

# General Purpose Relay MK

- Exceptionally reliable general purpose relay.
- Long life (minimum 100,000 electrical operations) assured by silver contacts.
- Built-in operation indicator (mechanical, LED), diode surge suppression, Varistor surge suppression.
- The contact operation can be easily checked by mechanical indicator and/or push-to-test button options.
- Conforms to CENELEC standards.
- VDE approved versions available.



## Ordering Information

To Order: Select the part number and add the desired coil voltage rating (e.g., MK3P5-S-AC120).

| Type                       | Terminal | Coil  | Contact form | Model                |  |
|----------------------------|----------|-------|--------------|----------------------|--|
|                            |          |       |              | Mechanical indicator | Mechanical indicator & push-to-test button |
| Standard                   | Plug-in  | AC/DC | DPDT         | MK2P-I               | MK2P-S                                     |
|                            |          |       | 3PDT         | MK3P-5-I             | MK3P-5-S                                   |
| LED indicator              |          |       | DPDT         | MK2PN-I              | MK2PN-S                                    |
|                            |          |       | 3PDT         | MK3PN-5-I            | MK3PN-5-S                                  |
| LED indicator and diode    |          | DC    | DPDT         | MK2PND-I             | MK2PND-S                                   |
|                            |          |       | 3PDT         | MK3PND-5-I           | MK3PND-5-S                                 |
| LED indicator and varistor |          | AC    | DPDT         | MK2PNV-I             | MK2PNV-S                                   |
|                            |          |       | 3PDT         | MK3PNV-5-I           | MK3PNV-5-S                                 |
| Diode                      |          | DC    | DPDT         | MK2PD-I              | MK2PD-S                                    |
|                            |          |       | 3PDT         | MK3PD-5-I            | MK3PD-5-S                                  |
| Varistor                   |          | AC    | DPDT         | MK2PV-I              | MK2PV-S                                    |
|                            |          |       | 3PDT         | MK3PV-5-I            | MK3PV-5-S                                  |

- Note:** 1. Reverse polarity versions available on DC coil types. Consult your OMRON representative for further information.  
 2. VDE approved versions are available. Consult your OMRON representative for further information.

## ■ Accessories (Order separately)

To Order: Select the appropriate part numbers for sockets, clips, and mounting tracks (if required) from the available types chart.

### Track Mounted Sockets

| Relay type   | Model    |                      |   |
|--------------|----------|----------------------|---|
|              | Socket   | Relay hold-down clip | Mounting track/end plate                  |
| SPDT<br>DPDT | PF083A-E | PFC-A1               | PFP-100N or PFP-50N and PFP-M (end plate) |
| 3PDT         | PF113A-E | PFC-A1               | PFP-100N or PFP-50N and PFP-M (end plate) |

## ■ Accessories (continued)

### Back Connecting Sockets

| Relay type | Model   |                      |
|------------|---------|----------------------|
|            | Socket  | Relay hold-down clip |
| SPDT       | PL08    | PLC-E                |
| DPDT       | PLE08-0 | PLC-10               |
|            | PL08-Q  | PLC-E                |
| 3PDT       | PL11    | PLC-E                |
|            | PLE11-0 | PLC-10               |
|            | PL11-Q  | PLC-E                |

## Specifications

### ■ Contact Data

| Load                    | Resistive load (p.f. = 1)         |  | Inductive load (p.f. = 0.4) |
|-------------------------|-----------------------------------|--|-----------------------------|
|                         | 2 Pole                            | 3 Pole   |                             |
| Rated load              | 10 A at 250 VAC<br>10 A at 28 VDC | 10 A at 120 VAC<br>10 A at 28 VDC<br>10 A at 250 VAC | 7 A at 250 VAC              |
| Contact material        | Ag                                |  |                             |
| Carry current           | 10 A                              |  |                             |
| Max. operating voltage  | 250 VAC, 250 VDC                  |  |                             |
| Max. operating current  | 10 A                              |  |                             |
| Max. switching capacity | 2,500 VA<br>280 W                 | 2,500 VA/1,250 VA (NO/NC contacts)<br>280 W          | 1,750 VA                    |
| Min. permissible load   | 10 mA at 1 VDC                    |  |                             |

