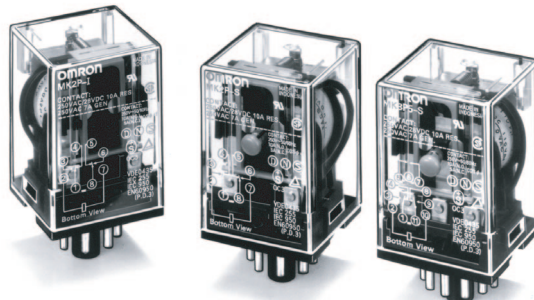


General-purpose Relay MK-I/-S

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.



Model Number Structure

Model Number Legend

Standard Models

MK - -

1 2 3 4 5 6

- | | | |
|--|---|--|
| <p>1. Contact Form 2: DPDT 3: 3PDT</p> <p>2. Cover P: Dust cover</p> | <p>3. Internal Connection Construction Blank: Standard 2 or 5: Non-standard connection (Refer to <i>Terminal Arrangement/Internal Connections</i>)</p> <p>4. Mechanical Indicator Push Button S: Mechanical indicator and push button I: Mechanical indicator</p> | <p>5. Approved Standards Blank: UL, CSA, DEMKO, NEMKO SEMKO, SEV, TÜV VD: VDE</p> <p>6. Rated Voltage (Refer to <i>Coil Ratings</i>)</p> |
|--|---|--|

Special Accessories

MK - - -

1 2 3 4 5 6 7 8

- | | | |
|---|---|--|
| <p>1. Contact Form 2: DPDT 3: 3PDT</p> <p>2. Cover P: Dust cover</p> <p>3. Classification N: LED indicator D: Diode V: Varistor ND: LED indicator and diode NV: LED indicator and varistor</p> | <p>4. Coil Polarity Blank: Standard 1: Reverse (Refer to <i>Terminal Arrangement/Internal Connections</i>)</p> <p>5. Internal Connection Construction Blank: Standard 2 or 5: Non-standard connection (Refer to <i>Terminal Arrangement/Internal Connections</i>)</p> | <p>6. Mechanical Indicator Push Button S: Mechanical indicator and push button I: Mechanical indicator</p> <p>7. Approved Standards Blank: UL and CSA only VD: VDE (N and D models only)</p> <p>8. Rated Voltage (Refer to <i>Coil Ratings</i>)</p> |
|---|---|--|

Ordering Information

List of Models

| 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-2-S-VD | | |
| | | | | MK3PN-5-I-VD | MK3PN-5-S-VD | | |
| | | | | | | | |
| 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

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 | 80% max. of rated voltage | 15% min. of rated voltage | 90% to 110% 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 | 7,400 Ω | | | | |
| DC (=) | 6 V | 225 mA | | 26.7 Ω | 80% max. of rated voltage | 15% min. of rated voltage | 90% to 110% 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 ($\cos\phi = 0.4$) |
|------------------------|--------------------------------------|--|
| Contact mechanism | Single | |
| Contact material | Ag | |
| 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 |

■ 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 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. 100G) Malfunction:100 m/s ² (approx. 10G); |
| Endurance | Mechanical:10,000,000 operations min. (at operating frequency of 18,000 operations/hour) Electrical:Refer to <i>Engineering Data</i> . |
| Error rate (reference value) | 10 mA at 1 VDC |
| Ambient temperature | Operating:–10°C to 40°C (with no icing or condensation) |
| Ambient humidity | Operating: 5% 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. LR35535)

| 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 $\overline{\text{---}}$ 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 $\overline{\text{---}}$ (NO) 5 A, 28 V $\overline{\text{---}}$ (NC) 7 A, 250 V \sim ($\cos\phi = 0.4$) | 100,000 cycles |

SEMKO

| Coil ratings | Contact ratings | Operations |
|---|---|----------------|
| 6 to 110 V $\overline{\text{---}}$ 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 $\overline{\text{---}}$ 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 $\overline{\text{---}}$ 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 |

