

# F3S-TGR-N□C

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

- Based on hall technology
- Connect up to 20 switches in series
- LED supports easy diagnosis
- 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□□C-□□-□□

1 2      3      4

### 1. Type

- L: Elongated Sensor
- S: Small Sensor
- M: Miniature Sensor
- B: Barrel 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

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

\* only existing for some 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




\* only for F3S-TGR-NMPC and F3S-TGR-NMHC

## Ordering Information




### Polyester Housing

Type	Cable connection	Contact configuration	Order code
 Elongated Sensors	5 m pre-wired	2NC/1NO	F3S-TGR-NLPC-21-05
	10 m pre-wired		F3S-TGR-NLPC-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NLPC-21-M1J8
 Small Sensors	5 m pre-wired		F3S-TGR-NSPC-21-05
	10 m pre-wired		F3S-TGR-NSPC-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NSPC-21-M1J8
 Miniature Sensors	5 m pre-wired		F3S-TGR-NMPC-21-05
	10 m pre-wired		F3S-TGR-NMPC-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NMPC-21-M1J8
	5 m pre-wired, cable exit right		F3S-TGR-NMPC-21-05-R
	10 m pre-wired, cable exit right		F3S-TGR-NMPC-21-10-R
	M12, 8 pin, fitted with 250 mm cable exit right		F3S-TGR-NMPC-21-M1J8-R
 Barrel Sensors	5 m pre-wired	F3S-TGR-NBPC-21-05	
	10 m pre-wired	F3S-TGR-NBPC-21-10	
	M12, 8 pin, fitted with 250 mm cable	F3S-TGR-NBPC-21-M1J8	

### Stainless steel housing

Type	Cable connection	Contact configuration	Order code
 Elongated Sensors	5 m pre-wired	2NC/1NO	F3S-TGR-NLMC-21-05
	10 m pre-wired		F3S-TGR-NLMC-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NLMC-21-M1J8
 Small Sensors	5 m pre-wired		F3S-TGR-NSMC-21-05
	10 m pre-wired		F3S-TGR-NSMC-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NSMC-21-M1J8
 Barrel Sensors	5 m pre-wired		F3S-TGR-NBMC-21-05
	10 m pre-wired		F3S-TGR-NBMC-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NBMC-21-M1J8

### Hygienic and food types

Type	Cable connection	Contact configuration	Order code
 Small Sensors	5 m pre-wired	2NC/1NO	F3S-TGR-NSHC-21-05
	10 m pre-wired		F3S-TGR-NSHC-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NSHC-21-M1J8
 Small Sensors (Special food types)	5 m pre-wired		F3S-TGR-NSFC-21-05
	10 m pre-wired		F3S-TGR-NSFC-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NSFC-21-M1J8
 Miniature Sensors	5 m pre-wired		F3S-TGR-NMHC-21-05
	10 m pre-wired		F3S-TGR-NMHC-21-10
	M12, 8 pin, fitted with 250 mm cable		F3S-TGR-NMHC-21-M1J8
	5 m pre-wired, cable exit right		F3S-TGR-NMHC-21-05-R
	10 m pre-wired, cable exit right		F3S-TGR-NMHC-21-10-R
	M12, 8 pin, fitted with 250 mm cable exit right		F3S-TGR-NMHC-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
T-connector connection cable	M12 T-connector for M12 connector - types	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	for F3S-TGR-NLPC	F39-TGR-NLPC-A
	for F3S-TGR-NSPC	F39-TGR-NSPC-A
	for F3S-TGR-NMPC	F39-TGR-NMPC-A
	for F3S-TGR-NCPC	F39-TGR-NCPC-A
	for F3S-TGR-NWPC	F39-TGR-NWPC-A
	for F3S-TGR-NBPC	F39-TGR-NBPC-A
	for F3S-TGR-NLMC	F39-TGR-NLMC-A
	for F3S-TGR-NSMC	F39-TGR-NSMC-A
	for F3S-TGR-NBMC	F39-TGR-NBMC-A
	for F3S-TGR-NSHC	F39-TGR-NSHC-A
	for F3S-TGR-NSFC	F39-TGR-NSFC-A
for F3S-TGR-NMHC	F39-TGR-NMHC-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

