

# Safety Relay Unit (Sensor Connector Type) G9SA-300-SC

## Less Wiring Required with Safety Light Curtain

- Sensor connector allows direct connection to OMRON F3SN-A/ F3SN-B/F3SH-A 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.



**NEW**



## 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	1 channel or 2 channels possible	24 VDC	G9SA-300-SC

**Note:** Connect to the sensor connector using a special OMRON F3SN-A/F3SN-B/F3SH-A Safety Light Curtain Connection Cord. For details, refer to the information on accessories given below.

### ■ Model Number Legend

G9SA-□□□□□□-□□  
1 2 3 4 5 6

**1. Function**

None: Emergency stop

**2. Contact Configuration (Safety Output)**

3: 3PST-NO

**3. Contact Configuration (OFF-delay Output)**

0: None

**4. Contact Configuration (Auxiliary Output)**

0: None

**5. Input Configuration**


None: 1-channel or 2-channel input possible

**6. Terminal**

SC: Connector terminals

## ■ Accessories (Order Separately)

### Connection Cords (for F3SN-A/F3SN-B/F3SH-A)

Appearance	Cord 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:** The model numbers given in the table are for sets of two Cords, one for the emitter and one for the receiver.

## Specifications

### ■ Ratings

#### Power Input

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

### ■ Characteristics

Item	G9SA-300-SC	
Contact resistance (see note 1)	100 mΩ	
Operating time (see note 2)	300 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 <sup>2</sup>
	Malfunction	100 m/s <sup>2</sup>
Life expectancy	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°C 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	

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

2. These values do not include bounce time.

3. The response time is the time it takes for the main contact to turn OFF 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.

### Approved Standards

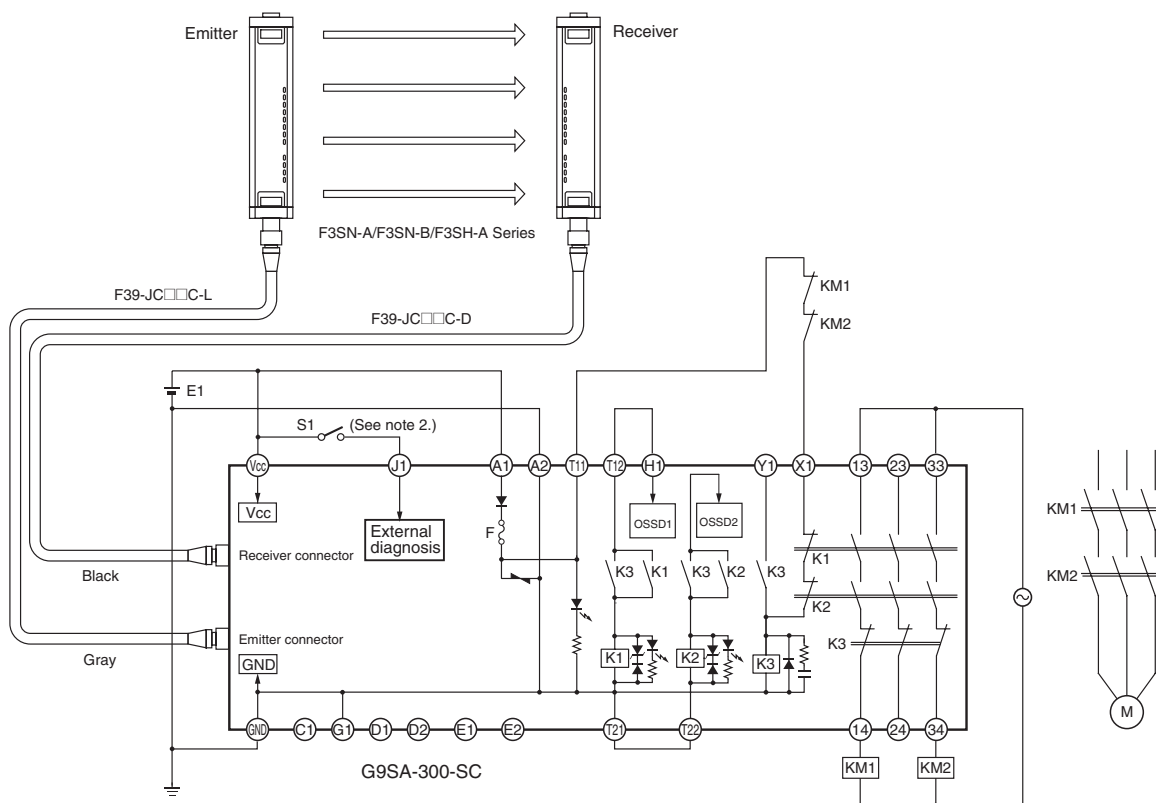
The G9SA-300-SC conforms to the following standards.

