

## Safety Limit Switch

Small, Economical Switch Featuring a Positive Opening Mechanism and CE Marking

- Contacts opened by positive opening mechanism (NC contacts only)
- Double insulation makes ground terminal unnecessary (Bears marking)
- Conforms to EN (TÜV) standards corresponding to the CE marking
- Wide standard operating temperature range: -30°C to 70°C
- Conforms to these standards and EC Directives:
  - Machinery Directive
  - Low Voltage Directive EN50047
  - EN1088 (slow-action models only)



### Approved Standards

#### Snap-Action Models

| Agency             | Standard                  | File No.                                           |
|--------------------|---------------------------|----------------------------------------------------|
| TÜV Rheinland      | EN60947-5-1               | J9950233<br>(Positive opening: approved)           |
| UL<br>(see note1)  | UL508<br>CSA C22.2 No. 14 | E76675                                             |
| BIA<br>(see note2) | GS-ET-15                  | 1-conduit type: 9407070<br>3-conduit type: 9601732 |

- Note: 1. CSA C22.2 No. 14 compliance was verified and approved by UL (Marked with ).
2. Except for variable roller lever, cat whisker, or plastic rod models.

#### Slow-Action Models

| Agency              | Standard                     | File No.                                           |
|---------------------|------------------------------|----------------------------------------------------|
| TÜV Rheinland       | EN60947-5-1<br>EN81<br>EN115 | R9451184<br>(Positive opening: approved)           |
| UL<br>(see note1)   | UL508<br>CSA C22.2 No. 14    | E76675                                             |
| BIA<br>(see note2)  | GS-ET-15                     | 1-conduit type: 9407070<br>2-conduit type: 9601732 |
| SUVA<br>(see note2) | SUVA                         | 1-conduit type: E6192.d<br>2-conduit type: E6193.d |

- Note: 1. CSA C22.2 No. 14 compliance was verified and approved by UL (Marked with ).
2. Except for variable roller lever, cat whisker, or plastic rod models.

# Ordering Information

## MODEL NUMBER LEGEND

D4D-□□□□N  
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

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

### 3. Head and Actuator

- 20: Roller lever (standard, resin lever)
- 21: Adjustable roller lever
- 22: Roller lever (metal lever)
- 27: Adjustable roller lever (with 50 dia. rubber roller)
- 31: Top plunger
- 32: Top roller plunger
- 62: One-way roller arm lever (horizontal)
- 72: One-way roller arm lever (vertical)
- 80: Cat whisker
- 87: Plastic rod
- RE: Fork lever lock (right operation)
- LE: Fork lever lock (left operation)

## SWITCHES

| Actuator                                                                                                                            | Conduit size/type |                            | Built-in switch mechanism                                                                           |             |                                                                                                       |             |                                                                                                       |             |
|-------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------|-----------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------|-------------|
|                                                                                                                                     |                   |                            | 1NC/1NO (Snap-action)                                                                               |             | 1NC/1NO (Slow-action)                                                                                 |             | 2NC (Slow-action)                                                                                     |             |
|                                                                                                                                     |                   |                            | Positive opening                                                                                    | Part number | Positive opening                                                                                      | Part number | Positive opening                                                                                      | Part number |
| Roller lever (resin lever)<br>                     | 1-conduit         | Pg13.5 (European)          |                    | D4D-1120N   |                    | D4D-1520N   |                    | D4D-1A20N   |
|                                                                                                                                     |                   | G1/2 (Japanese)            |                                                                                                     | D4D-2120N   |                                                                                                       | D4D-2520N   |                                                                                                       | D4D-2A20N   |
|                                                                                                                                     |                   | 1/2-14NPT (North American) |                                                                                                     | D4D-3120N   |                                                                                                       | D4D-3520N   |                                                                                                       | D4D-3A20N   |
|                                                                                                                                     | 2-conduit         | Pg13.5 (European)          |                    | D4D-5120N   |                    | D4D-5520N   |                    | D4D-5A20N   |
|                                                                                                                                     |                   | G1/2 (Japanese)            |                                                                                                     | D4D-6120N   |                                                                                                       | D4D-6520N   |                                                                                                       | D4D-6A20N   |
|                                                                                                                                     |                   |                            |                                                                                                     |             |                                                                                                       |             |                                                                                                       |             |
| Roller lever (metal lever)<br>                   | 1-conduit         | Pg13.5 (European)          |                  | D4D-1122N   |                  | D4D-1522N   |                  | D4D-1A22N   |
|                                                                                                                                     |                   | G1/2 (Japanese)            |                                                                                                     | D4D-2122N   |                                                                                                       | D4D-2522N   |                                                                                                       | D4D-2A22N   |
|                                                                                                                                     |                   | 1/2-14NPT (North American) |                                                                                                     | D4D-3122N   |                                                                                                       | D4D-3522N   |                                                                                                       | D4D-3A22N   |
|                                                                                                                                     | 2-conduit         | Pg13.5 (European)          |                  | D4D-5122N   |                  | D4D-5522N   |                  | D4D-5A22N   |
|                                                                                                                                     |                   | G1/2 (Japanese)            |                                                                                                     | D4D-6122N   |                                                                                                       | D4D-6522N   |                                                                                                       | D4D-6A22N   |
|                                                                                                                                     |                   |                            |                                                                                                     |             |                                                                                                       |             |                                                                                                       |             |
| Adjustable roller lever<br>                      | 1-conduit         | Pg13.5 (European)          | ---                                                                                                 | D4D-1121N   | <br>(See Note 1) | D4D-1521N   | <br>(See Note 1) | D4D-1A21N   |
|                                                                                                                                     |                   | G1/2 (Japanese)            |                                                                                                     | D4D-2121N   |                                                                                                       | D4D-2521N   |                                                                                                       | D4D-2A21N   |
|                                                                                                                                     |                   | 1/2-14NPT (North American) |                                                                                                     | D4D-3121N   |                                                                                                       | D4D-3521N   |                                                                                                       | D4D-3A21N   |
|                                                                                                                                     | 2-conduit         | Pg13.5 (European)          |                  | D4D-5121N   |                  | D4D-5521N   |                  | D4D-5A21N   |
|                                                                                                                                     |                   | G1/2 (Japanese)            |                                                                                                     | D4D-6121N   |                                                                                                       | D4D-6521N   |                                                                                                       | D4D-6A21N   |
|                                                                                                                                     |                   |                            |                                                                                                     |             |                                                                                                       |             |                                                                                                       |             |
| Adjustable roller lever (with rubber roller)<br> | 1-conduit         | Pg13.5 (European)          | <br>(See Note 1) | D4D-1127N   | <br>(See Note 1) | D4D-1527N   | <br>(See Note 1) | D4D-1A27N   |
|                                                                                                                                     |                   | G1/2 (Japanese)            |                                                                                                     | D4D-2127N   |                                                                                                       | D4D-2527N   |                                                                                                       | D4D-2A27N   |
|                                                                                                                                     |                   | 1/2-14NPT (North American) |                                                                                                     | D4D-3127N   |                                                                                                       | D4D-3527N   |                                                                                                       | D4D-3A27N   |
|                                                                                                                                     | 2-conduit         | Pg13.5 (European)          |                  | D4D-5127N   |                  | D4D-5527N   |                  | D4D-5A27N   |
|                                                                                                                                     |                   | G1/2 (Japanese)            |                                                                                                     | D4D-6127N   |                                                                                                       | D4D-6527N   |                                                                                                       | D4D-6A27N   |
|                                                                                                                                     |                   |                            |                                                                                                     |             |                                                                                                       |             |                                                                                                       |             |

(This table continues on the next page.)

Note: 1. The Switches are marked with "" indicating approval by TÜV Rheinland for the positive opening mechanism. Adjustable roller lever and fork lever lock models are approved by TÜV Rheinland for the positive opening mechanism, but not by the GS-ET-15 standard (BIA) nor by SUVA.

- 2. Right operation: Contact 11-12 is positively opened, when the lever on the right is lowered.  
Left operation: Contact 11-12 is positively opened, when the lever on the left is lowered.

