Glossary

The following provides information on general terms and other terms used for Switches.

■ General Terms

Basic Switch

A small-size switch which has contacts slightly separated and a snap action mechanism. Its contacts are enclosed in a case and operated by externally applying a specific force to an actuator provided on the case.

Contact Form

A configuration of switch contacts to input or output an external signal.

Contact Switch

A type of switch which uses, as opposed to a solid-state switch, mechanical contacts to break or make the external circuit.

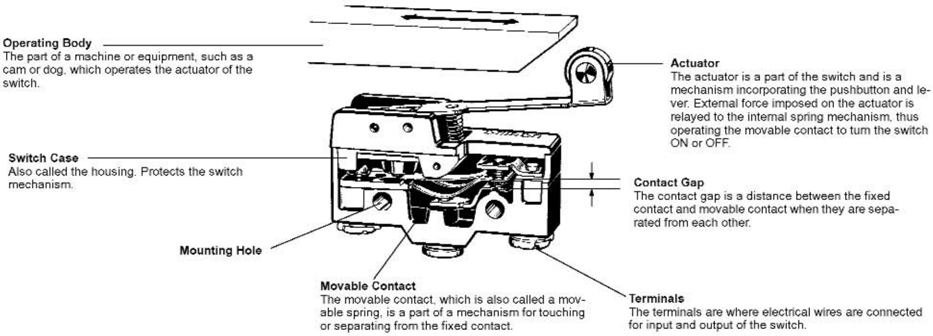
Ratings

Various parameters, such as current or voltage values, within which the normal operation of the basic switch is guaranteed.

Molded Terminal

A terminal which is molded with resin after being connected to the internal circuit of the switch with a lead to eliminate exposed currentcarrying metal parts and thereby to enhance the drip-proof properties of the switch.

■ Terms for Configuration & Structure



■ Terms Related to Life Expectancy

Mechanical Life: The duration in which the normal switching operation is performed without the contacts energized as long as the switch is used with the rated overtravel (OT).

Electrical Life: The duration in which the normal switching operation is performed under the rated load (resistive) as long as the switch is used with the rated overtravel (OT).

■ Standard Test Conditions

Switches are tested under the following conditions.

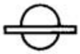
Ambient temperature 20±2°C
Relative humidity: 65±5%
Atmospheric pressure: 101.3 kPa

■ N-level Reference Value

The N-level reference value indicates the failure rate of the switch. The following formula indicates that the failure rate is 1/2,000,000 at a reliability level of 60% (λ_{60}).

$\lambda_{60} = 0.5 \times 10^{-6}$/operations

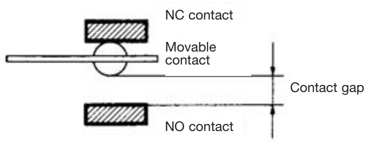
■ Contact Shape and Type

Shape	Type	Main material	Processing method	Main application
	Crossbar contact	Gold or silver alloy	Welding or rivetting	Crossbar contacts are used for ensuring high contact reliability for switching minute loads. The movable contact and fixed contact come in contact with each other at a right angle. Crossbar contacts are made with materials that are environment-resistant, such as gold alloy. In order to ensure excellent contact reliability, bifurcated crossbar contacts may be used.
	Needle	Silver		Needle contacts are used for ensuring improvement in contact reliability for switching loads, such as relays. A needle contact is made from a rivet contact by reducing the bending radius of the rivet contact to approximately 1 mm for the purpose of improving the contact pressure per unit area.
	Rivet	Silver Silver plated Silver alloy Gold plated		Rivet contacts are used in a wide application range from standard to heavy loads. The fixed rivet contact is usually processed so that it has a groove to eliminate compounds that may be generated as a result of switching. Furthermore, to prevent the oxidation or sulphuration of the silver contacts, the contacts may be gold-plated while the switch is stored. Contacts made with silver alloy are used for switching high current, such as the current supplied to TV sets.

■ Contact Gap

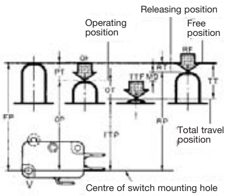
The contact gap is either 0.25, 0.5, 1.0, or 1.8 mm. Check the contact gap of the switch to be used if it is necessary to minimize the contact gap. The standard contact gap is 0.5 mm. The smaller the contact gap of a switch mechanism is, the less the movement differential (MD) is and the more sensitivity and longer life the switch has. Such a switch cannot ensure, however, excellent switching performance, vibration resistance, or shock resistance.

The snap-action switch will be less sensitive if the movement differential (MD) increases along with the contact gap due to the wear and tear of the contacts as a result of current switching operations. If the switch with a contact gap of 0.25mm is used, it will be necessary to minimize the switching current in order to prevent the wear and tear of the contacts as a result of current switching operations. A switch with a wide contact gap excels in vibration resistance, shock resistance, and switching performance.



Character displayed	Contact gap	DC switching	MD	Accuracy and life expectancy	Vibration and shock resistance	Feature
H	0.25 mm	Inferior	Minimal	Excellent	Inferior	High precision and long life
G	0.50 mm	Ordinary	Short	Good	Ordinary	General-purpose
F	1.00 mm	Good	Medium	Ordinary	Good	Performance level between G & E
E	1.80 mm	Excellent	Long	Inferior	Excellent	Highly vibration & shock resistive

■ Terms Related to Operating Characteristics

Definitions of Operating Characteristics	Classification	Term	Abbreviation	Unit	Dispersion	Definition
	Force	Operating Force	OF	N{gf, kgf}	Max.	The force applied to the actuator required to operate the switch contacts.
		Releasing Force	RF	N{gf, kgf}	Min.	The value to which the force on the actuator must be reduced to allow the contacts to return to the normal position.
		Total Travel Force	TTF	N{gf, kgf}	–	The force required for the actuator to reach the total travel position from the free position.
	Travel	Pretravel	PT	mm or degrees	Max.	The distance or angle through which the actuator moves from the free position to the operating position.
		Overtravel	OT	mm or degrees	Min.	The distance or angle of the actuator movement beyond the operating position.
		Movement Differential	MD	mm or degrees	Max.	The distance or angle from the operating position to the releasing position.
		Total Travel	TT	mm or degrees	–	The sum of the pretravel and total overtravel expressed as a distance or angle.
	Position	Free Position	FP	mm or degrees	Max.	The initial position of the actuator when no external force is applied.
		Operating Position	OP	mm or degrees	±	The position of the actuator at which the contacts snap to the operated contact position.
		Releasing Position	RP	mm or degrees	–	The position of the actuator at which the contacts snap from the operated contact position to their normal position.
		Total Travel Position	TTP	mm or degrees	–	The position of the actuator when it reaches the stopper.

Example of Fluctuation:
V-21-1□6 with max. operating force of 3.92 N {400 gf}
The above means that each switch sample operates with a maximum operating force (OF) of 3.92 N when increasing the OF imposed on the actuator from 0.

■ Terminal Symbol and Contact Form

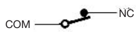
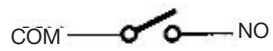
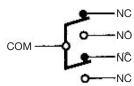
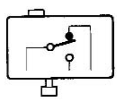
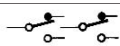
Contact	Terminal symbol
COM	Common terminal
NC	Normally closed terminal
NO	Normally open terminal

■ Terminal Types

Type	Shape
Solder terminal	
Quick-connect (#110, 187, and 250)	
Screw terminal	
PCB terminal	
PCB angle terminal	

Note: In addition to the above, molded terminals with lead wires and snap-on mounting connectors are available.

■ Contact Form

Symbol	Name	Model example
	SPDT	Standard snap-action switch
	SPST-NC	V
	SPST-NO	V
	Split-contact type	Z-10FY-B
	Maintained-contact type	Z-15ER
	DPDT	DZ

Note: The above illustrations show typical examples.
For the contact form of each product, refer to an individual datasheet.

■ Terms Related to EN61058-1 Standards

Electric Shock Protective Class: Indicates the electric shock preventive level. The following classes are provided.

Class 0: Electric shocks are prevented by basic insulation only.

Class I: Electric shocks are prevented by basic insulation and grounding.

Class II: Electric shocks are prevented by double insulation or enforced insulation with no grounding required.

Class III: No countermeasures against electric shocks are required because the electric circuits in use operate in a low-enough voltage range (50 VAC max. or 70 VDC max.)

Proof Tracking Index (PTI): Indicates the index of tracking resistance, that is, the maximum dielectric strength with no short-circuiting between two electrodes attached to the switch sample while 50 drops of 0.1% ammonium chloride solution are dropped between the electrodes drop by drop. Five levels are provided. The following table indicates the relationship between these PTI levels and CTI values according to the UL Plastics Recognized Directory.

PTI	CTI Classified by UL
500	PLC level 1: 400 ≤ CTI < 600 (Check with material manufacturer if the material meets CTI 500)
375	PLC level 2: 250 ≤ CTI < 400 (Check with material manufacturer if the material meets CTI 375)
300	PLC level 2: 250 ≤ CTI < 400 (Check with material manufacturer if the material meets CTI 300)
250	PLC level 2: 250 ≤ CTI < 400
175	PLC level 3: 175 ≤ CTI < 250

Switch Category: Indicates the heat and fire resistance of the switch on the basis of IEC335-1.

Category A: The switch has a rated switching capacity of 0.5 A maximum or is used for applications where the switch is kept ON by hand or manually.

Category C: The switch has a rated switching capacity exceeding 0.5 A or is used for applications where the switch is operated only when the operator is at present.

Category D: The switch is used for all kinds of applications.

Number of Operations: Indicates the operation number of durability test provided by the standard. They are classified into the following levels and the switch must bear the corresponding symbol. A switch with high switching frequency must withstand 50,000 switching operations and that with low switching frequency must withstand 10,000 operations to satisfy IEC standards.

Number of Operations	Symbol
100,000	1E5
50,000	5E4
25,000	25E3
10,000	No symbol required
6,000	6E3
3,000	3E3
1,000	1E3
300	3E2

Ambient Temperature: Indicates the operating temperature range of the switch. If the temperature range is not between 0°C and 55°C, the switch must bear the symbol of the temperature range. Refer to the following example.

Symbol	T85	25T85
Temperature range	0°C to 85°C	–25°C to 85°C

Solder Terminal Type 1: A type of solder terminal classified by heat resistance under the following test conditions.

Dip soldering bath applied: The terminal must not wobble or make any change in insulation distance after the terminal is dipped for a specified depth and period into a dip soldering bath at a temperature of 235°C at specified speed.

Soldering iron applied: The terminal must not wobble or make any change in insulation distance after the terminal is soldered by applying wire solder that is 0.8mm in diameter for two to three seconds by using a soldering iron, the tip temperature of which is 350°C.

Solder Terminal Type 2: A type of solder terminal classified by heat resistance under the following test conditions.

Dip soldering bath applied: The terminal must not wobble or make any change in insulation distance after the terminal is dipped for a specified depth and period into a dip soldering bath at a temperature of 260°C at specified speed.

Soldering iron applied: The terminal must not wobble or make any change in insulation distance after the terminal is soldered by applying wire solder that is 0.8 mm in diameter for 5 seconds by using a soldering iron, the tip temperature of which is 350°C.

Clearance distance: The minimum space distance between two charged parts or between a charged part and a metal foil stuck to the non-metal switch housing.

Creepage distance: The minimum distance on the surface of the insulator between two charged parts or between a charged part and a metal foil stuck to the non-metal switch housing.

Distance through insulation: The minimum direct distance between the charged part and a metal foil stuck to the non-metal switch housing through air plus any other insulator thickness including the housing itself.

Cautions

Do not wire the Switch or touch any terminal of the Switch while power is connected to the Switch, otherwise an electric shock may be received.

■ Electrical Conditions

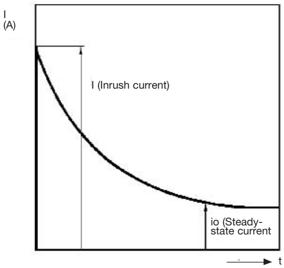
Load

The switching capacity of the Switch significantly differs depending on whether the Switch is used to break an alternating current or a direct current. Be sure to check both the AC and DC ratings of the Switch by referring to its datasheet. The control capacity will drop drastically if it is a DC load. This is because a DC load, unlike an AC load, has no current zero cross point. Therefore, if an arc is generated, it may continue for a comparatively long time. Furthermore, the current direction is always the same, which results in contact relocation phenomena, and the contacts hold each other with ease and will not separate if the surfaces of the contacts are uneven.

Some types of load have a large difference between usual current and inrush current. Make sure that the inrush current is within the permissible value. The higher the inrush current in the closed circuit is, the more the contact abrasion or shift will be. Consequently, contact weld, contact separation failures, or insulation failures may result. Furthermore, the Switch may break or become damaged.

If the load is inductive, counter-electromotive voltage will be generated. The higher the voltage is, the higher the generated energy is, which increase the abrasion of the contacts and contact relocation phenomena. Make sure to use the Switch within the rated conditions.

Inrush Current

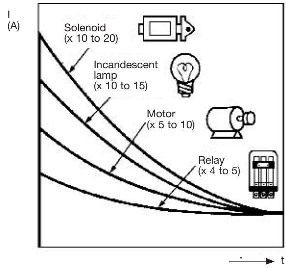


The switching capacity of each Switch appearing on a datasheet is the rated capacity. When applying the Switch to a circuit with a special load with unusual inrush and switching current and voltage waveforms, be sure to test the Switch under the actual conditions before use.

If the load is a minute voltage or current load, use a dedicated Switch for minute loads. The reliability of silver-plated contacts, which are used by standard Switch models, is insufficient in such a case.

If the Switch is used for switching both minute and heavy loads, be sure to connect relays suitable to the loads.

Types of Load vs. Inrush Current



The rated loads of the Switch are as follows:

Inductive Load: A load having aminimum power factor of 0.4 (AC) or a maximum time constant of 7 ms (DC).

Lamp Load: A load having an inrush current ten times the steady-state current.

Motor Load: A load having an inrush current six times the steadystate current.

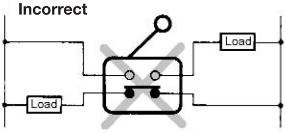
Note: It is important to know the time constant (L/R) of an inductive load in a DC circuit.

LOAD CONNECTIONS

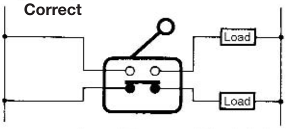
Example of Power Source Connection (Different Polarity)

The power source may short-circuit in failure mode if the loads are connected in the same way as the "incorrect" circuit below.

Incorrect



Correct



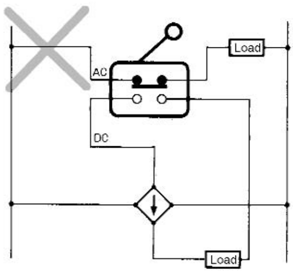
Connect the same polarities to the load.

Even in a "correct" circuit, note that the insulation performance of the switch may deteriorate and the switch life may be shortened because one load is connected to one contact.

Example of Incorrect Connection of Power Source (Different Current Type)

The DC and AC power may be mixed.

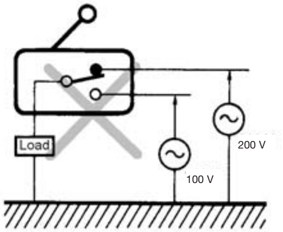
Incorrect



Microswitches

Do not configure a circuit that may place a voltage between the contacts of the Switch; otherwise metal deposition will occur between the contacts.

Incorrect



Contact Protective Circuit

Apply a contact protective circuit to extend contact life, prevent noise, and suppress the generation of carbide or nitric acid. Be sure to apply the contact protective circuit properly, otherwise an adverse effect may result. The use of the contact protective circuit may delay the response time of the load.

Life Expectancy

The life of the Switch greatly varies with switching conditions. Before using the Switch, be sure to test the Switch under actual conditions. Make sure that the number of switching operations is within the permissible range. If a deteriorated Switch is used continuously, insulation failures, contact weld, contact failures, Switch damage, or Switch burnout may result.

Mounting

Before mounting, dismounting, wiring, or inspecting the Switch, be sure to turn OFF the power supply to the Switch, otherwise an electric shock may be received or the Switch may burn.

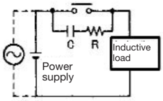
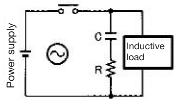
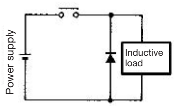
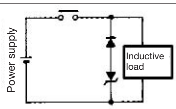
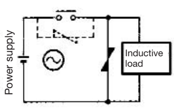
Wiring

When mounting the Switch to the mounting panel, keep a sufficient insulation distance between the mounting panel and the Switch. If the insulation distance is insufficient, add an appropriate insulation guard or separator. This is especially important if the Switch is mounted to a metal object.

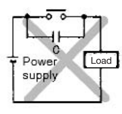
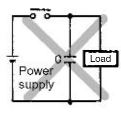
The Basic Switch does not incorporate a ground terminal. Do not mount the Basic Switch while power is being supplied.

The following provides typical examples of contact protective circuits. If the Switch is used in an excessively humid place for switching a load that generates arcs with ease, such as an inductive load, the arcs may generate NOx, which will change into HNO_3 (nitric acid) if it reacts with moisture. Consequently, the internal metal part may be corroded and result in an operating failure of the Switch. Be sure to select the best contact preventive circuit from the following in order to prevent this.

Typical Examples of Contact Protective Circuit

Circuit example		Applicable current		Feature	Element selection
		AC	DC		
CR circuit		See note	Yes	**Note:** When AC is switched, the load impedance must be lower than the CR impedance.	C: 0.5 to 1 µF per switching current (1 A) R: 0.5 to 1 Ω per switching voltage (1 V) The values may change according to the characteristics of the load. The capacitor suppresses the spark discharge of current when the contacts are open. The resistor limits the inrush current when the contacts are closed again. Consider these roles of the capacitor and resistor and determine the ideal capacitance and resistance values from experimentation. Use a capacitor that has low dielectric strength. When AC is switched, make sure that the capacitor has no polarity.
		Yes	Yes	The operating time will increase if the load is a relay or solenoid. It is effective to connect the CR circuit in parallel to the load when the power supply voltage is 24 or 48 V and in parallel to the contacts when the power supply voltage is 100 to 200 V.	
Diode Method		No	Yes	Energy stored in the coil is changed into current by the diode connected in parallel to the load. Then the current flowing to the coil is consumed and Joule heat is generated by the resistance of the inductive load. The reset time delay in this method is longer than that of the CR method.	The diode must withstand a peak inverse voltage 10 times higher than the circuit voltage and a forward current as high as or higher than the load current.
Diode and Zener diode method		No	Yes	This method will be effective if the reset time delay caused by the diode method is too long.	Zener voltage for a Zener diode must be about 1.2 times higher than the power source since the load may not work under some circumstances.
Varistor method		Yes	Yes	This method makes use of constant-voltage characteristic of the varistor so that no high-voltage is imposed on the contacts. This method causes a reset time delay more or less. It is effective to connect varistor in parallel to the load when the supply voltage is 24 to 48 V and in parallel to the contacts when the supply voltage is 100 to 200V.	–

Do not apply contact protective circuits as shown below.

	This circuit effectively suppresses arcs when the contacts are OFF. The capacitance will be charged, however, when the contacts are OFF. Consequently, when the contacts are ON again, short-circuited current from the capacitance may cause contact weld.		This circuit effectively suppresses arcs when the contacts are OFF. When the contacts are ON again, however, charge current flows to the capacitor, which may result in contact weld.

Microswitches

TERMINAL CONNECTIONS

Be sure to connect appropriate wires to the Switch by considering the voltage and current applied to the Switch.

Solder Terminals

When soldering lead wires to the Switch, make sure the temperature of the iron tip is 380ºC maximum, unless otherwise specified in the data sheet. Improper soldering may cause abnormal heat radiation from the switch and the switch may burn.

The characteristics of the switch will deteriorate if a soldering is more than 350ºC for 5s or more than 380ºC for 3s.

Soldering conditions of ultra subminiature size or smaller switch is more severe. Therefore, follow specified conditions in the data sheet.

Be sure to apply only the minimum required amount of flux. The Switch may have contact failures if flux intrudes into the interior of the Switch.

Quick-connect Terminals

Wire the quick-connect terminals with the specified receptacles and insert the terminals straight into the receptacles. Do not impose excessive external force on the terminals in the horizontal or vertical directions, otherwise the terminals may deform or the housing may become damaged.

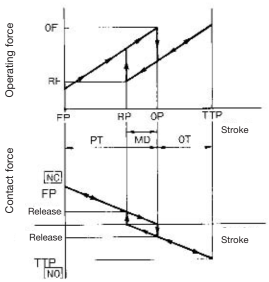
■ Mechanical Conditions

Operating Stroke Setting

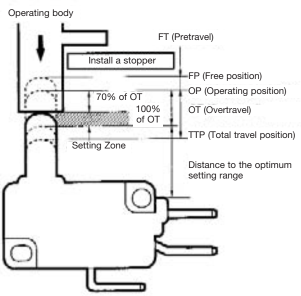
The setting of the stroke is very important for the Switch to operate with high reliability.

The chart below shows the relationship among operating force, stroke, and contact reliability. To obtain high reliability from the Switch, the Switch actuator must be manipulated within an appropriate range of operating force.

Be sure to pay the utmost attention when mounting the Switch.

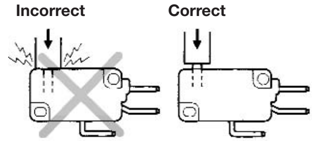


Make sure that operating body returns the actuator to the free position when the operating body has moved if the Switch is used to form a normally closed (NC) circuit. If the Switch is used to forma normally open (NO) circuit, the operating body must move the Switch actuator to a distance of 70% to 100% of the rated overtravel (OT) of the Switch.



If the stroke is set in the vicinity of the operating position (OP) or at the releasing position (RP), switching operation may become unstable. As a result, the Switch cannot ensure high reliability. Furthermore, the Switch may malfunction due to vibration or shock.

If the stroke is at the total travel position (TTP), the momentary inertia of the operating body may damage the actuator or the Switch itself. Furthermore, the life of the Switch may be shortened.



SWITCHING SPEED AND FREQUENCY

The switching frequency and speed of a Switch have a great influence on the performance of the Switch. Pay attention to the following.

- If the actuator is operated too slowly, the switching operation may become unstable, causing faulty contact or contact weld.
- If the actuator is operated too quickly, the Switch may be damaged by shock.
- If the switching frequency is too high, the switching of the contacts cannot catch up with the operating speed of the actuator.
- If the operating frequency is extremely low (i.e., once a month or less frequent), a film may be generated on the surface of the contacts, which may cause contact failures.

The permissible switching speed and switching frequency of a Switch indicates the operational reliability of the Switch. The life of the Switch may vary with the switching speed if the Switch is operated within the permissible switching speed and frequency ranges. Test a Switch sample under the actual conditions to ascertain its life expectancy.

Operating Condition

Do not leave the Switch actuated for a long time, otherwise the parts of the Switch may soon deteriorate and changes in its characteristic performance may result.

Correct Use

■ Electrical Conditions

Application of Switch to Electronic Circuits

The Basic Switch in switching operation may cause contact bouncing or chattering, thus generating noise or pulse signals that may interfere the operation of electronic circuits or audio equipment. To prevent this, take the following countermeasures.

- Design the circuits so that they include appropriate CR circuits to absorb noise or pulse signals.
- Use Switches incorporating gold-plated contacts for minute loads, which are more resistive to environmental conditions than standard Switches.

Switches for Minute Loads

Use a dedicated Switch for minute loads, otherwise contact failures may result. Be sure to connect the Switch to a load within the permissible range. Even if the load is within the permissible range, the inrush current of the load may deteriorate the contacts, thus shortening the life of the Switch. Therefore, if necessary, insert the proper contact protective circuit.

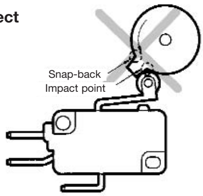
■ Mechanical Conditions

Switching Method

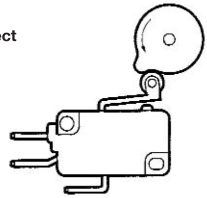
The switching method has a great influence on the performance of the Switch. Consider the following before operating the Switch.

- Design the operating body (i.e., the cam or dog) so that it will operate the actuator smoothly. If the actuator snaps backwards quickly or receives damage due to the shape of the operating body, its life expectancy may be shortened.

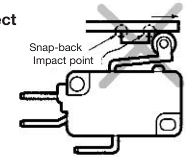
Incorrect



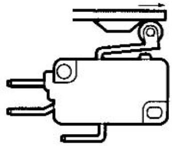
Correct



Incorrect

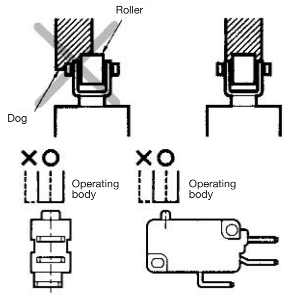


Correct

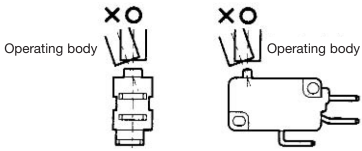


- Make sure that no improper load is imposed on the actuator, otherwise the actuator may incur local abrasion. As a result, the actuator may become damaged or its life expectancy shortened.

Incorrect **Correct**

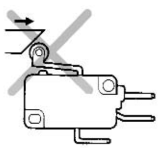


- Make sure that the operating body moves in a direction where the actuator moves. If the actuator is a pin plunger type, make sure that the operating body presses the pin plunger vertically.

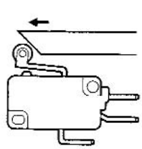


Operate the actuator of a roller hinge lever or simulated hinge lever type in the direction shown below.

Incorrect



Correct



- Do not modify the actuator to change the operating position (OP).
- If the lever-type actuator is used as an operating object, check the material and thickness of the lever and make sure that the force imposed on the lever is within the permissible range.

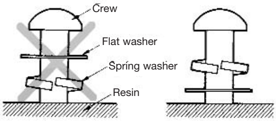
MOUNTING

When mounting the Switch, pay attention to the following.

Securing

When securing the Switch, be sure to use the specified mounting screws and tighten the screws with flat washers and springwashers securely.

If the Switch housing is made of thermoplastic, the Switch housing may incur crack damage if it comes into contact with the spring washers directly. In that case make sure that the flat washers come into contact with the Switch housing as shown below.



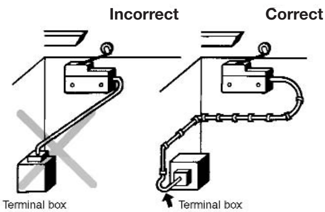
- Do not modify the Switch in any way, for example, by widening the mounting holes

Locking Agent

If glue or locking agent is applied, make sure that it does not stick to the movable parts or intrude into the interior of the Switch, otherwise the Switch may work improperly or cause contact failure. Some types of glue or locking agent may generate gas that has a bad influence on the Switch. Pay the utmost attention when selecting the glue or locking agent.

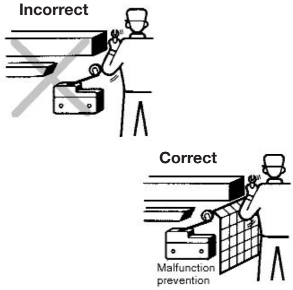
Wiring

Make sure that the lead wires are connected with no inappropriate pulling force and that the wires are supported securely.



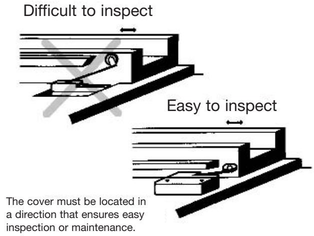
Mounting Location

Be sure not to mount the Switch in locations where the Switch may be actuated by mistake.



Maintenance and Inspection

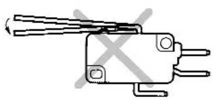
Make sure that the Switch is mounted in locations that allow easy inspection or replacement of the Switch.



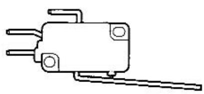
Mounting Direction

When using a Switch of low operating force attached with a long lever or long rod lever, make sure that the lever is in the downward direction as shown below, otherwise the Switch may not reset properly.

Incorrect



Correct



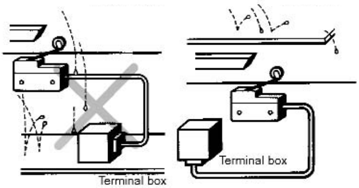
■ Operation and Storage

Oil and Water Resistance

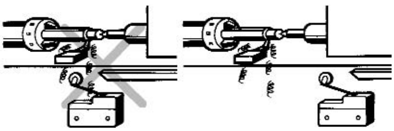
The standard Switch is not water-resistant. Protect the Switch with appropriately when using the Switch in places with water or oil spray.

If the Switch is exposed to water drops, use a sealed Switch.

Incorrect **Correct**



Incorrect **Correct**



■ Others

Handling

Do not drop the Switch, otherwise the Switch may break or deform. Do not apply oil, grease, or other lubricants to the sliding parts of the Switch, otherwise the actuator may not operate smoothly. Furthermore, the intrusion of oil, grease, or other lubricants into the internal part may cause the Switch to fail.

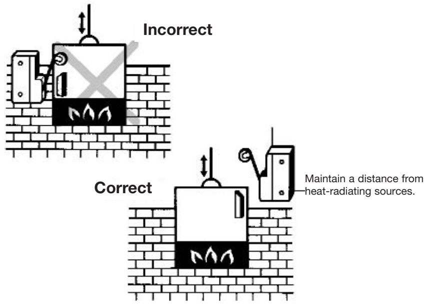
Operating Environment

Do not install the Switch in any location or direction where the Switch resonates or continuous vibration or shock is imposed on the Switch. If continuous vibration or shock is imposed on the Switch, a contact failure, malfunction, or a decrease in life expectancy may be caused by abrasive powder generated from the internal parts. If excessive vibration or shock is imposed on the Switch, the contacts may malfunction or become damaged.

Do not use the Switch in locations with corrosive gas, such as sulphuric gas (H_2S or SO_2), ammonium gas (NH_3), nitric gas (HNO_3), or chlorine gas (Cl_2), or in locations with high temperature and humidity. Otherwise, contact failure or corrosion damage may result.

If the Switch is used in places with silicone gas, arc energy may attract silicon dioxide (SiO_2) to the contacts and a contact failure may result. If there is silicone oil, silicone sealant, a wire covered with silicone, or any other silicone-based product near the Switch, attach a contact protective circuit to suppress the arcing of the Switch or eliminate the source of silicone gas generation.

Be sure to use the Switch at temperature within the specified range. If the Switch is exposed to radical temperature changes or intense heat, the performance characteristics of the Switch may change.



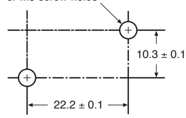
Storage Environment

When storing the Switch, make sure that the location is free of corrosive gas or dust with no high temperature or humidity. It is recommended that the Switch be inspected before use if it is stored for three months or more.

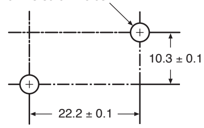
Microswitches

Switch Trouble and Remedial Action

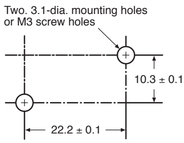
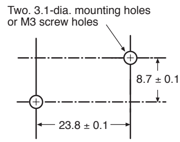
Type	Location of failure	Failure	Possible cause	Remedy
Failures related to electrical characteristics	Contacts	Fault contact	Dust and dirt collect on the contacts	Clean the environment, place the contact Switch in a box, or use a sealed Switch.
			Oil or water has penetrated into the Switch.	
			Chemical substances have been generated on the contact surfaces because the atmosphere contains chemical gas.	Use a Switch having contacts with high environmental resistivity (such as gold or alloy contacts).
			Chemical substances have been generated on the contact surface when the Switch breaks a very low load.	
			Solder flux has penetrated into the Switch.	Review the soldering method or use a flux-tight Switch.
		Malfunction	The contacts are separated from each other by vibration or shock.	Use a Switch having a high contact force (generally a heavy OF).
		Contact weld	The load connected to the Switch is too heavy.	Use a Switch having higher switching capacity or insert a relay to switch heavy load.
		Insulation degradation	Contacts have been melted and scattered by arc.	Insert a contact protection circuit.
			Water has penetrated into the Switch because the Switch is placed in extremely humid environment.	Change the environment, place the Switch in a sealed box, or use a sealed Switch.
			Oil has penetrated into the Switch and been carbonized by arc heat.	
Failures related to mechanical characteristics	Actuator	Misoperation	The sliding part of the actuator has been damaged because an excessive force was applied on the actuator.	Make sure that no excessive force is applied to the actuator, or use an auxiliary actuator mechanically strong.
			Dust and dirt have penetrated into the actuator.	Clean the environment or place the Switch in a sealed box.
			The actuator does not release because the operating body is too heavy.	Use a Switch having a heavier OF.
			The Switch is loosely installed and thus does not operate even when the actuator is at the rated OP.	Secure the Switch.
		Service life is too short	The shape of the dog or cam is improper.	Change the design of the dog or cam.
			The operating method is improper.	Review the OT and operating speed.
		Damage	A shock has been applied to the actuator.	Change the environment or use a Switch mechanically strong.
			The clamping part has not been tightened enough or the Switch has been loosely mounted.	Replace the Switch with a new one.
			Deformation or drop-out.	Relocate the Switch so that improper force will not be imposed on the actuator or in the wrong direction. Review the operating method.
	Mounting section	Damage	Screws have not been inserted straight.	Check and correct screw insertion methods.
			The mounting screws were tightened with too much torque.	Tighten the screws to an appropriate torque.
			The mounting pitch is wrong.	Correct the pitch.
			The Switch is not installed on a flat surface.	Install the Switch on a flat surface.
	Terminal	Damage	An excessive force was applied to the terminal while being wired.	Do not apply an excessive force.
			The plastic part has been deformed by solder heat	Use a soldering iron rated at a lower wattage.

Model		**D3V**				
Style		Non-Sealed				
Case Dimensions		27.8 x 10.3 x 15.9				
Characteristics		Available with externally or internally fitted levers. 2 fixing positions for external levers				
Appearance						
Part Number		**D3V-21**	**D3V-16**	**D3V-11**	**D3V-6**	**D3V-01**
Contact	**Contact Specification**	Rivet				
	Contact Material	Silver alloy				
	Rating (Resistive Load)	21 A at 250 VAC	16 A at 250 VAC	11 A at 250 VAC	6 A at 250 VAC	0.1 A at 250 VAC
Operating Force (see note)		1.23 N (125 gf)	0.96 N (200 gf)	0.98 N (100 gf), 1.96 N (200 gf)	0.49 N (50 gf), 0.98 N (100 gf)	0.49 N (50 gf), 0.25 N (25 gf) Standard
Life Expectancy	**Mechanical Ops Min.**	10,000,000				
	Electrical Ops Min.	50,000	100,000	200,000	500,000	500,000
Ambient Operating Temperature		-25°C to 85°C	-25°C to 105°C (High temperature version D3V-6 up to 200°C; D3V-11 up to 155°C)			-25°C to 85°C (High temp. version up to 200°C)
Mounting Pitch						
Actuator	**Pin Plunger**	•				
	Hinge Lever	•				
	Simulated Hinge Lever	•				
	Hinge Roller Lever	•				
	Short Hinge Lever	•				
	Long Hinge Lever	•				
	Short Hinge Roller Lever	•				
	Leaf Spring					
	Rotary Lever					
Terminals	**Quick Connect**	•				
	Solder	•				
	Screw					
	Straight PCB					
	Angled PCB					
	Connector					
	Lead wire					
Pack Quantity		100				
Page Number		519				

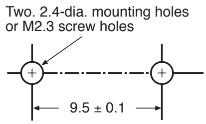
Note: These values are for pin plunger models

Model		V				
Style		Non-sealed				
Case Dimensions		27.8 x 10.3 x 15.9				
Characteristics		Compact and highly reliable switch				
Appearance						
Part Number		**V-21**	**V-16**	**V-15**	**V-11**	**V-10**
Contact	**Contact Specification**	Rivet				
	Contact Material	Silver alloy				
	Rating (Resistive Load)	21 A at 250 VDC	16 A at 250 VAC	15 A at 250 VAC	11 A at 250 VAC	10 A at 250 VAC
Operating Force (see note)		3.92 N (400 gf)	0.98, 0.96, 3.92 N (100, 200, 400 gf)		0.98 N (100 gf)	0.98, 1.96 N (100, 200 gf)
Life Expectancy	**Mechanical Ops Min.**	50,000,000				
	Electrical Ops Min.	100,000			300,000	
Ambient Operating Temperature		-25°C to 80°C (heat resistive -25°C to 150°C)				
Mounting Pitch						
Actuator	**Pin Plunger**	•				
	Hinge Lever	•				
	Simulated Hinge Lever	•				
	Hinge Roller Lever	•				
	Short Hinge Lever	•				
	Long Hinge Lever	•				
	Short Hinge Roller Lever	•				
	Leaf Spring					
	Rotary Lever					
Terminals	**Quick Connect**	•				
	Solder	•				
	Screw	•				
	Straight PCB					
	Angled PCB					
	Connector					
	Lead wire					
Pack Quantity		100				
Page Number		536				

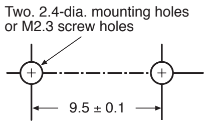
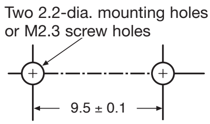
Note: These values are for pin plunger models

Model		VX		D2MC	
Style		Non-sealed		Non-sealed	
Case Dimensions		27.8 x 10.3 x 15.9		31.0 x 14.1 x 17.5	
Characteristics		Compact and highly reliable switch		Highly reliable rotary action switch	
Appearance					
Part Number		**VX-5**	**VX-01**	**D2MC-5**	**D2MC-01**
Contact	**Contact Specification**	Rivet	Crossbar	Rivet	Crossbar
	Contact Material	Silver alloy	Gold alloy	Silver alloy	Gold alloy
	Rating (Resistive Load)	5 A at 250 VAC	0.1 A at 125 VAC	5 A at 250 VAC	0.5 A at 30 VDC
Operating Force (see note)		0.25, 0.49 N (25, 50 gf)		0.5, 0.75, 1.00cNm (5.1, 7.6, 10.2 gfcm)	
Life Expectancy	**Mechanical Ops Min.**	50,000,000	10,000,000	10,000,000	
	Electrical Ops Min.	500,000	1,000,000	100,000	
Ambient Operating Temperature		-25°C to 80°C		-25°C to 80°C	
Mounting Pitch					
Actuator	**Pin Plunger**	•			
	Hinge Lever	•			
	Simulated Hinge Lever	•			
	Hinge Roller Lever	•			
	Short Hinge Lever	•			
	Long Hinge Lever	•			
	Short Hinge Roller Lever	•			
	Leaf Spring				
	Rotary Lever				
Terminals	**Quick Connect**	•		•	
	Solder	•			
	Screw	•			
	Straight PCB				
	Angled PCB				
	Connector				
	Lead wire				
Pack Quantity		100		50	
Page Number		551		558	

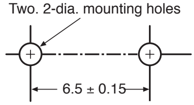
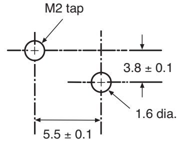
Note: These values are for pin plunger models

Model		**SS**		
Style		Non-sealed		
Case Dimensions		19.8 x 6.4 x 10.2		
Characteristics		Economical subminiature switch incorporating two split springs for long service life		
Appearance				
Part Number		**SS-10**	**SS-5**	**SS-01**
Contact	**Contact Specification**	Rivet		Crossbar
	Contact Material	Silver alloy	Silver	Gold alloy
	Rating (Resistive Load)	10.1 A at 250 VAC	3 A at 250 VAC	0.1 A at 125 VAC
Operating Force (see note)		1.47 N (150 gf)	0.49, 1.47 N (50, 150 gf)	0.25, 0.49, 1.47 N (25, 50, 150 gf)
Life Expectancy	**Mechanical Ops Min.**	10,000,000	30,000,000	
	Electrical Ops Min.	50,000	200,000	
Ambient Operating Temperature		-25°C to 85°C		
Mounting Pitch				
Actuator	**Pin Plunger**	•		
	Hinge Lever	•		
	Simulated Hinge Lever	•		
	Hinge Roller Lever	•		
	Short Hinge Lever			
	Long Hinge Lever			
	Short Hinge Roller Lever			
	Leaf Spring			
	Rotary Lever			
Terminals	**Quick Connect**	•		
	Solder	•		
	Screw			
	Straight PCB	•		
	Angled PCB			
	Connector			
	Lead wire			
Pack Quantity		100		
Page Number		563		

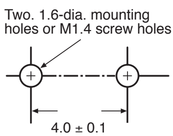
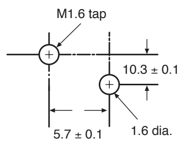
Note: These values are for pin plunger models

Model		SS-P		SSG	
Style		Non-sealed		Non-sealed	
Case Dimensions		19.8 x 6.4 x 10.2		19.8 x 6.4 x 10.2	
Characteristics		SS series compatible mounting with simple construction and easy to use design concept		Global subminiature switch conforming to EN, UL & CSA specifications	
Appearance					
Part Number		**SS-3P**	**SS-01P**	**SSG-5**	**SSG-01**
Contact	Contact Specification	Rivet	Crossbar	Rivet	Crossbar
	Contact Material	Silver Alloy	Gold Alloy	Silver alloy	PGS alloy
	Rating (Resistive Load)	3 A at 125 VAC	0.1 A at 125 VAC	3 A at 250 VAC	0.1 A at 125 VAC
Operating Force (see note)		1.50 N (153 gf)		0.50, 1.50 N (51, 153 gf)	
Life Expectancy	Mechanical Ops Min.	1,000,000		10,000,000	
	Electrical Ops Min.	70,000	200,000	200,000	
Ambient Operating Temperature		-25°C to 85°C		-25°C to 125°C	
Mounting Pitch					
Actuator	Pin Plunger	•		•	
	Hinge Lever	•		•	
	Simulated Hinge Lever	•		•	
	Hinge Roller Lever	•		•	
	Short Hinge Lever				
	Long Hinge Lever				
	Short Hinge Roller Lever				
	Leaf Spring				
	Rotary Lever				
Terminals	Quick Connect	•		•	
	Solder	•		•	
	Screw				
	Straight PCB	•		•	
	Angled PCB				
	Connector				
	Lead wire				
Pack Quantity		100		100	
Page Number		571		577	

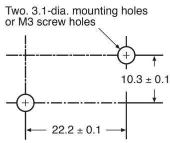
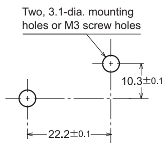
Note: These values are for pin plunger models

Model		D2F			D2A
Style		Non-sealed			Non-sealed
Case Dimensions		12.8 x 5.8 x 6.5			8.0 x 6.0 x 4.2
Characteristics		Low cost microswitch			Ultra sub-miniature switch detector switch
Appearance					
Part Number		D2F(-*) Standard	D2F-F* Low force	D2F-01* Micro load	
Contact	Contact Specification	Crossbar			SPDT
	Contact Material	Silver alloy		Gold alloy	Silver plated
	Rating (Resistive Load)	3 A at 125 VAC	1 A at 125 VAC	0.1 A at 30 VDC	0.1 A at 30 VDC
Operating Force (see note)		1.47 N (150 gf)	0.74 N (75 gf)	0.74, 1.47 N (75, 150 gf)	0.49 N, 0.98 N (50 gf, 100 gf)
Life Expectancy	Mechanical Ops Min.	10,000,000			50,000
	Electrical Ops Min.	30,000			50,000
Ambient Operating Temperature		-25°C to 65°C			-10°C to 70°C
Mounting Pitch					
Actuator	Pin Plunger	•			•
	Hinge Lever	•			
	Simulated Hinge Lever	•			
	Hinge Roller Lever	•			
	Short Hinge Lever				
	Long Hinge Lever				
	Short Hinge Roller Lever				
	Leaf Spring				
	Rotary Lever				
Terminals	Quick Connect				
	Solder	•			
	Screw				
	Straight PCB				
	Angled PCB	•			
	Connector	•			
	Lead wire				
Pack Quantity		500			50
Page Number		585			591

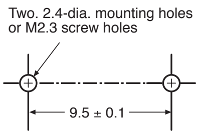
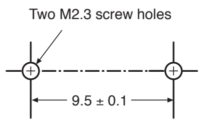
Note: These values are for pin plunger models

Model		**D2MQ**		**D3C**	
Style		Non-sealed		Non-sealed	
Case Dimensions		6.5 x 8.2 x 2.7		8.0 x 5.6 x 6.0	
Characteristics		Ultra sub-miniature switch suitable for micro loads		Compact, low cost microswitch	
Appearance					
Part Number				**D3C-1 Non-shorting**	**D3C-2 Shorting**
Contact	**Contact Specification**	Rivet		Slide	
	Contact Material	Silver plated	Gold plated	Silver plating	
	Rating (Resistive Load)	0.5 A at 30 VDC	50 mA at 30 VDC	0.1 A at 30 VDC	
Operating Force (see note)		1.18 N (120 gf)		0.39, 1.28 N (40, 130 gf)	
Life Expectancy	**Mechanical Ops Min.**	30,000		50,000	
	Electrical Ops Min.	10,000		50,000	
Ambient Operating Temperature		-15°C to 70°C		-20°C to 80°C	
Mounting Pitch					
Actuator	**Pin Plunger**	•			
	Hinge Lever	•		•	
	Simulated Hinge Lever				
	Hinge Roller Lever			•	
	Short Hinge Lever				
	Long Hinge Lever				
	Short Hinge Roller Lever				
	Leaf Spring	•			
	Rotary Lever				
Terminals	**Quick Connect**				
	Solder				
	Screw				
	Straight PCB	•		•	
	Angled PCB	•			
	Connector				
	Lead wire				
Pack Quantity		100		1,000	
Page Number		595		600	

