## Safety Solutions




## Contents




Network Technology Down to the Device Level


## [isiod Banner In-Series Diagnostics (ISD)

Easy-to-Implement Diagnostic Capabilities for Complex Safety Systems
In-Series Diagnostics allows connection of up to 32 devices with one in-series connection and
communicate directly with the most commonly used PLCs.
When a safety event occurs the system receives an alert that includes information about which safety device tripped, making troubleshooting a breeze.
n-Series Diagnostics provides an array of additional data points for each in-series device used, including a unique tag value, internal temperature, voltage, and more, along with deviceand actuator.
Additionally, the system sends warning alarms if devices are near to tripping, so issues can be addressed before your machine shuts dowr



Downtime

Safety Controller
Safety PLC


Choosing a Banner Safety Light Curtain



## Safety Light Curtain Selection Guide

|  |  |  | EZ-SCREEN 14/30 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | S4B | Ez-SCREen Ls |  |  | EZ-SCREEN LP | SLC4 | EZ-SCREEN LS2 | SGS Grids |
|  | p. 14 | p. 16 | p. 20 |  | p. 22 | p. 24 | p. 26 | p. 28 |
| Type IEC 61496-1, -2 | Type 4 | Type 4 | Type 4 |  | Type 4 | Type 4 | Type 2 | Type 4 |
| Safety Rating EN ISO 13849-1; IEC 61508; IEC 62061 | Category 4 PL e; SIL3 | Category 4 PL e; SIL3 | Category 4 PL e; SIL3 |  | Category 4 PL e; SIL3 | Category 4 PL e; SIL3 | Category 2 <br> PL c | Category 4 PL e; SIL3 |
| IP Rating | IP65 | \|P65, IP67, IP69 | IP65 |  | IP54, IP65 | IP65 | IP65 | IP65 |
| Dimensions W $\times \mathrm{D}(\mathrm{mm}$ ) | $38 \times 38$ | $36 \times 45$ | $36 \times 45$ |  | $28 \times 26$ | $27 \times 22$ | $25 \times 32$ | $52 \times 56.9$ |
| Resolution (mm) | 30 | 14, 23, 40 | 14 | 30 | 14, 25 | 14, 24 | 30 | 300, 400, 500 |
| Max Sensing Range ( $m$ ) | 12 | 12 | 6 | 18 | Basic: 4 Standard: 7 | 2 | 15 | Standard: 30 Long Distance: 60 |
| Defined Area (mm) | 300 to 1800 | 280 to 2380 | 150 to 1800 | 150 to 2400 | Basic: 270, 410, 550, 690 Standard: 270 to 1250 | 160, 240, 320 | 150 to 1800 | 500 to 1200 |
| Increments (mm) | 150 | 70 | 150 |  | Standard: 140 | 80 | 150 | 2, 3, 4 Beams |
| Functions |  |  |  |  |  |  |  |  |
| Hand Detection | $\checkmark$ | $\checkmark$ | $\checkmark$ |  | $\checkmark$ | $\checkmark$ | $\checkmark$ |  |
| Finger Detection |  | $\checkmark$ |  |  | $\checkmark$ | $\checkmark$ |  |  |
| Body Detection |  |  |  |  |  |  |  | $\checkmark$ |
| Cascade |  | slLc | SLSC |  | SLPC |  |  |  |
| Scan Codes | $\checkmark$ | $\checkmark$ | $\checkmark$ |  | $\checkmark$ |  |  | $\checkmark$ |
| Fixed Blanking |  | $\checkmark$ | $\checkmark$ |  | $\checkmark$ |  |  |  |
| Reduced Resolution |  |  | $\checkmark$ |  | $\checkmark$ |  |  |  |
| EDM |  | $\checkmark$ | $\checkmark$ |  | $\checkmark$ |  | $\checkmark$ | $\checkmark$ |
| Reset |  |  | $\checkmark$ |  | $\checkmark$ |  | $\checkmark$ | $\checkmark$ |
| Integrated Muting |  | See page 18 |  |  | $\checkmark$ |  |  | $\checkmark$ |
| LED on Top |  | Accessory |  |  |  |  |  | $\checkmark$ |

## S4B Type 4 Heavy-Duty Light Curtains

## Designed for a broad range of applications, the next generation of safety light curtains has essential features including remote indication

or predictive maintenance.
Prevent


## 4

Z3 Z2 Z1


## STATUS

Window is recessed 4 mm
for added protection
Simple Installation
The S4B is designed and optimized for easy and intuitive
installation, operation, and troubleshooting. Zone LEDs instalatrobleshooting and help reduce downtime.

Downtime Yellow indicates a
due to a dirty lens. A weak beam strength output s sent via pin 5 to a PLC or HMI alerting operators to preventive maintenance needs

End-to-end sensing design
(no blind zone) (no blind zone)


1. Select Emitter and Receiver


Intuitive Setup and Swap-out
select and save scan code setting without a PC
for easy setup and swap-out

2. Add S4B Brackets (required)
3. Add S4B Cordsets (required)
S4BA-MBK-16

- Side mount bracket
- Rotation: +1 -150
- Incluces 2 brackets and hardware
- Each bracket supports 900 mm of length
DES4E-51D
S4B removable 5 -pin M12 QD pigtail
- Includes one

Eliminate Costly Repairs Removable cordset with 5 -pin M12 QD allows for cost effective replacement of only the damaged component


Reliable Hand Detection The S4B features a 30-millimeter resolution for reliable hand detection

EZ-SCREEN LS Type 4 Heavy-Duty Light Curtains

The LS is a full-feature family of light curtains providing greater capabilities for cascading, blanking, EDM and more.



