Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

Flexible Safety Unit / Safety Guard Switching Unit
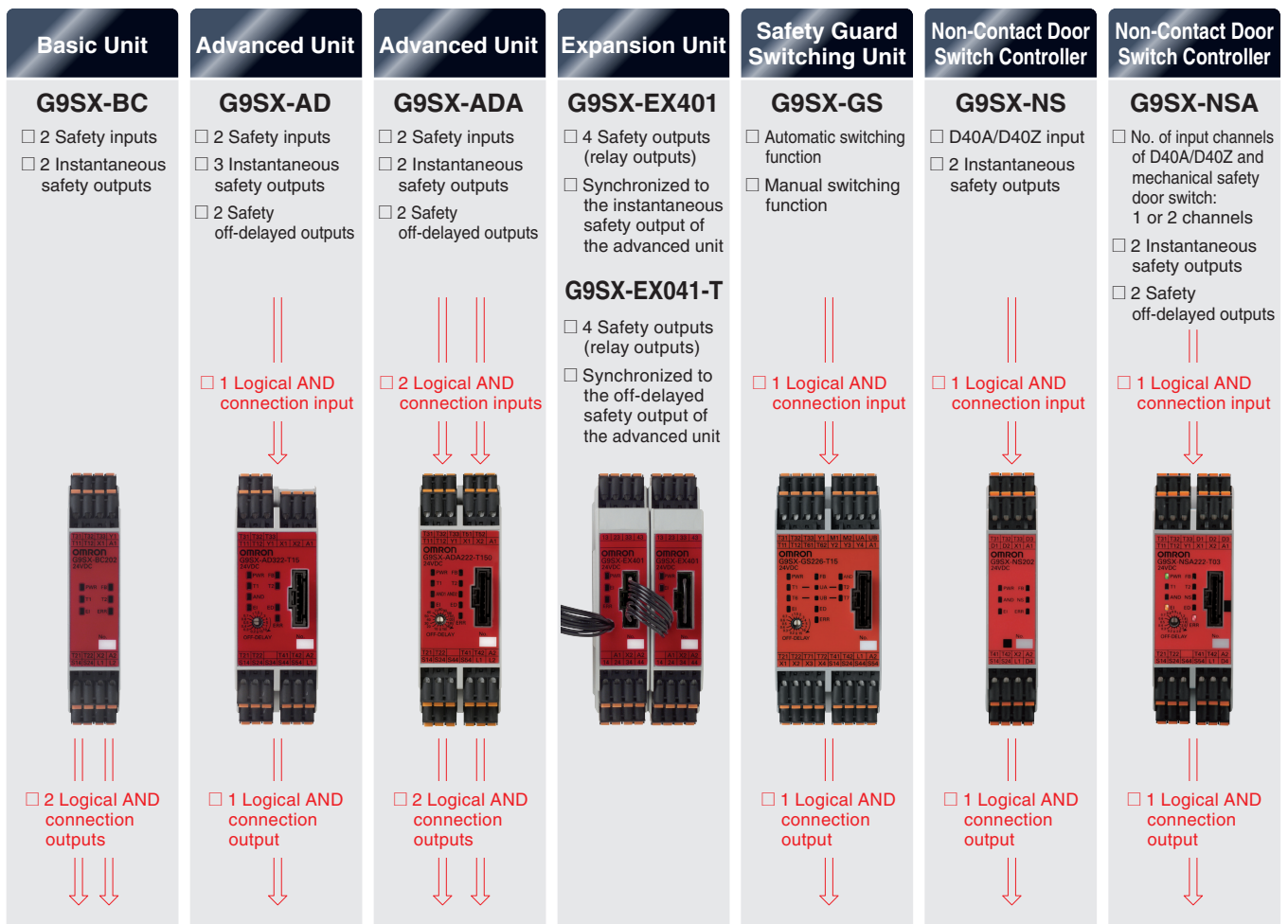# G9SX/G9SX-GS

CSM_G9SX_G9SX-GS_DS_E_8_2

Logical AND Function Adds Flexibility to Various Safety Circuits

⚠ Be sure to read the "*Safety Precautions*" on page 45.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Unit Variation

Basic Unit	Advanced Unit	Advanced Unit	Expansion Unit	Safety Guard Switching Unit	Non-Contact Door Switch Controller	Non-Contact Door Switch Controller
G9SX-BC	**G9SX-AD**	**G9SX-ADA**	**G9SX-EX401**	**G9SX-GS**	**G9SX-NS**	**G9SX-NSA**
☐ 2 Safety inputs ☐ 2 Instantaneous safety outputs	☐ 2 Safety inputs ☐ 3 Instantaneous safety outputs ☐ 2 Safety off-delayed outputs	☐ 2 Safety inputs ☐ 2 Instantaneous safety outputs ☐ 2 Safety off-delayed outputs	☐ 4 Safety outputs (relay outputs) ☐ Synchronized to the instantaneous safety output of the advanced unit **G9SX-EX041-T** ☐ 4 Safety outputs (relay outputs) ☐ Synchronized to the off-delayed safety output of the advanced unit	☐ Automatic switching function ☐ Manual switching function	☐ D40A/D40Z input ☐ 2 Instantaneous safety outputs	☐ No. of input channels of D40A/D40Z and mechanical safety door switch: 1 or 2 channels ☐ 2 Instantaneous safety outputs ☐ 2 Safety off-delayed outputs
	☐ 1 Logical AND connection input	☐ 2 Logical AND connection inputs		☐ 1 Logical AND connection input	☐ 1 Logical AND connection input	☐ 1 Logical AND connection input
☐ 2 Logical AND connection outputs	☐ 1 Logical AND connection output	☐ 2 Logical AND connection outputs		☐ 1 Logical AND connection output	☐ 1 Logical AND connection output	☐ 1 Logical AND connection output
For details on G9SX, refer to page 2 and the subsequent pages.				For details on G9SX-GS, refer to page 21 and the subsequent pages.	Note. For details on G9SX-NS/NSA, refer to D40A Compact Non-Contact Door Switch Catalog (Cat. No. C140).	

OMRON

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G9SX

Logical AND Function Adds Flexibility to I/O Expansion

- Facilitates partial or complete control system setup.
- Solid-state outputs (excluding Expansion Units).
- Detailed LED indications enable easy diagnosis.
- TÜV SÜD certification for compliance with IEC/EN61508 (SIL3), EN ISO13849-1 (PLe/Safety Category 4).
- Approved by UL and CSA.
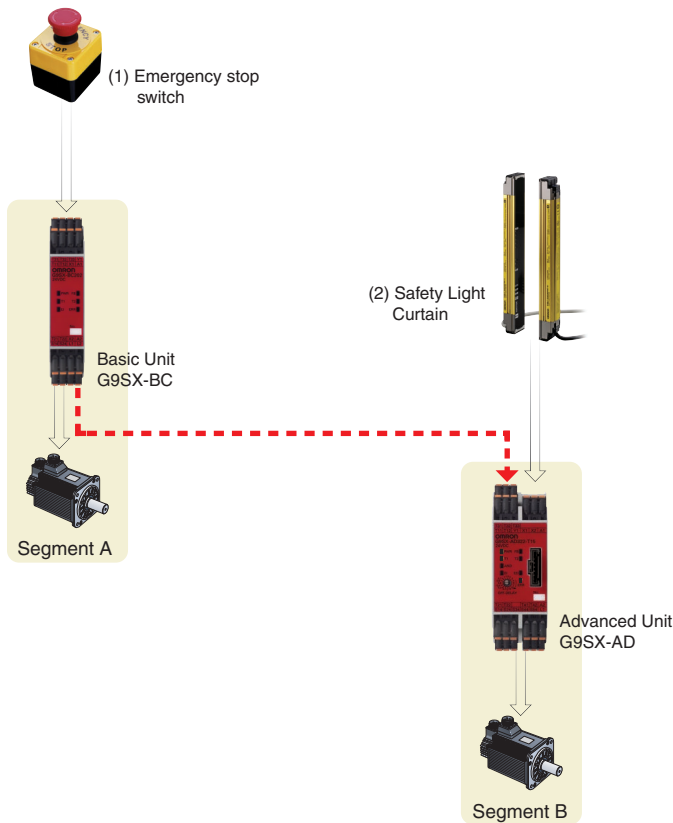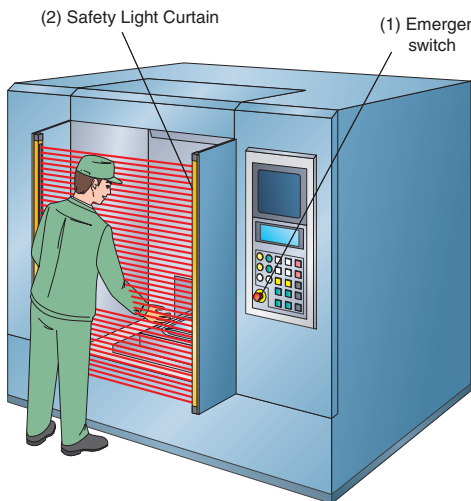
⚠ Be sure to read the "*Safety Precautions*" on page 45.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Application Examples

Parts Processing Machine

- The entire device stops when the emergency stop switch is pressed.
- Only the processing section stops when the Safety Light Curtain is interrupted.

(2) Safety Light Curtain

(1) Emergency stop switch

(1) Emergency stop switch

Basic Unit G9SX-BC

Segment A

(2) Safety Light Curtain

Advanced Unit G9SX-AD

Segment B

Operating Example

(1) The emergency stop switch is pressed.

Stop	**Stop**
Segment A	Segment B

(2) Safety Light Curtain is interrupted.

	Stop
Segment A	Segment B

Machining Center

- When the Emergency Stop Switch is pressed, the entire machine will stop.
- When a door is open, the corresponding part will not be activated.
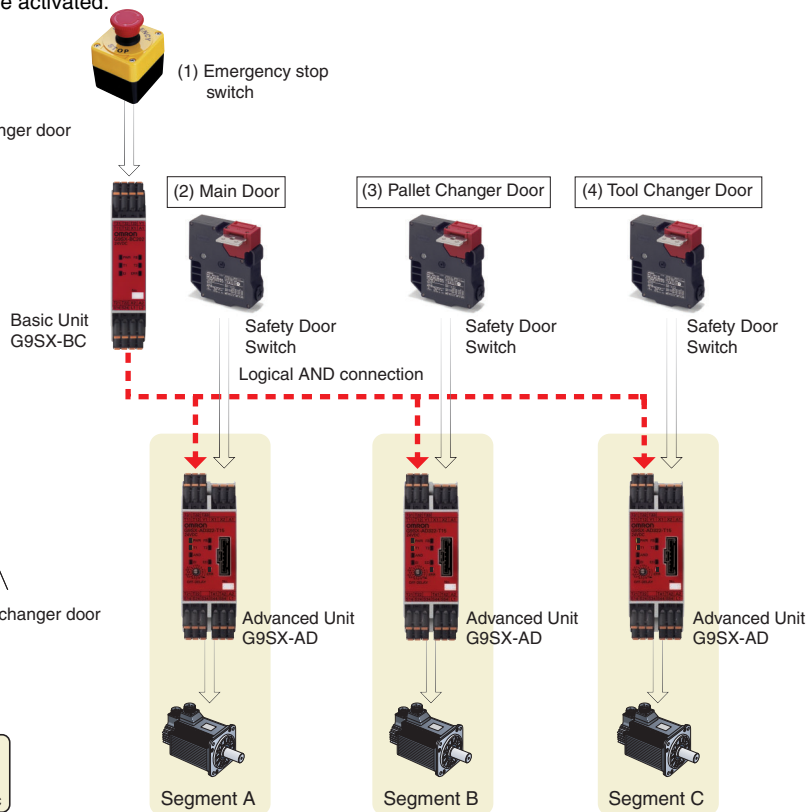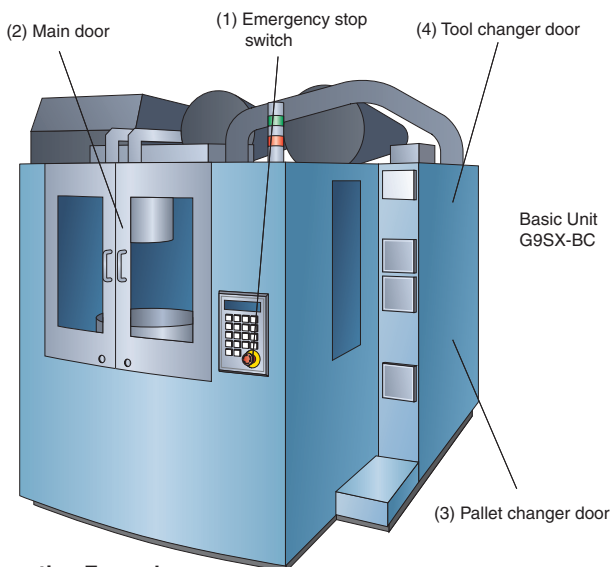
(2) Main door

(1) Emergency stop switch

(4) Tool changer door

(3) Pallet changer door

(1) Emergency stop switch

Basic Unit G9SX-BC

(2) Main Door — Safety Door Switch

(3) Pallet Changer Door — Safety Door Switch

(4) Tool Changer Door — Safety Door Switch

Logical AND connection

Advanced Unit G9SX-AD — Segment A

Advanced Unit G9SX-AD — Segment B

Advanced Unit G9SX-AD — Segment C

Operating Example

(1) The emergency stop switch is pressed.