### ■ Coil Data

#### AC

| Rated voltage (VAC) | Rated current (mA) (at 60 Hz) | Coil resistance (Ω) | Coil inductance (Ref. value) (H) |             | Pick-up voltage               | Dropout voltage                                  | Maximum voltage | Power consumption (mW)   |
|---------------------|-------------------------------|---------------------|----------------------------------|-------------|-------------------------------|--|-----------------|--|
|                     |                               |                     | Armature OFF                     | Armature ON |                               |  |                 |  |
| 6                   | 360                           | 3.9                 | 0.0423                           | 0.0201      | 80% max.<br>Approx.<br>2.7 VA | 30% min.<br>(at 60 Hz)<br>25% min.<br>(at 50 Hz) | 110% max.       | Approx.<br>2.3 VA<br>(at 60 Hz)<br>Approx.<br>2.7 VA<br>(at 50 Hz) |
| 12                  | 180                           | 16.3                | 0.3270                           | 0.1666      |                               |  |                 |  |
| 24                  | 88.0                          | 68.0                | 0.6940                           | 0.3760      |                               |  |                 |  |
| 50                  | 39.0                          | 338                 | 3.195                            | 1.530       |                               |  |                 |  |
| 110                 | 21.0                          | 1240                | 13.45                            | 7.32        |                               |  |                 |  |
| 120                 | 18.0                          | 1578                | 15.04                            | 7.19        |                               |  |                 |  |
| 220                 | 11.0                          | 5090                | 49.73                            | 27.02       |                               |  |                 |  |
| 240                 | 9.2                           | 6737                | 58.62                            | 32.07       |                               |  |                 |  |

#### DC

| Rated voltage (VDC) | Rated current (mA) (at 60 Hz) | Coil resistance (Ω) | Coil inductance (Ref. value) (H) |             | Pick-up voltage               | Dropout voltage | Maximum voltage | Power consumption (mW) |
|---------------------|-------------------------------|---------------------|----------------------------------|-------------|-------------------------------|-----------------|-----------------|------------------------|
|                     |                               |                     | Armature OFF                     | Armature ON |                               |                 |                 |                        |
| 6                   | 255                           | 23.5                | 0.206                            | 0.106       | 80% max.<br>Approx.<br>2.7 VA | 15% min.        | 110% max.       | Approx.<br>1.5 W       |
| 12                  | 126                           | 95                  | 0.963                            | 0.449       |                               |                 |                 |                        |
| 24                  | 56                            | 430                 | 4.915                            | 2.478       |                               |                 |                 |                        |
| 48                  | 29.5                          | 1630                | 16.685                           | 10.487      |                               |                 |                 |                        |
| 110                 | 15.1                          | 7300                | 80.2                             | 42.6        |                               |                 |                 |                        |

**Note:** 1. The rated current and coil resistance are measured at a coil temperature of 23°C (73°F) with a tolerance of ±15% for DC rated current and +15%, -20% for AC rated current.

2. The rated current is reference value.

3. Performance characteristic data are measured at a coil temperature of 23°C (73°F).

4. For models with the LED indicator built-in, add an LED current of approximately 0 thru 5 mA to the rated current.

## ■ Characteristics

|                              |                               |   |
|------------------------------|-------------------------------|---|
| <b>Contact resistance</b>    |                               | 50 mΩ max.  |
| <b>Operate time</b>          |                               | AC: 20 ms max. DC: 30 ms max.   |
| <b>Release time</b>          |                               | 20 ms max.  |
| <b>Operating frequency</b>   | <b>Mechanical</b>             | 18,000 operations/hour  |
|                              | <b>Electrical</b>             | 1,800 operations/hour (under rated load)  |
| <b>Insulation resistance</b> |                               | 100 MΩ min. (at 500 VDC)  |
| <b>Dielectric strength</b>   |                               | 2,500 VAC, 50/60 Hz for 1 minute between coil and contacts<br>1,000 VAC, 50/60 Hz for 1 minute between contacts of same poles, between terminals of the same polarity<br>2,500 VAC, 50/60 Hz for 1 minute between current-carrying parts, noncurrent-carrying parts, and terminals of opposite polarity |
| <b>Vibration</b>             | <b>Mechanical durability</b>  | 10 to 55 Hz, 1.50 mm (0.06 in) double amplitude   |
|                              | <b>Malfunction durability</b> | 10 to 55 Hz, 1.00 mm (0.04 in) double amplitude   |
| <b>Shock</b>                 | <b>Mechanical durability</b>  | 1,000 m/s <sup>2</sup> (approx. 100 G)  |
|                              | <b>Malfunction durability</b> | 100 m/s <sup>2</sup> (approx. 10 G)   |
| <b>Ambient temperature</b>   |                               | Operation: -10° to 40°C (14° to 104°F)  |
| <b>Humidity</b>              |                               | 35 to 85% RH  |
| <b>Service Life</b>          | <b>Mechanical</b>             | 10 million operations min. (at operating frequency of 18,000 operations/hour)   |
|                              | <b>Electrical</b>             | 100,000 operations at rated load (at operating frequency of 1,800 operations/hour)  |
| <b>Weight</b>                |                               | Approx. 85 g (3.0 oz)   |

