

## Power Solid-state Relay

### G3PA-(VD)

#### Extremely Thin Relays Integrated with Heat Sink

- Downsizing achieved through optimum design of heat sink.
- Mounting possible via screws or via DIN rail.
- Close mounting possible for linking terminals. (Except for G3PA-260B-VD.)
- Applicable with 3-phase loads.
- Replaceable power element cartridges.
- Conforms to VDE 0160 (finger protection), with a dielectric strength of 4,000 V between input and load.
- Conforms to VDE 0805, IEC 950.
- Approved by UL, CSA, and VDE.



#### Ordering Information

Model	Isolation	Zero cross function	Indicator	Applicable output load	Rated input voltage		
G3PA-210B-VD	Phototriac coupler	Yes	Yes	10 A at 24 to 240 VAC	5 to 24 VDC		
G3PA-220B-VD				20 A at 24 to 240 VAC			
G3PA-240B-VD				40 A at 24 to 240 VAC			
G3PA-260B-VD				60 A at 24 to 240 VAC			
G3PA-210BL-VD		No				10 A at 24 to 240 VAC	
G3PA-220BL-VD						20 A at 24 to 240 VAC	
G3PA-240BL-VD						40 A at 24 to 240 VAC	
G3PA-260BL-VD						60 A at 24 to 240 VAC	
G3PA-210B-VD	Phototriac coupler	Yes	Yes	10 A at 24 to 240 VAC	24 VAC		
G3PA-220B-VD				20 A at 24 to 240 VAC			
G3PA-240B-VD				40 A at 24 to 240 VAC			
G3PA-260B-VD				60 A at 24 to 240 VAC			
G3PA-420B-VD						20 A at 180 to 400 VAC	12 to 24 VDC
G3PA-430B-VD						30 A at 180 to 400 VAC	
G3PA-420B-VD-2						20 A at 200 to 480 VAC	
G3PA-430B-VD-2						30 A at 200 to 480 VAC	
G3PA-450B-VD-2	20 A at 200 to 480 VAC						
	50 A at 200 to 480 VAC						

## Replacement Parts

Name	Carry current	Model	Applicable SSR
Power Device Cartridge	10 A	G32A-A10-VD DC5-24	G3PA-210B-VD DC5-24
		G32A-A10L-VD DC5-24	G3PA-210BL-VD DC5-24
		G32A-A10-VD AC24	G3PA-210B-VD AC24
	20 A	G32A-A20-VD DC5-24	G3PA-220B-VD DC5-24
		G32A-A20L-VD DC5-24	G3PA-220BL-VD DC5-24
		G32A-A20-VD AC24	G3PA-220B-VD AC24
	40 A	G32A-A40-VD DC5-24	G3PA-240B-VD DC5-24
		G32A-A40L-VD DC5-24	G3PA-240BL-VD DC5-24
		G32A-A40-VD AC24	G3PA-240B-VD AC24
	60 A	G32A-A60-VD DC5-24	G3PA-260B-VD DC5-24
		G32A-A60L-VD DC5-24	G3PA-260BL-VD DC5-24
		G32A-A60-VD AC24	G3PA-260B-VD AC24
	20 A	G32A-A420-VD DC12-24	G3PA-420B-VD DC12-24
30 A	G32A-A430-VD DC12-24	G3PA-430B-VD DC12-24	
20 A	G32A-A420-VD-2 DC12-24	G3PA-420B-VD-2 DC12-24	
30 A	G32A-A430-VD-2 DC12-24	G3PA-430B-VD-2 DC12-24	
50 A	G32A-A450-VD-2 DC12-24	G3PA-450B-VD-2 DC12-24	

### ■ Other Units (Order Separately)

#### Units that Enable 2-line Switching of 3-phase Power

Name	Current flow	Model	Applicable SSR
Short-circuit Unit	10 A	G32A-D20	G3PA-210B-VD
	20 A		G3PA-220B-VD G3PA-420B-VD, G3PA-420B-VD-2
	30 A	G32A-D40	G3PA-430B-VD, G3PA-430B-VD-2
	40 A		G3PA-240B-VD

## Specifications

### ■ Ratings (at 25°C)

#### Input

Model	Rated voltage	Voltage range	Input current impedance	Voltage level	
				Must operate voltage	Must release voltage
G3PA-210B-VD	5 to 24 VDC	4 to 30 VDC	7 mA max.	4 VDC max.	1 VDC min.
G3PA-220B-VD					
G3PA-240B-VD					
G3PA-260B-VD					
G3PA-210BL-VD	5 to 24 VDC	4 to 30 VDC	20 mA max.	4 VDC max.	1 VDC min.
G3PA-220BL-VD					
G3PA-240BL-VD					
G3PA-260BL-VD					
G3PA-210B-VD	24 VAC	19.2 to 26.4 VAC	1.4 kΩ±20%	19.2 VAC max.	4.8 VAC min.
G3PA-220B-VD					
G3PA-240B-VD					
G3PA-260B-VD					
G3PA-420B-VD	12 to 24 VDC	9.6 to 30 VDC	7 mA max.	9.6 VDC max.	1 VDC min.
G3PA-430B-VD					
G3PA-420B-VD-2					
G3PA-430B-VD-2					
G3PA-450B-VD-2					

## Output

Model	Applicable load		
	Load voltage	Load current	Inrush current
G3PA-210B(L)-VD	19 to 264 VAC (50/60 Hz)	0.1 to 10 A	150 A (60 Hz, 1 cycle)
G3PA-220B(L)-VD		0.1 to 20 A	220 A (60 Hz, 1 cycle)
G3PA-240B(L)-VD		0.5 to 40 A	440 A (60 Hz, 1 cycle)
G3PA-260B(L)-VD		0.5 to 60 A	440 A (60 Hz, 1 cycle)
G3PA-420B-VD	150 to 440 VAC (50/60 Hz)	0.5 to 20 A	220 A (60 Hz, 1 cycle)
G3PA-430B-VD		0.5 to 30 A	440 A (60 Hz, 1 cycle)
G3PA-420B-VD-2	180 to 528 VAC (50/60 Hz)	0.5 to 20 A	220 A (60 Hz, 1 cycle)
G3PA-430B-VD-2		0.5 to 30 A	440 A (60 Hz, 1 cycle)
G3PA-450B-VD-2		0.5 to 50 A	440 A (60 Hz, 1 cycle)

Refer to *Engineering Data* for further details.

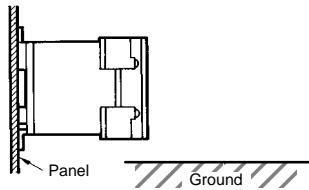
## ■ Characteristics

Item	G3PA-210B(L)-VD	G3PA-220B(L)-VD	G3PA-240B(L)-VD	G3PA-260B(L)-VD	G3PA-420B-VD	G3PA-420B-VD-2	G3PA-430B-VD	G3PA-430B-VD-2	G3PA-450B-VD-2
Operate time	1/2 of load power source cycle + 1 ms max. (DC Input, -B models) 1 1/2 of load power source cycle + 1 ms max. (AC Input) 1 ms max. (-BL models)								
Release time	1/2 of load power source cycle + 1 ms max. (DC Input) 1 1/2 of load power source cycle + 1 ms max. (AC Input)								
Output ON voltage drop	1.6 V (RMS) max.				1.8 V (RMS) max.				
Leakage current	5 mA max. (at 120 VAC) 10 mA max. (at 230 VAC)		10 mA max. (at 120 VAC) 20 mA max. (at 230 VAC)		20 mA max. (at 400 VAC)				
I <sup>2</sup> t	260 A <sup>2</sup> S		810 A <sup>2</sup> S		260 A <sup>2</sup> S		810 A <sup>2</sup> S		810 A <sup>2</sup> S
Insulation resistance	100 MΩ min. (at 500 VDC)								
Dielectric strength	4,000 VAC, 50/60 Hz for 1 min								
Vibration resistance	Malfunction: 10 to 55 Hz, 0.75-mm double amplitude (mounted to DIN rail)								
Shock resistance	Malfunction: 300 m/s <sup>2</sup> (mounted to DIN rail)								
Ambient temperature	Operating: -30°C to 80°C (with no icing or condensation) Storage: -30°C to 100°C (with no icing or condensation)								
Approved standards	UL508 File No.E64562, CSA C22.2 (No.14, No.950) File No.LR35535, EN60950 File No.5915UG						Approval expected in Mar 2000		
Ambient humidity	Operating: 45% to 85%								
Weight	Approx. 260 g	Approx. 340 g	Approx. 460 g	Approx. 900 g	Approx. 290 g	Approx. 290 g	Approx. 410 g	Approx. 410 g	Approx. 900 g

