

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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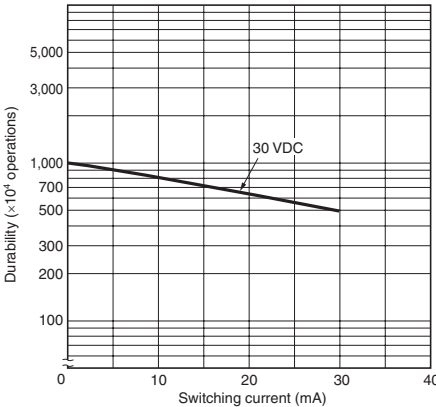
Characteristics

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.

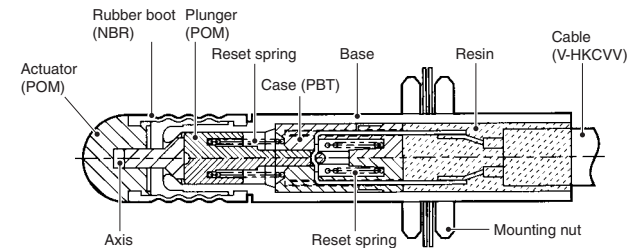
*2. 16.7 Hz, 1-mm double amplitude for wobble stick models.

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

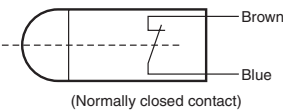
*4. Excluding the wobble stick models.

Structure and Nomenclature

Structure



Contact Form



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

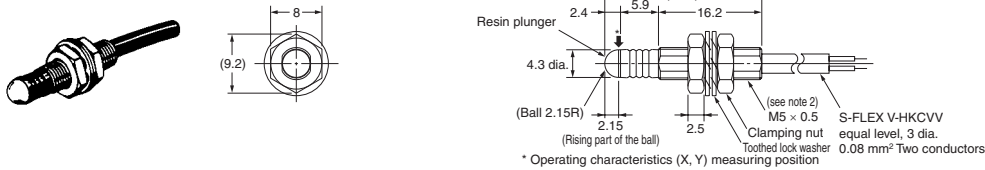
Dimensions and Operating Characteristics

(Unit: mm)

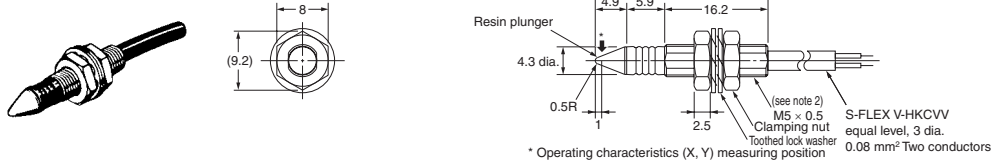
Dimensions

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

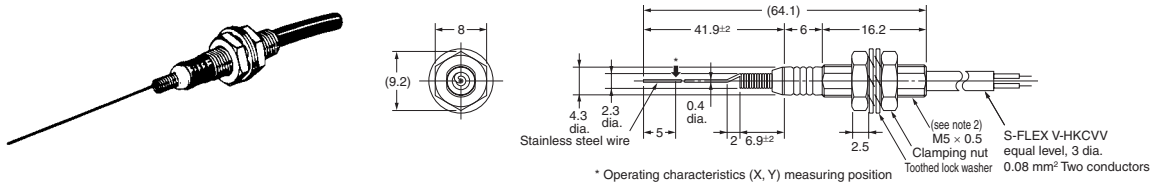
D5B-501□



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 mm² Two conductors, Toothed lock washer, and (Rising part of the ball).

* Operating characteristics (X, Y) measuring position

Technical drawing of the S-FLEX V-HKCVCV cable assembly. The drawing shows a cross-section of the cable with a resin plunger inserted into the end. Dimensions are given in millimeters: 8.5, 7.3, 16.7, 7 dia., 0.8R, 2.5, and (32.5). Components labeled include: Resin plunger, 7 dia., 0.8R, (see note 2) MB x 0.5 Clamping nut, Toothed lock washer, and 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 showing dimensions and components:

- Resin plunger**: The outermost component on the left.
- Ball 4.5R**: The spherical part of the resin plunger.
- (Rising part of the ball)**: The curved section of the ball.
- Dimensions**:
 - 5.5 (width of the resin plunger head)
 - 7.3 (width of the resin plunger neck)
 - 33.3 (total length of the resin plunger)
 - 20.5 (length of the cable jacket)
 - 9 dia. (diameter of the resin plunger head)
 - 4.5 (radius of the ball)
 - 2.5 (width of the clamping nut)
- Components**:
 - Clamping nut**: The nut used to secure the cable.
 - Toothed lock washer**: The washer used to secure the nut.
 - S-FLEX V-HKC/VV**: The cable itself, with a diameter of 9 mm.
 - equal level, 3 dia.**: The diameter of the conductors.
 - 0.08 mm² Two conductors**: The conductor specifications.
- Notes**:
 - (see note 2) M10 x 0.5 (specification for the clamping nut)
 - * Operating characteristics (X, Y) measuring position

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: 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. Dimensions are provided in millimeters (mm) and inches (in). The total length of the assembly is 39.3 mm (1.55 in). The resin plunger has a diameter of 9 mm (0.35 in) and a length of 11.5 mm (0.45 in). The cable has a diameter of 20.5 mm (0.81 in). The resin plunger is inserted into the cable, and the cable is secured with a clamping nut and a toothed lock washer. The cable is labeled S-FLEX V-HCKVV equal level, 3 dia. 0.08 mm² Two conductors.

Resin plunger

9 dia.

0.9R

(39.3)

11.5

7.3

20.5

(see note 2)

M10 × 0.5

Clamping nut

Toothed lock washer

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

* Operating characteristics (X, Y) measuring position

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
- Length of the outer jacket: 83.3
- Length of the braided shield: 7.3
- Length of the inner insulation: 20.5
- Length of the clamping nut: 2.5
- Length of the S-FLEX V-HKC/VV cable: 33.3
- Length of the inner insulation (inner): 5
- Length of the braided shield (inner): 5
- Length of the outer jacket (inner): 5

Components and Labels:

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

* 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

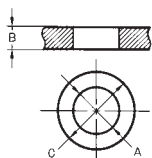
Handling

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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- 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.

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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.

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2008.11

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Электрон
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