## Ordering Information - continued from previous page

| Actuator                                                                                                                              | Conduit size/type |                            | Built-in switch mechanism                                                          |             |                                                                                                      |             |                                                                                                       |             |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------|------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------|-------------|
|                                                                                                                                       |                   |                            | 1NC/1NO (Snap-action)                                                              |             | 1NC/1NO (Slow-action)                                                                                |             | 2NC (Slow-action)                                                                                     |             |
|                                                                                                                                       |                   |                            | Positive opening                                                                   | Part number | Positive opening                                                                                     | Part number | Positive opening                                                                                      | Part number |
| Plunger<br>                                          | 1-conduit         | Pg13.5 (European)          |   | D4D-1131N   |                    | D4D-1531N   |                    | D4D-1A31N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-2131N   |                                                                                                      | D4D-2531N   |                                                                                                       | D4D-2A31N   |
|                                                                                                                                       |                   | 1/2-14NPT (North American) |                                                                                    | D4D-3131N   |                                                                                                      | D4D-3531N   |                                                                                                       | D4D-3A31N   |
|                                                                                                                                       | 2-conduit         | Pg13.5 (European)          |   | D4D-5131N   |                    | D4D-5531N   |                    | D4D-5A31N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-6131N   |                                                                                                      | D4D-6531N   |                                                                                                       | D4D-6A31N   |
|                                                                                                                                       |                   |                            |                                                                                    |             |                                                                                                      |             |                                                                                                       |             |
| Roller plunger<br>                                   | 1-conduit         | Pg13.5 (European)          |   | D4D-1132N   |                    | D4D-1532N   |                    | D4D-1A32N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-2132N   |                                                                                                      | D4D-2532N   |                                                                                                       | D4D-2A32N   |
|                                                                                                                                       |                   | 1/2-14NPT (North American) |                                                                                    | D4D-3132N   |                                                                                                      | D4D-3532N   |                                                                                                       | D4D-3A32N   |
|                                                                                                                                       | 2-conduit         | Pg13.5 (European)          |   | D4D-5132N   |                    | D4D-5532N   |                    | D4D-5A32N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-6132N   |                                                                                                      | D4D-6532N   |                                                                                                       | D4D-6A32N   |
|                                                                                                                                       |                   |                            |                                                                                    |             |                                                                                                      |             |                                                                                                       |             |
| One-way roller arm lever (horizontal)<br>            | 1-conduit         | Pg13.5 (European)          |   | D4D-1162N   |                    | D4D-1562N   |                    | D4D-1A62N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-2162N   |                                                                                                      | D4D-2562N   |                                                                                                       | D4D-2A62N   |
|                                                                                                                                       |                   | 1/2-14NPT (North American) |                                                                                    | D4D-3162N   |                                                                                                      | D4D-3562N   |                                                                                                       | D4D-3A62N   |
|                                                                                                                                       | 2-conduit         | Pg13.5 (European)          |   | D4D-5162N   |                    | D4D-5562N   |                    | D4D-5A62N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-6162N   |                                                                                                      | D4D-6562N   |                                                                                                       | D4D-6A62N   |
|                                                                                                                                       |                   |                            |                                                                                    |             |                                                                                                      |             |                                                                                                       |             |
| One-way roller arm lever (vertical)<br>             | 1-conduit         | Pg13.5 (European)          |   | D4D-1172N   |                    | D4D-1572N   |                    | D4D-1A72N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-2172N   |                                                                                                      | D4D-2572N   |                                                                                                       | D4D-2A72N   |
|                                                                                                                                       |                   | 1/2-14NPT (North American) |                                                                                    | D4D-3172N   |                                                                                                      | D4D-3572N   |                                                                                                       | D4D-3A72N   |
|                                                                                                                                       | 2-conduit         | Pg13.5 (European)          |  | D4D-5172N   |                   | D4D-5572N   |                   | D4D-5A72N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-6172N   |                                                                                                      | D4D-6572N   |                                                                                                       | D4D-6A72N   |
|                                                                                                                                       |                   |                            |                                                                                    |             |                                                                                                      |             |                                                                                                       |             |
| Fork lever lock (right operation) (See Note 2)<br> | 1-conduit         | Pg13.5 (European)          | ---                                                                                | ---         | <br>(See Note 1) | D4D-15REN   | <br>(See Note 1) | D4D-1AREN   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    |             |                                                                                                      | D4D-25REN   |                                                                                                       | D4D-2AREN   |
|                                                                                                                                       |                   | 1/2-14NPT (North American) |                                                                                    |             |                                                                                                      | D4D-35REN   |                                                                                                       | D4D-3AREN   |
|                                                                                                                                       | 2-conduit         | Pg13.5 (European)          | ---                                                                                | ---         | <br>(See Note 1) | D4D-55REN   | <br>(See Note 1) | D4D-5AREN   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    |             |                                                                                                      | D4D-65REN   |                                                                                                       | D4D-6AREN   |
|                                                                                                                                       |                   |                            |                                                                                    |             |                                                                                                      |             |                                                                                                       |             |
| Fork lever lock (left operation) (See Note 2)<br>  | 1-conduit         | Pg13.5 (European)          | ---                                                                                | ---         | <br>(See Note 1) | D4D-15LEN   | <br>(See Note 1) | D4D-1ALEN   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    |             |                                                                                                      | D4D-25LEN   |                                                                                                       | D4D-2ALEN   |
|                                                                                                                                       |                   | 1/2-14NPT (North American) |                                                                                    |             |                                                                                                      | D4D-35LEN   |                                                                                                       | D4D-3ALEN   |
|                                                                                                                                       | 2-conduit         | Pg13.5 (European)          | ---                                                                                | ---         | <br>(See Note 1) | D4D-55LEN   | <br>(See Note 1) | D4D-5ALEN   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    |             |                                                                                                      | D4D-65LEN   |                                                                                                       | D4D-6ALEN   |
|                                                                                                                                       |                   |                            |                                                                                    |             |                                                                                                      |             |                                                                                                       |             |
| Cat whisker<br>                                    | 1-conduit         | Pg13.5 (European)          | ---                                                                                | D4D-1180N   | ---                                                                                                  | ---         | ---                                                                                                   | D4D-1A80N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-2180N   |                                                                                                      | ---         |                                                                                                       | D4D-2A80N   |
|                                                                                                                                       |                   | 1/2-14NPT (North American) |                                                                                    | D4D-3180N   |                                                                                                      | ---         |                                                                                                       | D4D-3A80N   |
|                                                                                                                                       | 2-conduit         | Pg13.5 (European)          | ---                                                                                | D4D-5180N   | ---                                                                                                  | ---         | ---                                                                                                   | D4D-5A80N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-6180N   |                                                                                                      | ---         |                                                                                                       | D4D-6A80N   |
|                                                                                                                                       |                   |                            |                                                                                    |             |                                                                                                      |             |                                                                                                       |             |
| Plastic rod<br>                                    | 1-conduit         | Pg13.5 (European)          | ---                                                                                | D4D-1187N   | ---                                                                                                  | ---         | ---                                                                                                   | D4D-1A87N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-2187N   |                                                                                                      | ---         |                                                                                                       | D4D-2A87N   |
|                                                                                                                                       |                   | 1/2-14NPT (North American) |                                                                                    | D4D-3187N   |                                                                                                      | ---         |                                                                                                       | D4D-3A87N   |
|                                                                                                                                       | 2-conduit         | Pg13.5 (European)          | ---                                                                                | D4D-5187N   | ---                                                                                                  | ---         | ---                                                                                                   | D4D-5A87N   |
|                                                                                                                                       |                   | G1/2 (Japanese)            |                                                                                    | D4D-6187N   |                                                                                                      | ---         |                                                                                                       | D4D-6A87N   |
|                                                                                                                                       |                   |                            |                                                                                    |             |                                                                                                      |             |                                                                                                       |             |

Note: 1. The Switches are marked with  indicating approval by TÜV Rheinland for the positive opening mechanism. Adjustable roller lever and fork lever lock models are approved by TÜV Rheinland for the positive opening mechanism, but not by the GS-ET-15 standard (BIA) nor by SUVA.

2. Right operation: Contact 11-12 is positively opened, when the lever on the right is lowered.  
Left operation: Contact 11-1 (Japanese) 2 is positively opened, when the lever on the left is lowered.

# Specifications

## ■ APPROVED STANDARD RATINGS

TÜV (EN60947-5-1)

|                                           |       |
|-------------------------------------------|-------|
| Utilization category                      | AC-15 |
| Rated operating current (I <sub>e</sub> ) | 2 A   |
| Rated operating voltage (U <sub>e</sub> ) | 400 V |

Note: As protection against short-circuiting, use either a gI-type or gG-type 10-A fuse that conforms to IEC269.

