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Solid State Contactors (Three-phase)

CSM_G3PB-2_-3_DS_E_2_1

Compact, Low-cost Solid State Contactors of an Innovative Construction Ideal for Three-phase Heaters

- Slim Units with three-phase output.
- Optimum heat sinks attach to models without built-in heat sinks.
- Compact design achieved by optimizing heat sink shape.
- DIN track mounting possible (when using the Y92B-P50 Heat Sink) in addition to screw mounting.
- Comply with EN60947-4-3 (IEC947-4-3) UL508, and CSA22.2 No. 14, and bear CE marking.

Refer to Safety Precautions for All Solid State Relays.



\$1 @ ((

Model Number Structure

Model Number Legend

G3PB-___-

1 234 567

- 1. Basic Model Name
- G3PB: Solid State Relay
- 2. Rated Load Power Supply Voltage
 - 2: 200 VAC
 - 4: 400 VAC
- 3. Rated Load Current
 - 15: 15 A
 - 25: 25 A
 - 35: 35 A
 - 45: 45 A
- 4. Terminal Type
 - B: Screw terminals
- 5. Single-phase/3-phase and Number of Elements for 3-phase
 - 2: 3-phase, 2-element models
 - 3: 3-phase, 3-element models
- 6. 3-phase Type
 - Blank: Built-in heat sink
 - H: No heat sink ("hockey puck" type)
- 7. Certification
 - VD: Certified by UL, CSA, and VDE

■ List of Models

Models with Built-in Heat Sinks

Number of phases	Main circuit voltage	Zero cross function	Applicable load current (with Class-1 AC resistive load)	Number of elements	Model
3	100 to 240 VAC	Yes	15 A max.	3	G3PB-215B-3-VD
				2	G3PB-215B-2-VD
			25 A max.	3	G3PB-225B-3-VD
				2	G3PB-225B-2-VD
			35 A max.	3	G3PB-235B-3-VD
				2	G3PB-235B-2-VD
			45 A max.	3	G3PB-245B-3-VD
				2	G3PB-245B-2-VD
	200 to 400 VAC		15 A max.	3	G3PB-415B-3-VD
				2	G3PB-415B-2-VD
			25 A max.	3	G3PB-425B-3-VD
				2	G3PB-425B-2-VD
			35 A max.	3	G3PB-435B-3-VD
				2	G3PB-435B-2-VD
			45 A max.	3	G3PB-445B-3-VD
				2	G3PB-445B-2-VD

Note: 1. The applicable load current depends on the ambient temperature. For details, refer to *Load Current vs. Ambient Temperature* in, *Engineering Data* on page 7.

2. When ordering, specify the rated input voltage.

Models without Built-in Heat Sinks

Number of phases	Main circuit voltage	Zero cross function	Applicable load current	Number of elements	Model
3	100 to 240 VAC	Yes	15 A max.	3	G3PB-215B-3H-VD
				2	G3PB-215B-2H-VD
			25 A max.	3	G3PB-225B-3H-VD
				2	G3PB-225B-2H-VD
			35 A max.	3	G3PB-235B-3H-VD
				2	G3PB-235B-2H-VD
			45 A max.	3	G3PB-245B-3H-VD
				2	G3PB-245B-2H-VD
	200 to 400 VAC		15 A max.	3	G3PB-415B-3H-VD
				2	G3PB-415B-2H-VD
			25 A max.	3	G3PB-425B-3H-VD
				2	G3PB-425B-2H-VD
			35 A max.	3	G3PB-435B-3H-VD
				2	G3PB-435B-2H-VD
			45 A max.	3	G3PB-445B-3H-VD
				2	G3PB-445B-2H-VD

Note: 1. The applicable load current depends on the heat sink that is connected and the ambient temperature. For details, refer to *Load Current* vs. Ambient Temperature in, Engineering Data on page 7.

