Manual Reset Limit Switch

Pull Reset Limit Switch

- Each model features a positive opening mechanism (NC contacts only) and is equipped with a lockable head
- Conforms to EN standards (positive opening mechanism is shown by ⊖ on the Switch)
- Positive opening mechanism ⊖ and double insulation ▣ approved by TÜV and BIA
- Operates between –30°C and 70°C
- Conforms to these standards and EC Directives:

  Machinery Directive

  Low Voltage Directive

  EN50047

  EN1088
- Approved Standards

Slow-Action Models

Agency	Standard	File No.
TÜV Rheinland	EN60947-5-1 EN81, EN115	R9451184 ⊖ (Positive opening: approved)
UL (see note 1)	UL508 CSA C22.2 No.14	E76675
BIA (see note 2)	GS-ET-15	1-conduit: 9505895 2-conduit: 9509914
SUVA (see note 2)	SUVA	1-conduit: 6013Z 2-conduit: 6012Z

Note: 1. CSA C22.2 No. 14 compliance was verified and approved by UL (Marked with ⓤ).

2. Except for adjustable roller lever models.

Ordering Information

■ MODEL NUMBER LEGEND

D4D-□□□□R
1 2 3

1. Conduit
   1: Pg13.5 (1-conduit, European type)
   2: G1/2 (1-conduit, Japanese type)
   3: 1/2-14NPT (1-conduit, North American type)
   5: Pg13.5 (2-conduit, European type)
   6: G1/2 (2-conduit, Japanese type)
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)
   62: One-way roller arm lever (Horizontal)
   72: One-way roller arm lever (Vertical)
   31: Plunger
   32: Roller plunger

■ SWITCHES

Actuator	Conduit size/type		1NC/1NO (Slow-action)		2NC (Slow-action)	
			Positive opening (See Note 1)	**Part number**	Positive opening (see Note 1)	**Part number**
Roller lever 	1-conduit	Pg13.5 (European)	⊖	**D4D-1520R**	⊖	**D4D-1A20R**
		G1/2 (Japanese)		**D4D-2520R**		**D4D-2A20R**
		1/2-14NPT (North American)		**D4D-3520R**		**D4D-3A20R**
	2-conduit	Pg13.5 (European)		**D4D-5520R**		**D4D-5A20R**
		G1/2 (Japanese)		**D4D-6520R**		**D4D-6A20R**
Adjustable roller lever (See Note 2) 	1-conduit	Pg13.5 (European)	⊖	**D4D-1521R**	⊖	**D4D-1A21R**
		G1/2 (Japanese)		**D4D-2521R**		**D4D-2A21R**
		1/2-14NPT (North American)		**D4D-3521R**		**D4D-3A21R**
	2-conduit	Pg13.5 (European)		**D4D-5521R**		**D4D-5A21R**
		G1/2 (Japanese)		**D4D-6521R**		**D4D-6A21R**
Adjustable roller lever (with rubber roller) (See Note 2) 	1-conduit	Pg13.5 (European)	⊖	**D4D-1527R**	⊖	**D4D-1A27R**
		G1/2 (Japanese)		**D4D-2527R**		**D4D-2A27R**
		1/2-14NPT (North American)		**D4D-3527R**		**D4D-3A27R**
	2-conduit	Pg13.5 (European)		**D4D-5527R**		**D4D-5A27R**
		G1/2 (Japanese)		**D4D-6527R**		**D4D-6A27R**
Plunger 	1-conduit	Pg13.5 (European)	⊖	**D4D-1531R**	⊖	**D4D-1A31R**
		G1/2 (Japanese)		**D4D-2531R**		**D4D-2A31R**
		1/2-14NPT (North American)		**D4D-3531R**		**D4D-3A31R**
	2-conduit	Pg13.5 (European)		**D4D-5531R**		**D4D-5A31R**
		G1/2 (Japanese)		**D4D-6531R**		**D4D-6A31R**
Roller plunger 	1-conduit	Pg13.5 (European)	⊖	**D4D-1532R**	⊖	**D4D-1A32R**
		G1/2 (Japanese)		**D4D-2532R**		**D4D-2A32R**
		1/2-14NPT (North American)		**D4D-3532R**		**D4D-3A32R**
	2-conduit	Pg13.5 (European)		**D4D-5532R**		**D4D-5A32R**
		G1/2 (Japanese)		**D4D-6532R**		**D4D-6A32R**

(This table continues on the next page.)

