

# Panasonic

ideas for life

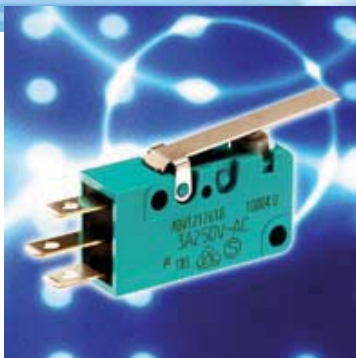


# Short Form Switches

# 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

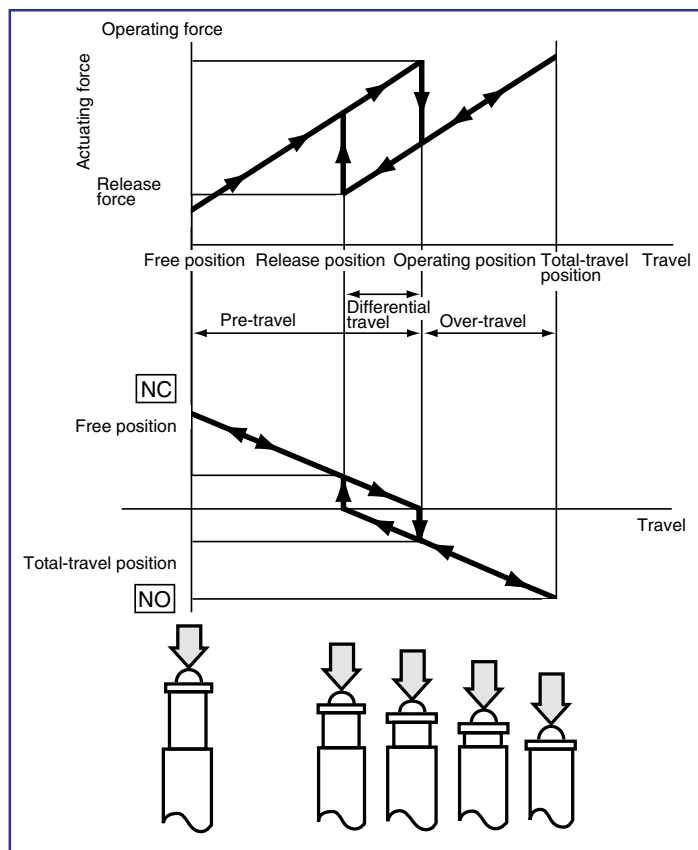
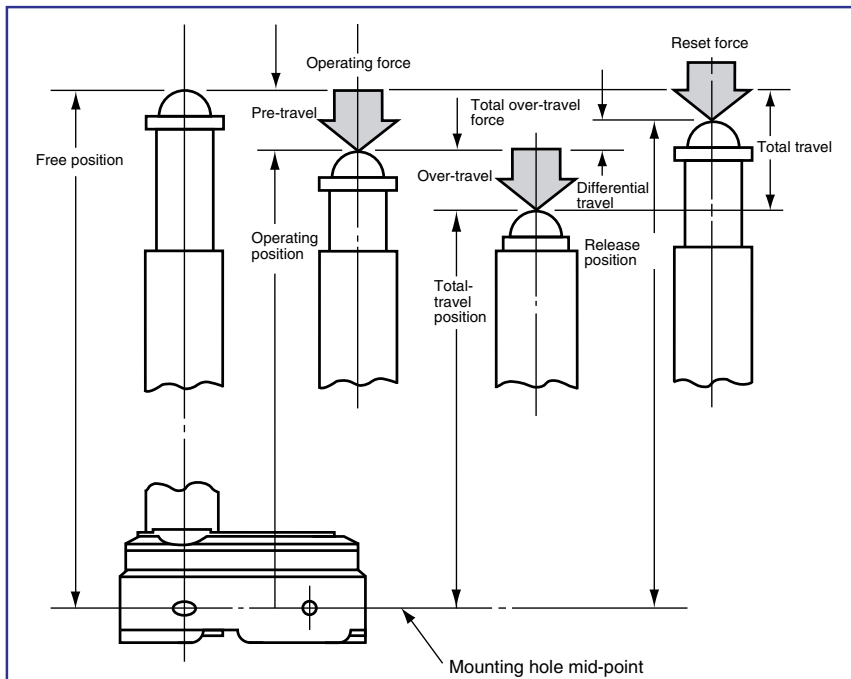
Free position:	The free position is the position of the actuator when no force is exerted on it from outside.
Operating position:	The position on the path travelled by the actuator at which the spring mechanism of the contact spring actually operates.
Total-travel position:	The total-travel position 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
					
