

Coaxial Switch G9YA

High-frequency, High-capacity Coaxial Switch Supporting Bandwidths to 26.5 GHz

- Isolation of 60 dB min., insertion loss of 0.8 dB max., and V.S.W.R. of 1.7 max. at 26.5 GHz (50 Ω).
- Contact carry power of 120 W at 3 GHz.
- High sensitivity with rated power consumption of 700 mW for failsafe models and 500 mW for dual coil latching models
- Models with TTL-driven dual coil latching and indicator terminals are available
- Models available with 26.5 GHz or 18 GHz operation.
- RoHS Compliant



Ordering Information

■ Model Number Legend:

G9YA□-□□-□□-□□□□
1 2 3 4 5 6 7 8

1. Relay Function

- None: Failsafe
- K: Dual coil latching
- T: TTL-driven dual coil latching (with self cut-off function)

2. Contact Form

- 12: SPDT

3. Terminal Shape

- S: SMA

4. Frequency

- 4: 26.5 GHz
- 3: 18 GHz

5. Characteristic Impedance

- 5: 50 Ω

6. Operating Terminals

- None: Soldering terminals
- P: Pin terminals (See note 1.)
- C: Connector cable

7. Auxiliary Indicator Terminals

- None: No indicator terminals
- N: Indicator terminals

8. Data Package

- None: No data package
- D: Data package

- Note:** 1. To order, select the part number and add the desired coil voltage rating (e.g. G9YAK-12S-45-PND DC12).
2. Refer to "List of Models" for available part numbers

Application Examples

- Mobile communications infrastructure equipment, mobile phone base station equipment, and antenna devices
- Wireless devices, wireless LAN, and disaster prevention wireless equipment
- Test and measurement equipment
- Broadcasting equipment (digital TV, cable TV, and satellite broadcasting)

■ List of Models

Standard SPDT Models with Soldering Terminals

Classification	Indicator terminals	Data package	Rated coil voltage	Minimum packaging unit	Model
Failsafe	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	G9YA-12S-45
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YA-12S-45-D
	Yes	No	4.5, 12, 15, 24, and 28 VDC		G9YA-12S-45-N
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YA-12S-45-ND
Dual coil latching	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	G9YAK-12S-45
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YAK-12S-45-D
	Yes	No	4.5, 12, 15, 24, and 28 VDC		G9YAK-12S-45-N
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YAK-12S-45-ND
TTL-driven dual coil latching (with self cut-off function)	No	No	5, 12, 15, and 24 VDC	One per box	G9YAT-12S-45
		Yes	5, 12, 15, and 24 VDC		G9YAT-12S-45-D
	Yes	No	5, 12, 15, and 24 VDC		G9YAT-12S-45-N
		Yes	5, 12, 15, and 24 VDC		G9YAT-12S-45-ND

Standard SPDT Models with Pin Terminals

Classification	Indicator terminals	Data package	Rated coil voltage	Minimum packaging unit	Model
Failsafe	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	G9YA-12S-45-P
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YA-12S-45-PD
	Yes	No	4.5, 12, 15, 24, and 28 VDC		G9YA-12S-45-PN
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YA-12S-45-PND
Dual coil latching	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	G9YAK-12S-45-P
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YAK-12S-45-PD
	Yes	No	4.5, 12, 15, 24, and 28 VDC		G9YAK-12S-45-PN
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YAK-12S-45-PND
TTL-driven dual coil latching (with self cut-off function)	No	No	5, 12, 15, and 24 VDC	One per box	G9YAT-12S-45-P
		Yes	5, 12, 15, and 24 VDC		G9YAT-12S-45-PD
	Yes	No	5, 12, 15, and 24 VDC		G9YAT-12S-45-PN
		Yes	5, 12, 15, and 24 VDC		G9YAT-12S-45-PND

