

General Purpose Relays MK-S

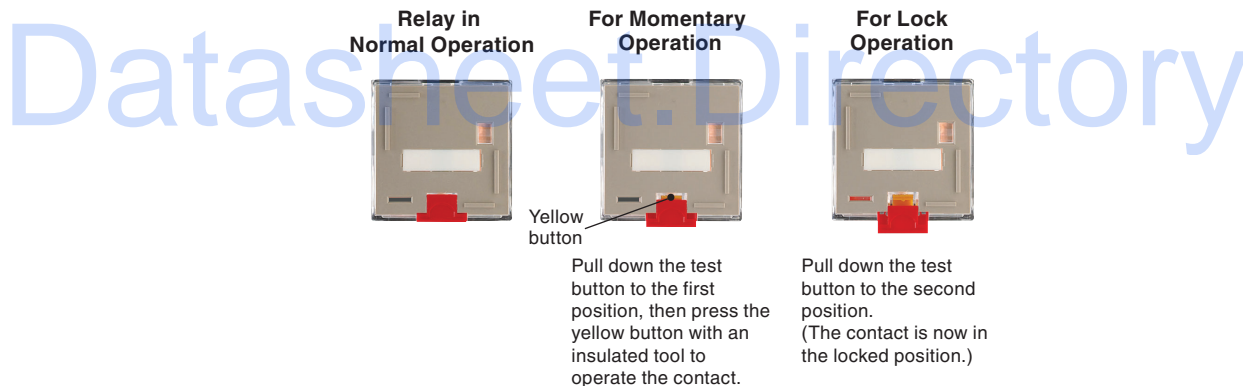
Exceptionally Reliable General Purpose Relay now available with Lockable Test Button

- IEC Rating of 7A 250 V AC 50/60 Hz, General use 100,000 cycles.
- Mechanical indicator standard for all models.
- Optional features include lockable test button, LED indicator, diode surge suppression, varistor, reverse polarity, and alternate wiring styles.
- UL/CUL, CE and TUV approved.
- RoHS Compliant.



Features

Two-way Action Test Button



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 DPDT

- Blank: Standard
- 2: Non Standard

Internal Connections 3PDT

- 5: Standard
- Blank: Non Standard
- 2: Non Standard

8. Rated Voltage

(Refer to "Coil Ratings".)

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
Basic Models	Plug-in	DPDT	Standard	MKS2P	MKS2PI	AC/DC
			Non Standard	MKS2P-2	MKS2PI-2	
		3PDT	Standard	MKS3P-5	MKS3PI-5	
			Non Standard	MKS3P-2	MKS3PI-2	
Models with LED Indicator (See note 2.)	Plug-in	DPDT	Standard	MKS2PN(1)	MKS2PIN(1)	AC/DC
			Non Standard	MKS2PN(1)-2	MKS2PIN(1)-2	
		3PDT	Standard	MKS3PN(1)-5	MKS3PIN(1)-5	
			Non Standard	MKS3PN(1)-2	MKS3PIN(1)-2	
Models with Diode (See note 2.)	Plug-in	DPDT	Standard	MKS2P(1)-D	MKS2PI(1)-D	DC
			Non Standard	MKS2P(1)-D-2	MKS2PI(1)-D-2	
		3PDT	Standard	MKS3P(1)-D-5	MKS3PI(1)-D-5	
			Non Standard	MKS3P(1)-D-2	MKS3PI(1)-D-2	
Models with LED Indicator and Diode	Plug-in	DPDT	Standard	MKS2PN-D	MKS2PIN-D	DC
			Non Standard	MKS2PN-D-2	MKS2PIN-D-2	
		3PDT	Standard	MKS3PN-D-5	MKS3PIN-D-5	
			Non Standard	MKS3PN-D-2	MKS3PIN-D-2	
Models with Varistor	Plug-in	DPDT	Standard	MKS2P-V	MKS2PI-V	AC
			Non Standard	MKS2P-V-2	MKS2PI-V-2	
		3PDT	Standard	MKS3P-V-5	MKS3PI-V-5	
			Non Standard	MKS3P-V-2	MKS3PI-V-2	
Models with LED Indicator and Varistor	Plug-in	DPDT	Standard	MKS2PN-V	MKS2PIN-V	AC
			Non Standard	MKS2PN-V-2	MKS2PIN-V-2	
		3PDT	Standard	MKS3PN-V-5	MKS3PIN-V-5	
			Non Standard	MKS3PN-V-2	MKS3PIN-V-2	
			MKS3PN-V	MKS3PIN-V		

