# **Solid State Contactors for Heaters G3PE-Three-phase**

**91** ( ) ( )

# Compact, Slim-profile SSRs with Heat Sinks. Solid State Contactors for Three-phase **Heaters Reduced Installation Work** with DIN Track Mounting.

### • RoHS compliant.

- Surge pass protection improved surge dielectric strength for output currents. (OMRON testing)
- Slim design with 3-phase output and built-in heat sinks.
- DIN Track mounting types and screw mounting types are available. All DIN Track mounting types mount to DIN Track (applicable DIN Track: TR35-15Fe (IEC 60715)).
- Conforms to UL, CSA, and EN standards (TÜV certification).

Refer to Safety Precautions for All G3PE  $\mathbb{A}$ Models.

# **Ordering Information**

### List of Models

### Models with Built-in Heat Sinks

Number of phases	Insulation method	Operation indicator	Rated input voltage	Zero cross function	Туре	Applicable load *1	Number of poles	Model
						15 A 100 to 040 VAC	3	G3PE-215B-3N DC12-24
						15 A, 100 to 240 VAC	2	G3PE-215B-2N DC12-24
						25 A, 100 to 240 VAC	3	G3PE-225B-3N DC12-24
						25 A, 100 10 240 VAC	2	G3PE-225B-2N DC12-24
						35 A, 100 to 240 VAC	3	G3PE-235B-3N DC12-24
						35 A, 100 10 240 VAC	2	G3PE-235B-2N DC12-24
						45 A, 100 to 240 VAC	3	G3PE-245B-3N DC12-24
					DIN track	45 A, 100 10 240 VAC	2	G3PE-245B-2N DC12-24
					mounting *2	15 A, 200 to 480 VAC	3	G3PE-515B-3N DC12-24
						15 A, 200 10 400 VAC	2	G3PE-515B-2N DC12-24
						25 A, 200 to 480 VAC	3	G3PE-525B-3N DC12-24
						25 A, 200 10 460 VAC	2	G3PE-525B-2N DC12-24
						35 A, 200 to 480 VAC	3	G3PE-535B-3N DC12-24
		Yes (yellow)		Yes		35 A, 200 10 460 VAC	2	G3PE-535B-2N DC12-24
			12 to 24 VDC			45 A, 200 to 480 VAC	3	G3PE-545B-3N DC12-24
Three-phase	Phototriac					43 A, 200 10 400 VAC	2	G3PE-545B-2N DC12-24
Thee-phase	coupler					15 A, 100 to 240 VAC	3	G3PE-215B-3 DC12-24
						15 A, 100 to 240 VAC	2	G3PE-215B-2 DC12-24 *3
						25 A, 100 to 240 VAC	3	G3PE-225B-3 DC12-24
						23 A, 100 10 240 VAO	2	G3PE-225B-2 DC12-24
						35 A, 100 to 240 VAC	3	G3PE-235B-3 DC12-24
						35 A, 100 10 240 VAC	2	G3PE-235B-2 DC12-24
						45 A, 100 to 240 VAC	3	G3PE-245B-3 DC12-24
					Screw	45 A, 100 10 240 VAC	2	G3PE-245B-2 DC12-24
					mounting	15 A, 200 to 480 VAC	3	G3PE-515B-3 DC12-24
						15 A, 200 10 460 VAC	2	G3PE-515B-2 DC12-24 *3
						25 A, 200 to 480 VAC	3	G3PE-525B-3 DC12-24
						23 A, 200 10 400 VAC	2	G3PE-525B-2 DC12-24
						35 A, 200 to 480 VAC	3	G3PE-535B-3 DC12-24
						35 A, 200 10 480 VAC	2	G3PE-535B-2 DC12-24
						45 A, 200 to 480 VAC	3	G3PE-545B-3 DC12-24
					+5 A, 200 10 400 VAC	2	G3PE-545B-2 DC12-24	

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

Data on page 5. **\*2.** The applicable DIN Track is the TR35-15Fe (IEC 60715). For details, refer to the mounting information in the Safety Precautions for All G3PE Models. **\*3.** DIN Track or Screw mounting.



