New Product

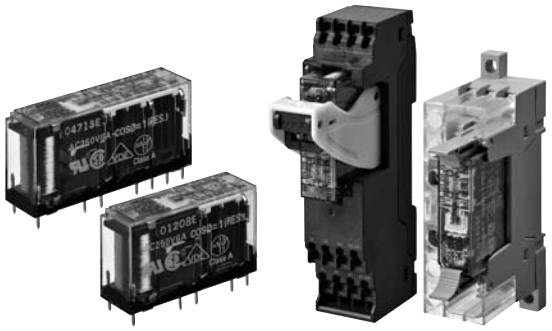
OMRON

Relays with Forcibly Guided Contacts
G7SA

Compact, Slim Relays Conforming to EN Standards

- Additional Push-In Plus terminal sockets are used to save wiring work in comparison with traditional screw terminals. (Wiring time is reduced by 60%✻ in comparison with traditional screw terminals.)
- Relays with forcibly guided contacts (EN/IEC 61810-3, 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.

✻ According to OMRON actual measurement data



Note: Sockets are sold separately.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

⚠ Be sure to read the *Safety Precautions* on page 13.

Model Number Structure

Model Number Legend

Main unit

Relays with forcibly guided contacts

G7SA-□A□B□
1 2 3

Specify the power supply voltage (coil rated voltage) when ordering.

Relays use PCB terminals.
This allows for mounting on PCBs and for connection to optional dedicated sockets (order separately).

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

3. Coil Rated Voltage (V)
12 VDC
18 VDC
21 VDC
24 VDC
48 VDC
110 VDC

Options (order separately)

Sockets

P7SA-□□-□-□□
1 2 3 4 5 6

1. Basic Model Name
P7SA: Socket for G7SA

2. Number of Poles
10: 4 poles (10 terminals)
14: 6 poles (14 terminals)

3. Mounting Type
F: Front-mounting
P: Back-mounting

4. LED Indicator
Blank: Without operation indicator LED/built-in diode
ND: With operation indicator LED/built-in diode

5. Terminal Type
Blank: Screw terminals when 3. is F type
PCB terminals when 3. is P type
PU: Push-In Plus terminals

6. Coil Rated Voltage (V)
24 VDC: When 4. is ND

Ordering Information

Main unit

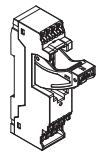
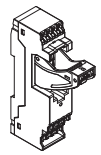
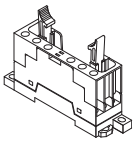
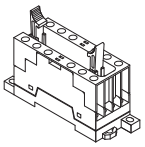
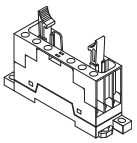
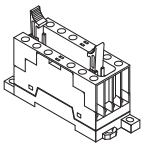
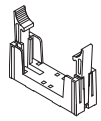
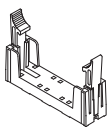
Relays with Forcibly Guided Contacts

Specify the coil rated voltage when ordering.

Terminal type	Sealing	Poles	Contact configuration	Coil rated voltage	Model
PCB terminals	Flux-tight	4 poles	3PST-NO, SPST-NC	12, 18, 21, 24, 48, 110 VDC	**G7SA-3A1B**
			DPST-NO, DPST-NC	12, 18, 21, 24, 48, 110 VDC	**G7SA-2A2B**
		6 poles	5PST-NO, SPST-NC	12, 18, 21, 24, 48, 110 VDC	**G7SA-5A1B**
			4PST-NO, DPST-NC	12, 18, 21, 24, 48, 110 VDC	**G7SA-4A2B**
			3PST-NO, 3PST-NC	12, 18, 21, 24, 48, 110 VDC	**G7SA-3A3B**

Options (order separately)

