

SAFETY SIMPLIFIED TO THE MAX

Making safety transparent and understandable

In order to implement safety controls, it is essential to begin taking safety into consideration at the design stage. We offer safety systems that incorporate the latest sensing and control technologies combined with safety design, consulting services to ensure optimum machine and equipment safety and secure a safe production environment.



Understand safety in minutes and ask for your own free safety guide at:
www.ce-safety.info

Safety – Table of contents

Emergency stop switches

13

Product overview	356
Selection table	358
Rope pull emergency Stop Switches	ER-series rope pulls 361
Emergency Stop Pushbutton Switches	A22E 364
	A165E 365

Safety limit switches

14

Product overview	366
Selection table	368
Safety limit switch with metal housing	D4B-_N 369
Safety limit switch with plastic housing	D4N 370
Safety door hinge switch D4N-_R	D4NH 372
Safety limit switch with manual reset	D4N-_R 373

Safety door switches

15

Product overview	374
Selection table	376
Guard-lock safety door switch	D4NL 379
	D4GL 380
	D4BL 381
Safety door switch	D4NS 382
	D4BS 383
Non-contact switches	F3S-TGR-N_C 384
	F3S-TGR-N_R 386
	D40A/G9SX-NS 410

Safety sensors

16

Product overview	388
Selection table	390
Category-2 safety light curtain	F3S-B 393
Category 4/2 safety light curtain	MS4800/2800 394
Category-4 safety light curtain/multi-beam safety sensor	F3SN-A 396
Multi-beam safety sensor	F3S-TGR-CL 398
Single-beam safety sensor in compact housing	E3FS 402
Safety light curtain controller with integrated muting function	F3SP-U4P 403

Safety control systems

17

Product overview	404
Selection table	406
Slim size safety unit	G9SB 408
Expandable safety relay unit	G9SA 409
Compact non-contact door switch/flexible safety unit	D40A/G9SX-NS 410
Safety guard switching unit	G9SX-GS/A4EG 412
Flexible safety unit	G9SX 414
Standstill monitoring unit	G9SX-SM 415
Limited speed monitoring unit	G9SX-LM 416
Standalone Safety Controller	NE0A/NE1A-L 418
Safety network controller	NE1A 420
DeviceNet safety I/O terminal block family	DST1-ID/-MD/-MRD 421
Relays with forcibly guided contacts	G7SA 423

Reliability data of Omron components	424
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STOP THE MACHINE IN HAZARD SITUATIONS

Safe stop at any point along the machine: ER series rope pull switches

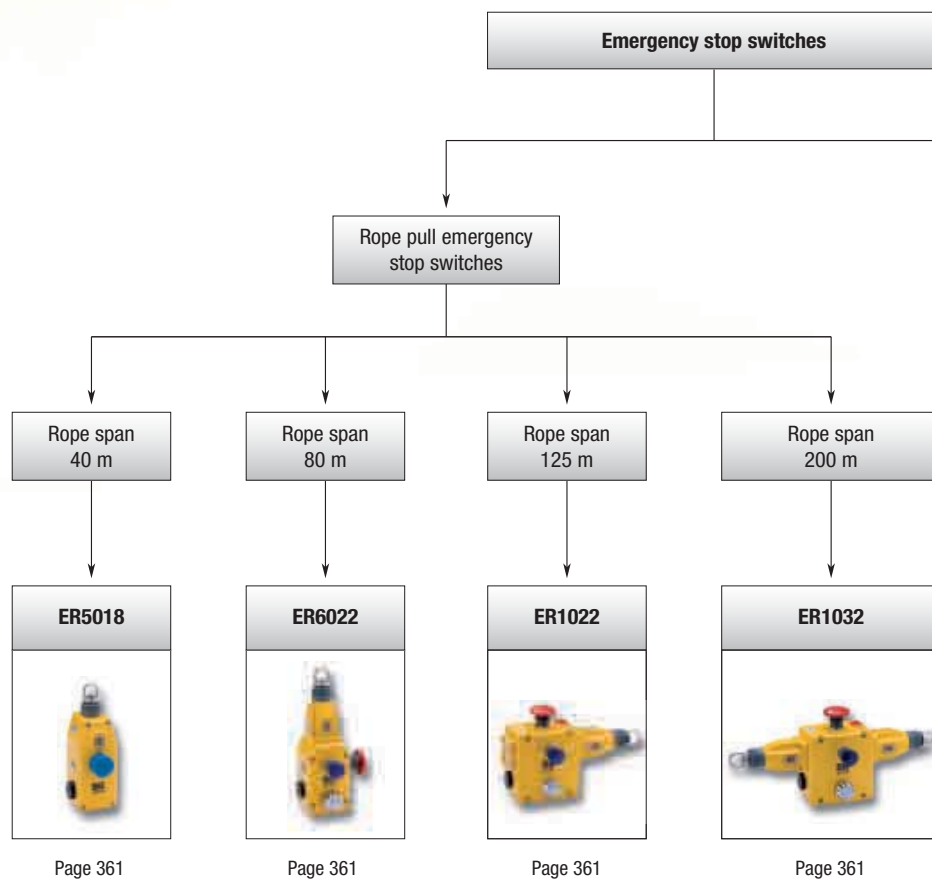
European Standards require Emergency Stop function on every machine to enable workers to stop machines as quickly as possible in a dangerous situation, this can be achieved with our Emergency stop pushbuttons or along a line with our rope pull emergency stop switches.

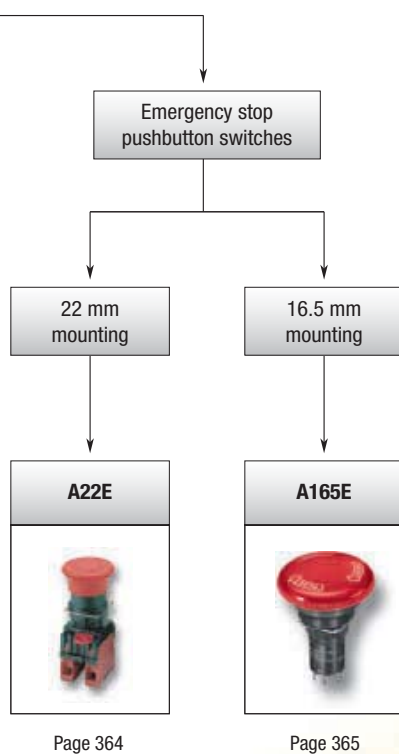
- Long rope span up to 200 m per switch
- Tension indicator for easy installation and maintenance
- Switch and accessories in stainless steel for demanding environment







Select your emergency stop equipment in a split second:



www.omron-industrial.com/safety





Selection table

		Rope pull switches			
					
Selection criteria	Model	ER 5018	ER 6022	ER 1022	ER 1032
	Housing	Metal			
	Protection class	IP67			
	Operating Temperature Range	-25 to +80°C			
	Head Size	—			
	Conformity	IEC947-5-1, IEC947-5-5, EN418, UL508, BS5304			
Features	Max. Rope Span	40 m	80 m	125 m	200 m
	Conduit size M20	■			
	Additional E-Stop button	■			
	LED indicator beacon	—	■	■	■
	Stainless steel housing	—	Available	—	—
	Explosion proof housing	—	■	■	■
	Lighted Head	—			
	Push lock - pull reset	—			
	Push lock, turn reset	—			
	Push lock, lock key reset	—			
Application	E-Stop application	■			
	General safety application	■			
Contact configuration	2NC+1NO	■	■	—	—
	3NC	■	■	—	—
	4NC+2NO	—	—	■	■
	SPST (NC)	—			
	DPST (NC)	—			
	SPST (NO) + SPST (NC)	—			
	TPST (NC)	—			
Page		361			

		Emergency stop pushbutton switches	
			
Selection criteria	Model	A22E	A165E
	Housing	Plastic	
	Protection class	IP65	
	Operating Temperature Range	-20 to 70°C	-10 to 55°C
	Head Size	30 mm, 40 mm, 60 mm	30 mm, 40 mm
	Conformity	EN 60947-5-1	
Features	Max. Rope Span	—	
	Conduit size M20	—	
	Additional E-Stop button	—	
	LED indicator beacon	—	
	Stainless steel housing	—	
	Explosion proof housing	—	
	Lighted Head	■	
	Push lock - pull reset	■	—
	Push lock, turn reset	■	
Application	E-Stop application	■	
	General safety application	■	
Contact configuration	2NC+1NO	—	
	3NC	—	
	4NC+2NO	—	
	SPST (NC)	■	
	DPST (NC)	■	
	SPST (NO) + SPST (NC)	■	—
	TPST (NC)	—	■
Page		364	365

■ Standard

— No/not available



Emergency Stop Switch

- Tension indicator – the tension indicator makes the system easy to set up and to maintain the proper rope tension
- Heavy-duty housing – the die-cast housing and stainless steel eye nut makes the ER series rope pull switches suitable for demanding industrial applications
- Vibration tolerant – the snap-acting switch contacts protect against nuisance tripping due to vibration
- Integral E-stop – the E-stop button provides emergency stopping capability at the extreme end of the installation and is field serviceable
- ER6022 available in stainless steel housing
- ER6022, ER1022 and ER1032 available in explosion proof housing

Ordering information

Standard models

Aluminium die-cast housing

E-Stop	Indicator Beacon	Contacts	Wiring Entry	Order code
Not included	–	2 N/C + 1 N/O	3 x M20	ER5018-021M
Not included	–	3 N/C	3 x M20	ER5018-030M
Included	–	2 N/C + 1 N/O	3 x M20	ER5018-021ME
Included	–	3 N/C	3 x M20	ER5018-030ME
Not included	Not included	2 N/C + 1 N/O	3 x M20	ER6022-021M
Not included	Not included	3 N/C	3 x M20	ER6022-030M
Not included	Included (24 VDC)	2 N/C + 1 N/O	3 x M20	ER6022-021ML
Not included	Included (24 VDC)	3 N/C	3 x M20	ER6022-030ML
Included	Not included	2 N/C + 1 N/O	3 x M20	ER6022-021ME
Included	Not included	3 N/C	3 x M20	ER6022-030ME
Included	Included (24 VDC)	2 N/C + 1 N/O	3 x M20	ER6022-021MEL
Included	Included (24 VDC)	3 N/C	3 x M20	ER6022-030MEL
Included	Included (24 VDC)	4 N/C + 2 N/O	4 x M20	ER1022-042MELL
Included	Included (24 VDC)	4 N/C + 2 N/O	4 x M20	ER1022-042MELR
Included	Included (24 VDC)	4 N/C + 2 N/O	4 x M20	ER1032-042MEL

Stainless steel housing

E-Stop	Indicator Beacon	Contacts	Wiring Entry	Order code
Not included	Not included	2 N/C + 2 N/O	3 x M20	ER6022-022MSS
Not included	Not included	3 N/C + 1 N/O	3 x M20	ER6022-031MSS
Not included	Included	2 N/C + 2 N/O	3 x M20	ER6022-022MLSS
Not included	Included	3 N/C + 1 N/O	3 x M20	ER6022-031MLSS
Included	Not included	2 N/C + 2 N/O	3 x M20	ER6022-022MESS
Included	Not included	3 N/C + 1 N/O	3 x M20	ER6022-031MESS
Included	Included	2 N/C + 2 N/O	3 x M20	ER6022-022MELSS
Included	Included	3 N/C + 1 N/O	3 x M20	ER6022-031MELSS

Explosion proof models

Aluminium die-cast housing

E-Stop	Indicator Beacon	Contacts	Wiring Entry	Order code
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	XER6022-011C3
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	XER1022-011C3L
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	XER1022-011C3R
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	XER1032-011C3

Stainless steel housing

E-Stop	Indicator Beacon	Contacts	Wiring Entry	Order code
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	XER6022-011C3SS
Not included	Not included	2 N/C	pre-wired, 3 m	XER6022-020C3SS

Accessories

Item	Applicable model	Order code
Replacement Lid	ER 5018	SM06-SL400
	ER 6022	SM06-SL500
	ER6022-SS stainless steel	SM06-SLXER6022SS
Replacement Lid/LED, 24 VDC	ER 1022	EM06-SL710
	ER 1032	SM06-SL711
	ER6022-SS stainless steel	SM06-SLXER622LSS
Replacement Lid/LED	ER 6022	SM06-SL510
Rope Kit, 5 m, Stainless Steel	ER 5018, ER 6022, ER 1022, ER 1032	RK5
Rope Kit, 10 m, Stainless Steel	ER 5018, ER 6022, ER 1022, ER 1032	RK10
Rope Kit, 20 m, Stainless Steel	ER 5018, ER 6022, ER 1022, ER 1032	RK20
Rope Kit, 50 m, Stainless Steel	ER 5018, ER 6022, ER 1022, ER 1032	RK50
Rope Kit, 80 m, Stainless Steel	ER 6022, ER1022, ER1032	RK80
Rope Only, 5 m	ER 5018, ER 6022, ER 1022, ER 1032	R5M
Rope Only, 10 m	ER 5018, ER 6022, ER 1022, ER 1032	R10M
Rope Only, 20 m	ER 5018, ER 6022, ER 1022, ER 1032	R20M
Rope Only, 50 m	ER 5018, ER 6022, ER 1022, ER 1032	R50M
Rope Only, 100 m	ER 5018, ER 6022, ER 1022, ER 1032	R100M
Rope Only, 126 m	ER 5018, ER 6022, ER 1022, ER 1032	R126M
Tensioner Gripper, Stainless Steel	ER 5018, ER 6022, ER 1022, ER 1032	SM06-TG00
Eye Bolt Stainless Steel, 8 per pack	ER 5018, ER 6022, ER 1022, ER 1032	SM06-EB10
Double Loop Clip, Stainless Steel, 4 per pack	ER 5018, ER 6022, ER 1022, ER 1032	SM06-DL20
Thimble Stainless Steel, 4 per pack	ER 5018, ER 6022, ER 1022, ER 1032	SM06-THSS
Turnbuckle, Stainless Steel	ER 5018, ER 6022, ER 1022, ER 1032	SM06-TB30
Spring, Stainless Steel	ER 5018, ER 6022, ER 1022, ER 1032	SM06-SP50
Rope Pulley, Stainless Steel	ER 5018, ER 6022, ER 1022, ER 1032	SM06-RPSS
E-Stop Mechanism	ER 5018, ER 6022, ER 1022, ER 1032	SM06-ES60

Specifications

Standard models

Item		Applicable model			
		ER 5018	ER 6022	ER 1022	ER 1032
Electrical	Contact Configurations	2 N/C + 1 N/O, 3 N/C	2 N/C + 1 N/O, 3 N/C, 3N/C + 1N/O	4 N/C + 2 N/O	4 N/C + 2 N/O
	Safety Contacts	2 N/C, 3 N/C	2 N/C, 3 N/C	4 N/C	
	Switching Ability	AC: 120 V–6 A, 240 V–3 A, Inductive DC: 24 V–2.5 A, Inductive			
	Auxiliary Contacts	1 N/O		2 N/O	
	Max. Switching Current/Volt/Amp	240 V/720 VA			
	Electrical Life	1,000,000 minimum			
	LED Indicator Beacon	–	24 VDC		
Mechanical	Max. Rope Span	40 m	80 m	125 m	125 m each side
	Case Material	Die-cast aluminium alloy			
	Eye Nut Material	Stainless steel			
	Wiring Entry	3 x M20		4 x M20	
	Mechanical Life	1,000,000 minimum			
Environmental	Protection	IP67 (NEMA 6)			
	Operating Temperature	–25 to 80°C			
	Cleaning	Water washdown			
Compliance	Standards	IEC947-5-1, IEC947-5-5, EN418, UL508, BS5304			
	Approvals/Listings	CE marked for all applicable directives, UL and C-UL			

Explosion proof models

Item		Applicable model		
		XER6022	XER1022	XER1032
Electrical	Contact configuration	1 N/C + 1 N/O, 2 N/C		
	Safety Contact	1 N/C, 2 N/C		
	Auxiliary Contact	1 N/O		
	Rated voltage AC15	400 VAC	250 VAC	250 VDC
	Rated Current	2 A AC	4 A AC	0.15 A DC
	Switching ability AC Ratings	Voltage	250 V	125 V
		Resistive Load	5A	
		Inductive Load	3A	
	Switching ability DC Ratings	Voltage	250V	30V
		Resistive Load	0,4A	7A
		Inductive Load	0,03A	5A
Compliance	Ex-Classification	II 2 G		
	Certification	PTB 00 ATEX 1093X	IBExU 01 ATEX 1007X	

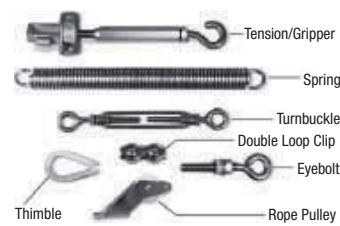
Accessories

RK Rope Tension Kit



The RK Rope Tension Kit comes with all of the required hardware for most installations. A spring is required as shown in the installation example below.

Installation Hardware



Individual hardware items may be purchased for specific installation requirements.



Emergency Stop Switch

The A22E line-up of E-Stop switches offers various head types as well as lighted models. E-stop shrouds and control boxes as accessories provide flexibility in application.

- Direct opening mechanism with minimum contact separation of 3 mm
- Safety lock mechanism prevents misuse
- Easy mounting of switch block
- Lighted models for easy diagnosis and maintenance
- Modular design for flexibility in application

Ordering Information

Non-lighted Models

Description	Output	Colour of cap	Order code
30-dia. head Push-lock Turn-reset	SPST-NC	Red	A22E-S-01
	SPST-NO/SPST-NC		A22E-S-11
	DPST-NC		A22E-S-02
40-dia. head Push-lock Turn-reset	SPST-NC		A22E-M-01
	SPST-NO/SPST-NC		A22E-M-11
	DPST-NC		A22E-M-02
60-dia. head Push-lock Turn-reset	SPST-NC		A22E-L-01
	SPST-NO/SPST-NC		A22E-L-11
	DPST-NC		A22E-L-02
30-dia. head Push-lock Key-reset	SPST-NC		A22E-SK-01
	SPST-NO/SPST-NC		A22E-SK-11
	DPST-NC		A22E-SK-02
40-dia. head Push-lock Key-reset	SPST-NC		A22E-MK-01
	SPST-NO/SPST-NC		A22E-MK-11
	DPST-NC		A22E-MK-02

Lighted Models

Description	Output	Lighting	Rated voltage	Colour of cap	Order code
40-dia. head Push-lock Turn-reset	SPST-NC	LED	24 VAC/VDC	Red	A22EL-M-24A-01
	SPST-NO/SPST-NC		24 VAC/VDC		A22EL-M-24A-11
	DPST-NC		24 VAC/VDC		A22EL-M-24A-02
40-dia. head Push-lock Turn-reset	SPST-NC		220 VAC		A22EL-M-T2-01
	SPST-NO/SPST-NC		220 VAC		A22EL-M-T2-11
	DPST-NC		220 VAC		A22EL-M-T2-02

Accessories (Order Separately)

Item	Classification	Remarks	Order code
Control Boxes (Enclosures)	One hole	Material: Polycarbonate resin	A22Z-B101
	One hole, yellow box (for emergency stop)		A22Z-B101Y
	Two holes		A22Z-B102
	Three holes		A22Z-B103
Legend Plates for Emergency Stop	60-dia. black letters on yellow back-ground	"EMERGENCY STOP" is indicated on the plate.	A22Z-3466-1
	90-dia. black letters on yellow back-ground		A22Z-3476-1

Specifications

Contacts (Standard Load)

Rated carry current	Rated voltage	Rated current (A)			
		AC15	AC12	DC13	DC12
10	24 VAC	10	10	---	---
	220 VAC	3	6	---	---
	24 VDC	---	---	1.5	10
	220 VDC	---	---	0.2	0.6

Note: 1. Rated current values are determined according to the testing conditions. The above ratings were obtained by conducting tests under the following conditions.

- (1) Ambient temperature: $20 \pm 2^\circ\text{C}$
- (2) Ambient humidity: $65 \pm 5\%$
- (3) Operating frequency: 20 operations/minute

2. Minimum applicable load: 10 mA at 5 VDC

Contacts (Microload)

Rated applicable load	Minimum applicable load
50 mA at 5 VDC (Resistive load)	1 mA at 5 VDC

Characteristics

Item	Emergency Stop Switches	
	Non-lighted model: A22E	Lighted model: A22EL
Dielectric strength	2,500 VAC, 50/60 Hz for 1 min between terminals of same polarity	
	2,500 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground	
Durability	Mechanical	Momentary operation: 300,000 operations min.
	Electrical	300,000 operations min.
Degree of protection	IP65 (oil-resistant)	IP65



Emergency stop switch

The A165E line-up offers E-Stop switches with various head types. For flexible applications, a wide range of accessories is provided. To set up easy installation and maintenance, various contact combinations are available.

- Direct opening mechanism with minimum contact separation of 3 mm
- Safety lock mechanism prevents misuse
- Short mounting depth
- Modular construction; easy installation using snap-in switch

Ordering information

Switches	Rated voltage	Pushbutton colour	Pushbutton size	Terminal	Contact	Order code
						Standard load (125 VAC at 5 A, 250 VAC at 3 A, 30 VDC at 3 A)
LED	24 VDC	Red	30 dia.	Solder terminal	SPST-NC	A165E-LS-24D-01
					DPST-NC	A165E-LS-24D-02
None	—				SPST-NC	A165E-S-01
					DPST-NC	A165E-S-02
					TPST-NC	A165E-S-03U
LED	24 VDC	Red	40 dia.	Solder terminal	SPST-NC	A165E-LM-24D-01
					DPST-NC	A165E-LM-24D-02
None	—				SPST-NC	A165E-M-01
					DPST-NC	A165E-M-02
					TPST-NC	A165E-M-03U

Note: The above models have a surface indication of “RESET.” Models with “STOP” indication are also available. For further information, contact your Omron representative.

Accessories (order separately)

Item	Type	Precautions	Order code
Yellow plate	Yellow, 45 dia.	Use this as an emergency stop nameplate.	A16Z-5070
Panel plug	Round	Used for covering the panel cutouts for future panel expansion.	A16ZT-3003
Tightening tool	—	Useful for repetitive mounting. Be careful not to tighten excessively.	A16Z-3004
Extractor	—	Convenient for extracting the switch and lamp.	A16Z-5080

Specifications

Rated voltage	Resistive load		Features	Characteristics
	A165E series	A165E_-U series		
125 VAC	5 A	1 A	Operating force (OF) max.	14.7 N
250 VAC	3 A	0.5 A	Releasing force (RF) min.	0.1 N·m
30 VDC	3 A	1 A	Pretravel (PT)	3.5±0.5 mm (3±0.5 mm In case of A165E_U series)
Minimum applicable load	150 mA at 5 VDC	1 mA at 5 VDC		

Item		Emergency stop switch
Allowable operating frequency	Mechanical	20 operations/minute max.
	Electrical	10 operations/minute max.
Insulation resistance		100 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity 2,000 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground 1,000 VAC, 50/60 Hz for 1 min between lamp terminals ^{*1}
Durability	Mechanical	100,000 operations min.
	Electrical	100,000 operations min.
Ambient temperature		Operating: -10 to 55°C (with no icing or condensation) Storage: -25 to 65°C (with no icing or condensation)
Protection against electric shock		Class II

^{*1} LED not mounted. Test them with the LED removed.

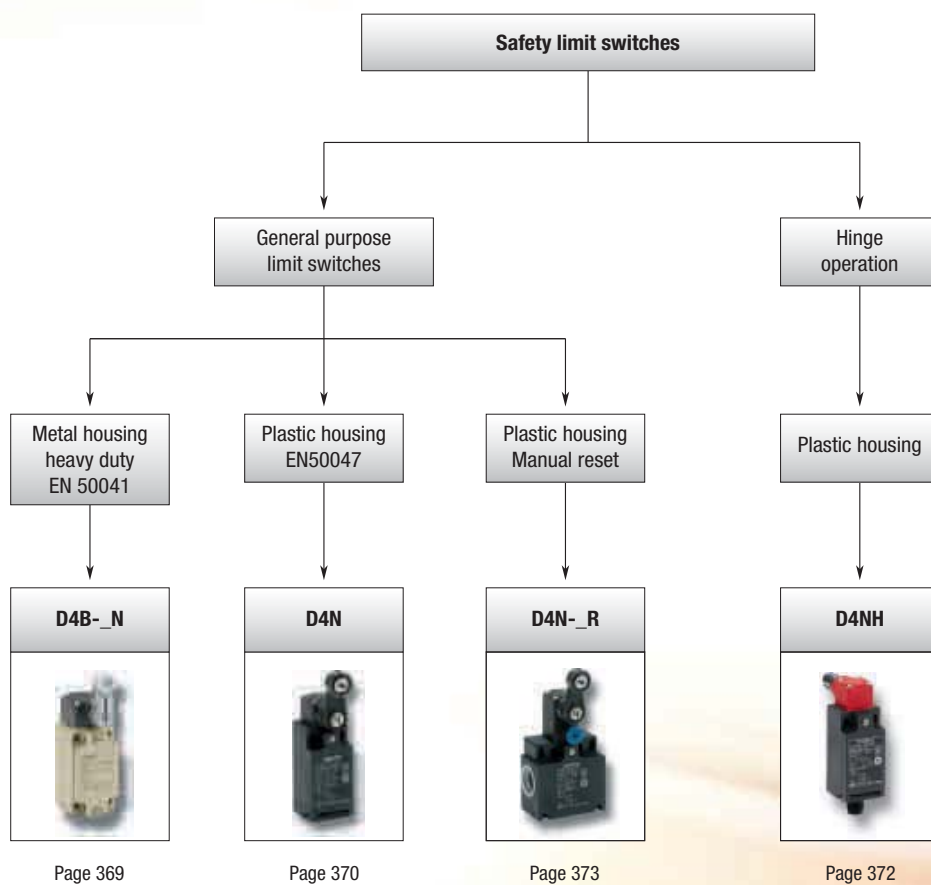
PRECISE MONITORING OF GUARD POSITION

Detect linear or rotational movement of guards: D4N

Guards and covers on machines protect workers. They limit access to the dangerous parts of the machine. Our safety limit switches guarantee that the guards and covers are in place before the machine is started.

