OMRON

Miniature Safety Limit Switch

D4D- j R

A Series of Pull-reset Models Available

- Ideal for elevators (EN81), escalators (EN115), and conveyors.
- Positive opening mechanism ⊖ and double insulation ▣ approved by TÜV, BIA and SUVA.
- Approved by UL and CSA standards.
- Operates between −30°C and 70°C.

Refer to *Precautions* on page 12.

- Approved Standards:
  Slow-action models (positive opening mechanism) ⊖

Agency	Standard	File No.
TÜV Rheinland	EN60947-5-1, EN81, EN115	R9451193
UL (see note 1)	UL508 CSA C22.2 No.14	E76675
BIA (see note 2)	GS-ET-15, EN60947-5-1	1-conduit: 9505895 2-conduit: 9509914
SUVA (see note 2)	SUVA	1-conduit: Nr.6013Z 2-conduit: Nr.6012Z

Note: 1. CSA C22.2 No. 14 compliance was verified and approved by UL (Marked with $_{C}$ (UL)).

2. Except for adjustable roller lever models.

- Conformity:
  Machine Directive
  Low-voltage Directive
  prEN1088

Ordering Information

Model Number Legend:

D4D- j j j j **R**
1 2 3

1. Conduit
- 1: Pg13.5 (1-conduit)
- 2: G1/2 (1-conduit)
- 3: 1/2-14NPT (1-conduit)
- 5: Pg13.5 (2-conduit)
- 6: G1/2 (2-conduit)

2. Built-in Switch
- 5: 1NC/1NO (Slow-action)
- A: 2NC (Slow-action)

3. Actuator
- 20: Roller lever
- 21: Adjustable roller lever
- 27: Adjustable roller lever (with rubber roller lever)
- 31: Plunger
- 32: Roller plunger
- 62: One-way roller arm lever (horizontal)
- 72: One-way roller arm lever (vertical)

Actuator	Conduit size (see note)		1NC/1NO (Slow-action)		2NC (Slow-action)	
			Positive opening (see note 2)	Model	Positive opening (see note 2)	Model
Roller lever 	1-conduit	Pg13.5	⊖	D4D-1520R	⊖	D4D-1A20R
		G1/2		D4D-2520R		D4D-2A20R
		1/2-14NPT		D4D-3520R		D4D-3A20R
	2-conduit	Pg13.5		D4D-5520R		D4D-5A20R
		G1/2		D4D-6520R		D4D-6A20R
Adjustable roller lever 	1-conduit	Pg13.5	⊖	D4D-1521R	⊖	D4D-1A21R
		G1/2		D4D-2521R		D4D-2A21R
		1/2-14NPT		D4D-3521R		D4D-3A21R
	2-conduit	Pg13.5		D4D-5521R		D4D-5A21R
		G1/2		D4D-6521R		D4D-6A21R
Adjustable roller lever (with rubber roller lever) 	1-conduit	Pg13.5	⊖	D4D-1527R	⊖	D4D-1A27R
		G1/2		D4D-2527R		D4D-2A27R
		1/2-14NPT		D4D-3527R		D4D-3A27R
	2-conduit	Pg13.5		D4D-5527R		D4D-5A27R
		G1/2		D4D-6527R		D4D-6A27R
Plunger 	1-conduit	Pg13.5	⊖	D4D-1531R	⊖	D4D-1A31R
		G1/2		D4D-2531R		D4D-2A31R
		1/2-14NPT		D4D-3531R		D4D-3A31R
	2-conduit	Pg13.5		D4D-5531R		D4D-5A31R
		G1/2		D4D-6531R		D4D-6A31R
Roller plunger 	1-conduit	Pg13.5	⊖	D4D-1532R	⊖	D4D-1A32R
		G1/2		D4D-2532R		D4D-2A32R
		1/2-14NPT		D4D-3532R		D4D-3A32R
	2-conduit	Pg13.5		D4D-5532R		D4D-5A32R
		G1/2		D4D-6532R		D4D-6A32R
One-way roller arm lever (horizontal) 	1-conduit	Pg13.5	⊖	D4D-1562R	⊖	D4D-1A62R
		G1/2		D4D-2562R		D4D-2A62R
		1/2-14NPT		D4D-3562R		D4D-3A62R
	2-conduit	Pg13.5		D4D-5562R		D4D-5A62R
		G1/2		D4D-6562R		D4D-6A62R
One-way roller arm lever (vertical) 	1-conduit	Pg13.5	⊖	D4D-1572R	⊖	D4D-1A72R
		G1/2		D4D-2572R		D4D-2A72R
		1/2-14NPT		D4D-3572R		D4D-3A72R
	2-conduit	Pg13.5		D4D-5572R		D4D-5A72R
		G1/2		D4D-6572R		D4D-6A72R

Note: 1. It is recommended that Pg13.5 be used for Switches to be exported to Europe and 1/2-14NPT for those to be exported to North America.

