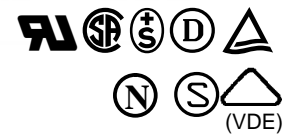


General-purpose Relay

MK-I/-S

Exceptionally Reliable General-purpose Relay Features Mechanical Indicator/Push Button

- Breaks relatively large load currents despite small size.
- Long life (minimum 100,000 electrical operations) assured by silver contacts.
- Built-in operation indicator (Mechanical, LED), push button, diode surge suppression, varistor surge suppression.
- Standard models are UL, CSA, SEV, DEMKO, NEMKO, SEMKO, TÜV (IEC), and VDE.
- Conforming to CENELEC standards.



Ordering Information

Type	Terminal	Contact form	Internal connection (see note 3)	With mechanical indicator	With mechanical indicator and pushbutton	Coil ratings	Approved standards
Standard	Plug-in	DPDT	Standard	MK2P-I	MK2P-S	AC (∧), DC (≡)	UL, CSA, SEV, DEMKO, NEMKO, SEMKO, TÜV
			Non-standard	MK2P2-I	MK2P2-S		
		3PDT	Standard	MK3P-I	MK3P-S		
			Non-standard	MK3P2-I MK3P5-I	MK3P2-S MK3P5-S		
LED Indicator (see note 2)	Plug-in	DPDT	Standard	MK2PN□-I	MK2PN□-S	AC (∧), DC (≡)	UL, CSA
			Non-standard	MK2PN□-2-I	MK2PN□-2-S		
		3PDT	Standard	MK3PN□-I	MK3PN□-S		
			Non-standard	MK3PN□-2-I MK3PN□-5-I	MK3PN□-2-S MK3PN□-5-S		
Diode (see note 2)	Plug-in	DPDT	Standard	MK2PD□-I	MK2PD□-S	DC (≡)	UL, CSA
			Non-standard	MK2PD□-2-I	MK2PD□-2-S		
		3PDT	Standard	MK3PD□-I	MK3PD□-S		
			Non-standard	MK3PD□-2-I MK3PD□-5-I	MK3PD□-2-S MK3PD□-5-S		
Varistor	Plug-in	DPDT	Standard	MK2PV-I	MK2PV-S	AC (∧)	UL, CSA
			Non-standard	MK2PV-2-I	MK2PV-2-S		
		3PDT	Standard	MK3PV-I	MK3PV-S		
			Non-standard	MK3PV-2-I MK3PV-5-I	MK3PV-2-S MK3PV-5-S		
VDE approved	Plug-in	DPDT	Standard	MK2P-I-VD	MK2P-S-VD	AC (∧), DC (≡)	UL, CSA, SEV, DEMKO, NEMKO, SEMKO, TÜV, VDE
			Non-standard	MK2P2-I-VD	MK2P2-S-VD		
		3PDT	Standard	MK3P-I-VD	MK3P-S-VD		
			Non-standard	MK3P2-I-VD MK3P5-I-VD	MK3P2-S-VD MK3P5-S-VD		
LED Indicator VDE approved	Plug-in	DPDT	Standard	MK2PN-I-VD	MK2PN-S-VD	AC (∧), DC (∧)	UL, CSA, VDE
			Non-standard	MK2PN-2-I-VD	MK2PN-2-S-VD		
		3PDT	Standard	MK3PN-I-VD	MK3PN-S-VD		
			Non-standard	MK3PN-2-I-VD MK3PN-5-I-VD	MK3PN-2-S-VD MK3PN-5-S-VD		

Type	Terminal	Contact form	Internal connection (see note 3)	With mechanical indicator	With mechanical indicator and pushbutton	Coil ratings	Approved standards
Diode VDE approved	Plug-in	DPDT	Standard	MK2PD-I-VD	MK2PD-S-VD	DC (...)	UL, CSA, VDE
			Non-standard	MK2PD-2-I-VD	MK2PD-2-S-VD		
		3PDT	Standard	MK3PD-I-VD	MK3PD-S-VD		
			Non-standard	MK3PD-2-I-VD	MK3PD-2-S-VD		
				MK3PD-5-I-VD	MK3PD-5-S-VD		

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

Example: MK3P5-S 230 VAC

Rated voltage

2. This DC coil comes in two types: standard coil polarity and reversed coil polarity. Refer to *Terminal Arrangement/Internal Connections*.