- Wide variety of actuators to fit wide range of applications
- Gold-plated contacts for reliable operation with micro loads
- 1- and 2-conduit models for flexibility in wiring
- M12 connector for fast installation and maintenance





		Safety limit switches			
					
Selection criteria	Model	D4B-_N	D4N	D4NH	D4N-_R
	Housing	Metal	Plastic	Plastic	Plastic
	M12 Plug connector	—	■	■	—
	Protection class	IP67			
	Operating Temperature Range	-40 to 80°C	-30 to 70°C	-30 to 70°C	-30 to 70°C
	Conformity	EN50047, EN1088			
Features	Conduit size PG13.5	■	■	■	■
	Conduit size M20	■	■	■	■
	Conduit size G1/2	■	■	■	■
	Conduit size 1/2-14NPT	■	■	■	■
	Gold clad contacts	■	■	■	■
	Actuators				
	Resin roller, resin lever	—	■	—	■
	Resin roller, metal lever	■	■	—	—
	Metal roller, metal lever	—	■	—	—
	Bearing lever, metal lever	—	■	—	—
	Adj. resin roller, metal lever	■	■	—	■
	Adj. Rubber roller, metal lever	—	■	—	■
	Adj. Rod lever	■	—	—	—
	Top plunger	■	■	—	■
	Top roller plunger	■	■	—	■
	Horizontal roller arm lever	—	■	—	■
	Vertical roller arm lever	—	■	—	■
	Cat whisker	—	■	—	—
	Plastic Rod	■	■	—	—
	Fork lever lock (right operation)	—	■	—	—
	Fork lever lock (left operation)	—	■	—	—
Application	Hinge operation	■	—	■	—
	Position monitoring	■	■	■	■
Contact configuration	General safety application	—	—	—	—
	1NC/1NO snap action	■	■	—	—
	2NC snap action	—	■	—	—
	1NC/1NO slow action	■	■	■	■
	2NC slow action	■	■	■	■
	2NC/1NO slow action	—	■	■	■
	3NC slow action	—	■	■	■
	1NC/1NO (MBB slow action)	—	■	■	—
	2NC/1NO (MBB slow action)	—	■	■	—
Page		369	370	372	373

■ Standard

— No/not available



Safety limit switch with metal housing

The D4BN family is a complete line-up of safety limit switches in metal housing. They are available with two built-in contacts and a wide range of head and actuator types. To set up easy installation and maintenance, various conduit types, e.g. M20, are provided.

- Direct opening mechanism
- Various actuators
- Robust metal housing
- Gold-plated contacts for handling micro loads
- Metric conduit types available

Ordering information

Switches (EN50041)		Order code		
		1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)
Side rotary	Roller lever (form A)	D4B-4111N	D4B-4511N	D4B-4A11N
	Adjustable roller lever	D4B-4116N	D4B-4516N	D4B-4A16N
	Adjustable rod lever (form D)	D4B-4117N	D4B-4517N	D4B-4A17N
Top plunger	Plain (form B)	D4B-4170N	D4B-4570N	D4B-4A70N
	Roller (form C)	D4B-4171N	D4B-4571N	D4B-4A71N
Wobble lever	Coil spring	D4B-4181N	—	—
	Plastic rod	D4B-4187N	—	—

Note: Conduit sizes G1/2 and Pg 13,5 are also available

3-conduit Switch		Order code		
		1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)
Side rotary	Roller lever (form A)	D4B-8111N	—	—
	Adjustable roller lever	D4B-8116N	—	—
	Adjustable rod lever (form D)	D4B-8117N	—	—
Top plunger	Plain (form B)	—	—	—
	Roller (form C)	D4B-8171N	—	D4B-8A71N
Wobble lever	Coil spring	—	—	—
	Plastic rod	—	—	—

bold = safety limit switch, mechanical form lock

Specifications

Item		Snap-action	Slow-action
Durability ^{*1}	Mechanical	30,000,000 operations min.	10,000,000 operations min.
	Electrical	500,000 operations min. (at a 250 VAC, 10 A resistive load)	
Operating speed		1 mm/s to 0.5 m/s	
Operating frequency		Mechanical: 120 operations/min Electrical: 30 operations/min	
Rated frequency		50/60 Hz	
Contact resistance		25 mΩ max. (initial value)	
Pollution degree (operating environment)		3 (EN60947-5-1)	
Conditional short-circuit current		100 A (EN60947-5-1)	
Conventional enclosed thermal current (I _{th})		20 A (EN60947-5-1)	
Protection against electric shock		Class I (with ground terminal)	
Ambient temperature		Operating: -40 to 80°C (with no icing) ^{*2}	
Degree of protection		IP67 (EN60947-5-1)	

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

^{*2} -25 to 80°C for the flexible-rod type.



Safety limit switch with plastic housing

The D4N family is a complete line-up of safety limit switches. They are available with one, two or three built-in contacts and a wide range of head and actuator types. To set up easy installation and maintenance, various conduit types, e.g. M20 and M12 connector types, are provided.

- Direct opening mechanism
- Various actuators
- Double insulation
- Gold-plated contacts for handling micro loads
- Metric conduit types available

Ordering information

Switches		Conduit size		Built-in switch mechanism					
				1NC/1NO (snap-action)		1NC/1NO (slow-action)		2NC (slow-action)	
				Direct opening	Order code	Direct opening	Order code	Direct opening	Order code
	Roller lever (resin lever, resin roller)	1-conduit	M20		D4N-4120		D4N-4A20		D4N-4B20
			M12 connector		D4N-9120		D4N-9A20		D4N-9B20
	Plunger	1-conduit	M20		D4N-4131		D4N-4A31		D4N-4B31
			M12 connector		D4N-9131		D4N-9A31		D4N-9B31
		2-conduit	M20		D4N-8131		D4N-8A31		D4N-8B31
	Roller plunger	1-conduit	M20		D4N-4132		D4N-4A32		D4N-4B32
			M12 connector		D4N-9132		D4N-9A32		D4N-9B32
		2-conduit	M20		D4N-8132		D4N-8A32		D4N-8B32
	One-way roller arm lever (horizontal)	1-conduit	M20		D4N-4162		D4N-4A62		D4N-4B62
			M12 connector		D4N-9162		D4N-9A62		D4N-9B62
		2-conduit	M20		D4N-8162		D4N-8A62		D4N-8B62
	One-way roller arm lever (vertical)	1-conduit	M20		D4N-4172		D4N-4A72		D4N-4B72
			M12 connector		D4N-9172		D4N-9A72		D4N-9B72
	Adjustable roller lever, form lock (metal lever, resin roller)	1-conduit	M20		D4N-412G		D4N-4A2G		D4N-4B2G
			M12 connector		D4N-912G		D4N-9A2G		D4N-9B2G
	Adjustable roller lever, form lock (metal lever, rubber roller)	1-conduit	M20		D4N-412H		D4N-4A2H		D4N-4B2H
			M12 connector		D4N-912H		D4N-9A2H		D4N-9B2H



Note: Conduit sizes 1/2-14NPT, G1/2 and Pg13,5 are also available.

Switches with two contacts and MBB contacts

Actuator		Conduit size		Built-in switch mechanism		MBB		MBB	
				2NC/1NO (slow-action)		1NC/1NO (slow-action)		2NC/1NO (slow-action)	
				Direct opening	Order code	Direct opening	Order code	Direct opening	Order code
	Roller lever (resin lever, resin roller)	1-conduit	M20		D4N-4C20		D4N-4E20		D4N-4F20
			M12 connector		—		D4N-9E20		—
		2-conduit	M20		D4N-8C20		D4N-8E20		D4N-8F20
	Roller plunger	1-conduit	M20		D4N-4C32		D4N-4E32		D4N-4F32
			M12 connector		—		D4N-9E32		—
		2-conduit	M20		D4N-8C32		D4N-8E32		D4N-8F32
	One-way roller arm lever (horizontal)	1-conduit	M20		D4N-4C62		D4N-4E62		D4N-4F62
			M12 connector		—		D4N-9E62		—
		2-conduit	M20		D4N-8C62		D4N-8E62		D4N-8F62

Note: Conduit sizes 1/2-14NPT, G1/2 and Pg13,5 are also available.

General-purpose switches with two contacts

Actuator		Conduit size		Built-in switch mechanism							
				1NC/1NO (snap-action)		2NC (snap-action)		1NC/1NO (slow-action)		2NC (slow-action)	
				Direct opening	Order code	Direct opening	Order code	Direct opening	Order code	Direct opening	Order code
	Cat whisker	1-conduit	M20	—	D4N-4180	—	D4N-4280	—	—	—	D4N-4B80
	Plastic rod	1-conduit	M20	—	D4N-4187	—	D4N-4287	—	—	—	D4N-4B87

Note: Conduit sizes 1/2-14NPT, G1/2 and Pg13,5 are also available.

Specifications

Degree of protection		IP67 (EN60947-5-1)
Durability ^{*1}	Mechanical	15,000,000 operations min./Fork lever 10,000,000 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		1 mm/s to 0.5 m/s (D4-1120)
Operating frequency		30 operations/minute max.
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		Snap-action: 2x0.5 mm min Slow-action: 2x2 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.

Note: - The above values are initial values.



Safety door hinge switch

D4NH safety door hinge switches are available with one or two built-in contacts, shaft or arm lever actuator and various conduit types, e.g. M20.

- Direct opening mechanism
- Shaft or arm lever actuator
- Wide temperature range
- Metric conduit and M12 connector types are available

Ordering information

Switches					
Actuator	Conduit size		Built-in switch mechanism		
			1NC/1NO (slow-action)	2NC (slow-action)	2NC/1NO (slow-action)
Shaft	1-conduit	M20	D4NH-4AAS	D4NH-4BAS	D4NH-4CAS
		M12 connector	D4NH-9AAS	D4NH-9BAS	—
	2-conduit	M20	D4NH-8AAS	D4NH-8BAS	D4NH-8CAS
Arm lever	1-conduit	M20	D4NH-4ABC	D4NH-4BBC	D4NH-4CBC
		M12 connector	D4NH-9ABC	D4NH-9BBC	—
	2-conduit	M20	D4NH-8ABC	D4NH-8BBC	D4NH-8CBC
Actuator	Conduit size		Built-in switch mechanism		
			3NC (slow-action)	1NC/1NO MBB (slow-action)	2NC/1NO MBB (slow-action)
Shaft	1-conduit	M20	D4NH-4DAS	D4NH-4EAS	D4NH-4FAS
		M12 connector	—	D4NH-9EAS	—
Arm lever	1-conduit	M20	D4NH-4DBC	D4NH-4EBC	D4NH-4FBC
		M12 connector	—	D4NH-9EBC	—

Note: Conduit types with G1/2, 1/2-14NPT and Pg13,5 are also available.

Specifications

Degree of protection		IP67 (EN60947-5-1)
Durability	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		2 to 360°/s
Operating frequency		30 operations/minute max.
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2x9.5 mm min Slow-action: 2x2 mm min
Conditional short-circuit current		100 A (EN60947-5-1)
Rated open thermal current (Ith)		10 A (EN60947-5-1)
Ambient temperature		Operating: -30°C to 70°C with no icing







Safety limit switch with manual reset

The D4NR family is a complete line-up of safety limit switches with manual reset. They are available with one, two or three built-in contacts and a wide range of actuator types. To set up easy installation and maintenance, various conduit types, e.g. M20 and M12 connector types, are provided.

- Direct opening mechanism
- Various actuators
- Pull-reset switches
- Gold-plated contacts for handling micro loads
- Metric conduit types available

Ordering information

Switches		Conduit size		Order code	
				Built-in switch mechanism	
				1NC/1NO (slow-action)	2NC/1NO (slow-action)
	Roller lever (resin lever, resin roller)	1-conduit	M20	D4N-4A20R	D4N-4C20R
			M12 connector	D4N-9A20R	—
	Adjustable roller lever, form lock (metal lever, rubber roller)	1-conduit	M20	D4N-4A2HR	D4N-4C2HR
			M12 connector	D4N-9A2HR	—
	Plunger	1-conduit	M20	D4N-4A31R	D4N-4C31R
			M12 connector	D4N-9A31R	—
	Roller plunger	1-conduit	M20	D4N-4A32R	D4N-4C32R
			M12 connector	D4N-9A32R	—
		2-conduit	M20	D4N-8A32R	D4N-8C32R

Note: Conduit types with G1/2, 1/2-14NPT and Pg13,5 are also available.

Specifications

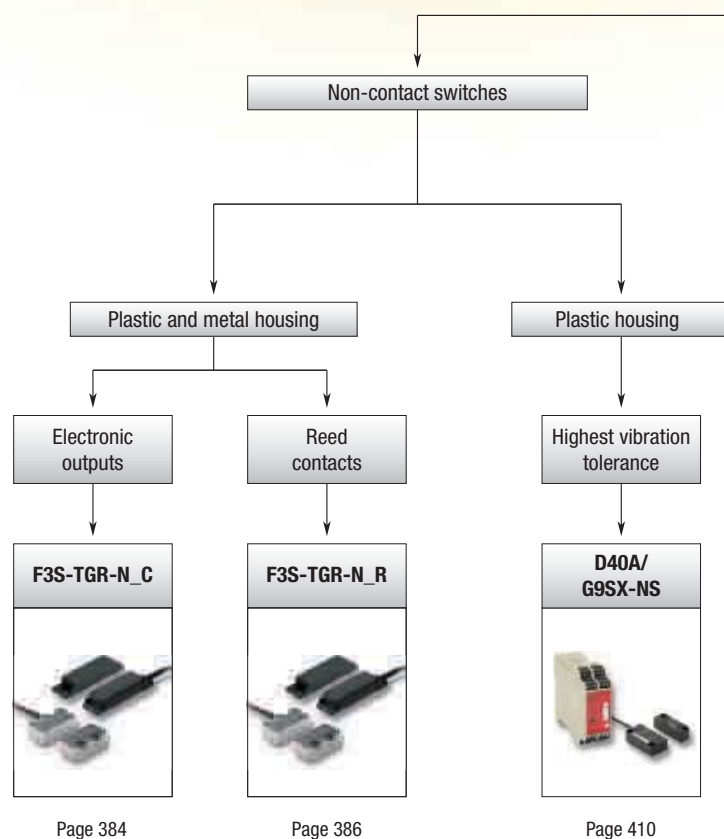
Degree of protection		IP67 (EN60947-5-1)
Durability	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		1 mm/s to 0.5 m/s (D4N-1A20R)
Operating frequency		30 operations/minute max.
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2×0.5 mm min Slow-action: 2×2 mm min
Rated open thermal current (I_{th})		10 A (EN60947-5-1)
Ambient temperature		Operating: -30°C to 70°C with no icing

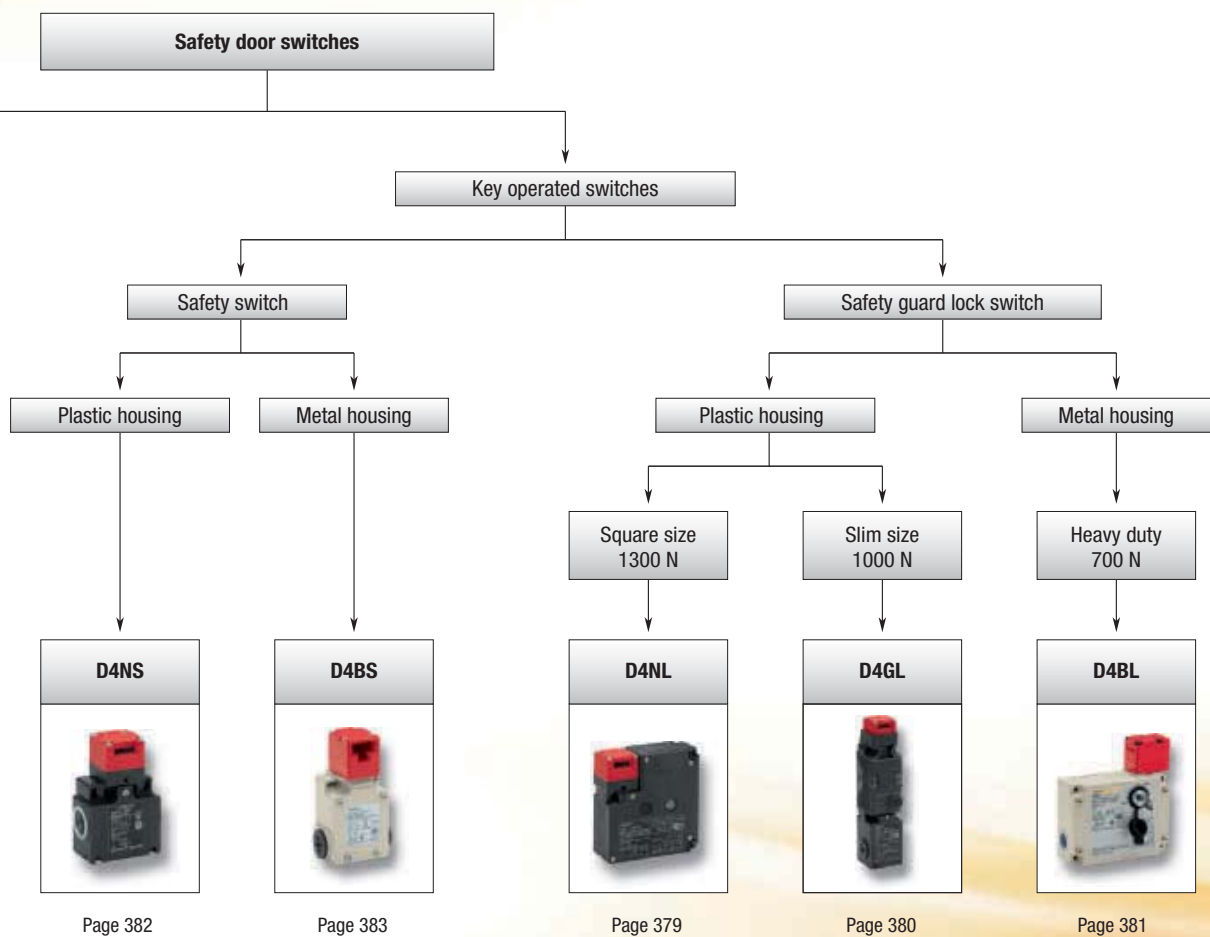
BREAK CONVENTIONAL BARRIERS IN SAFETY DESIGN

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 PDF-M acc. EN60947-5-3





Selection table

		Safety door switches		Non-contact safety door switches		
						
Selection criteria	Model	D4NS	D4BS	D40A/G9SX-NS	F3S-TGR-N_C	F3S-TGR-N_R
	Housing	Plastic	Metal	Plastic	Plastic/Metal	Plastic/Metal
	Head mounting	4 directions	4 directions	—	—	—
	Actuation	Straight	Straight	—	—	—
	Key holding force	—	—	—	—	—
	Protection class	IP67				
Features	Conformity	EN50047, EN1088		EN 954-1	EN954-1, EN60947-5-3	EN954-1, EN60947-5-3
	Conduit size PG13.5	■	■	—	—	—
	Conduit size M20	■	■	—	—	—
	Conduit size G1/2	■	■	—	—	—
	Conduit size 1/2-14NPT	■	■	—	—	—
	Cable length 2 m	—	—	■	■	■
	Cable length 5 m	—	—	■	■	■
	Cable length 10 m	—	—	—	■	■
	Connector type M12	■	—	—	■	■
	Gold clad contacts	■	■	—	—	—
	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 G9SA, G9SB	■	■	—	■	■
	operates with h G9SX	■	■	■	■	■
	operates with programmable safety units NE1A	■	■	—	■	■
Application	Door monitoring	■	■	■	■	■
	Door locking	—	—	—	—	—
Contact configuration	1NC/1NO	—	—	■	—	—
	1NC/1NO SL	■	■	—	—	—
	1NC/NO SL	—	■	—	—	—
	2NC	—	—	—	■	■
	2NC SL	■	■	—	—	—
	2NC/1NO	—	—	—	■	■
	2NC/1NO SL	■	—	—	—	—
	3NC	—	—	—	—	—
	3NC SL	■	—	—	—	—
	1NC/1NO (MBB contact)	■	—	—	—	—
	2NC/1NO (MBB contact)	■	—	—	—	—
	1NO/1NC	—	—	—	—	—
	2NO/1NC	—	—	—	—	—
	1NC/1NO SL + 1NC/1NO SL	—	—	—	—	—
	1NC/1NO SL + 2NC SL	—	—	—	—	—
	1NC/1NO SL + 1NC SL	—	—	—	—	—
	2NC SL + 1NC/1NO SL	—	—	—	—	—
	2NC/1NO SL + 1NC/1NO SL	—	—	—	—	—
	2NC/1NO SL + 2NC SL	—	—	—	—	—
	2NC SL + 2NC SL	—	—	—	—	—
	2NC SL + 1NC SL	—	—	—	—	—
	3NC SL + 1NC/1NO SL	—	—	—	—	—
	3NC SL + 2NC SL	—	—	—	—	—
Page		382	383	410	384	386

		Safety door lock switches		
				
Selection criteria	Model	D4NL	D4GL	D4BL
	Housing	Plastic	Plastic	Metal
	Head mounting	4 directions	4 directions	4 directions
	Actuation	Straight	Straight	Straight
	Key holding force	1,300 N	1,000 N	700 N
	Protection class	IP67		
Features	Conformity	EN1088	EN1088	EN1088
	Conduit size PG13.5	■	■	■
	Conduit size M20	■	■	■
	Conduit size G1/2	■	■	■
	Conduit size 1/2-14NPT	—	—	—
	Cable length 2 m	—	—	—
	Cable length 5 m	—	—	—
	Cable length 10 m	—	—	—
	Connector type M12	—	—	—
	Gold clad contacts	■	■	■
	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 G9SA, G9SB	■	■	■
	operates with G9SX	■	■	■
	operates with programmable safety units NE1A	■	■	■
Application	Door monitoring	■	■	■
	Door locking	■	■	■
Contact configuration	1NC/1NO	—	—	—
	1NC/1NO SL	—	—	—
	1NC/NO SL	—	—	—
	2NC	—	—	—
	2NC SL	—	—	—
	2NC/1NO	—	—	—
	2NC/1NO SL	—	—	—
	3NC	—	—	—
	3NC SL	—	—	—
	1NC/1NO (MBB contact)	—	—	—
	2NC/1NO (MBB contact)	—	—	—
	1NO/1NC	—	—	—
	2NO/1NC	—	—	—
	1NC/1NO SL + 1NC/1NO SL	■	■	—
	1NC/1NO SL + 2NC SL	■	■	—
	1NC/1NO SL + 1NC SL	—	—	■
	2NC SL + 1NC/1NO SL	■	■	—
	2NC/1NO SL + 1NC/1NO SL	■	—	—
	2NC/1NO SL + 2NC SL	■	■	—
	2NC SL + 2NC SL	—	■	—
	2NC SL + 1NC SL	—	—	■
	3NC SL + 1NC/1NO SL	■	■	—
	3NC SL + 2NC SL	■	■	—
	Page	379	380	381

■ Standard

— No/not available



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 1300N. Mechanical lock/solenoid release types and vice versa set up the complete range in combination with various conduit types, e.g. M20.

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

Ordering information

Switches (with approved direct opening contacts)



For 110V and 230V 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 D4GL 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 1000 N. Mechanical lock/solenoid release types and vice versa set up the complete range in combination with various conduit types, e.g. M20.

