# **General-purpose Relay**

#### Slim and Space-saving Power Plug-in Relay

- Reduces wiring work by 60% when combined with the P2RF-□-PU Push-In Plus Socket (according to actual OMRON measurements).
- Lockable test button models available.
- Built-in mechanical operation indicator.
- Provided with nameplate.
- AC type is equipped with a coil-disconnection self-diagnostic function (LED type).
- High switching power (1-pole: 10 A).



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

#### **Model Number Structure**

#### **Model Number Legend**

- S

1. Number of Poles

1:1 pole

2:2 poles

2. Terminals S:Plug-in

3. Classification

Blank:General-purpose

N:LED indicator

D:Diode

ND:LED indicator and diode

NI:LED indicator with test button

NDI:LED indicator and diode with test button

- 4. Rated Coil Voltage
- 5. Mechanical operation indicator and Nameplate (S):Models with mechanical operation indicator and Nameplate

Note: Contact your OMRON representative for Relays with gold-plated contacts.

#### Ordering Information When your order, specify the rated voltage.

#### **List of Models**

Classification	Coil ratings	Contact form		
	Coil ratings	SPDT	DPDT	
General-purpose		G2R-1-S (S)	G2R-2-S (S)	
LED indicator	AC 24, 48, 110, 120, 230, 240 DC 6, 12, 24, 48	G2R-1-SN (S)	G2R-2-SN (S)	
LED indicator with test button	DO 0, 12, 24, 40	G2R-1-SNI (S)	G2R-2-SNI (S)	
Diode		G2R-1-SD (S)	G2R-2-SD (S)	
LED indicator and diode	DC 6, 12, 24, 48	G2R-1-SND (S)	G2R-2-SND (S)	
LED indicator and diode with test button		G2R-1-SNDI (S)	G2R-2-SNDI (S)	

Note: 1. The standard models are compliant with UL/CSA and VDE standards. Also, an EC compliance declaration has been made for combinations with the P2RF-□-E, P2RF-□-S and P2RF-□-PU. The Relays bear the CE Marking.

- 2. Refer to Connecting Sockets, below, for applicable Socket models.
- 3. When ordering, add the rated coil voltage and "(S)" to the model number. Rated coil voltages are given in the coil ratings table. Example: G2R-1-S 12 VDC (S)

Rated coil voltage

#### Accessories (Order Separately)

#### **Connecting Sockets**

		Track/surface-r	nounting Socket	Back-mounting Socket		
Applicable Relay model		Push-In Plus Terminal Blocks Screw terminals *		PCB terminals	Solder terminals	
No. of poles	f poles Model		Models	Models	Model	
1 pole	G2R-1-S (S)	P2RF-05-PU	P2RFZ-05-E P2RF-05 P2RF-05-E	P2R-05P P2R-057P	P2R-05A	
2 poles	G2R-2-S (S)	P2RF-08-PU	P2RFZ-08-E P2RF-08 P2RF-08-E	P2R-08P P2R-087P	P2R-08A	

<sup>\*</sup>The structure of P2RF- -E models provides finger protection. Round terminals cannot be used. Use forked crimp terminals.

#### Accessories for Push-In Plus Terminal Block Sockets (P2RF-□-PU) **Short Bars**

Pitch	No. of poles	Colors	Model *	Minimum order (quantity)
	2		PYDN-7.75-020□	
7.75 mm	3	Red (R) Blue (S) Yellow (Y)	PYDN-7.75-030□	
7.75 11111	4		PYDN-7.75-040□	10
	20		PYDN-7.75-200□	
15.5 mm	8		PYDN-15.5-080□	

**Note:** Use the Short Bars for crossover wiring within one Socket or between Sockets.  $^*$  Replace the box ( $\square$ ) in the model number with the code for the covering color.

#### Labels

Model	Manufacturer	Minimum order (Box) (quantity per Box)	
MG-CPM-04 41391	Cembre	1,344 (28 Sheet/48 Pieces)	

Note: PRINTER: MARKINGENIUS MG3 (Ask to your Omron contact for more details on printers)

#### Accessories for Screw Terminal Sockets (P2RFZ-□-E)

#### **Short Bars**

Pitch	No. of poles	Colors	Model	Minimum order (set)
6.8 mm	10	(-)	P2DN-6.8-100S	1
15.7 mm	10	Blue (S)	P2DN-15.7-100S	One set (order unit) contains 10 short bars and 20 caps.