Due to its robust design, the EZ-SCREEN LS is the perfect fit in arge robotic cell applications that require sturdy safety devices and heavy duty enclosures.


EZ-SCREEN LS light curtains in hygienic tubular enclosure successfully protect operators from injury and remain hygienic for easy cleaning procedures.

$S=$ emitter or receiver only (LS bracket(s) and LS cordset(s) ordered separately)
P5 = Emitter or receiver includes one LS M12 double ended cordset ( 5 -pin) and LS brackets (-11 and -12) P55 = Pair includes two LS M12 double ended cordsets (5-pin) and LS brackets ( -11 and -12) P8 = Emitter or receiver includes one LS M12 double ended cordset ( 8 -pin) and LS brackets (-11 and -12)

2. Add LS Brackets (for "-S" termination)

| EZLSA-MBK-11 |  | EZLSA-MBK-12 |
| :--- | :--- | :--- |

3. Add LS Cordsets (for "-S" or "Blank" termination)


Bancixis

IP69 Hygenic

Create a turn-key muting solution for your EZ-SCREEN LS Safety Light Curtain
With a $300 \mathrm{~mm}(1 \mathrm{ft})$ PVC cable with a 8 -pin M12 male quick disconnect
Needs EZ-SCREEN LS Hardware Adaptor Kit EZLSA-MCB-HW


合
sGSA-MT-LPQ20 Includes 4 mute arms, 4 SGSA-Q2OPLPQ 5
mute sensors, and 4 retroreflectors
X-Configuration

sGSA-MX-LPQ20
Includes 4 mute arms. 2 SGSA-Q20PLPQ5 mute sensors, and 2 retroreflectors


A CSM4-M1281M1251M1281
LS muting connection cable
B SGS mute arm kit connection cable (select on 2. L.
c DEE2R-8x×D
C LES2R-8xxD LS emitter connection cable (xx is the length in feet)
QDEG-12xxE
Safety controller connection cable (xx is the length in feet)
F DELSE-81D (8-Pin)
LS receiver connection cable (M12)

Interface options
Interfa
Interface Modules (see page 52)

E1 TL50w TL50ya ksownea kotrxa
Mute lights (xx is the length in feet)
E2 DEE2R-5xx
DEE2R-5xX

EZ-SCREEN 14/30 Type 4 Light Curtains

Banner's traditional light curtain, the EZ-Screen $14 / 30$ provides the longest sensing range, reduced resolution, and includes trip or latch/ reset functionality


## EZ-SCREEN LP Type 4 Compact Light Curtains

Banner's compact full-feature family of light curtains providing capabilities for cascading, blanking, integral muting, latch/reset, EDM, and more.


The EZ-SCREEN LP safety light screen is compact and mounts in tight spaces with its continual end-toend sensing that leaves no gaps.

EZ Screen LP

| Family | Cascade | System Type | Resolution | Defined Area |  | Termination |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| SLP | c | P | 14 | - |  | P88 |
|  | C = Cascade* | P = Pair (Emitter and Receiver) | $14=14 \mathrm{~mm}$ | $270=270 \mathrm{~mm}^{* *}$ | $830=830 \mathrm{~mm}$ |  |
|  | Blank $=$ Standard | $\mathrm{E}=$ Emitter only | $25=25 \mathrm{~mm}$ | $410=410 \mathrm{~mm}$ | $970=970 \mathrm{~mm}$ |  |
|  | VA $=$ LP Basic | $\mathrm{R}=$ Receiver only |  | $550=550 \mathrm{~mm}$ | $1110=1110 \mathrm{~mm}$ |  |
|  |  |  |  | $690=690 \mathrm{~mm}$ | $1250=1250 \mathrm{~mm}$ |  |

$$
\begin{aligned}
& \text { Note: LP Pasic contins individual eniter andor receiver only. } \\
& \text { Brackets and cordset ordered separately }
\end{aligned}
$$

P8 $=300 \mathrm{~mm}$ 8-Pin M12 pigtail QD (individual Emitter or Receiver models) P88 $=300 \mathrm{~mm}$ 8-Pin M12 pigtail QD (on BOTH Emitter and Receiver models) Blank = no pigtail, RD connection (for RDLP-8.D cordset)

```
M..pin connection reauied for cases
```

EZ Screen LP with Muting


LPA-MBK-16
Side mount bracket Rotation: $+15^{\circ}$ and $-20^{\circ}$ Includes 1 bracket and Includes I bracket and
hardware . Black zinc die-cast

LPA-MBK-21 Pivoting cascade mounting bracket Includes 2 brackets and hardware 14 ga. steel, black zinc-plated
3. Add Cordsets
 Male QD DELPE-51D (5-pin) $0.3 \mathrm{~m}(1 \mathrm{ft})$ D.ELPE-81D (8-pi $)$
$0.3 \mathrm{~m}(1 \mathrm{ft})$

SLC4 Type 4 Ultra Compact Light Curtains

Banner's shortest, most compact light curtain is built with today's essential features including 14 mm and 24 mm resolution, zone/alignment indicators, and more.





SLC4 are Type 4 safety light curtains specifically designed to safeguard smaller points of operation and access on compact machines.

## EZ-SCREEN LS2 Type 2 Light Curtains

Designed for lower-risk applications such as bump or bruise, knock-down, trapping but not crushing, or minor cuts and abrasions.


