

# Slim Safety Door Switch

# D4GS-N

C33I-E-02

## Slim Safety Door Switches with IP67 Rating

- Slim design with a width of only 17 mm (three-contact models).
- Reversible design allowing either front or rear mounting.
- Built-in Switches with two- or three-terminal contact construction are available.
- Operation Key with rubber mounting hole to absorb vibration and shock.
- IP67 degree of protection.
- Conforms to ISO 14119

 Be sure to read the "Safety Precautions" on page 8.



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

#### Switch

D4GS-N□□-□  
1 2 3

- |   |  |   |
|---|--|---|
| <p><b>1. Built-in Switch</b></p> <p>1: 1NC/1NO (slow-action)<br/>2: 2NC (slow-action)<br/>3: 2NC/1NO (slow-action)<br/>4: 3NC (slow-action)</p> | <p><b>2. Direction of Operation Key Insertion</b></p> <p>R: Horizontal<br/>T: Vertical</p> | <p><b>3. Cable Length</b></p> <p>Blank: 1 m<br/>3: 3 m<br/>5: 5 m</p> |
|---|--|---|

#### Operation Key

D4GS-NK□  
1

- 1. Operation Key Type**
- 1: Horizontal mounting  
2: Vertical mounting  
4: Adjustable mounting (Vertical)



## Ordering Information

### List of Models




#### Switches (Operation Keys are sold separately.)

 : Models with certified direct opening contacts.

Consult with your OMRON representative when ordering any models that are not listed in this table.

| Appearance  | Direction of Operation Key insertion | Cable length | 1NC/1NO (Slow-action) | 2NC (Slow-action) | 2NC/1NO (Slow-action) | 3NC (Slow-action) |
|---|--------------------------------------|--------------|-----------------------|-------------------|-----------------------|-------------------|
|  | Horizontal                           | 1 m          | D4GS-N1R              | D4GS-N2R          | D4GS-N3R              | D4GS-N4R          |
|   |                                      | 3 m          | D4GS-N1R-3            | D4GS-N2R-3        | D4GS-N3R-3            | D4GS-N4R-3        |
|   |                                      | 5 m          | D4GS-N1R-5            | D4GS-N2R-5        | D4GS-N3R-5            | D4GS-N4R-5        |
|  | Vertical                             | 1 m          | D4GS-N1T              | D4GS-N2T          | D4GS-N3T              | D4GS-N4T          |
|   |                                      | 3 m          | D4GS-N1T-3            | D4GS-N2T-3        | D4GS-N3T-3            | D4GS-N4T-3        |
|   |                                      | 5 m          | D4GS-N1T-5            | D4GS-N2T-5        | D4GS-N3T-5            | D4GS-N4T-5        |

### Operation Keys

| Type   | Model    | Type  | Model    |
|--|----------|---|----------|
| Horizontal mounting<br> | D4GS-NK1 | Adjustable mounting (Vertical)<br> | D4GS-NK4 |
| Vertical mounting<br>   | D4GS-NK2 |   |          |

## Specifications

### Standards and EC Directives

#### Conforms to the following EC Directives:

- Machinery Directive
- Low Voltage Directive
- EN ISO 14119
- EN60204-1
- GS-ET-15

### Certified Standards

| Certification body | Standard                                  | File No.                                       |
|--------------------|---|--|
| TÜV SÜD            | EN60947-5-1<br>(certified direct opening) | Consult your OMRON representative for details. |
| UL *               | UL508<br>CSA C22.2 No. 14                 | E76675   |
| CQC (CCC)          | GB14048.5                                 | 2003010305064262                               |

\* Certification for CSA C22.2 No. 14 is authorized by the UL mark.

### Certified Standard Ratings

#### TÜV (EN60947-5-1), CCC (GB14048.5)

| Item                                      | Utilization category | AC-15  | DC-13  |
|---|----------------------|--------|--------|
| Rated operating current (I <sub>e</sub> ) |                      | 0.75 A | 0.27 A |
| Rated operating voltage (U <sub>e</sub> ) |                      | 240 V  | 250 V  |

Note: Use a 10 A fuse type gI or gG that conforms to IEC60269 as a short-circuit protection device.

