

## 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   | Cable length (m) | Type | M5       | M8       | M10      |
|--|------------------|------|----------|----------|----------|
|  |                  |      | Model    |          | Model    |
| Hemispheric actuator<br>  | 1, 3, 5          | 1    | D5B-5011 | D5B-8011 | D5B-1011 |
|  |                  | 3    | D5B-5013 | D5B-8013 | D5B-1013 |
|  |                  | 5    | D5B-5015 | D5B-8015 | D5B-1015 |
| Cone-shaped actuator<br>  | 1, 3, 5          | 1    | D5B-5021 | D5B-8021 | D5B-1021 |
|  |                  | 3    | D5B-5023 | D5B-8023 | D5B-1023 |
|  |                  | 5    | D5B-5025 | D5B-8025 | D5B-1025 |
| Wobble stick actuator<br> | 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)<br>With 3 m cable: 1.9 Ω max. (initial value)<br>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<br>10 to 55 Hz, 1.5-mm double amplitude *2  |
| Shock resistance                     | Mechanical   | 1,000 m/s <sup>2</sup> min.   |
|                                      | Malfunction  | 300 m/s <sup>2</sup> min. *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/s<sup>2</sup> min. for wobble stick models.

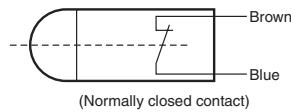
\*4. Excluding the wobble stick models.

## Structure and Nomenclature

### Structure



### Contact Form



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

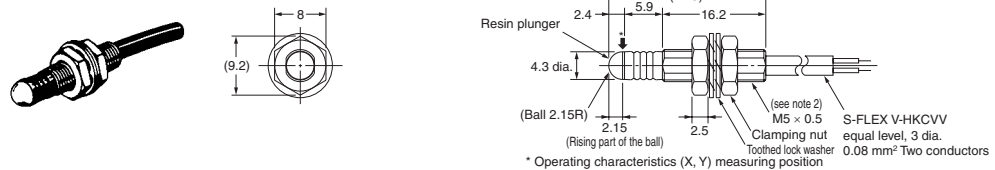
## Dimensions and Operating Characteristics

(Unit: mm)

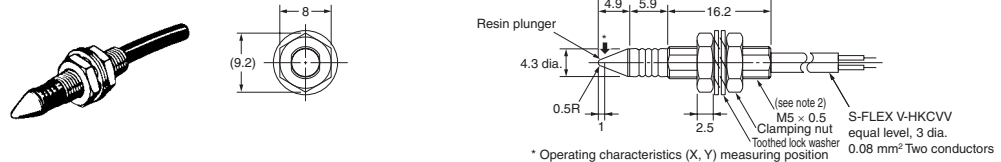
### Dimensions

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□



D5B-802□



D5B-851□



M10 Type

D5B-101□



D5B-151□



D5B-102□



D5B-153□



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                |        |         | Type                |        |        | 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 mm | 0.20 N              | 0.20 N | 0.39 N | 0.05 N       |       |       |
|                                   | Z       | 0.74 N              | 0.98 N | 1.47 mm | 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 <sup>+0.3</sup> <sub>0</sub> mm dia. | 8 <sup>+0.3</sup> <sub>0</sub> mm dia. | 10 <sup>+0.3</sup> <sub>0</sub> 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

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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.