1. Select Emitter and Receiver

| Family | System Type <br> TP | Resolution | Defined Area |  | Termination |
| :---: | :---: | :---: | :---: | :---: | :---: |
| LS2 |  | 30 | - | 150 | Q88 |
|  | $\mathrm{E}=$ Emitter | $30=30 \mathrm{~mm}$ | $150=150 \mathrm{~mm}$ | $1050=1050 \mathrm{~mm}$ | Q8 $=8$-pin QD (individual Emitter or Receiver models) |
|  | TR $=$ Trip Receiver |  | $300=300 \mathrm{~mm}$ | $1200=1200 \mathrm{~mm}$ | Q88 = For pair: Emitter with 8-pin M12 QD, |
|  | TP = Trip Pair |  | $450=450 \mathrm{~mm}$ | $1350=1350 \mathrm{~mm}$ | Receiver with 8-pin M12 QD |
|  | LR = Latch Receiver |  | $600=600 \mathrm{~mm}$ | $1500=1500 \mathrm{~mm}$ |  |
|  | LP = Latch Pair |  | $750=750 \mathrm{~mm}$ | $1650=1650 \mathrm{~mm}$ |  |
|  |  |  | $900=900 \mathrm{~mm}$ | $1800=1800 \mathrm{~mm}$ |  |

2. Add Brackets 3. Add Cordsets

|  |  |  | $0$ |
| :---: | :---: | :---: | :---: |
| USMB-5 | USMB-6 | USMB-8 | 8-Pin M12 with Flying Leads |
| - Retrofit mounting bracket | - Universal mounting bracket kit | - Low profile mounting plate for | QDE-815D |
| - 2.3 mm thickness, black zinc- | - 2.3 mm thickness, black zinc- | $90^{\circ}$ sensor direction | 4.5 m (15') |
| plated, chromate dip finish | plated, chromate dip finish | - Black anodized aluminum | ${ }^{\text {Q }}$ ( 7.6 m ( 2525 ) |
| - Mounting hardware included: 1 kit required per emitter or receiver | - Mounting hardware included: 1 kit required per emitter or receiver | - Uses two M4 screws (user supplied) for through-hole mounting | $\begin{aligned} & \text { QDE-850D } \\ & 15.2 \mathrm{~m}\left(50^{\prime}\right) \end{aligned}$ |
|  |  | - 1 kit required per emitter or receiver |  |



The Type 2 EZ-SCREEN safety light screen protects hands and parts of a carouse.


The Type 2 EZ-SCREEN safety light screen guards the opening to a chip shooter, which has moving parts that can cause painful but usually temporary injuries.

## SGS Type 4 Safety Light Grids

 perimeters. Able to detect a body in a cost-effective and heavy-duty safety light curtain package.


SGS Safety Grid Systems, with two, three, or four beams, are used to monitor the perimeter of the work area.


SGS Safety Grid Systems are available in Emitter/Receiver models capable of safeguarding over very long distances and in easy-todeploy Active/Passive models.

Preassembled (with mounting hardware) for plug-and-play connection to the SGS grid and LS Safety Light Curtains
Wiring connection block or cable accessories available
Adjusts easily for line changes
dordware kit to attach mute arms to LS curtains, EZLSA-MCB-HW, ordered separately from mute arm kits

| Mute Connection Options |  |  |  | Models |
| :--- | :--- | :---: | :---: | :---: |
| Description | SGSA-MCB |  |  |  |
| Connection box for X, L or T mute arm kits | SGSA-MCS-2 |  |  |  |
| Connection cable for X and L mute arm kits | SGSA-MCS-4 |  |  |  |
| Connection cable for T mute arm kits | SGSA-MCB-HW |  |  |  |
| Optional hardware kit for mounting mute connection box, or mute connection cable to the t-slot of SGS Receiver or Active Unit |  |  |  |  |



SGSA-ML-R-LPQ20 Cludes 2 mute arms, 2 SGSA-Q20PIPQ5 mute sensors, and 2 retroreflectors



Integral muting models have muting technology built into the device eliminating the need for an external muting controller. Preassembled muting arm kits are available in $T$, $L$ and $X$ configurations. The muting kits use premounted hardware and Q20 retroreflective sensors and reflectors.
Benefits of Muting
Maintain high safety standards while allowing for a predetermined object to break a beam
Limit downtime by not unnecessarily shutting down a conveyor or robot cell Applications
Assembly and packaging
machines
$\begin{array}{ll}\text { Assembly and packaging } & \text { - Robotic work cells } \\ \text { machines } \\ \text { Automated production equipment } & \text { - Automated warehouses }\end{array}$
Palletizers