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)

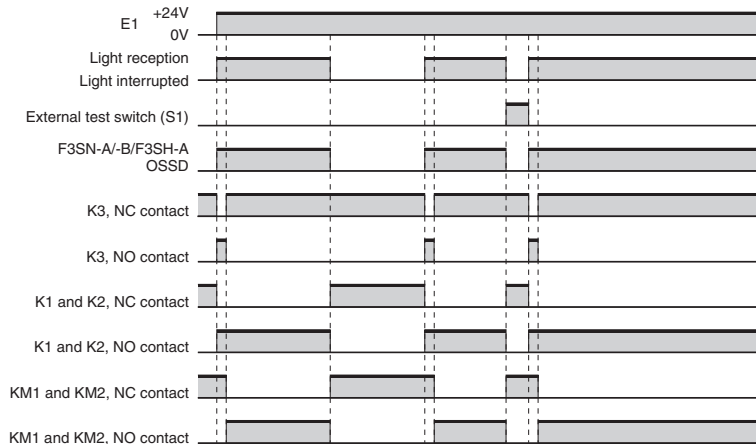
## Application Examples

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



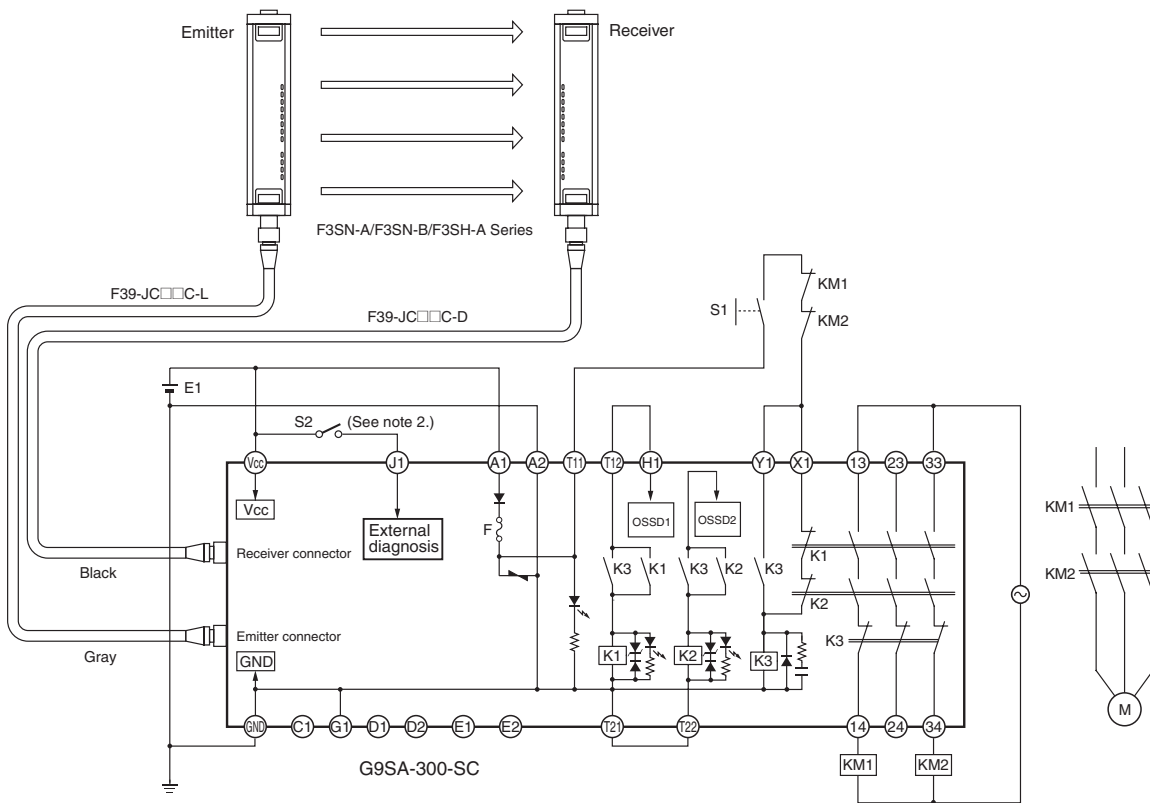
- S1: External test switch
- KM1 and KM2: Magnetic Contactors
- M: 3-phase motor
- E1: 24-VDC Power Supply (S82K)