Note: 1. The Switches are marked with ⊖ indicating approval for the positive opening mechanism.
2. The adjustable roller lever models are approved by the EN ratings (TÜV Rheinland) but not by GS-ET-15 (BIA) and SUVA.

Ordering Information Table - continued from previous page

Actuator	Conduit size/type		1NC/1NO (Slow-action)		2NC (Slow-action)	
			Positive opening (See Note 1)	**Part number**	Positive opening (See Note 1)	**Part number**
One-way roller arm lever (Horizontal) 	1-conduit	Pg13.5 (European)	⊖	**D4D-1562R**	⊖	**D4D-1A62R**
		G1/2 (Japanese)		**D4D-2562R**		**D4D-2A62R**
		1/2-14NPT (North American)		**D4D-3562R**		**D4D-3A62R**
	2-conduit	Pg13.5 (European)		**D4D-5562R**		**D4D-5A62R**
		G1/2 (Japanese)		**D4D-6562R**		**D4D-6A62R**
One-way roller arm lever (Vertical) 	1-conduit	Pg13.5 (European)	⊖	**D4D-1572R**	⊖	**D4D-1A72R**
		G1/2 (Japanese)		**D4D-2572R**		**D4D-2A72R**
		1/2-14NPT (North American)		**D4D-3572R**		**D4D-3A72R**
	2-conduit	Pg13.5 (European)		**D4D-5572R**		**D4D-5A72R**
		G1/2 (Japanese)		**D4D-6572R**		**D4D-6A72R**

Note: 1. The Switches are marked with ⊖ indicating approval for the positive opening mechanism.

2. The adjustable roller lever models are approved by the EN ratings (TÜV Rheinland) but not by GS-ET-15 (BIA) and SUVA.

Specifications

■ APPROVED STANDARD RATINGS

Applicable Standards

TÜV (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	Carry current	Current		Volt-amperes	
		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		

■ CHARACTERISTICS

Degree of protection	IP65 (EN60947-5-1)
Life expectancy (see note)	Mechanical: 1,000,000 operations min. Electrical: 150,000 operations min.
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 the same polarity, 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 the same polarity, between terminals of different polarity, 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)
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, 0.75-mm single amplitude
Shock resistance	Destruction: 1,000 m/s^2 min. Malfunction: 300 m/s^2 min.
Ambient temperature	Operating: −30°C to 70°C (with no icing)
Ambient humidity	Operating: 95% max.
Weight	Approx. 80 g (for D4D-1120R)

Note: Life expectancy values are calculated at an operating temperature of 5°C to 35°C and an operating humidity of 40% to 70%. Contact your OMRON sales representative for more detailed information on other operating environments.

■ OPERATING CHARACTERISTICS

1-Conduit Models

Part number	D4D-1520R D4D-2520R D4D-3520R D4D-1A20R D4D-2A20R D4D-3A20R	D4D-1521R D4D-2521R D4D-3521R D4D-1A21R D4D-2A21R D4D-3A21R (See Note 1)	D4D-1527R D4D-2527R D4D-3527R D4D-1A27R D4D-2A27R D4D-3A27R (See Note 2)	D4D-1531R D4D-2531R D4D-3531R D4D-1A31R D4D-2A31R D4D-3A31R	D4D-1532R D4D-2532R D4D-3532R D4D-1A32R D4D-2A32R D4D-3A32R	D4D-1562R D4D-2562R D4D-3562R D4D-1A62R D4D-2A62R D4D-3A62R	D4D-1572R D4D-2572R D4D-3572R D4D-1A72R D4D-2A72R D4D-3A72R
LF max.	6.37 N	5.59 N	5.39 N	10.79 N	10.79 N	7.35 N	7.85 N
LT max.	55°	55°	55°	4.5 mm	4.5 mm	7 mm	7 mm
PT1 max. (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)	19.61 N	19.61 N	19.61 N	19.61 N	19.61 N	19.61 N	19.61 N
POT min. (See Note 6)	50°	50°	50°	3.2 mm	3.2 mm	5.8 mm	4.8 mm

