

## Compact, Plastic-body Safety-door Hinge Switch Designed for Saving Space in Machines and Other Equipment



- Lineup includes three contact models with 2NC/1NO and 3NC contact forms in addition to the previous contact forms 1NC/1NO, and 2NC. Models with MBB contacts are also available.
- Can be used with both standard loads and microloads.



Be sure to read the "Safety Precautions" on page 9.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

## Model Number Structure

### Model Number Legend

D4NH-□□□  
1 2 3

#### 1. Conduit Outlet

- 1: Pg13.5 (1-conduit type)
- 2: G1/2 (1-conduit type)
- 4: M20 (1-conduit type)
- 6: G1/2 (2-conduit type)
- 8: M20 (2-conduit type)

#### 2. Built-in Switch

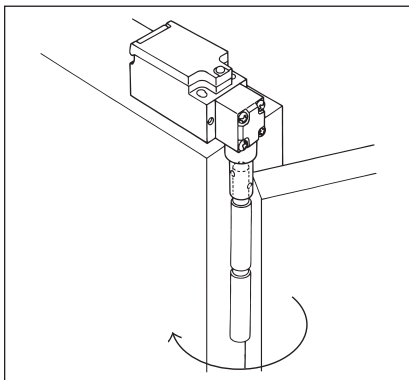
- A: 1NC/1NO (slow-action)
- B: 2NC (slow-action)
- C: 2NC/1NO (slow-action)
- D: 3NC (slow-action)
- E: 1NC/1NO (MBB contact) (slow-action)
- F: 2NC/1NO (MBB contact) (slow-action)

#### 3. Actuator

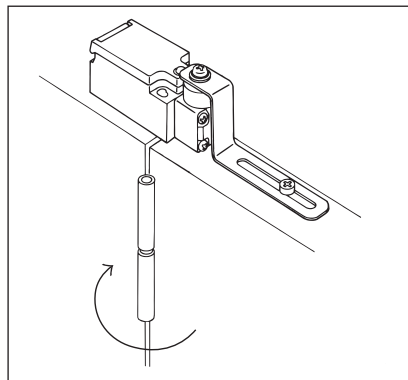
- AS: Shaft
- BC: Arm lever

## Application Examples (Protective Door Safety Measures)

### Shaft Actuator



### Arm Lever Actuator



## Ordering Information

### List of Models Switches

Consult with your OMRON representative when ordering any models that are not listed in this table.

Actuator	Conduit outlet		Built-in switch mechanism		
			1NC/1NO (Slow-action)	2NC (Slow-action)	2NC/1NO (Slow-action)
Shaft	1-conduit type	Pg13.5	D4NH-1AAS	D4NH-1BAS	D4NH-1CAS
		G1/2	D4NH-2AAS	D4NH-2BAS	D4NH-2CAS
		M20	D4NH-4AAS	D4NH-4BAS	D4NH-4CAS
	2-conduit type	G1/2	D4NH-6AAS	D4NH-6BAS	D4NH-6CAS
		M20	D4NH-8AAS	D4NH-8BAS	D4NH-8CAS
Arm lever	1-conduit type	Pg13.5	D4NH-1ABC	D4NH-1BBC	D4NH-1CBC
		G1/2	D4NH-2ABC	D4NH-2BBC	D4NH-2CBC
		M20	D4NH-4ABC	D4NH-4BBC	D4NH-4CBC
	2-conduit type	G1/2	D4NH-6ABC	D4NH-6BBC	D4NH-6CBC
		M20	D4NH-8ABC	D4NH-8BBC	D4NH-8CBC

