

General-purpose Relays MK-S

Super MK Relays.

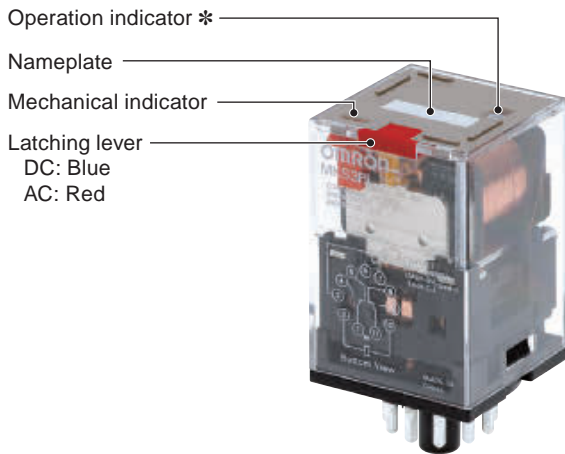
Models with Latching Lever Added to the Series.

- Same mounting and internal wiring as the previous Super MK Relays
- Built-in mechanical indicator enables checking contact operation.
- Two modes can be used to check circuits for models with latching lever.
- Nameplate provided on models with latching lever.
- All materials are RoHS compliant.
- UL and IEC (TÜV) certification.



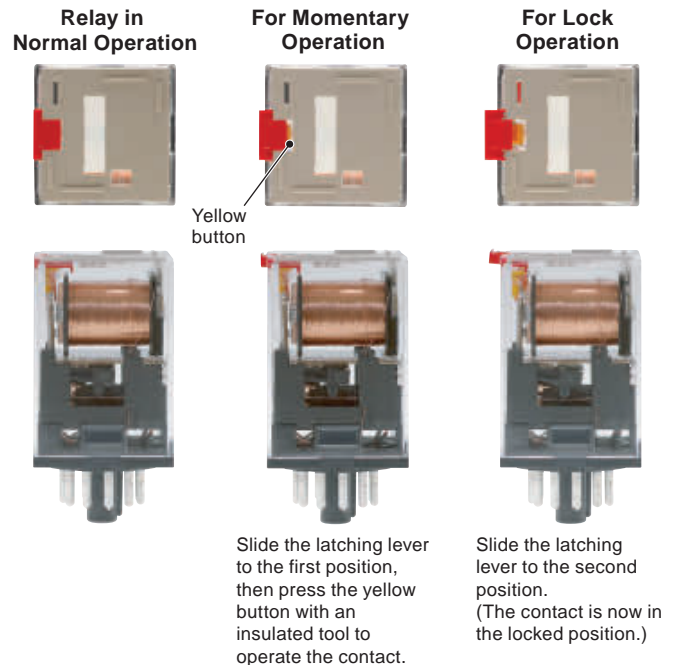
Features

Models with Latching Lever



* The operation indicator is built in only on specified models.

Operating Method for Latching Lever



Example of Applications of Models with Latching Levers

Operation checks in relay sequence circuits

Model Number Structure

Model Number Legend

MKS - -

1 2 3 4 5 6 7

1. Contact Form

- 2: DPDT
- 3: 3PDT

2. Terminals

P: Plug-in

3. Mechanical Indicator/Test Button

Blank: Mechanical indicator
I: Mechanical indicator and lockable test button

4. LED Indicator

Blank: Standard
N: LED indicator

5. Coil Polarity

Blank: Standard
1: Reverse polarity (DC coil only)

6. Surge Absorption

Blank: Standard
D: Surge absorber diode (DC coil only)
V: Surge absorber varistor (AC coil only)

7. Internal Connections

Blank: Standard
2 or 5: Non-standard connections (Refer to "Terminal Arrangement and Internal Connection (Bottom View)").

8. Rated Voltage

(Refer to "Coil Ratings".)

