

### A New Version of the D4B-\_ with Better Seal, Shock Resistance, and Maintenance

- Snap-action or slow-action contact for accurate switching with safe operation via direct drive positive contact opening even with metal deposition between mating contacts.
- Two sets of contact: one (NC) for safety circuit and the other (NO) for control circuit.
- Enclosure rating: IP67 (IEC529) UL/CSA NEMA 3, 4, 4X, 6P and 13.
- Wide standard operating temperature range: -40°C to 80°C (standard type).
- Conforms to EN50041 (42.5 x 60 mm) with the Forms A, B, C and D.
- Four-position turret head.
- 3 conduit switches are available.
- Approved Standards:  
IEC (IEC947-5-1)  
CENELEC (EN60947-5-1)  
VDE (VDE 0660 Part 200, 206)  
UL (UL508)  
CSA (CSA C22.2 No.14)
- SUVA approved (Slow-action type).



## Ordering Information

### Model Number Legend:

D4B -     N  
           1    2    3

#### 1. Conduit

- 1: PG13.5 (standard)
- 2: G1/2 (PF1/2) (standard)
- 3: 1/2-14NPT (standard)
- 5: PG13.5 (3 conduit)
- 6: G1/2 (PF1/2) (3 conduit)
- 7: 1/2-14NPT (3 conduit)

#### 2. Built-in Switch

- 1: SPDB-NO/NC (Snap-action)
- A: DPDB-2NC (Slow-action)
- 5: DPDB-1NC/1NO (Slow-action)

#### 3. Actuator

- 11: Roller lever (standard)
- 70: Top plunger
- 71: Top roller lever
- 16: Adjustable roller lever
- 17: Adjustable rod lever
- 81: Coil spring
- 87: Plastic rod
- 00: Switch box (without head)
- 1R: Roller lever  
(conventional D4B-compatible)

■ Standard Switch (EN50041)

Actuator		Conduit size								
		PG13.5**			G1/2			1/2-14NPT		
		SPDB-NO/NC (Snap-action)	DPDB-2NC (Slow-action)	DPDB-NO/NC (Slow-action)	SPDB-NO/NC (Snap-action)	DPDB-2NC (Slow-action)	DPDB-NO/NC (Slow-action)	SPDB-NO/NC (Snap-action)	DPDB-2NC (Slow-action)	DPDB-NO/NC (Slow-action)
Side rotary	Roller lever (form A)	D4B-1111N	D4B-1A11N	D4B-1511N	D4B-2111N	D4B-2A11N	D4B-2511N	D4B-3111N	D4B-3A11N	D4B-3511N
	Adjustable roller lever	D4B-1116N	D4B-1A16N	D4B-1516N	D4B-2116N	D4B-2A16N	D4B-2516N	D4B-3116N	D4B-3A16N	D4B-3516N
	Adjustable rod lever (form D)	D4B-1117N	D4B-1A17N	D4B-1517N	D4B-2117N	D4B-2A17N	D4B-2517N	D4B-3117N	D4B-3A17N	D4B-3517N
Top plunger	Plain (form B)	D4B-1170N	D4B-1A70N	D4B-1570N	D4B-2170N	D4B-2A70N	D4B-2570N	D4B-3170N	D4B-3A70N	D4B-3570N
	Roller (form C)	D4B-1171N	D4B-1A71N	D4B-1571N	D4B-2171N	D4B-2A71N	D4B-2571N	D4B-3171N	D4B-3A71N	D4B-3571N
Wobble lever*	Coil spring	D4B-1181N	D4B-1A81N	D4B-1581N	D4B-2181N	D4B-2A81N	D4B-2581N	D4B-3181N	D4B-3A81N	D4B-3581N
	Plastic rod	D4B-1187N	D4B-1A87N	D4B-1587N	D4B-2187N	D4B-2A87N	D4B-2587N	D4B-3187N	D4B-3A87N	D4B-3587N
Standards		VDE 0660 Part 200, IEC947-5-1 Chap.1	VDE 0660 Part 206, IEC947-5-1 Chap.1 and 3		VDE 0660 Part 200, IEC947-5-1 Chap.1	VDE 0660 Part 206, IEC947-5-1 Chap.1 and 3		VDE 0660 Part 200, IEC947-5-1 Chap.1	VDE 0660 Part 206, IEC947-5-1 Chap.1 and 3	

\*Wobble lever switches cannot be used as safety limit switches.

\*\*The D4B-  N is a limit switch conforming to European standards, and only the PG13.5 conduit is a standard in Europe.

