

Installation Instructions

Original Instructions



Allen-Bradley
by ROCKWELL AUTOMATION



Ferrogard Non-contact Interlock Switches

Catalog Numbers 440N-Gx

Installation must be in accordance with the following steps and stated specifications and implemented by suitably competent personnel. The unit is not to be used as a mechanical stop. Guard stops and guides must be fitted.

Before installation, perform a risk assessment 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.

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



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



WARNING: Do not defeat, tamper, remove, or bypass this unit. Severe injury to personnel could result.

Specifications

Attribute	Value
Safety contacts ⁽¹⁾	
FRS1, 2, 3, 4, 5, and 6 for AC circuits	1 N.C. special safety reed 250V AC 2 A max
FRS21AC for AC circuits	2 N.C. special safety reed 250V AC 2 A max ⁽²⁾
FRS9 for DC circuits	1 N.C. special safety reed 24V DC 1 A max
FRS20DC, 2DC, and 21DC for DC circuits	2 N.C. special safety reed 24V DC 1 A max ⁽³⁾
FRS10 for AC circuits	1 N.C. special safety reed 110V AC 3 A max ⁽⁴⁾
FRS13 for AC circuits	1 N.C. special safety reed 250V AC 2 A max
FRS14 for DC circuits	1 N.C. special safety reed 24V DC 1 A max
Auxiliary contacts	
FRS2, 4, and 21	1 N.O.
FRS3	1 N.C. 300V DC, 250V AC (RMS) 0.5 A INC. Inrush 15VA/10 W for AC/DC circuits
FRS13 and 14	1 N.C.
Ingress protection rating	
FRS1, 2, 6, 9, 10, 13, 14, 20DC, and 21	IP67
FRS3, 4, and 5	IP65
Operating temperature	-10...+65 °C (14...149 °F)
Mechanical life	10 x 10 ⁶
Electrical life	1 x 10 ⁶

(1) The safety contacts are described as normally closed (N.C.) that is, with the guard closed, actuator in place (where relevant), and the machine able to be started.

(2) Fuse externally 1.6 A quick blow.

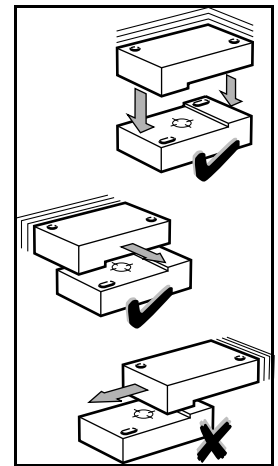
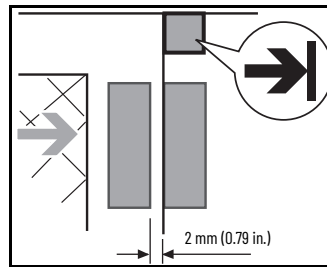
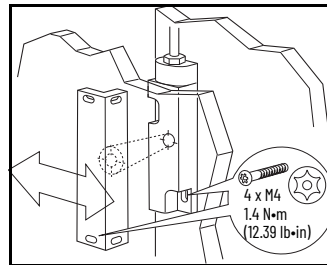
(3) Fuse externally 400 mA quick blow.

(4) Fuse externally 2.5 A quick blow.

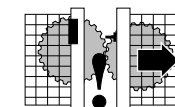
Installation

IMPORTANT After installation and commissioning, coat the actuator, switch, and switch lid mounting screws with a tamper-evident varnish or similar compound.

Figure 1 - Typical Mounting

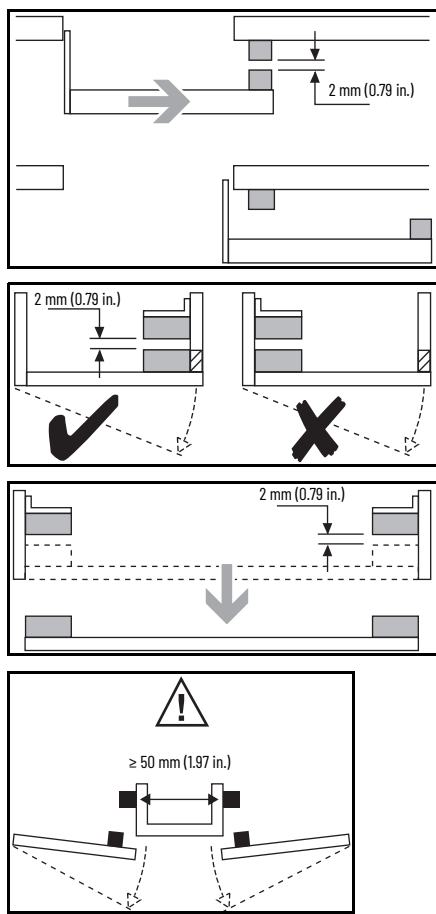


Maintain 5 mm (0.2 in.) clearance from Ferrous surroundings.