Actuator	Conduit outlet		Built-in switch mechanism		
			3NC (Slow-action)	1NC/1NO MBB (Slow-action)	2NC/1NO MBB (Slow-action)
Shaft	1-conduit type	Pg13.5	D4NH-1DAS	D4NH-1EAS	D4NH-1FAS
		G1/2	D4NH-2DAS	D4NH-2EAS	D4NH-2FAS
		M20	D4NH-4DAS	D4NH-4EAS	D4NH-4FAS
	2-conduit type	G1/2	D4NH-6DAS	D4NH-6EAS	D4NH-6FAS
		M20	D4NH-8DAS	D4NH-8EAS	D4NH-8FAS
Arm lever	1-conduit type	Pg13.5	D4NH-1DBC	D4NH-1EBC	D4NH-1FBC
		G1/2	D4NH-2DBC	D4NH-2EBC	D4NH-2FBC
		M20	D4NH-4DBC	D4NH-4EBC	D4NH-4FBC
	2-conduit type	G1/2	D4NH-6DBC	D4NH-6EBC	D4NH-6FBC
		M20	D4NH-8DBC	D4NH-8EBC	D4NH-8FBC

**Note:** All models have slow-action contacts with certified direct opening mechanisms on NC contacts only.

## Specifications

### Standards and EC Directives

Conforms to the following EC Directives:

- Machinery Directive
- Low Voltage Directive
- EN50047
- EN60204-1
- EN ISO 14119
- GS-ET-15

### Certified Standards

Certification body	Standard	File No.
TÜV SÜD	EN60947-5-1 (certified direct opening)	Consult your OMRON representative for details.
UL *	UL508, CSA C22.2 No.14	E76675
CCC (CQC)	GB/T 14048.5	Consult your OMRON representative for details.

\* Certification for CSA C22.2 No. 14 is authorized by the UL mark.

### Certified Standard Ratings

#### TÜV (EN60947-5-1)

Item	Utilization category	AC-15	DC-13
Rated operating current ( $I_e$ )		3 A	0.27 A
Rated operating voltage ( $U_e$ )		240 V	250 V

**Note:** Use a 10 A fuse type gI or gG that conforms to IEC60269 as a short-circuit protection device. This fuse is not built into the Switch.

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

##### A300

Rated voltage	Carry current	Current (A)		Volt-amperes (VA)	
		Make	Break	Make	Break
120 VAC	10 A	60	6	7,200	720
240 VAC		30	3		

##### Q300

Rated voltage	Carry current	Current (A)		Volt-amperes (VA)	
		Make	Break	Make	Break
125 VDC	2.5 A	0.55	0.55	69	69
250 VDC		0.27	0.27		

## Characteristics

Interlock type	Type 1 (EN ISO 14119)	
Coding level	Uncoded (EN ISO 14119)	
Degree of protection #1	IP67 (EN60947-5-1)	
Durability #2	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. (3 A resistive load at 250 VAC) *3 300,000 operations min. (10 A resistive load at 250 VAC)
Operating speed	2 to 360°/s	
Operating frequency	30 operations/minute max.	
Direct opening force #4	1 N·m min.	
Direct opening travel #4	18° min.	
Contact resistance	25 mΩ max.	
Minimum applicable load #5	1 mA resistive load at 5 VDC (N-level reference value)	
Rated insulation voltage ( $U_i$ )	300 V	
Rated frequency	50/60 Hz	
Protection against electric shock	Class II (double insulation) <input type="checkbox"/>	
Pollution degree (operating environment)	3 (EN60947-5-1)	
Impulse withstand voltage ( $U_{imp}$ ) (EN60947-5-1)	Between terminals of same polarity	2.5 kV
	Between terminals of different polarity	4 kV
	Between each terminal and non-current carrying metallic parts	6 kV
Insulation resistance	100 MΩ min.	
Contact gap	2 × 2 mm min.	
Vibration resistance	Malfuction	10 to 55 Hz, 0.75 mm single amplitude
	Destruction	1,000 m/s <sup>2</sup> min.
Shock resistance	Malfuction	300 m/s <sup>2</sup> min.
Conditional short-circuit current	100 A (EN60947-5-1)	
Conventional free air thermal current ( $I_{th}$ )	10 A (EN60947-5-1)	
Ambient operating temperature	-30 to 70°C (with no icing)	
Ambient operating humidity	95% max.	
Weight	Approx. 87 g (D4NH-1AAS)	
	Approx. 97 g (D4NH-1ABC)	

**Note:** 1. The above values are initial values.

2. Once the contacts have been used to switch a load, however, they cannot be used to switch smaller loads. The contact surfaces will become rough once they have been used and contact reliability for smaller loads may be reduced.

