Cat. No. X018-E1-08

OMRON

Basic Switches

Warranty and Application Considerations

Read and Understand this Catalog
Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

■ Warranty and Limitations of Liability

Warranty and Limitations of Liability
WARRANTY OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.
LIMITATIONS OF LIABILITY OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS, OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted. IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

■ Application Considerations

Application Considerations
SUITABILITY FOR USE OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products. At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use. The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products. • Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog. • Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations. • Systems, machines, and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to the products. NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

■ Disclaimers

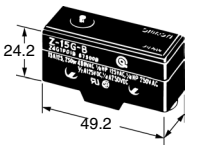
Disclaimers
PERFORMANCE DATA Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON *Warranty and Limitations of Liability.*
CHANGE IN SPECIFICATIONS Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.
DIMENSIONS AND WEIGHTS Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.
ERRORS AND OMISSIONS The information in this catalog has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

■ Copyright and Copy Permission

Copyright and Copy Permission
COPYRIGHT AND COPY PERMISSION This catalog shall not be copied for sales or promotions without permission. This catalog is protected by copyright and is intended solely for use in conjunction with the products. Please notify us before copying or reproducing this catalog in any manner, for any other purpose. If copying or transmitting this catalog to another, please copy or transmit it in its entirety.

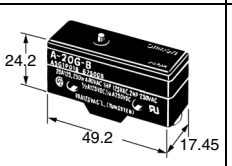
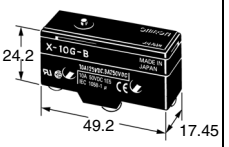
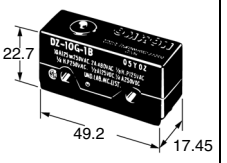
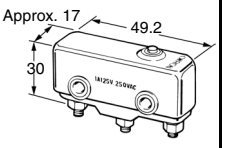
CONTENTS

Selection by Functions

Classifications		General-purpose Basic Switches, Z-size						
Model		Z						
Appearance								
		Z-15H2	Z-15H	Z-15G	Z-15E	Z-01H	Z-10FY	Z-15ER
Features		Basic Models (most popular) High sensitivity models, drip-proof models, micro load models, and models with protective covers.					Split-contact model	Maintained contact model
Contact	**Contact specification**	Rivet				Single crossbar	Rivet	
	Contact material	Silver				Gold alloy	Silver	
	Rating (resistive load)	15 A at 250 VAC 0.4 A at 125 VDC		0.5 A at 125 VDC	0.75 A at 125 VDC	0.1 A at 125 VAC	10 A at 250 VAC (series connection)	15 A at 250 VAC
	Max. operating current (A)	20 15 10 8 5 3 2 1 0.5 0.3 0.1						
	Min. permissible load (mA) (N-level reference value)	100 10 1 0.1 0.01 (160 mA at 5 VDC)				(1 mA at 5 VDC)	(160 mA at 5 VDC)	(160 mA at 5 VDC)
Operating force (OF) (see note)		1.96 to 2.75 N		2.45 to 3.43 N Drip-proof: 2.45 to 4.22 N	6.12 to 7.85 N	2.45 N Drip-proof: 3.43 N	4.46 to 7.26 N	1.96 to 2.50 N
Durability (see note)	**Mechanical**	20 x 10^6 min.			300 x 10^3 min.	10 x 10^6 min.	500 x 10^3 min.	300 x 10^3 min.
	Electrical	500 x 10^3 min.			100 x 10^3 min.	500 x 10^3 min.	100 x 10^3 min.	100 x 10^3 min.
Ambient operating temperature		–25°C to 80°C (Drip-proof: –15°C to 80°C)					–25°C to 80°C (Drip-proof: –15°C to 80°C)	
Mounting pitch		25.4 mm						
Actuators		Pin plunger	Pin plunger, Panel mount plunger, Panel mount roller plunger, Leaf spring, Hinge lever, Roller leaf spring, Hinge roller lever, Fixible rod		Pin plunger, Panel mount plunger, Panel mount roller plunger, Roller leaf spring	Pin plunger, Panel mount plunger, Roller leaf spring	Pin plunger, Panel mount plunger, Panel mount roller plunger, Hinge lever, Hinge roller lever	Pin plunger, Hinge lever
Terminals		Solder Screw					Screw	Solder
Page		32						

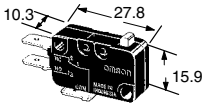
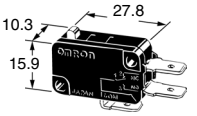
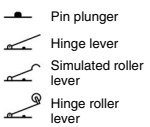
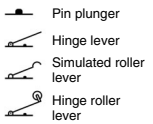
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		General-purpose Basic Switches, Z-size			
Model		A	X	DZ	TZ
Appearance					
Features		High-capacity load switching	Direct current switching. Built-in permanent magnet for extinguishing arc.	Ideal for controlling two independent circuits with two built-in switches.	Stable operation at 400°C. Suitable for electric furnaces or boilers.
Contact	**Contact specification**	Rivet	Cylinder+flat surface	Rivet	Rivet
	Contact material	Silver alloy	Silver alloy	Silver alloy	Platinum
	Rating (resistive load)	20 A at 250 VAC	10 A at 125 VDC	10 A at 250 VAC	1 A at 250 VAC
	Max. operating current (A)	20 15 10 8 5 3 2 1 0.5 0.3 0.1			
	Min. permissible load (mA)	100 10 1 0.1 0.01			
	(N-level reference value)	(160 mA at 5 VDC)	(160 mA at 5 VDC)	(160 mA at 5 VDC)	(20 mA at 5 VDC)
Operating force (OF) (see note)		3.92 to 6.13 N	5.00 N	5.59 N	4.90 N
Durability (see note)	**Mechanical**	1 x 10^6 min.	1 x 10^6 min.	1 x 10^6 min.	1 x 10^5 min.
	Electrical	500 x 10^3 min.	100 x 10^3 min.	500 x 10^3 min.	50 x 10^3 min.
Ambient operating temperature		–25°C to 80°C	–25°C to 80°C	–25°C to 80°C	–65°C to 400°C
Mounting pitch		25.4 mm	25.4 mm	25.4 mm	25.4 mm
Actuators		Pin plunger Panel mount plunger Panel mount roller plunger Hinge lever Hinge roller lever Roller leaf spring	Pin plunger Panel mount plunger Panel mount roller plunger Leaf spring Hinge lever Hinge roller lever	Pin plunger Hinge lever Hinge roller lever	Pin plunger Hinge lever Hinge roller lever
Terminals		Solder Screw	Solder Screw	Solder Screw	Screw
Page		63	70	78	83

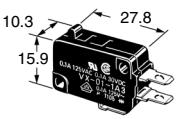
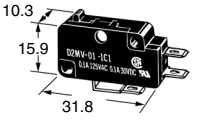
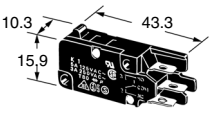
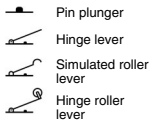
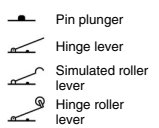
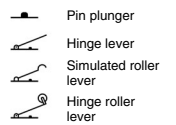
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Miniature Basic Switches, V-size					
Model		D3V	V				
Appearance							
			V-21	V-16	V-15	V-11	V-10
Features		Maximum operating temperature of 105°C. Available in 6-A, 11-A or 16-A models, all with self-cleaning contacts. Available with internally or externally fitted levers.	Wide variation of models with switching currents of 10 to 21 A. Can be used for interrupting current when doors are opened or closed. Available in two types of cases: thermoplastic and thermosetting.				
Contact	Contact specification	Rivet	Rivet				
	Contact material	Silver alloy	Silver alloy			Silver	
	Rating (resistive load)	16 A at 250 VAC	21 A at 250 VAC	16 A at 250 VAC	15 A at 250 VAC	11 A at 250 VAC	10 A at 250 VAC
	Max. operating current (A)	20 15 10 8 5 3 2 1 0.5 0.3 0.1					
	Min. permissible load (mA) (N-level reference value)	100 10 1 0.1 0.01 (160 mA at 5 VDC)	(160 mA at 5 VDC)				
Operating force (OF) (see note)		1.96 N {200 gf}	3.92 N {400 gf}	0.98, 1.96, 3.92 N {100, 200, 400 gf}		0.98 N {100 gf}	0.98, 1.96 N {100, 200 gf}
Durability (see note)	Mechanical	10 x 10^6 min.	50 x 10^6 min.				
	Electrical	100 x 10^3 min.	100 x 10^3 min.			300 x 10^3 min.	
Ambient operating temperature		–25°C to 105°C	–25°C to 80°C (Heat-resistive: –25°C to 150°C)				
Mounting pitch		10.3 x 22.2 mm	10.3 x 22.2 mm				
Actuators							
Terminals		Solder, Quick-connect (#187), Quick-connect (#250)	Quick-connect (#250)	Solder, Quick-connect (#187), Quick-connect (#250), Screw			
Page		92	110				

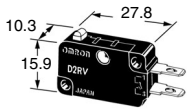
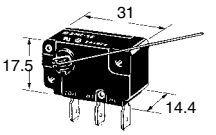
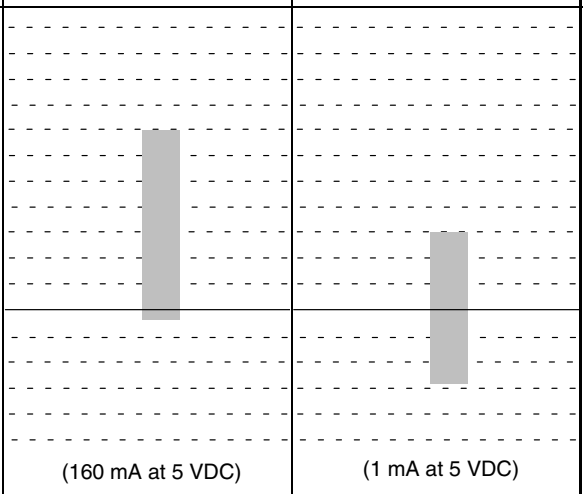
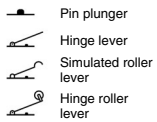
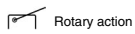
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Miniature Basic Switches, V-size				
Model		VX		D2MV		K
Appearance						
		VX-5	VX-01	D2MV-1	D2MV-01	
Features		Wide variation extends from micro load to 5-A switching current, with shapes identical to those of the V Series. High contact strength with low operating force.		Ultra-low operating force. Twin crossbar contact employed for micro load applications.		Long-life design with an OT stopper inside the case and high-precision movable spring. Models with right-hand barrier, left-hand barrier, or no barrier for the terminals are available.
Contact	Contact specification	Rivet	Crossbar	Needle	Crossbar	Rivet
	Contact material	Silver alloy	Gold alloy	Silver	Gold alloy	Silver
	Rating (resistive load)	5 A at 250 VAC	0.1 A at 30 VDC	1 A at 125 VAC	0.1 A at 30 VDC	3 A at 250 VAC
	Max. operating current (A)	20, 15, 10, 8, 5, 3, 2, 1, 0.5, 0.3, 0.1				
	Min. permissible load (mA) (N-level reference value)	100, 10, 1, 0.1, 0.01 (160 mA at 5 VDC)	(1 mA at 5 VDC)	(30 mA at 5 VDC)	(1 mA at 5 VDC)	(160 mA at 5 VDC)
Operating force (OF) (see note)		0.25, 0.49 N {25, 50 gf}		0.10, 0.25, 0.49 N {10, 25, 50 gf}		0.25 N {25 gf}
Durability (see note)	Mechanical	50 x 10^6 min.	10 x 10^6 min.	10 x 10^6 min.		20 x 10^6 min.
	Electrical	500 x 10^3 min.	1 x 10^6 min.	0.5 x 10^6 min.	1 x 10^6 min.	100 x 10^3 min.
Ambient operating temperature		–25°C to 80°C		–25°C to 80°C		–25°C to 80°C
Mounting pitch		10.3 x 22.2 mm		10.3 x 22.2 mm		10.3 x 22.2 mm
Actuators						
Terminals		Solder, Quick-connect (#187)		Solder		Solder
Page		126		133		140

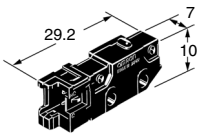
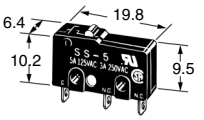
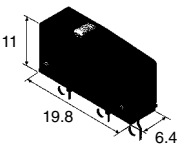
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Miniature Basic Switches, V-size		
Model		D2RV	D2MC	
Appearance				
			D2MC-5	D2MC-01
Features		Built-in reed switch. Same mounting pitch as the V Series.	Low torque (0.5 m N • m) rotary-action switch.	
Contact	Contact specification	Reed switch	Rivet	Crossbar
	Contact material		Silver alloy	Gold alloy
	Rating (resistive load)	0.1 A at 30 VDC	5 A at 250 VAC	0.5 A at 30 VDC
	Max. operating current (A) 20 15 10 8 5 3 2 1 0.5 0.3 0.1	• Ratings Switching voltage: 100 VDC max. Switching current: 0.25 ADC max. Contact capacity: 10 W DC max. Min. applicable load: 0.1 mA at 5 VDC		
	Min. permissible load (mA) 100 10 1 0.1 0.01 (N-level reference value)		 (160 mA at 5 VDC)	 (1 mA at 5 VDC)
Operating force (OF) (see note)		0.25, 0.49, 0.98 N {25, 50, 100 gf}	0.5, 0.75, 1.00 N • m {5.1, 7.6, 10.2 gf • cm}	
Durability (see note)	Mechanical	10 x 10^6 min.	10 x 10^6 min.	
	Electrical	3 x 10^6 min.	100 x 10^3 min.	
Ambient operating temperature		–10°C to 60°C	–25°C to 80°C	
Mounting pitch		10.3 x 22.2 mm	8.7 x 23.8 mm	
Actuators				
Terminals		Solder	Quick-connect (#205)	
Page		145	156	

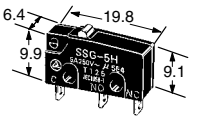
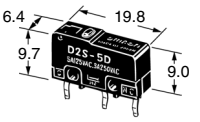
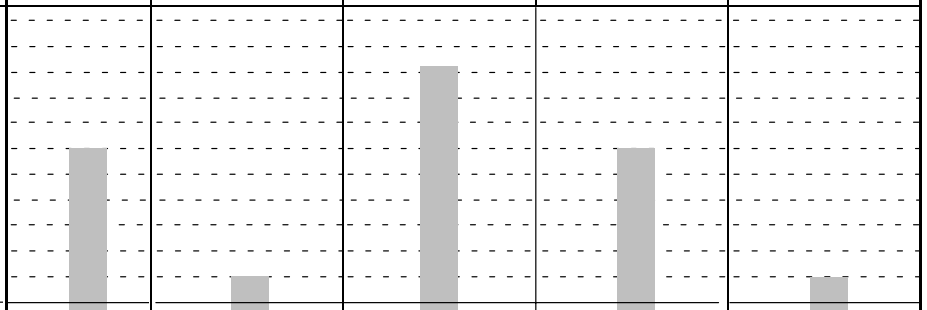
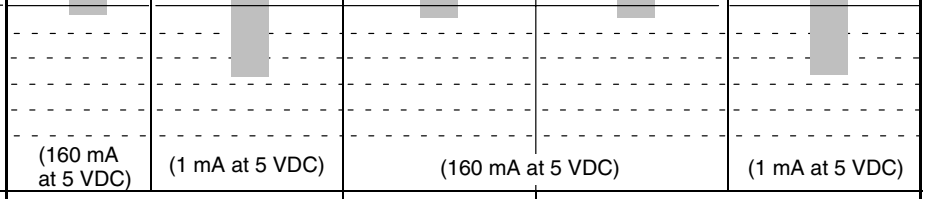
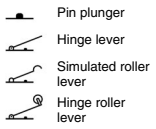
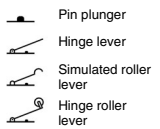
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Subminiature Basic Switches, S-size					
Model		D3M	SS			SS-P	
Appearance							
			SS-10	SS-5	SS-01	SS-3P	SS-01P
Features		Quick-connect terminals and horizontal terminal layout ensure easy wiring and save mounting space. Same mounting pitch as SS Series.	Long service life (30 million operations) with two split springs.			SS Series compatible mounting. Single-leaf movable spring construction. Even-pitched PCB terminal models available.	
Contact	Contact specification	Crossbar	Rivet		Crossbar	Rivet	Crossbar
	Contact material	Gold alloy	Silver alloy	Silver	Gold alloy	Silver alloy	Gold alloy
	Rating (resistive load)	0.1 A at 30 VDC	10.1 A at 250 VAC	3 A at 250 VAC	0.1 A at 30 VDC	3 A at 125 VAC	0.1 A at 30 VDC
	Max. operating current (A)	20 15 10 8 5 3 2 1 0.5 0.3 0.1					
	Min. permissible load (mA)	100 10 1 0.1 0.01					
	(N-level reference value)	(1 mA at 5 VDC)	(160 mA at 5 VDC)		(1 mA at 5 VDC)	(160 mA at 5 VDC)	(1 mA at 5 VDC)
Operating force (OF) (see note)		1.50 N {153 gf}	1.47 N {150 gf}	0.49, 1.47 N {50, 150 gf}	0.25, 0.49, 1.47 N {25, 50, 150 gf}	1.50 N {153 gf}	
Durability (see note)	Mechanical	500 x 10^3 min.	10 x 10^6 min.	30 x 10^6 min.		1 x 10^6 min.	
	Electrical	200 x 10^3 min.	50 x 10^3 min.	200 x 10^3 min.		70 x 10^3 min.	200 x 10^3 min.
Ambient operating temperature		–25°C to 85°C	–25°C to 85°C			–25°C to 85°C	
Mounting pitch		9.5 mm	9.5 mm			9.5 mm	
Actuators		Pin plunger Hinge lever Simulated roller lever Hinge roller lever	Pin plunger Hinge lever Simulated roller lever Hinge roller lever			Pin plunger Hinge lever Simulated roller lever	
Terminals		XA Connector (JST)	Solder, Quick-connect (#110), PCB			Solder, Quick-connect (#110), PCB (Uneven pitch, Even pitch)	
Page		161	168			176	

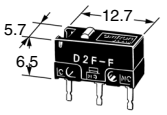
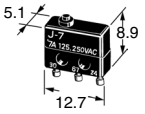
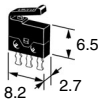
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Subminiature Basic Switches, S-size				
Model		SSG		D2S		
Appearance						
		SSG-5	SSG-01	D2S-10	D2S-5	D2S-01
Features		Conforms to EN (IEC), UL, CSA and standards. Wide operating temperature range: –25 to 125°C.		Flux-resistant structure. Available with self-clinching PCB or solder terminals.		
Contact	**Contact specification**	Rivet	Crossbar	Rivet		Crossbar
	Contact material	Silver alloy	PGS alloy	Silver alloy	Silver	Gold alloy
	Rating (resistive load)	3 A at 250 VAC	0.1 A at 125 VAC	10.1 A at 250 VAC	3 A at 250 VAC	0.1 A at 30 VDC
	Max. operating current (A)					
	Min. permissible load (mA)					
	(N-level reference value)	(160 mA at 5 VDC)	(1 mA at 5 VDC)	(160 mA at 5 VDC)		(1 mA at 5 VDC)
Operating force (OF) (see note)		0.50, 1.50 N {51, 153 gf}		1.47 N {150 gf}	0.49, 1.47 N {50, 150 gf}	
Durability (see note)	**Mechanical**	10 x 10^6 min.		10 x 10^6 min.	30 x 10^6 min.	
	Electrical	200 x 10^3 min.		50 x 10^3 min.	200 x 10^3 min.	
Ambient operating temperature		–25°C to 125°C		–25°C to 85°C		
Mounting pitch		9.5 mm		9.5 mm		
Actuators						
Terminals		Solder, Quick-connect (#110), PCB		Self-clinching PCB, Solder		
Page		182		190		

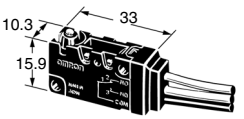
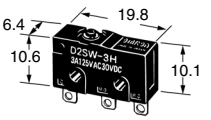
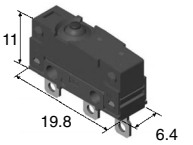
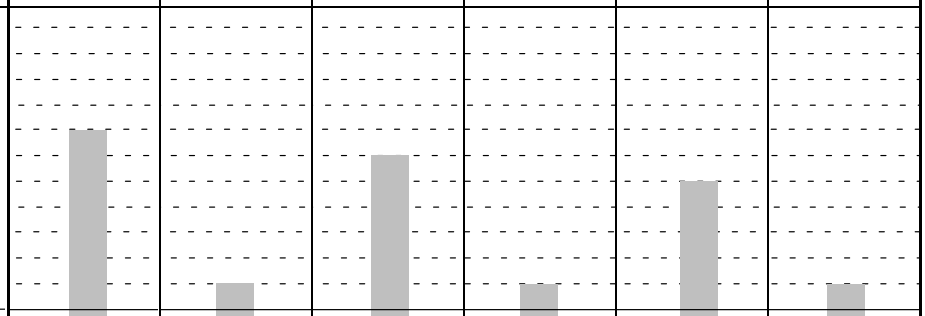
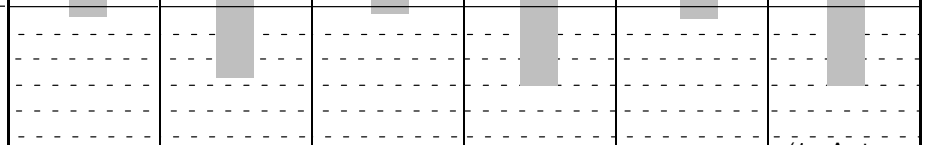
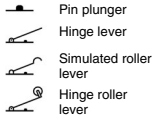
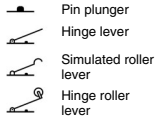
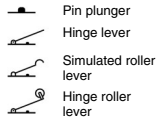
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Ultra Subminiature Basic Switches, J-size					
Model		D2F			J	D2MQ	
Appearance							
		Standard	Low force	Micro load		Silver plated	Gold plated
		D2F (-*)	D2F-F*	D2F-01*			
Features		Flux-resistant structure. Low operating force models available.			Ultra subminiature model capable of switching large-capacity loads (7 A, 250 VAC).	Snap-action switch with ultra subminiature size and light weight. Gold-plated contacts for micro load switching available in addition to silver-plated contacts.	
Contact	**Contact specification**	Crossbar			Rivet	Rivet	
	Contact material	Silver alloy		Gold alloy	Silver plated Gold plated	Silver plated	Gold plated
	Rating (resistive load)	3 A at 125 VAC	1 A at 125 VAC	0.1 A at 30 VDC	7 A at 250 VAC	0.5 A at 30 VDC	50 mA at 30 VDC
	Max. operating current (A)	20 15 10 8 5 3 2 1 0.5 0.3 0.1					
	Min. permissible load (mA) **(N-level reference value)**	100 10 1 0.1 0.01 (100 mA at 5 VDC)		(1 mA at 5 VDC)	(30 mA at 5 VDC)	(50 mA at 5 VDC)	(5 mA at 5 VDC)
Operating force (OF) (see note)		1.47 N {150 gf}	0.74 N {75 gf}	0.74, 1.47 N {75, 150 gf}	1.37 N {140 gf}	1.18 N {120 gf}	
Durability (see note)	**Mechanical**	1 x 10^6 min.			10 x 10^6 min.	30 x 10^3 min.	
	Electrical	30 x 10^3 min.			50 x 10^3 min.	10 x 10^3 min.	
Ambient operating temperature		–25°C to 65°C			–10°C to 80°C	–15°C to 70°C	
Mounting pitch		6.5 mm			4.8 mm	4.0 mm	
Actuators		Pin plunger Hinge lever Simulated roller lever Roller leaf spring			Pin plunger Leaf spring (available separately) Hinge lever Roller leaf spring Hinge roller lever	Pin plunger Leaf lever Hinge leaf lever	
Terminals		PCB (general, self-clinching, right angled, left angled), Solder (general, compact)			Turret	PCB (straight, right angled, left angled)	
Page		197			203	209	

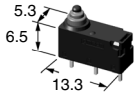
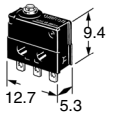
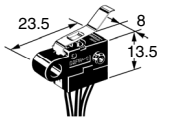
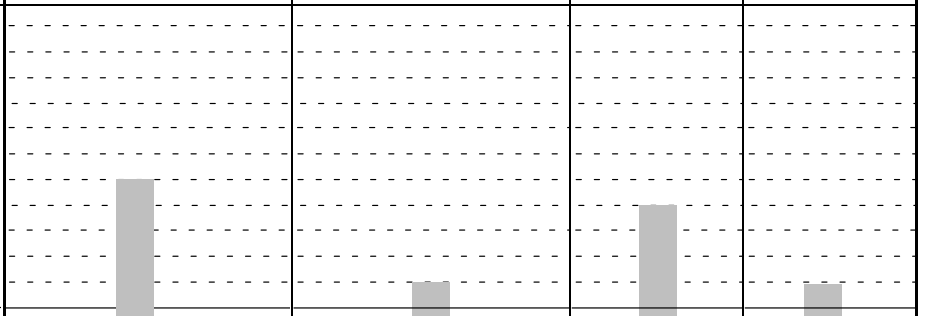
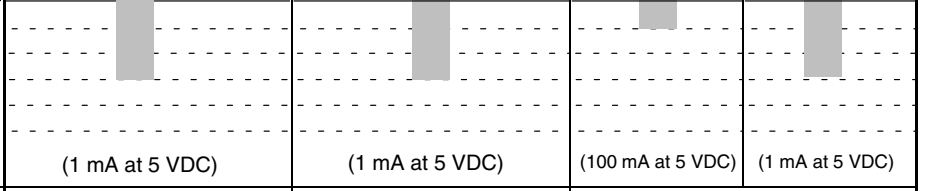
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Sealed Basic Switches					
Model		D2VW		D2SW		D2SW-P	
Appearance							
		D2VW-5	D2VW-01	D2SW-3	D2SW-01	D2SW-P2	D2SW-P01
Features		Same internal mechanism and mounting as V Series. Use of epoxy resin assures stable sealing. Conforms to UL, CSA, and VDE standards.		SS Series compatible mounting. Sealed structure using epoxy resin. Conforms to UL, CSA and VDE standards.		SS Series compatible mounting. Sealed structure using rubber packing. Single-leaf movable spring construction. Even-pitched PCB terminal models available.	
Contact	Contact specification	Rivet	Crossbar	Rivet	Crossbar	Rivet	Crossbar
	Contact material	Silver alloy	Gold alloy	Silver	Gold alloy	Silver	Gold alloy
	Rating (resistive load)	5 A at 250 VAC	0.1 A at 30 VDC	3 A at 125 VAC	0.1 A at 30 VDC	2 A at 250 VAC	0.1 A at 30 VDC
	Max. operating current (A)						
	Min. permissible load (mA) (N-level reference value)	 (160 mA at 5 VDC)	(1 mA at 5 VDC)	(160 mA at 5 VDC)	(1 mA at 5 VDC)	(160 mA at 5 VDC)	(1 mA at 5 VDC)
Operating force (OF) (see note)		1.96 N {200 gf}		1.77 N {180 gf}		1.80 N {183 gf}	
Durability (see note)	Mechanical	10 x 10^6 min.		5 x 10^6 min.		1 x 10^6 min.	
	Electrical	100 x 10^3 min.	1 x 10^6 min.	200 x 10^3 min.		50 x 10^3 min.	200 x 10^3 min.
Ambient operating temperature		–40°C to 85°C		–40°C to 85°C		–20°C to 70°C	
Mounting pitch		10.3 x 22.2 mm		9.5 mm		9.5 mm	
Actuators							
Terminals		Molded lead wire, Solder		Molded lead wire, Solder, Quick-connect (#110), PCB		Molded lead wire, Solder, Quick-connect (#110), PCB (Uneven pitch, Even pitch)	
Page		214		220		227	

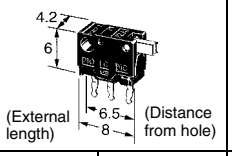
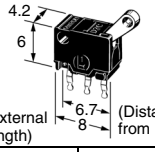
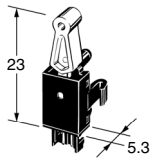
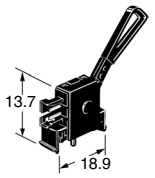
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Sealed Basic Switches			
Model		D2HW	D2JW	D2FW-G	
Appearance					
Features		Long stroke (OT: 1.4 mm). Base-mounting models, M3-screw mounting models, and models with posts are available. All models lead–free (including molded lead wire models).	Molded lead wire models conform to IP67 (water intrusion). Wide operating temperature range: –40 to 85°C.	Single-point mounting with an M4 screw. Incorporates a fixed leaf lever. All models lead–free (including molded lead wire models).	
Contact	Contact specification	Crossbar	Crossbar	Crossbar	
	Contact material	Gold alloy	Gold alloy	Silver alloy	Gold alloy
	Rating (resistive load)	2 A at 12 VDC	0.1 A at 30 VDC	1 A at 30 VDC	0.1 A at 30 VDC
	Max. operating current (A)				
	Min. permissible load (mA) (N-level reference value)	 (1 mA at 5 VDC)	(1 mA at 5 VDC)	(100 mA at 5 VDC)	(1 mA at 5 VDC)
Operating force (OF) (see note)		0.75 N {76 gf}	2.45 N {250 gf}	2.45 N {250 gf} (Leaf lever)	
Durability (see note)	Mechanical	1 x 10^6 min.	1 x 10^6 min.	3 x 10^5 min.	
	Electrical	100 x 10^3 min.	100 x 10^3 min.	30 x 10^3 min.	100 x 10^3 min.
Ambient operating temperature		–40°C to 85°C	–40°C to 85°C	–40°C to 85°C	
Mounting pitch		---	4.8 mm	---	
Actuators		Pin plunger Hinge lever Simulated roller lever Leaf lever Simulated leaf lever Hinge roller lever	Pin plunger Hinge lever Simulated roller lever Hinge roller lever	Leaf lever Long leaf lever	
Terminals		Solder, PCB (straight, right angled, left angled)	Molded lead wire, Solder	Molded lead wire	
Page		233	241	246	

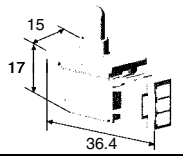
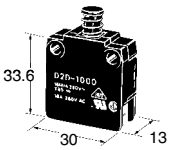
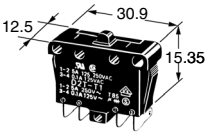
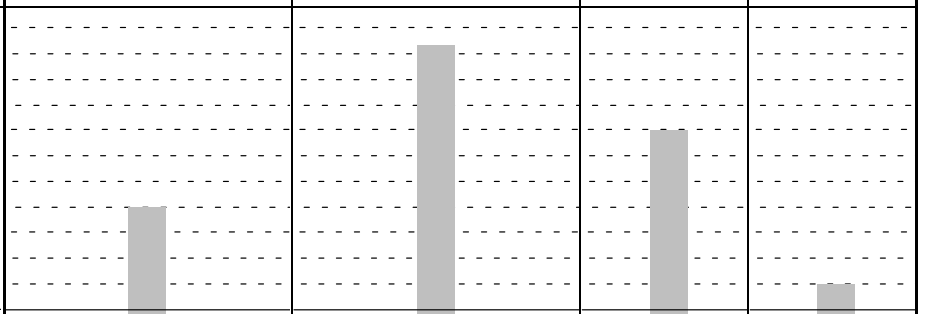
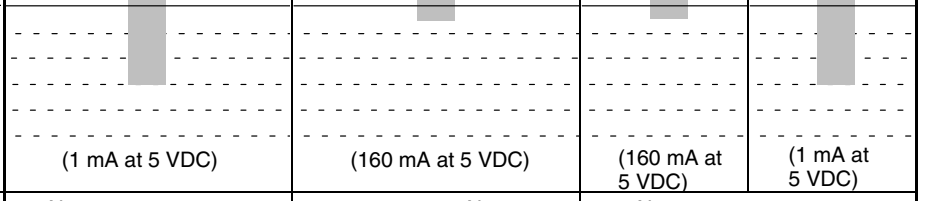
Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Detection Switches			
Model		D2A	D3C	D2X	D3K
Appearance		 Standard models / Models with low operating	 Standard models / Models with low operating		
Features		Compact, light weight, and 3-mm long stroke. Built-in slide mechanism for selecting shorting or non-shorting timing. Ideal for household appliances, audio equipment, office equipment, communications equipment, etc.	Long stroke of 3 mm. Shorting and non-shorting models available.	Clip-on wiring with crimp-type connectors. Snap-fit attachment for easy installation. Operation possible from either side.	Ultra-low operating force (0.03 N). Snap-fit attachment for easy installation. Clip-on wiring with crimp-type connectors. Long stroke of 45°.
Contact	**Contact specification**	Slide	Slide	Slide	Slide
	Contact material	Silver plated	Silver plated	Gold plated	Silver plated
	Rating (resistive load)	0.1 A at 30 VDC	0.1 A at 30 VDC	0.1 A at 30 VDC	10 mA at 12 VDC
	Max. operating current (A)	20 / 15 / 10 / 8 / 5 / 3 / 2 / 1 / 0.5 / 0.3 / 0.1			
	Min. permissible load (mA)	100 / 10 / 1 / 0.1 / 0.01			
	(N-level reference value)	(1 mA at 5 VDC)	(1 mA at 5 VDC)	(1 mA at 5 VDC)	(1 mA at 5 VDC)
Operating force (OF) (see note)		0.98 N {100 gf}, 0.49 N {50 gf}	0.39 N {40 gf}, 1.28 N {130 gf}	0.49 N {50 gf}	0.03 N {3 gf}
Durability (see note)	**Mechanical**	50 x 10^3 min.	50 x 10^3 min.	1 x 10^6 min.	2 x 10^6 min.
	Electrical	50 x 10^3 min.	50 x 10^3 min.	50 x 10^3 min.	2 x 10^6 min.
Ambient operating temperature		–10°C to 70°C	–20°C to 80°C	–10°C to 70°C	–10°C to 70°C
Mounting pitch		---	---	---	---
Actuators		Pin plunger	Rotary lever	Rotary lever	Rotary lever
Terminals		PCB	PCB	CT connector (AMP)	CT connector (AMP)
Page		250	254	258	262

Note: 1. These values are for pin plunger models.

2. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

Classifications		Door Switches			
Model		D3D	D2D	D2T	
Appearance					
Features		Choose from plunger or lever actuator. Low operation force of 2 N max. Quick-connection terminals for easier wiring.	Minimum contact gap of 3 mm (standard model). Pull-on lock model also available.	Incorporates two circuits for power loads and signals. Install using panel or screw mounting.	
Contact	Contact specification	Crossbar	Rivet	Rivet	
	Contact material	Gold alloy	Silver	Silver	
	Rating (resistive load)	1 A at 125 VAC	16 A at 250 VAC	5 A at 250 VAC	0.1 A at 30 VDC
	Max. operating current (A)				
	Min. permissible load (mA) (N-level reference value)	 (1 mA at 5 VDC)	(160 mA at 5 VDC)	(160 mA at 5 VDC)	(1 mA at 5 VDC)
Operating force (OF) (see note 1)		2.0 N {204 gf}	19.61, 2.94, 1.96 N {2000, 300, 200 gf}	3.24 N {330 gf}	
Durability (see note 1)	Mechanical	300 x 10^3 min.	10 x 10^6 min.	100 x 10^3 min.	
	Electrical	100 x 10^3 min.	100 x 10^3 min.	100 x 10^3 min.	
Ambient operating temperature		–30°C to 60°C	–25°C to 85°C	–25°C to 85°C	
Mounting pitch		---	22 mm	26.4 mm	
Actuators		Plunger Lever	Pin plunger	Pin plunger Hinge lever	
Terminals		HL connector (J.S.T)	Quick-connect (#250)	Solder (straight, right angled)	
Page		266	270	278	

Note: 1. These values are for pin plunger models.

2. Contact gap for pull-on lock model is 1 mm.

3. The above table provides only an overview of specifications. Before actual use, be sure to check the specification details and precautions given on the relevant reference pages.

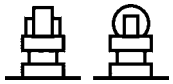
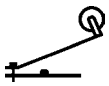
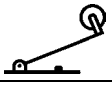
List of Standards

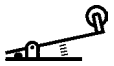
Model / Certification body/Standard			UL	CSA	EN/IEC	CE mark	TÜV	Page
Z-size (General-purpose)	Z	-15H/G/E	●	●	● (TÜV approval)			32
		-01H	●	●	● (TÜV approval)			
		-10FY	●	●				
		-15ER	●	●				
	Z-55	-15G55	●	●	● (TÜV approval)			
		-01H55	●	●	● (TÜV approval)			
	A		●	●				63
	X		●	●	●			70
	DZ		●	●				78
V-size (Miniature)	D3V		●	●	● (VDE approval)			92
	V	-21/16/11	●	●	● (VDE approval)			110
		-15/10	●	●	● (TÜV approval)			
	VX		●	●	● (VDE approval)			126
	D2MV		●	●				133
	K		●	●	● (VDE approval)			140
	D2RV		●	●				145
	D2MC		●	●				156
S-size (Subminiature)	D3M		●	●	● (TÜV approval)			161
	SS	-10/5	●	●	● (VDE approval)			168
		-01	●	●				
	SS-P		●	● (UL approval)	● (VDE approval)			176
	SSG		●	●	● (TÜV approval)			182
	D2S		●	●				190
J-size (Ultra Subminiature)	D2F		●	●				197
	J		●	●				203
	D2MQ							209
Sealed Basic Switches	D2VW		●	●	● (VDE approval)			214
	D2SW	-3	●	●				220
		-01	●	●	● (VDE approval)			
	D2SW-P		●	● (UL approval)				227
	D2HW		○	○ (UL approval)				233
	D2JW							241
	D2FW-G							246
Detection Switches	D2A							250
	D3C							254
	D2X							258
	D3K							262
Door Switches	D3D		●	● (cUL approval)	● (VDE approval)			266
	D2D		●	●	● (VDE approval, TÜV approval)			270
	D2T		●	●	● (VDE approval)			278

Note: ●: Approved model with standard marking on the switch.
○: Approved model without standard marking on the switch. The marking may be on the box.
Specific models within the approved models may not have the standard approvals.
Consult your OMRON sales representative for specific models with standard approvals.

Actuator Types and Selection Methods

■ Actuator Types and Selection Methods

Appearance	Type	Pretravel (PT)	Overtravel (OT)	Operating force (OF)	Precision	Vibration /shock	Description
	Pin plunger	Small	Small	Small	★★★	★★★★	Suitable for short direct strokes, switch characteristics are used directly, and high-precision position detection is possible. The overtravel, however, is the shortest of any actuator, requiring a reliable stopper.
	Spring pin plunger	Small	Medium	Large	★★	★★★	Overtravel is longer than for a pin plunger, but the same application methods are possible. The plunger diameter is slightly larger, but off-center loads must be avoided, i.e., the load must be on the center of the plunger.
	Spring short pin plunger	Small	Medium	Large	★★	★★	Overtravel is large, just as for a spring pin plunger. The plunger is short and has a larger diameter to make alignment easier.
	Panel mount pin plunger	Small	Large	Large	★★	★★	The overtravel is the largest of all plunger types. The switch is mounted to a panel using a hexagonal nut and lock nut (mounting position can be adjusted by adjusting the nuts). The plunger can be operated either manually or mechanically, and usage in combination with a low-speed cam is also possible.
	Panel mounted (cross) roller pin plunger	Small	Large	Large	★★	★	A roller is attached to a panel mount pin plunger switch and is operated with a cam or dog. The mounting position can be adjusted the same as a panel mount pin plunger switch, but the overtravel is slightly smaller. Cross rollers are also available that run parallel to the switch.
	Leaf spring	Medium	Medium	Medium	★★	★★	The stroke is larger because of a powerful leaf spring, making this actuator suitable for low-speed cams or cylinder drives. The bearing point is fixed, so the overtravel must be maintained within specifications in the application to prevent damage.
	Roller leaf spring	Medium	Medium	Medium	★★	★★	A leaf spring actuator with a roller attached. Suitable for cam or dog operation.
	Leaf lever	Large	Large	Medium	★	★	A bend in the lever is used to create a large stroke. Suitable for detecting cams or dogs, as well as various other moving objects.
	Simulated roller leaf lever	Large	Large	Medium	★	★	A leaf lever with the end bent into a curve to enable application as a simple roller type.
	Hinge lever	Large	Medium	Small	★	★	Used with a low-speed, low-torque cam, the shape of the level can be changed to match the operating body. Steel is mainly used as the material for the lever.
	Simulated roller lever	Large	Medium	Small	★	★	A hinge lever with the end bent into a curve to enable application as a simple roller type.
	Hinge roller lever	Large	Medium	Small	★	★	A hinge lever with a roller attached. Suitable for high-speed cam operation.
	Reverse operation hinge lever	Large	Small	Medium	★	★★	Used with a low-speed, low-torque cam, the shape of the level can be changed to match the operating body. Steel is mainly used as the material for the lever.

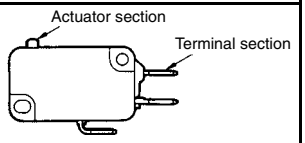
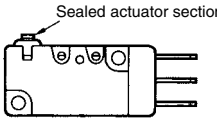
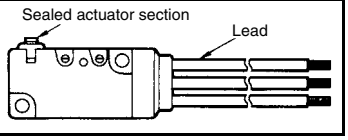
Appearance	Type	Pretravel (PT)	Overtravel (OT)	Operating force (OF)	Precision	Vibration /shock	Description
	Reverse operation hinge roller lever	Medium	Medium	Medium	★	★★	A reverse operation hinge lever with a roller attached. Suitable for cam operation.
	Rotating operation	Large	Large	Small	★	★★	A low-torque actuator with a rotating operation. Suitable for detecting lightweight objects, such as coins and paper currency.
	Flexible rod	Large	Large	Small	★	★	Can be operated in any of 360° (but not in the direction running along the center of the rod). The operating force is small. Effective for detecting when the direction or shape is not consistent. The overtravel is absorbed by the actuator, providing a large leeway in operation object play.

Note: Indications for precision and vibration/shock are as follows: ★: Possible, ★★: Good, ★★★: Excellent, ★★★★: Superior
Actuators related only to Z-series Switches are not listed above.

Selection of Models by Environmental Condition

Use a model with a degree of protection suited for the operating conditions, such as the exposure of the model to dust, gas, powder, and water drops.

■ Basic Switches

Dust and powder	Gas	Water drops	Degree of protection	Model	Environmental resistance	Description of sealing
△	X	X	IP00	Z, A, X, DZ, TZ, D3C, D2X, D3K, D2A	Dustproof, but no protection against gas, water, or oil (liquids). Use a model satisfying IP67 requirements or a Limit Switch in locations subject to water or liquid splashes.	 Normally, Basic Switches are protected against the entry of dust by minimizing the clearances in the actuator section (between the plunger and case) and terminal section, or by closely mating the convex and concave parts.
△	X	X	IP40	D3V, V, VX, D2MV, K, D2RV, D2MC, D3M, SS, SS-P, SSG, D2S, D2F, J, D2MQ, D3D, D2D, D2T		
○	△	○ (excluding the terminals)	IP67 (excluding the terminals)	D2VW terminal models D2SW terminal models D2SW-P terminal models D2HW terminal models D2JW terminal models	Since no clearance exists in the actuator section and inside the Switch (between the case and cover), the Switch is completely dustproof and gas-tight. Pay attention to water and oil, however, as the terminal section is exposed. Use a model satisfying IP67 requirements or a Limit Switch in locations subject to water or liquid splashes.	
○	△	○	IP67	D2VW molded lead wire models D2SW molded lead wire models D2SW-P molded lead wire models D2HW molded lead wire models D2JW molded lead wire models D2FW-G	The actuator, terminal section, and clearance between the case and cover are fully sealed. The Switch is thus resistant to dust, gas, water, oil, etc.	

Note: ○: Applicable
△: Applicable depending on the model. Consult your OMRON sales representative.
X: Not applicable

Temperature and Humidity

Be sure to use the Switch within the permissible temperature range with no icing.

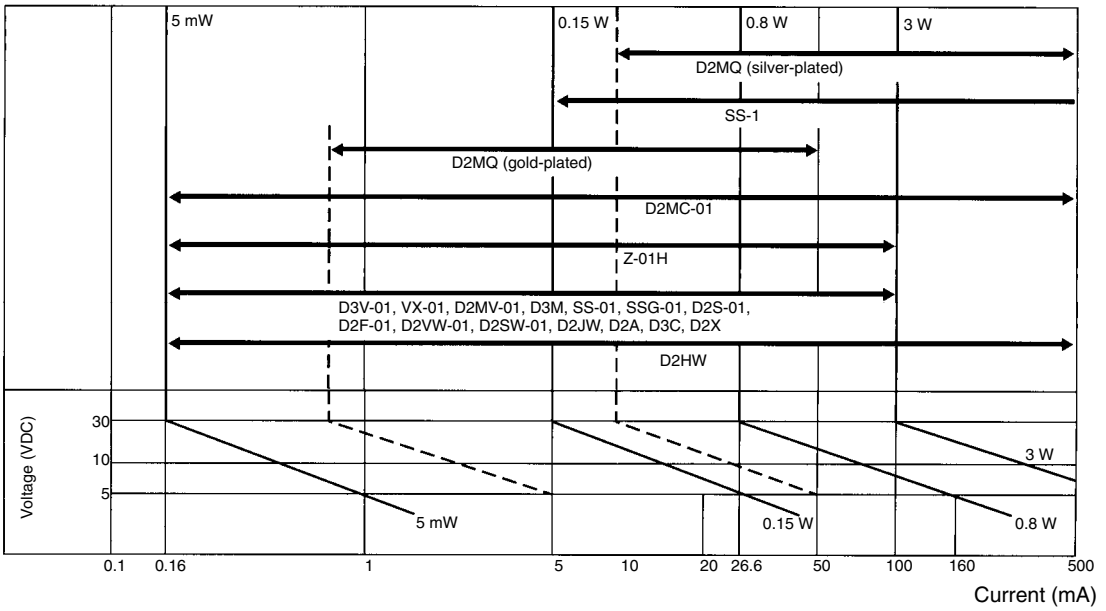
Shock and Vibration

The Switch will malfunction if the contact is separated for more than 1 ms due to shock or vibration.

Make sure to use the Switch with a contact gap that is wide enough and operating force that is low enough for the application.

Selection of Models for Micro Loads

It is recommended that the following Basic Switches be used, each of which has contact specifications suited to the specified micro load range.



Glossary

■ General Terms

Basic Switch

A small-size switch with a very small contact gap and snap–action mechanism and with a contact structure that switches by a specified movement and specified force enclosed in a case with an actuator provided on the exterior of the case. (Basic switches are often referred to as merely “switches” in this catalog.)

Switch with Contacts

A type of switch that achieves the switching function through the mechanical switching of contacts. Use as opposed to a semiconductor switch with switch characteristics.

Contact Form

The structure of the electrical I/O circuits of contacts used according to the type of application. (Refer to *Contact Form* table later in this section.)

Ratings

Value generally used as a reference for ensuring the characteristics and performance of switches, such as the rated current and rated voltage. Ratings are given assuming specific conditions (such as the type of load, current, voltage, and frequency).

Resin Filled (Molded Terminal)

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

Insulation Resistance

The resistance between discontinuous terminals, between terminals and non-current-carrying metal parts, and between terminals and ground.

Dielectric Strength

The threshold value up to which insulation will not be destroyed when a high voltage is applied for 1 minute to a predetermined measurement location.

Contact Resistance

The electrical resistance of the contact point of contacts. Generally, the contact resistance includes the conductive resistance of the spring or terminal section.

Vibration Resistance

Malfunction: The range of vibration for which closed contacts will not open for longer than a specific time when vibration is applied to a switch currently in operation.

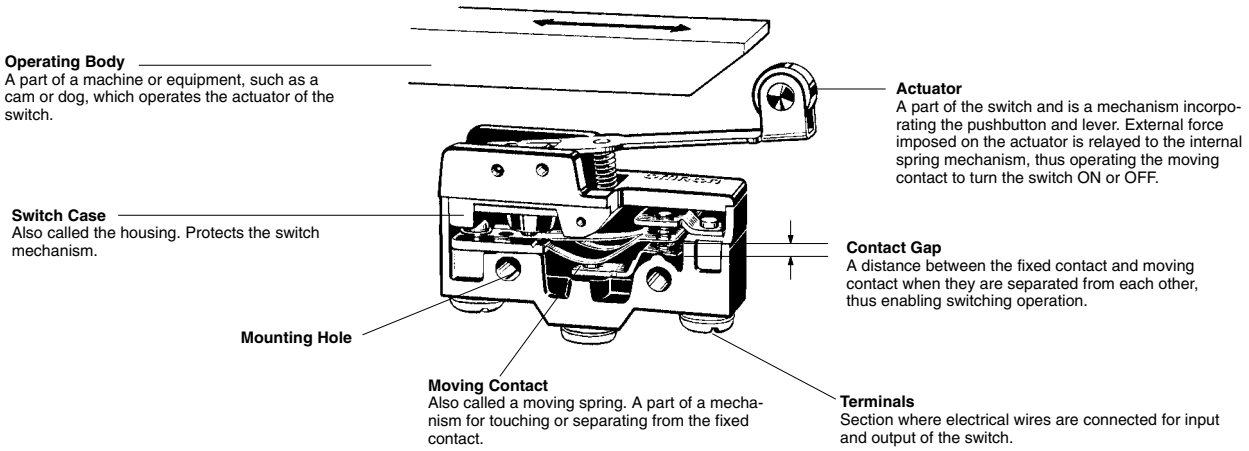
Shock Resistance

Destruction: The range of shock for which the components of the switch will not be damaged and for which operating characteristics are maintained when mechanical shock is applied to a switch during transportation or installation.

Malfunction: The range of shock for which closed contacts will not open for longer than a specific time when shock is applied to a switch currently in operation.

■ Terms for Configuration and Structure

Switch Configuration and Structure



■ Terms Related to Durability

Mechanical Durability: The switching durability when a switch is operated at a specified frequency and specified overtravel (OT) without the contacts energized.

Electrical Durability: The switching durability when a switch is operated at a specified frequency and specified overtravel (OT) under the rated load.

■ 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

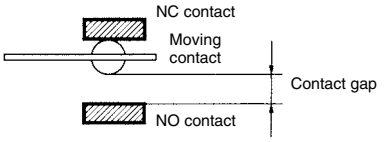
■ Contact Shape and Type

Shape	Type	Main material	Processing method	Main application
	Crossbar contact	Gold alloy Silver alloy	Welding or riveting	Crossbar contacts are used for ensuring high contact reliability for switching micro loads. The moving contact and fixed contact come in contact with each other at a right angle. Crossbar contacts are made with materials that 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 high-capacity 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 sulfidization of the silver contacts while the switch is stored, the contacts may be gold-plated. Contacts made with silver alloy are used for switching high current, such as the current supplied to TV sets.

■ Contact Gap

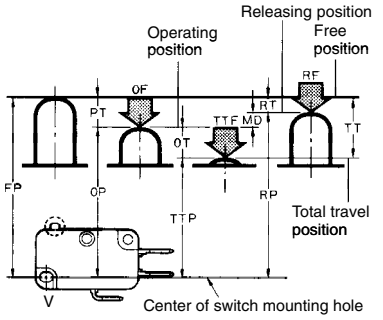
The contact gap is either 0.25, 0.5, 1.0, or 1.8 mm. The contact gap is a design goal. Check the contact gap of the switch to be used if a minimum contact gap is required. The standard contact gap is 0.5 mm. Even for the same switch configuration, the smaller the contact gap of a switch mechanism is, the less the movement differential (MD) is and the more sensitivity and longer durability the switch has. Such a switch cannot ensure, however, excellent switching performance, vibration resistance, or shock resistance.

A switch becomes less sensitive when 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 a switch with a contact gap of 0.25 mm is used for its high sensitivity, 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 durability	Vibration and shock resistance	Feature
H	0.25 mm	Inferior	Minimal	Excellent	Inferior	High precision and long durability
G	0.50 mm	Ordinary	Short	Good	Ordinary	General-purpose
F	1.00 mm	Good	Medium	Ordinary	Good	Performance level between G and E
E	1.80 mm	Excellent	Long	Inferior	Excellent	Highly vibration and 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 from the free position to the operating position.
		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 to the total travel position.
		Movement Differential	MD	mm or degrees	Max.	The distance or angle of the actuator from the operating position to the releasing position.
		Total Travel	TT	mm or degrees	---	The distance or angle of the actuator movement from the free position to the total travel position.
	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 when external force is applied from the free position.
		Releasing Position	RP	mm or degrees	---	The position of the actuator at which the contacts snap from the operated contact position to their free 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

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. Refer to page 28, *Operating Stroke Setting*.

■ Terminal Symbol and Contact Form

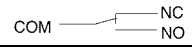
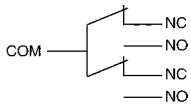
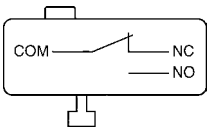
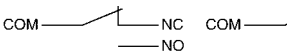
Contact	Terminal symbol
COM	Common terminal
NC	Normally closed terminal
NO	Normally open terminal

■ Terminal Types

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

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

■ Contact Form

Symbol	Name
	SPDT
	SPST-NC
	SPST-NO
	Split contacts Z-10FY-B
	Maintained contacts Z-15ER
	DPDT DZ

■ 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

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. The table indicates the meaning of symbol for reference.

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 0.8 mm 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 insulative switch housing through air plus any other insulator thickness including the housing itself. The distance through insulation will be the insulator thickness when there is no distance through air.

Cautions

Note: Always observe the following cautions to ensure safety.

Mounting

Before mounting, dismounting, wiring, or inspecting a 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

Do not perform wiring when power is being supplied to a switch. Also, do not touch any of the charged terminals when power is being supplied. Otherwise, electric shock may be received.

Follow the instructions provided in *Correct Use* for all wiring and soldering work. Using a switch with improper wiring or soldering may result in abnormal heating when power is supplied, possibly resulting in burning.

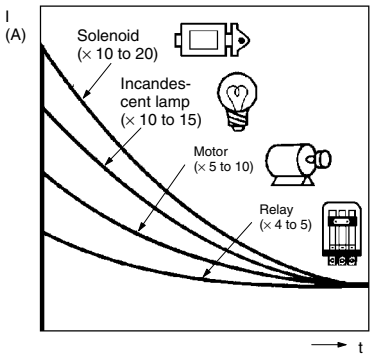
Contact Load

Select suitable switch ratings after confirming contact load. If the contact load is excessive for the contacts, the contacts may weld or shift, possibly resulting in short-circuits or burning when power is supplied.

Load Types

Some types of load have a large difference between steady-state current and inrush current, as shown in the following diagram. Select a switch with ratings suitable for the type of load. The higher the inrush current in the closed circuit is, the more the contact abrasion or shift there will be. Consequently, contact welding or shifting may occur, possibly resulting in short-circuits or burning.

Types of Load vs. Inrush Current



Operating Atmosphere

Do not use switches in atmospheres containing combustible or explosive gases. Arc or heat generated by switching may cause fires or explosions.

Shock on Individual Switches

Do not drop or disassemble switches. Not only will characteristics be jeopardized, but also damage, electric shock, or burning may result.

Durability

The durability of a switch greatly varies with switching conditions. Before using a switch, be sure to test the switch under actual conditions in the actual application and to use the switch within the switching operations causing no problem. If a deteriorated switch is used continuously, insulation failures, contact welding, contact failures, switch damage, or switch burnout may result.

Correct Use

■ Using Switches

- When switches are actually used, unforeseen accidents may occur. Before using a switch, perform all possible testing in advance.
- Unless otherwise specified, ratings and performances given in this catalog are for standard test conditions (i.e., 15 to 35°C, 25% to 75% humidity, and 86 to 106 kPa atmospheric pressure). When performing testing in the actual application, always use the same conditions as will be used in actual usage conditions for both the load and the operating environment.
- Reference data provided in this catalog represents actual measurements from production samples in graph form. All reference data values are nominal.
- All ratings and performance values provided in this catalog are the results of a single test each rating and performance value therefore may not be met for composite conditions.

■ Selecting Correct Switch

Select an appropriate switch for the operating environment and load conditions.

- Use the *Selection Guide* to select a suitable switch for the rated current, operating load, actuator type, and operating environment.
- It is not recommended to use a switch for a large current to switch a micro current, in terms of contact reliability. Select a switch that is suitable for the current actually being switched.
- Use a sealed switch in environments subject to water, other liquids and excessive dirt or dust.

■ Electrical Conditions

Load

The switching capacity of a 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 a switch. 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.

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 a switch within the rated conditions.

If a switch is used for switching both micro and high-capacity loads, be sure to connect relays suitable to the loads.

The rated loads of a switch are according to the following conditions:

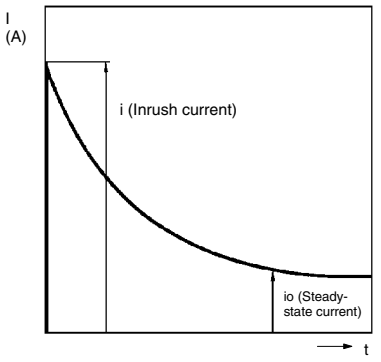
Inductive Load: A load having a minimum power factor of 0.4 (AC) or a maximum time constant of 7 ms (DC).

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 steady-state current.

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

Inrush Current



Application of Switch to Electronic Circuits

The Basic switch may have contact bouncing or chattering in switching, 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 with gold-plated contacts for micro loads, which are more resistive to environmental conditions.

Switches for Micro Loads

If a switch for a general load is used for switching a micro load, it may cause contact failures. Be sure to select a switch within the permissible range. Even if a switch for a micro load is used within the permissible range, the inrush current of the load may deteriorate the contacts, thus decreasing the durability of the switch. Therefore, if necessary, insert a proper contact protective circuit.

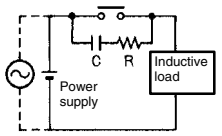
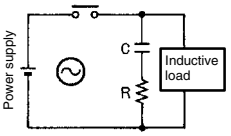
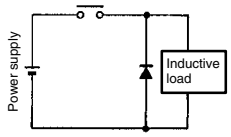
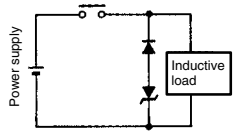
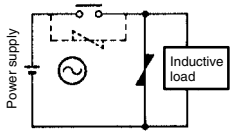
Contact Protective Circuit

Apply a contact protective circuit (surge killer) to extend contact durability, prevent noise, and suppress the generation of carbide or nitric acid due to arc. Be sure to apply the contact protective circuit properly, otherwise an adverse effect may result. Some typical examples of contact protective circuit are described in the following table.

When a switch is used under high humidity, arcs resulting from certain types of load (e.g., inductive loads) will generate nitrious oxides and, with mater the nitrious oxides will become nitric acid, which will corrode internal metal parts and may cause malfunctions. Always use a contact protective circuit according to information provided in the following table when using a switch under circuit conditions of frequent switching and arcing.

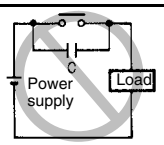
The use of a contact protective circuit may delay the response time of the load.

Typical Examples of Contact Protective Circuits (Surge Killers)

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 C and R 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 with a dielectric strength between 200 and 300 V. When AC is switched, make sure that the capacitor has no polarity. If, however, the ability to control arcs between contacts is a problem for high DC voltage, it may be more effective to connect a capacitor and resistor between the contacts across the load. Check the results by testing in the actual application.
		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 200 V.	Select the varistor so that the following condition is met for the cut voltage Vc. For AC currents, the value must be multiplied by √2. Vc > (Current Voltage x 1.5) If Vc is set too high, however, the voltage cut for high voltages will no longer be effective, diminishing the effect.

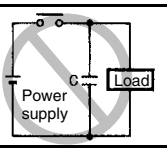
Do not apply contact protective circuit as shown below.

Incorrect



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.

Incorrect

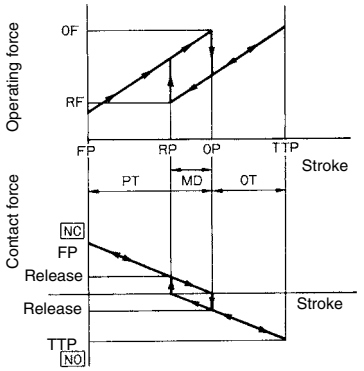


This circuit effectively suppresses arcs when the contacts are OFF. When the contacts are ON again, however, charge current flows to the capacitor, which may result in contact weld.

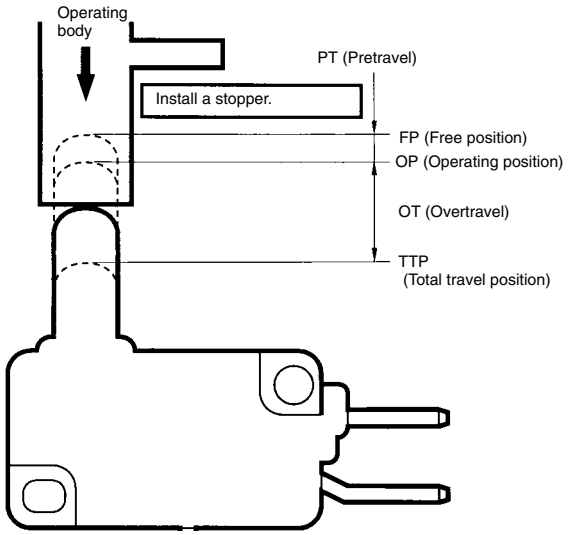
■ Mechanical Conditions

Operating Stroke Setting

The setting of stroke is very important for a switch to operate with high reliability.
The chart below shows the relationship among operating force, stroke, and contact force. To obtain high reliability from a switch, a switch actuator must be manipulated within an appropriate range of operating force.
Be sure to pay the utmost attention when mounting a switch.

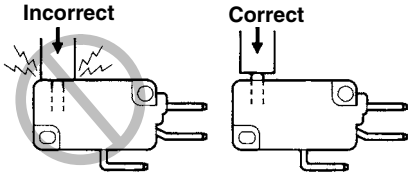


Make sure that the operating body is set so that the actuator should return to the free position when the operating body has moved if a switch is used to form a normally closed (NC) circuit. If a switch is used to form a normally open (NO) circuit, the operating body must move the switch actuator to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



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

If stroke is set exceeding the total travel position (TTP), the moment of inertia of the operating body may damage the actuator or the switch itself, and the stress applied to the moving spring inside the switch will increase and then, the durability of the switch may be deteriorated.



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 contact failures or contact welding.
- 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 indicate the operational reliability of the switch. The durability of a switch is based on operation under specific conditions regarding the switching speed and switching frequency. The durability of a switch may not meet the durability due to conditions even if the switch is operated within the permissible switching speed and frequency ranges. Test a switch sample under the actual conditions to ascertain its durability.

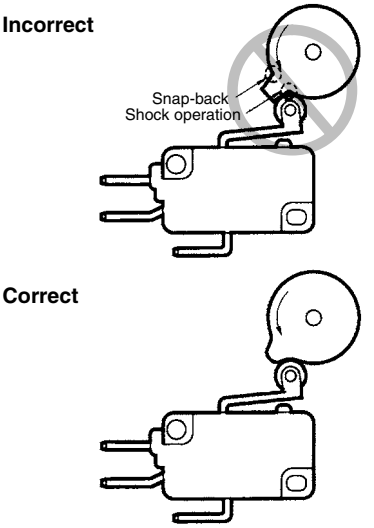
Operating Condition

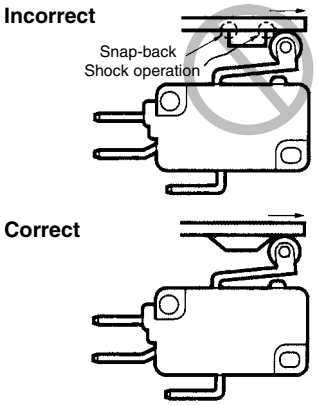
Do not leave a switch with the actuator depressed for a long time, otherwise the parts of the switch may soon deteriorate and the changes of its characteristics operating may result.

Operating Method

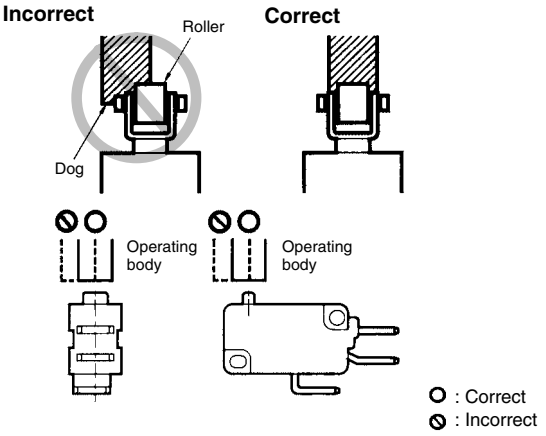
The operating method has a great influence on the performance of a switch. Consider the following before operating a switch.

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

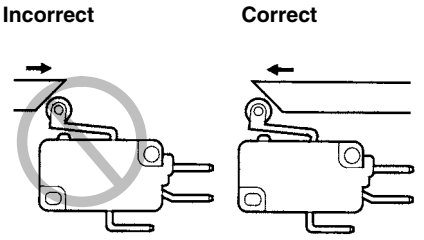




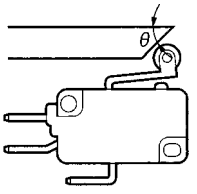
- Make sure that no improper force is applied to the actuator, otherwise the actuator may incur local abrasion. As a result, the actuator may become damaged or its durability may be deteriorated.



- 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 hinge roller lever or simulated hinge lever type in the direction shown below.



- Set the angle of the cam or dog (θ) for roller levers and similar actuators to the range between 30° and 45°. If the angle is too large, an abnormally large horizontal stress will be applied to the lever.



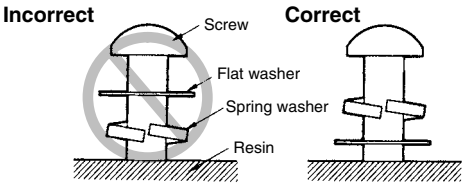
- Do not modify the actuator. If the actuator is modified, excessive external force may be applied to the internal switch mechanism, characteristics may change, and the switch may stop functioning.
- If an external actuator is used as an operating object, check the material and thickness of the lever to make sure that the force applied to the lever is within the permissible range.

■ Mounting

Securing

When mounting a switch, be sure to use the specified mounting screws and tighten the screws with flat washers or spring washers securely.

However, 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 subject the switch to excessive shock or high-frequency vibrations when mounting (e.g., do not use an impact driver) as it may cause contacts stick or switch damage.



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 moving parts or intrude into the inside of the switch, otherwise the switch may have operating failure or 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 glue or locking agent.

Wiring

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

Mounting Location

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

Maintenance and Inspection

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

Mounting Direction

When using a switch with a low operating force mounted with a long lever, make sure that the switch is mounted in the direction where the weight of the lever is not applied to the pushbutton directly, otherwise the switch may have releasing failures.

Terminal Connections

Solder Terminals

When soldering lead wires to a switch, make sure that the temperature of the iron tip is 380°C maximum. Improper soldering may cause abnormal heat radiation from the switch and the switch may burn.

Complete soldering within 5 seconds at 350°C or within 3 seconds at 380°C. If heat is applied for longer period of time, switch characteristics will be deteriorated, e.g., the case will melt and lead wire insulation will scorch.

Soldering conditions are even more strict for ultra subminiature switches. Refer to the *Precautions* for individual models for details.

Quick-Connect Terminals

Use the specified receptacles to connect to quick-connect terminals. Do not apply excessive force horizontally or vertically to the

terminals, otherwise the terminal may be deformed or the housing may be damaged.

Wiring Work

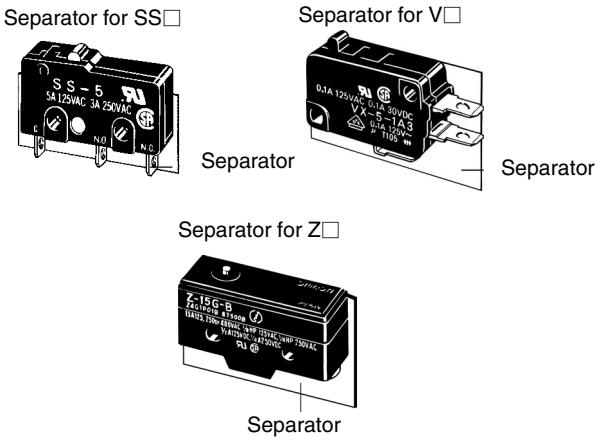
When wiring a switch, check the insulation distance between the switch and the mounting plate. If the insulation distance is insufficient, use an insulation guard or separator. Be particularly careful when mounting a switch to metal.

Use wire sizes suitable for the applied voltage and carrying current.

Do not wire a switch while power is being supplied.

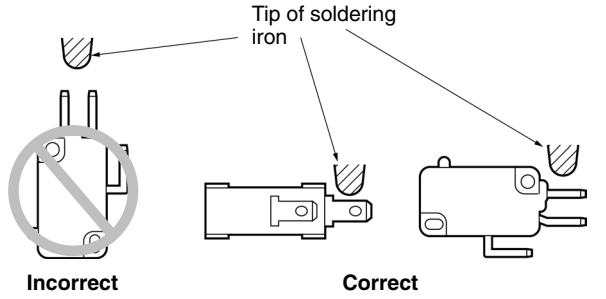
Using Separators

If providing sufficient insulation distance is a problem or there are metal components or copper wire near a switch, use a switch with an insulation guard or use a separator (order separately) to provide sufficient insulation distance.



Soldering Precautions

When soldering by hand, place the terminal horizontal to the ground, use a soldering iron with a suitable heat capacity and a suitable amount of solder, and complete soldering quickly. Prevent flux from entering a switch by exhausting flux gas with an exhaust fan and by avoiding the contact of the tip of the soldering iron and the switch body. Flux gas inside a switch may cause contact failure. Do not apply any force to the terminal or wire immediately after soldering.



When soldering automatically, adjust the amount of solder so that flux does not float onto the top of PCB. If flux enters the switch, it can cause contact failure.

■ Operation and Storage Environment

Handling

Do not apply oil, grease, or other lubricants to the sliding parts of a switch. The intrusion of oil, grease, or other lubricants into the internal part may cause operating failure or contact failure.

Operating Environment

A general switch is not water-resistant. Protect the switch appropriately when using the switch in places with water or oil spray.

Do not use a switch under the condition where vibration or shock is continuously applied to the switch. If continuous vibration or shock is applied to a switch, contact failure, malfunction, or decrease in durability may be caused by abrasive powder generated from the internal parts. If excessive vibration or shock is applied to a switch, the contacts may malfunction, stick, or be damaged.

Mount a switch in the location where vibration and shock is not applied to the switch and in the direction where they do not resonate.

Do not use a switch in the atmosphere of corrosive gas, such as sulfuric gas (H_2S or SO_2), ammonium gas (NH_3), nitric gas (HNO_3), or chlorine gas (Cl_2), or in the atmosphere of high temperature and humidity. Otherwise, contact failure or corrosion damage may result.

If a switch is used in the atmosphere of silicon gas, arc energy may attract silicon dioxide (SiO_2) to the contacts and contact failure may result. If there is silicon oil, silicon sealant, a wire covered with silicon, or any other silicon-based product near the switch, attach a contact protective circuit to suppress the arcing of the switch or eliminate the source of silicon gas generation. Even for a sealed switch, it may not be possible to prevent all of the gas from penetrating the seal rubber, and contact failure may result.

Be sure to use a switch at a temperature and humidity within the specified ranges. If a switch is exposed to radical temperature changes or intense heat, the characteristics of the switch may change. Separate the switch as far as possible from sources of heat to eliminate the influence.

Storage Environment

When storing a switch, consider countermeasures (e.g., storing in a plastic bag) to prevent discoloration resulting from sulfidization of terminals (silver-plated). Make sure that the location is free of corrosive gas or dust with no high temperature or humidity. 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.

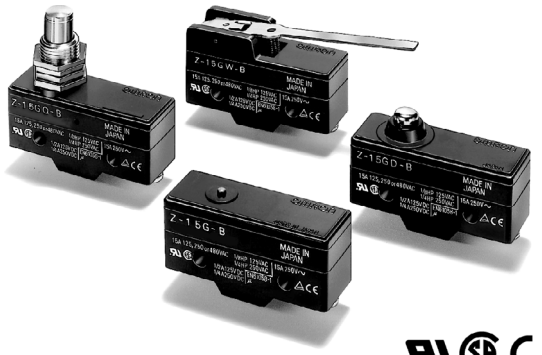
Switch Trouble and Corrective Action

Type	Location of failure	Failure	Possible cause	Corrective action
Failures related to electrical characteristics	Contact	Contact failure	Dust and dirt on the contacts.	Remove the cause of the problem, place the switch in a box, or use a sealed switch.
			Water or other liquid has penetrated into a switch.	
			Chemical substances have been generated on the contact surface due to the atmosphere containing chemical corrosive 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 switches a very low load.	
			Solder flux has penetrated into the switch.	Review the soldering method or use a sealed or flux-tight switch.
			Silicon gas exists near the switch.	Remove the material generating gas, or adjust contact capacity to prevent formation of silicon compounds on the contacts.
		Malfunction	The contacts are separated from each other by vibration or shock.	Use a switch having a high contact force (generally a high OF).
		Contact welding	The load connected to the switch is too high.	Switch the load with a high-capacity relay or magnetic relay or insert a contact protection circuit.
		Insulation degradation (burning)	Contacts have been melted and scattered by arc.	Switch the load with a high-capacity relay or magnetic relay.
			Water has penetrated into the switch because the switch has been used in an extremely hot environment.	Remove the cause of the problem, place the switch in a box, or use a sealed switch.
			Liquid has penetrated into the switch and been carbonized by arc heat.	
Failures related to mechanical characteristics	Actuator	Operating failure	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.
			Foreign material like dust, dirt and oil has penetrated into the switch.	Remove the cause of the problem or place the switch in a box.
			The actuator does not release because the operating body is too heavy.	Use a switch having a higher OF.
			The switch is loosely installed and thus does not operate even when the actuator is at the rated OP.	Secure the switch.
		Low durability	The shape of the dog or cam is improper.	Change the design of the dog or cam.
			The operating method is improper. The operating speed is too high.	Review the operating stroke and operating speed.
		Damage	A shock has been applied to the actuator.	Remove the cause of problem or use a switch mechanically strong.
			The caulked part is not good enough or the assembled condition is poor.	Replace the switch with a new one.
			Deformation or drop-out Actuator was subjected to an excessive force and force from an inappropriate direction.	Review the handling and operating method.
	Mounting section	Damage	Screws have not been inserted straight.	Check and correct screw insertion method.
			The mounting screws were tightened with too much torque.	Tighten the screws with 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 soldering heat.	Reduce the soldering time or soldering temperature. (Refer to the information given under *Precautions* for that model.)

General-purpose Basic Switch
Z

Best-selling Basic Switch Boasting High Precision and Wide Variety

- A large switching capacity of 15 A with high repeat accuracy.
- A wide range of variations in contact form for your selection: basic, split-contact, maintained-contact, and adjustable contact gap types.
- A series of standard models for micro loads is available.
- A series of molded terminal-type models incorporating safety terminal protective cover is available.



Model Number Structure

■ Configuration

Basic models	General-purpose		Refer to page 34.
	Drip-proof	Without terminal protective cover	Refer to individual datasheets. (Contact your OMRON representative).
		With terminal protective cover	Refer to individual datasheets. (Contact your OMRON representative).
		Molded terminal	Refer to page 36.
Split-contact models	General-purpose		Refer to page 35.
Maintained-contact models	General-purpose		Refer to page 36.

Basic Models

General-purpose

A variety of actuators is available for a wide range of application.

The contact mechanism of models for micro loads is a crossbar type with gold-alloy contacts, which ensures highly reliable operations for micro loads.

Contact Gap:
H2: 0.15 mm (extra-high-sensitivity)
H: 0.25 mm (high-sensitivity, micro voltage current load)
G: 0.5 mm (standard)
E: 1.8 mm (high-capacity)
F: 1.0 mm (split-contact models)

Drip-proof Models

These Switches use a rubber boot on the actuator and adhesive fill between the case and cover to increase resistance to drips.

Models with drip-proof terminal protective covers and molded terminals with resin filling are also available.

Split-contact Models

This type is identical in construction to the general-purpose basic switch except that it has two pairs of simultaneous acting contacts by splitting moving contacts.

Since the moving contacts are connected to a common terminal, either parallel or series connection is possible.

Highly reliable micro load switching is ensured if the model is used as a twin-contact switch.

Maintained-contact Models

The maintained-contact type has a reset button at the bottom of the switch case, in addition to the pushbutton (plunger) located on the opposite side of the reset button. Use these buttons alternately.

Since the Switch has greater pretravel than overtravel, it is suitable for use in reversible control circuits, manual reset circuits, safety limit circuits, and other circuits which are not preferable for automatic resetting. (For further details, refer to individual datasheets.)

■ Model Number Legend

Basic Models

Z-□□□□-□
1 2 3 4 5

1. Ratings
- 01: 0.1 A (for micro load)
- 15: 15 A

2. Contact Gap
- H2: 0.15 (extra-high-sensitivity)
- H: 0.25 mm (high-sensitivity, micro load)
- G: 0.5 mm (standard)
- E: 1.8 mm (high-capacity)

3. Actuator
- None: Pin plunger
- S: Slim spring plunger
- D: Short spring plunger
- K: Spring plunger (medium OP)
- K3: Spring plunger (high OP)
- Q3: Panel mount plunger (low OP)
- Q: Panel mount plunger (medium OP)
- Q8: Panel mount plunger (high OP)
- Q22: Panel mount roller plunger
- Q21: Panel mount cross roller plunger
- L: Leaf spring (high OF)
- L2: Roller leaf spring
- W21: Short hinge lever
- W: Hinge lever (low OF)
- W3: Hinge lever (medium OF)
- W32: Hinge lever (high OF)
- W4: Low-force hinge lever
- W44: Long hinge lever
- W78: Low-force wire hinge lever (low OF)
- W52: Low-force wire hinge lever (high OF)
- W22: Short hinge roller lever
- W2: Hinge roller lever
- W25: Hinge roller lever (large roller)
- W49: Short hinge cross roller lever
- W54: Hinge cross roller lever
- W2277: Unidirectional short hinge roller lever (Low OF)
- M: Reverse hinge lever
- M22: Reverse short hinge roller lever
- M2: Reverse hinge roller lever
- NJ: Flexible rod (high OF)
- NJS: Flexible rod (low OF)

4. Degree of Protection
- None: General-purpose
- 55: Drip-proof
- A55: Drip-proof (including the terminals)

5. Terminals
- None: Solder terminal
- B: Screw terminal (with toothed washer)
- B5V: Screw terminal with terminal cover (for Z-15G□A55 only)

Note: For combinations of models, refer to the following pages.

Standard Models (Drip-proof Type/ Molded Terminals)

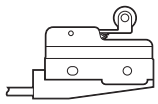
Z-□55-M□□ □M
1 2 3 4

1. Drip-proof Type

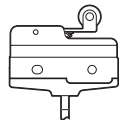
2. Lead Outlets
- None: VSF
- 19: VCT

3. Directions of Lead Outlets (See following diagrams.)
- L: Left
- R: Right
- D: Descending

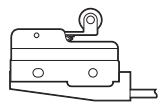
L Type



D Type



R Type



4. Length of Lead Outlets
- 1: 1 m
- 3: 3 m

Split-contact Models

Z-10F□Y-B
1 2 3 4 5

1. Ratings
- 10: 10 A

2. Contact Gap
- F: 1 mm (high-capacity)

3. Actuator
- None: Pin plunger
- S: Slim spring plunger
- D: Short spring plunger
- Q: Panel mount plunger
- Q22: Panel mount roller plunger
- W: Hinge lever
- W22: Short hinge roller lever
- W2: Hinge roller lever
- M22: Reverse short hinge roller lever

4. Construction
- Y: Split-contact models

5. Terminals
- None: Solder terminal
- B: Screw terminal (with toothed washer)

Maintained-contact Models

Z-15-E□R
1 2 3 4

1. Ratings
- 15: 15 A

2. Contact Gap
- E: 1.8 mm (High capacity)

3. Actuator
- None: Pin plunger
- S: Slim spring plunger
- W: Hinge lever

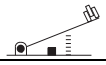
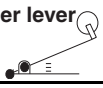
4. Structure
- R: Maintained-contact models

Ordering Information

■ List of Models

Basic Models (General-purpose)

Actuator			Standard	High-sensitivity	High-capacity	Micro load	Extra-high-sensitivity
			G (0.5 mm)	H (0.25 mm)	E (1.8 mm)	H (0.25 mm)	H2 (0.15 mm)
Pin plunger		Solder terminal	Z-15G	Z-15H	Z-15E	Z-01H	Z-15H2
		Screw terminal	Z-15G-B	Z-15H-B	Z-15E-B	Z-01H-B	Z-15H2-B
Slim spring plunger		Solder terminal	Z-15GS	Z-15HS	---	Z-01HS	---
		Screw terminal	Z-15GS-B	Z-15HS-B	---	Z-01HS-B	---
Short spring plunger		Solder terminal	Z-15GD	Z-15HD	Z-15ED	Z-01HD	---
		Screw terminal	Z-15GD-B	Z-15HD-B	Z-15ED-B	Z-01HD-B	---
Panel mount plunger	Low OP	Solder terminal	Z-15GQ3	---	---	---	---
		Screw terminal	Z-15GQ3-B				
	Medium OP	Solder terminal	Z-15GQ	Z-15HQ	Z-15EQ	Z-01HQ	---
		Screw terminal	Z-15GQ-B	Z-15HQ-B	Z-15EQ-B	Z-01HQ-B	---
	High OP	Solder terminal	Z-15GQ8	---	---	---	---
		Screw terminal	Z-15GQ8-B				
Panel mount roller plunger		Solder terminal	Z-15GQ22	Z-15HQ22	Z-15EQ22	---	---
		Screw terminal	Z-15GQ22-B	Z-15HQ22-B	Z-15EQ22-B	---	---
Panel mount cross roller plunger		Solder terminal	Z-15GQ21	Z-15HQ21	Z-15EQ21	---	---
		Screw terminal	Z-15GQ21-B	Z-15HQ21-B	Z-15EQ21-B		---
Leaf spring		Solder terminal	Z-15GL	---	---	---	---
		Screw terminal	Z-15GL-B				
Roller leaf spring		Solder terminal	Z-15GL2	---	---	---	---
		Screw terminal	Z-15GL2-B				
Short hinge lever		Solder terminal	Z-15GW21	---	---	---	---
		Screw terminal	Z-15GW21-B				
Hinge lever	Low OF	Solder terminal	Z-15GW	Z-15HW	---	---	---
		Screw terminal	Z-15GW-B	Z-15HW-B	---	---	---
	Medium OF	Solder terminal	Z-15GW3	---	---	---	---
		Screw terminal	Z-15GW3-B				
	High OF	Solder terminal	Z-15GW32	---	---	---	---
		Screw terminal	Z-15GW32-B				
Low-force hinge lever		Solder terminal	Z-15GW4	Z-15HW24	---	---	---
		Screw terminal	Z-15GW4-B	Z-15HW24-B	---		---
Low-force wire hinge lever	Low OF	Solder terminal	---	Z-15HW78	---	---	---
		Screw terminal		Z-15HW78-B	---		---
	High OF	Solder terminal	---	Z-15HW52	---	---	---
		Screw terminal		Z-15HW52-B	---		---
Short hinge roller lever		Solder terminal	Z-15GW22	Z-15HW22	Z-15EW22	Z-01HW22	---
		Screw terminal	Z-15GW22-B	Z-15HW22-B	Z-15EW22-B	Z-01HW22-B	---
Short hinge cross roller lever		Solder terminal	Z-15GW49	---	---	---	---
		Screw terminal	Z-15GW49-B				
Hinge roller lever	Standard	Solder terminal	Z-15GW2	Z-15HW2	---	---	---
		Screw terminal	Z-15GW2-B	Z-15HW2-B	---	---	---
	Large roller	Solder terminal	Z-15GW25	---	---	---	---
		Screw terminal	Z-15GW25-B				

Actuator		Standard	High-sensitivity	High-capacity	Micro load	Extra-high-sensitivity
		G (0.5 mm)	H (0.25 mm)	E (1.8 mm)	H (0.25 mm)	H2 (0.15 mm)
Hinge cross roller lever 	Solder terminal	Z-15GW54	---	---	---	---
	Screw terminal	Z-15GW54-B				
Unidirectional short hinge roller lever 	Solder terminal	Z-15GW2277	---	---	---	---
	Screw terminal	Z-15GW2277-B				
Reverse hinge lever (see note) 	Solder terminal	Z-15GM	---	---	---	---
	Screw terminal	Z-15GM-B				
Reverse short hinge roller lever (see note) 	Solder terminal	Z-15GM22	---	---	---	---
	Screw terminal	Z-15GM22-B				
Reverse hinge roller lever (see note) 	Solder terminal	Z-15GM2	---	---	---	---
	Screw terminal	Z-15GM2-B				

Note: The pin plungers of reverse-type models are continuously pressed by the actuator levers with compression coil springs and the pin plungers are freed by operating the levers. Reverse-type models are highly vibration- and shock-resistive because the pin plungers are normally pressed.