2. When ordering, specify the rated input voltage.

Heat Sinks

Heat resistance (°C/W)	Model
1.67	Y92B-P50
1.01	Y92B-P100
0.63	Y92B-P150
0.43	Y92B-P200
0.36	Y92B-P250

Accessories (Order Separately)

Mounting Track	50 cm (1) x 7.3 mm (t)	PFP-50N
	1 m (1) x 7.3 mm (t)	PFP-100N
	1 m (1) x 16 mm (t)	PFP-100N2

■ Ratings (at an Ambient Temperature of 25°C)

Operating Circuit (Common)

Item	Common
Rated voltage	12 to 24 VDC
Operating voltage range	9.6 to 30 VDC
Rated input current	10 mA max. (at 24 VDC)
Must operate voltage	9.6 VDC max.
Must release voltage	1 VDC min.
Insulation method	Phototriac
Operation indicator	Yellow LED

Main Circuit of Models with Built-in Heat Sinks

Item	G3PB- 215B-3-VD	G3PB- 215B-2-VD	G3PB- 225B-3-VD	G3PB- 225B-2-VD	G3PB- 235B-3-VD	G3PB- 235B-2-VD	G3PB- 245B-3-VD	G3PB- 245B-2-VD
Rated load voltage	100 to 240 VA	iC		-	<u>.</u>		•	-
Load voltage range	75 to 264 VAC)						
Applicable load current (See note.)	0.2 to 15 A at	40°C	0.2 to 25 A at	40°C	0.5 to 35 A at	25°C	0.5 to 45 A at	25°C
Inrush current resistance (peak value)	150 A (60 Hz, 1 cycl	e)	220 A (60 Hz, 1 cycl	e)	440 A (60 Hz, 1 cycl	e)		
Permissible I²t (half 60-Hz wave)	121 A ² s		260 A ² s		1260 A ² s			
Applicable load (with Class-1 AC resistive load)	5.1 kW max. (at 200 VAC)		8.6 kW (at 200 VAC)		12.1 kW max. (at 200 VAC)		15.5 kW max. (at 200 VAC)	
Item	G3PB- 415B-3-VD	G3PB- 415B-2-VD	G3PB- 425B-3-VD	G3PB- 425B-2-VD	G3PB- 435B-3-VD	G3PB- 435B-2-VD	G3PB- 445B-3-VD	G3PB- 445B-2-VD
Rated load voltage	200 to 400 VA		.202 0 12	1200 2 10	1002 0 12		1102 0 12	1100 2 1 0
Load voltage range	180 to 440 VA	C						
Applicable load current (See note.)	0.5 to 15 A at	40°C	0.5 to 25 A at 40°C		0.5 to 35 A at 25°C		0.5 to 45 A at 25°C	
Inrush current resistance (peak value)	220 A (60 Hz, 1 cycl	220 A (60 Hz, 1 cycle)			440 A (60 Hz, 1 cycle)			
Permissible I ² t (half 60-Hz wave)	260 A ² s		260 A ² s		1260 A ² s			
Applicable load (with Class-1 AC resistive load)	10.3 kW max. (at 400 VAC)		17.3 kW max. (at 400 VAC)		24.2 kW max. (at 400 VAC)		31.1 kW max. (at 400 VAC)	

Note: The applicable load current depends on the ambient temperature. For details, refer to Load Current vs. Ambient Temperature in, Engineering Data on page 7.

