Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

SensaGuard Integrated Latch

(These instructions are for the Series B version only)

Catalog Numbers 440N-Z21SS3PA, 440N-Z21SS3PB, 440N-Z21SS3PH, 440N-Z21SS3PJ, 440N-Z21US3PA, 440N-Z21US3PB, 440N-Z21US3PH, 440N-Z21US3PJ

Summary of Changes

Added Misalignment on page 3.

Introduction

Installation must be in accordance with the following instructions and specifications and implemented by suitable competent personnel. Adherence to the recommended maintenance instructions forms part of the warranty.

This unit is not to be used as a mechanical stop. Guard stops and guides must be fitted.

This device is intended to be part of the safety-related control system of a machine. Before installation, a risk assessment is performed to determine whether the specifications of this device are suitable for all foreseeable operational and environmental characteristics.

WARNING: Do not defeat, tamper, remove, or bypass this unit. Severe injury to personnel could result.

ATTENTION: This device must be provided with a 24V DC PELV or SELV power supply that conforms to the requirements of 414-3 of IEC 60364-4-41 where provisions have been taken. To confirm that, even if there's an internal fault, the voltage at the outgoing terminals cannot exceed 60V DC.
Improper selection or installation of the device affects the integrity of the safety systems.
Personal injury or death, property damage, or economic loss can result.
Comply with ISO 14119 including accessibility to the installation, arrangement and mounting, possible substitute actuation, access to the escape release, motivation to defeat, and actuation mode.

ATTENTION: Management controls, working procedures, training, and additional protective measures can be used to minimize the motivation to defeat and to manage the use and availability of spare actuators.
Comply with IEC 13857 and ISO 13855 for guard openings and minimum (safe) distances.
Comply with IEC 62061 or ISO 13849-1 and ISO 13849-2 for functional safety.

ATTENTION: Read this document and the documents that are listed in the Additional Resources section about installation, configuration, and operation of this equipment before you install. It is required that you familiarize yourself with installation and connection instructions and requirements of all applicable codes, laws, and standards.
In accordance with applicable codes of practice, suitably trained personnel are required to implement installation, adjustments, service initiation, use, assembly, disassembly, and maintenance.
If this equipment is used in a manner that the manufacturer does not specify, the protection that is provided by the equipment can be impaired.

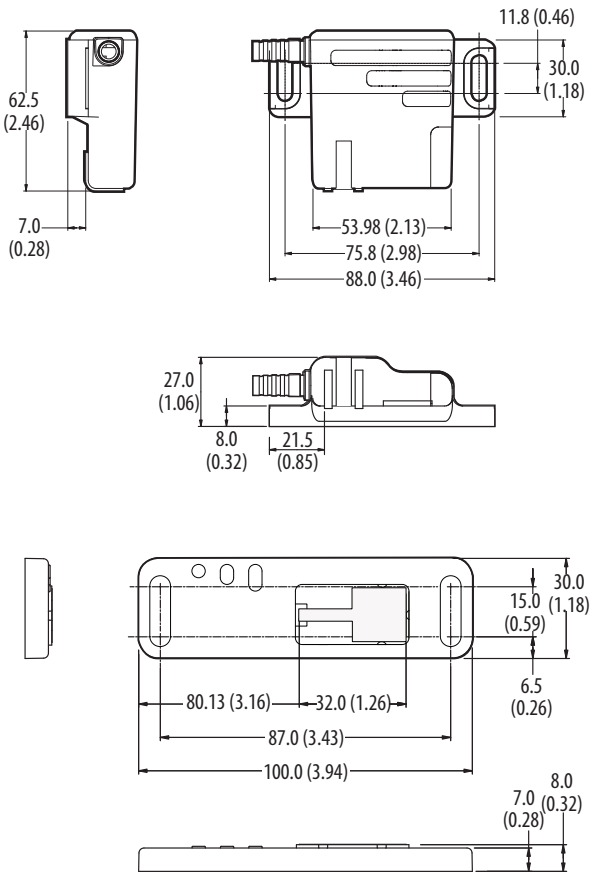
Rockwell Automation

Technical Specifications

Attribute	Low (Standard) Coding: 440N-Z21SS3PA, 440N-Z21SS3PB, 440N-Z21SS3PH, 440N-Z21SS3PJ High (Unique) Coding: 440N-Z21US3PA, 440N-Z21US3PB, 440N-Z21US3PH, 440N-Z21US3PJ
Safety Ratings	
Standards Safety Classification	IEC 60947-5-3, Cat. 4 PLe Per ISO 13849-1, Type 4 Interlock Device according to ISO 14119 with either low (standard) or high (unique) coding, SIL CL3 per IEC 62061 and IEC 61508
Functional Safety Data	PLe Cat 4 according to ISO 13849 Always send to PDF for functional safety See publication SAFETY-SR001.
Certifications	CE marked for all applicable directives, c-UL-us (UL 508), and TÜV. rok.auto/certifications
Operating Characteristics	
Sensing Distance, Assured ON	5 mm (0.2 in.) Both pool pieces must be in contact with striker plate.
Sensing Distance, Assured OFF	32 mm (1.25 in.)
Operating Voltage	24V DC +10%/-15% Class 2 SELV or PELV power supply
Response Time (Off)	45 ms
Utilization Category according to IEC 60947-5-2 Ue Ie	DC-12 and DC-13 24V 200 mA
Frequency of Operating Cycle	0.25 Hz
Operating Current, min	1 mA
Off-state Output Current	< 0.5 mA
No-load Supply Current	< 50 mA
Load Current, max	200 mA
Voltage Drop	< 1.5V
Switches Connected in Series	Unlimited. See Timing Diagram on page 4
Case Material	Grilamid
Actuator Material	Grilamid/PBT
Outputs	
Safe State	De-energized (2 x PNP, 0V), AUX energized (1 x PNP, 24V
Run State	Energized (2 x PNP, 24V), AUX de-energized (1 x PNP, 0V)
Mechanical	
Sensor Case Material	Red Grilamid
Actuator Case Material	Red Grilamid/PBT
Environmental	
Operating Temperature	-25...+70 °C (-13...+158 °F)
Relative Humidity	5...95%
Washdown Rate	NEMA 3, 4X, 12, 13, IP66, IP67, IP69K
Shock and Vibration	IEC 60068-2-27 — 30 g (1.1 oz), 11 ms IEC 60068-2-6 — 10...55 Hz
Pollution Degree	IEC 60947-1 — 3
Electro-magnetic Compatibility (EMC)	
Electrostatic Discharge ESD	IEC 61000-4-2: 8 kV air discharge; 4 kV contact discharge
Radiated EMF immunity	IEC 61000-4-3: 20V/m; 10V/m (1...6 GHz)
Electrical Fast Transient/Burst Immunity	IEC 61000-4-4: ±2 kV
Conducted Immunity	IEC 61000-4-6: 10V
Rated Impulse Withstand Voltage	IEC 60947-1: 1 kV
Protection	Short circuit, overload, reverse polarity, overvoltage, loss of ground