Note: These values are for pin plunger models

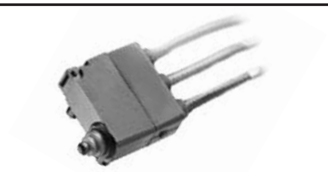
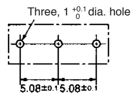
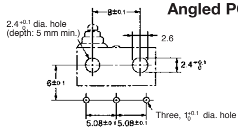
Model		D2VW		D2RW
Style		Sealed		Sealed
Case Dimensions		33.0 x 10.3 x 15.9		35.9 x15.9 x 10.3
Characteristics		Sealed sub-miniature switch		Sealed reed basic switch
Appearance				
Part Number		D2VW-5	D2VW-01	
Contact	Contact Specification	Rivet	Crossbar	Reed Switch
	Contact Material	Silver alloy	Gold alloy	–
	Rating (Resistive Load)	5 A at 250 VDC	0.1 A at 30 VDC	0.25 A at 100 VDC
Operating Force (see note)		1.96 N (200 gf)		1.5 N (153 gf)
Life Expectancy	Mechanical Ops Min.	10,000,000		1,000,000
	Electrical Ops Min.	100,000	1,000,000	1,000,000
Ambient Operating Temperature		-40°C to 85°C		-10°C to 60°C
Mounting Pitch				
Actuator	Pin Plunger	•		•
	Hinge Lever	•		•
	Simulated Hinge Lever	•		•
	Hinge Roller Lever	•		
	Short Hinge Lever	•		
	Long Hinge Lever	•		
	Short Hinge Roller Lever	•		
	Leaf Spring			
	Rotary Lever			
Terminals	Quick Connect	•		
	Solder	•		
	Screw			
	Straight PCB			
	Angled PCB			
	Connector			
	Lead wire	•		•
Pack Quantity		10		20
Page Number		604		610

Note: These values are for pin plunger models

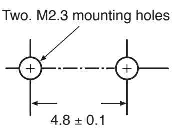
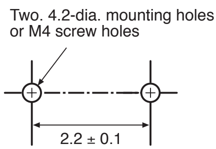
Model		D2SW		D2SW-P	
Style		Sealed		Sealed	
Case Dimensions		19.8 x6.4 x 10.1		19.8 x 6.4 x 10.1	
Characteristics		Sealed miniature switch		Sealed switch with basic construction	
Appearance					
Part Number		D2SW-3	D2SW-01	D2SW-P2	D2SW-P01
Contact	Contact Specification	Rivet	Crossbar	Rivet	Crossbar
	Contact Material	Silver	Gold alloy	Silver alloy	Gold Alloy
	Rating (Resistive Load)	3 A at 30 VDC	0.1 A at 30 VDC	2 A at 30 VDC	0.1 A at 30 VDC
Operating Force (see note)		1.77 N (180 gf)		1.8N (183 gf)	
Life Expectancy	Mechanical Ops Min.	5,000,000		1,000,000	
	Electrical Ops Min.	200,000		100,000	200,000
Ambient Operating Temperature		-40°C to 85°C		-20°C to 70°C	
Mounting Pitch					
Actuator	Pin Plunger	•		•	
	Hinge Lever	•		•	
	Simulated Hinge Lever	•		•	
	Hinge Roller Lever	•		•	
	Short Hinge Lever				
	Long Hinge Lever				
	Short Hinge Roller Lever				
	Leaf Spring				
	Rotary Lever				
Terminals	Quick Connect	•		•	
	Solder	•		•	
	Screw				
	Straight PCB	•		•	
	Angled PCB				
	Connector				
	Lead wire	•		•	
Pack Quantity		20		20	
Page Number		614		620	

Note: These values are for pin plunger models

Microswitches

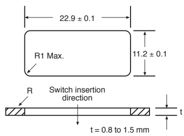
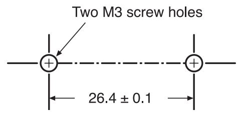
Model		D2HW			
Style		Sealed			
Case Dimensions		13.3 x 5.3 x 6.5			
Characteristics		Ultra sub-miniature sealed switch with extra long stroke even without levers			
Appearance					
Part Number		**D2HW-A** Without posts	**D2HW-BR** Posts on right	**D2HW-BL** Posts on left	**D2HW-C** M3 screw mounting
Contact	Contact Specification	Crossbar			
	Contact Material	Gold alloy			
	Rating (Resistive Load)	2 A at 12 VDC, 1 A at 24 VDC, 0.5 A at 24 VDC			
Operating Force (see note)		0.75 N (76 gf)			
Life Expectancy	Mechanical Ops Min.	1,000,000			
	Electrical Ops Min.	100,000			
Ambient Operating Temperature		-40°C to 85°C			
Mounting Pitch		**Straight PCB Terminals** 		**Angled PCB Terminals** 	
Actuator	Pin Plunger	•			
	Hinge Lever	•			
	Simulated Hinge Lever	•			
	Hinge Roller Lever	•			
	Short Hinge Lever	•			
	Long Hinge Lever	•			
	Short Hinge Roller Lever				
	Leaf Spring	•			
	Rotary Lever				
Terminals	Quick Connect				
	Solder	•			
	Screw				
	Straight PCB	•			
	Angled PCB	•			
	Connector				
	Lead wire	•			
Pack Quantity		100 without leads, 10 with leads			
Page Number		629			

Note: These values are for pin plunger models

Model		D2JW	D2D		
Style		Sealed	Door		
Case Dimensions		30.0 x12.4 x 31.0	30.0 x 12.4 x 31.0		
Characteristics		Switch for use in adverse environments such as water	Door interlock switch with fail safe mechanisms		
Appearance					
Part Number			D2D-1000	D2D-2000	D2D-3000
Contact	Contact Specification	Crossbar	Rivet		
	Contact Material	Gold alloy	Silver		
	Rating (Resistive Load)	0.1 A at 30 VDC	16 A at 250 VAC	120 A at 250 VAC	16 A at 250 VAC
Operating Force (see note)		2.54 N (250 gf)	NC-OFF 2.94 (300 gf) NC-ON 5.88 N (600 gf)	NC-OFF 1.96 N (200 gf) NC-ON 5.88 N (300 gf)	NC-OFF 2.94 N (300 gf) NC-ON 5.88 N (600 gf)
Life Expectancy	Mechanical Ops Min.	1,000,000	10,000,000		
	Electrical Ops Min.	100,000	100,000		
Ambient Operating Temperature		-40°C to 85°C	-25°C to 85°C		
Mounting Pitch					
Actuator	Pin Plunger	•	•		
	Hinge Lever	•			
	Simulated Hinge Lever	•			
	Hinge Roller Lever	•			
	Short Hinge Lever	•			
	Long Hinge Lever				
	Short Hinge Roller Lever				
	Leaf Spring				
	Rotary Lever				
Terminals	Quick Connect		•		
	Solder	•			
	Screw				
	Straight PCB				
	Angled PCB				
	Connector				
	Lead wire	•			
Pack Quantity		20	50		
Page Number		637	642		

Note: These values are for pin plunger models

Microswitches

Model		D3D	D2T
Style		Door	Door
Case Dimensions		36.4 x 11.0 x 15.0	33.0 x 24.6 x 11.5
Characteristics		Minature door switch	DPST-NO door switch for power and signal
Appearance			
Part Number			
Contact	Contact Specification	Crossbar	Rivet
	Contact Material	Gold alloy	Silver
	Rating (Resistive Load)	0.1 A at 125 VAC	Power: 5 A at 250 VAC, Signal: 0.1A at 125 VAC
Operating Force (see note)		2.0 N (204 gf)	3.24 N (330 gf)
Life Expectancy	Mechanical Ops Min.	300,000	100,000,000
	Electrical Ops Min.	50,000	100,000,000
Ambient Operating Temperature		-30°C to 60°C	-25°C to 85°C
Mounting Pitch			
Actuator	Pin Plunger	•	•
	Hinge Lever	•	•
	Simulated Hinge Lever		
	Hinge Roller Lever		
	Short Hinge Lever		
	Long Hinge Lever		
	Short Hinge Roller Lever		
	Leaf Spring		
	Rotary Lever		
Terminals	Quick Connect		•
	Solder		
	Screw		
	Straight PCB		
	Angled PCB		
	Connector	•	
	Lead wire		
Pack Quantity		100	100
Page Number		650	654

Note: These values are for pin plunger models

Reliable High Temperature Basic Switch with External Lever

- ROHS compliant.
- Available in 0.1 A, 6 A, 11 A, 16 A, 21 A, and 25 A models, all with self-cleaning contacts.
- Available with internally or externally fitted levers, and 2 fixing positions for external levers.
- Maximum operating temperature of 200˚C
- Conforms to EN61058-1 and UL 1054.

Ordering Information

Model Number Legend

D3V-□□□□-□□□-□-□□
1 2 3 4 5 6 7 8 9 10

1. Ratings

25:	22 (5) A at 250 VAC
21	20 (4) A at 250 VAC
16:	16 (3) A at 250 VAC
11:	11 (3) A at 250 VAC
6:	6 (2) A at 250 VAC
01:	0.1 A at 125 VAC

2. Contact Gap

None:	1 mm (F gap)
G:	0.5 mm (G gap)

3. Actuator

None:	Pin plunger
1:	Short hinge lever
2:	Hinge lever
3:	Long hinge lever
4:	Simulated roller lever
5:	Short hinge roller lever
6:	Hinge roller lever

4. Hinge Position

None:	Internal/Far from plunger
M:	External/Far from plunger
K:	External/Near plunger

5. Contact Form

1:	SPDT
2:	SPST-NC
3:	SPST-NO

6. Terminals

A:	Solder terminal (#187)
C2:	Quick-connect terminal (#187)
C:	Quick-connect terminal (#250)
C6:	RAST5 terminal (#250)

7. Maximum Operating Force

6:	3.92N {400gf}
5A:	3.43N {350gf}
5:	1.96 N {200 gf}
4B:	1.47N {150gf}
4A:	1.23 N {125 gf}
4:	0.98 N {100 gf}
3:	0.49 N {50 gf}
2:	0.25 N {25 gf}

Note: These values are for the pin plunger models.

8. Enclosure Material

None:	Standard
T:	High temperature (200°C, 155°C and EN 60695-2-11/-12 (Glow-wire flammability test methods) approved
W1:	Standard temperature (105°C, 85°C and EN 60695-2-11/-12 (Glow-wire flammability test methods) approved, PTI250

9. Mounting Hole Size

None:	3.1 mm
K:	2.9 mm

10. Special Code

None:	Standard
H:	High temperature (125°C)
E:	Special rating: 21 (8) A

■ Available Combinations - D3V - 25/21/16

	Model	D3V-25	D3V-21			D3V-16				
	Rated current	25 A	21 A			16 A				
	OF max.	3.47N {350gf}	3.47N {350gf}	1.47N {150gf}	1.23N {125gf}	3.92N {400gf}	1.96N {200gf}		1.23N {125gf}	0.98N {100gf}
Heat resistance	Contact Gap / Terminals	F/G	F/G	G	G	F/G	F	G	G	F/G
Standard (85°C)	#187									
	#250	○	○	○	●					
	RAST5									
Standard (105°C)	#187					○	●	○		○
	#250					○	●	○	○	○
	RAST5								●	
EN60695-2-11 approved W1: (85°)	#187									
	#250									
	RAST5									
EN60695-2-11 approved W1: (105°)	#187									
	#250						○		○	
	RAST5								●	
High Temp. H: (125°C)	#187						○	○		
	#250						○	○		
	RAST5									
High Temp. T: (155°C)	#187									
	#250									
	RAST5									
High Temp. T: (200°C)	#187									
	#250									
	RAST5									

Note. **1.** ● = Standard
○ = Semi-standard
2. Consult OMRON for models with standard approval

■ Available Combinations - D3V - 11

Heat resistance	Model / Rated current / OF max. / Contact Gap / Terminals	D3V-11					
	Rated current	11 A					
	OF max.	1.96N {200gf}		1.23N {125gf}	0.98N {100gf}		0.49N {50gf}
	Contact Gap	F	G	G	F	G	G
Standard (85°C)	#187						
	#250						
	RAST5						
Standard (105°C)	#187	●	○		●	○	○
	#250	●	○	○	●	○	○
	RAST5			●			●
EN60695-2-11 approved W1: (85°)	#187						
	#250						
	RAST5						
EN60695-2-11 approved W1: (105°)	#187						
	#250	○		○	○		
	RAST5			●			●
High Temp. H: (125°C)	#187	○	○		○	○	
	#250	○	○		○	○	
	RAST5						
High Temp. T: (155°C)	#187	○	○		○	○	○
	#250	○	○		○	○	○
	RAST5			○			○
High Temp. T: (200°C)	#187						
	#250						
	RAST5						

Note. **1.** ● = Standard
○ = Semi-standard
2. Consult OMRON for models with standard approval

■ Available Combinations - D3V - 6/01

Model		D3V-6					D3V-01			
Rated current		6 A					0.1 A			
OF max.		1.96N {200gf}	1.23N {125gf}	0.98N {100gf}		0.49N {50gf}	0.49N {50gf}	0.25N {25gf}	0.49N {50gf}	0.25N {25gf}
Contact Gap		F/G	G	F	G	G	F	F	G	G
Heat resistance	Terminals									
Standard (85°C)	#187						●	●	○	○
	#250						●	●	○	○
	RAST5						●	●	○	○
Standard (105°C)	#187	○		●	○	●				
	#250	○	○	●	○	●				
	RAST5		●			●				
EN60695-2-11 approved W1: (85°)	#187						●	●	○	○
	#250						●	●	○	○
	RAST5						●	●	○	○
EN60695-2-11 approved W1: (105°)	#187									
	#250		○	○		○				
	RAST5		●							
High Temp. H: (125°C)	#187	○		○	○					
	#250	○		○	○					
	RAST5									
High Temp. T: (155°C)	#187									
	#250									
	RAST5									
High Temp. T: (200°C)	#187	○		○	○	○	○		○	
	#250	○		○	○	○	○		○	
	RAST5		○			○	○		○	

Note. 1. ● = Standard
○ = Semi-standard
2. Consult OMRON for models with standard approval

■ List of Models

21 A (OF: 1.23 N {125 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-21G-1□4A-△	D3V-21G-2□4A-△	D3V-21G-3□4A-△
Short hinge lever	Internal	D3V-21G1-1□4A-△	D3V-21G1-2□4A-△	D3V-21G1-3□4A-△
	M	D3V-21G1M-1□4A-△	D3V-21G1M-2□4A-△	D3V-21G1M-3□4A-△
Hinge lever	Internal	D3V-21G2-1□4A-△	D3V-21G2-2□4A-△	D3V-21G2-3□4A-△
	M	D3V-21G2M-1□4A-△	D3V-21G2M-2□4A-△	D3V-21G2M-3□4A-△
Long hinge lever	Internal	D3V-21G3-1□4A-△	D3V-21G3-2□4A-△	D3V-21G3-3□4A-△
	M	D3V-21G3M-1□4A-△	D3V-21G3M-2□4A-△	D3V-21G3M-3□4A-△
Simulated hinge lever	Internal	D3V-21G4-1□4A-△	D3V-21G4-2□4A-△	D3V-21G4-3□4A-△
	M	D3V-21G4M-1□4A-△	D3V-21G4M-2□4A-△	D3V-21G4M-3□4A-△
Short hinge roller lever	Internal	D3V-21G5-1□4A-△	D3V-21G5-2□4A-△	D3V-21G5-3□4A-△
	M	D3V-21G5M-1□4A-△	D3V-21G5M-2□4A-△	D3V-21G5M-3□4A-△
Hinge roller lever	Internal	D3V-21G6-1□4A-△	D3V-21G6-2□4A-△	D3V-21G6-3□4A-△
	M	D3V-21G6M-1□4A-△	D3V-21G6M-2□4A-△	D3V-21G6M-3□4A-△

16 A (OF: 3.92 N {400 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-16-1□6-○-△□	D3V-16-2□6-○-△□	D3V-16-3□6-○-△□
Short hinge lever	Internal	D3V-161-1□6-○-△□	D3V-161-2□6-○-△□	D3V-161-3□6-○-△□
	M	D3V-161M-1□6-○-△□	D3V-161M-2□6-○-△□	D3V-161M-3□6-○-△□
Hinge lever	Internal	D3V-162-1□6-○-△□	D3V-162-2□6-○-△□	D3V-162-3□6-○-△□
	M	D3V-162M-1□6-○-△□	D3V-162M-2□6-○-△□	D3V-162M-3□6-○-△□
Long hinge lever	Internal	D3V-163-1□6-○-△□	D3V-163-2□6-○-△□	D3V-163-3□6-○-△□
	M	D3V-163M-1□6-○-△□	D3V-163M-2□6-○-△□	D3V-163M-3□6-○-△□
Simulated hinge lever	Internal	D3V-164-1□6-○-△□	D3V-164-2□6-○-△□	D3V-164-3□6-○-△□
	M	D3V-164M-1□6-○-△□	D3V-164M-2□6-○-△□	D3V-164M-3□6-○-△□
Short hinge roller lever	Internal	D3V-165-1□6-○-△□	D3V-165-2□6-○-△□	D3V-165-3□6-○-△□
	M	D3V-165M-1□6-○-△□	D3V-165M-2□6-○-△□	D3V-165M-3□6-○-△□
Hinge roller lever	Internal	D3V-166-1□6-○-△□	D3V-166-2□6-○-△□	D3V-166-3□6-○-△□
	M	D3V-166M-1□6-○-△□	D3V-166M-2□6-○-△□	D3V-166M-3□6-○-△□

Note: The □ in the model number is for the terminal code.
- A: Solder terminals
- C2: Quick-connect terminals (#187)
- C: Quick-connect terminals (#250)
- C6: RAST5 terminals (#250)

The ○ in the model number is for enclosure material code.
- None: Standard
- T: High Temperature (200˚C, 155˚C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity.
- W1: Standard temperature (105˚C, 85˚C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity, PTI250.

The △ in the model number is for the mounting hole size.
- None: 3.1 mm
- K: 2.9 mm

The □ is for the special code.
- None: Standard
- H: High Temperature (125˚C)
- E: Special rating 21(8)A

16 A (OF: 1.96 N {200 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-16-1□5-○-△□	D3V-16-2□5-○-△□	D3V-16-3□5-○-△□
Short hinge lever	Internal	D3V-161-1□5-○-△□	D3V-161-2□5-○-△□	D3V-161-3□5-○-△□
	M	D3V-161M-1□5-○-△□	D3V-161M-2□5-○-△□	D3V-161M-3□5-○-△□
Hinge lever	Internal	D3V-162-1□5-○-△□	D3V-162-2□5-○-△□	D3V-162-3□5-○-△□
	M	D3V-162M-1□5-○-△□	D3V-162M-2□5-○-△□	D3V-162M-3□5-○-△□
Long hinge lever	Internal	D3V-163-1□5-○-△□	D3V-163-2□5-○-△□	D3V-163-3□5-○-△□
	M	D3V-163M-1□5-○-△□	D3V-163M-2□5-○-△□	D3V-163M-3□5-○-△□
Simulated hinge lever	Internal	D3V-164-1□5-○-△□	D3V-164-2□5-○-△□	D3V-164-3□5-○-△□
	M	D3V-164M-1□5-○-△□	D3V-164M-2□5-○-△□	D3V-164M-3□5-○-△□
Short hinge roller lever	Internal	D3V-165-1□5-○-△□	D3V-165-2□5-○-△□	D3V-165-3□5-○-△□
	M	D3V-165M-1□5-○-△□	D3V-165M-2□5-○-△□	D3V-165M-3□5-○-△□
Hinge roller lever	Internal	D3V-166-1□5-○-△□	D3V-166-2□5-○-△□	D3V-166-3□5-○-△□
	M	D3V-166M-1□5-○-△□	D3V-166M-2□5-○-△□	D3V-166M-3□5-○-△□

16 A (OF: 0.98 N {100 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-16-1□4-○-△□	D3V-16-2□4-○-△□	D3V-16-3□4-○-△□
Short hinge lever	Internal	D3V-161-1□4-○-△□	D3V-161-2□4-○-△□	D3V-161-3□4-○-△□
	M	D3V-161M-1□4-○-△□	D3V-161M-2□4-○-△□	D3V-161M-3□4-○-△□
Hinge lever	Internal	D3V-162-1□4-D○-△□	D3V-162-2□4-○-△□	D3V-162-3□4-○-△□
	M	D3V-162M-1□4-○-△□	D3V-162M-2□4-○-△□	D3V-162M-3□4-○-△□
Long hinge lever	Internal	D3V-163-1□4-○-△□	D3V-163-2□4-○-△□	D3V-163-3□4-○-△□
	M	D3V-163M-1□4-○-△□	D3V-163M-2□4-○-△□	D3V-163M-3□4-○-△□
Simulated hinge lever	Internal	D3V-164-1□4-○-△□	D3V-164-2□4-○-△□	D3V-164-3□4-○-△□
	M	D3V-164M-1□4-○-△□	D3V-164M-2□4-○-△□	D3V-164M-3□4-○-△□
Short hinge roller lever	Internal	D3V-165-1□4-○-△□	D3V-165-2□4-○-△□	D3V-165-3□4-○-△□
	M	D3V-165M-1□4-○-△□	D3V-165M-2□4-○-△□	D3V-165M-3□4-○-△□
Hinge roller lever	Internal	D3V-166-1□4-○-△□	D3V-166-2□4-○-△□	D3V-166-3□4-○-△□
	M	D3V-166M-1□4-○-△□	D3V-166M-2□4-○-△□	D3V-166M-3□4-○-△□

Note: The □ in the model number is for the terminal code.
- A: Solder terminals
- C2: Quick-connect terminals (#187)
- C: Quick-connect terminals (#250)
- C6: RAST5 terminals (#250)

The ○ in the model number is for enclosure material code.
- None: Standard
- T: High Temperature (200°C, 155°C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity.
- W1: Standard temperature (105°C, 85°C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity, PTI250.

The △ in the model number is for the mounting hole size.
- None: 3.1 mm
- K: 2.9 mm

The □ is for the special code.
- None: Standard
- H: High Temperature (125°C)
- E: Special rating 21(8)A

16A (OF:0.49N {50 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-16-1□3-○-△□	D3V-16-2□3-○-△□	D3V-16-3□3-○-△□
Short hinge lever	Internal	D3V-161-1□3-○-△□	D3V-161-2□3-○-△□	D3V-161-3□3-○-△□
	M	D3V-161M-1□3-○-△□	D3V-161M-2□3-○-△□	D3V-161M-3□3-○-△□
Hinge lever	Internal	D3V-162-1□3-○-△□	D3V-162-2□3-○-△□	D3V-162-3□3-○-△□
	M	D3V-162M-1□3-○-△□	D3V-162M-2□3-○-△□	D3V-162M-3□3-○-△□
Long hinge lever	Internal	D3V-163-1□3-○-△□	D3V-163-2□3-○-△□	D3V-163-3□3-○-△□
	M	D3V-163M-1□3-○-△□	D3V-163M-2□3-○-△□	D3V-163M-3□3-○-△□
Simulated hinge lever	Internal	D3V-164-1□3-○-△□	D3V-164-2□3-○-△□	D3V-164-3□3-○-△□
	M	D3V-164M-1□3-○-△□	D3V-164M-2□3-○-△□	D3V-164M-3□3-○-△□
Short hinge roller lever	Internal	D3V-165-1□3-○-△□	D3V-165-2□3-○-△□	D3V-165-3□3-○-△□
	M	D3V-165M-1□3-○-△□	D3V-165M-2□3-○-△□	D3V-165M-3□3-○-△□
Hinge roller lever	Internal	D3V-166-1□3-○-△□	D3V-166-2□3-○-△□	D3V-166-3□3-○-△□
	M	D3V-166M-1□3-○-△□	D3V-166M-2□3-○-△□	D3V-166M-3□3-○-△□

11 A (OF: 1.96 N {200 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-11-1□5-○-△□	D3V-11-2□5-○-△□	D3V-11-3□5-○-△□
Short hinge lever	Internal	D3V-111-1□5-○-△□	D3V-111-2□5-○-△□	D3V-111-3□5-○-△□
	M	D3V-111M-1□5-○-△□	D3V-111M-2□5-○-△□	D3V-111M-3□5-○-△□
Hinge lever	Internal	D3V-112-1□5-○-△□	D3V-112-2□5-○-△□	D3V-112-3□5-○-△□
	M	D3V-112M-1□5-○-△□	D3V-112M-2□5-○-△□	D3V-112M-3□5-○-△□
Long hinge lever	Internal	D3V-113-1□5-○-△□	D3V-113-2□5-○-△□	D3V-113-3□5-○-△□
	M	D3V-113M-1□5-○-△□	D3V-113M-2□5-○-△□	D3V-113M-3□5-○-△□
Simulated hinge lever	Internal	D3V-114-1□5-○-△□	D3V-114-2□5-○-△□	D3V-114-3□5-○-△□
	M	D3V-114M-1□5-○-△□	D3V-114M-2□5-○-△□	D3V-114M-3□5-○-△□
Short hinge roller lever	Internal	D3V-115-1□5-○-△□	D3V-115-2□5-○-△□	D3V-115-3□5-○-△□
	M	D3V-115M-1□5-○-△□	D3V-115M-2□5-○-△□	D3V-115M-3□5-○-△□
Hinge roller lever	Internal	D3V-116-1□5-○-△□	D3V-116-2□5-○-△□	D3V-116-3□5-○-△□
	M	D3V-116M-1□5-○-△□	D3V-116M-2□5-○-△□	D3V-116M-3□5-○-△□

Note: The □ in the model number is for the terminal code.
- A: Solder terminals
- C2: Quick-connect terminals (#187)
- C: Quick-connect terminals (#250)
- C6: RAST5 terminals (#250)

The ○ in the model number is for enclosure material code.
- None: Standard
- T: High Temperature (200˚C, 155˚C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity.
- W1: Standard temperature (105˚C, 85˚C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity, PTI250.

The △ in the model number is for the mounting hole size.
- None: 3.1 mm
- K: 2.9 mm

The □ is for the special code.
- None: Standard
- H: High Temperature (125˚C)
- E: Special rating 21(8)A

11 A (OF: 0.98 N {100 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-11-1□4-○-△□	D3V-11-2□4-○-△□	D3V-11-3□4-○-△□
Short hinge lever	Internal	D3V-111-1□4-○-△□	D3V-111-2□4-○-△□	D3V-111-3□4-○-△□
	M	D3V-111M-1□4-○-△□	D3V-111M-2□4-○-△□	D3V-111M-3□4-○-△□
Hinge lever	Internal	D3V-112-1□4-○-△□	D3V-112-2□4-○-△□	D3V-112-3□4-○-△□
	M	D3V-112M-1□4-○-△□	D3V-112M-2□4-○-△□	D3V-112M-3□4-○-△□
Long hinge lever	Internal	D3V-113-1□4-○-△□	D3V-113-2□4-○-△□	D3V-113-3□4-○-△□
	M	D3V-113M-1□4-○-△□	D3V-113M-2□4-○-△□	D3V-113M-3□4-○-△□
Simulated hinge lever	Internal	D3V-114-1□4-○-△□	D3V-114-2□4-○-△□	D3V-114-3□4-○-△□
	M	D3V-114M-1□4-○-△□	D3V-114M-2□4-○-△□	D3V-114M-3□4-○-△□
Short hinge roller lever	Internal	D3V-115-1□4-○-△□	D3V-115-2□4-○-△□	D3V-115-3□4-○-△□
	M	D3V-115M-1□4-○-△□	D3V-115M-2□4-○-△□	D3V-115M-3□4-○-△□
Hinge roller lever	Internal	D3V-116-1□4-○-△□	D3V-116-2□4-○-△□	D3V-116-3□4-○-△□
	M	D3V-116M-1□4-○-△□	D3V-116M-2□4-○-△□	D3V-116M-3□4-○-△□

11 A (OF: 0.49 N {50 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-11G-1□3-○-△□	D3V-11G-2□4-○-△□	D3V-11G-3□3-○-△□
Short hinge lever	Internal	D3V-11G1-1□3-○-△□	D3V-11G1-2□4-○-△□	D3V-11G1-3□3-○-△□
	M	D3V-11G1M-1□3-○-△□	D3V-11G1M-2□3-○-△□	D3V-11G1M-3□3-○-△□
Hinge lever	Internal	D3V-11G2-1□3-○-△□	D3V-11G2-2□3-○-△□	D3V-11G2-3□3-○-△□
	M	D3V-11G2M-1□3-○-△□	D3V-11G2M-2□3-○-△□	D3V-11G2M-3□3-○-△□
Long hinge lever	Internal	D3V-11G3-T1□3-○-△□	D3V-11G3-T2□3-○-△□	D3V-11G3-T3□3-○-△□
	M	D3V-11G3M-1□3-○-△□	D3V-11G3M-2□3-○-△□	D3V-11G3M-3□3-○-△□
Simulated hinge lever	Internal	D3V-11G4-1□3-○-△□	D3V-11G4-2□3-○-△□	D3V-11G4-3□3-○-△□
	M	D3V-11G4M-1□3-○-△□	D3V-11G4M-2□3-○-△□	D3V-11G4M-3□3-○-△□
Short hinge roller lever	Internal	D3V-11G5-1□3-○-△□	D3V-11G5-2□3-○-△□	D3V-11G5-3□3-○-△□
	M	D3V-11G5M-1□3-○-△□	D3V-11G5M-2□3-○-△□	D3V-11G5M-3□3-○-△□
Hinge roller lever	Internal	D3V-11G6-1□3-○-△□	D3V-11G6-2□3-○-△□	D3V-11G6-3□3-○-△□
	M	D3V-11G6M-1□3-○-△□	D3V-11G6M-2□3-○-△□	D3V-11G6M-3□3-○-△□

Note: The □ in the model number is for the terminal code.
- A: Solder terminals
- C2: Quick-connect terminals (#187)
- C: Quick-connect terminals (#250)
- C6: RAST5 terminals (#250)

The ○ in the model number is for enclosure material code.
- None: Standard
- T: High Temperature (200˚C, 155˚C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity.
- W1: Standard temperature (105˚C, 85˚C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity, PTI250.

The △ in the model number is for the mounting hole size.
- None: 3.1 mm
- K: 2.9 mm

The □ is for the special code.
- None: Standard
- H: High Temperature (125˚C)
- E: Special rating 21(8)A

6 A (OF: 1.96 N {200 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-6-1□5-○-△□	D3V-6-2□5-○-△□	D3V-6-3□5-○-△□
Short hinge lever	Internal	D3V-61-1□5-○-△□	D3V-61-2□5-○-△□	D3V-61-3□5-○-△□
	M	D3V-61M-1□5-○-△□	D3V-61M-2□5-○-△□	D3V-61M-3□5-○-△□
Hinge lever	Internal	D3V-62-1□5-○-△□	D3V-62-2□5-○-△□	D3V-62-3□5-○-△□
	M	D3V-62M-1□5-○-△□	D3V-62M-2□5-○-△□	D3V-62M-3□5-○-△□
Long hinge lever	Internal	D3V-63-1□5-○-△□	D3V-63-2□5-○-△□	D3V-63-3□5-○-△□
	M	D3V-63M-1□5-○-△□	D3V-63M-2□5-○-△□	D3V-63M-3□5-○-△□
Simulated hinge lever	Internal	D3V-64-1□5-○-△□	D3V-64-2□5-○-△□	D3V-64-3□5-○-△□
	M	D3V-64M-1□5-○-△□	D3V-64M-2□5-○-△□	D3V-64M-3□5-○-△□
Short hinge roller lever	Internal	D3V-65-1□5-○-△□	D3V-65-2□5-○-△□	D3V-65-3□5-○-△□
	M	D3V-65M-1□5-○-△□	D3V-65M-2□5-○-△□	D3V-65M-3□5-○-△□
Hinge roller lever	Internal	D3V-66-1□5-○-△□	D3V-66-2□5-○-△□	D3V-66-3□5-○-△□
	M	D3V-66M-1□5-○-△□	D3V-66M-2□5-○-△□	D3V-66M-3□5-○-△□

6 A (OF: 0.98 N {100 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-6-1□4-○-△□	D3V-6-2□4-○-△□	D3V-6-3□4-○-△□
Short hinge lever	Internal	D3V-61-1□4-○-△□	D3V-61-2□4-○-△□	D3V-61-3□4-○-△□
	M	D3V-61M-1□4-○-△□	D3V-61M-2□4-○-△□	D3V-61M-3□4-○-△□
Hinge lever	Internal	D3V-62-1□4-○-△□	D3V-62-2□4-○-△□	D3V-62-3□4-○-△□
	M	D3V-62M-1□4-○-△□	D3V-62M-2□4-○-△□	D3V-62M-3□4-○-△□
Long hinge lever	Internal	D3V-63-1□4-○-△□	D3V-63-2□4-○-△□	D3V-63-3□4-○-△□
	M	D3V-63M-1□4-○-△□	D3V-63M-2□4-○-△□	D3V-63M-3□4-○-△□
Simulated hinge lever	Internal	D3V-64-1□4-○-△□	D3V-64-2□4-○-△□	D3V-64-3□4-○-△□
	M	D3V-64M-1□4-○-△□	D3V-64M-2□4-○-△□	D3V-64M-3□4-○-△□
Short hinge roller lever	Internal	D3V-65-1□4-○-△□	D3V-65-2□4-○-△□	D3V-65-3□4-○-△□
	M	D3V-65M-1□4-○-△□	D3V-65M-2□4-○-△□	D3V-65M-3□4-○-△□
Hinge roller lever	Internal	D3V-66-1□4-○-△□	D3V-66-2□4-○-△□	D3V-66-3□4-○-△□
	M	D3V-66M-1□4-○-△□	D3V-66M-2□4-○-△□	D3V-66M-3□4-○-△□

Note: The □ in the model number is for the terminal code.
- A: Solder terminals
- C2: Quick-connect terminals (#187)
- C: Quick-connect terminals (#250)
- C6: RAST5 terminals (#250)

The ○ in the model number is for enclosure material code.
- None: Standard
- T: High Temperature (200°C, 155°C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity.
- W1: Standard temperature (105°C, 85°C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity, PTI250.

The △ in the model number is for the mounting hole size.
- None: 3.1 mm
- K: 2.9 mm

The □ is for the special code.
- None: Standard
- H: High Temperature (125°C)
- E: Special rating 21(8)A

6 A (OF: 0.49 N {50 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-6G-1□3-○-△□	D3V-6G-2□3-○-△□	D3V-6G-3□3-○-△□
Short hinge lever	Internal	D3V-6G1-1□3-○-△□	D3V-6G1-2□3-○-△□	D3V-6G1-3□3-○-△□
	M	D3V-6G1M-1□3-○-△□	D3V-6G1M-2□3-○-△□	D3V-6G1M-3□3-○-△□
Hinge lever	Internal	D3V-6G2-1□3-○-△□	D3V-6G2-2□3-○-△□	D3V-6G2-3□3-○-△□
	M	D3V-6G2M-1□3-○-△□	D3V-6G2M-2□3-○-△□	D3V-6G2M-3□3-○-△□
Long hinge lever	Internal	D3V-6G3-1□3-○-△□	D3V-6G3-2□3-○-△□	D3V-6G3-3□3-○-△□
	M	D3V-6G3M-1□3-○-△□	D3V-6G3M-2□3-○-△□	D3V-6G3M-3□3-○-△□
Simulated hinge lever	Internal	D3V-6G4-1□3-○-△□	D3V-6G4-2□3-○-△□	D3V-6G4-3□3-○-△□
	M	D3V-6G4M-1□3-○-△□	D3V-6G4M-2□3-○-△□	D3V-6G4M-3□3-○-△□
Short hinge roller lever	Internal	D3V-6G5-1□3-○-△□	D3V-6G5-2□3-○-△□	D3V-6G5-3□3-○-△□
	M	D3V-6G5M-1□3-○-△□	D3V-6G5M-2□3-○-△□	D3V-6G5M-3□3-○-△□
Hinge roller lever	Internal	D3V-6G6-1□3-○-△□	D3V-6G6-2□3-○-△□	D3V-6G6-3□3-○-△□
	M	D3V-6G6M-1□3-○-△□	D3V-6G6M-2□3-○-△□	D3V-6G6M-3□3-○-△□

01 A (OF: 0.49 N {50 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger	–	D3V-01-1□3-○-△□	D3V-01-2□3-○-△□	D3V-01-3□3-○-△□
Short hinge lever	Internal	D3V-011-1□3-○-△□	D3V-011-2□3-○-△□	D3V-011-3□3-○-△□
	M	D3V-011M-1□3-○-△□	D3V-011M-2□3-○-△□	D3V-011M-3□3-○-△□
Hinge lever	Internal	D3V-012-1□3-○-△□	D3V-012-2□3-○-△□	D3V-012-3□3-○-△□
	M	D3V-012M-1□3-○-△□	D3V-012M-2□3-○-△□	D3V-012M-3□3-○-△□
Long hinge lever	Internal	D3V-013-1□3-○-△□	D3V-013-2□3-○-△□	D3V-013-3□3-○-△□
	M	D3V-013M-1□3-○-△□	D3V-013M-2□3-○-△□	D3V-013M-3□3-○-△□
Simulated hinge lever	Internal	D3V-014-1□3-○-△□	D3V-014-2□3-○-△□	D3V-014-3□3-○-△□
	M	D3V-014M-1□3-○-△□	D3V-014M-2□3-○-△□	D3V-014M-3□3-○-△□
Short hinge roller lever	Internal	D3V-015-1□3-○-△□	D3V-015-2□3-○-△□	D3V-015-3□3-○-△□
	M	D3V-015M-1□3-○-△□	D3V-015M-2□3-○-△□	D3V-015M-3□3-○-△□
Hinge roller lever	Internal	D3V-016-1□3-○-△□	D3V-016-2□3-○-△□	D3V-016-3□3-○-△□
	M	D3V-016M-1□3-○-△□	D3V-016M-2□3-○-△□	D3V-016M-3□3-○-△□

Note: The □ in the model number is for the terminal code.
- A: Solder terminals
- C2: Quick-connect terminals (#187)
- C: Quick-connect terminals (#250)
- C6: RAST5 terminals (#250)

The ○ in the model number is for enclosure material code.
- None: Standard
- T: High Temperature (200˚C, 155˚C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity.
- W1: Standard temperature (105˚C, 85˚C) and EN60695-2-11/-12 (Glow-wire flammability test method) conformity, PTI250.

The △ in the model number is for the mounting hole size.
- None: 3.1 mm
- K: 2.9 mm

The □ is for the special code.
- None: Standard
- H: High Temperature (125˚C)
- E: Special rating 21(8)A

Specifications

■ Ratings

Type	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
D3V-25	250 VAC	25 A						5 A	
D3V-21	250 VAC	21 A		3 A		12 A		4 A	
	8 VDC 30 VDC 125 VDC 250 VDC	21 A 14 A 0.6 A 0.3 A		5 A 5 A 0.1 A 0.05 A		12 A 12 A 0.6 A 0.3 A		7 A 5 A 0.1 A 0.05 A	
D3V-16	250 VAC	16 A		2 A		10 A		3 A	
	8 VDC 30 VDC 125 VDC 250 VDC	16 A 10 A 0.6 A 0.3 A		4 A 4 A 0.1 A 0.05 A		10 A 10 A 0.6 A 0.3 A		6 A 4 A 0.1 A 0.05 A	
D3V-11	250 VAC	11 A		1.5 A		6 A		2 A	
	8 VDC 30 VDC 125 VDC 250 VDC	11 A 6 A 0.6 A 0.3 A		3 A 3 A 0.1 A 0.05 A		6 A 6 A 0.6 A 0.3 A		3 A 3 A 0.1 A 0.05 A	
D3V-6	250 VAC	6 A		3 A		4 A		–	
	8 VDC 30 VDC 125 VDC 250 VDC	6 A 6 A 0.4 A 0.3 A		3 A 3 A 0.1 A 0.05 A		4 A 4 A 0.4 A 0.2 A		–	
D3V-01	125 VAC	0.1 A		–		–		–	
	8 VDC 30 VDC	0.1 A 0.1 A		–		–		–	

Note: 1. The above current values are the normal current values of models with a contact gap of 1 mm (gap F), which vary with the normal current values of models with a contact gap of 0.5 mm (gap G).

2. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).

3. Lamp load has an inrush current of 10 times the steady-state current.

4. Motor load has an inrush current of 6 times the steady-state current.

5. The ratings values apply under the following test conditions:
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 30 operations/min

■ Characteristics

Operating speed	0.1 mm to 1 m/s (at pin plunger models)
Operating frequency	Mechanical: 600 operations/min Electrical: 60 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial values)	D3V-21, D3V-25: 50 mΩ max. D3V-16, D3V-11, D3V-6: 30 mΩ max. D3V-01, 0.49 N {50 gf}: 50 mΩ max. 0.25 N {25 gf}: 100 mΩ max..
Dielectric strength (see note 1)	1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarity
	2,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 2)	Destruction: 400 m/s^2 {approx. 40G} max. Malfunction: 100 m/s^2 {approx. 10G} max.
Durability (see note 3)	Mechanical: 10,000,000 operations min. Electrical: D3V-21, D3V-25: 50,000 operations min. D3V-16: 100,000 operations min. D3V-11: 200,000 operations min. D3V-6, D3V-01: 500,000 operations min.
Degree of protection	IEC IP40
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	250 (High Temperature type with suffix “-T”: 175)
Ambient operating temperature	D3V-25: -25°C to 85°C (with no icing) D3V-21: -25°C to 85°C (with no icing) D3V-16: -25°C to 105°C (High temperature type H -25°C to 125°C) with no icing) D3V-11: -25°C to 105°C (High temperature type H; -25°C to 125°C, T; -25°C to 155°C) (with no icing) D3V-6: -25°C to 105°C (High temperature type H; -25°C to 125°C, T; -25°C to 200°C) (with no icing) D3V-01: -25°C to 85°C (High temperature type T; -25°C to 200°C) (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight	Approx. 6.2 g (pin plunger model)

Note: 1. The dielectric strength values shown in the table are for models with a Separator.
2. For the pin plunger models, the above values apply for use at both the free position and total travel position. For the lever models, they apply at the total travel position.
3. For testing conditions, contact your OMRON sales representative.

■ Approved Standards

UL1054 (File No. E41515) CSA C22.2 No.55 (File No. LR21642) (Only Standard Ratings are listed.)

Rated voltage	D3V-25*	D3V-21G	D3V-16	D3V-16G	D3V-11	D3V-11G	D3V-6	D3V-6G	D3V-01
125 VAC	1 HP	3/4 HP	16 A, 1/2 HP	16 A, 1/2 HP	11 A, 1/2 HP	11 A, 1/2 HP	6 A, 1/4 HP	6 A, 1/4 HP	0.1 A
250 VAC	22A, 2HP	20.1 A, 3/4 HP	16 A, 1/2 HP	16 A, 1/2 HP	11 A, 1/2 HP	11 A, 1/2 HP	6 A, 1/4 HP	6 A, 1/4 HP	–
125 VDC	–	–	0.6 A	0.1 A	0.6 A	0.1 A	–	–	–
250 VDC	–	–	0.3 A	–	0.3 A	–	–	–	–

EN 61058-1: 1992+A1: 1993 (License No. 119151L)

Rated voltage	D3V-25*	D3V-21G	D3V-16	D3V-11	D3V-6	D3V-01
125 VAC	–	–	–	–	–	0.1 A
250 VAC	22(5)A	20 (4) A	16 (3) A	11 (3) A	6 (2) A	–
250 VAC	–	21 (8) A**	–	–	–	–

Testing conditions: 50,000 operations, T85 (0°C to 85°C) for D3V-21/D3V-01, T105 (0°C to 105°C) for D3V-16/D3V-11/D3V-6 and 1200 (0 to 200˚C) for D3V-6/01 with suffix T,T155 (0 to 155˚C) for D3V-11 with suffix T.
*D3V-25 rating (projected). **Testing conditions: 10,000 operations, T85 (0°C to 85°C).

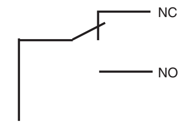
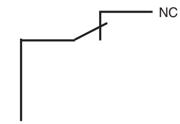
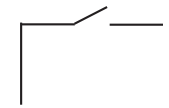
EN 60695-2-11 Ed.2, EN 60695-2-12 Ed.2 Glow-wire flammability test methods

Rated voltage	D3V-16	D3V-11	D3V-6	D3V-01
125 VAC	–	–	–	0.1 A
250 VAC	16(3) A	11(3) A	6(2) A	–

■ Contact Specifications

Item		D3V-25	D3V-21	D3V-16	D3V-11	D3V-6	D3V-01
Contact	Specification	Rivet					Crossbar
	Material	Silver alloy					Gold alloy
	Gap (standard value)	1 mm (F gap) type	0.5 mm	1 mm (F gap) or 0.5 mm (G gap)			1.0 mm
Inrush current	NC	50 A max.	50 A max.	40 A max.	24 A max.	15 A max.	–
	NO						
Minimum applicable load		160 mA at 5 VDC					1 mA at 5 VDC

■ Contact Form

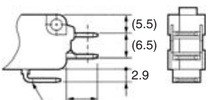
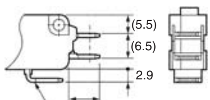
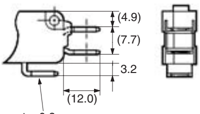
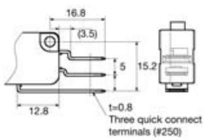
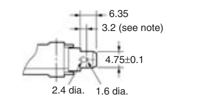
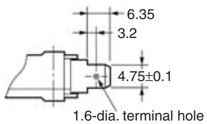
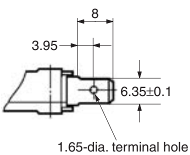
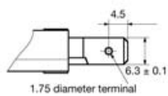
SPDT	SPST-NC	SPST-NO
		

Dimensions

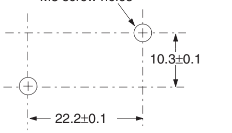
■ Terminals

Note: 1. All units are in millimetres unless otherwise indicated.

2. The table below is for the SPDT contact specifications. Two terminals will be available for SPST-NO or SPST-NC contact specifications. For terminal positions, refer to the above Contact Form.

Terminal type	Solder Terminal (A)	Quick-connect Terminal (#187) (C2)	Quick-connect Terminal (#250) (C)	Quick-connect RAST5 Terminals (#250) (C6)
COM	 t = 0.5 Three, solder/quick-connect terminals (#187)	 t = 0.5 Three, quick-connect terminals (#187)	 t = 0.8 Three, quick-connect terminals (#250)	
Terminal dimensions	 **Note:** Indicates the length to the center of the 1.6-dia. holes			

■ Mounting Holes



Dimensions & Operating Characteristics

Note: 1. All units are in millimetres unless otherwise indicated.