#### Timing Chart



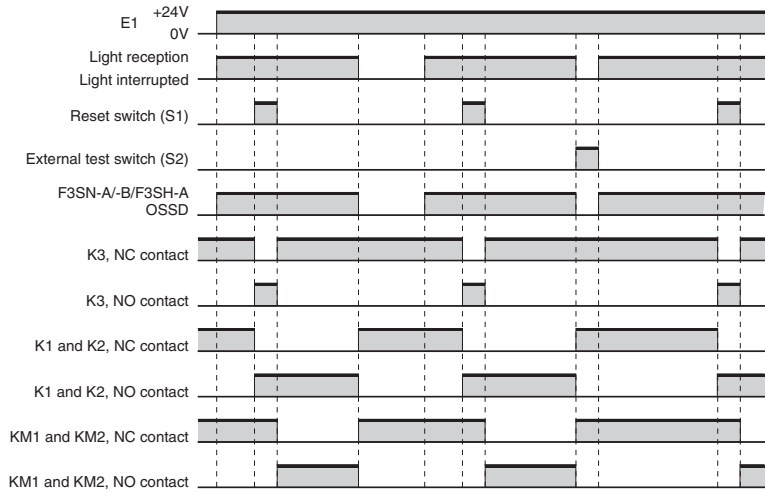
- Note:**
1. The F39-JC-A's EDM function and auxiliary outputs cannot be used.
  2. The Unit performs normal operation when S1 is open and external diagnosis when it is closed.
  3. Do not connect anything to terminals C1, D1, D2, E1, and E2.

