

Door Interlock Switch D2D

Power Switch with Minimum Contact Gap up to 3 mm.

- Minimum contact gap of 3 mm (standard models), needed in general power switches, is provided.
- Mechanism with double return spring and direct drive positive contact opening features
- Pull-on lock type for easy maintenance is also available.
- Conforms to Class II of VDE Insulation Grade.
- RoHS Compliant



Ordering Information

| Type | Contact Gap | Contact Form | Part Number | |
|--------------|-------------|----------------------|------------------|------------------|
| | | | Screw mount type | Panel mount type |
| Standard | 3 mm min. | SPDB-NO/NC | D2D-1000 | D2D-1100 |
| | | SPDB-NO | D2D-1001 | D2D-1101 |
| | | SPDB-NC | D2D-1002 | D2D-1102 |
| | | SPDB-NO + SPDB-NO/NC | - - - | D2D-3103 |
| | | DPDB-NO | - - - | D2D-3104 |
| Pull-on lock | 1 mm | SPDB-NO/NC | D2D-2000 | D2D-2100 |

Note: "DB" in the contact form = "Double Break".

Model Number Legend

D2D -
 1 2 3

1. Construction

- 1: Single pole, 3-mm contact gap
- 2: Pull-on-lock type, 1-mm contact gap
- 3: Double-pole, 3-mm contact gap

2. Mounting

- 0: Screw mount
- 1: Panel snap-fit mount

3. Contact Form

- 0: SPDB-NO/NC
- 1: SPDB-NO
- 2: SPDB-NC
- 3: SPDB-NO + SPDB-NO/NC
- 4: DPDB-NO

Specifications

■ Characteristics

| Item | | D2D-1000 models | D2D-2000 models | D2D-3000 models |
|--|--|---|---|---|
| Operating speed | | 10 mm/s to 1 m/s | | |
| Operating frequency | | Mechanical: 300 operations per minute max. Electrical: 30 operations per minute max. | | |
| Contact resistance | | 50 mΩ max. | | |
| Insulation resistance | | 100 MΩ min. (at 500 VDC) | | |
| Dielectric strength 50/60 Hz, 1mm (See note 2) | Between terminals of same polarity | 2,000 VAC | 1,000 VAC | 2,000 VAC |
| | Between terminals and ground | 2,000 VAC | 1,500 VAC | 2,000 VAC |
| | Between terminals and non-current carrying metal parts | 2,500 VAC | 1,500 VAC | --- |
| | Between terminals and actuator | 4,000 VAC | --- | 4,000 VAC |
| Vibration resistance | | Malfunction: 10 to 55 Hz, 1.5 mm double amplitude | | |
| Shock resistance | Destruction | 1,000 m/s ² (approx 100G) max. | | |
| | Malfunction | 500 m/s ² (approx. 50G) max. | 300 m/s ² (approx. 30G) max. | 500 m/s ² (approx. 50G) max. |
| Degree of protection | | IEC IP40 | | |
| Degree of protection vs. electric shock | | Class II | | |
| Proof tracking index (PTI) | | 175 | | |
| Ambient operating temperature | | -25° to 85°C (at 60% RH max.) with no icing | | |
| Ambient operating humidity | | 85% max (for 5°C to 35°C) | | |
| Life expectancy | | Mechanical: 10,000,000 operations min. at 60 operations/minute Electrical: 100,000 operations min. at 30 operations/minute | | |
| Weight | | Approx. 14 g (D2D-1000) | | |

- Note:** 1. Data shown are of initial value
2. The dielectric strength shown is measured using a separator between the switch and metal mounting plate

■ Ratings (Reference values)

| Type | Voltage | Resistive load | | Motor load | |
|--------------|--------------------|----------------|----|------------|----|
| | | NC | NO | NC | NO |
| Standard | 125 VAC 250 VAC | 16 A | | 4 A | |
| Pull-on lock | 125 VAC 250 VAC | 10 A | | --- | |

- Note:** 1. The above values are for steady-state current and the motor load has an inrush current of 6 times the steady-state current.
2. The ratings apply under the following test conditions: Ambient Temperature = 20±2°C, Ambient Humidity = 65±5%, Operating frequency = 30 operations/min.