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: MKS2P DC48

Rated voltage

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

Refer to *Terminal Arrangement and Internal Connections*.

Example: MKS3PN1-5 DC24

Reverse coil polarity

3. Refer to *Terminal Arrangement and Internal Connections* for all wiring diagrams.

■ 10A Sockets (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					
AC	6 V	443 mA	385 mA	3.1 Ω	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	13.7 Ω				
	24 V	110 mA	96.3 mA	48.4 Ω				
	110 V	24.2 mA	21.0 mA	932 Ω				
	120 V	22.2 mA	19.3 mA	1,130 Ω				
	220 V	12.1 mA	10.5 mA	3,550 Ω				
	230 V	11.5 mA	10.0 mA	4,250 Ω				
	240 V	11.0 mA	9.6 mA	4,480 Ω				
DC	6 V	224 mA		26.7 Ω	15% min. of rated voltage		Approx. 1.4 W	
	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 (p.f. = 0.4)
Contact mechanism	Single	
Contact material	AgSnIn	
Rated load	NO	10 A, 250 VAC 10A, 30 VDC
	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 capacity	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 models)
Max. operating frequency	Mechanical: 18,000 operations/hr (no load) Electrical: 1,800 operations/hr (at 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 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. 100 G) Malfunction: 100 m/s ² (approx. 10 G)
Life expectancy	Mechanical: 5,000,000 operations min. Electrical: 100,000 operations min.
Min. permissible load	10 mA at 1 VDC P level: λ ₆₀ =0.1 × 10 ⁻⁶ / ops
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. 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)	6,000
	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)	6,000

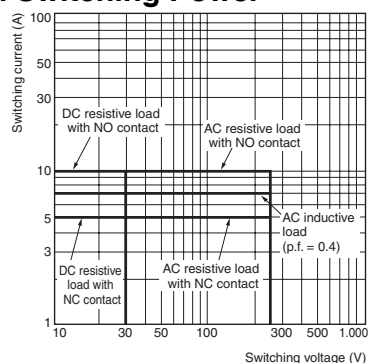
CSA Standard: CSA Certification by

UL[®] US: CSA C22.2 No. 14

Engineering Data

Reference Data

Maximum Switching Power

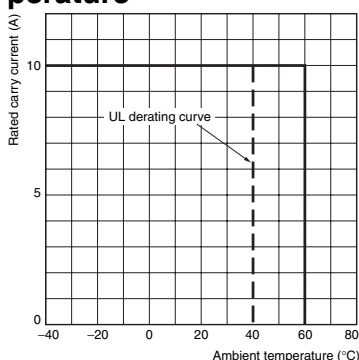


IEC Standard/TUV Certification: IEC61810-1 (Certification No. R50104853)

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

Note: Maximum carrying current per TUV Certification is 9 A when new MK-S relays are mounted in PF083A-E or PF113A-E Sockets.