Standard SPDT Models with Connector Cables

Classification	Indicator terminals	Data package	Rated coil voltage	Minimum packaging unit	Model
Failsafe	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	G9YA-12S-45-C
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YA-12S-45-CD
	Yes	No	4.5, 12, 15, 24, and 28 VDC		G9YA-12S-45-CN
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YA-12S-45-CND
Dual coil latching	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	G9YAK-12S-45-C
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YAK-12S-45-CD
	Yes	No	4.5, 12, 15, 24, and 28 VDC		G9YAK-12S-45-CN
		Yes	4.5, 12, 15, 24, and 28 VDC		G9YAK-12S-45-CND
TTL-driven dual coil latching (with self cut-off function)	No	No	5, 12, 15, and 24 VDC	One per box	G9YAT-12S-45-C
		Yes	5, 12, 15, and 24 VDC		G9YAT-12S-45-CD
	Yes	No	5, 12, 15, and 24 VDC		G9YAT-12S-45-CN
		Yes	5, 12, 15, and 24 VDC		G9YAT-12S-45-CND

Note: Versions with 18-GHz operation are available. Replace "-45" with "-35" when ordering.
 -- Example: Order G9YA-12S-35-PND DC12 instead of G9YA-12S-45-PND DC12.

Specifications

■ Indicator Ratings, SPDT Models

Rating	100 mA max. at 30 V
Contact resistance	1 Ω max. (See note 2.)

- Note:** 1. The above values are initial values.
 2. The contact resistance was measured with 10 mA at 1 VDC with a voltage drop method.

■ High-frequency Characteristics

Frequency	1 GHz max.	4 GHz max.	8 GHz max.	12.4 GHz max.	18 GHz max.	26.5 GHz max.
Item						
Insertion loss	0.2 dB max.		0.3 dB max.	0.4 dB max.	0.5 dB max.	0.8 dB max.
Isolation	85 dB min.	80 dB min.	70 dB min.	65 dB min.	60 dB min.	
V.S.W.R.	1.1 max.	1.15 max.	1.25 max.	1.35 max.	1.5 max.	1.7 max.

- Note:** 1. The above values are initial values.
 2. Of the above values, the rated values are 18 GHz max. for the 18-GHz models and 26.5 GHz max. for the 26.5-GHz models.

■ Coil / Input Ratings

Note: An extra 140 to 300 mW of power consumption is added to models with indicator terminals, due to the operating coil and voltage specifications.

Failsafe Models (G9YA-12S-45(35))

Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Must operate voltage (V)	Must release voltage (V)	Maximum voltage (V)	Power consumption (mW)
4.5	155.2	29	80% max. of rated voltage	10% min. of rated voltage	150% of rated voltage	Approx. 700
12	58.5	205				
15	46.7	321				
24	29.2	822				
28	25.0	1,118				

- Note:** 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
 2. The operating characteristics are measured at a coil temperature of 23°C.
 3. The maximum voltage is the highest voltage that can be imposed on the relay coil instantaneously.

Dual Coil Latching Models (G9YAK-12S-45(35))

Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Must operate voltage (V)	Must release voltage (V)	Maximum voltage (V)	Power consumption (mW)
4.5	109.8	41	80% max. of rated voltage	80% max. of rated voltage	150% of rated voltage	Approx. 500 mW
12	41.7	288				
15	33.3	450				
24	20.8	1,152				
28	17.9	1,568				

- Note:** 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
 2. The operating characteristics are measured at a coil temperature of 23°C.
 3. The maximum voltage is the highest voltage that can be imposed on the relay coil instantaneously.

TTL-driven Dual Coil Latching Models (G9YAT-12S-45(35))

Rated voltage (VDC)	TTL logic level		Electronic self cut-off	Switching frequency
	ON	OFF		
5 VDC	2.4 to 5.5 V	0 to 0.5 V	Yes	180 operations per minute max. (ON time: OFF time = 1:1)
12 VDC				
15 VDC				
24 VDC				

