

# F3S-TGR-N\_M / F3S-TGR-N\_U

RFID Non-contact switches are designed to monitor hinge, sliding or removal guard doors.

- Based on RFID technology (code) and hall technology (distance check)
- The RFID-design covers two operation models with very high anti-tamper level:
  - M-types (Master coded): Any sensor works with any actuator (re-teach needed if exchange of actuator)
  - U-types (Unique coded): Each sensor and actuator use a unique code. This is a solution for applications that requires even a higher anti-tamper level
- Connect up to 20 switches in series
- LED supports easy diagnosis
- Compensation of mechanical tolerances
- Non-contact – no abrasion – no particles
- Operates with all OMRON safety controllers
- Suitable for CIP/SIP processes and high pressure cleaning due IP69K (pre-wired types)
- Conforms to safety categories up to PLe acc. EN ISO 13849-1



## Model number structure

F3S-TGR-N□P□-21-□  
                   1  2          3

### 1. Type:

- L: Elongated Sensor  
 S: Small Sensor

### 2. Code:

- M: Master Code  
 U: Unique Codes

### 3. Cable length/connection


- 05: 5 m Cable  
 10: 10 m Cable  
 M1J8: M12 male connector, 8 pin, fitted with 250 mm cable

## Ordering information

**Master coded:** Any actuator will operate with any sensor (Teach process needed, if actuator will be changed: Power down - place actuator to sensor - power up).


**Unique coded:** Only one actuator fits to the code of the sensor (Replacement of only sensor OR actuator is not possible)

### Elongated sensors

Type	Cable connection	Contact configuration	Order code	
			Master coded <sup>1</sup>	Unique coded
	5 m pre-wired	2NC/1NO	F3S-TGR-NLPM-21-05	F3S-TGR-NLPU-21-05
	10 m pre-wired		F3S-TGR-NLPM-21-10	F3S-TGR-NLPU-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NLPM-21-M1J8	F3S-TGR-NLPU-21-M1J8

<sup>1</sup> Re-teach needed if exchange of actuator: Power down - replace the actuator and close the door or bring the new actuator close to the sensor - power up.

### Small sensors



Type	Cable connection	Contact configuration	Order code	
			Master coded <sup>1</sup>	Unique coded
	5 m pre-wired	2NC/1NO	F3S-TGR-NSPM-21-05	F3S-TGR-NSPU-21-05
	10 m pre-wired		F3S-TGR-NSPM-21-10	F3S-TGR-NSPU-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NSPM-21-M1J8	F3S-TGR-NSPU-21-M1J8

<sup>1</sup> Re-teach needed if exchange of actuator: Power down - replace the actuator and close the door or bring the new actuator close to the sensor - power up.

## Accessories

		Order code
Cables 8-pin	2 m	Y92E-M12PURSH8S2M-L
	5 m	Y92E-M12PURSH8S5M-L
	10 m	Y92E-M12PURSH8S10M-L
	25 m	Y92E-M12PURSH8S25M-L
T-Connector connection cable	T-Connector for M12 connector	F39-TGR-NT
	0.6 m, M12-8pin	Y92E-M12FSM12MSPURSH806M-L
	2 m, M12-8pin	Y92E-M12FSM12MSPURSH82M-L
	5 m, M12-8pin	Y92E-M12FSM12MSPURSH85M-L
	10 m, M12-8pin	Y92E-M12FSM12MSPURSH810M-L
Actuators (only for master coded types)	for F3S-TGR-NLPM	F39-TGR-NLPM-A
	for F3S-TGR-NSPM	F39-TGR-NSPM-A
Mounting screws	Set of Torx safety screws (M4, 4 × 30 mm, 4 × 20 mm, 4 × 10 mm; incl. washers and Torx bit)	F39-TGR-N-SCREWS

## Control units

		Order code
Safety relay units	G9SA 	G9SA-301 G9SA-501 G9SA-321-T075 G9SA-321-T15 G9SA-321-T30
	G9SB 	G9SB-2002-C G9SB-2002-A G9SB-200-B G9SB-200-D G9SB-3012-A G9SB-301-B G9SB-3012-C G9SB-301-D
	G9SX 	G9SX-BC202-R_ G9SX-AD322-T15-R_ G9SX-AD322-T150-R_ G9SX-ADA222-T15-R_ G9SX-ADA222-T150-R_
Programmable standalone controllers	G9SP-N 	G9SP-N10S G9SP-N10D G9SP-N20S
Programmable network controllers	NE1A 	NE1A-SCPU01-V1