2. The switches are marked with "⊖ " indicating approval for the positive opening mechanism.

Specifications

■ Ratings

Applicable Standards

TÜV and BIA (EN60947-5-1)

Utilization category	AC-15
Rated operating current (I_e)	2 A
Rated operating voltage (U_e)	400 V

UL (UL508/CSA C22.2 No.14)

A600

Rated voltage	Current			Voltage S Ampere	
	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	1.2 A		
600 VAC		12 A	1.2 A		

General

Rated voltage	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	10 A		3 A	1.5 A	10 A		5 A	2.5 A
250 VAC	10 A		2 A	1 A	10 A		3 A	1.5 A
400 VAC	10 A		1.5 A	0.8 A	3 A		1.5 A	0.8 A
8 VDC	10 A		6 A	3 A	10 A		6 A	
14 VDC	10 A		6 A	3 A	10 A		6 A	
30 VDC	6 A		4 A	3 A	6 A		4 A	
125 VDC	0.8 A		0.2 A	0.2 A	0.8 A		0.2 A	
250 VDC	0.4 A		0.1 A	0.1 A	0.4 A		0.1 A	

Note: 1. The above current ratings are for a steady-state current.
2. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
3. Lamp load has an inrush current of 10 times the steady-state current.
4. Motor load has an inrush current of 6 times the steady-state current.
5. Inrush current: 30 A max.

■ Characteristics

Operating speed	1 mm/s to 0.5 m/s
Contact gap	2 x 2 mm min.
Operating frequency	30 operations/min
Rated frequency	50/60 Hz
Insulation resistance	100 MΩ min. (at 500 VDC) between terminals of same polarity, between terminals of different polarity, between each terminal and ground, and between each terminal and non-current-carrying metal part
Contact resistance	25 mΩ max. (initial value)
Dielectric strength	U_{imp} 4 kV between terminals of same polarity, between terminals of different polarity, between each terminal and ground, and between each terminal and non-current-carrying metal part (EN60947-5-1)
Rated insulation voltage (U_i)	400 V (EN60947-5-1)
Switching overvoltage	1,500 V max. (EN60947-5-1)
Pollution degree (operating environment)	3 (EN60947-5-1)
Short-circuit protective device (SCPD)	10 A, fuse type gI or gG (IEC269)
Conditional short-circuit current	100 A (EN60947-5-1)
Conventional enclosed thermal current (I_{the})	10 A (EN60947-5-1)
Protection against electric shock	Class II (double insulation)
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction: 1,000 m/s^2 min. (approx. 100G min.) Malfunction: 300 m/s^2 min. (approx. 30G min.)
Life expectancy (see note 1)	Mechanical: 1,000,000 operations min. Electrical: 150,000 operations min.
Ambient temperature	Operating: −30°C to 70°C (with no icing)
Ambient humidity	Operating: 95% max.
Enclosure rating (see note 2)	IP65 (EN60947-5-1)
Weight	Approx. 80 g (for D4D-1120R)

Note: 1. The above mechanical life and electrical life are possible when the ambient temperature is 5°C to 35°C and the ambient humidity is 40% to 70%. Contact your OMRON representative for the mechanical life and electrical life at different temperatures and humidities.

2. Although the Switch box is protected from dust, oil, and water, be sure that the head is free from dust, oil, water, and chemical, otherwise the Switch may wear out, break, or malfunction.

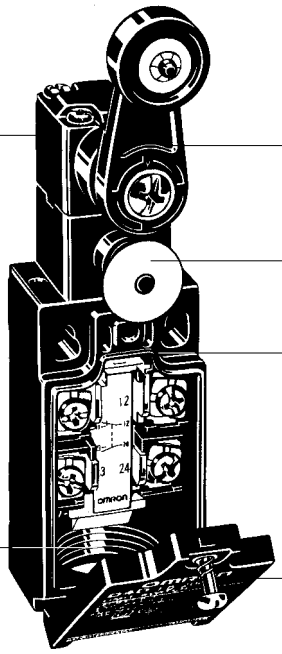
■ Operating Characteristics

1-conduit Models

Model	D4D- j 520R D4D- j A20R	D4D- j 521R D4D- j A21R (see note 1)	D4D- j 527R D4D- j A27R (see note 2)	D4D- j 531R D4D- j A31R	D4D- j 532R D4D- j A32R	D4D- j 562R D4D- j A62R	D4D- j 572R D4D- j A72R
LF max.	6.4 N (650 gf)	5.1 N (520 gf)	5.1 N (520 gf)	10.78 N (1,100 gf)	10.78 N (1,100 gf)	7.35 N (750 gf)	7.84 N (800 gf)
LT max.	55°	55°	55°	4.5 mm	4.5 mm	7 mm	7 mm
PT1 (see note 3)	18° to 27°	18° to 27°	18° to 27°	2 mm	2 mm	4 mm	4 mm
PT2 (see note 4)	(44°)	(44°)	(44°)	(2.9 mm)	(2.9 mm)	(5.2 mm)	(4.3 mm)
OP	---	---	---	34±0.5 mm	44.4±0.8 mm	53±0.8 mm	27±0.8 mm
TT (see note 5)	(70°)	(70°)	(70°)	(6 mm)	(6 mm)	(9 mm)	(9 mm)
POF min. (see note 6)	19.6 N (2,000 gf)	19.6 N (2,000 gf)	19.6 N (2,000 gf)	19.6 N (2,000 gf)	19.6 N (2,000 gf)	19.6 N (2,000 gf)	19.6 N (2,000 gf)
POT min. (see note 6)	50°	50°	50°	3.2 mm	3.2 mm	5.8 mm	4.8 mm

