

Installation Instructions for the FF Series Magnetically Actuated Safety Interlock Switches

ISSUE 1
50026830



⚠ WARNING

IMPROPER INSTALLATION

- Consult with local safety agencies and their requirements when designing a machine-control link, interface, and all control elements that affect safety.
- Strictly adhere to all installation instructions.

Failure to comply with these instructions could result in death or serious injury.

GENERAL INFORMATION

When installed on a machine guard, and the switch and actuator are within the specified operating range, the **safety contacts** will be closed and the **auxiliary contacts** will be open. (See table for switching distances).

When the actuator moves out of the operating range, the **safety contacts** will open. The **auxiliary contacts** will close for indication.

The FF series safety switches and actuators are designed to approach each other from most angles. When the switch is closed, the targets on the printed face of the switch must align.

MOUNTING INFORMATION

The FF safety switches can approach each other from most angles. When the switch is closed, targets on the printed face must align. See figure 1.

FIGURE 1. SWITCH ALIGNMENT (FF5 AND FF6)

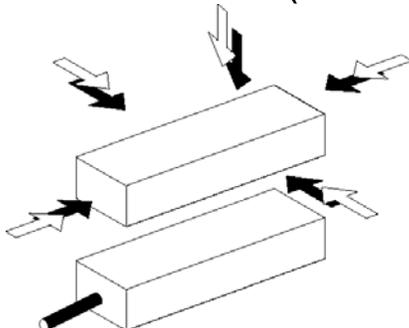


FIGURE 2. SWITCH ALIGNMENT (FF2 AND FF3)

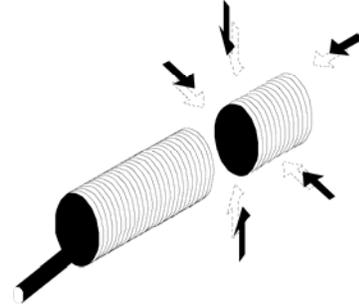
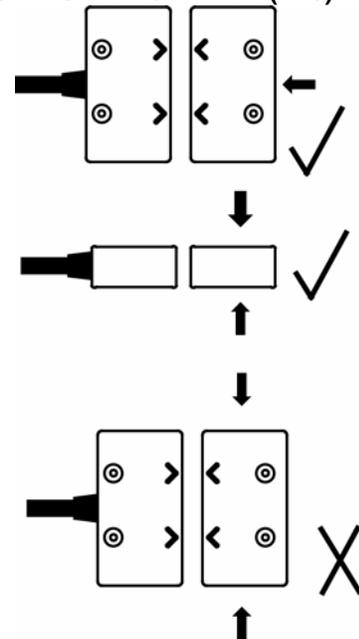


FIGURE 3. SWITCH ALIGNMENT (FF5)



Mount the switch on the machine frame and the actuator on the opening edge of the door. Always try to mount the switch on non-ferrous material. *Ferrous material may reduce the switching distance.* Be sure to use tamper-proof screws. Do not use the safety switch as a door stop. Leave a minimum of 50 mm [1.97 in] between any adjacent switches. See figures 4 and 5.

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FIGURE 4. DO NOT USE THE SAFETY SWITCH AS A DOOR STOP WRONG!

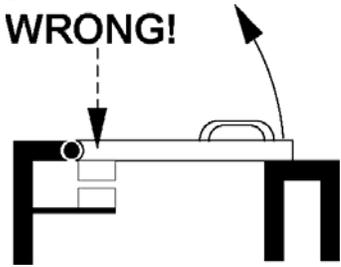
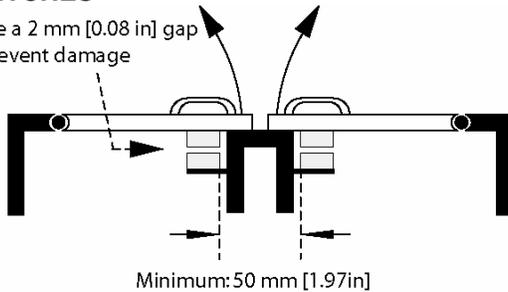


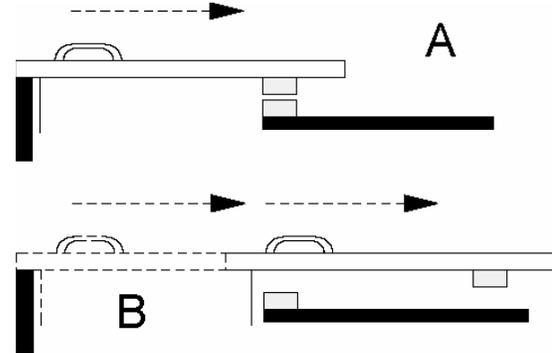
FIGURE 5. MINIMUM DISTANCE BETWEEN SWITCHES

Leave a 2 mm [0.08 in] gap to prevent damage



When fixing the safety switch to a sliding door (A), ensure that when the door is opened (B) it is not easily accessible, helping prevent the system being overridden. See figure 6.