Stop	**Stop**	**Stop**
Segment A	Segment B	Segment C

(2) The main door is opened.

Stop		
Segment A	Segment B	Segment C
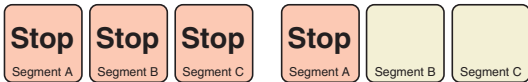
(3) The pallet changer door is opened.

	Stop	
Segment A	Segment B	Segment C

(4) The tool changer door is opened.

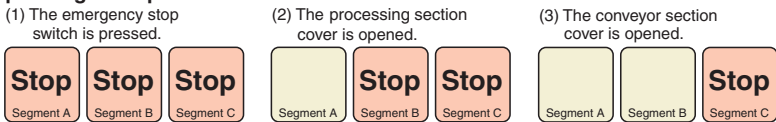|		**Stop**
Segment A	Segment B	Segment C
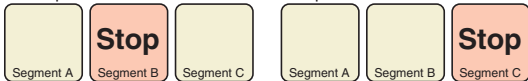
Semiconductor Manufacturing Equipment

- All of the equipment stops when the emergency stop switch is pressed.
- The processing section and conveyor section stop when the processing section cover is opened.
- Only the conveyor section stops when the conveyor section cover is opened.
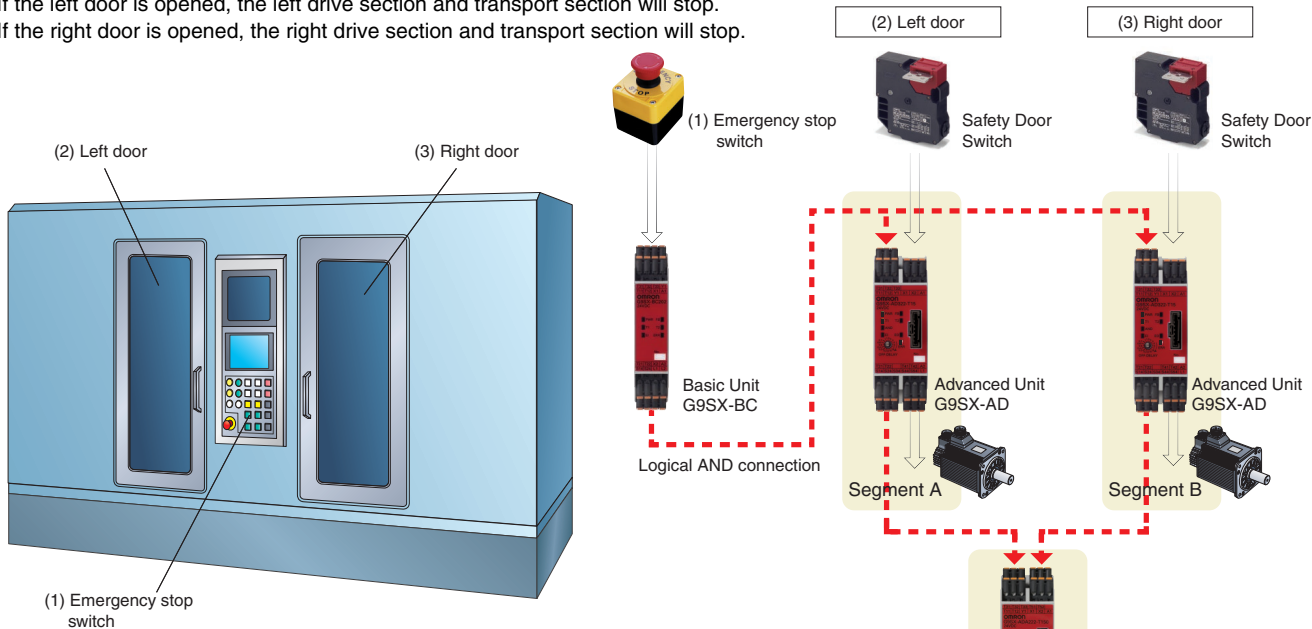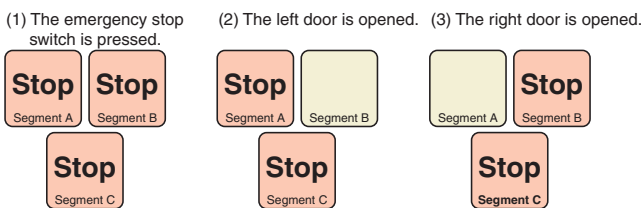
(3) Conveyor section cover

(2) Processing section cover

(1) Emergency stop switch

(2) Processing section cover — Safety Door Switch

(3) Conveyor section cover — Safety Door Switch

(1) Emergency stop switch

Basic Unit G9SX-BC — Logical AND connection — Segment A

Advanced Unit G9SX-AD — Logical AND connection — Segment B

Advanced Unit G9SX-AD — Segment C

Operating Example

(1) The emergency stop switch is pressed.

Stop	**Stop**	**Stop**
Segment A	Segment B	Segment C

(2) The processing section cover is opened.

	Stop	**Stop**
Segment A	Segment B	Segment C

(3) The conveyor section cover is opened.

		Stop
Segment A	Segment B	Segment C

Machine Tool

- When the Emergency Stop Switch is pressed, the entire machine will stop.
- If the left door is opened, the left drive section and transport section will stop.
- If the right door is opened, the right drive section and transport section will stop.

(2) Left door

(3) Right door

(1) Emergency stop switch

(2) Left door — Safety Door Switch

(3) Right door — Safety Door Switch

(1) Emergency stop switch

Basic Unit G9SX-BC — Logical AND connection

Advanced Unit G9SX-AD — Segment A

Advanced Unit G9SX-AD — Segment B

Advanced Unit G9SX-ADA — Segment C

Operating Example

(1) The emergency stop switch is pressed.

Stop	**Stop**
Segment A	Segment B

Stop
Segment C

(2) The left door is opened.

Stop	
Segment A	Segment B

Stop
Segment C

(3) The right door is opened.

	Stop
Segment A	Segment B

Stop
Segment C

Model Number Structure

Model Number Legend

Note: Please see "Ordering Information" below for the actual models that can be ordered.

G9SX-☐☐☐☐☐☐**-**☐☐☐**-**☐☐
　　　　1　**2 3 4**　**5**　　**6**

1. Functions
AD/ADA: Advanced Unit
BC: Basic Unit
EX: Expansion Unit
2. Output Configuration (Instantaneous Safety Outputs)
0: None
2: 2 outputs
3: 3 outputs
4: 4 outputs
3. Output Configuration (OFF-delayed Safety Outputs)
0: None
2: 2 outputs
4: 4 outputs

4. Output Configuration (Auxiliary Outputs)
1: 1 output
2: 2 outputs
5. Max. OFF-delay Time
Advanced Unit
T15: 15 s
T150: 150 s
Basic Unit
No indicator: No OFF delay
Expansion Unit
No indicator: No OFF delay
T: OFF delay
6. Terminal Block Type
RT: Screw terminals
RC: Spring-cage terminals

Ordering Information

List of Models

Advanced Unit

Safety outputs *3		Auxiliary outputs *4	Logical AND connection		No. of input channels	Max. OFF-delay time *1	Rated voltage	Terminal block type		Model
Instantaneous	OFF-delayed *2		Inputs	Outputs						
3 (Semiconductor)	2 (Semiconductor)	2 (Semiconductor)	1 (Semiconductor)	1 (Semiconductor)	1 or 2 channels	15 s	24 VDC	Screw terminals		G9SX-AD322-T15-RT
								Spring-cage terminals		G9SX-AD322-T15-RC
						150 s		Screw terminals		G9SX-AD322-T150-RT
								Spring-cage terminals		G9SX-AD322-T150-RC
2 (Semiconductor)			2 (Semiconductor)	2 (Semiconductor)		15 s		Screw terminals		G9SX-ADA222-T15-RT
								Spring-cage terminals		G9SX-ADA222-T15-RC
						150 s		Screw terminals		G9SX-ADA222-T150-RT
								Spring-cage terminals		G9SX-ADA222-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
*2. The OFF-delayed output becomes an instantaneous output by setting the OFF-delay time to 0 s.
*3. P channel MOS-FET output
*4. PNP transistor output

Basic Unit

Safety outputs *1		Auxiliary outputs *2	No. of input channels	Rated voltage	Terminal block type	Model
Instantaneous	OFF-delayed					
2	---	2 (Semiconductor)	1 or 2 channels	24 VDC	Screw terminals	G9SX-BC202-RT
					Spring-cage terminals	G9SX-BC202-RC

*1. P channel MOS-FET output
*2. PNP transistor output

Expansion Unit

Safety outputs		Auxiliary outputs *1	OFF-delay time	Rated voltage	Terminal block type	Model
Instantaneous	OFF-delayed					
4 PST-NO	---	1 (Semiconductor)	---	24 VDC	Screw terminals	G9SX-EX401-RT
					Spring-cage terminals	G9SX-EX401-RC
---	4 PST-NO		*2		Screw terminals	G9SX-EX041-T-RT
					Spring-cage terminals	G9SX-EX041-T-RC

*1. PNP transistor output
*2. The OFF-delay time is synchronized to the OFF-delay time setting in the connected Advanced Unit (G9SX-AD-☐/G9SX-ADA-☐).

Accessories

Terminal Block

Appearance *	Specifications	Applicable units	Model	Remarks
	Terminal Block with screw terminals (3-pin)	G9SX-AD-□ G9SX-ADA-□	**Y9S-03T1B-02A**	Two Terminal Blocks (black) with screw terminals, and a set of six code marks to prevent erroneous insertion.
	Terminal Block with screw terminals (4-pin)	G9SX-BC-□ G9SX-EX-□	**Y9S-04T1B-02A**	Two Terminal Blocks (black) with screw terminals, and a set of six code marks to prevent erroneous insertion.
	Terminal Block with spring-cage terminals (3-pin)	G9SX-AD-□ G9SX-ADA-□	**Y9S-03C1B-02A**	Two Terminal Blocks (black) with spring-cage terminals, and a set of six code marks to prevent erroneous insertion.
	Terminal Block with spring-cage terminals (4-pin)	G9SX-BC-□ G9SX-EX-□	**Y9S-04C1B-02A**	Two Terminal Blocks (black) with spring-cage terminals, and a set of six code marks to prevent erroneous insertion.

Note: The G9SX main unit comes with a terminal block as standard equipment. The accessories shown here can be ordered as a replacement.
* The illustrations show 3-pin types

Specifications

Ratings

Power input

Item Model	G9SX-AD322-□/ADA222-□	G9SX-BC202-□	G9SX-EX-□
Rated supply voltage	24 VDC		
Operating voltage range	−15% to 10% of rated supply voltage		
Rated power consumption *	4 W max.	3 W max.	2 W max.

* Power consumption of loads not included.

Inputs

Item Model	G9SX-AD322-□/ADA222-□	G9SX-BC202-□
Safety input	20.4 VDC to 26.4 VDC, internal impedance: approx. 2.8 kΩ *	
Feedback/reset input		

* Provide a current equal to or higher than that of the minimum applicable load of the connected input control device.