Note: 1. The operating characteristics of these switches were measured with the roller lever set at 30 mm.
2. The operating characteristics of these switches were measured with the roller lever set at 31 mm.
3. These PT1 values are possible when the NC contacts are OFF.
4. These PT2 values are possible when the NO contacts are ON (applicable to D4D- j R models with 1NC and 1NO contact each).
5. Reference value.
6. POT (positive opening travel) and POF (positive opening force) are required values for positive opening.

Nomenclature



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

Conduit
Wide switch variations.
Pg13.5: 1-conduit, 2-conduit models
G1/2: 1-conduit, 2-conduit models
1/2-14NPT: 1-conduit models

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.

Reset Head
The direction of the reset head can be adjusted to any of the four directions.

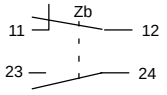
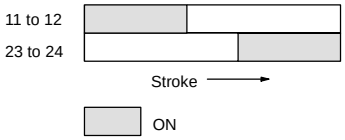
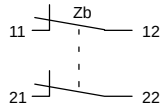
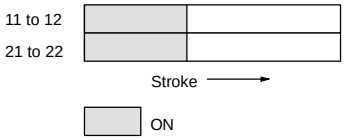
Built-in Switch
Has a positive opening mechanism separating the contacts when the contacts are welded.

Cover
The cover, with a hinge on its lower part, can be opened by removing the screw of the cover, which ensures ease of maintenance and wiring.

Note: The D4D- j R uses NBR.

Operation

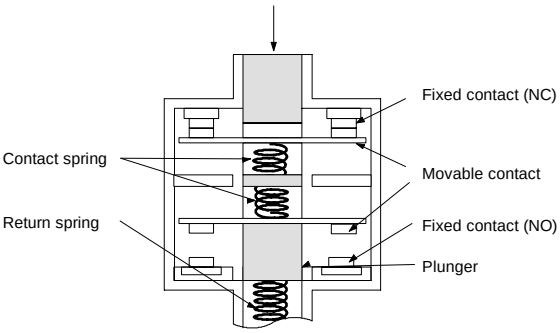
■ Contact Form

Model	Contact		Diagrams	Remarks
D4D- j 5 j R	1NC/1NO (slow-action)			Only NC contacts 11 and 12 have an approved positive opening mechanism.
D4D- j A j R	2NC (slow-action)			NC contacts 11, 12, 21, and 22 have an approved positive opening mechanism

Note: Terminals are numbered according to EN50013 and contacts are marked according to EN60947-5-1.

■ Positive Opening Mechanism

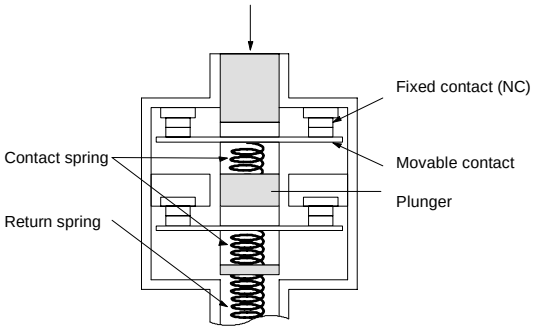
1NC/1NO Contact (Slow-action)



Only the NC contacts have a positive opening function.
When metal deposition occurs, the contacts are separated from each other by pushing in the plunger.

Conforms to EN60947-5-1 Positive Opening ⊖

2NC Contact (Slow-action)



Both NC contacts have a positive opening function.
When metal deposition occurs, the contacts are separated from each other by pushing in the plunger.

Conforms to EN60947-5-1 Positive Opening ⊖

Note: The switches are marked with "⊖" indicating approval for the positive opening mechanism.