Note: 1. Use the Short Bars for crossover wiring within one Socket or between Sockets.

2. Cannot be used on the P2RF-□-E.

#### Labels

Model	Manufacturer	Minimum order (Box) (quantity per Box)	
MG-CPM-04 41390N	Cembre	1680 (35 Sheet/48 Pieces)	

Note: PRINTER: MARKINGENIUS MG3 (Ask to your Omron contact for more details on printers)

#### **Accessories for Short Bars (P2DN)**

#### Cap

Model	Minimum order (bag)
P2DN-CP100	1 (100 pcs./bag)

#### Labels

Model	Manufacturer	Minimum order (Box) (quantity per Box)	
MG-CPM-04 41390N	Cembre	1680 (35 Sheet/48 Pieces)	

Note: PRINTER: MARKINGENIUS MG3 (Ask to your Omron contact for more details on printers)

#### **Mounting Tracks**

Applicable Socket	Des	cription	Model	Minimum order (quantity)
		50 cm ( $\ell$ ) × 7.3 mm (t):	PFP-50N	
	Mounting track	1 m (l) × 7.3 mm (t):	PFP-100N	
Track-connecting Socket		1 m (l) × 16 mm (t):	PFP-100N2	
	End plate *1		PFP-M	10
	Spacer		PFP-S	10
Back-connecting Socket	Mounting plate *2		P2R-P	1

<sup>\*1.</sup> When mounting DIN rail, please use End Plate (PFP-M). Use the Short Bars for crossover wiring within one Socket or between Sockets.

<sup>\*2.</sup> Used to mount several P2R-05A and P2R-08A Connecting Sockets side by side.

# **Specifications**

#### **Coil Ratings**

Rated voltage		Rated current*		Coil		Coil inductance (H) (ref. value)		Must release voltage	Max. voltage	Power consumption
	50 Hz 60 Hz		resistance	Armature OFF	Armature ON	% of rated voltage		(approx.)		
	24 V	43.5 mA	37.4 mA	253 Ω	0.81	1.55			30% max. 110%	0.9 VA at 60 Hz
	48 V	21.8 mA	18.8 mA	1,040 Ω	3.12	6.17				
AC	110 V	9.5 mA	8.2 mA	5,566 Ω	13.33	26.83	80% max.	20% may		
AC	120 V	8.6 mA	7.5 mA	7,286 Ω	16.13	32.46	ou% max.	% max. 30% max.		
	230 V	4.4 mA	3.8 mA	27,172 Ω	72.68	143.90				
	240 V	4.2 mA	3.7 mA	27,800 Ω	90.58	182.34				

Rated voltage		Rated current*	Rated current* Coil resistance		Coil inductance (H) (ref. value)		Must release voltage	Max. voltage	Power consumption
			resistance	Armature OFF	Armature ON	% of rated voltage		age	(approx.)
	6 V	87.0 mA	69 Ω	0.25	0.48		% max. 15% min.	in. 110%	
DC	12 V	43.2 mA	278 Ω	0.98	2.35	709/ may			0.53 W
ЪС	24 V	21.6 mA	1,113 Ω	3.60	8.25	70% max.			0.53 W
	48 V	11.4 mA	4,220 Ω	15.2	29.82				

- Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with tolerances of +15%/-20% for the AC rated current and ±10% for the DC coil resistance.
  - 2. The AC coil resistance and inductance values are reference values only (at 60 Hz).
  - 3. Operating characteristics were measured at a coil temperature of 23°C.
  - **4.** The maximum voltage is the maximum possible value of the voltage that can be applied to the relay coil. It is not the maximum voltage that can be applied continuously.

