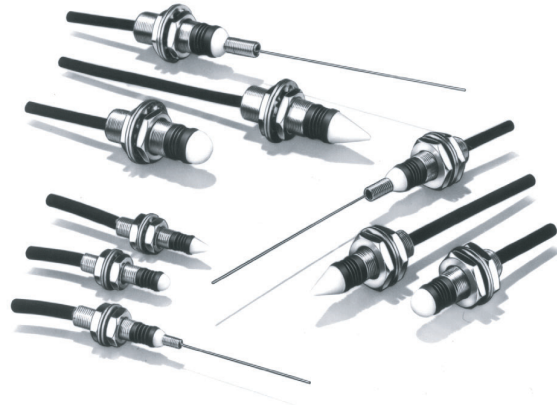


# Mechanical Touch Switch

## D5B

### Detects Objects in Multiple Directions with High Sensitivity, Ideal for Robotics

- Detects object contact from multiple directions and operates even with a slight force.
- Slow-action switching mechanism used. Movement differential as small as 0.01 mm assures high accuracy of detection.
- Gold-plated contact with coil spring capable of switching micro current/voltage load while providing high contact reliability.
- Highly resistant to dust, fine particles and water or oil splash, conforming to IP67.
- Three sizes (M10, M8, and M5) and three types of actuators (hemispheric, cone-shaped, and wobble stick).



## Model Number Structure

### Model Number Legend

D5B-□□□  
1 2 3

#### 1. Size

- 5: M5
- 8: M8
- 1: M10

#### 2. Actuator




- 01: Hemispheric
- 02: Cone-shaped
- 51: Wobble stick (short spring)
- 53: Wobble stick (long spring). Only with the M10 type.

#### 3. Cable length

- 1: 1 m
- 3: 3 m
- 5: 5 m

## Ordering Information

### List of Models

Type		Cable length	M5	M8	M10
<b>Hemispheric actuator</b> 		1 m	D5B-5011	D5B-8011	D5B-1011
		3 m	D5B-5013	D5B-8013	D5B-1013
		5 m	D5B-5015	D5B-8015	D5B-1015
<b>Cone-shaped actuator</b> 		1 m	D5B-5021	D5B-8021	D5B-1021
		3 m	D5B-5023	D5B-8023	D5B-1023
		5 m	D5B-5025	D5B-8025	D5B-1025
<b>Wobble stick actuator</b> 	Short spring	1 m	D5B-5511	D5B-8511	D5B-1511
		3 m	D5B-5513	D5B-8513	D5B-1513
		5 m	D5B-5515	D5B-8515	D5B-1515
	Long spring	1 m	---	---	D5B-1531
		3 m	---	---	D5B-1533
		5 m	---	---	D5B-1535

# Specifications

## ■ Ratings

Switching power	1 mA at 5 VDC to 30 mA at 30 VDC (resistive load)
-----------------	---

## ■ Characteristics

Degree of protection	IP67
Durability (see note 2)	Mechanical: 10,000,000 operations min. Electrical: 5,000,000 operations min. (at 30 VDC, 30-mA resistive load)
Operating speed	5 to 500 mm/s
Operating frequency	Mechanical: 120 operations/min. Electrical: 60 operations/min.
Insulation resistance	100 MΩ min. at 250 VDC between each terminal and ground
Contact resistance	With 1 m cable: 700 mΩ max. (initial value) With 3 m cable: 1.9 Ω max. (initial value) With 5 m cable: 3.1 Ω max. (initial value)
Dielectric strength	250 VAC, 50/60 Hz for 1 min between terminals of same polarity (TTP) 1,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground (600 VAC for M5 model)
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note 3)
Shock resistance	Mechanical: 1,000 m/s <sup>2</sup> min. Malfunction: 300 m/s <sup>2</sup> min. (see note 4)
Ambient temperature	Operating: -10°C to 70°C (with no icing)
Ambient humidity	Operating: 35% to 95%
Actuator strength	14.7 N (see note 5)
Weight	Switch: M5: Approx. 14 g, M8: Approx. 20 g, M10: Approx. 21 g Cable: Approx. 10 g/m

**Note:** 1. The above figures are initial values.

2. Durability values are calculated at an operating temperature of 5°C to 35°C, and an operating humidity of 40% to 70%. Contact your OMRON sales representative for more detailed information on other operating environments.

