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Find the *OMRON D4DS-35FS* at our website: *Click HERE*

Safety-door Switch
D4DS

Compact Safety Switch Saves Space and is Ideal for a Variety of Doors

- Conforms to EN (TÜV) standards corresponding to the CE marking. (Direct opening mechanism is indicated by ⊖ on the switch.)
- The switch contact is opened by a direct opening mechanism (NC contacts only) when the protective cover is opened.
- Wide standard operating temperature range: −30 to 70°C.
- Double-insulation structure requires no ground terminals. (with ⧈ mark)
- Five-direction Operation Key.
- Approved by UL, CSA, BIA and SUVA standards.
- Series includes models with gold-plated contacts for handling the micro-load range.



Model Number Structure

■ Model Number Legend

Switch
D4DS-□□□S
1 2 3

1. **Conduit**
   1: Pg13.5 (1-conduit)
   2: G1/2 (1-conduit)
   3: 1/2-14NPT (1-conduit)
   5: Pg13.5 (2-conduit)
   6: G1/2 (2-conduit)
2. **Built-in Switch**
   5: 1NC/1NO (slow-action)
   6: 1NC/1NO (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
D4DS-K□
1

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

Note: An order for the head part or the switch part alone cannot be accepted. The Operation Key is sold separately.

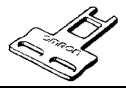
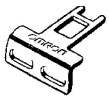
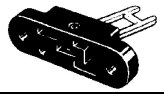
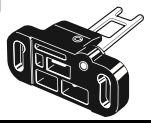
Ordering Information

■ List of Models

Switches

Type		Conduit size	1NC/1NO (Slow-action)	2NC (Slow-action)
			Model	Model
1-conduit		Pg13.5	D4DS-15FS	D4DS-1AFS
		G1/2	D4DS-25FS	D4DS-2AFS
		1/2-14NPT	D4DS-35FS	D4DS-3AFS
2-conduit		Pg13.5	D4DS-55FS	D4DS-5AFS
		G1/2	D4DS-65FS	D4DS-6AFS

Operation Keys (Order Separately)

Type	Model
Horizontal mounting 	D4DS-K1
Vertical mounting 	D4DS-K2
Adjustable mounting (Horizontal) 	D4DS-K3
Adjustable mounting (Horizontal/Vertical) 	D4DS-K5

Specifications

■ Approved Standards

Agency	Standard	File No.
TÜV Rheinland	EN60947-5-1	R9551708 (Direct opening: approved)
UL (see note)	UL508 CSA C22.2 No.14	E76675
BIA	GS-ET-15	1-conduit: 9509915 2-conduit: 9509913
SUVA	SUVA	1-conduit: 6335.d 2-conduit: 6336.d

Note: Approval for CSA C22.2 No.14 is authorized by the UL mark.

Standards and EC Directives

- Conforms to the following EC Directives:
  Machinery Directive
  Low Voltage Directive
  EN50047
  EN1088

■ Approved Standard Ratings

TÜV (EN60947-5-1)

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 gl or gG that conforms to IEC269 as a short-circuit protection device.

UL (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

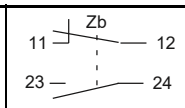
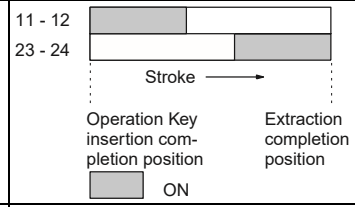
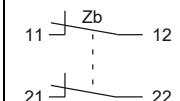
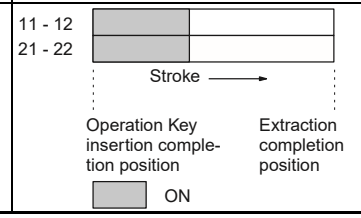
Degree of protection (see note 1)	IP65 (EN60947-5-1)
Durability (see note 2)	Mechanical: 1,000,000 operations min. Electrical: 150,000 operations min. (10-A resistive load at 250 VAC)
Operating speed	0.1 m/s to 0.5 m/s
Contact gap	2 x 2 mm min.
Operating frequency	30 operations/minute max.
Direct opening force (see note 3)	58.84 N min.
Direct opening travel (see note 3)	10 mm min.
Insulation resistance	100 MΩ min. (at 500 VDC) between terminals of same polarity, between terminals of different polarity, and ground, and between each terminal and non-current-carrying metal part
Contact resistance	25 mΩ max. (initial value)
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)
Conditional short-circuit current	100 A (EN60947-5-1)
Switching overvoltage	1,500 V max. (EN60947-5-1)
Pollution degree (operating environment)	3 (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, 0.75-mm single amplitude.
Shock resistance	Destruction: 1,000 m/s^2 min. Malfunction: 300 m/s^2 min.
Ambient temperature	Operating: −30°C to 70°C (with no icing)
Ambient humidity	Operating: 95% max.
Weight	Approx. 76 g (for D4DS-15FS)