Sockets

Mounting	Terminal Type	LED Indicator	Poles	Coil rated voltage	Appearance	Model
Front-mounting	Push-In Plus terminals	Yes	4 poles	24 VDC		**P7SA-10F-ND-PU DC24**
			6 poles			**P7SA-14F-ND-PU DC24**
	Screw terminals	Yes	4 poles			**P7SA-10F-ND DC24**
			6 poles			**P7SA-14F-ND DC24**
		No	4 poles	–		**P7SA-10F**
			6 poles			**P7SA-14F**
Back-mounting	PCB terminals	No	4 poles	–		**P7SA-10P**
			6 poles			**P7SA-14P**

Specifications

Ratings

Safety Relay Unit

Coil (4 poles)

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Max. voltage (V)	Power consumption (mW)
12 VDC	30	400	110%	Approx. 360
18 VDC	20	900		
21 VDC	17.1	1,225		
24 VDC	15	1,600		
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)	Max. voltage (V)	Power consumption (mW)
12 VDC	41.7	288	110%	Approx. 500
18 VDC	27.8	648		
21 VDC	23.8	882		
24 VDC	20.8	1,152		
48 VDC	10.4	4,606		
110 VDC	5.3	20,862		Approx. 580

Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with tolerances of ±15%.
2. 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
Contact materials	Au plating + Ag alloy

Characteristics

Safety Relay Unit

Contact resistance ✻1		100 mΩ max.
Operating time ✻2		20 ms max.
Response time ✻3		10 ms max.
Release time ✻2		20 ms max.
Must operate voltage		75% max.
Must release voltage		10% min.
Maximum operating frequency	Mechanical	36,000 operations/h
	Rated load	1,800 operations/h
Insulation resistance ✻4		1,000 MΩ min.
Dielectric Strength ✻5 ✻6	Between coil and contacts	4,000 VAC, 50/60 Hz for 1 min.
	Between contacts of different polarity	4,000 VAC, 50/60 Hz for 1 min. (except for followings) 4 poles (for poles 3-4 in 4-pole Relays), 6 poles (for poles 3-5, 4-6, and 5-6 in 6-pole Relays): 2,500 VAC, 50/60 Hz for 1 min.
	Between contacts of the 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
	Malfunction	100 m/s^2
Durability ✻7	Mechanical	10,000,000 operations min. (at approx. 36,000 operations/h)
	Electrical	100,000 operations min. (at the rated load)
Inductive load switching capability ✻8 (IEC60947-5-1)		AC15 240 VAC, 2 A DC13 24 VDC, 1 A/48 VDC, 0.5 A/110 VDC, 0.2 A
Failure rate (P level) (reference value ✻9)		5 VDC, 1 mA
Ambient operating temperature ✻10		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: 1. The above values are initial values.
2. Performance characteristics are based on coil temperature of 23°C.

✻**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 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. When using Push-In Plus terminal sockets (P7SA-□F-ND-PU), the dielectric strength between coil contacts as well as between different poles is 4,000 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%. For the durability performance to the load, refer to the Durability Curve.
✻**8.** AC15: $\cos\phi$ = 0.3, DC13: L/R = 48-ms.
✻**9.** The failure rate is based on an operating frequency of 300 operations/min.
✻**10.** 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 above 70°C.
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.

Options (order separately)

Sockets

Items	Models	Push-In Plus terminals		Screw terminals		PCB terminals	
		4 poles	6 poles	4 poles	6 poles	4 poles	6 poles
		P7SA-10F-ND-PU	P7SA-14F-ND-PU	P7SA-10F(-ND)	P7SA-14F(-ND)	P7SA-10P	P7SA-14P
Ambient operating temperature		• With operation indicator LED/built-in diode P7SA-□F-ND(-PU): −20 to +70°C • Without operation indicator LED/built-in diode P7SA-□F: −40 to +85°C (with no icing or condensation)				−40 to +85°C (with no icing or condensation)	
Ambient operating humidity		25% to 85%				5% to 85%	
Continuous carry current		6 A ✻1					
Dielectric strength	Between coil and contact terminals	4,000 VAC for 1 min.		2,500 VAC for 1 min.			
	Between contact terminals of different polarity	2,500 VAC for 1 min.					
	Between contact terminals of same polarity	1,500 VAC for 1 min.					
Insulation resistance		1,000 MΩ min. ✻2					
Weight		Approx. 58 g	Approx. 70 g	Approx. 44 g	Approx. 59 g	Approx. 9 g	Approx. 10 g