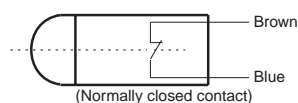
3. 16.7 Hz, 1-mm double amplitude for wobble stick models.

4. 50 m/s<sup>2</sup> min. for wobble stick models.

5. Excluding the wobble stick models.

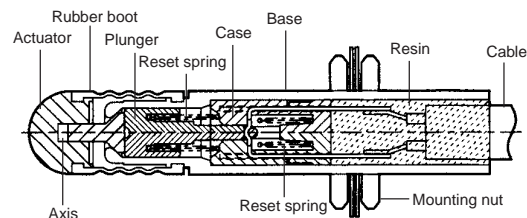
## Connections

### ■ Contact Form



**Note:** Specifications for normally open (N.O.) contacts are not available.

## Nomenclature

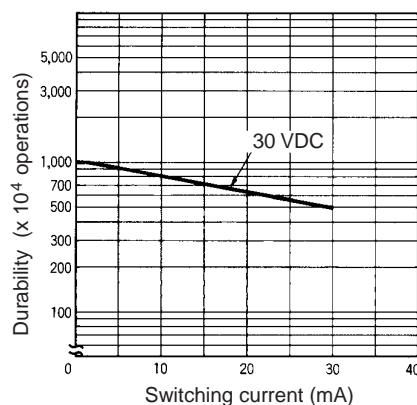


**Note:** NBR rubber is used with this Switch.

## Engineering Data

### Electrical Durability ( $\cos\phi = 1$ )

Operating temperature: 5°C to 35°C  
Operating humidity: 40% to 70%.



# Dimensions

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

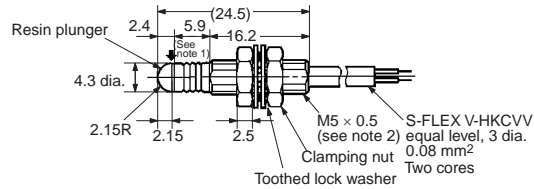
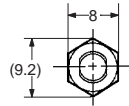
2. Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions. Values in parentheses ( ) are cumulative values and may exceed tolerance of  $\pm 0.4$  mm.

3. The square □ in the models represents the cable length. Refer to *Ordering Information*.

## M5 Type

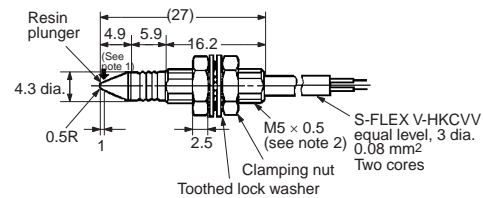
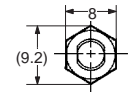
### Hemispheric Plunger

D5B-501□



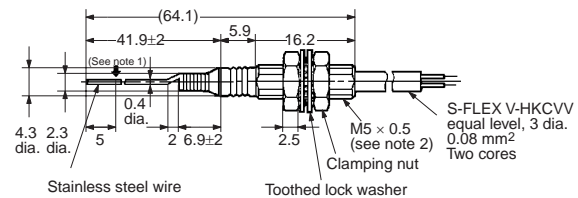
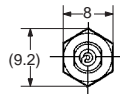
### Cone-shaped Plunger

D5B-502□



### Wobble Stick

D5B-551□



**Note:** 1. Operating characteristics (X, Y) measuring position  
2. The threads of the case are not standard; 0.5-mm pitch. Therefore standard tapping to the case is not possible for mounting.