■ 3 Conduit Switch

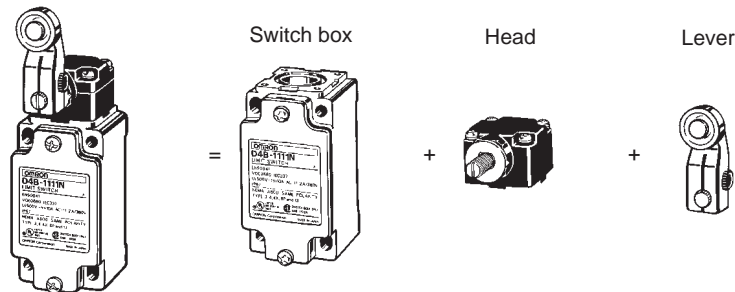
Actuator		Conduit size								
		PG13.5**			G1/2			1/2-14NPT		
		SPDB-NO/NC (Snap-action)	DPDB-2NC (Slow-action)	DPDB-NO/NC (Slow-action)	SPDB-NO/NC (Snap-action)	DPDB-2NC (Slow-action)	DPDB-NO/NC (Slow-action)	SPDB-NO/NC (Snap-action)	DPDB-2NC (Slow-action)	DPDB-NO/NC (Slow-action)
Side rotary	Roller lever (form A)	D4B-5111N	D4B-5A11N	D4B-5511N	D4B-6111N	D4B-6A11N	D4B-6511N	D4B-7111N	D4B-7A11N	D4B-7511N
	Adjustable roller lever	D4B-5116N	D4B-5A16N	D4B-5516N	D4B-6116N	D4B-6A16N	D4B-6516N	D4B-7116N	D4B-7A16N	D4B-7516N
	Adjustable rod lever (form D)	D4B-5117N	D4B-5A17N	D4B-5517N	D4B-6117N	D4B-6A17N	D4B-6517N	D4B-7117N	D4B-7A17N	D4B-7517N
Top plunger	Plain (form B)	D4B-5170N	D4B-5A70N	D4B-5570N	D4B-6170N	D4B-6A70N	D4B-6570N	D4B-7170N	D4B-7A70N	D4B-7570N
	Roller (form C)	D4B-5171N	D4B-5A71N	D4B-5571N	D4B-6171N	D4B-6A71N	D4B-6571N	D4B-7171N	D4B-7A71N	D4B-7571N
Wobble lever*	Coil spring	D4B-5181N	D4B-5A81N	D4B-5581N	D4B-6181N	D4B-6A81N	D4B-6581N	D4B-7181N	D4B-7A81N	D4B-7581N
	Plastic rod	D4B-5187N	D4B-5A87N	D4B-5587N	D4B-6187N	D4B-6A87N	D4B-6587N	D4B-7187N	D4B-7A87N	D4B-7587N

\*Wobble lever switches cannot be used as safety limit switches.



\*\*The D4B-  N is a limit switch conforming to European standards, and only the PG13.5 conduit is a standard in Europe.

Replacement of Parts

Because the D4B-  N employs a block mounting construction, the switch box, operating head, and lever (side rotary type only) may be ordered as a complete assembly or individually as replacement parts. (Replacement parts are not available as a switch box and head assembly or as a head and lever assembly.)



## ■ Replacement Part Switch Box

	EN50041			3 conduit type		
	PG13.5	G1/2	1/2-14NPT	PG13.5	G1/2	1/2-14NPT
SPDB-NO/NC (Snap-action)	D4B-1100N	D4B-2100N	D4B-3100N	D4B-5100N	D4B-6100N	D4B-7100N
DPDB-2NC (Slow-action) 	D4B-1A00N	D4B-2A00N	D4B-3A00N	D4B-5A00N	D4B-6A00N	D4B-7A00N
DPDB-NO/NC (Slow-action) 	D4B-1500N	D4B-2500N	D4B-3500N	D4B-5500N	D4B-6500N	D4B-7500N

## Operating Heads

Actuator	Type	Model
Side rotary	Standard	D4B-0010N
Top plunger	Plain	D4B-0070N
	Roller	D4B-0071N
Nobble lever	Coil spring	D4B-0081N
	Plastic rod	D4B-0087N

## Levers (for Side Rotary Switches)

Actuator	Length	Diameter of roller	Model
Standard	31.5	17.5 dia.	D4B-0001N
Adjustable roller lever	25 to 89	19 dia.	D4B-0006N
Adjustable rod lever	145 max.	---	D4B-0007N
Interchangeable with D4B-0001	33.7	19 dia.	D4B-000RN

## Specifications

### ■ Ratings

AC-15 2A/400V (TÜV)

NEMA A600 (UL/CSA)



Rated voltage	Current			Switching power	
	Continuous	Make	Break	Make	Break
120 VAC	10 A	60 A	6 A	7,200 VA	720 VA
240 VAC		30 A	3 A		
480 VAC		15 A	1.5 A		
600 VAC		12 A	1.2 A		

## ■ Approved Standards

### Snap-action

UL508 (UL File No. E576675)  
 CSA C22.2 No.14 (CSA File No. LR45746)  
 IEC 947-5-1 Chap. 1  
 EN 60947-5-1 Chap. 1  
 VDE 0660 Part 200 (TÜV File No. R9151372)

### Slow-action

UL508 (UL File No. E576675)  
 CSA C22.2 No.14 (CSA File No. LR45746)  
 IEC 947-5-1 Chap. 1, 3  
 EN 60947-5-1 Chap. 1,3  
 VDE 0660 Part 200, 206 (TÜV File No. R9151643)    
 SUVA (Certification No. 4887)

## ■ Characteristics

Operating speed	1 mm/s to 50 cm/s (with D4B-1111N)
Operating frequency	Mechanical: 120 operations/min Electrical: 30 operations/min
Insulation resistance	100 MW min. (at 500 VDC)
Contact resistance	25 mW max. (initial value)
Dielectric strength	Snap-action 1,000 VAC, 50/60 Hz for 1 min between non-continuous terminals 2,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal part Slow-action U <sub>imp</sub> 4,000 VAC between terminals of same polarity; between terminals of different polarity; between current-carrying metal parts and ground; between each terminal and non-current-carrying metal part
Positive opening force	Slow-action: lever type: 19.61 N (2 kgf) min. plunger type: 49.03 N (5 kgf) min.
Positive opening travel	Slow-action: lever type: 35% min. plunger type: 3.2 mm min.
Rated insulation voltage (U <sub>i</sub> )	600 VAC (IEC 947-5-1)
Conventional enclosed thermal current (I <sub>the</sub> )	20 A (IEC 947-5-1)
Short-circuit protective device	10 A fuse (type gI) (IEC 269-1, 2)
Pollution degree	3 (VDC0110/IEC664)
Vibration resistance	Malfunction: 10 to 500 Hz, 1.3-mm double amplitude
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> min. (approx. 100G min.) Malfunction: 300 m/s <sup>2</sup> min. (approx. 30G min.)
Life expectancy	Snap-action Mechanical: 30,000,000 operations min. Electrical: See "Engineering Data". Slow-action Mechanical: 30,000,000 operations min. Electrical: 500,000 operations min.
Contact gap	Snap-action: 2 x 0.5 mm min. Slow-action: 2 x 2 mm min.
Bounce time	Snap-action: 3 ms max. Slow-action: same as the operating speed
Ambient temperature	Operating: -40°C to 80°C (with no icing) (see note)
Ambient humidity	Operating: 95% max.
Enclosure ratings	NEMA: 3.4, 4X, 6P and 13 IEC: IP67
Weight	Approx. 290 g (for D4B-1111N)

Note: -25°C to 80°C for flexible rod type.

