


# Safety-door Switch D4BS

**The Special Operation Key Activates a Direct Opening Mechanism to Open the Contacts and Shut Off Control Circuits when Protective Doors Are Opened on Machine Tools or Other Equipment**

- Conforms to EN (TÜV) standards corresponding to the CE marking.
- Approved by UL, CSA, BIA, and SUVA standards.
- The Switch contact is opened by a direct opening mechanism (NC contacts only) when the protective cover is opened. The EN-approved direct opening mechanism is indicated by  on the Switch.
- Malfunctions and false operation prevented by special Operation Key.
- Wide temperature range specifications: -40 to 80°C.
- Degree of protection of the switch box: IP67 (EN60947-5-1).
- Series includes models with gold-plated contacts for handling the microload range.






Safety Interlock  
Switches  
D4BS

## Model Number Structure

### Model Number Legend

#### Switch

D4BS -    S

#### 1. Conduit

- 1: PG13.5 (1 conduit)
- 2: G1/2 (1 conduit)
- 3: 1/2-14NPT (1 conduit)
- 5: PG13.5 (3-conduit)
- 6: G1/2 (3-conduit)
- 7: 1/2-14NPT (3-conduit)

#### 2. Built-in Switch

- 5: 1NC/1NO (slow-action)
- 6: 1NC/NO (slow-action), gold-plated contacts
- A: 2NC (slow-action)
- B: 2NC (slow-action), gold-plated contacts

#### 3. Head Mounting Direction

- F: Four mounting directions possible (front-side mounting at shipping)

#### Operation Key

D4BS - K 

#### 1. Operation Key Type



- 1: Horizontal mounting
- 2: Vertical mounting
- 3: Adjustable mounting (Horizontal)

**Note:** Do not order the head and Switch separately. (The Operation Key, however, must be ordered separately.)

## Ordering Information

### List of Models

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

Type	Mounting direction		Conduit size	1NC/1NO (Slow-action)	2NC (Slow-action)
1-conduit	Front-side mounting		Pg13.5	D4BS-15FS	D4BS-1AFS
			G1/2	D4BS-25FS	D4BS-2AFS
			1/2-14NPT	D4BS-35FS	D4BS-3AFS
3-conduit	Front-side mounting		Pg13.5	D4BS-55FS	D4BS-5AFS
			G1/2	D4BS-65FS	D4BS-6AFS
			1/2-14NPT	D4BS-75FS	D4BS-7AFS



OMRON SCIENTIFIC TECHNOLOGIES, INC.

USA Tel. 1/888/510-4357 Canada Tel. 1/866/986-6766

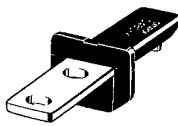
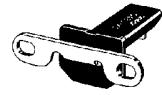
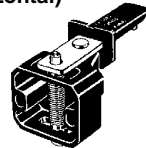


For the Latest Information

On the Internet: [www.sti.com](http://www.sti.com) or [www.omron.ca](http://www.omron.ca)

OMRON


**Operation Keys (Order Separately)**Safety Interlock  
Switches  
D4BS

Type	Model
Horizontal mounting 	D4BS-K1
Vertical mounting 	D4BS-K2
Adjustable mounting (Horizontal) 	D4BS-K3

**Specifications****Standards and EC Directives**

- Conforms to the following EC Directives:  
Machinery Directive  
Low Voltage Directive  
EN50041  
EN1088

**Approved Standards**

Agency	Standard	File No.
TÜV Rheinland	EN60947-5-1	R9351022 (Direct opening: approved) 
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746
BIA	GS-ET-15	9303323
SUVA	SUVA	E6187.d
CQC (CCC)	GB14048.5	2003010305073833

**Approved Standard Ratings****TÜV (EN60947-5-1), CCC (GB14048.5)**

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

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

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

Rated voltage	Carry current	Current		Volt-amperes	
		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		

