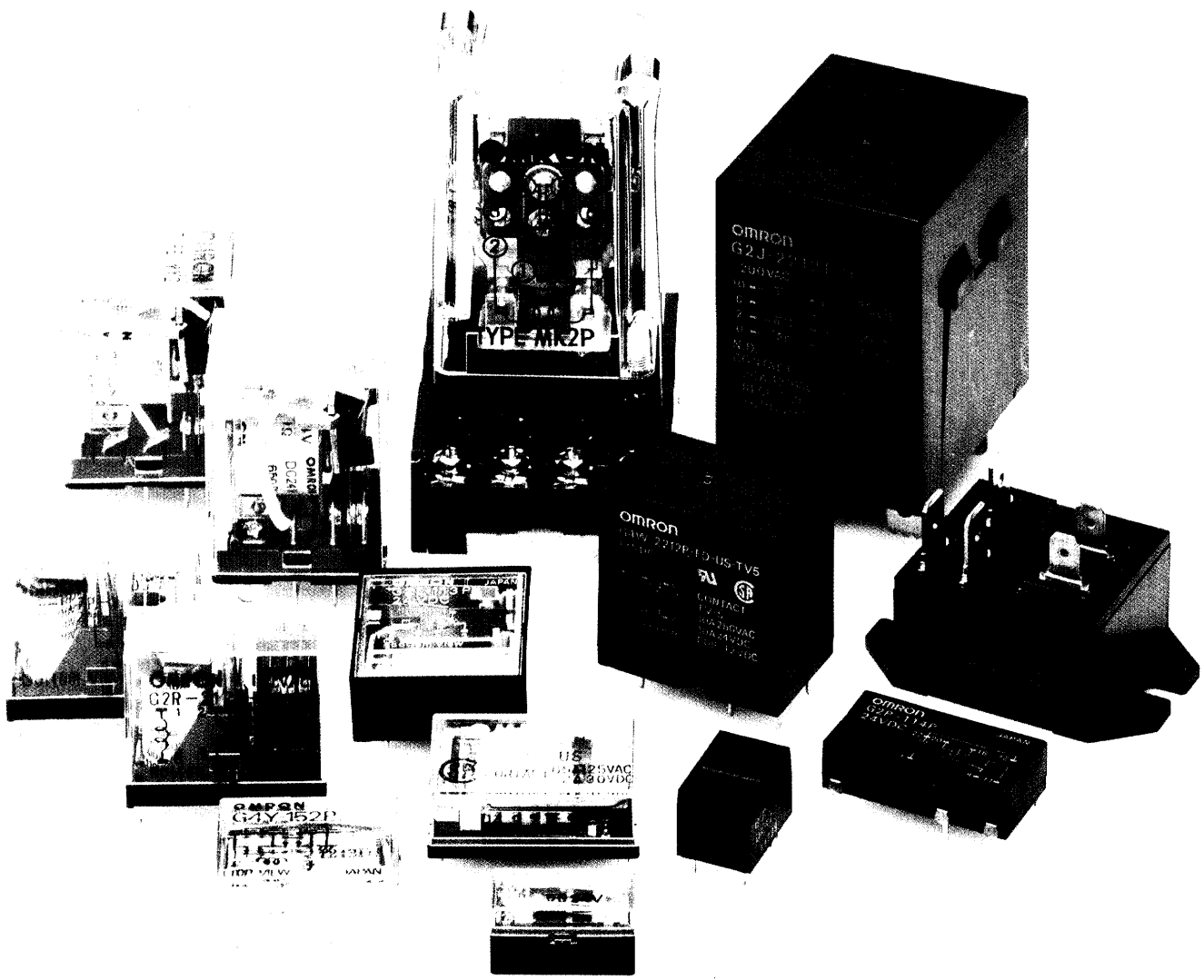
Cat. No. X11-E1-5

OMRON

RELAYS



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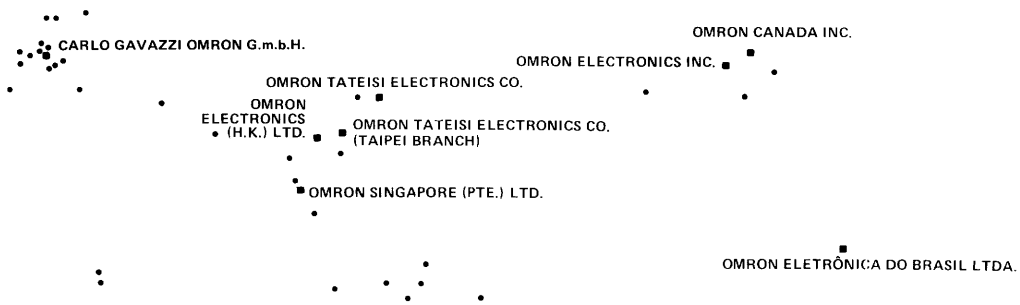

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NOTE: Sales organizations subject to change without notice.

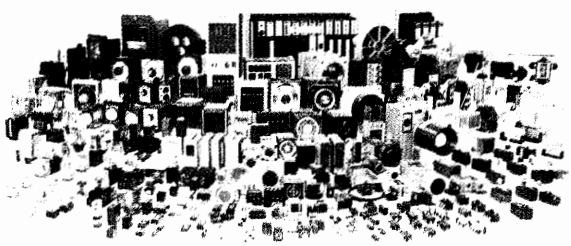
PROMOTING CYBERNATION THROUGHOUT THE WORLD

"TO THE MACHINE, THE WORK OF THE MACHINE; TO MAN, THE THRILL OF FURTHER CREATION"

OMRON has been firmly established as one of the leading manufacturers of electronic control components since 1955. In the latter part of the 1970's, OMRON developed a category of technology that promotes cybernation.
Cybernation refers to the use of systematized electronic control equipment together with computer-aided information control functions. Employing this revolutionary technology, OMRON has been able to introduce new products and systems in advance of others in the field. Today, the market has expanded to include manufacturing industries and continues to grow.
The change to cybernation is in full swing. By making efficient use of advanced engineering and electronics to perform and control routine, repetitive tasks. People, meanwhile, benefit from the freedom to pursue more rewarding tasks. OMRON is proud of its contributions to the general upgrading of work and employment, and takes pleasure in its continuing development of technology in the service of man.

Head office Kyoto, Japan

ELECTRONIC CONTROL COMPONENTS PLAYING A VITAL ROLE IN AUTOMATING EQUIPMENT



Control components for many applications

OMRON is the world's top brand of electronic control components for automation, and production of these control components constitutes the nucleus of OMRON's wide-ranging activities in diverse fields.
OMRON produces over 100,000 kinds of control components, and these components are incorporated in virtually all types of devices, instruments, machinery and equipment, running the gamut from household to industrial use.
Household electrical appliances such as televisions, radios and tape recorders often employ OMRON control components, as do copying machines and other office equipment, various measuring instruments and a wide range of computers and peripheral equipment. OMRON control components are also incorporated in such industrial machinery as machine tools, where they improve automation and labor-saving systems.

QUALITY THROUGH TOTAL PRODUCTION CONTROL

The key to our manufacturing success can be expressed in one word – quality. OMRON has the unique capability to control quality in every phase of production. Hundreds of quality control checks are built into OMRON production lines by a staff of professionally qualified quality control and reliability engineers. It starts with the careful procurement of the highest quality raw materials. Production line operations are continually monitored to assure work-in-process excellence.
In addition to the systematic on-line controls, every OMRON product is subject to a 100 percent final inspection. This final inspection means that every OMRON product from the smallest basic switch to the most sophisticated control system, leaves the plant in perfect working order. This dedication to quality is a major reason for OMRON's international acceptance, success and growth.

QC engineers exercising rigid quality control

OMRON RELAYS PLAY AN ACTIVE ROLE IN ALL MACHINERY AND EQUIPMENT

Industrial uses for relays have been increasingly expanded to the extent that a variety of general industrial and service machinery incorporating relays is available, including production equipment, machine tools, automatic vending machines and duplicating machines. In addition to widespread use in industrial machinery, they also are employed in non-industrial equipment or devices such as household electrical appliances, audio equipment, electronic games, and so on.

All types of electronic equipment are becoming increasingly sophisticated, requiring more and more diversification of relays for increasingly specialized uses. As this sophistication has grown it has become vitally important that relay designs meet the needs of equipment manufacturers. For example, relays are used extensively in PC boards in combination with various semiconductors.

will be accelerated at the same time that energy-conserving relays become even more essential. Low power consumption, high-speed operation, and high reliability all will become qualities required in relays. Latching-type relays will be increasingly used. Still more miniaturization will occur so that relays can meet the requirements of automated production for mounting, soldering, cleaning, and other operations on PC boards.

We, at OMRON, are meeting that challenge. Our engineers have been busy developing a large assortment of relays to satisfy those market needs. Our efforts have been met by a strong, favorable response from customers all over the world.

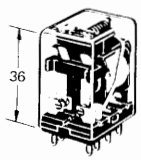
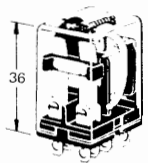
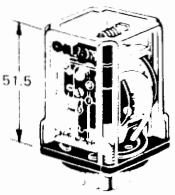
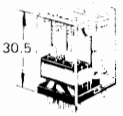
This publication describes the world's most advanced and diversified line of relays developed by OMRON using the world's most sophisticated technology. In its pages you

MEMO

GENERAL-PURPOSE & POWER RELAYS

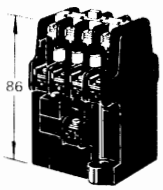
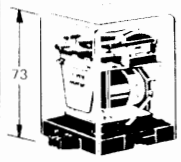
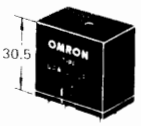
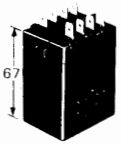
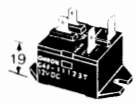
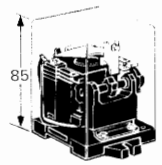
CONTENTS

SELECTION GUIDE

Classification		GENERAL-PURPOSE RELAY															
Model		MY				LY				MK(P)			MHS				
Features		Wide-ranging applications from power to sequence controls. Sealed and latching types also available				Small, general-purpose 10A relay for various applications				Best-selling power relay. Latching type also available.			High contact reliability relay ideal for communications equipment & measuring instruments. Sealed type also available.				
Appearance & dimensions																	
Number of poles		1	2	3	4	1	2	3	4	1	2	3	2	4	6		
Contact ratings	Max. operating current (A) (under resistive load)	25 20 15 10 5 3 2 1															
	Carry current (A)	5		3		15		10		7.5(5)		5(3)	2				
	Max. operating voltage (V)	AC 250 DC 125								AC 500 DC 250			AC 125 DC 125				
	Max. switching capacity (under resistive load)	1,100VA 120W		660VA 72W		1,700 VA 360W		1,100VA 240W		1,700 (1,000)VA 20(72)W		1,100 (660) VA 72(48) W	120VA 60W				
	Rated load (under resistive load)	220 VAC/ 24 VDC 5A		220 VAC/ 24 VDC 3A		110 VAC/ 24 VDC 15A		110 VAC/ 24 VDC 10A		220 VAC 7.5(5)A 24 VDC 5(3)A		220 VAC 5(3)A 24 VDC 3(2)A	110 VAC 0.3A 24 VDC 0.5A				
	Minimum permissible load (ref. value)	5 VDC 1mA		1 VDC 1mA		5 VDC 100mA				1 VDC 10mA			0.1 VDC 10μA				
Mechanical service life (x10³ operations min.)		AC: 50,000 DC: 100,000								5,000			50,000				
Coil ratings	Rated voltage (V)	AC 6, 12, 24, 50, 100, 110, 120, 200, 220, 240 DC 6, 12, 24, 48, 100								AC 6, 12, 24, 50, 100, 110, 120, 200, 220, 240 DC 6, 12, 24, 48, 100, 200			DC 6, 12, 24, 36, 48				
	Power consumption (at 60Hz for AC)	Approx. 1.2V Approx. 0.9W				Approx. 1.2VA Approx. 0.9W		1.6VA 1.4W	1.95VA 1.5W	Approx. 2.3VA Approx. 1.5W			0.36 W	0.72 W	1.3 W		
Dielectric strength (50/60Hz for 1 minute)		2,000 VAC				2,000 VAC				1,500 VAC			1,000 VAC				
Terminal*		PCB				PCB				PCB, plug-in, solder, faston, screw			PCB, solder				
Approved standards		UL CSA				UL CSA VDE				UL CSA			UL CSA				
Weight (g)		Approx. 35				Approx. 40		Approx. 50	Approx. 70	Approx. 85			24	28	30		
Page		7				17				23			33				

NOTES: 1. * PCB terminal, plug-in terminal, solder terminal, faston terminal and screw terminal.

2. The values in ( ) apply to the plug-in type relays.

GENERAL-PURPOSE RELAY	POWER RELAY						
MA	MM(P)	G4B	G4W	G4J	G4F	G4Q
Electromagnetic relay boasting high reliability and long life	Versatile relay satisfying all purposes. Latching type also available	High-capacity relay that breaks 15A, carries 20A and withstands 55A inrush	Boasts high impulse withstand voltage (10kV) & dielectric strength (4kV) — ideal for power switching	Designed small, yet makes and breaks 20A loads	High-capacity relay that breaks 20A, carries 20A and withstands 60A inrush	Impulse relay that breaks 5A loads
						
3 4 5	2 3 4	1	1 2	1, 2, 3	1	2
6 15 20	15(7.5)	20	15 10	N.O.: 20, N.C.: 3	20	5
AC 550 DC 250	AC 250 DC 250	AC 250 DC 125	AC 250	AC 250	AC 250	AC 500 DC 250
1,650VA 500W / 3,300 VA 1,000 W / 4,400 VA 1,000 W	3,300(1,700)VA 240(120)W	3,300VA 360W	3,750 VA / 2,500 VA	N.O.: 4,400VA N.C.: 660VA	3,300VA (4,400VA)	1,100VA 120W
220 VAC/ 24 VDC 6VA / 220 VAC/ 24 VDC 15A / 220 VAC/ 24 VDC 20A	220 VAC 15(7.5)A 24 VDC 10(5)A	220 VAC/15A 24 VDC/15A	220 VAC 15A / 220 VAC 10A	N.O.: 220 VAC 20A N.C.: 220 VAC 5A	220 VAC 15A(20A)	220 VAC/ 24 VDC 5A
—	5 VDC 25mA	5 VDC 100mA	5 VDC 100mA	—	5 VDC 100mA	5 VDC 1A 5 VDC 0.1A
5,000 10,000 5,000	5,000	10,000	5,000	1,000	5,000	5,000
AC 6, 12, 24, 50, 100, 110, 200, 220, 400	AC 6, 12, 24, 50, 100, 110, 200, 220 DC 6, 12, 24, 48, 100, 110	AC 6, 12, 24, 50, 100, 120 DC 6, 12, 24, 48, 100, 110	DC 12, 24, 100	AC 6, 12, 24, 50, 100, 200 DC 6, 12, 24, 48, 100	DC 12, 24	AC 6, 12, 24, 50, 110, 220 DC 6, 12, 24, 48, 100, 200
8.9 VA / 7.5 VA / 8 VA / 12 VA	3.5VA 2.1W / 5.1VA 2.7W	Approx. 1.3VA Approx. 1.2W	0.8W	4VA 1.7W	0.9W	Approx. 13.5 Approx. 6.4
2,000 VAC	2,000 VAC	2,000 VAC	4,000 VAC	2,000 VAC	2,000 VAC	2,000 VAC
	—					—
240 290 390 550	150 to 410	Approx. 44	29	165	40	240 to 340
39	45	53	55	57	59	61

GLOSSARY

- **Carry current**

The value of the current which can be continuously applied to the relay contacts without opening or closing them and within the permissible temperature rise limit.

- **Dielectric strength**

The critical value at which a dielectric can withstand without rupturing when a high-tension voltage is applied for 1 minute between the same points as those in the measurement of insulation resistance.

- **Electrical service life**

The life of a relay when it is switched at the rated operating frequency with the rated load applied to its contacts.

- **Impulse withstand voltage**

The critical value indicating the durability of a relay against momentary voltage surges caused by lightning or generated when an inductive load is switched.

- **Insulation resistance**

The resistance offered by an insulating material when a voltage is applied between an electric circuit such as a relay contact or coil and a grounded non-current-carrying metallic part such as an iron core or core frame, or between contacts.

- **Maximum operating current**

A current which serves as a reference in determining the performance of the relay contacts. This value will never exceed the carry current. When using a relay, be careful not to exceed this value.

- **Maximum operating voltage**

A voltage which serves as a reference in determining the performance of the relay contacts. When using a relay, be careful not to exceed this value.

- **Maximum switching capacity**

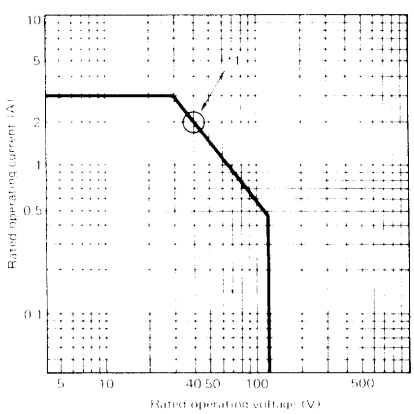
The maximum value of the load capacity which can be practically switched without any problem. When using a relay, be careful not to exceed this value.
For example, when operating voltage V_1 is known, maximum operating current I_1 can be obtained at the point of intersection on the characteristic curve of Maximum switching capacity below. Conversely, maximum operating voltage V_1 obtained if I_1 is known.

$$\text{Maximum operating current } (I_1) = \frac{\text{Maximum switching capacity [W (VA)]}}{\text{Operating voltage } (V_1)}$$

$$\text{Maximum operating voltage } (V_1) = \frac{\text{Maximum switching capacity [W (VA)]}}{\text{Operating current } (I_1)}$$

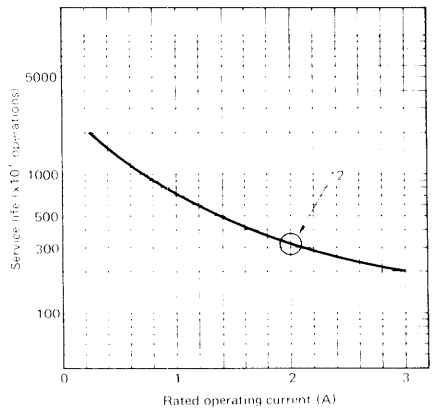
For instance, if operating voltage = 40V
Maximum operating current =2A . . . *1

Maximum switching capacity



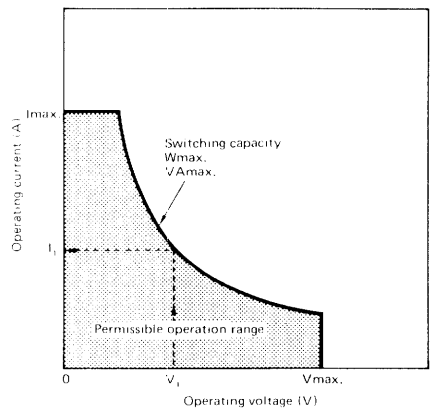
Next, the electrical service life of the relay can be determined from the service life curved based on the I_1 obtained above.
For instance, the electrical service life at the maximum operating current of 2A is slightly over 300,000 operations . . . *2

Electrical service life



However, with a DC load, it may become difficult to break the circuit of 48V or more due to arcing. Be sure to check this using the relay actually.
Correlation between the contact ratings is as shown in the following figure.

Maximum switching capacity



- **Maximum voltage**

The maximum value of permissible voltage fluctuations in the operating power supply of the relay coil.

- **Mechanical service life**

The life of a relay in terms of its mechanical functions when it is operated at the maximum mechanical operating frequency without applying any load to its contacts.

- **Must dropout voltage**

The value of a voltage at which a relay releases when the rated input voltage applied to the relay coil in the operating state is decreased gradually.

- **Must operate voltage**

The value of a voltage at which a relay operates when the input voltage applied to the relay coil in the reset state is increased gradually.

- **Minimum permissible load**

The value indicated as a standard to show the limit of the switching capability of a relay at minute load levels such as micro-electronic circuits. This value may vary depending on the operating frequency, ambient conditions, expected reliability level, etc. of the relay. It is recommended to doublecheck this under the actual load condition.
In this catalog, the minimum permissible load of each relay is indicated as a reference value. It indicates failure level at a reliability level of 60% (λ_{60}).
$\lambda_{60} = 0.1 \times 10^{6}$/operation means that one failure is presumed to occur per 10,000,000 operations at the reliability level of 60%.

- **Operating frequency**

The switching frequency at which a relay operates and releases continuously. The maximum operating frequency of a relay must satisfy its electrical or mechanical life.

- **Power consumption**

The power consumption of a relay is indicated as the value of the power (rated voltage x rated current) to be consumed by the relay coil when the rated voltage is applied to the coil. With AC operated relays, their power consumption values are at the power frequency of 60Hz.

- **Rated load**

The value which serves as a reference in determining the performance of the relay contacts and is indicated by a combination of operating voltage and operating current.

- **Rated voltage**

A voltage which serves as a reference for control input.

- **Shock**

The shock resistance of a relay is divided into two categories; "Mechanical durability" which regulates the characteristic changes of, or damage to, the relay due to considerably large shocks which may develop during the transportation or mounting of the relay and "Malfunction durability" which regulates the malfunction of the relay while it is in operation.

- **Vibration**

The vibration resistance of a relay is divided into two categories; "Mechanical durability" which regulates the characteristic changes of, or damage to, the relay due to considerably large vibrations which may develop during the transportation or mounting of the relay, and "Malfunction durability" which regulates the malfunction of the relay due to vibrations while it is in operation.

$\alpha = 0.002f^2$ A

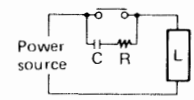
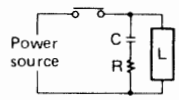
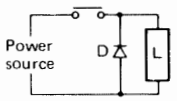
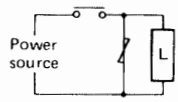
α : Acceleration of vibration
f : Frequency
A : Double amplitude

TECHNICAL INFORMATION

■ CONTACTS

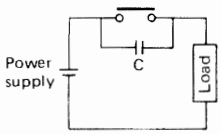
● Contact protection circuit

When switching inductive loads (relays, solenoids, etc.) it is recommended that one of the contact protection circuits shown below, be employed to prevent faulty contact (e.g., metal deposition between mating contacts) due to arcing, and to increase contact reliability and service life. It should be noted that the release time of the relay increases when the contact protection circuit is used.

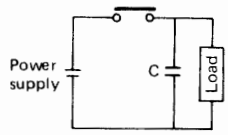
		RC type		Diode type	Varistor type
Circuit example					
Applicability	AC	△	○	X	○
	DC	○	○	○	○
Remarks		△: Load impedance must be much smaller than the RC circuit impedance when the relay operates on an AC voltage. Optimum C and R values are: C: 1 to 0.5μF for 1A contact current R: 0.5 to 1Ω for 1V contact voltage. A capacitor having 200 to 300V voltage proof must be employed.		The diodes employed must have a reverse breakdown voltage of ten times the circuit voltage, and a forward current rating greater than the load current.	—

Note: L denotes inductive load.

Avoid use of a surge suppressor in such manners as shown below.



This circuit arrangement is very effective for diminishing sparking (arcing) at the contacts when breaking the circuit. However, since electrical energy is stored in C (capacitor) when the contacts are open, short-circuit current of C flows into the contacts when they are closed. Therefore, metal deposition is likely to occur between mating contacts.



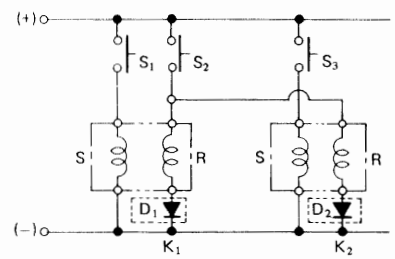
This circuit arrangement is very useful for diminishing sparking (arcing) at the contacts when breaking the circuit. However, since the charging current to C flows into the contacts when they are closed, metal deposition is likely to occur between the mating contacts.

■ LATCHING RELAYS

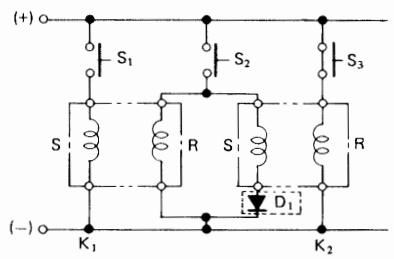
● Magnetic latching relay

1. Avoid use in locations subject to excessive magnetic particles or dust.
2. Avoid use in a magnetic field (over 70 gausses).
3. Pay adequate attention to vibration or shock which may be caused by any other relay on the same panel when it operates or releases.
4. Be careful not to drop the latching relay, as the performance of the latching relay will deteriorate significantly if it is dropped from the height of 30cm or above.
5. Avoid simultaneous energization of the set coil and the reset coil. (If both coils are energized simultaneously, the relay will be put in the set state.)
6. Avoid use under the condition where surge generating sources exist excessively in the coil power source.
7. When a DC operation type latching relay is used in one of the circuits shown at the right, the relay contacts may be released from the locked state unless a diode (enclosed in the dotted box in the circuit diagram) is connected to the circuit. As an alternative to prevent the relay contacts from unintentional unlock, use the latching relay by changing the circuit configuration or use a latching relay with a built-in diode.
8. When connecting a diode to the relay circuit, be sure to use the diode with a repetitive peak-inverse voltage and a DC reverse voltage sufficient to withstand external noise or surge, as well as with an average rectified current greater than the coil current.

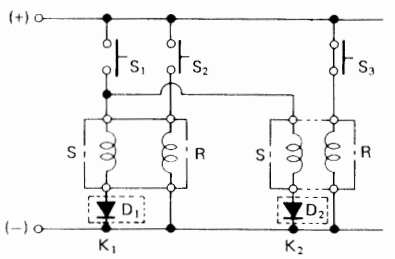
Circuit connecting two reset coils in parallel



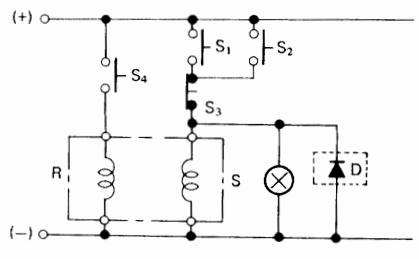
Circuit connecting set coil to reset coil



Circuit connecting two set coils in parallel



Circuit connecting set coil of latching relay in parallel with another relay coil.



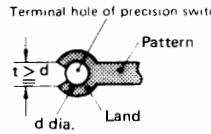
● Mechanical latching relay

1. Note that the mechanical latching relay is provided with a slight clearance in the latching mechanism to smooth the mechanical operation and is thus slightly inferior in vibration and shock resistance.
2. Avoid simultaneous energization of the set coil and the reset coil. The latching relay will be placed in the set state when both coils are simultaneously energized. It is not so meaningful to use the latching relay by applying current continuously, because one pulse is sufficient to place the relay contacts in the locked state. One-pulse operation is thus advantageous from the view point of electric power savings.

■ SOLDERING

I. Connection and mounting

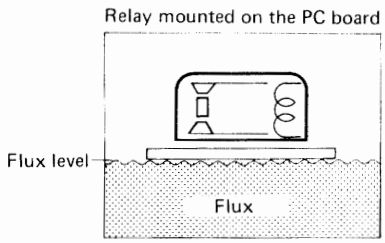
Hand soldering	Automatic soldering
• Process the land part of the printed circuit board to prevent the terminal hole of the relay from being filled with solder, and improving reliability of the solder connection.	



II. Flux application

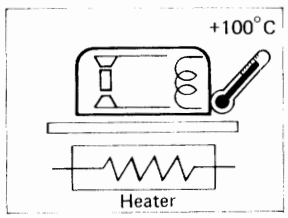
Use an anti-corrosive rosin-type flux with consideration given to the applicability of the flux to the relay's components.

- For flux solvent, use alcohol type, which is less chemically reactive.
- Apply flux sparingly and evenly to prevent penetration of solder flux into the relay. When dipping the relay terminals into solder flux, be sure to adjust the position of the flux level, so that the upper surface of the PC board is not flooded with flux.



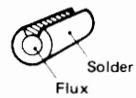
III. Preheating

Hand soldering	Automatic soldering
———	Preheat the PC board to dry the applied flux at a temperature of 100°C max.



IV. Soldering

Hand soldering	Automatic soldering
Complete soldering quickly and firmly with a soldering iron while smoothing the applied solder with the tip of the soldering iron. • Solder: (JIS Z 3282, H60 or H63 (containing rosin type flux)* • Soldering iron: rated at 30 to 60W • Tip temperature: 280 to 300°C • Soldering time: 3 sec. max. • The following is an example of the solders recommended for use in hand soldering:	• Flow soldering is recommended to assure uniform quality of soldering. • Solder: JIS Z 3282, H60 or H63* • Solder temperature and soldering time: 240°C ... 3 sec. max. • Adjust the position of the solder level so that the PC board is not flooded with solder.



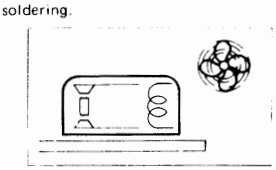
The solder shown above is provided with a cut section to prevent flux from being scattered.

Type	Sparkle solder V
Applicable solder diameter	0.8 to 1.6mm
Sn	58.8%
Flux content	1.67%
Impurities	JIS Z 3282 Class A
Spread rate	90%
Storage	3 months max.

NOTE: * H60A ... Sn (tin) content: 60±1%
H63A ... Sn (tin) content: 63±1%
A denotes A class.
The remaining contents of the above solders are mainly lead (Pb).
The above solders also contain the following chemical substances:
Antimony (Sb): 0.3% max.
Copper (Cu): 0.05% max.
Bismuth (Bi): 0.1% max.
Zinc (Zn): 0.005% max.
Iron (Fe): 0.03% max.
Aluminum (Al): 0.03% max.
Arsenic (As): 0.03% max.

V. Cooling

	Automatic soldering
———	Upon completion of the automatic soldering, forcedly cool the PC board with a fan, etc., so that the relay and other components on the PC board will not deteriorate from the inertial heat of soldering.



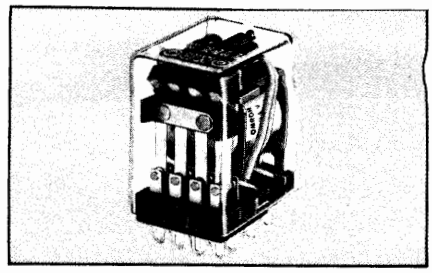
VI. Cleaning

- Avoid cleaning the soldered terminals as much as possible. When a rosin-type flux is used, no cleaning is required.
- Should cleaning be required, select an appropriate cleaning solvent. Clean only the soldered parts to prevent the flux-contaminated solvent from entering the relay.

Proper cleaning solvents	Improper cleaning solvents
Freon-based solvents	Thinner-based solvents
Alcohol-based solvents	Chlorosene-based solvents
	Trichlene-based solvents

- Plastic sealed relays can be immersion-cleaned while they are being mounted on a PC board. Some types of relays employ molding materials resistant to chemicals, and can be cleaned with thinner-based, chlorosene-based or trichlene-based solvents. Note that ultrasonic cleaning may have adverse effect on relay performance. If relays must be cleaned by this method, complete the clearing of the relays as quickly as possible.

Wide-ranging Applications From Power To Sequence Controls



■ FEATURES

- Designed small, 1-, 2- and 3-pole types break 5A loads and 4-pole type, 3A
- High reliability and long life
- Ultra high sinsitivity (AC: 1.2VA, DC: 0.9W) with quick response
- High variation/shock resistance
- Sealed type also available

■ AVAILABLE TYPES

Mounting style	Terminal	Contact form	Standard: Unsealed	Standard: Sealed	Bifurcated contact: Unsealed	Bifurcated contact: Sealed	Operation indicator self-contained	Test button self-contained	Arc barrier equipped	High capacity	High sensitivity	Standard approved
Standard bracket mounting	Solder	SPDT	MY1	–	–	–	MY1N	MY1I	–	–	–	–
		DPDT	MY2	–	MY2Z	–	MY2N	MY2I	–	MY2-Y	–	MY2-US
		3PDT	MY3	–	–	–	MY3N	MY3I	MY3-3	–	MYC3	MY3-US
		4PDT	MY4	MYQ4	MY4Z	MYQ4Z	MY4N	MY4I	MY4-3	–	–	MY4-US
	P.C.B	SPDT	MY1-02	–	–	–	–	–	–	–	–	–
		DPDT	MY2-02	–	MY2Z-02	–	–	–	–	–	–	MY2-02-US
		3PDT	MY3-02	–	–	–	–	–	–	–	–	MY3-02-US
		4PDT	MY4-02	MYQ4-02	MY4Z-02	MYQ4Z-02	–	–	–	–	–	MY4-02-US
Upper mounting bracket	Solder	SPDT	MY1F	–	–	–	–	–	–	–	–	–
		DPDT	MY2F	–	MY2ZF	–	–	–	–	–	–	MY2F-US
		3DPT	MY3F	–	–	–	–	–	–	–	–	MY3F-US
		4PDT	MY4F	–	MY4ZF	–	–	–	–	–	–	MY4F-US
Lower mounting bracket	Solder	SPDT	MY1S	–	–	–	–	–	–	–	–	–
		DPDT	MY2S	–	MY2ZS	–	–	–	–	–	–	MY2S-US
		3PDT	MY3S	–	–	–	–	–	–	–	–	MY3S-US
		4PDT	MY4S	–	MY4ZS	–	–	–	–	–	–	MY4S-US

NOTE: Add suffix code "-G" to each model number when the mounting stud equipped type is required (ex. MY4-G).

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (VA, W)
							% of rated voltage			
AC	6	234	200	11	0.04	0.08	80 max.	30 min.	110	Approx. 1.2
	12	117	100	41	0.14	0.27				
	24	58.5	50	180	0.56	1.06				
	50	28.1	24	695	2.78	4.88				
	100	14.1	12	3,160	13.80	22.50				
	110	11.7	10	3,830	13.80	29.80				
	120	12.9	11	3,830	13.80	29.80				
	200	9.4	8	10,100	36.20	62.20				
	220	6.5	5.5	15,700	51.00	110.30				
	240	7.2	6.1	15,700	51.00	110.30				
DC	6	150		40	0.17	0.33		10 min.		Approx. 0.9
	12	75		160	0.73	1.37				
	24	36.9		650	3.20	5.72				
	48	18.5		2,600	10.60	21.00				
	100	9.1		11,000	45.60	86.20				

NOTE: The rated current, coil resistance and inductance are measured at a coil temperature of 20°C with tolerances of ±15%, -20% for AC rated current and ±15% for DC rated current, and ±15% for rated coil resistance.

• CONTACT RATINGS

Type	Unsealed: SPDT, DPDT, 3PDT		Unsealed: 4PDT		Sealed: 4PDT	
Load / Item	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, =7msec)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, =7msec)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, =7msec)
Rated load	220 VAC 5A 24 VDC 5A	220 VAC 2A 24 VDC 2A	220 VAC 3A 24 VDC 3A	220 VAC 0.8A 24 VDC 1.5A	220 VAC 1A 24 VDC 1A	220 VAC 0.5A 24 VDC 0.5A
Carry current	5A		3A		1A	
Max. operating voltage	250 VAC, 125 VDC				250 VAC, 125 VDC	
Max. operating current	5A		3A		1A	
Max. switching capacity	1100VA 120W	440VA 48W	660VA 72W	176VA 36W	220VA 24W	110VA 12W
Minimum permissible load (ref. value)	5 VDC 1mA		1 VDC 1mA		1 VDC 1mA	

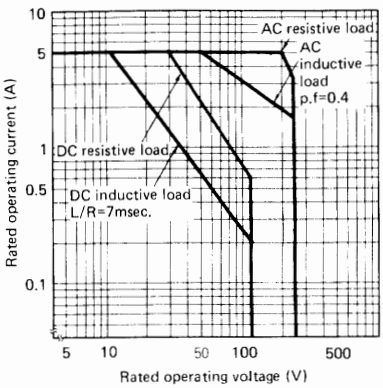
• CHARACTERISTICS

Contact resistance	50mΩ max.
Operate time	20msec max.
Release time	20msec max.
Operating frequency	Mechanically: 18,000 operations/hour Under rated load: 1,800 operations/hour
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000* VAC, 50/60Hz for 1 minute (1,000 VAC, 50/60Hz for 1 minute between non-continuous contacts)
Vibration	Mechanical durability: 10 to 55Hz; 1.0mm double amplitude Malfunction durability: 10 to 55Hz; 1.0mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 200m/sec² (approx. 20G's)
Ambient temperature	Operating: −10 to +60°C
Humidity	45 to 85% RH
Service life	Mechanically: AC: 50,000,000 operations min. (at operating frequency of 18,000 operations/hour) DC: 100,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 35g

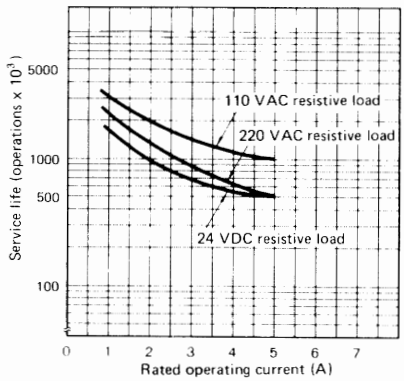
NOTES: 1. The data shown above are of initial value.
2. * 1,500 VAC for the sealed type relay.

• CHARACTERISTIC DATA

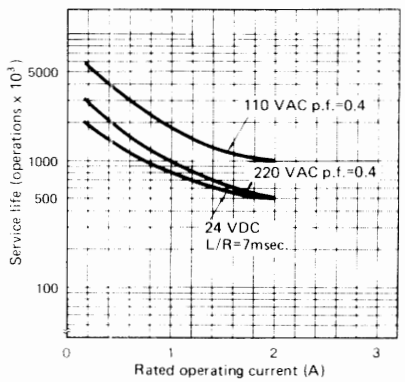
Max. switching capacity
MY1, MY2, MY3



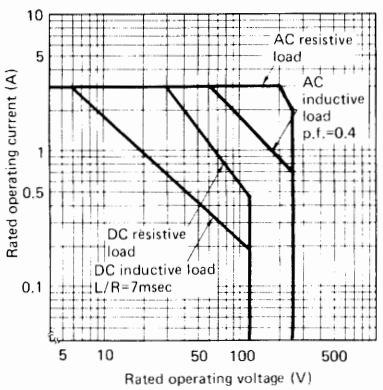
Electrical service life (Resistive load)
MY1, MY2, MY3



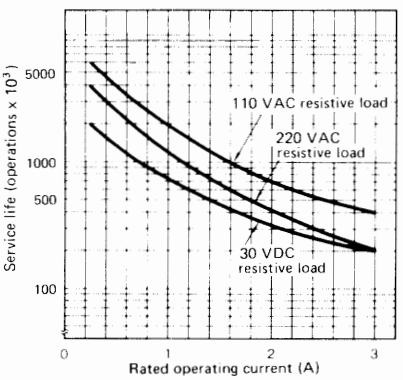
Electrical service life (Inductive load)
MY1, MY2, MY3



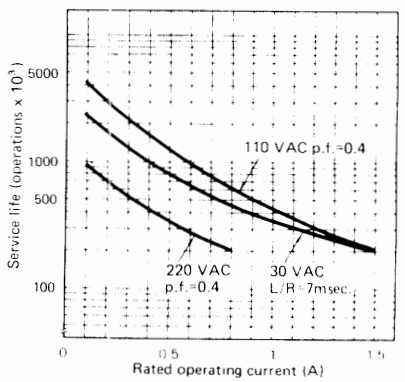
MY4



MY4



MY4

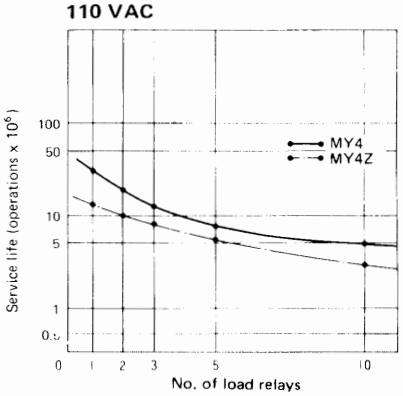


Self-coil load service life

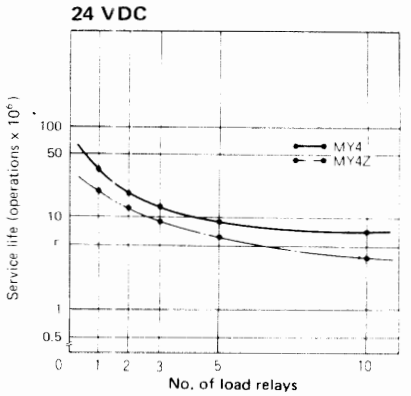
(Unit: mA)

No. of load relays / Rated voltage	1	2	3	5	10
110 VAC	12	24	36	60	120
24 VDC	36.9	73.8	110.7	184.5	369.0

110 VAC

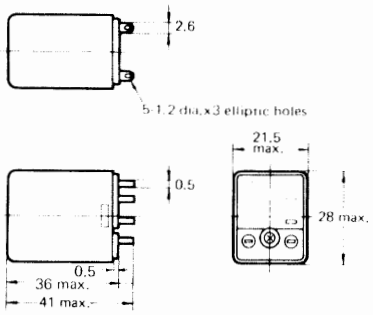


24 VDC

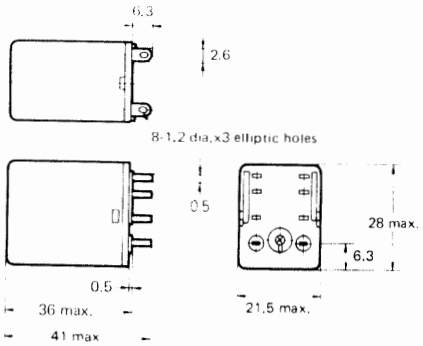


■ DIMENSIONS

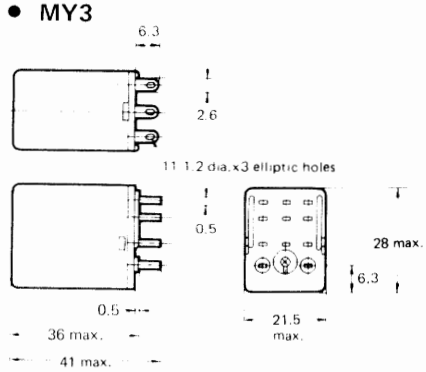
• MY1



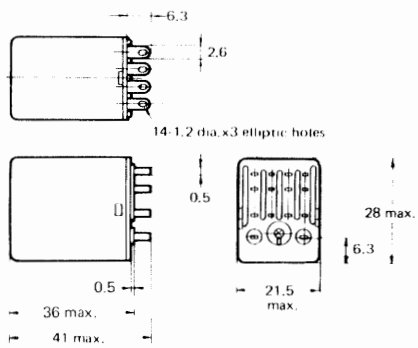
• MY2



• MY3

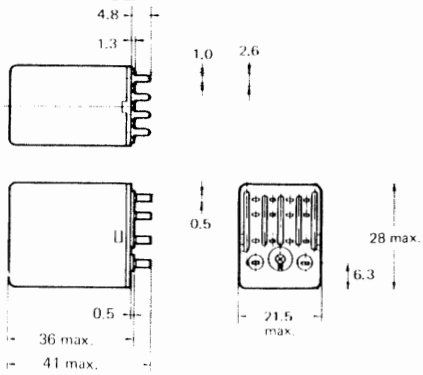


• MY4



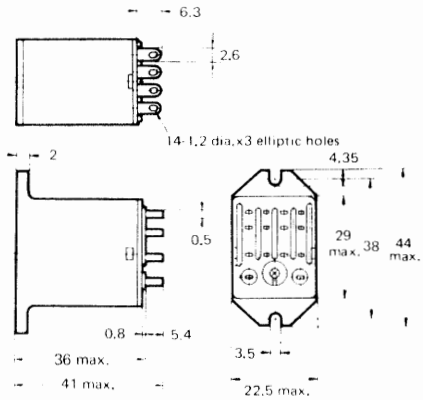
NOTE: When mounting MY1, MY2, MY3 or MY4, use the connecting socket shown in ACCESSORIES.

• MY□-02



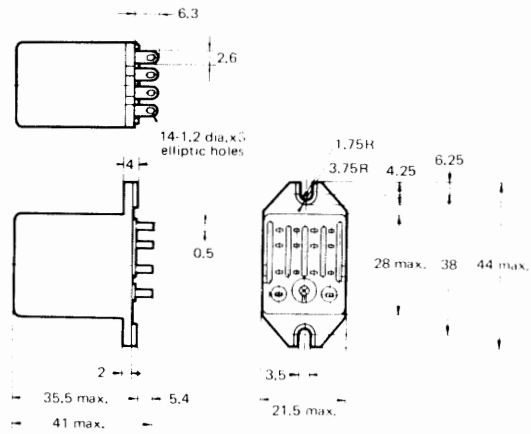
NOTE: The above dimensioned drawing shows the 4-pole type. The dimensions of the 1-, 2- and 3-pole types are identical to the 4-pole type.

• MY□F



NOTE: The above dimensioned drawing shows the 4-pole type. The dimensions of the 1-, 2- and 3-pole types are identical to the 4-pole type.

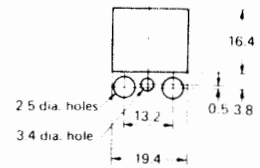
• MY□S



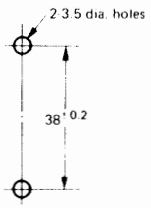
NOTE: The above dimensioned drawing shows the 4-pole type. The dimensions of the 1-, 2- and 3-pole types are identical to the 4-pole type.

Mounting holes

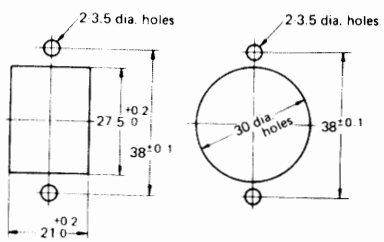
MY4□-G with mounting stud



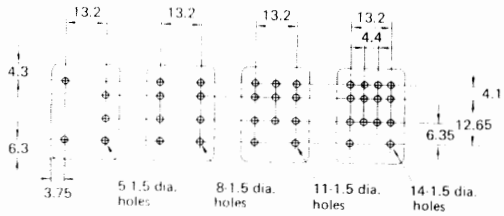
MY□F



MY□S



MY□-02



1-pole 2-pole 3-pole 4-pole

Terminal arrangement (Bottom view)

MY1 MY2 MY3 MY4

OPERATION INDICATOR SELF-CONTAINED TYPE

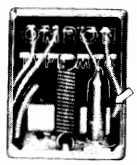
■ SPECIFICATIONS

Same as the Standard Type with the following exceptions.

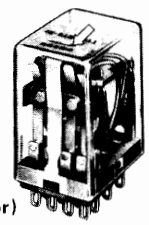
• COIL RATINGS

6, 12, 24, 50 VAC	LED indicator
6, 12, 24, 48 VDC	
100, 110, 120, 200, 220 and 240 VAC	Neon lamp indicator
100 VDC	

With the LED indicator type, the rated current is approximately 10mA higher than the Standard Type.



MY□N
(with operation indicator lamp)



MY4N2
(with mechanical operation indicator)

• CHARACTERISTICS

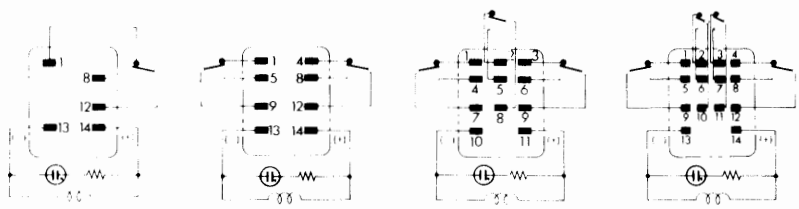
Dielectric strenth	1,500VAC, 50/60Hz for 1min.

■ DIMENSIONS

Same as the Standard Type with the following exceptions.

Terminal arrangement (Bottom view)

MY1N MY2N MY3N MY4N

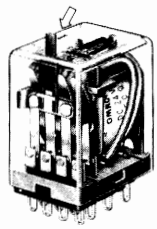


NOTE: The above terminal arrangements apply to the neon lamp indicator type.

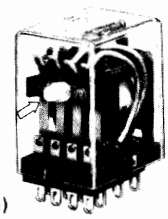
TEST BUTTON SELF-CONTAINED TYPE

■ SPECIFICATIONS

Same as the Standard Type.



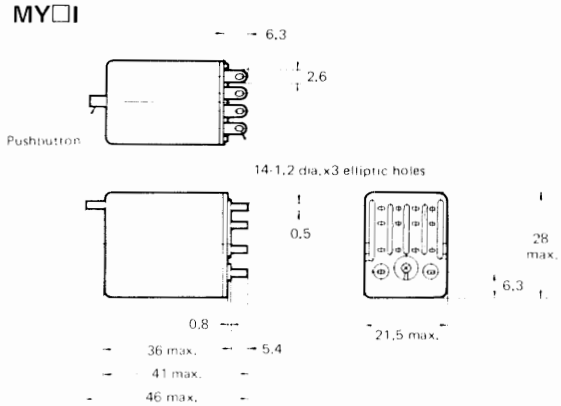
MY□I
(with built-in test button on the top of the case)



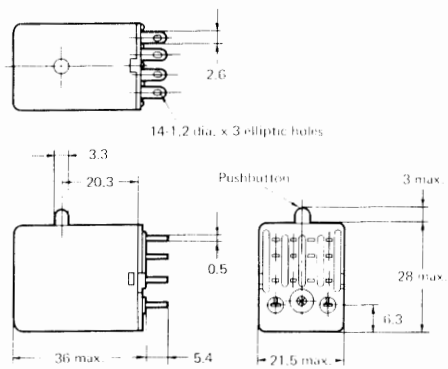
MY□I2
(with built-in test button on the front part of the case)

■ DIMENSIONS

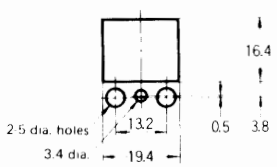
MY□I



MY□I2



Mounting holes



HIGH SENSITIVITY TYPE

■ SPECIFICATIONS

Same as the Stnadard Type with the following exceptions.

• COIL RATINGS

Power rating				
Rated voltage	Rated current	Coil resistance	Max. voltage	Power consumption
24 VDC	36.9mA	650Ω	110% of rated voltage	900mW

NOTE: Rated coil current and coil resistance are measured at a coil temperature of 20°C.

Input rating			
Input voltage range	Operate voltage	Release voltage	Power consumption
2 to 12V	2V max.	1V min.	0.5 to 52mW

NOTE: Operate and release voltages are measured with the rated voltage applied to the power supply.

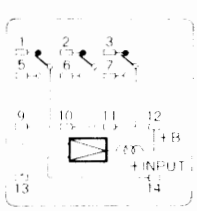
• CONTACT RATINGS

Item \ Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	220 VAC 3A 24 VDC 3A	220 VAC 0.8A 24 VDC 1.5A
Carry current	3A	
Max. operating voltage	250 VAC 125 VDC	
Max. operating current	3A	
Max. switching capacity	660VA 72W	176VA 36W
Minimum permissible load (ref. value)	1 VDC 1mA	

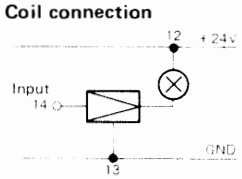
■ DIMENSIONS

Same as the Standard Type with the following exceptions.

• CONNECTION



Coil connection



• CHARACTERISTICS

Service life	Mechanically: 100,000,000 operations min. Electrically: 200,000 operations min. (under rated load)

HIGH CAPACITY TYPE

■ SPECIFICATIONS

Same as the Standard Type with the following exception.

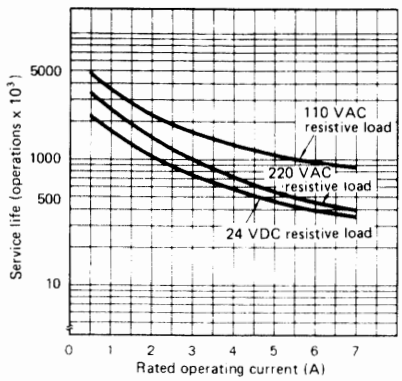
• CONTACT RATINGS

Item \ Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R =7msec)
Rated load	220 VAC 7A 24 VDC 7A	220 VAC 3.5A 24 VDC 3.5A
Carry current	7A	
Max. operating voltage	250 VAC; 125 VDC	
Min. operating current	7A	
Max. switching capacity	1,540VA 168W	770VA 84W

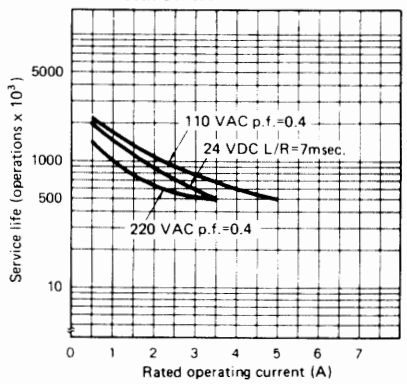
• CHARACTERISTIC DATA

MY2-Y

Electrical service life



Electrical service life

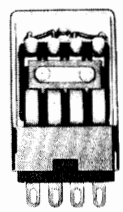


ARC BARRIER EQUIPPED TYPE

MY□-3 incorporates an arc barrier which serves to prevent shorts due to arcing and to permit use in circuits where the relay may be subject to potential differences developed between two juxtaposed contacts.

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type.



Arc barrier equipped type

STANDARD APPROVED TYPE

When placing your order for UL, CSA and SEV approved versions, please indicate "UL," "CSA" or "SEV" as desired in addition to the model number.

■ SPECIFICATIONS /DIMENSIONS

Same as the Standard Type with the following exceptions.

• RATINGS

UL recognized type (File No. E41515)

Type	Contact form	Coil ratings	Contact ratings
MY	DPDT 3PDT	6 to 240 VAC 6 to 120 VDC	5A 120 VAC/28 VDC (resistive load) 5A 240 VAC (inductive load)
	4PDT		3A 120 VAC (inductive load) 1.5A 240 VAC (inductive load) 3A 28 VDC (resistive load) 0.2A 120 VDC (resistive load)

SEV listed type [File No. D7 91/63 (2- & 4-pole), D7 91/91 (3-pole)]

Type	Contact form	Coil ratings	Contact ratings
MY	DPDT 3PDT 4PDT	6 to 220 VAC 6 to 110 VDC	3A 110 VAC 1.5A 250 VAC 3A 30 VDC (resistive load)

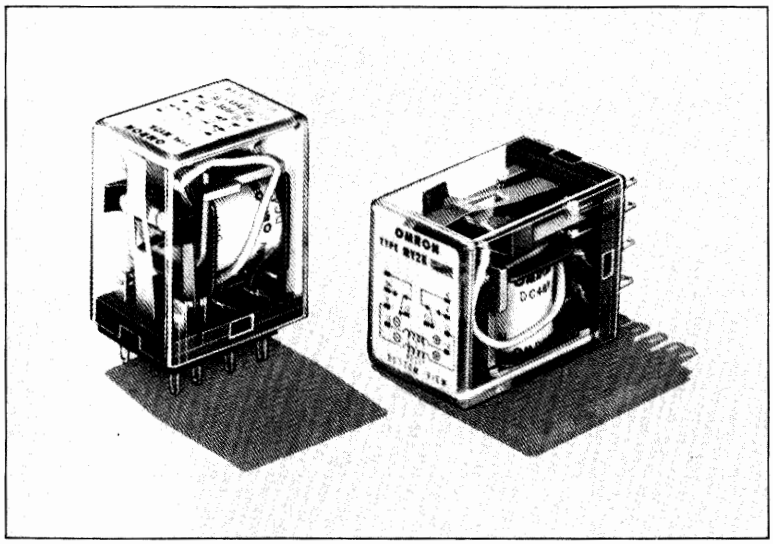
Lloyd listed type (File No. KOB-204524)

Type	Contact form	Coil ratings	Contact ratings
MY	DPDT	6 to 240 VAC 6 to 120 VDC	2A 200 VAC (inductive load) 2A 30 VDC (resistive load)
	4PDT		1.5A 115 VAC, 0.8A 200 VAC (inductive load) 1.5A 30 VDC (resistive load)

CSA certified type (File No. LR31928)

Type	Contact form	Coil ratings	Contact ratings
MY	DPDT 3PDT	6 to 240 VAC 6 to 120 VAC	5A 240 VAC (inductive load) 5A 28 VDC (resistive load)
	4PDT		3A 240 VAC (inductive load) 3A 28 VDC (resistive load)

Magnetic Latching Relay Ideal for Memory Circuit



■ FEATURES

- Changes due to aging are negligible, because of use of special magnetic materials, thus ensuring long continuous holding time
- Little change in characteristics such as contact follow, contact pressure, etc. and long life
- High vibration and shock resistance
- Built-in operation indicator for easy relay operation monitoring

■ AVAILABLE TYPES

Terminal / Contact form	Plug-in	P.C.B.
DPDT	MY2K	MY2K-02

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage (V)		Set coil: Rated current (mA) 50Hz	Set coil: Rated current (mA) 60Hz	Set coil: Coil resistance (Ω)	Set coil: Coil inductance (ref. value) (H) Armature OFF	Reset coil: Rated current (mA) 50Hz	Reset coil: Rated current (mA) 60Hz	Reset coil: Coil resistance (Ω)	Reset coil: Coil inductance (ref. value) (H) Armature ON	Must set voltage (% of rated voltage)	Must reset voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA, W) Set coil	Power consumption (VA, W) Reset coil
AC	6	146	142	13		68		32		80 max.	80 max.	110 max.	Approx. 0.6 to 0.9	Approx. 0.2 to 0.5
	12	57	56	72		39		130						
	24	27.4	26.4	320		18.6		550						
	50	14	13.4	1,400	–	3.5		3,000	–					
	100	7.1	6.9	5,400		3.5		3,000						
	110	7.8	7.6	5,400		3.8		3,000						
	120	5.8	5.6	8,300		3.5		3,000						
DC	6	230		26		100		60					Approx. 1.3	Approx. 0.6
	12	110		110	–	50		235	–					
	24	52		470		25		940						

NOTES: 1. The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of +15%, −20% for AC rated current and ±15% for DC rated current, and ±15% for rated coil resistance.
2. The rated current and performance characteristics are measured at a coil temperature of 5 to 35°C.

• CONTACT RATINGS

Load / Item	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	220 VAC 3A 24 VDC 3A	220 VAC 0.8A 24 VDC 1.5A
Carry current	3A	
Max. operating voltage	250 VAC 125 VDC	
Max. operating current	3A	3A
Max. switching capacity	660VA, 72W	180VA, 36W
Minimum permissible load (reference value)	1 VDC 1mA	

• CHARACTERISTICS

Contact resistance	50mΩ max.
Operate (Set) time	AC: 30msec max. DC: 15msec max.
Release (Reset) time	AC: 30msec max. DC: 15msec max.
Operating frequency	Mechanically: 18,000 operations/hour Under rated load: 1,800 operations/hour
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	1,500 VAC, 50/60Hz for 1 minute (1,000 VAC between non-continuous contacts, and between set and reset coils)
Vibration	Mechanical durability: 10 to 55Hz; 1.0mm double amplitude Malfunction durability: 10 to 55Hz; 1.0mm double amplitude
Shock	Mechanical durability: 1,000m/s² (approx. 100G's) Malfunction durability: 200m/s² (approx. 20G's)
Ambient temperature	Operating: −10 to +40°C
Humidity	45 to 85% RH
Service life	Mechanically: 100,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 30g

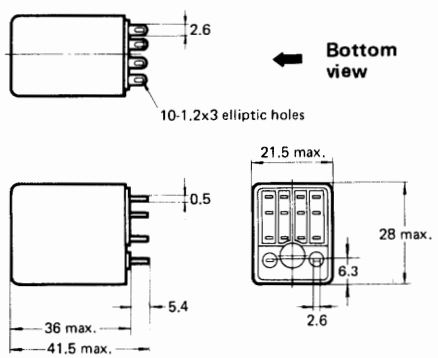
NOTE: The data shown above are of initial value.

• CHARACTERISTIC DATA

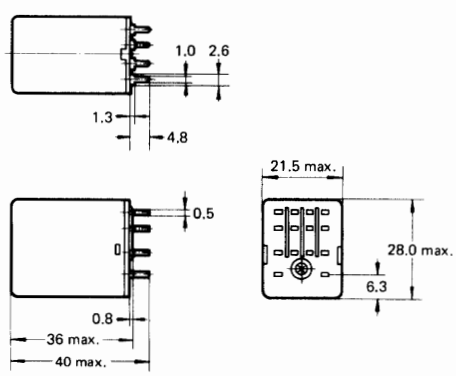
Same as the Standard Type.

■ DIMENSIONS

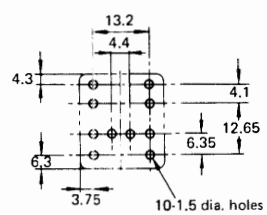
MY2K



MY2K-02



Mounting holes

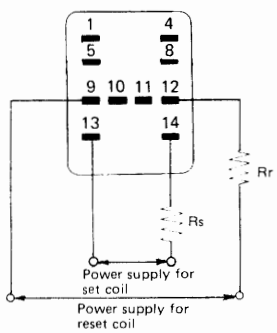


■ ACCESSORY

Same as the Standard Type.

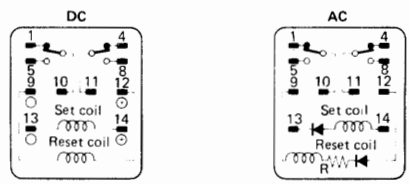
■ HINTS ON CORRECT USE

When using the relay rated at 100 or 120 VAC at a supply voltage of 200 or 240 VAC, be sure to connect external resistors Rs and Rr to the relay.



	110V	120V
Rs:	7kΩ 1.5W	10kΩ 1.5W
Rr:	14kΩ 1W	17kΩ 1W

Terminal arrangement/Internal connection (Bottom view)



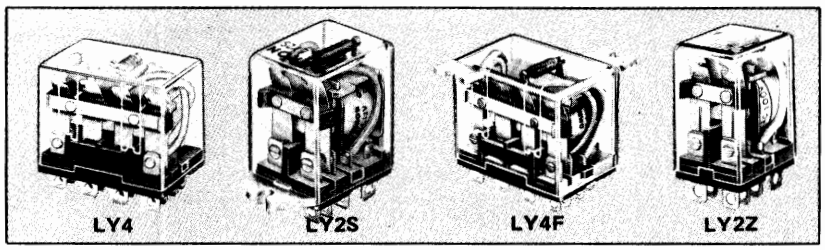
NOTES:
1. R is a resistor for ampere-turn compensation, and is incorporated in the relays rated at 50 VAC or above.
2. Pay attention to the polarity of the set and reset coils, as incorrect connection of positive and negative terminals will result in malfunctioning of the relay.

