Relays with Forcibly Guided Contacts

G7SA

CSM G7SA DS F 6 1

71 (F)

Compact, Slim Relays Conforming to EN Standards

- Relays with forcibly guided contacts (EN50205 Class A, certified by VDE).
- Supports the CE marking of machinery (Machinery Directive).
- Helps avoid hazardous machine status when used as part of an interlocking circuit.
- Four-pole and six-pole Relays are available.
- The Relay's terminal arrangement simplifies PWB pattern design.
- Reinforced insulation between inputs and outputs.
 Reinforced insulation between some poles of different polarity.





Be sure to read the "Safety Precautions" on page 6 and the "Precautions for All Relays with Forcibly Guided Contacts".

Model Number Structure

Model Number Legend

G7SA-□A□B

1. NO Contact Poles

2: DPST-NO

3: 3PST-NO

4: 4PST-NO

5: 5PST-NO

2. NC Contact Poles

1: SPST-NC

2: DPST-NC

3: 3PST-NC

Ordering Information

Relays with Forcibly Guided Contacts

| Туре | Sealing | Poles | Contact configuration | Rated voltage | Model |
|----------|------------|---------|-----------------------|---|-----------|
| | | 4 poles | 3PST-NO, SPST-NC | NO, DPST-NC 18 VDC 21 VDC 21 VDC 24 VDC | G7SA-3A1B |
| | | | DPST-NO, DPST-NC | | G7SA-2A2B |
| Standard | Flux-tight | | 5PST-NO, SPST-NC | | G7SA-5A1B |
| | | 6 poles | 4PST-NO, DPST-NC | | G7SA-4A2B |
| | | | 3PST-NO, 3PST-NC | 110 VDC | G7SA-3A3B |

Sockets

| Туре | | LED indicator | Poles | Rated voltage | Model |
|----------------|--|---------------|---------|-------------------|-------------|
| Track-mounting | Track mounting and screw mounting possible | No | 4 poles | | P7SA-10F |
| | | No | 6 poles | | P7SA-14F |
| | | Yes | 4 poles | 24 VDC 110 VDC | P7SA-10F-ND |
| | | | 6 poles | | P7SA-14F-ND |
| Back-mounting | PCB terminals | No | 4 poles | | P7SA-10P |
| | FOD terminals | INO | 6 poles | | P7SA-14P |

Specifications

Ratings Coil (4 poles)

| Iter Rated voltage | n Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|-----------------------|----------------------|---------------------|--------------------------|--------------------------|---------------------|------------------------|
| 12 VDC | 30 | 400 | - 75% max. | 10% min. 110% | | Approx.360 |
| 18 VDC | 20 | 900 | | | | |
| 21 VDC | 17.1 | 1,225 | | | 1100/ | |
| 24 VDC | 15 | 1,600 | | | 110% | |
| 48 VDC | 7.5 | 6,400 | | | | |
| 110 VDC | 3.8 | 28,810 | | | | Approx. 420 |

Coil (6 poles)

| Item Rated voltage | Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|-----------------------|--------------------|---------------------|--------------------------|--------------------------|---------------------|------------------------|
| 12 VDC | 41.7 | 288 | - 75% max. | 10% min. 110% | | Approx.500 |
| 18 VDC | 27.8 | 648 | | | | |
| 21 VDC | 23.8 | 882 | | | 1100/ | |
| 24 VDC | 20.8 | 1,152 | | | 110% | |
| 48 VDC | 10.4 | 4,606 | | | | |
| 110 VDC | 5.3 | 20,862 | | | | Approx. 580 |

The rated current and coil resistance are measured at a coil temperature of 23°C with tolerances of $\pm 15\%$.

Performance characteristics are based on a coil temperature of 23°C.

The maximum voltage is based on an ambient operating temperature of 23°C maximum.

