Safety Relay Unit
G9SB

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.

Ordering Information

Main contacts	Auxiliary contact	Number of input channels	Reset mode	Input type	Rated voltage	Model	Category
DPST-NO	None	2 channels	Auto-reset	Inverse	24 VAC/VDC	G9SB-2002-A	4
		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 (See note.)	3
		2 channels		Inverse	24 VAC/VDC	G9SB-3012-A	4
		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: The G9SB-3010 can be applied to Safety Category 3 of the EN954-1 if double breaking is used.

Model Number Structure

■ Model Number Legend

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

Specifications

■ Ratings

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	1.6 VA/1.4 W max.	1.7 W max.	2.0 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		
Rated load	250 VAC, 5 A 30 VDC, 5 A		
Rated carry current	5 A		

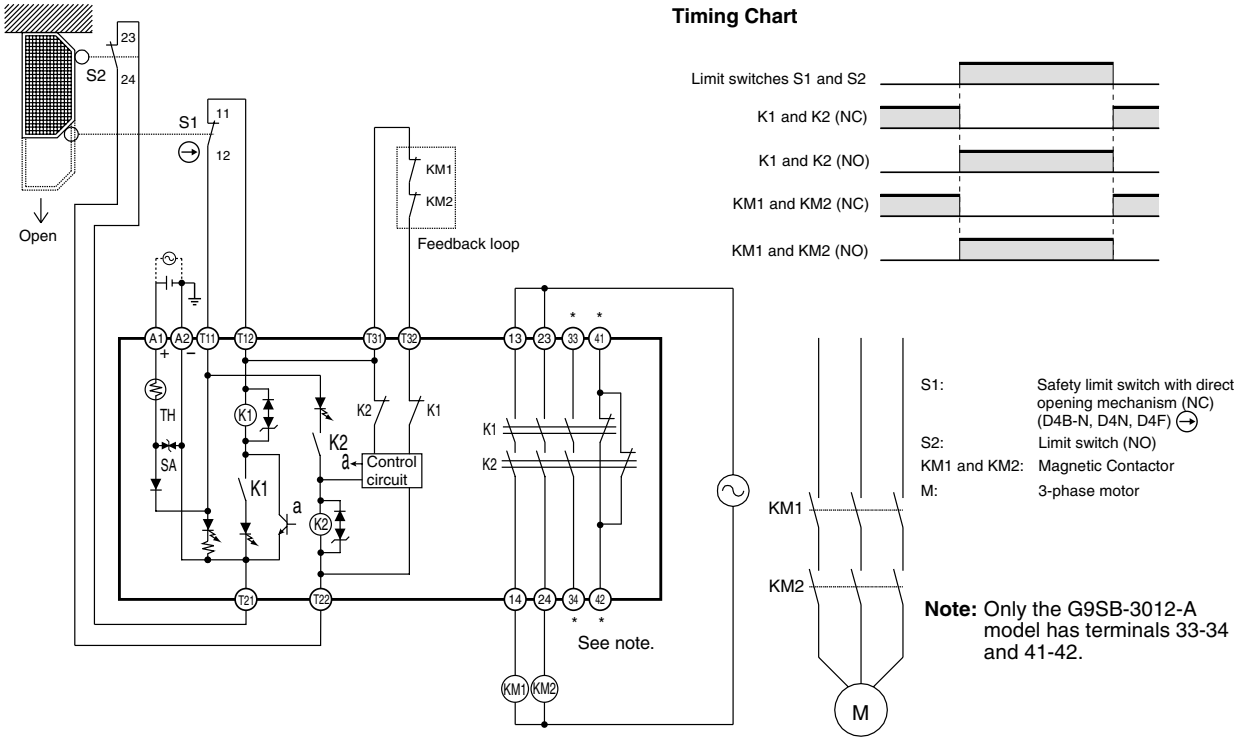
■ Characteristics

Item		G9SB-200□-□	G9SB-3010	G9SB-301□-□
Contact resistance (See note 1.)		100 mΩ		
Operating time (See note 2.)		30 ms max.		
Response time (See notes 2 and 3.)		10 ms max.		
Insulation resistance (See note 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 (See note 5.)	**Mechanical**	5,000,000 operations min. (at approx. 7,200 operations/hr)		
	Electrical	100,000 operations min. (at approx. 1,800 operations/hr)		
Error 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

Note: 1. The contact resistance was measured with 1 A at 5 VDC using the voltage-drop method.
2. The bounce time is included.
3. The response time is the time it takes for the main contact to open after the input is turned OFF.
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°C to 35°C and an ambient humidity of 25% to 75%.

