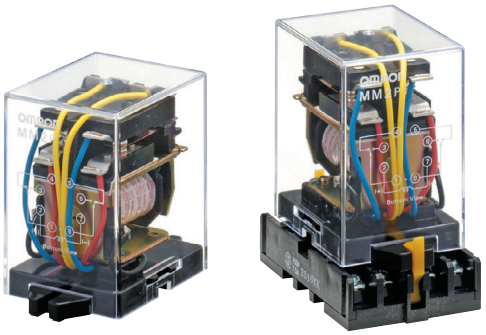
# Power Relay
# MM

CSM_MM_DS_E_2_1

## Stable Contact Reliability and Long Life

- Easy to mount, wire, and use.
- A large selection of models including various contact forms, DC-switching models, and open models.
- Mechanical life: 5,000,000 operations; electrical life (under rated load): 500,000 operations.
- Models also available with built-in diodes and for use as auxiliary power relays.



⚠ Refer to *Safety Precautions for All Relays*.

# Ordering Information

| Type | Contact form | Open structure | | Cased |
|---|---|---|---|---|
| | | Solder terminals | Screw terminals | Plug-in (octal pins) terminals |
| **Standard** | DPDT | MM2 | MM2B | MM2P |
| | 3PDT | MM3 | MM3B | MM3P |
| | 4PDT | MM4 | MM4B | MM4P |
| **DC-switching** | DPDT | MM2X | MM2XB | MM2XP |
| | 3PDT | MM3X | MM3XB | MM3XP |
| | 4PDT | MM4X | MM4XB | MM4XP |
| **With built-in diode** | DPDT | --- | --- | MM2P-D |
| | 4PDT | --- | --- | MM4P-D |
| **DC-switching with built-in diode** | DPDT | --- | --- | MM2XP-D |
| | 4PDT | --- | --- | MM4XP-D |
| **With operation indicator** | DPDT | --- | --- | MM2PN |
| | 3PDT | --- | --- | MM3PN |
| | 4PDT | --- | --- | MM4PN |
| **DC-switching with operation indicator** | DPDT | --- | --- | MM2XPN |
| | 3PDT | --- | --- | MM3XPN |
| | 4PDT | --- | --- | MM4XPN |
| **Conforming to auxiliary power relay specifications** | 4PDT | --- | --- | MM4P-JD |
| | | --- | --- | MM4XP-JD |

# ■ Available Models

## Open Coils (with Solder Terminals)

| Type | Contact form | Relay model | Available rated voltage |
|---|---|---|---|
| Standard | DP | MM2 | 6, 12, 24, 50, 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 100/110, 200/220 VDC |
| | 3P | MM3 | 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 200/220 VDC |
| | 4P | MM4 | 24, 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 100/110, 200/220 VDC |
| DC-switching | DP | MM2X | 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 100/110, 200/220 VDC |
| | 3P | MM3X | 100/(110), 200/(220) VAC<br>12, 24, 100/110 VDC |
| | 4P | MM4X | 100/(110), 200/(220) VAC<br>12, 24, 48, 100/110 VDC |

## Open Coils (with Screw Terminals)

| Type | Contact form | Relay model | Available rated voltage |
|---|---|---|---|
| Standard | DP | MM2B | 6, 12, 24, 50, 100/(110), 200/(220) VAC<br>12, 24, 48, 100/110, 125, 200/220 VDC |
| | 3P | MM3B | 6, 100/(110), 200/(220) VAC<br>12, 24, 100/110 VDC |
| | 4P | MM4B | 6, 100/(110), 200/(220) VAC<br>12, 24, 48, 100/110 VDC |
| DC-switching | DP | MM2XB | 24, 100/(110), 200/(220) VAC<br>12, 24, 48, 100/110, 125, 200/220 VDC |
| | 3P | MM3XB | 100/(110), 200/(220) VAC<br>12, 24, 48, 100/110, 125, 200/220 VDC |
| | 4P | MM4XB | 12, 24, 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 100/110, 200/220 VDC |

## Cased Coils (Plug-in Terminals)

| Type | Contact form | Relay model | Available rated voltage |
|---|---|---|---|
| Standard | DP | MM2P | 6, 12, 24, 50, 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 100/110, 125, 200/220 VDC |
| | 3P | MM3P | 6, 24, 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 100/110, 125, 200/220 VDC |
| | 4P | MM4P | 6, 24, 50, 100/(110), 200/(220) VAC<br>12, 24, 48, 100/110, 125, 200/220 VDC |
| DC-switching | DP | MM2XP | 6, 24, 100/(110), 125, 200/(220) VAC<br>6, 12, 24, 48, 100/110, 125, 200/220 VDC |
| | 3P | MM3XP | 24, 50, 100/(110), 200/(220) VAC<br>12, 24, 48, 100/110, 125, 200/220 VDC |
| | 4P | MM4XP | 12, 24, 50, 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 100/110, 125, 200/220 VDC |
| With built-in diode | DP | MM2P-D<br>MM4P-D | 12, 24, 48, 100/110, 200/220 VDC<br>12, 24, 48, 100/110, 125, 200/220 VDC |
| DC-switching with built-in diode | DP | MM2XP-D<br>MM4XP-D | 12, 24, 48, 100/110, 125, 200/220 VDC<br>12, 24, 48, 100/110, 125, 200/220 VDC |
| With operation indicator | DP | MM2PN | 6, 24, 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 100/110, 125, 200/220 VDC |
| | 3P | MM3PN | 100/(110), 200/(220) VAC<br>6, 12, 24, 48, 100/110, 200/220 VDC |
| | 4P | MM4PN | 24, 100/(110), 200/(220) VAC<br>24, 48, 100/110, 125, 200/220 VDC |
| DC-switching with operation indicator | DP | MM2XPN | 100/(110), 200/(220) VAC<br>12, 24, 48, 100/110, 125, 200/220 VDC |
| | 3P | MM3XPN | 100/(110), 200/(220) VAC<br>24, 48, 100/110, 200/220 VDC |
| | 4P | MM4XPN | 100/(110), 200/(220) VAC<br>12, 24, 48, 100/110, 125, 200/220 VDC |
| Conforming to auxiliary power relay specifications | 4P | MM4P-JD | 100/(110), 110, 115, 200/(220), 220 VAC<br>24, 100/110, 125, 200/220 VDC |
| Conforming to auxiliary power relay specifications for DC-switching | 4P | MM4XP-JD | 100/(110), 110, 115, 200/(220) VAC<br>24, 48, 100/110, 125, 200/220 VDC |

## Models Conforming to Auxiliary Power Relay Specifications

The MM4P-JD and MM4XP-JD satisfy the ratings of auxiliary relays provided in JEC-2500 (1987) standards for power protective relays specified by the Japan Electromechanical Commission. Furthermore, the MM4P-JD and MM4XP-JD satisfy the ratings of multi-contact relays provided in JEC-174D (1979) standards for power auxiliary relays.

These models work at operation level B specified by JEC-174D (1979) standards and the hot start of the relays is possible after the coils radiate heat.

In accordance with JEC-2500 (1987) standards, the coil of each model withstands a 130% DC load or 115% AC load.

**Note:** 1. When ordering, add the rated coil voltage to the model number. Rated coil voltages are given in the coil ratings table.
Example: MM2, 6 VAC
└── Rated coil voltage

2. Latching Relays based on the MM Series are also available. Refer to the MMK.

3. Models with built-in varistors (AC operation) are also available in addition to those with built-in diodes. Ask your OMRON representative for details.