## Specifications

### Electrical Data

			F3S-TGR-N_PM	F3S-TGR-N_PU
Technology			RFID (Code) and hall sensing (Distance check)	
Serial switching			up to 20 pcs. in series	
Code			Master coded: Every switch same code <sup>*1</sup>	Unique coded: 32 × 10 <sup>6</sup> different codes
Indicator			LED lighted - Indication of safety circuit closed - Door close LED dark - Indication of safety circuit opened - Door open	
Power supply			24 VDC ±10%	
Power consumption	Max.		30 mA @ 24 VDC	
Minimum switched current			10 VDC, 1 mA	
Rated insulating voltage			250 VAC	
Insulation Resistance			100 MΩ	
Output Types	Safety Channel 1 Safety Channel 2 Auxiliary Channel	NC NC NO	200 mA, max. 24 VDC, Solid State	
Switching frequency	Max.		1.0 Hz	
Contact release time			<2 ms	
Actuator approach speed	Min.		4 mm/s	
	Max.		1000 mm/s	
Initial contact resistance			<500 mΩ	

<sup>\*1</sup> Re-teach needed if exchange of actuator: Power down - replace the actuator and close the door or bring the new actuator close to the sensor - power up

### Mechanical Data

Body Material			Polyester	
Mounting Position (under attention to the precautions)			Any direction	
Recommended mounting gap			5 mm	
Tolerance to misalignment			5 mm in any direction from 5 mm setting gap	
Operating distance	OFF → ON (S <sub>ao</sub> )		10 mm	
	ON → OFF (S <sub>ar</sub> )		20 mm	
Temperature Range			-25... +80°C	
Enclosure Protection	Flying lead		IP69K	
	M12 connector		IP67	
Cable material	Flying lead		PVC, 8 core, Ø 6 mm o.d.	
	M12 connector		250 mm, PVC, Ø 6 mm o.d.	
Mounting Bolts			2 × M4	
Tightening Torque for Mounting Bolts			1 Nm	
Shock Resistance (IEC 68-2-27)			11 ms, 30 g	
Vibration Resistance (IEC 68-2-6)			10... 55 Hz, 1 mm	

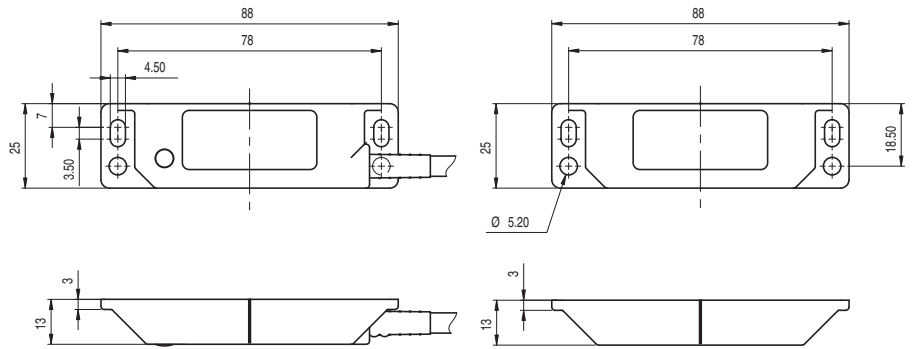
### Reliability Data

EN ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
PFHd	4.77 × 10 <sup>-10</sup>
Proof test interval (Life)	20 years
MTTFd	1100 years
Diagnostic Coverage DC	99% (high)

## Dimensions

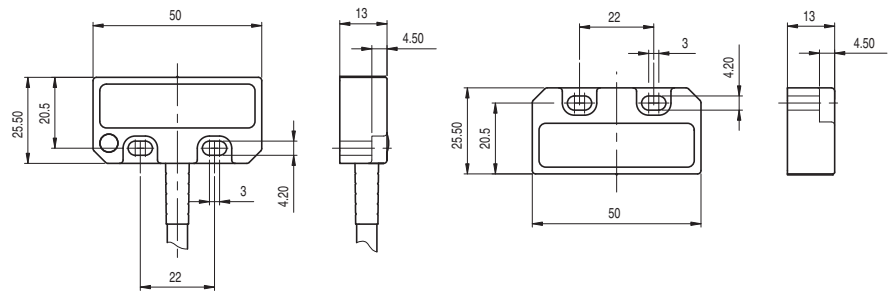
### Elongated sensor (Sensor/Actuator)

