

SRBQ-S-501

SRBQ PRODUCT SPECIFICATIONS

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1. General

1.1 Application This specification is applied to low current circuit (Secondary circuit) rotary switch used for electronic equipment.

1.2 Operating temperature range : $-10 \sim 60^{\circ}\text{C}$ Δ 1.2.2 Storage temperature range : $-10 \sim 60^{\circ}\text{C}$ (unrestrained) or $-20 \sim 85^{\circ}\text{C}$ (soak)1.3 Test conditions The standard test conditions shall be $5 \sim 35^{\circ}\text{C}$ in temperature, 45~85% RH and 86~106kPa ($860 \sim 1060\text{mbar}$) in atmospheric pressure. Should any doubt arise in judgement, tests shall be conducted at $20 \pm 2^{\circ}\text{C}$, $65 \pm 5\%$ RH and $86 \sim 106\text{kPa}$ ($860 \sim 1060\text{mbar}$).

2. Appearance, construction and dimensions

2.1 Appearance Switch shall have good finishing, and shall have no rust, crack or plating failures.

2.2 Construction and dimensions Per individual product drawing

2.3 Markings Per individual product drawing

3. Rating 0.1 V DC 16 A (Resistive load)

4. Electrical performance

Items	Test conditions	Criterion
4.1 Contact resistance	Shall be measured at $1\text{kHz} \pm 200\text{Hz}$ (20mV MAX, 50mA MAX) or 1A, 5V DC by voltage drop method.	50 mΩ MAX
4.2 Insulation resistance	Test voltage : 100 V DC, measured after 1 minute \pm 5 seconds. Applied position : Between all terminals Between terminals and ground (frame)	100 MΩ MIN.
4.3 Voltage proof	Test voltage : 100 V AC (50~60Hz, cut-off current 2 mA) Applied position : Between all terminals Between terminals and ground (frame)	No dielectric breakdown shall occur.
4.4 Capacitance	Shall be measured at $1\text{MHz} \pm 10\text{kHz}$ Between all terminals Between terminals and ground (frame) Between all circuits	PF MAX
4.5 Changeover timing		As per individual product drawing.

5. Mechanical performance

Items	Test conditions	Criterion												
5.1 Operating torque		As per individual product drawing.												
5.2 Changeover angle		As per individual product drawing.												
5.3 Terminal strength	A static load of <u>5 N (510 gf)</u> Δ shall be applied to the tip of terminal in a desired direction for one minute. The number of tests shall be once per terminal.	Shall be free from terminal looseness, and damage and breakage of terminal holding portion. Terminals may be bent after test, electrical performance requirement specified in item 4 shall be satisfied.												
5.4 Mounting strength (Applied to center nut mounting type)	Switch shall be mounted at <u>N·m (kgf·cm)</u> by normal mounting method.	Shall be free from damage of bushing thread portion. There shall be no abnormalities in axis rotation and caulking portion.												
5.5 Control strength	A static load of <u>20 N (204 kgf)</u> Δ shall be applied in the push and pull directions of the shaft for 15 seconds. <i>The static load shall be applied to the shaft tip in the vertical direction of shaft for 15 seconds as follows</i> <table><tr><th>Shaft tip height from mounting surface (mm)</th><th>Load</th></tr><tr><td>Less than 10</td><td>10 N (102 gf) Δ</td></tr><tr><td>Not less than 10</td><td>5 N (510 gf) Δ</td></tr></table>	Shaft tip height from mounting surface (mm)	Load	Less than 10	10 N (102 gf) Δ	Not less than 10	5 N (510 gf) Δ	Shall be free from pronounced wobble, bending and mechanical abnormalities.						
Shaft tip height from mounting surface (mm)	Load													
Less than 10	10 N (102 gf) Δ													
Not less than 10	5 N (510 gf) Δ													
5.6 Wobble of actuator	Run-out (P-P) shall be measured by applying a static load of 1 N (102 gf) to the shaft.	<table><tr><th>Shaft tip height from mounting surface</th><th>Run-out (P-P)</th><th>Unit : mm</th></tr><tr><td>Less than 5</td><td>0.5 MAX</td><td></td></tr><tr><td>Not less than 5 and less than 10</td><td>0.9 MAX</td><td></td></tr><tr><td>Not less than 10 and less than 15</td><td>1.2 MAX</td><td></td></tr></table>	Shaft tip height from mounting surface	Run-out (P-P)	Unit : mm	Less than 5	0.5 MAX		Not less than 5 and less than 10	0.9 MAX		Not less than 10 and less than 15	1.2 MAX	
Shaft tip height from mounting surface	Run-out (P-P)	Unit : mm												
Less than 5	0.5 MAX													
Not less than 5 and less than 10	0.9 MAX													
Not less than 10 and less than 15	1.2 MAX													
5.7 Vibration	Switch shall be secured to a testing machine by a regular mounting device and method. (1) Vibration frequency range : 10~55Hz (2) Total amplitude : 1.5mm (3) Sweep ratio : 10-55-10(Hz) Approx. 1 minute (4) Method of changing the sweep vibration frequency : Logarithmic or linear (5) Direction of vibration : Three vertical directions including actuator. (6) Time : 2 hours each (6 hours in total)	Contact resistance (Item 4.1) : <u>100</u> mΩ MAX Insulation resistance (Item 4.2) : <u>100</u> MΩ MIN Voltage proof (Item 4.3) : Apply <u>100</u> V AC for 1 minute. No dielectric breakdown shall occur. Operating torque (Item 5.1) : Within specified value. No abnormalities shall be recognized in appearance and construction.												

