Small Sealed Switch

D4E-□□N

Slim and Compact Switch with Better Seal and Ensuring Longer Service Life than D4E

- Flat springs with an improved lever ratio of the built-in switch ensure smooth snap action and long life expectancy.
- Protection cover protects the built-in switch from dust and oil. Plunger incorporates a tough seal cap that lasts for a long time.
- One touch connector eliminates need for tedious wiring operations and reduces downtime for wiring and maintenance (models with standard, easy-to-use screw terminals are also available).
- Minute load model with gold cladding is optimal for electronic control.
- Molded terminal types as well as molded terminal types with operating indicator lamps are available for screw terminal systems.
- Approved by EN, UL, CSA, and CCC (Chinese standard). (Ask your OMRON representative for Information on approved models.)
- No difference in mounting pitch and characteristics between D4E-□□N and D4E models.

Be sure to read Safety Precautions on page 9 to 10 and Safety Precautions for All Limit Switches.

Model Number Structure

Model Number Legend
(Not all combinations are possible. Ask your OMRON representative for details.)

D4E-□□□□□□N
(1)(2) (3) (4)

(1) Rated Current
1: 5 A at 125 VAC
   (1 A at 125 VAC/30 VDC for model with a connector)
2: 0.1 A at 125 VAC
   (0.1 A at 125 VAC/30 VDC for model with a connector)

(2) Actuator
A: Roller plunger
B: Crossroller plunger
C: Plunger
D: Sealed roller plunger
E: Sealed crossroller plunger
F: Sealed plunger
G: Roller lever
H: One-way action roller lever

(3) Terminals
00: AC connector
10: DC connector
20: Screw terminals without a cable
21: Screw terminals with a cable (right-hand)
22: Screw terminals with a cable (left-hand)
23: Molded terminals with a cable (right-hand)
24: Molded terminals with a cable (left-hand)
   (Cable is S-FLEX VCTF 3 m)

Note: The terminal specifications in model numbers are not the same for D4E-N and D4E Switches.

Comparison of New and Old Molded Terminal Models

<table>
<thead>
<tr>
<th>Location of lead outlet</th>
<th>D4E-N</th>
<th>D4E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right-hand</td>
<td>D4E-□□23N</td>
<td>D4E-□□21</td>
</tr>
<tr>
<td>Left-hand</td>
<td>D4E-□□24N</td>
<td>D4E-□□23</td>
</tr>
</tbody>
</table>

(4) Operation Indicator
None: Without operation indicator
L: Neon lamp (250 VAC)
L2: LED (24 VDC)

Note: Only the molded terminal models can be equipped with an operation indicators.

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

1. When ordering, specify the current type by replacing the blank box of the model number with 0 for AC connector or 1 for DC connector.
2. For the plunger and lever actuator models, the NC and NO terminal indicators are reversed.
3. Models are also available with molded terminals and with molded terminals and operation indicators. Refer to page 8.

Plug
For models with connectors, select one of the specified Cables with Connectors (sockets) from the following table.

Specifications

Agency | Standard | File No. | Approved models
--- | --- | --- | ---
UL | UL508 | E76675 | D4E-1A 20N Switches only except for Indicator-equipped Switches
CSA | CSA C22.2 No. 14 | LR45746 | D4E-1B 20N Switches only except for Indicator-equipped Switches
TÜV Rheinland | EN60947-5-1 | R9551015 | Ask your OMRON representative for information on approved models.
CCC (CQC) | GB14048.5 | 2003010305086795 | Ask your OMRON representative for information on approved models.

Ratings

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Standard load</th>
<th>Micro load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-inductive load (A)</td>
<td>Inductive load (A)</td>
</tr>
<tr>
<td>125 VAC 250 VAC</td>
<td>5 (1)</td>
<td>1.5 (1)</td>
</tr>
<tr>
<td>8 VDC 14 VDC 30 VDC 125 VDC 250 VDC</td>
<td>5 (1)</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>5 (1)</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>0.25</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Minimum applicable load | 160 mA at 5 VDC | 1 mA at 5 VDC

Note: 1. The above current ratings are for a standard current and the values in parentheses are for models with a connector.
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.
**Approved Standard Ratings**

**UL/CSA A300**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current (A)</th>
<th>Carry current</th>
<th>Volt-amperes (VA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 V</td>
<td>60 A</td>
<td>Make</td>
<td>7,200</td>
</tr>
<tr>
<td>240 V</td>
<td>30 A</td>
<td>Break</td>
<td>720</td>
</tr>
</tbody>
</table>

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<td>30 A</td>
<td>Break</td>
<td>720</td>
</tr>
</tbody>
</table>