### Mechanical data

		Plastic housing	Stainless steel housing
Indicator	–	LED	
Operating distance	OFF → ON (Sao)	8 mm: NMPC, NBPC 10 mm: NLPC, NSPC	8 mm: NMHC, NBMC 10 mm: NLMC, NSMC, NSHC, NSFC
	ON → OFF (Sar)	12 mm: NMPC, NBPC 20 mm: NLPC, NSPC	12 mm: NMHC, NBMC 20 mm: NLMC, NSMC, NSHC, NSFC
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	
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	–	Hall	
Serial switching	–	up to 20 pcs. in series	
Power supply	–	24 VDC ±10%	
Rated loads	NC contacts Max.	0.2 A @ 24 VDC	
	NO contact Max.	0.2 A @ 24 VDC	
Dielectric withstand	–	250 VAC	
Insulation resistance	–	100 MΩ	
Switching current	Min.	1 mA, 10 VDC	

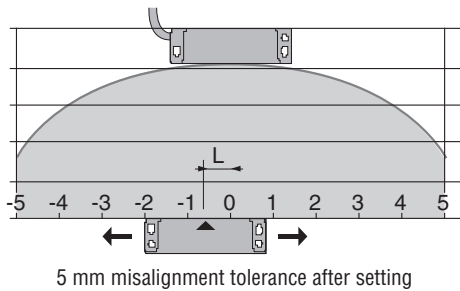
### Reliability data

		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	
PFHd		$2.6 \times 10^{-10}$	
Proof test interval (Life)		20 years	
MTTFd		866 years	
Diagnostic Coverage DC		99% (high)	

### Approved standards

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

## Operating characteristics



## Connection diagram

### Cable version

Pin No.	Signal name
red	+24 VDC
blue	GND
black	NC Channel 1/+
white	NC Channel 1/-
yellow	NC Channel 2/+
green	NC Channel 2/-
brown	Aux. NO Channel/+
orange	Aux. NO Channel/-

### M1J8-Connector version (M12 male)

Pin No. (male side)	Signal	Wire
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	Aux. NO Channel/+	— grey
8	Aux. NO Channel/-	— red

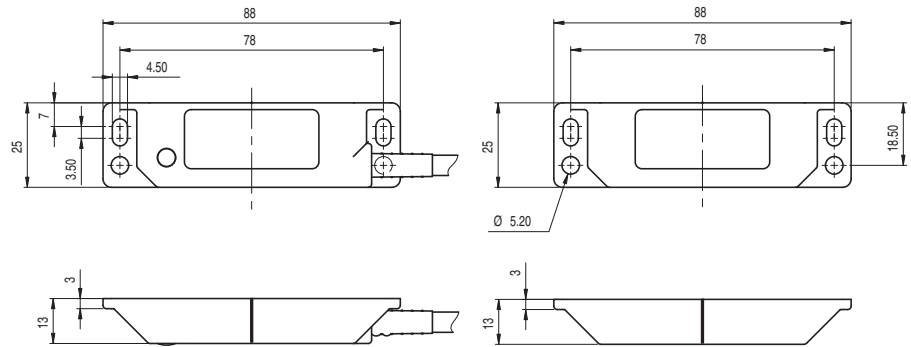
Y92E-M12PURSH8S\_M-L

Note: For 2NC+1NO contact configuration models (F3S-TGR-N□□C-21-□□), if the auxiliary circuit is not fitted or used, then cut and discard the brown/orange or the grey/red conductors.  
 For 2NC contact configuration models (F3S-TGR-N□□C-20-□□), the cable will be delivered with only 6 wires, without the brown/orange conductors.