Example: MK2PN1-I 24 VDC

Reverse polarity

3. Refer to *Terminal Arrangement/Internal Connections* for non-standard internal connection.

4. The gold plating thickness depends on the request.

Example: MK3P-I AP3 24 VAC

Gold plating thickness: 3 µm

Model Number Legend

Standard Models

MK - -

1 2 3 4 5 6

1. Contact Form

- 2: DPDT
- 3: 3PDT

2. Cover

- P: Dust cover

3. Internal Connection Construction

- Blank: Standard
- 2 or 5: Non-standard connection (Refer to *Terminal Arrangement/Internal Connections*)

4. Mechanical Indicator Push Button

- S: Mechanical indicator and push button
- I: Mechanical indicator

5. Approved Standards

- Blank: UL, CSA, DEMKO, NEMKO, SEMKO, SEV, TÜV
- VD: VDE

6. Rated Voltage

- (Refer to *Coil Ratings*)

Special Accessories

MK - - -

1 2 3 4 5 6 7 8

1. Contact Form

- 2: DPDT
- 3: 3PDT

2. Cover

- P: Dust cover

3. Classification

- N: LED indicator
- D: Diode
- V: Varistor
- ND: LED indicator and diode
- NV: LED indicator and varistor

4. Coil Polarity

- Blank: Standard
- 1: Reverse (Refer to *Terminal Arrangement/Internal Connections*)

5. Internal Connection Construction

- Blank: Standard
- 2 or 5: Non-standard connection (Refer to *Terminal Arrangement/Internal Connections*)

6. Mechanical Indicator Push Button

- S: Mechanical indicator and push button
- I: Mechanical indicator

7. Approved Standards

- Blank: UL and CSA only
- VD: VDE (N and D models only)

8. Rated Voltage

- (Refer to *Coil Ratings*)

Accessories (Order Separately)

	Item	Model
Track-mounted Socket	8-pin type	PF083A-E
	11-pin type	PF113A-E
Hold-down Clip		PFC-A1

Specifications

■ Coil Ratings

UL, CSA, DEMKO, NEMKO, SEMKO, SEV, TÜV

	Rated voltage	Rated current		Coil resistance	Must operate voltage	Must release voltage	Max. voltage	Power consumption
		60 Hz	50 Hz					
AC (~)	6 V	360 mA	404 mA	3.9 Ω	80% max. of rated voltage	30% min. of rated voltage	90% to 110% of rated voltage	Approx. 2.3 VA (at 60 Hz) Approx. 2.7 VA (at 50 Hz)
	12 V	180 mA	202 mA	16.9 Ω				
	24 V	88.0 mA	98.0 mA	62.0 Ω				
	50 V	39.0 mA	46.3 mA	330 Ω				
	100 V	24.8 mA	28.4 mA	1,010 Ω				
	110 V	21.0 mA	24.7 mA	1,240 Ω				
	120 V	18.0 mA	20.2 mA	1,520 Ω				
	200 V	12.1 mA	14.2 mA	4,520 Ω				
	220 V	11.0 mA	12.9 mA	5,130 Ω				
	230 V	10.5 mA	12.3 mA	6,170 Ω				
	240 V	9.2 mA	10.3 mA	6,450 Ω				
DC (—)	6 V	255 mA		23.5 Ω	15% min. of rated voltage			Approx. 1.5 W
	12 V	126 mA		95 Ω				
	24 V	56 mA		430 Ω				
	48 V	29.5 mA		1,630 Ω				
	100 V	14.7 mA		6,800 Ω				
	110 V	15.1 mA		7,300 Ω				

VDE

	Rated voltage	Rated current		Coil resistance	Must operate voltage	Must release voltage	Max. voltage	Power consumption
		50 Hz	60 Hz					
AC (~)	6 V	380 mA	325 mA	4.4 Ω	80% max. of rated voltage	30% min. of rated voltage	90% to 110% of rated voltage	Approx. 2.0 VA (at 60 Hz) Approx. 2.4 VA (at 50 Hz)
	12 V	175 mA	145 mA	19.0 Ω				
	24 V	91.0 mA	76.5 mA	70.7 Ω				
	50 V	42.0 mA	36.0 mA	330 Ω				
	100 V	24.0 mA	20.5 mA	1,150 Ω				
	110 V	21.5 mA	18.0 mA	1,400 Ω				
	120 V	20.0 mA	17.0 mA	1,600 Ω				
	200 V	11.2 mA	9.4 mA	5,110 Ω				
	220 V	10.2 mA	8.7 mA	5,800 Ω				
	230 V	9.6 mA	8.1 mA	6,990 Ω				
		240 V	9.4 mA	7.9 mA				
DC (—)	6 V	225 mA		26.7 Ω	15% min. of rated voltage			Approx. 1.3 W
	12 V	116 mA		107 Ω				
	24 V	56.0 mA		440 Ω				
	48 V	29.0 mA		1,660 Ω				
	100 V	13.1 mA		7,660 Ω				
	110 V	12.5 mA		8,720 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. ~ indicates AC and — indicates DC (IEC417 publications).
 4. For 200 VDC applications, a 100-VDC Relay is supplied with a fixed 6.8 kΩ, 30 W resistor. Be sure to connect the resistor in series with the coil.
 5. For models with the LED indicator built in, add an LED current of approximately 0 through 5 mA to the rated current.