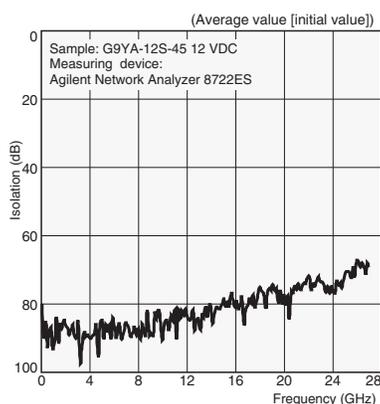
■ Characteristics

Item	Type	Failsafe models	Dual coil latching models	TTL-driven dual coil latching models
	Model	G9YA-12S-45(35)	G9YAK-12S-45(35)	G9YAT-12S-45(35)
Contact resistance (See note 3.)	100 mΩ max.			
Operating (set) time	15 ms max.			
Release (reset) time	15 ms max.			
Minimum set/reset pulse time	---		100 ms	
Insulation resistance (See note 4.)	1,000 MΩ min. (at 500 VDC)			
Dielectric strength	Coil and contacts	500 VAC, 50/60 Hz for 1 min		
	Coil and ground, contacts and ground	500 VAC, 50/60 Hz for 1 min		
	Contacts of same polarity	500 VAC, 50/60 Hz for 1 min		
Vibration resistance	Destruction	10 to 55 Hz, 5.0-mm double amplitude		
	Malfunction	10 to 55 Hz, 3.0-mm double amplitude		
Shock resistance	Destruction	1,000 m/s ²		
	Malfunction	500 m/s ²		
Endurance	Mechanical	5,000,000 operations min. (at 36,000 operations/hour)		
	Electrical	5,000,000 operations min. (3 GHz, 5 W, 50 Ω, V.S.W.R. 1.2 max.) at a switching frequency of 1,800 operations/hour		
Contact carry power	120 W (at 3 GHz, 50 Ω, V.S.W.R. ≤ 1.15) with an ambient temperature of 40°C			
Ambient operating temperature	-55 to 85°C (with no icing or condensation)			
Ambient operating humidity	5% to 85%			
Weight	Approx. 50 g			

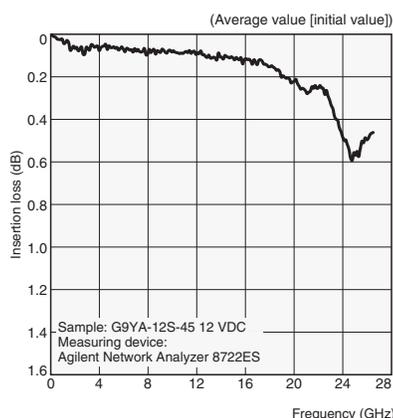
- Note:**
- The above values are initial values.
 - Rated and characteristic (initial) values are for a standard temperature of 23°C and a humidity of 65% unless otherwise indicated.
 - The contact resistance was measured with 10 mA at 1 VDC with a voltage drop method.
 - The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those used for checking the dielectric strength.

Engineering Data

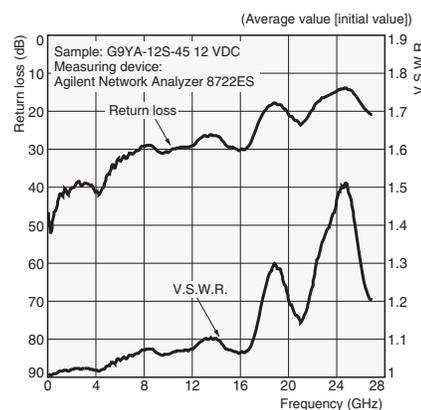
High-frequency Characteristics (Isolation)



High-frequency Characteristics (Insertion Loss)



High-frequency Characteristics (Return Loss, V.S.W.R.)



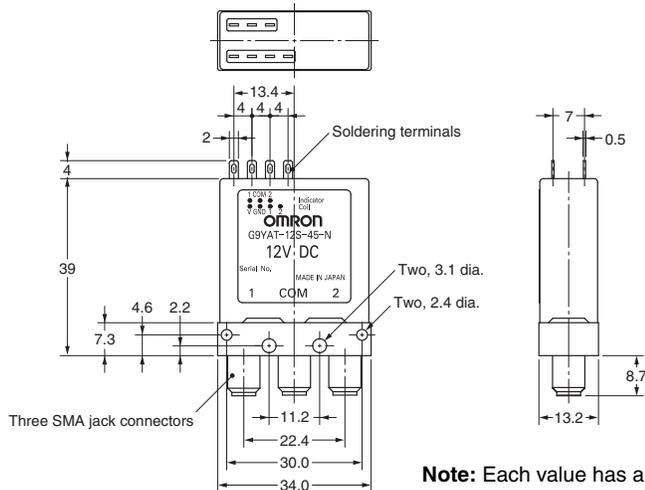
- Note:**
- The tests were conducted at an ambient temperature of 23°C.
 - The high-frequency characteristics will vary according to the connectors. Be sure to check operation including durability at the actual device before use.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

