

# OMRON ELECTRONICS

*See full Datasheet below...*

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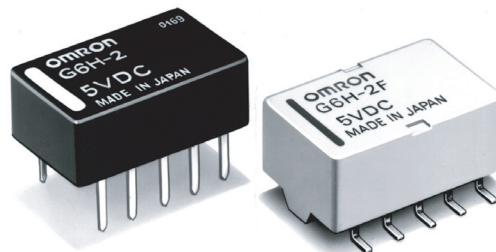
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# Low Signal Relay G6H

## Ultra-compact, Ultra-sensitive DPDT Relay

- Compact size and low 5 mm profile.
- Low thermoelectromotive force.
- Low magnetic interference enables high-density mounting.
- Utilizes Omron's moving-loop design.
- Highly stable magnetic circuit for latching endurance and excellent resistance to vibration and shock.
- High sensitivity with low nominal power consumption.
- Single or dual coil latching types available.
- RoHS Compliant



## Ordering Information

To Order: Select the part number and add the desired coil voltage rating, (e.g., G6H-2-DC6).

### ■ Non-latching

Terminal Type	Contact form	Model
Through-hole	DPDT	G6H-2
Surface mount		G6H-2F

### ■ Latching

Terminal Type	Contact form	Model	
		Single coil latching	Dual coil latching
Through-hole	DPDT	G6HU-2	G6HK-2

## Specifications

### ■ Contact Data

Load	Resistive load (p.f. = 1)
Rated load	0.50 A at 125 VAC, 1 A at 30 VDC
Contact material	Ag (Au clad)
Carry current	1 A
Max. operating voltage	125 VAC, 110 VDC
Max. operating current	1 A
Max. switching capacity	62.50 VA, 33 W
Min. permissible load (See note)	10 $\mu$ A, 10 mVDC

**Note:** P level:  $\lambda_{60} = 0.1 \times 10^{-6}$ /operation

This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 50  $\Omega$ . This value may vary depending on the operating environment. Always double-check relay suitability under actual operating conditions.

## ■ Coil Data

### Non-latching Type (G6H-2, G6H-2F)

Rated voltage (VDC)	Rated current (mA)	Coil resistance ( $\Omega$ )	Coil inductance (ref. value) (H)		Pick-up voltage	Dropout voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON				
3	46.70	64.30	0.025	0.022	75% max.	10% min.	200% max. at 23°C	Approx. 140
5	28.10	178	0.065	0.058				
6	23.30	257	0.11	0.09				
9	15.50	579	0.24	0.20				
12	11.70	1,028	0.43	0.37				
24	8.30	2,880	1.20	1.0			170% max. at 23°C	Approx. 200
48	5.8	8,228	—	—			140% max. at 23°C	Approx. 300

### Single Coil Latching Type (G6HU-2)

Rated voltage (VDC)	Rated current (mA)	Coil resistance ( $\Omega$ )	Coil inductance (ref. value) (H)		Set pick-up voltage	Reset pick-up voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON				
3	33.30	90	0.034	0.029	75% max.	75% max.	180% max. at 23°C	Approx. 100
5	20	250	0.11	0.09				
6	16.70	360	0.14	0.12				
9	11.10	810	0.33	0.28				
12	8.30	1,440	0.60	0.50				
24	6.25	3,840	1.6	1.3				Approx. 150

### Dual Coil Latching Type (G6HK-2)

Rated voltage (VDC)	Rated current (mA)	Coil resistance ( $\Omega$ )	Coil inductance (ref. value) (H)		Set pick-up voltage	Reset pick-up voltage	Maximum voltage	Power consumption (mW)
			Armature OFF	Armature ON				
3	66.70	45	0.014	0.0075	75% max.	75% max.	160% max. at 23°C	Approx. 200
5	40	125	0.042	0.023				
6	33.30	180	0.065	0.035				
9	22.20	405	0.16	0.086				
12	16.70	720	0.3	0.16				
24	12.50	1,920	0.63	0.33			130% max. at 23°C	Approx. 300

- Note:**
1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of  $\pm 10\%$ .
  2. Operating characteristics are measured at a coil temperature of 23°C with a tolerance of  $\pm 10\%$ .
  3. The maximum voltage is the highest voltage that can be imposed on the relay coil.
  4. The maximum voltage that can be applied when using the G6H-2F (at 85°C) is 115% (3 to 12 V) or 105% (24 V) of the rated voltage.