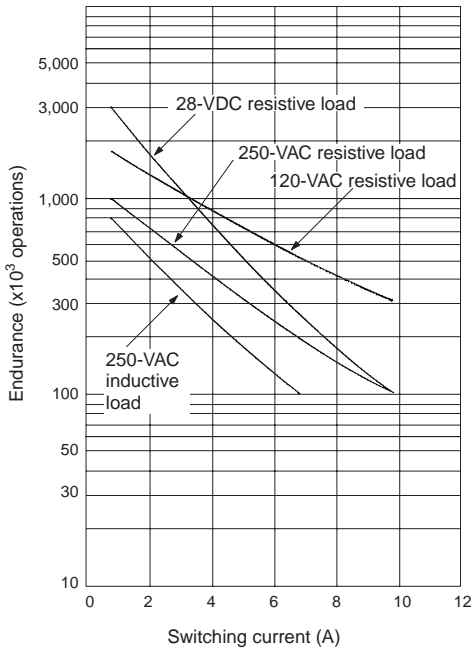
VDE (VDE 0435 Teil 201/05'83, IEC 255 Teil 1-00/75)

(VDE File No.: NR 5340)

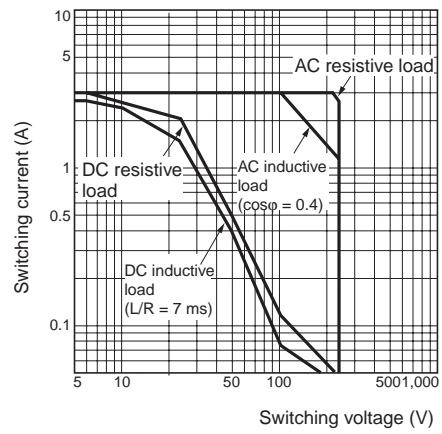
| Coil ratings | Contact ratings | Conditions | Operations |
|---|---|--------------------------|----------------|
| 6, 12, 24, 48, 100 110 V $\overline{\text{---}}$ 6, 12, 24, 50, 100, 110 115, 120, 200, 220 230, 240 V \sim | 10 A, 250 V \sim ($\cos\phi = 1$) 10 A, 28 V $\overline{\text{---}}$ 7 A,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

Engineering Data

■ Electrical Endurance



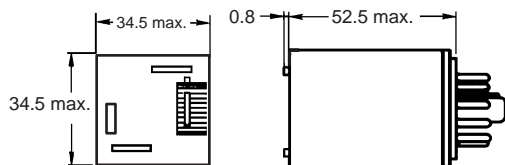
■ Maximum Switching Power



Dimensions

Note: All units are in millimeters unless otherwise indicated.

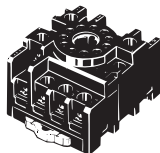
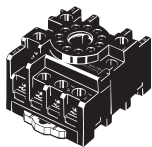
Relays



Sockets

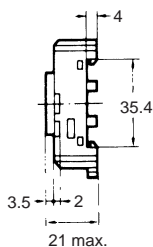
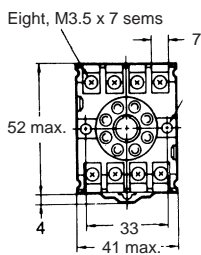
See below for Socket dimensions.

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

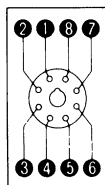


Note: Use the Surface-mounting Sockets (i.e., finger-protection models) with “-E” at the end of the model number. When using the PF083A and PF113A, be sure not to exceed the Socket’s maximum carry current of 5 A. Using at a current exceeding 5 A may lead to burning. Round terminals cannot be used for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

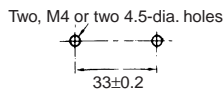
PF083A-E (Conforming to EN 5022)