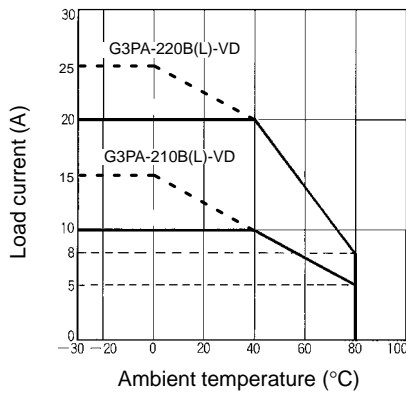
# Engineering Data

## Load Current vs. Ambient Temperature Characteristics

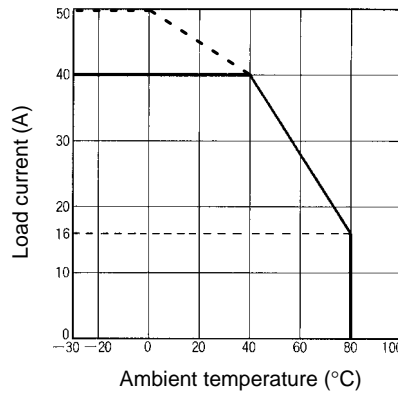
### Horizontal Mounting to Ground



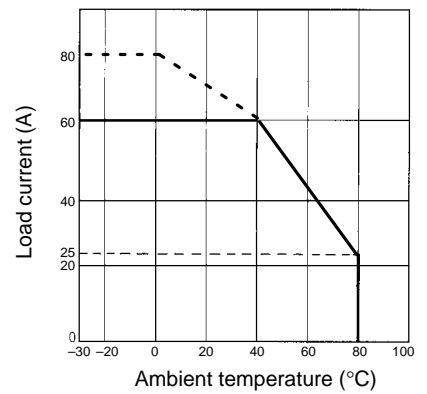
G3PA-210B(L)-VD, G3PA-220B(L)-VD



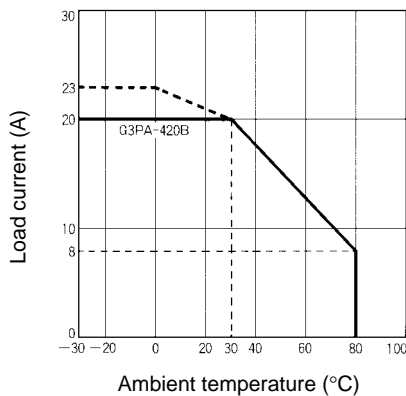
G3PA-240B(L)-VD



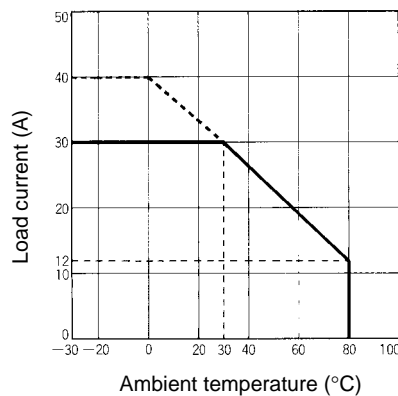
G3PA-260B(L)-VD



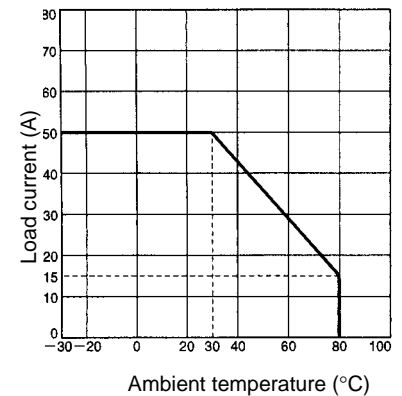
G3PA-420B-VD, G3PA-420B-VD-2



G3PA-430B-VD, G3PA-430B-VD-2



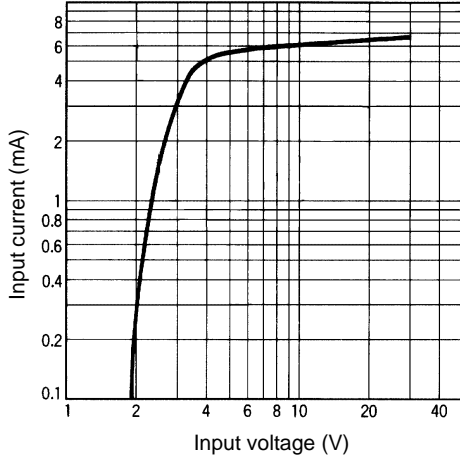
G3PA-450B-VD-2



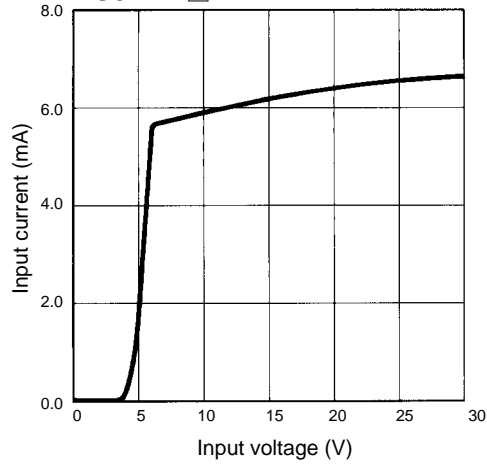
**Note:** Close mounting is possible for a maximum of three Units by reducing the load current by 20%. (A minimum clearance of 10 mm must be provided when mounting four or more Units.)

**Characteristics Between Input Voltage and Input Current**

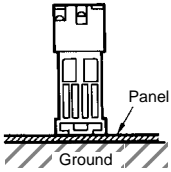
**G3PA-2□0B-VD**



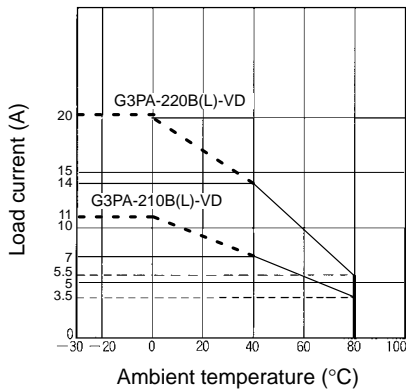
**G3PA-4□B-VD**



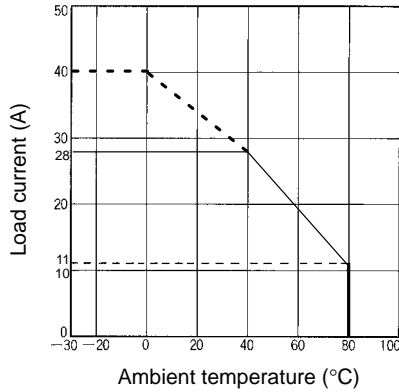
**Vertical Mounting to Ground**



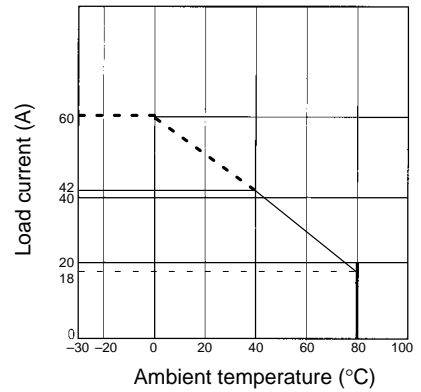
**G3PA-210B(L)-VD, G3PA-220B(L)-VD**



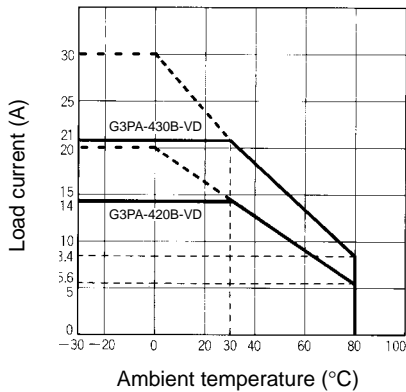
**G3PA-240B(L)-VD**



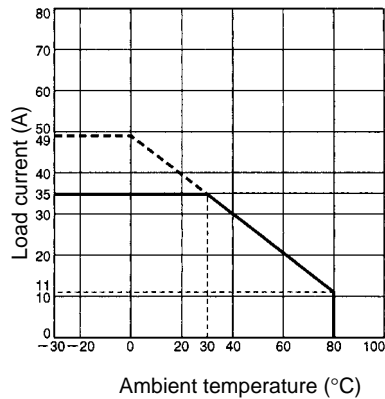
**G3PA-260B(L)-VD**



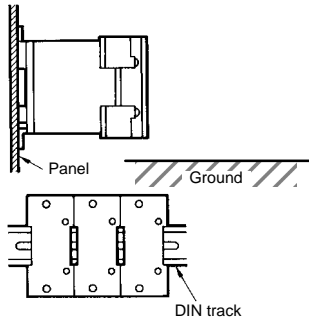
**G3PA-420B-VD, G3PA-430B-VD  
G3PA-420B-VD-2, G3PA-430B-VD-2**



