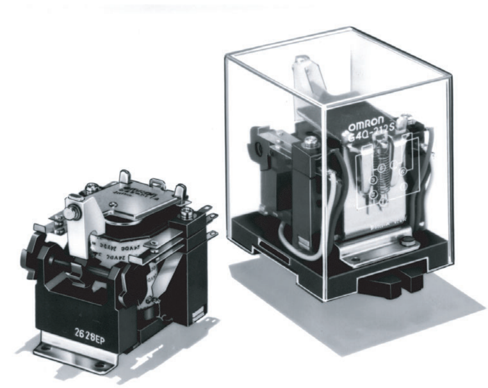
Ratchet Relay

G4Q

Unique Ratchet Mechanism Assures Positive Alternate Transfer/Switching Operation

- Each contact in the double-pole contact mechanism performs alternate make-brake operation at each pulse input and is thus ideal for alternate operation or transfer/switching operation of a motor.
- Positive operation is assured due to the unique ratchet mechanism.
- Satisfies dielectric strength of 2,000 VAC.
- Low power consumption.
  (AC: approx. 6.4 VA; DC: approx. 3.9 W)



Ordering Information

Open Models

Item	DPDT	
	Rated voltage (V)	Model
Basic model	6 VAC	G4Q-211A
	12 VAC	
	24 VAC	
	50 VAC	
	100/(110) VAC	
	200/(220) VAC	
	6 VDC	
	12 VDC	
	24 VDC	
	48 VDC	
	100 VDC	
	200 VDC	

Plug-in Models

Item	DPDT	
	Rated voltage (V)	Model
Basic model	6 VAC	G4Q-212S
	12 VAC	
	24 VAC	
	50 VAC	
	100/(110) VAC	
	200/(220) VAC	
	6 VDC	
	12 VDC	
	24 VDC	
	48 VDC	
	100 VDC	
	200 VDC	

Note: When ordering, add the rated coil voltage (listed in *Specifications*) to the model number.
Example: G4Q-211A, 24 VAC
Rated coil voltage

Model Number Legend

G4Q-□□□□
1 2 3 4

1. Contact Form
2: DPDT

2. Contact Type
1: Single

3. Enclosure Construction
1: No casing
2: Casing

4. Terminal Shape
A: Solder
S: Plug-in

■ Accessories (Order Separately)

DIN track/Front-connecting Socket	Back-connecting Socket
Screw terminal	Solder terminal
8PFA1	PL08

Specifications

■ Coil Ratings

Item		Current (mA)		Resistance (Ω)	Must operate	Must release	Max. voltage	Power consumption	
Rated voltage (V)		50 Hz	60 Hz		% of rated voltage			Initial	Rated
AC	6	1,233	1,067	0.54	80 % max.	10 % min.	110 % max.	Approx. 13.5 VA	Approx. 6.4 VA
	12	614	531	2.24					
	24	307	266	8.7					
	50	148	128	42.7					
	100/ (110)	74	64/73.5	160					
	200/ (220)	37	32/36.8	671					

Item		Current (mA)		Resistance (Ω)	Must operate	Must release	Max. voltage	Power consumption
Rated voltage (V)		50 Hz	60 Hz		% of rated voltage			
DC	6	640		9.4	5 % min.			Approx. 3.9 W
	12	320		37.5				
	24	155		155				
	48	80		600				
	100	39		2,580				
	200	19.2		10,400				

Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with tolerances of +15%/–20% for AC rated current and ±15% for DC coil resistance.

2. The AC coil resistance values are for reference only.

3. Performance characteristic data is measured at a coil temperature of 23°C.

4. The maximum voltage is one that is applicable instantaneously to the Relay coil at an ambient temperature of 23°C and not continuously.

5. The AC power consumption is measured at 60 Hz.

■ Contact Ratings

Load	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4) (L/R = 7 ms)
Contact mechanism	Single	
Contact material	Silver alloy	
Rated load	5 A at 220 VAC, 5 A at 24 VDC	3 A at 220 VAC, 4 A at 24 VDC
Rated carry current	5 A	
Max. switching voltage	250 VAC, 250 VDC	
Max. switching current	5 A	

