

Miniature Safety-door Hinge Switch

# D4NH

## New series Safety-door Hinge Switch Designed for space saving guarding in Machines and safety Equipment

- Lineup includes three contact models with 2NC/1NO and 3NC contacts in addition to the 1NC/1NO, and 2NC versions. Version with MBB contacts meet applications for advanced requirements.
- M12-connector models are available, saving on labor and simplifying maintenance.
- Standardized gold-clad contacts provide high contact reliability. Can be used with both standard loads and micro-loads.
- Free of lead, cadmium, and hexavalent chrome, reducing the burden on the environment.

Be sure to read the "Safety Precautions" on page G-214.



### Model Number Structure

D4NH-□□□  
1 2 3

**1. Conduit/Connector size**

- 1: Pg13.5 (1-conduit)
- 2: G1/2 (1-conduit)
- 3: 1/2-14NPT (1-conduit)
- 4: M20 (1-conduit)
- 5: Pg13.5 (2-conduit)
- 6: G1/2 (2-conduit)
- 7: 1/2-14NPT (2-conduit)
- 8: M20 (2-conduit)
- 9: M12 connector (1-conduit)

**2. Built-in Switch**

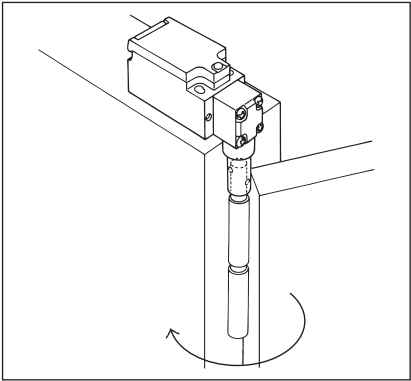
- A: 1NC/1NO (slow-action)
- B: 2NC (slow-action)
- C: 2NC/1NO (slow-action)
- D: 3NC (slow-action)
- E: 1NC/1NO (MBB contact) (slow-action)
- F: 2NC/1NO (MBB contact) (slow-action)

**3. Actuator**

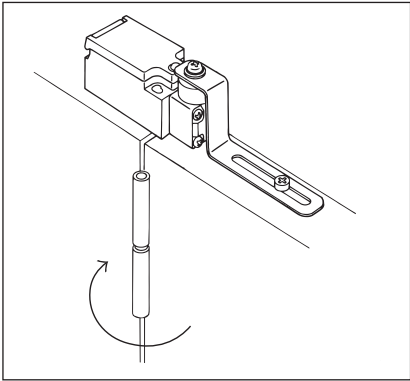
- AS: Shaft
- BC: Arm lever

### Application Examples (Protective Door Safety Measures)

Shaft Actuator



Arm Lever Actuator



Ordering Information

List of Models

Switches

| Actuator  | Conduit size |                            | Built-in switch mechanism |                      |                          |
|-----------|--------------|----------------------------|---------------------------|----------------------|--------------------------|
|           |              |                            | 1NC/1NO<br>(Slow-action)  | 2NC<br>(Slow-action) | 2NC/1NO<br>(Slow-action) |
| Shaft     | 1-conduit    | Pg13.5                     | D4NH-1AAS                 | D4NH-1BAS            | D4NH-1CAS                |
|           |              | G1/2                       | D4NH-2AAS                 | D4NH-2BAS            | D4NH-2CAS                |
|           |              | 1/2-14NPT                  | D4NH-3AAS                 | D4NH-3BAS            | D4NH-3CAS                |
|           |              | M20                        | D4NH-4AAS                 | D4NH-4BAS            | D4NH-4CAS                |
|           |              | M12 connector              | D4NH-9AAS                 | D4NH-9BAS            | ---                      |
|           | 2-conduit    | Pg13.5                     | D4NH-5AAS                 | D4NH-5BAS            | D4NH-5CAS                |
|           |              | G1/2                       | D4NH-6AAS                 | D4NH-6BAS            | D4NH-6CAS                |
|           |              | 1/2-14NPT<br>(See note 3.) | D4NH-7AAS                 | D4NH-7BAS            | D4NH-7CAS                |
|           |              | M20                        | D4NH-8AAS                 | D4NH-8BAS            | D4NH-8CAS                |
| Arm lever | 1-conduit    | Pg13.5                     | D4NH-1ABC                 | D4NH-1BBC            | D4NH-1CBC                |
|           |              | G1/2                       | D4NH-2ABC                 | D4NH-2BBC            | D4NH-2CBC                |
|           |              | 1/2-14NPT                  | D4NH-3ABC                 | D4NH-3BBC            | D4NH-3CBC                |
|           |              | M20                        | D4NH-4ABC                 | D4NH-4BBC            | D4NH-4CBC                |
|           |              | M12 connector              | D4NH-9ABC                 | D4NH-9BBC            | ---                      |
|           | 2-conduit    | Pg13.5                     | D4NH-5ABC                 | D4NH-5BBC            | D4NH-5CBC                |
|           |              | G1/2                       | D4NH-6ABC                 | D4NH-6BBC            | D4NH-6CBC                |
|           |              | 1/2-14NPT<br>(See note 3.) | D4NH-7ABC                 | D4NH-7BBC            | D4NH-7CBC                |
|           |              | M20                        | D4NH-8ABC                 | D4NH-8BBC            | D4NH-8CBC                |