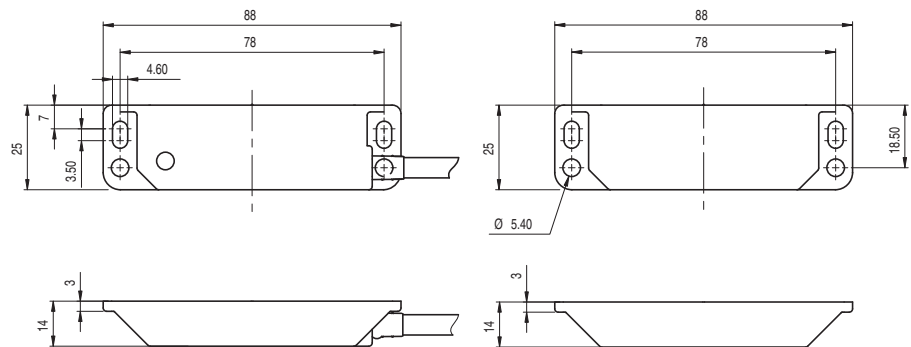
## Dimensions

### Elongated Sensor (Sensor/Actuator)

#### F3S-TGR-NLPC

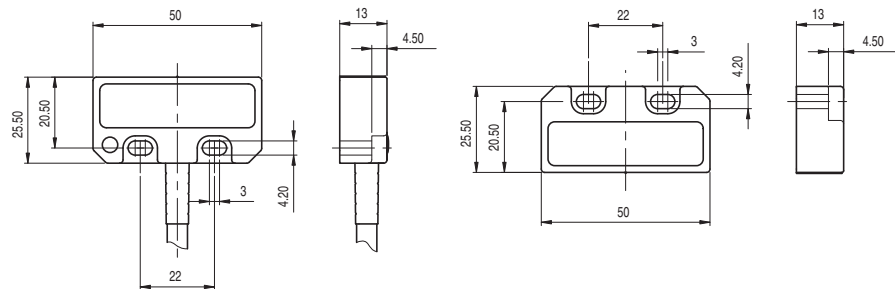


#### F3S-TGR-NLMC

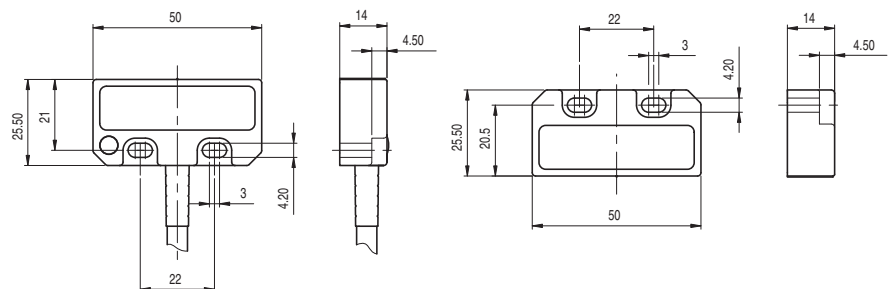


### Small Sensor (Sensor/Actuator)

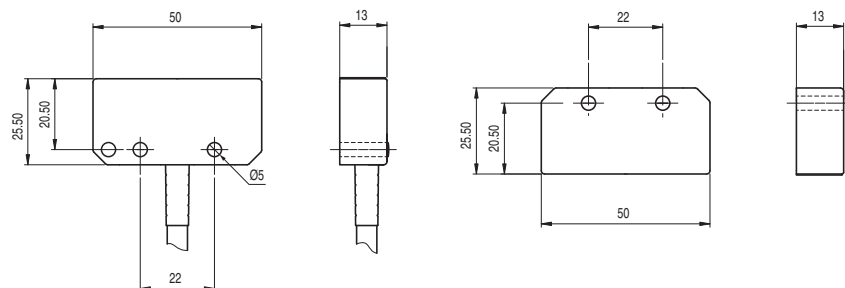
#### F3S-TGR-NSPC



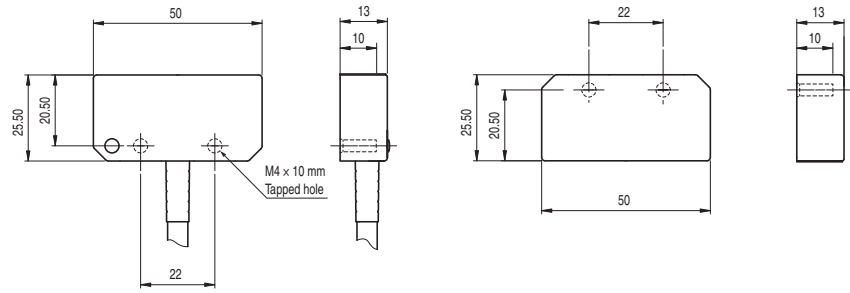
#### F3S-TGR-NSMC



#### F3S-TGR-NSHC

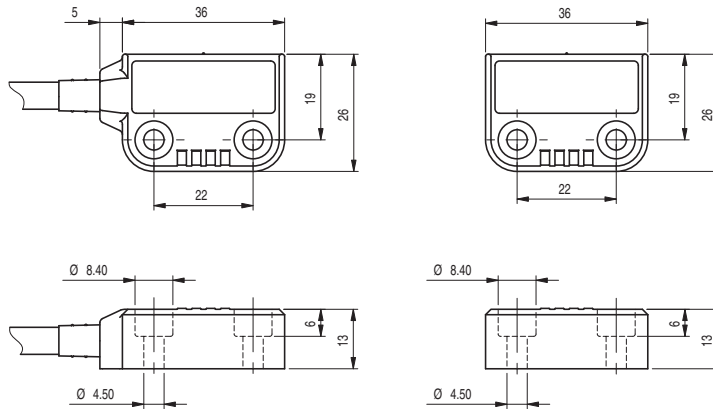