Application Examples

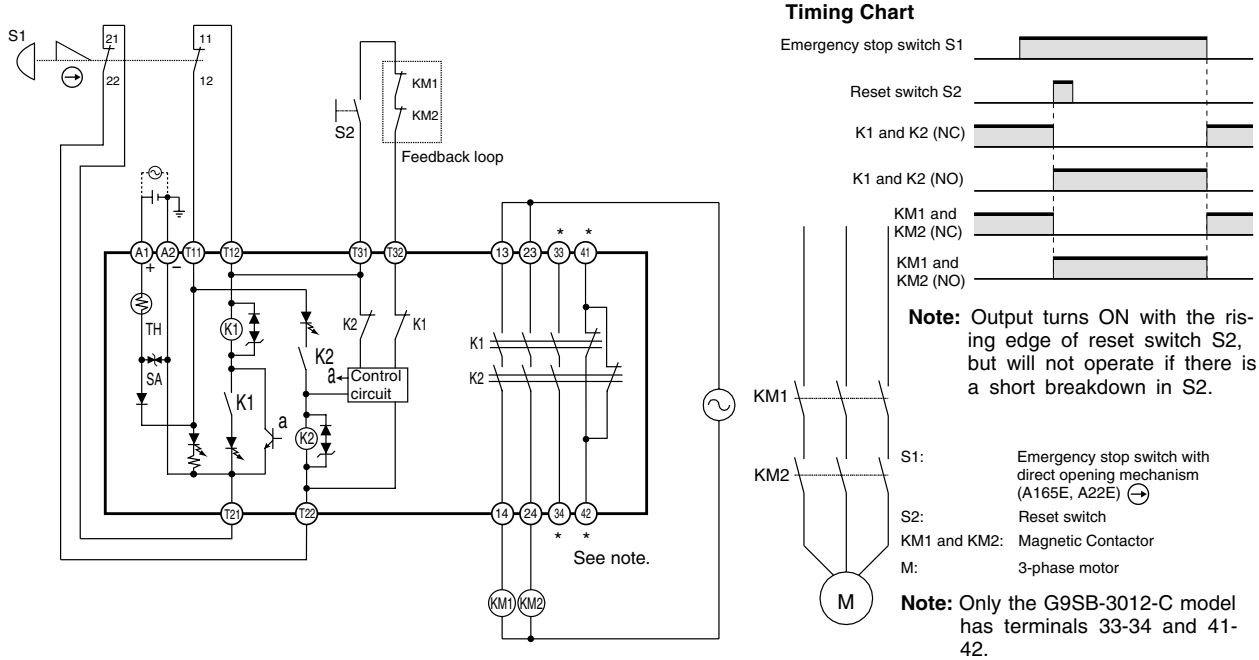
G9SB-2002-A (24 VAC/VDC) or G9SB-3012-A (24 VAC/VDC) with 2-channel Limit Switch Input/ Auto-reset



Note: 1. External connections and timing charts for G9SB-200-B/301-B models are the same as those for G9SB-2002-A/3012-A models.

