

## Less Wiring Required with Safety Light Curtain

- Sensor connector allows direct connection to OMRON F3SJ Safety Light Curtains with PNP outputs.
- Reduces wiring and prevents incorrect connection.
- Connection to emergency stop switch also supported.
- Conforms to EN standards (TÜV approval).
- DIN track mounting possible.



Be sure to read the "Safety Precautions" on page 8.

## Model Number Structure

### Model Number Legend

G9SA-□□□□□□-□□  
 1 2 3 4 5 6

- |  |  |
|--|--|
| <p><b>1. Function</b><br/>None: Emergency stop</p> <p><b>2. Contact Configuration (Safety Output)</b><br/>3: 3PST-NO</p> <p><b>3. Contact Configuration (OFF-delay Output)</b><br/>0: None</p> | <p><b>4. Contact Configuration (Auxiliary Output)</b><br/>0: None</p> <p><b>5. Input Configuration</b><br/>None: 1-channel or 2-channel input possible</p> <p><b>6. Terminal</b><br/>SC: Connector terminals</p> |
|--|--|

## Ordering Information

### Safety Relay Unit

#### Emergency-stop Unit with Sensor Connector

Main contact	Auxiliary contact	Number of input channels	Rated voltage	Model
3PST-NO	None	2 channels	24 VDC	G9SA-300-SC

- Note:** 1. Connect to the sensor connector using a special OMRON F3SJ Safety Light Curtain Connecting Cable. For details, refer to the information on accessories below.  
 2. The Safety Light Curtain and Connecting Cable are sold separately.

### Accessories (Order Separately)

#### Connecting Cables (for F3SJ - G9SA-300-SC connection only)

Appearance	Cable length	Model
	0.2 m	F39-JCR2C
	1 m	F39-JC1C
	3 m	F39-JC3C
	7 m	F39-JC7C
	10 m	F39-JC10C
	15 m	F39-JC15C

- Note:** 1. The model numbers given in the table are for sets of two Cables, one for the emitter and one for the receiver.  
 2. F3SP-JD□□ (F3SJ - F3SP-B1P Connecting Cables) cannot be used.

## Specifications

### Ratings

#### Power Input

Item	Model	G9SA-300-SC
Power supply voltage		24 VDC
Operating voltage range		85% to 110% of rated power supply voltage
Power consumption		24 VDC: 0.7 W max.

#### Inputs

Item	Model	G9SA-300-SC
Input current		40 mA max.

#### Contacts

Item	Model	G9SA-300-SC
	Load	Resistive load
Rated load		250 VAC, 5 A 30 VDC, 5 A
Rated carry current		5 A

### Characteristics

Item	Model	G9SA-300-SC
Contact resistance *1		100 mΩ
Operating time *2		300 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 <sup>2</sup>
	Malfunction	100 m/s <sup>2</sup>
Durability	Mechanical	5,000,000 operations min. (at approx. 7,200 operations/h)
	Electrical	100,000 operations min. (at approx. 1,800 operations/h, rated load)
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		0.98 N·m
Weight		Approx. 300 g

\*1. The contact resistance was measured with 1 A at 5 VDC using the voltage-drop method.

\*2. Not including bounce time.