Approximate Dimensions

Figure 1 - Switch and Actuator [mm (in.)]

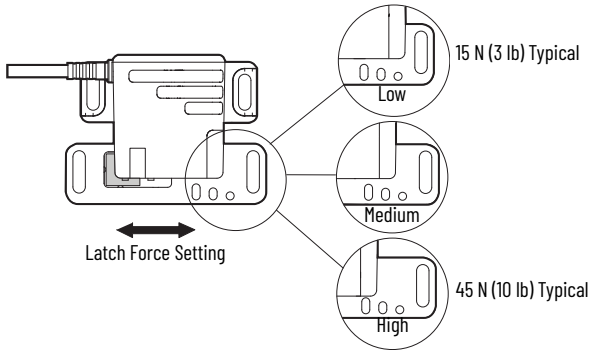


Mounting Information

IMPORTANT Do not over torque the mounting hardware.

1. Position the switch and actuator so they are aligned with each other.
2. Mount the switch and actuator to the removable guard, door, or gate. Recommended fastener size — M6.

Figure 2 - Nut Torque Specification [(a)]



(a) Switch/Actuator: 2.20 N•m (19.5 in•lb)

Figure 3 - Sliding Door

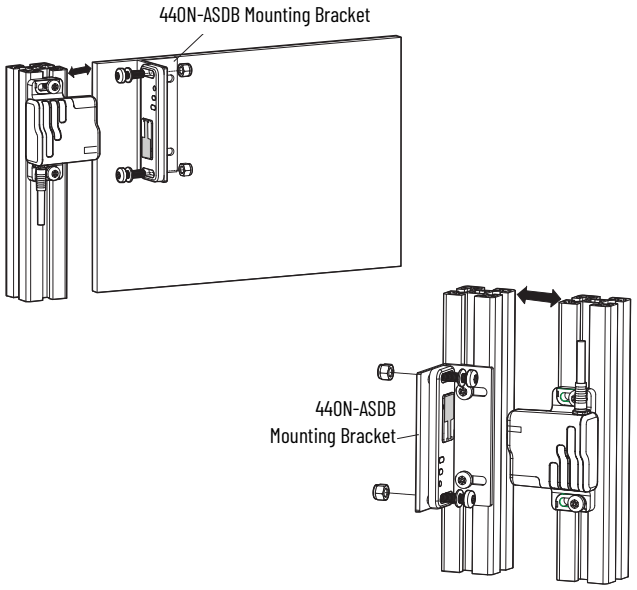
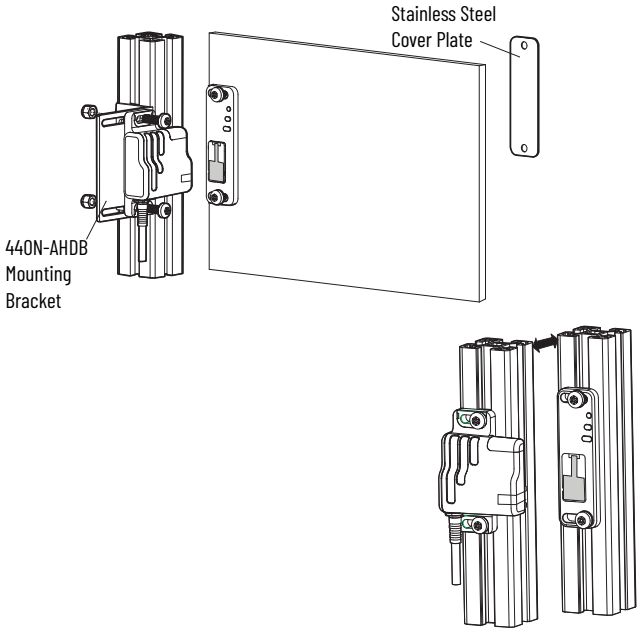


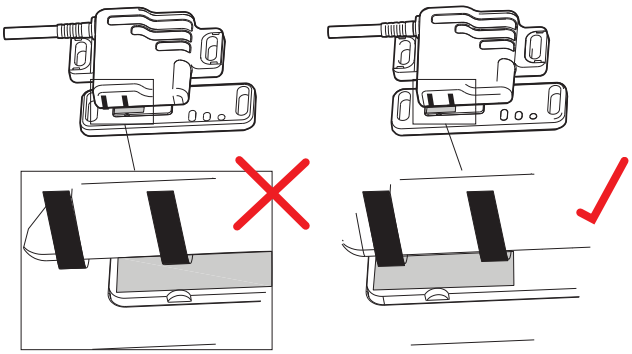
Figure 4 - Hinged Door



Misalignment

50 mm (1.97 in.) side-to-side orientation.

Figure 5 - Striker Plate



Both pole pieces must be in contact with the striker plate.