■ Approved Standards

UL Recognized (File No. E41515)
CSA Certified (File No. LR21642)

| Rated voltage | D2D-1000 | D2D-2000 | D2D-3000 |
|---------------|----------|----------|-------------|
| 125 VAC | --- | --- | 3/4 hp |
| 250 VAC | 16 A | 10 A | 16A, 1.5 hp |

EN61058-1 (File No. 136005 VDE approval)

| Rated voltage | D2D-1000 | D2D-2000 | D2D-3000 |
|---------------|----------|----------|----------|
| 250 VAC | 16(4) A | 10 A | 16(4) A |

Testing conditions: 1E4 (10,000 operations), T85 (0°C to 85°C)

Note: The value in parentheses indicate motor load ratings.

EN61058-1 (File No. R9551934, TÜV Rheinland approval)

| Rated voltage | D2D-3104 |
|---------------|----------|
| 24 VDC | 4 A |

Testing conditions: 5E4 (50,000 operations), T85 (0°C to 85°C)

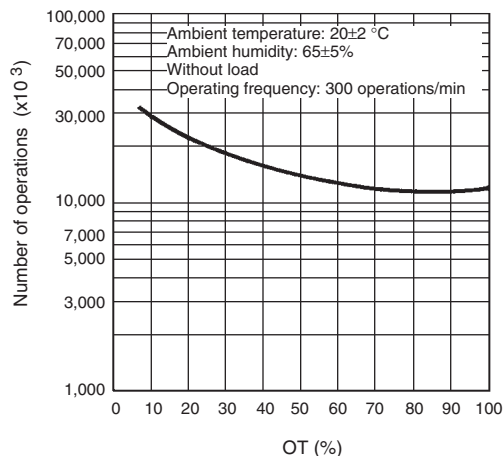
■ Contact Specifications

| Item | Standard model | Pull-on lock model |
|------------------------------------|-----------------|--------------------|
| Specification | Rivet | |
| Material | Silver | |
| Gap (standard value) | 3 mm min. | 1 mm |
| Inrush current | 30 A max. | 24 A max. |
| Minimum applicable load (see note) | 160 mA at 5 VDC | |

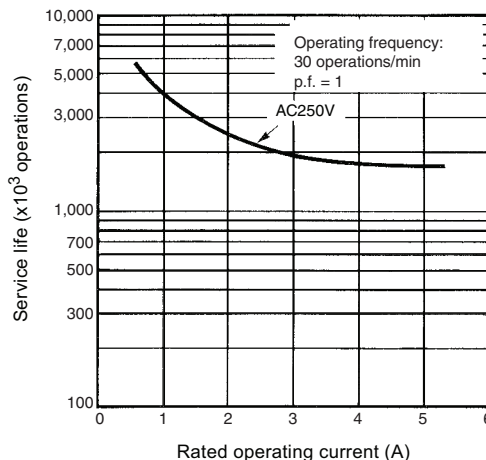
Note: Minimum applicable loads are indicated by N standard reference values. This value represents the failure rate at a 60% (λ_{60}) reliability level (JIS C5003).
The equation $\lambda_{60}=0.5 \times 10^{-6} / \text{operations}$ indicates that a failure rate of 1/2,000,000 operations can be expected at a reliability level of 60%