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

GENERAL-PURPOSE RELAY

Model LY

Small, General-purpose 10A Relay For Various Applications



■ FEATURES

- High vibration and shock resistance
- High contact deposition resistance with silver cadmium (Ag-CdO) contacts
- Arc barrier equipped for interpole arcing prevention
- High dielectric strength (2,000 VAC) with armature insulation base and terminal base made of diallylphtalate resin

■ AVAILABLE TYPES

Mounting style	Terminal	Contact form \ Type	Standard	Bifurcated contact	Operation indicator self-contained	Test button self-contained	Standard approved
Standard bracket mounting	Solder	SPDT	LY1	–	LY1N	LY1I2	LY1-US
		DPDT	LY2	LY2Z	LY2N	LY2I2	LY2-US
		3PDT	LY3	–	LY3N	LY3I2	LY3-US
		4PDT	LY4	LY4Z	LY4N	LY4I2	LY4-US
	P.C.B.	SPDT	LY1-0	–	–	–	LY1-0-US
		DPDT	LY2-0	LY2Z-0	–	–	LY2-0-US
		3PDT	LY3-0	–	–	–	LY3-0-US
		4PDT	LY4-0	LY4Z-0	–	–	LY4-0-US
Upper mounting bracket	Solder	SPDT	LY1F	–	–	–	LY1F-US
		DPDT	LY2F	LY2ZF	–	–	LY2F-US
		3PDT	LY3F	–	–	–	LY3F-US
		4PDT	LY4F	LY4ZF	–	–	LY4F-US
Lower mounting bracket	Solder	SPDT	LY1S	–	–	–	LY1S-US
		DPDT	LY2S	LY2ZS	–	–	LY2S-US
		3PDT	LY3S	–	–	–	LY3S-US
		4PDT	LY4S	LY4ZS	–	–	LY4S-US

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage (V)		Rated current (mA) SPDT,DPDT 50Hz	SPDT,DPDT 60Hz	3PDT 50Hz	3PDT 60Hz	4PDT 50Hz	4PDT 60Hz	Coil resistance (Ω) SPDT, DPDT	3PDT	4PDT	Coil inductance (ref. value) (H) SPDT,DPDT Armature OFF	SPDT,DPDT Armature ON	3PDT Armature OFF	3PDT Armature ON	4PDT Armature OFF	4PDT Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA, W) SPDT, DPDT	3PDT	4PDT
AC	6	234	200	310	270	386	330	10.5	6.7	5	0.04	0.08	0.03	0.05	0.02	0.04	85 max.	30 min.	110	Approx. 1.2	Approx. 1.6	Approx. 1.95
	12	117	100	159	134	199	170	41	24	20	0.14	0.27	0.12	0.21	0.10	0.17						
	24	58.5	50	80	67	93.6	80	180	100	78	0.56	1.06	0.44	0.79	0.38	0.67						
	50	28.0	24	38	33	46.8	40	695	410	350	2.78	4.88	2.24	3.87	1.74	2.88						
	100	14.1	12	19.6	16.9	23.4	20	3,160	1,720	1,600	13.3	22.5	8.4	14.1	7.68	13.2						
	110	11.7	10	16	13.6	19.6	16.8	3,830	2,300	2,200	13.8	29.8	11	20.1	9.3	19						
	120	12.9	11	17.3	14.8	19.0	16.4	3,830	2,300	2,200	13.8	29.8	11	20.1	9.3	19						
	200	9.4	8	9.5	8.3	11.7	10	10,100	6,800	6,500	36.2	62.2	31.8	53.9	30.2	51.1						
	220	6.5	5.5	9.9	8.5	10.6	9.1	10,100	8,650	6,900	51.0	110.3	33.4	63.7	31	60.8						
	240	7.2	6.1	9.4	8	11.0	9.5	16,000	10,400	9,000	51.0	110.3	38.6	74.6	33.2	63.4						
DC	6	150		234		240		40	25.7	25	0.16	0.33	0.11	0.21	0.09	0.21		10 min.		Approx. 0.9	Approx. 1.4	Approx. 1.5
	12	75		112		120		160	107	100	0.73	1.37	0.45	0.98	0.39	0.84						
	24	36.9		58.6		69		650	410	350	3.20	5.72	1.89	3.87	1.41	2.91						
	48	18.5		28.2		30		2,600	1,700	1,600	10.6	21.0	8.53	13.9	6.39	13.6						
	100	9.1		14.7		15		11,000	6,800	6,900	45.6	86.2	29.6	54.3	32	63.7						

NOTE: The rated current, coil resistance and inductance are measured at coil temperature of 20°C with tolerances of +15%, −20% for AC rated current and ±15% for DC rated current, and ±15% for rated coil resistance.

• CONTACT RATINGS

Item \ Type	SPDT Resistive load (p.f.=1)	SPDT Inductive load (p.f.=0.4, L/R=7ms.)	DPDT, 3PDT, 4PDT Resistive load (p.f.=1)	DPDT, 3PDT, 4PDT Inductive load (p.f.=0.4, L/R=7ms.)
Rated load	110 VAC 15A 24 VDC 15A	110 VAC 10A 24 VDC 7A	110 VAC 10A 24 VDC 10A	110 VAC 7.5A 24 VDC 5A
Carry current	15A		10A	
Max. operating voltage	250 VAC 125 VDC			
Max. operating current	15A		10A	
Max. switching capacity	1,700VA 360W	1,100VA 170W	1,100VA 240W	830VA 120W
Minimum permissible load (ref. value)	5 VDC 100mA			

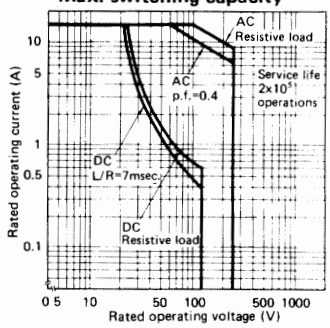
• CHARACTERISTICS

Contact resistance	50mΩ max.
Operate time	25msec. max.
Release time	25msec. max.
Operating frequency	Mechanically: 18,000 operations/hour Under rated load: 1,800 operations/hour
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (1,000 VAC, 50/60Hz for 1 minute between non-continuous contacts)
Vibration	Mechanical durability: 10 to 55Hz; 1.0mm double amplitude Malfunction durability: 10 to 55Hz; 1.0mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (Approx. 100G's) Malfunction durability: 200m/sec² (Approx. 20G's)
Ambient temperature	Operating: −5 to 40°C
Humidity	45 to 85% RH
Service life	Mechanically: AC: 50,000,000 operations min. (at operating frequency of 18,000 operations/hour) DC: 100,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	SPDT, DPDT: Approx. 40g, 3PDT: Approx. 50g, 4PDT: Approx. 70g

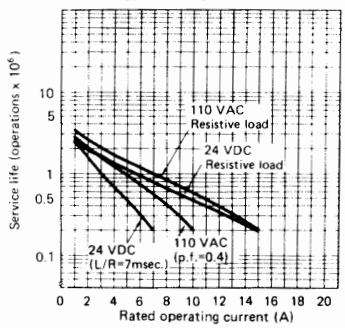
NOTE: The data shown above are of initial value.

• CHARACTERISTIC DATA

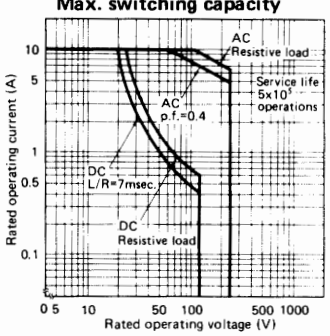
LY1 Max. switching capacity



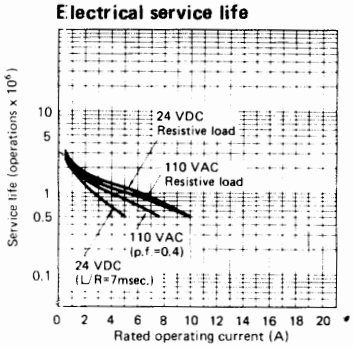
Electrical service life



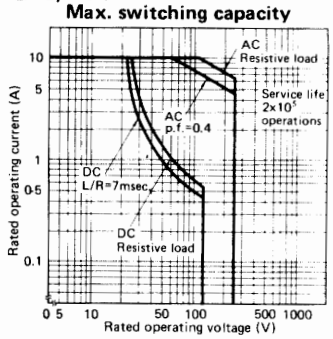
LY2 Max. switching capacity



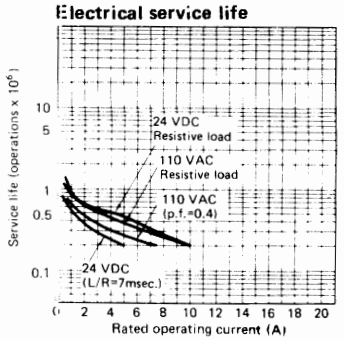
Electrical service life



LY3, LY4 Max. switching capacity

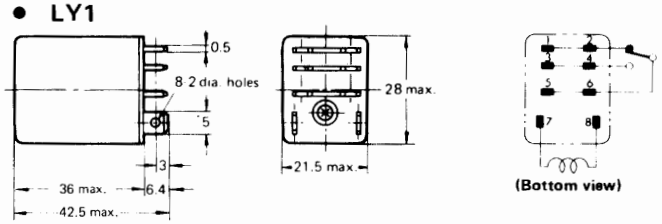


Electrical service life

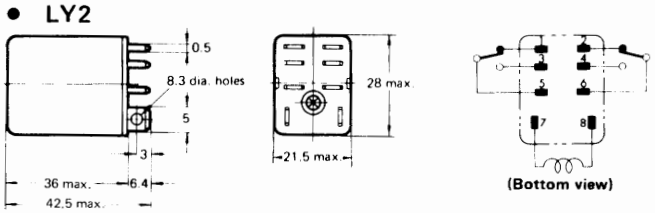


■ DIMENSIONS

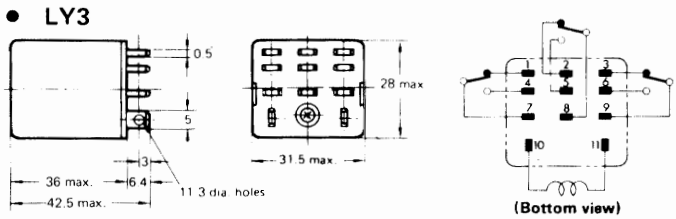
• LY1



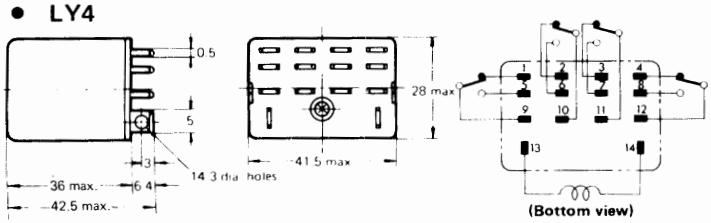
• LY2



• LY3

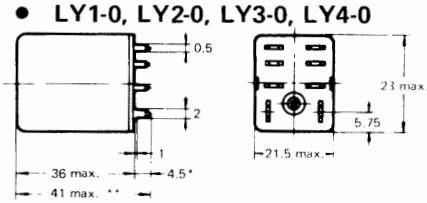


• LY4



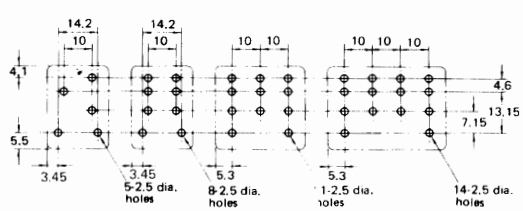
NOTE: When mounting LY1, LY2, LY3 or LY4, use the connecting socket shown in ACCESSORIES.

• LY1-0, LY2-0, LY3-0, LY4-0



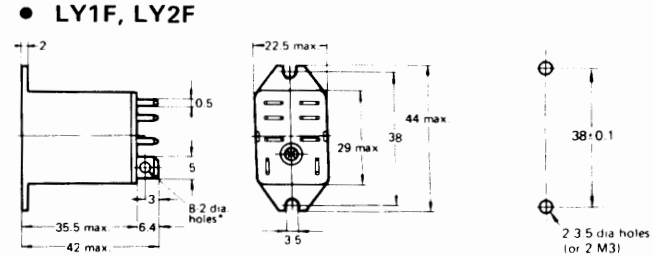
NOTE: The above drawing shows LY2-0. With LY1-0, dimension * should read as 6.4 and dimension **, 42.

Mounting holes (Bottom view) for LY1-0, LY2-0 , LY3-0, LY4-0



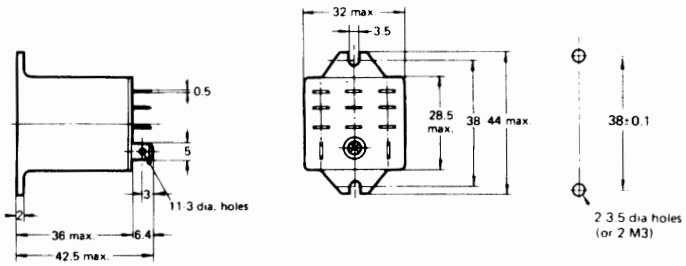
1-pole 2-pole 3-pole 4-pole

• LY1F, LY2F

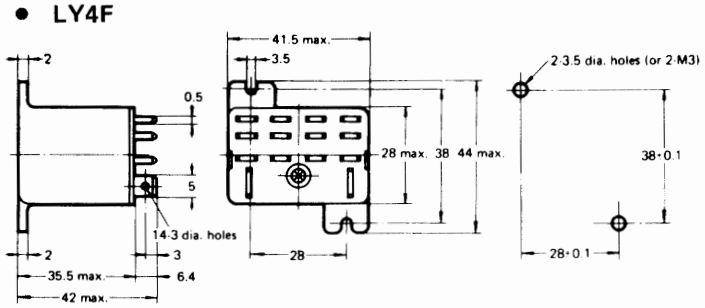


NOTE: The above drawing shows LY1F. With LY2F, dimension * should read as 8.3 dia. holes.

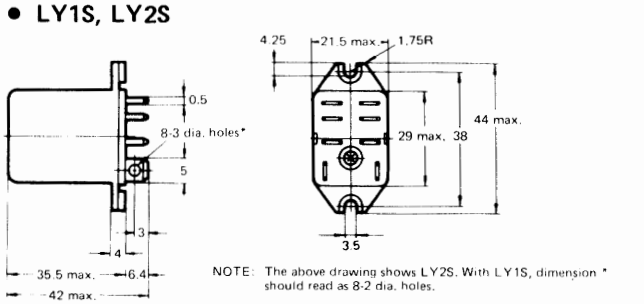
• LY3F

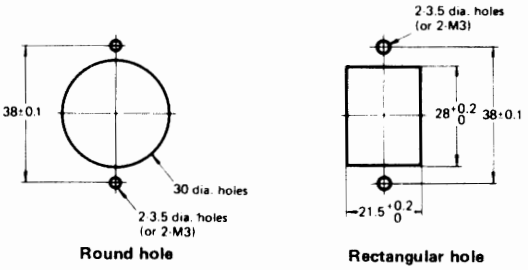


• LY4F

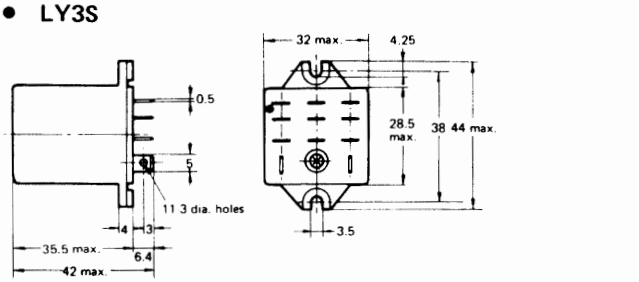


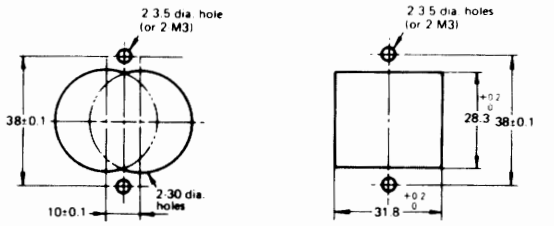
• LY1S, LY2S



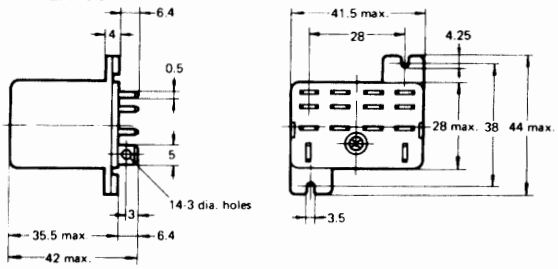


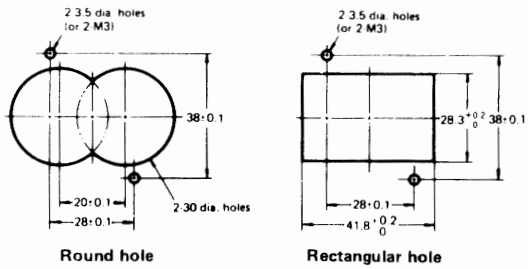
• LY3S





• LY4S





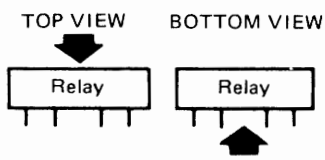
■ ACCESSORIES (Available on request)

• CONNECTING SOCKETS

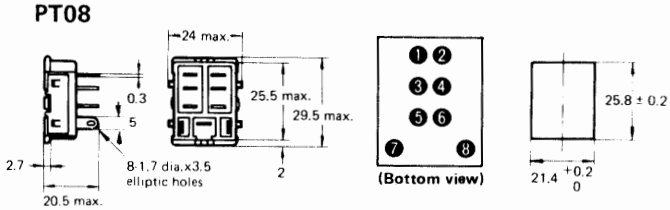
Available types

Relay \ Sockets	Track mounted socket*	Back connecting socket		
		Solder terminal	Wire-wrap terminal	P.C. terminal
SPDT, DPDT	PTF08A	PT08	PT08QN	PT08-0
3PDT	PTF11A	PT11	PT11QN	PT11-0
4PDT	PTF14A	PT14	PT14QN	PT14-0

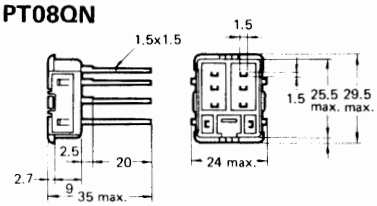
NOTE: Track mounted socket can be used as a front connecting socket.



PT08

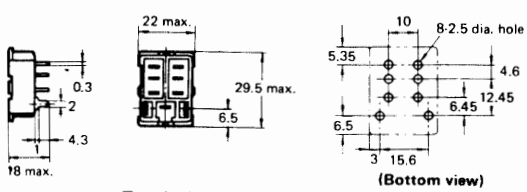


PT08QN



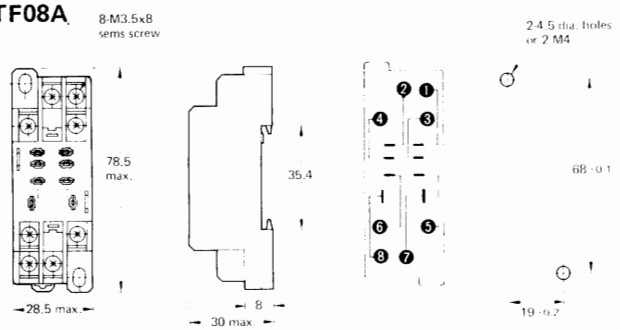
Panel cut-out and terminal arrangement are the same as the Type PT08.

PT08-0

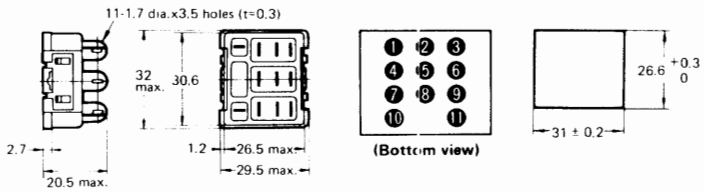


Terminal arrangement is the same as the Type PT08.

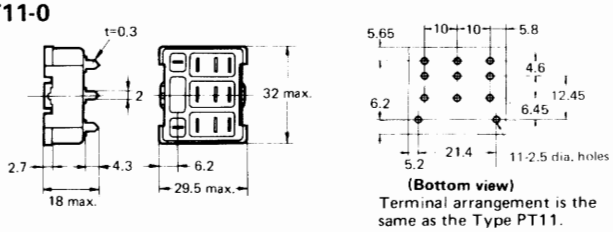
PTF08A



PT11

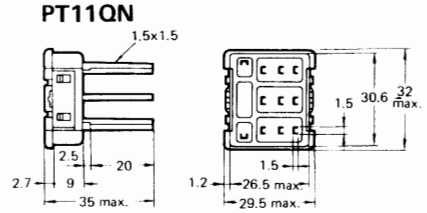


PT11-0



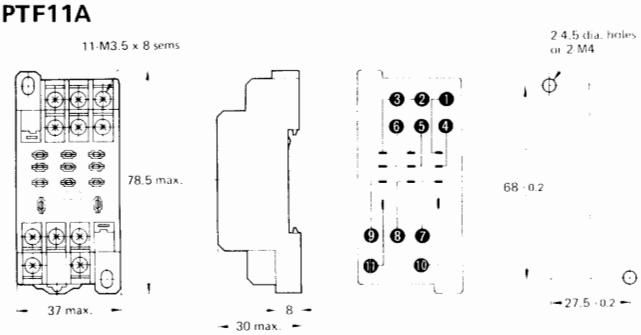
Terminal arrangement is the same as the Type PT11.

PT11QN

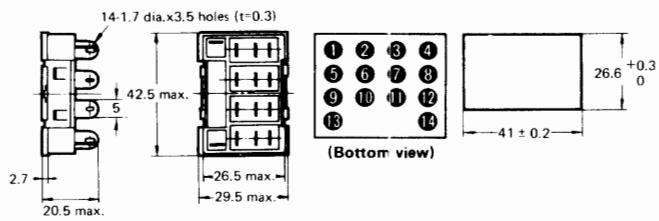


Panel cut-out and terminal arrangement are the same as the Type PT11.

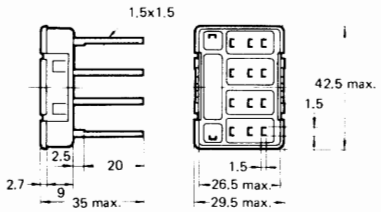
PTF11A



PT14

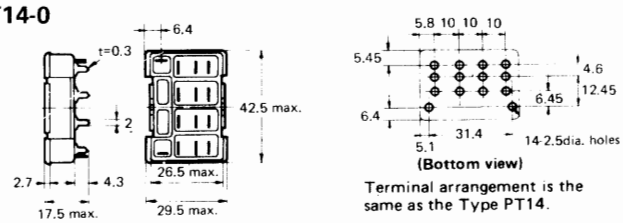


PT14QN



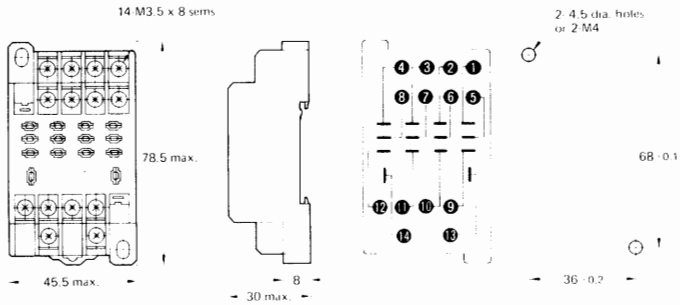
Panel cut-out and terminal arrangement are the same as the Type PT14.

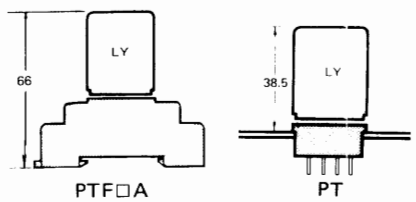
PT14-0



Terminal arrangement is the same as the Type PT14.

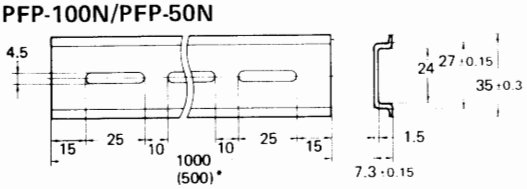
PTF14A





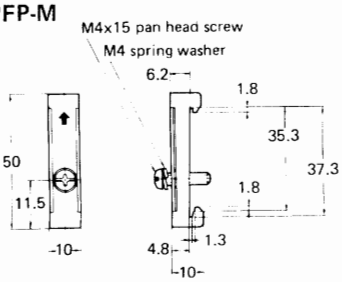
• SOCKET MOUNTING TRACK/END PLATE (for PTF□A)

PFP-100N/PFP-50N



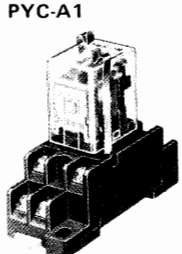
NOTE: * This dimension applies to Type PFP-50N.

PFP-M



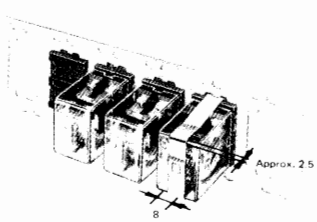
• RELAY HOLD-DOWN CLIPS

PYC-A1

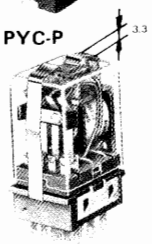


PYC-S

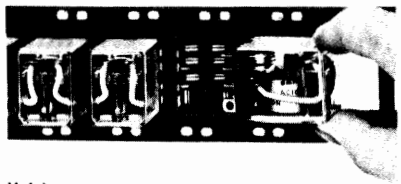
(Applicable to Types PYP-1 and PYP-18 socket mounting plates only.)



PYC-P



• SOCKET MOUNTING PLATES (t =1.6)

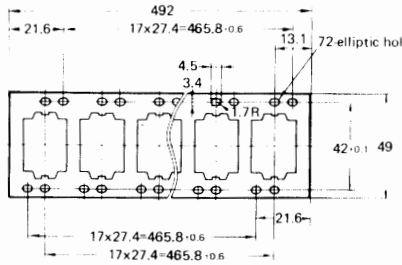


Available types

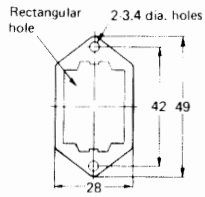
Type of socket \ No. of sockets	1	10	12	18
PT08 PT08QN	PYP-1	—	—	PYP-18
PT11 PT11QN	PTP-1-3	—	PTP-12	—
PT14 PT14QN	PTP-1	PTP-10	—	—

NOTE: The Types PYP-18, PTP-12 and PTP-10 may be cut to any desired length.

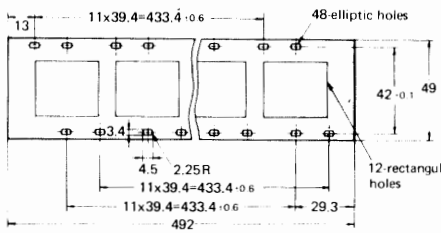
PYP-18



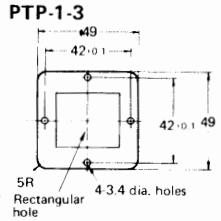
PYP-1



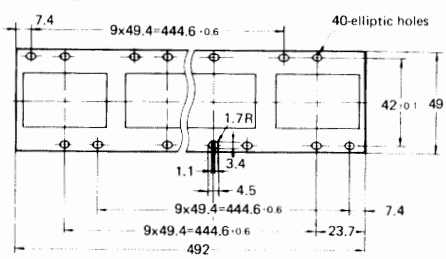
PTP-12



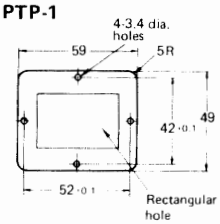
PTP-1-3



PTP-10



PTP-1



BIFURCATED CONTACT TYPE

■ SPECIFICATIONS

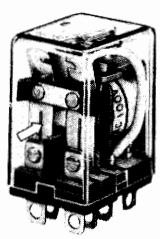
Same as the Standard Type with the following exceptions.

• CONTACT RATINGS

Item \ Type	DPDT, 4PDT	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7ms.)
Rated load	110 VAC 5A 24 VDC 5A	110 VAC 4A 24 VDC 4A
Carry current	7A	
Max. operating voltage	250 VAC 125 VDC	
Max. operating current	7A	
Max. switching capacity	550VA 120W	440VA 100W
Minimum applicable load	1 VDC 10mA (ref. value)	

• CHARACTERISTICS

Service life	Mechanically: Same as the Standard Type. Electrically: See "CHARACTERISTIC DATA."

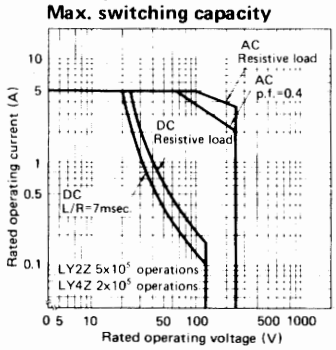


LY□Z

• CHARACTERISTIC DATA

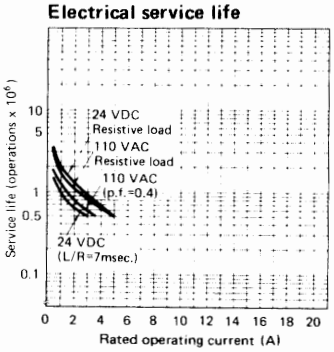
LY2Z, LY4Z

Max. switching capacity



LY2Z

Electrical service life



■ DIMENSIONS

Same as the Standard Type.

OPERATION INDICATOR SELF-CONTAINED TYPE

■ SPECIFICATIONS

Same as the Standard Type with the following exception.

• COIL RATINGS

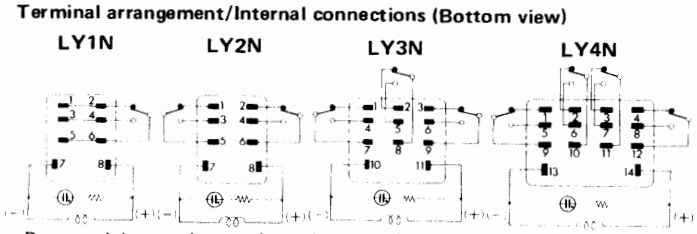
6, 12, 24, 50 VAC 6, 12, 24, 48 VDC	LED indicator
100, 110, 120, 200, 220, 240 VAC 100 VDC	Neon lamp indicator

With the LED indicator type, the rated current is approximately 5mA higher than the Standard Type.

■ DIMENSIONS

Same as the Standard Type with the following exceptions.

Terminal arrangement/Internal connections (Bottom view)



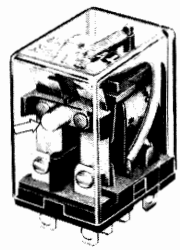
Pay special attention to the polarities when the DC type is used.

LY□N

TEST BUTTON SELF-CONTAINED TYPE

■ SPECIFICATIONS

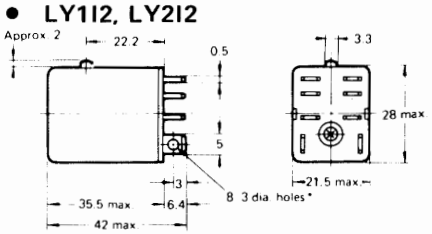
Same as the Standard Type.



LY□I2

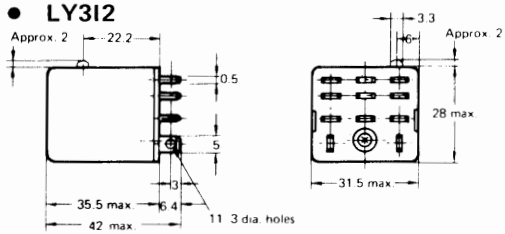
■ DIMENSIONS (The terminal arrangement and internal connection are the same as the Standard Type.)

● **LY1I2, LY2I2**

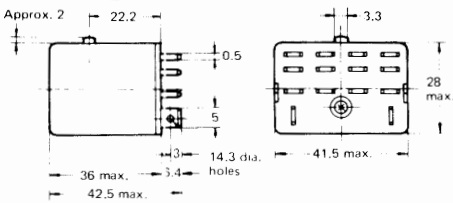


NOTE: Type LY1I2 has the same dimensions and appearance as Type LY2I2 shown above, except that dimension * is 2 dia.

● **LY3I2**



● **LY4I2**



STANDARD APPROVED TYPE

When placing your order for standard approved versions, please indicate "UL," "CSA," etc. as desired in addition to the model number.

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exceptions.

● RATINGS

UL recognized type (File No. E41515)

Type	Contact form	Coil ratings	Contact ratings
LY	SPDT	6 to 240 VAC 6 to 120 VDC	15A 240 VAC (inductive load) 15A 28 VDC (resistive load) TV-5
	DPDT		12A 240 VAC (inductive load) 10A 28 VDC (resistive load) TV-3
	3PDT 4PDT		10A 240 VAC (inductive load) 10A 28 VDC (resistive load)

CSA certified type (File No. LR31928)

Type	Contact form	Coil ratings	Contact ratings
LY	SPDT	6 to 240 VAC 6 to 120 VDC	10A 240 VAC (inductive load) 15A 28 VDC (resistive load) TV-5
	DPDT		13A 28 VDC (resistive load) 10A 240 VDC (inductive load) 1/3 HP 120 VAC (motor load)
	3PDT 4PDT		10A 240 VAC (inductive load) 10A 28 VDC (resistive load)

VDE approved type [File No. 9903 (SPDT, DPDT & 3PDT), File No. 9947 (4PDT)]

Type	Contact form	Coil ratings	Contact ratings
LY	SPDT DPDT 3PDT	6, 12, 24, 50, 110 and 220 VAC and 6, 12, 24, 48 and 110 VDC	10A 220 VAC (resistive load) 10A 28 VDC (resistive load) 7A 220 VAC (inductive load) 7A 28 VDC (inductive load)
	4PDT		7A 220 VAC (resistive load) 7A 28 VDC (resistive load) 4A 220 VAC (inductive load) 4A 28 VDC (inductive load)

SEV listed type [File No. D7 91/82 (2- & 4-pole), D 91/204a (1- & 3-pole)]

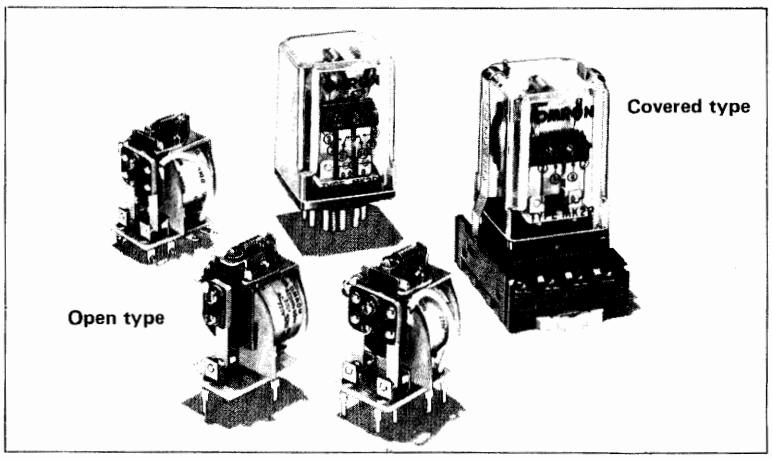
Type	Contact form	Coil ratings	Contact ratings
LY	SPDT	6 to 220 VAC 6 to 100 VDC	15A 220 VAC (resistive load) 15A 24 VDC (resistive load)
	DPDT 3PDT 4PDT		10A 220 VAC (resistive load) 10A 24 VDC (resistive load)

Lloyd listed type (File No. KOB-204523)

Type	Contact form	Coil ratings	Contact ratings
LY	DPDT 4PDT	6 to 240 VAC 6 to 110 VAC	7.5A 230 VAC (inductive load) 5A 24 VDC (resistive load)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Best-selling Power Relay



■ FEATURES

- Breaks relatively large load currents despite small size
- Built-in operation indicator for easy relay operation monitoring
- Long life (5,000,000 mechanical operations min.)

■ AVAILABLE TYPES

Construction	Terminal	Contact form	Standard	Bifurcated contact	Operation indicator self-contained	Arc barrier equipped	Standard approved
Open type	Solder	SPDT	MK1	–	–	–	–
		DPDT	MK2	–	–	–	–
		3PDT	MK3	–	–	–	–
	P.C.B	SPDT	MK1-0	–	–	–	–
		DPDT	MK2-0	–	–	–	–
		3PDT	MK3-0	–	–	–	–
Covered type	Plug-in	DPDT	MK2P*	MK2ZP	MK2PA MK2PN	–	MK3P(2)-US, MK2PE(2)-US, MK2ZP-US, MK2ZP2-US, MK2ZP5-US
		3PDT	MK3P*	MK3ZP	MK3PA MK3PN	MK3LP	MK3P-US, MK3PE-US, MK3ZP-US, MK3P2-US, MK3PE2-US, MK3ZP2-US, MK3P5-US, MK3PE5-US, MK3ZP5-US

NOTE: * Special internal connection versions, MK2P-2 (2 poles), MK3P-2 and MK3P-5 (3 poles) are available upon request.

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (VA, W)
							% of rated voltage			
AC	6	404	360	5.3	0.028	0.041	80 max.	30 min.	110	Approx. 2.3
	12	202	180	21.5	0.115	0.165				
	24	98	88	88	0.422	0.678				
	50	43.6	39	390	1.95	3.2				
	100	25.8	23	1,510	7.87	10.7				
	110	23.5	21	1,620	7.89	13.1				
	120	20.2	18	2,300	10.5	16.4				
	200	12	10.7	6,200	30.5	46.2				
	220	12.3	11	7,100	30.8	49.0				
	240	10.3	9.2	9,300	33.0	63.9				
DC	6	255		23.5	0.14	0.23		10 min.		Approx. 1.5
	12	126		95	0.56	0.87				
	24	56		430	2.82	4.46				
	48	29.5		1,630	10.99	16.52				
	100	14.7		6,800	41.46	66.34				
	200	14.7		6,800+6.8kΩ	–	–				

NOTES: 1. For 200 VDC applications, 100 VDC relay is supplied with a fixed 6.8kΩ, 30W resistor. Be sure to connect the resistor in series with the coil.
2. The rated current, coil resistance and inductance are measured at a coil temperature of 20°C with tolerances of ±20%.

• CONTACT RATINGS

Item \ Type	MK1, MK2(P)		MK3(P)	
Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4; L/R =7msec)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4; L/R =7msec)
Rated load	220 VAC 7.5(5)A 24 VDC 5(3)A	220 VAC 3(2)A 24 VDC 4(2.5)A	220 VAC 5(3)A 24 VDC 3(2)A	220 VAC 2(1.2)A 24 VDC 2.5(1.5)A
Carry current	7.5(5)A		5(3)A	
Max. operating voltage	500 VAC 250 VDC			
Max. operating current	7.5(5)A		5(3)A	
Max. switching capacity	1,700 (1,000)VA 120(72)W	660 (440)VA 96(60)W	1,100 (660)VA 72(48)W	440 (260)VA 60(35)W
Minimum permissible load	1 VDC 10mA			

NOTE: The values in ( ) apply to the covered type relays.

• CHARACTERISTICS

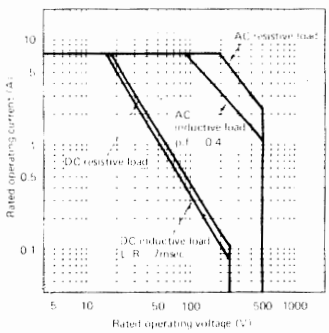
Item \ Type	Open type	Covered type
Contact resistance	25mΩ max.	50mΩ max.
Operate time	AC: 20msec max. DC: 30msec max.	
Release time	20msec max.	
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)	
Insulation resistance	100MΩ min. (at 500 VDC)	
Dielectric strength	1,500 VAC, 50/60Hz for 1 minute (1,000 VAC between the same poles)	
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.0mm double amplitude	
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 100m/sec² (approx. 10G's)	
Ambient temperature	Operating: −10 to +40°C	
Humidity	45 to 85% RH	
Service life	Mechanically: 5,000,000 operations min. (at operating frequency of 13,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."	
Weight	Approx. 85g	

NOTE: The data shown are of initial value.

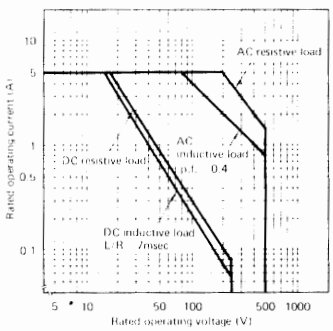
• CHARACTERISTIC DATA

Maximum switching capacity

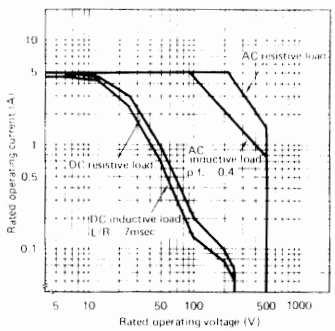
MK1, MK2



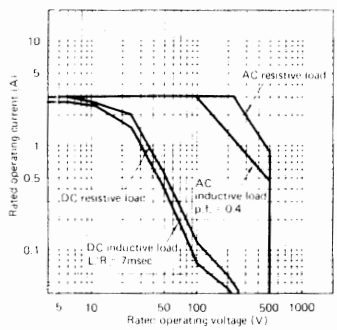
MK3



MK2P

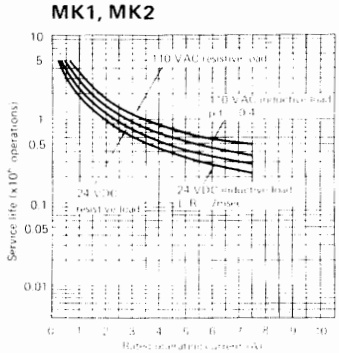


MK3P

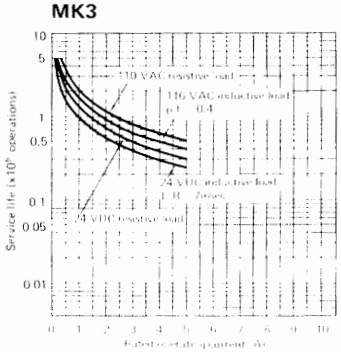


Electrical service life

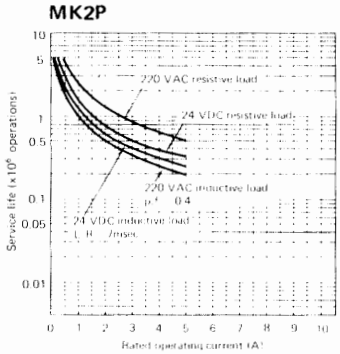
MK1, MK2



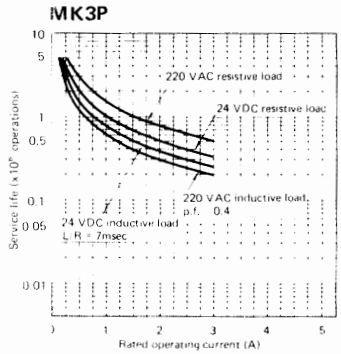
MK3



MK2P

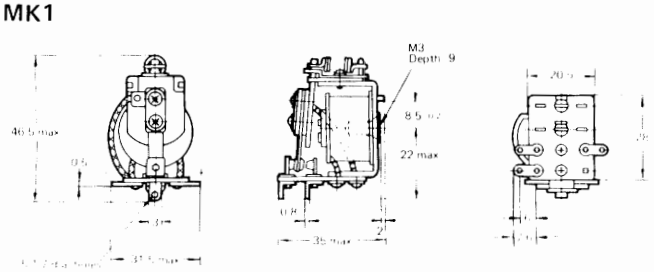


MK3P

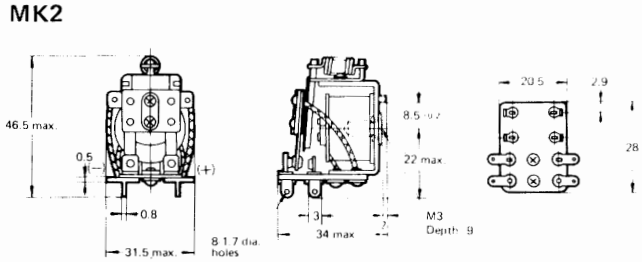


■ DIMENSIONS

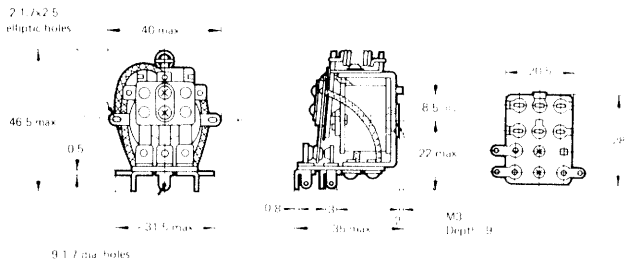
MK1



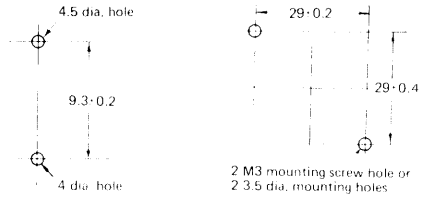
MK2

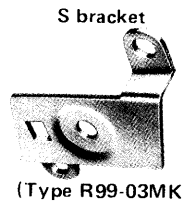


MK3



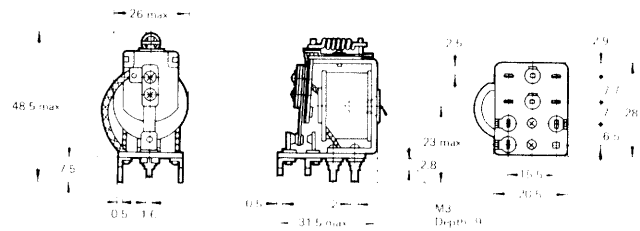
Mounting holes for MK1, MK2 and MK3



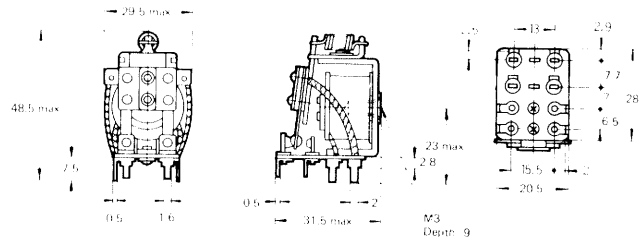


(Type R99-03MK)

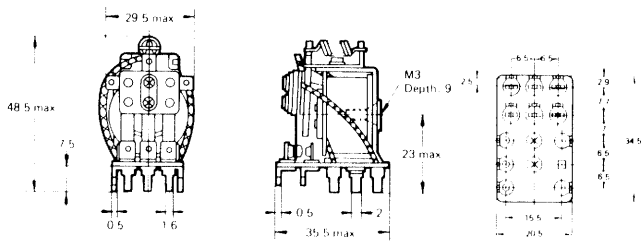
MK1-0



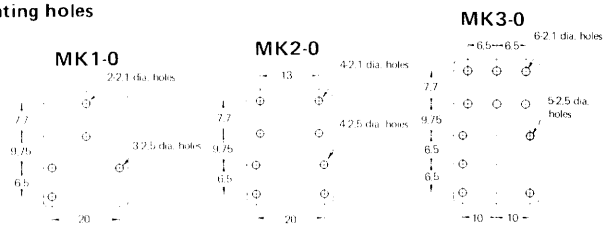
MK2-0



MK3-0

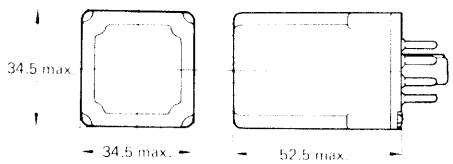


Mounting holes



(Bottom view)

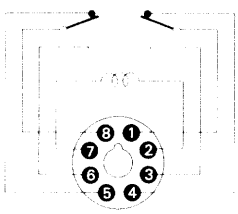
MK2P, MK3P, MK2P-2, MK3P-2, MK3P-5



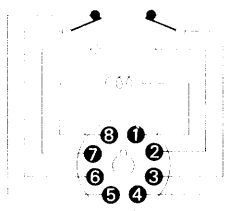
NOTE: MK2P-2, MK3P-2 and MK3P-5 are special internal connection versions of MK2P and MK3P respoctively.

Terminal layout/Internal connections (Bottom view)

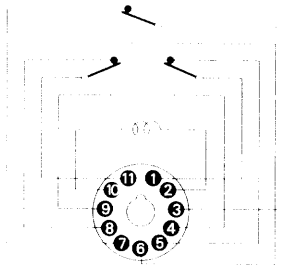
MK2P



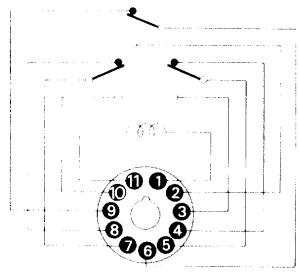
MK2P-2



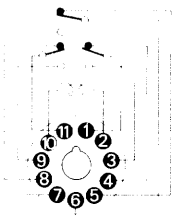
MK3P



MK3P-2



MK3P-5

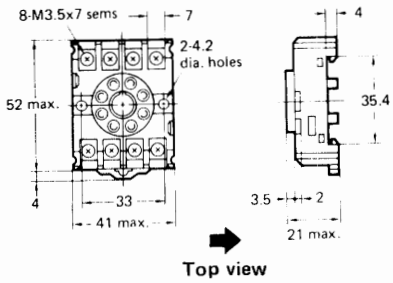


■ ACCESSORIES (Available on request)

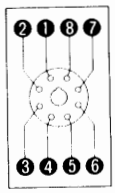
• CONNECTING SOCKETS

• Track mounted sockets

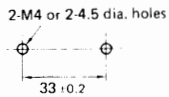
PF083A



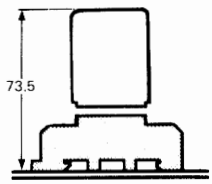
Terminal arrangement (Top view)



Mounting holes



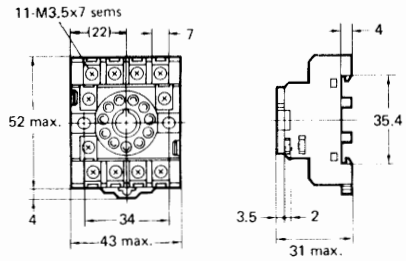
Mounting height of relay with socket

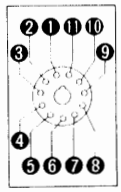


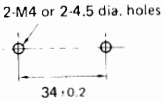
PF083A

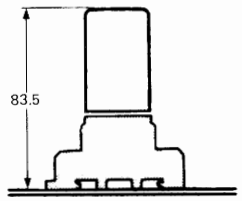
NOTE: Type PF083A can be used as a front connecting socket.

PF113A







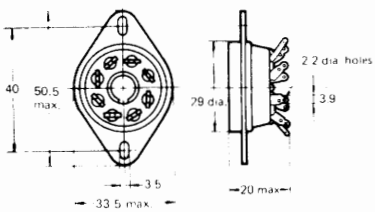


PF113A

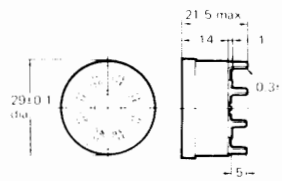
NOTE: Type PF113A can be used as a front connecting socket.

• Back connecting sockets

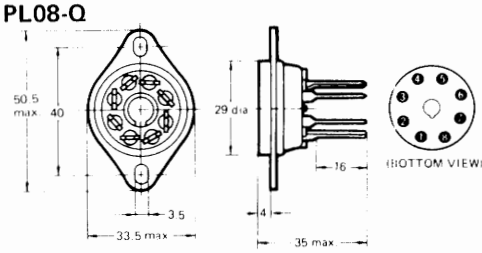
PL08



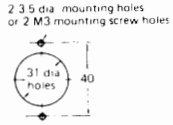
PLE08-0



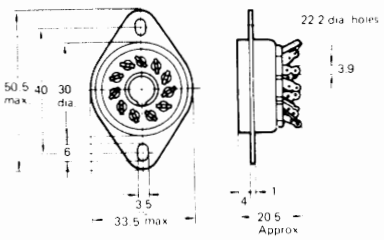
PL08-Q



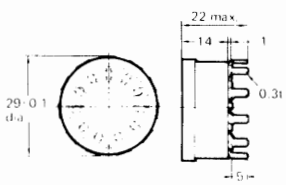
PL08, PL11, P3D



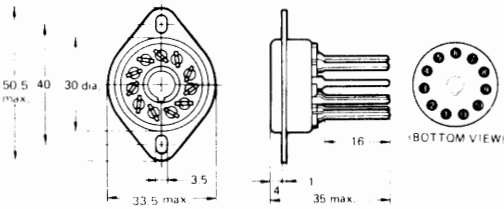
PL11



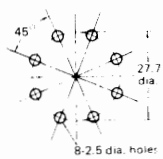
PLE11-0



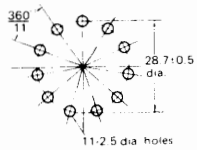
PL11-Q



PLE08-0

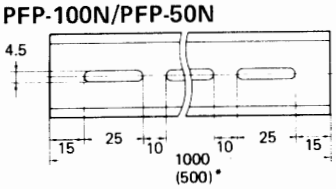


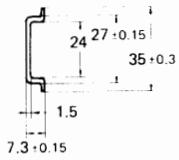
PLE11-0



• SOCKET MOUNTING TRACK/END PLATE (for PF083A, PF113A)

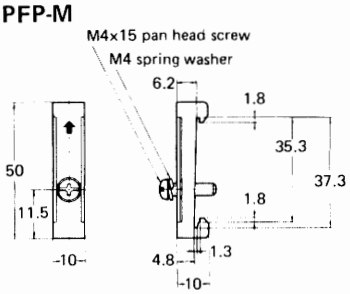
PFP-100N/PFP-50N

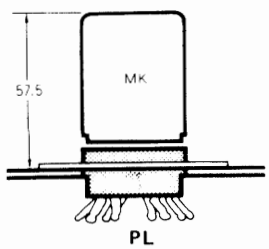




NOTE: * This dimension applies to Type PFP-50N.

PFP-M





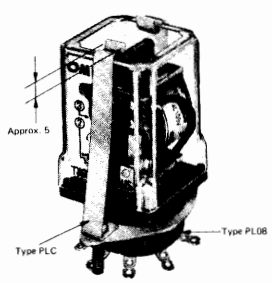
PL

• RELAY HOLD-DOWN CLIP

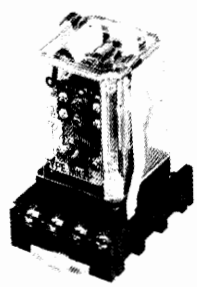
Socket \ Relay	MK2P (Including -Z and -US)	MK3P (Including -US)	MK3ZP MK3LP
PL08(Q)	PLC	—	—
PL11(Q)	—	PLC	PLC-1
PF083A	PFC-A1	—	—
PF113A	—	PFC-A1	PFC-A1
PLE08-0	PLC-10	—	—
PLE11-0	—	PLC-10	—

NOTE: When the Type PF□□□N socket is used as the front mounting socket, be sure to use the relay hold-down clip shown in ( ).

PLC



PFC-A1



BIFURCATED CONTACT TYPE

■ SPECIFICATIONS

Same as the Standard Type with the following exceptions.

• COIL RATINGS

MK2Z(P): Same as the Standard Type.
MK3Z(P): See Coil Ratings below.

Rated voltage (V) \ Item		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Power consumption (VA, W)
AC	6	500	445	3.8	Approx. 2.8
	12	258	230	16.2	
	24	130	116	62	
	50	63	56	280	
	100	31.9	28.5	1,140	
	110	28.4	25.4	1,300	
	120	26.1	23.3	1,700	
	200	15.7	14	4,950	
	220	14.2	12.7	5,900	
	240	13.1	11.7	6,900	
DC	6	302		19.9	Approx. 1.9
	12	156		77	
	24	79		303	
	48	39		1,230	
	100	18.9		5,300	
	200	18.9		5,300+5.3kΩ	

NOTE: For 200 VDC applications, a 100 VDC relay is supplied with a fixed 5.3kΩ, 30W resistor. Be sure to connect the resistor in series with the coil.

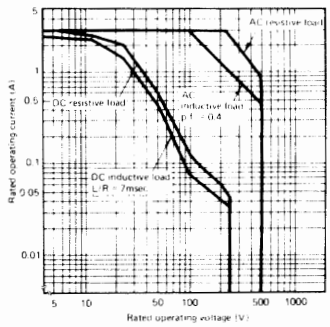
• CONTACT RATINGS

Item \ Type / Load	MK2Z(P), MK3Z(P) Resistive load (p.f.=1)	MK2Z(P), MK3Z(P) Inductive load (p.f.=0.4; L/R =7msec)
Rated load	220 VAC 3A 24 VDC 2A	220 VAC 1.2A 24 VDC 1.5A
Carry current	3A	
Max. operating voltage	500 VAC 250 VAC	
Max. operating current	3A	
Max. switching capacity	660VA 48W	260VA 35W
Minimum permissible load	1 VDC 100μA	

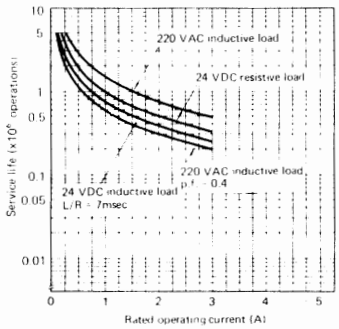
• CHARACTERISTIC DATA

MK2ZP, MK3ZP

Max. switching capacity



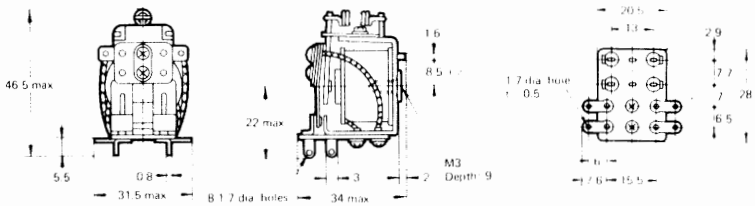
Electrical service life



NOTE: When switching a very small load rated at lower than the coil power consumption with the relay operated at an extremely low operating frequency, the relay may result in unstable contact due to oxidization of its contacts. In such a case, use of a relay with gold-plated contacts (Type MKP-AP) or PGS alloy contacts (Type MK-□) is recommended.

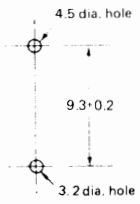
■ DIMENSIONS

MK2Z

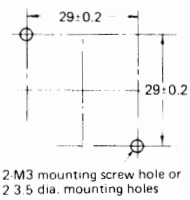


Mounting holes for MK2Z, MK3Z

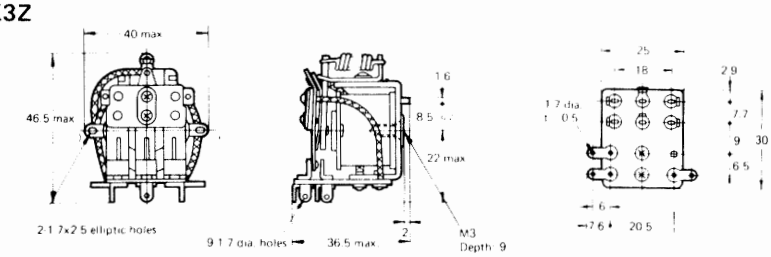
Without S bracket



With S bracket

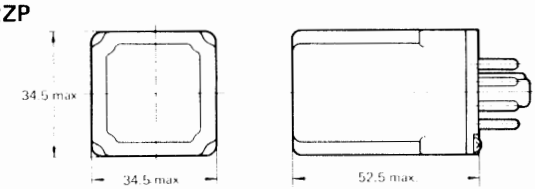


MK3Z

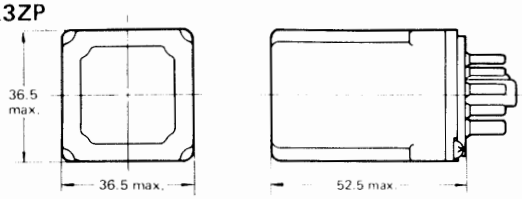


NOTE: When mounting MK2ZP or MK3ZP relay, use Type PF083, PD3-08T or PL08 connecting socket. See "ACCESSORIES" for the connecting sockets.

MK2ZP



MK3ZP



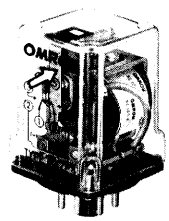
OPERATION INDICATOR SELF-CONTAINED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exceptions.

• COIL RATINGS (MK□PN)

Item / Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Power consumption (VA, W)
AC	6	420	385	5.3	Approx. 2.4
	12	220	195	21.5	
	24	110	100	88	
	50	64	60	390	
	100	25.8	23	1,510	
	110	23.5	21	1,620	
	120	20.2	18	2,300	
	200	12	10.7	6,200	
	220	12.3	11.0	7,100	
	240	10.3	9.2	9,300	
DC	6	315		23.5	Approx. 2
	12	160		95	
	24	84		430	
	48	41.5		1,630	
	100	14.7		6,800	Approx. 1.5
	200	14.7		6,800+6.8kΩ	



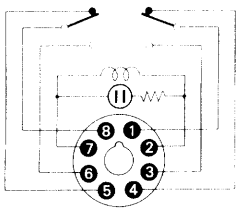
MK□PA
(with operation indicating mechanism)

MK□PN
(with operation indicator lamp)

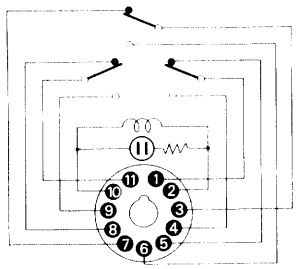
NOTES: 1. The rated current, coil resistance and inductance are measured at a coil temperature of 20°C with tolerances of ±20%.
2. For 200 VDC applications, 100 VDC relay is supplied with a fixed 6.8KΩ, 30W resistor. Be sure to connect the resistor in series with the coil.

Terminal layout/Internal connections (Bottom view)

MK2PN



MK3PN



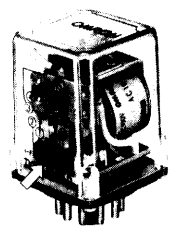
ARC BARRIER EQUIPPED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exceptions.

• CONTACT RATINGS

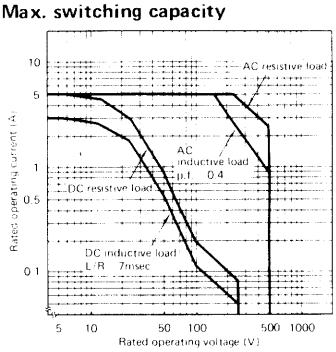
Item \ Type	MK3LP	
Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4; L/R =7msec)
Rated load	220 VAC 5A 24 VDC 3A	220 VAC 3A 24 VDC 1.8A
Carry current	5A	
Max. operating voltage	500 VAC 250 VDC	
Max. operating current	5A	
Max. switching capacity	1,100VA 72W	660VA 42W
Minimum permissible load	1 VDC 10mA	



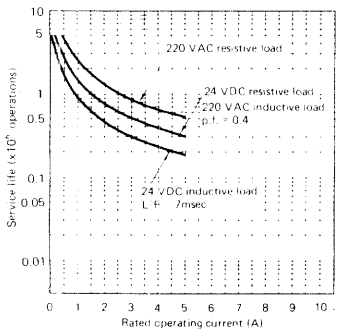
MK3LP

• CHARACTERISTIC DATA

Max. switching capacity



Electrical service life



• COIL RATINGS

Same as the Twin Contact Type MK3Z(P).

STANDARD APPROVED TYPE

When placing your order for UL and CSA approved versions, please indicate "UL" or "CSA" as desired in addition to the model number.

■ SPECIFICATIONS

Same as the Standard Type with the following exceptions.

- **RATINGS**

UL recognized type (File No. 41515)
CSA certified type (File No. LR24825)

Type		Coil rating	Contact material	Contact rating
Standard type	MK2P-US, MK2P2-US MK3P-US, MK3P2-US MK3P5-US	6 to 260 VAC 6 to 130 VDC (240 VAC max. 110 VDC max.)	Ag	5A 230 VAC or 5A 28 VDC, resistive load (5A 120 VAC or 5A 28 VDC resistive load)
	MK2PE-US, MK2PE2-US MK3PE-US, MK3PE2-US MK3PE5-US		AgCdO	10A 230 VAC or 10A 28 VDC resistive load (10A 120 VAC or 10A 28 VDC resistive load)
Two-contact type*	MK2ZP-US MK2ZP2-US MK2ZP5-US MK3ZP-US MK3ZP2-US MK3ZP5-US	6 to 260 VAC 6 to 130 VDC	Movable contact: Ag-Ni(10%) Stationary contact: Ag	3A 230 VAC 3A 28 VDC resistive load

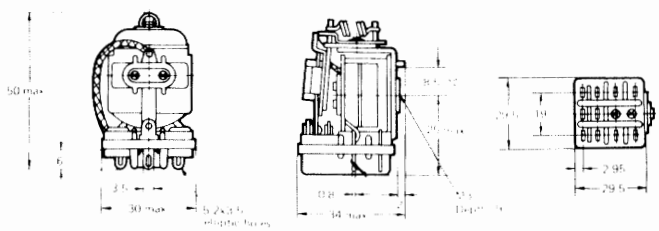
NOTE: * Gold-plated contacts types are available upon request.

SEV listed type (File No. D7 91/32)

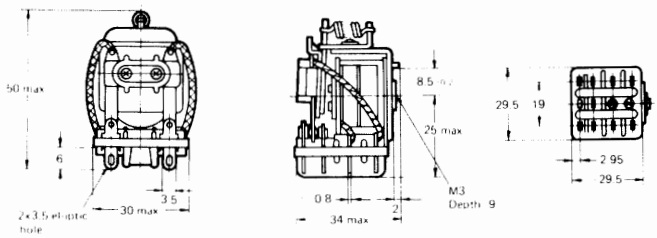
Type		Coil rating	Contact material	Contact rating
Standard type	MK2P-US, MK2P2-US MK3P-US, MK3P2-US MK3P5-US	6 to 220 VAC 6 to 110 VDC	Ag	5A 250 VAC (resistive load)
	MK2PE-US, MK2PE-2-US MK3PE-US, MK3PE-2-US MK3PE-5-US	6 to 220 VAC 6 to 110 VDC	AgCdO	10A 250 VAC (resistive load)
	MK3LP-5	6 to 220 VAC 6 to 110 VDC	Ag	5A 250 VAC (resistive load)

■ DIMENSIONS

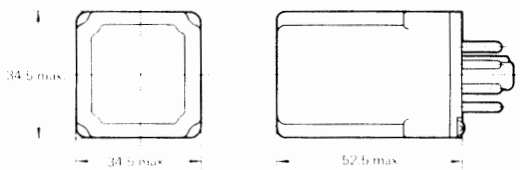
MK105, MK110E



MK205, MK210E



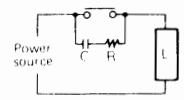
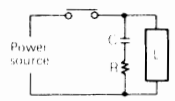
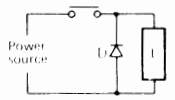
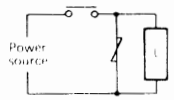
MK□-US



NOTE: When mounting MK□-US relays, use Type PF083A, PL08, PF113A or PL11 connecting socket as appropriate. See "ACCESSORIES" for the connecting sockets to be used.

