

# Slim Safety Door Switch

# D4GS-N

CSM\_D4GS-N\_DS\_E\_5\_1

## 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.

 Be sure to read the "Safety Precautions" on page 8 and the "Precautions for All Safety Door Switches".



## Model Number Structure

### Model Number Legend

#### Switch

D4GS-N□□-□  
1 2 3

#### 1. Built-in Switch

- 1: 1NC/1NO (slow-action)
- 2: 2NC (slow-action)
- 3: 2NC/1NO (slow-action)
- 4: 3NC (slow-action)

#### 2. Direction of Operation Key Insertion

- R: Horizontal  
T: Vertical

#### 3. Cable Length

- Blank: 1 m  
3: 3 m  
5: 5 m

#### 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
- EN1088
- EN60204-1

### Certified Standards

| Certification body | Standard  | File No.                                       |
|--------------------|---|--|
| TÜV SÜD            | EN60947-5-1<br>(certified direct opening)<br>GS-ET-15 | 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.

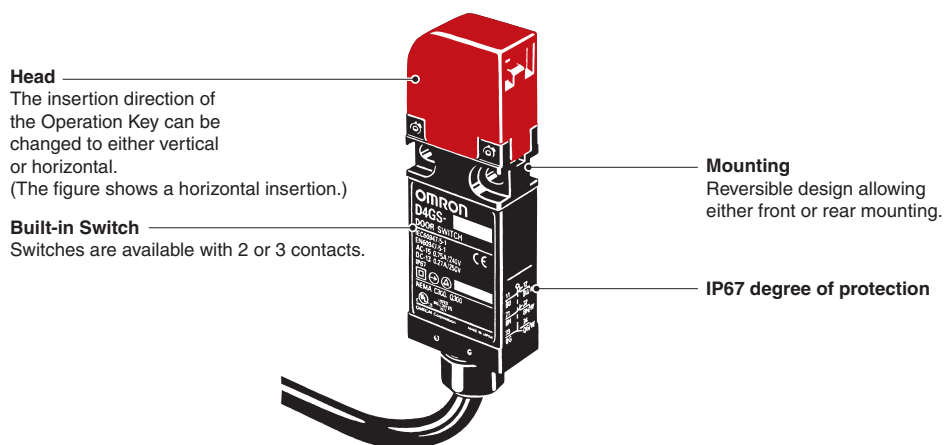
**\*3.** When the ambient temperature is 35°C or higher, do not apply 1 A at 125 VAC to more than one circuit.

**\*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.)

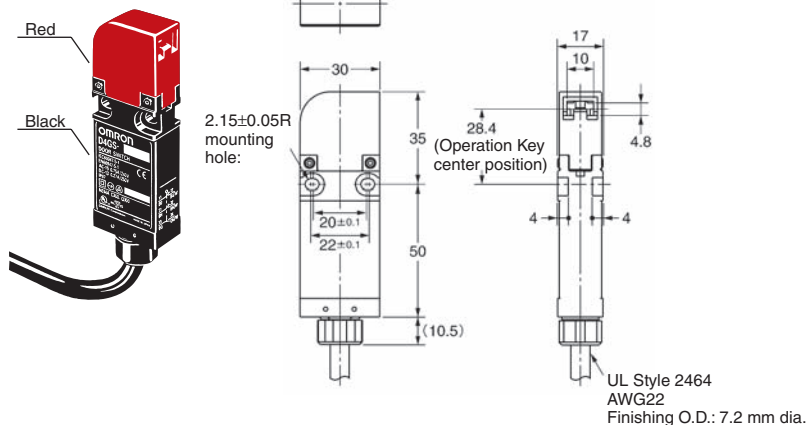
| Model      | Contact | Contact form | Operating pattern | Remarks  |
|------------|---------|--------------|-------------------|--|
| D4GS-N1□-□ | 1NC/1NO |              |                   | Only NC contact 11-12 has a certified direct opening mechanism.<br>The terminals 11-12 and 33-34 can be used 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