#### UL/CSA (UL508, CSA C22.2 No. 14)

##### C300

| Rated voltage | Carry current | Current (A) |       | Volt-amperes (VA) |       |
|---------------|---------------|-------------|-------|-------------------|-------|
|               |               | Make        | Break | Make              | Break |
| 120 VAC       | 2.5 A         | 15          | 1.5   | 1,800             | 180   |
| 240 VAC       |               | 7.5         | 0.75  |                   |       |

##### Q300

| Rated voltage | Carry current | Current (A) |       | Volt-amperes (VA) |       |
|---------------|---------------|-------------|-------|-------------------|-------|
|               |               | Make        | Break | Make              | Break |
| 125 VDC       | 2.5 A         | 0.55        | 0.55  | 69                | 69    |
| 250 VDC       |               | 0.27        | 0.27  |                   |       |

## Characteristics

|   |  |  |
|---|--|--|
| <b>Degree of protection *1</b>                                |  | IP67 (EN60947-5-1)   |
| <b>Durability *2</b>  | <b>Mechanical</b>  | 1,000,000 operations min.  |
|   | <b>Electrical</b>  | 100,000 operations min. (1 A resistive load at 125 VAC) *3   |
| <b>Operating speed</b>  |  | 0.1 to 0.5 m/s   |
| <b>Operating frequency</b>                                    |  | 30 operations/minute max.  |
| <b>Direct opening force *4</b>                                |  | 60 N min.  |
| <b>Direct opening travel *4</b>                               |  | 10 mm min.   |
| <b>Contact resistance</b>                                     |  | 300 mΩ max. (with 1 m cable)   |
| <b>Minimum applicable load *5</b>                             |  | Resistive load of 4 mA at 24 VDC (N-level reference value)   |
| <b>Rated insulation voltage (U<sub>i</sub>)</b>               |  | 250 V  |
| <b>Rated frequency</b>  |  | 50/60 Hz   |
| <b>Protection against electric shock</b>                      |  | Class II (double insulation) (IEC60536)  |
| <b>Pollution degree (operating environment)</b>               |  | 3 (EN60947-5-1)  |
| <b>Impulse withstand voltage (EN60947-5-1)</b>                | <b>Between terminals of same polarity</b>                            | 2.5 kV   |
|   | <b>Between terminals of different polarity</b>                       | 4 kV   |
|   | <b>Between each terminal and non-current carrying metallic parts</b> | 6 kV   |
| <b>Insulation resistance</b>                                  |  | 100 MΩ min. (at 500 VDC) between terminals of the same polarities, between terminals of different polarities, and between each terminal and non-current carrying metal parts |
| <b>Contact gap</b>  |  | 2 × 2 mm min.  |
| <b>Vibration resistance</b>                                   | <b>Malfunction</b>   | 10 to 55 Hz, 0.35 mm single amplitude  |
| <b>Shock resistance</b>                                       | <b>Destruction</b>   | 1,000 m/s <sup>2</sup> min.  |
|   | <b>Malfunction</b>   | 300 m/s <sup>2</sup> min.  |
| <b>Conditional short-circuit current</b>                      |  | 100 A (EN60947-5-1)  |
| <b>Conventional free air thermal current (I<sub>th</sub>)</b> |  | 2.5 A (EN60947-5-1)  |
| <b>Ambient operating temperature</b>                          |  | -30 to 70°C (with no icing)  |
| <b>Ambient operating humidity</b>                             |  | 95% max.   |
| <b>Cable</b>  |  | UL2464 No. 22 AWG, finishing O.D.: 7.2 mm  |
| <b>Weight</b>   |  | Approx. 120 g (D4GS-N1R, with 1 m cable)   |

**Note: 1.** The above values are initial values.

**2.** The Switch contacts can be used with either standard loads or microloads. Once the contacts have been used to switch a load, however, they cannot be used to switch smaller loads. The contact surfaces will become rough once they have been used and contact reliability for smaller loads may be reduced.

**\*1.** The degree of protection shown above is based on the test method specified in EN60947-5-1. Be sure to confirm in advance the sealing performance under the actual operating environment and conditions.

