

## Economical, High Utility Enclosed Switch



- Enclosed Switches with Built-in Basic Switches for High Repeatability and Durability of 10 Million Operations Minimum.
- Panel mount versions have the same operating position as Z Basic Switch.
- Suitable for applications demanding higher mechanical strength, dustproof and drip-proof properties than those on basic switches.
- Resin molded terminal versions are available.
- Approved by UL, CSA, and CCC (Chinese standard). (Ask your OMRON representative for information on approved models.)



Be sure to read *Safety Precautions* on page 5 and *Safety Precautions for All Limit Switches*.



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

## Model Number Structure

### Model Number Legend

D4MC-

(1) (2)

#### (1) Actuator

500: Panel mount plunger  
 502: Panel mount roller plunger  
 504: Panel mount crossroller plunger  
 100: Hinge lever  
 102: Short hinge lever  
 200: Hinge roller lever  
 202: Short hinge roller lever  
 303: One-way action short hinge roller lever

#### (2) Location of Cable Outlet

0: None  
 1: Right-hand (Molded terminals)  
 2: Left-hand (Molded terminals)  
 3: Underside (Molded terminals)

## Ordering Information

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

Note: 1. Use Switches with molded terminals in locations subject to dirt, dust, oil drops, or high humidity. Models are available with lead wires on the right, on the left, and from the bottom.

2. Contact your OMRON representative for information on models certified for international standards.

## Specifications

### Approved Standards

| Agency   | Standard               | File No.         |
|----------|------------------------|------------------|
| UL *     | UL508, CSA C22.2 No.14 | E76675           |
| CCC(CQC) | GB14048.5              | 2003010303077627 |

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

\* UL certified for CSA C22.2 No. 14.

## Ratings

| Rated voltage  | Non-inductive load (A) |           |           |    | Inductive load (A) |      |            |    |
|----------------|------------------------|-----------|-----------|----|--------------------|------|------------|----|
|                | Resistive load         |           | Lamp load |    | Inductive load     |      | Motor load |    |
|                | NC                     | NO        | NC        | NO | NC                 | NO   | NC         | NO |
| 125 VAC        | 10                     | 3         | 1.5       |    | 10                 | 5    | 2.5        |    |
| 250 VAC        | 10                     | 2.5       | 1.25      |    | 10                 | 3    | 1.5        |    |
| 480 VAC        | 3                      | 1.5       | 0.75      |    | 2.5                | 1.5  | 0.75       |    |
| 8 VDC          | 10                     | 3         | 1.5       |    | 6                  | 5    | 2.5        |    |
| 14 VDC         | 10                     | 3         | 1.5       |    | 6                  | 5    | 2.5        |    |
| 30 VDC         | 6                      | 3         | 1.5       |    | 5                  | 5    | 2.5        |    |
| 125 VDC        | 0.5                    | 0.4       | 0.4       |    | 0.05               | 0.05 | 0.05       |    |
| 250 VDC        | 0.25                   | 0.2       | 0.2       |    | 0.03               | 0.03 | 0.03       |    |
| Inrush current | NC                     | 30 A max. |           |    |                    |      |            |    |
|                | NO                     | 15 A max. |           |    |                    |      |            |    |

Note: 1. The above figures are for steady-state currents.  
 2. Inductive loads have a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).  
 3. Lamp load has an inrush current of 10 times the steady-state current.  
 4. Motor load has an inrush current of 6 times the steady-state current.  
 5. The above ratings were tested under the following conditions.  
 (1) Ambient temperature:  $+20\pm2^\circ\text{C}$   
 (2) Ambient humidity:  $65\pm5\%\text{RH}$   
 (3) Operating frequency: 20 operations/min

## Characteristics

|  |   |  |
|--|---|--|
| Degree of protection                     |   | IP67   |
| Durability                               |   | 10,000,000 operations min.   |
| Operating speed                          |   | 0.05 mm/s to 0.5 m/s *1  |
| Operating frequency                      |   | 120 operations/min   |
| Rated frequency                          |   | 50/60 Hz   |
| Insulation resistance                    |   | 100 M $\Omega$ min. (at 500 VDC)   |
| Contact resistance                       |   | 15 m $\Omega$ max. (initial value for the built-in switch when tested alone) |
| Dielectric strength                      | Between terminals of the same polarity              | 1,000 VAC, 50/60 Hz for 1 min  |
|  | Between each terminal and non-current-carrying part | 2,000 VAC, 50/60 Hz for 1 min  |
| Rated insulation voltage (Ui)            |   | 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 (Ie)             |   | 10 A   |
| Rated operating voltage (Ue)             |   | 250 VAC  |
| Vibration resistance                     | Malfunction   | 10 to 55 Hz, 1.5-mm double amplitude *2                                      |
| Shock resistance                         | Destruction   | 1,000 m/s <sup>2</sup> min.  |
|  | Malfunction   | 100 m/s <sup>2</sup> min. *1 *2  |
| Ambient operating temperature            |   | -10°C to +80°C (with no icing)   |
| Ambient operating humidity               |   | 35% to 95%RH   |
| Weight                                   |   | Approx. 71 g (in case of panel mount plunger)                                |

\*1. Only for models with plungers. (Contact your OMRON representative for information on other models.)