**UL/CSA (UL508/CSA C22.2 No. 14)**  
**A600 (D4D-□5□□N, D4D-□A□□N)**

| Type        | Rated voltage                            | Carry current | Current                               |                              | Volt-amperes |        |
|-------------|------------------------------------------|---------------|---------------------------------------|------------------------------|--------------|--------|
|             |                                          |               | Make                                  | Break                        | Make         | Break  |
| Slow-action | 120 VAC<br>240 VAC<br>480 VAC<br>600 VAC | 10 A          | 60 A<br>30 A<br>15 A<br>7.5 A<br>12 A | 6 A<br>3 A<br>1.5 A<br>1.2 A | 7,200 VA     | 720 VA |

**B600 (D4D-□1□□N)**

| Type        | Rated voltage                            | Carry current | Current                      |                                 | Volt-amperes |        |
|-------------|------------------------------------------|---------------|------------------------------|---------------------------------|--------------|--------|
|             |                                          |               | Make                         | Break                           | Make         | Break  |
| Snap-action | 120 VAC<br>240 VAC<br>480 VAC<br>600 VAC | 5 A           | 30 A<br>15 A<br>7.5 A<br>6 A | 3 A<br>1.5 A<br>0.75 A<br>0.6 A | 3,600 VA     | 360 VA |

## ■ CHARACTERISTICS

|                                                           |                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Degree of protection                                      | IP65 (EN60947-5-1)                                                                                                                                                                                                                                                                                                                                        |
| Life expectancy (see note 2)                              | Mechanical: 15,000,000 operations min. (see note 3)<br>Electrical: 150,000 operations min. (Refer to <i>Operating Characteristics</i> for snap-action.)                                                                                                                                                                                                   |
| Operating speed                                           | 1 mm/s to 0.5 m/s (with D4D-1120N)                                                                                                                                                                                                                                                                                                                        |
| Contact gap                                               | Snap-action: 2 x 0.5 mm min.<br>Slow-action: 2 x 2 mm min.                                                                                                                                                                                                                                                                                                |
| Operating frequency                                       | Mechanical: 120 operations/min min.<br>Electrical: 30 operations/min min.                                                                                                                                                                                                                                                                                 |
| Rated frequency                                           | 50/60 Hz                                                                                                                                                                                                                                                                                                                                                  |
| Insulation resistance                                     | 100 M $\Omega$ min. (at 500 VDC) between terminals of the same polarity and between each terminal and non-current-carrying metal parts                                                                                                                                                                                                                    |
| Contact resistance                                        | 25 m $\Omega$ max. (initial value)                                                                                                                                                                                                                                                                                                                        |
| Dielectric strength                                       | Snap-action<br>U <sub>imp</sub> 2.5 kV between terminals of the same polarity<br>U <sub>imp</sub> 4 kV between each terminal and non-current-carrying metal parts<br>Slow-action<br>U <sub>imp</sub> 4 kV between terminals of the same polarity, between terminals of different polarity, and between each terminal and non-current-carrying metal parts |
| Rated insulation voltage (U <sub>i</sub> )                | 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 <sub>the</sub> ) | 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 <sup>2</sup> min.<br>Malfunction: 300 m/s <sup>2</sup> min.                                                                                                                                                                                                                                                                        |
| Ambient temperature                                       | Operating: -30°C to 70°C (with no icing)                                                                                                                                                                                                                                                                                                                  |
| Ambient humidity                                          | Operating: 95% max.                                                                                                                                                                                                                                                                                                                                       |
| Weight                                                    | Approx. 70 g (for D4D-1120N)<br>Approx. 86 g (for D4D-5120N)                                                                                                                                                                                                                                                                                              |

Note: 1. The above figures are initial values.

- Life expectancy values are calculated at an operating temperature of 5 to 35°C, and an operating humidity of 40 to 70%. Contact your OMRON sales representative for more detailed information on other operating environments.
- The mechanical life expectancy of the fork lever lock model is 10,000,000 operations min.

## ■ OPERATING CHARACTERISTICS

### Snap-Action (1NC/1NO), Slow-Action (2NC)

#### 1-Conduit and 2-Conduit Models

| Model                    | D4D-□120N<br>D4D-□A20N | D4D-□121N<br>D4D-□A21N<br>(see note 1) | D4D-□122N<br>D4D-□A22N | D4D-□127N<br>D4D-□A27N<br>(see note 2) | D4D-□131N<br>D4D-□A31N | D4D-□132N<br>D4D-□A32N | D4D-□162N<br>D4D-□A62N | D4D-□172N<br>D4D-□A72N | D4D-□180N<br>D4D-□A80N | D4D-□187N<br>D4D-□A87N |
|--------------------------|------------------------|----------------------------------------|------------------------|----------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| OF max.                  | 4.90 N                 | 4.22 N                                 | 4.90 N                 | 4.22 N                                 | 6.37 N                 |                        | 3.92 N                 | 4.41 N                 | 1.47 N                 |                        |
| RF min.                  | 0.49 N                 | 0.42 N                                 | 0.49 N                 | 0.42 N                                 | 1.47 N                 |                        | 0.78 N                 | 0.88 N                 | ---                    |                        |
| PT                       | 18° to 27°             |                                        |                        |                                        | 2 mm max.              |                        | 4 mm max.              |                        | 15° max.               |                        |
| OT min.                  | 40°                    |                                        |                        |                                        | 4 mm                   |                        | 5 mm                   |                        | ---                    |                        |
| MD max.<br>(see note 3)  | 14°                    |                                        |                        |                                        | 1 mm                   | 1 mm                   | 1.5 mm                 |                        | ---                    |                        |
| OP                       | ---                    |                                        |                        |                                        | 18.2±0.5 mm            | 28.2±0.8 mm            | 37±0.8 mm              | 27±0.8 mm              | ---                    |                        |
| TT<br>(see note 4)       | 70°                    |                                        |                        |                                        | 6 mm                   |                        | 9 mm                   |                        | ---                    |                        |
| POT min.<br>(see note 5) | 50°                    |                                        |                        |                                        | 3.2 mm                 |                        | 5.8 mm                 | 4.8 mm                 | ---                    |                        |
| POF min.<br>(see note 5) | 19.61 N                |                                        |                        |                                        | 19.61 N                |                        |                        |                        | ---                    |                        |

- 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. Only for snap-action models.  
 4. Nominal value.  
 5. Only for slow-action models. POT (positive opening travel) and POF (positive opening force) are required values for positive opening.

### Slow-Action (1NC/1NO)

#### 1-Conduit and 2-Conduit Models

| Model                    | D4D-□520N  | D4D-□521N<br>(see note 1) | D4D-□522N | D4D-□527N<br>(see note 2) | D4D-□531N | D4D-□532N   | D4D-□562N | D4D-□572N |
|--------------------------|------------|---------------------------|-----------|---------------------------|-----------|-------------|-----------|-----------|
| OF max.                  | 4.90 N     | 4.22 N                    | 4.90 N    | 4.22 N                    | 6.37 N    |             | 3.92 N    | 4.41 N    |
| RF min.                  | 0.49 N     | 0.42 N                    | 0.49 N    | 0.42 N                    | 1.47 N    |             | 0.78 N    | 0.88 N    |
| PT<br>(see note 3)       | 18° to 27° |                           |           |                           | 2 mm max. |             | 4 mm max. |           |
| PT (2nd)<br>(see note 4) | (44°)      |                           |           |                           | (2.9 mm)  |             | (5.2 mm)  | (4.3 mm)  |
| OT min.                  | 40°        |                           |           |                           | 4 mm      |             | 5 mm      |           |
| OP                       | ---        |                           |           |                           | 18±0.5 mm | 28.2±0.8 mm | 37±0.8 mm | 27±0.8 mm |
| TT<br>(see note 5)       | 70°        |                           |           |                           | 6 mm      |             | (9 mm)    |           |
| POT min.<br>(see note 6) | 50°        |                           |           |                           | 3.2 mm    |             | 5.8 mm    | 4.8 mm    |
| POF min.<br>(see note 6) | 19.61 N    |                           |           |                           | 19.61 N   |             |           |           |

- 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. Measured with NC side in the OFF state.  
 4. PT (2nd) is the distance required before NO contact occurs.  
 PT (2nd) is the reference value.  
 5. Nominal value.  
 6. POT (positive opening travel) and POF (positive opening force) are required values for positive opening.