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

3. The following illustrations and drawings are for quick-connect terminals (#187) (terminals C2). D3V models incorporate terminals A, C and C6. Terminals A, C and C6 are omitted from the following drawings. Refer to Terminals on page 10 for these terminals.

4. The following illustrations and drawings are for models with the hinge position set to external/further than plunger. Models with the hinge position set to internal position are not shown here. For details about the internal position models, contact your OMRON sales representative. Operating characteristics are the same for these two types of models.

5. The □ in the model number is for the terminal code.

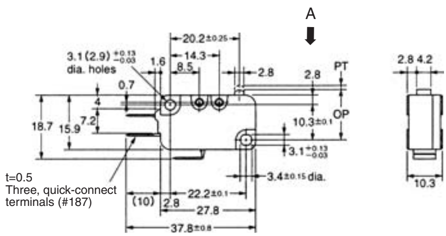
6. The △ in the model number is for the mounting hole size.

7. The hole size in the following illustrations of models with a suffix “K” in the △ is 2.9 mm.

8. The operating characteristics are for operation in the A direction (⬇).

Pin Plunger Models

D3V-25-1□5A-○-△□
D3V-21G-1□4A-○-△□
D3V-16-1□5-○-△□
D3V-16-1□4-○-△□
D3V-11-1□5-○-△□
D3V-11-1□4-○-△□
D3V-11G-1□4-○-△□
D3V-6-1□4-○-△□
D3V-6G-1□3-○-△□
D3V-01-1□2-○-△□
D3V-01-1□3-○-△□

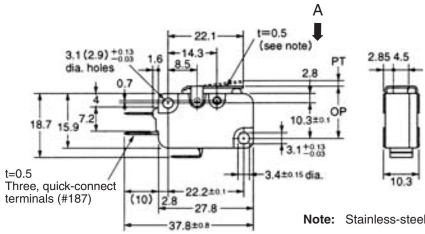


Model	D3V-25-1□5A-○-△□	D3V-21-1□5A-○-△□	D3V-21G-1□4B-○-△□	D3V-21G-1□4A-○-△□
OF max. RF min.	3.43 N{350 gf} 0.78 N{80 gf}	3.43 N{350 gf} 0.78 N{80 gf}	1.47 N{150 gf} 0.20 N{20 gf}	1.23 N{125 gf} 0.20 N{20 gf}
PT max.	1.2 mm			
OT min.	1.0 mm			
MD max.	0.4 mm (F gap type) or 0.3 mm (G gap type)			
OP	14.7±0.4 mm			

Model	D3V-16-1□6-○-△□	D3V-16-1□5-○-△□ D3V-11-1□5-○-△□	D3V-16-1□4-○-△□ D3V-11-1□4-○-△□ D3V-6-1□4-○-△□	D3V-11G-1□3-○-△□ D3V-6G-1□3-○-△□ D3V-01-1□3-○-△□	D3V-01-1□2-○-△□
OF max. RF min.	3.92 N{400 gf} 0.78 N{80 gf}	1.96 N{200 gf} 0.49 N{50 gf}	0.98 N{100 gf} 0.15 N{15 gf}	0.49N{50gf} 0.05N{5gf}	0.25N{25gf} 0.03N{3gf}
PT max.	1.2 mm				
OT min.	1.0 mm				
MD max.	0.4 mm (F gap type) or 0.3 mm (G gap type)				
OP	14.7±0.4 mm				

Short Hinge Lever Models

D3V-21G1M-1□4A-○-△□
D3V-161M-1□5-○-△□
D3V-161M-1□4-○-△□
D3V-111M-1□5-○-△□
D3V-111M-1□4-○-△□
D3V-11G1M-1□3-○-△□
D3V-61M-1□4-○-△□
D3V-6G1M-1□3-○-△□
D3V-011M-1□3-○-△□

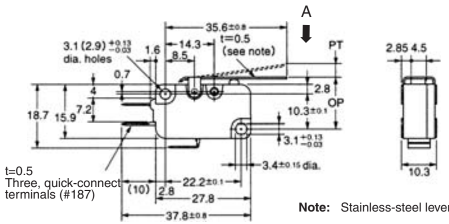


Note: Stainless-steel lever

Model	D3V-21G1M-1□4A-○-△□	D3V-161M-1□5-○-△□ D3V-111M-1□5-○-△□	D3V-161M-1□4-○-△□ D3V-111M-1□4-○-△□ D3V-61M-1□4-○-△□	D3V-11G1M-1□3-○-△□ D3V-6G1M-1□3-○-△□ D3V-011M-1□3-○-△□
OF max. RF min.	1.23 N (125 gf) 0.20 N (20 gf)	1.96 N{200 gf} 0.49 N{50 gf}	0.98 N{100 gf} 0.15 N{15 gf}	0.49N{50gf} 0.05N{5gf}
PT max. OT min. MD max.	1.6 mm 0.8 mm 0.6 mm (F gap type) or 0.5 mm (G gap type)			
OP	15.2±0.5 mm			

Hinge Lever Models

D3V-21G2M-1□4A-○-△□
D3V-162M-1□5-○-△□
D3V-162M-1□4-○-△□
D3V-112M-1□5-○-△□
D3V-112M-1□4-○-△□
D3V-11G2M-1□3-○-△□
D3V-62M-1□4-○-△□
D3V-6G2M-1□3-○-△□
D3V-012M-1□3-○-△□

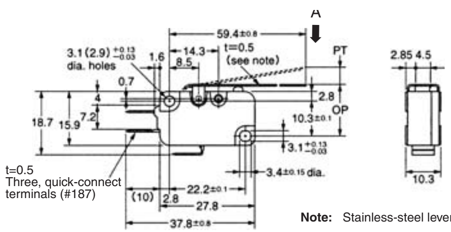


Note: Stainless-steel lever

Model	D3V-21G2M-1□4A-○-△□	D3V-162M-1□5-○-△□ D3V-112M-1□5-○-△□	D3V-162M-1□4-○-△□ D3V-112M-1□4-○-△□ D3V-62M-1□4-○-△□	D3V-11G2M-1□3-○-△□ D3V-6G2M-1□3-○-△□ D3V-012M-1□3-○-△□
OF max. RF min.	0.78 N (80 gf) 0.06 N (6 gf)	1.23N {125 gf} 0.14 N {14 gf}	0.59 N {60 gf} 0.06 N {6 gf}	0.29N {30gf} ---
PT max. OT min. MD max.	4.0 mm 1.6 mm 1.5 mm (F gap type) or 0.8 mm (G gap type)			
OP	15.2±1.2mm			

Long Hinge Lever Models

D3V-21G3M-1□4A-○-△□
D3V-163M-1□5-○-△□
D3V-163M-1□4-○-△□
D3V-113M-1□5-○-△□
D3V-113M-1□4-○-△□
D3V-11G3M-1□3-○-△□
D3V-63M-1□4-○-△□
D3V-6G3M-1□3-○-△□
D3V-013M-1□3-○-△□

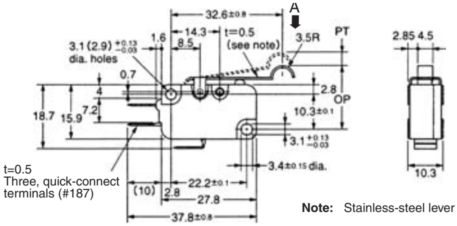


Note: Stainless-steel lever

Model	D3V-21G3M-1□4A-○-△□	D3V-163M-1□5-○-△□ D3V-113M-1□5-○-△□	D3V-163M-1□4-○-△□ D3V-113M-1□4-○-△□ D3V-63M-1□4-○-△□	D3V-11G3M-1□3-○-△□ D3V-6G3M-1□3-○-△□ D3V-013M-1□3-○-△□
OF max. RF min.	0.44 N (45 gf) 0.03 N (3 gf)	0.69 N {70 gf} 0.06 N {6 gf}	0.34 N {35 gf} ---	0.20N {20gf} ---
PT max. OT min. MD max.	9.0 mm 2.0 mm 2.0 mm	9.0 mm 2.0 mm 2.8 mm	9.0 mm 3.2 mm 2.8 mm (F gap type) or 2.0 mm (G gap type)	
OP	15.2+2.6/-3.2 mm		15.2±2.6 mm	

Simulated Roller Lever Models

D3V-21G4M-1□4A-○-△□
D3V-164M-1□5-○-△□
D3V-164M-1□4-○-△□
D3V-114M-1□5-○-△□
D3V-114M-1□4-○-△□
D3V-114M-1□3-○-△□
D3V-64M-1□4-○-△□
D3V-6G4M-1□3-○-△□
D3V-014M-1□3-○-△□

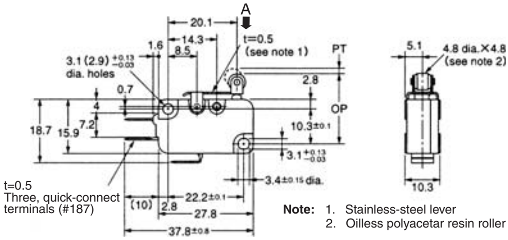


Note: Stainless-steel lever

Model	D3V-21G4M-1□4A-○-△□	D3V-164M-1□5-○-△□ D3V-114M-1□5-○-△□	D3V-164M-1□4-○-△□ D3V-114M-1□4-○-△□ D3V-64M-1□4-○-△□	D3V-11G4M-1□3-○-△□ D3V-6G4M-1□3-○-△□ D3V-014M-1□3-○-△□
OF max. RF min.	0.83 N (85 gf) 0.07 N (7 gf)	1.23 N {125 gf} 0.14 N {14 gf}	0.59 N {60 gf} 0.06 N {6 gf}	0.29N {30gf} ---
PT max. OT min. MD max.	4.0 mm 1.6 mm 1.4 mm	4.0 mm 1.6 mm 1.5 mm (F gap type) or 0.8 mm (G gap type)		
OP	18.7±1.2 mm			

Short Hinge Roller Lever Models

D3V-21G5M-1□4A-○-△□
D3V-165M-1□5-○-△□
D3V-164M-1□4-○-△□
D3V-115M-1□5-○-△□
D3V-115M-1□4-○-△□
D3V-11G5M-1□3-○-△□
D3V-65M-1□4-○-△□
D3V-6G5M-1□3-○-△□
D3V-015M-1□3-○-△□

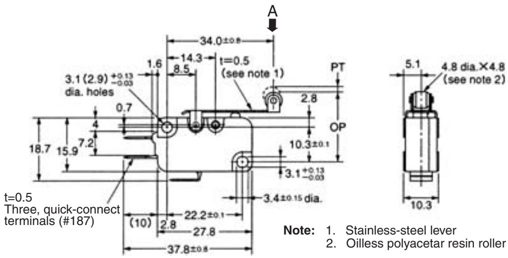


Note: 1. Stainless-steel lever
2. Oilless polyacetar resin roller

Model	D3V-21G5M-1□4A-○-△□	D3V-165M-1□5-○-△□ D3V-115M-1□5-○-△□	D3V-165M-1□4-○-△□ D3V-115M-1□4-○-△□ D3V-65M-1□4-○-△□	D3V-11G5M-5□3-○-△□ D3V-6G5M-5□3-○-△□ D3V-015M-5□3-○-△□
OF max. RF min.	1.42 N (145 gf) 0.02 N (20 gf)	2.35 N {240 gf} 0.49 N {50 gf}	1.18 N {120 gf} 0.15 N {15 gf}	0.59N {60gf} 0.06N {6gf}
PT max. OT min. MD max.	1.6 mm 0.8 mm 0.5 mm	1.6 mm 0.8 mm 0.6 mm (F gap type) or 0.5 mm (G gap type)		
OP	20.7±0.6 mm			

Hinge Roller Lever Models

D3V-21G6M-1□4A-○-△□
D3V-166M-1□5-○-△□
D3V-166M-1□4-○-△□
D3V-116M-1□5-○-△□
D3V-116M-1□4-○-△□
D3V-11G6M-1□3-○-△□
D3V-66M-1□4-○-△□
D3V-6G6M-1□3-○-△□
D3V-016M-1□3-○-△□



Note: 1. Stainless-steel lever
2. Oilless polyacetar resin roller

Model	D3V-21G6M-1□4A-○-△□	D3V-166M-1□5-○-△□ D3V-116M-1□5-○-△□	D3V-166M-1□4-○-△□ D3V-116M-1□4-○-△□ D3V-66M-1□4-○-△□	D3V-11G6M-1□3-○-△□ D3V-6G6M-1□3-○-△□ D3V-016M-1□3-○-△□
OF max. RF min.	0.79 N (80 gf) 0.05 N (5 gf)	1.23 N {125 gf} 0.14 N {14 gf}	0.59 N {60 gf} 0.06 N {6 gf}	0.29N {30gf} ---
PT max. OT min. MD max.	4.0 mm 1.6 mm 0.8 mm	4.0 mm 1.6 mm 1.5 mm (F gap type) or 0.8 mm (G gap type)		
OP	20.7±1.2 mm			

Precautions

■ Cautions

Handling

Be careful not to drop the switch. Doing so may cause damage to the switch's internal components because it is designed for a small load.

■ Correct Use

Mounting

Use two M3 mounting screws with an appropriate screwdriver to mount the switch. Tighten the screws to a torque of 0.39 to 0.59 N • m {4 to 6 kgf • cm}.

Mounting Direction

Mount lever-operated switches with a maximum operating force of 0.49 N in a direction where the actuator weight will not be applied to the switch. Since the switch is designed for a small load, its resetting force is small. Therefore, resetting failure may occur if unnecessary load is applied to the switch.

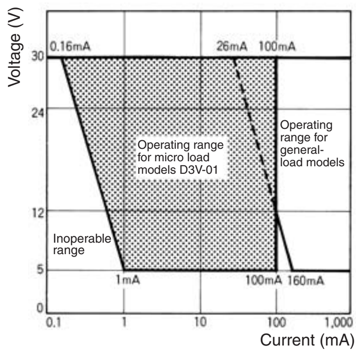
Insulation Distance

According to EN61058-1, the minimum insulation thickness for this switch should be 1.1 mm and minimum clearance distance between the terminal and mounting plate should be 1.9 mm. If the insulation distance cannot be provided in the product incorporating the switch, either use a switch with insulation barrier or use a Separator to ensure sufficient insulation distance.

Using Micro Loads

Using a model for ordinary loads to open or close the contact of a micro load circuit may result faulty contact. Use models that operate in the following range. However, even when using micro load models within the operating range shown below, if inrush current occurs when the contact is opened or closed, it may increase contact wear and so decrease life expectancy. Therefore, insert a contact protection circuit where necessary.

The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ 60). The equation, $\lambda\ 60 = 0.5 \times 10^{-6}$/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.



Solder Terminal Approval Conditions

Soldering iron can be used. Soldering hook hole available.
Soldering terminal types 1 and 2 are met.

Non-Sealed Microswitches

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

Reliable and Safe Basic Switch

- ROHS Compliant.
- Self-cleaning contacts.
- Best-seller Switches with switching currents of 10 to 21 A.
- Can be used for shutting down current in doors.
- Widely used for operating switches in applications where long life expectancy is required.
- Available in two types of cases: thermoplastic resin and thermosetting resin.
- Available with right-angle PCB terminal.

Ordering Information

Model Number Legend

V-□□□-□□□□-□

1 2 3 4 5 6 7 8

1. **Ratings**
   21: 21 A
   16: 16 A
   15: 15 A
   11: 11 A
   10: 10 A
2. **Contact Gap**
   None: 1 mm (F gap)
   G: 0.5 mm (G gap) (for remodelling)
3. **Actuator**
   None: Pin plunger
   1: Short hinge lever
   2: Hinge lever
   3: Long hinge lever
   4: Simulated hinge lever
   5: Short hinge roller lever
   6: Hinge roller lever
4. **Contact Form**
   1: SPDT (COM bottom terminal, double-throw)
   2: SPST-NC (COM bottom terminal, normally closed)
   3: SPST-NO (COM bottom terminal, normally open)
   4: SPDT (COM side terminal, double-throw)
   5: SPST-NC (COM side terminal, normally closed)
   6: SPST-NO (COM side terminal, normally open)
5. **Terminals**
   A: Solder terminal (#187)
   C2: Quick-connect terminal (#187)
   C: Quick-connect terminal (#250)
   B: Screw terminal
6. **Barrier (Models with Thermoplastic Case Only)**
   None: Without barrier
   R: Right-hand barrier
   L: Left-hand barrier
7. **Operating Force max.**
   6: 3.92 N {400 gf}
   5: 1.96 N {200 gf}
   4: 0.98 N {100 gf}

Note: These values are for the pin plunger models.

8. **Special Purpose**
   T: Heat-resistive

■ Combinations of Available Terminals

Terminal				Thermoplastic case				Thermosetting case			
			Model	V-21	V-16		V-11	V-15		V-10	
			Rated current	21 A	16 A		11 A	15 A		10 A	
COM terminal position	Insulation barrier	Heat resistance	Terminal symbol / OF	3.92 N {400 gf}	3.92 N {400 gf}	1.96 N {200 gf}	0.98 N {100 gf}	3.92 N {400 gf}	1.96 N {200 gf}	1.96 N {200 gf}	0.98 N {100 gf}
Bottom	No	Standard (80°C)	Solder/Quick-connect terminal (#187) (A)	---	Semi-standard	Standard	Standard	Semi-standard	Standard	Standard	Standard
			Quick-connect terminal (#187) (C2)	---	Semi-standard	Standard	Standard	Semi-standard	Standard	Standard	Standard
			Quick-connect terminal (#250) (C)	Standard	Semi-standard	Standard	Standard	Semi-standard	Semi-standard	Semi-standard	Semi-standard
			Screw terminal (B)	---	---	---	---	Semi-standard	Standard	Standard	Standard
		Heat resistant (150°C)	Solder/Quick-connect terminal (#187) (A)	---	---	---	---	Semi-standard	Standard	Standard	Standard
			Quick-connect terminal (#187) (C2)	---	---	---	---	Semi-standard	Semi-standard	Semi-standard	Semi-standard
			Quick-connect terminal (#250) (C)	---	---	---	---	---	---	---	---
			Screw terminal (B)	---	---	---	---	---	---	---	---
	Yes	Standard (80°C)	Solder/Quick-connect terminal (#187) (A)	---	Semi-standard	Standard	---	---	---	---	---
			Quick-connect terminal (#187) (C2)	---	Semi-standard	Standard	---	---	---	---	---
			Quick-connect terminal (#250) (C)	Standard	Semi-standard	Standard	---	---	---	---	---
Side	No	Standard (80°C)	Solder/Quick-connect terminal (#187) (A)	---	---	---	---	Semi-standard	Standard	Standard	Standard
			Quick-connect terminal (#187) (C2)	---	---	---	---	Semi-standard	Semi-standard	Semi-standard	Semi-standard
			Quick-connect terminal (#250) (C)	Semi-standard	---	---	---	---	---	---	---

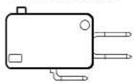
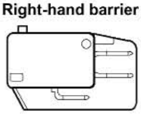
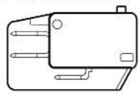
Consult OMRON for standard approvals of models.

■ List of Models

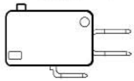
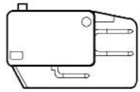
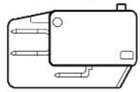
General-purpose Models

(Only standard combinations of terminal availability are shown.)

Thermoplastic Case

Actuator	COM terminal position	Contact form	Terminals (see note)	21 A (OF: 3.92 N {400 gf})		
				Without barrier 	Right-hand barrier 	Left-hand barrier 
Pin plunger	Bottom	SPDT	C	V-21-1C6	V-21-1CR6	V-21-1CL6
		SPST-NC	C	V-21-2C6	V-21-2CR6	V-21-2CL6
		SPST-NO	C	V-21-3C6	V-21-3CR6	V-21-3CL6
Short hinge lever	Bottom	SPDT	C	V-211-1C6	V-211-1CR6	V-211-1CL6
Hinge lever	Bottom	SPDT	C	V-212-1C6	V-212-1CR6	V-212-1CL6
Long hinge lever	Bottom	SPDT	C	V-213-1C6	V-213-1CR6	V-213-1CL6
Simulated hinge lever	Bottom	SPDT	C	V-214-1C6	V-214-1CR6	V-214-1CL6
Short hinge roller lever	Bottom	SPDT	C	V-215-1C6	V-215-1CR6	V-215-1CL6
Hinge roller lever	Bottom	SPDT	C	V-216-1C6	V-216-1CR6	V-216-1CL6

Note: C: Quick-connect terminals (#250)

Actuator	COM terminal position	Contact form	Terminals (see note)	16 A (OF: 1.96 N {200 gf})		
				Without barrier 	Right-hand barrier 	Left-hand barrier 
Pin plunger	Bottom	SPDT	A	V-16-1A5	V-16-1AR5	V-16-1AL5
			C2	V-16-1C25	V-16-1C2R5	V-16-1C2L5
			C	V-16-1C5	---	---
		SPST-NC	A	V-16-2A5	V-16-2AR5	V-16-2AL5
			C2	V-16-2C25	V-16-2C2R5	V-16-2C2L5
			C	V-16-2C5	---	---
		SPST-NO	A	V-16-3A5	V-16-3AR5	V-16-3AL5
			C2	V-16-3C25	V-16-3C2R5	V-16-3C2L5
			C	V-16-3C5	---	---
Short hinge lever	Bottom	SPDT	A	V-161-1A5	V-161-1AR5	V-161-1AL5
			C2	V-161-1C25	V-161-1C2R5	V-161-1C2L5
			C	V-161-1C5	---	---
Hinge lever	Bottom	SPDT	A	V-162-1A5	V-162-1AR5	V-162-1AL5
			C2	V-162-1C25	V-162-1C2R5	V-162-1C2L5
			C	V-162-1C5	---	---
Long hinge lever	Bottom	SPDT	A	V-163-1A5	V-163-1AR5	V-163-1AL5
			C2	V-163-1C25	V-163-1C2R5	V-163-1C2L5
			C	V-163-1C5	---	---
Simulated hinge lever	Bottom	SPDT	A	V-164-1A5	V-164-1AR5	V-164-1AL5
			C2	V-164-1C25	V-164-1C2R5	V-164-1C2L5
			C	V-164-1C5	---	---
Short hinge roller lever	Bottom	SPDT	A	V-165-1A5	V-165-1AR5	V-165-1AL5
			C2	V-165-1C25	V-165-1C2R5	V-165-1C2L5
			C	V-165-1C5	---	---
Hinge roller lever	Bottom	SPDT	A	V-166-1A5	V-166-1AR5	V-166-1AL5
			C2	V-166-1C25	V-166-1C2R5	V-166-1C2L5
			C	V-166-1C5	---	---

Note: A: Solder/quick-connect terminals (#187)
C2: Quick-connect terminals (#187)
C: Quick-connect terminals (#250)

Actuator	COM terminal position	Contact form	Terminals (see note)	11 A
				OF: 0.98 N {100 gf}
Pin plunger	Bottom	SPDT	A	V-11-1A4
			C2	V-11-1C24
			C	V-11-1C4
Short hinge lever	Bottom	SPDT	A	V-111-1A4
			C2	V-111-1C24
			C	V-111-1C4
Hinge lever	Bottom	SPDT	A	V-112-1A4
			C2	V-112-1C24
			C	V-112-1C4
Long hinge lever	Bottom	SPDT	A	V-113-1A4
			C2	V-113-1C24
			C	V-113-1C4
Simulated hinge lever	Bottom	SPDT	A	V-114-1A4
			C2	V-114-1C24
			C	V-114-1C4
Short hinge roller lever	Bottom	SPDT	A	V-115-1A4
			C2	V-115-1C24
			C	V-115-1C4
Hinge roller lever	Bottom	SPDT	A	V-116-1A4
			C2	V-116-1C24
			C	V-116-1C4

Note: A: Solder/quick-connect terminals (#187)
C2: Quick-connect terminals (#187)
C: Quick-connect terminals (#250)

Thermosetting Case

Actuator	COM terminal position	Contact form	Terminals (see note 2)	15 A	10 A	
				OF: 1.96 N {200 gf}	OF: 1.96 N {200 gf}	OF: 0.98 N {100 gf}
Pin plunger	Bottom	SPDT	A	V-15-1A5	V-10-1A5	V-10-1A4
			C2	V-15-1C25	V-10-1C25	V-10-1C24
			B	V-15-1B5	V-10-1B5	V-10-1B4
	Bottom	SPST-NC	A	V-15-2A5	V-10-2A5	V-10-2A4
			C2	V-15-2C25	V-10-2C25	V-10-2C24
			B	V-15-2B5	V-10-2B5	V-10-2B4
	Bottom	SPST-NO	A	V-15-3A5	V-10-3A5	V-10-3A4
			C2	V-15-3C25	V-10-3C25	V-10-3C24
			B	V-15-3B5	V-10-3B5	V-10-3B4
	Side	SPDT	A	V-15-4A5	V-10-4A5	V-10-4A4
		SPST-NC	A	V-15-5A5	V-10-5A5	V-10-5A4
		SPST-NO	A	V-15-6A5	V-10-6A5	V-10-6A4
Short hinge lever	Bottom	SPDT	A	V-151-1A5	V-101-1A5	V-101-1A4
			C2	V-151-1C25	V-101-1C25	V-101-1C24
			B	V-151-1B5	V-101-1B5	V-101-1B4
Hinge lever	Bottom	SPDT	A	V-152-1A5	V-102-1A5	V-102-1A4
			C2	V-152-1C25	V-102-1C25	V-102-1C24
			B	V-152-1B5	V-102-1B5	V-102-1B4
Long hinge lever	Bottom	SPDT	A	V-153-1A5	V-103-1A5	V-103-1A4
			C2	V-153-1C25	V-103-1C25	V-103-1C24
			B	V-153-1B5	V-103-1B5	V-103-1B4
Simulated hinge lever	Bottom	SPDT	A	V-154-1A5	V-104-1A5	V-104-1A4
			C2	V-154-1C25	V-104-1C25	V-104-1C24
			B	V-154-1B5	V-104-1B5	V-104-1B4
Short hinge roller lever	Bottom	SPDT	A	V-155-1A5	V-105-1A5	V-105-1A4
			C2	V-155-1C25	V-105-1C25	V-105-1C24
			B	V-155-1B5	V-105-1B5	V-105-1B4
Hinge roller lever	Bottom	SPDT	A	V-156-1A5	V-106-1A5	V-106-1A4
			C2	V-156-1C25	V-106-1C25	V-106-1C24
			B	V-156-1B5	V-106-1B5	V-106-1B4

Note: 1. A: Solder/quick-connect terminals (#187)
C2: Quick-connect terminals (#187)
B: Screw terminals

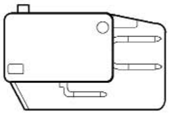
2. OF values shown in the table are for the pin plunger models.

Heat Resistant Models (Up to 150°C)

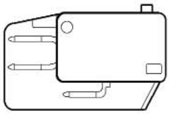
Actuator	COM terminal position	Contact specifications	Terminal specification	15 A	10 A
				OF: 1.96 N {200 gf}	OF: 0.98 N {100 gf}
Pin plunger	Bottom	SPDT	Solder/Quick-connect terminal (#187) (A)	V-15-1A5-T	V-10-1A4-T
Short hinge lever				V-151-1A5-T	V-101-1A4-T
Hinge lever				V-152-1A5-T	V-102-1A4-T
Long hinge lever				V-153-1A5-T	V-103-1A4-T
Simulated hinge lever				V-154-1A5-T	V-104-1A4-T
Short hinge roller lever				V-155-1A5-T	V-105-1A4-T
Hinge roller lever				V-156-1A5-T	V-106-1A4-T

■ Barrier (V-21 and V-16 Models Only)

Right-hand Barrier



Left-hand Barrier



Specifications

■ Ratings

Type	Rated voltage	Non-inductive load				Inductive laod			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
V-21	250 VAC	21 A		3 A		12 A		4 A	
	8 VDC	21 A		5 A		12 A		7 A	
	30 VDC	14 A		5 A		12 A		5 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	
V-16	250 VAC	16 A		2 A		10 A		3 A	
	8 VDC	16 A		4 A		10 A		6 A	
	30 VDC	10 A		4 A		10 A		4 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	
V-15	250 VAC	15 A		2 A		10 A		3 A	
	8 VDC	15 A		4 A		10 A		6 A	
	30 VDC	10 A		4 A		10 A		4 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	
V-11	250 VAC	11 A		1.5 A		6 A		2 A	
	8 VDC	11 A		3 A		6 A		3 A	
	30 VDC	6 A		3 A		6 A		3 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	
V-10	250 VAC	10 A		1.5 A		6 A		2 A	
	8 VDC	10 A		3 A		6 A		3 A	
	30 VDC	6 A		3 A		6 A		3 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	

Note:
1. The above current values are the normal current values of models with a contact gap of 1 mm (gap F), which vary with the normal current values of models with a contact gap of 0.5 mm (gap G).
2. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
3. Lamp load has an inrush current of 10 times the steady-state current.
4. Motor load has an inrush current of 6 times the steady-state current.
5. The ratings values apply under the following test conditions:
   Ambient temperature: 20±2°C
   Ambient humidity: 65±5%
   Operating frequency: 60 operations/min

■ Characteristics

Operating speed	0.1 mm to 1 m/s (at pin plunger models)
Operating frequency	Mechanical: 600 operations/min Electrical: 60 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance	15 mΩ max. (initial value)
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarity
	V-21, V-16, and V-11 models: 2,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts (see note 1)
	V-15 and V-10 models: 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts (see note 1)
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 2)	Destruction: 1,000 m/s^2 {approx. 100G} max. Malfunction: V-21/V-16/V-15: 300 m/s^2 {approx. 30G} max. V-11/V-10: 200 m/s^2 {approx. 20G} max.
Life expectancy (see note 3)	Mechanical: 50,000,000 operations min. Electrical: V-21/V-16/V-15: 100,000 operations min. (V-15 heat resistive: 20,000 operation min.) V-11/V-10: 300,000 operations min. (V-10 heat resistive: 50,000 operation min.)
Degree of protection	IP00
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Switch category	D (IEC335-1)
Ambient temperature	Operating: –25°C to 80°C (with no icing) –25°C to 150°C for heat-resistive model (with no icing)
Ambient humidity	Operating: 85% max. (for 5°C to 35°C)
Weight	Approx. 6.2 g (pin plunger model)

Note: 1. The dielectric strength values shown in the table are for models with a Separator.
2. For the pin plunger models, the above values apply for use at both the free position and total travel position. For the lever models, they apply at the total travel position.
3. For testing conditions, contact your OMRON sales representative.

■ Approved Standards

UL1054 (File No. E41515) CSA C22.2 No.55 (File No. LR21642) (Standard Ratings Only is listed.)

Rated voltage	V-21	V-16	V-15	V-11	V-10
125 VAC	21 A, 1/2 HP	16 A, 1/2 HP	15 A, 1/2 HP	11 A, 1/2 HP	10 A, 1/2 HP
250 VAC	21 A, 1/2 HP	16 A, 1/2 HP	15 A, 1/2 HP	11 A, 1/2 HP	10 A, 1/2 HP
125 VDC	0.6 A	0.6 A	0.6 A	0.6 A	0.6 A
250 VDC	0.3 A	0.3 A	0.3 A	0.3 A	0.3 A

VDE 0630 (File No. 6162ÜG), SEV (File No. 96. 550868. 01) DEMKO

Rated voltage	V-21	V-16	V-11
250 VAC	20 (4) A	16 (3) A	11 (2) A

Testing conditions: 50,000 operations, T105 (0°C to 105°C)

SEMKO EN61058-1 (File No. 9403007)

Rated voltage	V-16	V-11
250 VAC	16 (3) A	11 (2) A

Testing conditions: 5E4 (50,000 operations), T105 (0°C to 105°C)

TÜV Rheinland EN61058-1 (File No. T9451451)

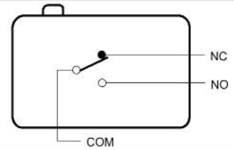
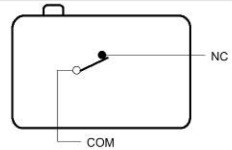
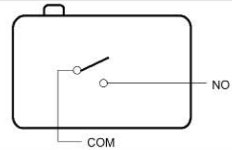
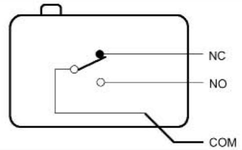
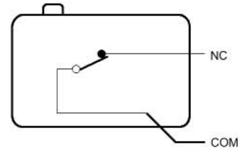
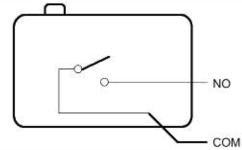
Rated voltage	V-15	V-10
250 VAC	15 A	10 A
250 VDC	0.3 A	0.3 A

Testing conditions: 5E4 (50,000 operations), T105 (0°C to 105°C)

■ Contact Specifications

Item		V-21	V-16	V-15	V-11	V-10
Contact	Specification	Rivet				
	Material	Silver alloy			Silver	
	Gap (standard value)	1 mm (F gap) or 0.5 mm (G gap)				
Inrush current	NC	50 A max.	40 A max.	36 A max.	24 A max.	
	NO					

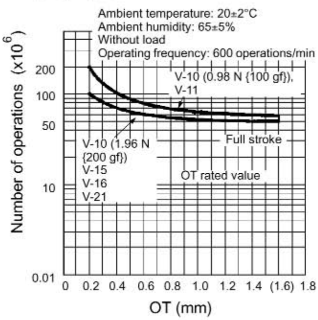
■ Contact Form

Terminal type	SPDT	SPST-NC	SPST-NO
Bottom terminal			
Side terminal			

Engineering Data

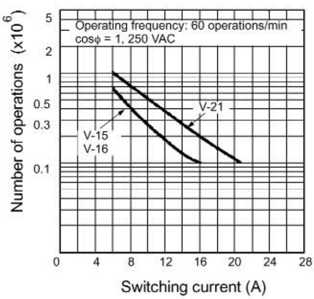
Mechanical Life Expectancy (Pin Plunger)

V-21/-16/-15/-10

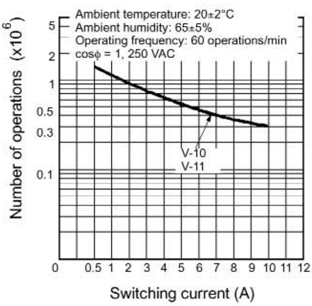


Electrical Life Expectancy

V-21/-16/-15

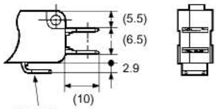
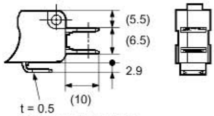
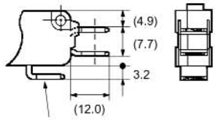
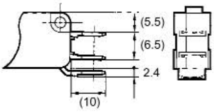
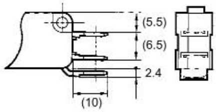
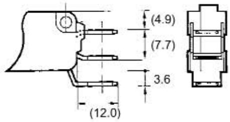
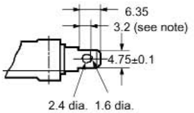
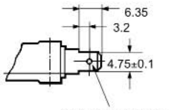
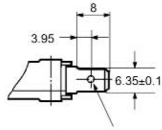


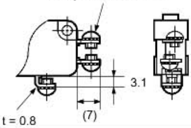
V-11/-10



Dimensions

■ Terminals

Terminal type	Solder Terminal (A)	Quick-connect Terminal (#187) (C2)	Quick-connect Terminal (#250) (C)
COM bottom position	 t = 0.5 Three, solder/quick-connect terminals (#187)	 t = 0.5 Three, quick-connect terminals (#187)	 t = 0.8 Three, quick-connect terminals (#250)
COM side position			
Terminal dimensions	 **Note:** Indicates the length to the center of the 1.6-dia. holes	 1.6-dia. terminal hole	 1.65-dia. terminal hole

Terminal type	Screw Terminal (B)
Bottom	Three, #M3 x 0.5 x 3.2 Phillips screw washer  t = 0.8

Note: 1. The above is for the SPDT contact specifications. Two terminals will be available for SPST-NO or SPST-NC contact specifications. For terminal positions, refer to the above *Contact Form*.

2. Right-angle PCB terminal type is available
D5 type: Pins at right angles, to the right.
D6 type: Pins at right angles, to the left.
Drawings will be provided if requested.

■ Dimensions and Operating Characteristics

Note: 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

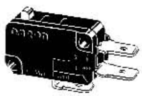
2. The following illustrations and drawings are for quick-connect terminals (#250) (terminals C). V models with a switching current of 16 A or 11 A incorporates terminals A and C2. These models are different from #250 models in terminal size only. Terminals A, C2, and side common terminals are omitted from the following drawings. Refer to *Kinds of Terminals* on page 85 for these terminals.

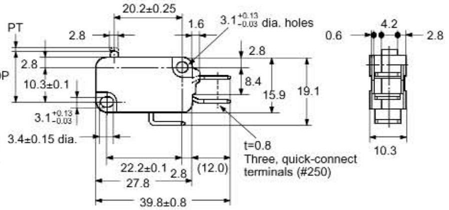
3. The □ in the model number is for the terminal code.

Pin Plunger

(Without Barrier)

V-21-1□6
V-16-1□5
V-11-1□4

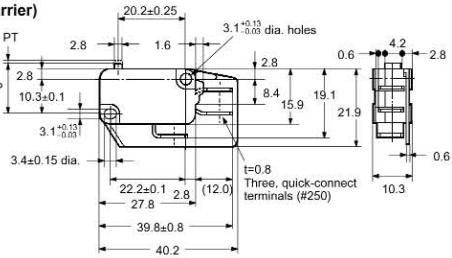




Model	V-21-1□6	V-16-1□5
OF max.	3.92 N {400 gf}	1.96 N {200 gf}
RF min.	0.78 N {80 gf}	0.49 N {50 gf}
PT max.	1.2 mm	
OT min.	1.0 mm	
MD max.	0.4 mm	
OP	14.7±0.4 mm	

(With Right-hand Barrier)

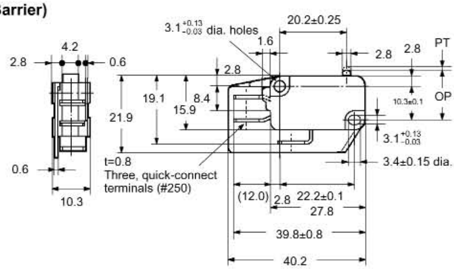
V-21-1□R6
V-16-1□R5



Model	V-11-1□4
OF max.	0.98 N {100 gf}
RF min.	0.20 N {20 gf}
PT max.	1.2 mm
OT min.	1.0 mm
MD max.	0.4 mm
OP	14.7±0.4 mm

(With Left-hand Barrier)

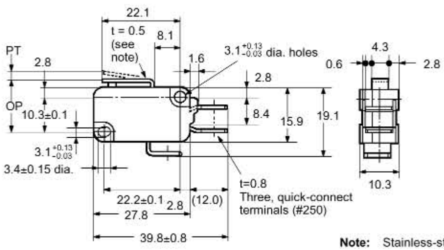
V-21-1□L6
V-16-1□L5



Short Hinge Lever

V-211-1□6
V-161-1□5
V-111-1□4

Model	V-211-1□6	V-161-1□5
OF max.	3.92 N {400 gf}	1.96 N {200 gf}
RF min.	0.49 N {50 gf}	0.49 N {50 gf}
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.6 mm	
OP	15.2±0.5 mm	

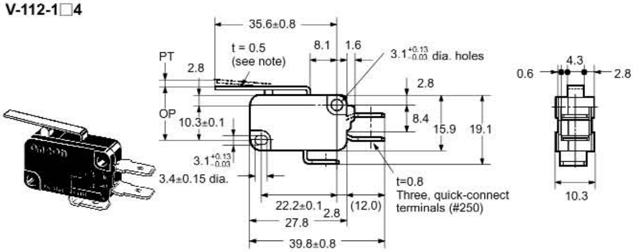


Note: Stainless-steel lever

Model	V-111-1□4
OF max.	0.98 N {100 gf}
RF min.	0.15 N {15 gf}
PT max.	1.6 mm
OT min.	0.8 mm
MD max.	0.6 mm
OP	15.2±0.5 mm

Hinge Lever

V-212-1□6
V-162-1□5
V-112-1□4



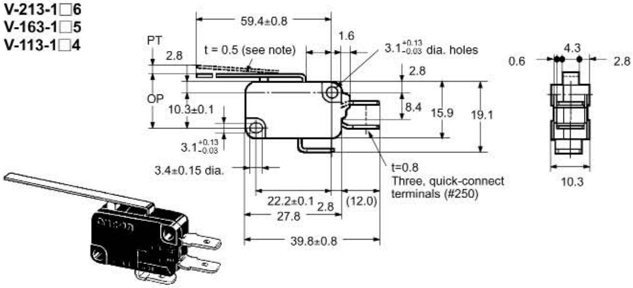
Note: Stainless-steel lever

Model	V-212-1□6	V-162-1□5
OF max.	2.45 N {250 gf}	1.23 N {125 gf}
RF min.	0.25 N {25 gf}	0.14 N {14 gf}
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	1.5 mm	
OP	15.2±1.2 mm	

Model	V-112-1□4
OF max.	0.59 N {60 gf}
RF min.	0.06 N {6 gf}
PT max.	4.0 mm
OT min.	1.6 mm
MD max.	1.5 mm
OP	15.2±0.5 mm

Long Hinge Lever

V-213-1□6
V-163-1□5
V-113-1□4



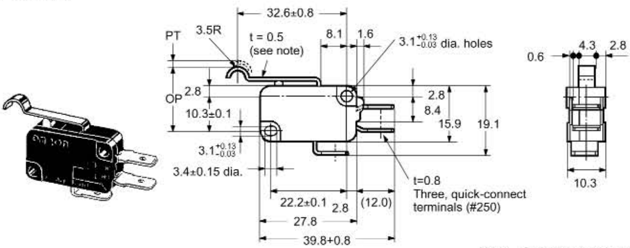
Note: Stainless-steel lever

Model	V-213-1□6	V-163-1□5
OF max.	1.27 N {130 gf}	0.69 N {70 gf}
RF min.	0.12 N {12 gf}	0.06 N {6 gf}
PT max.	9.0 mm	
OT min.	2.0 mm	
MD max.	2.8 mm	
OP	$15.2\pm^{+2.6}_{-3.2}$ mm	

Model	V-113-1□4
OF max.	0.34 N {35 gf}
RF min.	---
PT max.	9.0 mm
OT min.	3.2 mm
MD max.	2.8 mm
OP	15.2±2.6 mm

Simulated Hinge Lever

V-214-1□6
V-164-1□5
V-114-1□4



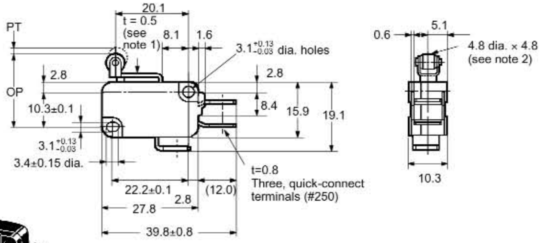
Note: Stainless-steel lever

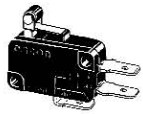
Model	V-214-1□6	V-164-1□5
OF max.	2.45 N {250 gf}	1.23 N {125 gf}
RF min.	0.25 N {25 gf}	0.14 N {14 gf}
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	1.5 mm	
OP	18.7±1.2 mm	

Model	V-114-1□4
OF max.	0.59 N {60 gf}
RF min.	0.06 N {6 gf}
PT max.	4.0 mm
OT min.	1.6 mm
MD max.	1.5 mm
OP	18.7±1.2 mm

Short Hinge Roller Lever

V-215-1□6
V-165-1□5
V-115-1□4





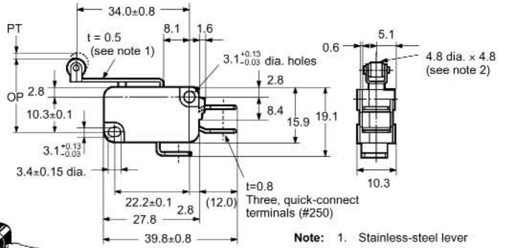
Note: 1. Stainless-steel lever
2. Oilless polyacetar resin roller

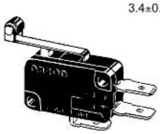
Model	V-215-1□6	V-165-1□5
OF max.	4.71 N {480 gf}	2.35 N {240 gf}
RF min.	0.49 N {50 gf}	0.49 N {50 gf}
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.6 mm	
OP	20.7±0.6 mm	

Model	V-115-1□4
OF max.	1.18 N {120 gf}
RF min.	0.15 N {15 gf}
PT max.	1.6 mm
OT min.	0.8 mm
MD max.	0.6 mm
OP	20.7±0.6 mm

Hinge Roller Lever

V-216-1□6
V-166-1□5
V-116-1□4





Note: 1. Stainless-steel lever
2. Oilless polyacetar resin roller

Model	V-216-1□6	V-166-1□5
OF max.	2.45 N {250 gf}	1.23 N {125 gf}
RF min.	0.25 N {25 gf}	0.14 N {14 gf}
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	1.5 mm	
OP	20.7±1.2 mm	

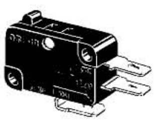
Model	V-116-1□4
OF max.	0.59 N {60 gf}
RF min.	0.06 N {6 gf}
PT max.	4.0 mm
OT min.	1.6 mm
MD max.	1.5 mm
OP	20.7±1.2 mm

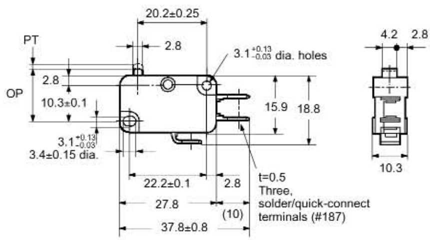
■ Thermosetting Case (V-15/-10 Models)

The following illustration and drawing are for solder and quick-connect terminals (#187) (terminals A). V models with a switching current of 15 A or 10 A incorporate terminals B or C2. These models are different from #187 models in terminal size only.
Refer to *Terminals* on page 85 for these terminals.

