

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

		Type	M5	M8	M10
Actuator	Cable length (m)		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)
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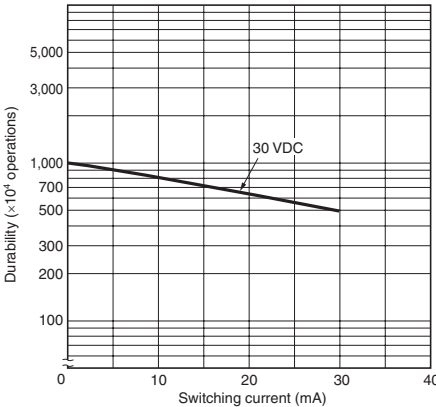
Characteristics

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/s ² min.
	Malfunction	300 m/s ² 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.

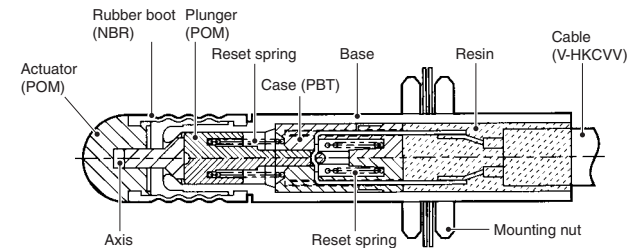
*2. 16.7 Hz, 1-mm double amplitude for wobble stick models.

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

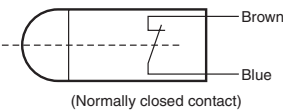
*4. Excluding the wobble stick models.

Structure and Nomenclature

Structure



Contact Form



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

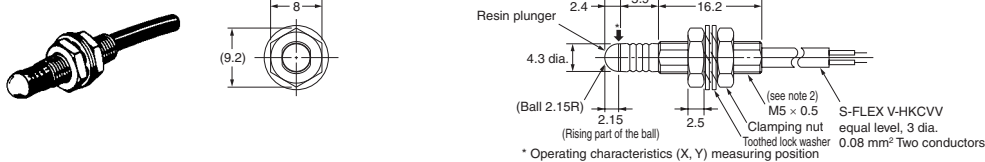
Dimensions and Operating Characteristics

(Unit: mm)

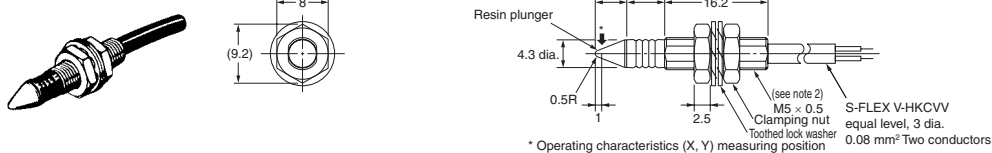
Dimensions

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

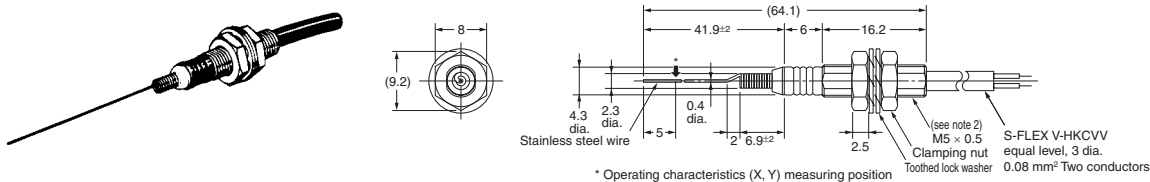
D5B-501□



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.

Technical drawing of the S-FLEX V-HKCVV cable assembly. The drawing shows a cross-section of the cable with various dimensions and labels. The dimensions are: (28) for the total length, 4 for the resin plunger length, 7.3 for the resin plunger diameter, 16.7 for the clamping nut length, 7 dia. for the resin plunger diameter, (Ball 3.5R) for the ball diameter, 3.5 for the ball radius, 2.5 for the clamping nut diameter, and 0.08 mm for the conductor diameter. The labels include: Resin plunger, (28), 4, 7.3, 16.7, 7 dia., (Ball 3.5R), 3.5, 2.5, (see note 2) M8 x 0.5, Clamping nut, S-FLEX V-HKCVV equal level, 3 dia., 0.08 mm Two conductors, Toothed lock washer, and (Rising part of the ball).

