## 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．

## Model Number Structure

## Model Number Legend

D4MC－

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

## Ordering Information

| Actuator |  | Model |
| :---: | :---: | :---: |
| Panel mount plunger | 号 | D4MC－5000 |
| Panel mount roller plunger | 回 | D4MC－5020 |
| Panel mount crossroller plunger | 曲 | D4MC－5040 |
| Hinge lever | $-$ | D4MC－1000 |
| Short hinge lever | の追 | D4MC－1020 |
| Hinge roller lever |  | D4MC－2000 |
| Short hinge roller lever | $\underbrace{Q}_{\text {م }}$ | 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 <br> 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: $+20 \pm 2^{\circ} \mathrm{C}$
(2) Ambient humidity: $65 \pm 5 \%$ RH
(3) Operating frequency: 20 operations/min

## Characteristics

| Degree of protection |  | IP67 |
| :---: | :---: | :---: |
| Durability | Mechanical | 10,000,000 operations min. |
|  | Electrical | 500,000 operations min. |
| Operating speed |  | $0.05 \mathrm{~mm} / \mathrm{s}$ to $0.5 \mathrm{~m} / \mathrm{s}$ *1 |
| Operating frequency | Mechanical | 120 operations/min |
|  | Electrical | 20 operations/min |
| Rated frequency |  | $50 / 60 \mathrm{~Hz}$ |
| Insulation resistance |  | $100 \mathrm{M} \Omega$ min. (at 500 VDC) |
| Contact resistance |  | $15 \mathrm{~m} \Omega$ max. (initial value for the built-in switch when tested alone) |
| Dielectric strength | Between terminals of the same polarity | 1,000 VAC, $50 / 60 \mathrm{~Hz}$ 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 (le) |  | 10 A |
| Rated operating voltage (Ue) |  | 250 VAC |
| Vibration resistance | Malfunction | 10 to $55 \mathrm{~Hz}, 1.5-\mathrm{mm}$ double amplitude *2 |
| Shock resistance | Destruction | $1,000 \mathrm{~m} / \mathrm{s}^{2} \mathrm{~min}$. |
|  | Malfunction | $100 \mathrm{~m} / \mathrm{s}^{2} \mathrm{~min}$. $1^{*} 2$ |
| Ambient operating temperature |  | $-10^{\circ} \mathrm{C}$ to $+80^{\circ} \mathrm{C}$ (with no icing) |
| Ambient operating humidity |  | 35\% to 95\%RH |
| Weight |  | Approx. 71 g (in case of panel mount plunger) |

${ }^{*}$. 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 <br> current | Current (A) |  | Volt-amperes (VA) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Make | Break | Make | Break |
| 120 VAC | $10 A$ | 60 | 6 | 7,200 | 720 |
| $\mathbf{2 4 0}$ 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

$(\mathrm{COM}) 1 \longrightarrow 2(\mathrm{NC})$

## Panel Mount Plunger

D4MC-5000


Panel Mount Roller Plunger

*1. Stainless steel plunger
2. The length of the imperfect

Thickness: 3 width: 17

Note: Do not use the M12 mounting screw and the case mounting hole at the same time.

Hinge Lever
D4MC-1000

*1. Stainless steel plunger

1. Stainless steel plunger
*2. The length of the imperfect
2. The length of the imperfect
threads is 1.5 mm maximum
*3. Thickness: 3 width: 17

## Short Hinge Lever

D4MC-1020


Hinge Roller Lever
D4MC-2000


Note: 1. Unless otherwise specified, a tolerance of $\pm 0.4 \mathrm{~mm}$ 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-5000 | D4MC-5020 | D4MC-5040 | D4MC-1000 | D4MC-1020 | D4MC-2000 |  |
| :--- | :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Operating force | OF | max. | 5.88 N | 5.88 N | 5.88 N | 1.67 N | 2.55 N | 1.96 N |
| Release force | RF | $\min$. | 0.98 N | 0.98 N | 0.98 N | 0.25 N | 0.34 N | 0.39 N |
| Pretravel | PT | max. | 1.6 mm | 1.6 mm | 1.6 mm | --- | --- | 5 mm |
| Overtravel | OT | min. | 5 mm | 5 mm | 5 mm | 2.5 mm | 5 mm |  |
| Movement Differential | MD | max. | 0.2 mm | 0.2 mm | 0.2 mm | 3 mm | 1.7 mm | 3 mm |
| Free Position | FP | max. | -- | -- | -- | 36 mm | 33 mm | 51 mm |
| Operating Position | OP |  | $21.8 \pm 1.2 \mathrm{~mm}$ | $33.4 \pm 1.2 \mathrm{~mm}$ | $33.4 \pm 1.2 \mathrm{~mm}$ | $25 \pm 1 \mathrm{~mm}$ | $25 \pm 1 \mathrm{~mm}$ | $40 \pm 1 \mathrm{~mm}$ |

Short Hinge Roller Lever
D4MC-2020


One-way Action Short Hinge Roller Lever
D4MC-3030


Note: 1. Unless otherwise specified, a tolerance of $\pm 0.4 \mathrm{~mm}$ 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 <br> characteristics | Model | D4MC-2020 | D4MC-3030 |
| :--- | :--- | :---: | :---: |
| Operating force | OF max. | 2.94 N | 2.94 N |
| Release force | RF mim. | 0.39 N | 0.39 N |
| Pretravel | PT max. | --- |  |
| Overtravel | OT min. | 2 mm | 2 mm |
| Movement Differential | MD max. | 1.5 mm | 1.5 mm |
| Free Position | FP max. | 47 mm | 57.2 mm |
| Operating position | OP | $40 \pm 1 \mathrm{~mm}$ | $50 \pm 1 \mathrm{~mm}$ |

## 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 Lead Outlet

| Location of lead outlet | Model |
| :---: | :---: |
| (Refer to left figure) | COM, NC, and NO |
| (1) Right-hand | D4MC- $\square \square \square 1$ |
| (2) Left-hand |  |
| (3) Underside | D4MC- $\square \square \square 2$ |

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.

## Leads Supplied

| Specifications | Nominal <br> cross-sec- <br> tional area <br> $\mathbf{m m}^{2}$ | External <br> diameter <br> mm | Terminal <br> connections | Cable length <br> $\mathbf{m}$ |
| :--- | :---: | :---: | :---: | :---: |
| Leads | 1.25 | 3 conductor <br> 10.5 dia. | Black: COM <br> Vhite: 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 lead wires and for lead wires longer than 3 m .

## How to Order

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

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 $\left(\mathrm{SiO}_{2}\right)$ 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 $+60^{\circ} \mathrm{C}$ 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 mm².)
- 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, D4MC5020, 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


## 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 <br> torque |
| :---: | :--- | :---: |
| $\mathbf{( 1 )}$ | Terminal screw | 0.78 to $1.18 \mathrm{~N} \cdot \mathrm{~m}$ |
| (2) | Panel mounting screw | 2.94 to $4.92 \mathrm{~N} \cdot \mathrm{~m}$ |
| $\mathbf{( 3 )}$ | Side mounting screw | 1.18 to $1.47 \mathrm{~N} \cdot \mathrm{~m}$ |

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