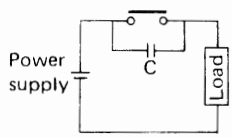
Contact Protection Circuit

When switching inductive loads (relays, solenoids, etc.) it is recommended that one of the contact protection circuits shown below, be employed to prevent faulty contact (e.g., metal deposition between mating contacts) due to arcing, and to increase contact reliability and service life. It should be noted that the release time of the relay increases when the contact protection circuit is used.

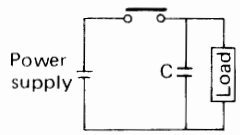
		RC type		Diode type	Varistor type
Circuit example					
Applicability	AC	△	○	X	○
	DC	○	○	○	○
Remarks		△: Load impedance must be much smaller than the RC circuit impedance when the relay operates on an AC voltage. Optimum C and R values are: C : 1 to 0.5μF for 1A contact current R : 0.5 to 1Ω for 1V contact voltage. A capacitor having 200 to 300V voltage proof must be employed.		The diodes employed must have a reverse breakdown voltage of ten times the circuit voltage, and a forward current rating greater than the load current.	———

Note: L denotes inductive load.

Avoid use of a surge suppressor in such manners as shown below.

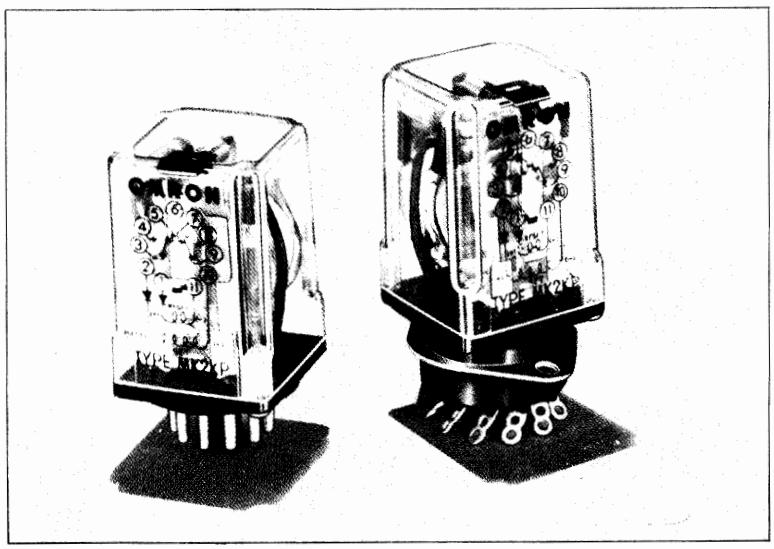


This circuit arrangement is very effective for diminishing sparking (arcing) at the contacts when breaking the circuit. However, since electrical energy is stored in C (capacitor) when the contacts are open, short-circuit current of C flows into the contacts when they are closed. Therefore, metal deposition is likely to occur between mating contacts.



This circuit arrangement is very useful for diminishing sparking (arcing) at the contacts when breaking the circuit. However, since the charging current to C flows into the contacts when they are closed, metal deposition is likely to occur between the mating contacts.

Magnetic Latching Relay Ideal for Memory Circuit



■ FEATURES

- Changes due to aging are negligible because of use of special magnetic materials, thus ensuring long continuous holding time
- Little change in characteristics such as contact follow, contact pressure, etc. and long life
- High vibration and shock resistance
- Built-in operation indicator for easy relay operation monitoring

■ AVAILABLE TYPES

Terminal / Contact form	Plug-in
DPDT	MK2KP

■ SPECIFICATIONS

• COIL RATINGS

Item / Rated voltage (V)		Set coil: Rated current (mA)	Set coil: Coil resistance (Ω)	Set coil: Coil inductance (ref. value) (H) Armature ON	Reset coil: Rated current (mA)	Reset coil: Coil resistance (Ω)	Reset coil: Coil inductance (ref. value) (H) Armature OFF	Must set voltage (% of rated voltage)	Must reset voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA, W) Set coil	Power consumption (VA, W) Reset coil
AC	6	286	4.8	0.05	29	78	0.16	80 max.	80 max.	110	Approx. 1.5 to 2	Approx. 0.1 to 0.7
	12	128	25	0.22	14.4	325	0.59					
	24	66	105	0.88	10.8	965	1.09					
	50	31	410	3.93	3.2	8,450	5.03					
	100	17.8	1,670	13.4	3.6	13,350	13.8					
	110	19.6	1,670	13.5	4	13,350	15.1					
	120	19	1,900	15.1	3.6	14,400	16.7					
	200	9.8	6,200	48.9	3.2	27,350	29.2					
	220	10.6	6,200	49.8	3.5	32,400	35.3					
	240	10.4	7,400	54.9	2.8	35,100	53.2					
DC	6	390	13	0.056	92.5	65	0.013				Approx. 2.3 to 2.7	Approx. 0.5 to 1.2
	12	205	52	0.23	50	240	0.05					
	24	110	210	0.90	22.8	1,050	0.20					
	48	48.5	990	4.13	23.4	2,050	0.20					
	100	24	4,160	16.5	10.3	9,740	1.25					
	110	28	4,160	16.5	13	9,740	1.25					

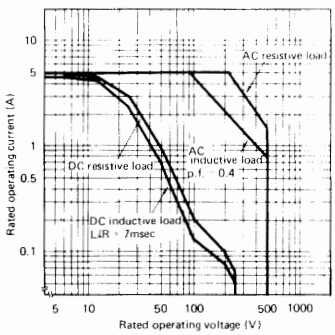
NOTES: 1. The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of +15%, −20%, and ±15% for rated coil resistance.
2. The rated current and performance characteristics are measured at a coil temperature of 5 to 35°C.
3. Peak reverse voltage of the built-in diode is 400V (600V for 200 VAC coil).

• CONTACT RATINGS

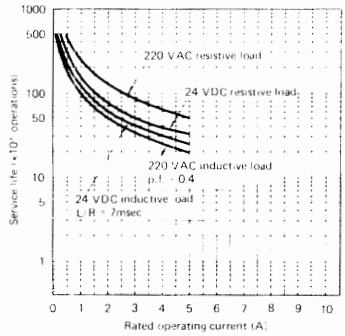
Item \ Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	220 VAC 5A 24 VDC 3A	220 VAC 2A 24 VDC 2.5A
Carry current	5A	
Max. operating voltage	500 VAC 250 VDC	
Max. operating current	5A	AC 5A DC 4.6A
Max. switching capacity	1,100VA, 80W	440VA, 60W
Minimum permissible load	1 VDC 1mA (reference value)	

• CHARACTERISTIC DATA

Maximum switching capacity MK2KP



Electrical service life MK2KP

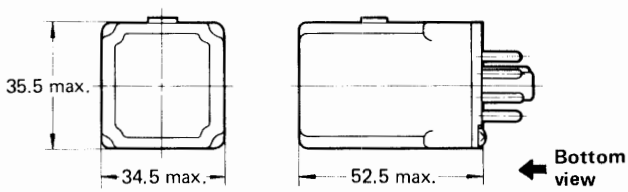


• CHARACTERISTICS

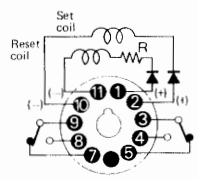
Contact resistance	50mΩ max.
Operate time	25msec max.
Release time	30msec max.
Operating frequency	Mechanically: 1,800 operations/hour Under rated load: 1,800 operations/hour
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	1,500 VAC, 50/60Hz for 1 minute (1,000 VAC between contacts of the same polarity and between set and reset coils)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.0mm double amplitude
Shock	Mechanical durability: 500m/sec² (approx. 50G's) Malfunction durability: 100m/sec² (approx. 10G's)
Ambient temperature	Operating: −10 to +40°C
Hjmidity	45 to 85% RH
Service life	Mechanically: 5,000,000 operations min. (at operating frequency of 1,800 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 85g

NOTE: The data shown above are of initial value.

■ DIMENSIONS



Terminal layout/Internal connections (Bottom view)



NOTES:
1. R is a resistor for ampere-turn compensation, and is incorporated in the relays rated at 50 VAC or above and 48 VDC or above.
2. Pay attention to the polarity of the set and reset coils, as incorrect connection of positive and negative terminals will result in malfunctioning of the relay.

■ ACCESSORY

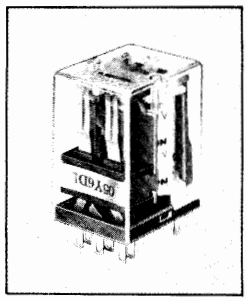
Same as the Standard Type.

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

GENERAL-PURPOSE RELAY

Model MHS

High Contact Reliability Relay Ideal for Communications Equipment & Measuring Instruments



■ FEATURES

- High contact reliability is assured through employment of bifurcated crossbar contacts and card lift-off system for contact driving
- Sealed type also available
- Highly stable operation with improved magnetic efficiency through use of an E-core
- Extremely low power consumption (DPDT: 0.36W)
- High vibration and shock resistance

■ AVAILABLE TYPES

Classification / Terminal / Contact form / Contact		Standard type		Sealed type		High-sensitivity type		Standard approved type	
		Solder	P.C.B.	Solder	P.C.B.	Solder	P.C.B.	Solder	P.C.B.
Single crossbar contact type	DPDT	MHS2P(-SM) MHS2PG(-SM)	MHS2P-0(-SM) MHS2PG-0(-SM)		–	MHS2P(-SM)□Ω MHS2PG(-SM)□Ω	MHS2P-0(-SM)□Ω MHS2PG-0(-SM)□Ω	MHS2P-US MHS2PG-US	MHS2P-0-US MHS2PG-0-US
	4PDT	MHS4P(-SM) MHS4PG(-SM)	MHS4P-0(-SM) MHS4PG-0(-SM)		–	MHS4P(-SM)□Ω MHS4PG(-SM)□Ω	MHS4P-0(-SM)□Ω MHS4PG-0(-SM)□Ω	MHS4P-US MHS4PG-US	MHS4P-0-US MHS4PG-0-US
	6PDT	MHS6P(-SM) MHS6PG(-SM)	MHS6P-0(-SM) MHS6PG-0(-SM)		–	–	–	MHS6P-US MHS6PG-US	MHS6P-0-US MHS6PG-0-US
Bifurcated crossbar contact type	DPDT	MHS2ZP(-SM) MHS2ZPG(-SM)	MHS2ZP-0(-SM) MHS2ZPG-0(-SM)		–	MHS2ZP(-SM)□Ω MHS2ZPG(-SM)□Ω	MHS2ZP-0(-SM)□Ω MHS2ZPG-0(-SM)□Ω	MHS2ZP-US MHS2ZPG-US	MHS2ZP-0-US MHS2ZPG-0-US
	4PDT	MHS4ZP(-SM) MHS4ZPG(-SM)	MHS4ZP-0(-SM) MHS4ZPG-0(-SM)	MHQ4ZP MHQ4ZPG	MHQ4ZP-0 MHQ4ZPG-0	MHS4ZP(-SM)□Ω MHS4ZPG(-SM)□Ω	MHS4ZP-0(-SM)□Ω MHS4ZPG-0(-SM)□Ω	MHS4ZP-US MHS4ZPG-US	MHS4ZP-0-US MHS4ZPG-0-US
	6PDT	MHS6ZP(-SM) MHS6ZPG(-SM)	MHS6ZP-0(-SM) MHS6ZPG-0(-SM)	–	–	–	–	MHS6ZP-US MHS6ZPG-US	MHS6ZP-0-US MHS6ZPG-0-US

NOTES. 1. The symbol "SM" suffixed to the model number denotes a special version with international 2.5mm grid terminal arrangement, intended especially for European countries.
2. The symbol "G" in the model number denotes that the relay is provided with a ground stud.
3. When placing your order for a high-sensitivity type relay, enter the desired coil resistance in the bracket portion of the model number, e.g., MHS2ZP7Ω.

OMRON

STANDARD/SEALED TYPE

■ SPECIFICATIONS

• COIL RATINGS

Item: Contact form / Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Coil inductance (H) (reference value) Armature OFF	Coil inductance (H) (reference value) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (W)
DPDT 6	66.7	90	0.53	0.78	80 max.	10 min.	150	Approx. 0.36
DPDT 12	36.9	325	2.16	3.46				
DPDT 24	15.0	1,600	10.2	16.7				
DPDT 36	11.3	3,200	–	–				
DPDT 48	10.9	4,400	–	–				
4PDT 6	115.4	52	0.26	0.41			130	Approx. 0.72
4PDT 12	64.9	185	1.17	1.64				
4PDT 24	34.3	700	4.35	6.04				
4PDT 36	21.2	1,700	–	–				
4PDT 48	15	3,200	13.2	23.1				
6PDT 6	230.8	26	–	–			110	Approx. 1.3
6PDT 12	109.1	110	0.60	0.70				
6PDT 24	55.8	430	2.17	2.64				
6PDT 36	32.7	1,100	–	–				
6PDT 48	28.2	1,700	–	–				

NOTE: Coil resistances shown are at an ambient temperature of 20°C with a tolerance of ±10%.

• CONTACT RATINGS

Item \ Type	Bifurcated crossbar: Resistive load (p.f. = 1)	Bifurcated crossbar: Inductive load (p.f. = 0.4, L/R = 7ms)	Single crossbar: Resistive load (p.f. = 1)	Single crossbar: Inductive load (p.f. = 0.4, L/R = 7ms)
Rated load	110 VAC 0.3A 24 VDC 0.5A	110 VAC 0.2A 24 VDC 0.12A	110 VAC 0.3A 24 VDC 0.2A	110 VAC 0.2A 24 VDC 0.12A
Carry current	2A			
Max. operating voltage	125 VAC 125 VDC			
Max. operating current	2A	1A	2A	1A
Max. switching capacity	120VA 60W	60VA 15W	120VA 50W	60VA 15W
Min. permissible load (ref. value)	0.1 VDC 10μA		1 VDC 1mA	

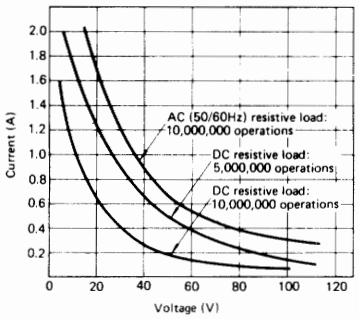
• CHARACTERISTICS

Contact resistance	60mΩ max. (initial)
Operate time	15msec max.
Release time	6msec max.
Operating frequency	Mechanically: 18,000 operations/hour Under rated load: 7,200 operations/hour
Insulation resistance	500MΩ min. (at 500 VDC)
Dielectric strength	1,000 VAC, 50/60Hz for 1 minute (700 VAC between non-continuous contacts)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/s² (approx. 100G's) Malfunction durability: 250m/s² (approx. 25G's)
Ambient temperature	Operating: −25 to +50°C
Humidity	45 to 85% RH
Service life	Mechanically: 50,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	DPDT: Approx. 24g 4PDT: Approx. 28g 6PDT: Approx. 30g

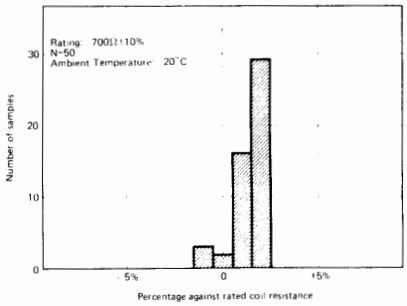
NOTE: The data shown above are of initial value.

• CHARACTERISTIC DATA

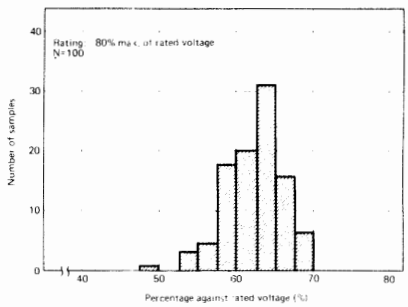
Electrical service life



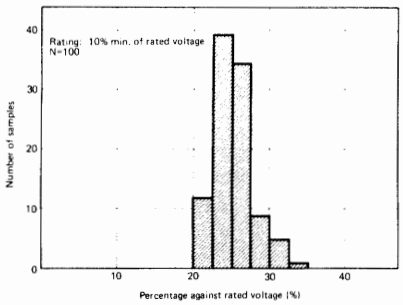
Distribution of coil resistance
MHS4ZP 24 VDC



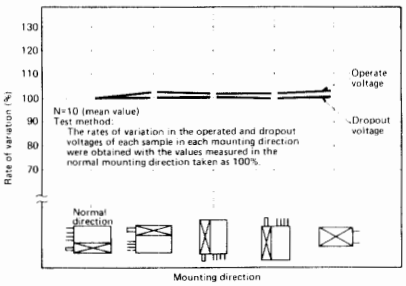
Distribution of operate voltage
MHS4ZP 24 VDC



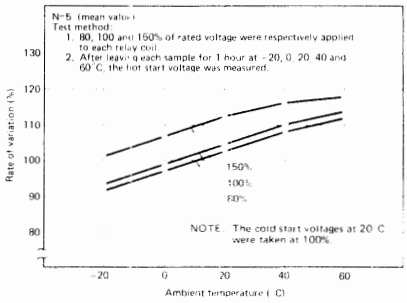
Distribution of dropout voltage
MHS4ZP 24 VDC



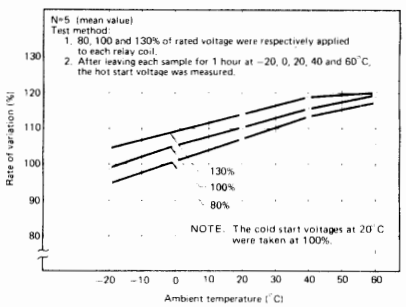
Mounting direction vs. operate and dropout voltage MHS4ZP 24 VDC



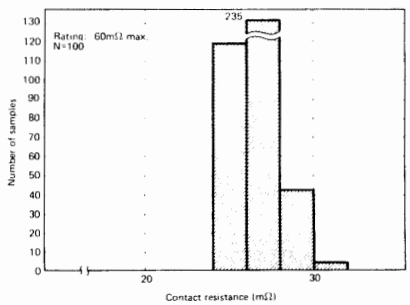
Hot start characteristic
MHS2ZP 12 VDC



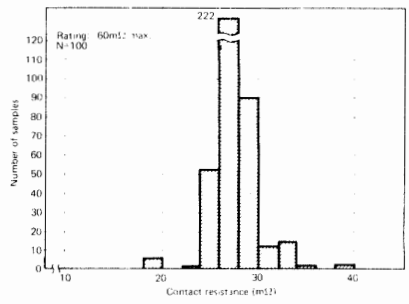
Hot start characteristic
MHS4ZP 12 VDC



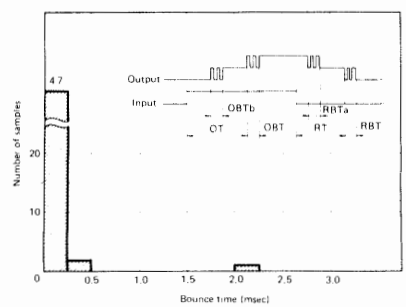
Distribution of contact resistance
MHS4ZP 24 VDC, N.C. contact



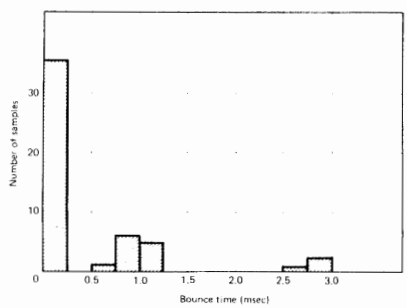
Distribution of contact resistance
MHS4ZP 24 VDC, N.O. contact



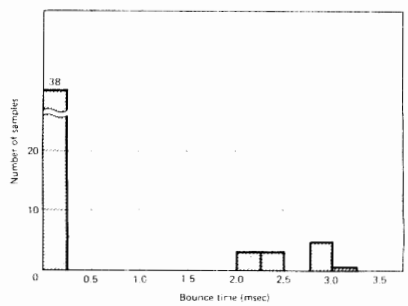
Operate bounce time (OBT)
MHS4ZP 24 VDC



Release bounce time (RBT)
MHS4ZP 24 VDC

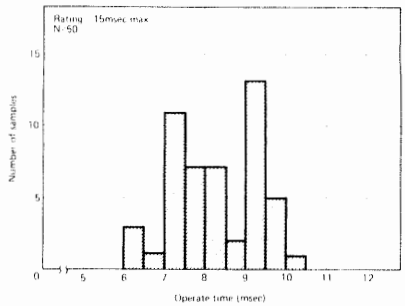


Operate bounce time b (OBTb)
MHS4ZP 24 VDC

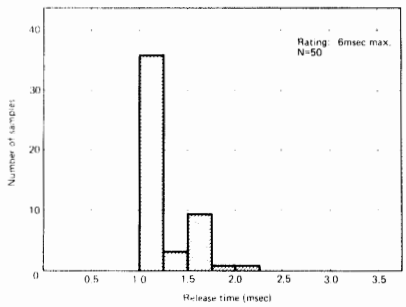


NOTE: Characteristic data for release bounce time (RBTa) is not shown, since this output waveform was not generated.

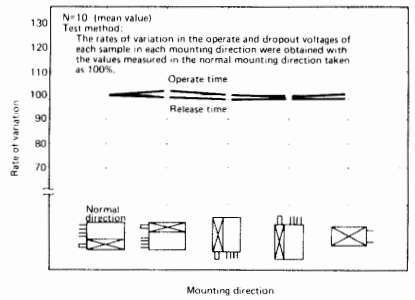
Distribution of operate time (OT) MHS4ZP-0 24 VDC



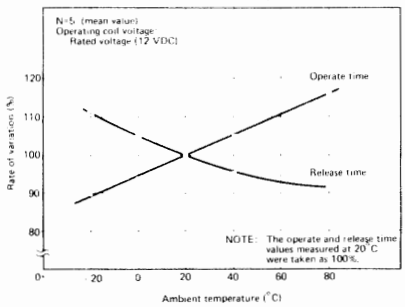
Distribution of release time (RT) MHS4ZP-0 24 VDC



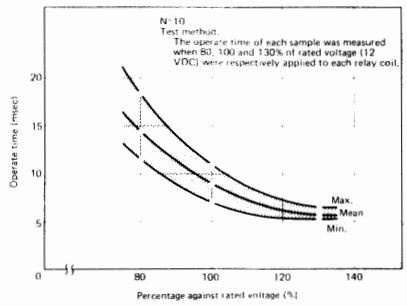
Mounting direction vs. operate and release times MHS4ZP 12 VDC



Ambient temperature vs. operate and release times MHS4ZP 12 VDC



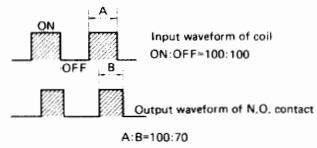
Applied voltage vs. operate time MHS4ZP 12 VDC



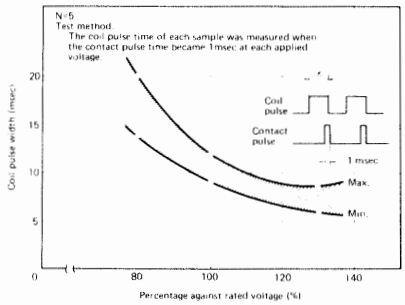
Response frequency MHS4ZP 12 VDC

N=20
Test method:
The response frequency of each sample was measured when the output waveform of N.O. contact became 70% of the input waveform of coil.

	Response frequency
Max.	21 Hz
Min.	17 Hz
Mean	18.7Hz



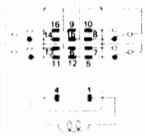
Applied voltage vs. coil pulse width MHS4ZP 12 VDC



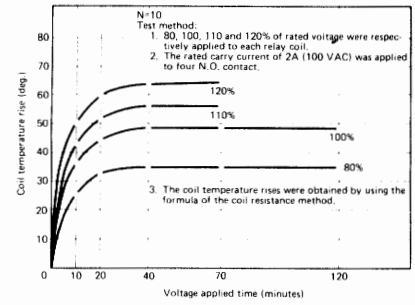
Distribution of stray capacitance MHS4ZP 12 VDC

N=5 (mean value)

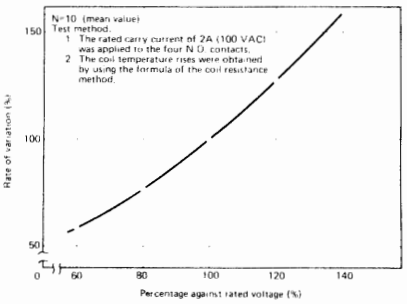
Measuring point		Stray capacitance (pF)
Between non-continuous contacts	12-7, 15-10 12-5, 15-8	2.4 ~ 2.5 3.1 ~ 3.4
Between different poles	12-6 12-9 12-15	2.0 ~ 2.1 1.4 ~ 1.6 1.7 ~ 1.9
Between coil and contact	1 - 12	2.3 ~ 3.2



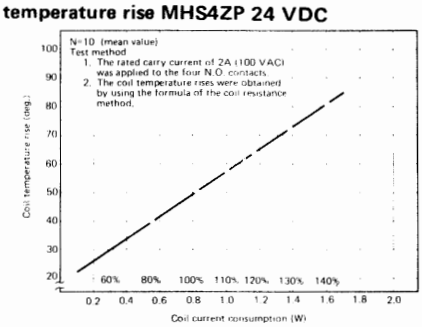
Voltage applied time vs. coil temperature rise MHS4ZP 24 VDC



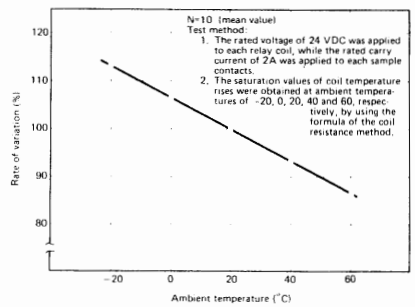
Applied voltage vs. temperature rise MHS4ZP 24 VDC



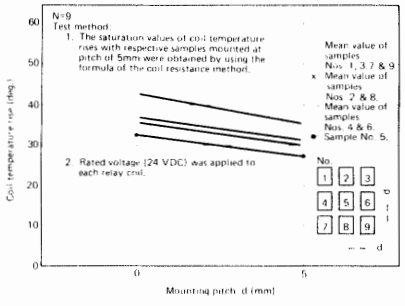
Coil current consumption vs. coil temperature rise MHS4ZP 24 VDC



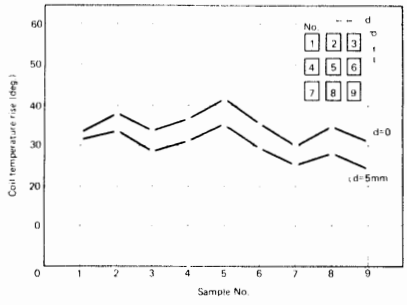
Ambient temperature vs. coil temperature rise MHS4ZP 24 VDC



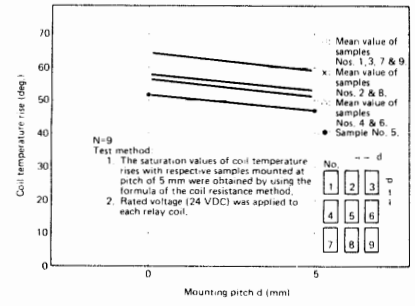
Mounting pitch vs. coil temperature rise MHS2ZP 12 VDC



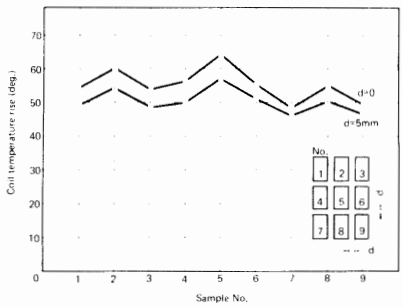
Mounting pitch vs. coil temperature rise MHS2ZP 12 VDC

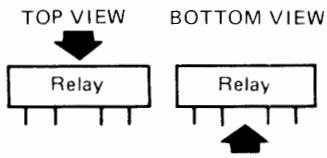


Mounting pitch vs. coil temperature rise MHS4ZP 24 VDC



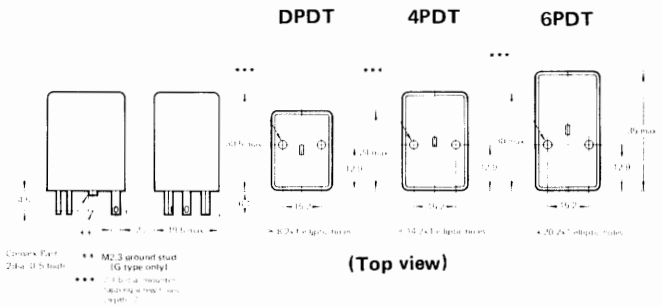
Mounting pitch vs. coil temperature rise
MHS4ZP 24 VDC



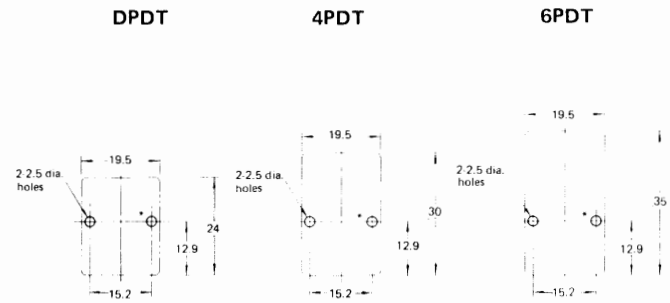


■ DIMENSIONS

• PLUG-IN SOLDER TERMINAL TYPE

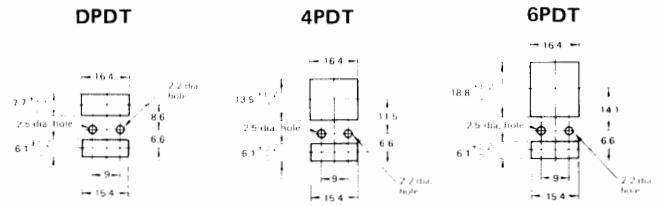


Mounting holes when mounting with tapping screws
(A tolerance of ±0.1 applies to all dimensions)
(Top view)



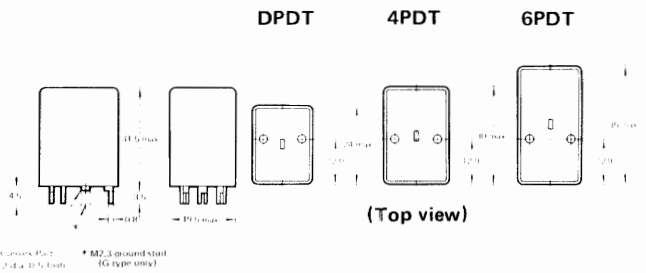
NOTES: 1. Recommended panel thickness is 2.6mm or less.
2. Employ 7mm long 2mm dia. tapping screws as the mounting screws.
3. The above drawings apply to the mounting of the relay with a ground stud. When mounting the relay without a ground stud, the 2.5 dia. hole shown in each of the above drawings by asterisk is not required.

Mounting of solder terminal type relay with or without connecting socket

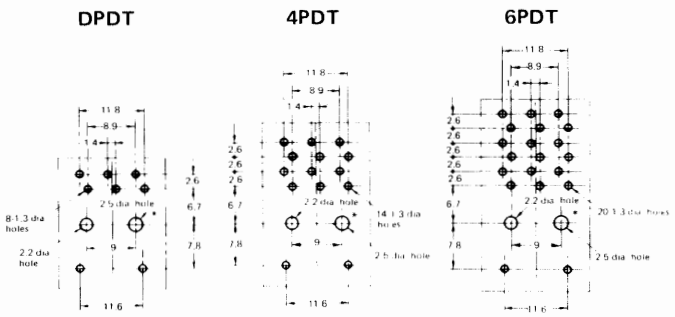


NOTE: When mounting the relay directly on a panel, only the relay with a ground stud (G type) can be mounted on a panel without use of the connecting socket.

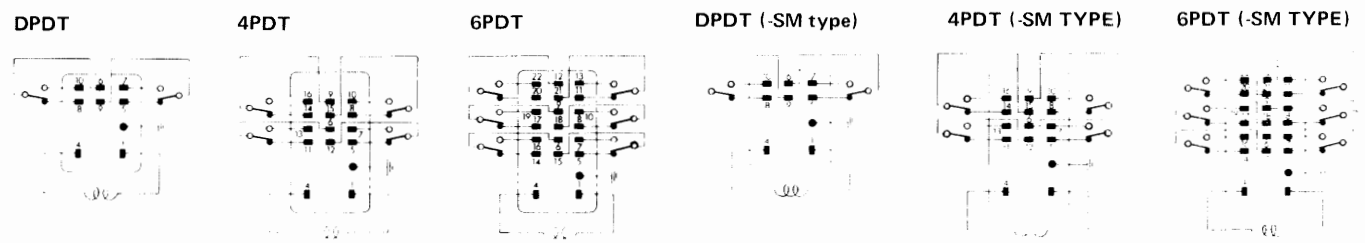
• PRINTED CIRCUIT TERMINAL TYPE



Mounting holes when mounting on P.C.B.
(A tolerance of ±0.1 applied to all dimensions)
(Bottom view)



Terminal arrangement (Bottom view)

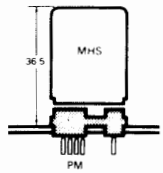


■ ACCESSORIES (Available on request)

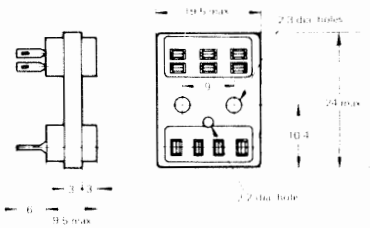
• CONNECTING SOCKETS/HOLD-DOWN CLIPS

Contact form	Back connecting socket			Applicable relay hold-down clip
	Solder terminal*	PC terminal		
		2.54mm grid**	Off set*	
DPDT	PM08	PM08-0-SM	PM08-0	PMC2S
4PDT	PM14	PM14-0-SM	PM14-0	PMC4S
6PDT	PM20	PM20-0-SM	PM20-0	PMC6S

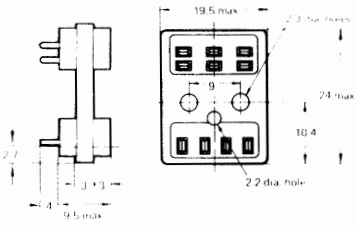
NOTES:
1. * When Type PM□ or PM□-0 connecting socket with ground stud (G type) is used, be sure to use a ground terminal (Type PMG or PMG-1) for the connecting socket.
2. ** If any of Type PM□-0-SM sockets is required with a ground stud, add symbol "G" to the part number of the socket when placing your order (e.g., PM□G-0-SM).



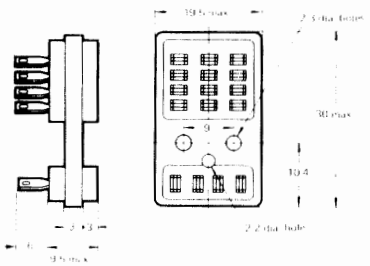
PM08



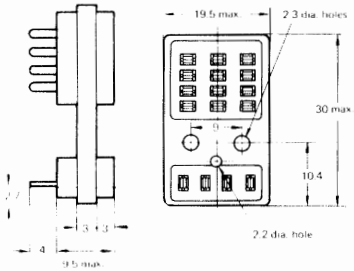
PM08-0



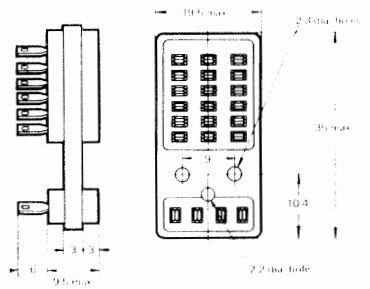
PM14



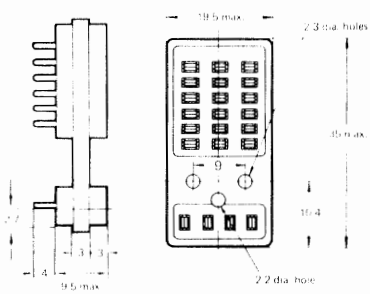
PM14-0



PM20

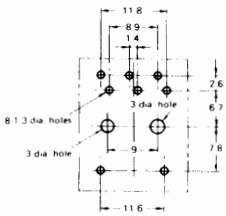


PM20-0

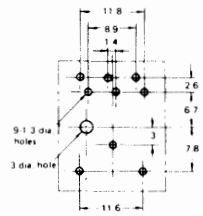


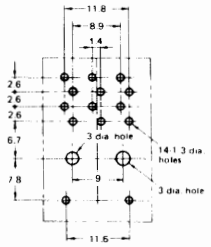
Mounting holes (Bottom view)

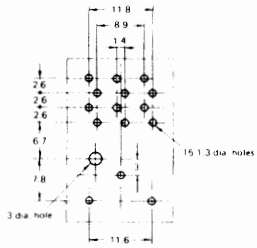
• **Without ground terminal**

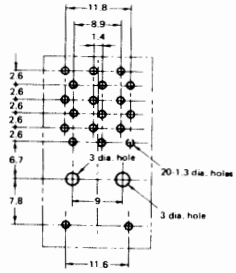


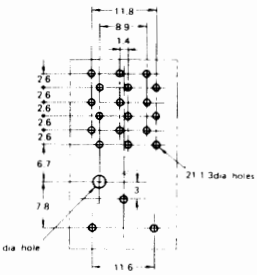
• **With ground terminal**





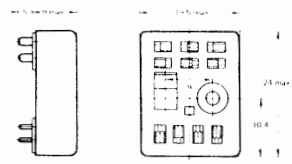




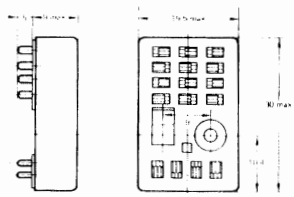


NOTE
The above three drawings apply to the mounting of the relay with a ground stud. In this case, be sure to use a Type PMG-1 ground terminal with the connecting socket.

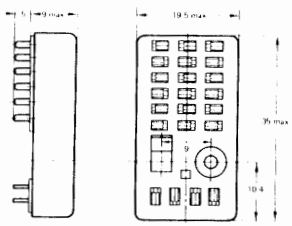
PM08-0-SM



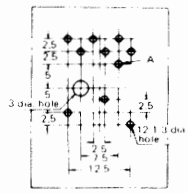
PM14-0-SM

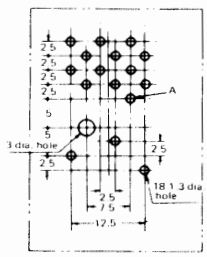


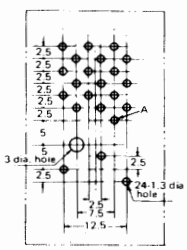
PM20-0-SM



Mounting holes (Bottom view)





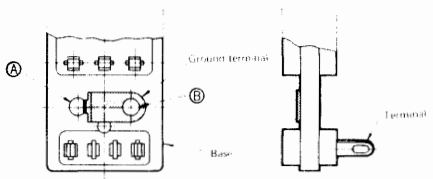


NOTE Hole A is required only when type PM□G-0-SM is used.

• GROUND TERMINAL

When mounting the connecting socket to the relay requiring grounding, be sure to use the ground terminal for the socket.

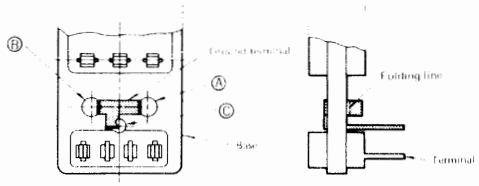
• PMG (for PM□)



Mounting method

1. Insert the legs of the ground terminal into the holes Ⓐ and Ⓑ in the base, as shown in the above drawing.
2. Mount it on the panel together with the base by inserting the screw into hole Ⓑ .

• PMG-1 (for PM□-0)

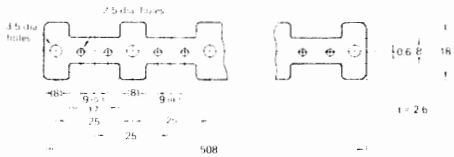


Mounting method

1. Insert the legs of the ground terminal into the holes Ⓐ , Ⓑ and Ⓒ , respectively, in the base, as shown in the above drawing.
2. Secure the ground terminal by bending inwards the two respective legs inserted into holes Ⓐ and Ⓑ .

• RELAY MOUNTING PLATE (PMP-20)

When a number of relay are to be mounted directly on a panel in a row, use the Type PMP relay mounting plate which permits the mounting of a maximum of 20 relays. The relay mounting plate also permits the mounting of Types PM08, PM14 and PM20 connecting sockets.
The relays with a ground stud (G type) only can be mounted directly on the relay mounting plate.



HIGH-SENSITIVITY TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exception.

• COIL RATINGS

Model	MHS2P(G)(-O)(-SM)□Ω MHS2ZP(G)(-O)(-SM)□Ω						MHS4P(G)(-O)(-SM)□Ω MHS4ZP(G)(-O)(-SM)□Ω					
Coil resistance (Ω)	Operate current (mA)	Max. permissible current (mA)	Release current (mA)	Operating voltage (V)	Recommended voltage (V)	Release voltage (V)	Operate current (mA)	Max. permissible current (mA)	Release current (mA)	Operating voltage (V)	Recommended voltage (V)	Release voltage (V)
1.5	210	910	29.4	0.35 to 1.5	0.55	0.04	324	910	45.3	0.54 to 1.5	0.8	0.06
2.6	165	690	23.1	0.47 to 1.9	0.7	0.05	250	690	35.0	0.72 to 1.9	1.1	0.08
5.1	125	495	17.5	0.7 to 2.9	1.0	0.08	190	495	26.5	1.07 to 2.9	1.6	0.12
6.8	127	430	17.7	0.95 to 3.2	1.5	0.09	200	430	28	1.5 to 3.2	2.3	0.13
7	105	420	14.7	0.8 to 3.2	1.2	0.09	158	420	22.1	1.22 to 3.2	1.8	0.13
9.5	110	360	15.4	1.15 to 3.9	1.7	0.12	172	360	24.1	1.8 to 3.9	2.7	0.18
15	72	290	10.0	1.2 to 4.9	1.7	0.13	110	290	15.4	1.8 to 4.9	2.7	0.20
18	65	260	9.1	1.3 to 5.3	2	0.14	100	260	14.0	2.0 to 5.3	3	0.22
28	53	210	7.4	1.65 to 6.7	2.3	0.18	82	210	11.4	2.5 to 6.7	3.7	0.28
46*	42	165	5.8	2.1 to 8.3	3	0.24	65	165	9.1	3.3 to 8.3	4.8	0.35
58	40	145	5.6	2.6 to 9.8	3.5	0.29	62	145	8.6	4.0 to 9.8	5.3	0.4
80	33	125	4.6	2.9 to 10.9	4	0.33	50	125	7.0	4.4 to 10.9	6	0.5
110	29	105	4.0	3.5 to 13.1	4.7	0.4	44	105	6.1	5.3 to 13.1	7.5	0.6
150*	24	91	3.3	4.0 to 15.5	6	0.4	37	91	5.1	6.1 to 15.5	8.5	0.7
170	23	86	3.2	4.3 to 15.9	6	0.5	35	86	4.9	6.5 to 15.9	9	0.7
220	22	75	3.1	5.4 to 18.8	8	0.5	34	75	4.7	8.3 to 18.8	12	0.8
250	19	71	2.6	5.2 to 19.4	7	0.6	29	71	4.0	8.0 to 19.4	12	0.9
280	20	67	2.8	6.2 to 20.3	9	0.6	31	67	4.3	9.6 to 20.3	15	0.9
325*	17	62	2.3	6.1 to 22.5	9	0.6	26	62	3.6	9.3 to 22.5	13	1.0
385	16	57	2.2	6.8 to 24.0	8.5	0.7	24	57	3.3	10 to 24.0	14	1.1
530	13	49	1.8	7.6 to 29.1	10	0.8	19	49	2.6	11 to 29.1	16	1.2
635*	12	44	1.6	8.4 to 30.8	12	0.9	19	44	2.6	13 to 30.8	18	1.4
890*	11	37	1.5	10.8 to 37.6	13	1.2	17	37	2.3	17 to 37.6	21	1.8
1,100	10	34	1.4	12.7 to 40.6	18	1.4	15	34	2.1	19 to 40.6	24	2.0
1,700*	8	27	1.1	15.6 to 55.4	19	1.7	12	27	1.6	23.5 to 55.4	30	2.4
2,100*	7	24	1.0	16.9 to 56.1	24	1.9	11	24	1.5	25 to 56.1	36	2.8
3,200*	6	20	0.8	22.0 to 70.5	25	2.3	9	20	1.2	33 to 70.5	40	3.4
5,300*	4.5	15	0.7	25.0 to 89.1	36	3.3	6.5	15	1.0	38 to 89.1	48	4.7
7,600	4	13	0.5	34.0 to 108.1	48	3.4	6.5	13	0.9	52 to 108.1	60	6.1
9,000	3.7	12	0.5	36.8 to 117	60	3.7	5.4	12	0.7	54 to 117	80	6.5
15,000	3	9	0.4	50.0 to 150	100	5.4	4.5	9	0.6	68 to 150	100	8.1

• CHARACTERISTICS

Service life	Electrically: 5,000,000 operations min. (under rated load)

NOTES:
1. * Recommended type
2. The appropriate coil resistance value indicated in the leftmost column must be entered in the bracket portion of each model number.
3. Coil resistances are at an ambient temperature of 20°C with a tolerance of ±10%. A change of approx. 0.4% in coil resistance must be taken into account for a change of ±1°C in ambient temperature.
4. Working voltages are at an ambient temperature of 20°C. Note that working voltage will increase by approx. 0.4% at each ambient temperature rise of 1°C.

STANDARD APPROVED TYPE

When placing your order for UL and CSA approved versions, please indicate "UL" or "CSA" as desired in addition to the model number.

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exceptions.

• RATINGS

UL recognized type (File No. E41515)/CSA certified type (File No. LR34815)

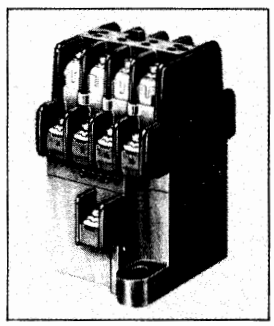
Type	Contact form	Coil ratings	Contact ratings
MHS	DPDT 4PDT 6PDT	6 to 110 VDC	2A 125 VAC/28 VDC (resistive load)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

GENERAL-PURPOSE RELAY

Model MA

Electromagnetic Relay Boasting Highly Reliability & Long Life



■ FEATURES

- Cone-shaped, wiping-rolling type movable contacts ensure high contact reliability
- Special iron core construction guarantees more than 10 million mechanical operations
- Compact design requires minimal mounting space
- Hermetically sealed electromagnetic section prevents the ingress of iron powder and dust into the iron core section
- Easy assembly, disassembly, and parts replacement with the two clamping screws

■ AVAILABLE TYPES

Carry current	No. of poles	Contact form \ Type	Standard	DC operated*	Standard approved**
6A	3	3PST-NO+3PST-NC	MA306	–	MA306-US***
		3PST-NO	MA306-30	–	MA306-30-US***
		DPST-NO+SPST-NC	MA306-21	–	MA306-21-US***
	4	4PST-NO+4PST-NC	MA406N(B)	–	MA406N(B)-US
		4PST-NO+3PST-NC	–	MA406N(DC)	–
		4PST-NO	MA406N(B)-40	–	MA406N(B)-40-US
		3PST-NO+SPST-NC	MA406N(B)-31	–	MA406N(B)-31-US
		DPST-NO+DPST-NC	MA406N(B)-22	–	MA406N(B)-22-US
15A	4	4PST-NO+4PST-NC	MA415N	–	MA415-US
		4PST-NO+3PST-NC	–	MA415N(DC)	–
		4PST-NO	MA415N-40	–	MA415-40-US
		3PST-NO+SPST-NC	MA415N-31	–	MA415-31 US
		DPST-NO+DPST-NC	MA415N-22	–	MA415-22-US
20A	5	5PST-NO+5PST-NC	MA520N	–	–
		5PST-NO	MA520N-50	–	–
		4PST-NO+SPST-NC	MA520N-41	–	–
		3PST-NO+DPST-NC	MA520N-32	–	–

NOTES:
* In the DC operated type, N.C. contact is used as an auxiliary contact by connecting it internally.
** Unless otherwise specified, all types are approved by UL & CSA.
*** Certified only by CSA.

OMRON

STANDARD TYPE

■ SPECIFICATIONS

- **COIL RATINGS** (NOTE: The rated current is measured at a coil temperature of 20°C with tolerance of ±20%.)

- **MA406N(B)/-40/-31/-22**

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA) Value at start	Power consumption (VA) Rated value
AC	6	137	140	0.6	0.00154	0.127	80% max	30% min	110%	Approx. 40	Approx. 7.5
	12	74	68	2.5	0.0066	0.054					
	24	40	32	9	0.025	0.20					
	50	18	14	35	0.114	0.95					
	100	8.7	7.1	160	0.49	4.1					
	(110)		(8.0)								
	200	4.4	3.6	690	1.9	15.7					
	(220)		(4.1)								
	400	2.3	2.0	3,300	8.38	69.3					

- **MA306/-30/-21**

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA) Value at start	Power consumption (VA) Rated value
AC	6	1,250	1,470	0.6	0.0020	0.011	80% max	30% min	110%	Approx. 35	Approx. 8.9
	12	865	700	2.3	0.0081	0.045					
	24	460	370	9	0.031	0.17					
	50	210	170	35	0.142	0.79					
	100	96	89	160	0.61	3.4					
	(110)		(98)								
	200	46	42.5	690	2.37	13.1					
	(220)		(47.2)								
	400	21	19.9	2,760	11	61					

- **MA415N/-40/-31/-22**

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA) Value at start	Power consumption (VA) Rated value
AC	6	1,860	1,500	0.39	0.00141	0.0109	80% max	30% min	110%	Approx. 56	Approx. 8
	12	965	770	1.65	0.0056	0.043					
	24	520	415	6.59	0.023	0.18					
	50	229	180	29.8	0.104	0.80					
	100	95	80	122	0.43	3.3					
	(110)		(88)								
	200	48	40	456	1.66	12.8					
	(220)		(45)								
	400	22	19	1,767	6.64	51					

- **MA520N/-50/-41/-32**

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA) Value at start	Power consumption (VA) Rated value
AC	6	2,420	2,080	0.7	0.00087	0.0075	80% max	30% min	110%	Approx. 120	Approx. 12
	12	1,270	930	2	0.0035	0.03					
	24	680	480	5.5	0.014	0.12					
	50	320	230	29	0.063	0.54					
	100	175	120	67	0.25	2.16					
	(110)		(140)								
	200	104	56	290	1	8.6					
	(220)		(70)								
	400	57.6	28	1,120	4	34.5					

- **CONTACT RATINGS**

Item \ Type	6A; 3, 4-pole		15A; 4-pole		20A; 5-pole	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7ms.)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7ms.)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7ms.)
Rated load	220 VAC 6A 24 VDC 6A	220 VAC 4A 24 VDC 6A	220 VAC 15A 24 VDC 15A	220 VAC 10A 24 VDC 15A	220 VAC 20A 24 VDC 20A	220 VAC 13A 24 VDC 16A
Carry current	6A		15A		20A	
Max. operating voltage	550 VAC 250 VDC		550 VAC 250 VDC		550 VAC 250 VDC	
Max. operating current	6A		15A		20A	
Max. switching capacity	1,650VA 500W	1,100VA 200W	3,300VA 1,000W	2,200VA 480W	4,400VA 1,000W	2,800VA 630W
Min. permissible load (ref. value)	MA306/406/415 series: 5 VDC 100mA; MA520 series: 5 VDC 1A					

• CHARACTERISTICS

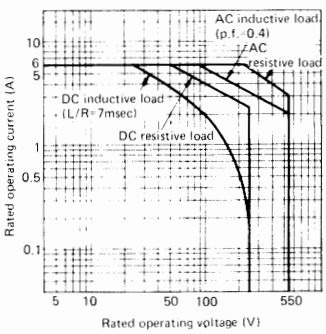
Contact resistance	50mΩ max.
Operate time	AC: 30msec max. DC: 50msec max.
Release time	AC: 30msec max. DC: 50msec max.
Operating frequency	Mechanically: 1,800 operations/hour Under rated load: 1,800 operations/hour
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 45Hz; 1.0mm double amplitude
Shock	Mechanical durability: 1,000m/s² (approx. 100G's) Malfunction durability: 200m/s² (approx. 20G's)
Ambient temperature	Operating: –10 to +40°C
Humidity	45 to 85% RH
Service life	Mechanically: 10,000,000 operations min. (5,000,000 operations min. for MA306 and MA520N) Electrically: 500,000 operations min. (under rated load)
Weight	MA306: Approx. 240g MA406N: Approx. 290g MA415N: Approx. 390g MA520N: Approx. 550g

NOTE: The data shown above are of initial value.

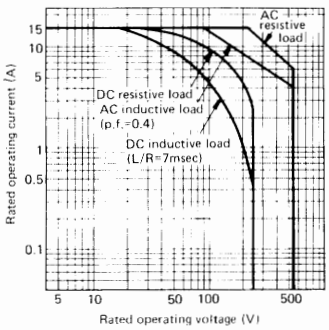
• CHARACTERISTIC DATA

Maximum switching capacity

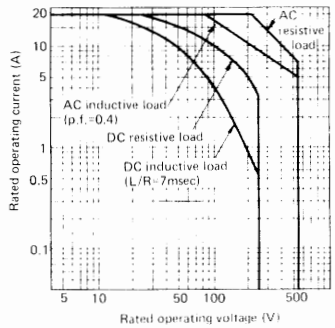
MA306/-30/-21, MA406N(B)/-40/-31/-22



MA415N/-40/-31/-22

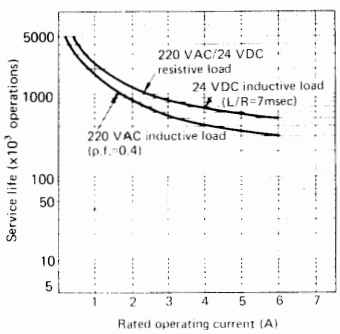


MA520N/-50/-41/-32

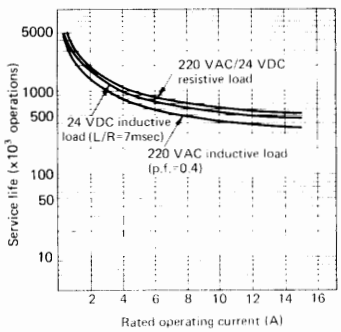


Electrical service life

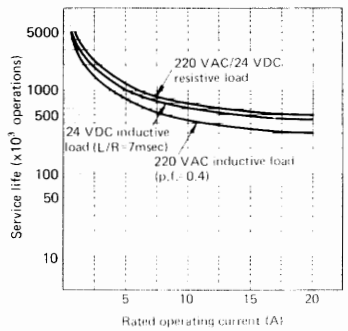
MA306/-30/-21, MA406N(B)/-40/-31/-22



MA415N/-40/-31/-22

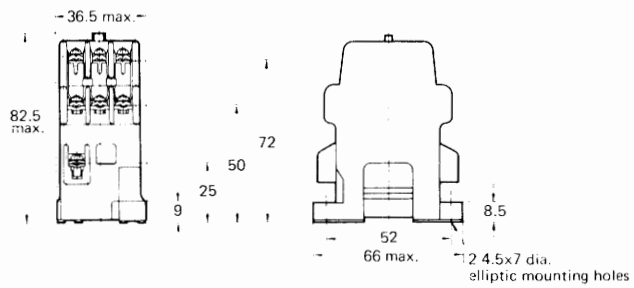


MA520N/-50/-41/-32



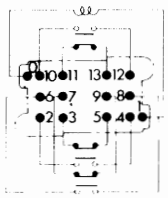
■ DIMENSIONS

• MA306

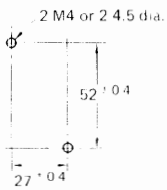


Terminal arrangement (Top view)

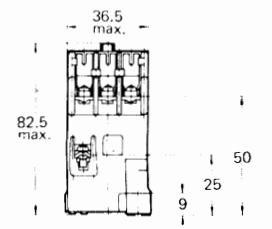
MA306

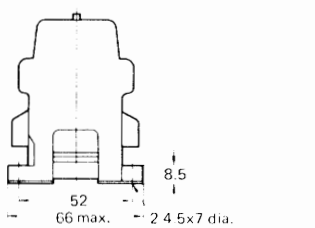


Mounting holes

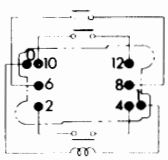


• MA306-30, MA306-21

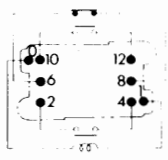




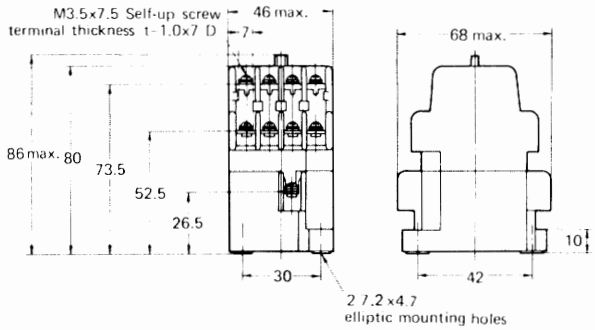
MA306-30



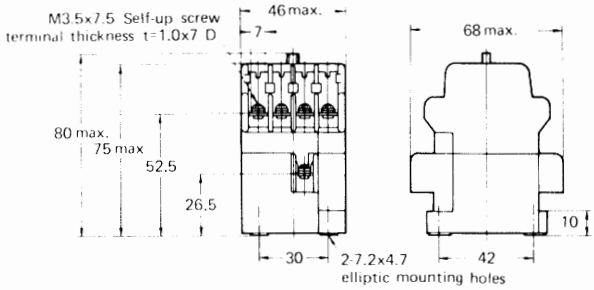
MA306-21



• MA406N

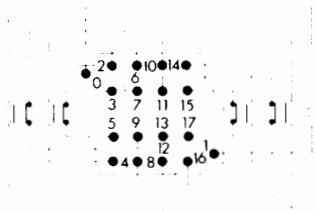


• MA406N-40, MA406N-31, MA406N-22

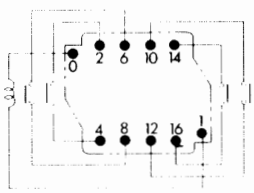


Terminal arrangement (Top view)

MA406N



MA406N-40



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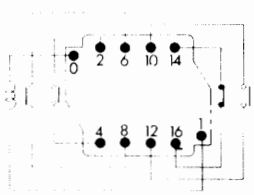
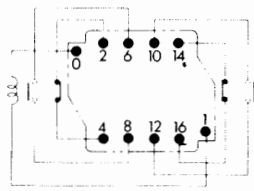
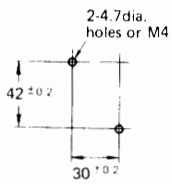


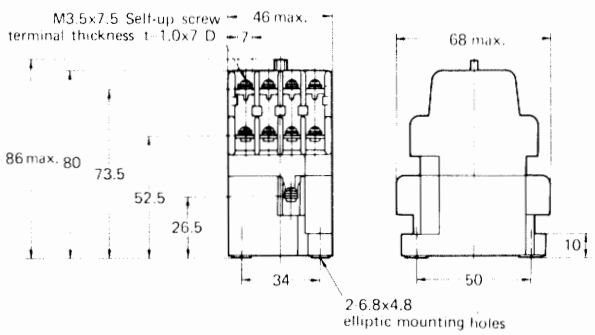
MA406N-22



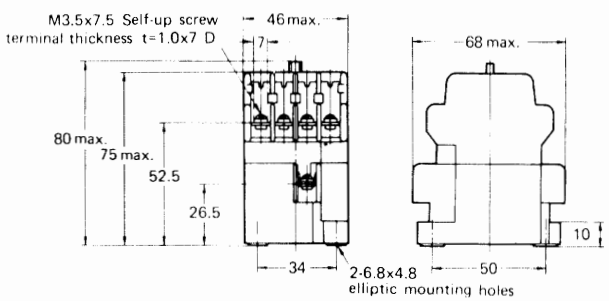
Mounting holes



• MA406NB

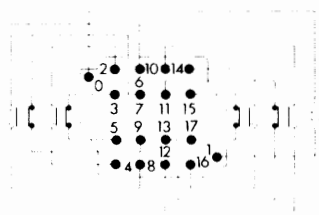


• MA406NB-40, MA406NB-31, MA406NB-22

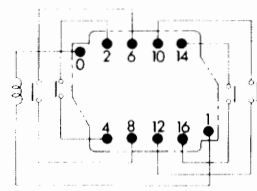


Terminal arrangement (Top view)

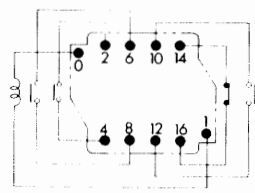
MA406NB



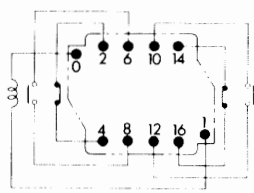
MA406NB-40



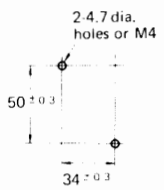
MA406NB-31



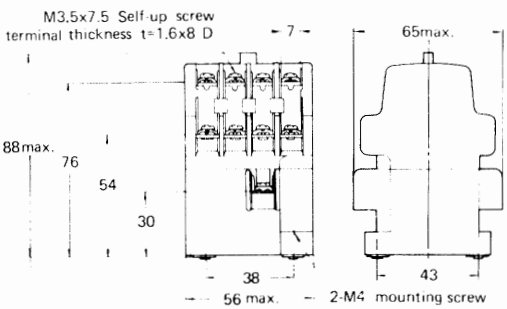
MA406NB-22



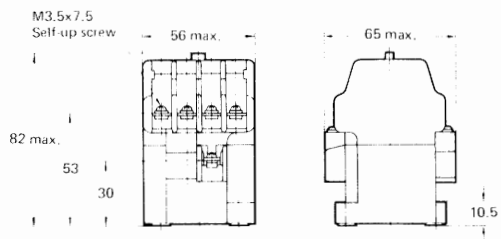
Mounting holes



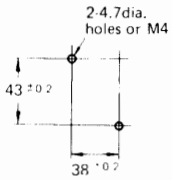
• MA415N



• MA415N-40, MA415N-31, MA415N-22

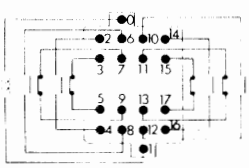


Mounting holes

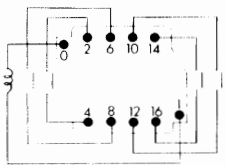


Terminal arrangement (Top view)

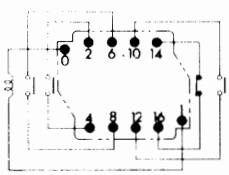
MA415N



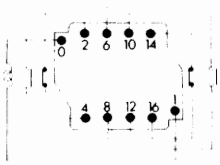
MA415-40



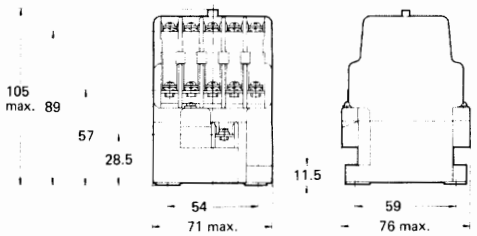
MA415-31



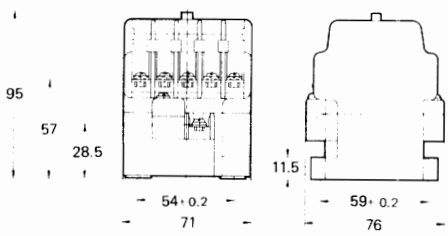
MA415-22



- **MA520N**

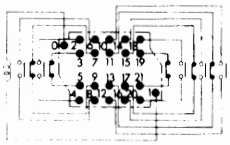


- **MA520N-51, MA520N-41, MA520N-32**

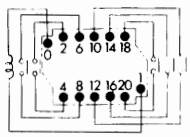


Terminal arrangement (Top view)

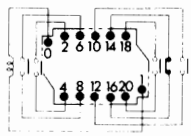
MA520N



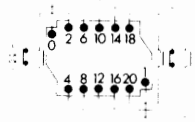
MA520N-50



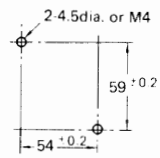
MA520N-41

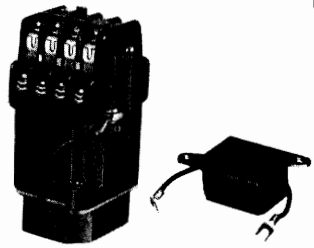


MA520N-32



Mounting holes





■ ACCESSORY (Available on request)

• SURGE ABSORBER

When the Model MA is to be used in a circuit containing solid state components, Model MAG series high-performance surge absorber developed for exclusive use with the MA relay, should be employed to protect the semiconductor devices from the surge voltage generated by the Model MA relay coil.