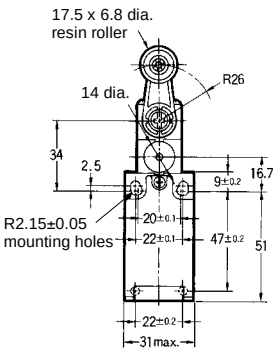
Dimensions

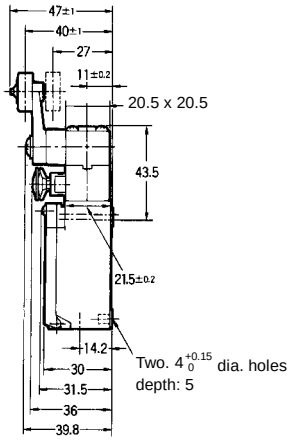
Note: 1. All units are in millimeters unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

1-conduit Models

Roller Lever

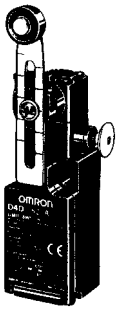
D4D-1520R
D4D-2520R
D4D-3520R
D4D-1A20R
D4D-2A20R
D4D-3A20R

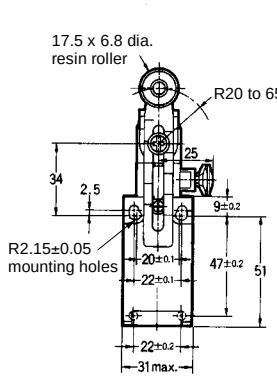


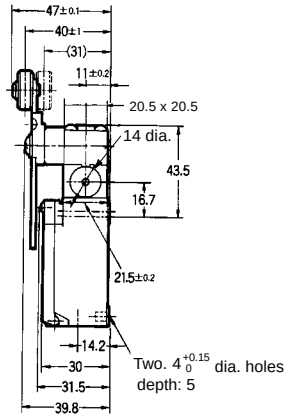


Adjustable Roller Lever

D4D-1521R
D4D-2521R
D4D-3521R
D4D-1A21R
D4D-2A21R
D4D-3A21R

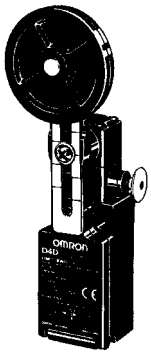


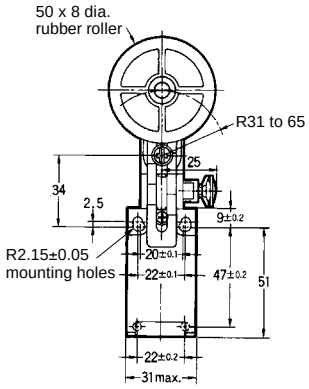


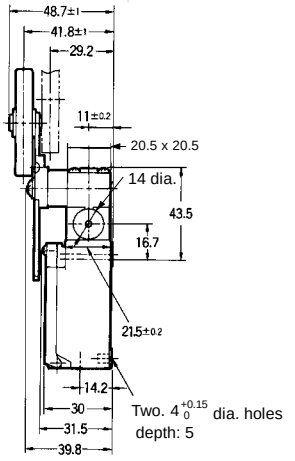


Adjustable Roller Lever (Rubber Roller Lever)

D4D-1527R
D4D-2527R
D4D-3527R
D4D-1A27R
D4D-2A27R
D4D-3A27R

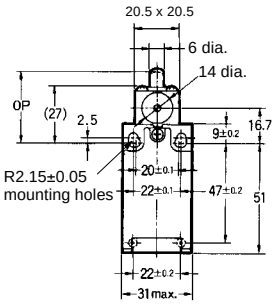


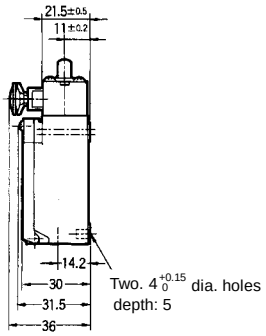




Plunger

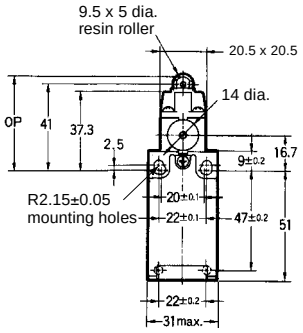
D4D-1531R
D4D-2531R
D4D-3531R
D4D-1A31R
D4D-2A31R
D4D-3A31R

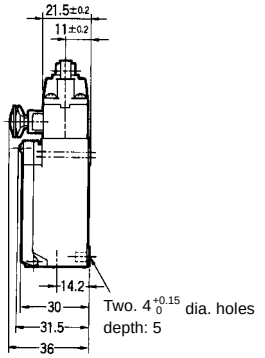




Roller Plunger

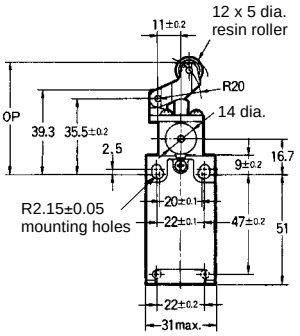
D4D-1532R
D4D-2532R
D4D-3532R
D4D-1A32R
D4D-2A32R
D4D-3A32R

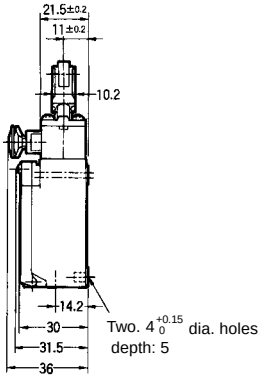




One-way Roller Arm Lever (Horizontal)