Outputs

Item Model	G9SX-AD322-□/ADA222-□	G9SX-BC202-□
Instantaneous safety output *1 **OFF-delayed safety output *1**	P channel MOS-FET output Load current: 0.8 A DC max./output *2 *3	P channel MOS-FET output Load current: 0.8 A DC max./output *2 *3
Auxiliary output	PNP transistor output Load current: 100 mA max./output	

*1. While safety outputs are in the ON state, the following signal sequence is output continuously for diagnosis. When using the safety outputs as input signals to control devices (i.e. Programmable Controllers), consider the OFF pulse shown below.
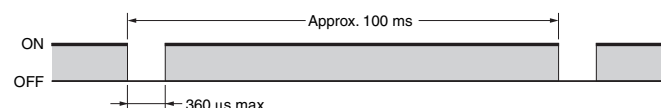
*2. The following derating is required when Units are mounted side-by-side.
G9SX-AD322-□/G9SX-ADA222-□/G9SX-BC202-□: 0.4 A max. load current/output
*3. A load current below 1 A DC/output can be used when the following outputs are used.
G9SX-AD322-□/G9SX-ADA222-□: 2 outputs or less
G9SX-BC202-□: 1 output

Expansion Unit Ratings

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

Characteristics

Item	Model	G9SX-AD322-□/ADA222-□	G9SX-BC202-□	G9SX-EX-□
Overvoltage category (IEC/EN 60664-1)		II		II (Safety relay outputs 13 to 43 and 14 to 44: III)
Operating time (OFF to ON state) *1		50 ms max. (Safety input: ON) *2 100 ms max. (Logical AND connection input: ON) *3	50 ms max. (Safety input: ON)	30 ms max. *4
Response time (ON to OFF state) *1		15 ms max.		10 ms max. *4
Accuracy of OFF-delay time *5		Within ± 5% of the set value	---	Within ± 5% of the set value
Input	Input current	10 mA min.		---
	ON voltage	11 V min.		---
	OFF voltage	5 V min.		---
	OFF current	1 mA max.		---
	Maximum wiring length	100 m max. (External connection impedance: 100 Ω max. and 10 nF max.)		---
	Reset input time	100 ms min.		---
Output	ON-state residual voltage	3.0 V max. (safety output, auxiliary output)		
	OFF-state leakage current	0.1 mA max. (safety output, auxiliary output)		
Insulation resistance	Between logical AND connection terminals, and power supply input terminals and other input and output terminals connected together	20 MΩ min. (at 100 VDC)	---	---
	Between all terminals connected together and DIN track		20 MΩ min. (at 100 VDC)	100 MΩ min. (at 500 VDC)
Dielectric strength	Between logical AND connection terminals, and power supply input terminals and other input and output terminals connected together	500 VAC for 1 min	---	---
	Between all terminals connected together and DIN track		500 VAC for 1 min	1,200 VAC for 1 min
	Between different poles of outputs	---	---	
	Between safety relay outputs connected together and other terminals connected together			2,200 VAC for 1 min
Vibration resistance		Frequency: 10 to 55 to 10 Hz, 0.375-mm single amplitude (0.75-mm double amplitude)		
Shock resistance	Destruction	300 m/s^2		
	Malfunction	100 m/s^2		
Durability	Electrical	---		100,000 cycles min. (rated load, switching frequency: 1,800 cycles/hour)
	Mechanical	---		5,000,000 cycles min. (switching frequency: 7,200 cycles/hour)
Ambient operating temperature		−10 to 55°C (with no icing or condensation)		
Ambient operating humidity		25% to 85%		
Terminal tightening torque *6		0.5 N·m		
Weight		Approx. 200 g	Approx. 125 g	Approx. 165 g

***1.** When two or more Units are connected by logical AND, the operating time and response time are the sum total of the operating times and response times, respectively, of all the Units connected by logical AND.
***2.** Represents the operating time when the safety input turns ON with all other conditions set.
***3.** Represents the operating time when the logical AND input turns ON with all other conditions set.
***4.** This does not include the operating time or response time of Advanced Units that are connected.
***5.** This does not include the operating time or response time of internal relays in the G9SX-EX-□.
***6.** For the G9SX-□-RT (with screw terminals) only.

Logical AND Connection

Item	Model	G9SX-AD322-□/ADA222-□	G9SX-BC202-□	G9SX-EX-□
Number of Units connected per logical AND output		4 Units max.		---
Total number of Units connected by logical AND *1		20 Units max.		---
Number of Units connected in series by logical AND		5 Units max.		---
Max. number of Expansion Units connected *2		---		5 Units max.
Maximum cable length for logical AND input		100 m max./output		---

Note: See Logical AND Connection Combinations below for details.
*1. The number of G9SX-EX401-□ Expansion Units or G9SX-EX041-T-□ Expansion Units (OFF-delayed Model) not included.
*2. G9SX-EX401-□ Expansion Units and G9SX-EX041-T-□ Expansion Units (OFF-delayed Model) can be mixed.

Logical AND Connection Combinations

1. One logical AND connection output from an Advanced Unit G9SX-AD can be logical AND connected to up to four Advanced Units.
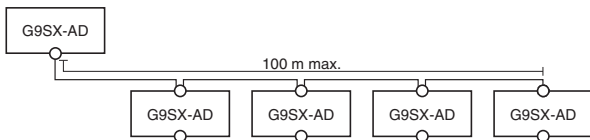
2. Two logical AND outputs from a Basic Unit G9SX-BC can be logical AND connected to up to eight Advanced Units.
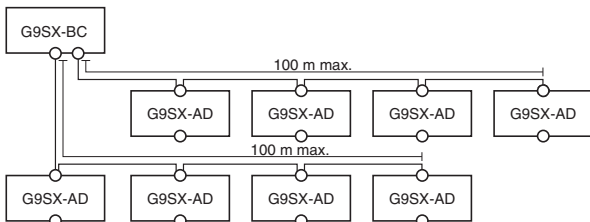
3. Two logical AND outputs from an Advanced Unit G9SX-ADA can be logical AND connected to up to eight Advanced Units.
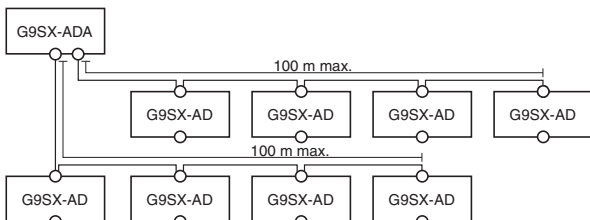
4. Any Advanced Unit with logical AND input can be logical AND connected to Advanced Units on up to five tiers.
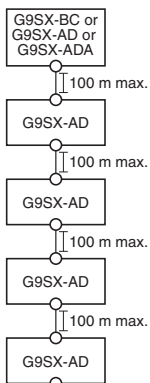
5. Two logical AND connection outputs, each from different Advanced/Basic Units, can be logical AND connected to a single G9SX-ADA Unit.
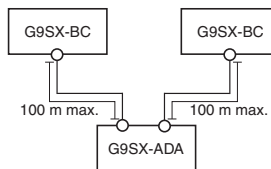
6. The largest possible system configuration contains a total of 20 Advanced and Basic Units. In this configuration, each Advanced Unit can have up to five Expansion Units.

Note 1: Basic Unit = G9SX-BC
Advanced Unit = G9SX-AD or G9SX-ADA
Note 2: The G9SX-AD322-T-□ has only one logical AND output.

Number of Units connected per logical AND output: 4 Units max.

Number of Units connected in series by logical AND: 5 Units max.

Total number of Units connected by logical AND: 20 Units max.
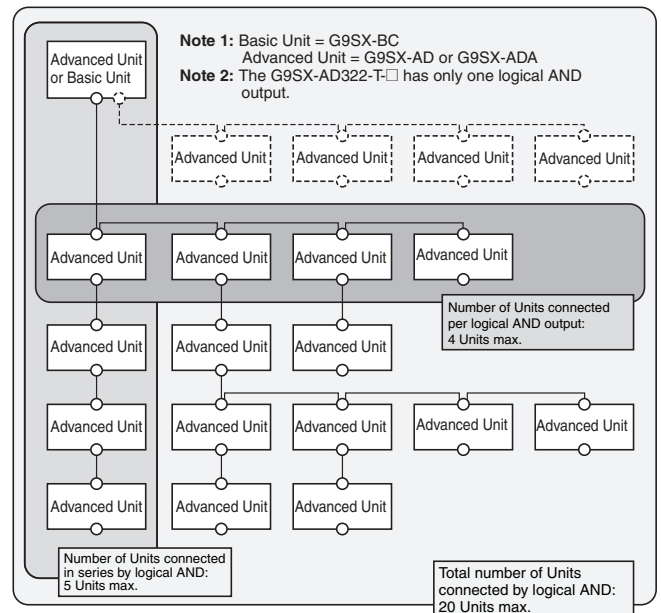
Response Time and Operating Time

The following table shows the response time for two or more Units that are logical AND connected.

Item / Tier	Block flow diagram	Max. response time *1 (not including Expansion Units)	Max. response time *2 (including Expansion Units)	Max. operating time *3 (not including Expansion Units)	Max. operating time *4 (including Expansion Units)
First tier	Advanced Unit or Basic Unit	15 ms	25 ms	50 ms	80 ms
Second tier	Advanced Unit	30 ms	40 ms	150 ms	180 ms
Third tier	Advanced Unit	45 ms	55 ms	250 ms	280 ms
Fourth tier	Advanced Unit	60 ms	70 ms	350 ms	380 ms
Fifth tier	Advanced Unit	75 ms	85 ms	450 ms	480 ms

*1. The maximum response time (not including Expansion Units) in this block flow diagram is the time it takes the output from the Unit on the lowest tier to switch from ON to OFF after the input to the Unit on the highest tier switches from ON to OFF.

*2. The maximum response time (including Expansion Units) in this block flow diagram is the time it takes the output from the Expansion Unit connected to the Unit on the lowest tier to switch from ON to OFF after the input to the Unit on the highest tier switches from ON to OFF.

*3. The maximum operating time (not including Expansion Units) in this block flow diagram is the time it takes the output from the Unit on the lowest tier to switch from OFF to ON after the input to the Unit on the highest tier switches from OFF to ON.

*4. The maximum operating time (including Expansion Units) in this block flow diagram is the time it takes the output from the Expansion Unit connected to the Unit on the lowest tier to switch from OFF to ON after the input to the Unit on the highest tier switches from OFF to ON.

Connections

Internal Connection

G9SX-AD322-□ (Advanced Unit)
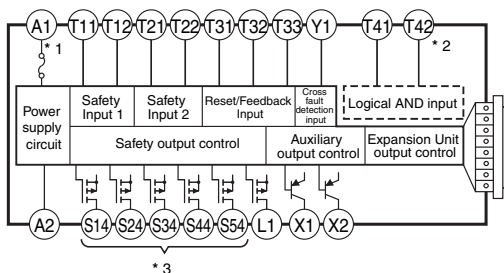
*1. Internal power supply circuit is not isolated.
*2. Logical AND input is isolated.
*3. Outputs S14 to S54 are internally redundant.

G9SX-ADA222-□ (Advanced Unit)
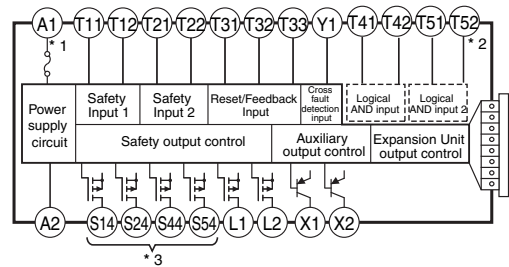
*1. Internal power supply circuit is not isolated.
*2. Logical AND inputs are isolated.
*3. Outputs S14 to S54 are internally redundant.

G9SX-BC202-□ (Basic Unit)
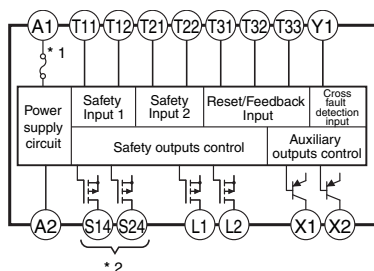
*1. Internal power supply circuit is not isolated.
*2. Outputs S14 and S24 are internally redundant.

G9SX-EX401-□/G9SX-EX041-T-□ (Expansion Unit / Expansion Unit OFF-delayed model)
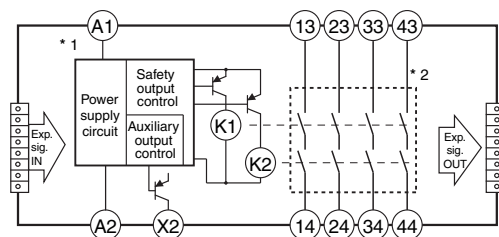

*1. Internal power supply circuit is not isolated.
*2. Relay outputs are isolated.

