Safety Relay Unit
G9SB

CSM_G9SB_DS_E_5_1

Ultra Slim Safety Relay Unit

- Models of width 17.5 mm available with 2 or 3 poles. Models of width 22.5 mm with 3 poles also available.
- Conforms to EN standards. (TÜV approval)
- DIN track mounting possible.

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

⚠ Be sure to read the *"Safety Precautions"* on page 9.

Model Number Structure

Model Number Legend

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

G9SB-□□□□□-□
1 2 3 4 5 6

1. Function
None: Emergency stop

2. Contact Configuration (Safety Output)
2: DPST-NO
3: 3PST-NO

3. Contact Configuration (OFF-delay Output)
0: None

4. Contact Configuration (Auxiliary Output)
0: None
1: SPST-NC

5. Input Configuration
None: 1-channel or 2-channel input possible
0: None (direct breaking)
2: 2-channel input

6. Miscellaneous
A: Auto-reset, inverse input
B: Auto-reset, + common input
C: Manual reset, inverse input
D: Manual reset, + common input

Ordering Information

Main contacts	Auxiliary contact	Number of input channels	Reset mode	Input type	Rated voltage	Model
DPST-NO	None	2 channels	Auto-reset	Inverse	24 VAC/VDC	**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	SPST-NC	None (direct breaking)	Auto-reset	---	24 VDC	**G9SB-3010 ✻**
		2 channels		Inverse	24 VAC/VDC	**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**

Note: 1. Relays with inverse inputs are used mainly when inputting signals from two mechanical switches.
2. Relays with positive commons are used mainly when inputting signals from a safety sensor or from one mechanical switch.
✻ The G9SB-3010 can be applied to Safety Category 3 of the EN954-1 if double breaking is used.

Specifications

Ratings

Power Input

Item / Model	G9SB-200□-□	G9SB-3010	G9SB-301□-□
Power supply voltage	24 VAC/VDC: 24 VAC, 50/60 Hz, or 24 VDC 24 VDC: 24 VDC		
Operating voltage range	85% to 110% of rated power supply voltage		
Power consumption	1.6 VA/1.4 W max.	1.7 W max.	2.0 VA/1.7 W max.

Inputs

Item / Model	G9SB-200□-□	G9SB-3010	G9SB-301□-□
Input current	25 mA max.	60 mA max. ✻	30 mA max.

✻ Indicates the current between terminals A1 and A2.

Contacts

Model	G9SB-200□-□	G9SB-3010	G9SB-301□-□
Item / Load	Resistive load		
Rated load	250 VAC, 5 A 30 VDC, 5 A		
Rated carry current	5 A		

Characteristics

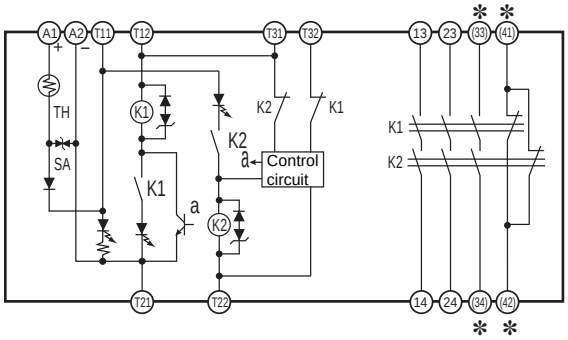
Item	Model	G9SB-200□-□	G9SB-3010	G9SB-301□-□
Contact resistance ✻1		100 mΩ		
Operating time ✻2		30 ms max.		
Response time ✻3		10 ms max.		
Insulation resistance ✻4		100 MΩ min. (at 500 VDC)		
Dielectric strength	Between different outputs	2,500 VAC, 50/60 Hz for 1 min		
	Between inputs and outputs			
	Between power inputs and outputs			
Vibration resistance		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 ✻5	Mechanical	5,000,000 operations min. (at approx. 7,200 operations/hr)		
	Electrical	100,000 operations min. (at approx. 1,800 operations/hr)		
Failure rate (P level) (reference value)		5 VDC, 1 mA		
Ambient operating temperature		–25 to 55°C (with no icing or condensation)		
Ambient operating humidity		35% to 85%		
Terminal tightening torque		0.5 N·m		
Weight		Approx. 115 g	Approx. 135 g	Approx. 120 g

✻1. The contact resistance was measured with 1 A at 5 VDC using the voltage-drop method.
✻2. Not including bounce time.
✻3. The response time is the time it takes for the main contact to open after the input is turned OFF. Includes bounce time.
✻4. The insulation resistance was measured with 500 VDC at the same places that the dielectric strength was checked.
✻5. The durability is for an ambient temperature of 15 to 35°C and an ambient humidity of 25% to 75%.