## ■ Characteristics

Degree of protection (see note 2)	IP67 (EN60947-5-1) (This applies for the Switch only. The degree of protection for the key hole is IP00.)
Durability (see note 3)	Mechanical: 1,000,000 operations min. Electrical: 500,000 operations min. (10 A at 250 VAC, resistive load)
Operating speed	0.1 m/s to 0.5 m/s
Operating frequency	30 operations/min max.
Rated frequency	50/60 Hz
Contact gap	2 x 2 mm min.
Direct opening force (see note 4)	19.61 N min. (EN60947-5-1)
Direct opening travel (see note 4)	20 mm min. (EN60947-5-1)
Full stroke	23 mm min.
Insulation resistance	100 MΩ min. (at 500 VDC) between terminals of same or different polarity, between each terminal and ground, and between each terminal and non-current-carrying metal part
Contact resistance	25 mΩ max. (initial value)
Rated insulation voltage (U <sub>i</sub> )	600 V (EN60947-5-1)
Conventional enclosed thermal current (I <sub>the</sub> )	20 A (EN60947-5-1)
Dielectric strength (U <sub>imp</sub> )	Impulse dielectric strength (U <sub>imp</sub> ) 4 kV (EN60947-5-1) between terminals of same or different polarity, between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal part
Switching overvoltage	1,500 V max. (EN60947-5-1)
Conditional short-circuit current	100 A (EN60947-5-1)
Pollution degree (operating environment)	3 (EN60947-5-1)
Insulation class	Class I (with ground terminal)
Vibration resistance	Malfunction: 10 to 500 Hz, 0.65-mm single amplitude
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> min. (IEC68-2-27) Malfunction: 300 m/s <sup>2</sup> min. (IEC68-2-27)
Ambient temperature	Operating: -40°C to 80°C (with no icing)
Ambient humidity	Operating: 95% max.
Weight	Approx. 285 g (in the case of D4BS-15FS)

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

- The degree of protection is tested using the method specified by the standard (EN60947-5-1). Confirm that sealing properties are sufficient for the operating conditions and environment beforehand. Although the switch box is protected from dust, oil, or water penetration, do not use the D4BS in places where dust, oil, water, or chemicals may enter through the key hole on the head, otherwise Switch damage or malfunctioning may occur.
- The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40% to 70%. Contact your OMRON sales representative for more detailed information on other operating environments.
- These figures are minimum requirements for safe operation.

## Connections

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

Model	Contact form	Operating pattern	Remarks
D4BS-□5□S	1NC/1NO		<p>Only NC contact 11-12 has an approved direct opening mechanism. (→)</p> <p>Terminals 11-12 and 23-24 can be used as unlike poles.</p>
D4BS-□A□S	2NC		<p>NC contacts 11-12 and 21-22 have an approved direct opening mechanism. (→)</p> <p>Terminals 11-12 and 21-22 can be used as unlike poles.</p>

**Note:** The terminal numbers are in accordance with EN50013, and the contact symbols are in accordance with IEC60947-5-1.

# Nomenclature

Safety Interlock  
Switches  
  
D4BS

**Operation Key**  
D4BS's exclusive-use Operation Key is provided to assure accurate switching operation.

**Set Zone Mark**  
A triangular Set Zone Mark makes it easy to adjust the operating position when inserting the Operation Key.

**Built-in Switch**  
A shearing force contact separating mechanism (NC contact) is employed, which positively pulls apart the contacts from each other by using shearing force if any abnormality such as contact welding should occur in the contact area.

There is a difference in level between the NC and NO terminal, which assures easy wiring.

**Ground Terminal Screw**  
A ground terminal is provided to improve safety. (Built into the Unit.)

**Head**  
The switch head is coated with easy-to-see red paint. The mounting direction of the switch head can be varied to any of the four directions.

**Seal Ring (NBR)**

**Oil Seal (NBR)**  
The operation plunger employs an oil seal, with which the switch box meets the requirements of IP67 (the sealing capability of the Operation Key's insertion mouth is IP00).