Rated Carry Current vs. Ambient Rated Temperature

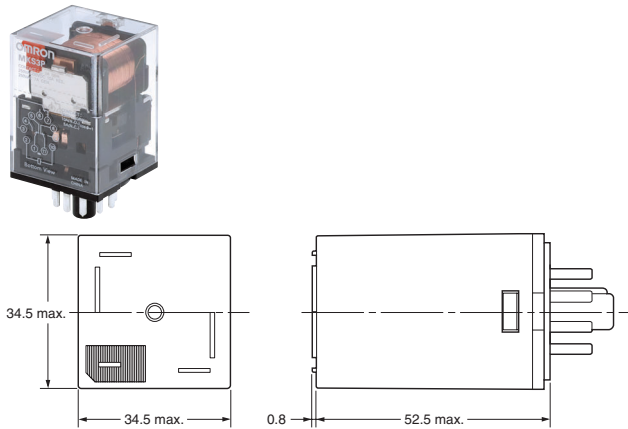


Note: The lower limit of the ambient operating temperature for models with built-in operation indicators is -25°C.

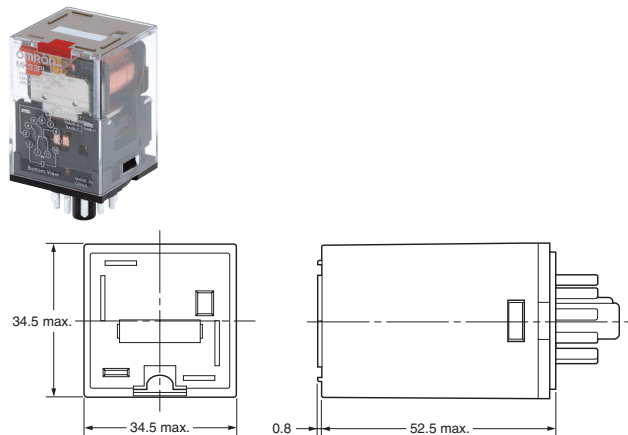
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Models without Test Button


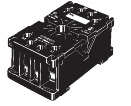
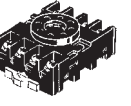

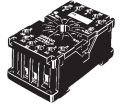



Models with Lockable Test Button



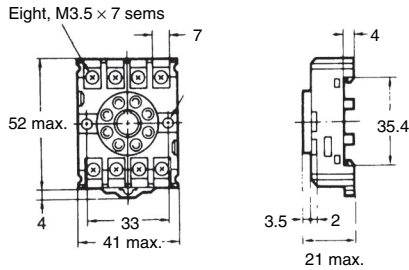
Track Mounted Sockets

See below for Socket dimensions.

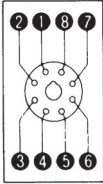
Poles	Finger-protection models		—
Maximum carry current	10 A		5 A
2 poles	PF083A-E 	PF083A-D 	PF083A 
3 poles	PF113A-E 	PF113A-D 	PF113A 

Note: If using the PF083A or PF113A Sockets, be sure the maximum carrying current is 5 A or less. When using finger-protection sockets, make sure the connecting wire terminals are Y-shaped.

PF083A-E (Conforming to EN 50022)

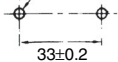


Terminal Arrangement

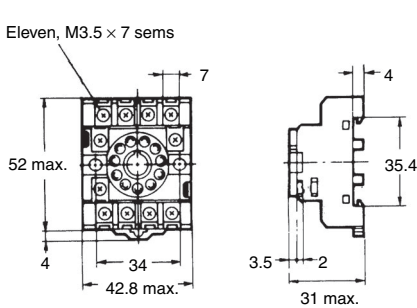


Mounting Holes

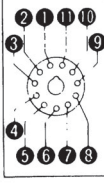
Two, M4 or two 4.5-dia. holes



PF113A-E (Conforming to EN 50022)

