

Ferrogard Safety Switches

The Ferrogard™ range of magnetically actuated safety switches offer 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 contacts, which are intended for the isolation of control power to a machine primary control element.

Ferrogard 1, 2, 20, and 21 Non-contact Interlock Switches

The Ferrogard 1, 2, 20, and 21 non-contact interlock switches have the following features:

- Non-contact actuation
- High tolerance to misalignment
- High switching current (up to 2 A AC, 1 A DC)
- Plastic rectangular housing (IP67)
- Cable or quick-disconnect (QD) connections



Specifications

Attribute	Value
Safety Ratings	
Standards	ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, AS4024.1
Safety classification	Cat. 1 Device per ISO13849-1. Dual channel interlocks suitable for Cat. 3 or 4 systems
Functional safety data ⁽¹⁾	B10d: > 2 x 10 ⁶ operations at min. PFH _d : > 3 x 10 ⁻⁷ 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
For up-to-date information, visit https://ab.rockwellautomation.com/safety	
Certifications	CE Marked for all applicable directives www.rockwellautomation.com/certification/overview.page
Outputs (Guard Door Closed, Actuator in Place)	
Safety outputs	FRS1: 1 N.C., FRS2: 1 N.C., FRS20: 2 N.C., FRS21: 2 N.C.
Auxiliary outputs	FRS1: None, FRS2: 1 N.O., FRS20: None, FRS21: 1 N.O.
Operating Characteristics	
Operating distance, make	Safety: 12 mm (0.47 in.); Auxiliary: 15 mm (0.59 in.)
Operating distance, break	Safety: 23 mm (0.91 in.); Auxiliary: 26 mm (1.02 in.)
Fuses, external	FRS1, 2 & 21: 1.6 A (Bussmann BK/60 A-1.6 A) max FRS20: 0.4 A (Bussmann BK/60 A-400 mA) max
Environmental	
Enclosure type rating	IP67 (NEMA 6P)
Operating temperature	-10...+55 °C (+14...+131 °F)
Relative humidity	5...95%
Shock	50 g
Vibration	7 g; 50...200 Hz
Radio frequency	IEC 61000-4-3, IEC 61000-4-6
Physical Characteristics	
Housing material	Molded ABS plastic

Attribute	Value
Actuator material	Molded ABS plastic
Weight	FRS 1-Sensor: 35 g (0.08 lb)/Actuator: 85 g (0.19 lb) FRS 2-Sensor: 40 g (0.09)/Actuator: 85 g (0.19 lb) FRS 20-Sensor: 43 g (0.09)/Actuator: 85 g (0.19 lb) FRS 21-Sensor: 43 g (0.09)/Actuator: 85 g (0.19 lb)
Color	Red

- (1) 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.

Product Selection

Switching Capability	Safety Contacts ⁽¹⁾	Auxiliary Contacts ⁽¹⁾	Connection	Type	Cat. No.
250V AC, 2 A max	1 N.C.	—	2 m Cable	FRS 1	440N-G02001
			4 m Cable		440N-G02004
			6 m Cable		440N-G02022
			8 m Cable		440N-G02041
			10 m Cable		440N-G02015
		1 N.O.	2 m Cable	FRS 2	440N-G02002
			4 m Cable		440N-G02014
			6 m Cable		440N-G02038
			8 m Cable		440N-G02033
			10 m Cable		440N-G02019
	2 N.C.	—	15 m Cable	440N-G02043	
			20 m Cable	440N-G02040	
			4-pin Micro QD	440N-G02093	
	2 N.C.	—	4-pin Micro QD	FRS 20	440N-G02097
	2 N.C.	1 N.O.	2 m Cable	FRS 21	440N-G02055
			4 m Cable		440N-G02061
			6 m Cable		440N-G02060
			10 m Cable		440N-G02059
6-pin AC Micro QD ⁽²⁾			440N-G02098		
24V DC, 1 A	1 N.C.	1 N.O.	2 m Cable	FRS 2	440N-G02092
			4-pin Micro QD		440N-G02094
	2 N.C.	—	4 m Cable	FRS 20	440N-G02085
			4-pin Micro QD		440N-G02090
		1 N.O.	2 m Cable	FRS 21	440N-G02058
			4 m Cable		440N-G02077
			6 m Cable		440N-G02083
			6-pin Micro QD		440N-G02099

(1) Contacts are described with the guard door closed, that is, actuator in place. Switch is shipped complete with actuator.