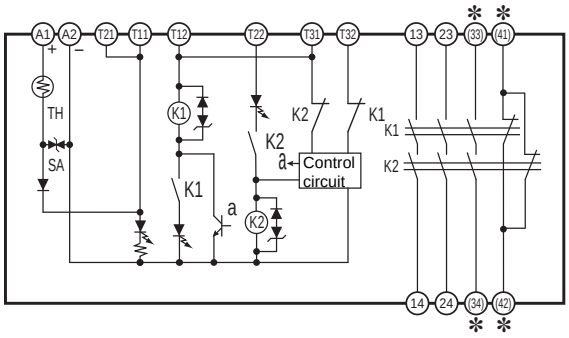
Connections

Internal Connections

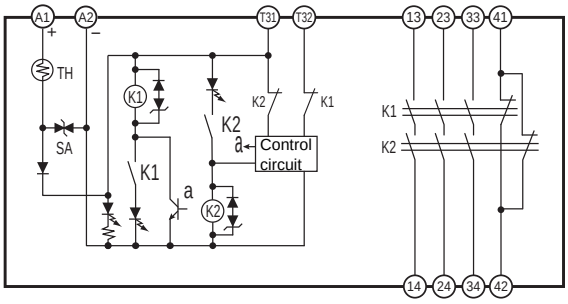
G9SB-2002-A/C (24 VAC/VDC)
G9SB-3012-A/C (24 VAC/VDC)



G9SB-200-B/D (24 VAC/VDC)
G9SB-301-B/D (24 VAC/VDC)



G9SB-3010 (24 VDC)



Note: 1. For 1-channel input with G9SB-□□□-B/D models, short terminals T12 and T22. It is not possible to wire G9SB-□□□2-A/C models for 1-channel input.
2. Always provide a protective ground externally, e.g., on the power supply.

✻Only G9SB-301□-□ models have terminals 33-34 and 41-42.

Wiring of Inputs and Outputs

Signal name	Terminal name	Description of operation
Power supply input	A1, A2	The input terminals for power supply. Connect the power source to the A1 and A2 terminals. DC inputs have polarity, so A1 should be connected to the positive side and A2 to the negative side.
Safety input 1 ✻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.
Safety input 2 ✻1	T21, T22	
Feedback/reset input	T31, T32	To set the safety outputs in the ON state, the ON state signal must be input to T31 - T32. Otherwise the safety outputs cannot be in the ON state.
Instantaneous safety outputs	See below. ✻2	Turns ON/OFF according to the state of the safety inputs and feedback/reset inputs.
Auxiliary output	See below. ✻2	Synchronized with Instant Safety Output.

Note: Grounding
Be sure to ground externally, such as at the power supply.

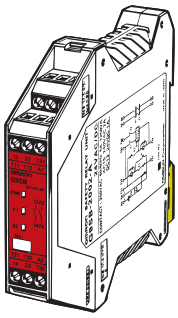
✻1. Safety Inputs
(1) G9SB-3010 directly cuts off power, and has no Safety Input.
(2) For 1-channel input with G9SB-□□□-B/D, short circuit T12-T22 and then input.
(3) With G9SB-□□□2-A/C, 1-channel input wiring is not possible.