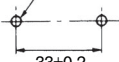


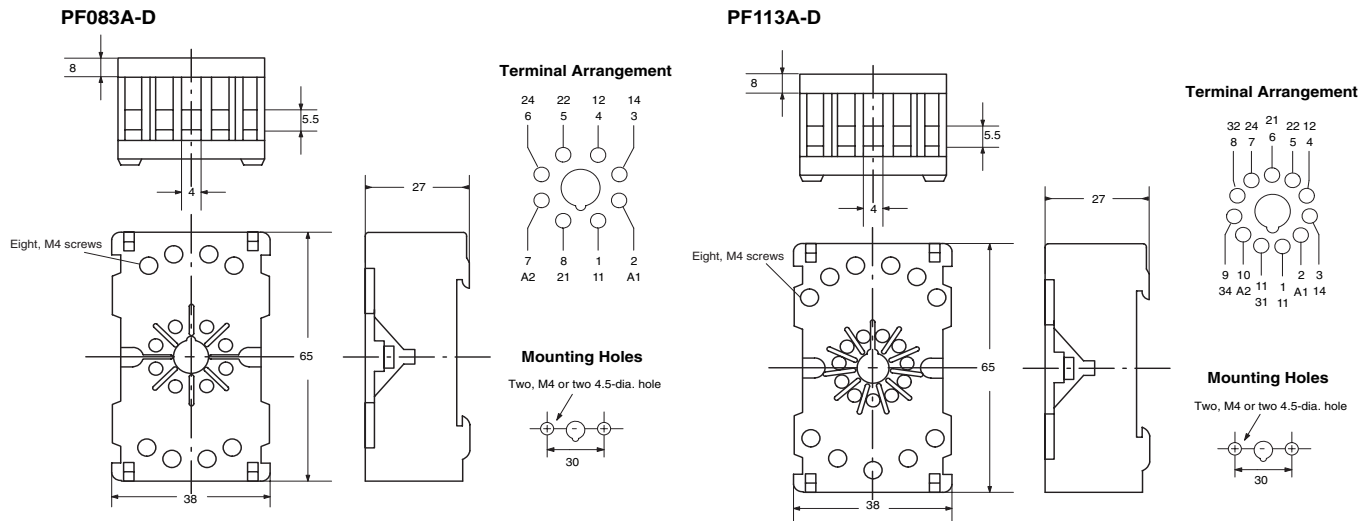
Terminal Arrangement



Mounting Holes

Two, M4 or two 4.5-dia. holes

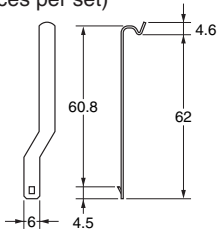




Hold-down Clips

PFC-A1

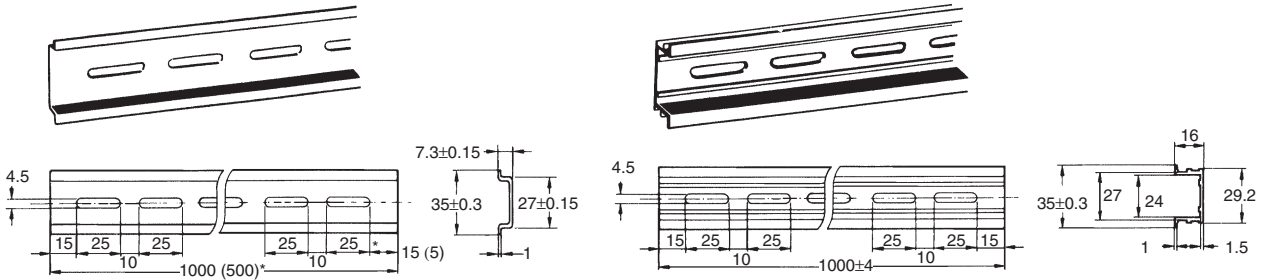
(2 pieces per set)



Mounting Tracks

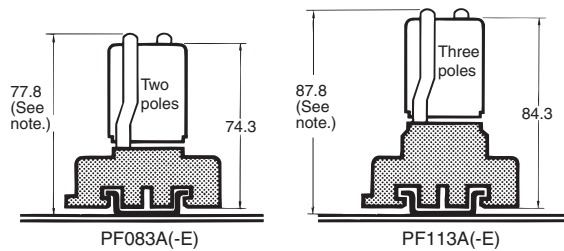
PFP-100N, PFP-50N
(Conforming to EN 50022)

PFP-100N2
(Conforming to EN 50022)



* The figure in parenthesis is for PFP-50N.

