

Industrial Automation Guide 2016



Industrial Products & Systems

Targeted Technologies

Creating maximum output with minimum input

By identifying the many ways of innovation in specific industries we developed the 'targeted technologies' concept. It's a way of thinking about technology in a prioritized format. Prioritized according to our customers' most pressing needs. The result? A set of solutions that make immediate impact on the core of our customers' businesses. A set of solutions that hit the target every time. Take a look at the examples on our website.

industrial.omron.eu/technologies



Welcome to our world

Our best-in-class devices for your automation system

Welcome to Omron's world of advanced industrial automation. The INDUSTRIAL AUTOMATION GUIDE is your essential tool to select best-in-class devices for your automation system. It highlights our core competences in sensing, control, visualisation, motion and panel components.

Of course, Omron offers a much larger range of products than you can find on the attached DVD. For more information on services and company competence visit our website.

Here you will find:

- Latest product news
- Technical product specifications
- 2D / 3D CAD Library
- Customer references
- Technology concepts
- Supporting product documentation
- Knowledge Base - "myOmron"
- Events Calendar
- Contact information

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Quick Links shortens your search. Quick Links are unique codes assigned to Omron products listed in this guide. Enter Quick Link codes in the search box on industrial.omron.eu to access detailed information on products in this guide.



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“To the machine the work of the machine,
to man the thrill of further creation.”

Kazuma Tateisi, founder of Omron

Omron at a glance

200.000 products ranging
input, logic and output

Sensing, Control Systems, Visualization, Drives, Robots, Safety,
Quality Control & Inspection, Control and Switching Components

7%

Investment in Research & Development

Innovation track
record of 80 years

Top 150 global patent assignee

1.200 employees dedicated to R&D

11.000 + issued and pending patents

37.000

Employees worldwide

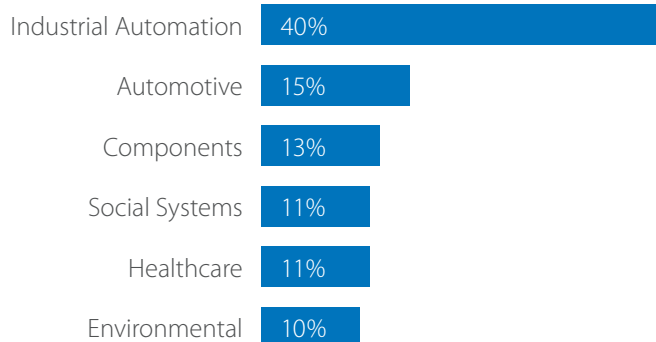
210

Locations worldwide

22

Countries in EMEA

Working for the
benefit of society



Close to your needs

Technical training & seminars, technical support, Automation Technology Centers, online community (MyOmron), online catalogues and technical documentation, customer service & sales support, inter-operability labs (Tsunagi), safety services, repairs.

Your needs, our focus

Solutions perfectly matching your needs

We asked ourselves: 'What do you need in sensors and components?' Well, first you need reliability. Then a variety and choice of performance levels. You may also want advanced functionality, with special features defined by you – or you may want standardized solutions, with highly competitive prices.

Whatever it is, it can all add up to a wish list that is difficult to fulfil. Until now. That's because our new 361° Approach not only provides a complete all-round offer without gaps, it also puts you at the very centre of the product selection process. It's an approach that leads to a Perfect Match – one with the extra degree of confidence that comes from choosing Omron.

361° in one view



Quality



Line-up



Application



Customization



Global availability



Specs

	Quality	Line-up	Application	Customization	Global availability	Specs
PRO^{plus}	Premium	Tailored	Special	Yes	Yes	Application oriented
PRO	Premium	Complete	Advanced	Yes	Yes	Above Standard
LITE	Premium	Standard	Basic	No	No	Basic
	'Quality' refers to the standard of manufacturing and the materials used – this translates into reliability	'Line-up' refers to the number of model types	'Application' indicates the complexity of the automation	'Customization' is the possibility to modify the product		'Specs' refers to the choice of performance levels

The extra degree of advantage

Three distinct lines of sensors and components

Three distinct lines

361° Approach offers three distinct lines within each sensor or component product category. LITE products are cost-effective without any compromise in quality. PRO products represent the “install & forget” option, offering longer lifetime, higher protection, and more features. While PROplus products are designed for specific applications or customer demands.

Optimized reliability

All three lines are backed by the Omron commitment to quality, so even when you need a price-competitive advantage, you can be confident that they will never let you down.

Solutions that perfectly match your needs

The 361° Approach ensures that you can quickly and easily identify the perfect match solution to your needs – nothing more, nothing less.

Optimized costs

Your sensor and component costs are also minimized – because it eliminates over-specification.

Why an extra 1°?

The extra degree is what you get when you do business with Omron, and that means different things to different customers – all depending on their needs. For example, if you need specification advice, the extra degree is ‘service’. But ultimately, to everyone it means “an extra degree of confidence in the perfect match”.



Sysmac: A fully integrated platform

Integration and Functionality

Sysmac is an integrated automation platform dedicated to providing complete control and management of your automation plant. At the core of this platform, the Machine Controller series offers synchronous control of all machine devices and advanced functionality such as motion, robotics and database connectivity. This multidisciplinary concept allows you to simplify solution architecture, reduce programming and optimize productivity.



Machine Automation Controller

FACTORY
AUTOMATION

MACHINE
CONTROL



Motion



Filling line

- Motion Control: Integrated within the IDE, and operating in real-time
- Standard PLCopen Function Blocks plus Omron generated motion FB's
- Direct Synchronous control for Position, Speed and Torque



Safety



Assembly

- All safety related data is synchronized with the whole network
- Safety functions such as muting, guard locking, EDM and valve monitoring are simple to manage

- ✓ **One Integrated Development Environment software** for Configuration, Programming, Simulation and Monitoring



Information



- Sysmac communicates in real-time with Databases such as SQL
- Secure Data: In the event of a server going down or losing communications, data is automatically stored in internal memory
- Sysmac operates with Databases at high speed [1000 table element/ 100 ms] ensuring realistic Big Data Processing to improve productivity and aid predictive maintenance etc.

✓ Integrated Automation Control:

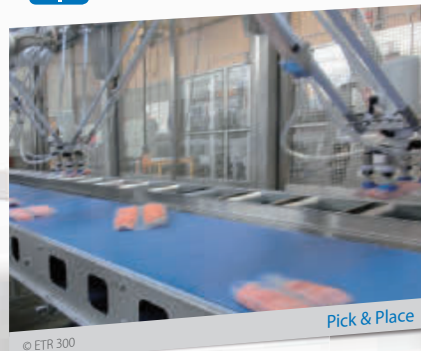
The Sysmac platform is scalable and provides the performance and functionality for a wide range of solutions from simple machines through to manufacturing cells

Vision



- Higher resolution images available without increasing the vision processing time
- Shape search technology: Provides more stable and accurate object detection for Pick & Place projects

Robotics



- Up to 8 Delta robots with one controller
- Time-based Robotic Function Blocks make programming easier

Sensing



- Full control of the process parameter setting and predictive maintenance functions
- High precision detection and positioning data synchronized on the network

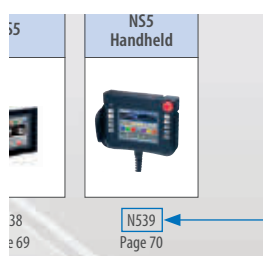
Product selection table

Automation systems	 12 Machine automation controller	 26 Programmable logic controllers (PLC)	 54 Remote I/O	 68 Human machine interfaces (HMI)
Motion & Drives	 96 Motion controllers	 112 Servo systems	 170 Robots	 202 Frequency inverters
Sensing	 236 Photoelectric sensors	 278 Mark and Color sensors	 284 Lightcurtains and area sensors	 292 Fiber optic sensors and amplifiers
Quality control & Inspection	 370 Inspection & Ident systems	 426 Measurement sensors		
Safety	 462 Emergency stop and control devices	 472 Safety limit switches	 480 Safety door switches	 506 Safety sensors
Control components	 574 Temperature controllers	 596 Power supplies	 614 Uninterruptible power supplies (UPS)	 622 Timers
Switching components	 682 Electromechanical relays	 696 Solid state relays	 706 Low voltage switchgear	 722 Monitoring products
Software	 766 Software			

Safety

Find information fast!

