

# SensaGuard™ Integrated Latch Unique Coded Installation Instructions



## Certifications



Tested To Comply  
with FCC Standards



**IMPORTANT:**  
SAVE THESE INSTRUCTIONS FOR FUTURE USE



## Installation Instructions

Installation must be in accordance with the following steps and stated specifications and should be carried out by suitable competent personnel.

Adherence to the recommended maintenance instructions forms part of the warranty.

**This switch has an integrated latch and guard stop for use on lightweight guard doors.**

This device is intended to be part of the safety related control system of a machine. Before installation, a risk assessment should be performed to determine whether the specifications of this device are suitable for all foreseeable operational and environmental characteristics of the machine to which it is to be fitted. Refer to Technical Specifications for Certification information and ratings.

### ATTENTION:



The presence of spare actuators compromise the integrity of the safety systems. Personal injury or death, property damage or economic loss can result. Appropriate management controls, working procedures and alternative protective measures should be introduced to control their use and availability.

## Technical Specification

### Safety Ratings

Standards	IEC60947-5-3, IEC61508, ISO 13849-1
Safety Classification	Cat. 4 Per ISO 13849-1, SIL CL3
Functional Safety Data	PFH <sub>D</sub> : 1.12 x 10 <sup>-9</sup> Dual channel interlock may be suitable for use in application up to PLe (according to ISO 13849-1) and for use up to SIL3 systems (according to IEC 62061) depending application characteristics.
Certifications	CE marked for all applicable directives, cULus (UL 508), and TÜV.

## Operating Characteristics

Sensing Distance, Assured ON	4 mm
Sensing Distance, Assured OFF	25 mm
Maximum output current (all outputs)	200 mA
Input Current	50 mA (no load supply current)
Operational Current, Min.	<sup>3</sup> 1 mA DC
Off-state Current	< 0.5 mA DC
Maximum # of switches, connected in series	Unlimited. See unit response time section
Operating Voltage	24V DC +10% / -15% Class 2 SELV power supply
Utilization category according to IEC 60947-5-2	DC-12 & DC-13
U <sub>e</sub>	24V
I <sub>e</sub>	200mA
Frequency of operating cycle	0.25 Hz
Response Time (Off)	60 ms
Case Material	Grilamid
Actuator Material	Grilamid / PBT

## Outputs (Guard door closed, Actuator in place)

Outputs	Description	Status
Safety	2 x PNP, 0.2 A max.	ON (+24vdc)
Auxiliary	1 x PNP, 0.2 A max.	OFF (0vdc)

## Environmental

Operating Temperature	-10...+55°C (+14...+131°F)
Operating Humidity	5% -95% relative
Washdown rating	NEMA 3, 4X, 12,13, IP66, IP67, IP69K
Shock & Vibration	IEC 60068-2-27 30 g, 11 ms IEC 60068-2-6 10...55Hz
Radio Frequency	IEC 61000-4-3 IEC 61000-4-6

### Protection

Short-Circuit Protection	Incorporated
Current limitation	Incorporated
Overload Protection	Incorporated
False Pulse Protection	Incorporated
Transient Noise Protection	Incorporated
Reverse Polarity Protection	Incorporated
Overvoltage protection	Incorporated
Thermal shutdown/restart	Incorporated
Electrical Life	10 x 10 <sup>6</sup>

### Mode of Operation

#### Status indicators:

- “Status/Diag” LED illuminates Green - *Door/Guard closed, safety outputs active.*
- “Status/Diag” LED illuminates Red: - *Door/Guard open, safety outputs off.*
- “Status/Diag” LED flashes Red or Green: - *Unit failure. See Diagnostic section below.*

### Mounting Information

Do not over torque the mounting hardware.

Position the switch and actuator so they are aligned with each other.