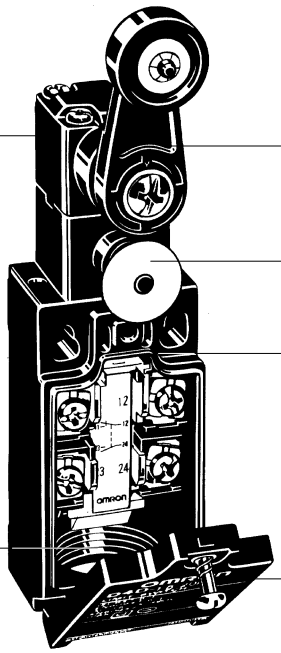
Note: 1. The operating characteristics of these Switches were measured with the roller lever set at 30 mm.
2. The operating characteristics of these Switches were measured with the roller lever set at 31 mm.
3. These PT1 values are possible when the NC contacts are OFF.
4. These PT2 values are possible when the NO contacts are ON (applicable to D4D-□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.

2-Conduit Models

Part number	D4D-5520R D4D-6520R D4D-5A20R D4D-6A20R	D4D-5521R D4D-6521R D4D-5A21R D4D-6A21R	D4D-5527R D4D-6527R D4D-5A27R D4D-6A27R	D4D-5531R D4D-6531R D4D-5A31R D4D-6A31R	D4D-5532R D4D-6532R D4D-5A32R D4D-6A32R	D4D-5562R D4D-6562R D4D-5A62R D4D-6A62R	D4D-5572R D4D-6572R D4D-5A72R D4D-6A72R
LF max.	6.37 N	5.59 N	5.39 N	10.79 N	10.79 N	7.35 N	7.85 N
LT max.	55°	55°	55°	4.5 mm	4.5 mm	7 mm	7 mm
PT1 max. (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)	19.61 N	19.61 N	19.61 N	19.61 N	19.61 N	19.61 N	19.61 N
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-□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 models, 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.

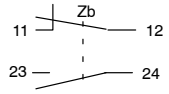
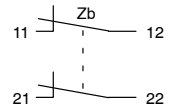
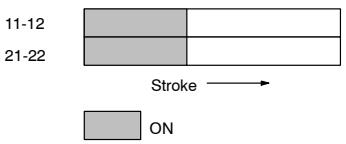
Built-in Switch
Has a positive opening mechanism separating the contacts when the contacts are welded.

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-□R uses NBR.

Operation

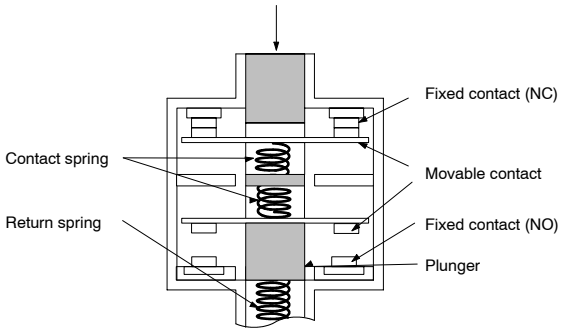
■ CONTACT FORM

Model	Contact		Diagrams	Remarks
D4D-□5□N	1NC/1NO (slow-action)			Only NC contact 11-12 has an approved positive opening ⊖ mechanism. Terminals 11-12 and 23-24 can be used as unlike poles.
D4D-□A□N	2NC (slow-action)			NC contacts 11-12 and 21-22 have an approved positive opening ⊖ mechanism. Terminals 11-12 and 21-22 can be used as unlike poles.

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

■ POSITIVE OPENING MECHANISM

1NC/1NO Contact (Slow-Action)

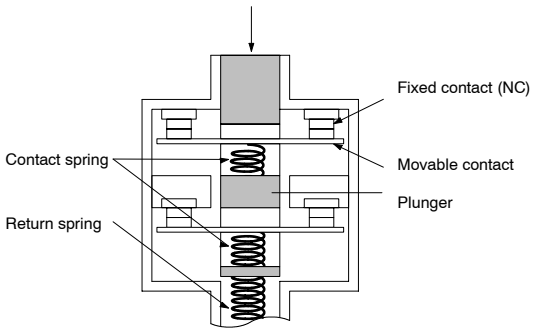


Only the NC contacts have a positive opening function.

