SAFETY SIMPLIFIED TO THE MAX

Making safety transparent and understandable

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INTERACT WITH YOUR MACHINE

Patlite Signal towers

Machines that are stopped during production are creating extra cost, our signal towers are used to show this status and guide workers to service the machines efficiently, minimizing downtime and production loss.

- LED technology
- Optional sound system
- 30 mm, 50 mm, 60 mm and 70 mm diameter
- Modular and monolithic systems

Select your signal tower in a split second:
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Control- and Signalling devices

Emergency stop switches

Rope pull emergency stop switches

Rope span 40 m

ER5018

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Rope span 80 m

ER6022

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Rope span 125 m

ER1022

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Rope span 200 m

ER1032

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Emergency stop pushbutton switches

22 mm mounting

A22E

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16.5 mm mounting

A165E

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Pushbutton switches

Standard pushbutton switches

22 mm mounting

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16.5 mm mounting

A16

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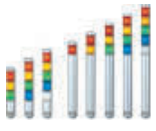
Signal towers

Monolithic system

30 mm

MP/MPS



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60 mm

LME

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Modular system

50 mm

LU5

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70 mm

LU7

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Selection table

		Category	Pushbutton switch	
				
Selection criteria		Model	A16	A22
		Mounting	Nut-mounting	
		Size	16 mm	22 mm
		Shape	▭ □ ○	▭ □ ○
Pushbutton colour	Incandescent lamp-lighted	Red	■	■
		Yellow	■	■
		Pure yellow	■	
		Green	■	■
		White	■	■
		Blue	■	■
	LED-lighted	Red	■	■
		Yellow	■	■
		Pure yellow	■	
		Green	■	■
		White	■	■
		Blue	■	■
	Non-lighted	Red	■	■
		Yellow	■	■
		Green	■	■
		White	■	■
		Blue	■	■
		Black	■	■
Features		Momentary operation	■	■
		Self-holding	■	■
		Number of contacts	2	6
		IP rating	IP65	
		Legend plate	■	■
Switch ratings [A]		125 VAC	5	10
		250 VAC	3	6
		30 VDC	3	10
		Rated load	5 A at 125 VAC, 3 A at 250 VAC, 3 A at 30 VDC	10 A at 110 VAC, 6 A at 220 VAC
Terminals		Solder	■	–
		PCB	–	–
		Screw-less Clamp	–	–
Operating voltage		5 VDC	■	■
		12 VDC	■	■
		24 VDC	■	■
Form		SPDT	■	–
		DPDT	■	–
		SPST-NO	–	■
		SPST-NC	–	■
		SPST-NO + SPST-NC	–	■
		DPST-NO	–	■
		DPST-NC	–	■
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		Emergency stop pushbutton switches	
			
Selection criteria	Model	A165E	A22E
	Housing	Plastic	
	Protection class	IP65	
	Operating Temperature Range	-10 to 55°C	-20 to 70°C
	Head Size	30 mm, 40 mm	30 mm, 40 mm, 60 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	■	
	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	316	317

■ Standard □ Available – No/not available

		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)	–			
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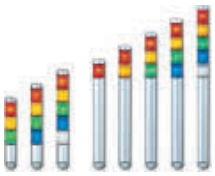
	Signalling devices			
				
	MP/MPS	LME	LU5	LU7
System	monolithic		modular	
Diameter	30 mm	60 mm	50 mm	70 mm
LED technology	■	■	■	■
Sound system	–	■	■	■
IP65	■	■	■	■
Maximum Modules	5	5	5	5
Input voltage 24 VDC	■	■	■	■
Unit color	silver	white or silver or black	white or silver	white or silver or black
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16 mm pushbutton switch

These sub-assembled pushbutton switches have a modular construction: pushbutton + case + lamp (if applicable) + switch. A16 is a nut-mounted pushbutton switch with a short mounting depth of less than 28.5mm below panel.

- Wide variety of control and signal devices: lighted, non-lighted and buzzer
- Quick and easy assembly, snap-in switch
- Wide range of switching capacity from standard load to micro load
- High reliability, IP65
- UL, cUL, CSA and VDE approved, conforms to EN60947-5-1 and IEC947-5-1

Ordering information

Type	Colour	Order code		
		Degree of protection: Oil-resistant IP65		
		Rectangular	Square	Round
Non-lighted LED Incandescent lamp	Red	A165L-JR	A165L-AR	A165L-TR
	Yellow	A165L-JY	A165L-AY	A165L-TY
	Pure yellow	A165L-JPY	A165L-APY	A165L-TPY
	White	A165L-JW	A165L-AW	A165L-TW
	Blue	A165L-JA	A165L-AA	A165L-TA
Non-lighted	Black	A165L-JB	A165L-AB	A165L-TB
LED	Green	A165L-TGY	A165L-AGY	A165L-TGY
Non-lighted/incandescent lamp	Green	A165L-JG	A165L-AG	A165L-TG

Cases

Appearance	Classification		Order code
			Oil-resistant IP65
	Momentary operation	Rectangular (2-way guard)	A165-CJM
		Square	A165-CAM
		Round	A165-CTM
	Alternate operation	Rectangular (2-way guard)	A165-CJA
		Square	A165-CAA
		Round	A165-CTA

Switches

Appearance	Classification				Order code
	Lighted/ non-lighted (common use)	Standard load/ microload (common use)	SPDT	Solder terminal	A16-1
			DPDT		A16-2
			SPDT	PCB terminal	A16-1P
			DPDT		A16-2P
			DPDT	Screw-less clamp	A16-2S

Switches with reduced voltage lighting

Appearance	Classification				Order code
	100 V	Standard load/ microload (common use)	SPDT	Solder terminal	A16-T1-1
			DPDT		A16-T1-2
	100 V		DPDT	Screw-less clamp	A16-T1-2S
	200 V				A16-T2-2S

Lamps

Type	Colour	Order code		
		5 VDC	12 VDC	24 VDC
LED	Red	A16-5DSR	A16-12DSR	A16-24DSR
	Yellow	A16-5DSY	A16-12DSY	A16-24DSY
	Green	A16-5DSG	A16-12DSG	A16-24DSG
	White *1	A16-5DSW	A16-12DSW	A16-24DSW
	Blue	**A16-5DA**	A16-12DA	A16-24DA
Type		**5 VAC/VDC**	**12 VAC/VDC**	**24 VAC/VDC**
Incandescent lamp		A16-5	A16-12	A16-24

*1 Use the white LED together with white or pure yellow pushbuttons.

Accessories

Name	Appearance	Classification	Remarks	Order code
Switch guards		For rectangular models	Cannot be used with the dust cover	A16ZJ-5050
		For square and round models		A16ZA-5050
Dust covers		For rectangular models	Cannot be used with the switch guard	A16ZJ-5060
		For square models		A16ZA-5060
		For round models		A16ZT-5060
Panel plugs		For rectangular models	Used for covering the panel cutouts for future panel expansion	A16ZJ-3003
		For square models		A16ZA-3003
		For round models		A16ZT-3003

Specifications

Allowable operating frequency	**Mechanical**	Momentary operation: 120 operations/minute max. Alternate operation: 60 operations/minute max.
	Electrical	20 operations/minute max.
Durability	**Mechanical**	Momentary operation: 2,000,000 operations min. Alternate operation: 200,000 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)
Weight		Approx. 10 g (in the case of a lighted DPDT switch with solder terminals)
Size in mm (HxWxD)		Round/square: 18x18x28.5 rectangular: 18x24x28.5

Operating characteristics	**Pushbutton switch**	
	Oil-resistant IP65	
	SPDT	**DPDT**
Operating force (OF) max.	2.94 N	4.91 N
Releasing force (RF) min.	0.29 N	
Total travel (TT)	Approx. 3 mm	
Pretravel (PT) max.	2.5 mm	
Lock stroke (LTA) min.	0.5 mm	

Item		**Screw-less clamp**			
Recommended wire size		0.5 mm^2 twisted wire or 0.8 mm dia. solid wire			
Usable wires and tensile strength	Twisted wire	0.3 mm^2	0.5 mm^2	0.75 mm^2	1.25 mm^2
	Solid wire	0.5 mm dia.	0.8 mm dia.	1.0 mm dia.	
	Tensile strength	10 N	20 N	30 N	40 N
Length of exposed wire		10 ±1 mm			

22 mm pushbutton switch

A22 comes in a wide variety of shapes and colours and is installable in 22-dia. or 25-dia. panel cutouts. The switch unit can easily be mounted. A22 is mounted using either open-type (fork-type) or closed-type (round-type) crimp terminals.

- Finger-protection mechanism on switch unit provided as standard feature
- Increased wiring efficiency with three-row mounting of switch blocks
- IP65 oil-resistant (non-lighted models), IP65 (lighted models)
- Lighted and non-lighted, flat, projection and half- and full-guard versions
- EN60947-5-1, UL and cUL approved

Ordering information

Pushbutton

Illumination	Colour	Order code							
		Flat type	Projection type	Full-guard type	Half-guard type	Square/ projection type	Square/ full-guard type	Round/ mushroom type (30-dia. head)	Round/ mushroom type (40-dia. head)
									
Non-lighted	Red	A22-FR	A22-TR	A22-GR	A22-HR	A22-CR	A22-DR	A22-SR	A22-MR
	Green	A22-FG	A22-TG	A22-TG	A22-HG	A22-CG	A22-DG	A22-SG	A22-MG
	Yellow	A22-FY	A22-TY	A22-GY	A22-HY	A22-CY	A22-DY	A22-SY	A22-MY
	White	A22-FW	A22-TW	A22-GW	A22-HW	A22-CW	A22-DW	A22-SW	A22-MW
	Blue	A22-FA	A22-TA	A22-GA	A22-HA	A22-CA	A22-DA	A22-SA	A22-MA
	Black	A22-FB	A22-TB	A22-GB	A22-HB	A22-CB	A22-DB	A22-SB	A22-MB
Lighted	Red	–	A22L-TR	A22L-GR	A22L-HR	A22L-CR	A22L-DR	–	–
	Green	–	A22L-TG	A22L-GG	A22L-HG	A22L-CG	A22L-DG	–	–
	Yellow	–	A22L-TY	A22L-GY	A22L-HY	A22L-CY	A22L-DY	–	–
	White	–	A22L-TW	A22L-GW	A22L-HW	A22L-CW	A22L-DW	–	–
	Blue	–	A22L-TA	A22L-GA	A22L-HA	A22L-CA	A22L-DA	–	–
Buttonsize in mm		29.7 dia. x 12D	29.7 dia. x 19D	29.7 dia. x 19D	29.7 dia. x 12/18.5D	29.8 mm^2 x 18D	29.8 mm^2 x 18D	30 dia. x 32D	40 dia. x 32D

Switches

Switch operation	Contacts	Oder code			
		Non-lighted models	Lighted models		
		Without voltage reduction unit		With voltage reduction unit	
				110 VAC	220 VAC
					
Momentary	SPST-NO	A22-10M	A22L-10M	A22L-10M-T1	A22L-10M-T2
	SPST-NC	A22-01M	A22L-01M	A22L-01M-T1	A22L-01M-T2
	SPST-NO + SPST-NC	A22-11M	A22L-11M	A22L-11M-T1	A22L-11M-T2
	DPST-NO	A22-20M	A22L-20M	A22L-20M-T1	A22L-20M-T2
	DPST-NC	A22-02M	A22L-02M	A22L-02M-T1	A22L-02M-T2
Alternate	SPST-NO	A22-10A	A22L-10A	A22L-10A-T1	A22L-10A-T2
	SPST-NC	A22-01A	A22L-01A	A22L-01A-T1	A22L-01A-T2
	SPST-NO + SPST-NC	A22-11A	A22L-11A	A22L-11A-T1	A22L-11A-T2
	DPST-NO	A22-20A	A22L-20A	A22L-20A-T1	A22L-20A-T2
	DPST-NC	A22-02A	A22L-02A	A22L-02A-T1	A22L-02A-T2

Switch blocks

	Standard load	Order code
Switch blocks	SPST-NO	A22-10
	SPST-NC	A22-01
	DPST-NO	A22-20
	DPST-NC	A22-02

Lamp – LED

AC/DC	LED light	Order code			
		Operating voltage			
		6 V	12 V	24 V	24 V superbright
DC	Red	A22-6DR	–	–	–
	Green	A22-6DG	–	–	–
	Yellow *1	A22-6DY	–	–	–
	Blue	A22-6DA	–	–	–
AC	Red	A22-6AR	–	–	–
	Green	A22-6AG	–	–	–
	Yellow *1	A22-6AY	–	–	–
	Blue	A22-6AA	–	–	–
AC and DC	Red	–	A22-12AR	A22-24AR	A22-24ASR
	Green	–	A22-12AG	A22-24AG	A22-24ASG
	Yellow *1	–	A22-12AY	A22-24AY	A22-24ASY
	Blue	–	A22-12AA	A22-24AA	A22-24ASA

*1 Used when the pushbutton colour is yellow or white

Lamp - incandescent lamp

Order code		
Operating voltage		
5 VAC/VDC	12 VAC/VDC	24 VAC/VDC
A22-5	A22-12	A22-24

Accessories

Item				Remarks	Order code
Lamp sockets	Direct lighting			Used when changing the lighting method (LED only)	A22-TN
	Voltage-reduction lighting		220 VAC		A22-T2
Mounting latches	For momentary models			Order mounting latches only when mounting switch blocks or lamp sockets are purchased individually	A22-3200
Legend plate frames	Large size	With snap-in legend plate, without text, black		Snap-in legend plate is acrylic	A22Z-3333
		Without snap-in legend plate			A22Z-3330
Sealing caps	For projection models			Used to prevent dust or water from entering the operation unit (pushbutton, etc.), colour: Opaque, material: Silicon	A22Z-3600T
Three-throw spacer				Used when mounting three non-lighted switches	A22Z-3003
Control boxes (enclosures)	Exclusively for A22		One hole	Do not use DPST-NO or DPST-NC switches, material: Polycarbonate resin	A22Z-B101
			Two holes		A22Z-B102
			Three holes		A22Z-B103
Snap-in legend plates	Standard size	Without text	White	Attached to the standard-size legend plate frame, material: Acrylic	A22Z-3443W
			Transparent		A22Z-3443C
		White text on black background	ON		A22Z-3443B-5
			OFF		A22Z-3443B-6
			DOWN		A22Z-3443B-8
			POWER ON		A22Z-3443B-9
	Large size	Without text	White	Attached to the large-size legend plate frame, material: Acrylic	A22Z-3453W
			Transparent		A22Z-3453C
	For emergency stop switch	60-dia. round plate with black letters on a yellow background		"EMERGENCY STOP" is engraved on the plate. Used as an emergency stop switch legend plate	A22Z-3466-1
		90-dia. round plate with black letters on a yellow background			A22Z-3476-1
Lamp extractor				Rubber tool used to easily replace lamps	A22Z-3901
Tightening wrench				Tool used to tighten nuts from the back of the panel	A22Z-3905

Specifications

Recognized organization	Standards	File number
UL, cUL	UL508	E41515
–	EN60947-5-1	–

Contact ratings (standard load)

Rated carry current (A)	Rated voltage	Rated current (A)			
		AC15 (inductive load)	AC12 (resistive load)	DC13 (inductive load)	DC12 (resistive load)
10	24 VAC	10	10	–	–
	110 VAC	5	10	–	–
	220 VAC	3	6	–	–
	380 VAC	2	3	–	–
	440 VAC	1	2	–	–
	24 VDC	–	–	1,5	10
	110 VDC	–	–	0,5	2
	220 VDC	–	–	0,2	0,6
	380 VDC	–	–	0,1	0,2

Contacts (microload)

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

LED indicators without voltage reduction unit

Rated voltage	Rated current	Operating voltage
6 VDC	60 mA (20 mA)	6 VDC ±5%
6 VAC	60 mA (20 mA)	6 VAC/VDC ±5%
12 VAC/VDC	30 mA (10 mA)	12 VAC/VDC ±5%
24 VAC/VDC	15 mA (10 mA)	24 VAC/VDC ±5%

Super-bright LED indicator

Rated voltage	Rated current	Operating voltage
24 VAC/VDC	15 mA	24 VAC/VDC ±5%

Incandescent lamp

Rated voltage	Rated current	Operating voltage
6 VAC/VDC	200 mA	5 VAC/VDC
14 VAC/VDC	80 mA	12 VAC/VDC
28 VAC/VDC	40 mA	24 VAC/VDC
130 VAC/VDC	20 mA	100 VAC/VDC

Voltage-reduction lighting

Rated voltage	Operating voltage	Applicable lamp (BA8S/13_ gold)
110 VAC	95 to 115 VAC	LED Lamp (A22-24A_)
220 VAC	190 to 230 VAC	

Item		Pushbutton switches		Emergency stop switches		Knob-type selector switches		Key-type selector switch
		Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted
Allowable operating frequency	Mechanical	Momentary operation: 60 operations/minute max.		30 operations/minute max.		Manual release: 30 operations/minute max., automatic release: 30 operations/minute max.		
	Electrical	30 operations/minute max.				30 operations/minute max.		
Durability (number of operations min.)	Mechanical	Momentary operation: 5,000,000		Momentary operation: 300,000		500,000	100,000	500,000
	Electrical	500,000		300,000		500,000	100,000	500,000
Ambient temperature	Operating	-20 to 70°C	-20 to 55°C	-20 to 70°C	-20 to 55°C	-20 to 70°C	-20 to 55°C	-20 to 70°C
	Storage	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C
Degree of protection		IP65 (oil-resistant)	IP65	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)
Size in mm (in-panel only)		34Hx34Wx54.7D, 34Hx34Wx72.7D for DPST switches						

Emergency stop switch

The A165E line-up offers E-Stop switches with various head types. For flexible application, 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 color	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		40 dia.		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	
	A165E series	A165E_-U series
125 VAC	5 A	1 A
250 VAC	3 A	0.5 A
30 VDC	3 A	1 A
Minimum applicable load	150 mA at 5 VDC	1 mA at 5 VDC

Features	Characteristics
Operating force (OF) max.	14.7 N
Releasing force (RF) min.	0.1 N·m
Pretravel (PT)	3.5±0.5 mm (3±0.5 mm In case of A165E_U series)

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.

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	Color 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	Color 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×±2°C
(2) Ambient humidity: 65±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

- 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

Aluminum 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 aluminum 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

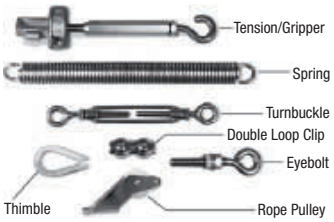
Item			Applicable model		
			XER6022	XER1022	XER1032
Electrical	Contact configuration		1 N/C + 1 N/O, 2 N/C		
	Safety contact		1 N/C, 2 N/C		
	Auxiliary contact		1 N/O		
	Rated voltage AC15		400 VAC	250 VAC	250 VDC
	Rated current		2 A AC	4 A AC	0.15 A DC
	Switching ability AC ratings	Voltage	250 V	125 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	EEx d II C T6	
	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.