MK-S

Ordering Information

List of Models

Type	Terminals	Contact form	Internal connections (See note 3.)	With mechanical indicator	With mechanical indicator and lockable test button	Coil ratings
Standard Models	Plug-in	DPDT	Standard	MKS2P	MKS2PI	AC/DC
			Non-standard	MKS2P-2	MKS2PI-2	
		3PDT	Standard	MKS3P	MKS3PI	
			Non-Standard	MKS3P-2	MKS3PI-2	
Models with LED Indicator (See note 2.)		DPDT	Standard	MKS2PN(1)	MKS2PIN(1)	AC/DC
			Non-standard	MKS2PN(1)-2	MKS2PIN(1)-2	
		3PDT	Standard	MKS3PN(1)	MKS3PIN(1)	
			Non-Standard	MKS3PN(1)-2	MKS3PIN(1)-2	
Models with Diode (See note 2.)	DPDT	Standard	MKS2P(1)-D	MKS2PI(1)-D	DC	
		Non-standard	MKS2P(1)-D-2	MKS2PI(1)-D-2		
	3PDT	Standard	MKS3P(1)-D	MKS3PI(1)-D		
		Non-Standard	MKS3P(1)-D-2	MKS3PI(1)-D-2		
Models with LED Indicator and Diode	DPDT	Standard	MKS2PN-D	MKS2PIN-D	DC	
		Non-standard	MKS2PN-D-2	MKS2PIN-D-2		
	3PDT	Standard	MKS3PN-D	MKS3PIN-D		
		Non-Standard	MKS3PN-D-2	MKS3PIN-D-2		
Models with Varistor	DPDT	Standard	MKS2P-V	MKS2PI-V	AC	
		Non-standard	MKS2P-V-2	MKS2PI-V-2		
	3PDT	Standard	MKS3P-V	MKS3PI-V		
		Non-Standard	MKS3P-V-2	MKS3PI-V-2		
Models with LED Indicator and Varistor	DPDT	Standard	MKS2PN-V	MKS2PIN-V	AC	
		Non-standard	MKS2PN-V-2	MKS2PIN-V-2		
	3PDT	Standard	MKS3PN-V	MKS3PIN-V		
		Non-Standard	MKS3PN-V-2	MKS3PIN-V-2		

Note: 1. When ordering, add the rated voltage to the model number. Rated voltages are given in the coil ratings table in the specifications.

Example: MKS3P 24 VDC

Rated voltage

2. The DC coil comes in two types: standard coil polarity and reverse coil polarity.

Refer to *Terminal Arrangement and Internal Connections (Bottom View)*.

Example: MKS2PIN1-2 24 VDC

Reverse coil polarity

3. Refer to *Terminal Arrangement and Internal Connections (Bottom View)* for non-standard internal connections.

List of Models (Order Separately)

Item	Type	Model
Track-mounted Socket	8-pin	PF083A-E
	11-pin	PF113A-E
	8-pin	PF083A-D
	11-pin	PF113A-D
Hold-down Clip (For PF083A-E and PF113A-E)		PFC-A1

Specifications

Ratings

Coil Ratings

Rated voltage	Rated current		Coil resistance	Must operate voltage	Must release voltage	Max. voltage	Power consumption	
	50 Hz	60 Hz		Percentage of rated voltage				
AC	6 V	443 mA	385 mA	80% max. of rated voltage	30% min. of rated voltage at 60 Hz 25% min. of rated voltage at 50 Hz	110% of rated voltage	Approx. 2.3 VA at 60 Hz Approx. 2.7 VA at 50 Hz	
	12 V	221 mA	193 mA					3.1 Ω
	24 V	110 mA	96.3 mA					13.7 Ω
	100 V	26.6 mA	23.1 mA					48.4 Ω
	110 V	24.2 mA	21.0 mA					760 Ω
	200 V	13.3 mA	11.6 mA					932 Ω
	220 V	12.1 mA	10.5 mA					3,160 Ω
	230 V	10.0 mA	11.5 mA					4,250 Ω
DC	240 V	11.0 mA	9.6 mA	15% min. of rated voltage			Approx. 1.4 W	
	6 V	224 mA						26.7 Ω
	12 V	112 mA						107 Ω
	24 V	55.8 mA						430 Ω
	48 V	28.1 mA						1,710 Ω
	100 V	13.5 mA						7,390 Ω
	110 V	12.3 mA		8,960 Ω				

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 voltage is one that is applicable instantaneously to the Relay coil at 23°C and not continuously.