- Slim safety door switch with electromagnetic lock or unlock mechanism
- Models with four or five built-in contacts
- Strong key holding force: 1000 N
- For standard loads and micro loads
- Keys are compatible with D4NL and D4NS

Ordering information

Switches (with approved direct opening contacts)

Lock and release types	Contact configuration	Conduit size	Order code
Mechanical lock solenoid release	1NC/1NO + 1NC/1NO	M20	D4GL-4AFA-A
	1NC/1NO + 2NC	M20	D4GL-4BFA-A
	2NC + 1NC/1NO	M20	D4GL-4CFA-A
	2NC + 2NC	M20	D4GL-4DFA-A
	2NC/1NO + 1NC/1NO	M20	D4GL-4EFA-A
	2NC/1NO + 2NC	M20	D4GL-4FFA-A
	3NC + 1NC/1NO	M20	D4GL-4GFA-A
	3NC + 2NC	M20	D4GL-4HFA-A

Note: - conduit sizes of G1/2 and Pg13,5 are also available.
- solenoid: 24 VDC, orange/green LED: 24 VDC

Operation keys (order separately)

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

Lock and release types	Contact configuration	Conduit size	Order code
Solenoid lock mechanical release	1NC/1NO + 1NC/1NO	M20	D4GL-4AFG-A
	1NC/1NO + 2NC	M20	D4GL-4BFG-A
	2NC + 1NC/1NO	M20	D4GL-4CFG-A
	2NC + 2NC	M20	D4GL-4DFG-A
	2NC/1NO + 1NC/1NO	M20	D4GL-4EFG-A
	2NC/1NO + 2NC	M20	D4GL-4FFG-A
	3NC + 1NC/1NO	M20	D4GL-4GFG-A
	3NC + 2NC	M20	D4GL-4HFG-A

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 4 mA at 24 VDC; 150,000 operations min. for a resistive load of 1 A at 125 VAC in 2 circuits and 4 mA at 24 VDC in 2 circuits
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 *3		10 mm min. (EN60947-5-1)
Holding force		1,000 N min.
Minimum applicable load		Resistive load of 4 mA at 24 VDC (N-level reference value)
Thermal current (I _{th})		2.5 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

*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.
*3 These figures are minimum requirements for safe operation.

Note: The above values are initial values.



Guard-lock safety door switch with metal housing

The D4BL guard-lock safety door switches are available with three built-in contacts. They are mechanically locked when the key is inserted and have a solenoid release. An auxiliary release key ensures easy maintenance and unlocks the door in case of power failure.




- Automatic mechanical lock
- Auxiliary release key for easy maintenance
- Tough aluminium die-cast body
- Horizontal and vertical conduit opening
- Head direction can easily be changed

Ordering information

Switches

Lock method	Conduit size	Voltage for solenoid	Without indicator 1NC/1NO+ 1NC (slow-action)	With LED indicator 1NC/1NO+ 1NC (slow-action)	Without indicator 2NC+ 1NC (slow-action)	With LED indicator 2NC+ 1NC (slow-action)
Mechanical lock	PG13.5	24 VDC	D4BL-1CRA	D4BL-1CRA-A	D4BL-1DRA	D4BL-1DRA-A
		110 VAC	D4BL-1CRB	D4BL-1CRB-A	D4BL-1DRB	D4BL-1DRB-A
	M20	24 VDC	D4BL-4CRA	D4BL-4CRA-A	D4BL-4DRA	D4BL-4DRA-A
		110 VAC	D4BL-4CRB	D4BL-4CRB-A	—	—
Solenoid lock	Pg 13.5	24 VDC	D4BL-1CRG	D4BL-1CRG-A	D4BL-1DRG	D4BL-1DRG-A
	M20	24 VDC	—	D4BL-4CRG-A	—	—

Operation keys (order separately)

Type		Order code	Type		Order code
Horizontal mounting		D4BL-K1	Adjustable mounting (horizontal)		D4BL-K3
Vertical mounting		D4BL-K2			

Specifications

Degree of protection	IP67 (EN60947-5-1)
Durability ^{*1}	Mechanical: 1,000,000 operations min. Electrical: 500,000 operations min. (10 A resistive load at 250 VAC)
Operating speed	0.05 to 0.5 m/s
Operating frequency	30 operations/min max.
Rated frequency	50/60 Hz
Operating characteristics	Direct opening force: 19.61 N min. (EN60947-5-1) Direct opening travel: 20 mm min. (EN60947-5-1) All stroke: 23 mm min.
Holding force	700 N min. (GS-ET-19)
Thermal current (I _{th})	10 A (EN60947-5-1)
Pollution degree (operating environment)	3 (EN60947-5-1)
Protection against electric shock	Class I (with ground terminal)
Ambient temperature	Operating: -10 to 55°C (with no icing)

^{*1} The durability is for an ambient temperature of 5 to 35°C and an ambient humidity of 40 to 70%.

Note: The above values are initial values.

Solenoid coil characteristics

Item	24 VDC mechanical lock models	110 VAC mechanical lock models	24 VAC solenoid lock models
Rated operating voltage	24 VDC ^{+10%} / _{-15%} (100% ED)	110 VAC $\pm 10\%$ (50/60 Hz)	24 VDC ^{+10%} / _{-15%} (100% ED)
Current consumption	Approx. 300 mA	Approx. 98 mA	Approx. 300 mA

Indicator characteristics

Item	LED
Rated voltage	10 to 115 VAC/VDC
Current leakage	Approx. 1 mA
Colour (LED)	Orange, green



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. Models with M12 connectors and conduit opening, such as M20, are also available.

- Line-up with three contacts: 2NC/1NC and 3NC contact forms
- Line-up with two contacts 1NC/1NO and 2NC
- M12 connector types available
- 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	M20	D4NS-4AF
		2NC	M20	D4NS-4BF
		2NC/1NO	M20	D4NS-4CF
		3NC	M20	D4NS-4DF
	Slow-action MBB contact	1NC/1NO	M20	D4NS-4EF
		2NC/1NO	M20	D4NS-4FF
2-conduit	Slow-action	1NC/1NO	M20	D4NS-8AF
		2NC	M20	D4NS-8BF
		2NC/1NO	M20	D4NS-8CF
	Slow-action MBB contact	1NC/1NO	M20	D4NS-8EF
	Slow-action MBB contact	2NC/1NO	M20	D4NS-8FF
1-conduit, with connector	Slow-action	1NC/1NO	M12 connector	D4NS-9AF
		2NC	M12 connector	D4NS-9BF
	Slow-action MBB contact	1NC/1NO	M12 connector	D4NS-9EF

Note: Additionally conduit sizes G1/2, 1/2-14NPT and Pg13,5 are available.

Operation keys (order separately)

Type		Order code	Type		Order code
Horizontal mounting		D4DS-K1	Adjustable mounting (horizontal)		D4DS-K3
Vertical mounting		D4DS-K2	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. 1 or 3 conduit openings, such as M20 or PG13,5 are available.

- 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
		M20	D4BS-45FS	D4BS-4AFS
3-conduit		Pg13.5	D4BS-55FS	D4BS-5AFS
		M20	D4BS-85FS	D4BS-8AFS

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.



Non-contact coded switches for monitoring the status of guarding doors

Non-contact switches monitor the status of guarding doors. LED for easy diagnosis and stainless steel housing for high hygiene demands in the food industry are available

- Operates with all Omron safety controllers
- Operates behind stainless steel fittings
- Non-contact – no abrasion – no particles
- Screw-hole covers support hygienic design (NMPC)
- Conforms to safety categories up to 4 acc. EN 954-1, PDF-M acc. EN60947-5-3 and PLe acc. EN ISO13849-1

Ordering Information

Elongated Sensors

Cable Connection	Contact Configuration	Order code
2 m pre-wired	2NC	F3S-TGR-NLPC-20-02
5 m pre-wired	2NC	F3S-TGR-NLPC-20-05
10 pre-wired	2NC	F3S-TGR-NLPC-20-10
M12, 8-pin	2NC	F3S-TGR-NLPC-20-M1J8
2 m pre-wired	2NC/1NO	F3S-TGR-NLPC-21-02
5 m pre-wired	2NC/1NO	F3S-TGR-NLPC-21-05
10 pre-wired	2NC/1NO	F3S-TGR-NLPC-21-10
M12, 8-pin	2NC/1NO	F3S-TGR-NLPC-21-M1J8

Small Sensor

Cable Connection	Contact Configuration	Order code
2 m pre-wired	2NC	F3S-TGR-NSMC-20-02
5 m pre-wired	2NC	F3S-TGR-NSMC-20-05
10 pre-wired	2NC	F3S-TGR-NSMC-20-10
M12, 8-pin	2NC	F3S-TGR-NSMC-20-M1J8
2 m pre-wired	2NC/1NO	F3S-TGR-NSMC-21-02
5 m pre-wired	2NC/1NO	F3S-TGR-NSMC-21-05
10 pre-wired	2NC/1NO	F3S-TGR-NSMC-21-10
M12, 8-pin	2NC/1NO	F3S-TGR-NSMC-21-M1J8

Miniature Sensors

Cable Connection	Contact Configuration	Order code
2m pre-wired	2NC	F3S-TGR-NMPC-20-02
5m pre-wired	2NC	F3S-TGR-NMPC-20-05
10m pre-wired	2NC	F3S-TGR-NMPC-20-10
M12, 8-pin	2NC	F3S-TGR-NMPC-20-M1J8
2m pre-wired	2NC/1NO	F3S-TGR-NMPC-21-02
5m pre-wired	2NC/1NO	F3S-TGR-NMPC-21-05
10m pre-wired	2NC/1NO	F3S-TGR-NMPC-21-10
M12, 8-pin	2NC/1NO	F3S-TGR-NMPC-21-M1J8

Specifications

Mechanical Data

Item	Model	Elongated Sensor	Small Sensor	Miniature Sensor
Operating distance	OFF → ON (Sao)	12 mm Close		8 mm Close
	ON → OFF (Sar)	17 mm Open		12 mm Open
Actuator approach speed	Min. Max.	4 mm/s 1000 mm/s		
Operating temperature	–	-25°C to +80°C	-25°C to +105°C	-25°C to +80°C
Enclosure protection	Flying lead M12 connector	IP 67		
Material	–	Black Polycarbonate	Stainless steel 316	Black Polyester

Electrical Data

Item		Model	Elongated Sensor	Small sensor	Miniature Sensor
Power supply		—	24 VDC ±15%		
Power consumption		Max.	50 mA		
Switching current		Min.	10 mA, 10 VDC		
Rated loads	NC contacts	Max.	100 mA, 24 VDC		
	NO contact		100 mA, 24 VDC		
Output type		—	Electronic output (potential-free optocoupler output)		

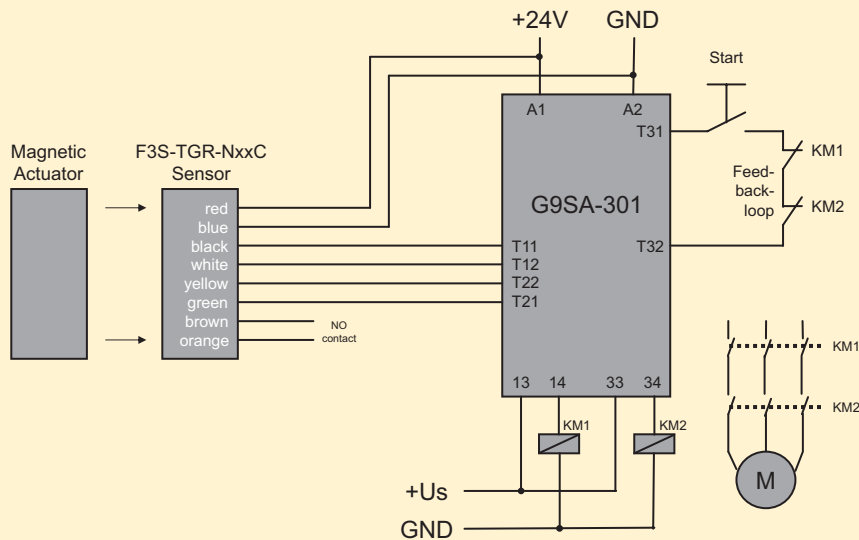
Approved Standards

EN standards certified by TÜV Rheinland	
EN 954-1, EN ISO13849-1	
EN 60204-1	
EN/IEC 60947-5-3	
UL 508, CSA C22.2	
BS 5304	
EN 1088-1 conformance	

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

G9SA

Single Sensor Application with G9SA-301
(up to Safety Category 4 acc. EN954-1)





Non-contact reed switches for monitoring the status of guarding doors

Non-contact switches monitor the status of guarding doors. LED for easy diagnosis and stainless steel housing for high hygiene demands in the food industry are available.

- Operates with all Omron safety controllers
- Operates behind stainless steel fittings
- Non-contact – no abrasion – no particles
- Screw-hole covers support hygienic design (NMPR)
- Conforms to safety categories up to 4 acc. EN 954-1, PDF-M acc. EN60947-5-3 and PLe acc. EN ISO13849-1

Ordering Information

Elongated Sensors

Cable Connection	Contact Configuration	Order code
2 m pre-wired	2NC	F3S-TGR-NLPR-20-02
5 m pre-wired	2NC	F3S-TGR-NLPR-20-05
10 pre-wired	2NC	F3S-TGR-NLPR-20-10
M12, 8-pin	2NC	F3S-TGR-NLPR-20-M1J8
2 m pre-wired	2NC/1NO	F3S-TGR-NLPR-21-02
5 m pre-wired	2NC/1NO	F3S-TGR-NLPR-21-05
10 pre-wired	2NC/1NO	F3S-TGR-NLPR-21-10
M12, 8-pin	2NC/1NO	F3S-TGR-NLPR-21-M1J8

Small Sensor

Cable Connection	Contact Configuration	Order code
2 m pre-wired	2NC	F3S-TGR-NSMR-20-02
5 m pre-wired	2NC	F3S-TGR-NSMR-20-05
10 pre-wired	2NC	F3S-TGR-NSMR-20-10
M12, 8-pin	2NC	F3S-TGR-NSMR-20-M1J8
2 m pre-wired	2NC/1NO	F3S-TGR-NSMR-21-02
5 m pre-wired	2NC/1NO	F3S-TGR-NSMR-21-05
10 pre-wired	2NC/1NO	F3S-TGR-NSMR-21-10
M12, 8-pin	2NC/1NO	F3S-TGR-NSMR-21-M1J8

Miniature Sensors

Cable Connection	Contact Configuration	Order code
2m pre-wired	2NC	F3S-TGR-NMPR-20-02
5m pre-wired	2NC	F3S-TGR-NMPR-20-05
10m pre-wired	2NC	F3S-TGR-NMPR-20-10
M12, 8-pin	2NC	F3S-TGR-NMPR-20-M1J8
2m pre-wired	2NC/1NO	F3S-TGR-NMPR-21-02
5m pre-wired	2NC/1NO	F3S-TGR-NMPR-21-05
10m pre-wired	2NC/1NO	F3S-TGR-NMPR-21-10
M12, 8-pin	2NC/1NO	F3S-TGR-NMPR-21-M1J8

Specifications

Mechanical Data

Item	Model	Elongated Sensor	Small Sensor	Miniature Sensor
Operating distance	OFF → ON (Sao)	10 mm Close		12 mm Close
	ON → OFF (Sar)	22 mm Open		20 mm Open
Actuator approach speed	Min.	4 mm/s		
	Max.	1000 mm/s		
Operating temperature	–	-25°C to +80°C	-25°C to +105°C	-25°C to +80°C
Enclosure protection	Flying lead M12 connector	IP 67		
Material	–	Black Polycarbonate	Stainless steel 316	Black Polyester

Electrical Data

Item		Model	Elongated Sensor	Small Sensor	Miniature Sensor
Contact release time		Max.	2 ms		
Initial contact resistance		Max.	50 mΩ		
Switching current		Min.	1 mA, 10 VDC		
Rated loads	NC contacts	Max.	1 A, 250 VAC 0.2 A, 24 VDC		
	NO contact				
			500 mΩ		
			10 mA, 10 VDC		
			0.5 A, 250 VAC 0.2 A, 24 VDC		

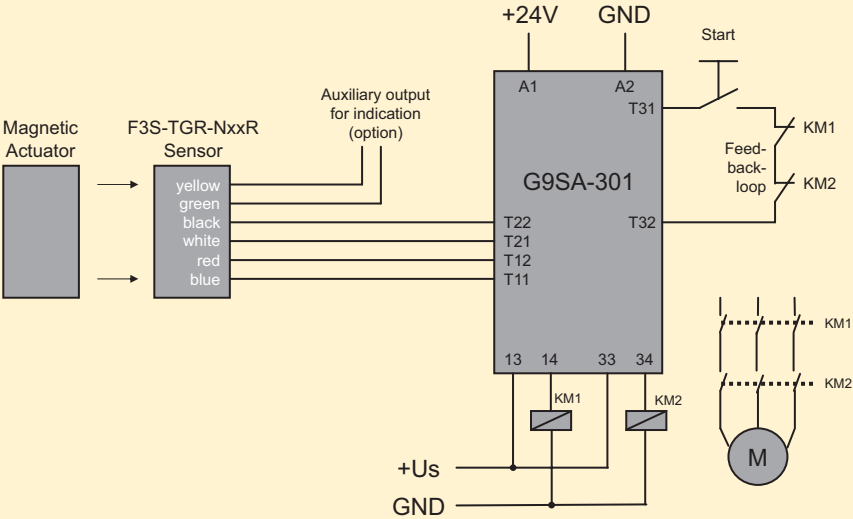
Approved Standards

EN standards certified by TÜV Rheinland	
EN 954-1, EN ISO13849-1	
EN 60204-1	
EN/IEC 60947-5-3	
UL 508, CSA C22.2	
BS 5304	
EN 1088-1 conformance	

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

G9SA

Single Sensor Application with G9SA-301
(up to Safety Category 4 acc. EN954-1)

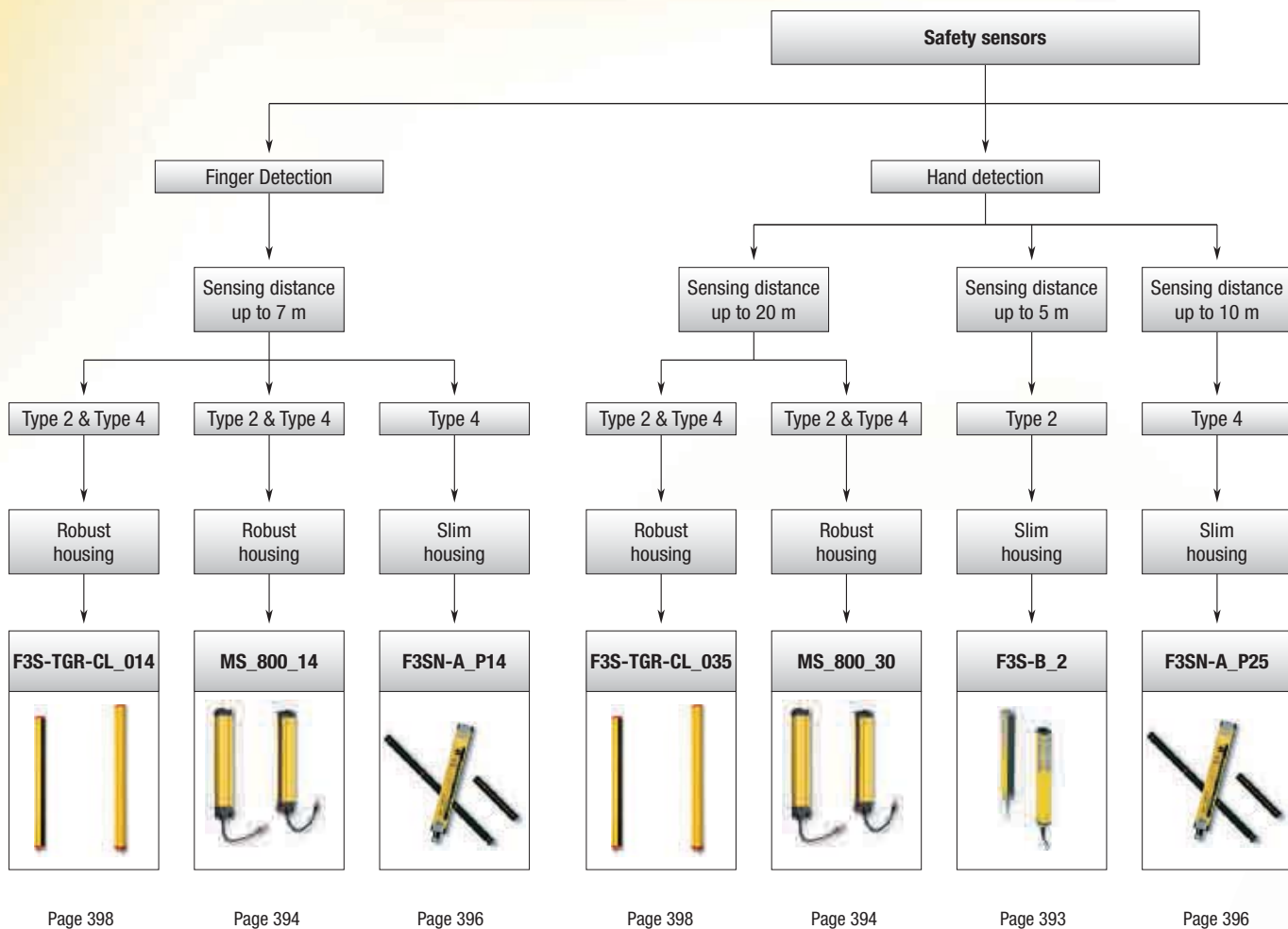


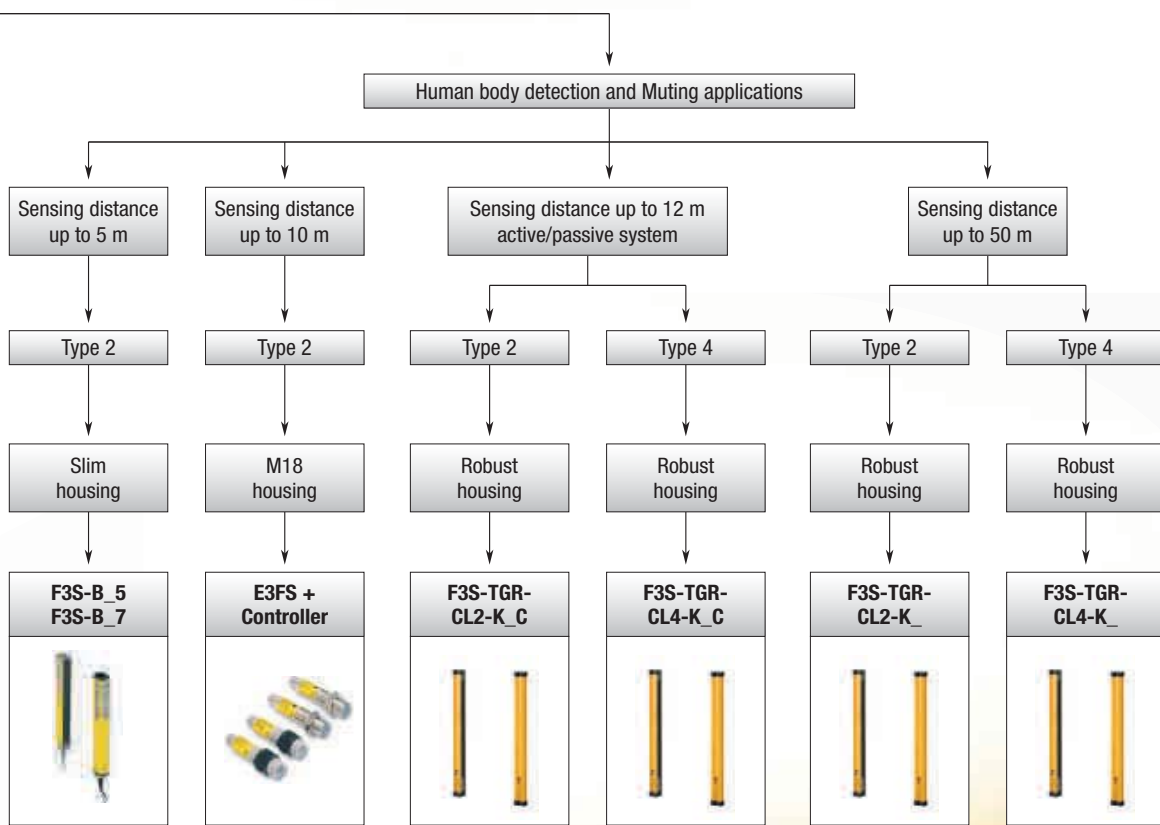
PROTECT OPERATORS AND PRODUCTION

Simplicity without limitations

Safety sensors are the first choice in safeguarding workplaces where people and machines cooperate. Built-in intelligence stops the machine in conditions that are dangerous for the worker. Our All-In-One concept for safety light curtains provides simplicity in mounting, configuring, daily use and maintenance.

