

# Enclosed Switch D4MC

## Economical, High Utility Enclosed Switch

- High precision and long life (10,000,000 mechanical operations) through employment of the moving spring used in OMRON Z Basic Switch.
- Sealed with gasket diaphragm to provide high sealing property without use of any adhesive or pin.
- Suitable for applications demanding higher mechanical strength, dustproof and drip-proof properties than those on basic switches.
- Panel mount versions have the same operating position as Z Basic Switch.
- Resin molded terminal versions are available.
- Approved by UL, CSA, and CCC (Chinese standard).



## Model Number Structure

### ■ Model Number Legend

D4MC-   
1

#### 1. Actuator

- 5000: Panel mount plunger
- 5020: Panel mount roller plunger
- 5040: Panel mount crossroller plunger
- 1020: Short hinge lever
- 1000: Hinge lever
- 2000: Hinge roller lever
- 2020: Short hinge roller lever
- 3030: One-way action short hinge roller lever

# Ordering Information

## ■ List of Models

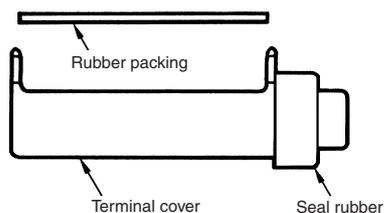
| Actuator                                |   | Model     |
|---|---|-----------|
| Panel mount plunger                     |  | D4MC-5000 |
| Panel mount roller plunger              |  | D4MC-5020 |
| Panel mount crossroller plunger         |  | D4MC-5040 |
| Short hinge lever                       |  | D4MC-1020 |
| Hinge lever                             |  | D4MC-1000 |
| Hinge roller lever                      |  | D4MC-2000 |
| Short hinge roller lever                |  | D4MC-2020 |
| One-way action short hinge roller lever |  | D4MC-3030 |

**Note:** Use molded terminal models (refer to page 100) when using the Switch under one of the following conditions:

- a) dusty, b) high amount of dripping oil, or c) high humidity

## ■ Terminal Protective Cover, Seal Rubber, and Rubber Packing

(The Switch is equipped with these 3 items as a standard.)



- ZC Terminal Cover  
(Product code: ZC55-0002H)
- ZC Seal Rubber  
(Product code: SC-1404C)
- ZC Rubber Packing  
(Product code: ZC55-0003F)

# Specifications

## ■ Approved Standards (Except Molded Terminal Models)

| Agency    | Standard     | File No.         |
|-----------|--------------|------------------|
| UL        | 508          | E76675           |
| CSA       | C22.2 No. 14 | E45258           |
| CCC (CQC) | GB14048.5    | 2003010303077627 |

**Note:** Ask your OMRON representative for information on approved models.

## ■ Approved Standard Ratings

### UL/CSA

#### 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   |              |        |

### EN60947-1 and EN60947-5-1

250 V, 10 A (AC12) (Tested by ASTA)

### CCC (GB14048.5)

| Applicable category and ratings |
|---------------------------------|
| AC-12 10 A/250 VAC              |

## ■ General Ratings

| Rated voltage | Non-inductive load |    |           |        | Inductive load |    |            |        |
|---------------|--------------------|----|-----------|--------|----------------|----|------------|--------|
|               | Resistive load     |    | Lamp load |        | Inductive load |    | Motor load |        |
|               | NC                 | NO | NC        | NO     | NC             | NO | NC         | NO     |
| 125 VAC       | 10 A               |    | 3 A       | 1.5 A  | 10 A           |    | 5 A        | 2.5 A  |
| 250 VAC       | 10 A               |    | 2.5 A     | 1.25 A | 10 A           |    | 3 A        | 1.5 A  |
| 480 VAC       | 3 A                |    | 1.5 A     | 0.75 A | 2.5 A          |    | 1.5 A      | 0.75 A |
| 8 VDC         | 10 A               |    | 3 A       | 1.5 A  | 6 A            |    | 5 A        | 2.5 A  |
| 14 VDC        | 10 A               |    | 3 A       | 1.5 A  | 6 A            |    | 5 A        | 2.5 A  |
| 30 VDC        | 6 A                |    | 3 A       | 1.5 A  | 5 A            |    | 5 A        | 2.5 A  |
| 125 VDC       | 0.5 A              |    | 0.4 A     | 0.4 A  | 0.05 A         |    | 0.05 A     | 0.05 A |
| 250 VDC       | 0.25 A             |    | 0.2 A     | 0.2 A  | 0.03 A         |    | 0.03 A     | 0.03 A |

| Inrush current | NC | 30 A max. |
|----------------|----|-----------|
|                | NO | 15 A max. |