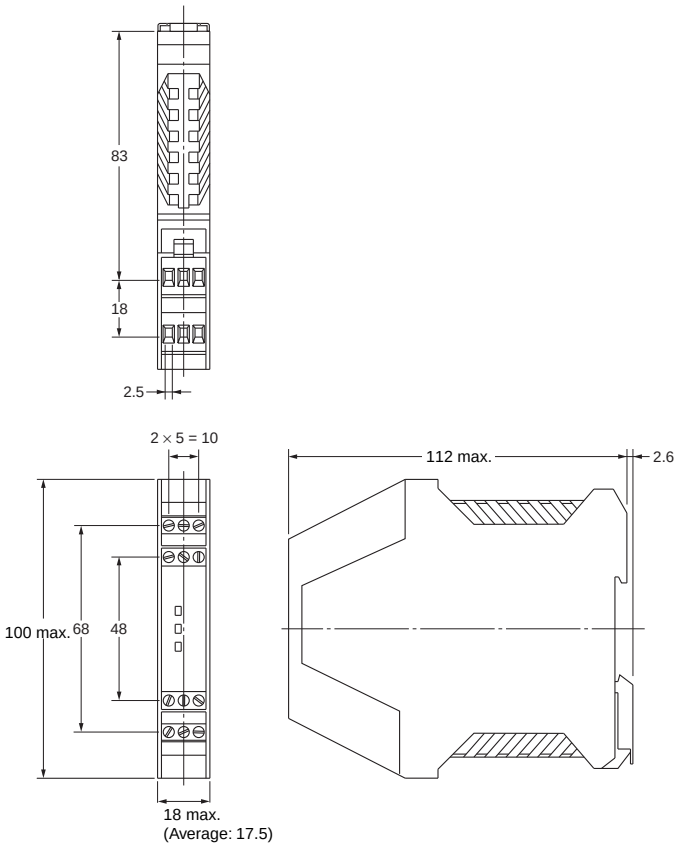
✻2. Output Contacts
G9SB-2002-A/C: Safety Output Contacts 13-14, 23-24.
G9SB-3012-A/C: Safety Output Contacts 13-14, 23-24, 33-34. Auxiliary Contact 41-42.
G9SB-200-B/D: Safety Output Contacts 13-14, 23-24.
G9SB-301-B/D: Safety Output Contacts 13-14, 23-24, 33-34. Auxiliary Contact 41-42.
G9SB-3010: Safety Output Contacts 13-14, 23-24, 33-34. Auxiliary Contact 41-42.

Dimensions and Terminal Arrangement

(Unit: mm)