Minimum Order Lot

The following models are available at the minimum order lot specified below. Orders must be placed per lot.

Actuator	Standard	High-sensitivity	Minimum order lot (pcs)
	G (0.5 mm)	H (0.25 mm)	
Short spring plunger	Z-15GD-B	---	10
Panel mount plunger	Z-15GQ Z-15GQ-B Z-15GQ8-B	---	
Panel mount roller plunger	Z-15GQ22 Z-15GQ22-B	---	
Panel mount cross roller plunger	Z-15GQ21-B	---	
Short hinge lever	Z-15GW21-B	---	
Hinge lever	Z-15GW Z-15GW-B	---	
Low-force hinge lever	Z-15GW4-B	Z-15HW24-B	
Low-force hinge wire lever	---	Z-15HW78-B	
Short hinge roller lever	Z-15GW22 Z-15GW22-B	---	
Hinge roller lever	Z-15GW2 Z-15GW2-B	---	
Reverse short hinge roller lever	Z-15GM22-B	---	
Reverse hinge roller lever	Z-15GM2-B	---	

Split-contact Models

Actuator			F (1.0 mm)
Pin plunger 		Solder terminal	---
		Screw terminal	Z-10FY-B
Slim spring plunger 		Solder terminal	---
		Screw terminal	Z-10FSY-B
Short spring plunger		Solder terminal	---
		Screw terminal	Z-10FDY-B
Panel mount plunger 	Medium OP	Solder terminal	---
		Screw terminal	Z-10FQY-B

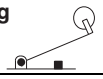
Actuator			F (1.0 mm)
Panel mount roller plunger 		Solder terminal	---
		Screw terminal	Z-10FQ22Y-B
Hinge lever 	Low OP	Solder terminal	---
		Screw terminal	Z-10FWY-B
Short hinge roller lever 		Solder terminal	---
		Screw terminal	Z-10FW22Y-B
Hinge roller lever 		Solder terminal	---
		Screw terminal	Z-10FW2Y-B
Reverse short hinge roller lever 		Solder terminal	---
		Screw terminal	Z-10FM22Y-B

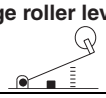
Note: The pin plungers of reverse-type models are continuously pressed by the actuator levers with compression coil springs and the pin plungers are freed by operating the levers. Reverse-type models are highly vibration- and shock-resistive because the pin plungers are normally pressed.

Maintained-contact Models

Actuator	Maintained-contact model
Pin plunger 	Z-15ER
Slim spring plunger 	Z-15ESR
Hinge lever 	Z-15EWR

Basic Models (Drip-proof Models)

Actuator			Basic model (drip-proof)		
			Standard		Micro load
			G (0.5 mm)		H (0.25 mm)
			Without drip-proof terminal protective cover	With drip-proof terminal protective cover	Without drip-proof terminal protective cover
Pin plunger 		Solder terminal	Z-15G55	---	Z-01H55
		Screw terminal	Z-15G55-B	Z-15GA55-B5V	Z-01H55-B
Short spring plunger 		Solder terminal	Z-15GD55	---	Z-01HD55
		Screw terminal	Z-15GD55-B		Z-01HD55-B
Spring plunger 	Medium OP	Solder terminal	Z-15GK55	---	---
		Screw terminal	Z-15GK55-B		
	HIgh OP	Solder terminal	Z-15GK355	---	---
		Screw terminal	Z-15GK355-B	Z-15GK3A55-B5V	
Panel mount plunger 	Medium OP	Solder terminal	Z-15GQ55	---	---
		Screw terminal	Z-15GQ55-B	Z-15GQA55-B5V	
Panel mount roller plunger 		Solder terminal	Z-15GQ2255	---	---
		Screw terminal	Z-15GQ2255-B	Z-15GQ22A55-B5V	
Panel mount cross roller plunger 		Solder terminal	---	---	---
		Screw terminal	Z-15GQ2155-B	Z-15GQ21A55-B5V	
Leaf spring 		Solder terminal	Z-15GL55	---	---
		Screw terminal	Z-15GL55-B		
Roller leaf spring 		Solder terminal	Z-15GL255	---	---
		Screw terminal	Z-15GL255-B		
Short hinge lever 		Solder terminal	Z-15GW2155	---	---
		Screw terminal	Z-15GW2155-B		
Long hinge lever 		Solder terminal	Z-15GW4455	---	---
		Screw terminal	Z-15GW4455-B	Z-15GW44A55-B5V	
Hinge lever 		Solder terminal	Z-15GW55	---	---
		Screw terminal	Z-15GW55-B	Z-15GWA55-B5V	
Short hinge roller lever 		Solder terminal	Z-15GW2255	---	Z-01HW2255
		Screw terminal	Z-15GW2255-B	Z-15GW22A55-B5V	Z-01HW2255-B

Actuator			Basic model (drip-proof)		
			Standard		Micro load
			G (0.5 mm)		H (0.25 mm)
			Without drip-proof terminal protective cover	With drip-proof terminal protective cover	Without drip-proof terminal protective cover
Hinge roller lever 	Parallel	Solder terminal	Z-15GW255	---	---
		Screw terminal	Z-15GW255-B	Z-15GW2A55-B5V	
Unidirectional short hinge roller lever 		Solder terminal	Z-15GW227755	---	---
		Screw terminal	Z-15GW227755-B	Z-15GW2277A55-B5V	
Reverse hinge lever (see note 1) 		Solder terminal	Z-15GM55	---	---
		Screw terminal	Z-15GM55-B		
Reverse short hinge roller lever (see note 1) 		Solder terminal	Z-15GM2255	---	---
		Screw terminal	Z-15GM2255-B		
Reverse hinge roller lever (see note 1) 		Solder terminal	Z-15GM255	---	---
		Screw terminal	Z-15GM255-B		
Flexible rod (coil spring) (see note 2) 		Solder terminal	Z-15GNJ55	---	---
		Screw terminal	Z-15GNJ55-B		

Note: 1. The pin plungers of reverse-type models are continuously pressed by the actuator levers with compression coil springs and the pin plungers are freed by operating the levers.

2. The tip is made of resin.

Minimum Order Lot

The following models are available at the minimum order lot specified below. Orders must be placed per lot.

Actuator	Standard		High-sensitivity	Minimum order lot
	G (0.5 mm)		H (0.25 mm)	
Short spring plunger	Z-15GD55-B	---	---	10
Spring plunger	Z-15GK55-B	---	---	
Hinge lever	Z-15GW4455-B Z-15GW55 Z-15GW55-B	---	---	
Short hinge roller lever	Z-15GW2255 Z-15GW2255-B	---	---	
Hinge roller lever	Z-15GW255-B	---	---	
Flexible rod (coil spring)	Z-15GNJ55-B	---	---	
Flexible rod (steel wire)	---	---	Z-15HNJS55-B	

Basic Models (Drip-proof High-sensitivity Models)

Actuator		High-sensitivity
		H (0.25 mm)
Flexible rod (steel wire) 	Solder terminal	Z-15HNJS55
	Screw terminal	Z-15HNJS55-B

Specifications

■ Approved Standards

Agency	Standard	File No.
UL	UL508	E41515
CSA	CSA C22.2 No. 55	LR21642
TÜV Rheinland	EN61058-1	R9451585

■ Approved Standard Ratings

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

Rated voltage	Z-15	Z-10F	Z-01H
125 VAC	15 A 1/8 HP	6 A 1/10 HP	0.1 A
250 VAC	15 A 1/4 HP	6 A 1/8 HP	---
480 VAC	15 A	6 A	---
30 VDC	---	---	0.1 A
125 VDC	0.5 A	0.6 A	---
250 VDC	0.25 A	0.3 A	---

Note: Consult with OMRON about approved part numbers by standards.

TÜV (EN61058-1)

Rated voltage	Z-15H□-B	Z-15G□-B	Z-01H□-B
250 VAC	15 A	15 A	---
125 VAC	---	---	0.1 A
30 VDC	---	---	0.1 A

Note: Z-15H2 Series models are not approved.

■ Ratings

Z-15 (Except Micro Load and Flexible Rod Models)

Item / Model	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
G, H, E	**125 VAC**	15 (10) A (see note)		3 A	1.5 A	15 (10) A (see note)		5 A	2.5 A
	250 VAC	15 (10) A (see note)		2.5 A	1.25 A	15 (10) A (see note)		3 A	1.5 A
	500 VAC	10 A		1.5 A	0.75 A	6 A		1.5 A	0.75 A
G	**8 VDC**	15 A		3 A	1.5 A	15 A		5 A	2.5 A
	14 VDC	15 A		3 A	1.5 A	10 A		5 A	2.5 A
	30 VDC	6 A		3 A	1.5 A	5 A		5 A	2.5 A
	125 VDC	0.5 A		0.5 A	0.5 A	0.05 A		0.05 A	0.05 A
	250 VDC	0.25 A		0.25 A	0.25 A	0.03 A		0.03 A	0.03 A
H	**8 VDC**	15 A		3 A	1.5 A	15 A		5 A	2.5 A
	14 VDC	15 A		3 A	1.5 A	10 A		5 A	2.5 A
	30 VDC	2 A		2 A	1.4 A	1 A		1 A	1 A
	125 VDC	0.4 A		0.4 A	0.4 A	0.03 A		0.03 A	0.03 A
	250 VDC	0.2 A		0.2 A	0.2 A	0.02 A		0.02 A	0.02 A
E	**8 VDC**	15 A		3 A	1.5 A	15 A		5 A	2.5 A
	14 VDC	15 A		3 A	1.5 A	15 A		5 A	2.5 A
	30 VDC	15 A		3 A	1.5 A	10 A		5 A	2.5 A
	125 VDC	0.75 A		0.75 A	0.75 A	0.4 A		0.4 A	0.4 A
	250 VDC	0.3 A		0.3 A	0.3 A	0.2 A		0.2 A	0.2 A

Note: Figures in parentheses are for the Z-15HW52 and Z-15HW78(-B) models, the AC ratings of these models are 125 and 250 V only.

Z-15 (Flexible Rod Models)

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	15 A		2 A	1 A	7 A		2.5 A	2 A
250 VAC			1 A	0.5 A	5 A		1.5 A	1 A
8 VDC	15 A		2 A	1 A	7 A		3 A	1.5 A
14 VDC	15 A		2 A	1 A	7 A		3 A	1.5 A
30 VDC	2 A		2 A	1 A	1 A		1 A	0.5 A
125 VDC	0.4 A		0.4 A	0.4 A	0.03 A		0.03 A	0.03 A
250 VDC	0.2 A		0.2 A	0.2 A	0.02 A		0.02 A	0.02 A

Z-15H2

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 250 VAC	10 A		3 A 2.5 A	1.5 A 1.25 A	10 A		5 A 3 A	2.5 A 1.5 A
8 VDC 14 VDC 30 VDC 125 VDC 250 VDC	15 A 15 A 2 A 0.4 A 0.2 A		3 A 3 A 2 A 0.4 A 0.2 A	1.5 A 1.5 A 1.4 A 0.4 A 0.2 A	15 A 10 A 1 A 0.03 A 0.02 A		5 A 5 A 1 A 0.03 A 0.02 A	2.5 A 2.5 A 1 A 0.03 A 0.02 A

Z-01H

Rated voltage	Resistive load	
	NC	NO
125 VAC	0.1 A	
8 VDC 14 VDC 30 VDC	0.1 A 0.1 A 0.1 A	

Z-10F

Model	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
Series connection	125 VAC 250 VAC	10 A 10 A		4 A 2.5 A	2 A 1.5 A	6 A		5 A 3 A	2.5 A 1.5 A
	30 VDC 125 VDC 250 VDC	10 A 1 A 0.6 A		4 A 1 A 0.6 A	2 A 1 A 0.6 A	6 A 0.1 A 0.05 A		6 A 0.1 A 0.05 A	3 A 0.1 A 0.05 A
Parallel connection	125 VAC 250 VAC	6 A 6 A		3 A 2.5 A	1.5 A 1.25 A	4 A 4 A		4 A 2 A	2 A 1 A
	30 VDC 125 VDC 250 VDC	6 A 0.6 A 0.3 A		4 A 0.6 A 0.3 A	2 A 0.6 A 0.3 A	4 A 0.1 A 0.05 A		6 A 0.1 A 0.05 A	3 A 0.1 A 0.05 A

Note: 1. The above current ratings are the values of the steady-state current.

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 normally closed and normally open ratings of reverse hinge lever models are opposite to each other.

6. The AC ratings of molded terminals are 125 and 250 V only.

7. 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	Basic (except micro load and flexible rod)/ maintained contact Z-15	Basic (micro load) Z-01H	Basic (flexible rod) Z-15	Split-contact Z-10F
Operating speed (see note)	0.01 mm to 1 m/s (see note 1)		1 mm to 1 m/s	0.1 mm to 1 m/s (see note 1)
Operating frequency	Mechanical: 240 operations/min Electrical: 20 operations/min		Mechanical: 120 operations/min Electrical: 20 operations/min	Mechanical: 240 operations/min Electrical: 20 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)			
Contact resistance	15 mΩ max. (initial value)	50 mΩ max. (initial value)	15 mΩ max. (initial value)	25 mΩ max. (initial value)
Dielectric strength	Between contacts of same polarity Contact gap G: 1,000 VAC, 50/60 Hz for 1 min Contact gap H, H2: 600 VAC, 50/60 Hz for 1 min Contact gap E: 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 2,000 VAC, 50/60 Hz for 1 min		Between contacts of same polarity Contact gap G: 1,000 VAC, 50/60 Hz for 1 min Contact gap H: 600 VAC, 50/60 Hz for 1 min Between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts 2,000 VAC, 50/60 Hz for 1 min	Between contacts of same polarity Contact gap F: 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 2,000 VAC, 50/60 Hz for 1 min
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note 5)		Malfunction: 10 to 20 Hz, 1.5-mm double amplitude (see note 5)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note 5)
Shock resistance	Destruction: 1,000 m/s^2 max. Malfunction: 300 m/s^2 max. (see note 2, 5)		Destruction: 1,000 m/s^2 max. Malfunction: 50 m/s^2 max. (see note 5)	Destruction: 1,000 m/s^2 max. Malfunction: 300 m/s^2 max. (see note 3, 5)
Durability	Mechanical: Contact gap G, H, H2: 20,000,000 operations min. (see note 4) Contact gap E: 300,000 operations Electrical: Contact gap G, H, H2: 500,000 operations min. Contact gap E: 100,000 operations min.		Mechanical: 1,000,000 operations min. Electrical: 100,000 operations min.	Mechanical: 500,000 operations min. (see note 1) Electrical: 100,000 operations min.
Degree of protection	General-purpose: IP00 Drip-proof: Equivalent to IP62			
Degree of protection against electric shock	Class I			
Proof tracking index (PTI)	175			
Switch category	D (IEC335-1)			
Ambient temperature	Operating: General-purpose: –25°C to 80°C (with no icing) Drip-proof: –15°C to 80°C (with no icing)			
Ambient humidity	Operating: General-purpose: 35% to 85% Drip-proof: 35% to 95%			
Weight	Approx. 22 to 58 g		Approx. 42 to 48 g	Approx. 34 to 61 g

Note: 1. The values are for the plunger models. (For the lever models, the values are at the plunger section.) (Consult your OMRON representative for other models.)

2. The values are for the Z-15G pin plunger.

3. The values are for the Z-10FY-B.

4. The values are for the pin plunger. The durability for models other than the pin plunger is 10,000,000 min.

5. Malfunction: 1 ms max.

■ Contacts Specification

Item		Z-15	Z-01H	Z-10F
Contacts	Shape	Rivet	Single crossbar	Rivet
	Material	Silver alloy	Gold alloy	Silver alloy
Inrush current	NC	30 A max.	0.1 A max.	40 A max.
	NO	15 A max.	0.1 A max.	20 A max.

■ Contact Form

Basic Models

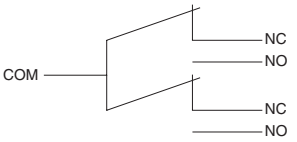
General-purpose

Contact Form (SPDT)

Note: The Z-15GM is a reversible model and the NO and NC positions are reversed.

Split-contact Models

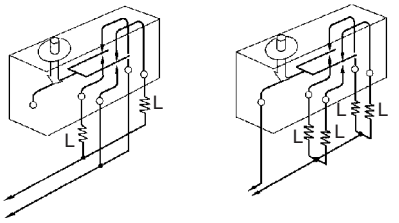
Contact Form (Split-contact)



Note: The NO and NC terminal arrangement is reversed for Models with reverse operation (Z-10FM).

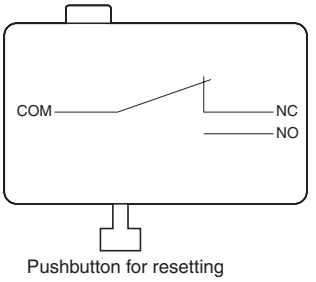
Connection Example

Series Connection **Parallel Connection**



Maintained-contact Models

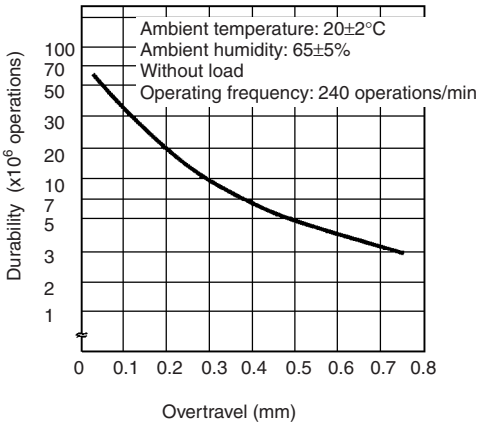
Contact Form (Maintained-contact)



Engineering Data

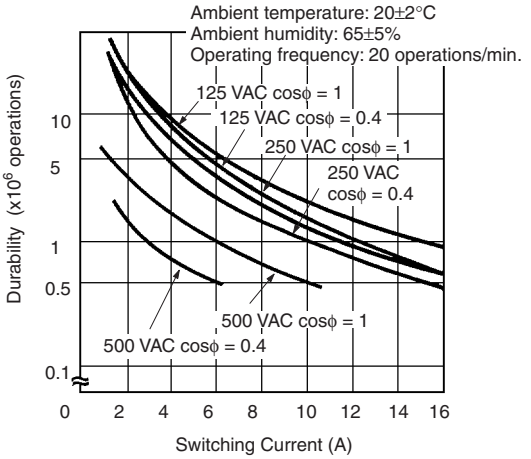
■ Mechanical Durability

Z-15G



■ Electrical Durability

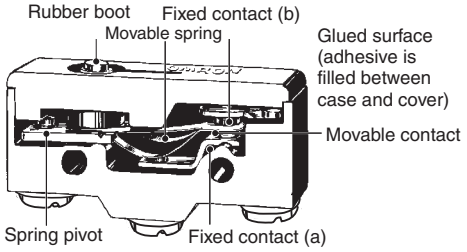
Z-15G



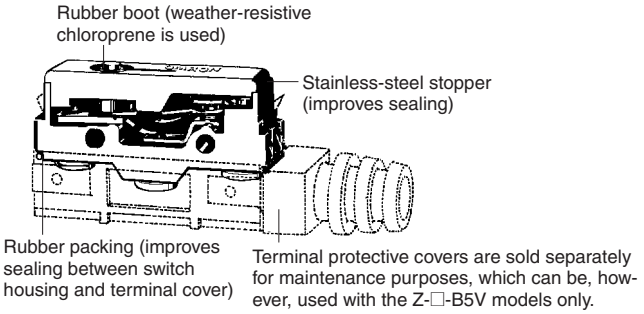
Nomenclature

■ Drip-proof Construction

Without Terminal Protective Cover



With Terminal Protective Cover



Dimensions

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

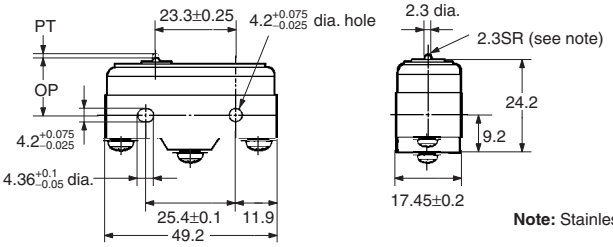
■ Dimensions and Operating Characteristics

Basic Models (General-purpose) & Split-contact Models

The models, illustrations, and graphics are for screw-terminal models (-B). The "-A" at the end of the model number for solder terminal models has been omitted. For details of the terminals, refer to *Terminals* on page 59.

Pin Plunger

Z-15G-B, Z-15E-B
Z-15H-B, Z-15H2-B
Z-01H-B, Z-10FY-B

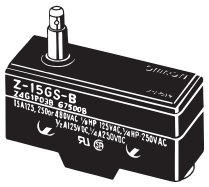


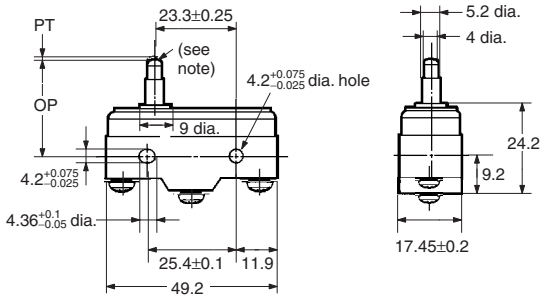
Note: Stainless-steel plunger

	Z-15G-B	Z-15H-B	Z-15H2-B	Z-15E-B	Z-01H-B	Z-10FY-B
OF	2.45 to 3.43 N	1.96 to 2.75 N	1.96 to 2.5 N	6.12 to 7.85 N	2.45 N max.	4.46 to 7.26 N
RF min.	1.12 N	1.12 N	1.12 N	1.12 N	0.78 N	1.12 N
PT max.	0.4 mm	0.3 mm	0.3 mm	0.8 mm	0.5 mm	0.8 mm
OT min.	0.13 mm	0.13 mm	0.1 mm	0.13 mm	0.13 mm	0.13 mm
MD max.	0.05 mm	0.025 mm	0.005 to 0.008 mm	0.13 mm	0.04 mm	0.1 mm
OP	15.9±0.4 mm					

Slim Spring Plunger

Z-15GS-B, Z-15HS-B,
Z-01HS-B, Z-10FSY-B



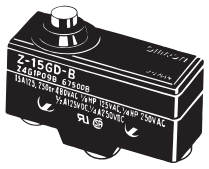


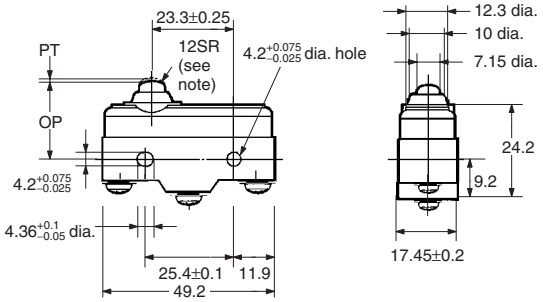
Note: Stainless-steel plunger (flat, 1R chamfered)

	Z-15GS-B	Z-15HS-B	Z-01HS	Z-10FSY-B
OF	2.45 to 3.43 N	1.96 to 2.79 N	2.45 N max.	4.46 to 7.26 N
RF min.	1.12 N	1.12 N	0.78 N	1.12 N
PT max.	0.4 mm	0.3 mm	0.5 mm	0.8 mm
OT min.	1.6 mm	1.6 mm	1.6 mm	1.6 mm
MD max.	0.05 mm	0.025 mm	0.05 mm	0.1 mm
OP	28.2±0.5 mm			

Short Spring Plunger

Z-15GD-B, Z-01HD-B
Z-15HD-B, Z-10FDY-B
Z-15ED-B



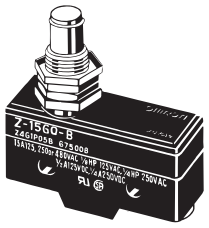


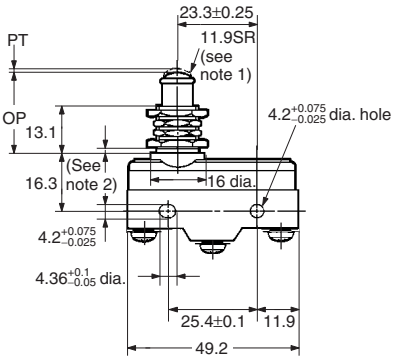
Note: Plated iron plunger

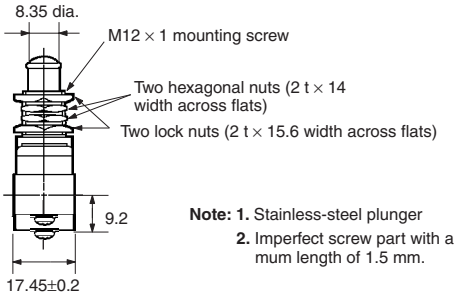
	Z-15GD-B	Z-15HD-B	Z-15ED-B	Z-01HD-B	Z-10FDY-B
OF	2.45 to 3.43 N	1.96 to 2.79 N	6.13 to 7.85 N	2.45 N max.	4.46 to 7.26 N
RF min.	1.12 N	1.12 N	1.12 N	0.78 N	1.12 N
PT max.	0.4 mm	0.3 mm	0.8 mm	0.5 mm	0.8 mm
OT min.	1.6 mm	1.6 mm	1.6 mm	1.6 mm	1.6 mm
MD max.	0.05 mm	0.025 mm	0.13 mm	0.05 mm	0.1 mm
OP	21.5±0.5 mm				

Panel Mount Plunger

Z-15GQ-B, Z-01HQ-B
Z-15HQ-B, Z-10FQY-B
Z-15EQ-B

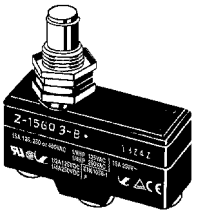


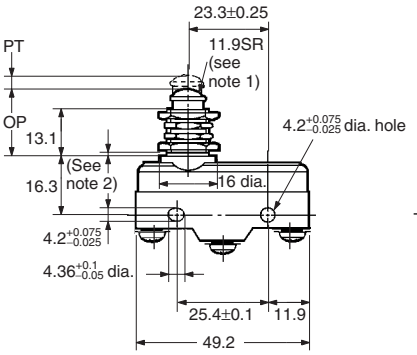


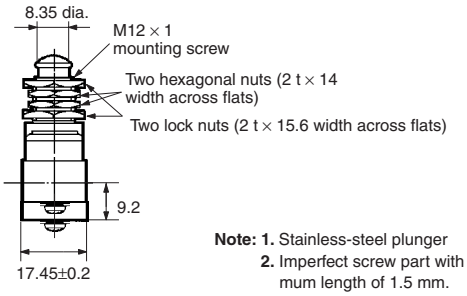


Note: 1. Stainless-steel plunger
2. Imperfect screw part with a maximum length of 1.5 mm.

Z-15GQ3-B

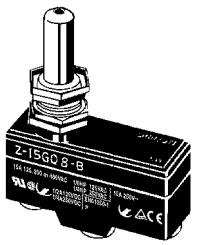


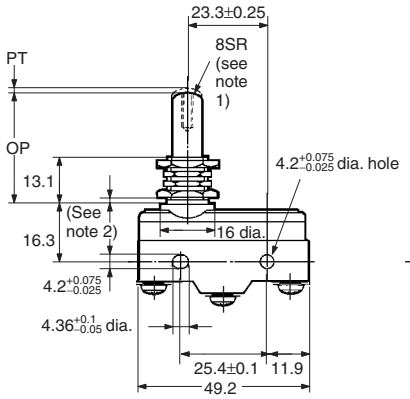


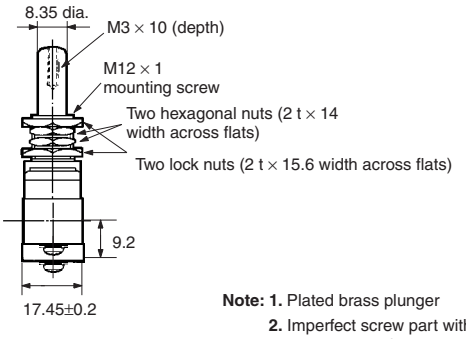


Note: 1. Stainless-steel plunger
2. Imperfect screw part with a maximum length of 1.5 mm.

Z-15GQ8-B







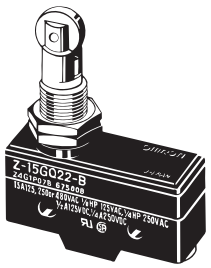
Note: 1. Plated brass plunger
2. Imperfect screw part with a maximum length of 1.5 mm.

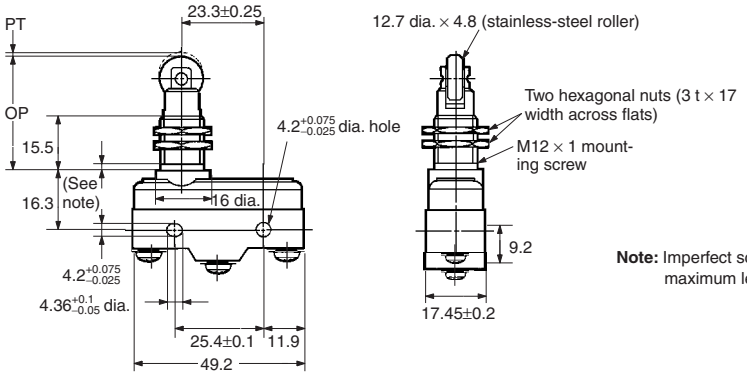
	Z-15GQ-B	Z-15HQ-B	Z-15EQ-B	Z-01HQ-B	Z-10FQY-B	Z-15GQ3-B	Z-15GQ8-B
OF	2.45 to 3.43 N	1.96 to 2.79 N	6.13 to 7.85 N	2.45 N max.	4.46 to 7.26 N	2.45 to 3.43 N	2.45 to 3.43 N
RF min.	1.12 N	1.12 N	1.12 N	0.78 N	1.12 N	1.12 N	1.12 N
PT max.	0.4 mm	0.3 mm	0.8 mm	0.5 mm	0.8 mm	4.2 mm	0.5 mm
OT min.	5.5 mm	5.5 mm	5.5 mm	5.5 mm	5.5 mm	2.5 mm	5.5 mm
MD max.	0.05 mm	0.025 mm	0.13 mm	0.05 mm	0.1 mm	2.2 mm	0.05 mm
OP	21.8±0.8 mm					18.8±0.8 mm	32.5±1 mm

Note: 1. Do not use the M12 mounting screw and the case mounting hole at the same time, or excessive pulling force will be imposed on the Switch and the case and cover may be damaged.
2. On the model Z-15GQ3-B, PT can be set to a value larger than that for the Z-15GQ.
3. On the model Z-15GQ8-B, operating position can be adjusted by providing a screw in the plunger section.
The M3 hole with a depth of 10 mm is a through hole. Take precautions so that no water or screw lock agent penetrates into the hole.

Panel Mount Roller Plunger

Z-15GQ22-B, Z-15EQ22-B
Z-15HQ22-B, Z-10FQ22Y-B





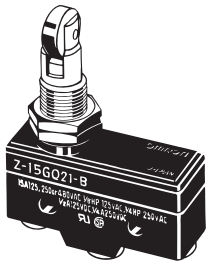
Note: Imperfect screw part with a maximum length of 1.5 mm.

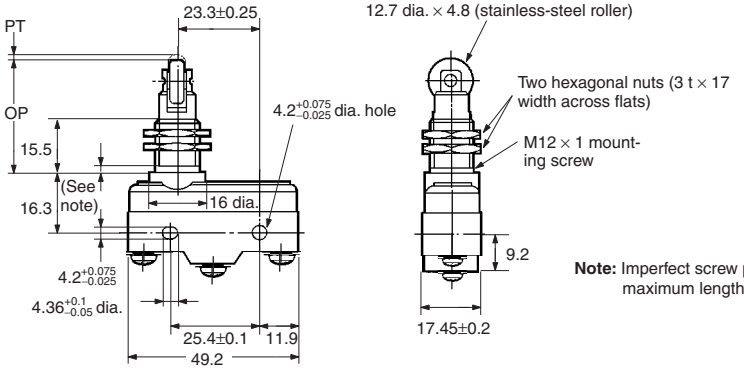
	Z-15GQ22-B	Z-15HQ22-B	Z-15EQ22-B	Z-10FQ22Y-B
OF	2.45 to 3.43 N	1.96 to 2.79 N	6.13 to 7.85 N	4.46 to 7.26 N
RF min.	1.12 N	1.12 N	1.12 N	1.12 N
PT max.	0.4 mm	0.3 mm	0.8 mm	1 mm
OT min.	3.58 mm	3.58 mm	3.58 mm	3.55 mm
MD max.	0.05 mm	0.025 mm	0.13 mm	0.1 mm
OP	33.4±1.2 mm			

Note: Do not use the M12 mounting screw and the case mounting hole at the same time, or the case may be damaged.

Panel Mount Cross Roller Plunger

Z-15GQ21-B, Z-15HQ21-B,
Z-15EQ21-B





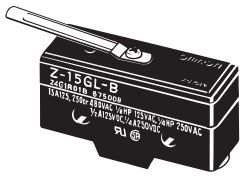
Note: Imperfect screw part with a maximum length of 1.5 mm.

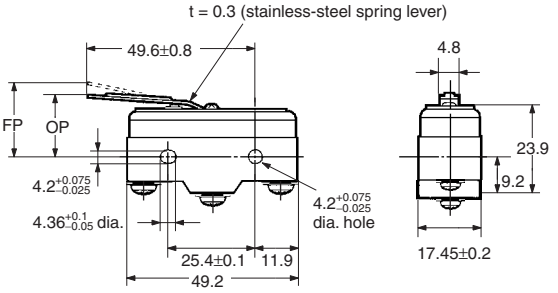
	Z-15GQ21-B	Z-15HQ21-B	Z-15EQ21-B
OF	2.45 to 3.43 N	1.96 to 2.79 N	6.13 to 7.85 N
RF min.	1.12 N	1.12 N	1.12 N
PT max.	0.4 mm	0.3 mm	0.8 mm
OT min.	3.58 mm	3.58 mm	3.58 mm
MD max.	0.05 mm	0.025 mm	0.13 mm
OP	33.4±1.2 mm		

Note: Do not use the M12 mounting screw and the case mounting hole at the same time, or the case may be damaged.

Leaf Spring

Z-15GL-B



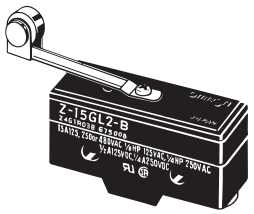


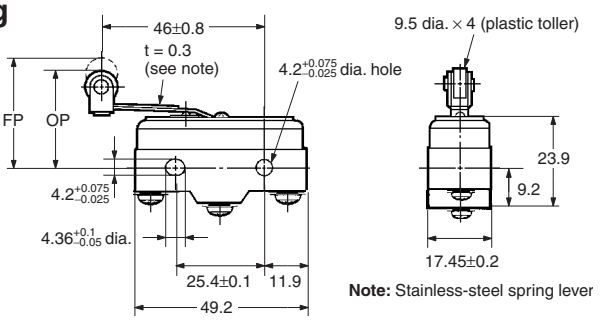
OF max.	1.38 N
RF min.	0.14 N
OT min.	1.6 mm (see note)
MD max.	1.3 mm
FP max.	20.6 mm
OP	17.4±0.8 mm

Note: When operating, be sure not to exceed 1.6 mm.

Roller Leaf Spring

Z-15GL2-B





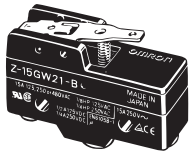
Note: Stainless-steel spring lever

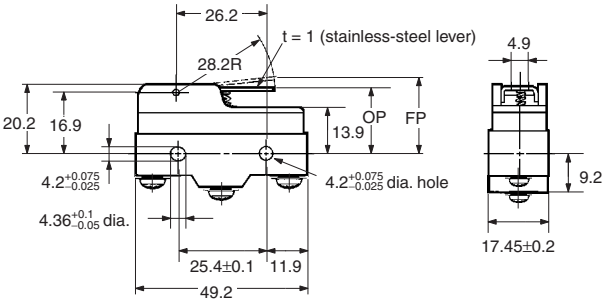
OF max.	1.38 N
RF min.	0.14 N
OT min.	1.6 mm (see note)
MD max.	1.3 mm
FP max.	31.8 mm
OP	28.6±0.8 mm

Note: When operating, be sure not to exceed 1.6 mm.

Short Hinge Lever

Z-15GW21-B

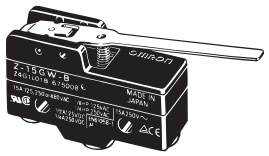


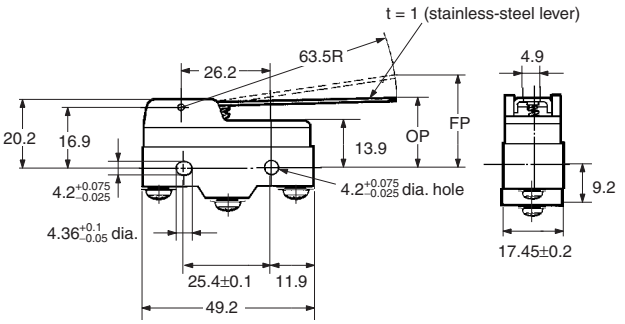


OF max.	1.57 N
RF min.	0.27 N
OT min.	2 mm
MD max.	1 mm
FP max.	24.8 mm
OP	19±0.8 mm

Hinge Lever

Z-15GW-B, Z-15GW32-B
Z-15HW-B, Z-10FWY-B
Z-15GW3-B (Lever Length: 56R)
(see note)



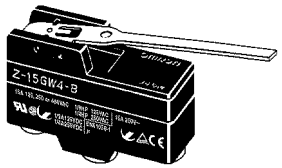


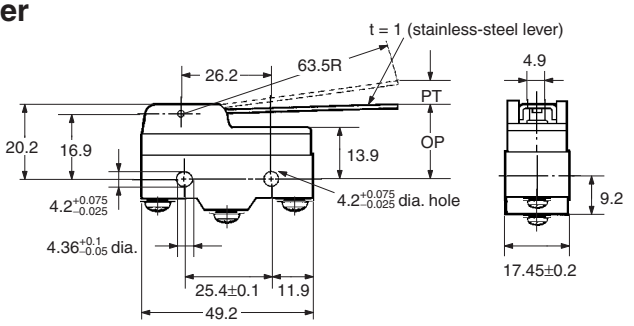
Note: The external dimensions of the actuator vary.

	Z-15GW-B	Z-15HW-B	Z-15GW32-B	Z-10FWY-B	Z-15GW3-B
OF max.	0.69 N	0.66 N	1.47 to 1.96 N	0.88 N	0.78 N
RF min.	0.14 N	0.14 N	0.92 N	0.14 N	0.15 N
OT min.	5.6 mm	5.6 mm	5.6 mm	5.6 mm	4.8 mm
MD max.	1.27 mm	0.63 mm	1.27 mm	2.4 mm	1.12 mm
FP max.	28.2 mm	27.4 mm	28.2 mm	29.8 mm	27.2 mm
OP	19±0.8 mm				

Low-force Hinge Lever

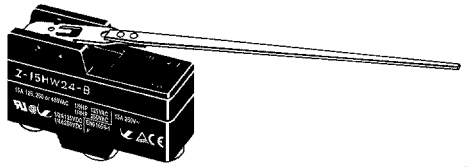
Z-15GW4-B

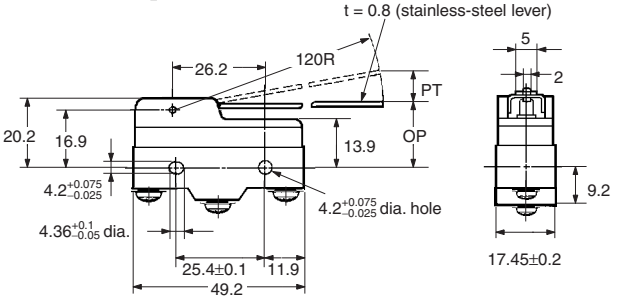




OF max.	274 mN
RF min.	34.3 mN
PT max.	10 mm
OT min.	5.6 mm
MD max.	1.27 mm
OP	19±0.8 mm

Z-15HW24-B

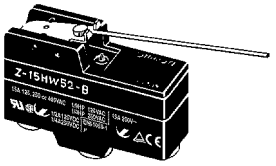


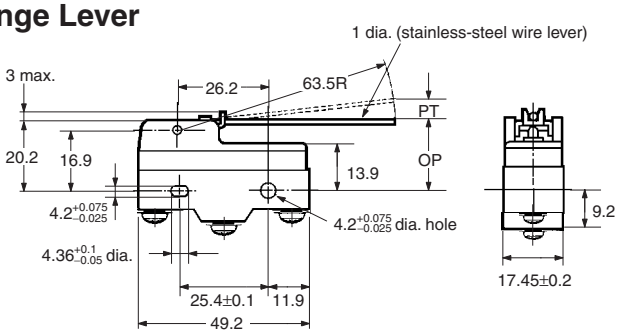


OF max.	58.8 mN
RF min.	4.90 mN
PT max.	19.8 mm
OT min.	10 mm
MD max.	2 mm
OP	19.8±1.6 mm

Low-force Wire Hinge Lever

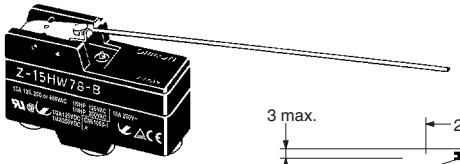
Z-15HW52-B

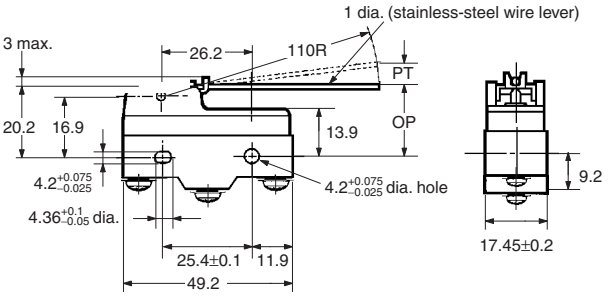




OF max.	58.8 mN
RF min.	4.90 mN
PT max.	8.3 mm
OT min.	5.6 mm
MD max.	0.65 mm
OP	19±1 mm

Z-15HW78-B

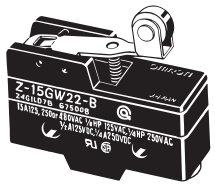


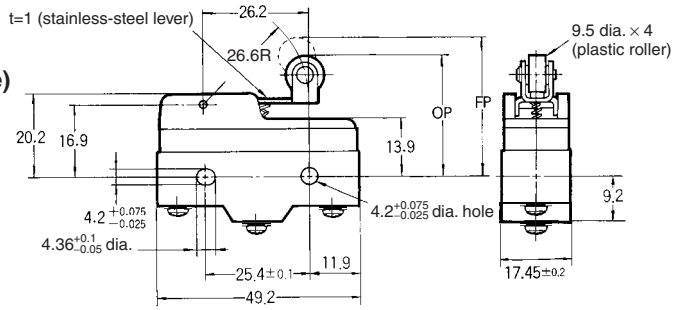


OF max.	39.2 mN
RF min.	2.94 mN
PT max.	10 mm
OT min.	6 mm
MD max.	3 mm
OP	20±1 mm

Short Hinge Roller Lever

Z-15GW22-B, Z-01HW22-B
Z-15HW22-B, Z-10FW22Y-B (see note)
Z-15EW22-B, Z-15GW2-B
Z-15HW2-B (see note), Z-10FW2Y-B (see note)
(Lever Length: 48.5R) (see note)



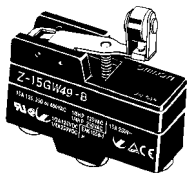


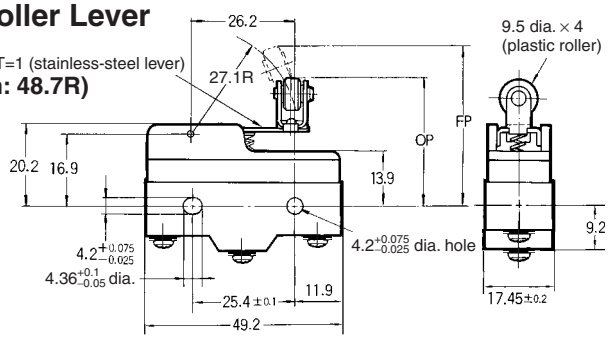
Note: The external dimensions of the actuator vary.

	Z-15GW22-B	Z-15HW22-B	Z-15EW22-B	Z-01HW22-B	Z-10FW22Y-B	Z-15GW2-B	Z-15HW2-B	Z-10FW2Y-B
OF max.	1.57 N	1.47 N	1.94 N	1.57 N	2.45 N	0.98 N	0.84 N	1.27 N
RF min.	0.41 N	0.41 N	0.41 N	0.27 N	0.34 N	0.22 N	0.22 N	0.22 N
OT min.	2.4 mm	2.4 mm	2.4 mm	2.4 mm	2.4 mm	4 mm	4 mm	4 mm
MD max.	0.5 mm	0.45 mm	1.3 mm	0.5 mm	1 mm	1.02 mm	0.6 mm	2 mm
FP max.	32.5 mm		35.1 mm	32.5 mm	34.8 mm	36.5 mm		37.4 mm
OP	30.2±0.4 mm		30.2±0.4 mm	30.2±0.4 mm	30.2±0.4 mm	30.2±0.8 mm		30.2±0.8 mm

Short Hinge Cross Roller Lever

Z-15GW49-B
Z-15GW54-B (Lever Length: 48.7R)
(see note)

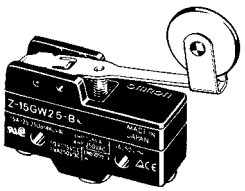


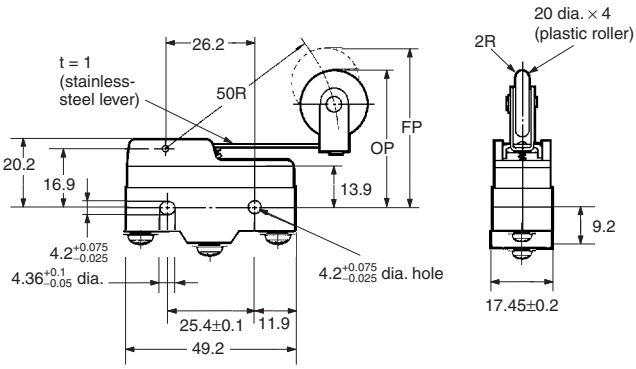


Model	Z-15GW49-B	Z-15GW54-B
OF max.	1.67 N	0.98 N
RF min.	0.41 N	0.22 N
OT min.	2.4 mm	4 mm
MD max.	0.51 mm	1 mm
FP max.	33.3 mm	37.3 mm
OP	31±0.4 mm	31±0.8 mm

Note: The external dimensions of the actuator vary.

Z-15GW25-B

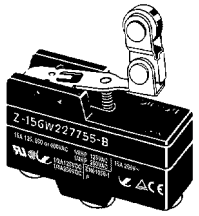


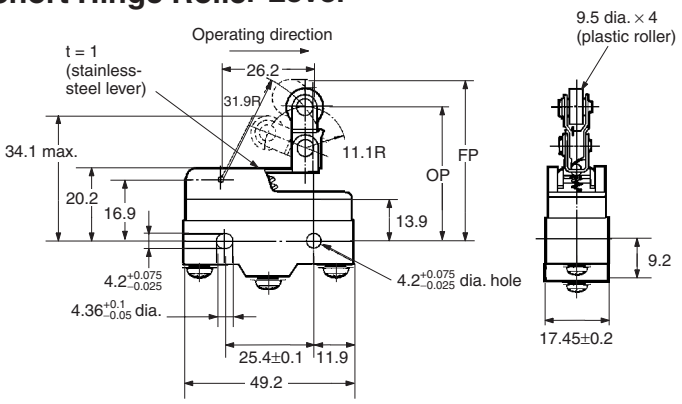


OF max.	0.98 N
RF min.	0.21 N
OT min.	4 mm
MD max.	1.6 mm
FP max.	47.5 mm
OP	41.2±0.8 mm

Unidirectional Short Hinge Roller Lever

Z-15GW2277-B



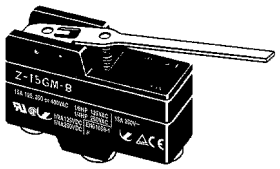


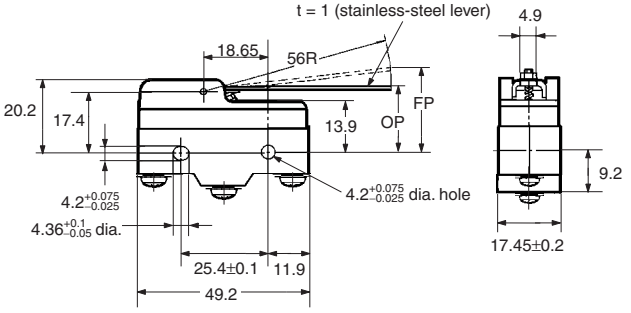
OF max.	1.67 N
RF min.	0.41 N
OT min.	2.4 mm
MD max.	0.51 mm
FP max.	43.6 mm
OP	41.3±0.8 mm

Reverse Hinge Lever

Note: The pin plungers of reverse-type models are continuously pressed by the actuator levers with compression coil springs and the pin plungers are freed by operating the levers. Reverse-type models are highly vibration- and shock-resistive because the pin plungers are normally pressed.

Z-15GM-B



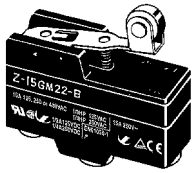


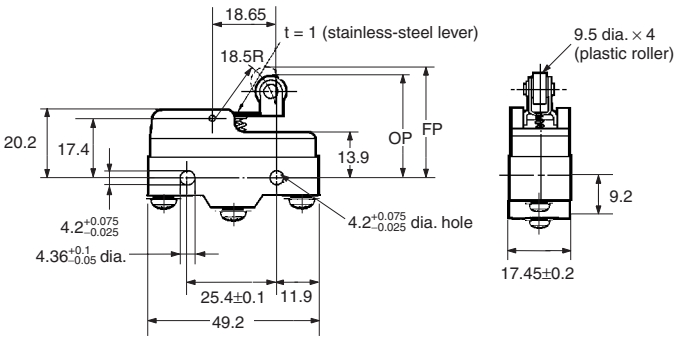
OF max.	1.67 N
RF min.	0.27 N
OT min.	5.6 mm
MD max.	0.89 mm
FP max.	23.8 mm
OP	19±0.8 mm

Reverse Short Hinge Roller Lever

Note: The pin plungers of reverse-type models are continuously pressed by the actuator levers with compression coil springs and the pin plungers are freed by operating the levers. Reverse-type models are highly vibration- and shock-resistive because the pin plungers are normally pressed.

Z-15GM22-B,
Z-10FM22Y-B



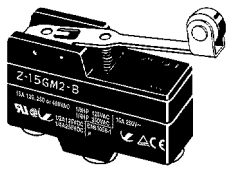


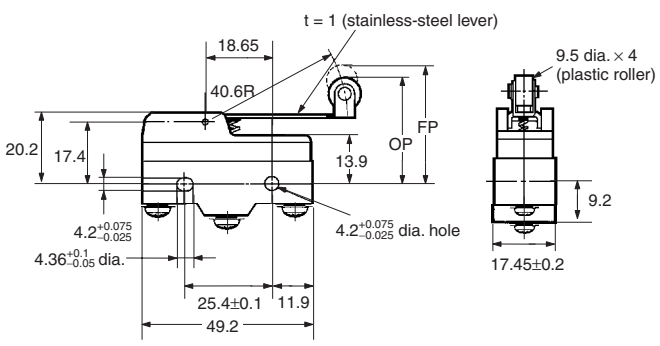
Model	Z-15GM22-B	Z-10FM22Y-B
OF max.	5.28 N	6.37 N
RF min.	1.67 N	1.67 N
OT min.	2 mm	2 mm
MD max.	0.28 mm	0.56 mm
FP max.	31.8 mm	33 mm
OP	29.4±0.4 mm	29.4±0.4 mm

Reverse Hinge Roller Lever

Note: The pin plungers of reverse-type models are continuously pressed by the actuator levers with compression coil springs and the pin plungers are freed by operating the levers. Reverse-type models are highly vibration- and shock-resistive because the pin plungers are normally pressed.

Z-15GM2-B



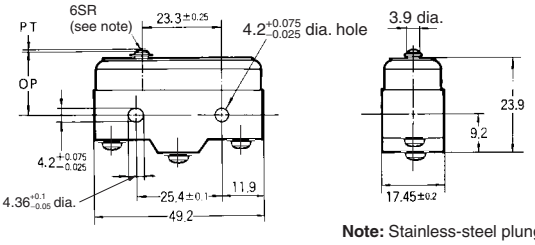


OF max.	2.35 N
RF min.	0.55 N
OT min.	4 mm
MD max.	0.64 mm
FP max.	35 mm
OP	30.2±0.8 mm

Basic Models (Drip-proof) without Terminal Protective Cover

Pin Plunger

Z-15G55-B
Z-01H55-B

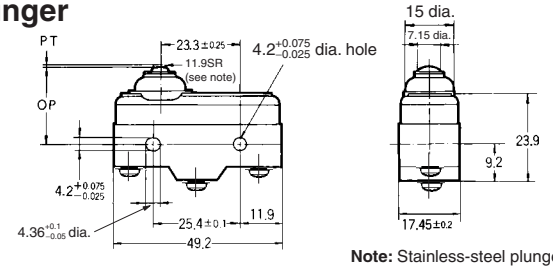


Note: Stainless-steel plunger

Model	Z-15G55-B	Z-01H55-B
OF	2.45 to 4.22 N	3.43 N max.
RF min.	1.12 N	0.78 N
PT max.	2.2 mm	2.2 mm
OT min.	0.13 mm	0.13 mm
MD max.	0.06 mm	0.06 mm
OP	15.9±0.4 mm	

Short Spring Plunger

Z-15GD55-B
Z-01HD55-B

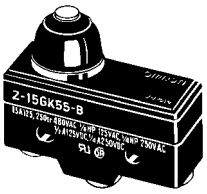


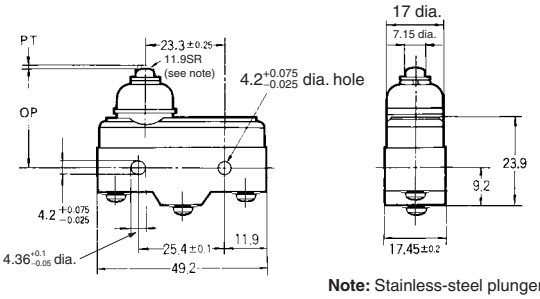
Note: Stainless-steel plunger

Model	Z-15GD55-B	Z-01HD55-B
OF max.	5.30 N	3.63 N
RF min.	1.12 N	0.78 N
PT max.	1.8 mm	1.9 mm
OT min.	1.6 mm	1.6 mm
MD max.	0.06 mm	0.06 mm
OP	21.5±0.5 mm	

Spring Plunger

Z-15GK55-B

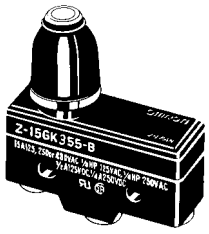


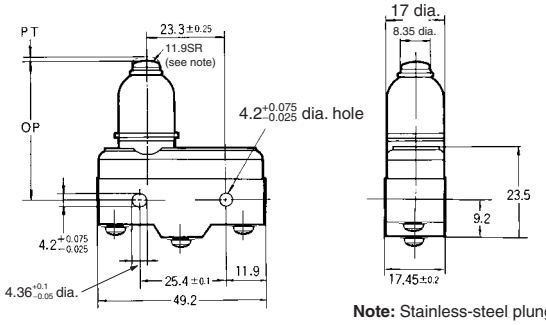


Note: Stainless-steel plunger

OF max.	5.30 N
RF min.	1.12 N
PT max.	2.3 mm
OT min.	1.6 mm
MD max.	0.06 mm
OP	28.2±0.5 mm

Z-15GK355-B



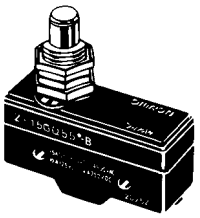


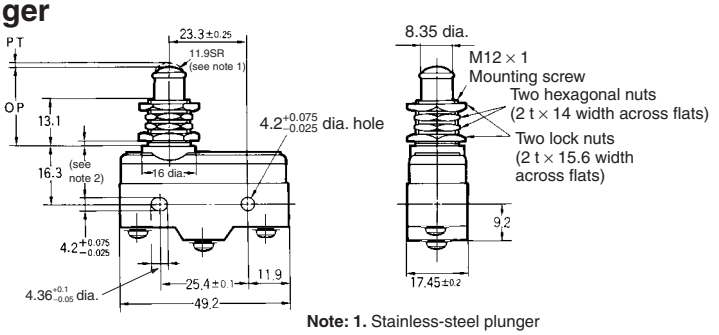
Note: Stainless-steel plunger

OF max.	5.30 N
RF min.	1.12 N
PT max.	2.4 mm
OT min.	3.5 mm
MD max.	0.06 mm
OP	37.8±1.2 mm

Panel Mount Plunger

Z-15GQ55-B





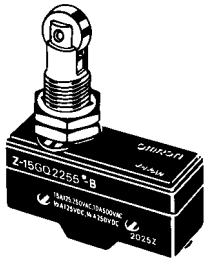
Note: 1. Stainless-steel plunger
2. Imperfect screw part with a maximum length of 1.5 mm.

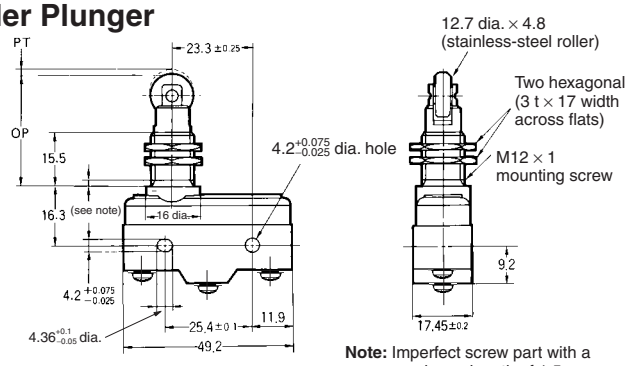
OF max.	5.30 N
RF min.	1.12 N
PT max.	1.8 mm
OT min.	5.5 mm
MD max.	0.06 mm
OP	21.8±0.8 mm

Note: Do not use the M12 mounting screw and the case mounting hole at the same time, or the case may be damaged.

Panel Mount Roller Plunger

Z-15GQ2255-B





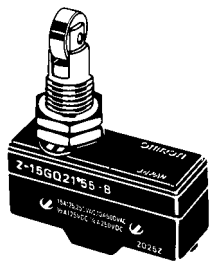
Note: Imperfect screw part with a maximum length of 1.5 mm.

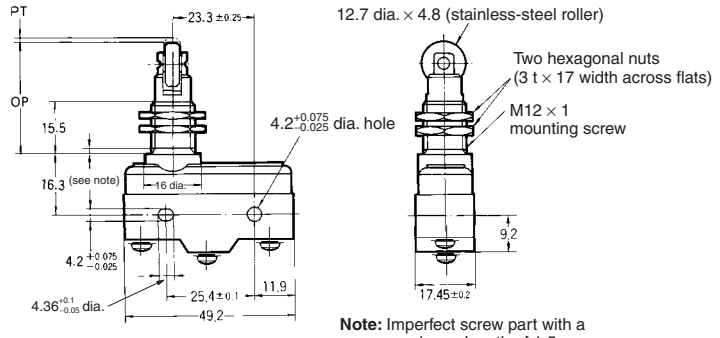
OF max.	5.30 N
RF min.	1.12 N
PT max.	1.8 mm
OT min.	3.58 mm
MD max.	0.06 mm
OP	33.4±1.2 mm

Note: Do not use the M12 mounting screw and the case mounting hole at the same time, or the case may be damaged.

Panel Mount Cross Roller Plunger

Z-15GQ2155-B





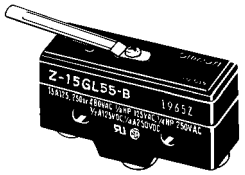
Note: Imperfect screw part with a maximum length of 1.5 mm.

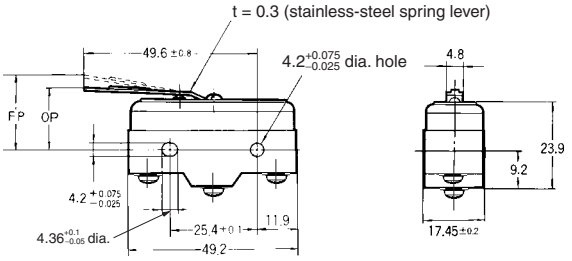
OF max.	5.30 N
RF min.	1.12 N
PT max.	1.8 mm
OT min.	3.58 mm
MD max.	0.06 mm
OP	33.4±1.2 mm

Note: Do not use the M12 mounting screw and the case mounting hole at the same time, or the case may be damaged.

Leaf Spring

Z-15GL55-B



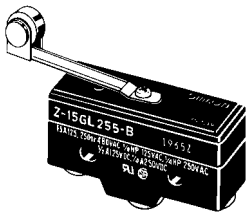


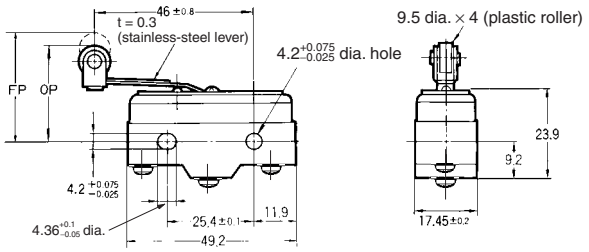
OF max.	1.96 N
RF min.	0.14 N
OT min.	1.6 mm
MD max.	1.3 mm
FP max.	20.6 mm
OP	17.5±0.8 mm

Note: When operating, be sure not to exceed 1.6 mm.

Roller Leaf Spring

Z-15GL255-B



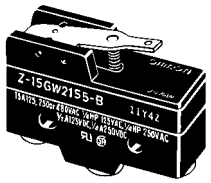


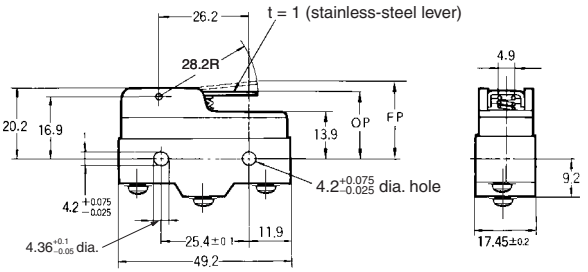
OF max.	1.96 N
RF min.	0.14 N
OT min.	1.6 mm
MD max.	1.3 mm
FP max.	31.8 mm
OP	28.6±0.8 mm

Note: When operating, be sure not to exceed 1.6 mm.

Short Hinge Lever

Z-15GW2155-B

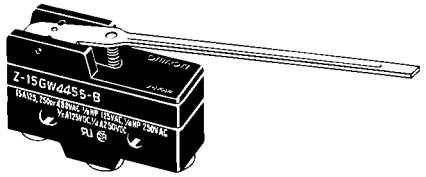


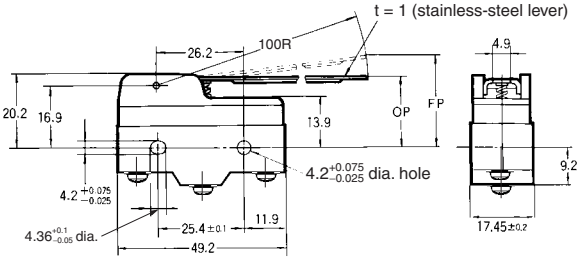


OF max.	1.86 N
RF min.	0.27 N
OT min.	2 mm
MD max.	1 mm
FP max.	25 mm
OP	19±0.8 mm

Long Hinge Lever

Z-15GW4455-B

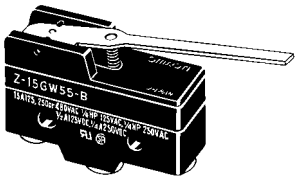


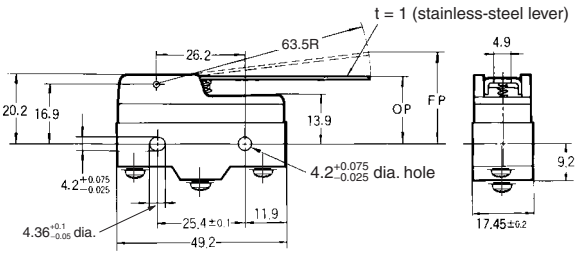


OF max.	0.88 N
RF min.	0.14 N
OT min.	5.6 mm
MD max.	3.5 mm
FP max.	33 mm
OP	19±1.2 mm

Hinge Lever

Z-15GW55-B

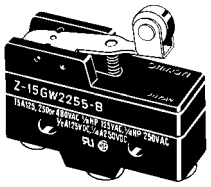


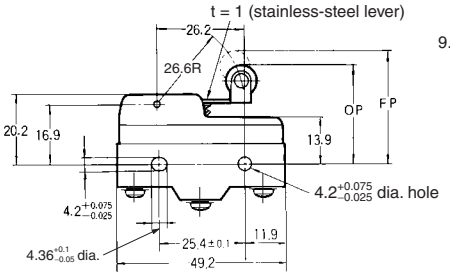


OF max.	0.98 N
RF min.	0.14 N
OT min.	5.6 mm
MD max.	2 mm
FP max.	28.2 mm
OP	19±0.8 mm

Short Hinge Roller Lever

Z-15GW2255-B
Z-01HW2255-B

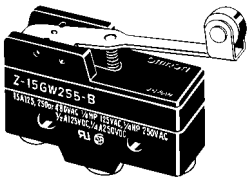


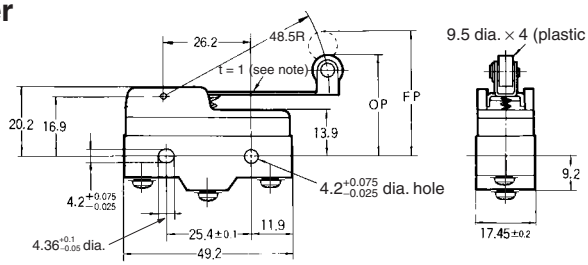


Model	Z-15GW2255-B	Z-01HW2255-B
OF max.	1.96 N	1.96 N
RF min.	0.41 N	0.27 N
OT min.	2.4 mm	2.4 mm
MD max.	0.8 mm	0.8 mm
FP max.	32.9 mm	
OP	30.2±0.4 mm	

Hinge Roller Lever

Z-15GW255-B



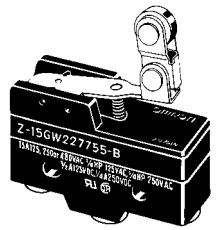


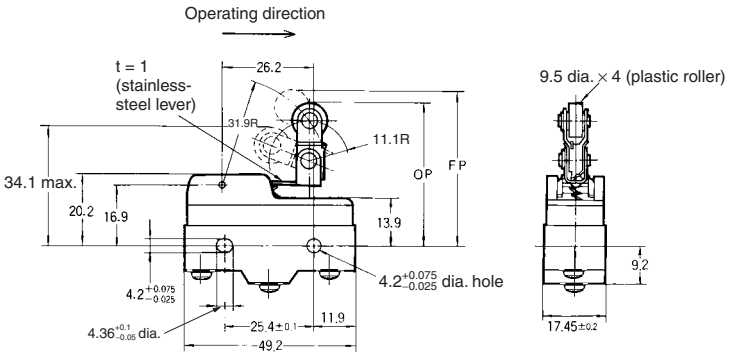
OF max.	1.27 N
RF min.	0.21 N
OT min.	4 mm
MD max.	1.6 mm
FP max.	36.5 mm
OP	30.2±0.8 mm

Note: Stainless-steel lever

Unidirectional Short Hinge Roller Lever

Z-15GW227755-B



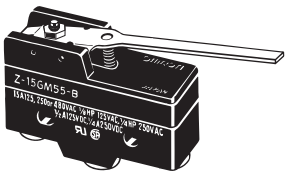


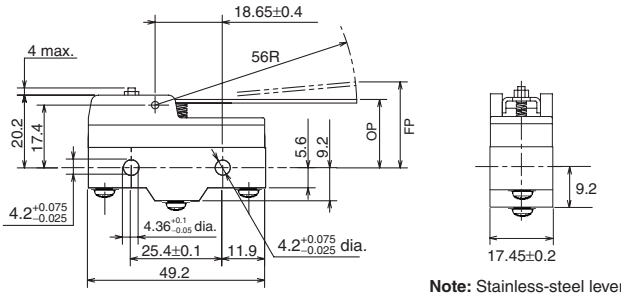
OF max.	1.77 N
RF min.	0.49 N
OT min.	2.4 mm
MD max.	0.8 mm
FP max.	43.6 mm
OP	41.3±0.8 mm

Reverse Hinge Lever

Note: The pin plungers of reverse-type models are continuously pressed by the actuator levers with compression coil springs and the pin plungers are freed by operating the levers. Reverse-type models are highly vibration- and shock-resistive because the pin plungers are normally pressed.

Z-15GM55-B





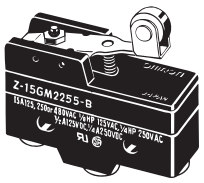
OF max.	1.96 N
RF min.	0.27 N
OT min.	5.6 mm
MD max.	0.89 mm
FP max.	23.8 mm
OP	19±0.8 mm

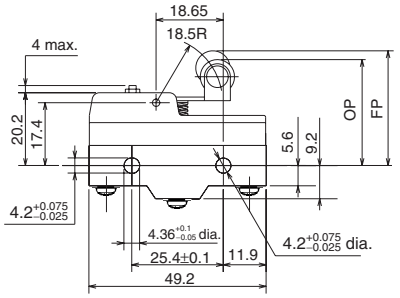
Note: Stainless-steel lever

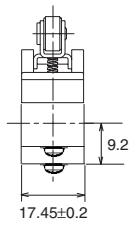
Reverse Short Hinge Roller Lever

Note: The pin plungers of reverse-type models are continuously pressed by the actuator levers with compression coil springs and the pin plungers are freed by operating the levers. Reverse-type models are highly vibration- and shock-resistive because the pin plungers are normally pressed.

Z-15GM2255-B







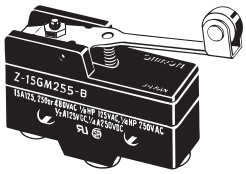
Note: Stainless-steel lever

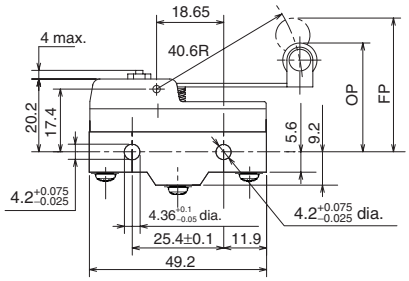
OF max.	5.69 N
RF min.	1.67 N
OT min.	2 mm
MD max.	0.28 mm
FP max.	31.8 mm
OP	29.4±0.4 mm

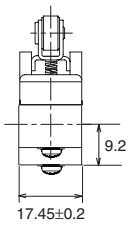
Reverse Hinge Roller Lever

Note: The pin plungers of reverse-type models are continuously pressed by the actuator levers with compression coil springs and the pin plungers are freed by operating the levers. Reverse-type models are highly vibration- and shock-resistive because the pin plungers are normally pressed.

Z-15GM255-B







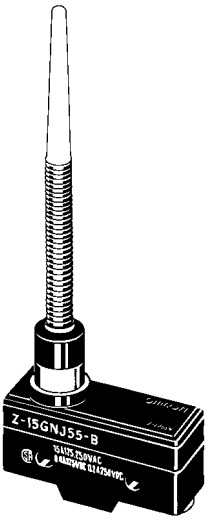
Note: Stainless-steel lever

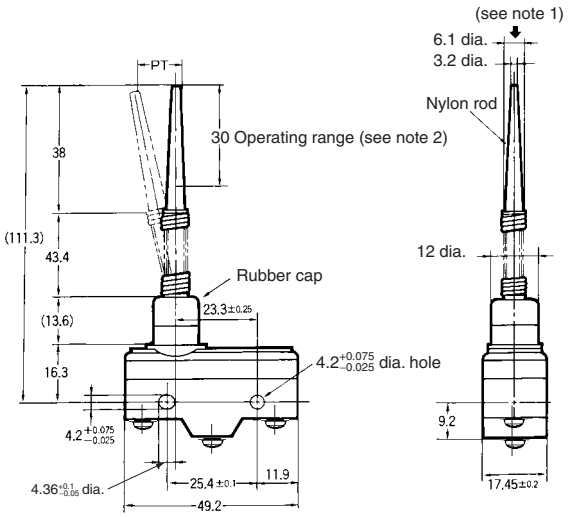
OF max.	2.65 N
RF min.	0.55 N
OT min.	4 mm
MD max.	0.64 mm
FP max.	35 mm
OP	30.2±0.8 mm

Flexible Rod (Coil Spring)

Z-15GNJ55-B

OF max.	0.49 N
PT max.	(20 mm)
OT	42 to 60 mm





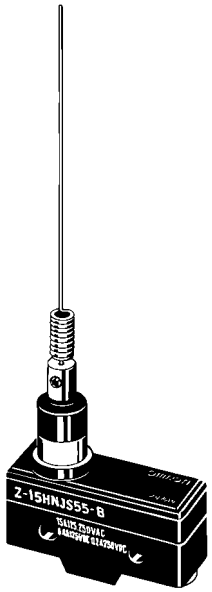
Note: 1. Operation is possible in any direction other than the axial direction (indicated by the arrow ↓).

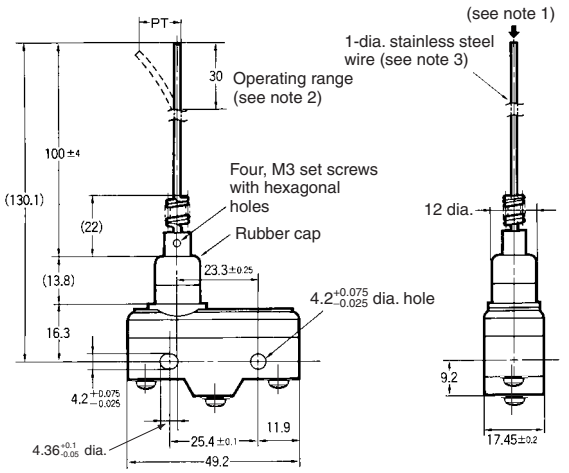
2. Use only the area within the top 30 mm of the rod as the operating part. (Do not use the area that falls within 80 mm from the mounting hole as the operating part. Using this area may cause damage to the nylon rod.

Flexible Rod (Steel Wire)

Z-15HNJS55-B

OF max.	0.15 N
PT max.	(25 mm)





Note: 1. Operation is possible in any direction other than the axial direction (indicated by the arrow ↓).

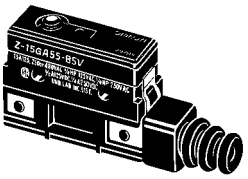
2. Use only the area within the top 30 mm of the rod as the operating part. (Do not use the area that falls within 100 mm from the mounting hole as the operating part. Using this area may cause damage to the steel wire.)

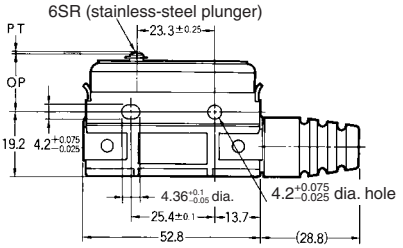
3. The steel wire can be replaced if damaged. (Model: Lever for HNJS55)

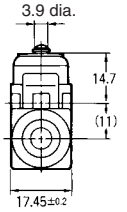
Basic Models (Drip-proof) with Terminal Protective Cover

Pin Plunger

Z-15GA55-B5V

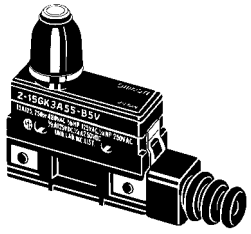


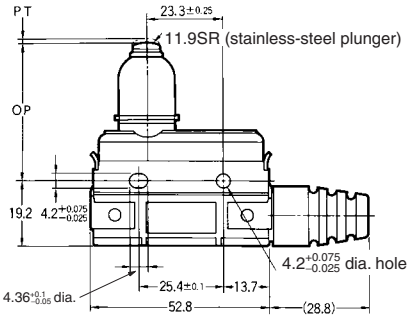


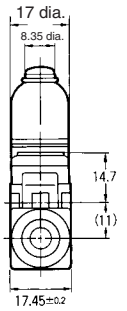


OF max.	2.45 to 4.22 N
RF min.	1.12 N
PT max.	2.2 mm
OT min.	0.13 mm
MD max.	0.06 mm
OP	15.9±0.4 mm

Z-15GK3A55-B5V



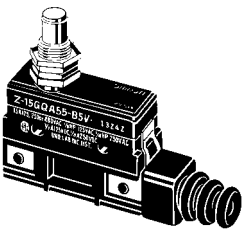


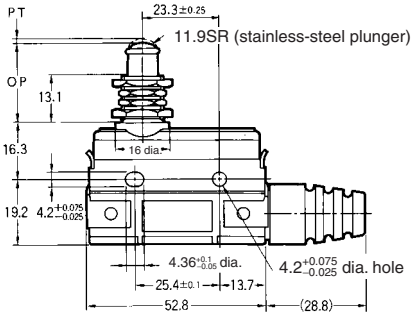


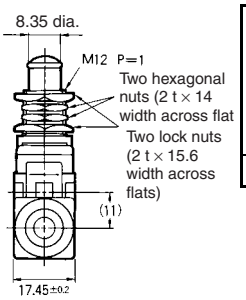
OF max.	5.30 N
RF min.	1.12 N
PT max.	2.4 mm
OT min.	3.5 mm
MD max.	0.06 mm
OP	37.8±1.2 mm

Panel Mount Plunger

Z-15GQA55-B5V





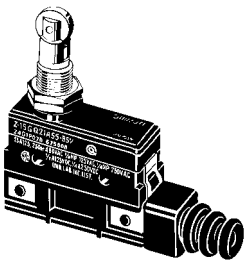


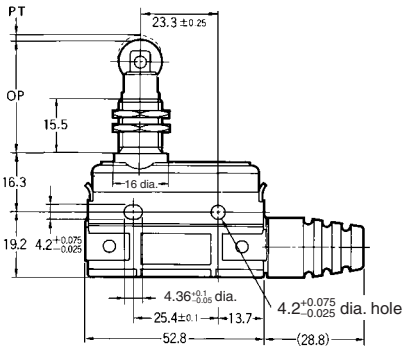
OF max.	5.30 N
RF min.	1.12 N
PT max.	1.8 mm
OT min.	5.5 mm
MD max.	0.06 mm
OP	21.8±0.8 mm

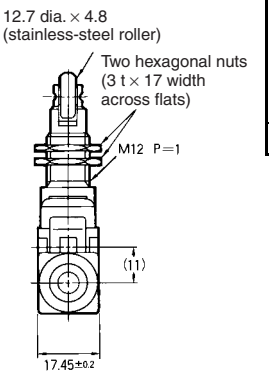
Note: Do not use the M12 mounting screw and the case mounting hole at the same time, or the case may be damaged.

Panel Mount Roller Plunger

Z-15GQ22A55-B5V





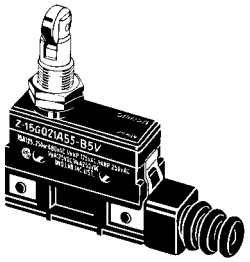


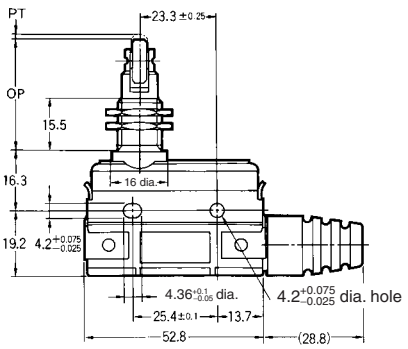
OF max.	5.30 N
RF min.	1.12 N
PT max.	1.8 mm
OT min.	3.58 mm
MD max.	0.06 mm
OP	33.4±1.2 mm

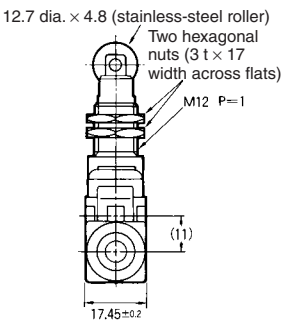
Note: Do not use the M12 mounting screw and the case mounting hole at the same time, or the case may be damaged.

Panel Mount Cross-roller Plunger

Z-15GQ21A55-B5V





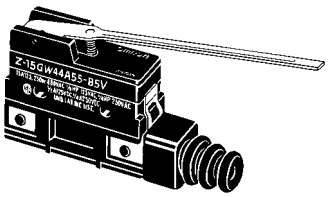


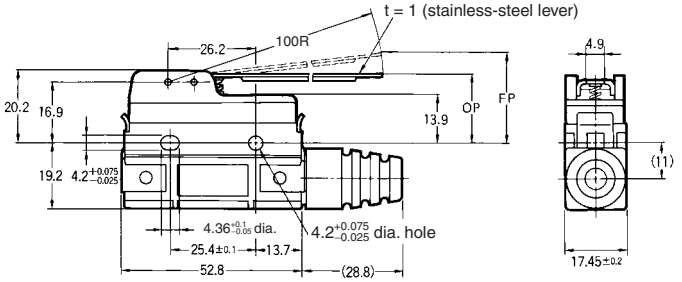
OF max.	5.30 N
RF min.	1.12 N
PT max.	1.8 mm
OT min.	3.58 mm
MD max.	0.06 mm
OP	33.4±1.2 mm

Note: Do not use the M12 mounting screw and the case mounting hole at the same time, or the case may be damaged.

