



Conforms to EN1088, EN292, EN60204-1  
CSA approved



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safety interlock switches

## MA Series

### Magnetically Actuated Safety Interlock Switches

- Large selection—choose from a large selection of contact configurations housed in plastic to satisfy most application requirements
- NEMA 6 enclosure enables the MA Series switches to satisfy most application requirements (MA 3, 4, 5 are NEMA 4)
- Misalignment tolerant—the non-contact actuation of the MA Series switches makes them very tolerant to misalignment of up to 10 mm (0.39 in.)
- Variety of terminations—select from various cable lengths or terminal strip termination for easy installation. Cable connector available on selected models.
- Long life—the MA Series safety interlock switches are designed for a minimum of one million actuations

**A** **Go to the Engineering Guide**  
For in-depth information on safety standards and use.

**N** **For More Guarding Products**  
See Section N for safeguarding cutting and turning machines

■ **Actual Size**

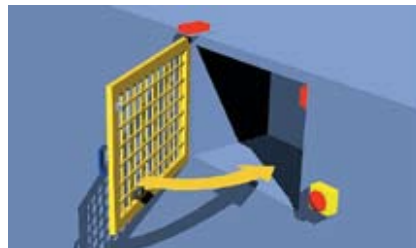
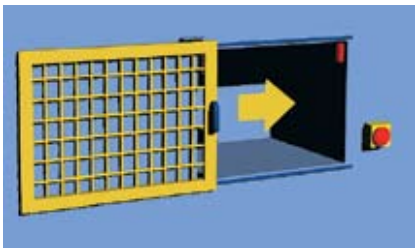


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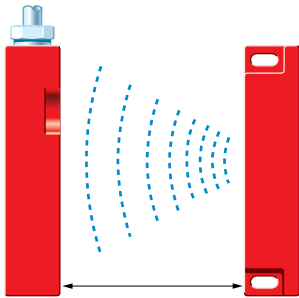
■ **Applications**

Typical applications are on sliding guard doors or swinging guard doors.



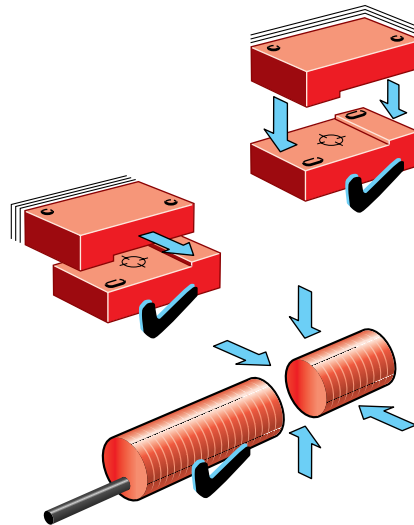
## ■ Operation

### Operating Principle

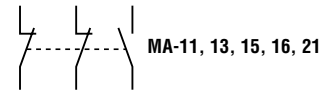
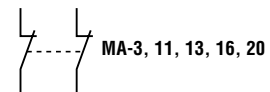
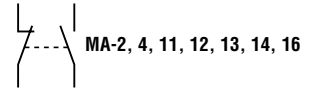
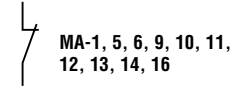


Encapsulated in the MA Series is a unique high-power industrial reed which is de-rated by a non-resettable overload protection circuit depending on switch type. On presenting the actuator to the switch, the high intensity magnetic field from the actuator causes the contacts to close. On removing the actuator (opening the door), the safety contacts open, isolating the machine.