\*1. The degree of protection is tested using the method specified by the standard (EN60947-5-1). Confirm that sealing properties are sufficient for the operating conditions and environment beforehand. Although the switch box is protected from dust or water penetration, do not use the D4NH in places where foreign material such as dust, dirt, oil, water, or chemicals may enter through the head. Otherwise, accelerated wear, Switch damage, or malfunctioning may occur.

\*2. The durability is for an ambient temperature of 5 to 35°C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.

\*3. Do not pass the 3 A, 250 VAC load through more than 2 circuits.

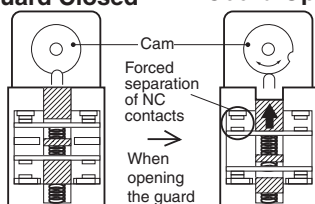
\*4. Be sure to provide this amount to ensure safety in operation.

\*5. This value will vary with the switching frequency, environment, and reliability level. Confirm that correct operation is possible with the actual load beforehand.

# Structure and Nomenclature

## Structure (D4NH-□□BC)

Guard Closed      Guard Open



When the guard is opened, the cam that is directly coupled to the shaft rotates to press the Switch in the direction shown by the (vertical) arrow. This action separates the contacts to stop the machine.

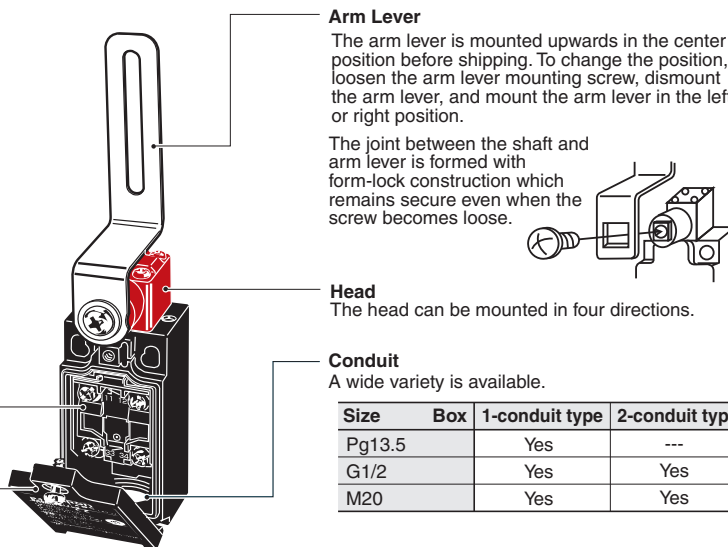
### Built-in Switch

The built-in switch has a direct opening mechanism that forcibly separates the NC contact even when there is contact deposit.

### 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.

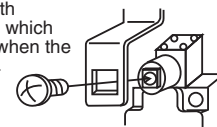
**Note:** The housing and head of the D4NH are made of resin. Use D4BS Safety-door Switches for applications requiring safety door switches of tough, high-sealing, or oil-resistant construction.



### Arm Lever

The arm lever is mounted upwards in the center position before shipping. To change the position, loosen the arm lever mounting screw, dismount the arm lever, and mount the arm lever in the left or right position.

The joint between the shaft and arm lever is formed with form-lock construction which remains secure even when the screw becomes loose.



### Head

The head can be mounted in four directions.

### Conduit

A wide variety is available.