**Seal Packing (NBR)**

**Conduit Opening**

Box Size	1-conduit box	3-conduit box
Pg13.5	Yes	Yes
G1/2	Yes	Yes
1/2-14NPT	Yes	Yes



# Dimensions

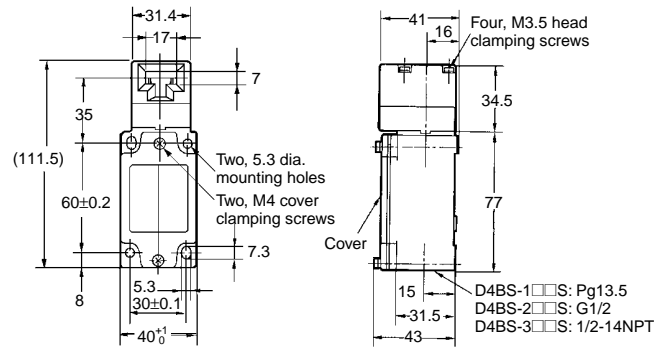
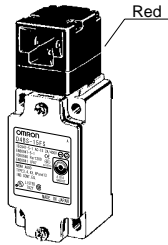
## Switches

### 1-conduit

D4BS-1□□S

D4BS-2□□S

D4BS-3□□S



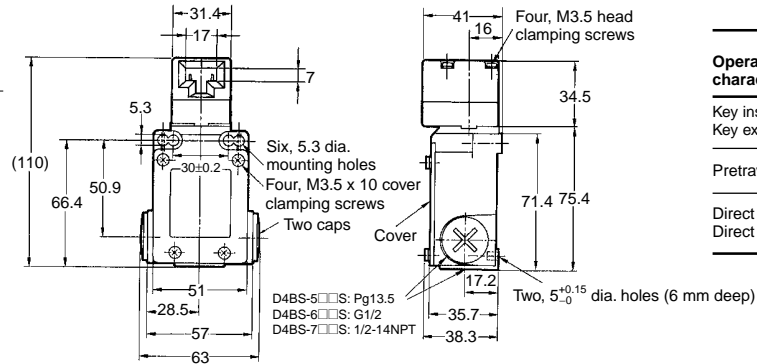
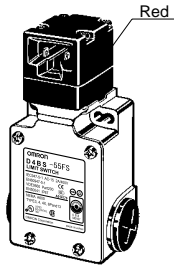
Operating characteristics	D4BS-1□□S D4BS-2□□S D4BS-3□□S
Key insertion force	19.61 N max.
Key extraction force	19.61 N max.
Pretravel (PT)	10±5 mm
Direct opening force	19.61 N min.
Direct opening stroke	20 mm min.

### 3-conduit

D4BS-5□□S

D4BS-6□□S

D4BS-7□□S



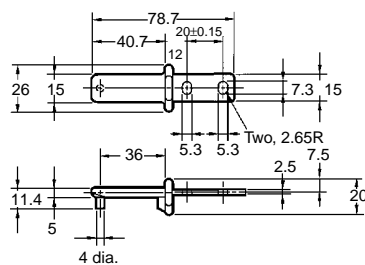
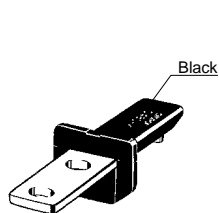
Operating characteristics	D4BS-5□□S D4BS-6□□S D4BS-7□□S
Key insertion force	19.61 N max.
Key extraction force	19.61 N max.
Pretravel (PT)	10±5 mm
Direct opening force	19.61 N min.
Direct opening stroke	20 mm min.

- Note:** 1. All units are in millimeters unless otherwise indicated.  
 2. Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions.  
 3. There are fluctuations in the contact ON/OFF timing for 2NC contacts. Confirm performance before application.  
 4. The conduit thread varies with the model as follows:

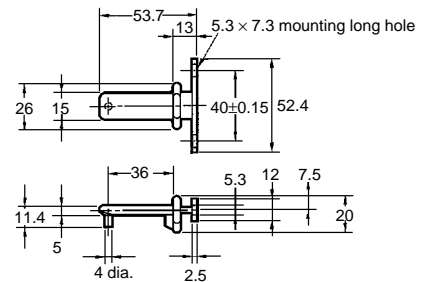
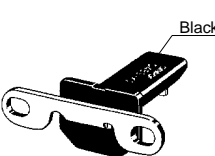
Conduit thread	Model
Pg 13.5	D4BS-1□□S, D4BS-5□□S
G1/2	D4BS-2□□S, D4BS-6□□S
1/2-14NPT	D4BS-3□□S, D4BS-7□□S