Long Hinge Lever

Z-15GW44A55-B5V

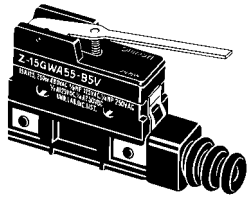


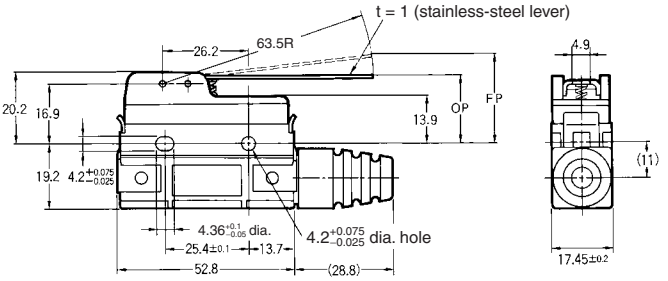


OF max.	0.88 N
RF min.	0.14 N
OT min.	5.6 mm
MD max.	3.5 mm
FP max.	33 mm
OP	19±1.2 mm

Hinge Lever

Z-15GWA55-B5V

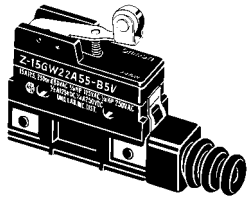


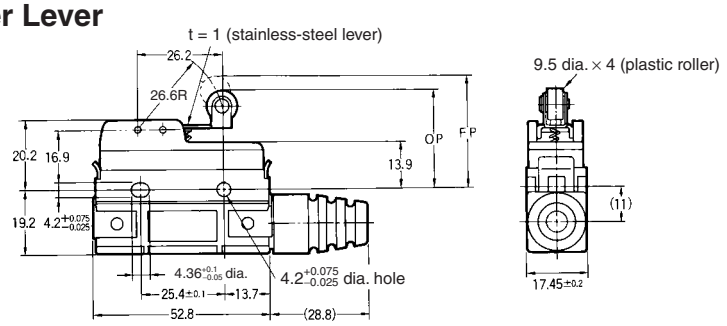


OF max.	0.98 N
RF min.	0.14 N
OT min.	5.6 mm
MD max.	2 mm
FP max.	28.2 mm
OP	19±0.8 mm

Short Hinge Roller Lever

Z-15GW22A55-B5V

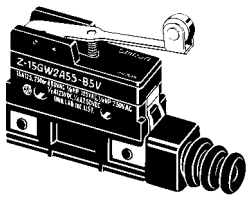


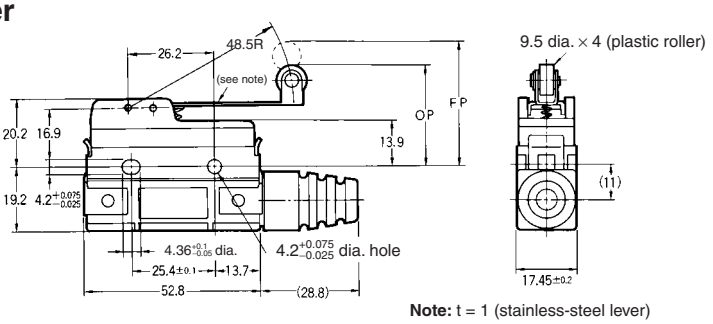


OF max.	1.96 N
RF min.	0.41 N
OT min.	2.4 mm
MD max.	0.8 mm
FP max.	32.9 mm
OP	30.2±0.4 mm

Hinge Roller Lever

Z-15GW2A55-B5V



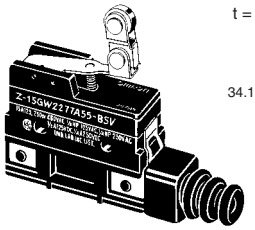


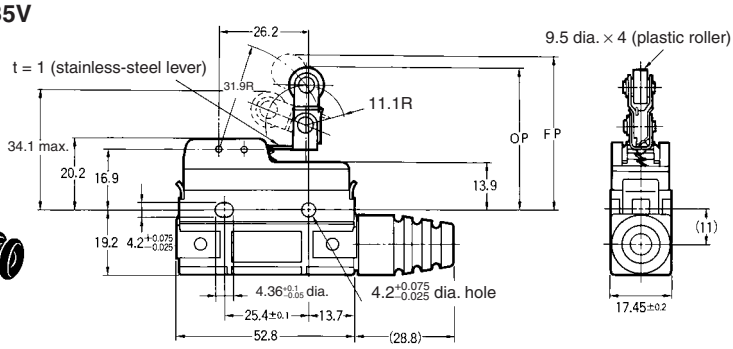
Note: t = 1 (stainless-steel lever)

OF max.	1.27 N
RF min.	0.21 N
OT min.	4 mm
MD max.	1.6 mm
FP max.	36.5 mm
OP	30.2±0.8 mm

Unidirectional Short Hinge Roller Lever

Z-15GW2277A55-B5V



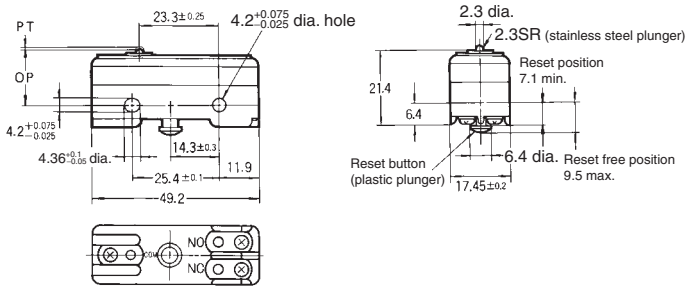


OF max.	1.77 N
RF min.	0.49 N
OT min.	2.4 mm
MD max.	0.8 mm
FP max.	43.6 mm
OP	41.3±0.8 mm

Maintained-contact Models

Pin Plunger

Z-15ER



Plunger

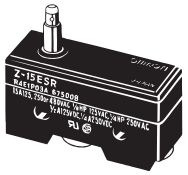
OF max.	1.96 to 2.50 N
PT max.	0.4 mm
OT min.	0.13 mm
OP	15.9±0.4 mm

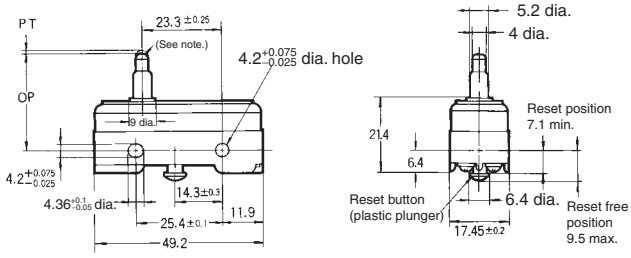
Reset Button

OF max.	0.55 to 2.79 N
OT min.	0.4 mm

Slim Spring Plunger

Z-15ESR





Note: Stainless steel plunger (tip only, flat, R1 bevel).

Plunger

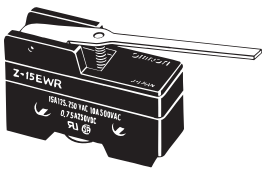
OF max.	2.65 N
PT max.	0.4 mm
OT min.	1.6 mm
OP	28.2±0.5 mm

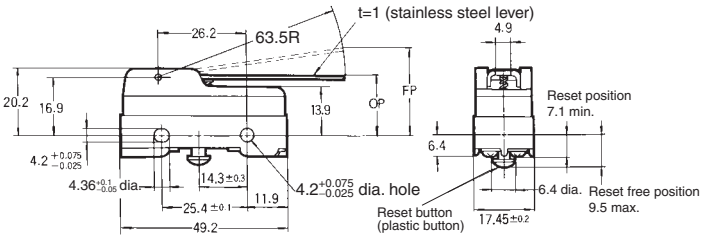
Reset Button

OF max.	2.79 N
OT min.	0.4 mm

Hinge Lever

Z-15EWR





Lever Tip

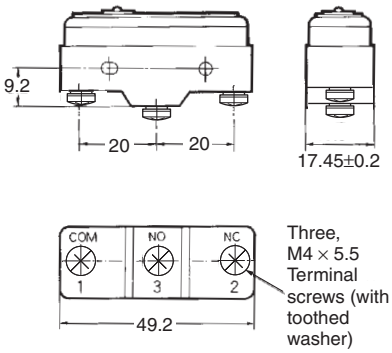
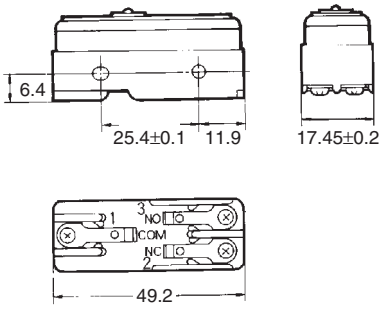
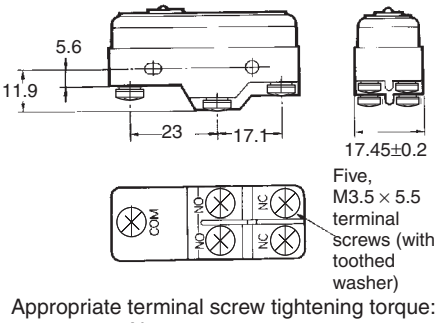
OF max.	0.54 N
OT min.	5.6 mm
FP max.	28.2 mm
OP	19±0.8 mm

Reset Button

OF max.	2.94 N
OT min.	0.4 mm

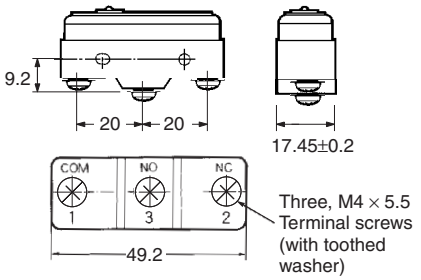
■ Terminals

Basic Models (General-purpose) & Split-contact Models

Basic (General-purpose) Models		Split-contact Models
Screw Terminals (-B)  Appropriate terminal screw tightening torque: 0.78 to 1.18 N·m.	**Solder Terminal** 	**Screw Terminals (Y-B)**  Appropriate terminal screw tightening torque: 0.49 to 0.78 N·m.
Note: With reverse action models (Z-15GM), the positions of NO and NC terminals are reversed.		**Note:** With reverse action models (Z-10FM), the positions of NO and NC terminals are reversed.

Basic Models (Drip-proof) without Terminal Protective Cover

Without Terminal Protective Cover

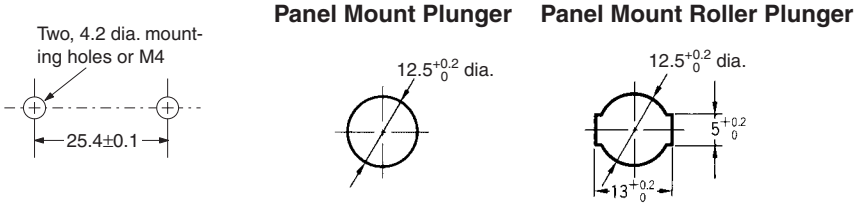


Note: With reverse action models (Z-15GM), the positions of NO and NC terminals are reversed.

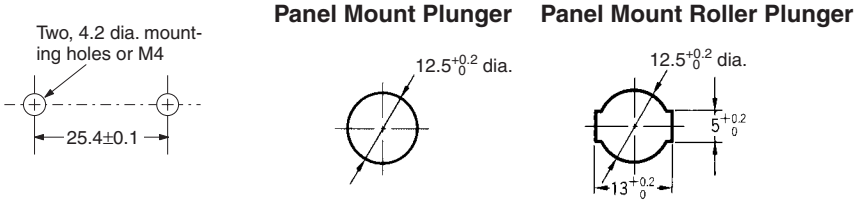
Mounting

Use M4 screws with plane washers and spring washers to mount the Switch. Tighten each mounting screw securely to a torque of 1.18 to 1.47 N·m.

Basic Models (General-purpose) & Split-contact Models



Basic Models (Drip-proof) without Terminal Protective Cover



Molded Terminals (Drip-proof Type/Molded Terminal)

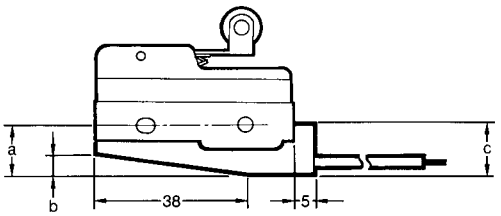
■ Contact Form

Note: With the reverse action model (Z-15GM), the positions of NO and NC terminals are reversed.

■ Dimensions

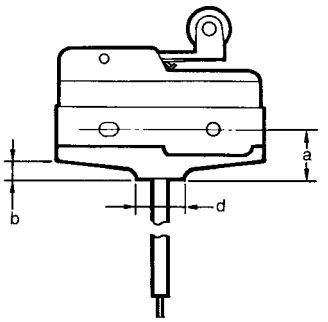
L/R Type

(The following illustration is the R type.)



Lead wire	a	b	d
VSF	12	4	13
VCT	19	11	20

D Type



Lead wire	a	b	d
VSF	12	4	12
VCT	19	11	16

Lead Wire Specifications

Lead wire	Nominal cross-sectional area (mm^2)	Finished outer diameter (mm)	Connection to terminal	Length (m)
VSF (single-core, vinyl cord)	1.25	Approx. 3.1 dia.	Black: COM White: NO Red: NC	1, 3
VCT (vinyl-insulated cable)		Three-core: approx. 10.5 dia.		

Note: No models with molded terminals are approved by UL, CSA, or TÜV.

Precautions

Refer to pages 25 to 30 of *General Information* for details.

■ Correct Use

Panel Mount Switch (Z-15□Q□, Z-01□Q□)

When mounting the panel mount plunger model with screws on a side surface, be careful of the dog angle and operation speed. Excessive dog angle or operation speed may damage the Switch.

The Switch can be panel mounted, provided that the hexagonal nut of the actuator is tightened to a torque of 2.94 to 4.9 N·m.

When using the panel mount plunger model mounted with screws on a side surface, be careful not to apply a large shock. Applying a shock exceeding 100G may damage the Switch.

When using the panel mount plunger model mounted with screws on a side surface, remove the hexagonal nuts from the actuator.

High-sensitivity Switch (Z-15H)/ Extra-high-sensitivity Switch (Z-15H2)

When using the Switch in a DC circuit, be sure to provide an arc suppressor as well because the small contact gap of the Switch may result in contact troubles.

In an application where a high repeat accuracy is required, limit the current that flows through the Switch to within 0.1 A. Also, use a relay to control a high-capacity load if the Switch is connected to such a load. (In this case, the exciting current of the relay coil is the load of the Switch.)

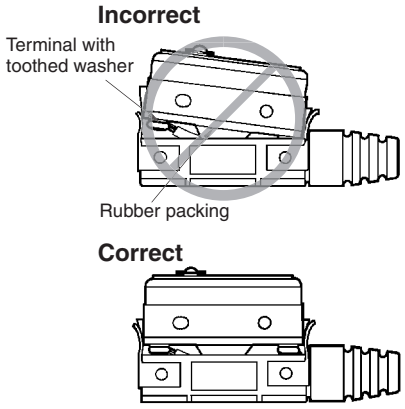
Do not apply a force of 19.6 N or higher to the pin plunger.

Exercise care that the environment conditions such as temperature and humidity do not change abruptly.

Models with Drip-proof Terminal Cover (Z-□A55-B5V)

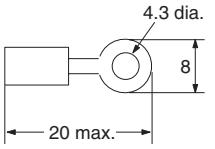
Wiring

To attach the Protective Cover to the case, hold the cover in almost parallel to the case and then push it to the case. If the cover is pushed diagonally, the rubber packing may slip off, degrading the sealability of the Switch.



Use round solderless terminals having the following dimensions to connect leads to the terminals. Tighten the screws of terminals to a torque of 0.78 to 1.18 N·m.

Use the terminal shown below.



A cable 8.5 to 10.5 mm in diameter can be applicable to the sealing rubber of the lead outlet of the Switch. A two-core or three-core VCT cable having a cross-sectional area of 1.25 mm^2 is especially suitable for this.

Use M4 small screws with spring toothed washer are used as the terminal screws.

Drip-proof Switch (Z□55)

The Switch is not perfectly oil-tight; so do not dip it in oil or water.

The rubber boots are made from weather-resistive chloroprene rubber.

Do not use Basic Switches in places with radical changes in temperature.

Rubber boots and rubber caps will tend to harden at lower ambient temperatures. If an Actuator is used in a pressed state for an extended period of time at low temperatures, it may return slowly or it may not return at all.

OMRON can provide special Actuators for use at low temperature with rubber boots or rubber caps made of silicon rubber, which has superior resistance to cold. Ask you OMRON representative for details.

Split-contact Switch (Z-10F□Y)

The applicable current varies depending on how the contacts are used. If the Switch is connected in series, the Switch can endure a current 1.5 to 2 times higher than the current that can be applied in parallel connection.

Flexible Rod Switch (Z-15□NJ□55, Drip-proof)

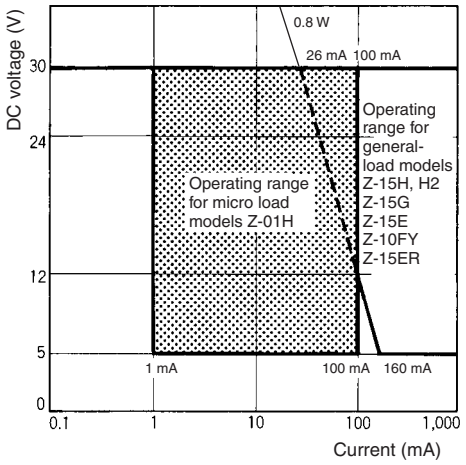
When the rod is fully swung, the Switch may operate when the lever returns, causing chattering. Use a circuit that compensates for chattering wherever possible.

Do not switch the rod to the fullest extent when the Switch is to break a power circuit because such a practice may cause metal deposition to occur between the mating contacts of the Switch.

Micro Load Applicable Range

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 here, 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.

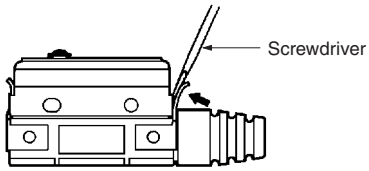
The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ 60). The equation, $\lambda\ 60 = 0.5 \times 10^{-6}$/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with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



Item	Z-01H	Z-15□, Z-10FY
Minimum applicable load	1 mA at 5 VDC	160 mA at 5 VDC

Others

Do not apply an excessive force to the mounting bracket with a screwdriver or a similar object when attaching or detaching the protective cover; otherwise, the cover will be deformed.



This terminal protective cover cannot be used with models whose model number does not have the prefix "-B5V."

Terminal protective covers can be ordered separately for maintenance use.

■ Accessories (Order Separately)

Refer to *Z/A/X/DZ Common Accessories* for details about Terminal Covers, Separators, and Actuators.

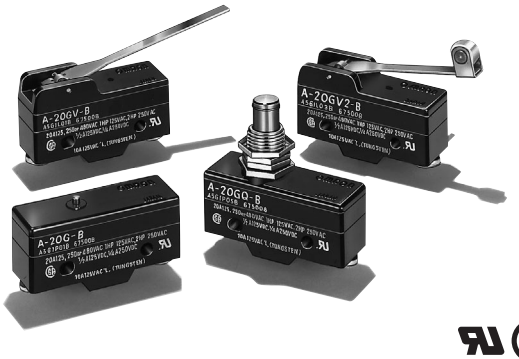
ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. B001-E1-12A In the interest of product improvement, specifications are subject to change without notice.

General-purpose Basic Switch
A

High-capacity Switch Capable of Handling 20 A Loads with Large Inrush Currents

- Same shape as OMRON Z Basic Switches except in pin plunger position, yet endures inrush currents as large as 75 A.



Model Number Structure

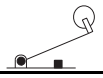
■ Model Number Legend

A-20G□-□
1 2 3 4

1. **Ratings**
   20: 20 A (250 VAC)
2. **Contact Gap**
   G: 0.5 mm
3. **Actuator**
   None: Pin plunger
   D: Short spring plunger
   Q: Panel mount plunger
   Q21: Panel mount cross roller plunger
   Q22: Panel mount roller plunger
   V: Hinge lever
   V2: Hinge roller lever
   V21: Short hinge lever
   V22: Short hinge roller lever
4. **Terminals**
   None: Solder terminal
   B: Screw terminal (with toothed washer)

Ordering Information

■ List of Models

Actuator	Solder terminal	Screw terminal (-B)
Pin plunger 	A-20G	A-20G-B
Short spring plunger 	A-20GD	A-20GD-B
Panel mount plunger 	A-20GQ	A-20GQ-B
Panel mount roller plunger 	A-20GQ22	A-20GQ22-B
Panel mount cross roller plunger 	---	A-20GQ21-B
Short hinge lever 	A-20GV21	A-20GV21-B
Hinge lever 	A-20GV	A-20GV-B
Short hinge roller lever 	A-20GV22	A-20GV22-B
Hinge roller lever 	A-20GV2	A-20GV2-B

Note: Refer to *Terminals* in Model Z for solder and screw terminals.

Specifications

■ Approved Standards

Agency	Standard	File No.
UL	UL508	E41515
CSA	CSA C22.2 No. 55	LR21642

■ Approved Standard Ratings

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

Rated voltage	A-20G
125 VAC	1 HP 10 A “L”
250 VAC	2 HP
480 VAC	20 A
125 VDC	0.5 A
250 VDC	0.25 A

■ 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	20 A		7.5 A		20 A		12.5 A	
250 VAC	20 A		7.5 A		20 A		8.3 A	
500 VAC	15 A		4 A		10 A		2 A	
8 VDC	20 A		3 A	1.5 A	20 A		12.5 A	
14 VDC	20 A		3 A	1.5 A	15 A		12.5 A	
30 VDC	6 A		3 A	1.5 A	5 A		5 A	
125 VDC	0.5 A		0.5 A		0.05 A		0.05 A	
250 VDC	0.25 A		0.25 A		0.03 A		0.03 A	

Note: 1. The above values are for steady-state current.

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: 20 operations/min

■ Characteristics

Operating speed	0.01 mm to 1 m/s (see note 1)
Operating frequency	Mechanical: 240 operations/min Electrical: 20 operations/min (under rated load)
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 2,000 VAC, 50/60 Hz for 1 min between the current-carrying metal parts and the ground, and between each terminal and non-current-carrying metal parts
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note 2)
Shock resistance	Destruction: 1,000 m/s^2 max. Malfunction: 300 m/s^2 max. (see note 1, 2)
Durability	Mechanical: 1,000,000 operations min. Electrical: 500,000 operations 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)
Ambient humidity	Operating: 35% to 85%
Weight	Approx. 23 to 58 g

Note: 1. The value is for the pin plunger. (Contact your OMRON representative for other models.)

2. Malfunction: 1 ms max.

■ Contact Form (SPDT)

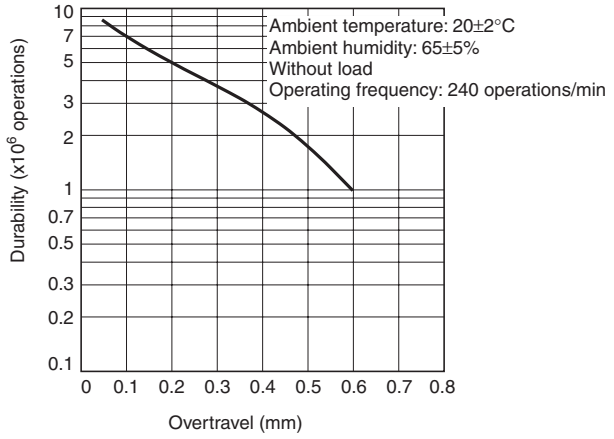
■ Contact Specification

Item		A-20
Contacts	Shape	Rivet
	Material	Silver alloy
	Gap (standard value)	0.5 mm
Inrush current	NC	75 A max.
	NO	75 A max.

Engineering Data

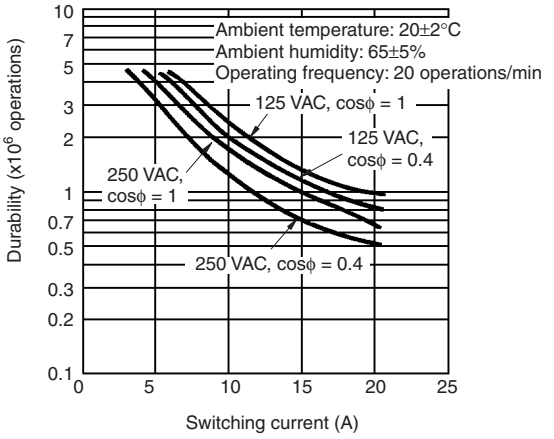
■ Mechanical Durability

A-20G



■ Electrical Durability

A-20G



Dimensions

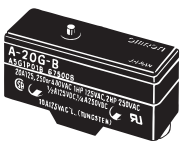
Note: 1. All units are in millimeters unless otherwise indicated.

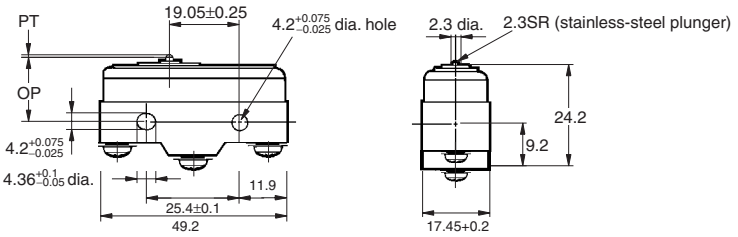
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

■ Dimensions and Operating Characteristics

The models, illustrations, and graphics are for screw-terminal models. (The dimensions for models that are omitted here are the same as for pin-plunger models.)

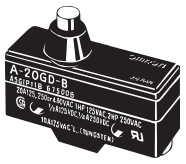
Pin Plunger
A-20G-B

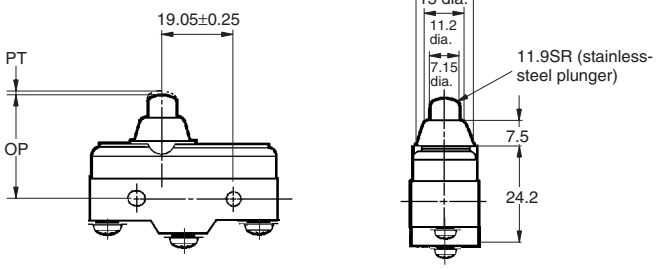




OF	3.92 to 6.13 N
RF min.	2.79 N
PT max.	1.3 mm
OT min.	0.25 mm
MD max.	0.2 mm
OP	16.3±0.4 mm

Short Spring Plunger
A-20GD-B

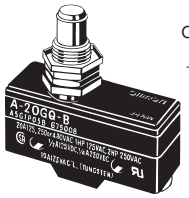


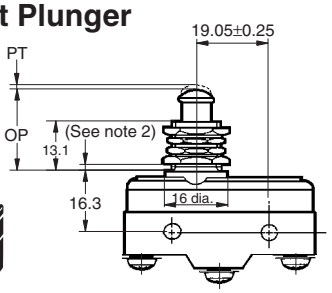


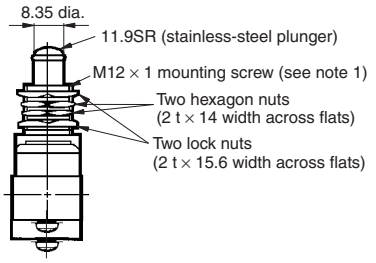
OF	3.92 to 6.13 N
RF min.	2.79 N
PT max.	1.3 mm
OT min.	3 mm
MD max.	0.2 mm
OP	26.2±0.5 mm

Panel Mount Plunger

A-20GQ-B





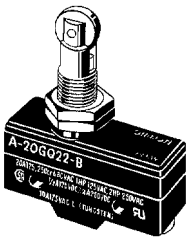


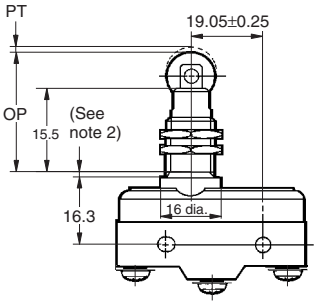
OF	3.92 to 6.13 N
RF min.	2.79 N
PT max.	1.3 mm
OT min.	5.6 mm
MD max.	0.2 mm
OP	21.8±0.8 mm

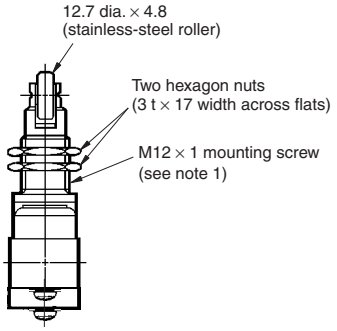
Note: 1. Do not use both M12 mounting screw and mounting holes at the same time.
2. Imperfect screw part with a maximum length of 1.5 mm.

Panel Mount Roller Plunger

A-20GQ22-B





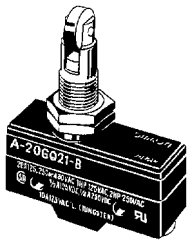


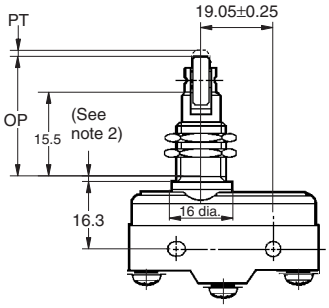
OF	6.18 N max.
RF min.	2.75 N
PT max.	1.3 mm
OT min.	3.58 mm
MD max.	0.35 mm
OP	33.4±1.2 mm

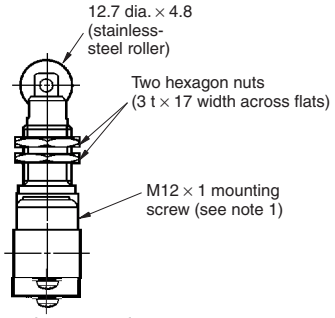
Note: 1. Do not use both M12 mounting screw and mounting holes at the same time.
2. Imperfect screw part with a maximum length of 1.5 mm.

Panel Mount Cross Roller Plunger

A-20GQ21-B





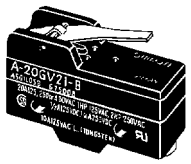


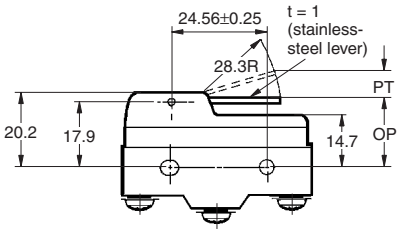
OF	6.18 N max.
RF min.	2.75 N
PT max.	1.3 mm
OT min.	3.58 mm
MD max.	0.35 mm
OP	33.4±1.2 mm

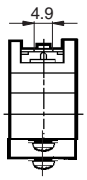
Note: 1. Do not use both M12 mounting screw and mounting holes at the same time.
2. Imperfect screw part with a maximum length of 1.5 mm.

Short Hinge Lever

A-20GV21-B



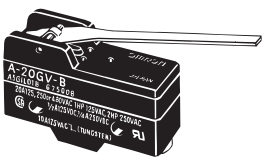


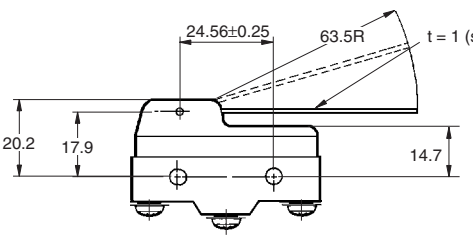


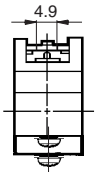
OF	1.57 N max.
RF min.	0.41 N
PT max.	6.5 mm
OT min.	1.2 mm
MD max.	1.2 mm
OP	19±0.8 mm

Hinge Lever

A-20GV-B



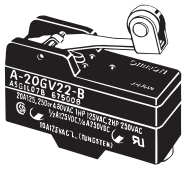


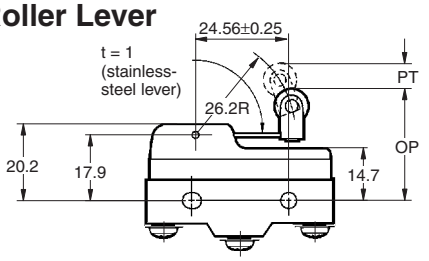


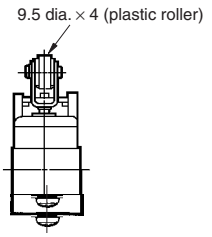
OF	0.69 N max.
RF min.	0.14 N
PT max.	15.9 mm
OT min.	4 mm
MD max.	2.4 mm
OP	19±0.8 mm

.

Short Hinge Roller Lever
A-20GV22-B

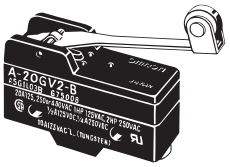


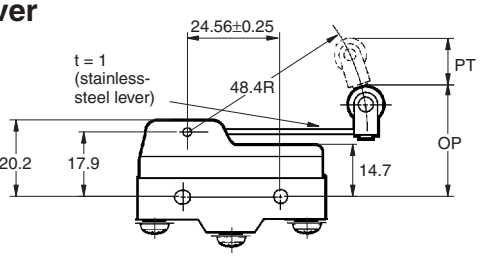


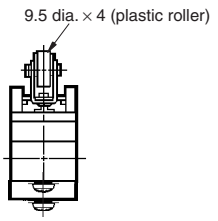


OF	1.57 N
RF min.	0.41 N
PT max.	6.3 mm
OT min.	1.2 mm
MD max.	1.2 mm
OP	29.8±0.8 mm

Hinge Roller Lever
A-20GV2-B



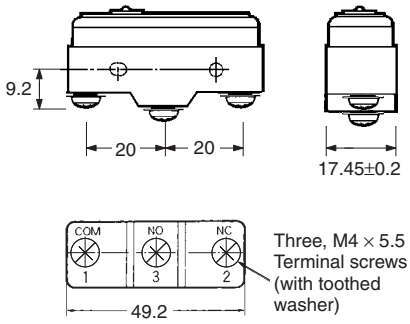




OF	0.88 N
RF min.	0.14 N
PT max.	12 mm
OT min.	2.4 mm
MD max.	2.2 mm
OP	30.2±0.8 mm

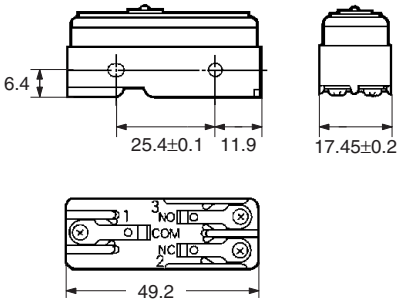
■ Terminals

Screw Terminals (-B)



Appropriate terminal screw tightening torque:
0.78 to 1.18 N·m.

Solder Terminal

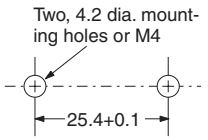


Mounting

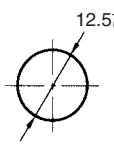
Use M4 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 1.18 to 1.47 N·m.

The Switch can be panel mounted, provided that the hexagonal nut of the actuator is tightened to a torque of 2.94 to 4.9 N·m.

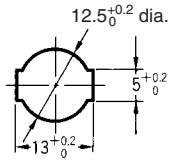
Mounting Holes



Panel Mount Plunger



Panel Mount Roller Plunger



Precautions

Refer to pages 25 to 30 of *General Information* for details.

■ Correct Use

Panel-mounting (A-20GQ□)

If a Switch is side-mounted with screws, remove the hexagonal nut of the actuator.

If a Switch is side-mounted and secured with screws, make sure that the angle or speed of the actuating object is not excessively large or too high, otherwise the Switch may be damaged.

If a Switch is panel-mounted, pay utmost attention to make sure that the actuating speed or OT distance is not excessively high or large. Not doing so may damage the Switch.

■ Accessories (Order Separately)

Refer to *Z/A/X/DZ Common Accessories* for details about Terminal Covers, Separators, and Actuators.

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

Cat. No. B002-E1-07A

General-purpose Basic Switch
X

Direct Current Switch with Built-in Magnetic Blowout

- Incorporates a small permanent magnet in the contact mechanism to deflect the arc to effectively extinguish it.
- Same shape and mounting procedures as the Z Basic Switches.

Model Number Structure

■ Model Number Legend

X-10G□-□
1 2 3 4

1. Ratings
10: 10 A (125 VDC)

2. Contact Gap
G: 0.9 mm

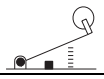
3. Actuator
None: Pin plunger
D: Short spring plunger
S: Slim spring plunger
Q: Panel mount plunger
Q21: Panel mount cross roller plunger
Q22: Panel mount roller plunger
L: Leaf spring
W: Hinge lever
W2: Hinge roller lever
W21: Short hinge lever
W22: Short hinge roller lever
W4: Low-force hinge lever
M: Reverse hinge lever
M2: Reverse hinge roller lever
M22: Reverse short hinge roller lever

4. Terminals
None: Solder terminal
B: Screw terminal (with toothed washer)

Ordering Information

■ List of Models

Actuator	Solder	Screw
Pin plunger	X-10G	X-10G-B
Slim spring plunger 	X-10GS	X-10GS-B
Short spring plunger	X-10GD	X-10GD-B
Panel mount plunger 	X-10GQ	X-10GQ-B
Panel mount roller plunger 	X-10GQ22	X-10GQ22-B
Panel mount cross roller plunger 	X-10GQ21	X-10GQ21-B
Leaf spring 	X-10GL	X-10GL-B
Short hinge lever 	X-10GW21	X-10GW21-B

Actuator	Solder	Screw
Hinge lever 	X-10GW	X-10GW-B
Low-force hinge lever 	X-10GW4	X-10GW4-B
Short hinge roller lever 	X-10GW22	X-10GW22-B
Hinge roller lever 	X-10GW2	X-10GW2-B
Reverse hinge lever 	X-10GM	X-10GM-B
Reverse short hinge roller lever 	X-10GM22	X-10GM22-B
Reverse hinge roller lever 	X-10GM2	X-10GM2-B

Note: The plungers of reverse-type models are continuously pressed by the compression coil springs and the plungers are freed by operating the levers.

Specifications

■ Approved Standards

Agency	Standard	File No.
UL	UL508	E41515
CSA	CSA C22.2 No. 55	LR21642

■ Approved Standard Ratings

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

Rated voltage	X-10G
125 VDC	10 A
250 VDC	3 A

■ Ratings

Rated voltage	Non-inductive load			Inductive load			
	Resistive load	Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO
8 VDC	10 A	3 A	1.5 A	10 A	10 A	5 A	2.5 A
14 VDC	10 A	3 A	1.5 A	10 A	10 A	5 A	2.5 A
30 VDC	10 A	3 A	1.5 A	10 A	10 A	5 A	2.5 A
125 VDC	10 A	3 A	1.5 A	7.5 A	6 A	5 A	2.5 A
250 VDC	3 A	1.5 A	0.75 A	2 A	1.5 A	2 A	1.5 A

Note: 1. The above values are for the steady-state current.
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 above electrical ratings also apply to the AC voltage.
6. With the reverse-type models (X-10GM□), the normally closed circuits and normally open circuits are reversed.
7. The ratings values apply 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 1 m/s (see note 1)
Operating frequency	Mechanical: 240 operations/min Electrical: 20 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance	15 mΩ max. (initial value)
Dielectric strength	1,500 VAC, 50/60 Hz for 1 min between terminals of the same polarity, between current-carrying metal parts and the ground, and between each terminal and non-current-carrying metal parts
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note 2)
Shock resistance	Destruction: 1,000 m/s^2 max. Malfunction: 300 m/s^2 max. (see note 1, 2)
Durability	Mechanical: 1,000,000 operations min. Electrical: 100,000 operations 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)
Ambient humidity	Operating: 35% to 85% max.
Weight	Approx. 27 to 63 g

Note: 1. The values are for the pin plunger models. (Contact your OMRON representative for other models.)
2. Malfunction: 1 ms max.

■ Contact Specification

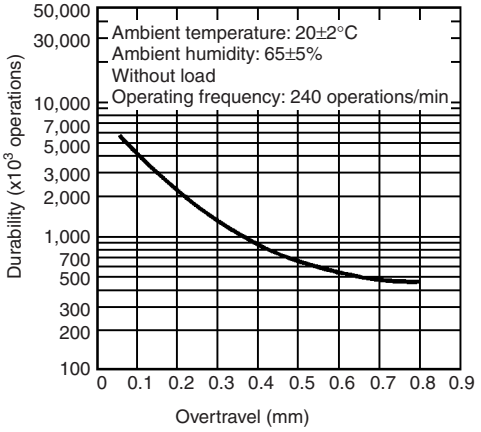
Item		X-10
Contacts	Material	Silver alloy
	Gap (standard value)	0.9 mm
Inrush current	NC	30 A max.
	NO	15 A max.

■ Contact Form (SPDT)

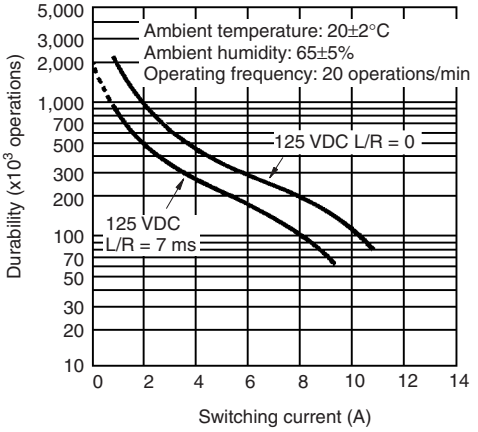
Note: With the reverse-type models (X-10GM□), the NC and NO terminal arrangements are reversed.

Engineering Data

■ Mechanical Durability (Pin Plunger)



■ Electrical Durability (Pin Plunger)



Dimensions

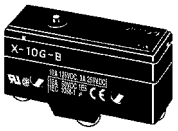
Note: 1. All units are in millimeters unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

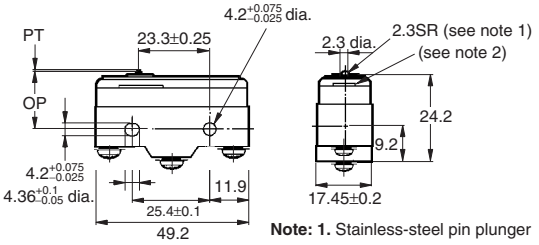
■ Dimensions and Operating Characteristics

The models, illustrations, and graphics are for screw-terminal models. (The dimensions for models that are omitted here are the same as for pin-plunger models.)

Pin Plunger

X-10G-B



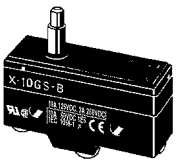


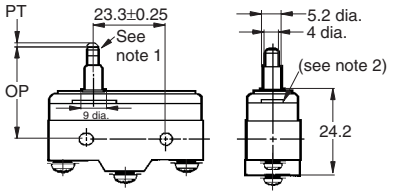
Note: 1. Stainless-steel pin plunger
2. Three vent holes

OF max.	5.00 N
RF min.	1.12 N
PT max.	0.9 mm
OT min.	0.13 mm
MD max.	0.18 mm
OP	15.9±0.4 mm

Slim Spring Plunger

X-10GS-B



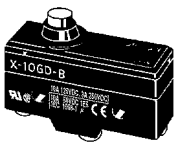


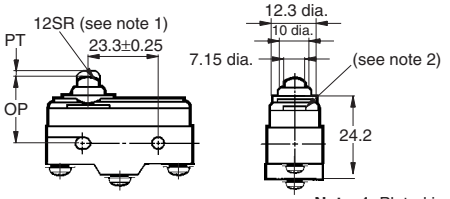
Note: 1. Stainless-steel pin plunger (flat, 1R chamfering)
2. Vent holes (3 places)

OF max.	5.00 N
RF min.	1.12 N
PT max.	0.9 mm
OT min.	1.6 mm
MD max.	0.18 mm
OP	28.2±0.5 mm

Short Spring Plunger

X-10GD-B



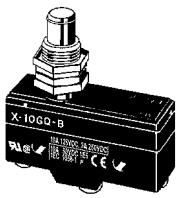


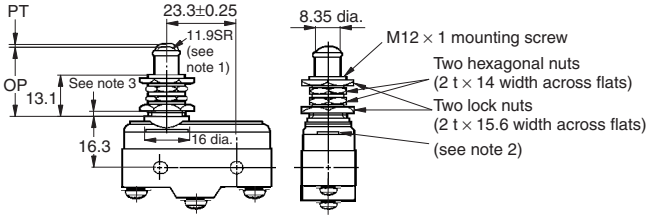
Note: 1. Plated iron plunger
2. Three vent holes

OF max.	5.00 N
RF min.	1.12 N
PT max.	0.9 mm
OT min.	1.6 mm
MD max.	0.18 mm
OP	21.2±0.5 mm

Panel Mount Plunger

X-10GQ-B



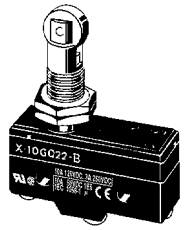


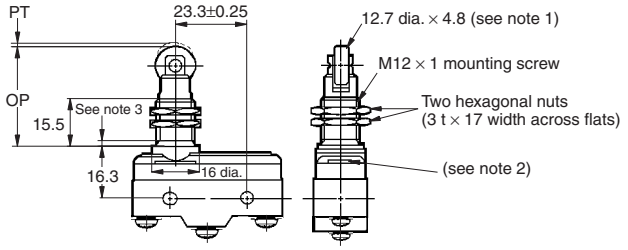
OF max.	5.00 N
RF min.	1.12 N
PT max.	0.9 mm
OT min.	5.5 mm
MD max.	0.18 mm
OP	21.8±0.8 mm

Note: 1. Stainless-steel pin plunger
2. Three vent holes
3. Imperfect screw part with a maximum length of 1.5 mm.

Panel Mount Roller Plunger

X-10GQ22-B



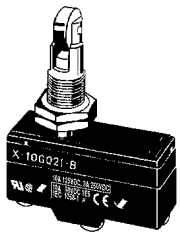


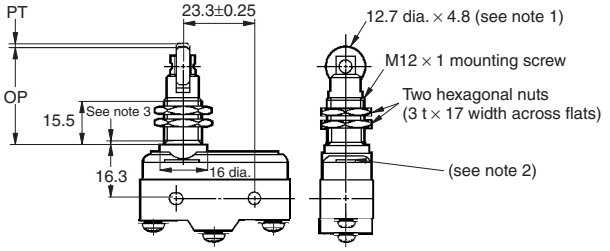
OF max.	5.00 N
RF min.	1.12 N
PT max.	0.9 mm
OT min.	3.6 mm
MD max.	0.18 mm
OP	33.4±1.2 mm

Note: 1. Stainless-steel roller
2. Three vent holes
3. Imperfect screw part with a maximum length of 1.5 mm.

Panel Mount Cross Roller Plunger

X-10GQ21-B



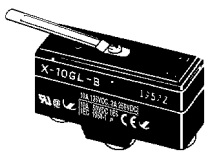


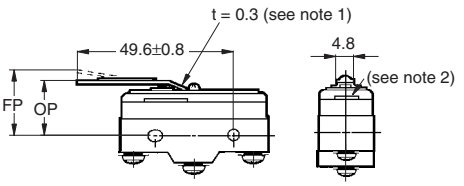
OF max.	5.00 N
RF min.	1.12 N
PT max.	0.9 mm
OT min.	3.6 mm
MD max.	0.18 mm
OP	33.4±1.2 mm

Note: 1. Stainless-steel roller
2. Three vent holes
3. Imperfect screw part with a maximum length of 1.5 mm.

Leaf Spring

X-10GL-B





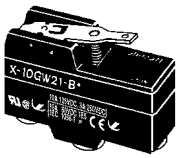
Note: 1. Stainless-steel spring lever
2. Three vent holes

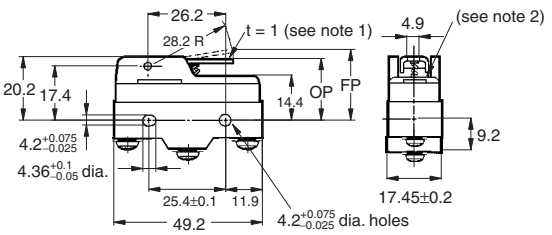
OF max.	1.96 N
RF min.	0.14 N
OT min.	1.6 mm (see note)
MD max.	2.3 mm
FP max.	22.1 mm
OP	17.4±0.8 mm

Note: 1. Reference value
2. Be sure to use the switch at the rated OT value of 1.6 mm.

Short Hinge Lever

X-10GW21-B



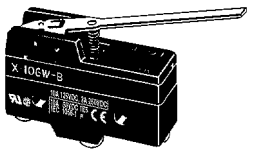


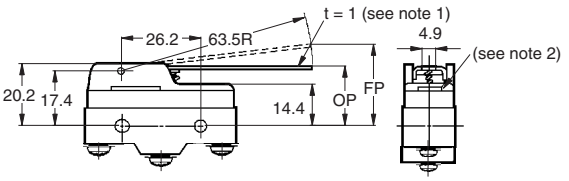
Note: 1. Stainless-steel lever
2. Three vent holes

OF max.	2.45 N
RF min.	0.31 N
OT min.	2.1 mm
MD max.	1.7 mm
FP max.	25.5 mm
OP	20.7±0.8 mm

Hinge Lever

X-10GW-B



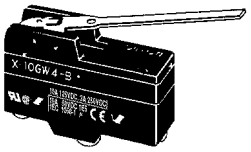


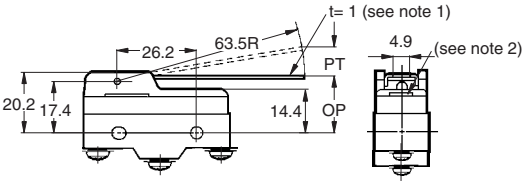
Note: 1. Stainless-steel lever
2. Three vent holes

OF max.	1.08 N
RF min.	0.14 N
OT min.	4.8 mm
MD max.	3.9 mm
FP max.	34.6 mm
OP	21.1±0.8 mm

Low-force Hinge Lever

X-10GW4-B



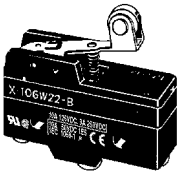


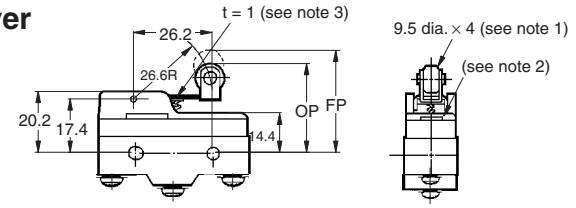
Note: 1. Stainless-steel lever
2. Three vent holes

OF max.	0.25 N
RF min.	0.05 N
PT max.	14.3 mm
OT min.	4.8 mm
MD max.	3.9 mm
OP	21.1±0.8 mm

Short Hinge Roller Lever

X-10GW22-B



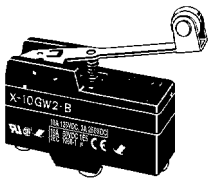


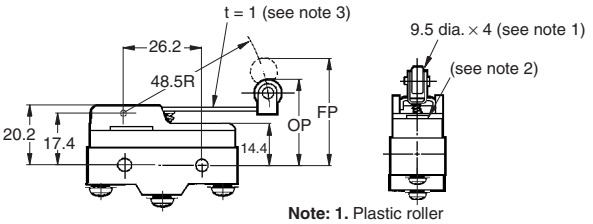
Note: 1. Plastic roller
2. Three vent holes
3. Stainless-steel spring lever

OF max.	2.16 N
RF min.	0.34 N
OT min.	2.4 mm
MD max.	1.7 mm
FP max.	37.1 mm
OP	32.2±0.8 mm

Hinge Roller Lever

X-10GW2-B



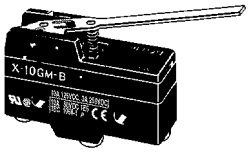


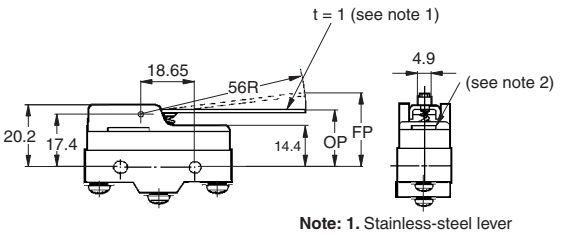
Note: 1. Plastic roller
2. Three vent holes
3. Stainless-steel spring lever

OF max.	1.42 N
RF min.	0.21 N
OT min.	4 mm
MD max.	3 mm
FP max.	40.5 mm
OP	32.2±0.8 mm

Reverse Hinge Lever

X-10GM-B



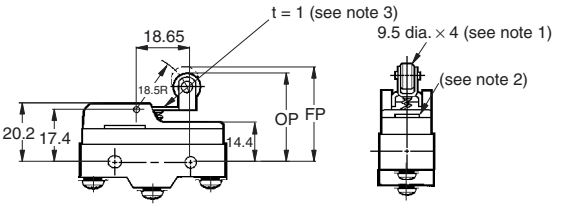


Note: 1. Stainless-steel lever
2. Three vent holes

OF max.	2.16 N
RF min.	0.25 N
OT min.	5.5 mm
MD max.	2.1 mm
FP max.	26.8 mm
OP	21.1±0.8 mm

Reverse Short Hinge Lever

X-10GM22-B

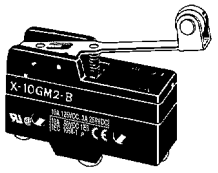


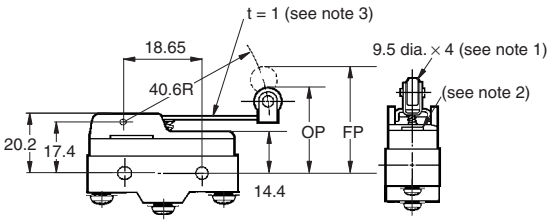
Note: 1. Plastic roller
2. Three vent holes
3. Stainless-steel spring lever

OF max.	6.86 N
RF min.	1.52 N
OT min.	2 mm
MD max.	0.75 mm
FP max.	36.1 mm
OP	32.2±0.8 mm

Reverse Hinge Roller Lever

X-10GM2-B



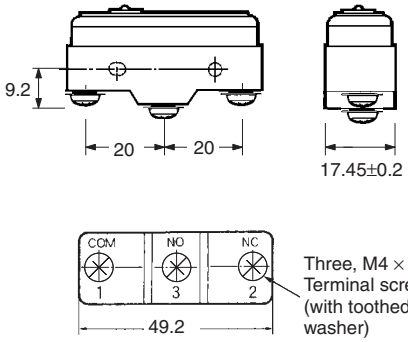


OF max.	3.14 N
RF min.	0.49 N
OT min.	4 mm
MD max.	1.5 mm
FP max.	37.4 mm
OP	32.2±0.8 mm

Note: 1. Plastic roller
2. Three vent holes
3. Stainless-steel spring lever

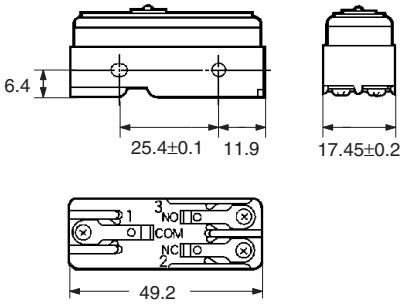
■ Terminals

Screw Terminals (-B)



Appropriate terminal screw tightening torque:
0.78 to 1.18 N·m.

Solder Terminal



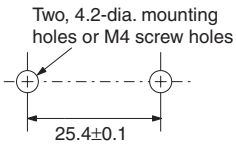
Note: 1. Tighten the terminal screws to a torque of 0.78 to 1.18 N·m.
2. In case of DC voltage, set the COM to the positive terminal.

Mounting

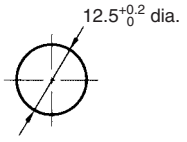
Use M4 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 1.18 to 1.47 N·m.

The Switch can be panel mounted, provided that the hexagonal nut of the actuator is tightened to a torque of 2.94 to 4.9 N·m.

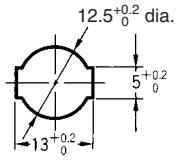
Mounting Holes



Panel Mount Plunger



Panel Mount Roller Plunger



Precautions

Refer to pages 25 to 30 of *General Information* for details.

■ Correct Use

Handling

Set the common (COM) terminal to the positive terminal. If it is set to the negative terminal, the Switch will not turn OFF.

When using the Switch under an inductive load, the arc suppression capability varies depending on current. If the current becomes 0.6 to 1.2 A or of the time constant L/R exceeds 7 ms, be sure to provide an arc suppressor.

Since the Switch incorporates a permanent magnet, attention must be paid to the following points:

- Avoid mounting the Switch directly onto a magnetic substance.
- Do not subject the Switch to severe shocks.
- Avoid placing the Switch in a strong magnetic field.
- Be sure to prevent iron dust or iron chips from adhering to the built-in magnet or the magnetic blowout function of the Switch will be adversely affected.
- Do not apply thermal shock to the Switch, or the magnetic flux will be diminished.

Since a ventilation hole is provided to avoid abnormal corrosion due to operating conditions, provide a dustproofing device in locations where the Switch is exposed to dust.

Do not change operating positions for the actuator. Changing the position may cause malfunction.

Panel-mounted Model (X-10GQ□)

To side-mount the panel-mount Switch to the panel with screws, remove the hexagonal nut from the actuator.

Too large a dog angle and too fast operating speed may damage the Switch when the Switch is side-mounted on the panel.

Too fast operating speed and too long overtravel of the roller plunger Switch may result in damage to the Switch.

■ Accessories (Order separately)

Refer to *Z/A/X/DZ Common Accessories* for details about Terminal Covers, Separators, and Actuators.

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

Cat. No. B003-E1-08A

Special-purpose Basic Switch
DZ

DPDT Basic Switch for Two Independent Circuit Control

- Incorporates two completely independent built-in switches.
- Ideal for switching the circuits operating on two different voltages, and for controlling two independent circuits.
- Interchangeable with OMRON Z Basic Switches, as both switches are identical in mounting hole dimensions, mounting pitch and pin plunger position.

Model Number Structure

■ Model Number Legend

DZ-10G□-1□
1 2 3 4 5

1. **Ratings**
   10: 10 A (250 VAC)
2. **Contact Gap**
   G: 0.5 mm
3. **Actuator**
   None: Pin plunger
   V: Hinge lever
   V22: Short hinge roller lever
   V2: Hinge roller lever
   W: Hinge lever
   W22: Short hinge roller lever
   W2: Hinge roller lever
4. **Contact Form**
   1: DPDT
5. **Terminals**
   A: Solder terminal
   B: Screw terminal

Ordering Information

■ List of Models

Actuator	OT	Solder terminal	Screw terminal
Pin plunger 	0.13 mm min.	DZ-10G-1A	DZ-10G-1B
Hinge lever 	1.6 mm min.	DZ-10GW-1A	DZ-10GW-1B
	0.4 mm min.	DZ-10GV-1A	DZ-10GV-1B
Short hinge roller lever 	0.9 mm min.	DZ-10GW22-1A	DZ-10GW22-1B
	0.13 mm min.	DZ-10GV22-1A	DZ-10GV22-1B
Hinge roller lever 	1.2 mm min.	DZ-10GW2-1A	DZ-10GW2-1B
	0.26 mm min.	DZ-10GV2-1A	DZ-10GV2-1B

Specifications

■ Approved Standards

Agency	Standard	File No.
UL	UL508	E41515
CSA	CSA C22.2 No. 55	LR21642

■ Approved Standard Ratings

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

Rated voltage	DZ-10G
125 VAC	10 A 1/3 HP
250 VAC	10 A 1/4 HP
480 VAC	2 A
125 VDC	0.5 A
250 VDC	0.25 A

■ Ratings

Rated voltage	Non-inductive load				Inductive load				Inrush current	
	Resistive load		Lamp load		Inductive load		Motor load			
	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	10 A		2 A	1 A	6 A		3 A	1.5 A	30 A max.	15 A max.
250 VAC	10 A		1.5 A	0.7 A	4 A		2 A	1 A		
8 VDC	10 A		3 A	1.5 A	6 A		5 A	2.5 A		
14 VDC	10 A		3 A	1.5 A	6 A		5 A	2.5 A		
30 VDC	10 A		3 A	1.5 A	4 A		3 A	1.5 A		
125 VAC	0.5 A		0.5 A		0.05 A		0.05 A			
250 VDC	0.25 A		0.25 A		0.03 A		0.03 A			

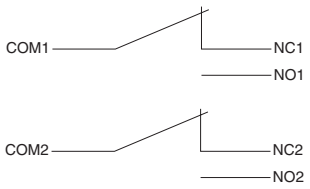
Note: 1. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
2. Lamp load has an inrush current of 10 times the steady-state current.
3. Motor load has an inrush current of 6 times the steady-state current.

■ Characteristics

Operating speed	0.1 mm to 1 m/s (at pin plunger)
Operating frequency	Mechanical: 240 operations/min Electrical: 20 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 non-continuous terminals 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and non-current-carrying metal part, and between current-carrying metal part and ground and between switches
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction: 1,000 m/s^2 max. Malfunction: 300 m/s^2 max. (See notes 1 and 2.)
Durability	Mechanical: 1,000,000 operations min. Electrical: 500,000 operations min.
Ambient temperature	Operating: –25°C to 80°C (with no icing)
Ambient humidity	Operating: 35% to 85% max.
Weight	Approx. 30 to 50 g

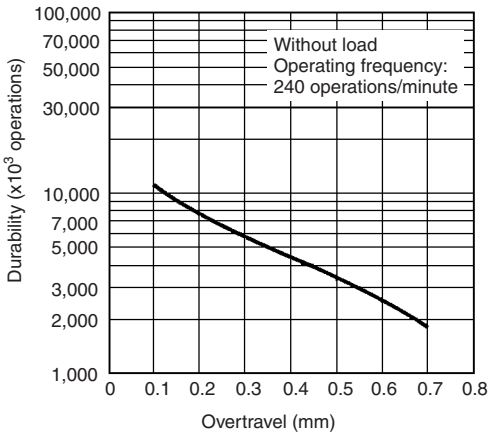
Note: 1. The values are for pin plunger models. (Contact your OMRON representative for other models.)
2. Malfunction: 1 ms max.

■ Contact Form (DPDT)

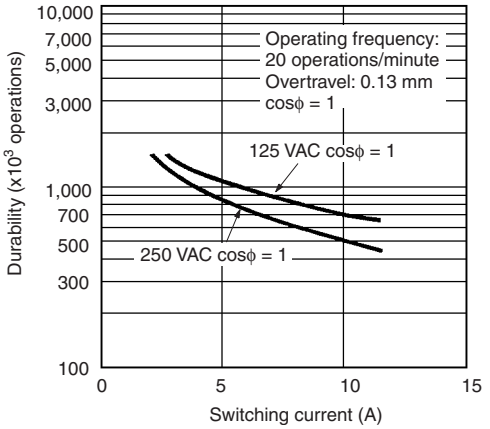


Engineering Data

■ Mechanical Durability (Pin Plunger)



■ Electrical Durability (Pin Plunger)



Dimensions

■ Dimensions and Operating Characteristics

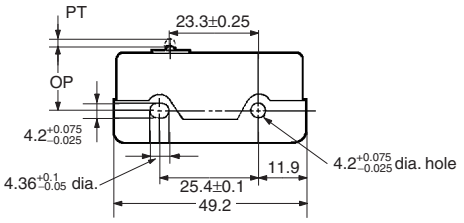
Note: 1. All units are in millimeters unless otherwise indicated.

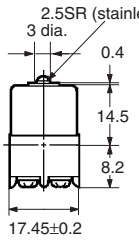
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

3. The solder terminal model has a suffix "-1A" in its model number and its omitted dimensions are the same as the corresponding dimensions of the pin plunger model.

Pin Plunger

DZ-10G-1B

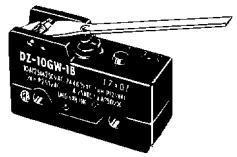


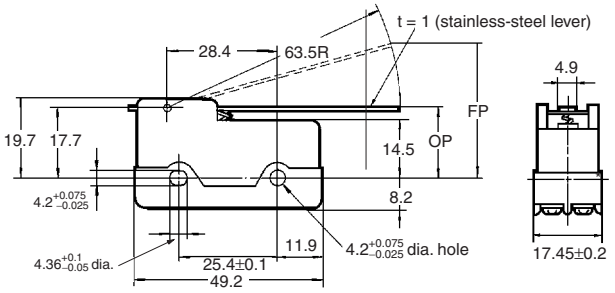


OF max.	5.59 N
RF min.	0.56 N
PT max.	1.7 mm
OT min.	0.13 mm
MD max.	0.4 mm
OP	15.6±0.4 mm

Hinge Lever

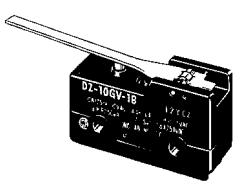
DZ-10GW-1B

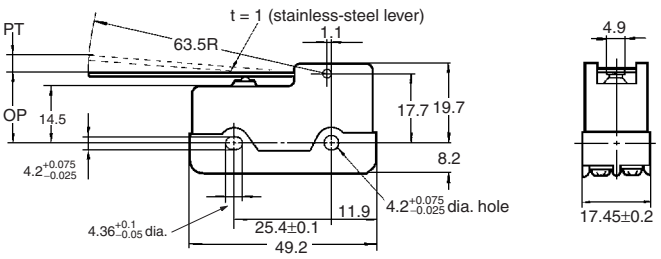




OF max.	1.67 N
RF min.	0.27 N
OT min.	1.6 mm
MD max.	4 mm
FP max.	46.3 mm
OP	21.8±1 mm

DZ-10GV-1B

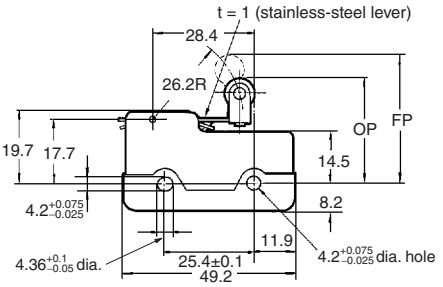


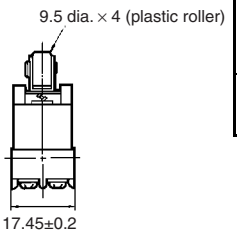


OF max.	1.96 N
RF min.	0.13 N
PT max.	6 mm
OT min.	0.4 mm
MD max.	1.7 mm
OP	18.3±1 mm

Short Hinge Roller Lever

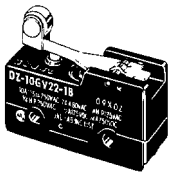
DZ-10GW22-1B

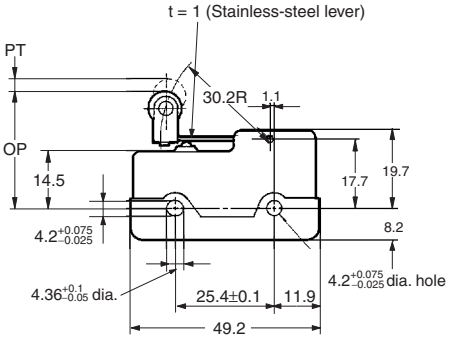


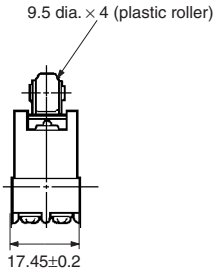


OF max.	3.92 N
RF min.	0.83 N
OT min.	0.9 mm
MD max.	2.4 mm
FP max.	39.7 mm
OP	30.2±0.8 mm

DZ-10GV22-1B



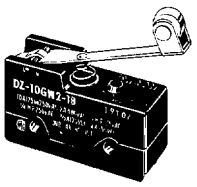


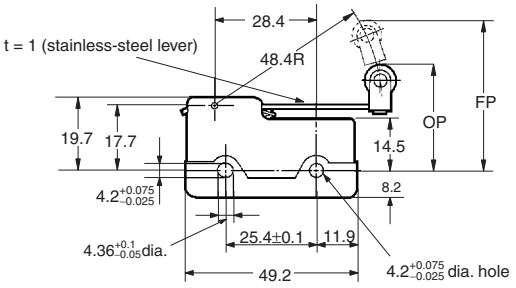


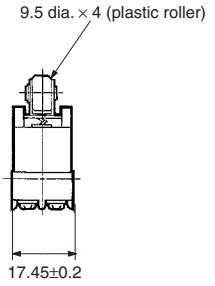
OF max.	4.22 N
RF min.	0.41 N
PT max.	3 mm
OT min.	0.13 mm
MD max.	0.6 mm
OP	29.4±0.8 mm

Hinge Roller Lever

DZ-10GW2-1B

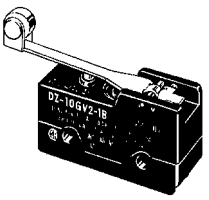


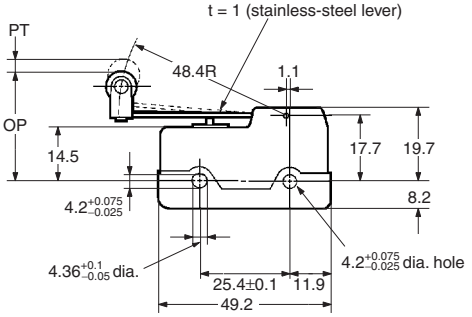


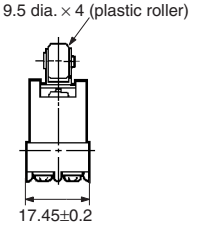


OF max.	2.09 N
RF min.	0.41 N
OT min.	1.2 mm
MD max.	3.3 mm
FP max.	47.6 mm
OP	31.8±0.8 mm

DZ-10GV2-1B



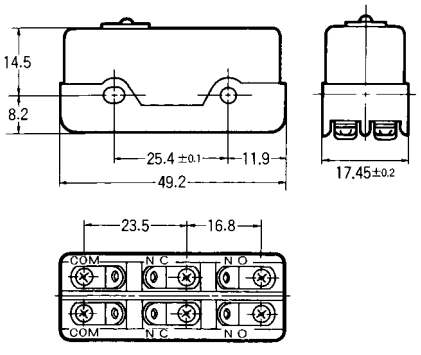




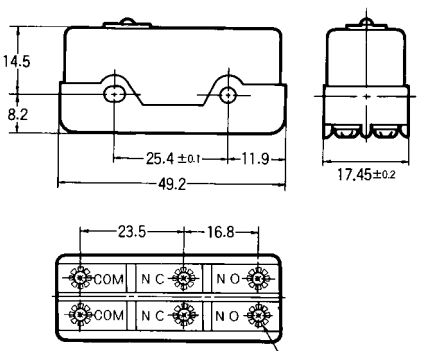
OF max.	2.65 N
RF min.	0.33 N
PT max.	4 mm
OT min.	0.26 mm
MD max.	1.1 mm
OP	29.4±0.8 mm

■ Terminals

Solder Terminals (-1A)



Screw Terminals (-1B)

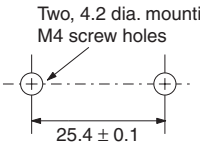


Six M3 pan head screws
(with toothed washer)

Mounting

Use M4 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 1.18 to 1.47 N·m.

Mounting Holes



Precautions

Refer to pages 25 to 30 of *General Information* for details.

■ Cautions

Terminal Connection

When soldering lead wires to the Switch, make sure that the capacity of the soldering iron is 60 W maximum. Do not take more than 5 s to solder any part of the Switch. 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 iron with a capacity of more than 60 W is applied to any part of the Switch for 6 s or more.

Operation

Make sure that the switching frequency or speed is within the specified range.

If the switching speed is extremely slow, the contact may not be switched smoothly, which may result in a contact failure or contact welding.

If the switching speed is extremely fast, switching shock may damage the Switch soon. If the switching frequency is too high, the contact may not catch up with the speed.

The rated permissible switching speed and frequency indicate the switching reliability of the Switch.

The life of a Switch is determined at the specified switching speed. The life varies with the switching speed and frequency even when they are within the permissible ranges. In order to determine the life of a Switch model to be applied to a particular use, it is best to conduct an appropriate durability test on some samples of the model under actual conditions.

Make sure that the actuator travel does not exceed the permissible OT position. The operating stroke must be set to 70% to 100% of the rated OT.

■ Accessories (Order separately)

Refer to *Z/A/X/DZ Common Accessories* for details about Terminal Covers, Separators, and Actuators.

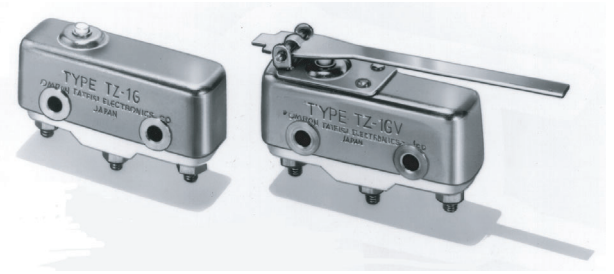
ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. B060-E1-07A

High-temperature Basic Switch
TZ

Stable Operation at an Ambient Temperature of 400°C

- Incorporates a ceramic insulator, cobalt-alloy spring, and special-alloy contact, thus ensuring high contact reliability at high ambient temperature.
- Smoothly operates at an ambient temperature of 400°C.



Model Number Structure

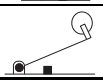
■ Model Number Legend

TZ-1G□
1 2 3

1. **Rating**
   1: 1 A, 250 VAC
2. **Contact Gap**
   G: 0.5 mm
3. **Actuator**
   None: Pin plunger
   V: Hinge lever
   V2: Hinge roller lever
   V22: Short hinge roller lever

Ordering Information

■ List of Model

Actuator	Model
Pin plunger	TZ-1G
Hinge lever 	TZ-1GV
Short hinge roller lever 	TZ-1GV22
Hinge roller lever 	TZ-1GV2

Specifications

■ Ratings

Rated voltage	Non-inductive load (A)				Inductive load (A)			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	1		0.9	0.45	1		1.5	0.75
250 VAC	1		0.45	0.3	1		0.45	0.3
8 VDC	1		0.9	0.45	1		1.5	1.5
14 VDC	1		0.9	0.45	1		1.5	1.5
30 VDC	1		0.9	0.45	1		1.5	1.5
125 VDC	0.4		0.05	0.05	0.4		0.05	0.05

Note: 1. The above current ratings are the values of the steady-state current.

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 above ratings are tested under the following conditions.

1. Ambient temperature: 20±2 °C
2. Ambient humidity: 65±5%
3. Switching frequency: 20 times/min

■ Characteristics

Operating speed	0.05 mm to 1 m/s (see note 1)
Operating frequency	Mechanical: 60 operations/min Electrical: 20 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance	100 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 and between each terminal and non-current-carrying metal parts
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note 2)
Shock resistance	Destruction: 500 m/s^2 max. Malfunction: 300 m/s^2 max. (see note 2)
Durability	Mechanical: 100,000 operations min. Electrical: 50,000 operations min.
Degree of protection	IP00
Electric shock protection	Class I
Ambient temperature	Operating: –65°C to 400°C (with no icing)
Ambient humidity	Operating: 35% to 85% max.
Weight	Approx. 45 to 54 g

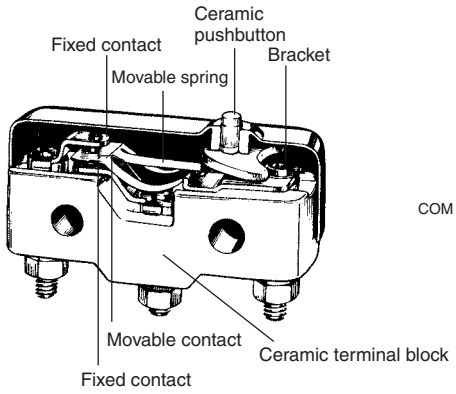
Note: 1. This operating speed applies to switches with pin-type pushbuttons.

2. This refers to a malfunction period of 1 ms max.

■ Contact Specifications

Item		
Contact	Specification	Cross bar
	Material	Platinum alloy
	Gap (standard value)	0.5 mm
Inrush current	NC	9 A max.
	NO	4.5 A max.

Nomenclature



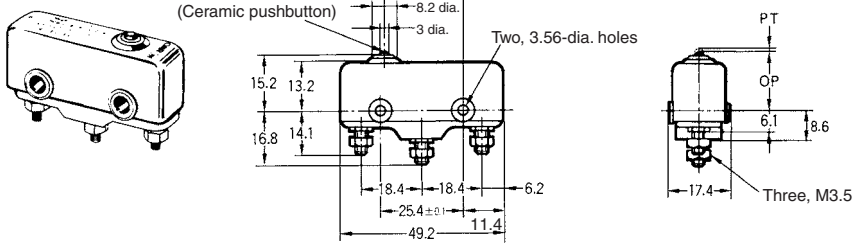
Dimensions

■ Dimensions and Operating Characteristics

Note: 1. All units are in millimeters unless otherwise indicated.
2. Each dimension has a tolerance of ±0.4 mm unless otherwise specified.

Pin Plunger

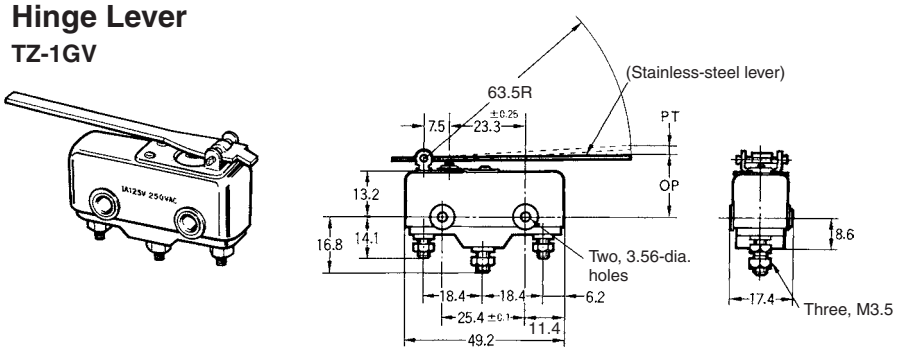
TZ-1G



OF max.	4.9 N
RF min.	1.12 N
PT max.	0.4 mm
OT min.	0.13 mm
MD max.	0.15 mm
OP	15.6±0.6 mm

Hinge Lever

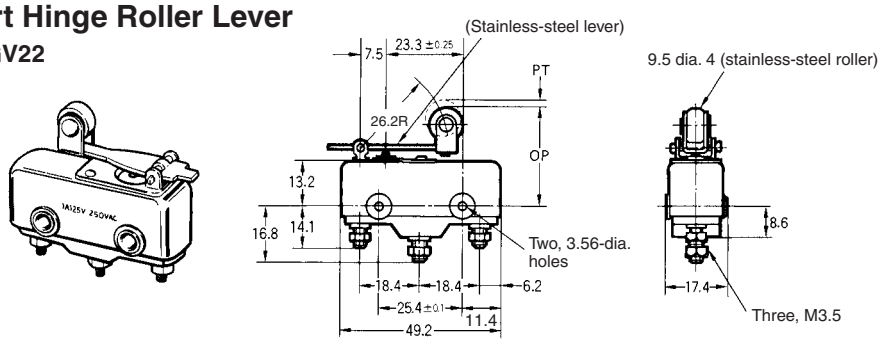
TZ-1GV



OF max.	0.98 N
RF min.	0.14 N
PT max.	3.5 mm
OT min.	4.6 mm
MD max.	1.3 mm
OP	18±1.2 mm

Short Hinge Roller Lever

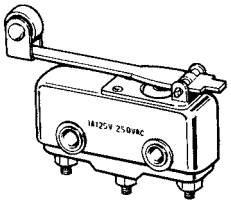
TZ-1GV22

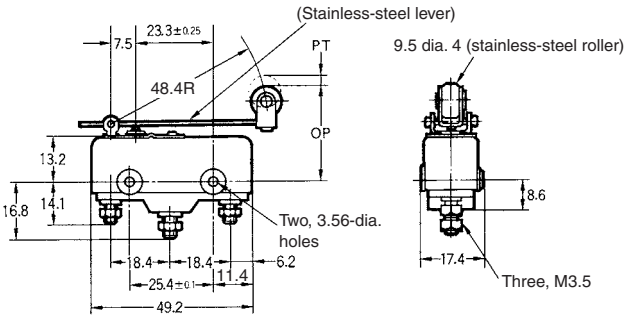


OF max.	2.35 N
RF min.	0.34 N
PT max.	1.5 mm
OT min.	1.9 mm
MD max.	0.6 mm
OP	28.6±1.2 mm

Hinge Roller Lever

TZ-1GV2





OF max.	1.27 N
RF min.	0.2 N
PT max.	2.6 mm
OT min.	3.5 mm
MD max.	1 mm
OP	28.6±1.2 mm

Precautions

Refer to pages 25 to 30 of *General Information* for details.

■ Correct Use

Handling

The Switch has a ceramic casing. Do not drop the Switch from a height of 30 cm or more. Doing so will break the casing.

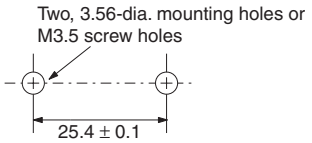
Mounting

Be sure to turn OFF the power supply to the Switch before mounting, dismounting, wiring, or working on the Switch for maintenance. Not doing so may result in an electric shock or the Switch may burn.

Mount the switch with M3.5 stainless-steel screws with plane washer and spring washers securely.

Use M3.5 stainless-steel mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.69 to 0.98 N·m.

Mounting Holes



Connect nickel-plated solderless terminals to the TZ. Each terminal must be secured on the TZ with M3.5 nut.

Make sure that the ceramic case is free of metal powder or other impurities.

Operation

Do not modify the Actuator and change the operating position.

Make sure that the switching speed is not extremely slow or do not use the Switch so that the pushbutton will be set to a position between the FP and OP.

Make sure that the pin-type pushbutton and the switching stroke are on the same vertical line.

Make sure that the switching frequency or speed is within the specified range.

- If the switching speed is extremely slow, the contact may not be switched smoothly, which may result in a contact failure or contact welding.
- If the switching speed is extremely fast, switching shock may damage the Switch soon. If the switching frequency is too high, the contact may not catch up with the speed.

The rated permissible switching speed and frequency indicate the switching reliability of the Switch.

The life of a Switch is determined at the specified switching speed. The life varies with the switching speed and frequency even when they are within the permissible ranges. In order to determine the life of a Switch model to be applied to a particular use, it is best to conduct an appropriate durability test on some samples of the model under actual conditions.

Make sure that the actuator travel does not exceed the permissible OT position. The operating stroke must be set to 70% to 100% of the rated OT.

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

Cat. No. B102-E1-02

Z/A/X/DZ Common Accessories
Z/A/X/DZ

Ordering Information

■ List of Models

Terminal Covers (Sold Separately)

Common to Z, A, X, and DZ Models

The Terminal Cover is secured with mounting screws and protects the casing and terminal wires from dust, vibration, or fingers, thus preventing terminal short-circuiting, ground faults, wire disconnection or improper connection, and electric shock accidents.

Terminal Covers made of phenol resin have five or six thin wall sections. These sections can be torn open for providing holes for lead cables at desired points.

Material	Application / Mounting direction	Soldering terminal use	Screw terminal use	Remarks
		Model		
Phenol resin	Side mounting	AP-A	AP-B	---
Metal press mold	Side mounting	AP1-A	AP1-B	Used for AP-A and AP-B
Vinyl chloride	Side mounting	AP-Z		---

Note: Use the screw-terminal use Terminal Cover for DZ-series soldering-terminal models.

Separator (Sold Separately)

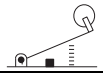
Common to Z, A, X, and DZ Models

Model: Separator for Z

Actuators (Sold Separately)

Common to Z and X Models

A Switch can be actuated by a cam or an appropriate object, in which case, use one of the following Actuators according to the application.