Contacts

| Item Load | Resistive load |
|------------------------|-------------------------------|
| Rated load | 6 A at 250 VAC, 6 A at 30 VDC |
| Rated carry current | 6 A |
| Max. switching voltage | 250 VAC, 125 VDC |
| Max. switching current | 6 A |

Characteristics of Sockets

| Model | Continuous current | Dielectric strength | Insulation resistance |
|---------|--------------------|------------------------------------|--------------------------|
| P7SA-1□ | 6 A *1 | 2,500 VAC for 1 min. between poles | 1,000 MΩ min. * 2 |

Note: Use the P7SA-1□F-ND in the ambient temperature range of −20 to 70°C.
Use the P7SA-1□F and P7SA-1□F-ND in the ambient humidity range of 45 to 85%.

*1. When operating the P7SA-1□F at a temperature between 55 and 85°C, reduce the continuous current (6 A at 55°C or less) by 0.1 A for each degree above 55°C.
When operating the P7SA-1□F-ND at a temperature between 50 and 70°C, reduce the continuous current (6 A at 50°C or less) by 0.3 A for each degree above 50°C.

*2. Measurement conditions: Measurement of the same points as for the dielectric strength at 500 VDC.

Characteristics

| Onaracteris | 1103 | | | | |
|--|-------------|--|---|--|--|
| Contact resistance *1 | | 100 mΩ max. | - | | |
| Operating time *2 | | 20 ms max. | | | |
| Response time *3 Release time *2 | | 10 ms max. | | | |
| | | 20 ms max. | _ | | |
| Maximum operating | Mechanical | 36,000 operations/h | _ | | |
| frequency | Rated load | 1,800 operations/h | | | |
| Insulation resistance | e *4 | 1,000 M Ω min. | | | |
| Dielectric strength *5 *6 | | Between coil contacts/different poles (except for poles 3-4 in 4-pole Relays and poles 3-5, 4-6, and 5-6 in 6-pole Relays): 4,000 VAC, 50/60 Hz for 1 min. Between different poles (poles 3-4 in 4-pole Relays and poles 3-5, 4-6, and 5-6 in 6-pole Relays): 2,500 VAC, 50/60 Hz for 1 min. Between contacts of same polarity: 1,500 VAC, 50/60 Hz for 1 min. | * | | |
| Vibration resistance | | 10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude) | - | | |
| Shock resistance | Destruction | 1,000 m/s ² | _ | | |
| Shock resistance | Malfunction | 100 m/s ² | | | |
| Durchility #7 | Mechanical | 10,000,000 operations min. (at approx. 36,000 operations/h) | - | | |
| Durability *7 | Electrical | 100,000 operations min. (at the rated load and approx. 1,800 operations/h) | ; | | |
| Failure rate (P level) (reference value *8) | | 5 VDC, 1 mA | ; | | |
| Ambient operating temperature *9 | | 12 to 48 VDC: -40 to 85°C (with no icing or condensation) 110 VDC: -40 to 60°C (with no icing or condensation) | _ | | |
| Ambient operating humidity | | 5% to 85% | _ | | |
| Weight | | 4 poles: Approx. 22 g 6 poles: Approx. 25 g | _ | | |
| | | | - | | |

Note: The above values are initial values.

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

*2. These times were measured at the rated voltage and an ambient temperature of 23°C. Contact bounce time is not included.

*3. The response time is the time it takes for the normally open contacts to open after the coil voltage is turned OFF. Contact bounce time is included. Measurement conditions: Rated voltage appropriate Applicant temperature 23°C.

operation, Ambient temperature: 23°C *4. The insulation resistance was measured with a 500-VDC megohmmeter at the same locations as the dielectric strength was measured.

*5. Pole 3 refers to terminals 31-32 or 33-34, pole 4 refers to terminals 43-44, pole 5 refers to terminals

53-54, and pole 6 refers to terminals 63-64.
*6. When using a P7SA Socket, the dielectric strength between coil contacts/different poles is 2,500 VAC, 50/60 Hz for 1 min.

