




### Compact and Economical Plastic-Body Safety-Door Switch

- Positive opening mechanism 
- Double insulation 
- Four unique head mounting positions
- Dual entry points for operation key, top and front side
- Protective insert covers unused entry point
- Enclosure ratings: IP65 (EN60529), Type 4 (UL/CSA) (Indoor use only: Refer to *Precautions*)
- Approved Standards







Agency	Standard	File No.
TÜV Rheinland	EN60947-5-1 (positive opening)	R9551708
UL (see note)	UL508 CSA C22.2 No.14	E76675
BIA	GS-ET-15, EN60947-5-1	1-conduit: 9509915 2-conduit: 9509913
SUVA	SUVA	Approval pending

Note: CSA C22.2 No. 14 compliance was verified and approved by UL (marked with ) .

## Ordering Information

### MODEL NUMBER LEGEND

#### Limit Switch

D4DS -      
1 2 3 4

1. **Conduit**  
3: 1/2-14NPT (1-conduit)
2. **Built-in Switch**  
5: 1NC/1NO (Slow-action)  
A: 2NC (Slow-action)

3. **Head Mounting Direction**  
F: Front-side mounting
4. **Head Variation**  
S: Standard




#### Operation Key

D4DS - K   
1

1. **Operation Key Type**  
1: Horizontal mounting  
2: Vertical mounting  
3: Adjustable mounting (horizontal)


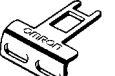
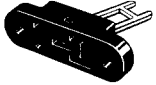
Note: The Operation Key is sold separately.

## ■ SWITCHES

Type		Conduit size	1NC/1NO (Slow-action)		2NC (Slow-action)	
			Positive opening	Part number	Positive opening	Part number
1-conduit		1/2-14NPT		<b>D4DS-35FS</b>		<b>D4DS-3AFS</b>

## ■ ACCESSORIES (ORDER SEPARATELY)

### Operation Key

Mounting type	Part number
Horizontal 	<b>D4DS-K1</b>
Vertical 	<b>D4DS-K2</b>
Adjustable (horizontal) 	<b>D4DS-K3</b>

## Specifications

### ■ RATINGS

#### TÜV and BIA (EN60947-5-1)

Utilization category	AC-15
Rated operating current ( $I_e$ )	2 A
Rated operating voltage ( $U_e$ )	400 V

#### UL (UL508/CSA C22.2 No.14) A600

Rated voltage	Current			Voltage	
	Continuous	Make	Break	Make	Break
120 VAC	10 A	60 A	6 A	7,200 VA	720 VA
240 VAC		30 A	3 A		
480 VAC		15 A	1.5 A		
600 VAC		12 A	1.2 A		

### General Ratings

Rated voltage	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	10 A		3 A	1.5 A	10 A		5 A	2.5 A
250 VAC	10 A		2 A	1 A	10 A		3 A	1.5 A
400 VAC	10 A		1.5 A	0.8 A	3 A		1.5 A	0.8 A
8 VDC	10 A		6 A	3 A	10 A		6 A	
14 VDC	10 A		6 A	3 A	10 A		6 A	
30 VDC	6 A		4 A	3 A	6 A		4 A	
125 VDC	0.8 A		0.2 A	0.2 A	0.8 A		0.2 A	
250 VDC	0.4 A		0.1 A	0.1 A	0.4 A		0.1 A	

- Note:
- The above current ratings are for a steady-state current.
  - Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
  - Lamp load has an inrush current of 10 times the steady-state current.
  - Motor load has an inrush current of 6 times the steady-state current.

