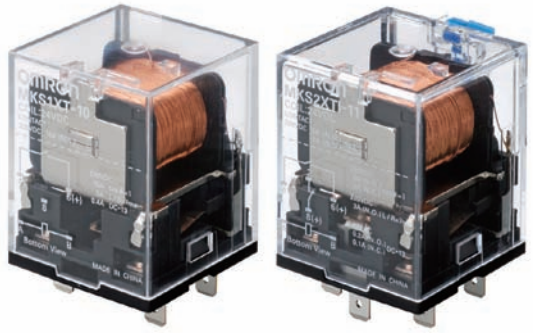
New Product

OMRON

Power Relays
MK-S(X)

MK-S-series Relays with DC-switching Models That Can Switch 220 VDC, 10 A (Resistive Load).



- Switch a DC load of 220 VDC, 10 A (resistive load).
- Lineup includes models with SPST-NO and SPST-NO/SPST-NC contact forms.
- Using a SPST-NO/SPST-NC contact form enables detecting contact welding. (When the NO contacts become welded, the NC contacts will maintain a minimum distance of 0.5 mm.)
- Models are also available with a built-in test button.
- Models for AC Loads can switch 250 VAC, 15 A (resistive load).
- RoHS compliant.

Ordering Information

General-purpose Relays

Models for DC Loads

Contact form / Type	SPST-NO		SPST-NO/SPST-NC	
	Rated coil voltage (V)	Model	Rated coil voltage (V)	Model
Standard Models	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS1XT-10	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS2XT-11
Models with Built-in Operation Indicators	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS1XTN-10	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS2XTN-11
Models with Test Button	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS1XTI-10	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS2XTI-11
Models with Test Button and Built-in Operation Indicators	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS1XTIN-10	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS2XTIN-11

Models for AC Loads

Contact form / Type	SPST-NO		SPST-NO/SPST-NC	
	Rated coil voltage (V)	Model	Rated coil voltage (V)	Model
Standard Models	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS1T-10	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS2T-11
Models with Built-in Operation Indicators	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS1TN-10	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS2TN-11
Models with Test Button	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS1TI-10	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS2TI-11
Models with Test Button and Built-in Operation Indicators	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS1TIN-10	AC: 24, 100, 110, 120, 200, 220, 230, 240 DC: 12, 24, 48, 110, 220	MKS2TIN-11

Accessory (Order Separately)

Connecting Socket

Classifications		Model
Back-connecting Socket	PCB Terminals	P7M-06P

Specifications

Ratings

Operating Coil

Item		Rated current (mA)		Coil resistance (Ω)	Must operate voltage (V)	Must release voltage (V)	Maximum voltage allowable (V)	Power consumption (VA, W)
Rated voltage (V)		50 Hz	60 Hz		Percentage of rated voltage			
AC	24	110	96.3	48.4	80% max.	30% min. at 60 Hz 25% min. at 50 Hz	110%	Approx. 2.3 VA at 60 Hz Approx. 2.7 VA at 50 Hz
	100	26.6	23.1	760				
	110	24.2	21.0	932				
	120	22.2	19.3	1,130				
	200	13.3	11.6	3,160				
	220	12.1	10.5	3,550				
	230	11.5	10.0	4,250				
	240	11.0	9.6	4,480				
DC	12	126		95		15% min.		Approx. 1.5 W
	24	63.2		380				
	48	32.0		1,500				
	110	13.6		8,060				
	220	6.8		32,200				

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. Performance characteristic data are measured at a coil temperature of 23°C.
3. The maximum allowable voltage is the maximum value of the allowable voltage range for the operating power supply for the relay coil. There is no continuous allowance.
4. The rated current is approximately 5 mA higher for Models with Built-in Operation Indicators (DC operating coils).