Wiring of Inputs and Outputs

Signal name	Terminal name	Description of operation	Wiring	
Power supply input	A1, A2	The input terminals for power supply. Connect the power source to the A1 and A2 terminals.	Connect the power supply plus (24 VDC) to the A1 terminal. Connect the power supply minus (GND) to the A2 terminal.	
Safety input 1	T11, T12	To set the safety outputs in the ON state, the ON state signals must be input to both safety input 1 and safety input 2. Otherwise the safety outputs cannot be in the ON state.	Using 1 safety input channel	
Safety input 2	T21, T22		Using 2 safety input channels (cross fault detection OFF)	
			Using 2 safety input channels (cross fault detection ON)	
Feedback/reset input	T31, T32, T33	To set the safety outputs in the ON state, the ON state signal must be input to T33. Otherwise the safety outputs cannot be in the ON state.	Auto reset	
		To set the safety outputs in the ON state, the signal input to T32 must change from the OFF state to the ON state, and then to the OFF state. Otherwise the safety outputs cannot be in the ON state.	Manual reset	
Logical AND connection input	T41, T42, T51, T52	A logical AND connection means that one unit (Unit A) outputs a safety signal "a" to a subsequent unit (Unit B) and Unit B calculates the logical multiplication (AND) (i.e., outputs the AND) of the signal "a" and safety signal "b", which is input to Unit B. Thereby the logic of the safety output of Unit B is "a" AND "b". (An AND of inputs "a" and "b" is output.) To set the safety outputs of the subsequent Unit in the ON state, its logical AND connection preset switch must be set to AND (enable) and the HIGH state signal must be input to T41 of the subsequent unit.		
Cross fault detection input	Y1	Selects the mode for the failure detecting (cross fault detecting) function for the safety inputs of G9SX corresponding to the connection of the cross fault detection input.	Y1 connection varies depending on whether T11 and T21 are used or not. Refer to wiring of the safety input 1 and 2.	
Instantaneous safety output	S14, S24, S34	Turns ON/OFF according to the state of the safety inputs, feedback/reset inputs, and logical AND connection inputs. During OFF-delay state, the Instantaneous safety outputs are not able to turn ON.	Keep these outputs open when not used.	
OFF-delayed safety output	S44, S54	OFF-delayed safety outputs. The OFF-delay time is set by the OFF-delay preset switch. When the delay time is set to zero, these outputs can be used as instantaneous safety outputs.	Keep these outputs open when not used.	
Logical AND connection output	L1, L2	Outputs a signal of the same logic as the instantaneous safety outputs.	Keep these outputs open when not used.	
Auxiliary monitor output	X1	Outputs a signal of the same logic as the instantaneous safety outputs	Keep these outputs open when not used.	
Auxiliary error output	X2	Outputs when the error indicator is lit or blinking.	Keep these outputs open when not used.	

Connecting Safety Sensors and the G9SX

1. When connecting safety sensors to the G9SX, the Y1 terminal must be connected to 24 VDC.
   The G9SX will detect a connection error, if the Y1 terminal is open.
2. In many cases, safety sensor outputs include an OFF-shot pulse for self diagnosis.
   The following condition of test pulse is applicable as safety inputs for the G9SX.
   • OFF-shot pulse width of the sensor, during the ON-state: 500 μs max.

500 μs max.
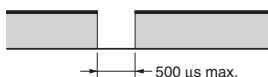
Operation

Functions

Logical AND Connection

● Example with G9SX-AD322-□

The logical AND connection means that the Basic Unit (or Advanced Unit) outputs a safety signal "a" to an Advanced Unit, and the Advanced Unit calculates the logical multiplication (AND) of the safety signal "a" and safety signal "b." The safety output of an Advanced Unit with the logical AND connection shown in the following diagram is "a" AND "b".
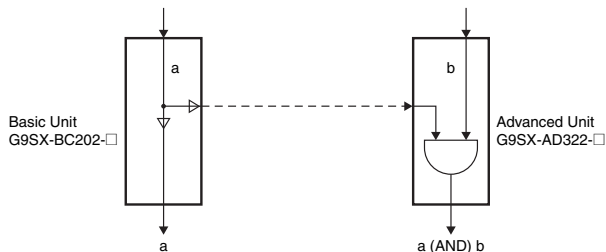

This is illustrated using the application in the following diagram as an example. The equipment here has two hazards identified as Robot 1 and Robot 2, and it is equipped with a safety door switch and an emergency stop switch. You may have overall control where both Robot 1 and Robot 2 are stopped every time the emergency stop switch is pressed. You may also have partial control where only Robot 1, which is closest to the door, is stopped when the door is opened. In that case, Robot 2 will continue to operate.

The actual situation using a G9SX for this application is shown in this example.

(Note: The logical AND setting on the Advanced Unit must be set to AND (enabled).)
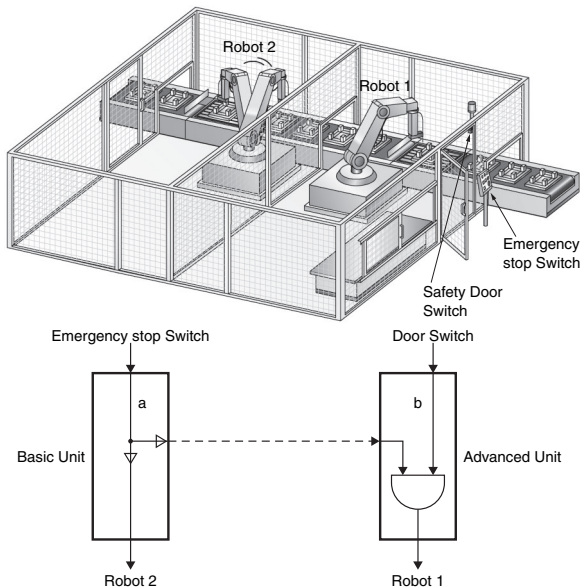
● Example with G9SX-ADA222-□

The Advanced Unit G9SX-ADA222-□ is equipped with two logical AND connection inputs. Therefore, it is capable of receiving two safety signals, each from different Advanced or Basic Units. As shown in the diagram below, the output of Advanced Unit G9SX-ADA222-□ will be "a" AND "b" AND "c".
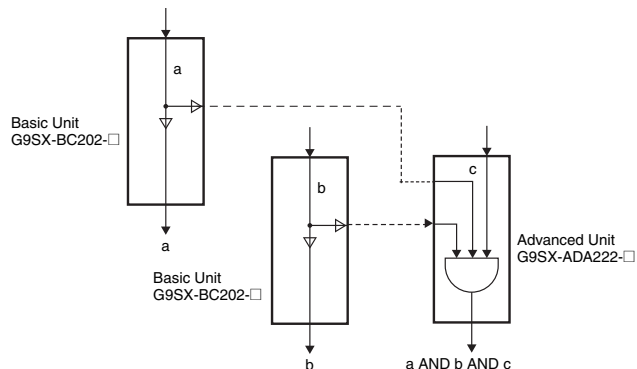
Connecting Expansion Units

- The G9SX-EX and G9SX-EX-T Expansion Units can be connected to an Advanced Unit (G9SX-AD322-□/G9SX-ADA222-□) to increase the number of safety outputs. (They cannot be connected to a Basic Unit.)
- A maximum of five Expansion Units can be connected to one Advanced Unit. This may be a combination of G9SX-EX Instantaneous types and G9SX-EX-T OFF-delayed types.
- Remove the terminating connector from the receptacle on the Advanced Unit and insert the Expansion Unit cable connector into the receptacle. Insert the terminating connector into the receptacle on the Expansion Unit at the very end (rightmost).
- When Expansion Units are connected to an Advanced Unit, make sure that power is supplied to every Expansion Unit. (Refer to the following diagram for actual Expansion Unit connection.)
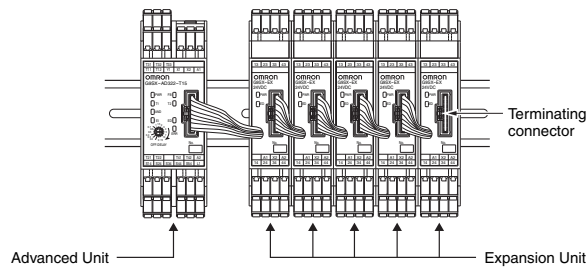
Setting Procedure

1.Cross Fault Detection (Advanced Unit/Basic Unit)

Set the cross fault detection mode for safety inputs by shorting Y1 to 24 V or leaving it open. When cross fault detection is set to ON, short-circuit failures are detected between safety inputs T11-T12 and T21-22. When a cross fault is detected, the following will occur.

1. The safety outputs and logical AND outputs lock out.
2. The LED error indicator is lit.
3. The error output (auxiliary output) turns ON.

Cross fault detection	Wiring	
OFF	Using 1 safety input channel	
	Using 2 safety input channels	
ON		

2.Reset Mode (Advanced Unit/Basic Unit)

Set the reset mode using feedback/reset input terminals T31, T32, and T33.

Auto reset mode is selected when terminal T32 is shorted to 24 V and manual reset mode is selected when terminal T33 is shorted to 24 V.
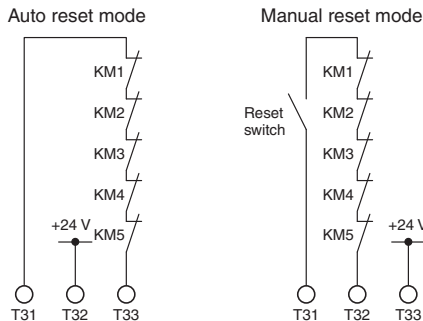
3.Setting Logical AND Connection (Advanced Unit)

When connecting two or more Advanced Units (or Basic Units) by logical AND connection, set the logical AND connection preset switch on the Advanced Unit that is on the input side (Advanced Unit G9SX-AD322 in the following diagram) to AND.

The default setting of the logical AND connection preset switch is set to OFF.

(1) Using G9SX-AD322 on the Input Side
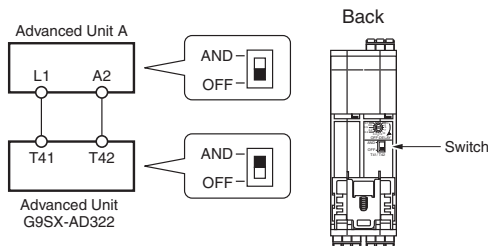
Note: 1. A setting error will occur and Advanced Unit G9SX-AD322 will lock out if the logical AND setting switch on the Unit is set to OFF.
2. Set the logical AND setting switch on Advanced Unit A to OFF or an error will occur.
3. A logical AND input cannot be sent to a Basic Unit.

(2) Using G9SX-ADA222 on the Input Side
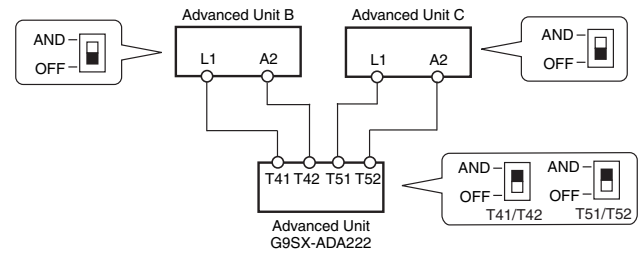
Note: 1. When not connecting Advanced Unit B, leave terminals T41 and T42 of the G9SX-ADA222 Advanced Unit open, and set the logical AND setting switch T41/T42 to OFF.
2. When not connecting Advanced Unit C, leave terminals T51 and T52 of the G9SX-ADA222 Advanced Unit open, and set the logical AND setting switch T51/T52 to OFF.

The following table shows the relationship between the logical ON setting switches and the conditions for safety outputs turning ON.

| Logical AND connection preset switch		Conditions for safety outputs turning ON		
T41/T42	T51/T52	Safety input	Logic input 1	Logic input 2
OFF	OFF	ON	OFF	OFF
AND	OFF	ON	ON	OFF
OFF	AND	ON	OFF	ON
AND	AND	ON	ON	ON

4.Setting the OFF-delay Time (Advanced Unit)

The OFF-delay preset time on an Advanced Unit is set from the OFF-delay time preset switch (1 each on the front and back of the Unit). Normal operation will only occur if both switches are identically set. An error will occur if the switches are not identically set.

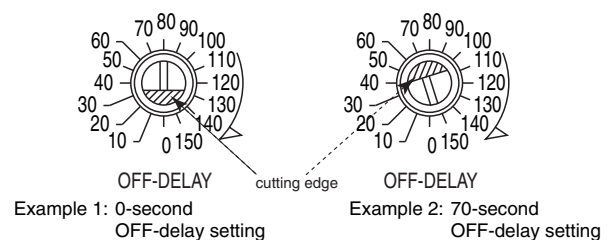The default setting of the OFF-delay time preset switch is set to 0 s.
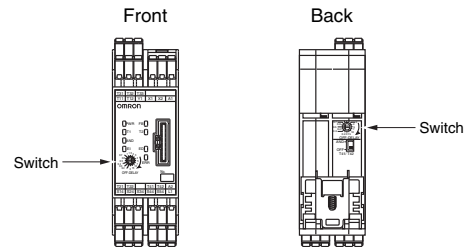
Refer to the following illustration for details on setting switch positions.