Pin Plunger

V-15-1□5
V-10-1□5
V-10-1□4

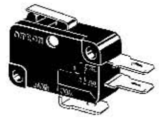


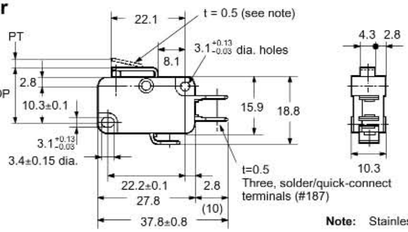


Model	V-15-1□5 V-10-1□5	V-10-1□4
OF max.	1.96 N {200 gf}	0.98 N {100 gf}
RF min.	0.49 N {50 gf}	0.20 N {20 gf}
PT max.	1.2 mm	
OT min.	1.0 mm	
MD max.	0.4 mm	
OP	14.7±0.4 mm	

Short Hinge Lever

V-151-1□5
V-101-1□5
V-101-1□4



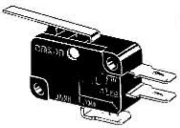


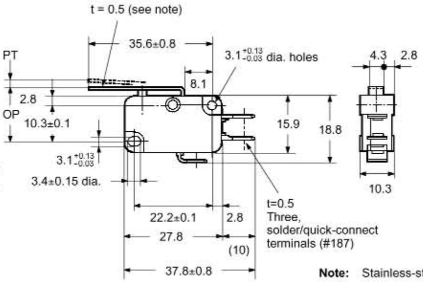
Note: Stainless-steel lever

Model	V-151-1□5 V-101-1□5	V-101-1□4
OF max.	1.96 N {200 gf}	0.98 N {100 gf}
RF min.	0.49 N {50 gf}	0.15 N {15 gf}
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.6 mm	
OP	15.2±0.5 mm	

Hinge Lever

V-152-1□5
V-102-1□5
V-102-1□4



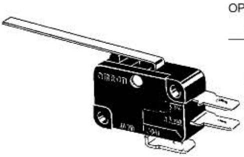


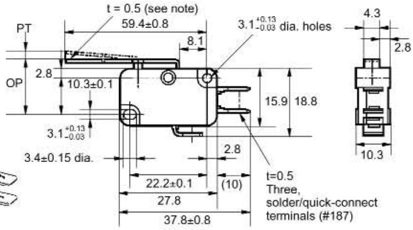
Note: Stainless-steel lever

Model	V-152-1□5 V-102-1□5	V-102-1□4
OF max.	1.23 N {125 gf}	0.59 N {60 gf}
RF min.	0.14 N {14 gf}	0.06 N {6 gf}
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	1.5 mm	
OP	15.2±1.2 mm	

Long Hinge Lever

V-153-1□5
V-103-1□5
V-103-1□4



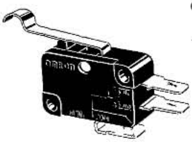


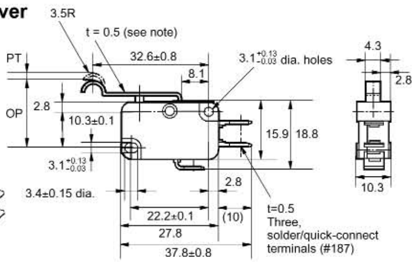
Note: Stainless-steel lever

Model	V-153-1□5 V-103-1□5	V-101-1□4
OF max.	0.69 N {70 gf}	0.34 N {35 gf}
RF min.	0.06 N {6 gf}	---
PT max.	9.0 mm	
OT min.	2.0 mm	3.2 mm
MD max.	2.8 mm	
OP	15.2$\pm^{+2.6}_{-3.2}$ mm	15.2±2.6 mm

Simulated Hinge Lever

V-154-1□5
V-104-1□5
V-104-1□4



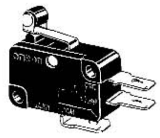


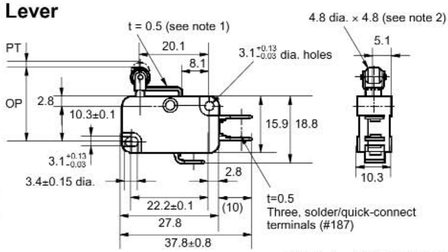
Note: Stainless-steel lever

Model	V-154-1□5 V-104-1□5	V-104-1□4
OF max.	1.23 N {125 gf}	0.59 N {60 gf}
RF min.	0.14 N {14 gf}	0.06 N {6 gf}
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	1.5 mm	
OP	18.7±1.2 mm	

Short Hinge Roller Lever

V-155-1□5
V-105-1□5
V-105-1□4



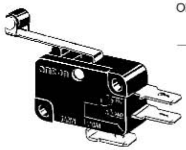


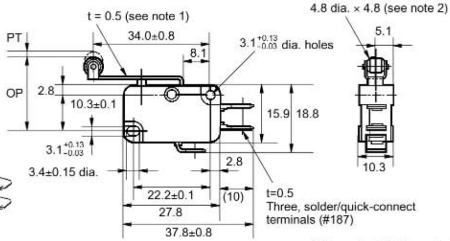
Note: 1. Stainless-steel lever
2. Oilless polyacetar resin roller

Model	V-155-1□5 V-105-1□5	V-105-1□4
OF max.	2.35 N {240 gf}	1.18 N {120 gf}
RF min.	0.49 N {50 gf}	0.15 N {15 gf}
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.6 mm	
OP	20.7±0.6 mm	

Hinge Roller Lever

V-156-1□5
V-106-1□5
V-106-1□4





Note: 1. Stainless-steel lever
2. Oilless polyacetar resin roller

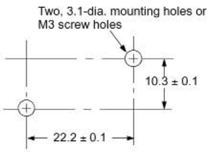
Model	V-156-1□5 V-106-1□5	V-106-1□4
OF max.	1.23 N {125 gf}	0.59 N {60 gf}
RF min.	0.14 N {14 gf}	0.06 N {6 gf}
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	1.5 mm	
OP	20.7±1.2 mm	

Precautions

■ Mounting Dimensions

Use two M3 mounting screws with an appropriate screwdriver to mount the switch. Tighten the screws to a torque of 0.39 to 0.59 N • m {4 to 6 kgf • cm}.

Mounting Holes



Specifications Approved by TÜV Rheinland According to EN61058-1

Appropriate Cable Size (mm^2)

Model	Solder terminal	Screw terminal
V-10	0.75, 1.25, 2.0	0.75, 1.25
V-15	1.25, 2.0	1.25

Terminal Connection

Use M3 crimp terminals for connecting to the screw terminals.

Appropriate tightening torque: 0.39 to 0.59 N • m (4 to 6 kgf • cm)

Insulation Distance

According to EN61058-1, the minimum insulation thickness for this Switch should be 1.1 mm and minimum clearance distance between the terminal and mounting plate should be 1.9 mm. If the insulation distance cannot be provided in the product incorporating the Switch, either use a Switch with insulation barrier or use a Separator to ensure sufficient insulation distance.

Solder Terminal Approval Conditions

Soldering iron can be used. Soldering hook hole available.
Soldering terminal types 1 and 2 are met.

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

Compact Basic Switch of Ultra-low Operating Force Assures Yet Higher Contact Reliability

- ROHS Compliant.
- Uses an internal hinge lever mechanism for ultra-low operating force and outstanding contact reliability.
- Shape is identical to that of the V Compact Basic Switches.
- Gold-alloy contact for micro-load VX-01 models.

Ordering Information

■ Model Number Legend

VX-□□-□□□
1 2 3 4 5

1. **Ratings**
   5: 5 A
   01: 0.1 A
2. **Actuator**
   None: Pin plunger
   1: Short hinge lever
   2: Hinge lever
   3: Long hinge lever
   4: Simulated hinge lever
   5: Short hinge roller lever
   6: Hinge roller lever
3. **Contact Form**
   1: SPDT
   2: SPST-NC
   3: SPST-NO
4. **Terminal Specifications**
   A: Solder terminal (#187)
   C2: Quick-connect terminal (#187)
5. **Operating Force max.**
   2: OF 0.25 N {25 gf}
   3: OF 0.49 N {50 gf}
   Note: These values are for the pin plunger model.

List of Models

Actuator	Terminals (see note)	OF max.	Model	
			5 A	0.1 A
Pin plunger	A	0.25 N {25 gf}	VX-5-1A2	VX-01-1A2
		0.49 N {50 gf}	VX-5-1A3	VX-01-1A3
	C2	0.25 N {25 gf}	VX-5-1C22	VX-01-1C22
		0.49 N {50 gf}	VX-5-1C23	VX-01-1C23
Short hinge lever	A	0.49 N {50 gf}	VX-51-1A3	VX-011-1A3
	C2	0.49 N {50 gf}	VX-51-1C23	VX-011-1C23
Hinge Lever	A	0.29 N {30 gf}	VX-52-1A3	VX-012-1A3
	C2	0.29 N {30 gf}	VX-52-1C23	VX-012-1C23
Long hinge lever	A	0.20 N {20 gf}	VX-53-1A3	VX-013-1A3
	C2	0.20 N {20 gf}	VX-53-1C23	VX-013-1C23
Simulated hinge lever	A	0.29 N {30 gf}	VX-54-1A3	VX-014-1A3
	C2	0.29 N {30 gf}	VX-54-1C23	VX-014-1C23
Short hinge roller lever	A	0.59 N {60 gf}	VX-55-1A3	VX-015-1A3
	C2	0.59 N {60 gf}	VX-55-1C23	VX-015-1C23
Hinge roller lever	A	0.29 N {30 gf}	VX-56-1A3	VX-016-1A3
	C2	0.29 N {30 gf}	VX-56-1C23	VX-016-1C23

Note: 1. SPST models are also available, but not listed in the above table.

2. Terminals A: Solder/Quick-connect terminals (#187)
C2: Quick-connect terminals (#187)

Specifications

Ratings

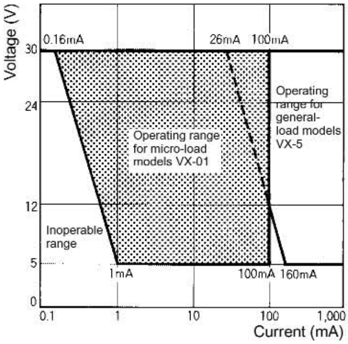
Rated current	Rated voltage	Non-inductive load				Inductive load	
		Resistive load		Lamp load			
		NC	NO	NC	NO	NC	NO
5 A	250 VAC	5 A		0.5 A		4 A	
	8 VDC	5 A		3 A		4 A	
	30 VDC	5 A		3 A		4 A	
	125 VDC	0.4 A		0.1 A		0.4 A	
	250 VDC	0.3 A		0.05 A		0.2 A	
0.1 A	125 VAC	0.1 A		---		---	
	8 VDC	0.1 A		---		---	
	30 VDC	0.1 A					

Note: 1. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).

2. Lamp load has an inrush current of 10 times the steady-state current.

3. The ratings values apply under the following test conditions:
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 60 operations/min

Use the Switch in the following operating range.



Model	VX-01	VX-5
Minimum applicable load	1 mA at 5 VDC	160 mA at 5 VDC

■ Characteristics

Item	VX-5	VX-01
Operating speed	0.1 mm to 1 m/s (at pin plunger models)	
Operating frequency	Mechanical: 600 operations/min Electrical: 60 operations/min	
Insulation resistance	100 MΩ min. (at 500 VDC)	
Contact resistance	30 mΩ max. (initial value)	50 mΩ max. (initial value)
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground (see note 1) 1,500 VAC, 50/60 Hz for 1 min between each terminal and non-current-carrying metal parts	
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude	
Shock resistance (see note 2)	Destruction: 400 m/s^2 {approx. 40G} max. Malfunction: 100 m/s^2 {approx. 10G} max.	
Life expectancy	Mechanical: 50,000,000 operations min. (Refer to the following *Engineering Data*.) Electrical: 500,000 operations min. (Refer to the following *Engineering Data*.)	Mechanical: 10,000,000 operations min. (Refer to the following *Engineering Data*.) Electrical: 1,000,000 operations min. (Refer to the following *Engineering Data*.)
Degree of protection	IP00	
Degree of protection against electric shock	Class I	
Proof tracking index (PTI)	175	
Ambient temperature	Operating: −25°C to 80°C (with no icing)	
Ambient humidity	Operating: 85% max. (for 5°C to 35°C)	
Weight	Approx. 6.2 g (pin plunger models)	

Note: 1. The value for dielectric strength shown is for models with a Separator.

2. For the pin plunger models, the above values apply for use at both the free position and total travel position. For the lever models, they apply at the total travel position.

■ Approved Standards

UL1054 (File No. E41515)
CSA C22.2 No.55 (File No. LR21642)

Rated voltage	VX-5	VX-01
125 VAC 250 VAC	5 A 5 A	0.1 A (Rating: 100,000 operations) ---
30 VDC	---	0.1 A (Rating: 100,000 operations)

VDE 0630 (File No. 90430)
SEMKO (File No. 8920075)

Rated voltage	VX-5	VX-01
125 VAC	5 A	0.1 A
250 VAC	5 A	---

Note: Testing conditions: 50,000 operations, T105 (0°C to 105°C)

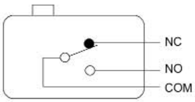
Non-Sealed Microswitches

■ Contact Specifications

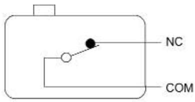
Item		VX-5 models	VX-01 models
Contact	Specification	Rivet	Crossbar
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.5 mm	
Inrush current	NC	15 A max.	---
	NO	---	---

■ Contact Form

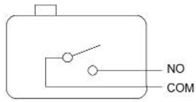
SPDT



SPST-NC



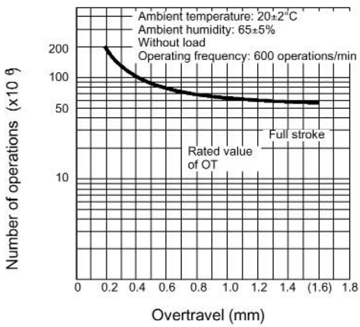
SPST-NO



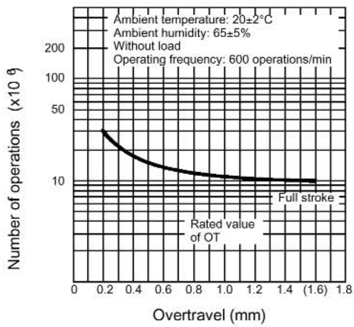
Engineering Data

Mechanical Life Expectancy (Pin Plunger)

VX-5

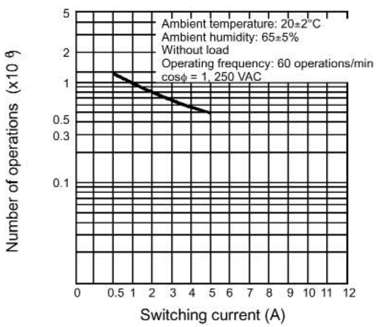


VX-01

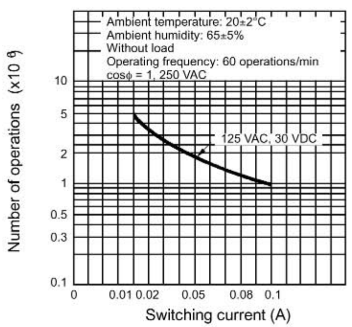


Electrical Life Expectancy

VX-5

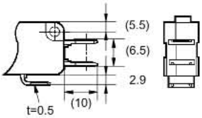


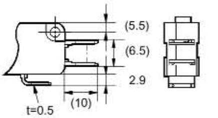
VX-01

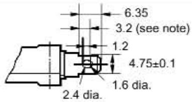


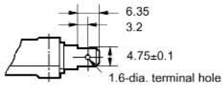
Dimensions

■ Terminals

<table>
<tr><th>Terminal</th><th>Solder (A) Terminal</th><th>Quick-connect terminal (#187) (C2 terminal)</th></tr>
<tr><td>COM terminal position is bottom.</td><td>

Three, solder/quick-connect terminals (#187)</td><td>

Three, quick-connect terminals (#187)</td></tr>
<tr><td>Terminal dimension</td><td>

Note: The length to the center of the 1.6-dia. holes.</td><td>
</td></tr>
</table>

Note: The above is for the SPDT contact specifications.

■ Dimensions and Operating Characteristics

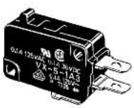
Note: 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

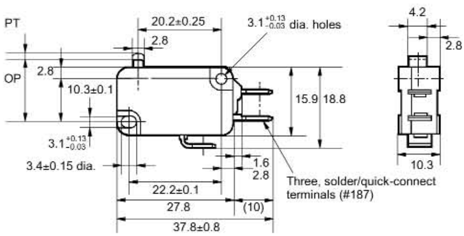
2. The following illustrations and drawings are for solder/quick-connect terminals (#187) (Terminal A). Illustrations for Terminal C2 are omitted. For details, refer to *Terminals*.

3. The □ in the model number is for the terminal code.
A: Solder/quick-connect terminal (#187)
C2: Quick-connect terminal (#187)

Pin Plunger

VX-5-1□2
VX-5-1□3
VX-01-1□2
VX-01-1□3

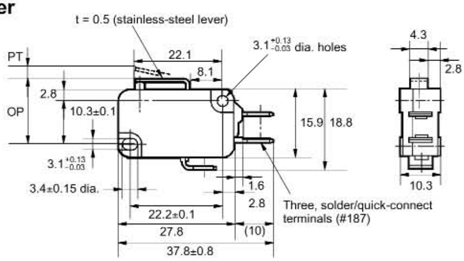




Model	VX-5-1□2	VX-5-1□3	VX-01-1□2	VX-01-1□3
OF max.	0.25 N {25 gf}	0.49 N {50 gf}	0.25 N {25 gf}	0.49 N {50 gf}
RF min.	0.03 N {3 gf}	0.05 N {5 gf}	0.03 N {3 gf}	0.05 N {5 gf}
PT max.	1.2 mm	1.2 mm	1.2 mm	1.2 mm
OT min.	1.0 mm	1.0 mm	1.0 mm	1.0 mm
MD max.	0.3 mm	0.3 mm	0.3 mm	0.3 mm
OP	14.7±0.4 mm	14.7±0.4 mm	14.7±0.4 mm	14.7±0.4 mm

Short Hinge Lever

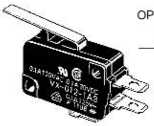
VX-51-1□3
VX-011-1□3

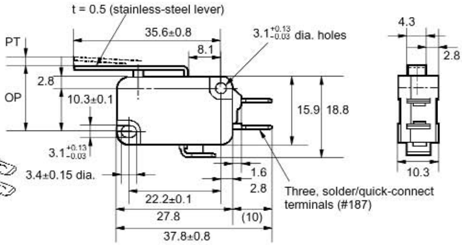


Model	VX-51-1□3	VX-011-1□3
OF max.	0.49 N {50 gf}	0.49 N {50 gf}
RF min.	0.04 N {4 gf}	0.04 N {4 gf}
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.5 mm	
OP	15.2±0.5 mm	

Hinge Lever

VX-52-1□3
VX-012-1□3

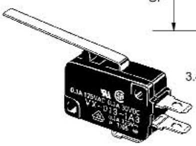


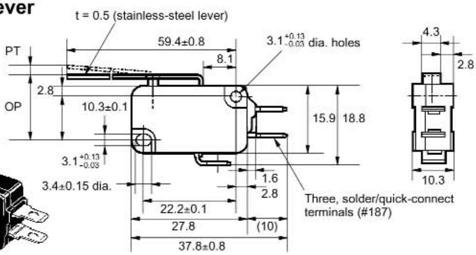


Model	VX-52-1□3	VX-012-1□3
OF max.	0.29 N {30 gf}	0.29 N {30 gf}
RF min.	---	---
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	0.8 mm	
OP	15.2±1.2 mm	15.2±1.2 mm

Long Hinge Lever

VX-53-1□3
VX-013-1□3

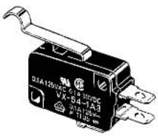


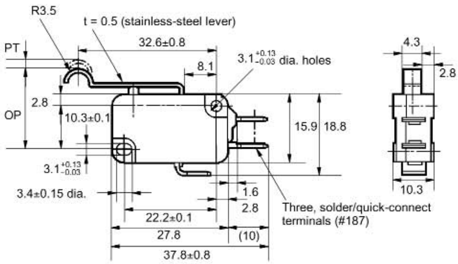


Model	VX-53-1□3	VX-013-1□3
OF max.	0.20 N {20 gf}	0.20 N {20 gf}
RF min.	---	---
PT max.	9.0 mm	
OT min.	3.2 mm	
MD max.	2.0 mm	
OP	15.2±2.6 mm	

Simulated Hinge Lever

VX-54-1□3
VX-014-1□3

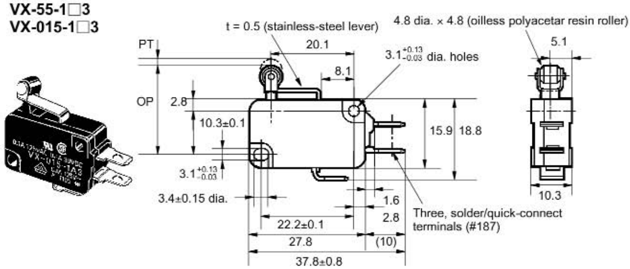




Model	VX-54-1□3	VX-014-1□3
OF max.	0.29 N {30 gf}	0.29 N {30 gf}
RF min.	0.02 N {2 gf}	0.02 N {2 gf}
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	0.8 mm	
OP	18.7±1.2 mm	

Short Hinge Roller Lever

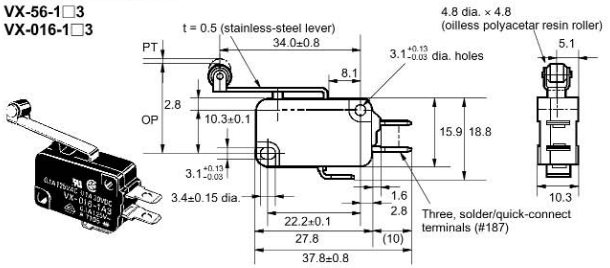
VX-55-1□3
VX-015-1□3



Model	VX-55-1□3	VX-015-1□3
OF max.	0.59 N {60 gf}	0.59 N {60 gf}
RF min.	0.04 N {4 gf}	0.04 N {4 gf}
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.5 mm	
OP	20.7±0.6 mm	

Hinge Roller Lever

VX-56-1□3
VX-016-1□3

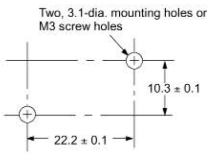


Model	VX-56-1□3	VX-016-1□3
OF max.	0.29 N {30 gf}	0.29 N {30 gf}
RF min.	---	---
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	1.5 mm	
OP	20.7±1.2 mm	

Precautions

■ Mounting Dimensions

Use two M3 mounting screws with spring washers to mount the switch. Tighten the screws to a torque of 0.39 to 0.59 N • m {4 to 6 kgf • cm}.



■ Correct Use

Handling

Be careful not to drop the Switch. doing so may cause damage to the switch's internal components because it is designed for a small load.

Mounting Direction

For a Switch with an actuator, mount the Switch in a direction where the actuator weight will not be applied to the Switch.
Since the Switch is designed for a small load, its resetting force is small. Therefore, resetting failure may occure if unnecessary load is applied to the Switch.

Operating Temperature

Do not use the Switch under a high temperature. The thermal plastic resin used for the housing may deteriorate if exposed to high temperature.

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

High Reliable Rotary-action Switch for Low Torque Operation

- ROHS Compliant.
- 0.5A rated model employs crossbar alloy contacts which exhibit unsurpassed contact reliablity in very small load ranges.
- Long life (10,000,000 mechanical operations min.) through use of a movable coil spring.

Ordering Information

Model Number Legend

D2MC-□□□
1 2 3

1. **Ratings**
   5: 5 A at 250 VAC
   0.1: 0.5 A at 125 VAC, 0.5 A at 30 VDC
2. **OF**
   E: 0.5 mN • m {5.1 gf • cm} max.
   F: 0.75 mN • m {7.6 gf • cm} max.
   H: 1.00 mN • m {10.2 gf • cm} max.
3. **Direction of Actuator**
   None: Clockwise
   L: Counterclockwise

List of Models

Direction of actuation	OF	5 A	0.5 A
Clockwise	0.5 m N • m {5.1 gf • cm}	D2MC-5E	D2MC-01E
	0.75 m N • m {7.6 gf • cm}	D2MC-5F	D2MC-01F
	1.00 m N • m {10.2 gf • cm}	D2MC-5H	D2MC-01H
Counterclockwise	0.5 m N • m {5.1 gf • cm}	D2MC-5EL	D2MC-01EL
	0.75 m N • m {7.6 gf • cm}	D2MC-5FL	D2MC-01FL
	1.00 m N • m {10.2 gf • cm}	D2MC-5HL	---

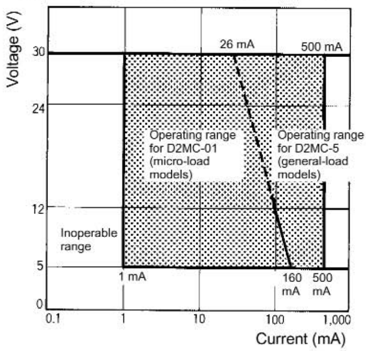
Note: All the models listed here are supplied without actuator lever. If an actuator lever is required, please order separately by indicating the model number of the actuator lever (CAA1M). Refer to page 200.

Specifications

■ Ratings

Item	D2MC-5	D2MC-01
Electrical ratings	5 A at 125/250 VAC (cosϕ = 1)	0.5 A at 125VAC/30 VDC (cosϕ = 1)

Note: The ratings values apply under the following test conditions:
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 20 operations/min for the D2MC-5 and 60 operations/min for the D2MC-01.
Use the Switch in the following operation range.



■ Characteristics

Item	D2MC-5	D2MC-01
Operating speed	1° to 360°/sec	
Operating frequency	Mechanical: 240 operations/min Electrical: 20 operations/min	Mechanical: 240 operations/min Electrical: 60 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)	
Contact resistance	20 mΩ max. (initial value)	100 mΩ max. (initial value)
Dielectric strength	600 VAC, 50/60 Hz for 1 min between terminals of same polarity 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal part	
Vibration resistance (see note)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude	
Shock resistance (see note)	Destruction: 1,000 m/s^2 {100 G} max. Malfunction: D2MC-5E, -01E: 100 m/s^2 {10 G} max. D2MC-5F, -01F: 100 m/s^2 {10 G} max. D2MC-5H, -01H: 200 m/s^2 {20 G} max.	
Life expectancy	Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min.	Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min. (1,000,000 operations at 0.1 A, 125 VAC/30 VDC)
Degree of protection	IP00	
Degree of protection against electric shock	Class I	
Proof tracking index (PTI)	175	
Ambient temperature	Operating: −25°C to 80°C (with no icing)	
Ambient humidity	Operating: 35 to 85% max.	
Weight	Approx. 10 g	

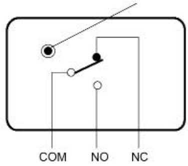
Note: Malfunction: 1 ms max.

■ Approved Standards

UL508 (File No. E41515)
CSA C22.2 No. 55 (File No. LR21642)

Rated voltage	D2MC-01	D2MC-5
125 VAC	0.5 A	5 A
250 VAC	---	5 A
30 VDC	0.5 A	---

■ Contact Form (SPDT)

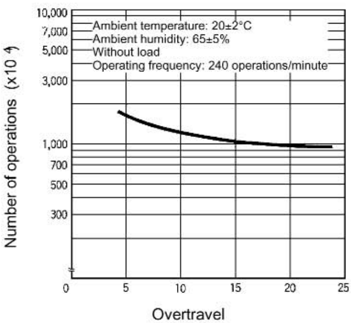


■ Contact Specifications

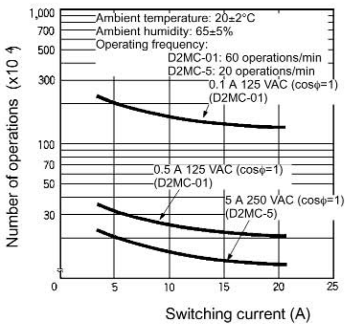
Item		D2MC-5	D2MC-01
Contact	Specification	Rivet	Crossbar
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.5 mm	
Inrush current	NC	15 A max.	0.5 A max.
	NO	7 A max.	0.5 A max.

Engineering Data

Mechanical Life Expectancy



Electrical Life Expectancy



Dimensions

Note: 1. All units are in millimeters unless otherwise indicated.

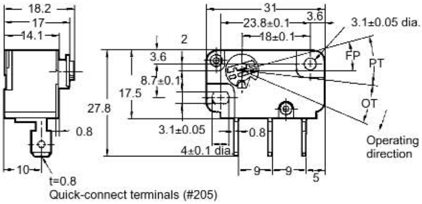
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

3. The following illustrations and operating characteristics are for the clockwise rotation direction. In case of the counterclockwise direction, only the rotation direction of the rotating axis is different, i.e., external dimensions are the same.

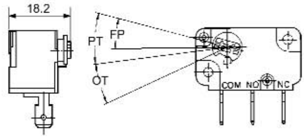
■ Dimensions and Operating Characteristics

D2MC-5E (L)
D2MC-5F (L)
D2MC-5H (L)
D2MC-01E (L)
D2MC-01F (L)
D2MC-01H (L)

Clockwise



Counterclockwise



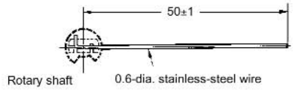
Model	D2MC-5E (01E)□	D2MC-5F (01F)□	D2MC-5H (01H)□
OF max.	0.5 mN • m {5.1 gf • cm}	0.75 mN • m {7.6 gf • cm}	1.0 mN • m {10.2 gf • cm}
RF min.	0.05 mN • m {0.6 gf • cm}	0.09 mN • m {0.9 gf • cm}	0.13 mN • m {1.3 gf • cm}
PT max.	21°		
OT min.	17°		
MD min.	3°		
RT min.	5°		
TT min.	38°		
FP	15±3°		

Note: For the counterclockwise rotation direction, designate "L" in the box (□).

Accessories (Order Separately)

■ Actuator Lever

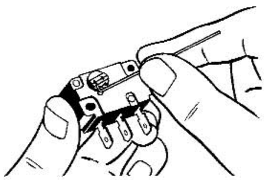
CAA1M for Snap-on Mounting



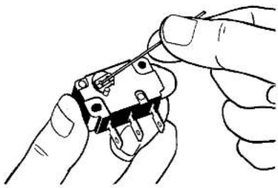
In addition to the standard wire lever model shown here, various other levers are available upon request.

Mounting Actuator Lever

1. Insert the end of the actuator lever into the hole in the rotary disc.



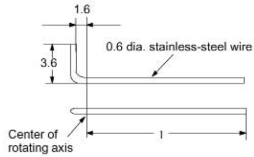
2. Push the lever down in the direction of the groove in the rotary disc.



Designing Own Actuator

If you decide to make your own actuator lever, the materials used should be stainless steel, piano wire, hard aluminum wire, etc.

There are no restrictions on the tip shape or length of the actuator lever. However, if the lever is too long, improper switch resetting or contact chattering may occur. Therefore, the shape of lever as shown below is suitable.



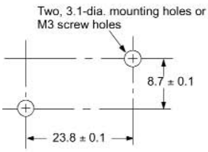
The appropriate value of dimension (l) from the fulcrum is 50 mm.

Precautions

Mounting/Soldering

Use M3 mounting screws with plane washers or spring washers to mount the switch. Tighten the screws to a torque of 0.20 to 0.29 N • m {2 to 3 kgf • cm}.

Mounting Holes



Do not change the operating position by modifying the actuator.

Microvoltage/current Load

For details, refer to *General Information.*

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

Economical, Subminiature Basic Switch Offers Long Life (30 x 106 Operations)

- ROHS Compliant.
- Incorporating simple and stable two split springs which ensures a long service life (30,000,000 operations).
- A variety of models with low operating force to high operating force are available.
- Solder, quick-connect terminals (#110) and PCB terminals are available.

Ordering Information

■ Model Number Legend

SS-□□□□□
 1 2 3 4 5

1. Ratings
01: 0.1 A
5: 5 A
10: 10 A

2. Actuator
None: Pin plunger
GL: Hinge lever
GL13: Simulated hinge lever
GL2: Hinge roller lever

3. Operating Force (at Pin Plunger)
None: 1.47 N {150 gf}
-F: 0.49 N {50 gf}
-E: 0.25 N {25 gf}
Note: These values are for the pin plunger model.

4. Contact Form
None: SPDT
-2: SPST-NC
-3: SPST-NO

5. Terminals
None: Solder
T: Quick-connect terminals (#110)
D: PCB
Note: The PCB terminal has a right-angle terminal option.
D1: Upward direction
D2: Downward direction
These are UL, CSA, and VDE approved.

Note: When suffix "-T" is placed after the model number, the model withstands high temperatures (–25°C to 125°C) and is UL and CSA approved.

■ List of Models

Rating	Actuator	OF max.	Soldering terminal	Quick-connect terminal (#110)	PCB terminal
0.1 A	Pin plunger	0.25 N {25 gf}	SS-01-E	SS-01-ET	SS-01-ED
		0.49 N {50 gf}	SS-01-F	SS-01-FT	SS-01-FD
		1.47 N {150 gf}	SS-01	SS-01T	SS-01D
	Hinge lever	0.08 N {8 gf}	SS-01GL-E	SS-01GL-ET	SS-01GL-ED
		0.16 N {16 gf}	SS-01GL-F	SS-01GL-FT	SS-01GL-FD
		0.49 N {50 gf}	SS-01GL	SS-01GLT	SS-01GLD
	Simulated hinge lever	0.08 N {8 gf}	SS-01GL13-E	SS-01GL13-ET	SS-01GL13-ED
		0.16 N {16 gf}	SS-01GL13-F	SS-01GL13-FT	SS-01GL13-FD
		0.49 N {50 gf}	SS-01GL13	SS-01GL13T	SS-01GL13D
	Hinge roller lever	0.08 N {8 gf}	SS-01GL2-E	SS-01GL2-ET	SS-01GL2-ED
		0.16 N {16 gf}	SS-01GL2-F	SS-01GL2-FT	SS-01GL2-FD
		0.49 N {50 gf}	SS-01GL2	SS-01GL2T	SS-01GL2D
5 A (see note 1)	Pin plunger	0.49 N {50 gf}	SS-5-F	SS-5-FT	SS-5-FD
		1.47 N {150 gf}	SS-5	SS-5T	SS-5D
	Hinge lever	0.16 N {16 gf}	SS-5GL-F	SS-5GL-FT	SS-5GL-FD
		0.49 N {50 gf}	SS-5GL	SS-5GLT	SS-5GLD
	Simulated hinge lever	0.16 N {16 gf}	SS-5GL13-F	SS-5GL13-FT	SS-5GL13-FD
		0.49 N {50 gf}	SS-5GL13	SS-5GL13T	SS-5GL13D
	Hinge roller lever	0.16 N {16 gf}	SS-5GL2-F	SS-5GL2-FT	SS-5GL2-FD
		0.49 N {50 gf}	SS-5GL2	SS-5GL2T	SS-5GL2D
10.1 A (see note 1)	Pin plunger	1.47 N {150 gf}	SS-10	SS-10T	SS-10D
	Hinge lever	0.49 N {50 gf}	SS-10GL	SS-10GLT	SS-10GLD
	Simulated hinge lever	0.49 N {50 gf}	SS-10GL13	SS-10GL13T	SS-10GL13D
	Hinge roller lever	0.49 N {50 gf}	SS-10GL2	SS-10GL2T	SS-10GL2D

Note: 1. EN61058-1 (IEC601058-1) approved by TÜV Rheinland.

2. SPST models are also available, but not listed in the above table.

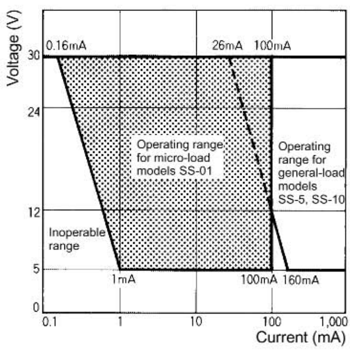
Specifications

■ Ratings

Type	Rated voltage	SS-10, SS-5								SS-01	
		Non-inductive load				Inductive load				Non-inductive load	
		Resistive load		Lamp load		Inductive load		Motor load		Resistive load	
		NC	NO	NC	NO	NC	NO	NC	NO	NC	NO
General-purpose	125 VAC	5 (10.1) A (see note 1)		1.5 A	0.7 A	3 A		2.5 A	1.3 A	0.1 A	
	250 VAC	3 (10.1) A (see note 1)		1 A	0.5 A	2 A		1.5 A	0.8 A	---	
	8 VDC	5 (10.1) A (see note 1)		2 A		5 A	4 A	3 A		0.1 A	
	14 VDC	5 (10.1) A (see note 1)		2 A		4 A	4 A	3 A		0.1 A	
	30 VDC	4 A		2 A		3 A	3 A	3 A		0.1 A	
	125 VDC	0.4 A		0.05 A		0.4 A	0.4 A	0.05 A		---	
	250 VDC	0.2 A		0.03 A		0.2 A	0.2 A	0.03 A		---	

Note:
1. Data in parentheses apply to the SS-10 models only.
2. The above values are for the steady-state current.
3. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
4. Lamp load has an inrush current of 10 times the steady-state current.
5. Motor load has an inrush current of 6 times the steady-state current.
6. If the Switch is used in a DC circuit and is subjected to a surge, connect a surge suppressor across the Switch.
7. The ratings values apply under the following test conditions:
   Ambient temperature: 20±2°C
   Ambient humidity: 65±5%
   Operating frequency: 30 operations/min

Use the Switch within the following operating range.



Item	SS-01	SS-5 SS-10
Minimum applicable load	1 mA at 5 VDC	160 mA at 5 VDC

Non-Sealed Microswitches

■ Characteristics

Operating speed	0.1 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 400 operations/min Electrical: 60 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	OF 1.47 N {150 gf}: SS-01 models: 50 mΩ max. SS-5, SS-10 models: 30 mΩ max. OF 0.49 N {50 gf}: SS-01 models: 100 mΩ max. SS-5 models: 50 mΩ max. OF 0.25 N {25 gf}: SS-01 models: 150 mΩ max.
Dielectric strength	1,000 VAC (600 VAC for SS-01 models), 50/60 Hz for 1 min between terminals of the same polarities 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal part and ground, and between each terminal and non-current-carrying metal part (see note 1)
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction: OF 1.47 N {150 gf}: 1,000 m/s^2 {approx. 100G} max. OF 0.25 N {25gf}/0.49 N {50 gf}: 500 m/s^2 {approx. 50G} max. Malfunction: OF 1.47 N {150 gf}: 300 m/s^2 {approx. 30G} max. OF 0.25 N {25 gf}/0.49 N {50 gf}: 200 m/s^2 {approx. 20G} max. **Note:** Lever-type model: Total travel position (with a contact separation time of 1 ms max.)
Life expectancy	Mechanical: 30,000,000 operations min. (Refer to the following *Engineering Data*.) 10,000,000 operations min. for SS-10 models Electrical: 200,000 operations min. (Refer to the following *Engineering Data*.) 50,000 operations min. for SS-10 models
Degree of protection	IP00
Degree of protection against electrical shock	Class 1
Proof Tracking Index (PTI)	175
Switch category	D (IEC 335-1)
Ambient temperature	Operating: –25°C to 85°C (at ambient humidity of 60% max.) (with no icing)
Ambient humidity	Operating: 85% max. (for 5°C to 35°C)
Weight	Approx. 1.6 g (pin plunger models)

Note: 1. The dielectric strength shown in the table indicates a value for models with a Separator.

2. For the pin plunger models, the above values apply for use at both the free position and total travel position. For the lever models, they apply at the total travel position.

■ Approved Standards

UL1054 (File No. E41515)
CSA C22.2 No. 55 (File No. LR21642)

Rated voltage	SS-10	SS-5	SS-01
125 VAC	---	5 A	0.1 A
250 VAC	10.1 A	3 A	---
30 VDC	---	---	0.1 A
120 VAC (TV)	---	2 A	---

VDE0630 (File No. 6131ÜG)
SEMKO (File No. 9812216/01), (File No. 8916091)

Rated voltage	SS-10	SS-5
250 VAC	10 A	5 A

SEV (File No. 93. 5. 51936. 01)

Rated voltage	SS-5
250 VAC	5 A

EN61058-1 (IEC601058-1)
(TÜV Rheinland, File No. J9451450)

Rated voltage	SS-10	SS-5	SS-01
250 VAC	10 A	5 A 5 (1) A motor 3 A (see note 2)	---
125 VAC	---	---	0.1 A (see note 2)
30 VDC	---	5 A (see note 2)	0.1 A (see note 2)

Note: 1. Testing conditions: 50,000 operations, T85 (0°C to 85°C)

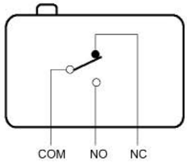
2. These approvals are only limited to OF 1.47 N {150 gf} models.

■ Contact Specifications

Item		SS-10	SS-5	SS-01
Contact	Specification	Rivet		Crossbar
	Material	Silver alloy	Silver	Gold alloy
	Gap (standard value)	0.5 mm		0.25 mm
Inrush current	NC	20 A max.		1 A max.
	NO	15 A max.	10 A max.	1 A max.

■ Contact Form (SPDT)

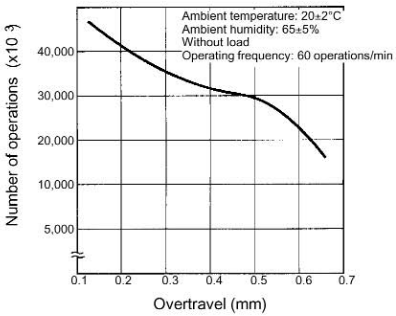
SPDT



Engineering Data

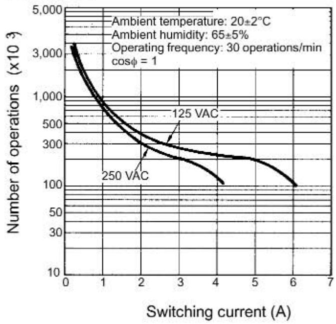
Mechanical Life Expectancy (Pin Plunger Model)

SS-5, SS-1, SS-01 Models



Electrical Life Expectancy (Pin Plunger Model)

SS-5 Models

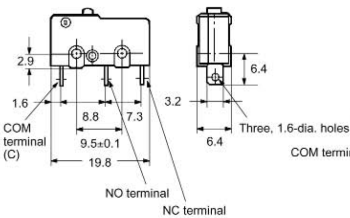


Dimensions

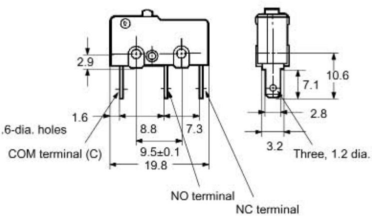
■ Terminals

Terminal plate thickness is 0.5 mm.

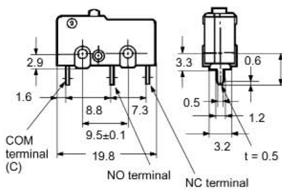
Solder Terminal



Quick-connect Terminal (#110)



PCB Terminal



Non-Sealed Microswitches

■ Dimensions and Operating Characteristics

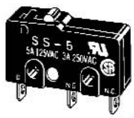
Note: 1. All units are in millimeters unless otherwise indicated.

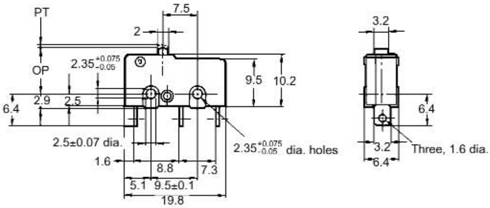
2. The following illustration and drawing are for solder terminal models. Refer to page 117 for details on models with quick-connect terminals (#110) or PCB terminals.