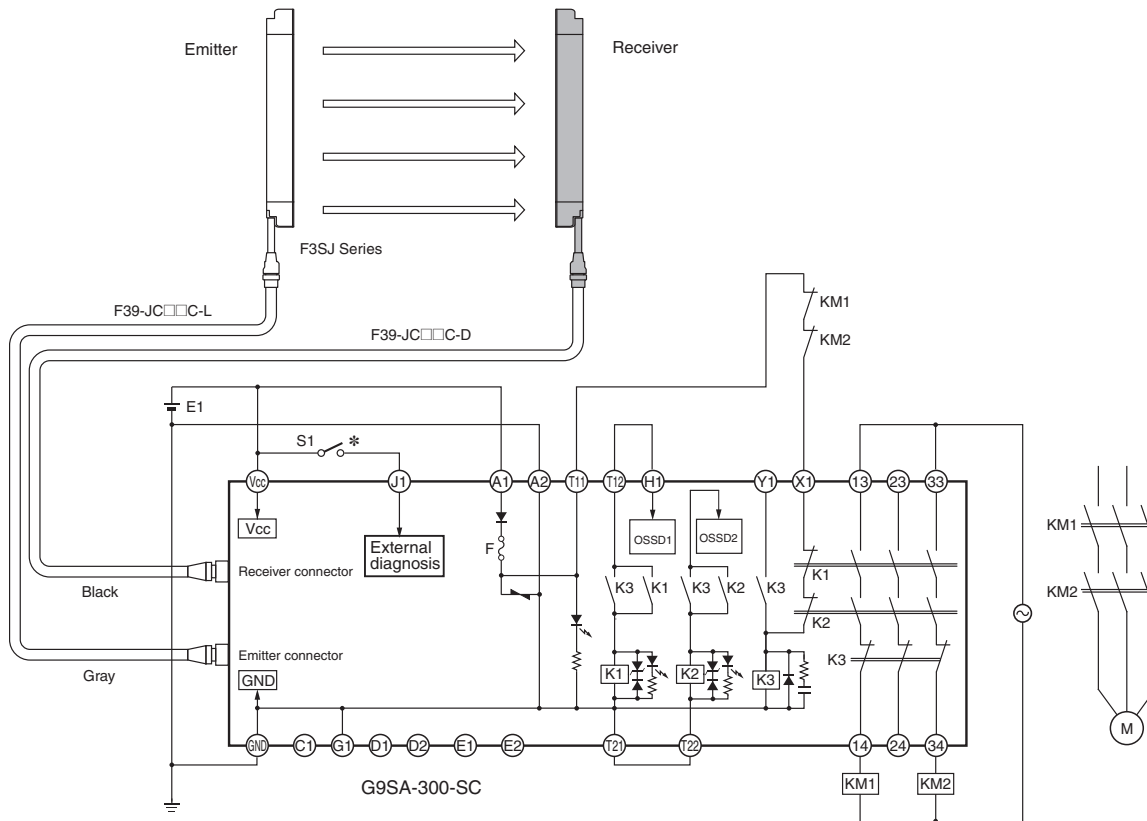
\*3. The response time is the time it takes for the main contact to turn OFF after the input is turned OFF. Includes bounce time.

\*4. The insulation resistance was measured with 500 VDC at the same places that the dielectric strength was checked.



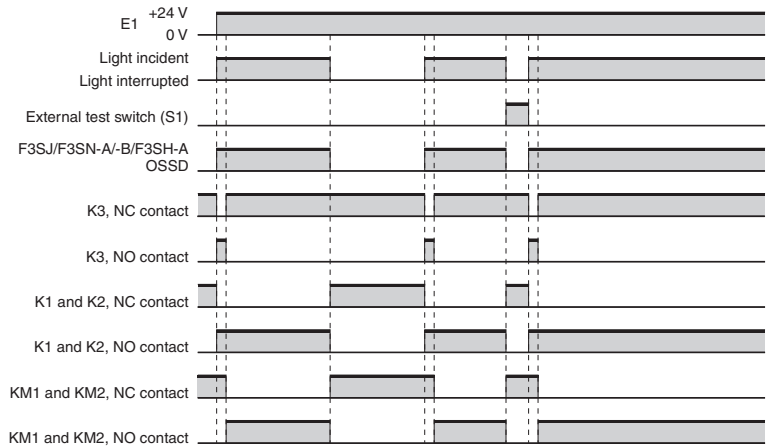
# Application Examples

## Connection to Safety Light Curtain Only (Auto-reset)



- S1: External test switch
- KM1 and KM2: Magnetic Contactors
- M: 3-phase motor
- E1: 24-VDC Power Supply (S82K)

