

Safety Switches
Non-Contact Switches
 Ferrogard™ GD2



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 contacts which are intended for the isolation of control power to a machine primary control element.

The GD2 version has a stainless steel housing for added protection against inadvertent impacts to the housing. The contacts are completely sealed to meet IP68 (NEMA 6P) requirements, making them ideal for wet environments. The GD2 also has a wider temperature range than the plastic Ferrogard switches, making them useful in a wider range of applications.

Unlike some magnetic switches, the Ferrogards have protected safety contacts to help ensure that they do not fail to danger. In addition, some versions have independent auxiliary signal contacts to indicate the machine and guard condition.

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 2 A AC, 1 A DC)
- Wide temperature range (-25...+125°C (-13...+257°F))
- Stainless steel housing
- Various contact arrangements

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 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
Note:	For up-to-date information, visit http://www.ab.com/Safety/
Certifications	CE Marked for all applicable directives and cULus

Outputs (Guard Door Closed, Actuator in Place)		
Safety Outputs	1 N.C.	2 N.C.
Auxiliary Outputs	1 N.O.	1 N.O.

Operating Characteristics	
Operating Distance, Make [mm (in.)]	Safety: 12 (0.47); Auxiliary: 15 (0.59)
Operating Distance, Break [mm (in.)]	Safety: 23 (0.91); Auxiliary: 26 (1.02)

Environmental	
Enclosure Type Rating	IP68 (NEMA 6P)
Operating Temperature [C (F)]	-25...+125° (-13...+257°)
Relative Humidity	5...95%
Shock	IEC 68-2-27, 30 g, 11 ms
Vibration	IEC 68-2-6, 10...200 Hz
Radio Frequency	IEC 61000-4-3, IEC 61000-4-6

Physical Characteristics	
Housing Material	Stainless Steel; BS3146 ANC4B (316L)
Actuator Material	Stainless Steel; BS3146 ANC4B (316L)
Weight [g (lbs)]	Sensor: 156 (0.34); Actuator: 168 (0.37)

* 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	Connection	Type	Cat. No.
250V AC, 2 A max.	2 N.C.	—	3 m Cable	FRS 20 GD2	440N-G02113
	1 N.C.	1 N.O.	3 m Cable	FRS 2 GD2	440N-G02112
	2 N.C.		3 m Cable	FRS 21 GD2	440N-G02117
24V DC, 1 A max.	1 N.C.	1 N.O.	3 m Cable	FRS 2 GD2	440N-G02118
			10 m Cable	FRS 2 GD2	440N-G02147
	2 N.C.	—	3 m Cable	FRS 20 GD2	440N-G02119
	2 N.C.	1 N.O.	3 m Cable	FRS 21 GD2	440N-G02123
			6 m Cable	FRS 21 GD2	440N-G02143
			10 m Cable	FRS 21 GD2	440N-G02137
			8-Pin Micro (M12)	FRS 21 GD2	440N-G02149

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

Recommended Logic Interfaces

Description	Safety Outputs	Auxiliary Outputs	Terminals	Reset Type	Power Supply	Cat. Page No.	Cat. No.
Single-Function Safety Relays							
MSR127RP	3 N.O.	1 N.C.	Removable (Screw)	Monitored Manual	24V AC/DC	5-26	440R-N23135
MSR127TP	3 N.O.	1 N.C.	Removable (Screw)	Auto./Manual	24V AC/DC	5-26	440R-N23132
MSR126T	2 N.O.	None	Fixed	Auto./Manual	24V AC/DC	5-24	440R-N23117
MSR30T	2 N.O. Solid State	1 N.O. Solid State	Removable	Auto./Manual or Monitored Manual	24V DC	5-16	440R-N23198
Modular Safety Relays							
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	8-Pin Micro (M12)
Cordset	889D-F8AB-*
Patchcord	889D-F8ABDM-*

* 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.

