

# F3S-TGR-N□R

**Reed non-contact switches monitor the status of guarding doors. Stainless steel housing for high hygiene demands in the food industry are available.**

- 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 due IP69K (pre-wired types)
- Conforms to safety categories up PLe acc. EN ISO13849-1



## Model Number Structure

F3S-TGR-N□□R-□□-□□

1 2      3      4

### 1. Type

- L: Elongated Sensor
- S: Small Sensor
- M: Miniature Sensor
- C: Compact Sensor
- W: Wide Sensor
- B: Barell Sensor

### 2. Housing Material

- P: Plastic Housing
- M: Stainless Steel Housing
- H: Hygienic designed Stainless Steel Housing
- F: Special Food Type Stainless Steel Housing

### 3. Contact configuration

- 11\*: 1 Normally Closed Contact (NC) +  
1 Normally Open Contact (NO)
- 20\*: 2 Normally Closed Contacts (NC)
- 21: 2 Normally Closed Contacts (NC) +  
1 Normally Open Contact (NO)

\* only existing for some NMPPR-types

### 4. Cable Length/connection

- 05: 5 m Cable
- 05-R\*: 5 m Cable exit to the right
- 10: 10 m Cable
- 10-R\*: 10 m Cable, exit to the right
- M1J8: M12 male connector, 8 pin, fitted with 250 mm cable
- M1J8-R\*: M12 male connector, 8 pin, fitted with 250 mm cable exit to the right
- 08-L10\*\*: M8 male connector, 4 pin
- 08-R10\*\*: M8 male connector, 4 pin, exit to the right

\* only for F3S-TGR-NMPPR and F3S-TGR-NMHR

\*\* only for F3S-TGR-NMPPR

## Ordering Information

### Polyester Housing

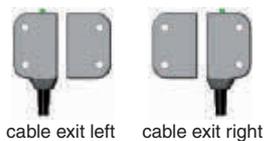
Type	Cable connection	Contact configuration	Order code
	5 m pre-wired	2NC/1NO	F3S-TGR-NLPR-21-05
	10 m pre-wired		F3S-TGR-NLPR-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NLPR-21-M1J8
	5 m pre-wired		F3S-TGR-NSPR-21-05
	10 m pre-wired		F3S-TGR-NSPR-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NSPR-21-M1J8
 F3S-TGR-NMPR-□□-□□-R  F3S-TGR-NMPR-□□-08-L10	5 m pre-wired, cable exit left		F3S-TGR-NMPR-21-05
	10 m pre-wired, cable exit left		F3S-TGR-NMPR-21-10
	M12, 8 pin, fitted with 250 mm cable exit left		F3S-TGR-NMPR-21-M1J8
	5 m pre-wired, cable exit right		F3S-TGR-NMPR-21-05-R
	10 m pre-wired, cable exit right	F3S-TGR-NMPR-21-10-R	
	M12, 8 pin, fitted with 250 mm cable exit right	F3S-TGR-NMPR-21-M1J8-R	
	M8, 4 pin, direct connector left side	F3S-TGR-NMPR-20-08-L10	
	M8, 4 pin, direct connector right side	F3S-TGR-NMPR-20-08-R10	
	5 m pre-wired	2NC	F3S-TGR-NMPR-11-08-L10
	10 m pre-wired		F3S-TGR-NMPR-11-08-R10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NMPR-11-08-L10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NMPR-11-08-R10
	5 m pre-wired	1NC/1NO	F3S-TGR-NCPR-21-05
	10 m pre-wired		F3S-TGR-NCPR-21-10
	5 m pre-wired	2NC/1NO	F3S-TGR-NWPR-21-05
	10 m pre-wired		F3S-TGR-NWPR-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NBPR-21-05
	5 m pre-wired	1NC/1NO	F3S-TGR-NBPR-21-10
	10 m pre-wired		F3S-TGR-NBPR-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NBPR-21-M1J8

### Stainless steel housing

Type	Cable connection	Contact configuration	Order code	
	5 m pre-wired	2NC/1NO	F3S-TGR-NLMR-21-05	
	10 m pre-wired		F3S-TGR-NLMR-21-10	
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NLMR-21-M1J8	
	5 m pre-wired		F3S-TGR-NSMR-21-05	
	10 m pre-wired		F3S-TGR-NSMR-21-10	
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NSMR-21-M1J8	
	5 m pre-wired		1NC/1NO	F3S-TGR-NBMR-21-05
	10 m pre-wired			F3S-TGR-NBMR-21-10
	M12, 8 pin, fitted with 250 mm cable			F3S-TGR-NBMR-21-M1J8