■ Operating Characteristics

Model	D4B- 111N D4B- A11N D4B- 511N	D4B- 116N D4B- A16N* D4B- 516N	D4B- 117N D4B- A17N** D4B- 517N	D4B- 170N D4B- A70N D4B- 570N	D4B- 171N D4B- A71N D4B- 571N	D4B- 181N D4B- A81N D4B- 581N	D4B- 187N D4B- A87N D4B- 587N
OF max.	9.4 N (960 gf)		2.1 N (216 gf)	18.6 N (1900 gf)		1.47 N (150 gf)	
RF min.	1.47 N (150 gf)		0.31 N (30 gf)	2.0 N (200 gf)		---	
PT	21+3%			2.0 mm max.		15% max.	
OT min.	50%			5.0 mm		---	
MD max.	Snap-action type: 12% Slow-action type: 0%			Snap-action type: 1.0 mm Slow-action type: 0 mm		---	
TT	(75%)			(7.0 mm)		---	
FP max.	---			38 mm	51 mm	---	
OP	---			35+1 mm	48+1 mm	---	

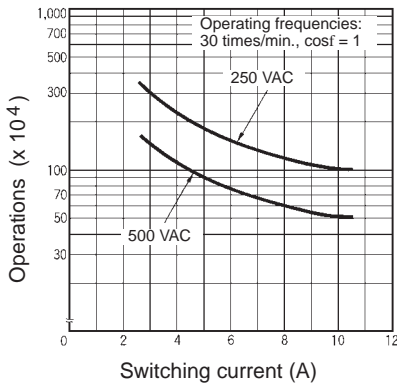
\*The operating characteristics of these switches were measured with the roller lever set at 31.5 mm.

\*\*The operating characteristics of these switches were measured with the rod lever set at 140 mm.

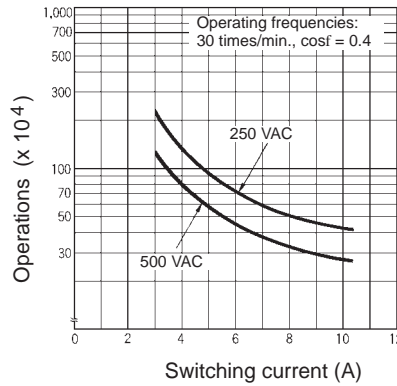
Engineering Data

Electrical Life Expectancy  
(SPDB-NO/NC Contact, Snap-action)

(cosφ = 1)



(cosφ = 0.4)



Nomenclature

Head

With roller lever switches, the direction of the switch head can be varied to any of the four directions by loosening the roller lever switch screws at the four corners of the head.

Operating Position Mark  
(arrow)

The roller lever switch employs a system which allows selection of operation on only one side (left or right) or both sides without the use of any tools.

Switch Box Material  
Aluminum die-cast

Conduit Opening

Available in three different types of conduit threads:  
Pg 13.5, G1/2 or 1/2-14NPT

Safety-oriented Lever Setting

Grooves which engage the lever every 90° are cut in the operation indicator disk to prevent the lever from slipping against the rotary shaft.

Equipped with Operation Zone Indicator

An optimum overtravel (OT) value may be secured by setting a desired OT value with a projection

Shearing Force Contact Separating Mechanism  
(NC Contact Section Only)

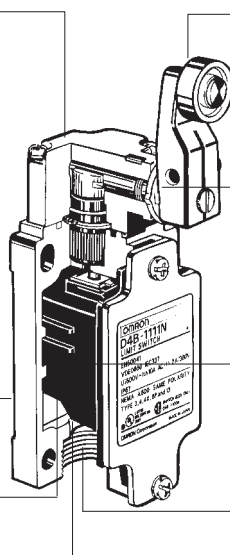
Should any abnormality occur in the contact area, the contacts are positively pulled apart from each other by shearing force.

Ground Terminal Screw

A ground terminal is provided to improve safety.

Contact Material

Ag alloy

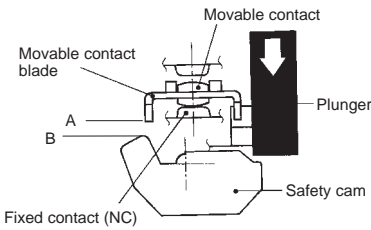


# Operation

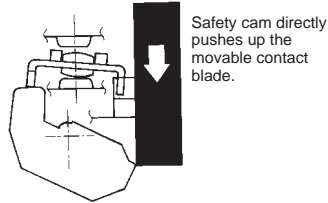
## Positive Contact Opening Mechanism SPDB-NO/NC Contact (Snap-action)

If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the black arrow, the limit switch releases.

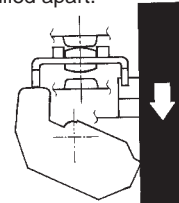
1. When metal deposition occurs.