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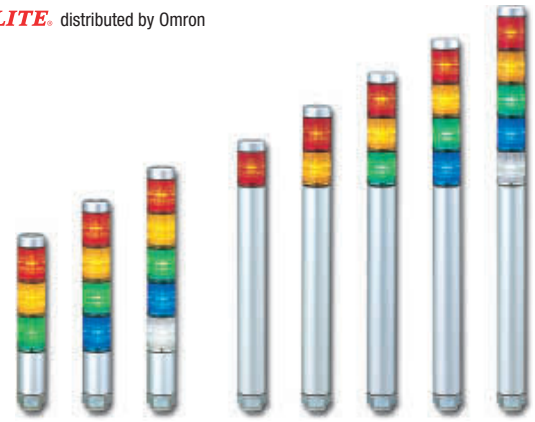


Super slim 30 mm silver body signal tower ideal for small devices

MP/MPS signal towers provide double insulation and superior UV resistant and light translucent AS resin lenses for enhanced durability and reliability in application environment. The 30mm diameter is ideal for small and mid-sized machines.

Up to 5 colored modules can be combined using a single mounting hole. Modules can be easily added without dismounting the whole signal tower to reduce installation effort.

- Special pre-wired versatile with 1 m connection cable
- NPN/ PNP compactible
- IP65
- Each color of LED module corresponds to the lead wire color.
- Available colors are Red, Yellow, Green, Blue and Clear/White.

Nomenclatur/how to order:

MP-502-RYGBC-B0438
1 2 3 4 5

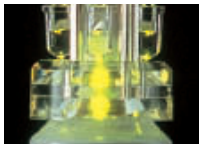
1. MP: Standard body
   MPS: Short body
2. Stack
   1~5
3. Rated voltage
   02: 24 V AC/DC
4. Color of LED
   R: Red
   Y: Yellow
   G: Green
   B: Blue
   C: Clear/White
   Top to bottom
5. Color of lense
   Blank: Colored lens
   B0438: Clear lens

Ordering information

Number of stacks	Rated voltage	Power consumption	Open collector	Order code
1	24 VAC/VDC	0.7 W	NPN/PNP	MP/MPS-102
2		1.4 W		MP/MPS-202
3		2.0 W		MP/MPS-302
4		2.6 W		MP/MPS-402
5		3.2 W		MP/MPS-502

Features

Patented reflection system increases visibility.



High intensity LED

Good visibility from any direction

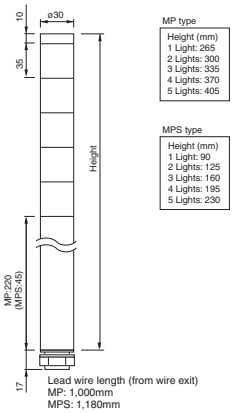
Interchangeable LED modules

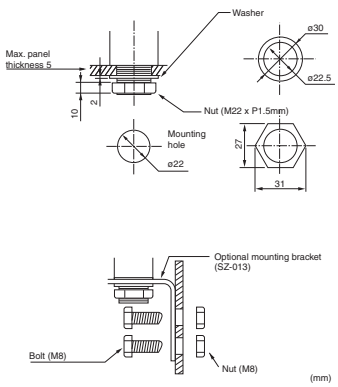
- Changeable color sequence: Easy to add/remove up to 5 colored modules even after installation.
- Note: LED modules of the same color will light up simultaneously.

The wiring remains the same.

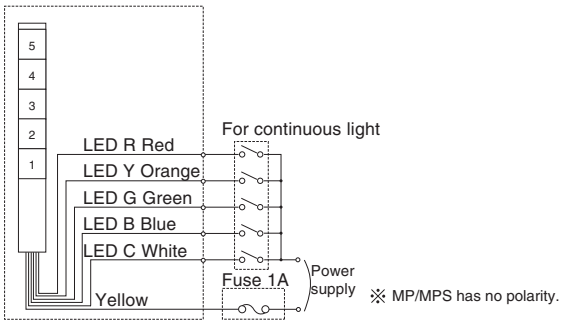
Each color of LED module corresponds to the lead wire color.

Dimensions





Wiring diagram



※ MP/MPS has no polarity.

Specifications

Size	30 mm diameter
Input voltage options	24 VAC/VDC
Functions available	Continuous only
Mounting options	Direct mount only: includes M22 mounting nut and sealing gasket
Body style	• pre-assembled, pre-wired • Interchangeable and stackable after purchase
Body color	Silver
Tiers	1-5 modules can be stacked
Module colors	Red / Yellow / Green / Blue / Clear-White (for sunlight applications: clear-lense modules in all colors available)
Alarms (FB style only)	• CE • UL component recognition (US) • UL component recognition (Canada) • RoHS
Protection	IP-65
Control options	• Dry contact closure such as switches or relay contacts • Open-collector transistor (NPN or PNP) for 24 VDC • Direct voltage control

PATLITE distributed by Omron

Versatile, cost and energy efficient LED signal tower for every need

The LME series provides the latest in LED technology. 1 to 5 modules can be arranged in tiers. The original dual reflection system for enhanced light diffusion, creates bright distinctive illumination while saving energy (patent pending).

Available Colors are Red, Yellow, Green, Blue and Clear/White.
All colors as clear-lense modules available

- Diameter: 60 mm
- 2 selectable built- in alarms with adjustable volume up to 90 dB at 1 m for FB type
- Special pre-wired versatile and flexible cable connection of 3 m
- UV resistant and light translucent AS resin lenses
- NPN/ PNP compatible
- IP 65

Nomenclature/how to order

LME-502UFBW-RYGBC-Z
1 2 3 4 5 6 7

1. Stack
   1 ~ 5
2. Rated voltage
   02: 24V AC/DC
3. Body color
   Blank: Ivory white
   N: Black color
   U: Silver color
4. Type
   Blank: Continuous light
   FB: Continuous light or flashing light with audible alarm
5. Mount
   Blank: Pole mount
   K: Pole mount (with SZ-020)
   W: Direct mount
6. Color of LED
   R: Red
   Y: Yellow
   G: Green
   B: Blue
   C: Clear/White
7. Color of Lens
   Blank: Colored lens
   Z: Clear lens

Ordering information

Number of stacks	Mount	Model	Rated voltage	Power consumption	Open collector	Order code	
						Continuos light	Continuous light with audible alarm
1	Pole mount	LME-102	24 VAC/DC	2.2 W	NPN/ PNP	LME-102-C	LME-102-FB-C
	Direct mount		24 VAC/DC			LME-102W-C	LME-102-FBW-C
2	Pole mount	LME-202	24 VAC/DC	3.4 W		LME-202-C	LME-202-FB-C
	Direct mount		24 VAC/DC			LME-202W-C	LME-202-FBW-C
3	Pole mount	LME-302	24 VAC/DC	3.8 W		LME-302-C	LME-302-FB-C
	Direct mount		24 VAC/DC			LME-302W-C	LME-302-FBW-C
4	Pole mount	LME-402	24 VAC/DC	4.2 W		LME-402-C	LME-402-FB-C
	Direct mount		24 VAC/DC			LME-402W-C	LME-402-FBW-C
5	Pole mount	LME-502	24 VAC/DC	4.6 W		LME-502-C	LME-502-FB-C
	Direct mount		24 VAC/DC			LME-502W-C	LME-502-FBW-C

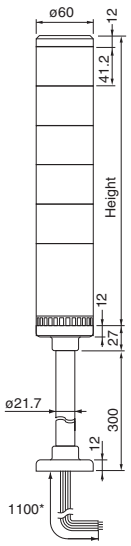
Optional parts

Typ	Material	Order code
Wall mount bracket	Aluminum alloy die-cast	SZ-017
	ABS resin	SZ-020
	PBT/ ABS resin	SZ-028
Mount bracket	Aluminum alloy die-cast	SZ-016A
	Aluminum alloy die-cast	SZ-010

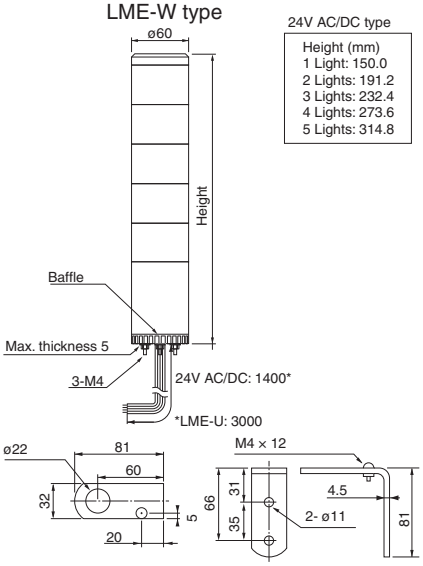
Typ	Height	Material	Order code
Pole	100 mm	Aluminium	Pole-100A21
		Steel	Pole-100S21
	300 mm	Aluminium	Pole-300A21
		Steel	Pole-300S21
	800 mm	Aluminium	Pole-800A21
		Steel	Pole-800S21

Dimensions

LME type



LME-W type



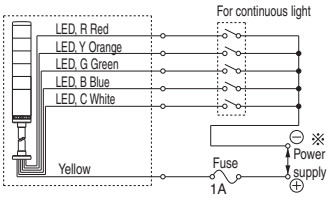
24V AC/DC type

Height (mm)
1 Light: 150.0
2 Lights: 191.2
3 Lights: 232.4
4 Lights: 273.6
5 Lights: 314.8

Wiring diagram

LME(–W)/LME(–W)-S·Q/LMS [Continuous type]

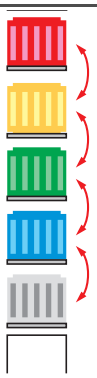
■ 24V AC/DC



Features

Interchangeable LED modules

- Changeable color sequence: Easy to add / remove up to 5 colored modules even after installation.
- Note: LED modules of the same color within a signal tower will light up simultaneously.



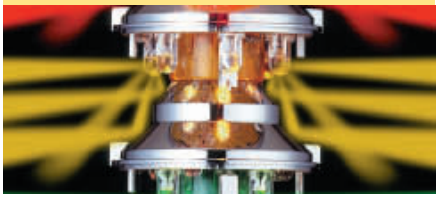
The wiring remains the same

Each color of LED module corresponds to the lead wire color.

Easy to add and remove

If the number of LED module is changed, center shaft must be purchased.

Dual reflection system



PATLITE's original dual reflection system with its exclusive hybrid prism-cut lens and 5 color LED modules create bright, distinctive, even illumination.

To bring more attention to certain conditions, two, User-selectable, Alarms integrated in the Base module with adjustable volume up to 85 dB at 1m are available.

Specifications

Size	60 mm diameter
Input voltage options	• 24 VAC/VDC
Functions available	• Continuous only • Continuous, flashing, alarms
Mounting options	• Pole mount: with 300 mm aluminum pole, plastic circular bracket • Direct mount: includes 3 mounting nuts
Body style	• Pre-assembled, pre-wired • Interchangeable and stackable after purchase
Body color	Beige (optional: Black or silver)
Tiers	1-5 modules can be stacked
Module colors	Red / Yellow / Green / Blue / Clear/White (for sunlight applications: clear-lense modules in all colors available)
Alarms (FB style only)	• Alarm 1: selectable, single-tone, intermittent (fast beep) alarm, 85 dB (at 1 m) • Alarm 2: selectable, single tone, intermittent (slow beep) alarm, 85 dB (at 1 m)
Ratings	• CE • UL component recognition (US) • UL component recognition (Canada) • RoHS
Protection	• IP-65 (LME, LME-W) • IP-54 (LME-FB, LME-FBW) • Type 4/4X/13 (indoor, direct-mount only)
Control options	• Dry contact closure such as switches or relay contacts • Open-collector transistor (NPN or PNP for 24 VDC) • Direct voltage control for 24 VDC, continuous and alarm functions only

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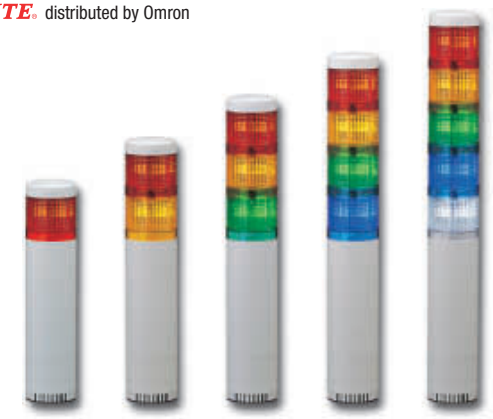


Versatile modular signal tower featuring easy assembly and wiring designed for every need.

LU5 Series - Medium size modular system provides beside hybrid prism cut lens for enhanced visibility from any direction and distance two selectable sound patterns up to 85 dB. Main features are the interchangeable LED modules and the color coordinated wiring for easy alignment.

- Diameter: 50 mm
- Base modules available in ivory white or in silver
- Up to 5 LED modules can be used on the light tower
- Modules of the same color operate from different terminals
- Two, user - selectable, alarms integrated in the base module with adjustable volume up to 85 dB at 1 m

Nomenclature/how to order

LED module

LU5-E-R
1 2

1. E: LED unit
2. Color of LED
   R: Red
   Y: Yellow
   G: Green
   B: Blue
   C : Clear/White

Base module

LU5-02UFB
1 2 3

1. Rated voltage
   02: 24 VDC
2. Unit color
   Blank: Ivory white
   U: Silver color
3. Type
   Blank: Continuous light
   FB: Continuous or flashing light with audible alarm

Ordering information

LED module

Module color	Power consumption	Rated voltage	Operation voltage	Operation temperature range	Mass	Order code
Red	52 mA/1.25 W	24 VDC	Rated voltage ±10% (21.6~26.4 V)	-30°C~+60°C	44 g ±10%	LU5-E-R
Yellow						LU5-E-Y
Green	42 mA/1.0 W					LU5-E-G
Blue						LU5-E-B
Clear						LU5-E-C

Base module

Typ	Alarm/Flash	Power consumption	Rated voltage	Operation voltage	Operation temperature range	Mass	Open collector	Order code
Standard body	Continuous	1.2 W	24 VDC	Rated voltage ±10% (21.6 ~ 26.4 V)	-30°C~+60°C	182g ±10%	PNP/ NPN	LU5-02*
	2 Sounds/Flashlight					200g ±10%		LU5-02FB*

* Ivory white: black, silver: add "U"

Optional parts

Typ	Material	Order code
Wall mount bracket	Aluminum alloy die-cast	SZ-017
	ABS resin	SZ-020
Upper bracket	Metal	SZ-60NPT
		SZ-60U
Mount bracket	Aluminum alloy die-cast	SZ-016A
		SZ-70B

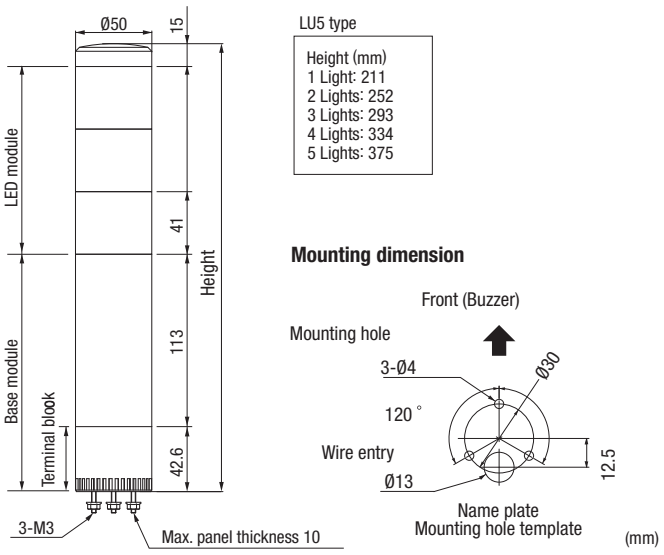
Typ	Height	Material	Order code
Pole	100 mm	Aluminium	Pole-100A21
	300 mm	Aluminium	Pole-300A21
	800 mm	Aluminium	Pole-800A21

Features

LED module is stackable and reconfigurable even after installation

IP 65: Implemented o rings seal out liquids so that the tower can be used in wet conditions.

Dimensions



LU5 type

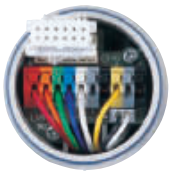
Height (mm)
1 Light: 211
2 Lights: 252
3 Lights: 293
4 Lights: 334
5 Lights: 375

Mounting dimension

(mm)

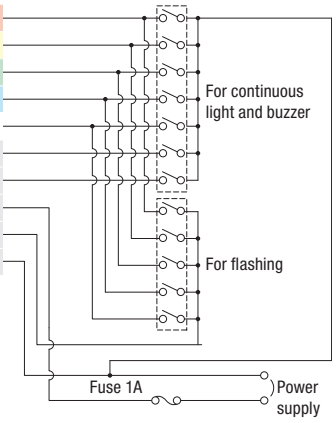
Wiring diagram

LU5-02FB
24 VDC



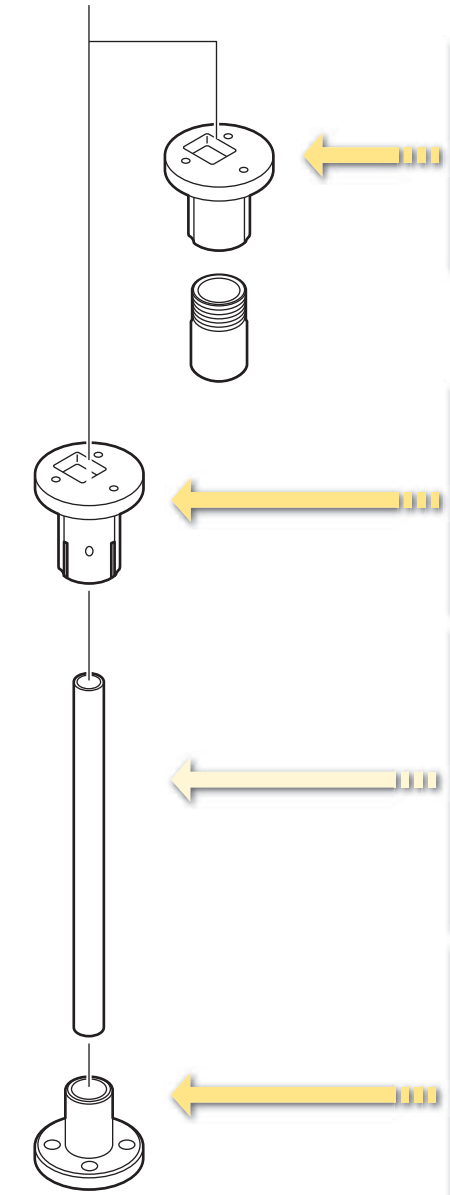
No.1	Red	LED unit Red
No.2	Orange	LED unit Yellow
No.3	Green	LED unit Green
No.4	Blue	LED unit Blue
No.5	White	LED unit Clear/White
No.6	Gray	Alarm 1
No.7	Black	Alarm 2
No.8	Yellow	COM
No.9	Gray	Flashing COM
No.10	Black	Power supply for flashing

