Mechanical Touch Switch

D5B

CSM_D5B_DS_E_3_2

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



- Slow-action switching mechanism used.
- Gold-plated contact with coil spring capable of switching micro current/voltage load while providing high contact reliability.
- Inputs directly to microcomputers and programmable controllers.
- Three sizes (M10, M8, and M5) and three types of compact actuators.
- Easy panel mounting.

⚠ Be sure to read *Safety Precautions* on page 4 and *Safety Precautions for All Limit Switches*.

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

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

Specifications

Ratings

Electrical ratings	1 mA at 5 VDC to 30 mA at 30 VDC (resistive load)

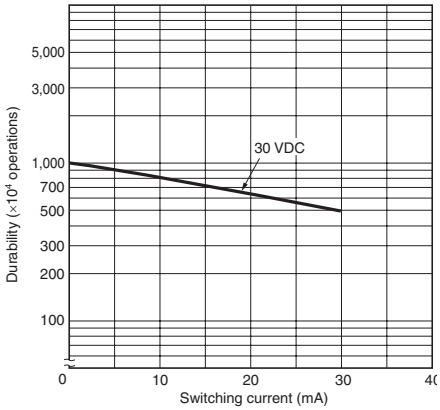
Characteristics

Degree of protection		IP67
Durability *1	**Mechanical**	10,000,000 operations min.
	Electrical	5,000,000 operations min. (at 30 mA 30 VDC 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 non-current-carrying metal parts
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 (50/60 Hz 1 min)	**Between terminals of same polarity**	250 VAC (at TTP)
	Between each terminal and non-current-carrying metal parts	1,000 VAC (600 VAC for M5 model)
Vibration resistance	**Malfunction**	10 to 55 Hz, 1.5-mm double amplitude *2
Shock resistance	**Mechanical**	1,000 m/s² max.
	Malfunction	300 m/s² max. *3
Ambient operating temperature		−10°C to +70°C (with no icing)
Ambient operating humidity		35% to 95%RH
Actuator strength		14.7 N *4
Weight	**Switch**	M5: Approx. 14 g, M8: Approx. 20 g, M10: Approx. 21 g
	Cable	Approx. 10 g/m

Engineering Data

Electrical Durability (cosϕ=1)

(Operating temperature: +5°C to +35°C, Operating humidity: 40% to 70%RH.)



Note: The above figures are initial values.

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

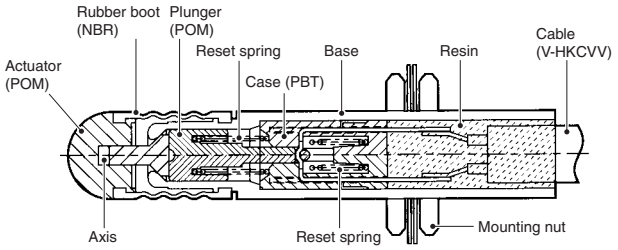
*2. 16.7 Hz, 1-mm double amplitude for wobble stick models.

*3. 50 m/s² max. for wobble stick models.

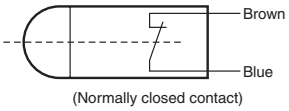
*4. Excluding the wobble stick models.

Structure and Nomenclature

Structure



Contact Form



(Normally closed contact)

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

Dimensions and Operating Characteristics

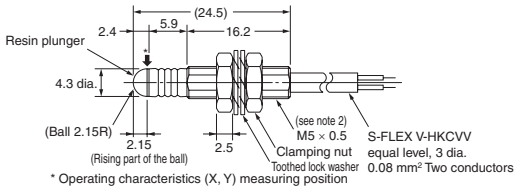
(Unit: mm)

Dimensions

M5 Type (The square □ in the models represents the cable length. Refer to Ordering Information.)