2. This circuit conforms to EN954-1 Safety Category 4.

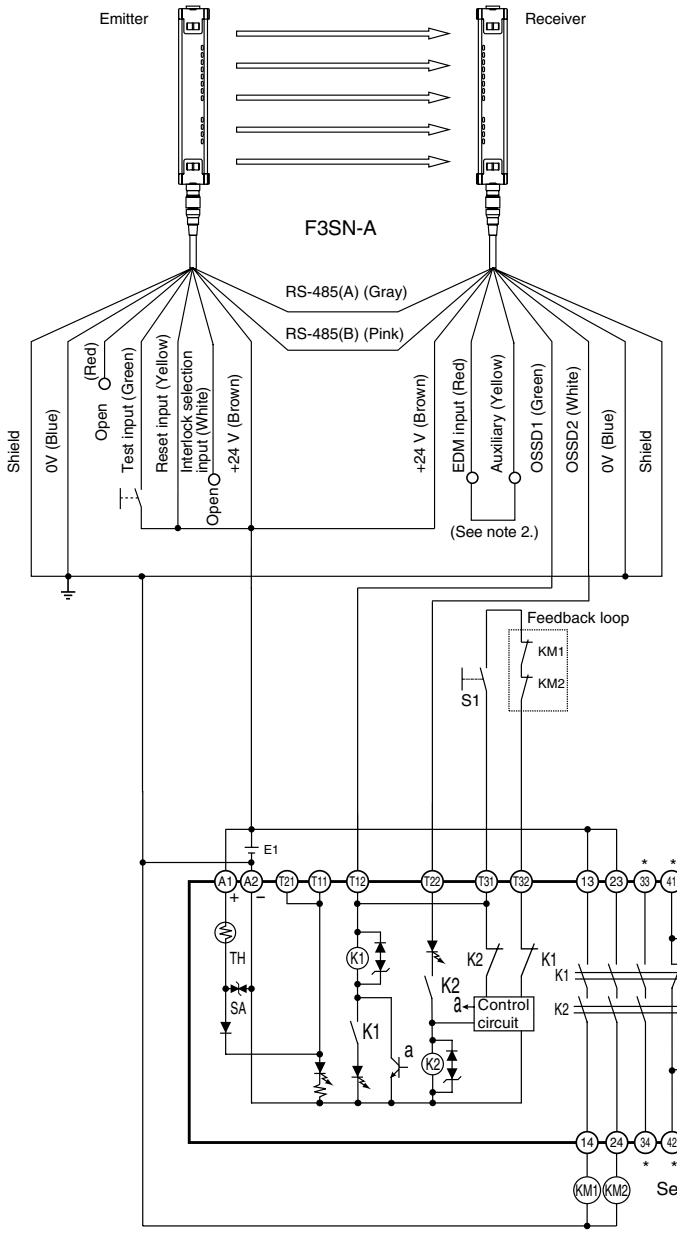
G9SB-2002-C (24 VAC/VDC) or G9SB-3012-C (24 VAC/VDC) with 2-channel Emergency Stop Switch Input/Manual Reset



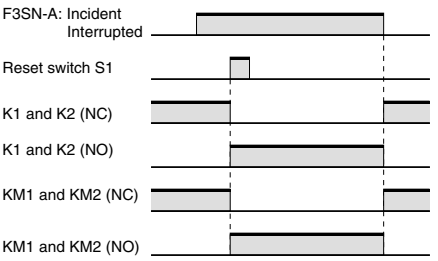
Note: 1. External connections and timing charts for G9SB-200-D/301-D models are the same as those for G9SB-2002-C/3012-D models.

2. This circuit conforms to EN954-1 Safety Category 4.

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

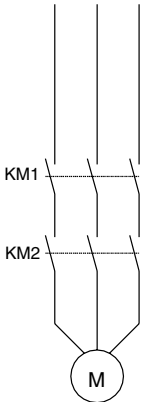


Timing Chart



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

F3SN-A:	Safety Area Sensor
S1:	Reset switch
KM1 and KM2:	Magnetic Contactor
M:	3-phase motor
E1:	24-VDC power supply (S82K)