(2) For connector ratings refer to [Table 23](#).

Table 22 - Connection Systems

Description	Connection to Distribution Box	
	4-pin Micro (M12) 1 N.C. & 1 N.O.	6-pin Micro (M12) 2 N.C. & 1 N.O.
Cordset	889D-F4AC-x ⁽¹⁾	889R-F6ECA-x ⁽¹⁾
Patchcord	889D-F4ACDM-y ⁽²⁾	889R-F6ECRM-y ⁽²⁾
Distribution box	898D-P4zKT-DM4 ⁽³⁾	898R-F68MT-A5
Shorting plug	898D-41KU-DM	898R-P61MU-RM
T-port	898D-43KY-D4	—

- (1) Replace x with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
- (2) Replace y with 1 (1 m), 2 (2 m), 3 (3 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
- (3) Replace z with 4 or 8 for number of ports.

Table 23 - Connector Ratings

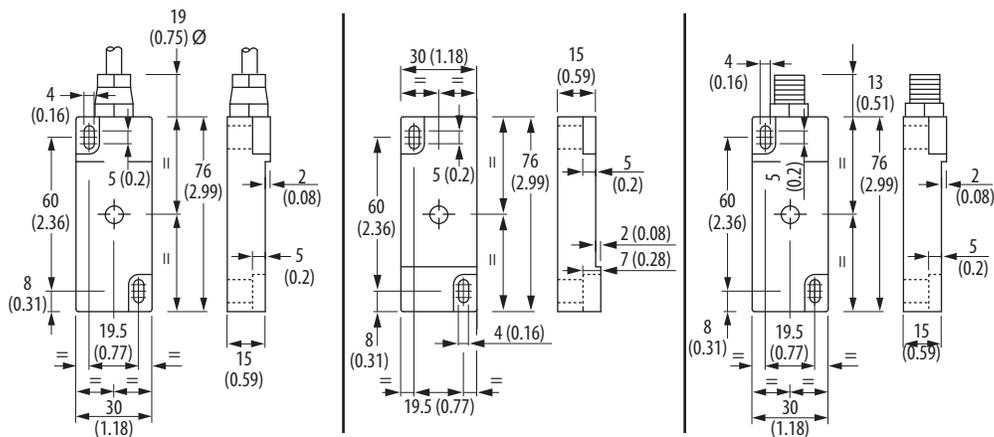
Description	Max Ratings		Applicable Standards
	AC	DC	
4-pin Micro (M12)	250V, 4 A	250V, 4 A	IEC 61076-2-101:2003
5-pin Micro (M12)	60V, 4 A	60V, 4 A	IEC 61076-2-101:2003
6-pin Micro (M12)	30V, 2 A	30V, 2 A	IEC 61076-2-101:2003
8-pin Micro (M12)	30V, 2 A	30V, 2 A	IEC 61076-2-101:2003
12-pin M23	63V, 6 A	63V, 6 A	IEC 61984:2001

Accessories

Description	Cat. No.
Replacement actuator	440N-A02005

Approximate Dimensions

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



Typical Wiring Diagrams

		FRS1 1 N.C.	FRS2 1 N.C. + 1 N.O.	FRS20 2 N.C.	FRS21 2 N.C. + 1 N.O.
4-pin Micro (M12)		—			
6-pin Micro (M12)		—	—	—	
Cordset 889D-F4AC-x or Cable Versions ⁽¹⁾	Brown	—	Safety A	Safety A	—
	Blue	—	—	—	—
	Black	—	—	—	—
	White	—	—	—	—
Cordset 889R-F6ECA-x ⁽¹⁾	Red/White	—	—	—	Safety A
	Red/Black	—	—	—	Safety B
	Red	—	—	—	Aux A
	Red/Blue	—	—	—	—
	Green	—	—	—	—
Cable Versions	Safety A	Brown	Blue	Brown	Black
		Blue	White	Blue	White
	Safety B	—	Yellow	Black	Red
		—	Green	White	Blue
	Aux A	—	—	—	Yellow
		—	—	—	Green

(1) Replace x with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.