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Quick Link

Safety

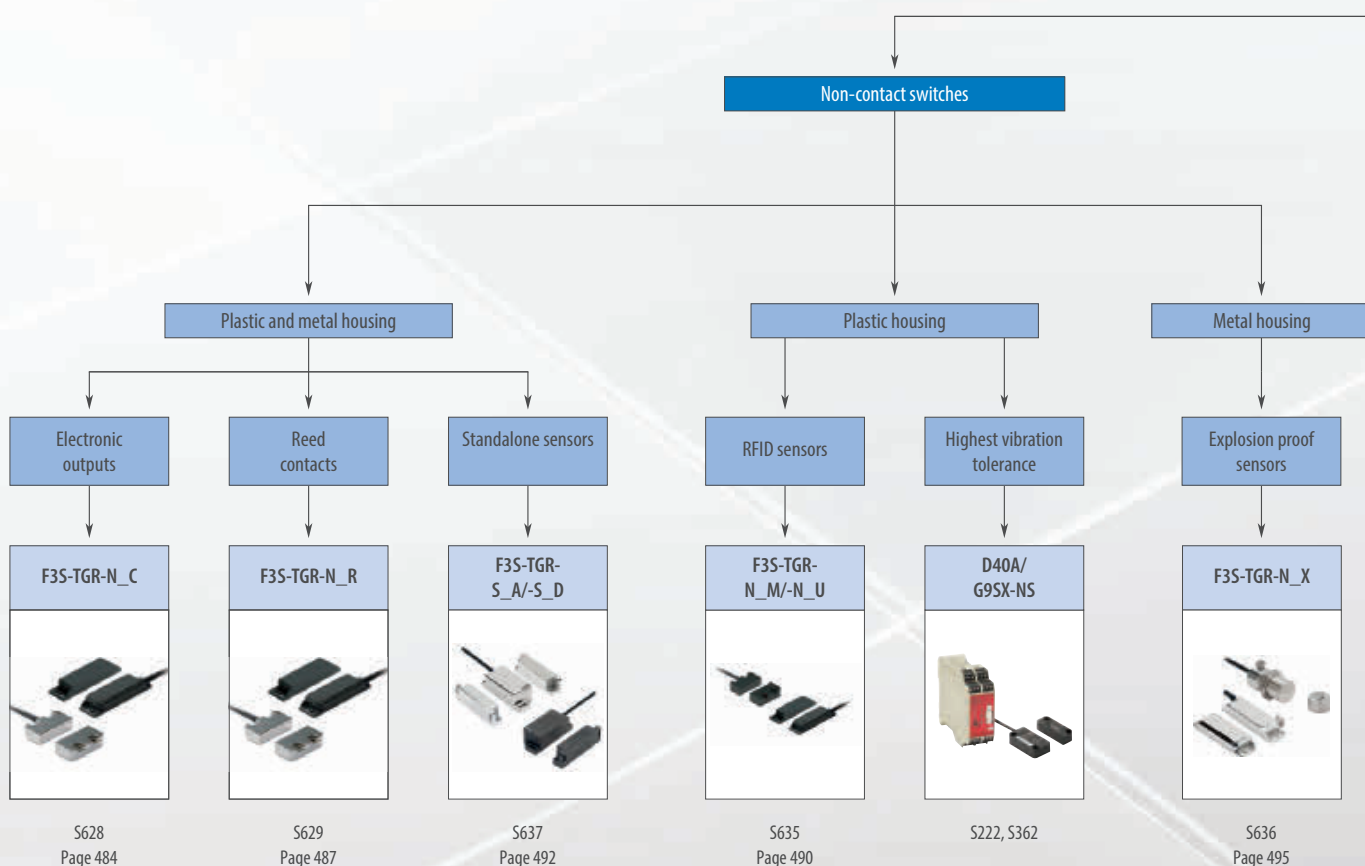
Emergency stop and control devices	462	G9SE	553
Selection table	464	Safety guard switching unit	
Standard pushbutton switches		G9SX-GS/A4EG	554
A16	753	Limited speed monitoring unit	
A22N	755	G9SX-LM	556
Emergency stop pushbutton switches		Standstill monitoring unit	
A16SE	467	G9SX-SM	558
A22E	468	Programmable safety controllers	
Rope pull emergency stop switches		G9SP-N_	559
ER-series rope pulls	469	NX-Safety stand alone modular I/O system	562
Safety limit switches	472	NE1A-SCPU_	563
Selection table	474	NX Safety distributed	564
Safety limit switch with metal housing		Compact non-contact door switch/flexible safety unit	
D4B	475	G9SX-NS	544
Safety limit switch with plastic housing		Safety outputs	566
D4N	477	Selection table	569
Safety door hinge switch		Free potential outputs	
D4NH	479	G7SA	570
Safety limit switch with manual reset		G7S_-E	571
D4N-_R	473	Motion	
Safety door switches	480	MX2	212
Selection table	482	Accurax G5	117
Non-contact switches			
F3S-TGR-N_C	484		
F3S-TGR-N_R	487		
F3S-TGR-N_M/-N_U	490		
F3S-TGR-S_A/-S_D	492		
F3S-TGR-N_X	495		
Safety door switches			
D4NS	497		
D4BS	498		
F3S-TGR-KM15/-KM16/-KH16	499		
Guard-lock safety door switch			
D4NL	501		
D4SL-N	502		
F3S-TGR-KHL1	504		
F3S-TGR-KHL3	505		
Compact non-contact door switch/flexible safety unit			
D40A/G9SX-NS	480		
Safety sensors	506		
Selection table	508		
Safety light curtain			
Slim housing			
F3SJ-E	510		
F3SJ-B	514		
F3SJ-A	518		
Robust housing			
F3S-TGR-CL	524		
F3SG-RA	529		
F3SG-RE	534		
F3S-TGR-CL_-K_	507		
F3S-TGR-CL_-K_C	507		
Muting actuators			
F39-TGR-MCL	538		
F3W-MA	539		
Safety laser scanner			
OS32C	541		
Safety logic control systems	544		
Selection table	546		
Safety relay units			
G9SA	549		
G9SB	550		
G9SR	551		
G9SX	552		

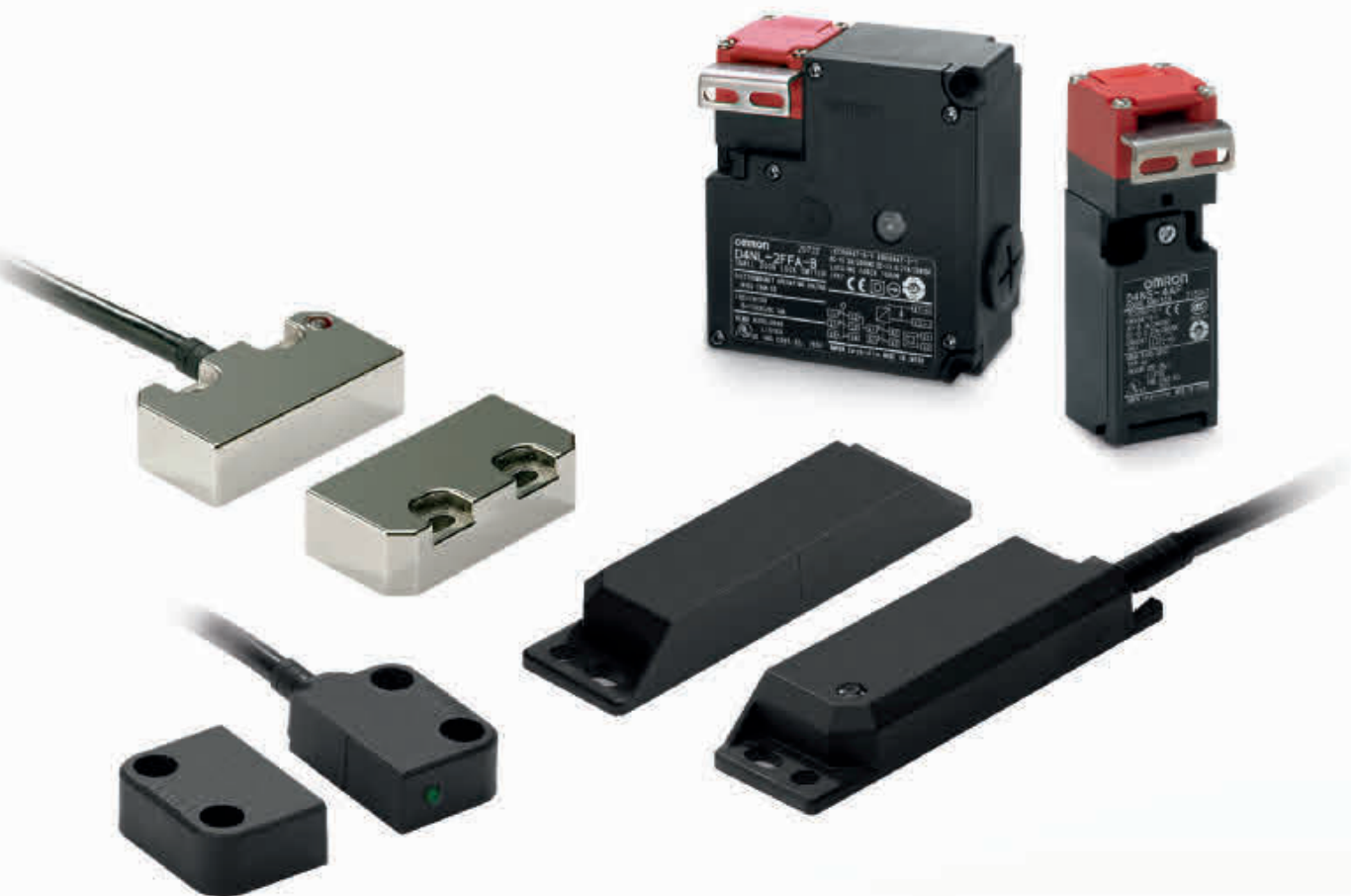
BREAK CONVENTIONAL BARRIERS IN SAFETY DESIGN

Flexibility selecting best fit control device for non-contact switch application: F3S-TGR-N

Omron has introduced a series of magnetic coded contactless switches for interlocking machine guard doors. The switches feature a built-in control function, thus saving the cost and space required for an external controller. The non-contact switches offer advantages in applications where a precise approach of the guard and lock is not possible. Applications with a large amount of dirt or high hygienic standards can also be addressed.