### Models with Externally Attached Heat Sinks

Number of phases	Insulation method	Operation indicator	Rated input voltage	Zero cross function	Туре	Applicable load *	Number of poles	Model
						15 4 400 4 040 140	3	G3PE-215B-3H DC12-24
						15 A, 100 to 240 VAC	2	G3PE-215B-2H DC12-24
						05 4 400 4 040 140	3	G3PE-225B-3H DC12-24
						25 A, 100 to 240 VAC	2	G3PE-225B-2H DC12-24
						05 A 100 to 010 1/40	3	G3PE-235B-3H DC12-24
					35 A, 100 to 240 VAC	2	G3PE-235B-2H DC12-24	
		Yes (yellow)	12 to 24 VDC	Yes	Externally attached heat sinks	45 A 100 to 240 VAC	3	G3PE-245B-3H DC12-24
<b>T</b> huse all see	Phototriac					45 A, 100 to 240 VAC	2	G3PE-245B-2H DC12-24
Three-phase	coupler					15 A, 200 to 480 VAC	3	G3PE-515B-3H DC12-24
							2	G3PE-515B-2H DC12-24
						05 A 000 to 100 VAO	3	G3PE-525B-3H DC12-24
						25 A, 200 to 480 VAC	2	G3PE-525B-2H DC12-24
						05 4 000 1 400 140	3	G3PE-535B-3H DC12-24
						35 A, 200 to 480 VAC	2	G3PE-535B-2H DC12-24
						45 A 000 to 400 VAO	3	G3PE-545B-3H DC12-24
						45 A, 200 to 480 VAC	2	G3PE-545B-2H DC12-24

\* The rated load current depends on the heat sink or radiator that is mounted. It also depends on the ambient temperature. For details, refer to Load Current vs. Ambient Temperature.

# Accessories (Order Separately)

### **Heat Sink**

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

# **Specifications**

# Certification

UL508, CSA22.2 No.14, and EN60947-4-3

# Ratings (at an Ambient Temperature of 25°C) **Operating Circuit (All Models)**

ItemModel	Same for all models
Rated operating voltage	12 to 24 VDC
Operating voltage range	9.6 to 30 VDC
Rated input current (impedance)	10 mA max. (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

Model		G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-	G3PE-
Item	215B- 3(N)	215B- 2(N)	225B- 3(N)	225B- 2(N)	235B- 3(N)	235B- 2(N)	245B- 3(N)	245B- 2(N)	515B- 3(N)	515B- 2(N)	525B- 3(N)	525B- 2(N)	535B- 3(N)	535B- 2(N)	545B- 3(N)	545B- 2(N)
Rated load voltage				100 to 2	40 VAC				200 to 480 VAC							
Operating voltage range		75 to 264 VAC 180 to 528 VAC														
Rated load current *1	15 A (at	40°C)	25 A (a	t 40°C)	35 A (a	35 A (at 25°C) 45 A (at 25°C			15 A (a	t 40°C)	25 A (a	t 40°C)	35 A (at 25°C) 45		45 A (a	t 25°C)
Minimum load current		0.2	2 A							0.5	5 A					
Inrush current resistance (peak value)	150 (60 Hz, 1			0 A 1 cycle)		440 (60 Hz,				220 (60 Hz,			440 A (60 Hz, 1 cycle)			
Permissible I <sup>2</sup> t (reference value)	121 <i>A</i>	A²s	260	)A²s	1,260A <sup>2</sup> s		260A <sup>2</sup> s				1,260A <sup>2</sup> s					
Applicable load (resistive load: AC1 class) *2	5.1 k (at 200		8.6 (at 200			12.1 kW (at 200 VAC)		kW VAC)	12.5 kW (at 480 VAC)		20.7 (at 480		29.0 (at 480		37.4 (at 480	

\*1. The applicable load current depends on the ambient temperature. For details, refer to Load Current vs. Ambient Temperature in Engineering Data on page 5.