## Model Number Legend

MM□□□□-□
1 2 3 4 5

1. **Contact Form**
   - 2: DPDT
   - 3: 3PDT
   - 4: 4PDT
2. **Type (See Note.)**
   - None: Standard
   - X: DC-switching
3. **Terminal Shape**
   - None: Solder
   - B: Screw
   - P: Plug-in
4. **Operation Indicator**
   - None: Not provided
   - N: Provided
5. **Built-in Diode**
   - None: Not provided
   - D: Provided

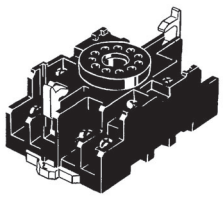
**Note:** The suffix "JD" indicates models conforming to auxiliary power relay specifications.

# ■ Accessories (Order Separately)

## Mounting Brackets

| | |
|---|---|
| **Mounting Bracket (S bracket)** | R99-03MM |

## Sockets

| Relay model | DIN Track/Front-connecting Socket (screw terminals) | Back-connecting Socket (solder terminals) |
|---|---|---|
| **MM2(X)P(-D)** | 8PFA | PL08 |
| **MM3P** | 11PFA  | PL11 |
| **MM3XP, MM4(X)P(-D)** | 14PFA | PL15 |
| **MM4(X)P-JD** | 14PFA | --- |

# Specifications

## ■ Coil Ratings

### Open Coils (with Solder or Screw Terminals)

| Rated voltage (V) | | Rated current (mA) | | | | Coil resistance (Ω) | | Must-operate voltage | Must-release voltage | Max. voltage | Power consumption (VA or W) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DP | | 3P or 4P | | DP | 3P or 4P | | | | | |
| | | 50 Hz | 60 Hz | 50 Hz | 60 Hz | | | % of rated voltage | | | Initial | Rated |
| AC | 6 | 790 | 655 | 1,120 | 950 | 1.1 | 0.5 | 80% max. | 30% min. (60 Hz) 25% min. (50 Hz) | 110% | Approx. 4.1 (DP) Approx. 6.3 (3P or 4P) | Approx. 3.5 (DP) Approx. 5.1 (3P or 4P) |
| | 12 | 395 | 325 | 560 | 480 | 4.7 | 2.0 | | | | | |
| | 24 | 195 | 160 | 280 | 240 | 19 | 8.5 | | | | | |
| | 50 | 94 | 78 | 134 | 114 | 82 | 36 | | | | | |
| | 100/(110) | 47 | 39/45 | 67 | 57/66 | 340 | 150 | | | | | |
| | 200/(220) | 23.5 | 19.5/ 22.5 | 33.5 | 28.5/33 | 1,540 | 620 | | | | | |
| DC | 6 | 340 | | 450 | | 17.5 | 13.4 | 70% max. | 10% min. | | Approx. 2.1 (DP) Approx. 2.7 (3P or 4P) | |
| | 12 | 176 | | 220 | | 68 | 54 | | | | | |
| | 24 | 87 | | 94 | | 275 | 255 | | | | | |
| | 48 | 41 | | 52 | | 1,180 | 930 | | | | | |
| | 100/110 | 17/19 | | 22/24.5 | | 5,750 | 4,500 | | | | | |
| | 200/220 | 8.6/9.5 | | 11/12 | | 23,200 | 18,000 | | | | | |

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

**2.** The AC coil resistance values are reference values.

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

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

### Cased Coils (Plug-in Terminals)

The rated current may vary if the Relay has a built-in operating indicator (See note 4.).

| Rated voltage (V) | | Rated current (mA) | | | | Coil resistance (Ω) | | Coil inductance (H) | | | | Must-operate voltage | Must-release voltage | Max. voltage | Power consumption (VA or W) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DP | | 3P or 4P | | DP | 3P or 4P | DP | | 3P or 4P | | | | | | |
| | | 50 Hz | 60 Hz | 50 Hz | 60 Hz | | | Contact release | Contact operate | Contact release | Contact operate | % of rated voltage | | | Initial | Rated |
| AC | 6 | 690 | 590 | 975 | 850 | 1.1 | 0.5 | 0.02 | 0.02 | 0.01 | 0.03 | 80% max. | 30% min. (60 Hz) 25% min. (50 Hz) | 110% | Approx. 4.1 (DP) Approx. 6.3 (3P or 4P) | Approx. 3.5 (DP) Approx. 5.1 (3P or 4P) |
| | 12 | 345 | 295 | 490 | 430 | 4.7 | 2.0 | 0.07 | 0.01 | 0.04 | 0.07 | | | | | |
| | 24 | 170 | 145 | 245 | 210 | 19 | 8.5 | 0.28 | 0.41 | 0.18 | 0.28 | | | | | |
| | 50 | 82 | 70 | 117 | 102 | 82 | 36 | 1.2 | 1.7 | 0.75 | 1.2 | | | | | |
| | 100/(110) | 41 | 35/40 | 58.5 | 51/58 | 340 | 150 | 4.8 | 6.7 | 3 | 4.5 | | | | | |
| | 200/(220) | 20.5 | 17.5/ 20 | 29 | 25.5/ 29 | 1,540 | 620 | 20 | 25.6 | 12 | 19 | | | | | |
| DC | 6 | 340 | | 450 | | 17.5 | 13.4 | 0.2 | 0.36 | 0.23 | 0.35 | 70% max. | 10% min. | | Approx. 2.1 (DP) Approx. 2.7 (3P or 4P) | |
| | 12 | 176 | | 220 | | 68 | 54 | 0.74 | 1.0 | 0.87 | 1.4 | | | | | |
| | 24 | 87 | | 94 | | 275 | 255 | 4.2 | 5.8 | 5.6 | 9.2 | | | | | |
| | 48 | 41 | | 52 | | 1,180 | 930 | 20.4 | 26 | 27.3 | 45.5 | | | | | |
| | 100/110 | 17/19 | | 22/24.5 | | 5,750 | 4,500 | 81.6 | 92.5 | 61.4 | 96.5 | | | | | |
| | 200/220 | 8.6/9.5 | | 11/12 | | 23,200 | 18,000 | 340 | 380 | 158 | 250 | | | | | |

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

**2.** The AC coil resistance and coil inductance values are for reference only.

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

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

**5.** The rated current of a model with a built-in LED indicator at 6, 12, 24, or 50 VAC or 6, 12, 24, or 48 VDC increases by approx. 10 mA due to the current consumption of the LED. The rated current of a model with a built-in neon lamp indicator at 100/(110) or 200/(220) VAC or 100/110 or 200/220 VDC increases by approx. 0.2 mA due to the current consumption of the neon lamp.