## ■ CHARACTERISTICS

Operating speed	0.1 m/s to 0.5 m/s
Contact gap	2 x 2 mm min.
Operating frequency	30 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC) between terminals of same polarity, between terminals of different polarity, between each terminal and ground, and between each terminal and non-current-carrying metal part
Contact resistance	25 mΩ max. (initial value)
Dielectric strength	Impulse dielectric strength ( $U_{imp}$ ) 4 kV between terminals of same polarity, between terminals of different polarity, and between each terminal and non-current-carrying metal part (EN60947-5-1)
Rated insulation voltage ( $U_i$ )	400 V (EN60947-5-1)
Switching overvoltage	1,500 V max. (EN60947-5-1)
Pollution degree (operating environment)	3 (EN60947-5-1)
Short-circuit protective device (SCPD)	10 A, fuse type gI or gG (IEC269)
Conditional short-circuit current	100 A (EN60947-5-1)
Conventional enclosed thermal current ( $I_{the}$ )	10 A (EN60947-5-1)
Protection against electric shock	Class II (double insulation)
Vibration resistance	Malfunction: 10 to 500 Hz, 0.65-mm single amplitude with an imposed acceleration of 100 m/s <sup>2</sup> (10G) max.
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> min. (approx. 100G min.) Malfunction: 300 m/s <sup>2</sup> min. (approx. 30G min.)
Life expectancy (see note 1)	Mechanical: 1,000,000 operations min. Electrical: 150,000 operations min.
Ambient temperature	Operating: -30°C to 70°C (with no icing)
Ambient humidity	Operating: 95% max.
Enclosure rating (see note 2)	IP65 (EN60947-5-1)
Weight	Approx. 76 g (for D4DS-15FS)

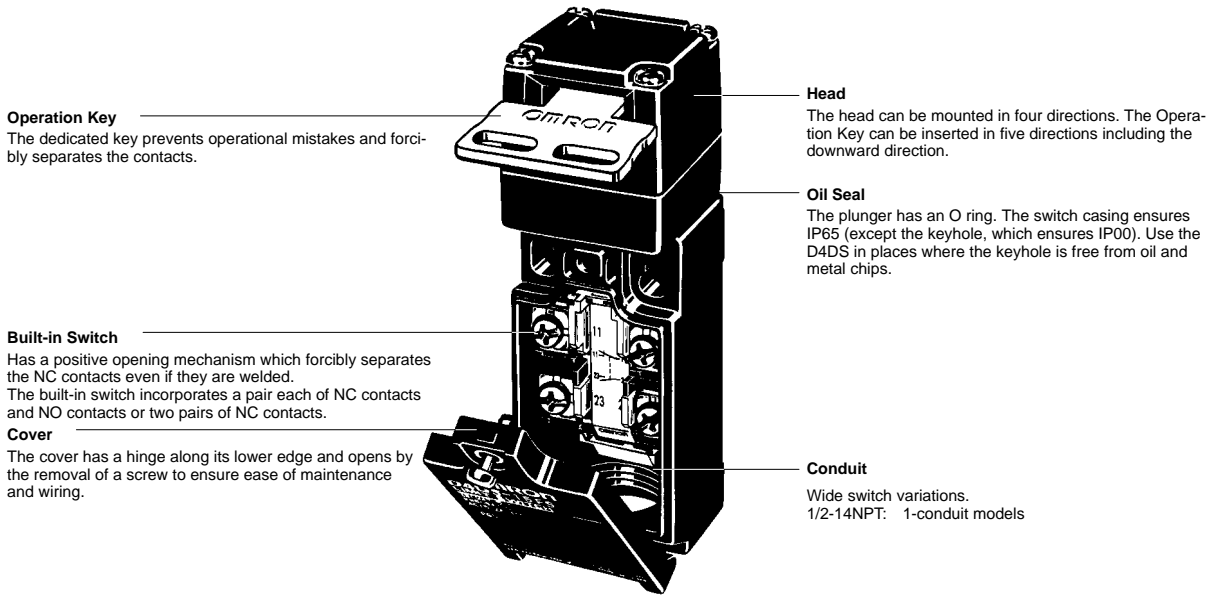
- Note: 1. The above mechanical life and electrical life are possible when the ambient temperature is 5°C to 55°C and the ambient humidity is 40% to 70%.
2. Although the switch casing resists dust, oil, and water, make sure that the keyhole on the head is free from dust, oil, water, and chemicals, otherwise the D4DS may wear out, break, or malfunction.

## ■ OPERATING CHARACTERISTICS

Part number	D4DS-3□□S
Operating force (extraction)	14.71 N (1,500 gf)
Release force (insertion)	29.42 N (3,000 gf)
Pretravel	6±3 mm
Total travel (reference value)	28 mm
Min. positive opening force (see note)	58.84 N (6,000 gf)
Min. positive opening stroke (see note)	10 mm

Note: Make sure that the positive opening stroke is at least 16 mm in order to use the D4DS safely.