\*2. Applicable Load

Use the following formula to calculate the maximum total capacity of a heater load for a three-phase balanced load with delta connections. Maximum load capacity = Load current × Load voltage  $\times \sqrt{3}$ 

Example: 15 A × 200 V ×  $\sqrt{3}$  = 5,196 W  $\cong$  5.1 kW Example: 15 A × 400 V ×  $\sqrt{3}$  = 10,392 W  $\cong$  10.3 kW

### Main Circuit of Models with Externally Attached Heat Sinks

Model	G3PE- 215B-	G3PE- 215B-	G3PE- 225B-	G3PE- 225B-	G3PE- 235B-	G3PE- 235B-	G3PE- 245B-	G3PE- 245B-	G3PE- G3PE- G3PE- G3PE- 515B- 515B- 525B- 525B-			G3PE- 535B-	G3PE- 535B-	G3PE- 545B-	G3PE- 545B-	
Item	3H	215B- 2H	3HH	225B- 2H	235B- 3H	235B- 2H	3H	245B- 2H	3H	2H	3H	2H	3H	2H	343B- 3H	2H
Rated load voltage				100 to 2	40 VAC				200 to 480 VAC							
Operating voltage range		75 to 264 VAC 180 to 52										28 VAC	28 VAC			
Rated load current *	15 A (a	t 40°C)	25 A (a	t 40°C)	35 A (a	t 25°C)	45 A (a	at 25°C)	15 A (at 40°C) 25 A (at 40°C)			35 A (at 25°C) 45 A (at 25		t 25°C)		
Minimum load current		0.2	2 A							0.5	5 A					
Inrush current resistance (peak value)	150 (60 Hz, 1		220 (60 Hz,	0 A 1 cycle)			0 A 1 cycle)		220 A 440 A (60 Hz, 1 cycle) (60 Hz, 1 cycle)							
Permissible I <sup>2</sup> t (reference value)	121	A²s	260	)A²s	1,260A <sup>2</sup> s 260A <sup>2</sup> s 1,260A <sup>2</sup> s								0A²s			
Applicable load (resistive load: AC1 class)	Refer to Engineering Data on page 5.															

\* The rated load current depends on the heat sink or radiator that is mounted. It also depends on the ambient temperature.

For details, refer to Load Current vs. Ambient Temperature in Engineering Data on page 5.

### Characteristics Models with Built-in Heat Sinks

Model	G3PE- 215B- 3(N)	G3PE- 215B- 2(N)	G3PE- 225B- 3(N)	G3PE- 225B- 2(N)	G3PE- 235B- 3(N)	G3PE- 235B- 2(N)	G3PE- 245B- 3(N)	G3PE- 245B- 2(N)	G3PE- 515B- 3(N)	G3PE- 515B- 2(N)	G3PE- 525B- 3(N)	G3PE- 525B- 2(N)	G3PE- 535B- 3(N)	G3PE- 535B- 2(N)	G3PE- 545B- 3(N)	G3PE- 545B- 2(N)
Operate time	. ,	1/2 of load power source cycle + 1 ms max.												2(11)		
Release time		/2 of load power source cycle + 1 ms max.														
Output ON voltage drop	1.6 V (RMS) max. 1.8 V (RMS) max.															
Leakage current *	10 mA m	10 mA max. (at 200 VAC) 20 mA max. (at 480 VAC)														
Insulation resistance	100 MΩ	min. (at 50	0 VDC)													
Dielectric strength	2,500 VA	,500 VAC, 50/60 Hz for 1 min														
Vibration resistance		<ul> <li>DIN Track mounting: 10 to 55 to 10 Hz, 0.175-mm single amplitude (0.35-mm double amplitude)</li> <li>Screw mounting: 10 to 55 to 10 Hz, 0.375-mm single amplitude (0.75-mm double amplitude)</li> </ul>														
Shock resistance	294 m/s <sup>2</sup>	(reverse r	nounting:	98 m/s2)												
Ambient storage temperature	-30 to 10	00°C (with	no icing o	r condensa	ation)											
Ambient operating temperature	-30 to 80	-30 to 80°C (with no icing or condensation)														
Ambient operating humidity	45% to 85%															
Weight	Approx.	9	Approx. 1.45 kg	Approx. 1.25 kg	Approx. 1.65 kg	Approx. 1.45 kg	Approx. 2.0 kg	Approx. 1.65 kg	Approx.	Ũ	Approx. 1.45 kg	Approx. 1.25 kg	Approx. 1.65 kg	Approx. 1.45 kg	Approx. 2.0 kg	Approx. 1.65 kg