- Note:**
- The above figures are for steady-state currents.
  - Inductive loads have a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
  - Lamp load has an inrush current of 10 times the steady-state current.
  - Motor load has an inrush current of 6 times the steady-state current.
  - The above ratings were tested under the following conditions.  
 Ambient temperature: 20±2°C  
 Ambient humidity: 65±5%  
 Operating frequency: 20 operations/min

Limit switches

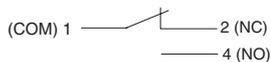
## ■ Characteristics

|  |  |
|--|--|
| Degree of protection                       | IP67   |
| Durability                                 | Mechanical: 10,000,000 operations min.<br>Electrical: 500,000 operations min.  |
| Operating speed                            | 0.05 mm/s to 0.5 m/s (for plunger models)  |
| Operating frequency                        | Mechanical: 120 operations/min<br>Electrical: 20 operations/min  |
| Rated frequency                            | 50/60 Hz   |
| Insulation resistance                      | 100 MΩ min. (at 500 VDC)   |
| Contact resistance                         | 15 mΩ max. (initial value)   |
| Dielectric strength                        | 1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarity<br>2,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying part |
| Rated insulation voltage (U <sub>i</sub> ) | 1,000 VAC  |
| Pollution degree (operating environment)   | 3 (IEC947-5-1)   |
| Protection against electric shock          | Class II   |
| PTI (tracking characteristics)             | 175  |
| Switch category                            | D (IEC335)   |
| Rated operating current (I <sub>e</sub> )  | 10 A   |
| Rated operating voltage (U <sub>e</sub> )  | 250 VAC  |
| Vibration resistance                       | Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note)   |
| Shock resistance                           | Destruction: 1,000 m/s <sup>2</sup> min.<br>Malfunction: 100 m/s <sup>2</sup> min. (for plunger models) (see note)   |
| Ambient temperature                        | Operating: -10°C to 80°C (with no icing)   |
| Ambient humidity                           | Operating: 35% to 95%  |
| Weight                                     | Approx. 71 g (at panel mount plunger)  |

**Note:** Less than 1 ms under a free state at the operating limits.

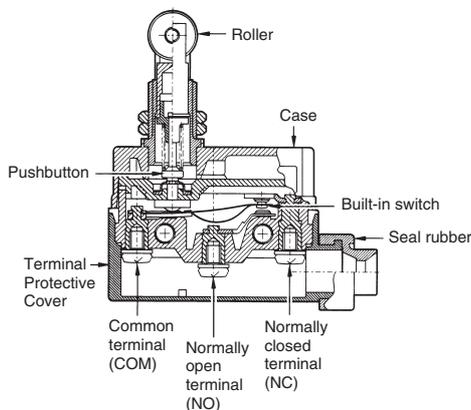
## Connections

### ■ Contact Form



## Nomenclature

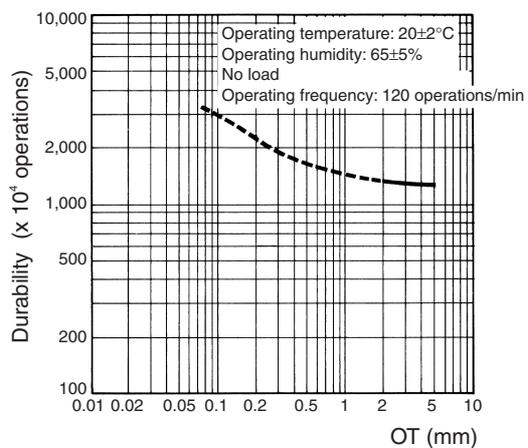
Changing the Terminal Protective Cover around allows the cable to be pulled out from either the right or the left.