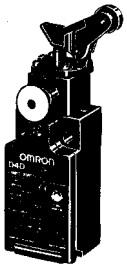
D4D-1562R
D4D-2562R
D4D-3562R
D4D-1A62R
D4D-2A62R
D4D-3A62R

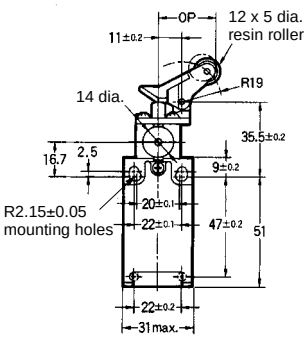


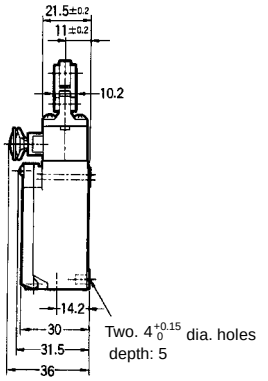


One-way Roller Arm Lever (Vertical)

D4D-1572R
D4D-2572R
D4D-3572R
D4D-1A72R
D4D-2A72R
D4D-3A72R



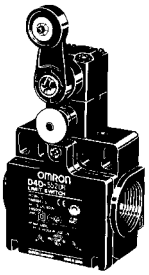


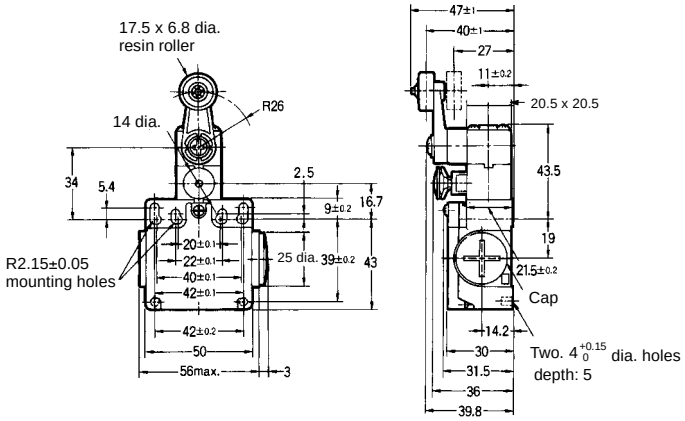


2-conduit Models

Roller Lever

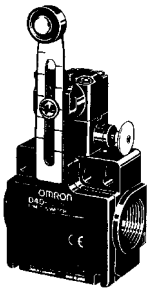
D4D-5520R
D4D-6520R
D4D-5A20R
D4D-6A20R

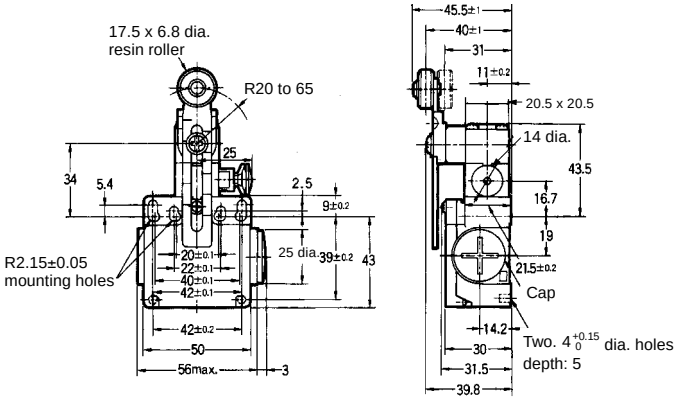




Adjustable Roller Lever

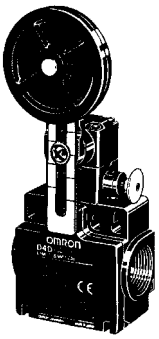
D4D-5521R
D4D-6521R
D4D-5A21R
D4D-6A21R

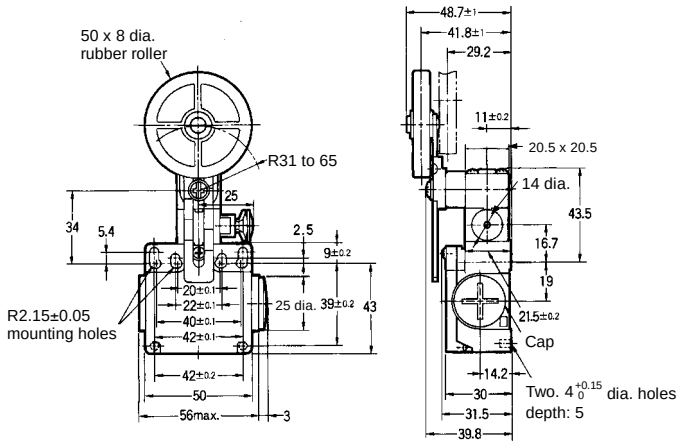




Adjustable Roller Lever (Rubber Roller Lever)