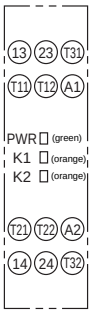
G9SB-200□-□
G9SB-3010



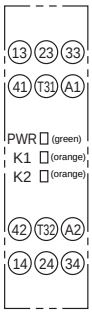


Terminal Arrangement

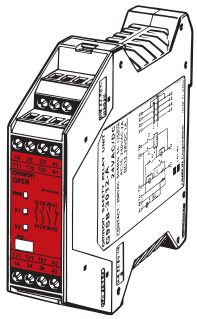
G9SB-200□-□

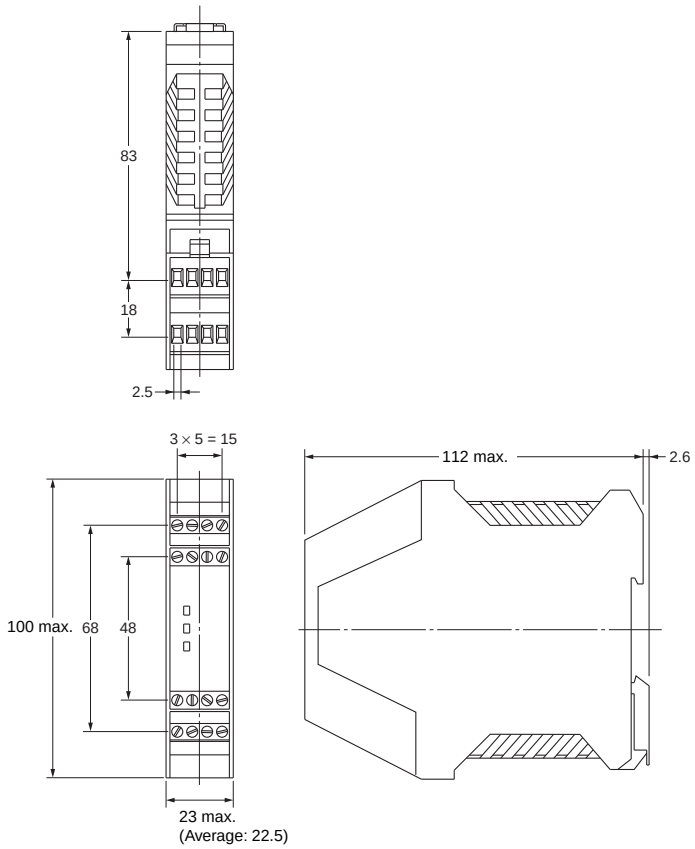


G9SB-3010



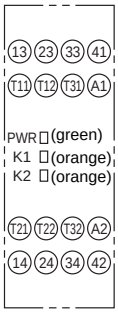
G9SB-301-□-□





Terminal Arrangement

G9SB-301-□-□



Application Examples

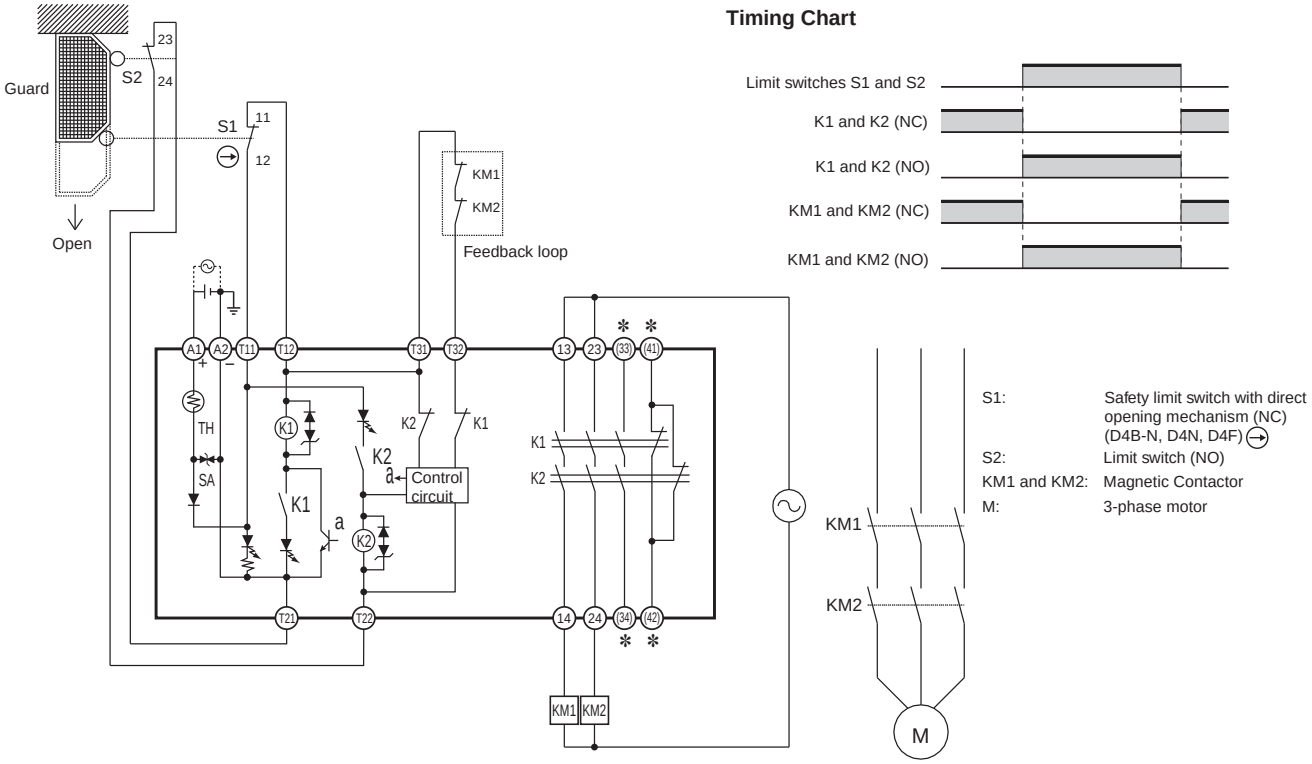
G9SB-2002-A (24 VAC/VDC) or G9SB-3012-A (24 VAC/VDC) with 2-channel Limit Switch Input/Auto-reset

PL/safety category	Model	Stop category	Reset
PLe/4 equivalent	Safety Limit Switch D4B-N/D4N/D4F Safety Relay Unit G9SB	0	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

- The power supply to the motor M is turned OFF when the S1 and S2 detect that the guard is opened.
- The power supply to the motor M is kept OFF until the guard is closed.