G9SX-AD322-T15/G9SX-ADA222-T15

Example 1: 0-second OFF-delay setting

Example 2: 1-second OFF-delay setting
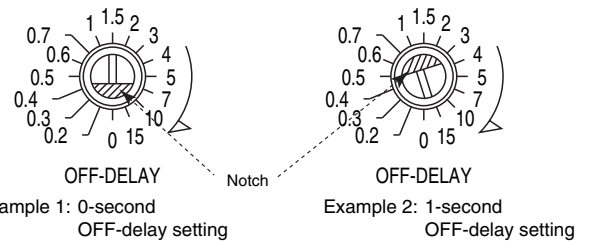
G9SX-AD322-T150/G9SX-ADA222-T150

Example 1: 0-second OFF-delay setting

Example 2: 70-second OFF-delay setting

LED Indicators

Marking	Color	Name	G9SX-AD	G9SX-ADA	G9SX-BC	G9SX-EX	G9SX-EX-T	Function	Reference
PWR	Green	Power supply indicator	❍	❍	❍	❍	❍	Lights up while power is supplied.	---
T1	Orange	Safety input 1 indicator	❍	❍	❍	---	---	Lights up while a HIGH state signal is input to T12. Blinks when an error relating to safety input 1 occurs.	
T2	Orange	Safety input 2 indicator	❍	❍	❍	---	---	Lights up while a HIGH state signal is input to T22. Blinks when an error relating to safety input 2 occurs.	
FB	Orange	Feedback/ reset input indicator	❍	❍	❍	---	---	Lights up in the following cases: • With automatic reset while a HIGH state signal is input to T33. • With manual reset while a HIGH state signal is input to T32. Blinks when an error relating to feedback/reset input occurs.	
AND	Orange	Logical AND input indicator	❍	---	---	---	---	Lights up while a HIGH state signal is input to T41. Blinks when an error relating to logical AND connection input occurs.	
AND1	Orange	Logical AND input indicator	---	❍	---	---	---	Lights up while a HIGH state signal is input to T41. Blinks when an error relating to logical AND connection input occurs.	*
AND2	Orange	Logical AND input indicator	---	❍	---	---	---	Lights up while a HIGH state signal is input to T51. Blinks when an error relating to logical AND connection input occurs.	
EI	Orange	Safety output indicator	❍	❍	❍	❍	---	Lights up while the Instantaneous safety outputs (S14, S24, S34) are in the ON-state. Blinks when an error relating to the instantaneous safety output occurs.	
ED	Orange	OFF-delayed safety output indicator	❍	❍	---	---	❍	Lights up while OFF-delayed safety outputs (S44, S54) are in the ON-state. Blinks when an error relating to OFF-delayed safety output occurs.	
ERR	Red	Error indicator	❍	❍	❍	❍	❍	Lights up or blinks when an error occurs.	

* Refer to *Fault Detection* on the next page for details.

Settings Indication (at Power ON)

Settings for the G9SX can be checked by the orange indicators for approx. 3 seconds after the power is turned ON. During this settings indication period, the ERR indicator will light, however the auxiliary error output will remain OFF

Indicator	Item	Setting position	Indicator status	Setting mode	Setting status
T1	Cross fault detection mode	Y1 terminal	Lit	Cross fault detection mode: ON	Y1 = open
			Not lit	Cross fault detection mode: OFF	Y1 = 24 VDC
FB	Reset mode	T32 or T33 terminal	Lit	Manual reset mode	T33 = 24 VDC
			Not lit	Auto reset mode	T32 = 24 VDC
AND (AND1, AND2)	Logical AND connection input mode	Logical AND connection preset switch	Lit	Enable logical AND input	"AND"
			Not lit	Disable logical AND input	"OFF"

Fault Detection

When the G9SX detects a fault, the ERR indicator and/or other indicators light up or blink to inform the user about the fault.

Check and take necessary measures referring to the following table, and then re-supply power to the G9SX.

(Advanced Unit/Basic Unit)

ERR indicator	Other indicator	Fault	Expected causes of the fault	Check points and measures to take
☀ **Blinks**	---	Fault due to electro-magnetic disturbance or of internal circuits.	1) Excessive electro-magnetic disturbance 2) Failure of the internal circuit	1) Check the disturbance level around the G9SX and the related system. 2) Replace with a new product.
● **Lights up**	☀ **T1 blinks**	Fault involved with safety input 1	1) Failure involving the wiring of safety input 1 2) Incorrect setting of cross fault detection input 3) Failure of the circuit of safety input 1	1) Check the wiring to T11 and T12. 2) Check the wiring to Y1. 3) Replace with a new product.
	☀ **T2 blinks**	Fault involved with safety input 2	1) Failure involving the wiring of safety input 2 2) Incorrect setting of cross fault detection input 3) Failure of circuits of safety input 2	1) Check the wiring to T21 and T22. 2) Check the wiring to Y1. 3) Replace with a new product.
	☀ **FB blinks**	Faults involved with feedback/reset input	1) Failures involving the wiring of feedback/reset input. 2) Failures of the circuit of feedback/reset input	1) Check the wiring to T31, T32 and T33. 2) Replace with a new product.
		Fault in Expansion Unit	1) Improper feedback signals from Expansion Unit 2) Abnormal supply voltage to Expansion Unit 3) Failure of the circuit of safety relay contact outputs	1) Check the connecting cable of Expansion Unit and the connection of the termination socket. 2) Check the supply voltage to Expansion Unit. **Note:** Make sure that all Expansion units' PWR indicators are lit. 3) Replace the Expansion Unit with a new one.
	☀ **EI blinks**	Fault involved with instantaneous safety outputs or logical AND connection outputs or auxiliary monitor output	1) Failure involving the wiring of instantaneous safety outputs 2) Failure of the circuit of Instantaneous safety outputs 3) Failure involving the wiring of the logical AND connection output 4) Failure of the circuit of the logical AND connection output 5) Failure involving the wiring of the auxiliary monitor output 6) Impermissible high ambient temperature	1) Check the wiring to S14, S24, and S34. 2) Replace with a new product. 3) Check the wiring to L1 and L2. 4) Replace with a new product. 5) Check the wiring to X1. 6) Check the ambient temperature and spacing around the G9SX.
	☀ **ED blinks**	Fault involved with OFF-delayed safety outputs	1) Failure involving the wiring of OFF-delayed safety relay contact outputs 2) Incorrect set values for OFF-delay time 3) Failure of the circuit of OFF-delayed safety relay contact outputs 4) Impermissible high ambient temperature	1) Check the wiring to S44 and S54. 2) Confirm the set values of the two OFF-delay time preset switches. 3) Replace with a new product. 4) Check the ambient temperature and spacing around the G9SX.
	☀ **AND blinks (AND1, AND2)**	Fault involved with logical AND connection input	1) Failure involving the wiring of the logical AND connection input 2) Incorrect setting for the logical AND connection input 3) Failure of the circuit of the logical AND connection input	1) Check the wiring to T41 and T42 (T51 and T52). **Note:** Make sure that the wiring length for the T41, T42, T51, T52 terminal is less than 100 meters. **Note:** Make sure that the logical AND connection signal is branched for less than 4 units. 2) Confirm the set value of the logical AND connection preset switch. 3) Replace with a new product.
	☀ **All indicators except PWR blink**	Supply voltage outside the rated value	1) Supply voltage outside the rated value	1) Check the supply voltage to the Units.

When indicators other than the ERR indicator blink, check and take necessary actions referring to the following table.

ERR indicator	Other indicators		Fault	Expected cause of the fault	Check points and measures to take
○ **Off**	**T1** / **T2**	☀ **Blink**	Mismatch between input 1 and input 2.	The input status between input 1 and input 2 is different, due to contact failure or a short circuit of safety input device(s) or a wiring fault.	Check the wiring from safety input devices to the G9SX. Or check the input sequence of safety input devices. After removing the fault, turn both safety inputs to the OFF state.

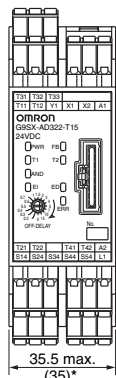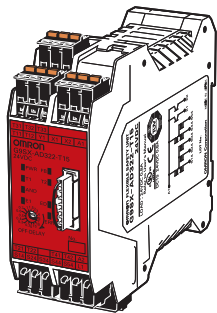### (Expansion Unit)

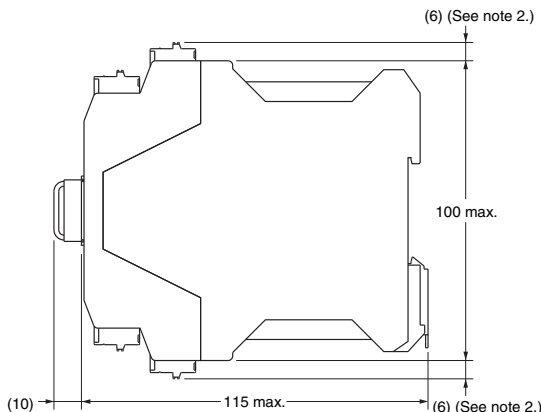| ERR indicator	Other indicators	Fault	Expected cause of the faults	Check points and measures to take
● **Lights**	---	Fault involved with safety relay outputs of Expansion Units	1)Welding of relay contacts 2)Failure of the internal circuit	Replace with a new product.

Dimensions and Terminal Arrangement
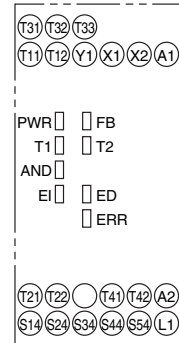
Advanced Unit

G9SX-AD322-☐
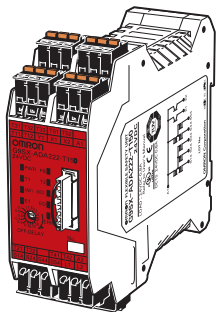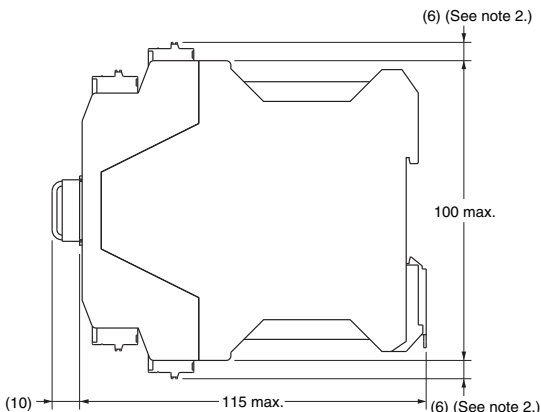
35.5 max.
(35)*

∗ Typical dimension

(6) (See note 2.)

100 max.

(10) → 115 max. ← (6) (See note 2.)

Note: 1. Above outline drawing is for -RC terminal type.
     2. For -RC terminal type only.

Terminal arrangement

T31 T32 T33
T11 T12 Y1 X1 X2 A1

PWR☐   ☐FB
T1☐   ☐T2
AND☐
EI☐   ☐ED
     ☐ERR

T21 T22 ◯ T41 T42 A2
S14 S24 S34 S44 S54 L1

Advanced Unit

G9SX-ADA222-☐

35.5 max.
(35)*

* Typical dimension

(6) (See note 2.)

100 max.

(10) → 115 max. ← (6) (See note 2.)

Note: 1. Above outline drawing is for -RC terminal type.
     2. For -RC terminal type only.

Terminal arrangement

T31 T32 T33 T51 T52 ◯
T11 T12 Y1 X1 X2 A1

PWR☐   ☐FB
T1☐   ☐T2
AND1☐   ☐AND2
EI☐   ☐ED
     ☐ERR

T21 T22 ◯ T41 T42 A2
S14 S24 S44 S54 L1 L2

Basic Unit

G9SX-BC202-☐

23 max.
(22.5)*

* Typical dimension
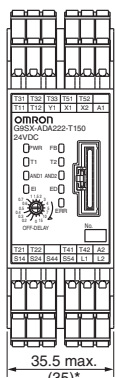
(6) (See note 2.)

100 max.

115 max. ← (6) (See note 2.)

Note: 1. Above outline drawing is for -RC terminal type.
     2. For -RC terminal type only.

Terminal arrangement

T31 T32 T33 Y1
T11 T12 X1 A1

PWR☐   ☐FB
T1☐   ☐T2
EI☐   ☐ERR

T21 T22 X2 A2
S14 S24 L1 L2
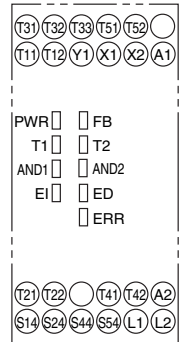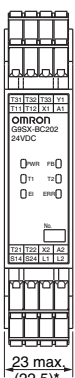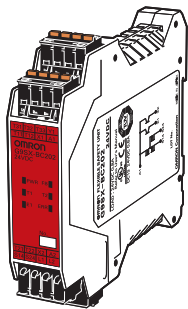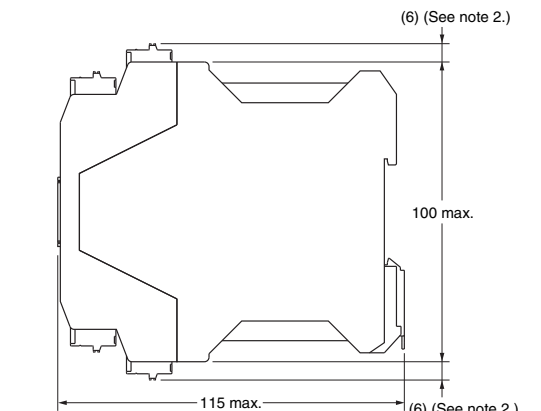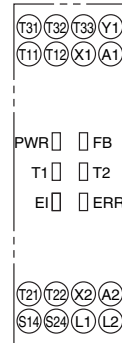
Expansion Unit
G9SX-EX401-☐
Expansion Unit (OFF-delayed Model)
G9SX-EX041-T-☐

Terminal arrangement

G9SX-EX401-☐
(Expansion Unit)

G9SX-EX041-T-☐
(Expansion Unit
with OFF Delay)

(6) (See note 2.)