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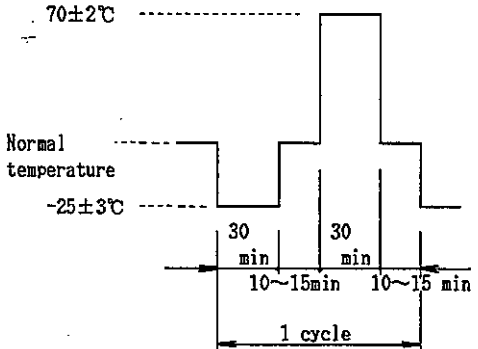
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Items		Test conditions					Criterion	
5.8	Mechanical shock	Switch shall be measured after following test. (1) Mounting method : Normal mounting method (2) Acceleration : 490m/s ² (=500) (3) Duration : 11ms (4) Test direction : 6 directions (5) Number of shock : 3 times per direction 						

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7. Weather proof			
Items	Test conditions		Criterion
7.1 Cold proof	After testing at $-20\pm 2^{\circ}\text{C}$ for 96 hours, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and then measurement shall be made within 1 hour. Water drops shall be removed.		Contact resistance (Item 4.1) : $100\text{ m}\Omega$ MAX Insulation resistance (Item 4.2) : $100\text{ M}\Omega$ MIN Voltage proof (Item 4.3) : Apply 100 V AC for 1 minute. No dielectric breakdown shall occur. Operating torque (Item 5.1) : Within $\pm 10\%$ of specified value. No abnormalities shall be recognized in appearance and construction.
7.2 Dry heat	After testing at $85\pm 2^{\circ}\text{C}$ for 96 hours, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that.		Contact resistance (Item 4.1) : $100\text{ m}\Omega$ MAX Insulation resistance (Item 4.2) : $100\text{ M}\Omega$ MIN Voltage proof (Item 4.3) : Apply 100 V AC for 1 minute. No dielectric breakdown shall occur. Operating torque (Item 5.1) : Within $\pm 10\%$ of specified value. No abnormalities shall be recognized in appearance and construction.
7.3 Damp heat	After testing at $40\pm 2^{\circ}\text{C}$ and $90\sim 95\text{RH}$ for 96 hours, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be removed.		Contact resistance (Item 4.1) : $100\text{ m}\Omega$ MAX Insulation resistance (Item 4.2) : $10\text{ M}\Omega$ MIN Voltage proof (Item 4.3) : Apply 100 V AC for 1 minute. No dielectric breakdown shall occur. Operating torque (Item 5.1) : Within $\pm 10\%$ of specified value. No abnormalities shall be recognized in appearance and construction.
7.4 Salt mist	Switch shall be checked after following test. (1) Temperature : $35\pm 2^{\circ}\text{C}$ (2) Salt solution : $5\pm 1\%$ (Solids by weight) (3) Duration : $24\pm 1\text{ h}$ After the test, salt deposit shall be removed in running water.		No remarkable corrosion shall be recognized in metal part.
7.5 Temperature cycling	After 5 cycles of following conditions, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be removed.		Contact resistance (Item 4.1) : $100\text{ m}\Omega$ MAX Insulation resistance (Item 4.2) : $100\text{ M}\Omega$ MIN Voltage proof (Item 4.3) : Apply 100 V AC for 1 minute. No dielectric breakdown shall occur. Operating torque (Item 5.1) : Within $\pm 10\%$ of specified value. No abnormalities shall be recognized in appearance and construction.
7.6 Damp heat with load (Silver migration)			Insulation resistance (50V DC) : $10\text{ M}\Omega$ MIN Voltage proof : Apply 100V AC for 1 minute. No dielectric breakdown shall occur.