Main Circuit of Models without Built-in Heat Sinks

Item	G3PB-215B- 3H-VD	G3PB-215B- 2H-VD	G3PB-225B- 3H-VD	G3PB-225B- 2H-VD	G3PB-235B- 3H-VD	G3PB-235B- 2H-VD	G3PB-245B- 3H-VD	G3PB-245B- 2H-VD
Rated load voltage	100 to 240 VA	C				•		•
Load voltage range	75 to 264 VAC	0						
Applicable load current (See note.)	0.2 to 15 A at	0.2 to 15 A at 40°C		: 40°C	0.2 to 35 A at	25°C	0.2 to 45 A at 25°C	
Inrush current resistance (peak value)	150 A (60 Hz, 1 cycl	e)	220 A (60 Hz, 1 cyc	le)	440 A (60 Hz, 1 cycl	e)		
Permissible I ² t (half 60-Hz wave)	121 A ² s		260 A²s		1260 A ² s			
Applicable load (with Class-1 AC resistive load)	The applicable	e load varies v	with the heat ra	adiation of the	Unit. Refer to p	age 7, <i>Engine</i>	<i>ering Data</i> for	details.
Item	G3PB-415B- 3H-VD	G3PB-415B- 2H-VD	G3PB-425B- 3H-VD	G3PB-425B- 2H-VD	G3PB-435B- 3H-VD	G3PB-435B- 2H-VD	G3PB-445B- 3H-VD	G3PB-445B- 2H-VD
Rated load voltage	200 to 400 VA	C	•	•	•		•	
Load voltage range	180 to 440 VA	NC .						
Applicable load current (See note.)	0.5 to 15 A at	40°C	0.5 to 25 A at 40°C		0.5 to 35 A at 25°C		0.5 to 45 A at 25°C	
Inrush current resistance (peak value)	220 A (60 Hz, 1 cycl	e)			440 A (60 Hz, 1 cycl	e)		
Permissible I ² t (half 60-Hz wave)	260 A ² s		260 A ² s		1260 A ² s			
Applicable load (with Class-1 AC resistive load)	Refer to page	7, Engineerin	g Data for deta	ails.				

Note: The applicable load current depends on the heat sink that is connected and the ambient temperature. For details, refer to Load Current vs. Ambient Temperature in, Engineering Data on page 7.

■ Characteristics

Models with Built-in Heat Sinks

Item	G3PB- 215B-3-VD	G3PB- 215B-2-VD	G3PB- 225B-3-VD	G3PB- 225B-2-VD	G3PB- 235B-3-VD	G3PB- 235B-2-VD	G3PB- 245B-3-VD	G3PB- 245B-2-VD
Operate time	1/2 of load pov	ver source cycl	e + 1 ms max.	(DC input)				
Release time	1/2 of load pov	ver source cycl	e + 1 ms max.	(DC input)				
Output ON voltage drop	1.6 V (RMS) m	iax.						
Leakage current (See note.)	10 mA (at 200	VAC)						
Insulation resistance	100 M Ω min. (at 500 VDC)						
Dielectric strength	2,500 VAC, 50	/60 Hz for 1 mi	n					
Vibration resistance	Destruction: 10) to 55 to 10 Hz	z, 0.375–mm si	ngle amplitude	(Mounted to I	DIN track)		
Shock resistance	Destruction: 29	94 m/s²						
Ambient temperature			(with no icing c C (with no icing					
Ambient humidity	Operating: 45%	% to 85%						
Weight	Approx. Approx. <t< th=""><th></th></t<>							
Certified standards	UL508, CSA22.2 No. 14, EN60947-4-3 (IEC947-4-3) (From April 1999)							
ЕМС		Emission: EN55011 Group 1 Class B Immunity: EN61000-6-2						

Note: The leakage current of phase S will be approximately $\sqrt{3}$ times larger if the 2-element model is applied.

Item	G3PB- 415B-3-VD	G3PB- 415B-2-VD	G3PB- 425B-3-VD	G3PB- 425B-2-VD	G3PB- 435B-3-VD	G3PB- 435B-2-VD	G3PB- 445B-3-VD	G3PB- 445B-2-VD
Operate time	1/2 of load po	wer source cy	cle + 1 ms ma	k. (DC input)				
Release time	1/2 of load po	wer source cy	cle + 1 ms ma	k. (DC input)				
Output ON voltage drop	1.8 V (RMS) r	nax.						
Leakage current (See note.)	20 mA (at 400) VAC)						
Insulation resistance	100 $M\Omega$ min.	(at 500 VDC)						
Dielectric strength	2,500 VAC, 50	0/60 Hz for 1 m	nin					
Vibration resistance	Destruction: 1	0 to 55 to 10 H	Hz, 0.375–mm	single amplitu	de (Mounted te	o DIN track)		
Shock resistance	Destruction: 2	94 m/s²						
Ambient temperature			C (with no icing C (with no icin					
Ambient humidity	Operating: 45	% to 85%						
Weight	Approx. Approx. <t< th=""><th></th></t<>							
Certified standards	UL508, CSA22.2 No. 14, EN60947-4-3 (IEC947-4-3)							
EMC	Emission: EN55011 Group 1 Class B Immunity: EN61000-6-2							