Although the switch box is protected from dust, oil, or water penetration, do not use the D4GS-N in places where dust, oil, water, or chemicals may enter through the key hole on the head, otherwise Switch damage or malfunctioning may occur.

**\*2.** The durability conditions are an ambient temperature of 5 to 35°C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.

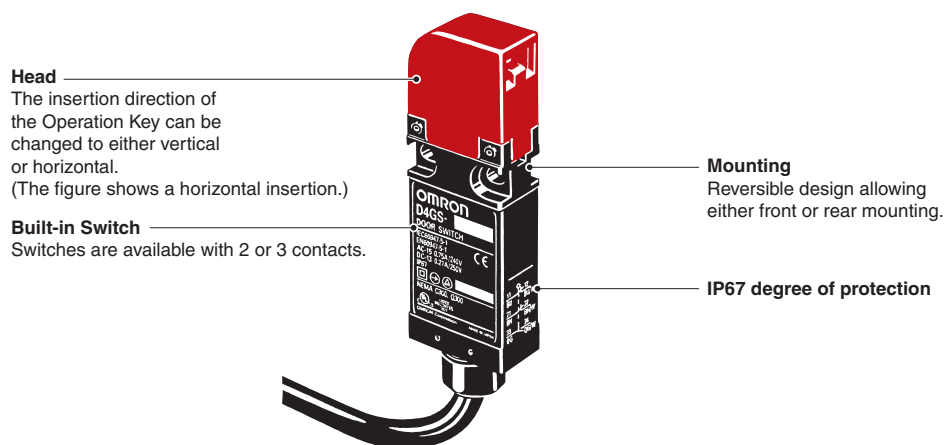
**\*3.** When the ambient temperature is 35°C or higher, do not apply 1 A at 125 VAC to more than one circuit.

**\*4.** These figures are minimum requirements for safe operation.

**\*5.** The value given for minimum applicable load is a reference value for microloads. The value will vary depending on factors such as the switching frequency, the ambient environment, and the reliability level. Be sure to confirm correct operation with the actual load before application.

# Structure and Nomenclature

## Structure



### Contact Form (Diagrams Show State with Key Inserted.)

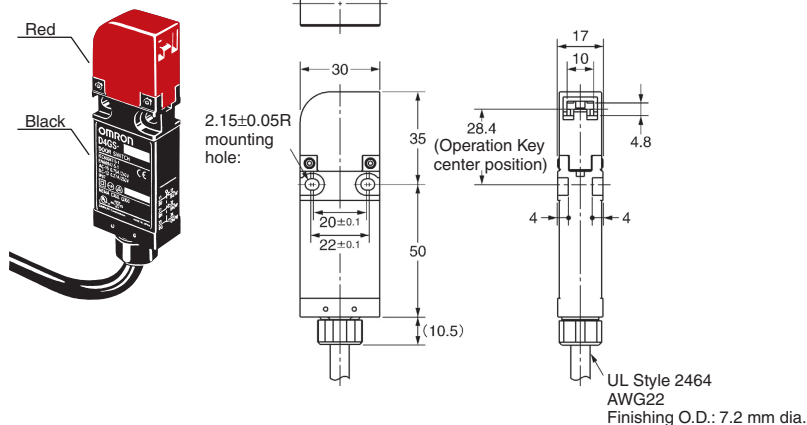
| Model      | Contact | Contact form | Operating pattern | Remarks  |
|------------|---------|--------------|-------------------|--|
| D4GS-N1□-□ | 1NC/1NO |              |                   | Only NC contact 11-12 has a certified direct opening mechanism.<br>The terminals 11-12 and 33-34 can be used as unlike poles.                      |
| D4GS-N2□-□ | 2NC     |              |                   | NC contacts 11-12 and 31-32 have a certified direct opening mechanism.<br>The terminals 11-12 and 31-32 can be used as unlike poles.               |
| D4GS-N3□-□ | 2NC/1NO |              |                   | Only NC contacts 11-12 and 21-22 have a certified direct opening mechanism.<br>The terminals 11-12, 21-22 and 33-34 can be used as unlike poles.   |
| D4GS-N4□-□ | 3NC     |              |                   | NC contacts 11-12, 21-22 and 31-32 have a certified direct opening mechanism.<br>The terminals 11-12, 21-22 and 31-32 can be used as unlike poles. |