## F3S-TGR-NSFC

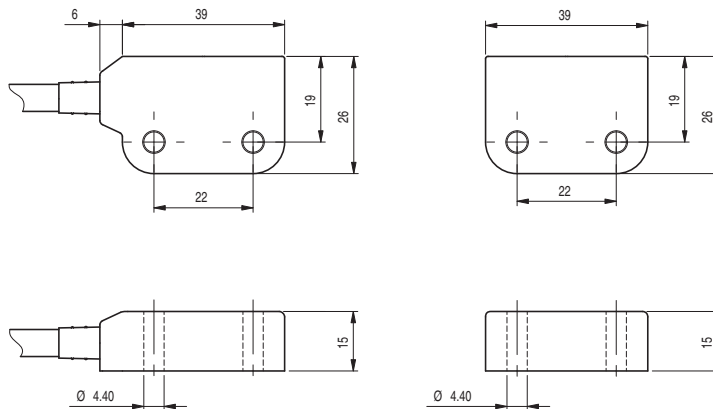


## Miniature Sensor (Sensor/Actuator, right side version)

### F3S-TGR-NMPC



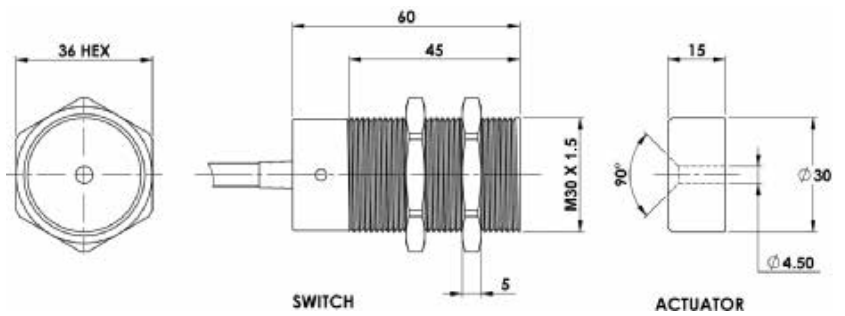
### F3S-TGR-NMHC



## Barrel Sensor (Sensor/Actuator)

### F3S-TGR-NBPC

### F3S-TGR-NBMC



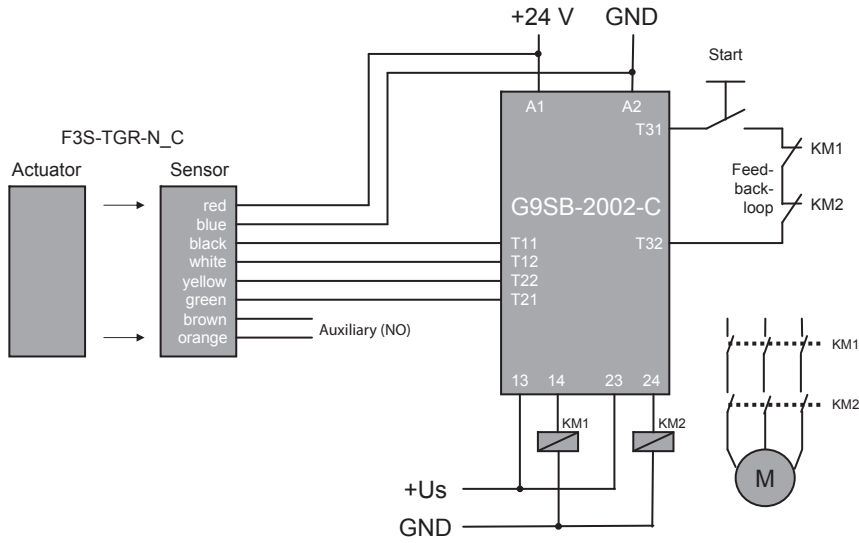


Wiring examples (Single head connection up to category 4 acc. EN954-1)