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

Unit: mm

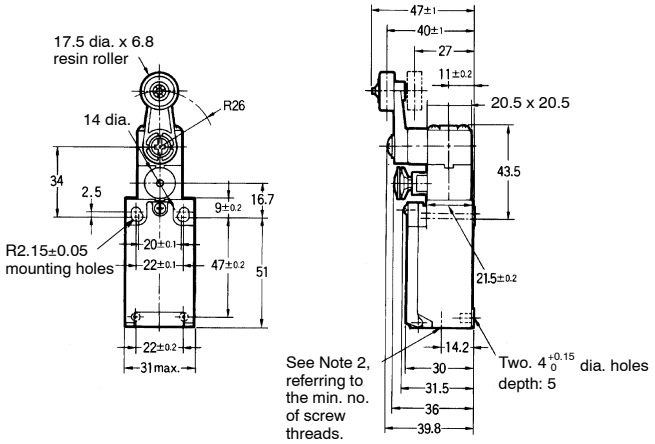
Note: 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
2. The minimum number of screw threads is five when the Pg13.5 conduit is used and four when the G1/2 conduit is used.

■ SWITCHES

1-Conduit Models

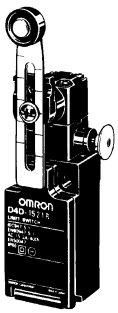
Roller Lever

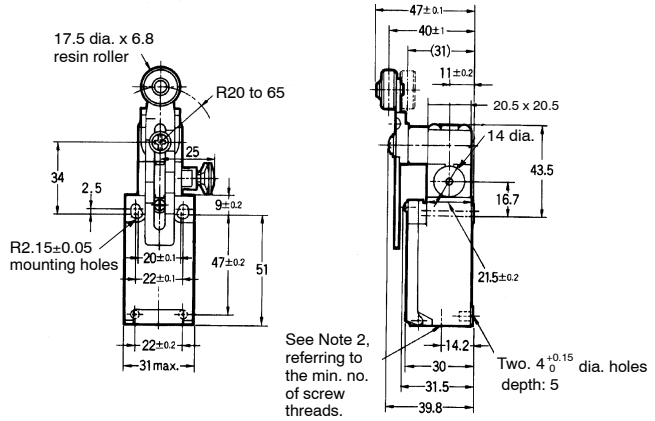
D4D-1520R
D4D-2520R
D4D-3520R
D4D-1A20R
D4D-2A20R
D4D-3A20R



Adjustable Roller Lever

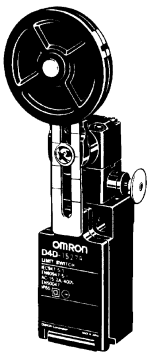
D4D-1521R
D4D-2521R
D4D-3521R
D4D-1A21R
D4D-2A21R
D4D-3A21R

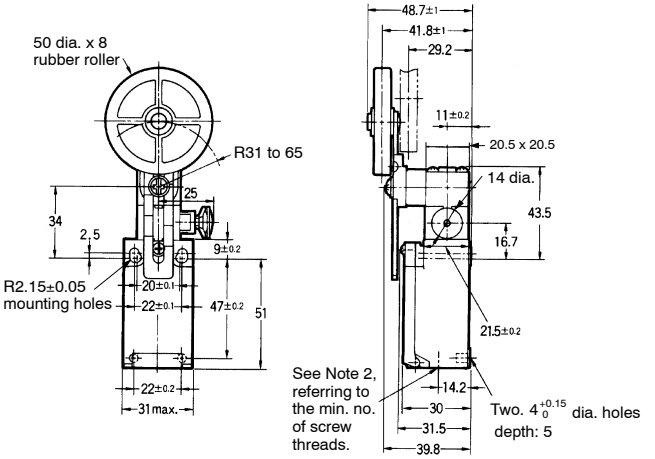




Adjustable Roller Lever (Rubber Roller Lever)

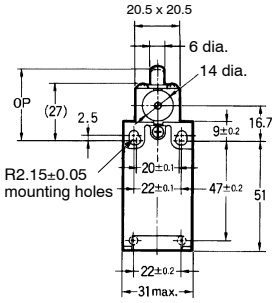
D4D-1527R
D4D-2527R
D4D-3527R
D4D-1A27R
D4D-2A27R
D4D-3A27R