- Finger- and Hand protection models
- Easy configuration via built in DIP-switches for simple setup.
- Easy mounting and common wiring for all types for simple design and installation





Page 393

Page 402





Page 398




Page 398

Page 398

Page 398

Selection table

		Safety Sensors			
					
Selection criteria	Model	MS2800 & MS4800	F3S-TGR-CL	F3SN-A	F3S-B
	Safety category	Category 2&4	Category 2&4	Category 4	Category 2
	Safety Integrity Level (IEC 61508)	SIL 3	–	–	–
	Protective height	280 to 2120 mm	150 to 2400 mm	189 to 1,807 mm	300 to 1650 mm
	Resolution	14, 30 mm	14, 35 mm	14, 25, 40, 70 mm	30, 55, 80 mm
	Beam pitch	10, 20 mm	7.5, 18 mm	9, 15, 30, 60 mm	25, 50, 70 mm
	Reaction time	14 to 59 ms	14 to 103 ms	10 to 15.5 ms	20 to 45 ms
	Temperature range	-10 to 55°C	-10 to 55°C	-10 to 55°C	-10 to 55°C
Features	IP class	IP65	IP65	IP65	IP65
	Blanking function	internal	internal	internal	option
	Muting function	option	internal	–	–
	EDM function	internal	internal	internal	internal
	Interlock function	internal	internal	internal	internal
	Series connection	option	option	option	option
	Mounting kits	option	option	option	option
	Parameter setting	internal DIP switch	internal DIP switch	option (Console)	option (PC)
Application	External control unit	–	–	–	–
	Finger protection	■	■	■	–
	Hand protection	■	■	■	■
	Arm protection	■	■	■	■
	Body protection	■	■	■	■
	Presence detection	■	■	■	■
	Muting application	–	■	–	–
Supply voltage	Blanking application	■	■	■	■
	24 VDC	■	■	■	■
In- and Outputs	Safety outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs
	Auxiliary output	1 PNP (non safety)	–	2 PNP (non safety)	1 PNP (non safety)
	Test input	■	■	■	■
	EDM input	■	■	■	■
	Reset input	■	■	■	■
	Muting sensor input	–	■	–	–
Page		394	398	396	393

		Safety Sensors		
				
Selection criteria	Model	E3FS + F3SP-U3P	F3S-TGR-CL_-K_	F3S-TGR-CL_-K_C
	Safety category	Category 2	Category 2 and 4	Category 2 and 4
	Safety Integrity Level (IEC 61508)	—	—	—
	Protective height	—	500 to 1.200 mm	500 to 1.200 mm
	Resolution	—	—	—
	Beam pitch	—	300 mm, 400 mm, 500 mm	300 mm, 400 mm, 500 mm
	Reaction time	32 ms	13 ms	13 ms
	Temperature range	-10 to 55°C	-10 to 55°C	-10 to 55°C
	IP class	IP67	IP65	IP65
Features	Blanking function	—	—	—
	Muting function	option	internal	internal
	EDM function	option	internal	internal
	Interlock function	option	internal	internal
	Series connection	—	—	—
	Mounting kits	■	option	option
	Parameter setting	—	internal DIP switch	internal DIP switch
Application	External control unit	■	—	—
	Finger protection	—	—	—
	Hand protection	—	—	—
	Arm protection	—	—	—
	Body protection	■	■	■
	Presence detection	—	—	—
	Muting application	■	■	■
Supply voltage	Blanking application	—	—	—
	24 VDC	■	■	■
In- and Outputs	Safety outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs
	Auxiliary output	—	—	—
	Test input	■	■	■
	EDM input	—	■	■
	Reset input	■	■	■
	Muting sensor input	■	■	■
Page		402	398	398



Category-2 safety light curtain

The F3S-B is a category-2 safety light curtain with resolutions of 30, 55 and 80 mm. An operating range of up to 5 m and protective heights from 300mm to 1,650 mm are provided with a very small dead zone.

- Sensing distance up to 5 m
- LEDs for easy alignment and diagnosis
- Series connection of two sensors is possible
- Category-2 sensor complying with EN 61496-1, EN 954-1 and EN ISO 13849-1

Ordering information

Optical resolution	No. of optical axes	Protective height	Order code	Optical resolution	No. of optical axes	Protective height	Order code
30 mm	12	300 mm	F3S-B122P	55 mm	21	1,050 mm	F3S-B215P
	18	450 mm	F3S-B182P		24	1,200 mm	F3S-B245P
	24	600 mm	F3S-B242P		27	1,350 mm	F3S-B275P
	30	750 mm	F3S-B302P		30	1,500 mm	F3S-B305P
	36	900 mm	F3S-B362P		33	1,650 mm	F3S-B335P
	42	1,050 mm	F3S-B422P	80 mm	4	300 mm	F3S-B047P
	48	1,200 mm	F3S-B482P		6	450 mm	F3S-B067P
	54	1,350 mm	F3S-B542P		8	600 mm	F3S-B087P
	60	1,500 mm	F3S-B602P		10	750 mm	F3S-B107P
	66	1,650 mm	F3S-B662P		12	900 mm	F3S-B127P
55 mm	6	300 mm	F3S-B065P		14	1,050 mm	F3S-B147P
	9	450 mm	F3S-B095P	80 mm	16	1,200 mm	F3S-B167P
	12	600 mm	F3S-B125P		18	1,350 mm	F3S-B187P
	15	750 mm	F3S-B155P		20	1,500 mm	F3S-B207P
	18	900 mm	F3S-B185P		22	1,650 mm	F3S-B227P

Specifications

Item	F3S-B___P ^{*1} Stand-alone	F3S-BM___P___ ^{*1} Master unit for series connection	F3S-BS___ ^{*1} Slave unit for series connection
Sensor type	Type 2 Safety Light Curtain		
Optical-axis pitch	25 mm 50 mm 75 mm	25 mm 50 mm 75 mm	25 mm 50 mm 75 mm
Optical resolution (Detection capability)	Non-transparent: In diameter		
	30 mm 55 mm 80 mm	30 mm 55 mm 80 mm	30 mm 55 mm 80 mm
Protective height	300/450/600/750/900/1,050/1,200/1,350/1,500/1,650 mm		300/450/600/750 mm
Detection distance	0.3 to 5.0 m		
Response time	ON to OFF 20 ms to 45ms (stand-alone) ON to OFF 20 ms to 65ms (series connection)		
Supply voltage (Vs)	24 VDC ±20% (including 5 Vp-p ripple)		
Current consumption	400 mA max. (under no-load conditions)		
Light source	Infrared LED (880 nm wavelength).		
Effective aperture angle	Within ±5° for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2		
Control output	Two PNP transistor outputs, load current 200 mA max.		
Instability output	PNP transistor output (non safety output)		
Protection circuit	Output short-circuit protection, power supply reverse connection protection		
External test function	Mode selection by connecting "External test input" line to: Active: 17 VDC to Vs, 10 mA max. duration time at least 15 ms Inactive: No connection or 0 to 2.5 VDC, 2 mA max.		
Relay monitoring function (optional)	Default inactive, selectable with F39-U1E		
Start interlock function (optional)	Default inactive, selectable with F39-U1E		
Blanking function (optional)	Default inactive, selectable with F39-U1E		
Connection method	For extension cable: 8 pins, M12 connector For series connection cable: 6 pins, M12 connector		
Ambient temperature	Operating: -10°C +55°C (with no icing or condensation)		
Degree of protection	IP65 (IEC60529)		
Size (cross section)	30x40 mm		

^{*1} For detailed type names and optical specifications, see "Type Naming Rule"



Category 4 / 2 safety light curtains

The MS4800 and MS2800 family of safety light curtains provide simplicity in mounting, configuring, daily use and maintenance by providing a:

- Sensing distance up to 20m for 30mm resolution and 7 m for 14mm resolution
- LED bar for easy alignment and diagnosis
- DIP-switch setup for Blanking, Muting and optical coding
- Category 4 / 2 sensor complying with EN 61496-1
- All-in-one M12 connection and mounting concept with robust housing
- Multi-cascadable up to 4 sets

Ordering information

MS2800 Safety Category 2

MS2800 Safety category 2															
Connection features	Standard				Master				Slave						
Standard Standalone operation															
Master Series connection, Muting															
Slave Series connection only															
	MS2800S-				MS2800FS-				MS2800F-						
Function Set	Basic		Advanced		Basic		Advanced								
Basic Interlock, Restart, EDM, 2 optical channels, integrated alignment tool															
Advanced Muting, Blanking (fixed/floating)															
	MS2800S-EB-		MS2800S-EA-		MS2800FS-EB-		MS2800FS-EA-		MS2800F-E-						
Resolution	14 mm	30 mm	14 mm	30 mm	14 mm	30 mm	14 mm	30 mm	14 mm	30 mm					
14 mm Finger protection	MS2800S-EB-014-	MS2800S-EB-030-	MS2800S-EA-014-	MS2800S-EA-030-	MS2800FS-EB-014-	MS2800FS-EB-030-	MS2800FS-EA-014-	MS2800FS-EA-030-	MS2800F-E-014-	MS2800F-E-030-					
30 mm Hand protection															
Length	280 ... 1800		280 ... 2120		280 ... 1800		280 ... 2120		240 ... 1280						
240 mm ... 2120 mm in 40 mm increments															

MS4800 Safety Category 4

Connection features		Standard				Master				Slave						
Standard Standalone operation	Standard															
Master connection, Muting	Series															
Slave connection only	Series															
	MS4800S-				MS4800FS-				MS4800F-							
Function Set		Basic		Advanced		Basic		Advanced								
Basic Interlock, Restart, EDM, 2 optical channels, integrated alignment tool																
Advanced Muting, Blanking (fixed/floating)																
	MS4800S-EB-		MS4800S-EA-		MS4800FS-EB-		MS4800FS-EA-		MS4800F-E-							
Resolution		14mm	30mm	14mm	30mm	14mm	30mm	14mm	30mm	14mm	30mm					
14mm Finger protection		MS4800S-EB-014-	MS4800S-EB-030-	MS4800S-EA-014-	MS4800S-EA-030-	MS4800FS-EB-014-	MS4800FS-EB-030-	MS4800FS-EA-014-	MS4800FS-EA-030-	MS4800F-E-014-	MS4800F-E-030-					
30mm Hand protection																
Length		280 ... 1800		280 ... 2120		280 ... 1800		280 ... 2120		240 ... 1280						
240mm ... 2120mm in 40mm increments																

Examples

MS2800S-EB-030-1000
 Standalone Operation
 Basic function set
 30mm resolution
 1000mm protective height

MS4800FS-EA-014-1200
 Series connection Model
 Advanced function set
 14mm resolution
 1200mm protective height

MS4800F-E-014-600
 Slave operation
 14mm resolution
 600mm protective height

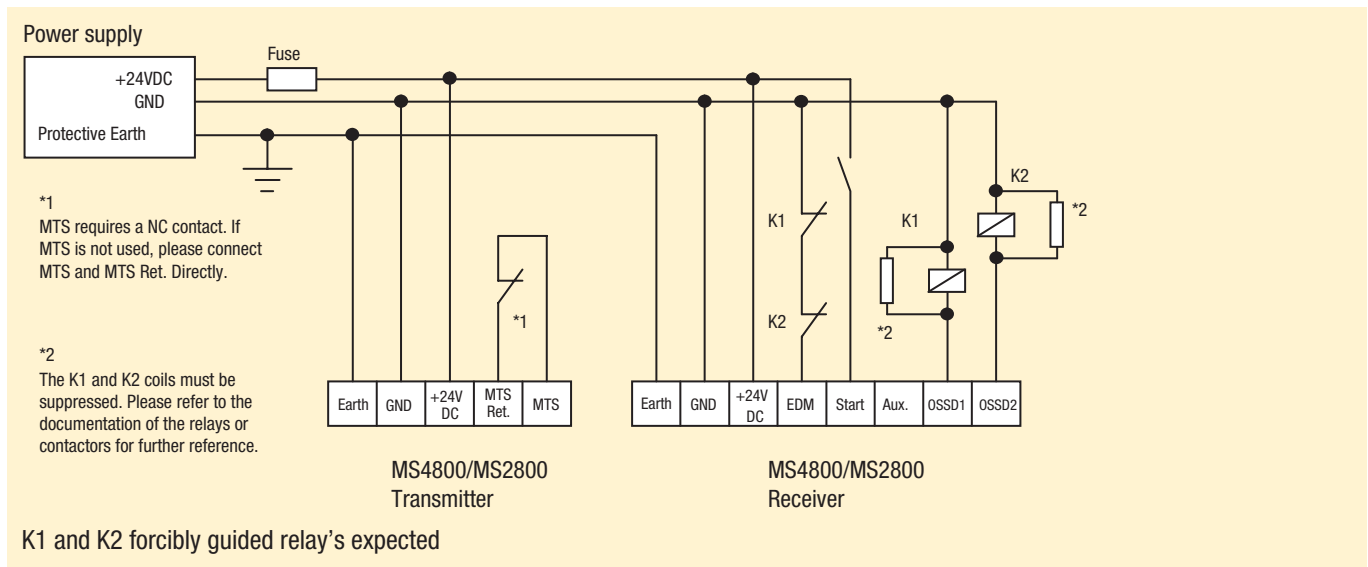
Specifications

Model	MS4800 -E - - - - -	MS2800 -E - - - - -
Sensor type	Type 4	Type2
Normal Operating range	14 mm resolution: 0.3 - 7 m, 30 mm resolution: 0.3 - 20 m	
Reduced range (DIP-switch 6)	14 mm resolution: 0.3 - 3 m, 30 mm resolution: 0.3 - 8 m	
Beam pitch	14 mm resolution: 10 mm; 30 mm resolution: 20 mm	
Protective height	14 mm resolution: 280 - 1800 mm; 30 mm resolution: 240 - 2120 mm	
Detection capability	14 mm resolution: 14 mm non-transparent; 30 mm resolution: 30 mm non-transparent	
Effective aperture angle (EAA)	Within $\pm 2,5^\circ$	Within $\pm 5,0^\circ$
	for the emitter and receiver at a detection distance of at least 3m according to IEC61496-2	
Light source	Infrared LED's (880 nm), Power Dissipation: 180 mW, Class 1 per EN60825-1	
Supply voltage (Vs)	24 VDC $\pm 20\%$, according EN/IEC60204, able to cover a drop of voltage of at least 20 msec	
OSSD	Two safety related PNP transistor output, load current 625 mA max. ^{*1} , short circuit protection	
Auxiliary Output (non safety output)	One PNP output sourcing 100mA @ 24VDC. This output follows the OSSD's	
Output operation mode	OSSD output: Light-ON	
Test functions	Self-test (after power ON and during operation)	
Safety-related functions	All versions: Auto reset/interlock with manual reset, EDM (external device monitoring) Advanced versions only: fixed blanking, floating blanking, muting	
Response time	ON to OFF: 14 to 59 ms	
Ambient light intensity	Incandescent lamp: 3000 lx max. (light intensity on the receiver surface)	
Ambient temperature	Operating: -10°C to +55°C, storage: -25°C to +70°C (without icing or condensation)	
Degree of protection	IP65 (IEC60529)	
Connection method	Flexible cable with M 12 connection: receiver: 8 pins, transmitter: 5 pins	
Materials	Case: Polyurethane powder painted aluminium, cap: polycarbonate, front window: acrylic, mounting brackets: cold rolled steel	
Size (cross section)	39 x 50 mm	
Receiver indicator lights	Individual Beam Indicator (IBI), Interlock, Blanking active, RUN and STOP state, error codes	
Transmitter indicator lights	ON, OFF, failure	
AOPD (ESPE)	Type4 acc. IEC 61496-1	Type2 acc. IEC 61496-1
Suitable for safety control systems	Cat. 4 acc. EN954-1, PLC acc. EN ISO 13849-1	Cat. 2 acc. EN954-1, PLC acc. EN ISO 13849-1
Safety Integrity Level	SIL 3 according IEC 61508	
PFH	$3,5 \times 10^{-8}$	

*1 Up to 12 m we recommend to use the F39-JMR cables, to use longer cables and a current of 625 mA the F39-JMR cables are necessary.

Connection example

Using a manual restart and an external device monitoring





Category-4 safety light curtain/ multi-beam safety sensor

The F3SN family is a category-4 safety light curtain with resolutions of 14, 25, 30 and 60 mm. An operating range of up to 10 m and protective heights from 189 to 1,822 mm are provided with no dead zone.

- Detection height = Sensor length
- Sensing distance up to 7 m (14 mm resolution) and 10 m for all other types
- LED bar for easy alignment and diagnosis
- Blanking function by using setup console
- Category-4 sensor complying with EN 61496-1

Ordering information

Safety light curtain

Minimum detection object	Sensing distance	Series connection, connector	Order code ^{*1}
14 mm dia. (finger protection)	0.2 to 7 m	No	F3SN-A____P14
		Yes	F3SN-A____P14H
25 mm dia. (hand protection)	0.2 to 10 m	No	F3SN-A____P25
		Yes	F3SN-A____P25-01
40 mm dia. (for presence protection)	0.2 to 10 m	No	F3SN-A____P40
		Yes	F3SN-A____P40-01
70 mm dia. (for presence detection)	0.2 to 10 m	No	F3SN-A____P70
		Yes	F3SN-A____P70-01

^{*1} ____ in the model name indicates the detection width (mm).

List of safety light curtains

F3SN-A____P14, F3SN-A____P14-01, F3SN-A____P14H-01

Detection height	Number of optical axes	Order code
207	23	F3SN-A0207P14 (-01)
297	33	F3SN-A0297P14 (-01)
405	45	F3SN-A0405P14 (-01)
495	55	F3SN-A0495P14 (-01)
603	67	F3SN-A0603P14 (-01)
711	79	F3SN-A0711P14 (-01)
801	89	F3SN-A0801P14 (-01)
909	101	F3SN-A0909P14 (-01)
999	111	F3SN-A0999P14 (-01)
1,107	123	F3SN-A1107P14 (-01)
1,197	133	F3SN-A1197P14H(-01)
1,359	151	F3SN-A1359P14H(-01)
1,503	167	F3SN-A1503P14H(-01)
1,611	179	F3SN-A1611P14H(-01)

F3SN-A____P25, F3SN-A____P25-01

Detection height	Number of optical axes	Order code
307	19	F3SN-A0307P25 (-01)
457	29	F3SN-A0457P25 (-01)
607	39	F3SN-A0607P25 (-01)
907	59	F3SN-A0907P25 (-01)
1,057	69	F3SN-A1057P25 (-01)
1,207	79	F3SN-A1207P25 (-01)
1,357	89	F3SN-A1357P25 (-01)
1,507	99	F3SN-A1507P25 (-01)
1,657	109	F3SN-A1657P25 (-01)
1,807	119	F3SN-A1807P25 (-01)

Note: Highlighted products are preferred stock types, other detection heights are available.

Accessories (order separately)

Setting console

Order code	Accessories
F39-MC11	One branching connector, one connector cap, 2 m cable, instruction manual

Specifications

Item	Stand-alone	F3SN-A ____ P14 ^{*1} ^{*3}	F3SN-A ____ P25 ^{*1}	F3SN-A ____ P40 ^{*1}	F3SN-A ____ P70 ^{*1}
	Series connection	F3SN-A ____ P14-01 ^{*1} ^{*2} ^{*3}	F3SN-A ____ P25-01 ^{*1}	F3SN-A ____ P40-01 ^{*1}	F3SN-A ____ P70-01 ^{*1}
Sensor type	Type 4 Safety Light Curtain				
Operating range	0.2 to 7 m		0.2 to 10 m		
Beam pitch (P)	9 mm		15 mm	30 mm	60 mm
Protective height (PH)	189 to 1611 mm PH = n × P		217 to 1822 mm PH = (n − 1) × P + 37	217 to 1807 mm PH = (n − 1) × P + 37	277 to 1777 mm PH = (n − 1) × P + 37
Outermost beam gap	—				
Detection capability	Non-transparent: 14 mm in diameter		Non-transparent: 25 mm in diameter	Non-transparent: 40 mm in diameter	Non-transparent: 70 mm in diameter
Effective aperture angle (EAA)	Within ±2.5° for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2				
Light source	Infrared LED (870 nm)				
Supply voltage (Vs)	24 VDC ±10% (ripple p-p 10% max.)				
OSSD	Two PNP transistor outputs, load current 300 mA max.				
Auxiliary output (non-safety output)	One PNP transistor output, load current 50 mA max.				
External indicator output (non-safety output) ^{*4}	One PNP transistor output, load current 40 mA max.				
Output operation mode	OSSD output: Light-ON Auxiliary output: Dark-ON (can be changed by the F39-MC11) External indicator output: Light-ON (can be changed by the F39-MC11) ^{*4}				
Input voltage	For test input, interlock selection input, reset input, and external relay monitor input voltages; ON voltage: 9 to 24 V (with a sink current of 3 mA max.), OFF voltage: 0 to 1.5 V or open				
Test functions	Self-test (after power ON, and during operation, one cycle during response time) External test (light emission stop function by test input)				
Safety-related functions	Auto reset/manual reset (interlock) ^{*5} EDM (external device monitoring) Fixed blanking ^{*6} Floating blanking ^{*6}				
Response time	ON to OFF: 10 to 15.5 ms max., 19.5 ms max. for 179 beams				
Ambient light intensity	Incandescent lamp: 3000 lx max. (light intensity on the receiver surface) Sunlight: 10000 lx max. (light intensity on the receiver surface)				
Ambient temperature	Operating: -10°C +55°C, storage: -30°C +70°C (with no icing or condensation)				
Degree of protection	IP65 (IEC60529)				
Connection method	M12 connector (8 pins)				
Materials	Case: Aluminium, cap: Zinc die-cast, optical cover: PMMA (acrylic resin)				
Size (cross section)	30x30 mm				

^{*1} The 4 digits in ____ in the model number represent the protective height. Use the formula given in the information on protective height specifications to calculate the height. For example, if the beam gap is 9 mm, and the No. of beams is 21, the protective height will be 9×21 = 189 mm. The model with this protective height is F3SN-A0189P14.

^{*2} F3SN-A ____ P14-01 is a customized model. Consult with your Omron representative when ordering this model.

^{*3} For sizes above 1,125 mm add „H“ after P14, e.g. F3SN-A1143P14H. Ask for supplemental manual.

^{*4} Models ending in -01 only.

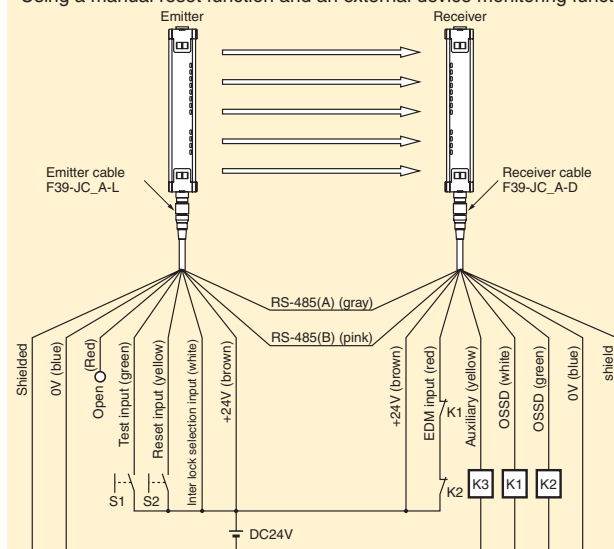
^{*5} For the factory setting, the manual reset mode is set to the “start/restart” interlock.

Using the F39-MC11 can select either the start interlock or the restart interlock.

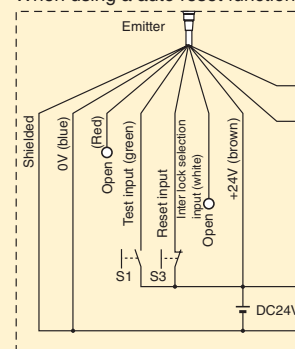
^{*6} For the factory setting, the function is not set. It can be enabled with the F39-MC11.

Connection

Using a manual reset function and an external device monitoring function



When using a auto reset function



S1: External test switch
S2: Interlock/lockout reset switch
S3: Lock-out reset switch if the switch is not needed, connect to 24 VDC)
K1, K2: Relays for control of dangerous parts of machine.
K3: Load, PLC, etc. (for monitor)

Note: If you do not intend to use the external relay monitor, connect the auxiliary output that is set for dark: ON operation to the external relay monitor input, or use F39-MC11 to disable the external relay monitor function.



Multi-beam, finger- and hand protection safety sensor

The multi-beam sensors are available in Category 2 (PL c) and Category 4 (PL e) with integrated muting function. The finger- and hand protection models are available in Category 2 (PL c) and Category 4 (PL e) with integrated safety control functions.

