RSio Remote Safe I/O Link

More Devices,
Machine Mountable,
and No Learning Curve

CIP Safety™

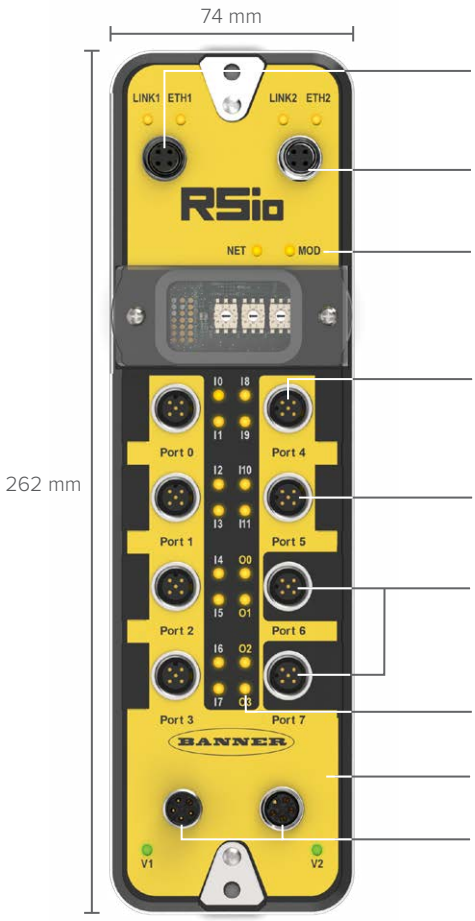
ISD

In-Series Diagnostics

Airline
www.airlinehyd.com

BANNER®

RSio Remote Safe I/O Block



Seamless integration into **CIP Safety** applications

Easy scalability with **Ethernet passthrough**

Familiar setup using Rockwell's **Studio 5000®** No new software to learn

Six inputs compatible with most industrial safety devices, including light curtains, e-stops, door switches, and scanners

Simplify wiring, reduce cost, and gain valuable insights into your safety devices with **In-Series Diagnostics** (ISD)

Two configurable safety outputs provide single- or dual-channel control at 1 A per channel

Bright LEDs for easy status indication and troubleshooting

IP67-rated for flexible, out-of-cabinet installations

Available with either M12 L-Code or Mini **pass-through power** connections

Banner's RSio Remote Safety I/O block provides six independently configurable hybrid I/O ports that support safety-rated or standard devices, giving system engineers flexibility in how each port is used. Inputs support dry-contact or solid-state safety devices, In-Series Diagnostics (ISD), and standard control signals. Two configurable outputs provide control signals for final switching devices, safety-rated devices, or non-safety devices, with ON/OFF readback for faster fault detection.

RSio is configured directly in Rockwell Automation's Studio 5000®, without any additional software needed, thanks to an included EDS file that also includes user-selectable port presets that simplify integration of common safety devices such as e-stops, light curtains, and safety switches.

Six inputs each support up to 32 ISD-enabled safety devices—up to 192 devices on a single RSio—delivering device-level diagnostics and scalable safety coverage up to Cat 4 PLe/SIL3 while reducing cable runs and shrinking cabinet footprints.

Available with M12 L-Code or Mini pass-through power and an IP67-rated, machine-mountable housing, RSio delivers field-level safety I/O with hybrid I/O flexibility and ISD scalability for CIP Safety systems—and it's configured entirely in the same Studio 5000 environment controls engineers already live in.

RSio Product Overview Video Link

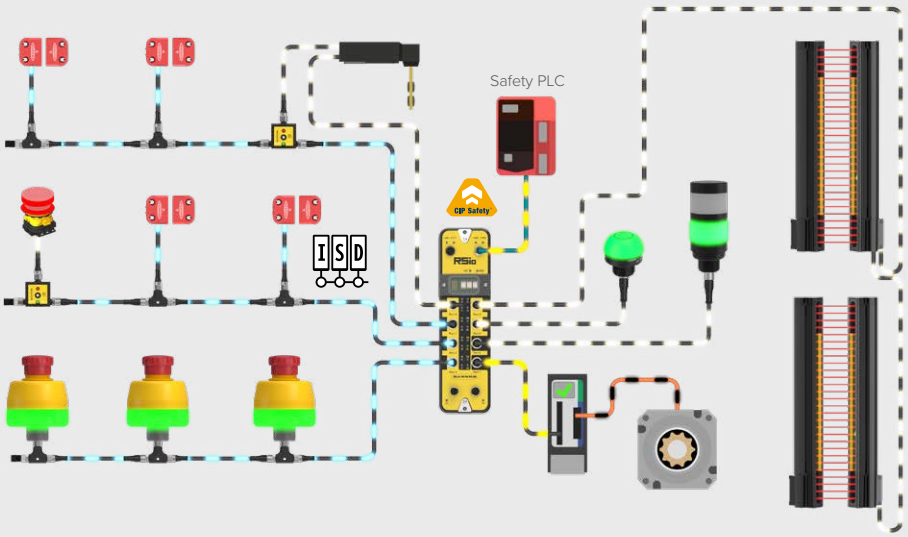
How to Configure RSio Presets Video Link

In-Series Diagnostics Link

More Devices, Less Wiring, and Faster Diagnostics

In-Series Diagnostics (ISD) makes it possible for each RSio input to connect up to 32 ISD-enabled safety devices, or safety devices brought in through ISD Connect, in a daisy-chain while providing diagnostic data for each individual device. ISD chains use plug-and-play M12 T-connectors and cabling, with the ISD protocol traveling over the same wiring as the OSSD signals, providing continuous device status and clear identification of which device in the chain causes a stop.