| Actuator  | Conduit size |                            | Built-in switch mechanism |                              |                              |
|-----------|--------------|----------------------------|---------------------------|------------------------------|------------------------------|
|           |              |                            | 3NC<br>(Slow-action)      | 1NC/1NO MBB<br>(Slow-action) | 2NC/1NO MBB<br>(Slow-action) |
| Shaft     | 1-conduit    | Pg13.5                     | D4NH-1DAS                 | D4NH-1EAS                    | D4NH-1FAS                    |
|           |              | G1/2                       | D4NH-2DAS                 | D4NH-2EAS                    | D4NH-2FAS                    |
|           |              | 1/2-14NPT                  | D4NH-3DAS                 | D4NH-3EAS                    | D4NH-3FAS                    |
|           |              | M20                        | D4NH-4DAS                 | D4NH-4EAS                    | D4NH-4FAS                    |
|           |              | M12 connector              | ---                       | D4NH-9EAS                    | ---                          |
|           | 2-conduit    | Pg13.5                     | D4NH-5DAS                 | D4NH-5EAS                    | D4NH-5FAS                    |
|           |              | G1/2                       | D4NH-6DAS                 | D4NH-6EAS                    | D4NH-6FAS                    |
|           |              | 1/2-14NPT<br>(See note 3.) | D4NH-7DAS                 | D4NH-7EAS                    | D4NH-7FAS                    |
|           |              | M20                        | D4NH-8DAS                 | D4NH-8EAS                    | D4NH-8FAS                    |
| Arm lever | 1-conduit    | Pg13.5                     | D4NH-1DBC                 | D4NH-1EBC                    | D4NH-1FBC                    |
|           |              | G1/2                       | D4NH-2DBC                 | D4NH-2EBC                    | D4NH-2FBC                    |
|           |              | 1/2-14NPT                  | D4NH-3DBC                 | D4NH-3EBC                    | D4NH-3FBC                    |
|           |              | M20                        | D4NH-4DBC                 | D4NH-4EBC                    | D4NH-4FBC                    |
|           |              | M12 connector              | ---                       | D4NH-9EBC                    | ---                          |
|           | 2-conduit    | Pg13.5                     | D4NH-5DBC                 | D4NH-5EBC                    | D4NH-5FBC                    |
|           |              | G1/2                       | D4NH-6DBC                 | D4NH-6EBC                    | D4NH-6FBC                    |
|           |              | 1/2-14NPT<br>(See note 3.) | D4NH-7DBC                 | D4NH-7EBC                    | D4NH-7FBC                    |
|           |              | M20                        | D4NH-8DBC                 | D4NH-8EBC                    | D4NH-8FBC                    |

■ Preferred types

- Note:**
1. It is recommended that M20 be used for Switches to be exported to Europe and 1/2-14NPT be used for Switches to be exported to North American countries.
  2. All models have slow-action contacts with approved direct opening mechanisms on NC contacts only.
  3. The 1/2-14NPT 2-conduit models include an M20-to-1/2-14NPT changing adaptor.

## Specifications

### Standards and EC Directives

- Conforms to the following EC Directives:
  - Machinery Directive
  - Low Voltage Directive
  - EN50047
  - EN1088
  - GS-ET-15

### Approved Standards

| Agency         | Standard                              | File No.                          |
|----------------|---------------------------------------|-----------------------------------|
| TÜV SÜD        | EN60947-5-1 (approved direct opening) | B03 11 39656 061                  |
| UL (See note.) | UL508, CSA C22.2 No.14                | E76675                            |
| CQC (CCC)      | GB/T 14048.5                          | Contact your OMRON representative |

Note: Approval for CSA C22.2 No. 14 is authorized by the UL mark.

### CCC (China Compulsory Certification) Mark

| Agency | Standard  | File No.          |
|--------|-----------|-------------------|
| CQC    | GB14048.5 | Under application |

### Approved 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 IEC269 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 |       | 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   |              |        |

#### Q300

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

### Characteristics

|  |             |   |
|--|-------------|---|
| Degree of protection (See note 3.)       |             | IP67 (EN60947-5-1)  |
| Durability (See note 4.)                 | Mechanical  | 1,000,000 operations min.   |
|  | Electrical  | 500,000 operations min. for a resistive load of 3 A at 250 VAC (See note 5.)<br>300,000 operations min. for a resistive load of 10 A at 250 VAC                 |
| Operating speed                          |             | 2 to 360°/s (See note 6.)   |
| Operating frequency                      |             | 30 operations/minute max.   |
| Contact resistance                       |             | 25 mΩ max.  |
| Minimum applicable load (See note 7.)    |             | Resistive load of 1 mA at 5 VDC (N-level reference value)   |
| Rated insulation voltage ( $U_i$ )       |             | 300 V   |
| Protection against electric shock        |             | Class II (double insulation)  |
| Pollution degree (operating environment) |             | Level 3 (EN60947-5-1)   |
| Impulse withstand voltage (EN60947-5-1)  |             | Between terminals of the same polarity: 2.5 kV<br>Between terminals of different polarities: 4 kV<br>Between other terminals and uncharged metallic parts: 6 kV |
| Insulation resistance                    |             | 100 MΩ min.   |
| Contact gap                              |             | Snap-action: 2 x 9.5 mm min<br>Slow-action: 2 x 2 mm min  |
| Vibration resistance                     | Malfunction | 10 to 55 Hz, 0.75-mm single amplitude   |
| Shock resistance                         | Destruction | 1,000 m/s <sup>2</sup>  |
|  | Malfunction | 300 m/s <sup>2</sup>  |
| Conditional short-circuit current        |             | 100 A (EN60947-5-1)   |
| Rated open thermal current ( $I_{th}$ )  |             | 10 A (EN60947-5-1)  |
| Ambient temperature                      |             | Operating: -30°C to 70°C with no icing  |
| Ambient humidity                         |             | Operating: 95% max.   |
| Weight                                   |             | Approx. 87 g (D4NH-1AAS)<br>Approx. 97 g (D4NH-1ABC)  |

Note: 1. The values in the table on the previous page are initial values.