Contact Ratings for Models for DC Loads

Item / Contact form		SPST-NO			SPST-NO/SPST-NC		
Model		MKS1XT(I)(N)-10			MKS2XT(I)(N)-11		
Load		Resistive load	Inductive load		Resistive load	Inductive load	
			L/R = 7 ms	DC13 class		L/R = 7 ms	DC13 class
Contact configuration	NO	Double-break			Double-break		
	NC	---			Single-break		
Contact material		AgSnIn			AgSnIn		
Rated load	NO	10 A, 220 VDC	5 A, 220 VDC	0.4 A, 220 VDC	5 A, 220 VDC	3 A, 220 VDC	0.2 A, 220 VDC
	NC	---			2 A, 220 VDC	0.3 A, 220 VDC	0.1 A, 220 VDC
Rated carry current	NO	10 A			5 A		
	NC	---			2 A		
Max. switching voltage	NO	220 VDC			220 VDC		
	NC	---					
Max. switching current	NO	10 A			5 A		
	NC	---			2 A		
Max. switching capacity (reference value)	NO	2,200 W	---	---	1,100 W	---	---
	NC	---			440 W	---	---

Note: If the L/R of an inductive load exceeds 7 ms with a Model for a DC Load, the arc interruption time must be less than approximately 50 ms to use the Relay. Design the circuit so that the arc interruption time is 50 ms or less.

✻ These values apply to a switching frequency of 60 times per minute.

Contact Ratings for Models for AC Loads

Item / Contact form		SPST-NO	SPST-NO/SPST-NC
Model		MKS1T(I)(N)-10	MKS2T(I)(N)-11
Load		Resistive load	Resistive load
Contact configuration	NO	Double-break	Double-break
	NC	---	Single-break
Contact material		AgSnIn	AgSnIn
Rated load	NO	15 A, 250 VAC	15 A, 250 VAC
	NC	---	5 A, 250 VAC
Rated carry current	NO	15 A	15 A
	NC	---	5 A
Max. switching voltage	NO	250 VAC	250 VAC
	NC	---	
Max. switching current	NO	15 A	15 A
	NC	---	5 A
Max. switching capacity (reference value)	NO	3,750 VA	3,750 VA
	NC	---	1,250 VA

✻ These values apply to a switching frequency of 60 times per minute.

Characteristics

Contact resistance ✻1		100 mΩ max.
Operate time ✻2		AC: 20 ms max. DC: 30 ms max.
Release time ✻2		20 ms max.
Max. operating frequency	**Mechanical**	18,000 operations/h
	Rated load	1,800 operations/h
Insulation resistance ✻3		100 MΩ min.
Dielectric strength	**Between coil and contacts**	2,500 VAC 50/60 Hz for 1 min between
	Between contacts of different polarity	2,500 VAC 50/60 Hz for 1 min between
	Between contacts of same polarity	1,000 VAC 50/60 Hz for 1 min
Vibration resistance	**Destruction**	10 to 55 to 10 Hz, 0.50-mm single amplitude (1.0-mm double amplitude)
	Malfunction	10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude)
Shock resistance	**Destruction**	1,000 m/s^2
	Malfunction	100 m/s^2
Endurance	**Mechanical**	5,000,000 operations min. (at 18,000 operations/hr)
	Electrical ✻4	100,000 operations min. (at rated load and 1,800 operations/hr)
Failure rate P level (reference value)		10 mA at 24 VDC
Ambient operating temperature		–40°C to 60°C (with no icing or condensation) **Note:** The range is –25°C to 60°C for models with built-in operation indicators.
Ambient operating humidity		5% to 85%
Weight		SPST-NO: Approx. 73 g, SPST-NO/SPST-NC: Approx. 82 g

Note: The values given above are initial values.
✻1. The contact resistance was measured for 1 A at 5 VDC using the voltage drop method.
✻2. The operate time was measured with the rated voltage imposed and any contact bounce ignored at an ambient temperature of 23°C.
✻3. The insulation resistance was measured with a 500-VDC insulation resistance tester at the same places as those used for checking the dielectric strength.
✻4. The electrical endurance was measured at an ambient temperature of 23°C.