Size	Box	1-conduit type	2-conduit type
Pg13.5		Yes	---
G1/2		Yes	Yes
M20		Yes	Yes

## Model and Contact Configuration

Model	Contact	Contact form	Operating pattern	Remarks
D4NH-□A□	1NC/1NO			Only NC contacts 11-12 have a certified direct opening mechanism. (→) The terminals 11-12 and 33-34 can be used as unlike poles.
D4NH-□B□	2NC			Only NC contacts 11-12 and 31-32 have a certified direct opening mechanism. (→) The terminals 11-12 and 31-32 can be used as unlike poles.
D4NH-□C□	2NC/1NO			Only NC contacts 11-12 and 21-22 have a certified direct opening mechanism. (→) The terminals 11-12, 21-22, and 33-34 can be used as unlike poles.
D4NH-□D□	3NC			Only NC contacts 11-12, 21-22, and 31-32 have a certified direct opening mechanism. (→) The terminals 11-12, 21-22, and 31-32 can be used as unlike poles.
D4NH-□E□	1NC/1NO MBB *			Only NC contacts 11-12 have a certified direct opening mechanism. (→) The terminals 11-12 and 33-34 can be used as unlike poles.
D4NH-□F□	2NC/1NO MBB *			Only NC contacts 11-12 and 21-22 have a certified direct opening mechanism. (→) The terminals 11-12, 21-22 and 33-34 can be used as unlike poles.

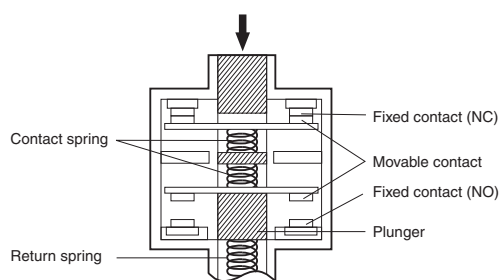
**Note:** 1. Terminals are numbered according to EN50013. Contact forms are according to EN60947-5-1.

2. MBB (Make Before Break) contacts have an overlapping structure, so that before the normally closed contact (NC) opens, the normally open contact (NO) closes.

\* MBB (Make Before Break) contacts have an overlapping structure, so that before the normally closed contact (NC) opens, the normally open contact (NO) closes.

## Direct Opening Mechanism

### 1NC/1NO Contact (Slow-action)

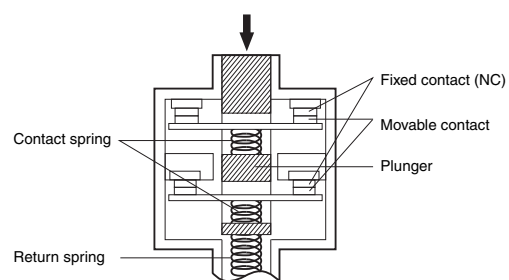


Conforms to EN60947-5-1 Direct Opening ⊖

(Only NC Contact has a direct opening mechanism.)

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

### 2NC Contact (Slow-action)



Conforms to EN60947-5-1 Direct Opening ⊖

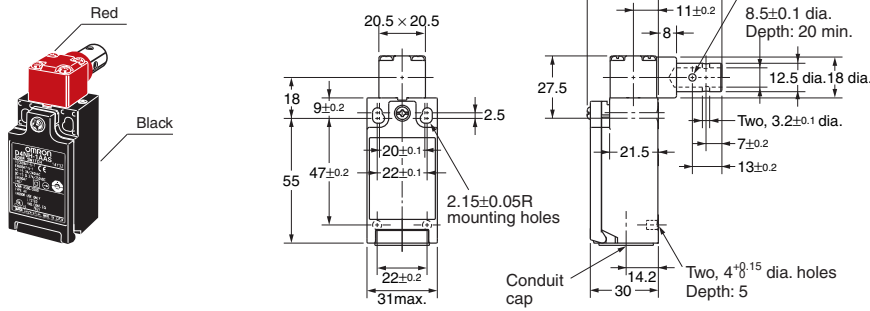
(Both NC Contacts have a direct opening mechanism.)