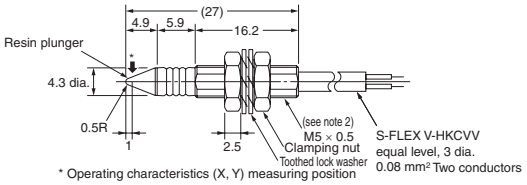
D5B-501□



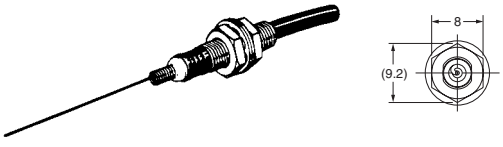


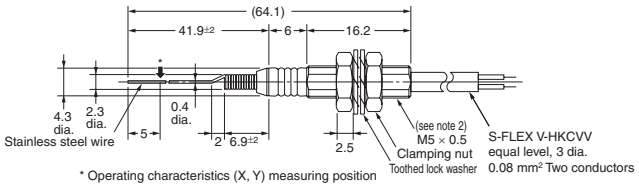
D5B-502□





D5B-551□

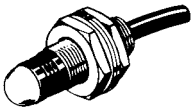


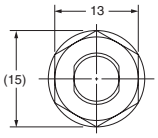


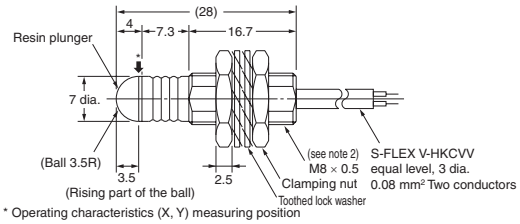
Note: 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
2. The threads of the case are not standard; 0.5-mm pitch. Therefore standard tapping to the case is not possible for mounting.

M8 Type

D5B-801□

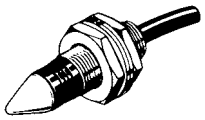


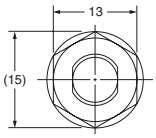


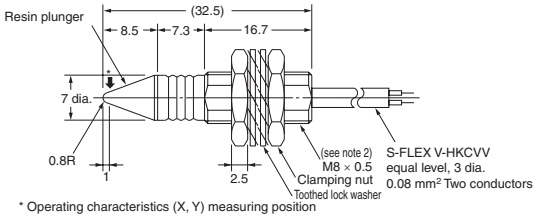


* Operating characteristics (X, Y) measuring position

D5B-802□

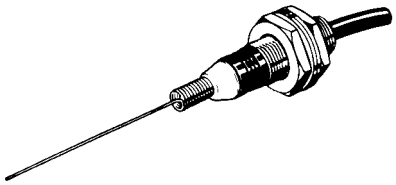


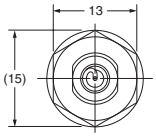


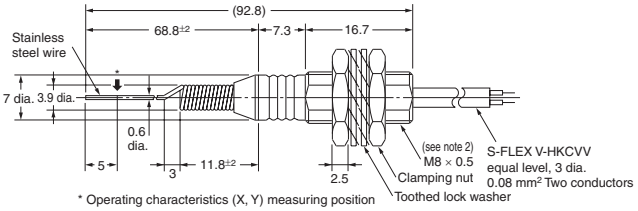


* Operating characteristics (X, Y) measuring position

D5B-851□



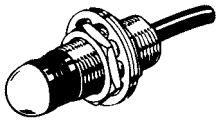


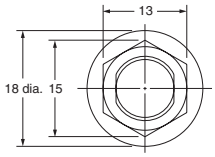


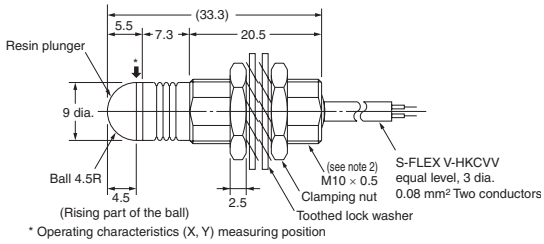
* Operating characteristics (X, Y) measuring position