Approved Standards

UL508 (pending)

Model	Coil ratings	Contact ratings
MKS1XT□-□	12 to 220 VDC 24 to 240 VAC	NO contacts
MKS2XT□-□		NO contacts NC contacts
MKS1T□-□		NO contacts
MKS2T□-□		NO contacts NC contacts

CSA Certification by UL Pending (CSA C22.2 No.14)

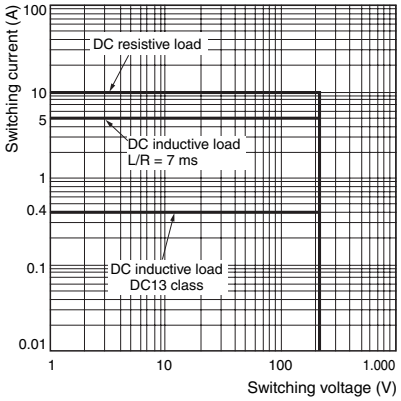
TÜV Certification Pending

Model	Coil ratings	Contact ratings	
MKS1XT□-□	12, 24, 48, 110, 220 VDC 24, 100, 110, 120, 200, 220, 230, 240 VAC	NO contacts	DC-1: 10 A, 220 VDC 5 A, 220 VDC L/R ($T_{0.632}$) = 7 ms DC-13: 0.4 A, 220 VDC
MKS2XT□-□		NO contacts	DC-1: 5 A, 220 VDC 3 A, 220 VDC L/R ($T_{0.632}$) = 7 ms DC-13: 0.2 A, 220 VDC
		NC contacts	DC-1: 2 A, 220 VDC 0.3 A, 220 VDC L/R ($T_{0.632}$) = 7 ms DC-13: 0.1 A, 220 VDC
MKS1T□-□		NO contacts	AC-1: 15 A, 250 VAC 50/60 Hz
MKS2T□-□		NO contacts	AC-1: 15 A, 250 VAC 50/60 Hz
		NC contacts	AC-1: 5 A, 250 VAC 50/60 Hz

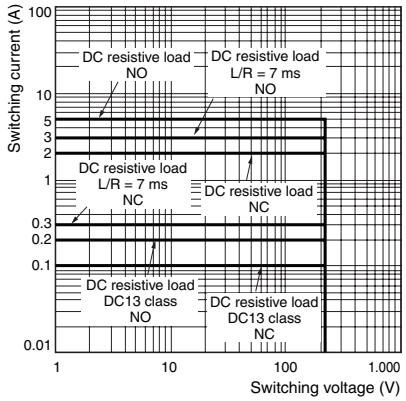
Engineering Data

Maximum Switching Power

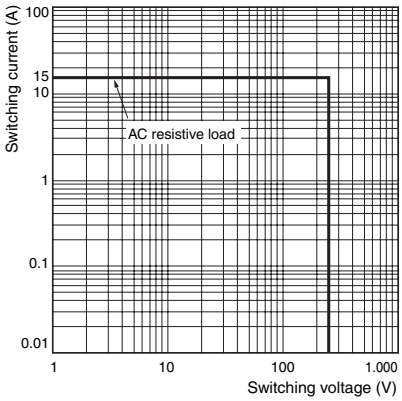
MKS1XT-10, MKS1XTN-10
MKS1XTI-10, MKS1XTIN-10



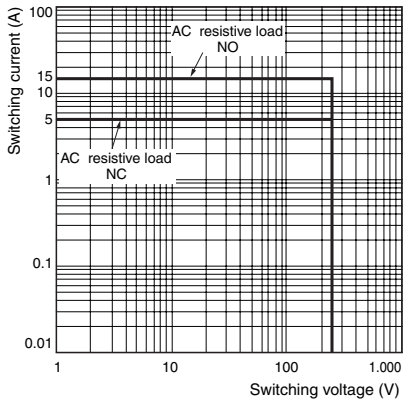
MKS2XT-11, MKS2XTN-11
MKS2XTI-11, MKS2XTIN-11



