

## Description

When it comes to machine safety, Rockwell Automation knows that protection of personnel and equipment is your main concern. At the same time, flexibility and productivity are points that must also be considered as you design your safety system. Optimize all of these with the new Allen-Bradley SensaGuard family of noncontact switches.

Featuring the latest generation of RFID technology for coding and Inductive technology for sensing, SensaGuard's large sensing range and tolerance to misalignment is a cost-effective solution that is ideally suited for a wide range of industrial safety applications.
The SensaGuard product line is a Category 4 /SIL 3 rated switch per EN954-1, TÜV functional safety approved to IEC 61508.

## Features

- Switches can be connect to a standard safety relay, for example, the MSR126, MSR127, MSR200/300 Family, SmartGuard and Safety I/O Blocks
- Multiple actuator sizes for large sensing distance
- IP 69K environmental rating
- Short-circuit and over-voltage protection
- Led located on the switch for door status and troubleshooting


## Benefits

- No dedicated controller required
- Cat 4/SIL 3 rating maintained even with multiple units connected in series
- Switches can be connected in series with other devices (light curtain, E-stops, key interlock switches)
- Extended diagnostics for easy troubleshooting
- Large sensing distances
- Tolerance to misalignment
- Multiple sensing directions
- Stainless steel version suitable for use in harsh environments
- Use standard proximity brackets


## Specifications

| Category | Cat. 4/SIL3 |
| :--- | :--- |
| Certifications | TÜV, CE, cULus (UL 508) |
| Standards | IEC 60947-5-3, IEC 61508, EN 954 |
| PFHd | $1.119 \ldots . .10^{-9}$ |


| Operating Characteristics |  |  |  |
| :---: | :---: | :---: | :---: |
| Sensing Distance (Target) | 18 mm Plastic | 30 mm Plastic | 18 mm SS |
| Operating Distance, Make-mm (in) | $\begin{aligned} & \text { Assured: } 15 \\ & \text { (0.59) } \end{aligned}$ | $\begin{aligned} & \text { Assured: } 25 \\ & (0.98) \end{aligned}$ | $\begin{aligned} & \text { Assured: } 10 \\ & (0.39) \end{aligned}$ |
| Case Material | Valox® DR 48 |  | 304 Stainless |
| Actuator Material | Valox® DR 48 |  | 304 Stainless Steel |
| Typical Misalignment | See misalignment curve. |  |  |
| Repeat Accuracy | 10\% of Sensing Range |  |  |
| Output Current, Max. | 200 mA (all outputs) |  |  |
| Switching Current @ Voltage, Max. | 24V DC +10\%/-15\% |  |  |
| Operating Voltage/Supply Current | 24V DC, +10\%/-15\% <br> Class 2 SELV power supply |  |  |
| Frequency of Operating Cycle | 1 Hz |  |  |
| Response Time (Off) | 54 ms |  |  |
| Outputs (Guard Door Closed, Actuator in Place) |  |  |  |
| Safety Outputs | $2 \times$ PNP, 0.2 A, max.; Status: ON (+24V DC) |  |  |
| Auxiliary Outputs | $1 \times$ PNP, 0.2 A max.; Status: OFF (0V DC) |  |  |
| Environmental |  |  |  |
| $\begin{aligned} & \hline \text { Operating } \\ & \text { Temperature-C (F) } \end{aligned}$ | $-10 \ldots+55^{\circ}\left(+14 \ldots+131{ }^{\circ}\right)$ |  |  |
| Relative Humidity | 5...95\% |  |  |
| Enclosure Type Rating | NEMA 3, 4X, 12, 13, IP 69K |  |  |
| Shock | IEC68-2-27 $30 \mathrm{~g}, 11 \mathrm{~ms}$ |  |  |
| Vibration | IEC 68-2-6 10... 55 Hz |  |  |
| Radio Frequency | IEC 61000-4-3, IEC 61000-4-6 |  |  |
| Protection |  |  |  |
| Protection Type | Short Circuit, Current Limitation, Overload, False Pulse, Transient Noise, Reverse Polarity, Overvoltage (inc. load dump), Thermal Shutdown with restart, Loss of GND and Vdd |  |  |
| Loss of GND and Vdd protection | Incorporated |  |  |
| Electrical Life | $10 \times 106$ |  |  |