## Coils (Conforming to Auxiliary Power Relay Specifications)

| Rated voltage (V) | | Rated current (mA) | | Coil resistance (Ω) | Coil inductance (H) | | Must-operate voltage | Must-release voltage | Max. voltage | Operation level (JEC-174D) | Power consumption (VA or W) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 50 Hz | 60 Hz | | Contact release | Contact operate | % of rated voltage | | | | Initial | Rated |
| AC | 24 | 245 | 210 | 8.5 | 0.18 | 0.28 | 80% max. | 30% min. (60 Hz) 25% min. (50 Hz) | 110% | B Hot start after coil heated | Approx. 6.3 | Approx. 5.1 |
| | 50 | 117 | 102 | 36 | 0.75 | 1.2 | | | | | | |
| | 100/(110) | 58.5 | 51/58 | 150 | 3 | 4.5 | | | | | | |
| | 110 | 53 | 46 | 182 | 3.6 | 5.5 | | | | | | |
| | 115 | 51 | 44 | 210 | 4 | 6.2 | | | | | | |
| | 200/(220) | 29 | 25.5/29 | 620 | 12 | 19 | | | | | | |
| | 220 | 26.5 | 23 | 780 | 15 | 21 | | | | | | |
| DC | 24 | 94 | | 255 | 5.6 | 9.2 | 70% max. | 10% min. | | | Approx. 2.7 | |
| | 48 | 52 | | 930 | 27.3 | 45.5 | | | | | | |
| | 100/110 | 22/24.5 | | 4,500 | 61.4 | 96.5 | | | | | | |
| | 125 | 22 | | 5,800 | 90 | 130 | | | | | | |
| | 200/220 | 11/12 | | 18,000 | 158 | 250 | | | | | | |

**Note: 1.** The rated current and coil resistance are measured at a coil temperature of 23°C with tolerances of +15%/–20% for AC rated current and ±15% for DC coil resistance.
**2.** The AC coil resistance and coil inductance values are for reference only.
**3.** Performance characteristic data are measured at a coil temperature of 23°C.
**4.** The maximum voltage is one that is applicable instantaneously to the Relay coil at 23°C and not continuously.

# ■ Contact Ratings

## Standard Relays

| Item | Open Relays | | Cased Relays | |
|---|---|---|---|---|
| | MM2(B), MM3(B), MM4(B) | | MM2P(N, -D), MM3P(N), MM4P(N, -D) | |
| | Resistive load (cosϕ = 1) | Inductive load (cosϕ=0.4, L/R=7 ms) | Resistive load (cosϕ = 1) | Inductive load (cosϕ=0.4, L/R=7 ms) |
| **Contact type** | Single | | | |
| **Contact material** | Ag | | | |
| **Rated load** | 15 A at 220 VAC<br>10 A at 24 VDC | | 7.5 A at 220 VAC<br>5 A at 24 VDC | |
| **Rated carry current** | 15 A | | 7.5 A | |
| **Max. switching voltage** | 250 VAC, 250 VDC | | 250 VAC, 250 VDC | |
| **Max. switching current** | 15 A | | 7.5 A | |
| **Max. switching power (reference value)** | 3,300 VA at 240 W | | 1,700 VA at 120 W | |
| **Minimum permissible load (reference value) (See note.)** | 5 VDC 10 mA | | | |

**Note:** This value is measured at 60 operations/min.

## DC-switching Relays/Built-in Diode Relays

| Item | Open Relays | | Cased Relays | |
|---|---|---|---|---|
| | MM2X(B), MM3X(B), MM4X(B) | | MM2XP(-D), MM3XP, MM4XP(-D) | |
| | Resistive load (cosϕ = 1) | Inductive load (L/R=7 ms) | Resistive load (cosϕ = 1) | Inductive load (L/R=7 ms) |
| **Contact type** | Single | | | |
| **Contact material** | Ag | | | |
| **Rated load** | 10 A at 110 VDC | 7 A at 110 VDC | 7 A at 110 VDC | 6 A at 110 VDC |
| **Rated carry current** | 15 A | | 7.5 A | |
| **Max. switching voltage** | 250 VAC, 250 VDC | | 250 VAC, 250 VDC | |
| **Max. switching current** | 15 A | | 7.5 A | |
| **Max. switching power (reference value)** | 1,200 W at 20 VA | 800 W at 20 VA | 800 W at 20 VA | 660 W at 20 VA |
| **Minimum permissible load (reference value) (See note 3.)** | 5 VDC at 10 mA | | | |

**Note: 1.** When switching DC inductive loads at 125 V or more, an unstable region exists for a contact current of between 0.5 and 2.5 A. The Relay will not turn OFF in this region. Use a contact current of 0.5 A or less when switching 125 VDC or more.
**2.** If L/R exceeds 7 ms when switching DC inductive loads, an arc-breaking time of up to 50 ms must be considered in application and the circuit must be designed to ensure that an arc-breaking time of 50 ms is not exceeded.
**3.** This value is measured at 60 operations/min.

## Contacts (Conforming to Auxiliary Power Relay Specifications)

| Item | MM4P-JD | | MM4XP-JD | |
|---|---|---|---|---|
| | Resistive load | Inductive load (cosϕ = 0.4, L/R = 7 ms) | Resistive load | Inductive load (cosϕ = 0.4, L/R = 7 ms) |
| **Contact type** | Single | | | |
| **Contact material** | Ag | | | |
| **Rated load** | 5 A at 220 VAC, 5 A at 24 VDC | | 5 A at 110 VDC | |
| **Rated carry current** | 5 A | | | |
| **Max. switching voltage** | 250 VAC, 250 VDC | | | |
| **Max. switching current** | 5 A | | | |
| **Max. switching power (reference value)** | 1,100 VA, 120 W, 30 W (L/R = 40 ms) | | 20 VA, 550 W, 40 W (L/R = 40 ms) | |

**Note: 1.** A model for DC loads is not in stable operation when switching an inductive load within a operating current range between 0.5 and 2.5 A at a minimum of 125 VDC, where the load cannot be switched.

**2.** If L/R exceeds 7 ms when switching DC inductive loads, an arc-breaking time of up to 50 ms must be considered in application and the circuit must be designed to ensure that an arc-breaking time of 50 ms is not exceeded.

# ■ Characteristics

## Standard Relays

| Item | Open Relays | Cased Relays |
|---|---|---|
| **Contact resistance (See note 2.)** | 25 mΩ max. | 50 mΩ max. |
| **Operate time (See note 3.)** | AC: 25 ms max. DC: 50 ms max. | |
| **Release time (See note 3.)** | 30 ms max. (100 ms max. for Built-in Diode Relays) | |
| **Max. operating frequency** | Mechanical:7,200 operations/hr<br>Electrical:1,800 operations/hr (under rated load) | |
| **Insulation resistance (See note 4.)** | 100 MΩ min. (at 500 VDC) | |
| **Dielectric strength** | 1,500 VAC, 50/60 Hz for 1 min between contacts of same polarity<br>2,000 VAC, 50/60 Hz for 1 min between contacts of different polarity (and between coil and contacts) | |
| **Vibration resistance** | Destruction: 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude)<br>Malfunction: 10 to 50 to 10 Hz, 0.5 mm single amplitude (1.0 mm double amplitude) | |
| **Shock resistance** | Destruction: 1,000 $m/s^2$<br>Malfunction: 100 $m/s^2$ | |
| **Endurance** | Mechanical: 5,000,000 operations min. (at 7,200 operations/hr)<br>Electrical: 500,000 operations min. (at 1,800 operations/hr under rated load) (See note 5.) | |
| **Ambient temperature** | Operating:–10°C to 55°C (with no icing or condensation) | |
| **Ambient humidity** | Operating:5% to 85% | |
| **Weight** | Standard models: DC-switching models<br>MM2 approx. 160 g MM2X approx. 165 g MM2XP approx. 225 g<br>MM3 approx. 270 g MM3X approx. 275 g MM3XP approx. 395 g<br>MM4 approx. 300 g MM4X approx. 310 g MM4XP approx. 420 g<br>MM2P approx. 220 g<br>MM3P approx. 360 g<br>MM4P approx. 410 g | |