### Mounting Examples

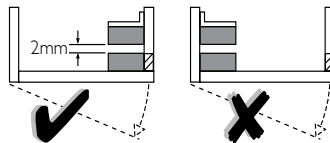
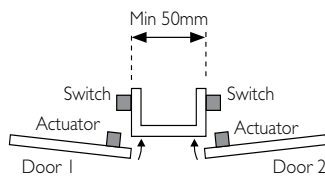


### Contact Arrangement

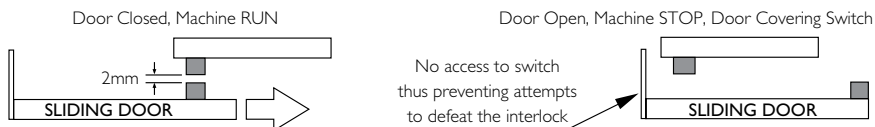


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It is advisable, where possible, to mount the switch and actuator on non-ferrous materials otherwise it may affect the operating distances.



Wherever possible the units should be mounted so that no access can be obtained to the switch when the guard door is open, thus preventing attempts to defeat the safety system.



Universal Mounting Brackets can be used with this product. See page G241 for details.

A

Go to the Engineering Guide

For in-depth information on safety standards and use.

N

For More Guarding Products

See Section N for safeguarding cutting and turning machines

## ■ Specifications

Electrical	All Models Unless Indicated		
<b>Safety Contacts:</b>	AC models	MA-1 thru 6, 10, 11, 12, 13, 16 — 1 N/C	MA-11, 13, 16, 21 — 2 N/C
	DC models	MA-9, 11, 12, 13, 14, 16 — 1 N/C	MA-11, 13, 15, 16, 20, 21 — 2 N/C
<b>Safety Contact Operating Distance:</b>	Make 7-12 mm (0.28-0.47in.); Break 12-25 mm (0.47-0.98 in.)		
<b>Auxiliary Contacts:</b>	MA-2, 4, 11, 12, 13, 14, 15, 16, 21	1 N/O	
	MA-3	1 N/C	
<b>Aux. Contact Operating Distance:</b>	MA-2, 4, 16, 21	Make 8-13 mm (0.39-0.51 in.); Break 8-10 mm (0.31-0.39 in.)	
	MA-3	Make 21 mm (0.83 in.); Break 24 mm (0.94 in.)	
<b>Safety Rated Voltage:</b>	AC models: All except MA-10	230 VAC	
	AC model: MA-10	110 VAC	
	DC models	30 VDC	
<b>Safety Rated Current:</b>	AC models: All except MA-3	2 A, fuse externally 1.6 A quick acting	
	AC model: MA-3	3 A, fuse externally 2.5 A quick acting	
	DC models: All except MA-15	1 A, fuse externally 800 mA quick acting	
	DC model: MA-15	0.3 A max., fuse externally 0.2 A quick acting	
<b>Internal Fuse</b>	AC models	2 A fast acting	
	DC models	1 A fast acting	
<b>External Fuse (Customer Supplied)</b>	AC models	1.6 A fast acting	
	DC models: All except MA-15	0.8 A fast acting	
<b>Electrical Life:</b>	1 x 10 <sup>6</sup>		
<b>Mechanical—Special Safety Reed</b>	<b>Safety</b>	<b>Aux.</b>	
<b>Closing Time:</b>	3.0 mS	0.5 mS	
<b>Drop-Out Time:</b>	2.1 mS	0.3 mS	
<b>Bounce Time:</b>	0.7 mS	0.7 mS	
<b>Shock:</b>	10 G	10 G	
<b>Vibration:</b>	10 G, 50 to 100 Hz		
<b>Mechanical</b>			
<b>Mounting:</b>	Any position		
<b>Case Material:</b>	Molded ABS		
<b>Actuator Material:</b>	Molded ABS		
<b>Wiring Connection:</b>	Various lengths or male M12 micro connector		
<b>Weight:</b>	384 g (14 oz.)		
<b>Color:</b>	Red		
<b>Mechanical Life:</b>	10 x 10 <sup>6</sup>		
<b>Environmental</b>			
<b>Protection:</b>	MA-3, 4, 5	IP65 (NEMA 4)	
	All models except MA-3, 4, 5	IP67 (NEMA 6)	
<b>Operating Temperature:</b>	MA-11, 12, 13, 14, 15, 16	-10 to 55°C (14 to 131°F)	
	All models except:		
	MA-11, 12, 13, 14, 15	-10 to 65°C (14 to 149°F)	
<b>Compliance</b>			
<b>Standards:</b>	EN1088, EN292, EN60204-1		
<b>Approvals/Listings:</b>	CE marked for all applicable directives		
	MA-1, 2, 3, 4, 5, 6, 9, 10, 20, 21	cCSAus (UL and C-UL pending)	
	MA-11, 12, 13, 14, 15, 16	(UL and C-UL pending)	