<b>Dimensions (mm) LxWxH without actuator</b>		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
<b>Design</b>		Ultra miniature with slide contact	Ultra miniature	Sub-miniature	Miniature
<b>Characteristics</b>		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
<b>Switching current range (ohmic load)</b>	25A	1mA to 100 mA	1mA to 2A	1mA to 2A	1mA to 5A
	20A				
<b>Maximum</b>	15A				
	10A				
	5A				
<b>Minimum</b>	1mA				
	100µA				
	10µA				
<b>Contact types</b>		Changeover, normally open, normally closed	Changeover, normally open, normally closed	Changeover, normally open, normally closed	Changeover, normally open, normally closed
<b>Contact material</b>		Ag / Au	Ag / Au	Ag / Au / three-layer contact	Ag / Au
<b>Switching voltage (max.)</b>	VDC	30	30	30	30
	VAC	-	250	250	250
<b>Ambient temperature</b>		- 40°C to +85°C	- 40°C to +85°C	- 40°C to +85°C	- 40°C to +85°C
<b>Service life at nominal load</b>	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
<b>Operating force on pin in N max.</b>		1.7	1.96	1.47	2.94
<b>Connection types</b>		Solder, PCB, lead wire	Solder, PCB, lead wire	Solder, PCB, lead wire, quick connect	Lead wire, quick connect
<b>Actuator</b>		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
<b>Degree of protection</b>		IP67	IP67	IP67	IP67
<b>Approvals</b>		-	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
					
<b>Dimensions (mm) LxWxH without actuator</b>		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
<b>Design</b>		Door interlock switch	Door interlock switch	Rocker switch	End of travel limit switch
<b>Characteristics</b>		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
<b>Switching current range (ohmic load)</b>	<b>25A</b>	10mA to 10.1A	10mA to 10.1A	10mA to 16A	10mA to 10A
	<b>20A</b>				
	<b>15A</b>				
	<b>10A</b>				
	<b>5A</b>				
	<b>1mA</b>				
<b>Maximum</b>	<b>100µA</b>				
	<b>10µA</b>				
	<b>1µA</b>				
<b>Minimum</b>					
<b>Contact types</b>		Normally open	Normally open, normally closed	Changeover	Changeover
<b>Contact material</b>		Ag	Ag	Ag	Ag
<b>Switching voltage (max.)</b>	<b>VDC</b>	48	30	30	250
	<b>VAC</b>	250	250	250	480
<b>Ambient temperature</b>		- 25°C to +85°C	- 25°C to +85°C	- 25°C to +85°C	- 25°C to +80°C
<b>Service life</b>	<b>mechanical, min.</b>	1,000,000	1,000,000	50,000	20,000,000
	<b>at nominal load electrical, min.</b>	100,000	100,000	10,000	500,000
<b>Operating force on pin in N max.</b>		5.88	9.81	6.86	3.63
<b>Connection types</b>		Quick connect	Quick connect	Quick connect, solder, PCB	Solder, screw
<b>Actuator</b>		Pushbutton	Pushbutton	Rocker switch	Standard plunger, roller lever, simulated roller, straight lever, other
<b>Degree of protection</b>		IP40	IP40	IP40	IP40
<b>Approvals</b>		UL/CSA/SEMKO/ENEC/VDE	UL/CSA/VDE/ENEC	UL/CSA/SEMKO/ENEC/VDE	UL/CSA