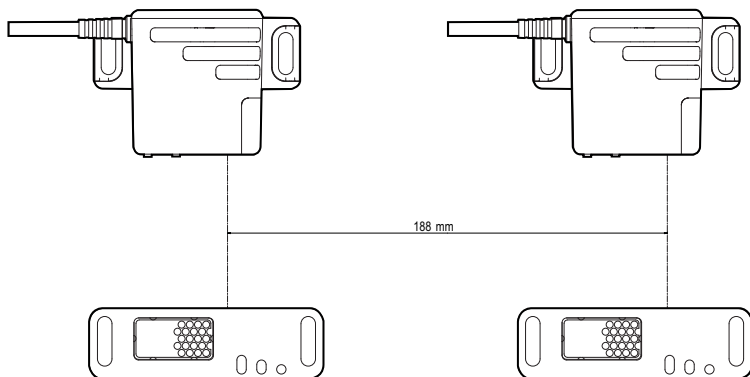
Mount the switch and actuator to removable guard, door or gate.

Recommended fastener size - M6

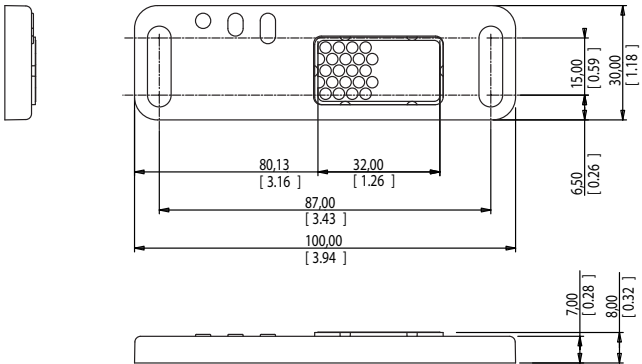
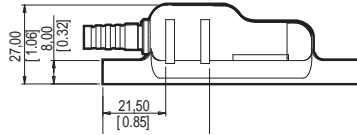
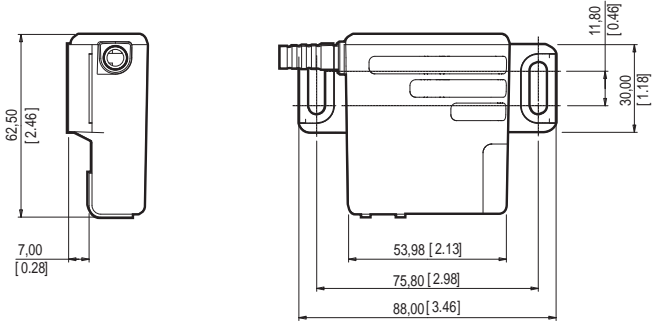
#### Nut Torque Specification

Switch/Actuator: 2.20 N·M (19.5 in·lbs)

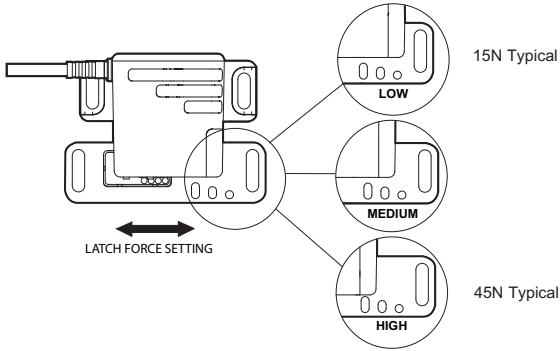
#### Minimum Distance Between Sensors



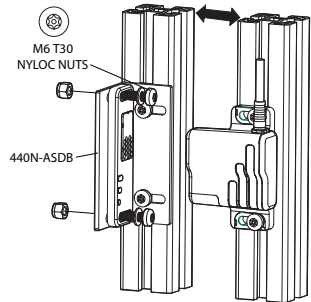
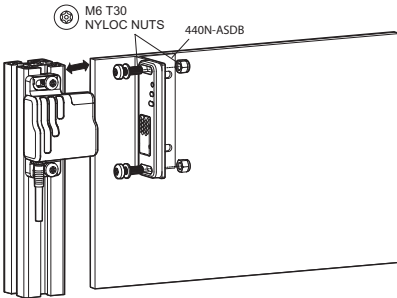
Dimensions - mm (inches)