Note: The leakage current of phase S will be approximately $\sqrt{3}$ times larger if the 2-element model is applied.

Models without Built-in Heat Sinks

Item	G3PB- 215B- 3H-VD	G3PB- 215B- 2H-VD	G3PB- 225B- 3H-VD	G3PB- 225B- 2H-VD	G3PB- 235B- 3H-VD	G3PB- 235B- 2H-VD	G3PB- 245B- 3H-VD	G3PB- 245B- 2H-VD
Operate time	1/2 of load por	wer source cy	cle + 1 ms ma	x. (DC input)				
Release time	1/2 of load por	wer source cy	cle + 1 ms ma	x. (DC input)				
Output ON voltage drop	1.6 V (RMS) r	nax.						
Leakage current (See note.)	10 mA (at 200	VAC)						
Insulation resistance	100 MΩ min.	(at 500 VDC)						
Dielectric strength	2,500 VAC, 50)/60 Hz for 1 m	nin					
Vibration resistance	Destruction: 1	0 to 55 to 10 H	Hz, 0.375–mm	single amplitue	de			
Shock resistance	Destruction: 2	94 m/s²						
Ambient temperature				or condensation g or condensation				
Ambient humidity	Operating: 45	Operating: 45% to 85%						
Certified standards	UL508, CSA2	UL508, CSA22.2 No. 14, EN60947-4-3 (IEC947-4-3)						
Weight (Max.)	300 g max.	00 g max.						
EMC		Emission: EN55011 Group 1 Class B Immunity: EN61000-6-2						

Note: The leakage current of phase S will be approximately $\sqrt{3}$ times larger if the 2-element model is applied.

Item	G3PB- 415B- 3H-VD	G3PB- 415B- 2H-VD	G3PB- 425B- 3H-VD	G3PB- 425B- 2H-VD	G3PB- 435B- 3H-VD	G3PB- 435B- 2H-VD	G3PB- 445B- 3H-VD	G3PB- 445B- 2H-VD
Operate time	1/2 of load po	wer source cy	cle + 1 ms ma	x. (DC input)				
Release time	1/2 of load po	wer source cy	cle + 1 ms ma	x. (DC input)				
Output ON voltage drop	1.8 V (RMS) r	nax.						
Leakage current (See note.)	20 mA (at 400) VAC)						
Insulation resistance	100 $M\Omega$ min.	(at 500 VDC)						
Dielectric strength	2,500 VAC, 50	0/60 Hz for 1 m	nin					
Vibration resistance	Destruction: 1	0 to 55 to 10 H	Hz, 0.375-mm	single amplitud	le			
Shock resistance	Destruction: 2	294 m/s²						
Ambient temperature				or condensations or condensations				
Ambient humidity	Operating: 45	Operating: 45% to 85%						
Certified standards	UL508, CSA22.2 No. 14, EN60947-4-3 (IEC947-4-3)							
Weight	Approx. 300 g	Approx. 300 g						
EMC		Emission: EN55011 Group 1 Class B Immunity: EN61000-6-2						

Note: The leakage current of phase S will be approximately $\sqrt{3}$ times larger if the 2-element model is applied.