Note: External connections and timing charts for G9SB-200-B/301-B models are the same as those for G9SB-2002-A/3012-A models.
✻Only the G9SB-3012-A model has terminals 33-34 and 41-42.

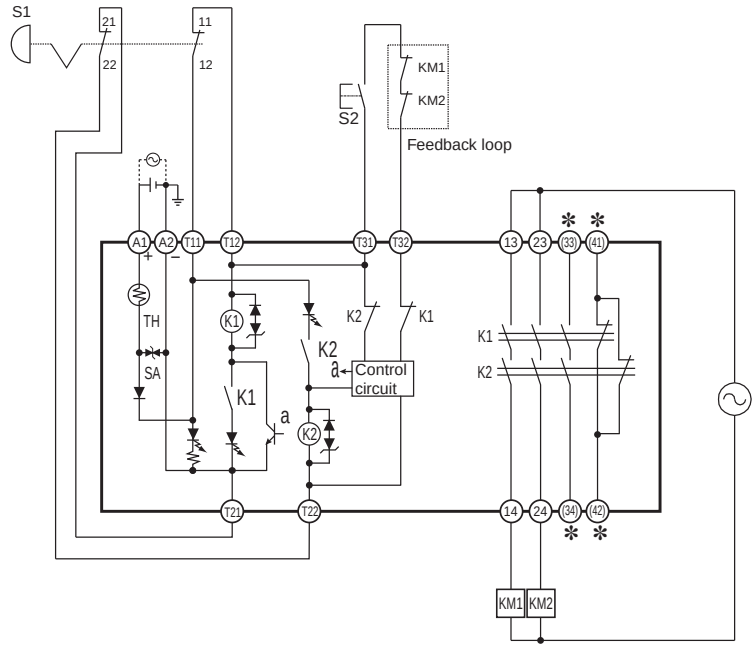
G9SB-2002-C (24 VAC/VDC) or G9SB-3012-C (24 VAC/VDC) with 2-channel Emergency Stop Switch Input/Manual Reset

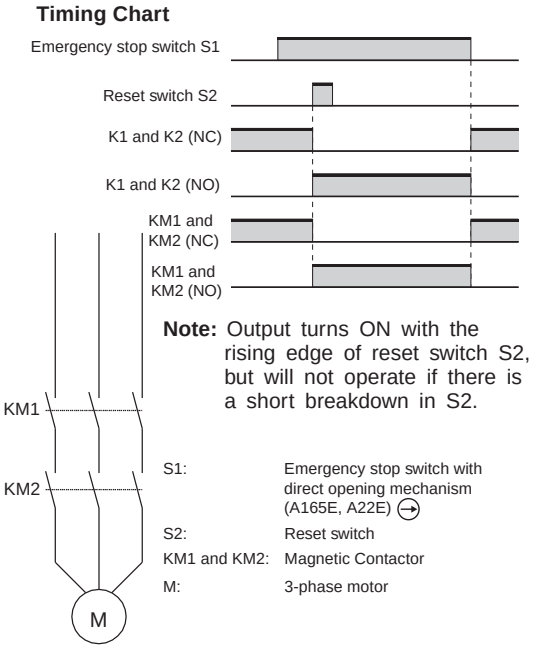
PL/safety category	Model	Stop category	Reset
PLe/4 equivalent	Emergency stop switch A165E/A22E Safety Relay Unit G9SB	0	Manual

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

- The power supply to the motor M is turned OFF when the emergency stop switch S1 is pressed.
- The power supply to the motor M is kept OFF until the reset switch S2 is pressed while the emergency stop switch is released.





Note: Output turns ON with the rising edge of reset switch S2, but will not operate if there is a short breakdown in S2.

S1:	Emergency stop switch with direct opening mechanism (A165E, A22E)
S2:	Reset switch
KM1 and KM2:	Magnetic Contactor
M:	3-phase motor

Note: External connections and timing charts for G9SB-200-D/301-D models are the same as those for G9SB-2002-C/3012-C models.
✻Only the G9SB-3012-C model has terminals 33-34 and 41-42.