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

**2.** The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.

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

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

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

## Relays (Conforming to Auxiliary Power Relay Specifications)

| Item | Cased Relays |
|---|---|
| **Contact resistance (See note 2.)** | 50 mΩ max. |
| **Operate time (See note 3.)** | AC: 25 ms max., DC: 50 ms max. |
| **Release time (See note 3.)** | 30 ms max. |
| **Max. operating frequency** | Mechanical: 1,800 operations/hr<br>Electrical: 1,800 operations/hr (under rated load) |
| **Insulation resistance (See note 4.)** | 100 MΩ min. |
| **Dielectric strength** | Between coil and contact: 2,000 VAC, 50/60 Hz for 1 minute<br>Between contacts of different polarity: 2,000 VAC, 50/60 Hz for 1 minute<br>Between contacts of same polarity: 1,500 VAC, 50/60 Hz for 1 minute |
| **Vibration resistance** | Destruction: 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude)<br>Malfunction: 10 to 22 to 10 Hz, 0.5 mm single amplitude (1.0 mm double amplitude) |
| **Shock resistance** | Destruction: 300 $m/s^2$<br>Malfunction: 30 $m/s^2$ |
| **Endurance** | Mechanical: 5,000,000 operations min. (at 1,800 operations/hr)<br>Electrical: 500,000 operations min. (at 1,800 operations/hr with rated load) (see note 5) |
| **Error rate (level P) (Reference value) (See note 6.)** | 10 mA at 5 VDC |
| **Ambient temperature** | Operating: –10°C to 40°C (with no icing or condensation) |
| **Ambient humidity** | Operating: 5% to 85% |
| **Weight** | MM4P-JD: approx. 410 g<br>MM4XP-JD: approx. 420 g |

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

**2.** The contact resistance was measured with 1 A at 5 VDC using the voltage drop method.

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

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

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

**6.** This value was measured at a switching frequency of 60 operations per minute.

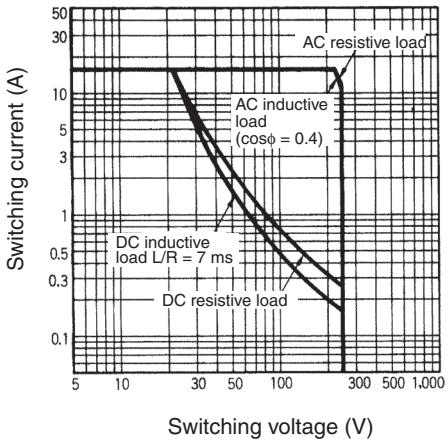
# Engineering Data

## ■ Standard Relays

### Maximum Switching Power

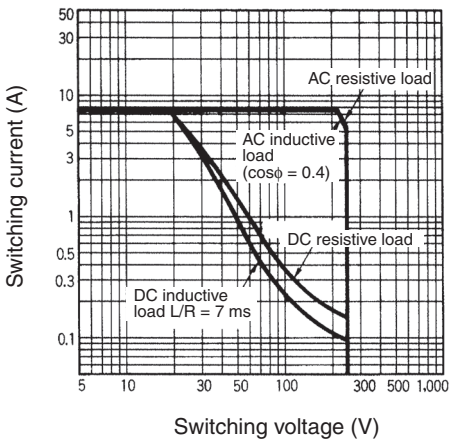
**Open Relays**

**MM□(B)**




**Cased Relays**

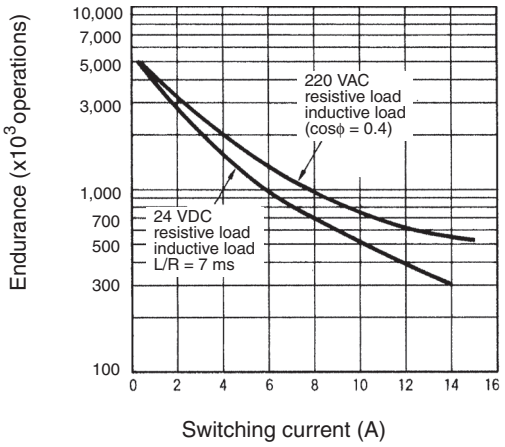
**MM□P(N, -D)**



## Endurance Curves

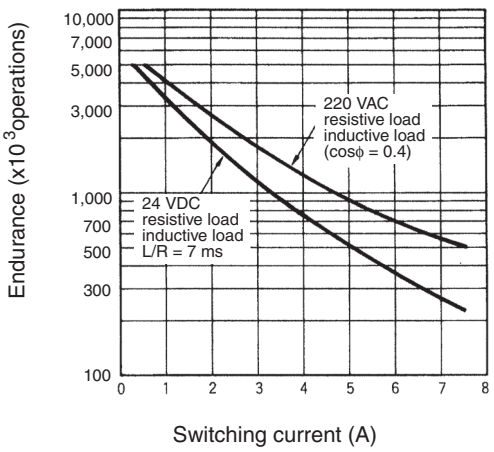
### Open Relays

MM□(B)




### Cased Relays

MM□P(N, -D)

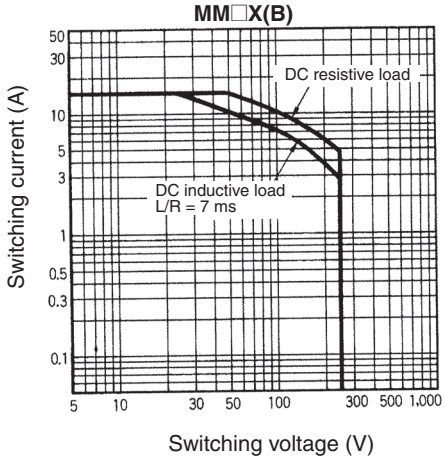



# ■ DC-switching Relays

## Maximum Switching Power

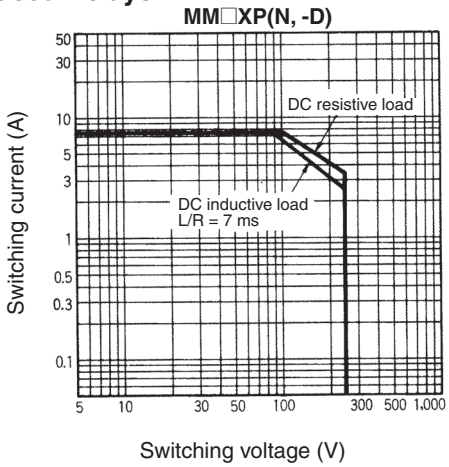
### Open Relays

MM□X(B)



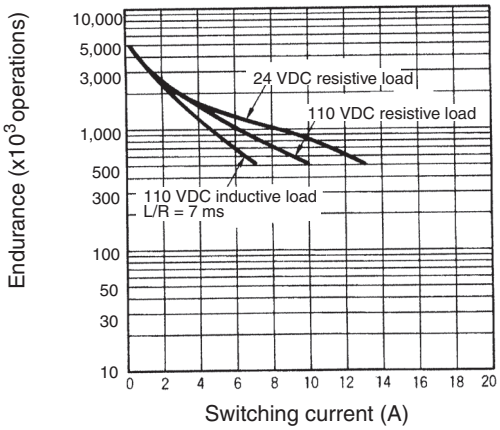

### Cased Relays

MM□XP(N, -D)