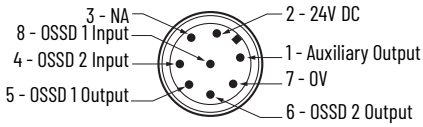
Diagnostic

Unit Indicators

	State	Status	Troubleshooting
Status/Diagnostic Indicator	Off	Not powered	–
	Red	OSSD not active	–
	Green	OSSD active	–
	Green flash	Power up test or OSSD inputs not valid	Check 24V DC on OSSD inputs (yellow and red wire)
	Red flash	1 Hz flash OSSD fault 4 Hz flash internal fault	OSSD fault—check OSSD outputs are not shorted to GND, 24V DC, or each other. Cycle power.

See Unique Coded Diagnostic on page 5 for learning process errors.

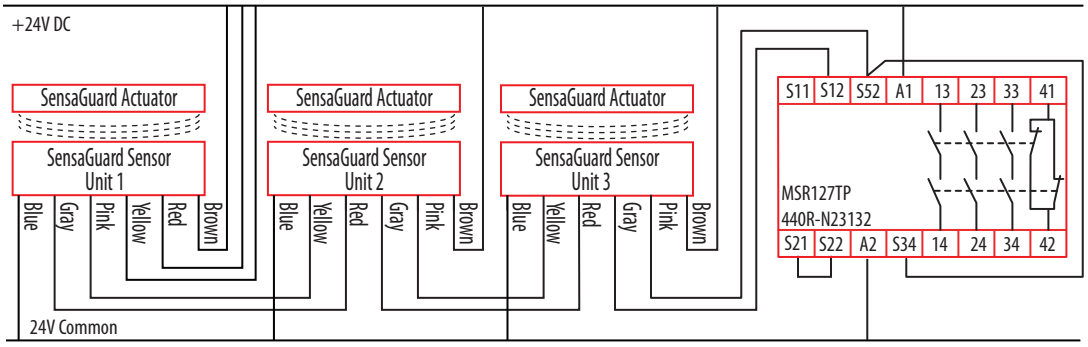
Typical 8-Pin Unit Wiring Diagram



Pin Number	Wire Color	Signal
1	White	Aux. Output C
2	Brown	+24V DC
3	Green	–
4	Yellow	OSSD 2 Input
5	Gray	OSSD 1 Output
6	Pink	OSSD 2 Output
7	Blue	0V
8	Red	OSSD 1 Input

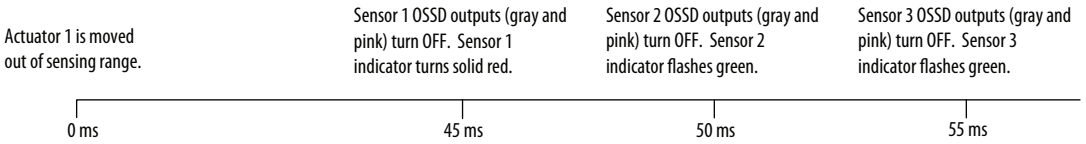
Recommended connection cable, 2 m (6.5 ft)—889D-F8AB-2. Replace the 2 with 5 (5 m [16.4 ft]) or 10 (10 m [32.8 ft]) for standard cable lengths.

Timing Diagram



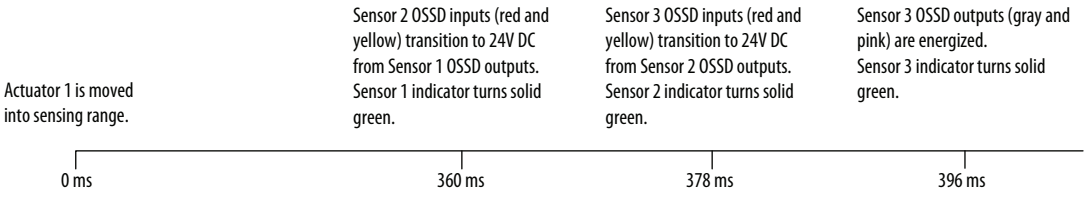
Response Time: Safety outputs turn OFF

Initial Conditions: All actuators are in sensing distance.



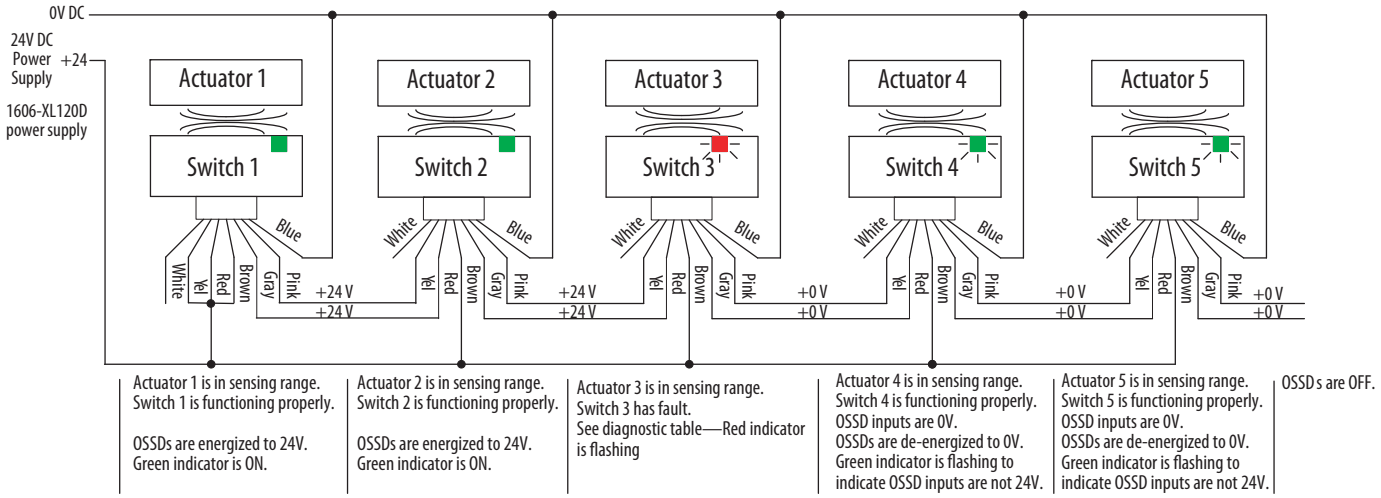
Reaction Time: Safety outputs turn ON

Initial Conditions: Actuator 1 is out of sensing range. Sensor 1 indicator is solid red. Actuator 2 and 3 are in sensing range. Sensor 2 and 3 indicators are flashing green.