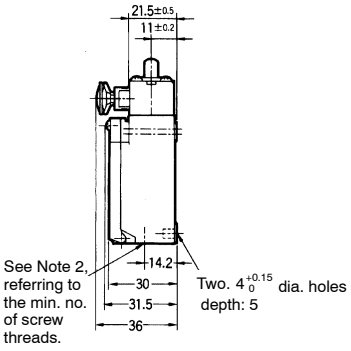




Plunger

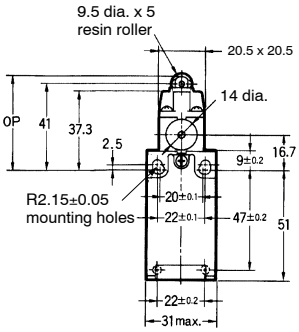
D4D-1531R
D4D-2531R
D4D-3531R
D4D-1A31R
D4D-2A31R
D4D-3A31R

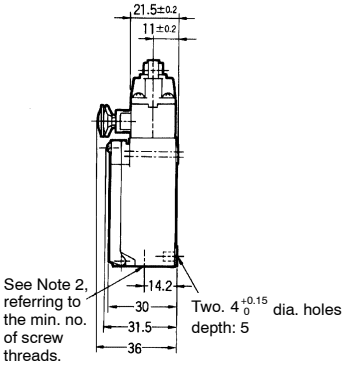




Roller Plunger

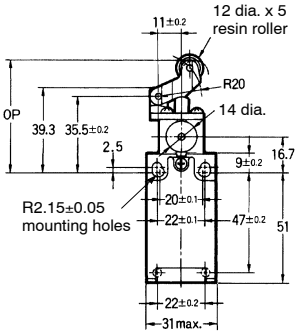
D4D-1532R
D4D-2532R
D4D-3532R
D4D-1A32R
D4D-2A32R
D4D-3A32R

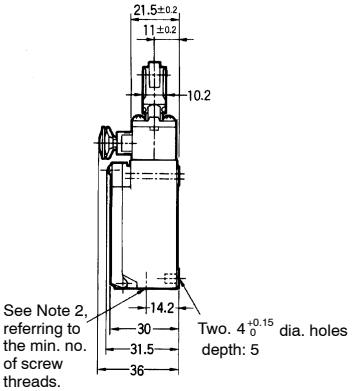




One-way Roller Arm Lever (Horizontal)

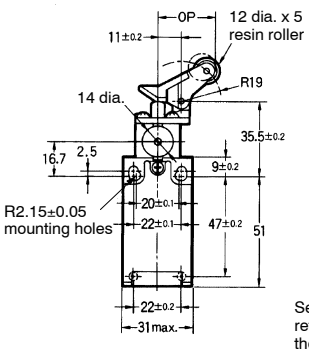
D4D-1562R
D4D-2562R
D4D-3562R
D4D-1A62R
D4D-2A62R
D4D-3A62R

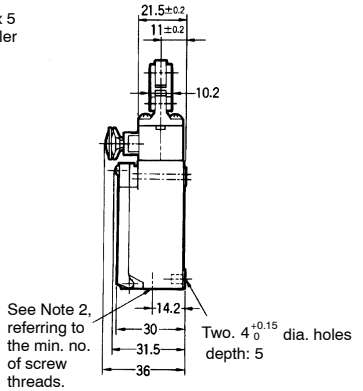




One-way Roller Arm Lever (Vertical)