<Recommended electric wire>
Solid wire: 0.8-1.2 mm dia.
Stranded wire : 0.3-1.25 mm^2 (AWG 22-18)

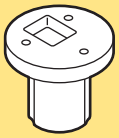


How to order

Optional parts

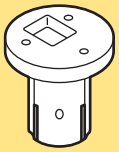


Upper bracket



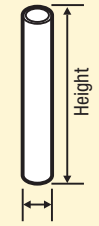
SZ-60NPT (for 1/2" NPT pole)

Upper bracket



SZ-60-U

Pole



Steel pole

Model	POLE-800S21	POLE-300S21	POLE-100S21
Height	800 mm	300 mm	100 mm

Aluminum pole

Model	POLE-800A21	POLE-300A21	POLE-100A21
Height	800 mm	300 mm	100 mm

Mount bracket

SZ-016A
(For Ø21.7 mm pole)

SZ-70-B
(For Ø21.7 mm aluminium pole only)

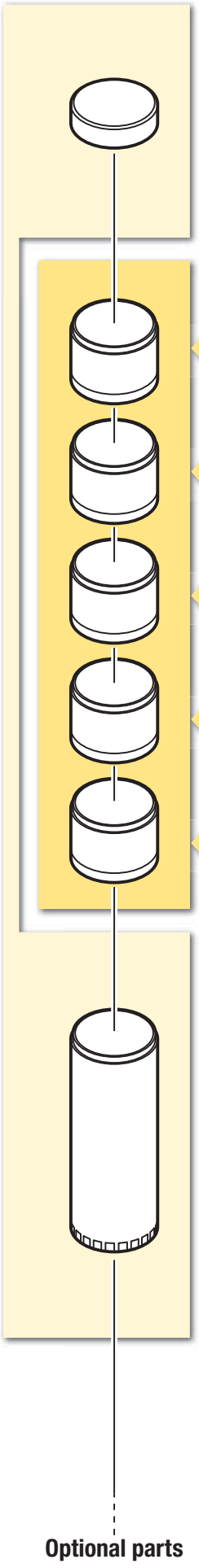
Wall mount bracket

SZ-020
(For Ø21.7 mm pole)

SZ-017
(For Ø21.7 mm pole)

Specifications

Size	50 mm diameter
Input voltage options	24 VDC
Functions available	• Continuous only • Continuous, flashing, alarms
Mounting options	Direct mount only, includes 3 mounting nuts
Body styles	• Component style, wiring terminals provided • Interchangeable and stackable after purchase
Body colours	Beige
Tiers	1-5 modules can be stacked
Module colors	Red / Yellow / Green / Blue / Clear
Alarms (FB style only)	• Alarm 1: selectable, single-tone, continuous alarm, 85 dB (at 1 m) • Alarm 2: selectable, single tone, intermittent (slow beep) alarm, 85 dB (at 1 m)
Ratings	• CE • UL listed (US) • UL listed (Canada) • RoHS
Protection	• IP-65 • Type 4 / 4X / 13 (indoor only)
Control options	• Dry contact closure such as switches or relay contacts • Open-collector transistor (NPN or PNP) for 24 VDC • Direct voltage control for 24 VDC, continuous and alarm functions only



LED units

Model	LU5-E-R	LU5-E-Y	LU5-E-G	LU5-E-B	LU5-E-C
Unit color					
Rated voltage	24 VDC				
Operating voltage range	Rated voltage±10% (21.6~26.4 V)				
Current/power consumption	52 mA/1.25 W		42 mA/1.0 W		
Operating temperature range	-30°C~+60°C				
Mass	44 g±10%				

RED YELLOW GREEN BLUE CLEAR/WHITE

BASE units

Model	LU5-02	LU5-02FB	
Color			
Standard body/short body	Standard		
Rated voltage	24 VDC		
Operating voltage range	Rated voltage±10%(21.6~26.4 V)		
Buzzer	–	*Buzzer 1	**Buzzer 2
Current consumption	–	50±10 mA	24±10 mA
Power consumption	–	1.2±0.25 W	0.58±0.25 W
Sound level	–	Max: 85±5 dB (at 1 m)	
Flashing cycle	–	6±12 flashes per minutes	
Operating temperature Range	-30°C~+60°C		
Mounting direction	Upright, indoor only		
Protection rating	IP65		
Mass	182 g±10%	200 g±10%	
Open collector	PNP/NPN		

* Buzzer 1: Continuous sound **Buzzer 2: Intermittent sound

Ivory white Silver color (U)

Optional parts

PATLITE distributed by Omron

Versatile modular signal tower featuring easy assembly and wiring designed for every need.

LU7 presents ultra bright LEDs combined with an innovative prism lens design. 1 to 5 modules can be arranged in tiers.

- Diameter: 70 mm
- Base module in 2 sizes and 3 colors
- Different modules: standard LED, strobe LED and sound
- Two, user - selectable, alarms integrated in the base module with adjustable volume up to 90 dB at 1 m.
- Color-coordinated and spring-loaded terminal block

Ordering information

LED module

Typ	Module color	Power consumption	Rated voltage	Operation voltage	Operation temperature range	Mass	Order code
Standard	Red	52 mA/1.25 W	24 VDC	Rated voltage ±10% (21.6~26.4 V)	-30°C~+60°C	60 g ±10%	LU7-E-R
	Yellow						LU7-E-Y
	Green	42 mA/1.0 W					LU7-E-G
	Blue						LU7-E-B
	Clear/White						LU7-E-C
Strobe	Red	290 mA	24 VDC	Rated voltage ±10% (21.6~26.4 V)	-30°C~+60°C	0,07 kg	LU7-XE-R
	Yellow						LU7-XE-Y
	Green	140 mA					LU7-XE-G
	Blue	270 mA					LU7-XE-B
	Clear/White	280 mA					LU7-XE-C

Base module

Typ	Alarm/Flash	Power consumption	Rated voltage	Operation voltage	Operation temperature range	Mass	Open collector	Order code
Short body	Continuous	1.2 W	24 VDC	Rated voltage ± 10% (21.6~26.4 V)	-30°C~+60°C	150 g ±10%	PNP/ NPN	LU7-02S*
Standard body	Continuous					250 g ±10%		LU7 - 02*
	2 Sounds/Flashlight					280 g ±10%		LU7 -02FB*

* Ivory white: blank, black: add "K", silver: add "U"

Optional parts

Typ	Material	Order code
Wall mount bracket	Aluminum alloy die-cast	SZ-017
	PBT/ ABS resin	SZ-018
		SZ-018U
		SZ-018K
	ABS resin	SZ-020
Upper bracket	Metal	SZ - 50U
		SZ - 50UU
		SZ - 50KU
		SZ - 50NPT
Mount bracket	Aluminum alloy die-cast	SZ-016A
		SZ-70B

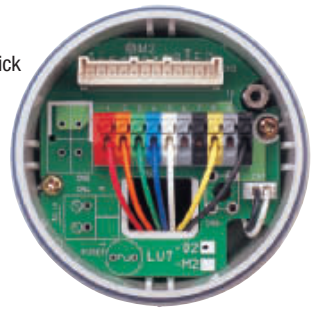
Typ	Height	Material	Order code
Pole	100 mm	Aluminium	Pole-100A21
		Steel	Pole-100S21
	300 mm	Aluminium	Pole-300A21
		Steel	Pole-300S21
	800 mm	Aluminium	Pole-800A21
		Steel	Pole-800S21

Voice and sound module (unique sound module in all directions)

Rated voltage	Power consumption	Mass	Order code
24 VDC	3.5 W	0.17 kg	LU7-V1

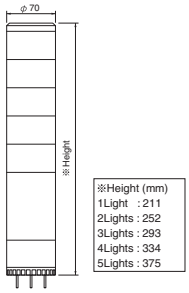
Features

Easy alignment:
Color-coordinated terminal block:
Corresponds to the lens colors for quick wiring verification in the base unit.

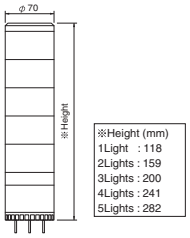


LU7-02FB

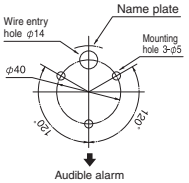
LU7
Standard body



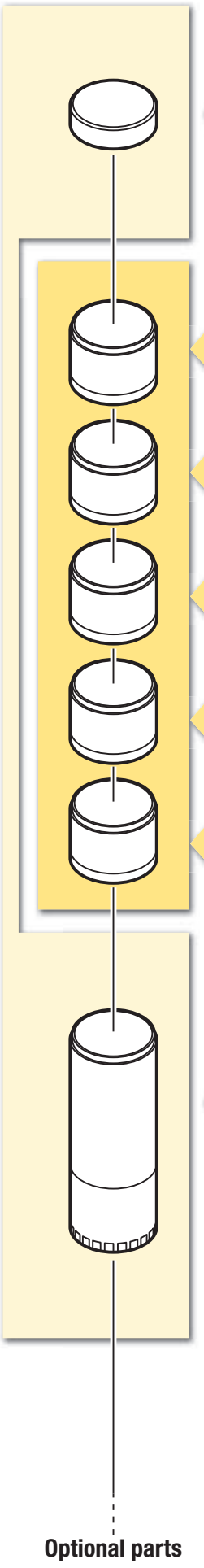
LU7-02S
Short body



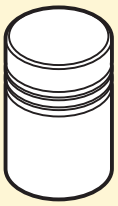
Mounting dimensions



How to order



Voice and sound module



Model	LU7-V1
Type	Voice synthesizer
Rated voltage	24 VDC
Power consumption	3.5 W
Weight	0.17 kg

LED units

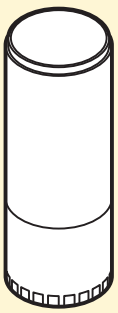
Model	LU7-E-R	LU7-E-Y	LU7-E-G	LU7-E-B	LU7-E-C
Unit color					
Rated voltage	24 VDC				
Operating voltage range	Rated voltage±10% (21.6~26.4 V)				
Current/power consumption	52 mA/1.25 W		42 mA/1.0 W		
Operating temperature range	-30°C~+60°C				
Mass	60 g±10%				

LED strobe module

Model	LU7-XE-R	LU7-XE-Y	LU7-XE-G	LU7-XE-B	LU7-XE-C
Unit color					
Rated voltage	24 VDC				
Power consumption	290 mA	290 mA	140 mA	270 mA	280 mA
Mass	0.07 kg				

RED YELLOW GREEN BLUE CLEAR/WHITE

BASE units



Standard body

Short body

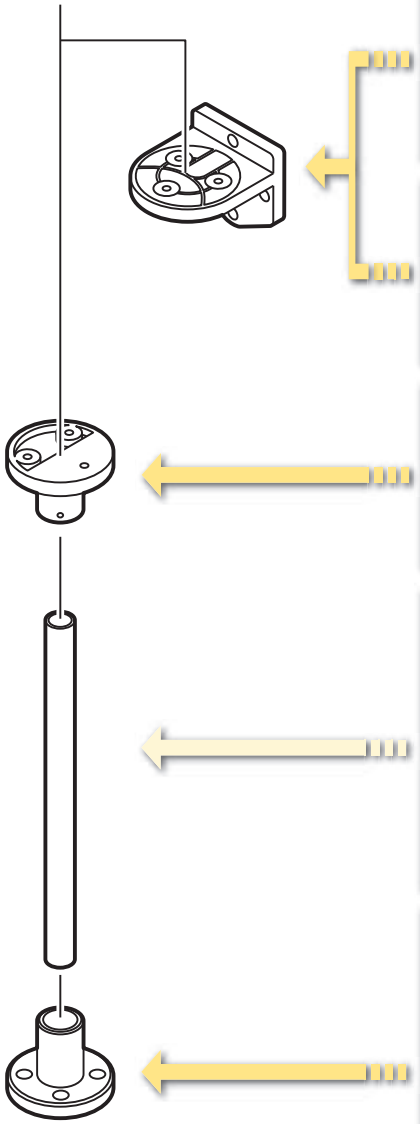
Model	LU7-02S	LU7-02	LU7-02FB	
Color				
Standard body/short body	Short	Standard		
Rated voltage	24 VDC			
Operating voltage range	Rated voltage±10% (21.6~26.4 V)			
Buzzer	–		*Buzzer 1	**Buzzer 2
Current consumption	–		50±10 mA	24±10 mA
Power Ccnsumption	–		1.2±0.25 W	0.58±0.25 W
Sound level	–		Max: 90±5d B (at 1 m)	
			Min: 70 dB or Less (at 1 m)	
Flashing cycle	–		60±12 flashes per minute	
Operating temperature Range	-30°C~+60°C			
Mounting direction	Upright, indoor only			
Protection rating	IP65			
Mass	150 g±10%	250 g±10%	280 g±10%	
Open collector	PNP/NPN			

* Buzzer 1: Continuous sound **Buzzer 2: Intermittent sound

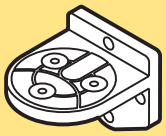
Ivory white Silver color (U) Black (K)

Optional parts

Optional parts



Wall mount bracket



Model	SZ-18	SZ-18U	SZ-18K
Color	Ivory white	Silver color (U)	Black (K)

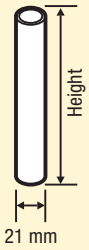
Upper bracket

SZ-50NPT(For 1/2" NPT pole)

Upper bracket

Model	SZ-50-U	SZ-50U-U	SZ-50K-U
Color	Ivory white	Silver color (U)	Black (K)

Pole



Steel pole

Model	POLE-800S21	POLE-300S21	POLE-100S21
Height	800 mm	300 mm	100 mm

Aluminum pole

Model	POLE-800A21	POLE-300A21	POLE-100A21
Height	800 mm	300 mm	100 mm

Mount bracket

SZ-016A
(For Ø21.7 mm pole)

SZ-70-B
(For Ø21.7 mm Aluminium pole only)

Wall mount bracket

SZ-020
(For Ø21.7 mm pole)

SZ-017
(For Ø21.7 mm pole)

Specifications

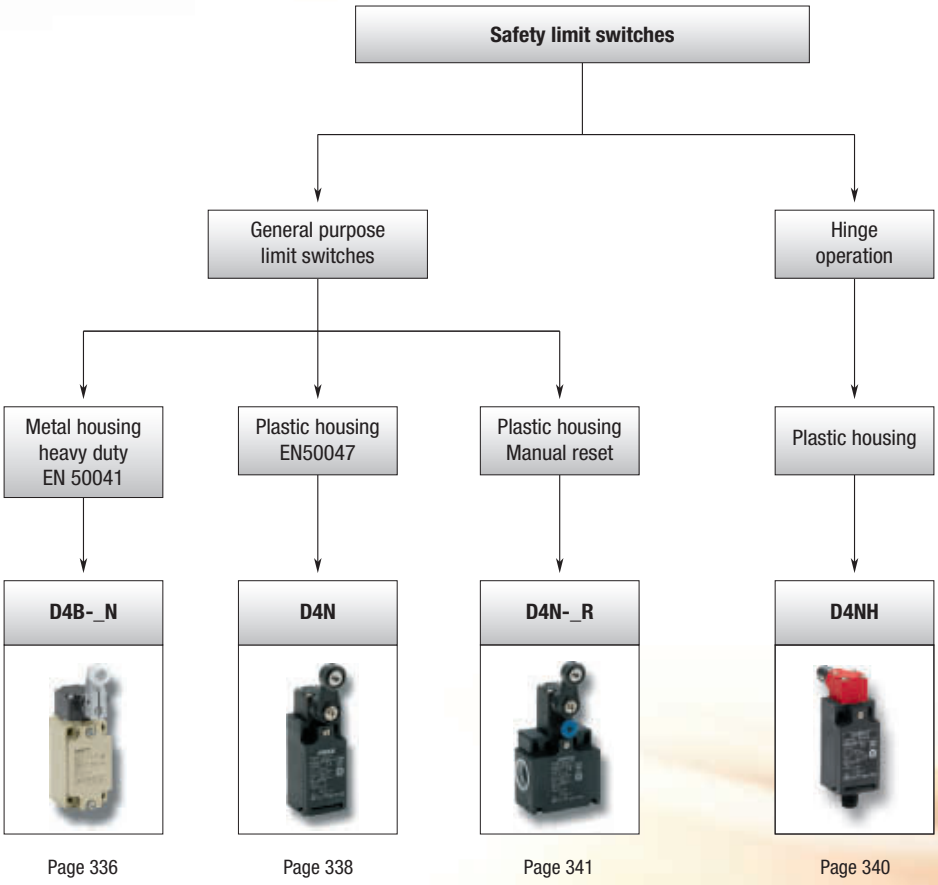
Size	70 mm diameter
Input voltage options	• 24 VDC
Functions available	• Continuous only • Continuous, flashing, alarms
Mounting options	Direct mount only: includes three mounting nuts
Body style	• Component style, wiring terminals provided • Interchangeable and stackable after purchase
Body color	• Beige • Black • Silver
Tiers	1-5 modules can be stacked
Module colors	• Red / Yellow / Green / Blue / Clear • Standard LED modules • Strobe-flash LED modules (24 V bases only)
Alarms (FB style only)	• Alarm 1: selectable, single-tone, continuous alarm, 90 dB (at 1 m) • Alarm 2: selectable, single tone, intermittent (slow beep) alarm, 90 dB (at 1 m)
Ratings	• CE • UL listed (US) • UL listed (Canada) • RoHS
Protections	• IP-65 • Type 4/4X/13 (indoor only)
Control options	• Dry contact closure such as switches or relay contacts • Open-collector transistor (NPN or PNP for 24 VDC • Direct voltage control for 24 VDC, continuous and alarm functions only

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
General purpose limit switches
Hinge operation
Metal housing heavy duty EN 50041
Plastic housing EN50047
Plastic housing Manual reset
Plastic housing
D4B-_N
D4N
D4N-_R
D4NH
Page 336
Page 338
Page 341
Page 340

Selection table

		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)	–	■	–	–
	Hinge operation	■	–	■	–
Application	Position monitoring	■	■	■	■
	General safety application	–	–	–	–
Contact configuration	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	336	338	340	341

■ Standard – No/not available

Limit switch with metal housing

The D4BN family is a complete line-up of 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

		Order code				
		Switches (EN50041)			3-conduit Switch	
		1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)	1NC/1NO (snap-action)	2NC (slow-action)
	Roller lever	**D4B-4111N**	**D4B-4511N**	**D4B-4A11N**	**D4B-8111N**	–
	Adjustable roller lever	D4B-4116N	D4B-4516N	D4B-4A16N	D4B-8116N	–
	Adjustable rod lever	D4B-4117N	D4B-4517N	D4B-4A17N	D4B-8117N	–
	Plain	**D4B-4170N**	**D4B-4570N**	**D4B-4A70N**	–	–
	Roller	**D4B-4171N**	**D4B-4571N**	**D4B-4A71N**	**D4B-8171N**	**D4B-8A71N**
	Coil spring	D4B-4181N	–	–	–	–
	Plastic rod	D4B-4187N	–	–	–	–

Note: The above models provide terminal block with M20 conduit. Conduit sizes G1/2 and PG 13.5 are also available. **bold** = safety limit switch, mechanical form lock

Specifications

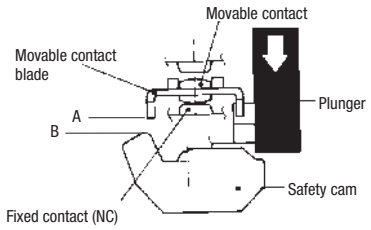
Item		Snap-action	Slow-action
Durability [*1]	Mechanical	30,000,000 operations min.	10,000,000 operations min.
	Electrical	500,000 operations min. (at a 250 VAC, 10 A resistive load)	
Operating speed		1 mm/s to 0.5 m/s	
Operating frequency		Mechanical: 120 operations/min Electrical: 30 operations/min	
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.