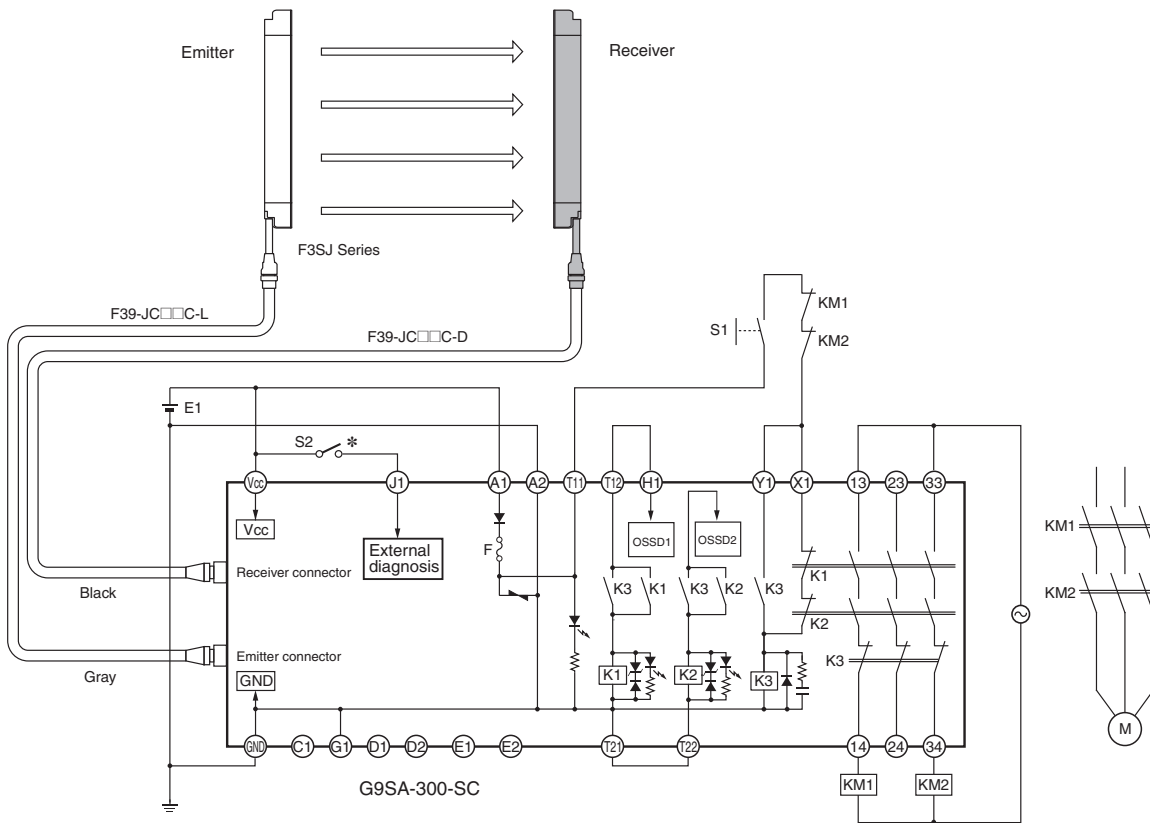
### Timing Chart



- Note: 1.** The Safety Light Curtain EDM function and auxiliary outputs cannot be used.
- 2.** Do not connect anything to terminals C1, D1, D2, E1, and E2.

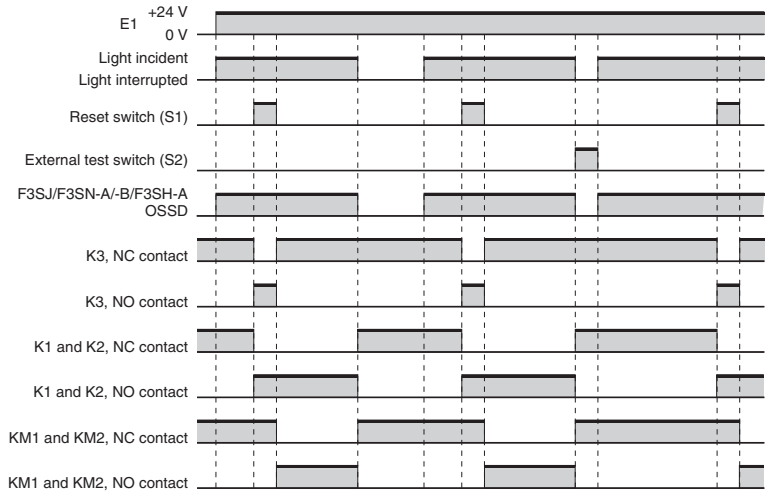
\* The Unit performs normal operation when S1 is open and external diagnosis when it is closed.