Note: 1. Although the switch box is protected from dust, oil, or water penetration, do not use the D4DS in places where dust, oil, water, or chemicals may penetrate through the key hole on the head, otherwise Switch damage or malfunctioning may occur.

2. 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.

3. These figures are minimum requirements for safe operation.

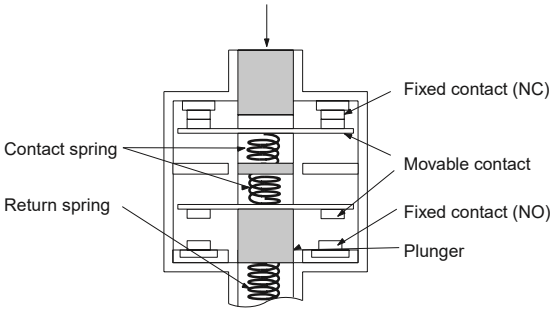
■ Contact Form (Diagrams Show State with Key Inserted)

Model	Contact		Diagrams	Remarks
D4DS-□5□S	1NC/1NO			Only NC contact 11-12 has an approved direct opening mechanism. ⊖ The terminals 11-12 and 23-24 can be used as unlike poles.
D4DS-□A□S	2NC			NC contacts 11-12 and 21-22 have an approved direct opening mechanism. ⊖ The terminals 11-12 and 21-22 can be used as unlike poles.

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

■ Direct Opening Mechanism

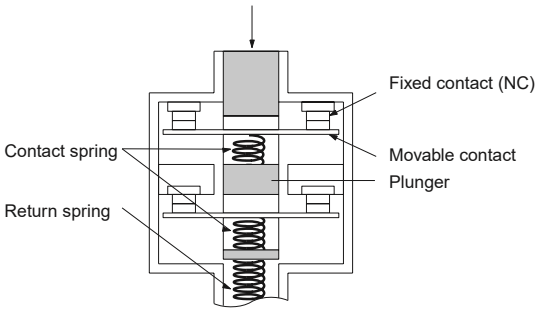
1NC/1NO Contact (Slow-action)



Only the NC contacts have a direct opening function.
When metal welding occurs, the contacts are separated from each other by pushing in the plunger.

Conforms to EN60947-5-1 Direct Opening

2NC Contact (Slow-action)

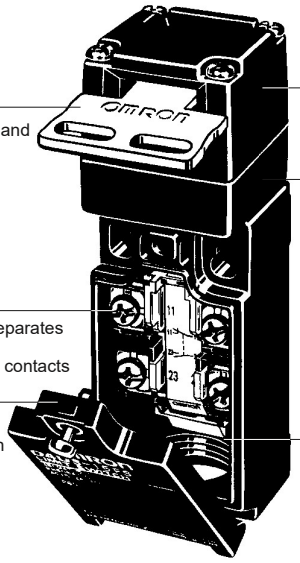


Both NC contacts incorporate a direct opening function.
When metal welding occurs, the contacts are separated from each other by pushing in the plunger.

Conforms to EN60947-5-1 Direct Opening

Note: The switches are marked with "⊖" indicating approval for the direct opening mechanism.

Nomenclature



Operation Key
The dedicated key prevents operational mistakes and forcibly separates the contacts.

