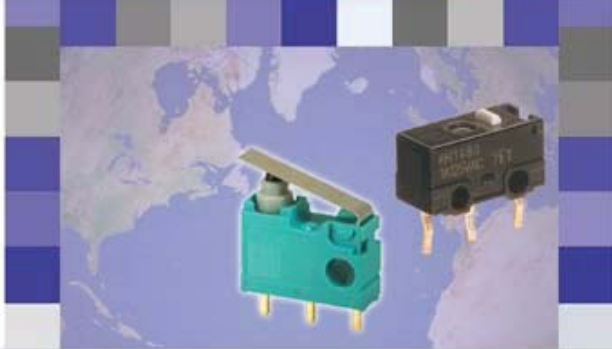


Panasonic
ideas for life



Short Form Switches

Our comprehensive switches program

Panasonic Electric Works' selection of switches is convincing due to their high performance, long life as well as extraordinary reliability. In addition, the large selection of actuators and various connection options such as solder, PC board, quick connect or lead wire connections offer flexibility for the most diverse applications.

Our microswitch product range extends from the "ultra miniature" size (IP40 version, AH1 series) with a switching current of maximum 3A at 30VDC, to the "miniature" size (IP67 version, series ABV) with a switching current of 5A at 30VDC. Panasonic's AV4 series microswitches are one of the smallest switches featuring snap action.



All switches fulfill RoHS requirements and are used in household appliances and security applications as well as instrumentation and engineering applications.



Solutions made for you

As a reliable supplier of innovative and high quality products for the complete range of industrial applications, Panasonic Electric Works also offers customer-specific solutions for microswitches so as to accommodate the increased market demands, in particular those of the automotive industry. The range includes specially manufactured actuators, custom cable assemblies as well as complex modules.



Our switches stand for:

- Quality & precision
- Innovation
- Customer-oriented service
- Optimum solutions for your applications



We are constantly striving for more innovation and further development.





Actuator positions

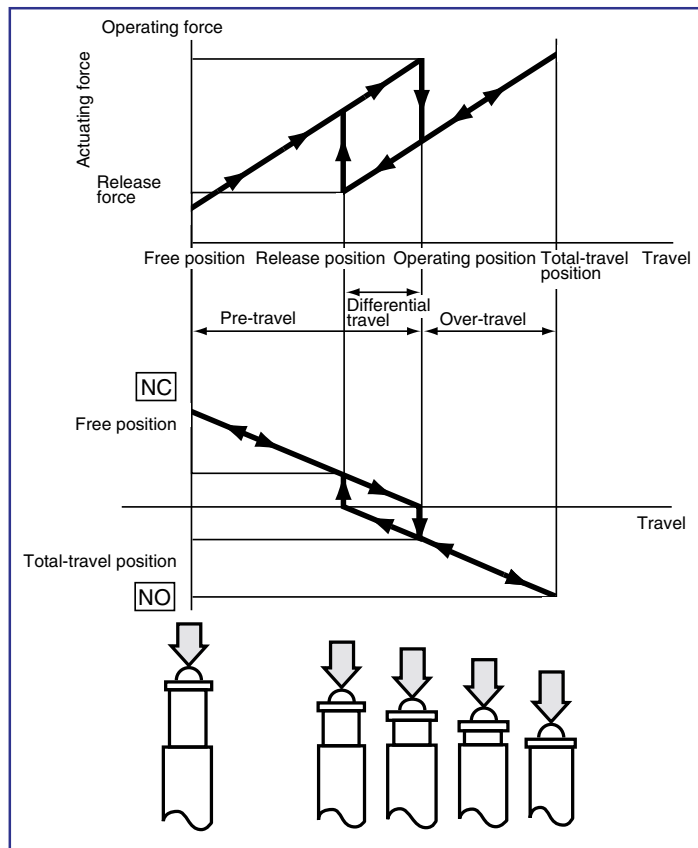
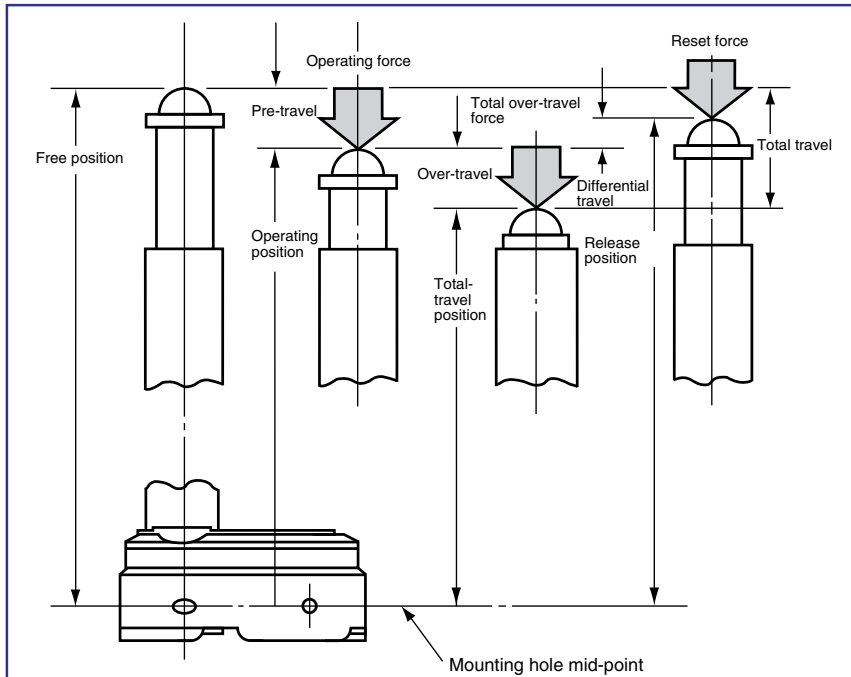
Free position:	The free position is the position of the actuator when no force is exerted on it from outside.
Operating position:	The position on the path travelled by the actuator at which the spring mechanism of the contact spring actually operates.
Total-travel position:	The total-travel position is the position of the actuator at the limit of permissible actuator travel.
Release position:	The position on the path travelled by the actuator back to the free position, at which the spring mechanism of the contact spring snaps back to its initial position. (This is not the same as the operating position. Note the differential travel).