Specifications are subject to change without notice.

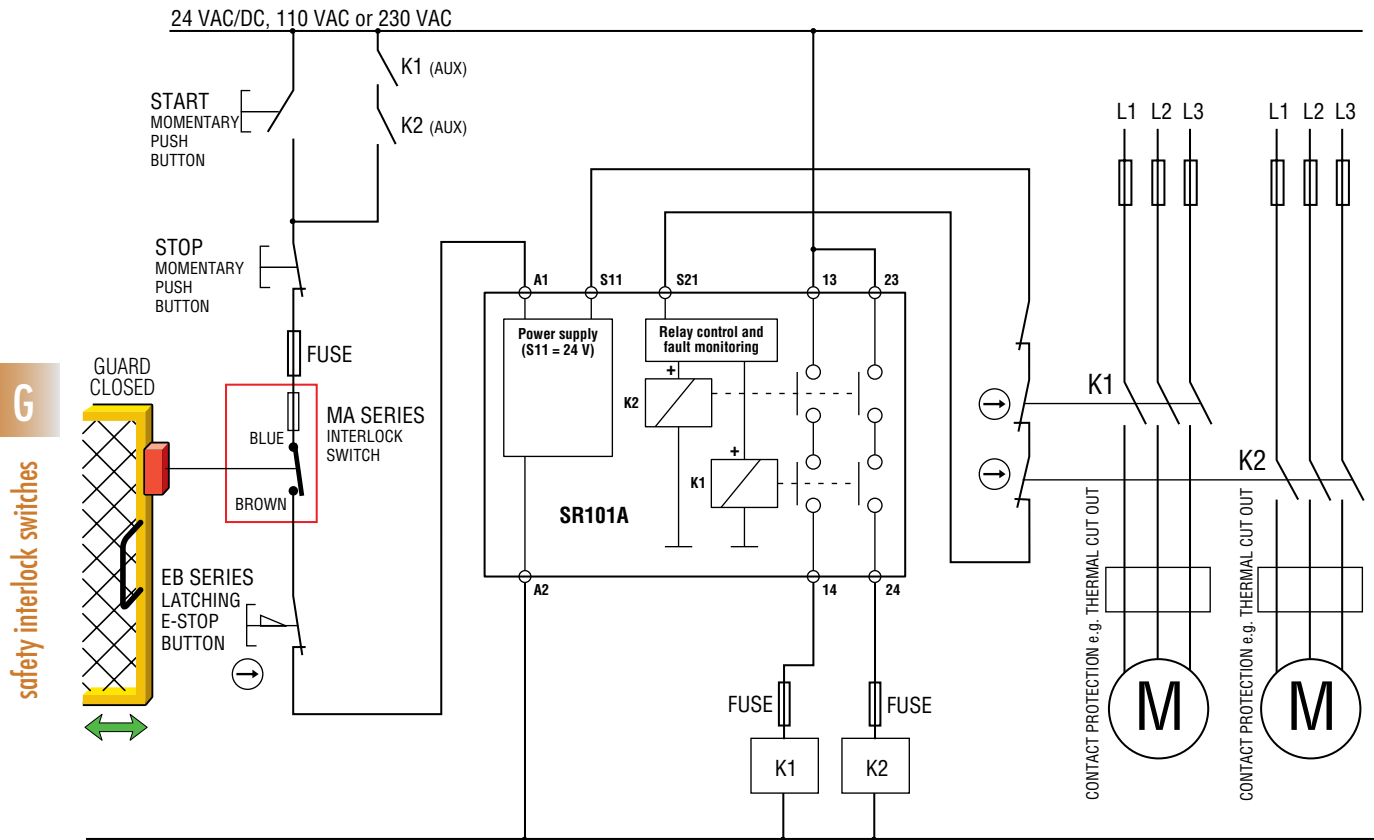
Note: The safety contacts of the Omron STI switches are described as normally closed (N/C)—i.e., with the guard closed, actuator in place, and the machine able to be started.

