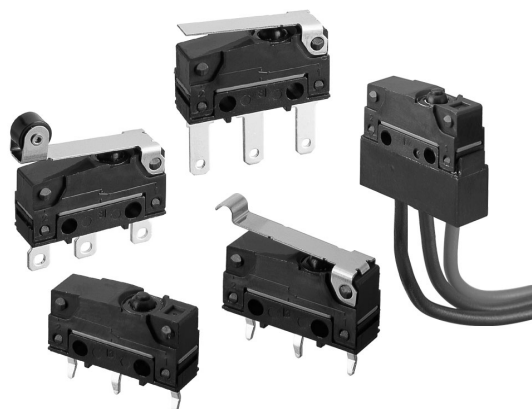


# Sealed Subminiature Basic Switch D2SW-P

## Sealed Basic Switch with Simplified Construction, Mounting Compatible with SS and D2SW Series.

- Sealed to IEC IP67.
- Switch rating of 2A at 250 VAC possible with a single-leaf movable spring. Models for micro loads are also available.
- Solder, quick-connect terminals (#110), PCB terminals and molded lead wires are available. Even-pitched PCB terminals are also standardized.



## Ordering Information

### Model Number Legend

D2SW-P      
1 2 3 4

#### 1. Ratings

- 2: 2A at 250 VAC
- 01: 0.1A at 30 VDC

#### 2. Actuator

- None: Pin plunger
- L1: Hinge lever
- L2: Hinge roller lever
- L3: Simulated roller lever

#### 3. Contact Form

- None: SPDT
- 2: SPST-NC (Molded lead wire models only)
- 3: SPST-NO (Molded lead wire models only)

#### 4. Terminals

- H: Solder terminals
- T: Quick-connect terminals (#110)
- D: PCB terminals (Uneven pitch)
- B: PCB terminals (Even pitch)
- M: Molded lead wires

### List of Models

Rating	Actuator	Terminal	Solder terminals	Quick-connect terminals (#110)	PCB terminals		Molded lead wires
					Uneven pitch	Even pitch	
2A	Pin plunger		D2SW-P2H	D2SW-P2T	D2SW-P2D	D2SW-P2B	D2SW-P2M
	Hinge lever		D2SW-P2L1H	D2SW-P2L1T	D2SW-P2L1D	D2SW-P2L1B	D2SW-P2L1M
	Hinge roller lever		D2SW-P2L2H	D2SW-P2L2T	D2SW-P2L2D	D2SW-P2L2B	D2SW-P2L2M
	Simulated roller lever		D2SW-P2L3H	D2SW-P2L3T	D2SW-P2L3D	D2SW-P2L3B	D2SW-P2L3M
0.1A	Pin plunger		D2SW-P01H	D2SW-P01T	D2SW-P01D	D2SW-P01B	D2SW-P01M
	Hinge lever		D2SW-P01L1H	D2SW-P01L1T	D2SW-P01L1D	D2SW-P01L1B	D2SW-P01L1M
	Hinge roller lever		D2SW-P01L2H	D2SW-P01L2T	D2SW-P01L2D	D2SW-P01L2B	D2SW-P01L2M
	Simulated roller lever		D2SW-P01L3H	D2SW-P01L3T	D2SW-P01L3D	D2SW-P01L3B	D2SW-P01L3M

**Note:** Consult your OMRON sales representative for details on SPST-NO and SPST-NC models.

# Specifications

## ■ Ratings

Model	Rated voltage	Resistive load
D2SW-P2	30 VDC	2 A
	250 VAC	
D2SW-P01	30 VDC	0.1 A
	125 VAC	

**Note:** The ratings values apply under the following test conditions.  
 Ambient temperature: 20±2°C  
 Ambient humidity: 65±5%  
 Operating frequency: 20 operations/min.