NS	ND	Type	AJN	AJ1/AJ2
				
ø 16 x 30	ø 16.0 / 22.0 x 54.0	<b>Dimensions (mm) LxWxH single pole version</b>	9.8 x 5.8/8.8 x 13.1	16.0 x 8.0 x 17.5
Illuminated pushbutton	Illuminated pushbutton		Toggle/rocker switch	Toggle/rocker switch
Wide variety of types and accessories, LED illumination option, sealed design (IP 65) available	Wide variety of types and accessories, LED illumination option, sealed design (IP 65) available	<b>Characteristics</b>	Pushbutton design available, colored lever caps obtainable	Toggle/rocker switch with various levers and a flux-resistant; wide current range from 1mA for the AJ2 to 3A (20A inrush )
1mA to 1A	1mA to 3A	<b>Switching current range (ohmic load)</b>	0,1µA to 0,1A	1mA to 7A
		<b>Maximum</b>		
		25A		
		20A		
		15A		
		10A		
		5A		
		<b>Minimum</b>		
		1mA		
		100µA		
		10µA		
Changeover	Changeover	<b>Switching function (for AJ1; AJN; T-series only)</b>	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)
Ag / Au	Ag / Au	<b>Contact material</b>	Ag / Au	Ag / Au
30	125	<b>Switching voltage (max.)</b>	VDC	48
250	250		VAC	48
- 25°C to +55°C	- 25°C to +55°C	<b>Ambient temperature</b>	- 25°C to +80°C	- 25°C to +85°C
100,000 10,000	2,000,000 100,000	<b>Service life</b> mechanical, min. electrical, min.	200,000 100,000	100,000 30,000
-	-	<b>Switching contact</b>	1-pole, 2-pole	1-pole, 2-pole, 4-pole
Quick connect, solder	Quick connect, solder	<b>Connection types</b>	PCB	Solder, PCB
Pushbutton, illuminated pushbutton, key selector, selector	Pushbutton, illuminated pushbutton, key selector, selector	<b>Actuator</b>	Toggle, pushbutton	Toggle, rocker, safety hook
IP40 / IP65	IP40 / IP65	<b>Degree of protection</b>	IP67	IP40 / IP67
UL/CSA/CE	UL/CSA/EN standard/CE	<b>Approvals</b>	UL/CSA	UL/CSA



Type		AJ4	T15	T10	T6/T3
					
<b>Dimensions (mm) LxWxH single pole version</b>		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
<b>Design</b>		Toggle/rocker switch	Toggle/rocker switch	Toggle/rocker switch	Toggle/rocker switch
<b>Characteristics</b>		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
<b>Switching current range (ohmic load)</b>	25A	10mA to 10A	10mA to 15A	10mA to 10A	10mA to 6A
	20A				
	15A				
	10A				
	5A				
<b>Maximum</b>					
<b>Minimum</b>					
1mA					
100µA					
10µA					
<b>Contact types</b>		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
<b>Contact material</b>		Ag	Ag-alloy	Ag-alloy	Ag-alloy
<b>Switching voltage (max.)</b>	VDC	30	250	250	30
	VAC	250	250	250	250
<b>Ambient temperature</b>		- 25°C to +80°C	- 25°C to +70°C	- 25°C to +70°C	- 25°C to +70°C
<b>Service life mechanical, min. at nominal load electrical, min.</b>		100,000 30,000	100,000 50,000	100,000 30,000	50,000 30,000 / 10,000
<b>Switching contact</b>		1-pole, 2-pole, 4-pole	1-pole, 2-pole, 3-pole, 4-pole	1-pole, 2-pole	1-pole, 2-pole
<b>Connection types</b>		Solder, quick connect	Solder, screw, quick connect, lead wire	Solder	Solder
<b>Actuator</b>		Toggle	Toggle, rocker, pushbutton	Toggle	Toggle
<b>Degree of protection</b>		IP 40	IP 40 / IP 60 / IP 67	IP 40	IP 40
<b>Approvals</b>		-	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					
Maximum					
Minimum					
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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China

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