Stands and Corner Mirrors

| Fits SGS Models | \# of Windows | Enclosure Height | Distance from Floor to Bottom Window | Distance between Beams | Enclosure Models |
| :---: | :---: | :---: | :---: | :---: | :---: |
| SGS.4-300Q. | 4 | 1543 mm (60.75") | 300 mm (11.8") | $300 \mathrm{~mm}\left(11.8{ }^{\prime \prime}\right)$ | SGSA4-S300 |
|  |  |  |  |  | SGSA4-S300-M |
| SGS..3-400Q.. | 3 | $1238 \mathrm{~mm}\left(48.78{ }^{\prime \prime}\right)$ | 300 mm (11.8") | 400 mm (15.8') | SGSA3-5400 |
|  |  |  |  |  | SGSA3-S400-M |
| SGS. 4-400Q. | 4 | 1618 mm (63.69") | $300 \mathrm{~mm}\left(11.8^{\prime \prime}\right)$ | 400 mm (15.8") | SGSA4-S400 |
|  |  |  |  |  | sGSA4-S400-M |
| SGS. 2-500Q.. | 2 | 1035 mm (40.75") | 400 mm (15.8) | 500 mm (19.7") | SGSSA2-S5500-M |
|  |  |  |  |  |  |
| SSM Series Corner Mirrors |  |  |  |  |  |
| Fits SGS Models | Reflective Area |  | Mounting Area | Mirror Height | Mirror Models |
| SGS.2-500.. | 550 mm (21.7") |  | $\left.661 \mathrm{~mm}(26.0)^{\prime \prime}\right) \quad 628$ | 628 mm (24.7") | SSM-550 |
| SGs.3-400.. | 825 mm (32.5") |  | $936 \mathrm{~mm}(36.9$ ") 9 | 903 mm (35.6") | SSM-825 |
| SGS. 4-300.. | 975 mm (38.4") |  | $1086 \mathrm{~mm}\left(42.88^{\prime \prime}\right) 10$ | 1053 mm (41.5") | SSM-975 |
| SGS.4-400.. | 1275 mm (50.2") |  | $1386 \mathrm{~mm}(54.6$ ") | 1353 mm (53.3") | SSM-1275 |
| MSA Series Stands |  |  |  |  |  |
| Pole Height | Usab | Stand Height | Stand Models |  |  |
| 1676 mm (66") | 1550 | m (61") | MSA-S66-1 |  |  |
| 2134 mm (84") | 200 | m( (79") | MSA-A84-1 |  |  |
| 2667 mm (105") | 266 | mm (100") | MSA-S105-1 |  |  |


| Cables |  |
| :--- | :--- |
|  |  |

## Choosing a Banner Safety Scanner



## Safety Scanner Selection Guide

|  |  | SX5-M10 | SX5-M70 | SX5-ME70 |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | p. 36 | p. 36 | p. 36 | p. 36 | p. 36 |
| Dimensions W $\times \mathrm{D} \times \mathrm{H}(\mathrm{mm}$ ) | $102 \times 112 \times 152$ | $102 \times 112 \times 152$ | $102 \times 112 \times 152$ | $102 \times 112 \times 152$ | $102 \times 112 \times 152$ |
| Presence Detection | $50 / 70 \mathrm{~mm}$ | $50 / 70 \mathrm{~mm}$ | $50 / 70 \mathrm{~mm}$ | $50 / 70 \mathrm{~mm}$ | $50 / 70 \mathrm{~mm}$ |
| Body Detection | $70 / 150 \mathrm{~mm}$ | $70 / 150 \mathrm{~mm}$ | $70 / 150 \mathrm{~mm}$ | $70 / 150 \mathrm{~mm}$ | $70 / 150 \mathrm{~mm}$ |
| Hand Detection | $30 / 40 \mathrm{~mm}$ | $30 / 40 \mathrm{~mm}$ | $30 / 40 \mathrm{~mm}$ | $30 / 40 \mathrm{~mm}$ | $30 / 40 \mathrm{~mm}$ |
| Range <br> (depending on resolution) | $\begin{gathered} 30 \mathrm{~mm}=2.5 \mathrm{~m} \\ 40 \mathrm{~mm}=3 \mathrm{~m} \\ 50 \mathrm{~mm}=4 \mathrm{~m} \\ 70 / 150 \mathrm{~mm}=5.5 \mathrm{~m} \end{gathered}$ | $\begin{gathered} 30 \mathrm{~mm}=2.5 \mathrm{~m} \\ 40 \mathrm{~mm}=3 \mathrm{~m} \\ 50 \mathrm{~mm}=4 \mathrm{~m} \\ 70 / 150 \mathrm{~mm}=5.5 \mathrm{~m} \end{gathered}$ | $\begin{gathered} 30 \mathrm{~mm}=2.5 \mathrm{~m} \\ 40 \mathrm{~mm}=3 \mathrm{~m} \\ 50 \mathrm{~mm}=4 \mathrm{~m} \\ 70 / 150 \mathrm{~mm}=5.5 \mathrm{~m} \end{gathered}$ | $\begin{gathered} 30 \mathrm{~mm}=2.5 \mathrm{~m} \\ 40 \mathrm{~mm}=3 \mathrm{~m} \\ 50 \mathrm{~mm}=4 \mathrm{~m} \\ 70 / 150 \mathrm{~mm}=5.5 \mathrm{~m} \end{gathered}$ | $\begin{gathered} 30 \mathrm{~mm}=2.5 \mathrm{~m} \\ 40 \mathrm{~mm}=3 \mathrm{~m} \\ 50 \mathrm{~mm}=4 \mathrm{~m} \\ 70 / 150 \mathrm{~mm}=5.5 \mathrm{~m} \end{gathered}$ |
| Max. Zone Sets <br> (depending on configuration) | 6 | 10 | 70 | 70 | depending on master |
| Master Remote |  | Master (up to 3 remotes) | Master (up to 3 remotes) | Master (up to 3 remotes) | Remote |
| Removable Memory |  | SXA-RM-10 | SXA-RM-70 | SXA-RM-70 |  |
| Speed Monitoring |  |  |  | $\checkmark$ |  |
| Max. OSSD Outputs (depending on configuration) | $1 \times 2$ OSSD | $2 \times 2$ OSSD | $3 \times 2$ OSSD | $3 \times 2$ OSSD |  |
| Inter Device Connection |  | 8-Pin M12 | 8-Pin M12 | 8-Pin M12 | 8-Pin M12 |
| Integral Muting | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ |
| Programmable Dust Filter | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ |
| Measurement Data | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ |
| Field-replaceable Window | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ |

## Safety Scanner System

Horizontal or vertical monitoring of both personnel and stationary or mobile systems
SX Series safety laser scanners protect personnel, equipment, and mobile systems by continuously scanning a user-defined area of up to $275^{\circ}$ to create a two-dimensional protected zone.