## Hygienic and food types

Type	Cable connection	Contact configuration	Order code
 Small Sensors	5 m pre-wired	2NC/1NO	F3S-TGR-NSHR-21-05
	10 m pre-wired		F3S-TGR-NSHR-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NSHR-21-M1J8
 Small Sensors (Special food types)	5 m pre-wired		F3S-TGR-NSFR-21-05
	10 m pre-wired		F3S-TGR-NSFR-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NSFR-21-M1J8
 Miniature Sensors F3S-TGR-NMHR-21-05-R	5 m pre-wired, cable exit left		F3S-TGR-NMHR-21-05
	10 m pre-wired, cable exit left		F3S-TGR-NMHR-21-10
	M12, 8 pin, fitted with 250 mm cable exit left		F3S-TGR-NMHR-21-M1J8
	5 m pre-wired, cable exit right		F3S-TGR-NMHR-21-05-R
	10 m pre-wired, cable exit right		F3S-TGR-NMHR-21-10-R
	M12, 8 pin, fitted with 250 mm cable exit right		F3S-TGR-NMHR-21-M1J8-R



## 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
Cables 4-pin	2 m	XS3F-M8PVC4S2M-EU
	5 m	XS3F-M8PVC4S5M-EU
	10 m	XS3F-M8PVC4S10M-EU
	25 m	XS3F-M8PVC4S20M-EU
Actuators	for F3S-TGR-NLPR	F39-TGR-NLPR-A
	for F3S-TGR-NSPR	F39-TGR-NSPR-A
	for F3S-TGR-NMPR	F39-TGR-NMPR-A
	for F3S-TGR-NCPR	F39-TGR-NCPR-A
	for F3S-TGR-NWPR	F39-TGR-NWPR-A
	for F3S-TGR-NBPR	F39-TGR-NBPR-A
	for F3S-TGR-NLMR	F39-TGR-NLMR-A
	for F3S-TGR-NSMR	F39-TGR-NSMR-A
	for F3S-TGR-NBMR	F39-TGR-NBMR-A
	for F3S-TGR-NSHR	F39-TGR-NSHR-A
for F3S-TGR-NSFR	F39-TGR-NSFR-A	
	for F3S-TGR-NMHR	F39-TGR-NMHR-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
Spacer (8 mm, Set of 2pcs.) <sup>1</sup>	for Elongated Sensors	F39-TGR-NLR-SPACER
	for Small Sensors	F39-TGR-NSR-SPACER
	for Miniature Sensors	F39-TGR-NMR-SPACER
	for Compact Sensors	F39-TGR-NCR-SPACER
	for Wide Sensors	F39-TGR-NWR-SPACER

<sup>1</sup> 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	<p>G9SE</p> 	<p>G9SE-201 G9SE-401 G9SE-221-T05 G9SE-221-T30</p>
	<p>G9SA</p> 	<p>G9SA-301 G9SA-501 G9SA-321-T075 G9SA-321-T15 G9SA-321-T30</p>
	<p>G9SR</p> 	<p>G9SR-BC201-RC G9SR-AD201-RC G9SR-EX031-T90-RC</p>
Programmable standalone controllers	<p>G9SP-N</p> 	<p>G9SP-N10S G9SP-N10D G9SP-N20S</p>
Integrated safety/ Programmable standalone controller	<p>NX-S</p> 	<p>NX-SL3300 NX-SL3500 NX-SIH400 NX-SID800 NX-SOH200 NX-SOD400</p>

## Specifications

### Mechanical data

		Plastic housing	Stainless steel housing
Indicator	–	None	
Operating distance	OFF → ON (Sao)	10 mm (NBPR, NBMR: 8 mm)	
	ON → OFF (Sar)	20 mm (NBPR, NBMR: 12 mm)	
Recommended setting gap	–	5 mm	
Actuator approach speed	Min.	4 mm/s	
	Max.	1,000 mm/s	
Switching frequency	Max.	1 Hz	
Operating temperature	–	–25 to 80°C	–25 to 105°C
Enclosure protection	Flying lead	IP69K	
	M12 connector	IP67	
	M8 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	Max.	1 Nm	
Shock resistance (IEC 68-2-27)	–	11 ms, 30 g	
Vibration resistance (IEC 68-2-6)	–	10 to 55 Hz, 1 mm	
Material	–	Black polyester	Stainless steel 316