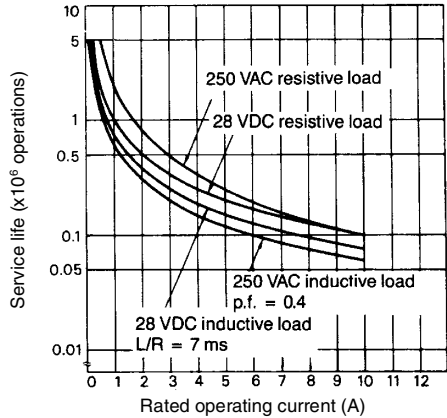
Note: Data shown are of initial value.

## ■ Characteristic Data

Maximum switching capacity  
MK2P-S



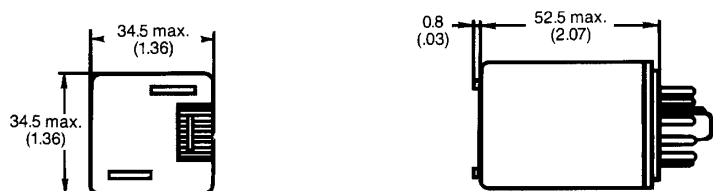
Electrical service life  
MK2P-S, MK3P5-S



# Dimensions

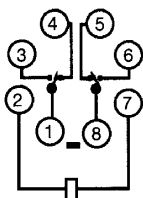
Unit: mm (inch)

## Relays

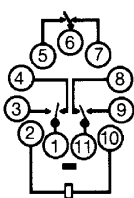


## Terminal Arrangement (Bottom view)

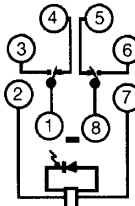
Standard type (AC/DC coil)  
MK2P-I, -S



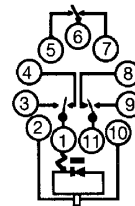
MK3P5-I, -S



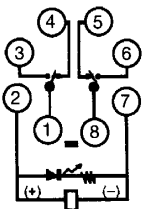
LED indicator type (AC coil)  
MK2PN-I, -S



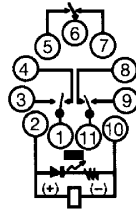
MK3PN-5-I, -S



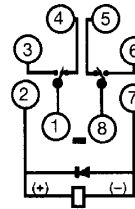
LED indicator type (DC coil)  
MK2PN-I, -S



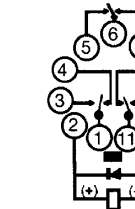
MK3PN-5-I, -S



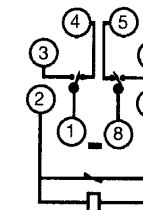
Diode type (DC coil)  
MK2PD-I, -S



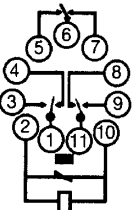
MK3PD-5-I, -S



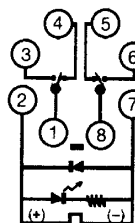
Varsistor type (AC coil)  
MK2PV-I, -S



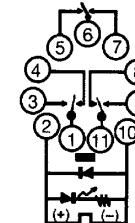
MK3PV-5-I, -S



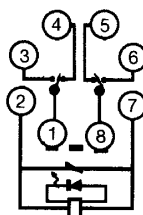
LED indicator and diode type (DC coil)  
MK2PND-I, -S



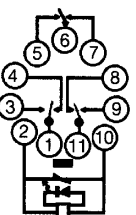
MK3PND-5-I, -S



LED indicator and Varsistor type (AC coil)  
MK2PNV-I, -S

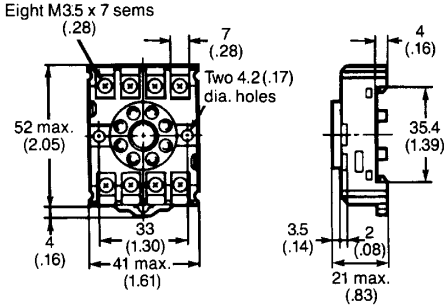


MK3PNV-5-I, -S

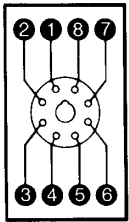


■ Accessories

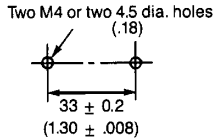
**Track mounted socket  
PF083A-E (conforming to DIN EN 50022)**