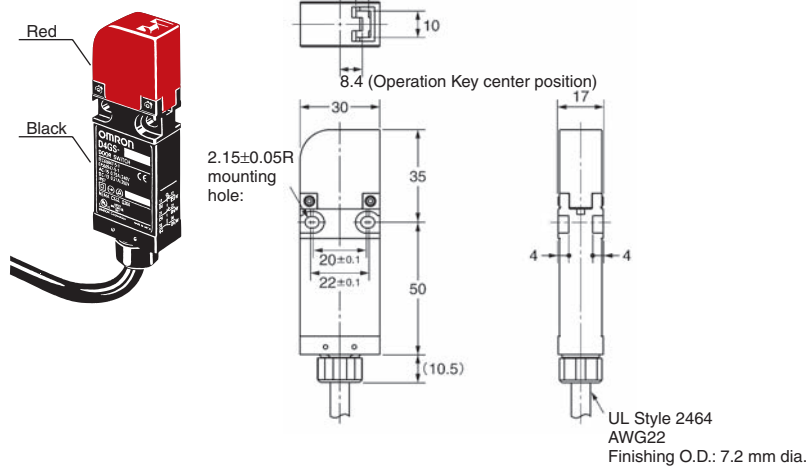
### D4GS-N□R-□



### 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. |

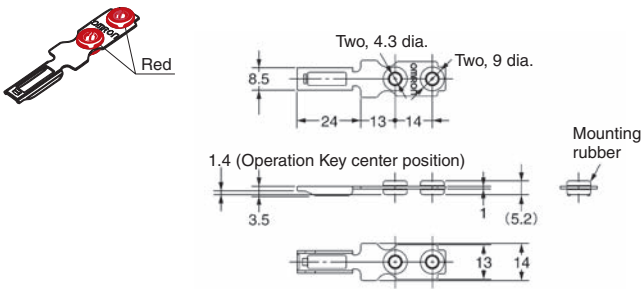
### D4GS-N□T-□



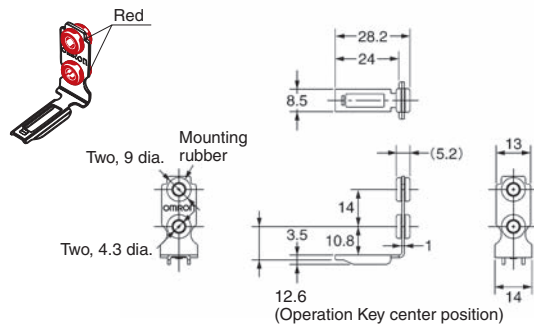
- Note: 1.** Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions. Dimensions in parentheses are reference values.
- 2.** There are fluctuations in the contact ON/OFF timing for Switches with multiple poles (2NC, 2NC/1NO, or 3NC). Confirm performance before application.