Built-in Switch
Has a direct opening mechanism which forcibly separates the NC contacts even if they are welded.
The built-in switch incorporates a pair each of NC contacts and NO contacts or two pairs of NC contacts.

Cover
The cover, with a hinge on its lower part, can be opened by removing the screw of the cover, which ensures ease of maintenance and wiring.

Head
The head can be mounted in four directions. The Operation Key can be inserted in five directions including the downward direction.

Oil Seal
The plunger has an O ring. The switch casing ensures IP65 (except the keyhole, which ensures IP00). Use the D4DS in places where the keyhole is free from oil, water, and metal chips.

Conduit
Wide switch variations.
Pg13.5: 1-conduit, 2-conduit models
G1/2: 1-conduit, 2-conduit models
1/2-14NPT: 1-conduit models

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.

Dimensions

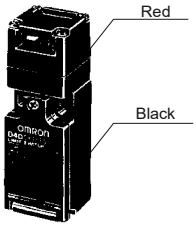
Note: 1. All units are in millimeters unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
3. The conduit thread varies with the model as follows:

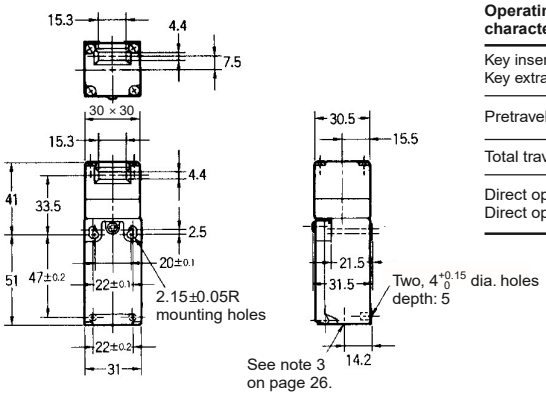
Conduit thread	Model
Pg13.5	D4DS-1□□S/-5□□S
G1/2	D4DS-2□□S/-6□□S
1/2-14NPT	D4DS-3□□S

■ Switches

1-conduit Models

D4DS-1□□S
D4DS-2□□S
D4DS-3□□S

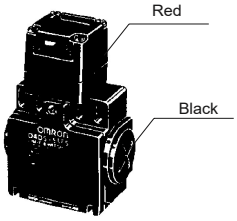


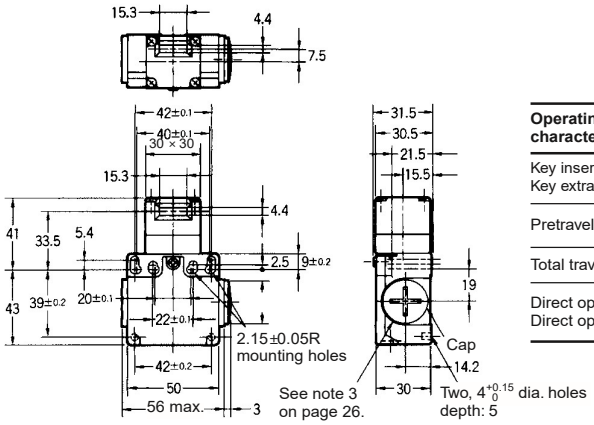


Operating characteristics	D4DS-1□□S D4DS-2□□S D4DS-3□□S
Key insertion force Key extraction force	14.71 N max. 29.42 N max.
Pretravel (PT)	6±3 mm
Total travel (TT)	(28 mm)
Direct opening force Direct opening stroke	58.84 N min. 10 mm min.

2-conduit Models

D4DS-5□□S
D4DS-6□□S

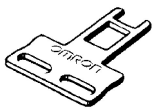


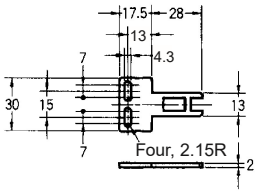


Operating characteristics	D4DS-5□□S D4DS-6□□S
Key insertion force Key extraction force	14.71 N max. 29.42 N max.
Pretravel (PT)	6±3 mm
Total travel (TT)	(28 mm)
Direct opening force Direct opening stroke	58.84 N min. 10 mm min.