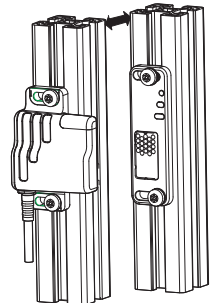
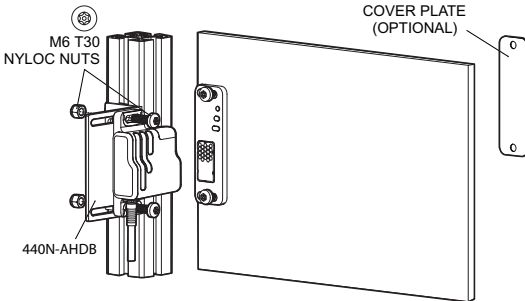
## Mounting Information



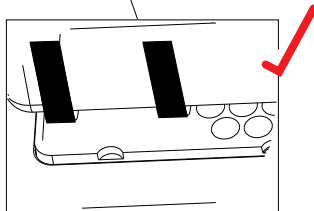
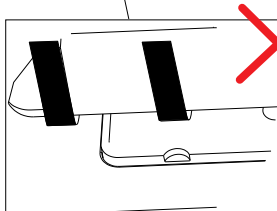
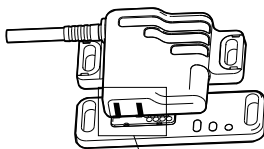
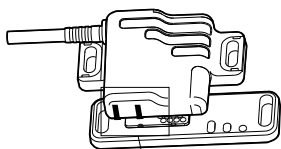
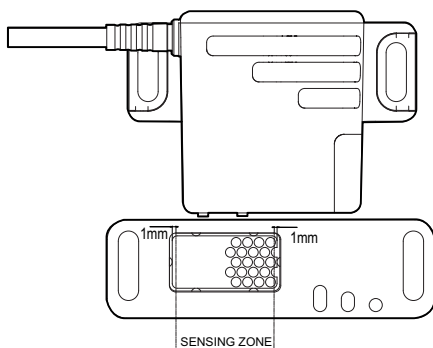
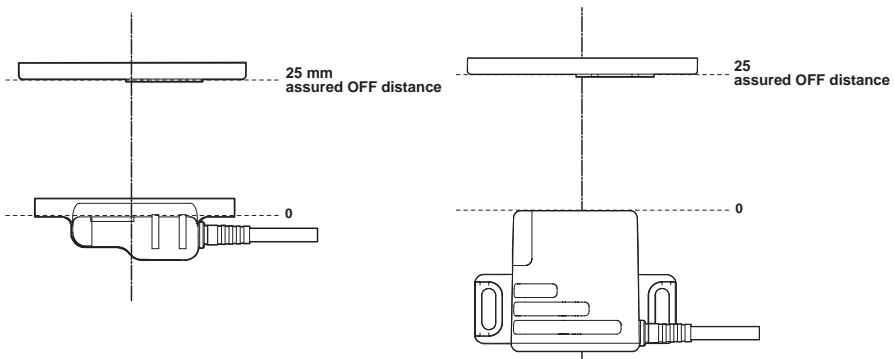
## Sliding Door



## Hinged Door



## Technical Data



**BOTH POLE PIECES MUST BE  
IN CONTACT WITH STRIKER PLATE**

## Diagnostic

### Unit Indicators (per IEC 60073)

Status/Diag LED	State	Status	Troubleshooting
	Off	Not Powered	NA
	Red	Not Safe, OSSD not active	NA
	Green	Safe, OSSD active	NA
	Green flash	Power up test or OSSD inputs not valid	Check 24V DC or OSSD inputs (yellow and red wire)
Red Flash	1 Hz Flash OSSD Fault 4 Hz Flash Recoverable / Non-recoverable Fault	OSSD fault —check OSSD outputs are not shorted to GND, 24V DC or each other. Cycle power.	