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

Pin Plunger

SS-01(-E, -F)
SS-5(-F)
SS-10

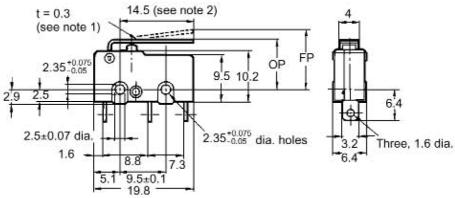




Model	SS-01-E	SS-01-F SS-5-F	SS-01 SS-5	SS-10
OF max.	0.25 N {25 gf}	0.49 N {50 gf}	1.47 N {150 gf}	1.47 N {150 gf}
RF min.	0.02 N {2 gf}	0.04 N {4 gf}	0.25 N {25 gf}	0.25 N {25 gf}
PT max.	0.5 mm	0.5 mm	0.5 mm	0.6 mm
OT min.	0.5 mm	0.5 mm	0.5 mm	0.4 mm
MD max.	0.1 mm	0.1 mm	0.1 mm	0.12 mm
OP	8.4±0.5 mm			

Hinge Lever

SS-01GL(-E, -F)
SS-5GL(-F)
SS-10GL



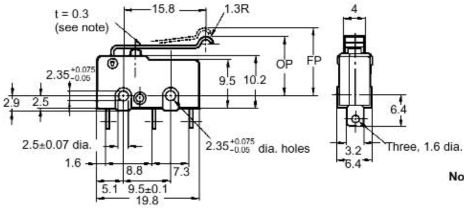
Note: 1. Stainless-steel lever

2. Besides the SS-□GL models with a hinge lever length of 14.5, the SS-□GL11 models with a hinge lever length of 18.5, the SS-□GL111 models with a hinge lever length of 22.6, and the SS-□GL1111 models with a hinge lever length of 37.8 are available. Contact your OMRON representative for these models

Model	SS-01GL-E	SS-01GL-F SS-5GL-F	SS-01GL SS-5GL	SS-10GL
OF max.	0.08 N {8 gf}	0.16 N {16 gf}	0.49 N {50 gf}	0.49 N {50 gf}
RF min.	0.01 N {1 gf}	0.02 N {2 gf}	0.06 N {6 gf}	0.06 N {6 gf}
OT min.	1.2 mm	1.2 mm	1.2 mm	1.0 mm
MD max.	0.8 mm	0.8 mm	0.8 mm	1.0 mm
FP max.	13.6 mm			
OP	8.8±0.8 mm			

Simulated Hinge Lever

SS-01GL13(-E, -F)
SS-5GL13(-F)
SS-10GL13

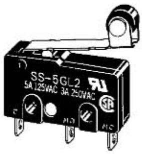


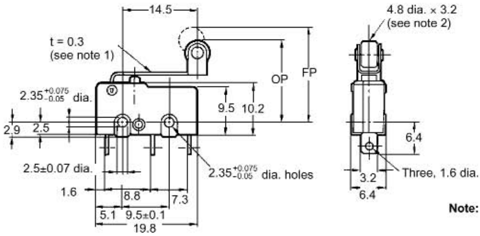
Note: Stainless-steel spring lever

Model	SS-01GL13-E	SS-01GL13-F SS-5GL13-F	SS-01GL13 SS-5GL13	SS-10GL13
OF max.	0.08 N {8 gf}	0.16 N {16 gf}	0.49 N {50 gf}	0.49 N {50 gf}
RF min.	0.01 N {1 gf}	0.02 N {2 gf}	0.06 N {6 gf}	0.06 N {6 gf}
OT min.	1.2 mm	1.2 mm	1.2 mm	1.0 mm
MD max.	0.8 mm	0.8 mm	0.8 mm	1.0 mm
FP max.	15.5 mm			
OP	10.7±0.8 mm			

Hinge Roller Lever

SS-01GL2(-E, -F)
SS-5GL2(-F)
SS-10GL2





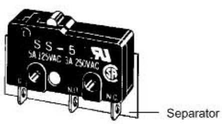
Note:
1. Stainless-steel spring lever
2. Polyacetal resin roller

Model	SS-01GL2-E	SS-01GL2-F SS-5GL2-F	SS-01GL2 SS-5GL2	SS-10GL2
OF max.	0.08 N {8 gf}	0.16 N {16 gf}	0.49 N {50 gf}	0.49 N {50 gf}
RF min.	0.01 N {1 gf}	0.02 N {2 gf}	0.06 N {6 gf}	0.06 N {6 gf}
OT min.	1.2 mm	1.2 mm	1.2 mm	1.0 mm
MD max.	0.8 mm	0.8 mm	0.8 mm	1.0 mm
FP max.	19.3 mm			
OP	14.5±0.8 mm			

■ Separators (Insulation Sheet)

Applicable Switch	Thickness (mm)	Model (see note)
SS, D2S, D2SW	0.18	Separator for SS0.18
	0.4	Separator for SS0.4

Separator for SS□

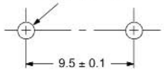


Precautions

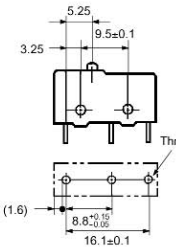
■ Mounting

Use two M2.3 mounting screws with spring washers to mount the Switch. Tighten the screws to a torque of 0.23 to 0.26 N • m {2.3 to 2.6 kgf • cm}.

Mounting Holes



PCB Mounting Dimensions (Reference)



Terminal Connection

When soldering the lead wire to the terminal, first insert the lead wire conductor through the terminal hole and then conduct soldering.

To solder the lead to the terminal, apply a soldering iron rated at 60 W max. (temperature of soldering iron: 250°C to 300°C) within 5 seconds. During soldering and one minute after soldering, do not apply any external force to the soldered terminal.

Feed solder away from the switch case so that solder or flux will not flow into the case side.

If the PCB terminal models are soldered in the solder bath, flux will permeate inside the Switch and cause contact failure. Therefore, manually solder the PCB terminal.

Specifications Approved by TÜV Rheinland According to EN61058-1

Model	Conductor size
SS-5	0.5 to 0.75 mm^2
SS-10	0.75 mm^2

Solder Terminal Approved Conditions

Soldering iron can be used. Soldering hook hole available.
Soldering terminal types 1 and 2 are met.

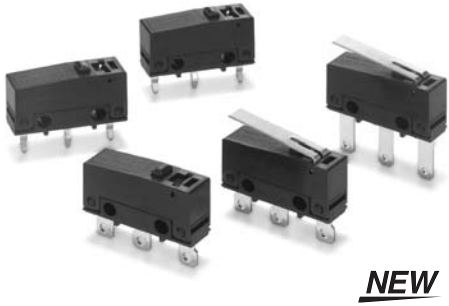
Spacing

The minimum thickness of insulation according to IEC61058-1 is 1.1 mm, and the minimum clearance between live terminals and mounting plate is 1.6 mm. If the proper insulation for the terminator cannot be obtained, add insulation such as a Separator or insulation guard on the switch.

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

SS series Compatible Mounting with a Simple Construction and Easy-to-use Design Concept

- ROHS compliant.
- Insert molded case provides enhanced resistance to flux.
- Switch rating of 3 A at 125 V AC with a single-leaf movable spring. Models for micro loads are also available.
- Solder, quick-connect terminals (#110), and PCB terminals are available, including even-pitched PCB terminals.



Ordering Information

Model Number Legend

SS-□□□P□
1 2 3 4

1. Ratings

3: 3 A at 125 VAC
01: 0.1 A at 30 VAC

2. Contact Gap

G: 0.5 mm

3. Actuator

None: Pin plunger
L: Hinge lever
L13: Simulated roller lever

4. Terminals

None: Solder terminals
T: Quick-connect terminals (#110)
D: PCB terminals (Uneven pitch)
B: PCB terminals (Even pitch)

■ List of Models

Rating	Actuator	Terminals	Solder terminals	Quick-connect terminals (#110)	PCB terminals	
					Uneven pitch	Even pitch
3 A	Pin plunger		SS-3GP	SS-3GPT	SS-3GPD	SS-3GPB
	Hinge lever		SS-3GLP	SS-3GLPT	SS-3GLPD	SS-3GLPB
	Simulated roller lever		SS-3GL13P	SS-3GL13PT	SS-3GL13PD	SS-3GL13PB
0.1 A	Pin plunger		SS-01GP	SS-01GPT	SS-01GPD	SS-01GPB
	Hinge lever		SS-01GLP	SS-01GLPT	SS-01GLPD	SS-01GLPB
	Simulated roller lever		SS-01GL13P	SS-01GL13PT	SS-01GL13PD	SS-01GL13PB

Specifications

■ Ratings

Rated voltage / Model / Item	SS-3P	SS-01P
	Resistive load	
125 VAC	3 A	0.1 A
30 VDC	3 A	0.1 A

Note: 1. The ratings values apply under the following test conditions.
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 30 operations/min

2. Contact your OMRON representative for information on models for other loads.

■ Characteristics

Operating speed	0.1 mm to 1 m/s (for pin plunger models)
Operating frequency	Mechanical: 300 operations/min Electrical: 30 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	SS-3P: 50 mΩ max. SS-01P: 100 mΩ max.
Dielectric strength (See note 2)	1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarities 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts
Vibration resistance (See note 3)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (See note 3)	Destruction: 1,000 m/s^2 {approx. 100 G} max. Malfunction: 300 m/s^2 {approx. 30 G} max.
Durability (See note 4)	Mechanical: 1,000,000 operations min. (60 operations/min) Electrical: SS-3P: 70,000 operations min. (20 operations/min, 125 VAC) 100,000 operations min. (20 operations/min, 30 VDC) SS-01P: 200,000 operations min. (20 operations/min)
Degree of protection	IEC IP40
Degree of protection against electrical shock	Class I
Proof Tracking Index (PTI)	175
Ambient operating temperature	–25°C to 85°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight	Approx. 1.6 g (for pin plunger models)

Note: 1. The data given above are initial values.

2. The dielectric strength shown in the table indicates a value for models with a Separator.
3. For the pin plunger models, the above values apply for both the free position and total travel position. For the lever models, the values apply at the total travel position. Contact opening or closing time is within 1 ms.
4. Contact your OMRON sales representative for testing conditions.

■ Approved Standards

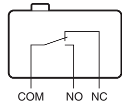
- UL, CSA, and EN approval projected for September 2003.

■ Contact Specifications

Item	Model	SS-3P	SS-01P
Contact	Specification	Rivet	Crossbar
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.5 mm	
Minimum applicable load (See note)		160 mA at 5 VDC	1 mA at 5 VDC

■ Contact Form

SPDT

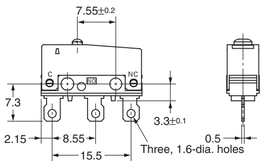


Dimensions

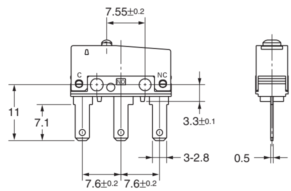
■ Terminals

Note: All units are in millimeters unless otherwise indicated. (Terminal plate thickness is 0.5 mm for all models.)

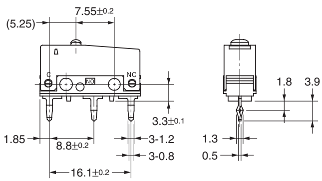
Solder Terminals



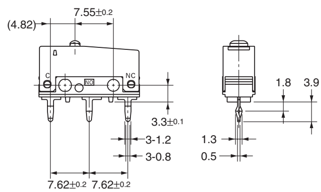
Quick-connect Terminals (#110)



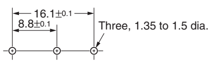
PCB Terminals (Uneven pitch)



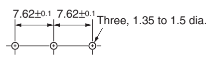
PCB Terminals (Even pitch)



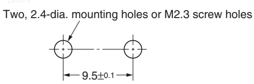
PCB Mounting Dimensions (Reference)



PCB Mounting Dimensions (Reference)



■ Mounting Holes

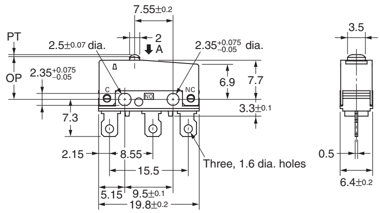


■ Dimensions and Operating Characteristics

Note:
1. All units are in millimeters unless otherwise indicated.
2. The following illustrations and drawings are for solder terminal models. terminals (#110) or PCB terminals.
3. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
4. The operating characteristics are for operation in the A direction (⬇).

Pin Plunger Models

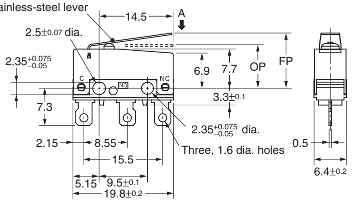
SS-3GP
SS-01GP



Model	SS-3GP	SS-01GP
OF max. RF min.	1.50 N 0.2 N	
PT max. OT min. MD max.	0.6 mm 0.4 mm 0.15 mm	
OP	8.4±0.3 mm	

Hinge Lever Models

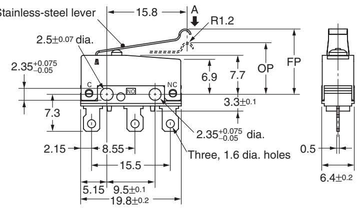
SS-3GLP
SS-01GLP



Model	SS-3GLP	SS-01GLP
OF max. RF min.	0.5 N 0.05 N	
OT min. MD max.	1.0 mm 0.8 mm	
FP max. OP	13.6 mm 8.8±0.8 mm	

Simulated Roller Lever Models

SS-3GL13P
SS-01GL13P



Model	SS-3GL13P	SS-01GL13P
OF max. RF min.	0.5 N 0.05 N	
OT min. MD max.	1.0 mm 0.8 mm	
FP max. OP	15.5 mm 10.7±0.8 mm	

Precautions

■ Cautions

Connecting to Solder Terminals

When soldering the lead wire to the terminal, first insert the lead wire conductor through the terminal hole and then conduct soldering.

Make sure that the temperature at the tip of the soldering iron is 350 to 400°C. Do not take more than 3 seconds to solder the switch terminal, and do not impose external force on the terminal for 1 min after soldering. Improper soldering involving an excessively high temperature or excessive soldering time may deteriorate the characteristics of the Switch.

Connecting to Quick-connect Terminals

Wire the quick-connect terminals (#110) with receptacles. Insert the terminals straight into the receptacles. Do not impose excessive force on the terminal in the horizontal direction, otherwise the terminal may be deformed or the housing may be damaged.

Connecting to PCB Terminal Boards

When using automatic soldering baths, we recommend soldering at 260±5°C within 5 seconds. Make sure that the liquid surface of the solder does not flow over the edge of the board.

When soldering by hand, as a guideline, solder with a soldering iron with a tip temperature of 350 to 400°C within 3 seconds, and do not apply any external force for at least 1 minutes after soldering. When applying solder, keep the solder away from the case of the Switch and do not allow solder or flux to enter the case.

■ Correct Use

Mounting

Turn OFF the power supply before mounting or removing the Switch, wiring, or performing maintenance or inspection. Failure to do so may result in electric shock or burning.

Use M2.3 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.23 to 0.26 N·m {2.3 to 2.7 kgf·cm}.

Mount the Switch onto a flat surface. Mounting on an uneven surface may cause deformation of the Switch, resulting in faulty operation or breakage in the housing.

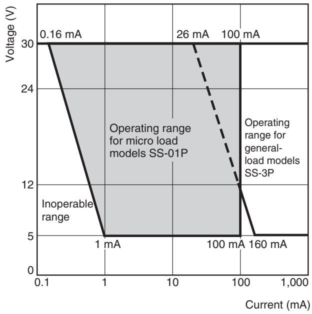
Operating Stroke Setting

Take particular care in setting the operating stroke for the pin plunger models. Make sure that the operating stroke is 60% to 90% of the rated OT distance. Do not operate the actuator exceeding the OT distance, otherwise the life expectancy of the Switch may be shortened.

Using Micro Loads

Using a model for ordinary loads to open or close the contact of a micro load circuit may result in faulty contact. Use models that operate in the following range. However, even when using micro load models within the operating range shown below, if inrush current occurs when the contact is opened or closed, it may increase contact wear and so decrease life expectancy. Therefore, insert a contact protection circuit where necessary.

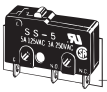
The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ_{60}). The equation, $\lambda_{60} = 0.5 \times 10^{-6}$/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.



■ Separators

Thickness	Model
0.18 mm	Separator for SS0.18
0.4 mm	Separator for SS0.4

Separator for SS□



Note: The material is EAVTC (Epoxide Alkyd Varnished Tetron Cloth) and its heat-resisting temperature is 130°C.

■ Connectors

Use the following quick-connect connector made by Nippon Tanshi or Tyco Electronics. This connector is not sold by OMRON. Contact the following Nippon Tanshi or Tyco Electronics office to purchase this connector.

Nippon Tanshi Co., Ltd.	Japan	Tel: (81)463-30-1150
	Hong Kong	Tel: (852)2191-2727
Tyco Electrocics AMP K.K.	Japan	Tel: (81)44-844-8111
	U.S.A.	Tel (1)800-522-6752

This connector is for use with the SS-P and the terminal direction is 90° different from the SS Series.

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

Global Subminiature Basic Switch Conforming to EN61058-1, UL1054, and CSA C22.2 No.55

- ROHS Compliant.
- A wide operating temperature range of -25°C to 125°C is available for high temperature use.
- Flexible change lever using the external snap-fit lever.
- PCB terminal models are resistant to flux.

Ordering Information

■ Model Number Legend

SSG-□□□□□
1 2 3 4 5

1. Ratings
01: 0.1 A
5: 5 A

2. Actuator
None: Pin plunger
L1: Hinge lever
L3: Simulated hinge lever
L2: Hinge roller lever

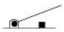
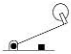
3. Contact Form
None: SPDT
-2: SPST-NC
-3: SPST-NO

4. Terminals
H: Solder
T: Quick-connect terminals (#110)
P: PCB

5. Operating Force max.
None: 1.5 N {153 gf}
-5: 0.5 N {51 gf}

Note: These values are for the pin plunger model.

■ List of Models

Actuator		Rating	OF max.	Solder	Quick-connect terminal (#110)	PCB
Pin plunger		0.1 A	1.50 N {153 gf}	SSG-01H	SSG-01T	SSG-01P
			0.50 N {51 gf}	SSG-01H-5	SSG-01T-5	SSG-01P-5
		5 A	1.50 N {153 gf}	SSG-5H	SSG-5T	SSG-5P
			0.50 N {51 gf}	SSG-5H-5	SSG-5T-5	SSG-5P-5
Hinge lever		0.1 A	0.60 N {61 gf}	SSG-01L1H	SSG-01L1T	SSG-01L1P
			0.20 N {20 gf}	SSG-01L1H-5	SSG-01L1T-5	SSG-01L1P-5
		5 A	0.60 N {61 gf}	SSG-5L1H	SSG-5L1T	SSG-5L1P
			0.20 N {20 gf}	SSG-5L1H-5	SSG-5L1T-5	SSG-5L1P-5
Simulated hinge lever		0.1 A	0.60 N {61 gf}	SSG-01L3H	SSG-01L3T	SSG-01L3P
			0.20 N {20 gf}	SSG-01L3H-5	SSG-01L3T-5	SSG-01L3P-5
		5 A	0.60 N {61 gf}	SSG-5L3H	SSG-5L3T	SSG-5L3P
			0.20 N {20 gf}	SSG-5L3H-5	SSG-5L3T-5	SSG-5L3P-5
Hinge roller lever		0.1 A	0.60 N {61 gf}	SSG-01L2H	SSG-01L2T	SSG-01L2P
			0.20 N {20 gf}	SSG-01L2H-5	SSG-01L2T-5	SSG-01L2P-5
		5 A	0.60 N {61 gf}	SSG-5L2H	SSG-5L2T	SSG-5L2P
			0.20 N {20 gf}	SSG-5L2H-5	SSG-5L2T-5	SSG-5L2P-5

Note: SPST models are also available, but not listed in the above table.

Specifications

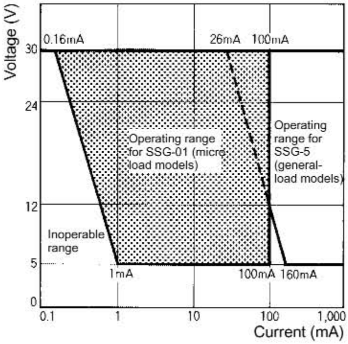
■ Ratings

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	5 (0.1) A (see note 1)		1.5 A	0.7 A	3 A		2.5 A	1.3 A
250 VAC	3 A		1 A	0.5 A	2 A		1.5 A	0.8 A
8 VDC	5 A		2 A		5 A		3 A	
14 VDC	5 A		2 A		4 A		3 A	
30 VDC	4 (0.1) A (see note 1)		2 A		3 A		3 A	
125 VDC	0.4 A		0.05 A		0.4 A		0.05 A	
250 VDC	0.2 A		0.03 A		0.2 A		0.05 A	

Note:
1. The values in the parentheses are for the SSG-01.
2. The above current ratings are the values of the steady-state current.
3. Inductive load has a power factor of 0.7 min. (AC) and a time constant of 7 ms max. (DC).
4. Lamp load has an inrush current of 10 times the steady-state current.
5. Motor load has an inrush current of 6 times the steady-state current.
6. If the Switch is used in a DC circuit and is subjected to a surge current, connect a surge suppressor across the switch.

Use the Switch in the following operation range.



Model	SSG-01	SSG-5
Minimum applicable load	1 mA at 5 VDC	160 mA at 5 VDC

■ Characteristics

Operating speed	0.1 mm to 1 m/s (at pin plunger models)
Operating frequency	Mechanical: 400 operations/min Electrical: 60 operations/min
Insulation resistance	100 MΩ min.
Contact resistance	OF 1.50 N: SSG-5 models: 30 mΩ max. SSG-01 models: 50 mΩ max. OF 0.50 N SSG-5 models: 50 mΩ max. SSG-01 models: 100 mΩ max.
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between contacts of the same polarity (600 VAC for SSG-01H and SSG-01T models) 1,500 VAC, 50/60 Hz for 1 min between each terminal and ground 1,500 VAC, 50/60 Hz for 1 min between each terminal and non-current-carrying metal part
Vibration resistance	Malfunction: 10 to 2,000 Hz, 196 m/s^2 {20G} (Contact open: 10 µs max., lever position: at TTP)
Shock resistance	Malfunction: 490 m/s^2 {approx. 50G} (Contact open: 10 µs max., lever position: at TTP)
Life expectancy	Mechanical: 10,000,000 operations min. (OT: rated value) Electrical: 200,000 operations min. (5 A at 125 VAC for SSG-5, 0.1 A at 125 VAC for SSG-01, resistive OT: full)
Degree of protection (IP code)	IP00
Degree of protection against electrical shock	Class I
Ambient temperature	Operating: −25°C to 125°C (with no icing)
Ambient humidity	Operating: 85% max. (5°C to 30°C)
Proof tracking index	175
Switch category (IEC335-1)	D
Weight	Approx. 1.6 g (pin plunger models)

■ Approved Standards

Standard	EN61058-1/IEC601058-1
Approval body	TÜV Rheinland (File No. T9451449) BEAB (File No. C0746) IMQ (File No. EL662) VDE (File No. 100873, EN61058-1 1992+AI: 1993
Rating	SSG-5 models: 5 A at 250 VAC (T125, 50,000 operations) SSG-01 models: 0.1 A at 30 VDC (T125, 50,000 operations)

UL1054 (File No. E41515), CSA C22.2 No. 55 (File No. LR21642) Approved Ratings

SSG-5 Models: 5 A at 125 VAC, 3 A at 250 VAC
3A at 250 VAC, 3A at 30 VDC (100,000 operations)
SSG-01 Models: 0.1 A at 125 VAC, 0.1 A at 30 VDC

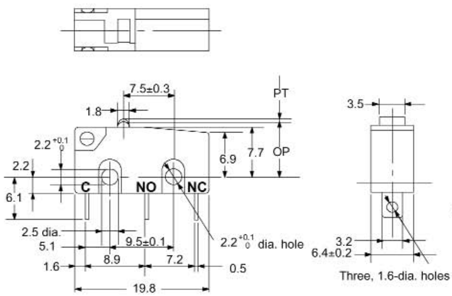
■ Contact

Item		SSG-5	SSG-01H.T	SSG-01P
Contact	Specification	Rivet	Crossbar	Crossbar
	Material	Silver	Gold alloy	Gold alloy
	Gap (standard value)	0.5 mm	0.25 mm	0.5 mm
Inrush current	NC	20 A max.	1 A max.	1 A max.
	NO	10 A max.	1 A max.	1 A max.

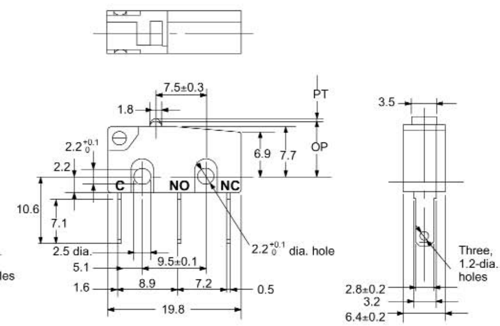
Dimensions

■ Terminals

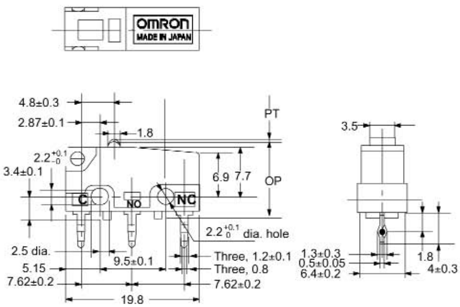
Solder Terminals



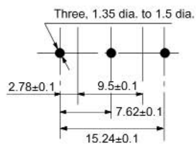
Quick-connect Terminals (#110)



PCB Terminals



PCB Mounting



■ Dimensions and Operating Characteristics

Note: 1. All units are in millimeters unless otherwise indicated.

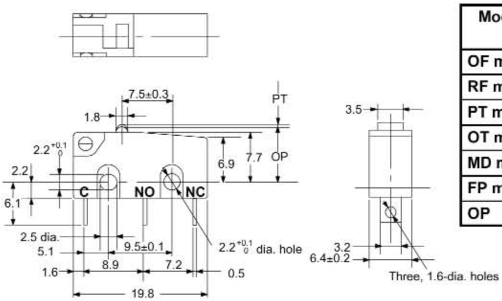
2. Every actual model number includes the code instead of □ for the kind of terminals incorporated by the model.

3. Unless otherwise specified, a tolerance of ±0.25 mm applies to all dimensions.

Solder/Quick-connect Terminal

Pin Plunger

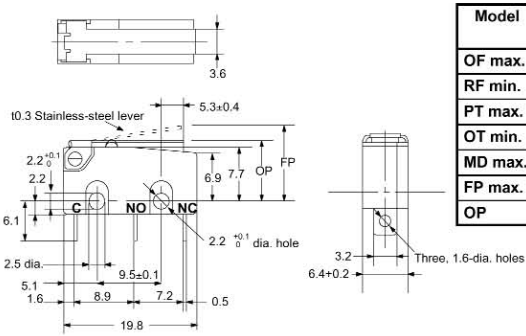
SSG-01□
SSG-5□
SSG-01□-5
SSG-5□-5



Model	SSG-01□ SSG-5□	SSG-01□-5 SSG-5□-5
OF max.	1.50 N {153 gf}	0.50 N {51 gf}
RF min.	0.25 N {25 gf}	0.04 N {4 gf}
PT max.	0.6 mm	
OT min.	0.4 mm	
MD max.	0.1 mm	
FP max.	---	
OP	8.4±0.3 mm	

Hinge Lever

SSG-01L1□
SSG-5L1□
SSG-01L1□-5
SSG-5L1□-5

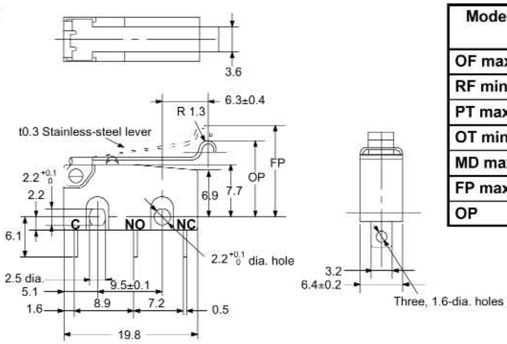


Model	SSG-01L1□ SSG-5L1□	SSG-01L1□-5 SSG-5L1□-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	1.0 mm	
OT min.	0.8 mm	
MD max.	---	
FP max.	13.6 mm	
OP	$8.8^{+1.0}/_{-0.6}$ mm	

Note: Also available are models with a hinge lever length of 39 mm under the following model numbers; SSG-01L14□, SSG-5L14□, SSG-01L14□-5, and SSG-5L14□-5. Contact your OMRON representative for these models.

Simulated Hinge Lever

SSG-01L3□
SSG-5L3□
SSG-01L3□-5
SSG-51L3□-5

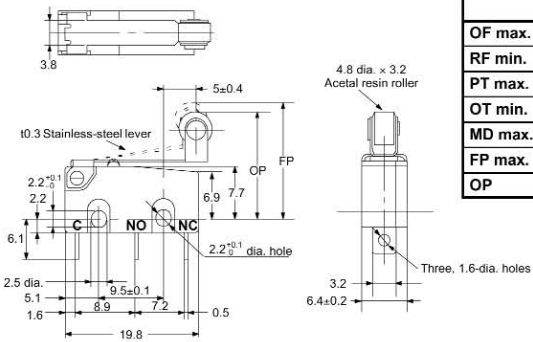


Model	SSG-01L3□ SSG-5L3□	SSG-01L3□-5 SSG-5L3□-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	1.0 mm	
OT min.	0.8 mm	
MD max.	---	
FP max.	15.5 mm	
OP	$10.7^{+1.0}/_{-0.6}$ mm	

Non-Sealed Microswitches

Hinge Roller Lever

SSG-01L2□
SSG-5L2□
SSG-01L2□-5
SSG-5L2□-5

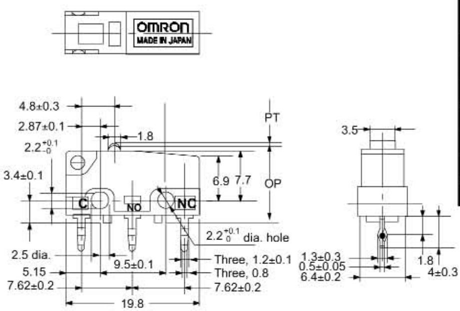


Model	SSG-01L2□ SSG-5L2□	SSG-01L2□-5 SSG-5L2□-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	1.0 mm	
OT min.	0.8 mm	
MD max.	---	
FP max.	19.0 mm	
OP	$14.5^{+1.0}/_{-0.6}$ mm	

PCB Terminals

Pin Plunger

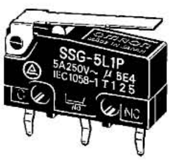
SSG-01P
SSG-5P
SSG-01P-5
SSG-5P-5

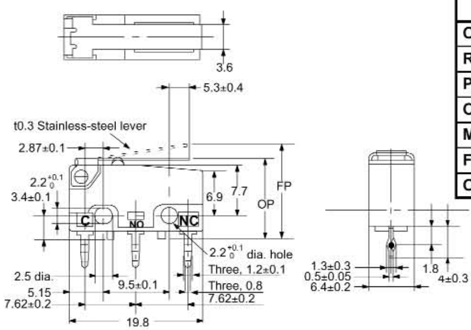


Model	SSG-01P SSG-5P	SSG-01P-5 SSG-5P-5
OF max.	1.50 N {153 gf}	0.50 N {51 gf}
RF min.	0.25 N {25 gf}	0.04 N {4 gf}
PT max.	0.6 mm	
OT min.	0.4 mm	
MD max.	0.1 mm	
FP max.	---	
OP	11.8±0.4 mm	

Hinge Lever

SSG-01L1P
SSG-5L1P
SSG-01L1P-5
SSG-5L1P-5



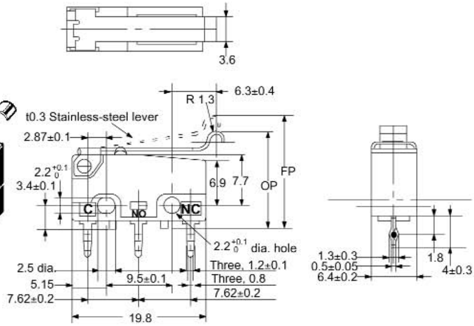


Model	SSG-01L1P SSG-5L1P	SSG-01L1P-5 SSG-5L1P-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	---	
OT min.	1.0 mm	
MD max.	0.8 mm	
FP max.	17.0 mm	
OP	$12.2^{+1.1}/_{-0.7}$ mm	

Note: Also available are models with a hinge lever length of 39 mm under the following model numbers; SSG-01L14P, SSG-5L14P, SSG-01L14P-5, and SSG-5L14P-5. Contact your OMRON representative for these models.

Simulated Hinge Lever

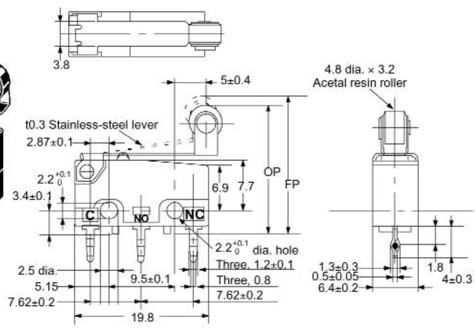
SSG-01L3P
SSG-5L3P
SSG-01L3P-5
SSG-51L3P-5



Model	SSG-01L3P SSG-5L3P	SSG-01L3P-5 SSG-5L3P-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	---	
OT min.	1.0 mm	
MD max.	0.8 mm	
FP max.	18.9 mm	
OP	$14.4^{+1.1}/_{-0.7}$ mm	

Hinge Roller Lever

SSG-01L2P
SSG-5L2P
SSG-01L2P-5
SSG-5L2P-5



Model	SSG-01L2P SSG-5L2P	SSG-01L2P-5 SSG-5L2P-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	---	
OT min.	1.0 mm	
MD max.	0.8 mm	
FP max.	22.4 mm	
OP	$17.9^{+1.1}/_{-0.7}$ mm	

Precautions

■ Terminal Connections

When soldering a lead wire to a switch terminal, insert the wire conductor into the hole of the switch terminal and take the following steps promptly.

- Make sure that the capacity of the soldering iron is 60 W maximum. Do not take more than 5 s to solder the switch terminal. Improper soldering involving an excessively high temperature or excessive soldering time may deteriorate the characteristics of the Switch.
- Be sure to apply only the minimum required amount of flux. The SSG may have contact failures if flux intrudes into the interior of the SSG.
- Use the following lead wires to connect to the solder terminals.

Type	Conductor size
SSG-01	AWG 22 to 20
SSG-5	AWG 20 to 18

- Soldering Categories (Refer to the conditions of EN61058-1.)

Type	Classified by EN61058-1
Solder terminal	Soldering iron used With soldering hole Solder terminal type 1.2
PCB terminal	Soldering bath used Solder terminal type 1.2

To automatically solder the Switch to a PCB in a soldering bath, complete soldering within 5 seconds at a flux temperature of 250°C and avoid the overflow of flux onto the surface of the PCB where the Switch or other parts are mounted.

Wire the quick-connect terminals (#110) with receptacles. Insert the terminals straight into the receptacles. Do not impose excessive force on the terminal in the horizontal direction, otherwise the terminal may be deformed or the housing may be damaged.

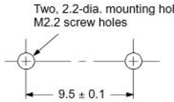
Insulation Distance

The Switch does not have a ground terminal. The minimum distance through insulation (IEC61058-1) is 0.9 mm. If proper insulation for the end product cannot be secured, additional insulation such as a Separator or insulation cover should be attached.

Mounting

When securing the SSG, be sure to use M2.2 mounting screws and tighten the screws with flat washers and spring washers securely within a torque range between 0.20 to 0.24 N • m {2 to 2.5 kgf • cm}.

Mounting Holes



Make sure that the plate to which the SSG is mounted is flat. If the plate has protruding or warped part, the SSG may not operate properly.

Operating Stroke

Make sure that the operating stroke is 70% to 100% of the rated OT distance. Do not operate the actuator exceeding the OT distance, otherwise the life expectancy of the SSG may be shortened.

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

A variety of D2F Models including Models Incorporating Simulated Hinge Lever and Hinge Roller Lever

- ROHS Compliant.
- Subminiature switch (12.8 x 6.5x 5.8 (W x H x D)) ideal for PCB mounting.
- Incorporating a snapping mechanism made with two highly precise split springs which ensures a long service life (1,000,000 operations).
- Two-stage bottom different in level and insertion moulded terminals prevents flux penetration.
- PCB, self-clinching, solder, and right-angle terminals are available.
- Ideal for home appliances, audio equipment, office machines, and communications equipment.

Ordering Information

■ Model Number Legend

D2F-□□□□
1 2 3 4

1. **Ratings**
   None: General load
   01: 0.1 A
2. **Operating Force max.**
   None: 1.47 N {150 gf}
   F: 0.74 N {75 gf}
   Note: These values are for the pin plunger model.
3. **Actuator**
   None: Pin plunger
   L: Hinge lever
   L2: Hinge roller lever
   L3: Simulated hinge lever
4. **Terminals**
   None: PCB terminal
   -T: Self-clinching PCB terminal
   -D: Solder terminal
   -A: Right-angle PCB terminal
   -A1: Left-angle PCB terminal

■ List of Models

Actuator	Operaating force (OF) (see note)	Microvoltage/current load		Standard	
		0.1 A		1 A	3 A
		Low operating force 0.74 N {75 gf}	General-purpose 1.47 N {150 gf}	Low operating force 0.74 N {75 gf}	General-purpose 1.47 N {150 gf}
Pin plunger	PCB terminals	D2F-01F	D2F-01	D2F-F	D2F
	Self-clinching terminals	D2F-01F-T	D2F-01-T	D2F-F-T	D2F-T
	Solder terminals	D2F-01F-D	D2F-01-D	D2F-F-D	D2F-D
	Right-angle terminals	D2F-01F-A	D2F-01-A	D2F-F-A	D2F-A
Hinge lever	PCB terminals	D2F-01FL	D2F-01L	D2F-FL	D2F-L
	Self-clinching terminals	D2F-01FL-T	D2F-01L-T	D2F-FL-T	D2F-L-T
	Solder terminals	D2F-01FL-D	D2F-01L-D	D2F-FL-D	D2F-L-D
	Right-angle terminals	D2F-01FL-A	D2F-01L-A	D2F-FL-A	D2F-L-A
Simulated hinge lever	PCB terminals	D2F-01FL3	D2F-01L3	D2F-FL3	D2F-L3
	Self-clinching terminals	D2F-01FL3-T	D2F-01L3-T	D2F-FL3-T	D2F-L3-T
	Solder terminals	D2F-01FL3-D	D2F-01L3-D	D2F-FL3-D	D2F-L3-D
	Right-angle terminals	D2F-01FL3-A	D2F-01L3-A	D2F-FL3-A	D2F-L3-A
Hinge roller lever	PCB terminals	D2F-01FL2	D2F-01L2	D2F-FL2	D2F-L2
	Self-clinching terminals	D2F-01FL2-T	D2F-01L2-T	D2F-FL2-T	D2F-L2-T
	Solder terminals	D2F-01FL2-D	D2F-01L2-D	D2F-FL2-D	D2F-L2-D
	Right-angle terminals	D2F-01FL2-A	D2F-01L2-A	D2F-FL2-A	D2F-L2-A

Note: The OF values shown in the table are for the pin plunger models.

Specifications

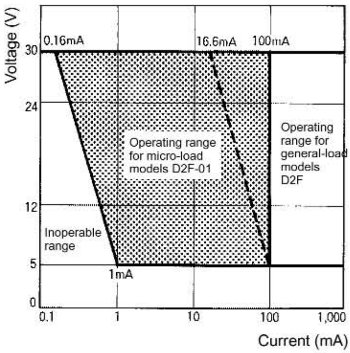
■ Ratings

Item	OF max.	D2F models		D2F-01 models	
		1.47 N {150 gf} (General-purpose)	0.74 N {75 gf} (Low operating)	1.47 N {150 gf} (General-purpose)	0.74 N {75 gf} (Low operating)
		Resistive load			
Rated voltage	**125 VAC**	3 A	1 A	---	
	30 VDC	2 A	0.5 A	0.1 A	

Note: 1. Consult your OMRON representative before using the Switch with inductive or motor loads.

2. The ratings values apply under the following test conditions:
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 30 operations/min

Use the Switch in the following operating range.



Model	D2F-01	D2F
Minimum applicable load	1 mA at 5 VDC	100 mA at 5 VDC

■ Characteristics

Operating speed	1 to 500 mm/s (at pin plunger models)
Operating frequency	Mechanical: 200 operations/min Electrical: 30 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	D2F models: 30 mΩ max. D2F-F models: 50 mΩ max. D2F-01 models: 100 mΩ max.
Dielectric strength	600 VAC, 50/60 Hz for 1 min between terminals of the same polarity 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground (see note 1), and between each terminal and non-current-carrying metal part
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 2)	Malfunction: 300 m/s^2 {approx. 30G} max.
Life expectancy	Mechanical: 1,000,000 operations min. (Refer to *Engineering Data*.) Electrical: 30,000 operations min. (Refer to *Engineering Data*.)
Degree of protection	IP00
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient temperature	Operating: –25°C to 65°C (with no icing)
Ambient humidity	Operating: 85% max. (for 5°C to 35°C)
Weight	Approx. 0.5 g (pin plunger models)

Note: 1. The dielectric strength shown in the table indicates a value for models with a Separator.
2. For the pin plunger models, the values are at the free position and total travel position. For the lever models, they are at the total travel position.

■ Approved Standards

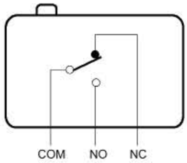
UL1054 (File No. 41515)
CSA C22.2 No. 55 (LR21642)

Rated voltage	D2F (general-purpose)	D2F (low operating force)	D2F-01
125 VAC	3 A	1 A	---
30 VDC	2 A	0.5 A	0.1 A

■ Contact Specifications

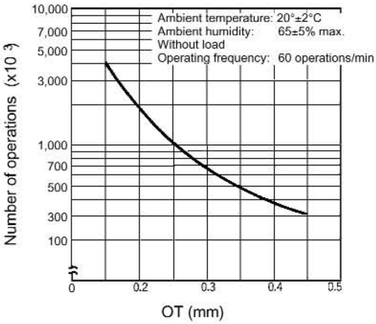
Item		D2F models	D2F-01 models
Contact	Specification	Crossbar	
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.25 mm	

Contact Form (SPDT)



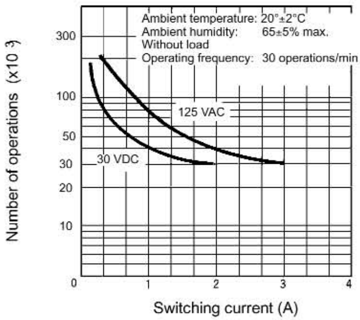
Engineering Data

Mechanical Life Expectancy (D2F, D2F-01)



The values are for the pin plunger model.

Electrical Life Expectancy (D2F)



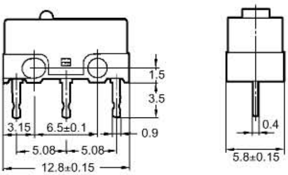
For details about the D2F-01, contact your OMRON sales representative.

Dimensions

■ Terminals

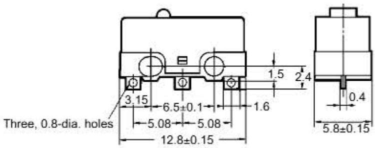
PCB Terminals (Standard)

D2F



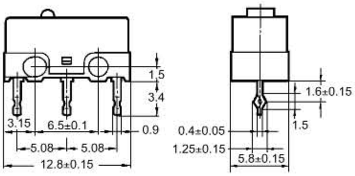
Solder Terminals

D2F-D



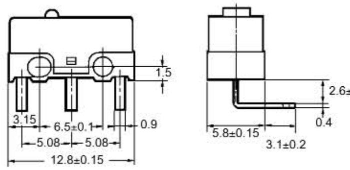
Self-clinching PCB Terminals

D2F-T



Right-angle PCB Terminals

D2F-A



■ Dimensions and Operating Characteristics

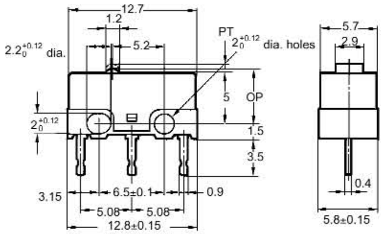
Note: 1. All units are in millimeters unless otherwise indicated.

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

3. The following illustrations and drawings are for D2F models with PCB terminals. Self-clinching, solder, and right-angle terminals are omitted from the following drawings. Refer to page 143 for these terminals. When ordering, replace □ with the code for the terminal that you need.

Pin Plunger

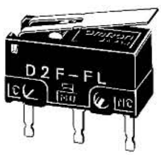
D2F□
D2F-01□
D2F-F□
D2F-01F□

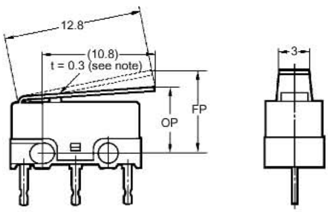


Model	D2F□ D2F-01□	D2F-F□ D2F-01F□
OF max.	1.47 N {150 gf}	0.74 N {75 gf}
RF min.	0.20 N {20 gf}	0.05 N {5 gf}
PT max.	0.5 mm	
OT min.	0.25 mm	
MD max.	0.12 mm	
OP	5.5±0.3 mm	

Hinge Lever

D2F-L□
D2F-01L□
D2F-FL□
D2F-01FL□



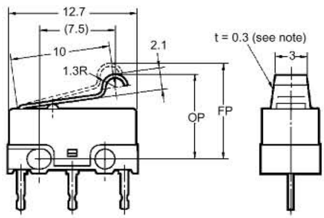


Note: Stainless-steel lever

Model	D2F-L□ D2F-01L□	D2F-FL□ D2F-01FL□
OF max.	0.78 N {80 gf}	0.25 N {25 gf}
RF min.	0.05 N {5 gf}	0.02 N {2 gf}
OT min.	0.55 mm	
MD max.	0.5 mm	
FP max.	10 mm	
OP	6.8±1.5 mm	

Simulate Hinge Lever

D2F-L3□
D2F-01L3□
D2F-FL3□
D2F-01FL3□

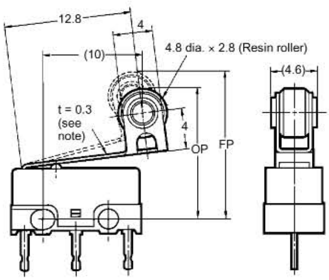


Note: Stainless-steel lever

Model	D2F-L3□ D2F-01L3□	D2F-FL3□ D2F-01FL3□
OF max.	0.78 N {80 gf}	0.39 N {40 gf}
RF min.	0.05 N {5 gf}	0.02 N {2 gf}
OT min.	0.5 mm	
MD max.	0.45 mm	
FP max.	13 mm	
OP	8.5±1.2 mm	

Hinge Roller Lever

D2F-L2□
D2F-01L2□
D2F-FL2□
D2F-01FL2□



Note: Stainless-steel lever

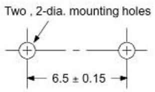
Model	D2F-L2□ D2F-01L2□	D2F-FL2□ D2F-01FL2□
OF max.	0.78 N {80 gf}	0.39 N {40 gf}
RF min.	0.05 N {5 gf}	0.02 N {2 gf}
OT min.	0.55 mm	
MD max.	0.5 mm	
FP max.	16.5 mm	
OP	13±2 mm	

Precautions

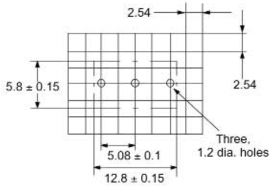
■ Mounting Dimensions

Use M2 mounting screws with plain or spring washers to mount the Switch. Tighten the screws to a torque of 0.08 to 0.1 N • m {0.8 to 1 kgf • cm}.

Mounting Holes

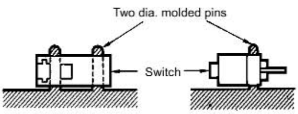


Mounting Dimensions



Molded fittings are recommended for securing the Switch.