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

# Dimensions and Operating Characteristics

## Shaft Type with 1 Conduit

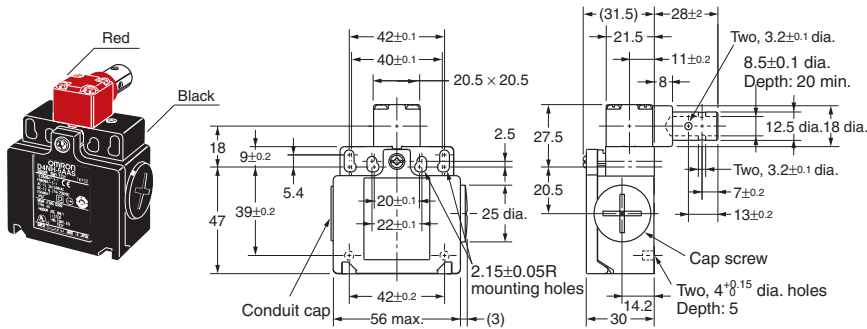
D4NH-1□AS D4NH-2□AS  
D4NH-4□AS



Operating force	OF max.	0.15 N·m
Pretravel PT 1 (NC)		7° (MBB: 10°)
Pretravel PT 2 (NO)		19° (MBB: 5°)

## Shaft Type with 2 Conduits

D4NH-6□AS D4NH-8□AS

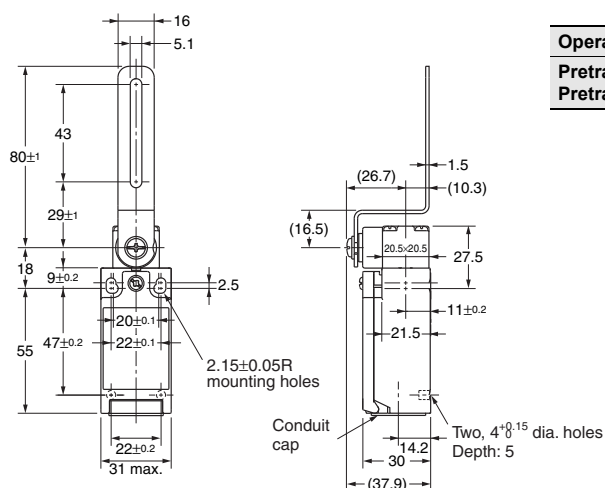
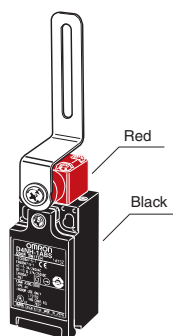


Operating force	OF max.	0.15 N·m
Pretravel PT 1 (NC)		7° (MBB: 10°)
Pretravel PT 2 (NO)		19° (MBB: 5°)

- Note:**
1. Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions.
  2. Variation occurs in the simultaneity of contact opening/closing operations of 2NC, 2NC/1NO, and 3NC contacts. Check contact operation.

### Arm Lever Type with 1 Conduit

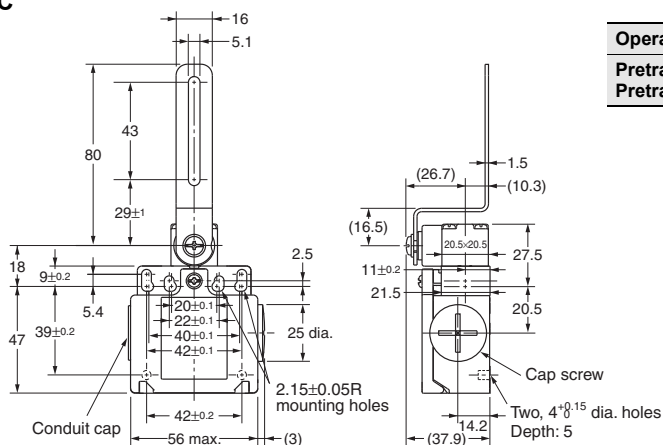
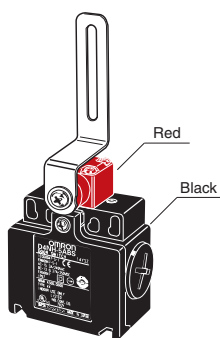
D4NH-1□BC D4NH-2□BC  
D4NH-4□BC