* Operating characteristics (X, Y) measuring position

Resin plunger

(32.5)

8.5

7.3

16.7

7 dia.

0.8R

2.5

Clamping nut

Toothed lock washer

(see note 2)
MB x 0.5

S-FLEX V-HKCVCV
equal level, 3 dia.
0.08 mm² Two conductors

* Operating characteristics (X, Y) measuring position

Technical drawing of the S-FLEX V-HKCVV cable assembly. The drawing shows a cross-section of the cable with various dimensions and components labeled.

Dimensions (mm):

- Overall length: 92.8
- Length of stainless steel wire: 68.8 ± 2
- Length of clamping nut: 7.3
- Length of S-FLEX V-HKCVV: 16.7
- Length of clamping nut (from end): 2.5
- Length of S-FLEX V-HKCVV (from end): 11.8 ± 2
- Length of clamping nut (from end): 3
- Length of S-FLEX V-HKCVV (from end): 5

Components and Labels:

- Stainless steel wire
- 7 dia. 3.9 dia.
- 0.6 dia.
- Clamping nut
- S-FLEX V-HKCVV equal level, 3 dia. 0.08 mm² Two conductors
- Toothed lock washer
- (see note 2)

* Operating characteristics (X, Y) measuring position

Technical drawing of the S-FLEX V-HKC/VV cable assembly. The drawing shows a side view of the assembly with various dimensions and labels. The dimensions are: 5.5, 7.3, (33.3), 20.5, 9 dia., 4.5, 2.5, and 0.08 mm². The labels are: Resin plunger, Ball 4.5R, (Rising part of the ball), (see note 2) M10 x 0.5, Clamping nut, Toothed lock washer, and S-FLEX V-HKC/VV equal level, 3 dia. 0.08 mm² Two conductors.

Technical drawing of the S-FLEX V-HKC/VV cable assembly. The drawing shows a cross-section of the cable with various dimensions and components labeled.

Dimensions (mm):

- Overall length: 111.1
- Section 1: 83.3
- Section 2: 7.3
- Section 3: 20.5
- Section 4: 2.5
- Section 5: 13.3
- Section 6: 5
- Section 7: 5
- Section 8: 0.6
- Section 9: 5

Components and Labels:

- Stainless steel wire
- 9 dia. 4.6 dia.
- 0.6 dia.
- (see note 2) M10 x 0.5
- Clamping nut
- Toothed lock washer
- S-FLEX V-HKC/VV equal level, 3 dia. 0.08 mm² Two conductors

* Operating characteristics (X, Y) measuring position

Technical drawing of the S-FLEX V-HCKVV cable assembly. The drawing shows a cross-section of the cable with a resin plunger inserted into the center. The dimensions are as follows:

- Overall length: (39.3)
- Distance from resin plunger tip to the start of the braided shield: 11.5
- Distance from the start of the braided shield to the end of the braided shield: 7.3
- Distance from the end of the braided shield to the end of the cable: 20.5
- Inner diameter of the resin plunger: 9 dia.
- Radius of the resin plunger tip: 0.9R
- Distance from the end of the braided shield to the start of the clamping nut: 2.5
- Clamping nut: M10 x 0.5
- Toothed lock washer
- S-FLEX V-HCKVV equal level, 3 dia.
- 0.08 mm² Two conductors

* Operating characteristics (X, Y) measuring position

Stainless steel wire

9 dia. 4.6 dia.

5 0.6 dia. 5 33.3

83.3 (111.1) 7.3 20.5

(see note 2) M10 x 0.5

Clamping nut

S-FLEX V-HKC/VV
equal level, 3 dia.
0.08 mm² Two conductors

Toothed lock washer

* 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.

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 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

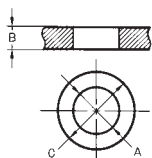
Handling

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 ^{+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.

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2008.11

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