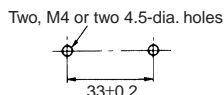
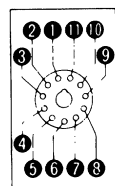
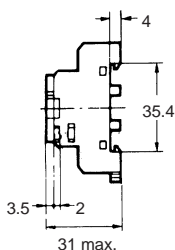
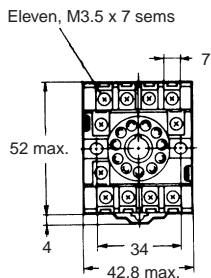
Terminal Arrangement



Mounting Holes

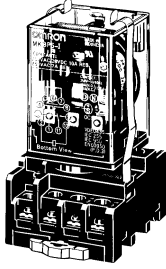


PF113A-E (Conforming to EN 5022)



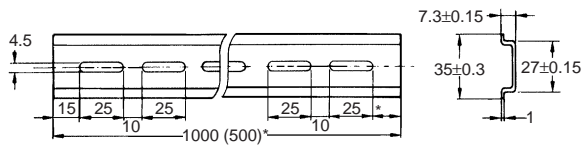
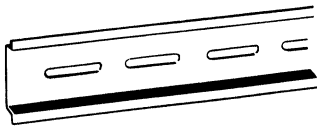
Hold-down Clips

PFC-A1



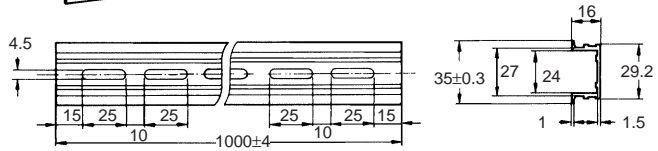
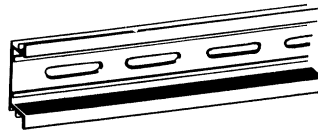
Mounting Tracks

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



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

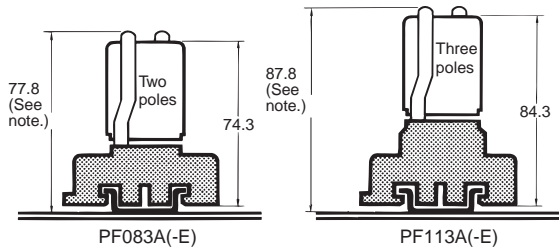
PFP-100N2
(Conforming to EN 50022)



* 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

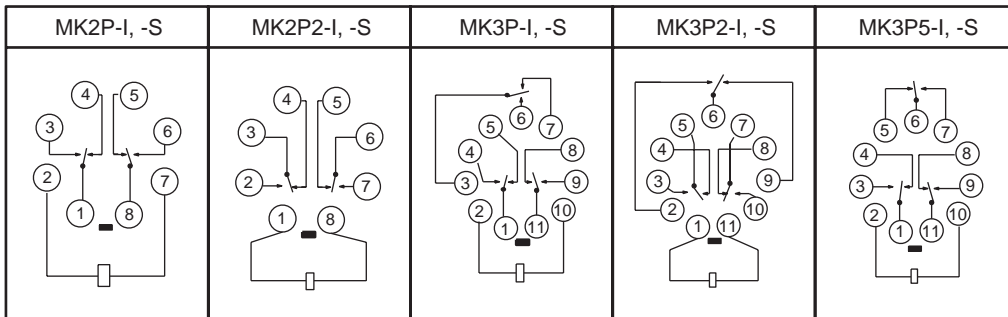
Surface-mounting Sockets



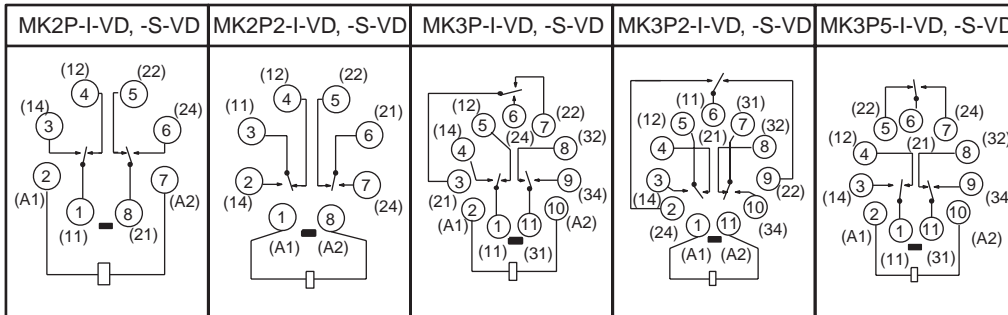
Note: PF083A(-E) and PF113A(-E) allow either track or screw mounting.