■ Contact Ratings

Load	Resistive load ($\cos\phi = 1$)	Inductive load ($\cos\phi = 0.4$)
Rated load	10 A at 250 VAC 10A at 28 VDC	7 A at 250 VAC
Rated carry current	10 A	
Max. switching voltage	250 VAC, 250 VDC	
Max. switching current	10 A	
Max. switching power	2,500 VA, 280 W	1,750 VA
Min. permissible load	10 mA at 1 VDC	

■ Characteristics

Contact resistance	50 m Ω max.
Operate time	AC: 20 ms max. DC: 30 ms max.
Release time	20 ms max.
Max. operating frequency	Mechanical: 18,000 operations/hr Electrical: 1,800 operations/hr (under rated load)
Insulation resistance	100 M Ω 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, terminals of the same polarity; 2,500 VAC, 50/60 Hz fro 1 min between current-carrying parts, non-current-carrying parts, and terminals of opposite polarity
Vibration resistance	Destruction: 10 to 55 Hz, 1.5-mm double amplitude Malfunction: 10 to 55 Hz, 1.0-mm double amplitude
Shock resistance	Destruction: 1,000 m/s ² (approx. 100G) Malfunction: 100 m/s ² (approx. 10G);
Life expectancy	Mechanical: 10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrical: Refer to <i>Engineering Data</i> .
Ambient temperature	Operating: -10°C to 40°C (with no icing or condensation) Storage: -25°C to 55°C (with no icing or condensation)
Ambient humidity	35% to 85%
Weight	Approx. 85 g

Note: The data shown are initial values.

■ Approved Standards

The following ratings apply to all models.

UL 508 (File No. E41515)/CSA 22.2 No.0/14 (File No. LR335535)

Coil ratings	Contact ratings	Operations
6 to 110 VDC 6 to 240 VAC	10 A, 28 VDC (resistive) 10 A, 250 VAC (resistive) 7 A, 250 VAC (general use)	100,000 cycles

SEV, DEMKO, NEMKO

Coil ratings	Contact ratings	Operations
6 to 110 V $\overline{=}$ 6 to 240 V \sim	10 A, 250 V \sim (NO) ($\cos\phi = 1$) 5 A, 250 V \sim (NC) ($\cos\phi = 1$) 10 A, 28 V $\overline{=}$ (NO) 5 A, 28 V $\overline{=}$ (NC) 7 A, 250 V \sim ($\cos\phi = 0.4$)	100,000 cycles

SEMKO

Coil ratings	Contact ratings	Operations
6 to 110 V $\overline{=}$ 6 to 240 V \sim	10 A, 250 V \sim (NO) ($\cos\phi = 1$) 5 A, 250 V \sim (NC) ($\cos\phi = 1$)	100,000 cycles

TÜV (VDE 0435 Teil 201/05'90, IEC 255 Teil 1-00/'75, EN 60950/ '88 (TÜV File No.: R9051410)

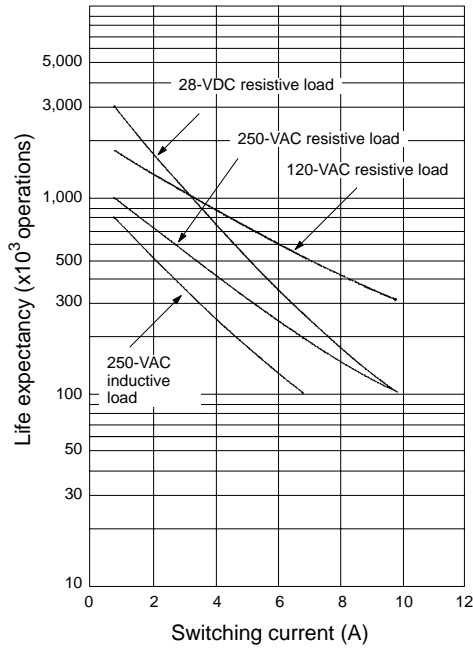
Coil ratings	Contact ratings	Conditions	Operations
6, 12, 24, 48, 100 110 V $\overline{=}$ 6, 12, 24, 50, 100, 110 115, 120, 200, 220 230, 240 V \sim	10 A, 250 V \sim ($\cos\phi = 1$) 10 A, 28 V $\overline{=}$ 7 A, 250 V \sim ($\cos\phi = 0.4$)	IEC 255-1-00 Item 3.1.4 Pollution Degree 3, Overvoltage Category II Pick up class - class 2 Temperature class - class b	100,000 cycles

