

Explosion proof Non-contact Safety Switches

F3S-TGR-N_X

Explosion proof reed non-contact switches monitor the status of guarding doors in petro-chemical and food applications with explosive atmospheres.

- Based on reed technology
- Connect up to 6 switches in series
- Operates with all Omron safety controllers
- Operates behind stainless steel fittings
- Non-contact - no abrasion - no particles
- Compensation of mechanical tolerances
- Suitable for high pressure cleaning, CIP/SIP processes
- Conforms to safety categories up to PLd acc. EN ISO13849-1
- For use in hazardous areas IECEx and ATEX EExd IIC T6 (Gas and Dust). Designed for Petro-chemical and food applications where explosive atmospheres are present.



Model number structure

F3S-TGR-N₁MX-21-₂

1. Type:

L: Elongated Sensor
B: Barrel Sensor

2. Cable length

05: 5 m Cable
10: 10 m Cable

Ordering information

Elongated sensors

Type	Cable connection	Contact configuration	Order code
	5 m pre-wired	2NC/1NO	F3S-TGR-NLMX-21-05
	10 m pre-wired	2NC/1NO	F3S-TGR-NLMX-21-10

Barrel sensors

Type	Cable connection	Contact configuration	Order code
	5 m pre-wired	2NC/1NO	F3S-TGR-NBMX-21-05
	10 m pre-wired	2NC/1NO	F3S-TGR-NBMX-21-10

Accessories

		Order code
Actuators	for F3S-TGR-NLMX	F39-TGR-NLMX-A
	for F3S-TGR-NBMX	F39-TGR-NBMX-A
Mounting screws	Set of Torx safety screws (M4, 4 x 30 mm, 4 x 20 mm, 4 x 10 mm; incl. washers and Torx bit)	F39-TGR-N-SCREWS
Spacer (8 mm, Set of 2pcs.)¹	for F3S-TGR-NLMX	F39-TGR-NLR-SPACER

¹ Spacers are needed to prevent influences if switch is mounted on ferromagnetic background (e. g. reduced switching distance, EMC influences)

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 NE1A-SCPU02

Specifications

Mechanical data

		Elongated sensors	Barrel sensors
Indicator	–	None	
Operating distance	OFF → ON (Sao)	10 mm close	
	ON → OFF (Sar)	22 mm open	
Actuator approach speed	Min.	4 mm/s	
	Max.	1000 mm/s	
Recommended setting gap	–	5 mm	
Mounting position	–	any	
Mounting bolts	–	2 × M4 recommended	
Tightening torque	Max.	1 Nm	
Operating temperature	–	–20 to +80°C (or +60°C at 2A)	
Enclosure protection	–	IP 67 (Certification for IP67 but can be used for SIP/CIP and high pressure cleaning like IP69K)	
Shock resistance (IEC 68-2-27)	–	11 ms, 30 g	
Vibration resistance (IEC 68-2-6)	–	10 to 55 Hz, 1 mm	
Material	–	Stainless steel 316	

Electrical data

		Elongated sensors	Barrel sensors
Sensor technology	–	reed	
Serial switching	–	up to 6 pcs. in series	
Initial contact resistance	Max.	500 mΩ	
Contact release time	Max.	2 ms	
Switching current	Min.	1 mA, 10 VDC	
Rated loads	NC contacts	0.6 A, 230 VAC/24 VDC (internally fused)	
	NO contact	0.2 A, 230 VAC/24 VDC	

Ex specification

2G Ex mb IIC T6Gb, II 2D Ex mb IIC T80 Db IP67*

(*Product is fully encapsulated which is considered to provide Ingress Protection to at least IP67)

Zones 0, 1, 2 (Gas)

Zones 20, 21, 22 (Dust)

(An area where Gas and Dust is likely to occur in use)

IEC/EN 60079-0, IEC/EN 60079-18

Reliability Data

EN ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
B10d	3.3 × 10 ⁶ cycles at 100 mA load