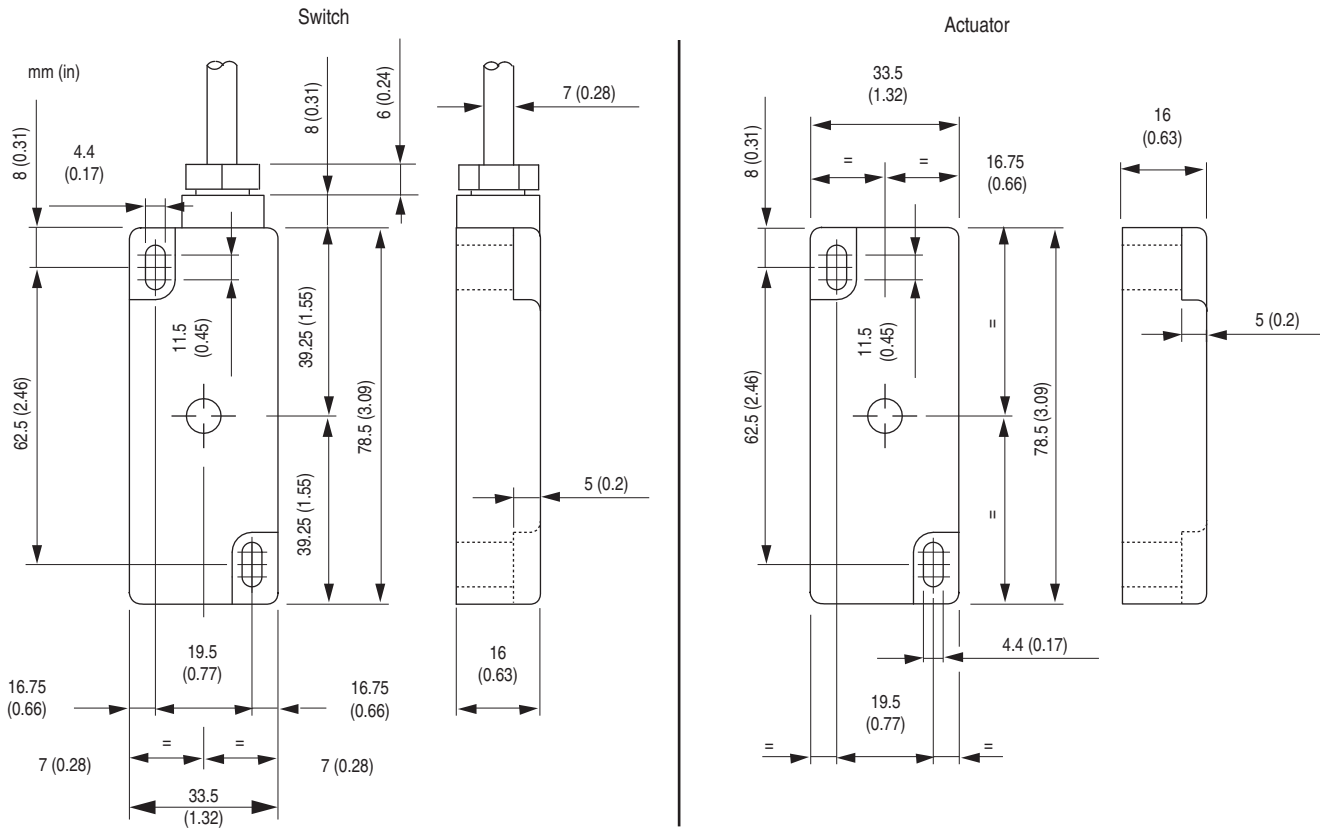
Accessories

Description	Cat. No.
Actuator	440N-A02128

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Approximate Dimensions

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



3-Interlock Switches

Typical Wiring Diagrams

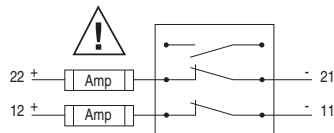
Description		FRS21	FRS2	FRS20
		2 N.C. + 1 N.O.	1 N.C. + 1 N.O.	2 N.C.
Cable Versions	Safety A	Black	Blue	Brown
		White	Red	Blue
	Safety B	Red	—	Black
		Blue	—	White
	Aux A	Yellow	Yellow	—
Green		Green	—	
Shield Gnd	—	Green/Yellow	Green/Yellow	
8-Pin Micro (M12)			—	—
Cordset 889D-F8AB-*	Brown White	Safety A	—	—
	Grey Pink	Safety B	—	—
	Yellow Red	Safety B	—	—
	Green Blue	NA	—	—

* 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.



FRS 2 GD2
 FRS20 GD2
 FRS21 GD2

FRS 2 GD2
 FRS 20 GD2
 FRS21 GD2

AC ≤ 1.6 A* (F) IEC 60127-2

DC ≤ 0.4 A** (F) IEC 60127-2

Recommended:

*Bussman BK/GDA-1.6 A

** Bussman BK/GDA-400 mA