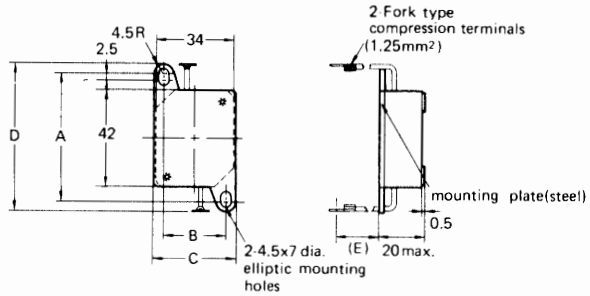
Available types

Applicable relay	Surge absorber
MA306	MAG1(H)
MA406N	MAG2(H)
MA415N MA506N	MAG3(H)
MA406NB	MAG4(H)

Specifications

Maximum applicable voltage	250V (500 for H-type)
Maximum rated current	20mA (19mA for H-type)
Insulation resistance	1,000MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz, for 1 min. between mounting plate and surge absorber device
Shock	Mechanical durability: 1,000m/s² (approx. 100G's)
Ambient temperature	Operating: −10 to +40°C
Service life	10 million operations or more in terms of magnetic relay operation

Dimensions



	MAG1(H)	MAG2(H)	MAG3(H)	MAG4(H)
A	54.5±0.2	44±0.2	43±0.2	52±0.2
B	27±0.2	30±0.2	38±0.2	34±0.2
C	36.5 max.	39.5 max.	48.5 max.	46 max.
D	64 max.	53.5 max.	53.5 max.	64 max.
E	30	55	55	30

Mounting holes

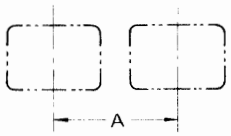
MAG1(H)	Same as MA306N wtih 2-4.5x7 dia. elliptic holes
MAG2(H)	Same as MA406N with 2-7.2x4.7 dia. elliptic holes
MAG3(H)	Same as MA415N with 2-4.7 dia. holes
MAG4(H)	Same as MA406NB with 2-6.8x4.7 dia. elliptic holes

Hints on correct use

- Securely connect the lead wires to the surge absorber to prevent loose connections. A loose connection may prevent the surge absorber from functioning normally.
- When mounting screws are required, order separately.

■ HINTS ON CORRECT USE

- **Mounting**
- When a number of relays are to be arrayed, provide the following mounting space between the relays.



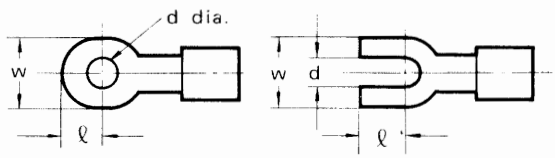
Series	Mounting space A (mm)
MA306 series	41 min.
MA406 series	50 min.
MA506N series	61 min.
MA415N series	61 min.
MA520N series	76 min.

- **Connection**
- When wiring, employ the polyvinyl chloride insulated wire listed below or its equivalents.

Type	Diameter (mm)
MA306Z MA406NZ	0.8 to 1.2
MA306 MA406N MA506N	1.0 to 1.2
MA415N MA520N	1.2 to 1.6

- When more than one lead wire is to be connected at one point, employ solderless terminals or lead wires of the same diameter.

- When employing solderless terminals, refer to the following table for the terminal size.



Type	W (mm)	ℓ (mm)	d (mm)
MA306(Z)	6.5 max.	5 max.	3.5 max.
MA406N(Z)	6.5 max.	4 max.	3.5 max.
MA506N	6.5 max.	4 max.	3.5 max.
MA415N	7.8 max.	4 max.	3.5 max.
MA520N	8.5 max.	5 max.	4 max.

- Tighten the screw terminals to 10kg-cm torque max.

DC OPERATED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exceptions.

- **COIL RATINGS**
- **MA406N (DC)**

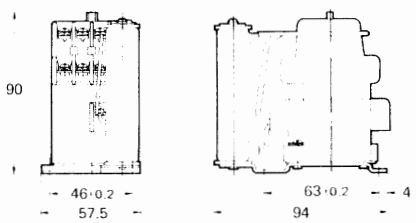
Rated voltage (V)		Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (W)	
				Armature OFF	Armature ON	% of rated voltage			Value at start	Rated value
DC	6	968	1.2	6.9	10.8	80 max.	10 min.	110	Approx. 40	Approx. 6.7
	12	492	4.4	32.4	51.1					
	24	247	17	93.6	189					
	48	132	64	534	858					
	100	66.8	245	2360	3630					
	200	33.7	930	10300	14300					

- **MA415N (DC)**

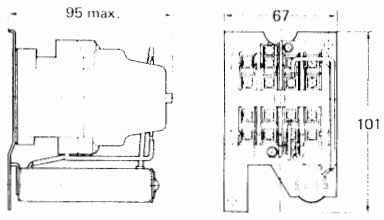
Rated voltage (V)		Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (W)	
				Armature OFF	Armature ON	% of rated voltage			Value at start	Rated value
DC	6	960	1.25	6.5	10.2	80 max.	10 min.	110	Approx. 50	Approx. 6.3
	12	475	5.25	25.1	39.2					
	24	242	19	98.9	145					
	48	127	77	455	717					
	100	63	330	1880	3730					
	200	30	1460	7190	14100					

■ DIMENSIONS

- **MA406N(DC)**

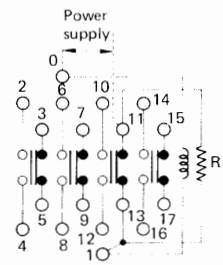


- **MA415N(DC)**

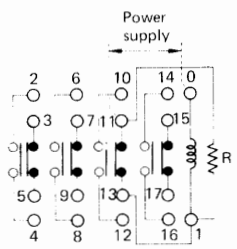


Terminal arrangement (Top view)

MA406N(DC)



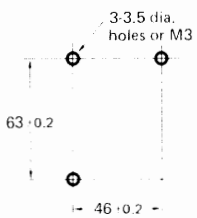
MA415N(DC)



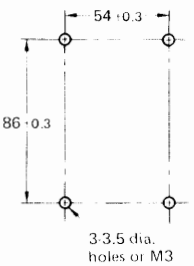
R: Externally connected resistor

Mounting holes

MA406N(DC)



MA415N(DC)



STANDARD APPROVED TYPE

When placing your order for foreign standard approved versions, please indicate "UL," "CSA," etc. as desired in addition to the model number.

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exceptions.

• RATINGS

UL recognized type (File No. E41643)

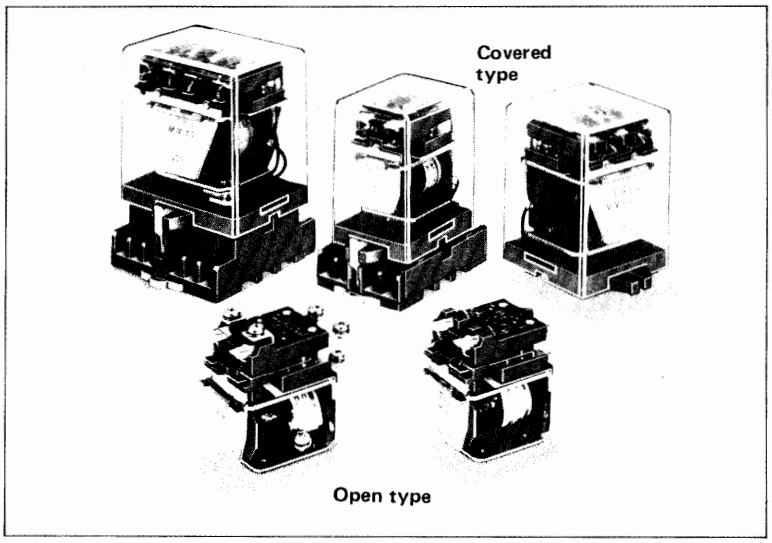
Type	No. of poles	Coil ratings	Contact ratings
MA406N	4	6 to 240 VAC	6A 240 VAC, 10A 120 VAC (inductive load) 1HP 240 VAC (motor load)
MA415N	4		10A 240 VAC, 15A 120 VAC (inductive load) 1HP 240 VAC (motor load)

CSA certified type (File No. LR31167)

Type	No. of poles	Coil ratings	Contact ratings
MA306 MA406N	3 4	6 to 240 VAC	1HP 240 VAC (motor load) 10A 120 VAC, 6A 240 VAC (inductive load)
MA415N	4		1HP 240 VAC (motor load) 15A 120 VAC, 10A 240 VAC

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Versatile Relay Satisfying All Purposes



■ FEATURES

- Various loads from low to medium power sources can be switched
- Specially designed construction provides excellent contact wipe
- Capable of making and breaking comparatively large DC loads because of the unique magnetic blowout construction

■ AVAILABLE TYPES

Construction	Terminal	Contact form	Standard	DC load switching
Open type	Solder	DPDT	MM2	MM2X
		3PDT	MM3	MM3X
		4PDT	MM4	MM4X
	Screw	DPDT	MM2B	MM2XB
		3PDT	MM3B	MM3XB
		4PDT	MM4B	MM4XB
Covered type	Plug-in	DPDT	MM2P	MM2XP
		3PDT	MM3P	MM3XP
		4PDT	MM4P	MM4XP

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Contact form	Rated voltage (V)		Rated current (mA) Open type 50Hz	Open type 60Hz	Covered type 50Hz	Covered type 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Armature ON	Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (VA, W) Value at start	Rated value
										% of rated voltage				
DPDT	AC	6	790	655	690	590	1.1	0.02	0.02	80 max.	50Hz: 25 min. 60Hz: 30 min.	110	Approx. 4.1	Approx. 3.5
		12	395	325	345	295	4.7	0.07	0.1					
		24	195	160	170	145	19	0.28	0.41					
		50	94	78	82	70	82	1.2	1.7					
		100	47	39	41	35	340	4.8	6.7					
		110	43	35	37	32	430	6	8					
		120	39	32.5	34	29	540	7	9.6					
		200	23.5	19.5	20.5	17.5	1,540	20	25.6					
		220	21	18	18.6	16	1,750	24	32					
		240	19.6	16	17.1	14.6	1,960	29	38					
	DC	6	340				17.5	0.2	0.36	70 max.	10 min.		...	Approx. 2.1
		12	176				68	0.74	1.0					
		24	87				275	4.2	5.8					
		48	41				1,180	20.4	26					
		100	17				5,750	81.6	92.5					
		110	19				5,750	81.6	92.5					
3PDT 4PDT	AC	6	1,120	950	975	850	0.5	0.01	0.03	80 max.	50Hz: 25 min. 60Hz: 30 min.	110	Approx. 6.3	Approx. 5.1
		12	560	480	490	430	2.0	0.04	0.07					
		24	280	240	245	210	8.5	0.18	0.28					
		50	134	114	117	102	36	0.75	1.2					
		100	67	57	58.5	51	150	3	4.5					
		110	61	52	53	46	182	3.6	5.5					
		120	56	47.5	49	42.5	220	4.5	6.4					
		200	33.5	28.5	29	25.5	620	12	19					
		220	30	26	26.5	23	780	15	21					
		240	28	24	24.5	21.5	980	18	26					
	DC	6	450				13.4	0.23	0.35	70 max.	10 min.		...	Approx. 2.7
		12	220				54	0.87	1.4					
		24	94				255	5.6	9.2					
		48	52				930	27.3	45.5					
		100	22				4,500	61.4	96.5					
		110	24.5				4,500	61.4	96.5					

NOTES: 1. The power consumption values in ( ) are for the covered type with plug-in terminals.
2. The performance characteristics are measured at coil temperatures ranging from 5 to 35°C.
3. The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances being ±15%, −20% for rated current, and ±15% for coil resistance.

• CONTACT RATINGS

Item \ Type	Open type: Resistive load (p.f.=1)	Open type: Inductive load (p.f.=0.4; L/R=7msec)	Covered type: Resistive load (p.f.=1)	Covered type: Inductive load (p.f.=0.4; L/R=7msec)
Rated load	220 VAC 15A; 24 VDC 10A		220 VAC 7.5A; 24 VDC 5A	
Carry current	15A		7.5A	
Maximum operating voltage	250 VAC, 250 VDC		250 VAC, 250 VDC	
Maximum operating current	15A		7.5A	
Maximum switching capacity	3,300VA, 240W		1,700VA, 120W	
Minimum permissible load (ref. value)	5 VDC 25mA			

• CHARACTERISTICS

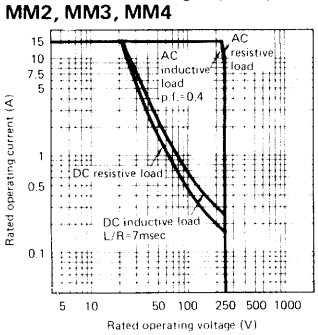
Item \ Type	Open type	Covered type
Contact resistance	25mΩ max.	50mΩ max.
Operate time	AC: 25msec max. DC: 50msec max.	
Release time	30msec max.	
Operating frequency	Mechanically: 7,200 operations/hour Electrically: 1,800 operations/hour (under rated load)	
Insulation resistance	100MΩ min. (at 500 VDC)	
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (1,500 VAC, 50/60Hz for 1 minute between the same poles)	
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 50Hz; 1mm double amplitude	
Shock	Mechanical durability: 1,000m/s² (approx. 100G's) Malfunction durability: 100m/s² (approx. 10G's)	
Ambient temperature	Operating: −10 to +55°C	
Humidity	45 to 85% RH	
Service life	Mechanically: 5,000,000 operations min. (at operating frequency of 7,200 operations/hour) Electrically: See "CHARACTERISTIC DATA."	
Weight	MM2: Approx. 160g MM2P: Approx. 220g MM3: Approx. 270g MM3P: Approx. 360g MM4: Approx. 300g MM4P: Approx. 410g	

NOTE: The data shown are of initial value.

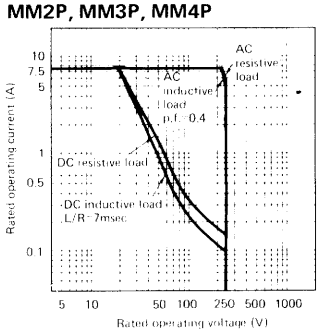
• CHARACTERISTIC DATA

Maximum switching capacity

MM2, MM3, MM4

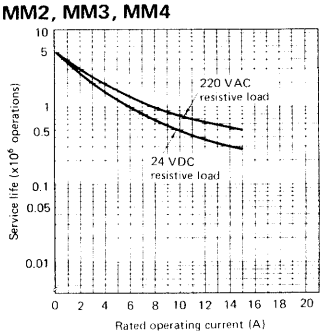


MM2P, MM3P, MM4P

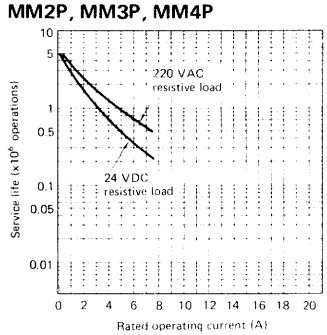


Electrical service life

MM2, MM3, MM4

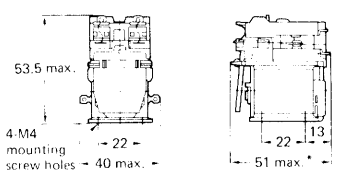


MM2P, MM3P, MM4P

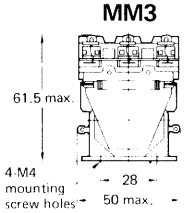


■ DIMENSIONS

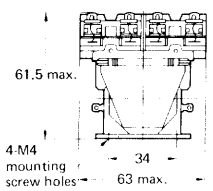
MM2



MM3

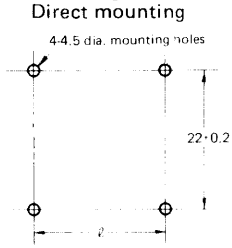


MM4



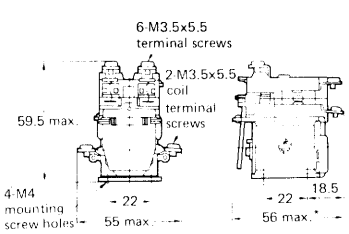
Mounting holes

Direct mounting

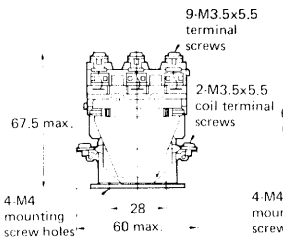


Dimension ℓ
MM2(B): 22±0.2
MM3(B): 28±0.2
MM4(B): 34±0.2

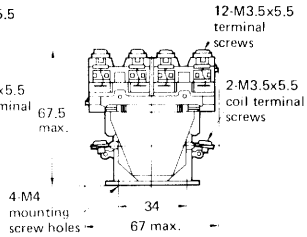
MM2B



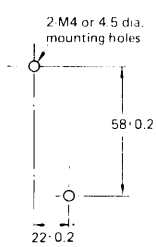
MM3B



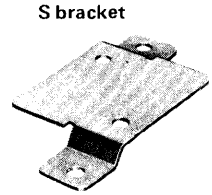
MM4B



Mounting with S bracket

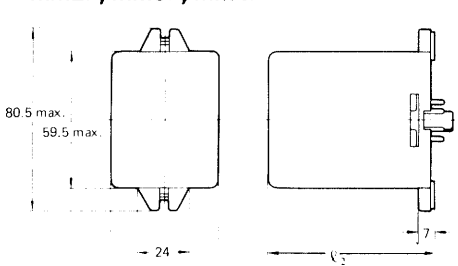


S bracket



(Type R99-03MM)

MM2P, MM3P, MM4P

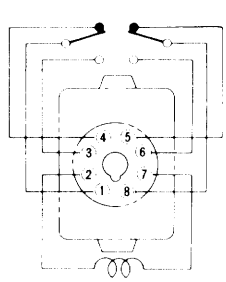


Dimension ℓ1
MM2P: 47.5 max.
MM3P: 61.5 max.
MM4P: 79.5 max.
Dimension ℓ2
MM2P: 73 max.
MM3P: 81.5 max.
MM4P: 81.5 max.

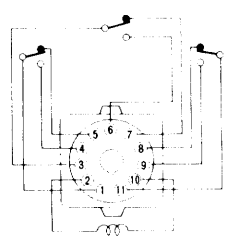
NOTE: When mounting the relay, use the connecting socket shown in ACCESSORY.

Terminal arrangements

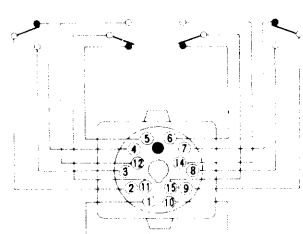
MM2P



MM3P



MM4P



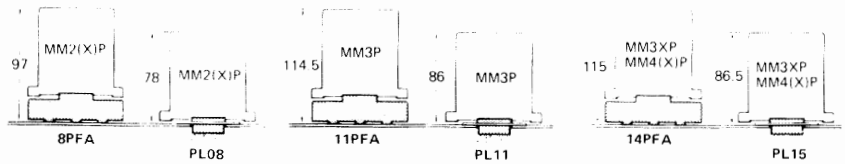
■ ACCESSORY (Available on request)

• CONNECTING SOCKETS

Relay \ Socket	Track mounted socket*	Back connecting socket	
		Solder terminal	Wire-wrap terminal
2-pole	8PFA	PL08	PL08-Q
3-pole	11PFA	PL11	PL11-Q
4-pole	14PFA	PL15	—

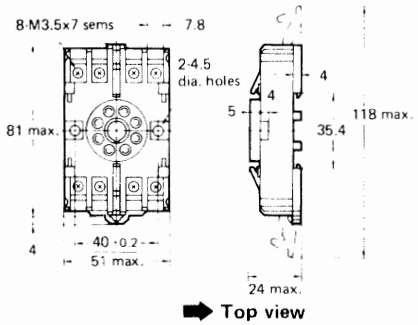
NOTES: 1. When placing your order for the relay, also specify the desired mounting socket.
2. * Track mounted socket can be used as a front connecting socket.

Mounting height of relay with connecting socket



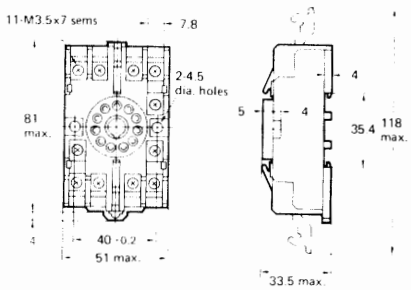
• Track Mounted Socket

8PFA

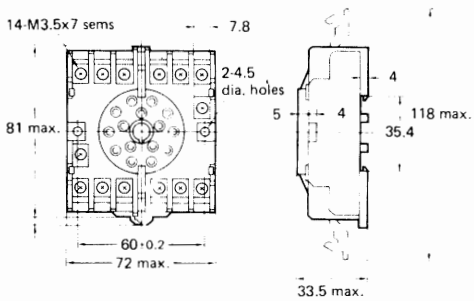


➡ Top view

11PFA

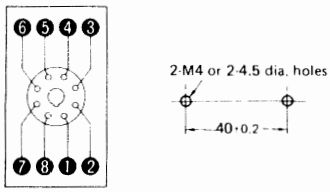


14PFA

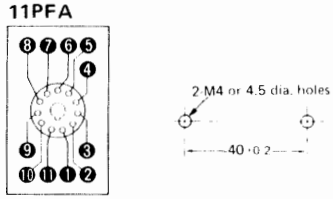


Terminal arrangement/mounting holes (Top view)

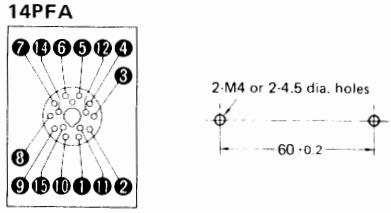
8PFA



11PFA

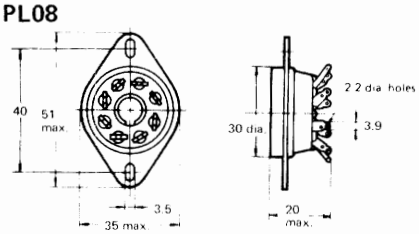


14PFA

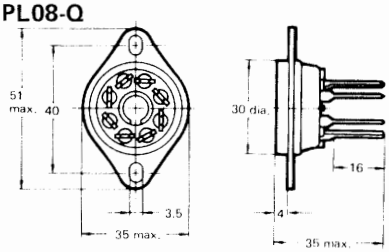


• Back Connecting Socket

PL08

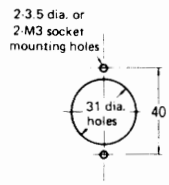


PL08-Q

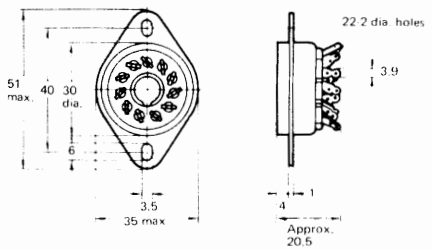


Terminal arrangement (Bottom view) PL08(-Q), P3D-08T

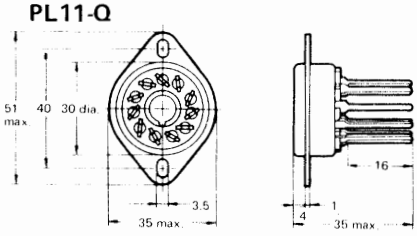
Mounting holes



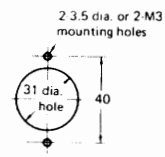
PL11



PL11-Q

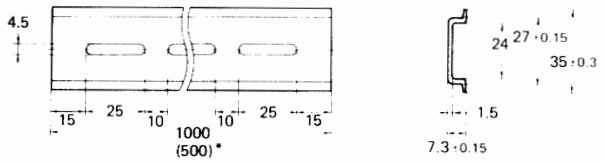


PL11(-Q), P3D-11T



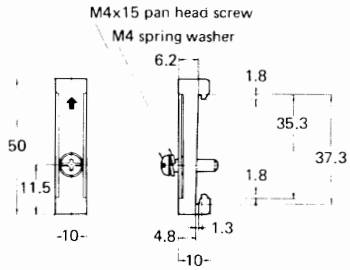
- **SOCKET MOUNTING TRACK/END PLATE (for □PFA)**

PFP-100N/PFP-50N



NOTE: * This dimension applies to Type PFP-50N.

PFP-M



DC LOAD SWITCHING TYPE

■ SPECIFICATIONS

Same as the Standard Type with the following exceptions.

- **CONTACT RATINGS**

Item \ Type	Open type		Covered type	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7ms)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7ms)
Rated load	110 VDC 10A	—	110 VDC 7.5A	—
Carry current	15A		7A	
Max. operating voltage	250 VAC 250 VDC			
Max. operating current	15A		7.5A	
Max. switching capacity	20VA 1,200W		20VA 800W	
Min. permissible load (ref. value)	5 VDC 25mA			

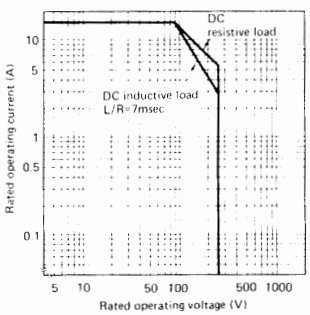
NOTE: With the AC load switching type, note that an unstable operating range where the load cannot be switched, exists in the vicinity of a rated operating current of 0.5 to 2.5A under an inductive load of 200 VDC.

- **CHARACTERISTICS**

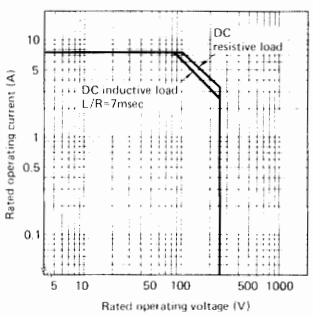
Weight:
MM2X: Approx. 170g, MM2XP: Approx. 220g
MM3X: Approx. 185g, MM3XP: Approx. 410g
MM4X: Approx. 320g, MM4XP: Approx. 430g

- **CHARACTERISTIC DATA**

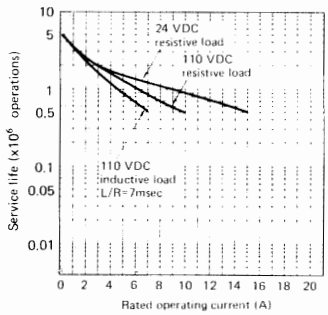
Maximum switching capacity
MM2X, MM3X, MM4X



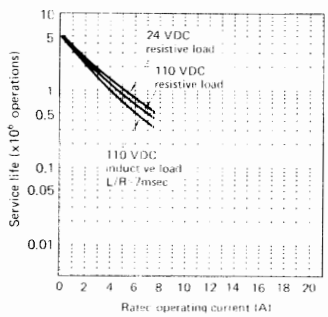
MM2XP, MM3XP, MM4XP



Electrical service life
MM2X, MM3X, MM4X



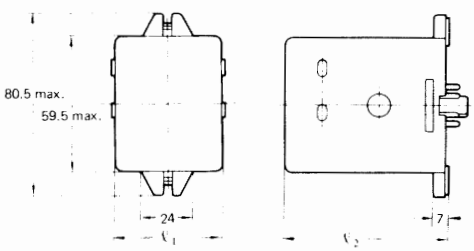
MM2XP, MM3XP, MM4XP



■ DIMENSIONS

Same as the Standard Type with the following exceptions.

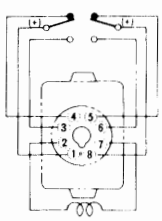
- **MM2XP, MM3XP, MM4XP**



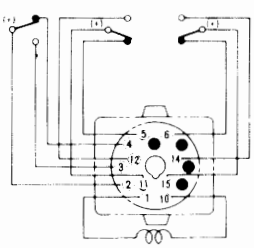
Dimension ℓ1
MM2XP: 47.5 max.
MM3XP: 79.5 max.
MM4XP: 79.5 max.
Dimension ℓ2
MM2XP: 73 max.
MM3XP: 81.5 max.
MM4XP: 81.5 max.

Terminal arrangements

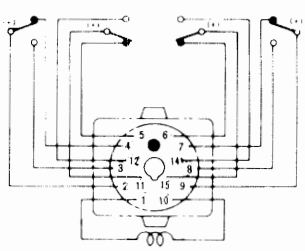
MM2XP



MM3XP



MM4XP

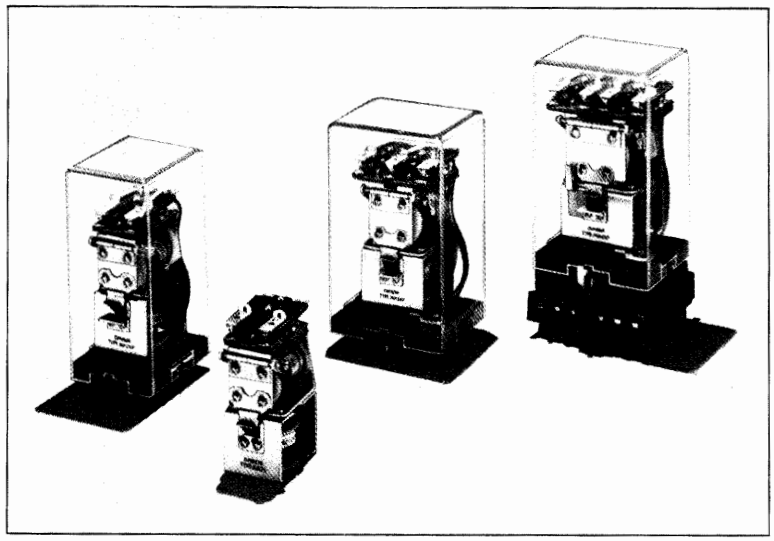


NOTE: When mounting the relay, use the connecting socket shown in "ACCESSORY."

■ ACCESSORY

Same as the Standard Type except that Type MM3XP shall use Type 14PF or PL15 socket.

Mechanical Latching Relay Boasting Wide Variety



■ FEATURES

- Low power consumption since the relay operation is held mechanically
- May be offered with different coil specifications such as set coil for AC operation and reset coil for DC operation
- Positively operates in quick response even to pulse signal input

■ AVAILABLE TYPES

Construction	Terminal	Contact form \ Type	Standard	DC load switching
Open type	Solder	DPDT	MM2K	MM2XK
		3PDT	MM3K	MM3XK
		4PDT	MM4K	MM4XK
	Screw	DPDT	MM2KB	MM2XKB
		3PDT	MM3KB	MM3XKB
		4PDT	MM4KB	MM4XKB
Covered type	Plug-in	DPDT	MM2KP	MM2XKP
		3PDT	MM3KP	MM3XKP
		DPDT+DPST-NO	MM4KP	MM4XKP

OMRON

■ SPECIFICATIONS

• COIL RATINGS

(SET COIL)

No. of poles	Rated voltage (V)		Rated current (mA) Open type 50Hz	Open type 60Hz	Covered type with plug-in terminals 50Hz	Covered type with plug-in terminals 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must set voltage (% of rated voltage)	Maximum permissible voltage (% of rated voltage)	Power consumption (VA, W) Open type	Power consumption (VA, W) Covered type
2	AC	6	1,092	931	960	815	13	0.015	0.02	80 max.	110	Approx. 5.7	Approx. 4.9
		12	551	471	483	410	5.5	0.06	0.08				
		24	271	231	237	205	23	0.24	0.33				
		50	132	113	116	98	100	1.0	1.5				
		100	66	56.6	58	49	400	3.9	5.5				
		110	69	51.5	53	44.5	495	4.8	7.0				
		120	54	46.5	48	40	635	5.8	8.5				
		200	31.5	27	27.5	24.5	1,920	13.6	22				
		220	30	24.5	26	22	2,220	19	28				
		240	26	22.5	23	20.5	2,291	22	32				
	DC	6	260				23	0.32	0.42			Approx. 2.6	
		12	150				80	0.85	1.1				
		24	73				327	3.6	4.8				
		48	38				1,260	13.4	16.6				
		100	22				4,570	46	60				
		200	13				15,500	175	240				
3	AC	6	1,450	1,241	1,260	1,080	0.72	0.009	0.013	80 max.	110	Approx. 7.7	Approx. 6.7
		12	738	631	642	560	3	0.035	0.05				
		24	375	321	326	270	12	0.14	0.2				
		50	170	151	148	130	52	0.6	0.9				
		100	88	75	76.5	65	220	2.7	4.0				
		110	80	68	70	59	280	2.9	4.5				
		120	73	63	64	54	326	3.5	5.5				
		200	43	37	37.5	32.5	1,000	9.5	15.6				
		220	40	33.5	35	29	1,150	11.5	19				
		240	36	31	31	27	1,380	13.5	22				
	DC	6	350				17	0.28	0.37			Approx. 2.2	
		12	170				70	1.15	1.55				
		24	88				274	4.1	5.5				
		48	44				1,095	15.1	20.5				
		100	22				4,550	74	100				
		200	11				18,000	280	380				
4	AC	6	1,780	1,520	1,460	1,250	0.53	0.008	0.011	80 max.	110	Approx. 9.9	Approx. 7.5
		12	961	821	790	625	2.1	0.034	0.045				
		24	463	396	380	312	8.1	0.14	0.18				
		50	230	197	189	150	39.5	0.6	0.8				
		100	113	97	93	75	162	2.3	3.4				
		110	103	88	84.5	68	192	3.0	4.0				
		120	94	81	77.5	62.5	224	3.5	4.5				
		200	52	49	42.5	37.5	640	8.4	13.7				
		220	47.2	44.5	38.6	34	840	12	16				
		240	43.3	40.8	35.4	31	990	14	19				
	DC	6	316				19	0.37	0.6			Approx. 3.1	
		12	235				51	0.7	1.2				
		24	104				230	3.5	6.0				
		48	64				748	7.6	13.8				
		100	30				3,290	40	70				
		200	13				15,200	125	200				

NOTES 1. The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±15%, −20%, and ±15% for rated coil resistance.

2. Performance characteristics are measured at a coil temperature of 5 to 35°C.

(RESET COIL)

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must reset voltage % of rated voltage	Power consumption (W,VA)
AC	6	975	833	2	0.012	0.019	80 max.	Approx. 5.0
	12	488	417	8.1	0.048	0.075		
	24	243	208	35.2	0.19	0.3		
	50	117	100	161	0.8	1.75		
	100	58.5	50	600	3.1	5.0		
	110	54	45	768	3.8	6.0		
	120	49	42	864	4.6	7.2		
	200	29.2	25	2,870	12	19		
	220	27	23	3,190	15	24		
	240	25	21	3,329	18	29		
DC	6	422		14.2	0.097	0.115		Approx. 2.8
	12	215		55.9	0.43	0.7		
	24	107		225.1	1.55	2.5		
	48	55		875	5.8	10		
	100	28		3,580	25	40		
	200	14		14,370	95	155		

NOTES:
1. The rated current and coil resistance are measured at a coil resistance of 20°C with tolerances of +15%, −20% for rated current and ±15% for coil resistance.
2. The performance characteristics are measured at coil temperatures ranging from 5 to 35°C.

• CONTACT RATINGS

Standard type

Load / Item	Open type: Resistive load (p.f.=1)	Open type: Inductive load (p.f.=0.4, L/R =7msec)	Covered type: Resistive load (p.f.=1)	Covered type: Inductive load (p.f.=0.4, L/R =7msec)
Rated load	220 VAC 10A 24 VDC 7A	220 VAC 10A 24 VDC 4A	220 VAC 5A 24 VDC 4A	220 VAC 5A 24 VDC 4A
Carry current	10A		5A	
Max. operating voltage	500 VAC 250 VDC		500 VAC 250 VDC	
Max. operating current	10A		5A	
Max. switching capacity	2,200VA, 170W		1,100VA, 90W	
Min. permissible load (ref. value)	5 VDC 1mA			

Direct load switching type

Rated carry current (A)	Rated voltage (V)		Switching capacity: Rated operating current (A) Resistive load (p.f.=1)	Switching capacity: Rated operating current (A) Inductive load (p.f.=0.4, L/R=7msec)
10(5)	DC	6	10(5)	10(5)
		12	10(5)	10(5)
		24	10(5)	10(5)
		48	10(5)	10(5)
		100	10(5)	6(5)
		200	4(3.5)	3(3)

NOTES: 1. The figures in parenthesis apply to the covered type.
2. With respect to the switching capacity of 200 VDC inductive load, note that an unstable range which prevents switching, exists in the vicinity of 0.5 to 2.5A.

• CHARACTERISTICS

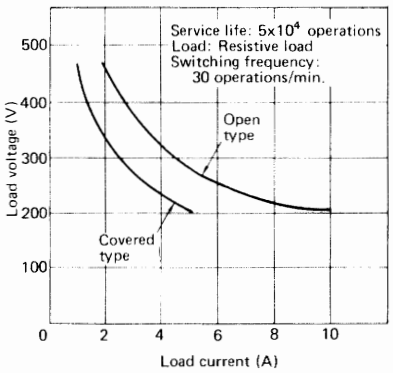
Item \ Classification	Open type	Covered type
Contact resistance	25mΩ max.	50mΩ max.
Operate (Set) time	AC: 30msec max. DC: 60msec max.	
Release (Reset) time	30msec max.	
Operating frequency	Mechanically: 1,800 operations/hour Under rated load: 1,800 operations/hour	
Insulation resistance	100MΩ min. (at 500 VDC)	
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (1,500 VAC between non-continuous contacts)	
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 35Hz; 1.0mm double amplitude	
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 50m/sec² (approx. 5G's)	
Ambient temperature	Operating: −10 to +40°C	
Humidity	45 to 85% RH	
Service life	Mechanically: 2,500,000 operations min. (at operating frequency of 1,800 operations/hour) Electrically: See "CHARACTERISTIC DATA."	
Weight	Approx. 250 to 550	

NOTE: The data shown above are of initial value.

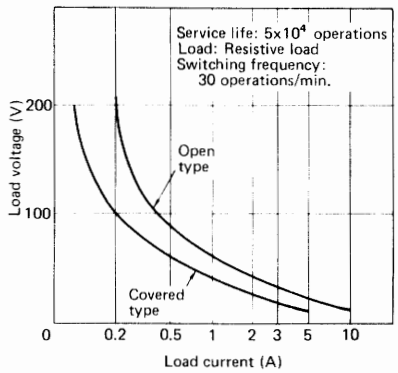
• CHARACTERISTIC DATA

Electrical service life

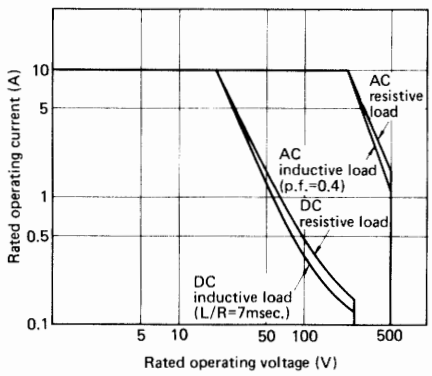
AC Load



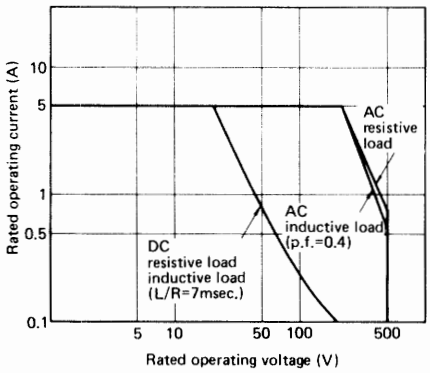
DC Load



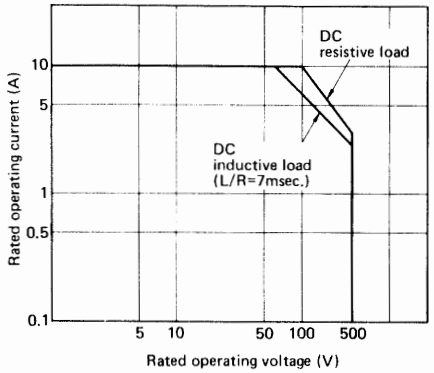
Maximum switching capacity
MM2K, MM3K, MM4K



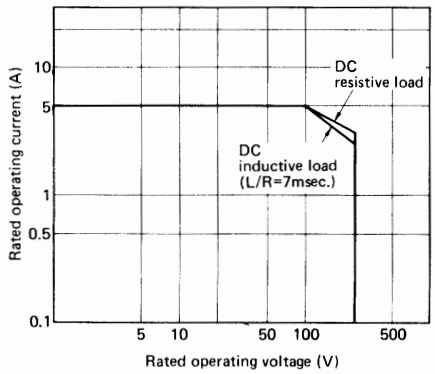
Maximum switching capacity
MM2KP, MM3KP, MM4KP



Maximum switching capacity
MM2XK, MM3XK, MM4XK

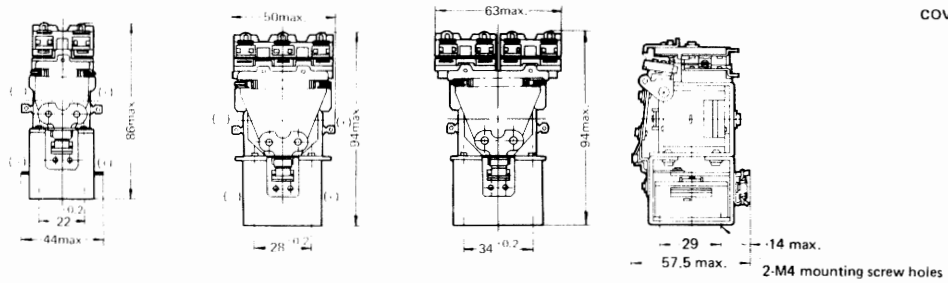


Maximum switching capacity
MM2XKP, MM3XKP, MM4XKP



■ DIMENSIONS

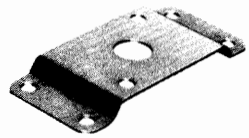
• MM2(X)K, MM3(X)K, MM4(X)K



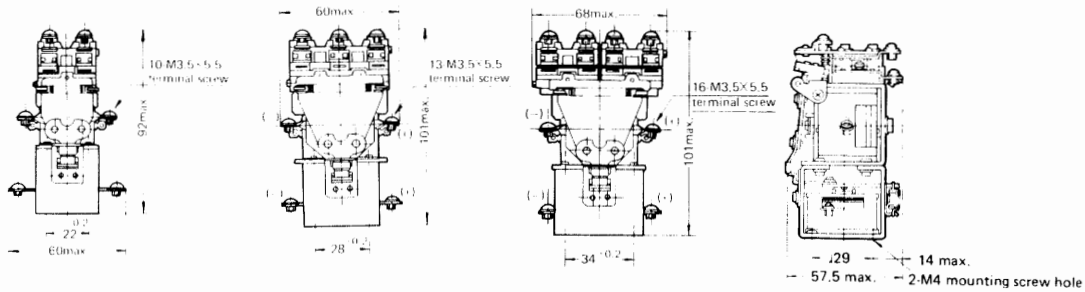
NOTE: Dimension in parenthesis applies to the DC load switching type (-X). With this type, connect common C to (+) terminal.

Mounting bracket

S bracket is available for mounting the covered type latching relay.

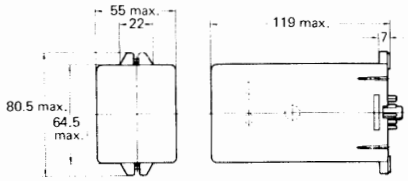


• MM2(X)KB, MM3(X)KB, MM4(X)KB



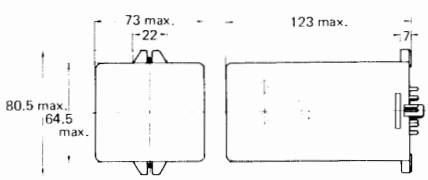
NOTE: Dimension in parenthesis applies to the DC load switching type (-X). With this type, connect common C to (+) terminal.

- **MM2(X)KP**



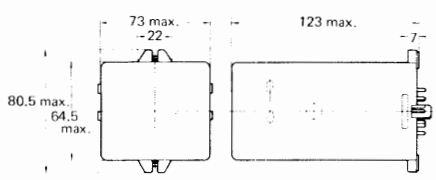
NOTE: The parts shown by the broken apply to Type MM2XKP only.

- **MM3(X)KP**



NOTE: The parts shown by the broken apply to Type MM3XKP only.

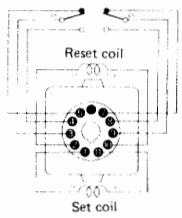
- **MM4(X)KP**



NOTE: The parts shown by the broken apply to Type MM4XKP only.

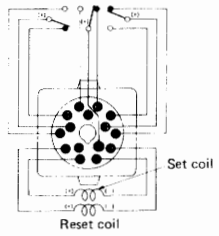
Terminal arrangement/Internal connection (Bottom view)

MM2(X)KP



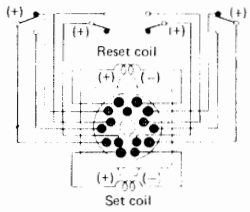
NOTE: The contact section (+) applies to Type MM2XKP only.

MM3(X)KP



NOTE: The contact section (+) applies to Type MM3XKP only.

MM4(X)KP



NOTES: 1. Contact form: 2c, 2a
2. The contact section (+) applies to Type MM4XKP only.

■ ACCESSORIES (Available on request)

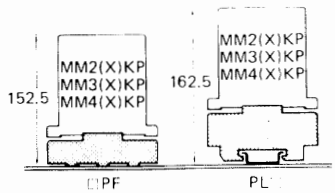
- **CONNECTING SOCKETS**

Available types

Relay \ Socket	Track mounted socket*
MM2(X)KP	11PFA
MM3(X)KP MM4(X)KP	14PFA

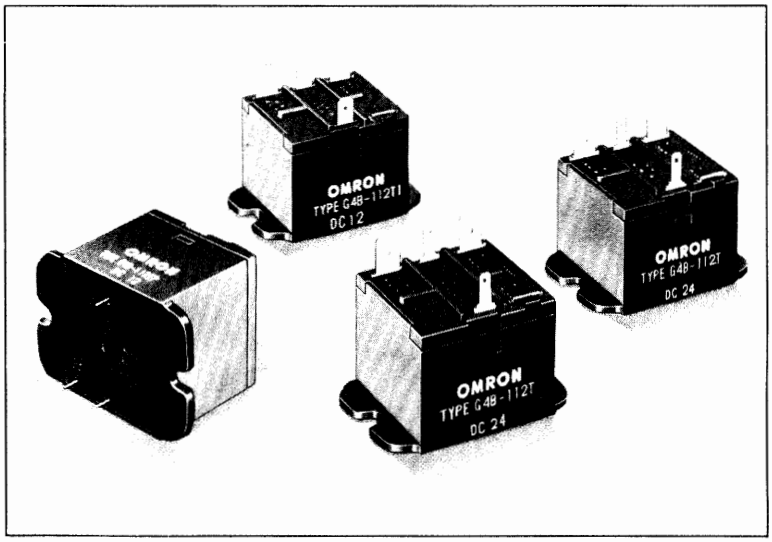
NOTE: * Track mounted socket can be used as a front connecting socket.

Mounting height of relay with connecting socket



NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

High-capacity Relay that Breaks 15A, Carries 20A and Withstands 55A Inrush



■ FEATURES

- Miniature, built-in use relay ideal for switching motor load, lamp load, heater, etc.
- Creepage distance of more than 2.0mm
- Upper mounting bracket type for easy wiring and mounting

■ AVAILABLE TYPES

Contact form \ Load contact terminal / Coil terminal	Quick connect #250	Quick connect #250
	Quick connect #110	Quick connect #187	PC board
SPST-NO	G4B-112T-US	G4B-112T1-US	G4B-112TP-US
SPDT	G4B-112T-C-US	G4B-112T1-C-US	G4B-112TP-C-US

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA, W)
AC	6	254	217							
	12	126.5	108							
	24	63	54							
	50	30.5	26							
	100	15	13							
	120	12.6	10.8							
DC	6	200		30						
	12	89		135						
	24	50		480						
	48	25		1,920						
	100	12		8,300						
	110	9		12,300						
					–	–	80 max.	30 min. / 10 min.	110	Approx. 1.3VA / Approx. 1.2W

NOTE The rated current and coil resistance are measured at a coil temperature of 68°F with tolerances of ±15% for DC rated current and +15%, −20% for AC rated current, and ±15% for rated coil resistance.

• CHARACTERISTICS

Contact resistance	30mΩ max.
Operate time	AC: 20msec max., DC: 20msec max.
Operating frequency	Mechanically: 1,800 operations/hour Under rated load: 1,800 operations/hour
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (1,000 VAC between non-continuous contacts)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: approx. 1000m/s² (100G's) Malfunction durability: approx. 200m/s² (20G's)
Ambient temperature	Operating: −10 to +55°C
Humidity	45 to 85% RH
Service life	Mechanically: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 44g

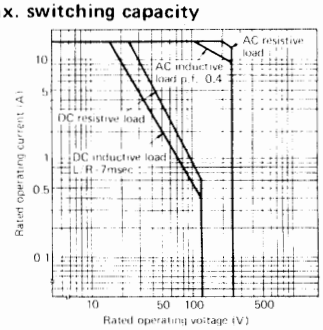
NOTE: The data shown above are of initial value.

• CONTACT RATINGS

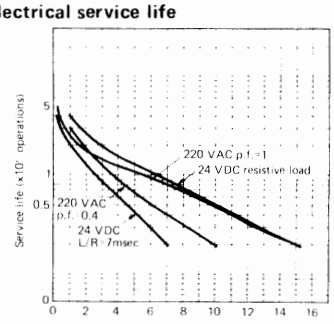
Item \ Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	220 VAC 15A 24 VDC 15A	220 VAC 10A 24 VDC 7A
Carry current	20A	
Max. operating voltage	250 VAC, 125 VDC	–
Max. operating current	20A	–
Max. switching capacity	3,300VA 360W	2,200VA 170W
Minimum permissible load (reference value)	5 VDC 100mA	

• CHARACTERISTIC DATA

Max. switching capacity



Electrical service life



Approved by Standards

UL recognized type (File No. E41643)

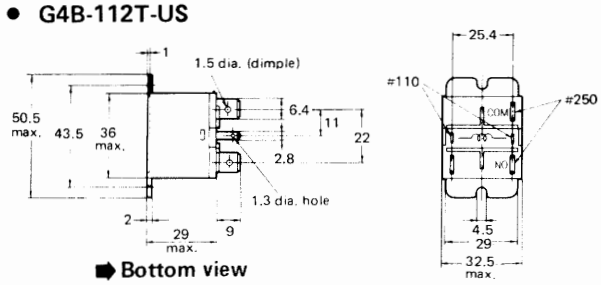
Type	Contact form	Coil ratings	Contact ratings
G4B	SPST-NO	6 to 120 VAC 6 to 100 VDC	15A 28 VDC (resistive load) 15A 120 VAC (inductive load) 10A 240 VAC (inductive load) 1HP 120 VAC (HP rating) TV-5 AC TV rating

CSA certified type (File No. LR31928)

Type	Contact form	Coil ratings	Contact ratings
G4B	SPST-NO	6 to 120 VAC 6 to 120 VDC	15A 28 VDC (resistive load) 10A 120 VAC (inductive load) 1/2HP 120 VAC (HP rating)

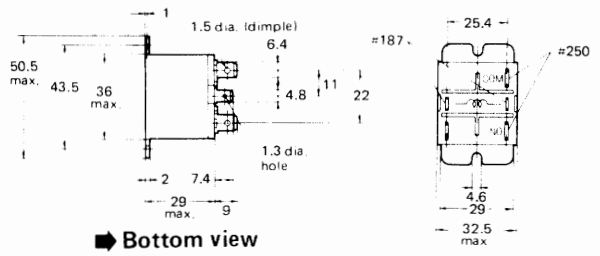
■ DIMENSIONS

- **G4B-112T-US**



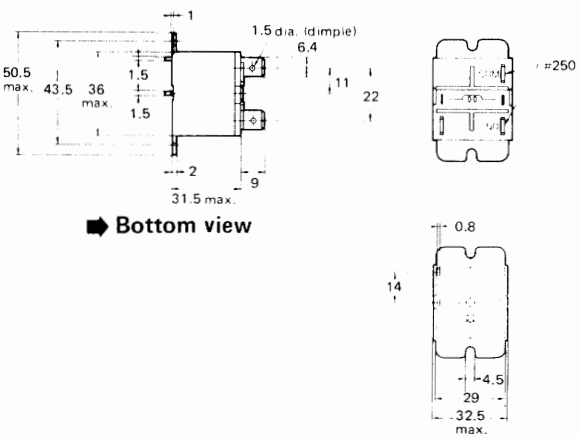
➡ Bottom view

- **G4B-112T1-US**



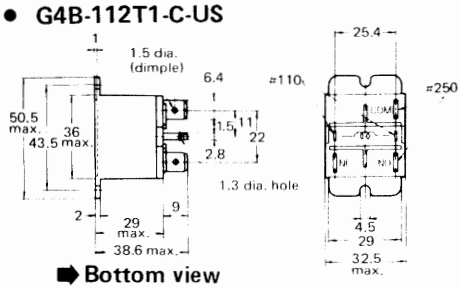
➡ Bottom view

- **G4B-112TP-US**



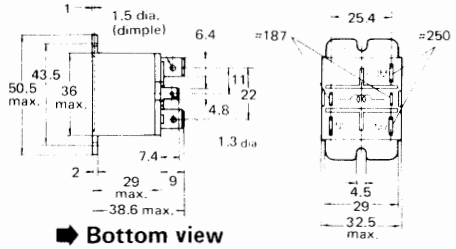
➡ Bottom view

- **G4B-112T1-C-US**



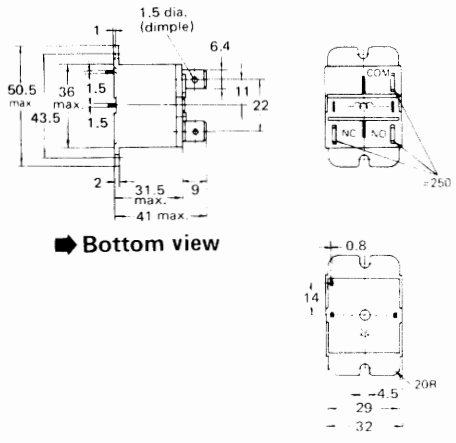
➡ Bottom view

- **G4B-112T1-C-US**



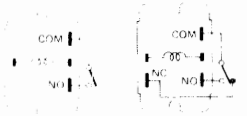
➡ Bottom view

- **G4B112TP-C-US**

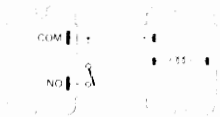


➡ Bottom view

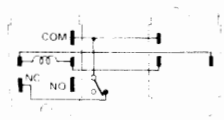
Terminal layout
Internal connection
(Bottom view)
G4B-112T-US, G4B-112T-C, G4B-112T1-US G4B-112T1-C



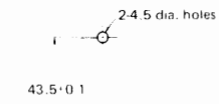
(Bottom view) (Top view)
G4B-112TP-US



G4B-112TP-C

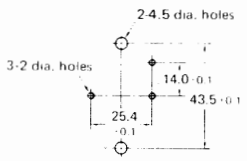


Mounting holes
G4B-112T(-C)-US,
G4B-112T1(-C)-US
(Bottom view)



G4B-112TP(-C)-US

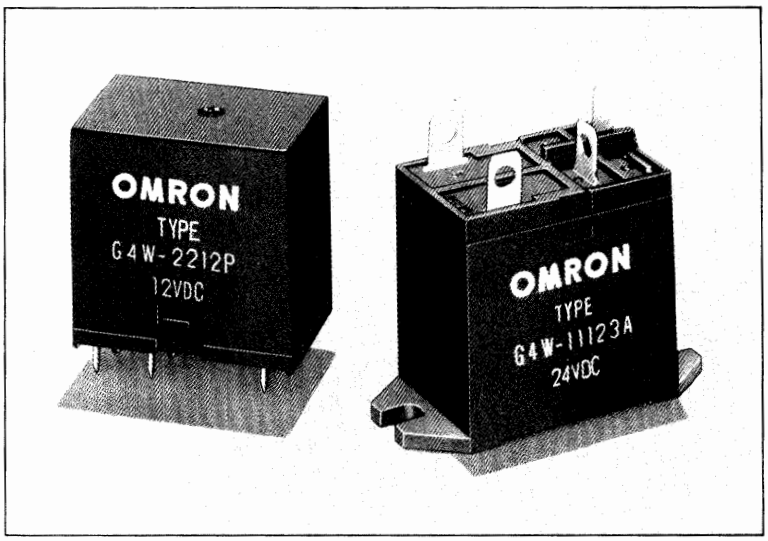
(Bottom view)



(Recommended panel thickness is 1.0 to 2.0 mm)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Boasts High Impulse Withstand Voltage (10KV) & Dielectric Strength (4KV)—Ideal for Power Switching



■ FEATURES

- Impulse withstand voltage of 10,000V between input and output (coil and contact)
- Creepage distance of 8mm min. between coil and contact fully meets VDE C/250 and dielectric strength of 4,000 VAC min. conforms to UL, CSA and IEC Class II
- Both SPST-NO and DPST-NO types conform to TV ratings, TV-8 and TV-5, respectively
- International 2.54mm terminal pitch
- Low power consumption (0.8W)

■ AVAILABLE TYPES

Classification \ Mounting style / Terminal / Contact form		Standard mounting	Upper mounting bracket
		PCB	Solder
Standard type	SPST-NO	G4W-1112P	G4W-11123A
	DPST-NO	G4W-2212P	G4W-22123A
Standard approved type	SPST-NO	G4W-1112P-US	G4W-11123A-US
	DPST-NO	G4W-2212P-US	G4W-22123A-US

NOTE: When the relay approved as SEV listed type is required, add "-SV" to the model number in your order.

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
12 VDC	66.7	180	—	—	80 max.	10 min.	110	Approx. 800
24 VDC	33.3	720	—	—				
100 VDC	8	12,500	—	—				

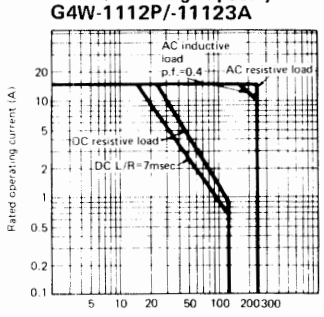
NOTE: The rated current and coil resistance are measured at a coil temperature of 20° C with tolerances of ±15%.

• CONTACT RATINGS

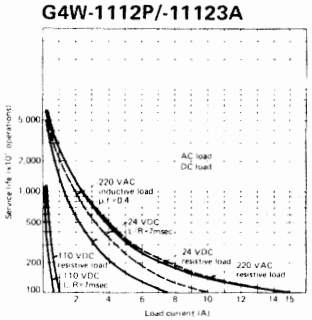
Type / Load / Item	G4W-1112P, G4W-11123A		G4W-2212P, G4W-22123A	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R =7msec)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R =7msec)
Rated load	220 VAC 15A	220 VAC 10A	220 VAC 10A	220 VAC 7.5A
Carry current	15A		10A	
Max. operating voltage	250 VAC		250 VAC	
Max. operating current	15A		10A	
Max. switching capacity	3,750VA	2,500VA	2,500VA	1,850VA
Min. permissible load (ref. value)	5 VDC 100mA			

• CHARACTERISTIC DATA

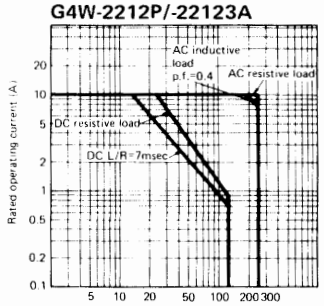
Max. switching capacity
G4W-1112P/-11123A



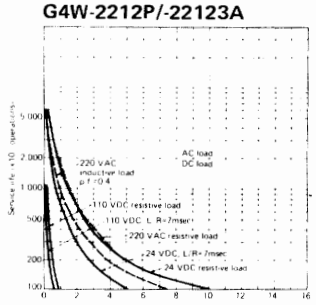
Electrical service life
G4W-1112P/-11123A



G4W-2212P/-22123A



G4W-2212P/-22123A



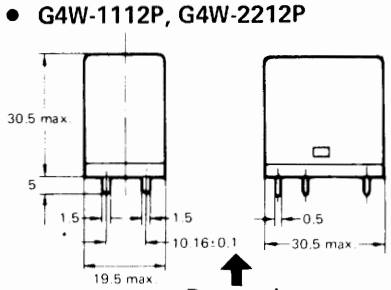
• CHARACTERISTICS

Contact resistance	30mΩ max.
Operate time	20msec max.
Release time	5msec max.
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	4,000 VAC, 50/60Hz for 1 minute between coil and contact 2,000 VAC, 50/60Hz for 1 minute between contacts of same pole 2,000 VAC, 50/60Hz for 1 minute between contacts of different poles
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 150m/sec² (approx. 15G's)
Ambient temperature	Operating: −25 to +55°C
Humidity	45 to 85% RH
Service life	Mechanically: 5,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 29g

NOTE: The data shown above are of initial value.

■ DIMENSIONS

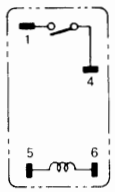
• G4W-1112P, G4W-2212P



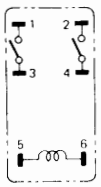
* Coil width terminal is 0.75mm.

Terminal arrangement/Internal connections (Bottom view)

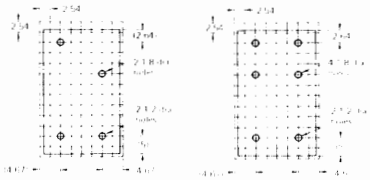
G4W-1112P



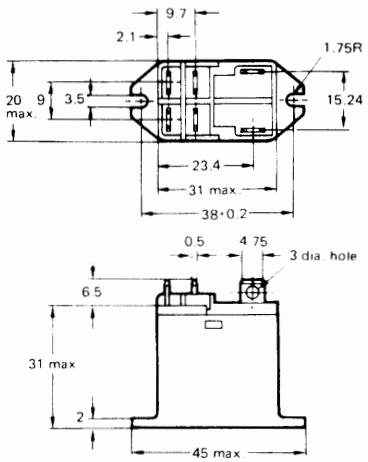
G4W-2212P



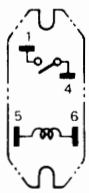
Mounting holes (Bottom view)
G4W-1112P **G4W-2212P**



• G4W-11123A, G4W-22123A



G4W-11123A
G4W-22123A



G4W-11123A
G4W-22123A

STANDARD APPROVED TYPE

When placing your order for UL and CSA approved versions, please indicate "UL" or "CSA" as desired in addition to the model number.

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exceptions.

• RATINGS

UL recognized type (File No. E41643)
CSA certified type (File No. LR31928)

Type	No. of poles	Coil rating	Contact ratings
G4W-1112P-US G4W-11123A-US	1	6 to 120 VDC	15A 240 VDC (inductive load) 15A 250 VAC (inductive load) TV-8
G4W-2212P-US G4W-22123A-US	2		10A 24 VDC (resistive load) 10A 250 VAC (inductive load) TV-5

SEV listed type (File No. 81.10227,01)

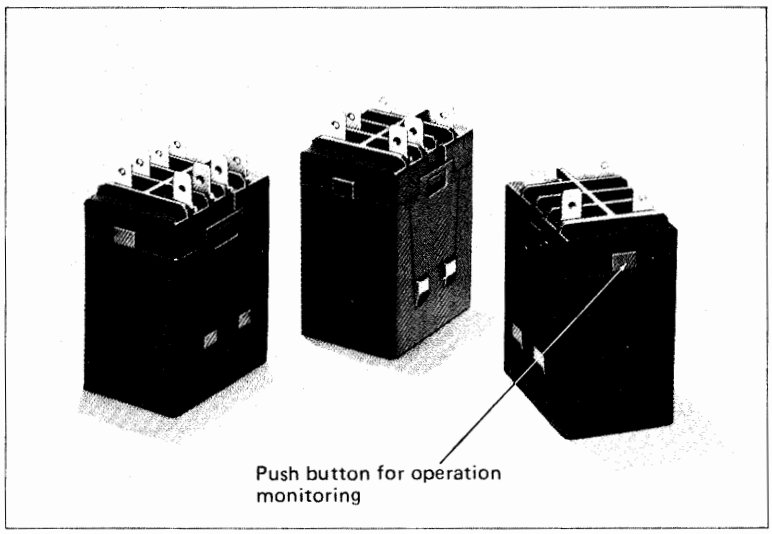
Type	Contact form	Coil ratings	Contact ratings
G4W-1112P G4W-11123A	SPST-NO	6 to 120 VDC	15A 250 VAC (AC1) 7.5A 250 VAC (AC3) 8A 380 VAC (AC1) 5A 380 VAC (AC3) 15A 24 VDC (DC1)
G4W-2212P G4W-22123A	DPST-NO		10A 250 VAC (AC1) 4.5A 250 VAC (AC3) 5A 380 VAC (AC1) 3A 380 VAC (AC3) 10A 24 VDC (DC1)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Designed Small, Yet Makes and Breaks 20A Loads

■ FEATURES

- Double make and break contact mechanism with silver alloy contacts
- With push button for operation monitoring
- Minimum creepage distance of 6.5mm conforms to UL, CSA (TV-10) and VDE C/250 Class II
- Nonflammable insulating materials employed in the hinge type meet UL94V-0
- Conforms to AMP #250 series receptacles
- Pending VDE approvals



■ AVAILABLE TYPES

Contact form \ Classification	Standard type	Standard approved type
SPST-NO	G4J-1142T	G4J-1142T-US
SPST-NO+SPST-NC	G4J-2142T	G4J-2142T-US
DPST-NO	G4J-2242T	G4J-2242T-US
DPST-NO+SPST-NC	G4J-3242T	G4J-3242T-US
3PST-NO	G4J-3342T	G4J-3342T-US

NOTE:
G4J series power relays cannot be mounted without an S or W mounting bracket. When ordering, please specify the appropriate mounting bracket type (R99-03G2J for the S mounting bracket or R99-04G2J for the W mounting bracket) together with the required type of relay.