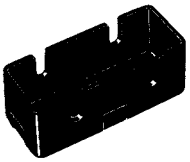
Actuator		Common to Z and X models
Hinge lever 		XAA-1
Hinge roller lever 		ZAA-2
Panel mount plunger 	Short	ZAQ-3
	Medium	ZAQ-2
	Long	ZAQ-1
Panel mount roller plunger 		ZAQ-22

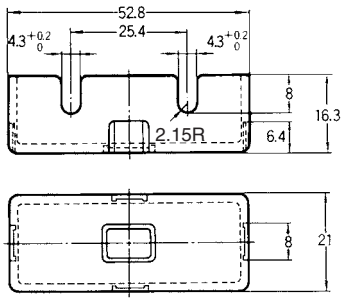
Dimensions

■ Dimensions and Operating Characteristics

Terminal Covers

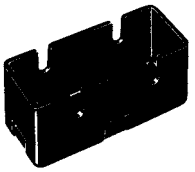
AP-A
Soldering Terminal Use (Phenol Resin)

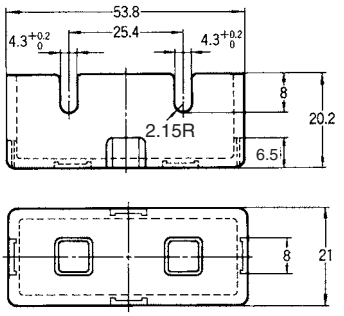




Note: The Cover has five thin, easy-to-separate portions for easy lead wire connections.

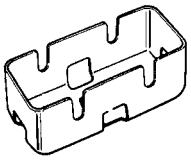
AP-B
Screw Terminal Use (Phenol Resin)

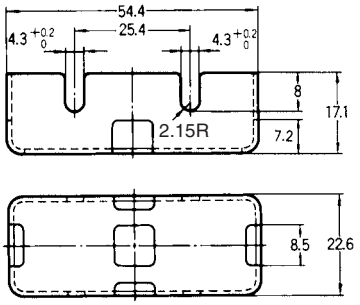




Note: The Cover has six thin, easy-to-separate portions for easy lead wire connections.

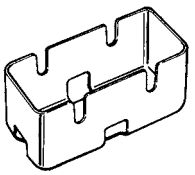
AP1-A
Soldering Terminal Use (Metal Press Mold)

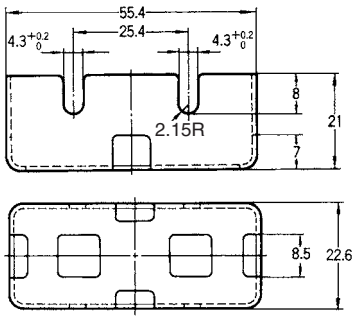




Note: 1. The Cover has five holes for easy lead wire connections.
2. AP1-A should be used with AP-A.

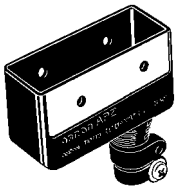
AP1-B
Screw Terminal Use (Metal Press Mold)

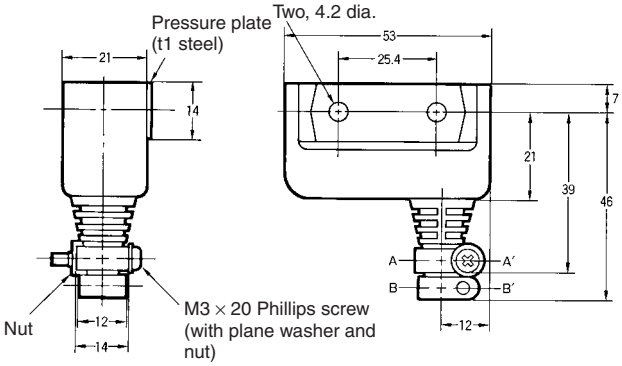




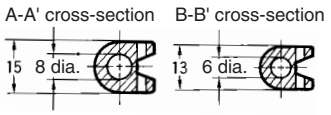
Note: 1. The Cover has six holes for easy lead wire connections.
2. AP1-B should be used with AP-B.

AP-Z
Soldering or Screw Terminal Use (Vinyl Chloride)





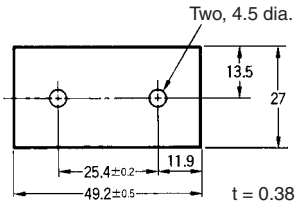
Cable Pull-out Dimension



Note: A 6-dia. or 8-dia. cable can be used by cutting the cable pull-out hole to the size of the cable to be used.

Note: Each dimension has a tolerance of ±0.4 mm unless otherwise specified. (±0.8 mm for the AP-Z)

Separator



Note: 1. Each dimension has a tolerance of +0.4 mm unless otherwise specified.

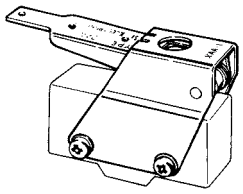
2. The material is EAVTC (Epoxide Alkyd Varnished Tetron Cloth) and its heat-resisting temperature is 130°C.

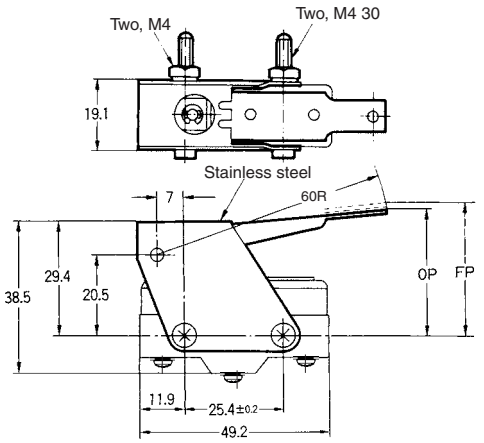
Actuators

Note: These Actuators are not provided with Switches.

Hinge Lever

XAA-1



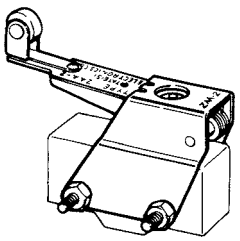


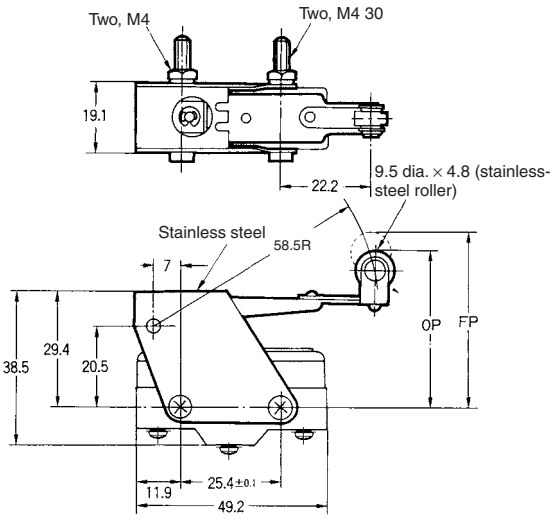
Model	Z-15G-B	X-10G-B
OF max.	4.90 N	4.90 N
RF min.	1.67 N	1.67 N
PT max.	6 mm	6 mm
OT min.	12.7 mm	12.7 mm
MD max.	2.2 mm	3.3 mm
FP max.	32.9±1.6 mm	

Note: This Actuator can be used with the Z-15G(-B) and ZX-10G(-B). When mounting the Switch, set the overtravel to between 32% and 100%, taking into consideration the operating body and the distance between the Actuator and the dog.

Hinge Roller Lever

ZAA-2





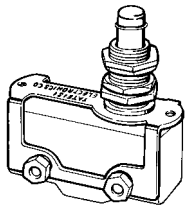
Model	Z-15G-B	X-10G-B
OF max.	4.90 N	4.90 N
RF min.	1.67 N	1.67 N
PT max.	6 mm	6 mm
OT min.	12.7 mm	12.7 mm
MD max.	2.2 mm	3.3 mm
FP max.	44.5±1.6 mm	

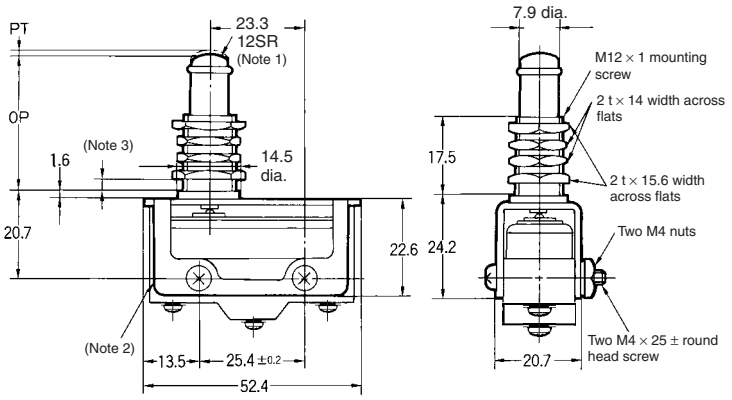
Note: This Actuator can be used with the Z-15G(-B) and ZX-10G(-B). When mounting the Switch, set the overtravel to between 32% and 100%, taking into consideration the operating body and the distance between the Actuator and the dog.

Note: Each dimension has a tolerance of ±0.4 mm unless otherwise specified.

Short Panel Mount Plunger

ZAQ-3





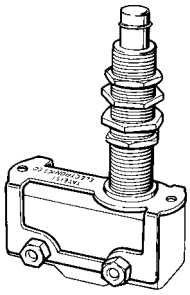
Model	ZAQ-3	
	Z-15E-B	X-10G-B
OF max.	8.34 N	5.39 N
RF min.	1.12 N	1.12 N
PT max.	0.8 mm	1 mm
OT min.	4.8 mm	4.5 mm
MD max.	0.15 mm	0.2 mm
OP	27.8±1.5 mm	

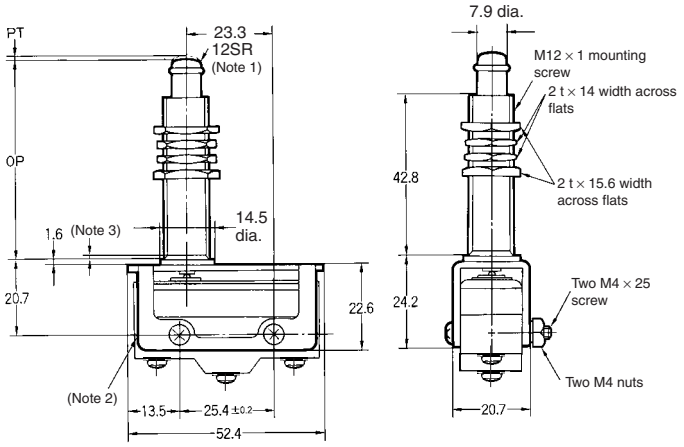
Note: 1. Stainless-steel pin plunger
2. Bronze frame
3. Incomplete screw section part with a maximum of 1.5 mm

Note: This Actuator (pin plunger) can be used with Standard Pin Plungers (Z-15G(-B), Z-15E(-B), X-10G(-B), DZ-10G-1A(-1B)) for the Z, X, and DZ models.

Medium Panel Mount Plunger

ZAQ-2





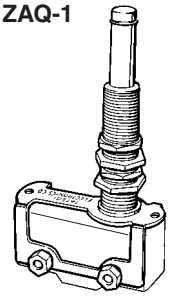
Model	ZAQ-2	
	Z-15E-B	X-10G-B
OF max.	8.34 N	5.39 N
RF min.	1.12 N	1.12 N
PT max.	0.8 mm	1 mm
OT min.	4.8 mm	4.5 mm
MD max.	0.15 mm	0.2 mm
OP	53.2±1.5 mm	

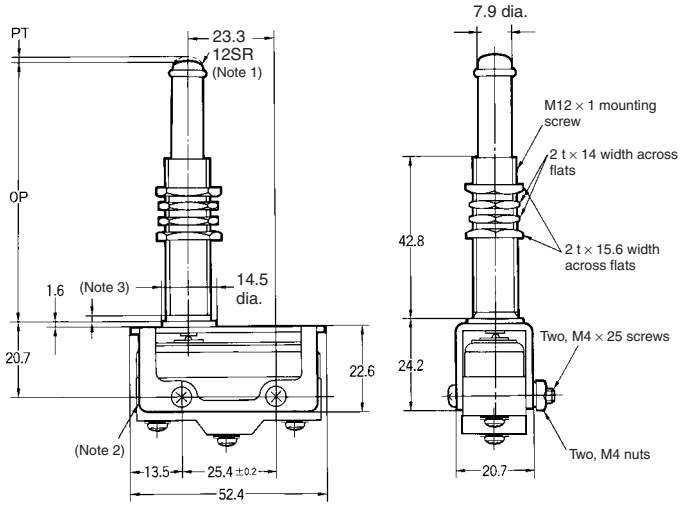
Note: 1. Stainless-steel pin plunger
2. Bronze frame
3. Incomplete screw section part with a maximum of 1.5 mm

Note: This Actuator (pin plunger) can be used with Standard Pin Plungers (Z-15G(-B), Z-15E(-B), X-10G(-B), DZ-10G-1A(-1B)) for the Z, X, and DZ models.

Long Panel Mount Plunger

ZAQ-1





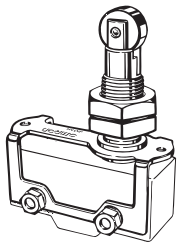
Model	ZAQ-1	
	Z-15E-B	X-10G-B
OF max.	8.34 N	5.39 N
RF min.	1.12 N	1.12 N
PT max.	0.8 mm	1 mm
OT min.	20.6 mm	20.4 mm
MD max.	0.15 mm	0.2 mm
OP	69.1±1.5 mm	

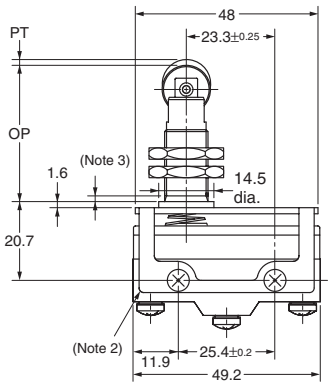
Note:1. Stainless-steel pin plunger
2. Bronze frame
3. Incomplete screw section part with a maximum of 1.5 mm

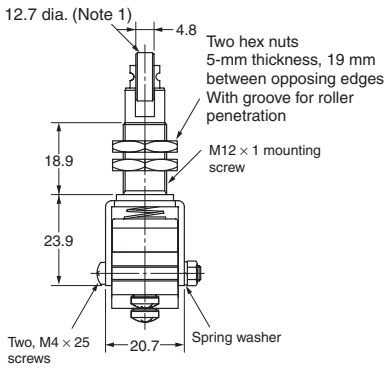
Note: This Actuator (pin plunger) can be used with Standard Pin Plungers (Z-15G(-B), Z-15E(-B), X-10G(-B), DZ-10G-1A(-1B)) for the Z, X, and DZ models.

Panel Mount Roller Plunger

ZAQ-22







Note: 1. Stainless-steel pin plunger
2. Bronze frame
3. Incomplete screw section part with a maximum of 1.5 mm.

Model	ZAQ-22	
	Z-15E-B	DZ-10G-B
OF max.	8.34 N	11.1 N
RF min.	1.12 N	1.12 N
PT max.	2 mm	2 mm
OT min.	3.58 mm	1 mm
MD max.	0.15 mm	0.46 mm
OP	37±0.8 mm	35.4±1.2 mm

Note: This Actuator (roller plunger) can be used with standard pin plungers (Z-15G(-B), Z-15E(-B), and DZ-10G-1A(-1B)).
It cannot be used with X models.

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

Cat. No. B106-E1-01A

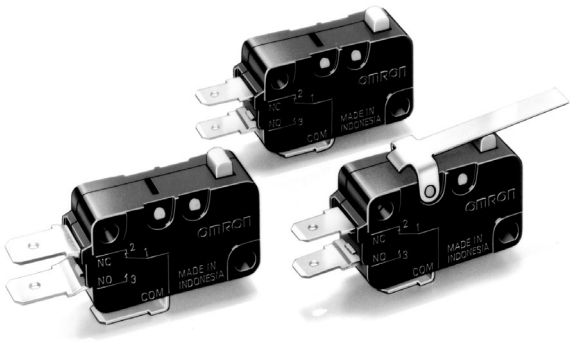
OMRON

Miniature Basic Switch

D3V

Reliable Basic Switch with External Lever

- Available by 0.1 A, 6 A, 11 A, 16 A and 21 A models, all with self-cleaning contacts.
- Available with internally or externally fitted levers, and 2 fixing positions for external levers.
- Conforms to EN61058-1 and UL1054.



Ordering Information

■ Model Number Legend

D3V-□□□□-□□□-□-□
1 2 3 4 5 6 7 8 9

1. Ratings
- 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 terminals
- C2: Quick-connect terminals (#187)
- C: Quick-connect terminals (#250)

7. Maximum Operating Force
- 5: 1.96 N {200 gf}
- 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. Mounting Hole Size
- None: 3.1 mm
- K: 2.9 mm

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

■ Available Combinations

Model		D3V-21	D3V-16			D3V-11					D3V-6				D3V-01	
Rated current		21 A	16 A			11 A					6 A				0.1 A	
OF max.		1.23 N {125 gf}	1.96 N {200 gf}		0.98 N {100 gf}	1.96 N {200 gf}		0.98 N {100 gf}		0.49 N {50 gf}	1.96 N {200 gf}	0.98 N {100 gf}		0.49 N {50 gf}	0.49 N {50 gf}	0.25 N {25 gf}
Heat resistance	Contact gap / Terminals	G	F	G	F/G	F	G	F	G	G	F/G	F	G	G	F	F
Standard (85°C)	#187														●	●
	#250	●													❍	❍
Standard (105°C)	#187		●	❍	❍	●	❍	●	❍	❍	❍	●	❍	●		
	#250		●	❍	❍	●	❍	●	❍	❍	❍	●	❍	●		
High temperature (125°C)	#187		❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍		
	#250		❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍		

Note: **1.** ●: Standard
❍: Semi-standard

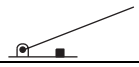
2. Consult your OMRON sales representative for specific models with standard approvals.

■ List of Models

• 21 A (OF: 1.23 N {125 gf})

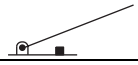
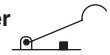
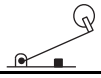
Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger 	---	D3V-21G-1□4A-Δ	D3V-21G-2□4A-Δ	D3V-21G-3□4A-Δ
Short hinge lever 	Internal	D3V-21G1-1□4A-Δ	D3V-21G1-2□4A-Δ	D3V-21G1-3□4A-Δ
	M	D3V-21G1M-1□4A-Δ	D3V-21G1M-2□4A-Δ	D3V-21G1M-3□4A-Δ
Hinge lever 	Internal	D3V-21G2-1□4A-Δ	D3V-21G2-2□4A-Δ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

• 16 A (OF: 1.96 N {200 gf})

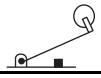
Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger 	---	D3V-16-1□5-Δ	D3V-16-2□5-Δ	D3V-16-3□5-Δ
Short hinge lever 	Internal	D3V-161-1□5-Δ	D3V-161-2□5-Δ	D3V-161-3□5-Δ
	M	D3V-161M-1□5-Δ	D3V-161M-2□5-Δ	D3V-161M-3□5-Δ
Hinge lever 	Internal	D3V-162-1□5-Δ	D3V-162-2□5-Δ	D3V-162-3□5-Δ
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

Note: The □ in the model number is for the terminal code.
A: Solder terminals
C2: Quick-connect terminals (#187)
C: Quick-connect terminals (#250)
The Δ in the model number is for the mounting hole size.
None: 3.1 mm
K: 2.9 mm

• 16 A (OF: 0.98 N {100 gf})

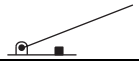
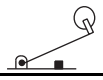
Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger 	---	D3V-16-1□4-Δ	D3V-16-2□4-Δ	D3V-16-3□4-Δ
Short hinge lever 	Internal	D3V-161-1□4-Δ	D3V-161-2□4-Δ	D3V-161-3□4-Δ
	M	D3V-161M-1□4-Δ	D3V-161M-2□4-Δ	D3V-161M-3□4-Δ
Hinge lever 	Internal	D3V-162-1□4-Δ	D3V-162-2□4-Δ	D3V-162-3□4-Δ
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

• 11 A (OF: 1.96 N {200 gf})

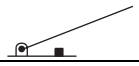
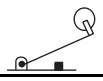
Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger 	---	D3V-11-1□5-Δ	D3V-11-2□5-Δ	D3V-11-3□5-Δ
Short hinge lever 	Internal	D3V-111-1□5-Δ	D3V-111-2□5-Δ	D3V-111-3□5-Δ
	M	D3V-111M-1□5-Δ	D3V-111M-2□5-Δ	D3V-111M-3□5-Δ
Hinge lever 	Internal	D3V-112-1□5-Δ	D3V-112-2□5-Δ	D3V-112-3□5-Δ
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

Note: The □ in the model number is for the terminal code.
A: Solder terminals
C2: Quick-connect terminals (#187)
C: Quick-connect terminals (#250)
The Δ in the model number is for the mounting hole size.
None: 3.1 mm
K: 2.9 mm

• 11 A (OF: 0.98 N {100 gf})

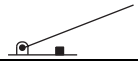
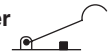
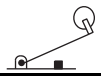
Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger 	---	D3V-11-1□4-Δ	D3V-11-2□4-Δ	D3V-11-3□4-Δ
Short hinge lever 	Internal	D3V-111-1□4-Δ	D3V-111-2□4-Δ	D3V-111-3□4-Δ
	M	D3V-111M-1□4-Δ	D3V-111M-2□4-Δ	D3V-111M-3□4-Δ
Hinge lever 	Internal	D3V-112-1□4-Δ	D3V-112-2□4-Δ	D3V-112-3□4-Δ
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

• 11 A (OF: 0.49 N {50 gf})

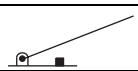
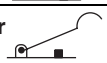
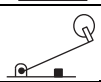
Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger 	---	D3V-11G-1□3-Δ	D3V-11G-2□4-Δ	D3V-11G-3□3-Δ
Short hinge lever 	Internal	D3V-11G1-1□3-Δ	D3V-11G1-2□4-Δ	D3V-11G1-3□3-Δ
	M	D3V-11G1M-1□3-Δ	D3V-11G1M-2□3-Δ	D3V-11G1M-3□3-Δ
Hinge lever 	Internal	D3V-11G2-1□3-Δ	D3V-11G2-2□3-Δ	D3V-11G2-3□3-Δ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

Note: The □ in the model number is for the terminal code.
A: Solder terminals
C2: Quick-connect terminals (#187)
C: Quick-connect terminals (#250)
The Δ in the model number is for the mounting hole size.
None: 3.1 mm
K: 2.9 mm

• 6 A (OF: 0.98 N {100 gf})

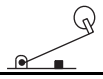
Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger 	---	D3V-6-1□4-Δ	D3V-6-2□4-Δ	D3V-6-3□4-Δ
Short hinge lever 	Internal	D3V-61-1□4-Δ	D3V-61-2□4-Δ	D3V-61-3□4-Δ
	M	D3V-61M-1□4-Δ	D3V-61M-2□4-Δ	D3V-61M-3□4-Δ
Hinge lever 	Internal	D3V-62-1□4-Δ	D3V-62-2□4–Δ	D3V-62-3□4-Δ
	M	D3V-62M-1□4-Δ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

• 6 A (OF: 0.49 N {50 gf})

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

Note: The □ in the model number is for the terminal code.
A: Solder terminals
C2: Quick-connect terminals (#187)
C: Quick-connect terminals (#250)
The Δ in the model number is for the mounting hole size.
None: 3.1 mm
K: 2.9 mm

• 01 A (OF: 0.49 N {50 gf})

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

• 01 A (OF: 0.25 N {25 gf})

Actuator	Hinge position	Contact form		
		SPDT	SPST-NC	SPST-NO
Pin plunger 	---	D3V-01-1□2-Δ	D3V-01-2□2-Δ	D3V-01-3□2-Δ

Note: The □ in the model number is for the terminal code.
A: Solder terminals
C2: Quick-connect terminals (#187)
C: Quick-connect terminals (#250)
The Δ in the model number is for the mounting hole size.
None: 3.1 mm
K: 2.9 mm

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-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	
D3V-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	
D3V-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	
D3V-6	250 VAC	6 A		3 A		4 A		---	
	8 VDC	6 A		3 A		4 A		---	
	30 VDC	6 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			
D3V-01	125 VAC	0.1 A		---		---		---	
	8 VDC	0.1 A		---		---		---	
	30 VDC	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 (pin plunger models)
Operating frequency	Mechanical: 600 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial values)	D3V-21: 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 2)	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 3)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 3)	Destruction:400 m/s^2 {approx. 40G} max. Malfunction:100 m/s^2 {approx. 10G} max.
Durability (see note 4)	Mechanical: 10,000,000 operations min. Electrical: D3V-21: 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
Ambient operating temperature	D3V-21, D3V-01: –25°C to 85°C (with no icing) D3V-16, D3V-11, D3V-6: –25°C to 105°C (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight	Approx. 6.2 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.

4. For testing conditions, contact your OMRON sales representative.

■ 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	D3V-21G	D3V-16	D3V-16G	D3V-11	D3V-11G	D3V-6	D3V-6G	D3V-01
125 VAC	---	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	20.1 A	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-21G	D3V-16	D3V-11	D3V-6	D3V-01
125 VAC	---	---	---	---	0.1 A
250 VAC	20 (4) A	16 (3) A	11 (3) A	6 (2) A	---

Testing conditions: 5E4 (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

Rated voltage	D3V-21G
250 VAC	21 (8) A

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

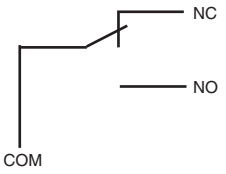
■ Contact Specifications

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

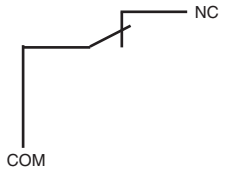
Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 109.

■ Contact Form

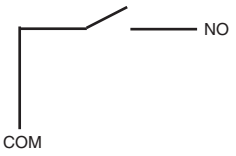
SPDT



SPST-NC



SPST-NO

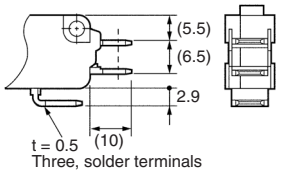
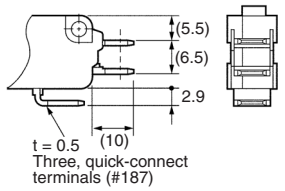
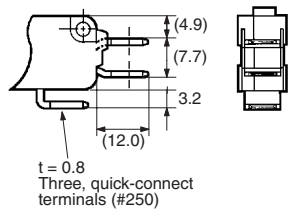
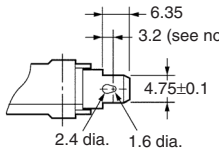
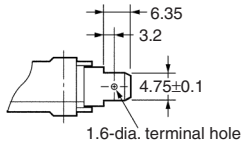
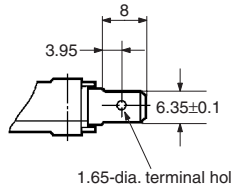


Dimensions

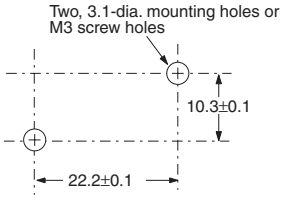
■ Terminals

Note: **1.** All units are in millimeters 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 Terminals(A)	Quick-connect Terminals (#187) (C2)	Quick-connect Terminals (#250) (C)
COM			
Terminal dimensions	 **Note:** Indicates the length to the center of the 1.6-dia. holes		

■ Mounting Holes



■ 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 quick-connect terminals (#187) (terminals C2). D3V models incorporate terminals A and C. These models are different from #187 models in terminal size only. Terminals A and C are omitted from the following drawings. Refer to *Terminals* on page 101 for these terminals.

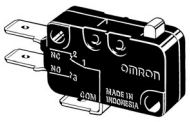
4. The □ in the model number is for the terminal code.

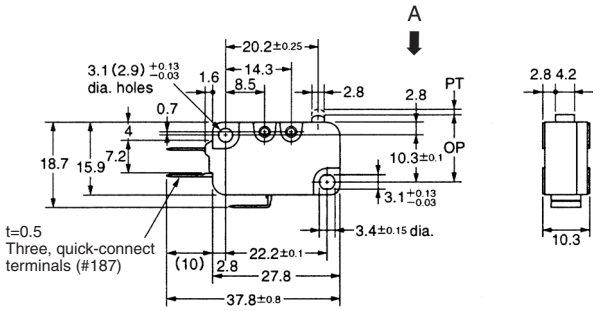
5. The Δ in the model number is for the mounting hole size.
The hole size in the following illustrations of models with a suffix "K" in the Δ is 2.9 mm.

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

Pin Plunger Models

D3V-21G-1□4A-Δ
D3V-16-1□5-Δ
D3V-11-1□5-Δ
D3V-11-1□4-Δ
D3V-6-1□4-Δ
D3V-6G-1□3-Δ
D3V-01-1□2-Δ
D3V-01-1□3-Δ

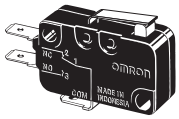


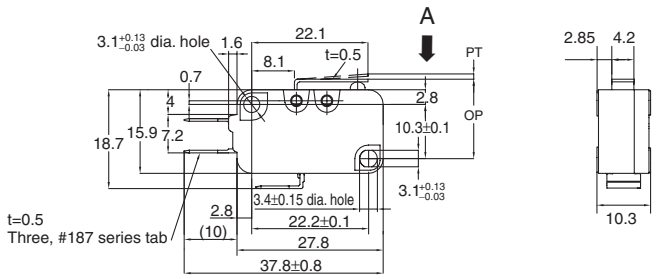


Model	D3V-21G-1□4A-Δ	D3V-16-1□5-Δ D3V-11-1□5-Δ	D3V-11-1□4-Δ D3V-6-1□4-Δ	D3V-6G-1□3-Δ	D3V-01-1□3-Δ	D3V-01-1□2-Δ
OF max. RF min.	1.23 N {125 gf} 0.20 N {20 gf}	1.96 N {200 gf} 0.49 N {50 gf}	0.98 N {100 gf} 0.15 N {15 gf}	0.49 N {50 gf} 0.05 N {5 gf}	0.49 N {50 gf} 0.05 N {5 gf}	0.25 N {25 gf} 0.03 N {3 gf}
PT max. OT min. MD max.	1.2 mm 1.0 mm 0.3 mm	1.2 mm 1.0 mm 0.4 mm (F gap type) or 0.3 mm (G gap type)			1.2 mm 1.0 mm 0.4 mm	
OP	14.7±0.4 mm					

Short Hinge Lever Models

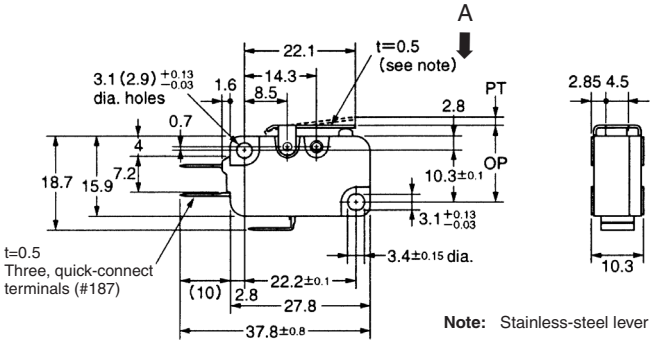
D3V-21G1-1□4A-Δ
D3V-161-1□5-Δ
D3V-111-1□5-Δ
D3V-111-1□4-Δ
D3V-61-1□4-Δ
D3V-6G1-1□3-Δ
D3V-011-1□3-Δ





Model	D3V-21G1-1□4A-Δ	D3V-161-1□5-Δ D3V-111-1□5-Δ	D3V-111-1□4-Δ D3V-61-1□4-Δ	D3V-6G1-1□3-Δ	D3V-011-1□3-Δ
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}	0.49 N {50 gf} 0.05 N {5 gf}	
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)			1.6 mm 0.8 mm 0.6 mm
OP	15.2±0.5 mm				

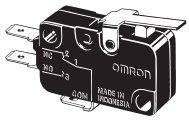
D3V-21G1M-1□4A-Δ
D3V-161M-1□5-Δ
D3V-111M-1□5-Δ
D3V-111M-1□4-Δ
D3V-61M-1□4-Δ
D3V-6G1M-1□3-Δ
D3V-011M-1□3-Δ

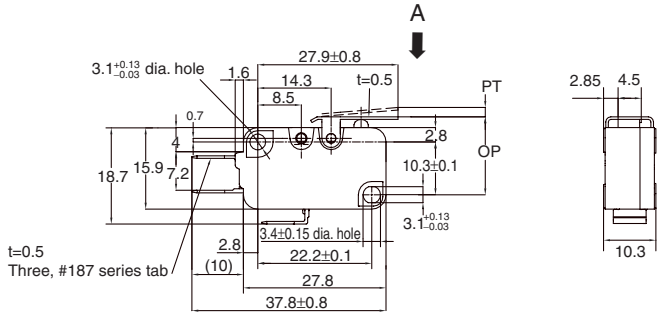


Note: Stainless-steel lever

Model	D3V-21G1M-1□4A-Δ	D3V-161M-1□5-Δ D3V-111M-1□5-Δ	D3V-111M-1□4-Δ D3V-61M-1□4-Δ	D3V-6G1M-1□3-Δ	D3V-011M-1□3-Δ
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}	0.49 N {50 gf} 0.05 N {5 gf}	
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)			1.6 mm 0.8 mm 0.6 mm
OP	15.2±0.5 mm				

D3V-21G1K-1□4A-Δ
D3V-161K-1□5-Δ
D3V-111K-1□5-Δ
D3V-111K-1□4-Δ
D3V-61K-1□4-Δ
D3V-6G1K-1□3-Δ
D3V-011K-1□3-Δ

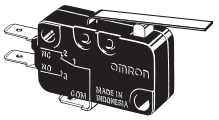


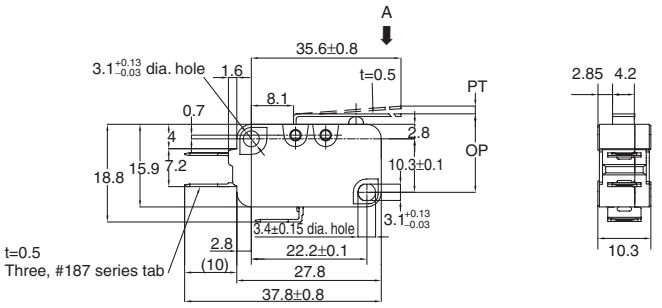


Model	D3V-21G1K-1□4A-Δ	D3V-161K-1□5-Δ D3V-111K-1□5-Δ	D3V-111K-1□4-Δ D3V-61K-1□4-Δ	D3V-6G1K-1□3-Δ	D3V-011K-1□3-Δ
OF max. RF min.	0.83 N {85 gf} 0.08 N {8 gf}	1.27 N {130 gf} 0.16 N {16 gf}	0.64 N {65 gf} 0.08 N {8 gf}	0.34 N {35 gf} 0.04 N {4 gf}	
PT max. OT min. MD max.	3.5 mm 1.1 mm 1.1 mm	3.5 mm 1.1 mm 1.2 mm (F gap type) or 1.1 mm (G gap type)			3.5 mm 1.1 mm 1.2 mm
OP	15.2±1.2 mm				

Hinge Lever Models

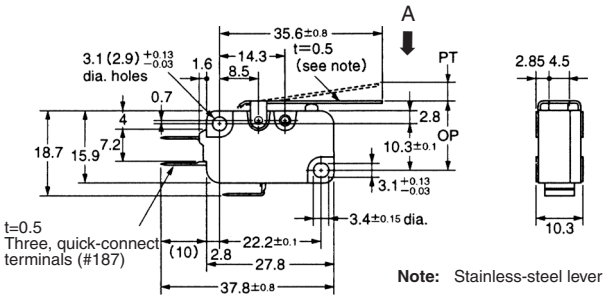
D3V-21G2-1□4A-Δ
D3V-162-1□5-Δ
D3V-112-1□5-Δ
D3V-112-1□4-Δ
D3V-62-1□4-Δ
D3V-6G2-1□3-Δ
D3V-012-1□3-Δ





Model	D3V-21G2-1□4A-Δ	D3V-162-1□5-Δ D3V-112-1□5-Δ	D3V-112-1□4-Δ D3V-62-1□4–Δ	D3V-6G2-1□3-Δ	D3V-012-1□3-Δ
OF max. RF min.	0.78 N {80 gf} 0.06 N {6 gf}	1.23 N {125 gf} 0.14 N {14 gf}	0.59 N {60 gf} 0.06 N {6 gf}		0.29 N {30 gf} ---
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)			4.0 mm 1.6 mm 1.5 mm
OP	15.2±1.2 mm				

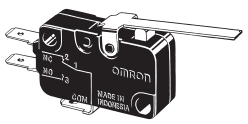
D3V-21G2M-1□4A-Δ
D3V-162M-1□5-Δ
D3V-112M-1□5-Δ
D3V-112M-1□4-Δ
D3V-62M-1□4-Δ
D3V-6G2M-1□3-Δ
D3V-012M-1□3-Δ

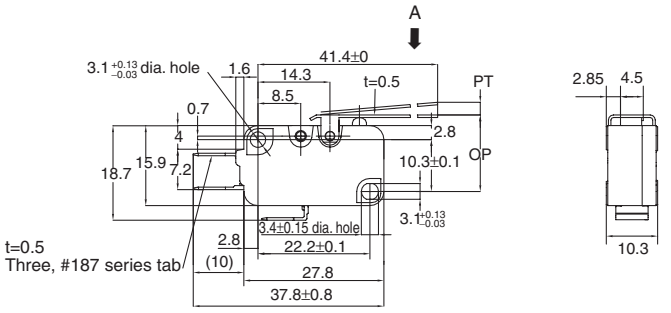


Note: Stainless-steel lever

Model	D3V-21G2M-1□4A-Δ	D3V-162M-1□5-Δ D3V-112M-1□5-Δ	D3V-112M-1□4-Δ D3V-62M-1□4–Δ	D3V-6G2M-1□3-Δ	D3V-012M-1□3-Δ
OF max. RF min.	0.78 N {80 gf} 0.06 N {6 gf}	1.23 N {125 gf} 0.14 N {14 gf}	0.59 N {60 gf} 0.06 N {6 gf}		0.29 N {30 gf} ---
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)			4.0 mm 1.6 mm 1.5 mm
OP	15.2±1.2 mm				

D3V-21G2K-1□4A-Δ
D3V-162K-1□5-Δ
D3V-112K-1□5-Δ
D3V-112K-1□4-Δ
D3V-62K-1□4-Δ
D3V-6G2K-1□3-Δ
D3V-012K-1□3-Δ

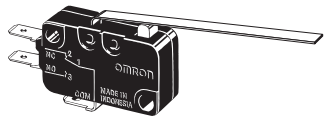


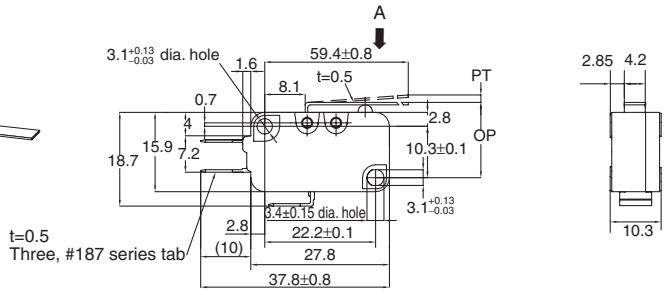


Model	D3V-21G2K-1□4A-Δ	D3V-162K-1□5-Δ D3V-112K-1□5-Δ	D3V-112K-1□4-Δ D3V-62K-1□4–Δ	D3V-6G2K-1□3-Δ	D3V-012K-1□3-Δ
OF max. RF min.	0.44 N {45 gf} 0.04 N {4 gf}	0.69 N {70 gf} 0.08 N {8 gf}	0.34 N {35 gf} 0.04 N {4 gf}	0.20 N {20 gf} ---	
PT max. OT min. MD max.	6.0 mm 2.5 mm 1.3 mm	6.0 mm 2.5 mm 2.0 mm (F gap type) or 1.3 mm (G gap type)			6.0 mm 2.5 mm 2.0 mm
OP	15.2±2.0 mm				

Long Hinge Lever Models

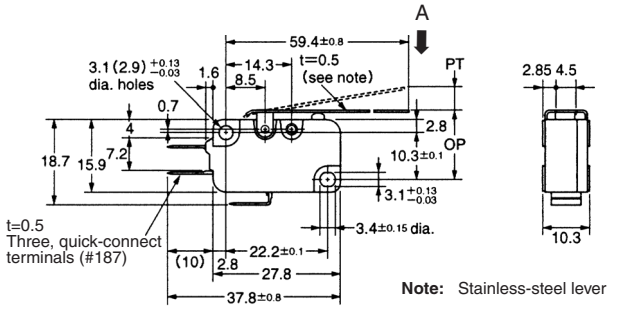
D3V-21G3-1□4A-Δ
D3V-163-1□5-Δ
D3V-113-1□5-Δ
D3V-113-1□4-Δ
D3V-63-1□4-Δ
D3V-6G3-1□3-Δ
D3V-013-1□3-Δ





Model	D3V-21G3-1□4A-Δ	D3V-163-1□5-Δ D3V-113-1□5-Δ	D3V-113-1□4-Δ D3V-63-1□4-Δ	D3V-6G3-1□3-Δ	D3V-013-1□3-Δ
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} ---	0.20 N {20 gf} ---	
PT max. OT min. MD max.	9.0 mm 2.0 mm 2.0 mm	9.0 mm 2.0 mm 2.8 mm (F gap type) or 2.0 mm (G gap type)	9.0 mm 3.2 mm 2.8 mm (F gap type) or 2.0 mm (G gap type)		9.0 mm 3.2 mm 2.8 mm
OP	15.2 +2.6 −3.2 mm		15.2±2.6 mm		

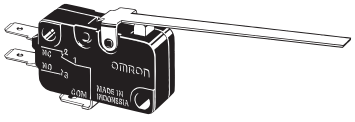
D3V-21G3M-1□4A-Δ
D3V-163M-1□5-Δ
D3V-113M-1□5-Δ
D3V-113M-1□4-Δ
D3V-63M-1□4-Δ
D3V-6G3M-1□3-Δ
D3V-013M-1□3-Δ

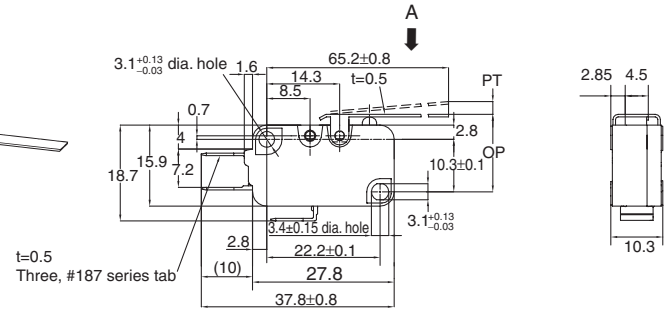


Note: Stainless-steel lever

Model	D3V-21G3M-1□4A-Δ	D3V-163M-1□5-Δ D3V-113M-1□5-Δ	D3V-113M-1□4-Δ D3V-63M-1□4-Δ	D3V-6G3M-1□3-Δ	D3V-013M-1□3-Δ
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} ---	0.20 N {20 gf} ---	
PT max. OT min. MD max.	9.0 mm 2.0 mm 2.0 mm	9.0 mm 2.0 mm 2.8 mm (F gap type) or 2.0 mm (G gap type)	9.0 mm 3.2 mm 2.8 mm (F gap type) or 2.0 mm (G gap type)		9.0 mm 3.2 mm 2.8 mm
OP	15.2 +2.6 −3.2 mm		15.2±2.6 mm		

D3V-21G3K-1□4A-Δ
D3V-163K-1□5-Δ
D3V-113K-1□5-Δ
D3V-113K-1□4-Δ
D3V-63K-1□4-Δ
D3V-6G3K-1□3-Δ
D3V-013K-1□3-Δ

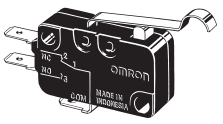


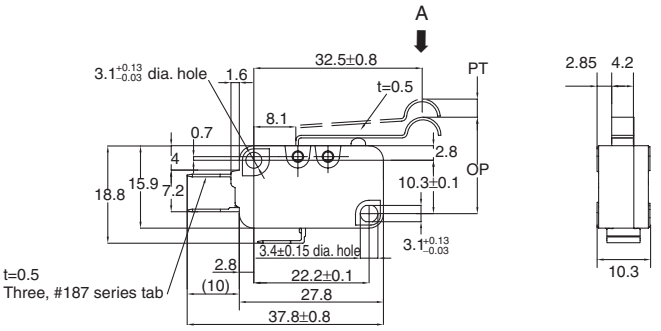


Model	D3V-21G3K-1□4A-Δ	D3V-163K-1□5-Δ D3V-113K-1□5-Δ	D3V-113K-1□4-Δ D3V-63K-1□4-Δ	D3V-6G3K-1□3-Δ	D3V-013K-1□3-Δ
OF max. RF min.	0.20 N {20 gf} ---	0.34 N {35 gf} 0.04 N {4 gf}	0.20 N {20 gf} ---	0.10 N {10 gf} ---	
PT max. OT min. MD max.	15.0 mm 4.0 mm 3.0 mm	15.0 mm 4.0 mm 3.8 mm (F gap type) or 3.0 mm (G gap type)			15.0 mm 4.0 mm 3.8 mm
OP	15.2±3.0 mm				

Simulated Roller Lever Models

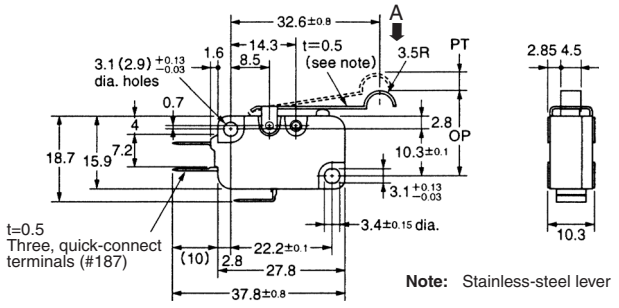
D3V-21G4-1□4A-Δ
D3V-164-1□5-Δ
D3V-114-1□5-Δ
D3V-114-1□4-Δ
D3V-64-1□4-Δ
D3V-6G4-1□3-Δ
D3V-014-1□3-Δ





Model	D3V-21G4-1□4A-Δ	D3V-164-1□5-Δ D3V-114-1□5-Δ	D3V-114-1□4-Δ D3V-64-1□4-Δ	D3V-6G4-1□3-Δ	D3V-014-1□3-Δ
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}	0.29 N {30 gf} ---	
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)			4.0 mm 1.6 mm 1.5 mm
OP	18.7±1.2 mm				

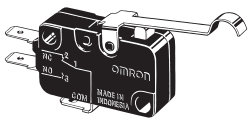
D3V-21G4M-1□4A-Δ
D3V-164M-1□5-Δ
D3V-114M-1□5-Δ
D3V-114M-1□4-Δ
D3V-64M-1□4-Δ
D3V-6G4M-1□3-Δ
D3V-014M-1□3-Δ

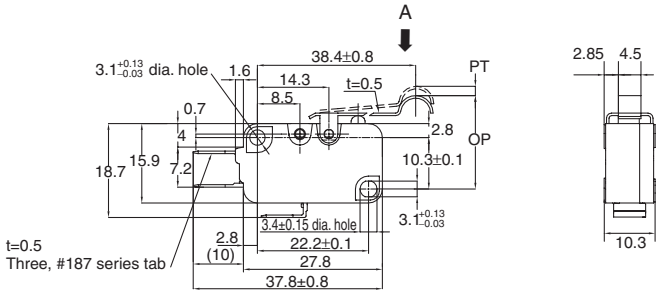


Note: Stainless-steel lever

Model	D3V-21G4M-1□4A-Δ	D3V-164M-1□5-Δ D3V-114M-1□5-Δ	D3V-114M-1□4-Δ D3V-64M-1□4-Δ	D3V-6G4M-1□3-Δ	D3V-014M-1□3-Δ
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}	0.29 N {30 gf} ---	
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)			4.0 mm 1.6 mm 1.5 mm
OP	18.7±1.2 mm				

D3V-21G4K-1□4A-Δ
D3V-164K-1□5-Δ
D3V-114K-1□5-Δ
D3V-114K-1□4-Δ
D3V-64K-1□4-Δ
D3V-6G4K-1□3-Δ
D3V-014K-1□3-Δ

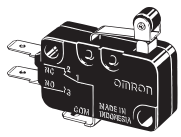


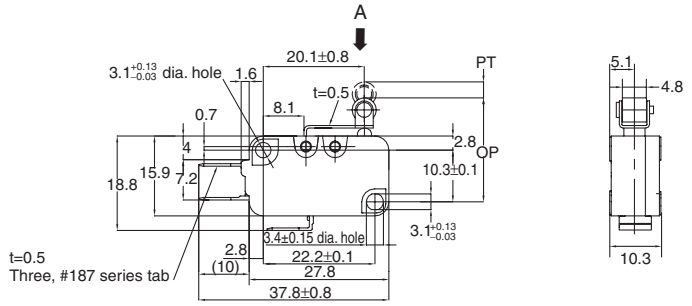


Model	D3V-21G4K-1□4A-Δ	D3V-164K-1□5-Δ D3V-114K-1□5-Δ	D3V-114K-1□4-Δ D3V-64K-1□4-Δ	D3V-6G4K-1□3-Δ	D3V-014K-1□3-Δ
OF max. RF min.	0.54 N {55 gf} 0.03 N {3 gf}	0.74 N {75 gf} 0.10 N {10 gf}	0.39 N {40 gf} 0.03 N {3 gf}	0.20 N {20 gf} ---	
PT max. OT min. MD max.	8.0 mm 1.5 mm 3.0 mm	8.0 mm 1.5 mm 3.5 mm (F gap type) or 3.0 mm (G gap type)			8.0 mm 1.5 mm 3.5 mm
OP	18.7±1.2 mm				

Short Hinge Roller Lever Models

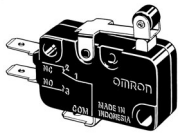
D3V-21G5-1□4A-Δ
D3V-165-1□5-Δ
D3V-115-1□5-Δ
D3V-115-1□4-Δ
D3V-65-1□4-Δ
D3V-6G5-1□3-Δ
D3V-015-1□3-Δ

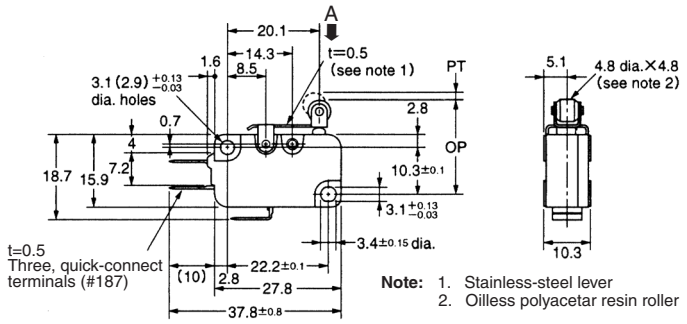




Model	D3V-21G5-1□4A-Δ	D3V-165-1□5-Δ D3V-115-1□5-Δ	D3V-115-1□4-Δ D3V-65-1□4-Δ	D3V-6G5-1□3-Δ	D3V-015-1□3-Δ
OF max. RF min.	1.42 N {145 gf} 0.2 N {20 gf}	2.35 N {240 gf} 0.49 N {50 gf}	1.18 N {120 gf} 0.15 N {15 gf}	0.59 N {60 gf} 0.06 N {6 gf}	
PT max. OT min. MD max.	1.6 mm 0.8 mm 0.5 mm	1.6 mm 0.8 mm 0.6 mm (F gap type) or 0.5 mm (G gap type)			1.6 mm 0.8 mm 0.6 mm
OP	20.7±0.6 mm				

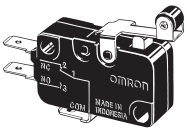
D3V-21G5M-1□4A-Δ
D3V-165M-1□5-Δ
D3V-115M-1□5-Δ
D3V-115M-1□4-Δ
D3V-65M-1□4-Δ
D3V-6G5M-1□3-Δ
D3V-015M-1□3-Δ

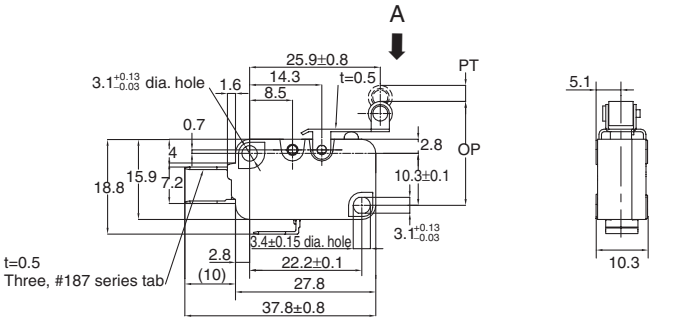




Model	D3V-21G5M-1□4A-Δ	D3V-165M-1□5-Δ D3V-115M-1□5-Δ	D3V-115M-1□4-Δ D3V-65M-1□4-Δ	D3V-6G5M-1□3-Δ	D3V-015M-1□3-Δ
OF max. RF min.	1.42 N {145 gf} 0.2 N {20 gf}	2.35 N {240 gf} 0.49 N {50 gf}	1.18 N {120 gf} 0.15 N {15 gf}	0.59 N {60 gf} 0.06 N {6 gf}	
PT max. OT min. MD max.	1.6 mm 0.8 mm 0.5 mm	1.6 mm 0.8 mm 0.6 mm (F gap type) or 0.5 mm (G gap type)			1.6 mm 0.8 mm 0.6 mm
OP	20.7±0.6 mm				

D3V-21G5K-1□4A-Δ
D3V-165K-1□5-Δ
D3V-115K-1□5-Δ
D3V-115K-1□4-Δ
D3V-65K-1□4-Δ
D3V-6G5K-1□3-Δ
D3V-015K-1□3-Δ

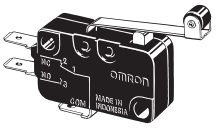


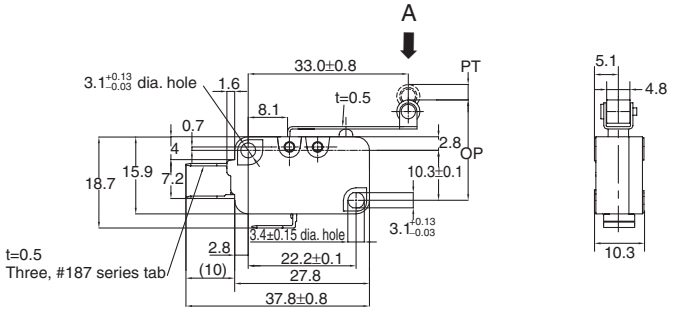


Model	D3V-21G5K-1□4A-Δ	D3V-165K-1□5-Δ D3V-115K-1□5-Δ	D3V-115K-1□4-Δ D3V-65K-1□4-Δ	D3V-6G5K-1□3-Δ	D3V-015K-1□3-Δ
OF max. RF min.	0.98 N {100 gf} 0.08 N {8 gf}	1.57 N {160 gf} 0.15 N {15 gf}	0.78 N {80 gf} 0.08 N {8 gf}	0.39 N {40 gf} 0.04 N {4 gf}	
PT max. OT min. MD max.	2.6 mm 1.0 mm 0.8 mm	2.6 mm 1.0 mm 0.9 mm (F gap type) or 0.8 mm (G gap type)			2.6 mm 1.0 mm 0.9 mm
OP	20.7±1.0 mm				

Hinge Roller Lever Models

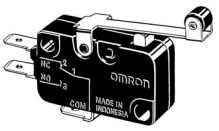
D3V-21G6-1□4A-Δ
D3V-166-1□5-Δ
D3V-116-1□5-Δ
D3V-116-1□4-Δ
D3V-66-1□4-Δ
D3V-6G6-1□3-Δ
D3V-016-1□3-Δ

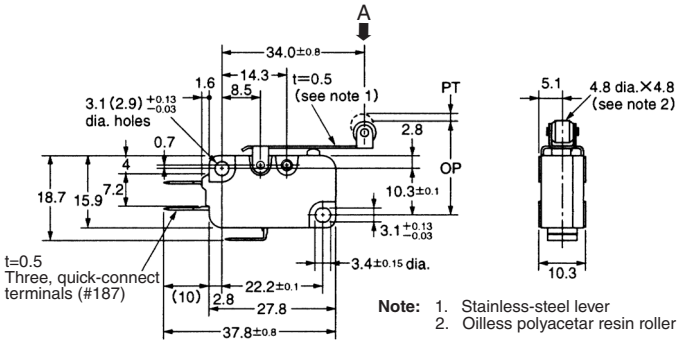




Model	D3V-21G6-1□4A-Δ	D3V-166-1□5-Δ D3V-116-1□5-Δ	D3V-116-1□4-Δ D3V-66-1□4-Δ	D3V-6G6-1□3-Δ	D3V-016-1□3-Δ
OF max. RF min.	0.79 N {80 gf} 0.05 N {5 gf}	1.23 N {125 gf} 0.14 N {14 gf}	0.59 N {60 gf} 0.06 N {6 gf}	0.29 N {30 gf} ---	
PT max. OT min. MD max.	4.0 mm 1.6 mm 0.8 mm	4.0 mm 1.6 mm 1.5 mm (F gap type) or 0.8 mm (G gap type)			4.0 mm 1.6 mm 1.5 mm
OP	20.7±1.2 mm				

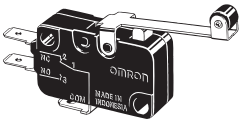
D3V-21G6M-1□4A-Δ
D3V-166M-1□5-Δ
D3V-116M-1□5-Δ
D3V-116M-1□4-Δ
D3V-66M-1□4-Δ
D3V-6G6M-1□3-Δ
D3V-016M-1□3-Δ

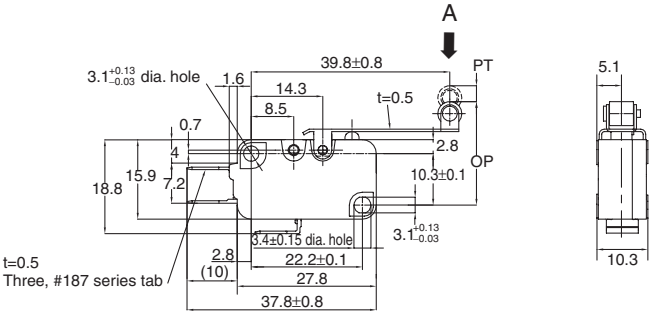




Model	D3V-21G6M-1□4A-Δ	D3V-166M-1□5-Δ D3V-116M-1□5-Δ	D3V-116M-1□4-Δ D3V-66M-1□4-Δ	D3V-6G6M-1□3-Δ	D3V-016M-1□3-Δ
OF max. RF min.	0.79 N {80 gf} 0.05 N {5 gf}	1.23 N {125 gf} 0.14 N {14 gf}	0.59 N {60 gf} 0.06 N {6 gf}	0.29 N {30 gf} ---	
PT max. OT min. MD max.	4.0 mm 1.6 mm 0.8 mm	4.0 mm 1.6 mm 1.5 mm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

D3V-21G6K-1□4A-Δ
D3V-166K-1□5-Δ
D3V-116K-1□5-Δ
D3V-116K-1□4-Δ
D3V-66K-1□4-Δ
D3V-6G6K-1□3-Δ
D3V-016K-1□3-Δ





Model	D3V-21G6K-1□4A-Δ	D3V-166K-1□5-Δ D3V-116K-1□5-Δ	D3V-116K-1□4-Δ D3V-66K-1□4-Δ	D3V-6G6K-1□3-Δ	D3V-016K-1□3-Δ
OF max. RF min.	0.49 N {50 gf} 0.03 N {3 gf}	0.74 N {75 gf} 0.10 N {10 gf}	0.39 N {40 gf} 0.03 N {3 gf}	0.20 N {20 gf} ---	
PT max. OT min. MD max.	7.2 mm 2.0 mm 2.0 mm	7.2 mm 2.0 mm 2.7 mm (F gap type) or 2.0 mm (G gap type)			7.2 mm 2.0 mm 2.7 mm
OP	20.7±2.2 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.

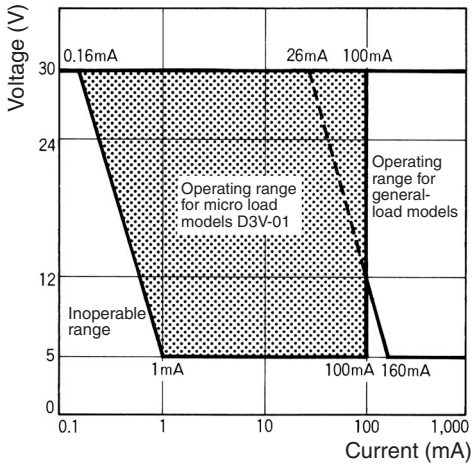
Insulation Distance

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 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% (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.

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

Cat. No. B103-E1-02A

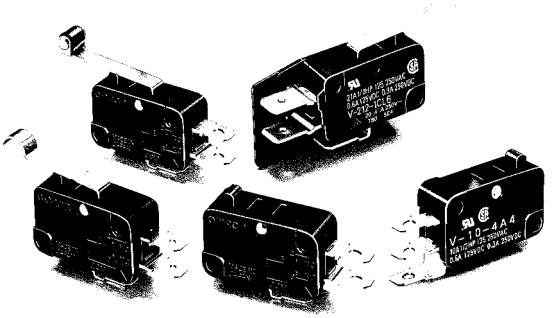
OMRON

Miniature Basic Switch

V

Reliable Basic Switches in a Wide Variation

- Wide variation of best-selling microswitches with switching currents of 10 to 21 A.
- Can be used for interrupting current when doors are opened or closed.
- Available in two types of cases: thermoplastic resin and thermosetting resin.



Ordering Information

■ Model Number Legend

V-□□□-□□□□-□

1 2 3 4 5 6 7 8

1. Ratings
- 21: 21 A at 250 VAC
- 16: 16 A at 250 VAC
- 15: 15 A at 250 VAC
- 11: 11 A at 250 VAC
- 10: 10 A at 250 VAC

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 roller 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 terminals
- C2: Quick-connect terminals (#187)
- C: Quick-connect terminals (#250)
- B: Screw terminals

6. Barrier (Models with Thermoplastic Case Only)
- None: Without barrier
- R: Right-hand barrier
- L: Left-hand barrier

7. Maximum Operating Force
- 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 (Models with Thermosetting Case Only)
- T: Heat-resistive

■ Available Combinations

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 terminals (A)	---	○	●	●	○	●	●	●
			Quick-connect terminals (#187) (C2)	---	○	●	●	○	●	●	●
			Quick-connect terminals (#250) (C)	●	○	●	●	○	○	○	○
			Screw terminals (B)	---	---	---	○ (1.96 N)	○	●	●	●
		Heat resistant (150°C)	Solder terminals (A)	---	---	---	---	○	●	●	●
			Quick-connect terminals (#187) (C2)	---	---	---	---	○	○	○	○
			Quick-connect terminals (#250) (C)	---	---	---	---	---	---	---	---
			Screw terminals (B)	---	---	---	---	---	---	---	---
	Yes	Standard (80°C)	Solder terminals (A)	---	○	●	---	---	---	---	---
			Quick-connect terminals (#187) (C2)	---	○	●	---	---	---	---	---
			Quick-connect terminals (#250) (C)	●	○	●	---	---	---	---	---
Side	No	Standard (80°C)	Solder terminals (A)	---	---	---	---	○	●	●	●
			Quick-connect terminals (#187) (C2)	---	---	---	---	○	○	○	○
			Quick-connect terminals (#250) (C)	○	---	---	---	---	---	---	---

Note: 1. ●: Standard
○: Semi-standard

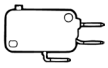
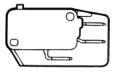
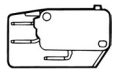
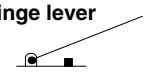
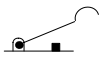
2. Consult your OMRON sales representative for spacific models with standard approvals.

■ List of Models

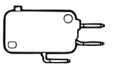
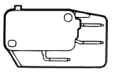
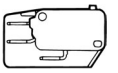
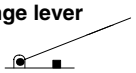
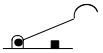
General-purpose Models

(Only combinations with standard terminals are shown.)

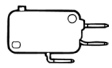
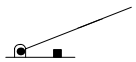
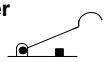
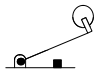
Thermoplastic Case

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		V-21-2C6	V-21-2CR6	V-21-2CL6
		SPST-NO		V-21-3C6	V-21-3CR6	V-21-3CL6
Short hinge lever 		SPDT		V-211-1C6	V-211-1CR6	V-211-1CL6
Hinge lever 				V-212-1C6	V-212-1CR6	V-212-1CL6
Long hinge lever 				V-213-1C6	V-213-1CR6	V-213-1CL6
Simulated roller lever 				V-214-1C6	V-214-1CR6	V-214-1CL6
Short hinge roller lever 				V-215-1C6	V-215-1CR6	V-215-1CL6
Hinge roller lever 				V-216-1C6	V-216-1CR6	V-216-1CL6

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

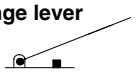
Actuator	COM terminal position	Contact form	Terminals (see note)	16 A (OF: 1.96 N {200 gf})		
				Without barrier 	Right-hand barrier 	Left-hand barrier 
Pin plunger 	Bottom	SPDT	A	V-16-1A5	V-16-1AR5	V-16-1AL5
			C2	V-16-1C25	V-16-1C2R5	V-16-1C2L5
			C	V-16-1C5	---	---
		SPST-NC	A	V-16-2A5	V-16-2AR5	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 		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 			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 			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 roller lever 			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 			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 			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 terminals
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} Without barrier 
Pin plunger 	Bottom	SPDT	A	V-11-1A4
			C2	V-11-1C24
			C	V-11-1C4
Short hinge lever 			A	V-111-1A4
			C2	V-111-1C24
			C	V-111-1C4
Hinge lever 			A	V-112-1A4
			C2	V-112-1C24
			C	V-112-1C4
Long hinge lever 			A	V-113-1A4
			C2	V-113-1C24
			C	V-113-1C4
Simulated roller lever 			A	V-114-1A4
			C2	V-114-1C24
			C	V-114-1C4
Short hinge roller lever 			A	V-115-1A4
			C2	V-115-1C24
			C	V-115-1C4
Hinge roller lever 			A	V-116-1A4
			C2	V-116-1C24
			C	V-116-1C4

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

Thermosetting Case

Actuator	COM terminal position	Contact form	Terminals (see note 1)	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
		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
		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		V-15-5A5	V-10-5A5	V-10-5A4
		SPST-NO		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 			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 			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 roller lever 			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 			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 			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 terminals
C2: Quick-connect terminals (#187)
B: Screw terminals

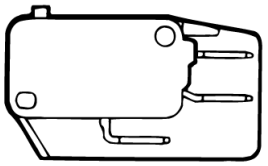
2. OF values shown in the table are for the pin plunger models.

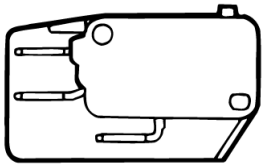
Heat Resistant Models (Up to 150°C)

Actuator	COM terminal position	Contact form	Terminals	15 A	10 A
				OF: 1.96 N {200 gf}	OF: 0.98 N {100 gf}
Pin plunger	Bottom	SPDT	Solder terminals (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 roller 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

Model	Item: Rated voltage	Resistive load
V-21	250 VAC	21 A
	125 VDC 250 VDC	0.6 A 0.3 A
V-16	250 VAC	16 A
	125 VDC 250 VDC	0.6 A 0.3 A
V-15	250 VAC	15 A
	125 VDC 250 VDC	0.6 A 0.3 A
V-11	250 VAC	11 A
	125 VDC 250 VDC	0.6 A 0.3 A
V-10	250 VAC	10 A
	125 VDC 250 VDC	0.6 A 0.3 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)

Model	Voltage	Non-inductive load				Inductive load			
		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.

■ Characteristics

Operating speed	0.1 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 600 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	15 mΩ max.
Dielectric strength (see note 2)	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
	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
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: V-21/V-16/V-15: 300 m/s^2 {approx. 30G} max. V-11/V-10: 200 m/s^2 {approx. 20G} max.
Durability (see note 4)	Mechanical: 50,000,000 operations min. (60 operations/min) Electrical: V-21/V-16/V-15: 100,000 operations min. (30 operations/min) (V-15 heat resistive: 20,000 operation min. (30 operations/min)) V-11/V-10: 300,000 operations min. (30 operations/min) (V-10 heat resistive: 50,000 operation 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 80°C (at ambient humidity of 60% max.) (with no icing) –25°C to 150°C for heat-resistive model (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight	Approx. 6.2 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.
4. For testing conditions, contact your OMRON sales representative.

■ Approved Standards

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

UL1054 (File No. E41515)/CSA C22.2 No. 55 (File NO. IR21642)

Rated voltage	V-21	V-16	V-15	V-11	V-10
125 VAC 250 VAC	21 A, 1/2 HP	16 A, 1/2 HP	15 A, 1/2 HP	11 A, 1/3 HP	10 A, 1/3 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

EN61058-01 (File No. 129608, VDE approval)

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

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

EN61058-1 (File No. T9451451, TÜV Rheinland approval)

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

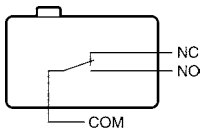
Testing conditions: 5E4 (50,000 operations), T85 (0°C to 85°C)

■ Contact Specifications

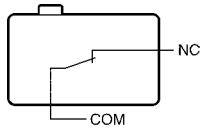
Item		V-21	V-16	V-15	V-11	V-10
Contact	Specification	Rivet				
	Material	Silver alloy			Silver	
	Gap (standard value)	1 mm (F gap) or 0.5 mm (G gap)				
Inrush current	NC	50 A max.	40 A max.	36 A max.	24 A max.	
	NO					
Minimum applicable load		160 mA at 5 VDC				

■ Contact Form

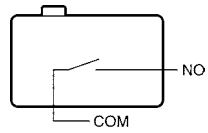
SPDT



SPST-NC



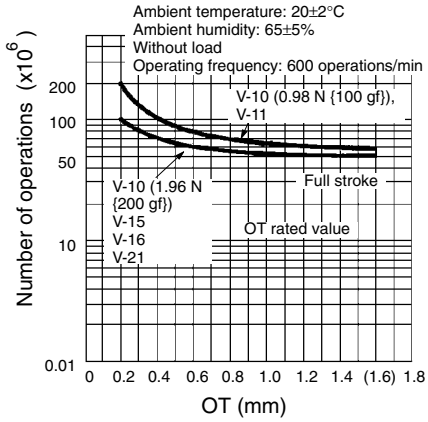
SPST-NO



Engineering Data (Reference Values)

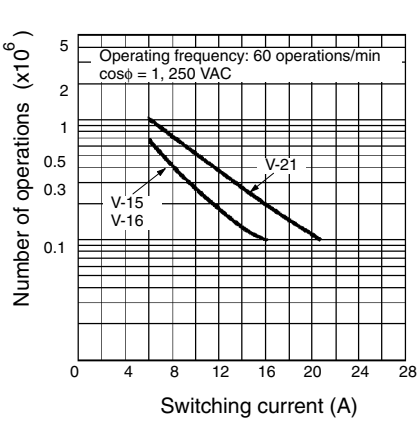
Mechanical Durability (Pin Plunger Models)

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

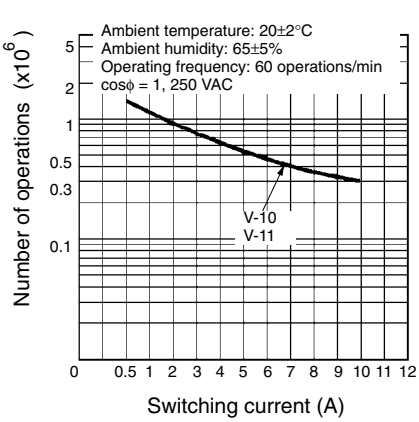


Electrical Durability (Pin Plunger Models)

V-21/-16/-15



V-11/-10



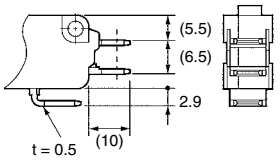
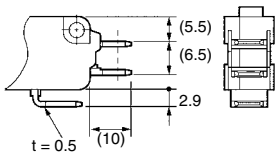
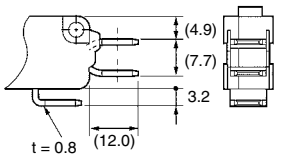
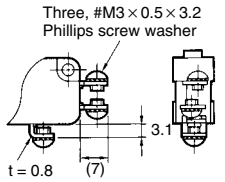
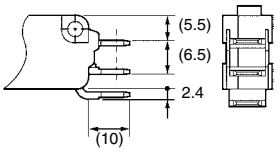
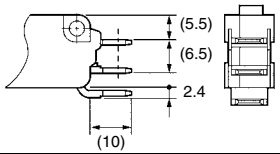
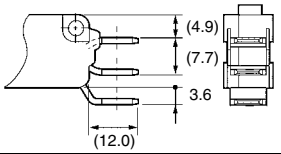
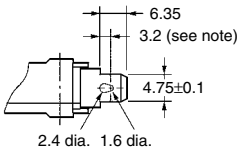
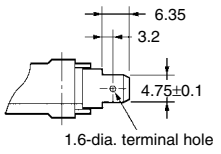
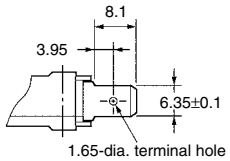
Dimensions

■ Terminals

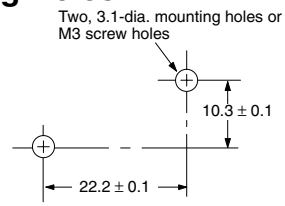
Note: 1. All units are in millimeters unless otherwise indicated.

2. The following is for the SPDT contact specifications. Two terminals will be available for SPST-NO or SPST-NC contact specifications. For terminal positions, refer to *Contact Form* on page 118.

3. 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.

Terminal type	Solder terminals (A)	Quick-connect Terminals (#187) (C2)	Quick-connect Terminals (#250) (C)	Screw Terminals (B)
COM bottom position	 Three, solder terminals	 Three, quick-connect terminals (#187)	 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	---

■ Mounting Holes



■ 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 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 119 for these terminals.

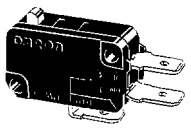
4. The □ in the model number is for the terminal code.

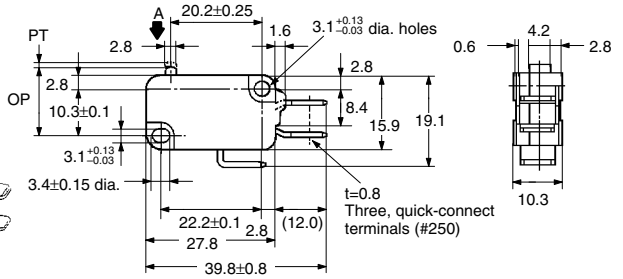
5. The operating characteristics are for operation in the A direction (⬇).

Pin Plunger Models

(Without Barrier)

V-21-1□6
V-16-1□5
V-11-1□4

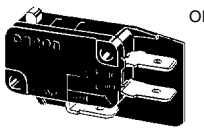


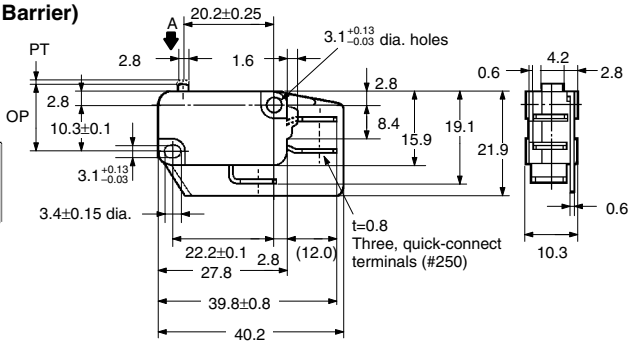


Model	V-21-1□6	V-16-1□5
OF max.	3.92 N {400 gf}	1.96 N {200 gf}
RF min.	0.78 N {80 gf}	0.49 N {50 gf}
PT max.	1.2 mm	
OT min.	1.0 mm	
MD max.	0.4 mm	
OP	14.7±0.4 mm	

(With Right-hand Barrier)

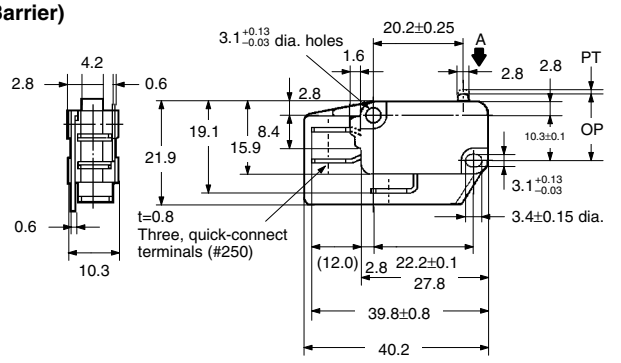
V-21-1□R6
V-16-1□R5





(With Left-hand Barrier)

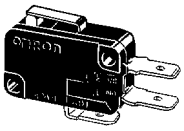
V-21-1□L6
V-16-1□L5

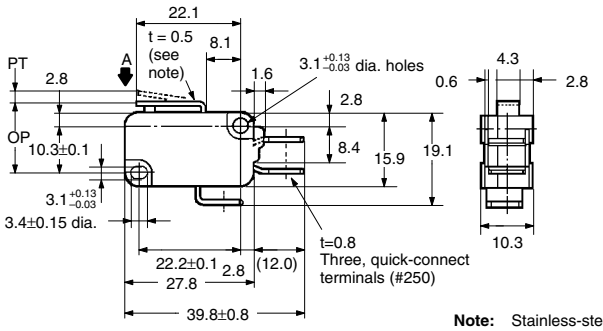


Model	V-11-1□4	V-11-1□5
OF max.	0.98 N {100 gf}	1.96 N {200 gf}
RF min.	0.20 N {20 gf}	0.49 N {50 gf}
PT max.	1.2 mm	
OT min.	1.0 mm	
MD max.	0.4 mm	
OP	14.7±0.4 mm	

Short Hinge Lever Models

V-211-1□6
V-161-1□5
V-111-1□4





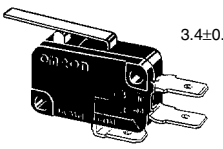
Note: Stainless-steel lever

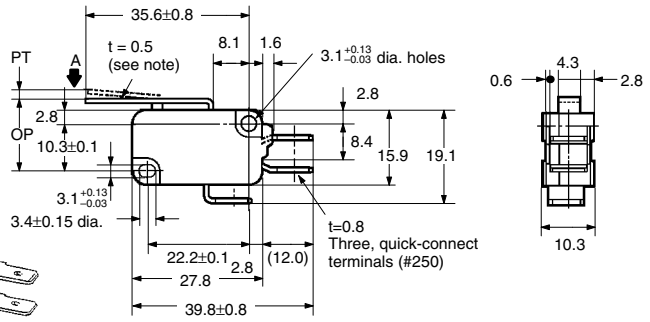
Model	V-211-1□6	V-161-1□5
OF max.	3.92 N {400 gf}	1.96 N {200 gf}
RF min.	0.49 N {50 gf}	0.49 N {50 gf}
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.6 mm	
OP	15.2±0.5 mm	

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 Models

V-212-1□6
V-162-1□5
V-112-1□4





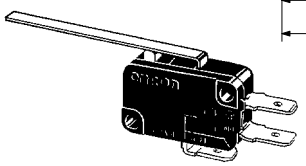
Note: Stainless-steel lever

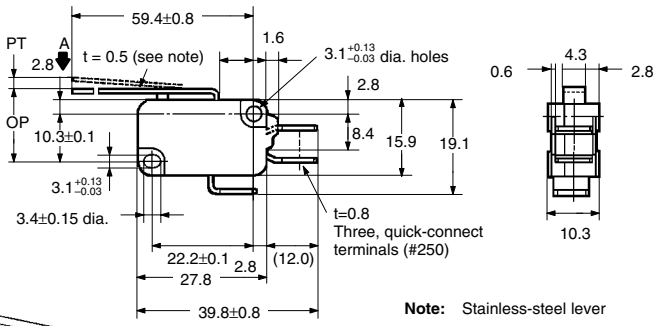
Model	V-212-1□6	V-162-1□5
OF max.	2.45 N {250 gf}	1.23 N {125 gf}
RF min.	0.25 N {25 gf}	0.14 N {14 gf}
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	1.5 mm	
OP	15.2±1.2 mm	

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±1.2 mm

Long Hinge Lever Models

V-213-1□6
V-163-1□5
V-113-1□4





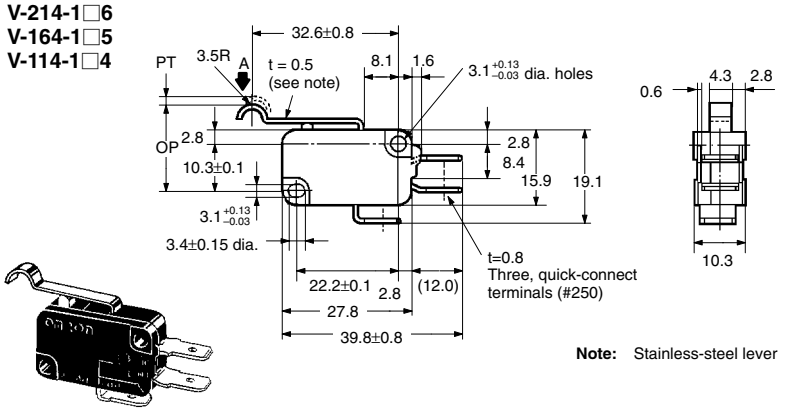
Note: Stainless-steel lever

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 +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 Roller Lever Models

V-214-1□6
V-164-1□5
V-114-1□4



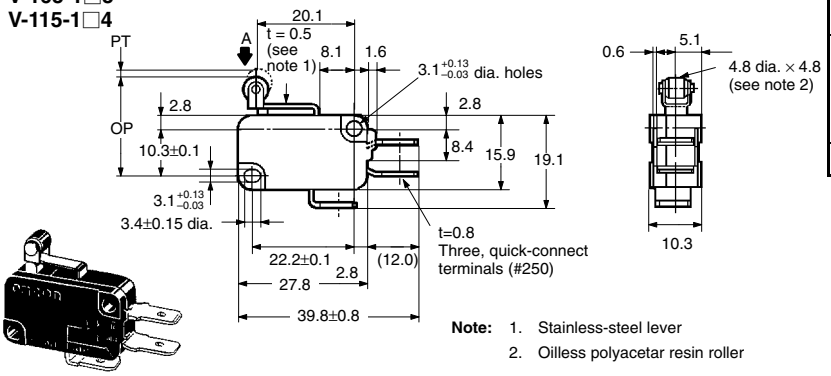
Note: Stainless-steel lever

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 Models

V-215-1□6
V-165-1□5
V-115-1□4



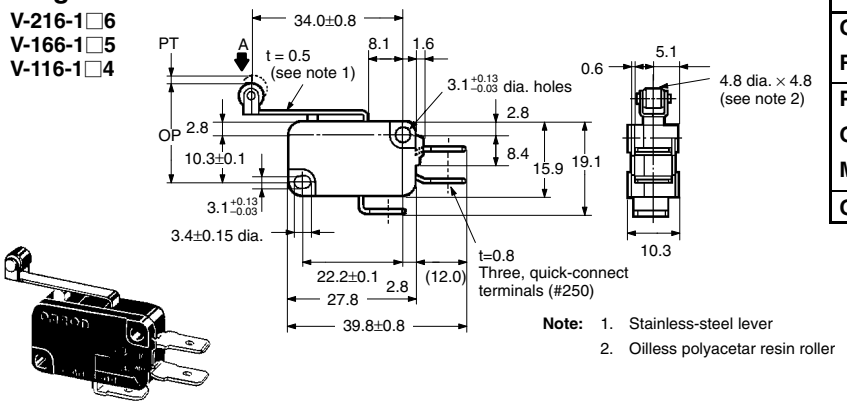
Note: 1. Stainless-steel lever
2. Oilless polyacetar resin roller

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 Models

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	

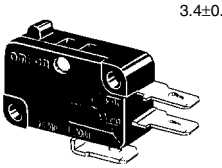
Model	V-116-1□4
OF max.	0.59 N {60 gf}
RF min.	0.06 N {6 gf}
PT max.	4.0 mm
OT min.	1.6 mm
MD max.	1.5 mm
OP	20.7±1.2 mm

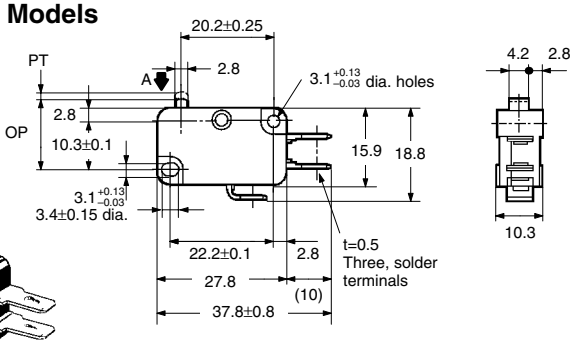
■ Thermosetting Case (V-15/-10 Models)

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 119 for these terminals.