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

Figure 2 - Proper Positioning



Wiring



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

Table 1 - Recommended Fuses

Schematic	Fuses	
	FRS1, 2, 3, 4, 5, 6, 13, 21 AC	AC ≤ 1.6 A ⁽¹⁾ (F) IEC60127-2
	FRS9, 14, 2DC, 20DC, 21 DC	DC ≤ 0.4 A ⁽²⁾ (F) IEC60127-2
	FRS10	AC ≤ 2.5 A ⁽³⁾ (F) IEC60127-2

- (1) Bussmann BK/GDA-1.6A
- (2) Bussmann BK/GDA-400MA
- (3) Bussmann BK/GDA-2.5A

Table 2 - Contact Configuration FRS3, FRS4, and FRS5

Schematic	1	2	3	4
<p>FRS3</p>	Safety N.C.	Safety N.C.	Aux N.C.	Aux N.C.
<p>FRS4</p>	Safety N.C.	Safety N.C.	Aux N.O.	Aux N.O.
<p>FRS5</p>	Safety N.C.	Safety N.C.	-	-

Table 3 - FRS13 and FRS14 QD, 8-pin Connector Pinout

8-pin Connector Pinout	Wire Color	Contact
	1	Blue Safety N.C.
	2	Brown Safety N.C.
	3	- Ground
	5	Gray Aux. N.C.
	6	Black Aux. N.C.

Recommended cable: Cat No. 889D-F8NB-x⁽¹⁾

Table 4 - FRS21 QD, 6-pin Connector Pinout

6-pin Connector Pinout	Wire Color	Contact
	1	White Safety N.C.
	2	Blue Safety N.C.
	3	Green Aux. N.O.
	4	Yellow Aux. N.O.
	5	Black Safety N.C.
	6	Red Safety N.C.

Recommended cable: Cat No. 889R-F6ECA-x⁽¹⁾

(1) x = 2 (2 m [6.6 ft]), 5 (5 m [16.4 ft]), or 10 (10 m [32.8 ft]) for standard cable lengths. For other cable lengths, contact your local Allen-Bradley product distributor or Rockwell Automation sales office.

Table 5 - FRS1, FRS6, FRS9, and FRS10 QD, 4-pin Connector Pinout

4-pin Connector Pinout	Wire Color	Contact
	1	Blue Safety N.C.
	2	-
	3	Brown Safety N.C.
	4	-

Recommended cable: Cat No. 889D-F4NB-x⁽¹⁾

Table 6 - FRS2 QD, 4-pin Connector Pinout

4-pin Connector Pinout	Wire Color	Contact
	1	Red Safety N.C.
	2	Green Aux. N.O.
	3	Blue Safety N.C.
	4	Yellow Aux. N.O.

Recommended cable: Cat No. 889D-F4NB-x⁽¹⁾

Table 7 - FRS20 QD, 4-pin Connector Pinout

4-pin Connector Pinout	Wire Color	Contact
	1	Blue Safety N.C.
	2	White Aux. N.O.
	3	Brown Safety N.C.
	4	Black Aux. N.O.

Recommended cable: Cat No. 889D-F4NB-x⁽¹⁾

(1) x = 2 (2 m [6.6 ft]), 5 (5 m [16.4 ft]), or 10 (10 m [32.8 ft]) for standard cable lengths. For other cable lengths, contact your local Allen-Bradley product distributor or Rockwell Automation sales office.

Maintenance

Frequency	Description
Every week	<ul style="list-style-type: none"> • Check the correct operation of the switching circuit. • Check for signs of abuse or tampering. • Inspect the switch casing and actuator for damage, particularly for loss of sealing at the lid or conduit entry. • Replace the unit if damage is apparent.

Repair

If there is any malfunction or damage, do not attempt to repair. The unit must be replaced before machine operation is allowed.

IMPORTANT Do not dismantle the unit.

Approximate Dimensions

Figure 3 - FRS3, FRS4, and FRS5 [mm (in.)]

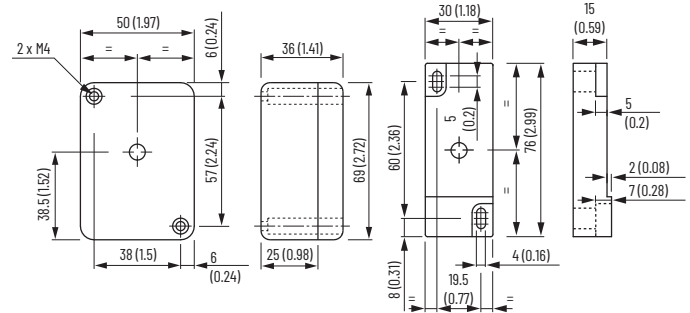


Figure 4 - FRS13 and FRS14 [mm (in.)]