- Operates with all Omron safety relay units and safety bus interfaces
- Operates behind stainless steel fittings
- Non-contact – no abrasion – no particles
- Conforms to safety categories up to 4 acc. EN 954-1 and PLe acc. EN ISO 13849-1





Safety door switches

Key operated switches

Safety switch

Plastic housing

Stainless steel head

Metal housing

Stainless steel housing

D4NS

F3S-TGR-KM15
F3S-TGR-KM16

D4BS

F3S-TGR-KH16



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Safety guard lock switch

Plastic housing

Plastic housing
Plastic or metal head

Stainless steel housing

Square size
1300 N

Slim size
1300 N

Standard size
1600 N

Slim size
2000 N

D4NL

D4SL-N

F3S-TGR-KHL1

F3S-TGR-KHL3









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Selection table

		Non-contact safety door switches					
							
Model		F3S-TGR-N_C	F3S-TGR-N_R	F3S-TGR-N_M/-N_U	F3S-TGR-S_A/-S_D	F3S-TGR-N_X	D40A/G9SX-NS
Selection criteria	Housing	Plastic/Metal	Plastic/Metal	Plastic	Plastic/Metal	Metal	Plastic
	Protection class	IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67	IP67
	Conformity	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1
Features	Cable length 2 m	■	■	–	–	–	■
	Cable length 5 m	■	■	■	■	■	■
	Cable length 10 m	■	■	■	■	■	–
	Connector type M12	■	■	■	■	■	–
	High temperature sensor	■	■	–	–	–	–
	Operates with G9SA, G9SB	■	■	■	■	■	–
	Operates with G9SX	■	■	■	■	■	■
	Operates with programmable safety units G9SP and NE1A	■	■	■	■	■	–
Application	Door monitoring	■	■	■	■	■	■
Contact configuration	1NC/1NO	–	–	–	–	–	■
	2NC	■	■	–	–	–	–
	2NC/1NO	■	■	■	■	■	–
	Force guided relays	–	–	–	■	–	–
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Safety door switches						Safety door lock switches			
									
Model	D4NS	F3S-TGR-KM15	F3S-TGR-KM16	D4B5	F3S-TGR-KH16	D4NL	D4SL-N	F3S-TGR-KHL1	F3S-TGR-KHL3
Selection criteria	Housing	Plastic	Plastic body Metal head	Plastic body Metal head	Metal	Stainless steel	Plastic	Plastic/metal head available	Stainless steel
	Head mounting	4 directions	2 directions	2 directions	4 directions	2 directions	4 directions	4 directions	2 directions
	Actuation	Straight	Straight	Straight	Straight	Straight	Straight	Straight	Straight
	Key holding force	–	–	–	–	–	1,300 N	1,300 N	1,600 N
	Protection class	IP67	IP67	IP67	IP67	IP69k	IP67	IP67	IP69k
	Conformity	EN50047, EN1088	EN1088	EN1088	EN50047, EN1088	EN1088	EN1088	EN1088	EN1088
Features	Conduit size M20	■	■	■	PG 13.5	■	■	■	■
	Screw terminal	■	■	■	■	■	■	■	■
	Connector terminal	–	–	–	–	–	■	–	–
	Operation key horizontal	■	■	■	■	■	■	■	■
	Operation key vertical	■	■	■	■	■	■	■	■
	Operation key adjustable horizontal	■	■	■	■	■	■	■	■
	Operation key adjustable horizontal and vertical	■	■	■	–	■	■	■	■
	Mechanical lock/ 24 VDC solenoid release	–	–	–	–	–	■	■	■
	Mechanical lock/ 110 VAC solenoid release	–	–	–	–	–	■	–	–
	Mechanical lock/ 230 VAC solenoid release	–	–	–	–	–	■	–	–
	24 VDC solenoid lock/ mechanical release	–	–	–	–	–	■	■	–
	110 VAC solenoid lock mechanical release	–	–	–	–	–	■	–	–
	240 VAC solenoid lock mechanical release	–	–	–	–	–	■	–	–
	High temperature sensor	–	–	–	–	–	–	–	–
	Operates with G9SR	■	■	■	■	■	■	■	■
	Operates with G9SA, G9SB	■	■	■	■	■	■	■	■
	Operates with G9SX	■	■	■	■	■	■	■	■
	Operates with programmable safety units G9SP and NE1A	■	■	■	■	■	■	■	■
Application	Door monitoring	■	■	■	■	■	■	■	■
	Door locking	–	–	–	–	–	■	■	■
Contact configuration	2 contact models	■	–	–	■	–	–	–	–
	3 contact models	■	■	■	–	■	–	–	–
	4 contact models	–	–	–	–	–	■	■	■
	5 contact models	–	–	–	–	–	■	■	–
	6 contact models	–	–	–	–	–	■	–	–
	Slow action contacts	■	■	■	–	■	–	■	■
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■ Standard

– No/not available







Hall coded non-contact for monitoring the status of guarding doors

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 3 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




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		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		F3S-TGR-NSPC-21-M1J8
 Miniature sensors	5 m pre-wired ^{*1}		F3S-TGR-NMPC-21-05
	10 m pre-wired ^{*1}		F3S-TGR-NMPC-21-10
	M12, 8-pin ^{*1}		F3S-TGR-NMPC-21-M1J8
 Barrel sensors	5 m pre-wired		F3S-TGR-NBPC-21-05
	10 m pre-wired		F3S-TGR-NBPC-21-10
	M12, 8-pin		F3S-TGR-NBPC-21-M1J8

^{*1} Optional cable exit to the right side is available for F3S-TGR-NMPC-types. Please add "R" to the order code (i.e. F3S-TGR-NMPC-21-05-R)

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		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		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		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		F3S-TGR-NSHC-21-M1J8
 Small sensors (Special food type)	5 m pre-wired		F3S-TGR-NSFC-21-05
	10 m pre-wired		F3S-TGR-NSFC-21-10
	M12, 8-pin		F3S-TGR-NSFC-21-M1J8
 Miniature sensors	5 m pre-wired ^{*1}		F3S-TGR-NMHC-21-05
	10 m pre-wired ^{*1}		F3S-TGR-NMHC-21-10
	M12, 8-pin ^{*1}		F3S-TGR-NMHC-21-M1J8

^{*1} Optional cable exit to the right side is available for F3S-TGR-NMHC-types. Please add "R" to the order code (i.e. F3S-TGR-NMHC-21-05-R)

Specifications

Mechanical data

Item	Model	Polyester types	Stainless steel types
Serial switching		up to 3 pcs.	
Indicator LED	–	LED green - Indication of safety circuit closed	
Operating distance ^{*1}	OFF → ON (Sao)	Min. 8 mm/max. 10 mm	
	ON → OFF (Sar)	Min. 12 mm/max. 22 mm	
Actuator approach speed	Min.	4 mm/s	
	Max.	1,000 mm/s	
Operating temperature	–	–25 to 80°C	–25 to 105°C
Enclosure protection	Flying lead	IP69K	
	M12 connector	IP67	
Material cable	Flying lead	PVC, Ø 6 mm o.d.	
	M12 connector	250 mm, PVC, Ø 6 mm o.d.	
Material housing	–	Black polyester	Stainless steel 316

^{*1} Depends on type. Please see online data sheet.

Electrical data

Item	Model	Polyester types	Stainless steel types
Sensor technology	–	Hall	
Power supply	–	24 VDC±15%	
Power consumption	Max.	50 mA	
Switching current	Min.	10 mA, 10 VDC	
Rated loads	NC contacts	200 mA, 24 VDC	
	NO contact	200 mA, 24 VDC	
Output type	–	Electronic output (potential-free optocoupler output)	