OMRON

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA, W) Value at start	Power consumption (VA, W) Rated value
AC	6	900	640	1.3	0.012	0.017	80 max.	50Hz: 25 min. 60Hz: 30 min.	110	Approx. 8	Approx. 4
	12	450	320	5.3	0.049	0.068					
	24	224	160	21.3	0.2	0.28					
	50	112	80	85	0.82	1.3					
	100	56	40	340	3.3	5.5					
	200	28	20	1,500	13	23					
DC	6	300		20	0.11	0.31		10 min.			Approx. 1.7
	12	150		80	0.37	1.1					
	24	70		340	1.6	5.5					
	48	32		1,500	7.7	23					
	100	16		6,250	34	125					

NOTES 1. The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±15%.
2. Performance characteristic data are measured at a coil temperature of 5 to 35°C.

• CONTACT RATINGS

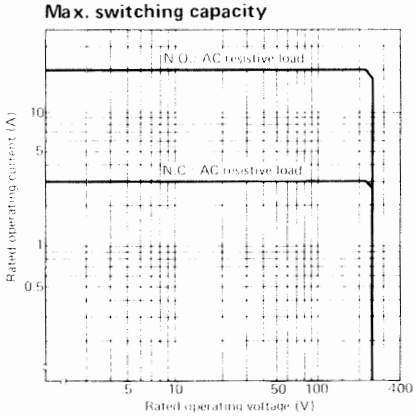
Item \ Load	Resistive load (p.f.=1)
Rated load	220 VAC 20(3) A
Carry current	20(3) A
Max. operating voltage	250 VAC
Max. operating current	20(3) A
Max. switching capacity	4,400(660) VA

NOTES:
1. Data in parenthesis apply to the N.C. contact types.
2. Service life with actual load (Reference only)

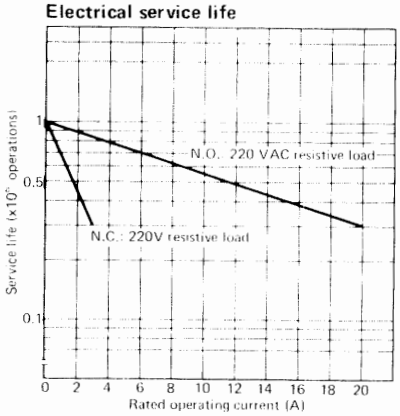
Type of load	Conditions	Operating frequency	Electrical service life ($\times 10^3$ operations min.)
AC motor	100/110 VAC, single-phase, 750W, Inrush current: 60A Steady-state current: 15A	ON: 1sec OFF: 9sec	200
AC lamp	100/110 VAC, 1kW Inrush current: 80A	ON: 1sec OFF: 5sec	
Magnetron	Inrush current: 140A Steady-state current: 12.5A	ON: 1.5sec OFF: 1.5sec	100

• CHARACTERISTIC DATA

Max. switching capacity



Electrical service life



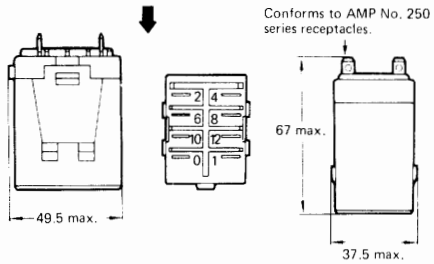
• CHARACTERISTICS

Contact resistance	50mΩ max.
Operate time	30msec max.
Release time	30msec max.
Operating frequency	Mechanically: 1,800 operations/hour Under rated load: 1,800 operations/hour
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: N.O. contact type: 10 to 40Hz; 1.5mm double amplitude N.C. contact type: 10 to 26Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: N.O. contact type: 50m/sec² (approx. 5G's) N.C. contact type: 20m/sec² (approx. 2G's)
Ambient temperature	Operating: −25 to +55°C
Humidity	45 to 85% RH
Service life	Mechanically: 1,000,000 operations min. (at operating frequency of 1,800 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 165g

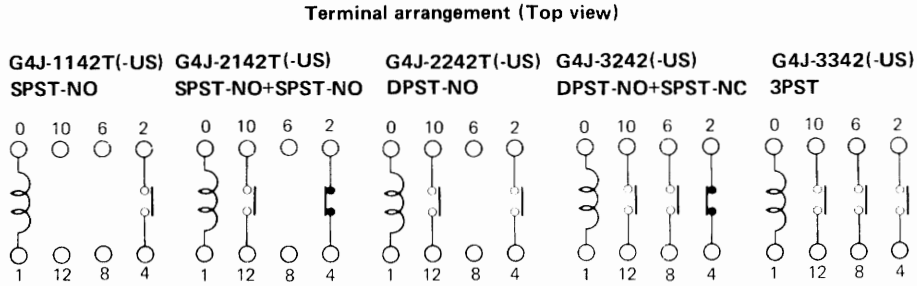
NOTE: The data shown above are of initial value.

■ DIMENSIONS

Top view



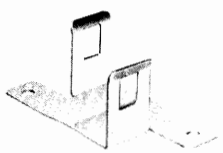
Terminal arrangement (Top view)



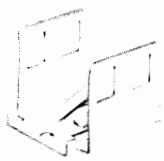
■ ACCESSORIES

• Mounting Bracket

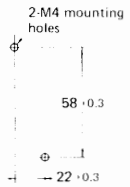
Type R99-03G2J
S mounting bracket



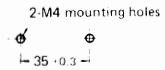
Type R99-04G2J
W mounting bracket



Mounting holes
For S mounting bracket



For W mounting bracket



STANDARD APPROVED TYPE

When placing your order for UL and CSA approved versions, please indicate "UL" or "CSA" as desired in addition to the model number.

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exceptions.

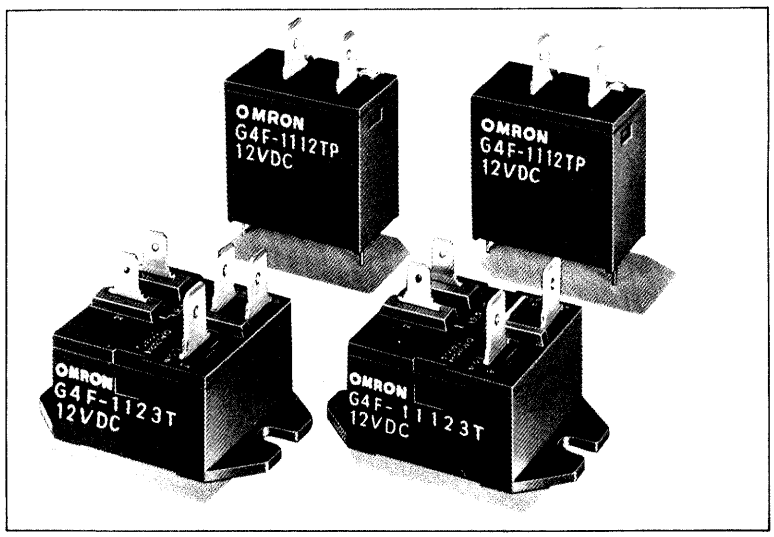
• RATINGS

UL recognized type (File No. E41515)/CSA certified type (File No. LR35535-28)

Type	Contact form	Coil ratings	Contact ratings
G4J-1142T-US	SPST-NO	6 to 200 VDC 6 to 240 VAC	NO contact; 20A 240 VAC (resistive load) 10A 240 VAC (general load) 20A 120 VAC (general load) 1kW 120 VAC (tungsten) NC contact; 3A 240 VAC (general load)
G4J-2142T-US	SPST-NO+SPST-NC		
G4J-2242T-US	DPST-NO		
G4J-3242T-US	DPST-NO+SPST-NC		
G4J-3342T-US	3PST-NO		

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

High-capacity Relay that Breaks 20A, Carries 20A and Withstands 60A Inrush.



■ FEATURES

- Miniature, high-capacity power relay ideal for incorporation in non-industrial equipment to switch such loads as motor, transformer, lamp, heater, etc
- Creepage distance of more than 4mm.
- Nonflammable insulating materials employed meet UL94V-0
- Pending CSA and VDE approvals

■ AVAILABLE TYPES

Classification: Load contact terminal / Coil terminal / Contact form		Quick connect #250 / Quick connect #187	Quick connect #250 / PC board
Standard type	SPST-NO	G4F-11123T	G4F-1112TP
	SPDT	G4F-1123T	–
Standard approved type	SPST-NO	G4F-11123T-US	G4F-1112TP-US
	SPDT	G4F-1123T-US	–

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
12 VDC	75	160	1.3	1.9	70 max.	10 min.	110	900
24 VDC	37.5	640	5.8	9.5				

NOTES: 1. The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.
2. Performance characteristics data are measured at a coil temperature of 20°C.

• CONTACT RATINGS

Type / Load / Item	G4F-1112TP, -1123T		G4F-11123T	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	220 VAC 15A	220 VAC 10A	220 VAC 20A	220 VAC 15A
Max. inrush current	55A		60A	
Carry current	20A		20A	
Max. operating voltage	250 VAC			
Max. operating current	20A			
Max. switching capacity	3,300VA	2,200VA	4,400VA	3,300VA
Min. permissible load (ref. value)	5 VDC 100mA			

• MOTOR RATINGS

Item / Type	Load conditions	Operating frequency	Electrical service life (x10³ operations min.)
G4F-11123T	110 VAC p.f.=0.7 Inrush: 60A (0.2 sec.) Break: 20A	ON: 1 sec. OFF: 10 sec.	200
G4F-1112TP	110 VAC p.f.=0.7 Inrush: 55A (0.2 sec.) Break: 15A		

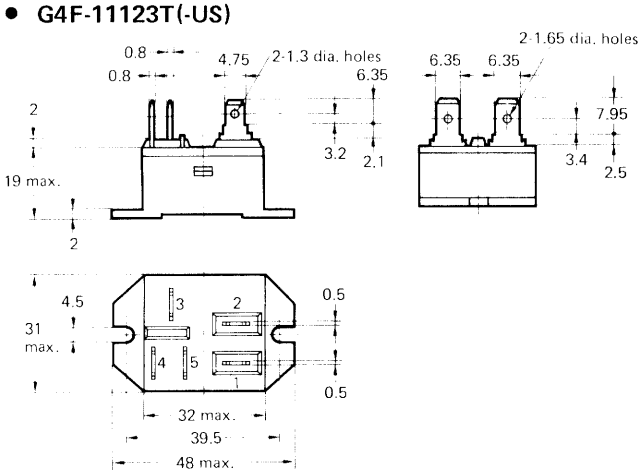
• CHARACTERISTICS

Contact resistance	30mΩ max.
Operate time	20msec max.
Release time	10msec max.
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (1,000 VAC between contacts of same polarity)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 200m/sec² (approx. 20G's)
Ambient temperature	Operating: −25 to +55°C
Humidity	45 to 85% RH
Service life	Mechanically: 5,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: ————
Weight	Approx. 40g

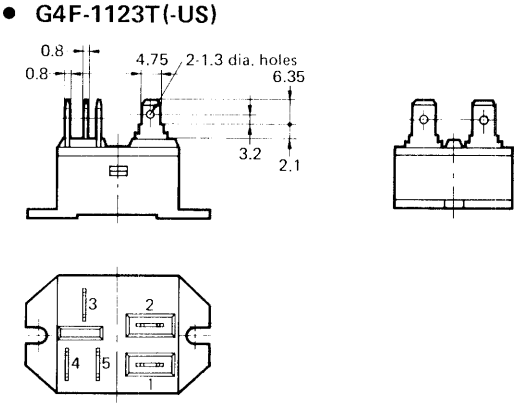
NOTE: The data shown are of initial value.

■ DIMENSIONS

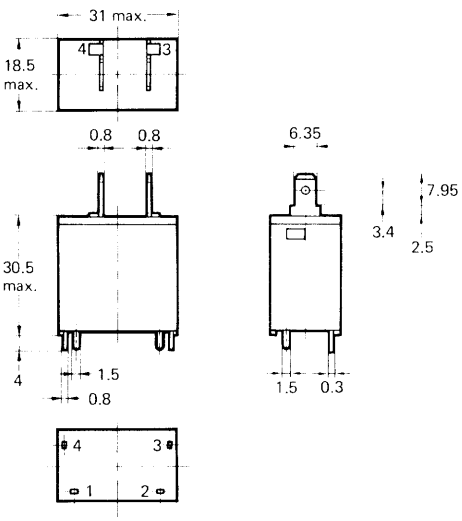
• G4F-11123T(-US)



• G4F-1123T(-US)

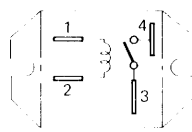


• G4F-1112TP(-US)

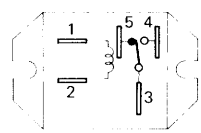


Terminal arrangement/Internal connections (Bottom view)

G4f-11123T(-US)



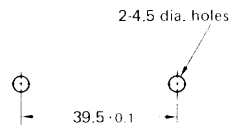
G4F-1123T(-US)



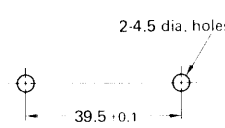
G4F-1112TP(-US)

Mounting holes

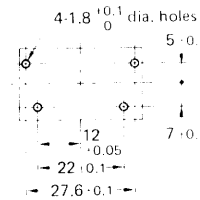
G4F-11123T(-US)



G4F-1123T(-US)



G4F-1112TP(-US)



STANDARD APPROVED TYPE

When placing your order for UL approved version, please indicate "UL" in addition to the model number.

■ SPECIFICATIONS

Same as the Standard Type with the following exceptions.

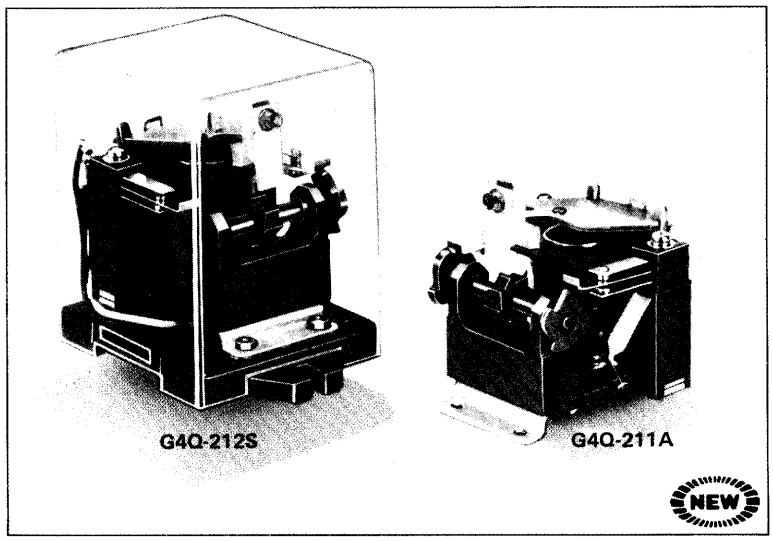
• RATINGS

UL recognized type (File No. E41643)/CSA certified type (File No. LR31928)

Type	Contact form	Coil ratings	Contact ratings
G4F-11123T-US G4F-1112TP-US	SPST-NO	12 to 24 VDC	15A 250 VAC (resistive load) 15A 30 VDC (resistive load) 1 HP 125/250 VDC (motor load)
G4F-1123T-US	SPDT		

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Impulse Relay That Breaks 5A Loads



■ FEATURES

- Ideal for on-off or reversing action on alternate operations
- Positive ratchet operation at all speeds on impulses as short as 60 msec
- Employs a plastic ratchet with 5,000,000 steps min. mechanical life

■ AVAILABLE TYPES

Construction / Contact form	Open type	Covered type
DPDT	G4Q-211A	G4Q-212S

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage (V)		Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA, W) At start	Power consumption (VA, W) Rating
AC	6	1,233	1,067	0.47	0.009	0.015	80 max.	10 min.	110	Approx. 13.5	Approx. 6.4
	12	614	531	1.9	0.033	0.06					
	24	307	266	7.8	0.14	0.24					
	48	148	128	37	0.59	1.03					
	110	–	73.5	139	2.34	4.13					
	220	–	36.8	564	9.22	16.52					
DC	6	640		9.4	0.15	0.22		5 min.		–	Approx. 3.9
	12	320		37.5	0.67	1.0					
	24	155		155	2.8	4.0					
	48	80		600	9.6	13.5					
	100	39		2,580	41.3	59.3					
	200	19.2		10,400	180	240					

NOTE: The rated current, coil resistance and inductance are measured at coil temperature of 20°C with tolerances of +15%, −20% for AC rated current and ±15% for DC rated coil resistance.

• CONTACT RATINGS

Load / Item	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R =7msec)
Rated load	220 VAC 5A 24 VDC 5A	220 VAC 3A 24 VDC 4A
Carry current	5A	
Max. operating voltage	500 VAC 250 VDC	
Max. operating current	5A	
Max. switching capacity	1,100VA 120W	660VA 100W
Minimum permissible load (ref. value)	G4Q-211A: 5 VDC 1A G4Q-212S: 5 VDC 0.1A	

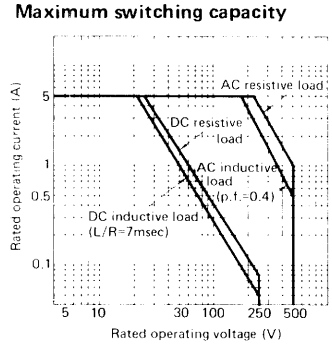
• CHARACTERISTICS

Contact resistance	50mΩ max.
Operate time	60msec max.
Operating frequency	Mechanically: 1,200 operations/hour Electrically: 1,200 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (1,000 VAC between contacts of same polarity)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 0.5mm double amplitude
Shock	Mechanical durability: 500m/s² (approx. 50G's) Malfunction durability: 100m/s² (approx. 10G's)
Ambient temperature	Operating: −10 to +55°C
Humidity	45 to 85% RH
Service life	Mechanically: 5,000,000 steps min. (at operating frequency of 1,200 operations/hour) Electrically: 500,000 steps min. (at operating frequency of 1,200 operations/hour under rated load)
Weight	Open type: Approx. 240g Covered type: Approx. 340g

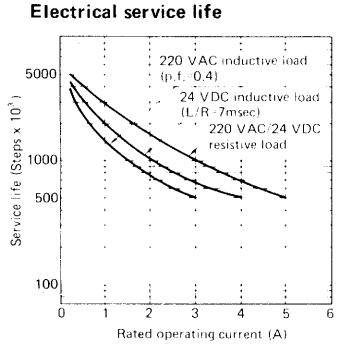
NOTE: The data shown are of initial value.

• CHARACTERISTIC DATA

Maximum switching capacity

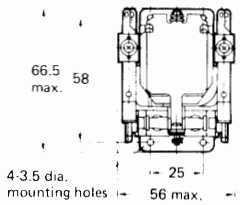


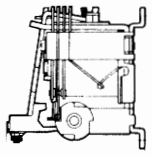
Electrical service life



■ DIMENSIONS

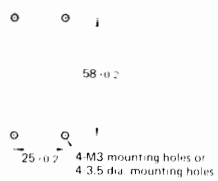
• G4Q-211A



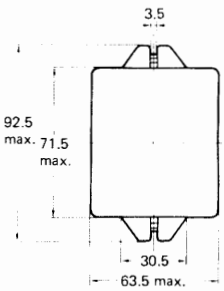


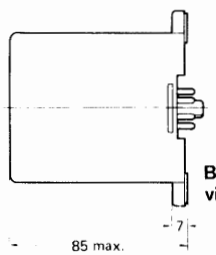
Terminal arrangement/ Internal connection

Mounting holes

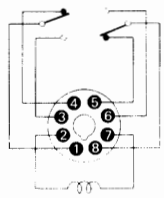


• G4Q-212S

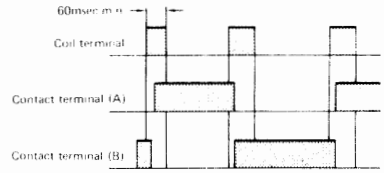




Terminal arrangement/ Internal connection (Bottom view)



■ OPERATION CHART



■ ACCESSORIES (Available on request)

• CONNECTING SOCKETS (for G4Q-212S)

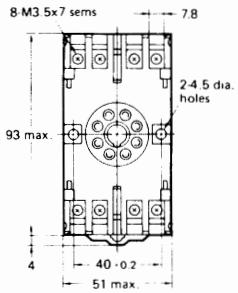
Available types

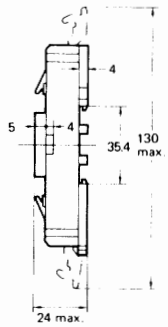
Track mounted socket*	Back connecting socket
	Solder terminal
8PFA1	PL08

NOTE:
Track mounted socket can be used as a front connecting socket.

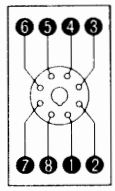
▪ DIMENSIONS

• 8PFA1

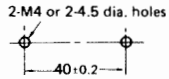




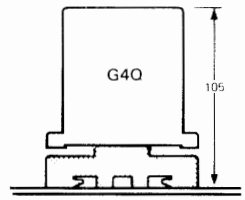
Terminal arrangement (Bottom view)



Mounting holes



Mounting height of relay with socket

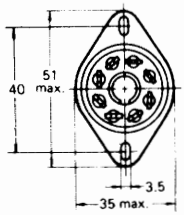


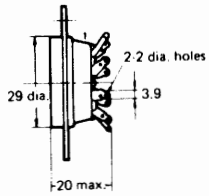
8PFA1

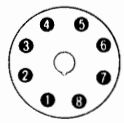
Bottom view

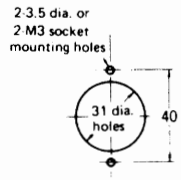
NOTE:
Type 8PFA1 can be used as a front connecting socket.

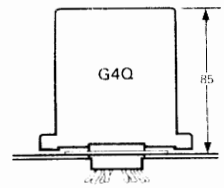
• PL08









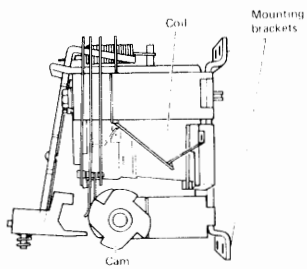


PL08

■ HINTS ON CORRECT USE

• MOUNTING

When mounting the Model G4Q relay, set the mounting brackets of the relay vertically so that the coil of the relay is positioned above the cam as shown at the right and then secure the mounting brackets.

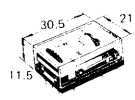
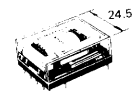
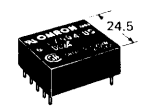
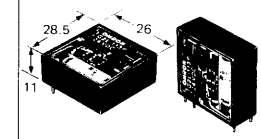
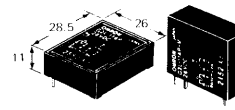


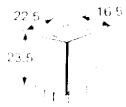
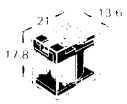
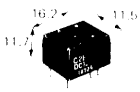
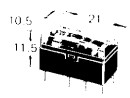
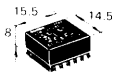
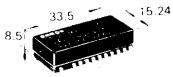
NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

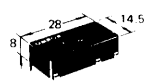
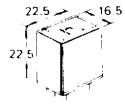
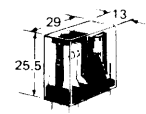
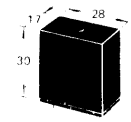
PC BOARD-USE RELAYS

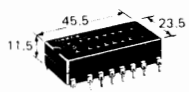
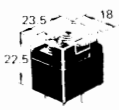
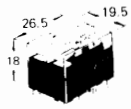
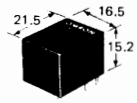
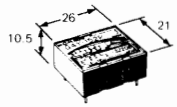
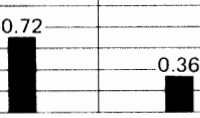
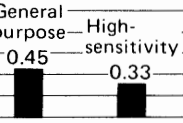
CONTENTS

SELECTION GUIDE

Applications	Interface							
	Signal control							
	Power drive							
Model (Type)		LZN				G2L			
		LZN2	LZN4	LZN203	LZN403	G2L-113P	G2L-113P-V	G2L-114P	G2L-114P-V
Features		Low profile relay with 3A switching capacity. Sealed, latching and make-before-break contact types also available.				Low profile power relay breaks up to 8A loads. Sealed type available.			
Appearance & dimensions		 LZN2	 LZN4	 LZNQ4		 G2L-113P G2L-113P-V		 G2L-114P G2L-114P-V	
Contact ratings	Contact form	DPDT	4PDT	DPDT	4PDT	SPDT			
	Contact type	Bifurcated crossbar				Single button			
	Contact material: Fixed	AgPd (Au clad)		Ag (Au clad)		AgCdO (Au plated)			
	Contact material: Movable	Ag (Au clad)		Ag (Au clad)		AgCdO (Au plated)			
	Max. operating current (under resistive load)	10A, 8A, 5A, 3A, 2A, 1A, 0.5A, 0.3A, 0.25A							
	Minimum permissible load	10mA, 1mA, 100μA, 15μA							
		0.1 VDC 100μA		5 VDC 1mA		5 VDC 1mA			
	Rated load (under resistive load)	110 VAC 0.5A 24 VDC 1A		110 VAC 2A 24 VDC 3A		220 VAC/24 VDC 8A			
Coil ratings	Rated voltage (V)	DC 5, 6, 12, 24, 48				DC 3, 5, 6, 12, 24, 48, 60			
	Power consumption	1.4, 1.2, 1.0, 0.8, 0.6, 0.4, 0.2							
		0.3	0.48	0.3	0.48	0.5			
Service life	Mechanically	100 x 10^6 min.				20 x 10^6 min.			
Approved standards									
Page		71				75			

	LC	G2K		G2E	G2V		G2N	G2T
	LC1N-10	G2K	G2K-3		G2V-282P	G2V-2		
	Subminiature, economical relay with 10A switching capacity	Sugar cube-sized high-reliability relay ideal for minute load switching		Sugar cube-sized, low-cost, exclusive-use PCB relay	Ultra small, highly reliable DIP type relay		High-sensitivity (80mW), DIP type relay. Latching type also available.	High-sensitivity (230mW max.) DIP type relay for signal control
								
	SPDT	SPDT		SPDT	SPDT		SPST-NO+ SPST-NC	4PST-NO+ 4PST-NC
	Single button	Single crossbar		Single button	Single crossbar	Bifurcated crossbar	Bifurcated button	Bifurcated button
	AgCdO	AgCd (Au clad)	AgCdO	AgPd (Au clad)	AgPd (Au clad)		AgPd (Au clad)	AgPd (Au clad)
	AgCdO	AgPd (Au clad)	AgCdO	AgPd (Au clad)	AgPd (Au clad)		AgPd (Au clad)	AgPd (Au clad)
								
	–	5 VDC 1mA	5 VDC 100mA	5 VDC 1mA	1 VDC 1mA	0.1 VDC 100μA	0.1 VDC 100μA	0.1 VDC 100μA
	110 VAC/24 VDC 10A 220 VAC 5A	110 VAC 0.5A 24 VDC 1A	110 VAC/ 24 VDC 3A	110 VAC 0.5A 24 VDC 1A	110 VAC 0.2A 24 VDC 0.5A	110 VAC 0.3A 24 VDC 1A	24 VDC 0.3A	24 VDC 0.3A
	DC 6, 9, 12, 24	DC 6, 9, 12, 24		DC 1.5, 3, 5, 6, 9, 12, 24	DC 3, 5, 6, 12, 24, 48		DC 3, 5, 12, 24	DC 3, 5, 12, 24
	0.36	0.36		0.45	0.56		0.15 (24 VDC) 0.125	0.36
	10 x 10^6 min.	10 x 10^6 min.		5 x 10^6 min.	10 x 10^6 min.		50 x 10^6 min.	50 x 10^6 min.
				–			–	–
	77	79		81	83		85	89

Applications	Interface						
	Signal control						
	Power drive						
Model (Type)		G2P	G2U	G2R		G2Z	
				G2R-117P-V, G2R-1117P-V	G2R-217P-V, G2R-2217P-V		
Features		DIP type relay for power drive with 3A, 250 VAC switching capacity	Switches 5A loads. Sealed type also available.	Slim styled power relay, High-capacity, High-sensitivity, Bifurcated contact, Sealed and Latching type also available		Audio equipment protective relay ideal for protection of amplifiers, speakers, muting circuits	
Appearance & dimensions							
Contact ratings	Contact form	SPDT	SPDT	SPDT, SPST-NO	DPDT, DPST-NO	DPDT	
	Contact type	Single button	Single button	Single button		Fixed, single button Movable, bifurcated button	
	Contact material: Fixed	Ag (Au clad)	AgCdO	AgCdo	AgNi	Ag (Au plated)	
	Contact material: Movable	Ag (Au clad)	AgCdO	AgCdo	Ag	Ag (Au plated)	
	Max. operating current (under resistive load)	10A, 8A, 5A, 3A, 2A, 1A, 0.5A, 0.3A, 0.25A					
	Minimum permissible load	10mA, 1mA, 100μA, 15μA					
		5 VDC 10mA	5 VDC 100mA	5 VDC 100mA	5 VDC 10mA	1 VDC 100μA	
	Rated load (under resistive load)	110 VAC 3A 220 VAC 1.5A 24 VDC 2A	110 VDC/ 24 VAC 5A	250 VAC/ 30 VDC 10A	250 VAC/ 30 VDC 5A	220 VAC 15A	
Coil ratings	Rated voltage (V)	DC 5, 6, 12, 24	DC 6, 12, 24	AC 6, 12, 24, 50, 100/(110), 200/(220) DC 3, 5, 6, 12, 24, 48, 100		DC 6, 12, 24, 48	
	Power consumption (W)	1.4, 1.2, 1.0, 0.8, 0.6, 0.4, 0.2					
		0.24	0.36	0.53		0.63	
Service life	Mechanically	10×10^6 min.	10×10^6 min.	AC: 10×10^6 min. DC: 20×10^6 min.		10×10^6 min.	
Approved standards		–					
Page		91	93	95		103	

	G2X		G4C		G4D	G4K	G4Y
	G2X-6414P (-V)	G2X-3214P (-V)	G4C-182P	G4C-112C			
	DIL type sealed relay with 5A, 220 VAC switching capacity		High impulse withstand voltage (7kV)—ideal for applications requiring resistance to voltage surges		Double-pole relay that breaks 5A loads	High impulse withstand voltage (6kV)—ideal for applications requiring resistance to voltage surges	Special relay for transmission and switching of VHF and UHF signals
							
	4PST-NO + DPST-NC DPST-NO + SPST-NC		SPDT		DPDT	SPDT, SPST-NO	SPDT
	Single button		Single crossbar	Single button	Single button	Single button	Bifurcated crossbar
	$AgSnO_2$ (Au clad)	Ag (Au clad)	AgPd (Au clad)	AgCdO	AgCdO	AgCdO	Au plated
	$AgSnO_2$ (Au clad)	Ag (Au clad)	AgPd (Au clad)	AgCdO	AgCdO	AgCdO	Au plated
							
	1 VDC 1mA		5 VDC 1mA	5 VDC 100mA	5 VDC 100mA	5 VDC 100mA	10mVDC 0.1A
	220 VAC/ 24 VDC 5A		110 VAC/ 24 VDC 1A	110 VAC 5A 220 VAC 3A 24 VDC 5A	110 VAC/ 24 VDC 5A	110 VAC/24 VDC 3A, 220 VAC 2A	24 VAC/24 VDC 0.01A
	DC 5, 12, 24, 48, 100		DC 6, 12, 24		DC 5, 6, 12, 24	DC 5, 6, 9, 12, 24	DC 5, 6, 9, 12, 24
							
	50 x 10^6 min.		10 x 10^6 min.		10 x 10^6 min.	20 x 10^6 min.	1 x 10^6 min.
	SP		UL SP DVE		UL SP	UL SP	—
	105		107		109	111	113

GLOSSARY

- **Carry current**

The value of the current which can be continuously applied to the relay contacts without opening or closing them and within the permissible temperature rise limit.

- **Dielectric strength**

The critical value at which a dielectric can withstand without rupturing when a high-tension voltage is applied for 1 minute between the same points as those in the measurement of insulation resistance.

- **Electrical service life**

The life of a relay when it is switched at the rated operating frequency with the rated load applied to its contacts.

- **Impulse withstand voltage**

The critical value indicating the durability of a relay against momentary voltage surges caused by lightning or generated when an inductive load is switched.

- **Insulation resistance**

The resistance offered by an insulating material when a voltage is applied between an electric circuit such as a relay contact or coil and a grounded non-current-carrying metallic part such as an iron core or core frame, or between contacts.

- **Maximum operating current**

A current which serves as a reference in determining the performance of the relay contacts. This value will never exceed the carry current. When using a relay, be careful not to exceed this value.

- **Maximum operating voltage**

A voltage which serves as a reference in determining the performance of the relay contacts. When using a relay, be careful not to exceed this value.

- **Maximum switching capacity**

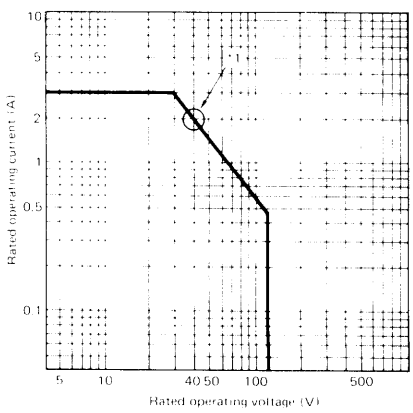
The maximum value of the load capacity which can be practically switched without any problem. When using a relay, be careful not to exceed this value.
For example, when operating voltage V_1 is known, maximum operating current I_1 can be obtained at the point of intersection on the characteristic curve of Maximum switching capacity below. Conversely, maximum operating voltage V_1 obtained if I_1 is known.

$$\text{Maximum operating current } (I_1) = \frac{\text{Maximum switching capacity [W (VA)]}}{\text{Operating voltage } (V_1)}$$

$$\text{Maximum operating voltage } (V_1) = \frac{\text{Maximum switching capacity [W (VA)]}}{\text{Operating current } (I_1)}$$

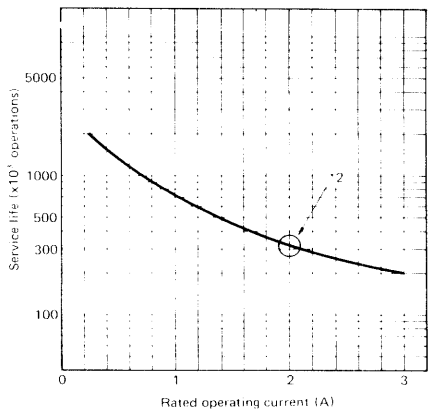
For instance, if operating voltage = 40V
Maximum operating current =2A . . . *1

Maximum switching capacity



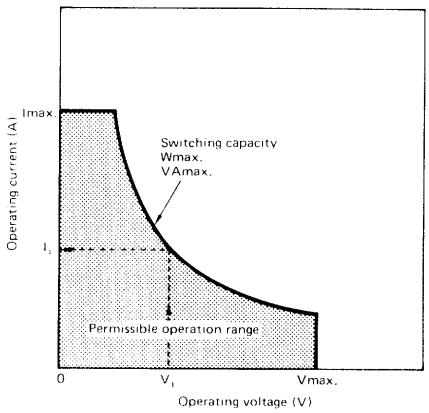
Next, the electrical service life of the relay can be determined from the service life curved based on the I_1 obtained above.
For instance, the electrical service life at the maximum operating current of 2A is slightly over 300,000 operations . . . *2

Electrical service life



However, with a DC load, it may become difficult to break the circuit of 48V or more due to arcing. Be sure to check this using the relay actually.
Correlation between the contact ratings is as shown in the following figure.

Maximum switching capacity



- **Maximum voltage**

The maximum value of permissible voltage fluctuations in the operating power supply of the relay coil.

- **Mechanical service life**

The life of a relay in terms of its mechanical functions when it is operated at the maximum mechanical operating frequency without applying any load to its contacts.

- **Must dropout voltage**

The value of a voltage at which a relay releases when the rated input voltage applied to the relay coil in the operating state is decreased gradually.

- **Must operate voltage**

The value of a voltage at which a relay operates when the input voltage applied to the relay coil in the reset state is increased gradually.

- **Minimum permissible load**

The value indicated as a standard to show the limit of the switching capability of a relay at minute load levels such as microelectronic circuits. This value may vary depending on the operating frequency, ambient conditions, expected reliability level, etc. of the relay. It is recommended to doublecheck this under the actual load condition.
In this catalog, the minimum permissible load of each relay is indicated as a reference value. It indicates failure level at a reliability level of 60% (λ_{60}).
$\lambda_{60} = 0.1 \times 10^{6}$/operation means that one failure is presumed to occur per 10,000,000 operations at the reliability level of 60%.

- **Operating frequency**

The switching frequency at which a relay operates and releases continuously. The maximum operating frequency of a relay must satisfy its electrical or mechanical life.

- **Power consumption**

The power consumption of a relay is indicated as the value of the power (rated voltage x rated current) to be consumed by the relay coil when the rated voltage is applied to the coil. With AC operated relays, their power consumption values are at the power frequency of 60Hz.

- **Rated load**

The value which serves as a reference in determining the performance of the relay contacts and is indicated by a combination of operating voltage and operating current.

- **Rated voltage**

A voltage which serves as a reference for control input.

- **Shock**

The shock resistance of a relay is divided into two categories; "Mechanical durability" which regulates the characteristic changes of, or damage to, the relay due to considerably large shocks which may develop during the transportation or mounting of the relay and "Malfunction durability" which regulates the malfunction of the relay while it is in operation.

- **Vibration**

The vibration resistance of a relay is divided into two categories; "Mechanical durability" which regulates the characteristic changes of, or damage to, the relay due to considerably large vibrations which may develop during the transportation or mounting of the relay, and "Malfunction durability" which regulates the malfunction of the relay due to vibrations while it is in operation.

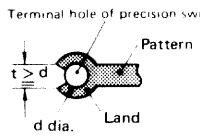
$\alpha = 0.002f^2$ A

α : Acceleration of vibration
f : Frequency
A : Double amplitude

■ SOLDERING

I. Connection and mounting

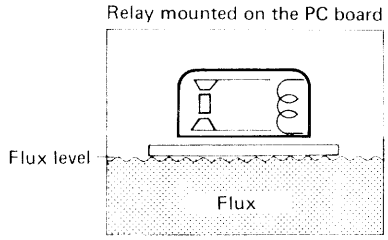
Hand soldering	Automatic soldering
• Process the land part of the printed circuit board to prevent the terminal hole of the relay from being filled with solder, and improving reliability of the solder connection.	



II. Flux application

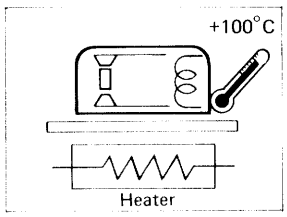
Use an anti-corrosive rosin-type flux with consideration given to the applicability of the flux to the relay's components.

- For flux solvent, use alcohol type, which is less chemically reactive.
- Apply flux sparingly and evenly to prevent penetration of solder flux into the relay. When dipping the relay terminals into solder flux, be sure to adjust the position of the flux level, so that the upper surface of the PC board is not flooded with flux.



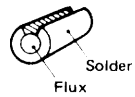
III. Preheating

Hand soldering	Automatic soldering
———	Preheat the PC board to dry the applied flux at a temperature of 100°C max.



IV. Soldering

Hand soldering	Automatic soldering
Complete soldering quickly and firmly with a soldering iron while smoothing the applied solder with the tip of the soldering iron. • Solder: (JIS Z 3282, H60 or H63 (containing rosin type flux)* • Soldering iron: rated at 30 to 60W • Tip temperature: 280 to 300°C • Soldering time: 3 sec. max. • The following is an example of the solders recommended for use in hand soldering:	• Flow soldering is recommended to assure uniform quality of soldering. • Solder: JIS Z 3282, H60 or H63* • Solder temperature and soldering time: 240°C ... 3 sec. max. • Adjust the position of the solder level so that the PC board is not flooded with solder.



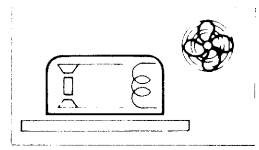
The solder shown above is provided with a cut section to prevent flux from being scattered.

Type	Sparkle solder V
Applicable solder diameter	0.8 to 1.6mm
Sn	58.8%
Flux content	1.67%
Impurities	JIS Z 3282 Class A
Spread rate	90%
Storage	3 months max.

NOTE: * H60A ... Sn (tin) content: 60±1%
H63A ... Sn (tin) content: 63±1%
A denotes A class.
The remaining contents of the above solders are mainly lead (Pb).
The above solders also contain the following chemical substances:
Antimony (Sb): 0.3% max.
Copper (Cu): 0.05% max.
Bismuth (Bi): 0.1% max.
Zinc (Zn): 0.005% max.
Iron (Fe): 0.03% max.
Aluminum (Al): 0.03% max.
Arsenic (As): 0.03% max.

V. Cooling

Hand soldering	Automatic soldering
———	Upon completion of the automatic soldering, forcedly cool the PC board with a fan, etc., so that the relay and other components on the PC board will not deteriorate from the inertial heat of soldering.



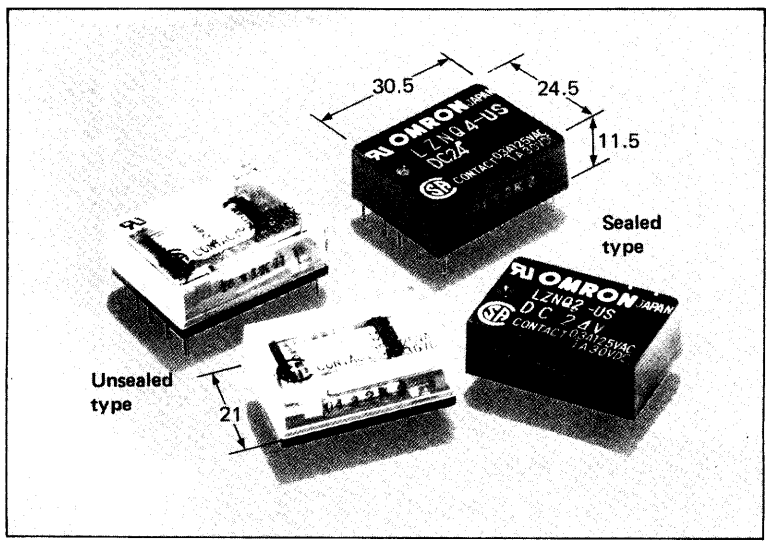
VI. Cleaning

- Avoid cleaning the soldered terminals as much as possible. When a rosin-type flux is used, no cleaning is required.
- Should cleaning be required, select an appropriate cleaning solvent. Clean only the soldered parts to prevent the flux-contaminated solvent from entering the relay.

Proper cleaning solvents	Improper cleaning solvents
Freon-based solvents	Thinner-based solvents
Alcohol-based solvents	Chlorosene-based solvents
	Trichlene-based solvents

- Plastic sealed relays can be immersion-cleaned while they are being mounted on a PC board. Some types of relays employ molding materials resistant to chemicals, and can be cleaned with thinner-based, chlorosene-based, or trichlene-based solvents. Note that ultrasonic cleaning may have adverse effect on relay performance. If relays must be cleaned by this method, complete the clearing of the relays as quickly as possible.

Low Profile Relay That Can Break from Minute Loads to 3A.



■ FEATURES

- Employs bifurcated crossbar contact for the contact mechanism and card-lift-off system for contact drive
- Ultra-low profile design with very little base area is best suited for P.C. board use
- 2.5mm or international 2.54mm grid terminal arrangement
- Long service life realized through the provision of large contact follow with large armature stroke

■ AVAILABLE TYPES

Classification \ Type	Contact form	General purpose		High capacity		Make-before-break contact	
		Unsealed	Sealed	Unsealed	Sealed	Unsealed	Sealed
Standard type	DPDT	LZN2	LZNQ2	LZN203	LZNQ203	LZN2M	LZNQ2M
	4PDT	LZN4	LZNQ4	LZN403	LZNQ403	LZN4M LZN4M1	LZNQ4M LZNQ4M1
Standard approved type	DPDT	LZN2-US	LZNQ2-US	LZN203-US	LZNQ203-US	LZN2M-US	LZNQ2M-US
	4PDT	LZN4-US	LZNQ4-US	LZN403-US	LZNQ403-US	LZN4M-US LZN4M1-US	LZNQ4M-US LZNQ4M1-US

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Contact form	Rated voltage (V)		Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (W)
					Armature OFF	Armature ON	% of rated voltage			
DPDT	DC	5	58.8	85	0.4	0.7	70 max.	10 min.	170	Approx. 0.3
		6	42.9	140	0.55	0.95				
		12	24	500	2	3.5				
		24	12	2000	7.5	13				
		48	6.9	7000	28	50				
4PDT	DC	5	96.2	52	0.22	0.3			140	Approx. 0.48
		6	70.6	85	0.4	0.5				
		12	36.4	330	1.6	2				
		24	20	1200	5.2	6.5				
		48	11.4	4200	17.5	22				

NOTE: The rated current, coil resistance and inductance are measured at a coil temperature of 20°C with tolerances of +15%, −20% for AC rated current and ±15% for DC rated current, and ±15% for rated coil resistance.

• CONTACT RATINGS

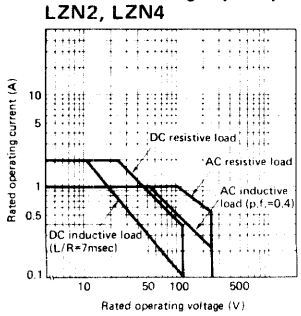
Type / Load / Item	General purpose & make before break-contact		High capacity	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R =7msec)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R =7msec)
Rated load	110 VAC 0.5A 24 VDC 1A (24 VDC 0.7A)	110 VAC 0.25A 24 VDC 0.5A (24 VDC 0.35A)	110 VAC 2A 24 VDC 3A	110 VAC 1A 24 VDC 1.5A
Carry current	3A			
Max. operating voltage	250 VAC, 125 VDC			
Max. operating current	2A (1A)	1A (0.5A)	3A	1.5A
Max switching capacity	110VA (60VA) 60W (30W)	60VA (30VA) 30W (15W)	220VA 120W	110VA 60W
Minimum permissible load	0.1 VDC 100μA (ref. value)		5 VDC 1mA (ref. value)	

NOTE: Data in parentheses apply to the make-before-break contact type only.

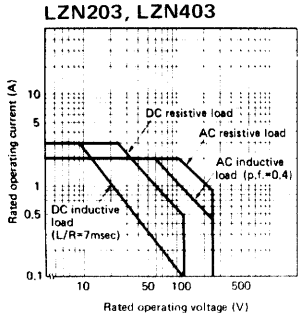
• CHARACTERISTIC DATA

Maximum switching capacity

LZN2, LZN4

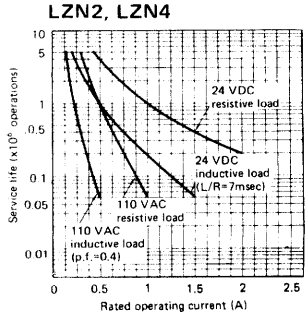


LZN203, LZN403

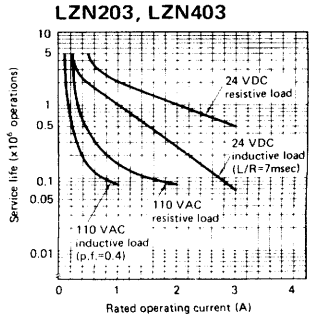


Electrical service life

LZN2, LZN4



LZN203, LZN403



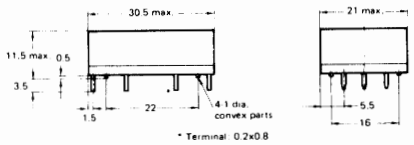
• CHARACTERISTICS

Item \ Type	General purpose	High capacity	Make-before-break contact
Contact resistance	100mΩ max.		
Operate time	15msec max.		
Release time	10msec max.		
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)		
Insulation resistance	100MΩ min. (at 500 VDC)		
Dielectric strength	1,000 VAC, 50/60Hz for 1 minute (750 VAC between non-continuous contacts)		1,000 VAC, 50/60Hz for 1 minute (400 VAC between non-continuous contacts)
Vibration	Mechanical durability: 10 to 55Hz; 3mm double amplitude Malfunction durability: 10 to 110Hz; 0.85mm double amplitude (10 to 50Hz; 0.85mm double amplitude in the direction of armature operation)		
Shock	Mechanical durability: 1,000 m/sec² (approx. 100G's) Malfunction durability: When energized: 150m/sec² (approx. 15G's) When de-energized: 100m/sec² (approx. 10G's) (4G's min. in the direction of armature operation)		
Ambient temperature	Operating: −10 to +60°C		
Humidity	45 to 85% RH		
Service life	Mechanically: 100,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."		
Weight	DPDT: 13g 4PDT: 15g		

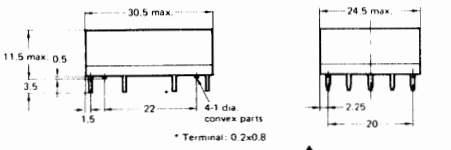
NOTE: The data shown above are of initial value.

■ DIMENSIONS

• LZN(Q)2(-US), LZN(Q)203(-US), LZN(Q)2M(-US)



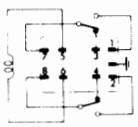
• LZN(Q)4(-US), LZN(Q)403(-US), LZN(Q)4M(1)(-US)



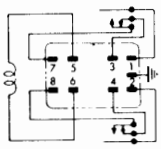
⬆ Bottom view

Terminal arrangement (Bottom view)

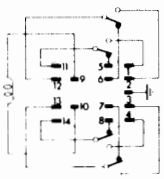
LZN(Q)2(-US), LZN(Q)203(-US)



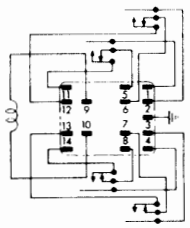
LZN(Q)2M(-US)



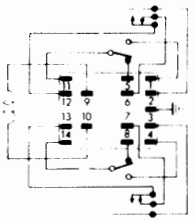
LZN(Q)4(-US), LZN(Q)403(-US)



LZN(Q)4M(-US)

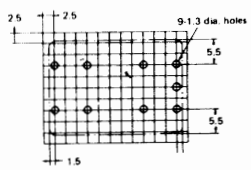


LZN(Q)4M1(-US)

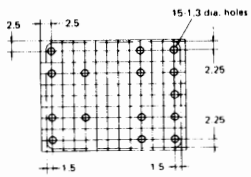


Mounting holes

DPDT



4PDT



NOTE: Terminal pitch is 2.5mm x number of grids. 2.54mm (0.1 inch) grid terminals may also be used.

STANDARD APPROVED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exception.

• RATINGS

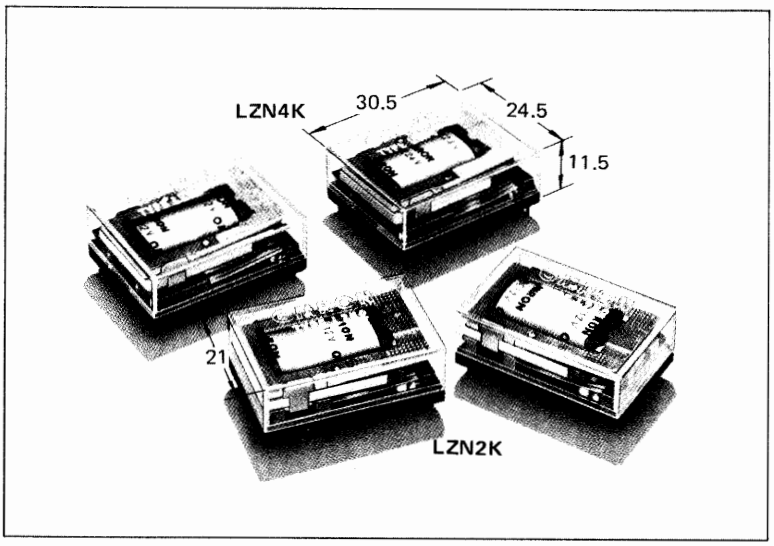
UL recognized type (File No. E41515)

Type	Contact form	Coil ratings	Contact ratings
General purpose & make before break contact	DPDT 4PDT	5 to 60 VDC	0.5A 100 VAC (resistive load) 0.4A 100 VAC (inductive load) 2A 30 VDC (inductive load)
High capacity			2A 100 VAC (resistive load) 1.6A 100 VAC (inductive load) 3A 30 VDC (inductive load)

CSA certified type (File No. LR24825-24)

Type	Contact form	Coil ratings	Contact ratings
General purpose & make before break contact	DPDT 4PDT	5 to 60 VDC	0.5A 125 VAC (resistive load) 0.4A 125 VAC (inductive load) 2A 30 VDC (resistive load)
High capacity			2A 100 VAC (resistive load) 1.6A 125 VAC (inductive load) 3A 30 VDC (resistive load)

Low Profile, PC Board-use Magnetic Latching Relay Ideal for Memory Circuit



■ FEATURES

- Latching ability little affected by aging, and excellent resistance to vibration and shock
- Continuous coil ratings
- Long life — 100 million mechanical operations
- Sealed type also available

■ AVAILABLE TYPES

Classification \ Type	Contact form	General purpose: Unsealed	General purpose: Sealed	High capacity: Unsealed	High capacity: Sealed
Standard type	DPDT	LZN2K	LZNQ2K	LZN203K	LZNQ203K
	4PDT	LZN4K	LZNQ4K	LZN403K	LZNQ403K
Standard approved type	DPDT	LZN2K-US	LZNQ2K-US	LZN203K-US	LZNQ203K-US
	4PDT	LZN4K-US	LZNQ4K-US	LZN403K-US	LZNQ403K-US

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Type	Rated voltage (V)	Set coil: Rated current (mA)	Set coil: Coil resistance (Ω)	Set coil: Coil inductance (ref. value) (H) Armature OFF	Set coil: Coil inductance (ref. value) (H) Armature ON	Reset coil: Rated current (mA)	Reset coil: Coil resistance (Ω)	Reset coil: Coil inductance (ref. value) (H) Armature OFF	Must set voltage (% of rated voltage)	Must reset voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (VA, W): Set coil	Power consumption (VA, W): Reset coil
LZN2K LZN203K LZNQ2K LZNQ203K	5 VDC	204	24.5	0.051	0.094	192	26	0.014	80 max.	80 max.	110	Approx. 1	Approx. 1
	6 VDC	179	33.5	0.064	0.117	152	39.5	0.022					
	12 VDC	85.7	140	0.28	0.51	85.7	140	0.07					
	24 VDC	44	545	1.1	2	45.7	525	0.25					
	48 VDC	20.7	2,320	4.4	8	17.8	2,700	1.2					
LZN4K LZN403K LZNQ4K LZNQ403K	5 VDC	246	20.3	0.041	0.065	266	18.8	0.01				Approx. 1.3	Approx. 1.3
	6 VDC	224	26.8	0.053	0.085	210	28.6	0.016					
	12 VDC	100	120	0.26	0.42	118	102	0.054					
	24 VDC	57.8	415	0.82	1.3	53.3	450	0.24					
	48 VDC	30	1,600	2.8	4.5	24.6	1,950	0.87					

NOTES: 1. The rated current is measured at a coil temperature of 20°C with tolerances of +15%, −20%.
2. Performance characteristic data are measured at a coil temperature of 5 to 35°C.

• CONTACT RATINGS

Item \ Load	General purpose type: Resistive load (p.f.=1)	General purpose type: Inductive load (p.f.=0.4, L/R=7msec)	High capacity type: Resistive load (p.f.=1)	High capacity type: Inductive load (p.f.=0.4, L/R=7msec)
Rated load	110 VAC 0.5A 24 VDC 1A	110 VAC 0.25A 24 VDC 0.5A	110 VAC 2A 24 VDC 3A	110 VAC 1A 24 VDC 1.5A
Carry current	3A		3A	
Max. operating voltage	250 VAC 125 VDC		250 VAC 125 VDC	
Max. operating current	2A	1A	3A	1.5A
Max. switching capacity	110VA, 60W	60VA, 30W	220VA, 120W	110VA, 60W
Minimum permissible load	0.1 VDC 0.1mA (ref. value)		—	

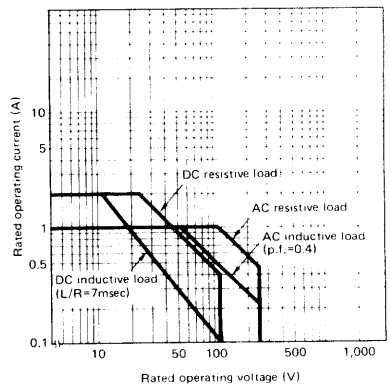
• CHARACTERISTICS

Item \ Classification	General purpose type	High capacity type
Contact resistance	100mΩ max.	
Operate (Set) time	15msec max. (Set pulse width: 15msec min.)	
Release (Reset) time	10msec max. (Reset pulse width: 10msec min.)	
Operating frequency	Mechanically: 18,000 operations/hour Under rated load: 1,800 operations/hour	
Insulation resistance	100MΩ min. (at 500 VDC)	
Dielectric strength	1,000 VAC, 50/60Hz for 1 minute (750 VAC between non-continuous contacts)	
Vibration	Mechanical durability: 10 to 55Hz; 3.0mm double amplitude Malfunction durability: 10 to 110Hz; 0.85mm double amplitude (10 to 50Hz; 0.85 double amplitude in the direction of armature operation with relay in de-energized state)	
Shock	Mechanical durability: 1,000m/s² (approx. 100G's) Malfunction durability: When energized: 150m/s² (approx. 15G's) When de-energized: 100m/s² (approx. 10G's) (4G's min. in the direction of armature operation)	
Ambient temperature	Operating: −10 to +60°C	
Humidity	45 to 85% RH	
Service life	Mechanically: 100,000,000 operations min. (at operating frequency of 1,800 operations/hour) Electrically: See "CHARACTERISTIC DATA."	
Weight	LZN2K: 13g, LZN4K: 15g	

NOTE: The data shown above are of initial value.

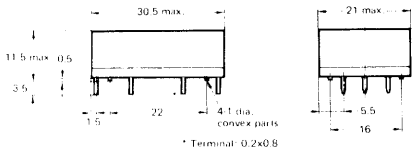
• CHARACTERISTIC DATA

Maximum switching capacity
LZN2K, LZN4K

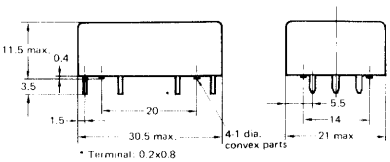


■ DIMENSIONS

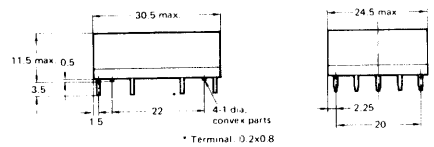
• LZN2K(-US), LZN203K(-US)



• LZNQ2K(-US)

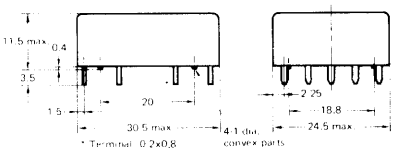


• LZN4K(-US), LZN403K(-US)



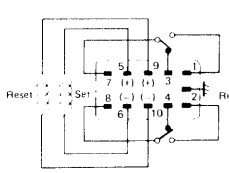
⬆ Bottom view

• LZNQ4K(-US)

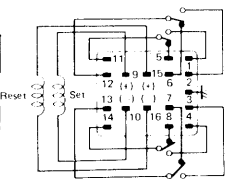


Terminal arrangement/Internal connection (Bottom view)

LZN2K(-US), LZN203K(-US), LZNQ2K(-US)

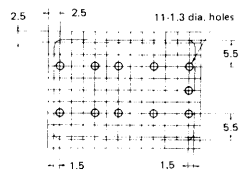


LZN4K(-US), LZN403K(-US), LZNQ4K(-US)

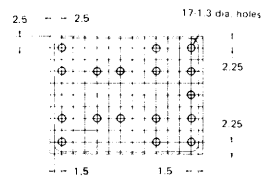


Mounting holes (Bottom view)

LZN2K(-US), LZN203K(-US), LZNQ2K(-US)



LZN4K(-US), LZN403K(-US), LZNQ4K(-US)



STANDARD APPROVED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exception.

• RATINGS

UL recognized type (File No. E41515)

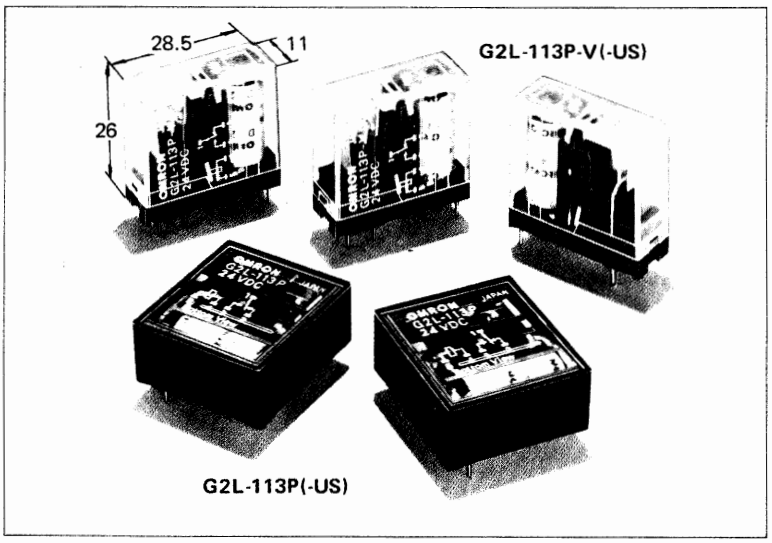
Type	Contact form	Coil ratings	Contact ratings
General purpose	DPDT 4PDT	5 to 48 VDC	0.5A 100 VAC (resistive load) 0.4A 100 VAC (inductive load) 2A 30 VDC (inductive load)
High capacity			2A 100 VAC (resistive load) 1.6A 100 VAC (inductive load) 3A 30 VDC (inductive load)

CSA certified type (File No. LR24825-24)

Type	Contact form	Coil ratings	Contact ratings
General purpose	DPDT 4PDT	5 to 60 VDC	0.5A 125 VAC (resistive load) 2A 30 VDC (resistive load) 0.4A 125 VAC (inductive load)
High capacity			2A 100 VAC (resistive load) 3A 30 VDC (resistive load) 1.6A 125 VAC (inductive load)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Low Profile Power Relay Breaks up to 8A Loads



■ FEATURES

- Miniature, low profile design
- Available in horizontal (flat pack) and vertical mount types ideal for space saving on PCB
- Conforms to VDE0110C/250 for creepage distance and clearance of insulation
- Switching capability of up to 8A loads at 220 VAC

■ AVAILABLE TYPES

Classification \ Contact form	Unsealed		Sealed	
	Horizontal mount (Flat pack)	Vertical mount	Horizontal mount	Vertical mount
Standard type	G2L-113P	G2L-113P-V	G2L-114P	G2L-114P-V
Standard approved type	G2L-113P-US	G2L-113P-V-US	*G2L-114P-US	*G2L-114P-V-US

NOTES: 1. When placing your order for the types approved by SEV, use the type names listed in "Standard type" above.
2. For types marked with an asterisk (*), CSA approval is pending.