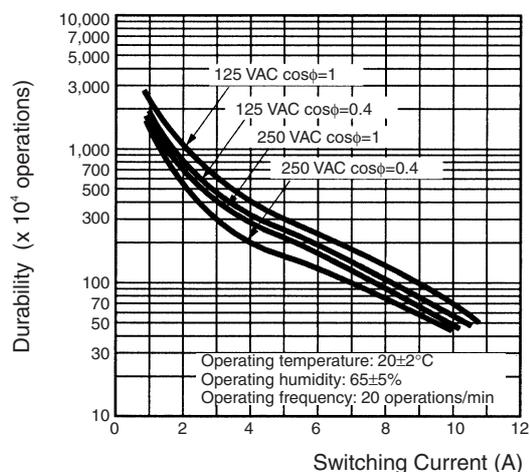
**Note:** M4 binding head screws (with toothed washers) are used as the terminal screws.

# Engineering Data

## ■ Mechanical Durability (D4MC-5000)



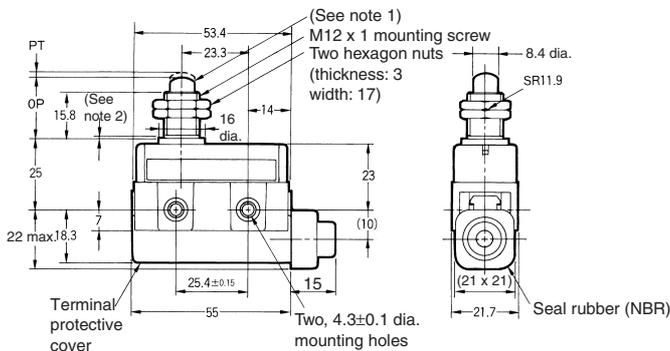
## ■ Electrical Durability



# Dimensions

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

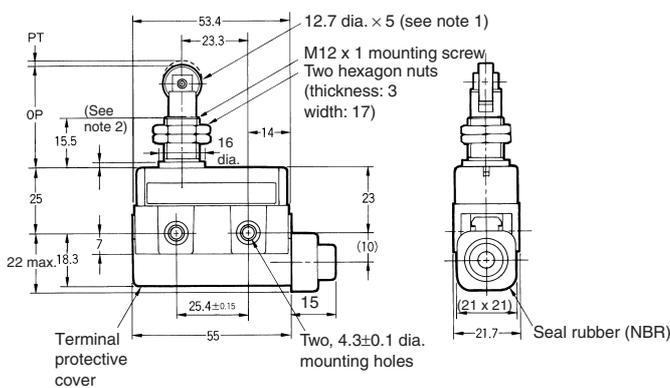
## Panel Mount Plunger D4MC-5000



- Note:** 1. Stainless steel plunger  
 2. The length of the imperfect threads is 1.5 mm maximum.  
 3. Do not use the M12 mounting screw and the case mounting hole at the same time.

| Model   | D4MC-5000     |
|---------|---------------|
| OF max. | 5.88 N        |
| RF min. | 0.98 N        |
| PT max. | 1.6 mm        |
| OT min. | 5 mm          |
| MD max. | 0.2 mm        |
| OP      | 21.8 ± 1.2 mm |
| FP max. | ---           |

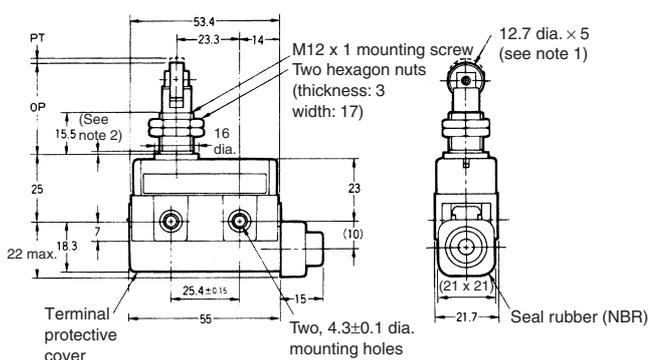
## Panel Mount Roller Plunger D4MC-5020



- Note:** 1. Stainless steel roller  
 2. The length of the imperfect threads is 1.5 mm maximum.  
 3. Do not use the M12 mounting screw and the case mounting hole at the same time.