Standards

EN standards certified by TÜV Rheinland

EN ISO13849-1

EN 60204-1

EN ISO 14119

EN/IEC 60947-5-3

CSA C22.2

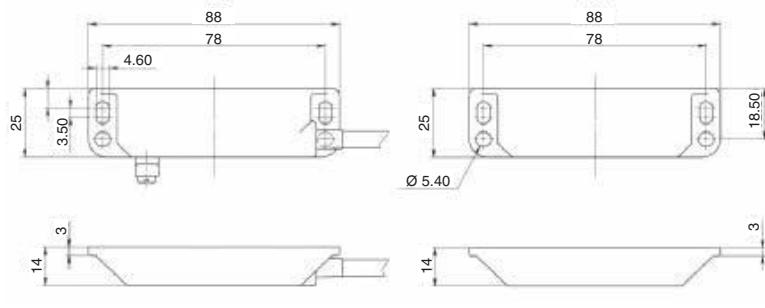
BS 5304

EN 1088 conformance

Dimensions

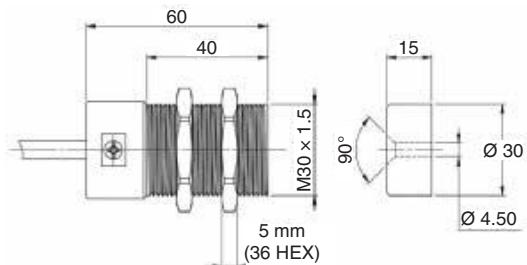
Elongated sensor (Sensor/Actuator)

F3S-TGR-NLMX



Barrel sensor (Sensor/Actuator)

F3S-TGR-NBMX



Connection diagram

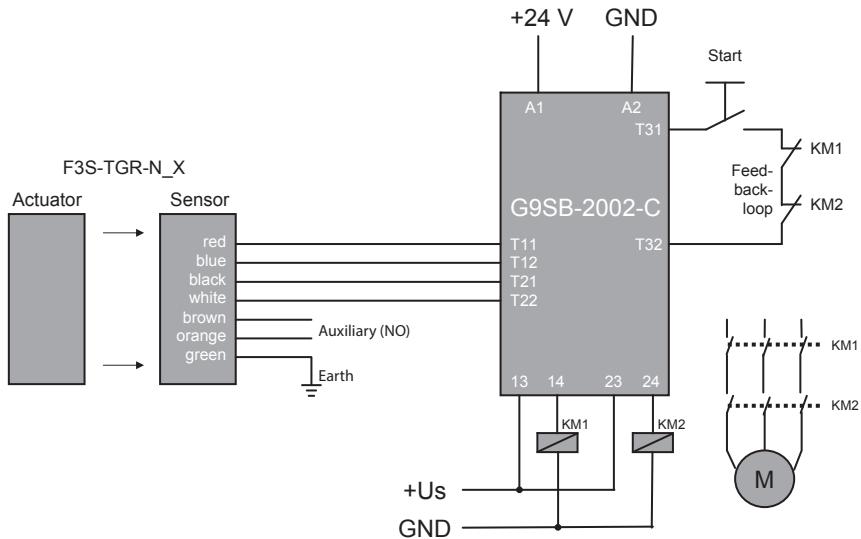
Wire	Signal
red	NC Channel 1
blue	NC Channel 1
black	NC Channel 2
white	NC Channel 2
brown	NO Aux. Channel
orange	NO Aux. Channel
green	Earth

Wiring examples

G9SB

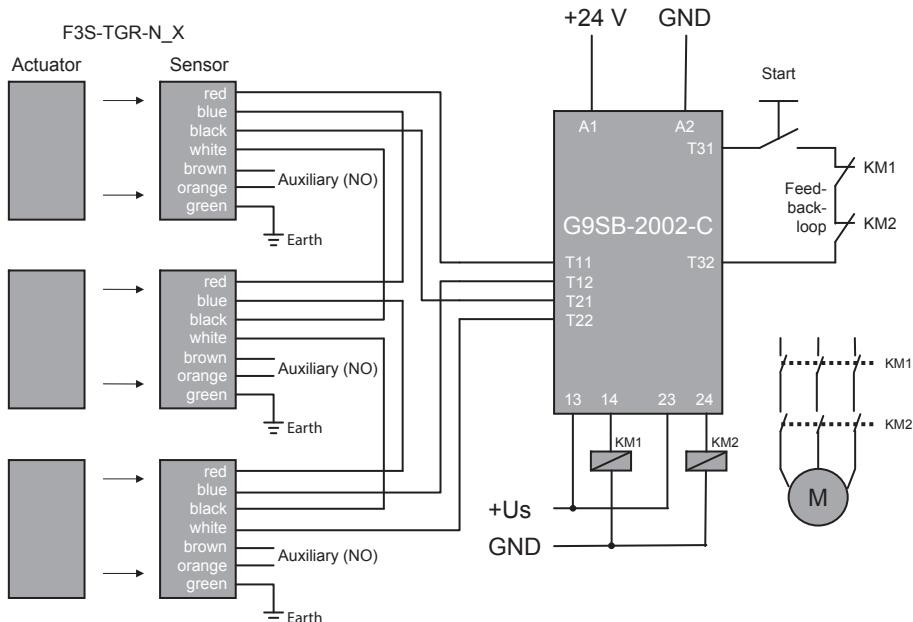
Single Sensor Application with G9SB-2002-C