- Type 2/Type 4 sensor complying with EN 61496-1
- Family concept in wiring and mounting

Multi-beam models

- Sensing distance up to 50 m
- DIP-switch setup for muting, pre-reset, interlock function and optical coding
- Muting function and muting lamp integrated

Finger- and hand protection models

- Sensing distance up to 0.2 m...6 m (14 mm) and 0.2 m...14 m (35 mm)
- DIP-switch setup for blanking, interlock function, muting and optical coding
- Floating blanking and Fixed blanking supported

Ordering information multi-beam safety sensor

Long-range active/active systems

F3S-TGR-CL2_-K_ (Type 2)

Number of optical axes	Sensing distance	Beam pitch	Feature set ^{*1}	Order code
2	0.5 m ... 40 m	500	Advanced	F3S-TGR-CL2A-K2-500
2	0.5 m ... 40 m	500	Basic	F3S-TGR-CL2B-K2-500
3	0.5 m ... 40 m	400	Advanced	F3S-TGR-CL2A-K3-800
3	0.5 m ... 40 m	400	Basic	F3S-TGR-CL2B-K3-800
4	0.5 m ... 40 m	300	Advanced	F3S-TGR-CL2A-K4-900
4	0.5 m ... 40 m	300	Basic	F3S-TGR-CL2B-K4-900
4	0.5 m ... 40 m	400	Advanced	F3S-TGR-CL2A-K4-1200
4	0.5 m ... 40 m	400	Basic	F3S-TGR-CL2B-K4-1200
2	25 m ... 50 m	500	Advanced	F3S-TGR-CL2A-K2-500-LD
2	25 m ... 50 m	500	Basic	F3S-TGR-CL2B-K2-500-LD
3	25 m ... 50 m	400	Advanced	F3S-TGR-CL2A-K3-800-LD
3	25 m ... 50 m	400	Basic	F3S-TGR-CL2B-K3-800-LD
4	25 m ... 50 m	300	Advanced	F3S-TGR-CL2A-K4-900-LD
4	25 m ... 50 m	300	Basic	F3S-TGR-CL2B-K4-900-LD
4	25 m ... 50 m	400	Advanced	F3S-TGR-CL2A-K4-1200-LD
4	25 m ... 50 m	400	Basic	F3S-TGR-CL2B-K4-1200-LD

F3S-TGR-CL4_-K_ (Type 4)

Number of optical axes	Sensing distance	Beam pitch	Feature set ^{*1}	Order code
2	0.5 m ... 40 m	500	Advanced	F3S-TGR-CL4A-K2-500
2	0.5 m ... 40 m	500	Basic	F3S-TGR-CL4B-K2-500
3	0.5 m ... 40 m	400	Advanced	F3S-TGR-CL4A-K3-800
3	0.5 m ... 40 m	400	Basic	F3S-TGR-CL4B-K3-800
4	0.5 m ... 40 m	300	Advanced	F3S-TGR-CL4A-K4-900
4	0.5 m ... 40 m	300	Basic	F3S-TGR-CL4B-K4-900
4	0.5 m ... 40 m	400	Advanced	F3S-TGR-CL4A-K4-1200
4	0.5 m ... 40 m	400	Basic	F3S-TGR-CL4B-K4-1200
2	25 m ... 50 m	500	Advanced	F3S-TGR-CL4A-K2-500-LD
2	25 m ... 50 m	500	Basic	F3S-TGR-CL4B-K2-500-LD
3	25 m ... 50 m	400	Advanced	F3S-TGR-CL4A-K3-800-LD
3	25 m ... 50 m	400	Basic	F3S-TGR-CL4B-K3-800-LD
4	25 m ... 50 m	300	Advanced	F3S-TGR-CL4A-K4-900-LD
4	25 m ... 50 m	300	Basic	F3S-TGR-CL4B-K4-900-LD
4	25 m ... 50 m	400	Advanced	F3S-TGR-CL4A-K4-1200-LD
4	25 m ... 50 m	400	Basic	F3S-TGR-CL4B-K4-1200-LD

Short-range active/passive systems

F3S-TGR-CL2_-K_C (Type 2)

Number of optical axes	Sensing distance	Beam pitch	Feature set ^{*1}	Order code
2	0.5 m ... 12 m	500	Advanced	F3S-TGR-CL2A-K2C-500
2	0.5 m ... 12 m	500	Basic	F3S-TGR-CL2B-K2C-500
3	0.5 m ... 8 m	400	Advanced	F3S-TGR-CL2A-K3C-800
3	0.5 m ... 8 m	400	Basic	F3S-TGR-CL2B-K3C-800
4	0.5 m ... 7 m	300	Advanced	F3S-TGR-CL2A-K4C-900
4	0.5 m ... 7 m	300	Basic	F3S-TGR-CL2B-K4C-900
4	0.5 m ... 7 m	400	Advanced	F3S-TGR-CL2A-K4C-1200
4	0.5 m ... 7 m	400	Basic	F3S-TGR-CL2B-K4C-1200

*1. Feature set: Basic: Manual/automatic restart, coding
Advanced: Basic + Muting + Pre-reset

F3S-TGR-CL4_-K_C (Type 4)

Number of optical axes	Sensing distance	Beam pitch	Feature set ^{*1}	Order code
2	0.5 m ... 12 m	500	Advanced	F3S-TGR-CL4A-K2C-500
2	0.5 m ... 12 m	500	Basic	F3S-TGR-CL4B-K2C-500
3	0.5 m ... 8 m	400	Advanced	F3S-TGR-CL4A-K3C-800
3	0.5 m ... 8 m	400	Basic	F3S-TGR-CL4B-K3C-800
4	0.5 m ... 7 m	300	Advanced	F3S-TGR-CL4A-K4C-900
4	0.5 m ... 7 m	300	Basic	F3S-TGR-CL4B-K4C-900
4	0.5 m ... 7 m	400	Advanced	F3S-TGR-CL4A-K4C-1200
4	0.5 m ... 7 m	400	Basic	F3S-TGR-CL4B-K4C-1200

Ordering information finger- and hand protection safety sensor

Safety category	Feature set ^{*2}	Resolution	Length	Order code
2	Basic	14 mm	150 mm...2400 mm	F3S-TGR-CL2B-014-
		35 mm		F3S-TGR-CL2B-035-
	Advanced	14 mm		F3S-TGR-CL2A-014-
		35 mm		F3S-TGR-CL2A-035-
4	Basic	14 mm		F3S-TGR-CL4B-014-
		35 mm		F3S-TGR-CL4B-035-
	Advanced	14 mm		F3S-TGR-CL4A-014-
		35 mm		F3S-TGR-CL4A-035-

*2. Feature set: Basic: Manual/automatic restart, coding
Advanced: Blanking functions + Muting + Pre-reset

Specifications

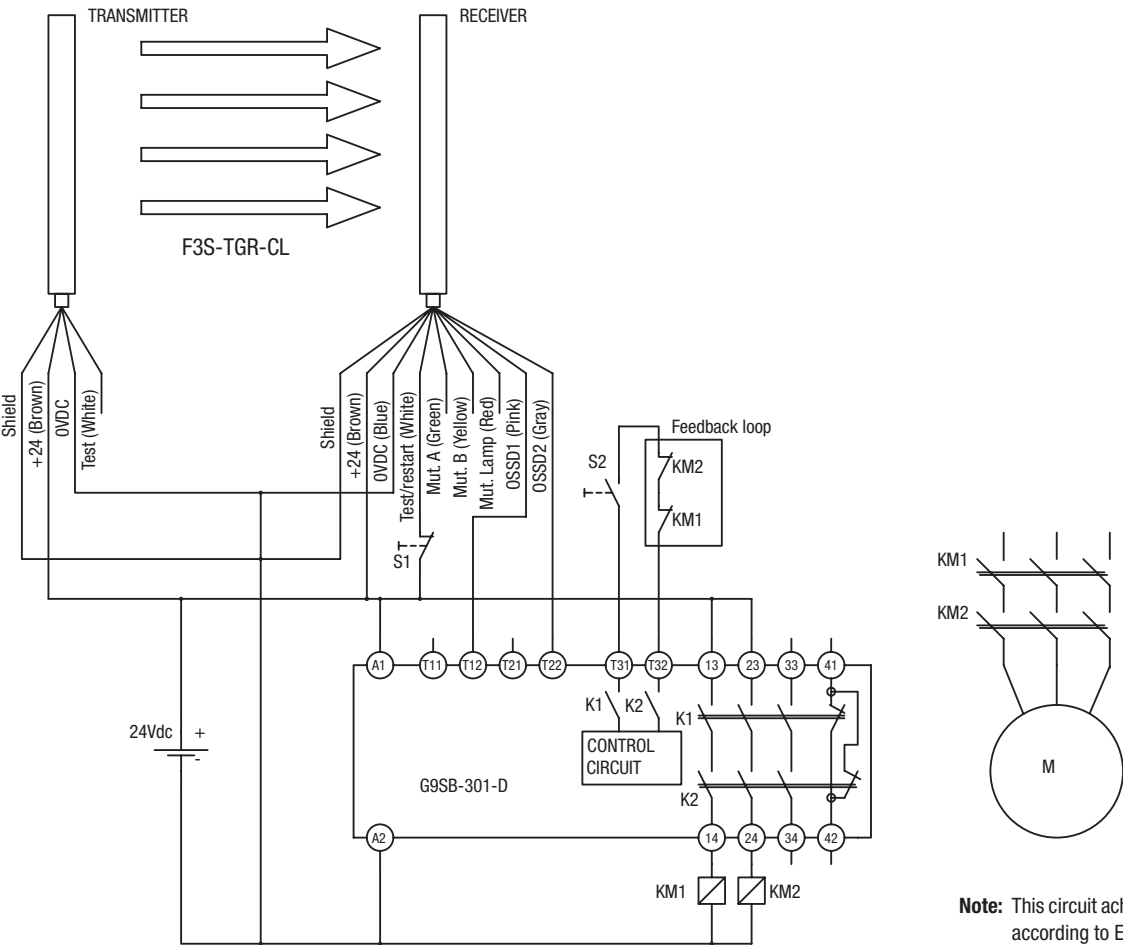
Multi-beam safety sensor

Item	F3S-TGR-CL2_-K_	F3S-TGR-CL4_-K_
Sensor Type	Type 2	Type 4
Operating range	F3S-TGR-CL__-K_ 0.5 m ... 40 m F3S-TGR-CL__-K_-__-LD 25 m ... 50 m F3S-TGR-CL__-K2C-500 0.5 m ... 12 m F3S-TGR-CL__-K3C-800 0.5 m ... 8 m F3S-TGR-CL__-K4C-__ 0.5 m ... 7 m	
Beam pitch	F3S-TGR-CL__-K2_-500: 2 beams, 500 mm F3S-TGR-CL__-K3_-800: 3 beams, 400 mm F3S-TGR-CL__-K4_-900: 4 beams, 300 mm F3S-TGR-CL__-K4_-1200: 4 beams, 400 mm	
Effective aperture angle acc. EN 61496-2 (2006) for distances >3 m	Within ±5°	Within ±2.5°
Light source	Infrared LED (880 nm), Power dissipation <3 mW, Class 1 per EN 60825-1	
Supply Voltage	24 VDC±20%, according EN/IEC60204 able to cover a drop of voltage of at least 20 ms	
OSSD	2 PNP transistor outputs, load current 2x250 mA max	
Test functions	Self test (after power ON and during operation)	
Safety-related functions	All versions: Auto reset/ interlock with manual reset, EDM (external device monitoring) Advance version only: Muting and Pre-reset function	
Response time	< 13 ms	
Ambient temperature	Operating: -10°C...+55°C, Storage: -25°C...+70°C (no icing, no condensation)	
Degree of protection	IP 65 (IEC 60529)	
Materials	Case: Painted Aluminium, Front window: Acrylic Lexan, Cap: ABS, mounting brackets: cold rolled steel	
Size (cross section)	37x48 mm	
Suitable for safety control systems	Cat. 2 (EN954-1), PL c (EN ISO 13849-1)	Cat. 4 (EN954-1), PL e (EN ISO 13849-1)
MTTFd, DC	MTTFd = 450 years, DC = high, MTTR = 8 hours	
PFH, Proof test interval	PFHd = 2,5*10 ⁻⁹ , Proof test interval: every 20 years	

Finger- and hand safety protection sensor

Item	F3S-TGR-CL2_-0_	F3S-TGR-CL4_-0_
Sensor Type	Type 2	Type 4
Operating range: short setting	F3S-TGR-CL__-014: 0.2 m... 3 m; F3S-TGR-CL__-035: 0.2 m... 7 m	
Operating range: long setting	F3S-TGR-CL__-014: 3 m... 6 m; F3S-TGR-CL__-035: 7 m...14 m	
Beam pitch (center)	14 mm resolution: 7.5 mm 35 mm resolution: 18 mm	
Detection capability	14 mm resolution: 14 mm non-transparent 35 mm resolution: 35 mm non-transparent	
Effective aperture angle acc. EN 61496-2 (2006) for distances < 3 m	Within ±5°	Within ±2.5°
Light source	Infrared LED (880 nm), Power dissipation <3 mW, Class 1 per EN 60825-1	
Supply Voltage	24 VDC±20%, according EN/IEC60204 able to cover a drop of voltage of at least 20 ms	
OSSD	2 PNP transistor outputs, load current 2x250 mA max	
Test functions	Self test (after power ON and during operation)	
Safety-related functions	All versions: Auto reset/ interlock with manual reset, EDM (external device monitoring) Advance version only: Blanking, Muting and Pre-reset function	
Response time	ON to OFF: 14 ms...103 ms	
Ambient temperature	Operating: -10°C...+55°C, Storage: -25°C...+70°C (no icing, no condensation)	
Degree of protection	IP 65 (IEC 60529)	
Materials	Case: Painted Aluminium, Front window: Acrylic Lexan, Cap: ABS, mounting brackets: cold rolled steel	
Size (cross section)	37x48 mm	
Suitable for safety control systems	Cat. 2 (EN954-1), PL c (EN ISO 13849-1)	Cat. 4 (EN954-1), PL e (EN ISO 13849-1)
MTTFd, DC	MTTFd = 450 years, DC = high, MTTR = 8 hours	
PFH, Proof test interval	PFHd = 2,5*10 ⁻⁹ , Proof test interval: every 20 years	

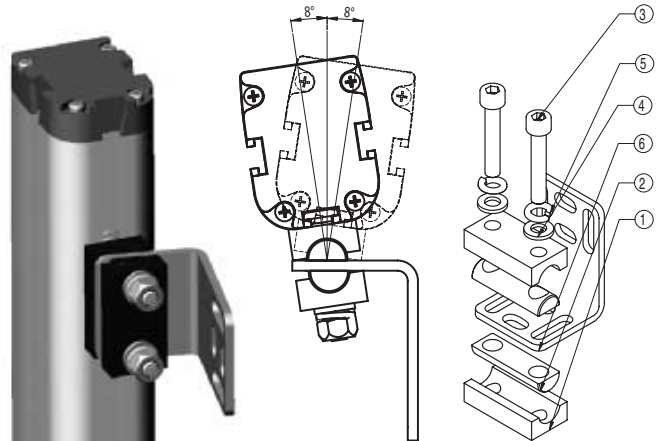
F3S-TGR-CL and GSB-301-D in manual reset



Standard cables

Receiver Cables (M12-8pin, shielded, flying leads)	
F39-TGR-CVL-B-2-R	Receiver Cable, 2 m length
F39-TGR-CVL-B-5-R	Receiver Cable, 5 m length
F39-TGR-CVL-B-10-R	Receiver Cable, 10 m length
F39-TGR-CVL-B-15-R	Receiver Cable, 15 m length
F39-TGR-CVL-B-25-R	Receiver Cable, 25 m length
Transmitter Cables (M12-4pin, shielded, flying leads)	
F39-TGR-CVL-B-2-E	Transmitter Cable, 2 m length
F39-TGR-CVL-B-5-E	Transmitter Cable, 5 m length
F39-TGR-CVL-B-10-E	Transmitter Cable, 10 m length
F39-TGR-CVL-B-15-E	Transmitter Cable, 15 m length
F39-TGR-CVL-B-25-E	Transmitter Cable, 25 m length

Mounting bracket F39-TGR-ST-ADJ



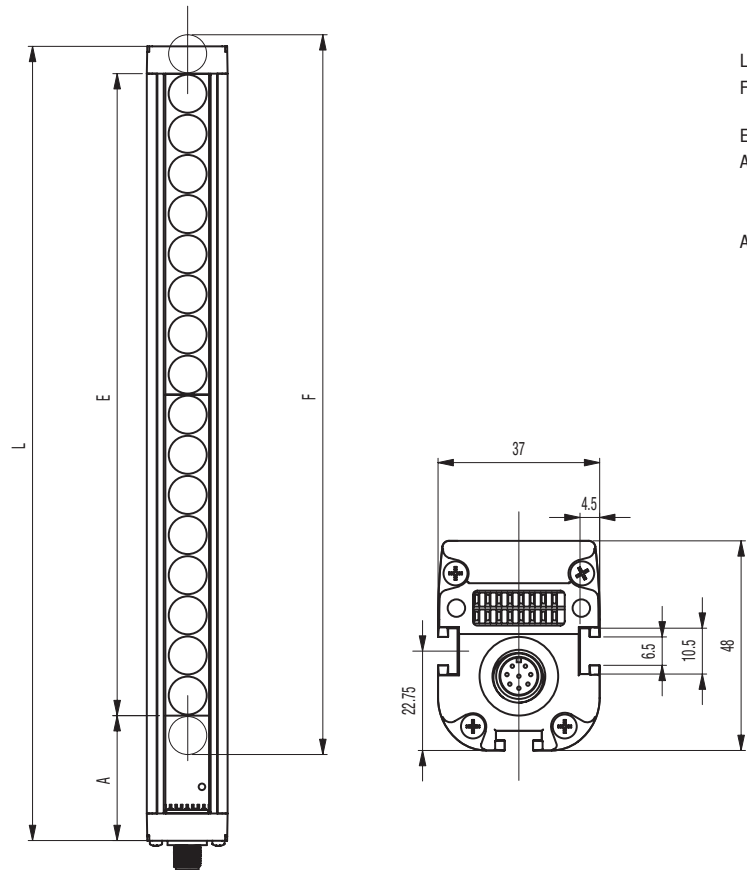
Wiring accessories (connectors and Y-connector cables)

Type	
F39-TGR-CT-B-R	Connector M12, 8-pin, female for wiring
F39-TGR-CT-B-E	Connector M12, 4-pin, female for wiring
F39-TGR-CT-W-R	Connector M12, 8-pin, male for wiring
F39-TGR-CT-W-E	Connector M12, 4-pin, male for wiring
F39-TGR-CVL-D-B-5-R	Cable for Sensor system and muting lamp connection

Safety relay units

Family	Type Name	Configuration
G9SB	G9SB-200-D	DPST-NO
	G9SB-301-D	3PST-NO
G9SA	G9SA-301	3PST-NO
	G9SA-501	5PST-NO
	G9SA-321-T075	3PST-NO, Time del. 7.5 s
	G9SA-321-T15	3PST-NO, Time del. 15 s
	G9SA-321-T30	3PST-NO, Time del. 30 s
G9SX	G9SX-BC202-RT	2 Safe Outputs
	G9SX-BC202-RC	2 Safe Outputs
	G9SX-AD322-T15-RT	3 Safe Outputs, Time del. 15 s
	G9SX-AD322-T15-RC	3 Safe Outputs, Time del. 15 s
	G9SX-AD322-T150-RT	3 Safe Outputs, Time del. 150 s
	G9SX-AD322-T150-RC	3 Safe Outputs, Time del. 150 s
	G9SX-ADA222-T15-RT	2 Safe Outputs, Time del. 15 s
	G9SX-ADA222-T15-RC	2 Safe Outputs, Time del. 15 s
	G9SX-ADA222-T150-RT	2 Safe Outputs, Time del. 150 s
	G9SX-ADA222-T150-RC	2 Safe Outputs, Time del. 150 s
DeviceNet Safety	NE1A-SCPU01	16 In, 8 Out, Safety Master
	NE1A-SCPU02	40 In, 8 Out, Safety Master
Safety Controller	NE1A-SCPU01L	16 In, 8 Out
	NE1A-SCPU02L	40 In, 8 Out
Relay interface	F39-TGR-SB-R	Relay interface for Semiconductor OSSDs

Dimensions



F3S-TGR-CL system data with 14 mm resolution

Model number	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400
L [mm]	217	364	511	658	805	952	1099	1246	1393	1540	1687	1834	1981	2128	2275	2422
F [mm]	161	308	455	602	749	896	1043	1190	1337	1484	1631	1778	1925	2072	2219	2366
E [mm]	147	294	441	588	735	882	1029	1176	1323	1470	1617	1764	1911	2058	2205	2352
A [mm]	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
Weight [kg]	0.83 kg	1.39 kg	1.95 kg	2.51 kg	3.07 kg	3.63 kg	4.19 kg	4.75 kg	5.31 kg	5.87 kg	6.43 kg	7 kg	7.55 kg	8.11 kg	8.67 kg	9.24 kg

F3S-TGR-CL system data with 35 mm resolution

Model number	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400
L [mm]	217	364	511	658	805	952	1099	1246	1393	1540	1687	1834	1981	2128	2275	2422
F [mm]	182	329	476	623	770	917	1064	1211	1358	1505	1652	1799	1946	2093	2240	2387
E [mm]	147	294	441	588	735	882	1029	1176	1323	1470	1617	1764	1911	2058	2205	2352
A [mm]	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
Weight [kg]	0.83 kg	1.39 kg	1.95 kg	2.51 kg	3.07 kg	3.63 kg	4.19 kg	4.75 kg	5.31 kg	5.87 kg	6.43 kg	7 kg	7.55 kg	8.11 kg	8.67 kg	9.24 kg

F3S-TGR-CL-K system data

Model number	Weight	Dimensions			
		F [mm]	L [mm]	E [mm]	A [mm]
F3S-TGR-CL_-K2C-500	2.3 kg	518	682	500	59
F3S-TGR-CL_-K3C-800	3.2 kg	818	982	400	59
F3S-TGR-CL_-K4C-900	4.1 kg	918	1082	300	59
F3S-TGR-CL_-K4C-1200	4.9 kg	1218	1382	400	59
F3S-TGR-CL_-K2-500	2.3 kg	518	682	500	59
F3S-TGR-CL_-K3-800	3.2 kg	818	982	400	59
F3S-TGR-CL_-K4-900	4.1 kg	918	1082	300	59
F3S-TGR-CL_-K4-1200	4.9 kg	1218	1382	400	59
F3S-TGR-CL_-K2-500-LD	2.3 kg	518	682	500	59
F3S-TGR-CL_-K3-800-LD	3.2 kg	818	982	400	59
F3S-TGR-CL_-K4-900-LD	4.1 kg	918	1082	300	59
F3S-TGR-CL_-K4-1200-LD	4.9 kg	1218	1382	400	59



Single beam safety sensor in compact housing

The slender M18 sized E3FS is a category-2 safety single beam sensor with an operating range of up to 10 m. Plastic and metal housing, cable and M12 connector offer flexibility in application together with a control unit such as F3SP-U3P or F3SP-U5P.

- Sensing distance up to 10 m
- LEDs for easy alignment and diagnosis
- Cable and M12 plug categories
- Plastic and metal housing
- Category-2 sensor complying with EN 61496-1

Ordering information

Safety single beam sensors (Type 2)

Case material	Operation distance	Order code	
Plastic	0 to 10 m	Cable type	E3FS-10B4
Nickel Brass		Plug type	E3FS-10B4-P1
		Cable type	E3FS-10B4-M
		Plug type	E3FS-10B4-M1-M

Controller for safety single beam sensors

Sensors	Output contacts	Width	Order code
1 to 2 Safety single beam sensors	2 NO 2.5 A	22.5 mm	F3SP-U3P-TGR
1 to 4 Safety single beam sensors		45 mm	F3SP-U5P-TGR

Specifications

Sensors

Sensing method	Through-beam
Controller	F3SP-U3P-TGR, F3SP-U5P-TGR
Supply voltage (Vs)	24 VDC \pm 10% (ripple p-p 10% max.)
Effective aperture angle (EAA)	$\pm 5^\circ$ (at 3 m)
Current consumption	Emitter: 50 mA max. Receiver: 25 mA max.
Sensing distance	10 m
Standard sensing object	Opaque object: 11 mm min. in diameter
Response time	2.0 ms (E3FS only)
Control output	PNP transistor output, load current: 100 mA max.
Test input (emitter)	21.5 to 24 VDC: Emitter OFF (source current: 3 mA max.) Open or 0 to 2.5 V: Emitter ON (leakage current: 0.1 mA max.)
Ambient light intensity	Incandescent lamp: 3,000 lx max. (light intensity on the receiver surface) Sunlight: 10,000 lx max. (light intensity on the receiver surface)
Ambient temperature	Operating: -20°C +55°C, storage: -30°C +70°C (with no icing or condensation)
Degree of protection	IP67 (IEC 60529)
Light source	Infrared LED
Protection	Output short-circuit protection, reverse polarity protection

Controllers

Item	F3SP-U3P	F3SP-U5P
Number of sensors	1 to 2 safety single beam sensor	1 to 4 safety single beam sensor
Width	22.5 mm	45 mm
Muting input	2 Inputs	4 Inputs
Safety related function	Override function Muting lamp Connection Interlock system (automatic and manual reset)	
Power supply voltage	24 VDC \pm 10%	
Power consumption	420 mA max.	
Output contacts	2 NO 2.5 A (protected by fuse), 115 VAC max.	2 NO 2.5 A (protected by fuse), 250 VAC max.
Indicators	6 LED for status and diagnostics	
Degree of protection	IP20 (IEC 60529)	
Terminal	16 screw terminals, detachable blocks with '4pin'	32 screw terminals, detachable blocks with '4pin'
Response time	\leq 30 ms	
Ambient temperature	Operation: -10°C +55°C	
Housing material	Plastic; DIN rail mounting	



Safety light curtain controller with integrated muting function

The F3SP-U4P muting controller can handle up to two safety light curtains. It has a 45 mm wide housing, two safety relay outputs with up to 2.5 A and additional functions such as muting-lamp monitoring and override function.