F3S-TGR-NLPM  
F3S-TGR-NLPU



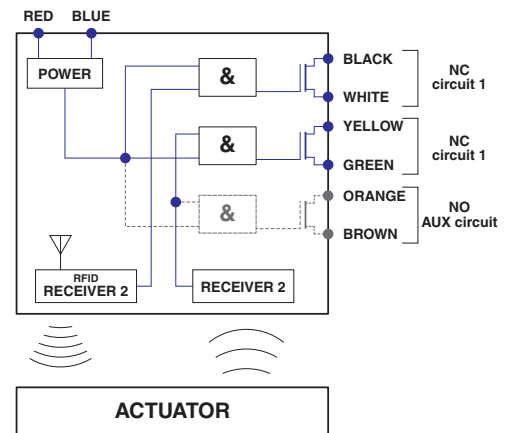
### Small sensor (Sensor/Actuator)

F3S-TGR-NSPM  
F3S-TGR-NSPU



## Circuit Schematic

The RFID non-contact switches are working with both principles, based on RFID and hall technology. RFID provides an increase of anti tamper level, the integrated hall system monitors the distance between sensor and actuator.



## Connection diagram

### Cable version

Wire	Signal
red	+24 VDC
blue	GND
black	NC Channel 1
white	NC Channel 1
yellow	NC Channel 2
green	NC Channel 2
brown	NO Aux. Channel
orange	NO Aux. Channel

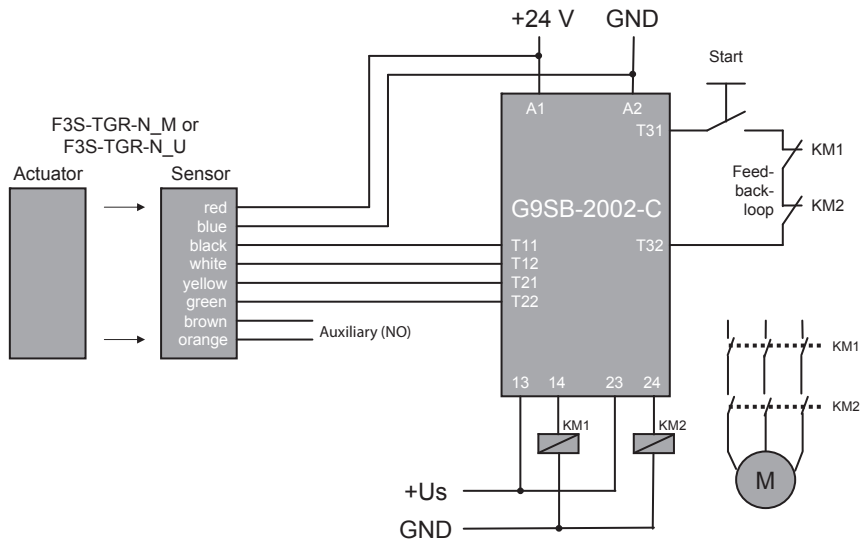
### M1J8-Connector version (M12 male)

Pin No. (male side)	Signal	Wire (Y92E-M12PURSH8S_M-L)
2	+24 VDC	Brown
3	GND	Green
7	NC Channel 1	Blue
1	NC Channel 1	White
4	NC Channel 2	Yellow
6	NC Channel 2	Pink
5	NO Aux. Channel	Grey
8	NO Aux. Channel	Red