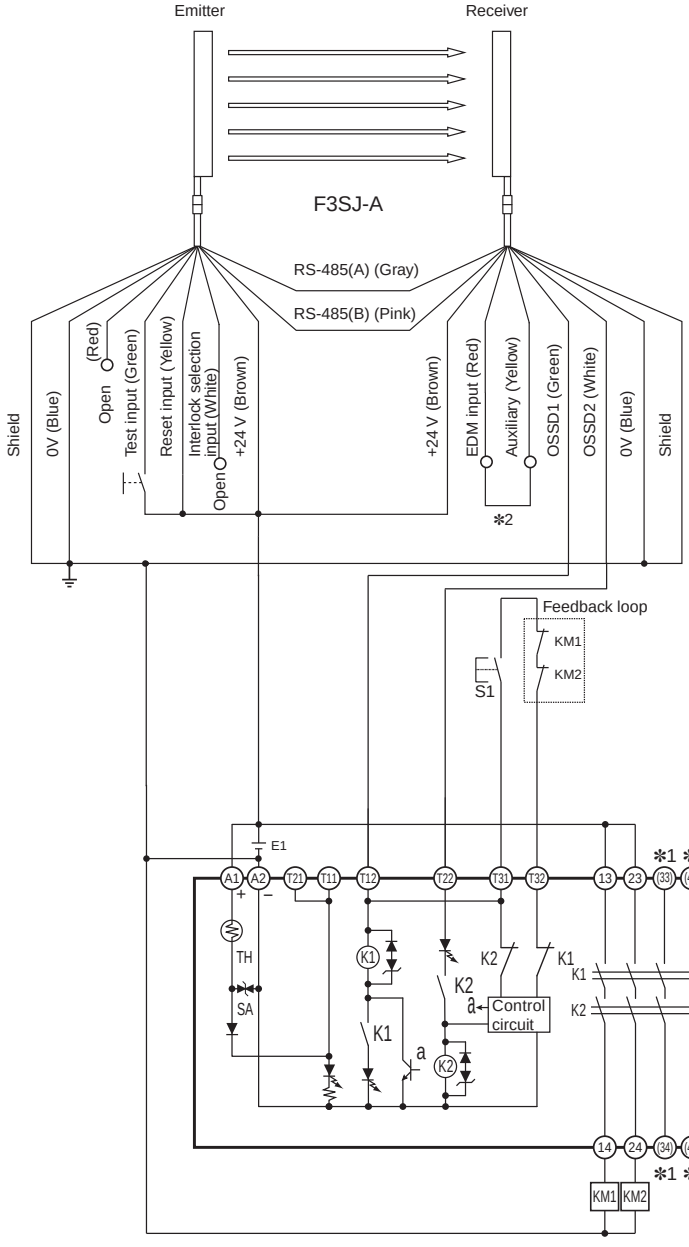
G9SB-200-D (24 VAC/VDC) or G9SB-301-D (24 VAC/VDC) with 2-channel Safety Sensor/Manual Reset (PNP models only)

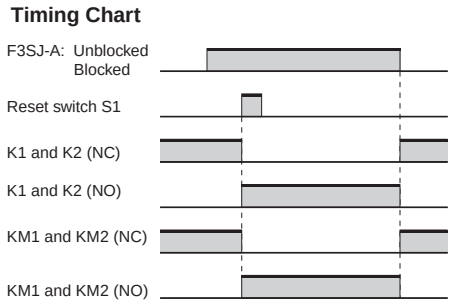
PL/safety category	Model	Stop category	Reset
PLe/4 equivalent	Safety Light Curtain F3SJ-A□□□□P□□ Safety Relay Unit G9SB	0	Manual

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

- The power supply to the motor M is turned OFF when the beam is blocked.
- The power supply to the motor M is kept OFF until the beam is unblocked and the reset switch S1 is pressed.





Note: Output turns ON with the rising edge of reset switch S1, but will not operate if there is a short breakdown in S1.

F3SJ-A:	Safety Sensor
S1:	Reset switch
KM1 and KM2:	Magnetic Contactor
M:	3-phase motor
E1:	24-VDC power supply (S82K)

✻1. Only the G9SB-301-D model has terminals 33-34 and 41-42.
✻2. Wiring is shown for when the F3SJ-A auxiliary output turns ON for light interruption.