■ Characteristics

Contact resistance (See note 2.)	50 mΩ max.
Operate time (See note 3.)	60 ms max.
Max. operating frequency	Mechanical: 1,200 operations/hr Electrical: 1,200 operations/hr (under rated load)
Insulation resistance (See note 4.)	100 MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min between coil and contact (1,000 VAC, 50/60 Hz for 1 min between contacts of same polarity) (2,000 VAC between contacts of different polarities)
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) Malfunction: 10 to 55 to 10 Hz, 0.5 mm single amplitude (1.0 mm double amplitude)
Shock resistance	Destruction: 500 m/s² Malfunction: 100 m/s²
Endurance	Mechanical: 5,000,000 operations min. (at operating frequency of 1,200 operations/hr) Electrical: 500,000 operations min. (under rated load and at operating frequency of 1,200 operations/hr) (See note 5.)
Error rate (See note 6.)	1 A at 5 VDC (0.1 A at 5 VDC)
Ambient temperature	Operating: –10°C to 55°C (with no icing or no condensation)
Ambient humidity	Operating: 5% to 85%
Weight	Open model: Approx. 240 g; cased model: Approx. 340 g

Note: 1. The data shown above are initial values.

2. The contact resistance was measured with 0.1 A at 5 VDC using the voltage drop method.

3. The operate time was measured with the rated voltage imposed with any contact bounce ignored at an ambient temperature of 23°C.

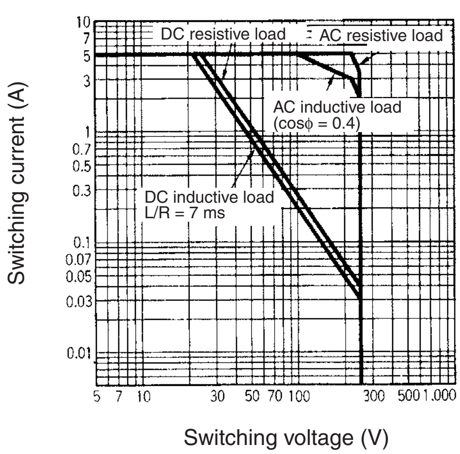
4. The insulation resistance was measured with a 500-VDC megger applied to the same places as those used for checking the dielectric strength.

5. The electrical endurance was measured at an ambient temperature of 23°C.

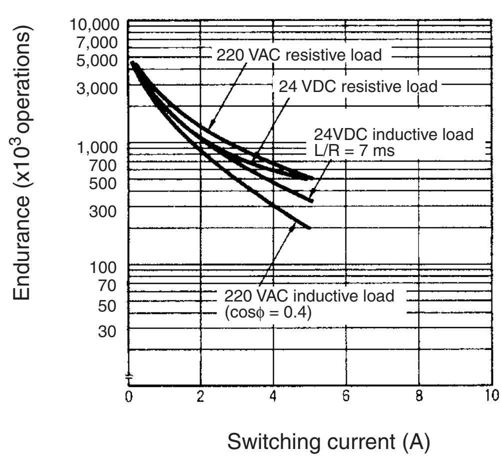
6. This value was measured at a switching frequency of 60 operations per minute. The value in parentheses is for the cased model.