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

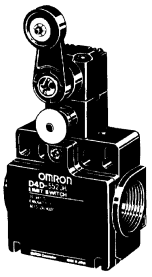


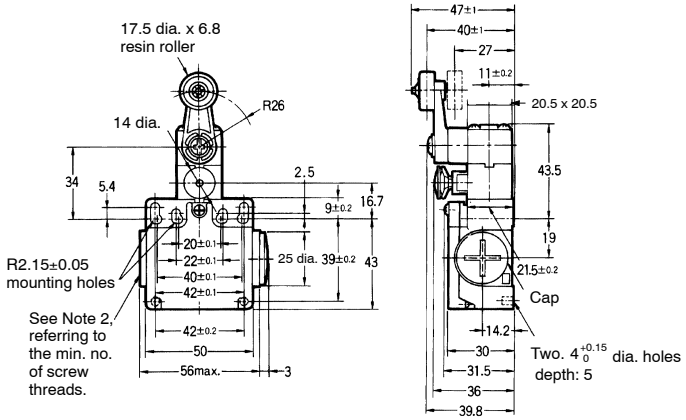


2-Conduit Models

Roller Lever

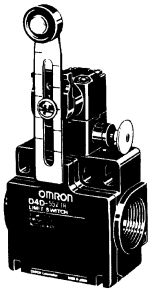
D4D-5520R
D4D-6520R
D4D-5A20R
D4D-6A20R

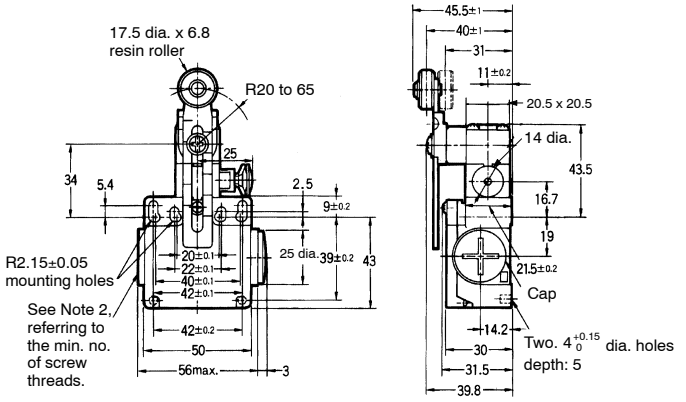




Adjustable Roller Lever

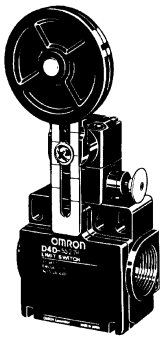
D4D-5521R
D4D-6521R
D4D-5A21R
D4D-6A21R

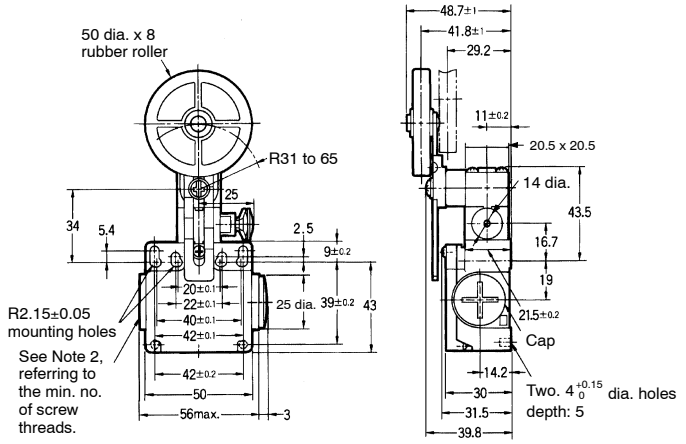




Adjustable Roller Lever (Rubber Roller Lever)

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

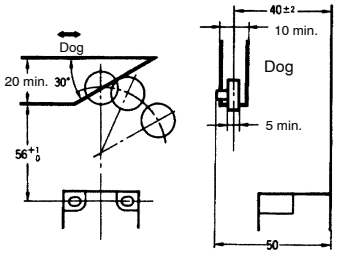




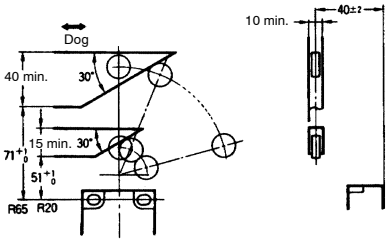
■ LEVERS

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

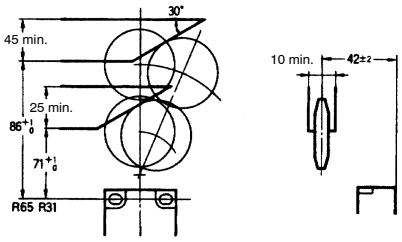
Roller Lever
D4D-□□20R



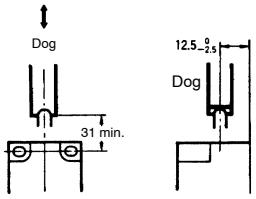
Adjustable Roller Lever
D4D-□□21R



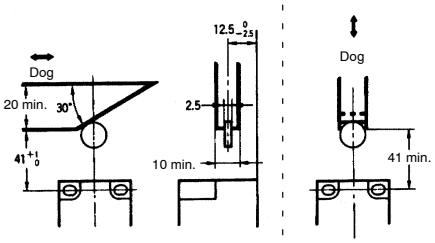
Adjustable Roller Lever (Rubber Roller Lever)
D4D-□□27R