#### **Contact Ratings**

Number of poles	1 pole		2 poles		
Load			Resistive load (cosφ = 1)	Inductive load (cos\phi = 0.4; L/R = 7 ms)	
Rated load	10 A at 250 VAC; 10 A at 30 VDC	7.5 A at 250 VAC; 5 A at 30 VDC	5 A at 250 VAC; 5 A at 30 VDC	2 A at 250 VAC; 3 A at 30 VDC	
Rated carry current	10 A		5 A		
Max. switching voltage	440 VAC, 125 VDC		380 VAC, 125 VDC		
Max. switching current	10 A		5 A		
Max. switching power	2,500 VA, 1,875 VA, 300 W 150 W		1,250 VA, 150 W 500 VA, 90 W		
Failure rate (reference value) *	100 mA at 5 VDC		10 mA at 5 VDC		

**Note:** P level:  $\lambda_{60} = 0.1 \times 10^{-6}$ /operation

<sup>\*</sup>This value was measured at a switching frequency of 120 operations per minute.

#### **Characteristics**

Item	1 pole		2 poles		
Contact configration	SPDT				
Contact structure	Single				
Contact resistance	100 m $Ω$ max.				
Operate (set) time	15 ms max.				
Release (reset) time	AC: 10 ms max.; DC: 5 ms max. (w/built-in diode: 20 ms max.)		AC: 15 ms max.; DC: 10 ms max. (w/built-in diode: 20 ms max.)		
Max. operating frequency	Mechanical: 18,000 operations/hr Electrical: 1,800 operations/hr (under rated load)				
Insulation resistance	1,000 M $\Omega$ min. (at 500 VDC)				
Dielectric strength *	5,000 VAC, 50/60 Hz for 1 min between coil and contacts; 1,000 VAC, 50/60 Hz for 1 min between contacts of same polarity		5,000 VAC, 50/60 Hz for 1 min between coil and contacts; 3,000 VAC, 50/60 Hz for 1 min between contacts of different polarity 1,000 VAC, 50/60 Hz for 1 min between contacts of same polarity		
Vibration resistance		10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude)			
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> Malfunction: 200 m/s <sup>2</sup> when energiz	·			
Endurance	DC coil: 20,000,000 op	DC coil: 20,000,000 operations min. (at 18,000 operations/hr)			
Ambient temperature	Operating: -40°C to 70°C (with no	perating: -40°C to 70°C (with no icing or condensation)			
Ambient humidity	perating: 5% to 85%				
Weight	Approx. 20 g				

Note: Values in the above table are the initial values.

# **Approved Standards** UL 508 (File No. E41643)

Model	Contact form	Coil ratings	Contact ratings	Opera- tions
G2R-1-S (S)	SPDT	5 to 110 VDC	10 A, 30 VDC (resistive) 10 A, 250 VAC (general use)	100 × 10 <sup>3</sup>
			TV-3 (NO contact only)	$25 \times 10^{3}$
G2R-2-S (S)	DPDT	6 to 240 VAC	5 A, 30 VDC (resistive) 5 A, 250 VAC (general use)	100 × 10 <sup>3</sup>
			TV-3 (NO contact only)	$25 \times 10^{3}$

#### CSA 22.2 No.0, No.14 (File No. LR31928)

Model	Contact form	Coil ratings	Contact ratings	Opera- tions
G2R-1-S (S) S	SPDT	010110100	10 A, 30 VDC (resistive) 10 A, 250 VAC (general use)	100 × 10 <sup>3</sup>
			TV-3 (NO contact only)	$25 \times 10^{3}$
G2R-2-S (S)	DPDT		5 A, 30 VDC (resistive) 5 A, 250 VAC (general use)	100 × 10 <sup>3</sup>
			TV-3 (NO contact only)	$25 \times 10^{3}$

#### IEC/VDE (Certificate No. 40015012 EN 61810-1)

Contact form	Coil ratings	Contact ratings	Operations
1 pole	6, 12, 24, 48 VDC 24, 110, 120, 230, 240 VAC	5 A, 440 VAC (cosφ = 1.0) 10 A, 250 VAC (cosφ = 1.0) 10 A, 30 VDC (0 ms)	100 × 10 <sup>3</sup>
2 poles	6, 12, 24, 48 VDC 24, 110, 120, 230, 240 VAC	5 A, 250 VAC (cosφ =1.0) 5 A, 30 VDC (0 ms)	100 × 10 <sup>3</sup>