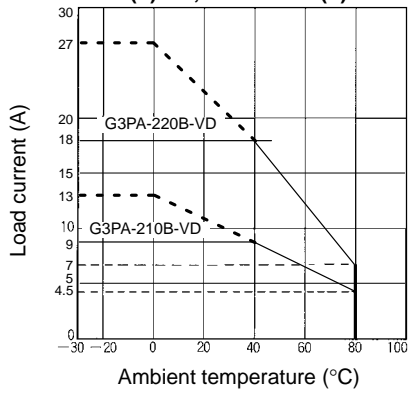
**G3PA-450B-VD-2**



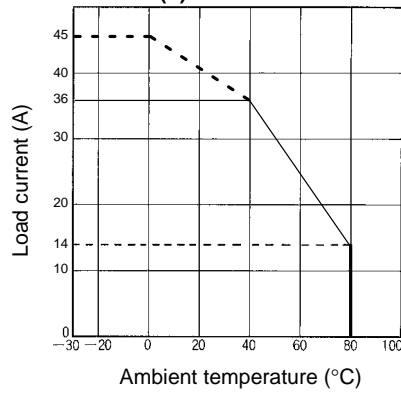
**Close Mounting (Up to Three)**



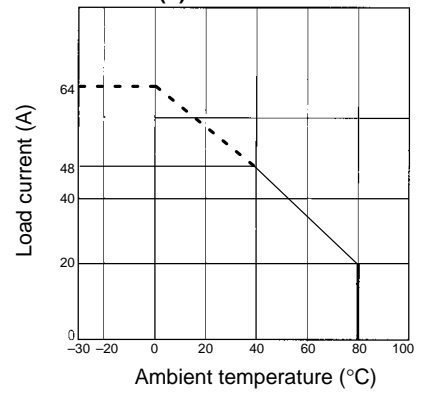
**G3PA-210B(L)-VD, G3PA-220B(L)-VD**



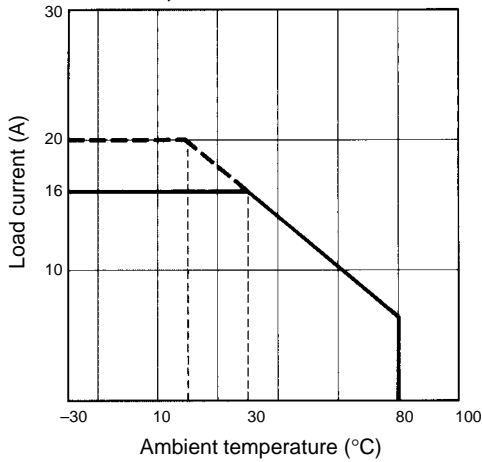
**G3PA-240B(L)-VD**



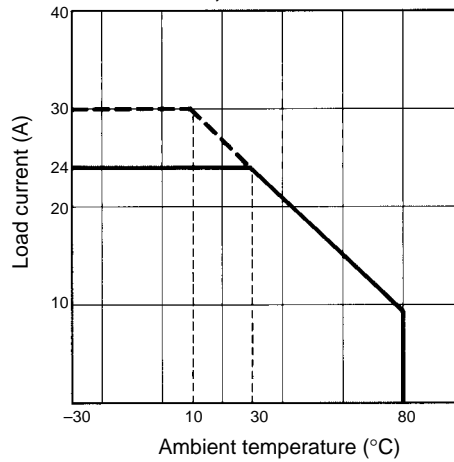
**G3PA-260B(L)-VD**



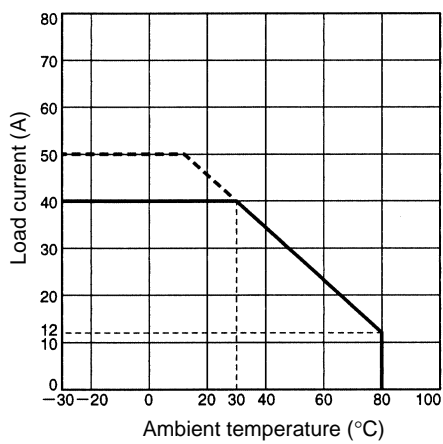
**G3PA-420B-VD, G3PA-420B-VD-2**



**G3PA-430B-VD, G3PA-430B-VD-2**



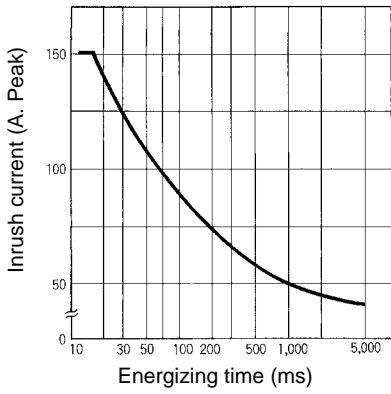
**G3PA-450B-VD-2**



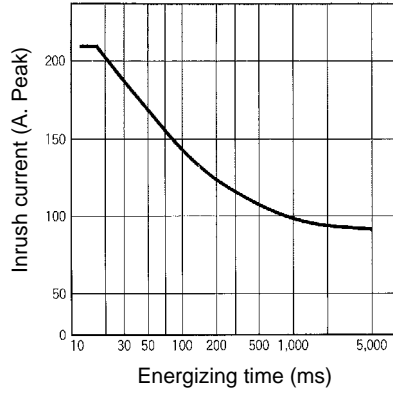
### Inrush Current Resistivity

Non-repetitive (Keep the inrush current to half the rated value if it occurs repetitively.)