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

### Models with Externally Attached Heat Sinks

Model Item	G3PE- 215B- 3H	115B-       215B-       225B-       225B-       235B-       235B-       245B-       245B-       515B-       515B-       525B-       525B-       535B-       535B-       545B-       545B-         3H       2H       3H </th <th>G3PE- 545B- 2H</th>											G3PE- 545B- 2H			
Operate time	1/2 of loa	1/2 of load power source cycle + 1 ms max.														
Release time	1/2 of loa	/2 of load power source cycle + 1 ms max.														
Output ON voltage drop	1.6 V (RMS) max. 1.8 V (RMS) max.															
Leakage current *	10 mA m	10 mA max. (at 200 VAC) 20 mA max. (at 480 VAC)														
Insulation resistance	100 MΩ I	100 MΩ min. (at 500 VDC)														
Dielectric strength	2,500 VA	2,500 VAC, 50/60 Hz for 1 min														
Vibration resistance	10 to 55	to 10 Hz, (	0.375-mm	single am	olitude (0.	75-mm do	uble ampli	tude)								
Shock resistance	Destructi	on: 294 m	/s²													
Ambient storage temperature	-30 to 10	00°C (with	no icing o	r condens	ation)											
Ambient operating temperature	-30 to 80°C (with no icing or condensation)															
Ambient operating humidity	45% to 85%															
Weight	Approx. 300 g															

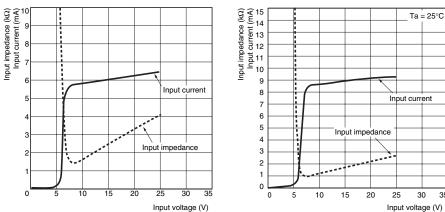
\*The leakage current of phase S will be approximately  $\sqrt{3}$  times larger if the 2-element model is used.

### **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

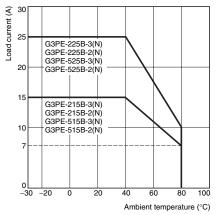
# **Engineering Data**

#### Input Voltage vs. Input Impedance and Input Voltage vs. Input Current G3PE-2 G3PE-500B-00

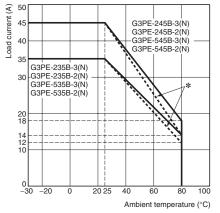


### Load Current vs. Ambient Temperature

Models with Built-in Heat Sinks G3PE-215B-3(N), G3PE-225B-3(N) G3PE-215B-2(N), G3PE-225B-2(N) G3PE-515B-3(N), G3PE-525B-3(N) G3PE-515B-2(N), G3PE-525B-2(N)



G3PE-235B-3(N), G3PE-245B-3(N) G3PE-235B-2(N), G3PE-245B-2(N) G3PE-535B-3(N), G3PE-545B-3(N) G3PE-535B-2(N), G3PE-545B-2(N)

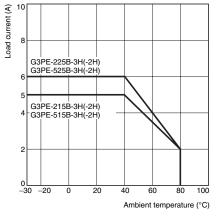


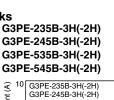
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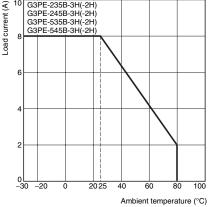
\* The dotted lines in the charts are the UL derating curves for the G3PE-235B-3(N), G3PE-245B-3(N), G3PE-235B-2(N), G3PE-245B-2(N), G3PE-535B-3(N), G3PE-545B-3(N), G3PE-535B-2(N), G3PE-545B-2(N).

#### Models with Externally Attached Heat Sinks G3PE-215B-3H(-2H) G3PE-225B-3H(-2H)

G3PE-515B-3H(-2H) G3PE-525B-3H(-2H)







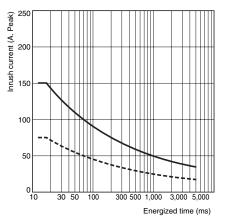
### **Inrush Current Resistance: Non-repetitive**

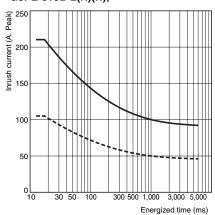
Keep the inrush current to below the inrush current resistance value (i.e., below the broken line) if it occurs repetitively. G3PE-215B-3(N)(H) G3PE-25B-3(N)(H) G3PE-235B-3(N)(H)

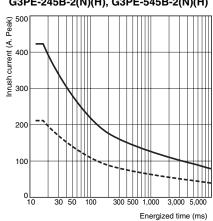
G3PE-215B-2(N)(H)