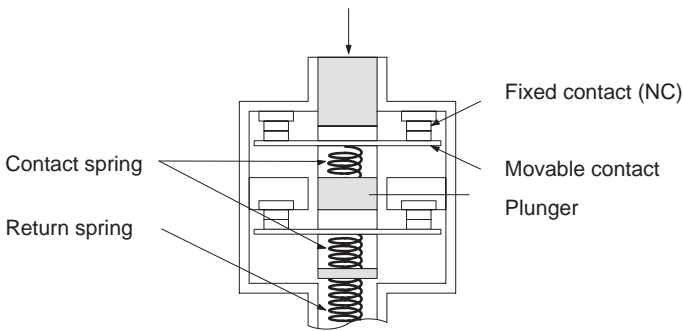
2. When contacts are being pulled apart.



3. When contacts are completely pulled apart.



## DPST Contact (Slow-action)



Conforms to IEC 947-5-1 chap. 3

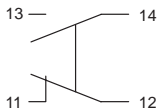
Conforms to VDE 0660 Part 206



When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

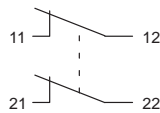
## Contact Form (EN 50013)

### SPDB-NO/NC Contacts (Snap-action)



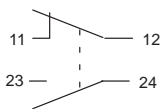
VDE 0660 part 200  
IEC 947-5-1 Chap.1

### DPDB-2NC Contacts (Slow-action)



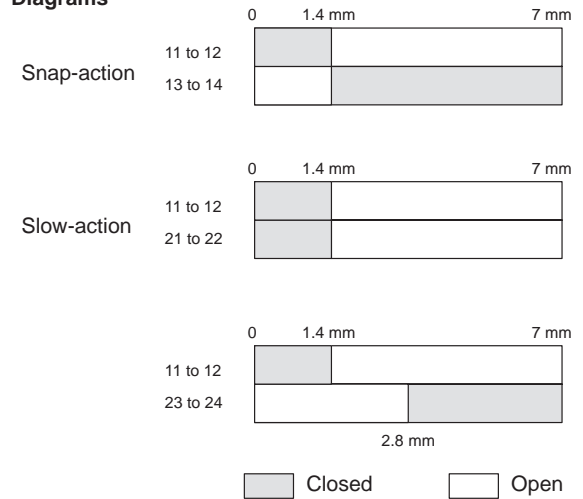
Positively opening contacts  
VDE 0660 part 200, 206  
IEC 947-5-1 Chap.1 and 3

### DPDB-1NC/1NO Contacts (Slow-action)



Positively opening contacts  
VDE 0660 part 200, 206  
IEC 947-5-1 Chap.1 and 3

## Diagrams

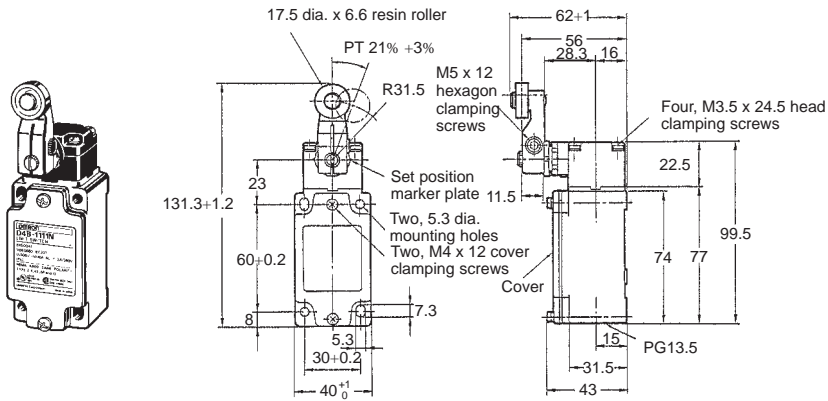


# Dimensions

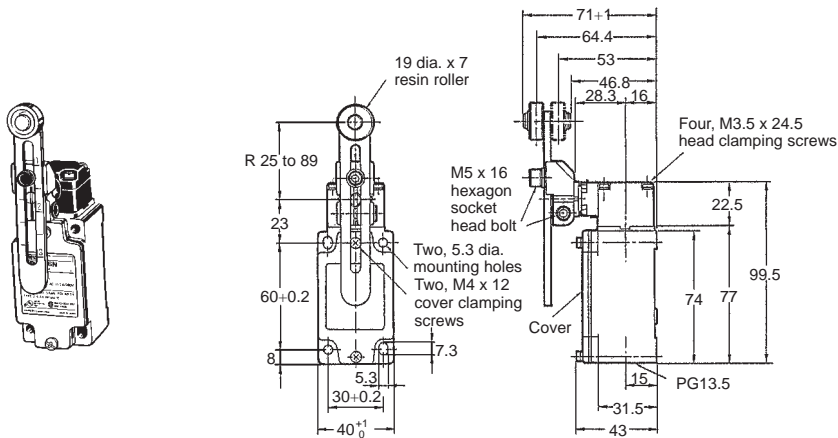
- Note:**
- All units are in millimeters unless otherwise indicated.
  - Unless otherwise specified, a tolerance of +0.4 mm applies to all dimensions.
  - When placing your order, specify the conduit type by adding a code from the list below to the blank box of the following model numbers as shown below.
- |                  |                    |
|------------------|--------------------|
| EN50041 switches | 3-conduit switches |
| 1: PG 13.5       | 5: PG 13.5         |
| 2: G 1/2         | 6: G 1/2           |
| 3: 1/2-14NPT     | 7: 1/2-14NPT       |