Heat Sinks

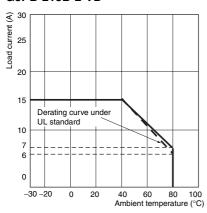
Model	Weight
Y92B-P50	Approx. 450 g
Y92B-P100	Approx. 450 g
Y92B-P150	Approx. 600 g
Y92B-P200	Approx. 850 g
Y92B-P250	Approx. 1,200 g

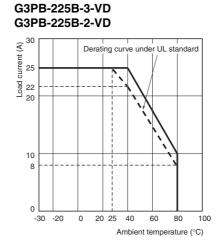
Engineering Data

Load Current vs. Ambient Temperature

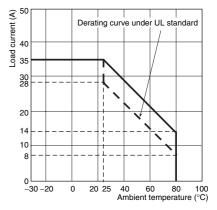
Models with Built-in Heat Sinks

G3PB-215B-3-VD G3PB-215B-2-VD



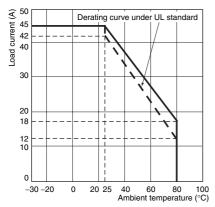


G3PB-235B-3-VD G3PB-235B-2-VD



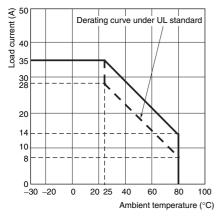
<sup>Note: 1. Please use proper ventilation and cooling.
2. Please note that the derating curve above 28 A is applicable under the UL standard only with forced air cooling by fan.</sup>

G3PB-245B-3-VD G3PB-245B-2-VD



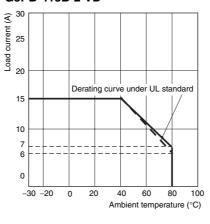
Note: 1. Please use proper ventilation and cooling.
 2. Please note that the derating curve above 42 A is applicable under the UL standard only with forced air cooling by fan.

G3PB-435B-3-VD G3PB-435B-2-VD

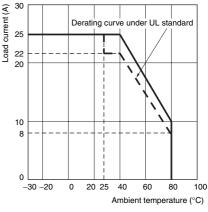


 Note: 1. Please use proper ventilation and cooling.
 Please note that the derating curve above 28 A is applicable under the UL standard only with forced air cooling by fan.

G3PB-415B-3-VD G3PB-415B-2-VD

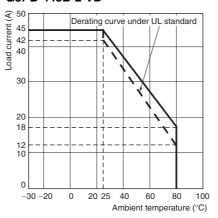


G3PB-425B-3-VD G3PB-425B-2-VD



Note: 1. Please use proper ventilation and cooling.
2. Please note that the derating curve above 22 A is applicable under the UL standard only with forced air cooling by fan.

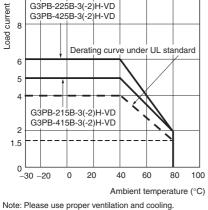
G3PB-445B-3-VD G3PB-445B-2-VD

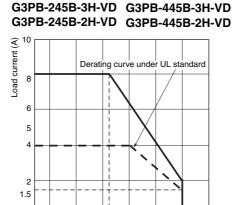


Note: 1. Please use proper ventilation and cooling.
2. Please note that the derating curve above 42 A is applicable under the UL standard only with forced air cooling by fan.

Models without Built-in Heat Sinks

G3PB-215B-3H-VD G3PB-225B-3H-VD G3PB-215B-2H-VD G3PB-225B-2H-VD G3PB-415B-3H-VD G3PB-425B-3H-VD G3PB-415B-2H-VD G3PB-425B-2H-VD €¹⁰ G3PB-225B-3(-2)H-VD





G3PB-235B-3H-VD G3PB-435B-3H-VD

G3PB-235B-2H-VD G3PB-435B-2H-VD

20 25 Ambient temperature (°C) Note: Please use proper ventilation and cooling.