Forces exerted on the actuator





Actuating force:	The force that is required to move the actuator from its free position and move it over the operating position.
Release force:	The force to which the actuating force must be minimized for the spring mechanism of the contact spring to return to its original position.
Differential force:	The difference between the actuating force and the release force.
Total over-travel force:	The force required to keep the actuator in the permissible total-travel position.

Actuator travel











Pre-travel:	The path travelled by the actuator between the free position and the operating position.
Over-travel:	The path travelled by the actuator between the operating position and the total-travel position.
Back travel:	The distance travelled by the actuator between the total-travel position and the release position.
Release travel:	The distance travelled by the actuator from the release position back to the free position.
Differential travel:	The difference between the operating position and the release position.
Total-travel:	Total travel is the sum total of pre-travel and over-travel or of back travel and release travel.









Type		ASQ	ABJ	ABS	ABV
					
Dimensions (mm) LxWxH without actuator		13.3 x 5.4 x 10.1	12.8 x 6.0 x 6.5 / 13.9 x 6.0 x 12.5	19.8 x 6.4 x 11.1 / 21.2 x 6.4 x 16.9	33.0 x 15.9 x 13.0
Design		Ultra miniature with slide contact	Ultra miniature	Sub-miniature	Miniature
Characteristics		Over-travel 2.5 mm, noiseless switching, side operation possible, high contact reliability	Highly resistant to environmental conditions, frost-resistant	Highly resistant to environmental conditions, frost-resistant	Highly resistant to environmental conditions, frost-resistant
Switching current range (ohmic load)	25A	1mA to 100 mA	1mA to 2A	1mA to 2A	1mA to 5A
	20A				
Maximum	15A				
	10A				
	5A				
Minimum	1mA				
	100µA				
	10µA				
Contact types		Changeover, normally open, normally closed	Changeover, normally open, normally closed	Changeover, normally open, normally closed	Changeover, normally open, normally closed
Contact material		Ag / Au	Ag / Au	Ag / Au / three-layer contact	Ag / Au
Switching voltage (max.)	VDC	30	30	30	30
	VAC	-	250	250	250
Ambient temperature		- 40°C to +85°C	- 40°C to +85°C	- 40°C to +85°C	- 40°C to +85°C
Service life at nominal load	mechanical, min.	1,000,000	1,000,000	5,000,000	5,000,000
	electrical, min.	500,000	30,000 / 100,000	50,000 / 200,000	100,000 / 1,000,000
Operating force on pin in N max.		1.7	1.96	1.47	2.94
Connection types		Solder, PCB, lead wire	Solder, PCB, lead wire	Solder, PCB, lead wire, quick connect	Lead wire, quick connect
Actuator		Pin plunger, hinge lever, simulated roller	Pin plunger, roller lever, simulated roller, hinge lever, other	Pin plunger, roller lever, simulated roller, hinge lever, other	Pin plunger, roller lever, simulated roller, hinge lever, other
Degree of protection		IP67	IP67	IP67	IP67
Approvals		-	UL/CSA	UL/CSA/VDE/SEMKO	UL/CSA/VDE/SEMKO







