

# Non-Contact Switches

Ferrogard™ 6, 9,10, 13 & 14



## Description

The Ferrogard range of magnetically actuated safety switches offers non-contact reliability together with tolerance to misalignment. They are designed to be installed so that when a guard door is opened, the action of the magnetic actuator being removed from the switch opens the N.C. safety contact which is intended for the isolation of control power to a machine primary control element.

The FRS 6, 9, 10, 13, and 14 sensors and actuators incorporate slim housings to accommodate narrow mounting areas. They are environmentally sealed to IP67 (NEMA 6P), which makes them ideal for wet environments. These Ferrogard switches have two active sensing faces allowing more flexible mounting options.

Unlike some magnetic switches the Ferrogards have protected safety contacts to help ensure that they do not fail to danger.

All Ferrogards have internal non-resettable overload protection on the safety contact. They should be protected by an external fuse rated as shown in the Specifications table.

## Features

- Non-contact actuation
- High tolerance to misalignment
- High switching current (up to 3 A)
- Two sensing faces
- IP67 (NEMA 6P) Rating
- Slim housings
- Stainless steel models available

## Specifications

Safety Ratings	
Standards	EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, ANSI B11.19, AS4024.1
Safety Classification	Cat. 1 Device per EN954-1 Dual channel interlocks suitable for Cat. 3 or 4 systems
Functional Safety Data *	B10d: > 2 x 10 <sup>6</sup> operations at min. PFH <sub>D</sub> : > 3 x 10 <sup>-7</sup> MTTFd: > 385 years Dual channel interlock may be suitable for performance levels PLe or PLd (according to ISO 13849-1:2006) and for use in SIL2 or SIL3 systems (according to IEC 62061) depending on application characteristics
Note: For up-to-date information, visit <a href="http://www.ab.com/Safety/">http://www.ab.com/Safety/</a>	
Certifications	CE Marked for all applicable directives and cULus
Outputs (Guard Door Closed, Actuator in Place)	
Safety Outputs	1 N.C.   1 N.C.
Auxiliary Outputs	—   1 N.C.
Operating Characteristics	
Operating Distance, Make [mm (in.)]	12 (0.47)
Operating Distance, Break [mm (in.)]	23 (0.91)
Environmental	
Enclosure Type Rating	IP67 (NEMA 6P)
Operating Temperature [C (F)]	-10...+65° (+14...+149°)
Relative Humidity	5...95%
Shock	IEC 68-2-27, 30 g, 11 ms
Vibration	IEC 68-2-6, 10...55 Hz
Radio Frequency	IEC 61000-4-3, IEC 61000-4-6
Physical Characteristics	
Actuator/Housing Material	Molded ABS plastic
Weight [g (lb)]	Sensor/Actuator FRS 6—28 (0.06)/70 (0.15) FRS 9—28 (0.06)/70 (0.15) FRS 10—28 (0.06)/70 (0.15)
Color	Red

\* Usable for ISO 13849-1:2006 and IEC 62061. Data other than B10d is based on:  
 - Usage rate of 1op/10 mins., 24 hrs/day, 360 days/year, representing 51840 operations per year  
 - Mission time/Proof test interval of 38 years

3-Interlock Switches

### Product Selection

Safety Contact Switching Capability	Safety Contacts	Auxiliary Contacts	Housing Material	Type	Connection	Cat. No.
250V AC, 2 A	1 N.C.	—	Red Molded ABS Plastic	FRS 6	2 m Cable	<b>440N-G02023</b>
					4 m Cable	440N-G02028
					6 m Cable	440N-G02032
					10 m Cable	440N-G02013
FRS 9				4-Pin Micro QD	440N-G02095	
				2 m Cable	<b>440N-G02044</b>	
				4 m Cable	440N-G02075	
				6 m Cable	440N-G02082	
110V AC, 3 A			FRS 10	10 m Cable	440N-G02089	
				4-Pin Micro QD	440N-G02096	
250V AC, 2 A	1 N.C.	—	Stainless Steel	FRS 13	2 m Cable	440N-G02045
					4 m Cable	440N-G02088
				FRS 14	4-Pin Micro QD	440N-G02154
2 m Cable					440N-G02155	
24V DC, 1 A				FRS 13	4 m Cable	440N-G02155
					FRS 14	4-Pin Micro QD
			2 m Cable			440N-G02156
24V DC, 1 A			FRS 14	4 m Cable	440N-G02157	
				4-Pin Micro QD	440N-G02161	