VDE (VDE 0435 Teil 201/05'83, IEC 255 Teil 1-00/'75) (VDE File No.: NR 5340)

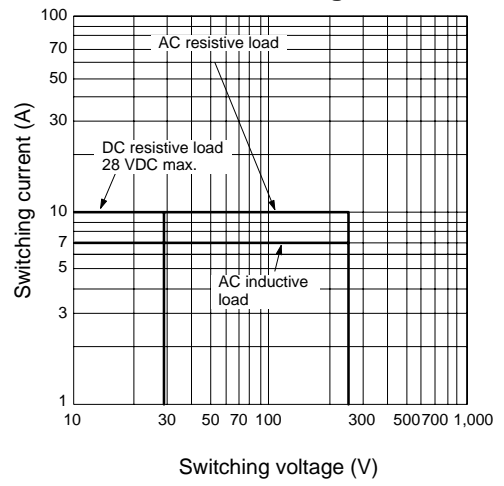
Coil ratings	Contact ratings	Conditions	Operations
6, 12, 24, 48, 100 110 V $\overline{=}$ 6, 12, 24, 50, 100, 110 115, 120, 200, 220 230, 240 V \sim	10 A, 250 V \sim ($\cos\phi = 1$) 10 A, 28 V $\overline{=}$ 7 A, 250 V \sim ($\cos\phi = 0.4$)	C/250 - class 1, class C	100,000 cycles

Engineering Data

Electrical Life Expectancy



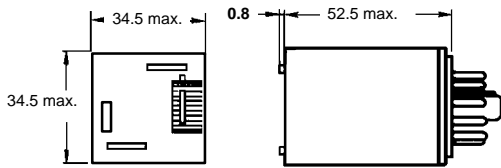
Maximum Switching Power



Dimensions

Note: All units are in millimeters unless otherwise indicated.

■ Relays



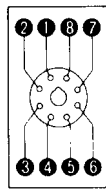
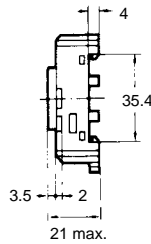
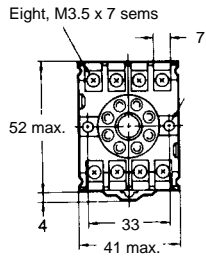
■ Accessories (Order Separately)

Sockets

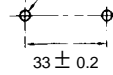
PF083A-E (Conforming to EN 50022)

Terminal Arrangement

Mounting Holes

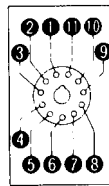
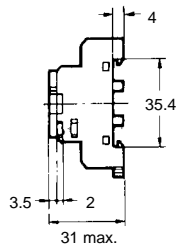
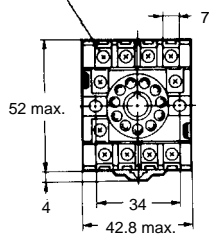


Two, M4 or two 4.5-dia. holes

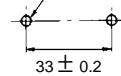


PF113A-E (Conforming to EN 50022)

Eleven, M3.5 x 7 sems

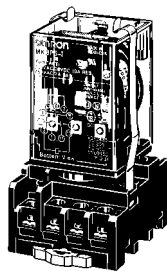


Two, M4 or two 4.5-dia. holes



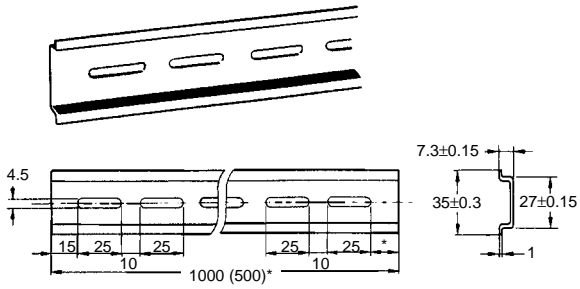
Hold-down Clips

PFC-A1



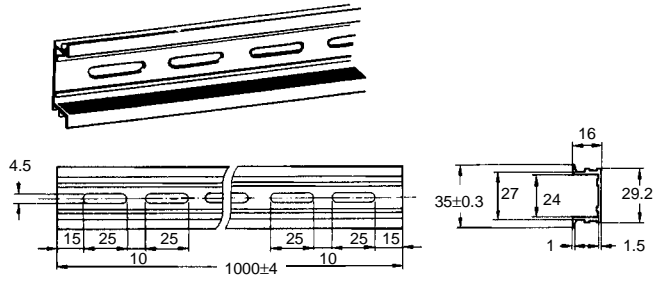
Mounting Tracks

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



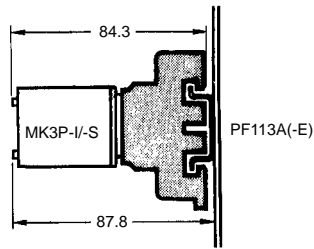
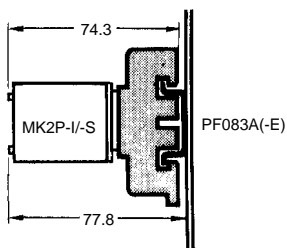
* This dimension applies to the PFP-50N Mounting Track.

