

SRBM-S-503

SRBM PRODUCT SPECIFICATIONS

⑤

PULSE

## 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 ~ 80°C~~  $\Delta$  -40 ~ 85°C1.3 Test conditions The standard test conditions shall be 5~35°C in temperature, 45~85% RH and 86~106kPa ~~(860~1060mmHg)~~  $\Delta$  in atmospheric pressure. Should any doubt arise in judgement, tests shall be conducted at 20 $\pm$ 2°C, 65 $\pm$ 5% RH and 86~106kPa ~~(860~1060mmHg)~~  $\Delta$ 

## 2. Appearance, construction and dimensions

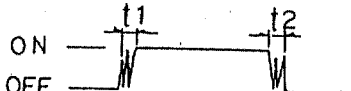
2.1 Appearance Switch shall have good finishing, and shall have no rust, crack or plating failures.

2.2 Construction and dimensions Per individual product drawing

2.3 Markings Per individual product drawing

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

## 4. Electrical performance

Items	Test conditions	Criterion
4.1 Contact resistance	Shall be measured at 1kHz $\pm$ 200Hz (20mV MAX, 50mA MAX) or 1A, 5V DC by voltage drop method.	50 m $\Omega$ 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 M $\Omega$ 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 Pulse width	To be measured with 1cycle/sec operations at a rate. (max. 16V DC, max. 50mA)	" ON " or " OFF " time: More than 10ms (Except chattering in " ON " time)
4.5 Chattering	To be measured with 1cycle/sec operations at a rate. (max. 16V DC, max. 50mA)  	Chattering time: t1 Max 2 ms t2 Max 3 ms

## 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 5 N <del>(510 gf)</del> $\Delta$ 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 1 N <del>(102 gf)</del> $\Delta$ 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	<del>A rotational torque of 1 N (102 gf) shall be applied to both ends for 15 seconds.</del> A static load of 100N <del>(102 kgf)</del> $\Delta$ shall be applied in the push and pull directions of the shaft for 15 seconds. A bending moment of 1 N <del>(102 gf)</del> $\Delta$ shall be applied to the shaft for 15 seconds.	Shall be free from pronounced wobble, bending and mechanical abnormalities.																		
5.6 Wobble of actuator	Run-out (P-P) shall be measured by applying a static load of 5N <del>(510 gf)</del> $\Delta$ to the shaft.	Unit : mm <table border="1"> <thead> <tr> <th>Measuring position at mounting surface</th><th>Run-out (P-P)</th><th>Mounting dimension</th></tr> </thead> <tbody> <tr> <td>10</td><td>0.17 MAX</td><td>15</td></tr> <tr> <td>15</td><td>0.25</td><td>20</td></tr> <tr> <td>20</td><td>0.35</td><td>25</td></tr> <tr> <td>25</td><td>0.42</td><td>30</td></tr> <tr> <td>30</td><td>0.50</td><td>35 MIN</td></tr> </tbody> </table>	Measuring position at mounting surface	Run-out (P-P)	Mounting dimension	10	0.17 MAX	15	15	0.25	20	20	0.35	25	25	0.42	30	30	0.50	35 MIN
Measuring position at mounting surface	Run-out (P-P)	Mounting dimension																		
10	0.17 MAX	15																		
15	0.25	20																		
20	0.35	25																		
25	0.42	30																		
30	0.50	35 MIN																		

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BACKGROUND

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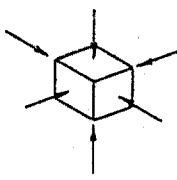
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SRBM-S-503