Engineering Data

Mechanical Service Life

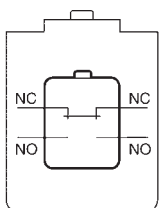


Electrical Service Life



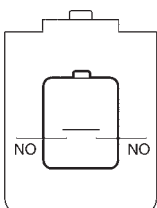
Contact Form

SPDB-NO/NC



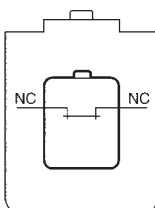
D2D-1000 D2D-2000
D2D-1100 D2D-2100

SPDB-NO



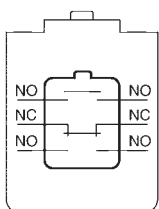
D2D-1001
D2D-1101

SPDB-NC



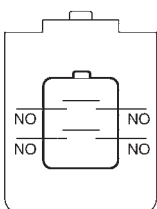
D2D-1002
D2D-1102

SPDB-NO +
SPDB-NO/NC



D2D-3103

DPDB-NO

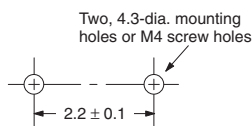


D2D-3104

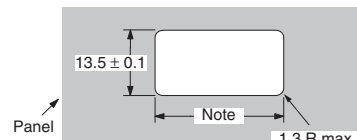
Mounting Holes

Screw mount switches may be panel mounted using M4 mounting screws with plane washers or spring washers to securely mount the switch. Tighten the screws to a torque of 0.49 to 0.69 N·m

Panel Mount Holes



Panel Cutout Dimensions

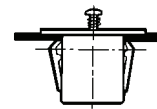


Panel thickness: 1.0 to 2.5 mm

Note: Dimension is 36.7±0.1 with a panel thickness of 1.0 mm and 37.0±0.1 with a panel thickness of 2.5 mm



Screw mount type panel



Panel mount type panel

Snap-fit panel mount switches use the panel cutout hole illustrated above. When mounting on a metal surface, be sure to provide a separator between the switch and mounting plate.

Pull-on Lock Function

When opening or closing the door, the power ON state of the switch can be checked with the door left open. By closing the door after maintenance inspection, the switch will resume the normal momentary action. (this feature is ideal for conducting the electrical continuity test, inspection, repair, etc. of the switch after its assembly.)

| Example | | To turn ON the power when the door is closed | To turn OFF the power when the door is open | To turn ON the power with the door left open |
|------------|-------|--|---|--|
| Connection | NO-NO | ON | OFF | ON |
| | NC-NC | OFF | ON | OFF |


■ Safety Features

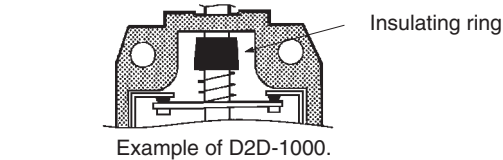
Double Spring Mechanism


Two return springs are provided for the pin plunger. Thus, if either of the springs are broken, this feature will prevent the switch from malfunctioning or short-circuiting.

(Applicable to D2D-1000 and D2D-3000 models. The D2D-2000 models with pull-on lock is not provided with this feature.)

Direct Contact Opening Mechanism

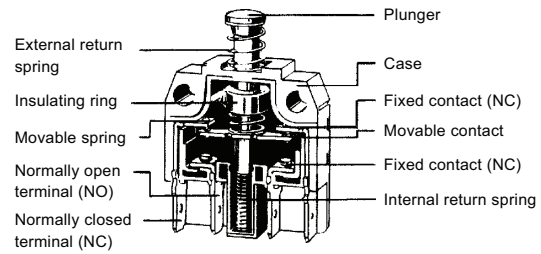
The insulating ring, identified by , will positively break the circuit if a contact weld occurs in the switch. (D2D-1000 models).



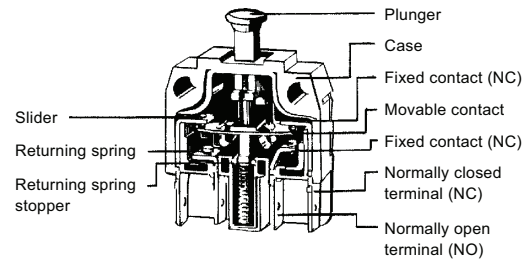
The section marked  pushes the movable contact to apply force in the direction which separates the movable contact forcibly from the fixed contact.