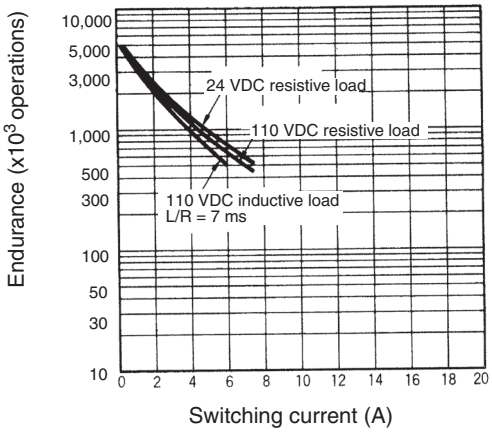



## Endurance Curves

### Open Relays



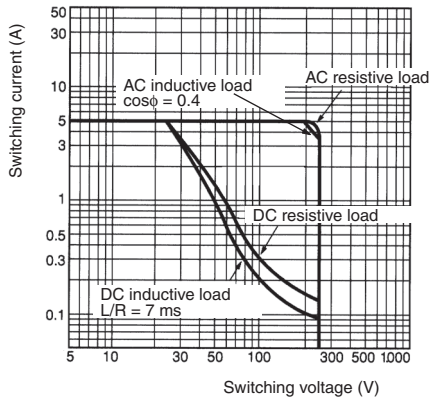

### Cased Relays



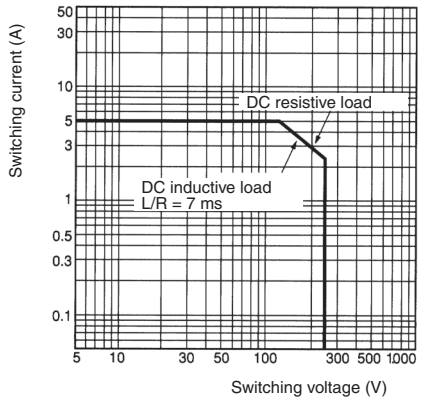
# ■ Relays Conforming to Auxiliary Power Relay Specifications

## Maximum Switching Power

**MM4P-JD**

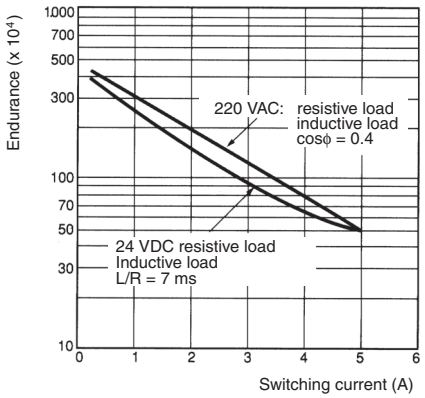



**MM4XP-JD**

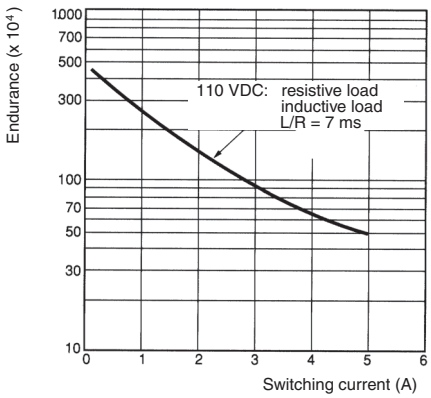



## Endurance Curves

**MM4P-JD**

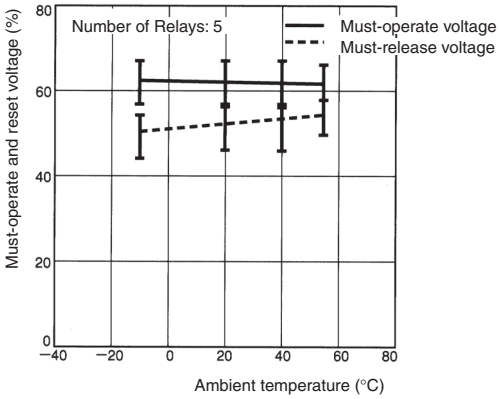



**MM4XP-JD**

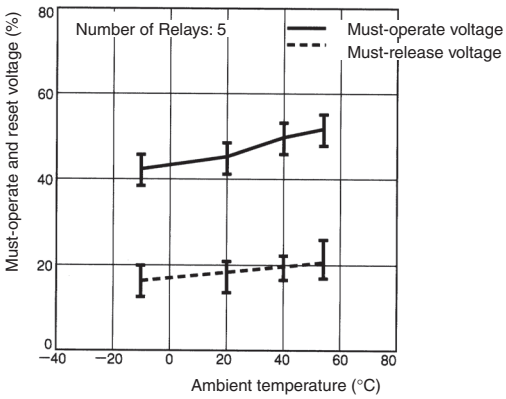


## Ambient Temperature vs. Must-operate and Must-release Voltage

### MM2P AC (60 Hz)

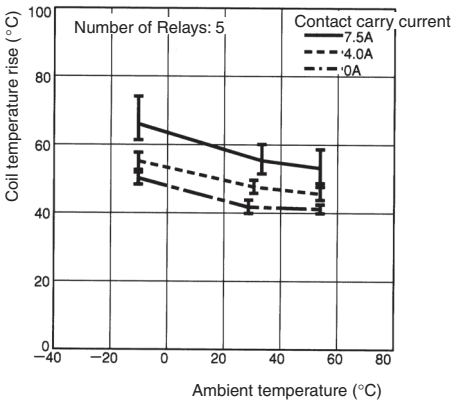



### MM2P DC

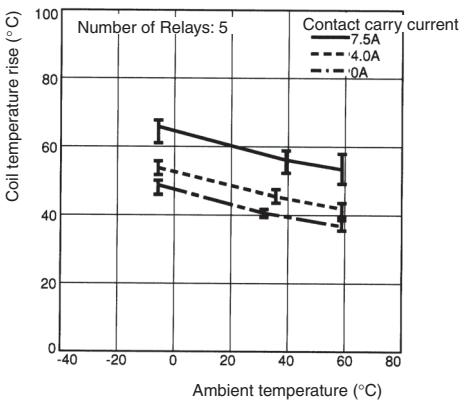



## Ambient Temperature vs. Coil Temperature Rise

### MM2P 110 VAC (60 Hz)

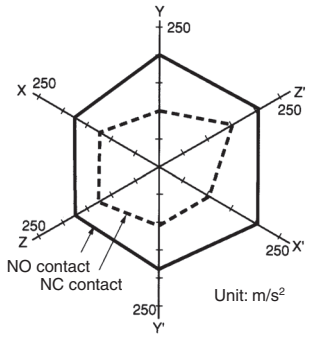



### MM2P DC




## Malfunctioning Shock

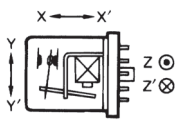
### MM2P AC




Number of samples: 5

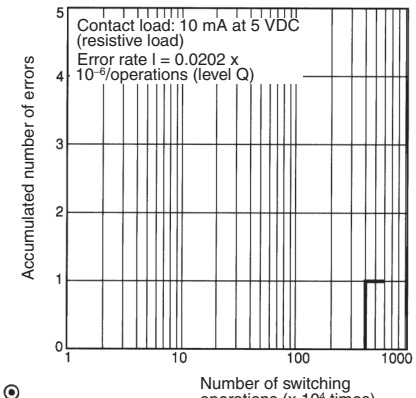
Measurement conditions:
Impose a shock of 100 m/s² in the ±X, ±Y, and ±Z directions three times each with the Relay energized and not energized to check the shock values that cause the Relay to malfunction.