### Electrical data

		Plastic housing	Stainless steel housing
Sensor technology	–	Reed	
Serial switching	–	up to 6 pcs. in series	
Rated loads	NC contacts Max.	1 A @ 250 VAC (NMPR and NMHR: 0.5 A @ 250 VAC, NBPR and NBMR: 0.5 A @ 24 VDC)	
	NO contacts Max.	0.2A @ 24VDC	
Contact release time	Max.	2 ms	
Initial contact resistance	Max.	500 mΩ	
Dielectric withstand	–	250 VAC	
Insulation resistance	–	100 MΩ	
Switching current	Min.	1 mA, 10 VDC	

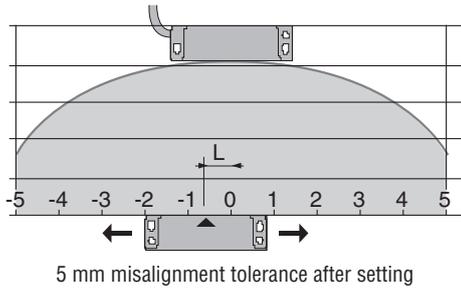
### Reliability data

		Plastic housing	Stainless steel housing
EN ISO 13849-1		up to PLe depending upon system architecture	
EN 62061		up to SIL3 depending upon system architecture	
B10d		3.3 × 10 <sup>6</sup> cycles at 100 mA load	

### Approved standards

EN standards certified by TÜV Rheinland
EN ISO13849-1
EN 62061
EN 60204-1
EN ISO 14119
EN/IEC 60947-5-3
UL 508, CSA C22.2
BS 5304
EN 1088 conformance

## Operating characteristics



## Connection diagrams

### Cable version

Pin No.	Signal name
red	NC Channel 1
blue	NC Channel 1
black	NC Channel 2
white	NC Channel 2
yellow	NO Channel Auxillary
green	NO Channel Auxillary
brown	
orange	

### M1J8-Connector version (M12 male)

Pin No. (male side)	Signal	Wire (Y92E-M12PURSH8S_M-L)
2		— brown
3		— green
7	NC Channel 1	— blue
1	NC Channel 1	— white
4	NC Channel 2	— yellow
6	NC Channel 2	— pink
5	NO Channel Aux.	— grey
8	NO Channel Aux.	— red

Note: If the auxiliary circuit is not fitted or not used then cut and discard the yellow/green or grey/red conductors.

## M8 connection diagram

### F3S-TGR-NMPR-20-08-\_10-Connector version (M8 male, 2NC)

Pin No. (male side)	Signal	Wire (XS3F-M8PVC4S_M-EU)
1	NC Channel 1	— brown
2	NC Channel 1	— white
3	NC Channel 2	— blue
4	NC Channel 2	— black

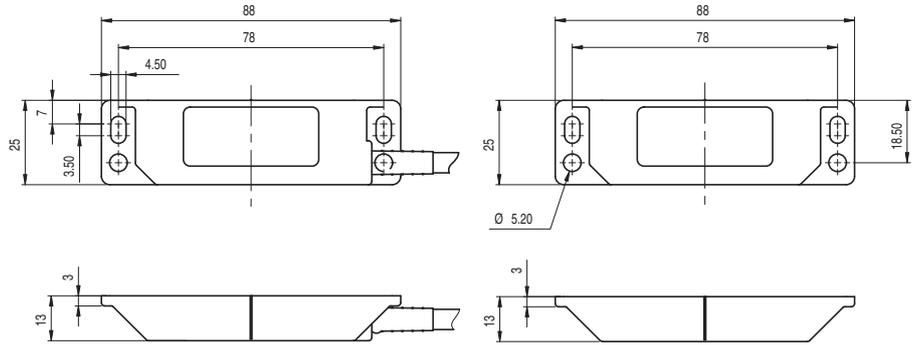
### F3S-TGR-NMPR-11-08-\_10-Connector version (M8 male, 1NC/1NO)

Pin No. (male side)	Signal	Wire (XS3F-M8PVC4S_M-EU)
1	NO Channel 1	— brown
2	NO Channel 1	— white
3	NC Channel 2	— blue
4	NC Channel 2	— black