■ Structure


Standard Types



Pull-on Lock Types



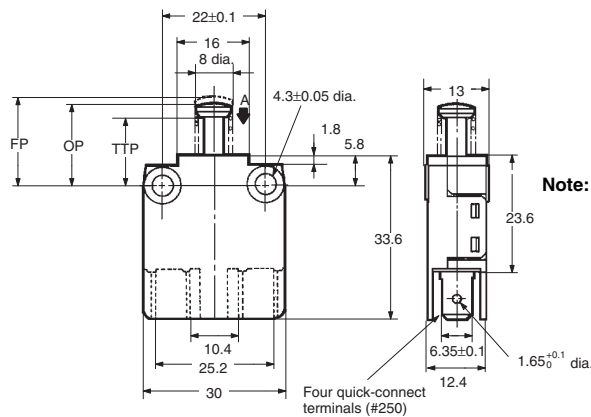
Dimensions and Operating Characteristics

- Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of ± 0.4 mm applies to all dimensions
 2. The operating characteristics are for operation in the A direction()

■ Standard Models

Screw Mounting

D2D-1000
 D2D-1001
 D2D-1002



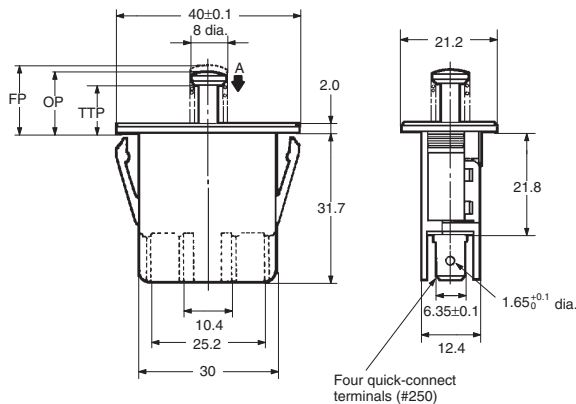
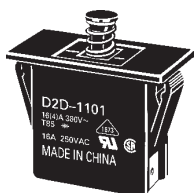
- Note:** 1. NC-OFF: The force applied to the actuator to cause it to move from the free position to the position at which the NC contact opens.
 2. NO-ON: The force applied to the actuator to cause it to move from the free position to the position at which the NO contact closes

| Model | D2D-1000 | D2D-1001 | D2D-1002 |
|----------|-------------------------|---------------|---------------|
| OF max. | NC-OFF 300 gf | --- | 300 gf |
| | NO-ON 600 gf | 600 gf | --- |
| TTF max. | 750 gf | | |
| OT min. | 2.3 mm | | 5.5 mm |
| FP max. | 16.4 mm | 17 mm | 16.4 mm |
| OP | NC-OFF 15.9 ± 0.4 mm | --- | 15.9 ± 0.4 mm |
| | NO-ON 12.7 ± 0.4 mm | 12.7 ± 0.4 mm | --- |
| TTP max. | 10 mm | | |

- Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of ± 0.4 mm applies to all dimensions
 2. The operating characteristics are for operation in the A direction (▼)

Panel Mounting

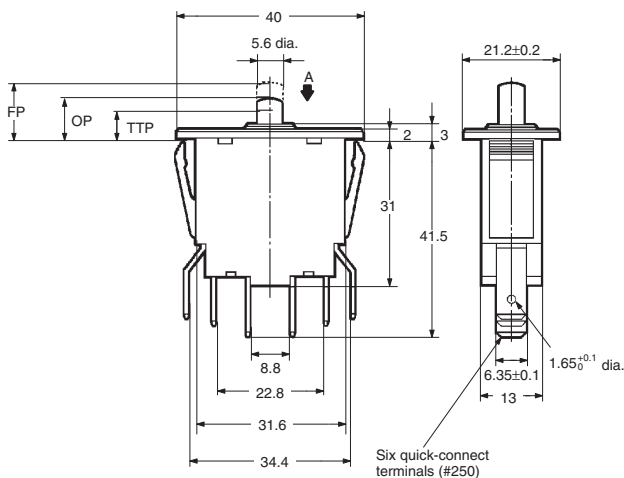
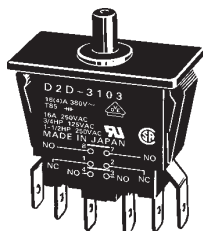
D2D-1100
 D2D-1101
 D2D-1102