Approved standards

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

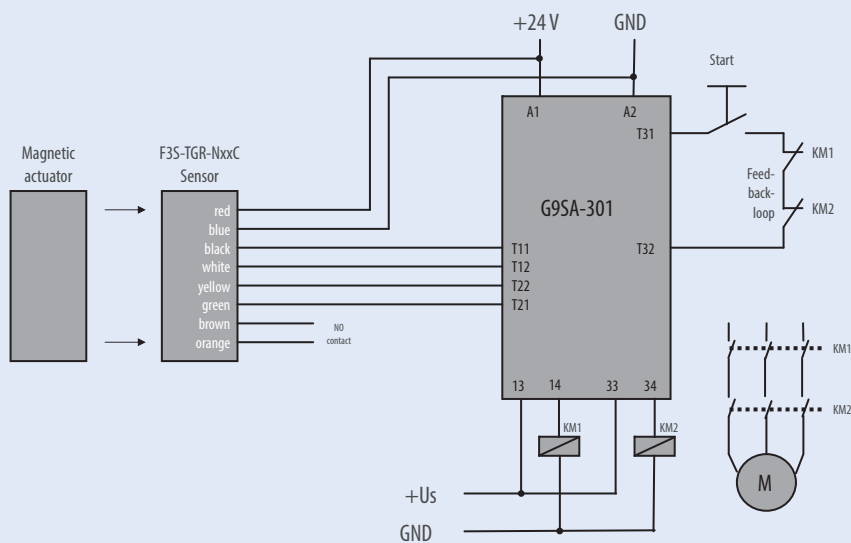
Accessories

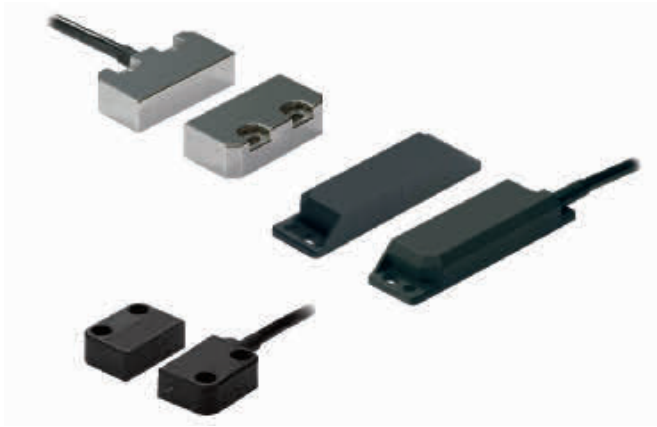
		Order code
Cables 8-pin	2 m	Y92E-M12PURSH8S2M-L
	5 m	Y92E-M12PURSH8S5M-L
	10 m	Y92E-M12PURSH8S10M-L
	25 m	Y92E-M12PURSH8S25M-L
T-connector connection cable	M12 T-connector for M12 connector-types	F39-TGR-NT
	0.6 m, M12-8pin	Y92E-M12FSM12MSPURSH806M-L
	2 m, M12-8pin	Y92E-M12FSM12MSPURSH82M-L
	5 m, M12-8pin	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

Wiring examples (Single head connection)

G9SA

Single sensor application with G9SA-301
(up to PLe acc. EN ISO 13849-1)









Reed non-contact switches for monitoring the status of guarding doors

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

Ordering information

Polyester housing




Type	Cable connection	Contact configuration	Order code
Elongated sensors 	5 m pre-wired	2NC/1NO ^{*1}	F3S-TGR-NLPR-21-05
	10 m pre-wired		F3S-TGR-NLPR-21-10
	M12, 8-pin		F3S-TGR-NLPR-21-M1J8
Small sensors 	5 m pre-wired	2NC/1NO ^{*1}	F3S-TGR-NSPR-21-05
	10 m pre-wired		F3S-TGR-NSPR-21-10
	M12, 8-pin		F3S-TGR-NSPR-21-M1J8
Miniature sensors 	5 m pre-wired ^{*2}	2NC/1NO ^{*3}	F3S-TGR-NMPR-21-05
	10 m pre-wired ^{*2}		F3S-TGR-NMPR-21-10
	M12, 8-pin ^{*2}		F3S-TGR-NMPR-21-M1J8
Barrel sensors 	5 m pre-wired	2NC/1NO ^{*3}	F3S-TGR-NBPR-21-05
	10 m pre-wired		F3S-TGR-NBPR-21-10
	M12, 8-pin		F3S-TGR-NBPR-21-M1J8

^{*1} 2NC: 1 A, 250 VAC/1NC: 0.2 A, 24 VDC

^{*2} Optional cable exit to the right side is available for F3S-TGR-NMPR-types. Please add "R" to the order code (i.e. F3S-TGR-NMPR-21-05-R)

^{*3} 2NC: 0.5 A, 24 VDC/1NC: 0.2 A, 24 VDC




Stainless steel housing

Type	Cable connection	Contact configuration	Order code
Elongated sensors 	5 m pre-wired	2NC/1NO ^{*1}	F3S-TGR-NLMR-21-05
	10 m pre-wired		F3S-TGR-NLMR-21-10
	M12, 8-pin		F3S-TGR-NLMR-21-M1J8
Small sensors 	5 m pre-wired	2NC/1NO ^{*1}	F3S-TGR-NSMR-21-05
	10 m pre-wired		F3S-TGR-NSMR-21-10
	M12, 8-pin		F3S-TGR-NSMR-21-M1J8
Barrel sensors 	5 m pre-wired	2NC/1NO ^{*2}	F3S-TGR-NBMR-21-05
	10 m pre-wired		F3S-TGR-NBMR-21-10
	M12, 8-pin		F3S-TGR-NBMR-21-M1J8

^{*1} 2NC: 1 A, 250 VAC/1NC: 0.2 A, 24 VDC

^{*2} 2NC: 0.5 A, 24 VDC/1NC: 0.2 A, 24 VDC

Hygienic and food types

Type	Cable connection	Contact configuration	Order code
Small sensors 	5 m pre-wired	2NC/1NO ^{*1}	F3S-TGR-NSHR-21-05
	10 m pre-wired		F3S-TGR-NSHR-21-10
	M12, 8-pin		F3S-TGR-NSHR-21-M1J8
Small sensors (Special food type) 	5 m pre-wired		F3S-TGR-NSFR-21-05
	10 m pre-wired		F3S-TGR-NSFR-21-10
	M12, 8-pin		F3S-TGR-NSFR-21-M1J8
Miniature sensors 	5 m pre-wired ^{*2}	2NC/1NO ^{*3}	F3S-TGR-NMHR-21-05
	10 m pre-wired ^{*2}		F3S-TGR-NMHR-21-10
	M12, 8-pin ^{*2}		F3S-TGR-NMHR-21-M1J8

^{*1} 2NC: 1 A, 250 VAC/1NC: 0.2 A, 24 VDC

^{*2} Optional cable exit to the right side is available for F3S-TGR-NMHR-types. Please add "R" to the order code (i.e. F3S-TGR-NMHR-21-05-R)

^{*3} 2NC: 0.5 A, 24 VDC/1NC: 0.2 A, 24 VDC

Specifications

Mechanical data

Item	Model	Plastic housing	Stainless steel housing
Serial switching		up to 6 pcs.	
Operating distance	OFF → ON (Sao)	10 mm Close	
	ON → OFF (Sar)	20 mm* Open	
Actuator approach speed	Min.	4 mm/s	
	Max.	1,000 mm/s	
Operating temperature	–	–25 to 80°C	–25 to 105°C
Enclosure protection	Flying lead	IP69K	
	M12 connector	IP67	
Material cable	Flying lead	PVC, Ø 6 mm o.d.	
	M12 connector	250 mm, PVC, Ø 6 mm o.d.	
Material housing	–	Black polyester	Stainless steel 316

* max. 22 mm, depends on the type

Electrical data

Item	Model	Plastic housing	Stainless steel housing
Indicator LED		none	
Contact release time	Max.	2 ms	
Initial contact resistance	Max.	500 mΩ	
Switching current	Min.	1 mA, 10 VDC	

Approved standards

EN standards certified by TÜV Rheinland

EN ISO13849-1

EN 60204-1

EN 62061

EN/IEC 60947-5-3

UL 508, CSA C22.2

BS 5304

EN 1088-1 conformance

Accessories

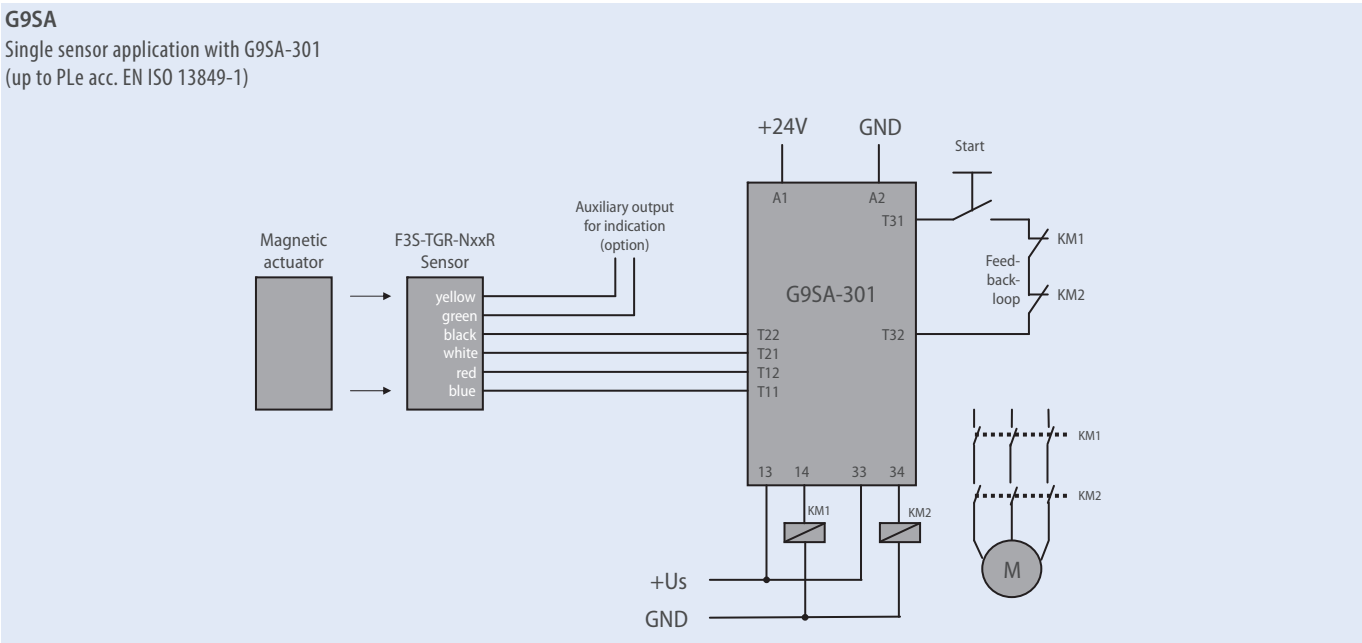
		Order code
Cables 8-pin	2 m	Y92E-M12PURSH8S2M-L
	5 m	Y92E-M12PURSH8S5M-L
	10 m	Y92E-M12PURSH8S10M-L
	25 m	Y92E-M12PURSH8S25M-L
Actuators	for F3S-TGR-NLPR	F39-TGR-NLPR-A
	for F3S-TGR-NSPR	F39-TGR-NSPR-A
	for F3S-TGR-NMPR	F39-TGR-NMPR-A
	for F3S-TGR-NCPR	F39-TGR-NCPR-A
	for F3S-TGR-NWPR	F39-TGR-NWPR-A
	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.)*1	for elongated sensors	F39-TGR-NLR-SPACER
	for small sensors	F39-TGR-NSR-SPACER
	for miniature sensors	F39-TGR-NMR-SPACER
	for long sensors	F39-TGR-NLR-SPACER
	for wide sensors	F39-TGR-NWR-SPACER