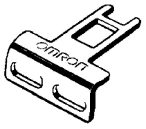
■ Operation Keys

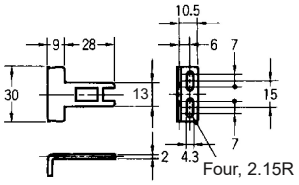
Horizontal Mounting
D4DS-K1



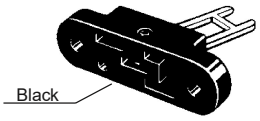


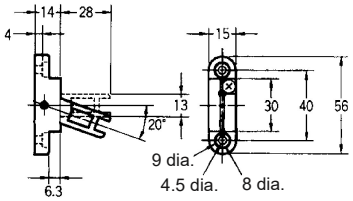
Vertical Mounting
D4DS-K2





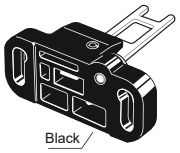
Adjustable Mounting (Horizontal)
D4DS-K3

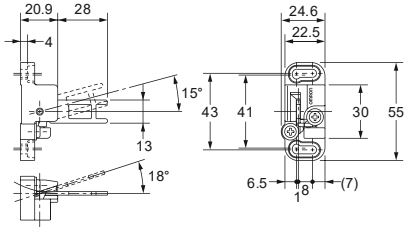




Adjustable Mounting (Horizontal/Vertical)