Models with Soldering Terminals

- G9YA-12S-45(35)-□
- G9YAK-12S-45(35)-□
- G9YAT-12S-45(35)-□



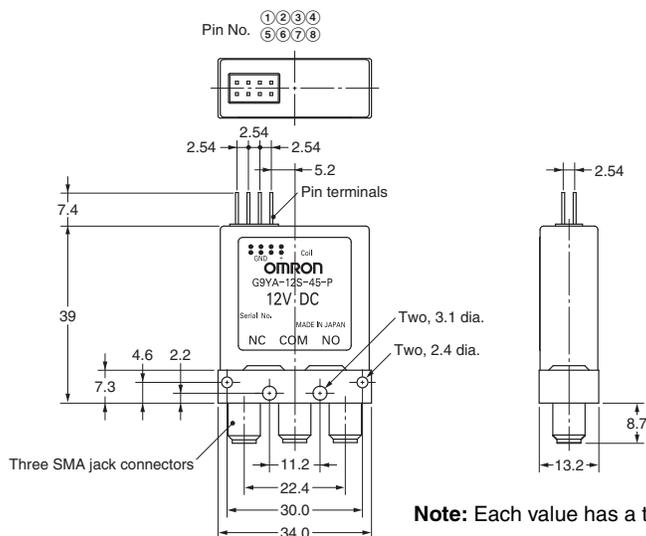
Note: Each value has a tolerance of ± 0.3 mm.

Soldering Terminal Arrangement

Model	G9YA-12S-45(35)-□			G9YAK-12S-45(35)-□			G9YAT-12S-45(35)-□		
	Indicator terminals	Type	Failsafe	Dual coil latching	TTL-driven dual coil latching				
Without indicator terminals									
With indicator terminals									

Models with Pin Terminals

- G9YA-12S-45(35)-P□
- G9YAK-12S-45(35)-P□
- G9YAT-12S-45(35)-P□

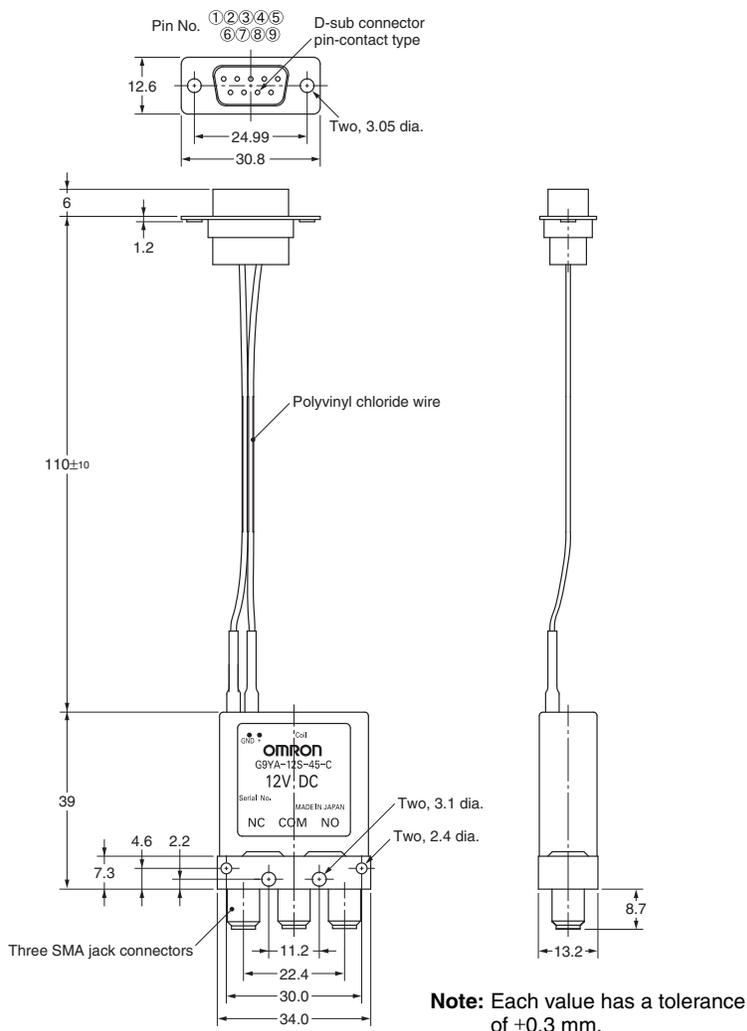
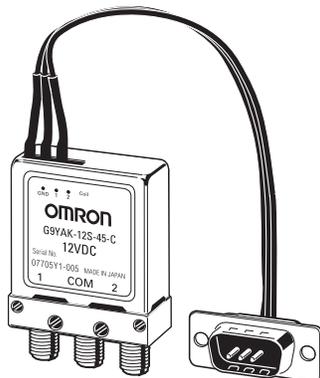