4. For DC-operated Relays with the LED indicator built-in, add an LED current of approx. 5 mA to the rated current.

Contact Ratings

Load		Resistive load ($\cos\phi = 1$)	Inductive load ($\cos\phi = 0.4$)
Contact mechanism	Single		
Contact material	AgSnIn		
Rated load	NO	10 A, 250 VAC 10A, 30 VDC	7 A, 250 VAC
	NC	5 A, 250 VAC 5 A, 30 VDC	
Rated carry current	10 A		
Max. switching voltage	250 VAC, 250 VDC		
Max. switching current	10 A		
Max. switching power	NO	2,500 VA/300 W	
	NC	1,250 VA/150 W	

Characteristics

Contact resistance	100 mΩ max.
Operate time	AC: 20 ms max. DC: 30 ms max.
Release time	20 ms max. (40 ms max. for built-in Diode Relays)
Max. operating frequency	Mechanical: 18,000 operations/h Electrical: 1,800 operations/h (under rated load)
Insulation resistance	100 MΩ min. (at 500 VDC)
Dielectric strength	2,500 VAC 50/60 Hz for 1 min between coil and contacts 1,000 VAC 50/60 Hz for 1 min between contacts of same polarity and terminals of the same polarity 2,500 VAC 50/60 Hz for 1 min between current-carrying parts, non-current-carrying parts, and opposite polarity
Insulation method	Basic insulation
Impulse withstand voltage	4.5 kV between coil and contacts (with 1.2 × 50 μs impulse wave) 3.0 kV between contacts of different polarity (with 1.2 × 50 μs impulse wave)
Pollution degree	3
Rated insulation voltage	250 V
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude) Malfunction: 10 to 55 to 10 Hz, 0.5-mm single amplitude (1.0-mm double amplitude)
Shock resistance	Destruction: 1,000 m/s ² (approx. 100 G) Malfunction: 100 m/s ² (approx. 10 G)
Endurance	Mechanical: 5,000,000 operations min. (at 18,000 operations/h under rated load) Electrical: 100,000 operations h. (at 1,800 operations/h under rated load)
Failure rate P level (reference value)	10 mA at 1 VDC
Ambient temperature	Operating: -40 to 60°C (with no icing or condensation)
Ambient humidity	Operating: 5% to 85%
Weight	Approx. 90 g

- Note:** 1. The values given above are initial values.
 2. P level: $\lambda_{60} = 0.1 \times 10^{-6}$ /operation
 3. Ambient temperature of models with LED indicator is -25 to 60°C.

Approved Standards

UL508 (File No. E41515)

Coil ratings	Contact ratings	Operations
6 to 110 VDC 6 to 240 VAC	N.O. contact 10 A, 250 V AC 50/60 Hz (Resistive) 10 A, 30 V DC (Resistive) 7 A, 250 V AC 50/60 Hz (General Use)	100,000
	N.C. contact 10 A, 250 V AC 50/60 Hz (Resistive) 10 A, 30 V DC (Resistive) 7 A, 250 V AC 50/60 Hz (General Use)	100,000

IEC Standard/TUV Certification: IEC61810-1 (Certification No. R50104853)

Coil ratings	Contact ratings	Operations
6, 12, 24, 48, 100, 110 VDC 6, 12, 24, 100, 110, 200, 220, 240 VAC	N.O. contact 10 A, 250 V AC 50/60 Hz (Resistive) 10 A, 30 V DC (Resistive) 7 A, 250 V AC 50/60 Hz (General Use)	100,000
	N.C. contact 5 A, 250 V AC 50/60 Hz (Resistive) 5 A, 30 V DC (Resistive) 7 A, 250 V AC 50/60 Hz (General Use)	100,000

CSA Standard: CSA Certification by

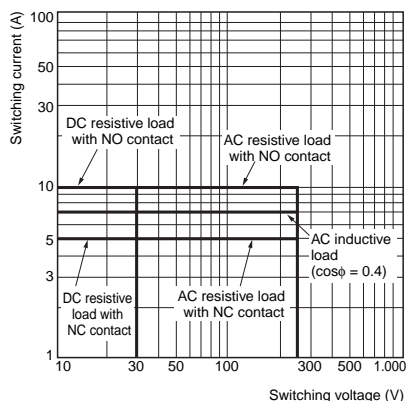
ULus: CSA C22.2 No. 14

Note: When Relays are mounted on the PF083A-E or PF113A-E, the maximum carrying current is 9 A.