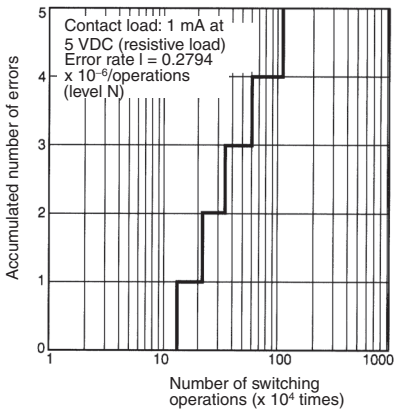
Shock direction




## Contact Reliability (Improved Allen-Bradley Test Circuit)

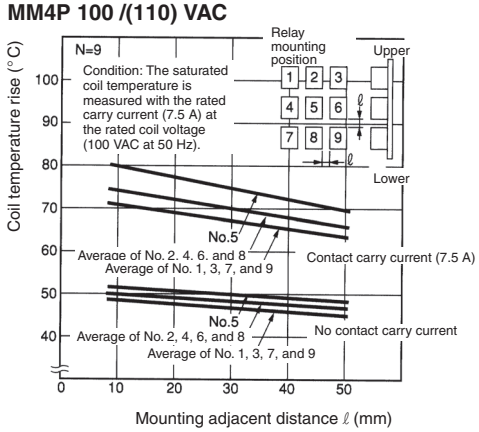
### MM4P 24 VDC



### Relay Mounting Adjacent Distance vs. Coil Temperature Rise

**MM4P 100 /(110) VAC**



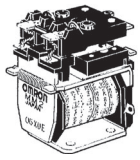

# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

## ■ Standard Relays

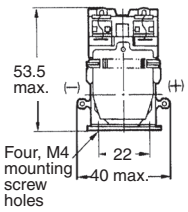
### Open Relays

#### Solder Terminals
**MM2(X), MM4(X), MM3(X)**

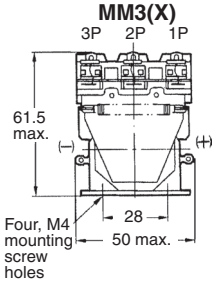


**MM2**

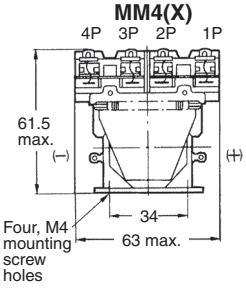
**MM2(X)**



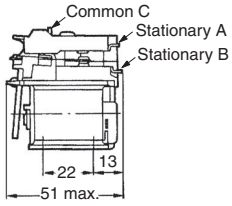

**MM3(X)**




**MM4(X)**

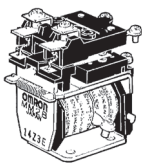



**Side View**



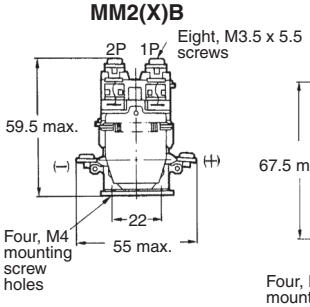

**Note:** Connect the common (C) of MM□X to positive (+).

#### Screw Terminals
**MM2(X)B, MM3(X)B, MM4(X)B**

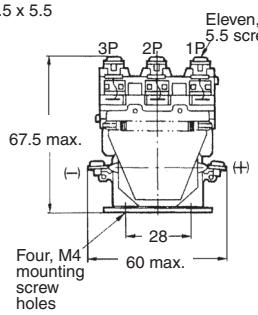


**MM2B**

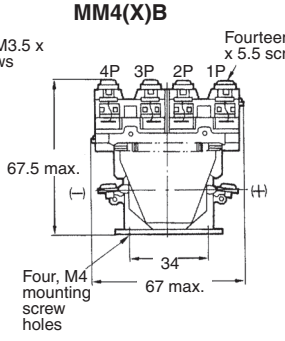
**MM2(X)B**



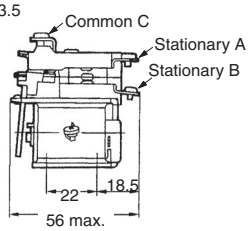

**MM3(X)B**




**MM4(X)B**



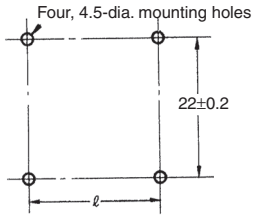

**Side View**




**Note:** Connect the common (C) of MM□XB to positive (+).

## Mounting Holes (Bottom View)

Direct mounting

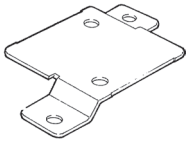


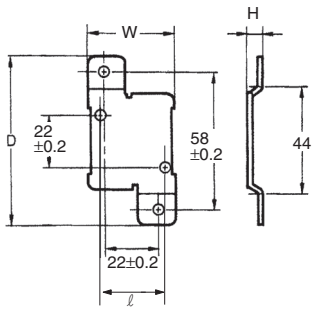

Length of ℓ
DPDT: 22±0.2
3PDT: 28±0.2
4PDT: 34±0.2

## Mounting Bracket (S Bracket)

**R99-03 (S KANAGU) FOR MM□**

The S Bracket can be used to mount a Relay with open solder or screw terminals.

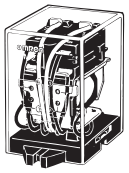





| | R99-03 (S KANAGU) FOR MM2 (611) (DPDT) | R99-03 (S KANAGU) FOR MM3. 4 (61) 3PDT, 4PDT |
|---|---|---|
| ℓ | 22 | 28, 34 |
| D | 71 max. | 71 max. |
| W | 36 max. | 46 max. |
| H | 6 max. | 6 max. |

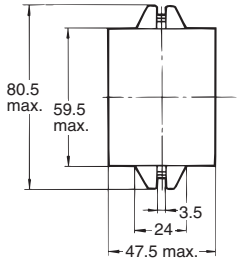
# Cased Relays

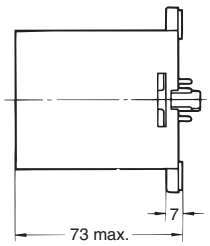
## Plug-in Terminals

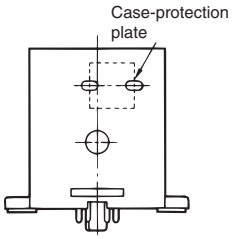


MM2P

**MM2P(N, -D)**
**MM2XP(N, -D)**



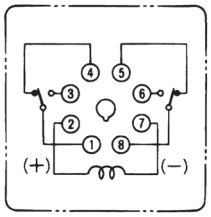
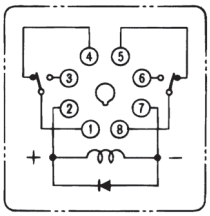
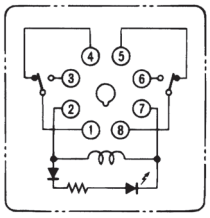
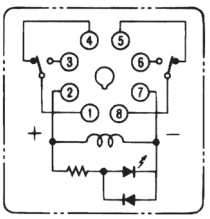
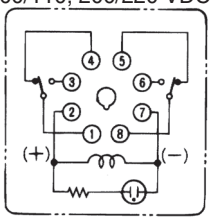
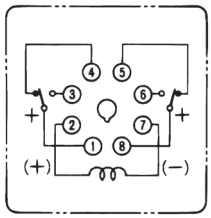
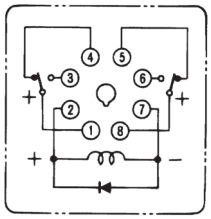
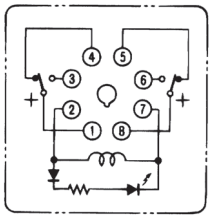
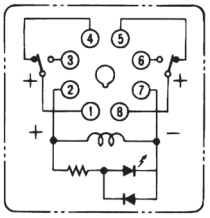
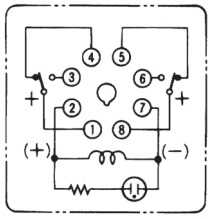



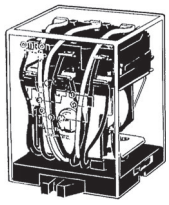

**Note:** As shown in the diagram, there are three 10-dia. holes in the side of the case for the MM2XP(N, -D). When a case-protection plate is attached, the width of the Relay will be 48 mm max.