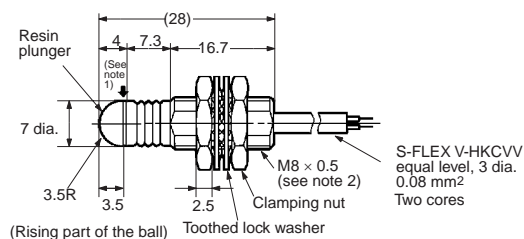
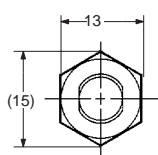
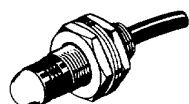
		TT (max.) (reference value)		OF (max.)		Permissible operating force (max.)	PT (reference value)	
		X, Y	Z	X, Y	Z	X, Y, Z	X, Y	Z
<b>Hemispheric actuator</b> 	<b>M5</b>	1.0 mm	0.8 mm	0.49 N	0.74 N	1.96 N	0.6 mm	0.3 mm
<b>Cone-shaped actuator</b> 	<b>M5</b>	2.2 mm	0.8 mm	0.20 N	0.74 N	1.96 N	0.6 mm	0.3 mm
<b>Wobble stick actuator</b> 	<b>M5</b>	22 mm	---	0.05 N max.	---	0.49 N	11 mm	---

**Note:** The operating characteristic values shown in the above table are measured at the portions indicated by the downward arrows in *Dimensions*.

# M8 Type

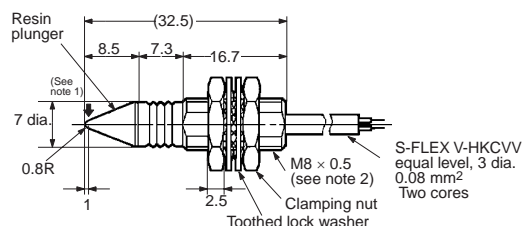
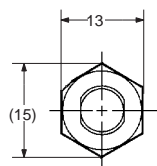
## Hemispheric Plunger

D5B-801□



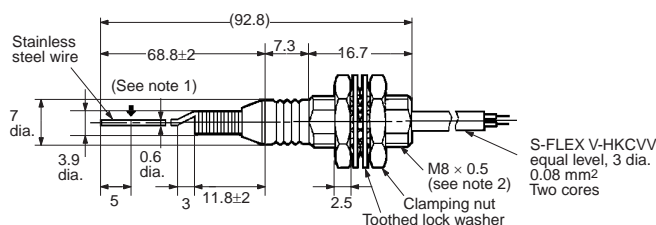
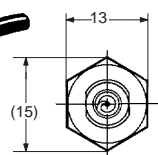
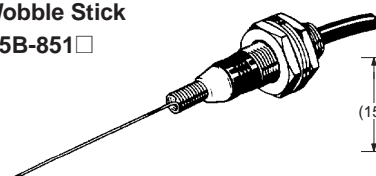
## Cone-shaped Plunger

D5B-802□



## Wobble Stick

D5B-851□



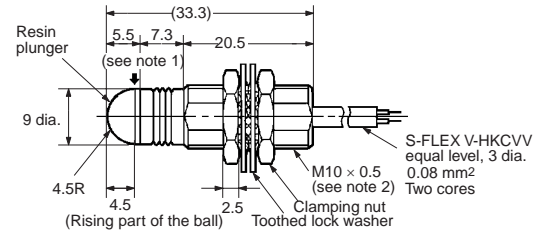
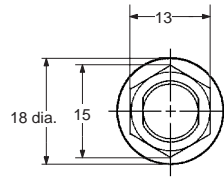
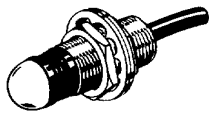
- Note:** 1. Operating characteristics (X, Y) measuring position  
2. The threads of the case are not standard. Therefore standard tapping to the case is not possible for mounting.