2. Once a contact has been used to switch a standard load, it cannot be used for a load of a smaller capacity. Doing so may result in roughening of the contact surface and contact reliability may be lost.
3. 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 penetrate through the head. Otherwise, premature wear, Switch damage or malfunctioning may occur.
4. The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.
5. If the ambient temperature is greater than 35°C, do not pass the 3-A, 250-VAC load through more than 2 circuits.
6. For safe use, make sure that the allowable operating speed is not exceeded.
7. This value will vary with the switching frequency, environment, and reliability level. Confirm that correct operation is possible with the actual load beforehand.

## Structure, Names, and Functions

### Structure (D4NH-□□BC)

**Guard Closed**      **Guard Open**

Cam  
Forced separation of NC contacts  
When opening the guard

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.

**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 of conduits is available.

| Size          | 1-conduit | 2-conduit |
|---------------|-----------|-----------|
| Pg13.5        | Yes       | Yes       |
| G1/2          | Yes       | Yes       |
| 1/2-14NPT     | Yes       | Yes       |
| M20           | Yes       | Yes       |
| M12 Connector | Yes       | ---       |

**Note:** M12 connector types are not available for Switches with three contacts.

**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.

\* The housing and head of the D4NH are made of resin. Use D4BS Miniature Electromagnetic Lock Safety Door Limit Switches for applications requiring safety door switches of tough, high-sealing, or oil-resistant construction.

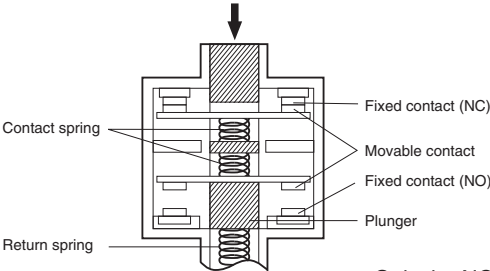
### Contact Form

| Model    | Contact     | Contact form | Operating pattern | Remarks   |
|----------|-------------|--------------|-------------------|---|
| D4NH-□A□ | 1NC/1NO     |              |                   | Only NC contacts 11-12 have an approved direct opening mechanism. (→)<br>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 an approved direct opening mechanism. (→)<br>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 an approved direct opening mechanism. (→)<br>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 an approved direct opening mechanism. (→)<br>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 an approved direct opening mechanism. (→)<br>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 an approved direct opening mechanism. (→)<br>The terminals 11-12, 21-22 and 33-34 can be used as unlike poles.          |

- Note:**
- Terminals are numbered according to EN50013. Contact forms are according to EN60947-5-1.
  - MBB (Make Before Break) contacts have an overlapping structure, so that before the normally closed contact (NC) opens, the normally open contact (NO) closes.

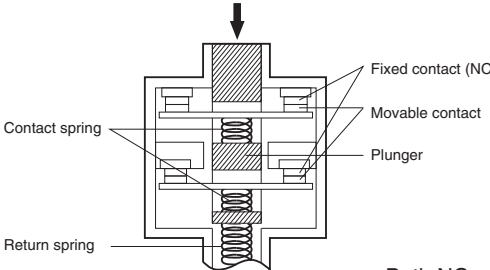
Direct Opening Mechanism

1NC/1NO Contact (Slow-action)



Only the NC contact side has a direct opening mechanism. When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in. (Conforms to EN60947-5-1 Direct Opening Operation.)

2NC Contact (Slow-action)



Both NC contacts have a direct opening mechanism. When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in. (Conforms to EN60947-5-1 Direct Opening Operation.)

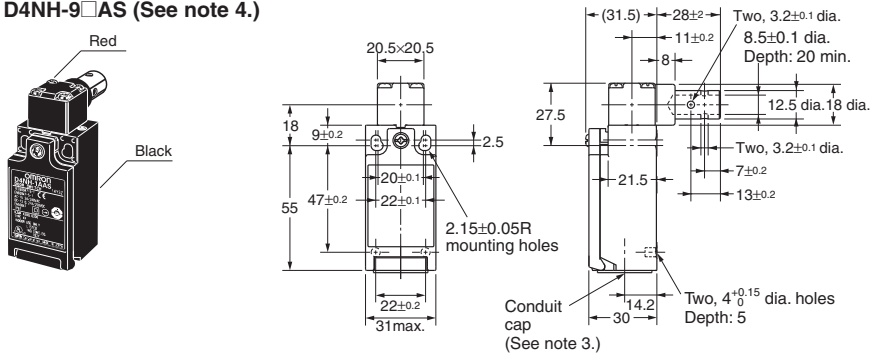
## Dimensions

### Switches

Note: All units are in millimeters unless otherwise indicated.