# Nomenclature



Note: The housing and head of the D4DS are made of synthetic resin. If high mechanical durability is required, use the D4BS Safety Door Switch.

# Operation

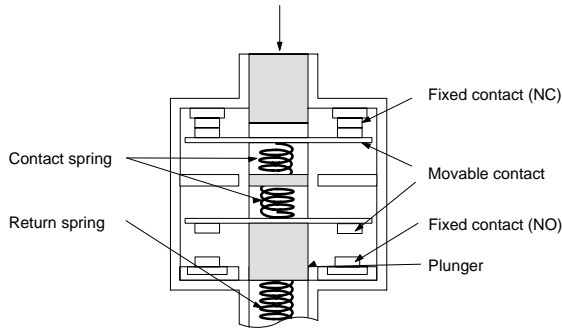
## CONTACT FORM

Part number	Contact	Diagrams	Remarks
D4DS-□5□S	1NC/1NO	 	Only NC contacts 11 and 12 have an approved positive opening mechanism.
D4DS-□A□S	2NC	 	NC contacts 11, 12, 21, and 22 have an approved positive opening mechanism.

Note: Terminals are numbered according to EN50013 and contacts are marked according to EN60947-5-1.

■ POSITIVE OPENING MECHANISM

1NC/1NO Contact (Slow-action)



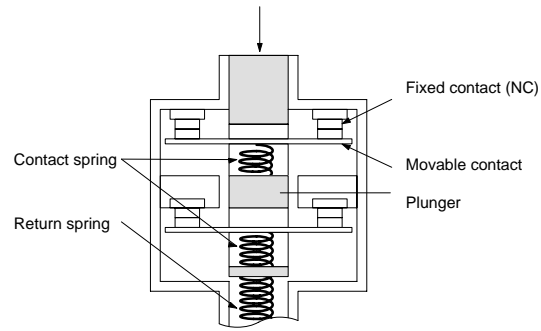
Only the NC contacts have a positive opening function.

When metal deposition occurs, the contacts are separated from each other by pushing in the plunger.

Conforms to EN60947-5-1 Positive Opening



2NC Contact (Slow-action)



Both NC contacts incorporate a positive opening function.

When metal deposition occurs, the contacts are separated from each other by pushing in the plunger.

Conforms to EN60947-5-1 Positive Opening



Note: The switches are marked with “” indicating approval for the positive opening mechanism.

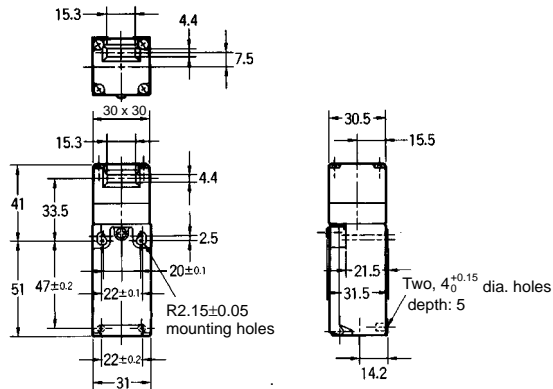
## Dimensions

Unit: mm

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

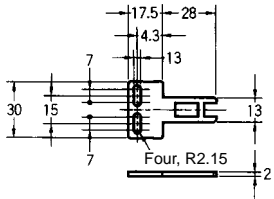
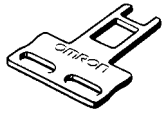
1-conduit Model

D4DS-3□□S

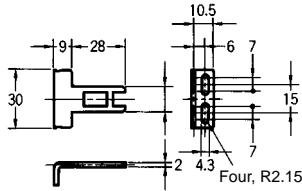
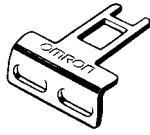


Operation Keys

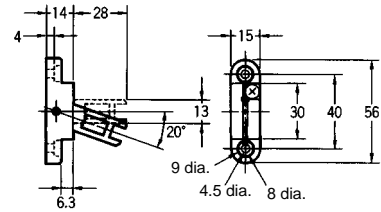
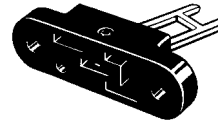
D4DS-K1