| Model   | D4MC-5020     |
|---------|---------------|
| OF max. | 5.88 N        |
| RF min. | 0.98 N        |
| PT max. | 1.6 mm        |
| OT min. | 5 mm          |
| MD max. | 0.2 mm        |
| OP      | 33.4 ± 1.2 mm |
| FP max. | ---           |

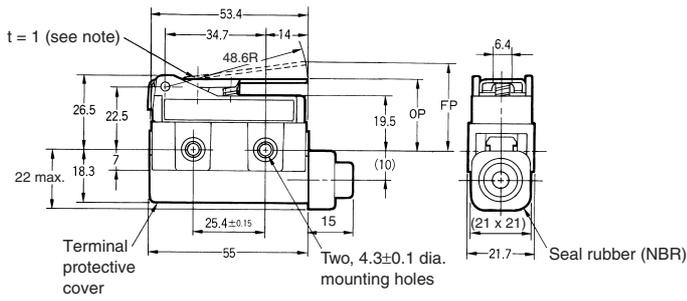
## Panel Mount Crossroller Plunger D4MC-5040



- Note:** 1. Stainless steel roller  
 2. The length of the imperfect threads is 1.5 mm maximum.  
 3. Do not use the M12 mounting screw and the case mounting hole at the same time.

| Model   | D4MC-5040     |
|---------|---------------|
| OF max. | 5.88 N        |
| RF min. | 0.98 N        |
| PT max. | 1.6 mm        |
| OT min. | 5 mm          |
| MD max. | 0.2 mm        |
| OP      | 33.4 ± 1.2 mm |
| FP max. | ---           |

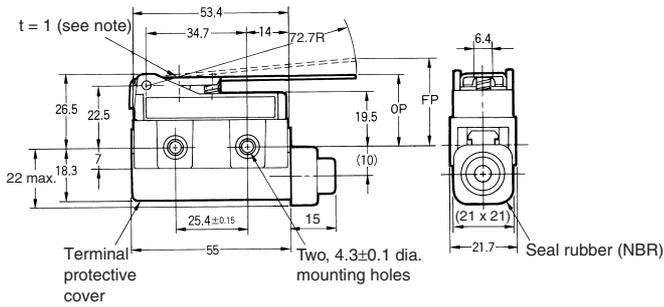
**Short Hinge Lever  
D4MC-1020**



Note: Stainless steel lever

| Model   | D4MC-1020 |
|---------|-----------|
| OF max. | 2.55 N    |
| RF min. | 0.34 N    |
| PT max. | ---       |
| OT min. | 2.5 mm    |
| MD max. | 1.7 mm    |
| OP      | 25±1 mm   |
| FP max. | 33 mm     |

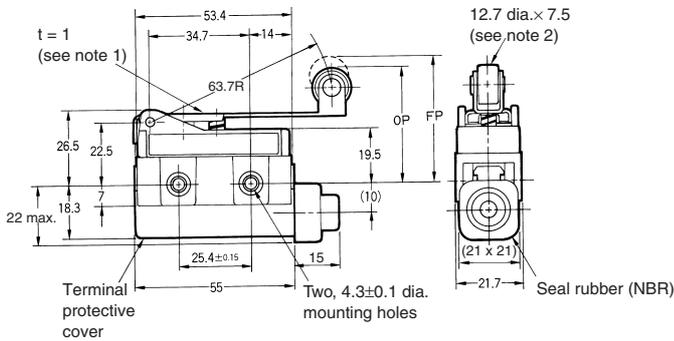
**Hinge Lever  
D4MC-1000**



Note: Stainless steel lever

| Model   | D4MC-1000 |
|---------|-----------|
| OF max. | 1.67 N    |
| RF min. | 0.25 N    |
| PT max. | ---       |
| OT min. | 4 mm      |
| MD max. | 3 mm      |
| OP      | 25±1 mm   |
| FP max. | 36 mm     |