RSio supports a mix of ISD and non-ISD devices across its six inputs. Each input can monitor either a single safety device directly or an ISD chain of up to 32 devices—192 devices total across one RSio.



Applications

Independent Coverage and Control Across Conveyor Lines

Use RSio's In-Series Diagnostics (ISD) capabilities to create individual safety zones on long-run conveyors common in distribution, 3PL, and material-handling environments. On one safety input, an ISD chain consisting of a rope pull brought in via ISD Connect and a series of e-stops provides stop coverage along the first conveyor line. A second safety input brings in another ISD chain of e-stops to protect a second line. A final switching device connected to one of RSio's safety-rated outputs controls the motor-driven rollers on the first line, while the second line's final switching device (FSD) is controlled by the GuardLogix safety controller via the CIP Safety connection. A hybrid port configured as a standard output drives a CL50 Column Light to provide system-status indication at a distance.

When any device in the first ISD chain is tripped, RSio drops the safety output to remove power from the FSD and stop the first conveyor. When a device in the second ISD chain is tripped, RSio reports the safety input status to the Safety PLC over the CIP Safety connection on the EtherNet/IP network, and the Safety PLC commands its final switching device to stop the second conveyor. ISD device-level diagnostics help maintenance quickly locate which device along either line needs attention.

RSIO-MA4-6SI2SO-C
Remote Safe I/O

SSA-EB1PLGR-0DECQ8
E-Stop

CL50GRYPQ
Column Light

K30LGRYPQ
Indicator

RP-RM83F-75LR
Rope Pull with E-Stop

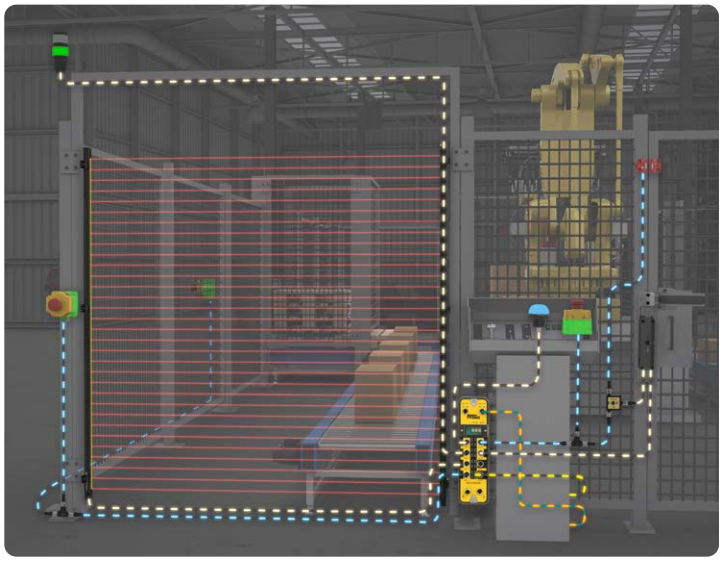
SSA-ISD-TCA
ISD Connect

Add a standard device, such as this Rope Pull to an ISD network using the ISD Connect.

Complete Palletizer Coverage

Use RSio to create a complete safety solution for robotic palletizing cells that takes advantage of hybrid I/O and In-Series Diagnostics (ISD). On one safety input, an S4B Safety Light Curtain provides perimeter protection. A second safety input brings in a daisy-chain of ISD e-stops that provide stop coverage along one side of the cell. A third safety input brings in another ISD chain with an e-stop for the gate area, and an SI-RF Safety Switch paired with an SI-GL42 Safety Locking Switch via ISD Connect to control gate access. Two ports configured for standard devices tie in both indication and a localized reset switch. A TL50 Tower Light provides visibility of system status at a distance, and a K50 Programmable Touch Button provides status indication and acts as a system reset switch. One of the safety-rated outputs controls the final switching device for the palletizer's motion.

When any safety device is tripped, RSio drops the safety output to stop the palletizer. The color on the TL50 and K50 then changes from green to red, indicating shutdown. Across both ISD chains, device-level visibility speeds up troubleshooting. After the tripped device is reset, touching the K50 resets the input through the Safety PLC to restart the system. Both indicators then switch back to green.



RSIO-MA4-6SI2SO-C
Remote Safe I/O

S4BE30-1200-S
S4BR30-1200-S
Safety
Light Curtain

SI-RF-A
SI-RFDT-HP8
Safety Switch

SSA-EB1PLGR-0DED1Q8
E-Stop

SI-GL42DM01-20Q13
Safety Locking Switch

SSA-ISD-TCA
ISD Connect

TL50GYQ
Tower Light

K50PSTGRY3Q
Reset Button

Add a standard device, such as this Safety Locking Switch to an ISD network using the ISD Connect.