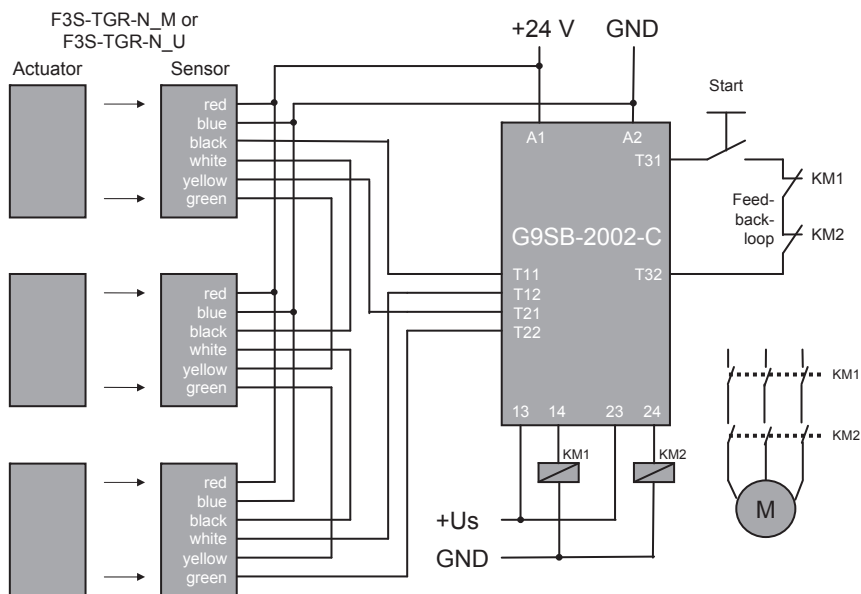
## Wiring examples

### G9SB

#### Single Sensor Application with G9SB-2002-C (up to Safety PLe acc. EN ISO 13849-1)

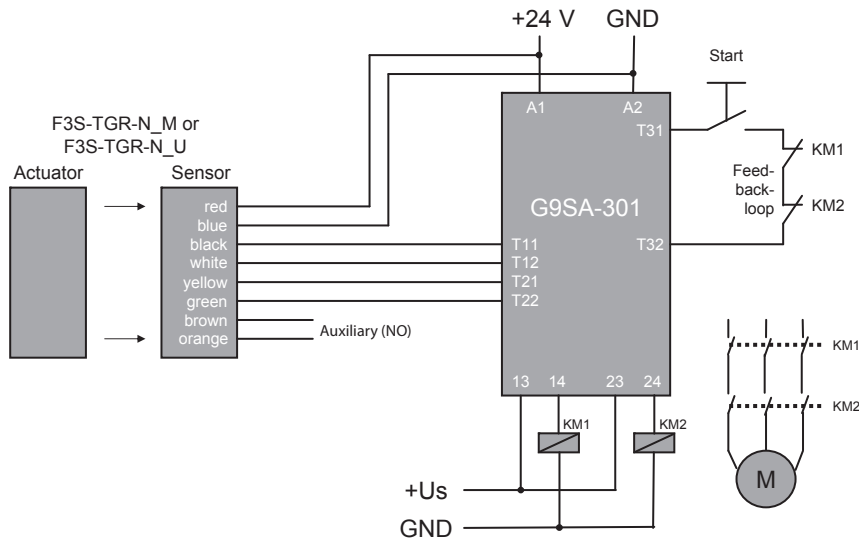


#### Series connection Application, up to 20 Sensors with G9SB-2002-C (up to Safety PLd acc. EN ISO 13849-1)

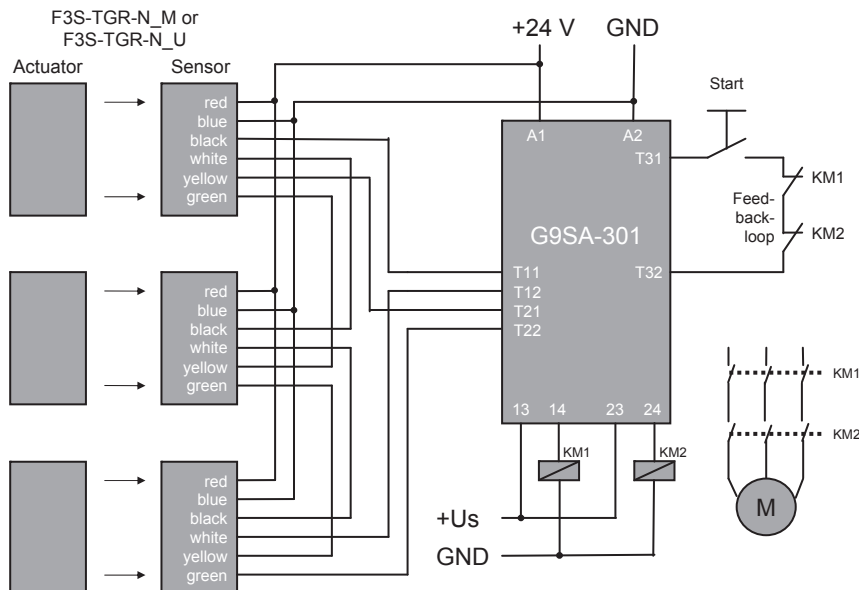


## G9SA

### Single Sensor Application with G9SA-301 (up to Safety PLe acc. EN ISO 13849-1)



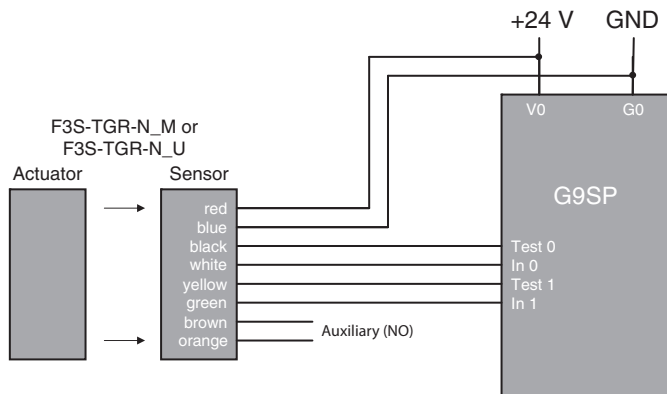