AM5	AV3 / AVM3 / AVT3 / AVL3	AV6	AH1	AV4
				
29.6 x 10.3 x 15.9	19.8 x 6.4 x 11.1	29.2 x 10.0 x 7.0	12.8 x 6.0 x 6.5	7.5 x 2.5 x 4.5
Miniature	Sub-miniature	Sub-miniature	Ultra miniature	Super miniature
Wide variety of types, inrush current to 160 A	Wide variety of types, high-capacity type available for 10A, long service life	Connector type for simple connections	Flux-resistant, gold contact available for low loads	Super miniature
100mA to 16A	1mA to 5 A, 10.1A	1mA to 100mA	1mA to 3A	0.2mA to 0.5A
				
Changeover, normally open, normally closed	Changeover	Normally open, normally closed	Changeover, normally open	Changeover
Ag / Au	Ag / Au / three-layer contact	Au	Ag / Au	Ag / Au
125	125	30	30	30
250	250	-	125	125
- 25°C to +105°C	- 25°C to +85°C	- 25°C to +85°C	- 25°C to +80°C	-25°C to +85°C
10,000,000 100,000 / 2,000,000	500,000 / 30,000,000 50,000 / 200,000	500,000 200,000	1,000,000 30,000 / 100,000	300,000 20,000 / 200,000
3.92	1.47	1.50	1.47	0.98
Solder, quick connect	Solder, PCB, quick connect	Connector	Solder, PCB	Solder, PCB
Pin plunger, roller lever, simulated roller, hinge lever, other	Pin plunger, roller lever, simulated roller, hinge lever, other	Pin plunger, roller lever, simulated roller, hinge lever, other	Pin plunger, simulated roller, hinge lever	Pin plunger, simulated roller, hinge lever
IP40	IP40	IP40	IP40	IP40
UL/CSA/VDE/SEMKO/ENEC	UL/CSA/VDE/SEMKO	UL/CSA	UL/CSA	-







Type		AGX	AV1	AJ7/8/9	AM1
					
Dimensions (mm) LxWxH without actuator		27.0 x 14.6 x 24.6	30.0 x 12.4 x 34.0	28.0 x 12.5 x 16.0 (AJ8 – 2-pin)	49.2 x 17.5 x 24.1
Design		Door interlock switch	Door interlock switch	Rocker switch	End of travel limit switch
Characteristics		Contact clearance 4mm, snap-in fixing, sep. signal and switching contacts	Contact clearance 3mm, snap-in fixing / screw fixing, contact gap 8mm, for 2 Form A / 3 Form	Contact gap 3mm, inrush current to 160A, AJ8R with coil-operated reset function	High precision and long service life, oil-proof design available
Switching current range (ohmic load)	25A	10mA to 10.1A	10mA to 10.1A	10mA to 16A	10mA to 10A
	20A				
	15A				
	10A				
	5A				
	1mA				
Maximum	100µA				
	10µA				
	1µA				
Minimum					
Contact types		Normally open	Normally open, normally closed	Changeover	Changeover
Contact material		Ag	Ag	Ag	Ag
Switching voltage (max.)	VDC	48	30	30	250
	VAC	250	250	250	480
Ambient temperature		- 25°C to +85°C	- 25°C to +85°C	- 25°C to +85°C	- 25°C to +80°C
Service life	mechanical, min.	1,000,000	1,000,000	50,000	20,000,000
	at nominal load electrical, min.	100,000	100,000	10,000	500,000
Operating force on pin in N max.		5.88	9.81	6.86	3.63
Connection types		Quick connect	Quick connect	Quick connect, solder, PCB	Solder, screw
Actuator		Pushbutton	Pushbutton	Rocker switch	Standard plunger, roller lever, simulated roller, straight lever, other
Degree of protection		IP40	IP40	IP40	IP40
Approvals		UL/CSA/SEMKO/ENEC/VDE	UL/CSA/VDE/ENEC	UL/CSA/SEMKO/ENEC/VDE	UL/CSA