**Note:** Contacts are described with the guard door closed, that is, actuator in place.

### Recommended Logic Interfaces

Description	Safety Outputs	Auxiliary Outputs	Terminals	Reset Type	Power Supply	Cat. Page No.	Cat. No.
<b>Single-Function Safety Relays</b>							
MSR127RP	3 N.O.	1 N.C.	Removable (Screw)	Monitored Manual	24V AC/DC	5-26	<b>440R-N23135</b>
MSR127TP	3 N.O.	1 N.C.	Removable (Screw)	Auto./Manual	24V AC/DC	5-26	<b>440R-N23132</b>
MSR126T	2 N.O.	None	Fixed	Auto./Manual	24V AC/DC	5-24	<b>440R-N23117</b>
MSR30T	2 N.O. Solid State	1 N.O. Solid State	Removable	Auto./Manual or Monitored Manual	24V DC	5-16	440R-N23198
<b>Modular Safety Relays</b>							
MSR210P Base 2 N.C. only	2 N.O.	1 N.C. and 2 PNP Solid State	Removable	Auto./Manual or Monitored Manual	24V DC from the base unit	5-82	440R-H23176
MSR220P Input Module	—	—	Removable	—	24V DC	5-86	440R-H23178
MSR310P Base	MSR300 Series Output Modules	3 PNP Solid State	Removable	Auto./Manual Monitored Manual	24V DC	5-102	440R-W23219
MSR320P Input Module	—	2 PNP Solid State	Removable	—	24V DC from the base unit	5-106	440R-W23218

**Note:** For additional Safety Relays connectivity, see page 5-12.  
 For additional Safety I/O and Safety PLC connectivity, see page 5-116.  
 For application and wiring diagrams, see page 10-1.

### Connection Systems

Description	4-Pin Micro (M12)
Cordset	889D-F4AC-*
Patchcord	889D-F4ACDM-*

\* Replace symbol with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.  
 \* Replace symbol with 1 (1 m), 2 (2 m), 3 (3 m), 5 (5 m), or 10 (10 m) for standard cable lengths.

**Note:** For additional information, see page 7-1.

### Accessories

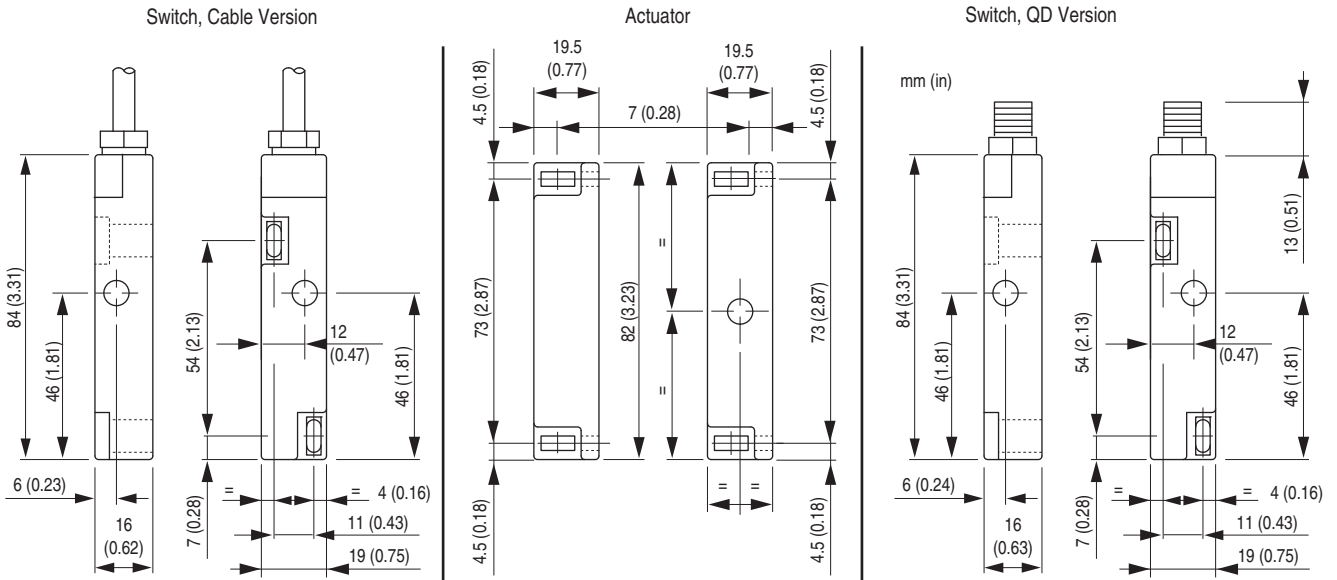
Description	Cat. No.
FRS 6, 9, 10 Plastic Replacement Actuator	440N-A02025
FRS 13, 14 Stainless Steel Replacement Actuator	440N-A02165