Mounting with Molded Pin



■ Terminal Connections

When soldering the lead wire to the terminal, first insert the lead wire conductor through the terminal and then apply solder. Use a soldering iron rated at 30 W maximum (temperature of soldering iron: 350°C max.) within 3 s.

If soldering is not carried out under the proper conditions there is a danger of over-heating and subsequent heat damage.

Applying a soldering iron for too long a time or using one that is rated at more than 30 W may degrade the Switch characteristics.

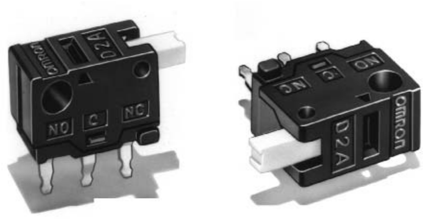
When soldering the PCB terminal to the PCB, the flux and solder liquid level should not exceed the PCB level.

Handling

Mount the Switch on a smooth and flat surface. Mounting a Switch on an uneven surface may cause malfunction or break the housing.

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

Ultra Subminiature Detection Switch with Slide Mechanism and Pushbutton Actuator



- Compact (8 x 6 x 4.2 mm (W H D)), light weight (approximately 0.3 g), and 3-mm long stroke.
- Built-in slide mechanism for selecting shorting or non-shorting timing of the switch.
- The switch's small size makes it ideal for household appliances, audio equipment, office equipment, communications equipment, etc.

Ordering Information

Model Number Legend

D2A - □ 1 □ 0
1 2

1. Switching Timing
1: Non-shorting
2. Shorting

2. Maximum Operating Force
1: 0.98 N {100 gf}
2: 0.49 N {50 gf}

■ List of Models

Actuator	OF 0.98 N {100 gf}		OF 0.49 N {50 gf}	
	Non-shorting Model	Shorting Model	Non-shorting Model	Shorting Model
Pin plunger	D2A-1110	D2A-2110	D2A-1120	D2A-2120

Specifications

■ Ratings

Electrical ratings	0.1 A at 30 VDC (resistive load)

Note: The ratings values apply under the following test conditions:
Ambient temperature: 20 ±2°C
Ambient humidity: 65 ±5%
Operating frequency: 30 operations/min

■ Characteristics

Operating speed	1 to 500 mm/s
Operating frequency	Mechanical: 200 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 250 VDC)
Contact resistance (initial value)	50 mΩ max.
Dielectric strength	250 VAC, 50/60 Hz for 1 min between terminals of same polarity 250 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction: 1,000 m/s2 {approx. 100G} max. Malfunction: 300 m/s2 {approx. 30G} max.
Durability (see note 2)	50,000 operations min. (30 operations/min)
Degree of protection	IEC IP00
Degree of protection against electric shock	Class III
Proof tracking index (PTI)	175
Ambient operating temperature	-10°C to 70°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight Approx.	0.3 g

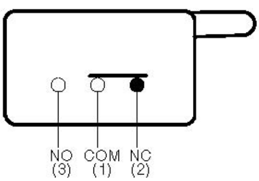
Note: **1.** The data given above are initial values.
2. For testing conditions, consult your OMRON sales representative.

■ Contact Specifications

Contact specification	Slide
Contact material	Silver alloy
Minimum applicable load (see note)	1 mA at 5 VDC

■ Contact Form

SPDT

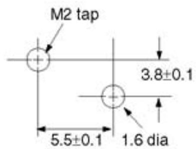


Dimensions

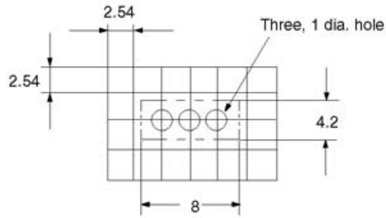
■ Mounting Holes

Note: 1. All units are in millimetres unless otherwise indicated.
2. Use the following mounting dimensions when mounting the D2A with screws.

Mounting Holes



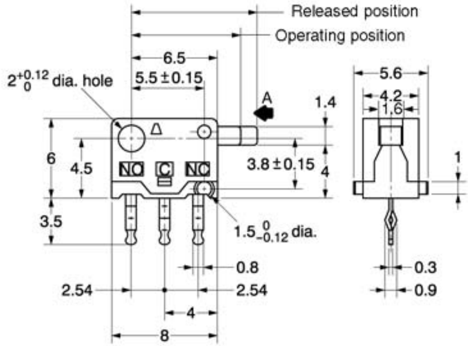
PCB Mounting Dimensions (Reference)



■ Dimensions and Operating Characteristics

Note: 1. All units are in millimetres unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
3. The operating characteristics are for operation in the A direction (⬇).

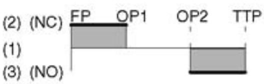
D2A-1110/-1120
D2A-2110/2120



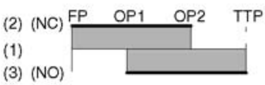
Model	Non-shorting Models		Shorting Models	
	D2A-1110	D2A-1120	D2A-2110	D2A-2120
OF max. **RF min.**	0.98 N {100 gf} 0.15 N {15 gf}	0.49 N {50 gf} 0.05 N {5 gf}	0.98 N {100 gf} 0.15 N {15 gf}	0.49 N {50 gf} 0.05 N {5 gf}
FP max. **OP1** **OP2** **TTP**	9.5 mm 8.1 ±0.3 mm 7.4 ±0.3 mm 6.5 ±0.2 mm		9.5 mm 8.0 ±0.3 mm 7.5 ±0.3 mm 6.5±0.2 mm	

■ Switching Timing

Non-shorting Model



Shorting Model



Precautions

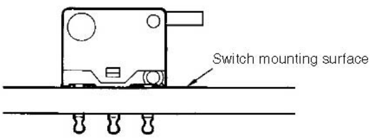
■ Cautions

Terminal Connection

When soldering the lead wire to the terminal, first bind the lead wire to the terminal and then apply the 6 (Sn) : 4 (Pb) solder to the terminal. Complete soldering within 5 s at a soldering iron temperature of 260°C. Soldering at a temperature exceeding 260°C, soldering for more than 5 s, or repeated soldering will degrade the Switch characteristics.

When soldering the lead wire to the PCB terminal, pay careful attention so that the flux and solder liquid level does not exceed the PCB level.

It is also recommended that you apply flux guard to the mounting surface of the Switch.



■ Correct Use

Mounting

Turn OFF the power supply before mounting or removing the Switch, wiring, or performing maintenance or inspection. Failure to do so may result in electric shock or burning.

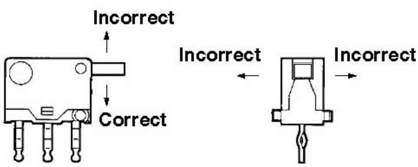
Use M1.6 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 4.9 to 9.8 x 10^{-2} N? m {0.5 to 1 kg ? cm}.

Mount the Switch onto a flat surface. Mounting on an uneven surface may cause deformation of the Switch, resulting in faulty operation or breakage in the housing.

Application of Operation Force to the Lever

Apply operation forces to the pushbutton in its operating direction.

Applying operating force to the pushbutton in any other directions will damage the Switch or cause malfunction.



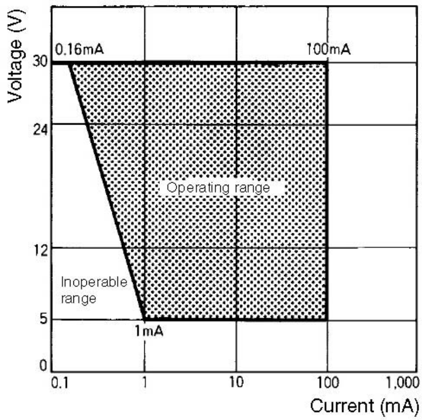
Mounting Plate

Use materials other than ABS or polycarbonate for the mounting plate. Since grease is used for the Switch, cracks may be caused if grease from the Switch comes in contact with such materials.

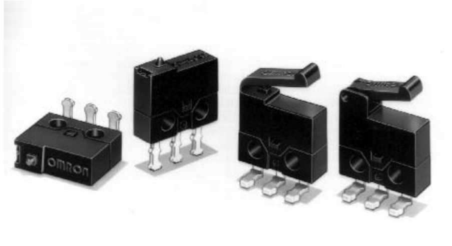
Using Micro Loads

Using a model for ordinary loads to open or close the contact of a micro load circuit may result in faulty contact. Use models that operate in the following range. However, even when using micro load models within the operating range shown below, if inrush current occurs when the contact is opened or closed, it may increase contact wear and so decrease durability. Therefore, insert a contact protection circuit where necessary.

The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ60). The equation, $\lambda60 = 0.5 \times 10^{-6}$/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.



Superminiaturised Basic Switch with Angle-terminal Models



- ROHS Compliant.
- Miniature size (6.5 x 8.2 x 2.7mm) and weight as light as 0.3g contribute to miniaturisation of devices.
- PCB mounting and angle terminals for side operation are available.
- Excels in electric characteristics with the snap-action mechanism despite superminiaturised design.
- Gold-plated (Au-P) contacts for micro load switching available in addition to the standard silver-plated contacts (Ag-P)
- Ideal for applications where size and weight requirements are crucial, such as in electronic wristwatches and miniaturised optical and audio equipment.

Ordering Information

■ Model Number Legend:

D2MQ-1□-□-□
1 2 3 4

1. **Ratings**
   1: 0.5 A, 30 VDC: Silver-plated contact type, 0.05 A, 30 VDC: Gold-plated contact type
2. **Actuator**
   None: Pin plunger
   L: Leaf lever
3. **Terminal Direction**
   None: Straight
   TL: Left
   TR: Right
4. **Contact Material**
   None: Silver-plated copper alloy
   105: Gold-plated copper alloy

D2MQ-4L-□-1-□
1 2 3 4

1. **Actuator**
   4L: Hinge leaf lever
2. **Contact Material (Rating)**
   None: Silver-plated copper alloy (0.5 A, 30 VDC)
   105: Gold-plated copper alloy (0.05 A, 30 VDC)
3. **Operating Position**
   1: 7.1 mm
4. **Terminal Direction**
   None: Straight
   L: Left angle
   R: Right angle

Non-Sealed Microswitches

■ List of Models

Actuator	Terminal direction						
	Standard model (Ag-plated)			Microvoltage/ Current load model (Au-plated)	Micro load model (Au-plated)		
	Straight	Left Angle	Right Angle	Straight	Straight	Left Angle	Right Angle
Pin plunger	D2MQ-1	D2MQ-1-TL	D2MQ-1-TR	D2MQ-1-105	---	---	---
Leaf lever	D2MQ-1L	D2MQ-1L-TL	D2MQ-1L-TR	D2MQ-1L-105	---	---	---
Hinge leaf lever	D2MQ-4L-1	D2MQ-4L-1-L	D2MQ-4L-1-R	---	D2MQ-4L-105-1	D2MQ-4L-105-1-L	D2MQ-4L-105-1-R

Note: The terminal profiles shown above are ones viewed from the right side of the Switch.

Specifications

■ Ratings

Item	Standard model	Microvoltage/current load model
Electrical ratings	50 to 500 mA at 30 VDC ($\cos \phi = 1$)	5 to 50 mA at 30 VDC ($\cos \phi = 1$)

Note: The ratings values hold under the following test conditions:
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 20 operations/min

■ Characteristics

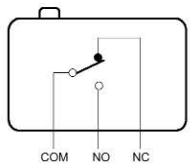
Operating speed	0.1 mm to 0.5 m/s (see note 1)
Operating frequency	Mechanical: 60 operations/min Electrical: 20 operations/min
Contact resistance	100 mΩ max. (initial value)
Insulation resistance	100 MΩ min. (at 250 VDC)
Dielectric strength	500 VAC, 50/60 Hz for 1 min between terminals at the same polarity 500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note 2)
Shock resistance	Destruction: 1,000 m/s^2 {approx. 100G} max. Malfunction: 300 m/s^2 {approx. 30G} max.
Life expectancy	Mechanical: 30,000 operations min. (at full OT value) Electrical: 10,000 operations min. (at full OT value)
Degree of protection	IP00
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient temperature	Operating: –15°C to 70°C (with no icing)
Ambient humidity	Operating: 35% to 85%
Weight	Approx. 0.3 g

Note: 1. The values are for the pin plunger model. (For different models, contact your OMRON representative.)
2. Malfunction: 1 ms max.

■ Contact Specifications

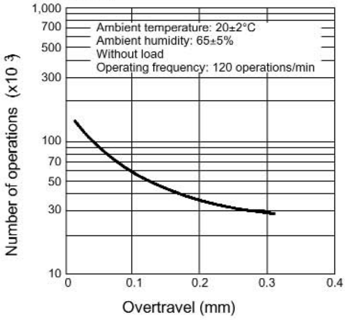
Item		Silver plating	Gold plating
Contact	Specification	Rivet	
	Material	Silver plating	Gold plating
	Gap (standard value)	0.15 mm	
Inrush current	NC	0.5 A max.	0.05 A max.
	NO	0.5 A max.	0.05 A max.

■ Contact Form (SPDT)

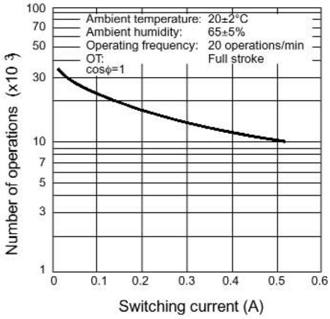


Engineering Data

Mechanical Life Expectancy (D2MQ-1)



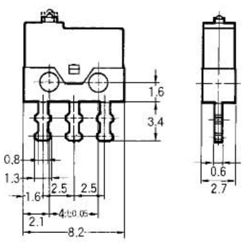
Electrical Life Expectancy (D2MQ-1)



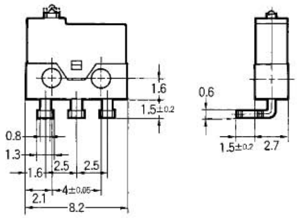
Dimensions

■ Terminals

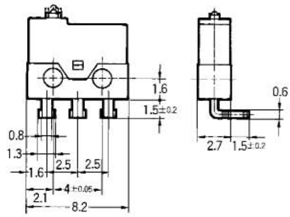
Straight Terminal



Left-angle Terminal



Right-angle Terminal



■ Dimensions and Operating Characteristics

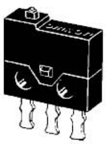
Note: 1. All units are in millimeters unless otherwise indicated.

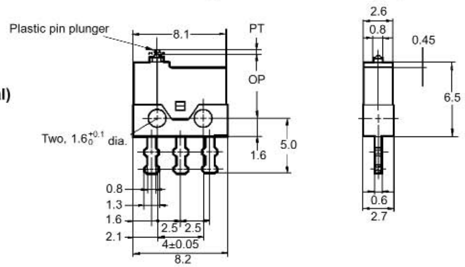
2. Unless otherwise specified, a tolerance of 0.15 mm applies to all dimensions.

3. The following illustrations are for the straight terminal models. Those for the left-angle terminals and right-angle terminals are different from straight terminal models in terminal size only. Refer to *Terminals* on page 148 for these terminals.

Pin Plunger

D2MQ-1 (Straight Terminal)
D2MQ-1-TL (Left Angle)
D2MQ-1-TR (Right Angle)
D2MQ-1-105 (Straight Terminal)

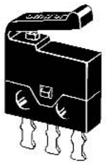


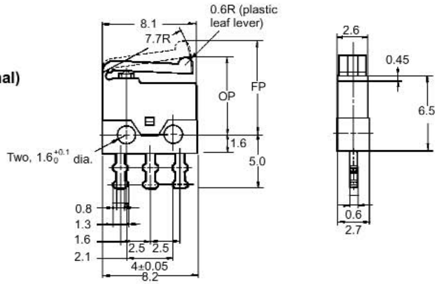


OF max.	1.18 N {120 gf}
RF min.	0.19 N {20 gf}
PT max.	0.4 mm
OT min.	0.1 mm
MD max.	0.1 mm
OP	5.7±0.2 mm

Leaf Lever

D2MQ-1L (Straight Terminal)
D2MQ-1L-TL (Left Angle)
D2MQ-1L-TR (Right Angle)
D2MQ-1L-105 (Straight Terminal)

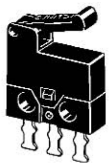


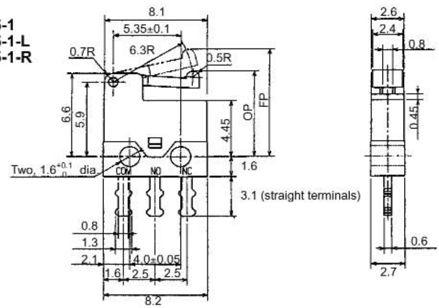


OF max.	0.59 N {60 gf}
RF min.	0.08 N {8 gf}
PT max.	2.4 mm
OT min.	0.3 mm
MD max.	0.7 mm
FP max.	9.6 mm
OP	6.7±0.5 mm

Hinge Leaf Lever

D2MQ-4L-1	**D2MQ-4L-105-1**
D2MQ-4L-1-L	**D2MQ-4L-105-1-L**
D2MQ-4L-1-R	**D2MQ-4L-105-1-R**





OF max.	0.39 N {40 gf}
RF min.	0.04 N {4 gf}
PT max.	2.1 mm
OT min.	0.3 mm
MD max.	0.7 mm
FP max.	8.7 mm
OP	7.1±0.5 mm

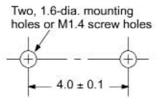
Precautions

■ Cautions

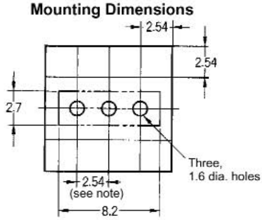
Mounting Dimensions

Use M1.4 mounting screws with screws to mount the Switch. Tighten the screws to a torque of 0.1 N • m {1 kgf • cm}.

Mounting Holes



Mounting Dimensions



Note: Terminal gap: 1 pitch

Terminal Connections

When soldering a lead wire to a terminal of the D2MQ, use a soldering iron with a maximum capacity of 15 W maximum (iron tip temperature: 250° max.) with the actuator at the free position and do not take more than 3 s to solder the lead wire, otherwise the characteristics of the Switch may change.

Applying a soldering iron for too long a time or using one that is rated at more than 15 W may degrade the Switch characteristics.

Operation

Do not apply a force more than two times the rated operating force to the actuator and leaf lever.

Make sure that the actuator is not hindered by any object from moving to or beyond the rated overtravel.

Do not change the operating position by modifying the actuator.

Do not use the Switch in an application where the operating speed is extremely slow or the actuator is set in the midpoint between the free position and operating position.

Install the pin plunger switch so that the operating force is applied in alignment with the stroke of the actuator.

Do not apply a shock to the actuator, otherwise, the Switch may be damaged.

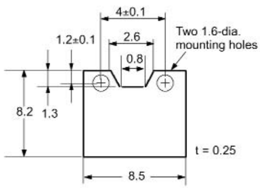
Do not apply excessive force to the actuator of the Leaf Lever Switch in the operating, releasing, and horizontal directions.

Separator

When mounting the Switch on a metallic surface, be sure to provide a Separator between the Switch and mounting plate.

The Separator must be made of hard material and must be processed as shown below.

Dimensions of Separator

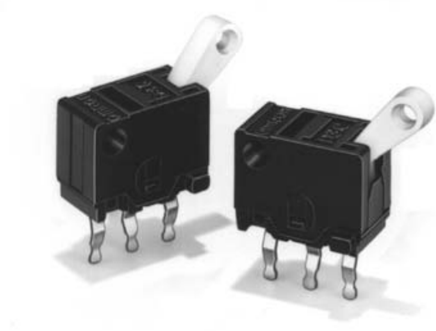


Non-Sealed Microswitches

CAT. No. B034-E2-06C

Low-cost Super Subminiature Basic Switch with a Long Stroke

- ROHS Compliant.
- Compact (8 x 6 x 4.2 (W x H x D)), light (approximately 0.3g), and low-cost.
- Built-in slide mechanism for selecting shorting or non-shorting timing of the switch.
- Available with a 3mm long stroke.
- Ideal for household appliances, sound equipment, office equipment, communications equipment, etc.



Ordering Information

■ Model Number Legend:

D3C-□2□0
1 2

1. Switching Timing
1: Non-shorting
2: Shorting

2. Operating Force max.
1: 1.28 N {130 gf}
2: 0.39 N {40 gf}

■ List of Models

Actuator	OF 1.28 N {130 gf}		OF 0.39 N {40 gf}	
	Non-shorting Model	Shorting Model	Non-shorting Model	Shorting Model
Hinge lever	D3C-1210	D3C-2210	D3C-1220	D3C-2220

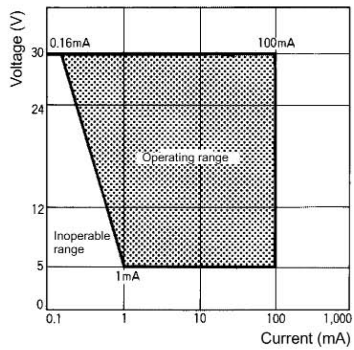
Specifications

■ Ratings

Electrical ratings	0.1 A at 30 VDC (resistive load)

Note: The ratings values hold under the following test conditions:
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 30 operations/min

Use the Switch within the following operating range.

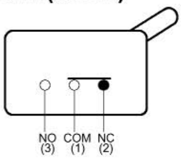


Minimum operating load	1 mA at 5 VDC

■ Characteristics

Operating speed	1 to 500 mm/s
Operating frequency	Mechanical: 200 operations/min Electrical: 30 operations/min
Insulation resistance	100 MΩ (at 250 VDC)
Contact resistance	50 mΩ max. (initial value)
Dielectric strength	250 VAC, 50/60 Hz for 1 min between terminals of same polarity 250 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Malfunction: 300 m/s^2 {approx. 30G} max.
Life expectancy	50,000 operations min.
Degree of protection	IP00
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient temperature	Operating: –20°C to 80°C (with no icing)
Ambient humidity	Operating: 65% max. (for 5°C to 35°C)
Weight	Approx. 0.3 g

■ Contact Form (SPDT)



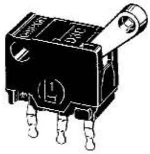
Dimensions

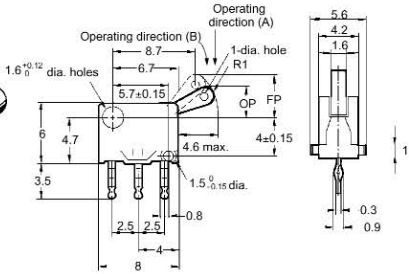
Note: 1 All units are in millimeters unless otherwise indicated.
2 Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

■ Dimensions and Operating Characteristics

Hinge Lever

D3C-1210/-2210
D3C-1220/-2220



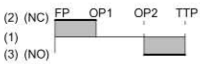


	Non-shorting Model		Shorting Model	
	D3C-1210	D3C-1220	D3C-2210	D3C-2220
OF max.	1.28 N {130 gf} (0.98 N)	0.39 N {40 gf} (0.29 N)	1.28 N {130 gf} (0.98 N)	0.39 N {40 gf} (0.29 N)
RF min.	0.10 N {10 gf} (0.15 N)	0.03 N {3 gf} (0.05 N)	0.10 N {10 gf} (0.15 N)	0.03 N {3 gf} (0.05 N)
TTP	1.3±0.4 mm		1.3±0.4 mm	
FP max.	4.8 mm		4.8 mm	
OP1	3.5±0.3 mm		3.4±0.3 mm	
OP2	2.5±0.3 mm		2.6±0.3 mm	

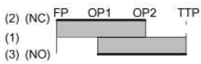
Note: The values for operating characteristics apply for operation in direction (A) shown above. The values in parentheses indicate those for operation in direction (B).

Switching Timing

Non-shorting Model



Shorting Model

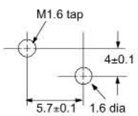


Precautions

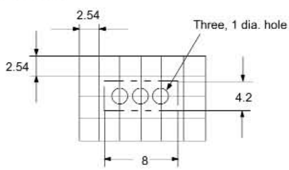
■ Mounting Dimensions

When mounting the D3C with screws, use M1.6 mounting screws with plain washers or spring washers. Tighten the screws to a torque of 4.9 to 9.8 x 10^{-2} N • m {0.5 to 1 kgf • cm}.

Mounting Holes



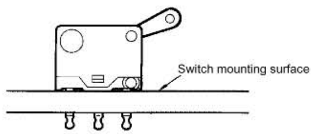
PCB Dimensions



■ Terminal Connections

When soldering the lead wire to the terminal, first bind the lead wire to the terminal and then apply the 6 (Sn) : 4 (Pb) solder to the terminal. Complete soldering within five seconds at a soldering iron temperature of 260°C. Soldering at a temperature exceeding 260°C, soldering for more than five seconds, or repeated soldering will degrade the Switch characteristics.

Control PCB soldering so that flux and solder liquid level does not exceed the PCB. It is recommended that flux guard be applied to the Switch mounting surface.



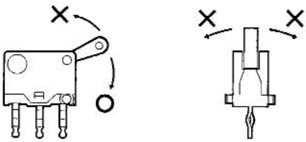
Mounting

Mount the Switch on a flat and even surface. Mounting on an uneven surface may cause the Switch to deform, resulting in malfunction or breakage in the housing.

When mounting on a PCB, the PCB must be prepared as shown previously. Provide a distance of 2.54 mm between terminals.

Application of Operation Force to the Lever

Apply operation forces to the lever in its operating direction. Applying operating force to the lever in any other directions will damage the Switch or cause malfunction.



Mounting Plate

Use materials other than ABS or polycarbonate for the mounting plate. Since grease is used for the Switch, cracks may be caused if grease from the Switch comes in contact with such materials.

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

High-quality, High-precision Miniature Switch Conforms to IP67 (Lead wire type only)

- ROHS Compliant.
- Monoblock construction made from single-liquid epoxy resin assures high sealing capability.
- V-model internal mechanism assures high operating-position accuracy and long life.
- A wide operating temperature range of -40°C to 85°C is ideal for any operating environment.
- General-load (5A at 250VAC) models and Micro-load models are available.
- Conforms to EN61058-1.

Ordering Information

Model Number Legend

D2VW-□□-□□
1 2 3 4

1. **Ratings**
   5: 5 A
   01: 0.1 A
2. **Actuator**
   None: Pin plunger
   L1A: Short hinge lever
   L1: Hinge lever
   L1B: Long hinge lever
   L3: Simulated hinge lever
   L2A: Short hinge roller lever
   L2: Hinge roller lever
3. **Contact Form**
   1: SPDT
   2: SPST-NC
   3: SPST-NO
4. **Terminal**
   None: Solder/Quick-connect terminals (#187)
   Note: HS for UL and CSA approval.
   M: Lead wire
   Note: MS for UL and CSA approval.

List of Models

Actuator		Model	
		0.1 A	5 A
Pin plunger	Solder and quick-connect terminals (#187)	D2VW-01-1	D2VW-5-1
	Lead wire	D2VW-01-1M	D2VW-5-1M
Short hinge lever	Solder and quick-connect terminals (#187)	D2VW-01L1A-1	D2VW-5L1A-1
	Lead wire	D2VW-01L1A-1M	D2VW-5L1A-1M
Hinge Lever	Solder and quick-connect terminals (#187)	D2VW-01L1-1	D2VW-5L1-1
	Lead wire	D2VW-01L1-1M	D2VW-5L1-1M
Long hinge lever	Solder and quick-connect terminals (#187)	D2VW-01L1B-1	D2VW-5L1B-1
	Lead wire	D2VW-01L1B-1M	D2VW-5L1B-1M
Simulated hinge lever	Solder and quick-connect terminals (#187)	D2VW-01L3-1	D2VW-5L3-1
	Lead wire	D2VW-01L3-1M	D2VW-5L3-1M
Short hinge roller lever	Solder and quick-connect terminals (#187)	D2VW-01L2A-1	D2VW-5L2A-1
	Lead wire	D2VW-01L2A-1M	D2VW-5L2A-1M
Hinge roller lever	Solder and quick-connect terminals (#187)	D2VW-01L2-1	D2VW-5L2-1
	Lead wire	D2VW-01L2-1M	D2VW-5L2-1M

Note: The standard lengths of the lead wires (AV0.75f) of models incorporating them are 30 cm.

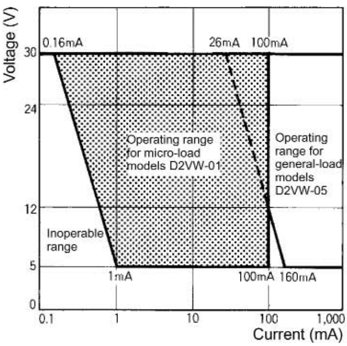
Specifications

■ Ratings

Model	Rated voltage	Non-inductive load				Inductive laod	
		Resistive load		Lamp load		Inductive load	
		NC	NO	NC	NO	NC	NO
D2VW-5	125 VAC	5 A		0.5 A		4 A	
	250 VAC	5 A		0.5 A		4 A	
	30 VDC	5 A		3 A		4 A	
	125 VDC	0.4 A		0.1 A		0.4 A	
D2VW-01	125 VAC	0.1 A		---		---	
	30 VDC	0.1 A		---		---	

Note: 1. The above current ratings are the values of the steady-state current.
2. Inductive load has a power factor of 0.7 min. (AC) and a time constant of 7 ms max. (DC).
3. Lamp load has an inrush current of 10 times the steady-state current.
4. The ratings values apply under the following test conditions:
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 30 operations/min

Use the Switch in the following operating range.



Model	D2VW-01	D2VW-5
Minimum applicable load	1 mA at 5 VDC	160 mA at 5 VDC

Sealed Microswitches

■ Characteristics

Operating speed	0.1 mm to 1 m/s (at pin plunger models)
Operating frequency	Mechanical: 300 operations/min Electrical: 60 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	50 mΩ max. (100 mΩ max. for lead wire model)
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground (see note 1) 1,500 VAC, 50/60 Hz for 1 min between each terminal and non-current-carrying metal parts
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 2)	Malfunction: 300 m/s^2 {approx. 30G} max.
Life expectancy (see note 3)	Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min. (1,000,000 operations min. for D2VW-01 models)
Degree of protection	IP67 for lead wire model IP50 for terminal model
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient temperature	Operating: –40°C to 90°C (with no icing) (see note 4)
Ambient humidity	Operating: 95% max. (for 5°C to 35°C)
Weight	Approx. 7 g (terminal type pin plunger models)

Note:
1. The dielectric strength shown in the table indicates the value for models with a Separator.
2. For the pin plunger models, the above values apply for use at both the free position and total travel position. For the lever models, they apply at the total travel position.
3. For testing conditions, consult your OMRON sales representative.
4. The operating temperature of the lead wire (AV0.75f) for the lead wire model is between –40°C to 85°C.

■ Approved Standards

UL1054 (File No. E41515)
CSA C22.2 No.55 (File No. LR21642)

Rated voltage	D2VW-5 Models	D2VW-01 Models
125 VAC 250 VAC	3 A 3 A	0.1 A ---
30 VDC	---	0.1 A

VDE/EN61058-1 (IEC61058-1) (File No. 104068)

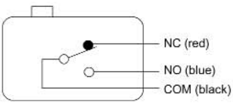
Rated voltage	D2VW-5 Models	D2VW-01 Models
125 VAC 250 VAC	--- 3 A	0.1 A ---

■ Contact Specifications

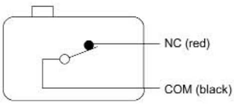
Item		D2VW-5	D2VW-01
Contact	**Specification**	Rivet	Crossbar
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.5 mm	
Inrush current	**NC**	15 A max.	---
	NO	15 A max.	---

■ Contact Form

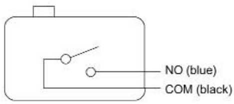
SPDT



SPST-NC



SPST-NO



Note: Colors in parentheses indicate lead wire colors.

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.

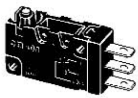
■ Terminal Models

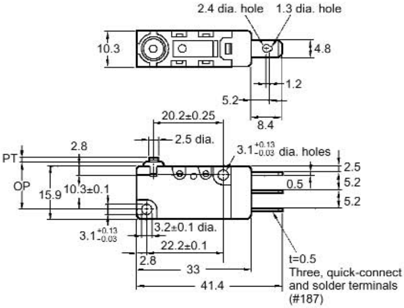
The pin plunger model is shown here as a typical example. Operating characteristics and dimensions of the actuator section are the same as for the lead wire models.

■ Dimensions and Operating Characteristics

Pin Plunger

D2VW-01-1
D2VW-5-1



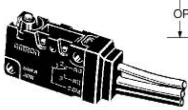


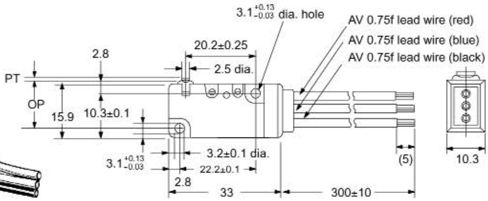
OF max.	1.96 N {200 gf}
RF min.	0.29 N {30 gf}
PT max.	1.2 mm
OT min.	1.0 mm
MD max.	0.4 mm
OP	14.7±0.4 mm

■ Lead Wire Models

Pin Plunger

D2VW-01-1M
D2VW-5-1M

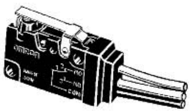


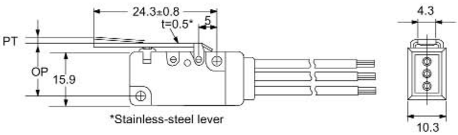


OF max.	1.96 N {200 gf}
RF min.	0.29 N {30 gf}
PT max.	1.2 mm
OT min.	1.0 mm
MD max.	0.4 mm
OP	14.7±0.4 mm

Short Hinge Lever

D2VW-01L1A-1M
D2VW-5L1A-1M

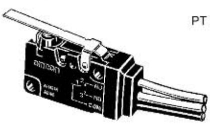


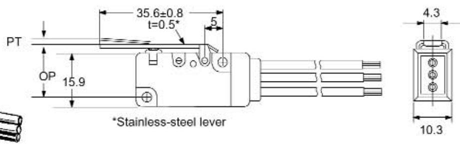


OF max.	1.96 N {200 gf}
RF min.	0.20 N {20 gf}
PT max.	1.6 mm
OT min.	0.8 mm
MD max.	0.5 mm
OP	15.2±0.5 mm

Hinge Lever

D2VW-01L1-1M
D2VW-5L1-1M

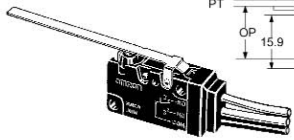


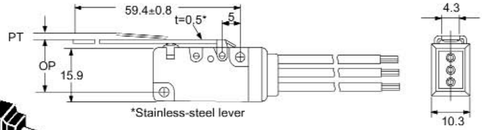


OF max.	1.18 N {120 gf}
RF min.	0.15 N {15 gf}
PT max.	4.0 mm
OT min.	1.6 mm
MD max.	0.8 mm
OP	15.2±1.2 mm

Long Hinge Lever

D2VW-01L1B-1M
D2VW-5L1B-1M



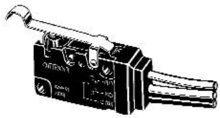


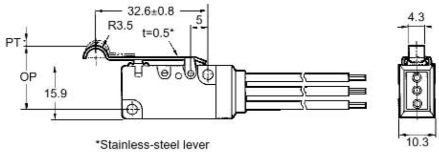
*Stainless-steel lever

OF max.	0.59 N {60 gf}
RF min.	0.05 N {5 gf}
PT max.	9.0 mm
OT min.	3.2 mm
MD max.	2.0 mm
OP	15.2±2.6 mm

Simulated Hinge Lever

D2VW-01L3-1M
D2VW-5L3-1M



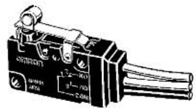


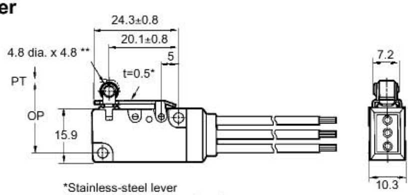
*Stainless-steel lever

OF max.	1.18 N {120 gf}
RF min.	0.15 N {15 gf}
PT max.	4.0 mm
OT min.	1.6 mm
MD max.	0.8 mm
OP	18.7±1.2 mm

Short Hinge Roller Lever

D2VW-01L2A-1M
D2VW-5L2A-1M



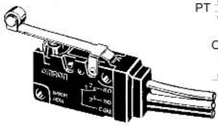


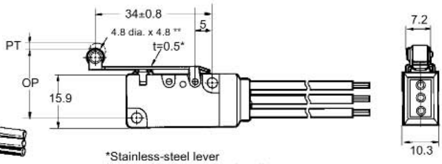
*Stainless-steel lever
**Oil-less polyacetar resin roller

OF max.	2.25 N {230 gf}
RF min.	0.20 N {20 gf}
PT max.	1.6 mm
OT min.	0.8 mm
MD max.	0.5 mm
OP	20.7±0.6 mm

Hinge Roller Lever

D2VW-01L2-1M
D2VW-5L2-1M





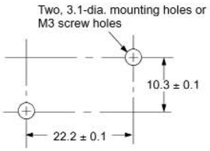
*Stainless-steel lever
**Oil-less polyacetar resin roller

OF max.	1.18 N {120 gf}
RF min.	0.15 N {15 gf}
PT max.	4.0 mm
OT min.	1.6 mm
MD max.	0.8 mm
OP	20.7±1.2 mm

Precautions

■ Mounting Dimensions

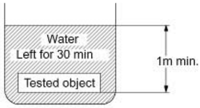
Use two M3 mounting screws with spring washers to mount the switch. Tighten the screws to a torque of 0.39 to 0.59 N • m {4 to 6 kgf • cm}.



■ Degree of Protection

The D2VW was tested under water and passed the following water-tightness tests, which however, does not mean that the D2VW can be used in the water.

IEC Publication 529, class IP67. Refer to the following illustration for the test method at OMRON.

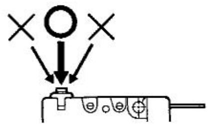


■ Protection Against Chemicals

Prevent the Switch from coming into contact with oil and chemicals. Otherwise, damage to or deterioration of Switch materials may result.

Operation

With the pin plunger models, set the Switch so that the plunger can be pushed in from directly above. Since the plunger is covered with a rubber cap, applying a force from lateral directions may cause damage to the plunger or reduction in the sealing capability.



Handling

Handle the Switch carefully so as not to break the sealing rubber of the plunger.

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

Achieving strong watertightness by sealing the internal switch and its conductor block

- The internal reed switch circuit block is separated from the mechanical actuator block, enabling the circuit block to be entirely sealed.
- Use of a reed switch maintains high contact reliability with micro load range.
- Compatible mounting dimension as miniature basic switch models V and D2VW.

Ordering Information

Model Number Legend

D2RW-01□

1 2

1. Ratings

01: 0.25A at 100 VDC

2. Actuactor

None: Pin plunger

L1: Hinge lever

L2: Hinge roller lever

L3: Simulated roller lever

List of Models

Actuator	Model
Pin plunger 	D2RW-01
Hinge lever 	D2RW-01L1
Hinge roller lever 	D2RW-01L2
Simulated roller lever 	D2RW-01L3

Specifications

Ratings

Switching voltage	100 VDC max.
Switching current	0.25 A max.
Contact capacity	10 W max.

Note: The values apply under the following test conditions:
Ambient temperature: 20 ±2°C
Ambient humidity: 65 ±5%
Operating frequency: 30 operations/min

■ Characteristics

Operating speed	0.1 mm to 1m/s (pin plunger models)
Operating frequency	Mechanical: 150 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 100 VDC) between terminals of same polarity 100 MΩ min. (at 500 VDC) between current-carrying metal parts and ground
Contact resistance (initial value)	300 mΩ max.
Dielectric strength (see note 2)	200 VDC for 1 min between terminals of same polarity 500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground
Vibration resistance (see note 3)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 3)	Destruction: 500 m/s^2 {approx. 50G} max. Malfunction: 200 m/s^2 {approx. 20G} max.
Durability (see note 4)	Mechanical: 1,000,000 operations min. (30 operations/min) Electrical: 1,000,000 operations min.(15 operations/min) (100 mA at 24 VDC)
Degree of protection	IEC IP67 (circuit block only)
Degree of protection against electric shock	Class 1
Proof tracking index (PTI)	175
Ambient operating temperature	-10°C to 60°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	95% max. (for 5°C to 35°C)
Weight	Approx. 20 g (pin plunger models)

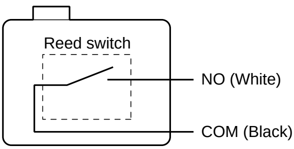
Note: 1. The data given above are initial values.
2. The dielectric strength values shown in the table are for models with a separator.
3. For the pin plunger models, the above values apply for use at both the free position and total travel position. For the lever models, they apply at the total travel position. Contact opening or closing time is within 1ms.
4. For testing conditions, contact your OMRON sales representative.

■ Contact Specifications

Maximum Applicable Load	100 μA at 5 VDC

■ Contact Form

SPST-NO

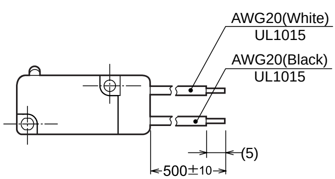


Dimensions

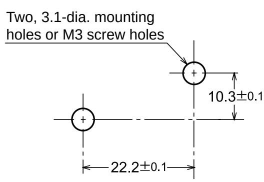
Note: All units are in millimetres unless otherwise indicated.

■ Terminals

Moulded Lead Wires



■ Mounting Holes

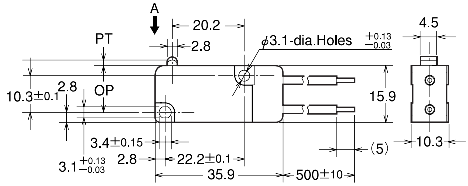


■ Dimensions and Operating Characteristics

Note: 1. All units are in millimetres unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
3. The operating characteristics are for operation in the A direction (⬇).

Pin Plunger Models

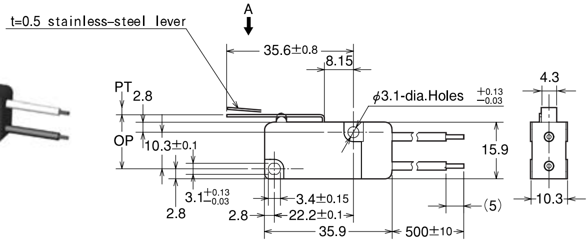
D2RW-01



OF max. **RF min.**	1.5N {153gf} 0.1N {10gf}
PT max. **OT min.** **MD max.**	1.6 mm 0.6 mm 0.8 mm
OP	14.7 ±0.6 mm

Hinge Lever Models

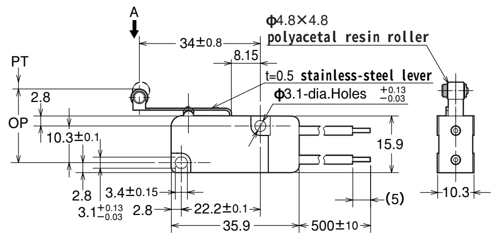
D2RW-01L1



OF max. **RF min.**	0.75N {76gf} 0.05N {5gf}
PT max. **OT min.** **MD max.**	4.0 mm 1.0 mm 1.6 mm
OP	15.2±1.5 mm

Hinge Roller Lever Models

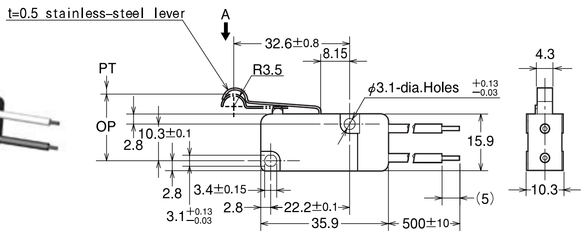
D2RW-01L2



OF max. **RF min.**	0.75N {76gf} 0.05N {5gf}
PT max. **OT min.** **MD max.**	4.0 mm 1.0 mm 1.6 mm
OP	20.7±1.5 mm

Simulated Roller Lever Models

D2RW-01L3



OF max. **RF min.**	0.75N {76gf} 0.05N {5gf}
PT max. **OT min.** **MD max.**	4.0 mm 1.0 mm 1.6 mm
OP	18.7±1.5 mm

Precautions

■ Cautions

Degree of Protection

Do not use this product in water. Although this model satisfies the test conditions for the standard given below, this test is to check the ingress of water into the switch enclosure after submerging the Switch in water for a given time. Satisfying this test condition does not mean that the Switch can be used in water.

IEC 60529: 2001 Degrees of protection provided by enclosures (IP Code)

Code: IP67 (The test to meet the standard checks for water intrusion after immersion for 30 minutes.)

Prevent the Switch to be exposed to water spray or to have water adhere to the Switch surface during sudden temperature changes, otherwise water may intrude into the interior of the Switch due to a suction effect.

Prevent the Switch from coming into contact with oil and chemicals. Otherwise, damage to or deterioration of Switch materials may result.

The environment-resistant performance of the switch differs depending on operating loads, ambient atmospheres, and installation conditions, etc. Please perform an operating test of the switch in advance under actual usage conditions.

Handling

Do not drop the Switch, as the internal mechanism of the Switch may be damaged and, as a result, the characteristics of the Switch may be degraded.

Effect of External vibrations

Note that the application of 1 kHz or higher vibration to the Switch may cause switching failure due to resonance frequencies, even though the acceleration may be small.

■ Correct Use

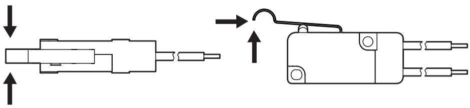
Mounting

Use M3 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.39 to 0.59 N?m {4 to 6 kgf?cm}.

Mount the Switch onto a flat surface. Mounting on an uneven surface may cause deformation of the Switch, resulting in faulty operation or damage.

Handling

When handling the Switch, ensure that uneven pressure or, as shown in the following diagram, pressure in a direction other than the operating direction is not applied to the Actuator, otherwise the Actuator or Switch may be damaged, or durabillty may be decreased.



Operating Stroke Setting

Install the Switch so that the operating body matches the movement direction of the actuator.