PFP-100N2
(Conforming to EN 50022)



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

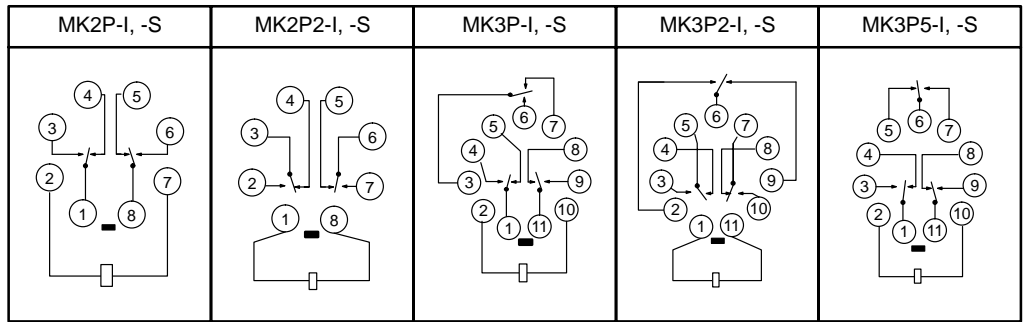
Mounting Height with Sockets



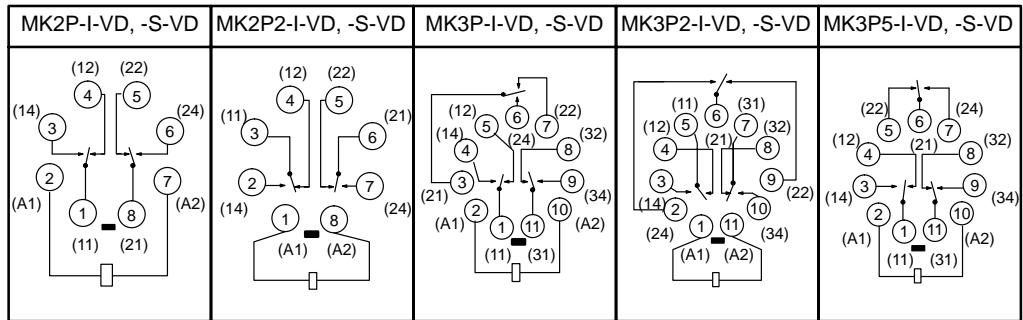
Installation

■ Terminal Arrangement/Internal Connection (Bottom View)

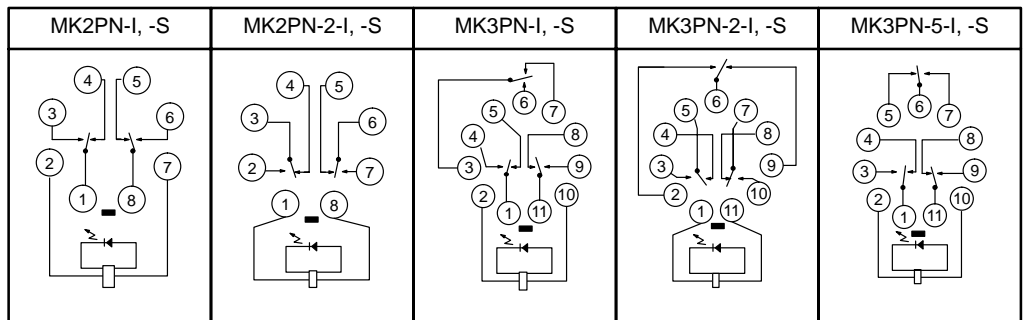
Standard
(AC/DC Coil)