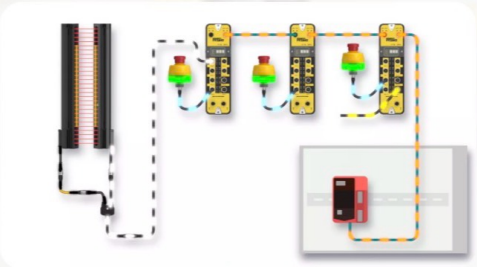
BANNER

ETHERNET PASSTHROUGH

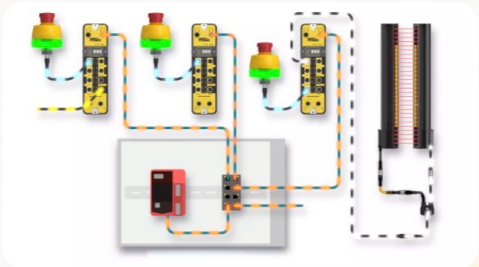
Extend Distributed I/O with Network Flexibility

RSio includes an integrated dual-port Ethernet switch for pass-through networking, allowing multiple RSio Remote Safe I/O blocks to be connected in daisy-chain, star, a combination of daisy-chain and star, or DLR ring network topologies without consuming external switch ports.

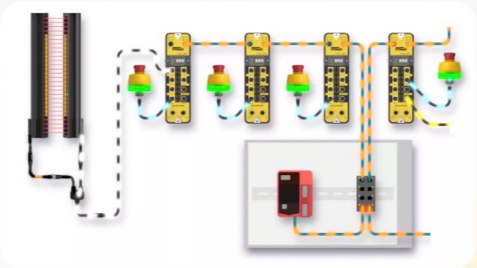
Daisy-Chain



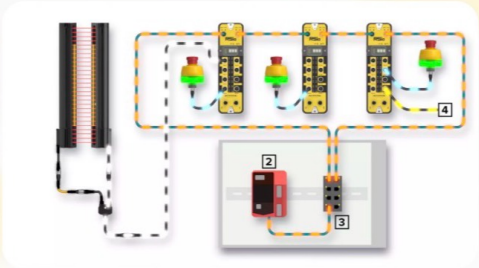
Star



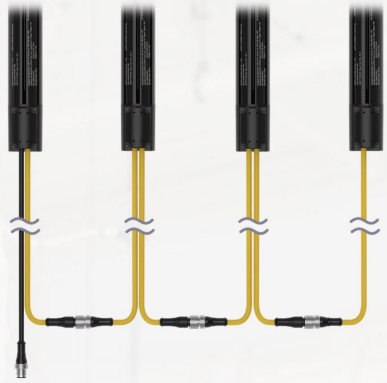
Daisy-Chain & Star



DLR Ring

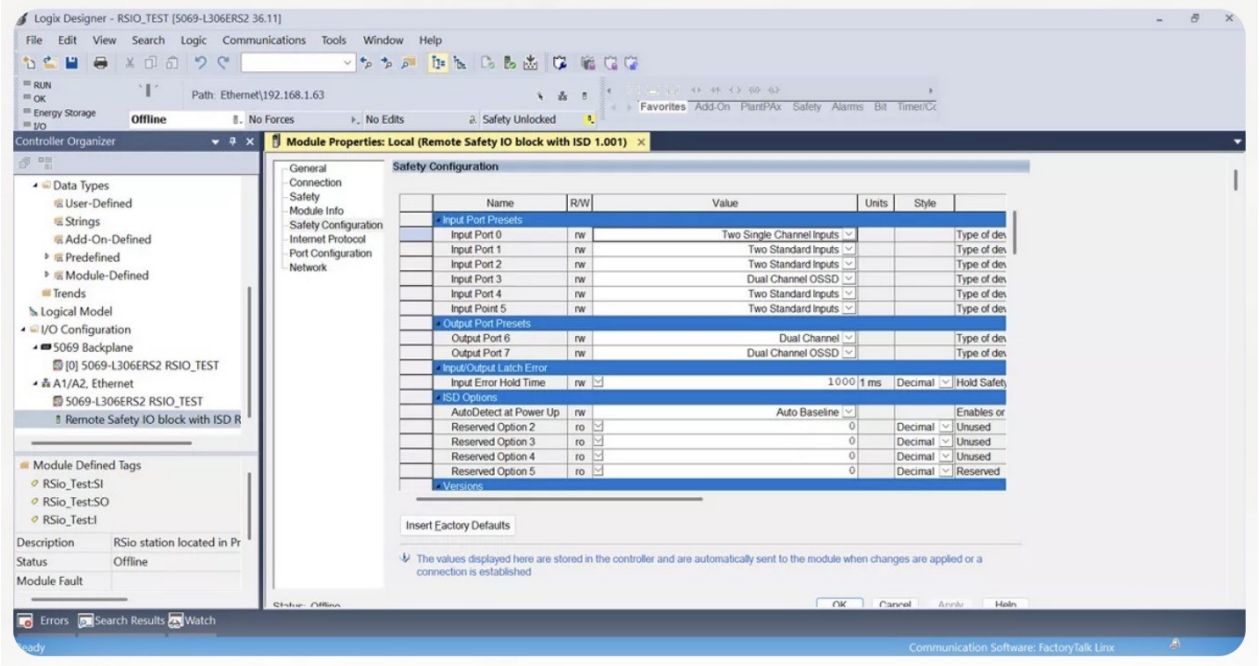


S4B Benefits



Save Installation and Setup Time with Optimized Auto Cascading

Cascading functionality is now available on the S4B, simplifying installation by minimizing the wiring needed to connect light curtains to a controller. The auto cascade feature in the S4B goes a step further to facilitate setup and installation, automatically recognizing the next light curtain as they are connected. The minimal response time impact when cascaded allows the S4B to be installed closer to the equipment being guarded, making more efficient use of valuable floor space. Each curtain has the flexibility to be used as a standalone pair or part of a cascade. That determination is made by the cordset selected. This means fewer parts to stock, easier ordering, and fast installation.