Connection to Safety Light Curtain Only (Manual Reset)



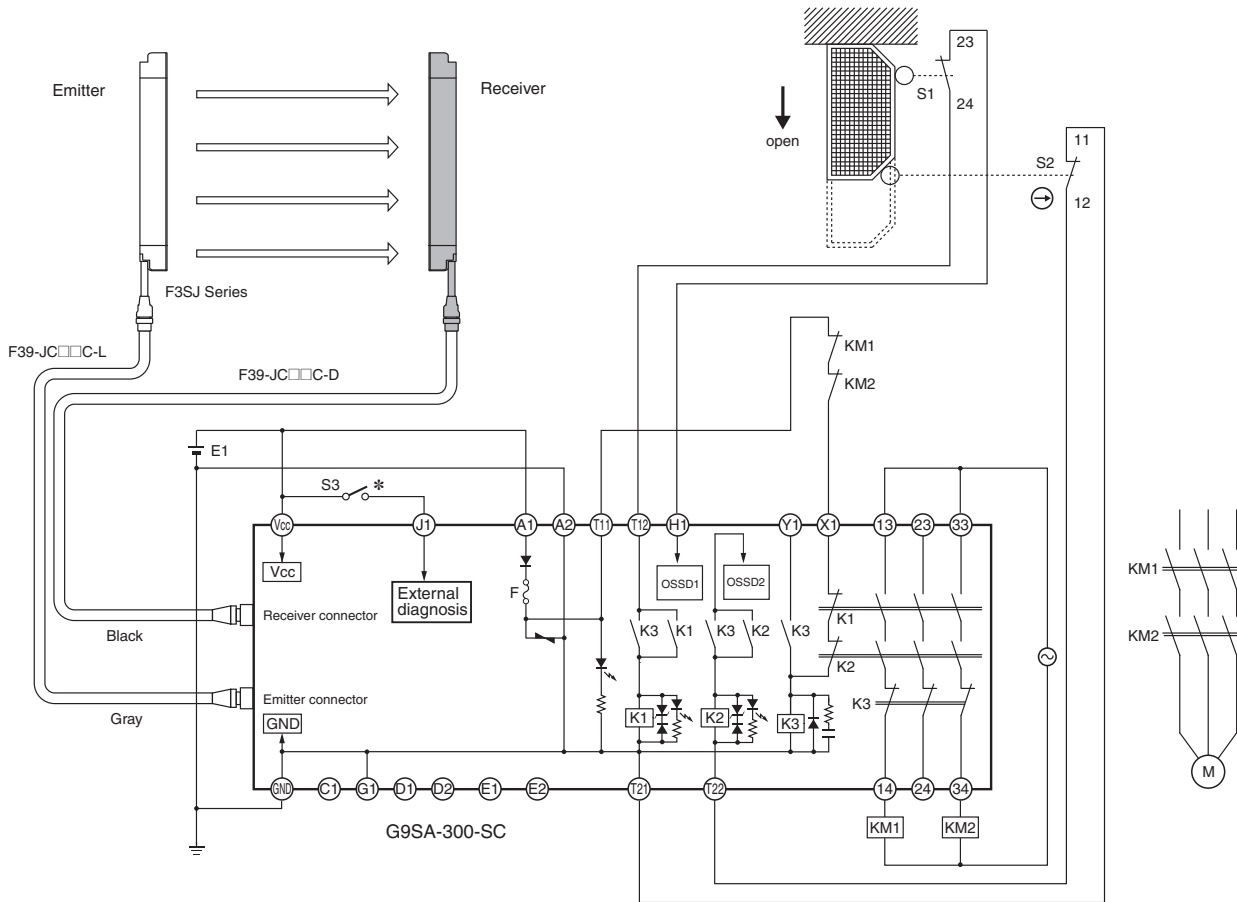
- S1: Reset switch (momentary action switch)
- S2: External test switch
- KM1 and KM2: Magnetic Contactors
- M: 3-phase motor
- E1: 24-VDC Power Supply (S82K)