Type		AJ4	T15	T10	T6/T3
					
Dimensions (mm) LxWxH single pole version		25.4 x 15.0 x 24.5	29.0 x 15.8 x 23.7	29.0 x 15.8 x 23.7	25.0 x 14.8 x 18.6
Design		Toggle/rocker switch	Toggle/rocker switch	Toggle/rocker switch	Toggle/rocker switch
Characteristics		Toggle switches with a safety design with a contact gap greater than 3mm; high contact efficiency for a high inrush resistance	Toggle, rocker and push button switches with high IP rating up to IP67; With various levers and terminals 15A/250VAC; 0.5A/250VDC	Toggle switches for high current applications 10A/250VAC; 15A/125VAC; 0.4A/250VDC	Toggle switches with smaller dimensions for space-saving design possibilities
Switching current range (ohmic load)	25A	10mA to 10A	10mA to 15A	10mA to 10A	10mA to 6A
	20A				
	15A				
	10A				
	5A				
Maximum					
Minimum					
1mA					
100µA					
10µA					
Contact types		On-Off; On-On; On-Off-On; On-(On); (On)-Off-(On); On-Off-(On)	On-Off; On-On; On-Off-On; On-(On); (On)-Off-(On); On-Off-(On)	On-Off; On-On	On-Off; On-On
Contact material		Ag	Ag-alloy	Ag-alloy	Ag-alloy
Switching voltage (max.)	VDC	30	250	250	30
	VAC	250	250	250	250
Ambient temperature		- 25°C to +80°C	- 25°C to +70°C	- 25°C to +70°C	- 25°C to +70°C
Service life mechanical, min. at nominal load electrical, min.		100,000 30,000	100,000 50,000	100,000 30,000	50,000 30,000 / 10,000
Switching contact		1-pole, 2-pole, 4-pole	1-pole, 2-pole, 3-pole, 4-pole	1-pole, 2-pole	1-pole, 2-pole
Connection types		Solder, quick connect	Solder, screw, quick connect, lead wire	Solder	Solder
Actuator		Toggle	Toggle, rocker, pushbutton	Toggle	Toggle
Degree of protection		IP 40	IP 40 / IP 60 / IP 67	IP 40	IP 40
Approvals		-	UL/C-UL	UL/C-UL	-



Type		AZ8	AZD	AZ7	AZH
					
Dimensions (mm) LxWxH without actuator		28 x 25 x 64	30 x 30 x 60	54 x 21.4 x 42	44.5 x 18 x 33
Design		Limit switch	Limit switch	Limit switch	Limit switch
Characteristics		Available with illumination; special type with zinc-coated bolts and nuts	Positive opening contact system (for a normally closed contact), hinged cover	Compact design; long service life, oil-resistant	Wide variety of types and variants, die casting and plastic case available
Switching current range (ohmic load)	25A	400mA to 5 A	300mA to 6A	400mA to 10A	250mA to 5A
	20A				
	15A				
	10A				
	5A				
	1mA				
	100µA				
10µA					
Contact types		Closer, opener	Closer, opener	Changeover	Changeover
Contact material		Ag / Au	Ag / Au	Ag / Au	Ag / Au
Switching voltage (max.)	VDC	125	220	115	250
	VAC	250	380	250	250
Ambient temperature		- 20°C to +60°C	- 30°C to +80°C	- 20°C to +60°C	- 10°C to +80°C
Service life	mechanical, min.	10,000,000	10,000,000	10,000,000	10,000,000
	at nominal load electrical, min.	300,000	150,000	200,000	500,000
Operating force on pin in N max.		0.88 - 8.83	3.92 - 6.37	1.18 - 5.88	0.88 - 11.8
Connection types		Screw	Screw	Screw	Quick connect, solder
Actuator		Roller, roller level, plunger, rod spring wire	Roller, roller level, plunger, rod	Roller, roller level, plunger, rod	Roller, roller level, plunger, rod
Degree of protection		IP64	IP67	IP64	IP64/ IP67
Approvals		UL/CSA/TÜV/CE	UL/ CSA/ TÜV/ CE	UL/ CSA/ TÜV/ CE	UL/ CSA/ TÜV/ CE

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Europe

Asia Pacific

China

Japan

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