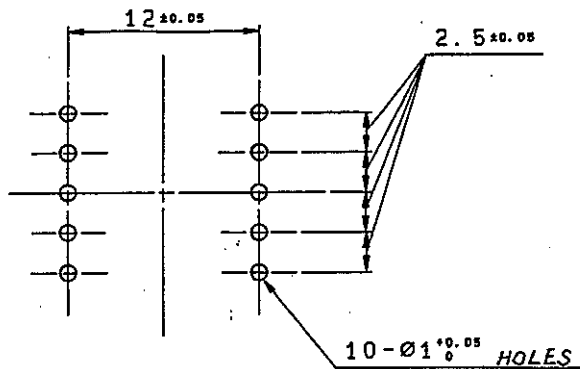
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K. Jino	Tadokashi	Y. Komatsu	DRAWING NO.
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Precaution in use

1. Note that if the load is applied to the terminals during soldering they might suffer deformation and defects in electrical performance.
2. Use of water-soluble soldering flux shall be avoided because it may cause corrosion of the switch.
3. Reference dimensions of mounting holes.



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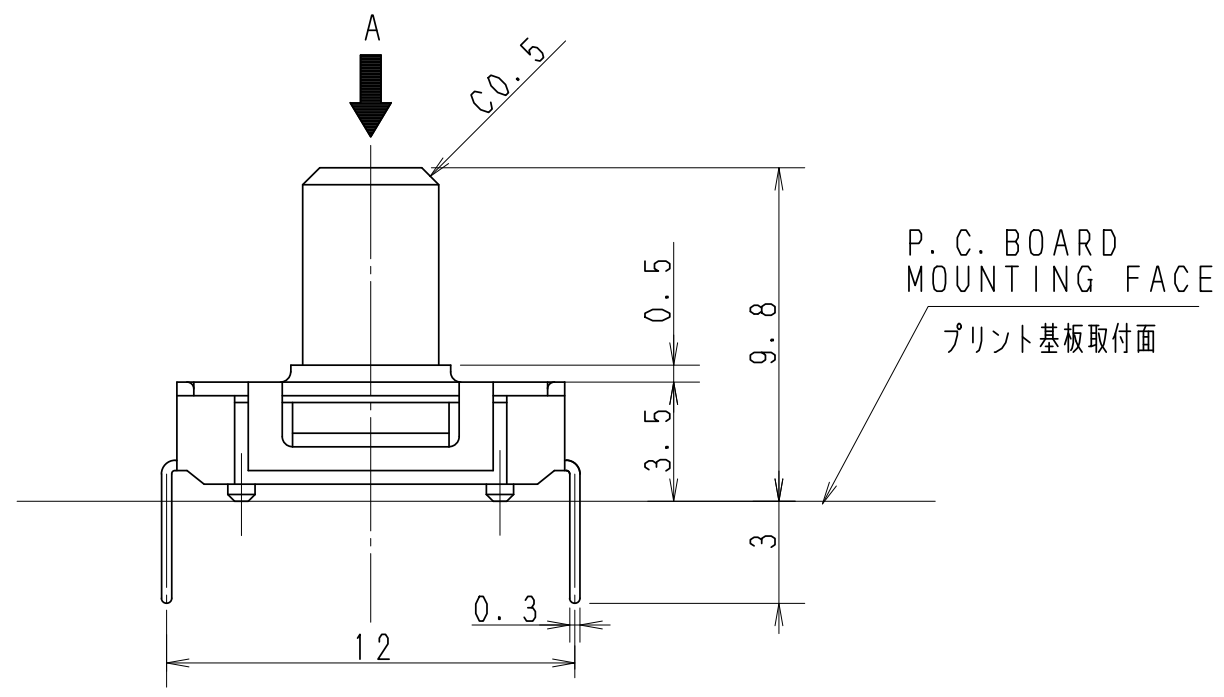
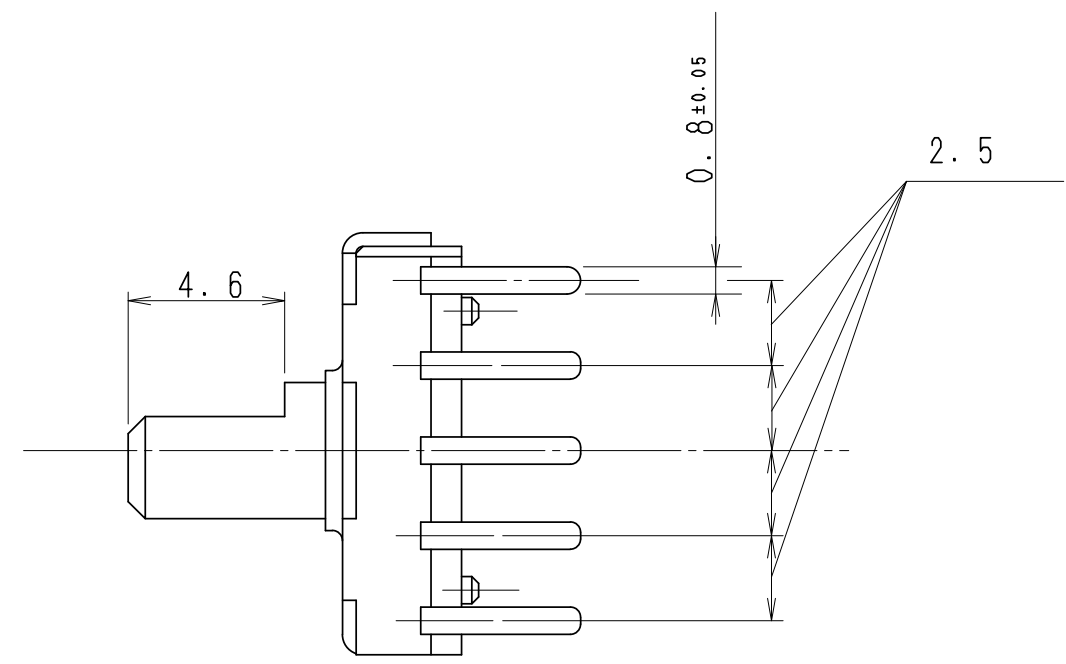
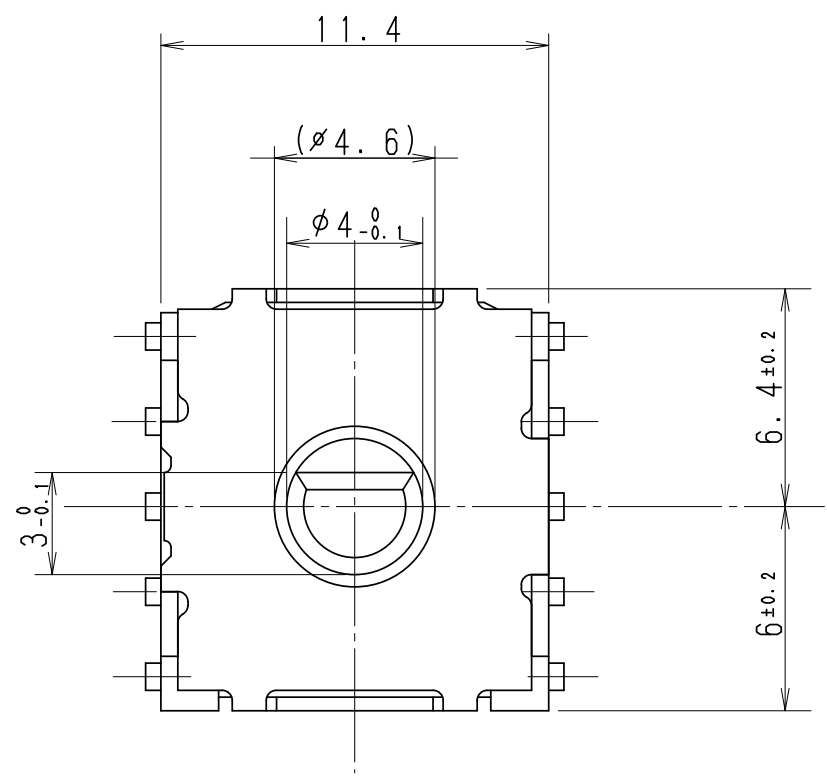
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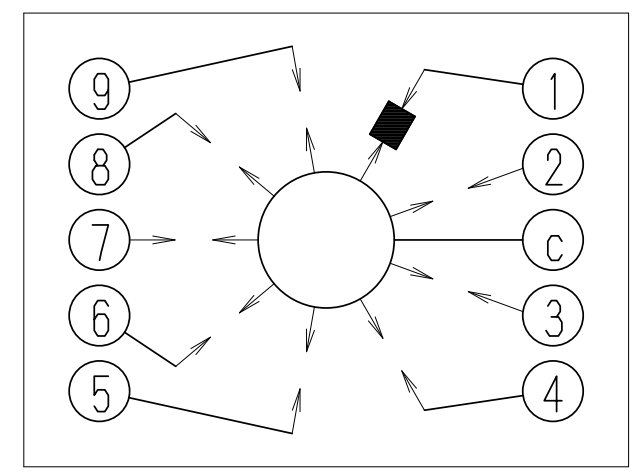
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CIRCUIT DIAGRAM
(VIEWED FROM DIRECTION A)