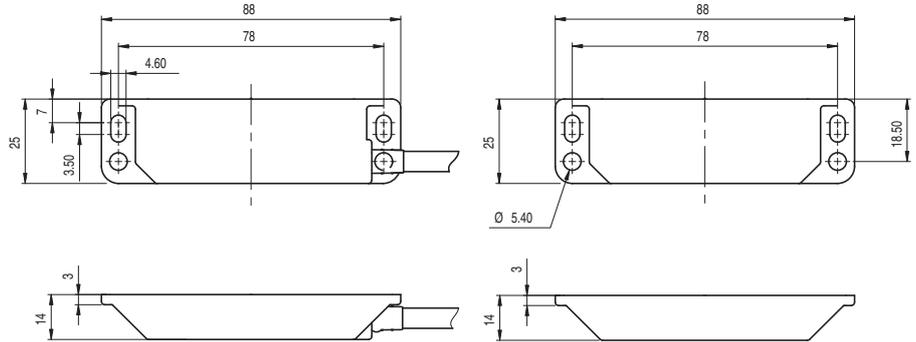
Dimensions

Elongated Sensor (Sensor/Actuator)

F3S-TGR-NLPR

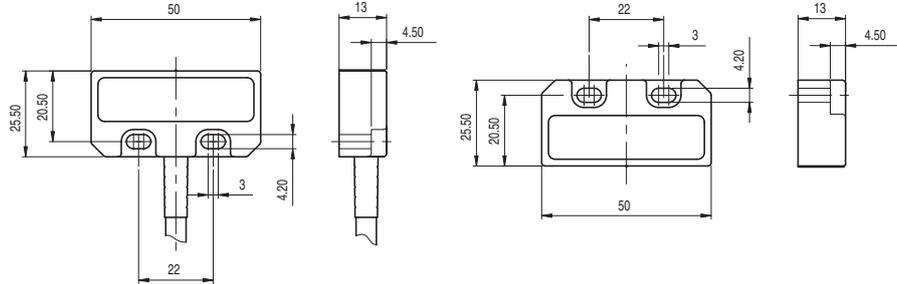


F3S-TGR-NLMR

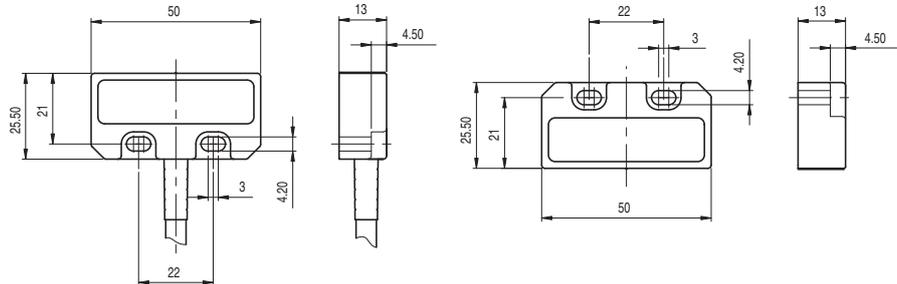


Small Sensor (Sensor/Actuator)