### Series connection Application, up to 20 Sensors with G9SA-301 (up to Safety PLd acc. EN ISO 13849-1)



## G9SP

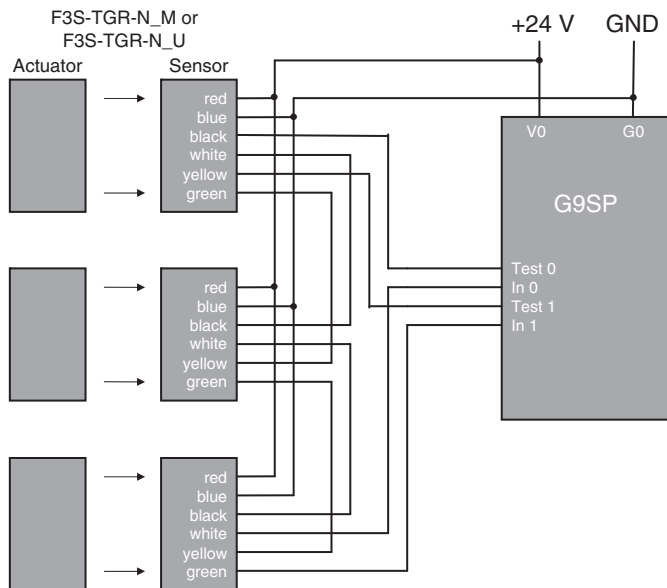
### Single Sensor Application with G9SP

(up to Safety PLe acc. EN ISO 13849-1)



### Series connection Application, up to 20 Sensors with G9SP

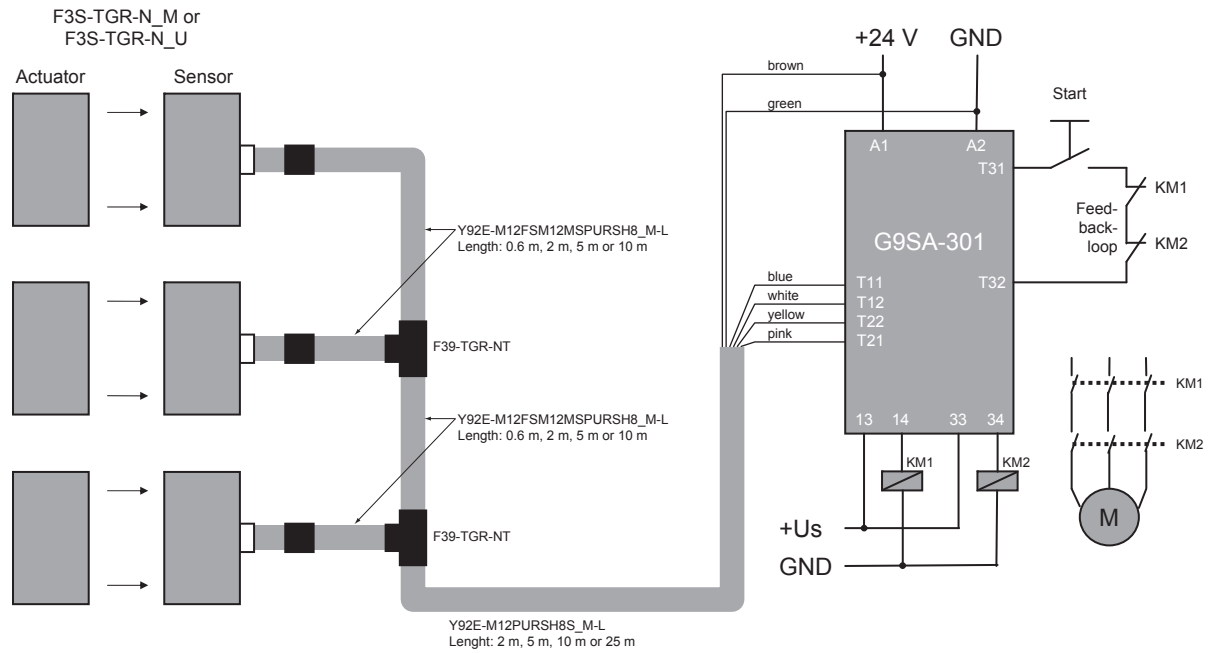
(up to Safety PLd acc. EN ISO 13849-1)