100 max.

115 max.

(6) (See note 2.)

23 max.
(22.5)*

* Typical dimension

13 23 33 43

☐PWR
☐EI
☐ERR

A1 X2 A2
14 24 34 44

13 23 33 43

☐PWR
☐ED
☐ERR

A1 X2 A2
14 24 34 44

Note: 1. Above outline drawing is for -RC terminal type.
2. For -RC terminal type only.
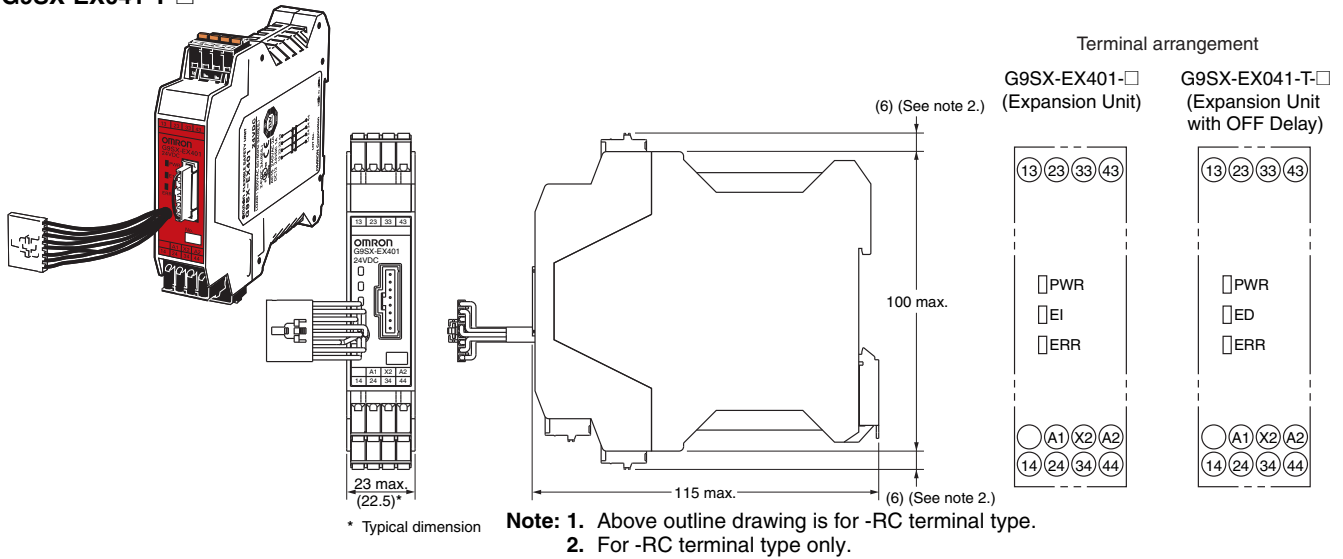
Application Examples

Highest achievable PL/ safety category	Model	Stop category	Reset
PLe/4 equivalent	Emergency Stop Switch A165E/A22 Flexible Safety Unit G9SX-BC202 Safety Limit Switch D4B-N/D4N/D4F Flexible Safety Unit G9SX-AD322-T15	M1, M2: 0	Emergency Stop: Manual Guard: Manual

Note: The above PL is only the evaluation result of the example. The PL must be evaluated in an actual application by the customer after confirming the usage conditions.

● **Application Overview 1**

1. When the emergency stop switch S1 is pressed.
- The power supply to the motor M1 and M2 is turned OFF immediately when the emergency stop switch S1 is pressed.
- The power supply to the motor M1 is kept OFF until the emergency stop switch S1 is released and the reset switch S2 is pressed.
- The power supply to the motor M2 is kept OFF until the guard is closed and the reset switch S2 and S5 are pressed while the emergency stop switch S1 is released.

2. When the guard is opened (the emergency stop switch S1 is released).
- The power supply to the motor M2 is turned OFF immediately when the S3 and S4 detect that the guard is opened. (The power supply to the motor M1 is kept ON.)
- The power supply to the motor M2 is kept OFF until the guard is closed and the reset switch S5 is pressed.
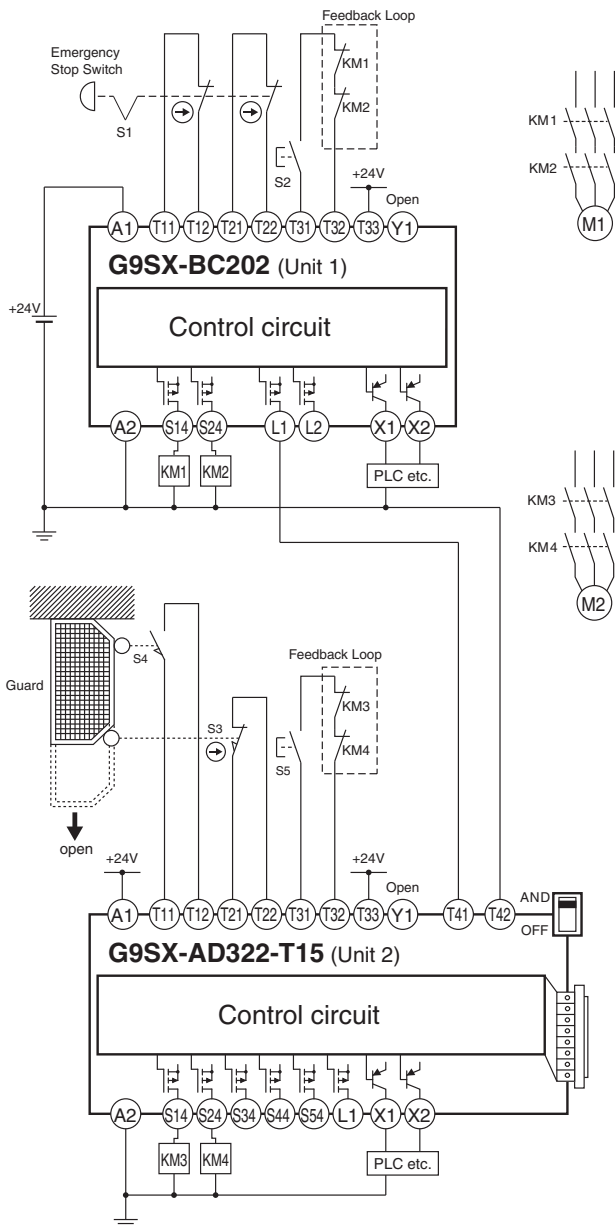
S1:   Emergency Stop Switch
S2, S5:   Reset Switch
S3:   Safety Limit Switch
S4:   Limit Switch
KM1 to KM6: Magnetic contactor
M1 to M2:   Motor

Timing chart 1
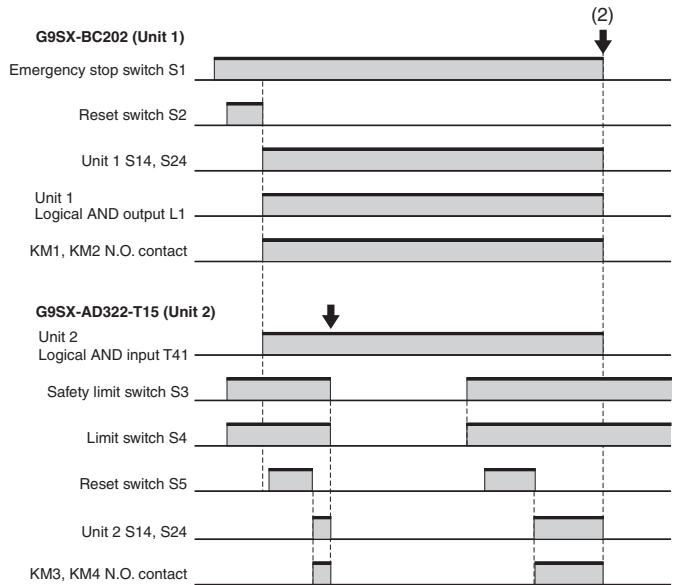
(1) Guard opened: Only the Unit 2 stops.
(2) Emergency stop switch pressed: Both the Unit 1 and 2 stop.
Note: In this example, press reset switch S2, confirm that Unit 1 has started operating, and then press reset switch S5.

Highest achievable PL/ safety category	Model	Stop category	Reset
PLe/4 equivalent	Emergency Stop Switch A165E/A22E Flexible Safety Unit G9SX-BC202 Safety Limit Switch D4B-N/D4N/D4F Safety Light Curtain F3SG Flexible Safety Unit G9SX-AD322-T15 Flexible Safety Unit G9SX-ADA222-T150	M1 to M4: 0	Emergency Stop: Manual Guard 1, 2: Auto Safety Light Curtain: Auto

Note: The above PL is only the evaluation result of the example. The PL must be evaluated in an actual application by the customer after confirming the usage conditions.
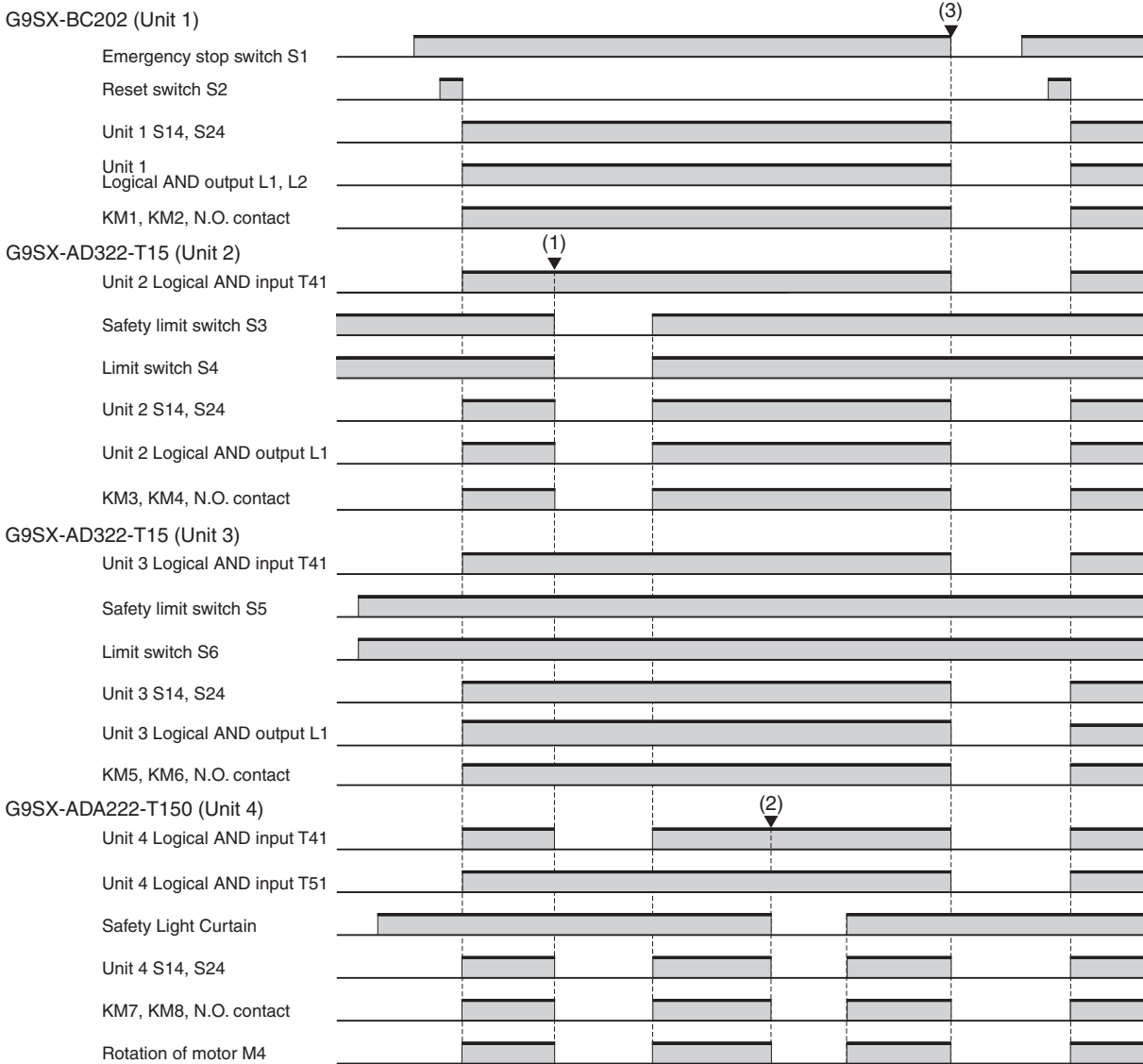
● Application Overview 2

1. When the emergency stop switch S1 is pressed.
- The power supply to the motor M1 to M4 is turned OFF immediately when the emergency stop switch S1 is pressed.
- The power supply to the motor M1 is kept OFF until the reset switch S2 is pressed while the emergency stop switch S1 is released.
- The power supply to the motor M2 is kept OFF until the reset switch S2 is pressed while the guard 1 is closed and the emergency stop switch S1 is released.
- The power supply to the motor M3 is kept OFF until the reset switch S2 is pressed while the guard 1 is closed and the emergency stop switch S1 is released.
- The power supply to the motor M4 is kept OFF until the reset switch S2 is pressed while the guard 1 and 2 are closed and the safety light curtain is unblocked and the emergency stop switch S1 is released.