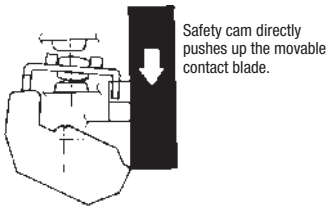
1NO/1NC contact (snap-action)

If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the arrow, the limit switch releases.

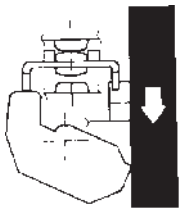
1. When metal deposition occurs.



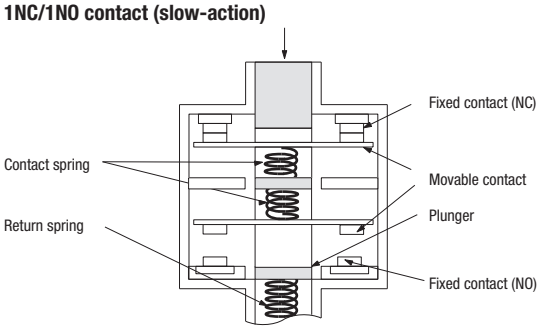
2. When contacts are being pulled apart.



3. When contacts are completely pulled apart.



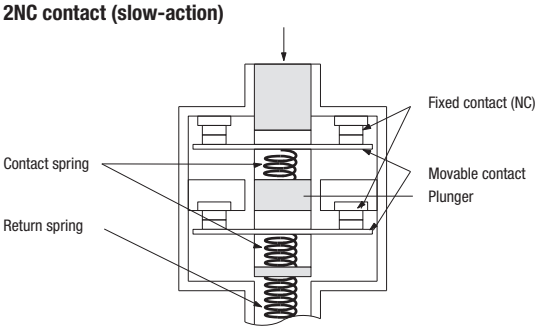
1NC/1NO contact (slow-action)



Conforms to EN60947-5-1 direct opening

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

2NC contact (slow-action)



Conforms to EN60947-5-1

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

is marked on the product to indicate approval of direct opening.

Limit switch with plastic housing

The D4N-family is a complete line-up of limit switches. They are available with one, two or three built-in contacts and a wide range of head and actuator types. The limit switches intuitive to set up, install and maintain.

- Direct opening mechanism
- Wide range of actuators
- Double insulation
- Gold-plated contacts for handling micro loads
- M12 connector terminal blocks (with M20, PG13,5 conduit)

Ordering information

Switches		Connection method		Order code			
				1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)	2NC/1NO (slow-action)
				Order code	Order code	Order code	Order code
	Roller lever (resin lever, resin roller)	1-conduit	M20*1	D4N-4120	D4N-4A20	D4N-4B20	D4N-4C20
			M12 connector	D4N-9120	D4N-9A20	D4N-9B20	–
		2-conduit	M20*1	–	–	–	D4N-8C20
	Plunger	1-conduit	M20*1	D4N-4131	D4N-4A31	D4N-4B31	–
			M12 connector	D4N-9131	D4N-9A31	D4N-9B31	–
		2-conduit	M20*1	D4N-8131	D4N-8A31	D4N-8B31	–
	Roller plunger	1-conduit	M20*1	D4N-4132	D4N-4A32	D4N-4B32	D4N-4C32
			M12 connector	D4N-9132	D4N-9A32	D4N-9B32	–
		2-conduit	M20*1	D4N-8132	D4N-8A32	D4N-8B32	D4N-8C32
	One-way roller arm lever (horizontal)	1-conduit	M20*1	D4N-4162	D4N-4A62	D4N-4B62	D4N-4C62
			M12 connector	D4N-9162	D4N-9A62	D4N-9B62	–
		2-conduit	M20*1	D4N-8162	D4N-8A62	D4N-8B62	D4N-8C62
	One-way roller arm lever (vertical)	1-conduit	M20*1	D4N-4172	D4N-4A72	D4N-4B72	–
	Adjustable roller lever, form lock (metal lever, resin roller)	1-conduit	M20*1	**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*1	**D4N-412H**	**D4N-4A2H**	**D4N-4B2H**	–
			M12 connector	**D4N-912H**	**D4N-9A2H**	**D4N-9B2H**	–

*1. Conduit sizes 1/2-14NPT, G1/2 and PG13.5 are also available.

bold = safety limit switch, mechanical form lock

Switches with two contacts and MBB contacts

MBB (Make Before Break) contacts have an overlapping structure, so that before the normally closed (NC) contact opens the normally open (NO) contact closes.

Actuator		Connection method		Order code	
				1NC/1NO (slow-action)	2NC/1NO (slow-action)
	Roller lever (resin lever, resin roller)	1-conduit	M20*1	D4N-4E20	D4N-4F20
			M12 connector	D4N-9E20	–
		2-conduit	M20*1	D4N-8E20	D4N-8F20
	Roller plunger	1-conduit	M20*1	D4N-4E32	D4N-4F32
			M12 connector	D4N-9E32	–
		2-conduit	M20*1	D4N-8E32	D4N-8F32
	One-way roller arm lever (horizontal)	1-conduit	M20*1	D4N-4E62	D4N-4F62
			M12 connector	D4N-9E62	–
		2-conduit	M20*1	D4N-8E62	D4N-8F62

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

Specifications

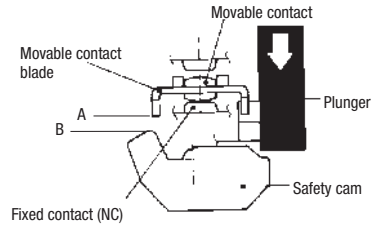
Durability *1	**Mechanical**	15,000,000 operations min./Fork lever 10,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		1 mm/s to 0.5 m/s (D4-1120)
Operating frequency		30 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
Degree of protection		IP67 (EN60947-5-1)

*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.

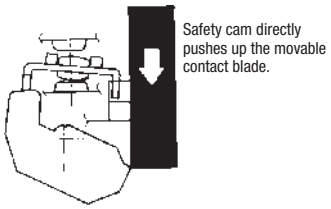
1NO/1NC contact (snap-action)

If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the arrow, the Limit Switch releases.

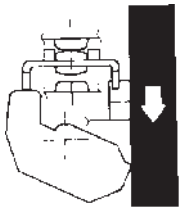
1. When metal deposition occurs.



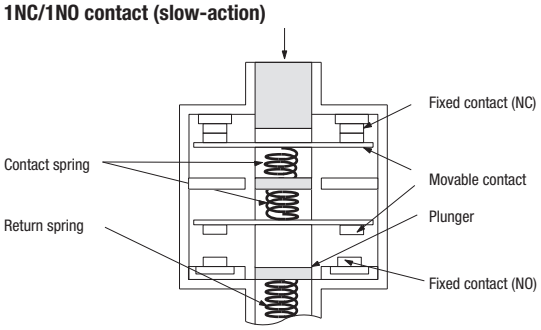
2. When contacts are being pulled apart.



3. When contacts are completely pulled apart.



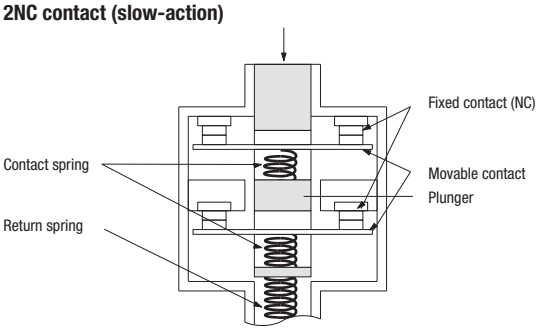
1NC/1NO contact (slow-action)



Conforms to EN60947-5-1 direct opening

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

2NC contact (slow-action)



Conforms to EN60947-5-1

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

is marked on the product to indicate approval of direct opening.

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 (I_{th})		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	–
		2-conduit	M20	D4N-8A20R	D4N-8C20R
	Adjustable roller lever, form lock (metal lever, rubber roller)	1-conduit	M20	D4N-4A2HR	D4N-4C2HR
			M12 connector	D4N-9A2HR	–
		2-conduit	M20	D4N-8A2HR	D4N-8C2HR
	Plunger	1-conduit	M20	D4N-4A31R	D4N-4C31R
			M12 connector	D4N-9A31R	–
		2-conduit	M20	D4N-8A31R	D4N-8C31R
	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

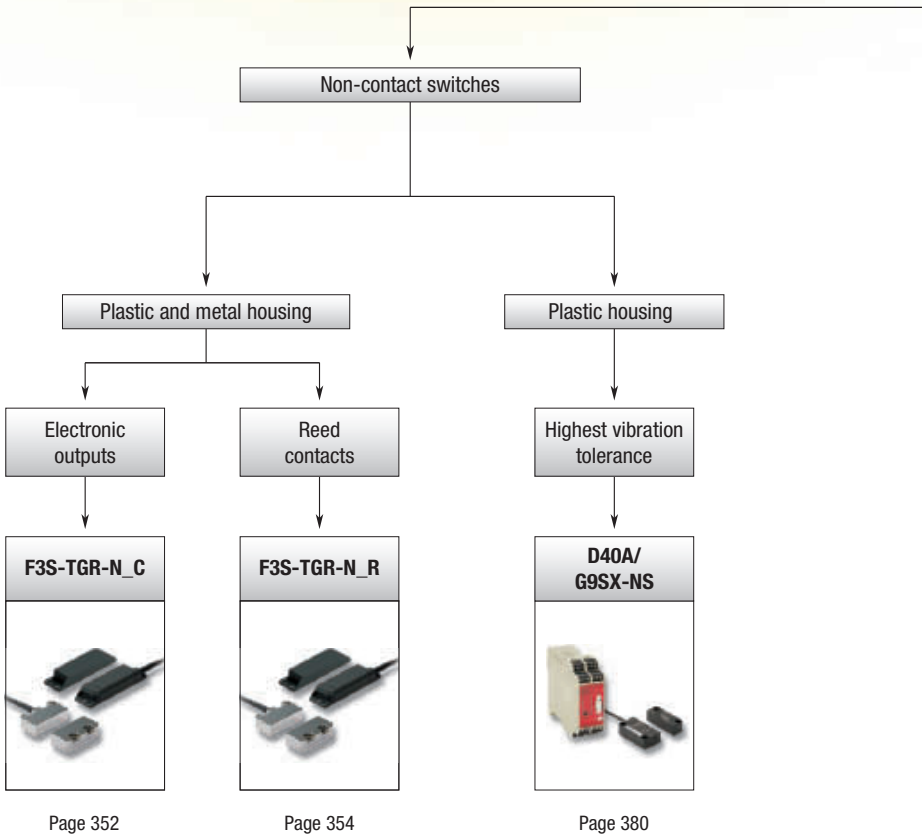
Degree of protection		IP67 (EN60947-5-1)
Durability	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		1 mm/s to 0.5 m/s (D4N-1A20R)
Operating frequency		30 operations/minute 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



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Safety door switches

- Key operated switches
  - Safety switch
    - Plastic housing
      - **D4NS**  Page 350
    - Metal housing
      - **D4BS**  Page 351
  - Safety guard lock switch
    - Plastic housing
      - Square size 1300 N
        - **D4NL**  Page 347
      - Slim size 1000 N
        - **D4GL**  Page 348
    - Metal housing
      - Heavy duty 700 N
        - **D4BL**  Page 349

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				
	Conformity	EN50047, EN1088		EN 954-1	EN954-1, EN60947-5-3	EN954-1, EN60947-5-3
Features	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 wit 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	350	351	380	352	354

		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		
	Conformity	EN1088	EN1088	EN1088
Features	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 wit 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	347	348	349

■ 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

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

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

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

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

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

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.

- Automatically 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
Horizontal mounting		D4BL-K1
Vertical mounting		D4BL-K2

Type		Order code
Adjustable mounting (horizontal)		D4BL-K3

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 ±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
Color (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
Horizontal mounting		D4DS-K1
Vertical mounting		D4DS-K2

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

Specifications

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

*1 The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%. For more details, consult your Omron representative.
*2 These figures are minimum requirements for safe operation.

Note: The above values are initial values.

Safety door switch with metal housing

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

Cable Ccnnection	Contact configuration	Order code
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/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 NO contact	Max.	100 mA, 24 VDC 100 mA, 24 VDC		
Output type		–	Electronic output (potential-free optocoupler output)		

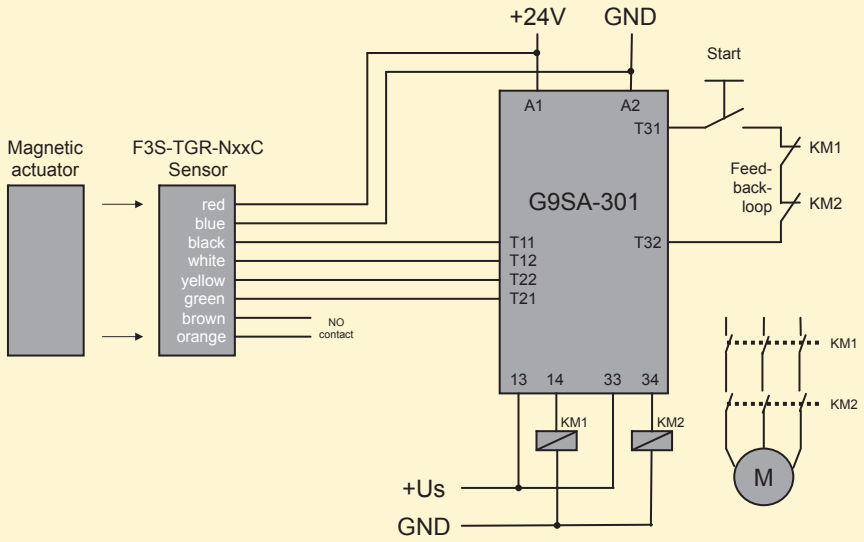
Approved standards

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 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/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 sensors

Cable connection	Contact configuration	Order code
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/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. 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
Contact release time		Max.	2 ms		
Initial contact resistance		Max.	50 mΩ		500 mΩ
Switching current		Min.	1 mA, 10 VDC		10 mA, 10 VDC
Rated loads	NC contacts NO contact	Max.	1 A, 250 VAC 0.2 A, 24 VDC		0.5 A, 250 VAC 0.2 A, 24 VDC

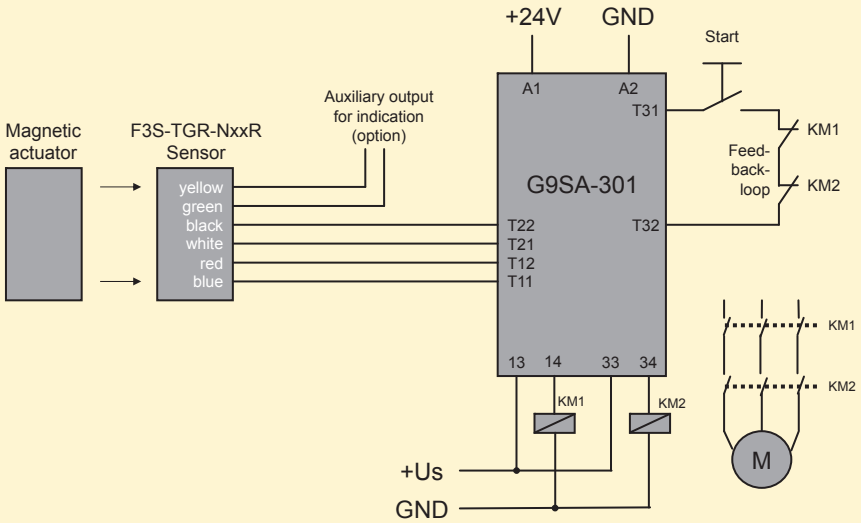
Approved standards

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)

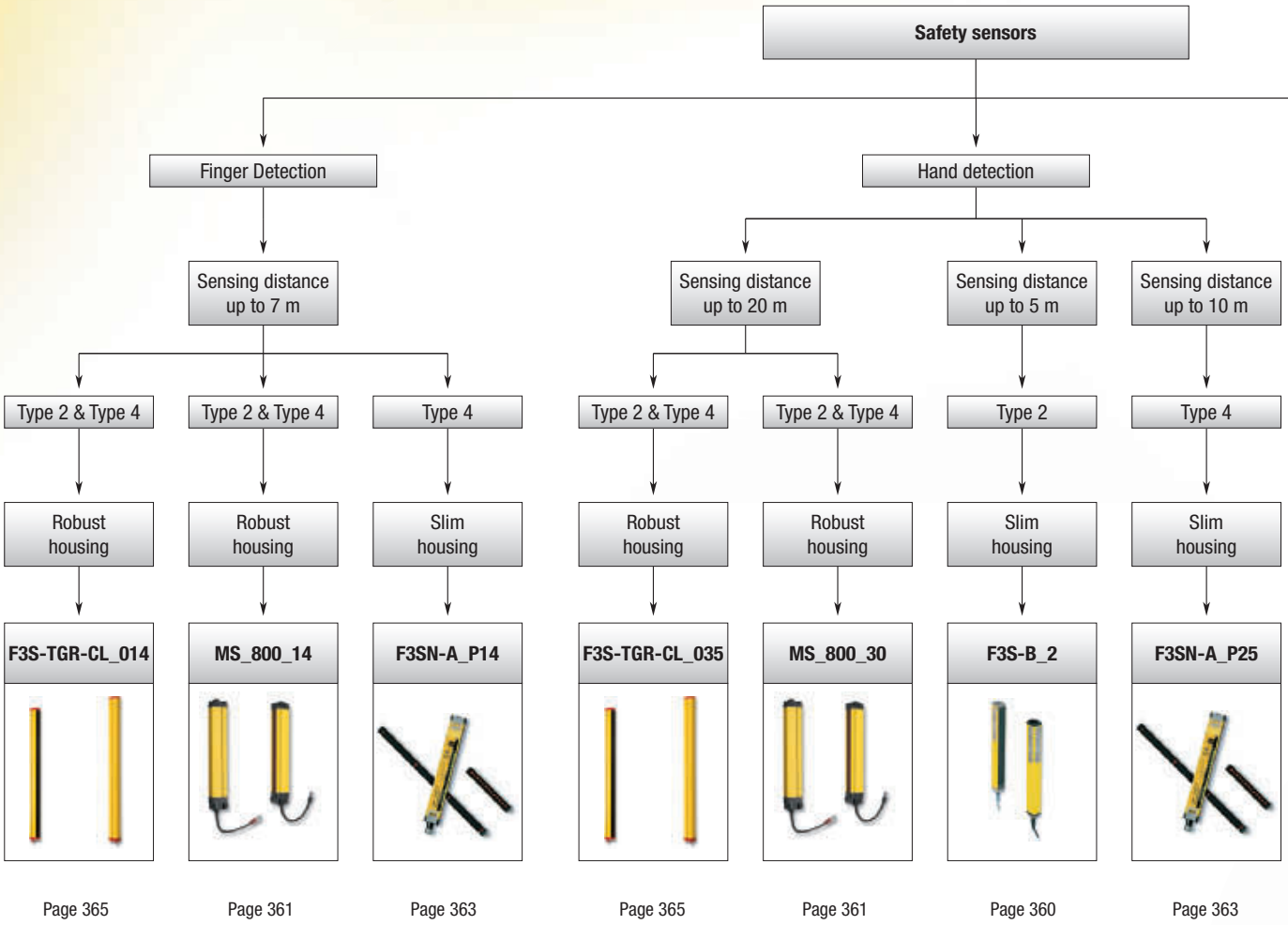


PROTECT OPERATORS AND PRODUCTION

Total consistency across the board

Safety Sensors are the first choice in safeguarding workplaces where persons and machines cooperate. Built-in intelligence stops the machine in conditions that are dangerous for the worker. Our F3S-TGR-CL range offers safety light curtains with included safe control functions for finger-, hand- and body protection, all using the same concept of wiring, installation and setup for simplicity in daily use and maintenance.