Timing Chart



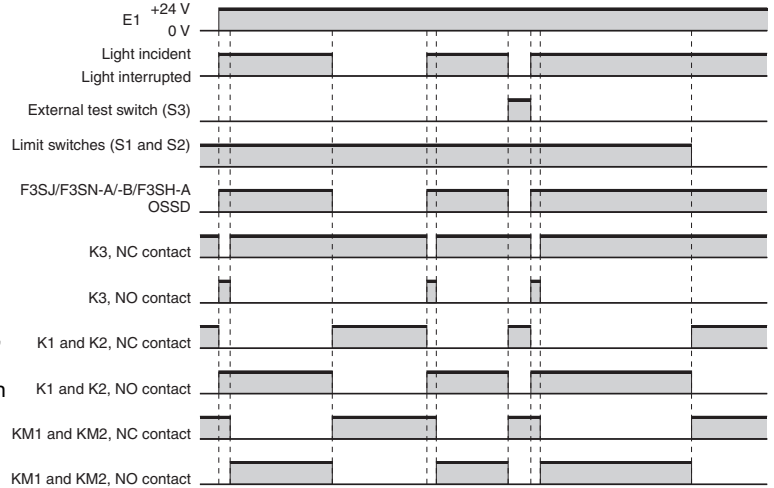
- Note:**
1. The Safety Light Curtain EDM function and auxiliary outputs cannot be used.
  2. Do not connect anything to terminals C1, D1, D2, E1, and E2.
- \* The Unit performs normal operation when S2 is open and external diagnosis when it is closed.

Connection to Safety Light Curtain and Two Channels of Limit Switch Input (Auto-reset)



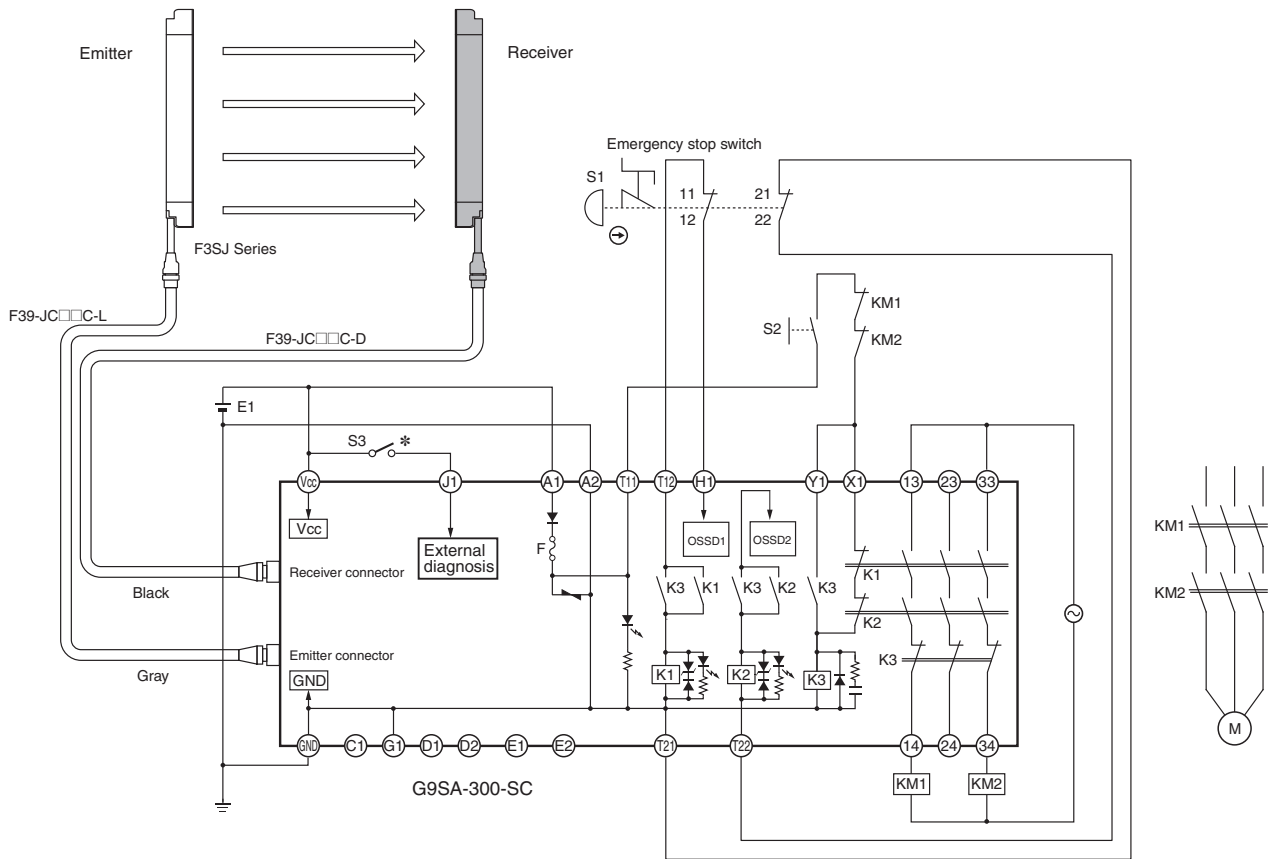
- S1: Limit switch (NO)
- S2: Safety Limit Switch with direct opening mechanism (NC) (D4B-N, D4N, D4F) ⊖
- S3: External test switch
- KM1 and KM2: Magnetic Contactors
- M: 3-phase motor
- E1: 24-VDC Power Supply (S82K)