MKS1T-10, MKS1TN-10
MKS1TI-10, MKS1TIN-10

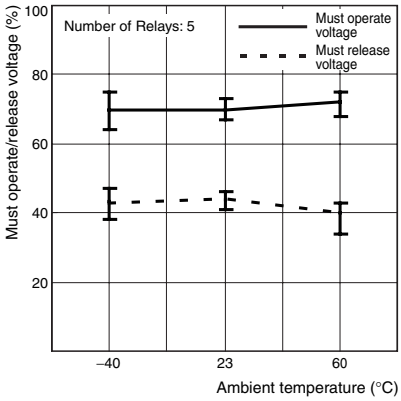


MKS2T-11, MKS2TN-11
MKS2TI-11, MKS2TIN-11

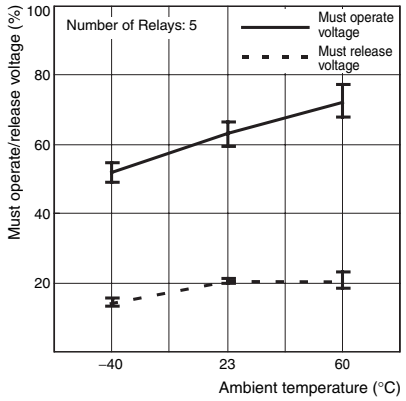


Ambient Temperature vs. Must Operate Voltage and Must Release Voltage

MKS2XT-11
AC Specification (60 Hz)

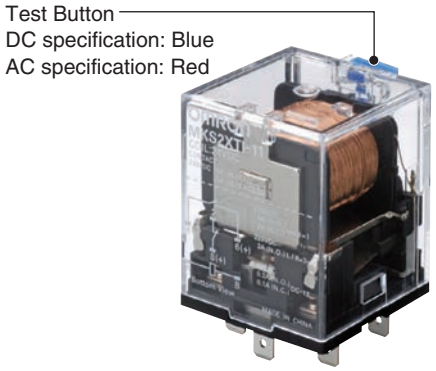


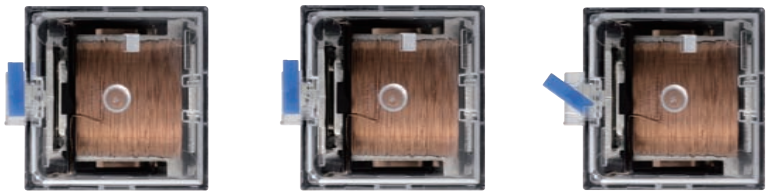
MKS2XT-11
DC Specification



Test Button

The circuit can be checked using either of two modes.





Press the button for operation. (No tool is required.)

Lock the contacts by pressing down on the button and turning it.

Test Button Applications

Example: Checking operation of Relays and sequence circuits.

Dimensions

(Unit: mm)

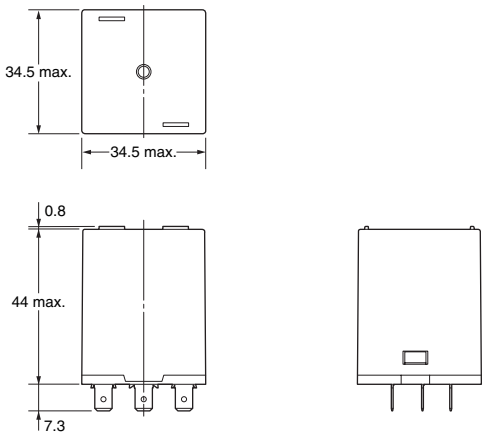
General-purpose Relays

Models for DC Loads

Standard Models
MKS1XT-10 **MKS2XT-11**
Models with Built-in Operation Indicators
MKS1XTN-10 **MKS2XTN-11**

Models for AC Loads

Standard Models
MKS1T-10 **MKS2T-11**
Models with Built-in Operation Indicators
MKS1TN-10 **MKS2TN-11**