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

Wiring examples (Single head connection)

G9SA

Single sensor application with G9SA-301
(up to PLe acc. EN ISO 13849-1)





RFID non-contact switches

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, like traditional switches
- 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

Ordering information


Master coded: Any actuator will operate with any sensor (Power down - power up re-teach needed if exchange of actuator)

Unique coded: Only one actuator fits to the code of the sensor

Elongated sensors

Type	Cable connection	Contact configuration	Order code	
			Master coded	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		F3S-TGR-NLPM-21-M1J8	F3S-TGR-NLPU-21-M1J8

Small sensors

Type	Cable connection	Contact configuration	Order code	
			Master coded	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		F3S-TGR-NSPM-21-M1J8	F3S-TGR-NSPU-21-M1J8

Specifications

Mechanical data

Item		
Serial switching		up to 20 pcs.
Indicator LED		LED green - Indication of safety circuit closed
Operating distance	OFF → ON (Sao)	10 mm Close
	ON → OFF (Sar)	20 mm Open
Actuator approach speed	Min.	4 mm/s
	Max.	1,000 mm/s
Operating temperature		-25 to 80°C
Enclosure protection	Flying lead	IP69K
	M12 connector	IP67
Material cable	Flying lead	PVC, Ø 6 mm o.d.
	M12 connector	250 mm, PVC, Ø 6 mm o.d.
Material		UL approved Polyester

Electrical data

Item		F3S-TGR-N_M	F3S-TGR-N_U
Code		Master coded: Every switch same code (Power down - Power up re-teach needed, if actuator interchanged)	Unique coded: 32 x 16 ⁶ different codes
Technology		RFID (code) and Hall (distance check)	
Power supply		24 VDC±15%	
Power consumption		Max.	0.2 A
Switching current		Min.	1 mA, 10 VDC
Rated loads	NC contacts	Max.	0.2 A, 24 VDC
	NO contact	Max.	0.2 A, 24 VDC
Output type		Electronic output (potential-free optocoupler output)	

Approved standards

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

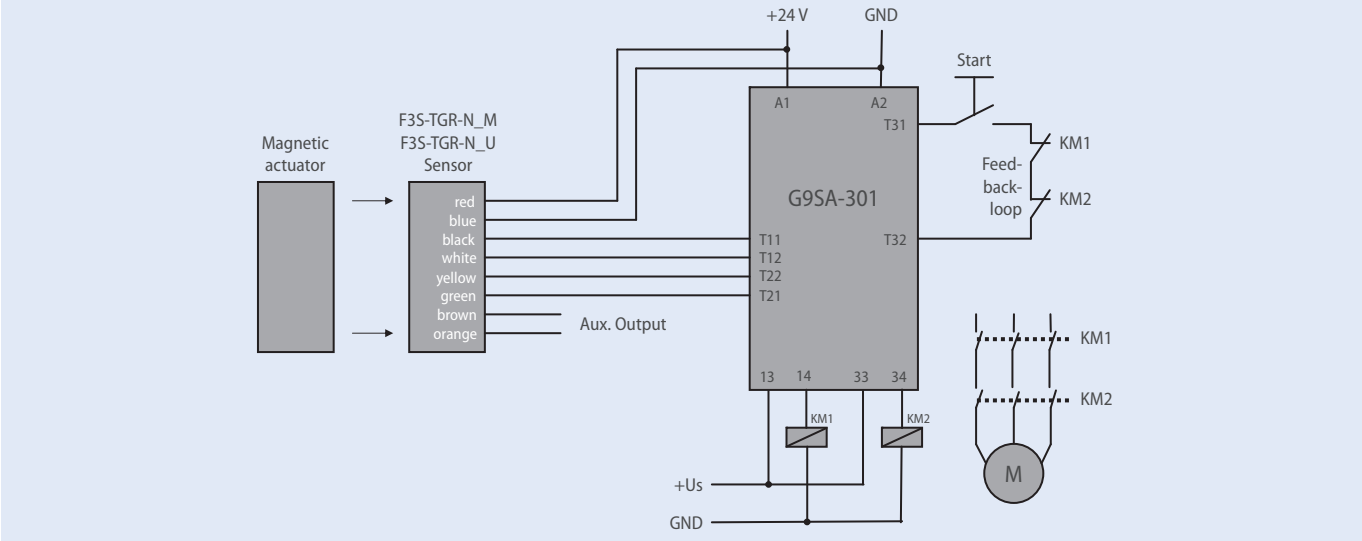
Accessories

		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

Wiring examples (Single head connection)

G9SA

Single sensor application with G9SA-301
(up to PLe acc. EN ISO 13849-1)





Standalone non-contact safety switches



Standalone non-contact switches support applications like guarding doors or position monitoring in machines. They are using the proven Omron non-contact technology allowing to cover mechanical tolerances and vibrations

- Models with single or dual actuator available (For one or two door systems in e.g.)
- Based on hall technology
- Connect up to 20 switches in series
- LED for easy diagnosis
- Operates behind stainless steel fittings
- Non-contact – no abrasion – no particles
- Compensation of mechanical tolerances
- Suitable for high pressure cleaning, CIP and SIP processes due IP69K (pre-wired types)
- Conforms to safety categories up to PLe acc. EN ISO 13849-1



Ordering information

Switches

Polyester housing

Type	Cable connection	Order code
Single actuator sensing 	5 m pre-wired	F3S-TGR-SPSA-05
	10 m pre-wired	F3S-TGR-SPSA-10
	M12, 8-pin	F3S-TGR-SPSA-M1J8
Dual actuator sensing 	5 m pre-wired	F3S-TGR-SPSD-05
	10 m pre-wired	F3S-TGR-SPSD-10
	M12, 8-pin	F3S-TGR-SPSD-M1J8

Stainless steel housing

Type	Cable connection	Order code
Single actuator sensing 	5 m pre-wired	F3S-TGR-SMSA-05
	10 m pre-wired	F3S-TGR-SMSA-10
	M12, 8-pin	F3S-TGR-SMSA-M1J8
Dual actuator sensing 	5 m pre-wired	F3S-TGR-SMSD-05
	10 m pre-wired	F3S-TGR-SMSD-10
	M12, 8-pin	F3S-TGR-SMSD-M1J8

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
Actuators (only for master coded types)	for F3S-TGR-SPSA and -SPSD	F39-TGR-SPS-A
	for F3S-TGR-SMSA and -SMSD	F39-TGR-SMS-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

Specifications

Mechanical data

Item	Model	Polyester Sensor	Stainless steel sensor
Indicator	–	Green LED: Indication of safety circuits closed (Guard closed, actuator present, feedback circuit checked) Yellow LED: Indication of safety circuits open (Actuator removed)	
Operating distance	OFF → ON (Sao)	10 mm Close	
	ON → OFF (Sar)	15 mm Open	
Actuator approach speed	Min.	4 mm/s	
	Max.	1,000 mm/s	
Operating temperature		–25 to 45°C	
Enclosure protection	Flying lead	IP69K	
	M12 connector	IP67	
Material cable	Flying lead	PVC, Ø 6 mm o.d.	
	M12 connector	250 mm, PVC, Ø 6 mm o.d.	
Material housing		UL approved Polyester	Stainless steel 316

Electrical data

Item	Model	Polyester sensor	Stainless steel sensor
Sensing technology	–	Hall	
Serial connection	–	up to 20 switches	
Power supply		24 VDC±10%	
Power consumption	Max.	0.1 A	
Switching current	Min.	10 mA, 5 VDC	
Rated loads	Safety outputs	Max.	3 A, 250 VAC/3A, 24 VDC
	Auxiliary output	Max.	0.2 A, 24 VDC