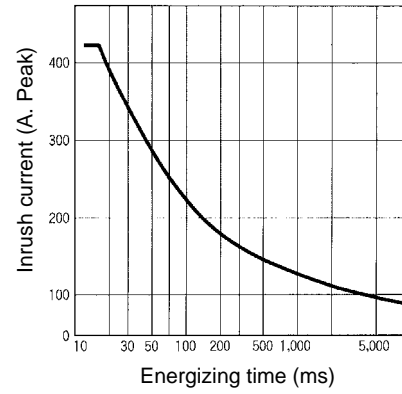
**G3PA-210B(L)-VD**



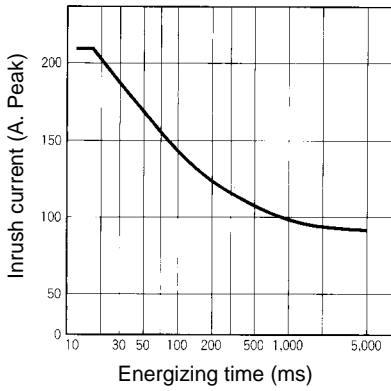
**G3PA-220B(L)-VD**



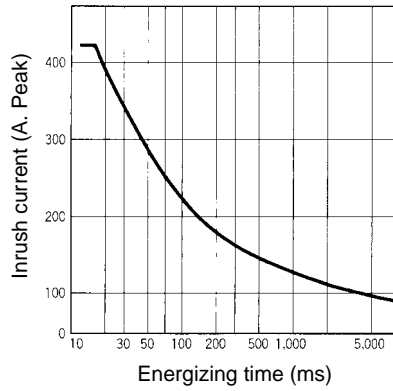
**G3PA-240B(L)-VD/260B(L)-VD**



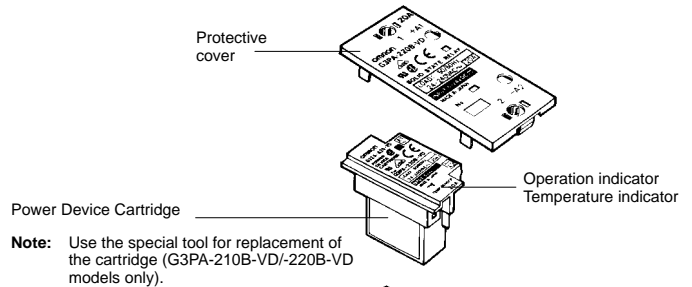
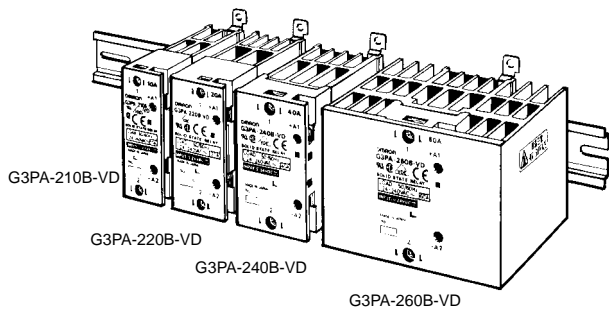
**G3PA-420B-VD, G3PA-420B-VD-2**



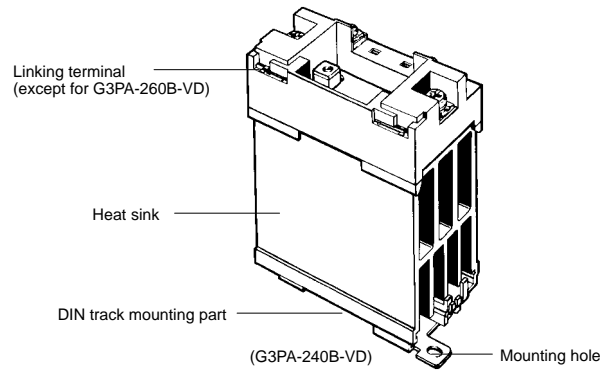
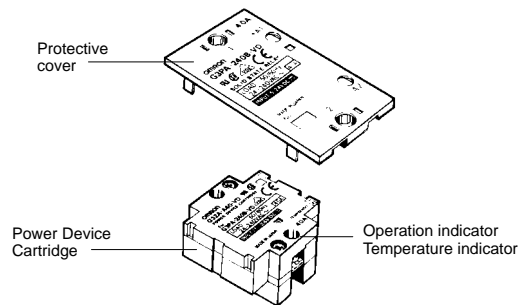
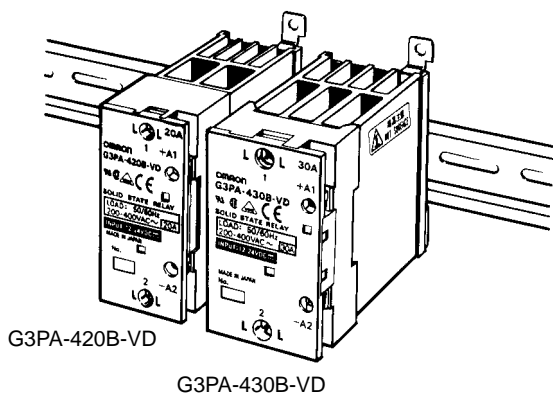
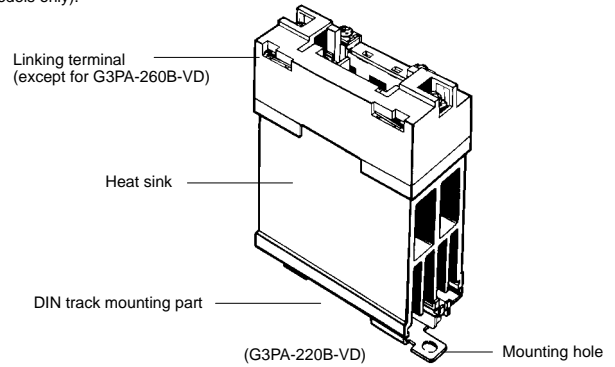
**G3PA-430B-VD, G3PA-430B-VD-2, G3PA-450B-VD-2**



# Nomenclature



**Note:** Use the special tool for replacement of the cartridge (G3PA-210B-VD/220B-VD models only).





## Operation

### ■ Renewal Parts

#### G32A-A Power Device Cartridge

The G32A-A Power Device Cartridge (a Triac Unit) can be replaced with a new one. When the temperature indicator has changed from pink to red, the triac circuitry may have malfunctioned possibly by an excessive flow of current, in which case, dismantle the damaged cartridge for replacement.

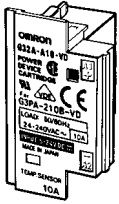
The damaged cartridge can be replaced with a new one without disconnecting the wires from the G3PA.

Improve the heat radiation efficiency of the G3PA before replacing the cartridge.

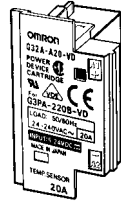
The G32A-A Power Device Cartridge can withstand an excessive current for a short period of time, such as may be caused accidentally by the short circuiting of the load, in which case the temperature indicator will not turn red.

#### Appearance

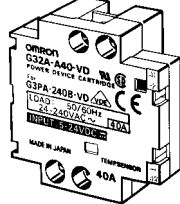
G32A-A10-VD



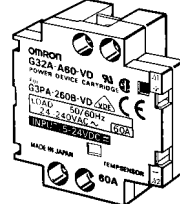
G32A-A20-VD



G32A-A40-VD



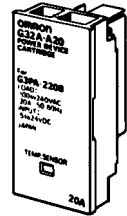
G32A-A60-VD



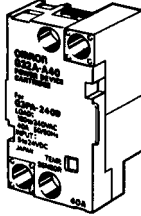
G32A-A10



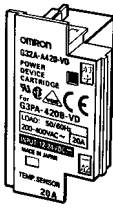
G32A-A20



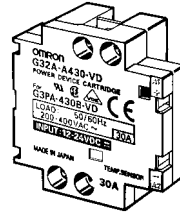
G32A-A40



G32A-A420-VD



G32A-A430-VD



#### Replacement Parts

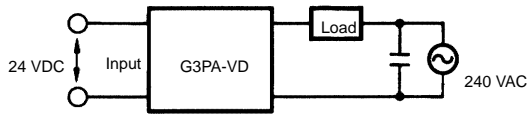
Name	Carry current	Load voltage	Model	Applicable SSR	Conforms to VDE	
Power Device Cartridge	10 A	19 to 264 VAC	G32A-A10-VD DC5-24	G3PA-210B-VD DC5-24	Yes	
			G32A-A10L-VD DC5-24	G3PA-210BL-VD DC5-24		
			G32A-A10-VD AC24	G3PA-210B-VD AC24		
	20 A		G32A-A20-VD DC5-24	G3PA-220B-VD DC5-24		
			G32A-A20L-VD DC5-24	G3PA-220BL-VD DC5-24		
			G32A-A20-VD AC24	G3PA-220B-VD AC24		
	40 A		G32A-A40-VD DC5-24	G3PA-240B-VD DC5-24		
			G32A-A40L-VD DC5-24	G3PA-240BL-VD DC5-24		
			G32A-A40-VD AC24	G3PA-240B-VD AC24		
	60 A		G32A-A60-VD DC5-24	G3PA-260B-VD DC5-24		
			G32A-A60L-VD DC5-24	G3PA-260BL-VD DC5-24		
			G32A-A60-VD AC24	G3PA-260B-VD AC24		
	20 A		150 to 440 VAC	G32A-A420-VD DC12-24		G3PA-420B-VD DC12-24
	30 A			G32A-A430-VD DC12-24		G3PA-430B-VD DC12-24
20 A	180 to 528 VAC	G32A-A420-VD-2 DC12-24	G3PA-420B-VD-2 DC12-24			
30 A		G32A-A430-VD-2 DC12-24	G3PA-430B-VD-2 DC12-24			
50 A		G32A-A450-VD-2 DC12-24	G3PA-450B-VD-2 DC12-24			
10 A	75 to 264 VAC	G32A-A10	G3PA-210B DC5-24	No		
20 A		G32A-A20	G3PA-220B DC5-24			
40 A		G32A-A40	G3PA-240B DC5-24			
20 A		180 to 528 VAC	G32A-A420		G3PA-420B DC5-24	
30 A	G32A-A430		G3PA-430B DC5-24			

**Note:** 1. Replacing Power Device Cartridges

When replacing Power Device Cartridges, use the specified model. Using a Power Device Cartridge other than the specified one will result in faulty operation and destruction of the elements.