Pin Plunger Models

V-15-1□5
V-10-1□5
V-10-1□4

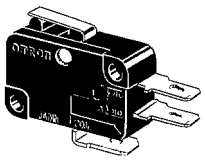


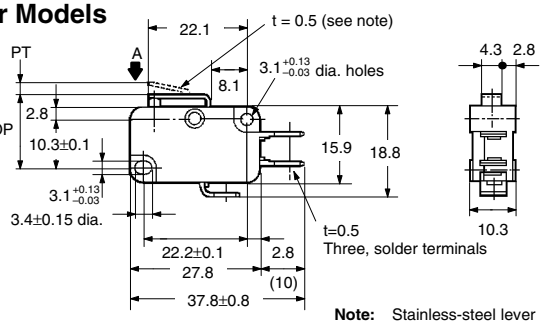


Model	V-15-1□5 V-10-1□5	V-10-1□4
OF max.	1.96 N {200 gf}	0.98 N {100 gf}
RF min.	0.49 N {50 gf}	0.20 N {20 gf}
PT max.	1.2 mm	
OT min.	1.0 mm	
MD max.	0.4 mm	
OP	14.7±0.4 mm	

Short Hinge Lever Models

V-151-1□5
V-101-1□5
V-101-1□4



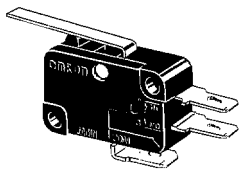


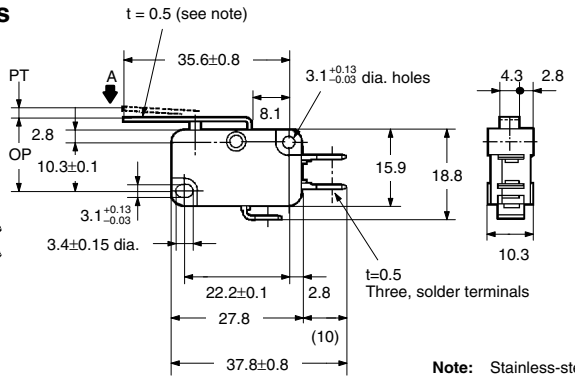
Note: Stainless-steel lever

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 Models

V-152-1□5
V-102-1□5
V-102-1□4



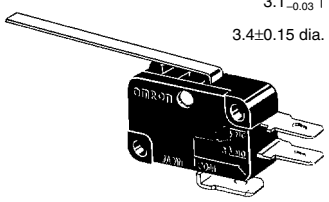


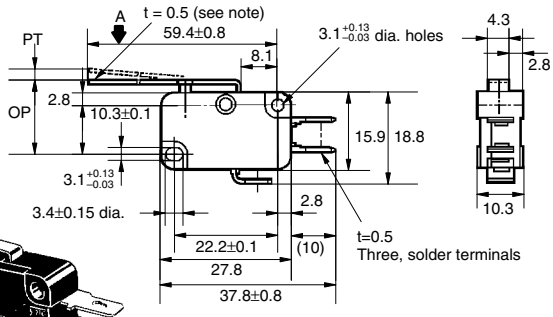
Note: Stainless-steel lever

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 Models

V-153-1□5
V-103-1□5
V-103-1□4



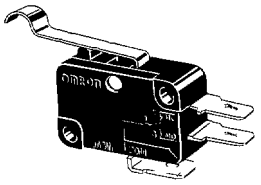


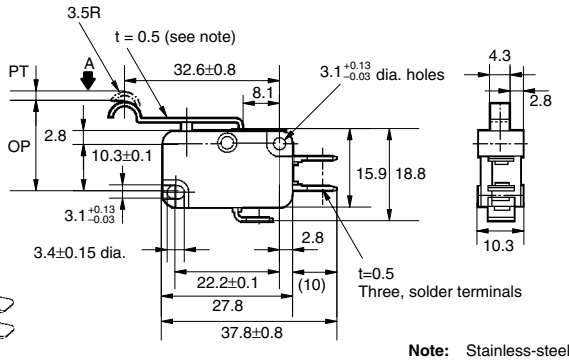
Note: Stainless-steel lever

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	9.0 mm
OT min.	2.0 mm	3.2 mm
MD max.	2.8 mm	2.8 mm
OP	15.2 +2.6 −3.2 mm	15.2±2.6 mm

Simulated Roller Lever Models

V-154-1□5
V-104-1□5
V-104-1□4



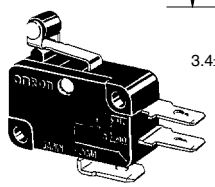


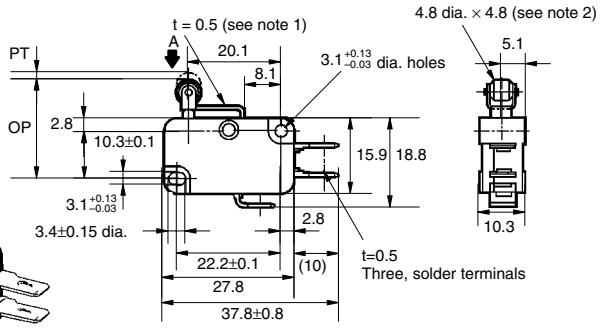
Model	V-154-1□5 V-104-1□5	V-104-1□4
OF max.	1.23 N {125 gf}	0.59 N {60 gf}
RF min.	0.14 N {14 gf}	0.06 N {6 gf}
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	1.5 mm	
OP	18.7±1.2 mm	

Note: Stainless-steel lever

Short Hinge Roller Lever Models

V-155-1□5
V-105-1□5
V-105-1□4



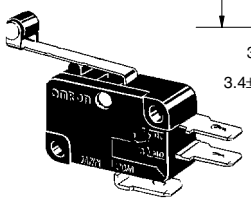


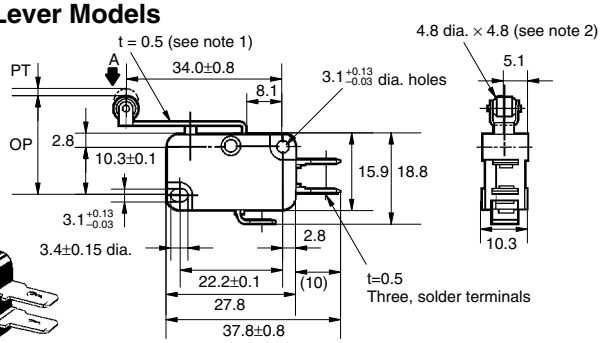
Model	V-155-1□5 V-105-1□5	V-105-1□4
OF max.	2.35 N {240 gf}	1.18 N {120 gf}
RF min.	0.49 N {50 gf}	0.15 N {15 gf}
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.6 mm	
OP	20.7±0.6 mm	

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

Hinge Roller Lever Models

V-156-1□5
V-106-1□5
V-106-1□4





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	

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

Precautions

Refer to pages 26 to 31 for common precautions.

■ Correct Use

Specifications Approved by TÜV Rheinland According to EN61058-1

Appropriate Cable Size (mm^2)

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

Use M3 crimp terminals for connecting to the screw terminals.

Applicable M3 crimp terminals:

Daido Solderless Terminal Mfg. Co., Ltd. F1.25–3

J.S.T. Mfg. Co., Ltd. 1.25 B3A

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}.

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. Refer to Separator on page 152.

■ Actuator (Sold Separately)

Various Actuators are available as shown on pages 152 to 155.

■ Connector (Sold Separately)

Refer to Terminal Connectors on page 282.

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

Cat. No. B010-E1-09B

OMRON

Miniature Basic Switch

VX

Miniature Basic Switch with Low Operating Force and High Contact Reliability

- Wide variation extends from micro load to 5-A switching current, with shapes identical to those of the V-series Miniature Basic Switch.
- A unique internal mechanism enables high contact strength with low operating force. Can be used for detecting lightweight objects.

Ordering Information

■ Model Number Legend

VX-□□-□□□

1 2 3 4 5

1. Ratings
- 5: 5 A at 250 VAC
- 01: 0.1 A at 30 VDC

2. 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

3. Contact Form
- 1: SPDT
- 2: SPST-NC
- 3: SPST-NO

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

5. Maximum Operating Force
- 2: OF 0.25 N {25 gf}
- 3: OF 0.49 N {50 gf}

Note: These values are for the pin plunger models.

■ 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		VX-51-1C23	VX-011-1C23
Hinge Lever 	A	0.29 N {30 gf}	VX-52-1A3	VX-012-1A3
	C2		VX-52-1C23	VX-012-1C23
Long hinge lever 	A	0.20 N {20 gf}	VX-53-1A3	VX-013-1A3
	C2		VX-53-1C23	VX-013-1C23
Simulated roller lever 	A	0.29 N {30 gf}	VX-54-1A3	VX-014-1A3
	C2		VX-54-1C23	VX-014-1C23
Short hinge roller lever 	A	0.59 N {60 gf}	VX-55-1A3	VX-015-1A3
	C2		VX-55-1C23	VX-015-1C23
Hinge roller lever 	A	0.29 N {30 gf}	VX-56-1A3	VX-016-1A3
	C2		VX-56-1C23	VX-016-1C23

Note: 1. Contact your OMRON sales representative for details on SPST-NO and SPST-NC models.

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

Specifications

■ Ratings

Item / Model	Rated voltage	Resistive load
VX-5	250 VAC	5 A
VX-01	125 VAC	0.1 A
	30 VDC	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)

Model	Voltage	Non-inductive load				Inductive load	
		Resistive load		Lamp load			
		NC	NO	NC	NO	NC	NO
VX-5	**125 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	
VX-01	**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.

■ Characteristics

Item	VX-5	VX-01
Operating speed	0.1 mm to 1 m/s (pin plunger models)	
Operating frequency	Mechanical: 600 operations/min max. Electrical: 30 operations/min max.	
Insulation resistance	100 MΩ min. (at 500 VDC)	
Contact resistance (initial value)	30 mΩ max.	50 mΩ max.
Dielectric strength (see note 2)	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 1,500 VAC, 50/60 Hz for 1 min 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: 400 m/s^2 {approx. 40G} max. Malfunction: 100 m/s^2 {approx. 10G} max.	
Durability (see note 4)	Mechanical: 50,000,000 operations min. (60 operations/min) (Refer to the following *Engineering Data*.) Electrical: 500,000 operations min. (30 operations/min) (Refer to the following *Engineering Data*.)	Mechanical: 10,000,000 operations min. (60 operations/min) (Refer to the following *Engineering Data*.) Electrical: 1,000,000 operations min. (30 operations/min) (Refer to the following *Engineering Data*.)
Degree of protection	IEC IP40	
Degree of protection against electric shock	Class I	
Proof tracking index (PTI)	175	
Ambient operating temperature	–25°C to 80°C (at ambient humidity of 60% max.) (with no icing)	
Ambient operating humidity	85% max. (for 5°C to 35°C)	
Weight	Approx. 6.2 g (pin plunger models)	

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

2. The value for dielectric strength shown is 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, contact your OMRON sales representative.

■ 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	VX-5	VX-01
125 VAC	5 A	0.1 A
250 VAC	5 A	---
30 VDC	---	0.1 A

EN61058-1 (File No. 124761, VDE approval)

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

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

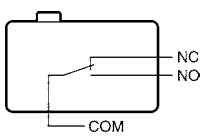
■ Contact Specifications

Item		VX-5	VX-01
Contact	Specification	Rivet	Crossbar
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.5 mm	
Inrush current	NC	15 A max.	---
	NO	---	---
Minimum applicable load (see note)		160 mA at 5 VDC	1 mA at 5 VDC

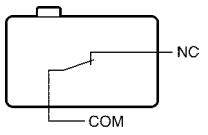
Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 132.

■ Contact Form

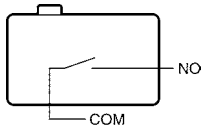
SPDT



SPST-NC



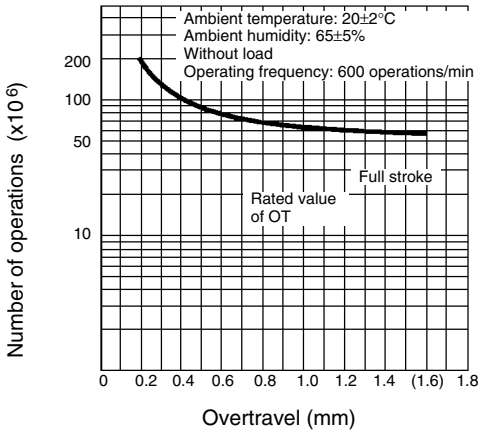
SPST-NO



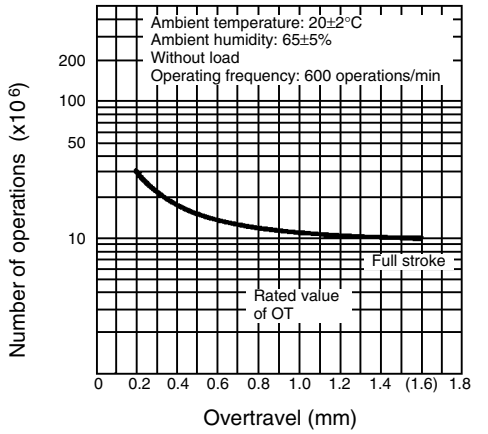
Engineering Data (Reference Values)

Mechanical Durability (Pin Plunger Models)

VX-5

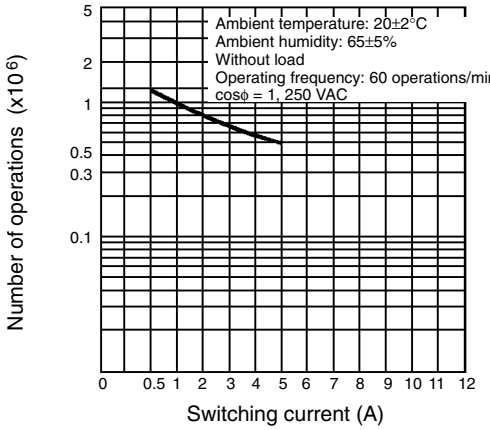


VX-01

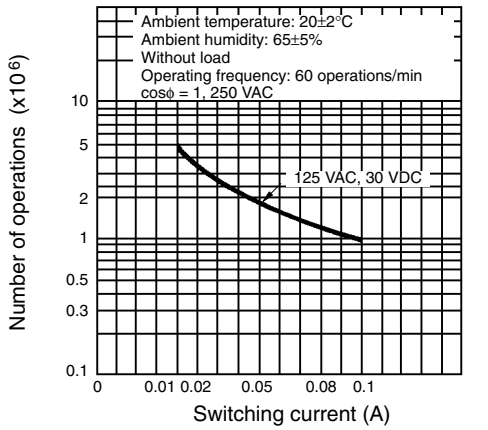


Electrical Durability (Pin Plunger Models)

VX-5



VX-01

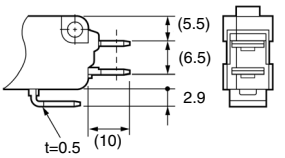
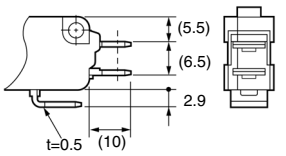
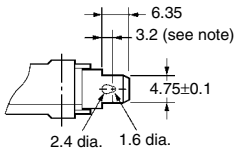
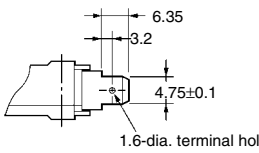


Dimensions

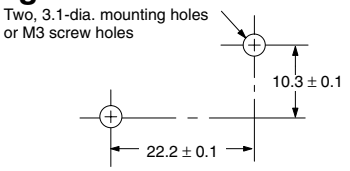
■ Terminals

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

2. The following is for the SPDT contact specifications.

Terminal type	Solder terminals (A)	Quick-connect terminals (#187) (C2)
COM bottom position	 Three, solder terminals	 Three, quick-connect terminals (#187)
Terminal dimensions	 **Note:** The length to the center of the 1.6-dia. holes.	

■ Mounting Holes



■ 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.

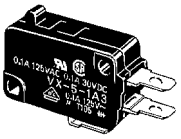
3. The following illustrations and drawings are for solder terminals (Terminal A). Illustrations for Terminal C2 are omitted. For details, refer to *Terminals*.

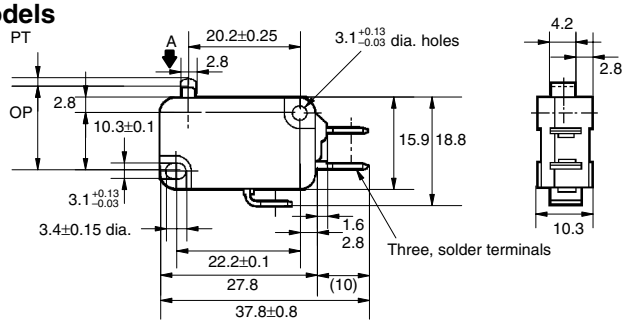
4. The □ in the model number is for the terminal code.
A: Solder terminals
C2: Quick-connect terminals (#187)

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

Pin Plunger Models

VX-5-1□2
VX-5-1□3
VX-01-1□2
VX-01-1□3

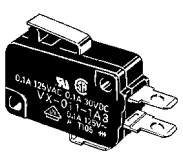


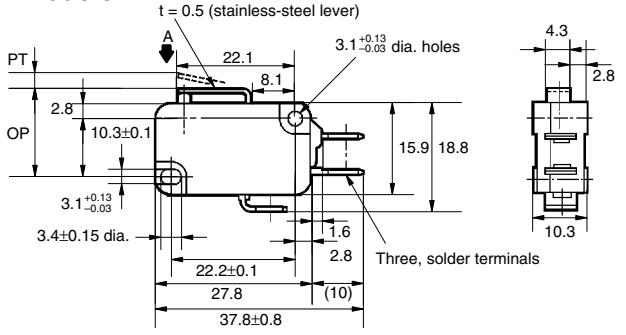


Model	VX-5-1□2 VX-01-1□2	VX-5-1□3 VX-01-1□3
OF max.	0.25 N {25 gf}	0.49 N {50 gf}
RF min.	0.03 N {3 gf}	0.05 N {5 gf}
PT max.	1.2 mm	
OT min.	1.0 mm	
MD max.	0.3 mm	
OP	14.7±0.4 mm	

Short Hinge Lever Models

VX-51-1□3
VX-011-1□3



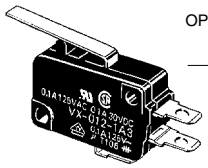


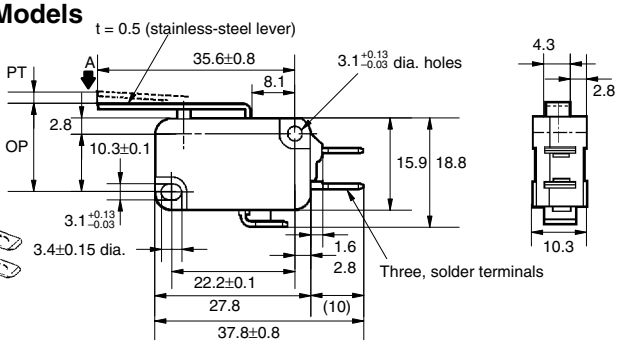
Model	VX-51-1□3	VX-011-1□3
OF max.	0.49 N {50 gf}	
RF min.	0.04 N {4 gf} (reference value)	
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.5 mm	
OP	15.2±0.5 mm	

Note: The values indicated in parentheses are reference values for cases when the installation direction is such that the lever weight is not applied to the plunger.

Hinge Lever Models

VX-52-1□3
VX-012-1□3

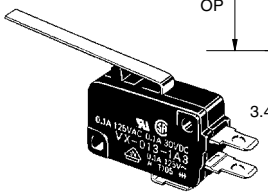


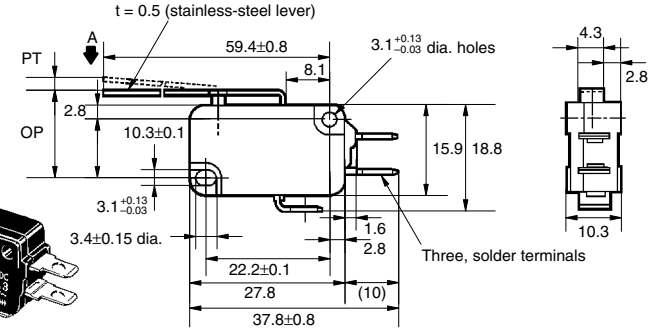


Model	VX-52-1□3	VX-012-1□3
OF max.	0.29 N {30 gf}	
RF min.	---	
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	0.8 mm	
OP	15.2±1.2 mm	

Long Hinge Lever Models

VX-53-1□3
VX-013-1□3

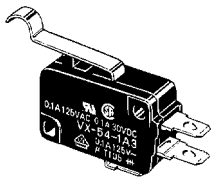


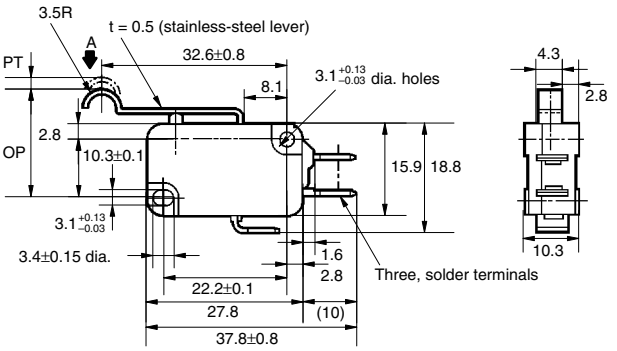


Model	VX-53-1□3	VX-013-1□3
OF max.	0.20 N {20 gf}	
RF min.	---	
PT max.	9.0 mm	
OT min.	3.2 mm	
MD max.	2.0 mm	
OP	15.2±2.6 mm	

Simulated Roller Lever Models

VX-54-1□3
VX-014-1□3

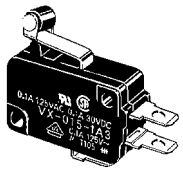


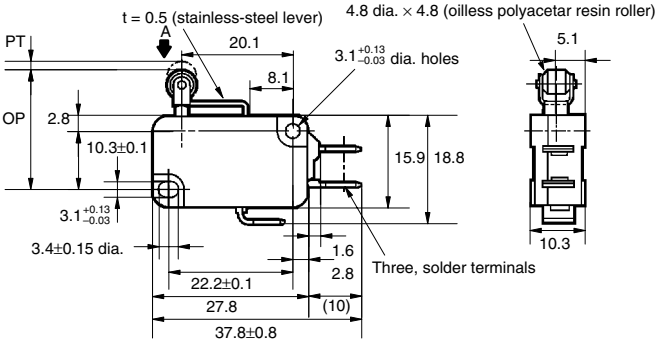


Model	VX-54-1□3	VX-014-1□3
OF max.	0.29 N {30 gf}	
RF min.	0.02 N {2 gf}	
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	0.8 mm	
OP	18.7±1.2 mm	

Short Hinge Roller Lever Models

VX-55-1□3
VX-015-1□3



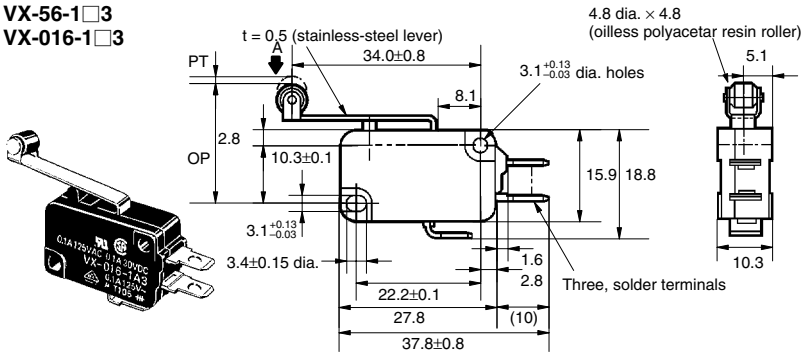


Model	VX-55-1□3	VX-015-1□3
OF max.	0.59 N {60 gf}	
RF min.	0.04 N {4 gf} (reference value)	
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.5 mm	
OP	20.7±0.6 mm	

Note: The values indicated in parentheses are reference values for cases when the installation direction is such that the lever weight is not applied to the plunger.

Hinge Roller Lever Models

VX-56-1□3
VX-016-1□3



Model	VX-56-1□3	VX-016-1□3
OF max.	0.29 N {30 gf}	
RF min.	---	
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	0.8 mm	
OP	20.7±1.2 mm	

Precautions

Refer to pages 26 to 31 for common 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 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}.

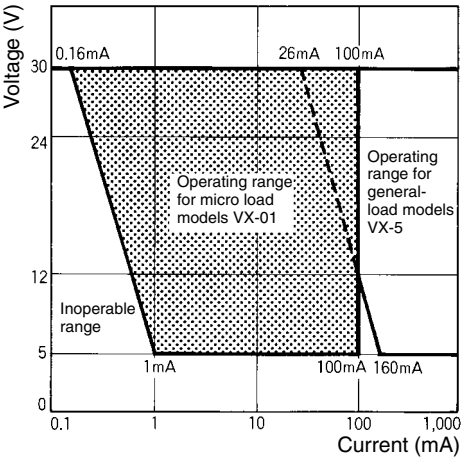
Mounting Direction

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 occur if unnecessary load is applied 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 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% (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%.



■ Actuator (Sold Separately)

Various Actuators are available as shown on pages 152 to 155.

■ Connector (Sold Separately)

Refer to Terminal Connectors on page 282.

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

Cat. No. B039-E1-02B

OMRON

Miniature Basic Switch | D2MV

Ultra-low Load, Miniature Basic Switch

- Twin crossbar contact employed for exceptionally high contact reliability in micro load applications.
- A coil spring employed in the internal mechanism extends durability and improves contact reliability.

Ordering Information

■ Model Number Legend

D2MV-□□-□□□

1 2 3 4 5

1. **Ratings**
   - 1: 1 A at 125 VAC
   - 01: 0.1 A at 30 VDC
2. **Actuator**
   - None: Pin plunger
   - L11: Short hinge lever
   - L: Hinge lever
   - L111: Long hinge lever
   - L13: Simulated roller lever
   - L22: Short hinge roller lever
   - L2: Hinge roller lever
3. **Contact Form**
   - 1: SPDT
   - 2: SPST-NC
   - 3: SPST-NO
4. **Terminals**
   - C: Solder terminals
5. **Maximum Operating Force**
   - 1: 0.10 N {10 gf}
   - 2: 0.25 N {25 gf}
   - 3: 0.49 N {50 gf}

   Note: These values are for the pin plunger models.

■ List of Models

Actuator	OF max.	0.1 A	1 A
Pin plunger	0.10 N {10 gf}	D2MV-01-1C1	D2MV-1-1C1
	0.25 N {25 gf}	D2MV-01-1C2	D2MV-1-1C2
	0.49 N {50 gf}	D2MV-01-1C3	D2MV-1-1C3
Short hinge lever	0.49 N {50 gf}	D2MV-01L11-1C3	D2MV-1L11-1C3
Hinge lever	0.29 N {30 gf}	D2MV-01L-1C3	D2MV-1L-1C3
Long hinge lever	0.15 N {15 gf}	D2MV-01L111-1C3	D2MV-1L111-1C3
Simulated roller lever	0.29 N {30 gf}	D2MV-01L13-1C3	D2MV-1L13-1C3
Short hinge roller lever	0.49 N {50 gf}	D2MV-01L22-1C3	D2MV-1L22-1C3
Hinge roller lever	0.29 N {30 gf}	D2MV-01L2-1C3	D2MV-1L2-1C3

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

Specifications

■ Ratings

Model / Rated voltage / Item	D2MV-1	D2MV-01
	Resistive load	
125 VAC	1 A	0.1 A
30 VDC	1 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)

The □ symbols in the model number are for the actuator type code and operating force code respectively.

Model	Voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
D2MV-1 (1 A type)	125 VAC	1 A		0.1 A		---		---	
	8 VDC	1 A		0.1 A		---		---	
	14 VDC	1 A		0.1 A					
	30 VDC	1 A		0.1 A					
D2MV-01 (0.1 A type)	125 VAC	0.1 A		---		---		---	
	8 VDC	0.1 A		---		---		---	
	14 VDC	0.1 A							
	30 VDC	0.1 A							

Note: 1. The above values are for the steady-current state.
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.

■ Characteristics

Operating speed	1 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 300 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	D2MV-01 models: 50 mΩ max. D2MV-1 models: 30 mΩ max.
Dielectric strength (see note 2)	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 the ground 1,500 VAC, 50/60 Hz for 1 min 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: Models with OF of 0.10 N: 150 m/s^2 {approx. 15G} max. Models with OF between 0.25 and 0.49 N: 400 m/s^2 {approx. 40G} max. Malfunction: 100 m/s^2 {approx. 10G} max.
Durability (see note 4)	Mechanical: 10,000,000 operations min. (60 operations/min) (Refer to *Engineering Data*.) Electrical: D2MV-1 models: 500,000 operations min. (30 operations/min) D2MV-01 models: 1,000,000 operations min. (30 operations/min) (Refer to *Engineering Data*.)
Degree of protection	IEC IP40
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient operating temperature	–25°C to 80°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight	Approx. 6 g (pin plunger models)

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

2. The values for dielectric strength shown 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.
4. For testing conditions, contact your OMRON sales representative.

■ 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	D2MV-1	D2MV-01
125 VAC	1 A	0.1 A
30 VDC	1 A	0.1 A

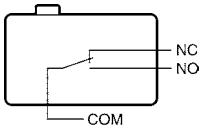
■ Contact Specifications

Item		D2MV-01 models	D2MV-1 models
Contact	Specification	Twin crossbar	Needle
	Material	Gold alloy	Silver
	Gap (standard value)	0.5 mm	
Inrush current	NC	0.1 A max.	1 A max.
	NO		
Minimum applicable load (see note)		1 mA at 5 VDC	30 mA at 5 VDC

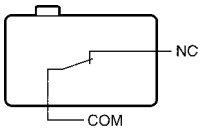
Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 139.

■ Contact Form

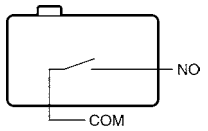
SPDT



SPST-NC

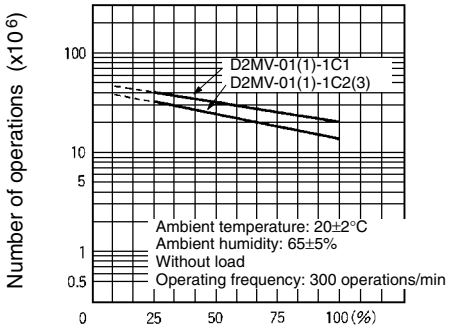


SPST-NO



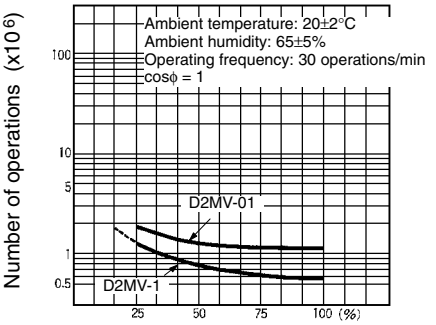
Engineering Data (Reference Values)

Mechanical Durability
(Pin Plunger Models)



Percentage of OT to its rated value (%)

Electrical Durability
(Pin Plunger Models)

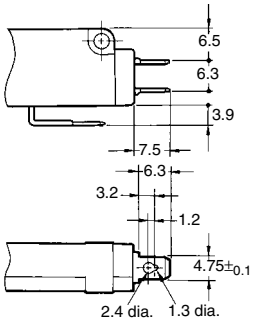


Percentage of switching current to its rated value (%)

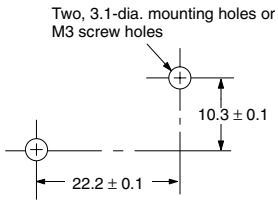
Dimensions

Note: All units are in millimeters unless otherwise indicated.

■ Terminals



■ Mounting Holes

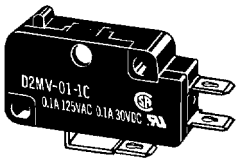


■ Dimensions and Operating Characteristics

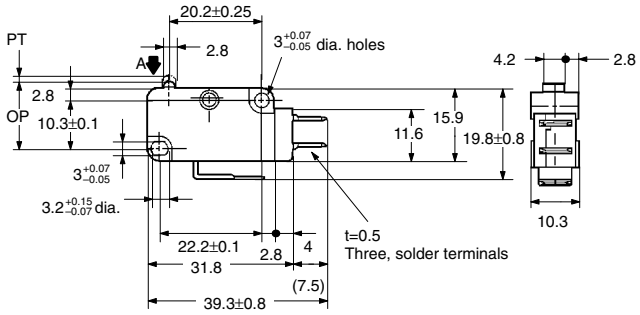
Note: 1. All units are in millimeters unless otherwise indicated.
2. The RF values indicated in parentheses are for cases where the lever weight is not applied to the plunger.
3. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
4. The operating characteristics are for operation in the A direction (▼).

Pin Plunger Models

D2MV-01-1C□
D2MV-1-1C□



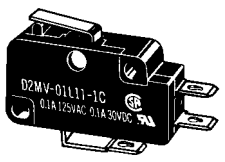
Note: The □ in the model number is for the OF code.

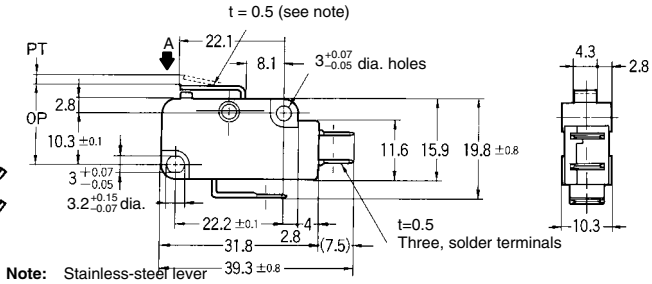


Model	D2MV-01-1C1 D2MV-1-1C1	D2MV-01-1C2 D2MV-1-1C2	D2MV-01-1C3 D2MV-1-1C3
OF max.	0.10 N {10 gf}	0.25 N {25 gf}	0.49 N {50 gf}
RF min.	0.005 N {0.5 gf} (reference value)	0.01 N {1 gf} (reference value)	0.02 N {2 gf} (reference value)
PT max.	1.2 mm		
OT min.	1.3 mm		
MD max.	0.25 mm		
OP	14.7±0.4 mm		

Short Hinge Lever Models

D2MV-01L11-1C3
D2MV-1L11-1C3



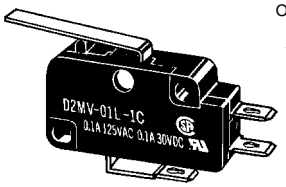


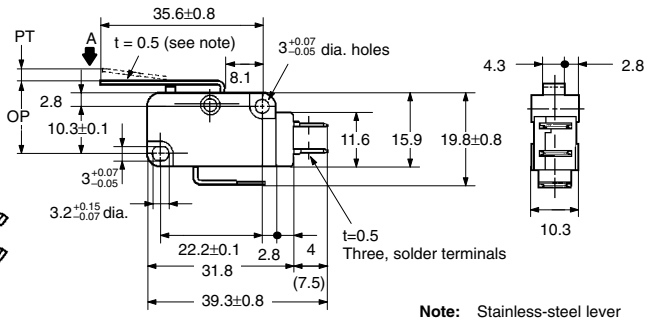
Note: Stainless-steel lever

Model	D2MV-01L11-1C3 D2MV-1L11-1C3
OF max.	0.49 N {50 gf}
RF min.	0.04 N {4 gf} (reference value)
PT max.	1.7 mm
OT min.	1.0 mm
MD max.	0.4 mm
OP	15.2±0.5 mm

Hinge Lever Models

D2MV-01L-1C3
D2MV-1L-1C3



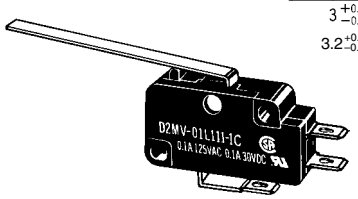


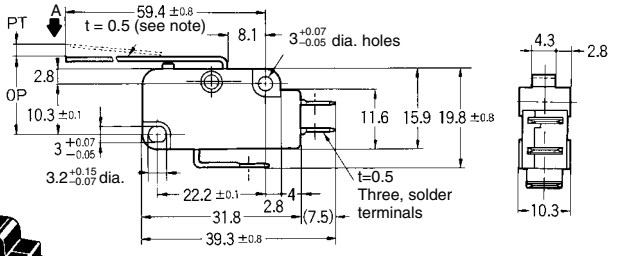
Note: Stainless-steel lever

Model	D2MV-01L-1C3 D2MV-1L-1C3
OF max.	0.29 N {30 gf}
RF min.	0.02 N {2 gf} (reference value)
PT max.	3.3 mm
OT min.	2.1 mm
MD max.	0.7 mm
OP	15.2±1.2 mm

Long Hinge Lever Models

D2MV-01L111-1C3
D2MV-1L111-1C3



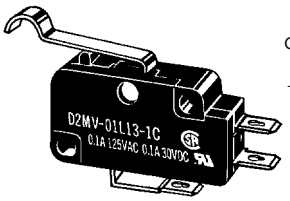


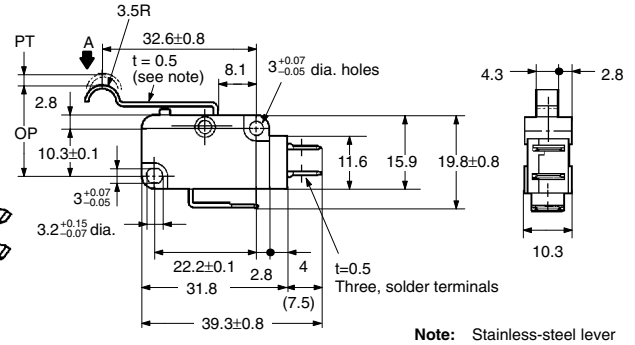
Note: Stainless-steel lever

Model	D2MV-01L111-1C3 D2MV-1L111-1C3
OF max.	0.15 N {15 gf}
RF min.	0.01 N {1 gf} (reference value)
PT max.	6.0 mm
OT min.	4.0 mm
MD max.	1.4 mm
OP	15.2±2.6 mm

Simulated Roller Lever Models

D2MV-01L13-1C3
D2MV-1L13-1C3



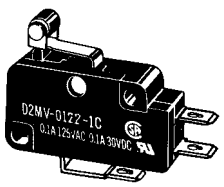


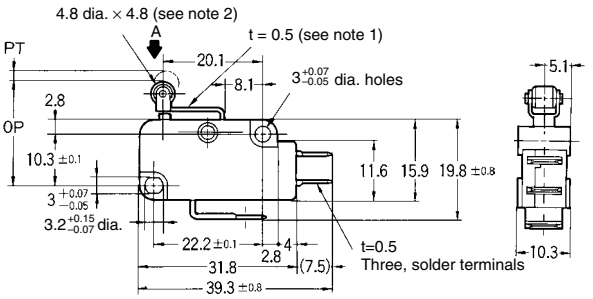
Note: Stainless-steel lever

Model	D2MV-01L13-1C3 D2MV-1L13-1C3
OF max.	0.29 N {30 gf}
RF min.	0.02 N {2 gf} (reference value)
PT max.	3.3 mm
OT min.	1.9 mm
MD max.	0.7 mm
OP	18.7±1.2 mm

Short Hinge Roller Lever Models

D2MV-01L22-1C3
D2MV-1L22-1C3



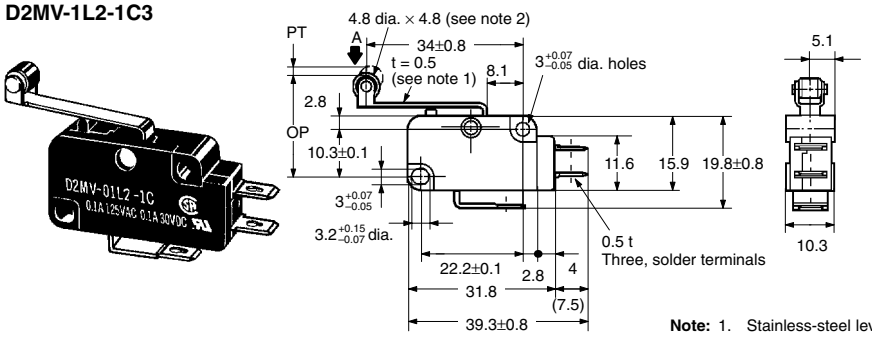


Note: 1. Stainless-steel lever
2. Oilless polyacetar resin roller

Model	D2MV-01L22-1C3 D2MV-1L22-1C3
OF max.	0.49 N {50 gf}
RF min.	0.04 N {4 gf} (reference value)
PT max.	1.7 mm
OT min.	1.0 mm
MD max.	0.4 mm
OP	20.7±0.6 mm

Hinge Roller Lever Models

D2MV-01L2-1C3
D2MV-1L2-1C3



Model	D2MV-01L2-1C3 D2MV-1L2-1C3
OF max.	0.29 N {30 gf}
RF min.	0.02 N {2 gf} (reference value)
PT max.	3.3 mm
OT min.	2.1 mm
MD max.	0.7 mm
OP	20.7±1.2 mm

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

Precautions

Refer to pages 26 to 31 for common 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 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}.

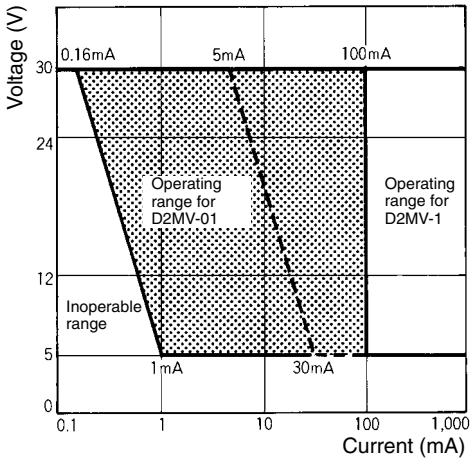
Mounting Direction

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 occur if unnecessary load is applied 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 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% (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%.



■ Actuator (Sold Separately)

Various Actuators are available as shown on pages 152 to 155.

■ Connector (Sold Separately)

Refer to Terminal Connectors on page 282.

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

Cat. No. B018-E1-07B

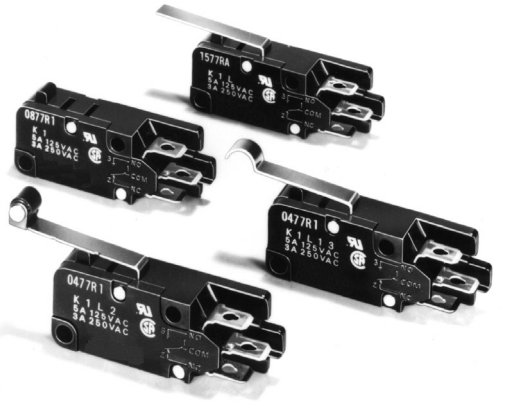
OMRON

Miniature Basic Switch

K

Simple Internal Mechanism Enables Durability of 20,000,000 Mechanical Operations or More

- Long-life design with an OT stopper inside the case and high-precision movable spring.
- A choice of types with right-hand barrier, left-hand barrier and no barrier for the terminals is available.



Ordering Information

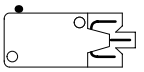
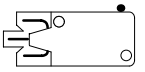
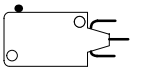
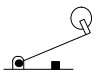
■ Model Number Legend

K□□
1 2

1. Barrier
- 1: With right-hand barrier
- 2: With left-hand barrier
- 3: Without barrier

2. Actuator
- None: Pin plunger
- L: Hinge lever
- L13: Simulated roller lever
- L2: Hinge roller lever

■ List of Models

Actuator	OF max.	With right-hand barrier 	With left-hand barrier 	Without barrier 
Pin plunger	0.25 N {25 gf}	K1	K2	K3
Hinge lever 	0.15 N {15 gf}	K1L	K2L	K3L
Simulated roller lever 		K1L13	K2L13	K3L13
Hinge roller lever 		K1L2	K2L2	K3L2

Specifications

■ Ratings

Rated voltage	Resistive load
125 VAC 250 VAC	5 A 3 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	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	5 A		1.5 A	0.7 A	3 A		1.5 A	0.7 A
250 VAC	3 A		1 A	0.5 A	2 A		1 A	0.5 A
8 VDC	5 A		3 A	3 A	4 A		3 A	
14 VDC	5 A		3 A	3 A	4 A		3 A	
30 VDC	5 A		3 A	3 A	4 A		3 A	
125 VDC	0.4 A		0.05 A	0.05 A	0.4 A		0.05 A	
250 VDC	0.2 A		0.05 A	0.03 A	0.2 A		0.03 A	

Note: 1. The above values are for 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.

■ Characteristics

Operating speed	0.1 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 300 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	30 mΩ max.
Dielectric strength (see note 2)	1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarities 2,000 VAC, 50/60 Hz for 1 min between current-carrying metal part and ground, and between each terminal and non-current-carrying metal part
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: 300 m/s^2 {approx. 30G} max.
Durability (see note 4)	Mechanical: 20,000,000 operations min. (60 operations/min) (Refer to *Engineering Data*.) Electrical: 100,000 operations min. (30 operations/min) (Refer to *Engineering Data*.)
Degree of protection	IEC IP40
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient operating temperature	–25°C to 80°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight	Approx. 5.9 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.

■ 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	K
125 VAC	5 A
250 VAC	3 A

EN61058-1 (File No. 40006539, VDE approval)

Rated voltage	K
125 VAC	5 A
250 VAC	3 A

Testing conditions: 5E4 (50,000 operatings), T80 (0°C to 80°C)

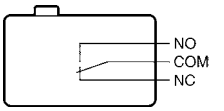
■ Contact Specifications

Contact	Specification	Rivet
	Material	Silver
	Gap (standard value)	0.5 mm
Inrush current	NC	10 A max.
	NO	10 A max.
Minimum applicable load (see note)		160 mA at 5 VDC

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 144.

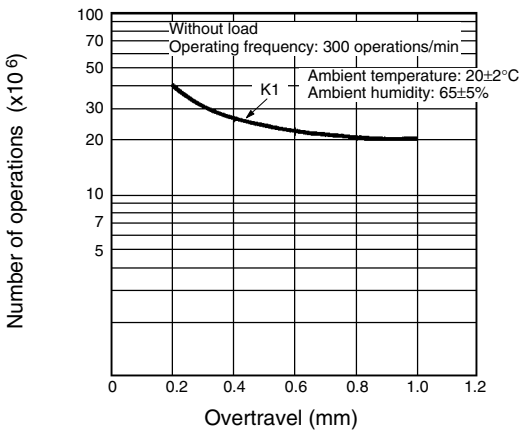
■ Contact Form

SPDT

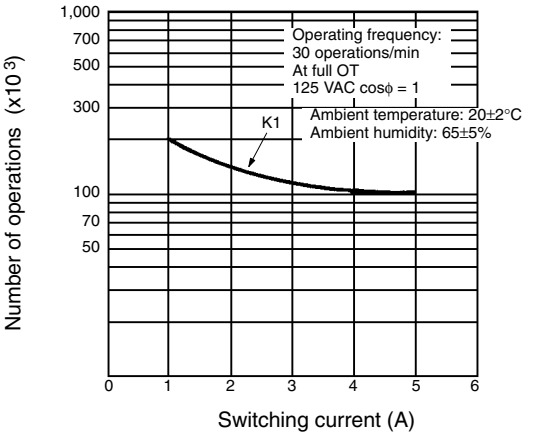


Engineering Data (Reference Values)

Mechanical Durability



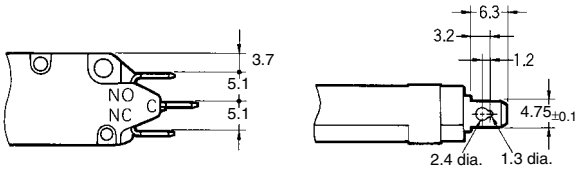
Electrical Durability



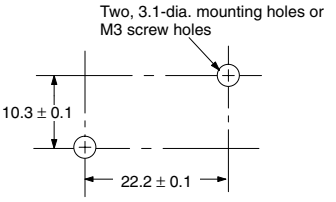
Dimensions

Note: All units are in millimeters unless otherwise indicated.

■ Terminals



■ Mounting Holes

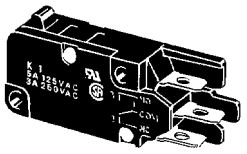


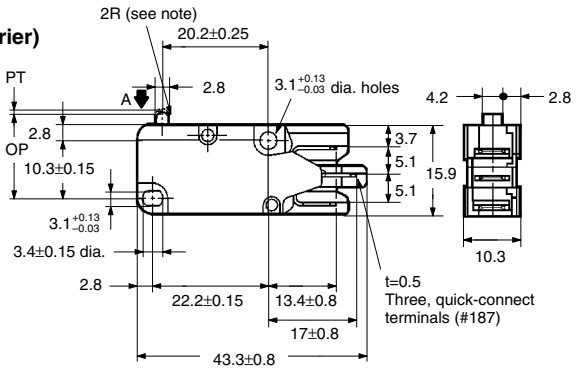
■ Dimensions and Operating Characteristics

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. Dimensions of models without barrier are exactly the same as those of models with right- or left-hand barrier except the dimensions of the barrier.
4. Barrier specification symbol will be indicated in the □ of the model number.
5. The operating characteristics are for operation in the A direction (⬇).

Pin Plunger Models

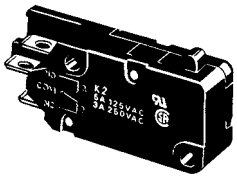
K1 (With Right-hand Barrier)

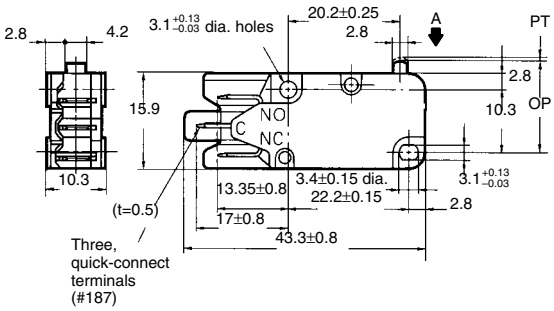




Model	K1
OF max.	0.25 N {25 gf}
RF min.	0.05 N {5 gf}
PT max.	1.6 mm
OT min.	0.8 mm
MD max.	0.8 mm
OP	14.4±0.7 mm

K2 (With Left-hand Barrier)

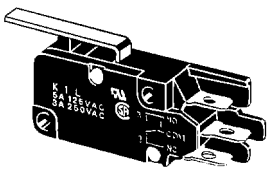


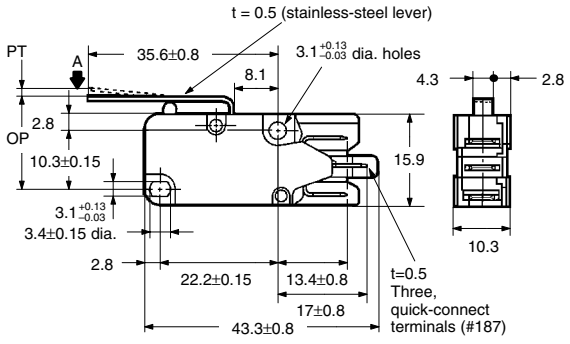


Model	K2
OF max.	0.25 N {25 gf}
RF min.	0.05 N {5 gf}
PT max.	1.6 mm
OT min.	0.8 mm
MD max.	0.8 mm
OP	14.4±0.7 mm

Hinge Lever Models

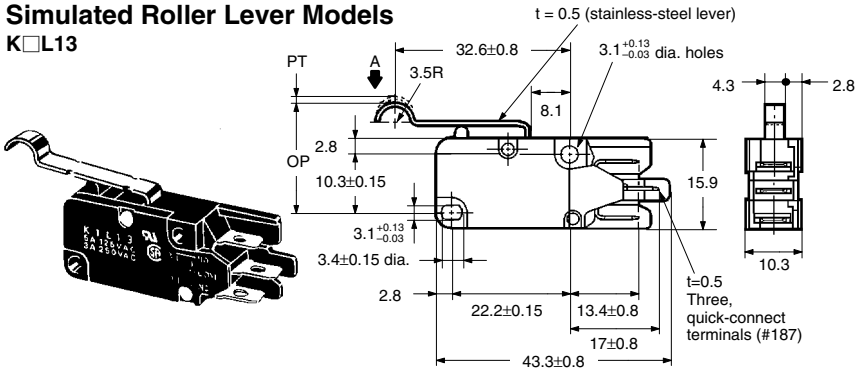
K□L





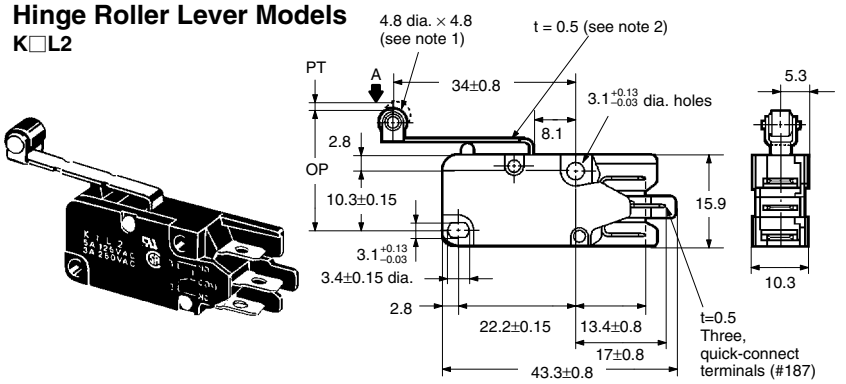
Model	K□L
OF max.	0.15 N {15 gf}
RF min.	0.015 N {1.5 gf}
PT max.	4.7 mm
OT min.	1.3 mm
MD max.	2.4 mm
OP	14.9±2 mm

Simulated Roller Lever Models
K□L13



Model	K□L13
OF max.	0.15 N {15 gf}
RF min.	0.015 N {1.5 gf}
PT max.	4.7 mm
OT min.	1.3 mm
MD max.	2.4 mm
OP	18.4±2 mm

Hinge Roller Lever Models
K□L2



Model	K□L2
OF max.	0.15 N {15 gf}
RF min.	0.015 N {1.5 gf}
PT max.	4.7 mm
OT min.	1.3 mm
MD max.	2.4 mm
OP	20.4±2 mm

Note: 1. Oil-less polyacetal resin roller
2. Stainless-steel lever

Precautions

Refer to pages 26 to 31 for common precautions.

■ Correct Use

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 occur if unnecessary load is applied to the Switch.

Use two M3 mounting screws with plain washers or 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}.

Using Micro Loads

For details, refer to *General Information.*

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

Cat. No. B014-E1-07B

OMRON

Reed Miniature Basic Switch | D2RV

High Reliability for Micro Load Applications, Even in Adverse Atmospheres (Dust, High Humidity, Silicon Gas, Etc.)

- The reed switch offers exceptional contact reliability in micro load applications.
- Same mounting pitch as for the V Miniature Basic Switch.
- Long life expectancy with a bounce time of 1 ms max.

Ordering Information

■ Model Number Legend

D2RV-□□
1 2

1. Actuator
None: Pin plunger
L11: Short hinge lever
L: Hinge lever
L13: Simulated roller lever
L22: Short hinge roller lever
L2: Hinge roller lever

2. Maximum Operating Force
None: 0.49 N {50 gf}
E: 0.25 N {25 gf}
G: 0.98 N {100 gf}
Note: These values are for the pin plunger models.

■ List of Models

Actuator	OF max.	D2RV
Pin plunger	0.25 N {25 gf}	D2RV-E
	0.49 N {50 gf}	D2RV
	0.98 N {100 gf}	D2RV-G
Short hinge lever	0.25 N {25 gf}	D2RV-L11E
	0.49 N {50 gf}	D2RV-L11
	0.98 N {100 gf}	D2RV-L11G
Hinge lever	0.123 N {12.5 gf}	D2RV-LE
	0.25 N {25 gf}	D2RV-L
	0.49 N {50 gf}	D2RV-LG
Simulated roller lever	0.123 N {12.5 gf}	D2RV-L13E
	0.25 N {25 gf}	D2RV-L13
	0.49 N {50 gf}	D2RV-L13G
Short hinge roller lever	0.25 N {25 gf}	D2RV-L22E
	0.49 N {50 gf}	D2RV-L22
	0.98 N {100 gf}	D2RV-L22G
Hinge roller lever	0.25 N {25 gf}	D2RV-L2
	0.49 N {50 gf}	D2RV-L2G

Specifications

■ Ratings

Switching voltage	100 VDC max.
Switching current	0.25 ADC 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 1 m/s (pin plunger models)
Operating frequency	Mechanical: 200 operations/min max. Electrical: 30 operations/min max.
Insulation resistance (see note 1)	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	150 mΩ max.
Dielectric strength	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, and between each terminal and non-current-carrying metal part
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: 10,000,000 operations min. (60 operations/min) Electrical: 3,000,000 operations min. (30 operaions/min)
Degree of protection	IEC IP40
Degree of protection against electric shock	Class I
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	80% max. (for 5°C to 35°C)
Weight	Approx. 7 g (pin plunger models with terminals)

Note: 1. The data given above are initial values.
2. Insulation resistance between terminals of the same polarity is measured at 100 VDC.
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.
4. For testing conditions, contact your OMRON sales representative.

■ Approved Standards

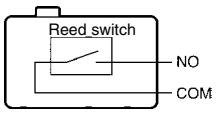
Consult your OMRON sales representative for specific models with standard approvals.

UL508 (File No. E41515)/CSA C22.2 No. 14 (File No. LR45746)

Rated voltage	D2RV
30 VDC	0.1 A

■ Contact Form

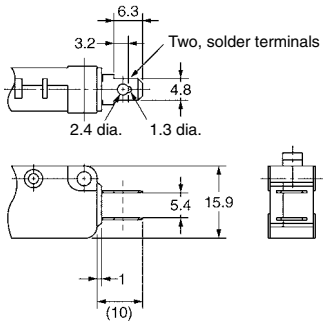
SPST-NO



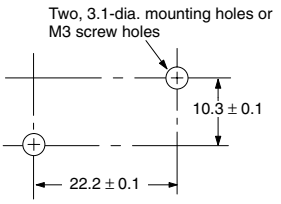
Dimensions

Note: All units are in millimeters unless otherwise indicated.

■ Terminals



■ Mounting Holes

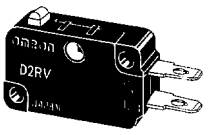


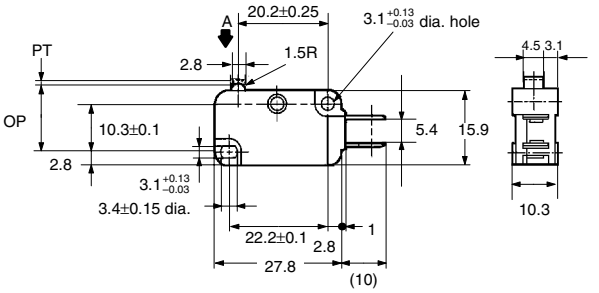
■ Dimensions and Operating Characteristics

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 □ in the model number is for the OF code.
4. The operating characteristics are for operation in the A direction (⬇).

Pin Plunger Models

D2RV-□

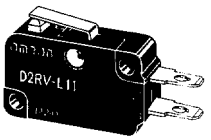


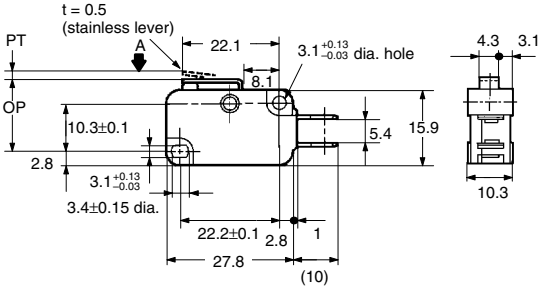


Model	D2RV-E	D2RV	D2RV-G
OF max.	0.25 N {25 gf}	0.49 N {50 gf}	0.98 N {100 gf}
PT max.	1.6 mm		
OT min.	0.6 mm		
MD max.	0.8 mm		
OP	14.4±0.6 mm		

Short Hinge Lever Models

D2RV-L11□

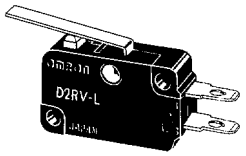


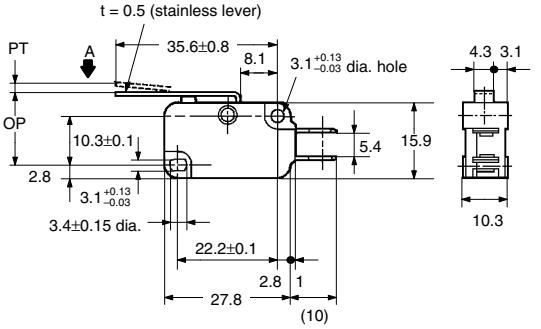


Model	D2RV-L11E	D2RV-L11	D2RV-L11G
OF max.	0.25 N {25 gf}	0.49 N {50 gf}	0.98 N {100 gf}
PT max.	1.8 mm		
OT min.	0.4 mm		
MD max.	1 mm	1.6 mm	1 mm
OP	15±0.6 mm		

Hinge Lever Models

D2RV-L□

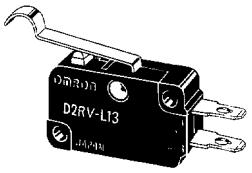


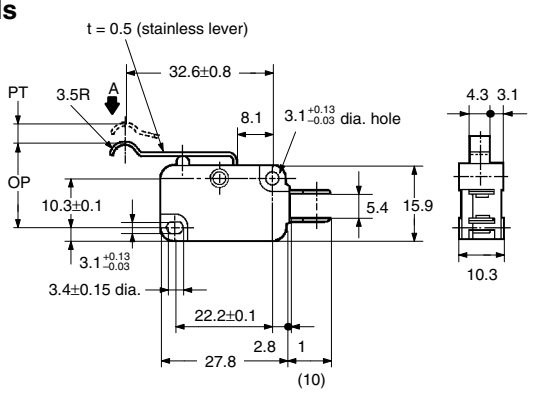


Model	D2RV-LE	D2RV-L	D2RV-LG
OF max.	0.123 N {12.5 gf}	0.25 N {25 gf}	0.49 N {50 gf}
PT max.	4 mm		
OT min.	1 mm		
MD max.	1.6 mm		
OP	14.4±1.2 mm		

Simulated Roller Lever Models

D2RV-L13□

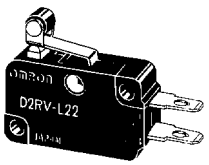


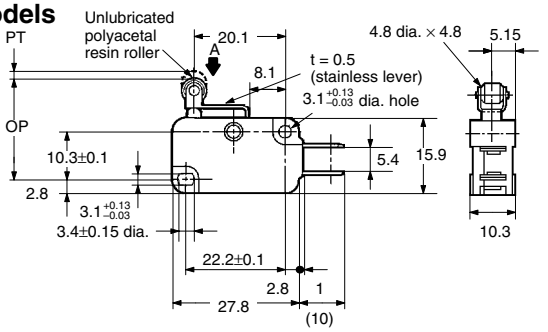


Model	D2RV-L13E	D2RV-L13	D2RV-L13G
OF max.	0.123 N {12.5 gf}	0.25 N {25 gf}	0.49 N {50 gf}
PT max.	4 mm		
OT min.	1 mm		
MD max.	1.6 mm		
OP	18.1±1.2 mm		

Short Hinge Roller Lever Models

D2RV-L22□

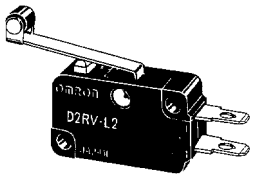


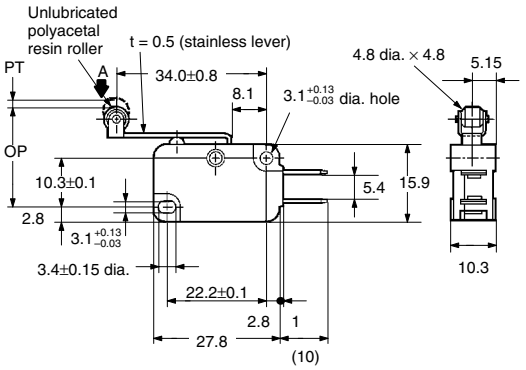


Model	D2RV-L22E	D2RV-L22	D2RV-L22G
OF max.	0.25 N {25 gf}	0.49 N {50 gf}	0.98 N {100 gf}
PT max.	1.8 mm		
OT min.	0.4 mm		
MD max.	1 mm		
OP	20.4±0.6 mm		

Hinge Roller Lever Models

D2RV-L2□





Model	D2RV-L2	D2RV-L2G
OF max.	0.25 N {25 gf}	0.49 N {50 gf}
PT max.	4 mm	
OT min.	1 mm	
MD max.	1.6 mm	
OP	20.7±1.2 mm	

Precautions

Refer to pages 26 to 31 for common precautions.

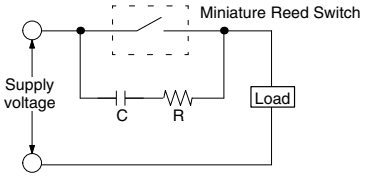
■ Designing

Contact Protection

Depending on the load, an appropriate protective circuit must be connected across or to the Switch so as to ensure the rated durability of the Switch.

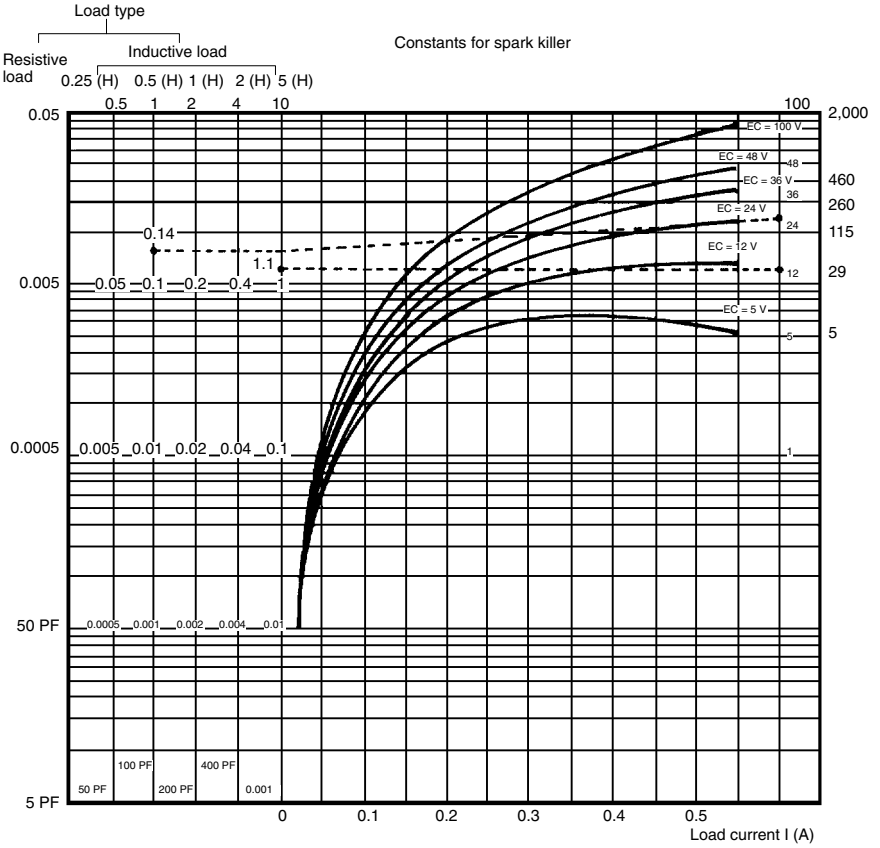
Inductive Load

If the load is inductive, connect a spark killer across the Switch to diminish the spark discharge that may occur when the Switch contacts release.



The constants of this spark killer, i.e., resistance R and capacitance C, can be obtained from the graph shown if the following constants are known:

Load current I
Load voltage E = EC
Inductance L



To obtain R, start on the load voltage E axis on the graph. Run up to the point on the axis indicating the given load voltage and then across to the R axis. For example, if E is 24 VDC, R is about 115 Ω.

Next, to determine C, L must be known. Suppose L is 0.5 H, I is 0.5 A, and E is 24 VDC. Then C can be obtained by following these steps:

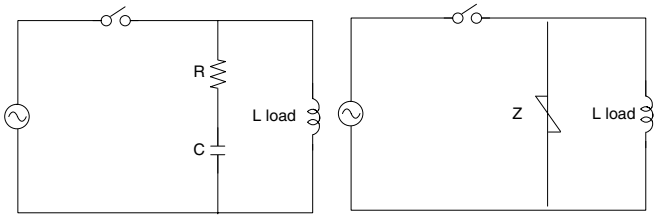
1. Plot the value of E, 24 V, on the E axis.
2. Plot the point where the EC curve corresponding to E, or the EC = 24 V curve intersects with the value of I, 0.5 A.
3. Join points E and the intersection of EC with I with a straight line. This line is the top dotted line in the graph.
4. Find the point the E-EC line intersects with the value of L, 0.5 H. This intersection indicates the value of 0.14 μF. This is the capacitance the constant C must satisfy.

Another Example

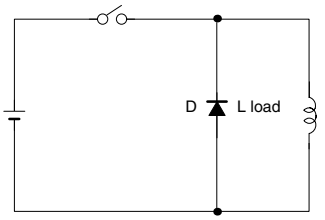
For the sake of practice, obtain the value of C where I = 0.4 A, E = 12 VDC, and L = 5 H. The E-EC line in this case is the bottom dotted line on the graph. It indicates the value of 1.1 μF. So, use a capacitor having a capacitance of 1.1 μF.

Example of Other Protective Circuits

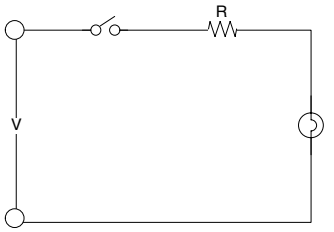
For AC circuit load



For DC circuit load



For lamp load



For Electronic Circuit Load

If an electric circuit is connected to the Switch as the load, a high response speed is required from the Switch. To assure the rated response speed of the Switch and to prevent contact bounce, insert an integral circuit between the Switch and the load.

Change in Characteristics Due to Temperature Fluctuation

The characteristics of the Switch may be changed with the temperature.

■ Correct Use

Handling

Do not drop the Reed Switch on a hard object such as floor because the internal mechanism of the Switch may be damaged and, as a result, the characteristics of the Switch may be degraded.

Install the Switch so that the actuator can move at least 70% of the rated travel and returns to the free position when the Switch is released.

Take adequate preventive measures against inrush current and surge voltage. Under the load conditions where severe transient phenomena take place, metal deposition may occur between the mating contacts of the Switch, degrading the electrical and mechanical characteristics and contact reliability of the Switch.

Lead Wiring

To solder the lead to the terminal, apply a soldering iron rated at 30 W max. quickly (within 5 seconds) with the actuator at the free position.
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.

Mounting

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

When installing two or more Switches side by side, provide at least 8 mm between the adjacent Switches. If this is impossible, attach the optional magnetic baffle D2RV-□-I to the Switches.

■ Connector

Refer to terminal connections on page 282.

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

Cat. No. B056-E1-03B

D3V/V/VX/D2MV/K/D2RV Common Accessories

Ordering Information

■ Actuators (Sold Separately)

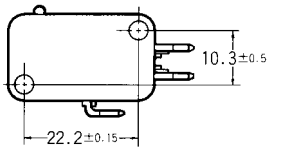
Actuators are supplementary components used when operating the Switch using cams or dogs or when transmitting mechanical movements that are not in alignment with the switch plunger.

The VAL models are suitable for cases where a Switch is operated by a rotary cam or sliding devices with relatively low operation frequency.

The VAM models are designed to operate in reverse movements and have high shock and vibration resistance. Since the OT of these models is rather large, these models can be used for automatic control or door switches of machining tools.

The VAV models can be used for cases where a small OF is required.

Note: 1. These Actuators do not include Switches.
2. Switches with the mounting holes shown below can be used except for special models.

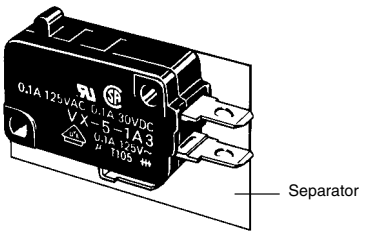


■ Separators (Insulation Sheet) (Sold Separately)

Applicable Switches	Thickness	Model
D3V, V, VX, D2MV, K, D2RV, D2VW	0.18	Separator for V0.18
	0.25	Separator for V0.25

Note: The Separator is made of epoxy alkyd/varnish tetron cloth and has heat-resistant temperature of 130°C.

Separator for V□

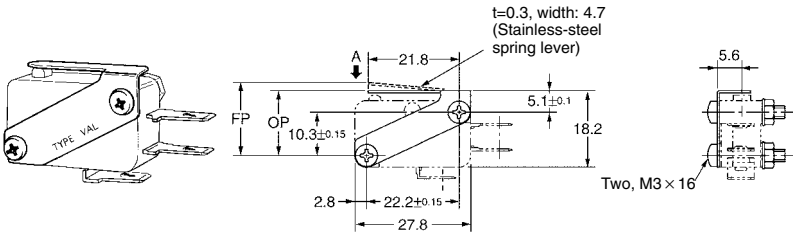


■ Dimensions and Operating Characteristics

Note: 1. All units are in millimeter unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
3. For operating characteristics of models not listed above, consult your OMRON sales representative.
4. The operating characteristics are for operation in the A direction (⬇).
5. Model numbers are for the Actuator only.

Leaf Spring

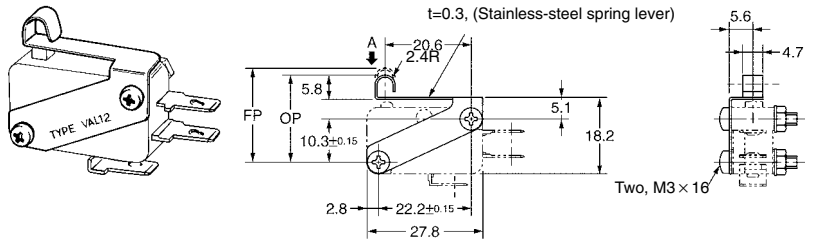
VAL (Designed for models of OF 200 gf and greater)



In the case of V-15-1A5	
OF max.	2.26 N {230 gf}
RF min.	0.49 N {50 gf}
OT min.	0.8 mm
MD max.	0.4 mm
FP max.	17 mm
OP	14.9±0.5 mm

Simulated Leaf Spring

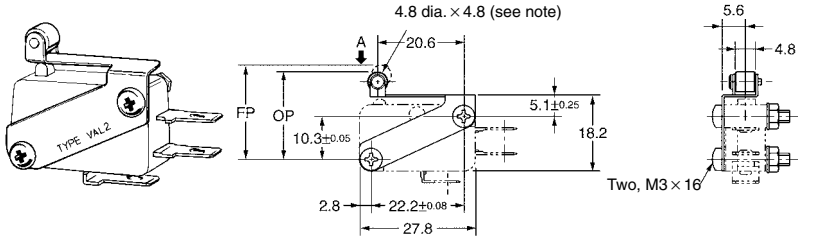
VAL12 (Designed for models of OF 200 gf and greater)



In the case of V-15-1A5	
OF max.	2.26 N {230 gf}
RF min.	0.49 N {50 gf}
OT min.	0.8 mm
MD max.	0.4 mm
FP max.	22.9 mm
OP	20.5±0.8 mm

Roller Leaf Spring

VAL2, VAL02 (Designed for models of OF 200 gf max.)

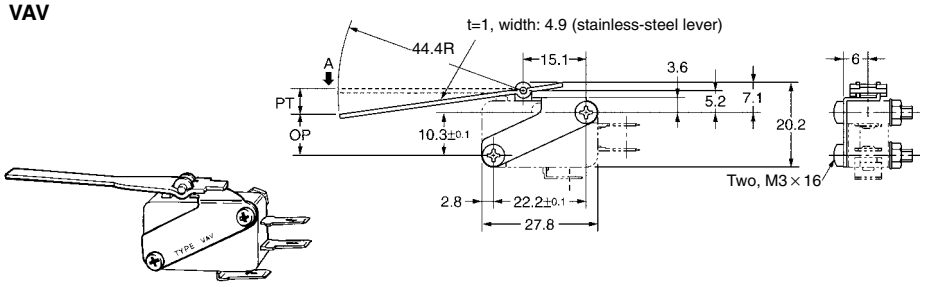


Note: VAL2: Unlubricated polyacetal resin roller
VAL02: Stainless-steel roller

In the case of V-15-1A5	
OF max.	2.26 N {230 gf}
RF min.	0.49 N {50 gf}
OT min.	0.8 mm
MD max.	0.4 mm
FP max.	22.6 mm
OP	20.5±0.5 mm

Long Hinge Lever

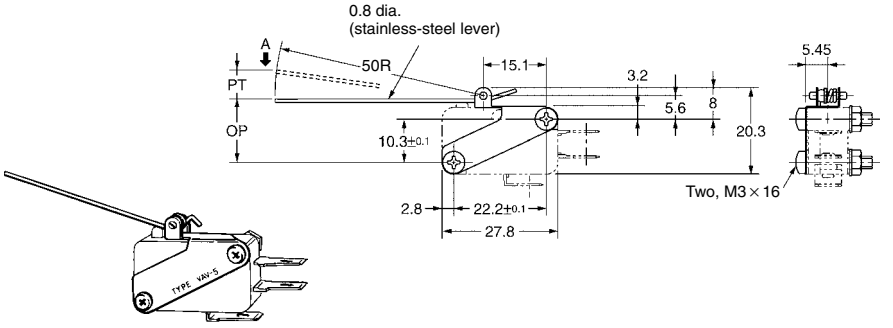
VAV



In the case of V-15-1A5	
OF max.	0.34 N {35 gf}
RF min.	0.04 N {4 gf}
PT max.	7.6 mm
OT min.	3.6 mm
MD max.	4.7 mm
OP	Approx. 10.6 mm

Hinge Wire Lever

VAV-5 (Designed for models of OF 25 gf max.)

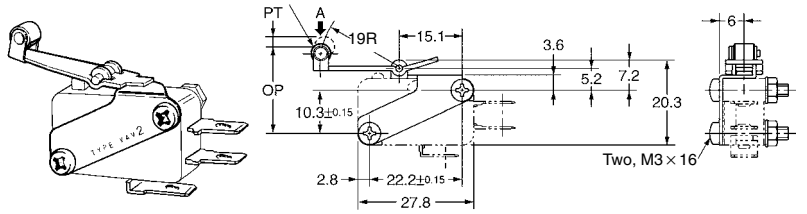


In the case of VX-5-1A2	
OF max.	0.03 N {2.8 gf}
RF min.	0.002 N {0.2 gf}
PT max.	16 mm
OT min.	2 mm
MD max.	5 mm
OP	Approx. 16.7 mm

Hinge Roller Lever

VAV2

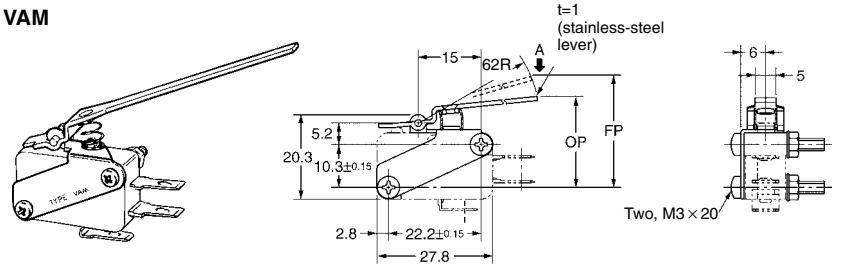
4.8 dia. × 4.8 (Unlubricated polyacetal resin roller)



In the case of V-15-1A5	
OF max.	0.74 N {75 gf}
RF min.	0.09 N {9 gf}
PT max.	4.8 mm
OT min.	1.5 mm
MD max.	1.2 mm
OP	18.6±1.6 mm

Reverse Long Hinge Lever

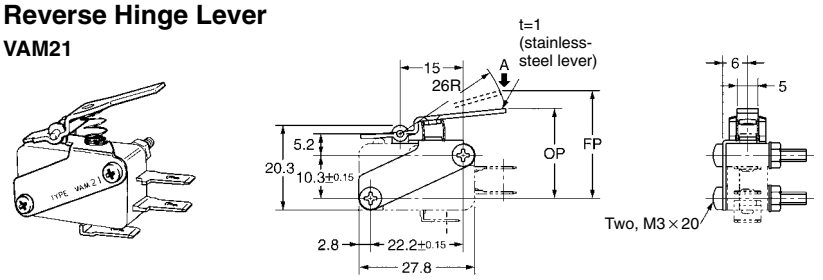
VAM



In the case of V-15-1A5	
OF max.	1.96 N {200 gf}
RF min.	0.29 N {30 gf}
OT min.	7 mm (reference value)
MD max.	5 mm
FP max.	45 mm
OP	20±9 mm

Reverse Hinge Lever

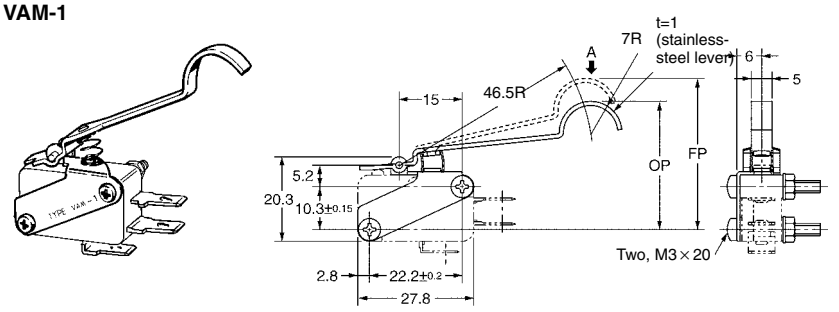
VAM21



In the case of V-15-1A5	
OF max.	3.53 N {360 gf}
RF min.	0.69 N {70 gf}
OT min.	5 mm (reference value)
MD max.	4 mm
FP max.	30 mm
OP	20±4 mm

Reverse Roller Modified Lever

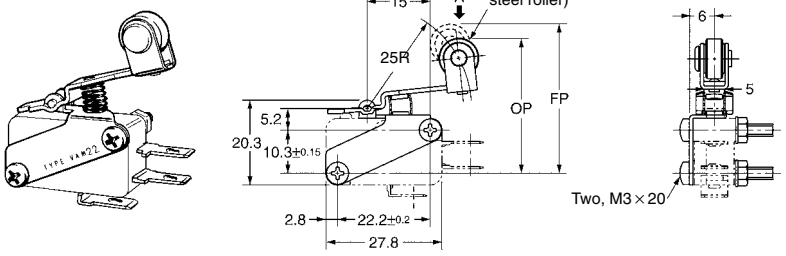
VAM-1



In the case of V-15-1A5	
OF max.	2.94 N {300 gf}
RF min.	0.39 N {40 gf}
OT min.	5 mm (reference value)
MD max.	6 mm
FP max.	47 mm
OP	30±5 mm

Reverse Hinge Roller Lever

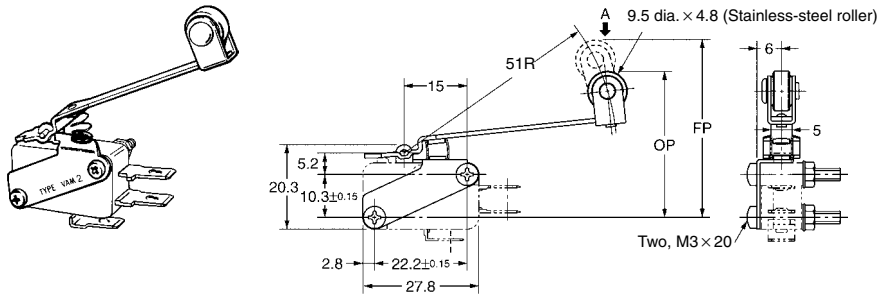
VAM22



In the case of V-15-1A5	
OF max.	3.53 N {360 gf}
RF min.	0.69 N {70 gf}
OT min.	3 mm (reference value)
MD max.	4 mm
FP max.	38 mm
OP	31.3±3 mm

Reverse Long Hinge Roller Lever

VAM2



In the case of V-15-1A5	
OF max.	2.45 N {250 gf}
RF min.	0.39 N {40 gf}
OT min.	7 mm (reference value)
MD max.	6 mm
FP max.	48 mm
OP	31±6 mm

OMRON

Low-torque Basic Switch | D2MC

Highly Reliable Rotary-action Switch for Low Torque Operation (0.5 m N • m {5.1 gf • cm})

- 0.5-A rated model employs crossbar gold-alloy contacts for excellent contact reliability in the micro load range.
- 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 30 VDC

2. Maximum Operating Torque (OTq)
- 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	OTq max.	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	D2MC-01HL

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 160.