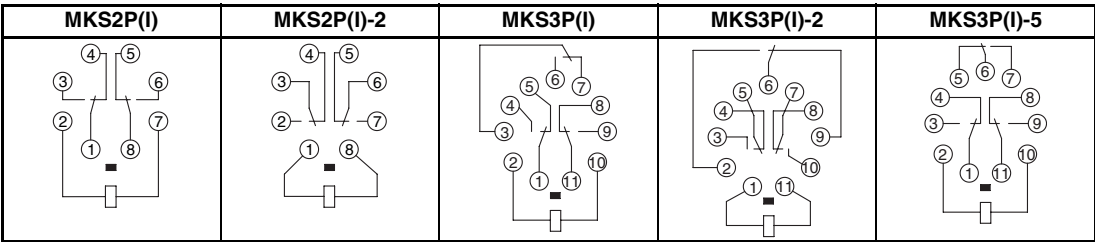
Mounting Height with Sockets



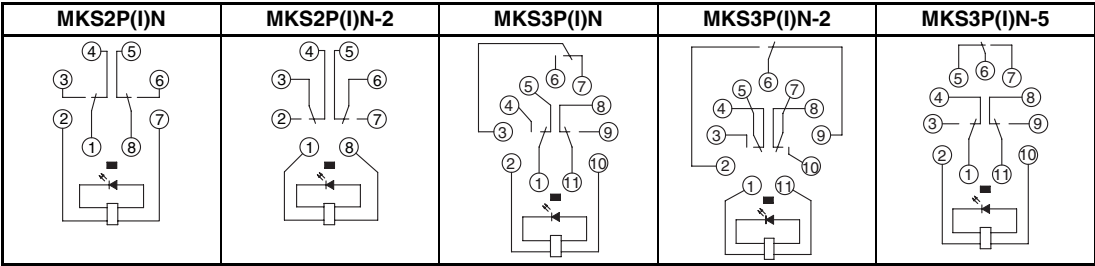
Note: PF083A(-E) and PF113A(-E) allow either track or screw mounting.

Terminal Arrangement/Internal Connection (Bottom View)