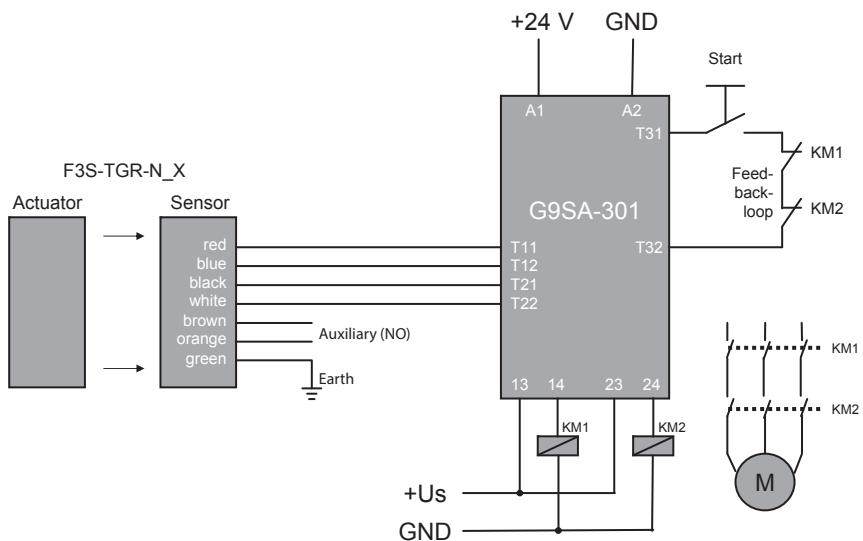
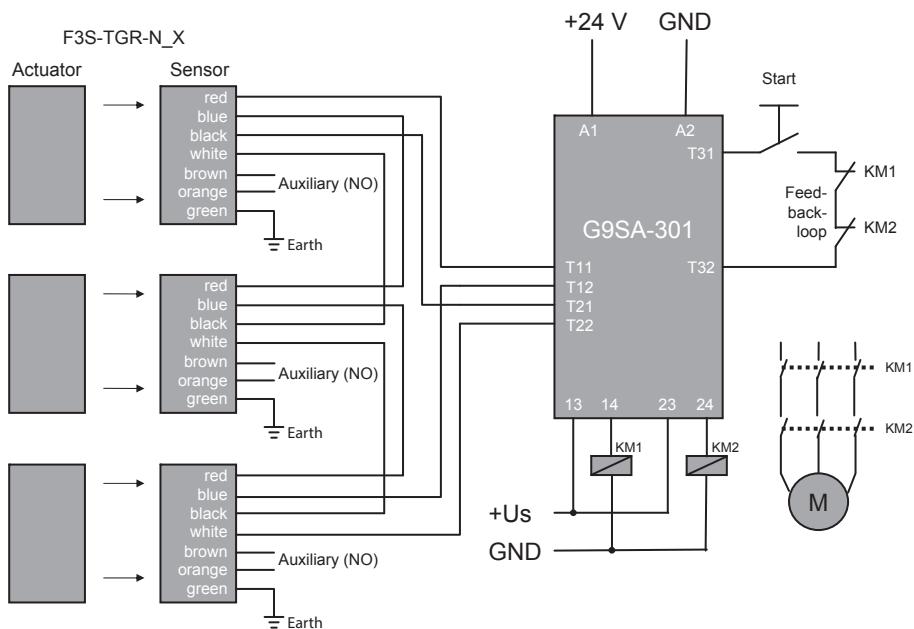
(up to Safety PLd acc. EN ISO 13849-1)