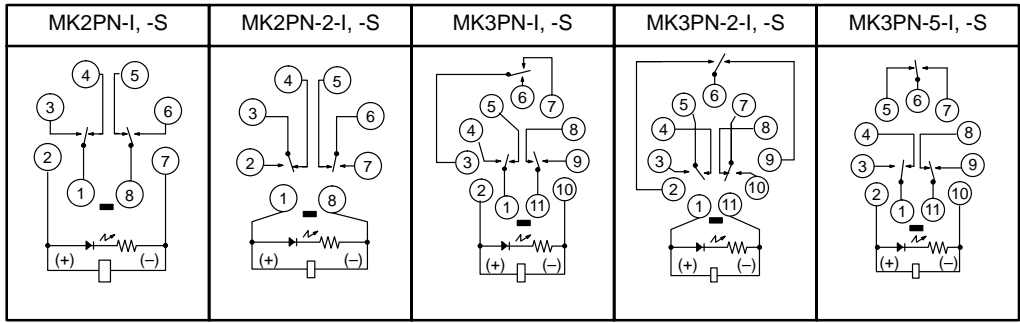
VDE-approved Type
(AC/DC Coil)
(): Dual Numbering



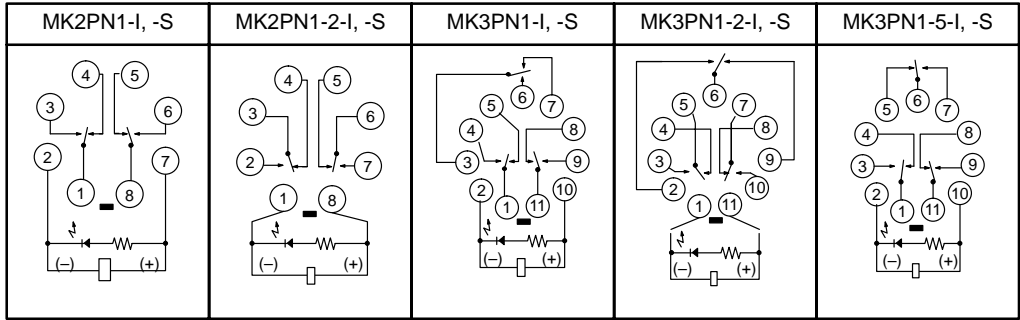
LED Indicator Type
(AC Coil)



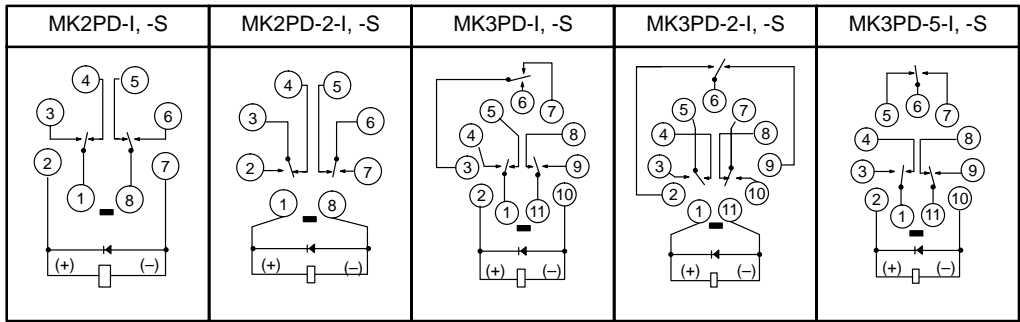
**LED Indicator Type
(DC Coil:
Standard Polarity)**



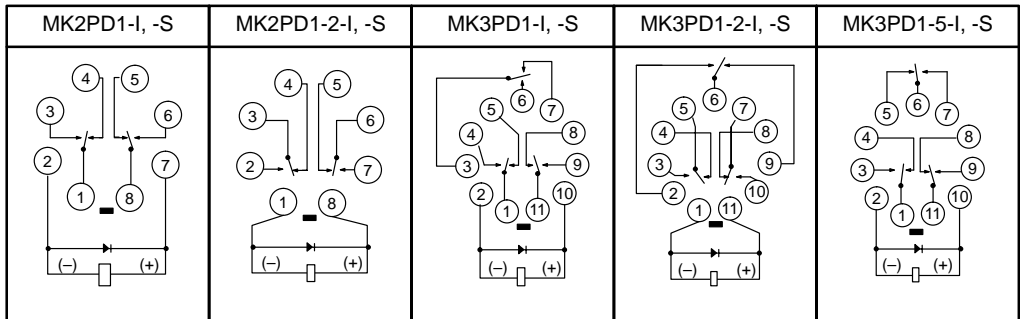
**LED Indicator Type
(DC Coil:
Reverse Polarity)**