D4DS-K5



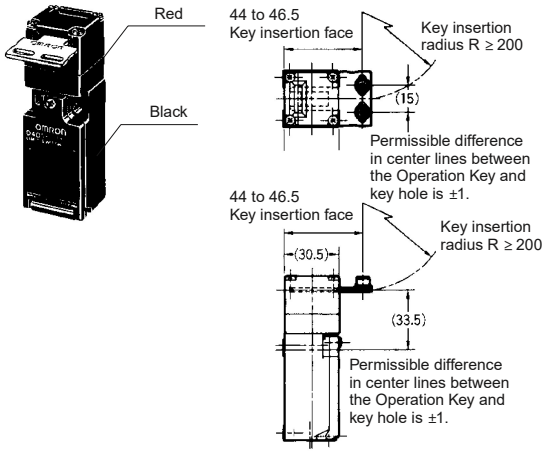


Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

■With Operation Key Inserted

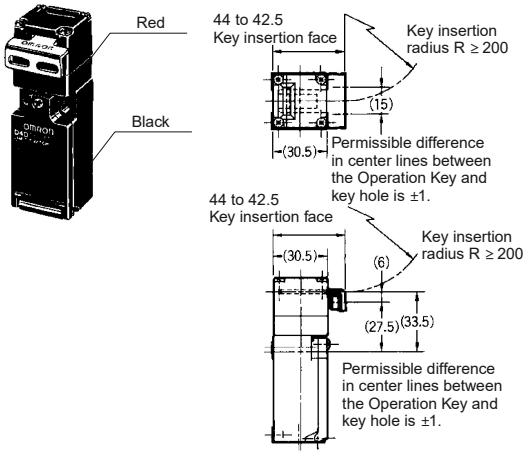
Horizontal Mounting

D4DS-1□□S + D4DS-K1
D4DS-2□□S + D4DS-K1
D4DS-3□□S + D4DS-K1
D4DS-5□□S + D4DS-K1
D4DS-6□□S + D4DS-K1



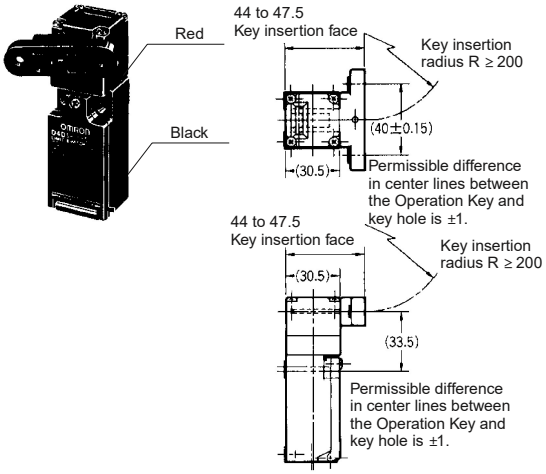
Vertical Mounting

D4DS-1□□S + D4DS-K2
D4DS-2□□S + D4DS-K2
D4DS-3□□S + D4DS-K2
D4DS-5□□S + D4DS-K2
D4DS-6□□S + D4DS-K2



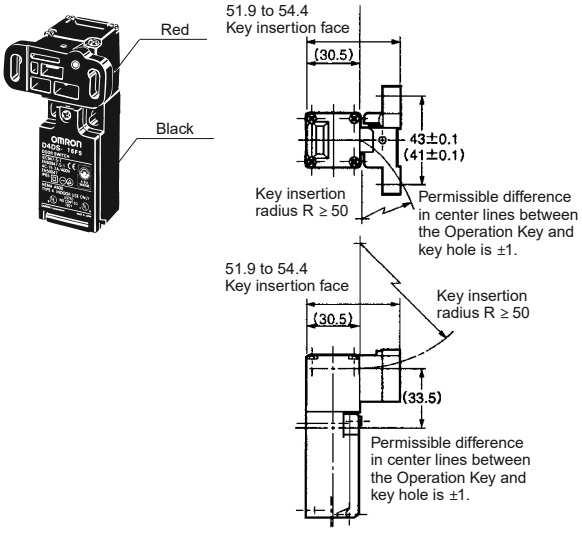
Adjustable Mounting (Horizontal)

D4DS-1□□S + D4DS-K3
D4DS-2□□S + D4DS-K3
D4DS-3□□S + D4DS-K3
D4DS-5□□S + D4DS-K3
D4DS-6□□S + D4DS-K3



Adjustable Mounting (Horizontal/Vertical)

D4DS-1□□S + D4DS-K5
D4DS-2□□S + D4DS-K5
D4DS-3□□S + D4DS-K5
D4DS-5□□S + D4DS-K5
D4DS-6□□S + D4DS-K5



Precautions

⚠ Caution

Do not dismount the Operation Key from the door intentionally and insert it to the switch with the door open. Machine may start operating and injury or death may be caused.

Do not use metal connectors or conduits with this switch. Rigid connectors and conduits may damage the switch. The broken conduit hole may cause an electrical shock hazard.

Install the Operation Key so that it will not hit the operator when the door is open.

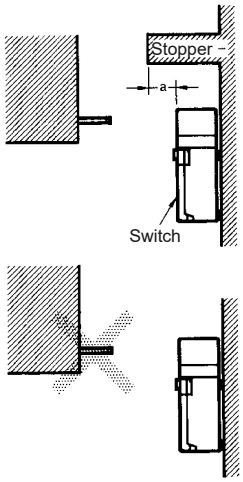
If the D4DS is to be used as a switch in a safety category circuit for preventing accidents resulting in injuries or deaths, use NC contacts with a direct opening mechanism and set the D4DS so that it will operate in direct opening mode. For safety, install the Switch and the Operation Key using one-way rotational screws or other similar means to prevent them from easily coming off. Protect the D4DS with an appropriate cover and post a warning sign near the D4DS in order to ensure the safety of the door.

To prevent the D4DS from damage due to circuit short-circuiting, connect a fuse with a breaking current 1.5 to 2 times larger than the rated current of the D4DS in series to the D4DS.

If the D4DS is used under EN-approved conditions, use a gI or gG 10-A fuse approved by IEC269.

Mounting

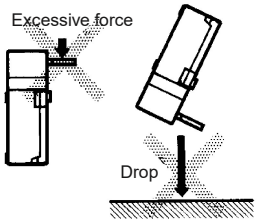
Be sure to mount the D4DS with a stopper as shown in the following illustration. Do not use the casing of the D4DS as a stopper. Be sure to install the stopper so that the space “a” will be a maximum of 3 mm.



Operation Key

Be sure to use a special Operation Key only. Do not operate the D4DS with anything other than the special Operation Key, otherwise the D4DS may break or the safety of the system may not be maintained.