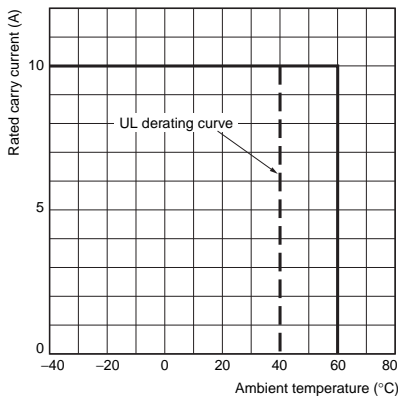
Engineering Data

Reference Data

Maximum Switching Power



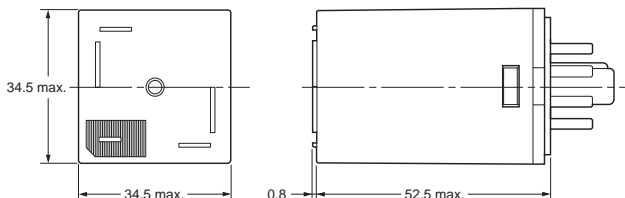
Rated Carry Current vs. Ambient Rated Temperature



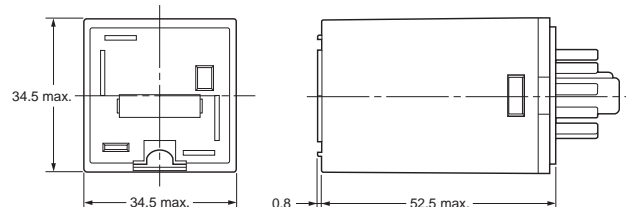
Note: The lower limit of the ambient operating temperature for models with built-in operation indicators is -25°C.

Dimensions

Models without Latching Lever

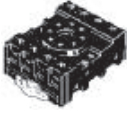






Models with Latching Lever



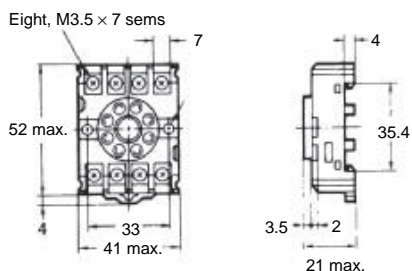
Sockets

See below for Socket dimensions.

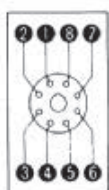
Socket	Surface-mounting Socket (for track or screw mounting)		
	Finger-protection models	---	
Maximum carry current	10 A	5 A	
2 poles	PF083A-E 	PF083A-D 	PF083A 
	3 poles	PF113A-E 	PF113A-D 

Note: Use the Surface-mounting Sockets (i.e., finger-protection models) with "E" at the end of the model number. When using the PF083A and PF113A, be sure not to exceed the Socket's maximum carry current of 5 A. Using at a current exceeding 5 A may lead to burning. Round terminals cannot be used for finger-protection models. Use Y-shaped terminals.

PF083A-E (Conforming to EN 50022)

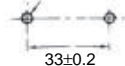


Terminal Arrangement

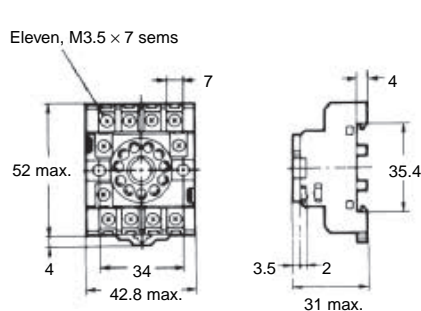


Mounting Holes

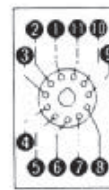
Two, M4 or two 4.5-dia. holes



PF113A-E (Conforming to EN 50022)