Operating force	OF max.	0.15 N·m
Pretravel PT 1 (NC)		7° (MBB: 10°)
Pretravel PT 2 (NO)		19° (MBB: 5°)

### Arm Lever Type with 2 Conduits

D4NH-6□BC D4NH-8□BC



Operating force	OF max.	0.15 N·m
Pretravel PT 1 (NC)		7° (MBB: 10°)
Pretravel PT 2 (NO)		19° (MBB: 5°)

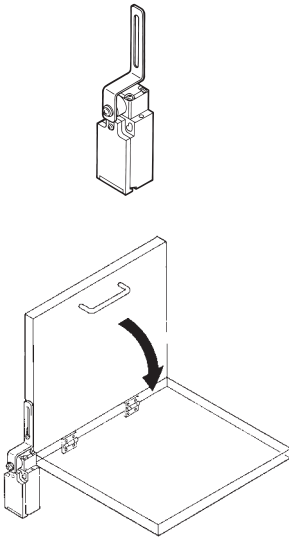
**Note: 1.** Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions.

**2.** Variation occurs in the simultaneity of contact opening/closing operations of 2NC, 2NC/1NO, and 3NC contacts. Check contact operation.

**Application Examples of Arm Lever Use** (Be sure to evaluate the Switch under actual working conditions after installation.)

**When Installing at the Center**

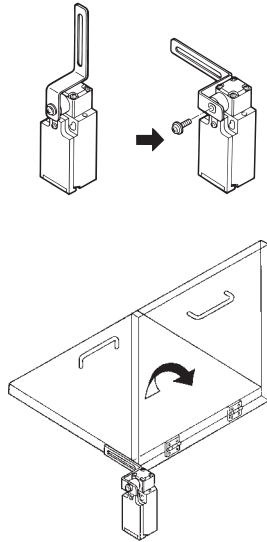
The arm lever is set for center installation at the time of shipment.



**Note:** Install the arm lever so that it will not rotate more than 90°.

**When Installing to the Left**

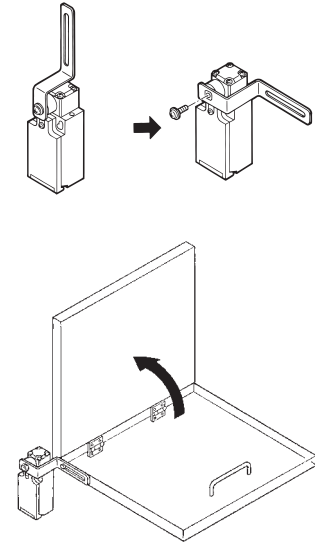
Remove the screw and arm lever, position the arm lever to the left, and then secure it with the screw.



**Note:** Install the arm lever so that it will not rotate more than 180°.

**When Installing to the Right**

Remove the screw and arm lever, position the arm lever to the right, and then secure it with the screw.




**Note:** Install the arm lever so that it will not rotate more than 180°.



## Safety Precautions

Be sure to read the precautions for **All Safety Door Switches** in the website at: <http://www.ia.omron.com/>.

### Indication and Meaning for Safe Use

 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.
<b>Precautions for Safe Use</b>	Supplementary comments on what to do or avoid doing, to use the product safely.
<b>Precautions for Correct Use</b>	Supplementary comments on what to do or avoid doing, to prevent failure to operate, or undesirable effect on product performance.

### CAUTION

Electric shock may occasionally occur.  
Do not use metal cable gland or metal conduits.