## SRBM PRODUCT SPECIFICATIONS

Items	Test conditions	Criterion						
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.						
5.8 Mechanical shock	Switch shall be measured after following test. (1) Mounting method : Normal mounting method (2) Acceleration : $490\text{m/s}^2$ ( <del>500</del> )  (3) Duration : 11ms (4) Test direction : 6 directions (5) Number of shock : 3 times per direction (18 times in total)	Contact resistance (Item 4.1) : <u>100</u> mΩ MAX Operating torque (Item 5.1) : Within specified value. Shall be free from mechanical abnormalities.						
5.9 Solderability	Switch shall be checked after following test. (1) Solder : H63A (JIS Z 3282) (2) Flux : Rosin flux (JIS K 5902) having a nominal composition of 25% solids by weight of water white rosin in methyl alcohol (JIS K 1501)solution. (3) Soldering temperature : $230\pm 5^\circ\text{C}$ Immersing time : $3\pm 0.5$ s Flux immersing time shall be 5~10 seconds in normal temperature. (4) Immersion depth : Immersion depth shall be at copper plating portion for P.C.B. terminal after mounting. Thickness of P.C. board : 1.6 mm	More than 75% of immersed part shall be covered with solder.						
5.10 Soldering heat resistance	Switch shall be measured after following test. (1) Solder : H63A (JIS Z 3282) (2) Flux : Rosin flux (JIS K 5902) having a nominal composition of 10% solids by weight of water white rosin in methyl alcohol (JIS K 1501)solution. (3) Temperature and immersing time <table border="1" data-bbox="518 1276 1053 1344"> <tr> <th></th><th>Temperature (°C)</th><th>Time (s)</th></tr> <tr> <td>Dip soldering</td><td><math>260\pm 5</math></td><td>※ 5 MAX</td></tr> </table> ※ Auto-dip soldering shall be applied up to twice. After first testing, temperature shall be back to normal. (4) Immersion depth : Immersion depth shall be at copper plating portion for P.C.B. terminal after mounting. Thickness of P.C. board (Single sided copper clad P.C.B.) : 1.6mm		Temperature (°C)	Time (s)	Dip soldering	$260\pm 5$	※ 5 MAX	No abnormalities shall be recognized in appearance. The electrical performance requirements specified in item 4 shall be satisfied.
	Temperature (°C)	Time (s)						
Dip soldering	$260\pm 5$	※ 5 MAX						

## 6. Durability

Items	Test conditions	Criterion
6.1 Operating life without load	30,000 cycles of operation shall be performed continuously at a rate of 1~1.2πrad/s without load.	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 <u>±30</u> % of specified value. No abnormalities shall be recognized in appearance and construction. Chattering(4.5): t1 Max <u>3</u> ms t2 Max <u>5</u> ms