D4BS-K2

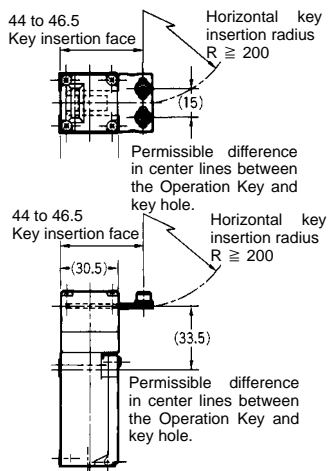
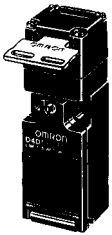


D4BS-K3

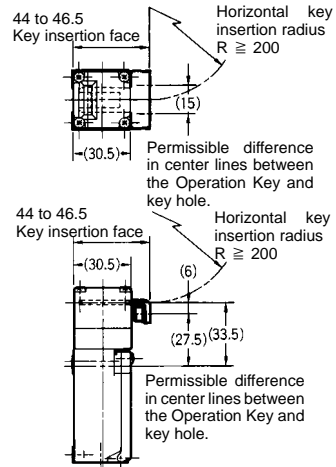


With Operation Key Inserted

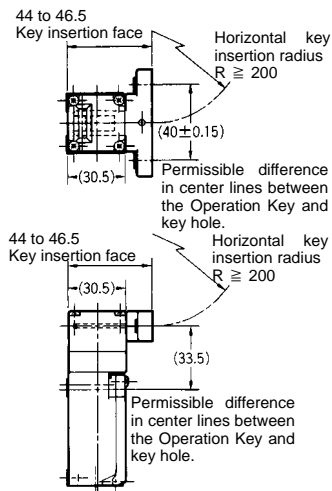
D4DS-3□□S + D4DS-K1



D4DS-3□□S + D4DS-K2



D4DS-3□□S + D4DS-K3



## Precautions

### ■ WARNINGS AND CAUTIONS

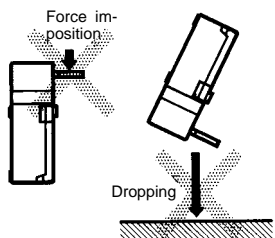
- WARNING** Do not insert the spare Operation Key into the key-hole when the door is open, otherwise the machine will operate, which may result in serious injury.
- WARNING** Protect the D4DS with an appropriate cover and post a warning sign near the D4DS, otherwise the D4DS or Operation Key may be removed accidentally, which may result in serious injury due to the unexpected operation of the machine.
- WARNING** Connect a short-circuit protection device specified by OMRON to the D4DS in series to protect the D4DS from overcurrent. The D4DS will radiate heat and a fire may result if overcurrent flows into the D4DS over a long time.
- Caution** Do not use any metal connector or conduit with the D4DS, otherwise the conduit hole of the D4DS may become damaged.
- Caution** Use the D4DS indoors only. The D4DS may malfunction if the D4DS is used outdoors.

### ■ CORRECT USE

#### Operation Key

Do not operate the Safety-door Limit Switch with a tool other than OMRON's special Operation Key for the Safety-door Limit Switch, otherwise the Safety-door Limit Switch will become damaged or the safety of the system will not be assured.

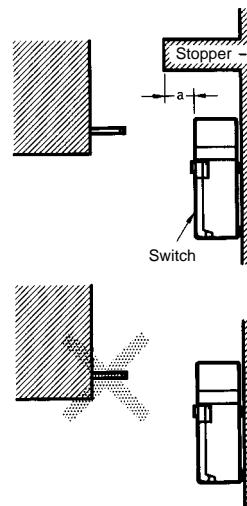
Do not impose excessive force to the Operation Key in the switch or drop the Operation Key, otherwise the Operation Key will become deformed or damaged.



Secure the Operation Key with a one-way screw, or an equivalent, so that the Operation Key will not be easily removed.

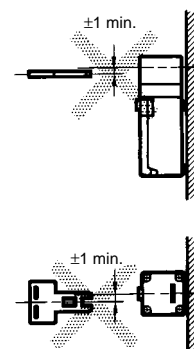
### Mounting

Be sure to locate a stopper as shown in the following illustration when mounting the D4DS. Do not use a switch as a stopper. The distance between the front side of the D4DS and the top of the stopper must be 3 mm maximum.