2. When the guard 1 is opened (the emergency stop switch S1 is released).
- The power supply to the motor M2 and M4 is turned OFF immediately when the S3 and S4 detect that the guard 1 is opened.
- The power supply to the motor M2 is kept OFF until the guard 1 is closed.
- The power supply to the motor M4 is kept OFF until the guard 1 and 2 are closed and the safety light curtain is unblocked.

3. When the guard 2 is opened (the emergency stop switch S1 is released).
- The power supply to the motor M3 and M4 is turned OFF immediately when the S5 and S6 detect that the guard 2 is opened.
- The power supply to the motor M3 is kept OFF until the guard 2 is closed.
- The power supply to the motor M4 is kept OFF until the guard 1 and 2 are closed and the safety light curtain is unblocked.

4. When the safety light curtain is blocked (the emergency stop switch S1 is released).
- The power supply to the motor M4 is turned OFF immediately when the safety light curtain is blocked.
- The power supply to the motor M4 is kept OFF until the guard 1 and 2 are closed and the safety light curtain is unblocked.
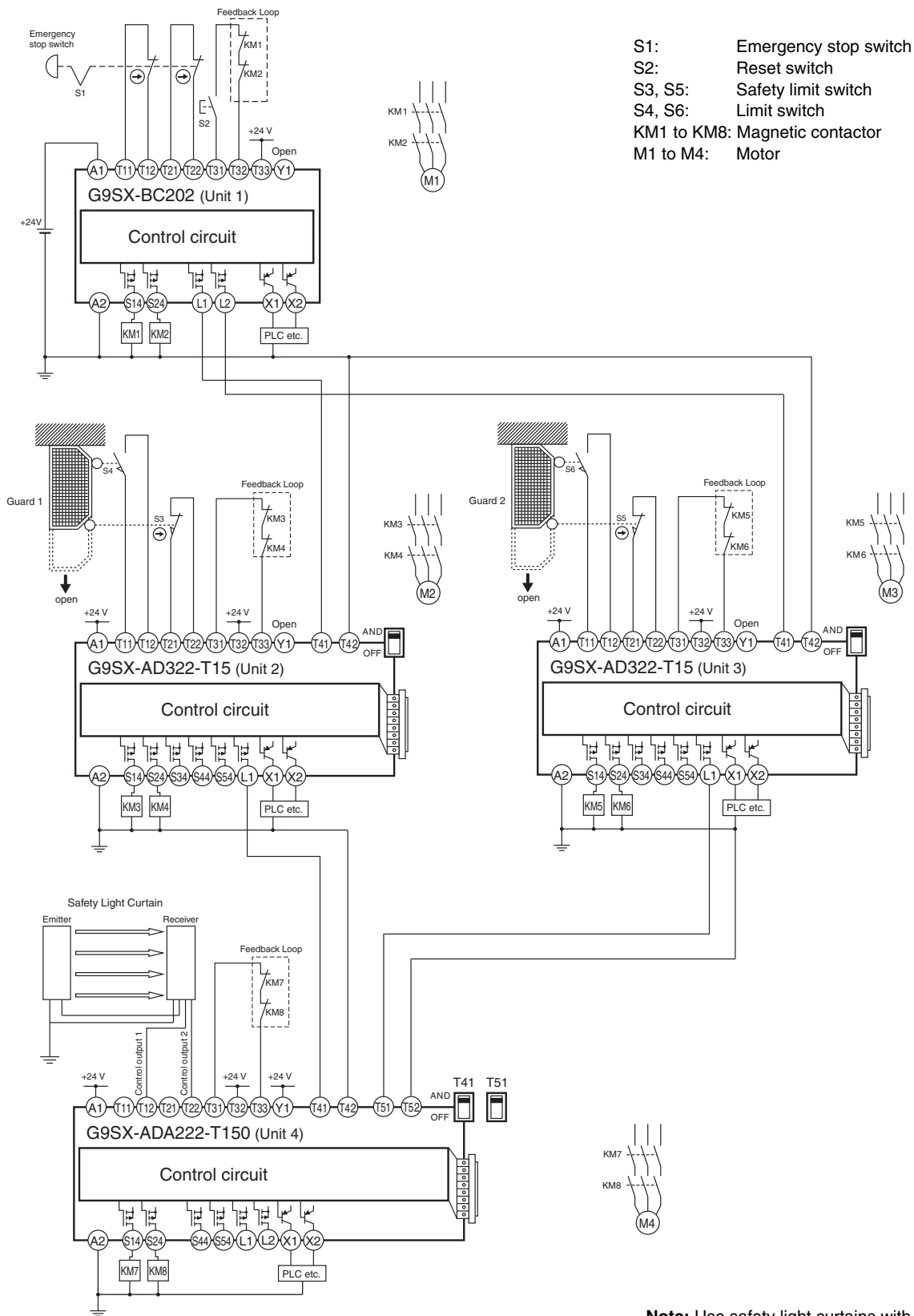
S1: Emergency stop switch
S2: Reset switch
S3, S5: Safety limit switch
S4, S6: Limit switch
KM1 to KM8: Magnetic contactor
M1 to M4: Motor

Note: Use safety light curtains with PNP control outputs.

Timing chart 2

G9SX-BC202 (Unit 1)

Emergency stop switch S1	(3)
Reset switch S2	
Unit 1 S14, S24	
Unit 1 Logical AND output L1, L2	
KM1, KM2, N.O. contact	

G9SX-AD322-T15 (Unit 2)

Unit 2 Logical AND input T41	(1)
Safety limit switch S3	
Limit switch S4	
Unit 2 S14, S24	
Unit 2 Logical AND output L1	
KM3, KM4, N.O. contact	

G9SX-AD322-T15 (Unit 3)

Unit 3 Logical AND input T41	
Safety limit switch S5	
Limit switch S6	
Unit 3 S14, S24	
Unit 3 Logical AND output L1	
KM5, KM6, N.O. contact	

G9SX-ADA222-T150 (Unit 4)

Unit 4 Logical AND input T41	(2)
Unit 4 Logical AND input T51	
Safety Light Curtain	
Unit 4 S14, S24	
KM7, KM8, N.O. contact	
Rotation of motor M4	

(1) Guard 1 opened: Unit 2 and Unit 4 stop.
(2) Guard 3 opened: Unit 4 stops.
(3) Emergency stop switch pressed: All units stop.

A Safety Measure for Hazardous Operations That Does Not Lower Productivity

- Two functions support two types of application:
  - Auto switching: For applications where operators work together with machines
  - Manual switching: For applications with limited operations
- External indicator outputs enable indicating the switching status of two safety input devices.
- Auxiliary outputs enable monitoring of safety inputs, safety outputs, and errors.
- Detailed LED indications enable easy diagnosis.
- Logical AND connection allows complicated applications in combination with other G9SX-series Units.
- Certification for compliance with IEC/EN 61508 (SIL3), IEC/EN 62061 (SIL3) and EN ISO13849-1 (PLe/Safety Category 4).
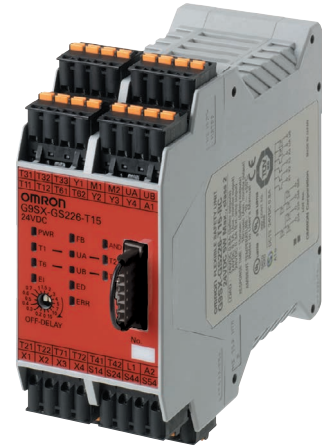
⚠ Be sure to read the "*Safety Precautions*" on page 45.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Application Examples

Auto Switching Function

When the operator inserts the workpiece...

Safety Light Curtain A

- Safety Light Curtain A monitors the robot.
- The robot can continue to operate as long as it does not interrupt Safety Light Curtain A.
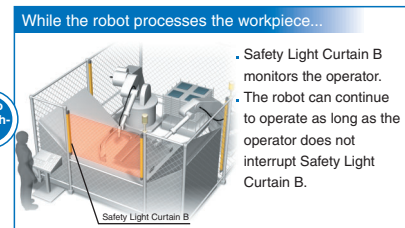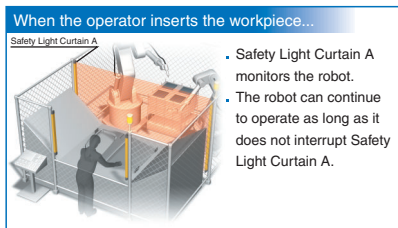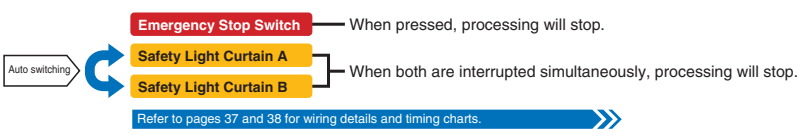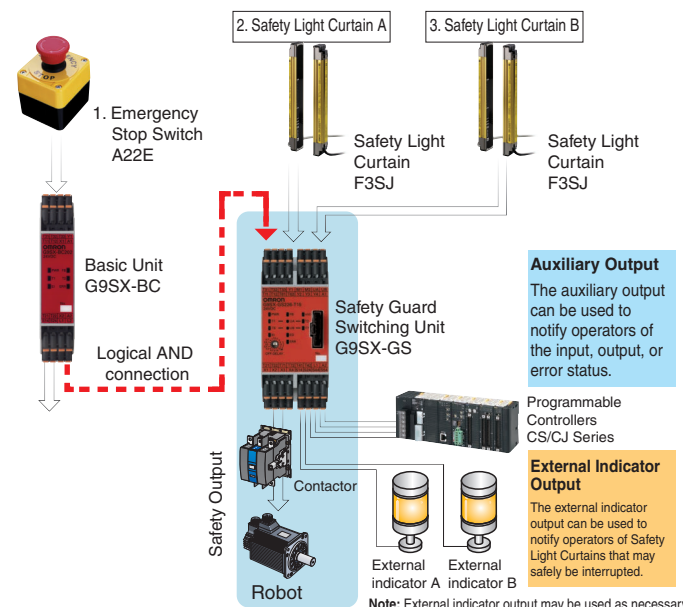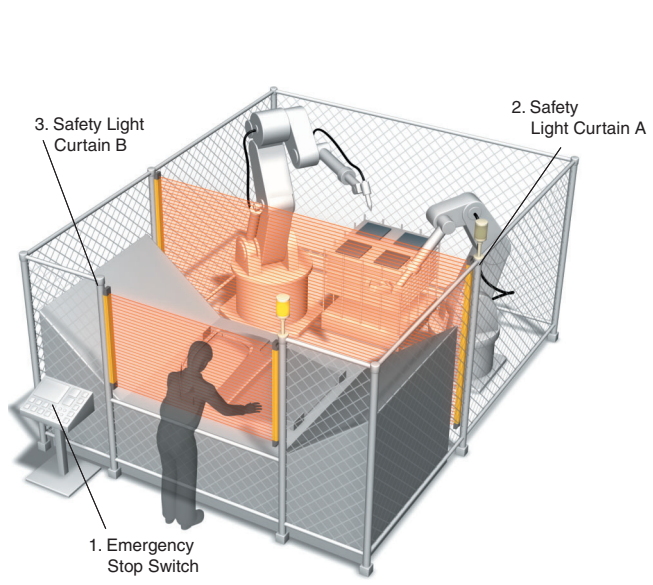
Auto switching

While the robot processes the workpiece...

- Safety Light Curtain B monitors the operator.
- The robot can continue to operate as long as the operator does not interrupt Safety Light Curtain B.