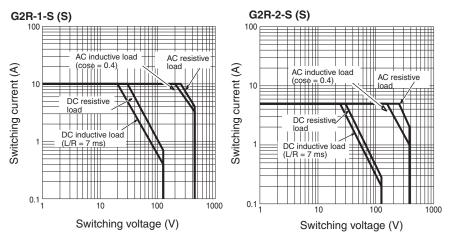
#### LR

Number of poles	Coil ratings	Contact ratings	Operations
1 pole	5 to 110 VDC 6 to 240 VDC	10 A, 250 VAC (general use) 7.5 A, 250 VAC (PF0.4) 10 A, 30 VDC (resistive) 5A, 30VDC (L/R=7ms)	100 × 10 <sup>3</sup>
2 poles	5 to 110 VDC 6 to 240 VDC	5 A, 250 VAC (general use) 2 A, 250 VAC (PF0.4) 5 A, 30 VDC (resistive) 3A, 30VDC (L/R=7ms)	100 × 10 <sup>3</sup>

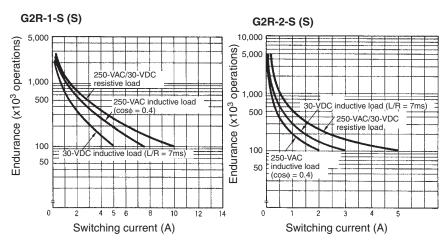
<sup>\*</sup>These values are relay only. Prease refer to the "Products Related to Common Sockets and DIN Tracks Data Sheet" for connecting sockets.

# **Engineering Data**

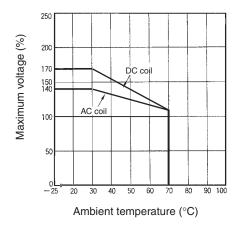
#### **Maximum Switching Power**



#### **Endurance**



#### **Ambient Temperature vs Maximum Coil Voltage**



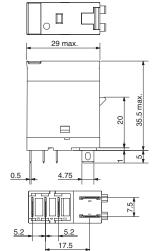
Dimensions (Unit: mm)

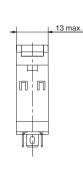
Note: All units are in millimeters unless otherwise indicated.

#### **SPDT Relays**

G2R-1-S (S), G2R-1-SN (S), G2R-1-SNI (S) G2R-1-SD (S), G2R-1-SND (S), G2R-1-SNDI (S)

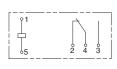


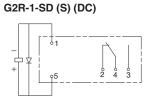




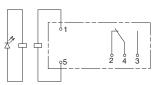
# Terminal Arrangement/Internal Connections (Bottom View)

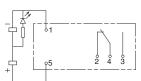
G2R-1-S (S)



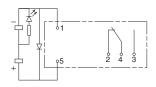


G2R-1-SN (S), G2R-1-SNI (S) (AC) G2R-1-SN (S), G2R-1-SNI (S) (DC)





G2R-1-SND (S), G2R-1-SNDI (S) (DC)

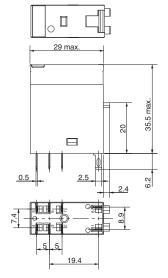


#### **DPDT Relays**

G2R-2-S (S), G2R-2-SN (S), G2R-2-SNI (S) G2R-2-SD (S), G2R-2-SND (S), G2R-2-SNDI (S)





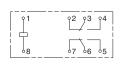


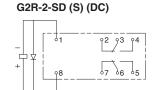
# Terminal Arrangement/Internal Connections (Bottom View)

G2R-2-S (S)

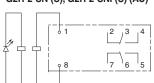
13 max.

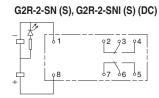
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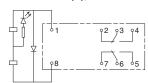


G2R-2-SN (S), G2R-2-SNI (S) (AC)



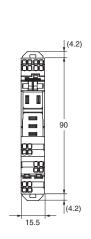


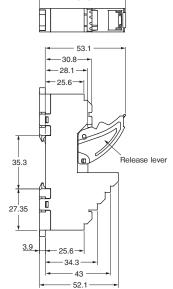
G2R-2-SND (S), G2R-2-SNDI (S) (DC)

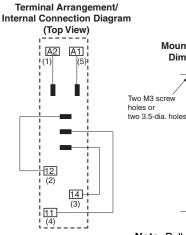


#### **Track/Surface Mounting Sockets** P2RF-05-PU









Note: Pull out the hooks to

**Mounting Hole** 

**Dimensions** 

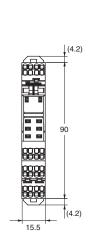
Note: The numbers in parentheses are traditionally used terminal numbers.