#### Shaft Type with 1 Conduit

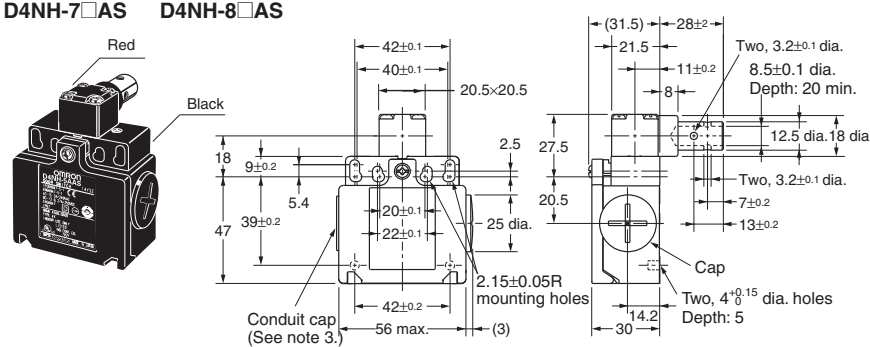
D4NH-1□AS D4NH-2□AS  
 D4NH-3□AS D4NH-4□AS  
 D4NH-9□AS (See note 4.)



|                        |                                    |
|------------------------|------------------------------------|
| OF max.                | 0.15 N·m                           |
| PT 1 (NC)<br>PT 2 (NO) | (7°) (MBB: 10°)<br>(19°) (MBB: 5°) |
| DOT min.<br>DOF min.   | 18°<br>1 N·m                       |

#### Shaft Type with 2 Conduits

D4NH-5□AS D4NH-6□AS  
 D4NH-7□AS D4NH-8□AS

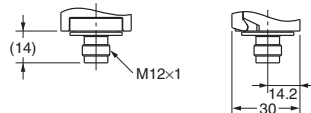


|                        |                                    |
|------------------------|------------------------------------|
| OF max.                | 0.15 N·m                           |
| PT 1 (NC)<br>PT 2 (NO) | (7°) (MBB: 10°)<br>(19°) (MBB: 5°) |
| DOT min.<br>DOF min.   | 18°<br>1 N·m                       |

- 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.
  3. There are a minimum of five turns of the screw thread for a Pg13.5 conduit opening and four turns minimum for a G 1/2 conduit opening.
  4. Refer to the following diagram for details on M12 connectors.

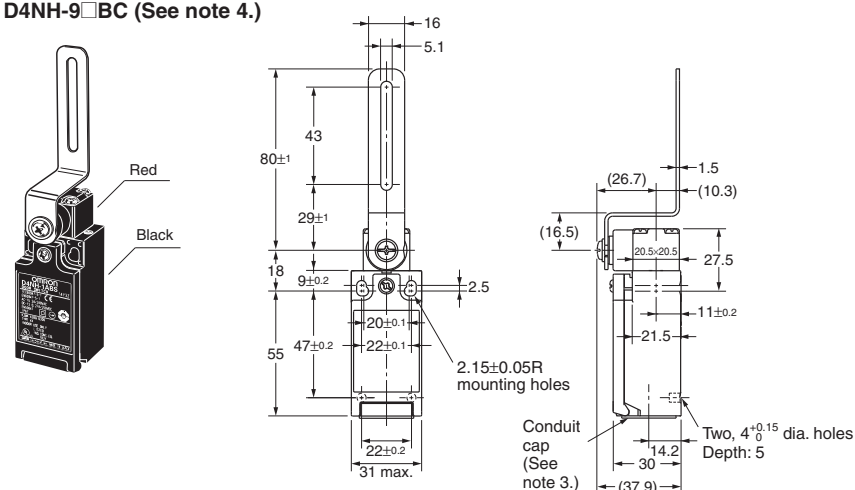
#### 1-conduit M12 Connector

D4NH-9□□□



#### Arm Lever Type with 1 Conduit

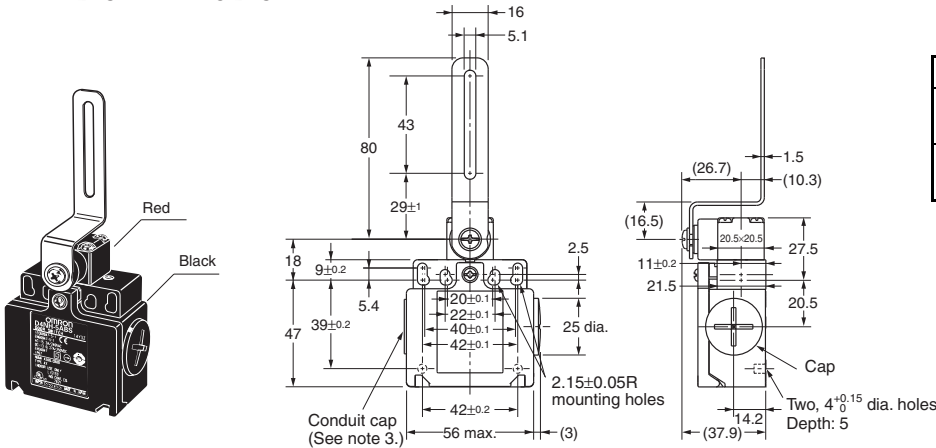
D4NH-1□BC D4NH-2□BC  
 D4NH-3□BC D4NH-4□BC  
 D4NH-9□BC (See note 4.)