FAMILIAR SOFTWARE

Seamless Integration into Studio 5000®

RSio configures entirely in Rockwell Automation's Studio 5000®, the same software environment used with GuardLogix® safety PLCs, making it easy to take advantage of hybrid I/O and Banner's In-Series Diagnostics (ISD) technology without requiring additional software.

RSio Remote Safe I/O

Safety Communication Protocol	Safe Output Ports	Safe/Non-Safe Input Ports	Power Connection	Models
CIP Safety	2	6* (ISD compatible†)	4-pin Mini	**RSIO-MA4-6SI2SO-C**
			5-pin M12 L-code	**RSIO-L5-6SI2SO-C**

*Pin 1 and pin 5 test outputs independently controlled
†Each input supports an ISD chain of up to 32 ISD-enabled devices—192 devices total across one RSio.

Specifications

RSIO-L5-6SI2SO-C **RSIO-MA4-6SI2SOC**

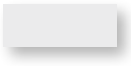
Supply Voltage	24 V DC
Safety	Up to Category 4, PL e (EN ISO 13849) Up to SIL 3 (IEC 61508)
Reaction Time	Maximum input time: 6 ms + debounce time (default 6 ms) Maximum output time: 5 ms
Construction	Enclosure: Glass filled polyamide Rotary switch cover: Polycarbonate Encapsulation: Epoxy Connectors: Nickel-plated copper and polyamide
Operating Conditions	–25 to +70 °C (–13 to +158 °F)
Environmental Rating	For Indoor Use Only IP65, IP67, NEMA 1, UL Type 1

Accessories

ACC-CAP M12-10
Female M12 Cap (10 pack)

BCC-MAM-NPB
Male 7/8 Inch Cap

BCC-MAF-NPB
Female 7/8 Inch Cap



RSA-PL-16
Port Labels (16 pack)

RSA-RSD-1
Door Hardware Kit
(1 door, 1 gasket, 2 screws)

M12 Single-Ended for Signal Connections
Straight connector models

4-Pin Male	4-Pin Female	5-Pin Male	5-Pin Female
BC-M12M4-22-2 2 m (6.6 ft) **BC-M12M4-22-5** 5 m (16.4 ft) **BC-M12M4-22-10** 10 m (32.8 ft)	**BC-M12F4-22-2** 2 m (6.6 ft) **BC-M12F4-22-5** 5 m (16.4 ft) **BC-M12F4-22-10** 10 m (32.8 ft)	**BC-M12M5-22-2** 2 m (6.6 ft) **BC-M12M5-22-5** 5 m (16.4 ft) **BC-M12M5-22-10** 10 m (32.8 ft)	**BC-M12F5-22-2** 2 m (6.6 ft) **BC-M12F5-22-5** 5 m (16.4 ft) **BC-M12F5-22-10** 10 m (32.8 ft)

M12 Double-Ended for Signal Connections
Straight connector models

4-Pin Female-Male	5-Pin Female-Male
BC-M12F4-M12M4-22-2 2 m (6.5 ft) **BC-M12F4-M12M4-22-5** 5 m (16.4 ft) **BC-M12F4-M12M4-22-10** 10 m (32.8 ft)	**BC-M12F5-M12M5-22-2** 2 m (6.5 ft) **BC-M12F5-M12M5-22-5** 5 m (16.4 ft) **BC-M12F5-M12M5-22-10** 10 m (32.8 ft)

M12 L-Code Single-Ended for Power Connections
Straight connector models

5-Pin Male	5-Pin Female
BCP-M12LM5-14-2 2 m (6.5 ft) **BCP-M12LM5-14-5** 5 m (16.4 ft) **BCP-M12LM5-14-10** 10 m (32.8 ft)	**BCP-M12LF5-14-2** 2 m (6.5 ft) **BCP-M12LF5-14-5** 5 m (16.4 ft) **BCP-M12LF5-14-10** 10 m (32.8 ft)

M12 L-Code Double-Ended for Power Connections
Straight connector models

5-Pin Female-Male
BCP-M12LF5-M12LM5-14-2 2 m (6.5 ft) **BCP-M12LF5-M12LM5-14-10** 10 m (32.8 ft) **BCP-M12LF5-M12LM5-14-15** 15 m (49.2 ft)

Mini Single-Ended for Power Connections
Straight connector models

4-Pin Female
MBCC-406 1.83 m (6 ft) **MBCC-412** 3.66 m (12 ft) **MBCC-430** 9.14 m (30 ft)

M12 D-Code Double-Ended for Ethernet/Data Connections
Straight connector models

4-Pin Male
BCD-M12DM-M12DM-2 2 m (6.5 ft) **BCD-M12DM-M12DM-5** 5 m (16.4 ft) **BCD-M12DM-M12DM-10** 10 m (32.8 ft)