### Precautions for Safe Use

- Do not use the Switch submerged in oil or water, or in locations continuously subject to splashes of oil or water. Doing so may result in oil or water entering the Switch interior. (The IP67 degree of protection specification for the Switch refers to water penetration while the Switch is submerged in water for a specified period of time.)
- Always attach the cover after completing wiring and before using the Switch. Also, do not turn ON the Switch with the cover open. Doing so may result in electric shock.
- Do not switch circuits for two or more standard loads (250 VAC, 3 A) at the same time. Doing so may adversely affect insulation performance.

### Precautions for Correct Use

## Mounting Method

### Appropriate Tightening Torque

- Loose screws may result in malfunction.  
Be sure to tighten each screw of the Switch properly.

<b>Terminal screw</b>	0.6 to 0.8 N·m
<b>Cover mounting screw</b>	0.5 to 0.7 N·m
<b>Head mounting screw</b>	0.5 to 0.6 N·m
<b>Arm lever mounting screw</b>	1.6 to 1.8 N·m
<b>Body mounting screw</b>	0.5 to 0.7 N·m
<b>Cable gland</b>	1.8 to 2.2 N·m
<b>Cap screw</b>	1.3 to 1.7 N·m

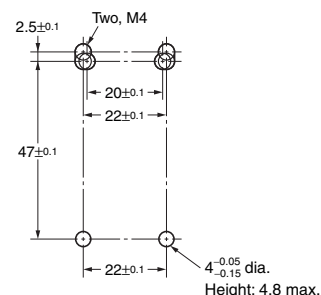
- When loosening a screw with an electrical screwdriver or similar tool while pressing down on the screw head, do not continue turning the screw past the point where the threads disengage. Doing so may strip the end of the threads.

## Switch Mounting

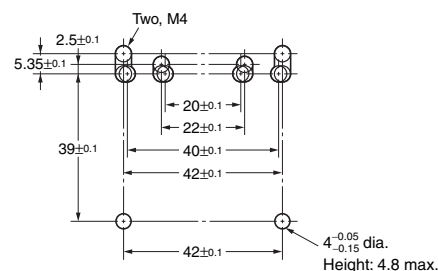
- Mount the Switch using M4 screws and spring washers and tighten the screws to the specified torque.
- To ensure safety, use screws that cannot be easily removed or another means to prevent the Switch and Operation Key from easily being removed.
- As shown below, two studs with a maximum height of 4.8 mm and a diameter of  $4_{-0.05}^{+0.15}$  mm can be provided, the studs inserted into the holes on the bottom of the Switch, and the Switch secured at four locations to increase the mounting strength.

### Switch Mounting Holes

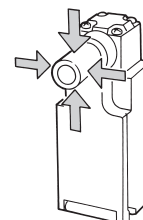
#### • 1-conduit Type



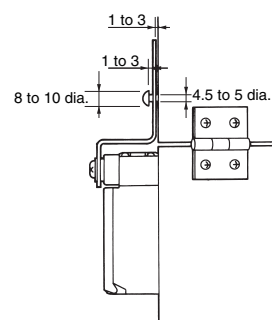
#### • 2-conduit Type



- Mount the shaft or arm lever securely with a one-way screw, or an equivalent so that the shaft or arm lever cannot be easily removed.
- Align the rotational center of the shaft with the door, so that the Switch shaft and head will not be subjected to mechanical stress when the door opens or closes.  
Do not impose a force of 50 N or more on the shaft.



Be sure that the arm lever and door are mounted as shown in the following diagram so that the arm lever and head are not subjected to mechanical stress when the door opens or closes.



## Changing the 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 the head during a change in direction.
- Do not insert or remove the Operation Key with the Switch head removed. Doing so may make it impossible to insert the Operation Key.