FIGURE 6. PLACEMENT FOR SLIDING DOORS



SPECIFICATIONS

Type	FF2-10-AC FF2-11-AC	FF2-10-DC FF2-11-DC	FF3-20-AC FF3-21-AC	FF3-20-DC FF3-21-DC	FF5	FF5-SS
Contact arrangement	1NC (FF2-10-AC) 1NC/1NO (FF2-11-AC)	1NC (FF2-10-DC); 1NC/1NO (FF2-11-DC)	2NC (FF3-20-AC) 2NC/1NO (FF3-21-AC)	2NC (FF3-20-DC); 2NC/1NO (FF3-21-DC)	Max: 2NC safety and 1NO auxiliary	Max: 2NC safety and 1NO auxiliary
Safety contact rating	230 Vac/2 A	30 Vdc/1 A inductive/ resistive	230 Vac/2A	30 Vdc/1 A inductive/ resistive	24 Vdc/0.3 A inductive/resistive	24 Vdc/0.3 A inductive/resistive
Safety contact operating distance	10 mm [0.4 in] ON; 30 mm [1.18 in] OFF	10 mm [0.4 in] ON; 30 mm [1.18 in] OFF	10 mm [0.4 in] ON; 35 mm [1.38 in] OFF	10 mm [0.4 in] ON; 35 mm [1.38 in] OFF	6 mm [0.24 in] ON; 17 mm [0.67 in] OFF	6 mm [0.24 in] ON; 17 mm [0.67 in] OFF
Safety contact close/drop/bounce	3 ms/2.1 ms/ 0.7 ms					
Auxiliary contact rating	15 W/10 VA	15 W/10 VA	15 W/10 VA	15 W/10 VA	24 Vdc/0.3 A inductive/resistive	24 Vdc/0.3 A inductive/resistive
Auxiliary contact operating distance	7 mm [0.28 in] OFF; 14 mm [0.55 in] ON	7 mm [0.28 in] OFF; 14 mm [0.55 in] ON	7 mm [0.28 in] OFF; 20 mm [0.79 in] ON	7 mm [0.28 in] OFF; 20 mm [0.79 in] ON	6 mm [0.24 in] OFF; 17 mm [0.67 in] ON	6 mm [0.24 in] OFF; 17 mm [0.67 in] ON
Auxiliary contact close/drop/bounce	0.5 ms/0.3 ms/ 0.7 ms					
Internal fuse	ac: 2 A fast acting	dc: 1 A fast acting	ac: 2 A fast acting	dc: 1 A fast acting	Not applicable	Not applicable
External fuse (cust. supplied)	ac: 1.6 A fast acting	dc: 0.8 A fast acting	ac: 1.6 A fast acting	dc: 0.8 A fast acting	dc: 0.2 A fast acting	dc: 0.2 A fast acting
IP rating	IP67	IP67	IP67	IP67	IP67	IP67
Vibration/shock	50 Hz to 100 Hz/ 10 g					
Operating temperature	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]
Mounting and fixture	Target to target					
Construction	Red ABS resin filled	316 grade stainless steel resin filled				