## Safety Switches <br> Noncontact Switches

SensaGuardTM 18 mm Barrel
Product Selection

| Description | Operating Voltage/ Input Current | Safety Outputs | Auxiliary Outputs | Actuator Type | Assured Sensing Distance | Connection | Cat. No. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 18 mm Plastic Barrel | $\begin{aligned} & 24 \mathrm{~V} \text { DC, +10\%/- } \\ & 15 \% / 50 \mathrm{~mA} \text { max. } \end{aligned}$ | 2 Solid State outputs | 1 Solid State output | 18 mm | 15 mm (0.59 in) | 6 in Pigtail, 8-Pin Micro (M12) | 440N-Z21S16H |
|  |  |  |  |  |  | 3 m Cable | 440N-Z21S16A |
|  |  |  |  |  |  | 10 m Cable | 440N-Z21S16B |
|  |  |  |  | 30 mm | 25 mm (0.98 in) | 6 in Pigtail, 8-Pin Micro (M12) | 440N-Z21S26H |
|  |  |  |  |  |  | 3 m Cable | 440N-Z21S26A |
|  |  |  |  |  |  | 10 m Cable | 440N-Z21S26B |
| 18 mm Stainless Steel Barrel |  |  |  | 18 mm | 10 mm (0.39 in) | 6 in Pigtail, 8-Pin Micro (M12) | 440N-Z21S17H |
|  |  |  |  |  |  | 3 m Cable | 440N-Z21S17A |
|  |  |  |  |  |  | 10 m Cable | 440N-Z21S17B |

## Recommended Logic Interfaces

| Description | Safety Outputs | Auxiliary Outputs | Terminals | Reset Type | Power Supply | Cat. Pg. No. | Cat. No. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Single-Function Safety Relays |  |  |  |  |  |  |  |
| MSR127RP | 3 N.O. | 1 N.C. | Removable Screw | Monitored Manual | 24V AC/DC | - | 440R-N23135 |
| MSR127TP | 3 N.O. | 1 N.C. | Removable Screw | Automatic/Manual | 24V AC/DC | - | 440R-N23132 |
| Modular Safety Relays |  |  |  |  |  |  |  |
| MSR211P Base 2 N.C. only | 2 N.O. | 1 N.C. and 2 PNP Solid State | Removable | Automatic/Manual Monitored Manual | 24V DC | - | 440R-H23176 |
| MSR220P Input Module | - | - | Removable | - | 24V DC | - | 440R-H23178 |
| MSR310P Base | - | 3 PNP Solid State | Removable | Automatic/Manual Monitored Manual | 24 V DC | - | 440R-W23219 |
| MSR320P Input Module | - | 2 PNP Solid State | Removable | - | 24V DC | - | 440R-W23218 |

Note: For additional Safety Relays connectivity, see the Logic section of this catalog.
For additional Safety I/O connectivity, see the Safety I/O section of this catalog.
For Application and wiring diagrams, see the Applications section of this catalog.

Connection Systems

| Description | Cat. No. |
| :--- | :---: |
| Cordset | 889D-F8AB-* |

* Replace symbol with $2(2 \mathrm{~m}), 5(5 \mathrm{~m})$, or $10(10 \mathrm{~m})$ for standard cable lengths.


## Accessories

|  | Description | Cat. No. |  |
| :--- | :--- | :--- | :--- |
|  | 18 mm Plastic Actuator | - |  |

## Approximate Dimensions-mm (inches)

Dimensions are not intended to be used for installation purposes.


## Safety Switches

Noncontact Switches
SensaGuard ${ }^{\text {TM }} 18$ mm Barrel
Typical Wiring Diagrams

| Description |  | Plastic |  | Stainless Steel |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 8-Pin Micro (M12) |  |  |  |  |  |
| 8-Pin Cordset 889D-F8AB-* | Grey | OSSD 1 | Safety A | OSSD 1 | Safety A |
|  | Red | OSSD 1+ |  | OSSD 1+ |  |
|  | Pink | OSSD 2 | Safety B | OSSD 2 | Safety B |
|  | Yellow | OSSD 2+ |  | OSSD 2+ |  |
|  | White | Aux A |  | Aux A |  |
|  | Brown | 24V DC | Unit Power | 24V DC | Unit Power |
|  | Blue | Gnd |  | Gnd |  |
|  | Green | NA |  | Shield |  |

* Replace symbol with $2(2 \mathrm{~m}), 5(5 \mathrm{~m})$ or $10(10 \mathrm{~m})$ for standard cable lengths.


## Misalignment Curve



Note: There must be a minimum spacing of 4 mm (0.157 in) if actuator and sensor face approaches laterally. This will prevent false triggering due to the side lobe areas.


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Note: There must be a minimum spacing of 7 mm (0.275 in) if actuator and sensor face approaches laterally. This will prevent false triggering due to the side lobe areas.

## Minimum Distance Between Sensors



## Diagnostic

Unit Indicators (per IEC 60073)

| Device Output 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 on OSSD Inputs (yellow and red wire) |
|  | Red Flash | 1 Hz Flash Recoverable Fault | Recoverable Fault: Check OSSD Outputs Are Not <br> Shorted to GND, 24V DC or Each Other. Cycle Power. |