回路図 (A方向より見る)
CHANGEOVER TIMING: NON-SHORTING
切換タイミング: ノンショータイング



3. NUMBER OF POSITIONS: 9
(ポジション数)
2. CHANGEOVER ANGLE: 40° (ENDLESS)
(切換角度) (全回転)
NOTES 1. ROTATOINAL TORQUE: 6±3mN·m { 61±31gf·cm }
注記 (回転トルク)

TOLERANCES UNLESS OTHERWISE SPEC.				ALPS ELECTRIC CO., LTD.			
BASIC DIMENSION	TOLERANCE			UNIT	SCALE	MODEL NO. (製品番号)	
UP TO 4	±0.2			mm	%	SRBQ090200	
ABOVE 4 TO 16	±0.3			APPD.	CHKD.	DSGD.	TITLE
ABOVE 16 TO 63	±0.4			Dec. 24, '97	Dec. 24, '97	Dec. 24, '97	PRODUCT DRAWING (製品図)
ABOVE 63 TO 250	±0.5			H. Yoshizawa	H. Yoshizawa	M. Kise	DOCUMENT NO.
ABOVE 250	±0.7						SRBQ090200, AE11, 003
ANGULAR DIMENSION	±3°	ZONE	SYMB	DATE	APPD	CHKD	DSGD
				FURUKAWA DIV. (A3)			