|                        |                                    |
|------------------------|------------------------------------|
| OF max.                | 0.15 N·m                           |
| PT 1 (NC)<br>PT 2 (NO) | (7°) (MBB: 10°)<br>(19°) (MBB: 5°) |
| DOT min.<br>DOF min.   | 18°<br>1 N·m                       |

Arm Lever Type with 2 Conduits

D4NH-5□BC D4NH-6□BC  
 D4NH-7□BC D4NH-8□BC

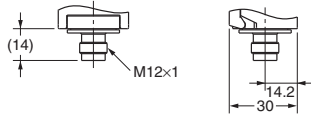


|           |                 |
|-----------|-----------------|
| OF max.   | 0.15 N·m        |
| PT 1 (NC) | (7°) (MBB: 10°) |
| PT 2 (NO) | (19°) (MBB: 5°) |
| DOT min.  | 18°             |
| DOF min.  | 1 N·m           |

- Note:**
1. Unless otherwise specified, a tolerance of ±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.
  3. There are a minimum of five turns of the screw thread for a Pg13.5 conduit opening and four turns minimum for a G 1/2 conduit opening.
  4. Refer to the following diagram for details on M12 connectors.

1-conduit M12 Connector

D4NH-9□□□

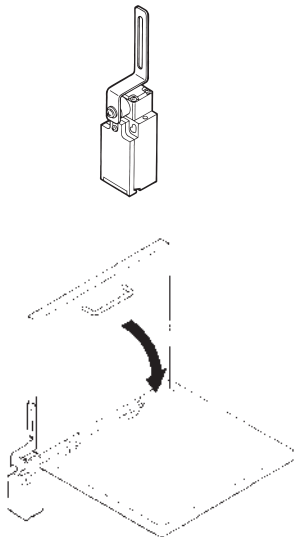


Application Examples of Arm Lever Use

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

When Installing at the Center

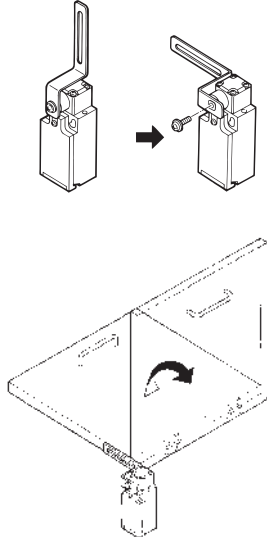
The arm lever is set for center installation at the time of shipment.



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

When Installing to the Left

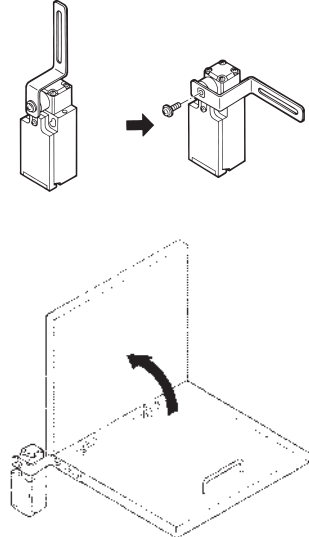
Remove the screw and arm lever, position the arm lever to the left, and then secure it with the screw.



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

Refer to *OMRON SAFETY COMPONENTS SERIES (Y106)* for common precautions for Switches and Safety Limit Switches.

### CAUTION

Do not use metal connectors or metal conduits with this Switch. Doing so may occasionally result in electric shock.

### Precautions for Safe Use

- Do not drop the Switch. Doing so may result in the Switch not performing to its full capacity.
- Do not attempt to disassemble or modify the Switch. Doing so may cause the Switch to malfunction.
- Do not use the Switch where explosive gas, flammable gas, or any other hazardous gas may be present.
- Install the Switch in a location away from close body contact. Not doing so may result in malfunction.
- 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.)
- Protect the head from foreign material. Subjecting the head to foreign material may result in premature wear or damage to the Switch. Although the switch body is protected from penetration by dust or water, the head is not protected from penetration by minute particles or water.
- Turn the power OFF before wiring. Doing so may result in electric shock.
- Install a cover after wiring. Not doing so may result in electric shock.
- Connect a fuse to the Switch in series to protect the Switch from short-circuit damage. Use a fuse with a breaking current 1.5 to 2 times larger than the rated current. To conform to EN ratings, use an IEC60269-compliant 10-A fuse type gI or gG.
- 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.
- The durability of the Switch is greatly affected by operating conditions. Evaluate the Switch under actual working conditions before permanent installation and use within a number of switching operations that will not adversely affect the Switch's performance.
- Be sure to indicate in the machine manufacturer's instruction manual that the user must not attempt to repair or maintain the Switch and must contact the machine manufacturer for any repairs or maintenance.
- If the Switch is to be used in an emergency stop circuit or in a safety circuit for preventing accidents resulting in injuries or deaths, use a model that has an NC contact equipped with a direct opening mechanism and make sure that the Switch operates in the direct opening mode.