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PN B_51961627

Banner In-Series Diagnostics

ISD Explained

Banner In-Series Diagnostics Link

Cut costs by preventing and reducing downtime
Local operator guidance and remote actionable data

Reduce and simplify wiring
Up to 32 plug-n-play devices with one in-series connection — achieves the highest level of safety; up to Category 4, PL e, SIL CL 3

Intuitive setup and PLC integration
Easy-to-use software and auto-tag export

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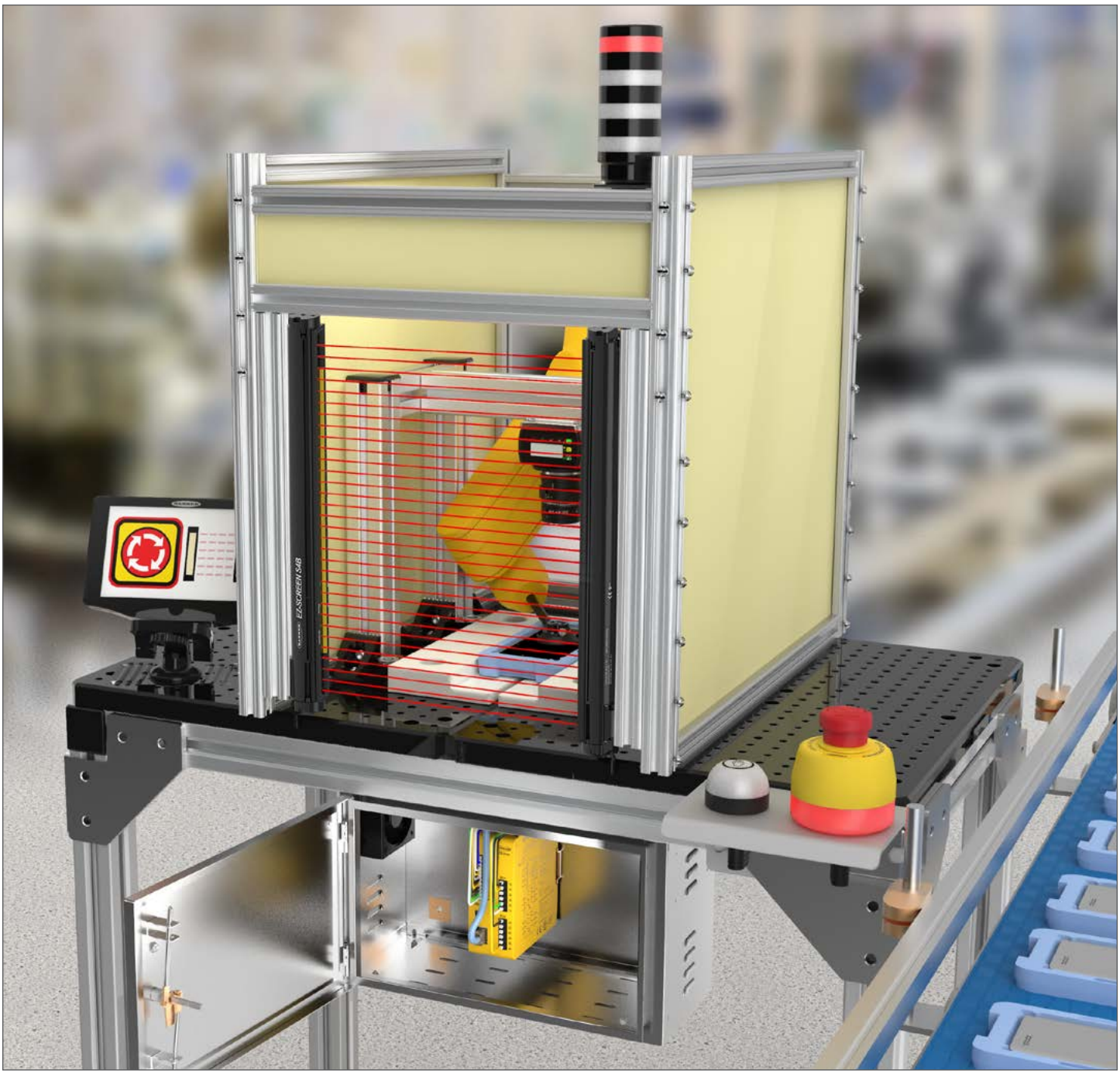
BANNER®



Cut Costs by Preventing and Reducing Downtime

Gather Real-Time Data About Safety Systems

In-Series Diagnostics gives machine owners and operators greater insight into the health and performance of their equipment, making them less reliant on outside experts to solve system problems. Users can monitor the status of each device in their safety system in real-time, identify the location and nature of any potential problems, and receive alerts if a critical event does occur, so equipment can get back up and running as soon as possible.

Reduce and Simplify Wiring

Cost-Effective and Easy to Implement

Connect up to 32 ISD devices in a series chain using plug-and-play industry standard M12 4-pin cables and T-connectors. The ISD protocol overlays the diagnostic data for each device on top of the safety OSSD signal wires, delivering the highest level of safety and advanced diagnostic over two wires. This error-proofs the system, reduces controller I/O, and eliminates the time, hassle, and expense of running designated cables between the device and control panel.