Approved standards

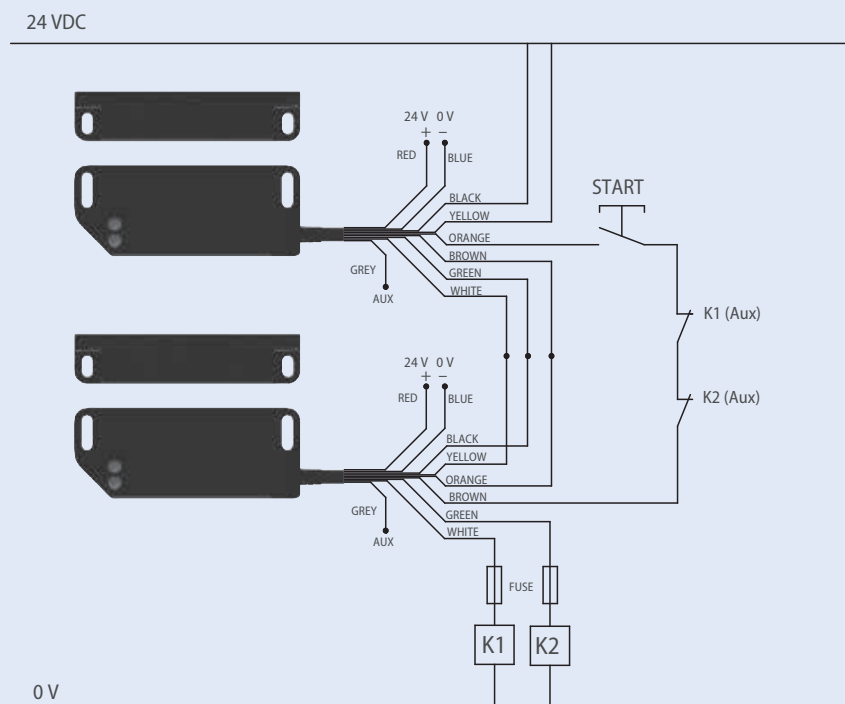
EN standards certified by TÜV Rheinland	
EN ISO13849-1	
EN 62061	
EN ISO 14119	
EN 60204-1	
EN/IEC 60947-5-3	
UL 508, CSA C22.2	
BS 5304	
EN 1088-1 conformance	

Wiring example (serial connection with manual restart)

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

Safety Circuit 1 (Black/White) utilises internally checked force guided relay contacts and is connected in series with the corresponding Safety Circuit 2 (Yellow/Green) of the next switch. Allows minimal wiring and higher current switching to K1 and K2 contactors.

A manual start and contactor feedback check is achieved by connecting K1(Aux) and K2(Aux) feedback contacts and momentary start button through the orange and brown feedback check.






Explosion proof non-contact switches

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 PLe 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.

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

Specifications

Mechanical data

		Elongated sensors	Barrel sensors
Serial switching		up to 6 pcs.	
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	
Operating temperature	–	–20°C to +60°C	
Enclosure protection	Flying lead	IP 67 Certification for IP67 but can be used for SIP/CIP and high pressure cleaning like IP69K)	
Material	–	Stainless steel 316	

Electrical data

		Elongated sensors	Barrel sensors
Sensor technology	–	Reed	
Power supply	–	24 VDC±15%	
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

II 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 1 and 2 (Gas), Zones 21 and 22 (Dust) (An area where Gas and Dust is likely to occur in use)
IEC/EN 60079-0, IEC/EN 60079-18

Approved standards

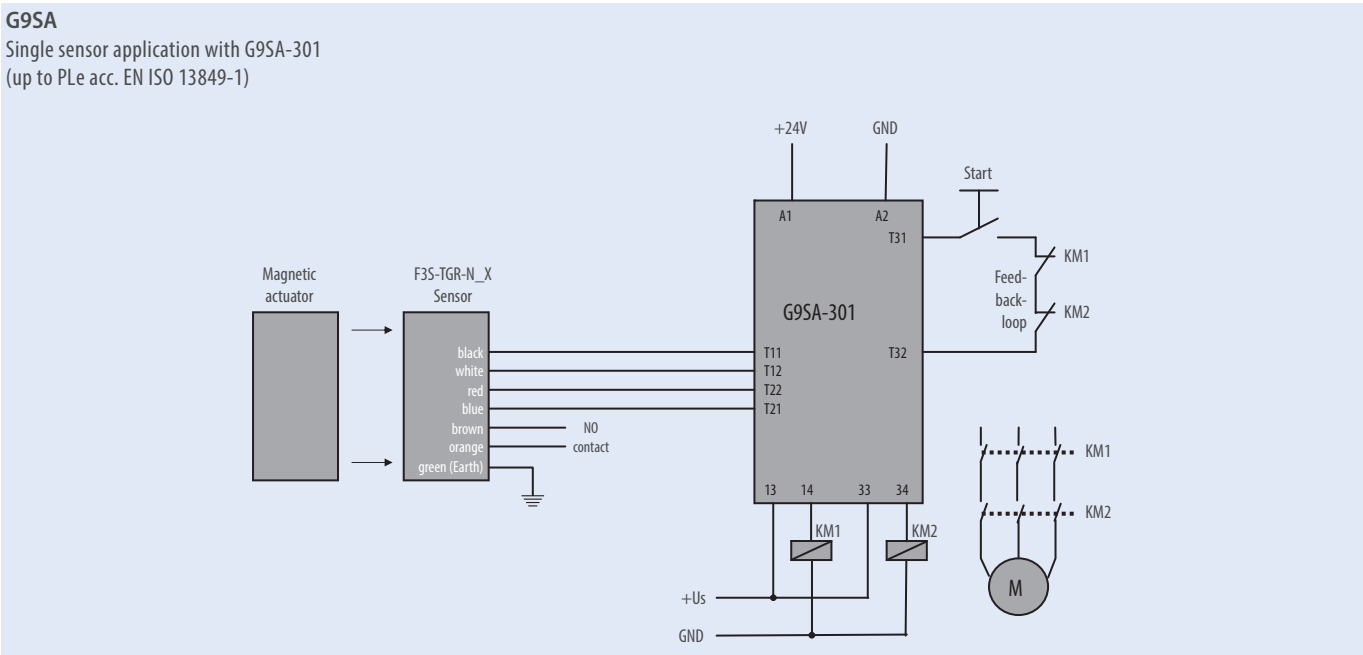
EN standards certified by TÜV Rheinland
EN ISO 13849-1
EN 60204-1
EN 62061
EN ISO 14119
EN/IEC 60947-5-3
UL 508, CSA C22.2
BS 5304
EN 1088-1

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 × 30 mm, 4 × 20 mm, 4 × 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)

Wiring examples (Single head connection)





Safety door switch with plastic housing

The D4NS line-up includes three-contact models with 2NC/1NC and 3NC contact forms in addition to the previous contact forms, 1NC/1NO and 2NC. All models have a M20 conduit opening.

- Line-up with three contacts: 2NC/1NC and 3NC contact forms
- Line-up with two contacts 1NC/1NO and 2NC
- Standardised gold-clad contacts for high contact reliability
- Applicable for standard loads and micro loads


Ordering information

Switches (with approved direct opening contacts)

Type	Contact configuration	Conduit opening/connector	Order code
1-conduit	Slow-action	1NC/1NO	D4NS-4AF
		2NC	D4NS-4BF
		2NC/1NO	D4NS-4CF
		3NC	D4NS-4DF
	Slow-action MBB contact	1NC/1NO	D4NS-4EF
		2NC/1NO	D4NS-4FF

Operation keys (order separately)

Type		Order code
Horizontal mounting		D4DS-K1
Vertical mounting		D4DS-K2

Type		Order code
Adjustable mounting (horizontal)		D4DS-K3
Adjustable mounting (horizontal/vertical)		D4DS-K5

Specifications

Degree of protection	IP67 (EN60947-5-1) (This applies for the switch only. The degree of protection for the key hole is IP00.)	
Durability ^{*1}	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed	0.05 to 0.5 m/s	
Operating frequency	30 operations/minute max.	
Direct opening force ^{*2}	60 N min.	
Direct opening travel ^{*2}	10 mm min.	
Minimum applicable load	Resistive load of 1 mA at 5 VDC (N-level reference value)	
Protection against electric shock	Class II (double insulation)	
Pollution degree (operating environment)	3 (EN60947-5-1)	
Contact gap	2×2 mm min	
Conditional short-circuit current	100 A (EN60947-5-1)	
Rated open thermal current (I _{th})	10 A (EN60947-5-1)	
Ambient temperature	Operating: −30°C to 70°C with no icing	

^{*1} The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%. For more details, consult your Omron representative.

^{*2} These figures are minimum requirements for safe operation.

Note: The above values are initial values.



Safety door switch with metal housing

The D4BS line-up includes two-contact models with 1NC/1NO and 2NC in a robust metal housing with 1 PG 13.5 conduit opening.