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						Kise	Shibata	T. Saito	

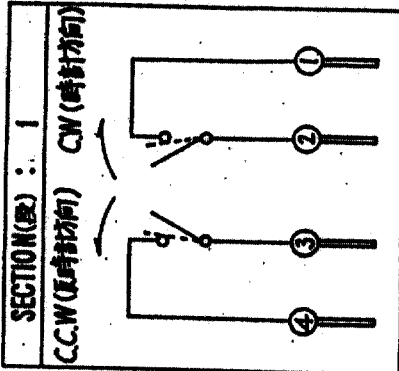
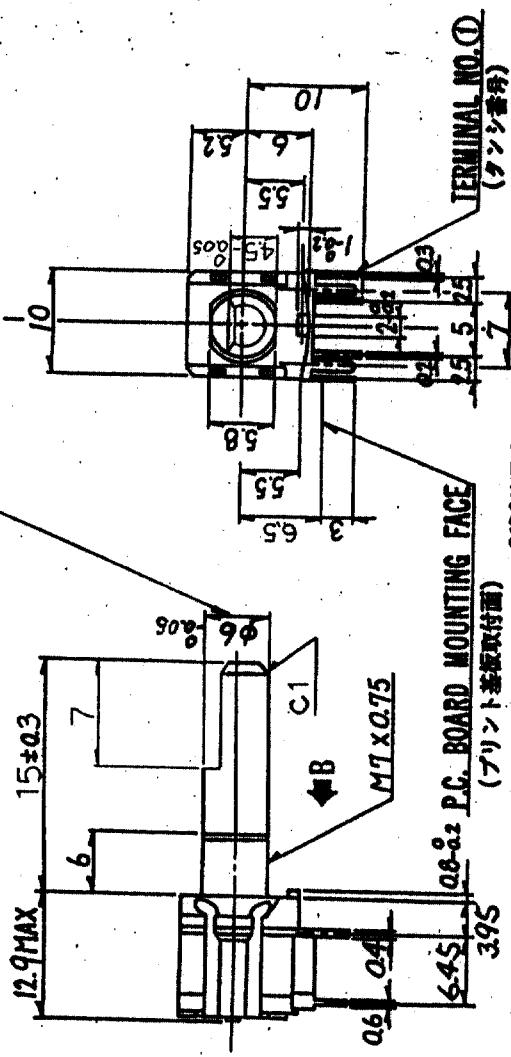
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SRBM-S-503		SRBM PRODUCT SPECIFICATIONS	
Items	Test conditions	Criterion	
6.2 Operating life with load	10,000 cycles of operation shall be performed continuously at a rate of $1 \sim 1.2\pi$ rad/s with load of <u>0.1</u> A, <u>16</u> V DC.	Contact resistance (Item 4.1) : <u>150</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 $\pm 30$ % of specified value. No abnormalities shall be recognized in appearance and construction. Chattering(4.5): t1 Max <u>3</u> ms t2 Max <u>5</u> ms	
7. Weather proof			
Items	Test conditions	Criterion	
7.1 Cold proof	After testing at <del><math>20 \pm 2^\circ\text{C}</math></del> $-20 \pm 2^\circ\text{C}$ 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) : <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 $\pm 10, -30$ % 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) : <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 $\pm 10, -30$ % 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) : <u>100</u> mΩ MAX Insulation resistance (Item 4.2) : <u>10</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 $\pm 10, -30$ % 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 : $24 \pm 1$ h After the test, salt deposit shall be removed in running water.	No remarkable corrosion shall be recognized in metal part.	
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Items	Test conditions	Criterion																									
7.5 Temperature cycling	<p>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.</p>	<p>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 <u>+10,-30</u> % of specified value.  No abnormalities shall be recognized in appearance and construction.</p>																									
7.6 H <sub>2</sub> S gas test	<p>After following testing, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour.</p> <p>H<sub>2</sub>S gas : <math>1 \pm 0.2</math> ppm  Temperature : <math>40 \pm 2^\circ\text{C}</math>  Humidity : <math>75 \pm 5\%</math>  Time : 96 hours</p>	<p>Contact resistance (Item 4.1) : <u>10</u> Ω 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.</p>																									
<p>Precaution in use</p> <ol style="list-style-type: none"> <li>Note that if the load is applied to the terminals during soldering they might suffer deformation and defects in electrical performance.</li> <li>Use of water-soluble soldering flux shall be avoided because it may cause corrosion of the switch.</li> </ol>																											
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φ6.1±0.2EXCEPT FOR FLAT PART  
(フラット部以外φ6.1±0.2)



C.W. : ①② ON IN BETWEEN CLICK  
(時計方向) (切替途中のオナ)

C.C.W. : ③④ ON IN BETWEEN CLICK  
(反時計方向) (切替途中のオナ)

TOLERANCES UNLESS OTHERWISE SPEC.		
BASIC DIMENSIONS	TOLERANCES	
ØP TO 4	±0.2	
OVER 4 UP TO 16	±0.3	
OVER 16 UP TO 83	±0.4	
ABOVE 83 TO 250	±0.5	
ABOVE 250	±0.7	
ANGULAR DIMENSIONS	±3°	

3. NUMBER OF POSITION: 20 (ENDLESS(全回転)  
(ホジゲン数))

2. STEP ANGLE:  $18^{\circ} \pm 3^{\circ}$   
(切换角度)

NOTES  
(注記)

1. ROTATION TORQUE:  $15 \pm 7 \text{ mN} \cdot \text{m}$   $(158 \pm 74 \text{ gf} \cdot \text{cm})$   $\Delta$   
(回転トルク)

ALPS ELECTRIC CO., LTD.	
SCALE	MODEL NO. (E281)
%	SRBM1L1400
DWG. No. 2197	TITLE
M. L.	PRODUCT DRAWING (製品図)
akise	DOCUMENT NO.