Safety Relay Unit

- Four kinds of 45-mm wide units are available:
  - A 3-pole model, a 5-pole model, and models with 3 poles and 2 OFF-delay poles, as well as a two-hand controller.
  - Also available are 17.5 mm wide expansion units with 3 poles and 3 OFF-delay poles.
- Simple expansion connection
- OFF-delay models have 15-step OFF-delay settings
- Conforms to EN standards (BG approval)
- Both DIN track mounting and screw mounting are possible

Specifications

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Power Input</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G9SA-301/TH301</td>
<td>G9SA-501</td>
<td>G9SA-321-T</td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>24 VAC/VDC: 24 VAC, 50/60 Hz, or 24 VDC</td>
<td>100 to 240 VAC: 100 to 240 VAC, 50/60 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>85% to 110% of rated power supply voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption *</td>
<td>24 VAC/VDC: 1.8 VA/1.7 W max.</td>
<td>24 VAC/VDC: 2.8 VA/2.6 W max.</td>
<td>24 VAC/VDC: 3.5 VA/3.3 W max.</td>
<td></td>
</tr>
</tbody>
</table>
  - 100 to 240 VAC: 11 VA max. | 100 to 240 VAC: 12.5 VA max. | |

*When an Expansion Unit is connected, the power consumption is increased by 2 VA/2 W max.

<table>
<thead>
<tr>
<th>Inputs</th>
<th>G9SA-301/321-T/TH301</th>
<th>G9SA-501</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input current *</td>
<td>40 mA max.</td>
<td>60 mA max.</td>
<td></td>
</tr>
</tbody>
</table>

* When an Expansion Unit is connected, the input current is increased by 30 mA max.

<table>
<thead>
<tr>
<th>Contacts</th>
<th>G9SA-301/501/321-T/TH301/EX301/EX031-T</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated load</td>
<td>250 VAC, 5 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 VDC, 5 A</td>
<td></td>
</tr>
<tr>
<td>Rated carry current</td>
<td>5 A</td>
<td></td>
</tr>
</tbody>
</table>
Specifications (continued)

Characteristics

<table>
<thead>
<tr>
<th></th>
<th>G9SA-301/TH301</th>
<th>G9SA-501/321-T</th>
<th>G9SA-EX301/EX301-T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact resistance *1</td>
<td>100 mΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating time *2</td>
<td>30 ms max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time *3</td>
<td>10 ms max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance *4</td>
<td>100 MΩ min. (at 500 VDC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>Between different outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Between inputs and outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Between power inputs and outputs</td>
<td>2,500 VAC, 50/60 Hz for 1 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Between power inputs and other inputs (only for 100 to 240-V models)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>10 to 55 to 10 Hz, 0.375 mm single amplitude (0.75 mm double amplitude)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock resistance</td>
<td>Destruction</td>
<td>300 m/s²</td>
<td></td>
</tr>
<tr>
<td>Malfunction</td>
<td></td>
<td>100 m/s²</td>
<td></td>
</tr>
<tr>
<td>Durability *5</td>
<td>Mechanical</td>
<td>5,000,000 operations min. (at approx. 7,200 operations/hr)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical</td>
<td>100,000 operations min. (at approx. 1,800 operations/hr)</td>
<td></td>
</tr>
<tr>
<td>Failure rate (P Level) (reference value)</td>
<td>5 VDC, 1 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>-25 to 55°C (with no icing or condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient operating humidity</td>
<td>35% to 85%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal tightening torque</td>
<td>0.98 N m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight *6</td>
<td>Approx. 210 g</td>
<td>Approx. 270 g</td>
<td>Approx. 130 g</td>
</tr>
</tbody>
</table>

*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%.
*6. Weight shown is for 24-VAC/VDC type. For 100 to 240 VAC type, add approximately 20 g.