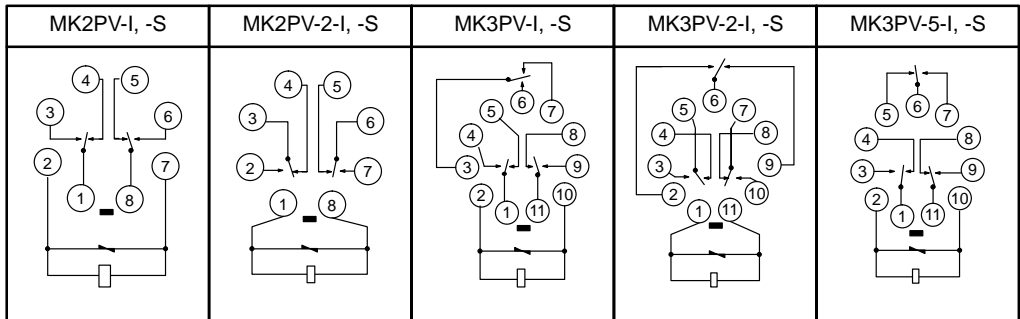
**Diode Type
(DC Coil:
Standard Polarity)**



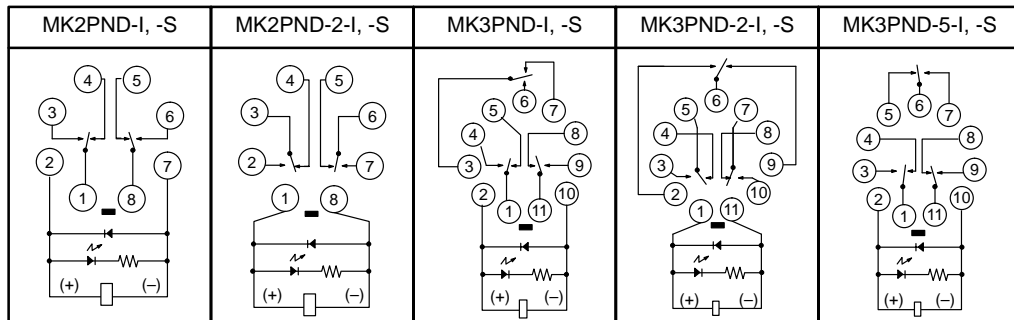
**Diode Type
(DC Coil:
Reverse Polarity)**



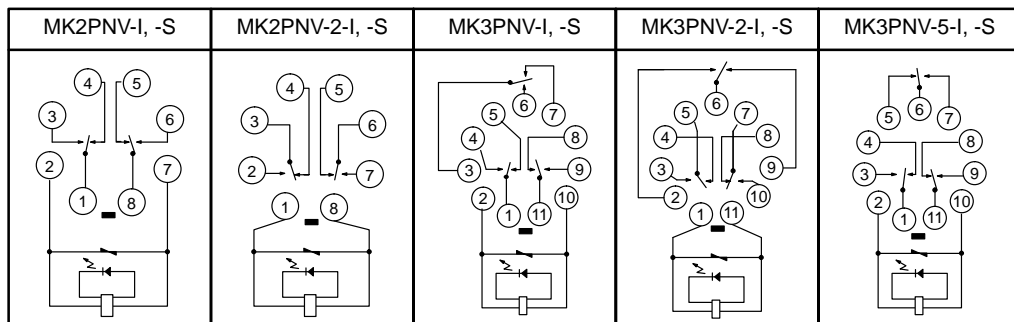
**Varistor Type
(AC Coil)**



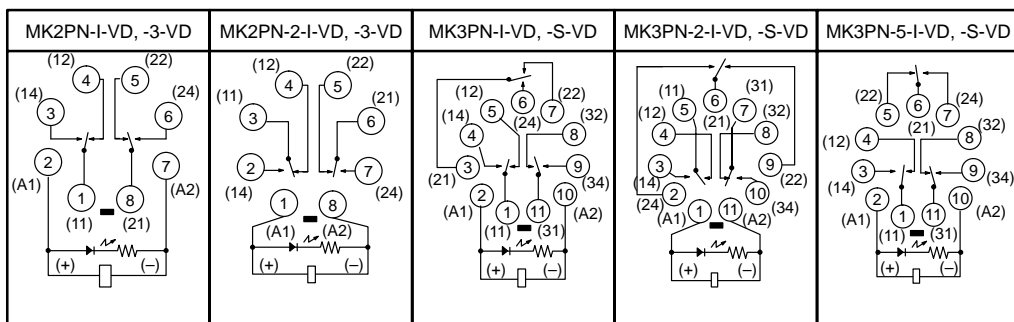
LED Indicator and Diode Type (DC Coil)