- Finger- and Hand and body protection models
- Control functions included
  - X-, T- and L-muting
  - fixed and floating blanking
  - single and double break operation
  - pre-reset access control
- Easy mounting and common wiring for all types for simple design and installation
- Certified acc. EN61496 and EN ISO 13849-1.



Human body detection and Muting applications

Sensing distance up to 5 m	Sensing distance up to 10 m	Sensing distance up to 12 m active/passive system		Sensing distance up to 50 m		Presence sensing Collision avoidance
Type 2	Type 2	Type 2	Type 4	Type 2	Type 4	3m safety zone
Slim housing	M18 housing	Robust housing	Robust housing	Robust housing	Robust housing	270° scanning zone
F3S-B_5 F3S-B_7	**E3FS + Controller**	**F3S-TGR-CL2-K_C**	**F3S-TGR-CL4-K_C**	**F3S-TGR-CL2-K_**	**F3S-TGR-CL4-K_**	**OS32C**
						
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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
	IP class	IP65	IP65	IP65	IP65
Features	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)
	External control unit	–	–	–	–
Application	Finger protection	■	■	■	–
	Hand protection	■	■	■	■
	Arm protection	■	■	■	■
	Body protection	■	■	■	■
	Presence detection	■	■	■	■
	Muting application	–	■	–	–
	Blanking application	■	■	■	■
Supply voltage	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	–	■	–	–
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		Safety Sensors			
					
Selection criteria	Model	E3FS + F3SP-U3P	F3S-TGR-CL_-K_	F3S-TGR-CL_-K_C	OS32C
	Safety category	Category 2	Category 2 and 4	Category 2 and 4	Category 3
	Safety Integrity Level (IEC 61508)	–	–	–	SIL 2
	Protective height	–	500 to 1.200 mm	500 to 1.200 mm	Scanning range 3 m
	Resolution	–	–	–	–
	Beam pitch	–	300 mm, 400 mm, 500 mm	300 mm, 400 mm, 500 mm	–
	Reaction time	32 ms	13 ms	13 ms	80 ms
	Temperature range	-10 to 55°C	-10 to 55°C	-10 to 55°C	-10 to 50°C
	IP class	IP67	IP65	IP65	IP65
Features	Blanking function	–	–	–	–
	Muting function	option	internal	internal	–
	EDM function	option	internal	internal	internal
	Interlock function	option	internal	internal	internal
	Series connection	–	–	–	–
	Mounting kits	■	option	option	option
	Parameter setting	–	internal DIP switch	internal DIP switch	Software (included)
	External control unit	■	–	–	–
Application	Finger protection	–	–	–	–
	Hand protection	–	–	–	–
	Arm protection	–	–	–	–
	Body protection	■	■	■	■
	Presence detection	–	–	–	■
	Muting application	■	■	■	–
	Blanking application	–	–	–	–
Supply voltage	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	–	–	–	■
	Test input	■	■	■	–
	EDM input	–	■	■	■
	Reset input	■	■	■	■
	Muting sensor input	■	■	■	–
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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
30 mm	12	300 mm	F3S-B122P
	18	450 mm	F3S-B182P
	24	600 mm	F3S-B242P
	30	750 mm	F3S-B302P
	36	900 mm	F3S-B362P
	42	1,050 mm	F3S-B422P
	48	1,200 mm	F3S-B482P
	54	1,350 mm	F3S-B542P
	60	1,500 mm	F3S-B602P
	66	1,650 mm	F3S-B662P
55 mm	6	300 mm	F3S-B065P
	9	450 mm	F3S-B095P
	12	600 mm	F3S-B125P
	15	750 mm	F3S-B155P
	18	900 mm	F3S-B185P

Optical resolution	No. of optical axes	Protective height	Order code
55 mm	21	1,050 mm	F3S-B215P
	24	1,200 mm	F3S-B245P
	27	1,350 mm	F3S-B275P
	30	1,500 mm	F3S-B305P
	33	1,650 mm	F3S-B335P
80 mm	4	300 mm	F3S-B047P
	6	450 mm	F3S-B067P
	8	600 mm	F3S-B087P
	10	750 mm	F3S-B107P
	12	900 mm	F3S-B127P
	14	1,050 mm	F3S-B147P
80 mm	16	1,200 mm	F3S-B167P
	18	1,350 mm	F3S-B187P
	20	1,500 mm	F3S-B207P
	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 45 ms (stand-alone) ON to OFF 20 ms to 65 ms (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 curtain

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

- Sensing distance up to 20 m for 30 mm resolution and 7 m for 14 mm 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
- Multicascadable up to 4 sets

Ordering information

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 Interlock, restart, EDM, 2 optical channels, integrated alignment tool	Basic		Advanced		Basic		Advanced			
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										
30 mm hand 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-
Length										
240 mm … 2120 mm in	280 … 1800	280 … 2120	280 … 1800	280 … 2120	280 … 1800	280 … 2120	280 … 1800	280 … 2120	240 … 1280	280 … 2120
40 mm increments										

MS4800 Safety Category 4

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

Examples

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

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

MS4800F-E-014-600
Slave operation

14 mm resolution
600 mm protective height

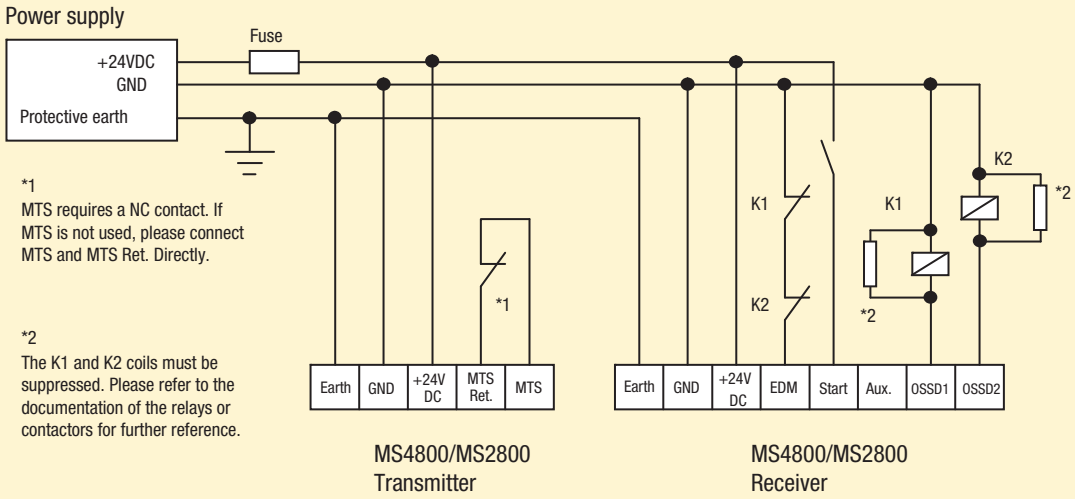
Specifications

Model	MS4800_-E_-___-____	MS2800_-E_-___-____
Sensor type	Type 4	Type2
Normal operating range Reduced range (DIP-switch 6)	14 mm resolution: 0.3 - 7 m, 30 mm resolution: 0.3 - 20 m 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 ±2,5°	Within ±5,0°
	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 ±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 100 mA @ 24 VDC. 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 methode	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 activ, 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, PLe 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 x 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



K1 and K2 forcibly guided relay's expected

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 curtains

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 F3SN-A____P14H
		Yes	F3SN-A____P14H-01
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

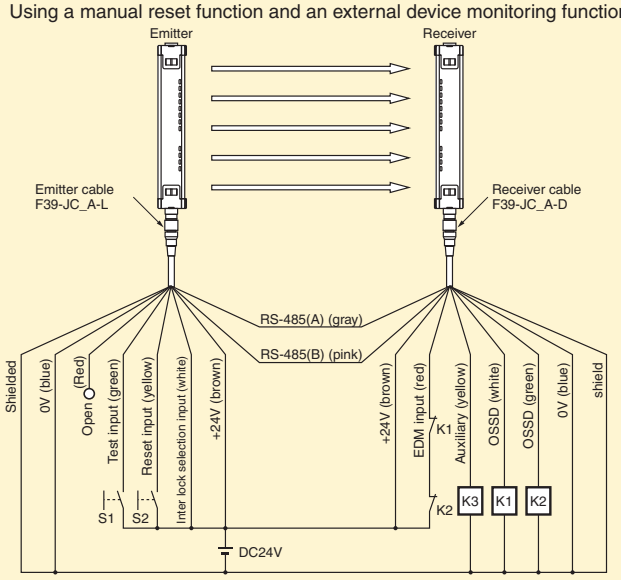
Specifications

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: Aluminum, cap: Zinc die-cast, optical cover: PMMA (acrylic resin)			
Size (cross section)		30x30 mm			

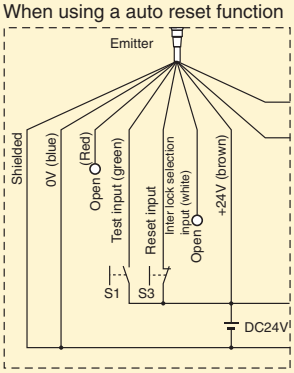
*1 The 4 digits in ____ in the model number represent the protective height. Use the formula given in the information on protective height specifications to calculate the height. For example, if the beam gap is 9 mm, and the No. of beams is 21, the protective height will be 9×21 = 189 mm. The model with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

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

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

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

Ordering information finger- and hand protection safety sensors

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

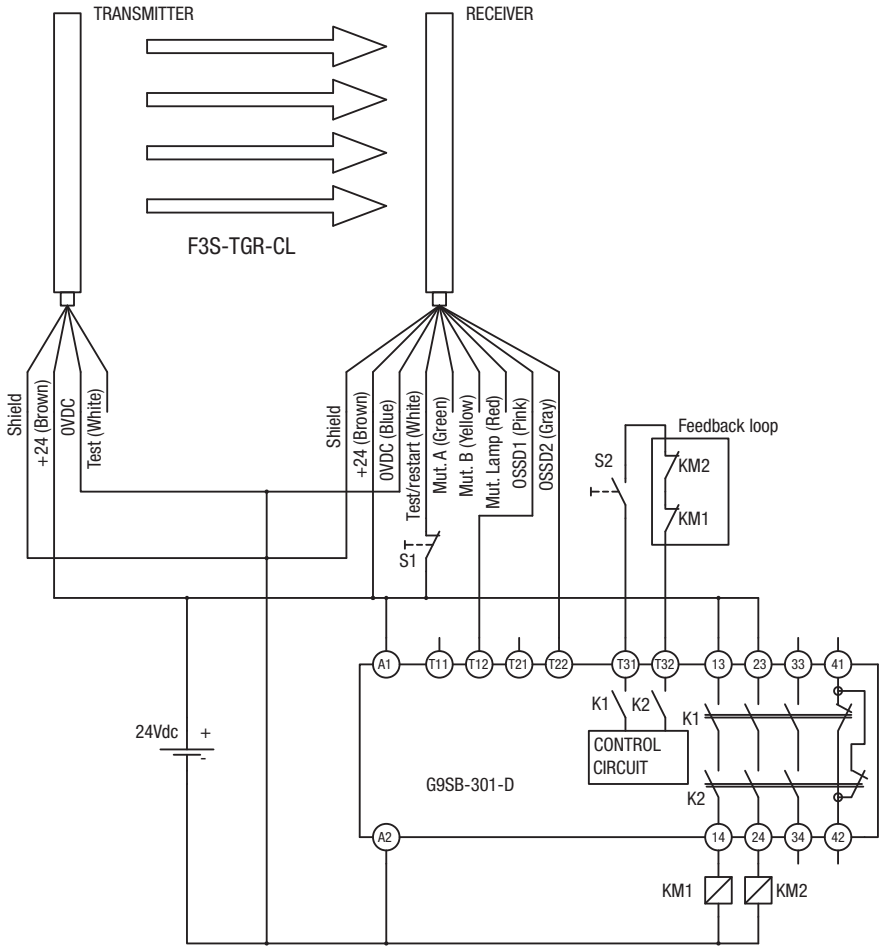
Multi-beam safety sensors

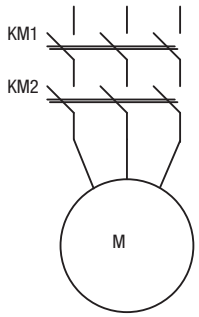
Item	F3S-TGR-CL2_-K_	F3S-TGR-CL4_-K_
Sensor Type	Type 2	Type 4
Operating range	F3S-TGR-CL__-K_ 0.5 m … 40 m F3S-TGR-CL__-K_-___-LD 25 m … 50 m F3S-TGR-CL__-K2C-500 0.5 m … 12 m F3S-TGR-CL__-K3C-800 0.5 m … 8 m F3S-TGR-CL__-K4C-____ 0.5 m … 7 m	
Beam pitch	F3S-TGR-CL__-K2_-500: 2 beams, 500 mm F3S-TGR-CL__-K3_-800: 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), PLc (EN ISO 13849-1)	Cat. 4 (EN954-1), PLe (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 sensors

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)	
Detgree 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





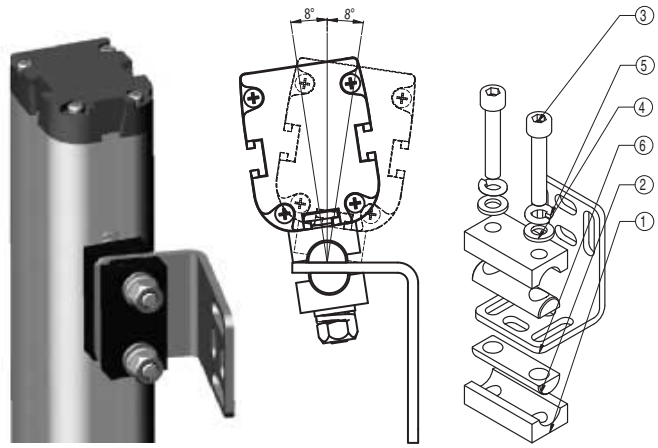
Note: This circuit achieves up to Safety Category 4 according to EN 954-1

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



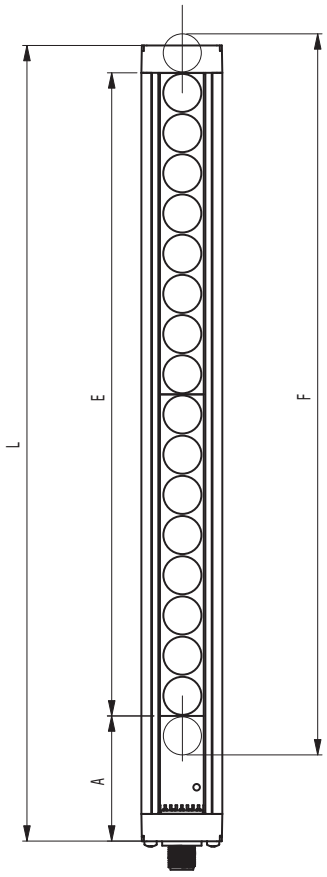
Wiring accessories (connectors and Y-connector cables)

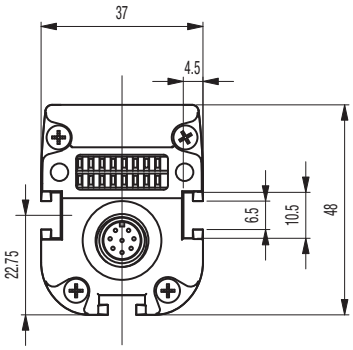
Type	
F39-TGR-CT-B-R	Connector M12, 8-pin, female for wiring
F39-TGR-CT-B-E	Connector M12, 4-pin, female for wiring
F39-TGR-CT-W-R	Connector M12, 8-pin, male for wiring
F39-TGR-CT-W-E	Connector M12, 4-pin, male for wiring
F39-TGR-CVL-D-B-5-R	Cable for sensor system and muting lamp connection

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





L: Total length of the F3S-TGR-CL system
F: Protective height where an object equal or greater the resolution is detected
E: Detection zone
A: Dead zone without detection capability

Alternate T-slot mounting

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
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
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

OS32C Safety Laser Scanner

- Type 3 Safety laser scanner complies with IEC61496-1/-3.
- 70 sets of safety zone and warning zone combinations are available, supporting complicated changes in working environments.
- A safety radius up to 3 m and warning zone(s) radius up to 10 m can be set.
- 8 Individual sector indicators and various LED indications allow the user to determine scanner status at a glance.
- Reference boundary monitoring function prevents unauthorized changes in the scanner position.

Ordering information

OS32C (Power cable is sold separately.)

Description	Order code
Back location cable entry	OS32C-BP
Side location cable entry*1	OS32C-SP1

*1 For OS32C-SP1, each connector is located on the left as viewed from the back of the I/O block.

Description	Remarks	Order code
Configuration tool	CD-ROM OS supported: Windows 2000; Windows XP; Windows Vista	included

Note: The OS32C laser scanner may not be sold or imported into or used in the Federal Republic of Germany prior to December 1, 2013.