SX5 software configuration allows zone switching for full, right-side and left-side safety protection during this forklift access application


Sottware interface makes it easy to create custom safety and warning zones to safeguard large, complex, and irregularly shaped areas.


Increased Machine Uptime
The SX5 has on-board LED indicators and a large multi-segment color display that provide at-a-glance system status information so users can quickly identify zone breaches and resolve issues with a minimal amount of equipment downtime.

compact, one-piece safety device installs easily above and way from area hazards without requiring time-consuming alterations to area infrastructure.

a a equipment will come to a stop if the safety zone is breached
An alert is triggered if an object enters the warning zone and
warning, and error displays

## Dynamic Muting available and selectable detection capability selectable detection vertical applications


:

Rugged design for reliable $\square$

 cover for standalone
models

## Safety Scanner System

Removable memory for fast scanner replacement The system configuration is backed up in a removable memory needing to reconfigure your system. The machine interface cab attach to this memory unit on the Master models.

## $\pi$

Master and Remote connection reduces wiring
For applications that require monitoring multiple sides of an AGV, up to four scanners can be easily connected through an Ethernetbased safe communications bus, working as a single system. Each remote unit is connected to the master by a single cable that provides them with power, and the memory of the entire system is stored in the master.


## Safety Scanner Software

Simple setup for rapid deployment
The $\mathrm{S} \times 5$ can be set up in just a few simple steps using Banner's free configuration software. This robust software features menu-drive fools that guide users through setup and make it easy to design custom safety and warning zones to accommodate existing infrastructure and meet the specific needs of any application.


## Safety Scanner Fixed Applications

Stationary area guarding
Stationary area guarding uses sensing fields such as safety or warning zones to continually sense an individual within a safeguarded area Stationary area guarding can reduce or eliminate the possibility of a pass-through hazard that could result in an individual being exposed to unexpected machine startup or motion.


Single-zone safeguarding
The safety scanner detects when a person approaches a hazard. When the person enters a warning zone, the hazardous motion is controlled safely. When the person enters the safety zone, the hazard is stopped.


Multi-zone safeguarding via master-remote Manage multiple areas with master-remote architecture. Multiple safety zones stop different parts of the dangerous machine, without the need of an external controller.


Multi-zone safeguarding
Up to three safety zones can be monitored simultaneously and independently. This way, safety in the entire plant is optimized, ensuring increased productivity and improved ergonomics in the entire plant.

Safeguarding with dynamic and partial muting Muting sensors can be directly connected to the SX5, creating a tightly protected area around the muted object while muting is active. Each safety output can be configured with its own muting requirements.

## Safety Scanner Mobile Applications

Mobile area guarding
On mobile applications, the $\mathrm{S} \times 5$ monitors the area directly ahead of the vehicle using both the warning and the safety zones. The vehicle slows down if something is detected in the warning zone and the vehicle stops when something is detected in the safety zone. If the speed increases or decreases, alternate zone sets can be used to adjust for varying stopping distances.


Automated guided vehicle collision avoidance Warning and safety zones can be used to alert operators, slow down the vehicle, or stop it. Up to 70 different zones can be set and activated per position, speed and movement of the vehicle.


Advanced measurement data for direct navigation
he SX5 has a direct transmission protocol over Ethernet.
It can be used to read measurement data for vehicle navigation. Data includes active zone, I/O status, measured speed, intensity of beams, and diagnostic


Safe speed monitoring
Incremental encoders inputs can be directly read by the SX5 scanner in order to select the appropriate slow-down and stopping areas, based on the speed of the vehicle.


Collaborative robot monitoring Mobile collaborative robots (cobots) have built-in safety eatures that enable them to work alongside humans. Cobots an be programmed to slow down or stop when a human enters the warning or safety zone.

## Choosing a Banner Relay and Controller



|  |  | Safety Relay |
| :---: | :---: | :---: |
| Configurable Logic | $\checkmark$ |  |
| Safe Inputs | 10 | 1 |
| Safe Outputs | 2 | 1 |
| ISD (In-Series Diagnostics) | $\checkmark$ |  |
|  | $\checkmark$ |  |
| EtherCAT. ${ }_{*}^{\sim}$ |  |  |