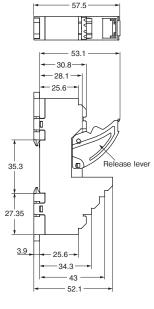
mount the Socket with screws.

108

#### P2RF-08-PU







#### **Terminal Arrangement/ Internal Connection Diagram** (Top View) **Mounting Hole** Dimensions Two M3 screw holes or two 3.5-dia. holes 108 22 12 (2) 14 24 (4) (5) 11 21

Note: The numbers in parentheses are traditionally used terminal numbers.

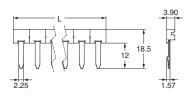
(6)

(3)

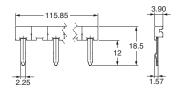
Note: Pull out the hooks to mount the Socket with screws.

#### Accessories for P2RF-□-PU **Short Bars**

PYDN-7.75-□□ (7.75 mm)







Application	Pitch	No. of poles	L (Length)	Colors	Model *	Maximum carry current	
•	7.75 mm		2	15.1		PYDN-7.75-020□	
For Contact		3	22.85		PYDN-7.75-030□		
terminals (common)		4	30.6	Red (R) Blue (S)	PYDN-7.75-040□	20 A	
		20	154.6	Yellow (Y)	PYDN-7.75-200□		
For Coil terminals	15.5 mm	8	115.85		PYDN-15.5-080□		

<sup>\*</sup>Replace the box (
) in the model number with the code for the covering color.

Note: 1. Use the Short Bars for crossover wiring within one Socket or between Sockets.

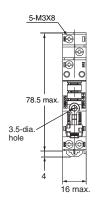
2. When using short bar to coil terminals of PYF- PU, make sure to use PYDN-31.0-080□ (31 mm).

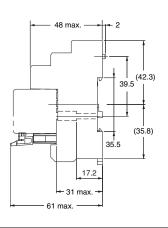
When using short bar to coil terminals of P2RF- PU, make sure to use PYDN-15.5-080□ (15.5 mm).

# **G2R-**□-**S** (S)

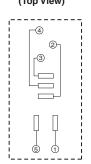
#### P2RFZ-05-E (1-pole)

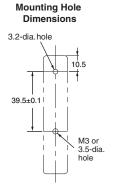






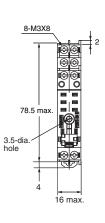
Terminal Arrangement/
Internal Connection Diagram (Top View) -4

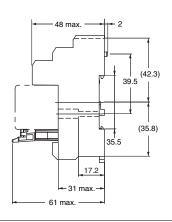




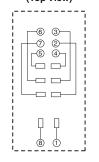
P2RFZ-08-E (2-pole)

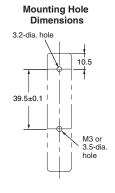






**Terminal Arrangement/ Internal Connection Diagram** (Top View)



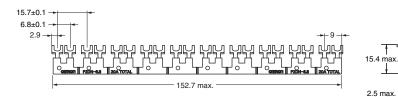


Accessories for P2RFZ-□-E **Short Bars** 

P2DN-6.8-100S (6.8 mm)

Maximum carry current: 20A

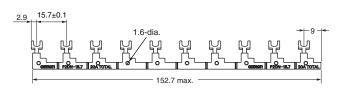




P2DN-15.7-100S (15.7 mm)