Mounting brackets

Type	Remarks	Order code
Bottom/side mounting bracket 	Bottom/side mounting bracket x 1, unit mounting screws x 4 sets	OS32C-BKT1
XY axis rotation mounting bracket 	XY axis rotation mounting bracket x 1, unit mounting screws x 6 sets, bracket mounting screws x 1 set (must be used with OS32C-BKT1)	OS32C-BKT2

Note: For a full line-up of accessories and spare parts, please refer to the Z298-E1… datasheet.

Specifications

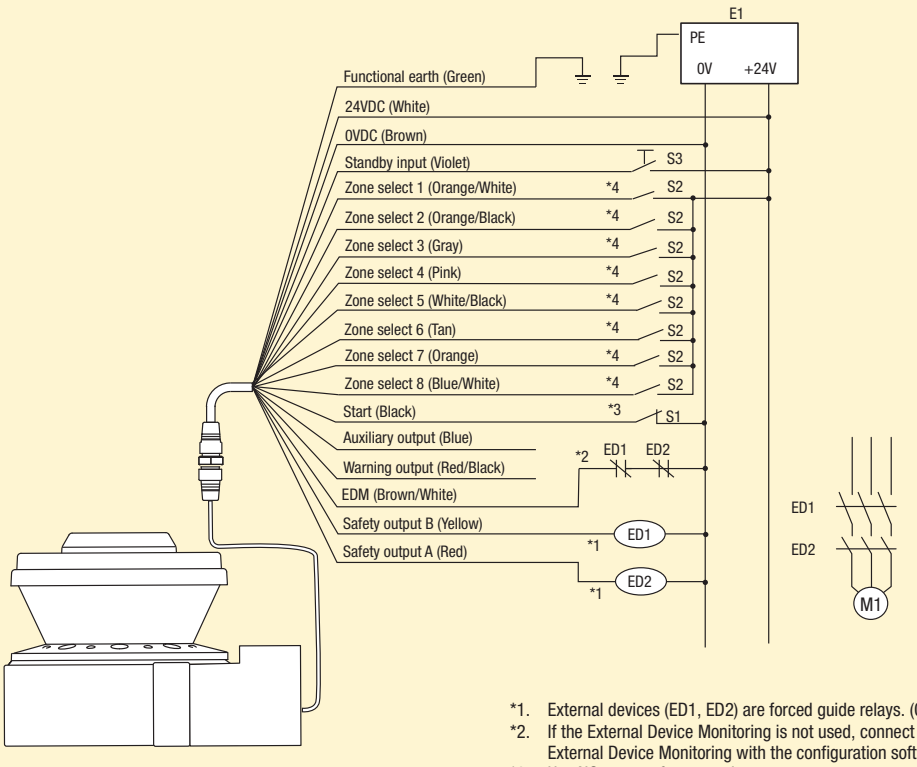
Sensors

Sensor type		Type 3 Safety laser scanner
Safety category		Category 3, performance level d (ISO13849-1: 2006)
Detection capability		Non-transparent with a diameter of 70 mm (1.8% reflectivity or greater)
Monitoring zone		Monitoring zone set count: (Safety zone + 2 warning zones) x 70 sets
Operating range		Safety zone radius up to 3 m, warning zone radius up to 10 m.
Detection angle		270°
Response time		Response time from ON to OFF: From 80 ms (2 scans) to 680 ms (up to 17 scans) Response time from OFF to ON: Response time from ON to OFF + 100 ms to 60 s (configurable)
Line voltage		24 VDC +25%/-30% (ripple p-p 2.5 V max.)*1
Power consumption		Normal operation: 5 W max., 4 W typical (without output load)*2 Standby mode: 3.75 W (without output load)
Safety output (OSSD)		PNP transistor x 2, load current of 250mA max., residual voltage of 2 V max., load capacity of 2.2 µf max., leak current of 1 mA max.*2,*3,*4
Auxiliary output (Non-Safety)		NPN/PNP transistor x 1, load current of 100 mA max., residual voltage of 2 V max., leak current of 1 mA max.*3,*4,*5
Warning output (Non-Safety)		NPN/PNP transistor x 1, load current of 100 mA max., residual voltage of 2 V max., leak current of 1 mA max.*3,*4,*5
Output operation mode		Auto start, start interlock, start/restart interlock
Input	**External Device Monitoring (EDM)**	ON: 0 V short (input current of 50 mA), OFF: Open
	Start	ON: 0 V short (input current of 20 mA), OFF: Open
	Zone select	ON: 24 V short (input current of 5 mA), OFF: Open
	Stand-by	ON: 24 V short (input current of 5 mA), OFF: Open
Connection type		Power cable: 18-pin mini-connector (pigtail) Communication cable: M12, 4-pin connector
Connection with PC		Communication: Ethernet
Indicators		RUN indicator: Green, STOP indicator: Red, Interlock indicator: Yellow, Warning output indicator: Orange, Status/diagnostic display: 2 x 7-segment LEDs, Intrusion indicators: Red LED x 8
Enclosure rating		IP65 (IEC60529)
Dimensions (WxHxD)		133.0 x 104.5 x 142.7 mm (except cable)
Weight (Main Unit only)		1.3 kg
Approvals		EN61496-1 (Type 3 ESPE), EN61496-3 (Type 3 AOPDDR), EN61508 (SIL2), ISO13849-1 (Category 3, Performance Level d), UL508, UL1998, CAN/CSA-C22.2 No. 14, CAN/CSA-C22.2 No. 0.8

*1 For power source specification, refer to “Safety Precautions” on page 16.
*2 Rated current of OS32C is 1.025 A max. (OS32C 210 mA + OSSD A load + OSSD B load + auxiliary output load + warning output load + functional Inputs). Where functional inputs are: EDM input ... 50 mA Start input ... 20 mA Standby input ... 5 mA Zone X input ... 5 mA x 8 (eight zone set select inputs)
*3 Output voltage is input voltage - 2.0 VDC.
*4 Total consumption current of 2 OSSDs, auxiliary output, and warning output must not exceed 700 mA.
*5 Output polarity (NPN/PNP) is configurable via the configuration tool.

Connection

Basic connection with single OS32C unit
Category 3, performance level d (ISO13849-1)



S1 : Start input
S2 : Zone select switch
S3 : Standby switch
ED1, ED2: Forced guided relay
M1 : 3-Phase motor
E1 : 24 VDC Power

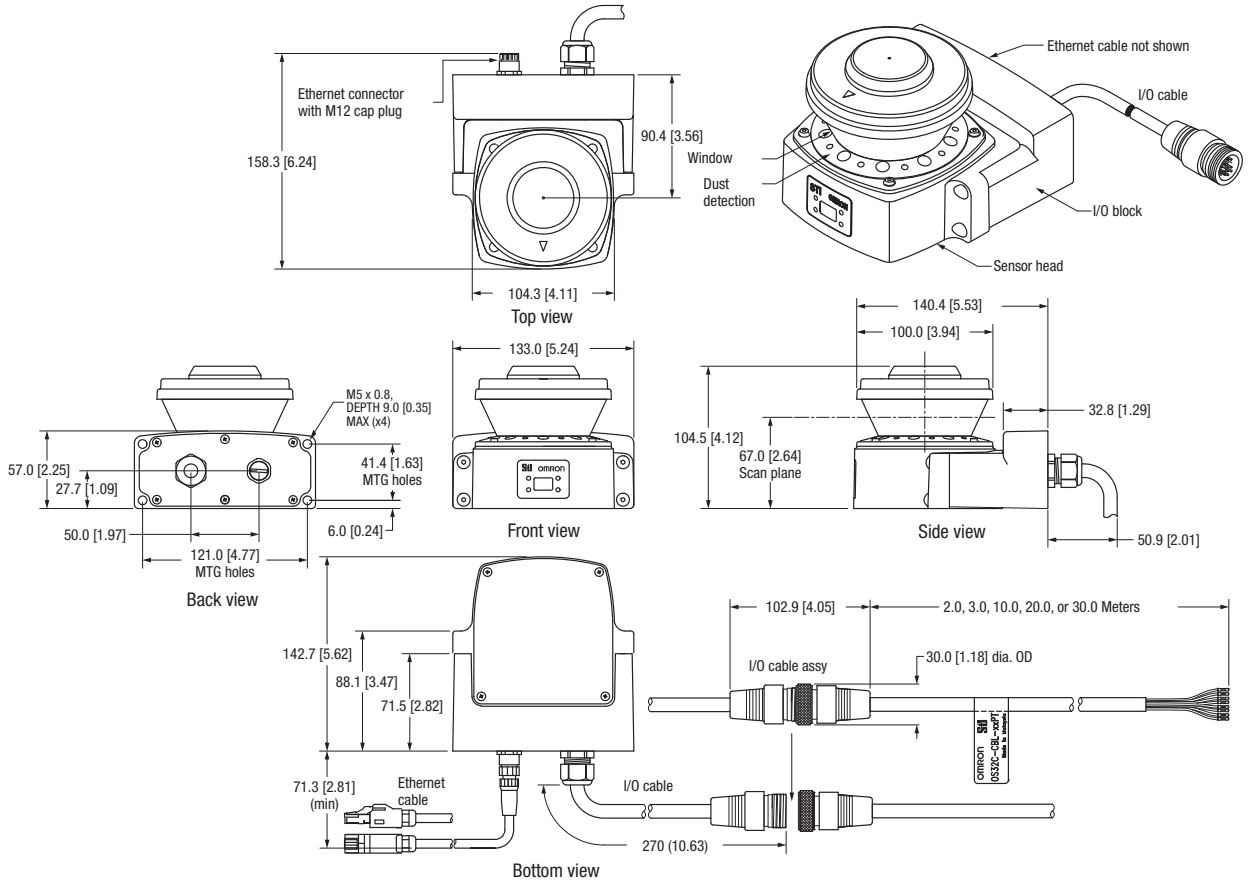
OS32C Configuration
- External Device Monitoring enabled
- Start/restart interlock

*1. External devices (ED1, ED2) are forced guide relays. (G7Z, G7SA, G7S, etc)
*2. If the External Device Monitoring is not used, connect brown/white wires to 0 V, and then turn OFF the External Device Monitoring with the configuration software.
*3. Use NC-contact for a start input.
*4. For zone select switch setting, refer to OS32C Series user's manual.

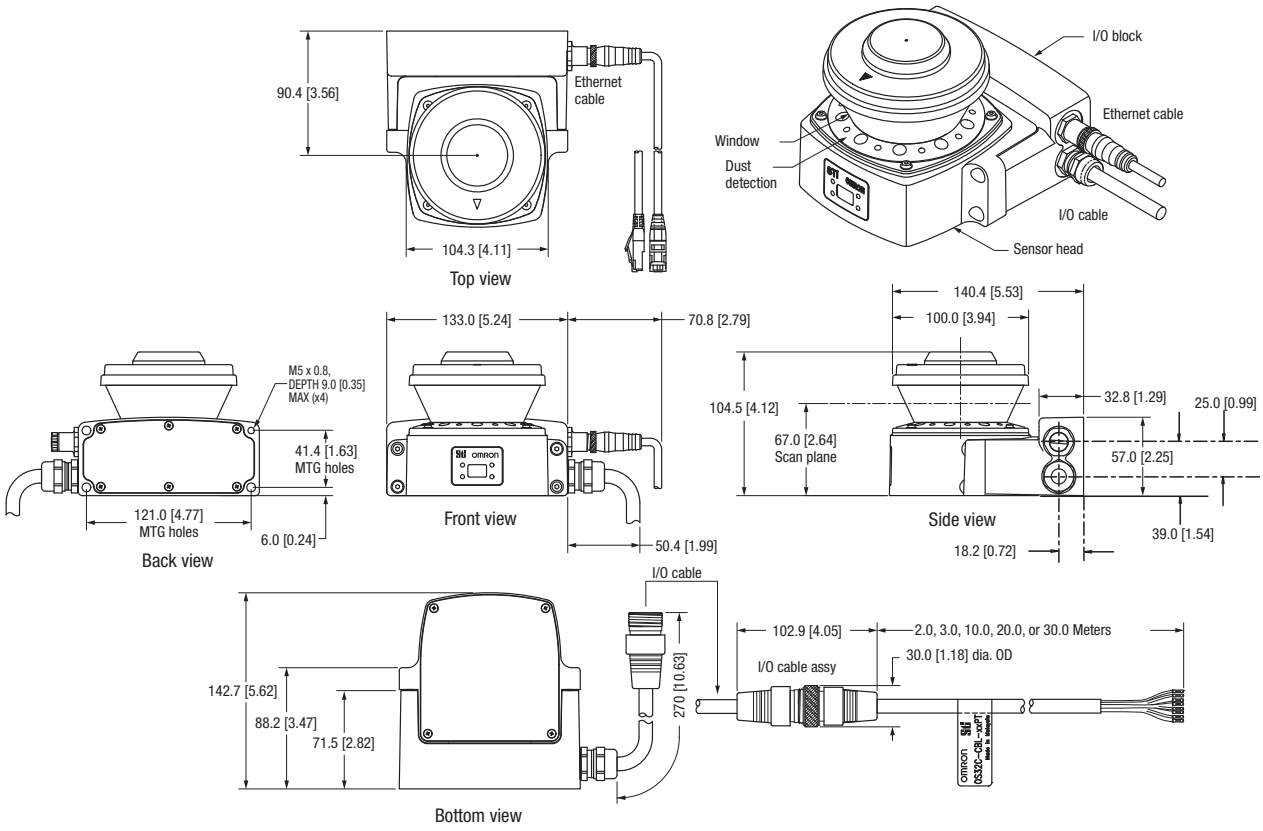
Note: This wiring example is for category 3.

Dimensions

OS32C with back location cable entry - OS32C-BP



OS32C with side LIcation cable entry - OS32C-SP1



Single-beam safety sensor in compact housing

The slender M18-sized E3FS is a type 2 safety single beam 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
- Type 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
		Plug type	E3FS-10B4-P1
Nickel brass		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 ± 10% (ripple p-p 10% max.)
Effective aperture angle (EAA)	±5° (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 ±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	≤ 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

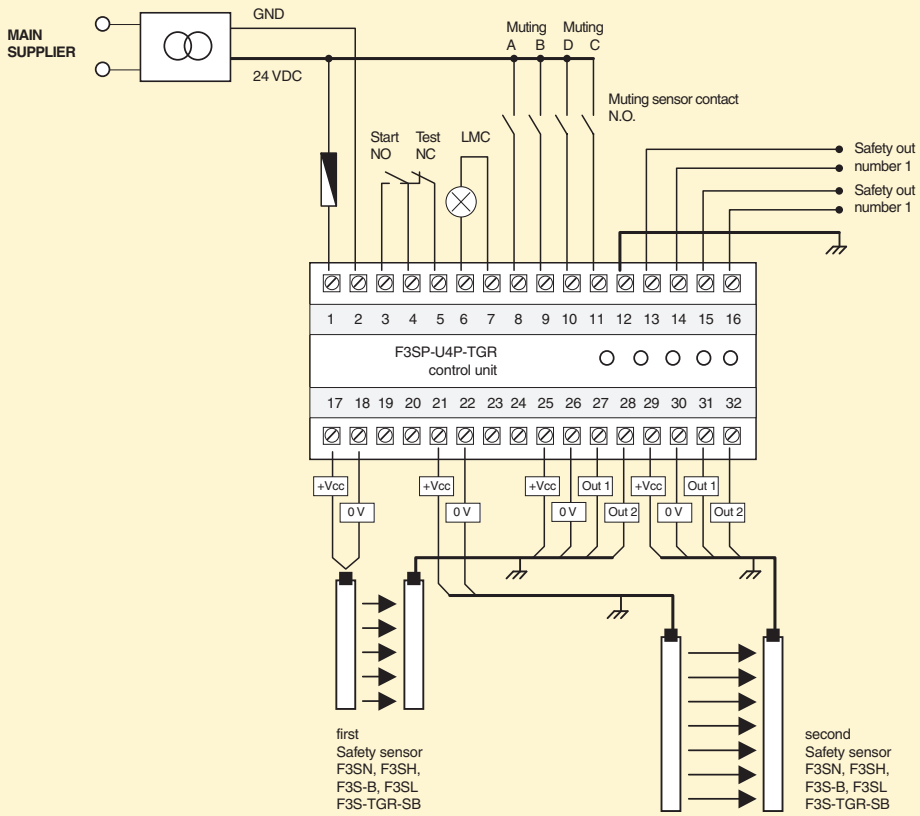
Description	Order code
Muting controller for safety light curtain F3S-B, F3SN and F3SH	F3SP-U4P-TGR

Specifications

Item	F3SP-U4P-TGR
Power supply voltage	24 VDC ±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 mm²), detachable blocks with 4 screws each
Response time	≤ 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 perimetrical guards.