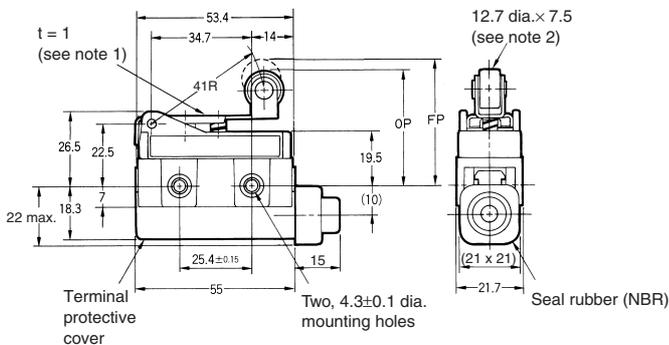
**Hinge Roller Lever  
D4MC-2000**



Note: 1. Stainless steel lever  
2. Plastic roller

| Model   | D4MC-2000 |
|---------|-----------|
| OF max. | 1.96 N    |
| RF min. | 0.39 N    |
| PT max. | ---       |
| OT min. | 5 mm      |
| MD max. | 3 mm      |
| OP      | 40±1 mm   |
| FP max. | 51 mm     |

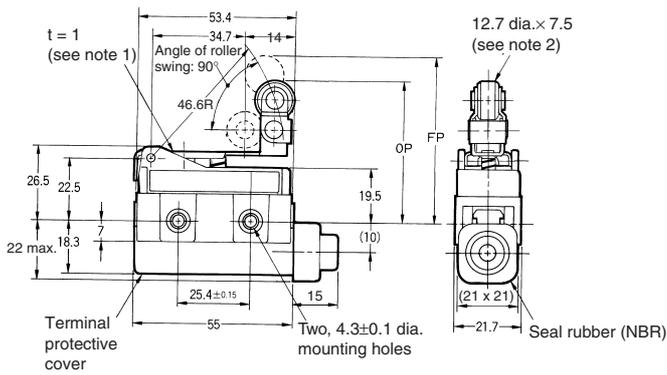
**Short Hinge Roller Lever  
D4MC-2020**



Note: 1. Stainless steel lever  
2. Plastic roller

| Model   | D4MC-2020 |
|---------|-----------|
| OF max. | 2.94 N    |
| RF min. | 0.39 N    |
| PT max. | ---       |
| OT min. | 2 mm      |
| MD max. | 1.5 mm    |
| OP      | 40±1 mm   |
| FP max. | 47 mm     |

**One-way Action Short Hinge Roller Lever  
D4MC-3030**



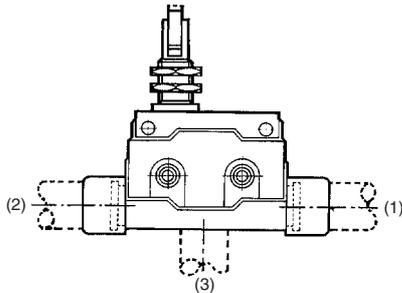
Note: 1. Stainless steel lever  
2. Plastic roller

| Model   | D4MC-3030 |
|---------|-----------|
| OF max. | 2.94 N    |
| RF min. | 0.39 N    |
| PT max. | ---       |
| OT min. | 2 mm      |
| MD max. | 1.5 mm    |
| OP      | 50 ± 1 mm |
| FP max. | 57.2 mm   |

## Molded Terminal Models

### ■ Molded Terminal Models

The molded terminal model is available with right-hand, left-hand and underside leads and is recommended for use where the Switch is exposed to dust, oil, or moisture.