✻1. When operating the P7SA-□F-ND-PU at a temperature between 50 and 70°C, reduce the continuous current (6 A at 50°C or less) by 0.25 A for each degree above 50°C.
When operating the P7SA-□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.
When operating the P7SA-□F at a temperature between 50 and 85°C, reduce the continuous current (6 A at 50°C or less) by 0.1 A for each degree above 50°C.
✻2. Measurement conditions: For 500 VDC applied to the same location as for dielectric strength measurement.

Short Bars (for P7SA-□F-ND-PU)

Application	Applicable sockets	Models	Maximum carry current	Ambient operating temperature	Ambient operating humidity
Crossover wiring of contact terminals (bottom)	P7SA-□F-ND-PU	XW5S-P2.5-2□	24 A	−40 to 55°C	5% to 95%
		XW5S-P2.5-3□			
		XW5S-P2.5-4□			
		XW5S-P2.5-5□			

Certified Standards

Safety Relay Unit

EN Standards, VDE Certified

Models	Ratings	Standard number	Certification No.	Operating coil	Contact ratings
G7SA-2A2B	12, 18, 21, 24, 48, 110 VDC	EN/IEC 61810-1 Electromagnetic relay EN/IEC 61810-3 Relays with forcibly guided contacts	125547	12, 18, 21, 24, 48, 110 VDC	6 A, 240 VAC (Resistive) 6 A, 30 VDC (Resistive)
G7SA-3A1B					
G7SA-3A3B					
G7SA-4A2B					
G7SA-5A1B					

UL Standards Certification (File No. E41515) Industrial Control Devices

Models	Standard number	Category	Listed/Recognized	Contact ratings	Operating Coil ratings
G7SA-2A2B	UL508	E41515	Recognized	6 A, 250 VAC (Resistive) 6 A, 30 VDC (Resistive)	12, 18, 21, 24, 48, 110 VDC
G7SA-3A1B					
G7SA-3A3B					
G7SA-4A2B					
G7SA-5A1B					

CSA standard CSA C22.2 No.14 Industrial Control Devices

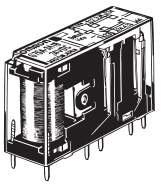
Models	Class number	File No.	Contact ratings	Operating Coil ratings
G7SA-2A2B	3211-07	LR35535	6 A, 250 VAC (Resistive) 6 A, 30 VDC (Resistive)	12, 18, 21, 24, 48, 110 VDC
G7SA-3A1B				
G7SA-4A2B				
G7SA-5A1B				

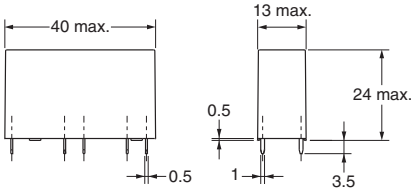
Dimensions

(Unit: mm)

Safety Relay Unit

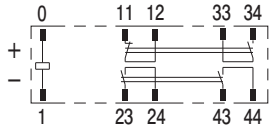
4 poles
G7SA-3A1B
G7SA-2A2B



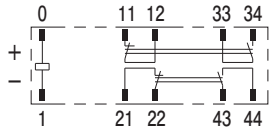


Terminal Arrangement/ Internal Connection Diagram (Bottom View)

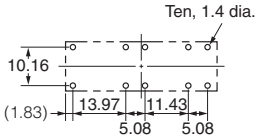
G7SA-3A1B



G7SA-2A2B

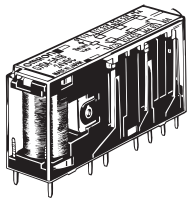


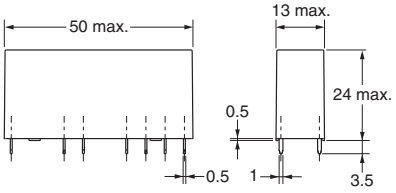
Printed Circuit Board Design Diagram (Bottom View)
(±0.1 tolerance)



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.

