1 & 2, SSD = 250V ac max., 4 amps max.<br>**Mechanical life:** 10,000,000 operations (minimum)<br>**Electrical life:** 100,000 operations (typical @ 1.0 kVA switching power)<br>*Arc suppression is recommended when switching inductive loads.* |
| **Enclosure** | **Material:** Polycarbonate<br>**Rating:** NEMA 1; IEC IP20 |
| **Operating Conditions** | **Temperature:** 0° to +50° C **Relative humidity:** 95% maximum (non-condensing) |
| **FMEA Tested** | Per requirements of proposed first edition of IEC 61496-1 (Type 4) |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | **2 FSDs, 1 SSD and Power Monitoring:** WD025 (p. 259) |

# EZ-SCREEN®
## Type 2 Light Screens

- A low-cost solution is suited to lower-risk applications where the result of an accident is only a slight injury such as a bump, bruise, knockdown or trapping (but not crushing), minor cuts and abrasions.
- Simple two-piece system requires no control box.
- 30 mm resolution detects narrow objects, such as a hand or ankle across long spans up to 15 m.
- System meets all requirements for Type 2 applications per IEC61496-1/-2 and Category 2 per EN 954-1.
- System performs internal self-tests, with typical installations requiring additional external safety function checks.
- Dedicated models eliminate selectable functions, DIP switches and programming.
- Trip output model automatically resets when the beam is cleared; Latch output model requires a manual reset.
- Fast response times of 11 to 25 milliseconds shutdown machinery quickly.

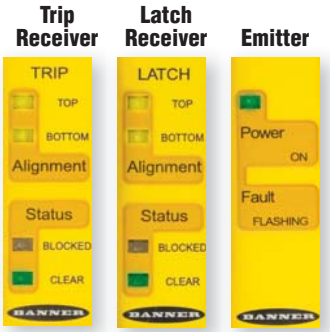
*See page 180.*

QD CABLES 8-Pin Euro PAGE 176
INDICATORS PAGE 187
BRACKETS PAGE 190
MIRRORS PAGE 204
STANDS PAGE 209
LENS SHIELDS PAGE 213

**Effortless diagnostics.**

Intuitive EZ-SCREEN Type 2 status LEDs indicate

- Power ON
- Fault (flashing LED)
- Beam alignment, top and bottom
- Beam/output status: blocked or clear




MORE INFO ONLINE *Q&A: Type 2 vs Type 4*

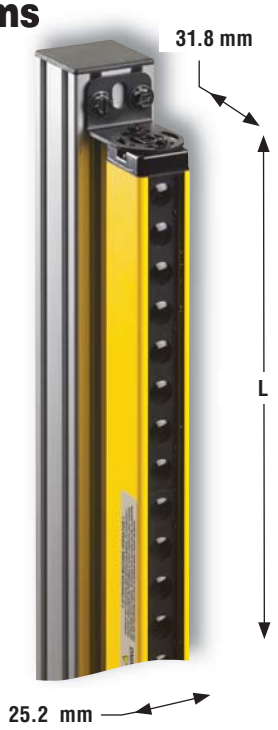
### Choosing Type 2 vs. Type 4

The international standard IEC 61496 specifies requirements for the design, construction and testing for two levels or "types" of light screens to ensure the appropriate safety-related performance.

| Light Screen | Type 2 | Type 4 |
|---|---|---|
| Cost/features | • Lower cost<br>• Single microprocessor<br>• Two safety outputs | • Two microprocessors<br>• Two safety outputs<br>• Control reliable/Category 4<br>• More features and range |
| Functionality | • Faults detected by self-test or periodic external test<br>• Fault exclusion increases the integrity of the safety function | • Faults detected by self-test<br>• High levels of fault tolerance through redundancy and monitoring |
| Effective Aperture Angle (EAA) | • Larger ±5.0° EAA (field-of-view)<br>• More susceptible to optical short circuits | • Smaller ±2.5° EAA (field-of-view)<br>• Less susceptible to optical short circuits |
| Applications | • Low- to moderate-risk applications where injury is slight<br>• Automated production equipment, "table-top" robotic work cells, "pick and place" machines, small packaging machines, equipment protection and supplemental safeguarding | • High-risk applications that can result in severe injury or death<br>• Primary safeguard in hazardous situations<br>• Injuries that result in an OSHA recordable incident<br>• Where mandated by a relevant standard |
| Assessing Risk | Conduct a risk assessment of your machine. Level of risk depends on the severity of harm and probability of occurrence. In the USA, if severity of harm is high, regardless of probability, you must choose a Type 4 safety light screen. See ISO 14121, ANSI B11 TR3, and ANSI/RIA R15.06 for more specific information. | |