### Precautions for Correct Use

#### Environment

- The Switch is intended for indoor use only.
- Do not use the Switch outdoors. Doing so may cause the Switch to malfunction.
- Do not use the Switch where hazardous gases (e.g., H<sub>2</sub>S, SO<sub>2</sub>, NH<sub>3</sub>, HNO<sub>3</sub>, Cl<sub>2</sub>) are present or in locations subject to high temperature and humidity. Doing so may result in damage to the Switch caused by contact failure or corrosion.
- Do not use the Switch under any of the following conditions.
  - Locations subject to extreme temperature changes.
  - Locations where high humidity or condensation may occur.
  - Locations subject to excessive vibration.
  - Locations where metal dust, processing waste, oil, or chemicals may penetrate through the protective door.
  - Locations subject to detergents, thinner, or other solvents.

## Mounting Method

### Mounting Screw Tightening Torque

Tighten each of the screws to the specified torque. Loose screws may result in malfunction of the Switch within a short time.

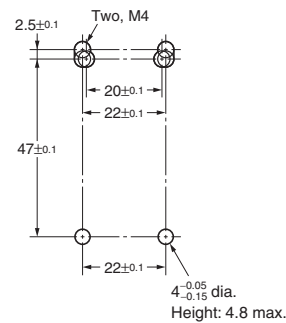
|  |                            |
|--|----------------------------|
| Terminal screw                           | 0.6 to 0.8 N·m             |
| Cover clamping screw                     | 0.5 to 0.7 N·m             |
| Head clamping screw                      | 0.5 to 0.6 N·m             |
| Arm lever clamping screw                 | 1.6 to 1.8 N·m             |
| Body clamping screw                      | 0.5 to 0.7 N·m             |
| Conduit mounting connection, M12 adaptor | 1.8 to 2.2 N·m             |
| Cap screw                                | 1.4 to 1.8 N·m (1/2-14NPT) |
| Cap screw                                | 1.3 to 1.7 N·m             |

### Switch Mounting

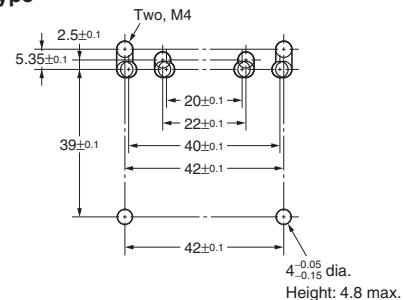
- Mount the Switch using M4 screws and washers and tighten the screws to the specified torque.
- For safety, use screws that cannot be easily removed, or use an equivalent measure to ensure that the Switch is secure.
- Secure the Switch with two M4 bolts and washers. Provide studs with a diameter of  $4^{-0.05}/_{-0.15}$  and a height of 4.8 mm max. at two places, inserting into the holes at the bottom of the Switch as shown below so that the Switch is firmly fixed at four points.

### Switch Mounting Holes

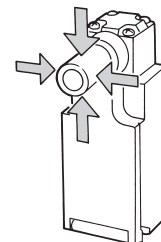
#### One-conduit Type



#### Two-conduit Type

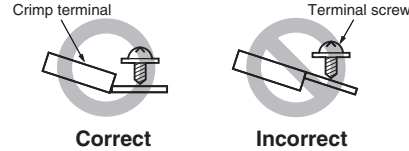
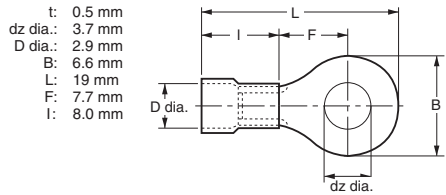
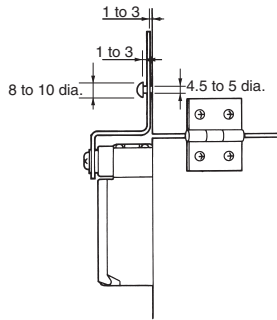


- Mount the shaft or arm lever securely with a one-way screw, or an equivalent so that the shaft or arm lever cannot be easily removed.
- Align the rotational center of the shaft with the door, so that the switch shaft and head will not be subjected to mechanical stress when the door opens or closes.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

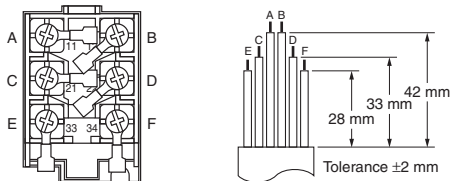
**Arm Lever Mounting Position**

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.

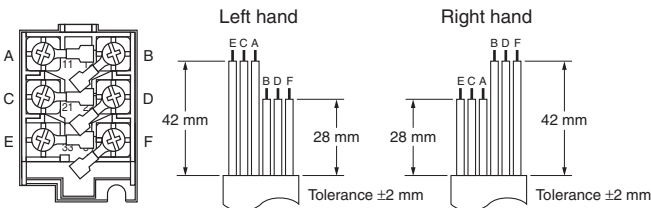
**Wiring**

- 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.

**One-conduit Type (3 Poles)**



**Two-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. The crimp terminals shown below are not more than 0.5 mm thick.

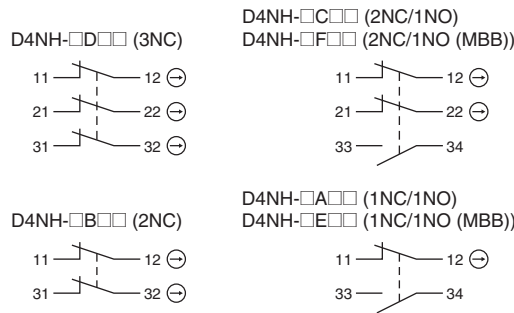
| Manufacture | Type   | Wire size                    |
|-------------|--|------------------------------|
| J.S.T.      | FV0.5-3.7 (F type)<br>V0.5-3.7 (straight type) | AWG20 (0.5 mm <sup>2</sup> ) |

J.S.T is a Japanese manufacturer.