		TT (max.) (reference value)		OF (max.)		Permissible operating force (max.)	PT (reference value)	
		X, Y	Z	X, Y	Z		X, Y	Z
Hemispheric actuator	M8	1.2 mm	0.9 mm	0.74 N	0.98 N	1.96 N	0.6 mm	0.3 mm
Cone-shaped actuator	M8	3.0 mm	0.9 mm	0.20 N	0.98 N	1.96 N	1.4 mm	0.3 mm
Wobble stick actuator	M8	23 mm	---	0.05 N max.	---	0.49 N	11 mm	---

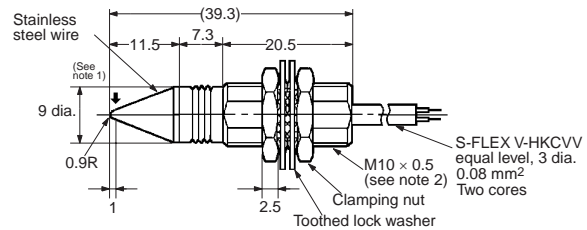
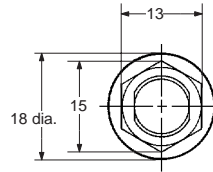
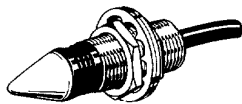
**Note:** The operating characteristic values shown in the above table are measured at the portions indicated by the downward arrows in *Dimensions*.

# M10 Type

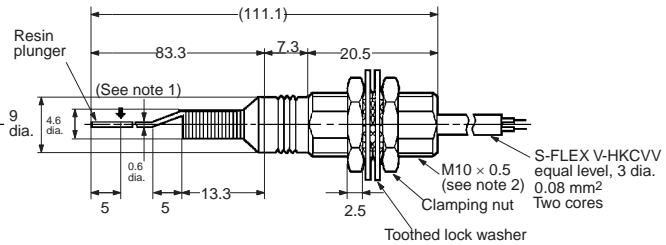
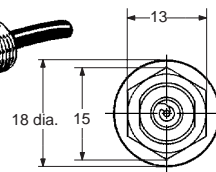
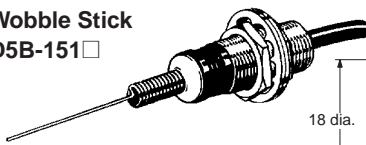
## Hemispheric Plunger D5B-101□



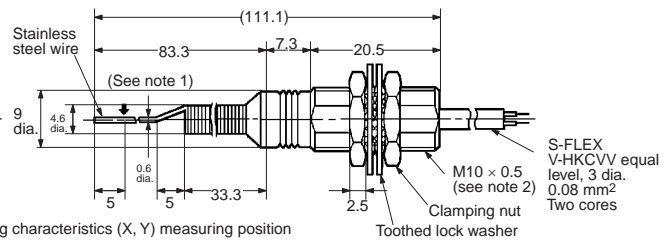
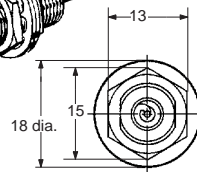
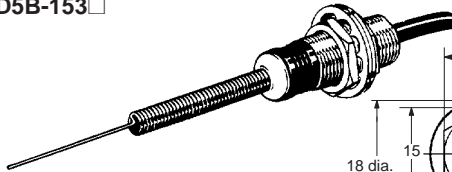
## Cone-shaped Plunger D5B-102□



## Wobble Stick D5B-151□



## D5B-153□



- Note: 1. Operating characteristics (X, Y) measuring position  
2. The threads of the case are not standard. Therefore standard tapping to the case is not possible for mounting.

		TT (max.) (reference value)		OF (max.)		Permissible operating force (max.)	PT (reference value)	
		X, Y	Z	X, Y	Z	X, Y, Z	X, Y	Z
<b>Hemispheric actuator</b>	<b>M10</b>	1.3 mm	1.0 mm	0.98 N	1.47 N	1.96 N	0.7 mm	0.3 mm
<b>Cone-shaped actuator</b>	<b>M10</b>	4.0 mm	1.0 mm	0.39 N	1.47 N	1.96 N	2.0 mm	0.3 mm
<b>Wobble stick actuator</b>	<b>M10</b>	30 mm	---	0.05 N max.	---	0.49 N	14 mm	---

Note: The operating characteristic values shown in the above table are measured at the portions indicated by the downward arrows in *Dimensions*.