Troubleshooting

Figure 6 - Series Circuit



IMPORTANT See Technical Specifications on page 2 for Certification information and ratings.

Commissioning – Unique Coded Units

Power the Sensor

Connect the sensor to 24V DC. See Typical 8-Pin Unit Wiring Diagram on page 3 for help.

IMPORTANT The sensor "Status/Diag" indicator begins to blink green eight times then repeat, indicates that the sensor has not yet learned an actuator.

The sensor can be commissioned to either learn additional actuators or be locked for a one-time learn only.

IMPORTANT The sensor can be locked so it cannot learn another actuator; see One-time Learn Only (Unit Locked).

Teach the Actuator

Quick Start

1. Power up the sensor and bring an actuator into the sensing range.
2. Leave the actuator in the sensing field for 2 minutes or longer.
3. Learn is complete.

IMPORTANT The sensor can learn a new actuator up to eight times. The Status/Diag indicator blinks the number of actuators left that a sensor can learn.

Ability to Learn an Additional Actuator

The sensor automatically starts the learning process as soon as an actuator is brought into the sensing range.

Learning Sequence

	Step	Description
1	Target present	Status/Diag indicator blinking green 1 Hz rate
2	Verifying actuator	Status/Diag indicator blinking green/red 1 Hz rate (15 s)
3	Program sensor	Status/Diag indicator blinking green/red 4 Hz rate (15 s)
4	Program complete	Status/Diag indicator blinking green/1 Hz rate (number of learns left) (15 s)
5	Ready state	Status/Diag indicator solid green
6	Learn is completed	–

One-time Learn Only (Unit Locked)

The sensor automatically starts the learning process as soon as an actuator is brought into the sensing range.

Learning Sequence

	Step	Description
1	Target present	Status/Diag indicator blinking green 1 Hz rate
2	Verifying actuator	Status/Diag indicator blinking green/red 1 Hz rate (15 s)
3	Program sensor	Status/Diag indicator blinking green/red 4 Hz rate (15 s)
4	Program Locking	Status/Diag indicator blinking green (number of learns left) (15 s)
5	Remove the actuator from the sensing field	Status/Diag indicator changes to solid red
6	Replace the actuator back into the sensing field	Status/Diag indicator continues blinking green 1 Hz rate (number of learns remaining)
7	Ready state	Status/Diag indicator solid green
8	Learn is complete.	–

Learn a New Actuator

- To learn a replacement actuator, bring the actuator to be taught into the sensing range of the safety switch.
- The learn sequence is the same as the sequence for commissioning the first actuator.
- A sensor cannot relearn a previously learned actuator or a standard SensaGuard™ actuator.
- The sensor only recognizes the most recently learned actuator.

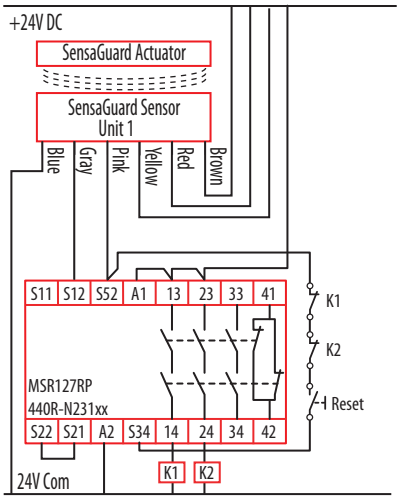
Unique Coded Diagnostic

Error codes for learning process. Power cycle to clear fault.

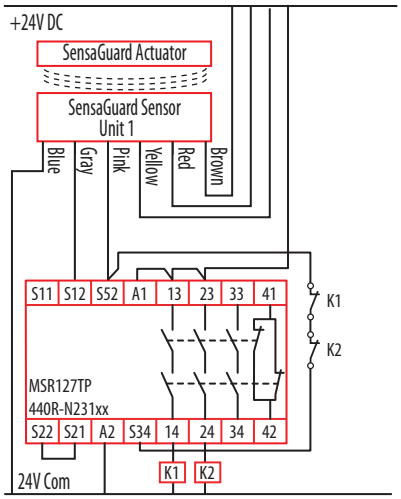
Status/Diagnostic Indicator—Flashes (4 Hz)	Error Code
Green	OSSD inputs not valid
Red-Red-Red-Green	Cannot learn a standard SensaGuard actuator
Red-Red-Red-Green-Green	Actuator already learned
Red-Red-Red-Green-Green-Green	Bad RFID; Target that is moved out of range
Red-Red-Red-Green-Green-Green-Green	Exceeded learning eight actuators
Red-Red-Red-Green-Green-Green-Green-Green	Unit locked: Cannot learn another actuator

Application Wiring Examples

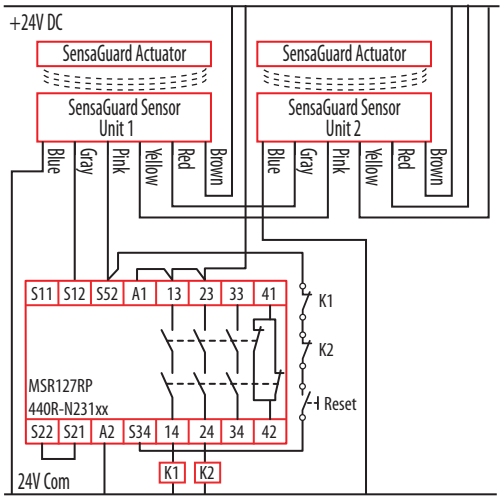
Figure 7 - Wiring to MSR127 Safety Relay