Refer to the mounting dimensions on page 6 and secure the Operation Key correctly. Make sure that the Operation Key is not slanted when securing the Operation Key.

The tolerance of the position of the Operation Key is  $\pm 1$  mm in the upward, downward, left, right, and slanting directions. If the Operation Key is not mounted properly, the D4DS may wear out or break.

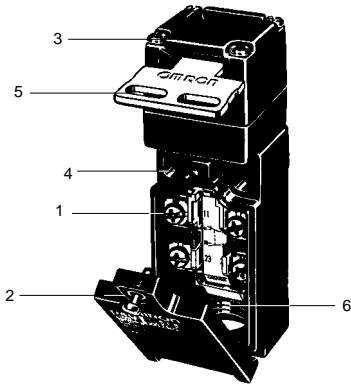


### Other

Make sure that the D4DS is free from metal chips, oil, and chemical, otherwise the D4DS may malfunction.

**Mounting Screw Tightening Torque**

Refer to the following and tighten each screw of the D4DS properly, otherwise the D4DS may malfunction.



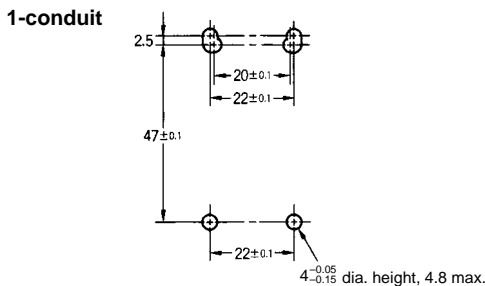
No.	Type	Torque
1	Terminal screw	0.4 to 0.6 N • m (4 to 6 kgf • cm)
2	Cover mounting screw	0.78 to 0.88 N • m (8 to 9 kgf • cm)
3	Head mounting screw	0.8 to 0.88 N • m (8 to 9 kgf • cm)
4	Switch mounting screw (M5) (see note 1)	0.49 to 0.69 N • m (5 to 7 kgf • cm)
5	Operation Key mounting screw	2.4 to 2.8 N • m (24 to 28 kgf • cm)
6	Connector	1.4 to 1.8 N • m (14 to 18 kgf • cm)

Note: When mounting the D4DS with M5 screws, use a washer with each of the M5 screws and tighten the M5 screws to the specified torque.

**■ MOUNTING HOLES**

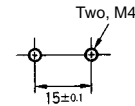
**Switches**

Use two M4 bolts and washers to mount the D4DS securely. Each M4 bolt must have a hexagonal hole on the head. The D4DS will be mounted more securely by opening two 4.8-mm long holes and inserting the protruding portions of the D4DS into the holes as shown in the following illustration.

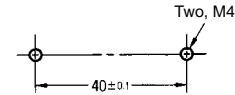


**Operation Key**

**Horizontal/Vertical Mounting (D4DS-K1/-K2)**



**Adjustable Mounting (D4DS-K3)**



**■ CHANGING THE ACTUATOR MOUNTING POSITION**

Remove the screws on four corners of the head to change the direction of the head. The head can be mounted in four directions.

When changing the direction of the head, make sure that the Operation Key is inserted into the head and that the D4DS is free from any foreign substance. Do not remove any internal screw from the head, otherwise the internal parts of the head may become lost or deformed.

**■ WIRING**

When wiring, do not connect the lead wire directly to the terminal, but use an insulation tube and crimp-type terminal. Tighten to a torque 0.4 to 0.6 N • m (4 to 6 kgf • cm). The lead wire must be between AWG20 and AWG14 (0.5 to 2.5 mm<sup>2</sup>).

Be careful not to touch the terminals while power is being supplied in order to avoid any electrical shock.

**■ CONDUIT**

Do not use any metal connector or conduit with the D4DS, otherwise the conduit hole of the D4DS may be damaged. To keep the D4DS meeting the requirements of IP65, protect the conduit hole side of the connector with sealing tape. Use a cable with a diameter suitable for the connector.

Insert a cap screw provided with the D4DS into any unused conduit opening of the D4DS and tighten the cap screw to a torque of 1.3 to 1.7 N • m (13 to 17 kgf • cm).

**■ MAINTENANCE AND REPAIRS**

The user must not maintain or repair equipment incorporating any D4DS model. Contact the manufacturer of the equipment for any maintenance or repairs required.



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