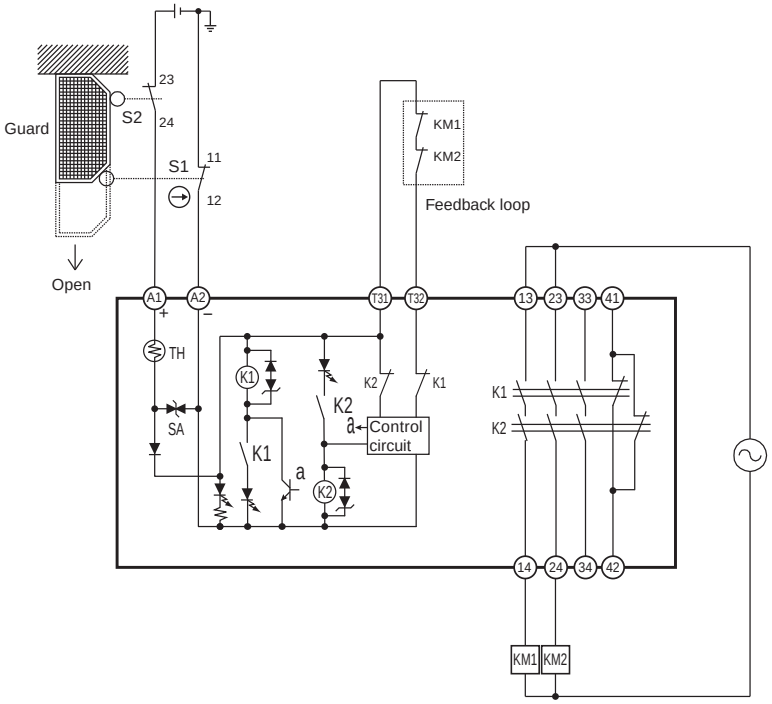
G9SB-3010 (24 VDC) with 2-channel Limit Switch Input/Auto-reset

PL/safety category	Model	Stop category	Reset
PLd/3 equivalent	Safety Limit Switch D4B-N/D4N/D4F Safety Relay Unit G9SB	0	Auto

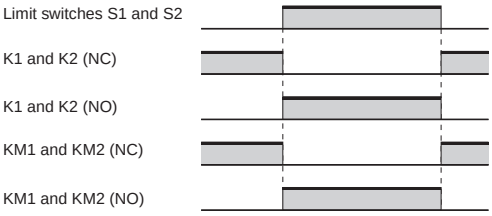
Note: The above PL is only the evaluation result of the example. The PL must be evaluated in an actual application by the customer after confirming the usage conditions.

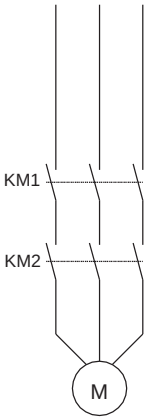
● Application Overview

- The power supply to the motor M is turned OFF when the S1 and S2 detect that the guard is opened.
- The power supply to the motor M is kept OFF until the guard is closed.



Timing Chart





S1: Safety limit switch with direct opening mechanism (NC) (D4B-N, D4N, D4F)
S2: Limit switch (NO)
KM1 and KM2: Magnetic Contactor
M: 3-phase motor

Safety Precautions

Be sure to read the precautions *"Precautions for All Relays" and "Precautions for All Relays with Forcibly Guided Contacts"* in the website at:http://www.ia.omron.com/.

⚠ CAUTION

Turn OFF the G9SB before wiring the G9SB. Do not touch the terminals of the G9SB while the power is turned ON, because the terminals are charged and may cause an electric shock.

Precautions for Correct Use

Failure Detection for Slow-starting Power Supply

When using a power supply with a long start-up time, if power is switched on while input has been closed the internal circuits will detect a power voltage error and the product will not operate. Apply the voltage to the product once the voltage has reached its rated level.

Installation

The G9SB can be installed in any direction.

Wiring

- Use the following to wire the G9SB.
  Stranded wire: 0.2 to 2.5 mm^2
  Solid wire: 0.2 to 2.5 mm^2
- Tighten each screw to a torque of 0.5 to 0.6 N·m, or the G9SB may malfunction or generate heat.
- External inputs connected to T11 and T12 or T21 and T22 of the G9SB must be no-voltage contact inputs.
- Strip the wires by 7 mm max.