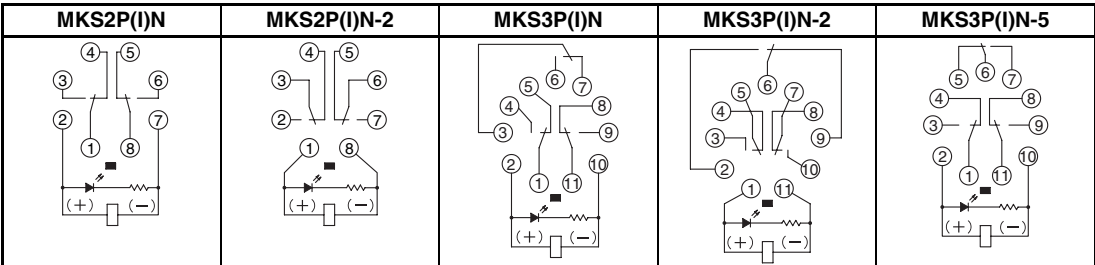
**Basic Models
(AC/DC Coil)**



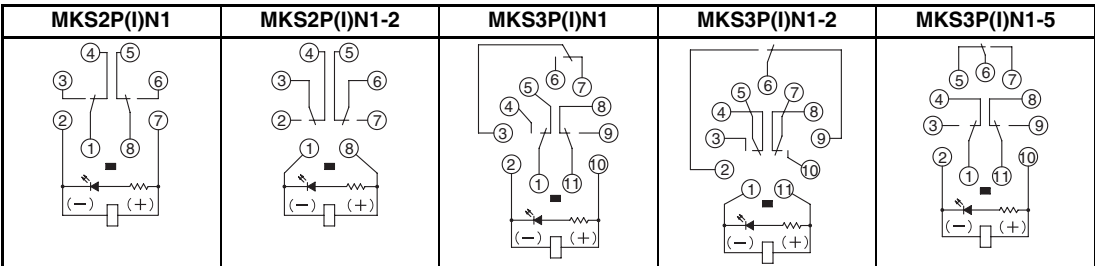
**LED Indicator Type
(AC Coil)**



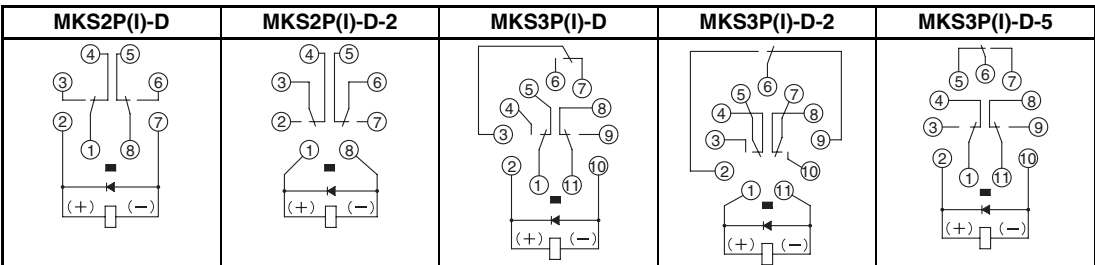
**LED Indicator Type
(DC Coil:
Standard Polarity)**



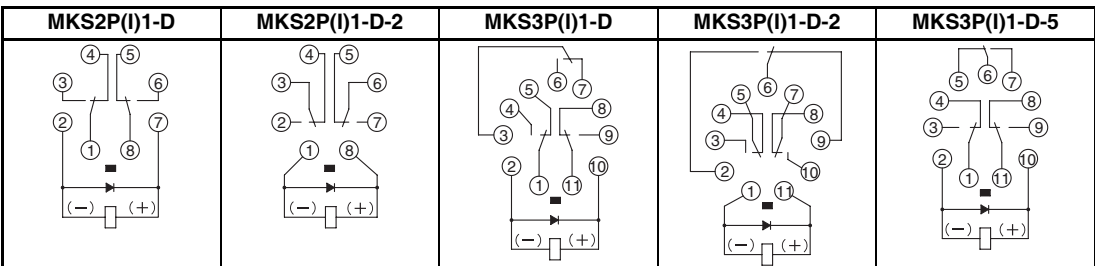
**LED Indicator Type
(DC Coil:
Reverse Polarity)**



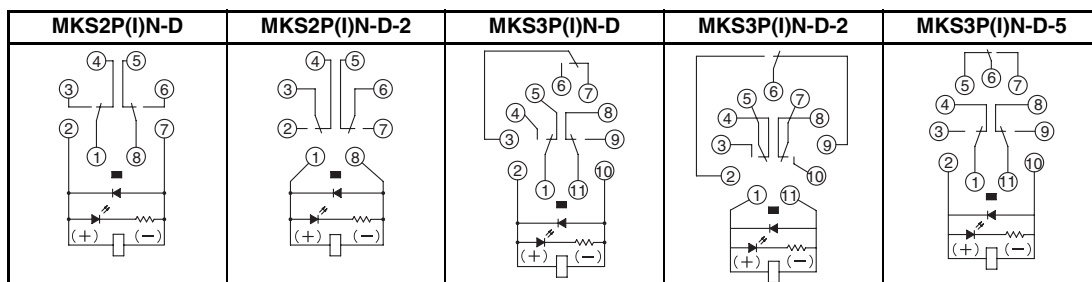
**Diode Type
(DC Coil:
Standard Polarity)**