M10 Type

D5B-101□

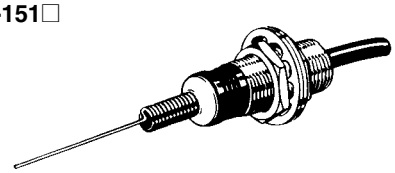


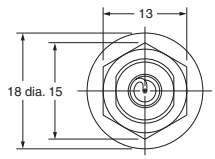


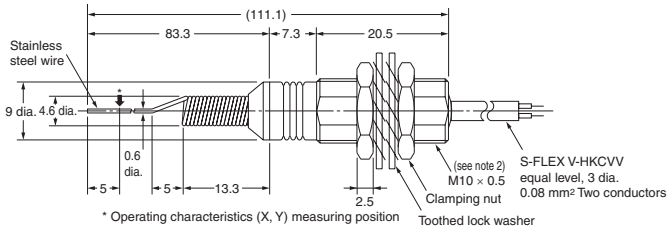


* Operating characteristics (X, Y) measuring position

D5B-151□

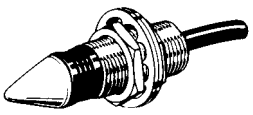


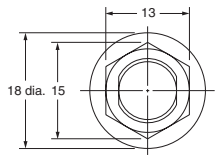


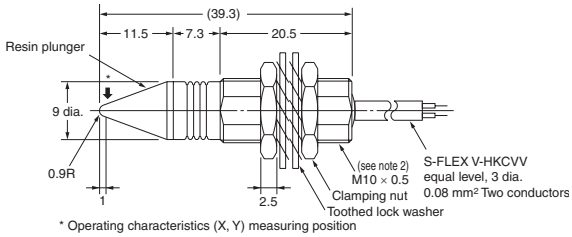


* Operating characteristics (X, Y) measuring position

D5B-102□

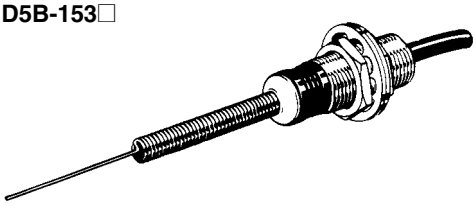


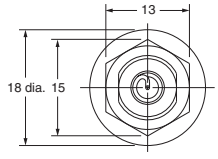


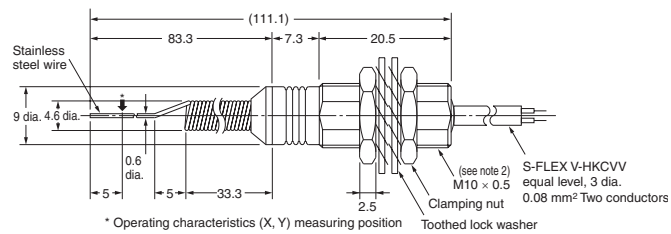


* Operating characteristics (X, Y) measuring position

D5B-153□







* Operating characteristics (X, Y) measuring position

Note: 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
2. The threads of the case are not standard; 0.5-mm pitch. Therefore standard tapping to the case is not possible for mounting.

Operating Characteristics

Actuator		Hemispheric Plunger			Cone-shaped Plunger			Wobble Stick		
Operating direction										
Operating characteristics	Type	M5	M8	M10	M5	M8	M10	M5	M8	M10
Total travel TT *	X, Y	1.0 mm	1.2 mm	1.3 mm	2.2 mm	3.0 mm	4.0 mm	22 mm	23 mm	30 mm
	Z	0.8 mm	0.9 mm	1.0 mm	0.8 mm	0.9 mm	1.0 mm	---		
Operating force OF (max.)	X, Y	0.49 N	0.74 N	0.98 N	0.20 N	0.20 N	0.39 N	0.05 N		
	Z	0.74 N	0.98 N	1.47 N	0.74 N	0.98 N	1.47 N	---		
Permissive operating force (max.)	X, Y, Z	1.96 N			1.96 N			0.49 N		
Pretravel PT *	X, Y	0.6 mm	0.6 mm	0.7 mm	0.6 mm	1.4 mm	2.0 mm	11 mm	11 mm	14 mm
	Z	0.3 mm	0.3 mm	0.3 mm	0.3 mm	0.3 mm	0.3 mm	---	---	---

* Reference value

Safety Precautions

Refer to *Safety Precautions for All Limit Switches*.

Precautions for Correct Use

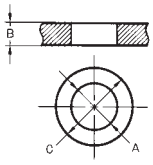
Handling

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

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.

Type	Appropriate Tightening Torque (max.)
M5	0.98 N·m
M8	2.94 N·m
M10	3.92 N·m



Size Type	M5	M8	M10
A (Mounting hole size)	$5^{+0.3}_{0}$ mm dia.	$8^{+0.3}_{0}$ mm dia.	$10^{+0.3}_{0}$ mm dia.
B (Panel thickness)	3 to 7 mm dia.	4 to 6 mm dia.	6 to 10 mm dia.
C (Toothed lock washer diameter)	9.2 mm dia.	15 mm dia.	18 mm dia.

- The base may be deformed if it is subjected to an excessive load. Be careful when mounting the Switch.

Operation

- Do not impose excessive force on the actuator. Even though the actuator withstands a maximum force of 14.7 N, 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 above.
- 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.

Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS 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 OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear 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.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS 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 PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

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 model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

2012.8

In the interest of product improvement, specifications are subject to change without notice.

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Industrial Automation Company

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