**Connection to Safety Light Curtain Only (Manual-reset)**



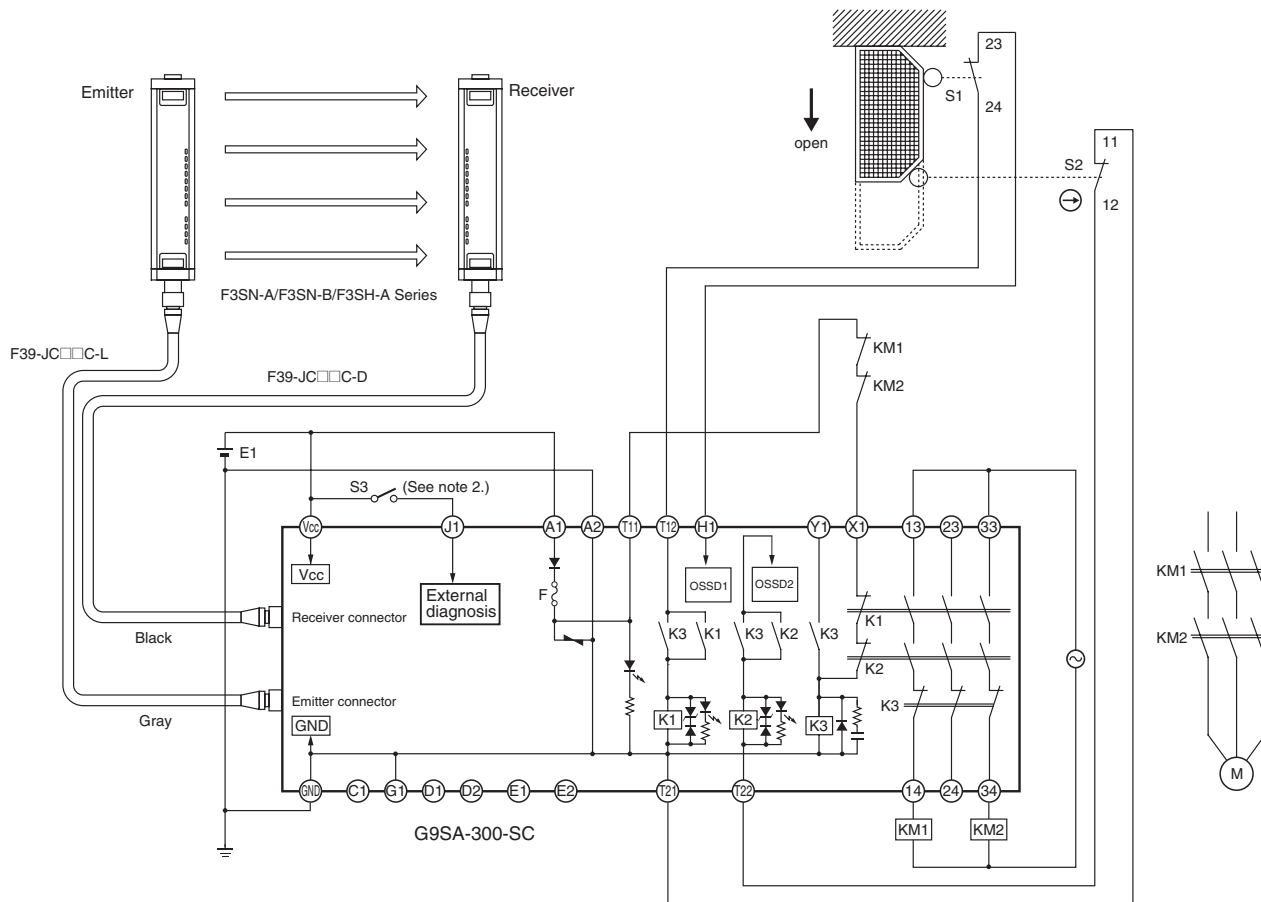
- S1: Reset switch (momentary action switch)
- S2: External test switch
- KM1 and KM2: Magnetic Contactors
- M: 3-phase motor
- E1: 24-VDC Power Supply (S82K)

**Timing Chart**



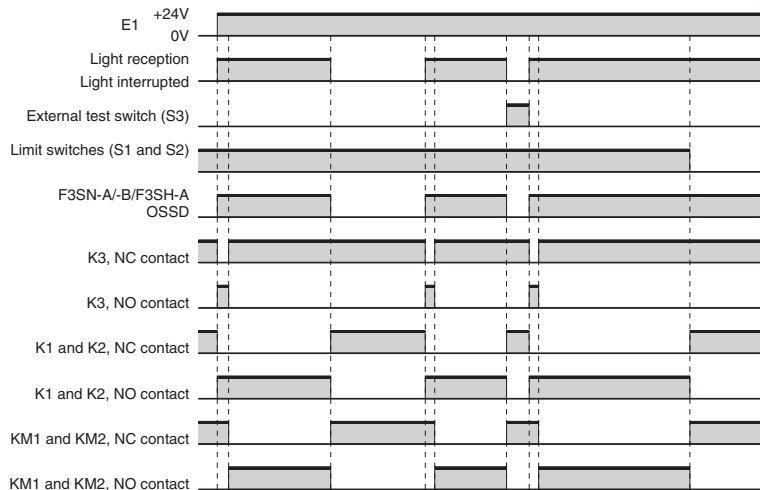
- Note:**
1. The F39SN-A's EDM function and auxiliary outputs cannot be used.
  2. The Unit performs normal operation when S2 is open and external diagnosis when it is closed.
  3. Do not connect anything to terminals C1, D1, D2, E1, and E2.