Operation Keys

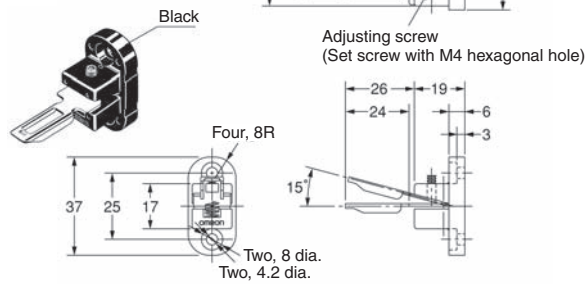
D4GS-NK1



D4GS-NK2



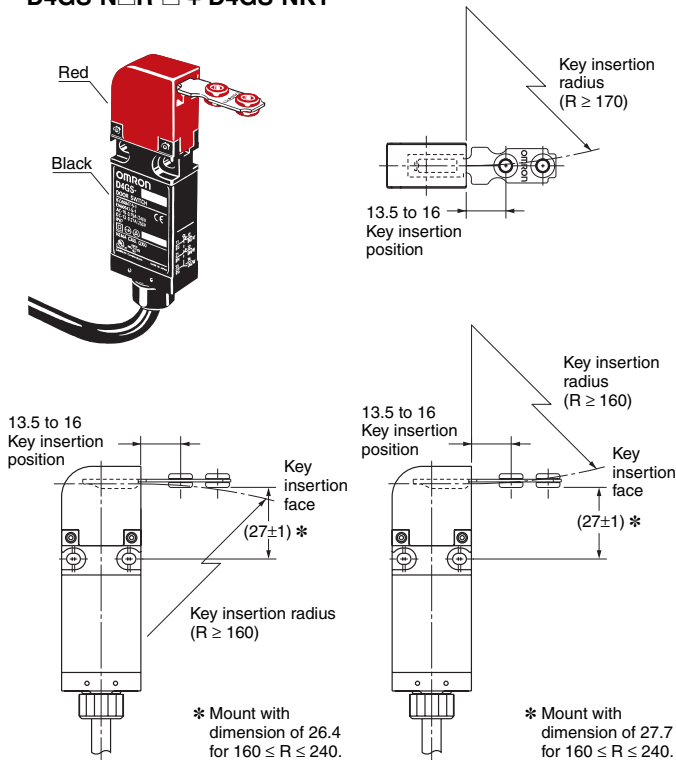
D4GS-NK4



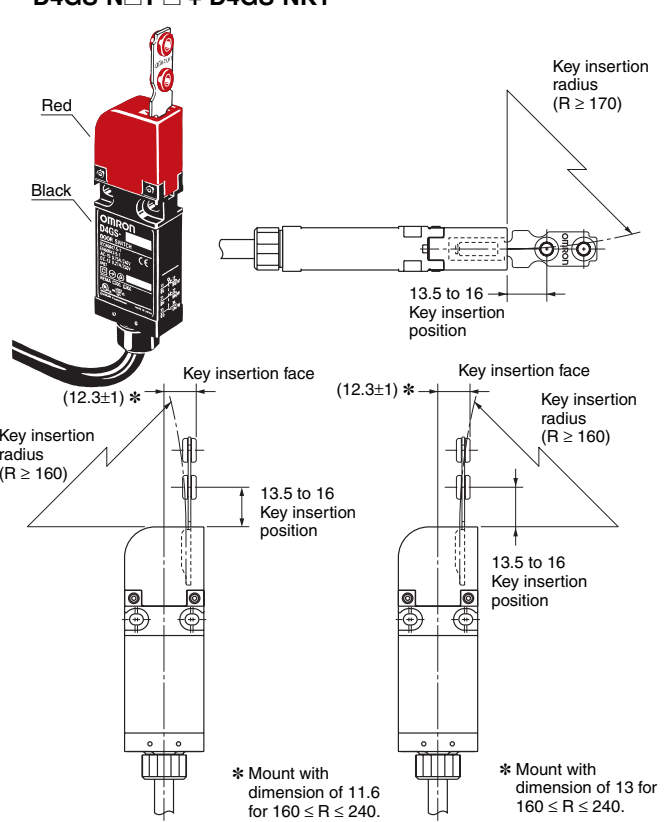
Note: Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions. Dimensions in parentheses are reference values.