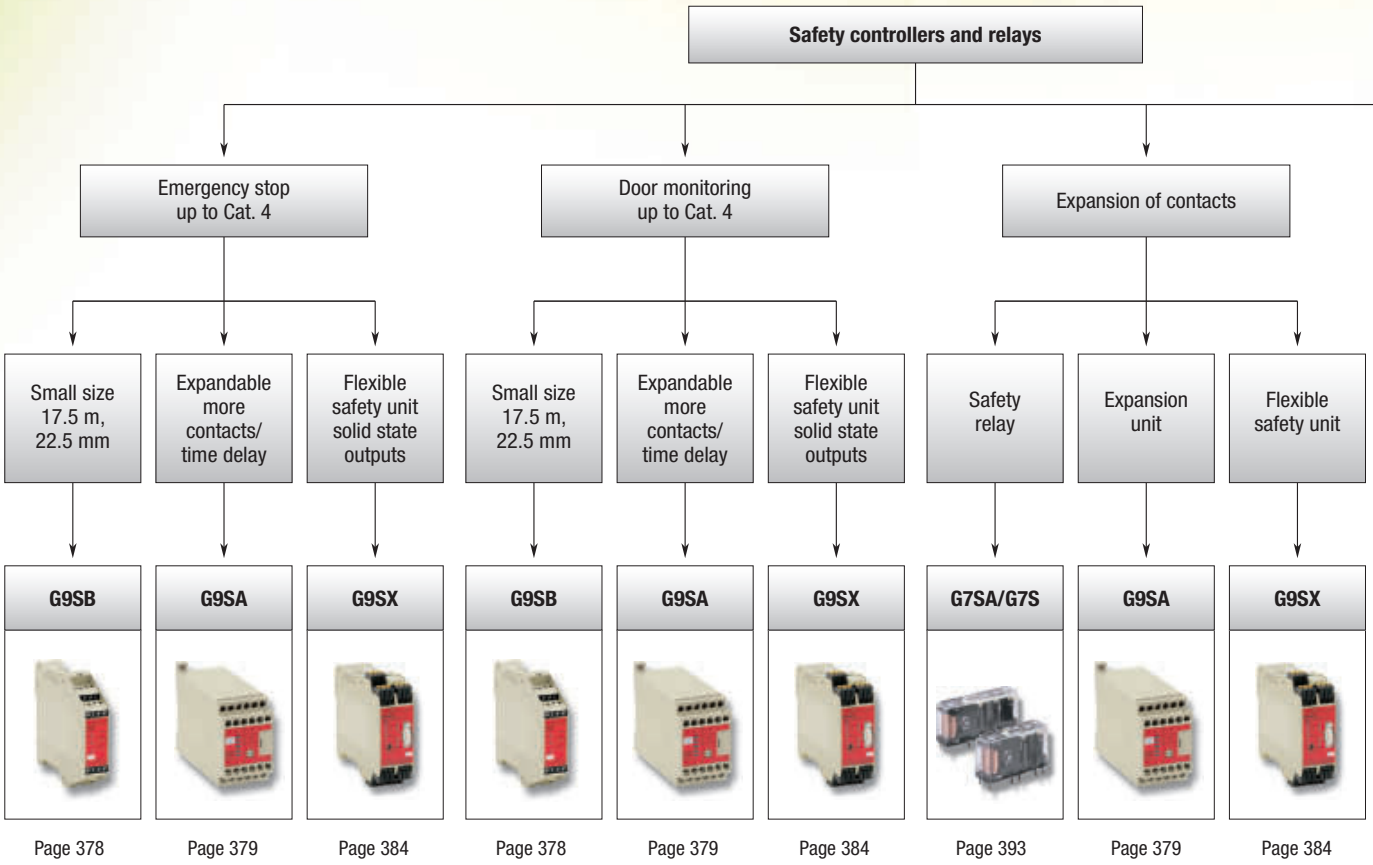


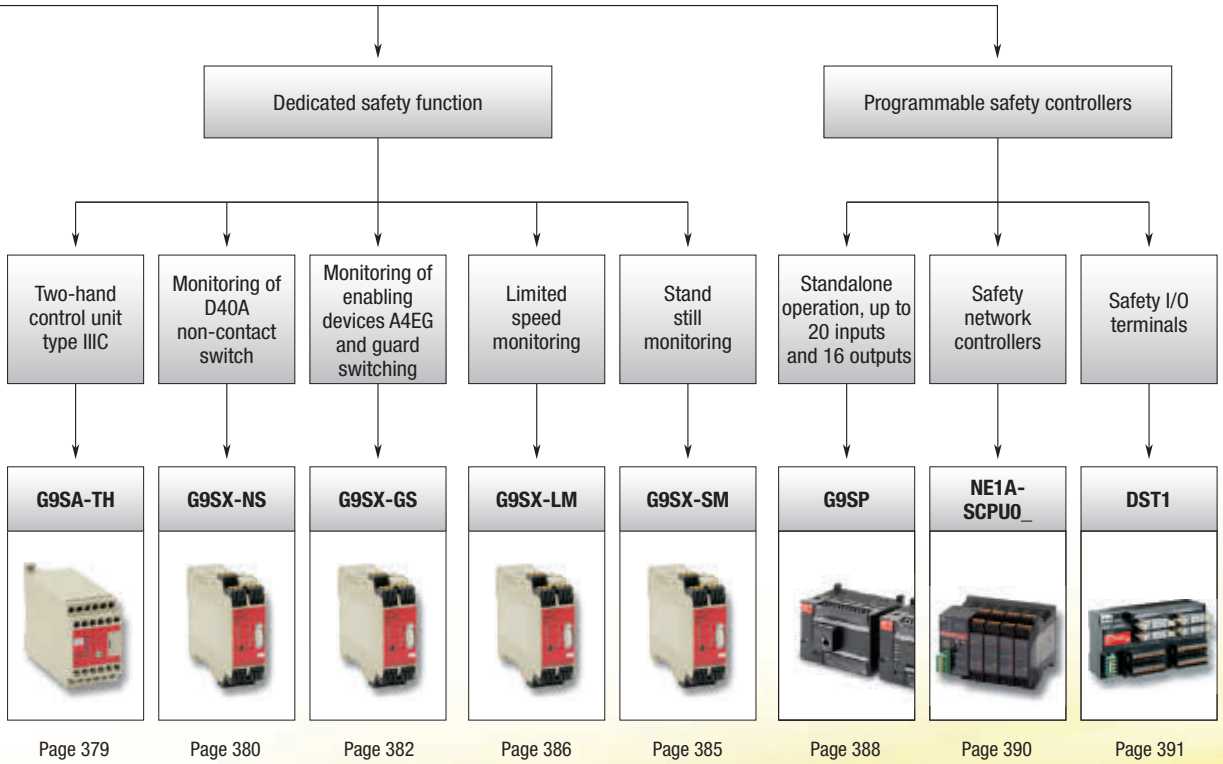
BREAK THROUGH BARRIERS IN SAFETY DESIGN

Configurable, flexible and simple

Omron safety controllers offer transparent standalone operation and scalability in safety networking applications for all sizes of machine safety control systems. The G9SP safety controller is simple to configure and setup and overcomes limitations of hard-wired solutions by adding flexibility of a software - based solution. Total cost of ownership is reduced by having user-defined function blocks and an integrated simulation tool for debugging or the application program.

- EN ISO 13849-1 (PLe) and IEC 61508 (SIL3) certification for future-proof design of the safety system
- Predefined function blocks for simple configuration and self-explanatory validation
- Equipped with Ethernet and serial interface for transparent diagnosis




Dedicated safety function
Programmable safety controllers
Two-hand control unit type IIIC
Monitoring of D40A non-contact switch
Monitoring of enabling devices A4EG and guard switching
Limited speed monitoring
Stand still monitoring
Standalone operation, up to 20 inputs and 16 outputs
Safety network controllers
Safety I/O terminals
G9SA-TH
G9SX-NS
G9SX-GS
G9SX-LM
G9SX-SM
G9SP
NE1A-SCPU0_
DST1
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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
	Flux-tight	–	–	–	■
	Number of poles	–	–	–	4pole and 6pole
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	–	–	■	–
	General safety application	■	■	■	■
Supply voltage	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	379	378	384	393

		Programmable safety system			
					
Selection criteria	Model	G9SP	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	Diagnosis via Ethernet and Serial interface (option)	■	■	■
	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	–	–	–	■
	General safety application	■	■	■	■
Supply voltage	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	388	390		391

■ 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 22.5mm-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 permissable 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

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-color 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-contactdoor switch controller.

On-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
							Spring-cage terminals	G9SX-NS202-RC
	2 (Semi-conductors)				3.0 s		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	

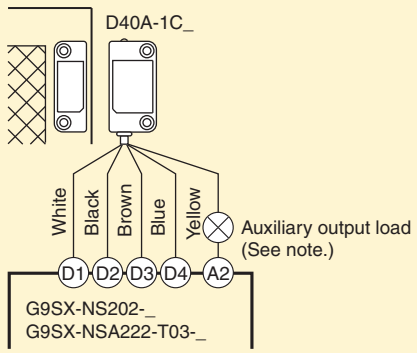
*1 Only applies to the G9SX-NSA222-T03-_. Refers to input other than that from the non-contact door switch.

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

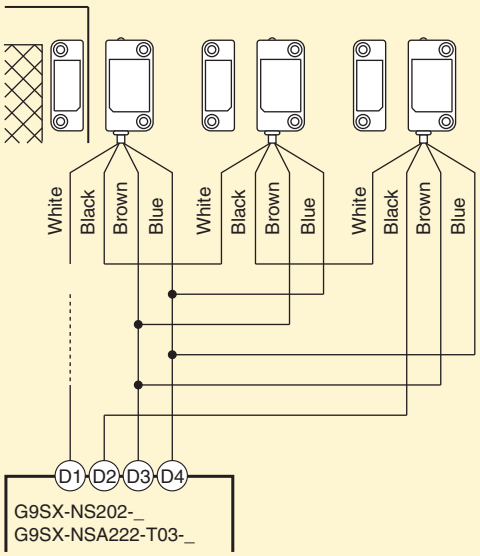
Example: Wiring a single switch



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 switchting 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 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.
External indicator outputs	P channel MOS FET transistor outputs Connectable indicators • Incandescent lamp: 24 VDC, 3 W to 7 W • LED lamp: 10 to 300 mA DC

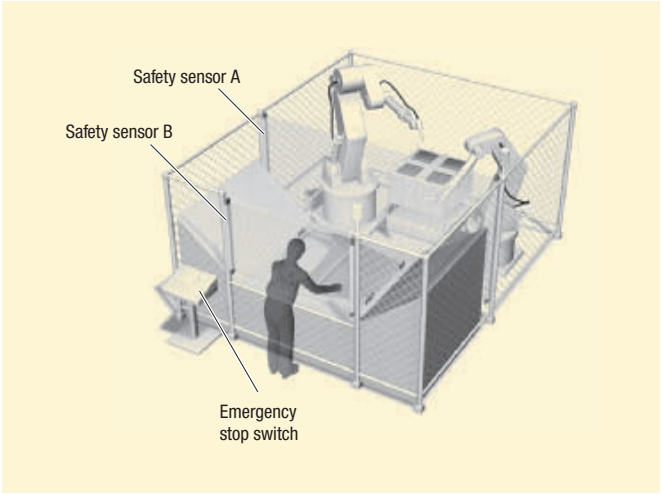
Application example

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

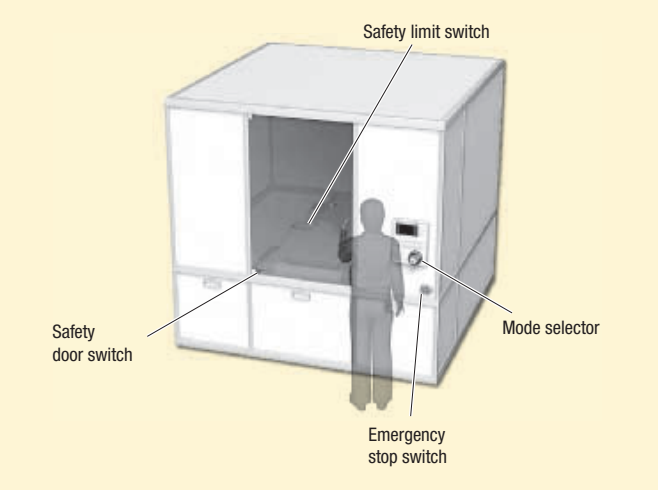
Worker has to do maintenance in this machine. While maintenance, it is necessary to move the machine in a limited way. The worker has to select automatic mode or manual mode manually by using the mode selector switch.

Operation steps:

1) Select maintenance mode by using the mode selector
2) Open the door to do the maintenance while the machine still is 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 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	G9SX-AD322-T15-RT
						Cage clamp terminals	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	G9SX-AD-322-T150-RT
						Cage clamp terminals	G9SX-AD-322-T150-RC
				0 to 15 sec in 16 steps	24 VDC	Screw terminals	G9SX-ADA-222-T15-RT
						Cage clamp terminals	G9SX-ADA-222-T15-RC
				0 to 150 sec in 16 steps	24 VDC	Screw terminals	G9SX-ADA-222-T150-RT
						Cage clamp terminals	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	G9SX-BC202-RT
					Cage clamp terminals	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	G9SX-EX401-RT
					Cage clamp terminals	G9SX-EX401-RC
–	4 PST-NO (contact)		Synchronized with G9S-X-AD - unit		Screw terminals	G9SX-EX041-T-RT
					Cage clamp terminals	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 Instantaneous	Auxiliary outputs *1	Power input Rated supply voltage	Terminal block type	Order code
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

Power input

Item	G9SX-SM032-_
Rated supply voltage	24 VDC

Inputs

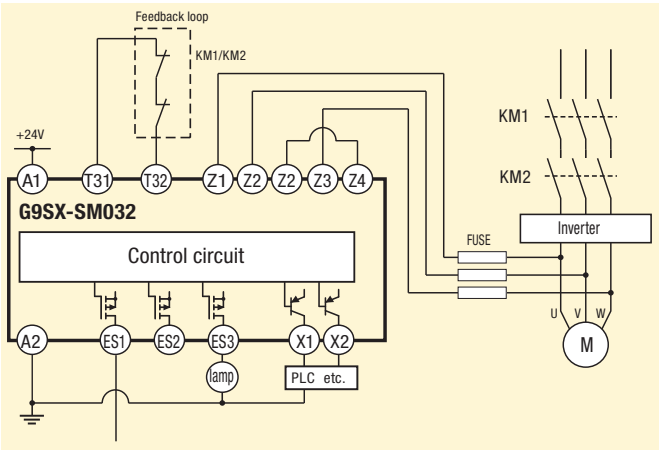
Item	G9SX-SM032-__
Input voltage	Standstill detection input (Z1-Z2/Z3-Z4) AC 415 Vrms + 10% max.
Maximum power supply frequency for AC induction motor	60 Hz max.
Internal impedance	Standstill detection input: approx, 660 kΩ EDM input: approx. 2.8 kΩ

Outputs

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

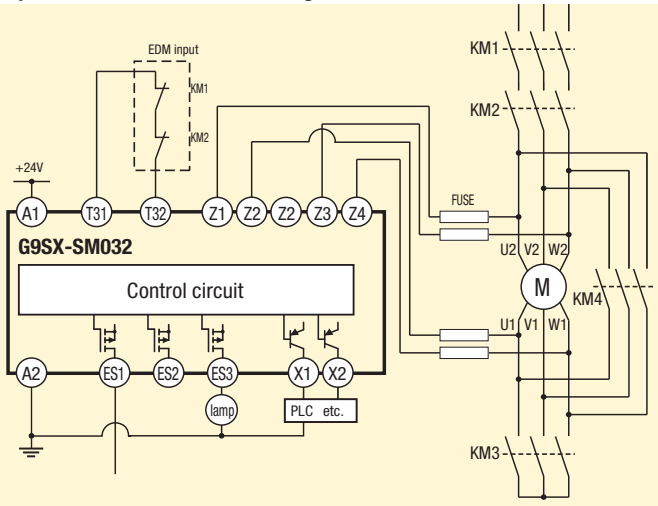
Application example

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 Instantaneous	Auxiliary outputs *2	Logical AND connection input	Rated voltage	Sensor power supply terminals	Terminal block type	Order code
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

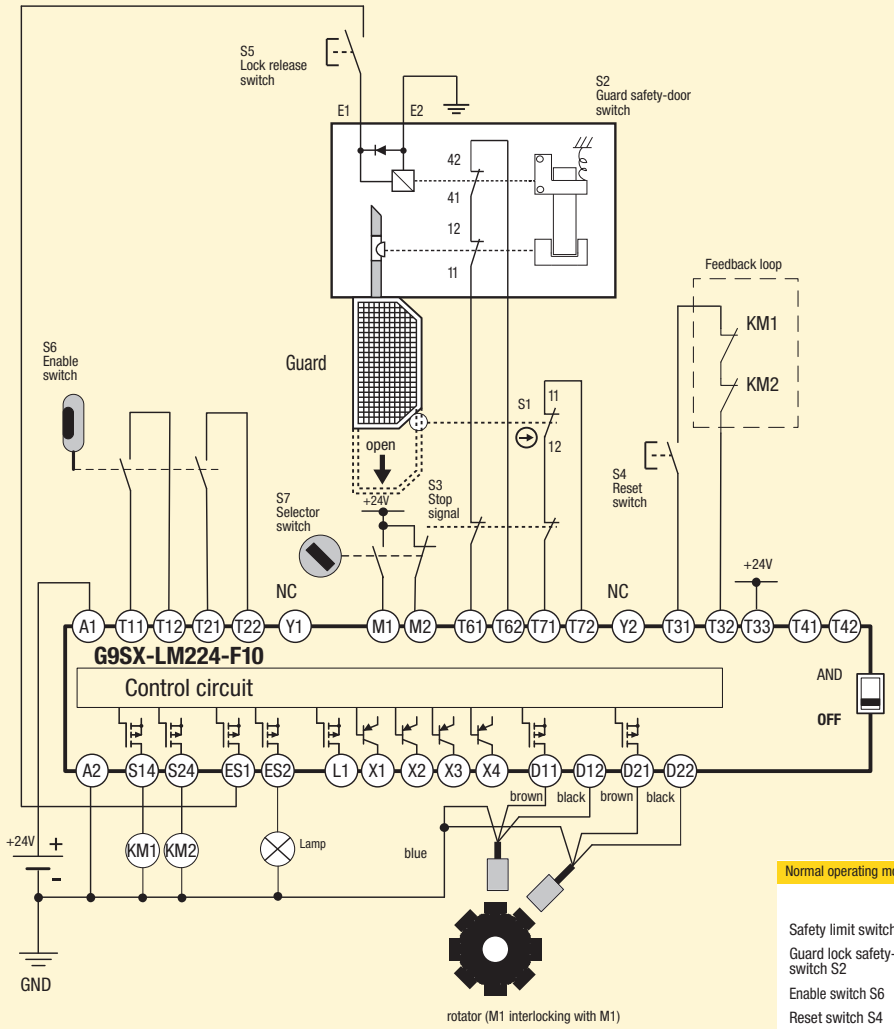
Item	G9SX-LM224-F10-_
Safety input	Operating voltage: 20.4 VDC to 26.4 VDC Internal impedance: approx. 2.8 kΩ
Feedback/reset input	
Mode selector input	
Rotation detection input	Operating voltage 20.4 VDC to 26.4 VDC Internal impedance: approx. 2.8 kΩ Input frequency: 1 kHz max.

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

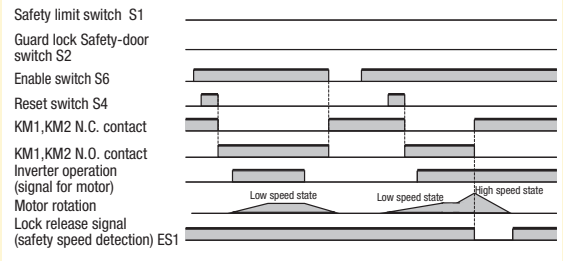


This example is corresponding to category 3 (EN954-1)

Devices	
S1	:Safety limit switch
S2	:Guard lock safety-door switch
S3	:Stop signal
S4	:Reset switch
S5	:Lock release switch
S6	:Enable switch
S7	:Selector switch
KM1, KM2	:Contactor
M1	:3-phase motor

Normal operating mode (M1:ON, M2:OFF) Timing chart

Maintenance mode (M1:OFF, M2:ON) Timing chart



Standalone safety controller

The G9SP safety controller provides all local safety based in- and outputs and controls the safety application.