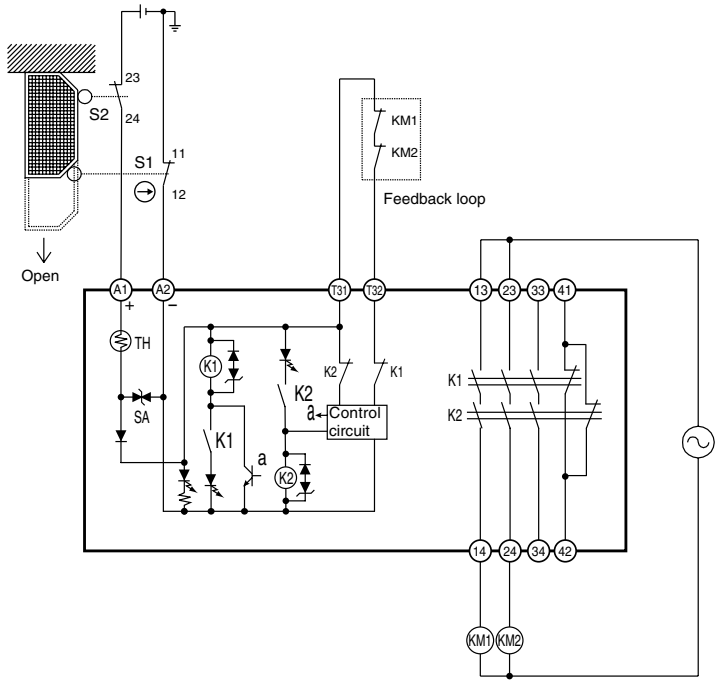


Note: 1. Only the G9SB-301-D model has terminals 33-34 and 41-42.

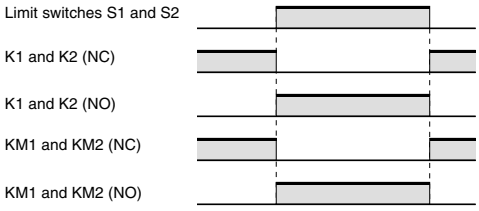
2. Wiring is shown for when the F3SN-A auxiliary output turns ON for light interruption.

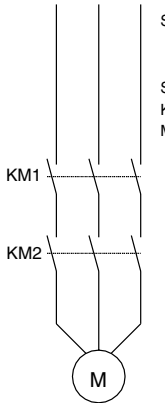
Note: This circuit conforms to EN954-1 Safety Category 4.

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



Timing Chart



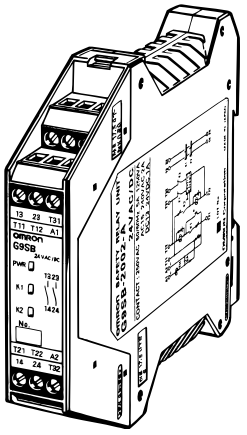


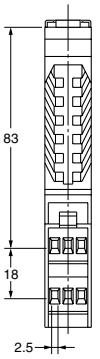
S1: Safety limit switch with direct opening mechanism (NC) (D4B-N, D4N, D4F)
S2: Limit switch (NO)
KM1 and KM2: Magnetic Contactor
M: 3-phase motor

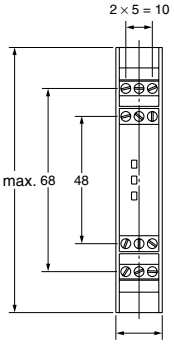
Note: This circuit conforms to EN954-1 Safety Category 3.