- Two independent muting functions with override
- Slim housing: 45 mm
- LEDs for status and diagnosis
- Detachable terminals
- Fully certified according to EN 61496-1

Ordering information

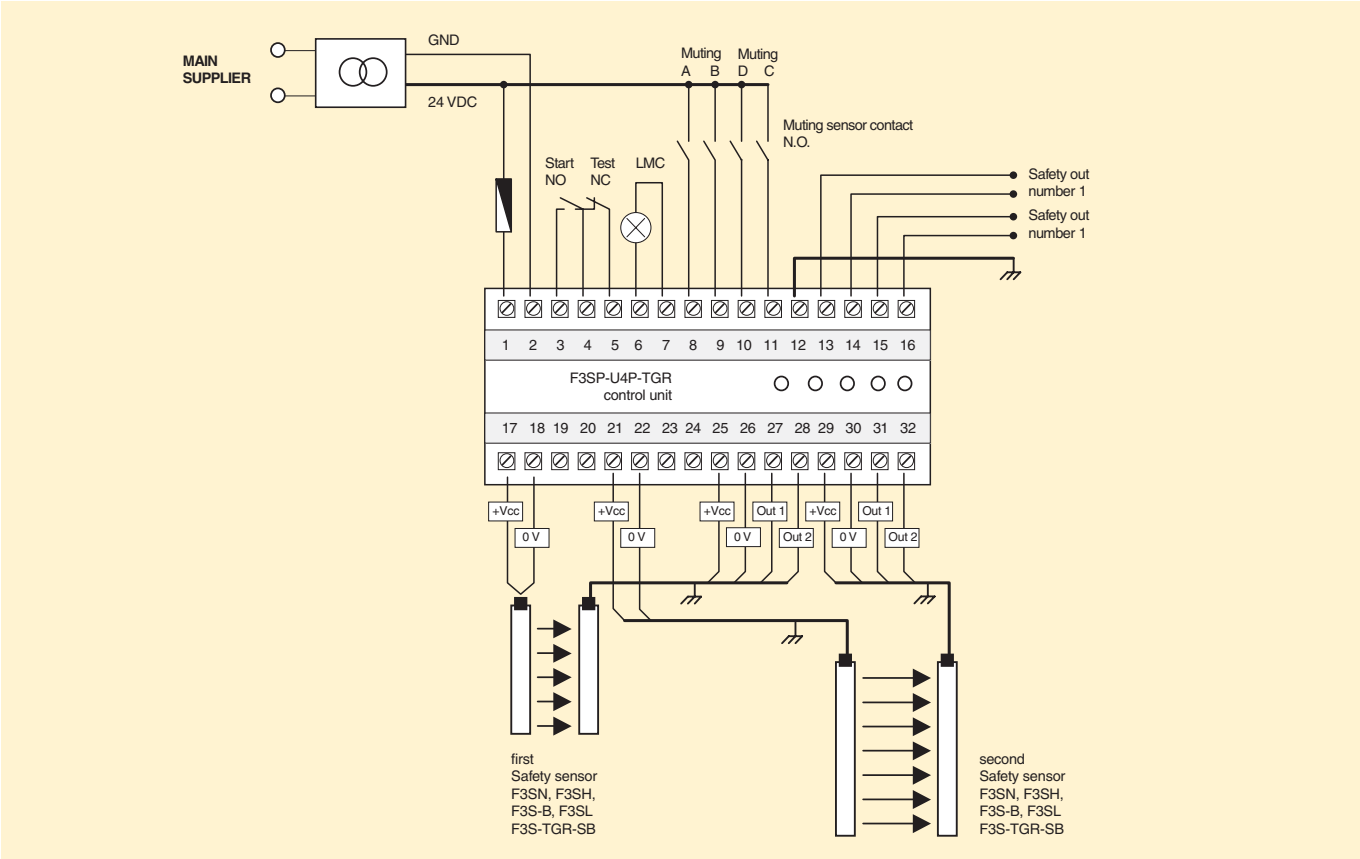
Description	Order code
Muting controller for safety light curtain F3S-B, F3SN and F3SH	F3SP-U4P-TGR

Specifications

Item	F3SP-U4P-TGR
Power supply voltage	24 VDC \pm 10%
Power consumption	420 mA max. (excl. SLC power consumption)
Output contacts	2 NO 2.5 A (protected by fuse)
Indicators	6 LEDs for status and diagnostics.
Degree of protection	IP20 (IEC 60529)
Terminal	32 screw terminals (1.5 mm ²), detachable blocks with 4 screws each
Response time	\leq 30 ms
Ambient temperature	Operating: -10 °C + 55 °C
Housing material	Plastic, DIN rail mounting

Wiring example

Control unit F3SP-U4P-TGR in a mixed configuration that allows the use of several Omron safety light curtains and perimeter guards.

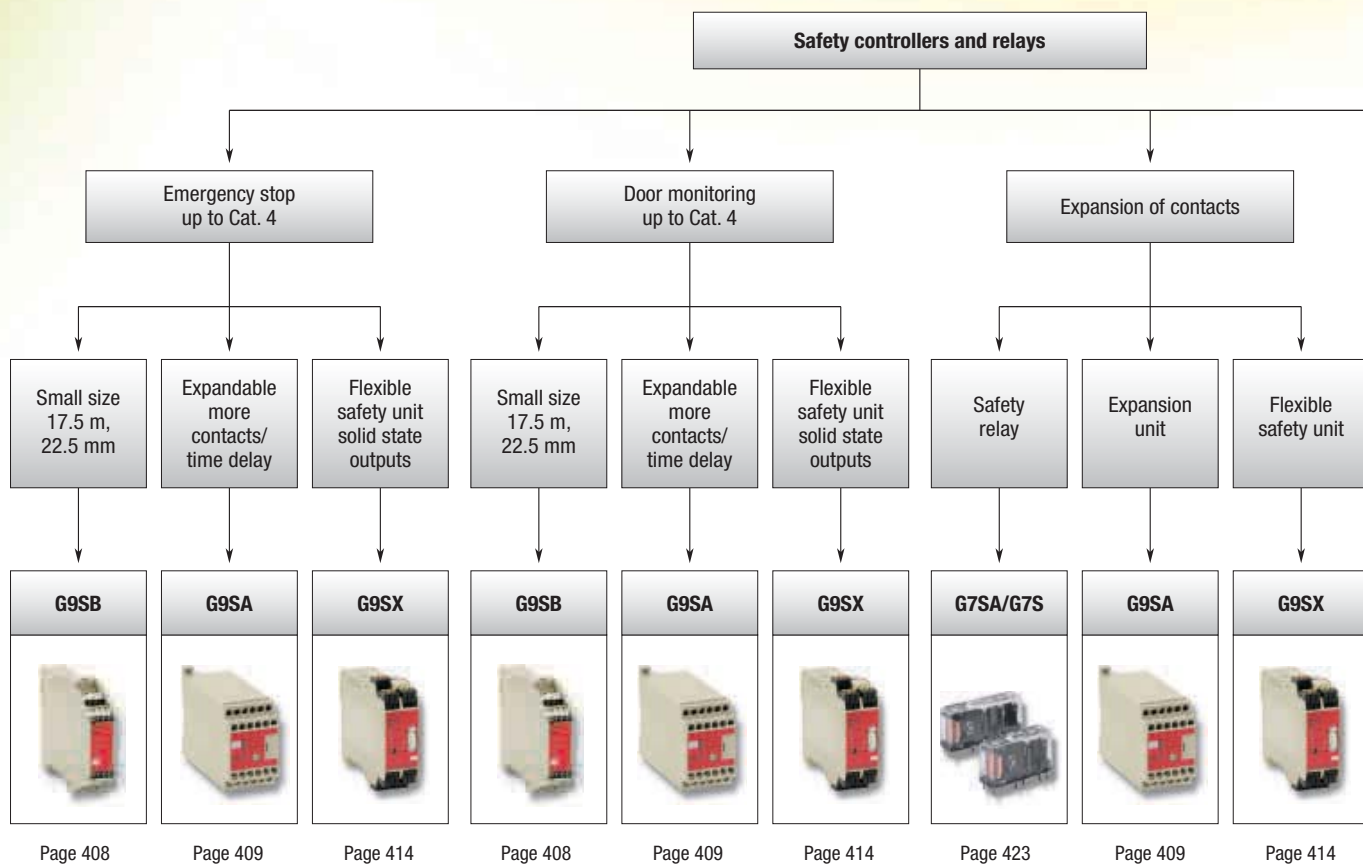


BREAK THROUGH BARRIERS IN SAFETY DESIGN

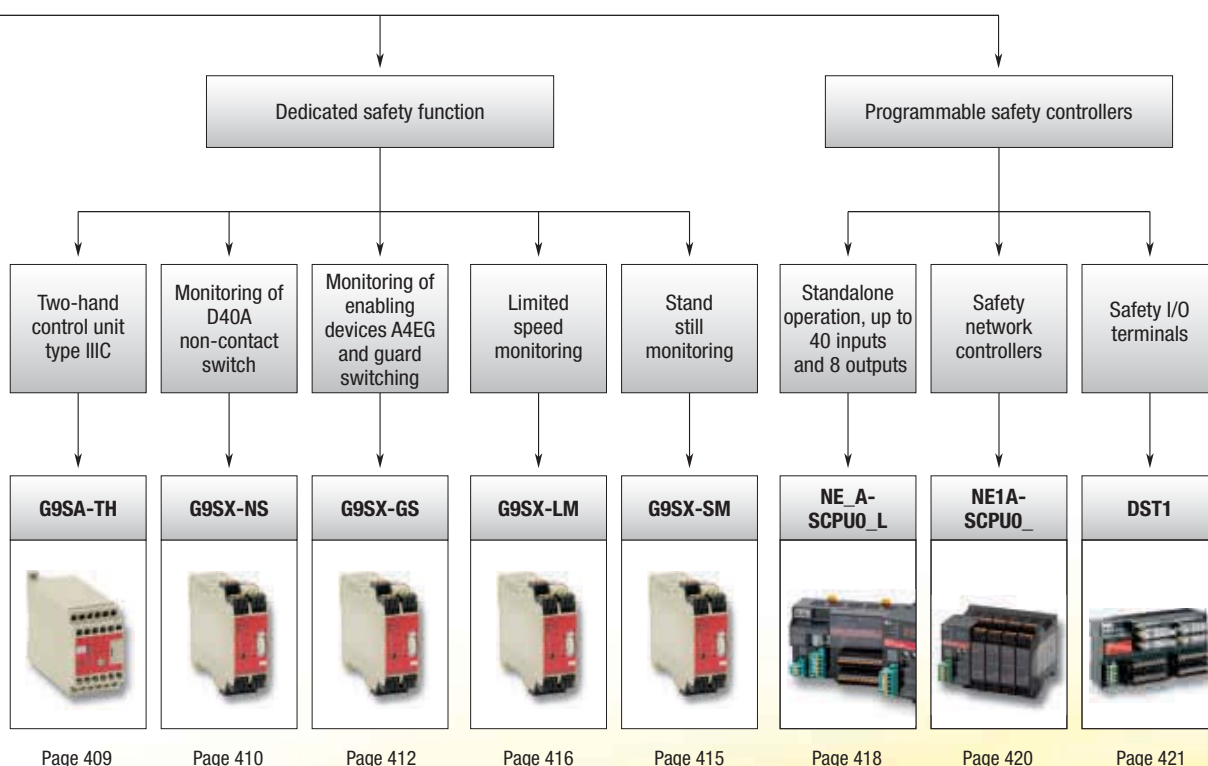
Our offer: Flexibility in safety control systems

Using one tool and operation concept, Omron safety controllers offer transparent standalone operation or scalability in safety networking applications for all sizes of machine control systems.

- IEC61508 (SIL3) and EN954-1/ISO13849-1 (Cat. 4) certification for future-proof design of the safety system
- Predefined function blocks for simple configuration and self-explanatory validation
- Equipped with DeviceNet slave function for transparent diagnosis information



DeviceNet



Page 409

Page 410

Page 412

Page 416





Page 415





Page 418

Page 420

Page 421

Selection table

		Safety relay units		Flexible safety unit	Safety relays
					
Selection criteria	Model	G9SA	G9SB	G9SX	G7SA
	Safety category (EN 954-1)	up to Category 4			–
	Safety integrity level (IEC 61508)	–	–	SIL 3	–
	Reaction time	max. 10 ms	max. 10 ms	15 ms	–
	DeviceNet safety Bus interface	–	–	–	–
	Standard DeviceNet Bus interface	–	–	–	–
	EDM function	■	■	■	–
	Interlock function	■	■	■	–
	Logical 'AND' connection	–	–	■	–
	Relay expansion units	■	–	■	–
	Housing	Plastic	Plastic	Plastic	Plastic
	Operating temperature	-25 to +55°C	-25 to +55°C	-10 to +55°C	-40 to +85°C
Features	Flux-tight	–	–	–	■
	Number of poles	–	–	–	4pole and 6pole
	Gold clad contacts	–	–	–	■
	Relay socket	–	–	–	■
	Detachable cage clamp terminals	–	–	■	–
	Screw terminals	■	■	■	–
	Safe timing functions	■	–	■	–
	USB-interface	–	–	–	–
Application	Programming software	–	–	–	–
	E-Stop application	■	■	■	–
	Door switch monitoring	■	■	■	–
	Safety light curtain monitoring	■	■	■	–
	EDM monitoring	■	■	■	–
	Interlock function	■	■	■	–
	Logic function blocks	–	–	–	–
	Safe ON delay timer	–	–	–	–
	Safe OFF delay timer	■	–	■	–
	Two-Hand control	■	–	–	–
	Manual/automatic reset	■	■	■	–
	Non-contact switches monitoring	–	–	■	–
	Guard switching/enabling function	–	–	■	–
	limited speed monitoring	–	–	■	–
	standstill monitoring	–	–	■	–
Supply voltage	General safety application	■	■	■	■
	24 VDC	■	■	■	■
	100 VAC to 240 VAC	■	–	–	–
In- and outputs	Safety inputs	■	■	■	–
	Test signal output	–	–	■	–
	Solid state safety outputs	–	–	■	–
	Safety relay outputs	3PST-NO, 5PST-NO	DPST-NO, 3PST-NO	■	–
	Auxiliary outputs	SPST-NC	SPST-NC	■	–
	4PST-NO + DPST-NC	–	–	–	■
	3PST-NO + 3PST-NC	–	–	–	■
	3PST-NO + SPST-NC	–	–	–	■
	DPST-NO + DPST-NC	–	–	–	■
	5PST-NO + SPST-NC	–	–	–	■
Page		409	408	414	423

		Programmable safety system			
					
Selection criteria	Model	NE0A-SCPU01	NE1A-SCPU0_L	NE1A-SCPU0_	DST1
	Safety category (EN 954-1)	up to Category 4			
	Safety integrity level (IEC 61508)	SIL 3			
	Reaction time	dependent on safety application program			
	DeviceNet safety Bus interface	—	—	■	■
	Standard DeviceNet Bus interface	■	■	■	■
	EDM function	■	■	■	■
	Interlock function	■	■	■	■
	Logical 'AND' connection	—	—	—	—
	Relay expansion units	—	—	—	—
	Housing	Plastic	Plastic	Plastic	Plastic
	Operating temperature	-10 to +55°C	-10 to +55°C	-10 to +55°C	-10 to +55°C
	Flux-tight	—	—	—	—
	Number of poles	—	—	—	—
Features	Gold clad contacts	—	—	—	—
	Relay socket	—	—	—	—
	Detachable cage clamp terminals	■	■	■	■
	Screw terminals	—	—	—	—
	Safe timing functions	■	■	■	■
	USB-interface	■	■	■	—
	Programming software	■	■	■	—
Application	E-Stop application	■	■	■	■
	Door switch monitoring	■	■	■	■
	Safety light curtain monitoring	■	■	■	■
	EDM monitoring	■	■	■	■
	Interlock function	■	■	■	■
	Logic function blocks	■	■	■	■
	Safe ON delay timer	■	■	■	■
	Safe OFF delay timer	■	■	■	■
	Two-Hand control	■	■	■	■
	Manual/automatic reset	■	■	■	■
	Non-contact switches monitoring	■	■	■	■
	Guard switching/enabling function	■	■	■	■
	limited speed monitoring	—	—	—	■
	standstill monitoring	—	—	—	■
Supply voltage	General safety application	■	■	■	■
	24 VDC	■	■	■	■
	100 VAC to 240 VAC	—	—	—	—
In- and outputs	Safety inputs	■	■	■	■
	Test signal output	■	■	■	■
	Solid state safety outputs	■	■	■	■
	Safety relay outputs	—	—	—	■
	Auxiliary outputs	■	■	■	■
	4PST-NO + DPST-NC	—	—	—	—
	3PST-NO + 3PST-NC	—	—	—	—
	3PST-NO + SPST-NC	—	—	—	—
	DPST-NO + DPST-NC	—	—	—	—
	5PST-NO + SPST-NC	—	—	—	—
Page		418	418	420	421

■ Standard

— No/not available



Slim size safety unit

G9SB is a family of slender safety relay units, providing two safety contacts in a 17.5 mm and three safety contacts in a 22.5 mm wide housing.

- 17.5 mm and 22.5 mm wide housing
- 1- and 2-input channel units
- Manual and automatic reset units
- Certification up to category 4 according to EN954-1 depending on the application

Ordering information

Main contacts	Auxiliary contact	Number of input channels	Reset mode	Input type	Rated voltage	Category (EN954-1)	Size	Order code
DPST-NO 2 safety contacts	None	2 channels	Auto-reset	Inverse	24 VAC/VDC	4	17.5 mm	G9SB-2002-A
		1 channel or 2 channels		+ common				G9SB-200-B
		2 channels	Manual-reset	Inverse				G9SB-2002-C
		1 channel or 2 channels		+ common				G9SB-200-D
3PST-NO 3 safety contacts	SPST-NC	None (direct breaking)	Auto-reset	—	24 VDC	3	17.5 mm	G9SB-3010
		2 channels		Inverse	24 VAC/VDC	4	22.5 mm	G9SB-3012-A
		1 channel or 2 channels		+ common				G9SB-301-B
		2 channels	Manual-reset	Inverse				G9SB-3012-C
		1 channel or 2 channels		+ common				G9SB-301-D

Specifications

Power input

Item	G9SB-200 _ _	G9SB-3010	G9SB-301 _ _
Power supply voltage	24 VAC/VDC: 24 VAC, 50/60 Hz, or 24VDC 24 VDC: 24 VDC		
Operating voltage range	85 to 110% of rated power supply voltage		
Power consumption	1.4 VA/1.4 W max.	1.7 W max.	1.7 VA/1.7 W max.

Inputs

Item	G9SB-200 _ _	G9SB-3010	G9SB-301 _ _
Input current	25 mA max.	60 mA max. (See note.)	30 mA max.

Note: Indicates the current between terminals A1 and A2.

Contacts

Item	G9SB-200 _ _	G9SB-3010	G9SB-301 _ _
	Resistive load ($\cos\phi=1$)		
Rated load	250 VAC, 5 A		
Rated carry current	5 A		

Characteristics

Item		G9SB-200 _ _	G9SB-3010	G9SB-301 _ _
Response time *1		10 ms max.		
Durability	Mechanical	5,000,000 operations min. (at approx. 7,200 operations/hr)		
	Electrical	100,000 operations min. (at approx. 1,800 operations/hr)		
Minimum permissible load (reference value)		5 VDC, 1 mA		
Ambient operating temperature		-25°C +55°C (with no icing or condensation)		

^{*1} The response time is the time it takes for the main contact to open after the input is turned OFF.



Expandable safety relay unit

The G9SA family offers a complete line-up of compact and expandable safety relay units. Modules with safe OFF-delay timing are available as well as a two-hand controller. Simple multiplication of safety contacts is possible by using the connection on the front.

- 45 mm wide housing, expansion units are 17.5 mm wide
- Safe OFF-delay timer
- Simple expansion connection
- Certification up to category 4 according to EN954-1 depending on the application

Ordering information

Emergency-stop units

Main contacts	Auxiliary contact	Number of input channels	Rated voltage	Category	Order code
3PST-NO	SPST-NC	1 channel or 2 channels possible	24 VAC/VDC	4	G9SA-301
			100 to 240 VAC		
5PST-NO	SPST-NC	1 channel or 2 channels possible	24 VAC/VDC		G9SA-501
			100 to 240 VAC		

Emergency-stop OFF-delay units

Main contacts	OFF-delay contacts	Auxiliary contact	Number of input channels	OFF-delay time	Rated voltage	Category	Order code
3PST-NO	DPST-NO	SPST-NC	1 channel or 2 channels possible	7.5 s	24 VAC/VDC	Main contacts: 4 OFF-delay contacts: 3	G9SA-321-T075
					100 to 240 VAC		
				15 s	24 VAC/VDC		G9SA-321-T15
					100 to 240 VAC		
				30 s	24 VAC/VDC		G9SA-321-T30
					100 to 240 VAC		

Two-hand controller

Main contacts	Auxiliary contact	Number of input channels	Rated voltage	Category	Order code
3PST-NO	SPST-NC	2 channels	24 VAC/VDC	4 (IIIc, EN574)	G9SA-TH301
			100 to 240 VAC		

Expansion unit

The expansion unit connects to a G9SA-301, G9SA-501, G9SA-321, or G9SA-TH301.

Main contacts	Auxiliary contact	Category	Order code
3PST-NO	SPST-NC	4	G9SA-EX301

Expansion units with OFF-delay outputs

The expansion unit connects to a G9SA-301, G9SA-501, G9SA-321, or G9SA-TH301.

Main contact form	Auxiliary contact	OFF-delay time	Category	Order code
3PST-NO	SPST-NC	7.5 s	3	G9SA-EX031-T075
		15 s		G9SA-EX031-T15
		30 s		G9SA-EX031-T30

Specifications

Power input

Item	G9SA-301/TH301 / G9SA-501 / G9SA-321-T_
Power supply voltage	24 VAC/VDC: 24 VAC, 50/60 Hz, or 24 VDC 100 to 240 VAC: 100 to 240 VAC, 50/60 Hz
Operating voltage range	85 to 110% of rated power supply voltage

Inputs

Item	G9SA-301/321-T_/TH301	G9SA-501
Input current	40 mA max.	60 mA max.

Contacts

Item	G9SA-301/501/321-T_/TH301/EX301/EX031-T_
	Resistive load (cosφ= 1)
Rated load	250 VAC, 5 A
Rated carry current	5 A

Characteristics

Item		G9SA-301/TH301 / G9SA-501/321-T_ / G9SA-EX301/EX031-T_	
Operating time		30 ms max. (not including bounce time)	
Response time *1		10 ms max. (not including bounce time)	
Durability	Mechanical	5,000,000 operations min. (at approx. 7,200 operations/hr)	
	Electrical	100,000 operations min. (at approx. 1,800 operations/hr)	
Minimum permissible load (reference value)		5 VDC, 1 mA	
Ambient temperature		Operating:	-25 to 55°C (with no icing or condensation)
		Storage:	-25 to 85°C (with no icing or condensation)

*1 The response time is the time it takes for the main contact to open after the input is turned OFF.



Compact non-contact door switch/ flexible safety unit

Electronic detection mechanism for better stability in non-contact door switch operation

- Stable operation reduces controller errors caused by unstable doors.
- Connect up to 30 non-contact door switches with LED indicators to one controller.
- Reversible switch provides flexibility in installation.
- Two colour LED indicator enables easier maintenance by identification of door status and cable disconnections.
- Safety category 3 (EN 954-1).

Ordering information

Non-contact door switches (Switch/Actuator)

Classification	Auxiliary outputs	Cable length	Order code
Standard models	Semiconductor outputs *1	2 m	D40A-1C2
		5 m	D40A-1C5

*1 PNP open-collector semiconductor output.

Note: Must be used in combination with a G9SX-NS_ non-contact door switch controller.