## EN50041 Switches

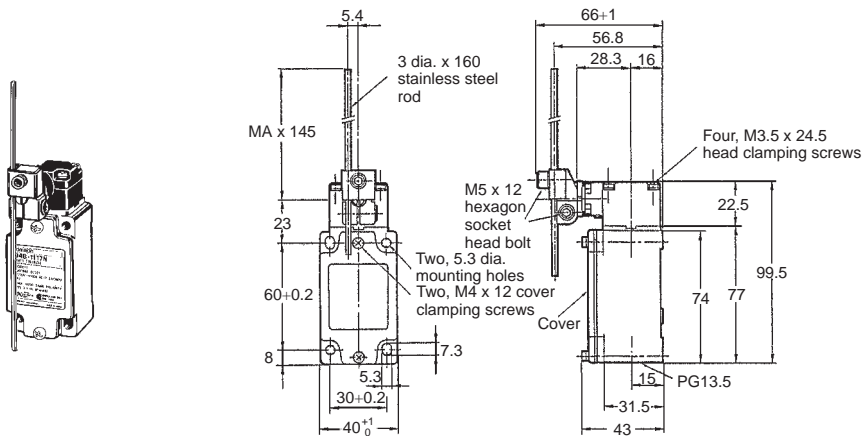
D4B-111N,  
D4B-A11N



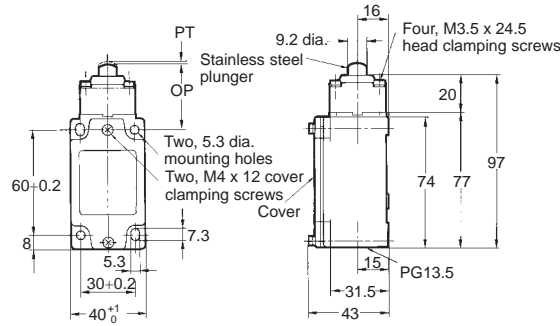
D4B-116N,  
D4B-A16N



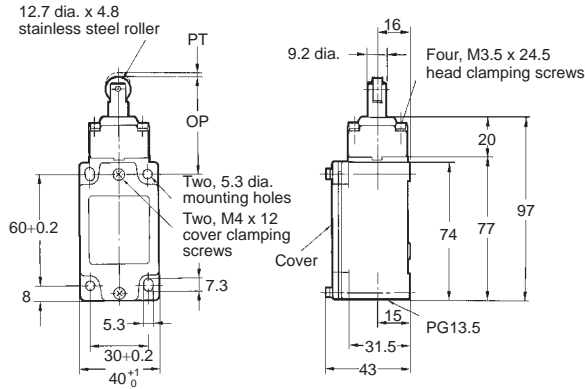
D4B-117N,  
D4B-A17N



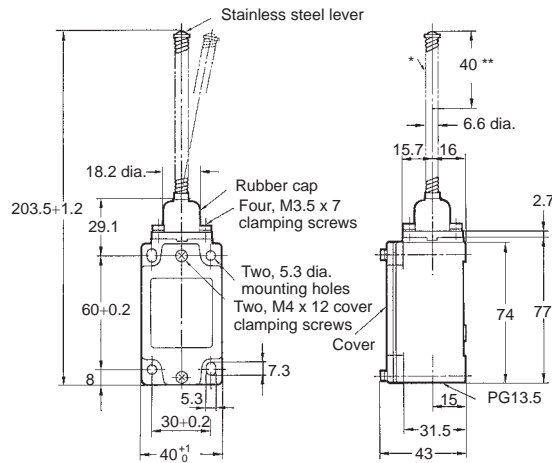
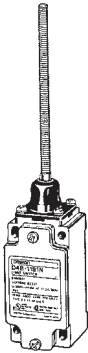
D4B- 170N,  
D4B- A70N



D4B- 171N,  
D4B- A71N



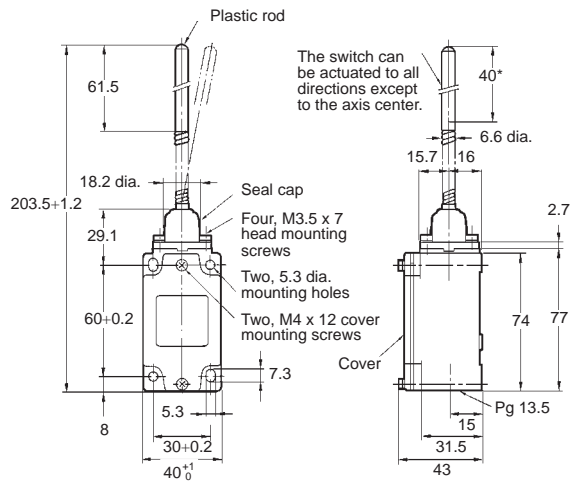
D4B- 181N,  
D4B- A81N



\*The coil spring may be operated from any direction except axial direction.

\*\*Be sure to adjust the dog to within 40 mm from the top end of the coil spring.

D4B- 187N,  
D4B- A87N

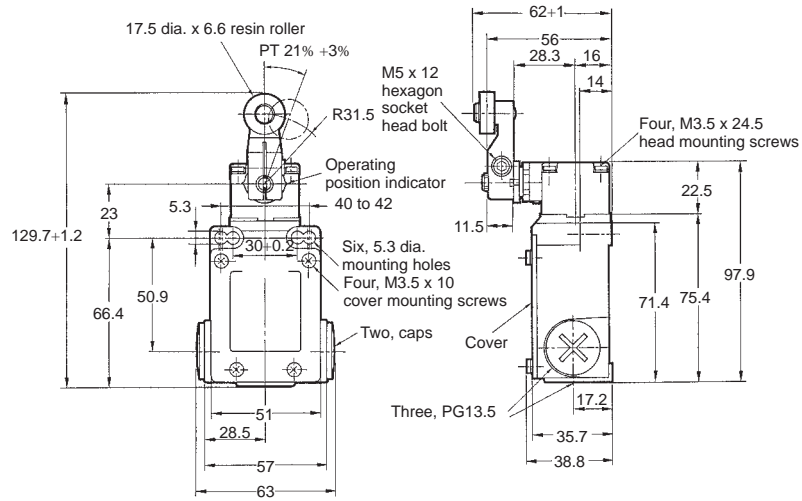
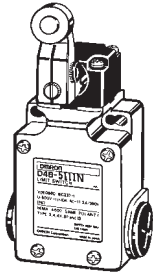


\*Be sure to adjust the dog to within 40 mm from the top end of the plastic rod.