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SPECIFICATIONS

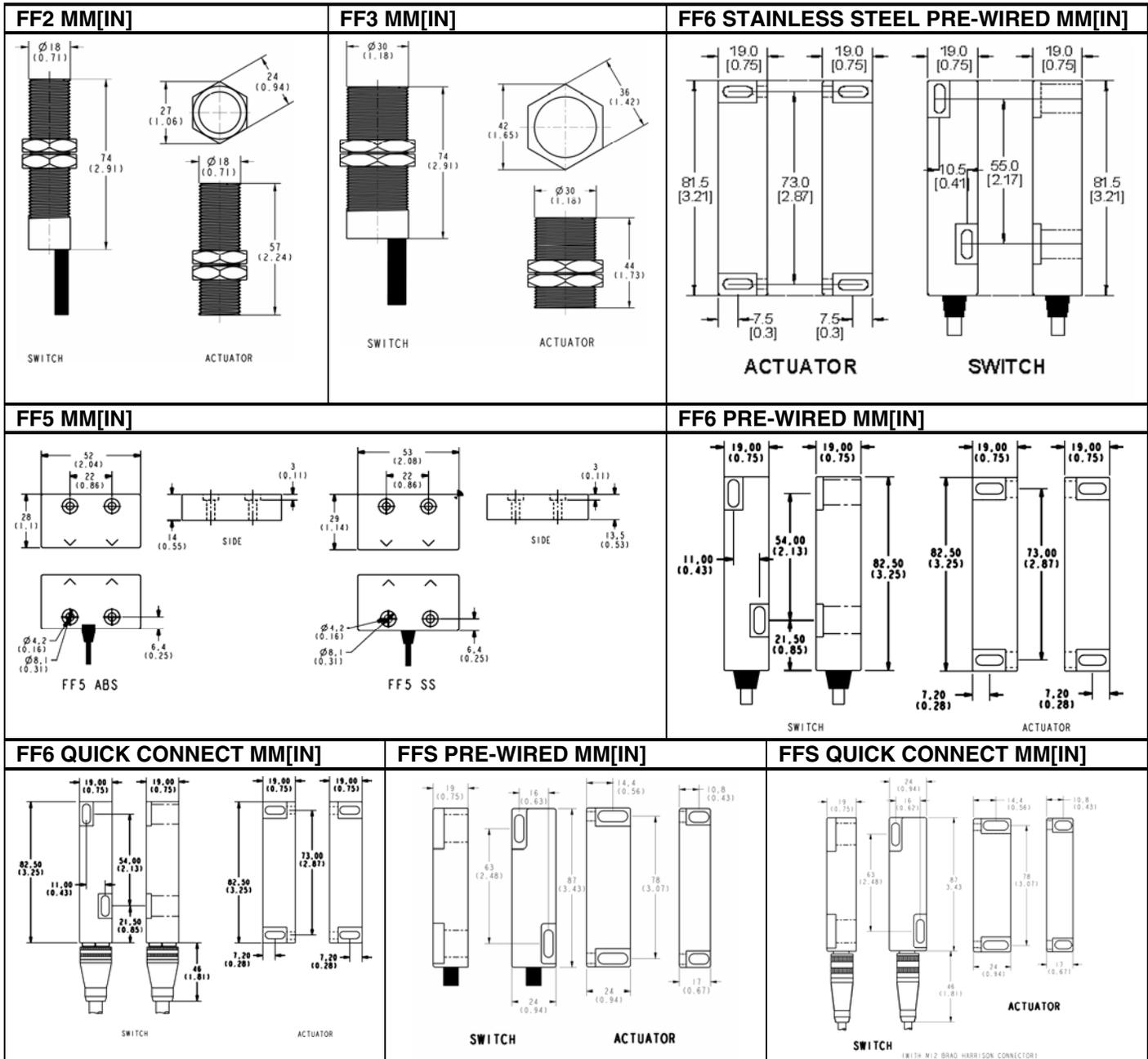
Type	FF6 ac	FF6 dc	FF6-SS ac	FF6-SS dc
Contact arrangement	Max: 2NC safety and 1NO auxiliary	Max: 2NC safety and 1NO auxiliary	1NC safety	Max: 2NC safety and 1NO auxiliary
Safety contact rating	230 Vac/2 A	30 Vdc/1 A inductive/resistive	230 Vac/2A	30 Vdc/1 A inductive/resistive
Safety contact operating distance	10 mm [0.4 in] ON; 30 mm [1.18 in] OFF	10 mm [0.4 in] ON; 30 mm [1.18 in] OFF	10 mm [0.4 in] ON; 30 mm [1.18 in] OFF	10 mm [0.4 in] ON; 30 mm [1.18 in] OFF
Safety contact close/drop/bounce	3 ms/2.1 ms/0.7 ms			
Auxiliary contact rating	15 W/10 VA	15 W/10 VA		15 W/10 VA
Auxiliary contact operating distance	7 mm [0.28 in] OFF; 20 mm [0.79 in] ON	7 mm [0.28 in] OFF; 20 mm [0.79 in] ON		7 mm [0.28 in] OFF; 20 mm [0.79 in] ON
Auxiliary contact close/drop/bounce	0.5 ms/0.3 ms/0.7 ms	0.5 ms/0.3 ms/0.7 ms		0.5 ms/0.3 ms/0.7 ms
Internal fuse	ac: 2 A fast acting	dc: 1 A fast acting	ac: 2 A fast acting	dc: 1 A fast acting
External fuse (customer supplied)	ac: 1.6 A fast acting	dc: 0.8 A fast acting	ac: 1.6 A fast acting	dc: 0.8 A fast acting
IP rating	IP67	IP67	IP67	IP67
Vibration/shock	50 Hz to 100 Hz/10 g			
Operating temperature	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]
Mounting and fixture	Target to target	Target to target	Target to target	Target to target
Construction	Red ABS resin filled	Red ABS resin filled	316 grade stainless steel resin filled	316 grade stainless steel resin filled