Non-contact door switch controllers (Controllers for D40A)

Safety outputs *1		Auxiliary outputs *2	Logical AND connection input	Logical AND connection output	Max. OFF delay time *3	Rated voltage	Terminal block type	Order code
Instantaneous	OFF-delayed *4							
2 (Semi-conductors)	0	2 (Semi-conductors)	1	1	–	24 VDC	Screw terminals	G9SX-NS202-RT
	2 (Semi-conductors)				3.0 s		Spring-cage terminals	G9SX-NS202-RC
					Screw terminals		G9SX-NSA222-T03-RT	
							Spring-cage terminals	G9SX-NSA222-T03-RC

*1 P channel MOS FET transistor output

*2 PNP transistor output

*3 The OFF-delay time can be set in 16 steps as follows:

0/0.2/0.3/0.4/0.5/0.6/0.7/0.8/0.9/1.0/1.2/1.4/1.8/2.0/2.5/3.0 s

*4 The OFF-delayed output becomes an instantaneous output by setting the OFF-delay time to 0 s.

Specifications

Ratings/Characteristics of non-contact door switches

Item	Model	D40A-1C_
Operating characteristics *1	Operating distance OFF→ON	5 mm min.
	Operating distance ON→OFF	15 mm max.
	Differential travel (max.)	20% of operating distance
Ambient operating temperature		–10 to 55°C (no icing or condensation)
Vibration resistance		10 to 55 to 10 Hz (single amplitude: 0.75 mm, double amplitude: 1.5 mm)
Shock resistance		300 m/s ² min.
Degree of protection		IP67
Material		PBT resin
Mounting method		M4 screws
Power consumption		0.6 W max.
Auxiliary outputs *2		24 VDC, 10 mA (PNP open-collector outputs)
LED indicators		Actuator not detected (red); actuator detected (yellow)
Connection cables		2 m, 5 m
Number of connectable switches		30 max. (wiring length: 100 m max.)

*1 This is the distance where the switch operates from OFF to ON when approaching and the distance where the switch operates from ON to OFF when separating when the switch and actuator target marks are on the same axis, and the sensing surfaces coincide.

*2 Turns ON when the actuator is approaching.

Ratings of non-contact door switch controllers

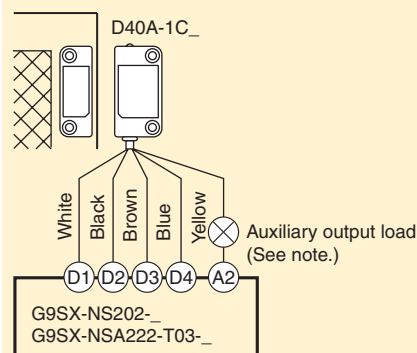
Power input			
Item	G9SX-NS202-__	G9SX-NSA222-T03-__	G9SX-EX-__
Rated supply voltage	24 VDC		
Inputs			
Item	G9SX-NS202-_/G9SX-NSA222-T03-__		
Safety input *1	Operating voltage: 20.4 VDC to 26.4 VDC, internal impedance: approx. 2.8 kΩ		
Feedback/reset input			

^{*1} Only applies to the G9SX-NSA222-T03-__. Refers to input other than that from the non-contact door switch.

Outputs

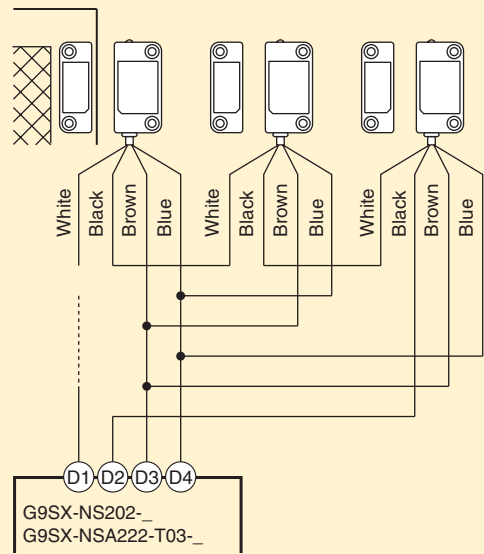
Item	G9SX-NS202-__ /G9SX-NSA222-T03-__
Instantaneous safety output OFF-delayed safety output	P channel MOS FET transistor output Load current: 0.8 A DC max.
Auxiliary output	PNP transistor output Load current: 100 mA max.

Non-contact Door Switch and
Non-contact Door Switch Controller Wiring
Example: Wiring a Single Switch



Note: The auxiliary output load current must be 10 mA max.

Example: Wiring Multiple Switches
Connect Up to 30 Non-contact Door Switches





Safety guard switching unit

The safety controller to support maintenance mode of machinery in the safe way.

- Two operation modes to support:
 - Auto switching for applications where machine and worker co-operate.
 - Manual switching for applications with limitation in operation like maintenance.
- Clear and transparent segmentation of safety functions by use of unique "AND" connection
- Clear LED diagnosis of all in- and output signals for easy maintenance
- Category 4 according to EN954-1 and SIL 3 according to EN 61508.

Ordering information

Enabling grip switches

Contact form			Order code
Enabling switch	Monitor switch	Pushbutton switch	
Two contacts	1NC (grip output)	None	A4EG-C000041
Two contacts	None	Emergency stop switch (2NC)	A4EG-BE2R041
Two contacts	None	Momentary operation switch (2NO)	A4EG-BM2B041

Safety Guard Switching Units

Safety outputs ^{*1}		Auxiliary outputs ^{*2}	Logical AND connection input	Logical AND connection output	Max. OFF delay time ^{*3}	Rated voltage	Terminal block type	Order code
Instantaneous	OFF-delayed ^{*4}							
2 (Semi-conductors)	2 (Semi-conductors)	6 (Semi-conductors)	1	1	15 s	24 VDC	Screw terminals	G9SX-GS226-T15-RT
							Spring-cage terminals	G9SX-GS226-T15-RC

^{*1} P channel MOS FET transistor output

^{*2} PNP transistor output

^{*3} The OFF-delay time can be set in 16 steps as follows:

T15: 0, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 1, 1.5, 2, 3, 4, 5, 7, 10 or 15 s

^{*4} The OFF-delayed output becomes an instantaneous output by setting the OFF-delay time to 0 s.

Specifications

Ratings of non-contact door switch controllers

Power input

Item	G9SX-GS226-T15-__	G9SX-EX-__
Rated supply voltage	24 VDC	

Inputs

Item	G9SX-GS226-T15-__
Safety input	Operating voltage: 20.4 VDC to 26.4 VDC, internal impedance: approx. 2.8 kΩ
Feedback/reset input	
Mode selector input	

Outputs

Item	G9SX-G9SX-GS226-T15-__
Instantaneous safety output	P channel MOS FET transistor output Load current: 0.8 A DC max.
OFF-delayed safety output	
Auxiliary output	PNP transistor output Load current: 100 mA max.
External indicator outputs	P channel MOS FET transistor outputs Connectable indicators <ul style="list-style-type: none"> • Incandescent lamp: 24 VDC, 3 W to 7 W • LED lamp: 10 to 300 mA DC

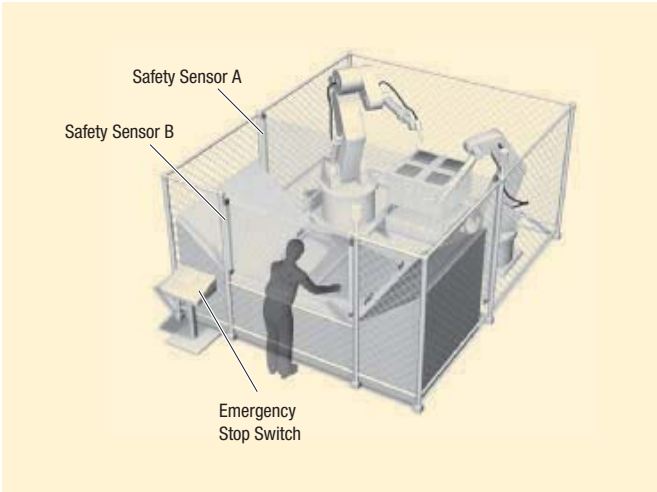
Application example

Automatic switching mode

Worker is loading and unloading the machine manually. When loading is finished, robot cycle is started manually by the worker. When robots return to their home position, loading cycle is selected automatically.

Loading Condition: Safety Sensor B is not active, Safety Sensor A is active because the robots are not allowed to move to the loading area while the worker loads the machine. So the worker is safe because Safety Sensor A is active.

Robot Work Condition: Safety Sensor B is active, Safety Sensor A is not active because the worker is not allowed to move to the loading area when the robots work. So the worker is safe because Safety Sensor B stops the machine if he moves to the loading area.



Manual switching mode

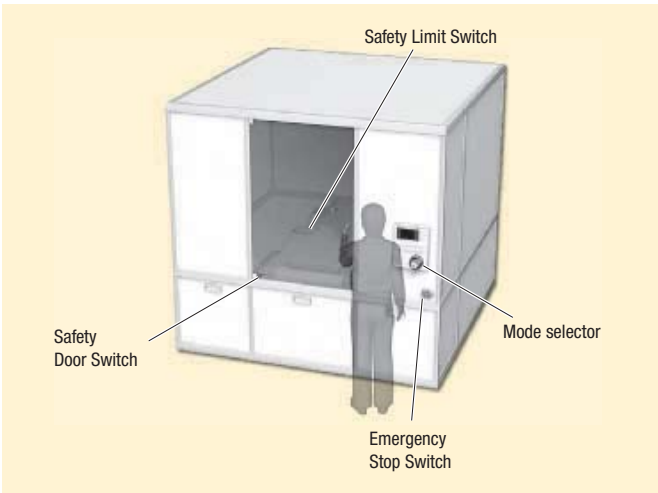
Worker has to do maintenance in this machine. During maintenance, it is necessary to move the machine in a limited way. The worker has to select automatic mode or manual mode manually by using the mode selector switch.

Operation steps:

- 1) Select Maintenance mode by using the mode selector
- 2) Open the door to do the maintenance while the machine is still able to operate in a limited way (monitoring of limited movement by using the safety limit switch).
- 3) Close the cover after finishing maintenance
- 4) Select Automatic mode by using the mode selector

E-Stop conditions:

- a) open the door while not in maintenance mode
- b) the machine actuates the limit switch (breaks the limit).
- c) the Enabling grip switch A4EG is actuated to stop the machine in an emergency condition.





Flexible safety unit

G9SX family modules can be connected by a logical "AND" function to implement partial/global stopping of a machine. Solid-state outputs, detailed LED diagnosis and clever feedback signals help to keep maintenance easy. The line-up is completed by expansion units with safe timing functions.

- Clear and transparent segmentation of safety functions by use of unique "AND" connection
- Solid-state outputs for long life and relay outputs in extension box available
- Detailed LED indications enable easy diagnosis
- Clever feedback signals for easy maintenance
- Category-4 according to EN954-1 and SIL 3 according to EN 61508

Ordering information

Advanced unit

Safety outputs		Auxiliary outputs	No. of input channels	Max. OFF-delay time ^{*1}	Rated voltage	Terminal block type	Order code
Instantaneous	OFF-delayed						
3 P channel MOS-FET transistor output	2 P channel MOS-FET transistor output	2 PNP transistor outputs	1 or 2 channels	0 to 15 sec in 16 steps	24 VDC	Screw terminals Cage clamp terminals	G9SX-AD322-T15-RT G9SX-AD322-T15-RC
2 P channel MOS-FET transistor output	2 P channel MOS-FET transistor output	2 PNP transistor outputs	1 or 2 channels	0 to 150 sec in 16 steps	24 VDC	Screw terminals Cage clamp terminals	G9SX-AD-322-T150-RT G9SX-AD-322-T150-RC
				0 to 15 sec in 16 steps	24 VDC	Screw terminals Cage clamp terminals	G9SX-ADA-222-T15-RT G9SX-ADA-222-T15-RC
				0 to 150 sec in 16 steps	24 VDC	Screw terminals Cage clamp terminals	G9SX-ADA-222-T150-RT G9SX-ADA-222-T150-RC

^{*1} The OFF-delay time can be set in 16 steps as follows: T15: 0/0.2/0.3/0.4/0.5/0.6/0.7/1/1.5/2/3/4/5/7/10/15 s, T150: 0/10/20/30/40/50/60/70/80/90/100/110/120/130/140/150 s.

Basic unit

Safety outputs		Auxiliary outputs	No. of input channels	Rated voltage	Terminal block type	Order code
Instantaneous	OFF-delayed					
2 P channel MOS FET transistor output	—	2 PNP transistor output	1 or 2 channels	24 VDC	Screw terminals Cage clamp terminals	G9SX-BC202-RT G9SX-BC202-RC

Expansion unit

Safety outputs		Auxiliary outputs	OFF-delay time	Rated voltage	Terminal block type	Order code
Instantaneous	OFF-delayed					
4 PST-NO (contact)	—	2 (solid state) PNP transistor outputs	—	24 VDC	Screw terminals Cage clamp terminals	G9SX-EX401-RT G9SX-EX401-RC
—	4 PST-NO (contact)		Synchronized with G9S-X-AD - unit		Screw terminals Cage clamp terminals	G9SX-EX041-T-RT G9SX-EX041-T-RC

Specifications

Power input

Item	G9SX-AD _	G9SX-BC202- _	G9SX-EX- _
Rated supply voltage	20.4 to 26.4 VDC (24 VDC -15% +10%)		

Inputs

Item	G9SX-AD _	G9SX-BC202- _
Safety input	Operating voltage: 20.4 VDC to 26.4 VDC, internal impedance: Approx. 2.8 kΩ	
Feedback/reset input		

Outputs

Item	G9SX-AD _	G9SX-BC202- _
Instantaneous safety output OFF-delayed safety output	P channel MOS FET transistor output Load current: Using 2 outputs or less: 1 A DC max. Using 3 outputs or more: 0.8 A DC max.	P channel MOS FET transistor output Load current: Using 1 output: 1 A DC max. Using 2 outputs: 0.8 A DC max.
Auxiliary output	PNP transistor output Load current: 100 mA max.	

Expansion unit

Item	G9SX-EX- _
Rated load	250 VAC, 3A/30 VDC, 3A (resistive load)
Rated carry current	3 A
Maximum switching voltage	250 VAC, 125 VDC

Characteristics

Item	G9SX-AD _	G9SX-BC202- _	G9SX-EX- _
Operating time (OFF to ON state)	50 ms max. (Safety input: ON) 100 ms max. (Logical AND connection input: ON)	50 ms max. (Safety input: ON)	30 ms max.
Response time (ON to OFF state)	15 ms max.		10 ms max.
Durability	Electrical	—	100,000 cycles min.
	Mechanical	—	5,000,000 cycles min.
Ambient temperature	-10°C +55°C (with no icing or condensation)		



Standstill monitoring unit

- Safe Standstill monitoring unit based on Back-EMF operation for two- and three-phase systems.
- Ready to use – covering all standard applications without additional setup
 - Easy integration in star and delta wiring
 - Clear LED diagnosis of all in- and output signals for easy maintenance
 - Applicable up to Safety Category 4 according to EN954-1

Ordering information

Safety standstill monitoring unit				
Safety outputs *1	Auxiliary outputs *1	Power input	Terminal block type	Order code
Instantaneous		Rated supply voltage		
3 (Semi-conductors)	2 (Semi-conductors)	24 VDC	Screw terminals	G9SX-SM032-RT
			Spring-cage terminals	G9SX-SM032-RC

*1 PNP transistor output

Specifications

Ratings of non-contact door switch controllers

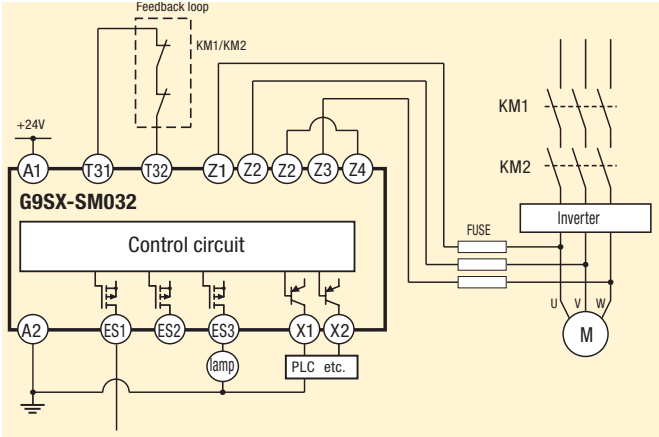
Item	G9SX-SM032- _
Power input	
Rated supply voltage	24 VDC

Item	G9SX-SM032- _
Inputs	
Input Voltage	Standstill detection input (Z1-Z2/Z3-Z4) AC 415 Vrms + 10% max.
Maximum power supply frequency for AC induction motor	60 Hz max.
Internal impedance	Standstill detection input: approx. 660 kΩ EDM input: approx. 2.8 kΩ

Item	G9SX-SM032- _
Outputs	
Safety Standstill detection output	Sourcing output (PNP) Load current: 300 mA DC max.
Auxiliary output	Sourcing output (PNP) Load current: 100 mA DC max.

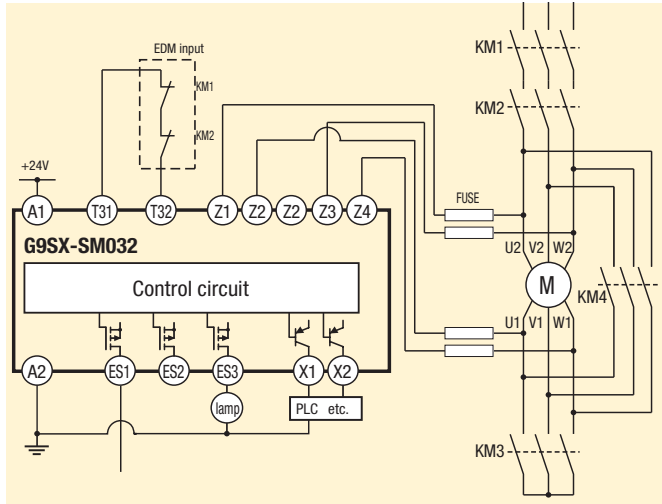
Application example

3-phase motor



Standstill detected

3-phase motor with star-delta wiring



Standstill detected



Limited speed monitoring unit

Safe Limited Speed monitoring unit for complete support of maintenance mode in machinery.

- Preset of limited speed frequency by using integrated preset switches
- Easy integration in G9SX systems by using unique logical "AND" connection
- Clear LED diagnosis of all in- and output signals for easy maintenance
- Applicable up to Safety Category 3 according to EN954-1 using Omron proximity sensors

Ordering information

Proximity sensors

Classification			Order code
Proximity sensor	Shielded	M8	E2E-X1R5F1
		M12	E2E-X2F1
		M18	E2E-X5F1
	Unshielded	M8	E2E-X2MF1
		M12	E2E-X5MF1
		M18	E2E-X10MF1

Safety standstill monitoring unit

Safety outputs *1	Auxiliary outputs *2	Logical AND connection input	Rated voltage	Sensor power supply terminals	Terminal block type	Order code
Instantaneous						
4 (Semi-conductors)	4 (Semi-conductors)	1	24 VDC	2	Screw terminals	G9SX-LM224-F10-RT
					Spring-cage terminals	G9SX-LM224-F10-RC

*1 P channel MOS FET output

*2 PNP transistor output

Specifications

Ratings of non-contact door switch controllers

Power input

Item	G9SX-LM224-F10-__
Rated supply voltage	24 VDC

Inputs

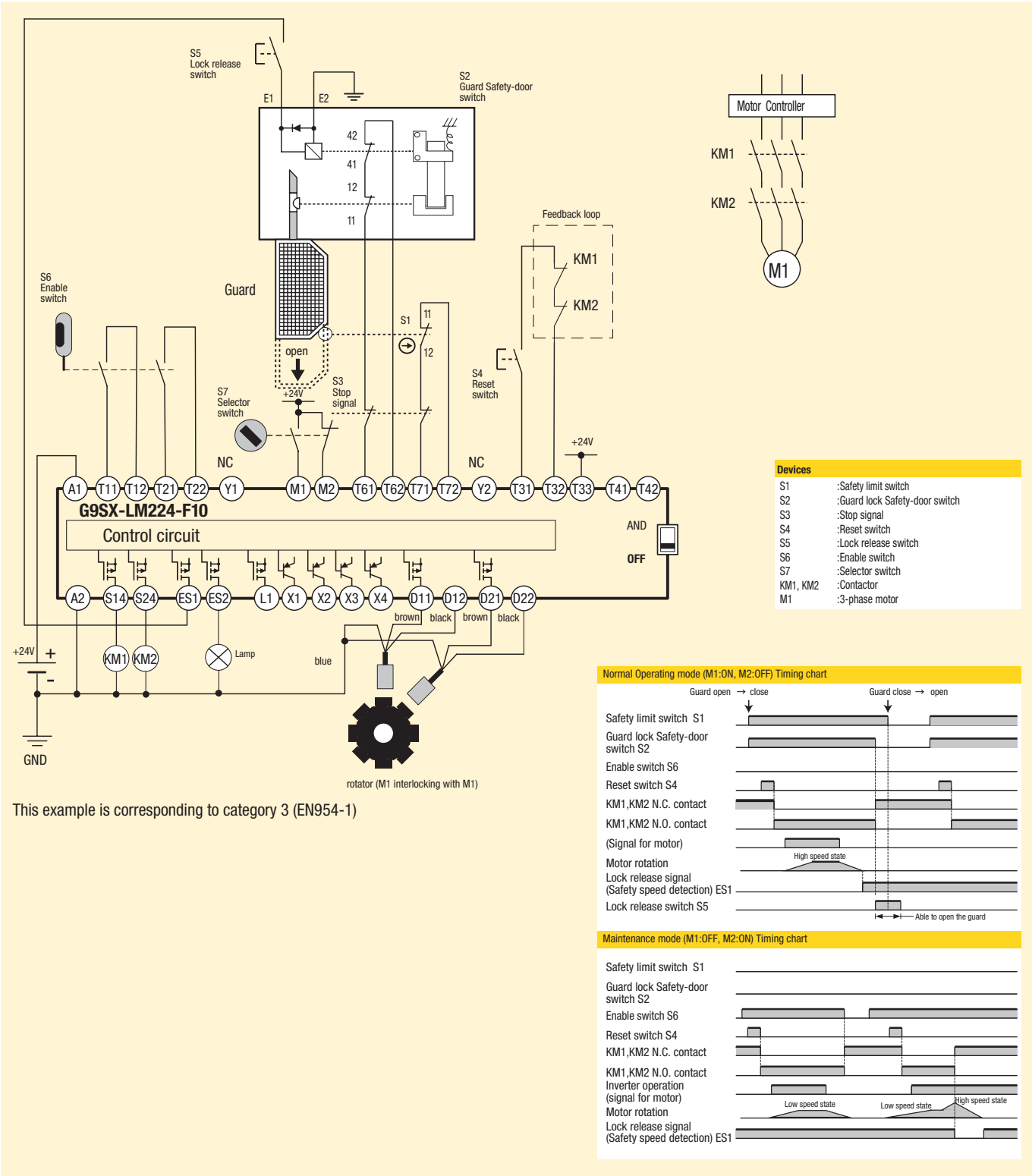
Item	G9SX-LM224-F10-__
Safety input	Operating voltage: 20.4 VDC to 26.4 VDC
Feedback/reset input	Internal impedance: approx. 2.8 kΩ
Mode selector input	
Rotation detection input	Operating voltage 20.4 VDC to 26.4 VDC Internal impedance: approx. 2.8 kΩ Input frequency: 1 kHz max.

Outputs

Item	G9SX-LM224-F10-__
Safety solid state output	P channel MOS FET transistor output Load current: 0.8 A DC max.
Safety speed detection output	P channel MOS FET transistor output Load current: 0.3 A DC max.
External indicator output	PNP transistor output Load current: 100 mA max.

Application example

Safe limited speed





Standalone controller

The NE0A and NE1A hosts the safety application program. All local safety based in- and outputs are monitored and controlled by the NE0A and the NE1A-L. It can be seamlessly integrated in a standard DeviceNet system.