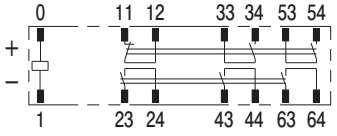
6 poles
G7SA-5A1B
G7SA-4A2B
G7SA-3A3B



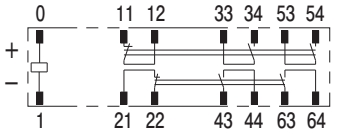


Terminal Arrangement/ Internal Connection Diagram (Bottom View)

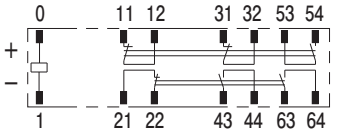
G7SA-5A1B



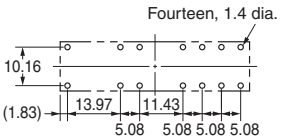
G7SA-4A2B



G7SA-3A3B



Printed Circuit Board Design Diagram (Bottom View)
(±0.1 tolerance)

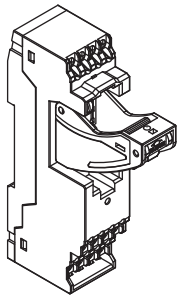


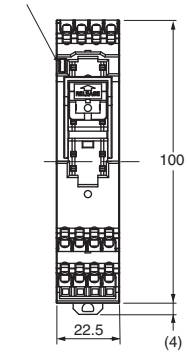
Note: 1. Terminals 23-24, 33-34, 43-44, 53-54, and 63-64 are normally open. Terminals 11-12, 21-22, and 31-32 are normally closed.
2. The colors of the cards inside the Relays are as follows: G7SA-5A1B: Blue, G7SA-4A2B: White, and G7SA-3A3B: Yellow.

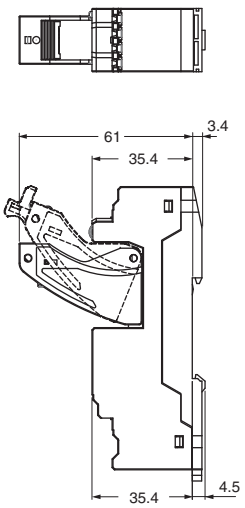
Options (order separately)

Sockets

Front-mounting Sockets
Push-In Plus terminals 4 poles
P7SA-10F-ND-PU

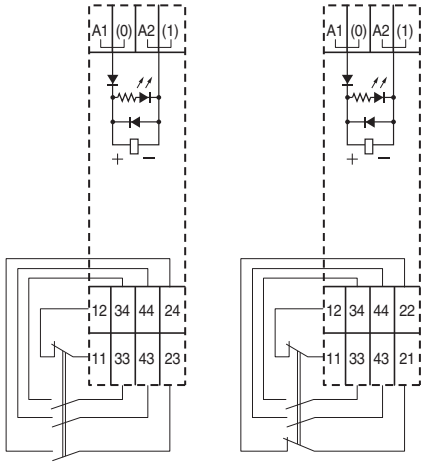






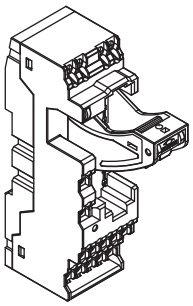
Terminals Arrangement/Internal Connections Diagram (Top View)