*7. The durability is for an ambient temperature of 15 to 35×C and an ambient humidity of 25% to 75%

*8. The failure rate is based on an operating frequency of 300 operations/min. *9. 12 to 48 VDC:

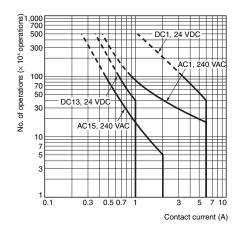
When operating between 70 and 85°C, reduce the rated carry current of 6 A by 0.1 A for each degree

110 VDC:

When operating between 40 and 60°C, reduce the rated carry current of 6 A by 0.27 A for each degree above 40°C.

Engineering Data

Durability Curve

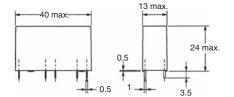


Dimensions (Unit: mm)

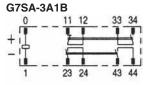
Relays with Forcibly Guided Contacts

G7SA-3A1B G7SA-2A2B

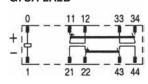




Terminal Arrangement/ Internal Connection Diagram (Bottom View)

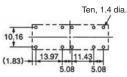


G7SA-2A2B



Printed Circuit Board Design Diagram (Bottom View)

(±0.1 tolerance)



Note: 1. Terminals 23-24, 33-34, and 43-44 are normally open. Terminals 11-12 and 21-22 are normally closed.

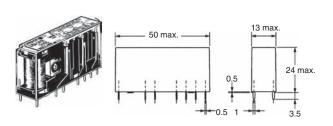
2. The colors of the cards inside the Relays are as follows: G7SA-3A1B: Blue and G7SA-2A2B: White.

Printed Circuit Board

Design Diagram

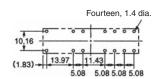
(Bottom View) (±0.1 tolerance)

G7SA-5A1B G7SA-4A2B G7SA-3A3B



Terminal Arrangement/ Internal Connection Diagram (Bottom View)

G7SA-5A1B 0 11 12 33 34 53 54 + 23 24 43 44 63 64



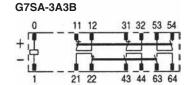
G7SA-4A2B

0 11 12 33 34 53 54

+ 1 3 3 34 53 54

43 44

63 64

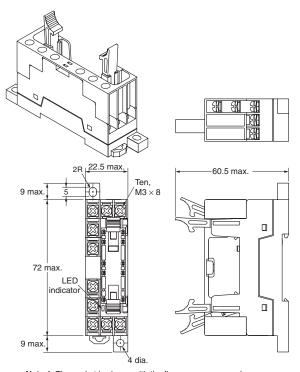


Note: 1. Terminals 23-24, 33-34, 43-44, 53-54, and 63-64 are normally open. Terminals 11-12, 21-22, and 31-32 are normally closed.

2. The colors of the cards inside the Relays are as follows: G7SA-5A1B: Blue, G7SA-4A2B: White, and G7SA-3A3B: Yellow.

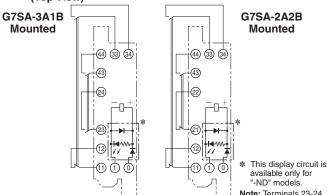
Sockets

Track-mounting Socket P7SA-10F, P7SA-10F-ND



Note 1: The socket is shown with the finger cover removed.
2: Only the -ND Sockets have LED indicators (orange)

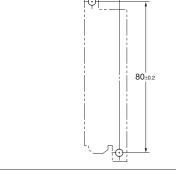
Terminal Arrangement/Internal Connection Diagram (Top View)



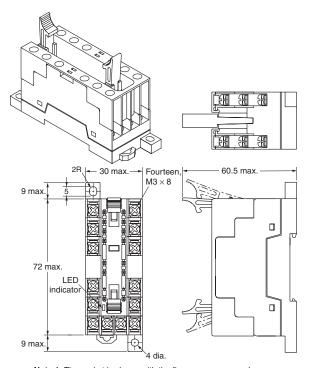
Mounting Hole Placement Diagram
(Top View)

Two, 4 dia. or M3.5

Note: Terminals 23-24, 33-34, and 43-44 are normally open. Terminals 11-12 and 21-22 are normally closed.