2. Noise Terminal Voltage according to EN55011

Conformance to EN55011 is possible if a capacitor is connected to the load power supply as shown in the diagram below. (G3PA-VD)

**Replacement**

**Note:** Be sure to turn OFF the power supply when replacing the Cartridge. Supplying power with the Cartridge removed may result in malfunction.

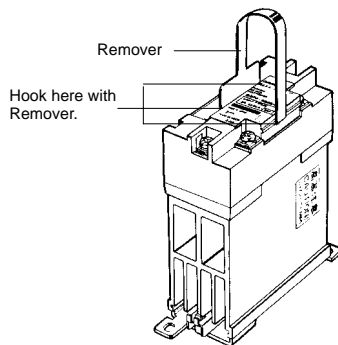
**G32A-A10-VD/G32A-A20-VD/G32-A420-VD**

Use the special tool (provided) to extract the cartridge for replacement with a new one.

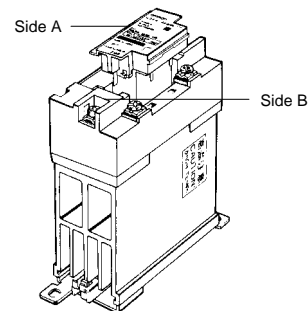
**Extraction**

Follow the procedures below to dismount the Power Device Cartridge from the G3PA.

1. **Switch off the power.**
2. Remove the terminal cover.
3. Hook the indented part of the cartridge with the tool and pull up on the cartridge to remove it.



3. Insert the cartridge into the opening of the G3PA so that the letters on the cartridge and those on the G3PA are in the same direction and side A and side B are even.

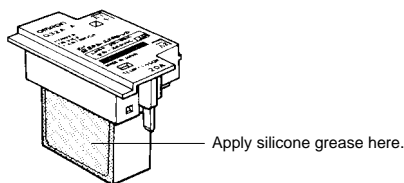


4. Attach the terminal cover.
5. Switch on the power and check the G3PA to be sure it works properly.

**Mounting**

Follow the procedures below to mount the Power Device Cartridge on the G3PA.

1. Apply silicone grease (provided with the G32A-A) to the entire surface of the heat radiator.



2. Make sure that there is no dust or pieces of wire on the heat radiator of the G32A-A or the G3PA.

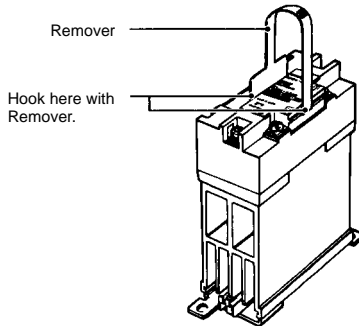
**G32A-A10/G32A-A20**

Use the special tool (provided) to extract the cartridge for replacement with a new one.

**Extraction**

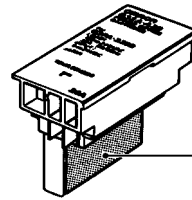
Follow the procedures below to dismount the Power Device Cartridge from the G3PA.

1. **Switch off the power.**
2. Remove the terminal cover.
3. Hook the indented part of the cartridge with the tool and pull up on the cartridge to remove it.

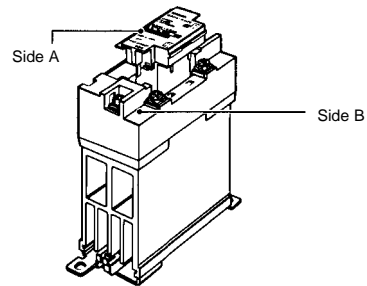
**Mounting**

Follow the procedures below to mount the Power Device Cartridge on the G3PA.

1. Apply silicone grease (provided with the G32A-A) to the entire surface of the heat radiator.



2. Make sure that there is no dust or pieces of wire on the heat radiator of the G32A-A or the G3PA.
3. Insert the cartridge into the opening of the G3PA so that the letters on the cartridge and those on the G3PA are in the same direction and side A and side B are even.



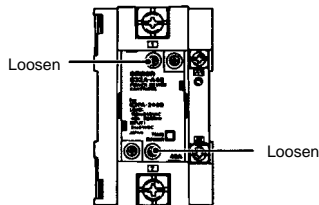
4. Attach the terminal cover.
5. Switch on the power and check the G3PA to be sure it works properly.

**G32A-A40**

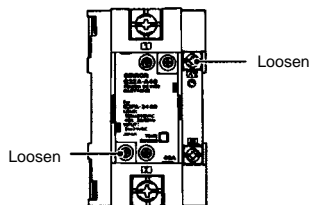
The Power Device Cartridge is secured with screws.

**Extraction**

1. **Switch off the power.**
2. Remove the terminal cover.
3. Loosen and remove the two middle screws. These screws are connected to terminals 1 and 2. (For safety reasons, be sure to turn the power supply off.)



4. Loosen the screws in the corners.

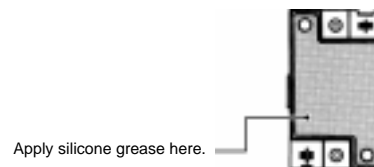


5. Hold the indented parts on both sides of the cartridge and pull up on the cartridge to remove it.

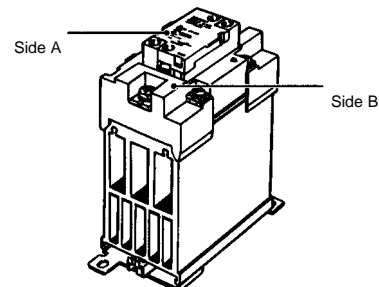
**Mounting**

Follow the procedures below to mount the Power Device Cartridge on the G3PA.

1. Apply silicone grease to the entire surface of the heat radiator.



2. Make sure that there is no dust or pieces of wire on the heat radiator of the G32A-A or the G3PA-240B.
3. Insert the cartridge into the opening of the G3PA-240B. (Insert until side A and side B are even.)



4. Tighten the screws in the corners. (Tightening torque: 0.59 to 0.78 N•m)
5. Tighten the middle screws. (Tightening torque: 0.59 to 0.78 N•m)
6. Attach the terminal cover.
7. Switch on the power and check the G3PA to be sure it works properly.

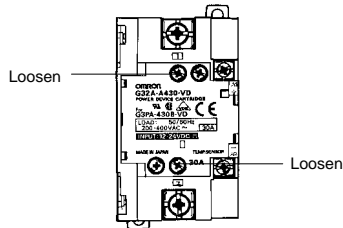
### G32A-A40-VD/G32A-A60-VD/G32A-A430-VD

The G32A Power Device Cartridge is mounted and secured with screws to the G3PA Unit.

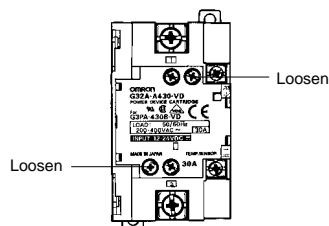
#### Extraction

Follow the procedures below to dismantle the G32A-A Power Device Cartridge from the G3PA.

1. **Switch off the power.**
2. Remove the terminal cover.
3. Loosen the two centered screws on the sides to dismount the cartridge. The screws are connected to terminals 1 and 2.



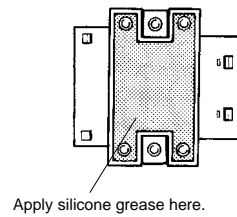
4. Loosen the screws on both the corners.



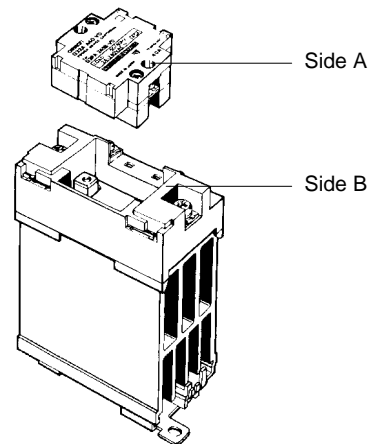
5. Hold the indented part of both the corners to dismount the cartridge.