Maximum carry current: 20A







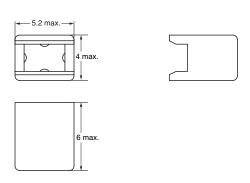
2.5 max

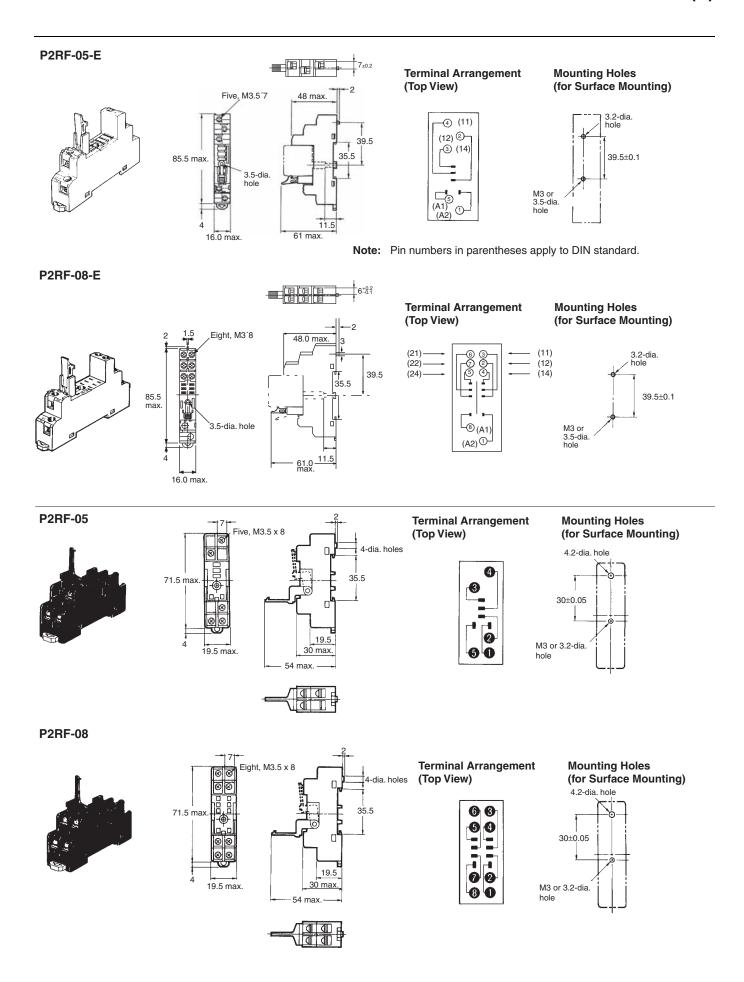
8.7 max

Note: Each Short Bar set comes with 20 Caps.

#### **Accessories for P2DN** Cap P2DN-CP100

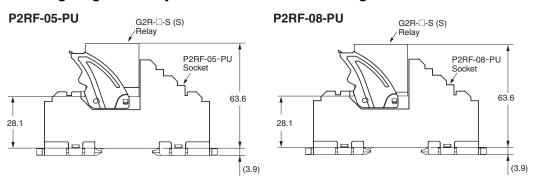


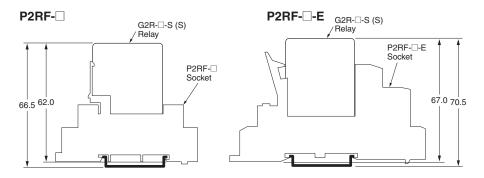




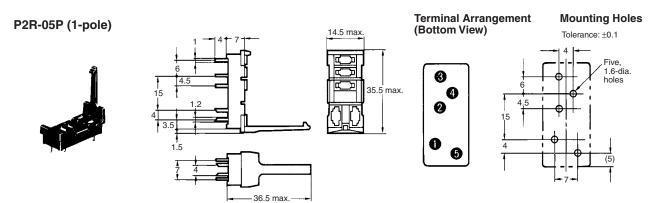
# **G2R-**□-**S** (**S**)