Specifications

■ Ratings

Model	Item: Rated voltage	Resistive load
D2MC-5	125 VAC	5 A
	250 VAC	5 A
D2MC-01	125 VAC	0.5 A
	30 VDC	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	D2MC-5	D2MC-01
Operating speed	1° to 360°/sec	
Operating frequency	Mechanical: 240 operations/min max. Electrical: 30 operations/min max.	
Insulation resistance	100 MΩ min. (at 500 VDC)	
Contact resistance (initial value)	20 mΩ max.	100 mΩ max.
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 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude	
Shock resistance (see note 2)	Destruction: 1,000 m/s^2 {100 G} max. Malfunction: Models with OTq of 0.5 mN • m: 100 m/s^2 {10 G} max. Models with OTq of 0.75 mN • m: 100 m/s^2 {10 G} max. Models with OTq of 1.00 mN • m: 200 m/s^2 {20 G} max.	
Durability (see note 3)	Mechanical: 10,000,000 operations min. (60 operations/min) Electrical: 100,000 operations min. (30 operations/min)	Mechanical: 10,000,000 operations min. (60 operations/min) Electrical: 100,000 operations min. (30 operations/min, 125 VAC, 30 VDC 0.1 A)
Degree of protection	IEC IP40	
Degree of protection against electric shock	Class I	
Proof tracking index (PTI)	175	
Ambient operating temperature	–25°C to 80°C (at ambient humidity of 60% max.) (with no icing)	
Ambient operating humidity	35% to 85% max. (for 5°C to 35°C)	
Weight	Approx. 10 g	

Note: 1. The data given above are initial values.
2. Malfunction: 1 ms max.
3. For testing conditions, contact your OMRON sales representative.

■ Approved Standards

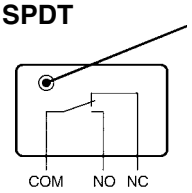
Consult your OMRON sales representative for specific models with standard approvals.

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



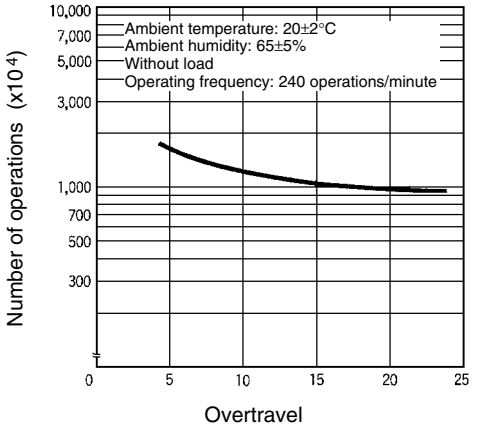
■ Contact Specifications

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.
Minimum applicable load (see note)		160 mA at 5 VDC	1 mA at 5 VDC

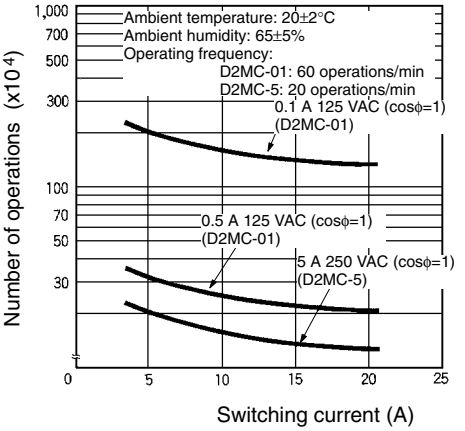
Note: For more information on the minimum applicable load, refer to Using Micro Loads on page 160.

Engineering Data (Reference Values)

Mechanical Durability



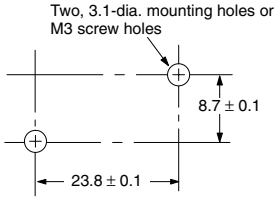
Electrical Durability



Dimensions

■ Mounting Holes

Note: All units are in millimeters unless otherwise indicated.

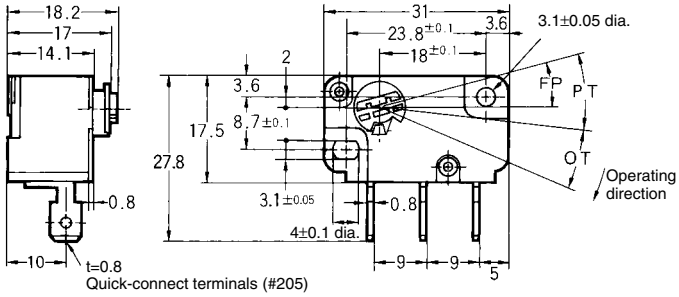


■ Dimensions and Operating Characteristics

Note: 1. All units are in millimeters unless otherwise indicated.
2. The □ in the model number are for the Ratings and OTq code.
3. The angle given for the free position (FP) is the angle made with the horizontal.

Clockwise

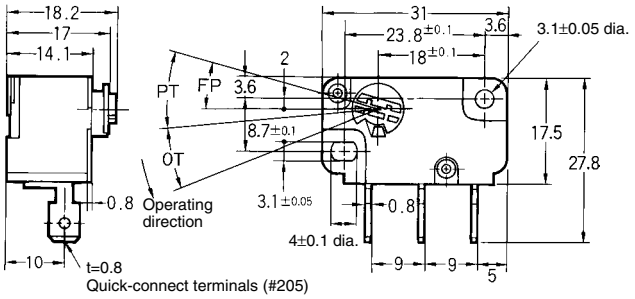
D2MC-□□



Model	D2MC-5E D2MC-01E	D2MC-5F D2MC-01F	D2MC-5H D2MC-01H
OTq 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}
RTq min.	0.06 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°	21°	21°
OT min.	17°	17°	17°
MD min.	3°	3°	3°
RT min.	5°	5°	5°
TT min.	38°		
FP	15±3° (see note 3)		

Counterclockwise

D2MC-□□L

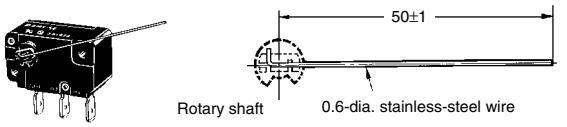


Model	D2MC-5EL D2MC-01EL	D2MC-5FL D2MC-01FL	D2MC-5HL D2MC-01HL
OTq max.	0.5 mN • m {5.1 gf • cm}	0.75 mN • m {7.6 gf • cm}	1.0 mN • m {10.2 gf • cm}
RTq min.	0.06 mN • m {0.6 gf • cm}	0.09 mN • m {0.9 gf • cm}	0.13 mN • m {1.3 gf • cm}
PT max.	21°	21°	21°
OT min.	17°	17°	17°
MD min.	3°	3°	3°
RT min.	5°	5°	5°
TT min.	38°		
FP	15±3° (see note 3)		

Accessories (Sold Separately)

■ Actuator Lever

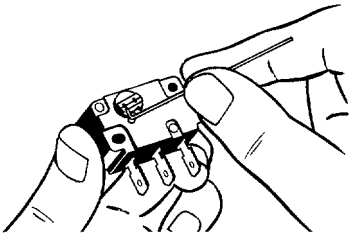
CAA1M for Snap-on Mounting



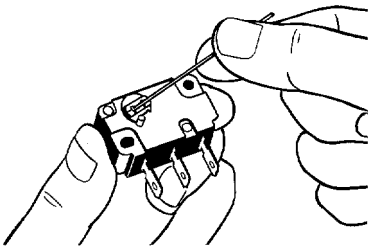
In addition to the standard wire lever model shown here, various other levers are available upon request.

Mounting Actuator Lever

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



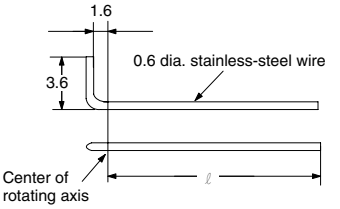
2. Push the lever down in the direction of the groove in the rotary disc.



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

Refer to pages 26 to 31 for common precautions.

■ Correct Use

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}.

Do not change the operating position by modifying the actuator.

Using Micro Loads

For details, refer to *General Information.*

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

Cat. No. B051-E1-07B

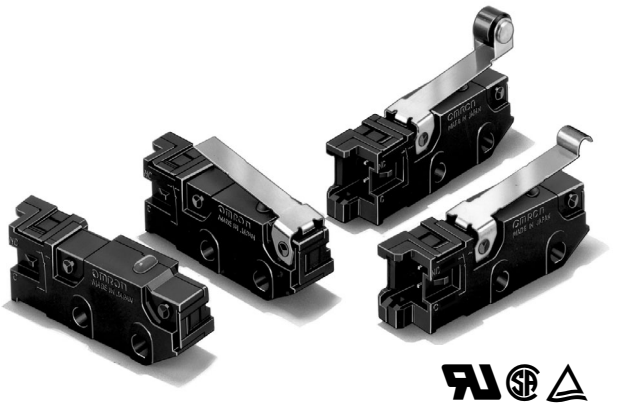
OMRON

Subminiature Basic Switch

D3M

Quick-connect Terminals Simplify Wiring and Reduce Production Steps

- Easy wiring is ensured by quick-connect terminals, and horizontal layout of terminals saves mounting space.
- External actuator mounts in either of two directions to increase Switch mounting flexibility.
- Same mounting pitch as the OMRON SS Subminiature Basic Switch.



Ordering Information

■ Model Number Legend

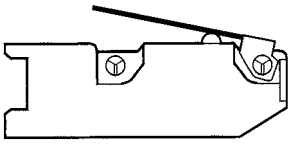
D3M-01□□□

1 2 3

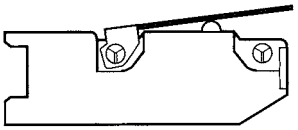
1. Actuator Mounting Position

None: No actuator

K: Pushbutton close to actuator fulcrum



L: Pushbutton far from actuator fulcrum



2. Actuator

None: Pin plunger

1: Hinge lever

2: Hinge roller lever

3: Simulated roller lever

3. Contact Form

None: SPST-NC (with red pushbutton)

-3: SPST-NO (with black pushbutton)

Note: For details about models with a low operating force, contact your OMRON sales representative.

■ List of Models

Actuator	Actuator mounting position		Contact type	Model
Pin plunger	---		SPST-NC	D3M-01
			SPST-NO	D3M-01-3
Hinge lever	K		SPST-NC	D3M-01K1
			SPST-NO	D3M-01K1-3
	L		SPST-NC	D3M-01L1
			SPST-NO	D3M-01L1-3
Hinge roller lever	K		SPST-NC	D3M-01K2
			SPST-NO	D3M-01K2-3
	L		SPST-NC	D3M-01L2
			SPST-NO	D3M-01L2-3
Simulated roller lever	K		SPST-NC	D3M-01K3
			SPST-NO	D3M-01K3-3
	L		SPST-NC	D3M-01L3
			SPST-NO	D3M-01L3-3

Specifications

■ Ratings

Rated voltage	Resistive load
30 VDC	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

■ Characteristics

Operating speed	0.1 mm/s to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 400 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. at 500 VDC
Contact resistance (initial value) (see note 2)	100 mΩ max. including connector and 50-mm AWG28 lead-wire resistance
Dielectric strength (see note 3)	1,000 VAC at 50/60 Hz for 1 min between terminals of the same polarity 1,500 VAC at 50/60 Hz for 1 min between charged metal part and ground 1,500 VAC at 50/60 Hz for 1 min between non-charged metal part and each terminal
Vibration resistance (see note 4)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 4)	Destruction: 1,000 m/s^2 {approx. 100G} max. Malfunction: 300 m/s^2 {approx. 30G} max.
Durability (see note 5)	Mechanical: 500,000 operations min. (60 operations/min) Electrical: 200,000 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. 2 g (pin plunger models)

Note: 1. The data given above are initial values.
2. Includes the resistance of the connector and lead wire (AWG #28, 50-mm length).
3. The dielectric strength values shown in the table are for models with a Separator. (Refer to page 175.)
4. 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.
5. For testing conditions, contact your OMRON sales representative.

■ 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	D3M
30 VDC	0.1 A

EN61058-1 (File No. R9750979, TÜV Rheinland approval)

Rated voltage	D3M
30 VDC	0.1 A

Testing conditions: 1E5 (100,000 operatings), T85 (0°C to 85°C)

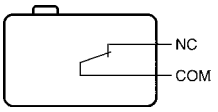
■ Contact Specifications

Contact	Crossbar
Material	Gold alloy
Distance between contacts	0.5 mm
Inrush current	1 A max.
Minimum applicable load (see note)	1 mA at 5 VDC

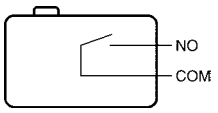
Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 167.

■ Contact Form

SPST-NC



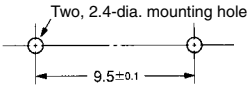
SPST-NO



Dimensions

■ Mounting Holes

Note: All units are in millimeters unless otherwise indicated.

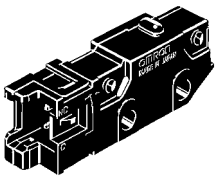


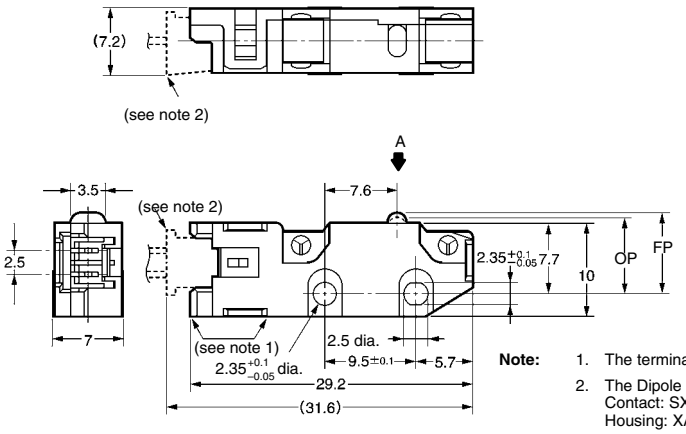
■ Dimensions and Operating Characteristics

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 the A direction (⬇).

Pin Plunger Models

D3M-01
D3M-01-3



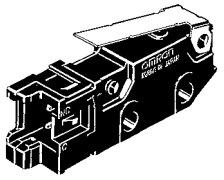


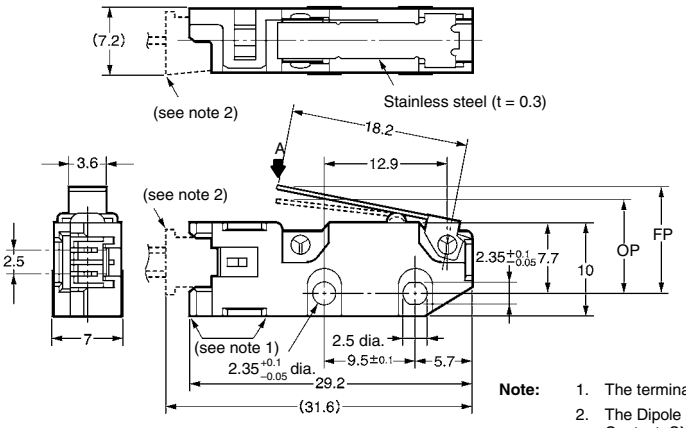
Model	D3M-01 D3M-01-3
OF max.	1.50 N {153 gf}
RF min.	0.25 N {25 gf}
PT max.	0.6 mm
OT min.	0.4 mm
MD max.	0.1 mm
OP	8.4±0.3 mm

Note: 1. The terminals connect to JST's Dipole XA Connector.
2. The Dipole XA Connector consists of the following components.
Contact: SXA-001T-P0.6
Housing: XAP-02V-1

Hinge Lever Models (K)

D3M-01K1
D3M-01K1-3



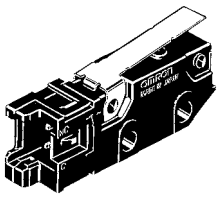


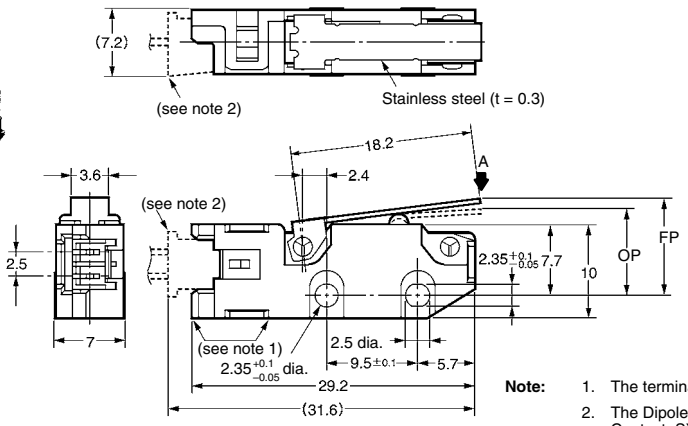
Model	D3M-01K1 D3M-01K1-3
OF max.	0.50 N {51 gf}
RF min.	0.06 N {6 gf}
OT min.	1.2 mm
MD max.	0.8 mm
FP max.	14.0 mm
OP	10.0±0.8 mm

Note: 1. The terminals connect to JST's Dipole XA Connector.
2. The Dipole XA Connector consists of the following components.
Contact: SXA-001T-P0.6
Housing: XAP-02V-1

Hinge Lever Models (L)

D3M-01L1
D3M-01L1-3



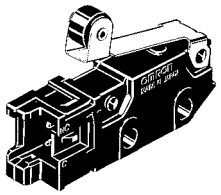


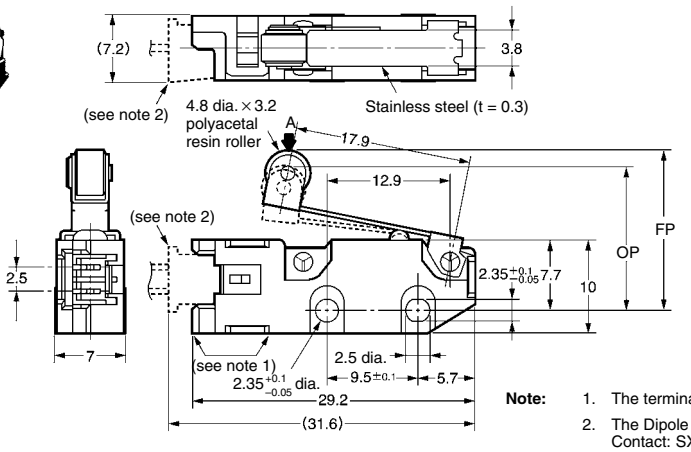
Model	D3M-01L1 D3M-01L1-3
OF max.	1.00 N {102 gf}
RF min.	0.10 N {10 gf}
OT min.	0.7 mm
MD max.	0.6 mm
FP max.	11.5 mm
OP	9.2±0.6 mm

Note:
1. The terminals connect to JST's Dipole XA Connector.
2. The Dipole XA Connector consists of the following components.
   Contact: SXA-001T-P0.6
   Housing: XAP-02V-1

Hinge Roller Lever Models (K)

D3M-01K2
D3M-01K2-3



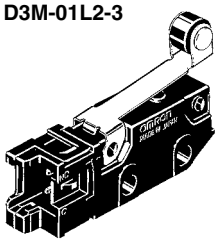


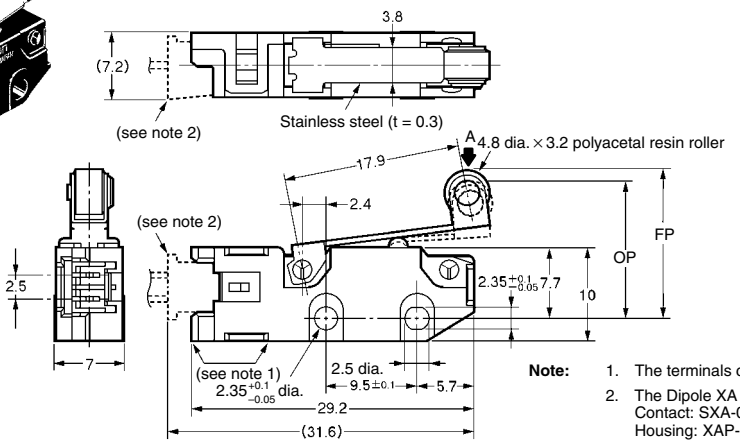
Model	D3M-01K2 D3M-01K2-3
OF max.	0.50 N {51 gf}
RF min.	0.06 N {6 gf}
OT min.	1.2 mm
MD max.	0.8 mm
FP max.	19.7 mm
OP	15.7±0.8 mm

Note:
1. The terminals connect to JST's Dipole XA Connector.
2. The Dipole XA Connector consists of the following components.
   Contact: SXA-001T-P0.6
   Housing: XAP-02V-1

Hinge Roller Lever Models (L)

D3M-01L2
D3M-01L2-3



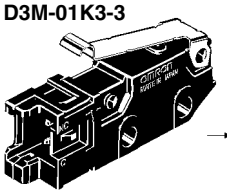


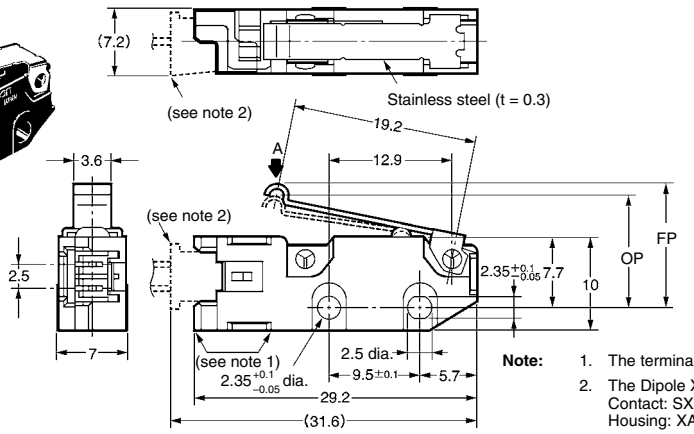
Model	D3M-01L2 D3M-01L2-3
OF max.	1.00 N {102 gf}
RF min.	0.10 N {10 gf}
OT min.	0.7 mm
MD max.	0.6 mm
FP max.	17.2 mm
OP	14.9±0.6 mm

Note:
1. The terminals connect to JST's Dipole XA Connector.
2. The Dipole XA Connector consists of the following components.
   Contact: SXA-001T-P0.6
   Housing: XAP-02V-1

Simulated Roller Lever Models (K)

D3M-01K3
D3M-01K3-3



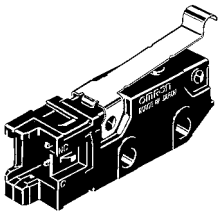


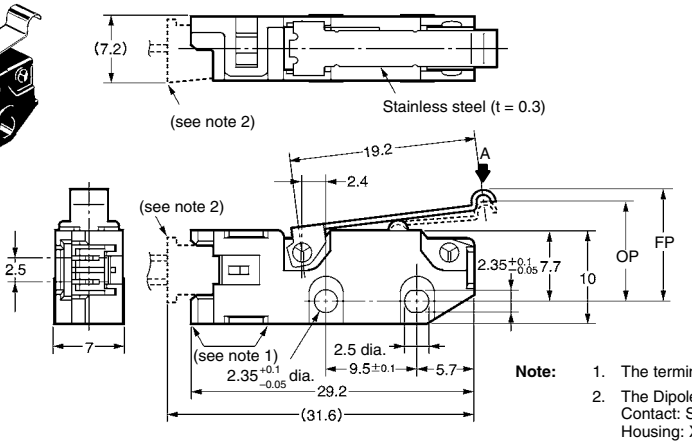
Model	D3M-01K3 D3M-01K3-3
OF max.	0.50 N {51 gf}
RF min.	0.06 N {6 gf}
OT min.	1.2 mm
MD max.	0.8 mm
FP max.	16.2 mm
OP	12.2±0.8 mm

Note:
1. The terminals connect to JST's Dipole XA Connector.
2. The Dipole XA Connector consists of the following components.
   Contact: SXA-001T-P0.6
   Housing: XAP-02V-1

Simulated Roller Lever Models (L)

D3M-01L3
D3M-01L3-3





Model	D3M-01L3 D3M-01L3-3
OF max.	1.00 N {102 gf}
RF min.	0.10 N {10 gf}
OT min.	0.7 mm
MD max.	0.6 mm
FP max.	13.6 mm
OP	11.3±0.6 mm

Note:
1. The terminals connect to JST's Dipole XA Connector.
2. The Dipole XA Connector consists of the following components.
   Contact: SXA-001T-P0.6
   Housing: XAP-02V-1

Precautions

Refer to pages 26 to 31 for common precautions.

■ Correct Use

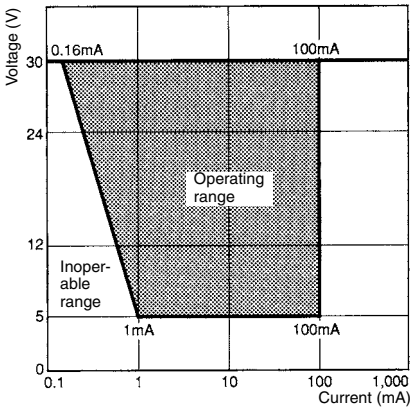
Mounting

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}.

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% (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%.



■ Connectors

The terminals connect to JST's XA Connector.

The XA Connector consists of the following components.
Contact: SXA-001T-P0.6
Housing: XAP-02V-1

OMRON does not sell the XA 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

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

Cat. No. B100-E1-02B

OMRON

Subminiature Basic Switch | SS

Subminiature Basic Switch Offers Long Life of 30,000,000 Operations

- A design that combines simplicity and stability by the use of two split springs ensures a long service life of 30,000,000 operations.
- A variety of models are available, with operating force ranging from low to high.
- Solder, quick-connect terminals (#110) and PCB terminals are available.
- Approval obtained for standards including UL, CSA, and VDE.

Ordering Information

■ Model Number Legend

SS-□□□□□
1 2 3 4 5

1. Ratings
- 10: 10.1 A at 125 VAC
- 5: 5 A at 125 VAC
- 01: 0.1 A at 30 VDC

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

3. Maximum Operating Force (see note 1)
- None: 1.47 N {150 gf}
- -F: 0.49 N {50 gf} (0.1 A, 5 A)
- -E: 0.25 N {25 gf} (0.1 A)

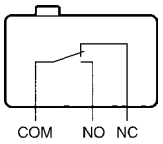
4. Contact Form
- None: SPDT
- -2: SPST-NC
- -3: SPST-NO

5. Terminals
- None: Solder terminals
- T: Quick-connect terminals (#110)
- D: PCB terminals (see note 2)

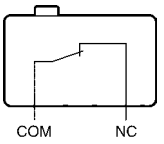
Note: 1. These values are for the pin plunger models.
2. The PCB terminals has a right-angle terminal option.
D1: Left-angled terminals
D2: Right-angled terminals
3. When suffix "-T" is placed after the model number, the model withstands high temperatures (–25°C to 120°C).

■ Contact Form

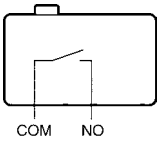
SPDT



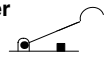
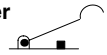
SPST-NC



SPST-NO



■ List of Models

Rating	Actuator	OF max.	Solder terminals	Quick-connect terminals (#110)	PCB terminals
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 roller 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	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 roller 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	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 roller 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: Consult your OMRON sales representative for details on SPST-NO and SPST-NC models.

Specifications

■ Ratings

Model	Item: Rated voltage	Resistive load
SS-10	250 VAC	10.1 A
SS-5	125 VAC 250 VAC	5 A 3 A
SS-01	125 VAC	0.1 A
	30 VDC	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	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
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). The inductive load rating of SS-10 is the same as that of SS-5.
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.

■ Characteristics

Operating speed	0.1 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 400 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	OF 1.47 N {150 gf}: SS-10, SS-5 models: 30 mΩ max. SS-01 models: 50 mΩ max. OF 0.49 N {50 gf}: SS-5 models: 50 mΩ max. SS-01 models: 100 mΩ max. OF 0.25 N {25 gf}: SS-01 models: 150 mΩ max.
Dielectric strength (see note 2)	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
Vibration resistance (see note 3)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 4)	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.
Durability (see note 5)	Mechanical: 30,000,000 operations min. (60 operations/min) (Refer to the following *Engineering Data*.) 10,000,000 operations min. (60 operations/min) for SS-10 models Electrical: 200,000 operations min. (30 operations/min) (Refer to the following *Engineering Data*.) 50,000 operations min. (30 operations/min) for SS-10 models
Degree of protection	IEC IP40
Degree of protection against electrical shock	Class 1
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 (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.
4. Lever-type models: Total travel position (with a contact separation time of 1 ms max.)
5. For testing conditions, contact your OMRON sales representative.

■ 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	SS-10	SS-5	SS-01
125 VAC 250 VAC	--- 10.1 A	5 A 3 A	0.1 A ---
30 VDC	---	---	0.1 A

EN61058-1 (File No. 129246 for SS-5, 125256 for SS-10, VDE approval)

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

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

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

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

■ Contact Specifications

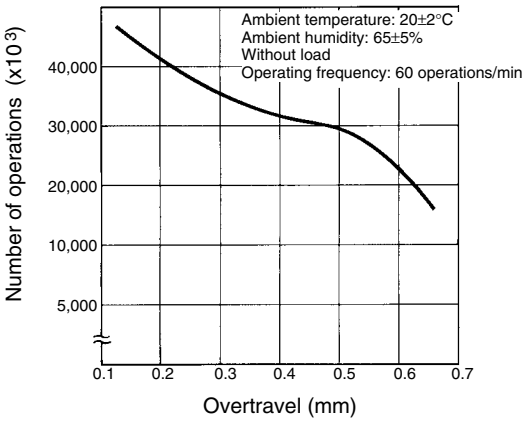
Item		SS-10	SS-5	SS-01
Contact	Specification	Rivet		Crossbar
	Material	Silver alloy	Silver	Gold alloy
	Gap (standard value)	0.5 mm		0.25 mm
Inrush current	NC	20 A max.		1 A max.
	NO	15 A max.	10 A max.	1 A max.
Minimum applicable load (see note)		160 mA at 5 VDC		1 mA at 5 VDC

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 175.

Engineering Data (Reference Values)

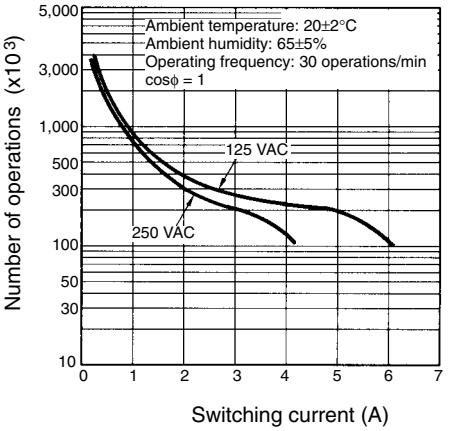
Mechanical Durability (Pin Plunger Models)

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



Electrical Durability (Pin Plunger Models)

SS-5 Models



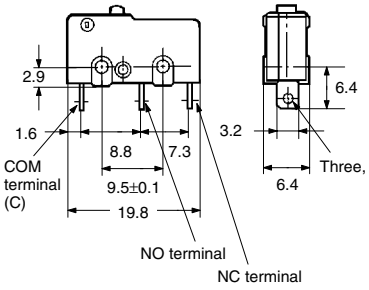
Dimensions

Note: All units are in millimeters unless otherwise indicated.

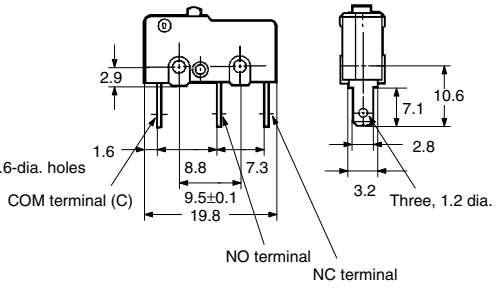
■ Terminals

Terminal plate thickness is 0.5 mm for all models.

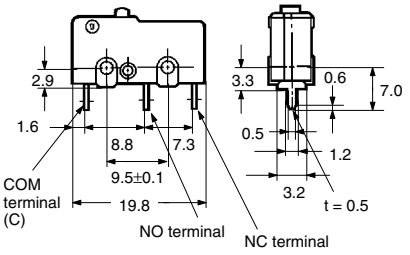
Solder Terminals



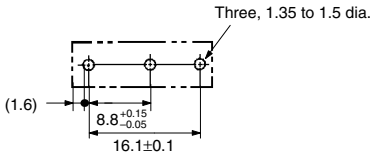
Quick-connect Terminals (#110)



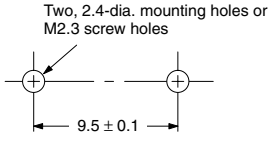
PCB Terminals



PCB Mounting Dimensions (Reference)



■ Mounting Holes



■ Dimensions and Operating Characteristics

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

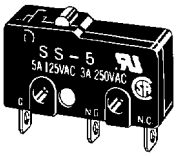
2. The following illustration and drawing are for solder terminal models. Refer to page 172 for details on models with quick-connect terminals (#110) or PCB terminals.

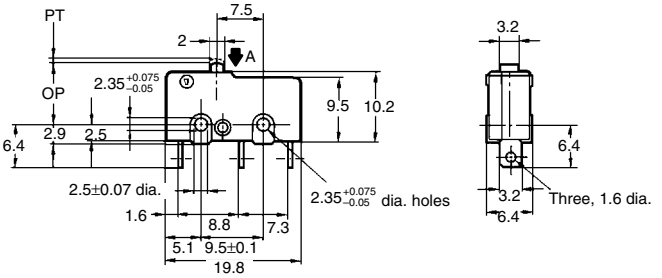
3. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

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

Pin Plunger Models

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

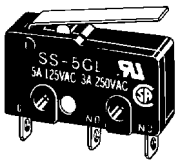


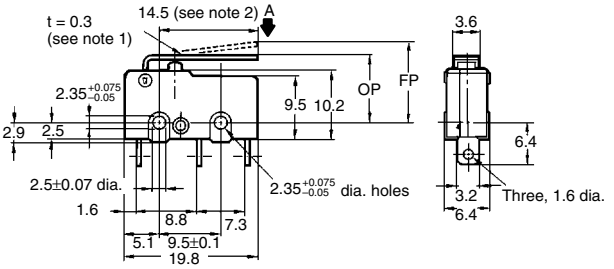


Model	SS-01-E	SS-01-F SS-5-F	SS-01 SS-5	SS-10
OF max.	0.25 N {25 gf}	0.49 N {50 gf}	1.47 N {150 gf}	1.47 N {150 gf}
RF min.	0.02 N {2 gf}	0.04 N {4 gf}	0.25 N {25 gf}	0.25 N {25 gf}
PT max.	0.5 mm	0.5 mm	0.5 mm	0.6 mm
OT min.	0.5 mm	0.5 mm	0.5 mm	0.4 mm
MD max.	0.1 mm	0.1 mm	0.1 mm	0.12 mm
OP	8.4±0.5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

Hinge Lever Models

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





Note: 1. Stainless-steel lever

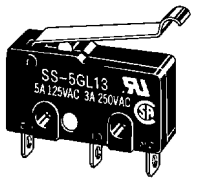
2. Besides the SS-□GL models with a hinge lever length of 14.5, the SS-□GL11 models with a hinge lever length of 18.5, the SS-□GL111 models with a hinge lever length of 22.6, and the SS-□GL1111 models with a hinge lever length of 37.8 are available. Contact your OMRON representative for these models

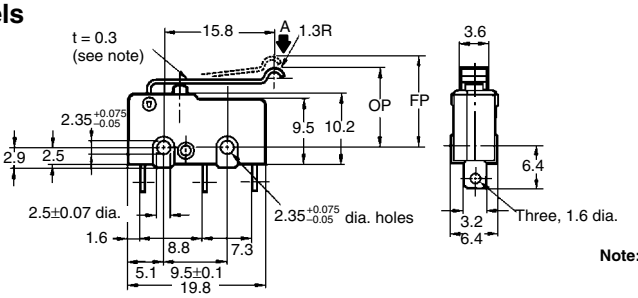
Model	SS-01GL-E	SS-01GL-F SS-5GL-F	SS-01GL SS-5GL	SS-10GL
OF max.	0.08 N {8 gf}	0.16 N {16 gf}	0.49 N {50 gf}	0.49 N {50 gf}
RF min.	0.01 N {1 gf} (reference value)	0.02 N {2 gf}	0.06 N {6 gf}	0.06 N {6 gf}
OT min.	1.2 mm	1.2 mm	1.2 mm	1.0 mm
MD max.	0.8 mm	0.8 mm	0.8 mm	1.0 mm
FP max.	13.6 mm			
OP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

Note: The values indicated in parentheses are reference values for cases when the installation direction is such that the lever weight is not applied to the plunger.

Simulated Roller Lever Models

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





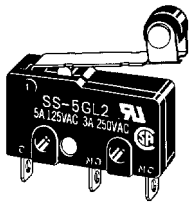
Note: Stainless-steel spring lever

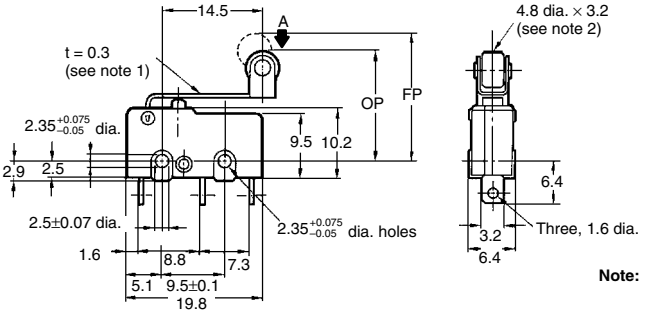
Model	SS-01GL13-E	SS-01GL13-F SS-5GL13-F	SS-01GL13 SS-5GL13	SS-10GL13
OF max.	0.08 N {8 gf}	0.16 N {16 gf}	0.49 N {50 gf}	0.49 N {50 gf}
RF min.	0.01 N {1 gf} (reference value)	0.02 N {2 gf}	0.06 N {6 gf}	0.06 N {6 gf}
OT min.	1.2 mm	1.2 mm	1.2 mm	1.0 mm
MD max.	0.8 mm	0.8 mm	0.8 mm	1.0 mm
FP max.	15.5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

Note: The values indicated in parentheses are reference values for cases when the installation direction is such that the lever weight is not applied to the plunger.

Hinge Roller Lever Models

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} (reference value)	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			

Note: The values indicated in parentheses are reference values for cases when the installation direction is such that the lever weight is not applied to the plunger.

Precautions

Refer to pages 26 to 31 for common precautions.

■ Cautions

Terminal Connection

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 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 Switch may have contact failures if flux intrudes into the interior of the Switch.

Use the following lead wires to connect to the solder terminals.

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

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.

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

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 1.6 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. Refer to Separator on page 152.

■ 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.

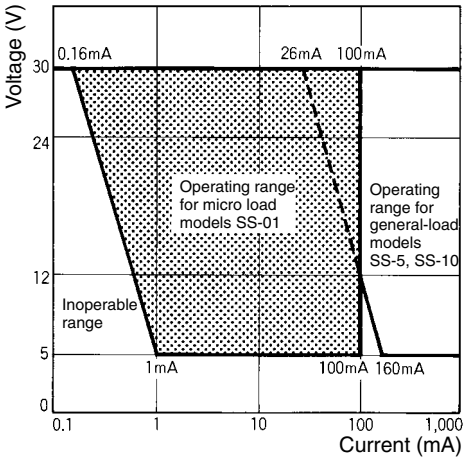
Operating Stroke Setting

Take particular care in setting the operating stroke for the pin plunger models. Make sure that the operating stroke is 70% to 100% of the rated OT distance. Do not operate the actuator exceeding the OT distance, otherwise the durability 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 durability. Therefore, insert a contact protection circuit where necessary.

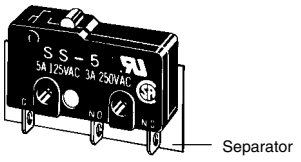
The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ 60). The equation, $\lambda\ 60 = 0.5 \times 10^{-6}$/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with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



■ Separators

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□



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

■ Connector

Refer to Terminal Connectors on page 282.

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

Cat. No. B032-E1-11C

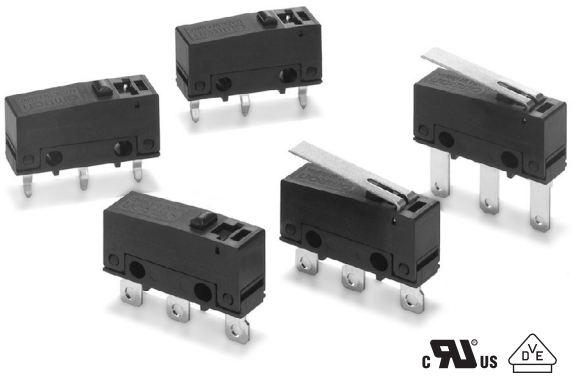
OMRON

Miniature Basic Switch

SS-P

SS Series Compatible Mounting with a Simple Construction and Easy-to-Use Design Concept

- Insert molded case provides enhanced resistance to flux.
- Switch rating of 3 A at 125 V AC possible 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 VDC

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

Model / Rated voltage / 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. Consult your OMRON sales representative for information on models for other loads.

■ Characteristics

Operating speed	0.1 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 300 operations/min max. Electrical: 30 operations/min max.
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 (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. Consult your OMRON sales representative for testing conditions.

■ Approved Standards

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

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

	SS-3P	SS-01P
125 VAC	3 A	0.1 A
30 VDC	3 A	0.1 A

EN61058-1 (File No. 40008425, VDE approval)

	SS-3P	SS-01P
125 VAC	3 A	0.1 A
30 VDC	3 A	0.1 A

Testing conditions: 5E4 (50,000 operations), T55 (0°C to 55°C)

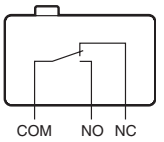
■ Contact Specifications

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

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 180.

■ Contact Form

SPDT

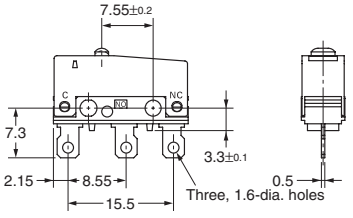


Dimensions

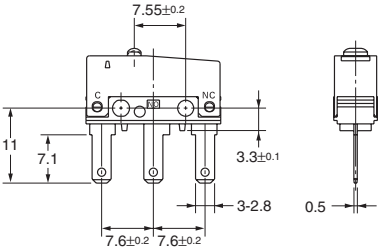
■ Terminals

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

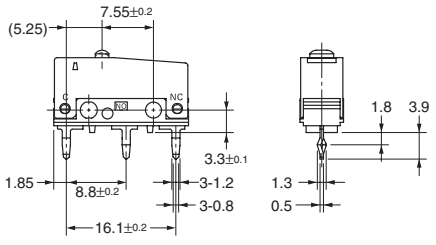
Solder Terminals



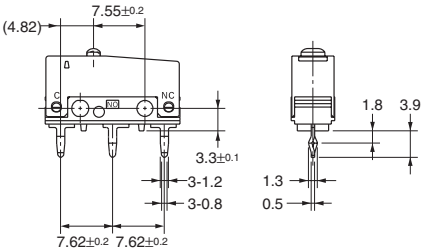
Quick-connect Terminals (#110)



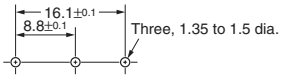
PCB Terminals (Uneven pitch)



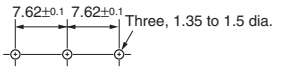
PCB Terminals (Even pitch)



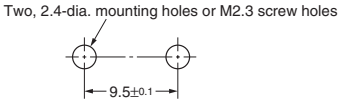
PCB Mounting Dimensions (Reference)



PCB Mounting Dimensions (Reference)



■ Mounting Holes



■ Dimensions and Operating Characteristics

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

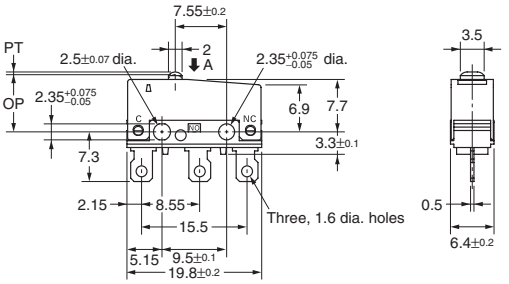
2. The following illustrations and drawings are for solder terminal models. Refer to page 178 for details on models with quick-connect terminals (#110) or PCB terminals.

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

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

Pin Plunger Models

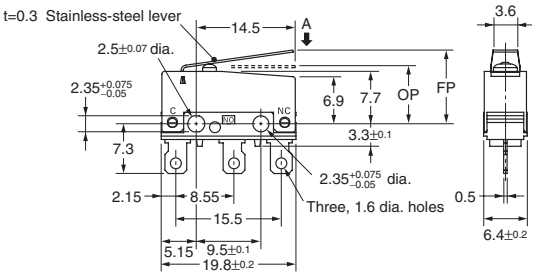
SS-3GP
SS-01GP



Model	SS-3GP	SS-01GP
OF max. RF min.	1.50 N {153 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

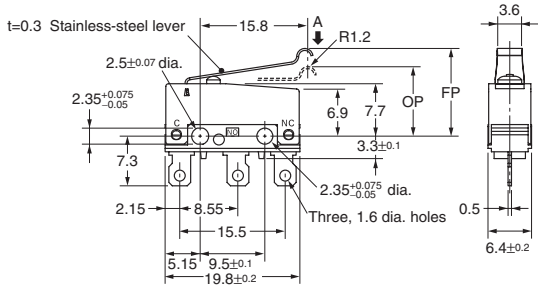
SS-3GLP
SS-01GLP



Model	SS-3GLP	SS-01GLP
OF max. RF min.	0.5 N {51 gf} 0.05 N {5 gf}	
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 {51 gf} 0.05 N {5 gf}	
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.

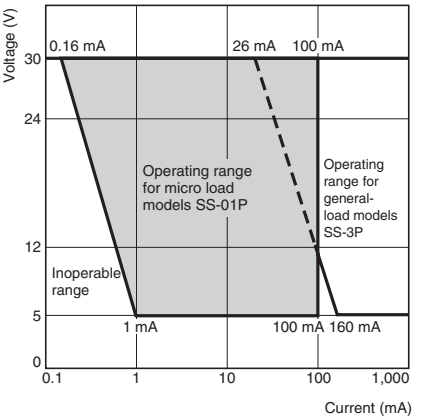
Operating Stroke Setting

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 durability 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 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% ($_{\lambda}60$). 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 MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. B108-E1-01A

OMRON

Subminiature Basic Switch | SSG

Global Subminiature Basic Switch Conforming to EN61058-1 (IEC601058-1), UL1054, and CSA C22.2 No.54

- A wide operating temperature range of –25°C to 125°C is available for at high-temperature use.
- PCB terminal models are resistant to flux.
- Even-pitched PCB terminals.
- Mounting hole size of M2.2.

Ordering Information

■ Model Number Legend

SSG-□□□□□

1 2 3 4 5

1. Ratings
- 5: 5 A at 125 VAC
- 01: 0.1 A at 125 VAC

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

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

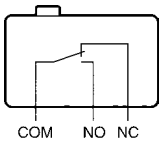
4. Terminals
- H: Solder terminals
- T: Quick-connect terminals (#110)
- P: PCB terminals (SPDT only)

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

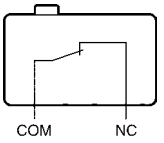
Note: These values are for the pin plunger models.

■ Contact Form

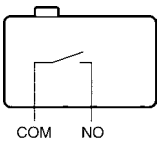
SPDT



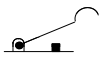
SPST-NC



SPST-NO



■ List of Models

Actuator	Rating	OF max.	Solder terminals	Quick-connect terminals (#110)	PCB terminals
Pin plunger 	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
	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
Hinge lever 	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
	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
Simulated roller lever 	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
	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
Hinge roller lever 	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
	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

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

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.
7. 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 (pin plunger models)
Operating frequency	Mechanical: 400 operations/min max. Electrical: 30 operations/min max.
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)
Durability (see note 2)	Mechanical: 10,000,000 operations min. (60 operations/min) Electrical: 200,000 operations min. (30 operations/min)
Degree of protection (IP code)	IEC IP40
Degree of protection against electrical shock	Class I
Proof tracking index	175
Ambient operating temperature	–25°C to 125°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	85% max. (5°C to 30°C)
Weight	Approx. 1.6 g (pin plunger models)

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

■ 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	SSG-5	SSG-01
125 VAC	5 A	0.1 A
250 VAC	3 A	---
30 VDC	---	0.1 A

EN61058-1 (File No. T9451449, TÜV Rheinland approval)

Rated voltage	SSG-5	SSG-01
250 VAC	5 A	---
30 VDC	---	0.1 A

Testing conditions: 5E4 (50,000 operations), T125 (0°C to 125°C)

■ Contact Specifications

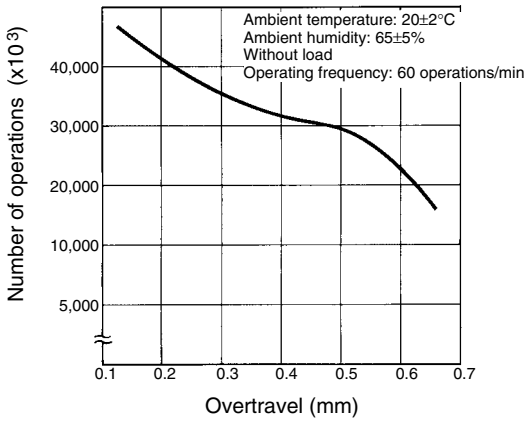
Item		SSG-5	SSG-01H.T	SSG-01P
Contact	Specification	Rivet	Crossbar	Crossbar
	Material	Silver	Gold alloy	Gold alloy
	Gap (standard value)	0.5 mm	0.25 mm	0.5 mm
Inrush current	NC	20 A max.	1 A max.	1 A max.
	NO	10 A max.	1 A max.	1 A max.
Minimum applicable load (see note)		160 mA at 5 VDC	1 mA at 5 VDC	1 mA at 5 VDC

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 189.

Engineering Data (Reference Values)

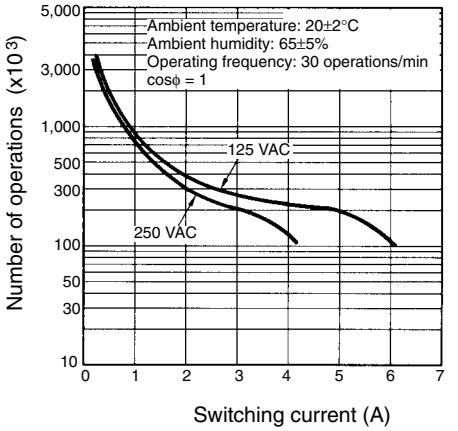
Mechanical Durability (Pin Plunger Models)

SSG-5 Models



Electrical Durability (Pin Plunger Models)

SSG-5 Models

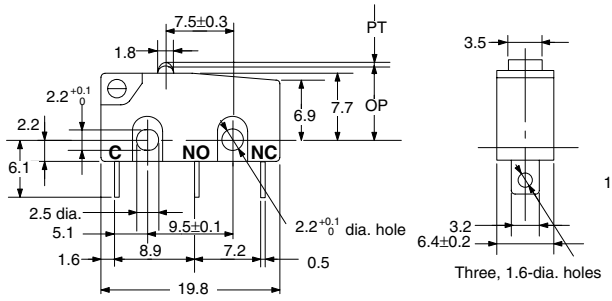


Dimensions

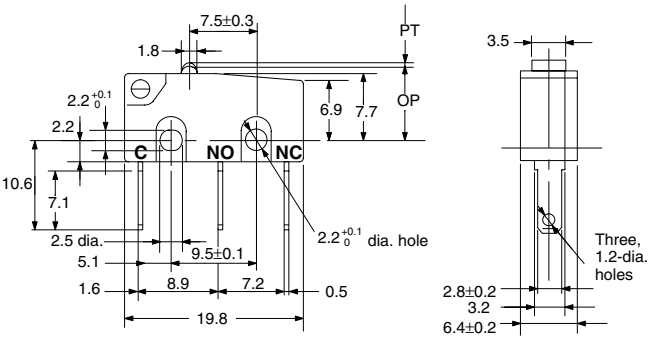
Note: All units are in millimeters unless otherwise indicated.

■ Terminals

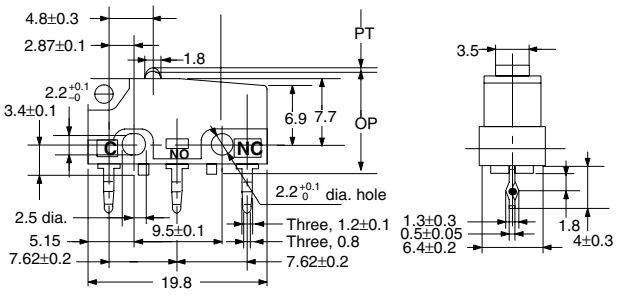
Solder Terminals



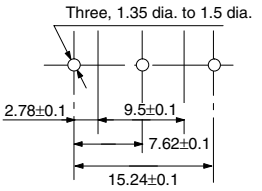
Quick-connect Terminals (#110)



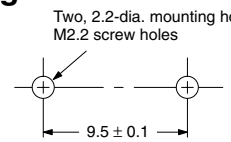
PCB Terminals



PCB Mounting Dimensions (Reference)



■ 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.

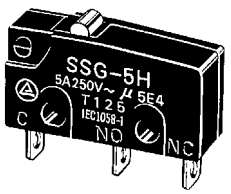
■ Dimensions and Operating Characteristics

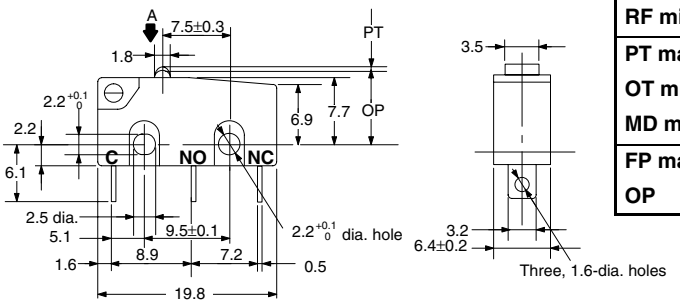
Note: 1. All units are in millimeters unless otherwise indicated.
2. Every actual model number includes the code instead of □ for the kind of terminals incorporated by the model.
3. Unless otherwise specified, a tolerance of ±0.25 mm applies to all dimensions.
4. The operating characteristics are for operation in the A direction (▼).

Solder/Quick-connect Terminals

Pin Plunger Models

SSG-01□
SSG-5□
SSG-01□-5
SSG-5□-5

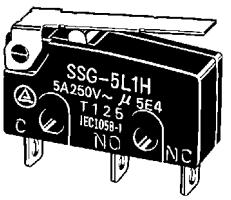


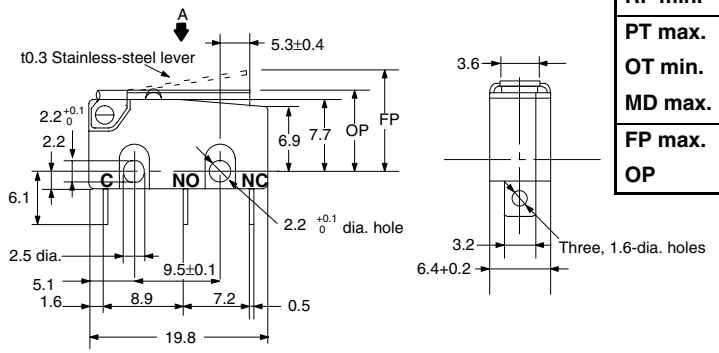


Model	SSG-01□ SSG-5□	SSG-01□-5 SSG-5□-5
OF max.	1.50 N {153 gf}	0.50 N {51 gf}
RF min.	0.25 N {25 gf}	0.04 N {4 gf}
PT max.	0.6 mm	
OT min.	0.4 mm	
MD max.	0.1 mm	
FP max.	---	
OP	8.4±0.3 mm	

Hinge Lever Models

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



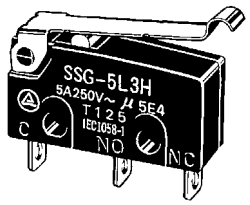


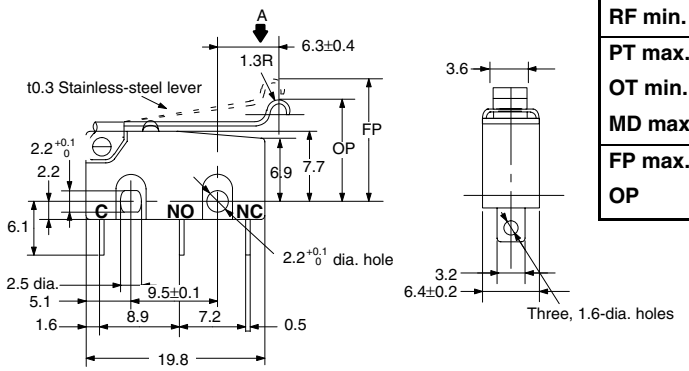
Model	SSG-01L1□ SSG-5L1□	SSG-01L1□-5 SSG-5L1□-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	1.0 mm	
OT min.	0.8 mm	
MD max.	---	
FP max.	13.6 mm	
OP	$8.8^{+1.0}_{-0.6}$ mm	

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. Consult your OMRON sales representative for these models.

Simulated Roller Lever Models

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

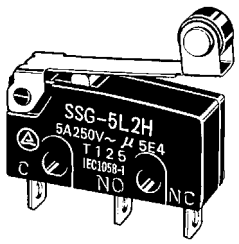


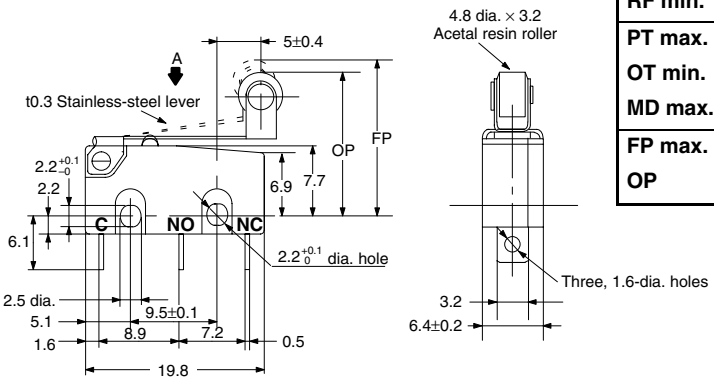


Model	SSG-01L3□ SSG-5L3□	SSG-01L3□-5 SSG-5L3□-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	1.0 mm	
OT min.	0.8 mm	
MD max.	---	
FP max.	15.5 mm	
OP	10.7 +1.0 −0.6 mm	

Hinge Roller Lever Models

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



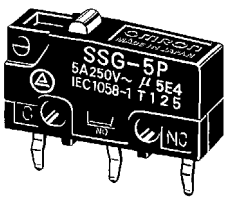


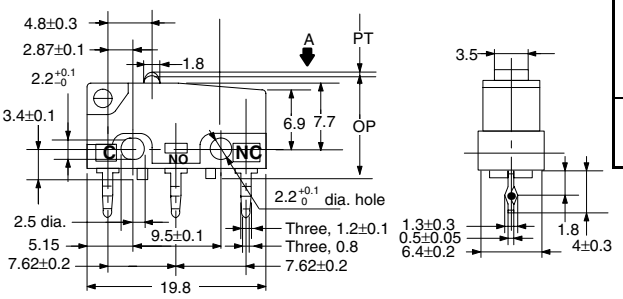
Model	SSG-01L2□ SSG-5L2□	SSG-01L2□-5 SSG-5L2□-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	1.0 mm	
OT min.	0.8 mm	
MD max.	---	
FP max.	19.0 mm	
OP	14.5 +1.0 −0.6 mm	

PCB Terminal Models

Pin Plunger

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

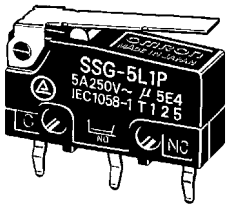


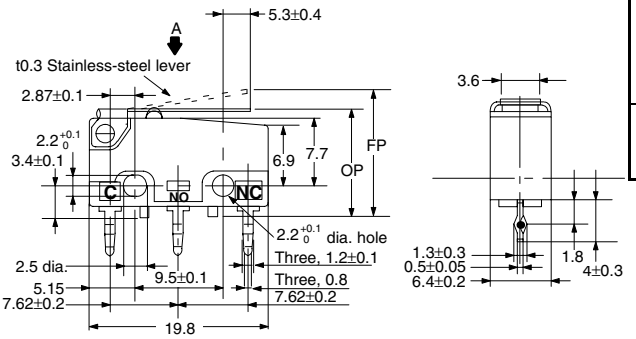


Model	SSG-01P SSG-5P	SSG-01P-5 SSG-5P-5
OF max.	1.50 N {153 gf}	0.50 N {51 gf}
RF min.	0.25 N {25 gf}	0.04 N {4 gf}
PT max.	0.6 mm	
OT min.	0.4 mm	
MD max.	0.1 mm	
FP max.	---	
OP	11.8±0.4 mm	

Hinge Lever Models

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



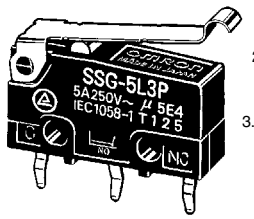


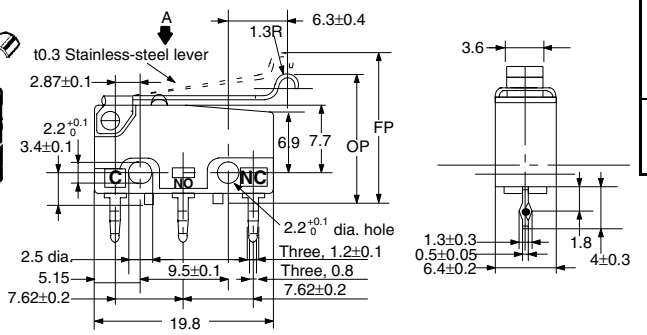
Model	SSG-01L1P SSG-5L1P	SSG-01L1P-5 SSG-5L1P-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	---	
OT min.	1.0 mm	
MD max.	0.8 mm	
FP max.	17.0 mm	
OP	12.2 $^{+1.1}_{-0.7}$ mm	

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. Consult your OMRON sales representative for these models.

Simulated Roller Lever Models

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

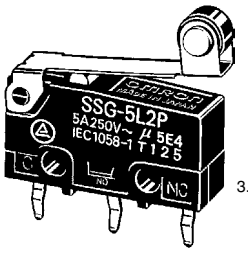


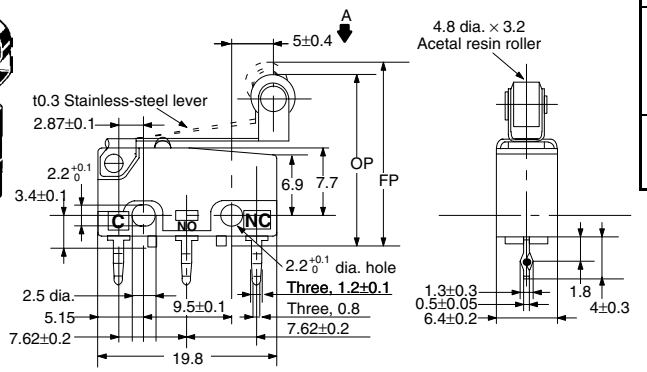


Model	SSG-01L3P SSG-5L3P	SSG-01L3P-5 SSG-5L3P-5
OF max.	0.60 N {61 gf}	0.20 N {20 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
PT max.	---	
OT min.	1.0 mm	
MD max.	0.8 mm	
FP max.	18.9 mm	
OP	14.4 $^{+1.1}_{-0.7}$ mm	

Hinge Roller Lever Models

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

Refer to pages 26 to 31 for common precautions.

■ Cautions

Terminal Connection

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

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. According to EN61058-1, the minimum insulation thickness for this Switch should be 0.9 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.

■ Correct Use

Mounting

Use M2.2 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.20 to 0.24 N • m {2 to 2.5 kgf • cm}.

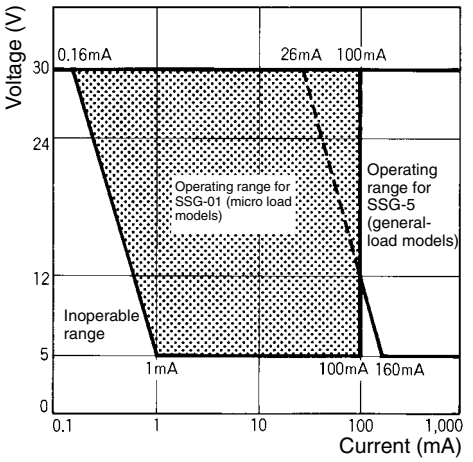
Operating Stroke

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 durability 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 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% (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%.



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

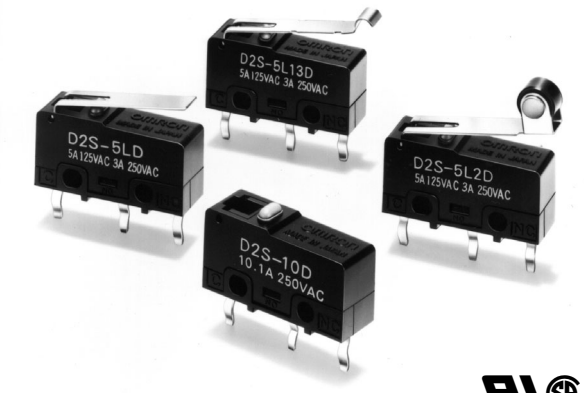
Cat. No. B096-E1-02B

OMRON

Subminiature Basic Switch | D2S

Subminiature Switch with Superb Flux Resistance

- One-piece terminal construction to keep out flux.
- High operating-position accuracy (±0.25 mm) enables easy peripheral design and positioning. Use of pin plunger also allows horizontal operation.
- Available with self-clinching PCB or solder terminals.



Ordering Information

■ Model Number Legend

D2S-□□□□
1 2 3 4

1. **Ratings**
   10: 10.1 A at 250 VAC
   5: 5 A at 125 VAC
   01: 0.1 A at 30 VDC
2. **Actuator**
   None: Pin plunger
   L: Hinge lever
   L13: Simulated roller lever
   L2: Hinge roller lever
3. **Maximum Operating Force**
   None: 1.47 N {150 gf}
   -F: 0.49 N {50 gf}
   Note: These value are for the pin plunger models.
4. **Terminals**
   None: Solder terminals
   D: Self-clinching PCB terminals

■ List of Models

Actuator	Terminals	OF max.	Model		
			10.1 A	5 A	0.1 A
Pin plunger 	Solder terminals	1.47 N {150 gf}	D2S-10	D2S-5	D2S-01
		0.49 N {50 gf}	---	D2S-5-F	D2S-01-F
	Self-clinching PCB terminals	1.47 N {150 gf}	D2S-10D	D2S-5D	D2S-01D
		0.49 N {50 gf}	---	D2S-5-FD	D2S-01-FD
Hinge lever 	Solder terminals	0.49 N {50 gf}	D2S-10L	D2S-5L	D2S-01L
		0.18 N {18 gf}	---	D2S-5L-F	D2S-01L-F
	Self-clinching PCB terminals	0.49 N {50 gf}	D2S-10LD	D2S-5LD	D2S-01LD
		0.18 N {18 gf}	---	D2S-5L-FD	D2S-01L-FD
Simulated roller lever 	Solder terminals	0.49 N {50 gf}	D2S-10L13	D2S-5L13	D2S-01L13
		0.18 N {18 gf}	---	D2S-5L13-F	D2S-01L13-F
	Self-clinching PCB terminals	0.49 N {50 gf}	D2S-10L13D	D2S-5L13D	D2S-01L13D
		0.18 N {18 gf}	---	D2S-5L13-FD	D2S-01L13-FD
Hinge roller lever 	Solder terminals	0.49 N {50 gf}	D2S-10L2	D2S-5L2	D2S-01L2
		0.18 N {18 gf}	---	D2S-5L2-F	D2S-01L2-F
	Self-clinching PCB terminals	0.49 N {50 gf}	D2S-10L2D	D2S-5L2D	D2S-01L2D
		0.18 N {18 gf}	---	D2S-5L2-FD	D2S-01L2-FD

Specifications

■ Ratings

Model / Item: Rated voltage	Resistive load
D2S-10	250 VAC	10.1 A
D2S-5	125 VAC 250 VAC	5 A 3 A
D2S-01	125 VAC	0.1 A
	30 VDC	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	D2S-10, D2S-5: Rivet contact								D2S-01: Crossbar contact	
	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
125 VAC	5 (10.1) A		1.5 A	0.7 A	3 A		2.5 A	1.3 A	0.1 A	
250 VAC	3 (10.1) A		1 A	0.5 A	2 A		1.5 A	0.8 A	---	
8 VDC	5 (10.1) A		2 A		5 A	4 A	3 A		0.1 A	
14 VDC	5 (10.1) A		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 D2S-10 models only.
2. The above values are for the steady-state current.
3. Inductive loads have a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
4. Lamp loads have an inrush current of 10 times the steady-state current.
5. Motor loads have an inrush current of 6 times the steady-state current.

■ Characteristics

Operating speed	0.1 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 400 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value) (see note 2)	OF 1.47 N {150 gf}: D2S-10, D2S-5 models: 30 mΩ max. D2S-01 models: 50 mΩ max. OF 0.49 N {50 gf}: D2S-5 models: 50 mΩ max. D2S-01 models: 100 mΩ max.
Dielectric strength (see note 3)	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 1,500 VAC, 50/60 Hz for 1 min between each terminal and non-current-carrying metal parts
Vibration resistance (see note 4)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 4)	Destruction: OF 1.47 N {150 gf}: 1,000 m/s^2 {approx. 100G} max. OF 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 0.49 N {50 gf}: 200 m/s^2 {approx. 20G} max.
Durability (see note 5)	Mechanical: D2S-10 models: 10,000,000 operations min. (60 operations/min) D2S-5, D2S-01 models: 30,000,000 operations min. (60 operations/min) (Refer to *Engineering Data*.) Electrical: D2S-10 models: 50,000 operations min. (30 operations/min) D2S-5, D2S-01 models: 200,000 operations min. (30 operations/min) (Refer to *Engineering Data*.)
Degree of protection	IEC IP40
Degree of protection against electric shock	Class 1
Proof tracking index (PTI)	175
Ambient operating temperature	–25° 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 (pin plunger models)

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

2. The specifications shown with the OF values are those for pin plunger models.
3. The dielectric strength shown in the table is for models with a Separator.
4. 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.
5. For testing conditions, consult your OMRON sales representative.

■ Approved Standards

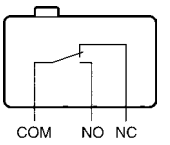
Consult your OMRON sales representative for specific models with standard approvals.

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

Rated voltage	D2S-10	D2S-5	D2S-01
125 VAC	---	5 A	0.1 A
250 VAC	10.1 A	3 A	---
30 VDC	---	---	0.1 A

■ Contact Form

SPDT



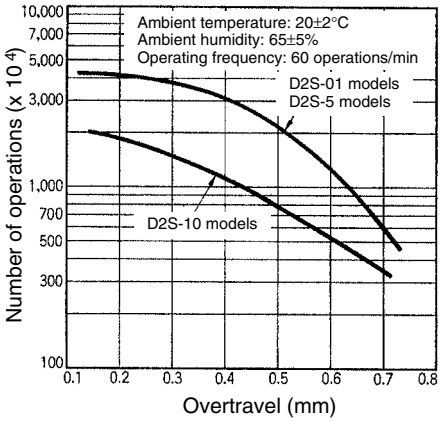
■ Contact Specifications

Item		D2S-10	D2S-5	D2S-01
Contact	Specification	Rivet		Crossbar
	Material	Silver alloy	Silver	Gold alloy
	Gap (standard value)	0.5 mm		
Inrush current	NC	20 A max.		1 A max.
	NO	15 A max.	10 A max.	1 A max.
Minimum applicable load (see note)		160 mA at 5 VDC		1 mA at 5 VDC

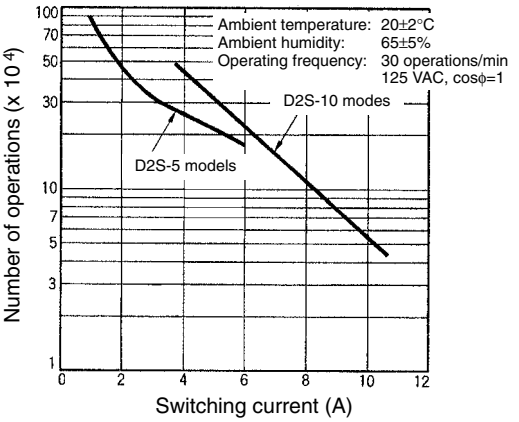
Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 196.

Engineering Data (Reference Values)

Mechanical Durability
(Pin Plunger Models)



Electrical Durability
(Pin Plunger Models)

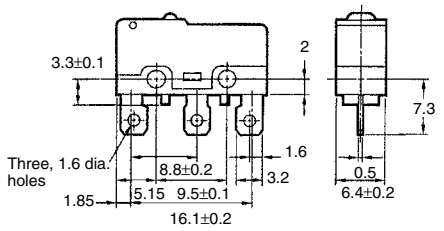


Dimensions

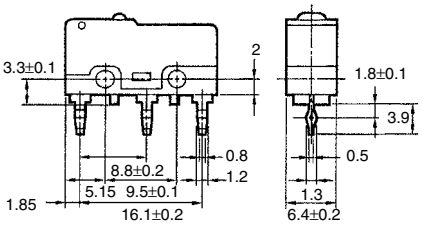
Note: All units are in millimeters unless otherwise indicated.

■ Terminals

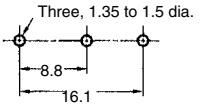
Solder terminals



Self-clinching PCB terminals

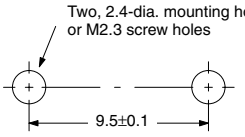


PCB Mounting Dimensions (Reference)



Thickness of PCB: t = 1.6 mm

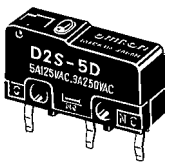
■ Mounting Holes

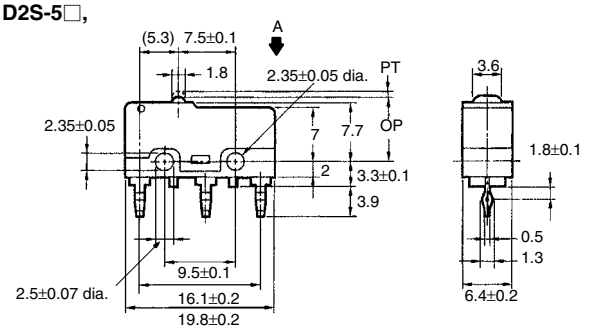


■ Dimensions and Operating Characteristics

Note: 1. All units are in millimeters unless otherwise indicated.
2. Unless specified, a tolerance of ±0.4 mm applies to all dimensions.
3. The following figures show models with self-clinching PCB terminals. For the solder terminals, refer to *Terminals*.
4. The □ in the model number is replaced with "D" for self-clinching PCB terminals or removed for solder terminals.
5. The operating characteristics are for operation in the A direction (⬇).

Pin Plunger Models
D2S-01□, D2S-01-F□, D2S-5□, D2S-5-F□, D2S-10□

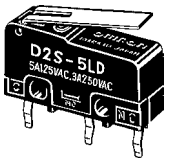


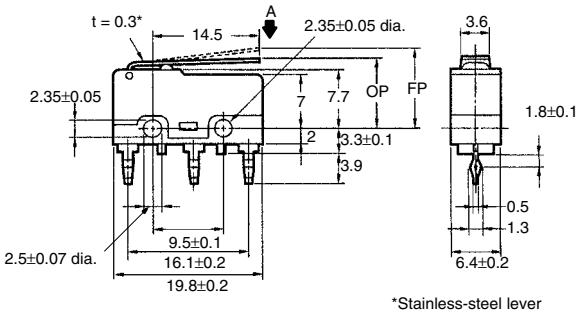


Model	D2S-01□ D2S-5□ D2S-10□	D2S-01-F□ D2S-5-F□
OF max.	1.47 N {150 gf}	0.49 N {50 gf}
RF min.	0.25 N {25 gf}	0.04 N {4 gf}
PT max.	0.7 mm	
OT min.	0.4 mm	
MD max.	0.1 mm	
OP	8.4±0.25 mm	

Hinge Lever Models

D2S-01L□, D2S-01L-F□, D2S-5L□, D2S-5L-F□, D2S-10L□



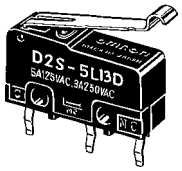


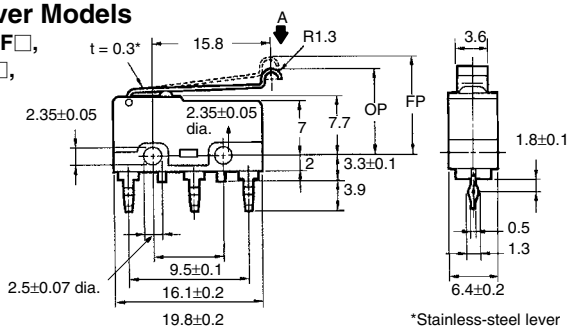
*Stainless-steel lever

Model	D2S-01L□ D2S-5L□ D2S-10L□	D2S-01L-F□ D2S-5L-F□
OF max.	0.49 N {50 gf}	0.18 N {18 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
OT min.	1.0 mm	
MD max.	0.8 mm	
FP max.	13.6 mm	
OP	9.4±0.8 mm	

Simulated Roller Lever Models

D2S-01L13□, D2S-01L13-F□, D2S-5L13□, D2S-5L13-F□, D2S-10L13□



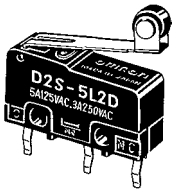


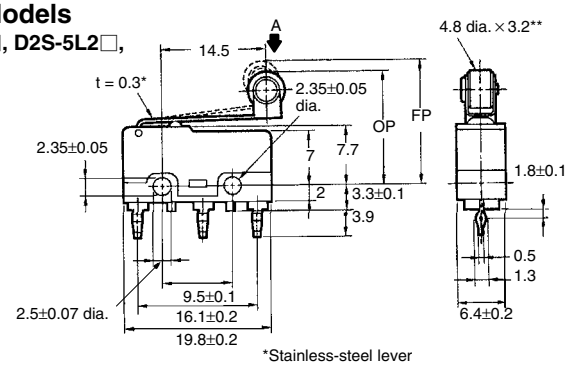
*Stainless-steel lever

Model	D2S-01L13□ D2S-5L13□ D2S-10L13□	D2S-01L13-F□ D2S-5L13-F□
OF max.	0.49 N {50 gf}	0.18 N {18 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
OT min.	1.0 mm	
MD max.	0.8 mm	
FP max.	15.5 mm	
OP	11.4±0.8 mm	

Hinge Roller Lever Models

D2S-01L2□, D2S-01L2-F□, D2S-5L2□, D2S-5L2-F□, D2S-10L2□





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

Model	D2S-01L2□ D2S-5L2□ D2S-10L2□	D2S-01L2-F□ D2S-5L2-F□
OF max.	0.49 N {50 gf}	0.18 N {18 gf}
RF min.	0.06 N {6 gf}	0.02 N {2 gf}
OT min.	1.0 mm	
MD max.	0.8 mm	
FP max.	19.3 mm	
OP	15.1±0.8 mm	

Precautions

Refer to pages 26 to 31 for common precautions.

■ Cautions

Terminal Connection

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 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.

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.

■ 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.

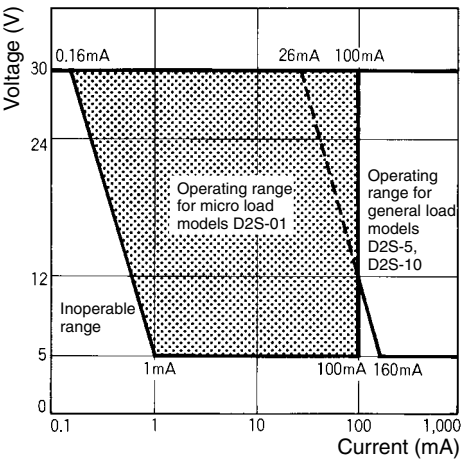
Operating Stroke Setting

Take particular care in setting the operating stroke for the pin plunger models. Make sure that the operating stroke is 70% to 100% of the rated OT distance. Do not operate the actuator exceeding the OT distance, otherwise the durability 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 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% (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%.