Set the operating stroke so that the actuator is completely disengaged when the switch is in the free position (FP), and is pushed to a point between 60% and 90% of the OT distance after the switch is operated.

Avoid shock operation to the Switch, as this may result in a degradation in the durability of the switch.

Effect of External Magnetic Field

Do not install two or more Switches in close proximity. Doing so may result in failure due to interference by leaked magnetic fields. When installing several switches, maintain a distance of at least 8mm between units.

When mounting on a steel plate, maintain a distance of at least 2mm between Switches as failure to do so may lead to changes in operating characteristics.

Avoid installing the Switch where there are strong magnetic forces, as these may cause failures in operation.

Screws used to mount the Switch should be made of brass or stainless steel (SUS304). Avoid using steel screws.

Storage Environment

Make sure that the location is free of corrosive gas, dust with no high temperature or humidity, or rapid temperature change. It is recommended that a switch be inspected before use if it is stored for three months or more after the production, depending on the location.

Effect of Contained Material

The Switch uses a corrosion inhibitor inside the unit. Before using, check the effect of outgassing.

High-quality Sealed Miniature Basic Switch Conforming to IP67 (Lead wire type only)

- ROHS Compliant.
- Monoblock construction assures high sealing capability and is ideal for dusty places or where water is sprayed.
- A wide operating temperature range of -40°C to 85°C is ideal for any operating environment.
- Ideal for the automobile, agricultural machinery, automatic vending machine, refrigerator, ice-manufacturing, bath equipment, hot-water supply, air conditioner, and factory machine industries, which require highly environment-resistive capabilities.

Ordering Information

Model Number Legend

D2SW-□□□□
1 2 3 4

1. Ratings
01: 0.1 A
3: 3 A

2. Actuator
None: Pin plunger
L1: Hinge lever
L2: Hinge roller lever
L3: Simulated hinge lever

3. Contact Form
None: SPDT
-2: SPST-NC (Lead wire model only)
-3: SPST-NO (Lead wire model only)

4. Terminals
H: Solder terminal (HS for UL and CSA approval)
D: PCB terminal (DS for UL and CSA approval)
T: Quick-connect terminal (#110) (TS for UL and CSA approval)
M: With lead wire (MS for UL and CSA approval)

List of Models

Actuator		Model 3 A	Model 0.1A
Pin plunger	Solder terminals	D2SW-3H	D2SW-01H
	Quick-connect terminals (#110)	D2SW-3T	D2SW-01T
	PCB terminals	D2SW-3D	D2SW-01D
	With lead wires	D2SW-3M	D2SW-01M
Hinge lever	Solder terminals	D2SW-3L1H	D2SW-01L1H
	Quick-connect terminals (#110)	D2SW-3L1T	D2SW-01L1T
	PCB terminals	D2SW-3L1D	D2SW-01L1D
	With lead wires	D2SW-3L1M	D2SW-01L1M
Simulated hinge lever	Solder terminals	D2SW-3L3H	D2SW-01L3H
	Quick-connect terminals (#110)	D2SW-3L3T	D2SW-01L3T
	PCB terminals	D2SW-3L3D	D2SW-01L3D
	With lead wires	D2SW-3L3M	D2SW-01L3M
Hinge roller lever	Solder terminals	D2SW-3L2H	D2SW-01L2H
	Quick-connect terminals (#110)	D2SW-3L2T	D2SW-01L2T
	PCB terminals	D2SW-3L2D	D2SW-01L2D
	With lead wires	D2SW-3L2M	D2SW-01L2M

Note: The standard lengths of the lead wires (AV0.5f) of models incorporating them are 30 cm.

Specifications

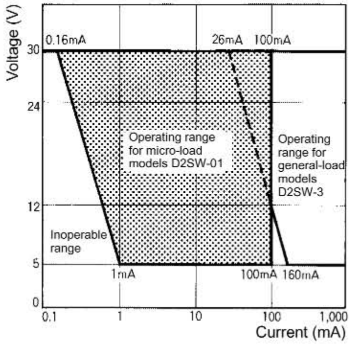
■ Ratings

Model	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
D2SW-3	125 VAC	3 A		1 A	0.5 A	1 A	0.5 A	1 A	0.5 A
	250 VAC	2 A		0.5 A	0.3 A	0.5 A	0.3 A	0.5 A	0.3 A
	30 VDC	3 A		1 A		1 A		1 A	
D2SW-01	125 VAC	0.1 A		---		---		---	
	30 VDC	0.1 A		---		---		---	

Note:
1. The above current ratings are the values of the steady-state current.
2. Inductive load has a power factor of 0.7 min. (AC) and a time constant of 7 ms max. (DC).
3. Lamp load has an inrush current of 10 times the steady-state current.
4. Motor load has an inrush current of 6 times the steady-state current.
5. The ratings values apply under the following test conditions:
   Ambient temperature: 20±2°C
   Ambient humidity: 65±5%
   Operating frequency: 30 operations/min

Model	D2SW-01	D2SW-3
Minimum applicable load	1 mA at 5 VDC	160 mA at 5 VDC

Use the Switch in the following operation range.



■ Characteristics

Item	D2SW-3	D2SW-01
Operating speed	0.1 mm to 1 m/s (at pin plunger models)	
Operating frequency	Mechanical: 300 operations/min Electrical: 60 operations/min	
Insulation resistance	100 MΩ min. (at 500 VDC)	
Contact resistance	30 mΩ max. (initial value) for terminal models	50 mΩ max. (initial value) for terminal models
	50 mΩ max. (initial value) for lead wire models	70 mΩ max. (initial value) for lead wire models
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarity 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts (see note 1)	600 VAC, 50/60 Hz for 1 min between terminals of the same polarity 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts (see note 1)
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude	
Shock resistance (see note 2)	Malfunction: 300 m/s^2 {approx. 30G} max.	
Life expectancy (see note 3)	Mechanical: 5,000,000 operations min. (OT value)	
	Electrical: 200,000 operations min. (3 A at 125 VAC), 100,000 operations min. (2 A at 250 VAC)	Electrical: 200,000 operations min.
Degree of protection	IP67 for lead wire models IP50 for terminal models	
Proof tracking index (PTI)	175	
Switch category (IEC335-1)	A (IEC335)	
Degree of protection against electric shock	Class 1	
Ambient temperature	Operating: –40°C to 85°C (with no icing)	
Ambient humidity	Operating: 95% max. (for 5°C to 35°C)	
Weight	Approx. 2 g (for a pin plunger model with terminal)	

Note:
1. The dielectric strength shown is for models with a Separator.
2. For the pin plunger models, the above values apply for use at the free position, operating position, and total travel position. For the lever models, they apply at the total travel position.
3. For testing conditions, contact your OMRON sales representative.

■ Approved Standards

UL1054 (File No. E41515)
CSA C22.2 No.55 (File No. LR21642)

Rated voltage	D2SW-3□	D2SW-01□
125 VAC 250 VAC	3 A 2 A	0.1 A ---
30 VDC	3 A	0.1 A

VDE/EN61058-1 (IEC601058-1) (File No. 85002)

Rated voltage	D2SW-01□H
125 VAC	0.1 A

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

■ Contact Specifications

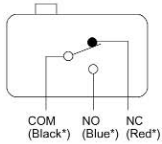
Item		D2SW-3	D2SW-01
Contact	**Specification**	Rivet	Crossbar
	Material	Silver	Gold alloy
	Gap (standard value)	0.5 mm	0.5 mm
Inrush current	**NC**	20 A max.	1 A max.
	NO	10 A max.	1 A max.

■ Separators (Insulation Sheet)

Applicable switch	Thickness (mm)	Model
SS, D2S, D2SW	0.18	Separator for SS0.18
	0.4	Separator for SS0.4

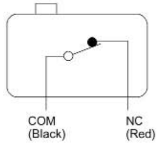
■ Contact Form

SPDT

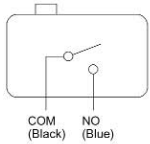


*Indicates the color of the lead wire.

SPST-NC



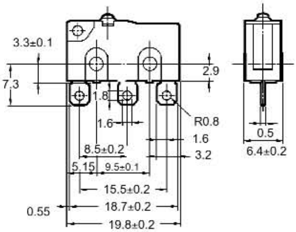
SPST-NO



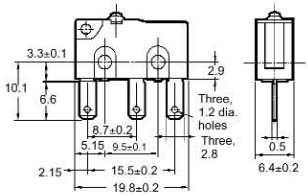
Dimensions

■ Terminals

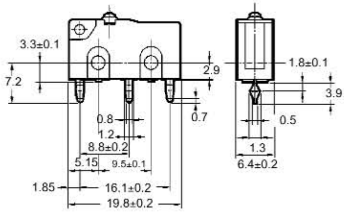
Solder Terminals (H)



Quick-connect Terminals (#110) (T)



PCB Terminals (D)



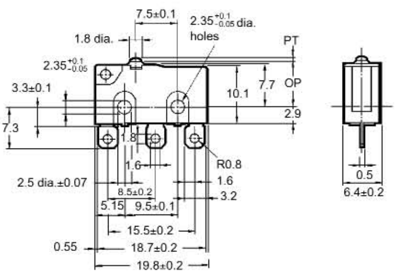
■ Dimensions and Operating Characteristics

Note:
1. All units are in millimeters unless otherwise indicated.
2. The following illustrations and dimensions are for models with soldered terminals. Refer to *Terminals* for models with quick-connect and PCB terminals (#110).
3. The dimensions not described are the same as those of models with pin plungers.
4. Unless otherwise specified, tolerance of ±0.4 mm applies to all dimensions.
5. The □ in the model number is for a terminal code such as H, T, D, or M.

Terminal Models

Pin Plunger

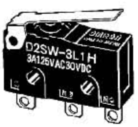
D2SW-3□
D2SW-01□

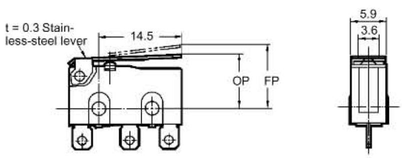


OF	1.77 N {180 gf}
RF min.	0.29 N {30 gf}
PT max.	0.6 mm
OT min.	0.5 mm
MD max.	0.1 mm
OP	8.4±0.3 mm

Hinge Lever

D2SW-3L1□
D2SW-01L1□

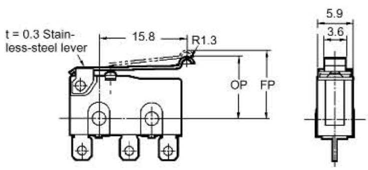




OF	0.59 N {60 gf}
RF min.	0.06 N {6 gf}
OT min.	1.0 mm
MD max.	0.8 mm
FP max.	13.6 mm
OP	8.8±0.8 mm

Simulated Hinge Lever

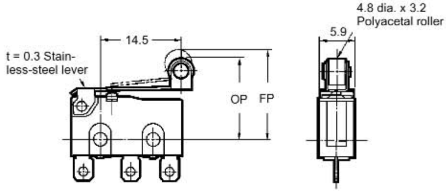
D2SW-3L3□
D2SW-01L3□



OF	0.59 N {60 gf}
RF min.	0.06 N {6 gf}
OT min.	1.0 mm
MD max.	0.8 mm
FP max.	15.5 mm
OP	10.7±0.8 mm

Hinge Roller Lever

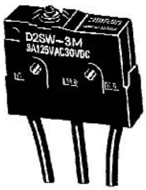
D2SW-3L2□
D2SW-01L2□

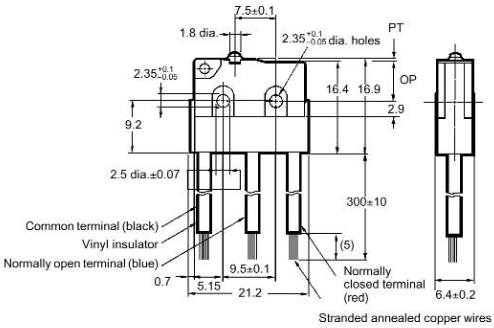


OF	0.59 N {60 gf}
RF min.	0.06 N {6 gf}
OT min.	1.0 mm
MD max.	0.8 mm
FP max.	19.3 mm
OP	14.5±0.8 mm

Lead Wire Model
Pin Plunger

D2SW-3M
D2SW-01M





OF max.	1.77 N {180 gf}
RF min.	0.29 N {30 gf}
PT max.	0.6 mm
OT min.	0.5 mm
MD max.	0.1 mm
OP	8.4±0.3 mm

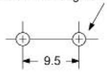
Precautions

■ Cautions

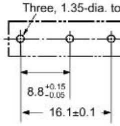
Mounting Dimensions

Use two M3 mounting screws with spring washers to mount the Switch. Tighten the screws to a torque of 0.23 to 0.26 N • m {2.3 to 2.7 kgf • cm}.

Mounting Holes



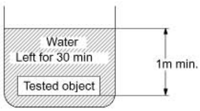
PCB Mounting



Degree of Protection

The D2SW was tested underwater and passed the following water-tightness tests, which however, does not mean that the D2SW can be used in the water.

IEC Publication 529, degree of protection IP67. Refer to the following illustration for the test method.

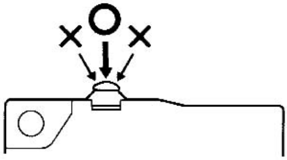


Protection Against Chemicals

Prevent the Switch from coming into contact with oil and chemicals. Otherwise, damage to or deterioration of Switch materials may result.

Operation

With the pin plunger models, set the Switch so that the plunger can be pushed in from directly above. Since the plunger is covered with a rubber cap, applying a force from lateral directions may cause damage to the plunger or reduction in the sealing capability.



Handling

Handle the Switch carefully so as not to break the sealing rubber of the plunger.

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

Sealed Basic Switch with Simplified Construction, Mounting Compatible with SS and D2SW Series

- Sealing by using rubber packing means the switch can be used in dust-proof or in temporary water-proof environments (IEC IP67).
- Switch rating of 2A at 250 VAC possible with a single-leaf movable spring. Models for micro loads are also available.
- Solder, quick-connect terminals (#110), PCB terminals and molded lead wires are available. Even-pitched PCB terminals are also standardized.

Ordering Information

Model Number Legend

D2SW-P□□□□
1 2 3 4

1. Ratings

2:	2 A at 250 VAC
01:	0.1 A at 30 VAC

2. Actuator

None:	Pin plunger
L1:	Hinge lever
L2:	Hinge roller lever
L3:	Simulated roller lever

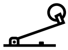
3. Contact Form

None:	SPDT
-2:	SPST-NC (Molded lead wire models only)
-3:	SPST-NO (Molded lead wire models only)

4. Terminals

None:	Solder terminals
T:	Quick-connect terminals (#110)
D:	PCB terminals (Uneven pitch)
B:	PCB terminals (Even pitch)
M:	Molded lead wires

■ List of Models

Rating	Actuator	Terminal	Solder terminals	Quick-connect terminals (#110)	PCB terminals: Uneven pitch	PCB terminals: Even pitch	Molded lead wires
2A	Pin plunger		D2SW-P2H	D2SW-P2T	D2SW-P2D	P2SW-P2B	D2SW-P2M
	Hinge lever		D2SW-P2L1H	D2SW-P2L1T	D2SW-P2L1D	D2SW-P2L1B	D2SW-P2L1M
	Hinge roller lever		D2SW-P2L2H	D2SW-P2L2T	D2SW-P2L2D	D2SW-P2L2B	D2SW-P2L2M
	Simulated roller lever		D2SW-P2L3H	D2SW-P2L3T	D2SW-P2L3D	D2SW-P2L3B	D2SW-P2L3M
0.1A	Pin plunger		D2SW-P01H	D2SW-P01T	D2SW-P01D	D2SW-P01B	D2SW-P01M
	Hinge lever		D2SW-P01L1H	D2SW-P01L1T	D2SW-P01L1D	D2SW-P01L1B	D2SW-P01L1M
	Hinge roller lever		D2SW-P01L2H	D2SW-P01L2T	D2SW-P01L2D	D2SW-P01L2B	D2SW-P01L2M
	Simulated roller lever		D2SW-P01L3H	D2SW-P01L3T	D2SW-P01L3D	D2SW-P01L3B	D2SW-P01L3M

Note: Consult your OMRON sales representative for details on SPST-NO and SPST-NC models.

Specifications

Model	Rated voltage	Resistive load
D2SW-P2	30 VDC	2 A
	250 VAC	
D2SW-P01	30 VDC	0.1 A
	125 VAC	

Note: The ratings values apply under the following test conditions.
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 20 operations/min

■ Characteristics

Item Model	D2SW-P2	D2SW-P01
Operating speed	0.1 mm to 500 mm/s (pin plunger models)	
Operating frequency	Machanical:120 operations/min max. Electrical: 20 operations/min max.	
Insulation resistance	100 MΩ min. (at 500 VDC)	
Contact resistance (initial value)	Terminal models: 50 mΩ max. Molded lead wire models: 100 mΩ max.	Terminal models: 100 mΩ max. Molded lead wire models: 150 mΩ max.
Dielectric strength (see note 2)	1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarities	600 VAC, 50/60 Hz for 1 min between terminals of the same polarities
	1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts	
Vibration resistance (see note 3)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude	
Shock resistance (see note 3)	Destruction: 1,000 m/s^2 {approx. 100G} max. Malfunction: 300 m/s^2 {approx. 30G} max.	
Durability (see note 4)	Mechanical: 1,000,000 operations min. (60 operations/min.) Electrical: 50,000 operations min. (20 operations/min)	Mechanical: 1,000,000 operations min. (60 operations/min.) Electrical: 200,000 operations min. (20 operations/min.)
Degree of protection	IEC IP67 (see note 5) (excluding the terminals on terminal models)	
Degree of protection against electric shock	Class I	
Proof tracking index (PTI)	175	
Ambient operating temperature	-20°C to 70°C (at ambient humidity of 60% max.) (with no icing)	
Ambient operating humidity	85% max. (for 5°C to 35°C)	
Weight	Approx. 2 g (pin plunger models with terminals)	

Note: 1. The data given above are initial values.
2. The dielectric strength shown in the table indicates a value for models with a Separator.
3. For the pin plunger models, the above values apply for both the free position and total travel position. For the lever models, the values apply at the total travel position. Contact opening or closing time is within 1ms.
4. Consult your OMRON sales representative for testing conditions.
5. The test to meet standards checks for water intrusion after immersion for 30 minutes. The test does not check for switching operation underwater. Refer to **'Degree of Protection'** of **'Instructions for Correct Use'**.

■ Approved Standards

Consult your OMRON sales representative for specific models with standard approval.

UL1054 (File No. E41515) /CSA C22.2 No. 55 (UL approval)

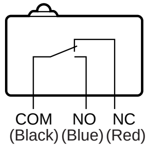
Model	Rated voltage	Resistive load
125 VAC **250 VAC**	**–** **2 A**	**0.1 A** **–**
30 VDC	**2 A**	**0.1 A**

■ Approved Standards

Item	Model	D2SW-P2	D2SW-P01
Contact	Specification	Rivet	Crossbar
	Material	Silver alloy	Gold alloy
	Gap (Standard value)	0.5 mm	
Minimum applicable load (see note)		160 mA at 5 VDC	1 mA at 5 VDC

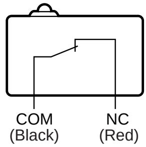
■ Contact Form

SPDT



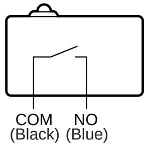
SPST-NC

(Molded lead wire models only)



SPST-NO

(Molded lead wire models only)



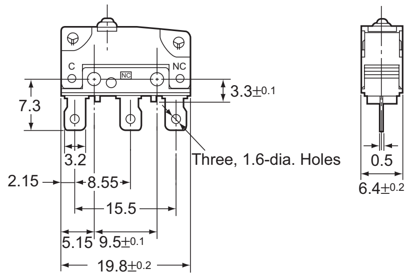
Note: Lead wire colors are indicated in parentheses.

Dimensions

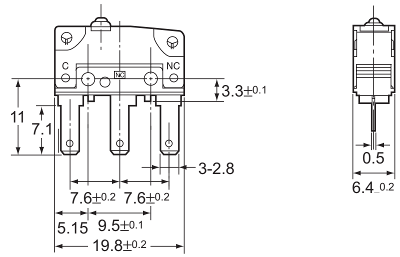
■ Terminals

Note: 1. All units are in millimetres unless otherwise indicated.
2.Terminal plate thickness is 0.5 mm for all models.

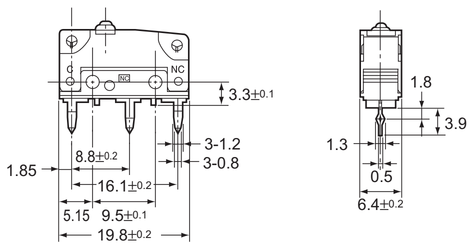
Solder Terminals



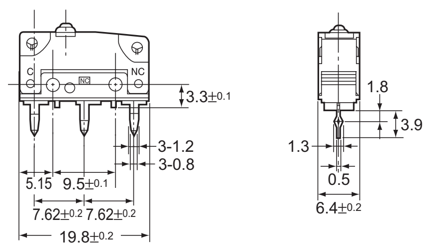
Quick-connect Terminals (#110)



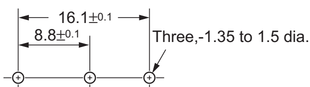
PCB Terminals (Uneven pitch)



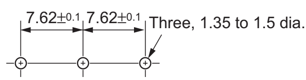
PCB Terminals (Even pitch)



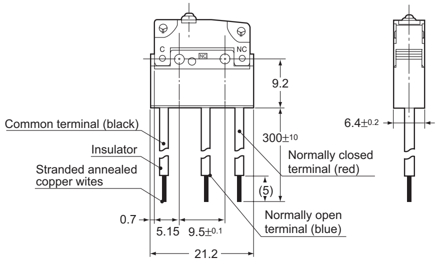
PCB Mounting Dimensions (Reference)



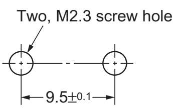
PCB Mounting Dimensions (Reference)



Moulded Lead wires



■ Mounting Holes

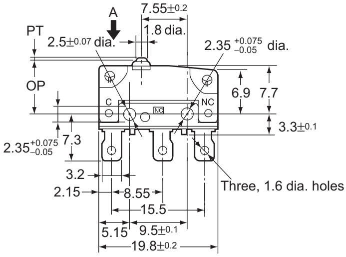


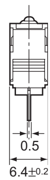
■ Dimensions and Operating Characteristics

Note: 1. All units are in millimetres unless otherwise indicated.
2. The □ in the model number is for the contact form code or the terminal code.
3. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
4. The operating characteristics are for operation in the A direction (⬇)

Pin Plunger Models
D2SW-P2□□
D2SW-P01□□

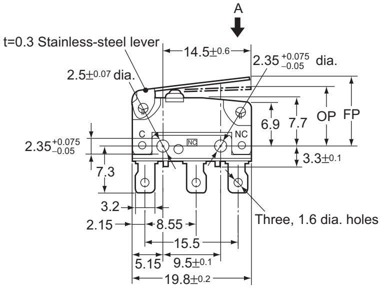
Item	D2SW-P2□□	D2SW-P01□□
OF max. **RF min.**	1.8 N {183 gf} 0.2 N {20 gf}	
PT max. **OT min.** **MD max.**	0.6 mm 0.4 mm 0.15 mm	
OP	8.4±0.3 mm	

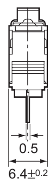




Hinge Lever Models
D2SW-P2L1□□
D2SW-P01L1□□

Item	D2SW-P2L1□□	D2SW-P01L1□□
OF max. **RF min.**	0.6 N {61 gf} 0.05 N {5 gf}	
OT min. **MD max.**	0.8 mm 0.8 mm	
FP max. **OP**	13.6 mm 8.8±0.8 mm	

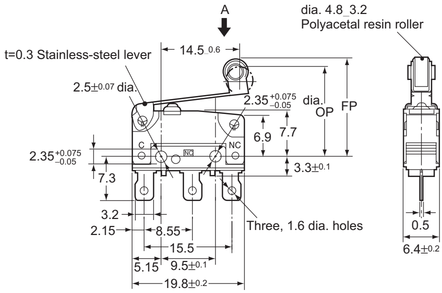




Hinge Roller Lever Models

D2SW-P2L2□□
D2SW-P01L2□□

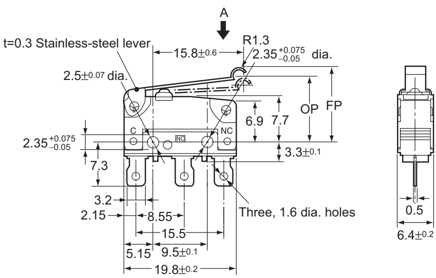
Item	D2SW-P2L1□□	D2SW-P01L1□□
OF max. **RF min.**	0.6 N {61 gf} 0.05 N {5 gf}	
OT min. **MD max.**	0.8 mm 0.8 mm	
FP max. **OP**	19.3 mm 14.5±0.8 mm	



Simulated Roller Lever Models

D2SW-P2L3□□
D2SW-P01L3□□

Item	D2SW-P2L3□□	D2SW-P01L3□□
OF max. **RF min.**	0.6 N {61 gf} 0.05 N {5 gf}	
OT min. **MD max.**	0.8 mm 0.8 mm	
FP max. **OP**	15.5 mm 10.7±0.8 mm	



Precautions

■ Cautions

DEGREE OF PROTECTION

Do not use this product in water. Although this models satisfy the test conditions for the standard given below, this test is to check the ingress of water into the switch enclosure after submerging the Switch in water for a given time. Satisfying this test condition does not mean that the Switch can be used in water.

IEC 60529: 2001 Degrees of protection provided by enclosures (IP Code)

Code: IP67 (The test to meet the standard checks for water intrusion after immersion for 30 minutes.)

Do not operate the Switch when it is exposed to water spray, or when water drops adhere to the Switch surface, or during sudden temperature changes, otherwise water may intrude into the interior of the Switch due to a suction effect.

Prevent the Switch from coming into contact with oil and chemicals. Otherwise, damage to or deterioration of Switch materials may result.

Do not use the Switch in areas where it is exposed to silicon adhesives, oil, or grease, otherwise faulty contact may result due to the generation of silicon oxide.

The environment-resistant performance of the switch differs depending on operating loads, ambient atmospheres, and installation conditions, etc. Please perform an operating test of the switch in advance under actual usage conditions.

CONNECTING TO TERMINALS

Connecting to Solder Terminals

When soldering the lead wire to the terminal, first insert the lead wire conductor through the terminal hole and the conduct soldering.

Make sure that the temperature at the tip of the soldering iron is 350 to 400°C. Do not take more than 3 seconds to solder the switch terminal, and do not impose external force on the terminal for 1 min after soldering. Improper soldering involving an excessively high temperature or excessive soldering time may deteriorate the characteristics of the Switch.

Connecting to Quick-connect Terminals

Wire the quick-connect terminals (#110) with receptacles. Insert the terminals straight into the receptacles. Do not impose excessive force on the terminal in the horizontal direction, otherwise the terminal may be deformed or the housing may be damaged.

Connecting to PCB Terminal Boards

When using automatic soldering baths, we recommend soldering at 260±5°C within 5 seconds. Make sure that the liquid surface of the solder does not flow over the edge of the board.

When soldering by hand, as a guideline, solder with a soldering iron with a tip temperature of 350 to 400°C within 3 seconds, and do not apply any external force for at least 1 minutes after soldering. When applying solder, keep the solder away from the case of the Switch and do not allow solder or flux to enter the case.

SIDE-ACTUATED (CAM/DOG) OPERATION

When using a cam or dog to operate the Switch, factors such as the operating speed, operating frequency, push-button indentation, and material and shape of the cam or dog will affect the durability of the Switch. Confirm performance specifications under actual operation conditions before using the Switch in applications.

■ Correct Use

MOUNTING

Turn OFF the power supply before mounting or removing the Switch, wiring, or performing maintenance or inspection. Failure to do so may result in electric shock or burning.

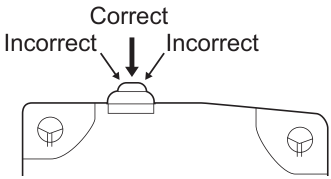
Use M2.3 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.23 to 0.26 N·m {2.3 to 2.7 kgf·cm}. Exceeding the specified torgue may result in deterioration of the sealing or damage.

Mount the Switch onto a flat surface. Mounting on an uneven surface may cause deformation of the Switch, resulting in faulty operation or damage.

OPERATING BODY

Use an operating body with low frictional resistance and of a shape that will not interfere with the sealing rubber, otherwise the plunger may be damaged or the sealing may deteriorate.

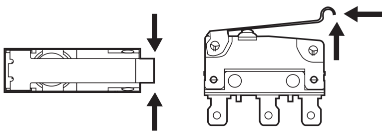
With the pin plunger models, set the Switch so that the plunger can be pushed in from directly above. Since the plunger is covered with a rubber cap, applying a force from lateral directions may cause damage to the plunger or reduction in the sealing capability.



HANDLING

Do not handle the Switch in a way that may cause damage to the sealing rubber.

When handling the Switch, ensure that uneven pressure or, as shown in the following diagram, pressure in a direction other than the operating direction is not applied to the Actuator, otherwise the Actuator or Switch may be damaged, or durability may be decreased.



WIRING MOLDED LEAD WIRE MODELS

When wiring molded lead wire models, ensure that there is no weight on the wire or that there are no sharp bends near the parts where the wire is drawn out. Otherwise, damage to the Switch or deterioration in the sealing may result.

OPERATING STROKE SETTING

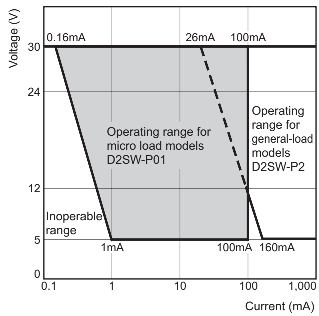
Set the operating stroke so that the actuator is completely disengaged when the switch is in the free position (FP), and is pushed to a point between 60% and 90% of the OT distance after the switch is operated.

Insufficient or excessive pushing of the actuator may result in decreased switch durability or damage to the switch.

USING MICRO LOADS

Using a model for ordinary loads to open or close the contact of a micro load circuit may result in a faulty contact. Use models that operate in the following range. However, even when using micro load models within the operating range shown below, if inrush current occurs when the contact is opened or closed, it may increase contact wear and so decrease durability. Therefore, insert a contact protection circuit where necessary. The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (l60).

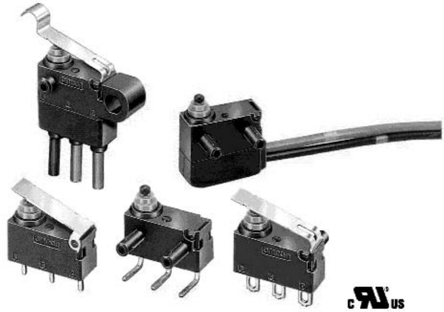
The equation, $\lambda 60 = 0.5 \times 10^{-6}$/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.



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

Smallest sealed snap-action switch in the industry with a very long stroke for reliable ON/OFF action

- ROHS Compliant.
- The case dimensions are 78% of conventional models, contributing to down-sizing of mechanical modules.
- Extra-long stroke even without levers, (OT: 1.4mm)



Ordering Information

■ Model Number Legend:

D2HW-□□□□□
1 2 3 4 5

1. Mounting Structure

A: Without posts (base-mounting)
BR: Posts on right
BL: Posts on left
C: M3-screw mounting

2. Ratings

2: 1 mA at 5 VDC to 2 A at 12 VDC

3. Actuator

0: Pin plunger
1: Hinge lever
2: Long hinge lever
3: Simulated roller hinge lever
4: Hinge roller lever
6: Leaf lever
7: Simulated roller leaf lever
8: Long leaf lever

4. Contacts

1: SPDT
2: SPST-NC (Molded lead wire models only.)
3: SPST-NO (Molded lead wire models only.)

5. Terminals

D: Straight PCB terminals
DR: Right-angled PCB terminals
DL: Left-angled PCB terminals
H: Solder terminals
M: Molded lead wires downwards
MR: Molded lead wires on right-side
ML: Molded lead wires on left-side

Note Add “S” to the end of the model number for the UL/CSA-approved version.

■ List of Models

PCB-mounted Models

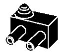
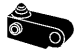
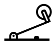
Actuator	Terminals		Contact form	Model: With posts on right	Model: With posts on left	Model: Without posts
Pin plunger	For PCB	Straight	SPDT	---	---	D2HW-A201D
		Angled		D2HW-BR201DR	D2HW-BL201DL	---
Hinge lever		Straight		---	---	D2HW-A211D
		Angled		D2HW-BR211DR	D2HW–BL211DL	---
Long hinge lever		Straight		---	---	D2HW-A221D
		Angled		D2HW-BR221DR	D2HW-BL221DL	---
Simulated roller hinge lever		Straight		---	---	D2HW-A231D
		Angled		D2HW-BR231DR	D2HW-BL231DL	---

Note Add "S" to the end of the model number for the UL/CSA-approved version. Consult your OMRON representative for details.

Models with Solder Terminals or Molded Lead Wires

Actuator	Terminals		Contact form	Model: With posts on right	Model: With posts on left	Model: M3-screw mounting
Pin plunger	Solder		SPDT	D2HW-BR201H	D2HW-BL201H	D2HW-C201H
	Molded lead wires	Downwards	SPDT	D2HW-BR201M	D2HW-BL201M	D2HW-C201M
			SPST-NC	D2HW-BR202M	D2HW-BL202M	D2HW-C202M
			SPST-NO	D2HW-BR203M	D2HW-BL203M	D2HW-C203M
		Right-side	SPST-NC	D2HW-BR202MR	D2HW-BL202MR	D2HW-C202MR
			SPST-NO	D2HW-BR203MR	D2HW-BL203MR	D2HW-C203MR
		Left-side	SPST-NC	D2HW-BR202ML	D2HW-BL202ML	---
			SPST-NO	D2HW-BR203ML	D2HW-BL203ML	---
Hinge lever	Solder		SPDT	D2HW-BR211H	D2HW-BL211H	D2HW-C211H
	Molded lead wires	Downwards	SPDT	D2HW-BR211M	D2HW-BL211M	D2HW-C211M
			SPST-NC	D2HW-BR212M	D2HW-BL212M	D2HW-C212M
			SPST-NO	D2HW-BR213M	D2HW-BL213M	D2HW-C213M
		Right-side	SPST-NC	D2HW-BR212MR	D2HW-BL212MR	D2HW-C212MR
			SPST-NO	D2HW-BR213MR	D2HW-BL213MR	D2HW-C213MR
		Left-side	SPST-NC	D2HW-BR212ML	D2HW-BL212ML	---
			SPST-NO	D2HW-BR213ML	D2HW-BL213ML	---
Long hinge lever	Solder		SPDT	D2HW-BR221H	D2HW-BL221H	D2HW-C221H
	Molded lead wires	Downwards	SPDT	D2HW-BR221M	D2HW-BL221M	D2HW-C221M
			SPST-NC	D2HW-BR222M	D2HW-BL222M	D2HW-C222M
			SPST-NO	D2HW-BR223M	D2HW-BL223M	D2HW-C223M
		Right-side	SPST-NC	D2HW-BR222MR	D2HW-BL222MR	D2HW-C222MR
			SPST-NO	D2HW-BR223MR	D2HW-BL223MR	D2HW-C223MR
		Left-side	SPST-NC	D2HW-BR222ML	D2HW-BL222ML	---
			SPST-NO	D2HW-BR223ML	D2HW-BL223ML	---

Note: **1.** The length of standard lead wires (AVSS0.5) for molded lead wire models is 30 cm.
2. Add "S" to the end of the model number for the UL/CSA-approved version. Consult your OMRON representative for details.

Actuator	Terminals		Contact form	Model		
				With posts on right 	With posts on left 	M3-screw mounting 
Simulated roller hinge lever 	Solder		SPDT	D2HW-BR231H	D2HW-BL231H	D2HW-C231H
	Molded lead wires	Downwards	SPDT	D2HW-BR231M	D2HW-BL231M	D2HW-C231M
			SPST-NC	D2HW-BR232M	D2HW-BL232M	D2HW-C232M
			SPST-NO	D2HW-BR233M	D2HW-BL233M	D2HW-C233M
		Right-side	SPST-NC	D2HW-BR232MR	D2HW-BL232MR	D2HW-C232MR
			SPST-NO	D2HW-BR233MR	D2HW-BL233MR	D2HW-C233MR
		Left-side	SPST-NC	D2HW-BR232ML	D2HW-BL232ML	---
			SPST-NO	D2HW-BR233ML	D2HW-BL233ML	---
Hinge roller lever 	Solder		SPDT	D2HW-BR241H	D2HW-BL241H	D2HW-C241H
	Molded lead wires	Downwards	SPDT	D2HW-BR241M	D2HW-BL241M	D2HW-C241M
			SPST-NC	D2HW-BR242M	D2HW-BL242M	D2HW-C242M
			SPST-NO	D2HW-BR243M	D2HW-BL243M	D2HW-C243M
		Right-side	SPST-NC	D2HW-BR242MR	D2HW-BL242MR	D2HW-C242MR
			SPST-NO	D2HW-BR243MR	D2HW-BL243MR	D2HW-C243MR
		Left-side	SPST-NC	D2HW-BR242ML	D2HW-BL242ML	---
			SPST-NO	D2HW-BR243ML	D2HW-BL243ML	---
Leaf lever 	Solder		SPDT	D2HW-BR261H	D2HW-BL261H	D2HW-C261H
	Molded lead wires	Downwards	SPDT	D2HW-BR261M	D2HW-BL261M	D2HW-C261M
			SPST-NC	D2HW-BR262M	D2HW-BL262M	D2HW-C262M
			SPST-NO	D2HW-BR263M	D2HW-BL263M	D2HW-C263M
		Right-side	SPST-NC	D2HW-BR262MR	D2HW-BL262MR	D2HW-C262MR
			SPST-NO	D2HW-BR263MR	D2HW-BL263MR	D2HW-C263MR
		Left-side	SPST-NC	D2HW-BR262ML	D2HW-BL262ML	---
			SPST-NO	D2HW-BR263ML	D2HW-BL263ML	---
Simulated roller leaf lever 	Solder		SPDT	D2HW-BR271H	D2HW-BL271H	D2HW-C271H
	Molded lead wires	Downwards	SPDT	D2HW-BR271M	D2HW-BL271M	D2HW-C271M
			SPST-NC	D2HW-BR272M	D2HW-BL272M	D2HW-C272M
			SPST-NO	D2HW-BR273M	D2HW-BL273M	D2HW-C273M
		Right-side	SPST-NC	D2HW-BR272MR	D2HW-BL272MR	D2HW-C272MR
			SPST-NO	D2HW-BR273MR	D2HW-BL273MR	D2HW-C273MR
		Left-side	SPST-NC	D2HW-BR272ML	D2HW-BL272ML	---
			SPST-NO	D2HW-BR273ML	D2HW-BL273ML	---
Long leaf lever 	Molded lead wires	Downwards	SPDT	D2HW-BR281M	D2HW-BL281M	D2HW-C281M
			SPST-NC	D2HW-BR282M	D2HW-BL282M	D2HW-C282M
			SPST-NO	D2HW-BR283M	D2HW-BL283M	D2HW-C283M
		Right–side	SPST-NC	---	---	D2HW-C282MR
			SPST-NO	---	---	D2HW-C283MR

Note: **1.** The length of standard lead wires (AVSS 0.5) for molded lead wire models is 30 cm.
2. Add "S" to the end of the model number for the UL/CSA-approved version. Consult your OMRON representative for details.

Specifications

■ Ratings

Rated voltage (V)	Resistive load
125 VAC	0.1 A
12 VDC 24 VDC 42 VDC	2 A 1 A 0.5 A

Note: The ratings values apply under the following test conditions:
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 30 operations / min

■ Characteristics

Item	Specification
Operating speed	1 mm to 500 mm/s (for pin plunger models)
Operating frequency	30 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	100 mΩ max. (molded lead wire models: 150 mΩ max.)
Dielectric strength	600 VAC, 50/60 Hz for 1 min between terminals of the same polarity 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 2)	Destruction: 1,000 m/s^2 {approx. 100 G} max. Malfunction: 300 m/s^2 {approx. 30 G} max.
Durability (see note 3)	Mechanical: 1,000,000 operations min. (30 operations/min) Electrical: 100,000 operations min. (20 operations/min)
Degree of protection	IEC IP67 (excluding the terminals on terminal models)
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient operating temperature	–40 to 85°C (with no icing)
Ambient operating humidity	95% max. (for 5 to 35°C)
Weight	Approx. 0.7 g (for pin plunger models with terminals)

Note: **1.** The data given above are initial values.
2. For the pin plunger models, the above values apply for use at the free position, operating position, and total travel position. For the lever models, they apply at the total travel position.
The values shown apply for malfunctions of 1 ms max.
3. For testing conditions, contact your OMRON sales representative.

■ Approved Standards

UL1054 (File No. E41515)/CSA C22.2 No. 55 (cUL approval)

Consult your OMRON sales representative for models with standard approval.

Rated voltage	D2HW
125 VAC	0.1 A
12 VDC	2 A

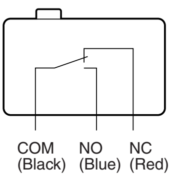
■ Contact Specifications

Item	Specification
Specification	Crossbar
Material	Gold alloy
Gap (standard value)	0.5 mm
Minimum applicable load (see note)	1 mA at 5 VDC

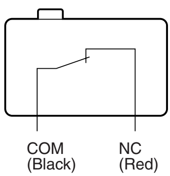
Note Minimum applicable loads are indicated by N standard reference values. This value represents the failure rate at a 60% (λ60) reliability level.
The equation λ60=035×10–6/operations indicates that a failure rate of 1/2,000,000 operations can be expected at a reliability level of 60%.

■ Contact Form

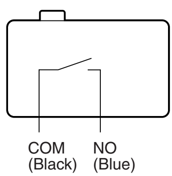
SPDT



SPST-NC (Molded Lead Wire Models Only)



SPST-NO (Molded Lead Wire Models Only)



Note Molded lead wire colors are indicated in parentheses.

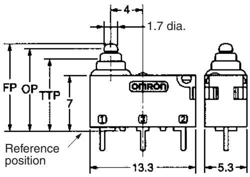
Dimensions

■ Mounting Structure and Reference Positions for Operating Characteristics

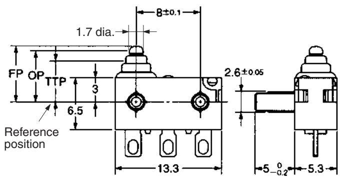
Note All units are in millimeters unless otherwise indicated.

The reference positions used for FP, OP, and TTP values are as shown below for each type of mounting.

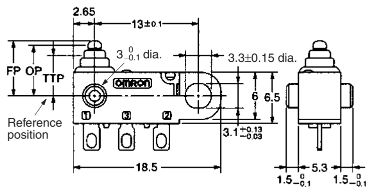
D2HW-A☐ Models without Posts



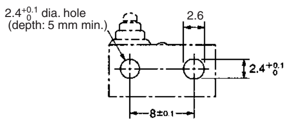
D2HW-B☐ Models with Posts



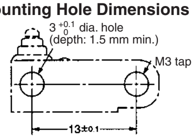
D2HW-C☐ M3-screw Mounting Models



Mounting Hole Dimensions (Reference)

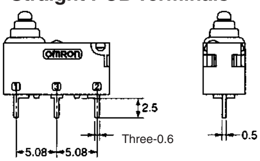


Mounting Hole Dimensions (Reference)

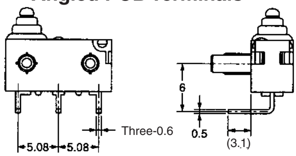


■ Terminals

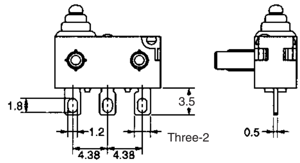
Straight PCB Terminals



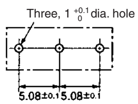
Angled PCB Terminals



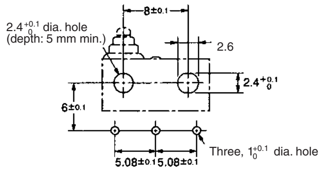
Solder Terminals



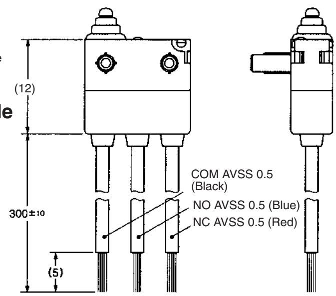
PCB Cutout Dimensions (Reference)



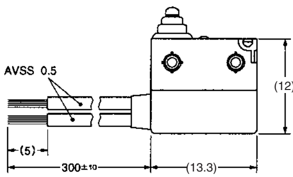
PCB Cutout Dimensions (Reference)



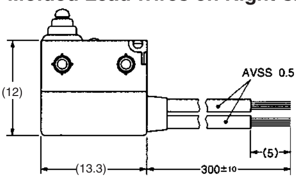
Molded Lead Wires Downwards



Molded Lead Wires on Left-side



Molded Lead Wires on Right-side

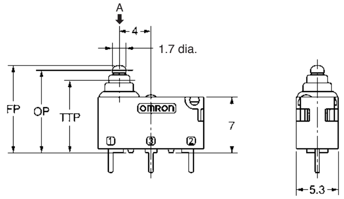


■ Dimensions and Operating Characteristics

Note: 1. All units are in millimeters unless otherwise indicated.
2. Dimensions not indicated in the above diagrams have a tolerance of ±0.2 mm.
3. The operating characteristics are for operation in the A direction (A).