| Model | D2D-1100 | D2D-1101 | D2D-1102 |
|----------|--|----------|----------------------|
| OF max. | NC-OFF NO-ON 300 gf 600 gf | --- | 300 gf --- |
| TTF max. | 750 gf | | |
| OT min. | 2.3 mm | | |
| FP max. | 12.4 mm | 13 mm | 12.4 mm |
| OP | NC-OFF NO-ON 11.9 ± 0.4 mm 8.7 ± 0.4 mm | --- | 11.9 ± 0.4 mm --- |
| TTP max. | 6 mm | | |

Panel Mounting

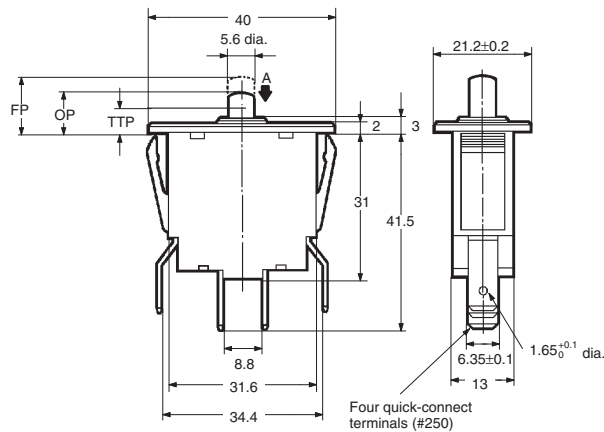
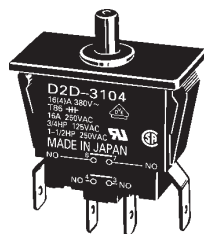
D2D-3103



| Model | D2D-3103 |
|----------|--|
| OF max. | NC-OFF NO-ON 300 gf 600 gf |
| TTF max. | 1,000 gf |
| OT min. | 2.3 mm |
| FP max. | 12.4 mm |
| OP | NC-OFF NO-ON 11.9 ± 0.8 mm 8.7 ± 0.8 mm |
| TTP max. | 6.4 mm |

Panel Mounting

D2D-3104



| Model | D2D-3104 |
|----------|------------------------|
| OF max. | NC-OFF NO-ON --- |
| TTF max. | 1,000 gf |
| OT min. | 2.3 mm |
| FP max. | 13.4 mm |
| OP | NC-OFF NO-ON --- |
| TTP max. | 8.7 ± 0.8 mm 6.4 mm |

- Note: 1. Unless otherwise specified, all units are in millimeters and a tolerance of ± 0.4 mm applies to all dimensions
- 2. The operating characteristics are for operation in the A direction(▼)

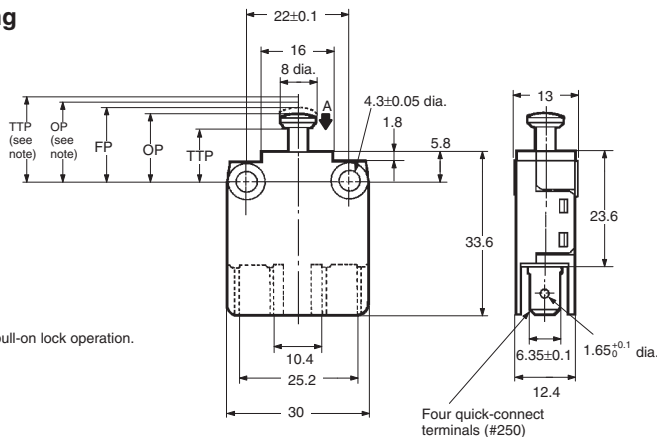
■ Pull-on Lock Models

Screw Mounting

D2D-2000



Note: At pull-on lock operation.