### Terminal Arrangement (Bottom View)

Make sure that all common connections have the same polarity for the MM2XP-N/-D. The markings of the common connections on the casing all show "+" but the polarity of the common connections can be either negative or positive as long as they are all the same.

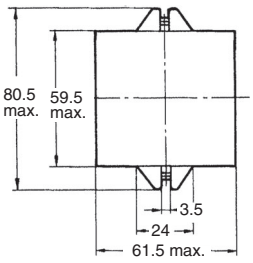
| MM2P | MM2P-D | MM2PN | MM2PN | MM2PN |
|---|---|---|---|---|
|  |  | 6, 12, 24, 50 VAC  | 6, 12, 24, 48 VAC  | 100/(110), 200/(220) VAC<br>100/110, 200/220 VDC  |
| **MM2XP** | **MM2XP-D** | **MM2XPN** | **MM2XPN** | **MM2XPN** |
|  |  | 6, 12, 24, 50 VAC  | 6, 12, 24, 48 VAC  | 100/(110), 200/(220) VAC<br>100/110, 200/220 VDC  |

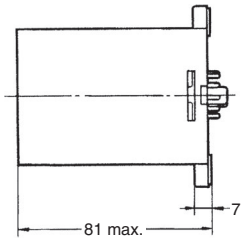
**Note:** Wire the terminals correctly with no mistakes in coil polarity.



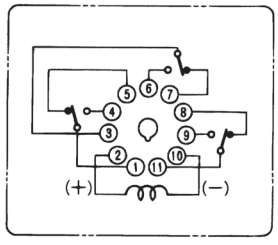
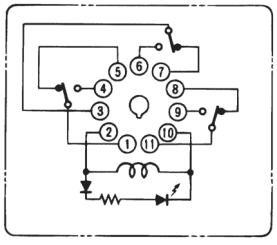
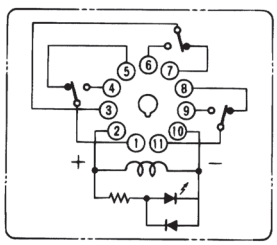
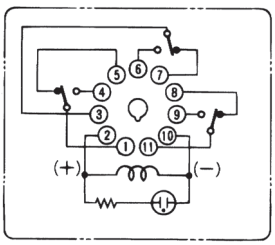
MM3P

**MM3P(N)**



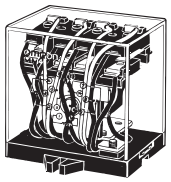




### Terminal Arrangement (Bottom View)

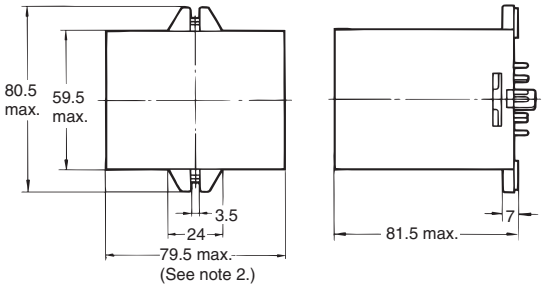
| MM3P | MM3PN | MM3PN | MM3PN |
|---|---|---|---|
|  | 6, 12, 24, 50 VAC  | 6, 12, 24, 48 VAC  | 100/(110), 200/(220) VAC<br>100/110, 200/220 VDC  |

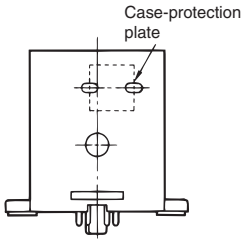
**Note:** Wire the terminals correctly with no mistakes in coil polarity.

**MM3PXP(N)**
**MM4P(N, -D)**
**MM4XP(N, -D)**



**MM4P**

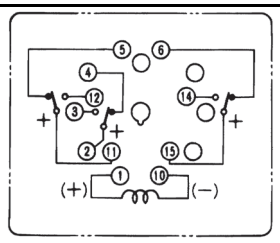
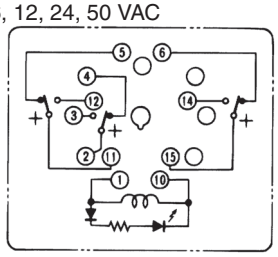
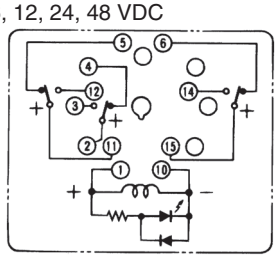
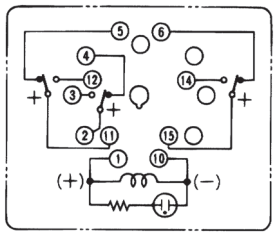


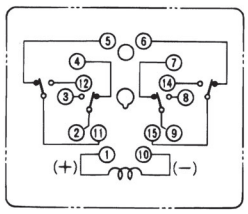
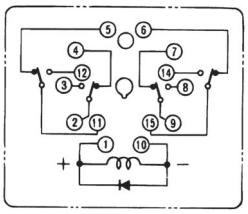
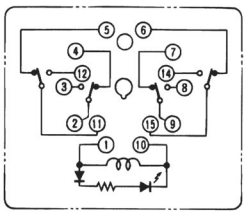
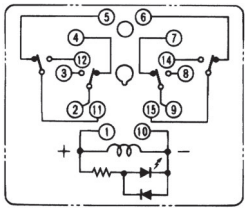
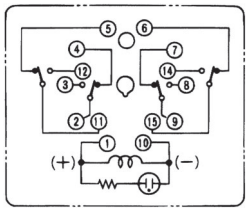
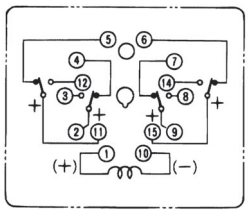
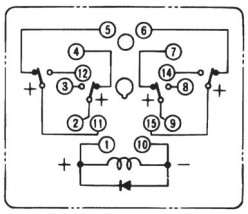
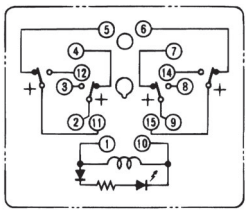
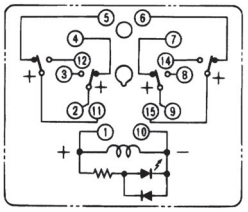
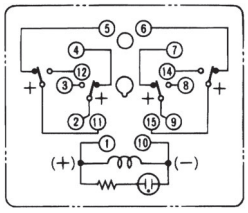




**Note 1:** As shown in the diagram, there are three 10-dia. holes in the side of the case for MM□XP(N, -D).
**2:** When a case-protection plate is attached, the width of the Relay will be 80 mm max.

**Terminal Arrangement (Bottom View)**

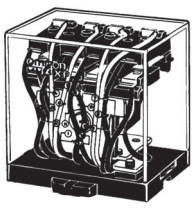
Make sure that all common connections have the same polarity for the MM□XP-N/-D. The markings of the common connections on the casing all show "+" but the polarity of the common connections can be either negative or positive as long as they are all the same.