# EZ-SCREEN® Type 2 Systems

- *Economical, compact optical safeguarding*
- *Type 2 per IEC 61496-1/-2*
- *30 mm resolution and 15 m range*
- *24V dc supply voltage*
- *Latch or trip output*
- *8-pin Euro QD connection*
- *QD cables ordered separately (see page 176)*
- *IEC IP65 housing*




**EZ-SCREEN Type 2**

MORE INFO ONLINE Detailed Dimensions

**Full View**

**Yellow Painted Aluminum**

## EZ-SCREEN® Type 2 Systems, 30 mm Resolution

MORE INFO ONLINE Download PDF

| Model Number | Resolution | Output | Range | Defined Area | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time | Connection | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|---|
| **LS2TP30-150Q88†**<br>**LS2E30-150Q8**<br>**LS2TR30-150Q8** |  <br>30 mm Resolution | Trip | 15 m | 150 mm | 215 mm | 24V dc | **2 PNP OSSD** | ≤ 11 ms | 8-pin Euro QD | 122452 |
| **LS2LP30-150Q88†**<br>**LS2E30-150Q8**<br>**LS2LR30-150Q8** | | Latch | | | | | | | | |
| **LS2TP30-300Q88†**<br>**LS2E30-300Q8**<br>**LS2TR30-300Q8** | | Trip | | 300 mm | 365 mm | | | ≤ 13 ms | | |
| **LS2LP30-300Q88†**<br>**LS2E30-300Q8**<br>**LS2LR30-300Q8** | | Latch | | | | | | | | |
| **LS2TP30-450Q88†**<br>**LS2E30-450Q8**<br>**LS2TR30-450Q8** | | Trip | | 450 mm | 515 mm | | | ≤ 14 ms | | |
| **LS2LP30-450Q88†**<br>**LS2E30-450Q8**<br>**LS2LR30-450Q8** | | Latch | | | | | | | | |

30 mm Resolution

† A pair includes an emitter and receiver (example, **LS2TP30-150Q88**). Emitters (example, **LS2E30-150Q8**) and receivers (example, **LS2TR30-150Q8**) are sold separately.

# EZ-SCREEN® Type 2 Systems, 30 mm Resolution (cont'd)

MORE INFO ONLINE Download PDF

| Model Number | Resolution | Output | Range | Defined Area | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time | Connection | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|---|
| **LS2TP30-600Q88**† **LS2E30-600Q8** **LS2TR30-600Q8** | 30 mm Resolution | Trip | 15 m | 600 mm | 665 mm | 24V dc | **2 PNP OSSD** | ≤ 16 ms | 8-pin Euro QD | 122452 |
| **LS2LP30-600Q88**† **LS2E30-600Q8** **LS2LR30-600Q8** | | Latch | | | | | | | | |
| **LS2TP30-750Q88**† **LS2E30-750Q8** **LS2TR30-750Q8** | | Trip | | 750 mm | 815 mm | | | ≤ 17 ms | | |
| **LS2LP30-750Q88**† **LS2E30-750Q8** **LS2LR30-750Q8** | | Latch | | | | | | | | |
| **LS2TP30-900Q88**† **LS2E30-900Q8** **LS2TR30-900Q8** | | Trip | | 900 mm | 964 mm | | | ≤ 19 ms | | |
| **LS2LP30-900Q88**† **LS2E30-900Q8** **LS2LR30-900Q8** | | Latch | | | | | | | | |
| **LS2TP30-1050Q88**† **LS2E30-1050Q8** **LS2TR30-1050Q8** | | Trip | | 1050 mm | 1114 mm | | | ≤ 21 ms | | |
| **LS2LP30-1050Q88**† **LS2E30-1050Q8** **LS2LR30-1050Q8** | | Latch | | | | | | | | |
| **LS2TP30-1200Q88**† **LS2E30-1200Q8** **LS2TR30-1200Q8** | | Trip | | 1200 mm | 1264 mm | | | ≤ 22 ms | | |
| **LS2LP30-1200Q88**† **LS2E30-1200Q8** **LS2LR30-1200Q8** | | Latch | | | | | | | | |
| **LS2TP30-1350Q88**† **LS2E30-1350Q8** **LS2TR30-1350Q8** | | Trip | | 1350 mm | 1414 mm | | | ≤ 24 ms | | |
| **LS2LP30-1350Q88**† **LS2E30-1350Q8** **LS2LR30-1350Q8** | | Latch | | | | | | | | |

30 mm Resolution

† A pair includes an emitter and receiver (example, **LS2TP30-600Q88**). Emitters (example, **LS2E30-600Q8**) and receivers (example, **LS2TR30-600Q8**) are sold separately.