\*2. Less than 1 ms under a free state at the operating limits.

## Approved Standard Ratings

### UL/CSA

### A300

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

### EN60947-5-1

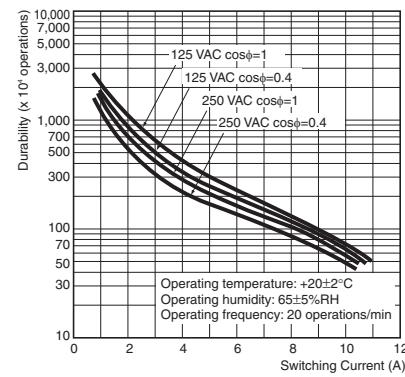
### CCC (GB14048.5)

#### Applicable category and ratings

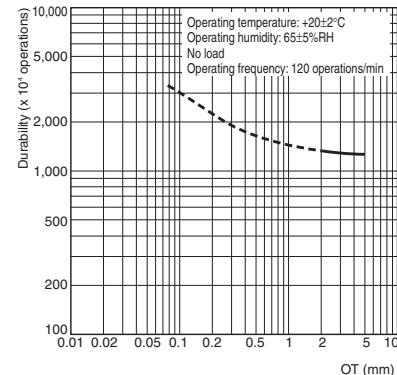
AC-12 10 A/250 VAC

## Engineering Data

### Electrical Durability



### Mechanical Durability (D4MC-5000)

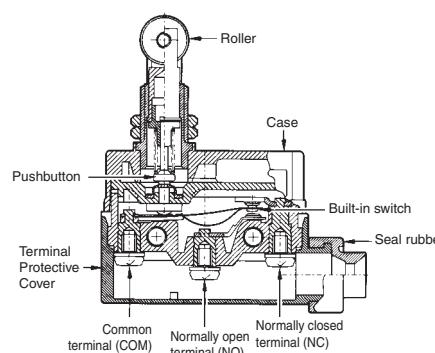


## Structure and Nomenclature

### Structure

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

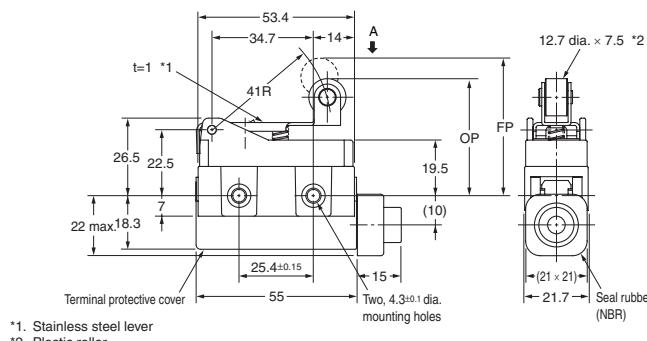
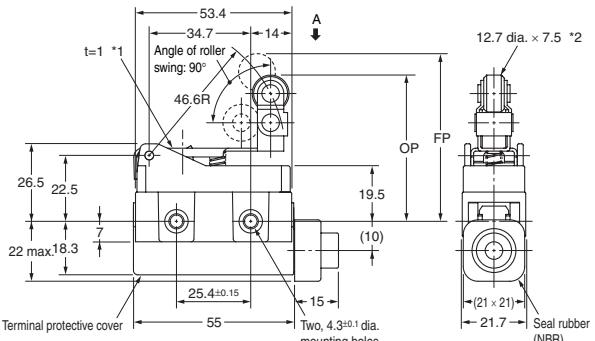
M4 binding head screws (with toothed washers) are used as the terminal screws.



### Contact Form





**Short Hinge Roller Lever****D4MC-2020****One-way Action Short Hinge Roller Lever****D4MC-3030**

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

2. Operating characteristics are for when the Switch is operated from direction A.

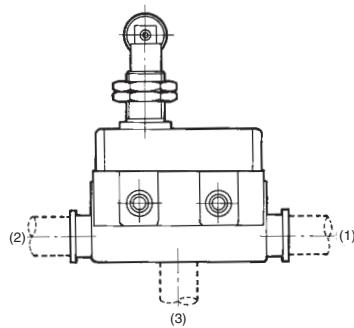
3. Make sure that the permissible OT position is not exceeded.

| Operating characteristics     | Model   | D4MC-2020 | D4MC-3030 |
|-------------------------------|---------|-----------|-----------|
| Operating force OF max.       | OF max. | 2.94 N    | 2.94 N    |
| Release force RF min.         | RF min. | 0.39 N    | 0.39 N    |
| Pretravel PT max.             | PT max. | ---       | ---       |
| Overtravel OT min.            | OT min. | 2 mm      | 2 mm      |
| Movement Differential MD max. | MD max. | 1.5 mm    | 1.5 mm    |
| Free Position FP max.         | FP max. | 47 mm     | 57.2 mm   |
| Operating position OP         | OP      | 40±1 mm   | 50±1 mm   |

**Molded Terminal Models (Not Approved by UL, CSA, or EN)**

Use Switches with molded terminals in locations subject to dirt, dust, oil drops, or high humidity. Molded terminals are available with all D4MC models.