## Relay and Controller Selection Guide

|  | GM/ES | UM | E <br> SM |  |  | SSM |  |  |  |  | SC26/XS26 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | p. 46 | p. 46 | p. 46 | p. 46 | p. 46 | p. 46 | p. 46 | p. 46 | p. 46 | p. 48 | p. 48 |
| Device Type | Preconfigured Safety Relay Modules |  |  |  |  | Preconfigured Safety Relay Modules |  |  |  | Configurable Controllers |  |
| Self Testing Safety Device |  | $\checkmark$ |  |  | $\checkmark$ |  |  |  |  | $\checkmark$ | $\checkmark$ |
| Self Testing Safety Device with EDM Function |  | $\checkmark$ |  |  | $\checkmark$ |  | $\checkmark$ | $\checkmark$ |  | $\checkmark$ | $\checkmark$ |
| E-Stop | $\checkmark$ | $\checkmark$ |  |  | $\begin{gathered} \checkmark \\ \begin{array}{c} \text { (secondary } \\ \text { function) } \end{array} \end{gathered}$ |  |  |  |  | $\checkmark$ | $\checkmark$ |
| Rope Pull | $\checkmark$ | $\checkmark$ |  |  | (secondary function) |  |  |  |  | $\checkmark$ | $\checkmark$ |
| Gate Switch (potential free contacts) | $\checkmark$ | $\checkmark$ |  |  | $\checkmark$ |  |  |  |  | $\checkmark$ | $\checkmark$ |
| RFID Gate Switch (OSSD contacts) |  | $\checkmark$ |  |  | $\checkmark$ |  |  |  |  | $\checkmark$ | $\checkmark$ |
| ISD Functionality |  |  |  |  |  |  |  |  |  | 2 chains | 8 chains |
|  |  |  |  |  |  |  |  |  |  | $\checkmark$ | $\checkmark$ |
| EtherCAT. ${ }_{\text {¢ }}{ }^{*}$ |  |  |  |  |  |  |  |  |  |  | $\checkmark$ |
| Safety Mat Monitoring |  |  | $\checkmark$ |  |  |  |  |  |  | $\checkmark$ | $\checkmark$ |
| Two-Hand Control |  |  |  | $\checkmark$ |  |  |  |  |  | $\checkmark$ | $\checkmark$ |
| Enabling Device | $\checkmark$ | $\checkmark$ |  |  |  |  |  |  |  | $\checkmark$ | $\checkmark$ |
| Expandable |  |  |  |  |  |  |  |  | $\checkmark$ |  | $\checkmark$ |
| Muting |  |  |  |  | $\checkmark$ |  |  |  |  | $\checkmark$ | $\checkmark$ |
| ON/OFF Delay |  |  |  |  |  |  |  |  | OFF delay available | $\checkmark$ | $\checkmark$ |
| Speed Monitoring |  |  |  |  |  | $\checkmark$ |  |  |  |  |  |
| Safety Standard | Cat. 4 PL e, per EN ISO 13849-1; SIL 3 per IEC 61508 and IEC 62061 |  |  |  |  | Cat. 4 PL e e, per EN ISO 13849-1; SIL 3 per IEC 61508 and IEC 62061 |  |  |  |  |  |
| Inputs | 1 NC and 1 NO (single or dual) 1 NC (single) 2 NC (dual) | 1 NC (single) or 2 NC (dual) or 2 PNP | $\begin{aligned} & 1 \text { (or multiple } \\ & \text { in series) } \\ & 4 \text {-wire safety mat } \end{aligned}$ | $\begin{gathered} 2 \mathrm{STB} \text { or } \\ \text { buttons with } \\ \text { complementary } \\ \text { contacts } \end{gathered}$ | 2 NC mutable (dual) and 2 NC SSI (dual) | 2 PNP | 2 NC (dual) or 2 PNP | 2 NC (dual) or 2 PNP | 1 NC (single) or 2 NC (dual) | 10 | $\begin{aligned} & \text { SC26: up to } 26 \\ & \text { XS26: up to } 154 \end{aligned}$ |
| Safety Outputs | $2 \mathrm{NO}, 3 \mathrm{NO}, 4 \mathrm{NO}$ | 2 NO or 3 NO | 4 NO | 2 No | $\begin{aligned} & 2 \text { PNP OSSD } \\ & \text { or } 2 \text { NO } \end{aligned}$ | 2 No | $2 \mathrm{NO}, 3 \mathrm{NO}$ | $2 \mathrm{NO}, 3 \mathrm{NO}$ | 4 NO or 4 NO with delay | 2×3NO | $\begin{gathered} \text { SC: } 2 \\ \text { Xs: up to } 68 \end{gathered}$ |
| Maximum Safety Output Rating | 6A, 7A | 7A | 6 A | 6 A | 6 A | 4 A | 6 A | 6 A | 6 A | 6 A each | 0.54 each |
| Auxiliary Outputs | 1 NC or 1 NC and 2 PNP | 1 NC , depending on model | 1 NC and 2 PNP |  | 1 PNP or 1 NC | 1 NC | 1 NC | 1 NC , depending on model |  | depends on configuration | depends on configuration |
| Power Supply | 24 V AC/DC <br> 115 V AC and $12-24 \mathrm{~V}$ DC or 230 V AC and $12-24 \mathrm{~V}$ DC | 24 V AC/DC | $\begin{gathered} 115 \mathrm{VAC} \text { and } \\ 12-24 \mathrm{VDC} \\ \text { or } 230 \mathrm{VAC} \text { and } \\ 12-24 \mathrm{VDC} \end{gathered}$ | 24 VACIDC | 24 VDC | 24 VDC | 24 VDC | 24 VDC | 24 V DC or 24 V AC/DC, depending on mode | 24 VDC | 24 VDC |
| 44 bannerengineering.com |  |  |  |  |  |  |  |  |  |  | NTMET |

## Safety Relays and Controllers


ndustrial safety controllers and relays provide an interface between safety devices and the machines and processes ose devices monitor for a complete and easy-to-use safety ontrol solution.