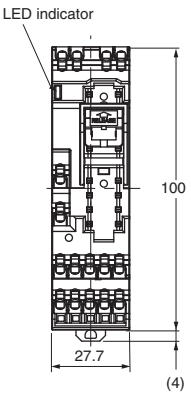
G7SA-3A1B Mounted **G7SA-2A2B Mounted**

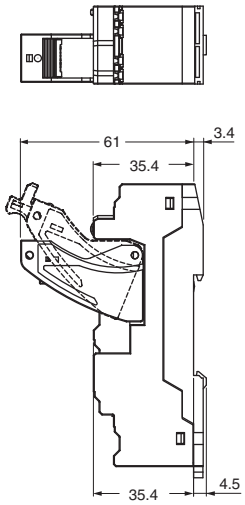


Note: 1. The numbers in parentheses are traditionally used terminal numbers.
2. Terminals 23-24, 33-34, and 43-44 are normally open. Terminals 11-12 and 21-22 are normally closed.

Push-In Plus terminals 6 poles
P7SA-14F-ND-PU

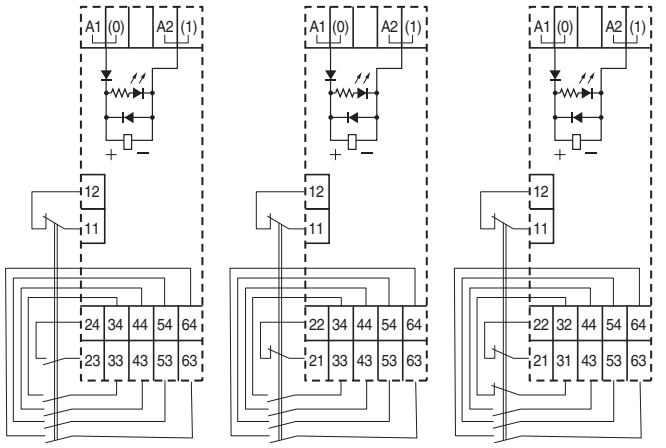






Terminals Arrangement/Internal Connections Diagram (Top View)

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

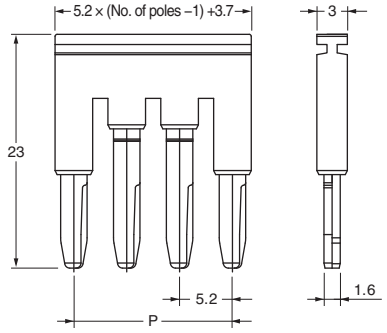


Note: 1. The numbers in parentheses are traditionally used terminal numbers.
2. Terminals 23-24, 33-34, 43-44, 53-54, and 63-64 are normally open. Terminals 11-12, 21-22, and 31-32 are normally closed.

Accessories for Push-In Plus Sockets

Short Bars (for P7SA-□F-ND-PU)

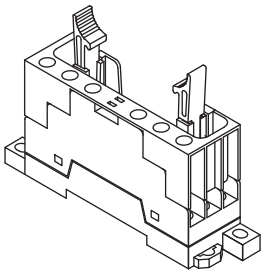
XW5S-P2.5-□□



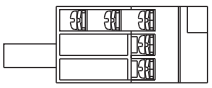
Pitch	Compatible models	No. of poles	P(mm)	Colors	Model ✻
5.2 mm	For P7SA-□F-ND-PU	2	5.2	Red (RD) Blue (BL) Yellow (YL)	XW5S-P2.5-2□
		3	10.4		XW5S-P2.5-3□
		4	15.6		XW5S-P2.5-4□
		5	20.8		XW5S-P2.5-5□

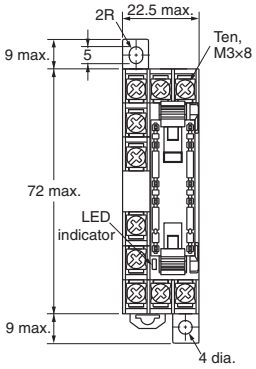
Note: Use for crossover wiring of adjacent contact terminals (bottom) within one Socket.
✻ Replace the box (□) in the model number with the code for the covering color.
Color Options: RD = red, BL = blue, YL = yellow