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



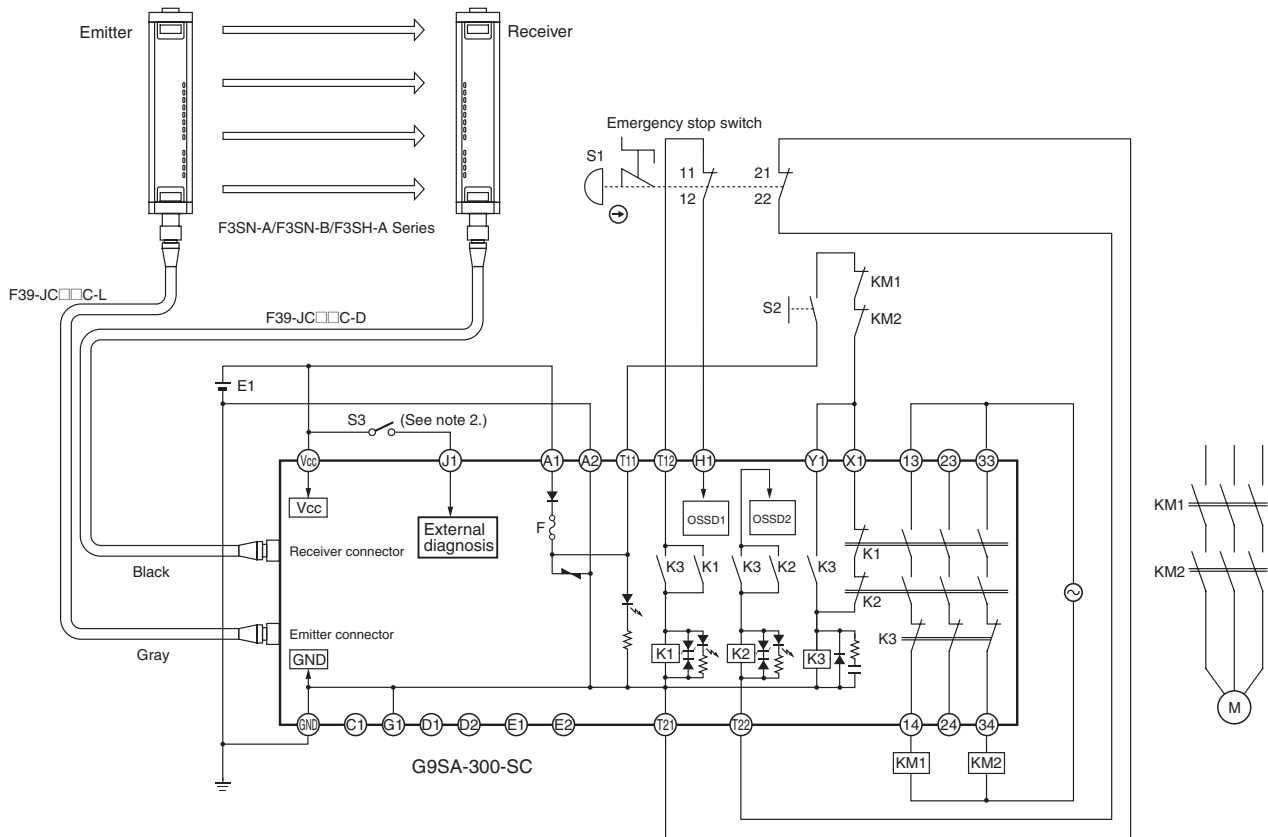
- S1: Limit switch
- S2: Safety Limit Switch with direct opening mechanism (D4D or D4B) ⊕
- S3: External test switch
- KM1 and KM2: Magnetic Contactors
- M: 3-phase motor
- E1: 24-VDC Power Supply (S82K)