### Slow-Action (1NC/1NO), Slow-Action (2NC)

#### 1-Conduit and 2-Conduit Models

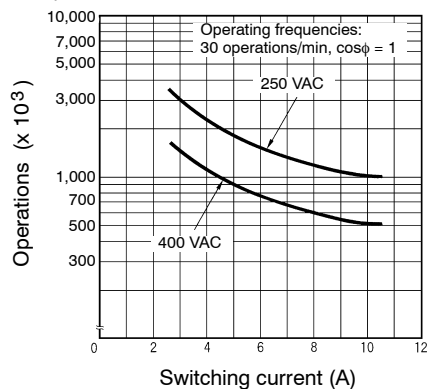
| Model                                                       | D4D-□□REN  | D4D-□□LEN |
|-------------------------------------------------------------|------------|-----------|
| Force necessary to reverse the direction of the lever: max. | 6.37 N     |           |
| Movement until the lever reverses                           | 45° to 65° |           |
| Movement until switch operation (NC)                        | (6.5°)     |           |
| Movement until switch operation (NO)                        | (18.5°)    |           |
| POT min.                                                    | 30°        |           |
| POF min.                                                    | 19.61 N    |           |

Note: POT (positive opening travel) and POF (positive opening force) are required values for positive opening.

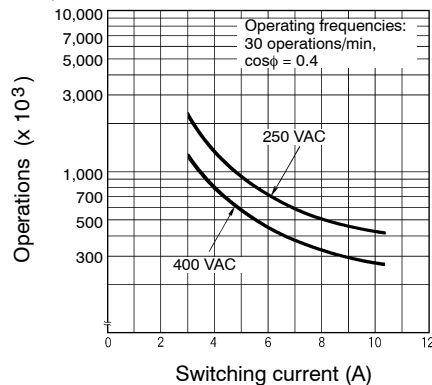
# Engineering Data

## ■ ELECTRICAL LIFE EXPECTANCY (1NC/1NO CONTACT, SNAP-ACTION)

( $\cos\phi = 1$ )



( $\cos\phi = 0.4$ )



## Nomenclature

### Head

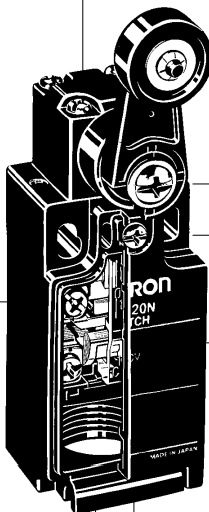
With roller lever models, the direction of the switch head can be varied to any of the four directions by loosening the roller lever switch screws at the four corners of the head.

### Built-in Switch

Wide switch variations.  
Snap-action: 1NC/1NO  
Slow-action: 1NC/1NO  
2NC

### Conduit Opening

Available in two different types of conduit threads:  
Pg 13.5: European standard (1-conduit, 2-conduit)  
G 1/2: Japanese standard (1-conduit, 2-conduit)  
1/2-14NPT: US standard (1-conduit)



### 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. There are resin-lever and metal-lever types.

### Cover

Easy to open and wire. (One mounting screw and opposite side is for hinge mounting.)

### Contact Material

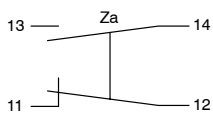
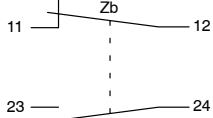
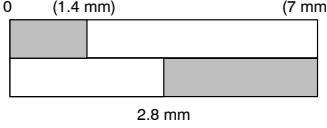
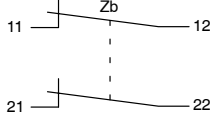
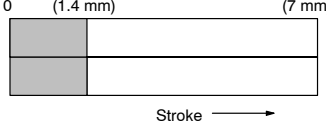
Ag alloy

### Conduit Cap

Can be used as a simple connector under good environmental conditions.

# Operation

## ■ CONTACT FORM (EN60947-5-1,EN50013)

| Model    | Contact                  | Diagrams (see note)                                                                                                                                                  | Remarks                                                                                                                                         |
|----------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| D4D-□1□N | 1NC/1NO<br>(snap-action) |   | <p>Only NC contact 11-12 has an approved positive opening mechanism. →</p> <p>Terminals 11-12 and 13-14 cannot be used as unlike poles.</p>     |
| D4D-□5□N | 1NC/1NO<br>(slow-action) |   | <p>Only NC contact 11-12 has an approved positive opening mechanism. →</p> <p>Terminals 11-12 and 23-24 can be used as unlike poles.</p>        |
| D4D-□A□N | 2NC<br>(slow-action)     |   | <p>NC contacts 11-12 and 23-24 have an approved positive opening mechanism. →</p> <p>Terminals 11-12 and 21-22 can be used as unlike poles.</p> |

Note: 1. Contact operation

 Closed
  Open

2. Terminals are numbered according to EN50013. Contact forms are according to EN60947-5-1.

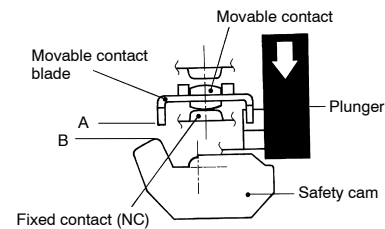
## ■ POSITIVE OPENING MECHANISM

### 1NC/1NO Contact (Snap-Action)

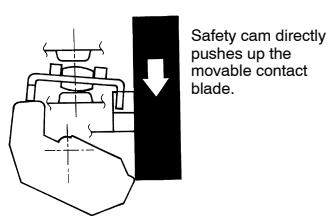
Conforms to EN60947-5-1 Positive Opening 

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

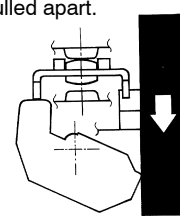
1. When metal deposition occurs.



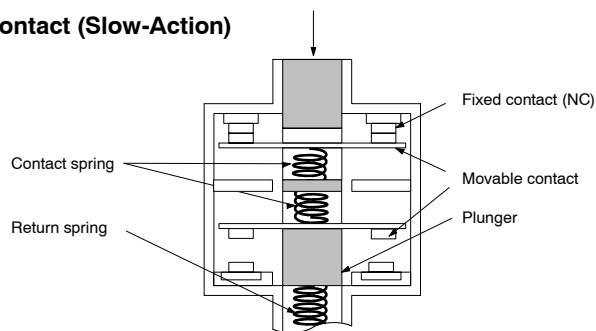
2. When contacts are being pulled apart.



3. When contacts are completely pulled apart.



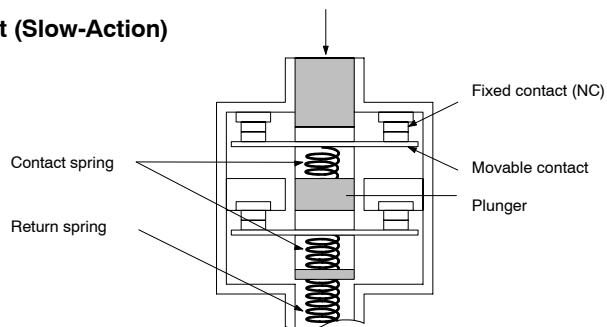
### 1NC/1NO Contact (Slow-Action)



Conforms to EN60947-5-1 Positive Opening 

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

### 2NC Contact (Slow-Action)



Conforms to EN60947-5-1 Positive Opening 

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

# Dimensions

Unit: mm

## SWITCHES

### 1-Conduit Models

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

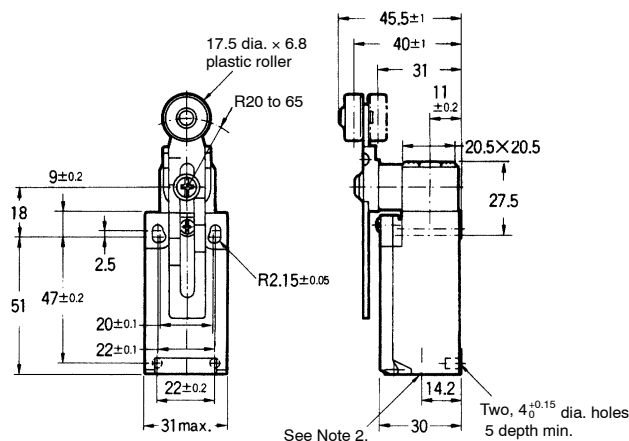
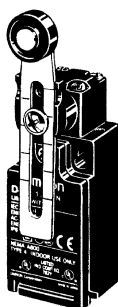
2. When placing your order, refer to the Model Number Legend in *Ordering Information* in order to correctly specify the conduit type. (The code number for the conduit type will fill the blank box within the model numbers shown below.)