Intuitive Setup and PLC Integration

Easy to Design and Implement

Create a safety configuration in mere minutes with the free PC software, which provides an intuitive on-screen interface incorporating drag-and-drop icons. Download the configuration using the XM3 external memory drive, no PC required. Integration with the PLC is made easy with the export-tag feature that automates the typical manual entry of tag values in the PLC. Quickly set the controller's IP address using the on-board LCD display via the ClickSet IP feature.

Banner
In-Series
Diagnostics

ISD-Enabled Products by Banner

SC10 Safety Controller

- Safety Controller + ISD to PLC Gateway
- Easy to configure with free PC software
- Connect up to 64 ISD devices
- Supports up to 70 total safety devices
- Two independently controlled 6A safety relay outputs
- Profient, Ethernet/IP, Modbus TCP

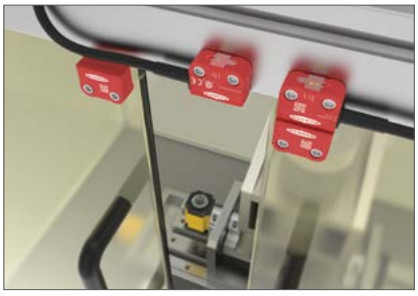
XS26-ISDd Safety Controller

- Safety Controller + ISD to PLC Gateway
- Easy to configure with free PC software
- Connect up to 256 ISD devices
- Expandable up to: 394 total safety devices and 68 safety outputs
- Profient, Ethernet/IP, Modbus TCP

ISD to IO-Link Modules

- Compact field device
- ISD to IO-Link Gateway
- Connect up to 32 ISD devices
- Easily daisy-chain to a separate safety relay or controller
- IP20 and IP69 models available

RFID Safety Switches



- High tolerance to misalignment
- Provides data to prevent downtime
- Basic, medium, and high-tamper-resistance models available
- Features an IP69 rating and resistance to both vibration and metal shavings
- Cascade up to 32 ISD devices while achieving the highest level of safety

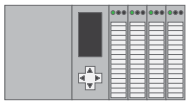
Illuminated E-Stops

- Illuminated base flashes red to quickly identify which button has been pressed
- Illuminated base is green, yellow, or unlit to indicate it is armed and ready for operation
- Unique OSSD safety outputs simplify wiring and allow it to be included in an In-Series Diagnostics (ISD) chain
- Cascade up to 32 ISD devices while achieving the highest level of safety

Add Other Safety Devices to an ISD Chain

In-Series Diagnostics System Overview

HMI



PLC

EtherNet/IP

Modbus TCP/IP

PROFINET

ISD Connect

- Add any safety device with two normally closed sets of contacts to an ISD chain
- Bright LEDs for simplified local diagnostics
- Flexible mounting in any orientation with integral mounting hole and visible LEDs on both sides
- Add up to 32 non-ISD devices to an ISD chain and achieve the highest level of safety