Timing Chart



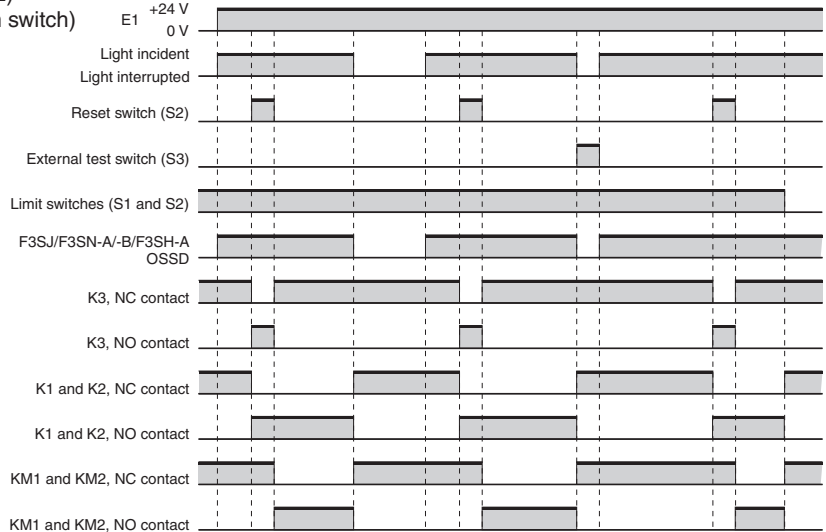
- Note: 1.** The Safety Light Curtain EDM function and auxiliary outputs cannot be used.  
**2.** Do not connect anything to terminals C1, D1, D2, E1, and E2.  
 \* The Unit performs normal operation when S3 is open and external diagnosis when it is closed.

Connection to Safety Light Curtain and Two Channels of Emergency Stop Switch Input (Manual Reset)



Timing Chart

- S1: Emergency stop switch ⊕ (A22E)
- S2: Reset switch (momentary action switch) E1 +24 V
- S3: External test switch 0 V
- KM1 and KM2: Magnetic Contactors
- M: 3-phase motor
- E1: 24-VDC Power Supply (S82K)



**Note: 1.** The Safety Light Curtain EDM function and auxiliary outputs cannot be used.  
**2.** Do not connect anything to terminals C1, D1, D2, E1, and E2.