## ■ Characteristics

Item	Model	
	D2SW-P2	D2SW-P01
<b>Operating speed</b>	0.1 mm to 500 mm/s (pin plunger models)	
<b>Operating frequency</b>	Mechanical: 120 operations/min max. Electrical: 20 operations/min max.	
<b>Insulation resistance</b>	100 MΩ min. (at 500 VDC)	
<b>Contact resistance (initial value)</b>	Terminal models: 50 mΩ max. Molded lead wire models: 100 mΩ max.	Terminal models: 100 mΩ max. Molded lead wire models: 150 mΩ max.
<b>Dielectric strength (see note 2)</b>	1,000 VAC, 50/60 Hz for 1 min. between terminals of the same polarities	600 VAC, 50/60 Hz for 1 min. between terminals of the same polarities
	1,500 VAC, 50/60 Hz for 1 min. between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts	
<b>Vibration resistance (see note 3)</b>	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude	
<b>Shock resistance (see note 3)</b>	Destruction: 1,000 m/s <sup>2</sup> {approx. 100 G} max. Malfunction: 300 m/s <sup>2</sup> {approx. 30 G} max.	
<b>Durability (see note 4)</b>	Mechanical: 1,000,000 operations min. (60 operations/min.) Electrical: 50,000 operations min. (20 operations/min.)	Mechanical: 1,000,000 operations min. (60 operations/min.) Electrical: 200,000 operations min. (20 operations/min.)
<b>Degree of protection</b>	IEC IP67 (see note 5) (excluding the terminals on terminal models)	
<b>Degree of protection against electric shock</b>	Class 1	
<b>Proof tracking index (PTI)</b>	175	
<b>Ambient operating temperature</b>	-20°C to 70°C (at ambient humidity of 60% max.) (with no icing)	
<b>Ambient operating humidity</b>	85% max. (for 5°C to 35°C)	
<b>Weight</b>	Approx. 2 g (pin plunger models with terminals)	

- Note:**
- The data given above are initial values.
  - The dielectric strength shown in the table indicates a value for models with a Separator.
  - For the pin plunger models, the above values apply for both the free position and total travel position. For the lever models, the values apply at the total travel position. Contact opening or closing time is within 1ms.
  - Consult your OMRON sales representative for testing conditions.
  - The test to meet standards checks for water intrusion after immersion for 30 minutes. The test does not check for switching operation underwater. Refer to “**Degree of Protection**” or “**Instructions for Correct Use**”.

## Approved Standards

Consult your OMRON sales representative for specific models with standard approval.

**UL1054 (File No. E41515)/  
CSA C22.2 No. 55 (UL approval)**

Rated voltage	D2SW-P2	D2SW-P01
125 VAC	—	0.1 A
250 VAC	2 A	—
30 VDC	2 A	0.1 A

## Contact Specifications

Item		Model	
		D2SW-P2	D2SW-P01
Contact	Specification	Rivet	Crossbar
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.5 mm	
Minimum applicable load (see note)		160 mA at 5 VDC	1 mA at 5 VDC

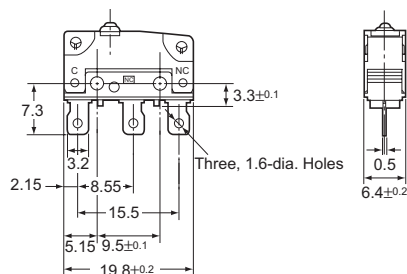
**Note:** For more information on the minimum applicable load, refer to *Using Micro Loads* on page 6.

## Dimensions

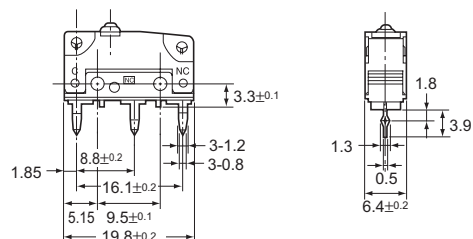
### Terminals

- Note: 1.** All units are in millimeters unless otherwise indicated.
- 2.** Terminal plate thickness is 0.5 mm for all models.

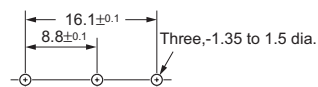
#### Solder Terminals



#### PCB Terminals (Uneven pitch)

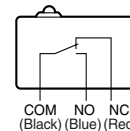


#### PCB Mounting Dimensions (Reference)

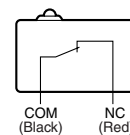


## Contact Form

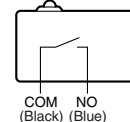
### SPDT



### SPST-NC (Molded lead wire models only)

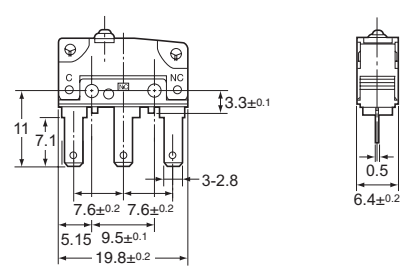


### SPST-NO (Molded lead wire models only)

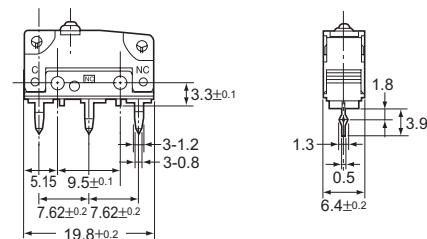


**Note:** Lead wire colors are indicated in parentheses.

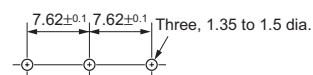
#### Quick-connect Terminals (#110)