**Note:** The terminal numbers are according to EN50013, and the contact symbols are according to IEC 60947-5-1.

# Dimensions and Operating Characteristics

## Switches

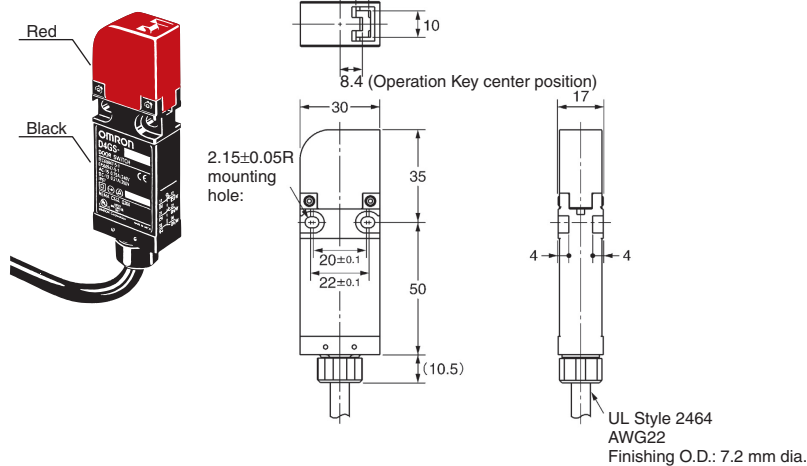
### D4GS-N□R-□



### Operating characteristics

|                              |            |
|------------------------------|------------|
| Key insertion force          | 15 N max.  |
| Key extraction force         | 30 N max.  |
| Pretravel (PT)               | 6.8±3 mm   |
| Movement before being locked | (22 mm)    |
| Direct opening force         | 60 N min.  |
| Direct opening stroke        | 10 mm min. |

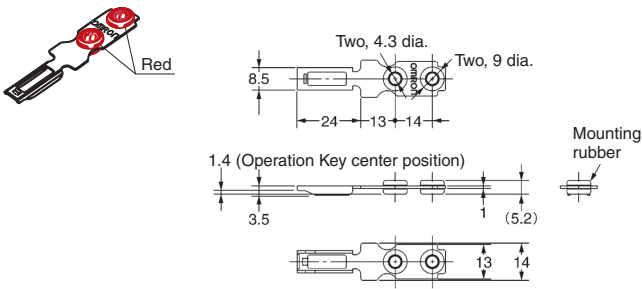
### D4GS-N□T-□



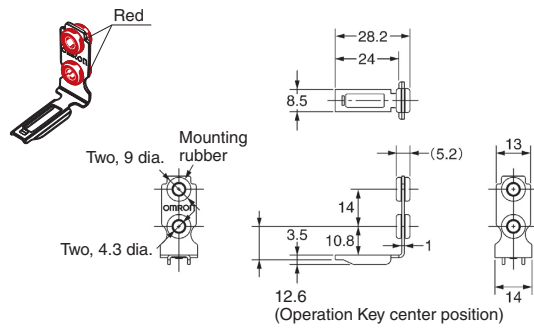
- Note: 1.** Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions. Dimensions in parentheses are reference values.
- Note: 2.** There are fluctuations in the contact ON/OFF timing for Switches with multiple poles (2NC, 2NC/1NO, or 3NC). Confirm performance before application.