Momentary Operation (Normal Operation)

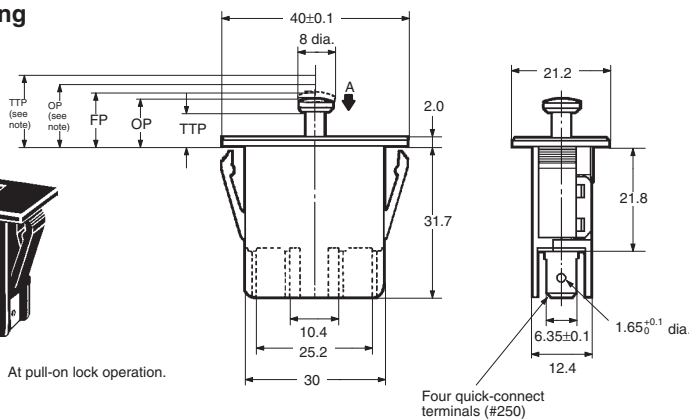
| Model | D2D-2000 | D2D-2100 |
|----------|-----------------|-------------------------------|
| OF max. | NC-OFF NO-ON | 200 gf 300 gf |
| TTF max. | 600 gf | |
| OT min. | 4.5 mm | |
| FP max. | 14.3 mm | 10.3 mm |
| OP | NC-OFF NO-ON | 13.5 ± 0.6 mm 9.5 ± 0.6 mm |
| TTP max. | 8.3 mm | 4.3 mm |

Panel Mounting

D2D-2100



Note: At pull-on lock operation.



Pull-on Lock Operation

| Model | D2D-2000 | D2D-2100 |
|----------|---------------|---------------|
| OF max. | 2,000 gf | |
| PT max. | 2 mm | |
| OT min. | 0.4 mm | |
| MD max. | 1.5 mm | |
| FP max. | 14.3 mm | 10.3 mm |
| OP | 15.1 ± 0.6 mm | 11.1 ± 0.6 mm |
| TTP max. | 16.5 mm | 12.5 mm |

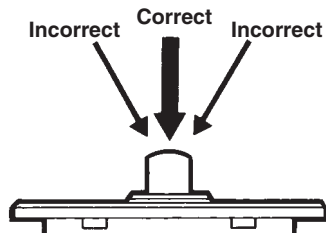
Precautions

Be sure to read the precautions and information common to all Snap Action and Detection Switches, contained in the Technical User's Guide, "Snap Action Switches, Technical Information" for correct use.

■ Correct Use

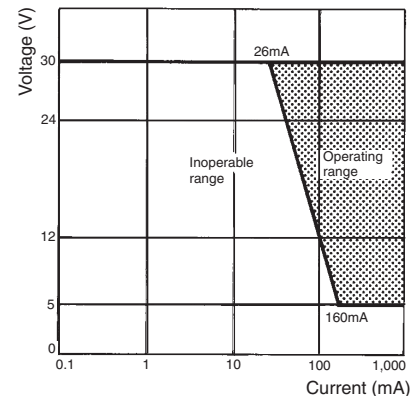
Actuation

Apply operation force to the pin plunger in the direction it operates. Applying forces laterally or from an oblique direction may damage the pin plunger.



Using Microloads

Using a model for ordinary loads to switch microloads may result in faulty operation. Instead, use the models that are designed for microloads and that operate in the following range;



However, even when using microload models within the operating range shown above, if inrush current or inductive voltage spikes occur when the contact is opened or closed, then contact wear may increase and so decrease the service life. Therefore, insert a contact protection circuit where necessary.

A large grid of 20 columns and 30 rows of small squares, intended for taking notes. The grid is composed of thin lines forming a uniform pattern of squares across the page.

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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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- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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