## Operation Keys

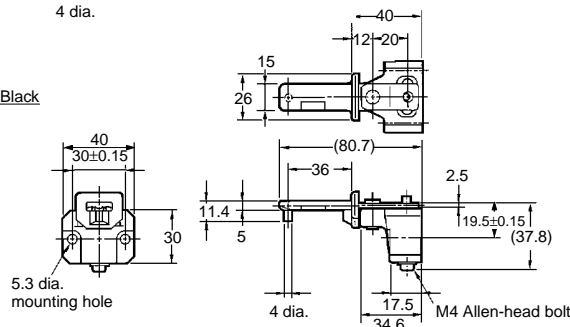
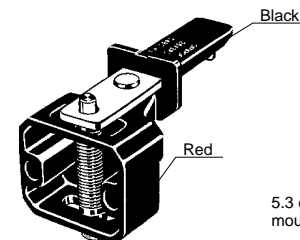
### D4BS-K1



### D4BS-K2



### D4BS-K3



## With Operation Key Inserted

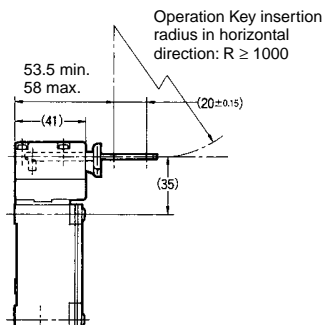
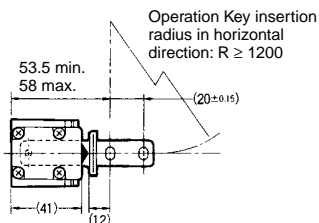
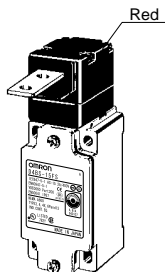
### Horizontal Mounting

D4BS-1□□S +D4BS-K1

D4BS-2□□S +D4BS-K1

D4BS-3□□S +D4BS-K1

Safety Interlock Switches  
D4BS

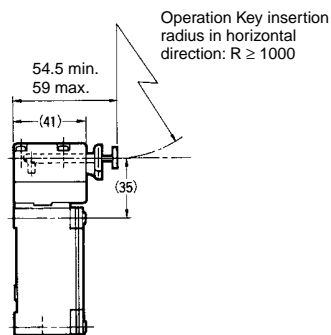
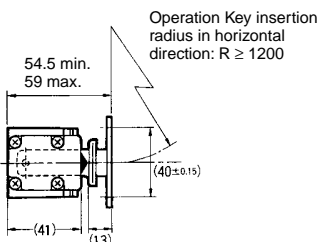
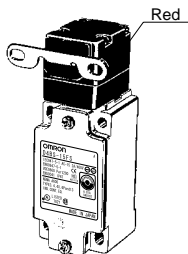


### Vertical Mounting

D4BS-1□□S +D4BS-K2

D4BS-2□□S +D4BS-K2

D4BS-3□□S +D4BS-K2

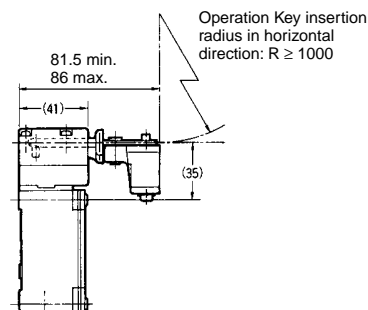
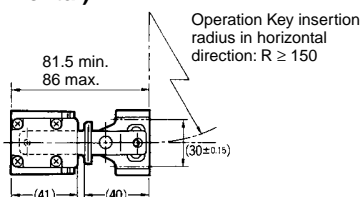
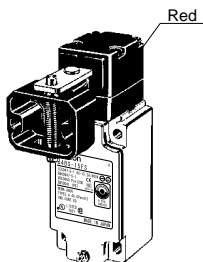