Terminal Arrangement/Internal Connection (Bottom View)

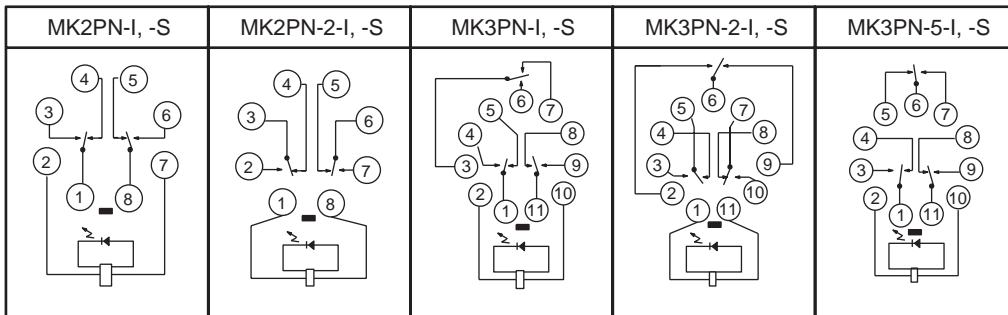
Standard
(AC/DC Coil)



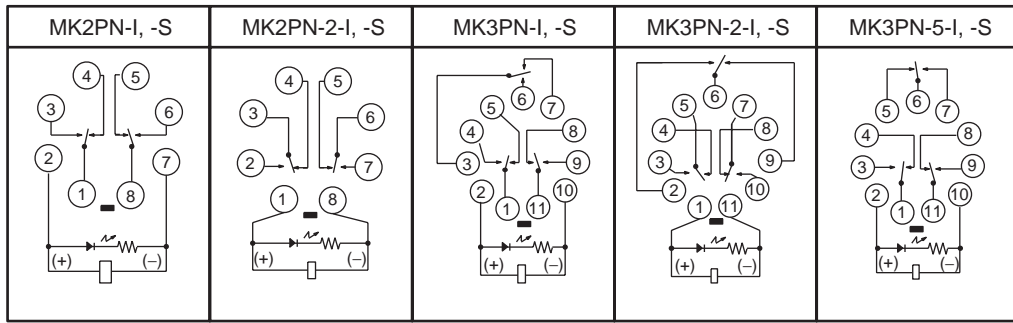
VDE-approved Type
(AC/DC Coil)
(): Dual Numbering



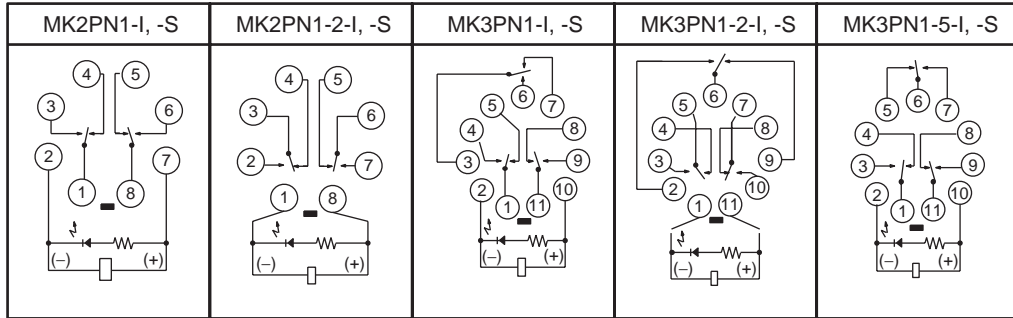
LED Indicator Type
(AC Coil)