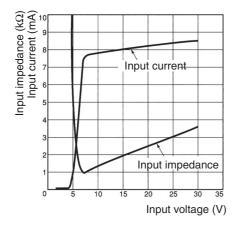
0

40 60 80 100

Input Voltage vs. Input Current and Input Voltage vs. Input Impedance

0

-30-20

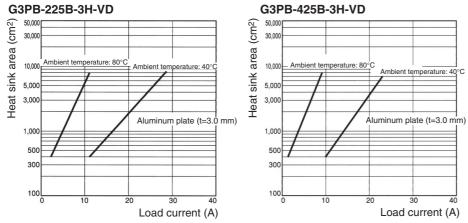


One Cycle Surge Current: Non-repetitive

Note: Keep the inrush current to half the rated value if it occurs repetitively.

G3PB-235B-3 (H)-VD G3PB-435B-3 (H)-VD G3PB-235B-2 (H)-VD G3PB-435B-2 (H)-VD G3PB-245B-3 (H)-VD G3PB-445B-3 (H)-VD G3PB-245B-2 (H)-VD G3PB-445B-2 (H)-VD G3PB-215B-3 (H)-VD G3PB-215B-2 (H)-VD G3PB-225B-3 (H)-VD G3PB-425B-3 (H)-VD G3PB-225B-2 (H)-VD G3PB-415B-3 (H)-VD G3PB-425B-2 (H)-VD G3PB-415B-2 (H)-VD 500 250 250 400 200 (A. Peak) 200 (A. Peak) (A. Peak Inrush current Inrush current Inrush current 300 150 150 200 100 100 100 50 50 0L 10 0L 10 0L 30 50 300 500 1.000 3 000 5 000 300 500 1,000 30 50 3.000 5.000 30 50 3,000 5,000 100 300 500 1.000 Energized time (ms) Energized time (ms) Energized time (ms)

Heat Sink Area vs. Load Current



Note: The heat sink area refers to the combined area of the sides of the heat sink that radiate heat. In the case of G3PB-425B-3H-VD, when a current of 18 A is allowed to flow through the SSR at 40°C, the graph shows that the heat sink area is about 2,500 cm². Therefore, if the heat sink is square, one side of the heat sink must be 36 cm ($36^2 \times 2 = 2,592$) or longer.

Thermal Resistance Rth (Junction/SSR Back Surface)

Three-phase Models without Heat Sink

Model	Rth (°C/W)
G3PB-215B-3H-VD	1.05
G3PB-225B-3H-VD	0.57
G3PB-235B-3H-VD	0.57
G3PB-245B-3H-VD	0.57

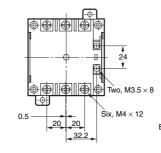
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Models with Built-in Heat Sinks

G3PB-215B-2-VD G3PB-415B-2-VD Without Terminal Cover

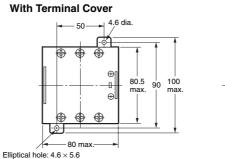




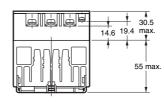
Mounting holes Two, 4.5 dia. or M4

— 50±0.3 -

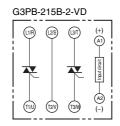
90+0.3



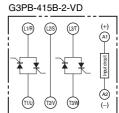




Terminal Arrangement/Internal Circuit Diagram



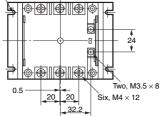
80.5 max.

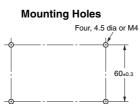


G3PB-215B-3-VD G3PB-225B-2-VD G3PB-415B-3-VD G3PB-425B-2-VD

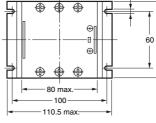


Without Terminal Cover Four, R2.5

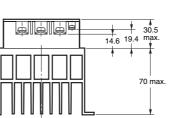


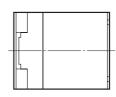


- 100±0.3

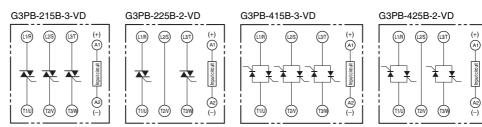


With Terminal Cover



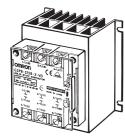


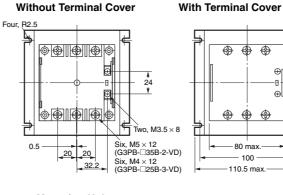
Terminal Arrangement/Internal Circuit Diagram