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## ■ Application Diagram

### Typical Application of MA Series with a Safety Monitoring Relay



For a full explanation of the circuit operating principle and fault detection, see "Common Circuit Examples" in the Engineering Section of this catalog.

### Pin Assignments with Connector Option

#### MA-2

Pin 1 same as Red lead	N/C Safety
Pin 3 same as Blue lead	N/C Safety
Pin 2 same as Green lead	N/O Auxiliary
Pin 4 same as Yellow lead	N/O Auxiliary

#### MA-6 and MA-9

Pin 1 same as Brown lead	N/C Safety
Pin 3 same as Blue lead	N/C Safety
Pins 2 & 4 not used	

#### MA-15, 21

Pin 1 same as Red/Blue lead	N/C Safety
Pin 3 same as Red lead	N/C Safety
Pin 2 same as Red/Black lead	N/C Safety
Pin 4 same as Red/White lead	N/C Safety
Pin 5 same as Red/Yellow lead	N/O Auxiliary
Pin 6 same as Green lead	N/O Auxiliary

#### MA-20

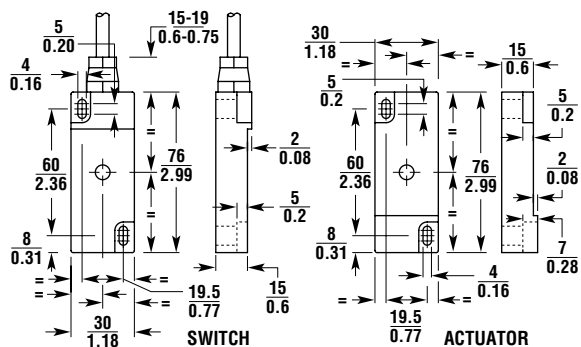
Pin 1 same as Brown lead	N/C Safety
Pin 3 same as Blue lead	N/C Safety
Pin 2 same as White lead	N/C Safety
Pin 4 same as Black lead	N/C Safety

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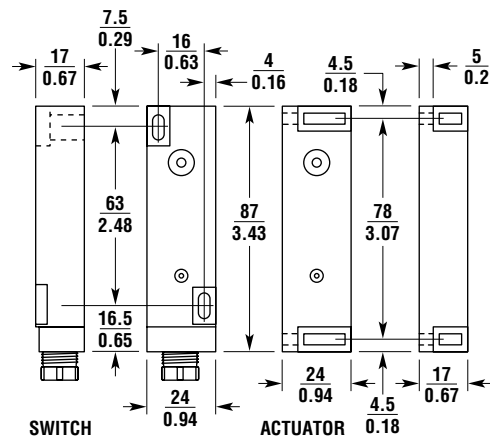
**N** **For More Guarding Products**  
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## ■ Dimensions — mm/in.