## ■ Characteristics

<b>Contact resistance (See note 1)</b>		50 mΩ max. (through-hole); 60 mΩ max. (surface mount)
<b>Operate (set) time (See note 2)</b>		Non-latching: 3 ms max. (approx. 2.0 ms) Latching: 3ms max. (approx. 1.5 ms)
<b>Release (reset) time (See note 2)</b>		Non-latching: 2 ms max. (approx. 1.0 ms) Latching: 3ms max. (approx. 1.5 ms)
<b>Min. set/reset signal width</b>		5ms min. (at 23°C)
<b>Operating frequency (max.)</b>	<b>Mechanical</b>	36,000 operations/hour
	<b>Electrical</b>	1,800 operations/hour (under rated load)
<b>Insulation resistance (See note 3)</b>		1,000 MΩ max. (at 500 VDC)
<b>Dielectric strength</b>		1,000 VAC, 50/60 Hz for 1 minute between coil and contacts 1,000 VAC, 50/60 Hz for 1 minute between contacts of different poles 750 VAC, 50/60 Hz for 1 minute between contacts of same pole 125 VAC, 50/60 Hz for 1 minute between set and reset coils (G6HK-2)
<b>Surge withstand voltage</b>		1,500 V (10 x 160 μs) between contacts of same polarity (conforms to FCC Part 68)
<b>Vibration</b>	<b>Mechanical durability</b>	10 to 55 Hz; 5 mm double amplitude
	<b>Malfunction durability</b>	10 to 55 Hz; 3 mm double amplitude
<b>Shock</b>	<b>Mechanical durability</b>	1,000 m/s <sup>2</sup> (approx. 100 G)
	<b>Malfunction durability</b>	500 m/s <sup>2</sup> (approx. 50 G)
<b>Ambient temperature</b>		-40° to 70°C with no icing
<b>Humidity</b>		5% to 85% RH
<b>Service life</b>	<b>Mechanical</b>	100 million operations min. (at 36,000 operations/hr)
	<b>Electrical</b>	200,000 operations min. (at 1,800 operations/hr) See "Characteristic Data"
<b>Weight</b>		Approx. 1.5 g

- Note:**
1. The contact resistance was measured with 10 mA at 1 VDC with a fall-of-potential method.
  2. Values in parentheses are typical values unless otherwise stated.
  3. The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those for checking the dielectric strength. (The insulation resistance between the set and reset coil (G6HK-2), however, is 100MΩ min. when measured with a 125-VDC megohmmeter).
  4. The above values are initial values.

## ■ Approvals

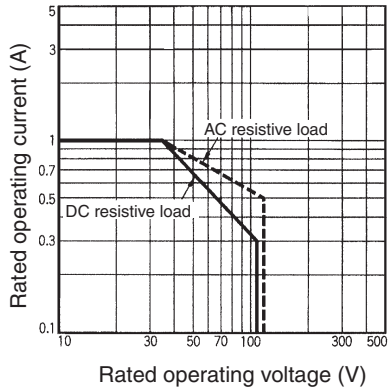
UL Recognized (File No. E41515) / CSA Certified (File No. LR31928) - - Ambient Temp. = 40°C

Type	Contact form	Coil rating	Contact ratings
G6H-2(F)	DPDT	1.50 to 48 VDC	2 A, 30 VDC
G6HU-2			0.30 A, 110 VDC
G6HK-2			0.50 A, 125 VAC

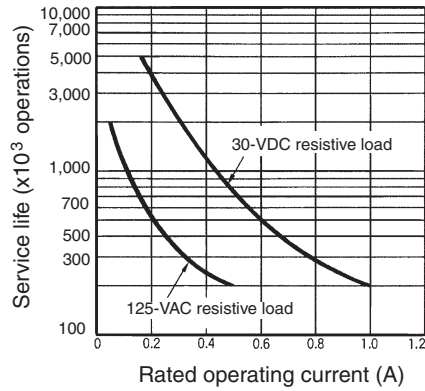
- Note:**
1. The rated values approved by each of the safety standards (e.g., UL, CSA, TUV) may be different from the performance characteristics individually defined in this catalog.
  2. In the interest of product improvement, specifications are subject to change.