Compatible with ISD Connect

SSA-EB1P-02-A01 — 30 mm Panel-Mounted E-Stop with M12 QD Pigtail

SI-GL42 — Locking Safety Switch

SI-HGZ63FQDxx — SI-HG63 Series Hinged Safety Switch

MQEAC-601-Q5A — SI-HG63 to ISD Connect Adapter Cable

CSE5A-M1251M1251 — Two Mechanical Switches to ISD Connect Adapter Cable

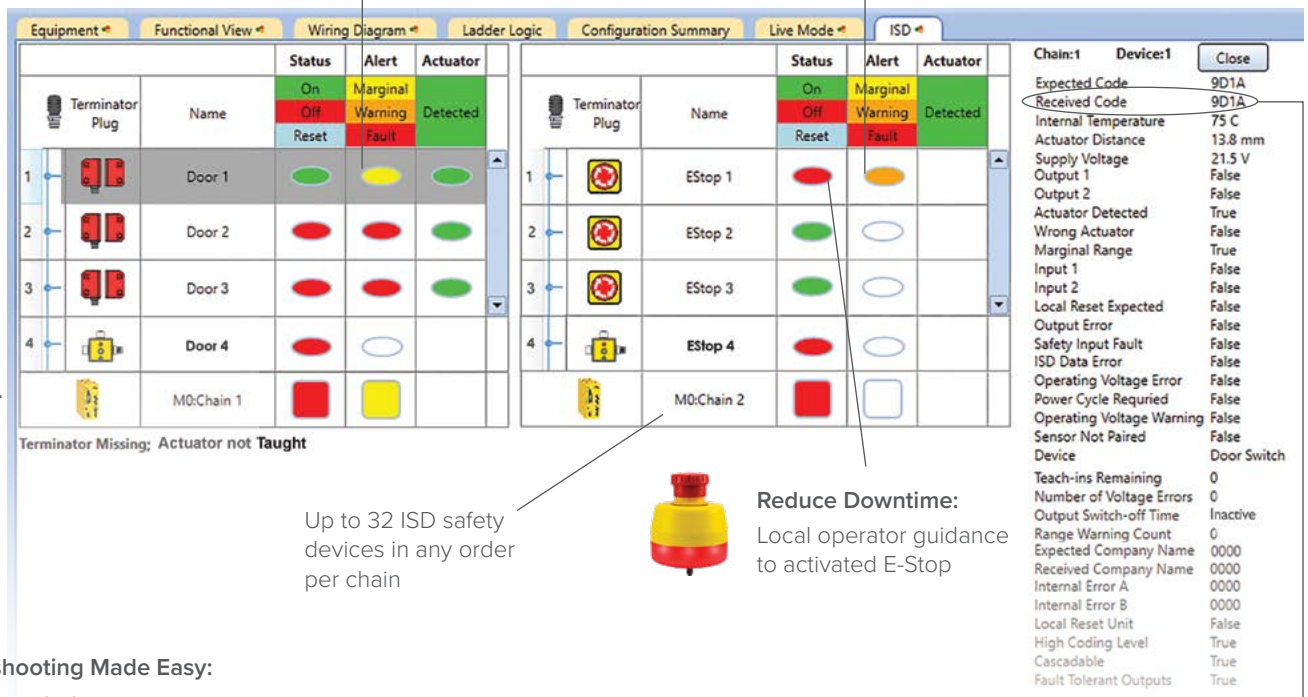
Banner
In-Series
Diagnostics

Software to Design, Configure, and Manage Your Safety System

Prevent Downtime:

Marginal — Alert to check Door 1 for misalignment **before** it causes downtime

Warning — Alert to check E-Stop 1 for low voltage **before** it causes downtime



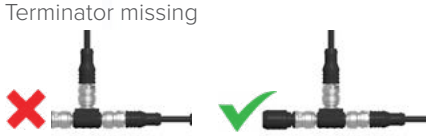
Up to 32 ISD safety devices in any order per chain

Reduce Downtime:

Local operator guidance to activated E-Stop

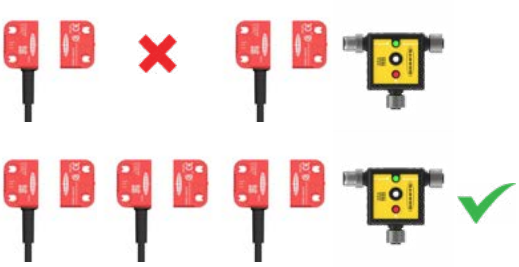
Troubleshooting Made Easy:

Terminator missing

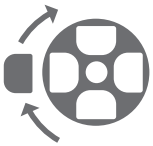


Actuator not taught

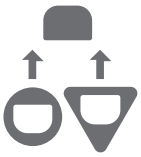
Wrong number of devices



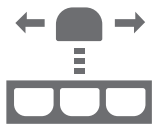
Additional Uses for ISD



Rotation/Indexing



Tool Identification



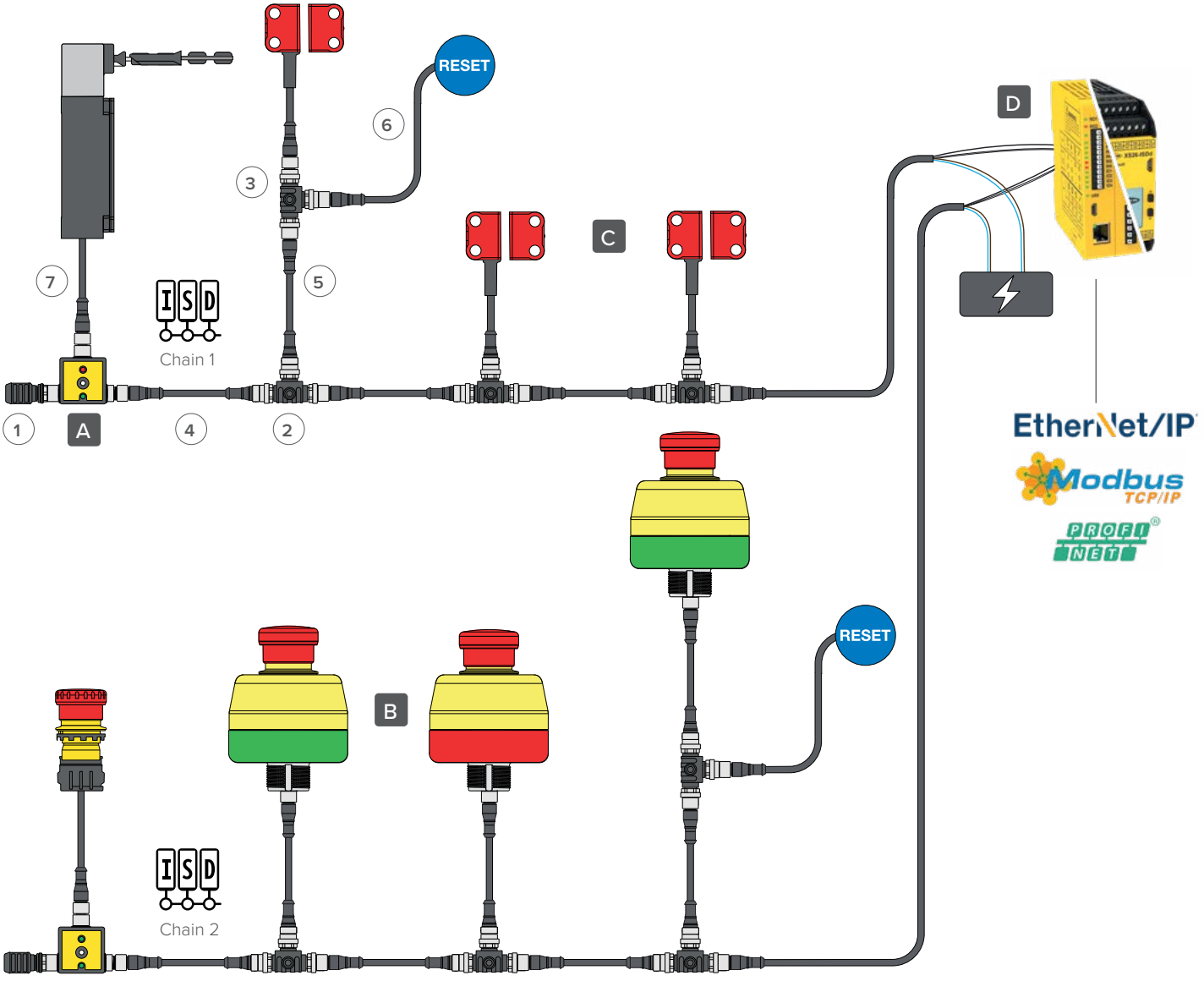
Position Verification

Easy to Implement with AutoDetect ISD

Upon initial power-up, the system activates AutoDetect ISD, which identifies devices added to the ISD chains and informs the PLC of these changes. With this new feature, users can add up to 256 ISD devices with a few clicks of a mouse. It provides flexibility for dynamic safety system configurations—users can add, move, or remove safety devices as needed, and then easily error-proof the entire safety system prior to deployment.

A Guide to Completing Your Safety System

- Simplified wiring using T-adapters and cost-effective 4-pin cables
- Achieves the highest level of safety; up to Category 4, PL e, SIL CL 3



Banner Safety Products with ISD

- **A** **ISD Connect**
  (Use to connect non-ISD devices to a chain)
- **B** **Illuminated E-Stops**
- **C** **RFID Safety Switches**
- **D** **SC10-2roe or XS26-ISDd Safety Controllers**

Connectors and Cordsets

1. **SI-RFA-P**
   Termination plug
2. **SI-RFA-TS**
   4-pin, 8-pin, 4-pin T-adapter for series ISD devices
3. **SI-RFA-TK**
   8-pin, 4-pin, 8-pin T-adapter for local reset button or power supply connection
4. **MQDEC-4xxSS**
   4-pin male/female M12 double-ended cable (straight to straight)
5. **DEE2R-8xxD**
   8-pin male/female M12 double-ended cable (straight to straight)
6. **MQDC-4xx**
   4-pin female M12 to flying lead cable
7. **MQDMC-5xx**
   5-pin female M12 to flying lead cable

Safety Controllers

Model*	Description	Industrial Ethernet	Inputs/ Convertible	Independently Controlled Safe Outputs	Max. Safety Output Rating
XS26-ISDd 	Base Controller 	✓	26/8	2	0.5A PNP @24 V dc
XS8si 	Safety Input Module		8/2	NA	NA
XS16si 	Safety Input Module		16/4	NA	NA
XS2so 	Safety Output Module		NA	1	0.75A PNP @24 V dc

Model*	Description	Industrial Ethernet	Inputs/ Convertible	Independently Controlled Safe Outputs	Max. Safety Output Rating
XS4so 	Safety Output Module		NA	2	0.5A PNP @24 V dc
XS1ro 	Safety Relay Output Module		NA	1	6A; 2 NO, 1 NC aux
XS2ro 	Safety Relay Output Module		NA	2	6A; 2 NO, 1 NC aux
SC10-2roe 	Base Controller 	✓	10/4	2	6A; 3 NO

* Models operate at 24 V dc +/- 20%.

RFID Safety Switches

Family: **SI-RF**

System Type: **D**
- **D** = Cascade with (ISD)

Reset: **T** —
- **T** = Automatic (Trip)
- **L** = Manual (Latch)

Coding*: **U**
- **L** = Low
- **H** = High
- **U** = Unique

Connector: **P8**
- **P8** = 250 mm pigtail, M12 8-pin QD

QD models require mating cordset

NOTE: SI-RF-A Actuator is required to complete a sensor solution. Ordered separately.

*** Tamper Resistant Coding**

Low (L)—The SI-RF Safety Switch accepts any SI-RF-A Actuator

High (H)—The SI-RF Safety Switch only accepts the last taught-in actuator, a maximum of 12 teach-in processes are possible

Unique (U)—The SI-RF Safety Switch only accepts the taught-in actuator, and only one teach-in process is possible

Illuminated E-Stops

Family: **SSA-EB1PL**
- **Illuminated E-Stop**

Color Armed: **Y**
- **X** = OFF
- **Y** = Yellow Solid
- **G** = Green Solid

Color Pressed: **R**
- **R** = Red Flashing

Shroud Option: [ ]
- **Blank** = None
- **S1** = Shroud

— Outputs: **0D**
- **0D** = OSSD Outputs with ISD

Enclosure Style: **ECQ8**
- **ECQ8** = 30 mm Round
- **ED1Q8** = Flush Mount Square

Reset: **R**
- **Blank** = Without Local Reset
- **R** = With Local Reset

ISD Connect

Family: **SSA-ISD**
- **ISD Connect**

—

Device Input Type: **TC**
- **TC** = 2 NC Sets of Dry Contacts

Input Pin Configuration: **A**
- **A** = 5-pin Config A

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