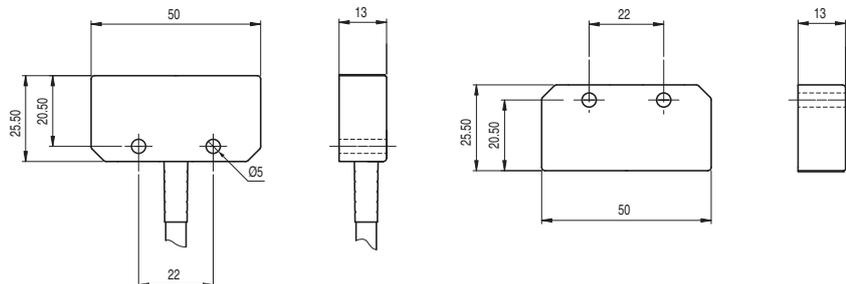
F3S-TGR-NSPR



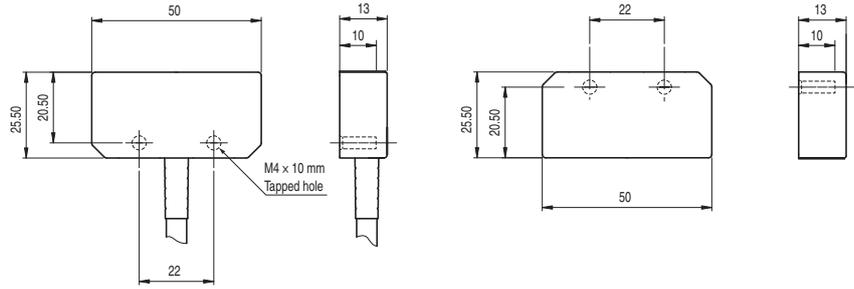
F3S-TGR-NSMR



F3S-TGR-NSHR



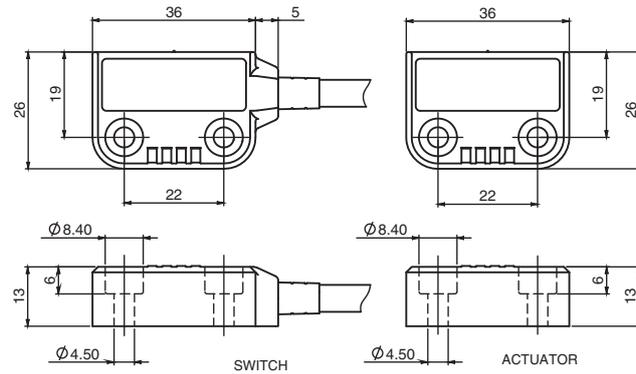
F3S-TGR-NSFR



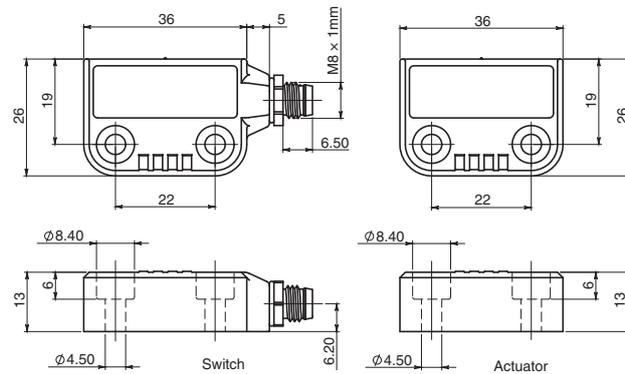
Miniature Sensor (Sensor/Actuator)

F3S-TGR-NMPR (Cable exit right)

TYPE : NMPR (Left)

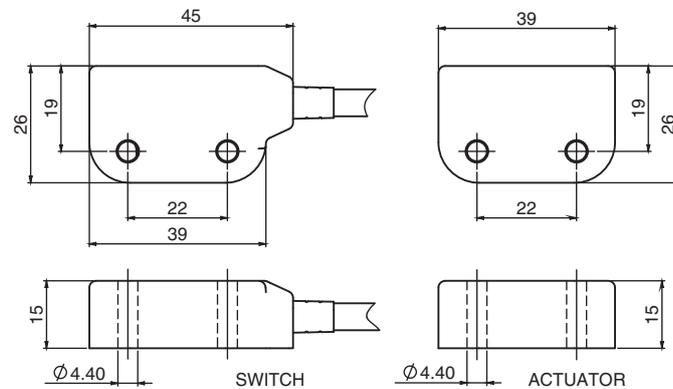


F3S-TGR-NMPR (M8, 4pin connector)



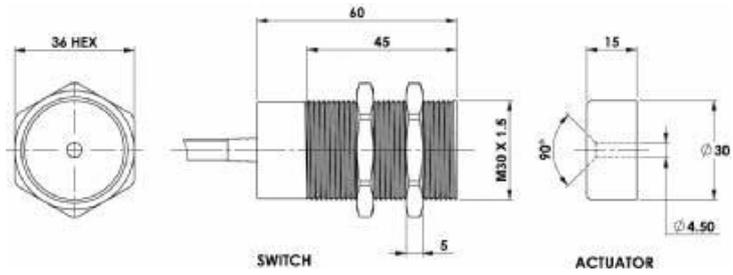
F3S-TGR-NMHR (Cable exit right)

TYPE : NMHR (Left)