## Characteristic Data

Maximum Switching Capacity

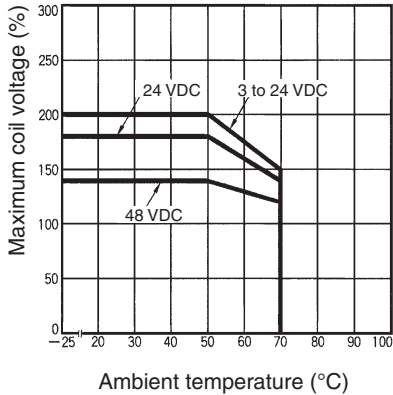


Electrical Service Life

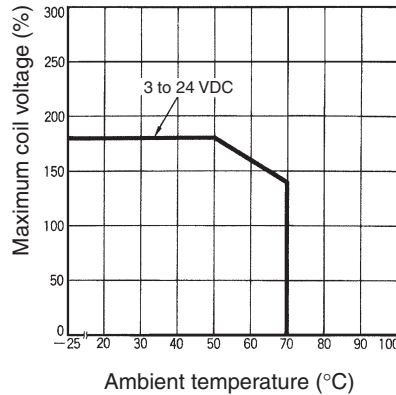


### Ambient Temperature vs. Maximum Coil Voltage

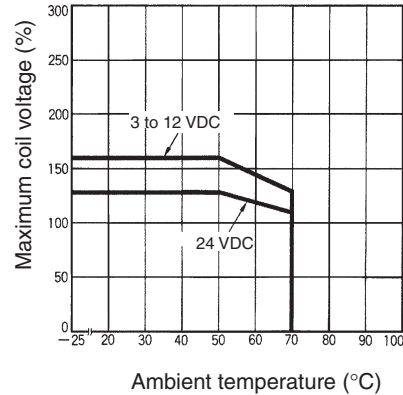
Non-latching (G6H-2)



Single Coil Latching (G6HU-2)



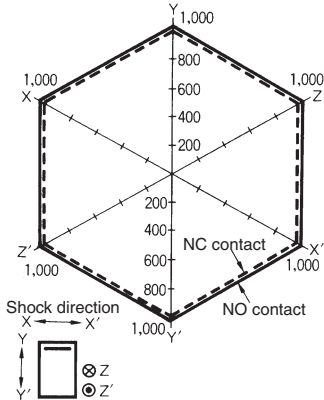
Dual Coil Latching (G6HK-2)



**Note:** The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

### Malfunctioning Shock Resistance (G6H-2)

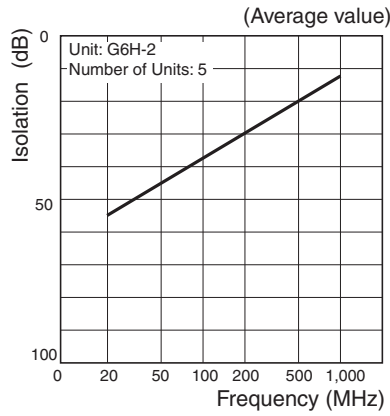
5 VDC  
Number of Units: 10



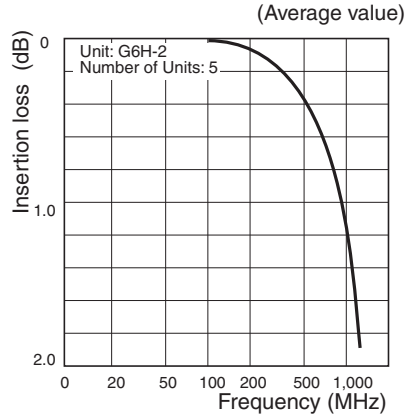
Condition: The Units were shocked at the rate of 500 m/s<sup>2</sup> three times each in the ±X, ±Y, and ±Z directions with and without voltage imposed on the Units until the Units malfunctioned.

High-frequency Characteristics (See notes 1 and 2.)

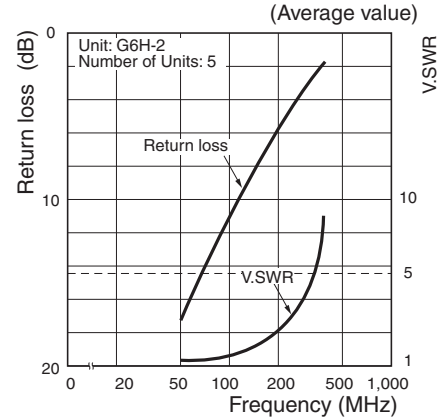
Frequency vs. Isolation



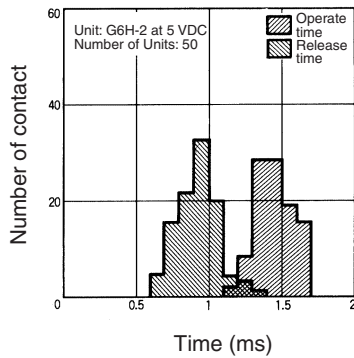
Frequency vs. Insertion Loss



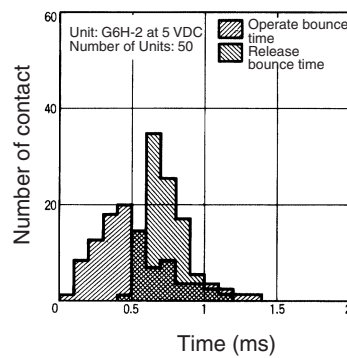
Frequency vs. Return Loss, V.SWR



Distribution of Operate and Release Time (See note 1.)