G9SB

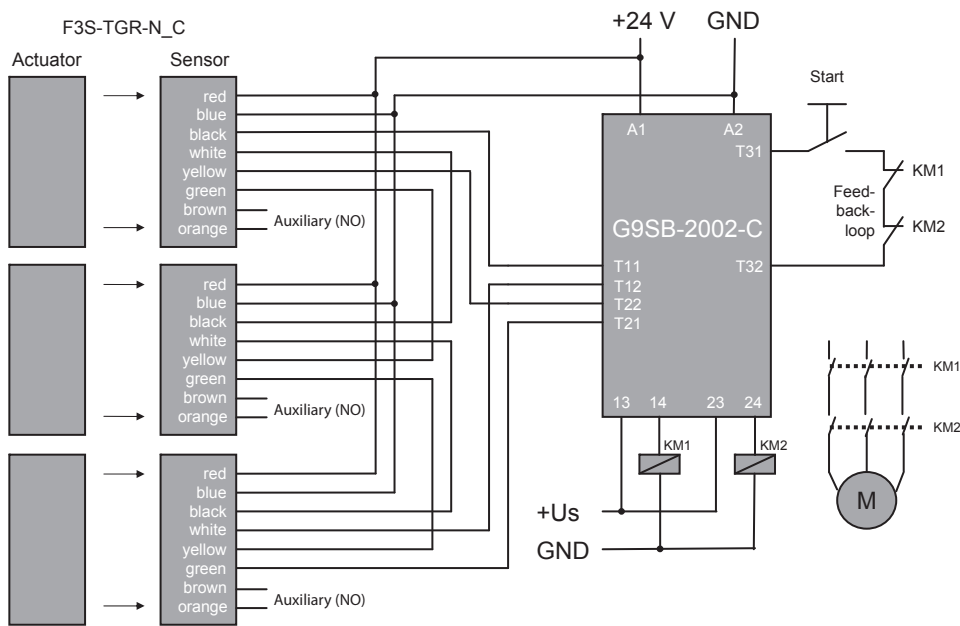
Single Sensor Application with G9SB-2002-C

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



Series connection Application, up to 20 Sensors with G9SB-2002-C

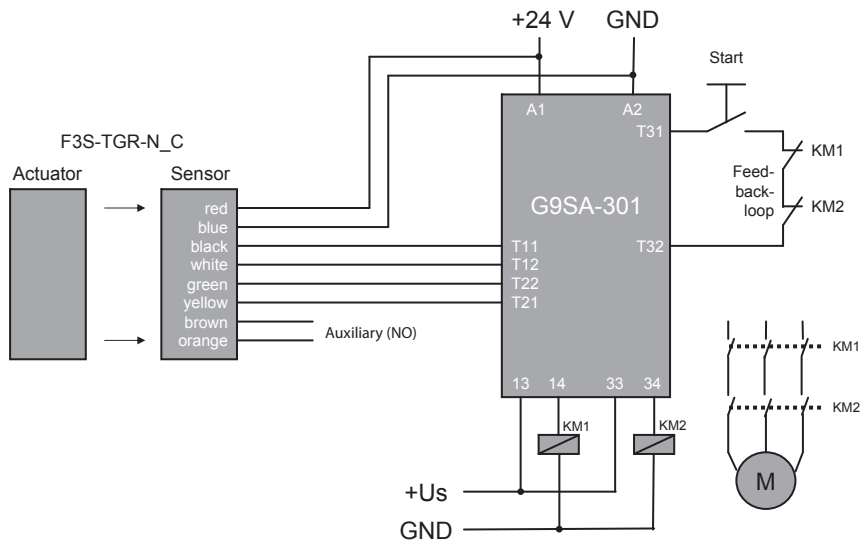
(up to Safety PLd acc. EN ISO 13849-1)