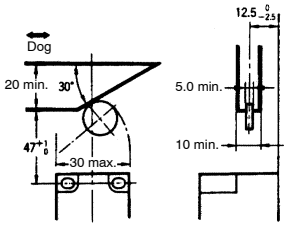
Sealed Plunger
D4D-□□31R



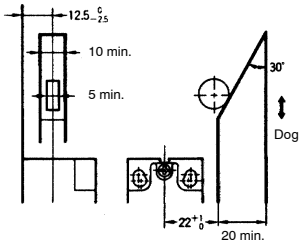
Roller Plunger
D4D-□□32R



One-Way Roller Arm Lever (Horizontal)
D4D-□□62R



One-Way Roller Arm Lever (Vertical)
D4D-□□72R



Precautions

⚠ CAUTION

Do not use metal connectors or conduits with this Switch. Rigid connectors and conduits may damage the Switch. A broken conduit hole may cause an electrical shock hazard.

If the D4D-□R is applied to an emergency stop circuit or safety circuit for prevention of injury, use the D4D-□R model that has an NC contact equipped with a force-separation mechanism and make sure that the D4D-□R operates in the positive mode. In addition, secure the D4D-□R with screws or equivalent parts that are tightened in a single direction so that the D4D-□R cannot be easily removed. Then provide a protection cover for the D4D-□R and post a warning label near the D4D-□R.

Ensure that the actuator is pushed into the lock position by, for example, setting up a dog. Not doing so may result in the actuator becoming unlocked and causing an accident.

When the Limit Switch locks due to a fault in the system, be sure to reset it manually before resupplying power after confirming the safety of the system.

Be sure to connect a fuse with a breaking current 1.5 to 2 times larger than the rated current to the Limit Switch in parallel, to protect it from damage due to short-circuiting.

When using the Limit Switch for the EN ratings, use the gI or gG 10-A fuse.

Do not use the Limit Switch as a stopper.

Actuation of the Limit Switch over a long time may cause Switch parts to deteriorate, and a releasing failure may result. Be sure to check the condition of the Limit Switch regularly.

When using the Limit Switch as a safety component, be sure to check the system design for both operational and circuit safety.

■ CORRECT USE

Operating Environment

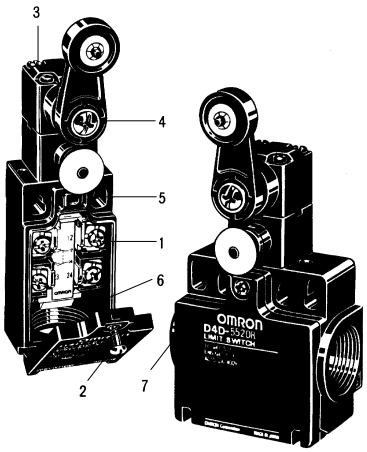
The Limit Switch is intended for indoor use only. Using the Limit Switch outdoors may result in a malfunction.

Correct Tightening Torque

A loose screw may result in a malfunction. Be sure to tighten each screw to the proper tightening torque as shown below.

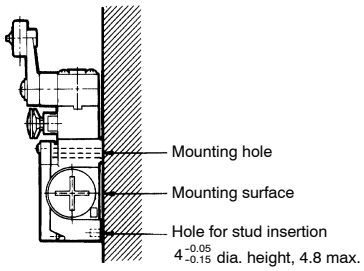
No.	Type	Torque
1	Terminal screw	0.59 to 0.78 N • m
2	Cover mounting screw	0.78 to 0.88 N • m
3	Head mounting screw	0.78 to 0.88 N • m
4	Lever mounting screw	1.57 to 1.77 N • m
5	Switch mounting screw (M4)	0.49 to 0.69 N • m
6	Connector	1.77 to 2.16 N • m 1.37 to 1.77 N • m (see note)
7	Cap screw	1.27 to 1.67 N • m

Note: This applies to the 1/2-14NPT connector.