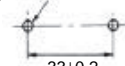


Terminal Arrangement

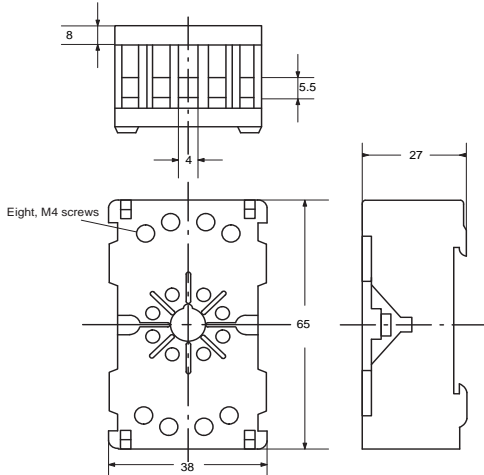


Mounting Holes

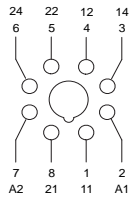
Two, M4 or two 4.5-dia. holes



PF083A-D

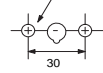


Terminal Arrangement

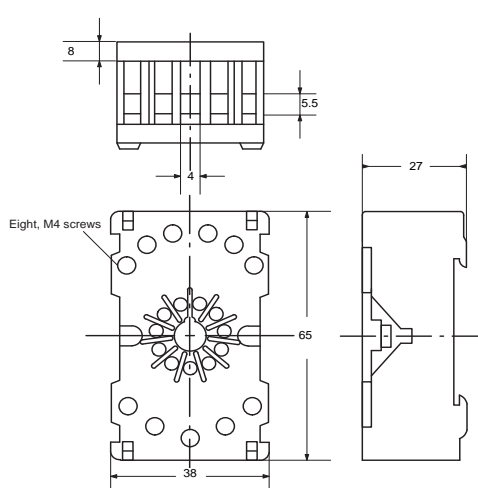


Mounting Holes

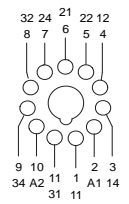
Two, M4 or two 4.5-dia. hole



PF113A-D

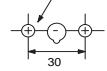


Terminal Arrangement



Mounting Holes

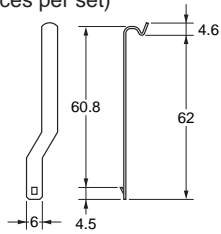
Two, M4 or two 4.5-dia. hole



Hold-down Clips

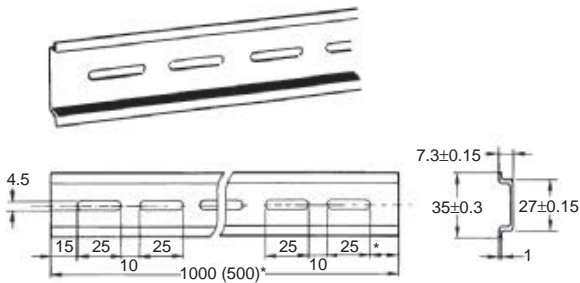
PFC-A1

(2 pieces per set)



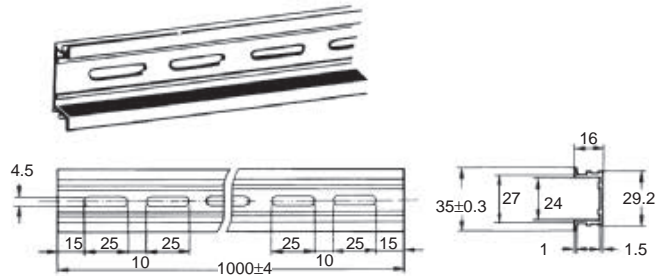
Mounting Tracks

PFP-100N, PFP-50N (Conforming to EN 50022)



* This dimension applies to the PFP-50N Mounting Track.

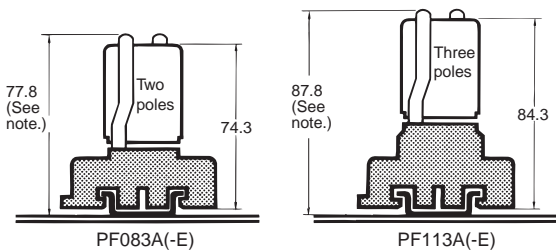
PFP-100N2 (Conforming to EN 50022)



* A total of twelve 25 × 4.5 elliptical holes is provided with six holes cut from each track end at a pitch of 10 mm.