Type	FFS-11-03	FFS-20-03	FFS-11-QD	FFS-20-QD
Contact arrangement	Max: 1NC safety and 1NO auxiliary	Max: 2NC safety	Max: 1NC safety and 1NO auxiliary	Max: 2NC safety
Safety contact rating	230 Vac/2 A 30 Vdc/2 A			
Safety contact operating distance	7 mm [0.28 in] ON; 12 mm [0.47 in] OFF	7 mm [0.28 in] ON; 12 mm [0.47 in] OFF	7 mm [0.28 in] ON; 12 mm [0.47 in] OFF	7 mm [0.28 in] ON; 12 mm [0.47 in] OFF
Safety contact close/drop/bounce	3 ms/2.1 ms/0.7 ms			
Auxiliary contact rating	15 W/10 VA		15 W/10 VA	
Auxiliary contact operating distance	7 mm [0.28 in] OFF; 12 mm [0.47 in] ON		7 mm [0.28 in] OFF; 12 mm [0.47 in] ON	
Auxiliary contact close/drop/bounce	0.5 ms/0.3 ms/0.7 ms		0.5 ms/0.3 ms/0.7 ms	
Internal fuse	Not applicable	Not applicable	Not applicable	Not applicable
External fuse (customer supplied)	3 A/230 Vac, 1 A/30 Vdc			
IP rating	IP67	IP67	IP67	IP67
Supply voltage	24 Vdc	24 Vdc	24 Vdc	24 Vdc
Vibration/shock	50 Hz to 100 Hz/10 g			
Operating temperature	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]	-10 °C to 55 °C [14 °F to 131 °F]
Mounting and fixture	Target to target	Target to target	Target to target	Target to target
Construction	Blue ABS resin filled			

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DIMENSIONS



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CONTACTS AND CONNECTIONS

FF2-10

FF2-10-AC & FF2-10-DC



FF3-20

FF3-20-AC & FF3-20-DC



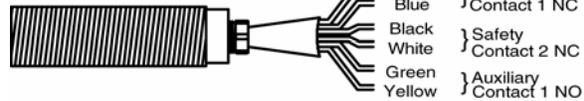
FF2-11

FF2-11-AC & FF2-11-DC



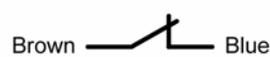
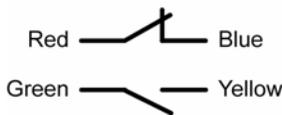
FF3-21

FF3-21-AC & FF3-21-DC



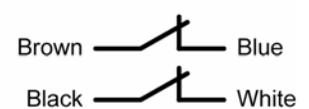
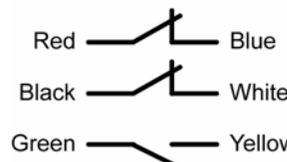
FF2-11-AC-03
FF2-11-DC-03