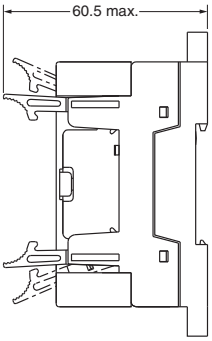
Front-mounting Sockets
Screw terminals 4 poles
P7SA-10F, P7SA-10F-ND



The above figure shows with the finger cover mounted.



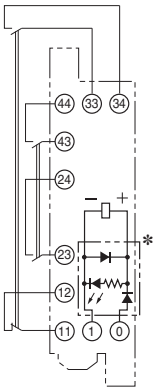




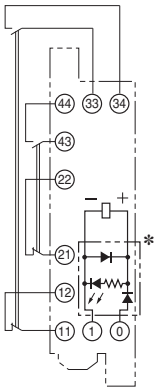
Note 1: The front view shows with the finger cover removed.
2: Only the -ND Sockets have LED indicators (orange)

Terminal Arrangement/Internal Connection Diagram (Top View)

G7SA-3A1B Mounted

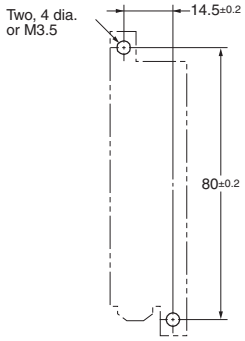


G7SA-2A2B Mounted

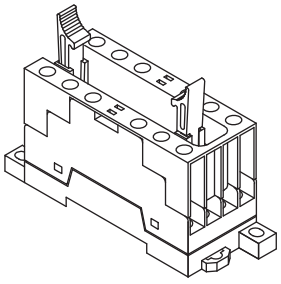


✻ This display circuit is available only for "-ND" models.
Note: Terminals 23-24, 33-34, and 43-44 are normally open.
Terminals 11-12 and 21-22 are normally closed.

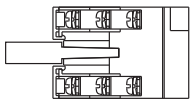
Mounting Hole Placement Diagram (Top View)

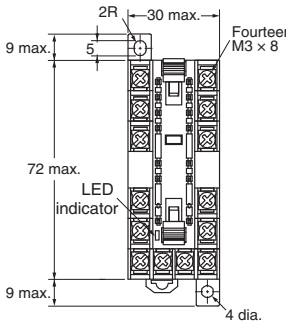


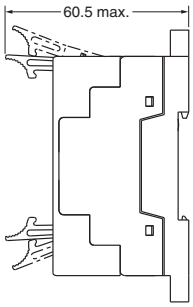
Screw terminals 6 poles
P7SA-14F, P7SA-14F-ND



The above figure shows with the finger cover mounted.



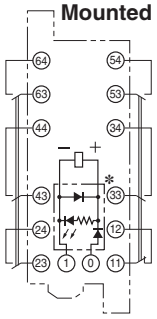




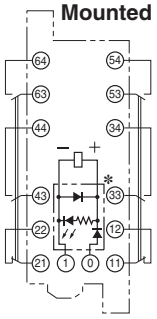
Note 1: The front view shows with the finger cover removed.
2: Only the -ND Sockets have LED indicators (orange).

Terminal Arrangement/Internal Connection Diagram (Top View)

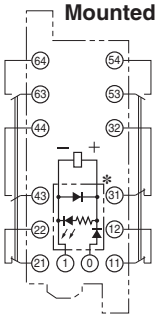
G7SA-5A1B Mounted



G7SA-4A2B Mounted



G7SA-3A3B Mounted



✻ 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.

Mounting Hole Placement Diagram (Top View)