Operation Keys

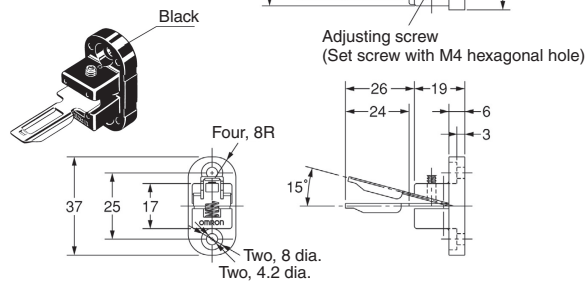
D4GS-NK1



D4GS-NK2



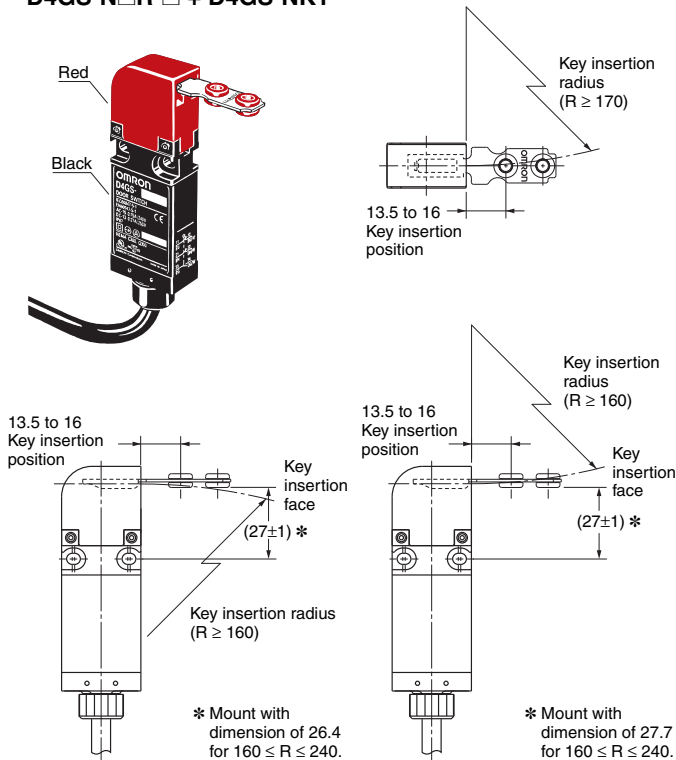
D4GS-NK4



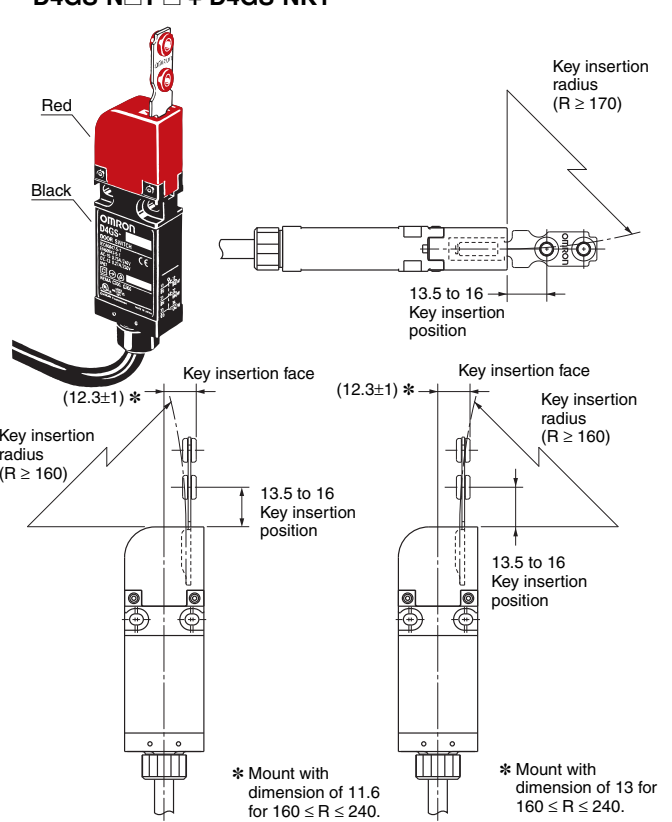
Note: Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions. Dimensions in parentheses are reference values.