Distribution of Bounce Time (See note 1.)



Note: 1. The ambient temperature is 23°C.

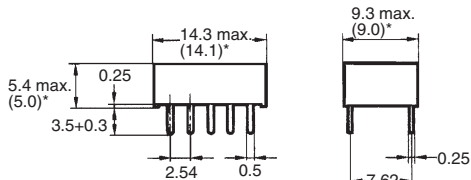
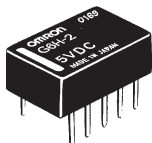
2. High-frequency characteristics depend on the PCB to which the Relay is mounted. Always check these characteristics, including endurance, in the actual machine before use.

# Dimensions

Note: 1. All units are in millimeters unless otherwise indicated.  
 2. Orientation marks are indicated as follows:  

## ■ Non-latching

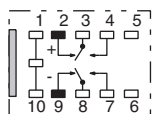
### G6H-2



\* Average value

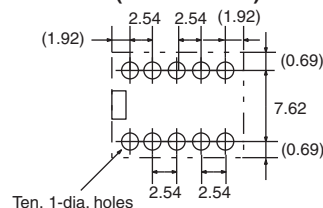
### Terminal Arrangement/ Internal Connections

#### (Bottom View)

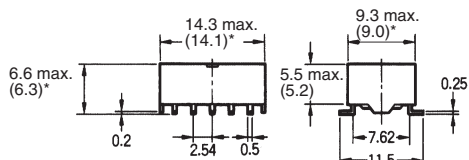
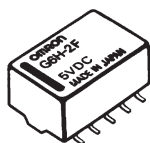


### Mounting Holes Tolerance: ±0.1

#### (Bottom View)

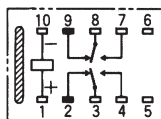


### G6H-2F

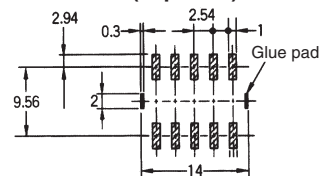


\* Average value

#### (Top View)

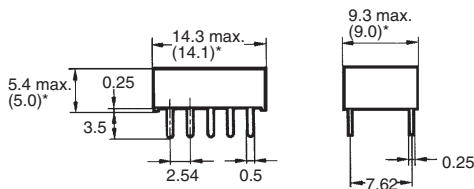
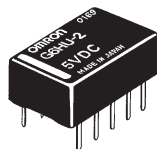


#### (Top View)



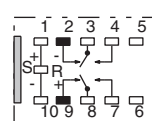
## ■ Latching

### G6HU-2

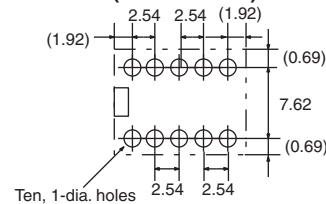


\* Average value

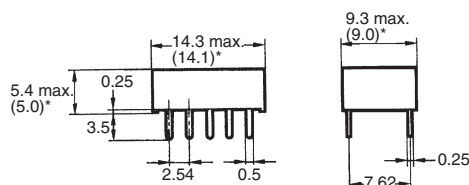
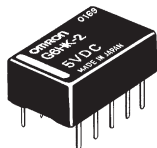
#### (Bottom View)



#### (Bottom View)

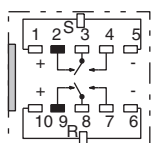


### G6HK-2

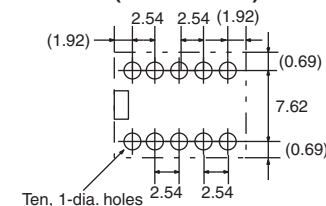


\* Average value

#### (Bottom View)



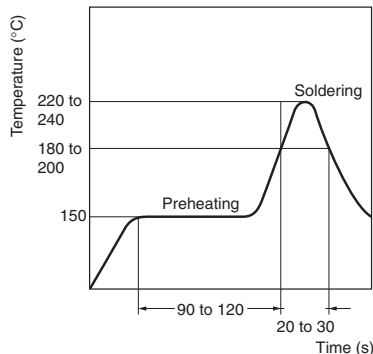
#### (Bottom View)