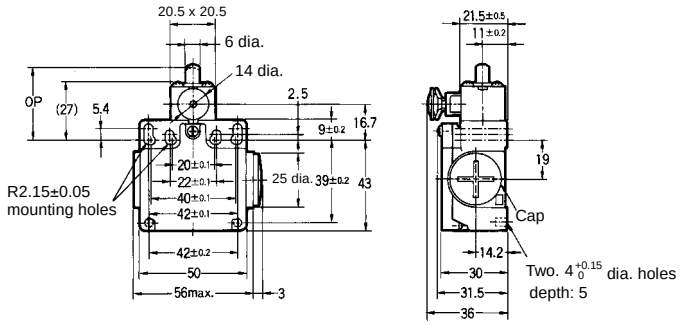
D4D-5527R
D4D-6527R
D4D-5A27R
D4D-6A27R





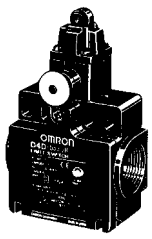
Plunger

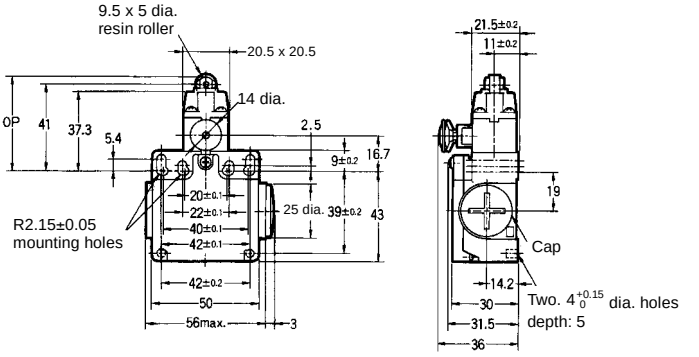
D4D-5531R
D4D-6531R
D4D-5A31R
D4D-6A31R



Roller Plunger

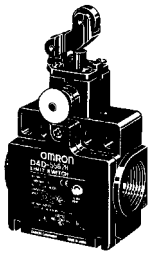
D4D-5532R
D4D-6532R
D4D-5A32R
D4D-6A32R

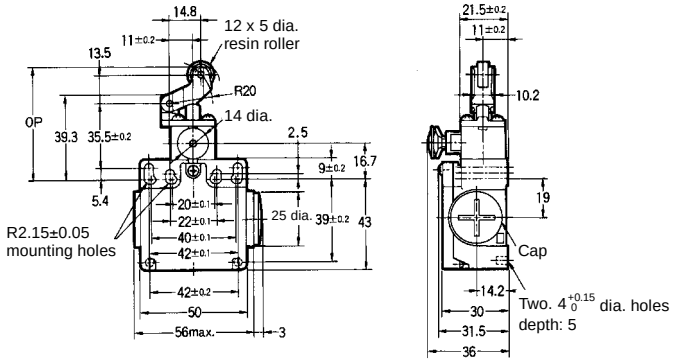




One-way Roller Arm Lever (Horizontal)

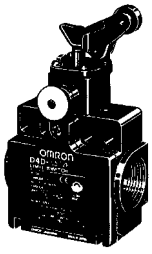
D4D-5562R
D4D-6562R
D4D-5A62R
D4D-6A62R

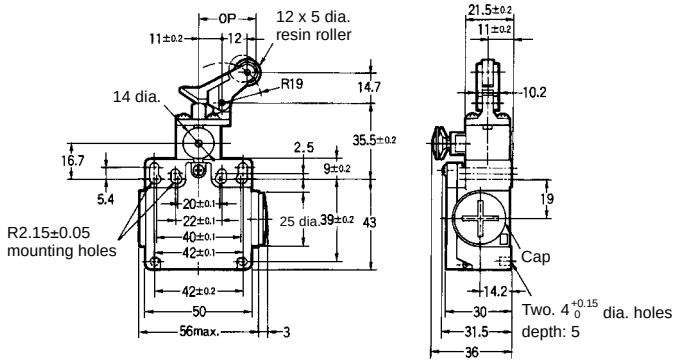




One-way Roller Arm Lever (Vertical)

D4D-5572R
D4D-6572R
D4D-5A72R
D4D-6A72R

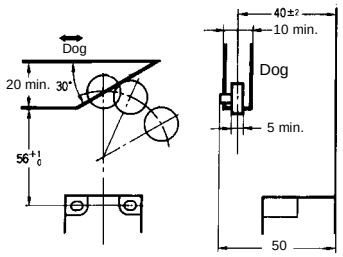




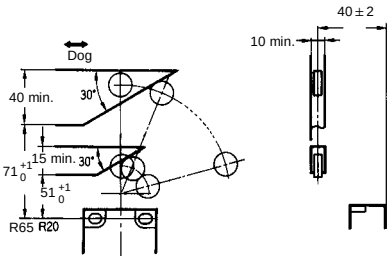
■ Levers

Refer to the following for the angles and positions of the watchdogs.