With Operation Key Inserted

D4GS-N□R□ + D4GS-NK1

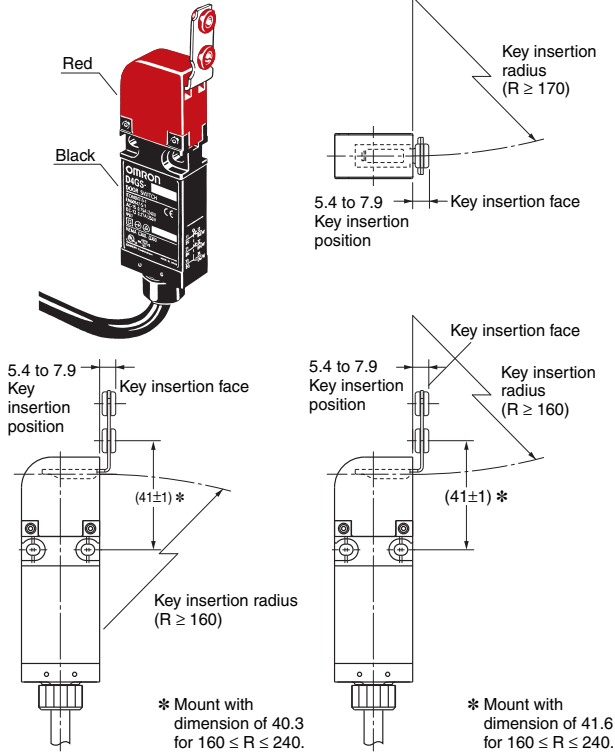


D4GS-N□T□ + D4GS-NK1

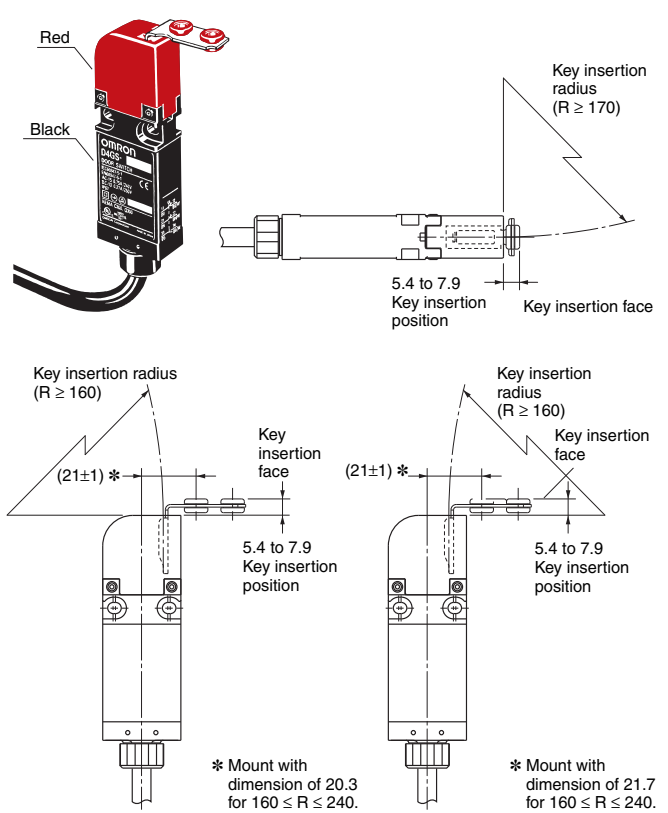


Note: Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions. Dimensions in parentheses are reference values.