Safety Switches  
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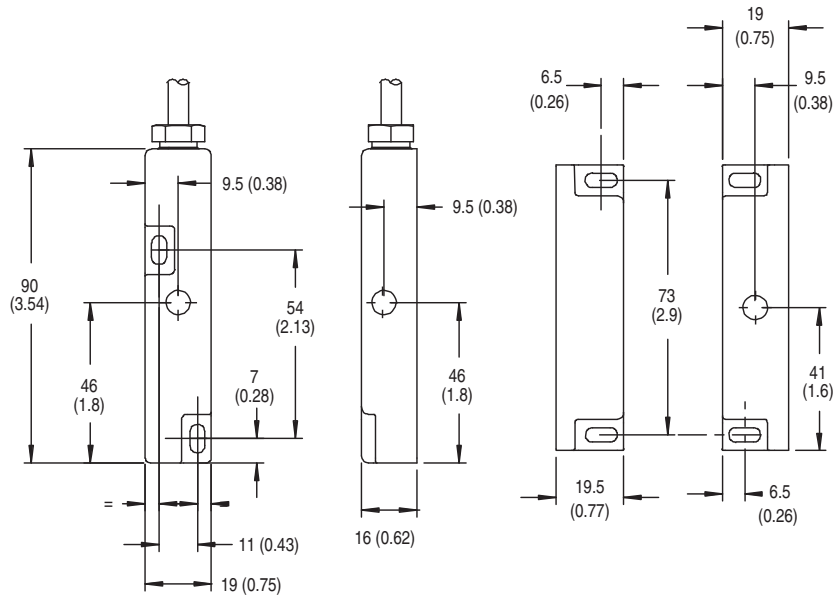
**Approximate Dimensions**

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.

FRS 6, 9, 10



FRS 13, 14



3-Interlock  
Switches

**Typical Wiring Diagrams**

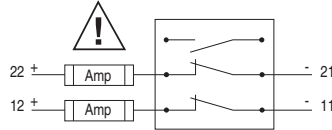
		FRS 6, 9, 10	FRS 13, 14
		1 N.C.	1 N.C. + 1 N.O.
4-Pin Micro (M12)			
Cordset 889D-F4AC-*	Brown	Safety A	Safety A
	Blue	—	Aux A
	White	—	—
	Black	—	—
Cable Version	Safety A	Brown	Brown
		Blue	Blue
	Aux A	—	Black
		—	Grey

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

**External Fuse Safety Contacts**



**WARNING:** All safety contacts fitted with internal non-resettable fuse and must be fused externally as detailed.



Recommended:  
 \*Bussman BK/GDA-1.6 A  
 \*\* Bussman BK/GDA-400 mA  
 \*\*\*Bussman BK/GDA-2.5 A

FRS 1, 2, 3, 4, 5, 6, 13, 21 AC

AC ≤ 1.6 A\* (F) IEC 60127-2

FRS 9, 14, 2 DC, 20 DC, 21 DC

DC ≤ 0.4 A\*\* (F) IEC 60127-2

FRS 10

AC ≤ 2.5 A\*\*\* (F) IEC 60127-2