(D4D- j j 20R)

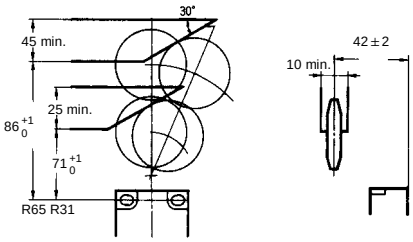


(D4D- j j 21R)



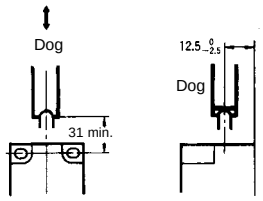
(Rubber Roller Lever)

(D4D- j j 27R)



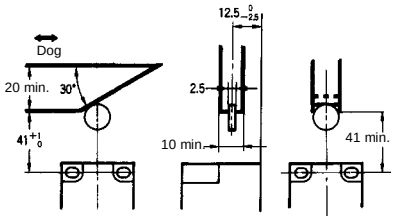
Sealed Plunger

(D4D- j j 31R)



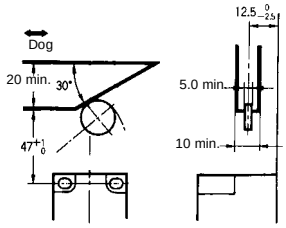
Roller Plunger

(D4D- j j 32R)



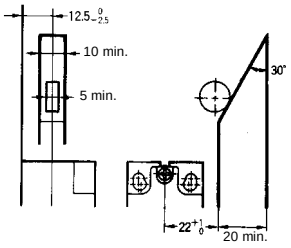
One-way Roller Arm Lever (Horizontal)

(D4D- j j 62R)



One-way Roller Arm Lever (Vertical)

(D4D- j j 72R)



Precautions

Warnings

⚠ WARNING
Locate the dog so that the actuator will be pressed to the lock position, otherwise the actuator will not be locked, which may result in loss of life or serious injury.
Do not disassemble or touch inside under power-on. Electrical shock hazard may be caused.
Do not use metal connector or conduit with this switch. Electrical shock hazard may be caused.
The reset button must be reset by hand before supplying power to the D4D- j R, otherwise the equipment may malfunction or an accident may result.

NOTICE

To protect the D4D- j R from damage due to short-circuits, connect the D4D- j R in series to a fuse that has a breaking current 1.5 to 2 times the rated current of the D4D- j R. If the D4D- j R is used under EN-approved rating conditions, use a 10 A fuse, type gI or gG conforming to IEC 269.

Do not touch the live switch terminal. Electric shock hazard may be caused.

Be sure to evaluate the Switch under actual working conditions after installation.

Operating Environment

The D4D- j R is for indoor use only. Do not use the D4D- j R outdoors. Otherwise, the D4D- j R may malfunction. Be sure that no metal dust, oil, or chemical will be sprayed onto the D4D- j R, otherwise the D4D- j R may malfunction.

Mounting Screw Tightening Torque

Be sure to tighten each screw of the D4D- j R properly, otherwise the D4D- j R may malfunction.

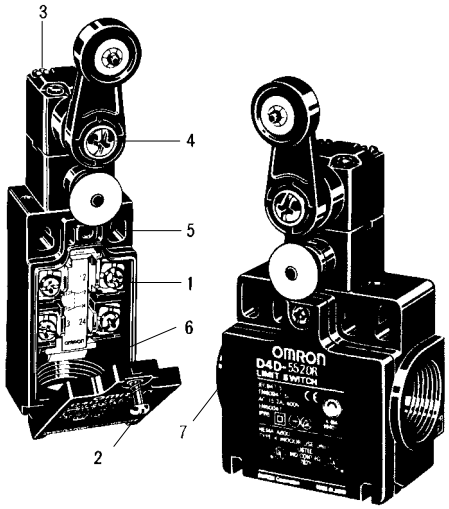
No.	Type	Torque
1	Terminal screw (M3.5)	0.59 to 0.78 N S m (6 to 8 kgf S cm/0.43 to 0.58 ft S lbf)
2	Cover mounting screw	0.78 to 0.88 N S m (8 to 9 kgf S cm/0.58 to 0.65 ft S lbf)
3	Head mounting screw	0.78 to 0.88 N S m (8 to 9 kgf S cm/0.58 to 0.65 ft S lbf)
4	Lever mounting screw	1.57 to 1.77 N S m (16 to 18 kgf S cm/1.16 to 1.31 ft S lbf)
5	Body mounting screw (M4) (See note 1)	0.49 to 0.69 N S m (5 to 7 kgf S cm/0.36 to 0.51 ft S lbf)
6	Connector at conduit opening	1.77 to 2.16 N S m (18 to 22 kgf S cm/1.30 to 1.59 ft S lbf)
		1.37 to 1.77 N S m (14 to 18 kgf S cm/1.01 to 1.31 ft S lbf) (see note 2)
7	Cap screw	1.27 to 1.67 N S m (13 to 17 kgf S cm/0.94 to 1.23 ft S lbf)

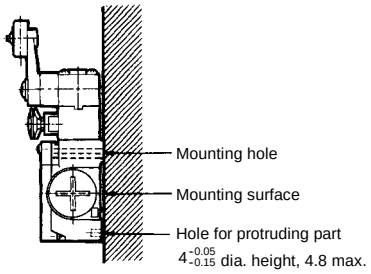
Note: 1. Tighten each screw together with a washer to the specified torque.
2. This torque range applies to $^1/_2$-14NPT connectors.