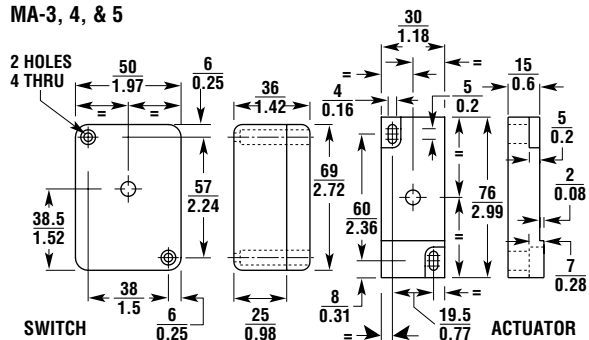
MA-1, 2, 20, 21



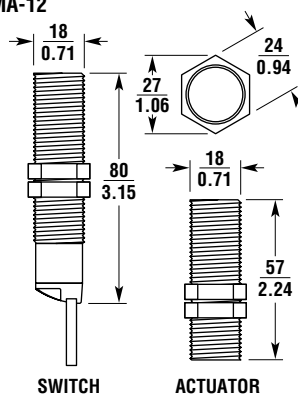
MA-11



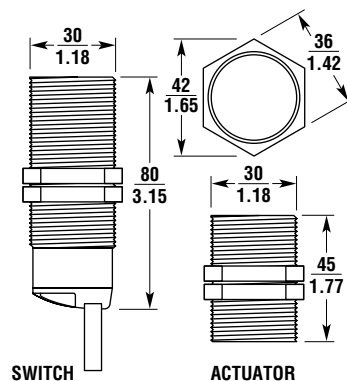
MA-3, 4, & 5



MA-12



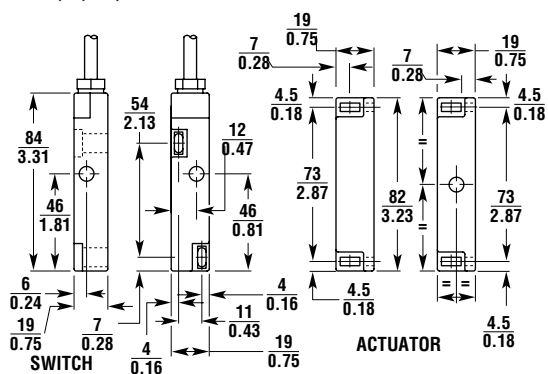
MA-13



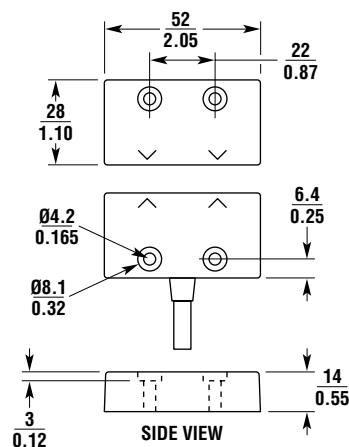
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MA-6, 9, 10, 16