Pin Terminal Arrangement

Pin number		Indicator				Coil			
		①	②	③	④	⑤	⑥	⑦	⑧
Without indicator terminals	Failsafe						GND		+
	Dual coil latching						GND	1	2
	TTL-driven dual coil latching					V	GND	Logic 1	Logic 2
With indicator terminals	Failsafe		NC	COM	NO		GND		+
	Dual coil latching		1	COM	2		GND	1	2
	TTL-driven dual coil latching		1	COM	2	V	GND	Logic 1	Logic 2

Models with Connector Cables

- G9YA-12S-45(35)-C□
- G9YAK-12S-45(35)-C□
- G9YAT-12S-45(35)-C□



Pin Terminal Arrangement

Pin number		Indicator				Coil				
		①	②	③	④	⑤	⑥	⑦	⑧	⑨
Without indicator terminals	Failsafe							GND	+	
	Dual coil latching							GND	1	2
	TTL-driven dual coil latching						V	GND	Logic 1	Logic 2
With indicator terminals	Failsafe		NC	COM	NO			GND	+	
	Dual coil latching		1	COM	2			GND	1	2
	TTL-driven dual coil latching		1	COM	2		V	GND	Logic 1	Logic 2

Precautions

■ Precautions for Correct Use

Relay Handling

- Relays are precision components. Do not subject the Relay to vibration or shock in excess of the standard values, whether before or after mounting. The original performance cannot be maintained if the Relay is subjected to abnormal vibration or shock or dropped. Also, do not subject the Relay to vibration or shock in excess of the rated values when it is still packaged.
- Avoid subjecting the Relay to direct sunlight when it is being used, stored or transported. Keep the Relay at conditions of normal temperature, humidity, and pressure.
- The Relay is not sealed. It cannot be washed.
- Be absolutely sure not to wire the Relay incorrectly. Incorrect wiring will result in failure of Relay functions and damage or fire in the Relay, in addition to affecting external circuits.
- Recommended torque for mounting the SMA connectors is the MIL-C-39012 standard of 0.90 ± 0.1 N·m. The conditions, however, depend on the compatibility with the material of the connectors.
- Use of two or more Relays may result in change in the Relay characteristics due to interference in the magnetic fields generated by the Relays. Be sure to check operation using the actual devices before use.
- Use a power supply for the coil operating power supply with a maximum ripple of 5%. Be sure to check operation using the actual devices before use.
- Operation in excess of the coil ratings, contact ratings, switching service life or other specifications may result in abnormal heat generation, smoke, or fire.

Latching Relay Mounting

Make sure that the vibration or shock generated from other devices (e.g., Relays) on the same panel during operation or resetting do not exceed the values provided in the catalog, otherwise the latching Relay that has been set may be reset or vice versa. The latching Relay is reset before shipping. If excessive vibration or shock is imposed, however, the latching Relay may be set accidentally. Be sure to apply a reset signal before use.