Note: 1. ■ Actuator variation of item II
2. AC-14 0.5 A/125 VAC means as follows:
3. Applicable category: AC-14
Rated operating current (Ie): 0.5 A
Rated operating voltage (Ue): 125 VAC

**Characteristics**

<table>
<thead>
<tr>
<th>Degree of protection</th>
<th>Mechanical: 10,000,000 operations min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durability</td>
<td>Electrical: 500,000 operations min. (5 A at 250 VAC, resistive load)</td>
</tr>
<tr>
<td></td>
<td>5,000,000 operations min. (10 mA at 24 VDC, resistive load)</td>
</tr>
</tbody>
</table>

| Operating speed       | 0.1 mm/sec to 0.5 m/sec |
| Operating frequency   | Mechanical: 120 operations/min |
|                      | Electrical: 30 operations/min |
| Rated frequency       | 50/60 Hz |
| Insulation resistance | 100 MΩ min. (at 500 VDC) |
| Contact resistance    | 15 mΩ max. (initial value for the built-in switch when tested alone) |

| Dielectric strength   | Between terminals of same polarity |
|                      | 1,000 VAC, 50/60 Hz for 1 min |
|                      | Between each terminal and non-current-carrying metal part |
|                      | 1,500 VAC, 50/60 Hz for 1 min/Uimp at 2.5 kV (EN60947-5-1) |

| Rated insulation voltage (UI) | 250V |
| Pollination degree (operating environment) | 3 (EN60947-5-1) |
| Short-circuit protective device (SCPD) | 10 A fuse (type gG or gI, IEC60269 approved) |
| Conditional short-circuit current | 100 A (EN60947-5-1) |

| Protection against electric shock | Class II (grounding not required with double insulation) |
| Vibration resistance | Malfunction |
| Shock resistance | Malfunction |

| Ambient operating temperature | -10°C to +80°C (with no icing) |
| Ambient operating humidity   | 35% to 95%RH |
| Weight                       | Approx. 86 g (in case of roller plunger) |

**Structure and Nomenclature**

**Structure**

- Movable Plunger
  - Rubber Cap (NBR)
    - Rubber cap provides a tight seal and ensures a long service life and smooth reset at low temperatures.

- Seal Packing (NBR)
  - Seal packing withstands a pressure of 186 kPa.

- Terminal Protection Cover
  - D4E-□N has a wide wiring space of 10 mm horizontally.

- Screw Terminal
  - Screw terminal incorporates a M3 screw with a toothed washer.

**Engineer Data**

**General-purpose Models**

**Electrical Durability (cosφ=1)**

Operating temperature: +5°C to +30°C
Operating humidity: 40% to 70%RH.

**Engineering Data**

- Operating frequency: 30 operations/min
- Durable (in □ operations)
- Harmonic cosφ=1

**Note:**
1. The above values are initial values.
2. The above ratings may vary depending on the model. Contact your OMRON representative for further details.

*Durability values are calculated at an operating temperature of +5°C to +35°C, and an operating humidity of 40% to 70%RH.*
2. A 3-m lead wire cable equivalent to the 3-conductor VCTF S-FLEX cable (0.75 mm², 7 mm in dia.) is provided.

1. A 5.8-dia. to 7.6-dia. cable can be applied to the seal rubber for the lead wire outlet.

Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

*2. A 3.5-dia. to 6.5-dia. cable can be applied to the seal rubber for the lead wire outlet.

*1. A 3.5-dia. to 6.5-dia. cable can be applied to the seal rubber for the lead wire outlet.

* The position of the positioning piece is not always the same. If using an L-shaped connector causes problems in application, use a straight connector.

Dimensions and Operating Characteristics (Unit: mm)

<table>
<thead>
<tr>
<th>Roller Plunger</th>
<th>Operating force</th>
<th>Release force</th>
<th>Pretravel</th>
<th>Overtravel</th>
<th>Movement Differential</th>
<th>Operating Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>D4E-1A00N</td>
<td>OF max. 11.77 N</td>
<td>RF min. 4.90 N</td>
<td>PT max. 1.5 mm</td>
<td>OT min. 3 mm</td>
<td>MD (0.1 mm)</td>
<td>OP 31.4±0.8 mm</td>
</tr>
<tr>
<td>D4E-2A00N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D4E-1A10N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D4E-2A10N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cross Roller Plunger</th>
<th>Operating force</th>
<th>Release force</th>
<th>Pretravel</th>
<th>Overtravel</th>
<th>Movement Differential</th>
<th>Operating Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>D4E-1B00N</td>
<td>OF max. 11.77 N</td>
<td>RF min. 4.90 N</td>
<td>PT max. 1.5 mm</td>
<td>OT min. 3 mm</td>
<td>MD (0.1 mm)</td>
<td>OP 31.4±0.8 mm</td>
</tr>
<tr>
<td>D4E-1B10N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D4E-2B10N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<th>Operating force</th>
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<th>Pretravel</th>
<th>Overtravel</th>
<th>Movement Differential</th>
<th>Operating Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>D4E-1B20N *1</td>
<td>OF max. 11.77 N</td>
<td>RF min. 4.90 N</td>
<td>PT max. 1.5 mm</td>
<td>OT min. 3 mm</td>
<td>MD (0.1 mm)</td>
<td>OP 31.4±0.8 mm</td>
</tr>
<tr>
<td>D4E-2B20N *1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D4E-1B21N *2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D4E-2B21N *2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