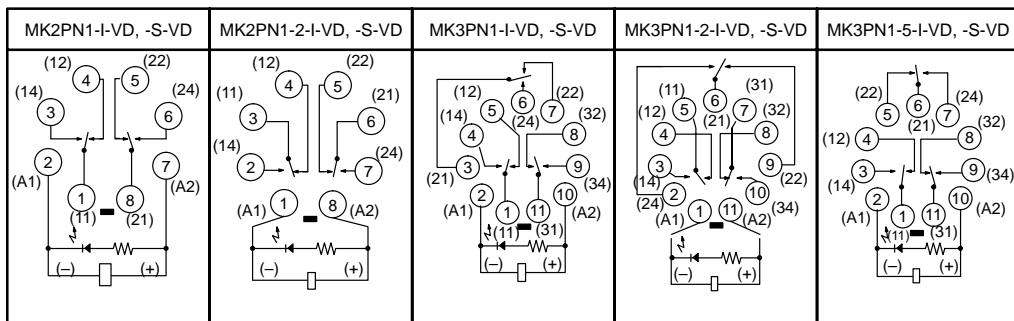
LED Indicator and Varistor Type (AC Coil)



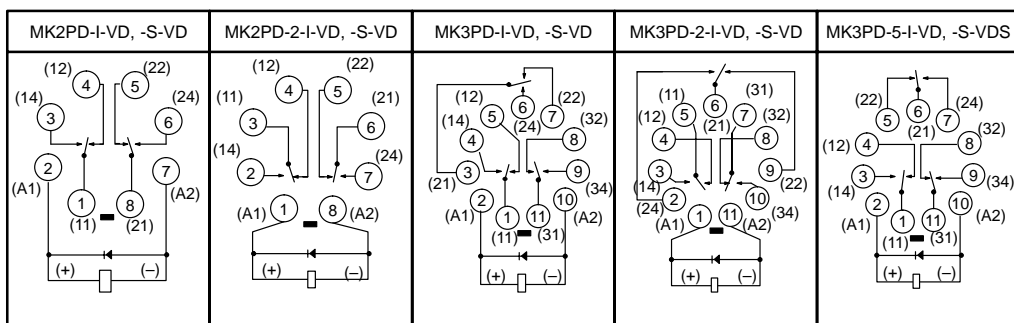
VDE Approved Type LED Indicator Type (DC Coil: Standard Polarity) (): Dual Numbering



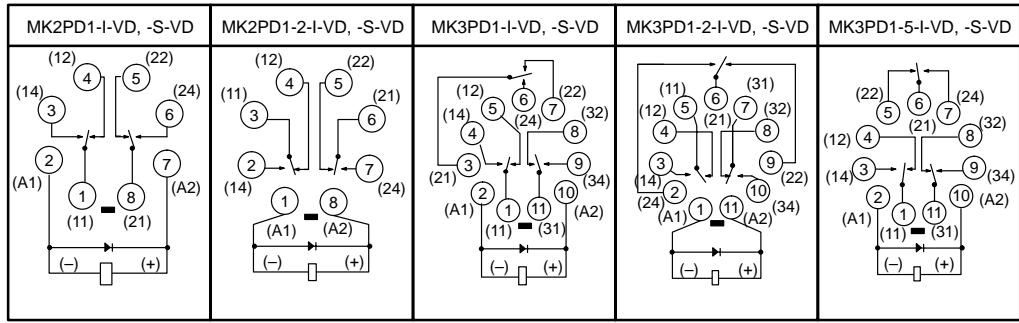
VDE Approved Type LED Indicator Type (DC Coil: Reverse Polarity)



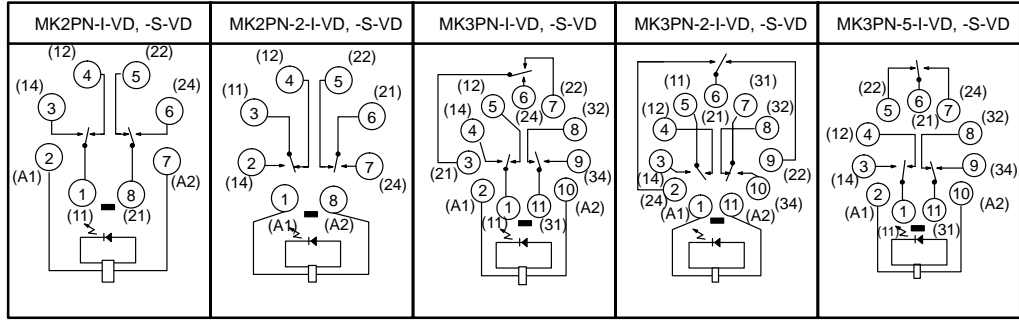
VDE Approved Type Diode Type (DC Coil: Standard Polarity)



VDE Approved Type
Diode Type
(DC Coil:
Reverse Polarity)



VDE Approved Type
LED Indicator Type
(AC Coil)



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