FF2-10-AC-03
FF2-10-DC-03



FF3-21-AC-03
FF3-21-DC-03

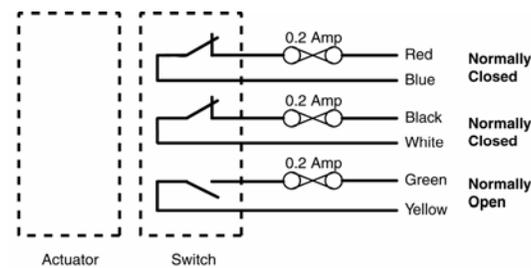
FF3-20-AC-03
FF3-20-DC-03



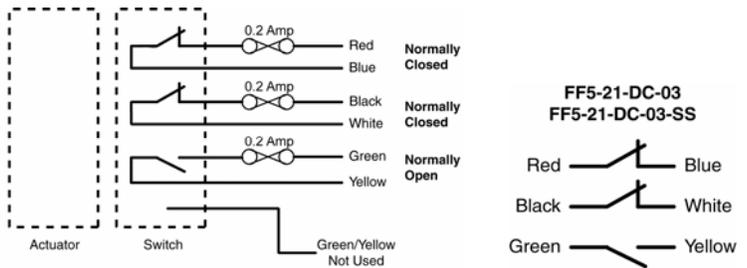
FF5

The safety contact must be fused externally. dc switch – external fuse= 0.2 A fast acting

FF5 Connections



FF5 High Temperature Connections

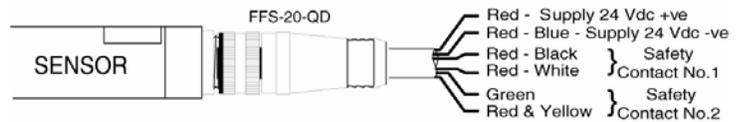
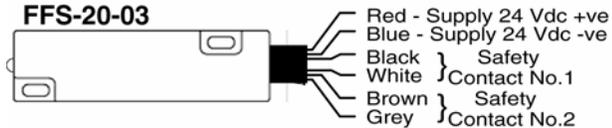


FF5-21-DC-03
FF5-21-DC-03-SS

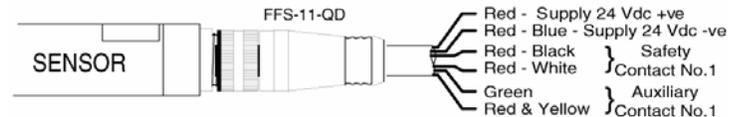
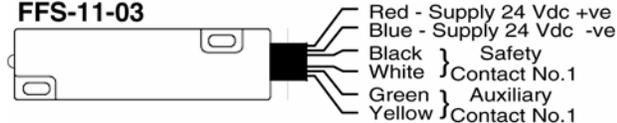


FFS

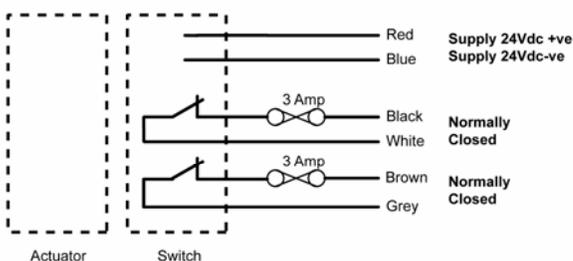
FFS-20-03



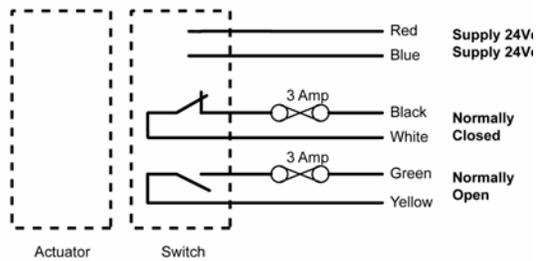
FFS-11-03



FFS-20-03 Connections



FFS-11-03 Connections



NOTE: Contact configurations show under closed condition for guard device.

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CONTACTS AND CONNECTIONS

FF6-21-ABS (ac & dc) FF6-21-SS (dc only)	FF6-20 ABS (ac & dc) FF6-20 SS (dc only)	FF6-11 ABS (ac & dc) FF6-11 (dc only)	FF6-10 ABS (ac & dc) FF6-10 SS (ac & dc)
FF6-10-03-SS			

NOTE: Contact configurations show under closed condition for guard device.

QUICK DISCONNECT CONNECTIONS

FF6-21-AC-QD05 FF6-21-DC-QD05	FF6-20-AC-QD05 FF6-20-DC-QD05	FF6-11-AC-QD05 FF6-11-DC-QD05	FF6-10-AC-QD05 FF6-10-DC-QD05
FF6-10-AC-SS-QD05			

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50026830-1-EN IL50 GLO Printed in USA
June 2007
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