#### Mounting

1. Apply silicone grease to the entire surface of the heat radiator.



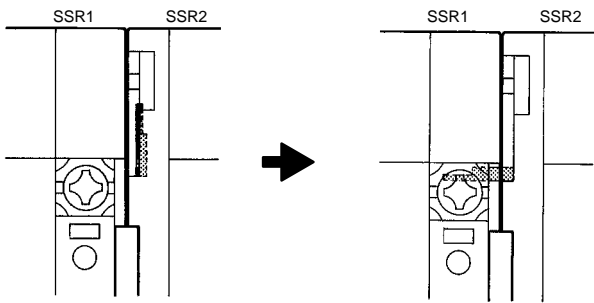
2. Make sure that there is no dust or pieces of wire on the radiator of the G32A-A or the G3PA.
3. Insert the cartridge into the opening of the G3PA so that side A and side B are even.



4. Tighten the screws on both the corners with a tightening torque of 0.59 to 0.78 N • m.
5. Tighten the screws on both the sides with a tightening torque of 0.59 to 0.78 N • m.
6. Attach the terminal cover.
7. Switch on the power and check the G3PA to be sure it works properly.

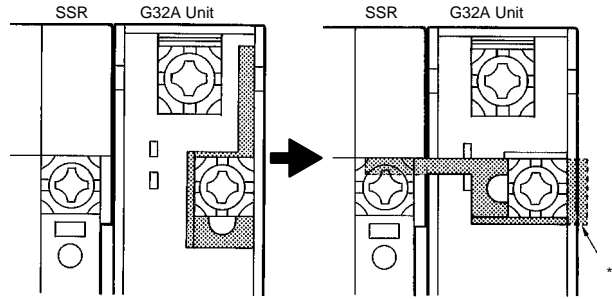
■ Linking Terminal Connection

- Connecting with linking terminal for G3PA-210B-VD, -220B-VD, -240B-VD and G3PA-420B-VD, G3PA-430B-VD.

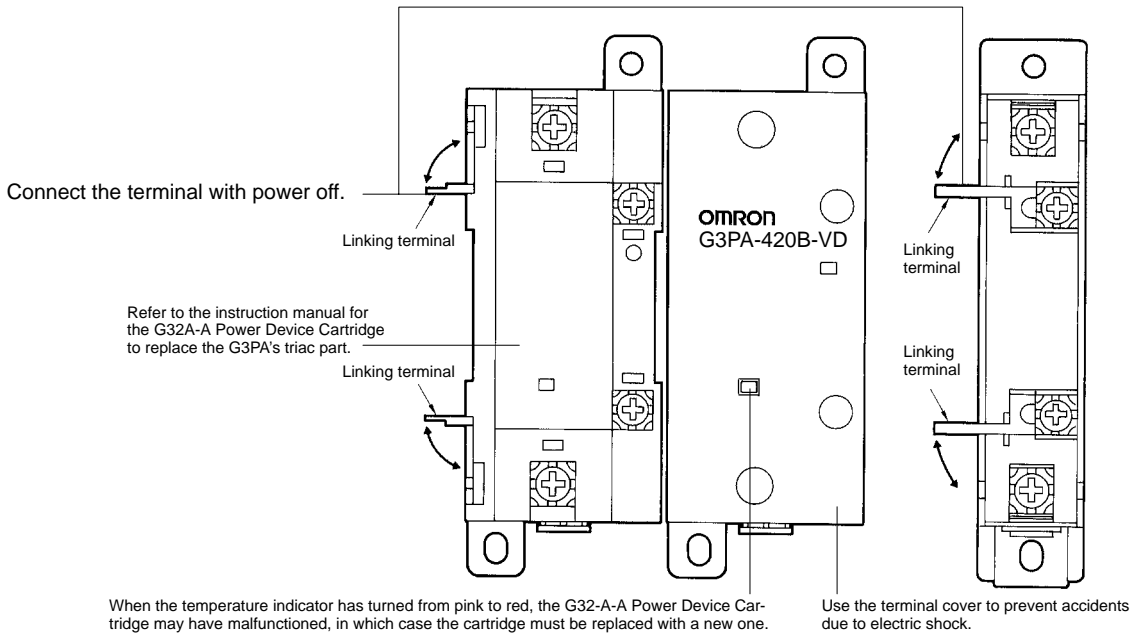


1. When SSRs are close mounted, loosen the M3.5 Sems screw and flip the linking terminal down.
2. Insert the linking terminal securely into the center of the screw and tighten the screw.

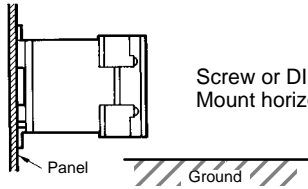
- Connecting with linking terminal for G32A.



1. When SSR are close mounted, loosen the M3.5 Sems screw on the G32A and flip the linking terminal down.
2. Insert the linking terminal securely into the center of the screw and tighten the screw. Ensure that the linking terminal does not protrude.

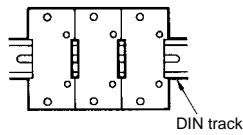


### Horizontal Mounting

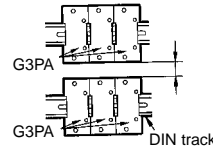


Screw or DIN track mounting is possible.  
Mount horizontally to ground.

### Close Mounting

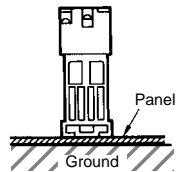


Close mounting of up to three G3PA SSRs is possible.  
Load current should be reduced by 10% for G3PA-210B-VD, -220B-VD, -240B-VD, and by 20% for other models.  
To close mount more than three G3PA, keep a distance of 10 mm between each SSR.



Keep a distance of 80 mm between the upper SSR and the lower SSR.

### Vertical Mounting



For vertical mounting, the load current must be 30% lower than the rated one (refer to *Engineering Data*).

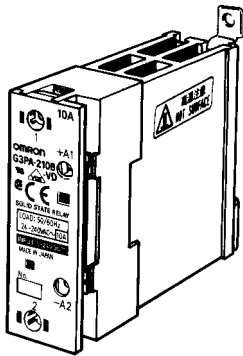
At a rated ambient temperature for each.

**Note:** Keep a distance of 3 cm or more between the G3PA (especially the SSR on the upper side) and the duct.

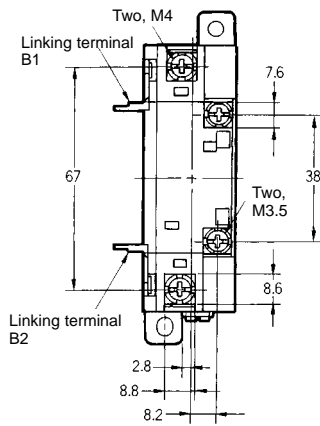
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