When placing your order for the Switch specify the required length of V.C.T. cable in addition to the model number of the Switch

**Example:**

Standard type: D4MC-5020

Location of lead outlet: Underside

Length of lead: 1 m (V.C.T. lead)

When placing your order for the above Switch specify the model number as D4MC-5023 VCT 1M

### Suffix by Location of Lead Outlet

| Location of lead outlet | Model           |
|-------------------------|-----------------|
|                         | COM, NC, and NO |
| Right-hand              | D4MC-□□□1       |
| Left-hand               | D4MC-□□□2       |
| Underside               | D4MC-□□□3       |

### Leads Supplied

| Leads                        | Nominal cross-sectional area | Finished outside diameter | Terminal connections               | Standard length |
|------------------------------|------------------------------|---------------------------|------------------------------------|-----------------|
| V.C.T. (Vinyl cabtire cable) | 1.25 mm <sup>2</sup>         | 3 core:10.5 mm dia.       | Black: COM<br>White: NO<br>Red: NC | 1, 3 m          |

# Precautions

Refer to the "Precautions for All Switches" on CD.

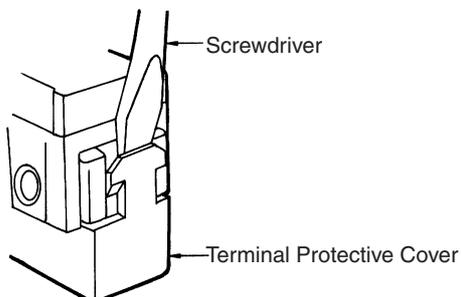
## Correct Use

### Operating

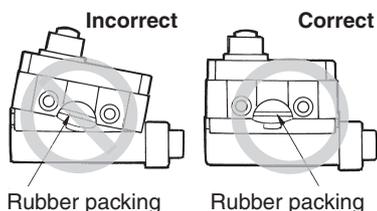
Excessive dog angle, operating speed, or overtravel (OT) may damage the actuator. Check that OT has a sufficient margin. The actual OT should be rated OT x 0.7 to 1.

### Handling

- Do not expose the Switch to water exceeding 60°C or use it in steam.
- Do not use the Switch in oil or water.
- An 8.5- to 10.5-dia. cable can be applied as seal rubber for the lead wire outlet. (Use two- or three-core cable of VCT1.25 mm<sup>2</sup>.)
- When detaching the Terminal Protective Cover, insert a screwdriver and apply a force in the opening direction. Do not use excess force to remove the cover. Doing so may cause deformation in the fitting section and reduce the holding force.



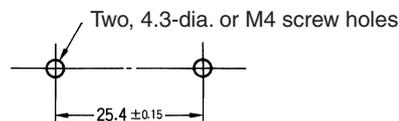
When mounting the Terminal Protective Cover to the case, align the cover on the case and then press the cover down to mount it firmly. If the cover is pressed down in an inclined position, rubber packing will deform and thus affect the sealing capability.



## Mounting

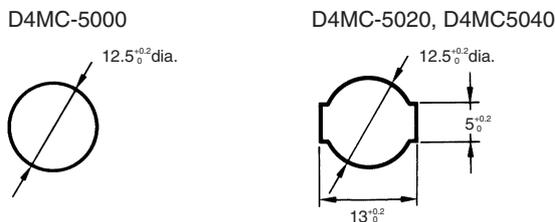
When mounting the Switch with screws on a side surface, fasten the Switch with M4 screws and use washers, spring washers, etc., to ensure secure mounting.

### Mounting Holes



- When mounting the Panel Mount-type Switch (D4MC-5000, D4MC-5020, or D4MC-5040) with screws on a side surface, remove the hexagonal nuts from the actuator.
- When mounting the panel mount type on a panel, be careful not to tighten to an excessive torque. Tightening the screws to a torque exceeding 4.91 N·m will cause the plunger to fail.

### Mounting Hole Dimensions



### Correct Tightening Torque

A loose screw may cause malfunctions. Be sure to tighten each screw to the proper tightening torque as shown in the table.

| No. | Type                 | Torque           |
|-----|----------------------|------------------|
| 1   | Terminal screw       | 0.78 to 1.18 N·m |
| 2   | Panel mounting screw | 2.94 to 4.92 N·m |
| 3   | Side mounting screw  | 1.18 to 1.47 N·m |

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

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