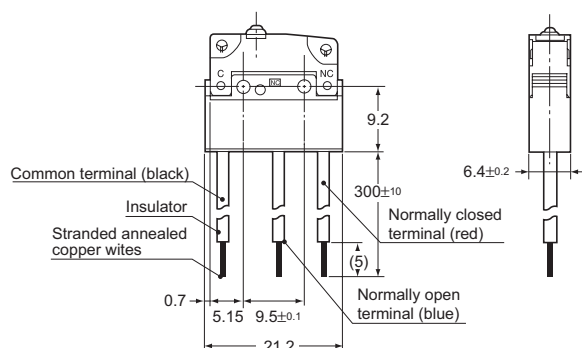
#### PCB Terminals (Even pitch)



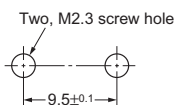
#### PCB Mounting Dimensions (Reference)



**Molded Lead Wires**



**■ Mounting Holes**



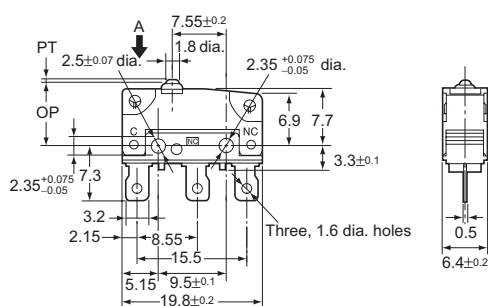
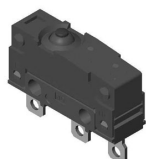
**■ Dimensions and Operating Characteristics**

**Note:** 1. All units are in millimeters unless otherwise indicated.

2. The following illustrations and drawings are for solder terminal models. Refer to *Terminals* section for details on models with quick-connect terminals (#110) or PCB terminals or molded lead wires.
3. The □ in the model number is for the contact form code or the terminal code.
4. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
5. The operating characteristics are for operation in the A direction (↓).

**Pin Plunger Models**

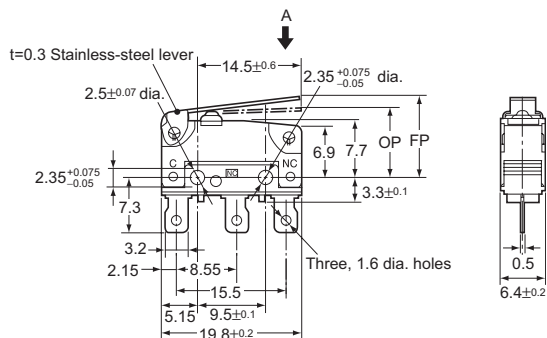
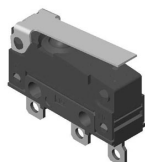
D2SW-P2□□  
D2SW-P01□□



Model	D2SW-P2□□	D2SW-P01□□
OF max.	1.8 N {183 gf}	
RF min.	0.2 N {20 gf}	
PT max.	0.6 mm	
OT min.	0.4 mm	
MD max.	0.15 mm	
OP	8.4±0.3 mm	

**Hinge Lever Models**

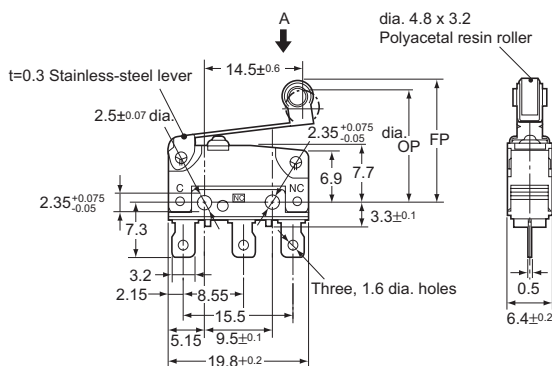
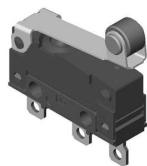
D2SW-P2L1□□  
D2SW-P01L1□□