## Precautions

Refer to the "Precautions for General-purpose Limit Switches (Including Multiple Limit Switches, Mechanical Touch Switches, High-precision Switches, Touch Switches, On-site Flexible Switches; Not Including Safety Switches)" on page 17.

### ■ Correct Use

Do not impose a load exceeding 29.42 N on the cord, otherwise the cord may break. If the cord is to be bent repeatedly, make sure that the bending radius is at least R20 mm.

### Operation

Do not impose excessive force on the actuator. Even though the actuator withstands a maximum force of 14.7N, if the D5B is repeatedly actuated, make sure that the maximum force imposed on the actuator is 1.96 N. If the actuator is, however, a wire spring type, the maximum force imposed must be 0.49 N instead.

The operating characteristics of the D5B vary with the direction (i.e., X, Y, or Z) in which force is imposed. Refer to page 200.

The wobble stick model is actuated when force is imposed on the tip of the wobble stick and the built-in switch unit is closed or opened. This is different from the NL Limit Touch Switch or D5C Column Touch Switch in terms of the main mechanism. The NL or D5C is actuated when the actuator comes into contact with an actuating object.

The wobble stick model may break if the stroke is excessive. Make sure that the total travel (TT) is within the reference value provided in the datasheet.

Attach an appropriate cover for protecting the D5B from direct exposure to sprayed oil or water. No protective cover is, however, provided together with the D5B.

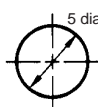
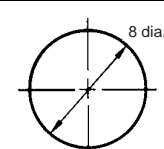
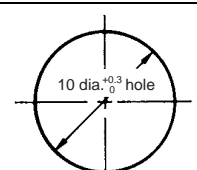
The D5B may be damaged by ozone and failures may result if the D5B is used outdoors. Consult your OMRON representative before attempting to use the D5B outdoors.

Outdoor environmental conditions may have a bad influence on the service life of the D5B. Refer to the general precautions of Limit Switches for details.

### Mounting

Do not tighten the nuts with excessive torque. Refer to the following for the appropriate tightening torque and mounting dimensions of each nut.

The base incorporates special threads that cannot be mounted to plates with standard tap holes.

Size	Max. tightening torque	Mounting hole dimension
M5	0.98 N·m	
M8	2.94 N·m	
M10	3.92 N·m	

An excessive load may deform the base. When mounting the base, be careful not to impose an excessive load on the base.

# Terms and Conditions of Sale

1. **Offer; Acceptance.** These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
2. **Prices; Payment Terms.** All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
3. **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 (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
4. **Interest.** Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. **Orders.** Omron will accept no order less than \$200 net billing.
6. **Governmental Approvals.** Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. **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 Omron or required to be collected directly or indirectly by Omron 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 Omron.
8. **Financial.** If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron 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, Omron 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.
9. **Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. **Force Majeure.** Omron 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.
11. **Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
  - a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
  - b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
  - c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
  - d. Delivery and shipping dates are estimates only; and
  - e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. **Claims.** Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. **Warranties.** (a) **Exclusive Warranty.** Omron'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 Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) **Limitations.** OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) **Buyer Remedy.** Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly 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 Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See <http://oeweb.omron.com> or contact your Omron representative for published information.
14. **Limitation on Liability; Etc.** OMRON COMPANIES 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 Omron Companies exceed the individual price of the Product on which liability is asserted.
15. **Indemnities.** Buyer shall indemnify and hold harmless Omron Companies and their 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 Omron 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. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. **Property; Confidentiality.** Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron 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.
17. **Export Controls.** Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (ii) sale of products to "forbidden" or other proscribed persons; and (iii) disclosure to non-citizens of regulated technology or information.
18. **Miscellaneous.** (a) **Waiver.** No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) **Assignment.** Buyer may not assign its rights hereunder without Omron's written consent. (c) **Law.** These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) **Amendment.** These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) **Severability.** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) **Setoff.** Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) **Definitions.** As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

## Certain Precautions on Specifications and Use

1. **Suitability of Use.** Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron 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) Use in consumer products or any use in significant quantities.
  - (iii) 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.
  - (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 OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
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5. **Errors and Omissions.** Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.



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**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

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



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