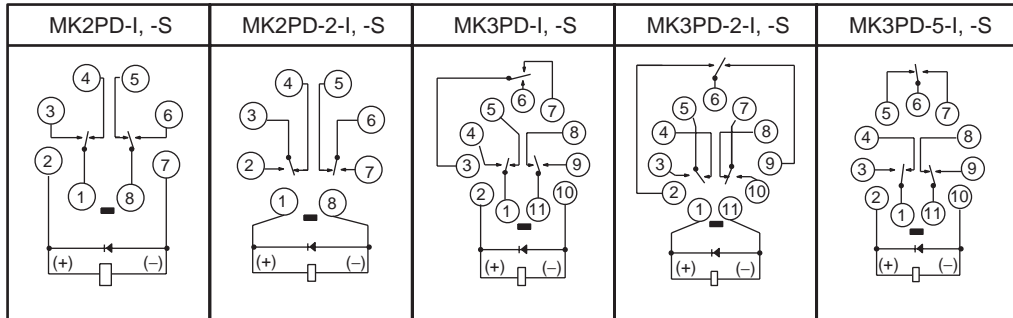
LED Indicator Type
(DC Coil:
Standard Polarity)



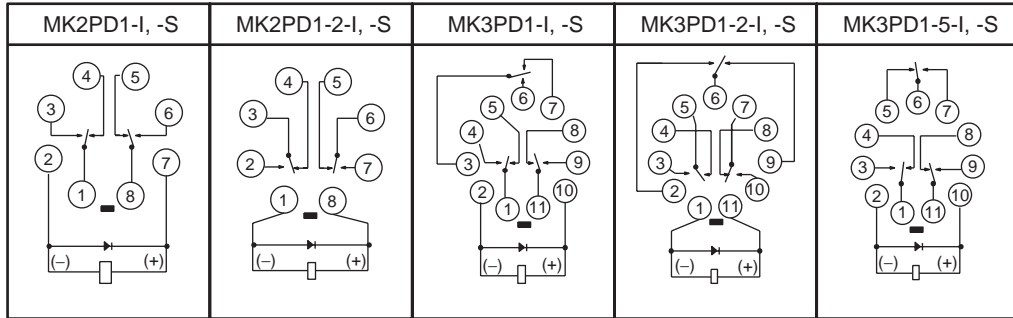
LED Indicator Type
(DC Coil:
Reverse Polarity)



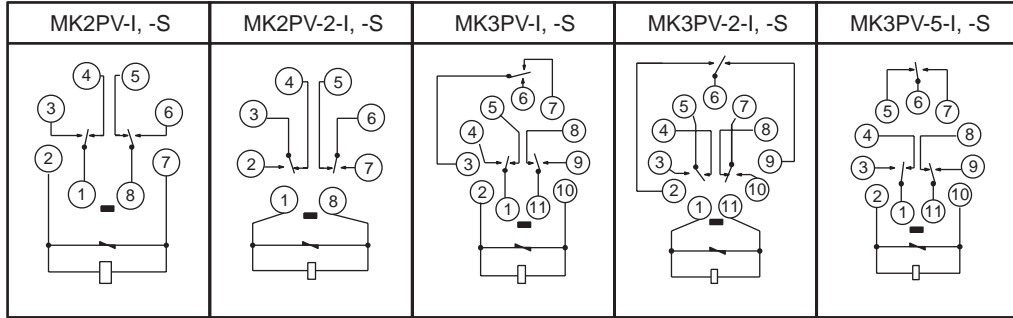
Diode Type
(DC Coil:
Standard Polarity)