*1. A 5.8-dia. to 7.6-dia. cable can be applied to the seal rubber for the lead wire outlet.

*2. A 3-m lead wire cable equivalent to the 3-conductor VCTF S-FLEX cable (0.75 mm², 7 mm in dia.) is provided.
Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

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D4E-\text{\textbullet}N

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*1. A 5.8-dia. to 7.6-dia. cable can be applied to the seal rubber for the lead wire outlet.

*2. A 3-m lead wire cable equivalent to the 3-conductor VCTF S-FLEX cable (0.75 mm$^2$, 7 mm in dia.) is provided.
Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

*1. A 5.8-dia. to 7.6-dia. cable can be applied to the seal rubber for the lead wire outlet.

*2. A 3-m lead wire cable equivalent to the 3-conductor VCTF 5-FLEX cable (0.75 mm², 7 mm in dia.) is provided.
Molded Terminal Models

The molded-terminal model is available with right-hand and left-hand leads and is recommended for use where the Switch is exposed to dust, oil or moisture. It can be used like a screw-terminal model (with a cable), and the dimensions and operating characteristics are the same as for standard models.

Operation of Indicator-equipped Models

• The molded terminal model may be equipped with an operation indicator (neon lamp or LED) upon request to facilitate maintenance and inspection.
• The operation indicator is designed to illuminate when the Switch is not operating. (Because of the molded terminal model, any change to the Switch wiring cannot be made.)

AC Operation

• The operating voltage is 90 to 250 VAC.

DC Operation

• LED indicator is provided.
• As a rectifier stack is incorporated, into the unit and no directionality exists for connection of + and −, this type can also be operated on AC.
• Voltage ratings of LED indicators are as shown in the table below.

Internal Circuit

Example:
Add “L” at the frond of “N”, which is suffix of a part number.
Basic type: D4E-1A23N
When placing your order for the molded terminal model with an neon lamp operation indicator, specify the model number as D4E-1A23LN.

Internal Circuit

Example:
Add “L2” at the frond of “N”, which is suffix of a part number.
Basic Model: The model number of the D4E-1A23N with a built-in 24-V LED indicator is D4E-1A23L2N.
Safety Precautions

Refer to Safety Precautions for All Limit Switches.

Precautions for Correct 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 (SiO₂) 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.
- Do not solder the screw terminals.
- Sealing materials may deteriorate when used outdoors or when exposed to cutting oil, solvents, or chemicals. Check this on actual equipment and, if deterioration is foreseen, consult your OMRON representative in advance.
- If the one-touch connector is to be mounted onto the switch body, lightly push up the fitting so that the switch body can then be inserted into the clamp.

Mounting

- Be sure to connect a fuse with a breaking current 1.5 to 2 times the rated current to the Limit Switch in series in order to protect the Limit Switch from damage due to short-circuiting. When using the Limit under the EN ratings, use a gl or gG 10-A fuse that conforms to IEC60269.

Mounting Holes

- When mounting the panel mount-type Switch with screws on a side surface, remove the hexagonal nuts from the actuator.
- When mounting the panel mount type on a panel, tighten the hexagonal nuts of the actuator to a torque less than 7.85 N·m.

Wiring

- Be sure that the clamp is inserted to the full depth, because the Switch will not function properly if one of the clamps is improperly inserted.
- If the clamp is properly inserted up to the full depth, it will not slide out easily. Be sure to carefully confirm all the above items.

(1) Insert the switch body
(2) Lightly push up the filling on the left and right side alternately.

Switch body

Clamp fitting

Confirm visually

Wiring Method
Tightening Torque
A loose screw may result in a malfunction. Be sure to tighten each screw to the proper tightening torque as shown below.

<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Appropriate tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Terminal screw (M3)</td>
<td>0.24 to 0.44 N·m</td>
</tr>
<tr>
<td>(2)</td>
<td>Switch mounting screw (M4)</td>
<td>1.18 to 1.37 N·m</td>
</tr>
</tbody>
</table>

![Diagram of the device showing the locations of the screws mentioned in the table.](Diagram)
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