# EZ-SCREEN® Type 2 Systems, 30 mm Resolution (cont'd)

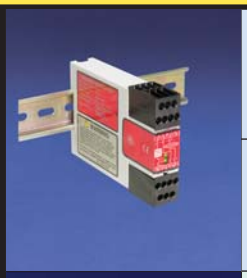
| Model Number | Resolution | Output | Range | Defined Area | Housing Length (L) | Supply Voltage | Safety Outputs | Response Time | Connection | Data Sheet |
|---|---|---|---|---|---|---|---|---|---|---|
| **LS2TP30-1500Q88**†<br>**LS2E30-1500Q8**<br>**LS2TR30-1500Q8** |  <br>30 mm Resolution | Trip | 15 m | 1500 mm | 1563 mm | 24V dc | **2 PNP OSSD** | ≤ 25 ms | 8-pin Euro QD | 122452 |
| **LS2LP30-1500Q88**†<br>**LS2E30-1500Q8**<br>**LS2LR30-1500Q8** | | Latch | | | | | | | | |

 30 mm Resolution

† A pair includes an emitter and receiver (example, **LS2TP30-1500Q88**). Emitters (example, **LS2E30-1500Q8**) and receivers (example, **LS2TR30-1500Q8**) are sold separately.

# EZ-SCREEN® Type 2 Interfacing Products

MORE INFO ONLINE Download PDF

| | Models | | Description | Product Information | Data Sheet |
|---|---|---|---|---|---|
| Interface Modules |  | **IM-T-9A** (3 NO) | • Interface modules provide two or three normally open force-guided relay outputs rated at 6 A.<br>• EZ-SCREEN monitors these interface modules when they are connected to the EZ-SCREEN External Device Monitoring (EDM) inputs.<br>• Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing are included. | Page 132 | 62822 |
| | | **IM-T-11A** (2 NO/1 NC) | | | |
| Muting Modules |  | **MM2-TA-12B** | • The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery.<br>• The module uses redundant microcontroller-based logic. | Page 123 | 63517 |
| | | **MMD-TA-12B** | | | 116390 |
| | | **MMD-TA-11B** | | | |
| Contactor Products |  | **Mechanically Linked Contactors** | • Pairs of contactors create safety stop circuits with two normally open contacts in series.<br>• EZ-SCREEN can monitor the circuit because of the contacts' force-guided mechanically linked design.<br>• Contactors add 10 or 16 amp current carrying capability to any safety system.<br>• Auxiliary contacts add 3 or 4 normally open contacts.<br>• Suppressors extend the life of an actuating device that uses a contactor.<br>• Modular design simplifies assembly and installation. | Page 186 | 111881 |
| | | **11-BG00-31-D-024** | | | |
| | | **11-BF16C01-024** | | | |
| | | **Aux. Contacts** | | | |
| | | **11-BGX10-40** | | | |
| | | **11-G484-30** | | | |
| | | **Suppressors** | | | |
| | | **11-BGX77-048** | | | |
| | | **11-G318-48** | | | |

# EZ-SCREEN® Type 2 Kits

You can purchase a kit that contains an emitter and receiver of equal length; brackets; and optional interfacing solution and quick-disconnect cables. Detailed information about individual kit components is as follows.


- Emitter and Receivers . . . . . Page 79
- Interfacing Options. . . . . 82
- Cables . . . . . 176
- Brackets . . . . . 190


A **partial listing** of kits is listed below; see Kit Model Key to order other variations.

| Kit Model Number | Protected Height | Resolution | Range | Supply Voltage | No. of Outputs | Output Type | Emitter & Receiver Connection | Interfacing Options | QD Cabling |
|---|---|---|---|---|---|---|---|---|---|
| LS2TK30-600Q88-1RE25 | 600 mm | 30 mm | 18 m | 24V dc | 2 OSSD | Trip | Integral Euro QD | IM-T-9A, 1 each | 8 m, 2 each |
| LS2LK30-600Q88-1RE25 | | | | | | Latch | | | |
| LS2TK30-750Q88-1RE25 | 750 mm | | | | | Trip | | | |
| LS2LK30-750Q88-1RE25 | | | | | | Latch | | | |