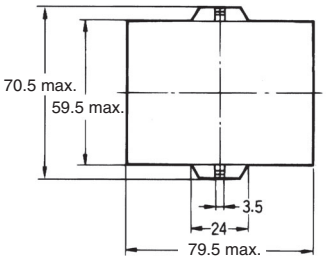
| MM3XP | MM3XPN | MM3XPN | MM3XPN |
|---|---|---|---|
|  | 6, 12, 24, 50 VAC  | 6, 12, 24, 48 VDC  | 100/(110), 200/(220) VAC<br>100/110, 200/220 VDC  |

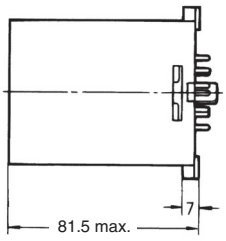
| MM4P | MM4P-D | MM4PN | MM4PN | MM4PN |
|---|---|---|---|---|
|  |  | 6, 12, 24, 50 VAC  | 6, 12, 24, 48 VDC  | 100/(110), 200/(220) VAC<br>100/110, 200/220 VDC  |
| **MM4XP** | **MM4XP-D** | **MM4XPN** | **MM4XPN** | **MM4XPN** |
|  |  | 6, 12, 24, 50 VAC  | 6, 12, 24, 48 VDC  | 100/(110), 200/(220) VAC<br>100/110, 200/220 VDC  |

**Note:** Wire the terminals correctly with no mistakes in coil polarity.

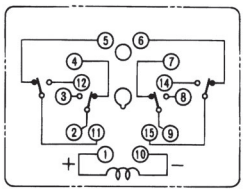
**MM4P-JD**



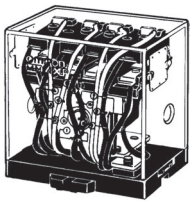


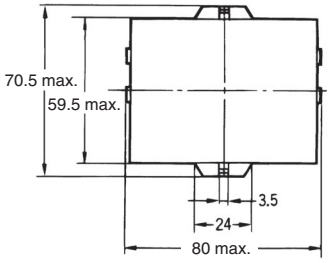



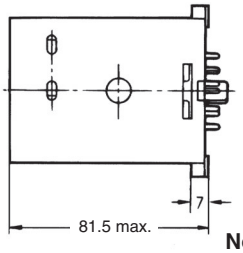

**Terminal Arrangement (Bottom View)**

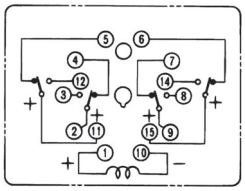



**MM4XP-JD**





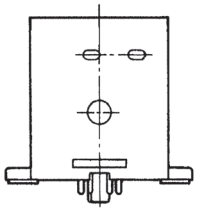




**Note:** Make sure that all common connections are the same in polarity. The markings of the common connections on the casing all show "+" but the polarity of the common connections can be either all negative or all positive.

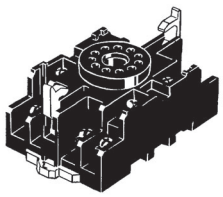
## ■ Relays with Operation Indicators

Dimensions are the same as those for standard Relays except that there are three 10-mm holes in the case as shown below.



# Accessories

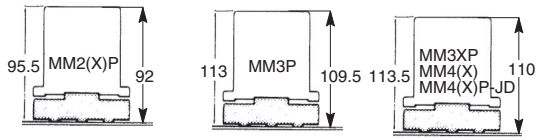
## ■ Sockets

| Relay model | DIN Track/Front-connecting Socket (screw terminals) | Back-connecting Socket (solder terminals) |
|---|---|---|
| **MM2(X)P(-D)** | 8PFA | PL08 |
| **MM3P** | 11PFA  | PL11 |
| **MM3XP, MM4(X)P(-D)** | 14PFA | PL15 |
| **MM4(X)P-JD** | 14PFA | --- |

**Note:** When using the MM4(X)P-JD (i.e., a model conforming to auxiliary power relay specifications) by itself, the PL15 Back-connecting Socket cannot be used.

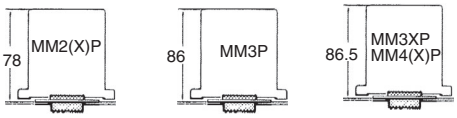
## Height with Socket

**DIN Track/Front-connecting Socket**




8PFA 11PFA 14PFA

**Back-connecting Socket**




PL08 PL11 PL15

# Safety Precautions

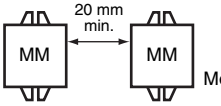
Refer to *Safety Precautions for All Relays*.

## ■ Connection

- Use proper crimp terminals or 1.2- to 2-mm-dia. single-conductor wire to connect screw terminals.
- Connect loads to DC-switching Relays so that arcs from adjacent terminals will not strike each other. E.g., connect all common terminals to the same polarity.
- Screw Terminal Model:
  Do not bend the coil terminals, otherwise the coil wire may be disconnected. Make sure that the tightening torque applied to each terminal is 0.78 to 1.18 N·m and the insertion force is 49 N for 10 s.
- Do not reverse polarity when connecting open DC-switching Relays, including 3- and 4-pole models.

## ■ Installation

- Do not install the Relays where iron dust can adhere to the contacts or coil. Such dust can prevent the armature from moving freely and inhibit proper electrical contact.
- Relays can generate arcs externally. Either install the Relay in a location where a nearby object will not burn or use a covered Relay.
- DC-switching Relays contain a permanent magnet in the insulation base. Do not place a magnet or magnetic object near this base. Doing so will reduce the power of the permanent magnet, thus reducing Relay capacity.
- Insert PL Back-mounting Sockets from the back of the panel.
- Separate Relays from each other by at least 20 mm when mounting multiple Relays together.




Mounting orientation

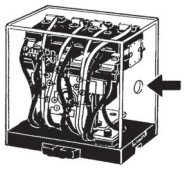
- Relays should be mounted with the armature facing down.

## ■ Wiring

When connecting a load to the contact terminals of a model for DC loads, consider the polarity of the contact terminals so that the generated arcs on the adjacent poles will not collide. If the common connections of the Relay are all positive or all negative, no arc collision will occur.

## ■ MMXP

The MMXP has a hole in the Relay case to allow gas to escape. Do not use this Relay in locations subject to excessive dust.



## ■ Contact Loads

The contact load should be greater than the power consumption of the coil. If it is less than this power consumption or if the Relay is operated very infrequently, the contact can change chemically thus causing unstable operation.

## ■ Soldering

When soldering solder terminals, do not let flux or other foreign matter adhere to contacts or do not let the coil terminals become bent. Also, solder as quickly as possible because excessive heat may damage the coil.

## ■ Diode Built into Relays

A diode is built into the Relays to absorb reverse electromotive force from the relay coil. The diode will be destroyed if a large external surge voltage is applied. If there is a possibility of a large external surge voltage being applied, take suitable measures to absorb the surge.

## ■ Storage

A model for DC loads incorporates a permanent magnetic for arc suppression. Keep floppy disks away from the Relay, otherwise the data on the floppy disk may be damaged.

## ■ Operating Environment

Do not use the Relay in places with flammable gas, otherwise an explosion may result due to an arc generated from the Relay

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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

## Read and Understand This Catalog

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- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

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

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

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2008.11

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**Industrial Automation Company**

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# OCEAN CHIPS
## Океан Электроники
## Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

**«JONHON»** (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

**«FORSTAR»** (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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