#### Adjustable Roller Lever

D4D-□121N

D4D-□521N

D4D-□A21N

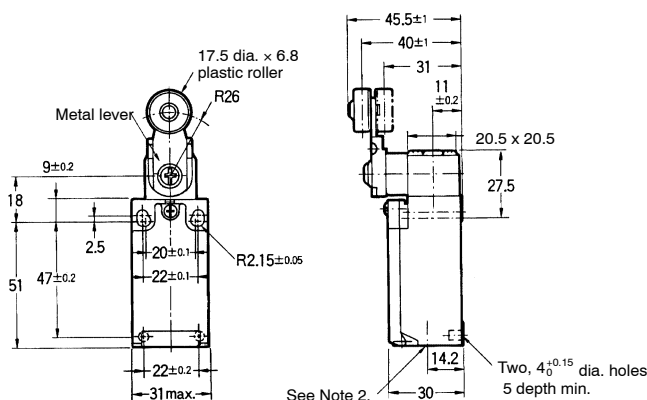


#### Roller Lever (Metal Lever)

D4D-□122N

D4D-□522N

D4D-□A22N

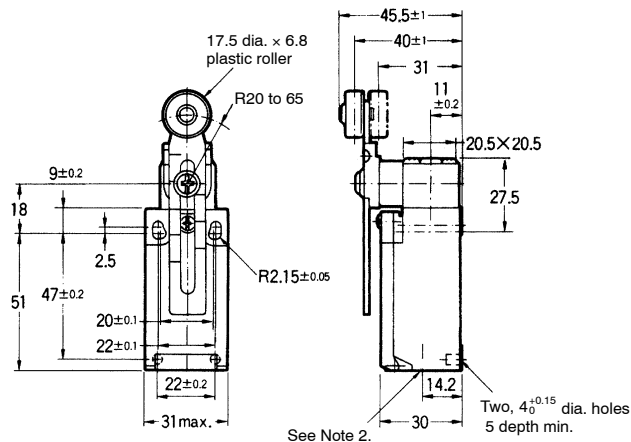
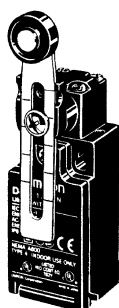


#### Adjustable Roller Lever

D4D-□121N

D4D-□521N

D4D-□A21N

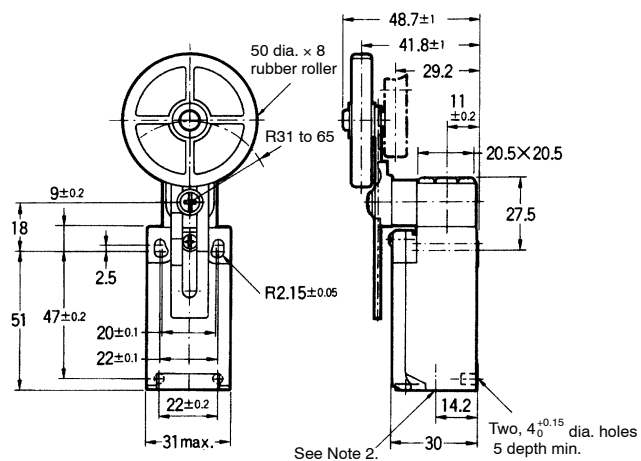
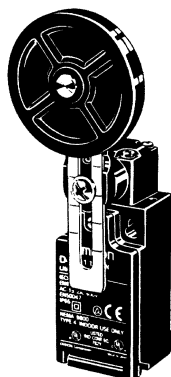


### Adjustable Roller Lever (with Rubber Roller)

D4D-□127N

D4D-□527N

D4D-□A27N

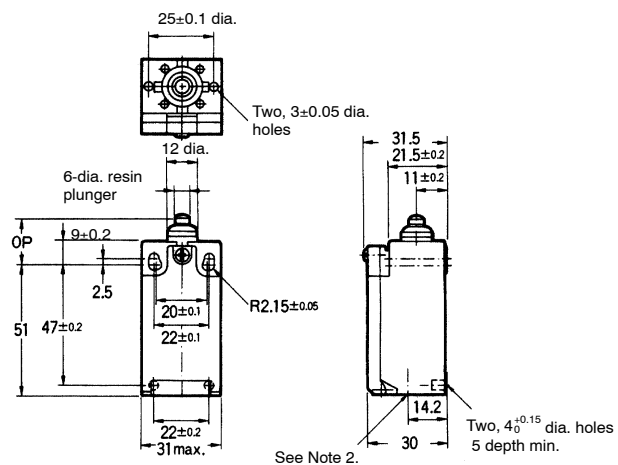


### Plunger

D4D-□131N

D4D-□531N

D4D-□A31N

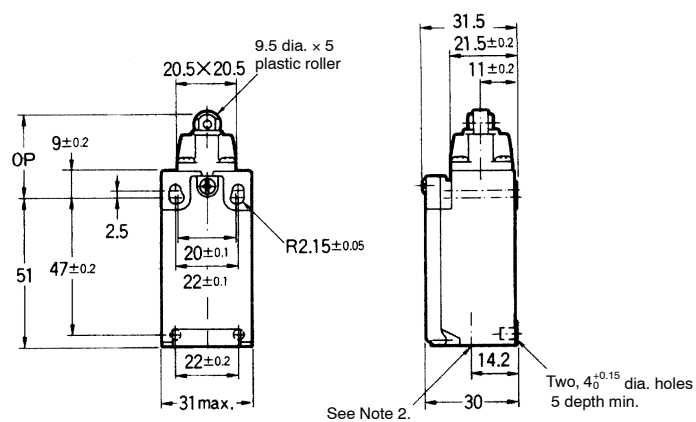


### Roller Plunger

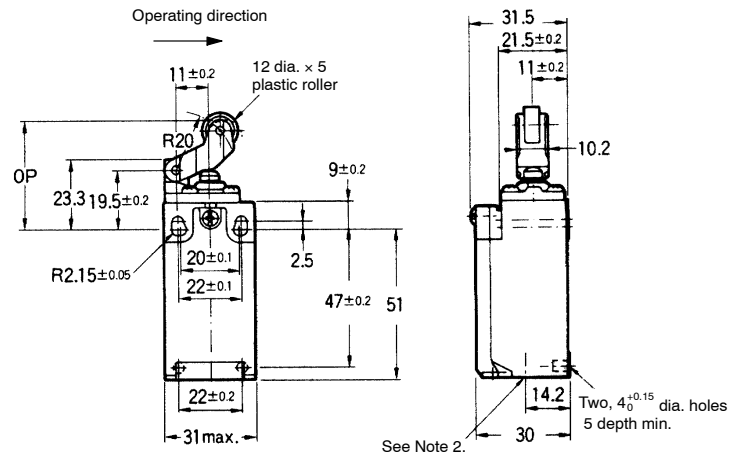
D4D-□132N

D4D-□532N

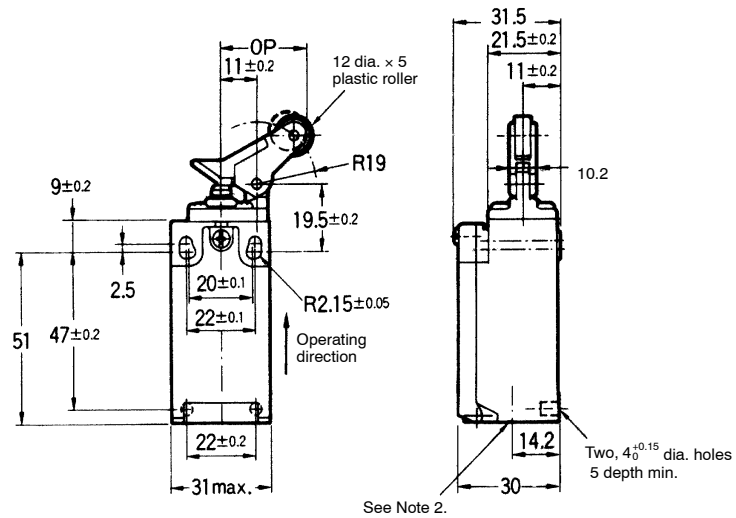
D4D-□A32N



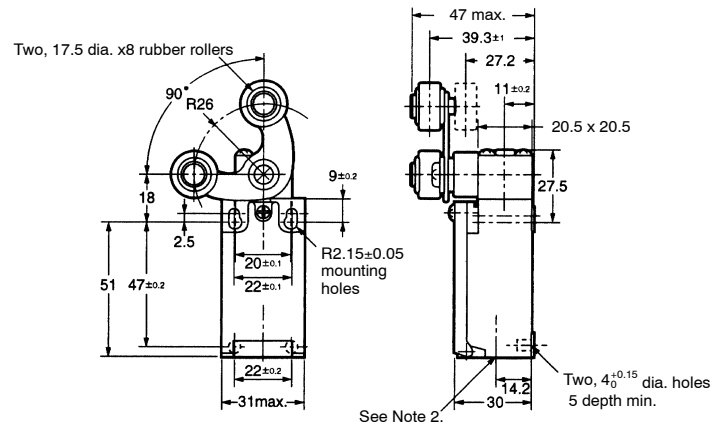
**One-Way Roller Arm Lever  
(Horizontal)**  
D4D-□162N  
D4D-□562N  
D4D-□A62N