Engineering Data

Maximum Switching Power

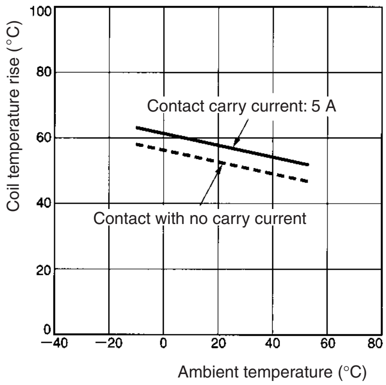


Electrical Endurance

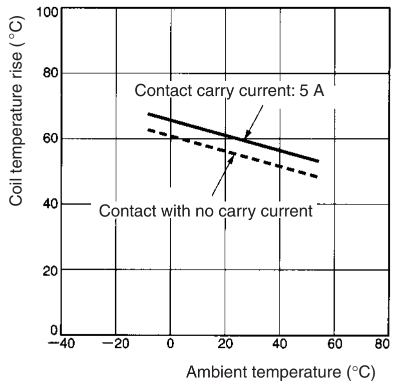


Ambient Temperature vs. Coil Temperature Rise

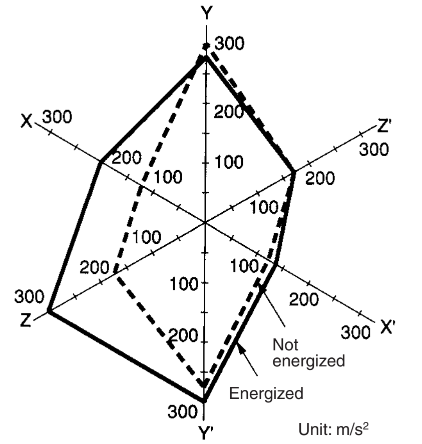
100 VAC 50 Hz

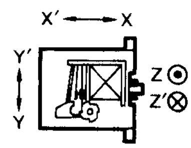


24 VDC



Malfunctioning Shock



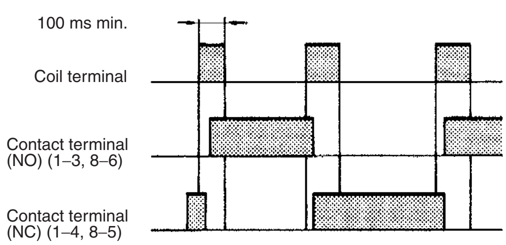


Number of samples: 5

Measurement conditions: Impose a shock of 100 m/s² in the ±X, ±Y, and ±Z directions three times each with the Relay energized and not energized to check the shock values that cause the Relay to malfunction.

Operation

Operation Timing Chart



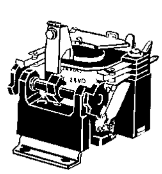
Note: When a pulse for application to the coil is used, such a pulse should have a width of 100 ms or more. If a pulse is applied with a width less than the operate time, the cam may fail to rotate fully.

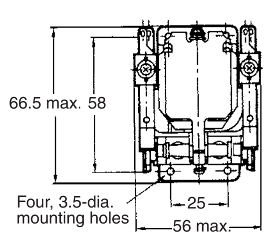
Dimensions

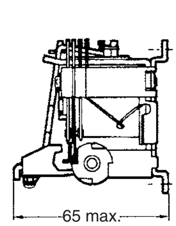
Note: All units are in millimeters unless otherwise indicated.

Open Model

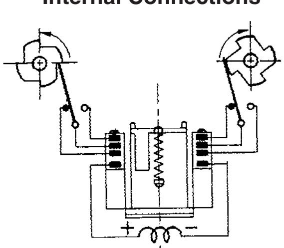
G4Q-211A



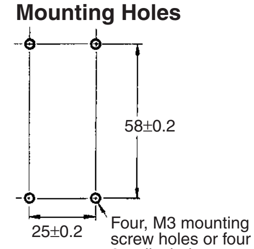




Terminal Arrangement/ Internal Connections

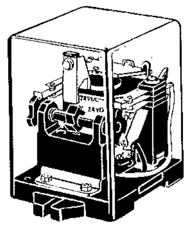


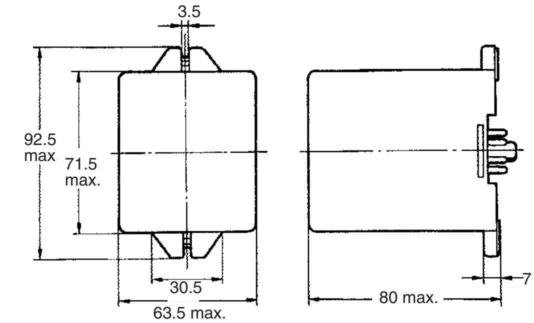
Mounting Holes



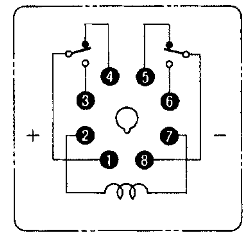
Plug-in Terminal Model

G4Q-212S



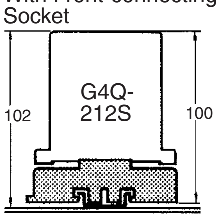


Terminal Arrangement/
Internal Connections
(Bottom view)



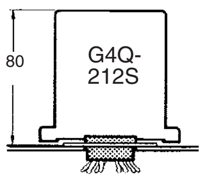
Relay Mounting Height with Socket

With Front-connecting Socket



8PFA1

With Back-connecting Socket



PL08

Precautions

Refer to page 11 for general precautions.

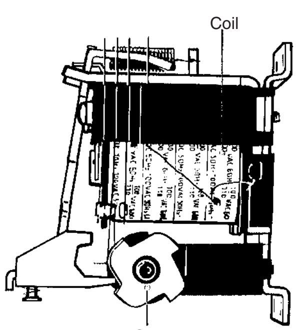
■ Surface Mounting Socket

Be sure to provide a mounting space according to the width of the Relay. The width of the Relay is 63.5 mm and the width of the Socket is 51 mm.

■ Mounting

Mount the Relay so that the coil faces upward and the cam faces downwards with the mounting plate secured vertically. Do not change the cam angle.

Make sure that Relay terminals are free of flux or any other foreign substance before soldering the Relay terminals.



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

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

Cat. No. J070-E1-04 In the interest of product improvement, specifications are subject to change without notice.