G3PE-225B-2(N)(H), G3PE-525B-2(N)(H) G3PE-515B-3(N)(H), G3PE-515B-2(N)(H),

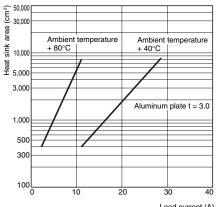
G3PE-235B-3(N)(H), G3PE-535B-3(N)(H) G3PE-235B-2(N)(H), G3PE-535B-2(N)(H) G3PE-245B-3(N)(H), G3PE-545B-3(N)(H) G3PE-245B-2(N)(H), G3PE-545B-2(N)(H)

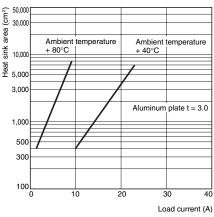






Heat Sink Area vs. Load Current (40°C and 80°C) G3PE-225B-3H G3PE-525B-3H





Note: The heat sink area is the combined area of all surfaces of the heat sink that radiate heat.

For the G3PE-525B-3H, when a current of 18 A flows through the SSR at 40°C, the graph shows that a heat sink area of about 2,500 cm<sup>2</sup> would be required. Therefore, if the heat sink is square, one side of an aluminum plate in the heat sink must be 36 cm or longer  $(\sqrt{2,500} \text{ (cm}^2)/2 =$ 36 cm (rounded to a whole number)).

Load current (A)

### Models with Externally Attached Heat Sinks Heat Resistance Rth (Junction/SSR Back Surface)

Model	Rth (°C/W)
G3PE-215B-3H	1.05
G3PE-225B-3H	0.57
G3PE-235B-3H	0.57
G3PE-245B-3H	0.57

#### Heat Resistance of Heat Sinks

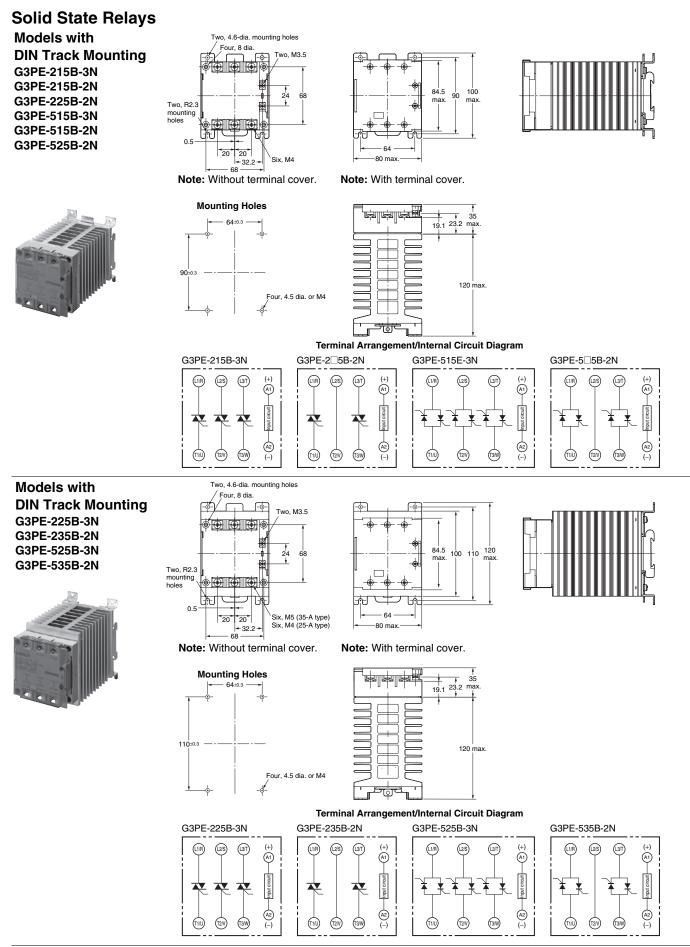
Model	Rth (°C/W)
Y92B-P50	1.67
Y92B-P100	1.01
Y92B-P150	0.63
Y92B-P200	0.43
Y92B-P250	0.36