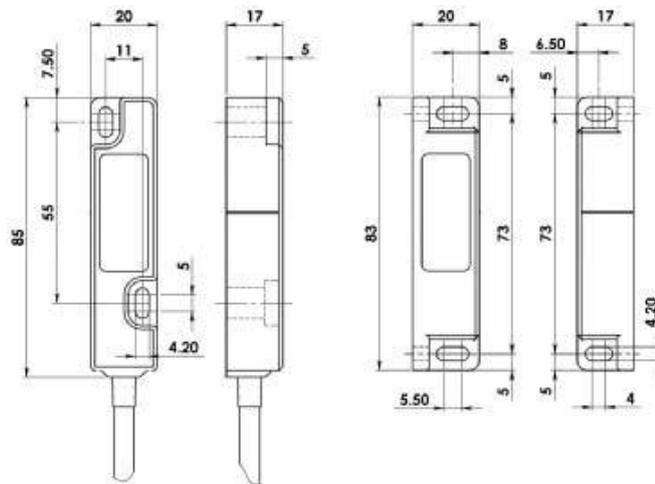
**Barrel Sensor (Sensor/Actuator)**

F3S-TGR-NBPR  
F3S-TGR-NBMR



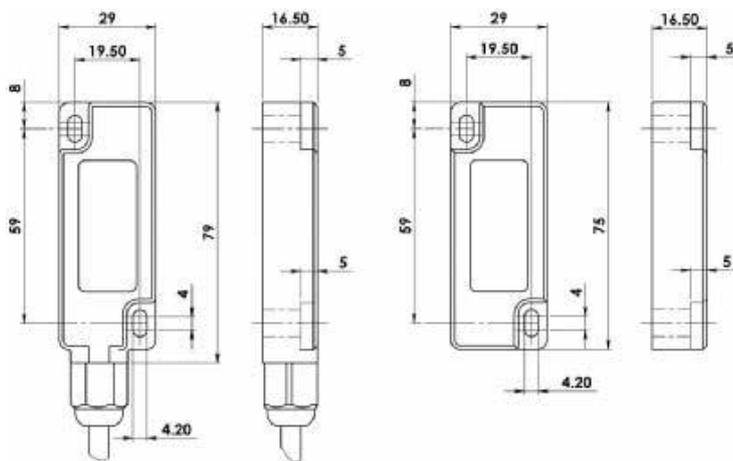
**Compact Sensor (Sensor/Actuator)**

F3S-TGR-NCPR



**Wide Sensor (Sensor/Actuator)**

F3S-TGR-NWPR

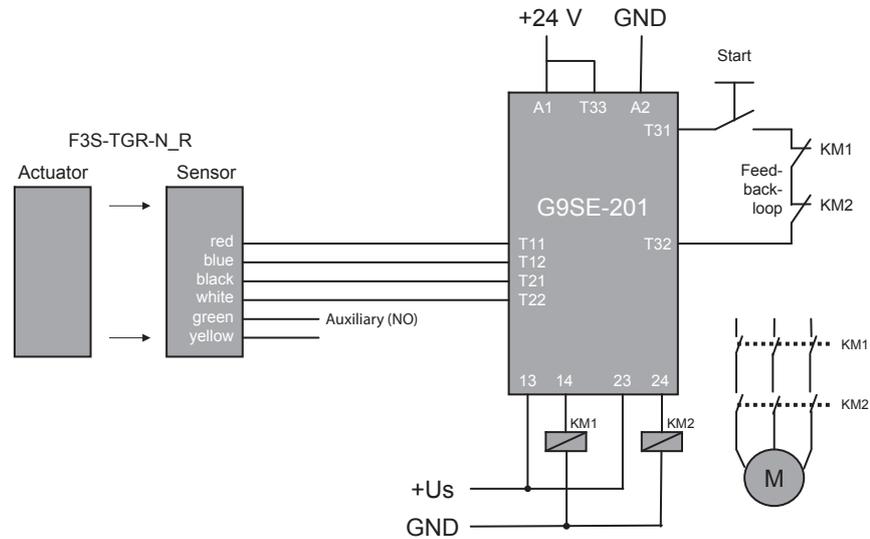


Wiring examples (Single head connection up to category 4 acc. EN954-1)