## T-Connector and Connection Cable

Series connection with up to 20 pcs. for example with G9SA-301

(up to Safety PLd acc. EN ISO 13849-1)





## Safety Precautions

### WARNING

Be sure to turn OFF the power before performing wiring. Do not touch charge parts (e.g., terminals) while power is ON. Doing so may result in electric shock.



Do not allow the actuator to come close to the switch with the door open. Doing so may cause machinery to start operating and may result in injury.



Keep actuators (magnets) away from magnetically sensitive equipment like PC harddisks, floppy disks etc. The magnetic field of the magnet will damage existing data.



## Application Precautions

- Do not use the product in locations subject to explosive or flammable gases.
- Do not use load currents exceeding the rated value.
- Be sure to wire each conductor correctly.
- Be sure to confirm correct operation after completing mounting and adjustment.
- Do not drop or attempt to disassemble the product.
- Be sure to use the correct combination of switch and actuator.
- Use a power supply of the specified voltage. Do not use power supplies with large ripples or power supplies that intermittently generate incorrect voltages.
- Capacitors are consumable and require regular maintenance and inspection.

## Installation Locations

Do not install the product in the following locations. Doing so may result in product failure or malfunction.

- Locations subject to direct sunlight
- Locations subject to humidity levels outside the range 35% to 85% or subject to condensation due to extreme temperature changes
- Locations subject to corrosive or flammable gases
- Locations subject to shocks or vibration in excess of the product ratings
- Locations subject to dust (including iron dust) or salts

Take appropriate and sufficient countermeasures when using the product in the following locations.

- Locations subject to static electricity or other forms of noise
- Locations subject to possible exposure to radioactivity
- Locations subject to power supply lines
- It is advisable to mount the switches on non ferrous materials. The presence of ferrous material can effect switching sensitivity.

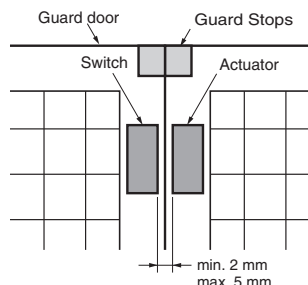
## Solvents

Ensure that solvents, such as alcohol, thinner, trichloroethane, or gasoline do not adhere to the product. Solvents may cause markings to fade and components to deteriorate.

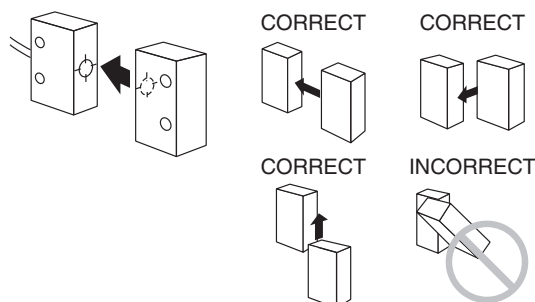
## Guard Stops

### CAUTION

Use guard stops in the way shown below to ensure that the switch and actuator do not make contact when the guard door is closed.

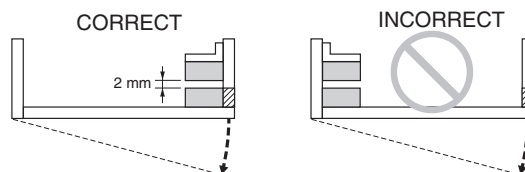


## Mounting Direction



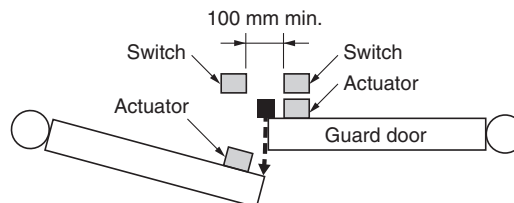
## Using for Hinged Doors

On hinged doors, install the Sensor at an opening edge as shown below.



## Mutual Interference

If the switch and actuator are mounted in parallel, be sure to separate them by at least 100 mm, as shown below.



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.