**G9SA**

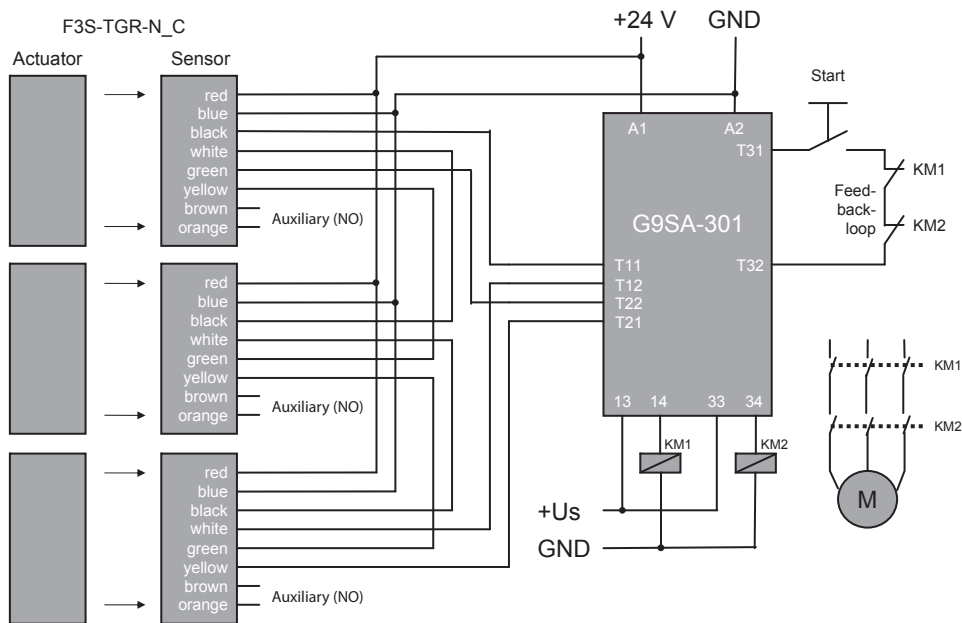
**Single Sensor Application with G9SA-301**

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



**Series connection Application, up to 20 Sensors with G9SA-301**

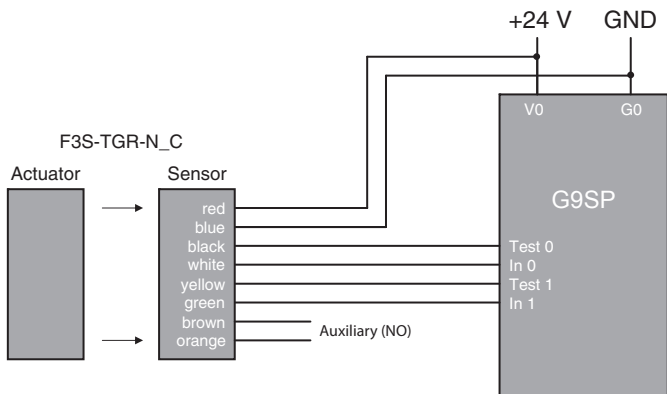
(up to Safety PLd acc. EN ISO 13849-1)