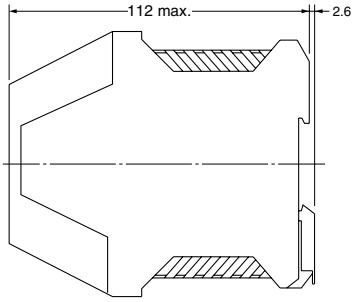
Dimensions

G9SB-200□-□
G9SB-3010



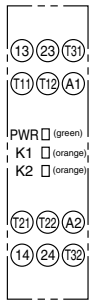






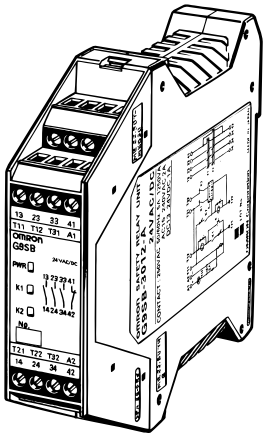
Terminal Arrangement

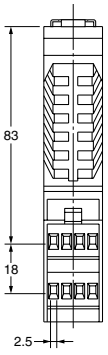
G9SB-200□-□

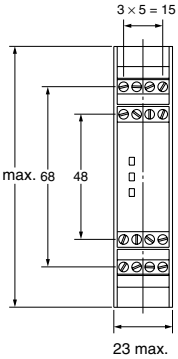


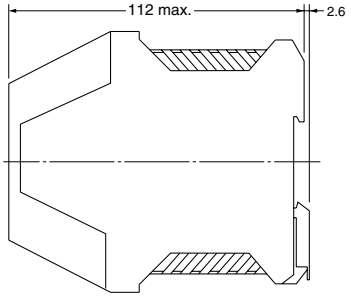
G9SB-3010

G9SB-301-□-□



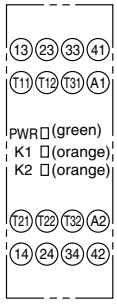






Terminal Arrangement

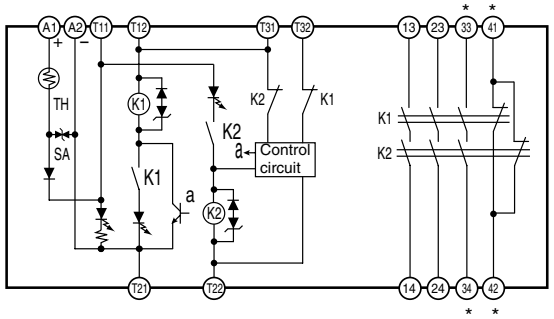
G9SB-301-□-□



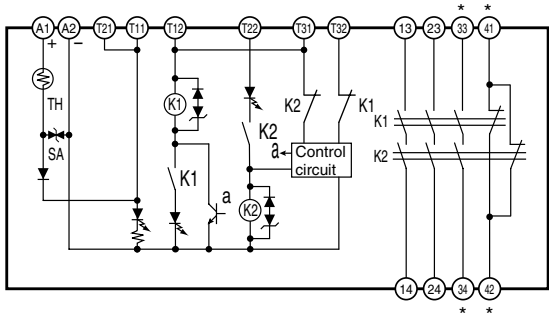
Installation

■ Internal connections

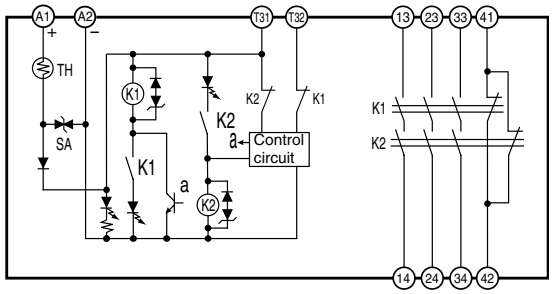
G9SB-2002-A/C (24 VAC/VDC)
G9SB-3012-A/C (24 VAC/VDC)



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.

Safety Precautions

⚠ 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

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.

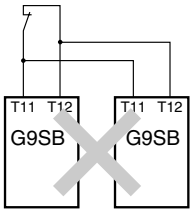
External inputs connected to T11 and T12 or T21 and T22 of the G9SB must be no-voltage contact inputs.

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.



Earth Shorts

A positive thermistor is built into the G9SB circuits, so you can detect earth short breakdowns and breakdown shorts between channel 1 and channel 2. (Detection of breakdown shorts between channel 1 and channel 2 is supported for G9SB-2002-□/3012-□ models only.)

The G9SB will recover automatically when the short fault is cleared.

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

■ Applicable Safety Category (EN954-1)

G9SB-200□-□/301□-□ meet the requirements of Safety Category 4 of the EN954-1 standards 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 the EN954-1 using double breaking.

The applicable safety category is determined from the whole safety control system. Make sure that the whole safety control system meets EN954-1 requirements.

■ Approved Standards

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

- EN standards, certified by TÜV:
  EN954-1
  EN60204-1
- Conformance to EMC (Electromagnetic Compatibility), certified by TÜV Rheinland
  EMI (Emission): EN55011 Group 1 Class A
  EMS (Immunity): EN61000-6-2
- UL standards: UL508 (Industrial Control Equipment)
- CSA standards: CSA C22.2 No. 14 (Industrial Control Equipment)