Mounting

Be sure the that D4D- j R operates properly after mounting and adjusting the D4D- j R.

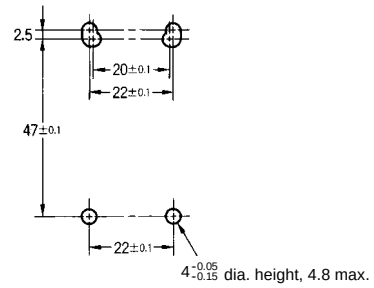
Use two M4 screws (one-way screws, etc.) and washers to mount the D4D- j R securely. The D4D- j R can be mounted more securely with two protruding portions inserted into the lower part of the D4D- j R as shown below. Each protruding portion is 4 $^{-0.05}_{-0.15}$ mm in diameter with a maximum height of 4.8 mm.



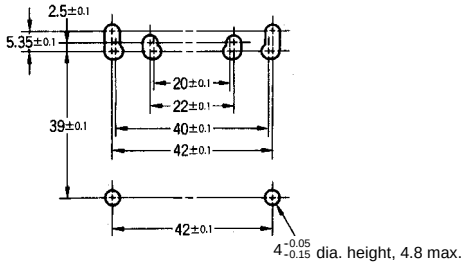


Mounting Holes

1-conduit Model



2-conduit Model



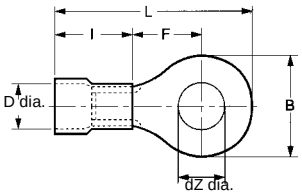
Head Direction

By removing the four screws of the head, the mounting direction of the head can be changed. The head can be mounted in four directions. Be sure that no foreign material will enter during a change in direction.

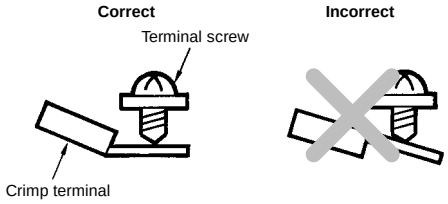
Wiring

Do not connect lead wires directly to the terminals. Be sure to connect the lead wires through insulation tubes and crimp terminals. The tightening torque applied to each crimp terminal is 0.59 to 0.78 N S m (6 to 8 kgf S cm). The lead wires must be an AWG20 to AWG14 type (i.e., 0.5 to 2.5 mm^2 thick).

dz dia.:	3.7
D dia.:	4.5
B:	7.0
L:	20.2
F:	7.7
I:	9.0 (mm)



Wire the crimp terminal as shown in the following diagram so that it will not come in contact with the case or cover.



Conduit Opening

The torque required to tighten a connector other than a 1/2-14NPT connector is 1.77 to 2.16 N S m (18 to 22 kgf S cm). The torque required to tighten a 1/2-14NPT connector is 1.37 to 1.77 N S m (14 to 18 kgf S cm).

The casing may be damaged if an excessive tightening torque is applied. For the casing to maintain IP65, apply sealing tape between the connector and conduit opening. Be sure that the diameter of the cable connected to the connector is correct.

When wiring a 2-conduit model, attach and tighten a conduit cap to the unused conduit opening. The torque to be applied to the conduit cap is 1.27 to 1.67 N S m (13 to 17 kgf S cm). The conduit cap is provided with the D4D- j R.

Recommended Connectors

Size	Manufacturer	Model	Cable diameter
G 1/2	OMRON	SC-6	7.5 to 9.0 mm
	LAPP	ST-PF1/2 5380-1002	6.0 to 12.0 mm
	Ohm Denki	OA-W1609	7.0 to 9.0 mm
Pg13.5	LAPP	ST13.5 5301-5030	5.0 to 12.0 mm
	HEYCO	3216	4.3 to 11.9 mm
1/2-14NPT	LAPP	ST-NPT1/2 5301-6030	6.0 to 12.0 mm
	HEYCO	3231	4.3 to 11.9 mm

Note: LAPP is a German manufacturer.
Ohm Denki is a Japanese manufacturer.
HEYCO is an American manufacturer.

Maintenance and Repairs

Users must not repair or maintain the D4D- j R. Contact your OMRON representative for any repairs or maintenance.

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. C103-E1-2 **In the interest of product improvement, specifications are subject to change without notice.**

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