- Robust metal housing
- Line-up with two contacts: 1NC/1NO and 2NC
- Standardised gold-clad contacts for high contact reliability
- Applicable for standard loads and micro loads

Ordering information

Switches

Type	Mounting direction	Conduit size	Order code	
			1NC/1NO (slow-action)	2NC (slow-action)
1-conduit	Front-side mounting	Pg13.5	D4BS-15FS	D4BS-1AFS

Operation keys (order separately)

Type		Order code
Horizontal mounting		D4BS-K1
Vertical mounting		D4BS-K2
Adjustable mounting (horizontal)		D4BS-K3

Specifications

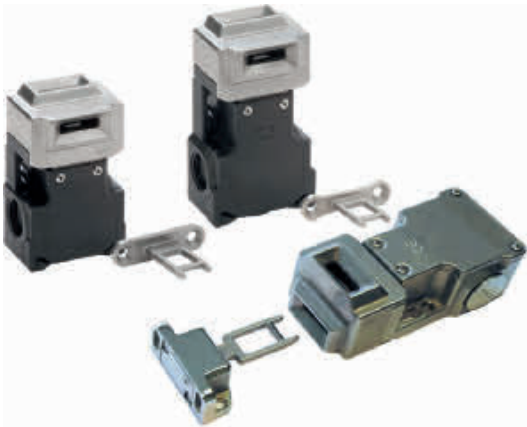
Degree of protection ^{*1}	IP67 (EN60947-5-1)
Durability ^{*2}	Mechanical: 1,000,000 operations min. Electrical: 500,000 operations min. (10 A at 250 VAC, resistive load)
Operating speed	0.1 m/s to 0.5 m/s
Operating frequency	30 operations/min max.
Rated frequency	50/60 Hz
Contact gap	2×2 mm min.
Direct opening force ^{*3}	19.61 N min. (EN60947-5-1)
Direct opening travel ^{*3}	20 mm min. (EN60947-5-1)
Full stroke	23 mm min.
Conventional enclosed thermal current (I _{th})	20 A (EN60947-5-1)
Conditional short-circuit current	100 A (EN60947-5-1)
Pollution degree (operating environment)	3 (EN60947-5-1)
Protection against electric shock	Class I (with ground terminal)
Ambient temperature	Operating: -40 to 80°C (with no icing)

^{*1} Although the switch box is protected from dust, oil, or water penetration, do not use the D4BS in places where dust, oil, water, or chemicals may penetrate through the key hole on the head, otherwise switch damage or malfunctioning may occur.

^{*2} The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%. Contact your Omron sales representative for more detailed information on other operating environments.

^{*3} These figures are minimum requirements for safe operation.

Note: The above values are initial values.






Safety door switches with stainless steel head or full stainless steel body

This safety door switches use a stainless steel head or even a full stainless steel body to increase the robustness.






- 2NC/1NO, 2NC/2NO or 3NC contacts
- Key entry turnable to back side
- 4 key insertion positions
- 3 M20 conduit entries
- Positive break contacts (to IEC 60947-5-1)

Ordering information

Switches

Type	Housing	Conduit	Contacts	Order code	
	Plastic body with metal head	M20	2NC/1NO Slow action	F3S-TGR-KM15-21	
			3NC Slow action	F3S-TGR-KM15-30	
	Plastic body with metal head		2NC/2NO Slow action	F3S-TGR-KM16-22	
			3NC Slow action	F3S-TGR-KM16-30	
	Full stainless steel body		2NC/2NO Slow action	F3S-TGR-KH16-22	
			3NC Slow action	F3S-TGR-KH16-30	

Keys (order separately)

Type		Order code
for metal head		F39-TGR-KAM
Horizontal mounting		F39-TGR-KF
plastic flexible		F39-TGR-KPF
heavy flexible		F39-TGR-KHF
hygienic flexible		F39-TGR-KHFH

Accessories

Item	Remarks	Order code
M20 Gland	Stainless steel 316 for F3S-TGR-KH16 types	F39-TGR-M20
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

Specifications

Item		F3S-TGR-KM15	F3S-TGR-KM16	F3S-TGR-KH16
Standards		EN1088, IEC 60947-5-1, EN 60204-1, UL508 EN ISO 13849-1: up to PLe ^{*1} EN 62061: up to SIL3 ^{*1}		
Mechanical reliability B10d		2.5 × 10 ⁶ operations at 100mA load		
PFHd		3.44 × 10 ⁻⁸		
Proof test interval (Life)		35 years		
MTTFd		356 years		
Utilization category		AC15 A300 3 A		
Thermal current (Ith)		5 A		
Rated insulation/Withstand voltages		500 VAC/2,500 VAC		
Rated travel for positive opening		8 mm		
Actuator entry minimum radius		175 mm standard, 100mm flexible		
Maximum approach/Withdrawal speed		600 mm/s		
Body dimensions (W × H × D)		54 × 88.4 × 34.5 mm	58 × 100.4 × 34.5 mm	58 × 103.5 × 39.5 mm
Fixing		2 × M5, 40 mm distance	4 × M5, 40 mm distance	
Conduit entry		M20		
Material	Body	Polyester		Stainless steel 316
	Head	Stainless steel 316		
Enclosure Protection		IP67		
Temperature Range		-25 to 80°C		
Vibration		IEC 68-2-6, 10-55 Hz +1 Hz, Excursion: 0.35 mm, 1 octave/min		

^{*1} Depending upon system architecture



Guard-lock safety door switch

The D4NL guard-lock safety-door switches are available with four or five built-in contacts. When locked, they have a key holding force of up to 1300 N. Mechanical lock/solenoid release types and vice versa set up the complete range.

- Safety-door switch with electromagnetic lock or unlock mechanism
- Models with four or five built-in contacts
- Strong key holding force: 1300 N
- For standard loads and micro loads
- Keys are compatible with D4GL and D4NS

Ordering information



Switches (with approved direct opening contacts)

For 110 V and 230 V version ask your local Omron representative



Lock and release types	Contact configuration	Conduit opening	Order code
Mechanical lock solenoid release	1NC/1NO + 1NC/1NO	M20	D4NL-4AFA-B
	1NC/1NO + 2NC	M20	D4NL-4BFA-B
	2NC + 1NC/1NO	M20	D4NL-4CFA-B
	2NC + 2NC	M20	D4NL-4DFA-B
	2NC/1NO + 1NC/1NO	M20	D4NL-4EFA-B
	2NC/1NO + 2NC	M20	D4NL-4FFA-B
	3NC + 1NC/1NO	M20	D4NL-4GFA-B
	3NC + 2NC	M20	D4NL-4HFA-B

- Note**
- Conduit sizes of G1/2 and Pg 13,5 are also available.
 - Solenoid: 24 VDC, Orange LED: 10 to 115 VAC/VDC

Operation keys (order separately)

Type		Order code
Horizontal mounting		D4DS-K1
Vertical mounting		D4DS-K2

Lock and release types	Contact configuration	Conduit opening	Order code
Solenoid lock mechanical release	1NC/1NO + 1NC/1NO	M20	D4NL-4AFG-B
	1NC/1NO + 2NC	M20	D4NL-4BFG-B
	2NC + 1NC/1NO	M20	D4NL-4CFG-B
	2NC + 2NC	M20	D4NL-4DFG-B
	2NC/1NO + 1NC/1NO	M20	D4NL-4EFG-B
	2NC/1NO + 2NC	M20	D4NL-4FFG-B
	3NC + 1NC/1NO	M20	D4NL-4GFG-B
	3NC + 2NC	M20	D4NL-4HFG-B

Type		Order code
Adjustable mounting (horizontal)		D4DS-K3
Adjustable mounting (horizontal/vertical)		D4DS-K5

Specifications

Degree of protection		IP67 (EN60947-5-1) (This applies for the switch only. The degree of protection for the key hole is IP00.)
Durability ^{*1}	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC
Operating speed		0.05 to 0.5 m/s
Operating frequency		30 operations/minute max.
Rated frequency		50/60 Hz
Contact gap		2x2 mm min
Direct opening force ^{*2}		60 N min. (EN60947-5-1)
Direct opening travel ^{*2}		10 mm min. (EN60947-5-1)
Holding force		1,300 N min.
Minimum applicable load		Resistive load of 1 mA at 5 VDC (N-level reference value)
Thermal current (I _{th})		10 A (EN60947-5-1)
Conditional short-circuit current		100 A (EN60947-5-1)
Pollution degree (operating environment)		3 (EN60947-5-1)
Protection against electric shock		Class II (double insulation)
Ambient temperature		Operating: -10°C to 55°C (with no icing or condensation)

^{*1} The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%. For more details, consult your Omron representative.

^{*2} These figures are minimum requirements for safe operation.

Note: The above values are initial values.



Guard-lock safety door switch

The D4SL-N guard-lock safety door switches safety door switches provides a wide range of models for the safe monitoring of entries and positions of guards.