Applications

G9SA-TH301 (24 VDC) with 2-hand Inputs

Timing Chart

S11 (NC) [ ]
S11 (NO) [ ]
S12 (NC) [ ]
S12 (NO) [ ]
KM1 and KM2 (NC) [ ]
KM1 and KM2 (NO) [ ]

Input time difference operates only when the difference is 0.5 s max.

Note:
1. Use a 1NC+1NO switch for S11 and S12.
2. This circuit achieves Safety Category 4.
Applications (continued)

G9SA-301 (24 VAC/VDC) with 2-channel Safety Sensor/Manual Reset

Timing Chart

<table>
<thead>
<tr>
<th>F3SJ-A Incident Interrupted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset switch S1</td>
</tr>
<tr>
<td>K1 and K2 (NC)</td>
</tr>
<tr>
<td>K1 and K2 (NO)</td>
</tr>
<tr>
<td>KM1 and KM2 (NC)</td>
</tr>
<tr>
<td>KM1 and KM2 (NO)</td>
</tr>
<tr>
<td>PLC input</td>
</tr>
<tr>
<td>PLC output</td>
</tr>
<tr>
<td>KM3</td>
</tr>
</tbody>
</table>

F3SJ-A: Safety sensor
S1: Reset switch
KM1 and KM2: Magnetic Contactor
KM3: G3J Solid-state Contactor (G3J)
E1: 24-VDC Power Supply (S82K)

Note: This circuit achieves Safety Category 4.
* The F3SJ-A auxiliary output wiring is shown for dark-ON operation.
Applications (continued)

G9SA-501 (24 VAC/VDC) and G9SA-EX301 with 2-channel Limit Switch Input/Manual Reset

Note: This circuit achieves Safety Category 4.

Timing Chart

Limit switches S1 and S2
Reset switch S3
G9SA-501
K1, K2, K3 and K4 (NC)
G9SA-501
K1, K2, K3, and K4 (NO)
G9SA-EX301
K1 and K2 (NC)
G9SA-EX301
K1 and K2 (NO)
KM1 and KM2 (NC)
KM1 and KM2 (NO)
Dimensions and Terminal Arrangement

**G9SA-301**
**G9SA-501**
**G9SA-321-T**
**G9SA-TH301**

**Terminal Arrangement**

**G9SA-301**
G9SA-301:
G9SA-321-T:
G9SA-TH301:

**G9SA-501**
G9SA-501:
G9SA-321-T:

**G9SA-321-T@**

**G9SA-EX301**
**G9SA-EX031-T**

**Terminal Arrangement**

**G9SA-EX301**
G9SA-EX301:

**G9SA-EX031-T**

**Mounting Holes**

Two, 4.2 dia. or M4

**Note 1:** The OFF-delay time setting switch is found on the G9SA-321-T@ only.

1: The K1 to K4 indicators light when the NO contacts of internal relays K1 to K4 close.

* Do not remove unless an Expansion Unit is being used.

G9SA-321-T@

- **Core Data**
  - Dimensions (mm): 13 x 23 x 33 x 41
  - Terminal Arrangement:
    - Two, M3
  - OFF-delay time setting switch (See note 1)

G9SA-301:
- Dimensions (mm): 54 x 35 x 91
- Terminal Arrangement:
  - Eight, M3
- OFF-delay time setting switch (See note 1)

G9SA-501:
- Dimensions (mm): 54 x 35 x 111
- Terminal Arrangement:
  - Twenty-four, M3
- OFF-delay time setting switch (See note 1)

G9SA-TH301:
- Dimensions (mm): 54 x 35 x 111
- Terminal Arrangement:
  - Twenty-one, M3
- OFF-delay time setting switch (See note 1)

G9SA-EX301:
- Dimensions (mm): 54 x 35 x 87
- Terminal Arrangement:
  - Eight, M3
- OFF-delay time setting switch (See note 1)

G9SA-EX031-T@:
- Dimensions (mm): 54 x 35 x 70
- Terminal Arrangement:
  - Four, M3
- OFF-delay time setting switch (See note 1)