### Timing Chart



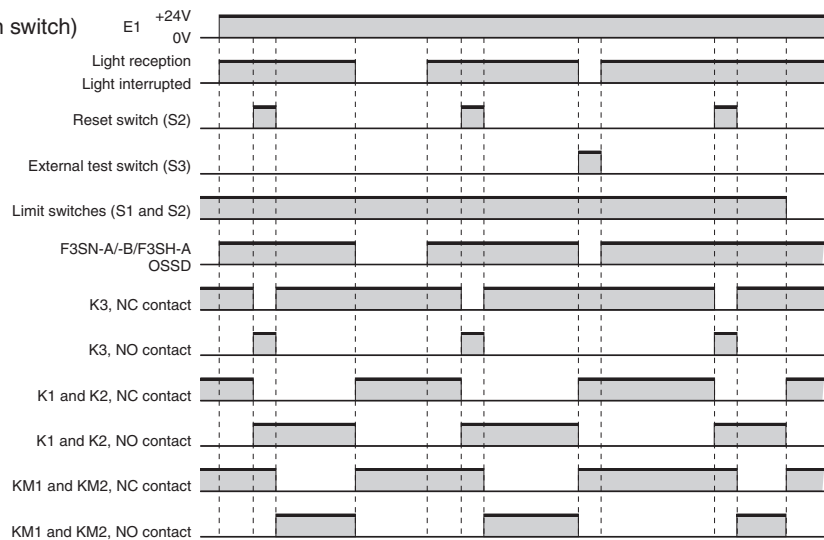
- Note:**
1. The F3SN-A's EDM function and auxiliary outputs cannot be used.
  2. The Unit performs normal operation when S2 is open and external diagnosis when it is closed.
  3. Do not connect anything to terminals C1, D1, D2, E1, and E2.

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



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

### Timing Chart

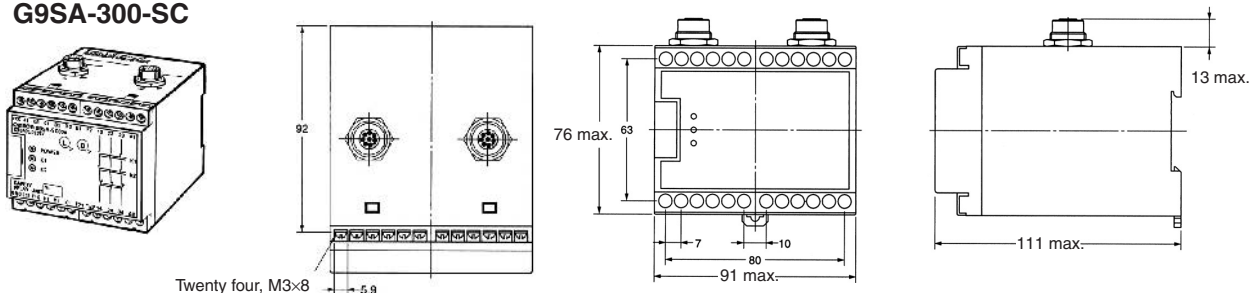


- Note:**
1. The F3SN-A's EDM function and auxiliary outputs cannot be used.
  2. The Unit performs normal operation when S2 is open and external diagnosis when it is closed.
  3. Do not connect anything to terminals C1, D1, D2, E1, and E2.