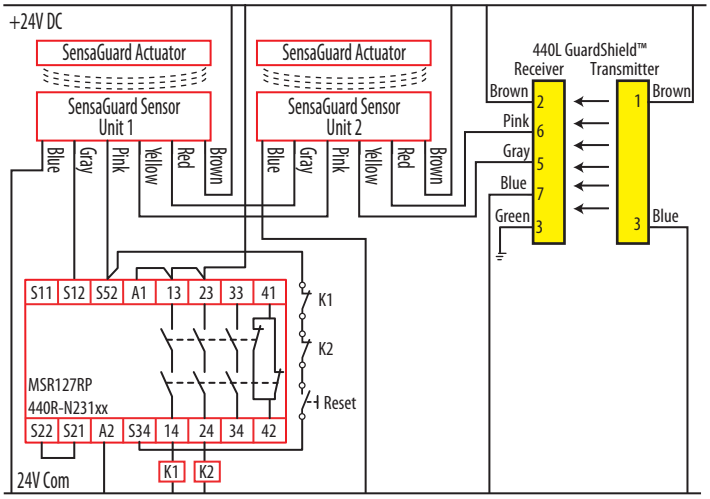
MSR127RP with 1 sensor, monitored manual reset, driving 100S or 700S safety relays.



MSR127TP with 1 sensor, automatic reset, driving 100S or 700S safety relays.



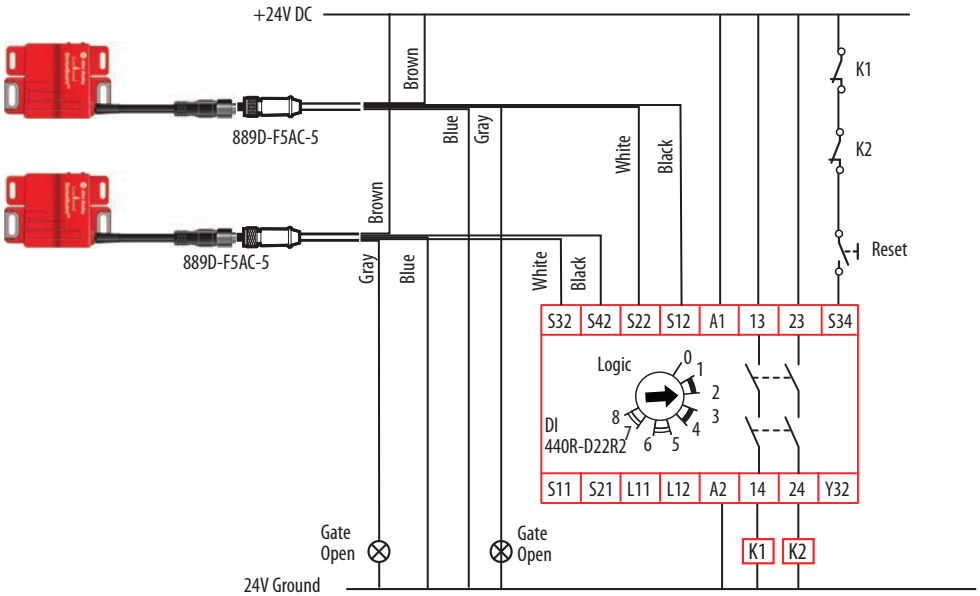
MSR127RP with 2 sensors in series, monitored manual reset, driving 100S or 700S safety relays.



MSR127RP with 2 sensors and 1 440L light curtain in series, monitored manual reset, driving 100S or 700S safety relays.

Note: Light curtain must be last (farthest from MSR127).

Figure 8 - Guardmaster SI or DI Safety Relay Wiring with M12 5-pin Version



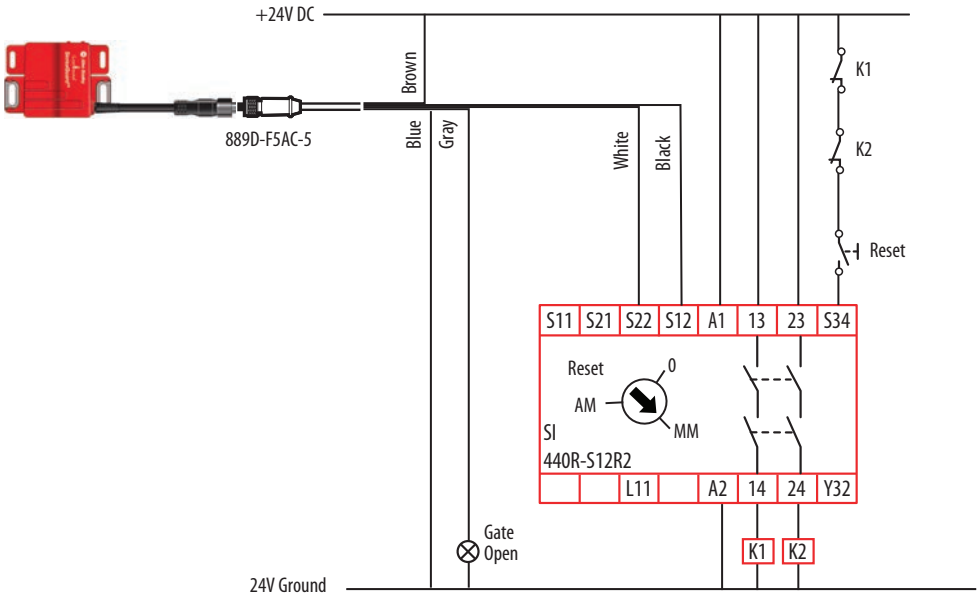
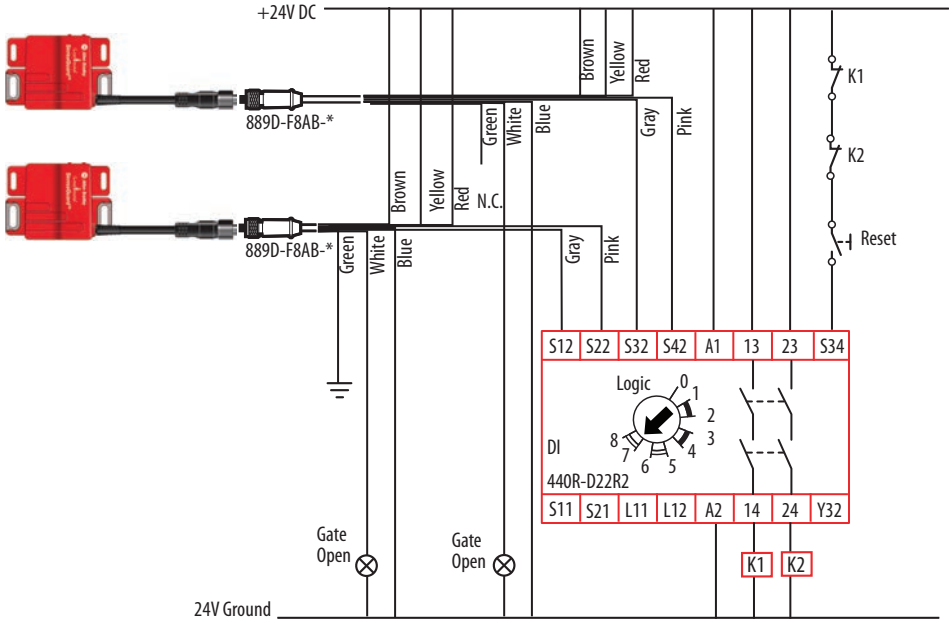