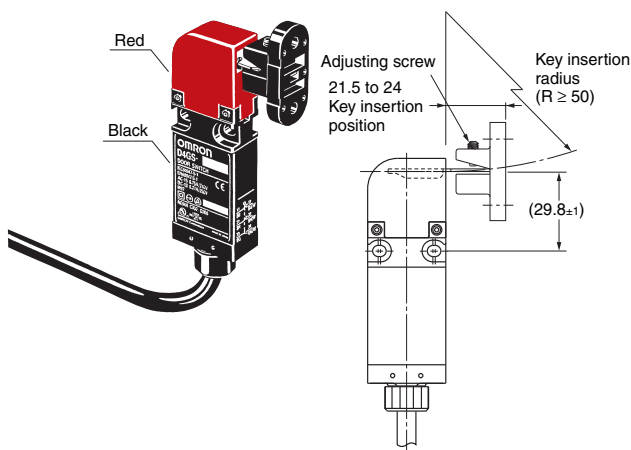
D4GS-N□R-□ + D4GS-NK2



D4GS-N□T-□ + D4GS-NK2



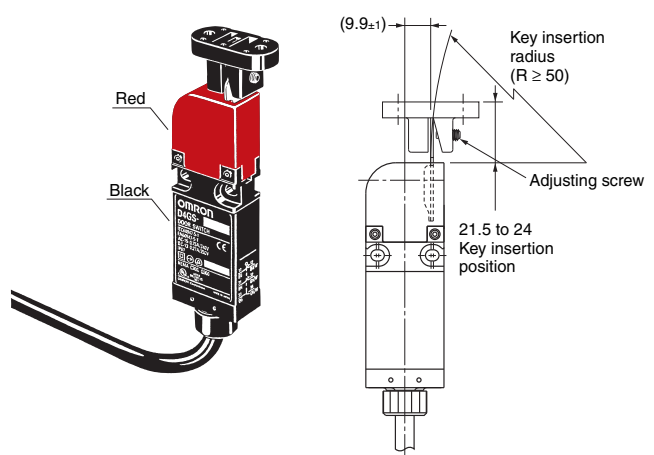
D4GS-N□R-□ + D4GS-NK4



**Note 1:** When determining the operation key insertion radius, adjust the adjusting screw so that the tip of the operation key is positioned to the center of the key insertion hole of the Switch.

**Note 2:** The operation key cannot be inserted or adjusted in a direction different from the one shown above. Use the D4GS-NK1 or D4GS-NK2 if necessary.

D4GS-N□T-□ + D4GS-NK4



**Note 1:** When determining the operation key insertion radius, adjust the adjusting screw so that the tip of the operation key is positioned to the center of the key insertion hole of the Switch.

**Note 2:** The operation key cannot be inserted or adjusted in a direction different from the one shown above. Use the D4GS-NK1 or D4GS-NK2 if necessary.

**Note:** Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions. Dimensions in parentheses are reference values.

## Safety Precautions

Be sure to read the precautions for **All Safety Door Switches** in the website at: <http://www.ia.omron.com/>.

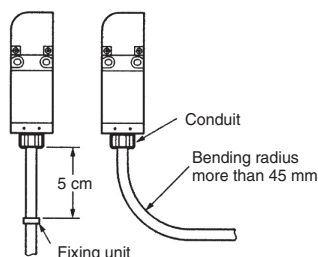
### Precautions for Safe Use

#### Supplementary comments on what to do or avoid doing, to use the product safely.

- Do not use the Switch submersed in oil or water or in locations continuously subject to splashes of oil or water. Doing so may result in oil or water entering the Switch. (The IP67 degree of protection of the Switch specifies the amount of water penetration after the Switch is submerged in water for a certain period of time.)
- Although the Switch body is protected from the ingress of dust or water, the head is not protected. Do not allow foreign substance to enter through the head. Otherwise, accelerated wear or breaking may result.
- Do not switch circuits for two or more standard loads (125 VAC, 1 A). Doing so may adversely affect insulation performance.
- Do not use the D4GS-N□ Switch or D4GS-NK□ Operation Key (rubber color: red) in combination with the D4GS-□ Switch or D4GS-K□ Operation Key (rubber color: black).

#### Handling Cables

- Cables must not be bent repeatedly.
- A cable is fixed with sealing materials on the bottom of the D4GS-N. When excessive force may be imposed on the cable, fix the cable with a fixing unit at the distance of 5 cm from the bottom of the D4GS-N as shown.
- When bending the cable, secure the cable with more than 45 mm bending radius so as not to cause damage to the insulator or sheath of the cable. Otherwise, fire or electrical shock may result.



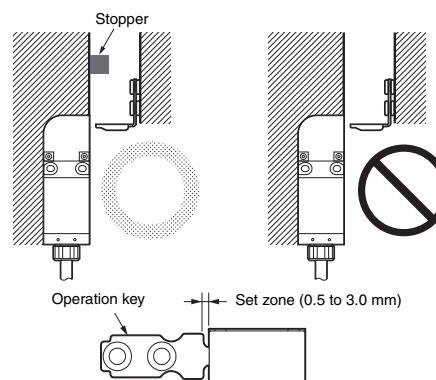
- Do not fasten or loosen the conduit at the bottom of the D4GS-N.
- When wiring, be sure not to allow a liquid such as water or oil into the tip of cable.

#### Stopper Installation

Do not use a Switch as a stopper.