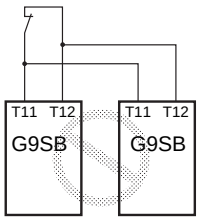
Mounting Multiple Units

When mounting multiple Units close to each other, the rated current will be 3 A. Do not apply a current higher than 3 A.

Connecting Inputs

If using multiple G9SB models, inputs cannot be made using the same switch. This is also true for other input terminals.

Incorrect



Ground Shorts

A positive thermistor (TH) is built into the G9SB internal circuit to detect ground shorts and shorts between channels 1 and 2. When such faults are detected, the safety outputs are interrupted. (Only G9SB-2002-□/3012-□ is able to detect shorts between channels 1 and 2.)
If the short breakdown is repaired, the G9SB automatically recovers.

Note: In order to detect earth short breakdowns, connect the minus side of the power supply to ground.

Resetting Inputs

When only channel 1 of the 2-channel input turns OFF, the safety output is interrupted. In order to restart when this happens, it is necessary to turn OFF and ON both input channels. It is not possible to restart by resetting only channel 1.

Durability of Contact Outputs

Relay with Forcibly Guided Contact durability depends greatly on the switching condition. Confirm the actual conditions of operation in which the Relay will be used in order to make sure the permissible number of switching operations.
When the accumulated number of operation exceeds its permissible range, it can cause failure of reset of safety control circuit. In such case, please replace the Relay immediately. If the Relay is used continuously without replacing, then it can lead to loss of safety function.

Applicable Safety Category (EN ISO13849-1)

G9SB-200□-□/301□-□ meet the requirements of Safety Category 4 of EN ISO13849-1 when they are used as shown in the examples provided by OMRON. Relays may not meet the standards in some operating conditions. The G9SB-3010 can be applied to Safety Category 3 of EN ISO 13849-1 using double breaking.
The applicable safety category is determined from the whole safety control system. Make sure that the whole safety control system meets EN ISO 13849-1 requirements.

Certified Standards

The G9SB-200□-□/3010/301□-□ conforms to the following standards.

- EN standards, certified by TÜV Rheinland:
  EN60204-1
  EN60947-1
  EN60947-5-1
  EN ISO13849-1
  EN62061
  IEC61496-1
  EN81-1, EN81-2
- UL standards: UL508 (Industrial Control Equipment)
- CSA standards: CSA C22.2 No. 14 (Industrial Control Equipment)
- CCC Certification: GB14048.5

Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

2012.12

In the interest of product improvement, specifications are subject to change without notice.

OMRON Corporation
Industrial Automation Company

http://www.ia.omron.com/

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for omron ***manufacturer:***

Other Similar products are found below :

G9ED-1-B-AQ-DC24 E3X-SD11 2M S8VM-10024C R88A-CCW002P2 S82Y-VM30D H3AM-NS-A AC100-240 G3NA-440B-2 DC5-24 XF2J-0824-11A-R100 G3NA-425B-2 DC5-24 XF2J-0824-12A G8JN-1C7T-R-DC12 G8VA-1A4T-R01-DC12 G8HE-1A7T-R-DC12 XF2W-2415-1A XF2U-3015-3A G8V-RH-1A7T-R-DC12 LY1D-2-5S-AC120 M165-JR-24D M16-TG-24D CS1G-CPU43-E M22CAT1 61F-GP-NT AC110 M7E-01DGN2-B M7E-02DGN2 M7E-08DRN2 M7E-20DRN1 M7E-HRN2 M8PHWS D2HW-C233MR F03-02 SUS316 F150LTC20 F3SJ-A0245P30 F3STGRNSMC21M1J8 F3UVHM MG2-US-AC24 MK2EP-UA-AC6V MK2PNIAC240 MK310E-DC24 MKS2XTIN-11 DC110 MM4KPAC120NC MM4XPAC120 G2Q-184P-V-DC5 G2R-1114P-V-US-DC5 G2R13SNDDC24 G2RL-2A4-CF-DC48 G2U-114P-US-DC12 G2V-234P-US-DC48 G3CA-8H-AC100/110/120 G3PA-210B-US-DC24 G3PE525B3NDC1224