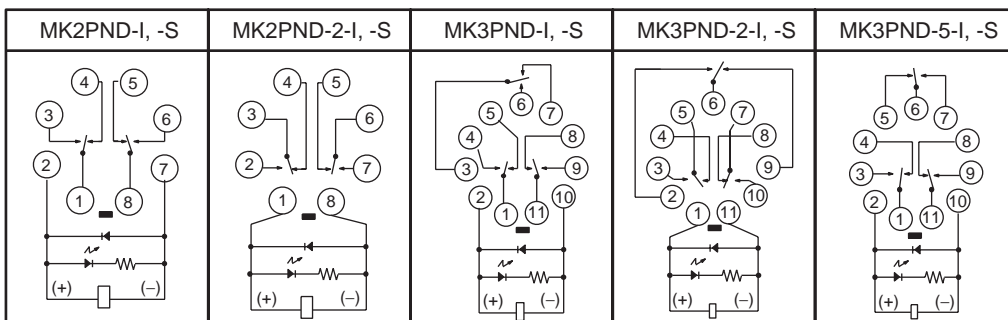
Diode Type
(DC Coil:
Reverse Polarity)



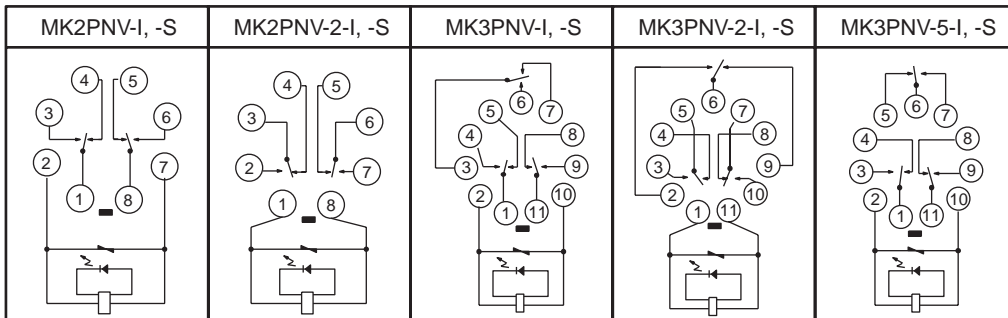
Varistor Type
(AC Coil)



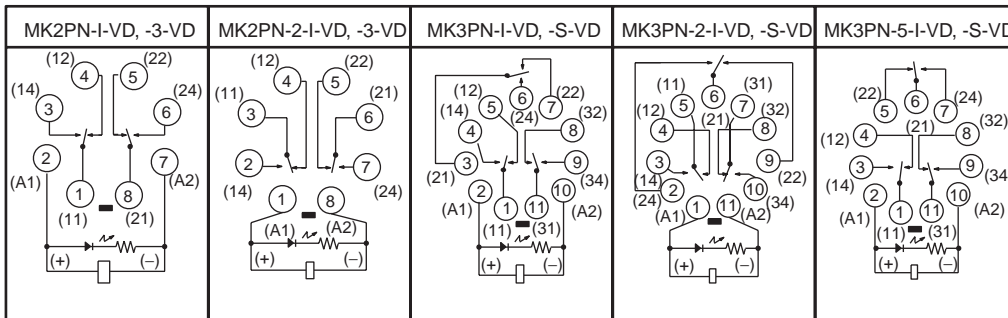
LED Indicator and Diode Type (DC Coil)



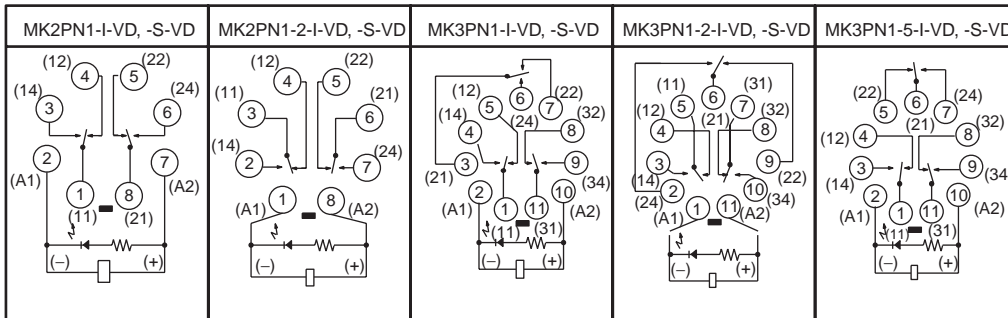
LED Indicator and Varistor Type (AC Coil)