#### Mounting Height of Relay with Track/Surface Mounting Sockets

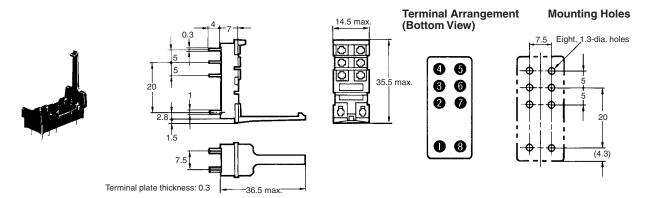


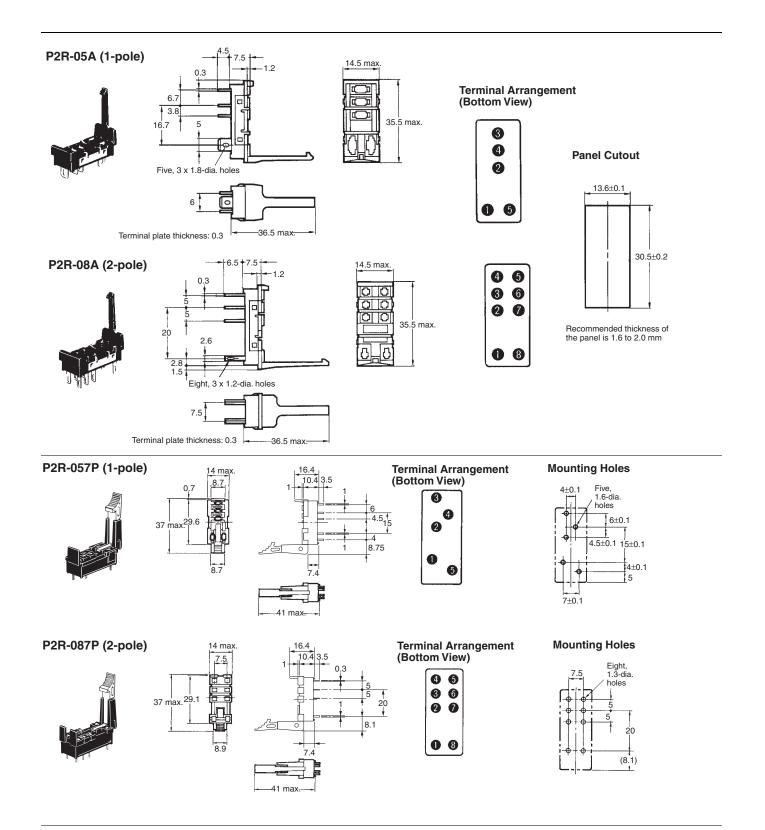


#### **Back-connecting Sockets**

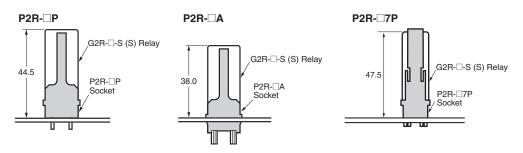


#### P2R-08P (2-pole)



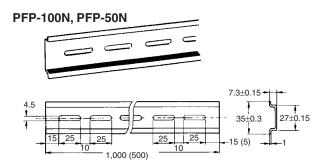


#### Mounting Height of Relay with Back-connecting Sockets

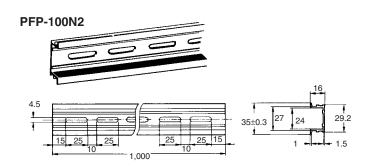


# **G2R-**□-**S** (**S**)

#### **Mounting Tracks**



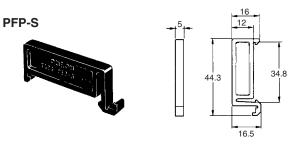
It is recommended to use a panel 1.6 to 2.0 mm thick.



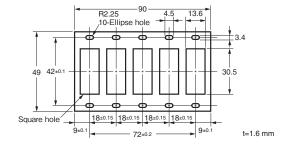
#### **End Plate**

# PFP-M 10 6.2 1,8 35.5 35.3 1.8 1.8 1.8 4.8 head screw

#### **Spacer**



# Mounting Plate P2R-P



#### **Safety Precautions**

Be sure to read the *Common Precautions for All Relay* in the website at the following URL: http://www.ia.omron.com/.

Refer to Products Related to Common Sockets and DIN Tracks for precautions on the applicable Sockets.

Refer to PYF- - PU/P2RF- - PU for precautions on Push-In Plus Terminal Block Sockets.

#### **Warning Indications**

<b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.
Precautions for Correct Use	Supplementary comments on what to do or avoid doing to prevent failure to operate, malfunction, or undesirable effects on product performance.