\* The Unit performs normal operation when S3 is open and external diagnosis when it is closed.

## Safety Precautions

Refer to the “*Precautions for All Relays*” and “*Precautions for All Relays with Forcibly Guided Contacts*”.

### Precautions for Safe Use

- Turn OFF the G9SA-300-SC before wiring the G9SA-300-SC. Do not touch the terminals of the G9SA-300-SC while the power is turned ON, because the terminals are charged and may cause an electric shock.
- To conform to IEC61496-1 and UL508 when using the F3SJ ensure that the DC power supply satisfies all the conditions below.
  - The voltage is within the rated power supply voltage range (24 VDC  $\pm$ 10%).
  - The power supply is connected only to the F3SJ or devices with a direct bearing on the F3SJ's electrical detection protective function, such as Safety Controllers or Muting Sensors. Do not connect it to any other devices or equipment. When connecting more than one device, ensure that the capacity is easily sufficient for the total rated current.
  - The power supply conforms to the EMC Directive (industrial environment).
  - The power supply uses double or reinforced insulation between the primary and secondary circuits.
  - The power supply automatically resets overcurrent protection characteristics (voltage drop).
  - The power supply maintains an output holding time of at least 20 ms.
  - The power supply satisfies the output characteristic requirements of limited voltage/current circuits and Class 2 circuits as defined by UL508.
  - The power supply satisfies laws, regulations, and standards concerning EMC and the safety of electrical devices for the country or region in which it is used. (In the EU, for example, the power supply must conform to the EMC Directive and Low Voltage Directive.)
- Do not connect any device other than the F3SJ-Series with PNP outputs.
- Be sure to mount both the emitter and the receiver in the correct position. (The Sensor will not operate if they are mounting in reverse.)
- For further details on using the Safety Light Curtains, refer to F3SJ-Series User's Manual.

### Precautions for Correct Use

## Applicable Safety Category (ISO 13849-1)

G9SA-300-SC Safety Relay Units fall under PLe/Safety Category 4. The above is provided according to circuit examples presented by OMRON. Therefore, the above may not apply to all operating environments.

The applicable safety category is determined from the whole safety control system. Make sure that the whole safety control system meets ISO 13849-1 requirements.

## 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 G9SA-300-SC can be installed in any direction.

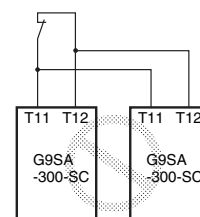
## Wiring

- Use the following to wire the Unit.
  - Stranded wire: 0.75 to 1.5 mm<sup>2</sup>
  - Solid wire: 1.0 to 1.5 mm<sup>2</sup>
- Tighten each screw to a torque of 0.78 to 1.18 N·m, or the Unit may malfunction or generate heat.
- External inputs connected to H1 and T12 or T21 and T22 of the Unit must be no-voltage contact inputs.
- GND is a ground terminal. When a machine is grounded at the positive, the GND terminal cannot be grounded.

## Connecting Inputs

When using more than one G9SA300-SC Unit, do not connect the same switch to more than one G9SA300-SC Unit. This applies to all input terminals.

Incorrect



## 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.

## Certified Standards

The G9SA-300-SC conforms to the following standards.

- EN standards, certified by TÜV Rheinland  
ISO 13849-1  
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)



## Terms and Conditions Agreement

### 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.

### Warranties.

(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

(b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses 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. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

See <http://www.omron.com/global/> or contact your Omron representative for published information.

### Limitation on Liability; Etc.

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

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

### Suitability of Use.

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

### Programmable Products.

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

### Performance Data.

Data presented in Omron Company websites, catalogs and other materials 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 user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

### 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 part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

### Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

2017.4

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

**OMRON Corporation**  
Industrial Automation Company

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

(c)Copyright OMRON Corporation 2017 All Right Reserved.