G9SE

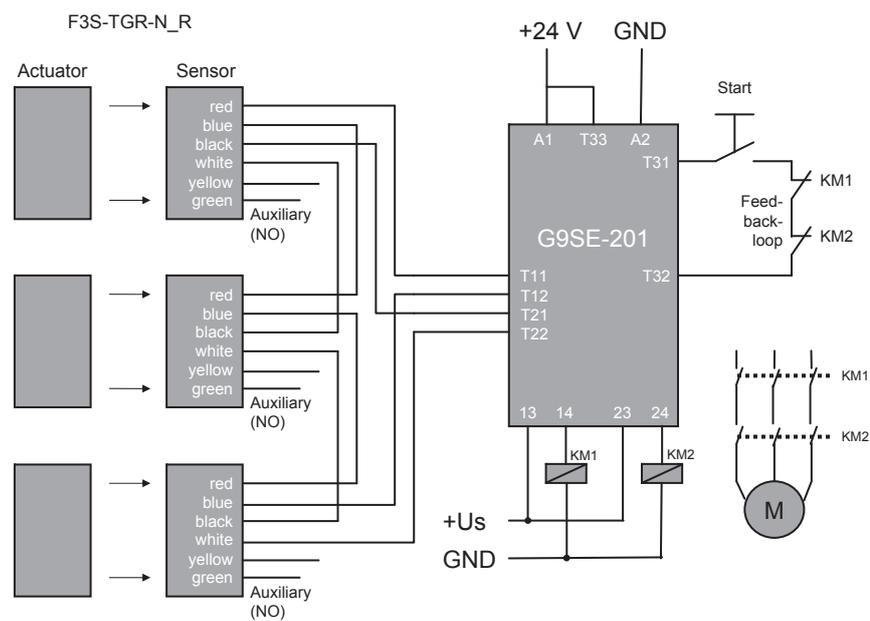
Single Sensor Application with G9SE-201

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



Series connection Application, up to 6 Sensors with G9SE-201

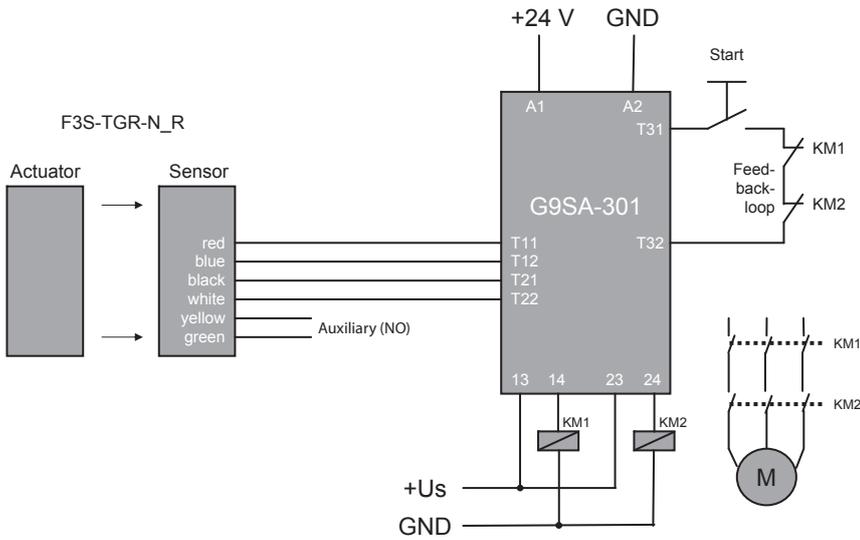
(up to Safety PLd acc. EN ISO 13849-1)



**G9SA**

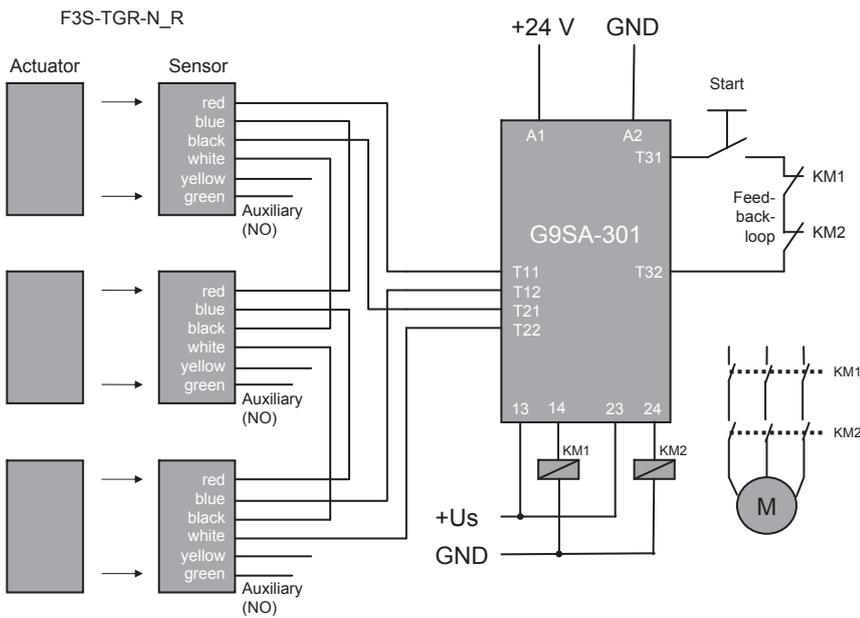
**Single Sensor Application with G9SA-301**