#### 

- Do not use the test button for any purpose other than testing. Be sure not to touch the test button accidentally as this will turn the contacts ON. Before using the test button, confirm that circuits, the load, and any other connected item will operate safely.
- Check that the test button is released before turning ON relay circuits.
- If the test button is pulled out too forcefully, it may bypass the momentary testing position and go straight into the locked position.
- Use an insulated tool when you operate the test button.

#### **Precautions for Correct Use**

#### **About the Built-in Diodes**

The diodes that are built into the Relays are designed to absorb reverse voltage from the Relay's coil. If a large surge in voltage is applied to the diode from an external source, the element will be destroyed.

If there is the possibility of large voltage surges that could be applied to the elements from an external source, take any necessary surge absorption measures.

#### **Latching Levers**

- Turn OFF the power supply when operating the latching lever.
   After you use the latching lever always return it to its original state.
- Do not use the latching lever as a switch.
- The latching lever can be used for 100 operations minimum.

#### **Relay Replacement**

To replace the Relay, turn OFF the power supply to the load and Relay coil sides to prevent unintended operation and possible electrical shock.

#### Coil tape color

Pink tape is used for the AC coil type and blue tape is used for the DC coil type, making it easy to distinguish AC and DC.

#### Screw terminal socket

• Use the following tightening torque for screws during wiring.

Model	Tightening torque
P2RF-05 P2RF-08	0.78 to 1.18 N·m
P2RFZ-05-E P2RFZ-08-E P2RF-05-E P2RF-08-E	0.59 to 0.88 N·m *Use a No. 1 screwdriver.

 Use the following wire diameters as a guide for wiring. (Select the appropriate wire diameter for the current used.)

Model	Recommended wire diameter (mm²)		
P2RF-05	Stranded wire	0.75 to 2.5 mm <sup>2</sup> AWG 18 to 14	
P2RF-08	Solid wire	0.75 to 2.0 mm <sup>2</sup> AWG 18 to 14	
P2RFZ-05-E P2RFZ-08-E	Stranded wire	0.75 to 2.5 mm <sup>2</sup> AWG 18 to 14	
P2RF-05-E P2RF-08-E	Solid wire	0.75 to 1.5 mm <sup>2</sup> AWG 18 to 16	

#### Using a short-circuit bar

- Use the short-circuit bar that is suitable for the socket you are using and the location of use.
- Note that the P2DN short-circuit bar for the P2RFZ-E Socket has both a short-circuit bar for shorting coil terminals and a short-circuit bar for shorting contact COM terminals.
- The short-circuit bar can be cut to match any number of poles. Cut with a tool as appropriate for the number of relays and sockets.
   When using a cut short-circuit bar, take care to avoid injuring yourself on the cut surface.
- When cutting with a tool, insert the tool from the plastic part and cut
  along the slot in the plastic part between terminals. If you cut a part
  other than the slot in the plastic part between terminals, it may not
  be possible to attach the insulating cap.



When using a cut short-circuit bar (P2DN), always use the provided cap to protect the charger part.



 The proper orientation for installing the short-circuit bar is with the molded part facing inward.



#### **G2R-**□-**S**(**S**)

- Use the short-circuit bar to short-circuit two or more coil terminals, or two or more contact COM terminals.
- Do not use a deformed short-circuit bar. Risk of failure, malfunctioning, or deterioration of characteristics.
- In socket terminals, insert the short-circuit bar in the correct orientation all the way into all terminals, and then secure with screws.
- Install the short -circuit bar before wiring.

# **Equivalent Labels from Other Companies and Recommended Label Printers**

Use the following label printer.

The following table gives the manufacturer's model number as of March 2017.

Manufacturer	Omron	Phoenix Contact	Weidmuller	Cembre
Label	XW5Z-P4.0LB1	UCT-TM6	MF 10/6	MG-CPM-04 41391
	XW5Z-P2.5LB2	UCT-TMF5		
Label printer	*	BLUEMARK CLED, THERMOMA RK CARD SET PLUS, THERMOMA RK CARD	PrintJet ADVCANCED, Plotter MCP Plus, Plotter MCP Basic	Markingenius MG3

<sup>\*</sup> When using a printing tool, use a Phoenix Contact label printer.

Note: Ask the label manufacturer or printer manufacturer for details.

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