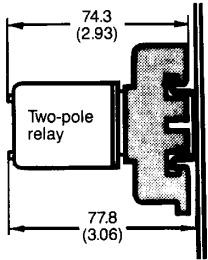
**Terminal arrangement**



**Mounting holes**

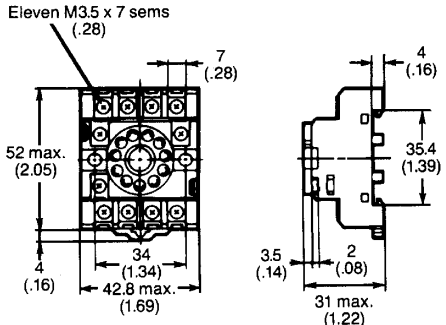


**Mounting dimensions of relay with socket**

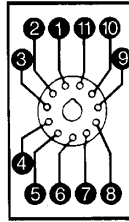


**Note:** Model PF083A-E can be used as a front connecting socket.

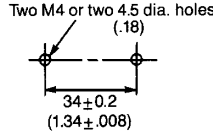
**Track mounted socket  
PF113A-E (conforming to DIN EN 50022)**



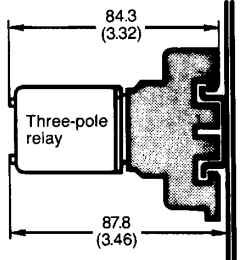
**Terminal arrangement**



**Mounting holes**



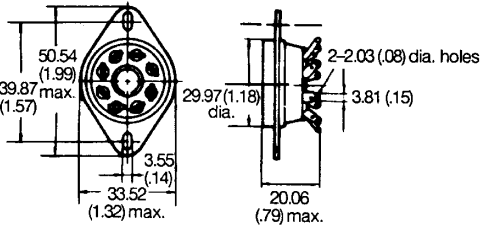
**Mounting dimensions of relay with socket**



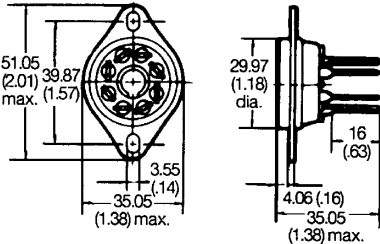
**Note:** Model PF113A-E can be used as a front connecting socket.

**Back connecting socket  
MK2 sockets (8 pin)**

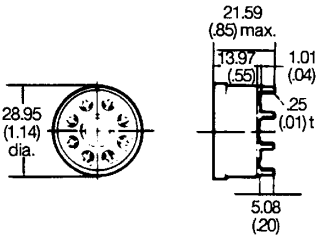
**PL08 (UL File No. E87929)  
Solder terminals**



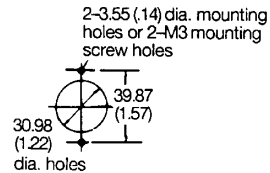
**PL08-Q  
Wire wrap terminals**



**Printed circuit board socket  
PLE08-0**

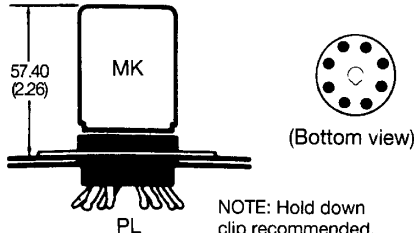


**Mounting holes  
PL08**

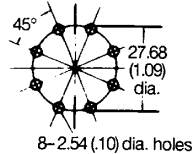


Mounting holes and panel cut-out applies to PL08 and PL08-Q

**PL08 type sockets and MK2 relay  
Total height dimension**



**Recommended PCB layout  
PLE08-0**



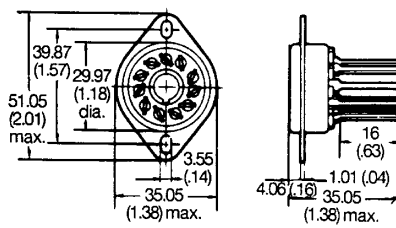
Unit: mm (inch)