MA-14 / MA-15



Model	Contacts	Wiring Entry	Part No.
<b>DC ONLY</b>			
MA-2DPC4	1 N/C + 1 N/O	4 m cable, pre-wired	44507-0390
MA-2DPC10	1 N/C + 1 N/O	10 m cable, pre-wired	44507-0380
MA-2DPC15	1 N/C + 1 N/O	15 m cable, pre-wired	44507-0370
MA-2DPCC	1 N/C + 1 N/O	Connector, Brad Harrison	44507-0650
MA-9DPC2 (24 VDC only)	1 N/C	2 m cable, pre-wired	44507-0100
MA-9DPC4 (24 VDC only)	1 N/C	4 m cable, pre-wired	44507-0200
MA-9DPC6 (24 VDC only)	1 N/C	6 m cable, pre-wired	44507-0320
MA-9DPC10 (24 VDC only)	1 N/C	10 m cable, pre-wired	44507-0220
MA-9DPCC (24 VDC only)	1 N/C	Connector, Brad Harrison	44507-0620
MA-11DP10C3	1 N/C	3 m cable, pre-wired	44507-1110
MA-11DP11C3	1 N/C + 1 N/O	3 m cable, pre-wired	44507-1120
MA-11DP20C3	2 N/C	3 m cable, pre-wired	44507-1130
MA-11DP20C5	2 N/C	5 m cable, pre-wired	44507-1131
MA-11DP21C3	2 N/C + 1 N/O	3 m cable, pre-wired	44507-1140
MA-12DP10C3	1 N/C	3 m cable, pre-wired	44507-1210
MA-12DP11C3	1 N/C + 1 N/O	3 m cable, pre-wired	44507-1220
MA-13DP10C3	1 N/C	3 m cable, pre-wired	44507-1310
MA-13DP11C3	1 N/C + 1 N/O	3 m cable, pre-wired	44507-1320
MA-13DP20C3	2 N/C	3 m cable, pre-wired	44507-1330
MA-13DP21C3	2 N/C + 1 N/O	3 m cable, pre-wired	44507-1340
MA-13DP21C10	2 N/C + 1 N/O	10 m cable, pre-wired	44507-1341
MA-14DP10C3	1 N/C	3 m cable, pre-wired	44507-1410
MA-14DP11C3	1 N/C + 1 N/O	3 m cable, pre-wired	44507-1420
MA-15DP21C3*	2 N/C + 1 N/O	3 m cable, pre-wired (300 mA max.)	44507-1540
MA-15DP21C5*	2 N/C + 1 N/O	5 m cable, pre-wired (300 mA max.)	44507-1541
MA-15DP21CC*	2 N/C + 1 N/O	Connector, Brad Harrison	44507-1549
MA-16DP10C3 (DC only)	1 x N/C	3 m cable, pre-wired	44507-1610
MA-16DP10C6 (DC only)	1 x N/C	6 m cable, pre-wired	44507-1611
MA-16DP11C3 (DC only)	1 x N/C + 1 N/O	3 m cable, pre-wired	44507-1620
MA-16DP11C6 (DC only)	1 x N/C + 1 N/O	6 m cable, pre-wired	44507-1621
MA-16DP20C3 (DC only)	2 x N/C	3 m cable, pre-wired	44507-1630
MA-16DP20C6 (DC only)	2 x N/C	6 m cable, pre-wired	44507-1631
MA-16DP21C3 (DC only)	2 N/C + 1 N/O	3 m cable, pre-wired	44507-1640
MA-16DP21C6 (DC only)	2 N/C + 1 N/O	6 m cable, pre-wired	44507-1641
MA-20DPC4 (24 VDC only)	2 N/C	4 m cable, pre-wired	44507-0340
MA-20DPCC (24 VDC only)	2 N/C	Connector, Brad Harrison	44507-0630
MA-21DPC2 (24 VDC only)	2 N/C + 1 N/O	2 m cable, pre-wired	44507-0270
MA-21DPC4 (24 VDC only)	2 N/C + 1 N/O	4 m cable, pre-wired	44507-0280
MA-21DPC6 (24 VDC only)	2 N/C + 1 N/O	6 m cable, pre-wired	44507-0290
MA-21DPC10 (24 VDC only)	2 N/C + 1 N/O	10 m cable, pre-wired	44507-0350
MA-21DPC15 (24 VDC only)	2 N/C + 1 N/O	15 m cable, pre-wired	44507-0360
MA-21DPCC	2 N/C + 1 N/O	Connector, Brad Harrison	44507-0670
Spare Actuator (1–5 & 20, 21), Red ABS Plastic			44507-0700
Spare Actuator (6, 9 & 10), Red ABS Plastic			44507-0710
Replacement Actuator for MA-11, Red ABS Plastic			44507-0711
Replacement Actuator for MA-12, Red ABS Plastic			44507-0712
Replacement Actuator for MA-13, Red ABS Plastic			44507-0713
Replacement Actuator for MA-14, Red ABS Plastic			44507-0714
Replacement Actuator for MA-15, Red ABS Plastic			44507-0715
Replacement Actuator for MA-16, Red ABS Plastic			44507-0716
Accessories and Cables with Mating Connectors (see page G238)			

\*MA-15 switches are not compatible with the following Omron STI safety relays: SR203M, SR203AM, SR208AD, SR209AD and all Legacy Relays.

■ = New product