## G9SP

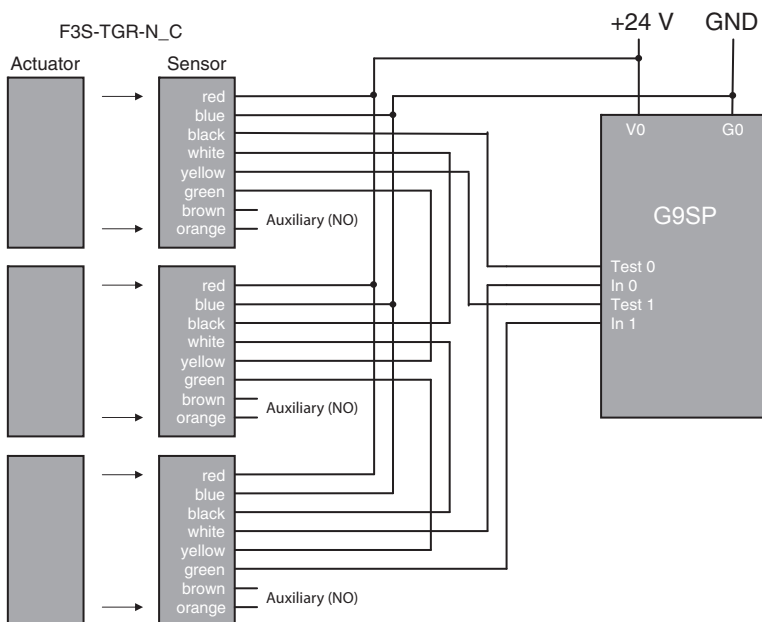
### Single Sensor Application with G9SP

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



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

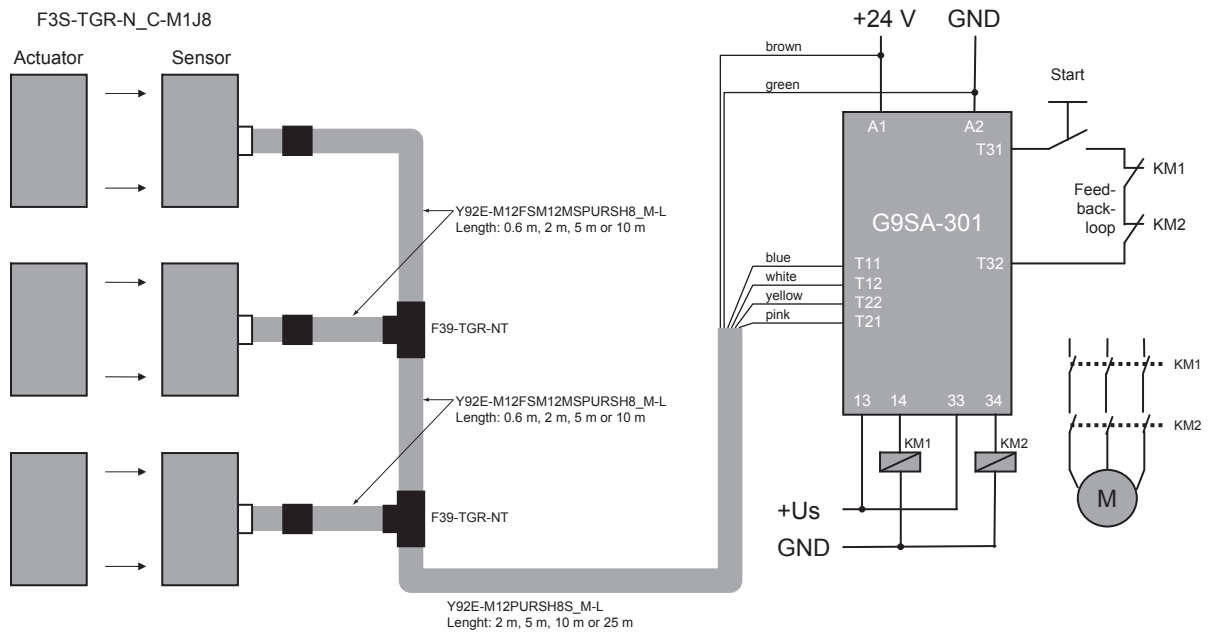
(up to Safety PLd acc. EN ISO 13849-1)



## T-Connector and Connection Cable

### Series connection with 2 or 3 Sensors 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.

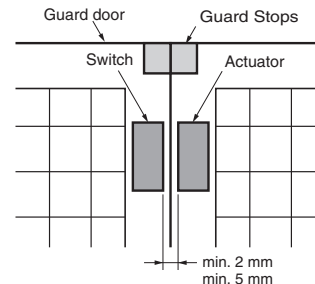
## Solvents

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.

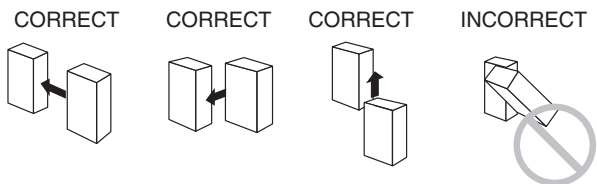
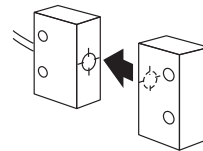
## Guard Stops

### 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.

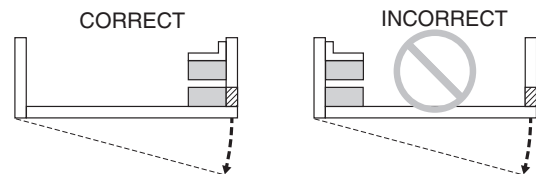


## Mounting Direction



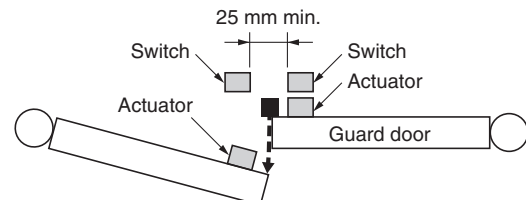
## Using for Hinged Doors

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 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.