## Arm Lever Mounting Position

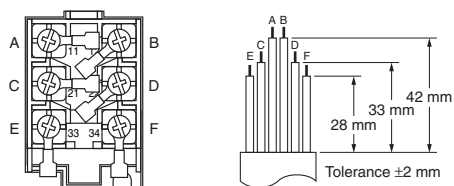
The arm lever is mounted upwards in the center position before shipping. To change the position, loosen the arm lever mounting screw, dismount the arm lever, and mount the arm lever in the left or right position.

## Wiring

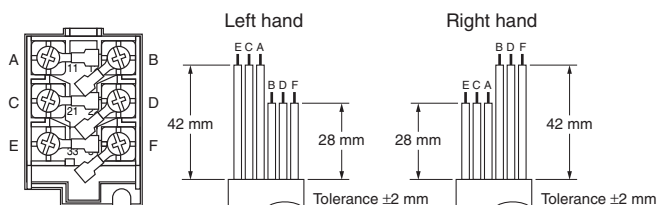
### Wiring

- When connecting to the terminals via insulating tube and M3.5 crimp terminals, arrange the crimp terminals as shown below so that they do not rise up onto the case or the cover. Applicable lead wire size: AWG20 to AWG18 (0.5 to 0.75 mm<sup>2</sup>). Use lead wires of an appropriate length, as shown below. Not doing so may result in excess length causing the cover to rise and not fit properly.

### 1-conduit Type (3 Poles)



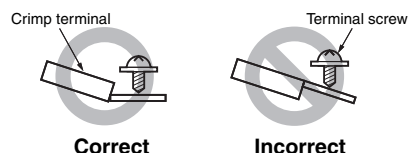
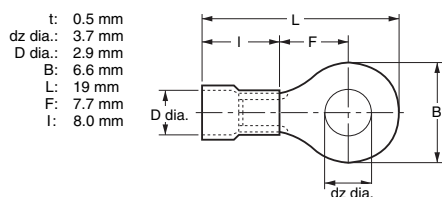
### 2-conduit Type (3 Poles)



- Do not push crimp terminals into gaps in the case interior. Doing so may cause damage or deformation of the case.
- Use crimp terminals not more than 0.5 mm in thickness. Otherwise, they will interfere with other components inside the case.

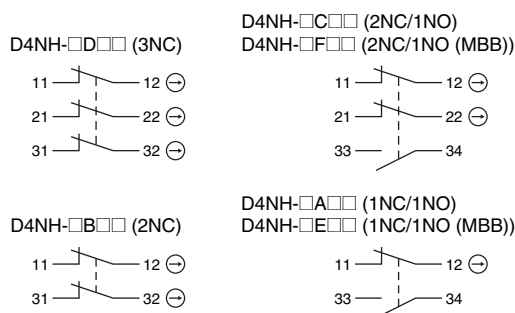
**[Reference]** The crimp terminals shown below are not more than 0.5 mm thick.

Manufacture	Type
J.S.T. Mfg Co.	FN0.5-3.7 (F Type) N0.5-3.7 (Straight Type)



## Contact Arrangement

- The following diagrams show the contact arrangements.



## Conduit Outlet

- Use a recommended cable gland and tighten it with the appropriate tightening torque. The case may be damaged if an excessive tightening torque is applied.
- Use a cable conforming to the diameter of the cable gland to be used.
- Attach and tighten a conduit cap to the unused conduit outlet when wiring. Tighten the conduit cap to the specified torque. The conduit cap is provided with the Switch (2-conduit types).

## Cable Gland

- Use a commercially available cable gland.
- Use a cable gland with the length of the screw not exceeding 9 mm to avoid interference with the inside of the Switch case.

## Others

- When attaching a cover, be sure that the seal rubber is in place and that there is no foreign material present. If the cover is attached with the seal rubber out of place or if foreign material is stuck to the rubber, a proper seal will not be obtained.
- Do not use any screws to connect the cover other than the specified ones. The seal characteristics may be reduced.

## Terms and Conditions Agreement

### 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.

### Warranties.

(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

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