- Removable cage-clamp terminals for easy installation
- Predefined and certified function blocks for easy programming
- LED display and status LEDs for advanced diagnostics
- System status on DeviceNet for easy troubleshooting and predictive maintenance
- Portability of configuration to DeviceNet Safety Bus Systems for maximum scalability

Ordering information

Appearance	Appearance description	Order code
Standalone Safety Controller	12 PNP inputs 6 PNP outputs 2 test outputs removable cage clamp terminals	NE0A-SCPU01
	16 PNP inputs 8 PNP outputs 4 test outputs 254 function block programming removable cage clamp terminals	NE1A-SCPU01L
	40 PNP inputs 8 PNP outputs 8 test outputs 254 function block programming removable cage clamp terminals	NE1A-SCPU02L

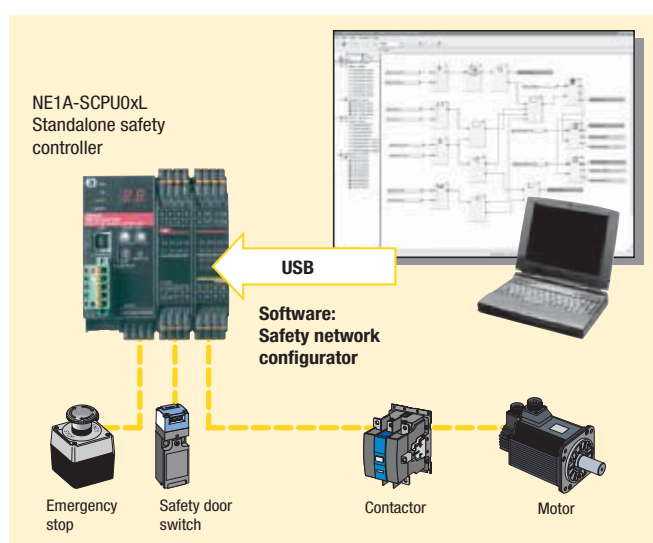
Software

Appearance	Appearance description	Order code
Safety network configurator	Installation disk (CD-ROM) IBM PC/AT compatible Windows 2000 or XP (English version)	WS02-CFSC1-E

Stand-alone programmable controller

Programmable safety circuits

The standalone safety controller uses predefined logical function blocks to set up the safety system. Modifications of the safety system in the life cycle of a machine are done without tedious wiring.



Specifications

General specifications

DeviceNet communications power supply voltage		11 to 25 VDC (supplied from communications connector)
Unit power supply voltage		20.4 to 26.4 VDC (24 VDC -15% +10%)
I/O power supply voltage		
Consumption current	Communications power supply	24 VDC, 15 mA
	Internal circuit power supply	24 VDC, 230 mA
Mounting method		35-mm DIN track
Ambient operating temperature		-10°C +55°C
Ambient storage temperature		-40°C +70°C
Degree of protection		IP20 (IEC 60529)

Safety input specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each input terminal and G1
OFF voltage	5 VDC max. between each input terminal and G1
OFF current	1 mA max.
Input current	4.5 mA

Safety output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max. per output
Residual voltage	1.2 V max. between each output terminal and V2

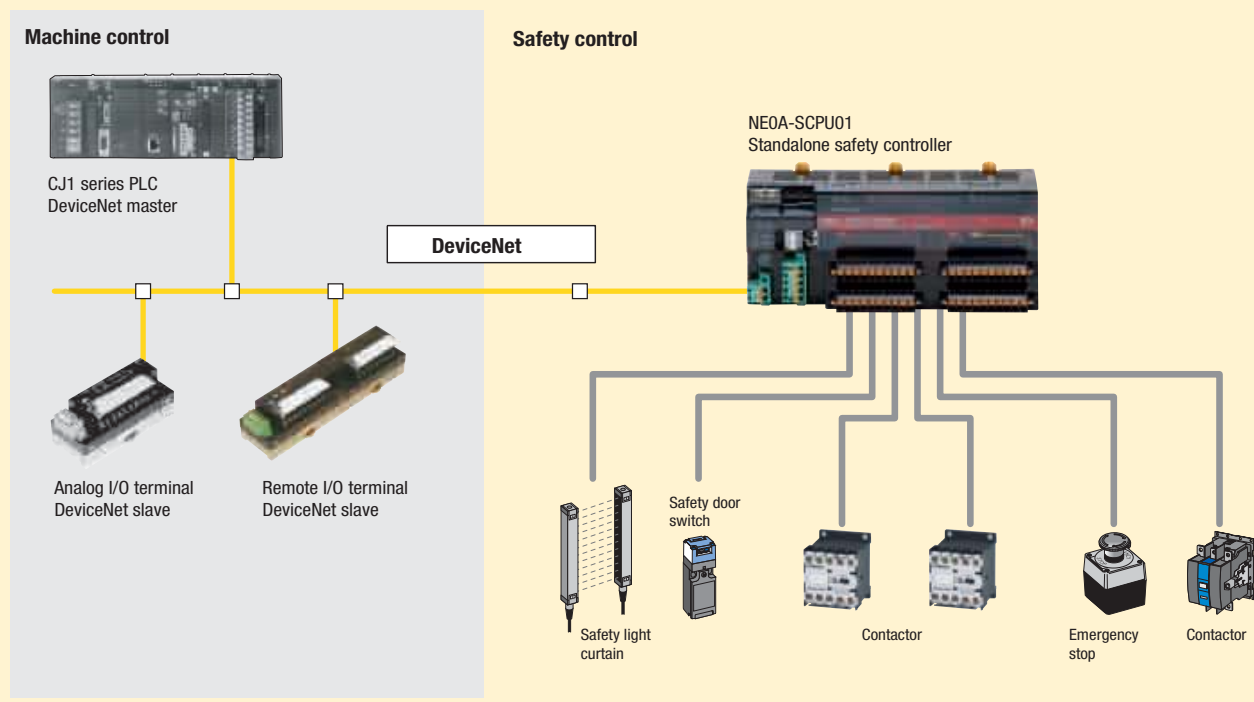
Test output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max. per output (see note.)
Residual voltage	1.2 V max. between each output terminal and V1

Network integration**Safety - I/O-status becomes transparent**

The standalone Safety Controller NE1AxL can be seamlessly integrated in a standard DeviceNet System.

Information of all safety in- and outputs on the standard control system ensure minimum downtime of the machine.





Safety network controller

The NE1A hosts the safety application program. All local and DeviceNet safety based in- and outputs are monitored and controlled by the NE1A. It manages up to 32 DeviceNet safety slaves and can be seamlessly integrated in a standard DeviceNet system.

- Removable cage-clamp terminals for easy installation
- Predefined and certified function blocks for easy programming
- LED display and status LEDs for advanced diagnostics
- System status on DeviceNet for easy troubleshooting and predictive maintenance
- Easy scalability through the addition of DeviceNet safety devices

Ordering information

Appearance	Appearance description	Interface	Order code
Safety network controller	16 PNP inputs 8 PNP outputs 4 test outputs 254 function block programming removable cage clamp terminals	USB and DeviceNet Safety	NE1A-SCPU01-V1
		Ethernet/IP and DeviceNet Safety	NE1A-SCPU01-EIP
	40 PNP inputs 8 PNP outputs 8 test outputs 254 function block programming removable cage clamp terminals	USB and DeviceNet Safety	NE1A-SCPU02
		Ethernet/IP and DeviceNet Safety	NE1A-SCPU02-EIP

Software

Appearance	Appearance description	Order code
Safety network configurator	Installation disk (CD-ROM) IBM PC/AT compatible Windows 2000 or XP (English version)	WS02-CFSC1-E

Accessories

Appearance	Appearance description	Order code
Network router	Ethernet/IP - DeviceNet router	NE1A-EDR01
Programming console	CF-Card slot to store configuration USB-Interface for maintenance Touchscreen for easy troubleshooting	NE1A-HDY

Specifications

General specifications

DeviceNet communications power supply voltage		11 to 25 VDC (supplied from communications connector)
Unit power supply voltage		20.4 to 26.4 VDC
I/O power supply voltage		(24 VDC -15% +10%)
Consumption current	Communications power supply	24 VDC, 15 mA
	Internal circuit power supply	24 VDC, 230 mA
Mounting method		35-mm DIN track
Ambient operating temperature		-10°C +55°C
Ambient storage temperature		-40°C +70°C
Degree of protection		IP20 (IEC 60529)

Safety input specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each input terminal and G1
OFF voltage	5 VDC max. between each input terminal and G1
OFF current	1 mA max.
Input current	4.5 mA

Safety output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max. per output
Residual voltage	1.2 V max. between each output terminal and V2

Test output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max. per output (see note.)
Residual voltage	1.2 V max. between each output terminal and V1



DeviceNet safety I/O terminal block family

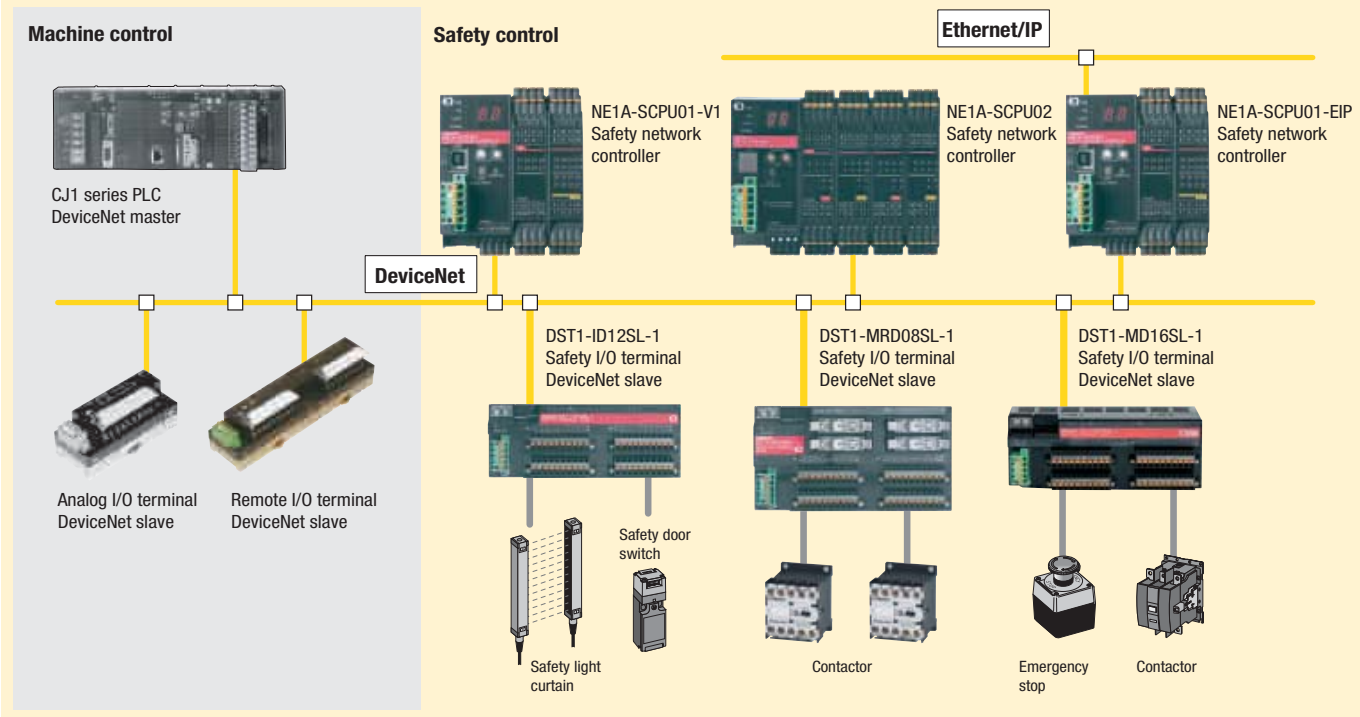
- Removable cage clamp terminals for easy installation
- up to 12 Inputs for safety signals
- 4 test pulse outputs to ensure crosstalk and short circuit detection
- up to 8 safety outputs (solid state or relay)
- Status LEDs for advanced diagnostics
- Mixed mode operation (safety and standard) for all in- and outputs

Ordering information

Safety network

Expand safety I/O through networks

Safety components distributed over many different installation locations required long and complicated wiring. Replacing the wiring with a network between safety components greatly improves productivity.



Appearance	Appearance description	Order code
Input terminal	12 PNP inputs 4 Test outputs Removable cage clamp terminals	DST1-ID12SL-1
Mixed I/O terminal	8 PNP inputs 8 PNP outputs 4 Test outputs Removable cage clamp terminals	DST1-MD16SL-1
Mixed I/O terminal	4 PNP inputs 4 relay outputs (4×2-single pole) 4 Test outputs Removable cage clamp terminals	DST1-MRD08SL-1

Specifications

General specifications		
DeviceNet communications power supply voltage	11 to 25 VDC	(supplied from communications connector)
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC -15% +10%)	
I/O power supply voltage		
Consumption current	Communications power supply	DST1-ID12SL-1/MD16SL-1: 100 mA DST1-MRD08SL-1: 110 mA
Mounting method	35-mm DIN track	
Ambient operating temperature	-10°C +55°C	
Ambient storage temperature	-40°C +70°C	
Degree of protection	IP20 (IEC 60529)	
Weight	DST1-ID12SL-1/MD16SL-1: 420 g DST1-MRD08SL-1: 600 g	

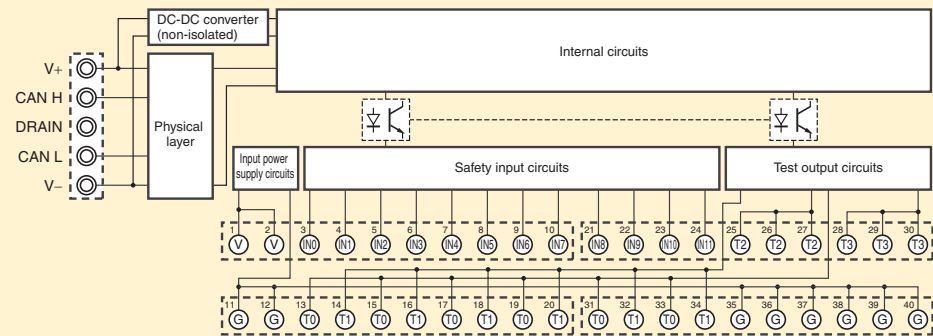
Safety input specifications		
Input type	Sinking inputs (PNP)	
ON voltage	11 VDC min. between each input terminal and G1	
OFF voltage	5 VDC max. between each input terminal and G1	
OFF current	1 mA max.	
Input current	6 mA	

Safety output specifications	
Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max. per output
Residual voltage	1.2 V max. between each output terminal and V1

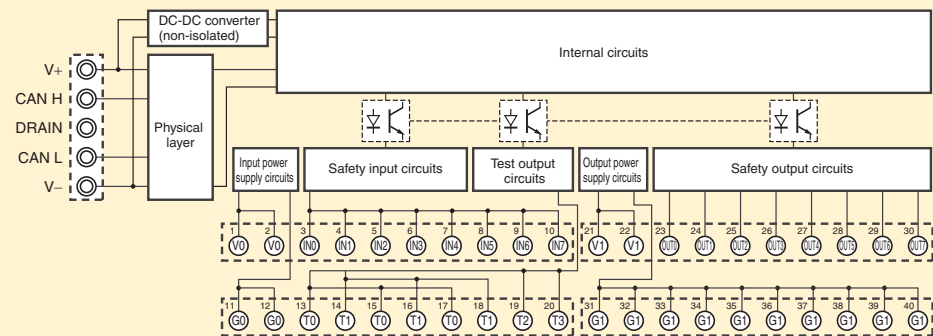
Test output specifications	
Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max. per point
Residual voltage	1.2 V max. between each output terminal and V0

Safety output specifications for relay outputs	
Relays	G7SA-2A2B, EN 50205 class A
Minimum applicable load	1 mA at 5 VDC
Rated load for a resistive load	240 VAC: 2 A, 30 VDC: 2 A
Rated load for an inductive load	2 A at 240 VAC (cosφ= 0.3), 1 A at 24 VDC
Mechanical life expectancy	5,000,000 operations min. (switching frequency of 7,200 operations/h)
Electrical life expectancy	100,000 operations min. (at rated load and switching frequency of 1,800 operations/h)

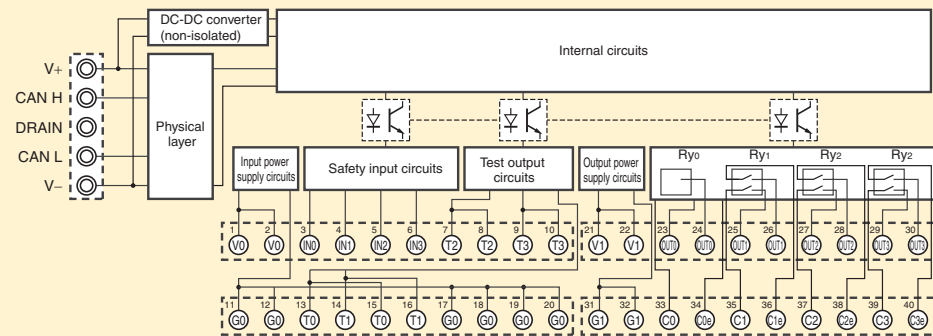
Safety I/O terminals
DST1-ID12SL-1



DST1-MD16SL-1



DST1-MRD08SL-1





Relays with forcibly guided contacts

The slim G7SA relay family with forcibly guided contacts is available as a four- or six-pole type in various contact combinations and offers reinforced insulation. Terminals are arranged for easy PCB layout. It can be soldered directly to a PCB or used together with the P7SA sockets.

- Forcibly guided contacts
- Conforms to EN 50205
- 6 A at 240 VAC and 6A at 24 VDC for resistive loads
- Reinforced insulation between inputs and outputs and poles
- 4- and 6-pole relays available

Ordering information

Relays with forcibly guided contacts

Type	Sealing	Poles	Contacts	Rated voltage	Order code
Standard	Flux-tight	4 poles	3PST-NO, SPST-NC	24 VDC ^{*1}	G7SA-3A1B
			DPST-NO, DPST-NC		G7SA-2A2B
		6 poles	5PST-NO, SPST-NC		G7SA-5A1B
			4PST-NO, DPST-NC		G7SA-4A2B
			3PST-NO, 3PST-NC		G7SA-3A3B

^{*1} 12 VDC, 21 VDC, 48 VDC are available on request.

Sockets

Type	LED indicator	Poles	Rated voltage	Order code
Track-mounting	Track mounting and screw mounting possible	4 poles	24 VDC	P7SA-10F-ND
		6 poles		P7SA-14F-ND
Back-mounting	PCB terminals	4 poles	—	P7SA-10P
		6 poles		P7SA-14P

Specifications

Coil

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Max. voltage	Power consumption
24 VDC	4 poles: 15 mA 6 poles: 20.8 mA	4 poles: 1,600 Ω 6 poles: 1,152 Ω	75% max. (V)	10% min. (V)	110% (V)	4 poles: Approx. 360 mW 6 poles: Approx. 500 mW

Note: Refer to datasheet for details

Contacts

Load	Resistive load (cosφ = 1)	Load	Resistive load (cosφ = 1)
Rated load	6 A at 250 VAC, 6 A at 30 VDC	Max. switching current	6 A
Rated carry current	6 A	Max. switching capacity (reference value)	1,500 VA, 180 W
Max. switching voltage	250 VAC, 125 VDC		

Relays with forcibly guided contacts

Contact resistance		100 mΩ max. (The contact resistance was measured with 1 A at 5 VDC using the voltage-drop method.)
Operating time *1		20 ms max.
Response time *1		10 ms max. (The response time is the time it takes for the normally open contacts to open after the coil voltage is turned OFF.)
Release time *1		20 ms max.
Insulation resistance		100 MΩ min. (at 500 VDC) (The insulation resistance was measured with a 500 VDC megger at the same places that the dielectric strength was measured.)
Dielectric strength *2 *3		Between coil contacts/different poles: 4,000 VAC, 50/60 Hz for 1 min (2,500 VAC between poles 3-4 in 4-pole Relays or poles 3-5, 4-6, and 5-6 in 6-pole Relays.) Between contacts of same polarity: 1,500 VAC, 50/60 Hz for 1 min
Durability	Mechanical	10,000,000 operations min. (at approx. 36,000 operations/hr)
	Electrical	100,000 operations min. (at the rated load and approx. 1,800 operations/hr)
Min. permissible load*4		5 VDC, 1 mA (reference value)
Ambient temperature *5		Operating: -40 to 85°C (with no icing or condensation)
Ambient humidity		Operating: 35 to 85%
Approved standards		EN61810-1 (IEC61810-1), EN50205, UL508, CSA22.2 No. 14

^{*1} These times were measured at the rated voltage and an ambient temperature of 23°C. Contact bounce time is not included.

^{*2} Pole 3 refers to terminals 31-32 or 33-34, pole 4 refers to terminals 43-44, pole 5 refers to terminals 53-54, and pole 6 refers to terminals 63-64.

^{*3} When using a P7SA socket, the dielectric strength between coil contacts/different poles is 2,500 VAC, 50/60 Hz for 1 min.

^{*4} Min. permissible load is for a switching frequency of 300 operations/min.

^{*5} When operating at a temperature between 70°C and 85°C, reduce the rated carry current (6 A at 70°C or less) by 0.1 A for each degree above 70°C.

Note: The values listed above are initial values.

Reliability data of Omron components

Below tables show the reliability data of Omron components and give a reference to the relevant standard:

Emergency stop switches

Model name	B _{10d}	Remarks
A165E	100.000	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed
A22E	100.000	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed
ER5018 ^{*1}	1.500.000	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed
ER6022 ^{*1}	1.500.000	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed. Additionally valid for all XER and stainless steel models
ER1022 ^{*1}	1.500.000	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed. Additionally valid for all XER models
ER1032 ^{*1}	1.500.000	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed. Additionally valid for all XER models

^{*1} at 100 mA switching current.

Safety limit switches

Model name	B _{10d}	Remarks
D4B- _N ^{*1}	2.000.000	From table in annex C of EN ISO 13849-1
D4N ^{*1}	2.000.000	From table in annex C of EN ISO 13849-1
D4NH ^{*1}	2.000.000	From table in annex C of EN ISO 13849-1
D4N- _R ^{*1}	2.000.000	From table in annex C of EN ISO 13849-1
D4F ^{*1}	2.000.000	From table in annex C of EN ISO 13849-1

^{*1} If fault exclusion for direct opening action of NO and NC is possible.

Safety door switches

Model name	B _{10d}	PL	Category	MTTF _d	DC	Remarks
D4NL	2.000.000	n.a.	n.a.	n.a.	n.a.	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed
D4GL ^{*1}	2.000.000	n.a.	n.a.	n.a.	n.a.	From table in annex C of EN ISO 13849-1
D4BL ^{*1}	2.000.000	n.a.	n.a.	n.a.	n.a.	From table in annex C of EN ISO 13849-1
D4NS	2.000.000	n.a.	n.a.	n.a.	n.a.	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed
D4BS ^{*1}	2.000.000	n.a.	n.a.	n.a.	n.a.	From table in annex C of EN ISO 13849-1
F3S-TGR-N_C	3.300.000	e	4	470 years	n.a.	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed
F3S-TGR-N_R	3.300.000	e	4	470 years	n.a.	Adopted EN ISO 13849-1 Annex C, B _{10d} fixed
D40A + G9SX-NS	n.a.	d	3	100 years	95%	Adopted EN ISO 13849-1 Annex C, PL data fixed

^{*1} If fault exclusion for direct opening action is possible.

Safety sensors

Model name	B _{10d}	PL	Category	MTTF _d	DC	Remarks
F3SB	n.a.	c	2	PFH _d =3,59*10 ⁻⁸		
F3SN-A	n.a.	e	4	100 years	98,8%	Adopted EN ISO 13849-1 Annex C, PL data fixed
MS2800E_	n.a.	c	2	51 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
MS4800E_	n.a.	e	4	51 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
F3S-TGR-CL2_	n.a.	c	2	450 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
F3S-TGR-CL4_	n.a.	e	4	450 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed

Safety control systems

Model name	B _{10d}	PL	Category	MTTF _d	DC	Remarks
G9SA-301	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
G9SA-300-SC	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
G9SB-series ^{*1}	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
G9SB-3010	n.a.	d	3	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
G9SX-BC	n.a.	e	4	100 years	97%	Adopted EN ISO 13849-1 Annex C, PL data fixed
G9SX-AD	n.a.	e	4	100 years	97%	Adopted EN ISO 13849-1 Annex C, PL data fixed
G9SX-ADA	n.a.	e	4	100 years	97%	Adopted EN ISO 13849-1 Annex C, PL data fixed
G9SX-EX	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
G9SX-SM	n.a.	e	4	100 years	98%	Adopted EN ISO 13849-1 Annex C, PL data fixed
G9SX-LM	n.a.	d	3	100 years	82%	Adopted EN ISO 13849-1 Annex C, PL data fixed
NE1A-SCPU01	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
NE1A-SCPU02	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
NE0A-SCPU01	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
DST1-ID12SL-1	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
DST1-MD16SL-1	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
DST1-MRD08SL-1	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed
DST1-XD0808SL-1	n.a.	e	4	100 years	99%	Adopted EN ISO 13849-1 Annex C, PL data fixed

^{*1} Except G9SB-3010.

Reliability data of Omron components

Positively guided relays

Model name	B _{10d}	Remarks
G7SA ^{*1}	400.000	According to IEC 61810-1, valid for DC13, Inductive load I _e
G7SA ^{*1}	400.000	According to IEC 61810-1, valid for DC13, Inductive load I _e /2
G7SA ^{*1}	400.000	According to IEC 61810-1, valid for DC13, Inductive load I _e /4
G7SA ^{*1}	400.000	According to IEC 61810-1, valid for AC15 load

*1 Refer to the load characteristic to select correct B_{10d} value.

Please check Omron on the Internet for updated information and SISTEMA library (March 15th, 2010):
<http://industrial.omron.eu/safety>