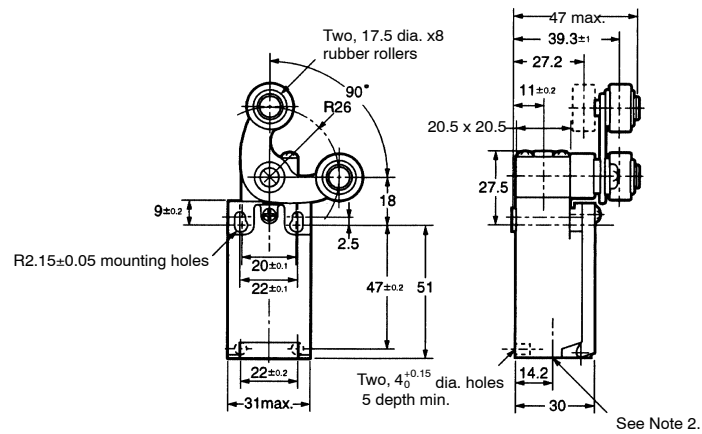
**One-Way Roller Arm Lever  
(Vertical)**  
D4D-□172N  
D4D-□572N  
D4D-□A72N



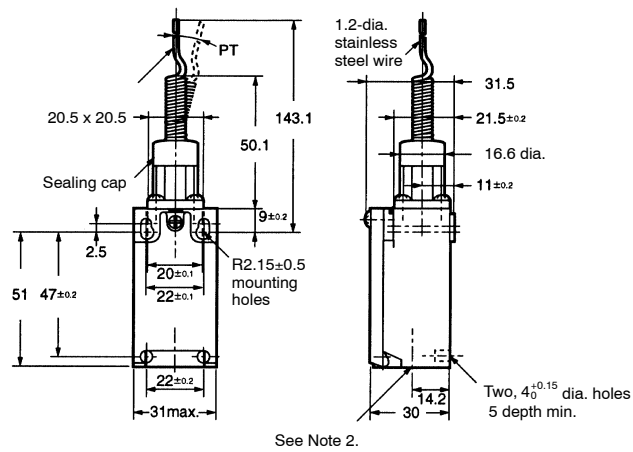
**Fork Lever Lock  
(Right Operation)**  
D4D-15REN



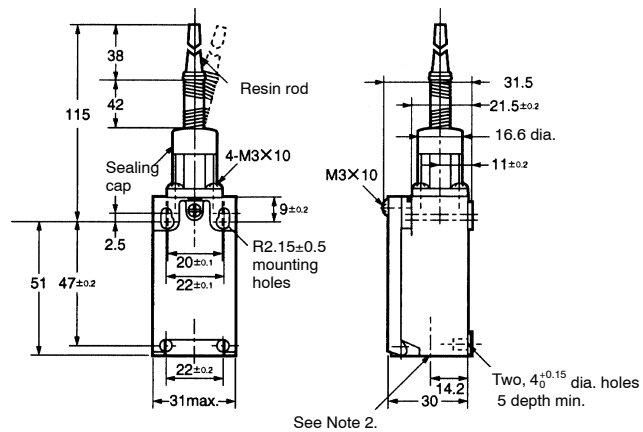
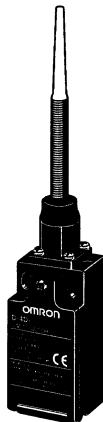
### Fork Lever Lock (Left Operation) D4D-15LEN



### Cat Whisker D4D-□□80N



### Plastic Rod D4D-□□87N



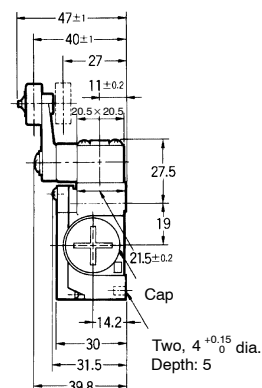
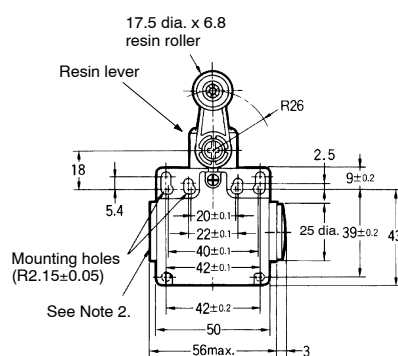
## 2-Conduit Models

### Roller Lever (Resin Lever)

D4D-□120N

D4D-□520N

D4D-□A20N

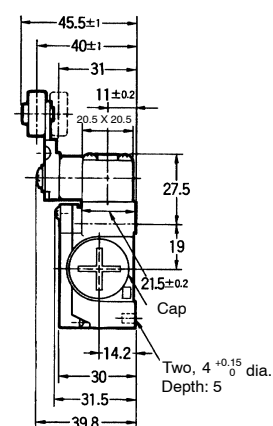
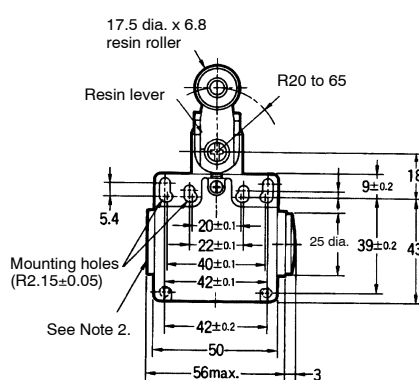
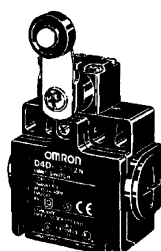


### Roller Lever (Metal Lever)

D4D-□122N

D4D-□522N

D4D-□A22N

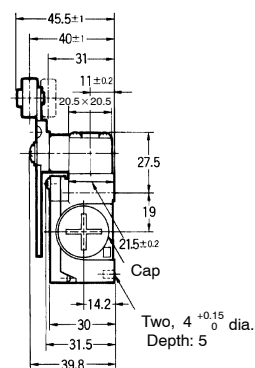
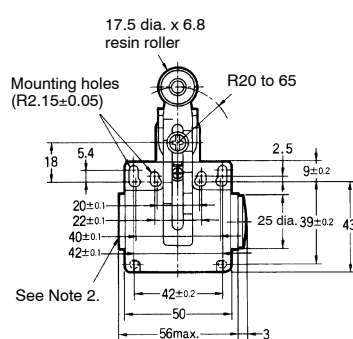
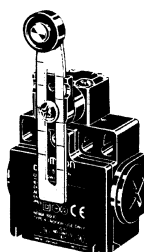


### Adjustable Roller Lever

D4D-□121N

D4D-□521N

D4D-□A21N

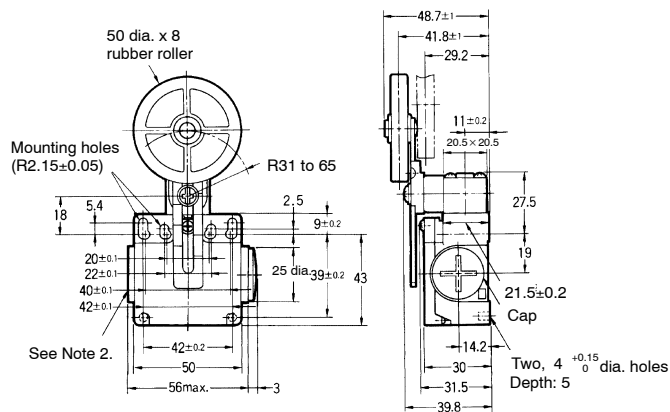
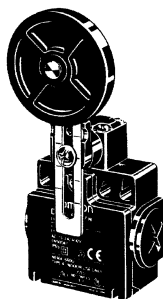