Dimensions and operating characteristics are the same as the basic models.

**Suffix by Location of Cable Outlet**

| Location of lead outlet<br>(Refer to left figure) | Model           |
|---|-----------------|
|   | COM, NC, and NO |
| (1) Right-hand                                    | D4MC-□□□1       |
| (2) Left-hand                                     | D4MC-□□□2       |
| (3) Underside                                     | D4MC-□□□3       |

Note: To form the model numbers for molded terminals models, add the numbers 1 to 3 in the table above to the end of the model number in Ordering Information on page 1.

**Cables Supplied**

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

Note: Add the VCT length to the end of the model number when ordering. Consult with your OMRON representative for other types of cables and for cables longer than 3 m.

**How to Order**

Example:

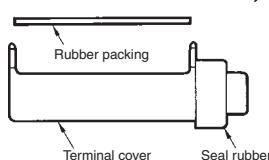
Standard type: D4MC-5020

Location of cable outlet: Underside

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

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

**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)

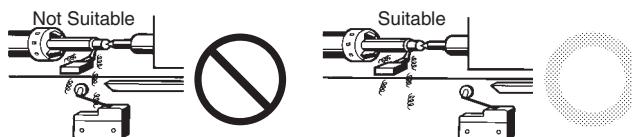
## Safety Precautions

Refer to *Safety Precautions for All Limit Switches*.

### Precautions for Use

#### Operating Environment

- Seal material may deteriorate if a Switch is used outdoor or where subject to special cutting oils, solvents, or chemicals. Always appraise performance under actual application conditions and set suitable maintenance and replacement periods.
- Install Switches where they will not be directly subject to cutting chips, dust, or dirt. The Actuator and Switch must also be protected from the accumulation of cutting chips or sludge.



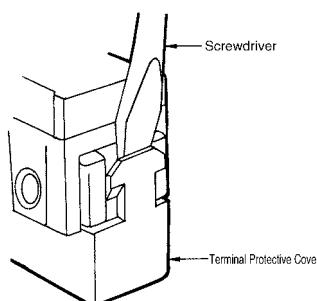
- Constantly subjecting a Switch to vibration or shock can result in wear, which can lead to contact interference with contacts, operation failure, reduced durability, and other problems. Excessive vibration or shock can lead to false contact operation or damage. Install Switches in locations not subject to shock and vibration and in orientations that will not produce resonance.
- The Switches have physical contacts. Using them in environments containing silicon gas will result in the formation of silicon oxide ( $SiO_2$ ) due to arc energy. If silicon oxide accumulates on the contacts, contact interference can occur. If silicon oil, silicon filling agents, silicon cables, or other silicon products are present near the Switch, suppress arcing with contact protective circuits (surge killers) or remove the source of silicon gas.

#### Operating

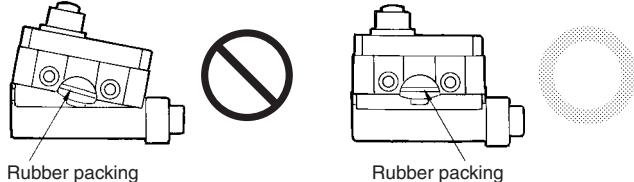
Excessive dog angle, operating speed, or overtravel (OT) may damage the actuator. Check that OT has a sufficient margin. The actual OT should be rated  $OT \times 0.7$  to 1.

#### Handling

- Do not expose the Switch to water exceeding  $+60^{\circ}C$  or use it in steam.
- Do not use the Switch in oil or water.
- An 8.5-dia. 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.



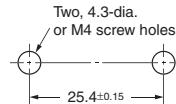
- When mounting the Terminal Protective Cover to the case, align the cover on the case and then press the cover down to mount it firmly. If the cover is pressed down in an inclined position, rubber packing will deform and thus affect the sealing capability.



#### 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

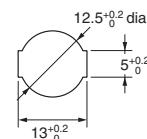
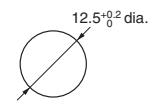


- When mounting the Panel Mount-type Switch (D4MC-5000, D4MC-5020, or D4MC-5040) with screws on a side surface, remove the hexagonal nuts from the actuator.
- When mounting the panel mount type on a panel, be careful not to tighten to an excessive torque. Tightening the screws to a torque exceeding 4.91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

##### Mounting Hole Dimensions

D4MC-5000

D4MC-5020, D4MC-5040



#### 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                 | Appropriate tightening 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              |

## Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

## Warranty and Limitations of Liability

### WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

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At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

### PROGRAMMABLE PRODUCTS

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## Disclaimers

### CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

### DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

### PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

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2012.8

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