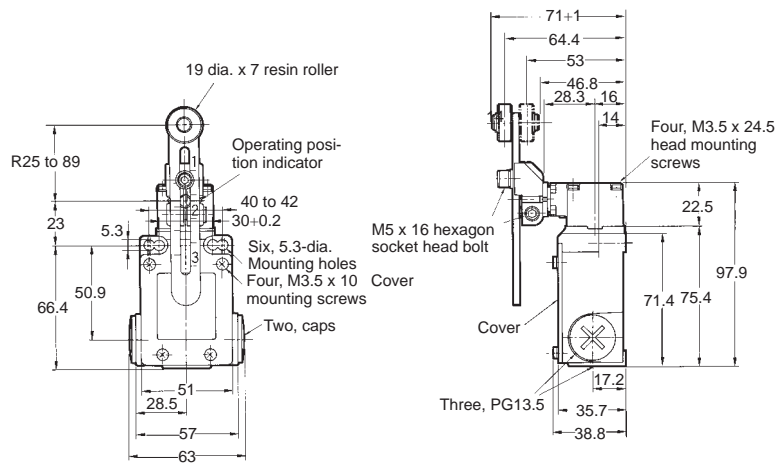
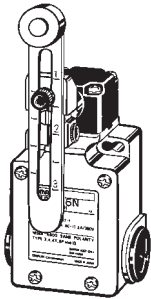


3 Conduit Switches

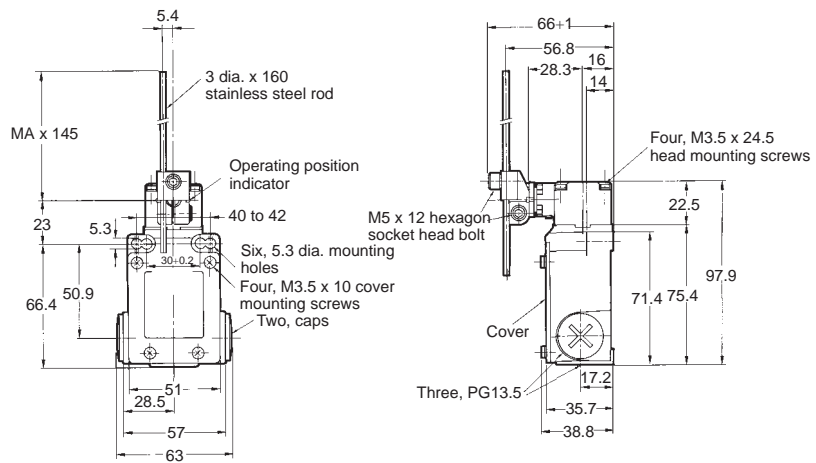
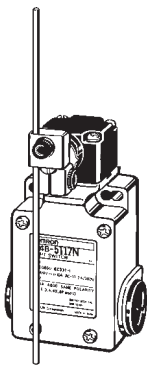
D4B-111N,  
D4B-A11N



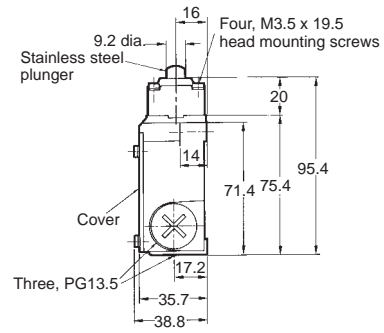
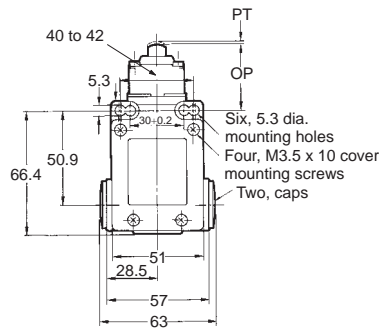
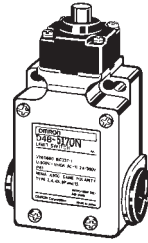
D4B-116N,  
D4B-A16N



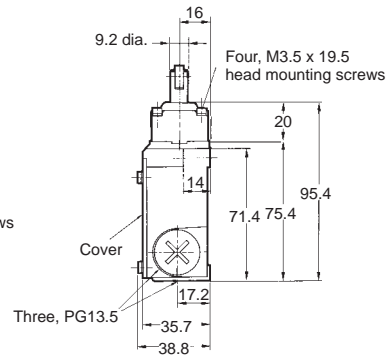
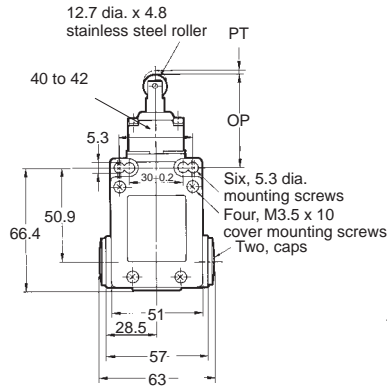
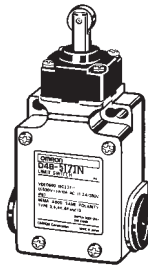
D4B-117N,  
D4B-A17N