## Typical Wiring Diagram

Description		Plastic
8-Pin Micro (M12)		
8-Pin Cordset 889D-F8AB-* or cable version	Grey	Safety A
	Red	Safety A+
	Pink	Safety B
	Yellow	Safety B+
	White	Aux A
	Brown	24V DC+
	Blue	0V
Green	N/A	

\* Replace symbol with 2 (2m), 5 (5m) or 10 (10m) for standard cable lengths.



## Commissioning

### Power the Sensor

Connect the sensor to 24Vdc. See "Typical Wiring Diagram" section for help.

#### Note:

The sensor "Status/Diag" LED will begin to blink Green eight times then repeat, indicating that the sensor has not yet learned an actuator.

The sensor can be commissioned to either have the ability to learn another actuator or be locked for a one time learn only. See 'Teaching in the actuator' section.

## Teaching in the actuator (Ability to learn an additional actuator)

#### Note:

The sensor can learn a new actuator up to eight times. The "Status/Diag" LED will blink the number of actuators left that an sensor can learn at end of learning cycle.

### Initially teaching in the actuator

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

#### Important!

The actuator must not be removed from the sensing field during the learning procedure.

### Learning Sequence

- |                        |  |
|------------------------|--|
| 1. Target present:     | "Status/Diag" LED blinking Green 1Hz rate                    |
| 2. Verifying actuator: | "Status/Diag" LED blinking Green/RED 1Hz rate (15sec)        |
| 3. Program Sensor:     | "Status/Diag" LED blinking Green/RED 4Hz rate (15sec)        |
| 4. Program Complete:   | "Status/Diag" LED blinking Green (# of learns left) (15 sec) |
| 5. Ready state:        | "Status/Diag" LED solid Green                                |
| 6. Learn is complete   |  |

#### Note:

A sensor can be locked so it can not learn another actuator; see teaching in the actuator (one time learn only) section.

## Teaching in the actuator (One time learn only; Unit locked)

### Initially teaching in the actuator

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

### Learning Sequence

- |                        |   |
|------------------------|---|
| 1. Target present:     | "Status/Diag" LED blinking Green 1Hz rate                   |
| 2. Verifying actuator: | "Status/Diag" LED blinking Green/RED 1Hz rate (15sec)       |
| 3. Program Sensor:     | "Status/Diag" LED blinking Green/RED 4Hz rate (15sec)       |
| 4. Program Locking:    | "Status/Diag" LED blinking Green (# of learn left) (15 sec) |

## 10 SensaGuard™ Installation Instructions

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### During the Program Locking Stage, perform the following steps:

- a. Remove the actuator from the sensing field, until the "Status/Diag" LED changes to solid Red.
- b. Replace the actuator back into the sensing field and the "Status/Diag" LED will continue blinking Green (# of learns left).

**Note: The program locking sequence must be completed within the 15 second program locking window.**

5. Ready state: "Status/Diag" LED solid Green

6. Learn is complete

### Learning 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 same as the sequence for commissioning the first actuator.

A sensor can not re-learn a previously learned actuator or a standard SensaGuard actuator.

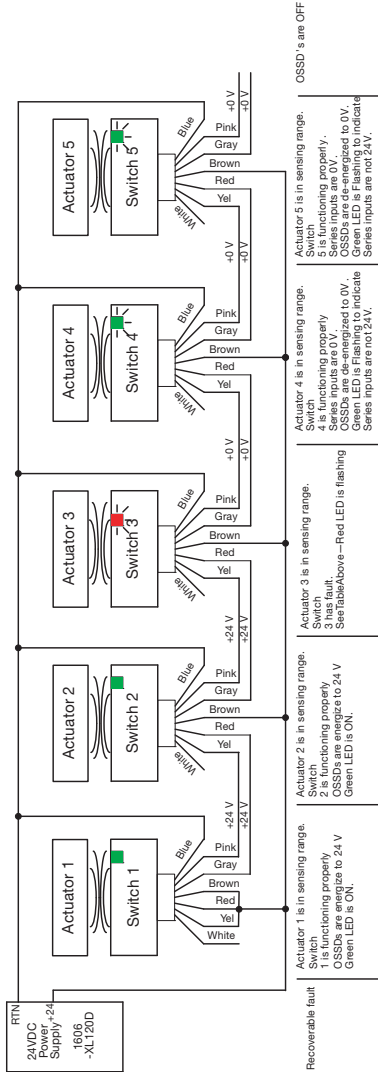
### Unique Coded Diagnostic:

Error codes for learning process - Repeat until unit is power cycled

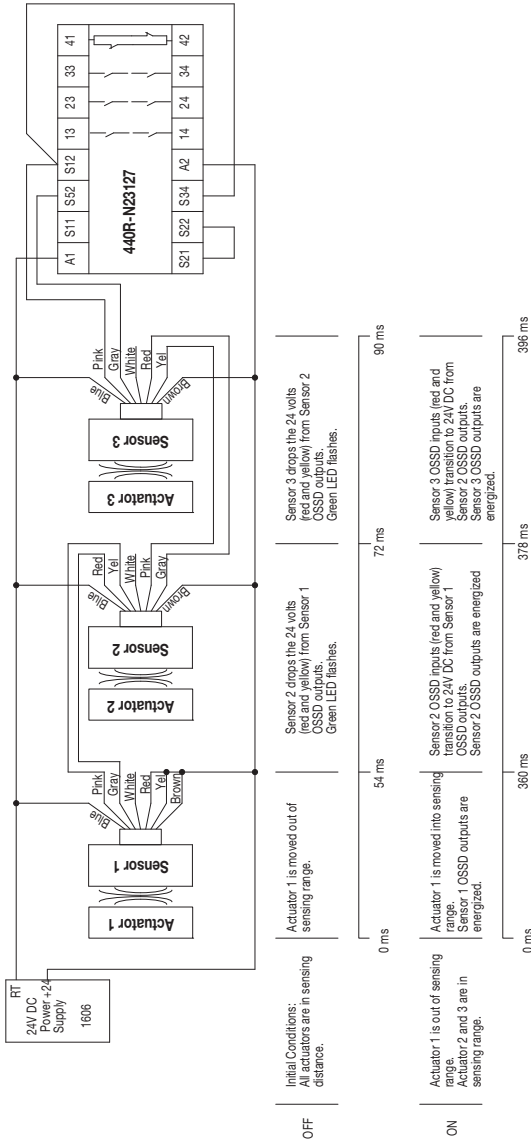
Status/Diag LED - Flashes (4Hz)	Error Code
Green	OSSD inputs not valid
Red-Red-Red-Green	Can not learn a standard SensaGuard Actuator
Red-Red-Red-Green-Green	Actuator already learned
Red-Red-Red-Green-Green-Green	Bad RFID; Target moved out of range
Red-Red-Red-Green-Green-Green-Green	Exceeded learning 8 actuators
Red-Red-Red-Green-Green-Green-Green-Green	Unit locked: Can not learn another actuator

# Troubleshooting

## Series Circuit



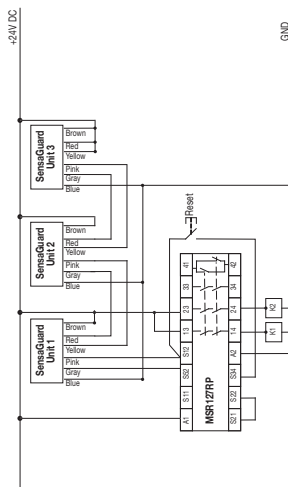
## Unit Response Time (does not include safety relay response time)