Figure 9 - Guardmaster SI or DI Safety Relay Wiring with M12 8-pin Version



IMPORTANT The green wire is connected to the housing of the stainless steel SensaGuard only; it has no connection for plastic SensaGuard.

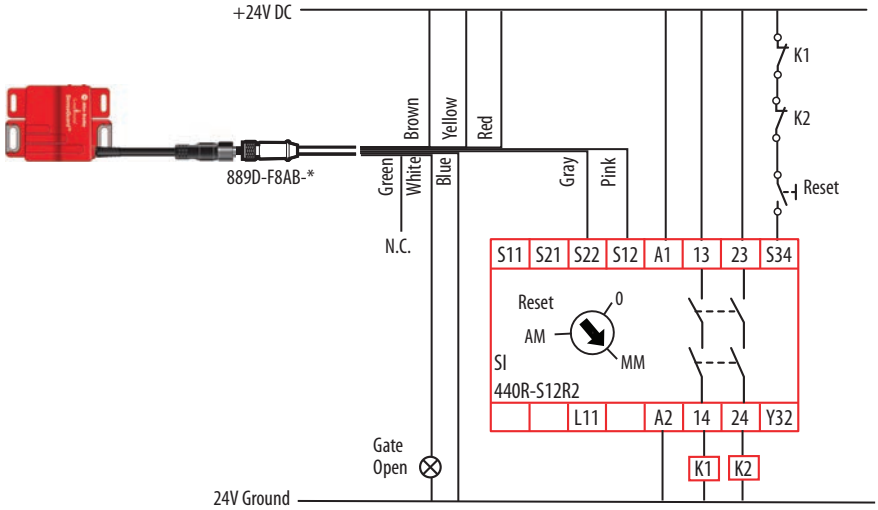


Figure 10 - CR30 Software Configurable Relay Wiring

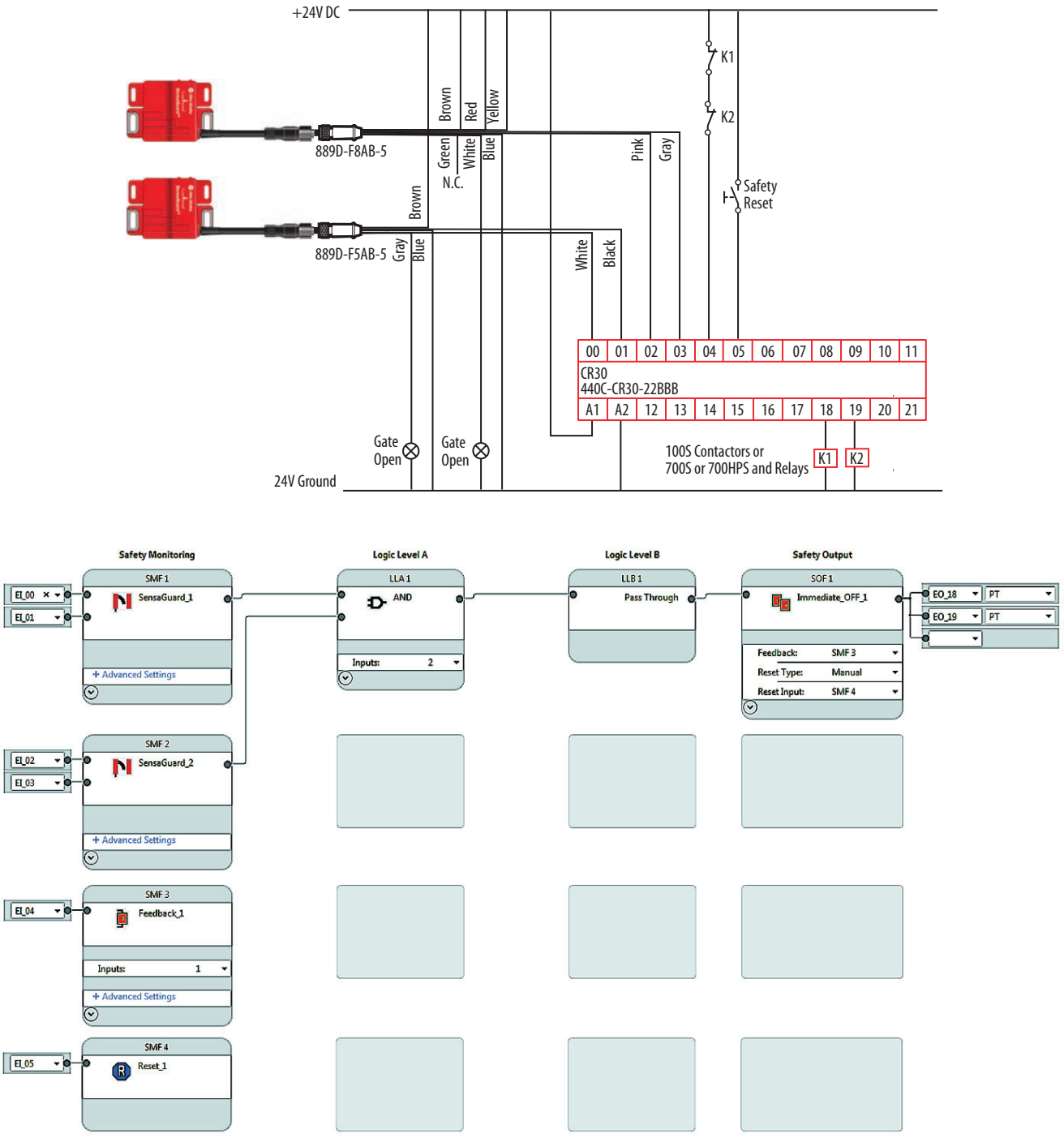
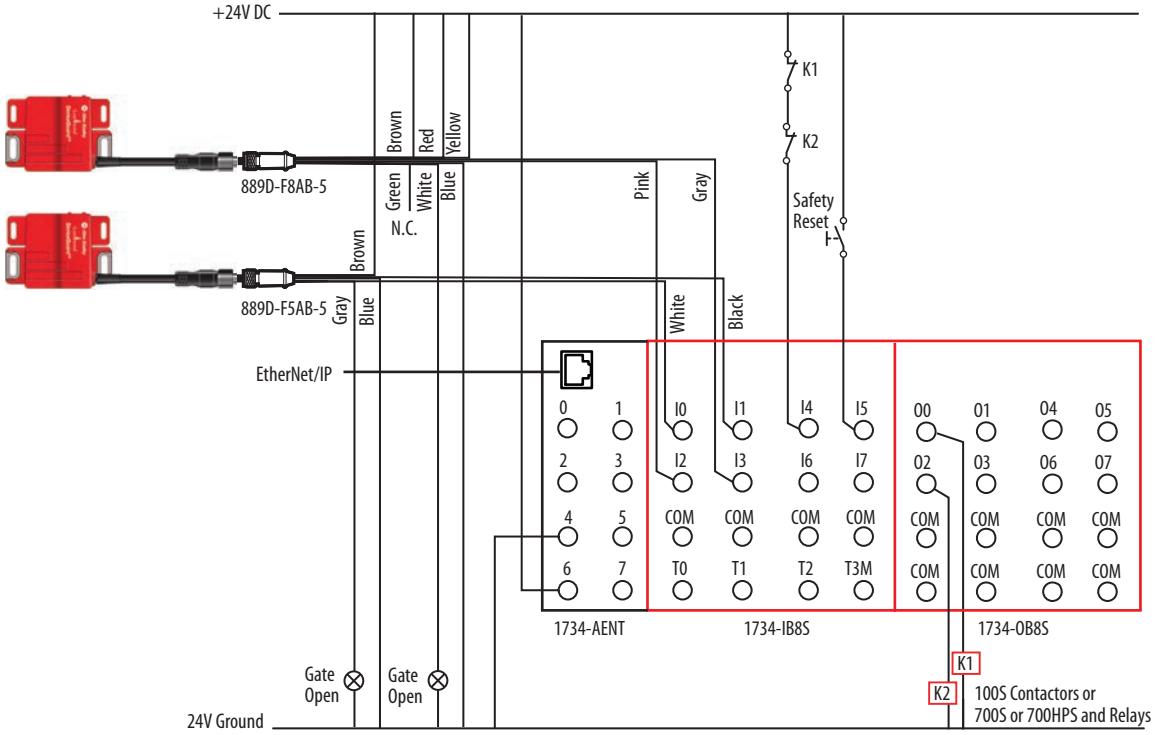