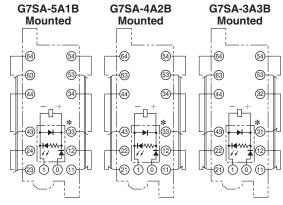


Track-mounting Socket P7SA-14F, P7SA-14F-ND



Note 1: The socket is shown with the finger cover removed.
2: Only the -ND Sockets have LED indicators (orange)

Terminal Arrangement/Internal Connection Diagram (Top View)



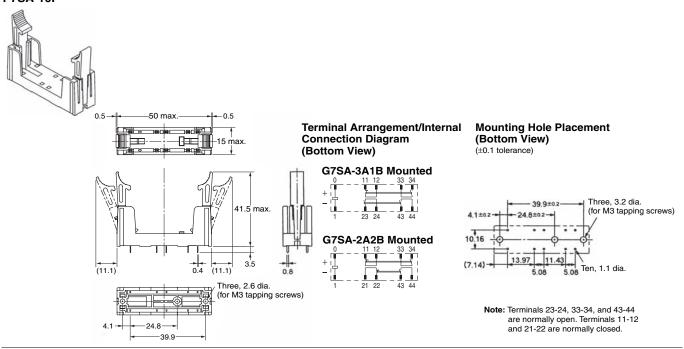
Mounting Hole Placement Diagram (Top View)

Two, 4 dia. or M3.5

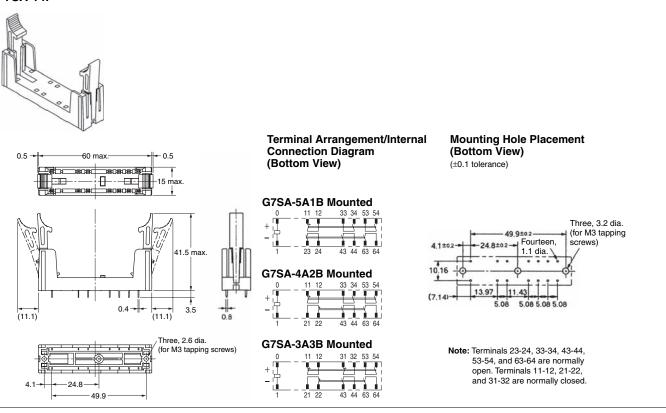
This display circuit is available only for "-ND" models.

Note: Terminals 23-24, 33-34, 43-44, 53-54, and 63-64 are normally open. Terminals 11-12, 21-22, and 31-32 are normally closed.

Back-mounting Socket (for PCB)



Back-mounting Socket (for PCB) P7SA-14P



Certified Standards

G7SA

- EN Standards, VDE Certified EN61810-1 (Electromechanical non-specified time all-or-nothing relays)
 - EN50205 (Relays with forcibly guided (linked) contacts)
- UL standard UL508 Industrial Control Devices
- CSA standard CSA C22.2 No. 14 Industrial Control Devices

Forcibly Guided Contacts (from EN50205)

If an NO contact becomes welded, all NC contacts will maintain a minimum distance of 0.5 mm when the coil is not energized. Likewise if an NC contact becomes welded, all NO contacts will maintain a minimum distance of 0.5 mm when the coil is energized.

Safety Precautions

Refer to the "Precautions for All Relays" and "Precautions for All Relays with Forcibly Guided Contacts".

Precautions for Correct Use

Wiring

• Use one of the following wires to connect to the

P7SA-10F/10F-ND/14F/14F-ND. Stranded wire: 0.75 to 1.5 mm² Solid wire: 1.0 to 1.5 mm²

- Tighten each screw of the P7SA-10F/10F-ND/14F/14F-ND to a torque of 0.78 to 0.98 N·m.
- Wire the terminals correctly with no mistakes in coil polarity, otherwise the G7SA will not operate.

Cleaning

The G7SA is not of enclosed construction. Therefore, do not wash the G7SA with water or detergent.

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