Safety Relays


Cost-effective for simple safety circuits
Preset functionality: Configuration not required Safety inputs: 1

- Independently controlled safety outputs: 1; 4 to 7A

Choose from a variety of models:
Universal input safety relays

- E-stop monitoring safety relays

Muting safety relays
Safe speed monitoring relays
Safety mat relays
Safety extension relay
Interface relays


Safety controllers can be tailored for a wide variety of
machines, including machines with multiple processes

Hybrid Safety Controller Plus 2 Safety Relays


Flexible and co
2 safety relays
2 safety relays

- PC configurable: Flexible and easy-to-use

Safety inputs: up to 10; up to 70 with ISD
Independently controlled safety outputs: 2; 6A ead
Convertible safety inputs: 4
Terminal LEDS for easy troubleshooting
Industrial Ethernet
Each output contains 3 NO redundant safety contacts

## 115




Configurable controllers monitor multiple safety devices, suc as E-stop buttons, safety switches, safety light screens, twoEand controls, and rope pull switches


Expandable Safety Controller


Expandable for complex safety applications where 3
or more safety relays are typically used
PC more safety relays are typically used
Safety inputs: 26 (base unit) up to 154
Idependently controlled safety outputs: up to 68 . 0.5A to 6A each

Convertibe sofety inouts: 8 (Base unit) up to 40
LCD screen for easy troubleshooting
Industrial Ethernet
III II

IT D
Madodous
PRop Etheri'et/IP EtherCAT. ${ }^{*}$

## Safety Controllers

XS26 Expandable Safety Controller


Easy to Configure and Integrate with a PLC



- Backup copy of configuration, password, network settings - Download configuration without a PC
Save time during panel build
Fast swapout minimizes downtime
$\downarrow$
$\stackrel{\downarrow}{4}$

In-Series Diagnostics Functionality

In-Series Diagnostics allows you to connect up to 32 devices with one in-series connection and communicate directly with the most commonly used PLCs. Achieves up to CAT4, SIL3, PLe safety rating.

Compatible Devices



## Configure Your System in Minutes

The feature-rich SC10 and SC/XS26 safety controller software provides a seamless user interface for setting up and managing safety systems. The software features an intuitive icon-based, drag-and-drop user interface to reduce the learning curve and speed up commissioning.
Complex configurations made easy
Simulate configurations before implementation
Auto configure Industrial Ethernet for remote monitoring and diagnostics
Start using the free software today. Go to www.bannerengineering.com/safetycontroller

1. Choose Controller

2. Equipment View



| 5. Add virtual non-safety inputs |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | 4 | 2 |  | 同 |
| (20) | $\cdots$ |  | $\cdots$ |  |
| (2) mimmmem |  |  |  |  |
| - |  |  |  |  |
| [100 |  |  |  |  |
| $\square$ |  |  |  |  |

System Software


## Safety Relays





| Supply Voltage | Inputs | Safety Outputs | Aux. Outputs | Output Rating | Output Response Time | Models |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 24 VDC | 2 NC | 3 NO | - | 6A | 20 ms | SR-IM-9A |
|  |  | 2 NO | 1 NC |  |  | SR-IM-11A |
|  |  | 3 No | - |  |  | IM-T-9A |
|  |  | 2 NO | 1 NC |  |  | $1 \mathrm{M}-\mathrm{T}-11 \mathrm{~A}$ |

[^0]
## Safety Controllers



Choosing a Banner Safety Switch



Safety Switches


Hinge Switches
One-piece sensor and actuator with hinge function Fast installation and setup with repositionable safety switch point
Stainless steel and IP69 available
Matching hinges without sensing available for additional
oor support
Available with up to $270^{\circ}$ safety switch point operation range

fint
Two-piece design where sensor and actuator do not contact Coded magnets/tags minimize the potential for intentional defea A single pair can achieve up to Category 4/PLe safety rating Accommodating to misalignment
on contact solution minimizes device wear and tear even applications with persistent use prers wis persistent use

## Mechanical Switches

Locking Switches

## 献

Two-piece design with mechanical operator feedback
lexible actuator options for misalignmen
Rotatable heads for flexible install ation Mechanically coded actuator to minimize tampering
do 5 N latching force to reduce owntime due to vibrating doors limit switches availab


Wo-piece design with up to 2000 N Two-piece design with up to 2000 N
locking force for safety or process critical applications
Flexible actuator options for misalignment Rotatable heads for flexible installatio Mechanically coded actuator to minimize tampering W to 15N I atching force to positio door prior to locking


Cost effective one piece sens No actuator allows for fewer alignment issues
Hideable making them more tamper resistant
Rotating head and top or side engagement allows for eight different actuator positions Design meets positive opening


The SI-GL42D fail-safe guard locking switch has several guard locking options: manual, spring-to-lock, or power-to-lock. The safety switch can manually be unlocked using a tool in case of maintenance work. Emergency or escape release are additiona functions that allow for quick intervention when required. nspring-to-lock models, the guard is locked by spring force. To unlock, the solenoid must be energized
$n$ power-to-lock models, the guard is locked when the energized. To unlock, power must be switched off


Escape releas
extensions

## Non-Contact RFID Safety Switches



Safety switches respond when a mechanical guard is opened They feature "positive opening" contacts for high reliability regardless of environmental conditions and withstand attempts to override the switch and defeat the system.

RFID SI-RF Switches


Single door RFID non-contact gate/door sensing solution
Basic, medium, and high tamper resistance
Misalignment tolerance of 10 mm
Resistant to high vibration and operations with metallic shaving On-board LED for status and diagnostics

RFID SI-RF Switches - Cascade


Multiple door RFID non-contact gate/door sensing solution
Basic, medium, and high tamper resistance
Misalignment tolerance of 10 mm

- Resistant to high vibration and operations with metallic shavings On-board LED for status and diagnostics
ITD - Connect up to 32 sensors in cascade while maintaining the highest level of safety 4-pin QD connections for cost-effective, simple, error-free installation RFID cascade with In-Series Diagnostics available


## Enabling Devices



A two-hand control safeguarding system will prevent the operator from approaching the machine while a hazard is present. DuoTouch Run Bar provides an all-in-one solution.