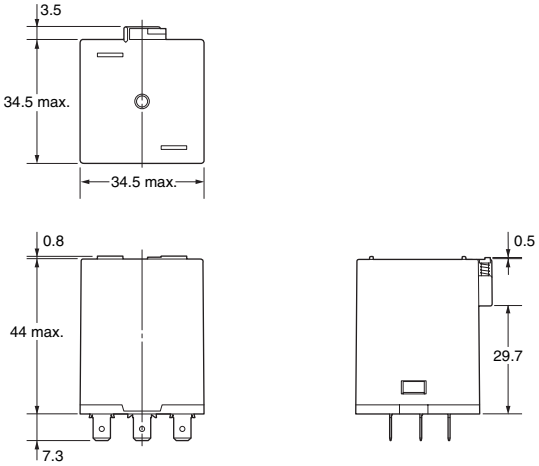


Models for DC Loads

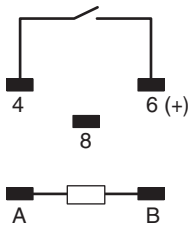
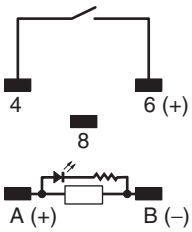
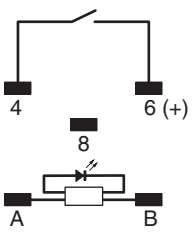
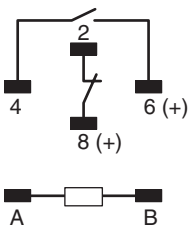
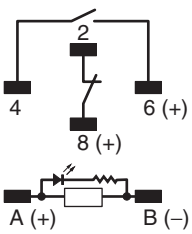
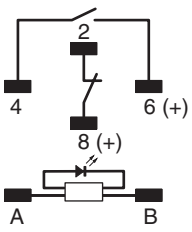
Models with Test Button
MKS1XTI-10 **MKS2XTI-11**
Models with Test Button and Built-in Operation Indicators
MKS1XTIN-10 **MKS2XTIN-11**

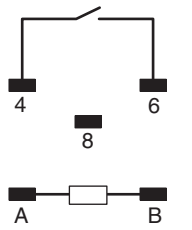
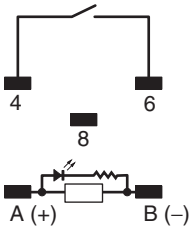
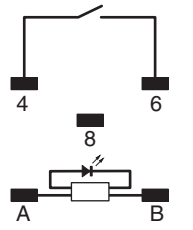
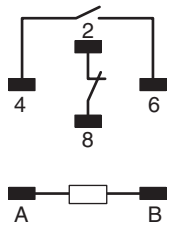
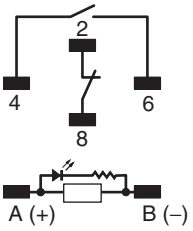
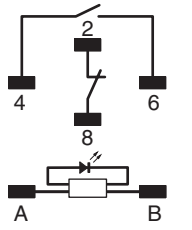
Models for AC Loads

Models with Test Button
MKS1TI-10 **MKS2TI-11**
Models with Test Button and Built-in Operation Indicators
MKS1TIN-10 **MKS2TIN-11**



Terminal Arrangement/Internal Connection (Bottom View)

MKS1XT-10 MKS1XTI-10	MKS1XTN-10 MKS1XTIN-10		MKS2XT-11 MKS2XTI-11	MKS2XTN-11 MKS2XTIN-11	
	DC specification	AC specification		DC specification	AC specification
					

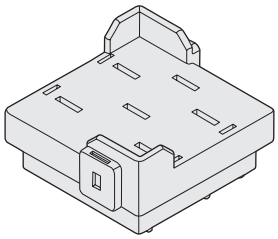
MKS1T-10 MKS1TI-10	MKS1TN-10 MKS1TIN-10		MKS2T-11 MKS2TI-11	MKS2TN-11 MKS2TIN-11	
	DC specification	AC specification		DC specification	AC specification
					

Note: 1. Wire properly using the correct coil polarity.
2. The contact terminals on Models for DC Loads have polarity. Wire properly using the correct polarity.

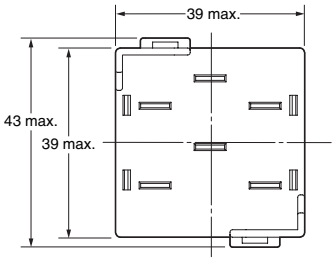
Connecting Socket

Back-connecting Socket

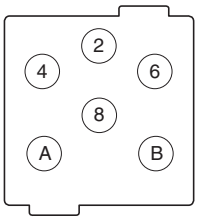
P7M-06P



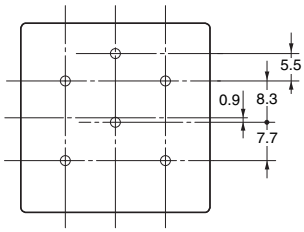
Dimensions

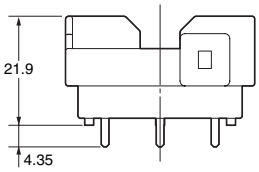


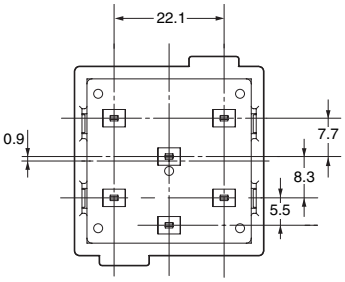
Terminal Arrangement/Internal Connections (Bottom View)