# Dimensions

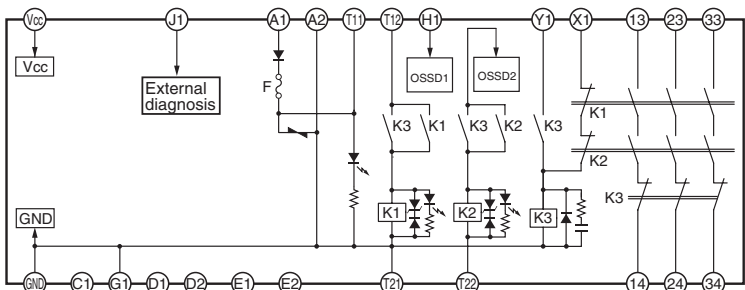
Note: All units are in millimeters unless otherwise indicated.

## G9SA-300-SC



# Installation

## Internal Connections

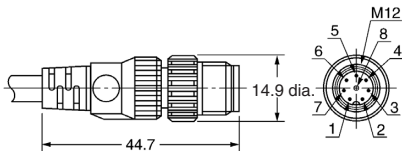
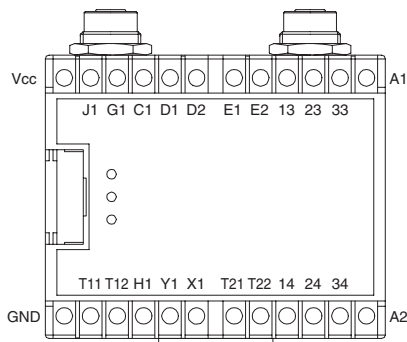


## Terminal Arrangement

Emitter Connector  
 F3SN-A□□□□P□□-L,  
 F3SN-B□□□□P□□-L,  
 F3SH-A□□□□P□□-L

Receiver Connector  
 F3SN-A□□□□P□□-D,  
 F3SN-B□□□□P□□-D,  
 F3SH-A□□□□P□□-D

The pin arrangement at the Sensor is shown below.  
**Connector (Sensor End)**



Pin number	Signal name	
	Receiver	Emitter
1	Control output 2 (OSSD2)	Interlock selection input (INTERLOCK)
2	+24V (24 VDC)	+24V (24 VDC)
3	Control output 1 (OSSD1)	Test input (TEST)
4	Auxiliary output (AUXILIARY)	Reset input (RESET)
5	RS-485 (A)	RS-485 (A)
6	RS-485 (B)	RS-485 (B)
7	0V	0V
8	External relay monitor input (EDM)	N.C.

# Precautions

## Application Precautions

Turn OFF the Unit before wiring. Do not touch the terminals of the Unit 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 F3SN-A, F3SN-B, or F3SH-A, 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 F3SN-A or devices with a direct bearing on the F3SN-A'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.)

Recommended Power Supplies: S82K, S82J, S82F, or S82F-P made by OMRON. For details, refer to the *Power Supply Selection Guide* (Cat. No. Y102).

Do not connect any device other than the F3SN-A, F3SN-B, or F3SH-A 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 F3SN-A, F3SN-B, or F3SH-A, refer to *F3SN-A/F3SN-B/F3SH-A Safety Light Curtain/Multi-beam Safety Sensor* (Cat. No. E322).

## Correct Use

### 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.

## Applicable Safety Category (EN954-1)

The G9SA-300-SC can be used in environments classified as Safety Category 4 according to the requirements of European standard EN954-1. This evaluation, however, is based on circuit configuration examples proposed by OMRON. The standard may not apply in some operating conditions.

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

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. J123-E1-02 **In the interest of product improvement, specifications are subject to change without notice.**

## OMRON Corporation

Industrial Automation Company

Industrial Devices and Components Division H.Q.  
Safety Components Business Development Department

Shiokoji Horikawa, Shimogyo-ku,

Kyoto, 600-8530 Japan

Tel: (81)75-344-7093/Fax: (81)75-344-7113

Printed in Japan

0303-3M (0600) (B)