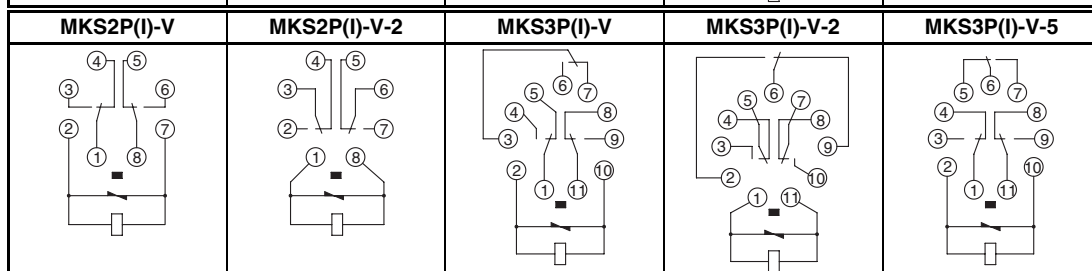
**Diode Type
(DC Coil:
Reverse Polarity)**



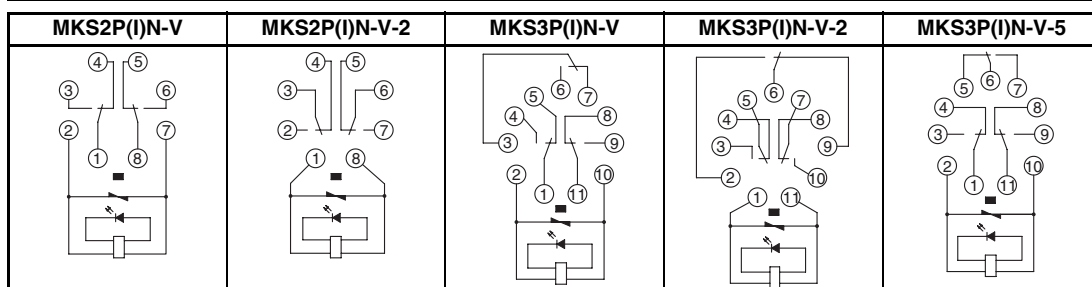
LED Indicator and Diode Type (DC Coil)



Varistor Type (AC Coil)



LED Indicator and Varistor Type (AC Coil)



Safety Precautions

■ Safety Precautions for Correct Use

Installation

Recommend mounting MK-S Relay so that side with wiring diagram is facing down.

Handling

Check coil polarity when wiring LED Indicator and Diode Models.

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.

Omron Electronic Components, LLC

Terms and Conditions of Sales

I. GENERAL

- Definitions:** The words used herein are defined as follows.
 - Terms:** These terms and conditions
 - Seller:** Omron Electronic Components LLC and its subsidiaries
 - Buyer:** The buyer of Products, including any end user in section III through VI
 - Products:** Products and/or services of Seller
 - Including:** Including without limitation
- Offer; Acceptance:** These Terms are deemed part of all quotations, acknowledgments, invoices, purchase orders and other documents, whether electronic or in writing, relating to the sale of Products by Seller. Seller hereby objects to any Terms proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
- Distributor:** Any distributor shall inform its customer of the contents after and including section III of these Terms.

II. SALES

- Prices; Payment:** All prices stated are current, subject to change without notice by Seller. Buyer agrees to pay the price in effect at time of shipment. Payments for Products received are due net 30 days unless otherwise stated in the invoice. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice.
- Discounts:** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (a) the invoice is paid according to Seller's payment terms and (b) Buyer has no past due amounts owing to Seller.
- Interest:** Seller, at its option, may charge Buyer 1.5% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
- Orders:** Seller will accept no order less than 200 U.S. dollars net billing.
- Currencies:** If the prices quoted herein are in a currency other than U.S. dollars, Buyer shall make remittance to Seller at the then current exchange rate most favorable to Seller; provided that if remittance is not made when due, Buyer will convert the amount to U.S. dollars at the then current exchange rate most favorable to Seller available during the period between the due date and the date remittance is actually made.
- Governmental Approvals:** Buyer shall be responsible for all costs involved in obtaining any government approvals regarding the importation or sale of the Products.
- Taxes:** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Seller or required to be collected directly or indirectly by Seller for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Seller.
- Financial:** If the financial position of Buyer at any time becomes unsatisfactory to Seller, Seller reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Seller may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
- Cancellation; Etc:** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
- Force Majeure:** Seller shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
- Shipping; Delivery:** Unless otherwise expressly agreed in writing by Seller:
 - All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Products shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Products until the full purchase price is paid by Buyer;
 - Delivery and shipping dates are estimates only; and
 - Seller will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- Claims:** Any claim by Buyer against Seller for shortage or damage to the Products occurring before delivery to the carrier must be presented in detail in writing to Seller within 30 days of receipt of shipment.