With Operation Key Inserted

D4GS-N□R□ + D4GS-NK1

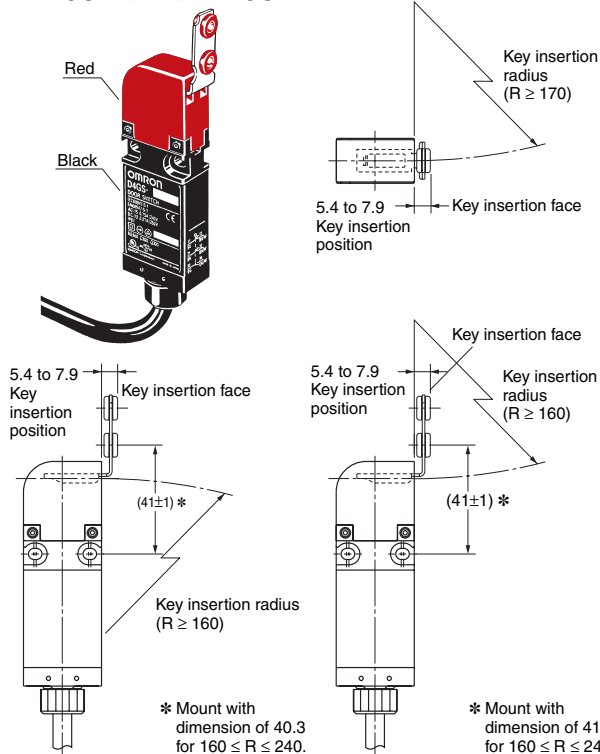


D4GS-N□T□ + D4GS-NK1

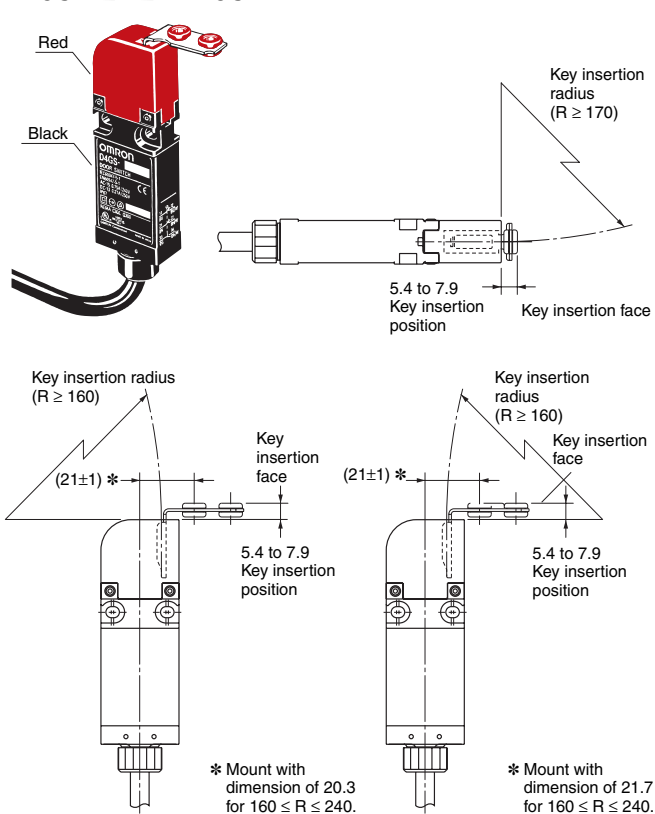


Note: Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions. Dimensions in parentheses are reference values.