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage \ Item	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
3 VDC	167	18	0.065	0.075	70 max.	10 min.	110 max.	Approx. 500
5 VDC	100	50	0.18	0.20				
6 VDC	83	72	0.26	0.29				
12 VDC	41.4	290	1.05	1.20				
24 VDC	20.9	1,150	4.21	4.80				
48 VDC	10.4	4,600	16.8	19.2				
60 VDC	8.3	7,200	26.2	29.8				

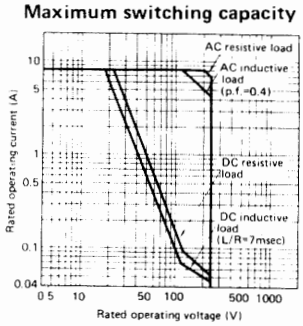
NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±15%.

• CONTACT RATINGS

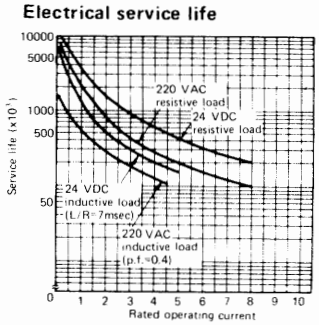
Item \ Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	220 VAC 8A 24 VDC 8A	220 VAC 5A 24 VDC 5A
Carry current	8A	
Max. operating voltage	250 VAC, 250 VDC	
Max. operating current	8A	5A
Max. switching capacity	1,800VA, 200W	1,100VA, 120W
Min. permissible load (reference value)	5 VDC 1mA	

• CHARACTERISTIC DATA

Maximum switching capacity



Electrical service life



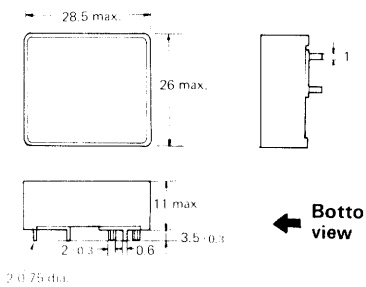
• CHARACTERISTICS

Contact resistance	30mΩ max.
Operate time	15msec max.
Release time	10msec max.
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,500 VAC, 50/60Hz for 1 minute (1,000 VAC between non-continuous contacts)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 0.8mm double amplitude
Shock	Mechanical durability: 1,000m/sec^2 (approx. 100G's) Malfunction durability: 100m/sec^2 (approx. 10G's)
Ambient temperature	Operating: –40 to +70°C
Humidity	45 to 85% RH
Service life	Mechanically: 20,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 15g

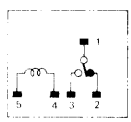
NOTE: The data shown are of initial value.

■ DIMENSIONS

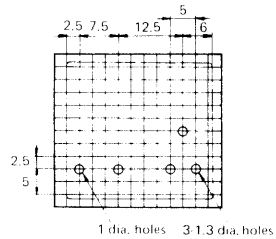
G2L-113P(-US), G2R-114P(-US)



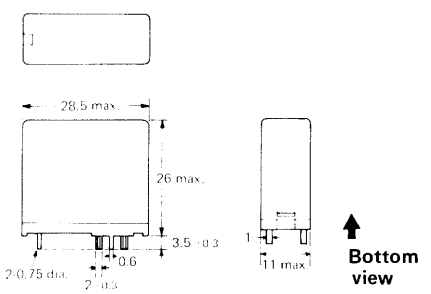
Terminal arrangement/ Internal connections (Bottom view)

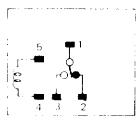


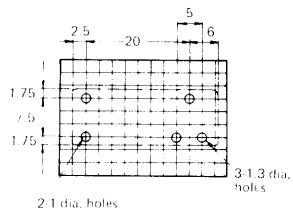
Mounting holes (Bottom view)



G2L-113P-V(-US), G2L-114P-V(-US)







STANDARD APPROVED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exception.

• RATINGS

UL recognized type (File No. E41515)

Type	Contact form	Coil ratings	Contact ratings
G2L-113P-US G2L-113P-V-US G2L-114P-US G2L-114P-V-US	SPDT	3 to 60 VDC	10A 250 VAC or 8V 24 VDC (resistive load) TV-5

CSA certified type (File No. LR24825-25)

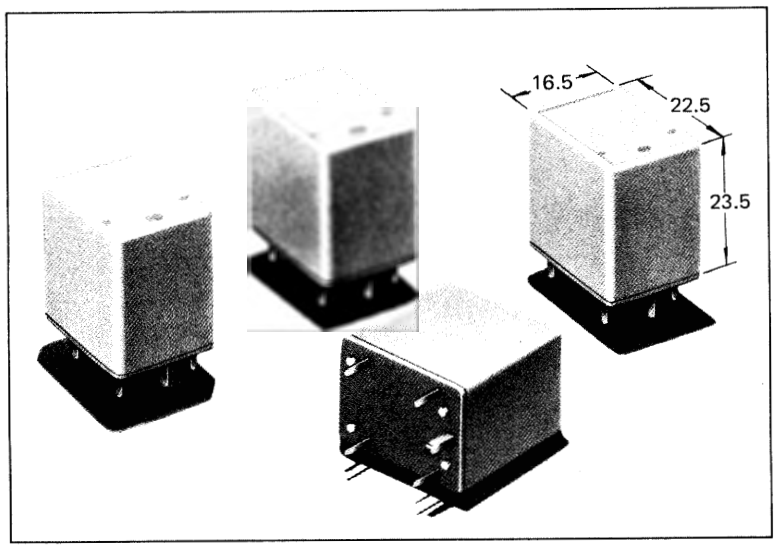
Type	Contact form	Coil ratings	Contact ratings
G2L-113P-US G2L-113P-V-US	SPDT	3 to 60 VDC	10A 250 VAC or 8A 24 VDC (resistive load) TV-5

SEV listed type (File No. D791/262)

Type	Contact form	Coil ratings	Contact ratings
G2L-113P-US G2L-113P-V-US G2L-114P G2L-114P(-V)	SPDT	3 to 60 VDC	10A 250 VAC (resistive load)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Subminiature, Economical Relay with 10A Switching Capacity



■ FEATURES

- Space saver ideal for equipment miniaturization, satisfying all requirements for use in household electric appliances
- Direct soldering to PCB is possible

■ AVAILABLE TYPES

Classification \ Contact form \ Type	General purpose
Standrad type — SPDT	LC1N-10
Standrad type — SPST-NO	LC1N-10-100
Standard approved type — SPDT	LC1-10-US
Standard approved type — SPST-NO	LC1N-10-100-US

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
6 VDC	60	100	0.34	0.51	75 max.	10 min.	130 max.	Approx. 360
12 VDC	30	400	1.2	2.3				
24 VDC	15	1,600	4.8	8.0				

NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of +15%, −20% for rated current and ±10% for rated coil resistance.

• CONTACT RATINGS

Item / Load \ Type	LC1N-10(-100)	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4; L/R=7msec)
Rated load	110 VAC/24 VDC 10A 220 VAC 5A	–
Carry current	10A	
Max. operating voltage	250 VAC, 60 VDC	
Max. operating current	10A	–
Max. switching capacity	1200VA 240W	–
Minimum permissible (ref. value)	–	

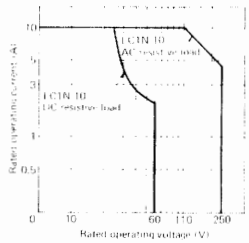
• CHARACTERISTICS

Contact resistance	100mΩ max.
Operate time	15msec max.
Release time	5msec max.
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	1,500 VAC, 50/60Hz for 1 minute (750 VAC between non-continuous contacts)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/s² (approx. 100G's) Malfunction durability: 100m/s² (approx. 10G's)
Ambient temperature	Operating: –25 to +60°C
Humidity	45 to 85% TH
Service life	Mechanically: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTICS DATA."
Weight	Approx. 14g

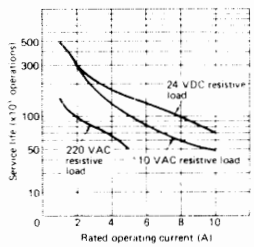
NOTE: The data shown are of initial value.

• CHARACTERISTIC DATA

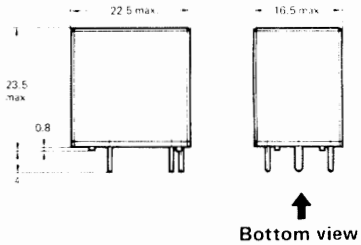
Maximum switching capacity



Electrical service life



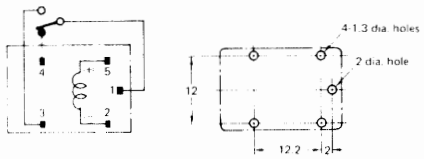
■ DIMENSIONS



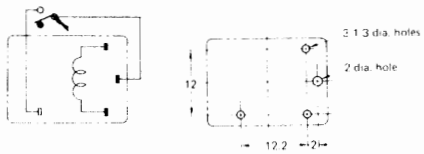
Terminal arrangement (Bottom view)

Mounting holes (Bottom view)

LC1N-10 (SPDT type)



LC1N-10-100 (SPST-NO type)



STANDARD APPROVED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exception.

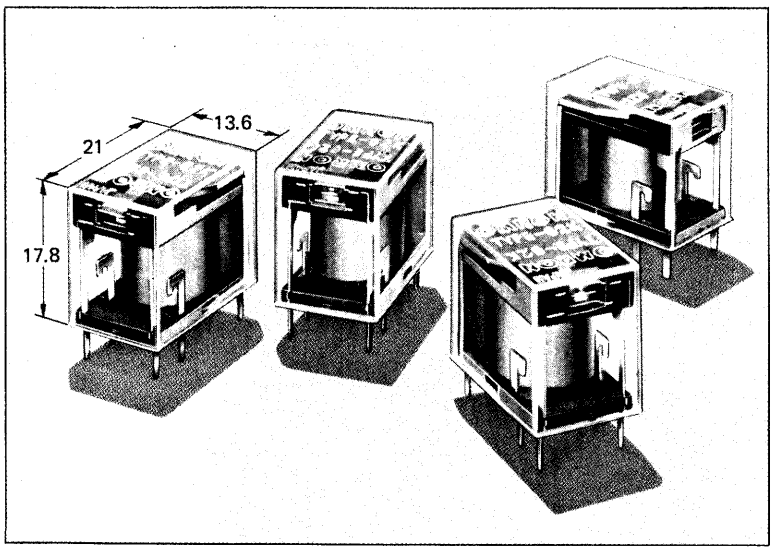
• RATINGS

UL recognized type (File No. E41515)/CSA certified type (File No. LR34815)

Type	Contact form	Coil ratings	Contact ratings
LC1N-10-US	SPDT	6, 12 and 24 VDC	10A 120 VAC/24 VDC (resistive load)
LC1N-10-100-US	SPST-NO		

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Sugar Cube-Sized High-Reliability Relay Ideal for Minute Load Switching



■ FEATURES

- Contacts employing gold-clad silver-paladium alloy with crossbar construction assure high contact reliability
- Contact section located opposite the terminal section provides a greater creepage distance, and is resistant to solder flux wicking
- International 2.5mm grid terminal arrangement
- Movable contact piece of the triple arm construction assures extended service life and stable operation

■ AVAILABLE TYPES

Classification \ Contact form		General purpose	High capacity
Standard type	SPDT	G2K	G2K-3
Standard approved type	SPDT	G2K-US	G2K-3-US

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage (Color code on coil) \ Item	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
6 VDC	60	100	0.277	0.441	75 max.	10 min.	130 max.	Approx. 360
9 VDC	40	225	0.673	1.16				
12 VDC	30	400	1.01	1.84				
24 VDC	15	1,600	4.04	5.66				

NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of +15%, −20% for rated current and ±10% for rated coil resistance.

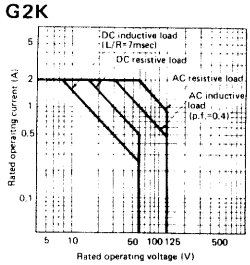
• CONTACT RATINGS

Item \ Type / Load	G2K		G2K-3	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R =7msec)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R =7msec)
Rated load	110 VAC 0.5A, 24 VDC 1A	110 VAC 0.2A, 24 VDC 0.3A	110 VAC/ 24 VDC 3A	110 VAC/ 24 VDC 1.5A
Carry current	2A		5A	
Max. operating voltage	125 VAC, 60 VDC			
Max. operating current	1A		3A	2A
Max. switching capacity	120VA, 30W	60VA, 15W	300VA, 70W	150VA, 40W
Min. permissible load (ref. value)	5VDC 1mA		50 VDC 100mA	

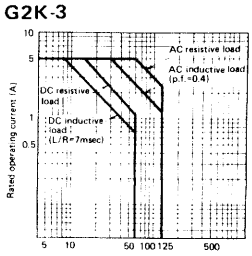
• CHARACTERISTIC DATA

Maximum switching capacity

G2K

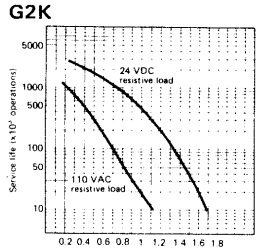


G2K-3

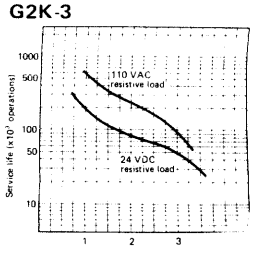


Electrical service life

G2K



G2K-3



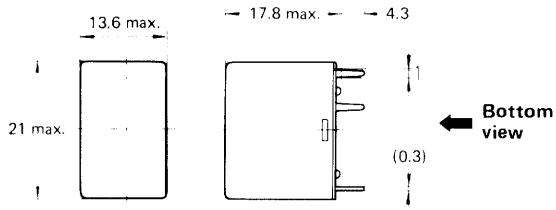
• CHARACTERISTICS

Item \ Type	G2K	G2K-3
Contact resistance	50mΩ max.	100mΩ max.
Operate time	15msec max.	
Release time	5msec max.	
Operating frequency	Mechanically: 18,000 operations/hour; Electrically: 1,800 operations/hour (under rated load)	
Insulation resistance	100MΩ min. (at 500 VDC)	
Dielectric strength	1,000 VAC, 50/60Hz for 1 minute (500 VAC between non-continuous contacts)	
Vibration	Mechanical and malfunction durability: 10 to 55Hz; 1.5mm double amplitude	
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 100m/sec² (approx. 10G's)	
Ambient temperature	Operating: −30 to +70°C	
Humidity	45 to 85% RH	
Service life	Mechanically: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."	
Weight	Approx. 11g	

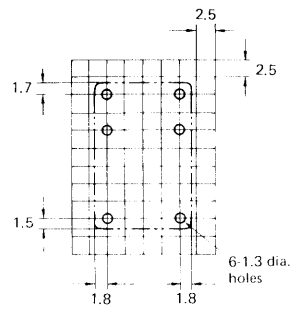
NOTE: The data shown are of initial value.

■ DIMENSIONS

• G2K(-US), G2K-3(-US)

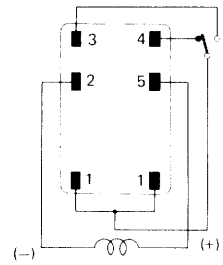


Mounting holes



(Bottom view)

Terminal arrangement/ Internal connections



(Bottom view)

STANDARD APPROVED TYPE

When placing your order for UL or CSA approved versions, please indicate "UL" or "CSA" as desired in addition to the model number.

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exception.

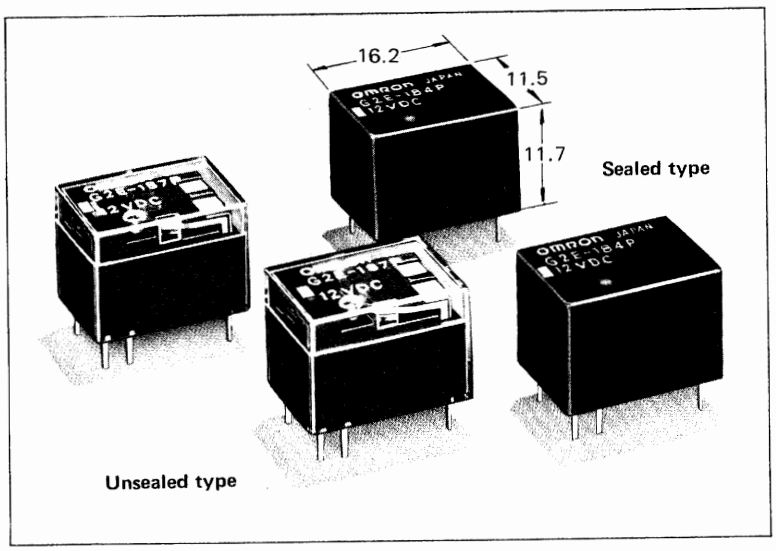
• RATINGS

UL recognized type (File No. E41515)/CSA certified type (File No. LR34815, -6, -7, -8)

Type	Contact form	Coil ratings	Contact ratings
G2K-US	SPDT	3 to 48 VDC	0.5A 120 VAC or 1A 28 VDC (resistive load)
G2K-3-US			3A 120 VAC or 3A 28 VDC (resistive load)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

High-sensitivity (290mW), Sugar Cube-Sized PCB Relay



■ FEATURES

- Standard terminal arrangement on 2.5mm grid
- Fast response (5msec operate time)
- Crossbar contacts (gold-clad silver-palladium)
- Contact section located opposite the terminal section and dust-proof cover prevent solder flux wicking
- Sealed type availabe

■ AVAILABLE TYPES

Contact form \ Type		General purpose		High-sensitivity	
		Unsealed type	Sealed type	Unsealed type	Sealed type
SPDT	Single crossbar	G2E-187P	G2E-184P	G2E-187P-H	G2E-184P-H
	Bifurcated crossbar	G2E-137P	G2E-134P	G2E-137P-H	G2E-134P-H

■ SPECIFICATIONS

• COIL RATINGS (Value in parentheses applies to High-sensitivity type.)

Rated voltage (Color code on coil) \ Item	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
1.5 VDC (Brown)	300(–)	5(–)	0.005(–)	0.009(–)	70 max. (80 max.)	10 min.	110 max. (130 max.)	Approx. 450 (Approx. 200)
3 VDC (Purple)	150(–)	20(–)	0.017(–)	0.034(–)				
5 VDC (Orange)	89.3(41.7)	56(120)	0.044(–)	0.091(–)				
6 VDC (Red)	75(33.3)	80(180)	0.067(–)	0.136(–)				
9 VDC (Yellow)	50(22.5)	180(400)	0.137(–)	0.297(–)				
12 VDC (Blue)	37.5(17.1)	320(700)	0.229(–)	0.496(–)				
24 VDC (Green)	18.8(8.6)	1,280(2,800)	0.94 (–)	2.1 (–)				

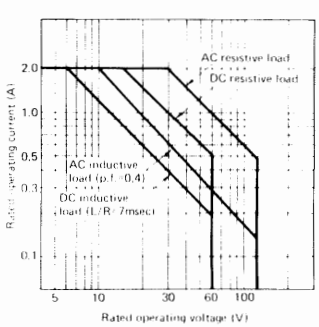
NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of +15%, −20% for rated current and ±10% for coil resistance.

• CONTACT RATINGS

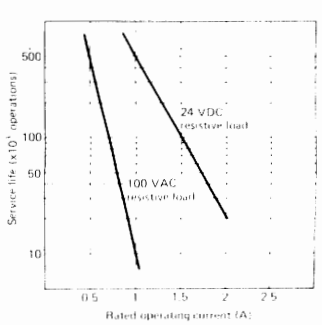
Item \ Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	110 VAC 0.5A 24 VDC 1A	110 VAC 0.2A 24 VDC 0.3A
Carry current	2A	
Max. operating voltage	125 VAC, 60 VDC	
Max. operating current	1A	
Max. switching capacity	120VA 30W	60VA 15W
Minimum permissible load (reference value)	5 VDC 1mA	

• CHARACTERISTIC DATA

Maximum switching capacity



Electrical service life

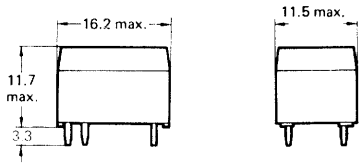


• CHARACTERISTICS

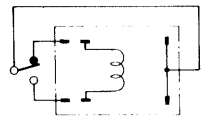
Contact resistance	100mΩ max.
Operate time	5msec max. (General purpose type), 10msec max. (High-sensitivity type)
Release time	5msec max.
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	500 VAC, 50/60Hz for 1 minute
Vibration	Mechanical and malfunction durability: 10 to 55Hz; 3.3mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 100m/sec² (approx. 10G's)
Ambient temperature	Operating: −25 to +55°C (General purpose type), −25 to +65°C (High-sensitivity type)
Humidity	45 to 85% RH
Service life	Mechanically: 5,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 3.7g

NOTE: The data shown are of initial value.

■ DIMENSIONS

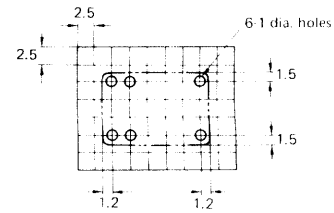


Terminal arrangement/ Internal connections



(Bottom view)

Mounting holes



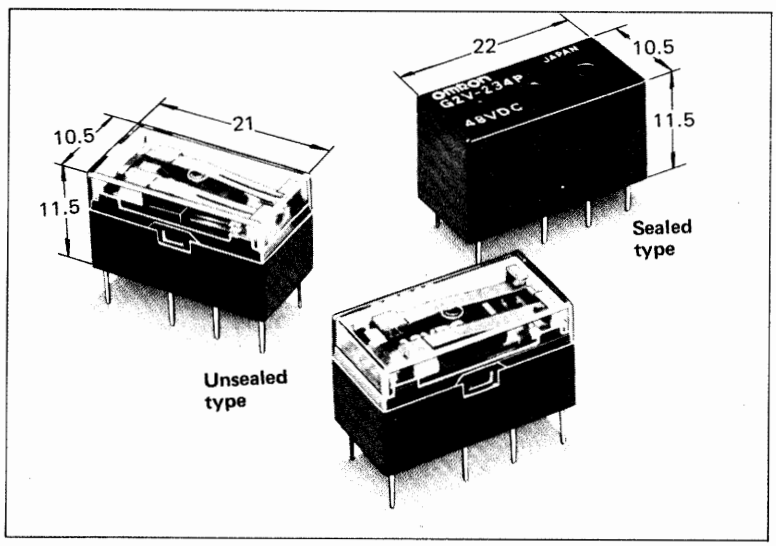
(Bottom view)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

PC BOARD-USE RELAY

Model G2V

Ultra Small, Highly Reliable DIP Type Relay



■ FEATURES

- Same pitch as 16-pin DIP IC
- High contact reliability with bifurcated crossbar contacts. Single crossbar contact type also available
- Wide switching capacity from 100μA to 2A loads
- Construction resistant to flux wicking—automatic flow soldering is possible
- Permits 15.5mm pitch PC board rack mounting
- Sealed type available

■ AVAILABLE TYPES

Classification \ Contact type	Contact form	Unsealed		Sealed	
		Bifurcated crossbar	Single crossbar	Bifurcated crossbar	Single crossbar
Standard type	DPDT	G2V-2	G2V -282P	G2V -234P	G2V -284P
Standard approved type		G2V-2-US	G2V -282P-US	G2V 234P-US	G2V -284P-US

■ SPECIFICATIONS

• COIL RATINGS

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
3 VDC	188	16	0.031	0.041	80 max.	10 min.	125 max.	Approx. 560
5 VDC	111	45	0.075	0.113				
6 VDC	100	60	0.12	0.168				
12 VDC	42.9	280	0.537	0.789				
24 VDC	22.9	1,050	1.36	2.06				
48 VDC	12.3	3,900	6.74	9.72				

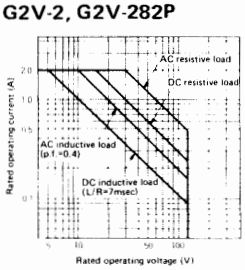
NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.

• CONTACT RATINGS

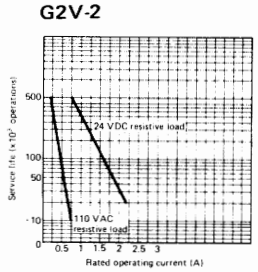
Type / Load / Item	G2V-2, G2V-234P		G2V-282P, G2V-284P	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4; L/R =7msec)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4; L/R =7msec)
Rated load	110 VAC 0.3A 24 VDC 1A	110 VAC 0.2A 24 VDC 0.3A	110 VAC 0.3A 24 VDC 1A	110 VAC 0.2A 24 VDC 0.3A
Carry current	2A			
Max. operating voltage	125 VAC, 125 VDC			
Max. operating current	2A			
Max. switching capacity	60VA 30W	20VA 10W	60VA 30W	20VA 10W
Minimum permissible load (reference value)	0.1 VDC 100μA		1 VDC 1mA	

• CHARACTERISTIC DATA

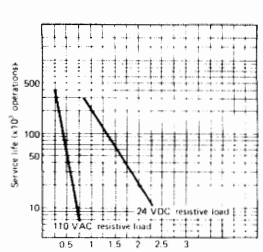
Maximum switching capacity
G2V-2, G2V-282P



Electrical service life
G2V-2



G2V-282P



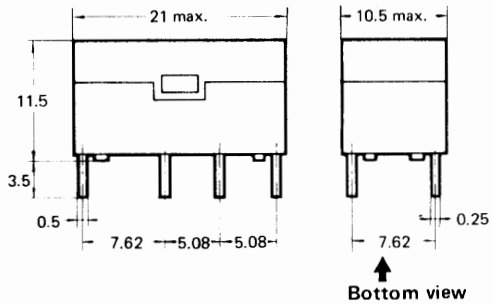
- CHARACTERISTICS

Item \ Type	G2V-2, G2V-234P	G2V-282P, G2V-284P
Contact resistance	100mΩ max.	
Operate time	8msec max.	
Release time	5msec max.	
Operating frequency	Mechanically: 18,000 operations/hour; Electrically: 3,600 operations/hour (under rated load)	
Insulation resistance	100MΩ min. (at 500 VDC)	
Dielectric strength	1,000 VAC, 50/60Hz for 1 minute (500 VAC between non-continuous contacts)	
Vibration	Mechanical and malfunction durability: 10 to 55Hz; 1.5mm double amplitude	
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 200m/sec² (approx. 20G's)	
Ambient temperature	Operating: −25 to +50°C	
Humidity	45 to 85% RH	
Service life	Mechanically: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."	
Weight	Approx. 4.5g	

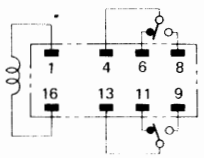
NOTE: The data shown are of initial value.

■ DIMENSIONS

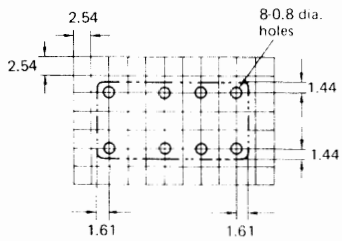
- G2V-2(-US), G2V-282P(-US)



Terminal arrangement/Internal connections (Bottom view)

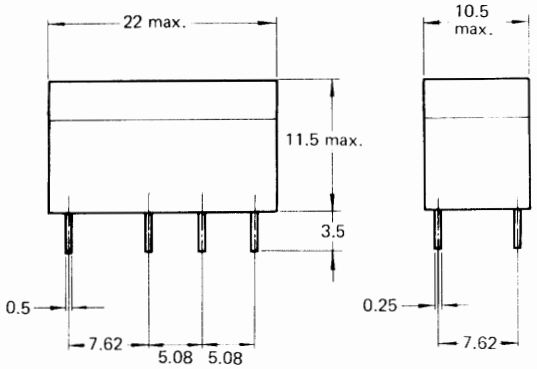


Mounting holes

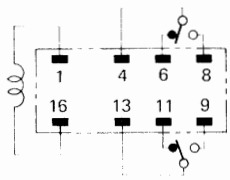


NOTE: When a socket is to be used, use of a DIN 16-pin IC socket is recommended.

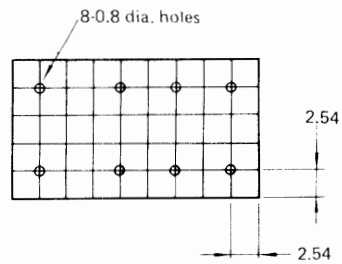
- G2V-234P(-US), G2V-284P(-US)



Terminal arrangement/Internal connections (Bottom view)



Mounting holes



STANDARD APPROVED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exception.

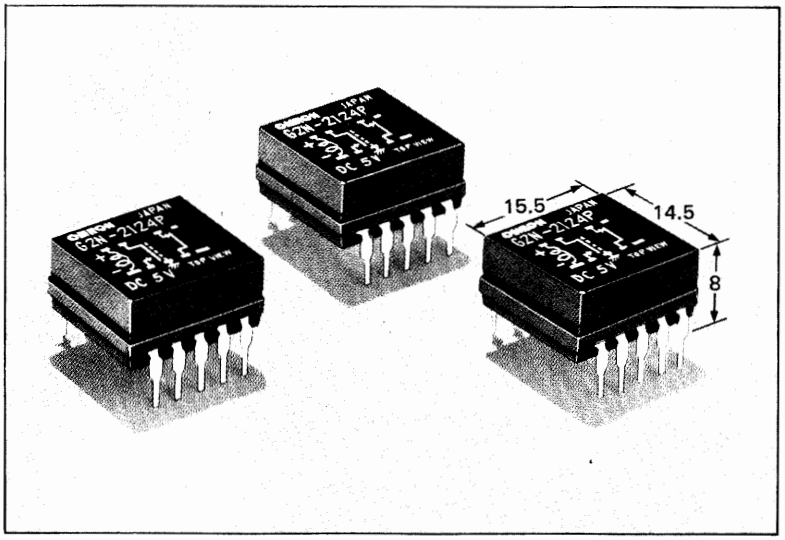
- RATINGS

UL recognized type (File No. E41515)/CSA certified type (File No. LR34815)

Type	Contact form	Coil ratings	Contact ratings
G2V-2-US G2V-282P-US G2V-234P-US G2V-284P-US	DPDT	3 to 48 VDC	0.3A 120 VAC 1A 24 VDC

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

High-sensitivity (80mW), DIP Type Relay for Interface Devices



■ FEATURES

- Sealed and 8mm thick
- Direct drive by TTL, DTL or IC is possible
- Bifurcated contact construction employing gold alloy assures high reliability at low signal levels
- Short contact bounce time (approx. 20μsec)
- Shield plate prevents contacts from being affected adversely by noise generated by coil
- High shock and vibration resistance is assured by the balanced armature system
- Thermoelectromotive force as low as 5μV max., ideal for analog signals
- Conforms to UL, CSA and VDE

■ AVAILABLE TYPES

Contact form \ Type	General purpose
SPST-NO+SPST-NC	G2N-2124P

OMRON

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage \ Item	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
3 VDC	41.7	72	0.09	0.12	80 max.	10 min.	110 max.	Approx. 125
5 VDC	25.0	200	0.23	0.31				
12 VDC	10.4	1,150	1.44	1.91				
24 VDC	6.1	3,940	4.31	5.72				Approx. 150

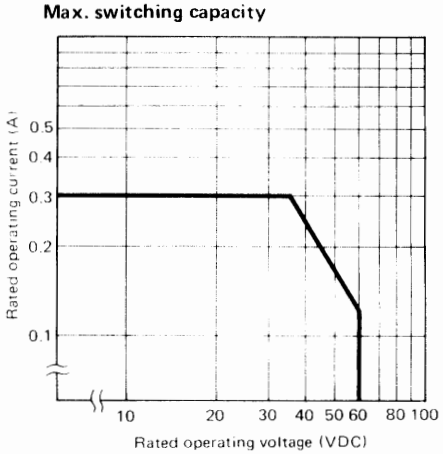
NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.

• CONTACT RATINGS

Item \ Load	Resistive load (p.f.=1)
Rated load	24 VDC 0.3A
Carry current	0.3A
Max. operating voltage	60 VDC
Max. operating current	0.3A
Max. switching capacity	10W
Min. permissible load (ref. value)	0.1 VDC 100μA

• CHARACTERISTIC DATA

Max. switching capacity

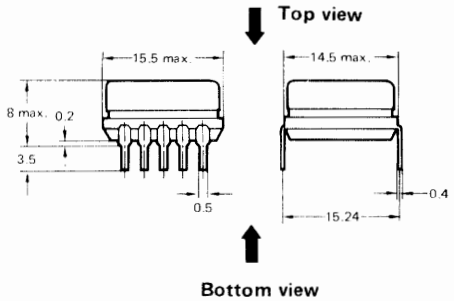


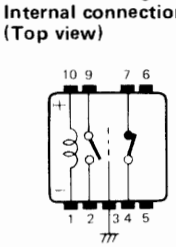
• CHARACTERISTICS

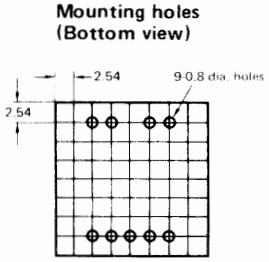
Contact resistance	50mΩ max.
Stray capacitance	2pF max. between contacts of same poles 5pF max. between coil or ground terminal and contact 10pF max. between ground terminal and coil terminals
Thermoelectromotive force	5μV max. (when the rated voltage is applied to the coil at an ambient temperature of 20°C)
Operate time	7msec max.
Release time	3msec max.
Max. operating frequency	Mechanically: 36,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	500 VAC, 50/60Hz for 1 minute (250 VAC between contacts of same pole)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 150m/sec² (approx. 15G's)
Ambient operating temperature	Operating: −25 to +70°C
Humidity	45 to 85% RH
Service life	Mechanically: 50,000,000 operations min. (at operating frequency of 36,000 operations/hour) Electrically:
Weight	Approx. 3.5g

NOTE: The data shown above are of initial value.

■ DIMENSIONS







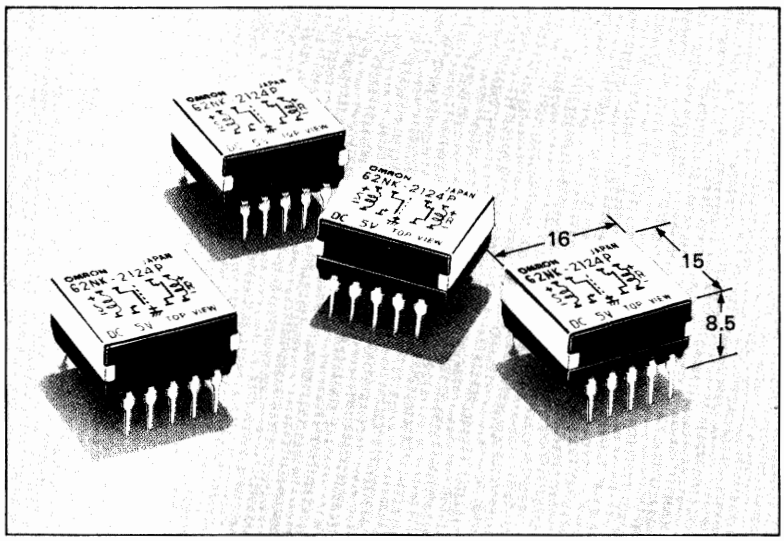
How to Solder Sealed Type PC Relays

• Soldering

Since the PC relay is of perfectly sealed construction, no problem should arise from automatic soldering or cleaning with the PC relay mounted on a PC board. However, please pay attention to the following points.

(1) Use an anti-corrosive rosin type flux.
(2) For flux solvent, use alcohol type which is less chemically reactive.
(3) When preheating the PC board after flux application, keep the temperature of the land side of the PC board to less than 80°C.
(4) Dip the bottom of the PC board into molten solder for the shortest possible period (approx. 3sec) at a solder temperature of 240°C. In this case, be sure that the PC board is not flooded with solder.
(5) Use a solder conforming with H60 (Sn 60, Pb 40) or H63 (Sn 63, Pb 37 eutectic solder) JIS Z 3282.
(6) Use freon type solvents which are less chemically reactive. Note that use of other solvents may damage the plastic material used for the relay base, etc.

DIP Type Latching Relay for Power-saving Driving



■ FEATURES

- Highly efficient permanent magnet incorporated in the dual coil type latching relay permits direct drive by IC or TTL circuit
- Employs magnetic shielding case
- Excellent resistance to vibration and shock
- Hermetically sealed construction
- Thermoelectromotive force of 5μV permits stable signal transmission

■ AVAILABLE TYPES

Contact form \ Type	General purpose
SPST-NO+SPST-NC	G2NK-2124P

■ SPECIFICATIONS

• COIL RATINGS

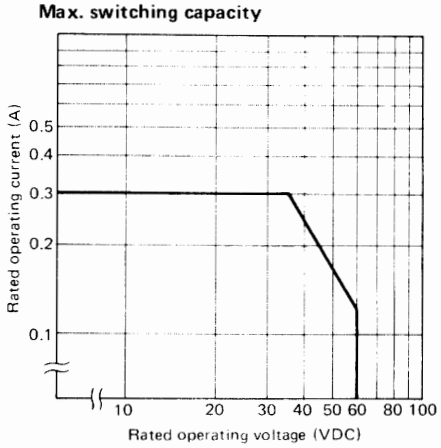
Item / Rated voltage	Set coil			Reset coil			Must set voltage	Must reset voltage	Maximum voltage	Power consumption	
	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)	% of rated voltage			Set coil (mW)	Reset coil (mW)
3 VDC	66.7	45	0.018	66.7	45	0.019	80 max.	80 max.	110	200	200
5 VDC	40	125	0.05	40	125	0.047					
12 VDC	20.8	576	0.17	20.8	576	0.18				250	250
24 VDC	10.4	2,304	0.79	10.4	2,304	0.80					

• CONTACT RATINGS

Item \ Load	Resistive load (p.f.=1)
Rated load	24 VDC 0.3A
Carry current	0.3A
Max. operating voltage	60 VDC
Max. operating current	0.3A
Max. switching capacity	10W
Min. permissible load (ref. value)	0.1 VDC 100μA

• CHARACTERISTIC DATA

Max. switching capacity



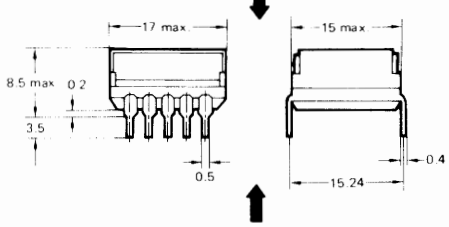
• CHARACTERISTICS

Contact resistance	100mΩ max.
Stray capacitance	2pF max. between contacts of same poles 5pF max. between coil or ground terminal and contact 5pF max. between ground terminal and coil terminal
Thermoelectromotive force	3μV max. (when the rated voltage is applied to the coil at an ambient temperature of 20°C.)
Operate time Release time	7msec max. (Pulse width: 10msec min.)
Max. operating frequency	Mechanically: 36,000 operations/hour; Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	500 VAC, 50/60Hz for 1 minute 250 VAC, 50/60Hz for 1 minute between contacts of same pole 100 VAC, 50/60Hz for 1 minute between set and reset coils
Vibration	Mechanical and malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 250m/sec² (approx. 25G's)
Ambient temperature	Operating: −25 to +70°C
Humidity	45 to 85% RH
Service life	Mechanically: 50,000,000 operations min. (at operating frequency of 36,000 operations/hour) Electrically: ——
Weight	Approx. 4.0g

NOTE: The data shown above are of initial value.

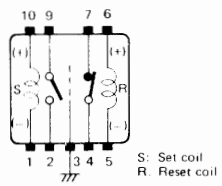
■ DIMENSIONS

Top view

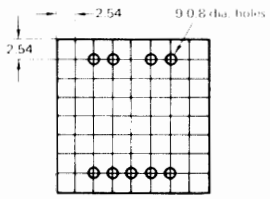


Bottom view

Terminal arrangement/ Internal connection (Top view)



Mounting holes (Bottom view)



■ HINTS ON CORRECT USE

1. Both the set and reset coils may be energized continuously. However, do not apply voltage simultaneously to both coils.
2. If the relays are used in any of the circuits shown at the right, the relay contacts may be released from their locked (energized/deenergized) positions. To prevent this, either connect diodes D1 and D2 or change the circuit configuration.

• Hints on circuit connection

Circuit with two reset coils parallelly connected to one another	Circuit with two set coils parallelly connected to one another
Circuit with two set coils and two reset coils connected	Circuit with set coil parallelly connected to other relay

- When connecting diodes to the circuit, use diodes which have repetitive peak-inverse voltage and DC reverse voltage sufficient to absorbe external noise or surges, and whose average rectifying current is greater than the coil current.

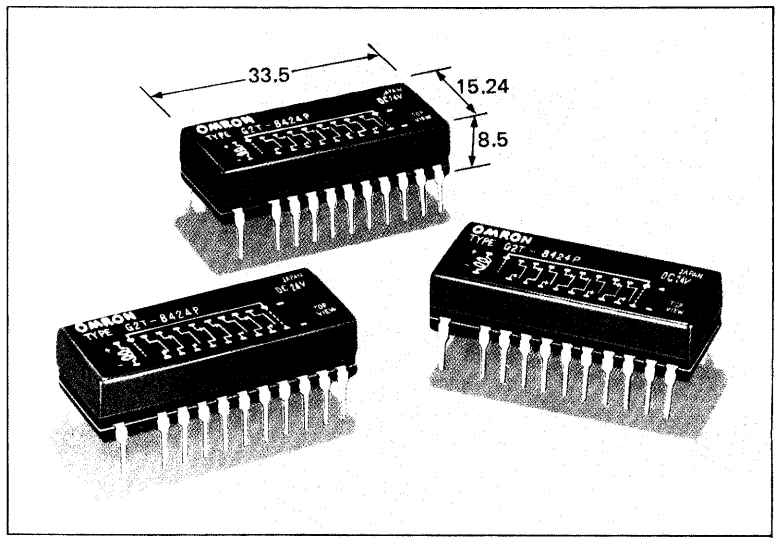
Since voltage drop by the diodes will occur, use diodes of which the forward voltage is as low as possible or increase the supply voltage to compensate for the voltage drop.

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

PC BOARD-USE RELAY

Model G2T

High-sensitivity (230mW max.) DIP Type Relay for Signal Control



■ FEATURES

- Perfectly sealed package construction
- Bifurcated contact construction employing gold alloy assures high reliability at low signal levels, and is ideal for input in IC or transistor circuits
- Short contact bounce time (approx. 20μsec)
- Shield plate prevents contacts from being affected adversely by noise generated by coil
- High shock and vibration resistance is assured by the balanced armature system
- Thermoelectromotive force as low as 3μV max., ideal for analog signals
- Conforms to UL, CSA and VDE

■ AVAILABLE TYPES

Contact form \ Type	General purpose
4PST-NO + 4PST-NC	G2T-8424P

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage \ Item	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
3 VDC	120	25	0.053	0.079	80 max.	10 min.	110	Approx. 360
5 VDC	72	69	0.139	0.209				
12 VDC	30	400	0.788	1.183				
24 VDC	15	1,600	3.250	4.870				

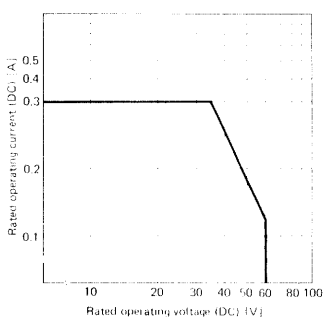
NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.

• CONTACT RATINGS

Item \ Load	Resistive load (p.f.=1)
Rated load	24 VDC 0.3A
Carry current	0.3A
Max. operating voltage	60 VDC
Max. operating current	0.3A
Max. switching capacity	10W
Min. permissible load (ref. value)	0.1 VDC 100μA

• CHARACTERISTIC DATA

Max. switching capacity



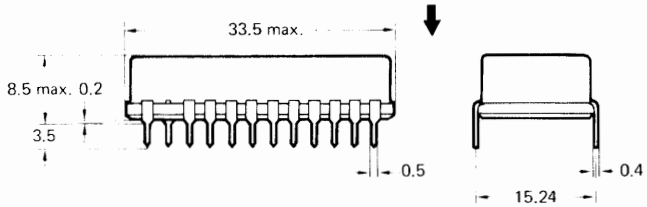
• CHARACTERISTICS

Contact resistance	100mΩ
Stray capacitance*	1(2)pF max. between contacts of same pole. 1(2)pF max. between other terminals. 1(3)pF max. between coil and contact.
Thermoelectromotive force	3μV (with rated voltage applied at ambient temperature of 20°C)
Operate time	10msec max.
Release time	5msec max.
Operating frequency	Mechanically: 36,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 250 VDC)
Dielectric strength	1,000 VAC, 50/60Hz for 1 minute (250 VAC between contacts of same pole)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 200m/sec² (approx. 20G's)
Ambient temperature	Operating: −25 to +70°C
Humidity	45 to 85% RH
Service life	Mechanically: 50,000,000 operations min. (at operating frequency of 36,000 operations/hour) Electrically: —
Weight	Approx. 8.7g

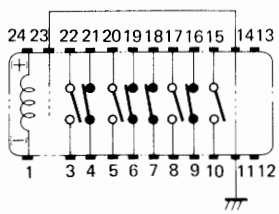
NOTES: 1. The data shown above are of initial value.
2. * Values in parentheses are those when the ground terminal is not connected.

■ DIMENSIONS

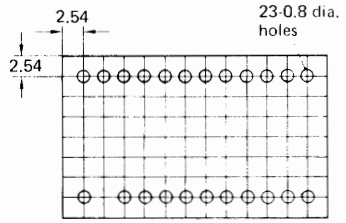
Top view



Terminal arrangement/
Internal connections
(Top view)



Mounting holes
(Top view)



NOTE: Ordinary 24-pin IC socket can be used.

How to Solder Sealed Type PC Relays

• **Soldering**

Since the PC relay is of perfectly sealed construction, no problem should arise from automatic soldering or cleaning with the PC relay mounted on a PC board. However, please pay attention to the following points.

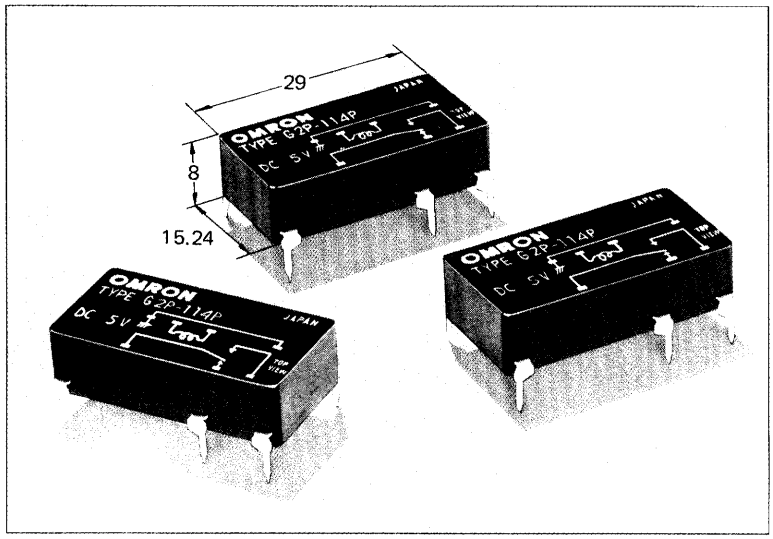
(1) Use an anti-corrosive rosin type flux.
(2) For flux solvent, use alcohol type which is less chemically reactive.
(3) When preheating the PC board after flux application, keep the temperature of the land side of the PC board to less than 80°C.
(4) Dip the bottom of the PC board into molten solder for the shortest possible period (approx. 3sec) at a solder temperature of 240°C. In this case, be sure that the PC board is not flooded with solder.
(5) Use a solder conforming with H60 (Sn 60, Pb 40) or H63 (Sn 63, Pb 37 eutectic solder) JIS Z 3282.
(6) Use freon type solvents which are less chemically reactive. Note that use of other solvents may damage the plastic material used for the relay base, etc.

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

PC BOARD-USE RELAY

Model G2P

DIP Type Relay for Power Drive With 3A, 250VAC Switching Capacity



■ FEATURES

- Sealed and 8mm thick
- High dielectric strength (2,000 VAC)
- Gold-clad silver contacts with high contact reliability assure stable switching of a wide range of loads from micro current/voltage to 3A loads
- Conforms to UL, CSA, VDE and SEV

■ AVAILABLE TYPES

Contact form \ Type	General purpose
SPDT	G2P-114P

■ SPECIFICATIONS

• COIL RATINGS

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
5 VDC	48	104	0.27	0.30	80 max.	10 min.	120	Approx. 240
6 VDC	40	150	0.44	0.49				
12 VDC	20	600	1.6	1.9				
24 VDC	10	2,400	6.0	7.2				

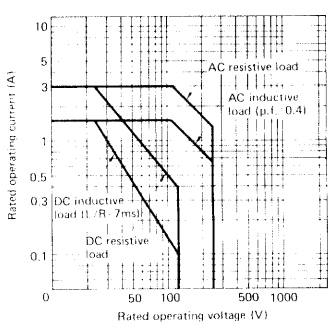
NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.

• CONTACT RATINGS

Item \ Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	110 VAC 3A 220 VAC 1.5A 24 VDC 3A	110 VAC 1.5A 220 VAC 0.75A 24 VDC 1.5A
Carry current	3A	
Max. operating voltage	250 VAC 125 VDC	
Max. operating current	3A	1.5A
Max. switching capacity	330VA, 72W	165VA 36W
Min. permissible load (reference value)	5 VDC 10mA	

• CHARACTERISTIC DATA

Max. switching capacity

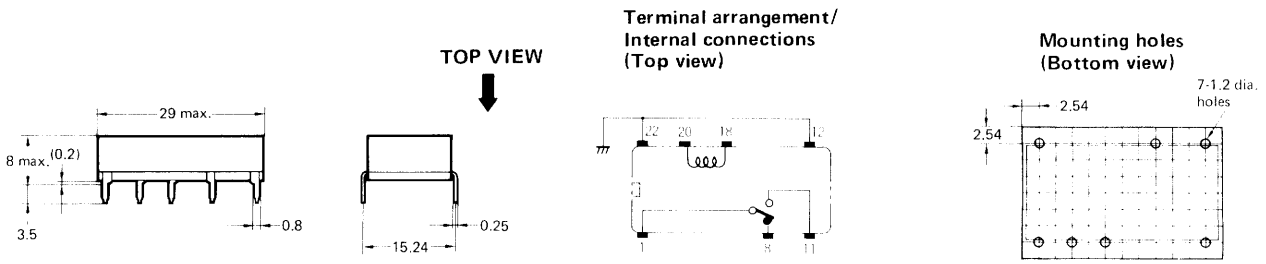


• CHARACTERISTICS

Contact resistance	100mΩ max.
Stray capacitance	20pF max. between coil and ground terminal. 2pF max. between other terminals.
Operate time	10msec max.
Release time	
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (1,000 VAC between coil and ground terminal, 750 VAC between contacts of same pole)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.0mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 100m/sec² (approx. 10G's)
Ambient temperature	Operating: −25 to +70°C
Humidity	45 to 85% RH
Service life	Mechanically: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: —
Weight	Approx. 6g

NOTE: The data shown above are of initial value.

■ DIMENSIONS



How to Solder Sealed Type PC Relays

• **Soldering**

Since the PC relay is of perfectly sealed construction, no problem should arise from automatic soldering or cleaning with the PC relay mounted on a PC board. However, please pay attention to the following points.

(1) Use an anti-corrosive rosin type flux.
(2) For flux solvent, use alcohol type which is less chemically reactive.
(3) When preheating the PC board after flux application, keep the temperature of the land side of the PC board to less than 80 C.
(4) Dip the bottom of the PC board into molten solder for the shortest possible period (approx. 3sec) at a solder temperature of 240° C. In this case, be sure that the PC board is not flooded with solder.
(5) Use a solder conforming with H60 (Sn 60, Pb 40) or H63 (Sn 63, Pb 37 eutectic solder) JIS Z 3282.
(6) Use freon type solvents which are less chemically reactive. Note that use of other solvents may damage the plastic material used for the relay base, etc.

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

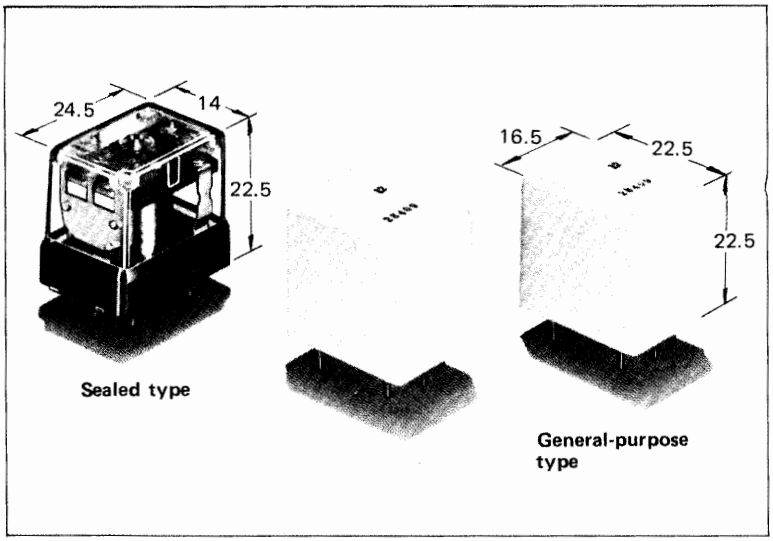
PC BOARD-USE RELAY

Model G2U

Sugar Cube-Sized PCB Relay Capable of Switching 5A Loads

■ FEATURES

- Ideal for application in household electrical appliances
- Construction resistant to flux wicking
- Sealed type available



■ AVAILABLE TYPES

Classification \ Contact form \ Type		General purpose	Sealed
Standard type	SPDT	G2U-112P	G2U-114P
	SPST-NO	G2U-1112P	G2U-1114P
Standard approved type	SPDT	G2U-112P-US	G2U-114P-US
	SPST-NO	G2U-1112P-US	G2U-1114P-US

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage \ Item	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
6 VDC	60	100	0.34	0.51	75 max.	10 min.	130 max.	Approx. 360
12 VDC	30	400	1.2	2.3				
24 VDC	15	1,600	4.8	8.0				

NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.

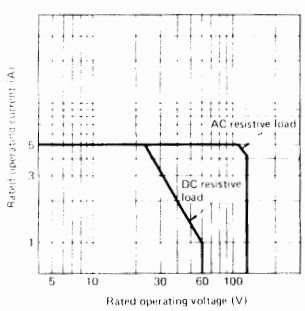
• CONTACT RATINGS

(Value in parentheses applies to sealed type.)

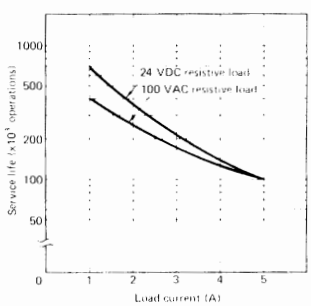
Item \ Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4; L/R=7msec)
Rated load	110 VAC/24 VDC 5A (3A)	110 VAC/24 VDC 2.5A (1.5A)
Carry current	5A (3A)	
Max. operating voltage	125 VAC, 60 VDC	
Max. operating current	5A (3A)	3A (1.5A)
Max. switching capacity	600VA/150W (350VA/90W)	300VA/70W (180VA/40W)
Min. permissible load (reference value)	5 VDC 100mA	

• CHARACTERISTIC DATA

Max. switching capacity



Electrical service life



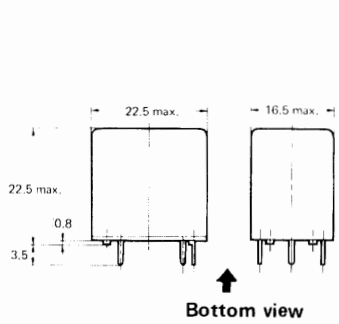
• CHARACTERISTICS

Contact resistance	100mΩ max.
Operate time	15msec max.
Release time	5msec max.
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	1,500 VAC, 50/60Hz for 1 minute (750 VAC between non-continuous contacts)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 100m/sec² (approx. 10G's)
Ambient temperature	Operating: −20 to 60°C
Humidity	45 to 85% RH
Service life	Mechanically: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 13g

NOTE: The data shown are of initial value.

■ DIMENSIONS

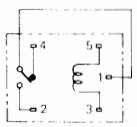
• G2U-112P(-US), G2U-112P-100(-US)



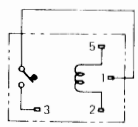
Bottom view

Terminal layout/ Internal connections (Bottom view)

G2U-112P(-US)

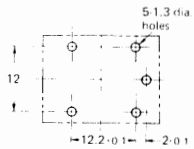


G2U-112P-100(-US)

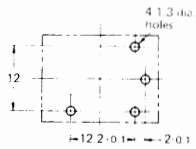


Mounting holes (Bottom view)

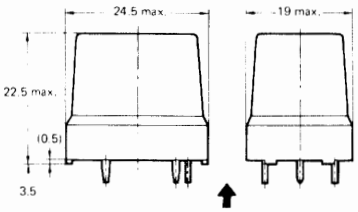
G2U-112P(-US)



G2U-112P-100(-US)

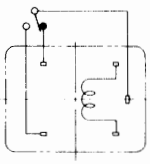


• G2U-114P(-US), G2U-114P-100(-US)

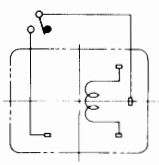


Bottom view

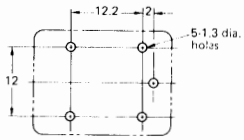
G2U-114P(-US)



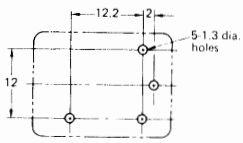
G2U-114P-100(-US)



G2U-114P(-US)



G2U-114P-100(-US)



STANDARD APPROVED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exception.

• RATINGS

UL recognized type (File No. E41515)

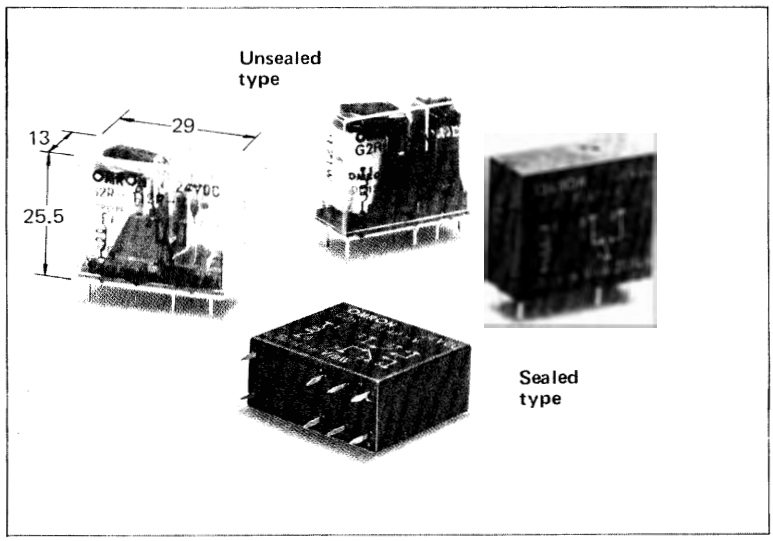
Type		Contact form	Coil ratings	Contact ratings
General purpose	G2U-112P-US G2U-114P-US	SPDT	5 to 24 VDC	5A 120 VAC or 5A 28 VDC (resisitve load) 3A 120 VAC (inductive load)
	G2U-112P-100-US G2U-114P-100-US	SPST-NO		

CSA certified type (File No. LR34815)

Type		Contact form	Coil ratings	Contact ratings
General purpose	G2U-112P-US G2U-114P-US	SPDT	5 to 24 VDC	3A 120 VAC (resistive load) 3A 28 VDC (resistive load) 1.5A 120 VAC (inductive load)
	G2U-112P-100-US G2U-114P-100-US	SPST-NO		

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Slim Styled Power Relay Breaks up to 10A Loads



■ FEATURES

- Miniature, slim style design
- Ideal for space saving on PCB
- Creepage distance of more than 8mm (between coil and contact)
- Flux-tight construction (unsealed type). Sealed type also available
- High-sensitivity type (360mW), bifurcated contact type and high-capacity type (16A) also available

■ AVAILABLE TYPES

Type / Contact material / Contact form	General-purpose				High capacity			
	Unsealed		Sealed		Unsealed		Sealed	
	AgCdO***	AgInSn	AgCdO***	AgInSn	AgCdO	AgInSn	AgCdO	AgInSn
SPDT	G2R-117P-V-US*	G2R-117P-FD-V-US*	G2R-114P-V-US*	G2R-114P-FD-V-US*				
SPST-NO	G2R-1117P-V-US*	G2R-1117P-FD-V-US*	G2R-1114P-V-US*	G2R-1114P-FD-V-US*	G2R-1117P-V-HP-US*	G2R-1117P-FD-V-HP-US*		
DPDT	G2R-217P-V-US*	G2R-217P-FD-V-US*	G2R-214P-V-US*	G2R-214P-FD-V-US*				
DPST-NO	G2R-2217P-V-US*	G2R-2217P-FD-V-US*	G2R-2214P-V-US*	G2R-2214P-FD-V-US*				

Type / Contact material / Contact form	Bifurcated contacts				High-sensitivity**			
	Unsealed		Sealed		Unsealed		Sealed	
	AgCdO	AgInSn	AgCdO	AgInSn	AgCdO	AgInSn	AgCdO	AgInSn
SPDT	G2R-127P-V-US*	G2R-127P-FD-V-US*	G2R-124P-V-US*	G2R-124P-FD-V-US*	G2R-117P-V-H-US*	G2R-117P-FD-V-H-US*	G2R-114P-V-H-US*	G2R-114P-FD-V-H-US*
SPST-NO	G2R-1127P-V-US*	G2R-1127P-FD-V-US*	G2R-1124P-V-US*	G2R-1124P-FD-V-US*	G2R-1117P-V-H-US*	G2R-1117P-FD-V-H-US*	G2R-1114P-V-H-US*	G2R-1114P-FD-V-H-US*
DPDT					G2R-217P-V-H-US*	G2R-217P-FD-V-H-US*	G2R-214P-V-H-US*	G2R-214P-FD-V-H-US*
DPST-NO					G2R-2217P-V-H-US*	G2R-2217P-FD-V-H-US*	G2R-2214P-V-H-US*	G2R-2214P-FD-V-H-US*

NOTES
1. The types with asterisk (*) are approved by SEV and SEMKO. When placing your order, remove suffix "-US" from the type number listed above.
2. ** Operating wattage of G2R-(-)H-US types is 360mW. Types with operating wattage of 290mW (-H2) and of 240mW (-H3) are also available as series version.
3. *** Contact materials used in the following DP types are AgNi for the fixed contacts and Ag for the movable contact: G2R-217P-V-US, 2217P-V-US, 214P-V-US and 2214P-V-US.

OMRON

■ SPECIFICATIONS

• COIL RATINGS

Classification	Rated voltage	Rated current (mA) 50Hz	Rated current (mA) 60Hz	Coil resistance (Ω)	Coil inductance (H) Armature OFF	Coil inductance (H) Armature ON	Must operate voltage (V) (% of rated voltage)	Must dropout voltage (V) (% of rated voltage)	Maximum voltage (V) (% of rated voltage)	Power consumption
General-purpose type	AC 6	186	150	16	0.05	0.10	80% max.	30% min.	110	Approx 0.9VA (60Hz)
	AC 12	93	75	65	0.19	0.39				
	AC 24	46.5	37.5	260	0.81	1.55				
	AC 50	22	18	1,130	3.25	6.73				
	AC 100/(110)	11	9/(10.6)	4,600	13.34	26.84				
	AC 200/(220)	5.5	4.5/(5.3)	22,000	51.3	102				
General-purpose type, High-capacity type, Bifurcated-contact type	DC 3	176		17	0.07	0.14	70% max.	15% min.	110	Approx 0.53W
	DC 5	106		47	0.20	0.39				
	DC 6	88		68	0.28	0.55				
	DC 12	44		275	1.15	2.29				
	DC 24	22		1,100	4.27	8.55				
	DC 48	11.5		4,170	13.86	27.71				
	DC 100	5.3		18,860	67.2	93.2				
High-sensitivity type	DC 3	120		25	0.13	0.26	70% max.	5% min.	110	Approx 0.36W
	DC 5	72.5		69	0.37	0.75				
	DC 6	60		100	0.53	1.07				
	DC 12	30		400	2.14	4.27				
	DC 24	15		1,600	7.80	15.60				
	DC 48	7.5		6,400	31.20	62.40				

NOTES
1. The rated current and coil resistance are measured at coil temperature of 20°C with tolerance of +15%, -20% for AC rated current and ±10% for DC coil resistance.
2. Types with self-contained operation indicator employ an LED for relay operation monitoring. The rated current for those types is 1mA greater than that of types without self-contained operation indicators.