Figure 11 - 1734 POINT Guard I/O™ Wiring



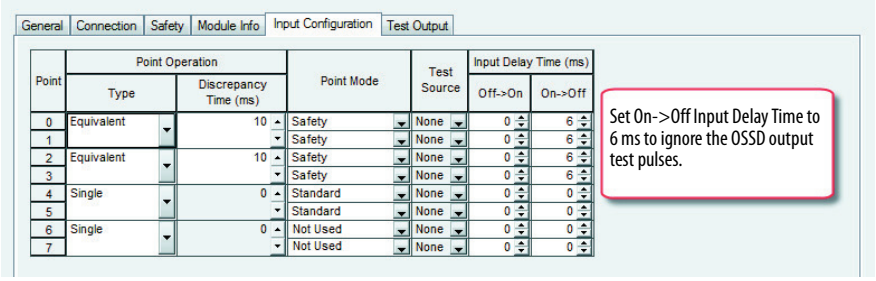
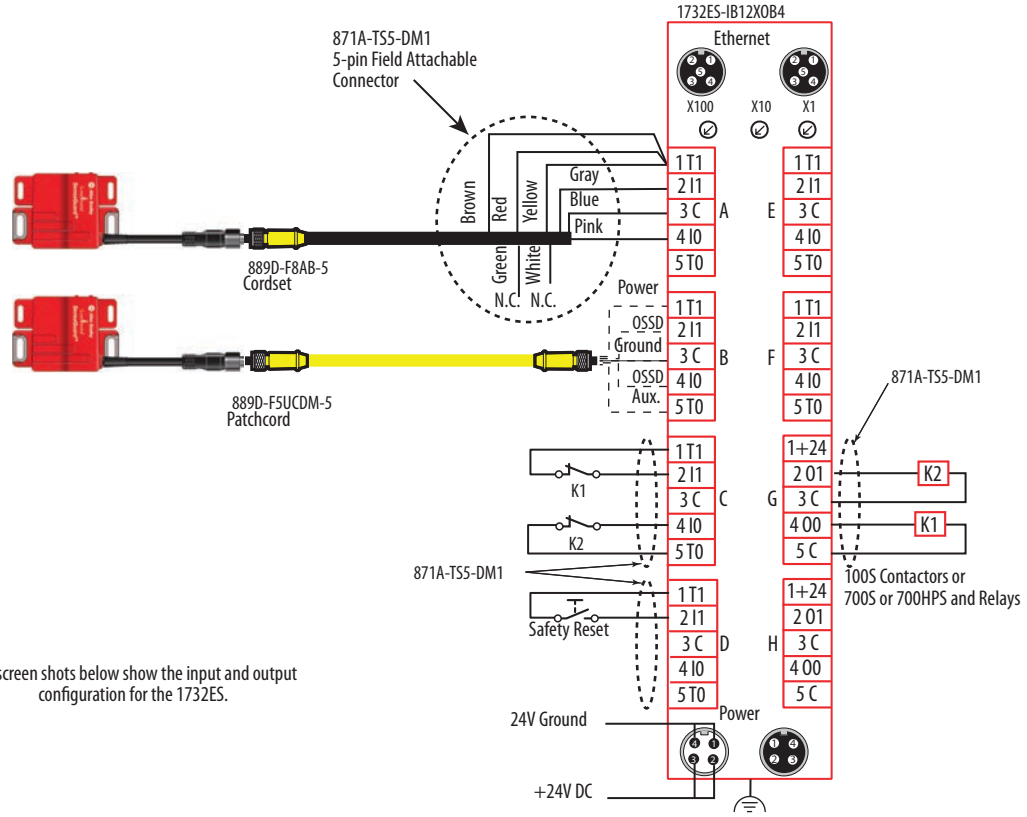
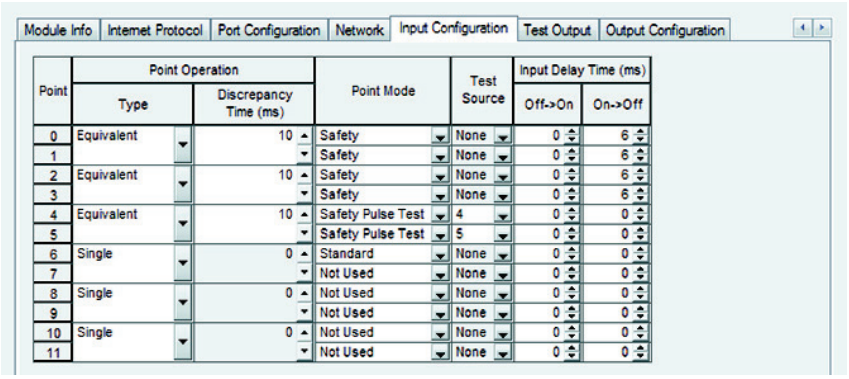
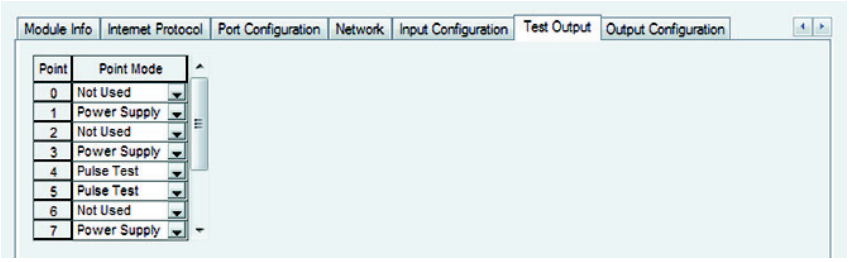


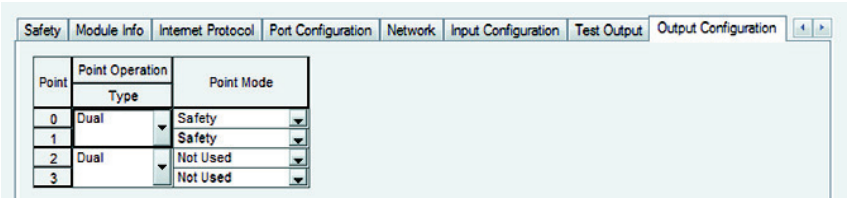
Figure 12 - 1732DS/ES ArmorBlock Guard I/O Wiring



The screen shots below show the input and output configuration for the 1732ES.







Recommended Safety Control Interfaces

Recommended relays are Guardmaster® safety relays (CI, DI, DIS, SI), CR30 safety relay, Minotaur™ safety relays (MSR126, MSR127, MSR131, MSR138), SmartGuard™ controller, 1791DS/ES CompactBlock™ Guard I/O™, 1732DS/ES ArmorBlock® Guard I/O, 1734 POINT Guard I/O™.

Maintenance and Repair

Every month, check the correct operation of the switching circuit. Also check for signs of abuse or alterations. Inspect the switch casing for damage. Inspect the magnet poles and clean off any dirt or debris.

If there is any malfunction or damage, no attempts at repair can be made. The unit can be replaced before machine operation is allowed.

Declaration of Conformity

This certification declares that the products that are shown in this document conform with the Essential Health and Safety Requirement (EHSRs) of the European Machinery Directive 2006/42/EC. These products also conform to EN 60947-5-3, EN ISO 12100, EN 60204-1 and have third-party approval.

Visit rok.auto/certifications.

Additional Resources

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications (including translations) at rok.auto/literature.

Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental information on its website at rok.auto/pec.

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