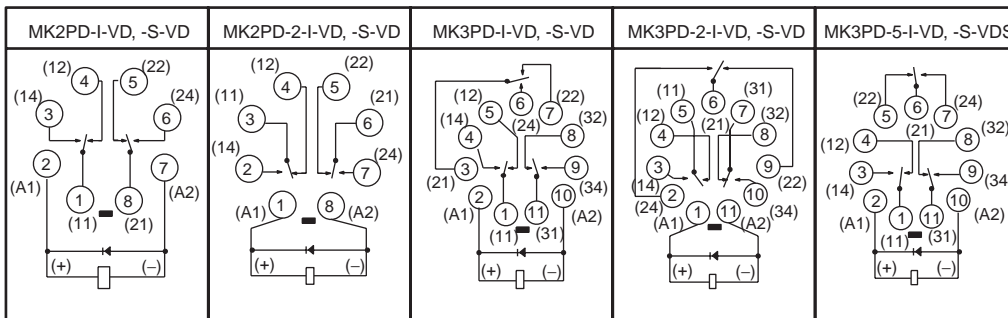
VDE Approved Type LED Indicator Type (DC Coil: Standard Polarity)
(): Dual Numbering



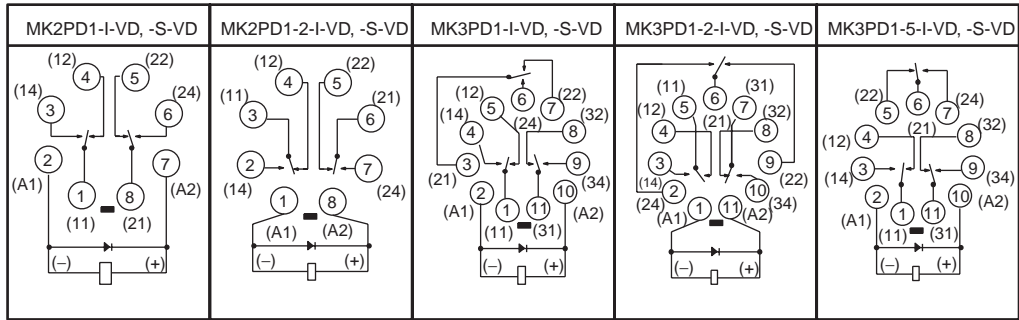
VDE Approved Type LED Indicator Type (DC Coil: Reverse Polarity)



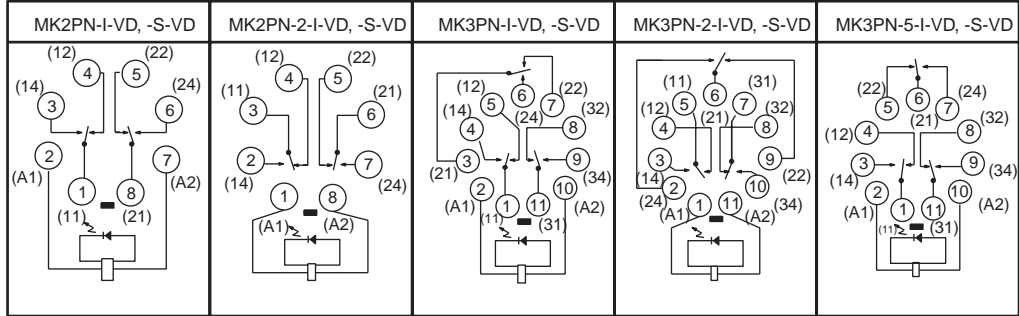
VDE Approved Type Diode Type (DC Coil: Standard Polarity)



**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.