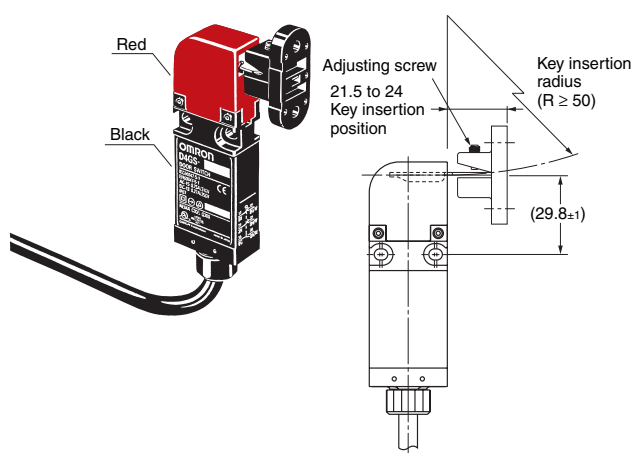
D4GS-N□R-□ + D4GS-NK2



D4GS-N□T-□ + D4GS-NK2



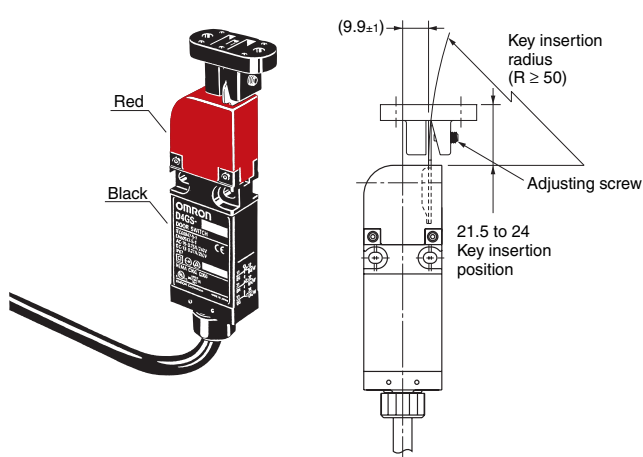
D4GS-N□R-□ + D4GS-NK4



**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

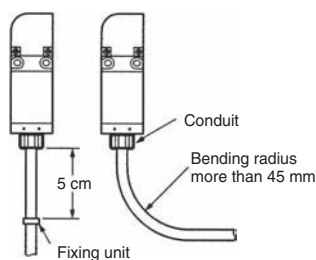
Refer to the “*Precautions for All Switches*” and “*Precautions for All Safety Door Switches*”.

### Precautions for Safe Use

- Do not use the Switch submerged 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.



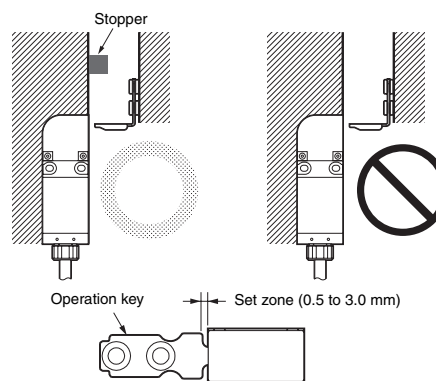
- Do not fasten or loosen the conduit at the bottom of the D4GS-N.
- When wiring, be sure not to allow a liquid such as water or oil into the tip of cable.

### 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

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

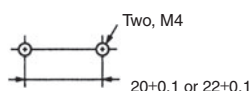
#### Appropriate Tightening Torque

- 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 |

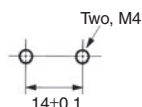
- Use the specified sizes of mounting screws flat or spring washers to mount the Switch and Operation Key, and tighten the screws to the proper tightening torque. To ensure safety, use screws that cannot be easily removed or another means to prevent the Switch and Operation Key from easily being removed.

### Mounting Hole Dimensions for Switches

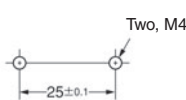


### Mounting Hole Dimensions for Operation Keys

D4GS-NK1/NK2

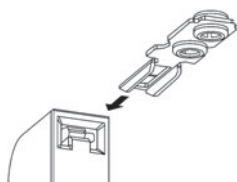


D4GS-NK4



### 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.

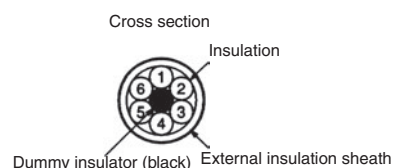


- Depending on the conditions in which the Switch is used, the rubber of the Operation Key may deteriorate. If the rubber becomes deformed or cracked, replace it as soon as possible.

### Wiring

#### Identifying Wires

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



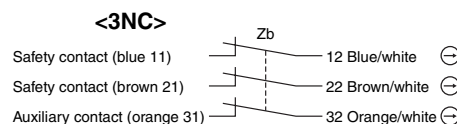
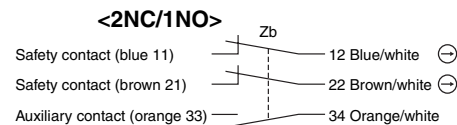
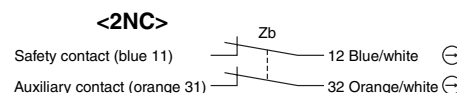
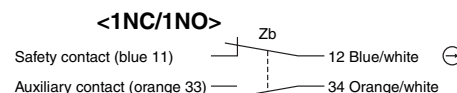
#### Core Insulator Colors

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.

## 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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## Application Considerations

### SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

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

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

## 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.

### ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

2010.8

In the interest of product improvement, specifications are subject to change without notice.

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Industrial Automation Company

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