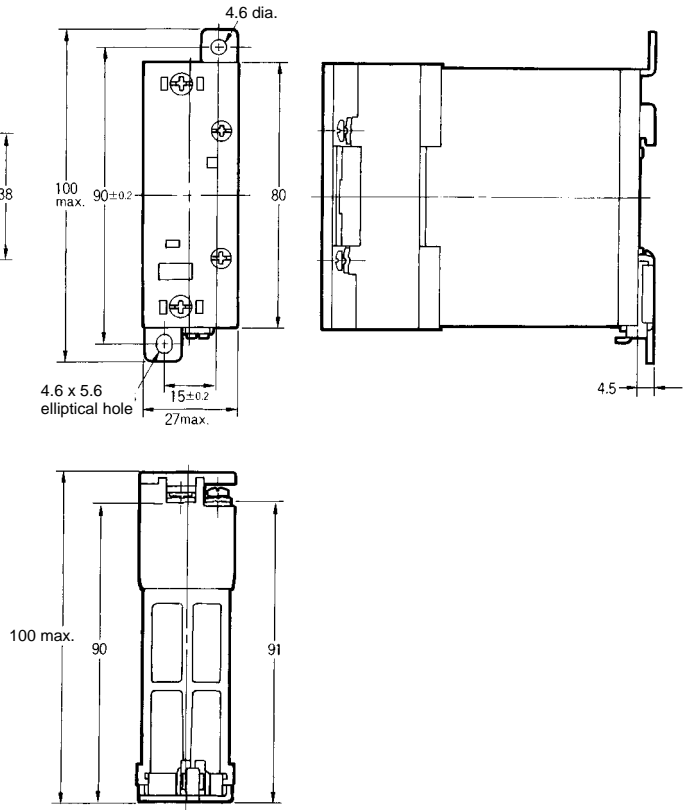
## G3PA-210B-VD



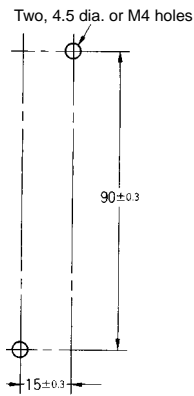
**Without Terminal Cover**



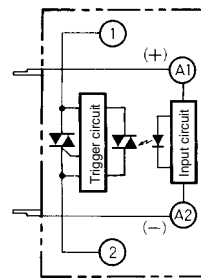
**With Terminal Cover**



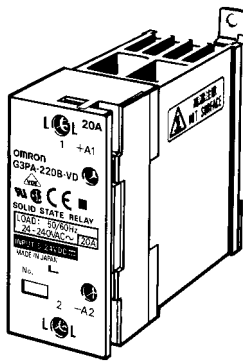
**Mounting Holes**



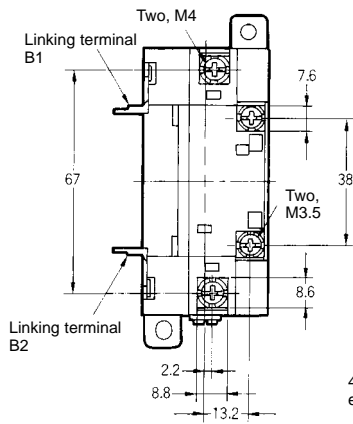
**Terminal Arrangement/ Internal Connections**



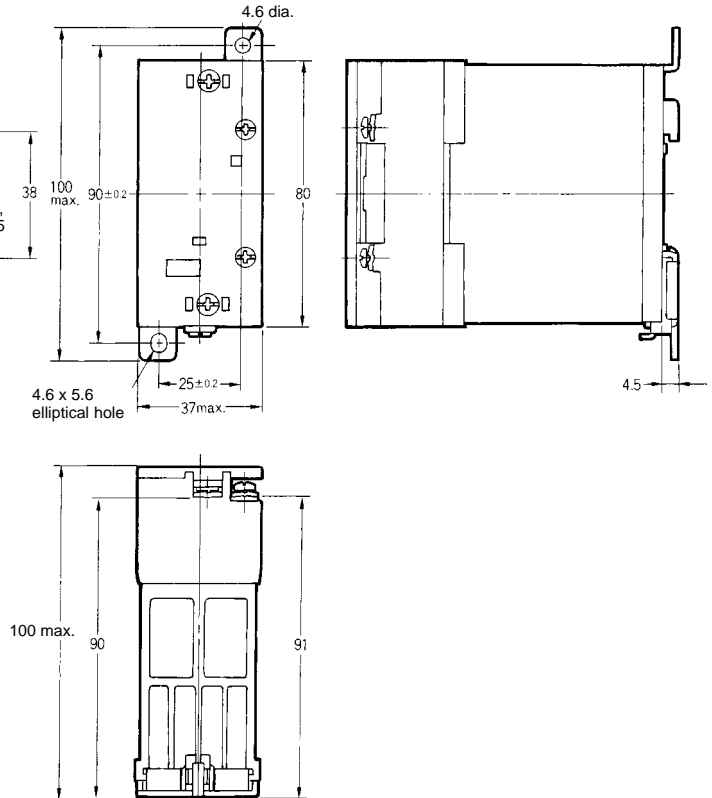
G3PA-220B-VD



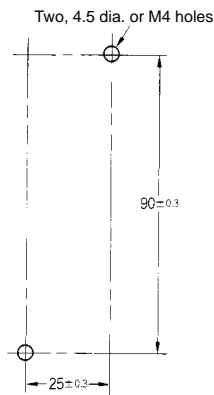
Without Terminal Cover



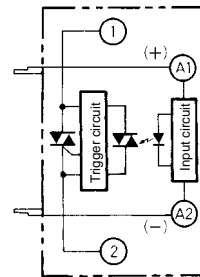
With Terminal Cover



Mounting Holes

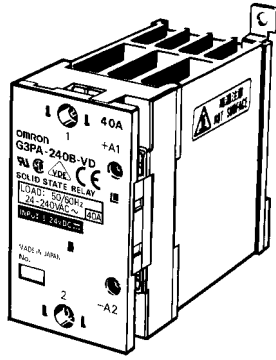


Terminal Arrangement/  
Internal Connections

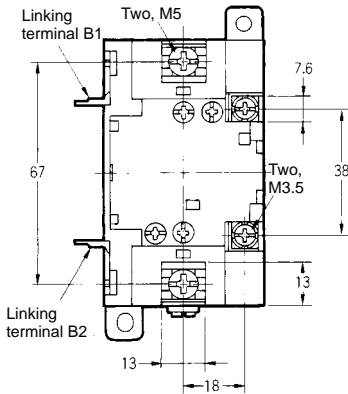




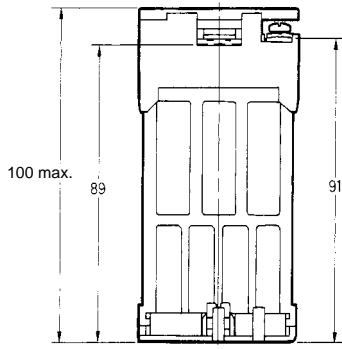
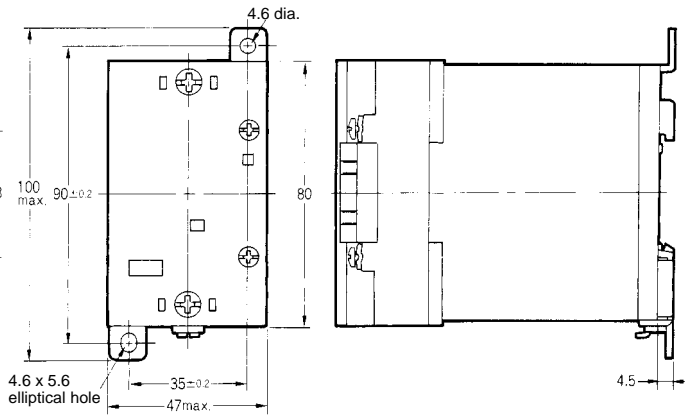
G3PA-240B-VD