Safety Light Curtain B

Note: If the operator is able to completely enter the zone inside Safety Light Curtain B, a presence detection device, such as a Safety Mat, is necessary as an additional safety measure.

3. Safety Light Curtain B

2. Safety Light Curtain A

1. Emergency Stop Switch

2. Safety Light Curtain A

3. Safety Light Curtain B

1. Emergency Stop Switch A22E

Safety Light Curtain F3SJ

Safety Light Curtain F3SJ

Basic Unit G9SX-BC

Logical AND connection

Safety Guard Switching Unit G9SX-GS

Safety Output

Contactor

Robot

Programmable Controllers CS/CJ Series

Auxiliary Output
The auxiliary output can be used to notify operators of the input, output, or error status.

External Indicator Output
The external indicator output can be used to notify operators of Safety Light Curtains that may safely be interrupted.

External indicator A   External indicator B

Note: External indicator output may be used as necessary.

Emergency Stop Switch — When pressed, processing will stop.

Auto switching

Safety Light Curtain A
Safety Light Curtain B — When both are interrupted simultaneously, processing will stop.

Refer to pages 37 and 38 for wiring details and timing charts.

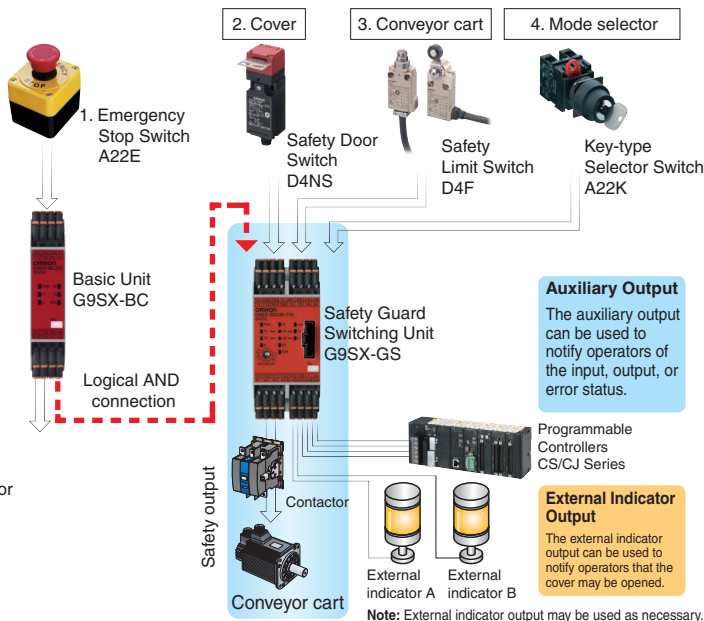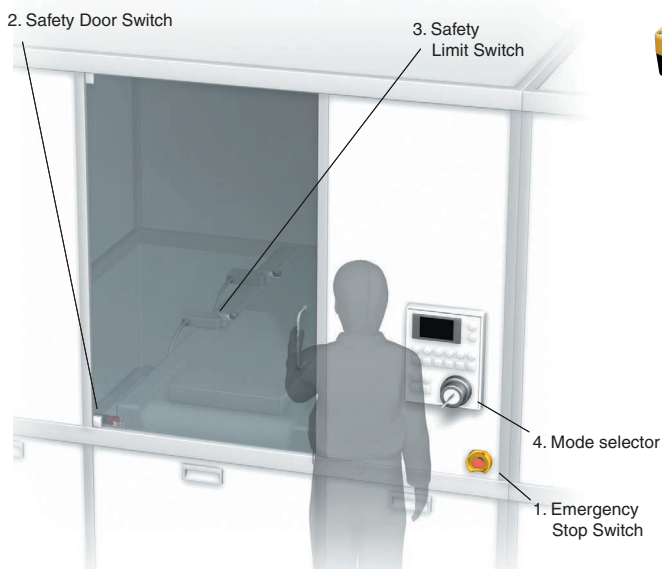| Working condition	External indicator	G9SX-GS			
		Safety input	Safety output	Monitor output	External indicator
Normal operation 1	OK to work	Safety input A **ON** / Safety input B **ON**	**ON** Safety output	**ON** Input A monitor / **ON** Input B monitor	Indicator A (lit) / Indicator B (lit)
2	OK to work	Safety input A **ON** / Safety input B **OFF**	**ON** Safety output	**ON** Input A monitor / **OFF** Input B monitor	Indicator A (off) / Indicator B (lit)
3	Not OK to work	Safety input A **OFF** / Safety input B **ON**	**ON** Safety output	**OFF** Input A monitor / **ON** Input B monitor	Indicator A (lit) / Indicator B (off)
Hazardous condition 4	Not OK to work	Safety input A **OFF** / Safety input B **OFF**	**OFF** Safety output	**OFF** Input A monitor / **OFF** Input B monitor	Indicator A (off) / Indicator B (off)

Manual Switching Function

During normal operation...
- The Door Switch monitors the opening and closing of the door during normal operation.
- The machine is able to operate while the door is closed.

Door Switch

Manual switching
Normal operation — Maintenance
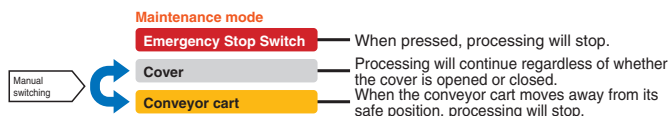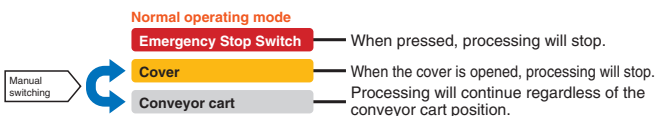
During maintenance...
- The Limit Switch monitors the conveyor cart position during maintenance.
- The machine is able to operate while the conveyor cart is in a specified area.

Limit Switch

2. Safety Door Switch

3. Safety Limit Switch

4. Mode selector

1. Emergency Stop Switch

1. Emergency Stop Switch A22E

Basic Unit G9SX-BC

Logical AND connection

2. Cover — Safety Door Switch D4NS

3. Conveyor cart — Safety Limit Switch D4F

4. Mode selector — Key-type Selector Switch A22K

Safety Guard Switching Unit G9SX-GS

Safety output

Contactor

Conveyor cart

Programmable Controllers CS/CJ Series

Auxiliary Output
The auxiliary output can be used to notify operators of the input, output, or error status.

External Indicator Output
The external indicator output can be used to notify operators that the cover may be opened.

External indicator A

External indicator B

Note: External indicator output may be used as necessary.

Normal operating mode

Manual switching

Emergency Stop Switch	When pressed, processing will stop.
Cover	When the cover is opened, processing will stop.
Conveyor cart	Processing will continue regardless of the conveyor cart position.

Maintenance mode

Manual switching

Emergency Stop Switch	When pressed, processing will stop.
Cover	Processing will continue regardless of whether the cover is opened or closed.
Conveyor cart	When the conveyor cart moves away from its safe position, processing will stop.

Working condition	External indicator	G9SX-GS				
		Safety input	Safety output	Mode selector	Monitor output	External indicator
Normal operation 1	Not OK to open	Safety input A: Disabled / Safety input B: ON	ON Safety output	Normal operating mode	Input A monitor: OFF / Input B monitor: ON	Indicator A / Indicator B
Maintenance 2	OK to open	Safety input A: ON / Safety input B: Disabled	ON Safety output	Maintenance mode	Input A monitor: ON / Input B monitor: OFF	Indicator A / Indicator B
Maintenance 3	OK to open	Safety input A: ON / Safety input B: Disabled	ON Safety output	Maintenance mode	Input A monitor: ON / Input B monitor: OFF	Indicator A / Indicator B
Hazardous condition 4	OFF / OK to open	Safety input A: OFF / Safety input B: Disabled	OFF Safety output	Maintenance mode	Input A monitor: OFF / Input B monitor: OFF	Indicator A / Indicator B

OMRON

Model Number Structure

Model Number Legend

Note: Please see "Ordering Information" below for the actual models that can be ordered.

$$G9SX-\underbrace{\square\square\square\square\square}_{1 \quad 2 \ 3 \ 4 \quad 5}-\underbrace{\square\square\square}_{}-\underbrace{\square\square}_{6}$$

1. Functions
   GS: Safety Guard Switching Unit
   EX: Expansion Unit

2. Output Configuration (Instantaneous Safety Outputs)
   0: None
   2: 2 outputs
   4: 4 outputs

3. Output Configuration (OFF-delayed Safety Outputs)
   0: None
   2: 2 outputs
   4: 4 outputs

4. Output Configuration (Auxiliary Outputs)
   1: 1 output
   6: 6 outputs

5. Max. OFF-delay Time
   Safety Guard Switching Unit
      T15: 15 s
   Expansion Unit
      No indicator: No OFF delay
      T: OFF delay

6. Terminal Block Type
   RT: Screw terminals
   RC: Spring-cage terminals

Ordering Information

List of Models

Safety Guard Switching Unit

| Safety outputs *3 | | Auxiliary outputs *4 | Logical AND connection | | Max. OFF-delay time *1 | Rated voltage | Terminal block type | Model |
Instantaneous	OFF-delayed *2		Inputs	Outputs				
2 (semiconductor)	2 (semiconductor)	6 (semiconductor)	1 (semiconductor)	1 (semiconductor)	15 s	24 VDC	Screw terminals	**G9SX-GS226-T15-RT**
							Spring-cage terminals	**G9SX-GS226-T15-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, or 15 s
*2. The OFF-delayed output becomes an instantaneous output by setting the OFF-delay time to 0 s.
*3. P channel MOS-FET output
*4. PNP transistor output (except for the external indicator outputs, which are P channel MOS-FET outputs)
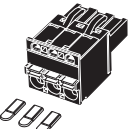
Expansion Unit

| Safety outputs | | Auxiliary outputs *1 | OFF-delay time | Rated voltage | Terminal block type | Model |
Instantaneous	OFF-delayed					
4 PST-NO (contact)	---	1 (semiconductor)	---	24 VDC	Screw terminals	**G9SX-EX401-RT**
					Spring-cage terminals	**G9SX-EX401-RC**
---	4 PST-NO (contact)		*2		Screw terminals	**G9SX-EX041-T-RT**
					Spring-cage terminals	**G9SX-EX041-T-RC**

*1. PNP transistor output
*2. The OFF-delay time is synchronized to the OFF-delay time setting in the connected Unit (G9SX-GS226-T15-□).

Accessories

Terminal Block

Appearance *	Specifications	Applicable units	Model	Remarks
	Terminal Block with screw terminals (4-pin)	G9SX-GS G9SX-EX-□	**Y9S-04T1B-02A**	Two Terminal Blocks (black) with screw terminals, and a set of six code marks to prevent erroneous insertion.
	Terminal Block with spring-cage terminals (4-pin)	G9SX-GS G9SX-EX-□	**Y9S-04C1B-02A**	Two Terminal Blocks (black) with spring-cage terminals, and a set of six code marks to prevent erroneous insertion.

Note: The G9SX main unit comes with a terminal block as standard equipment. The accessories shown here can be ordered as a replacement.
* The illustrations show 3-pin types

Specifications

Ratings

Power Input

Item	Model	G9SX-GS226-T15-□	G9SX-EX-□
Rated supply voltage		24 VDC	
Operating voltage range		−15% to 10% of rated supply voltage	
Rated power consumption *		5 W max.	2 W max.

* Power consumption of loads not included.

Inputs

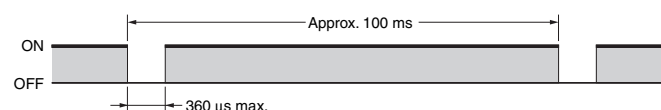| Item	Model	G9SX-GS226-T15-□
Safety inputs		Operating voltage: 20.4 VDC to 26.4 VDC, Internal impedance: Approx. 2.8 kΩ *
Mode selector input		
Feedback/reset input		

* Provide a current equal to or higher than that of the minimum applicable load of the connected input control device.

Outputs

Item	Model	G9SX-GS226-T15-□
Instantaneous safety outputs *1 OFF-delayed safety outputs *1		P channel MOS-FET outputs Load current: 0.8 A DC max./output *2
Auxiliary outputs (for input, output, and error monitoring)		PNP transistor outputs Load current: 0.8 A DC max./output *2
External indicator outputs		P channel MOS-FET outputs Connectable indicators • Incandescent lamp: 24 VDC, 3 to 7 W • LED lamp: 10 to 300 mA DC/output

*1. While safety outputs are in the ON state, the following signal sequence is output continuously for diagnosis.
When using the safety outputs as input signals to control devices (i.e. Programmable Controllers), consider the OFF pulse shown below.

*2. The following derating is required when Units are mounted side-by-side.
G9SX-GS226-T15-□: 0.4 A max. load current/output

Expansion Unit

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