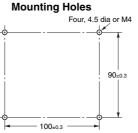




G3PB-225B-3-VD G3PB-235B-2-VD G3PB-425B-3-VD G3PB-435B-2-VD







G3PB-225B-3-VD

 \mathbf{X}

> (T2/V) (T3/W)

(L1/R) (12/5)

(T1/U)

Four, R2.5

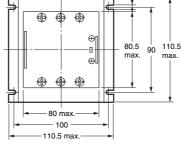
(L3/T) (+) (A1)

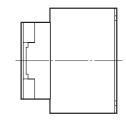
AY

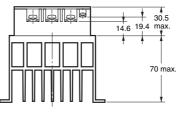
Without Terminal Cover

A2

(-)







G3PB-425B-3-VD

(L2/S)

* * * * *

(T2/V)

(L1/R)

(T1/U)

G3PB-435B-2-VD

(+) (A1)

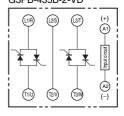
Input circuit

(-)

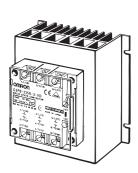
(L3T)

(T3/W)

5



G3PB-235B-3-VD G3PB-245B-2-VD G3PB-435B-3-VD G3PB-445B-2-VD



@@!@!@@ Ð 24 1 0 € Two $M3.5 \times 8$ Six. 0.5 20 20 M5 × 12

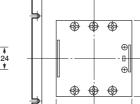
32.2

Four, 4.5 dia or M4

90±0.3

Mounting Holes

- 120±0.3



Terminal Arrangement/Internal Circuit Diagram

G3PB-235B-2-VD

(L1/R) (L2/S)

 \mathbf{X}

(T1/U) (T2/V) (T3W)

(L3/T) (+) (A1)

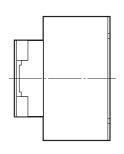
X

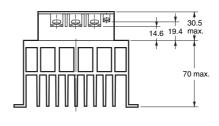
Inputci

(-)

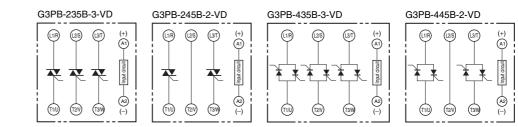
With Terminal Cover

80.5 130.5 90 max 80 max. 120 130.5 max





Terminal Arrangement/Internal Circuit Diagram



(-)

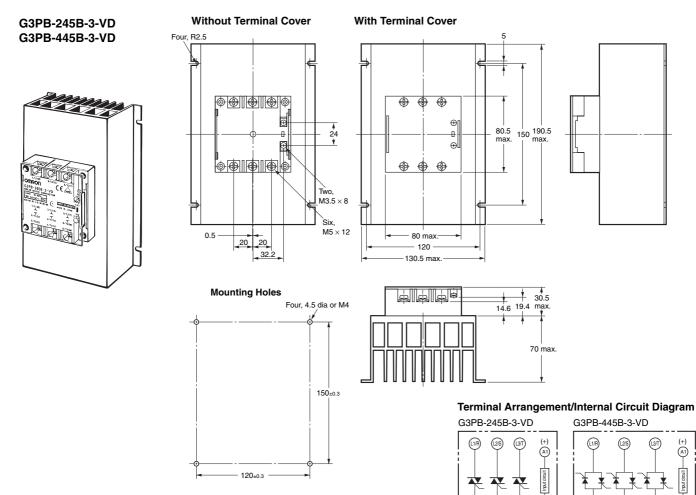
(T1/U)

(T2/V)