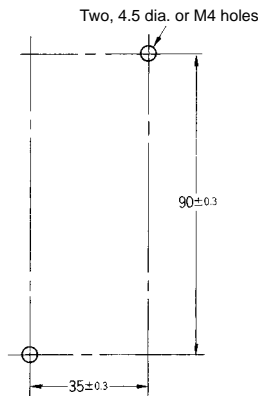
Without Terminal Cover



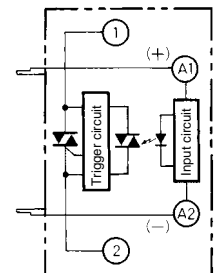
With Terminal Cover



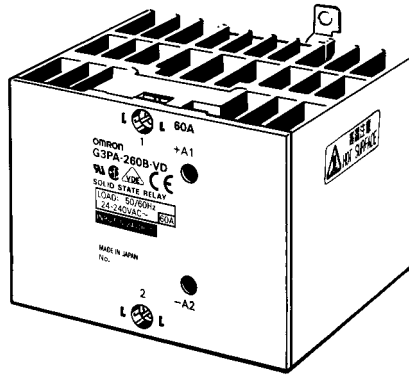
Mounting Holes



Terminal Arrangement/ Internal Connections

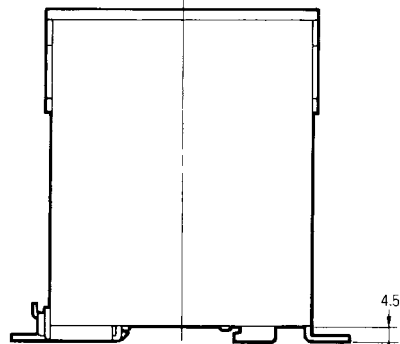
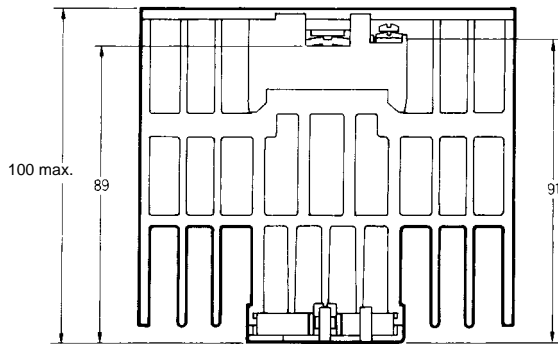
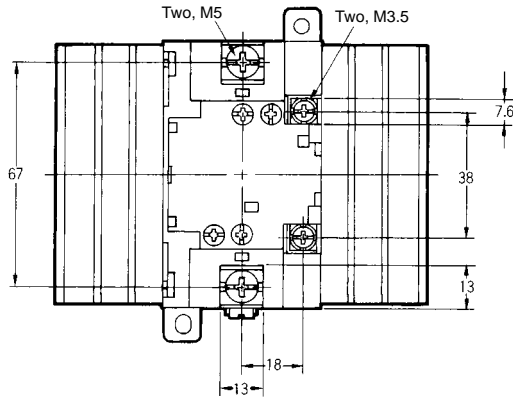
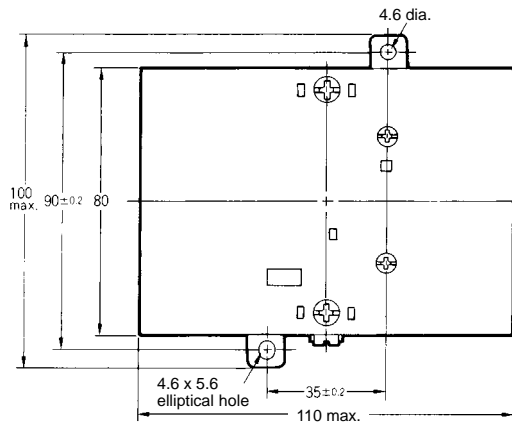


G3PA-260B-VD  
G3PA-450B-VD-2



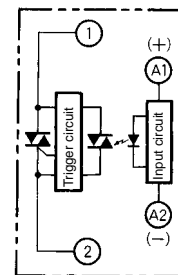
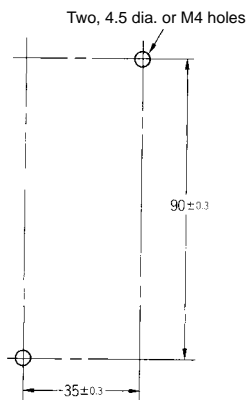
Without Terminal Cover

With Terminal Cover

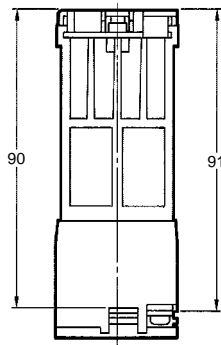
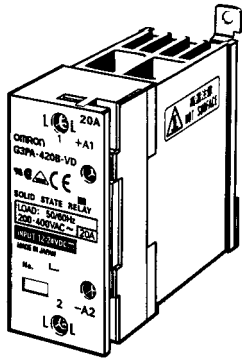


Mounting Holes

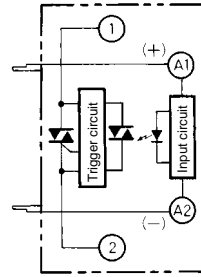
Terminal Arrangement/  
Internal Connections



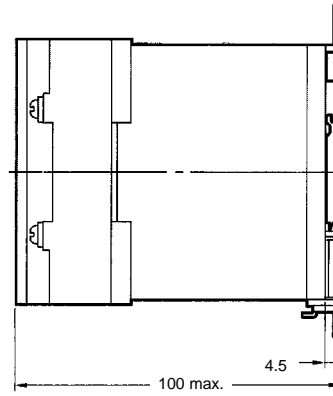
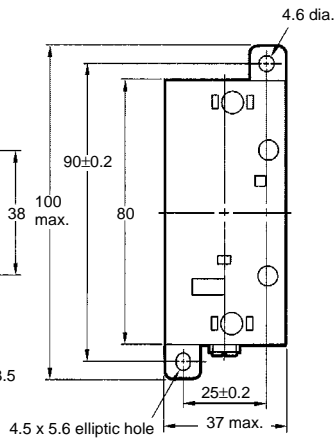
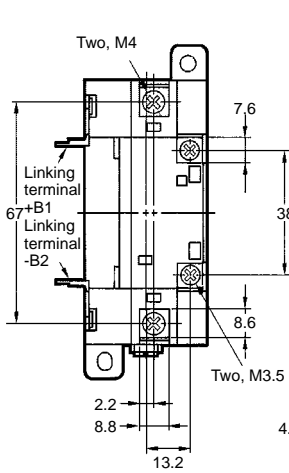
G3PA-420B-VD, G3PA-420B-VD-2



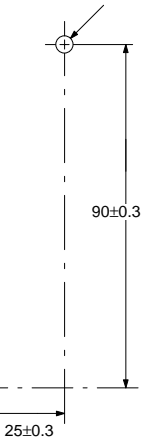
Terminal Arrangement/  
Internal Connections



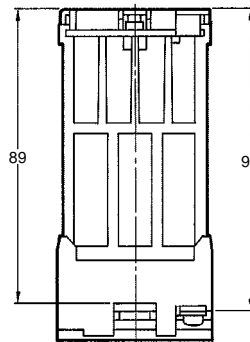
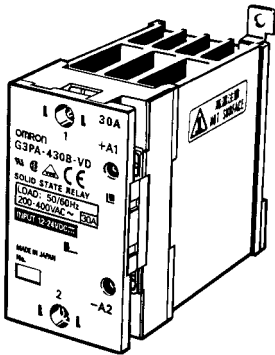
Mounting Holes



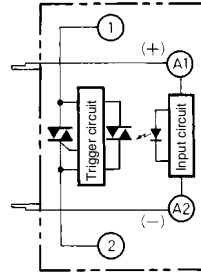
Two, 4.5 dia. or M4



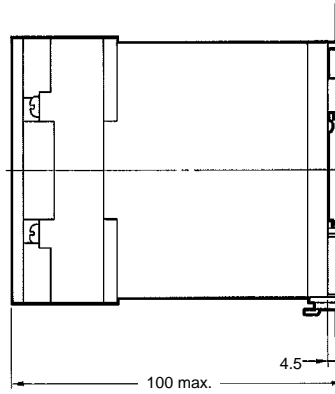
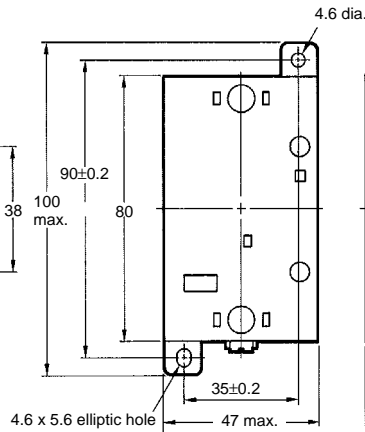
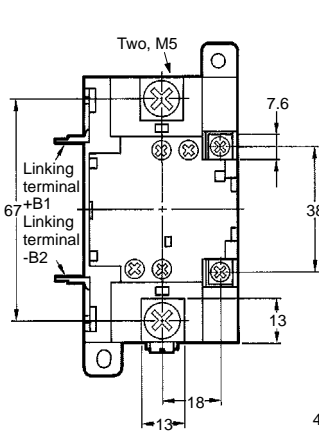
G3PA-430B-VD, G3PA-430B-VD-2



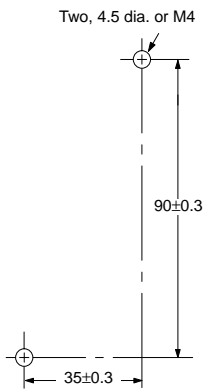
Terminal Arrangement/  
Internal Connections



Mounting Holes



Two, 4.5 dia. or M4



**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**  
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.