# Hints on correct use

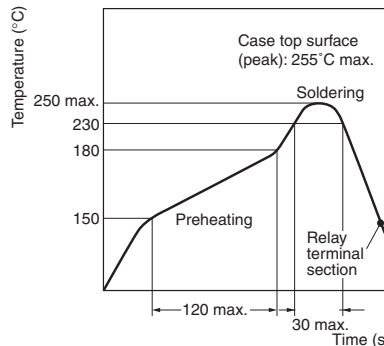
## Example of Recommended Soldering Conditions for the G6H-2F (Surface Mount Relays)

### (1) IRS Method (Mounting Solder: Lead)



**Note:** The temperature profile indicates the temperature on the PCB.

### (2) IRS Method (Mounting Solder: Lead-free)



**Note:** The temperature profile indicates the temperature on the relay terminal.

## Approved Standards

The approved rated values for international standards differ from the performance characteristics of the individual models. Be sure to confirm that required standards are satisfied before actual use.

**UL Recognized (File No. E41515) - -Ambient Temp. = 40°C**

Model	No. of poles	Coil rating	Contact rating	No. of operations
G6H-2(F)	2	1.5 to 48 VDC	2 A, 30 VDC	6,000
			0.3 A, 110 VDC	
			0.5 A, 125 VAC	

**CSA Certified (File NO. LR31928)**

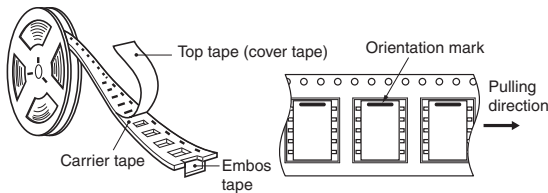
Model	No. of poles	Coil rating	Contact rating	No. of operations
G6H-2(F)	2	1.5 to 48 VDC	2 A, 30 VDC	6,000
			0.3 A, 110 VDC	
			0.5 A, 125 VAC	

## Tape Packing (Surface Mounting Terminal Models)

When ordering Relays in tape packing, add the prefix “-TR” to the model number otherwise the Relays in stick packing will be provided.

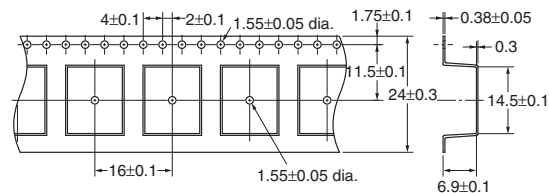
Relays per Reel: 500

### Direction of Relay Insertion

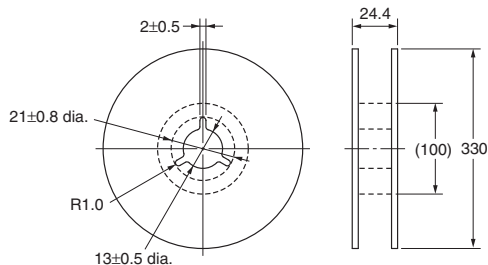


### Carrier Tape Dimensions

G6H-2F



### Reel Dimensions





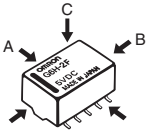
# Precautions

## Long-term Continuously ON Contacts

Using the Relay in a circuit where the Relay will be ON continuously for long periods (without switching) can lead to unstable contacts because the heat generated by the coil itself will affect the insulation, causing a film to develop on the contact surfaces. We recommend using a latching relay (magnetic-holding relay) in this kind of circuit. If a single-side stable model must be used in this kind of circuit, we recommend using a fail-safe circuit design that provides protection against contact failure or coil burnout.

## Claw Securing Force During Automatic Mounting

During automatic insertion of Relays, be sure to set the securing force of each claw to the following so that the Relay's characteristics will be maintained.



Direction A: 1.96 N max.  
 Direction B: 4.90 N max.  
 Direction C: 1.96 N max.

## Relay Handling

Use the Relay as soon as possible after opening the moisture-proof package. If the Relay is left for a long time after opening the moisture-proof package, the appearance may deteriorate and seal failure may occur after the solder mounting process. To store the Relay after opening the moisture-proof package, place it into the original package and seal the package with adhesive tape.

When washing the product after soldering the Relay to a PCB, use a water-based solvent or alcohol-based solvent, and keep the solvent temperature to less than 40°C. Do not put the Relay in a cold cleaning bath immediately after soldering.

**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 the time the purchase order is accepted by Seller. 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 or any claim related to pricing or other charges 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**

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- Change In Specifications:** Product specifications and descriptions may be changed at any time based on improvements or other reasons. It is Seller's practice to change part numbers when published ratings or features are changed, or when significant engineering changes are made. However, some specifications of the Product may be changed without any notice.
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  - (ii) 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.
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