• CONTACT RATINGS

Type	General-purpose				High-capacity		Bifurcated contact		High-sensitivity			
Load / Item	Resistive load (p.f. 1)	Inductive load (p.f. 0.4 L/R 7ms)	Resistive load (p.f. 1)	Inductive load (p.f. 0.4 L/R 7ms)	Resistive load (p.f. 1)	Inductive load (p.f. 0.4 L/R 7ms)	Resistive load (p.f. 1)	Inductive load (p.f. 0.4 L/R 7ms)	Resistive load (p.f. 1)	Inductive load (p.f. 0.4 L/R 7ms)	Resistive load (p.f. 1)	Inductive load (p.f. 0.4 L/R 7ms)
Rated load	250 VAC 10A 30 VDC 10A	250 VAC 7.5A 30 VDC 5A	250 VAC 5A 30 VDC 5A	250 VAC 2A 30 VDC 3A	250 VAC 16A 30 VDC 16A	250 VAC 8A 30 VDC 8A	250 VAC 5A 30 VDC 5A	250 VAC 2A 30 VDC 3A	250 VAC 5A 30 VDC 5A	250 VAC 2A 30 VDC 3A	250 VAC 3A 30 VDC 3A	250 VAC 1A 30 VDC 1.5A
Carry current	10A		5A		16A		5A		5A		3A	
Maximum operating voltage	380 VAC, 125 VDC				380 VAC, 125 VDC				380 VAC, 125 VDC			
Maximum operating current	10A		5A		16A		5A		5A		3A	
Maximum switching capacity	2,500 VA 300W	1,875 VA 150W	1,250 VA 150W	500 VA 90W	4,000 VA 480W	2,000 VA 240W	1,250 VA 150W	500 VA 90W	1,250 VA 150W	500 VA 90W	750 VA 90W	250 VA 45W
Minimum permissible load (ref. value)	5 VDC, 100mA		5 VDC, 10mA		5 VDC, 100mA		5 VDC, 1mA		5 VDC, 100mA		5 VDC, 10mA	

NOTES
1. P standard: λ_{60} 0.1×10⁻⁶ operation
2. Regarding to standard approved ratings, refer to "STANDARD APPROVED RATINGS".

• CHARACTERISTICS

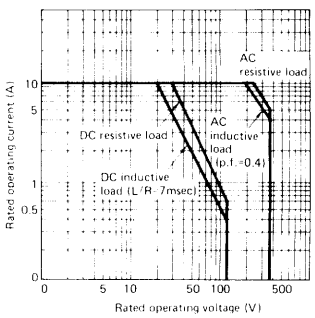
Item \ Type	1-pole	2-pole
Contact resistance	30mΩ max.	50mΩ max.
Operate time	15ms max.	
Release time	AC: 10ms max. DC: 5ms max.	
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)	
Insulation resistance	1,000MΩ min. (at 500 VDC)	
Dielectric strength	5,000 VAC, 50/60Hz for 1 minute between coil and contacts 1,000 VAC, 50/60Hz for 1 minute between contacts of same pole	5,000 VAC, 50/60Hz for 1 minute between coil and contacts 3,000 VAC, 50/60Hz for 1 minute between non-continuous contacts 1,000 VAC, 50/60Hz for 1 minute between contacts of same pole
Vibration	Mechanical durability: 10 to 55Hz, 1.5mm double amplitude Malfunction durability: 10 to 55Hz, 1.5mm double amplitude	
Shock	Mechanical durability: 1,000m/s² (approx. 100G's) Malfunction durability: when energized: 200m/s² (approx. 20G's) when de-energized: 100m/s² (approx. 10G's)	
Ambient temperature	Operating/storage: −40 to +70°C	
Humidity	45 to 85% RH	
Service life	Mechanically: AC: 10,000,000 operations min. DC: 20,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTICS."	
Weight	Approx. 17g	

NOTE: The data shown above are of initial value.

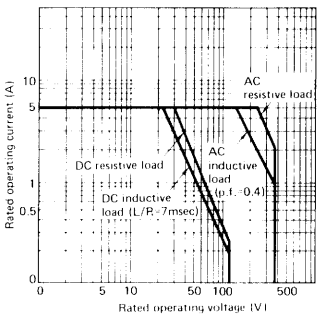
• CHARACTERISTIC DATA

Max. switching capacity

G2R-117P-V-US, G2R-1117P-V-US

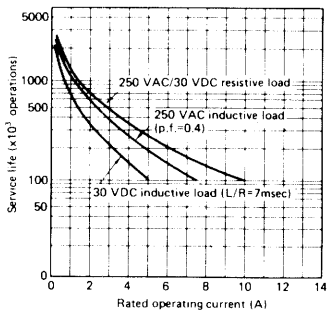


G2R-217P-V-US, 2217P-V-US, G2R-127P-V-US, 1127P-V-US, G2R-124P-V-US, 1124P-V-US, G2R-117P-V-H-US, 1117P-V-H-US

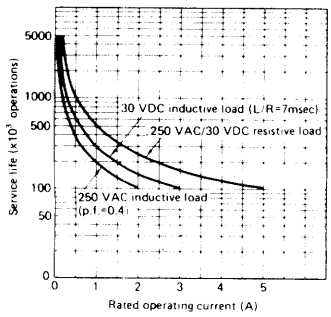


Electrical service life

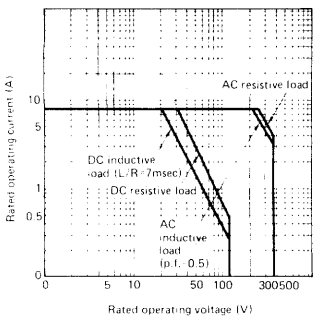
G2R-117P-V-US, G2R-1117P-V-US



G2R-217P-V-US, 2217P-V-US, G2R-127P-V-US, 1127P-V-US, G2R-124P-V-US, 1124P-V-US, G2R-117P-V-H-US, 1117P-V-H-US



G2R-114P-V-US, G2R-1114P-V-US



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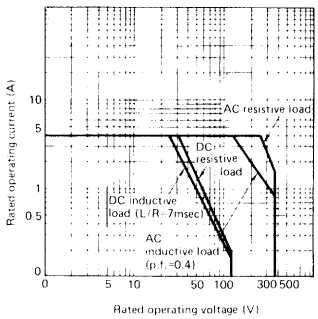
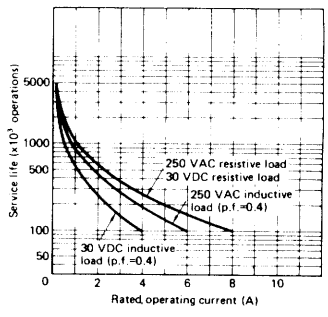
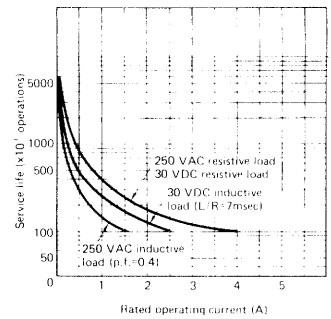


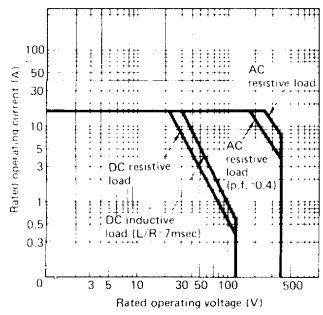
G2R-114P-V-US, G2R-1114P-V-US



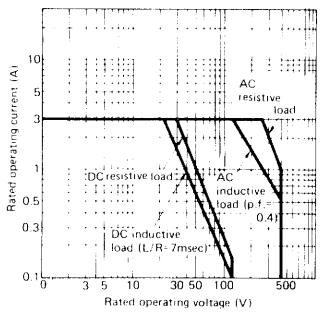
G2R-214P-V-US, G2R-2214P-V-US



G2R-1117P-V-RP-US



G2R-217P-V-H-US, G2R-2217P-V-H-US



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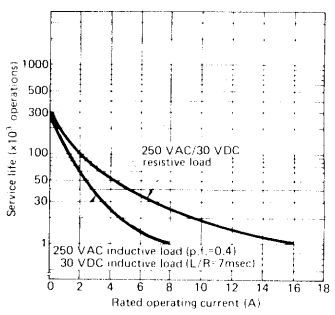
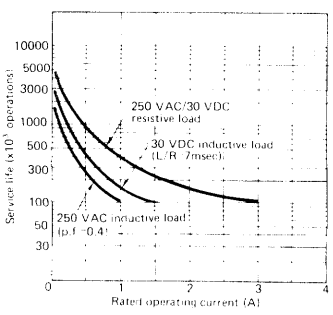


G2R-217P-V-H-US, G2R-2217P-V-H-US



Approved by Standard

UL recognized type (File No. E41515)

Type	Contact form	Coil ratings	Contact ratings
G2R-117P-V-US G2R-127P-V-US G2R-117P-V-H-US G2R-114P-V-US G2R-124P-V-US G2R-114P-V-H-US	SPDT	3 to 110 VDC 3 to 120 VAC	10A 250 VAC (General use) 10A 30 VDC (Resistive) 360WT 120 VAC (Tungsten load)
G2R-1117P-V-US G2R-1127P-V-US G2R-1117P-V-H-US G2R-1114P-V-US G2R-1124P-V-US G2R-1114P-V-H-US	SPST-NO	3 to 110 VDC 3 to 120 VAC	10A 250 VAC (General use) 10A 30 VDC (Resistive) 360WT 120 VAC (Tungsten load) TV-3 (TV rating)
G2R-1117P-V-RP-US	SPST-NO	3 to 110 VDC 3 to 120 VAC	16A 250 VAC (General use) 16A 30 VDC (Resistive) TV-5 (TV rating)
G2R-217P-V-US G2R-217P-V-H-US G2R-214P-V-US G2R-214P-V-H-US G2R-217P-FD-V-US G2R-217P-FD-V-H-US G2R-214P-FD-V-US G2R-214P-FD-V-H-US	DPDT	3 to 110 VDC 3 to 120 VAC	5A 250 VAC (General use) 5A 30 VDC (Resistive)
G2R-2217P-V-US G2R-2217P-V-H-US G2R-2214P-V-US G2R-2214P-V-H-US	DPST-NO	3 to 110 VDC 3 to 120 VAC	5A 250 VAC (General use) 5A 30 VDC (Resistive) TV-3 (TV rating)
G2R-117P-FD-V-US G2R-127P-FD-V-US G2R-117P-FD-V-H-US G2R-114P-FD-V-US G2R-124P-FD-V-US G2R-114P-FD-V-H-US	SPDT	3 to 110 VDC 3 to 120 VAC	10A 250 VAC (General use) 10A 30 VDC (Resistive) 600WT 120 VAC (Tungsten load)
G2R-1117P-FD-V-US G2R-1127P-FD-V-US G2R-1117P-FD-V-H-US G2R-1114P-FD-V-US G2R-1124P-FD-V-US G2R-1114P-FD-V-H-US	SPST-NO	3 to 110 VDC 3 to 120 VAC	10A 250 VAC (General use) 10A 30 VDC (Resistive) 600WT 120 VAC (Tungsten load) TV-5 (TV rating)
G2R-1117P-FD-V-RP-US	SPST-NO	3 to 110 VDC 3 to 120 VAC	16A 250 VAC (General use) 16A 30 VDC (Resistive) TV-8 (TV rating)
G2R-2217P-FD-V-US G2R-2217P-FD-V-H-US G2R-2214P-FD-V-US G2R-2214P-FD-V-H-US	DPST-NO	3 to 110 VDC 3 to 120 VAC	5A 250 VAC (General use) 5A 30 VDC (Resistive) 360WT 120 VAC (Tungsten load) TV-3 (TV rating)

CSA certified type (File No. LR31928)

Type	Contact form	Coil ratings	Contact ratings
G2R-117P-V-US G2R-127P-V-US G2R-117P-V-H-US G2R-114P-V-US G2R-124P-V-US G2R-114P-V-H-US	SPDT	3 to 110 VDC 3 to 120 VAC	10A 250 VAC (General use) 10A 30 VDC (Resistive) 360WT 120 VAC (Tungsten load) TV-3 (TV rating)
G2R-1117P-V-US G2R-1127P-V-US G2R-1117P-V-H-US G2R-1114P-V-US G2R-1124P-V-US G2R-1114P-V-H-US	SPST-NO	3 to 110 VDC 3 to 120 VAC	10A 250 VAC (General use) 10A 30 VDC (Resistive) 360WT 120 VAC (Tungsten load) TV-3 (TV rating)
G2R-1117P-V-RP-US	SPST-NO	3 to 110 VDC 3 to 120 VAC	16A 250 VAC (General use) 16A 30 VDC (Resistive) TV-5 (TV rating)
G2R-217P-V-US G2R-217P-V-H-US G2R-214P-V-US G2R-214P-V-H-US G2R-217P-FD-V-US G2R-217P-FD-V-H-US G2R-214P-FD-V-US G2R-214P-FD-V-H-US	DPDT	3 to 110 VDC 3 to 120 AVC	5A 250 VAC (General use) 5A 30 VDC (Resistive) 360WT 120 VAC (Tungsten load) TV-3 (TV rating)
G2R-2217P-V-US G2R-2217P-V-H-US G2R-2214P-V-US G2R-2214P-V-H-US	DPST-NO	3 to 110 VDC 3 to 120 VAC	5A 250 VAC (General use) 5A 30 VDC (Resistive) 360WT 120 VAC (Tungsten load) TV-3 (TV rating)
G2R-117P-FD-V-US G2R-127P-FD-V-US G2R-117P-FD-V-H-US G2R-114P-FD-V-US G2R-124P-FD-V-US G2R-114P-FD-V-H-US	SPDT	3 to 110 VDC 3 to 120 VAC	10A 250 VAC (General use) 10A 30 VDC (Resistive) 600WT 120 VAC (Tungsten load) TV-5 (TV rating)
G2R-1117P-FD-V-US G2R-1127P-FD-V-US G2R-1117P-FD-V-H-US G2R-1114P-FD-V-US G2R-1124P-FD-V-US G2R-1114P-FD-V-H-US	SPST-NO	3 to 110 VDC 3 to 120 VAC	10A 250 VAC (General use) 10A 30 VDC (Resistive) 600WT 120 VAC (Tungsten load) TV-5 (TV rating)
G2R-1117P-FD-V-RP-US	SPST-NO	3 to 110 VDC 3 to 120 VAC	16A 250 VAC (General use) 16A 30 VDC (Resistive) TV-8 (TV rating)
G2R-2217P-FD-V-US G2R-2217P-FD-V-H-US G2R-2214P-FD-V-US G2R-2214P-FD-V-H-US	DPST-NO	3 to 110 VDC 3 to 120 VAC	5A 250 VAC (General use) 5A 30 VDC (Resistive) 360WT 120 VAC (Tungsten load) TV-3 (TV rating)

SEV listed type (File No. 82.10976.01)

Type	Contact form	Coil ratings	Contact ratings
G2R-114P-V G2R-114P-FD-V	SPDT	3 to 110 VDC	10A 250V ~ AC1 5A 250V ~ AC3 10A 30V = DC1
G2R-1114P-V G2R-1114P-FD-V	SPST-NO		
G2R-214P-V	DPDT	3 to 110 VDC	5A 250V ~ AC1 2A 250V ~ AC1 5A 30V = DC1

SEMKO listed type (File No. 43-61331/1-2)

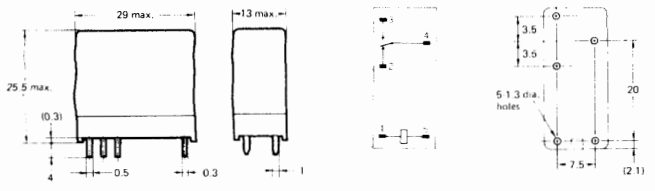
Type	Contact form	Coil ratings	Contact ratings
G2R-114P-V G2R-114P-FD-V	SPDT	3 to 110 VDC	10A/80A(inrush) 250V ~
G2R-1114P-V G2R-1114P-FD-V	SPST-NO		
G2R-214P-V	DPDT	3 to 110 VDC	5A/40A(inrush) 250V ~

■ DIMENSIONS

- **G2R-117P-V-US, G2R-117P-V-H-US, G2R-127P-V-US**

Terinal arrangement/ Internal connections (Bottom view)

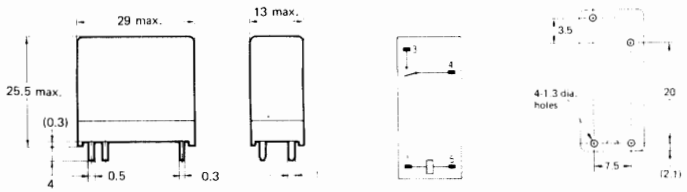
Mounting holes (Bottom view)



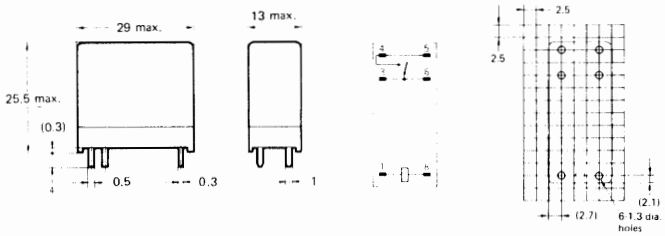
- **G2R-1117P-V-US, G2R-1117P-V-H-US, G2R-1127P-V-US**

Terminal arrangement/ Internal connections (Bottom view)

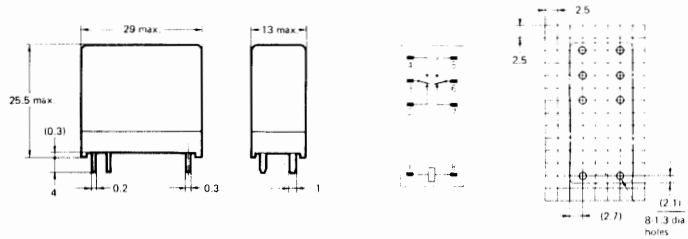
Mounting holes (Bottom view)



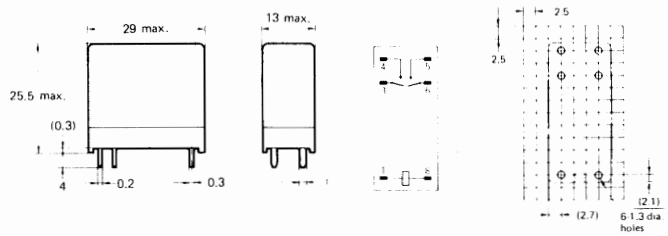
- **G2R-1117P-V-RP-US**



- **G2R-217P-V-US, G2R-217P-V-H-US**



- **G2R-2217P-V-US, G2R-2217P-V-H-US**



- **G2R-114P-V-US, G2R-1114P-V-US, G2R-124P-V-US, G2R-1124P-V-US**

Terminal arrangement/ Internal connections (Bottom view)

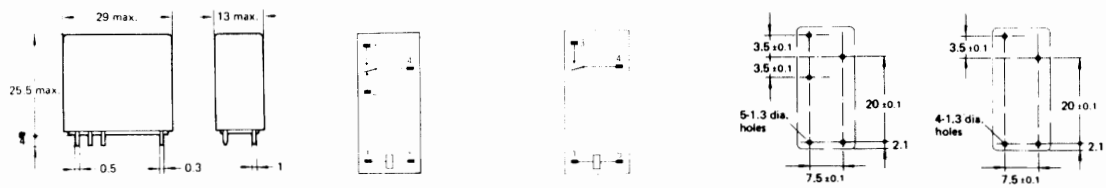
Mounting holes (Bottom view)

G2R-114P-V-US, G2R-124P-V-US

G2R-1114P-V-US, G2R-1124P-V-US

G2R-114P-V-US

G2R-1114P-V-US



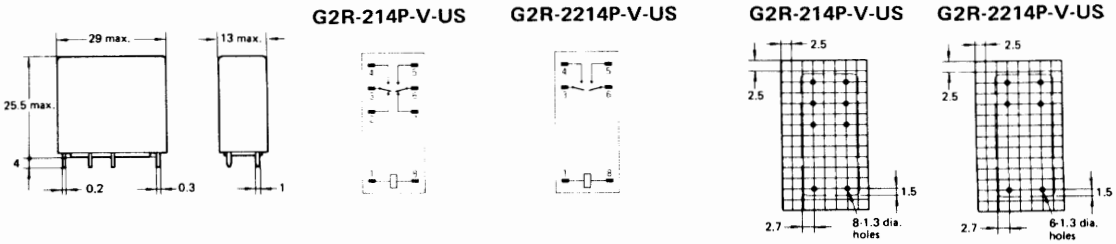
- **G2R-214P-V-US, G2R-2214P-V-US**

G2R-214P-V-US

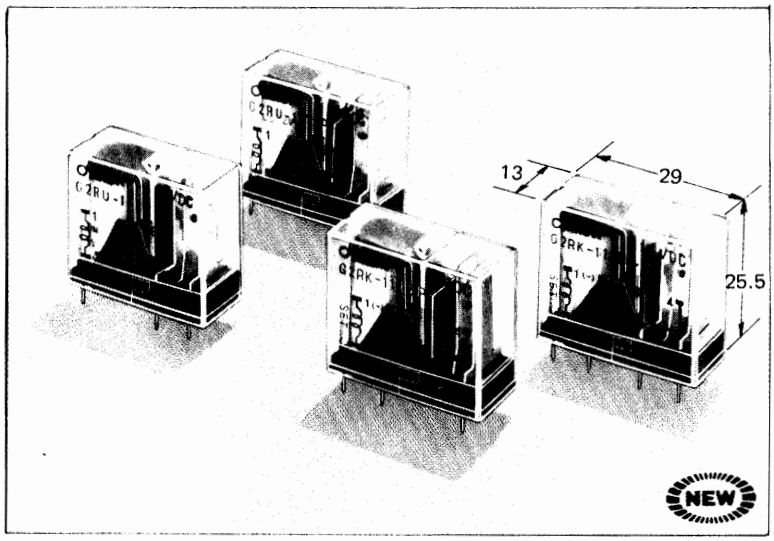
G2R-2214P-V-US

G2R-214P-V-US

G2R-2214P-V-US



Magnetic Latching Relay Available in Single and Double Coil Winding Versions



■ FEATURES

- Latching ability little affected by aging, and excellent resistance to vibration and shock
- Continuous coil ratings
- Safety-oriented design assuring high surge resistance (15,000V min. between coil and contact with the single-winding type; 10,000V min. between coil and contact with the double-winding type).
- Conforms to SEV and SEMKO

■ AVAILABLE TYPES

Type / Contact material / Contact form	Single-winding		Double-winding	
	Unsealed			
	AgCdO	AgInSn	AgCdO	AgInSn
SPDT	G2RU-117P-V-US	G2RU-117P-FD-V-US	G2RK-117P-V-US	G2RK-117P-FD-V-US
SPST-NO	G2RU-1117P-V-US	G2RU-1117P-FD-V-US	G2RK-1117P-V-US	G2RK-1117P-FD-V-US
DPDT	G2RU-217P-V-US	G2RU-217P-FD-V-US	G2RK-217P-V-US	G2RK-217P-FD-V-US
DPST-NO	G2RU-2217P-V-US	G2RU-2217P-FD-V-US	G2RK-2217P-V-US	G2RK-2217P-FD-V-US

OMRON

■ SPECIFICATIONS

• COIL RATINGS

Single-winding Type

Item / Rated voltage (V)	At set				At reset	Must set voltage	Must reset voltage	Maximum voltage	Power consumption	
	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Resistance of externally connected resistor (rated at 1/2W min.) (Ω)	% of rated voltage			At Set (mW)	At Reset (mW)
			Armature OFF	Armature ON						
3 VDC	277	10.8	0.026	0.052	33	70 max.	70 max.	110	Approx. 830	Approx. 210
5 VDC	167	30	0.073	0.146	91					
6 VDC	138	43.5	0.104	0.208	130					
12 VDC	69	174	0.42	0.83	510					
24 VDC	34.6	694	1.74	3.43	2,000					

Double-winding Type

Item / Rated voltage (V)	Set coil				Reset coil				Must set voltage	Must reset voltage	Maximum voltage	Power consumption	
	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		% of rated voltage			Set coil (mW)	Reset coil (mW)
			Armature OFF	Armature ON			Armature OFF	Armature ON					
3 VDC	227	10.8	0.026	0.052	200	15	0.001	0.002	70 max.	70 max.	110	Approx. 830	Approx. 600
5 VDC	167	30	0.073	0.146	119	42	0.003	0.006					
6 VDC	138	43.5	0.104	0.208	100	60	0.005	0.009					
12 VDC	69	174	0.42	0.83	50	240	0.018	0.036					
24 VDC	34.6	694	1.74	3.43	25	960	0.079	0.148					

NOTES: 1. The rated current and resistance are measured at a coil temperature of 20°C with tolerances of ±10%.
2. * To reset the single-winding type relay, connect the appropriate external resistor shown in the above table, in series with the coil and reverse the polarity of the power supply at the time of set. Refer to "HINTS ON CORRECT USE" for details.

• CONTACT RATINGS

Type / Load / Item	G2RU-117P(-FD)-V-US, G2RU-1117P(-FD)-V-US G2RK-117P(-FD)-V-US, G2RK-1117P(-FD)-V-US		G2RU-217P-V-US, G2RU-2217P-V-US G2RK-217P-V-US, G2RK-2217P-V-US	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7ms)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7ms)
Rated load	250 VAC 5A 30 VDC 5A	250 VAC 3.5A 30 VDC 2.5A	250 VAC 3A 30 VDC 3A	250 VAC 1.5A 30 VDC 2A
Carry current	5A		3A	
Max. operating voltage	380 VAC 125 VDC		380 VAC 125 VDC	
Max. operating current	5A		3A	
Max. switching capacity	1,250VA 150W	875VA 75W	750VA 90W	375VA 60W
Minimum permissible load	5 VDC 100mA		5 VDC 10mA	

NOTE: Regarding standard approved ratings, refer to "Approved by Standard" below.

• CHARACTERISTICS

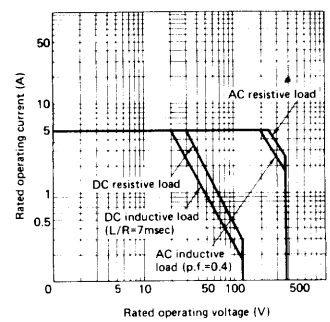
Type / Item	G2RU-117P (-FD)-V-US G2RU-1117P (-FD)-V-US	G2RK-117P (-FD)-V-US G2RK-1117P (-FD)-V-US	G2RU-217P-V-US G2RU-2217P-V-US	G2RK-217P-V-US G2RK-2217P-V-US
Contact resistance	30mΩ max.		50mΩ max.	
Operate (set) time	20ms max. (set pulse width: 30ms min.)			
Release (reset) time	20ms max. (reset pulse width: 30ms min.)			
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)			
Insulation resistance	1,000MΩ max. (at 500 VDC)			
Dielectric strength	5,000 VAC, 50/60Hz for 1 minute between coil and contact 1,000 VAC, 50/60Hz for 1 minute between contacts of same pole	5,000 VAC, 50/60Hz for 1 minute between coil and contact 1,000 VAC, 50/60Hz for 1 minute between contacts of same pole and between set and reset coils	5,000 VAC, 50/60Hz for 1 minute between coil and contact 3,000 VAC, 50/60Hz for 1 minute between contacts of different pole 1,000 VAC, 50/60Hz for 1 minute between contacts of same pole	5,000 VAC, 50/60Hz for 1 minute between coil and contact 3,000 VAC, 50/60Hz for 1 minute between contacts of different pole 1,000 VAC, 50/60Hz for 1 minute between contacts of same pole and between set and reset coils
Vibration	Malfunction durability: 10 to 55Hz; 1.5mm double amplitude Mechanical durability: 10 to 55Hz; 1.5mm double amplitude			
Shock	Malfunction durability: Set: 500m/s² (approx. 50G's) Reset: 100m/s² (approx. 10G's) Mechanical durability: 1,000m/s² (approx. 100G's)			
Ambient temperature	Operating/storage: −40 to +70°C			
Humidity	45 to 85% RH			
Service life	Mechanically: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."			
Weight	Approx. 17g			

NOTE: The data shown above are of initial value.

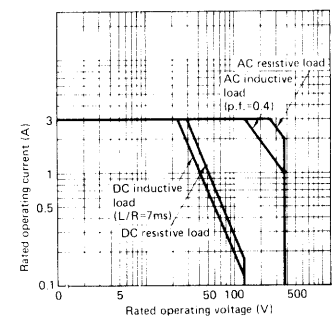
• CHARACTERISTIC DATA

Maximum switching capacity

G2RU-117P(-FD)-V-US
G2RU-1117P(-FD)-V-US
G2RK-117P(-FD)-V-US
G2RK-1117P(-FD)-V-US

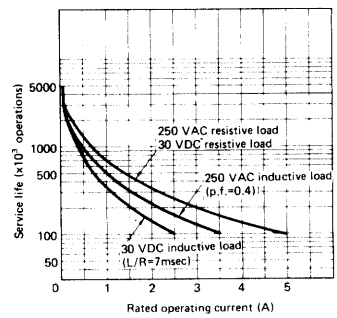


G2RU-217P-V-US
G2RU-2217P-V-US
G2RK-217P-V-US
G2RK-2217P-V-US

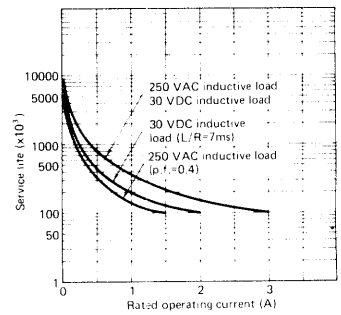


Electrical service life

G2RU-117P(-FD)-V-US
G2RU-1117P(-FD)-V-US
G2RK-117P(-FD)-V-US
G2RK-1117P(-FD)-V-US



G2RU-217P-V-US
G2RU-2217P-V-US
G2RK-217P-V-US
G2RK-2217P-V-US



Approved by Standard

UL recognized type (File No. E41515)

Type	Contact form	Coil ratings	Contact ratings
G2RU-117P-V-US G2RK-117P-V-US	SPDT	3 to 48 VDC	10A 250 VAC (General use) 10A 30 VDC (Resistive)
G2RU-1117P-V-US G2RK-1117P-V-US	SPST-NO	3 to 48 VDC	10A 250 VAC (General use) 10A 30 VDC (Resistive) TV-3 (TV rating)
G2RU-217P-V-US G2RK-217P-V-US G2RU-217P-FD-V-US G2RK-217P-FD-V-US	DPDT	G2RU series: 3 to 48 VDC G2RK series: 3 to 24 VDC	5A 250 VAC (General use) 5A 30 VDC (Resistive)
G2RU-2217P-V-US G2RK-2217P-V-US	DPST-NO		
G2RU-117P-FD-V-US G2RK-117P-FD-V-US	SPDT	3 to 48 VDC	10A 250 VAC (General use) 10A 30 VDC (Resistive)
G2RU-1117P-FD-V-US G2RK-1117P-FD-V-US	SPST-NO	3 to 48 VDC	10A 250 VAC (General use) 10A 30 VDC (Resistive)
G2RU-2217P-FD-V-US G2RK-2217P-FD-V-US	DPST-NO	G2RU series: 3 to 48 VDC G2RK series: 3 to 24 VDC	5A 250 VAC (General use) 5A 30 VDC (Resistive)

CSA certified type (File No. LR31928)

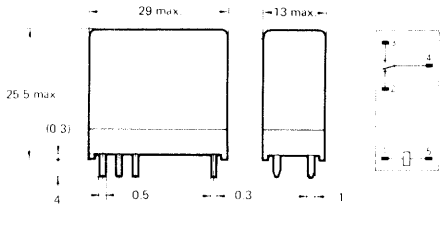
Type	Contact form	Coil ratings	Contact ratings
G2RU-117P-V-US G2RK-117P-V-US	SPDT	3 to 48 VDC	10A 250 VAC (General use) 10A 30 VDC (Resistive) TV-3 (TV rating)
G2RU-1117P-V-US G2RK-1117P-V-US	SPST-NO	3 to 48 VDC	10A 250 VAC (General use) 10A 30 VDC (Resistive) TV-3 (TV rating)
G2RU-217P-V-US G2RK-217P-V-US G2RU-217P-FD-V-US G2RK-217P-FD-V-US	DPDT	3 to 48 VDC	5A 250 VAC (General use) 5A 30 VDC (Resistive) TV-3 (TV rating)
G2RU-2217P-V-US G2RK-2217P-V-US	DPST-NO		
G2RU-117P-FD-V-US G2RK-117P-FD-V-US	SPDT	3 to 48 VDC	10A 250 VAC (General use) 10A 30 VDC (Resistive) TV-5 (TV rating)
G2RU-1117P-FD-V-US G2RK-1117P-FD-V-US	SPST-NO	3 to 48 VDC	10A 250 VAC (General use) 10A 30 VDC (Resistive) TV-5 (TV rating)
G2RU-2217P-FD-V-US G2RK-2217P-FD-V-US	DPST-NO	3 to 48 VDC	5A 250 VAC (General use) 5A 30 VDC (Resistive) TV-3 (TV rating)

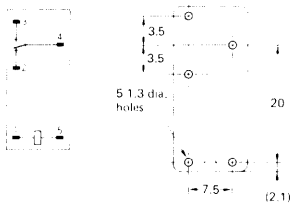
■ DIMENSIONS

● G2RU-117P(-FD)-V-US

Terminal arrangement/ Internal connections (Bottom view)

Mounting holes (Bottom view)

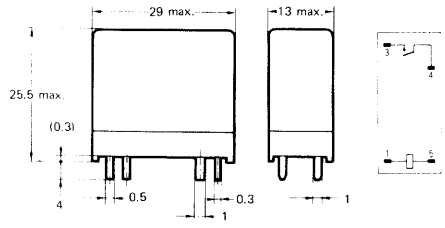


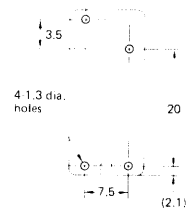


● G2RU-1117P(-FD)-V-US

Terminal arrangement/ Internal connections (Bottom view)

Mounting holes (Bottom view)





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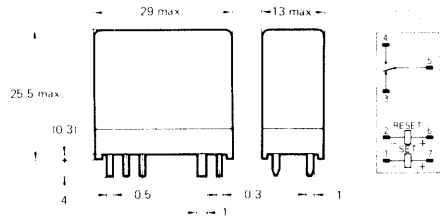

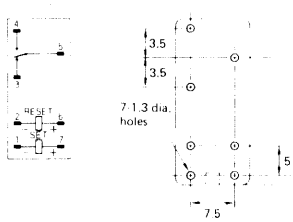

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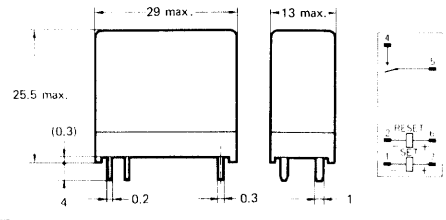

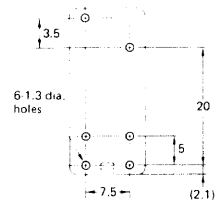

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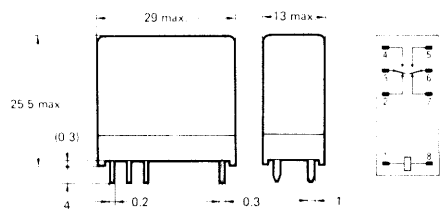

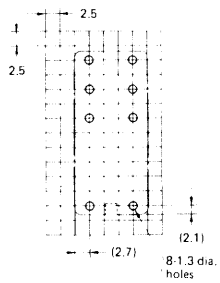

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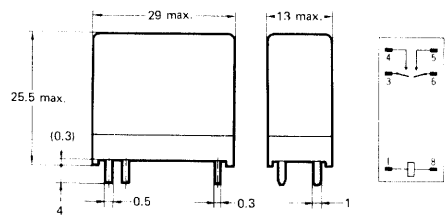

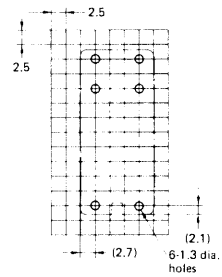

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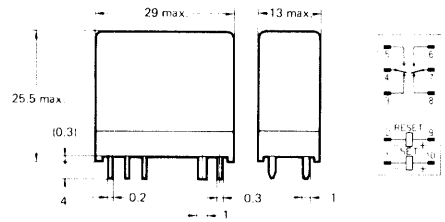

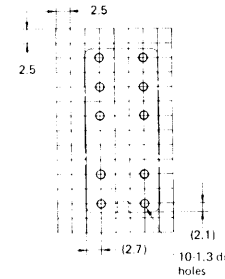

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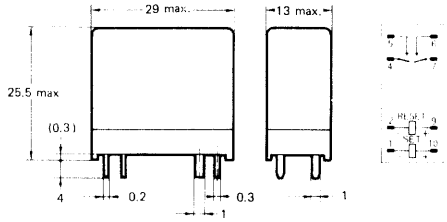
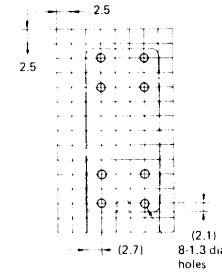
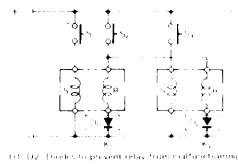
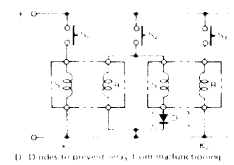
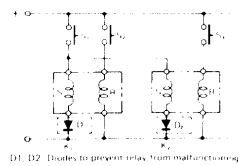
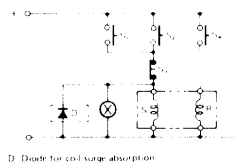




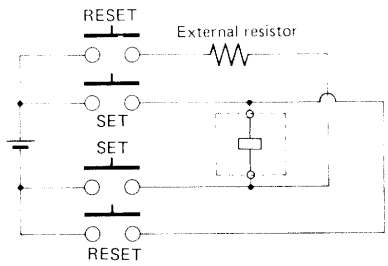
■ HINTS ON CORRECT USE

1. With the double-winding type, both the set and reset coils may be energized continuously. However, do not apply voltage simultaneously to both coils.
2. If the double-winding type relays are used in any of the circuits shown at the right, the relay contacts may be released from their locked (energized/de-energized) positions. To prevent this, either connect diodes D1 and D2 or change the circuit configuration.
   When connecting diodes to the circuit, use diodes which have repetitive peak-inverse voltage and DC reverse voltage sufficient to absorb external noise or surges, and whose average rectifying current is greater than the coil current. Since voltage drop by the diodes will occur, use diodes which have a forward voltage that is as low as possible, or increase the supply voltage to compensate for the voltage drop.

● Hints on circuit connection

Circuit with two reset coils connected parallelly to one another	Circuit with two set coils connected parallelly to one another
	
Circuit with two set coils and two reset coils connected	**Circuit with set coil connected parallelly to other relay**
	

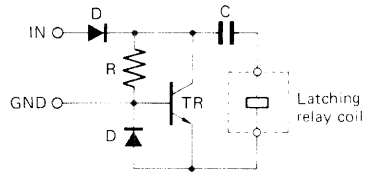
3. When the single-winding type is used to operate the relay from a rectangular pulse with a width of 30ms min. for both set and reset
   - To release the latching relay, connect an external resistor (R) in series with the reset coil with polarity of the power supply reversed to that when operating the relay. Note that the relay contacts will be put in the locked state again if the reset coil is energized without the external resistor connected as described.



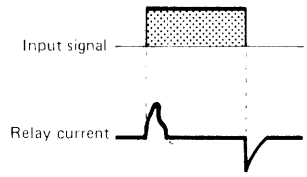
Supply voltage	External resistor (capacity: 1/2W min.)
3	33Ω
5	91Ω
6	130Ω
12	510Ω
24	2,000Ω

- Example of low-power drive circuit

1. The figure below shows a drive circuit (JAPAN PAT. NO. 1239293) in which the latching relay can function like a general-purpose relay from a normal input pulse for switching.
2. Use a charging current of capacitor C to operate the latching relay, which flows suddenly through diode D1, capacitor C, latching relay and diode D2 and the relay contacts will be put in the locked state.



3. Use a discharging current of capacitor C to release the latching relay, which flows through transistor TR, capacitor C and the latching relay.

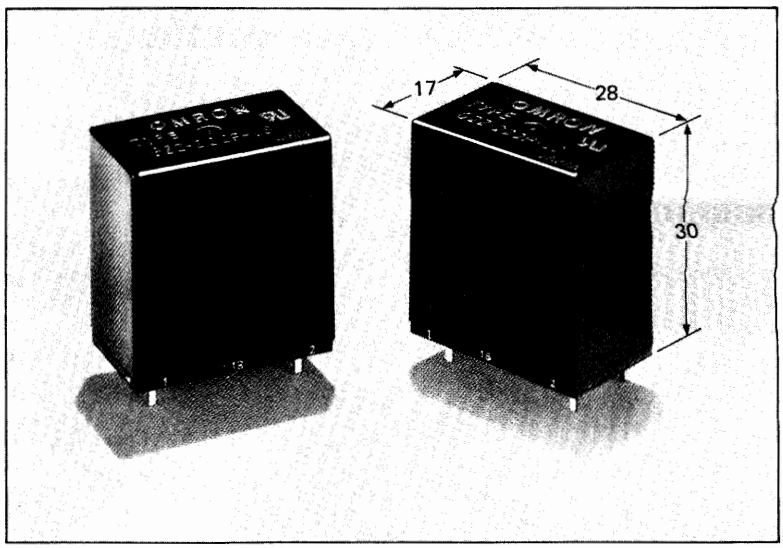


NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

PC BOARD-USE RELAY

Model G2Z

Audio Equipment Protective Relay Ideal for Protection of Amplifiers, Speakers, Muting Circuits



■ FEATURES

- Creepage distance of 3.2mm min. conforms to CEE Pub. 1 (IEC Pub. 65), CEE Pub. 24 and UL 1270
- High dielectric strength (2,000 VAC min.)
- International 2.54mm terminal pitch
  In addition, a minimum pitch of 5.08mm is provided between terminals

■ AVAILABLE TYPES

Contact form \ Type	General purpose
DPST—NO	G2Z-222P-US

■ SPECIFICATIONS

• COIL RATINGS

Item: Rated voltage	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
6 VDC	105	57	0.18	0.3	80 max.	10 min.	110 max.	Approx. 630
12 VDC	52	233	0.89	1.28				
24 VDC	26	914	3.24	4.71				
48 VDC	13	3,660	12.1	17.6				

NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.

• CONTACT RATINGS

Item \ Load	Resistive load (p.f.=1)
Rated load	40VA 5A
Carry current	5A
Max. operating voltage	120 VAC
Max. operating current	5A
Max. switching capacity	200VA, 120W
Min. permissible load	1 VDC 100μA (ref. value)

• CHARACTERISTICS

Contact resistance	50mΩ max.
Operate time	20msec max.
Release time	20msec max.
Operating frequency	Mechanically: 18,000 operations/hour Under rated load: 1,800 operations/hour
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (1,500 VAC, 50/60Hz for 1 minute between contacts)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.0mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 100m/sec² (approx. 10G's)
Ambient temperature	Operating: −10 to +40°C (without frost formation)
Humidity	45 to 85% RH
Service life	Mechanically: 100,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: ——
Weight	Approx. 20g

NOTE: The data shown above are of initial value.

Approved by Standards

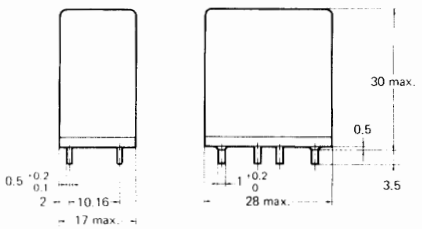
UL recognized type (File No. E41515)

Type	Contact form	Coil ratings	Contact ratings
G2Z-222P-US	SPDT	6 to 48 VDC	3A 120 VAC or 5A 40 VAC (inductive load) TV-1

CSA certified type (File No. LR31928)

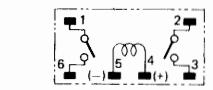
Type	Contact form	Coil ratings	Contact ratings
G2Z-222P-US	SPDT	6 to 48 VDC	5A 24 VDC (resistive load) 3A 120 VAC or 5A 40 VAC (inductive load)

■ DIMENSIONS



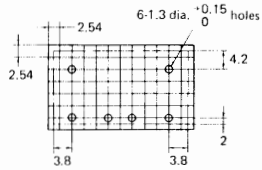
Bottom view

Terminal arrangement/ Internal connections (Bottom view)



NOTE: Pay attention to the polarity of the coil.

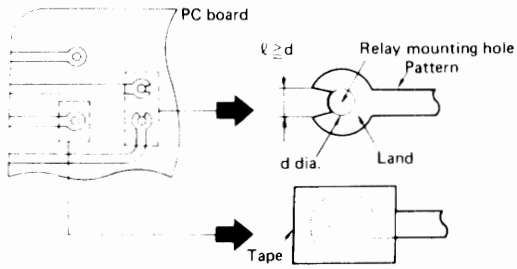
Mounting holes (Bottom view)



How to Solder Unsealed Type PC Relays

- **Manual Soldering**

It is recommended that the PC relay be manually soldered after automatic soldering of other components to protect the relay contacts from excessive flux. When soldering, apply a soldering iron rated at 30 to 60W (tip temperature: 280 to 300°C) quickly (within 3sec) and firmly. Then, be sure to confirm that the relay operates normally. Process the PC board beforehand as shown below to prevent the relay mounting holes from being filled with solder and to facilitate subsequent manual soldering.

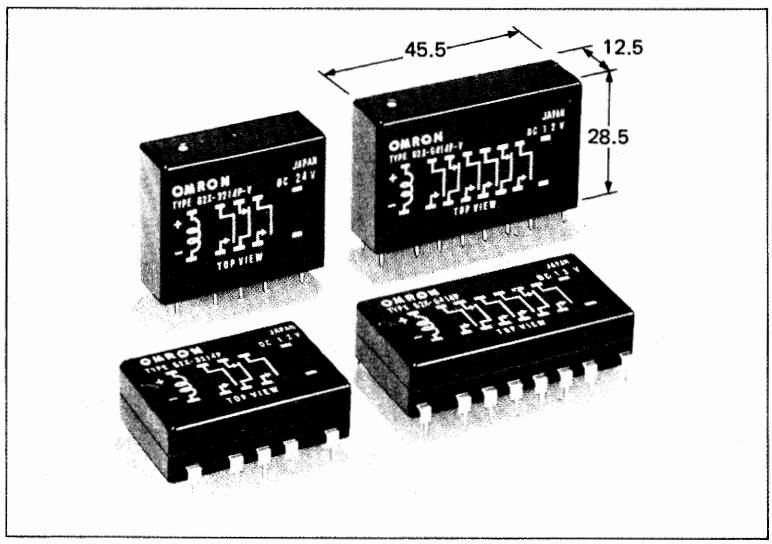


- **Automatic flow soldering**

1) Flux application
   a. Apply flux sparingly and evenly to prevent penetration of solder flux into the relay. In this case, adjust the position of flux level so that the upper surface of the PC board is not flooded with flux.
   b. Use an anti-corrosive rosin type flux.
   c. For flux solvent, use alcohol type which is less chemically reactive.
   d. Preheating process subsequent to flux application is effective to dry the applied flux, facilitate metal melting and prevent penetration of flux into the relay. However, when preheating the PC board, keep the temperature of the land side of the PC board to less than 80°C.
2) Soldering
   a. Move the bottom of the PC board over a flowing wave of molten solder for the shortest possible period (approx. 3sec) at a solder temperature of 240°C. In this case, be sure that the PC board is not flooded with solder.
   b. Use a solder conforming with H60 (Sn 60, Pb 40) or H63 (Sn 63, Pb 37) JIS Z 3282.
3) Cooling
   Cool forcedly the PC board with fan, etc.
4) Cleaning
   As much as possible, avoid cleaning the terminals. When cleaning for some reason or other, care should be taken to the following:
   a. Use alcohol or freon type solvents which are less chemically reactive. Note that use of other solvents may damage the plastic material used for the relay base, etc.
   b. Clean the soldered PC board pattern side only to prevent the flux-contaminated solvent from entering the relay.

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

DIL Type Sealed Relay with 5A, 220 VAC Switching Capacity



■ FEATURES

- Unique balanced armature mechanism incorporating high-efficiency permanent magnet assures low power consumption
- International 2.54mm terminal pitch. In addition, an interval of 3 pitches (7.62mm) is provided between the coil and the terminal section
- High dielectric strength construction (2,000 VAC) conforms to various safety standards including VDE, UL and CSA

■ AVAILABLE TYPES

Classification \ Type / Contact form	Horizontal mount (Flat pack)	Vertical mount
Standard type — 4PST-NO+DPST-NC	G2X-6414P	G2X-6414P-V
Standard type — DPST-NO+SPST-NC	G2X-3214P	G2X-3214P-V
Standard approved type — 4PST-NO+DPST-NC	G2X-6414P-US	G2X-6414P-V-US
Standard approved type — DPST-NO+SPST-NC	G2X-3214P-US	G2X-3214P-V-US

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Type	Item / Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (mW)
G2X-6414P G2X-6414P-V	5	144	34.7	0.083	0.124	80 max.	10 min.	110	720
	12	60	200	0.636	0.954				
	24	30	800	2.93	3.99				
	48	15	3,200	9.85	15.6				
	100	7.2	13,890	47.9	72.6				
G2X-3214P G2X-3214P-V	5	72	69.4	0.182	0.288				360
	12	30	400	1.14	1.92				
	24	15	1,600	4.52	7.56				
	48	7.5	6,400	15.5	24.4				
	100	3.6	27,780	77.9	134				

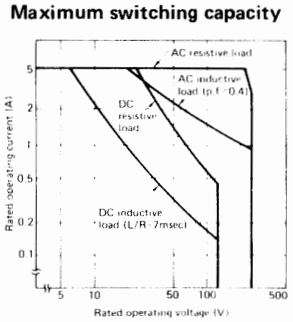
NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.

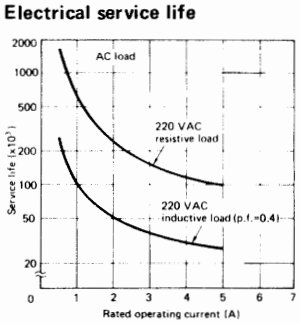
• CONTACT RATINGS

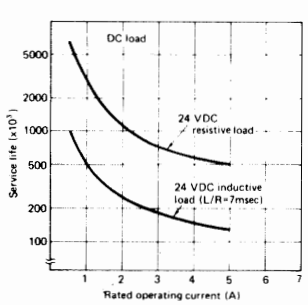
Item \ Load	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	220 VAC 5A 24 VDC 5A	220 VAC 1A 24 VDC 1A
Carry current	5A	
Max. operating voltage	250 VAC 125 VDC	
Max. operating current	5A	
Max. switching capacity	1,100VA 120W	220VA 24W
Min. permissible load (reference value)	1 VDC 1mA	

• CHARACTERISTIC DATA

Maximum switching capacity **Electrical service life**







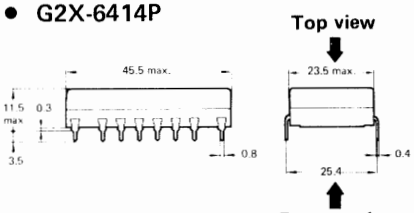
• CHARACTERISTICS

Contact resistance	50mΩ max.
Operate time	20msec max.
Release time	10msec max.
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (1,000 VAC between the same poles)
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: When energized: 10 to 55Hz; 1mm double amplitude When de-energized: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 100m/sec² (approx. 10G's)
Ambient temperature	Operating: −40 to +55°C
Humidity	45 to 85% RH
Service life	Mechanically: 50,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	G2X-6414P: approx. 23g G2X-6414P-V: approx. 28g G2X-3214P: approx. 15g G2X-3214P-V: approx. 19g

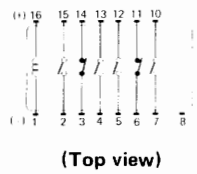
NOTE: The data shown above are of initial value.

■ DIMENSIONS

• G2X-6414P

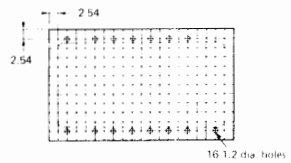


Terminal arrangement/ Internal connections

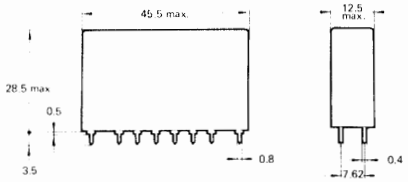


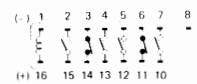
(Top view)

Mounting holes (Bottom view)

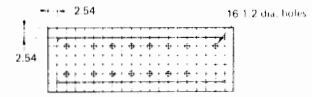


• G2X-6414P-V

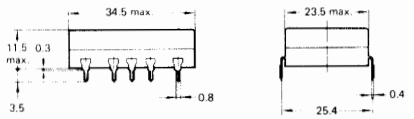




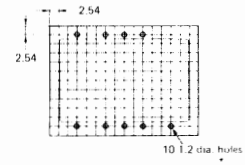
(Bottom view)



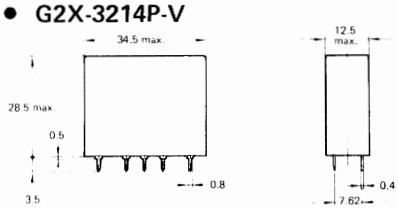
• G2X-3214P



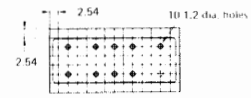
(Top view)



• G2X-3214P-V



(Bottom view)



STANDARD APPROVED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exception.

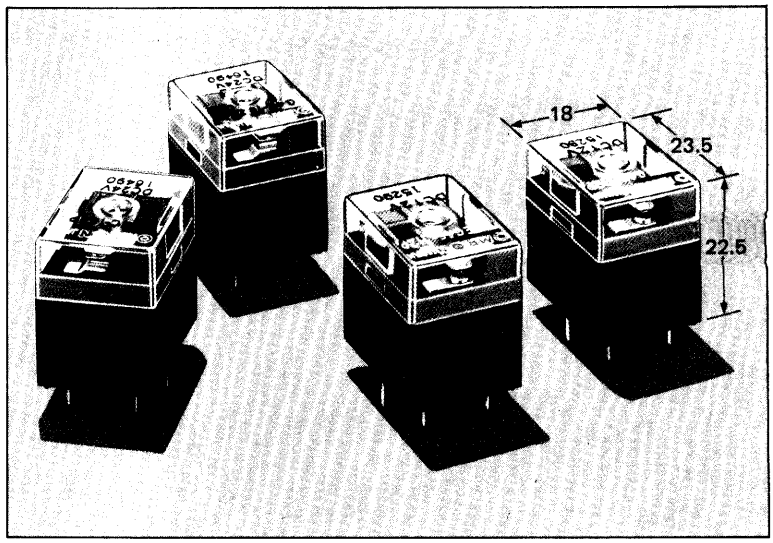
• RATINGS

CSA certified type (File No. LR31928)

Type	Contact form	Coil rating	Contact rating
G2X-3214P-V-US G2X-6414P-V-US	3PST 6PST	3 to 120 VAC	5A, 250 VAC (general load) 5A, 30 VDC (resistive load) 0.5A, 125 VAC (resistive load) TV-3 (TV Rating)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

High Impulse Withstand Voltage (7KV)—Ideal for Applications Requiring Resistance to Voltage Surges



■ FEATURES

- Distance of 7.5mm min. between coil and contact terminals permits flexible pattern design
- Contact section located opposite the terminal section provides a greater creepage distance and prevents solder flux wicking, thus facilitating automatic flow soldering
- Micro voltage/current load type employs highly reliable gold-silver alloy with crossbar construction to switch wide-ranging loads from dry circuits of several mA to 1A

■ AVAILABLE TYPES

Classification \ Contact form		Micro voltage/current load	High capacity
Standard type	SPDT	G4C-182P	G4C-112P-E
Standard approved type: UL, CSA	SPDT	G4C-182P-US	G4C-112P-E-US (TV-2)
Standard approved type: VDE, SEV	SPDT	—	G4C-112P-E-VD

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
6 VDC	60	100	0.31	0.49	80 max.	10 min.	130	Approx. 360
12 VDC	30	400	1.27	1.83				
24 VDC	15	1,600	5.97	8.16				

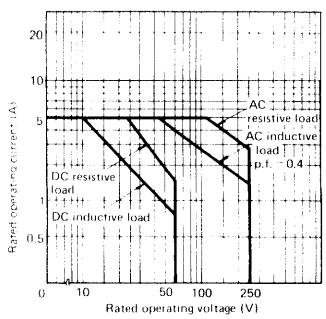
NOTES: 1. The rated current and coil resistance are measured at a coil temperature of 20° C with tolerances of ±10%.
2. The performance characteristics are measured at a coil temperature of 20° C.

• CONTACT RATINGS

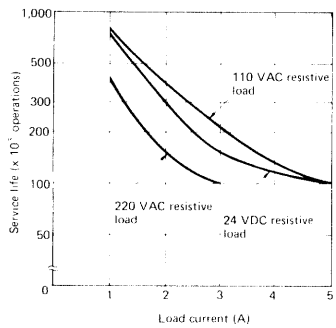
Type / Load / Item	Micro voltage/current load		High capacity	
	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)	Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load	110 VAC 1A 24 VDC 1A	110 VAC 0.5A 24 VDC 0.5A	110 VAC 5A 24 VDC 5A 220 VAC 3A	110 VAC 2A 24 VDC 2A
Carry current	2A		5A	
Max. operating voltage	250 VAC, 60 VDC		250 VAC, 60 VDC	
Max. operating current	1A		5A	3A
Max. switching capacity	120VA, 30W	60VA, 15W	750VA, 150W	220VA, 48W
Min. permissible load (reference value)	5 VDC 1mA		5 VDC 100mA	

• CHARACTERISTIC DATA

Maximum switching capacity G4C-112P-E



Electrical service life G4C-112P-E

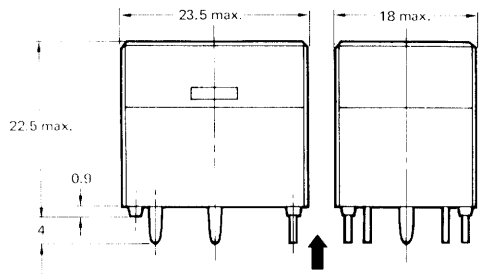


• CHARACTERISTICS

Item \ Type	G4C-182P (-US)	G4C-112P-E (-US, -VD)
Contact resistance	50mΩ max.	100mΩ max.
Operate time	15msec max.	
Release time	5msec max.	
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)	
Insulation resistance	100MΩ min. (at 500 VDC)	
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (750 VAC between contacts of same pole)	
Vibration	Mechanical durability: 10 to 55Hz; 1.5mm double amplitude Malfunction durability: 10 to 55Hz; 1.5mm double amplitude	
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 100m/sec² (approx. 10G's)	
Ambient temperature	Operating: -25 to +60°C	
Humidity	45 to 85% RH	
Service life	Mechanically: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."	
Weight	Approx. 15g	

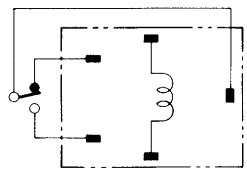
NOTE: The data shown above are of initial value.

■ DIMENSIONS

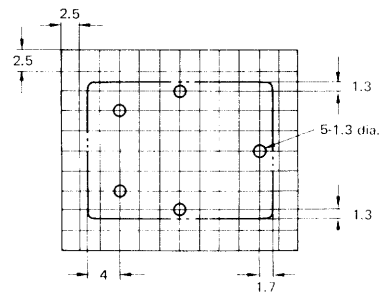


Bottom view

Terminal arrangement/ Internal commections (Bottom view)



Mounting holes (Bottom view)



STANDARD APPROVED TYPE

■ SPECIFICATIONS

Same as the Standard Type with the following exceptions.

• RATINGS

UL recognized type (File No. E41515)/CSA certified type (File No. LR-34815)

Type	Contact form	Coil ratings	Contact ratings
G4C-182P-US	SPDT	6 to 24 VDC	0.5A 120 VAC (resistive load) 1A 120 VAC (resistive load) 1A 28 VDC (resistive load)
G4C-112P-E-US-TV2			3A 120 VAC (resistive load) 5A 120 VAC (resistive load) 5A 28 VDC (resistive load) TV-2 (TV ratings)

VDE approved type (File No. 58613913)

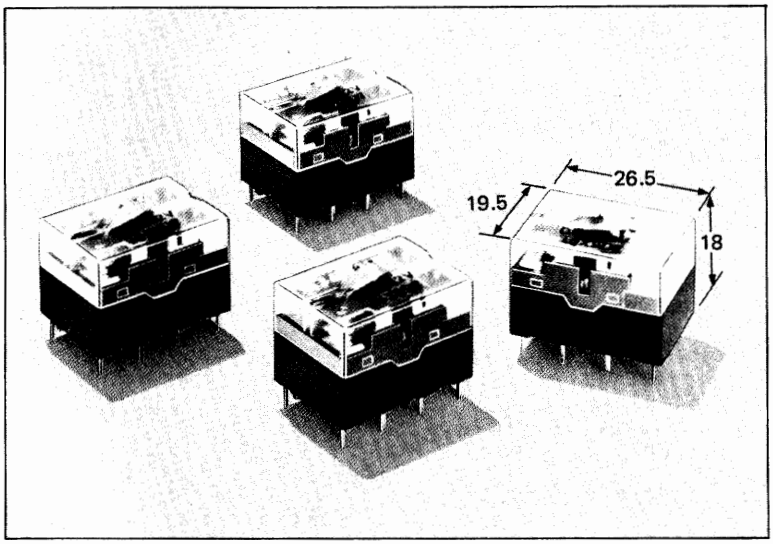
Type	Contact form	Coil ratings	Contact ratings
G4C-112P-E-VD	SPDT	6 to 24 VDC	3A 250 VAC (resistive load) 1.5A 250 VAC (inductive load)

SEV listed type (File No. D7.91/371)

Type	Contact form	Coil ratings	Contact ratings
G4C-112P-E-VD	SPDT	6 to 24 VDC	3A 250 VAC (resistive load) 5A 28 VDC (resistive load)

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

Double-pole Relay That Breaks 5A Loads



■ FEATURES

- Creepage distance of more than 3mm
- International 2.54mm terminal pitch arrangement
- Contact section arranged at the upper part of the relay housing with unique terminal construction to seat the relay enclosure base 1mm above the PC board surface, facilitates automatic flow soldering

■ AVAILABLE TYPES

Contact form \ Type	High capacity, AgCdO single contact	Standard approved
DPDT	G4D-212P	G4D-212P-US-TV2
DPST-NO	G4D-212P-200	G4D-212P-200-US-TV2

OMRON

STANDARD TYPE

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage \ Item	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
5 VDC	160.3	31.2	0.114	0.215	80 max.	15 min.	110	800
6 VDC	133.3	45	0.185	0.284				
12 VDC	66.7	180	0.713	1.200				
24 VDC	33.3	720	2.140	3.570				

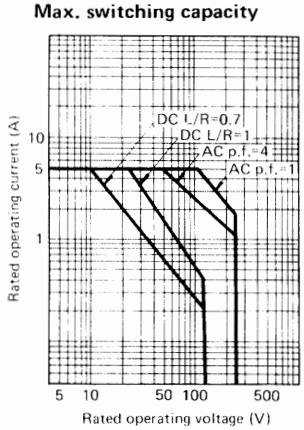
NOTES: 1. The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.
2. The performance characteristics are measured at a coil temperature of 20°C±5.

• CONTACT RATINGS

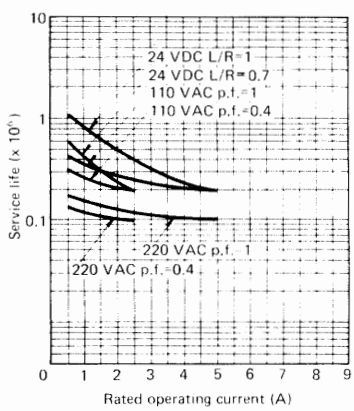
Item \ Load		Resistive load (p.f.=1)	Inductive load (p.f.=0.4, L/R=7msec)
Rated load		110 VAC 5A 24 VDC 5A	110 VAC 2.5A 24 VDC 2.5A
Carry current		5A	
Max. operating voltage		250 VAC, 125 VDC	
Max. operating current		5A	
Max. switching capacity	AC	1,100VA	550VA
	DC	120W	60W
Min. permissible load (reference value)		5 VDC 100mA	

• CHARACTERISTIC DATA

Max. switching capacity



Electrical service life

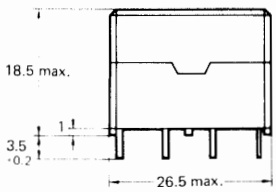


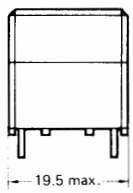
• CHARACTERISTICS

Contact resistance	50mΩ max.
Operate time	20msec max.
Release time	10msec max.
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC 50/60Hz for 1 minute (1,000 VAC between contacts)
Vibration	Mechanical and malfunction durability: 10 to 55Hz; 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/sec^2 (approx. 100G's) Malfunction durability: 100m/sec^2 (approx. 10G's)
Ambient temperature	Operating: -20 to +60°C
Humidity	45 to 85% RH
Service life	Mechanically: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 21g

NOTE: The data shown above are of initial value.