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

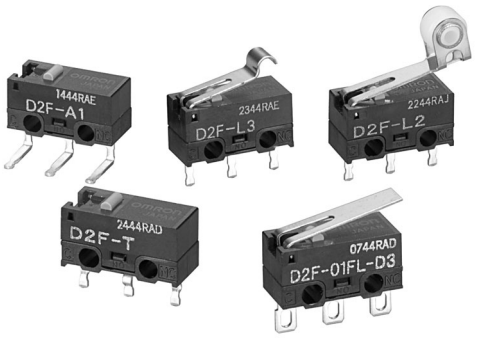
Cat. No. B092-E1-03B

OMRON

Ultra Subminiature Basic Switch | D2F

Subminiature Size Ideal for PCB Mounting (12.8 × 6.5 × 5.8 (W × H × D))

- Incorporating a snapping mechanism made with two highly precise split springs that ensures a long service life.
- Insertion molded terminals and a two-stage bottom with different levels prevent flux penetration.
- Self-clinching PCB, right-angled, left-angled, and solder terminals are available.
- Meets a wide range of applications, including home appliances, audio equipment, office machines, and communications equipment.



Ordering Information

■ Model Number Legend

D2F-□□□□

1 2 3 4

1. Ratings
- None: General loads
- 01: Micro loads (0.1 A at 30 VDC)

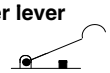
2. Maximum Operating Force
- None: 1.47 N {150 gf}
- F: 0.74 N {75 gf}

Note: These values are for the pin plunger models.

3. Actuator
- None: Pin plunger
- L: Hinge lever
- L2: Hinge roller lever
- L3: Simulated roller lever

4. Terminals
- None: PCB terminals/straight terminals
- -T: Self-clinching PCB terminals
- -A: Right-angled PCB terminals
- -A1: Left-angled PCB terminals
- -D3: Solder terminals
- -D: Compact solder terminals

■ List of Models

Actuator	General loads	General loads		Micro loads	
		3 A	1 A	0.1 A	
	OF max. (see note)	General-purpose 1.47 N {150 gf}	Low operating force 0.74 N {75 gf}	General-purpose 1.47 N {150 gf}	Low operating force 0.74 N {75 gf}
Pin plunger 	PCB terminals	D2F	D2F-F	D2F-01	D2F-01F
	Self-clinching terminals	D2F-T	D2F-F-T	D2F-01-T	D2F-01F-T
	Right-angled terminals	D2F-A	D2F-F-A	D2F-01-A	D2F-01F-A
	Left-angled terminals	D2F-A1	D2F-F-A1	D2F-01-A1	D2F-01F-A1
	Solder terminals	D2F-D3	D2F-F-D3	D2F-01-D3	D2F-01F-D3
	Compact solder terminals	D2F-D	D2F-F-D	D2F-01-D	D2F-01F-D
Hinge lever 	PCB terminals	D2F-L	D2F-FL	D2F-01L	D2F-01FL
	Self-clinching terminals	D2F-L-T	D2F-FL-T	D2F-01L-T	D2F-01FL-T
	Right-angled terminals	D2F-L-A	D2F-FL-A	D2F-01L-A	D2F-01FL-A
	Left-angled terminals	D2F-L-A1	D2F-FL-A1	D2F-01L-A1	D2F-01FL-A1
	Solder terminals	D2F-L-D3	D2F-FL-D3	D2F-01L-D3	D2F-01FL-D3
	Compact solder terminals	D2F-L-D	D2F-FL-D	D2F-01L-D	D2F-01FL-D
Simulated roller lever 	PCB terminals	D2F-L3	D2F-FL3	D2F-01L3	D2F-01FL3
	Self-clinching terminals	D2F-L3-T	D2F-FL3-T	D2F-01L3-T	D2F-01FL3-T
	Right-angled terminals	D2F-L3-A	D2F-FL3-A	D2F-01L3-A	D2F-01FL3-A
	Left-angled terminals	D2F-L3-A1	D2F-FL3-A1	D2F-01L3-A1	D2F-01FL3-A1
	Solder terminals	D2F-L3-D3	D2F-FL3-D3	D2F-01L3-D3	D2F-01FL3-D3
	Compact solder terminals	D2F-L3-D	D2F-FL3-D	D2F-01L3-D	D2F-01FL3-D
Hinge roller lever 	PCB terminals	D2F-L2	D2F-FL2	D2F-01L2	D2F-01FL2
	Self-clinching terminals	D2F-L2-T	D2F-FL2-T	D2F-01L2-T	D2F-01FL2-T
	Right-angled terminals	D2F-L2-A	D2F-FL2-A	D2F-01L2-A	D2F-01FL2-A
	Left-angled terminals	D2F-L2-A1	D2F-FL2-A1	D2F-01L2-A1	D2F-01FL2-A1
	Solder terminals	D2F-L2-D3	D2F-FL2-D3	D2F-01L2-D3	D2F-01FL2-D3
	Compact solder terminals	D2F-L2-D	D2F-FL2-D	D2F-01L2-D	D2F-01FL2-D

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

Specifications

■ Ratings

Item		D2F models		D2F-01 models	
	OF max.	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 sales 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

■ Characteristics

Operating speed	1 to 500 mm/s (pin plunger models)
Operating frequency	Mechanical: 200 operations/min max. Electrical: 30 operations/min max.
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 (see note 2)	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 part
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) (Refer to *Engineering Data*.) Electrical: 30,000 operations min. (30 operations/min) (Refer to *Engineering Data*.)
Degree of protection	IEC IP40
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Ambient operating temperature	–25°C to 65°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight	Approx. 0.5 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 values are at the free position and total travel position. For the lever models, they are at the total travel position.
4. For testing conditions, consult your OMRON sales representative.

■ Approved Standards

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

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

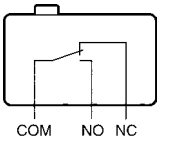
■ Contact Specifications

Item		D2F models	D2F-01 models
Contact	Specification	Crossbar	
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.25 mm	
Minimum applicable load (see note)		100 mA at 5 VDC	1 mA at 5 VDC

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 202.

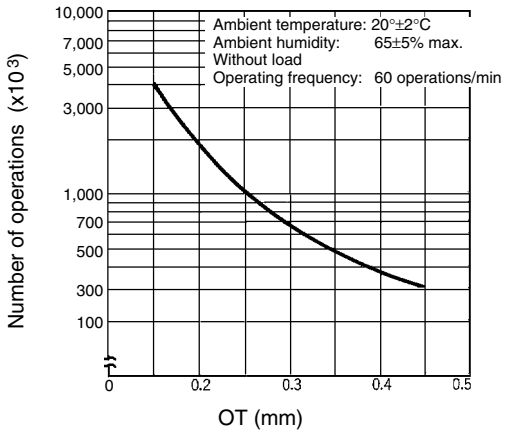
■ Contact Form

SPDT

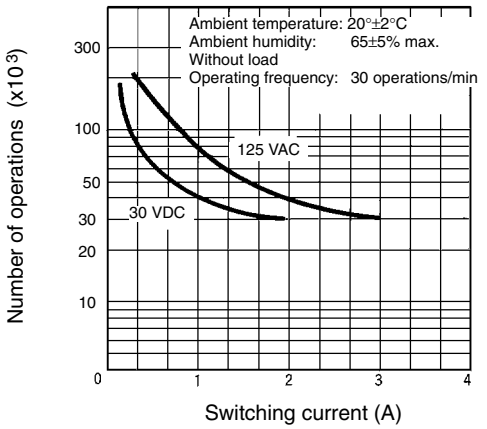


Engineering Data (Reference Values)

Mechanical Durability (Pin Plunger Models)
D2F, D2F-01



Electrical Durability (Pin Plunger Models)
D2F



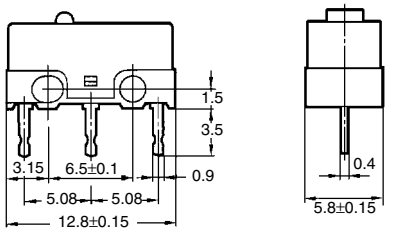
For details about the D2F-01, consult your OMRON sales representative.

Dimensions

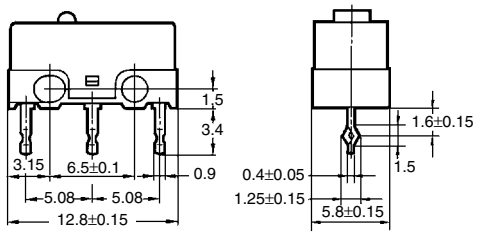
Note: All units are in millimeters unless otherwise indicated.

■ Terminals

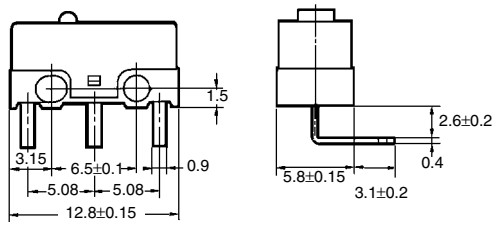
PCB Terminals (Standard)



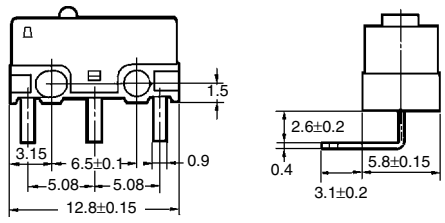
Self-clinching PCB Terminals



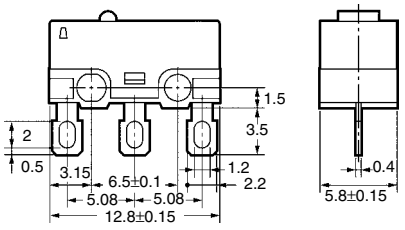
Right-angled PCB Terminals



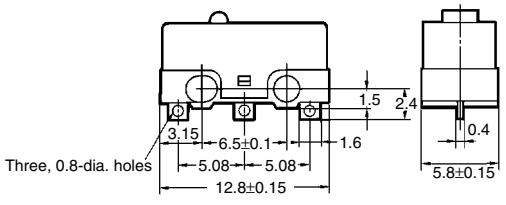
Left-angled PCB Terminals



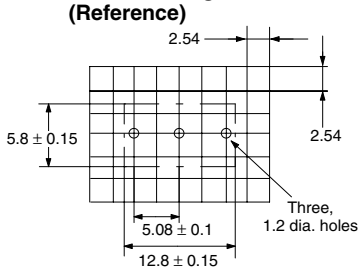
Solder Terminals



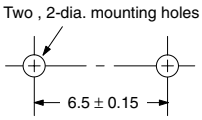
Compact Solder Terminals



PCB Mounting Dimensions (Reference)



■ Mounting Holes



■ Dimensions and Operating Characteristics

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

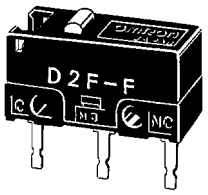
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

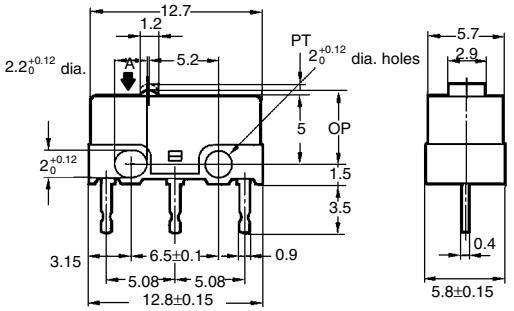
3. The following illustrations and drawings are for D2F models with PCB terminals. Self-clinching, solder, and right-angled, left-angled terminals are omitted from the following drawings. Refer to page 200 for these terminals. When ordering, replace □ with the code for the terminal that you need.

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

Pin Plunger Models

D2F□
D2F-01□
D2F-F□
D2F-01F□

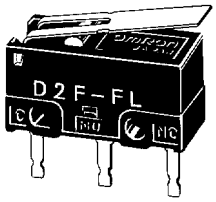


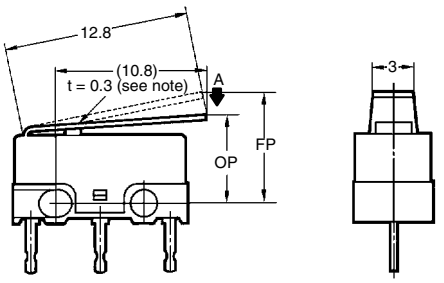


Model	D2F□ D2F-01□	D2F-F□ D2F-01F□
OF max.	1.47 N {150 gf}	0.74 N {75 gf}
RF min.	0.20 N {20 gf}	0.05 N {5 gf}
PT max.	0.5 mm	
OT min.	0.25 mm	
MD max.	0.12 mm	
OP	5.5±0.3 mm	

Hinge Lever Models

D2F-L□
D2F-01L□
D2F-FL□
D2F-01FL□



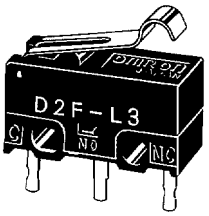


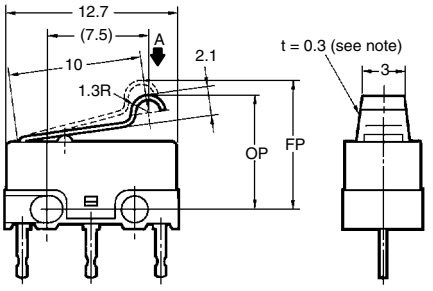
Note: Stainless-steel lever

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	

Simulated Roller Lever Models

D2F-L3□
D2F-01L3□
D2F-FL3□
D2F-01FL3□



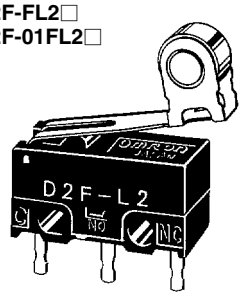


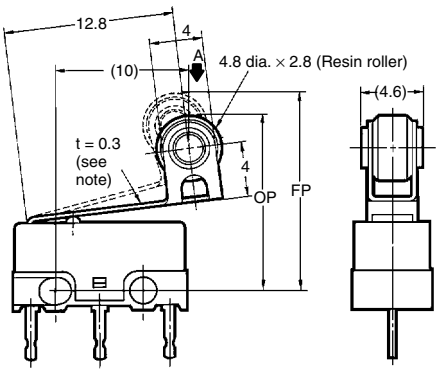
Note: Stainless-steel lever

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 Models

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

Refer to pages 26 to 31 for common precautions.

■ Cautions

Terminal Connection

When soldering a lead wire to the terminal, first insert the lead wire conductor into the terminal hole and then perform soldering.

Make sure that the capacity of the soldering iron is 30 W maximum and that the temperature of the soldering iron tip is approximately 300°C. (350°C maximum.) Complete the soldering within 3 s.

Using a switch with improper soldering may result in abnormal heating, possibly resulting in burn.

Applying a soldering iron for more than 3 s or using one that is rated at more than 30 W may deteriorate 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.

■ 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 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.08 to 0.1 N•m {0.8 to 1 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.

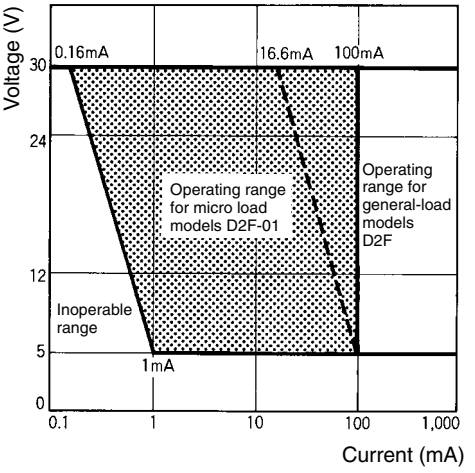
Operating Stroke Setting

Take particular care in setting the operating stroke for the pin plunger models. Make sure that the operating stroke is 70% to 100% of the rated OT distance. Do not operate the actuator exceeding the OT distance, otherwise the durability 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 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% (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%.



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

Cat. No. B036-E1-07C

OMRON

Ultra Subminiature Basic Switch

J

Subminiature Models Capable of Large-capacity Loads

- Snap-action switch allows large-capacity switching (7 A at 250 VAC) in spite of its small size (8.9 × 12.7 × 5.1 mm).
- Particularly suitable as control switches for applications where there are restrictions on installation space and weight.
- Easy positioning, as the pin plunger is located in alignment with the center line of one of the two mounting holes.

Ordering Information

■ Model Number Legend

J-7□-□

1 2 3

1. Ratings
7: 7 A at 250 VAC

2. Contact Material
None: Gold-plated silver
Y: Silver

3. Actuator
None: Pin plunger
V: Short hinge lever
V3: Hinge lever
V4: Long hinge lever
V22: Short hinge roller lever
V2: Hinge roller lever

■ List of Models

Actuator	Model
Pin plunger	J-7
Short hinge lever	J-7-V
Hinge lever	J-7-V3
Long hinge lever	J-7-V4
Short hinge roller lever	J-7-V22
Hinge roller lever	J-7-V2

Note: Externally mounted levers JAL and JAL2 are sold separately. Refer to page 208.

Specifications

■ Ratings

Rated voltage	Resistive load
125 VAC	7 A
250 VAC	7 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	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	7 A		1.5 A	0.7 A	4 A		2.5 A	1.3 A
250 VAC	7 A		1.5 A	0.7 A	4 A		2.5 A	1.3 A
8 VDC	7 A		1.5 A	0.7 A	3 A		2.5 A	1.3 A
14 VDC	7 A		1.5 A	0.7 A	3 A		2.5 A	1.3 A
30 VDC	5 A		1.5 A	0.7 A	3 A		2.5 A	1.3 A
125 VDC	0.4 A		0.4 A	0.4 A	0.03 A		0.03 A	0.03 A
250 VDC	0.2 A		0.2 A	0.2 A	0.02 A		0.02 A	0.02 A

Note: 1. The above values are for the steady-state current.
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.

■ Characteristics

Operating speed	0.05 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 400 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	15 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 each terminal and non-current-carrying metal part and between current-carrying metal part and ground.
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 2, 3)	Destruction: 1,000 m/s^2 {approx. 100G} max. Malfunction: 200 m/s^2 {approx. 20G} max. (pin plunger models)
Durability (see note 4)	Mechanical: 10,000,000 operations min. (60 operations/min) Electrical: 50,000 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	–10°C to 80°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	85% max. (for 5°C to 35°C)
Weight	Approx. 1 g (pin plunger models)

Note: 1. The data given above are initial values.
2. Malfunction: 1 ms max.
3. 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.
4. For testing conditions, consult your OMRON sales representative.

■ Approved Standards

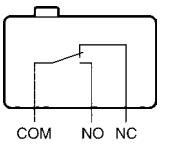
Consult your OMRON sales representative for specific models with standard approvals.

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

Rated voltage	J-7
125 VAC 250 VAC	7 A

■ Contact Form

SPDT

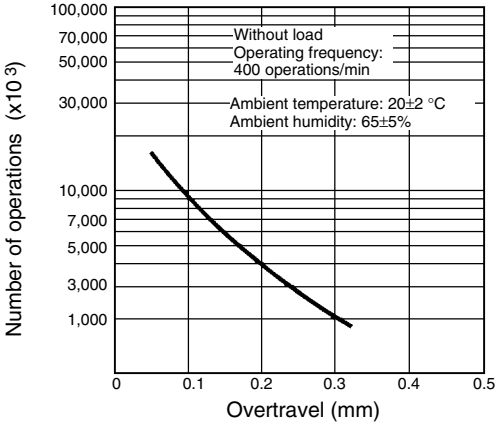


■ Contact Specifications

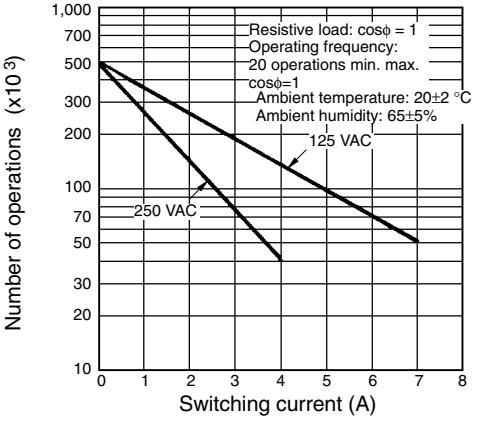
Contact	Specification	Rivet
	Material	Silver plated Gold plated
	Gap (standard value)	0.35 mm
Inrush current	NC	15 A max.
	NO	7 A max.
Minimum applicable load		30 mA at 5 VDC

Engineering Data (Reference Values)

Mechanical Durability



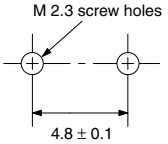
Electrical Durability



Dimensions

■ Mounting Holes

Note: All units are in millimeters unless otherwise indicated.

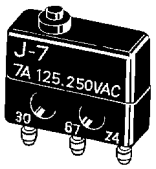


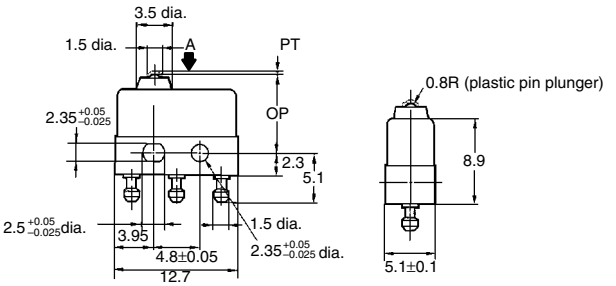
■ Dimensions and Operating Characteristics

Note: 1. All units are in millimeters unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.2 mm applies to all dimensions.
3. The operating characteristics are for operation in the A direction (⬇).

Pin Plunger Models

J-7

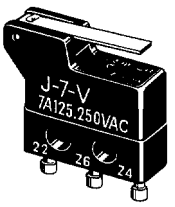


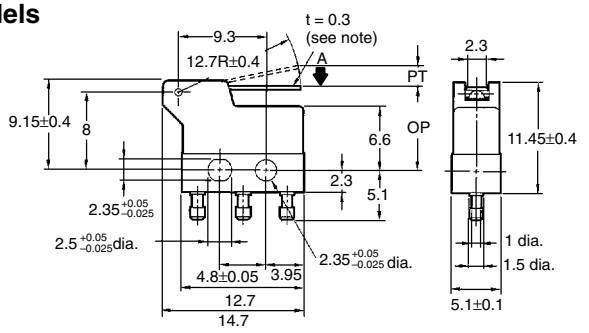


Model	J-7
OF max.	1.37 N {140 gf}
RF min.	0.27 N {28 gf}
PT max.	0.6 mm
OT min.	0.1 mm
MD max.	0.15 mm
OP	8.1±0.3 mm

Short Hinge Lever Models

J-7-V



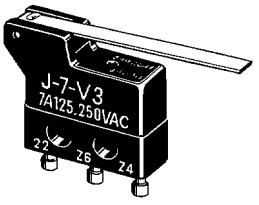


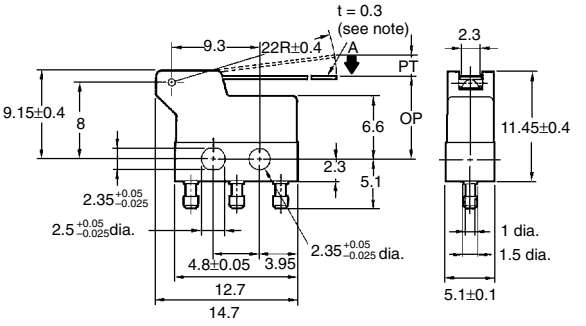
Model	J-7-V
OF max.	0.49 N {50 gf}
RF min.	0.08 N {9 g}
PT max.	1.7 mm
OT min.	0.35 mm
MD max.	0.5 mm
OP	8.3±1.2 mm

Note: Stainless-steel spring lever

Hinge Lever Models

J-7-V3



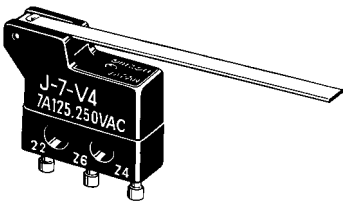


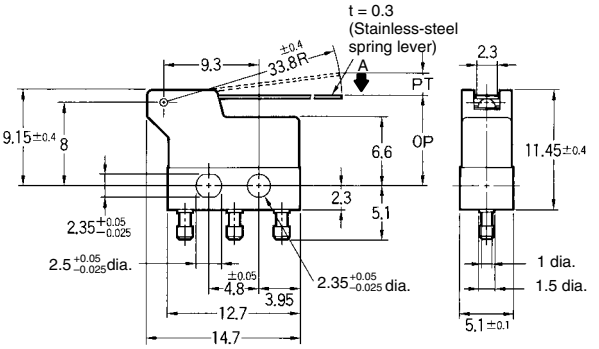
Model	J-7-V3
OF max.	0.29 N {30 gf}
RF min.	0.04 N {5 gf}
PT max.	2.9 mm
OT min.	0.5 mm
MD max.	0.7 mm
OP	8.3±1.9 mm

Note: Stainless-steel spring lever

Long Hinge Lever Models

J-7-V4

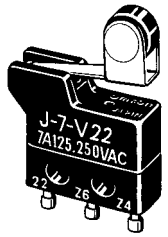


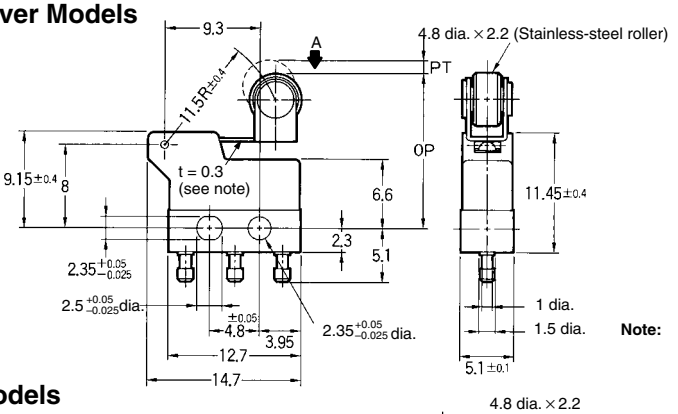


Model	J-7-V4
OF max.	0.20 N {20 gf}
RF min.	0.02 N {3 gf}
PT max.	4.5 mm
OT min.	0.8 mm
MD max.	1.2 mm
OP	8.3±2.9 mm

Short Hinge Roller Lever Models

J-7-V22



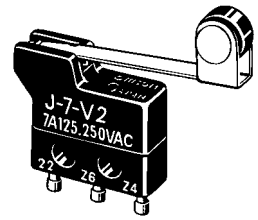


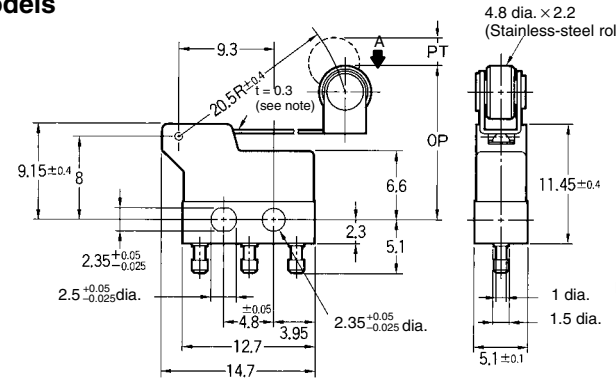
Model	J-7-V22
OF max.	0.54 N {55 gf}
RF min.	0.04 N {5 gf}
PT max.	1.6 mm
OT min.	0.25 mm
MD max.	0.4 mm
OP	14.7±1 mm

Note: Stainless-steel spring lever

Hinge Roller Lever Models

J-7-V2





Model	J-7-V2
OF max.	0.324 N {33 gf}
RF min.	0.02 N {3 gf}
PT max.	2.7 mm
OT min.	0.45 mm
MD max.	0.7 mm
OP	14.7±1.9 mm

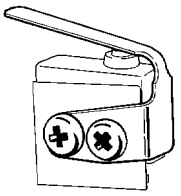
Note: Stainless-steel spring lever

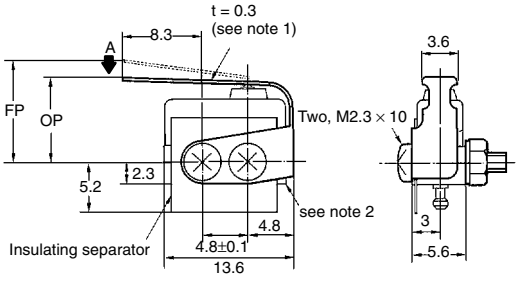
Accessories (Sold Separately)

Actuators

Leaf Spring

JAL

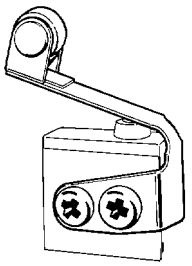


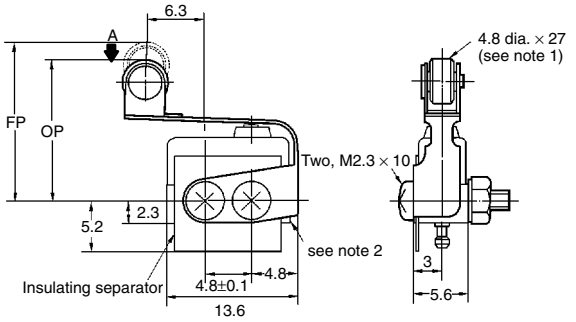


Model	JAL
OF max.	1.95 N {199 gf}
RF min.	0.54 N {56 gf}
PT max.	5.2 mm (reference value)
OT min.	0.3 mm
MD max.	0.8 mm
FP max.	13.1 mm
OP	8.7±0.8 mm

Note: 1. Stainless-steel spring lever
2. J-7 Subminiature Basic Switch

JAL2





Model	JAL2
OF max.	1.95 N {199 gf}
RF min.	0.54 N {56 gf}
PT max.	3.6 mm (reference value)
OT min.	0.3 mm
MD max.	0.8 mm
FP max.	19.5 mm
OP	15.1±0.8 mm

Note: 1. Stainless-steel spring lever
2. J-7 Subminiature Basic Switch

Precautions

Refer to pages 26 to 31 for common precautions.

■ Correct Use

Mounting

Use two M2.3 screws with plain washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.19 to 0.29 N • m {2 to 3 kgf • cm}.

Soldering

To solder the lead to the terminal, apply a soldering iron rated at 30 W max. quickly (within 3 seconds) with the actuator at the free position.

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.

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

Cat. No. B033-E1-02C

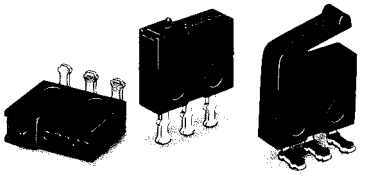
OMRON

Ultra Subminiature Basic Switch

D2MQ

Snap-action Switch with Ultra Subminiature Size (6.5 × 8.2 × 2.7 mm (H × W × D)) and Light Weight (0.3 g)

- Excellent electrical characteristics and a snap-action mechanism in spite of its ultra small size.
- Gold-plated (Au-P) contacts for micro load switching available in addition to silver-plated contacts (Ag-P).
- Ideal for applications where size is extremely limited and high reliability is demanded, such as in compact audio, optical. and telecommunications equipment.



Ordering Information

■ Model Number Legend

D2MQ-1□-□-□

1 2 3 4

1. Ratings
1: Silver-plated contact type (0.5 A at 30 VDC)
Gold-plated contact type (50 mA at 30 VDC)

2. Actuator
None: Pin plunger
L: Leaf lever

3. Contact Material
None: Silver-plated
105: Gold-plated

4. Terminals
None: Straight terminals
TL: Left-angled terminals
TR: Right-angled terminals

D2MQ-4L-□-1-□

1 2 3

1. Actuator
4L: Hinge leaf lever

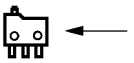
2. Contact Material (Rating)
None: Silver-plated (0.5 A at 30 VDC)
105: Gold-plated (50 mA at 30 VDC)

3. Terminals
None: Straight terminals
L: Left-angled terminals
R: Right-angled terminals

■ List of Models

Actuator / Terminals	Standard model (Ag-plated)			Micro load model (Au-plated)		
	Straight terminals	Left-angled terminals	Right-angled terminals	Straight terminals	Left-angled terminals	Right-angled terminals
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 shape drawings indicate the shape when the Switch is viewed from the direction of the arrow in the drawing below.



Specifications

■ Ratings

Type / Rated voltage / Item	Silver-plated contact type	Gold-plated contact type
	Resistive load	
30 VDC	0.5 A	50 mA

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 (see note 2)	0.1 mm to 0.5 m/s
Operating frequency	Mechanical: 60 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 250 VDC)
Contact resistance (initial value)	100 mΩ max.
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 (see note 3)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (see note 2)
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: 30,000 operations min. (60 operations/min) Electrical: 10,000 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	–15°C to 70°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	35% to 85% (for 5°C to 35°C)
Weight	Approx. 0.3 g

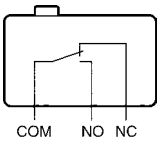
Note: 1. The data given above are initial values.
2. The values are for the pin plunger models. (For different models, consult your OMRON representative.)
3. Malfunction: 1 ms max.
4. For testing conditions, consult your OMRON sales representative.

■ Contact Specifications

Item		Silver-plated contact type	Gold-plated contact type
Contact	Specification	Rivet	
	Material	Silver plated	Gold plated
	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.
Minimum applicable load		50 mA at 5 VDC	5 mA at 5 VDC

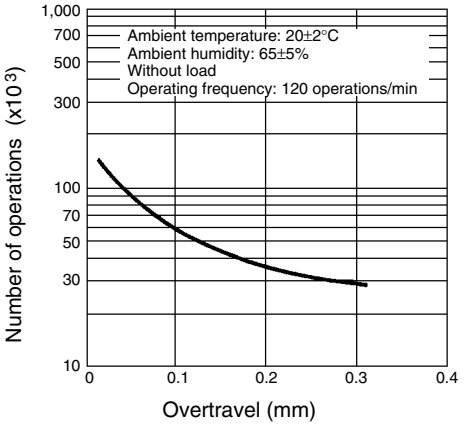
■ Contact Form

SPDT

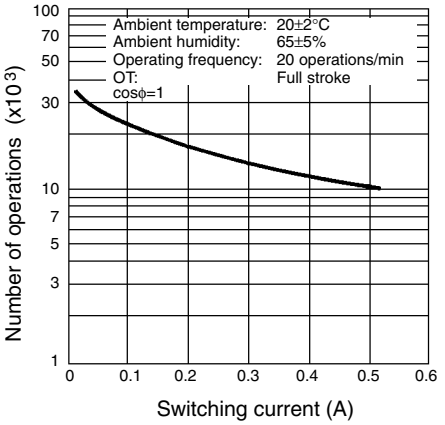


Engineering Data (Reference Values)

Mechanical Durability (D2MQ-1)



Electrical Durability (D2MQ-1)

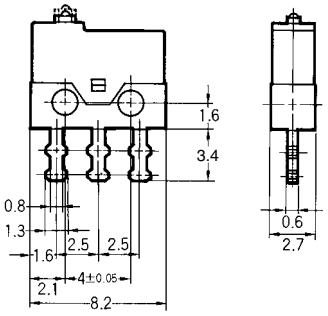


Dimensions

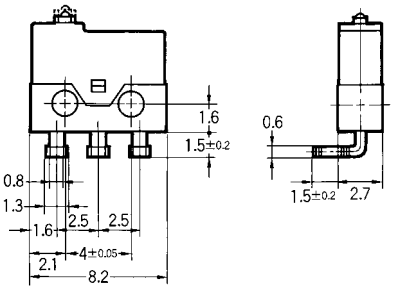
Note: All units are in millimeters unless otherwise indicated.

■ Terminals

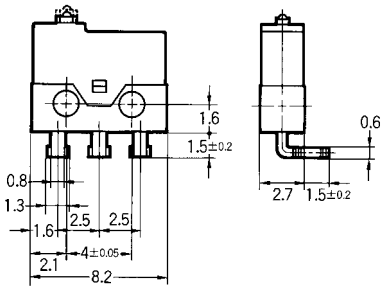
Straight Terminals



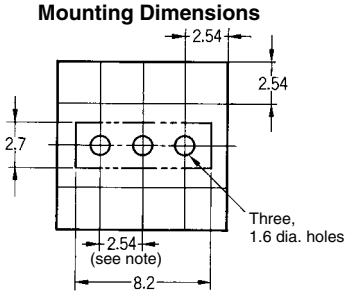
Left-angled Terminals



Right-angled Terminals

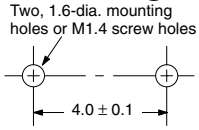


Mounting Dimensions



Note: Terminal gap: 1 pitch

■ Mounting Holes



■ Dimensions and Operating Characteristics

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

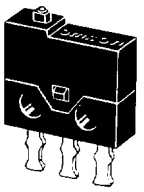
2. Unless otherwise specified, a tolerance of 0.15 mm applies to all dimensions.

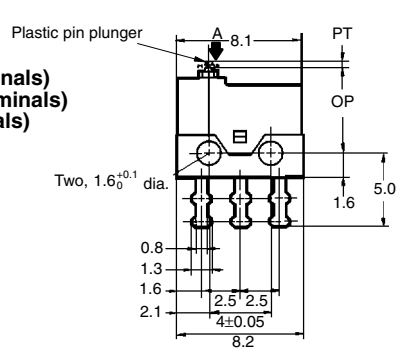
3. The following illustrations are for the straight terminal models. Those for the left-angled terminals and right-angled terminals are different from straight terminal models in terminal size only. Refer to *Terminals* on page 211 for these terminals.

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

Pin Plunger Models

D2MQ-1 (Straight Terminals)
D2MQ-1-TL (Left-angled terminals)
D2MQ-1-TR (Right-angled terminals)
D2MQ-1-105 (Straight Terminals)

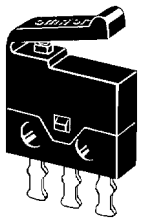


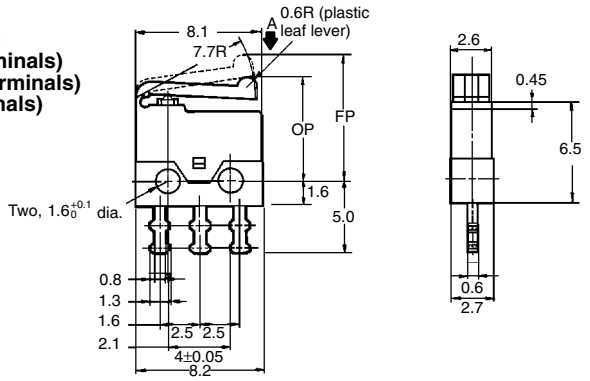


OF max.	1.18 N {120 gf}
RF min.	0.19 N {20 gf}
PT max.	0.4 mm
OT min.	0.1 mm
MD max.	0.1 mm
OP	5.7±0.2 mm

Leaf Lever Models

D2MQ-1L (Straight Terminals)
D2MQ-1L-TL (Left-angled terminals)
D2MQ-1L-TR (Right-angled terminals)
D2MQ-1L-105 (Straight Terminals)

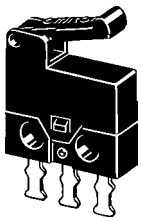


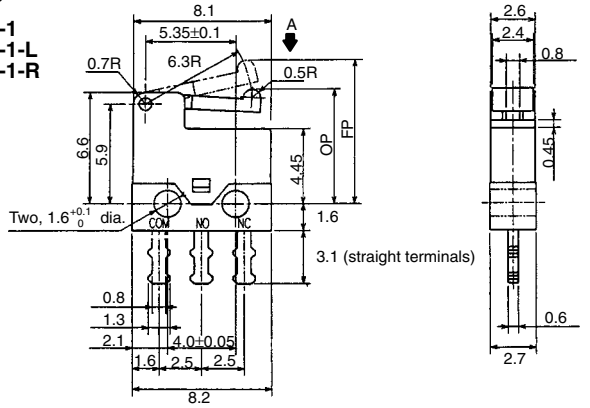


OF max.	0.59 N {60 gf}
RF min.	0.08 N {8 gf}
PT max.	2.4 mm
OT min.	0.3 mm
MD max.	0.7 mm
FP max.	9.6 mm
OP	6.7±0.5 mm

Hinge Leaf Lever Models

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

Refer to pages 26 to 31 for common precautions.

■ Cautions

Terminal Connections

Make sure that the capacity of the soldering iron is 15 W maximum (temperature of soldering iron: 250°C max.). Do not take more than 3 s to solder the switch terminal.

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 more than 3 s or using one that is rated at more than 15 W may deteriorate 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.

■ Correct Use

Mounting

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

Operation

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

Provide an amount of OT that equals or exceeds the standard.

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.

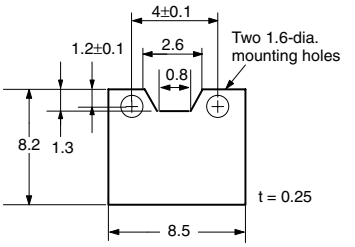
Do not apply excessive force to the actuator of the Leaf Lever Switch in the operating, releasing, and horizontal directions.

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



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

Cat. No. B034-E1-06C

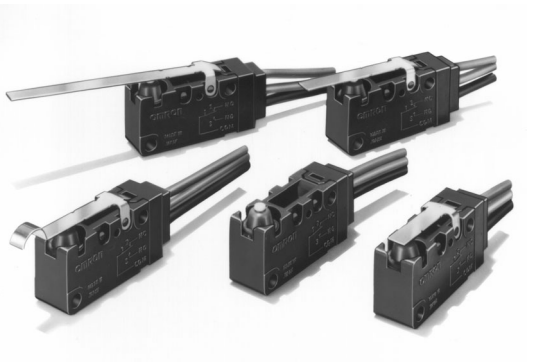
OMRON

Sealed Miniature Basic Switch

D2VW

Sealed Miniature Basic Switch Conforms to IP67 (Molded Lead Wire Type Only)

- Use of epoxy resin assures stable sealing, making this switch ideal for places subject to water spray or excessive dust.
- V-series internal mechanism assures high precision and long life.
- Ideal for automobiles, agricultural machines, large-scale home appliances, and industrial equipment, which require high environmental resistance.
- Models available with conformance to safety standards, including UL, CSA and VDE.



Ordering Information

■ Model Number Legend

D2VW-□□-□□

1 2 3 4

1. Ratings

5: 5 A at 250 VAC

01: 0.1 A at 30 VDC

2. Actuator

None: Pin plunger

L1A: Short hinge lever

L1: Hinge lever

L1B: Long hinge lever

L3: Simulated roller lever

L2A: Short hinge roller lever

L2: Hinge roller lever

3. Contact Form

1: SPDT

2: SPST-NC

3: SPST-NO

4. Terminals

None, HS: Solder terminals (HS for UL and CSA approval.)

M, MS: Molded lead wires (MS for UL and CSA approval)

■ List of Models

Actuator		Model	
		5 A	0.1 A
Pin plunger	Solder terminals	D2VW-5-1	D2VW-01-1
	Molded lead wires	D2VW-5-1M	D2VW-01-1M
Short hinge lever	Solder terminals	D2VW-5L1A-1	D2VW-01L1A-1
	Molded lead wires	D2VW-5L1A-1M	D2VW-01L1A-1M
Hinge Lever	Solder terminals	D2VW-5L1-1	D2VW-01L1-1
	Molded lead wires	D2VW-5L1-1M	D2VW-01L1-1M
Long hinge lever	Solder terminals	D2VW-5L1B-1	D2VW-01L1B-1
	Molded lead wires	D2VW-5L1B-1M	D2VW-01L1B-1M
Simulated roller lever	Solder terminals	D2VW-5L3-1	D2VW-01L3-1
	Molded lead wires	D2VW-5L3-1M	D2VW-01L3-1M
Short hinge roller lever	Solder terminals	D2VW-5L2A-1	D2VW-01L2A-1
	Molded lead wires	D2VW-5L2A-1M	D2VW-01L2A-1M
Hinge roller lever	Solder terminals	D2VW-5L2-1	D2VW-01L2-1
	Molded lead wires	D2VW-5L2-1M	D2VW-01L2-1M

Note: 1. The standard lengths of the molded lead wires (AV0.75f) of models incorporating them are 30 cm.

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

3. Add “HS” or “MS” to the end of the model number for the UL/CSA-approved version (e.g., D2VW-01-1 → D2VW-01-1HS). Consult your OMRON sales representative for details.

Specifications

■ Ratings

Model	Item: Rated voltage	Resisteve load
D2VW-5	250 VAC	5 A
	125 VAC	5 A
	30 VDC	5 A
D2VW-01	125 VAC	0.1 A
	30 VDC	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)

Model	Voltage	Non-inductive load				Inductive load	
		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	

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.

■ Characteristics

Operating speed	0.1 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 300 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	50 mΩ max. (100 mΩ max. for molded lead wire models)
Dielectric strength (see note 2)	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 1,500 VAC, 50/60 Hz for 1 min 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: 10,000,000 operations min. (60 operations/min) Electrical: D2VW-5 models: 100,000 operations min. (30 operations/min) D2VW-01 models: 1,000,000 operations min. (30 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 (see note 5)	–40°C to 85°C (at ambient humidity of 60% max.) (with no icing)
Ambient operating humidity	95% max. (for 5°C to 35°C)
Weight	Approx. 7 g (pin plunger models with terminals)

Note: 1. The data given above are initial values.
2. The dielectric strength shown in the table indicates the 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.
4. For testing conditions, consult your OMRON sales representative.
5. The operating temperature of the lead wire (AV0.75f) for the molded lead wire model is between –40°C to 85°C.

■ 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	D2VW-5	D2VW-01
125 VAC 250 VAC	3 A 3 A	0.1 A ---
30 VDC	---	0.1 A

EN61058-1 (File No. 104068, VDE approval)

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

Testing conditions:
25E3 (25,000 operations), T85 (0°C to 85°C) for D2VW-5,
1E5 (100,000 operations), T85 (0°C to 85°C) for D2VW-01

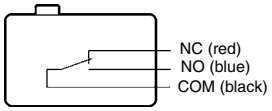
■ Contact Specifications

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.	---
Minimum applicable load (see note)		160 mA at 5 VDC	1 mA at 5 VDC

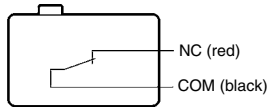
Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 219.

■ Contact Form

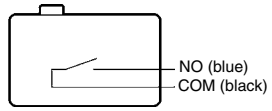
SPDT



SPST-NC



SPST-NO



Note: Colors in parentheses indicate lead wire colors.

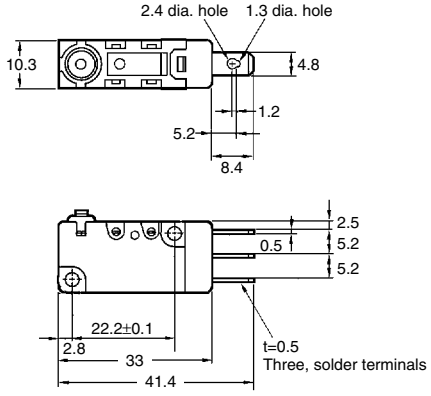
Dimensions

Note: All units are in millimeters unless otherwise indicated.

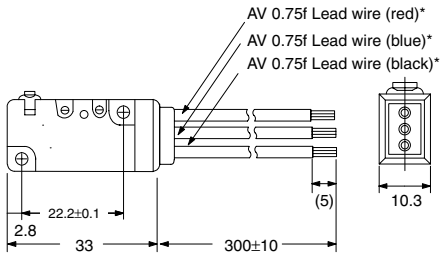
■ Terminals

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 molded lead wire models.

Solder/Quick Connect Terminals

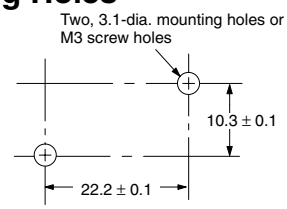


Molded Lead Wires



* UL/CSA approved models have UL approved wiring.

■ Mounting Holes

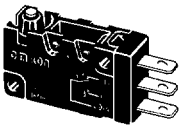


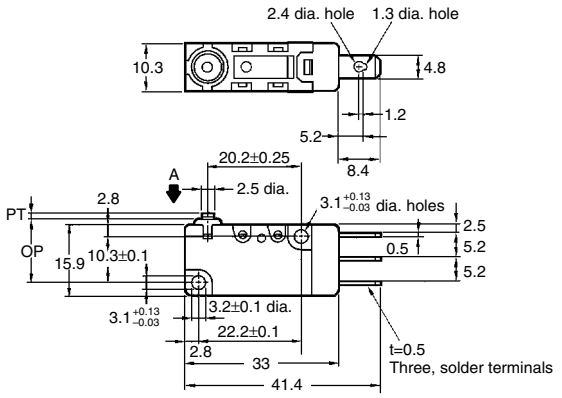
■ Dimensions and Operating Characteristics

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 the A direction (⬇).

Pin Plunger Models

D2VW-01-1
D2VW-5-1

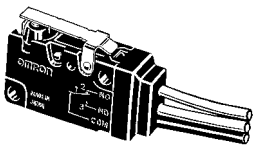


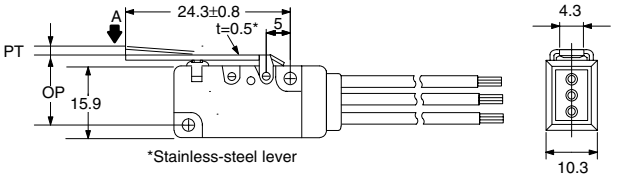


OF max.	1.96 N {200 gf}
RF min.	0.29 N {30 gf}
PT max.	1.2 mm
OT min.	1.0 mm
MD max.	0.4 mm
OP	14.7±0.4 mm

Short Hinge Lever Models

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

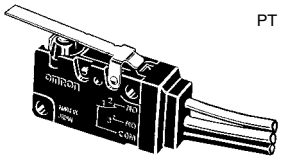


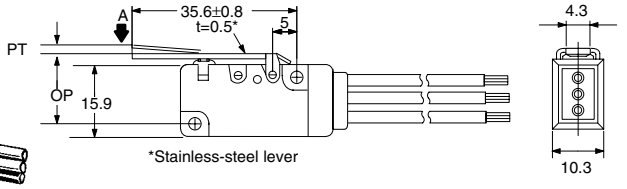


OF max.	1.96 N {200 gf}
RF min.	0.20 N {20 gf}
PT max.	1.6 mm
OT min.	0.8 mm
MD max.	0.5 mm
OP	15.2±0.5 mm

Hinge Lever Models

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

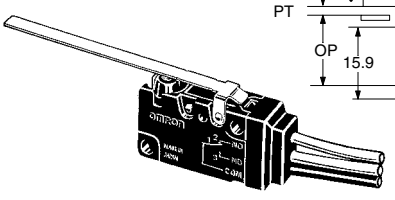


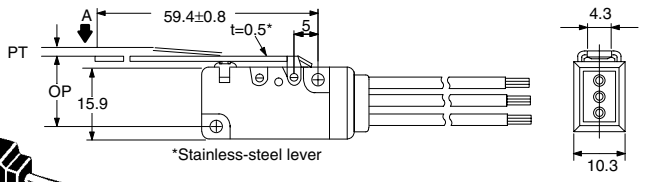


OF max.	1.18 N {120 gf}
RF min.	0.15 N {15 gf}
PT max.	4.0 mm
OT min.	1.6 mm
MD max.	0.8 mm
OP	15.2±1.2 mm

Long Hinge Lever Models

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

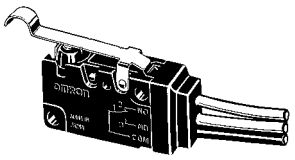


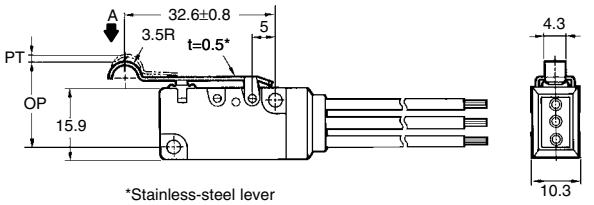


OF max.	0.59 N {60 gf}
RF min.	0.05 N {5 gf}
PT max.	9.0 mm
OT min.	3.2 mm
MD max.	2.0 mm
OP	15.2±2.6 mm

Simulated Roller Lever Models

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



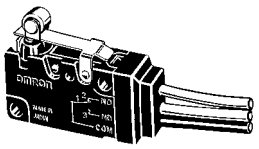


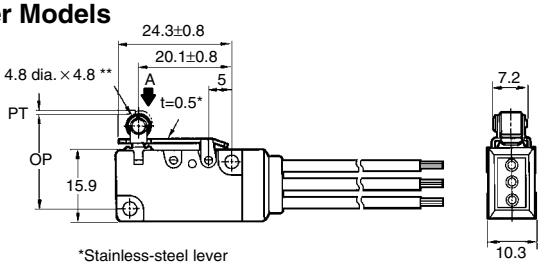
*Stainless-steel lever

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 Models

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



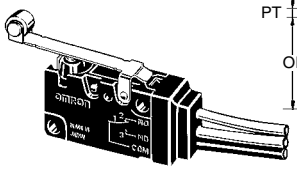


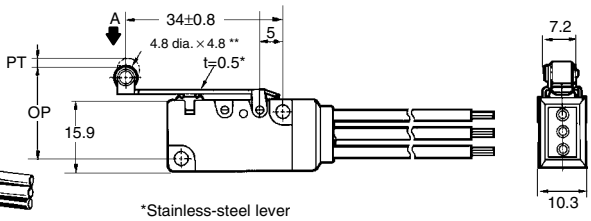
*Stainless-steel lever
**Oil-less polyacetal resin roller

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 Models

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





*Stainless-steel lever
**Oil-less polyacetal 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

Refer to pages 26 to 31 for common precautions.

■ Cautions

Degree of Protection

Do not use the Switch underwater. The Switch was tested and found to meet the conditions necessary to meet the following standard. The test checks for water intrusion after immersion for a specified time period. The test does not check for switching operation underwater.

IEC Publication 529, degree of protection IP67.

Protection Against Chemicals

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

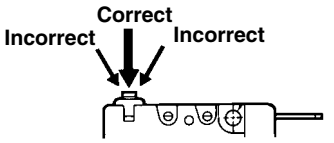
■ Correct Use

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}.

Operating Body

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.



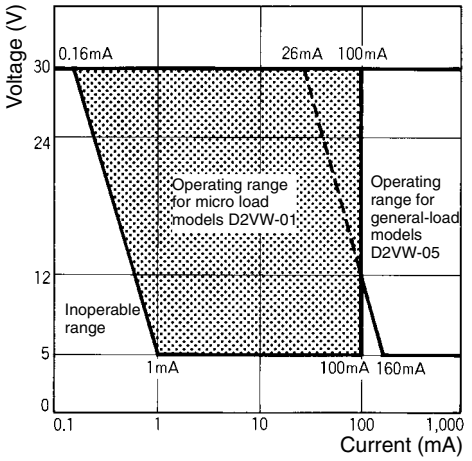
Handling

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

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% (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%.

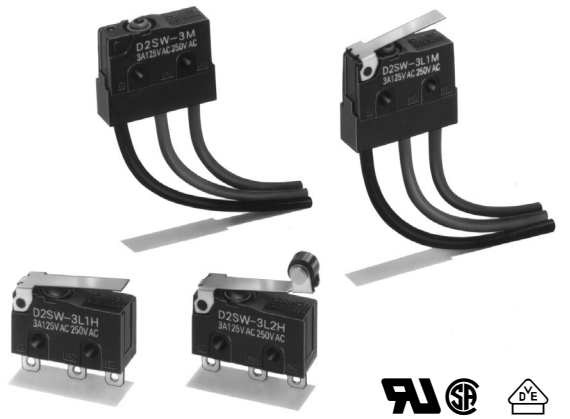


ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. C095-E1-03C

Sealed Subminiature Basic Switch Conforming to IP67 (Molded Lead Wire Type Only)

- Use of epoxy resin assures stable sealing, making this switch ideal for places subject to water spray or excessive dust.
- Ideal for automobiles, automatic vending machines, refrigerators, ice-making equipment, bath equipment, hot-water supply systems, air conditioners, and industrial equipment, which require high environmental resistance.
- Models available with conformance to safety standards, including UL, CSA and VDE.



Ordering Information

■ Model Number Legend

D2SW-□□□□

1 2 3 4

1. Ratings
- 3: 3 A at 125 VAC
- 01: 0.1 A at 30 VDC

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
- H, HS: Solder terminals (HS for UL and CSA approval)
- D, DS: PCB terminals (DS for UL and CSA approval)
- T, TS: Quick-connect terminals (#110) (TS for UL and CSA approval)
- M, MS: Molded lead wires (MS for UL and CSA approval)

■ List of Models

Actuator		Model	
		3 A	0.1A
Pin plunger	Solder terminals	D2SW-3H	D2SW-01H
	Quick-connect terminals (#110)	D2SW-3T	D2SW-01T
	PCB terminals	D2SW-3D	D2SW-01D
	Molded 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
	Molded lead wires	D2SW-3L1M	D2SW-01L1M
Simulated roller lever	Solder terminals	D2SW-3L3H	D2SW-01L3H
	Quick-connect terminals (#110)	D2SW-3L3T	D2SW-01L3T
	PCB terminals	D2SW-3L3D	D2SW-01L3D
	Molded 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
	Molded lead wires	D2SW-3L2M	D2SW-01L2M

Note: 1. The standard lengths of the molded lead wires (AV0.5f) of models incorporating them are 30 cm.
2. Consult your OMRON sales representative for details on SPST-NO and SPST-NC models.
3. Add “HS,” “DS,” “TS,” or “MS” to the end of the model number for the UL/CSA-approved version. (e.g., D2SW-3H → D2SW-3HS). Consult your OMRON sales representative for details.

Specifications

■ Ratings

Model	Item: Rated voltage	Resistive load
D2SW-3	250 VAC	2 A
	125 VAC	3 A
	30 VDC	3 A
D2SW-01	125 VAC	0.1 A
	30 VDC	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)

Model	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	

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.

■ Characteristics

Item	D2SW-3	D2SW-01
Operating speed	0.1 mm to 1 m/s (pin plunger models)	
Operating frequency	Mechanical: 300 operations/min max. Electrical: 30 operations/min max.	
Insulation resistance	100 MΩ min. (at 500 VDC)	
Contact resistance (initial value)	30 mΩ max. for terminal models	50 mΩ max. for terminal models
	50 mΩ max. for molded lead wire models	70 mΩ max. for molded lead wire models
Dielectric strength (see note 2)	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	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 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: 5,000,000 operations min. (60 operations/min)	
	Electrical: 200,000 operations min. (30 operations/min) (3 A at 125 VAC), 100,000 operations min. (30 operations/min) (2 A at 250 VAC)	Electrical: 200,000 operations min. (30 operations/min)
Degree of protection	IEC IP67 (excluding the terminals on terminal models)	
Degree of protection against electric shock	Class 1	
Proof tracking index (PTI)	175	
Ambient operating temperature	–40°C to 85°C (at ambient humidity of 60% max.) (with no icing)	
Ambient operating humidity	95% 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 is for models with a Separator.

3. 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.

4. For testing conditions, consult your OMRON sales representative.

■ 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	D2SW-3	D2SW-01
125 VAC 250 VAC	3 A 2 A	0.1 A ---
30 VDC	3 A	0.1 A

EN61058-1 (File No. 85002, VDE approval)

Rated voltage	D2SW-01
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	
Inrush current	**NC**	20 A max.	1 A max.
	NO	10 A max.	1 A max.
Minimum applicable load (see note)		160 mA at 5 VDC	1 mA at 5 VDC

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 226.

■ Separators (Insulation Sheet)

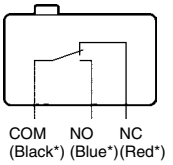
Applicable switch	Thickness (mm)	Model
SS, D2S, D2SW	0.18	Separator for SS0.18
	0.4	Separator for SS0.4

Separator for SS□

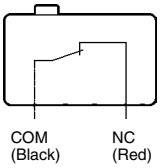
Note: The material is EAVTC (Epoxide Alkyd Varnished Tetron Cloth) and can withstand temperatures up to 130°C.

■ Contact Form

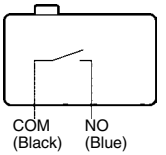
SPDT



SPST-NC



SPST-NO



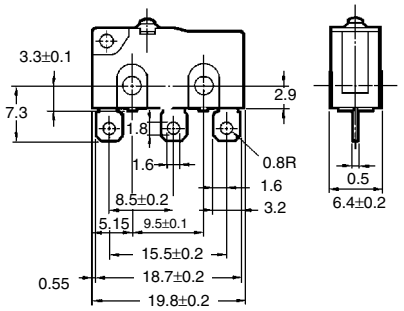
*Indicates the color of the lead wire.

Dimensions

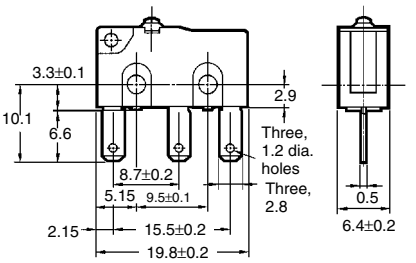
■ Terminals

Note: All units are in millimeters unless otherwise indicated.

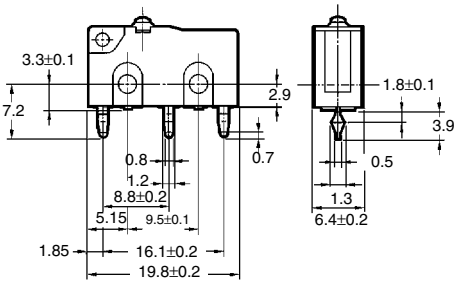
Solder Terminals (H)



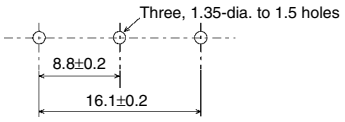
Quick-connect Terminals (#110) (T)



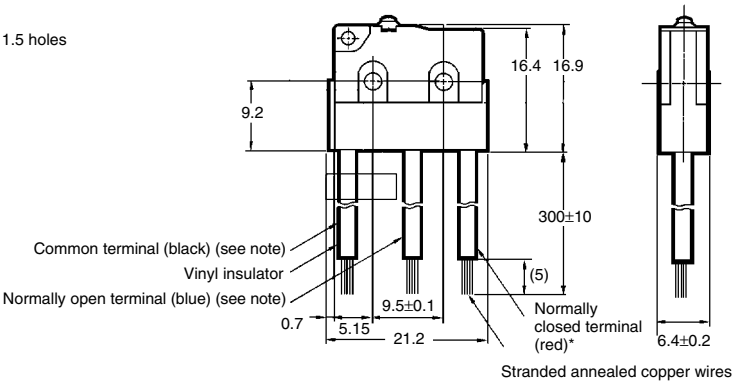
PCB Terminals (D)



PCB Mounting

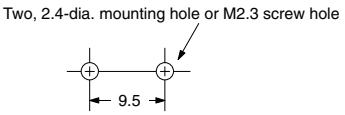


Molded Lead Wires



* UL/CSA approved models have UL approved wiring.

■ Mounting Holes

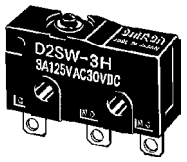


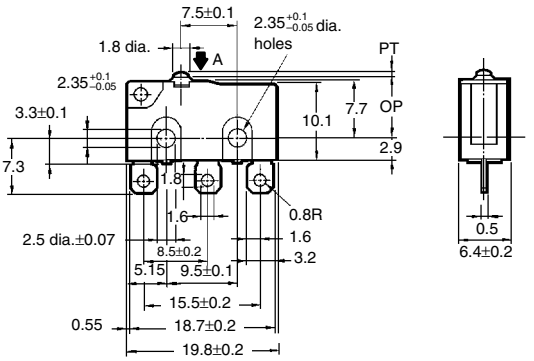
■ Dimensions and Operating Characteristics

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

Pin Plunger Models

D2SW-3□
D2SW-01□

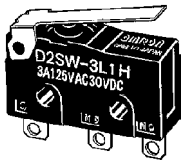


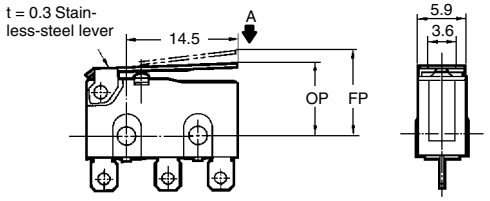


OF	1.77 N {180 gf}
RF min.	0.29 N {30 gf}
PT max.	0.6 mm
OT min.	0.5 mm
MD max.	0.1 mm
OP	8.4±0.3 mm

Hinge Lever Models

D2SW-3L1□
D2SW-01L1□

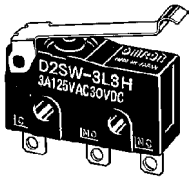


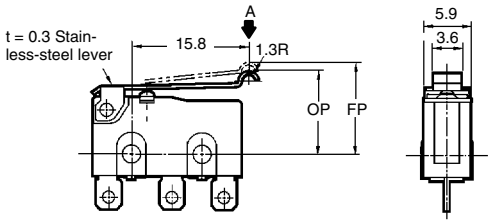


OF	0.59 N {60 gf}
RF min.	0.06 N {6 gf}
OT min.	1.0 mm
MD max.	0.8 mm
FP max.	13.6 mm
OP	8.8±0.8 mm

Simulated Roller Lever Models

D2SW-3L3□
D2SW-01L3□

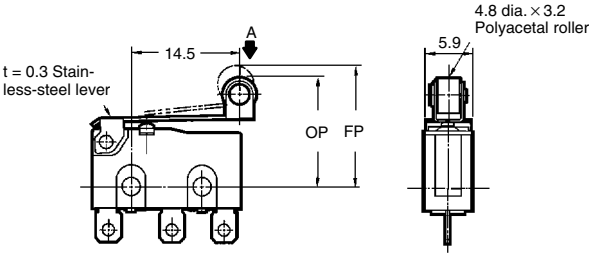




OF	0.59 N {60 gf}
RF min.	0.06 N {6 gf}
OT min.	1.0 mm
MD max.	0.8 mm
FP max.	15.5 mm
OP	10.7±0.8 mm

Hinge Roller Lever Models

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

Precautions

Refer to pages 26 to 31 for common precautions.

■ Cautions

Degree of Protection

Do not use the Switch underwater. The Switch was tested and found to meet the conditions necessary to meet the following standard. The test checks for water intrusion after immersion for a specified time period. The test does not check for switching operation underwater.

IEC Publication 529, degree of protection IP67.

Protection Against Chemicals

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

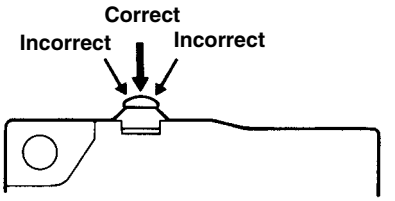
■ Correct Use

Mounting

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}.

Operating Body

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.



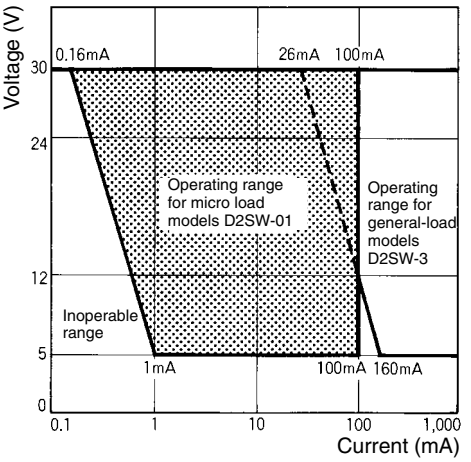
Handling

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

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% (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%.



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

Cat. No. C097-E1-01C

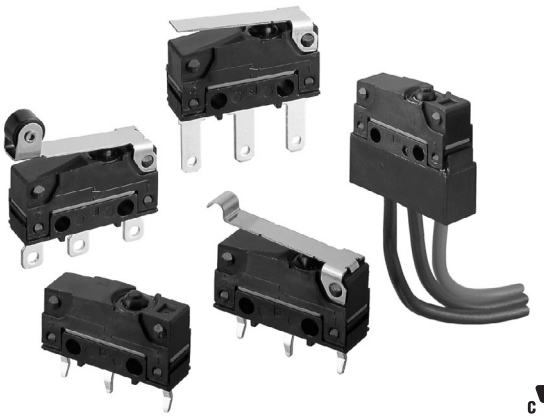
OMRON

Sealed Subminiature Basic Switch

D2SW-P

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

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

H: 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		Molded lead wires
					Uneven pitch	Even pitch	
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

■ Ratings

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 1	
Proof tracking index (PTI)	175	
Ambient operating temperature	−20°Cto 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)

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

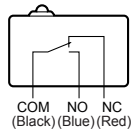
■ Contact Specifications

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

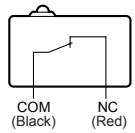
Note For more information on the minimum applicable load, refer to *Using Micro Loads* on page 232.

■ Contact Form

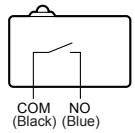
SPDT



SPST-NC
(Molded lead wire models only)



SPST-NO
(Molded lead wire models only)



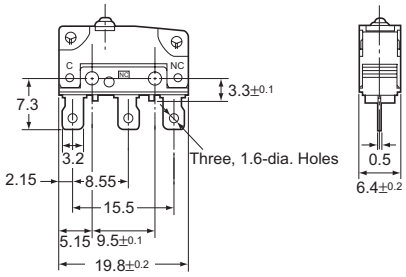
Note Lead wire colors are indicated in parentheses.

Dimensions

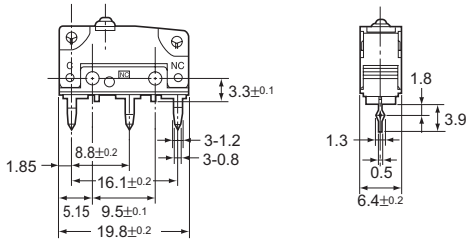
■ Terminals

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

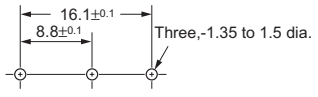
Solder Terminals



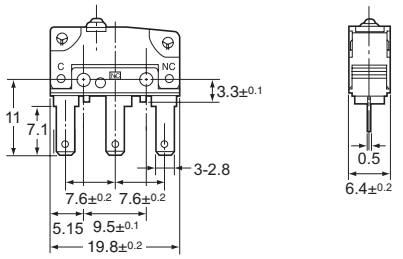
PCB Terminals (Uneven pitch)



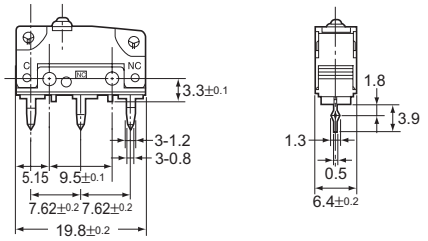
PCB Mounting Dimensions (Reference)



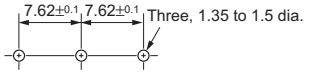
Quick-connect Terminals (#110)



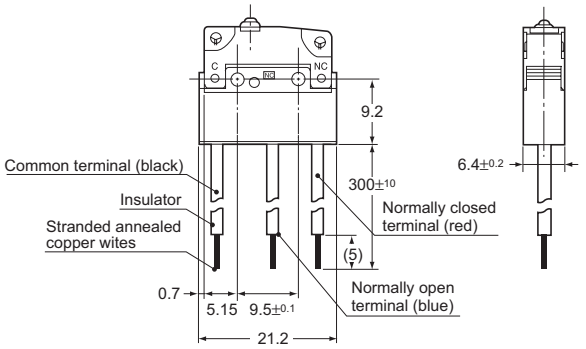
PCB Terminals (Even pitch)



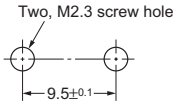
PCB Mounting Dimensions (Reference)



Molded Lead Wires



■ Mounting Holes

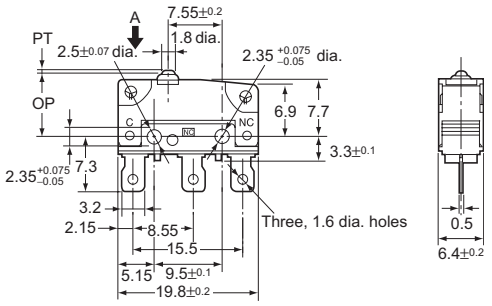


■ Dimensions and Operating Characteristics

Note: **1.** All units are in millimeters unless otherwise indicated.
2. The following illustrations and drawings are for solder terminal models. Refer to page 229 for details on models with quick-connect terminals (#110) or PCB terminals or molded lead wires.
3. The □ in the model number is for the contact form code or the terminal code.
4. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
5. The operating characteristics are for operation in the A direction (⬇).

Pin Plunger Models

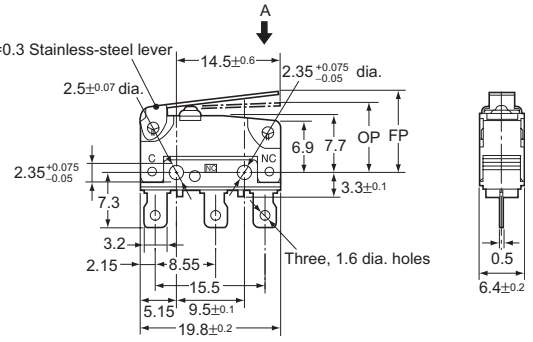
D2SW-P2□□
D2SW-P01□□



Model	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

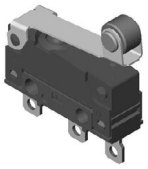
D2SW-P2L1□□
D2SW-P01L1□□

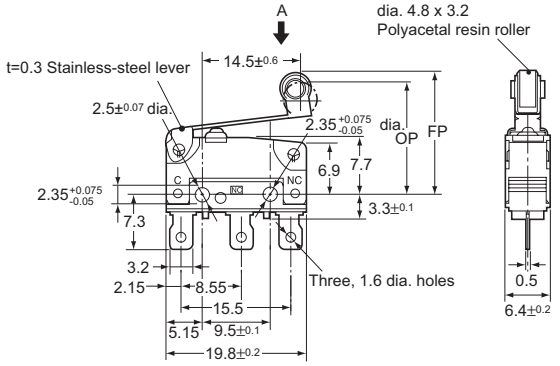


Model	D2SW-P2L1□□	D2SW-P01L1□□
OF max. **RF min.**	0.6 N {61 gf} 0.05 N {5 gf}	
OT min. **MD max.**	0.8 mm 0.8 mm	
FP max. **OP**	13.6 mm 8.8±0.8 mm	

Hinge Roller Lever Models

D2SW-P2L2□□
D2SW-P01L2□□

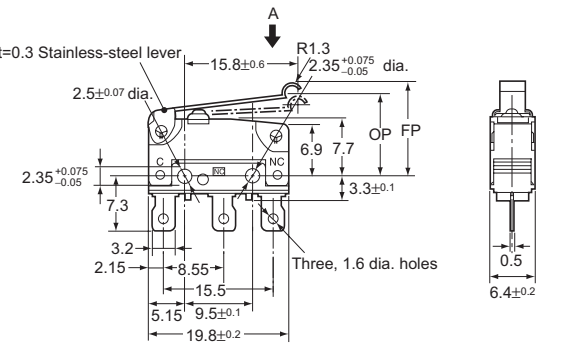




Model	D2SW-P2L2□□	D2SW-P01L2□□
OF max. **RF min.**	0.6 N {61 gf} 0.05 N {5 gf}	
OT min. **MD max.**	0.8 mm 0.8 mm	
FP max. **OP**	19.3 mm 14.5±0.8 mm	

Simulated Roller Lever Models

D2SW-P2L3□□
D2SW-P01L3□□



Model	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.

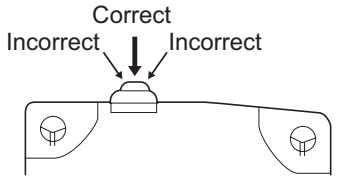
Use M2.3 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.23 to 0.26 N·m {2.3 to 2.7 kgf·cm}. Exceeding the specified torgue may result in deterioration of the sealing or damage.

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.

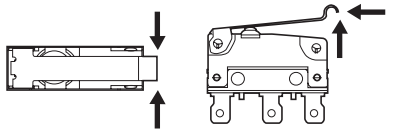
With the pin plunger models, set the Switch so that the plunger can be pushed in from directly above. Since the plunger is covered with a rubber cap, applying a force from lateral directions may cause damage to the plunger or reduction in the sealing capability.



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

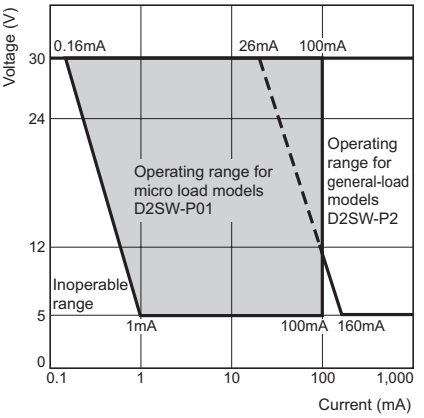
Set the operating stroke so that the actuator is completely disengaged when the switch is in the free position (FP), and is pushed to a point between 60% and 90% of the OT distance after the switch is operated.

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% (λ60).

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

Cat. No. B109-E1-02

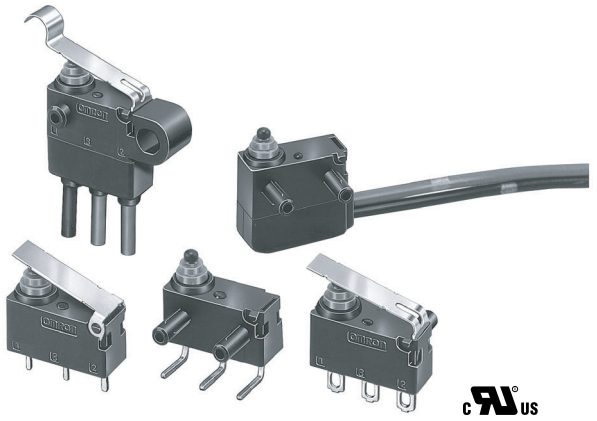
OMRON

Sealed Ultra Subminiature Basic Switch

D2HW

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

- The case dimensions are 78% of conventional models, contributing to down-sizing of mechanical modules.
- Extra-long stroke even without levers. (OT: 1.4 mm)
- Made of environment-friendly materials. All models are lead-free, including molded lead wire models.



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

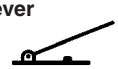
4. Contacts
- 1: SPDT
- 2: SPST-NC (Molded lead wire models only.)
- 3: SPST-NO (Molded lead wire models only.)

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

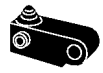
Actuator	Terminals		Contact form	Model		
				With posts on right 	With posts on left 	Without posts 
Pin plunger	For PCB	Straight	SPDT	---	---	D2HW-A201D
		Angled		D2HW-BR201DR	D2HW-BL201DL	---
Hinge lever 		Straight		---	---	D2HW-A211D
		Angled		D2HW-BR211DR	D2HW–BL211DL	---
Long hinge lever 		Straight		---	---	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 sales epresentative for details.

Models with Solder Terminals or Molded Lead Wires

Actuator	Terminals		Contact form	Model		
				With posts on right 	With posts on left 	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 sales 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 sales 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 max.
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, consult your OMRON sales representative.

■ Approved Standards

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

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

Rated voltage	D2HW
125 VAC	0.1 A
12 VDC	2 A

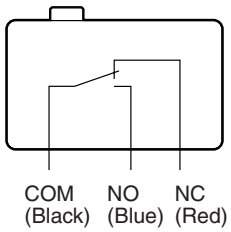
■ Contact Specifications

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

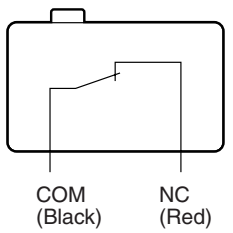
Note Minimum applicable loads are indicated by N standard reference values. This value represents the failure rate at a 60% (λ60) reliability level.
The equation λ60=035×10–6/operations indicates that a failure rate of 1/2,000,000 operations can be expected at a reliability level of 60%.

■ Contact Form

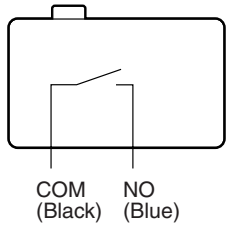
SPDT



SPST-NC
(Molded Lead Wire Models Only)



SPST-NO
(Molded Lead Wire Models Only)



Note Molded lead wire colors are indicated in parentheses.

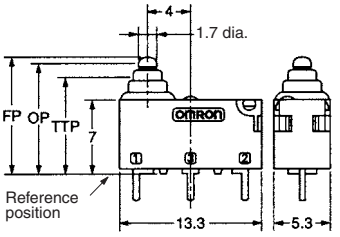
Dimensions

■ Mounting Structure and Reference Positions for Operating Characteristics

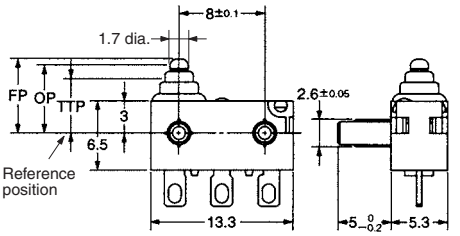
Note All units are in millimeters unless otherwise indicated.

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

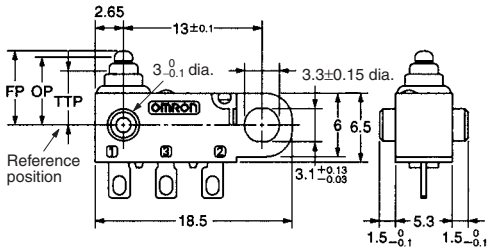
Models without Posts
D2HW-A□



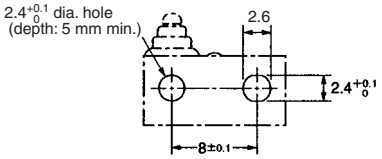
Models with Posts
D2HW-B□



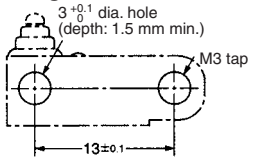
M3-screw Mounting Models
D2HW-C□



Mounting Hole Dimensions (Reference)

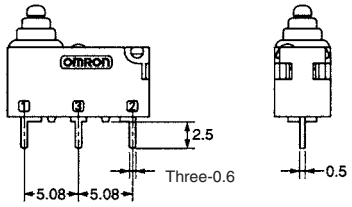


Mounting Hole Dimensions (Reference)

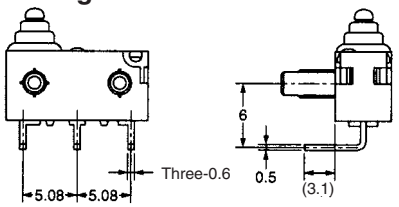


■ Terminals

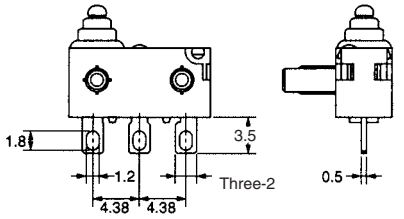
Straight PCB Terminals



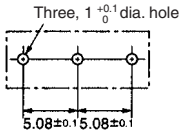
Angled PCB Terminals



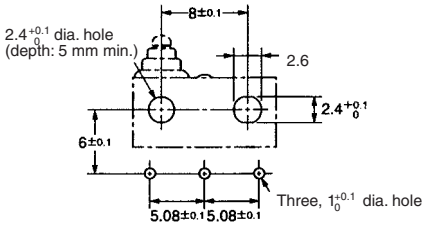
Solder Terminals



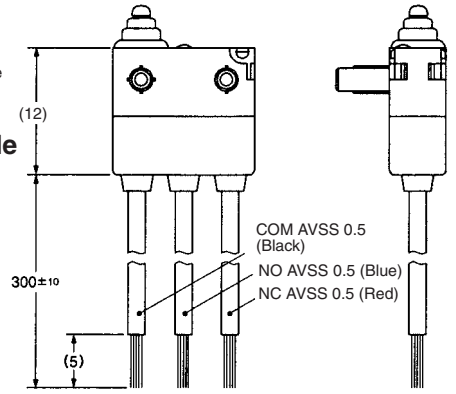
PCB Cutout Dimensions (Reference)



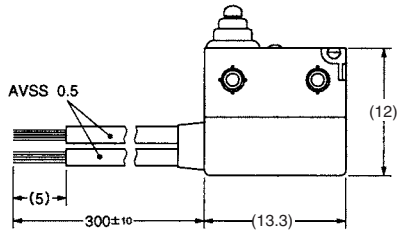
PCB Cutout Dimensions (Reference)



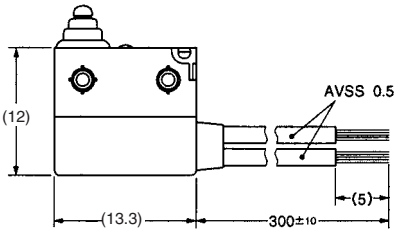
Molded Lead Wires Downwards



Molded Lead Wires on Left-side



Molded Lead Wires on Right-side

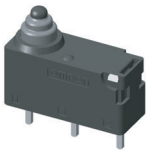


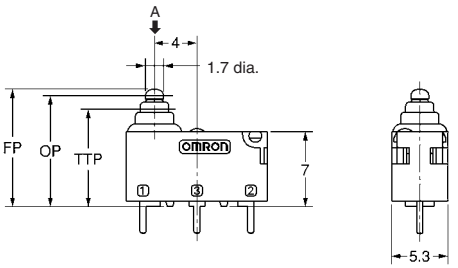
■ Dimensions and Operating Characteristics

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 (⬇).