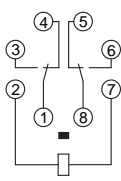
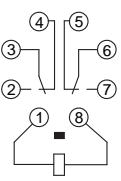
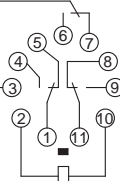
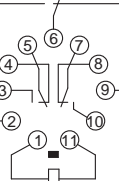
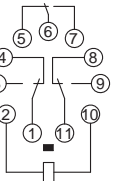
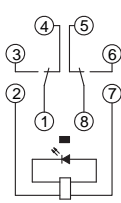
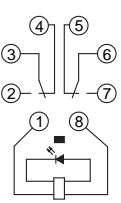
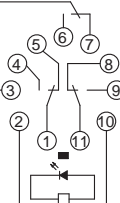
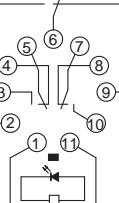
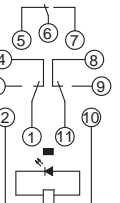
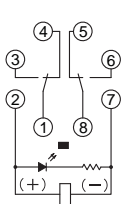
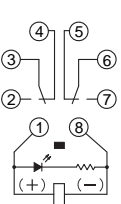
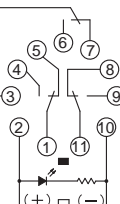
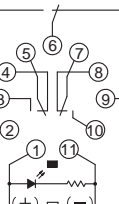
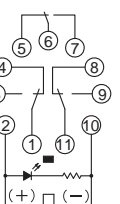
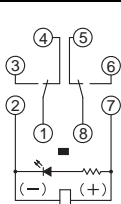
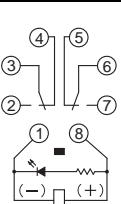
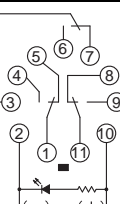
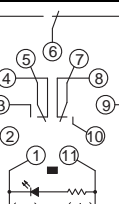
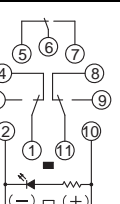
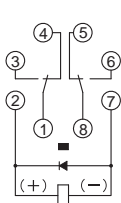
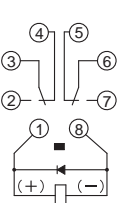
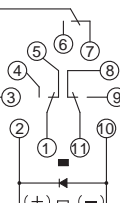
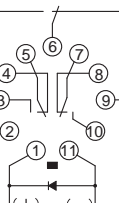
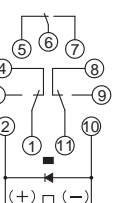
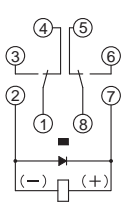
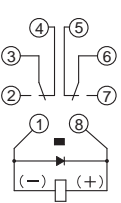
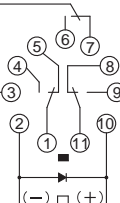
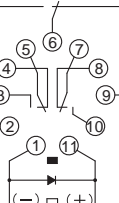
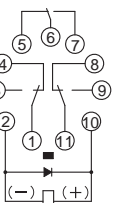
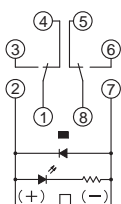
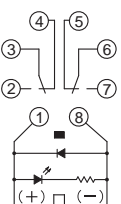
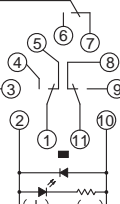
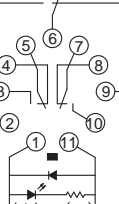
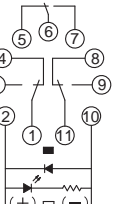
Mounting Height with Sockets

Surface-mounting Sockets



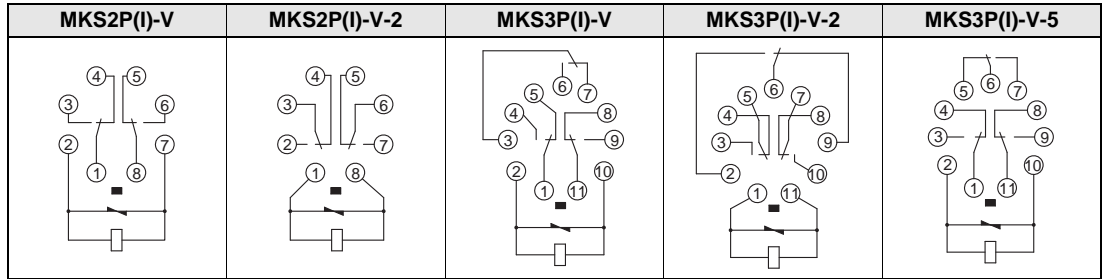
Note: PF083A(-E) and PF113A(-E) allow either track or screw mounting.