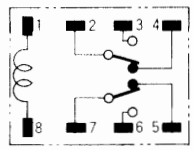
■ DIMENSIONS



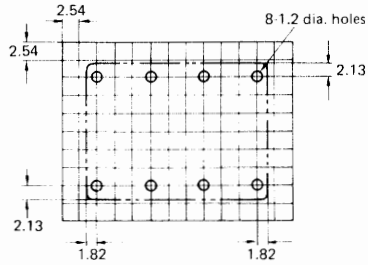


Bottom view

Terminal arrangement/
Internal connections
(Bottom view)



Mounting holes



STANDARD APPROVED TYPE

■ SPECIFICATIONS

Same as the Standard Type with the following exceptions.

• RATINGS

UL recognized type (File No. E41515)/CSA certified type (File No. LR34815)

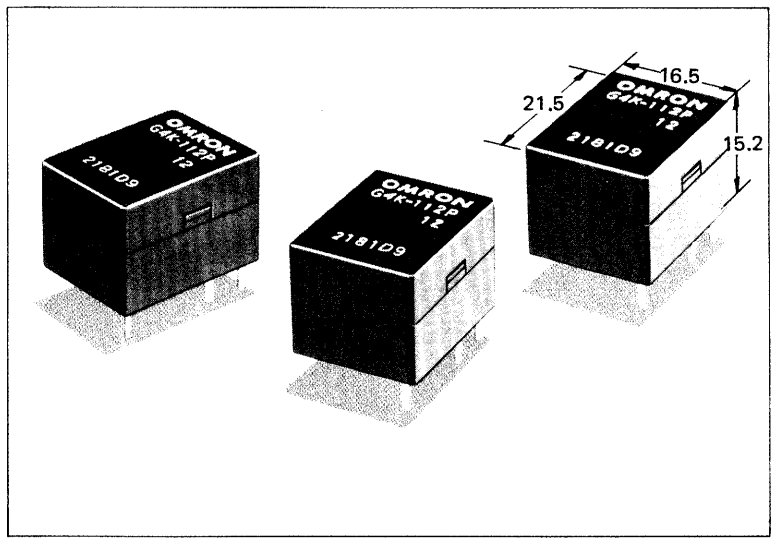
Type	Contact form	Coil ratings	Contact ratings
G4D-212P-US-TV2	DPDT	5 to 24 VDC	5A 250 VAC, 5A 28 VDC (resistive load) TV-2

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

PC BOARD-USE RELAY

Model G4K

High Impulse Withstand Voltage (6kv) — Ideal for Applications Requiring Resistance to Voltage Surges



■ FEATURES

- Contact section located opposite the terminal section provides a greater creepage distance, and is resistant to solder flux wicking
- High sensitivity type with low power consumption (330mW) also available
- International 2.54mm terminal pitch
- Pending UL and CSA approvals

■ AVAILABLE TYPES

Classification \ Type / Contact form	General purpose	High-sensitivity
Standard type — SPDT	G4K-112P	G4K-112P-H
Standard type — SPST-NO	G4K-1112P	G4K-1112P-H
Standard approved type — SPDT	G4K-112P-US	G4K-112P-H-US
Standard approved type — SPST-NO	G4K-1112P-US	G4K-1112P-H-US

■ SPECIFICATIONS

• COIL RATINGS

Type	Item / Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H) Armature OFF	Coil inductance (ref. value) (H) Armature ON	Must operate voltage (% of rated voltage)	Must dropout voltage (% of rated voltage)	Maximum voltage (% of rated voltage)	Power consumption (mW)
General purpose	5	89.3	56	0.15	0.18	70 max.	10 min.	165	Approx. 450
	6	75	80	0.23	0.27				
	9	50	180	0.51	0.63				
	12	37.5	320	0.88	1.10				
	24	18.8	1,280	3.68	4.65				
High-sensitivity	5	62.5	80	0.25	0.29			195	Approx. 330
	6	54.5	110	0.33	0.39				
	9	36	250	0.78	0.91				
	12	27.3	440	1.37	1.61				
	24	13.5	1,780	5.53	6.37				

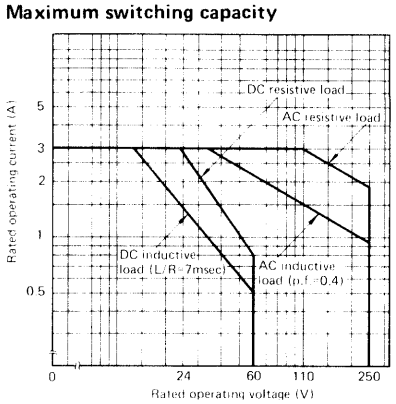
NOTES: 1. The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.
2. Performance characteristic data are measured at a coil temperature of 20°C.

• CONTACT RATINGS

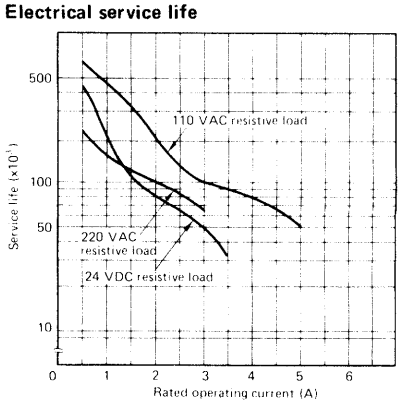
Item \ Load	Resistive load (p.f.=1)
Rated load	110 VAC/24 VDC 3A, 220 VAC 2A
Carry current	3A
Max. operating voltage	250 VAC/60 VDC
Max. operating current	3A
Max. switching capacity	440VA/75W
Minimum permissible load (reference value)	5 VDC 100mA

• CHARACTERISTIC DATA

Maximum switching capacity



Electrical service life



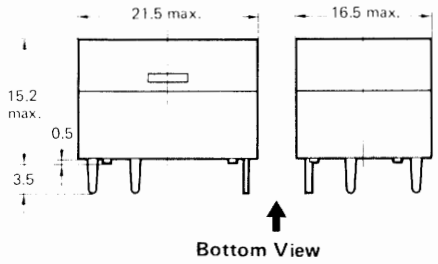
• CHARACTERISTICS

Contact resistance	100mΩ max.
Operate time	10msec max.
Release time	5msec max.
Operating frequency	Mechanically: 18,000 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60Hz for 1 minute (750 VAC between the same poles)
Impulse withstand voltage	6,000V (1x40μsec) between coil and contact
Vibration	Mechanical durability: 10 to 55Hz; 3.3mm double amplitude Malfunction durability: 10 to 55Hz; 3.3mm double amplitude
Shock	Mechanical durability: 1,000m/sec² (approx. 100G's) Malfunction durability: 100m/sec² (approx. 10G's)
Ambient temperature*	Operating: −30 to +70°C (General purpose type), −30 to +80°C (High-sensitivity type)
Humidity	45 to 85% RH
Service life	Mechanically: 20,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 9.1g

NOTES: 1. The data shown above are of initial value.
2. * The ambient temperature range is that measured with the rated voltage applied to the relay coil but without energizing the relay contacts.

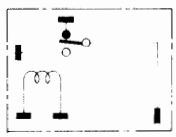
■ DIMENSIONS

• G4K-112P, G4K-1112P

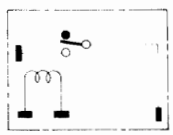


Terminal arrangement/ Internal connections (Bottom view)

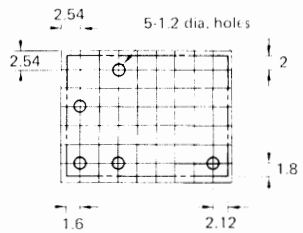
G4K-112P

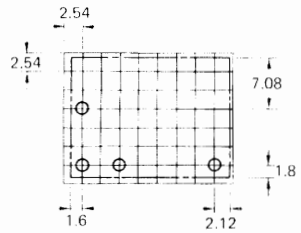


G4K-1112P



Mounting holes (Bottom view)





STANDARD APPROVED TYPE

■ SPECIFICATIONS/DIMENSIONS

Same as the Standard Type with the following exceptions.

• RATINGS

UL approved type (File No. E41515)
CSA certified type (File No. LR34815)

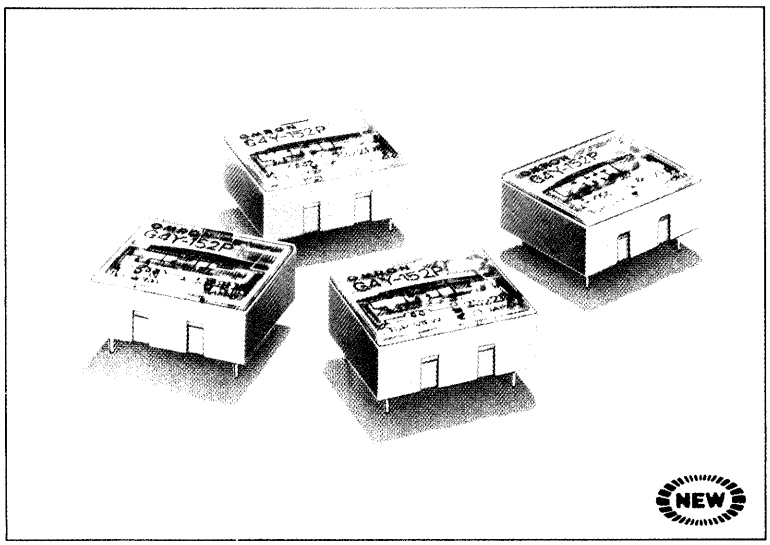
Type	Contact form	Coil ratings	Contact ratings
G4K-112P-US G4K-112P-H-US	SPDT	5 to 24 VDC	3A 28 VDC (resistive load) 3A 120 VDC (inductive load)
G4K-1112P-US G4K-1112P-H-US	SPST-NO		

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

PC BOARD-USE RELAY

Model G4Y

Special Relay for Transmission and Switching of VHF and UHF Signals



■ FEATURES

- Outstanding high-frequency characteristics; isolation of 65dB min., insertion loss of 0.25dB (typ.) and VSWR of 1.6 (typ.) at 900MHz
- Ultra small (26W x 21D x 10.5H mm) and light weight (11.5g), yet allows relay drive at low power consumption (450mW)
- DIL terminal arrangement with international 2.54mm pitch. Flux wicking resistant construction permits automatic flow or dip soldering
- Gold-plated bifurcated contact for wide switching capacity from micro current/voltage to 1W DC loads
- Double-break contact mechanism with ground contact integrated into the relay base greatly reduces stray capacitance
- Shield plate and resin-mold relay base completely isolates the contact section from external electric waves

■ AVAILABLE TYPES

Contact form \ Type	Standard	Special internal connection*
SPDT	G4Y-152P	G4Y-152P-MKB

NOTE: * Terminal positions of NO and NC contacts are opposite to those of the standard type.

OMRON

■ SPECIFICATIONS

• COIL RATINGS

Rated voltage \ Item	Rated current (mA)	Coil resistance (Ω)	Coil inductance (ref. value) (H)		Must operate voltage	Must dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON	% of rated voltage			
5 VDC	90	56	0.20	0.34	75 max.	5 min.	120	450
6 VDC	75	80	0.31	0.50				
9 VDC	50	180	0.58	1.05				
12 VDC	37.5	320	1.67	2.37				
24 VDC	18.8	1,280	6.10	8.68				

NOTE: The rated current and coil resistance are measured at a coil temperature of 20°C with tolerances of ±10%.

• CONTACT RATINGS

Item \ Load	Resistive load (p.f.=1)
Rated load	24 VAC 0.01A 24 VDC 0.01A
Carry current	0.1A
Max. operating voltage	30 VAC 30 VDC
Max. operating current	AC: 0.1A DC: 0.1A
Max. switching capacity	1VA, 1W
Minimum permissible load (ref. value)	10mVDC 0.1mA

• HIGH-FREQUENCY CHARACTERISTICS

Item \ Frequency	250MHz	900MHz
Isolation	85dB min.	65dB min.
Insertion loss	1.0dB max.	1.5dB max.
VSWR	1.3 max.	2.0 max.
Carry power (Not switching)	15W max.	15W max.

NOTE: Line impedance (Zo) of the measuring instrument system is 50Ω.

• CHARACTERISTICS

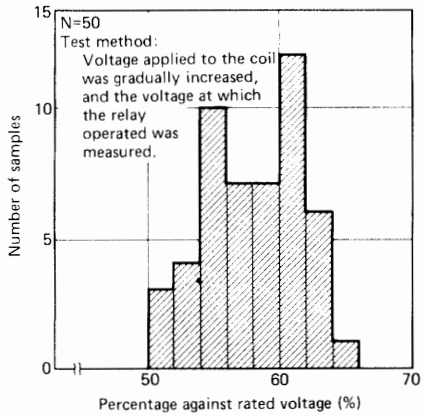
Contact resistance	100mΩ max.
Operate time	15msec max.
Release time	5msec max.
Bounce time	5msec max.
Operating frequency	Mechanically: 1,800 operations/hour Electrically: 1,800 operations/hour (under rated load)
Insulation resistance	100MΩ min. (at 100 VDC)
Dielectric strength	500 VAC, 50/60Hz for 1 minute between contacts, between contact and ground, and between coil and ground 1,000 VAC, 50/60Hz for 1 minute between coil and contact
Vibration	Mechanical and malfunction durability: 10 to 55Hz, 1.5mm double amplitude
Shock	Mechanical durability: 1,000m/s² (approx. 100G's) Malfunction durability: 200m/s² (approx. 20G's)
Ambient operating temperature	−25 to +60°C
Humidity	45 to 85% RH
Service life	Mechanically: 1,000,000 operations min. (at operating frequency of 30 operations/minute) Electrically: See "CHARACTERISTIC DATA."
Weight	Approx. 11.5g

NOTE: The data shown above are of initial value.

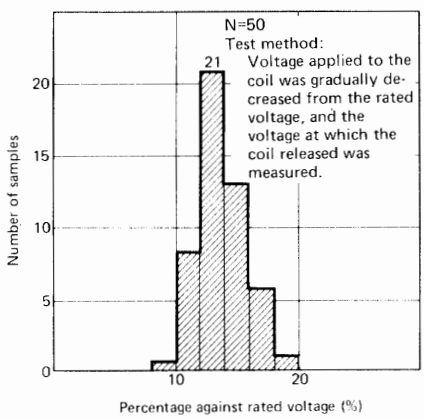
• CHARACTERISTIC DATA

Distribution of Operate and Dropout Voltages

Distribution of operate voltage
G4Y-152P 12 VDC

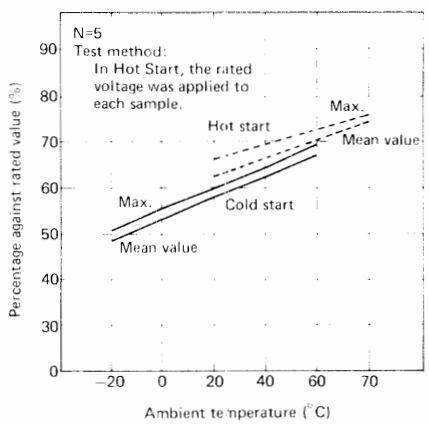


Distribution of dropout voltage
G4Y-152P 12 VDC



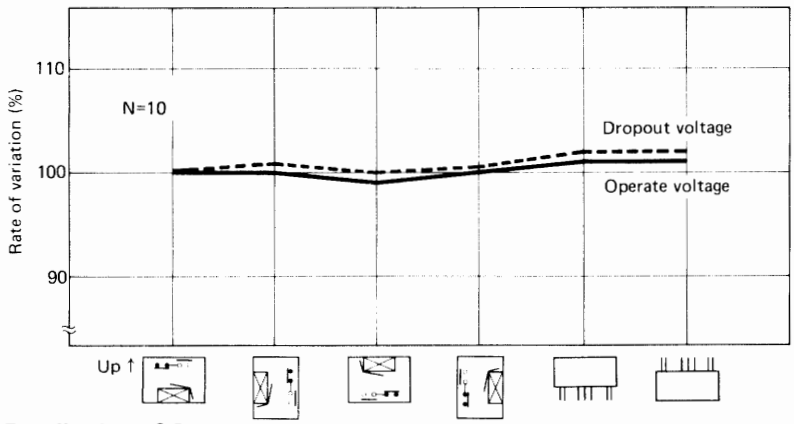
Ambient Temperature vs. Operate Voltage

G4Y-152P 12 VDC



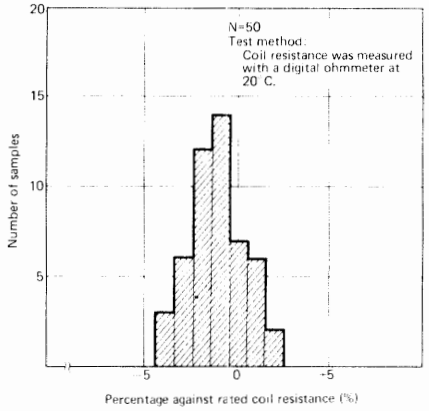
Mounting Direction vs. Operate and Dropout Voltages

G4Y-152P 12 VDC



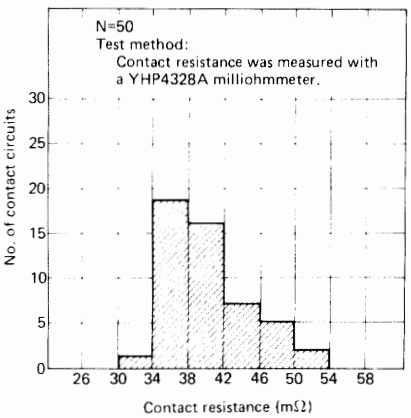
Distribution of Coil Resistance

G4Y-152P 12 VDC



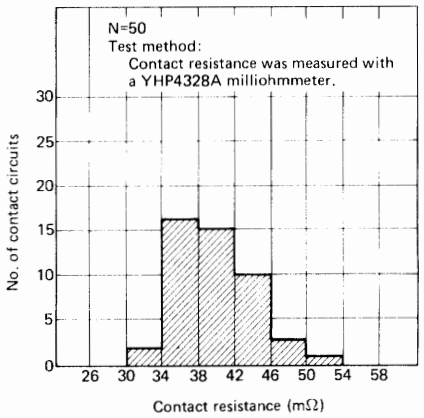
Distribution of Contact Resistance (NO contact)

G4Y-152P 12 VDC



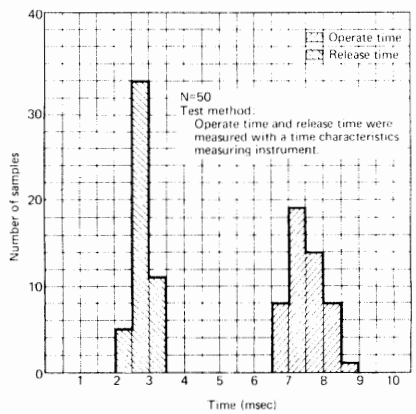
(NC contact)

G4Y-152P 12 VDC



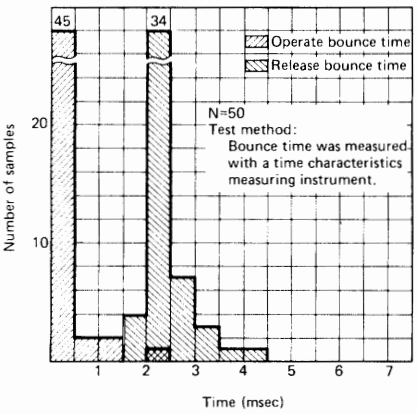
Distribution of Operate and Release Times

G4Y-152P 12 VDC



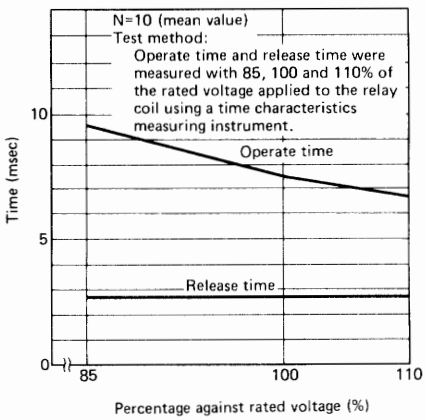
Distribution of Bounce Time

G4Y-152P 12 VDC



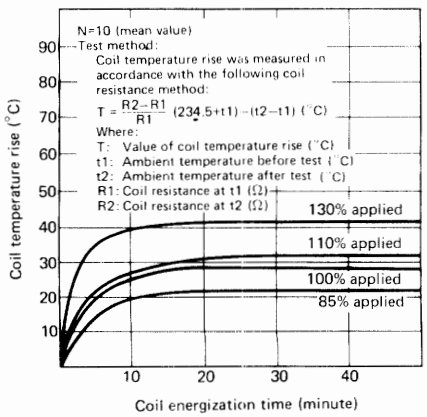
Applied Voltage vs. Operate and Release Times

G4Y-152P 12 VDC



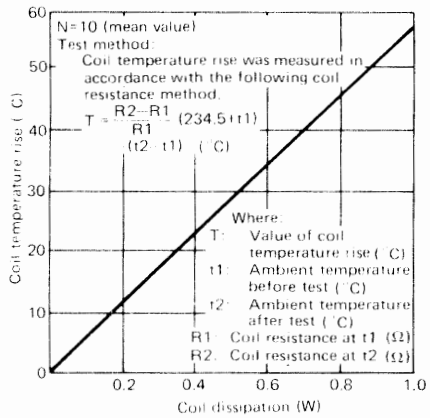
Coil Energization Time vs. Coil Temperature Rise

G4Y-152P 12 VDC



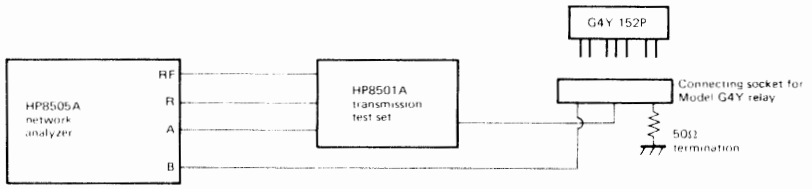
Coil Dissipation vs. Coil Temperature Rise

G4Y-152P 12 VDC



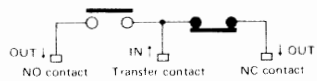
High-Frequency Characteristics

Measuring conditions



The following characteristics, when a signal is applied from the transfer contact to the NO contact or from the transfer contact to the NC contact of the sample, are measured with contacts unrelated to the measurement terminated at 50Ω.

1. Isolation characteristics
2. Insertion loss characteristics
3. Return loss



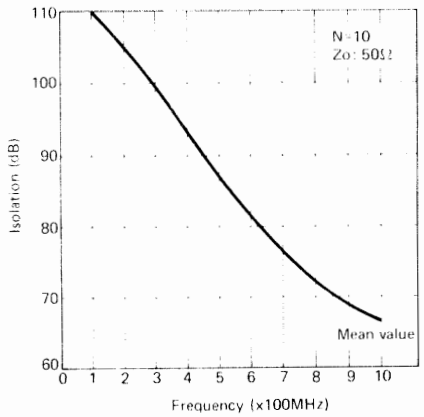
NOTE: Conversion formulas between return loss and VSWR

$$VSWR = \frac{1 + 10^{\frac{X}{20}}}{1 - 10^{\frac{X}{20}}} \quad (X: \text{Return loss})$$

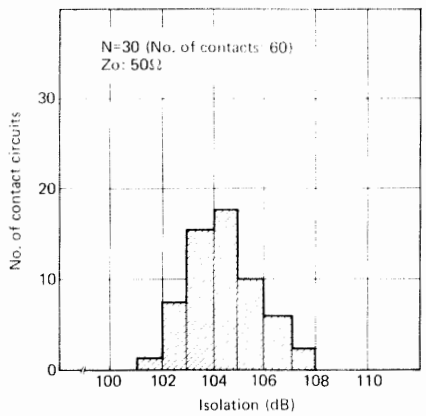
High-Frequency Characteristics

1. Isolation characteristics

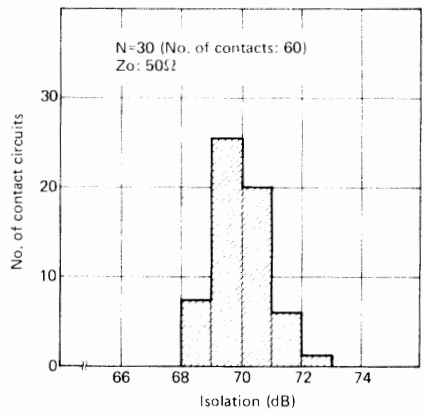
Frequency vs. isolation
G4Y-152P 12 VDC



Distribution of isolation at 250MHz
G4Y-152P 12 VDC

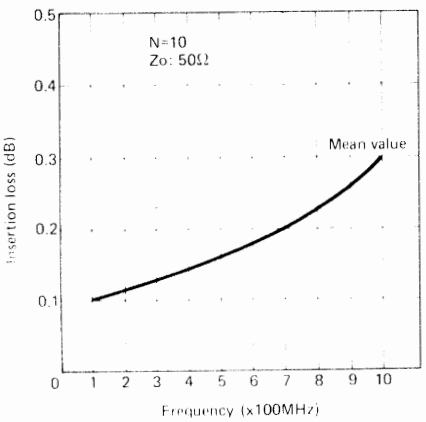


Distribution of isolation at 900MHz
G4Y-152P 12 VDC

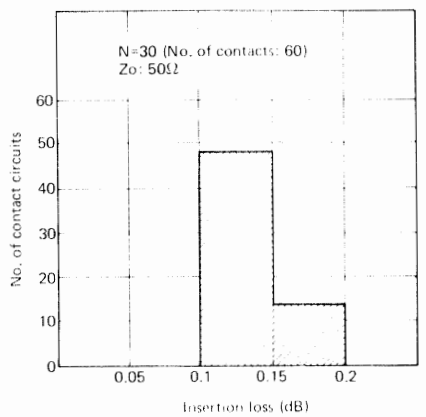


2. Insertion loss characteristics

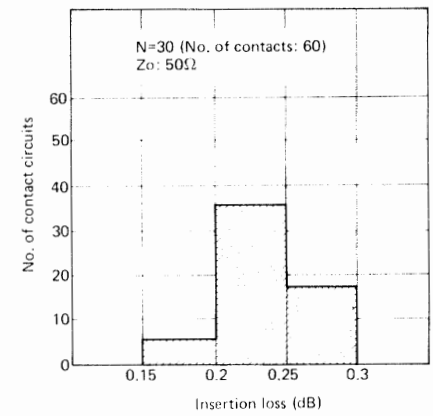
Frequency vs. insertion loss
G4Y-152P 12 VDC



Distribution of insertion loss at 250MHz
G4Y-152P 12 VDC

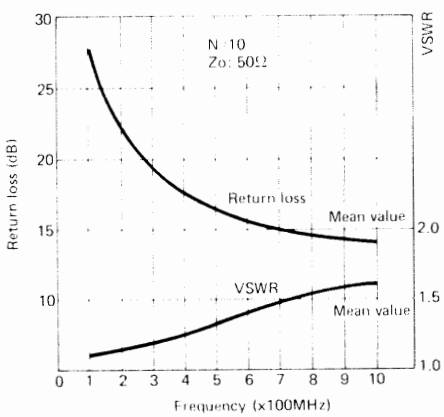


Distribution of insertion loss at 900MHz
G4Y-152P 12 VDC

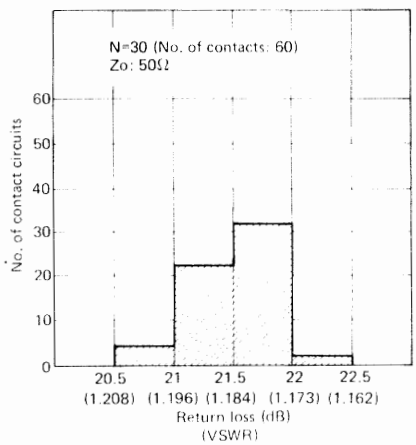


3. VSWR characteristics

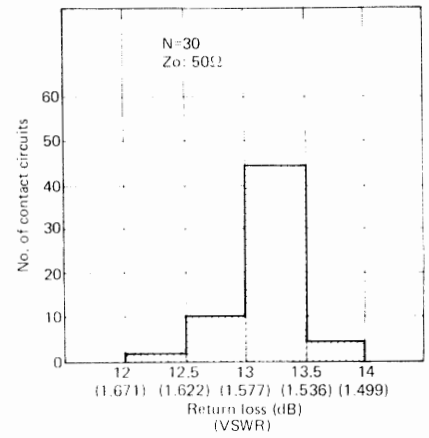
Frequency vs. return loss and VSWR
G4Y-152P 12 VDC



Distribution of return loss at 250MHz
G4Y-152P 12 VDC



Distribution of return loss at 900MHz
G4Y-152P 12 VDC



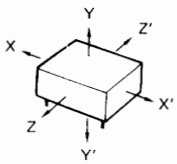
Shock Resistance Characteristics (malfunction durability)

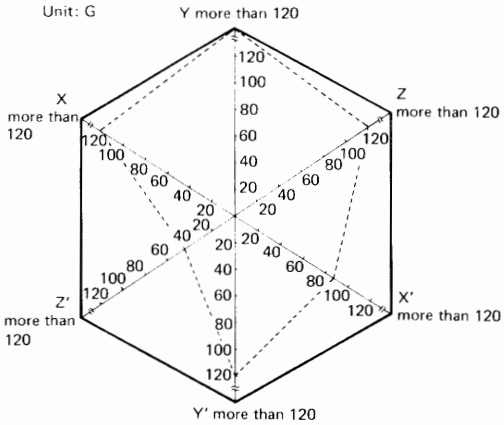
G4Y-152P

N=10

Test method:

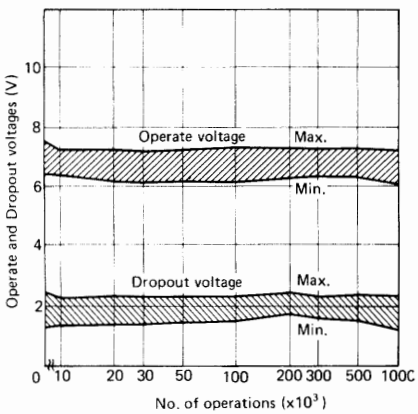
Each sample was subjected to shocks applied in two directions on each of three axes X, Y and Z; three times with the relay coil non-excited and twice with the relay coil excited for each direction. The force in grams at which the contacts became separated was recorded. (The sample with a contact opening time of 10μsec min. was rejected.)



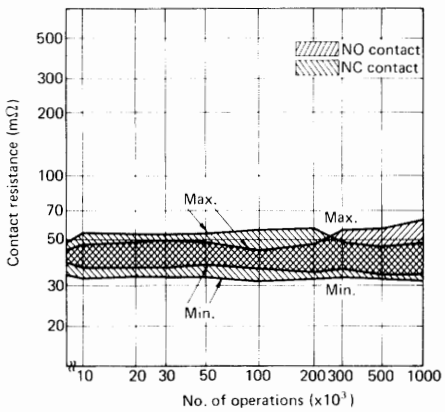


Mechanical Service Life Test

Changes in operate and dropout voltages



Changes in contact resistance



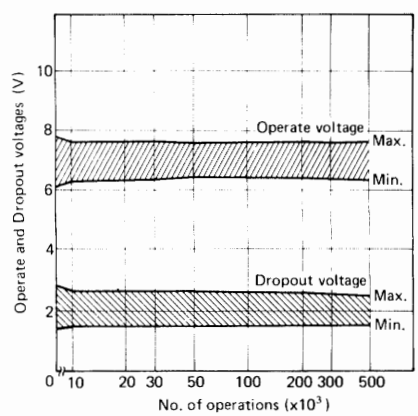
Changes in high frequency characteristics

Zo:50Ω

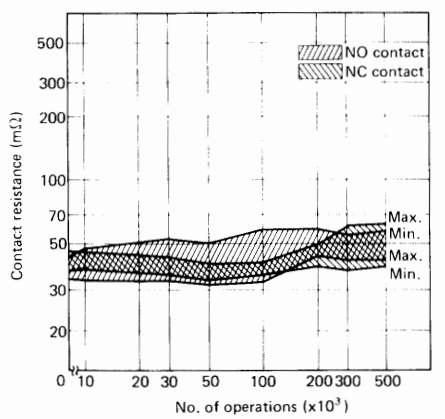
No. of operations / Characteristics f	Initial value		After 500,000 operations	
	250MHz	900MHz	250MHz	900MHz
Isolation (dB)	101.0 min.	69.1 min.	100.5 min.	69.0 min.
Insertion loss (dB)	0.1 max.	0.3 max.	0.1 max.	0.3 max.
VSWR	1.18 max.	1.56 max.	1.18 max.	1.58 max.

Electrical Service Life Curve (24 VAC, 10mA resistive load)

Changes in operate and dropout voltage



Changes in contact resistance



Changes in high frequency characteristics

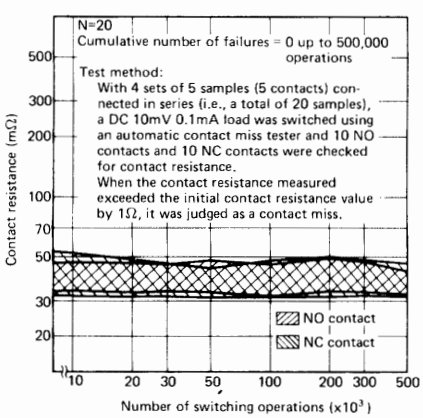
Zo:50Ω

No. of operations / Characteristics f	Initial value		After 500,000 operations	
	250MHz	900MHz	250MHz	900MHz
Isolation (dB)	101.2 min.	68.0 min.	100.6 min.	67.7 min.
Insertion loss (dB)	0.1 max.	0.3 max.	0.1 max.	0.3 max.
VSWR	1.18 max.	1.56 max.	1.18 max.	1.56 max.

Failure Rate

Contact resistance

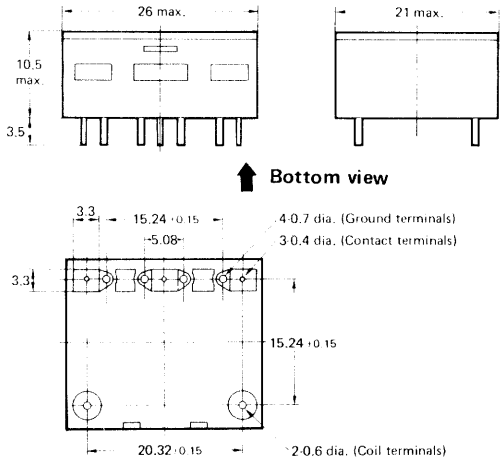
G4Y-152P 12 VDC



Failure rate

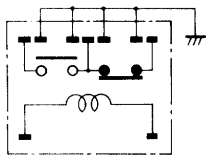
No. of switching operations t (x10⁶)	No. of samples n	No. of failures r	Total No. of switching operations T (x10⁶)	Point estimate $\hat{\lambda}$ (x10⁶)	Failure rate λ_{60} (x10⁻⁶)	Level
0.5	20	0	10	- - - -	0.092	P

■ DIMENSIONS

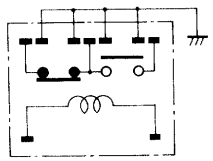


Terminal arrangement (Bottom view)

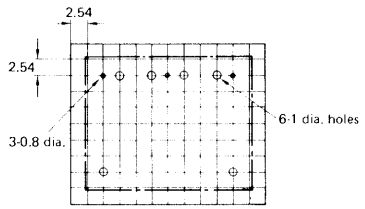
G4Y-152P



G4Y-152P-MKB



Mounting holes (Bottom view)



■ HINTS ON CORRECT USE

HOW TO DESIGN PC BOARD

● PC board selection

Thickness of PC board

PC boards are generally available in the following thicknesses: 0.8, 1.0, 1.2, 1.6 and 2.0mm. In determining the thickness of the PC board to be used, the pattern widths of the microstrips must be taken into account. First, determine the applicable pattern widths based on the intended arrangement of components on the PC board. Then select the appropriate PC board thickness.

PC board material

The base materials of PC boards can be divided into two types: epoxy type and phenolic type. For high-frequency circuits, glass epoxy type double-sided PC boards are recommended because of their distinct dielectric constant and material stability. However, paper epoxy type or paper phenolic type single-sided PC boards may also be used if cost factor is essential. Refer to "Examples of packaging design" for mounting the relay on a single-sided PC board.

● Pattern design

Preparation for pattern design

● Relay mounting direction

The mounting direction of each relay must be taken into account for the relay to function with maximum performance. Shock resistance is one of the representative relay performance characteristics greatly influenced by the relay mounting direction. Refer to the Shock Resistance Characteristic in CHARACTERISTIC DATA.

Note that the shock resistance of a relay (NC contact), with its coil in the non-excited state, is governed greatly by the mounting direction of the relay.

Terminal hole diameters, land diameters, and land shapes (DC circuit)

● Terminal hole diameter and land diameter

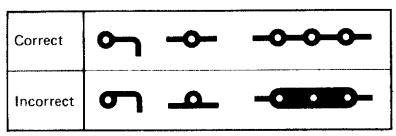
Select the appropriate terminal hole diameter and land diameter from the following table based on the PC board mounting hole drawing. Land diameters may be reduced to less than those listed below if thru-hole connection process is to be employed.

Terminal hole diameters and land diameters

Terminal hole diameter (mm)		Minimum land diameter (mm)
Nominal value	Tolerance	
0.6	±0.1	1.5
0.8		1.8
1.0		2.0
1.2		2.5
1.3		2.5
1.5		3.0
1.6		3.0
2.0		3.0

● Shape of land

(1) The land section should be on the center line of the copper-foil pattern so that the soldered fillets become uniform.



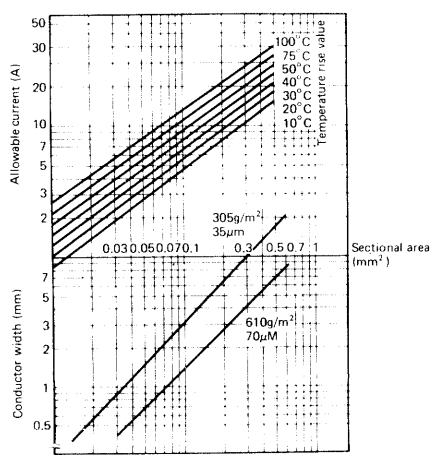
(2) If the relay and other circuit components are to be soldered manually after the automatic soldering of the PC board, a terminal hole can be secured by providing a break in the land.

Conductor width and microstrip

● Patterns for DC circuits

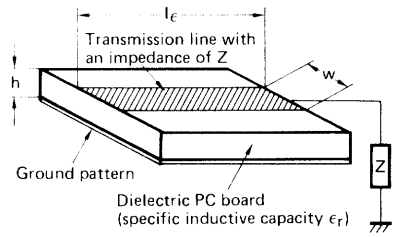
The following thicknesses of copper foil are standard: 35μm and 70μm. The conductor width is determined by the carry current and allowable temperature rise. Refer to the table below.

Conductor width and carry current (according to IEC Pub321)



● MICROSTRIPS

For high-frequency transmission circuits, the use of microstrips is recommended. By adopting this stripline method, a low-loss transmission circuit can be configured. The microstrips are prepared by etching a PC board made of dielectric material and covered on both sides with copper foil. As shown in the figure below, the microstrip utilizes the concentration of the electric field between transmission line and the ground.



The characteristic impedance of a transmission line is determined by the type of PC board (specific inductive capacity), its thickness, and the width of the transmission line. This impedance is expressed by the following formula.

$$Z = {}^{377}/_{(\frac{W}{h})} \cdot \sqrt{\epsilon_r} \cdot [1+(1.735\epsilon_r^{-0.0724})(\frac{W}{h})^{-0.836}]$$

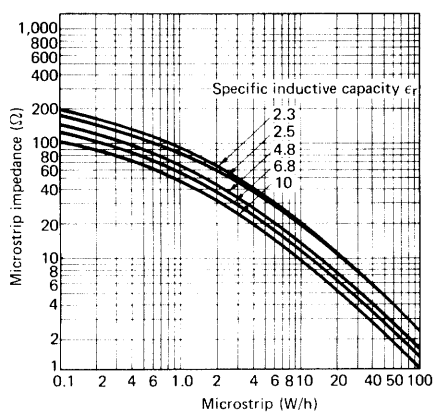
where

W: Width of transmission line

ϵ_r: Specific inductive capacity

h: Thickness of dielectric PC board, provided that the thickness of copper foil is not greater than h.

This relationship is shown in the figure below.

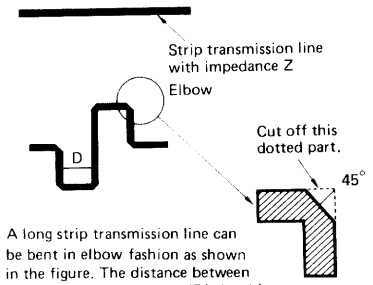


For example, when a 50Ω transmission line is to be formed using a 1.6mm glass epoxy type double-sided PC board, the width of the transmission line can be obtained in the following manner. Since the specific inductive capacity (ϵ_r) of this circuit board is 4.8, w/h = 1.7. (obtained from the above table). Based on the thickness of the PC board (i.e., 1.6mm), the thickness of transmission line W can be calculated as follows.

W = h x 1.7 = 1.6 x 1.7 ≒ 2.7mm

Note that in this calculation, the thickness of copper foil "t" is ignored, so there may be a greater error in characteristic impedance of t ≒ W. Also, the attenuation constant of the transmission line, due to the effective filling rate of microstrip or dielectric loss and conductor loss, is not taken into account, but these factors must be considered in the actual design of microstrips. In the frequency band for which Model G4Y is intended, however, these factors may be ignored by shortening the length of the transmission line.

- **Bending of strip transmission line**



A long strip transmission line can be bent in elbow fashion as shown in the figure. The distance between the bends of the strip line (D) should be almost double the width of the strip line.

The separation between the strip line and each ground pattern should be approximately the same as the strip line width.

- Conductive patterns should be designed to be as short as possible. Meandering of the strip transmission line will adversely affect the high-frequency characteristics of the relay.
- Each ground pattern should be designed to be as wide as possible so as not to generate a potential difference between ground patterns.
- Avoid directing of conductive lines in the area of the PC board on which the relay bottoms, as this can result in short-circuiting.

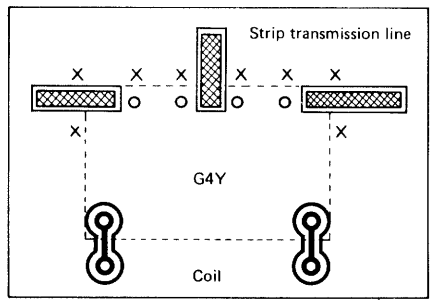
- **Examples of packaging design**

Since these examples are presented with an eye to low cost packaging, expensive packaging methods, such as thru-hole connection, are not described. For this reason, the characteristics of each circuit board should be checked thoroughly before putting it to practical use.

1. The method of packaging using paper epoxy type double-sided PC board

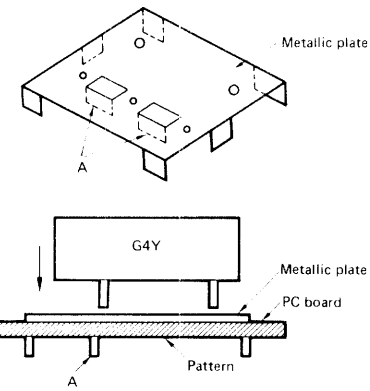
The dielectric constant of a paper epoxy type double-sided PC board is considered to be approximately the same as that of a glass epoxy type PC board (ϵ_r = 4.8). The width of a strip transmission line is as follows:

Thickness of PC board	Impedance	Width of strip line
1.6mm	50Ω	2.7mm
1.6mm	75Ω	1.3mm
1.0mm	50Ω	1.7mm
1.0mm	75Ω	0.8mm



The figure above shows the conductive pattern side. The microstrip connected to the contact terminal must be of the above-mentioned pattern width. Ensure that the distance between microstrip and each ground pattern is approximately the same as the width of the microstrip. Connect with jumpers between the top and bottom of the pattern at the points marked "X" in the figure. The greater the number of jumper points, the better the high-frequency characteristics. In this manner, an isolation of 70 to 80dB at 500MHz or 50dB at 900MHz can be obtained. In this case, the components mounting side of the PC board is entirely the ground pattern. Remove the pattern around each of the contact terminals and coil terminal in size 3.0x3.0mm.

2. The method of packaging using a single-sided PC board



When a relay is mounted on a single-sided PC board, an isolation of only 60 to 70dB can be obtained at 200MHz. Therefore, to permit the relay on the single-sided PC board in a higher frequency range, a metallic plate can be inserted between the PC board and the relay, then connected to the ground pattern.

As seen in the figure above, a metallic plate is sandwiched between the relay and the PC board to connect to the pattern. The key is that the ground terminal of the Type G4Y-152P relay, the bent tabs A of the metallic plate, and the ground pattern must be soldered together at one time.

This combination of a low-cost, single-sided PC board and a low-cost, metallic plate, provides the same high-frequency characteristics as when the relay is mounted on a double-sided PC board. By grounding the ground terminal of the Type G4Y-152P relay and the metallic plate at the same place, excellent high-frequency characteristics can be obtained.

In this method, the metallic plate must adhere firmly to the PC board. The design of strip transmission lines should be the same as when a double-sided PC board is employed.

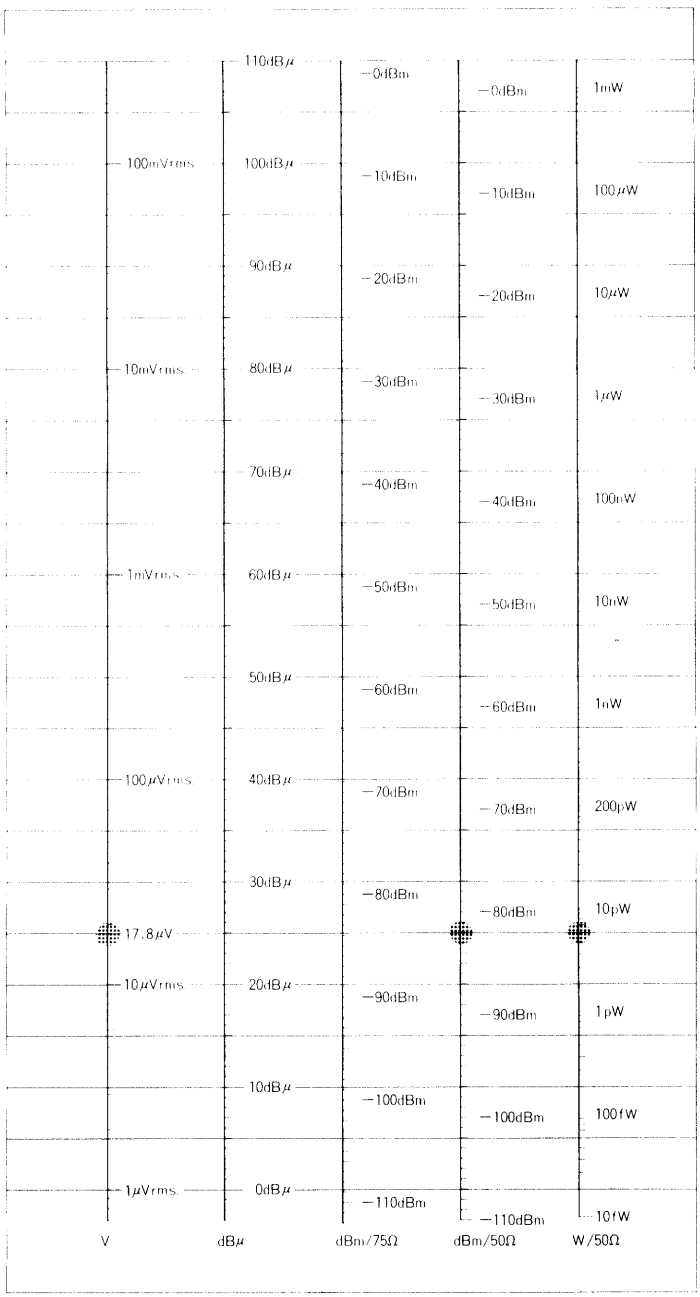
CAUTION:
A key point in mounting the relay on a single-sided PC board is to ensure that the relay base is not floating above the PC board or metallic plate, but bottoms firmly upon them.

• RETURN LOSS VS. VSWR CONVERSION TABLE (Also used to calculate VSWR from a return loss obtained.)

	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	VSWR (to two decimal places)
1.0		46.064	40.086	36.607	34.151	32.256	30.714	29.417	28.299	27.318	
1.1	26.444	25.658	24.943	24.289	23.686	23.127	22.607	22.120	21.664	21.234	
1.2	20.828	20.443	20.079	19.732	19.401	19.085	18.783	18.493	18.216	17.949	
1.3	17.692	17.445	17.207	16.977	16.755	16.540	16.332	16.131	15.936	15.747	
1.4	15.563	15.385	15.211	15.043	14.879	14.719	14.564	14.412	14.264	14.120	
1.5	13.979	13.842	13.708	13.577	13.449	13.324	13.201	13.081	12.964	12.849	
1.6	12.736	12.626	12.518	12.412	12.308	12.207	12.107	12.009	11.913	11.818	
1.7	11.725	11.634	11.545	11.457	11.370	11.285	11.202	11.120	11.039	10.960	
1.8	10.881	10.804	10.729	10.654	10.581	10.509	10.437	10.367	10.298	10.230	
1.9	10.163	10.097	10.032	9.968	9.904	9.842	9.780	9.720	9.660	9.601	
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	VSWR (to one decimal place)
2.0	9.542	8.999	8.519	8.091	7.707	7.360	7.044	6.755	6.490	6.246	
3.0	6.021	5.811	5.617	5.435	5.265	5.105	4.956	4.815	4.682	4.556	
4.0	4.437	4.324	4.217	4.115	4.018	3.926	3.838	3.753	3.673	3.596	
5.0	3.522	3.451	3.383	3.317	3.255	3.194	3.136	3.080	3.025	2.973	
6.0	2.923	2.874	2.827	2.781	2.737	2.694	2.653	2.612	2.573	2.535	
7.0	2.499	2.463	2.428	2.395	2.362	2.330	2.299	2.269	2.239	2.211	
8.0	2.183	2.156	2.129	2.103	2.078	2.053	2.029	2.006	1.983	1.960	
9.0	1.938	1.917	1.896	1.875	1.855	1.835	1.816	1.797	1.779	1.761	
10.0	1.743	1.726	1.709	1.692	1.676	1.659	1.644	1.628	1.613	1.598	
11.0	1.584	1.569	1.555	1.541	1.528	1.514	1.501	1.488	1.476	1.463	
12.0	1.451	1.439	1.427	1.415	1.404	1.393	1.382	1.371	1.360	1.349	
13.0	1.339	1.329	1.319	1.309	1.299	1.289	1.280	1.270	1.261	1.252	
14.0	1.243	1.234	1.225	1.217	1.208	1.200	1.192	1.184	1.176	1.168	
15.0	1.160	1.152	1.145	1.137	1.130	1.122	1.115	1.108	1.101	1.094	
16.0	1.087	1.080	1.074	1.067	1.061	1.054	1.048	1.041	1.035	1.029	
17.0	1.023	1.017	1.011	1.005	0.999	0.994	0.988	0.983	0.977	0.972	
18.0	0.966	0.961	0.955	0.950	0.945	0.940	0.935	0.930	0.925	0.920	
19.0	0.915	0.910	0.906	0.901	0.896	0.892	0.887	0.883	0.878	0.874	
20.0	0.869	0.865	0.861	0.856	0.852	0.848	0.844	0.840	0.836	0.832	
VSWR (to one decimal place)											

Example: When the return loss is 12.0dB, VSWR is 1.67 from the table above.

• CONVERSION TABLE 1



Example
17.8μV = 25dBμ
= −82dBm/50Ω
= 6.3pW/50Ω

0dBμ = 1μVrms.
0dBmV = 1mVrms.
0dBV = 1Vrms
0dBm/50Ω = 1mW

• CONVERSION TABLE 2

dB	Power ratio	Voltage ratio, current ratio
0	1.000	1.000
−0.1	0.977	0.982
−0.2	0.955	0.977
−0.3	0.933	0.966
−0.4	0.912	0.955
−0.5	0.891	0.944
−0.6	0.871	0.933
−0.7	0.851	0.923
−0.8	0.832	0.912
−0.9	0.813	0.902
−1	0.794	0.891
−2	0.631	0.794
−3	0.501	0.708
−4	0.398	0.631
−5	0.316	0.562
−6	0.251	0.501
−7	0.200	0.447
−8	0.158	0.398
−9	0.126	0.355
−10	0.100	0.312
−20	0.010	0.100
−30	1×10^{-3}	0.032
−40	1×10^{-4}	0.010
−50	1×10^{-5}	3.2×10^{-3}
−60	1×10^{-6}	1×10^{-3}
−70	1×10^{-7}	3.2×10^{-4}
−80	1×10^{-8}	1×10^{-4}
−90	1×10^{-9}	3.2×10^{-5}
−100	1×10^{-10}	1×10^{-5}

NOTE: ALL DIMENSIONS SHOWN IN THIS CATALOG ARE IN UNITS OF MILLIMETERS.
To convert millimeters into inches multiply by 0.03937. To convert grams into ounces multiply by 0.03527.

In addition to the products featured in this catalog, OMRON offers a broad line of other quality control components and devices. Below are general listings of other OMRON product lines. Let OMRON satisfy your design and production requirements.

- **SWITCHES** (Cat. No. X10-E1)
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  - Miniature basic switch
  - Subminiature basic switch
  - Low-torque basic switch
  - Special-purpose basic switch
  - General-purpose limit switch
  - Enclosed switch
  - Multiple limit switch
  - Pushbutton switch
- **TIMERS** (Cat. No. X12-E1)
  - Motor timer
  - Solid-state timer
  - Digital timer
  - Pneumatic timer
  - Time switch
- **COUNTERS** (Cat. No. X13-E1)
  - Solid-state counter
  - Electromagnetic counter
- **PROXIMITY SWITCHES** (Cat. No. X14-E1)
  - High-frequency oscillation type proximity switch
  - Electrostatic capacitance type proximity switch
- **PHOTOELECTRIC SWITCHES** (Cat. No. X15-E1)
  - Amplifier self-contained type photoelectric switch
  - Power supply self-containing type photoelectric switch
  - Amplifier separated type photoelectric switch
- **LEVEL SWITCHES** (Cat. No. X16-E1)
  - Electrostatic capacitance type level switch
  - Floatless level switch
- **TEMPERATURE CONTROLLERS** (Cat. No. X17-E1)
  - Temperature controller
  - Temperature sensor
- **SOLID-STATE RELAYS** (Cat. No. X30-E1)
- **THUMBWHEEL SWITCHES** (Cat. No. X31-E1)
- **LIGHTED PUSHBUTTON SWITCHES** (Cat. No. X32-E1)
- **PC BOARD-USE RELAYS** (Cat. No. X33-E1)
- **PHOTO MICROSENSORS** (Cat. No. X36-E1)

All the catalogs shown above may not be readily obtainable in some areas.

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NOTE: Specifications subject to change without notice.

Authorized distributor:

This catalog supersedes catalog X11-E1-4, dated July '82.

Printed in Japan
1084-2M

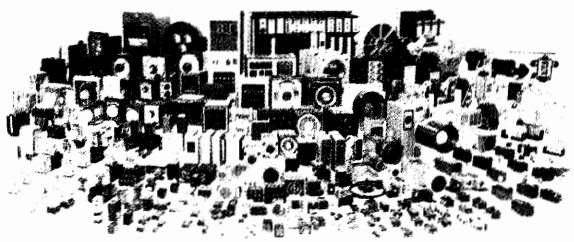
PROMOTING CYBERNATION THROUGHOUT THE WORLD

"TO THE MACHINE, THE WORK OF THE MACHINE; TO MAN, THE THRILL OF FURTHER CREATION"

OMRON has been firmly established as one of the leading manufacturers of electronic control components since 1955. In the latter part of the 1970's, OMRON developed a category of technology that promotes cybernation.
Cybernation refers to the use of systematized electronic control equipment together with computer-aided information control functions. Employing this revolutionary technology, OMRON has been able to introduce new products and systems in advance of others in the field. Today, the market has expanded to include manufacturing industries and continues to grow.
The change to cybernation is in full swing. By making efficient use of advanced engineering and electronics to perform and control routine, repetitive tasks. People, meanwhile, benefit from the freedom to pursue more rewarding tasks. OMRON is proud of its contributions to the general upgrading of work and employment, and takes pleasure in its continuing development of technology in the service of man.

Head office Kyoto, Japan

ELECTRONIC CONTROL COMPONENTS PLAYING A VITAL ROLE IN AUTOMATING EQUIPMENT



Control components for many applications

OMRON is the world's top brand of electronic control components for automation, and production of these control components constitutes the nucleus of OMRON's wide-ranging activities in diverse fields.
OMRON produces over 100,000 kinds of control components, and these components are incorporated in virtually all types of devices, instruments, machinery and equipment, running the gamut from household to industrial use.
Household electrical appliances such as televisions, radios and tape recorders often employ OMRON control components, as do copying machines and other office equipment, various measuring instruments and a wide range of computers and peripheral equipment. OMRON control components are also incorporated in such industrial machinery as machine tools, where they improve automation and labor-saving systems.

QUALITY THROUGH TOTAL PRODUCTION CONTROL

The key to our manufacturing success can be expressed in one word — quality. OMRON has the unique capability to control quality in every phase of production. Hundreds of quality control checks are built into OMRON production lines by a staff of professionally qualified quality control and reliability engineers. It starts with the careful procurement of the highest quality raw materials. Production line operations are continually monitored to assure work-in-process excellence.
In addition to the systematic on-line controls, every OMRON product is subject to a 100 percent final inspection. This final inspection means that every OMRON product from the smallest basic switch to the most sophisticated control system, leaves the plant in perfect working order. This dedication to quality is a major reason for OMRON's international acceptance, success and growth.

QC engineers exercising rigid quality control

OMRON RELAYS PLAY AN ACTIVE ROLE IN ALL MACHINERY AND EQUIPMENT

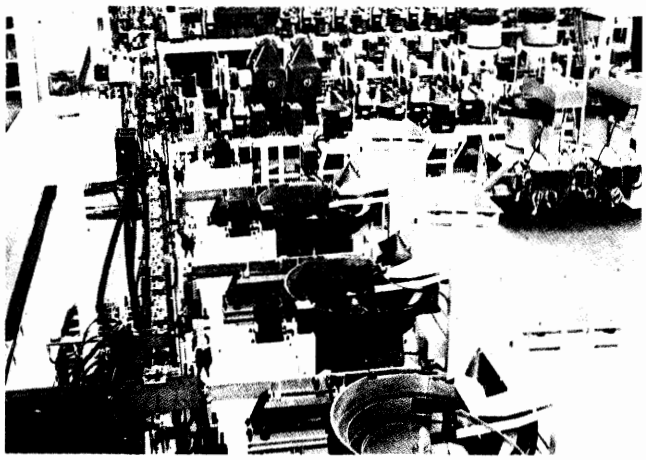
Industrial uses for relays have been increasingly expanded to the extent that a variety of general industrial and service machinery incorporating relays is available, including production equipment, machine tools, automatic vending machines and duplicating machines. In addition to widespread use in industrial machinery, they also are employed in non-industrial equipment or devices such as household electrical appliances, audio equipment, electronic games, and so on.

All types of electronic equipment are becoming increasingly sophisticated, requiring more and more diversification of relays for increasingly specialized uses. As this sophistication has grown it has become vitally important that relay designs meet the needs of equipment manufacturers. For example, relays are used extensively in PC boards in combination with various semiconductors.

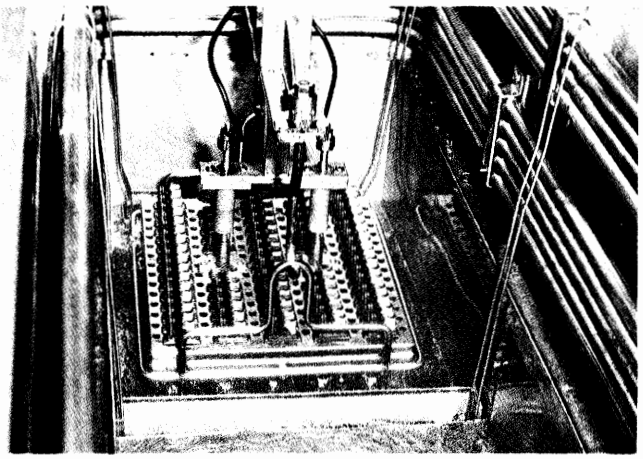
It is expected that future demand for relays will become even more diversified. The relay industry faces a number of challenges. For instance, development of electrical relays will be accelerated at the same time that energy-conserving relays become even more essential. Low power consumption, high-speed operation, and high reliability all will become qualities required in relays. Latching-type relays will be increasingly used. Still more miniaturization will occur so that relays can meet the requirements of automated production for mounting, soldering, cleaning, and other operations on PC boards.

We, at OMRON, are meeting that challenge. Our engineers have been busy developing a large assortment of relays to satisfy those market needs. Our efforts have been met by a strong, favorable response from customers all over the world.

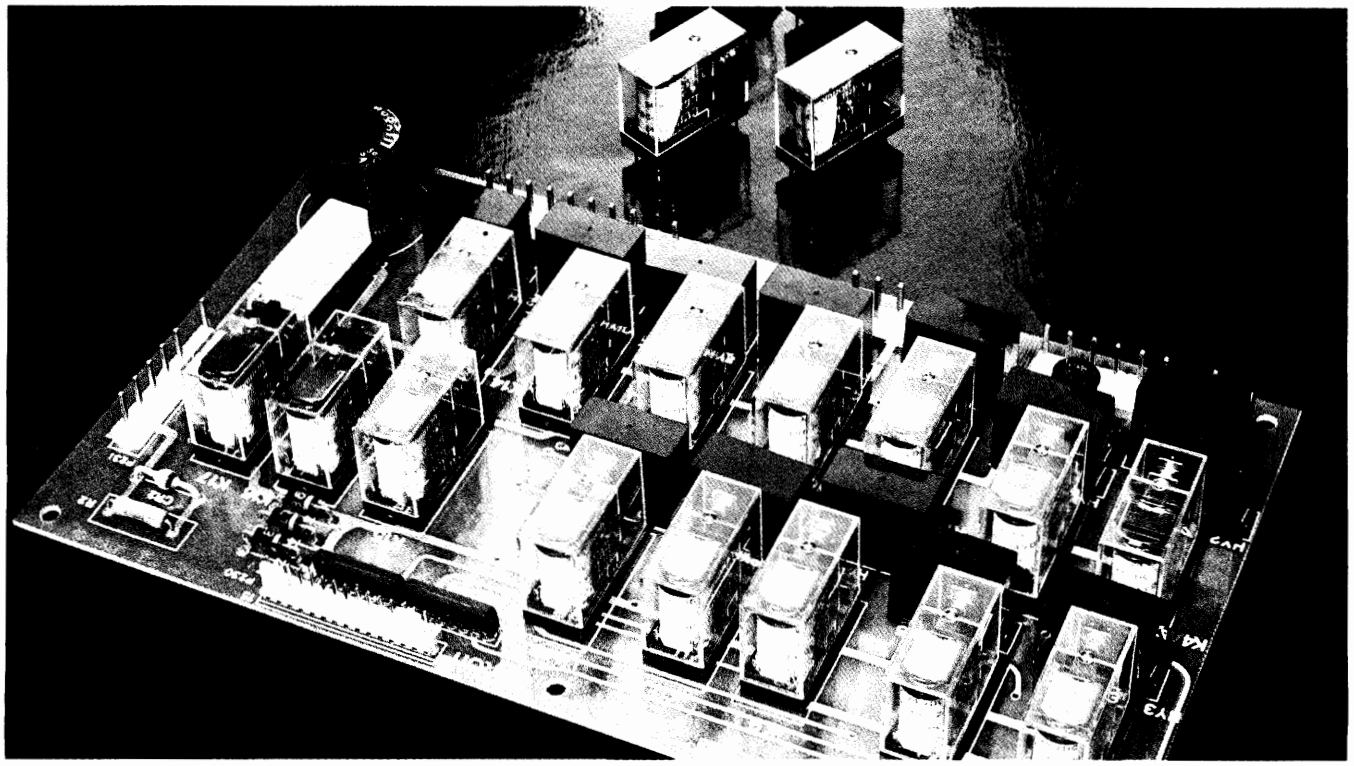
This publication describes the world's most advanced and diversified line of relays developed by OMRON using the world's most sophisticated technology. In its pages, you will find almost every kind of high performance, highly reliable relay available. We are convinced OMRON's product line has virtually every type of relay you will ever need.



Production line



Cleaning process



Application in printed circuit boards

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Since all the models listed may not normally be marketed in your area, please contact OMRON's distributor or sales representative for detailed information.