Pin Plunger Models

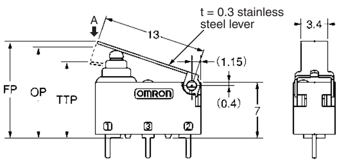
D2HW-□20□□



Charac-teristic	Models without posts	Models with posts and M3-mounting models
OF max.	0.75 N {76 gf}	
RF min.	0.10 N {10 gf}	
OT ref.	(1.4 mm)	
MD max.	0.25 mm	
FP max.	11.2 mm	7.2 mm
OP	10.4±0.2 mm	6.4±0.2 mm
TTP max.	9.1 mm	5.1 mm

Hinge Lever Models

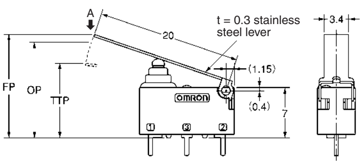
D2HW-□21□□



Charac-teristic	Models without posts	Models with posts and M3-mounting models
OF max.	0.75 N {76 gf}	
RF min.	0.07 N {7 gf}	
OT ref.	(1.6 mm)	
MD max.	0.5 mm	
FP max.	12.8 mm	8.8 mm
OP	11.5±0.5 mm	7.5±0.5 mm
TTP max.	10 mm	6 mm

Long Hinge Lever Models

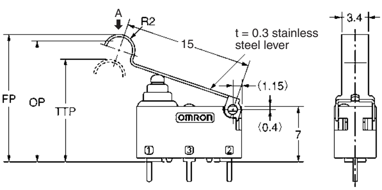
D2HW-□22□□



Charac-teristic	Models without posts	Models with posts and M3-mounting models
OF max.	0.5 N {50 gf}	
RF min.	0.03 N {3 gf}	
OT ref.	(2.5 mm)	
MD max.	0.8 mm	
FP max.	15.5 mm	11.5 mm
OP	13.3±0.8 mm	9.3±0.8 mm
TTP max.	11 mm	7 mm

Simulated Roller Hinge Lever Models

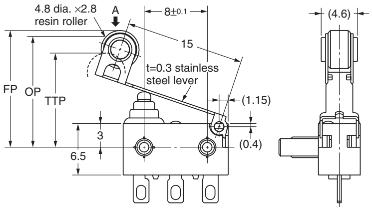
D2HW-□23□□



Charac-teristic	Models without posts	Models with posts and M3-mounting models
OF max.	0.65 N {66 gf}	
RF min.	0.05 N {5 gf}	
OT ref.	(1.9 mm)	
MD max.	0.5 mm	
FP max.	16.5 mm	12.5 mm
OP	15.2±0.5 mm	11.2±0.5 mm
TTP max.	13.5 mm	9.5 mm

Hinge Roller Lever Models

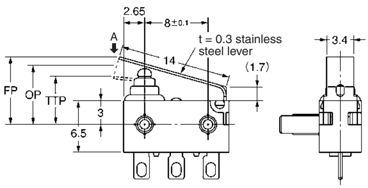
D2HW-□24□□



Characteristic	Models with posts and M3-mounting models
OF max. RF min.	0.65 N {66 gf} 0.03 N {3 gf}
OT ref. MD max.	(1.9 mm) 0.6 mm
FP max. OP TTP max.	15.3 mm 14±0.6 mm 12.3 mm

Leaf Lever Models

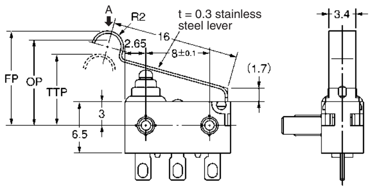
D2HW-□26□□



Characteristic	Models with posts and M3-mounting models
OF max. RF min.	1.8 N {183 gf} 0.20 N {20 gf}
OT ref. MD max.	(1.8 mm) 0.5 mm
FP max. OP TTP max.	9.3 mm 7.4±0.5 mm 5.8 mm

Simulated Roller Leaf Lever Models

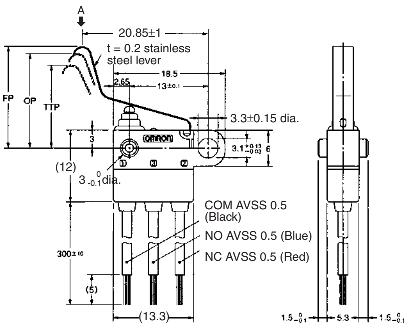
D2HW-□27□□



Characteristic	Models with posts and M3-mounting models
OF max. RF min.	1.8 N {183 gf} 0.20 N {20 gf}
OT ref. MD max.	(2.0 mm) 0.5 mm
FP max. OP TTP max.	12.5 mm 10.8±0.5 mm 8.9 mm

Long Leaf Lever Models

D2HW-□28□□



Characteristic	Models with posts and M3-mounting models
OF max. RF min.	0.9 N {92 gf} 0.05 N {5 gf}
OT ref. MD max.	(2.8 mm) 0.7 mm
FP max. OP TTP max.	19 mm 15.4±1.5 mm 12.8 mm

Precautions

■ Cautions

Degree of Protection

Do not use this product in water. Although molded lead wire models satisfy the test conditions for the standard given below, this test is to check the ingress of water into the switch enclosure after submerging the Switch in water for a given time. Satisfying this test condition does not mean that the Switch can be used in water.

IEC Publication 529, degree of protection IP67.

Do not operate the Switch when it is exposed to water spray, or when water drops adhere to the Switch surface, or during sudden temperature changes, otherwise water may intrude into the interior of the Switch due to a suction effect.

Prevent the Switch from coming into contact with oil and chemicals. Otherwise, damage to or deterioration of Switch materials may result.

Do not use the Switch in areas where it is exposed to silicon adhesives, oil, or grease, otherwise faulty contact may result due to the generation of silicon oxide.

Terminal Connection

When soldering the lead wire to the terminal, first insert the lead wire conductor through the terminal hole and then conduct soldering.

Made sure that the capacity of the soldering iron is 30 W maximum. Do not take more than 3 s to solder the switch terminal.

Improper soldering involving an excessively high temperature or excessive soldering time may deteriorate the characteristics of the Switch.

When soldering the lead wire to the PCB terminal, pay careful attention so that the flux and solder liquid level does not exceed the PCB level.

Side-actuated (Cam/Dog) Operation

When using a cam or dog to operate the Switch, factors such as the operating speed, operating frequency, push-button indentation, and material and shape of the cam or dog will affect the durability of the Switch. Confirm performance specifications under actual operation conditions before using the Switch in applications.

■ Correct Use

Mounting

Turn OFF the power supply before mounting or removing the Switch, wiring, or performing maintenance or inspection. Failure to do so may result in electric shock or burning.

For M3-screw mounting models, use M3 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.29 N·m {3 kgf·cm}. Exceeding the specified torque may result in deterioration of the sealing or damage.

For models with posts, secure the posts by thermal caulking or by pressing into an attached device. When pressed into an attached device, provide guides on the opposite ends of the posts to ensure that they do not fall out or rattle.

Mount the Switch onto a flat surface. Mounting on an uneven surface may cause deformation of the Switch, resulting in faulty operation or damage.

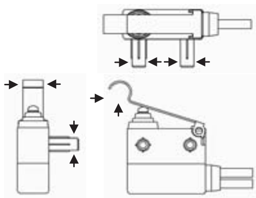
Operating Body

Use an operating body with low frictional resistance and of a shape that will not interfere with the sealing rubber, otherwise the plunger may be damaged or the sealing may deteriorate.

Handling

Do not handle the Switch in a way that may cause damage to the sealing rubber.

When handling the Switch, ensure that pressure is not applied to the posts in the directions shown in the following diagram. Also, ensure that uneven pressure or pressure in a direction other than the operating direction is not applied to the Actuator as shown in the following diagram. Otherwise, the post, Actuator, or Switch may be damaged, or the service life may be reduced.



Wiring Molded Lead Wire Models

When wiring molded lead wire models, ensure that there is no weight on the wire or that there are no sharp bends near the parts where the wire is drawn out. Otherwise, damage to the Switch or deterioration in the sealing may result.

Using Micro Loads

Even when using micro load models within the operating range, inrush currents or surges may decrease the life expectancy of the Switch. Therefore, insert a contact protection circuit where necessary.

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

Ultra-small and Highly Sealed

- ROHS Compliant.
- Degree of protection for the lead wire models conforms to IEC IP67. (Lead wire type only).
- Wide range of operating temperature from -40°C to 85°C .
- Gold crossbar contact and coil spring offer long life expectancy and high contact reliability.

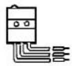
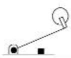
Ordering Information

Model Number Legend

D2JW-01□-□
1 2 3

1. **Ratings**
   01: 0.1 A, 30 VDC
2. **Actuator**
   1: Pin plunger
   K1A1: Short hinge lever
   K11: Hinge lever
   K31: Simulated hinge lever
   K21: Hinge roller lever
3. **Terminal**
   None: Solder terminal
   MD: Molded lead wire terminal

List of Models

Actuator	Model	
	Solder 	Molded lead wire 
Pin plunger 	D2JW-011	D2JW-011-MD
Short hinge lever 	D2JW-01K1A1	D2JW-01K1A1-MD
Hinge lever 	D2JW-01K11	D2JW-01K11-MD
Simulated hinge lever 	D2JW-01K31	D2JW-01K31-MD
Hinge roller lever 	D2JW-01K21	D2JW-01K21-MD

Note: The standard lengths of the lead wires (AVS0.3f) of models incorporating them are 30 cm.

Specifications

■ Ratings

Electrical ratings	0.1 A at 30 VDC (resistive load)

The ratings values apply under the following test conditions:

Ambient temperature: 20±2°C

Ambient humidity: 65±5%

Operating frequency: 30 operations/min

Minimum applicable load	1 mA at 5 VDC

■ Characteristics

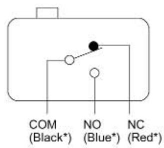
Operating speed	1 mm to 250 mm/s (see note 1)
Operating frequency	Mechanical: 240 operations/min Electrical: 30 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	100 mΩ max. (molded lead wire models: 140 mΩ max.)
Dielectric strength	600 VAC, 50/60 Hz for 1 min between terminals of the same polarity 1,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground (see note 2), and between each terminal and non-current-carrying metal parts
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note 3)
Shock resistance	Destruction: 1,000 m/s^2 {approx. 100G} max. Malfunction: 200 m/s^2 {approx. 20G} max. (see note 3)
Life expectancy	Mechanical: 1,000,000 operations min. Electrical: 100,000 operations min.
Degree of protection	IP67 for molded lead wire terminal models IP50 for solder terminal models
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient temperature	Operating: −40°C to 85°C (with no icing or condensation)
Ambient humidity	Operating: 35% to 98%
Weight	Approx. 7 g (molded lead wire models, pin plunger models)

Note: 1. The operating speed value shown is for pin plunger models. (For different models, contact your OMRON representative.)
2. The dielectric strength values shown apply for use with Separator (terminal type).
3. The values shown apply for malfunctions of 1 ms max.

■ Contact Specifications

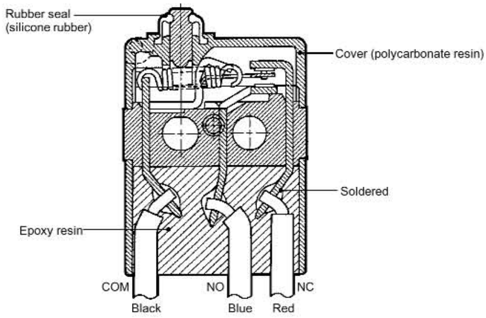
Contact	Specification	Crossbar
	Material	Gold alloy
	Gap (standard value)	0.5 mm
Inrush current	NC	0.1 A max.
	NO	0.1 A max.

■ Contact Form (SPDT)



*Indicates the color of the lead wire.

Nomenclature



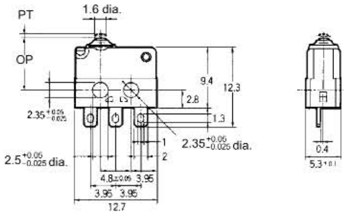
Dimensions

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. Actuators of the molded lead wire terminals are omitted here. The dimensions (other than the terminals) and operating characteristics of the molded lead wire terminals are the same as those for the solder terminals.

■ Dimensions and Operating Characteristics

Pin Plunger

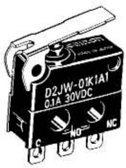
D2JW-011

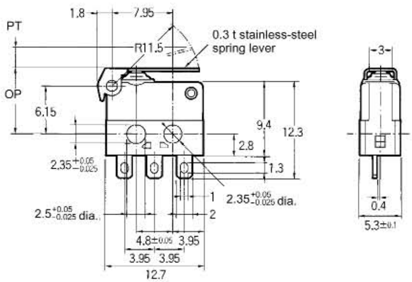


OF max.	2.45 N {250 gf}
RF min.	0.98 N {100 gf}
PT max.	0.6 mm
OT min.	0.3 mm
MD max.	0.1 mm
OP	8.1±0.3 mm

Short Hinge Lever

D2JW-01K1A1

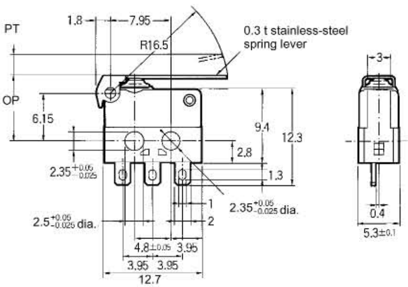




OF max.	1.15 N {117 gf}
RF min.	0.23 N {23 gf}
PT max.	5.4 mm
OT min.	0.7 mm
MD max.	0.5 mm
OP	8.4±0.8 mm

Hinge Lever

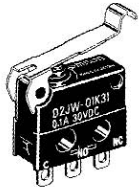
D2JW-01K11

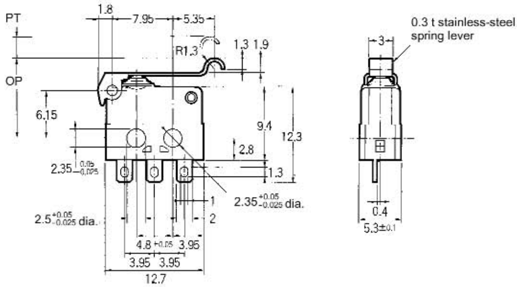


OF max.	0.80 N {82 gf}
RF min.	0.15 N {16 gf}
PT max.	6.4 mm
OT min.	1.4 mm
MD max.	0.7 mm
OP	8.4±0.8 mm

Simulated Hinge Lever

D2JW-01K31

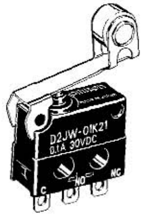


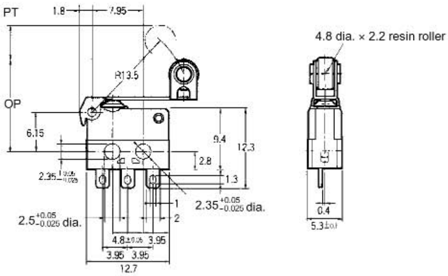


OF max.	0.95 N {97 gf}
RF min.	0.19 N {20 gf}
PT max.	5.5 mm
OT min.	1.1 mm
MD max.	0.6 mm
OP	10.3±0.8 mm

Hinge Roller Lever

D2JW-01K21

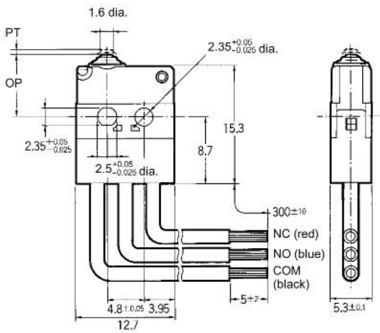




OF max.	0.98 N {100 gf}
RF min.	0.19 N {20 gf}
PT max.	5.2 mm
OT min.	1.1 mm
MD max.	0.5 mm
OP	14.6±0.8 mm

Molded Lead Wire

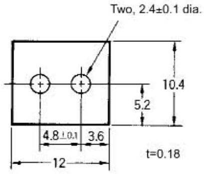
D2JW-01□□□-MD



Note: Letters and numbers are inserted in □ by the actuator.

■ Separator (Order Separately)

Model	Separator for D2JW



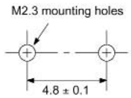
Precautions

■ Cautions

Mounting Dimensions

Use M2.3 mounting screws with plain or spring washers to mount the Switch. Tighten the screws to a torque of 0.20 to 0.29 N • m {2 to 3 kgf • cm}.

Mounting Holes



Terminal Connection

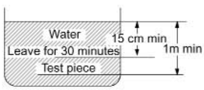
To solder the lead to the terminal, apply a soldering iron rated at 30 W max. (temperature of soldering iron: 250°C max.) within 3 seconds.

If soldering is not carried out under the proper conditions there is a danger of over-heating and subsequent heat damage. Applying a soldering iron for too long a time or using one that is rated at more than 30 W may degrade the Switch characteristics.

Degree of Protection

The D2JW satisfies the following test condition specified by the IEC Publication 529:

Degree of protection: IP67
Test method:See the figure below.



Note: Temperature difference between the test piece and water must be 5°C or more.

Leave the test piece in water for 30 min with the top of the test piece submerged 15 cm or more below the water level and the bottom of the test piece submerged 1 m or more below the water level.

This test is to check the ingress of water into the switch enclosure after submerging the switch in water for a given time. Even if this test condition is met, the switch cannot be used in water.

Protection Against Chemicals

Prevent the Switch from coming into contact with oil and chemicals. Otherwise, damage to or deterioration of Switch materials may result.

Separator

When mounting the Switch on a metallic surface, be sure to use a Separator between the Switch and the mounting plate.

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

Power Switch with Fail-safe Mechanisms

- ROHS Compliant.
- Minimum contact gap of 3mm for general power switches is satisfied. Highly reliable design conforms to European safety standards.
- Fail-safe mechanisms with double return spring and direct drive positive contact opening features.
- Conforms to Class II of VDE Insulation.
- Pull-on lock model for easy maintenance is also available.

Ordering Information

■ Model Number Legend

D2D-□□0□
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 mounting
   - 1: Panel snap-fit mounting
3. **Contact Form**
   - 0: SPDB-NO/NC
   - 1: SPDB-NO
   - 2: SPDB-NC
   - 3: SPDB-NO+SPDB-NO/NC
   - 4: DPDB-NO

■ List of Models

Mounting method	Contact form	Standard	Pull-on lock (see note)
		Contact gap: 3 mm min.	Contact gap: 1 mm
Screw mounting	SPDB-NO/NC	D2D-1000	D2D-2000
	SPDB-NO	D2D-1001	---
	SPDB-NC	D2D-1002	---
Panel mounting	SPDB-NO/NC	D2D-1100	D2D-2100
	SPDB-NO	D2D-1101	---
	SPDB-NC	D2D-1102	---
	SPDB-NO+SPDB-NO/NC	D2D-3103	---
	DPDB-NO	D2D-3104	---

Note: Refer to page 208 for the pull-on lock function.

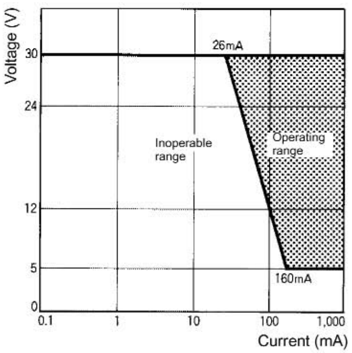
Specifications

■ Ratings

Type	Rated voltage	Non-inductive load		Inductive load	
		Resistive load		Motor load	
		NC	NO	NC	NC
Standard	**125 VAC**	16 A		4 A	
	250 VAC	16 A		4 A	
Pull-on lock	**125 VAC**	10 A		---	
	250 VAC	10 A		---	

Note: 1. The above values are for the steady-state current.
2. Motor load has an inrush current of 6 times the steady-state current.
3. The ratings values hold under the following test conditions:
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 60 operations/min

Use the Switch under the following operating range.



Minimum applicable load	160 mA at 5 VDC

Door Microswitches

■ Characteristics

Item		D2D-1000 models	D2D-2000 models	D2D-3000 models
Operating speed		10 mm to 1 m/s		
Operating frequency		Mechanical: 300 operations/min Electrical: 60 operations/min		
Insulation resistance		100 MΩ min. (at 500 VDC)		
Contact resistance		50 mΩ max. (initial value)		
Dielectric strength (50/60 Hz 1mm)	Between terminals of same polarity	2,000 VAC	1,000 VAC	2,000 VAC
	Between terminals and ground (see note1)	2,000 VAC	1,500 VAC	2,000 VAC
	Between terminals and non-current-carrying metal part	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		Malfunction: 500 m/s^2 {approx. 50G} max. (300 m/s^2 {approx. 30G} max. for pull-on models)		
Life expectancy (see note 2)		Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min.		
Degree of protection		IP00		
Degree of protection against electric shock		Class II		
Proof tracking index (PTI)		175		
Switch category		D (IEC335-1)		
Ambient temperature		Operating: −25°C to 85°C (for an ambient humidity of 60% max.) (with no icing)		
Ambient humidity		Operating: 85% max. (for 5°C to 35°C)		
Weight		Approx. 14 g (D2D-1000)		

Note: 1. The dielectric strength shown in the table indicates a value for models with a Separator.
2. Contact your OMRON sales representative for testing conditions.

■ Approved Standards

UL1054 (File No. E41515)
CSA C22.2 No. 55 (File No. LR21642)

Rated voltage	D2D-1000	D2D-2000	D2D-3000
125 VAC	---	---	3/4 HP
250 VAC	16 A	10 A	16 A, 1-1/2 HP

VDE (File No. 6147ÜG)/(File No. 92542)

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

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

Note: The values in parentheses indicate motor load ratings.

TÜV EN61058-1 (File No. R9551934)

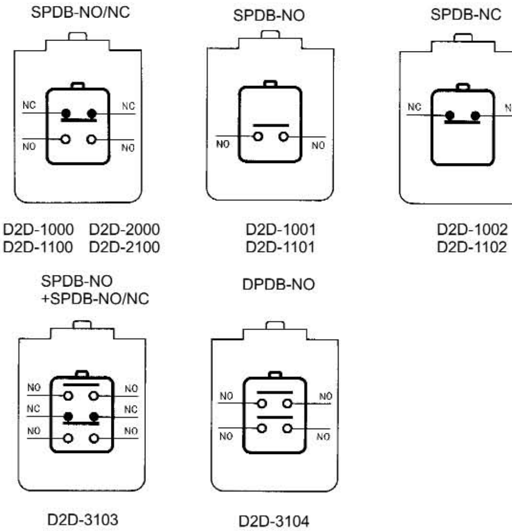
Rated voltage	D2D-3104
24 VDC	4 A

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

■ Contact Specifications

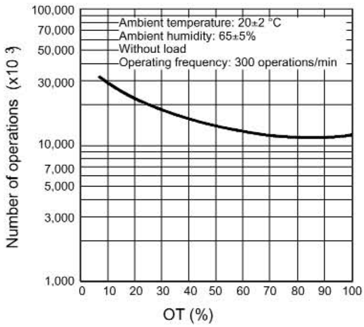
Item		Standard model	Pull-on lock model
Contact	Specification	Rivet	
	Material	Silver	
	Gap (standard value)	3 mm min.	1 mm
Inrush current	NC	30 A max.	24 A max.
	NO	30 A max.	24 A max.

■ Contact Form



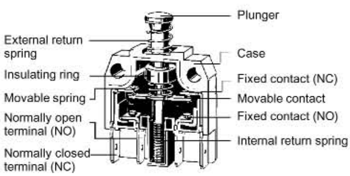
Engineering Data

Mechanical Life Expectancy (D2D-1000)

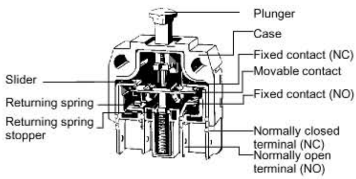


Nomenclature

Standard Model



Pull-on Lock Model



Dimensions

■ Dimensions and Operating Characteristics

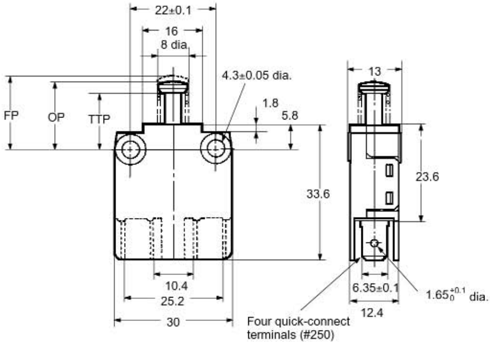
Note: 1. All units are in millimeters unless otherwise indicated.

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

■ Standard Models

Screw Mounting

D2D-1000
D2D-1001
D2D-1002

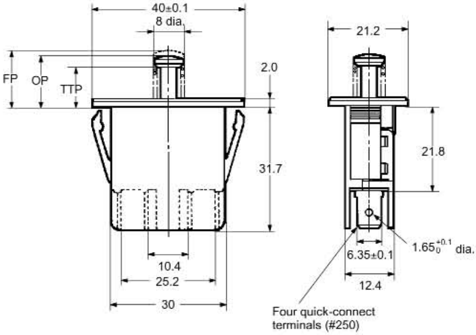


Note: NC-OFF: The force applied to the actuator to cause it to move from the free position to the position at which the NC contact opens.
NO-ON: The force applied to the actuator to cause it to move from the free position to the position at which the NO contact closes.

Model		Screw mount		
		D2D-1000	D2D-1001	D2D-1002
OF max.	NC-OFF	2.94 N {300 gf}	---	2.94 N {300 gf}
	NO-ON	5.88 N {600 gf}	5.88 N {600 gf}	---
TTF max.		7.35 N {750 gf}	7.35 N {750 gf}	7.35 N {750 gf}
OT min.		2.3 mm	2.3 mm	5.5 mm
TTP max.		10 mm	10 mm	10 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	---

Panel Mounting

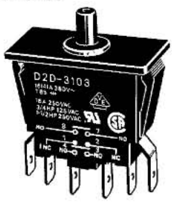
D2D-1100
D2D-1101
D2D-1102

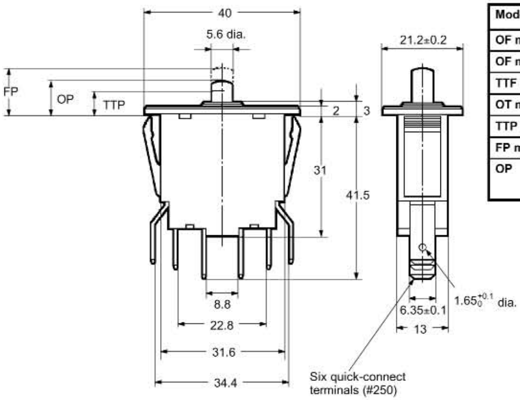


Model		Panel mounting		
		D2D-1100	D2D-1101	D2D-1102
OF max.	NC-OFF	2.94 N {300 gf}	---	2.94 N {300 gf}
	NO-ON	5.88 N {600 gf}	5.88 N {600 gf}	---
TTF max.		7.35 N {750 gf}	7.35 N {750 gf}	7.35 N {750 gf}
OT min.		2.3 mm	2.3 mm	5.5 mm
TTP max.		6 mm	6 mm	6 mm
FP max.		12.4 mm	13 mm	12.4 mm
OP	NC-OFF	11.9±0.4 mm	---	11.9±0.4 mm
	NO-ON	8.7±0.4 mm	8.7±0.4 mm	---

Panel Mounting

D2D-3103

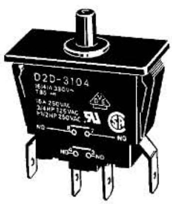


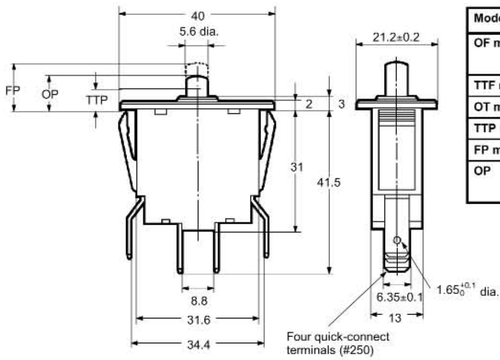


Model		D2D-3103
OF max.	NC-OFF	2.94 N {300 gf}
OF max.	NO-ON	5.88 N {600 gf}
TTF max.		9.81 N {1,000 gf}
OT min.		2.3 mm
TTP max.		6.4 mm
FP max.		12.4 mm
OP	NC-OFF	11.9±0.8 mm
	NO-ON	8.7±0.8 mm

Panel Mounting

D2D-3104

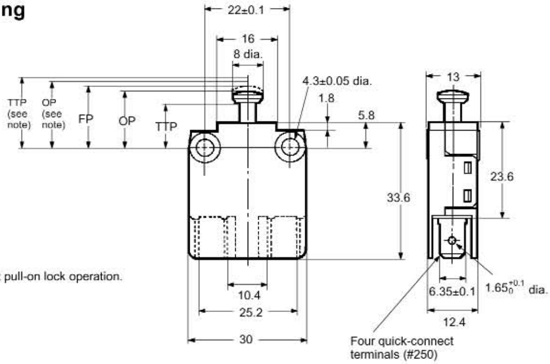




Model		D2D-3104
OF max.	NC-OFF	---
	NO-ON	5.88 N {600 gf}
TTF max.		9.81 N {1,000 gf}
OT min.		2.3 mm
TTP max.		6.4 mm
FP max.		13.5 mm
OP	NC-OFF	---
	NO-ON	8.7±0.8 mm

■ Pull-on Lock Models

Screw Mounting
D2D-2000

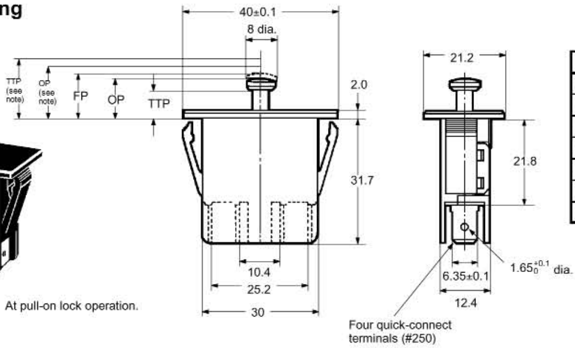


Note: At pull-on lock operation.

Momentary Operation (Normal Operation)

Model		D2D-2000	D2D-2100
OF max.	NC-OFF	1.96 N {200 gf}	
	NO-ON	2.94 N {300 gf}	
TTF max.		5.88 N {600 gf}	
OT min.		4.5 mm	
TTP max.		8.3 mm	4.3 mm
FP max.		14.3 mm	10.3 mm
OP	NC-OFF	13.5± 0.6 mm	9.5±0.6 mm
	NO-ON	12.7± 0.6 mm	8.7±0.6 mm

Panel Mounting
D2D-2100



Note: At pull-on lock operation.

Pull-on Lock Operation

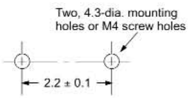
Model	D2D-2000	D2D-2100
OF max.	19.61 N {2,000 gf}	
PT max.	2 mm	
OT min.	0.4 mm	
MD max.	1.5 mm	
TTP max.	16.5 mm	12.5 mm
FP max.	14.3 mm	10.3 mm
OP	15.1±0.6 mm	11.1±0.6 mm

Precautions

■ Mounting Dimensions

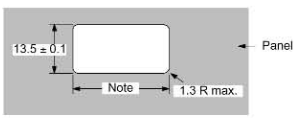
Use M4 mounting screws with plain or spring washers to mount the Switch. Tighten the screws to a torque of 0.49 to 0.69 N • m {5 to 7 kg • cm}.

Mounting Holes



Panel Cutout Dimensions

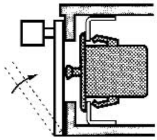
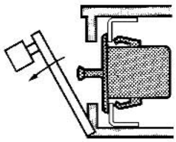
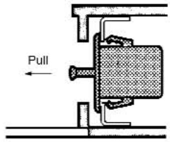
Panel thickness: 1.0 to 2.5 mm



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

■ 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
State				
Connection	NO	ON	OFF	ON
	NC	OFF	ON	OFF

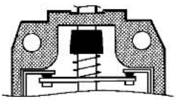
■ Fail-safe Mechanisms

Double Spring Feature for Ensuring a Contact Opening

Two return springs are provided for the pin plunger. Thus, when either of the spring is broken, this feature will prevent the Switch from malfunctioning or short-circuiting.
Applicable Models: D2D-1000 and 3000 models

Direct Drive Positive Contact Opening Feature for Ensuring NC Contact Opening

The section marked ▲ will positively break the circuit if a contact weld occurs in the Switch.
Applicable Models: D2D-1000 Models



Example of D2D-1000.

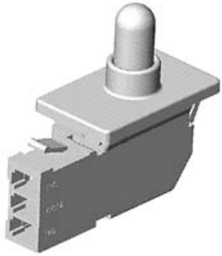
Handling

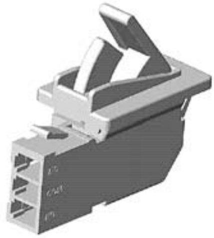
Apply operation force to the pin plunger in the direction it operates. Applying forces laterally or from an oblique direction may damage the pin plunger.

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

Unique Mechanism Allows Switching of Both Micro Loads and Power Loads Design Concept

- ROHS Compliant.
- Choose from plunger or lever as the actuator type.
- The internal structure of plunger models provides temporary sealing at the free position.
- Low operating force of 2 N max.
- Quick-connection terminals for easier wiring.
- High contact reliability ensured with gold crossbar contacts.





Ordering Information

Model Number Legend

D3D-□□□
1 2 3

1. Actuator

1: Plunger
2: Lever

2. Contact Form

1: SPDT
2: SPST-NC
3: SPST-NO

3. Colour of Housing

1: White

■ List of Models

Actuator	Contact form		
	SPDT	SPST-NC	SPST-NO
Plunger	D3D-111	D3D-121	D3D-131
Lever	D3D-211	D3D-221	D3D-231

Specifications

■ Ratings

Rated voltage	Resistive load
125 VAC	1 A
250 VAC	0.5 A

Note: The ratings on the left were tested under the following conditions.
Ambient temperature: 20±2°C
Ambient humidity: 65±5%
Operating frequency: 20 operations/min

■ Characteristics

Operating speed	7.5 to 500 mm/s
Operating frequency	Mechanical: 120 operations/min Electrical: 20 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	100 mΩ max.
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarity 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (See note 1)	Destruction: 490 m/s^2 max. Malfunction: 300 m/s^2 max.
Durability (See note 2)	Mechanical: 300,000 operations min. (60 operations/min) Electrical: 100,000 operations min. (20 operations/min)
Degree of protection	IP00
Degree of protection against electric shock	D3D-1 models (plunger models): Class II D3D-2 models (lever models): Class 0
Proof tracking index (PTI)	600
Ambient operating temperature	–30°C to 60°C (with no icing)
Ambient operating humidity	85% max.
Weight	Approx. 4 g

Note: **1.** The contacts do not open or close for more than 1 ms.
2. Consult your OMRON representative for details on test conditions.

■ Approved Standards

UL (1054), CSA (C22.2 No. 55 (cULus)), VDE (EN61058-1)

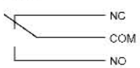
■ Contact Specifications

Contact	**Specification**	Crossbar
	Material	Gold alloy
Minimum applicable load (See note)		1 mA at 5 VDC

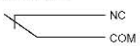
Note: For more information about the minimum applicable load, refer to "Micro Loads" on page 5.

■ Contact Form

SPDT



SPST-NC



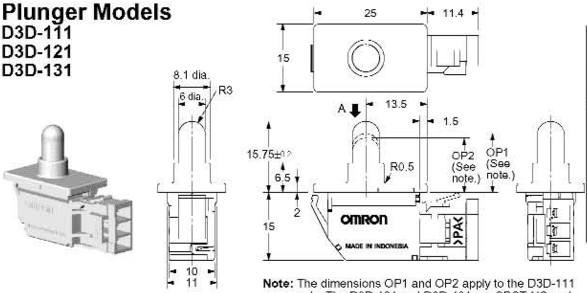
SPST-NO

Dimensions

■ Dimensions and Operating Characteristics

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 operating characteristics are for operation in direction A (indicated by the arrow).

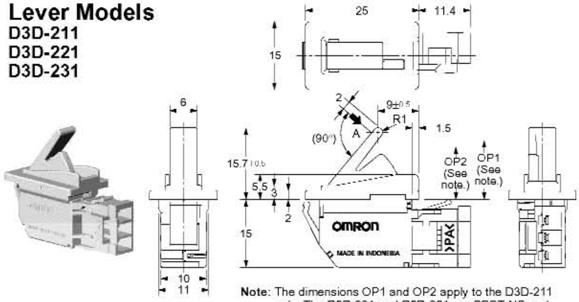
Plunger Models
D3D-111
D3D-121
D3D-131



Note: The dimensions OP1 and OP2 apply to the D3D-111 only. The D3D-121 and D3D-131 are SPST-NC and SPST-NO respectively and so therefore have only one corresponding dimension here (OP).

Type	Plunger model		
Model	D3D-111	D3D-121	D3D-131
OF max.	2.0 N		
TT	(9.0) mm		
OP min.	OP1 (NC-OFF) 13 mm	13 mm	12 mm
	OP2 (NO-ON) 12 mm		

Lever Models
D3D-211
D3D-221
D3D-231

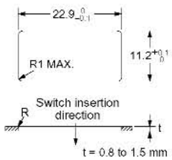


Note: The dimensions OP1 and OP2 apply to the D3D-211 only. The D3D-221 and D3D-231 are SPST-NC and SPST-NO respectively and so therefore have only one corresponding dimension here (OP).

Type	Lever model		
Model	D3D-211	D3D-221	D3D-231
OF max.	2.0 N		
TT	(9.7) mm		
OP min.	OP1 (NC-OFF) 13 mm	13 mm	11.5 mm
	OP2 (NO-ON) 11.5 mm		

■ Mounting Panel Cutout Dimensions

Note: All units are in millimeters unless otherwise indicated.



■ Connectors

The terminals connect to JST's HL Connector.

The HL Connector consists of the following components.
Contact: SSF-21T-P1.4
Housing: HLP-03V

OMRON does not sell the HL Connector. Contact the following.

J.S.T. Manufacturing Co., Ltd. (Japan)
Tel: (81)6-6968-6855
Fax: (81)6-6964-2085

J.S.T. (U.K.) Ltd. (United Kingdom)
Tel: (44)1986-874131
Fax: (44)1986-874276

J.S.T. Corporation (U.S.A.)
Tel: (1)847-473-1957
Fax: (1)847-473-1373

J.S.T. (H.K.) Co. Ltd. (Hong Kong)
Tel: (852)24137979
Fax: (852)24111193

Precautions

■ Cautions

Handling

Do not expose the Switch to shocks, such as by dropping it. Doing so may damage or deform the Switch.

Do not apply lubrication to the sliding parts, such as pushbuttons or actuators. Doing so may result in faulty operation or contact failure.

In order to ensure stable contact force for NO contacts, use an operating stroke of at least 5 mm.

■ Correct Use

Mounting

This product does not have a waterproof or drip-proof construction. Ensure that water does not enter the Switch interior. In particular, do not use the Switch in locations where water may be spilt or flow over the Switch. Doing so may result in deterioration of the insulation.

Wiring

Do not use the Switch with a large force applied to the connector or lead wire. Doing so may result in rattling or contact failure.

Storage Environment

Storing the Switch in a plastic bag will help prevent discoloration due to sulfuration of the (silver-plated) terminals.

Do not use the Switch in locations subject to harmful gases or to high temperatures or humidity levels. Depending on the location, it is recommended that Switches are inspected between 3 and 6 months after the date of manufacturer.

Micro Loads

Even when using the Switch within the operating range, if there are inrush currents or surges, it may decrease the durability of the Switch. If necessary, insert a contact protection circuit.

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

Compact DPST-NO Door Switch

- Incorporates two circuits for power loads and micro loads.
- Micro load circuit uses twin contacts.
- Compact size, with an operating force of only 3.24 N {330 gf}.
- Panel- or screw-mounted with ease.

Ordering Information

Model Number Legend

D2T-□T1□
1 2

1. Actuator
None: Pin plunger
L: Hinge lever

2. Terminals
None: Right-angled solder terminals
S: Straight solder terminals

■ List of Models

Actuator (see note)	Right-angled solder terminals	Straight solder terminals
Pin plunger 	D2T-T1	D2T-T1S
Hinge lever 	D2T-LT1	D2T-LT1S

Note: The actuator of the D2T is identical to that used for OMRON's V Snap-action Switches. The actuator can be replaced with other types of actuators. Consult your OMRON sales representatives for details.

Specifications

■ Ratings

	Rated voltage	Resistive load
Between terminals 1 and 2 Between terminals 3 and 4	250 VAC 125 VAC	5 A 0.1 A

Note: The ratings values apply under the following test conditions:
Ambient temperature: 20 ±2°C
Ambient humidity: 65 ±5%
Operating frequency: 30 operations/min

■ Switching Capacity per Load (Reference Values)

Voltage	Resistive load	
	Between terminals 1 and 2	Between terminals 3 and 4
250 VAC 125 VAC	5 A 5 A	– 0.1 A
30 VDC	6 A	0.1 A

■ Characteristics

Operating speed	10 to 500 mm/s (pin plunger models)
Operating frequency	Mechanical: 120 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	Between terminals 1 and 2: 50 mΩ max. Between terminals 3 and 4: 100 mΩ max.
Dielectric strength (see note 2)	1,000 VAC for 1 min 50/60 Hz between terminals of same polarity 1,500 VAC for 1 min 50/60 Hz between current-carrying metal part and ground (see note 1), between each terminal and non-current-carrying metal part, and between terminals of different polarity
Vibration resistance (see note 3)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 3)	Destruction: 1,000 m/s^2 {approx. 100G} max. Malfunction: 300 m/s^2 {approx. 30G} max.
Durability (see note 4)	Mechanical: 100,000 operations min. (60 operations/min) Electrical: 100,000 operations min. (30 operations/min)
Degree of protection	IEC IP40
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient operating temperature	–25°C to 85°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight	Approx. 10 g (pin plunger models)

Note: 1. The data given above are initial values.
2. The dielectric strength shown in the table indicates a value for models with a Separator.
3. For the pin plunger models, the above values apply for use at both the free position and total travel position. For the lever models, they apply at the total travel position. Contact opening or closing time is within 1 ms.
4. For testing conditions, consult your OMRON sales representative.

Door Microswitches

■ Approved Standards

Consult your OMRON sales representative for specific models with standard approvals.

UL1054 (File No. E41515)/
CSA C22.2 No. 55 (File No. LR21642)

Rated voltage	Between terminals 1 and 2	Between terminals 3 and 4
125 VAC	5 A	0.1 A (for 100,000 operations)
250 VAC	5 A	–

EN61058-1 (File No. 120144, VDE approval)

Rated voltage	Between terminals 1 and 2	Between terminals 3 and 4
125 VAC	–	0.1 A
250 VAC	5 A	–

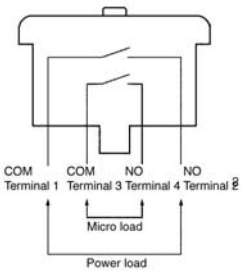
Testing conditions: 5E4 (50,000 operations), T85 (0°C to 85°C)

High-frequency Characteristics

Item		Between terminals 1 and 2	Between terminals 3 and 4
Contact	Specification	Rivet	Plated
	Material	Silver	
	Gap (standard value)	1 mm	1.4 mm
Inrush current		60 A max.	–
Minimum applicable load		160 mA at 5 VDC	1 mA at 5 VDC

■ Contact Form

DPST-NO



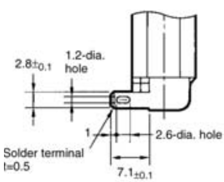
Note: The circuit switching power loads has a snap-action mechanism and the circuit switching micro loads has a slow-action mechanism.

Dimensions

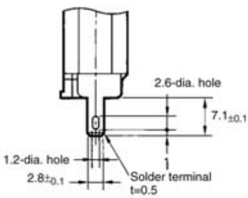
Note: All units are in millimetres unless otherwise indicated.

■ Terminals

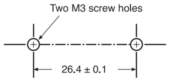
Angled Terminals



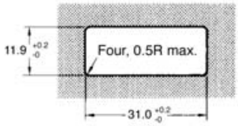
Straight Terminals



■ Mounting Holes



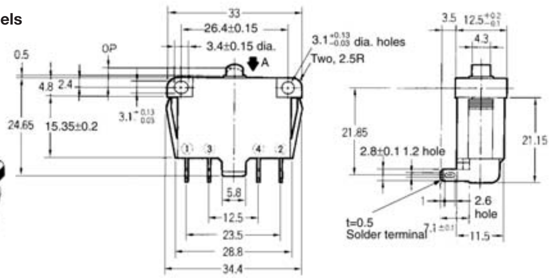
Panel Cutout Dimensions
(Panel thickness: 1.5 to 2 mm)



■ Dimensions and Operating Characteristics

Note: 1. All units are in millimetres unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
3. The following illustrations and dimensions are for D2T models with angled terminals. Refer to the dimensions in Terminals for the straight terminals of the D2T.
4. The operating characteristics are for operation in the A direction (⬇).

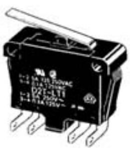
Pin Plunger Models
D2T-T1
D2T-T1S

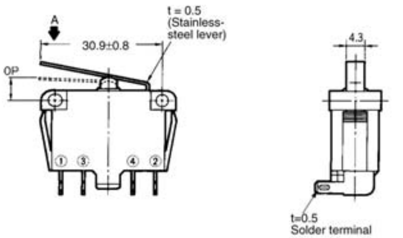


Model	D2T-T1 D2T-T1S
OF max. **RF min.** **TTF max.**	3.24 N {330 gf} 0.5 N {50 gf} 6.37 N {650 gf}
OT min.	0.8 mm
OP	4.4 ±0.6 mm (see note)

Note: Operating sequence of the circuit between terminals 1 and 2 and the circuit between terminals 3 and 4 is not specified.

Hinge Lever Models
D2T-LT1
D2T-LT1S





Model	D2T-LT1 D2T-LT1S
OF max. **RF min.** **TTF max.**	1.47 N {150 gf} 0.2 N {20 gf} 2.45 N {250 gf}
OT min.	1.6 mm
OP	6.9 ±1.3 mm (see note)

Note: Operating sequence of the circuit between terminals 1 and 2 and the circuit between terminals 3 and 4 is not specified.

Door Microswitches

Precautions

■ Correct Use

Mounting
Use M3 mounting screws to mount the Switch. Tighten the screws to a torque of 0.4 to 0.6 Nm {4 to 6 kg cm}.

Mounting Holes
When mounting on a metal surface, be sure to provide a Separator between the Switch and mounting plate.

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