Model	D2SW-P2L1□□	D2SW-P01L1□□
OF max.	0.6 N {61 gf}	
RF min.	0.05 N {5 gf}	
OT min.	0.8 mm	
MD max.	0.8 mm	
FP max.	13.6 mm	
OP	8.8±0.8 mm	

**Hinge Roller Lever Models**

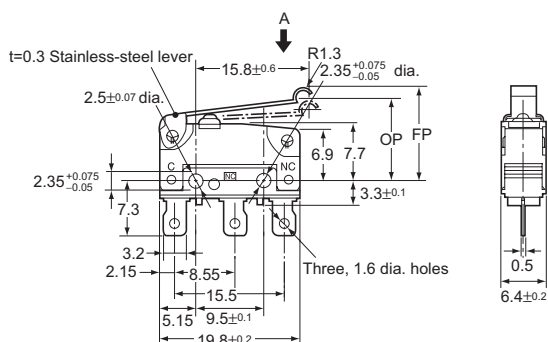
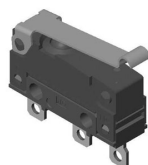
D2SW-P2L2□□  
D2SW-P01L2□□



Model	D2SW-P2L2□□	D2SW-P01L2□□
OF max.	0.6 N {61 gf}	
RF min.	0.05 N {5 gf}	
OT min.	0.8 mm	
MD max.	0.8 mm	
FP max.	19.3 mm	
OP	14.5±0.8 mm	

**Simulated Roller Lever Models**

D2SW-P2L3□□  
D2SW-P01L3□□



Model	D2SW-P2L3□□	D2SW-P01L3□□
OF max.	0.6 N {61 gf}	
RF min.	0.05 N {5 gf}	
OT min.	0.8 mm	
MD max.	0.8 mm	
FP max.	15.5 mm	
OP	10.7±0.8 mm	

**Precautions**

**■ Cautions**

**Degree of Protection**

Do not use this product in water. Although these models satisfy the test conditions for the standard given below, this test is to check the ingress of water into the switch enclosure after submerging the Switch in water for a given time. Satisfying this test condition does not mean that the Switch can be used in water.

IEC 60529: 2001 Degrees of protection provided by enclosures (IP Code)

Code: IP67 (The test to meet the standard checks for water intrusion after immersion for 30 minutes.)

Do not operate the Switch when it is exposed to water spray, or when water drops adhere to the Switch surface, or during sudden temperature changes, otherwise water may intrude into the interior of the Switch due to a suction effect.

Prevent the Switch from coming into contact with oil and chemicals. Otherwise, damage to or deterioration of Switch materials may result.

Do not use the Switch in areas where it is exposed to silicon adhesives, oil, or grease, otherwise faulty contact may result due to the generation of silicon oxide.

The environment-resistant performance of the switch differs depending on operating loads, ambient atmospheres, and installation conditions, etc. Please perform an operating test of the switch in advance under actual usage conditions.

**Connecting to Terminals**

**Connecting to Solder Terminals**

When soldering the lead wire to the terminal, first insert the lead wire conductor through the terminal hole and the conduct soldering.

Make sure that the temperature at the tip of the soldering iron is 350 to 400°C. Do not take more than 3 seconds to solder the switch terminal, and do not impose external force on the terminal for 1 min. after soldering. Improper soldering involving an excessively high temperature or excessive soldering time may deteriorate the characteristics of the Switch.

**Connecting to Quick-connect Terminals**

Wire the quick-connect terminals (#110) with receptacles. Insert the terminals straight into the receptacles. Do not impose excessive force on the terminal in the horizontal direction, otherwise the terminal may be deformed or the housing may be damaged.

**Connecting to PCB Terminal Boards**

When using automatic soldering baths, we recommend soldering at 260±5°C within 5 seconds. Make sure that the liquid surface of the solder does not flow over the edge of the board.

When soldering by hand, as a guideline, solder with a soldering iron with a tip temperature of 350 to 400°C within 3 seconds, and do not apply any external force for at least 1 minute after soldering. When applying solder, keep the solder away from the case of the Switch and do not allow solder or flux to enter the case.