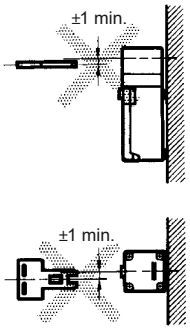
Do not impose excessive force on the Operation Key inserted into the D4DS or drop the D4DS with the Operation Key inserted, otherwise the Operation Key may deform or break.



Secure the Operation Key with screws so that the Operation Key cannot be removed with ease.

Refer to *Dimensions* for the mounting dimensions of the Operation Key and properly mount and the Operation Key correctly so that the position and angle will be correct.

Make sure that the Operation Key can be inserted properly with a tolerance of ±0.5 mm in the upward, downward, left, or right direction, otherwise the D4DS may soon become damaged.



■ Correct Use

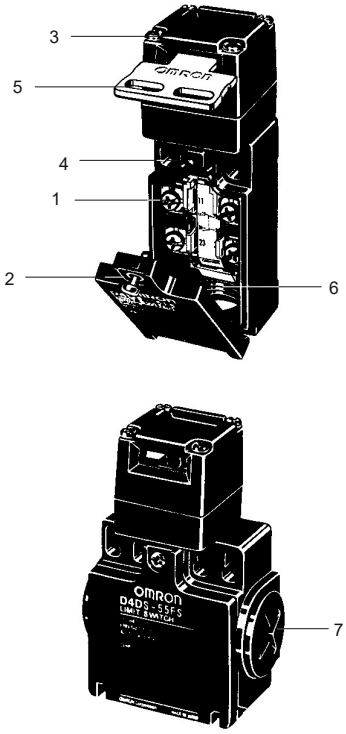
Operating Environment

Do not use the D4DS in the following locations:

- Locations subject to severe temperature changes
- Locations subject to high temperatures or condensation
- Locations subject to severe vibration
- Locations subject to metal chips, oils, and chemicals inside a protective door

Tightening Torque

Be sure to tighten each screw of the D4DS properly, otherwise the D4DS may malfunction.



No.	Type	Torque
1	M3.5 terminal screw	0.59 to 0.78 N·m
2	Cover mounting screw	0.78 to 0.88 N·m
3	Head mounting screw	0.78 to 0.88 N·m
4	M4 body mounting screw (see note 1)	0.49 to 0.69 N·m
5	Operation Key mounting screw	2.35 to 2.75 N·m
6	Connector	1.77 to 2.16 N·m 1.37 to 1.77 N·m (see note 2)
7	Cap screw	1.27 to 1.67 N·m

Note: 1. Tighten each screw together with a washer to the specified torque.

2. This torque range applies to 1/2-14NPT connectors.

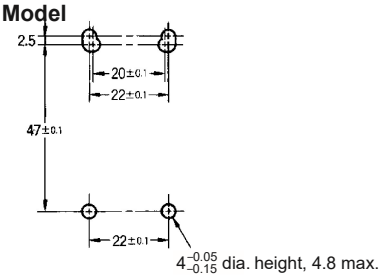
Mounting

Switch

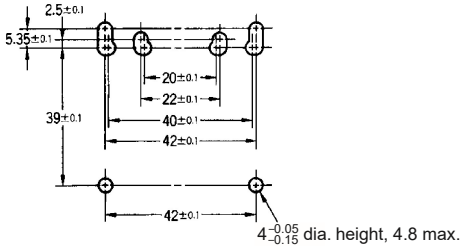
Two, M4 Allen-head bolts with washers must be used in order to mount the D4DS securely. To mount the D4DS more securely, prepare two, 4 $^{-0.05}/_{-0.15}$ dia. protruding portions with 4.8 mm maximum in height each as shown below and support the D4DS at a total of four points.