Be sure to install a stopper as shown in the following illustration when mounting the Switch and adjust the stopper so that the Operation Key is within the setting zone.

Do not subject the Switch to a shock that exceeds the Switch's shock resistance of 1,000 m/s<sup>2</sup>.





### Precautions for Correct Use

#### Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

The Switch contacts can be used with either standard loads or microloads. Once the contacts have been used to switch a load, however, they cannot be used to switch smaller loads. The contact surfaces will become rough once they have been used and contact reliability for smaller loads may be reduced.

#### Mounting Methods

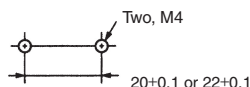
##### Appropriate Tightening Torque

- Loose screws may result in malfunction. Tighten the screws to the specified torques.

| Type                         | Torque           | Size     |
|------------------------------|------------------|----------|
| Body mounting screw          | 0.75 to 1.15 N·m | M4 screw |
| Operation Key mounting screw | 0.75 to 1.15 N·m | M4 screw |

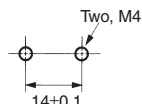
- Use the specified sizes of mounting screws flat or spring washers to mount the Switch and Operation Key, and tighten the screws to the proper tightening torque. To ensure safety, use screws that cannot be easily removed or another means to prevent the Switch and Operation Key from easily being removed.

#### Mounting Hole Dimensions for Switches

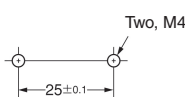


#### Mounting Hole Dimensions for Operation Keys

D4GS-NK1/NK2

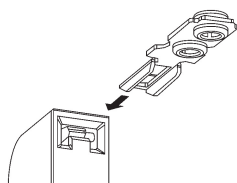


D4GS-NK4



#### Operation Key

- As shown below, mount the Operation Key after matching the concave surface of the Operation Key with the convex surface of the insertion face.

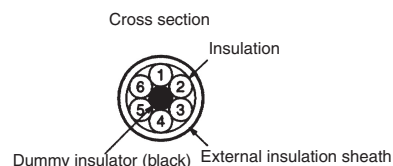


- Depending on the conditions in which the Switch is used, the rubber of the Operation Key may deteriorate. If the rubber becomes deformed or cracked, replace it as soon as possible.

#### Wiring

##### Identifying Wires

Identify wires according to the color (with or without white lines) of the insulation on the wire.



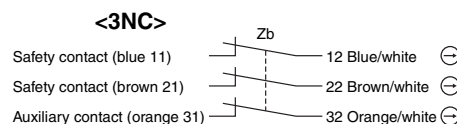
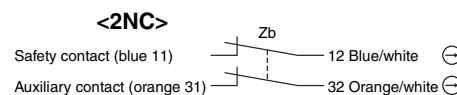
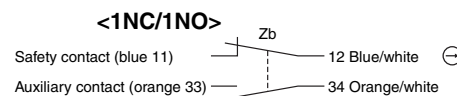
##### Core Insulator Colors

Blue/white, Brown/white, Orange/white, Orange, Brown, and Blue

Example: Orange/white is an orange insulator with a white line.

##### Terminal Numbers

- Identify terminal numbers based on the color of the insulation on the wire.
- The safety and auxiliary contacts of D4GS-N models of three-terminal contact construction and those of two-terminal contact construction are described below. The following shows contact form with key inserted.
- The auxiliary contacts (orange) can be used as safety contacts.
- The safety contacts are direct opening contacts certified by EN and each of them is indicated with the mark  $\ominus$ .



- Cut the black dummy insulator and all unused wires at the end of the external insulation sheath when wiring the cable.

# Terms and Conditions of Sale

1. **Offer; Acceptance.** These terms and conditions (these "**Terms**") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "**Products**") by Omron Electronics LLC and its subsidiary companies ("**Omron**"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
2. **Prices; Payment Terms.** All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
3. **Discounts.** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
4. **Interest.** Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. **Orders.** Omron will accept no order less than \$200 net billing.
6. **Governmental Approvals.** Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. **Taxes.** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
8. **Financial.** If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
9. **Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. **Force Majeure.** Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
11. **Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
  - a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
  - b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
  - c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
  - d. Delivery and shipping dates are estimates only; and
  - e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. **Claims.** Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
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