Series connection Application, up to 6 Sensors with G9SB-2002-C

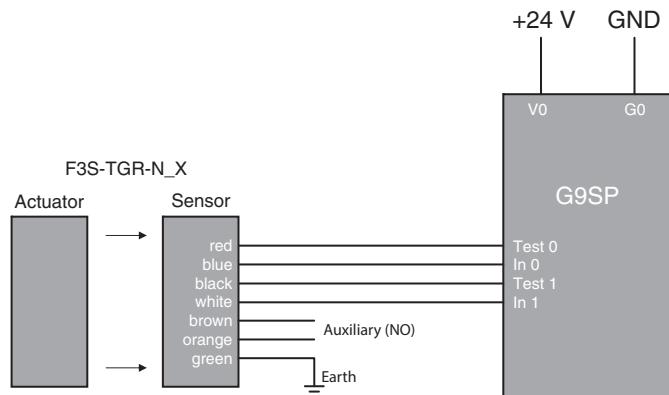
(up to Safety PLd acc. EN ISO 13849-1)



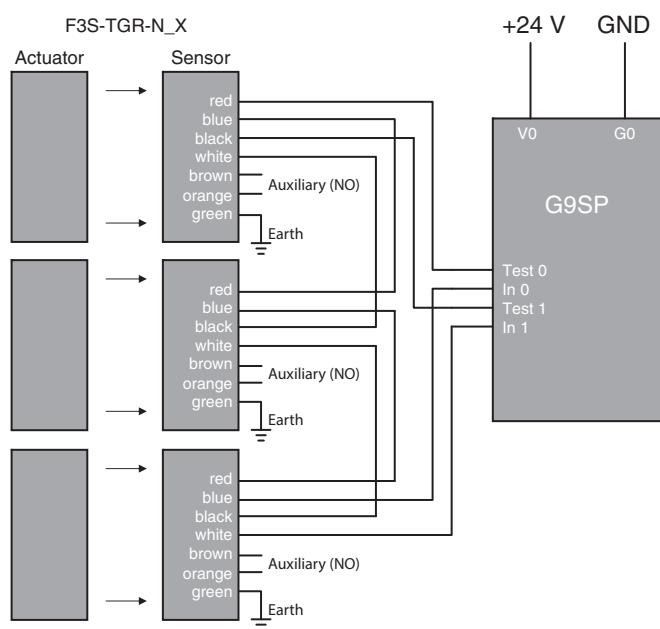
G9SA**Single Sensor Application with G9SA-301**
(up to Safety PLc acc. EN ISO 13849-1)**Series connection Application, up to 6 Sensors with G9SA-301**
(up to Safety PLd acc. EN ISO 13849-1)

G9SP

Single Sensor Application with G9SP
(up to Safety PLe acc. EN ISO 13849-1)



Series connection Application, up to 6 Sensors with G9SP
(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

- Use the product only in the authorized Ex zones (see Ex specification)
- 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 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.

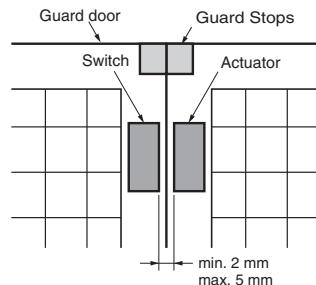
Solvents

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.

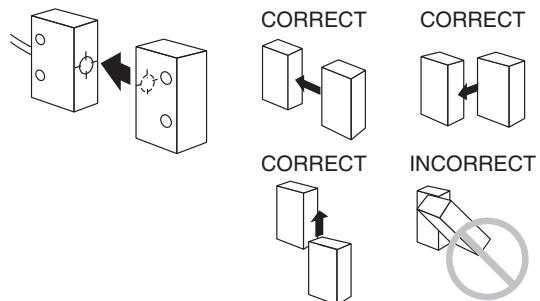
Guard Stops

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.

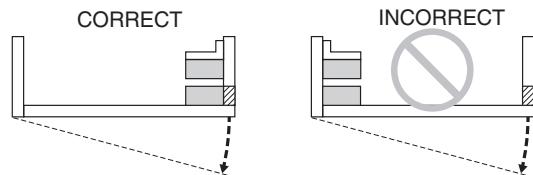


Mounting Direction



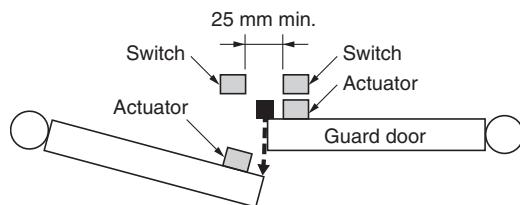
Using for Hinged Doors

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 25 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.