**Side-actuated (Cam/Dog) Operation**

When using a cam or dog to operate the Switch, factors such as the operating speed, operating frequency, push-button indentation, and material and shape of the cam or dog will affect the durability of the Switch. Confirm performance specifications under actual operation conditions before using the Switch in applications.

## Correct Use

### Mounting

Turn OFF the power supply before mounting or removing the Switch, wiring, or performing maintenance or inspection. Failure to do so may result in electric shock or burning.

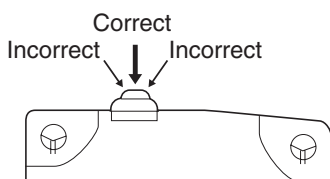
Use M2.3 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.23 to 0.26 N·m {2.3 to 2.7 kgf·cm}. Exceeding the specified torque may result in deterioration of the sealing or damage.

Mount the Switch onto a flat surface. Mounting on an uneven surface may cause deformation of the Switch, resulting in faulty operation or damage.

### Operating Body

Use an operating body with low frictional resistance and of a shape that will not interfere with the sealing rubber, otherwise the plunger may be damaged or the sealing may deteriorate.

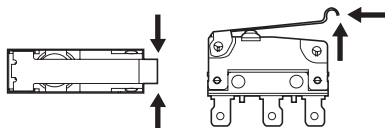
With the pin plunger models, set the Switch so that the plunger can be pushed in from directly above. Since the plunger is covered with a rubber cap, applying a force from lateral directions may cause damage to the plunger or reduction in the sealing capability



### Handling

Do not handle the Switch in a way that may cause damage to the sealing rubber.

When handling the Switch, ensure that uneven pressure or, as shown in the following diagram, pressure in a direction other than the operating direction is not applied to the Actuator, otherwise the Actuator or Switch may be damaged, or durability may be decreased.



### Wiring Molded Lead Wire Models

When wiring molded lead wire models, ensure that there is no weight on the wire or that there are no sharp bends near the parts where the wire is drawn out. Otherwise, damage to the Switch or deterioration in the sealing may result.

### Operating Stroke Setting

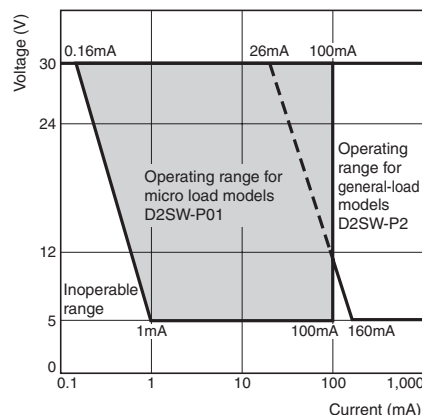
Set the operating stroke so that the actuator is completely disengaged when the switch is in the free position (FP), and is pushed to a point between 60% and 90% of the OT distance after the switch is operated.

Insufficient or excessive pushing of the actuator may result in decreased switch durability or damage to the switch.

### Using Micro Loads

Using a model for ordinary loads to open or close the contact of a micro load circuit may result in a faulty contact. Use models that operate in the following range. However, even when using micro load models within the operating range shown below, if inrush current occurs when the contact is opened or closed, it may increase contact wear and so decrease durability. Therefore, insert a contact protection circuit where necessary. The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% ( $\lambda_{60}$ ).

The equation,  $\lambda_{60} = 0.5 \times 10^{-6}/\text{operations}$  indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.



# 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 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.
  - Motorized Vehicle Application:** USE OF ANY PRODUCT/S FOR A MOTORIZED VEHICLE APPLICATION MUST BE EXPRESSLY STATED IN THE SPECIFICATION BY SELLER.
  - Programmable Products:** Seller shall not be responsible for the Buyer's programming 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 by Seller (or such other period expressed in writing by Seller). SELLER MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT ALL OTHER WARRANTIES, 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 form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product or, at Seller's election, to repay or credit Buyer 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 Products were handled, stored, installed and maintained and not subject to contamination, abuse, 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 CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. FURTHER, IN NO EVENT SHALL LIABILITY OF SELLER OR ITS AFFILIATES EXCEED THE INDIVIDUAL PRICE OF THE PRODUCT ON WHICH LIABILITY IS ASSERTED.
- Indemnities:** Buyer shall indemnify and hold harmless Seller, its affiliates and its employees from and against all liabilities, losses, claims, costs and expenses (including 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 acts or omissions under these Terms or in any way with respect to the Products.

### V. INFORMATION; ETC.

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