Terminal Arrangement and Internal Connection (Bottom View)

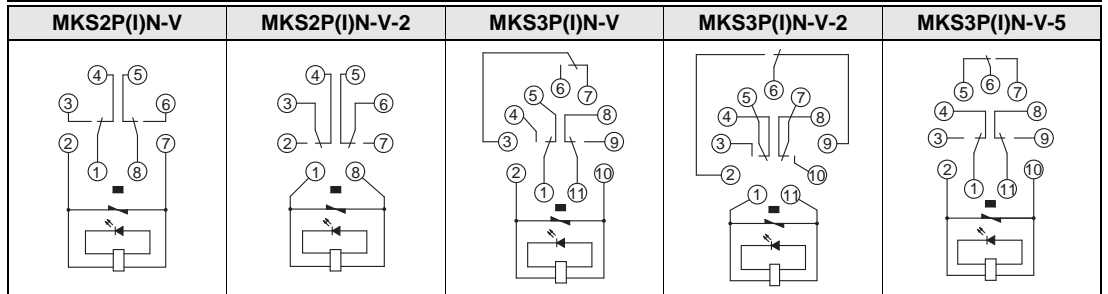
Standard Models (AC/DC Coil)	MKS2P(I) 	MKS2P(I)-2 	MKS3P(I) 	MKS3P(I)-2 	MKS3P(I)-5 
Models with LED Indicator (AC Coil)	MKS2P(I)N 	MKS2P(I)N-2 	MKS3P(I)N 	MKS3P(I)N-2 	MKS3P(I)N-5 
Models with Diode (DC Coil: Standard Polarity)	MKS2P(I)N 	MKS2P(I)N-2 	MKS3P(I)N 	MKS3P(I)N-2 	MKS3P(I)N-5 
Models with LED Indicator and Diode (DC Coil: Reverse Polarity)	MKS2P(I)N1 	MKS2P(I)N1-2 	MKS3P(I)N1 	MKS3P(I)N1-2 	MKS3P(I)N1-5 
Standard Models (DC Coil: Standard Polarity)	MKS2P(I)-D 	MKS2P(I)-D-2 	MKS3P(I)-D 	MKS3P(I)-D-2 	MKS3P(I)-D-5 
Models with Diode (DC Coil: Reverse Polarity)	MKS2P(I)1-D 	MKS2P(I)1-D-2 	MKS3P(I)1-D 	MKS3P(I)1-D-2 	MKS3P(I)1-D-5 
Models with LED indicator (DC Coil)	MKS2P(I)N-D 	MKS2P(I)N-D-2 	MKS3P(I)N-D 	MKS3P(I)N-D-2 	MKS3P(I)N-D-5 

MK-S

**Models with Varistor
(AC Coil)**



**Models with LED indicator and
Varistor
(AC Coil)**



Safety Precautions

Safety Precautions for Correct Use

Installation

Mount the MK-S with the marking at the bottom.

Handling

Check the coil polarity of models with built-in diodes and wire them correctly
(DC operation coil).

Test Button

Do not use the test button for any purpose other than testing. Be sure not to touch the test button accidentally as this will turn the contacts ON. Before using the test button, confirm that circuits, the load, and any other connected item will operate safely.

Check that the test button is released before turning ON relay circuits. If the test button is pulled out too forcefully, it may bypass the momentary testing position and go straight into the locked position. Use an insulated tool when you operate the test button.

Models with test buttons or LED indicators fulfill the requirements for reinforced insulation between live parts and the front of cover only when the Relay is in a complete condition, i.e. with the nameplate, nameplate frame, test button, and slider in place. If any of these parts are removed, only the requirements for basic insulation are fulfilled.

READ AND UNDERSTAND THIS DOCUMENT

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- Systems, machines, and equipment that could present a risk to life or property.

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Cat. No. J168-E2-02A-X

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

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