### Adjustable Roller Lever (Rubber Roller Lever)

D4D-□127N

D4D-□527N

D4D-□A27N

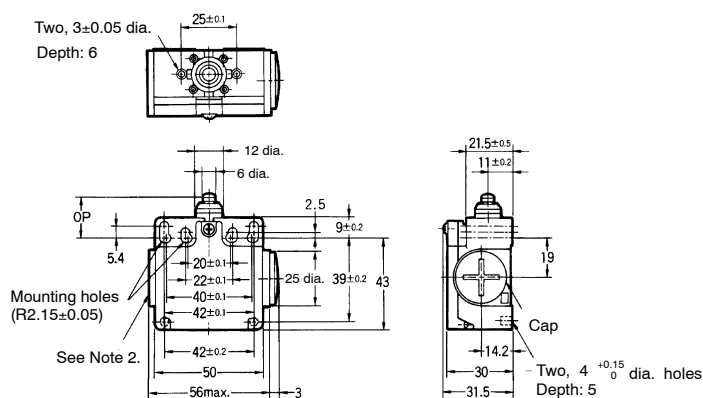


### Plunger

D4D-□131N

D4D-□531N

D4D-□A31N

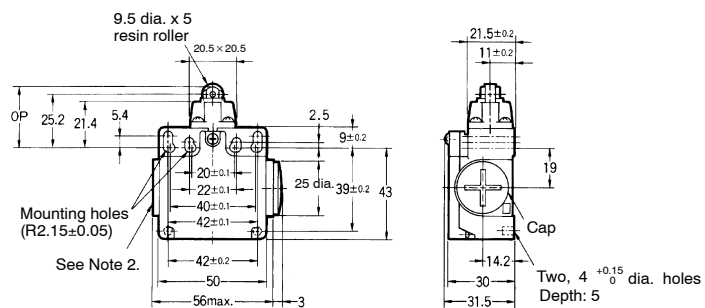
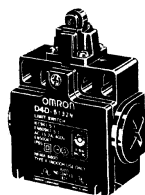


### Roller Plunger

D4D-□132N

D4D-□532N

D4D-□A32N

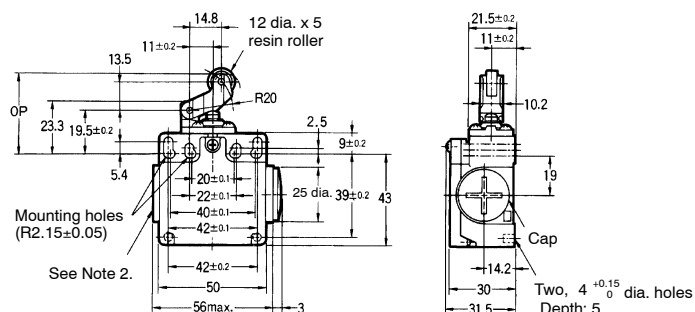
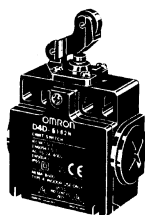


**One-Way Roller Arm Lever  
(Horizontal)**

D4D-□162N

D4D-□562N

D4D-□A62N

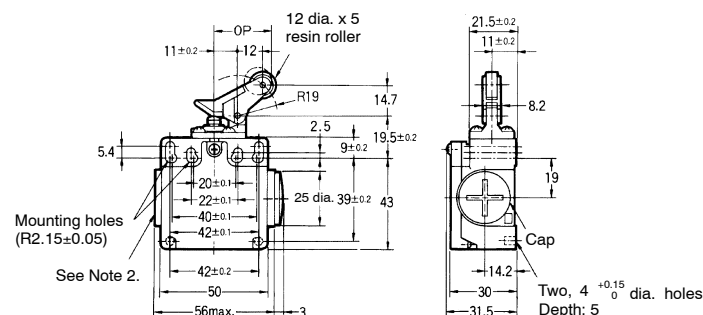


**One-Way Roller Arm Lever  
(Vertical)**

D4D-□172N

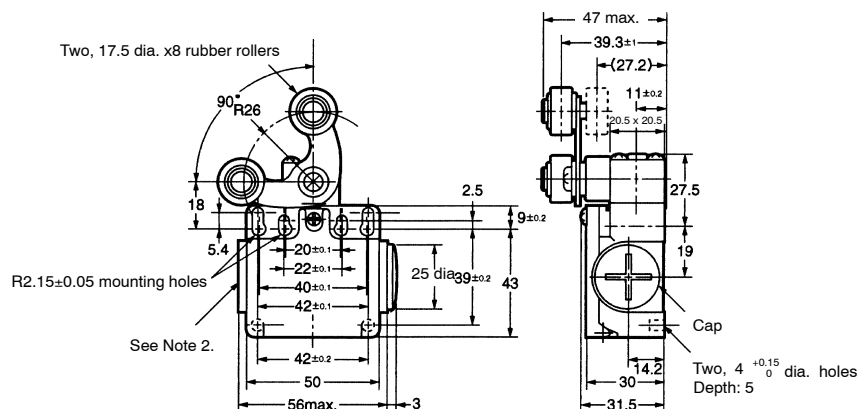
D4D-□572N

D4D-□A72N



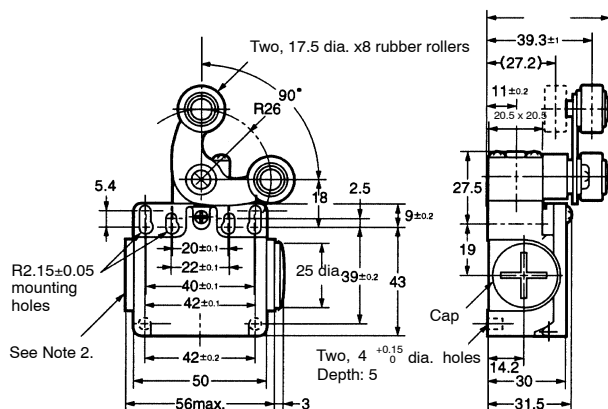
**Fork Lever Lock  
(Right Operation)**

D4D-55REN

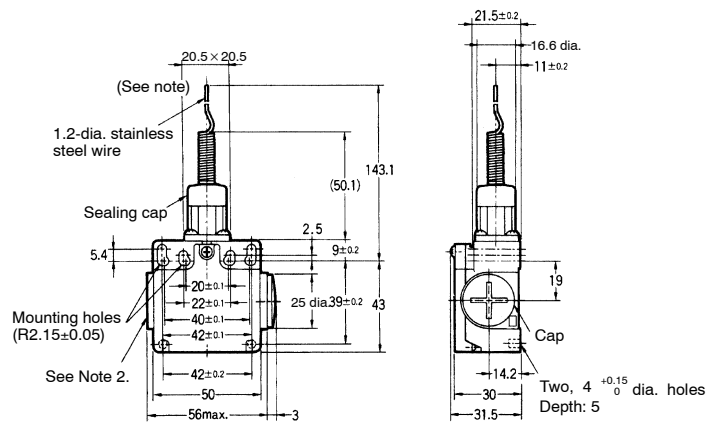
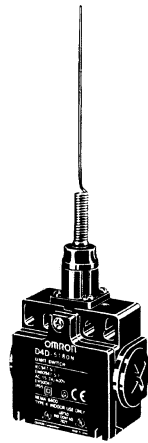


**Fork Lever Lock  
(Left Operation)**

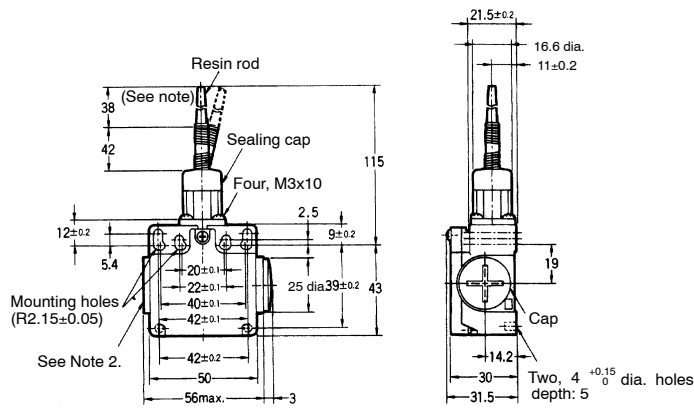
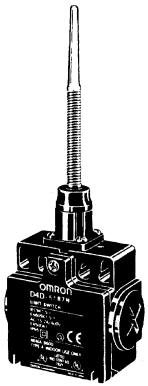
D4D-55LEN