**Note 1:** The OFF-delay time setting switch is found on the G9SA-EX031-T@ only.

2: The K1 and K2 indicators light when the NO contacts of internal relays K1 and K2 close.
Ordering

Model Number Legend

G9SA – □ □ □ □ □ □ □ □ □

1 Function
None: Emergency stop
EX: Expansion Unit
TH: Two-hand Controller

2 Contact Configuration (Safety Output)
0: None
3: 3PST-NO
5: 5PST-NO

3 Contact Configuration (OFF-delay Output)
0: None
2: DPST-NO
3: 3PST-NO

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

Input Configuration
None: 1-channel or 2-channel input possible

OFF-delay Time (Max. setting time)
None: No OFF-delay
T075: 7.5 seconds
T15: 15 seconds
T30: 30 seconds

Note: Call the factory for G9SA models designed for positive ground system.

Specific Models

Emergency-stop Units

<table>
<thead>
<tr>
<th>Main contacts</th>
<th>Auxiliary contact</th>
<th>Number of input channels</th>
<th>Rated voltage</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PST-NO</td>
<td>SPST-NC</td>
<td>1 channel or 2 channels possible</td>
<td>24 VAC/VDC</td>
<td>G9SA-301</td>
</tr>
<tr>
<td>5PST-NO</td>
<td></td>
<td></td>
<td>100 to 240 VAC</td>
<td>G9SA-501</td>
</tr>
</tbody>
</table>

Emergency-stop OFF-delay Units

<table>
<thead>
<tr>
<th>Main contacts</th>
<th>OFF-delay contacts</th>
<th>Auxiliary contact</th>
<th>Number of input channels</th>
<th>OFF-delay time</th>
<th>Rated voltage</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PST-NO</td>
<td>DPST-NO</td>
<td>SPST-NC</td>
<td>1 channel or 2 channels possible</td>
<td>7.5 s</td>
<td>24 VAC/VDC</td>
<td>G9SA-321-T075</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15 s</td>
<td>24 VAC/VDC</td>
<td>G9SA-321-T15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 s</td>
<td>24 VAC/VDC</td>
<td>G9SA-321-T30</td>
</tr>
</tbody>
</table>

Note: Set to maximum values in the factory.

* The following 15-step OFF-delay time settings are available:
  T075: 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, and 7.5 s
  T15: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15 s
  T30: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, and 30 s

Two-hand Controller

<table>
<thead>
<tr>
<th>Main contacts</th>
<th>Auxiliary contact</th>
<th>Number of input channels</th>
<th>Rated voltage</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PST-NO</td>
<td>SPST-NC</td>
<td>2 channels</td>
<td>24 VAC/VDC</td>
<td>G9SA-TH301</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 to 240 VAC</td>
<td></td>
</tr>
</tbody>
</table>

Expansion Unit

The Expansion Unit connects to a G9SA-301, G9SA-501, G9SA-321, or G9SA-TH301.

<table>
<thead>
<tr>
<th>Main contacts</th>
<th>Auxiliary contact</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PST-NO</td>
<td>SPST-NC</td>
<td>G9SA-EX301</td>
</tr>
</tbody>
</table>

Expansion Units with OFF-delay Outputs

The Expansion Unit connects to a G9SA-301, G9SA-501, G9SA-321, or G9SA-TH301.

<table>
<thead>
<tr>
<th>Main contact form</th>
<th>Auxiliary contact</th>
<th>OFF-delay time</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PST-NO</td>
<td>SPST-NC</td>
<td>7.5 s</td>
<td>G9SA-EX301-T075</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 s</td>
<td>G9SA-EX301-T15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 s</td>
<td>G9SA-EX301-T30</td>
</tr>
</tbody>
</table>

Note: Set to maximum values in the factory.

* The following 15-step OFF-delay time settings are available:
  T075: 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, and 7.5 s
  T15: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15 s
  T30: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, and 30 s

= Highlighted Rapid Delivery products are available for shipment today or within FIVE days.