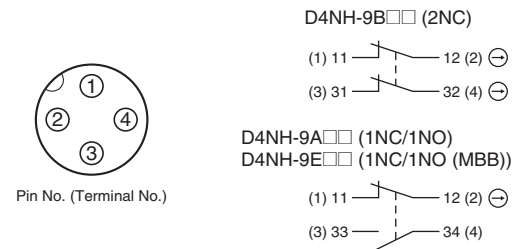
**Contact Arrangement**

- The following diagrams show the contact arrangements used for screw terminal types and connector types.

**Screw Terminal Type**



**Connector Type**



- Applicable socket: XS2F (OMRON).
- Refer to the G010 *Connector Catalog* for details on socket pin numbers and lead wire colors.

**Socket Tightening (Connector Type)**

- Turn the socket connector screws by hand and tighten until no space remains between the socket and the plug.
- Make sure that the socket connector is tightened securely. Otherwise, the rated degree of protection (IP67) may not be maintained and vibration may loosen the socket connector.

**Conduit Opening**

- Connect a recommended connector to the opening of the conduit and tighten the connector to the specified torque. The case may be damaged if an excessive tightening torque is applied.
- When using 1/2-14NPT, wind sealing tape around the joint between the connector and conduit opening so that the enclosure will conform to IP67.
- Use a cable with a suitable diameter for the connector.
- Attach and tighten a conduit cap to the unused conduit opening when wiring. Tighten the conduit cap to the specified torque. The conduit cap is provided with the Switch (2-conduit types).

## Recommended Connectors

Use connectors with screws not exceeding 9 mm, otherwise the screws will protrude into the case interior, interfering with other components in the case. The connectors listed in the following table have connectors with thread sections not exceeding 9 mm. Use the recommended connectors to ensure conformance to IP67.

| Size      | Manufacturer | Model                     | Applicable cable diameter |
|-----------|--------------|---------------------------|---------------------------|
| G1/2      | LAPP         | ST-PF1/2<br>5380-1002     | 6.0 to 12.0 mm            |
|           | Ohm Denki    | OA-W1609                  | 7.0 to 9.0 mm             |
|           |              | OA-W1611                  | 9.0 to 11.0 mm            |
| Pg13.5    | LAPP         | ST-13.5<br>5301-5030      | 6.0 to 12.0 mm            |
| M20       | LAPP         | ST-M20 × 1.5<br>5311-1020 | 7.0 to 13.0 mm            |
| 1/2-14NPT | LAPP         | ST-NPT1/2<br>5301-6030    | 6.0 to 12.0 mm            |
| M12       | LAPP         | ST-M12 × 1.5<br>5311-1000 | 3.5 to 7.0 mm             |

Use LAPP connectors together with seal packing (JPK-16, GP-13.5, GPM20, or GPM12), and tighten to the specified tightening torque. Seal packing is sold separately.

LAPP is a German manufacturer. Ohm Denki is a Japanese manufacturer.

## Production Termination

Following the release of the D4NH, production of the D4DH will be terminated.

### Date of Production Termination

Production of the D4DH Series will be terminated in March 2006.

### Product Replacement

#### 1. Dimensions

The D4DH and D4NH use the same mounting method, and mounting hole. The multi-contact structure and the extra 4 mm in length, however, are different.

#### 2. Terminal Numbers

For the 2-contact model, the terminals 21, 22, 23, and 24 on the D4DH are 31, 32, 33, and 34 on the D4NH.

#### 3. Recommended Terminals

If the recommended terminals are not used, the Switch may not be compatible. Make sure that the Switch is compatible with the terminals.

Before using an M12 type, attaching the provided changing adaptor to the Switch and then connect the recommended connector.

Before using a 2-conduit 1/2-14NPT type, attach the provided changing adaptor to the Switch and then connect the recommended connector.

### Storage

Do not store the Switch in locations where hazardous gases (e.g., H<sub>2</sub>S, SO<sub>2</sub>, NH<sub>3</sub>, HNO<sub>3</sub>, Cl<sub>2</sub>) or dust is present, or in locations subject to high temperatures and humidity.

### Others

- Do not allow the load current to exceed the rated value.
- Confirm that the seal rubber has no defects before use. If the seal rubber is displaced or raised, or has foreign particles adhered to it, the sealing capability of the seal rubber will be adversely affected.
- Use the correct cover mounting screws only, or the sealing capability of the seal rubber will deteriorate.
- Inspect the Switch regularly.
- Use the following recommended countermeasures to prevent telegraphing when using adjustable or long levers.

1. Make the rear edge of the dog smooth with an angle of 15° to 30° or make it in the shape of a quadratic curve.
2. Design the circuit so that no error signal will be generated.
3. Use or set a Switch that is operated in one direction only.