Cat Whisker  
D4D-□180N  
D4D-□A80N



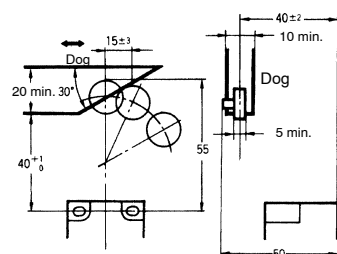
Plastic Rod  
D4D-□187N  
D4D-□A87N



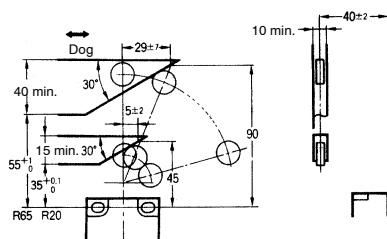
## LEVERS

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

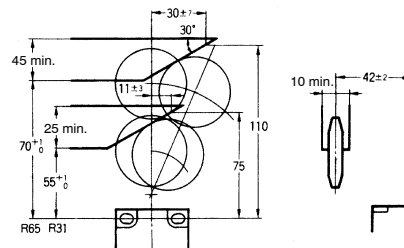
**Roller Lever**  
D4D-□□20N,  
D4D-□□22N



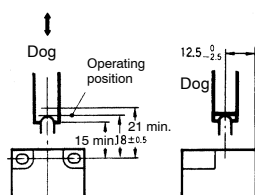
**Adjustable Roller Lever**  
D4D-□□21N  
(Reference Value)



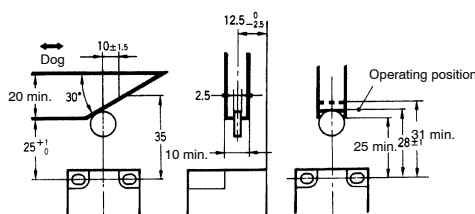
**Adjustable Roller Lever**  
**Rubber Roller Lever**  
D4D-□□27N  
(Reference Value)



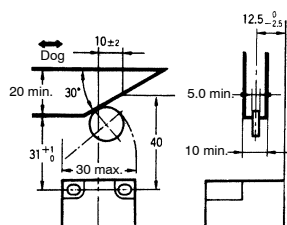
**Sealed Plunger**  
(D4D-□□31N)



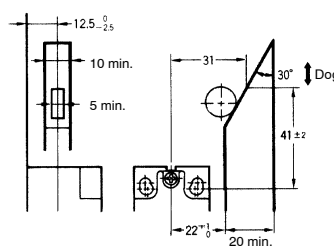
**Roller Plunger**  
(D4D-□□32N)



**One-way Roller Arm Lever**  
(Horizontal)  
D4D-□□62N



**One-way Roller Arm Lever**  
(Vertical)  
D4D-□□72N



## Precautions



### CAUTION

Do not use metal connectors or conduits to wire the Limit Switch, otherwise the conduit of the Limit Switch may break and an electric shock may be received.

- If the D4D-□N is applied to an emergency stop circuit or safety circuit for prevention of injury, use a D4D-□N model that has an NC contact equipped with a force-separation mechanism, and make sure that the D4D-□N operates in the positive mode. Furthermore, secure the D4D-□N with screws or equivalent parts that are tightened in a single direction so that the D4D-□N cannot be easily removed. Then provide a protection cover for the D4D-□N and post a warning label near the D4D-□N.
- 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 in order to protect the Limit Switch from damage due to short-circuiting.
- When using the Limit Switch for the EN ratings, use the gl or gG 10-A fuse.

## CORRECT USE

### Operating Environment

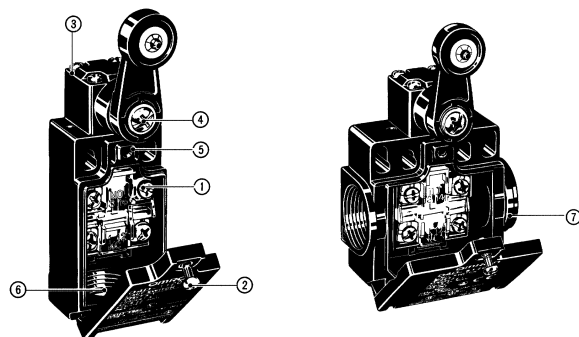
The Limit Switch is intended for indoor use only. Using the Limit Switch outdoors may result in a malfunction.

### 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<br>1.37 to 1.77 N • m<br>(see note) |
| 7   | Cap screw                  | 1.27 to 1.67 N • m                                     |

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

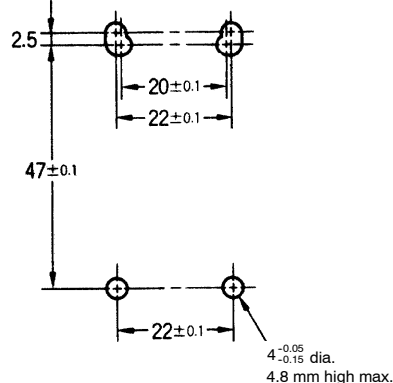


## Mounting

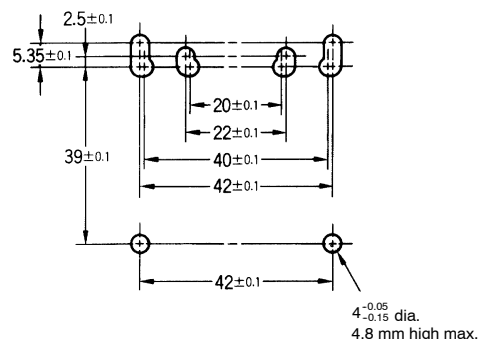
Fasten the Switch with two M4 Allen-head bolts and washers. Provide a stud with a diameter of  $4^{+0.05}_{-0.15}$  and a height of 4.8 mm max. at two places as shown below so that the Switch is firmly fixed at four points.

### Mounting Holes/Studs

#### 1-Conduit Models



#### 2-Conduit Models



### Changing the Lever Angle

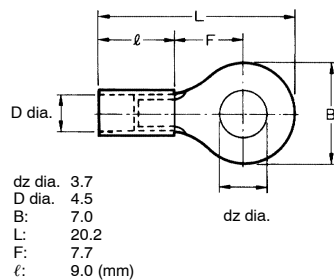
- To change the angle of the lever, loosen the lever mounting screw. Then the lever can be set at any angle in 7.5° increments.
- The length of a variable roller lever can be changed by loosening the lever mounting screw.
- The lever mounting position may be inside out after removing the lever mounting screw. Make sure that the lever will not touch the Switch when the lever is mounted inside out.

### Changing the Head Direction

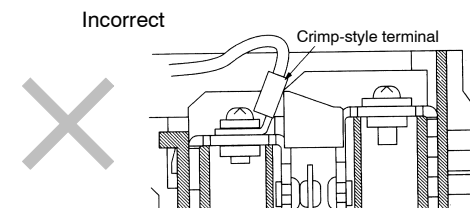
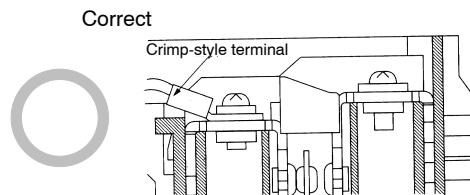
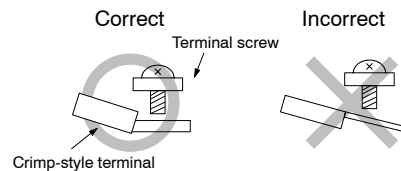
If the head direction has been changed, check the torque of each screw and make sure that the screws are free of foreign substances, and that each screw is tightened to the proper torque.

### 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<sup>2</sup>) in size.



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



### Processing the Conduit Opening

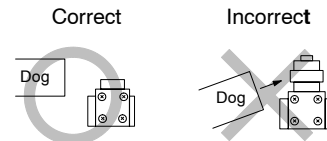
Tighten the connector to a torque of 1.8 to 2.2 N • m (1.37 to 1.77 N • m if it is a 1/2-14NPT). Excessive tightening torque may damage the casing. To satisfy IP65, apply sealing tape to the connector conduit.

The diameter of the cable must be suited to the corresponding connector.

When performing wiring, close conduit openings in any places that will not be used using the cap screws provided as accessories. Tighten the screws to the applicable torque.

### Applying the Load

Applying a load to the switch actuator (roller) from a slanted direction may deform or damage the actuator, or deform or damage the rotary spindle, so make sure that the dog is straight.



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.

### Recommended Connector

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

Note: 1. LAPP is a German manufacturer.

2. Ohm Denki is a Japanese manufacturer.

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



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