Handheld grip-styled switches are used for manual control of machine functions including visual observations, minor adjustments, calibration, and more

Two-Hand Control
STB Self-Checking Touch Buttons

| Connection | Touch Surface Material | Output | Power Supply | Models |
| :---: | :---: | :---: | :---: | :---: |
| 2 m cable | Polyetherimide (PEI) | Solid-state 2 Complementary PNP (1 ON, 1 OFF) | $10-30 \mathrm{~V} \mathrm{DC}$ | STBVP6 |
| 4-pin M12 QD |  |  |  | STBVP6Q5 |
| 2 m cable |  | E/M Relay 2 Complementary SPST (1 NC, 1 NO) | $20-30 \mathrm{~V} \mathrm{AC/DC}$ | STBVR81 |
| 5-pin M12 QD |  |  |  | STBVR8106 |



Two-Hand Control Run Bars

Enabling Devices


| Contact Configuration |
| :--- |
| 2 NO \& 1NC Aux |
| 2NO \& 1NC Aux |
| 2NO |

ED1G Enabling Devices Momentary Push Button -

## Safety Switches

Magnetic Switches


RFID Switches


| Brackets |  |  |  | Adaptor Cable |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\left[\begin{array}{l} 0 \\ 0 \\ \pi 0 \end{array}\right.$ |  |
| SI-HG80DQD | SI-HG80DQDR | SI-HG80A | SI-HG63A | MQEAC-601-Q5A |
| Inline QD Fitting | Right-angle QD Fitting | Blank Hinge | Blank Hinge | SI-HG63 to ISD Connect Adaptor Cable |



[^1]
Actuators

| SI-QS-SSA-2 |
| :---: |
| Stright Rigid |
| Inline Actuator |


| SI-Qs-sSA-3 |
| :---: |
| Rnt-Angle Rigid |
| Inline Actuator |

Flexible Inline Actuator


## Safety Switches

SI-QM-SSA-2

| Straight rigid |
| :---: |
| actuator for sliding or |
| removable guards | | Flat tigid actuator for |
| :---: |
| sliding or removable |
| guards |$\quad$| Flexible actuator for |
| :---: |
| small hinged guards |
| 150 mm or larger |$\quad$| Flexible actuator for |
| :---: |
| small hinged guards |
| 400 mm or larger |

Unlock Mechanism

|  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| SI-QM-SSA-SHER | SI-GL42-ERS-F-1 | SI-GL42-ERS-B-1 | SI-GL42-ERBD-B-1 | SI-GL42-EM20-1 | Sl-GL42-EM40-1 |
| Sliding door handle with emergency release (-SH model withou emergency release | Front mount emergency release lever | Back mount emergency release lever | Back mount escape release mechanism | 20 mm extension for escape release mechanism | 40 mm extension for escape release mechanism |



## Choosing a Banner E-Stop Device



## E-Stop Devices Selection Guide



## E-Stop Devices

E-Stop Buttons*


Accessories

bannerengineering.com
*Not all combinations are orderable. Visit bannerengineering.com for available models.

E-Stop Button Kits


Rope Pull E-Stop Devices


|  | Maximum Rope Length | Rope Connection | Safety Contacts | Auxiliary Contacts | Actuation | Housing Material | Models |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 25 m |  |  |  |  |  | RP-LS42F-25L |
|  | 37.5 m | Ring connection |  |  |  |  | RP-LS42F-38L |
|  | 75 m |  |  |  |  |  | RP-LS42F-75L |
|  | 25 m |  |  |  |  |  | RP-LS42F-25LF |
|  | 37.5 m | Built-in turnbuckle |  |  |  |  | RP-LS42F-38LF |
|  | 75 m |  |  |  |  |  | RP-LS42F-75LF |
|  | 6 m |  |  |  |  |  | RP-QM72D-6L |
|  | 12 m |  | 2 NC in |  |  |  | RP-QM72D-12L |
|  | 20 m |  |  |  | Latch |  | RP-QM72D-20L |
|  | 12 m |  | 4 NC in |  |  | Meta | RP-QMT72F-12L |
|  |  |  |  | 1 NO in |  |  | RP-QMT72E-12L |
| -19 | 6 m |  | 2 NC in | - | Trip |  | RP-LM40D-6 |
|  |  |  |  |  |  |  | RP-LM40D-6L |
|  | $100 \mathrm{~m}(50 \mathrm{~m} \mathrm{each}$ |  |  | 2 NO in | , |  | RP-QM90F-100L |

Components for Wire Rope Assembly


## More Sensors, More Solutions.

Banner Engineering designs and manufactures industrial automation products including sensors, smart IIoT and industrial wireless technologies, LED lights and indicators, measurement devices, machine safety equipment, as well as barcode scanners and machine vision. These solutions help make many of the things we use every day, from food and medicine to cars and electronics. A high-quality, reliable Banner product is installed somewhere around the world every two seconds. Headquartered in Minneapolis since 1966, Banner is an industry leader with more than 10,000 products, operations on five continents, and a world-wide team of more than 5,500 employees and partners. Our dedication to innovation and personable service makes Banner a trusted source of smart automation technologies to customers around the globe.



[^0]:    bannerengineering.com

[^1]:    bannerengineering.com