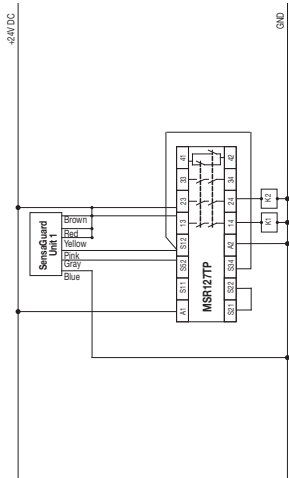
OFF

ON

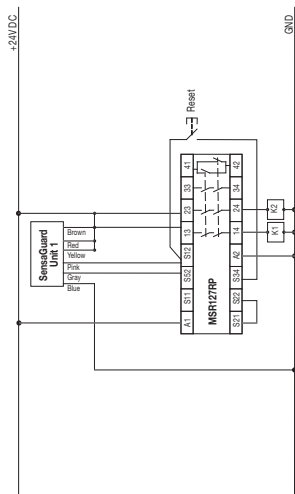
# Application Wiring Examples



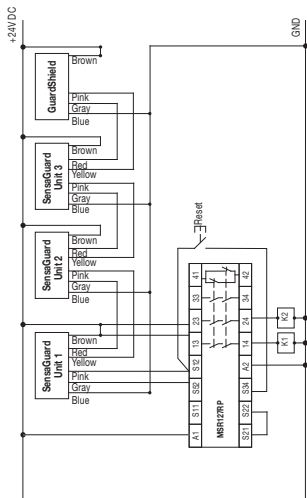
MSRI27RP with 3 sensors in series, monitored manual reset, driving 100S or 700S safety controllers



MSRI27TP with 1 sensor, automatic reset, driving 100S or 700S safety controllers



MSRI27RP with 1 sensor, monitored manual reset, driving 100S or 700S safety controllers.

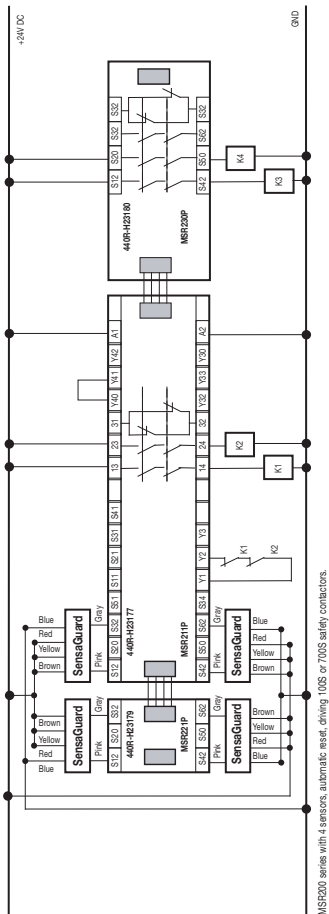


MSRI27RP with 3 sensors and 1 440V light curtain in series, monitored manual reset, driving 100S or 700S safety relays.  
 Note: Light curtain must be last (farthest from MSRI27).





## Application Wiring Examples





## Notes

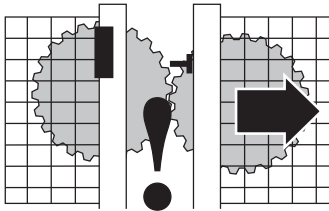
## Notes

## Notes

### List of recommended relays

MSR126, MSR127, MSR123, MSR124, MSR131, MSR138, MSR211, MSR121, MSR200 Family (Except MSR210), MSR300 Family, SmartGuard, 1791 DS DeviceNet™ Safety I/O.

Relay must have light curtain inputs.



Check the machine is isolated and stopped whenever the interlocked guard door is open.

**IMPORTANT:** After installation and commissioning, the actuator, switch and switch lid fixing screws should be coated with tamper evident varnish or similar compound.

### Maintenance

#### Every month.

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

### Repair

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

### Declaration of Conformity



This is to declare that the products shown on this document conforms with the Essential Health and Safety Requirements (EHSR's) of the European Machinery Directive 2006/42/EC. These products also conform to EN 60947-5-3, EN 1088, EN ISO 12100, EN 60204-1 and have Third Party Approval.

For a comprehensive certificate please visit: [www.ab.com/safety](http://www.ab.com/safety).



**Allen-Bradley**

Guardmaster®