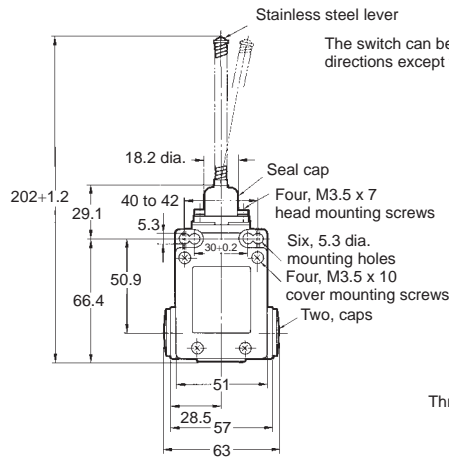
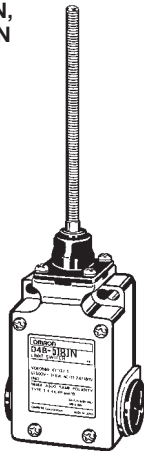
D4B- 170N,  
D4B- A70N



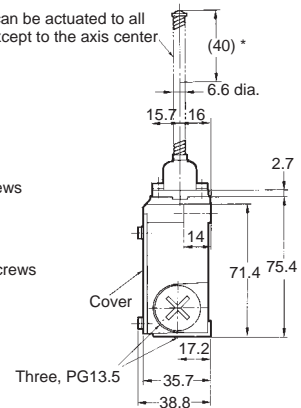
D4B- 171N,  
D4B- A71N



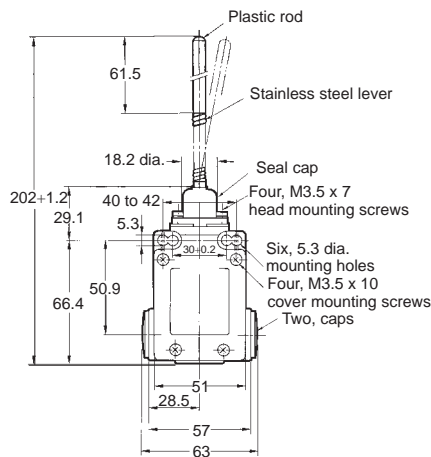
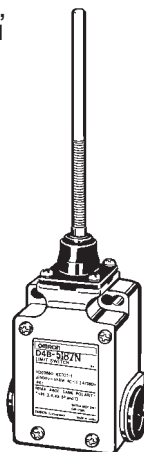
D4B- 181N,  
D4B- A81N



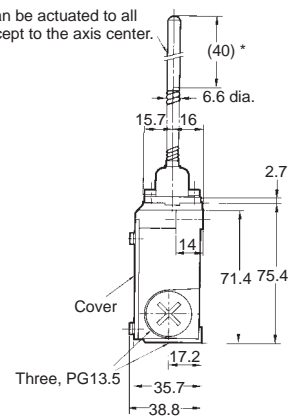
The switch can be actuated to all directions except to the axis center.



D4B- 187N,  
D4B- A87N

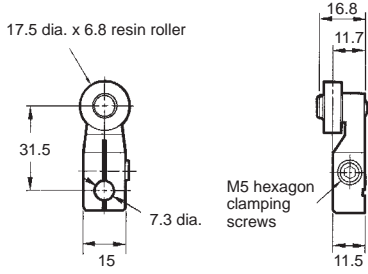


The switch can be actuated to all directions except to the axis center.