### Adjustable Mounting (Horizontal)

D4BS-1□□S +D4BS-K3

D4BS-2□□S +D4BS-K3

D4BS-3□□S +D4BS-K3



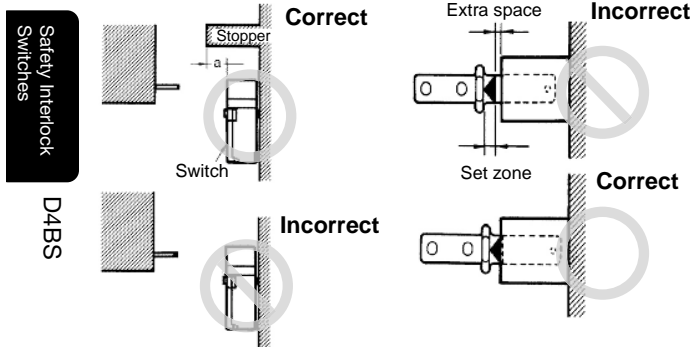
**Note:** "R" is the Operation Key insertion radius.

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



## 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 so that the base of the Operation Key does not strike the Head.

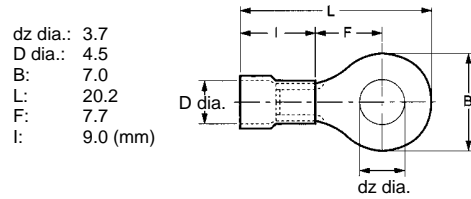


Refer to *Dimensions* for the mounting dimensions of the Operation Key and mount the Operation Key correctly. The Operation Key will soon become damaged or worn out if it is not mounted correctly.

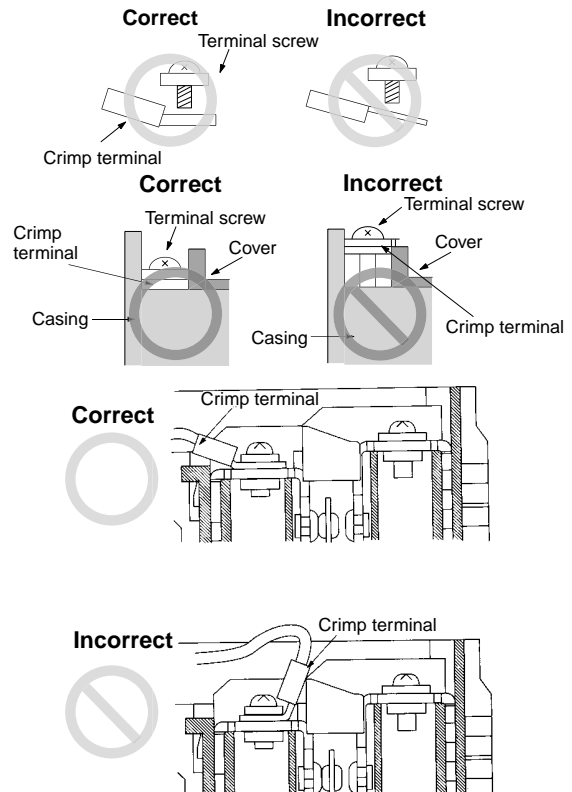
## Wiring

Do not connect the lead wires directly to the terminals. Connect the lead wires through insulation tubes and M3.5 crimp terminals. Tighten each terminal screw within the proper torque range.

The proper lead wire is AWG20 to AWG14 (0.5 to 2.5 mm<sup>2</sup>) in size.



Wire using the methods shown below so that the crimp terminals are not caught on the case or cover. Otherwise it may not be possible to mount the cover completely and malfunctions may occur.



## Conduit Opening

Tighten the connector to a suitable torque. Excessive tightening torque may damage the casing.

When using 1/2-14NPT conduits, apply sealing tape between the connector and conduit opening to maintain the degree of protection (IP67) of the Switch. If using a Pg13.5 conduit, use an ABS-08 Pg13.5 connector or an ABS-12 Pg13.5 connector (manufactured by Nippon Flex).

Use a connector (SC Series, sold separately) suitable for the outer diameter of the cable.

When wiring a 3-conduit model, securely tighten the cap screw provided for unused conduit openings.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Omron:

[D4BS-15FS](#) [D4BS-1AFS](#) [D4BS-2AFS](#)