## Comparison of the D4DH and Substitute Products

| Model                     | D4NH                    |
|---------------------------|-------------------------|
| Switch color              | Very similar            |
| Dimensions                | Very similar            |
| Wiring/connection         | Significantly different |
| Mounting method           | Completely compatible   |
| Ratings/performance       | Very similar            |
| Operating characteristics | Very similar            |
| Operating method          | Completely compatible   |

### List of Recommended Substitute Products

Using M screws is recommended to comply with European standards. Therefore, the M20 conduit model is recommended for use in new designs.

| D4DH product to be discontinued | Recommended substitute product | D4DH product to be discontinued | Recommended substitute product |
|---------------------------------|--------------------------------|---------------------------------|--------------------------------|
| D4DH-15AS                       | D4NH-1AAS                      | D4DH-1AAS                       | D4NH-1BAS                      |
| D4DH-25AS                       | D4NH-2AAS                      | D4DH-2AAS                       | D4NH-2BAS                      |
| D4DH-35AS                       | D4NH-3AAS                      | D4DH-3AAS                       | D4NH-3BAS                      |
| D4DH-55AS                       | D4NH-5AAS                      | D4DH-5AAS                       | D4NH-5BAS                      |
| D4DH-65AS                       | D4NH-6AAS                      | D4DH-6AAS                       | D4NH-6BAS                      |
| D4DH-15BC                       | D4NH-1ABC                      | D4DH-1ABC                       | D4NH-1BBC                      |
| D4DH-25BC                       | D4NH-2ABC                      | D4DH-2ABC                       | D4NH-2BBC                      |
| D4DH-35BC                       | D4NH-3ABC                      | D4DH-3ABC                       | D4NH-3BBC                      |
| D4DH-55BC                       | D4NH-5ABC                      | D4DH-5ABC                       | D4NH-5BBC                      |
| D4DH-65BC                       | D4NH-6ABC                      | D4DH-6ABC                       | D4NH-6BBC                      |

Dimensions (Unit: mm)

| Discontinued Models (1-conduit D4DH)  | Replacement Products (1-conduit D4NH)   |
|---|---|
| <p>2.15±0.05R mounting holes<br/>20.5×20.5<br/>9<sup>+0.2</sup><br/>18<br/>2.5<br/>47<sup>+0.2</sup><br/>51<br/>31 max.<br/>22<sup>+0.2</sup><br/>20<sup>+0.1</sup><br/>22<sup>+0.1</sup><br/>11<sup>+0.2</sup><br/>27.5<br/>28<sup>+0.2</sup><br/>8<sup>+0.1</sup><br/>13<sup>+0.2</sup><br/>12.5 dia.<br/>17 dia.<br/>Two, 3.2±0.1 dia.<br/>Two, 3.2±0.1 dia.<br/>Two, 4<sup>+0.15</sup> dia. holes<br/>Depth: 5 min.<br/>Conduit opening<br/>30<br/>14.2</p>   | <p>20.5×20.5<br/>18<br/>9<sup>+0.2</sup><br/>55<br/>47<sup>+0.2</sup><br/>2.5<br/>20±0.1<br/>22±0.1<br/>31 max.<br/>2.15±0.05R mounting holes<br/>Conduit cap (See note.)<br/>14.2<br/>30<br/>Two, 4<sup>+0.15</sup> dia. holes<br/>Depth: 5 min.<br/>(31.5)<br/>28±0.2<br/>11±0.2<br/>8<br/>Two, 3.2±0.1 dia.<br/>8.5±0.1 dia.<br/>Depth: 20 min.<br/>12.5 dia. 18 dia.<br/>Two, 3.2±0.1 dia.<br/>7±0.2<br/>13±0.2<br/>27.5<br/>21.5</p>   |
| Discontinued Models (2-conduit D4DH)  | Replacement Products (2-conduit D4NH)   |
| <p>2.15±0.05R mounting holes<br/>20.5×20.5<br/>5.4<br/>18<br/>2.5<br/>9<sup>+0.2</sup><br/>43<br/>25 dia.<br/>39<sup>+0.2</sup><br/>42<sup>+0.1</sup><br/>40<sup>+0.1</sup><br/>20<sup>+0.1</sup><br/>22<sup>+0.1</sup><br/>42<sup>+0.1</sup><br/>50<br/>56 max.<br/>3<br/>11<sup>+0.2</sup><br/>27.5<br/>28<sup>+0.2</sup><br/>8<br/>13<sup>+0.2</sup><br/>12.5 dia.<br/>3.2<sup>+0.1</sup> dia.<br/>Two, 3.2±0.1 dia.<br/>Cap<br/>14.2<br/>Two, 4<sup>+0.15</sup> dia. holes<br/>Depth: 5 min.<br/>30</p> | <p>42±0.1<br/>40±0.1<br/>20.5×20.5<br/>20.5<br/>18<br/>9<sup>+0.2</sup><br/>47<br/>39<sup>+0.2</sup><br/>5.4<br/>25 dia.<br/>20.5<br/>22±0.1<br/>42±0.2<br/>56 max.<br/>2.15±0.05R mounting holes<br/>Conduit cap (See note.)<br/>14.2<br/>30<br/>Two, 4<sup>+0.15</sup> dia. holes<br/>Depth: 5 min.<br/>(3)<br/>(31.5)<br/>28±0.2<br/>21.5<br/>11±0.2<br/>8<br/>Two, 3.2±0.1 dia.<br/>8.5±0.1 dia.<br/>Depth: 20 min.<br/>12.5 dia. 18 dia.<br/>Two, 3.2±0.1 dia.<br/>7±0.2<br/>13±0.2<br/>27.5<br/>2.5</p> |

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

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