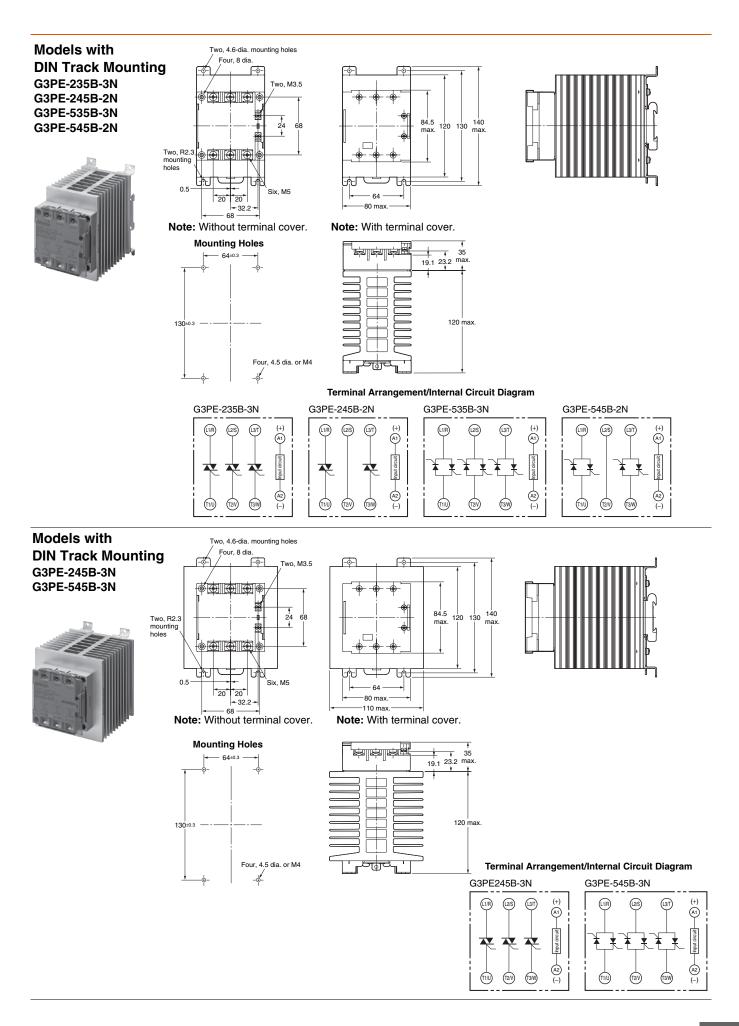
Note: If a commercially available heat sink is used, use one that has a heat resistance equal to or lower than a standard OMRON Heat Sink.

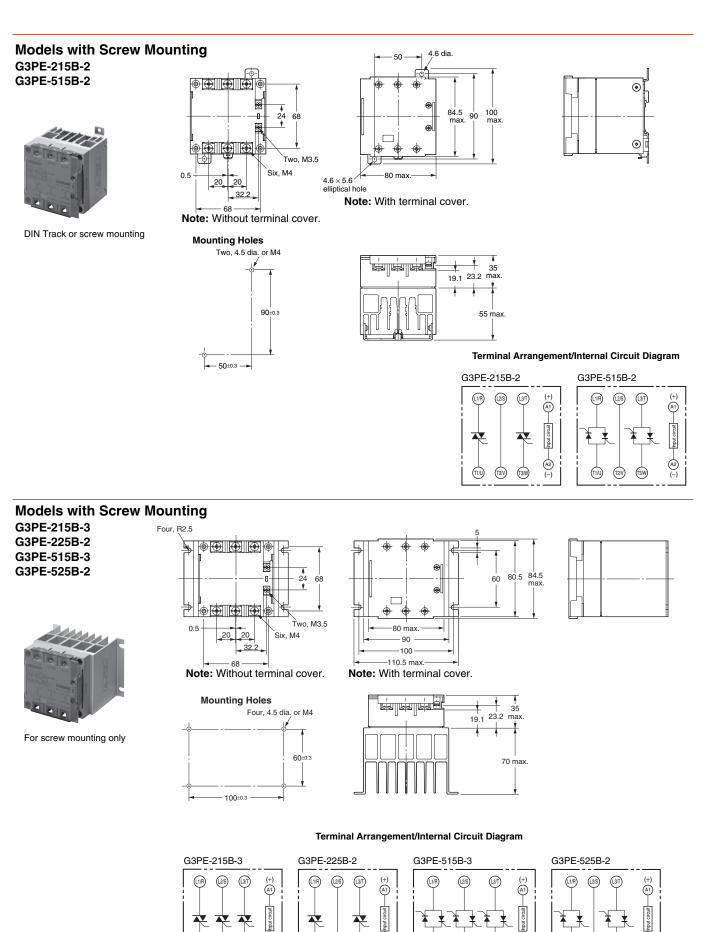
OMRON

# Dimensions

Note: All units are in millimeters unless otherwise indicated.