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 deteriorate 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 failsafe Relay must be used in this kind of circuit, use a full-loop circuit design to provide protection against possible poor connections and coil disconnection.

Using Relays in an Atmosphere Containing Corrosive Gas (Silicon, Sulfuric, or Organic Gas)

Do not use Relays in a location where silicon gas, sulfuric gas (SO_2 , H_2S), or organic gas is present. If Relays are used for a long period in an atmosphere of sulfuric gas or organic gas, contact surfaces may become corroded and cause contact instability and obstruction, and terminal soldering characteristics may be degraded. If Relays are stored or used for a long time in an atmosphere of silicon gas, a silicon coating will be generated on contact surfaces, causing contact failure.

Connecting to Coil and Indicator Terminals

I. Models with Soldering Terminals

Perform manual soldering under the following conditions.

- Soldering iron tip temperature: 280 to 300°C
- Soldering time: Approx. 3 s max.

II. Models with Pin Terminals

Heed the following precautions when using models with pin terminals.

1. Connectors for use: Straight dip type for panels
Male connectors: HKP-8M29 (Honda Tsushin Kogyo)
Refer to the general catalog of Honda Tsushin Kogyo for connector models and specifications.
2. The sockets do not have a lock mechanism. Pulling the lead wires, shock, or long-term vibration may cause the connectors to become disconnected. Heed the following precautions.
 - Securely fix the Relay and connectors and make sure that no force is pulling on the lead wires during use.
 - Fully insert the socket into the Relay connector.
3. Do not solder the lead wires directly to the pin connectors.

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

- 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 correctly 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.

- Intellectual Property:** The intellectual property embodied in the Products is the exclusive property of Seller and its affiliates and Buyer shall not attempt to duplicate it in any way 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 to the extent that it is based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
- Property; Confidentiality:** Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Seller. All information and materials supplied by Seller to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
- Performance Data:** Performance data is provided as a guide in determining suitability and does not constitute a warranty. It may represent the result of Seller's test conditions, and the users must correlate it to actual application requirements.
- 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.
- Errors And Omissions:** The information on Seller's website or in other documentation has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.
- Export Controls:** Buyer shall comply with all applicable laws, regulations and licenses regarding (a) export of the Products or information provided by Seller; (b) sale of Products to forbidden or other proscribed persons or organizations; (c) disclosure to non-citizens of regulated technology or information.

VI. MISCELLANEOUS

- Waiver:** No failure or delay by Seller in exercising any right and no course of dealing between Buyer and Seller shall operate as a waiver of rights by Seller.
- Assignment:** Buyer may not assign its rights hereunder without Seller's written consent.
- Law:** These Terms are governed by Illinois law (without regard to conflict of laws). Federal and state courts in Cook County, Illinois have exclusive jurisdiction for any dispute hereunder.
- Amendment:** These Terms constitute the entire agreement between Buyer and Seller relating to the Products, and no provision may be changed or waived unless in writing signed by the parties.
- Severability:** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision.

Certain Precautions on Specifications and Use

1. **Suitability for Use.** Seller shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in Buyer's application or use of the Product. At Buyer's request, Seller will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
 - (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
 - (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.
 - (iii) Use in consumer products or any use in significant quantities.
 - (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this product.

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 OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. **Programmable Products.** Seller shall not be responsible for the user's programming of a programmable product, or any consequence thereof.
3. **Performance Data.** Performance data given in this publication is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Seller's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to Seller's Warranty and Limitations of Liability.
4. **Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Seller representative at any time to confirm actual specifications of purchased Product.
5. **Errors and Omissions.** The information in this publication has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors, or omissions.
6. **RoHS Compliance.** Where indicated, our products currently comply, to the best of our knowledge as of the date of this publication, with the requirements of the European Union's Directive on the Restriction of certain Hazardous Substances ("RoHS"), although the requirements of RoHS do not take effect until July 2006. These requirements may be subject to change. Please consult our website for current information.

Complete "Terms and Conditions of Sale" for product purchase and use are on Omron's website at <http://www.components.omron.com> – under the "About Us" tab, in the Legal Matters section.

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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