- Three CPU-types to suit different applications
- Clear diagnosis and monitoring via Ethernet or serial connection
- Memory cassette for easy duplication of configuration
- Unique programming software to support easy design, verfication, standardization and reusage of the program.
- Certified according to PLe (EN ISO 13849-1) and SIL 3 (IEC 61508)

Ordering information

Appearance	Appearance description	Order code
Standalone safety controller	10 PNP safety inputs 4 PNP safety outputs 4 test outputs 4 PNP standard outputs	G9SP-N10S
	10 PNP safety inputs 16 PNP safety outputs 6 test outputs	G9SP-N10D
	20 PNP safety inputs 8 PNP safety outputs 6 test outputs	G9SP-N20S

Software

Appearance	Media	Applicable OS	Order code
G9SP configurator	Setup disk 1 license	Windows 2000 Windows XP Windows Vista	WS02-G9SP01-V1
	Setup disk 10 licenses		WS02-G9SP10-V1
	Setup disk 50 licenses		WS02-G9SP50-V1
	Setup disk Site license		WS02-G9SPXX-V1

Expansion units (standard I/O)

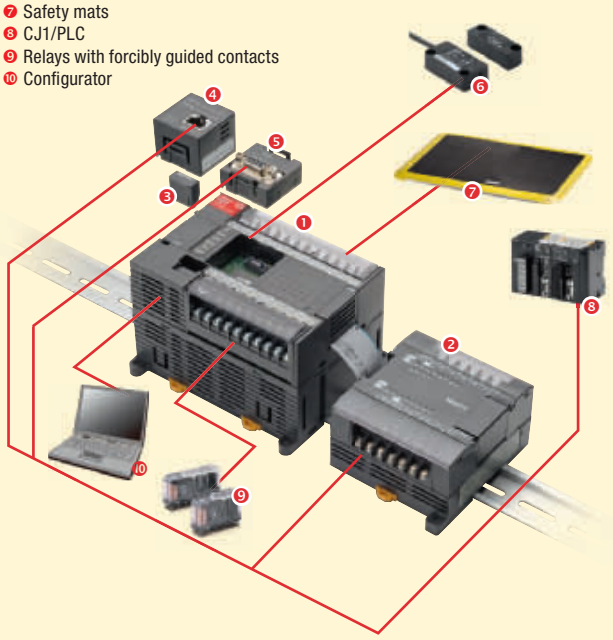
Appearance	Type	Number of I/O		Model
		In	Out	
Expansion I/O unit	Sinking	12	8 (solid state)	CP1W-20EDT
	Sourcing	12	8 (solid state)	CP1W-20EDT1
	Sinking	-	32 (solid state)	CP1W-32ET
	Sourcing	-	32 (solid state)	CP1W-32ET1
I/O Connecting cable, 80 cm long				CP1W-CN811

Option units

Appearance	Order code
RS-232 option board	CP1W-CIF01
Ethernet option board (Ver. 2.0 or later)	CP1W-CIF41
Memory cassette	CP1W-ME05M

G9SP configuration

❶ Safety controller G9SP
❷ Expansion I/O units
❸ Memory cassette
❹ Ethernet option board
❺ RS-232C option board
❻ Compact non-contact door switch
❼ Safety mats
❽ CJ1/PLC
❾ Relays with forcibly guided contacts
❿ Configurator



Specifications

General specifications

Power supply voltage		20.4 to 26.4 VDC (24 VDC -15% +10%)
Consumption current	G9SP-N10S	400 mA (V1: 300 mA, V2: 100 mA)
	G9SP-N10D	500 mA (V1: 300 mA, V2: 200 mA)
	G9SP-N20S	500 mA (V1: 400 mA, V2: 100 mA)
Mounting method		35-mm DIN track
Ambient operating temperature		0°C +55°C
Ambient storagetemperature		-20°C +75°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	6 mA

Safety output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.8 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	0.3 A max. per output*
Residual voltage	1.2 V max. between each output terminal and V1

Standard output specifications (G9SP-N10S)

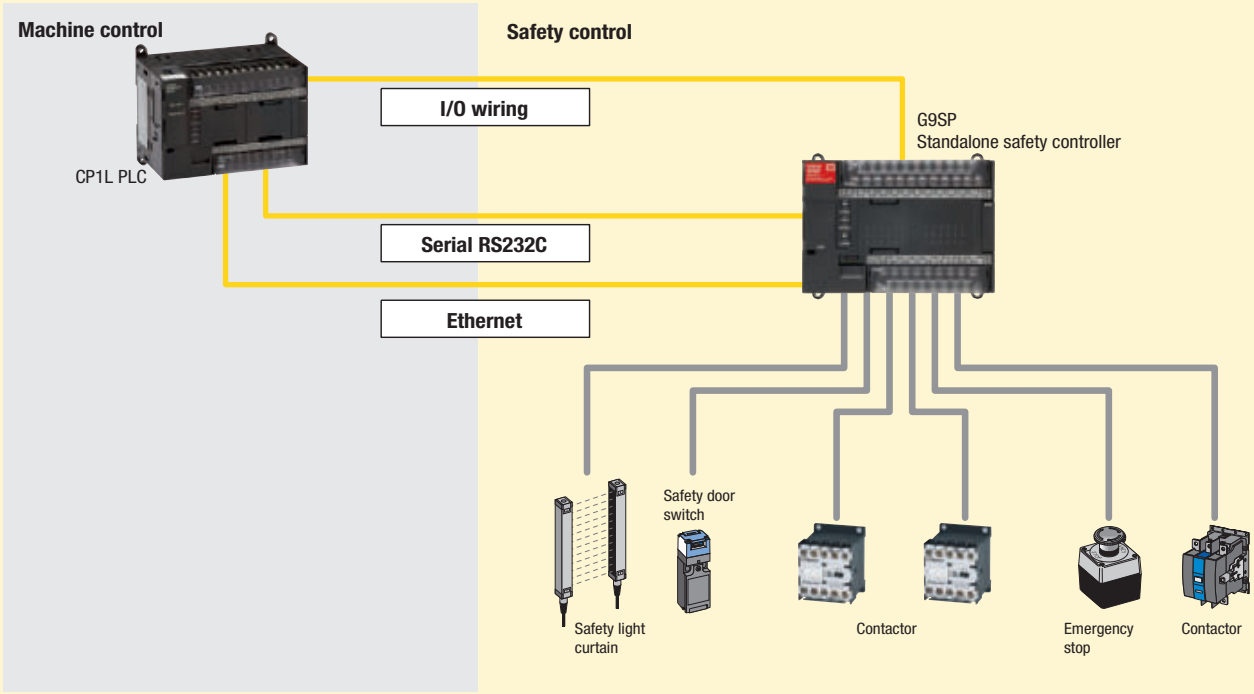
Output type	Sourcing outputs (PNP)
ON Residual voltage	1.5 V max. (between each output terminal and V2)
Rated output current	100 mA max.*

*For details on the rated output current, please refer to the user manual of G9SP.

Control system integration

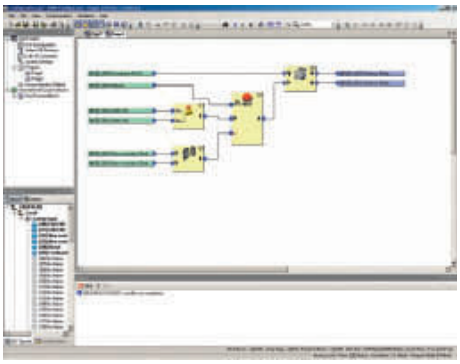
Safety - I/O-status becomes transparent

The standalone safety controller offers diagnosis information in 3 ways:
1) via parallel wiring
2) via serial RS232C interface (option)
3) via Ethernet interface (option).
Information of all safety in- and outputs on the standard control system ensure minimum downtime of the machine.

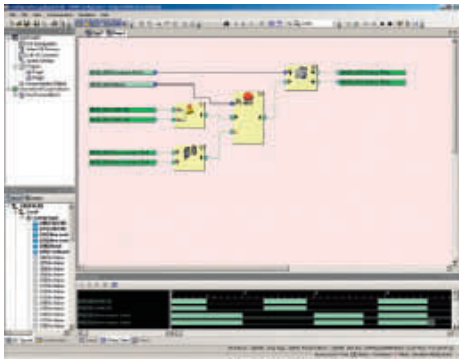


G9SP configuration tool

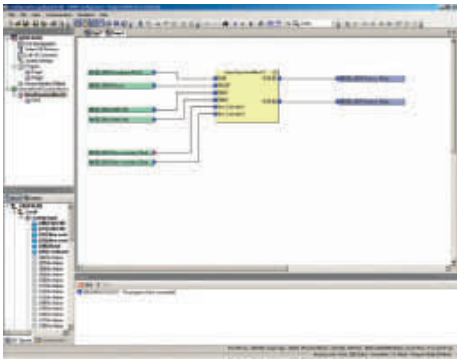
Easy setup and configuration is provided by a setup wizard supporting the hardware selection.



User-defined function blocks
Approved configuration elements such as a tested door monitoring solution can be easily stored as a user defined function block and re-used in future projects. This minimises the time it takes to create a new system configuration.



Integrated Simulator
All functions can be tested and simulated in the configuration tool, so there's no unnecessary additional workload for the engineer. In addition, on-line diagnosis reduces debug time to a minimum during implementation in the machine control system.



Knowledge-building
Existing configurations are the basis for new projects. The G9SP configuration tool supports re-use of existing and proven know-how in safety control, as well as user-defined function blocks. Which means no more repetition of effort, instead a growing library of safety solutions.

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 controler	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 (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

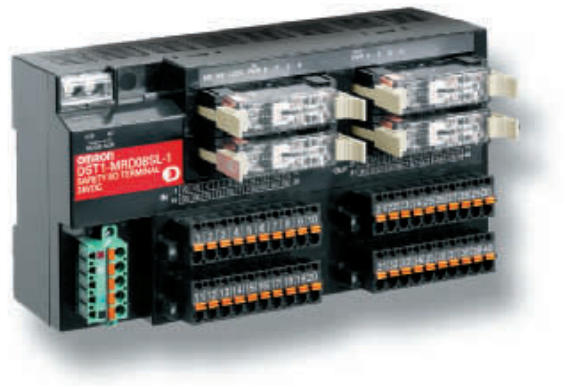
Input type	**Sinking inputs (PNP)**
ON voltage	11 VDC min. between each input terminal and G1
OFF voltage	5 VDC max. between each input terminal and G1
OFF current	1 mA max.
Input current	4.5 mA

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



DeviceNet safety I/O terminal block family

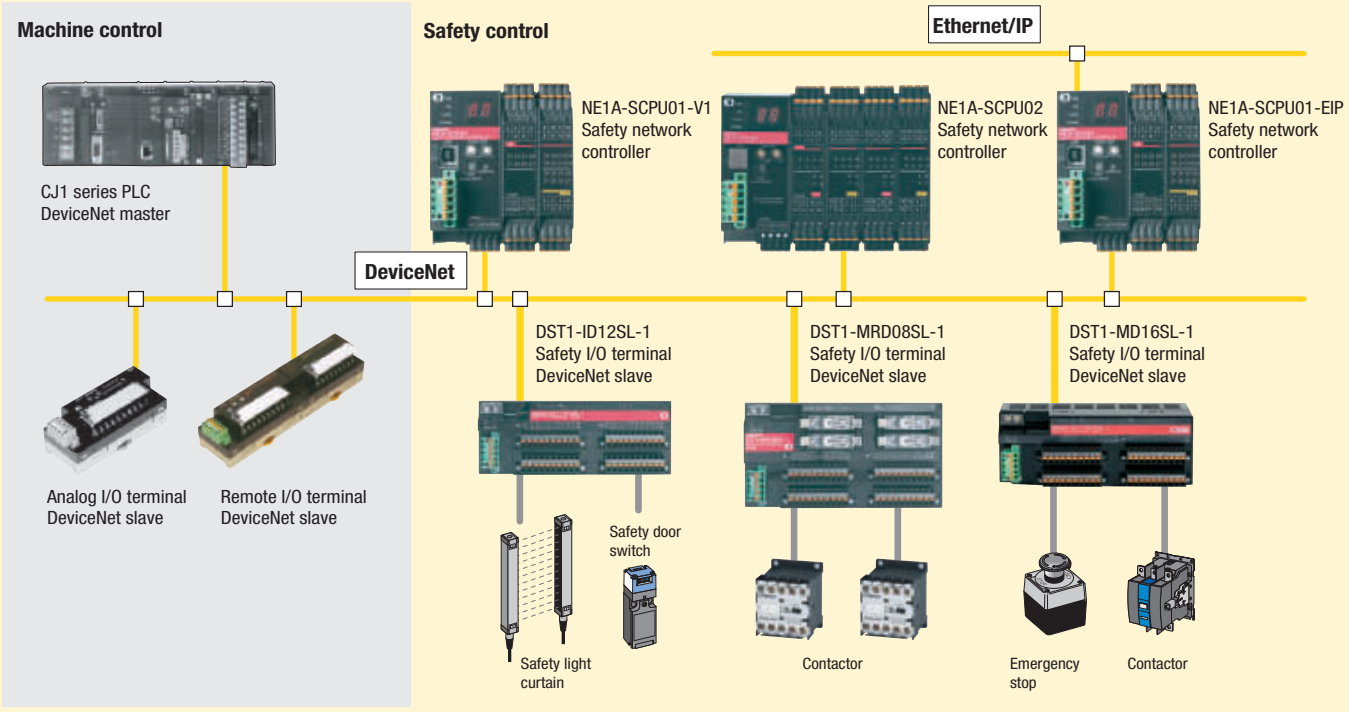
- Removable cage clamp terminals for easy installation
- Up to 12 inputs for safety signals
- 4 test pulse outputs to ensure crosstalk and short circuit detection
- Up to 8 safety outputs (solid state or relay)
- Status LEDs for advanced diagnostics
- Mixed mode operation (safety and standard) for all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

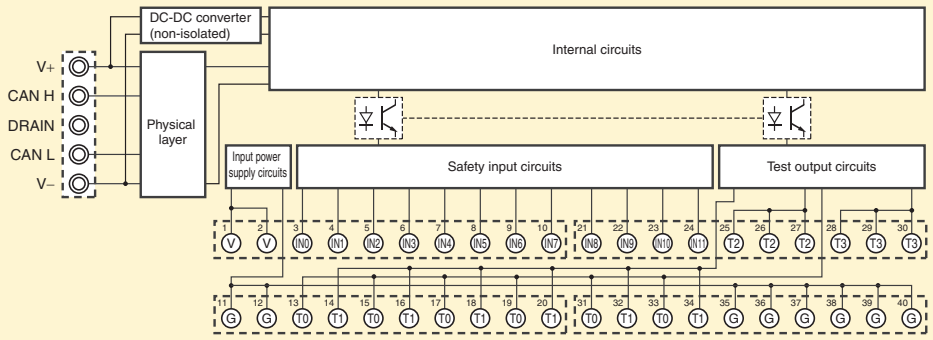
Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max. per point
Residual voltage	1.2 V max. between each output terminal and V0

Safety output specifications for relay outputs

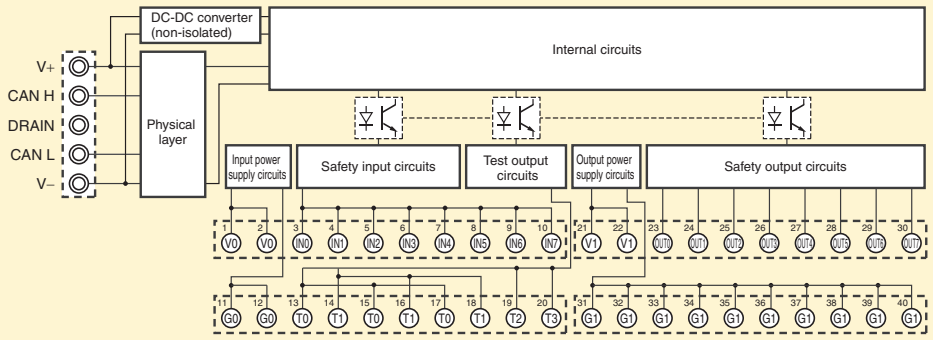
Relays	G7SA-2A2B, EN 50205 class A
Minimum applicable load	1 mA at 5 VDC
Rated load for a resistive load	240 VAC: 2 A, 30 VDC: 2 A
Rated load for an inductive load	2 A at 240 VAC (cosϕ= 0.3), 1 A at 24 VDC
Mechanical life expectancy	5,000,000 operations min. (switching frequency of 7,200 operations/h)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

Safety I/O terminals

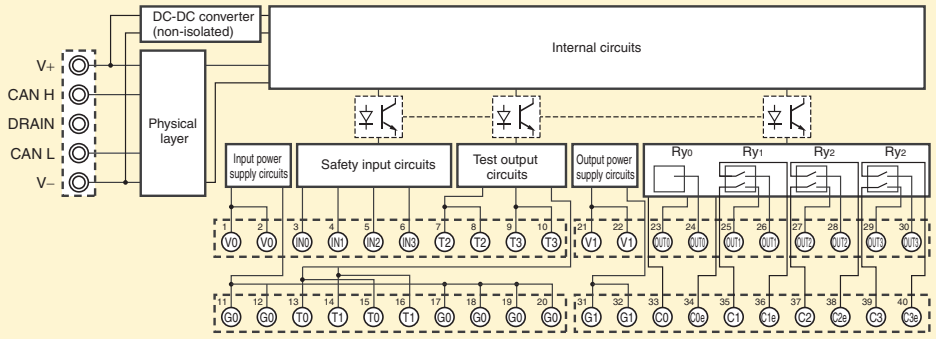
DST1-ID12SL-1



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	Yes	4 poles	24 VDC	P7SA-10F-ND
			6 poles		P7SA-14F-ND
Back-mounting	PCB terminals	No	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)
Rated load	6 A at 250 VAC, 6 A at 30 VDC
Rated carry current	6 A
Max. switching voltage	250 VAC, 125 VDC

Load	Resistive load (cosϕ = 1)
Max. switching current	6 A
Max. switching capacity (reference value)	1,500 VA, 180 W

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	1.500.000	Adopted EN ISO 13849-1 Annex C, B_{10d} fixed
ER6022	1.500.000	Adopted EN ISO 13849-1 Annex C, B_{10d} fixed. Additionally valid for all XER and stainless steel models
ER1022	1.500.000	Adopted EN ISO 13849-1 Annex C, B_{10d} fixed. Additionally valid for all XER models
ER1032	1.500.000	Adopted EN ISO 13849-1 Annex C, B_{10d} fixed. Additionally valid for all XER models

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	n.a.	n.a.	n.a.	n.a.	Adopted EN ISO 13849-1 Annex C, B_{10d} fixed
F3S-TGR-N_R	3.300.000	n.a.	n.a.	n.a.	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
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

Safe 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
G9SP-N10S	n.a.	e	4	n.a.	n.a.	PFHd = 7,80E-11
G9SP-N10D	n.a.	e	4	n.a.	n.a.	PFHd = 9,96E-11
G9SP-N20S	n.a.	e	4	n.a.	n.a.	PFHd = 8,55E-11
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

Safe actuators

Model name	B_{10d}	Remarks
G7SA*1	400.000	According to IEC 61810-1, valid for DC13, Inductive load Ie
G7SA*1	400.000	According to IEC 61810-1, valid for DC13, Inductive load Ie/2
G7SA*1	400.000	According to IEC 61810-1, valid for DC13, Inductive load Ie/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 in the Internet for updated information:
http://industrial.omron.eu/safety

Further information can be found in the SISTEMA library:
http://industrial.omron.eu/safety