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(11/U) (12/V) (T3/W)

(11/1) (12/1) (13/1)

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(T1/U)

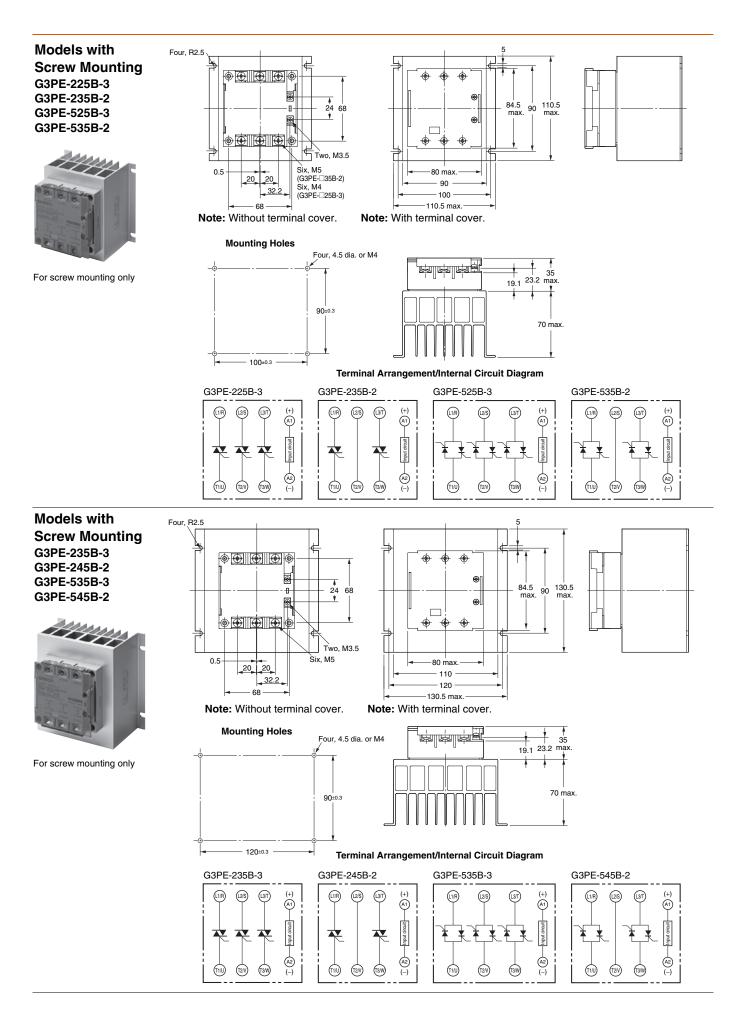
(T2/V)