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



**Series connection Application, up to 6 Sensors with G9SA-301**

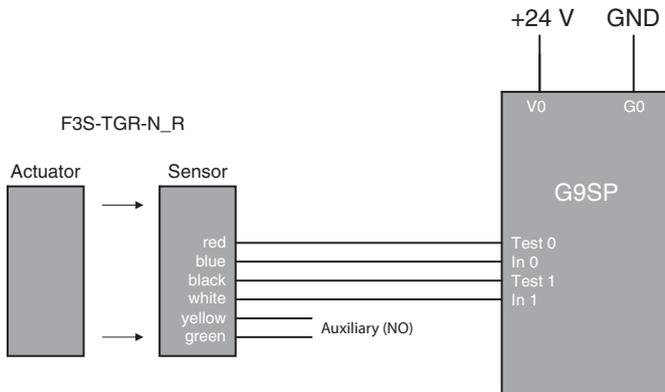
(up to Safety PLd acc. EN ISO 13849-1)



## G9SP

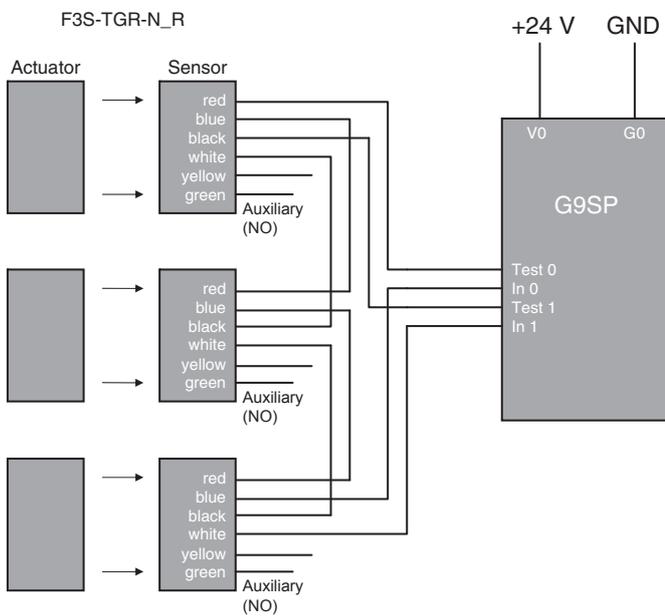
### Single Sensor Application with G9SP

(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

- 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.

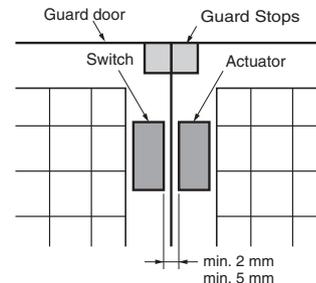
## Solvents

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.

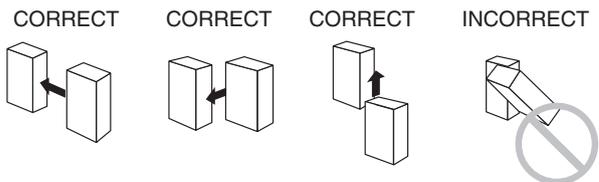
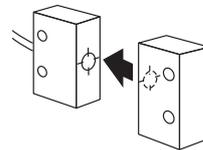
## Guard Stops

### 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.

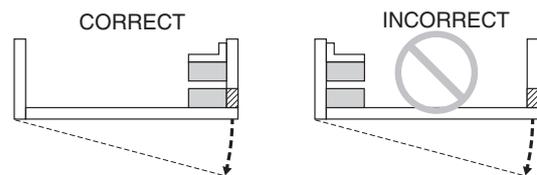


## Mounting Direction



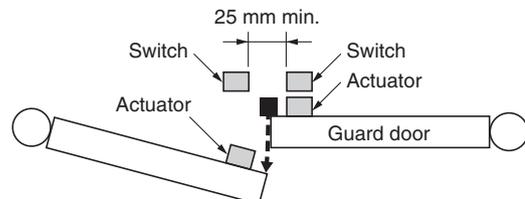
## Using for Hinged Doors

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 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.