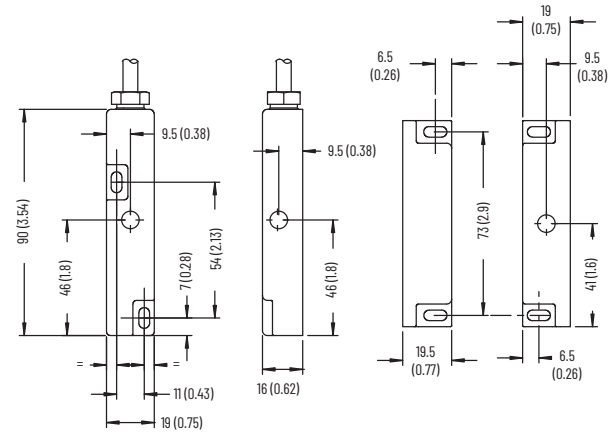


Figure 5 - FRS1, FRS2, FRS20DC, and FRS21 [mm (in.)]

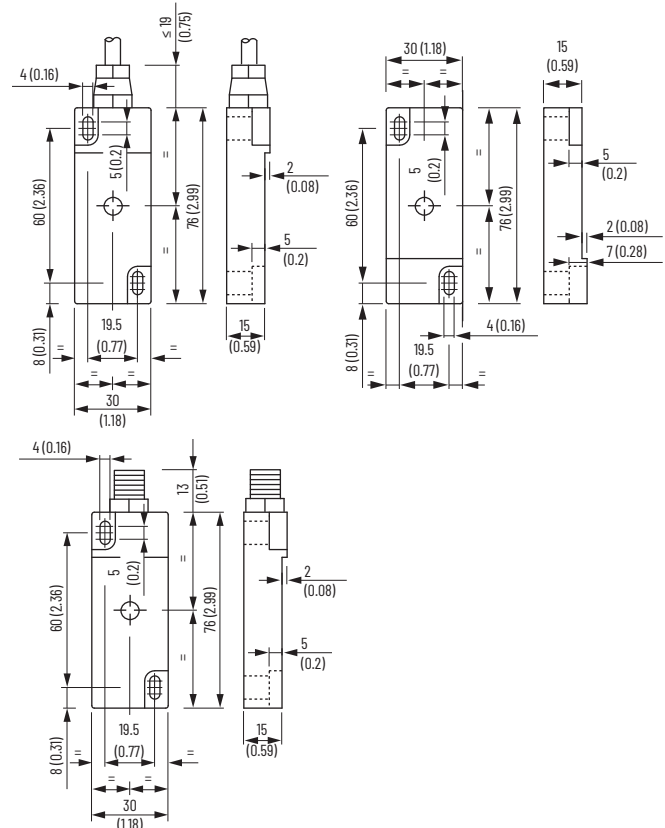
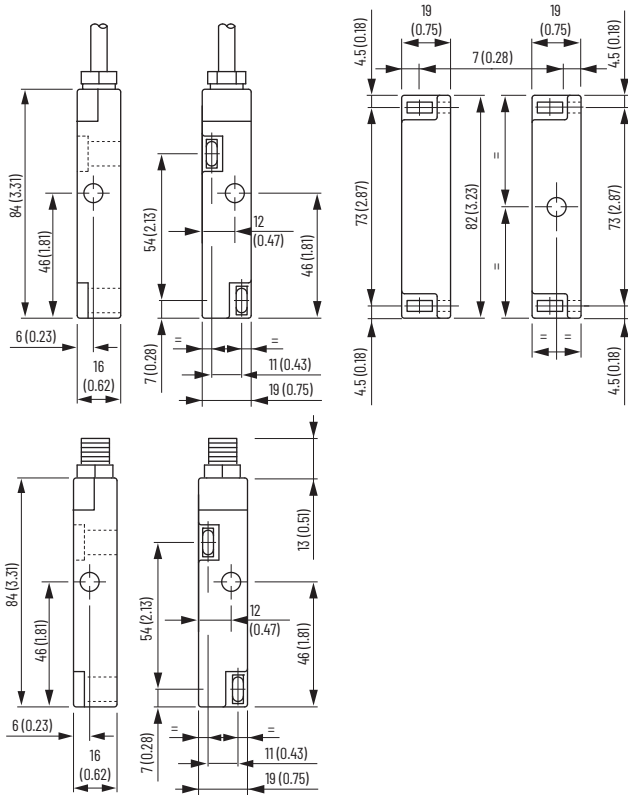


Figure 6 - FRS6, FRS9, and FRS10 [mm (in.)]



Additional Resources

To download publications, visit rok.auto/literature and search for the following publication numbers.

Resource	Description
Safety Switches Specifications Technical Data, publication SWITCH-TD001	Provides specification information for safety switch devices.
Functional Safety Data Sheet, publication SAFETY-SR001	Provides functional safety data for Rockwell Automation products.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

Waste Electrical and Electronic Equipment (WEEE)







At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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