III. PRECAUTIONS

- Suitability:** IT IS THE BUYER'S SOLE RESPONSIBILITY TO ENSURE THAT ANY OMRON PRODUCT IS FIT AND SUFFICIENT FOR USE IN A MOTORIZED VEHICLE APPLICATION. BUYER SHALL BE SOLELY RESPONSIBLE FOR DETERMINING APPROPRIATENESS OF THE PARTICULAR PRODUCT WITH RESPECT TO THE BUYER'S APPLICATION INCLUDING (A) ELECTRICAL OR ELECTRONIC COMPONENTS, (B) CIRCUITS, (C) SYSTEM ASSEMBLIES, (D) END PRODUCT, (E) SYSTEM, (F) MATERIALS OR SUBSTANCES OR (G) OPERATING ENVIRONMENT. Buyer acknowledges that it alone has determined that the Products will meet their requirements of the intended use in all cases. Buyer must know and observe all prohibitions of use applicable to the Product/s.
- Use with Attention:** The followings are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible use of any Product, nor to imply that any use listed may be suitable for any Product:
 - Outdoor use, use involving potential chemical contamination or electrical interference.
 - Use in consumer Products or any use in significant quantities.

- Energy control systems, combustion systems, railroad systems, aviation medical equipment, amusement machines, vehicles, safety equipment, installations subject to separate industry or government regulations.
 - Systems, machines, and equipment that could present a risk to life or property.
- Prohibited Use:** NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE PRODUCT AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THE PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
 - Motorized Vehicle Application:** USE OF ANY PRODUCT/S FOR A MOTORIZED VEHICLE APPLICATION MUST BE EXPRESSLY STATED IN THE SPECIFICATION BY THE SELLER.
 - Programmable Products:** Seller shall not be responsible for the Buyer's program of a programmable Product.

IV. WARRANTY AND LIMITATION

- Warranty:** Seller's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale (or such other period expressed in writing by Seller). SELLER MAKES NO WARRANTY, REPRESENTATION, EXPRESS OR IMPLIED, ABOUT ALL OTHER MATTERS INCLUDING NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS.
- Buyer Remedy:** Seller's sole obligation hereunder shall be to replace (in the originally shipped with Buyer responsible for labor charges for removal or rework thereof) the non-complying Product or, at Seller's election, to repay or credit an amount equal to the purchase price of the Product; provided that there shall be no liability for Seller or its affiliates unless Seller's analysis confirms that the Product handled, stored, installed and maintained and not subject to contamination, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Seller before shipment.
- Limitation on Liability:** SELLER AND ITS AFFILIATES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTION WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. FURTHER, IN NO EVENT SHALL THE LIABILITY OF SELLER OR ITS AFFILIATES EXCEED THE INDIVIDUAL PURCHASE PRICE OF THE PRODUCT ON WHICH LIABILITY IS ASSERTED.
- Indemnities:** Buyer shall indemnify and hold harmless Seller, its affiliates and employees from and against all liabilities, losses, claims, costs and expense attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer's omissions under these Terms or in any way with respect to the Products.

V. INFORMATION; ETC.

- Intellectual Property:** The intellectual property embodied in the Products is the property of Seller and its affiliates and Buyer shall not attempt to duplicate it without the written permission of Seller. Buyer (at its own expense) shall indemnify and hold harmless Seller and defend or settle any action brought against Seller that it is based on a claim that any Product made to Buyer specifications infringes intellectual property rights of another party.
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ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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