**Back connecting socket  
MK3 sockets (11 pin)**

**PL11 (UL File No. E87929)  
Solder terminals**



**PL11-Q  
Wire wrap terminals**

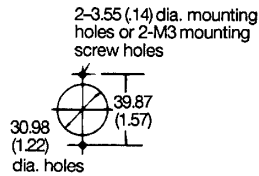


**Printed circuit  
board socket**

**PLE11-0**

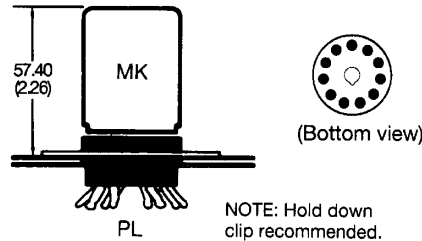


**Mounting holes  
PL11**



Mounting holes and panel cut-out applies to PL11 and PL11-Q

**PL11 type sockets and MK3 relay  
Total height dimension**



**Recommended PCB layout  
PLE11-0**



**Mounting tracks**

**PFP-100N/PFP-50N  
(conforming to DIN EN 500022)**



**PFP-100N2  
(conforming to DIN EN 500022)**



**Note:** 1. \*This dimension applies to mounting track PFP-50N.

2. A total of twelve 25 x 4.50 mm (0.98 x 0.18 in) elliptic holes is provided with six holes cut from each rail end at a pitch of 10 mm (0.39 in) holes.

**PFP-M end plate**



**Note:** Use of Type PFP-M end plate is recommended to secure the socket on the mounting track. Be sure that the engraved arrow mark on the surface of the end plate faces upward and then tighten the screw firmly with a screwdriver.

## ■ Approvals

### UL (File No. E41515)/CSA (File Nos. LR41408 and LR335535)

| Type        | Contact form | Coil ratings                 | Contact ratings          |
|-------------|--------------|------------------------------|--------------------------|
| MK2P-I, -S  | DPDT         | 6 to 250 VAC<br>6 to 110 VDC | 10 A, 250 VAC, Resistive |
|             |              |                              | 10 A, 28 VDC, Resistive  |
|             |              |                              | 7 A, 250 VAC, Inductive  |
| MK3P5-I, -S | 3PDT         | 6 to 250 VAC<br>6 to 110 VDC | 10 A, 120 VAC, Resistive |
|             |              |                              | 10 A, 28 VDC, Resistive  |
|             |              |                              | 10 A, 250 VAC, Resistive |
|             |              |                              | 7 A, 250 VAC, Inductive  |

### SEV, DEMKO

| Type        | Contact form | Coil ratings | Contact ratings                       |
|-------------|--------------|--------------|---------------------------------------|
| MK2P-I, -S  | DPDT         | 6 to 110 VDC | 10 A, 250 VAC (NO) ( $\cos\phi = 1$ ) |
|             |              |              | 5 A, 250 VAC (NC) ( $\cos\phi = 1$ )  |
|             |              |              | 10 A, 280 VDC (NO)                    |
| MK3P5-I, -S | 3PDT         | 6 to 240 VAC | 5 A, 280 VDC (NC)                     |
|             |              |              | 7 A, 250 VAC ( $\cos\phi = 0.4$ )     |

### TUV (File No. R9051410)

| Type        | Contact form | Coil ratings  | Contact ratings                       |
|-------------|--------------|---|---------------------------------------|
| MK2P-I, -S  | DPDT         | 6, 12, 24, 48,<br>100, 110 VDC                                | 10 A, 250 VAC (NO) ( $\cos\phi = 1$ ) |
|             |              |   | 5 A, 250 VAC (NC) ( $\cos\phi = 1$ )  |
|             |              |   | 10 A, 280 VDC (NO)                    |
| MK3P5-I, -S | 3PDT         | 6, 12, 24, 50,<br>110, 115, 120,<br>200, 220, 230,<br>240 VAC | 5 A, 280 VDC (NC)                     |
|             |              |   | 7 A, 250 VAC ( $\cos\phi = 0.4$ )     |

- Note:**
1. The rated values approved by each of the safety standards (e.g., UL and CSA) may be different from the performance characteristics individually defined in this catalog.
  2. VDE, Nemko and Semko versions are available. Please consult your OMRON representative for further information.
  3. In the interest of product improvement, specifications are subject to change.

# 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.
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  - 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 systems, medical equipment, amusement machines, vehicles, safety equipment, and 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 SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
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**OMRON ELECTRONIC  
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55 E. Commerce Drive, Suite B  
Schaumburg, IL 60173

**847-882-2288**

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