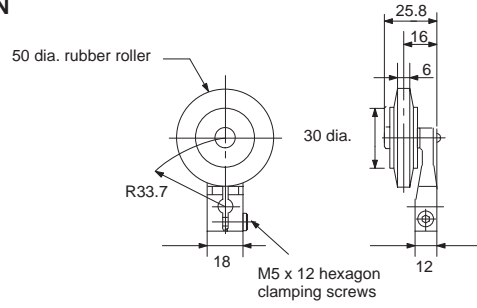


Roller Lever

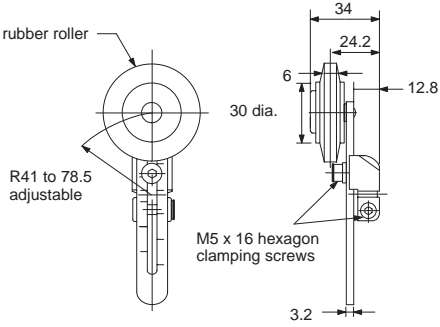
D4B-0001N



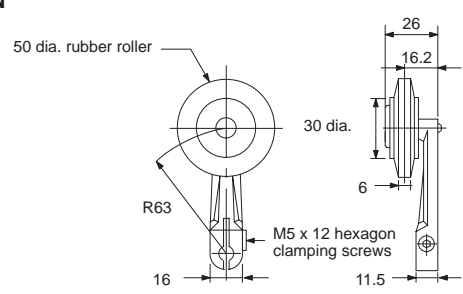
D4B-0002N



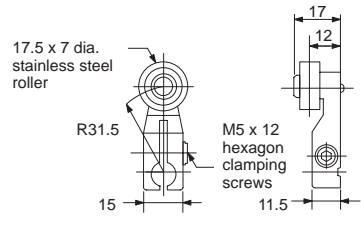
D4B-0003N



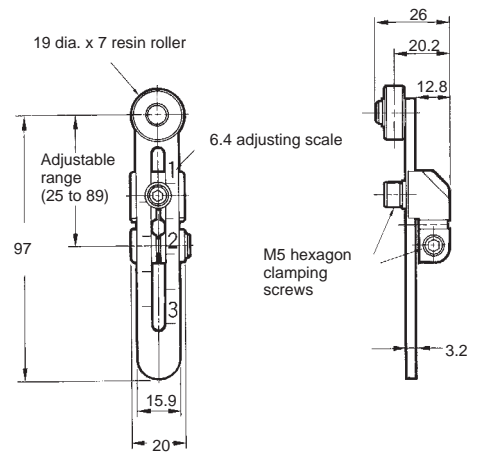
D4B-0004N



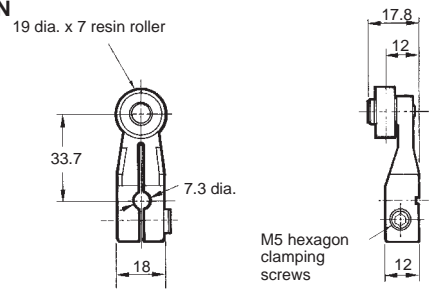
D4B-0005N



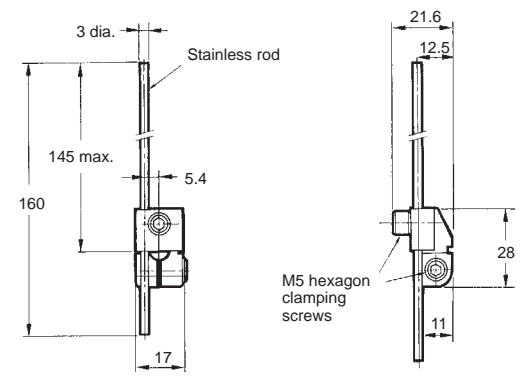
D4B-0006N



D4B-000RN



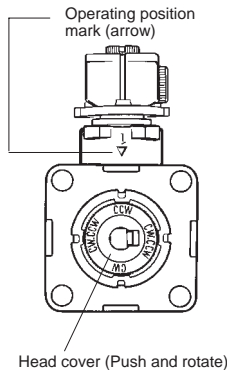
D4B-0007N



# Precautions

## CW, CCW or Two-way Operation

The head of side rotary switches can be converted in seconds to CW, CCW, or two-way operation. The conversion procedure follows.

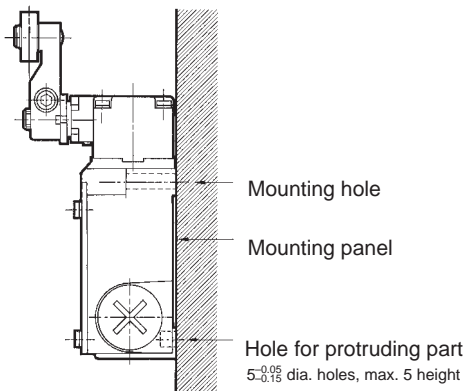


### Procedure

1. Dismount the head by loosening the four screws that secure it.
2. Turn over the head to set the desired operation (CW, CCW, or both). The desired operation can be selected by setting the mode selector knob shown in the figure. This knob is factory set to the "CW + CCW" (two-way operation) position.

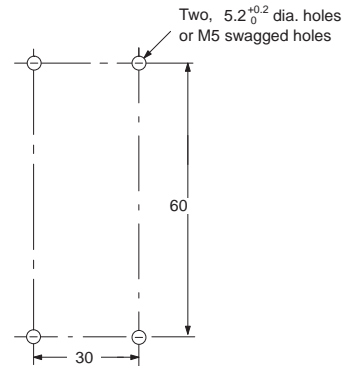
### Mounting

To mount the D4B 3-conduit type, mounting screws are required as well as the preparation of two protruding parts (5 dia.  $-0.05/-0.15$ ) to secure the switch as shown in the illustration.



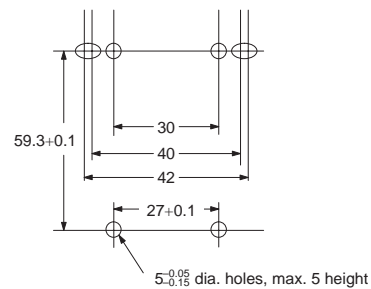
### Mounting Holes

#### D4B-1 N, -2 N, -3 N



**Note:** Accommodates EN50041 mounting dimensions.

#### D4B-5 N, -6 N, -7 N



## Correct Selection and Usage of Switches

### Snap-action Switch

A snap-action switch takes only a short time to switch electric current, which reduces contact arcing and prevents contacts from wear and tear. Therefore, a snap-action switch is more ideal than a slow-action switch for applications that require high repeat accuracy, high operation frequency, and slow operating speed.

### Slow-action Switch

The electric current switching time of a slow-action switch increases or decreases in proportion to the operating speed of the switch. A slow-action switch, compared with a snap-action switch, has enough separation force at the time of contact weld and provides insulation capability after the contacts are separated. Therefore, a slow-action switch is ideal for different load connections such as the same polarity, the opposite polarity, and the different power source connections.

### Safety Switch

The NC contact section of the D4B- N's built-in switch incorporates a shearing force contact separating mechanism. Therefore, based on the above mentioned switching features, the snap-action switch can be mainly applied to positioning control purposes and the slow-action switch can be mainly applied to safety and protection purposes. Both slow- and snap-action switches conform to BS5304, IEC 204-1, and VDE 0113 safety standards.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

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

Cat. No. C05-E1-6 In the interest of product improvement, specifications are subject to change without notice.

## OMRON Corporation

Mechanical Components Division  
29th Fl., Crystal Tower Bldg.  
1-2-27, Shiromi, Chuo-ku,  
Osaka 540 Japan  
Phone: 06-949-6115 Fax: 06-949-6124

Printed in Japan  
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