# Kit Model Key

| Model Style | Kit | Resolution | Protected Height | QD Options | Interfacing Options | QD Cabling Length Options |
|---|---|---|---|---|---|---|
| L S 2 T | K | 3 0 | 6 0 0 | Q 8 8 | 1 | R E 2 5 |

**Model Style**
**LS2T** = Type 2 Light Screen (Trip)
**LS2L** = Type 2 Light Screen (Latch)

**Kit**
**K** = Kit

**Resolution**
**30** = 30 mm

**Protected Height**
150 mm
300 mm
450 mm
600 mm
750 mm
900 mm
1050 mm
1200 mm
1350 mm
1500 mm

**Receiver & Emitter QD Options**
**Q88** = Receiver with integral 8-pin Euro-style QD
Emitter with integral 8-pin Euro-style QD

**Interfacing Options**
**1** = IM-T-9A Interface Module, 1 each
**2** = IM-T-11A Interface Module, 1 each
**3** = 11-BG00-31-D-024 Contactors (10A), 2 each
**4** = 11-BF16C01-024 Contactors (16A), 2 each

**QD Cabling Length Options**
**RE15** = 5 m, 2 each
**RE25** = 8 m, 2 each
**R15E25** = 5 m (Receiver) & 8 m (Emitter)
**R25E15** = 8 m (Receiver) & 5 m (Emitter)
**RE50** = 15 m, 2 each
**R15E50** = 5 m (Receiver) & 15 m (Emitter)
**R50E15** = 15 m (Receiver) & 5 m (Emitter)
**R25E50** = 8 m (Receiver) & 15 m (Emitter)
**R50E25** = 15 m (Receiver) & 8 m (Emitter)
**RE75** = 23 m, 2 each
**RE100** = 30 m, 2 each

NOTE: Not all combinations are possible. Contact Banner Engineering Corp. for additional information and/or verification of valid kit model number.

# EZ-SCREEN® Type 2 Specifications

| | |
|---|---|
| **Supply Voltage at the Device*** | 24V dc ±20% (PELV) |
| **Supply Current*** | **Emitter:** 50 mA max.<br>**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 +24V dc or dc common* |
| **Electrical Safety Class** | III (per IEC 61140: 1997) |
| **Safety Rating** | Type 2 per IEC 61496-1, -2; Category 2 per EN 954-1 |
| **Operating Range** | 0.2 m to 15 m<br>Range decreases with use of mirrors and/or lens shields:<br>**Lens shields** – approximately 10% less range per shield.<br>**Glass-surface mirrors** – approximately 8% less range per mirror.<br>See Accessory section for more information on a specific mirror, page 204. |
| **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 table on page 79. |
| **EDM Input** | "Power Monitoring" accomplished via Reset/Remote Test input |
| **Reset Input / Remote Test Input** | Connect to +24V dc via a normally closed (NC) reset switch<br>**Auto Rest (Trip Output) Models:** Test/Reset<br>**Manual Rest (Latch Output) Models:** Test/Restart/Reset |
| **Safety Outputs** | Two redundant solid-state 24V dc, 0.5 A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.)<br>Not compatible with the Banner "Safety Handshake."<br>**ON-State voltage:** > Vin-1.5V dc<br>**OFF-State voltage:** 0.2V dc max.<br>**Max. load capacitance:** 0.1 µF<br>**Min. load resistance:** 48 Ω<br>**Open ground leakage current:** 0.65 mA max.<br>**OSSD test pulse width:** 0.25 milliseconds<br>**OSSD test pulse period:** 500 milliseconds |
| **Enclosure** | **Materials:** Extruded aluminum housing with yellow polyester powder finish and well-sealed, rugged die-cast zinc end caps, acrylic lens cover<br>**Rating:** IEC IP65 |
| **Operating Conditions** | **Temperature:** 0° to +55° C **Relative humidity:** 95% maximum (non-condensing) |
| **Shock and Vibration** | EZ-SCREEN Type 2 systems 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). |
| **Certifications** | For a list of certifications see page 236. |
| **Wiring Diagrams** | **Emitter:** WD026 (p. 260)<br>**Receiver with 2 Solid-State OSSDs, 2 FSDs and Power Monitoring:** WD027 (p. 260)<br>**Power Monitoring of IM-T-9A Interface Module:** WD028 (p. 261) |

*The external voltage supply must be capable of buffering brief mains interruptions of 20 milliseconds as specified in IEC/EN 60204-1.

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