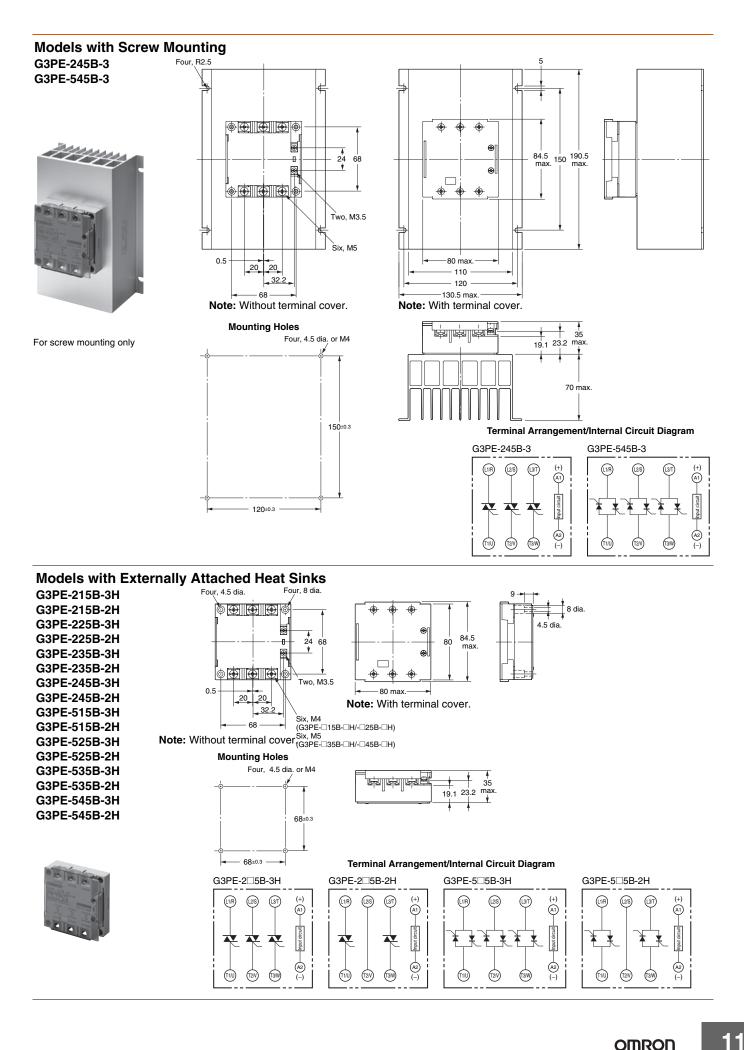
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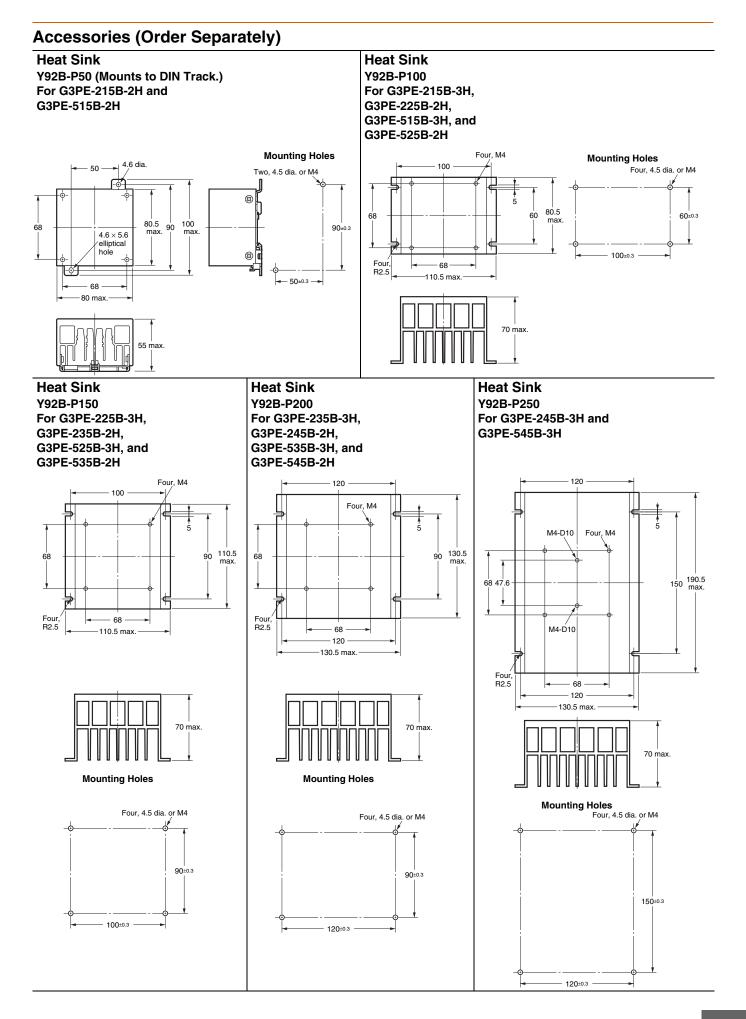
(11) (121) (1310)

(T3W)

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#### **Read and Understand This Catalog**

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

#### Warranty and Limitations of Liability

#### WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

#### LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

#### **Application Considerations**

#### SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- · 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.

#### PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

#### Disclaimers

#### CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

#### DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

#### PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

#### ERRORS AND OMISSIONS

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