- Key holding force 1,300 N
- 4, 5 and 6 contact types
- Terminal block type and connector type
- Drive solenoid directly from the controller
- Turning key insertion point without detaching head

Ordering information

Contact configuration

Contact model	Built-in Switch
4-contact model	Door monitor and Lock monitor are connected in series internally.
	A: 1NC/1NO + 1NC/1NO
	B: 1NC/1NO + 2NC
	C: 2NC + 1NC/1NO
	D: 2NC + 2NC
	Door monitor and Lock monitor are NOT connected in series internally.
	S: 1NC/1NO + 1NC/1NO
	T: 1NC/1NO + 2NC
	U: 2NC + 1NC/1NO
	V: 2NC + 2NC

Contact model	Built-in Switch
5-contact model	E: 2NC/1NO + 1NC/1NO
	F: 2NC/1NO + 2NC
	G: 3NC + 1NC/1NO
	H: 3NC + 2NC
6-contact model	N: 2NC/1NO + 2NC/1NO
	P: 2NC/1NO + 3NC
	Q: 3NC + 2NC/1NO
	R: 3NC + 3NC

Models




Housing	Release key type	Wiring method	Solenoid voltage/Indicator	Lock and release type	Contact configuration (door open/closed detection switch and lock monitor switch contacts)	Conduit size ^{*1}	Order code
Head Resin/ Body Resin ^{*2}	Standard (metal) ^{*3}	Connector	24 VDC (Orange)	Mechanical lock Solenoid release	6-contact Model Insert the built-in switch (N, P, Q or R) into the blank _.	M20	D4SL-N4_FA-DN
			24 VDC (without indicator)		5-contact Model Insert the built-in switch (E, F, G or H) into the blank _.	M20	D4SL-N4_FA-DN
			24 VDC (without indicator)		4-contact Model Insert the built-in switch (A, B, C, D, S, T, U or V) into the blank _.	M20	D4SL-N4_FA-N
			24 VDC (without indicator)		6-contact Model Insert the built-in switch (N, P, Q or R) into the blank _.	M20	D4SL-N4_FA-D
		Terminal block	24 VDC (Orange)	Solenoid lock Mechanical release	5-contact Model Insert the built-in switch (E, F, G or H) into the blank _.	M20	D4SL-N4_FA-D
			24 VDC (without indicator)		4-contact Model Insert the built-in switch (A, B, C, D, S, T, U or V) into the blank _.	M20	D4SL-N4_FA
			24 VDC (Orange)		6-contact Model Insert the built-in switch (N, P, Q or R) into the blank _.	M20	D4SL-N4_FG-DN
			24 VDC (without indicator)		5-contact Model Insert the built-in switch (E, F, G or H) into the blank _.	M20	D4SL-N4_FG-DN
		Connector	24 VDC (Orange)	Solenoid lock Mechanical release	4-contact Model Insert the built-in switch (A, B, C, D, S, T, U or V) into the blank _.	M20	D4SL-N4_FG-N
			24 VDC (without indicator)		6-contact Model Insert the built-in switch (N, P, Q or R) into the blank _.	M20	D4SL-N4_FG-D
			24 VDC (Orange)		5-contact Model Insert the built-in switch (E, F, G or H) into the blank _.	M20	D4SL-N4_FG-D
			24 VDC (without indicator)		4-contact Model Insert the built-in switch (A, B, C, D, S, T, U or V) into the blank _.	M20	D4SL-N4_FG





^{*1} Types also with G1/2 and 1/2-14NPT available - see online data sheet

^{*2} 'Head metal/Body resin' also available - see online data sheet

^{*3} Release key type also resin available - see online data sheet

Operation keys (order separately)

Type		Order code
Horizontal mounting		D4SL-NK1
Horizontal mounting (Short)		D4SL-NK1S
Horizontal mounting (Cushion rubber)		D4SL-NK1G

Type		Order code
Vertical mounting		D4SL-NK2
Vertical mounting (Cushion rubber)		D4SL-NK2G
Adjustable (Horizontal)		D4SL-NK3
Adjustable (Horizontal/Vertical)		D4SL-NK5

Connector cables for connector types

Cable length	Order code
1 m	D4SL-CN1
3 m	D4SL-CN3
5 m	D4SL-CN5
10 m	D4SL-CN10

Specifications

Degree of protection ^{*1}	IP67 (EN60947-5-1)	
Durability ^{*2}	Mechanical	1,000,000 operations min.
	Electrical	150,000 operations min. (1 A resistance at 125 VAC) ^{*3}
Operating speed	0.05 to 1 m/s	
Operating frequency	5 operations minute max.	
Direct opening force ^{*4}	60 N min. (EN60947-5-1)	
Direct opening travel ^{*4}	15 mm min. (EN60947-5-1)	
Holding force	1,300 N min.	
Minimum applicable load	1 mA resistive load at 5 VDC (N-level reference value)	
Rated insulation voltage (Ui)	150 V (EN60947-5-1)	
Rated frequency	50/60 Hz	
Protection against electric shock	Class II(double insulation)	
Pollution degree (operating environment)	3 (EN60947-5-1)	
Conditional short-circuit current	100 A (EN60947-5-1)	
Conventional free air thermal current (Ith)	2.5 A (11-42, 21-52, 21-22) 1 A (Others)	
Ambient operating temperature	-10 to 55°C (with no icing)	
Ambient operations humidity	95% max.	

^{*1} This applies for the switch only. The degree of protection for the key hole is IP00.

^{*2} The durability is for an ambient temperature of 5 to 35°C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.

^{*3} Do not pass the 1 A, 125 VAC load through more than 3 circuits.

^{*4} These figures are minimum requirements for safe operation.

Note 1. The above values are initial values.

2. The switch contacts can be used with either standard loads or microloads.




Stainless steel guard-lock safety door switch

The F3S-TGR-KHL1 safety-door switch keeps medium to large guard doors closed until hazards have been removed. It has a stainless steel body and is designed to cope with the rigorous applications of the food processing and chemical industries.




- Safety-door switch with electromagnetic lock and unlock mechanism (mechanical lock/solenoid unlock)
- Model with 6 built-in contacts
- Strong key holding force: 1600 N
- LED for diagnosis
- IP69K suitable for SIP and CIP processes
- Positive break contacts to IEC 60947-5-1

Ordering information

Switches

Type	Housing	Conduit	Contacts	Order code
	Stainless steel 316	M20	2NC/1NO+2NC/1NO Each NC Door contact is connected with another Lock monitor contact internally. NO contacts are not connected in series internally.	F3S-TGR-KHL1

Keys (order separately)

Type		Order code
Standard		F39-TGR-KAM
Horizontal mounting		F39-TGR-KF
heavy flexible		F39-TGR-KHF
hygienic flexible		F39-TGR-KHFH

Accessories

Item	Remarks	Order code
M20 Gland	Stainless steel 316	F39-TGR-M20

Specifications

Item	F3S-TGR-KHL1
Standards	EN1088, IEC 60947-5-1, EN 60204-1, UL508 EN ISO 13849-1: up to PLe ^{*1} EN 62061: up to SIL3 ^{*1}
Lock principle	Mechanical lock/solenoid unlock
Indicator LED	Status of solenoid
Holding force	1600 N
Utilization category	AC15 A300 3 A
Thermal current (Ith)	5 A
Rated insulation/Withstand voltages	500 VAC/2,500 VAC
Rated travel for positive opening	10 mm
Actuator entry minimum radius	175 mm standard, 100 mm flexible
Maximum approach/Withdrawal speed	600 mm/s
Body dimensions (W × H × D)	63 × 143 × 41.5 mm
Fixing	2 × M5, 40 mm distance
Conduit entry	M20
Material	Stainless steel 316
Enclosure Protection	IP69K
Temperature Range	-25 to 55°C
Vibration	IEC 68-2-6, 10 to 55 Hz +1 Hz, Excursion: 0.35 mm, 1 octave/min

^{*1} Depending upon system architecture





Stainless steel guard-lock safety door switch

The F3S-TGR-KHL3 safety-door switch keeps medium to large guard doors closed until hazards have been removed. It has a stainless steel body and is designed to cope with the rigorous applications of the food processing and chemical industries.

- Safety-door switch with electromagnetic lock and unlock mechanism (mechanical lock/solenoid unlock)
- Models with 6 built-in contacts
- Strong key holding force: 2000 N
- LED for diagnosis
- IP69K suitable for SIP and CIP processes
- Positive break contacts to IEC 60947-5-1





Ordering information

Switches

Type	Housing	Conduit	Contacts	Order code
	Stainless steel 316	M20	2NC/1NO+2NC/1NO 4NC safety contacts (2 door monitoring, 2 lock monitoring) 2NO Auxiliary contact (guard open, lock status)*1	F3S-TGR-KHL3
	Stainless steel 316 with rear push button manual release			F3S-TGR-KHL3R

*1 1NO lock status if LED2 Lock Status Indicator not used

Keys (order separately)

Type	Order code
Standard 	F39-TGR-KAM
Horizontal mounting 	F39-TGR-KF
heavy flexible 	F39-TGR-KHF
hygienic flexible 	F39-TGR-KHFH

Accessories

Item	Remarks	Order code
M20 Gland	Stainless steel 316	F39-TGR-M20
Key	Manual release key	F39-TGR-MRK

Specifications

	F3S-TGR-KHL3
Standards	EN1088, IEC 60947-5-1, EN 60204-1, UL508 EN ISO 13849-1: up to PLe*1 EN 62061: up to SIL3*1
Lock principle	Mechanical lock/solenoid unlock
Holding force	2000 N
Indicator LEDs	LED1: Status of solenoid LED2: Lock status indication (if 1NO Auxiliary contact not used)
Utilization category	AC15 A300 3 A
Thermal current (Ith)	5 A
Rated insulation/Withstand voltages	500 VAC/2,500 VAC
Rated travel for positive opening	10 mm
Actuator entry minimum radius	175 mm standard, 100 mm flexible
Maximum approach/Withdrawal speed	600 mm/s
Body dimensions (W × H × D)	48 × 177 × 47 mm
Fixing	4 × M5, mounted from backside
Conduit entry	M20
Material	Stainless steel 316
Enclosure Protection	IP69K
Temperature Range	−25 to 55°C
Vibration	IEC 68-2-6, 10-55 Hz +1 Hz, Excursion: 0.35 mm, 1 octave/min

*1 Depending upon system architecture