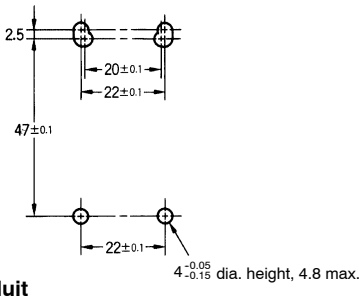
Mounting

Fasten the Switch with two M4 Allen-head bolts and washers. Provide a stud with a diameter of $4^{-0.05}_{-0.15}$ and a height of 4.8 mm max. at two places as shown below so that the Switch is firmly fixed at four points.

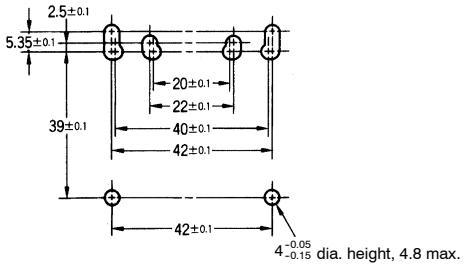


Mounting Holes/Studs

Standard 1-Conduit



2-Conduit



Changing the Head Direction

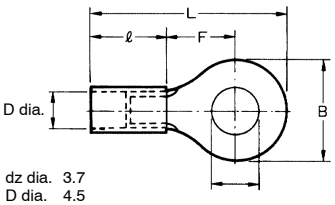
If the head direction has been changed, check the torque of each screw and make sure that the screws are free of foreign substances, and that each screw is tightened to the proper torque.

Wiring

Do not connect the bare lead wires directly to the terminals, but be sure to connect each of them by using an insulation tube and M3.5 round solderless terminals and tighten each terminal screw within the specified torque range.

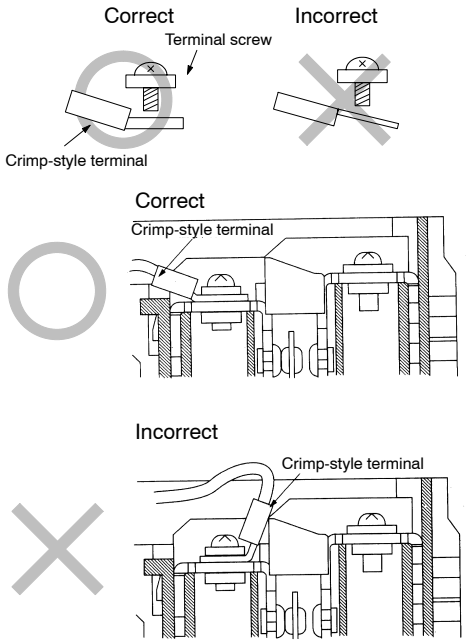
The proper lead wire is 20 to 14 AWG (0.5 to 2.5 mm^2) in size.

To avoid an electrical shock, do not touch the terminals while power is being supplied.



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

Perform wiring for the crimp terminals in the orientation shown below, so that they do not rest on the case or the cover.



Processing the Conduit Opening

Tighten the connector to a torque of 1.8 to 2.2 N • m (1.37 to 1.77 N • m if it is a 1/2-14NPT). Excessive tightening torque may damage the casing. To satisfy IP65, apply sealing tape to the connector conduit. The diameter of the cable must be suited to the corresponding connector.

Insert a cap screw provided with the D4D-□R into any unused conduit opening of the D4D-□R and tighten the cap screw to a torque of 1.27 to 1.67 N • m.

Recommended Connector

Conduit size	Manufacturer	Model	Applicable cable diameter
G1/2	OMRON	SC-6	7.5 to 9.0 mm
	LAPP (see note 1)	ST-PF1/2 5380-1002	6.0 to 12.0 mm
	Ohm Denki (see note 2)	OA-W1609	7.0 to 9.0 mm
Pg13.5	LAPP (see note 1)	ST13.5 5301-5030	5.0 to 12.0 mm
1/2-14NPT	LAPP (see note 1)	ST-NPT1/2 5301-6030	6.0 to 12.0 mm

Note: 1. LAPP is a German manufacturer.
2. Ohm Denki is a Japanese manufacturer.

Maintenance and Repairs

The user must not maintain or repair equipment incorporating any D4D-□R model. Contact the manufacturer of the equipment for any maintenance or repairs required.

Rubber Roller Lever Models

With rubber roller lever models, the rubber roller may turn white with the passage of time, but this will not affect the quality of operation.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters into inches, divide by 25.4

OMRON

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