Pin Plunger Models

D2HW-□20□□

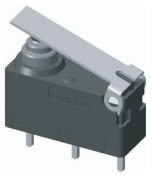


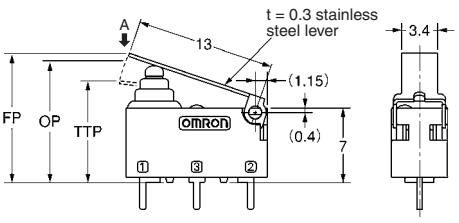


Characteristic	Models without posts	Models with posts and M3-mounting models
OF max. **RF min.**	0.75 N {76 gf} 0.10 N {10 gf}	
OT ref. **MD max.**	1.4 mm (reference value) 0.25 mm	
FP max. **OP** **TTP max.**	11.2 mm 10.4±0.2 mm 9.1 mm	7.2 mm 6.4±0.2 mm 5.1 mm

Hinge Lever Models

D2HW-□21□□

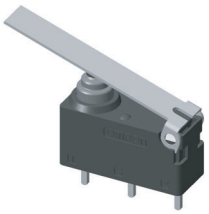


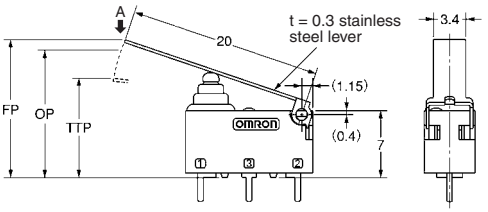


Characteristic	Models without posts	Models with posts and M3-mounting models
OF max. **RF min.**	0.75 N {76 gf} 0.07 N {7 gf}	
OT ref. **MD max.**	1.6 mm (reference value) 0.5 mm	
FP max. **OP** **TTP max.**	12.8 mm 11.5±0.5 mm 10 mm	8.8 mm 7.5±0.5 mm 6 mm

Long Hinge Lever Models

D2HW-□22□□

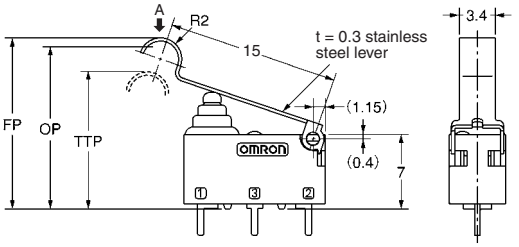




Characteristic	Models without posts	Models with posts and M3-mounting models
OF max. **RF min.**	0.5 N {50 gf} 0.03 N {3 gf}	
OT ref. **MD max.**	2.5 mm (reference value) 0.8 mm	
FP max. **OP** **TTP max.**	15.5 mm 13.3±0.8 mm 11 mm	11.5 mm 9.3±0.8 mm 7 mm

Simulated Roller Hinge Lever Models

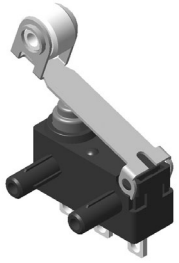
D2HW-□23□□

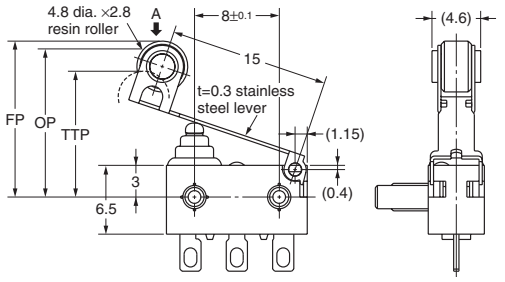


Characteristic	Models without posts	Models with posts and M3-mounting models
OF max. **RF min.**	0.65 N {66 gf} 0.05 N {5 gf}	
OT ref. **MD max.**	1.9 mm (reference value) 0.5 mm	
FP max. **OP** **TTP max.**	16.5 mm 15.2±0.5 mm 13.5 mm	12.5 mm 11.2±0.5 mm 9.5 mm

Hinge Roller Lever Models

D2HW-□24□□

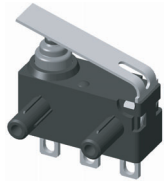


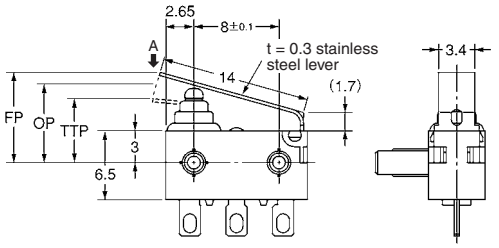


Characteristic	Models with posts and M3-mounting models
OF max. **RF min.**	0.65 N {66 gf} 0.03 N {3 gf}
OT ref. **MD max.**	1.9 mm (reference value) 0.6 mm
FP max. **OP** **TTP max.**	15.3 mm 14±0.6 mm 12.3 mm

Leaf Lever Models

D2HW-□26□□

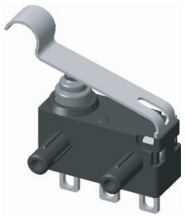


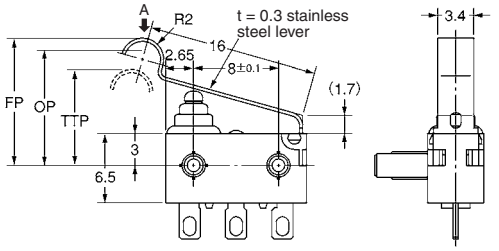


Characteristic	Models with posts and M3-mounting models
OF max. **RF min.**	1.8 N {183 gf} 0.20 N {20 gf}
OT ref. **MD max.**	1.8 mm (reference value) 0.5 mm
FP max. **OP** **TTP max.**	9.3 mm 7.4±0.5 mm 5.8 mm

Simulated Roller Leaf Lever Models

D2HW-□27□□

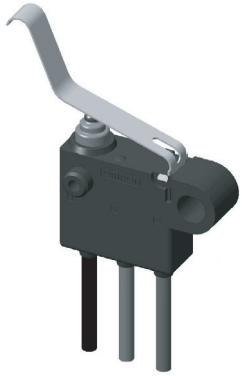


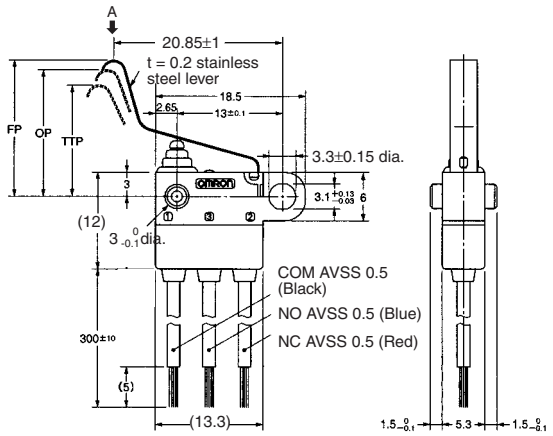


Characteristic	Models with posts and M3-mounting models
OF max. **RF min.**	1.8 N {183 gf} 0.20 N {20 gf}
OT ref. **MD max.**	2.0 mm (reference value) 0.5 mm
FP max. **OP** **TTP max.**	12.5 mm 10.8±0.5 mm 8.9 mm

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 (reference value) 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 0.27 to 0.29 N·m. 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.

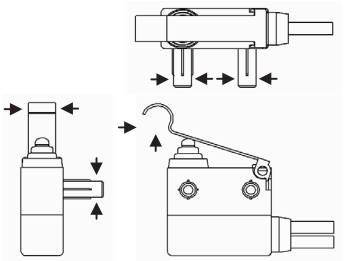
Operating Body

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

Cat. No. B105-E1-04A

OMRON

Sealed Ultra Subminiature Basic Switch

D2JW

Ultra-small and Highly Sealed

- Degree of protection for the molded lead wire models conforms to IEC IP67.
- Wide range of operating temperature from –40°C to 85°C.
- Gold-alloy crossbar contact and coil spring offer long life expectancy and high contact reliability.

Ordering Information

■ Model Number Legend

D2JW-01□-□-□

1 2 3 4

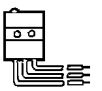
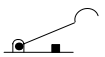
1. Ratings
- 01: 0.1 A at 30 VDC

2. Actuator
- None: Pin plunger
- K1A: Short hinge lever
- K1: Hinge lever
- K3: Simulated roller lever
- K2: Hinge roller lever

3. Contact Form
- 1: SPDT
- 2: SPST-NC
- 3: SPST-NO

4. Terminals
- None: Solder terminals
- MD: Molded lead wires

■ List of Models

Actuator	Model	
	Solder terminals 	Molded lead wires 
Pin plunger	D2JW-011	D2JW-011-MD
Short hinge lever 	D2JW-01K1A1	D2JW-01K1A1-MD
Hinge lever 	D2JW-01K11	D2JW-01K11-MD
Simulated roller lever 	D2JW-01K31	D2JW-01K31-MD
Hinge roller lever 	D2JW-01K21	D2JW-01K21-MD

Note: 1. The standard lengths of the lead wires (AVS0.3f) of models incorporating them are 30 cm.
2. Consult your OMRON sales representative for details on SPST-NO and SPST-NC models.

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

■ Characteristics

Operating speed (see note 2)	1 mm to 250 mm/s
Operating frequency	Mechanical: 240 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	100 mΩ max. (molded lead wire models: 140 mΩ max.)
Dielectric strength (see note 3)	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, and between each terminal and non-current-carrying metal parts
Vibration resistance (see note 4)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 4)	Destruction: 1,000 m/s^2 {approx. 100G} max. Malfunction: 200 m/s^2 {approx. 20G} max.
Durability (see note 5)	Mechanical: 1,000,000 operations min. (60 operations/min) Electrical: 100,000 operations min. (30 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°C to 85°C (at ambient humidity of 60% max.) (with no icing or condensation)
Ambient operating humidity	35% to 98% (for 5°C to 35°C)
Weight	Approx. 7 g (pin plunger models with molded lead wire models)

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

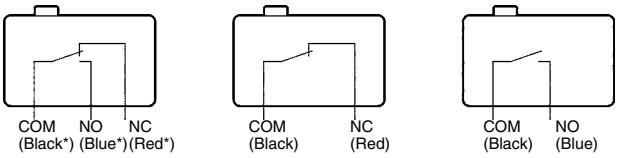
2. The operating speed value shown is for pin plunger models. (For different models, consult your OMRON sales representative.)
3. The dielectric strength values shown apply for use with Separator (terminal type).
4. The values shown apply for malfunctions of 1 ms max.
5. For testing conditions, consult your OMRON sales representative.

■ 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.
Minimum applicable load		1 mA at 5 VDC

■ Contact Form

SPDT **SPST-NC** **SPST-NO**



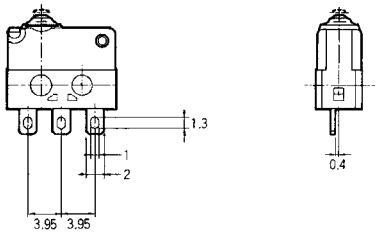
*Indicates the color of the lead wire.

Dimensions

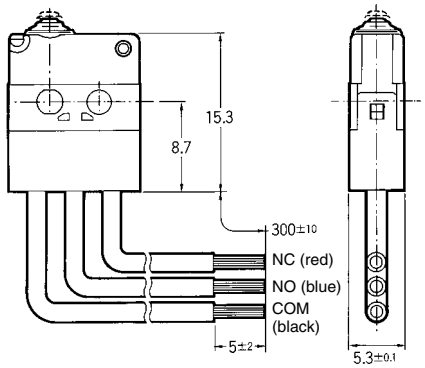
Note: All units are in millimeters unless otherwise indicated.

■ Terminals

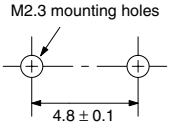
Solder Terminals



Molded Lead Wires



■ Mounting Holes



■ Dimensions and Operating Characteristics

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

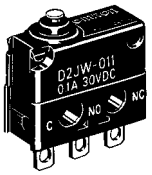
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

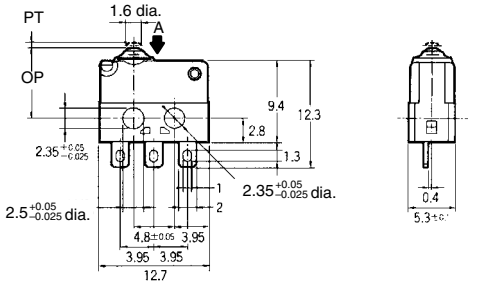
3. Actuators of the molded lead wire terminals are omitted here. The dimensions (other than the terminals) and operating characteristics of the molded lead wire terminals are the same as those for the solder terminals.

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

Pin Plunger Models

D2JW-011

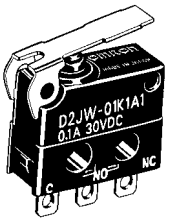


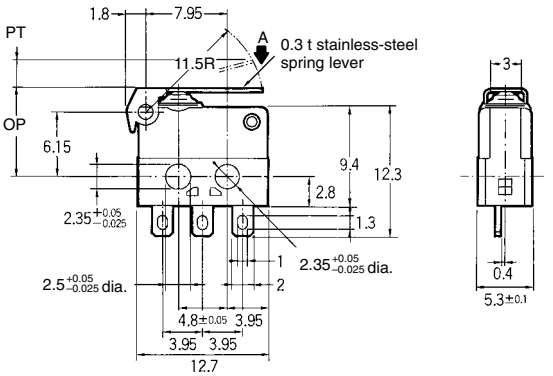


OF max.	2.45 N {250 gf}
RF min.	0.98 N {100 gf}
PT max.	0.6 mm
OT min.	0.3 mm
MD max.	0.1 mm
OP	8.1±0.3 mm

Short Hinge Lever Models

D2JW-01K1A1

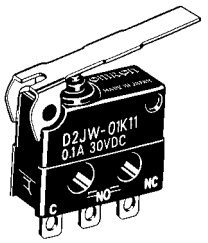


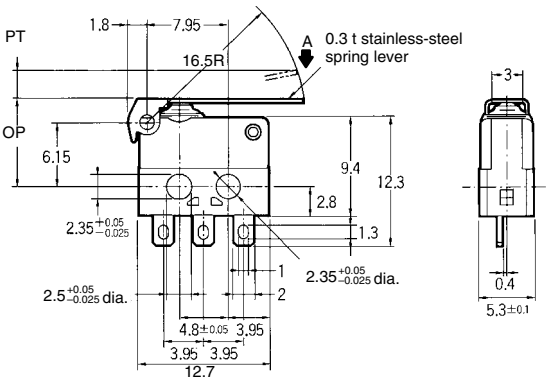


OF max.	1.15 N {117 gf}
RF min.	0.23 N {23 gf}
PT max.	5.4 mm
OT min.	0.7 mm
MD max.	0.5 mm
OP	8.4±0.8 mm

Hinge Lever Models

D2JW-01K11

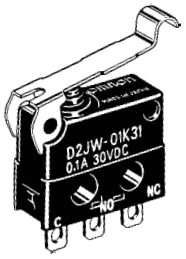


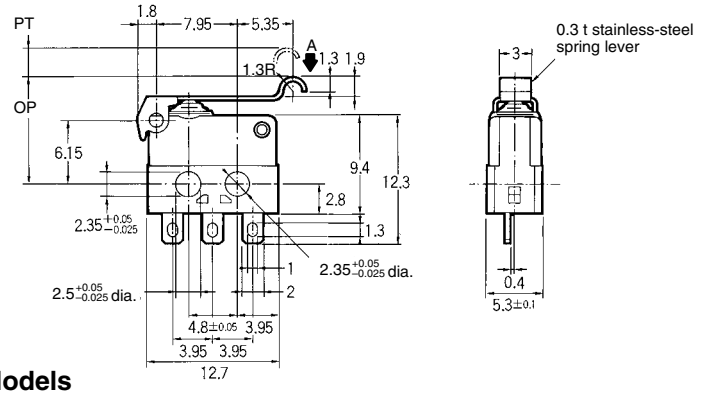


OF max.	0.80 N {82 gf}
RF min.	0.15 N {16 gf}
PT max.	6.4 mm
OT min.	1.4 mm
MD max.	0.7 mm
OP	8.4±0.8 mm

Simulated Roller Lever Models

D2JW-01K31

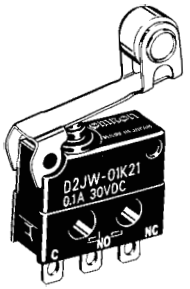


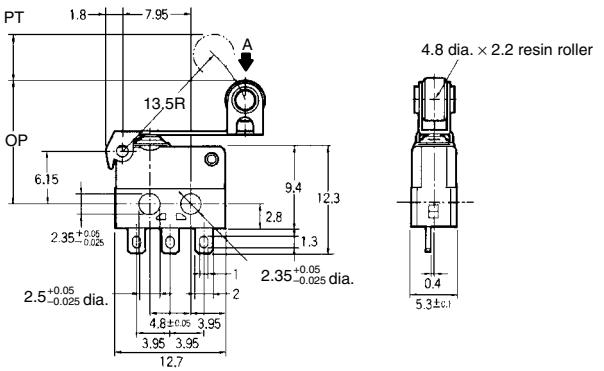


OF max.	0.95 N {97 gf}
RF min.	0.19 N {20 gf}
PT max.	5.5 mm
OT min.	1.1 mm
MD max.	0.6 mm
OP	10.3±0.8 mm

Hinge Roller Lever Models

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

Precautions

Refer to pages 26 to 31 for common precautions.

■ Cautions

Terminal Connection

When soldering, make sure that the capacity of the soldering iron is 30 W maximum (temperature of soldering iron: 250°C max.). Do not take more than 3 s to solder the switch terminal.

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 more than 3 s or using one that is rated at more than 30 W may deteriorate the Switch characteristics.

Degree of Protection

Do not use the Switch underwater. The Switch was tested and found to meet the conditions necessary to meet the following standard. The test checks for water intrusion after immersion for a specified time period. The test does not check for switching operation underwater.

IEC Publication 529, degree of protection IP67.

Protection Against Chemicals

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

■ Correct Use

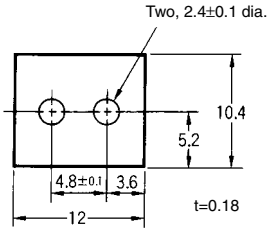
Use M2.3 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.20 to 0.29 N•m {2 to 3 kgf•cm}.

Separator

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

■ Separator (Sold Separately)

Model	Separator for D2JW



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

Cat. No. B040-E1-01D

OMRON

Sealed Basic Switch for Vehicles

D2FW-G

A Sealed Switch for Mechanical Detection in Automobiles and Industrial Vehicles (Conforming to IP67)

- Single-point mounting with an M4 screw.
- Incorporates a fixed leaf lever for tough environments.
- Molded lead wires are installed using lead-free connections for environmental conservation.

Ordering Information

■ Model Number Legend

D2FW-G□□□M

1 2 3

1. Ratings/Contact Specifications
- 2: For general load
- 0: For micro load

2. Actuator
- 7 Leaf lever
- 8: Long leaf lever

3. Contact Form
- 1: SPDT
- 2: SPST-NC
- 3: SPST-NO

■ List of Models

Actuator	Rated load	Contact specifications (molded lead wires)	Model
Leaf lever 	1 A	SPDT	D2FW-G271M
		SPST-NC	D2FW-G272M
		SPST-NO	D2FW-G273M
	0.1 A	SPDT	D2FW-G071M
		SPST-NC	D2FW-G072M
		SPST-NO	D2FW-G073M
Long leaf lever 	1 A	SPDT	D2FW-G281M
		SPST-NC	D2FW-G282M
		SPST-NO	D2FW-G283M
	0.1 A	SPDT	D2FW-G081M
		SPST-NC	D2FW-G082M
		SPST-NO	D2FW-G083M

Note: The standard length of the molded lead wires (AVS0.5) is 30 cm.

Specifications

■ Ratings

Rated voltage	D2FW-G2□ (general load models)	D2FW-G0□ (micro load models)
	Resistive load	
30 VDC	1 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	Non-inductive load		Inductive load	
	Resistive load	Lamp load	Inductive load	Motor load
14 VDC	1.5 A	0.5 A	0.5 A	0.5 A
30 VDC	1 A	0.3 A	0.3 A	0.3 A

Note: 1. Inductive load has a power factor of 0.7 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. Motor load has an inrush current of 6 times the steady-state current.

■ Characteristics

Item	D2FW-G2□	D2FW-G0□
Operating speed	1 to 500 mm/s	
Operating frequency	Mechanical: 120 operations/min max. Electrical: 30 operations/min max.	
Insulation resistance	100 MΩ min. (at 500 VDC)	
Contact resistance	100 mΩ max.	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 max. Malfunction: 300 m/s^2 max.	
Durability (see note 3)	Mechanical: 300,000 operations min. (60 operations/min)	
	Electrical: 30,000 operations min. (20 operations/min)	Electrical: 100,000 operations min. (20 operations/min)
Degree of protection	IEC IP67	
Degree of protection against electric shock	Class I	
Proof tracking index (PTI)	175	
Ambient operating temperature	–40°C to 85°C (at ambient humidity of 60% max.) (with no icing)	
Ambient operating humidity	95% max. (for 5°C to 35°C)	
Weight	Approx. 10.4 g (SPDT type)	

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, consult your OMRON sales representative.

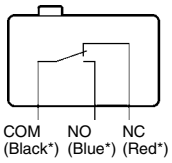
■ Contact Specifications

Item	D2FW-G2□ (general load models)	D2FW-G0□ (micro load models)
Specification	Crossbar	
Material	Silver alloy	Gold alloy
Gap (standard value)	0.25 mm	
Minimum applicable load (see note)	100 mA at 5 VDC	1 mA at 5 VDC

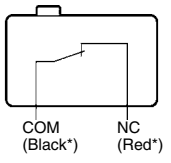
Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 249.

■ Contact Form

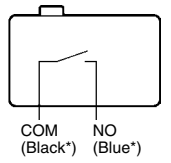
SPDT



SPST-NC



SPST-NO

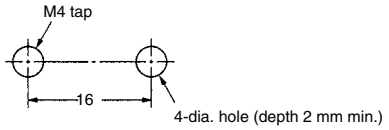


* The color in parentheses indicates the color of the lead wire.

Dimensions

■ Mounting Holes

Note: All units are in millimeters unless otherwise indicated.



■ Dimensions and Operating Characteristics

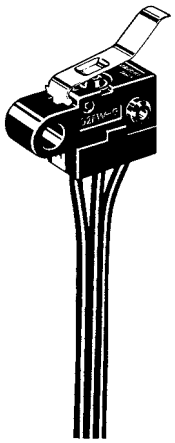
Note: 1. All units are in millimeters unless otherwise indicated.

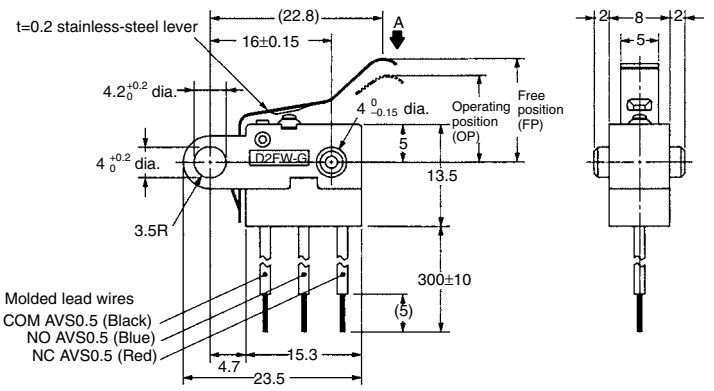
2. The operating characteristics are for operation in the A direction (⬇).

3. The □ in the model number is for rating code and contact form code.

Leaf Lever Models

D2FW-G□7□M

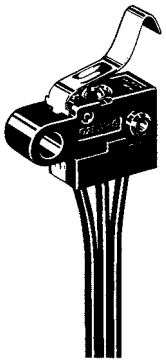


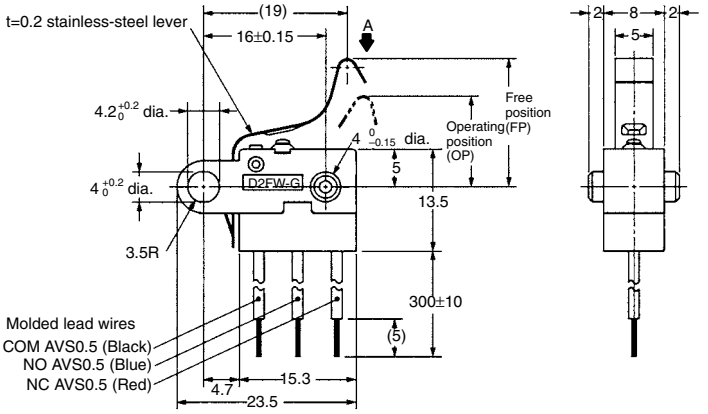


Model	Leaf Lever Models
	D2FW-G□7□M
OF max.	2.45 N {250 gf}
RF min.	0.29 N {30 gf}
OT min.	1.0 mm
MD max.	1.0 mm
FP max.	15.5 mm
OP	11.5±2 mm
TTP	6.5 mm (reference value)

Long Leaf Lever Models

D2FW-G□8□M





Model	Long Leaf Lever Models
	D2FW-G□8□M
OF	2.94 N {300 gf}
RF min.	0.59 N {60 gf}
OT min.	1.0 mm
MD max.	1.0 mm
FP max.	19 mm
OP	12±2 mm
TTP	8.5 mm (reference value)

Precautions

Refer to pages 26 to 31 for common precautions.

■ Cautions

Use the Switch within the specified electrical ratings. Using the Switch outside of the rated values will not only shorten its service life but may cause heat generation or fire damage. When turning the power ON or OFF, use the rated voltage and current.

Degree of Protection

Do not use the Switch underwater. The Switch was tested and found to meet the conditions necessary to meet the following standard. The test checks for water intrusion after immersion for a specified time period. The test does not check for switching operation underwater.

IEC Publication 529, degree of protection IP67.

Protection Against Chemicals

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

■ 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 M4 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 1.18 to1.47 N•m {12 to 15 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.

Switch Mounting

When mounting the Switch, do not apply force to the actuator in any direction other than its operating direction.

Operation

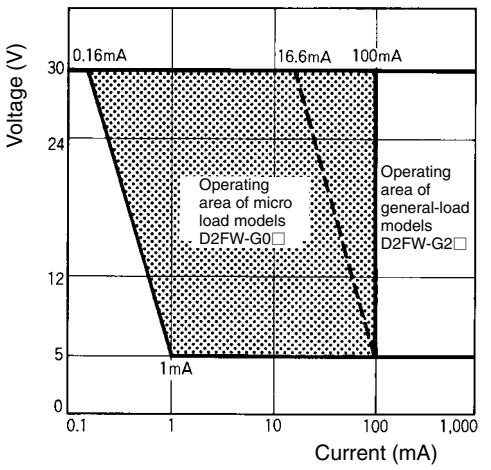
Make sure that the switching object is perfectly separated from the actuator when the switch is not operated and the actuator is pressed appropriately by the switching object when the switch is operated. The switching object must not move beyond its operational limit position, otherwise the Switch may be damaged.

Install the switching object so that its moving direction is the same as that of the actuator.

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% (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%.



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

Cat. No. B104-E1-01C

Ultra Subminiature Detection Switch with Slide Mechanism and Pushbutton Actuator

- Compact (8 × 6 × 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 Oprating 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/s^2 {approx. 100G} max. Malfunction: 300 m/s^2 {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.

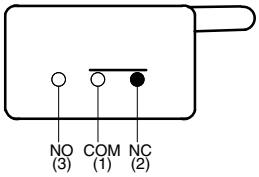
■ Contact Specifications

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

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 253.

■ Contact Form

SPDT

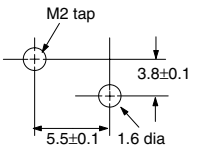


Dimensions

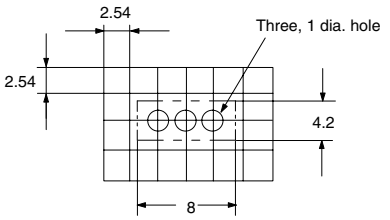
■ Mounting Holes

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

Mounting Holes



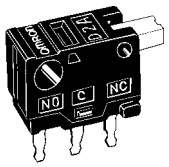
PCB Mounting Dimensions (Reference)

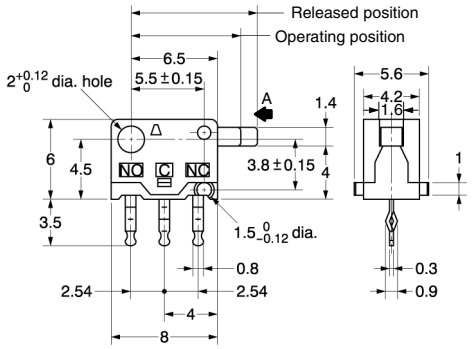


■ Dimensions and Operating Characteristics

Note: 1. All units are in 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 the A direction (⬇).

D2A-1110/-1120
D2A-2110/2120

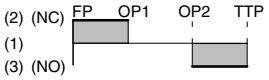




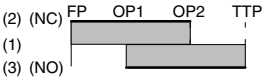
Model	Non-shorting Models		Shorting Models	
	D2A-1110	D2A-1120	D2A-2110	D2A-2120
OF max.	0.98 N {100 gf}	0.49 N {50 gf}	0.98 N {100 gf}	0.49 N {50 gf}
RF min.	0.15 N {15 gf}	0.05 N {5 gf}	0.15 N {15 gf}	0.05 N {5 gf}
FP max.	9.5 mm		9.5 mm	
OP1	8.1±0.3 mm		8.0±0.3 mm	
OP2	7.4±0.3 mm		7.5±0.3 mm	
TTP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

Switching Timing

Non-shorting Model



Shorting Model



Precautions

Refer to pages 26 to 31 for common precautions.

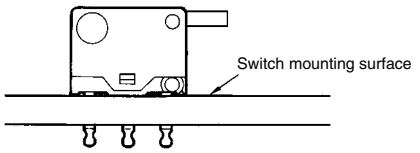
■ Cautions

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

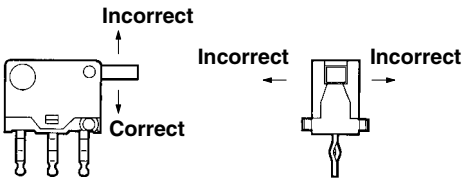
Turn OFF the power supply before mounting or removing the Switch, wiring, or performing maintenance or inspection. Failure to do so may result in electric shock or burning.

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 9.8×10^{-2} N • m {0.5 to 1 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.

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.



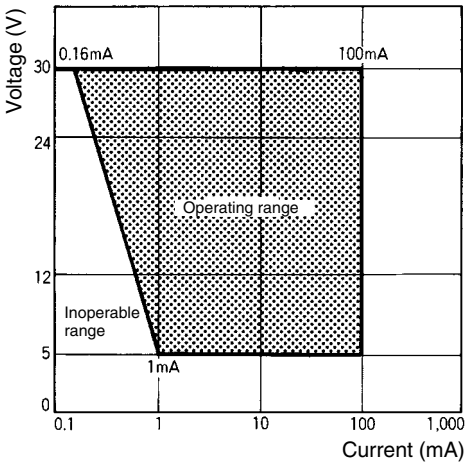
Mounting Plate

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



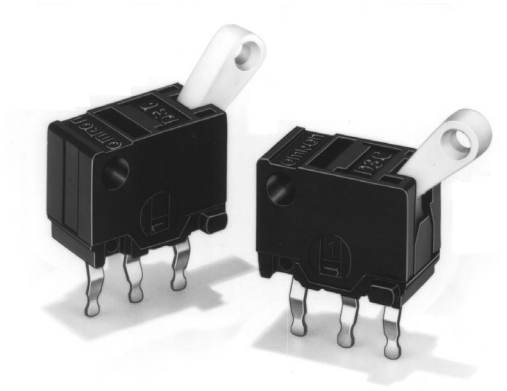
ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

OMRON

Ultra Subminiature Detection Switch | D3C

Ultra Subminiature Detection Switch with Slide Mechanism and Lever Actuator

- Compact (8 × 6 × 4.2 mm (W × H × D)) and light (approximately 0.3 g) with long, 3-mm stroke.
- Built-in slide mechanism allows selection of shorting or non-shorting timing to match the application.
- Ideal for a wide variety of applications, including compact household appliances, audio equipment, office machines, and telecommunications equipment.



Ordering Information

■ Model Number Legend

D3C-□2□0

1 2

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

2. Maximum Oprating Force
- 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
Rotary 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 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/s^2 {approx. 100G} max. Malfunction: 300 m/s^2 {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	–20°C to 80°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.

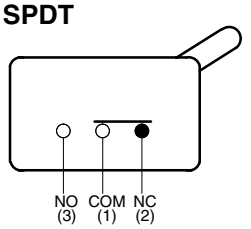
■ Contact Specifications

Contact	Specification	Slide
	Material	Silver plated
Minimum applicable load (see note)		1 mA at 5 VDC

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 257.

■ Contact Form

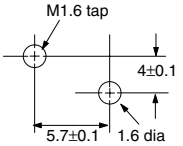
SPDT



Dimensions

■ Mounting Holes

Note: All units are in millimeters unless otherwise indicated.

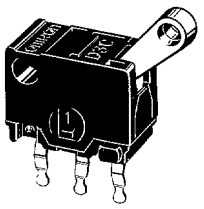


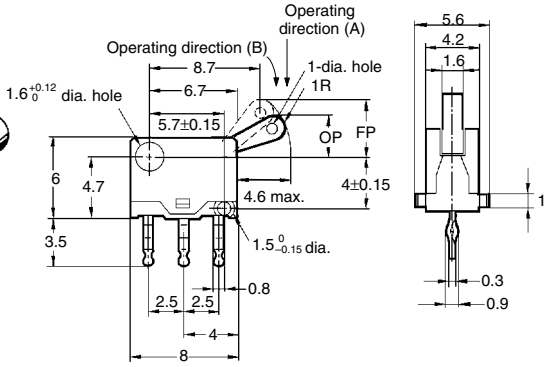
■ Dimensions and Operating Characteristics

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

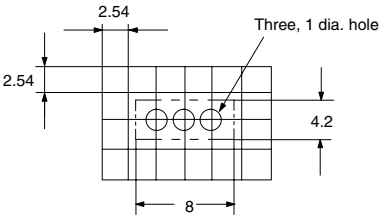
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

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





PCB Dimensions



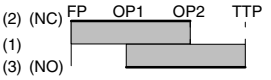
Model	Non-shorting Models		Shorting Models	
	D3C-1210	D3C-1220	D3C-2210	D3C-2220
OF max.	1.28 N {130 gf} (0.98 N)	0.39 N {40 gf} (0.29 N)	1.28 N {130 gf} (0.98 N)	0.39 N {40 gf} (0.29 N)
RF min.	0.10 N {10 gf} (0.15 N)	0.03 N {3 gf} (0.05 N)	0.10 N {10 gf} (0.15 N)	0.03 N {3 gf} (0.05 N)
FP max.	4.8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

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

Switching Timing

Non-shorting Model

Shorting Model



Precautions

Refer to pages 26 to 31 for common precautions.

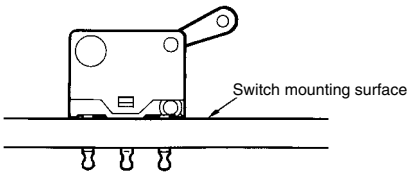
■ Cautions

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

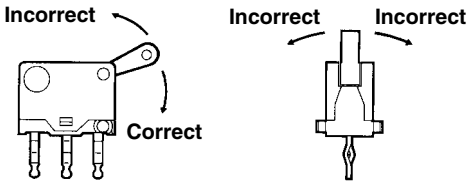
Turn OFF the power supply before mounting or removing the Switch, wiring, or performing maintenance or inspection. Failure to do so may result in electric shock or burning.

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 9.8×10^{-2} N • m {0.5 to 1 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.

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.



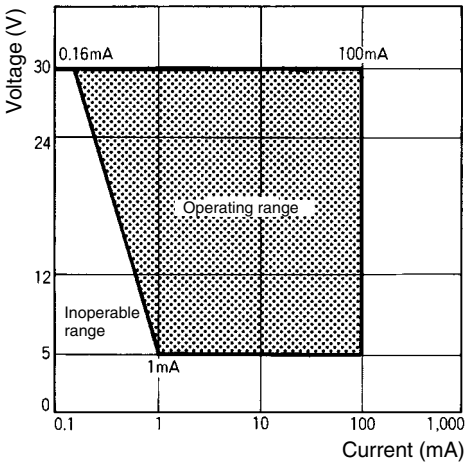
Mounting Plate

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.

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% (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%.



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

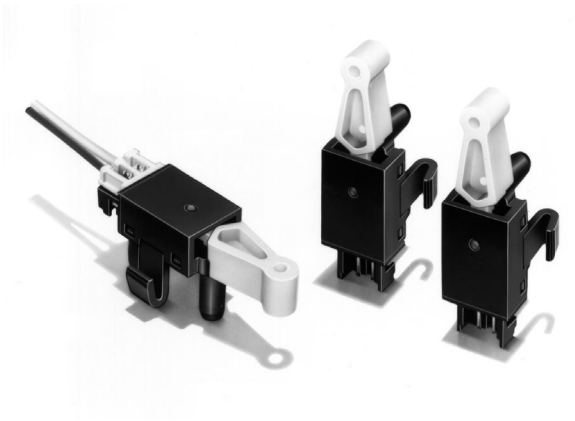
Cat. No. C099-E1-02C

OMRON

Connector Termination Switch | D2X

A Switch with Crimp-type Connectors that Greatly Reduces Wiring Work

- Clip-on wiring via AMP crimp-type connectors.
- Snap-fit attachment for easy installation.
- Operation possible from either side to enable mounting in either direction.



Ordering Information

Model	D2X-C

Specifications

■ Ratings

30 VDC	0.1 A (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	0.1 to 100 mm/s
Operating frequency	Mechanical: 60 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 250 VDC)
Contact resistance (initial value)	200 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 part and ground
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction: 500 m/s^2 {approx. 50G} max. Malfunction: 300 m/s^2 {approx. 30G} max.
Durability (see note 2)	Mechanical: 1,000,000 operations min. Electrical: 50,000 operations min.
Degree of protection	IEC IP00
Degree of protection against electric shock	Class I
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	45% to 85% (for 5°C to 35°C)
Weight	Approx. 1 g

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

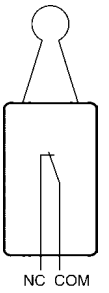
■ Contact Specifications

Contact	Specification	Slide
	Material	Gold plated
Minimum applicable load (see note)		1 mA at 5 VDC

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 261.

■ Contact Form

SPST-NC



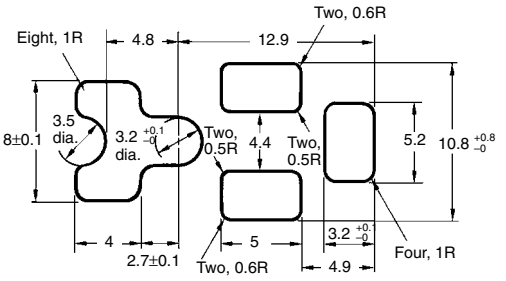
Dimensions

■ Mounting Holes

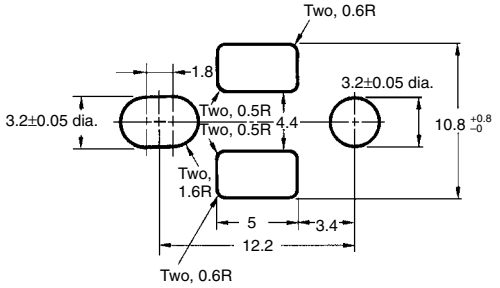
Note: 1. All units are in millimeters unless otherwise indicated.
2. Allowable deviation from the center is ±0.07 mm.
3. Unless otherwise specified, a tolerance of ±0.1 mm applies to all dimensions.

Make sure that the bur is placed to backside of Mounting Plate.

When thickness of the plate (t) is 1.6 mm.



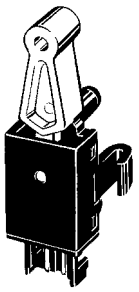
When thickness of the plate (t) is 1.2 mm.

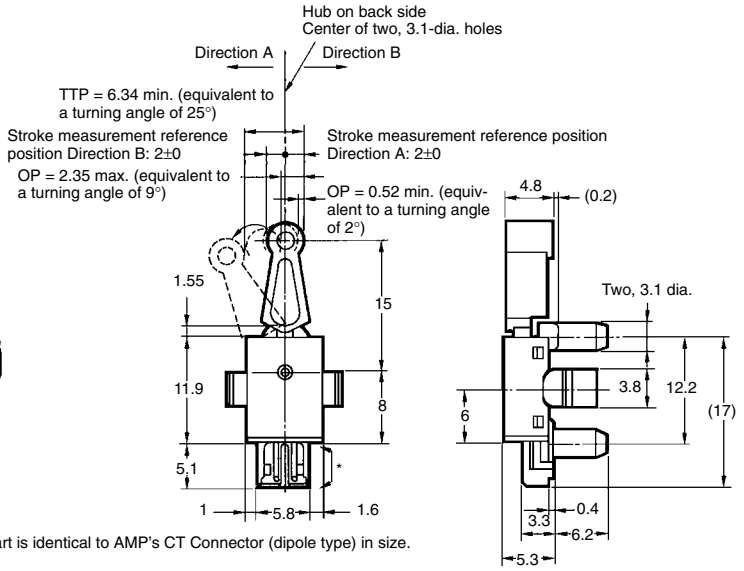


■ Dimensions and Operating Characteristics

Note: 1. All units are in millimeters unless otherwise indicated.
2. Unless specified, a tolerance of ±0.4 mm applies to all dimensions.
3. The operating characteristics are for cases where the actuator operates in the A (←) direction or B (→) direction.

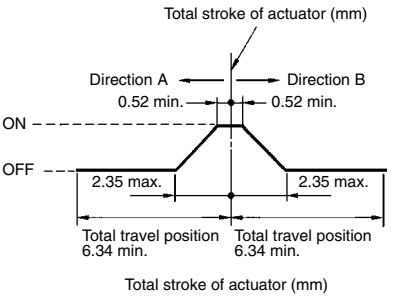
D2X-C





*This part is identical to AMP's CT Connector (dipole type) in size.

OF max.	0.49 N {50 gf}
RF min.	0.02 N {2 gf}
OP	0.52 to 2.35 mm
TTP min.	6.34 mm



Precautions

Refer to pages 26 to 31 for common precautions.

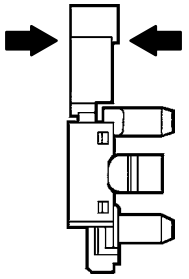
■ Correct Use

Operating Object

The operating object must fully press the lever when the operating object travels and must be perfectly separated from the lever when the operating object is in the free position. The operating object must not be pressed excessively to exceed the TTP, otherwise the D2X may be damaged. Be sure that the operating object imposes a proper load on the lever according to the motion of the lever.

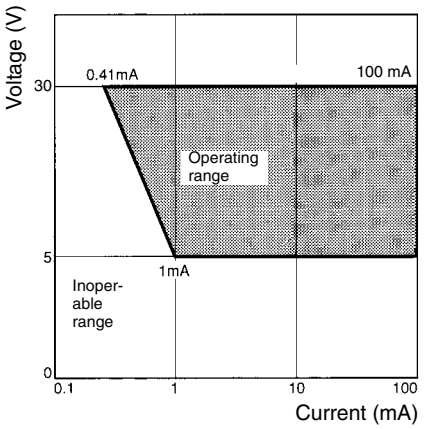
Lever Load

Do not impose loads in the following directions on the lever, otherwise the Switch may be damaged or malfunction.



Using Micro Loads

Be sure that the load is within the following range.



■ Wiring Connector

Use the following type CT connectors of Tyco Electronics AMP for wiring.

Press-fit connector: 173977-2
Crimp-style connector housing: 179228-2
Crimp-style connector contact: 179227-1

The above connectors are not sold by OMRON. Contact the following offices for these connectors:

Tyco Electronics/AMP

- Japan
  Phone: 81-44-844-8111
- U.S.A.
  Phone: 1-800-522-6752
- Great Britain
  Phone: 44-208-954-2356
- Hong Kong
  Phone: 852-2735-1628

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

Cat. No. B094-E1-02B

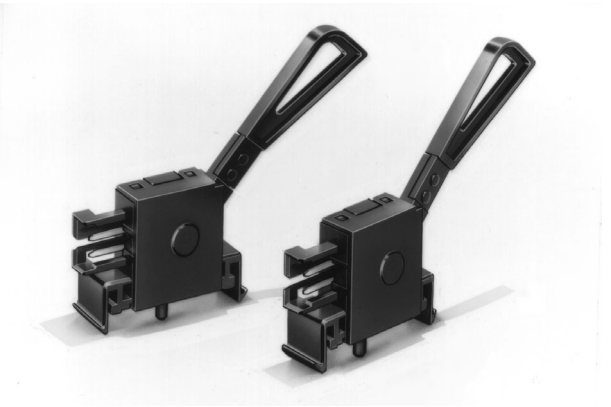
OMRON

Low Force Detection Switch

D3K

Detection Switch Requiring Only Minimal Operating Force

- Detects insertion of cards or passage of paper sheets with a 0.03-N {3-gf} operating force.
- Capable of snap-fitting onto 0.8, 1.0, or 1.2-mm-thick mounting objects.
- Easy wiring ensured through quick-connect terminals.
- Long, 45-degree stroke angle makes it easier to design a wide range of mechanisms.



Ordering Information

Model	Minimum order
D3K-B	100

Note: Only orders in multiples of 100 are accepted.

Specifications

■ Ratings

12 VDC	10 mA (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	0.1 to 100 mm/s
Operating frequency	Mechanical: 30 operations/min max. Electrical: 30 operations/min max.
Insulation resistance	100 MΩ min. (at 250 VDC)
Contact resistance (initial value)	200 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 part and ground
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance (see note 2)	Destruction: 500 m/s^2 {approx. 50G} max. Malfunction: 300 m/s^2 {approx. 30G} max.
Durability (see note 3)	Mechanical: 2,000,000 operations min. (30 operations/min) Electrical: 2,000,000 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 or condensation)
Ambient operating humidity	35% to 85% (for 5°C to 35°C)
Weight	Approx. 1 g

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

2. These values are possible on condition that the actuator of the D3K is operated up to the total travel position (TTP). The values shown apply for malfunctions of 1 ms max.

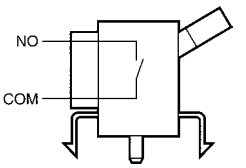
3. For testing conditions, consult your OMRON sales representative.

■ Contact Specifications

Contact	Specification	Slide
	Material	Silver plated
Minimum applicable load (see note)		1 mA at 5 VDC

Note: For more information on the minimum applicable load, refer to *Using Micro loads* on page 265.

■ Contact Form



Dimensions

■ Mounting Holes

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

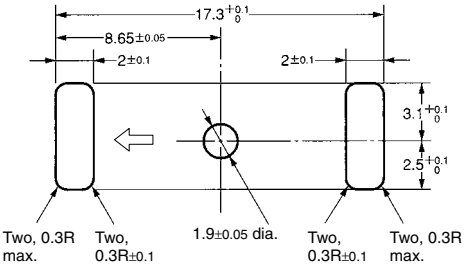
2. The switch lever is set in the direction indicated by an arrow in the above illustrations.

Refer to the following mounting hole dimensions and be sure that the burred side is opposite to the Switch mounting side.

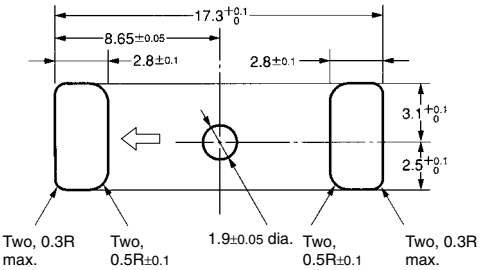
If further mounting security is required for the prevention of rattling, consult your OMRON sales representative.

By changing the 1.9±0.05-dia. hole to a 1.7 to 1.8-dia. hole, the pin on the Switch side will need to be pressed in. This will reduce the clattering of the pin.

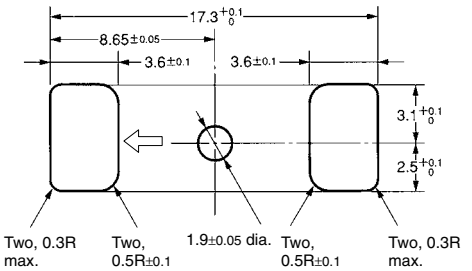
- Plate thickness t=0.8



- Plate thickness t=1.0



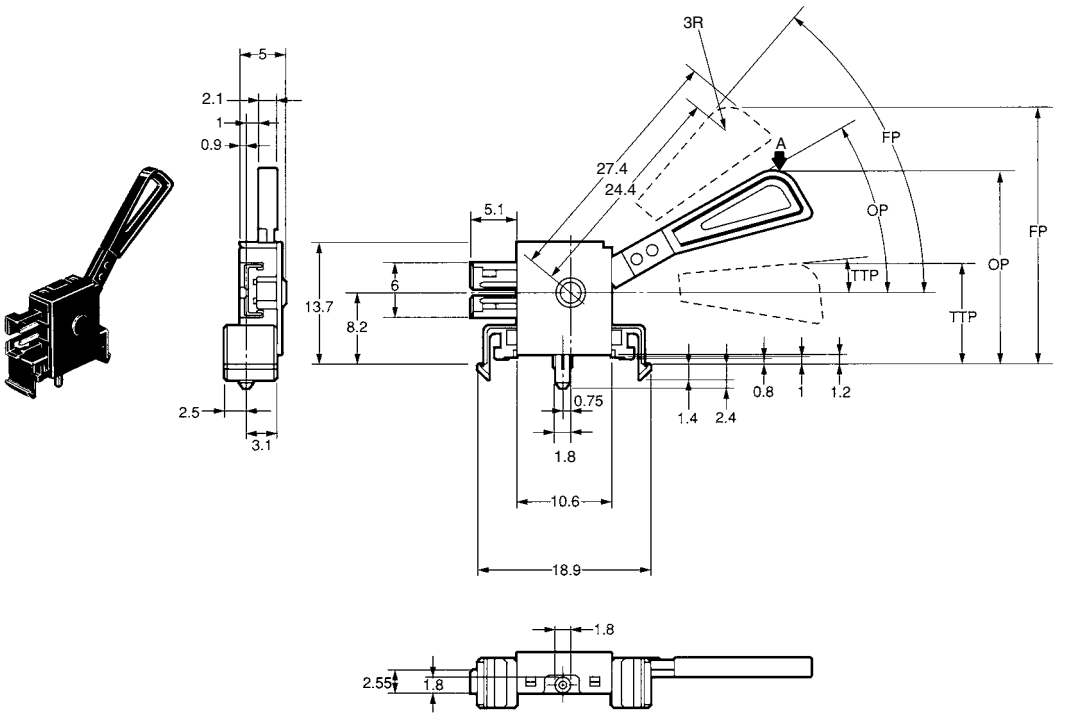
- Plate thickness t=1.2



■ Dimensions and Operating Characteristics

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

D3K



OF max.	0.03 N {3 gf}
TTF max.	0.05 N {5 gf}
FP max.	28.7 mm {50°}
OP	21.6±2 mm {30±5°}
TTP max.	11.4 mm {5°}

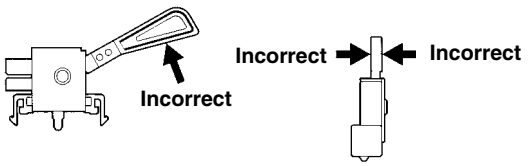
Precautions

Refer to pages 26 to 31 for common precautions.

■ Correct Use

Application of Operation Force to the Lever

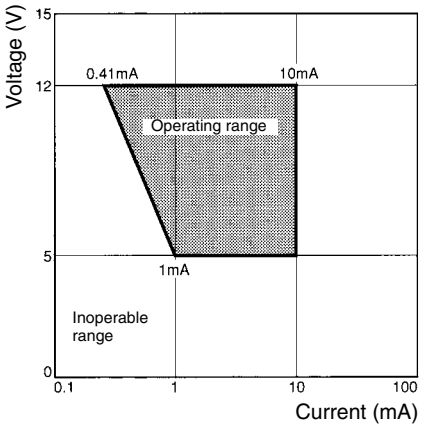
Apply operation forces to the lever in its operating direction. Applying operating force to the lever in any other directions will damage the Switch or cause malfunction.



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% (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%.



■ Connector

Use the following type CT connectors of Tyco Electronics AMP for wiring the D3K:

Press-fit connector: 173977-2
Crimp-style connector housing: 179228-2
Crimp-style connector contact 179227-1

The above connectors are not sold by OMRON. Contact the following offices for these connectors:

Toyo Electronics/AMP

- Japan
  Phone: 81-44-844-8111
- U.S.A.
  Phone: 1-800-522-6752
- Great Britain
  Phone: 44-208-954-2356
- Hong Kong
  Phone: 852-2735-1628

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

Cat. No. B099-E1-01B

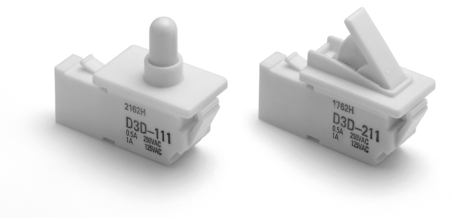
OMRON

Miniature Door Switch

D3D

Unique Mechanism Allows Switching of Both Micro Loads and Power Loads

- Choose from plunger or lever as the actuator type.
- 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

1 2

1. Actuator

1: Plunger

2: Lever

2. Contact Form

1: SPDT

2: SPST-NC

3: SPST-NO

■ 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 values apply under the following test 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 max. Electrical: 30 operations/min max.
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 2)	Destruction: 490 m/s^2 max. Malfunction: 300 m/s^2 max.
Durability (see note 3)	Mechanical: 300,000 operations min. (60 operations/min) Electrical: 50,000 operations min. (20 operations/min)
Degree of protection	IP40
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 data given above are initial values.
2. The contacts do not open or close for more than 1 ms.
3. Consult your OMRON sales representative for details on test conditions.

■ Approved Standards

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

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

	D3D
125 VAC	1 A
250 VAC	0.5 A

EN61058-1 (File No. 40005053, VDE approval)

	D3D
125 VAC	1 A
250 VAC	0.5 A

Testing conditions: 5E4 (50,000 operations), T55 (0°C to 55°C)

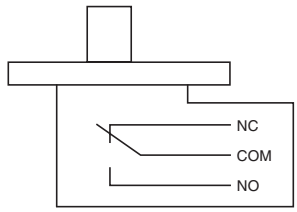
■ Contact Specifications

Contact	**Specification**	Crossbar
	Material	Gold alloy
Minimum applicable load (see note)		1 mA at 5 VDC

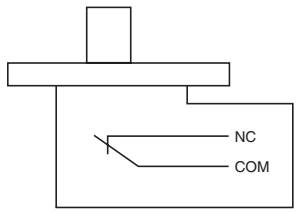
Note For more information on the minimum applicable load, refer to *Using Micro Loads* on page 269.

■ Contact Form

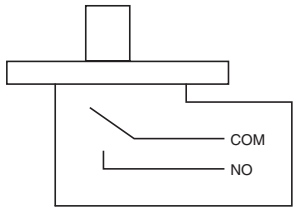
SPDT



SPST-NC



SPST-NO



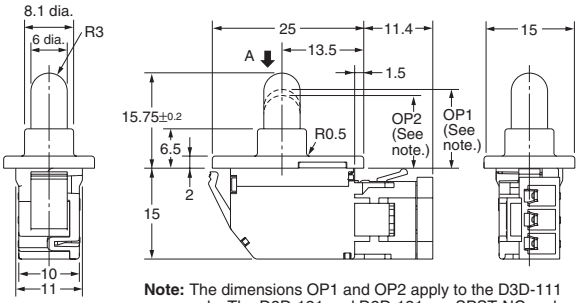
Dimensions

■ 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

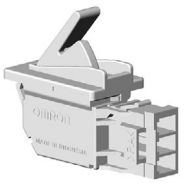


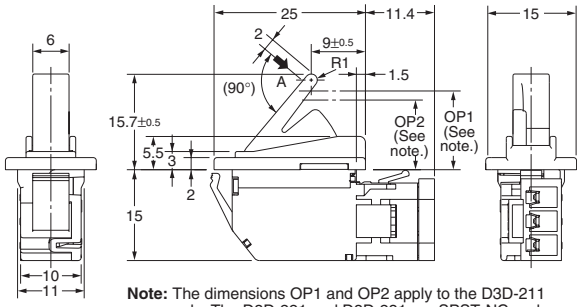
Note: The dimensions OP1 and OP2 apply to the D3D-111 only. The D3D-121 and D3D-131 are SPST-NC and SPST-NO respectively and so therefore have only one corresponding dimension here (OP).

Type	Plunger model		
Model	D3D-111	D3D-121	D3D-131
OF max.	2.0 N {204 gf}		
TTF max.	3.5 N {357 gf}		
TT	9.0 mm (reference value)		
OP min.	OP1 (NC-OFF) 13 mm	13 mm	12 mm
	OP2 (NO-ON) 12 mm		

Lever Models

D3D-211
D3D-221
D3D-231



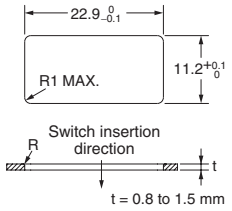


Note: The dimensions OP1 and OP2 apply to the D3D-211 only. The D3D-221 and D3D-231 are SPST-NC and SPST-NO respectively and so therefore have only one corresponding dimension here (OP).

Type	Lever model		
Model	D3D-211	D3D-221	D3D-231
OF max.	2.0 N {204 gf}		
TTF max.	3.5 N {357 gf}		
TT	9.7 mm (reference value)		
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.

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

Cat. No. B107-E1-01A

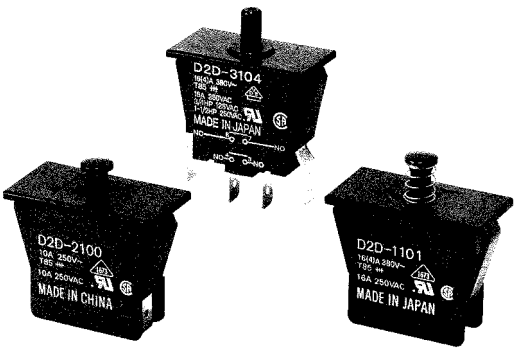
OMRON

Door Interlock Switch

D2D

Power Switch with Minimum Contact Gap of 3 mm

- Offers the minimum contact gap of 3 mm required for power switches as standard equipment. Highly reliable design conforms to European safety standards.
- Safety considerations include a double return spring and direct drive positive contact opening feature. Also 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 273 for the pull-on lock function.

Specifications

■ Ratings

Type	Item: Rated voltage	Resistive load
Standard	250 VAC	16 A
Pull-on lock	250 VAC	10 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)

Type	Voltage	Non-inductive load		Inductive load	
		Resistive load		Motor load	
		NC	NO	NC	NO
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.

■ 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 max. Electrical: 30 operations/min max.		
Insulation resistance		100 MΩ min. (at 500 VDC)		
Contact resistance (initial value)		50 mΩ max.		
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 note 2)	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		Destruction: 1,000 m/s^2 {approx. 100G} max.		
		Malfunction: 500 m/s^2 {approx. 50G} max.	Malfunction: 300 m/s^2 {approx. 30G} max.	Malfunction: 500 m/s^2 {approx. 50G} max.
Durability (see note 3)		Mechanical: 10,000,000 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 II		
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. 14 g (D2D-1000)		

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 testing conditions, consult your OMRON sales representative.

■ 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	D2D-1000	D2D-2000	D2D-3000
125 VAC	---	---	3/4 HP
250 VAC	16 A	10 A	16 A, 1-1/2 HP

EN61058-1 (File No. 136005, VDE approval)

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

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

Note: The values in parentheses indicate motor load ratings.

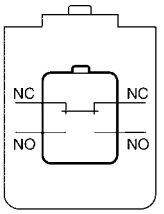
EN61058-1 (File No. R9551934, TÜV Rheinland approval)

Rated voltage	D2D-3104
24 VDC	4 A

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

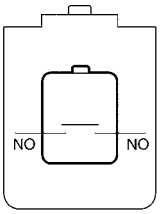
■ Contact Form

SPDB-NO/NC



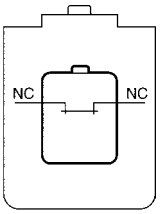
D2D-1000 D2D-2000
D2D-1100 D2D-2100

SPDB-NO



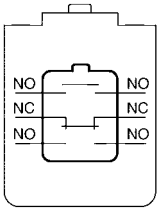
D2D-1001
D2D-1101

SPDB-NC



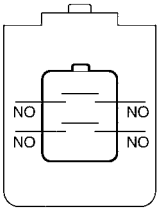
D2D-1002
D2D-1102

SPDB-NO +SPDB-NO/NC



D2D-3103

DPDB-NO



D2D-3104

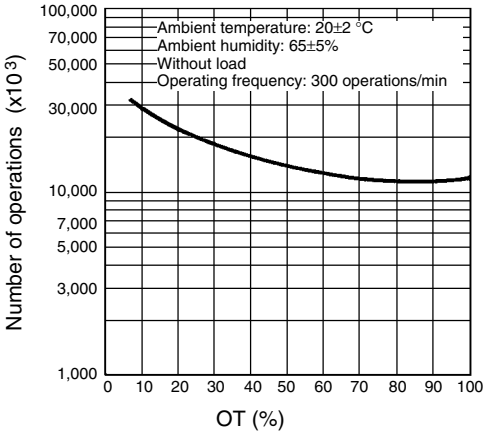
■ Contact Specifications

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.
Minimum applicable load (see note)		160 mA at 5 VDC	

Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 277.

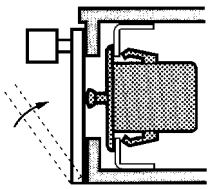
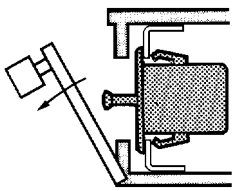
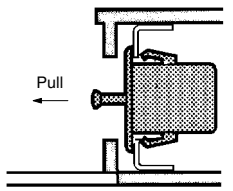
Engineering Data (Reference Values)

Mechanical Durability (D2D-1000)



■ 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.)

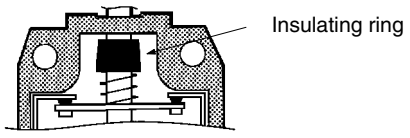
Example		To turn ON the power when the door is closed	To turn OFF the power when the door is open	To turn ON the power with the door left open
State				
Connection	NO-NO	ON	OFF	ON
	NC-NC	OFF	ON	OFF

■ Double Spring Mechanism

Two return springs are provided for the pin plunger. Thus, if either of the springs is broken, this feature will prevent the Switch from malfunctioning or short-circuiting.
Applicable Models: D2D-1000 and 3000 models

■ Direct Contact Opening Mechanism

The insulating ring ▲ will positively break the circuit if a contact weld occurs in the Switch.
Applicable Models: D2D-1000 Models

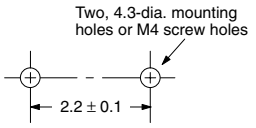


Example of D2D-1000.

Dimensions

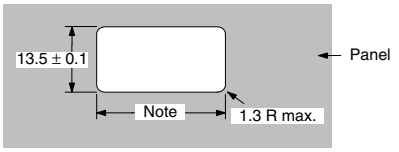
■ Mounting Holes

Note: All units are in millimeters unless otherwise indicated.



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

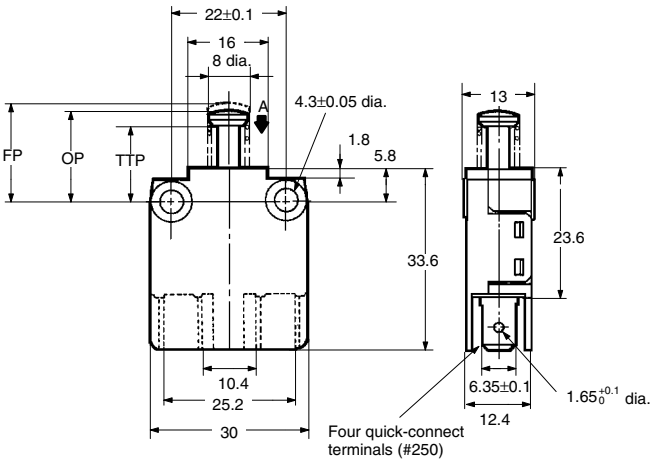
■ Dimensions and Operating Characteristics

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 the A direction (▼).

■ Standard Models

Screw Mounting

D2D-1000
D2D-1001
D2D-1002

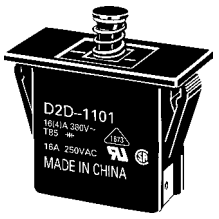


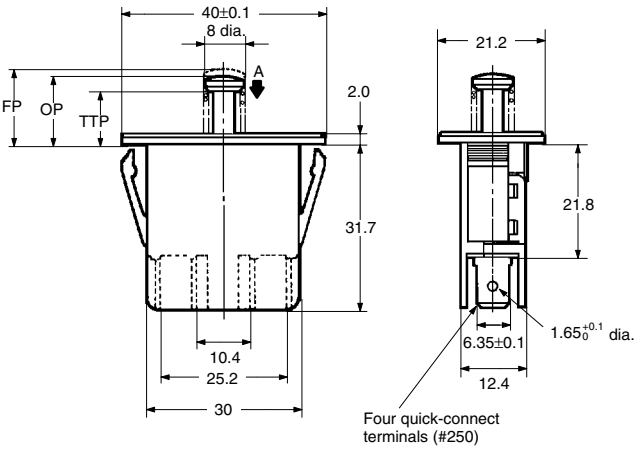
Note: NC-OFF: The force applied to the actuator to cause it to move from the free position to the position at which the NC contact opens.
NO-ON: The force applied to the actuator to cause it to move from the free position to the position at which the NO contact closes.

Model		Screw mounting		
		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
FP max.		16.4 mm	17 mm	16.4 mm
OP	NC-OFF	15.9±0.4 mm	---	15.9±0.4 mm
	NO-ON	12.7±0.4 mm	12.7±0.4 mm	---
TTP max.		10 mm	10 mm	10 mm

Panel Mounting

D2D-1100
D2D-1101
D2D-1102

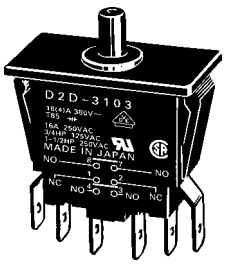


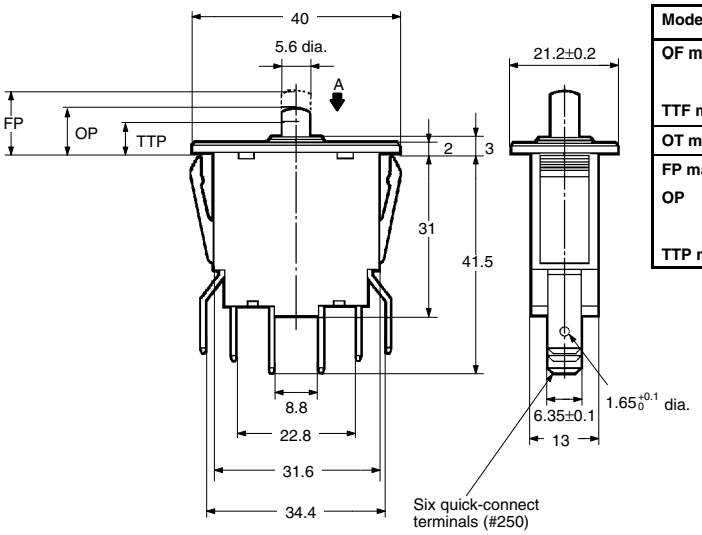


Model		Panel mounting		
		D2D-1100	D2D-1101	D2D-1102
OF max.	NC-OFF	2.94 N {300 gf}	---	2.94 N {300 gf}
	NO-ON	5.88 N {600 gf}	5.88 N {600 gf}	---
TTF max.		7.35 N {750 gf}	7.35 N {750 gf}	7.35 N {750 gf}
OT min.		2.3 mm	2.3 mm	5.5 mm
FP max.		12.4 mm	13 mm	12.4 mm
OP	NC-OFF	11.9±0.4 mm	---	11.9±0.4 mm
	NO-ON	8.7±0.4 mm	8.7±0.4 mm	---
TTP max.		6 mm	6 mm	6 mm

Panel Mounting

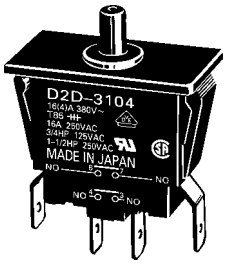
D2D-3103

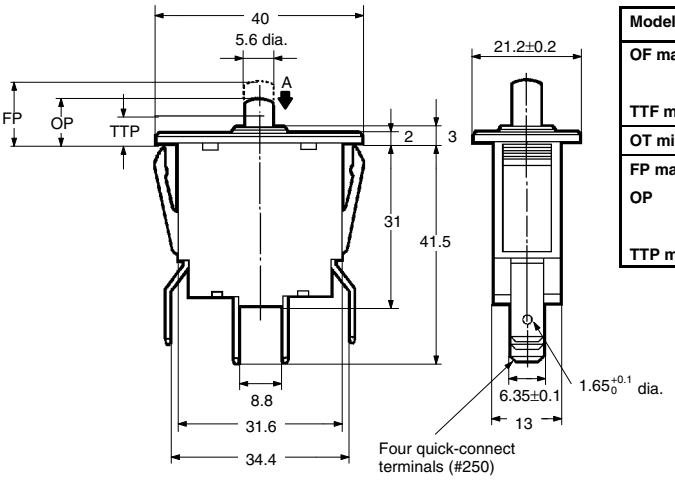




Model		D2D-3103
OF max.	NC-OFF	2.94 N {300 gf}
	NO-ON	5.88 N {600 gf}
TTF max.		9.81 N {1,000 gf}
OT min.		2.3 mm
FP max.		12.4 mm
OP	NC-OFF	11.9±0.8 mm
	NO-ON	8.7±0.8 mm
TTP max.		6.4 mm

Panel Mounting
D2D-3104

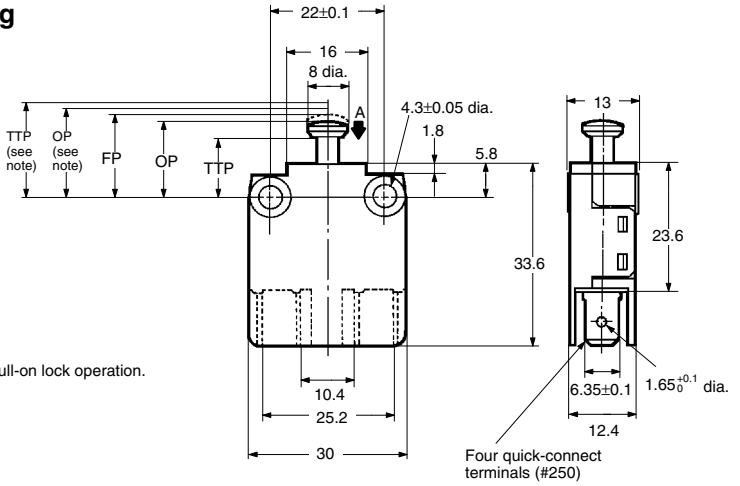




Model		D2D-3104
OF max.	NC-OFF	---
	NO-ON	5.88 N {600 gf}
TTF max.		9.81 N {1,000 gf}
OT min.		2.3 mm
FP max.		13.5 mm
OP	NC-OFF	---
	NO-ON	8.7±0.8 mm
TTP max.		6.4 mm

■ Pull-on Lock Models

Screw Mounting
D2D-2000

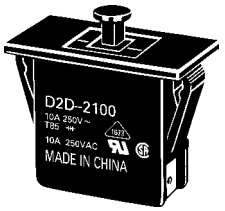


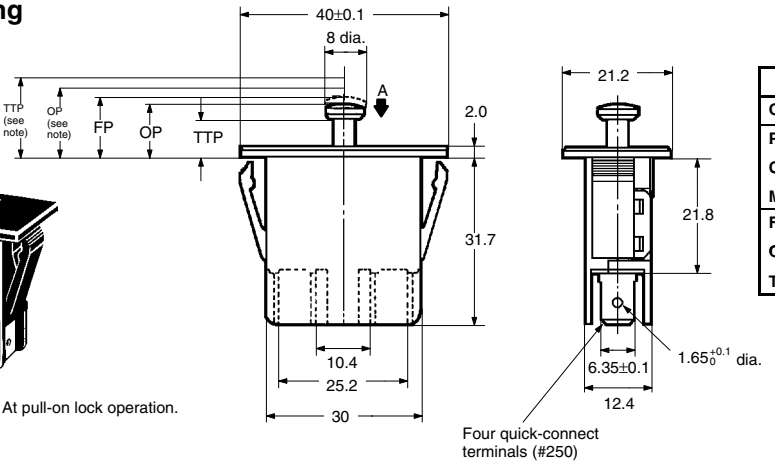
Note: At pull-on lock operation.

Momentary Operation (Normal Operation)

Model		D2D-2000	D2D-2100
OF max.	NC-OFF	1.96 N {200 gf}	1.96 N {200 gf}
	NO-ON	2.94 N {300 gf}	2.94 N {300 gf}
TTF max.		5.88 N {600 gf}	5.88 N {600 gf}
OT min.		4.5 mm	4.5 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
TTP max.		8.3 mm	4.3 mm

Panel Mounting
D2D-2100





Note: At pull-on lock operation.

Pull-on Lock Operation

Model	D2D-2000	D2D-2100
OF max.	19.61 N {2,000 gf}	
PT max.	2 mm	
OT min.	0.4 mm	
MD max.	1.5 mm	
FP max.	14.3 mm	10.3 mm
OP	15.1±0.6 mm	11.1±0.6 mm
TTP max.	16.5 mm	12.5 mm

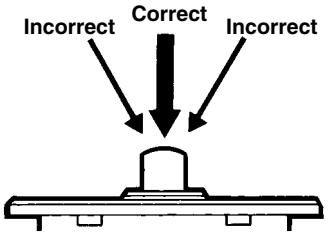
Precautions

Refer to pages 26 to 31 for common precautions.

■ Correct Use

Mounting

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.

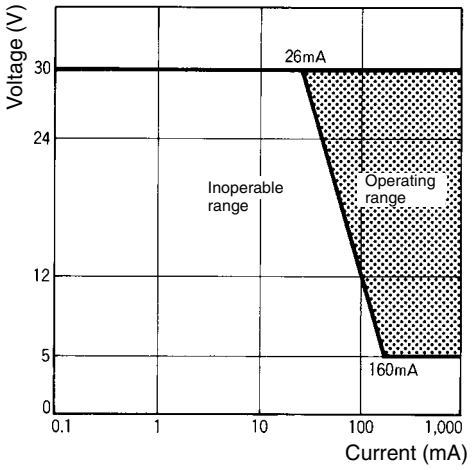


Use M4 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.49 to 0.69 N • m {5 to 7 kg • cm}

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% (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%.



■ Connector (Sold Separately)

Refer to Terminal Connectors on page 282.

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

Cat. No. B085-E1-05B

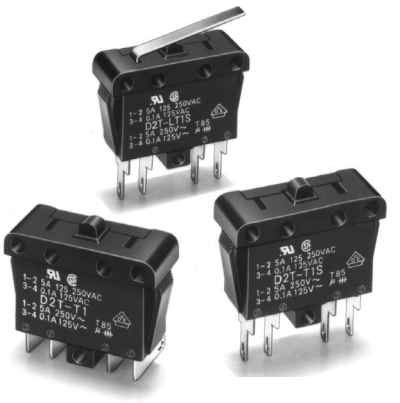
OMRON

Door Interlock Switch

D2T

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	250 VAC	5 A
Between terminals 3 and 4	125 VAC	0.1 A

Note: The ratings values apply under the following trest 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.

■ 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	---

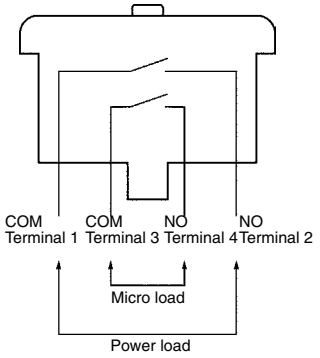
EN61058-1 (File No. 120144, VDE approval)

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)

■ 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.

■ Contact Specifications

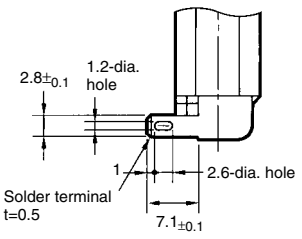
Item		Between terminals 1 and 2	Between terminals 3 and 4
Contact	Specification	Rivet	Plated
	Material	Silver	
	Gap (standard value)	1 mm	1.4 mm
Inrush current		60 A max.	---
Minimum applicable load		160 mA at 5 VDC	1 mA at 5 VDC

Dimensions

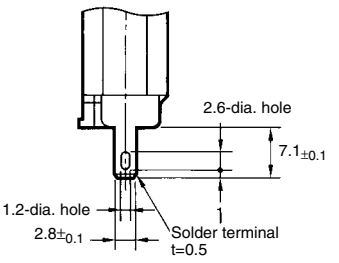
Note: All units are in millimeters unless otherwise indicated.

■ Terminals

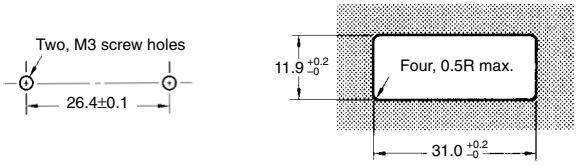
Angled Terminals



Straight Terminals



■ Mounting Holes



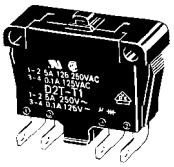
■ Dimensions and Operating Characteristics

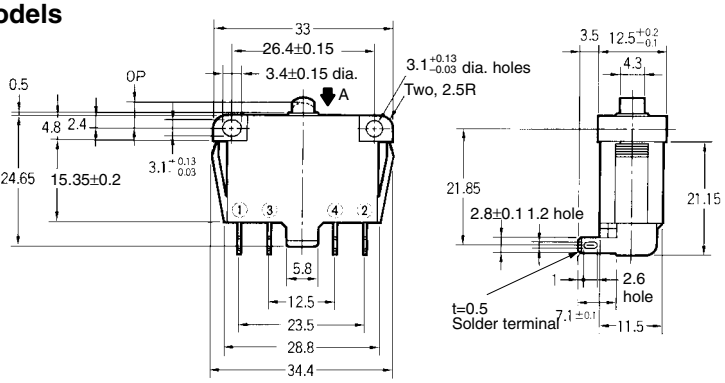
Note: 1. All units are in millimeters unless otherwise indicated.

2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
3. The following illustrations and 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



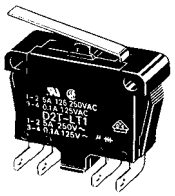


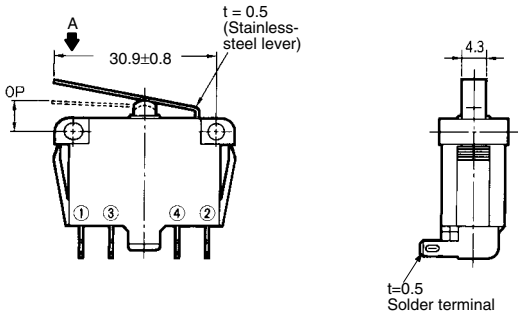
Model	D2T-T1 D2T-T1S
OF max.	3.24 N {330 gf}
RF min.	0.5 N {50 gf}
TTF max.	6.37 N {650 gf}
OT min.	0.8 mm
OP	4.4±0.6 mm (see note)

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.	1.47 N {150 gf}
RF min.	0.2 N {20 gf}
TTF max.	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.

Precautions

Refer to pages 26 to 31 for common precautions.

■ Correct Use

Mounting

Use M3 mounting screws to mount the Switch. Tighten the screws to a torque of 0.4 to 0.6 N • m {4 to 6 kgf • 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 MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. B097-E1-02B

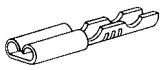
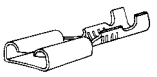
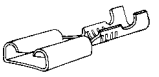
Connectors

Microswitches for tab-terminals listed in this catalog are compatible with other companies‘ products. The following AMP-made Connectors are also available. For more details about AMP Connectors, contact one of the addresses listed below.

Tyco Electronics/AMP

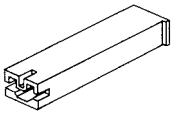
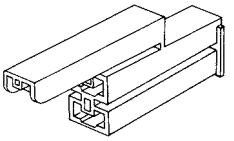
- Japan
  Phone: 81-44-844-8013
- U.S.A.
  Phone: 1-800-522-6752
- Great Britain
  Phone: 44-208-954-2356
- Hong Kong
  Phone: 852-2735-1628

Receptacles for Quick-connect Terminals

 For #110 models	 For #187 models	 For #250 models

Positive Lock Connectors

(Connectors with an easy-to-insert, secure lock mechanism.)

 For #187, 1 pole	 For #187, 3 poles (Compatible with V and VX Miniature Basic Switches)

Note: Other companies’ products are listed in this catalog as general user information. We assume no responsibility for the quality or price of other companies’ products.