PCB Mounting Holes (Bottom View)

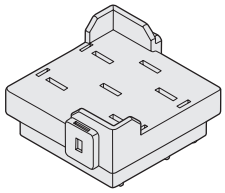






Accessory (Order Separately)

Connecting Socket

Socket / Number of poles	Back-connecting Socket PCB terminals
2	P7M-06P 

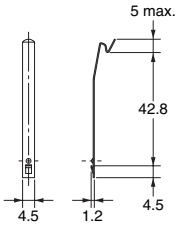
Note: The P7M-06P Connecting Socket can be used with SPST-NO and SPST-NO/SPST-NC Models for DC Loads and SPST-NO and SPST-NO/SPST-NC Models for AC Loads.

Relay Hold-down Clips

Use the Clips to securely mount the Relay and prevent it from falling due to vibration or shock.

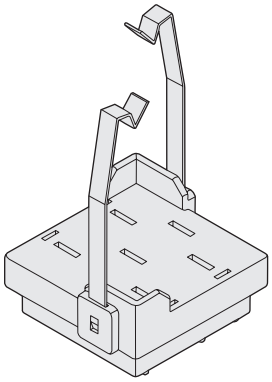
Socket / Applicable Relay models			MKS1XT-10 MKS1XTI-10 MKS1XTIN-10 MKS1T-10 MKS1TI-10 MKS1TIN-10	MKS2XT-11 MKS2XTI-11 MKS2XTIN-11 MKS2T-11 MKS2TI-11 MKS2TIN-11
Back-connecting Socket	PCB terminals	P7M-06P	PYC-A2	

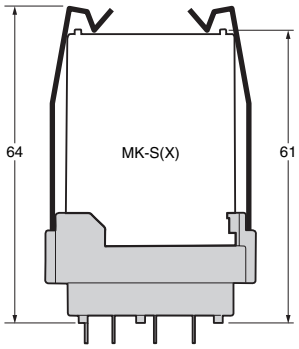
PYC-A2
One Set (Two Clips)



Note: The minimum order for the PFC-A2 is ten clips.

Socket Mounting Height





Safety Precautions

Refer also to *Precautions for All Relays*.

Precautions for Correct Use

Installation

- Models for DC Loads (i.e., models with “X” in the model number) have permanent magnets built into the insulating block, so magnetic interference will occur and contact switching capacity will be decreased if a permanent magnet or other magnetic body comes near the Relay.
- Models for AC Loads do not have permanent magnets built in.

Wiring

- The contact terminals on Models for DC Loads (i.e., models with “X” in the model number) have polarity. Wiring with incorrect polarity may result in inability to turn OFF the Relay or loss of functionality.
- Wire models with built-in operation indicators with the correct coil polarity (DC operating coil).

Test Button

- Turn OFF the power supply before operating the test button. Always return the test button to the original position after you use it.
- Do not use the test button as a switch.
- The durability of the test button is 100 operations minimum.

Operating Environment

Do not use the Relay in environments with combustible gas. Doing so may result in explosion due to arcing.

Storage

Models for DC Loads (i.e., models with “X” in the model number) are magnetized because they have a built-in magnet to deflect and extinguish the arc. Do not install the Relay near IC cards or other items that may be adversely affected by magnetism.

Usage

Use the Relay mounted in the P7M-06P Socket.

Warranty and Application Considerations

Read and Understand this Catalog

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

Warranty and Limitations of Liability

WARRANTY

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

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

Application Considerations

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

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

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.

Disclaimers

PERFORMANCE DATA

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

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

DIMENSIONS AND WEIGHTS

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

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