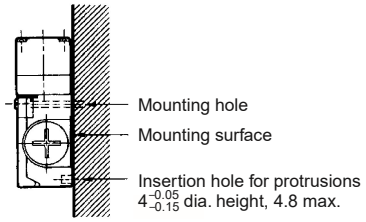
Mounting Dimensions with Protruding Portions

Standard Model



Two-conduit Model

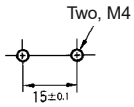




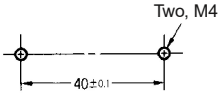
Operation Key

Mounting Dimensions

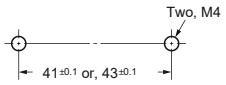
- **Horizontal/Vertical Mounting D4DS-K1 or D4DS-K2**



- **Adjustable Mounting (Horizontal) D4DS-K3**

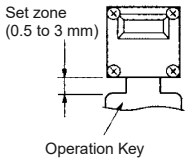


- **Adjustable Mounting (Horizontal/Vertical)**
  D4DS-K5



Securing the Door

When the door is closed (with the Operation Key inserted), the door (or the Operation Key) may be pulled outside the set zone due to the door's weight or the door cushion rubber. If a load is applied to the Operation Key, the door may fail to unlock. Secure the door with hooks so that it will remain within in the set zone.



Changes in Head Mounting Direction

By removing the screws on the four corners of the head, the head can be reset in any of four directions.

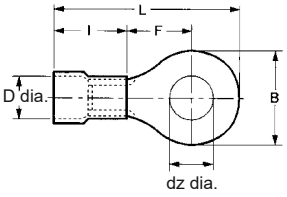
When changing the head mounting direction, make sure that the Operation Key is in the head.

Make sure that no foreign materials penetrate through the mounting holes of the head. Internal screws of the head must not be removed, otherwise the internal parts of the head may be lost or deformed.

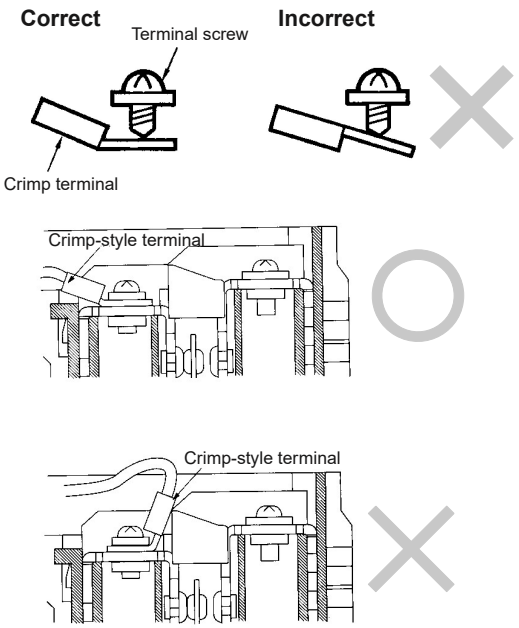
Wiring

Do not connect lead wires directly to the terminals. Be sure to connect the lead wires through insulation tubes and crimp terminals., and tighten each terminal screw within an optimum torque range. The lead wires must be an AWG20 to AWG14 type (i.e., 0.5 to 25 mm^2 thick).

dz dia.: 3.7
D dia.: 4.5
B: 7.0
L: 20.2
F: 7.7
I: 9.0 (mm)



Wire the crimp terminal as shown in the following diagram so that it will not come in contact with the casing or cover.



Conduit Opening

Tighten the connector to a torque of 1.8 to 2.2 N·m (1.37 to 1.77 N·m if it is a 1/2-14NPT). Excessive tightening torque may damage the casing. In order to continue satisfying IP65, apply sealing tape to the connector conduit.

The diameter of the cable must be suited to the corresponding connector.

Properly attach the provided conduit cap to the unused conduit opening and securely tighten the cap screw within a torque range between 1.27 and 1.67 N·m when wiring the D4DS two-conduit model.

Recommended Connector

Size	Manufacturer	Model	Suitable cable dia.
G1/2	OMRON	SC-6	7.5 to 9.0 mm
	LAPP (see note 1)	ST-PF1/2 5360-1002	6.0 to 12.0 mm
	OHM ELECTRIC CO.	OA-W1609	7.0 to 9.0 mm
Pg13.5	LAPP (see note 1)	ST13.5 5301-5030	5.0 to 12.0 mm
1/2-14NPT	LAPP (see note 1)	ST-NPT1/2 5301-6030	6.0 to 12.0 mm

Note: 1. LAPP is a German manufacturer.
2. OHM ELECTRIC CO. is a Japanese manufacturer.

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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ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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