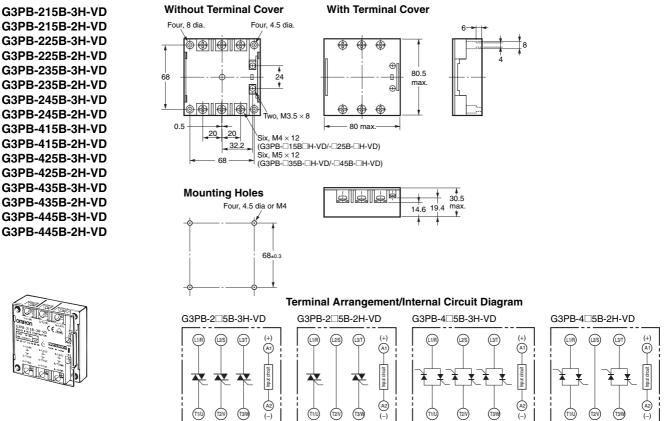
(11) (12V) (13W)

(-)

(T3W)

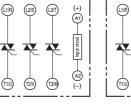


Models without Built-in Heat Sinks

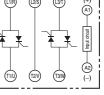


Heat Sinks

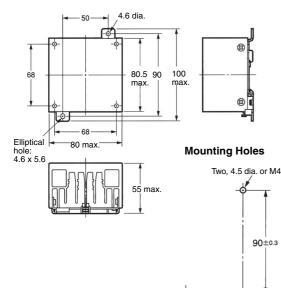
Y92B-P50 For model G3PB-215B-2H-VD G3PB-415B-2H-VD



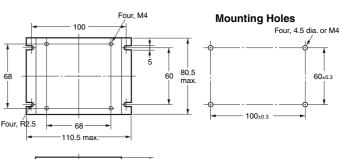
(-) (T3W) (T1/U) (T2/V)

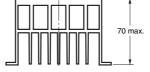


Y92B-P100 For G3PB-215B-3H-VD G3PB-225B-2H-VD G3PB-415B-3H-VD G3PB-425B-2H-VD

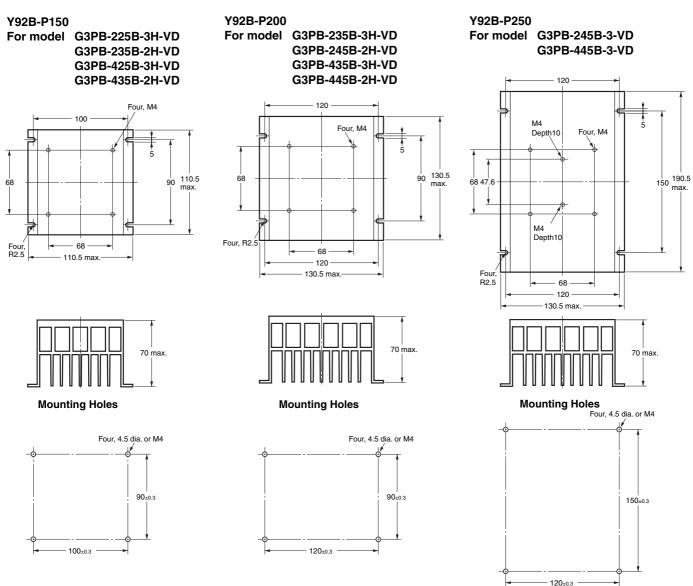


-50±0.3----



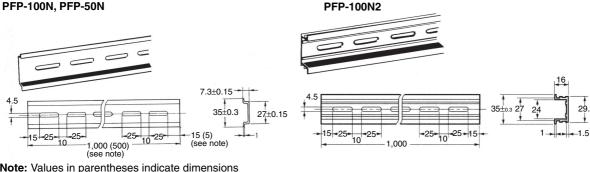


OMRON



Accessories (Order Separately)





Note: Values in parentheses indicate dimensions for the PFP-50N.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

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

In the interest of product improvement, specifications are subject to change without notice.

29.2

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- · Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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Disclaimers

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