Customer:

No. SW065102A

Date: 2006 - 07 - 20

ALPS EUROPE DISTRIBUTION

Attention:

Your ref. No. :

Your Part No.: SPUN191600

SPECIFICATION

ALPS';

MODEL: SPUN191600

Spec. No.: SPUN-S-501

Sample No.: F3289962M

RECE	IPT STATUS
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Ву	Date
_	Signature
_	Name
_	Title



K.
DSG'D Tomita

APP'D **K.ITO**ENG. DEPT. DIVISION

Sales

Head Office 1-7,Yukigaya-otsuka-cho,Ota-ku,Tokyo.145-8501 Japan Phone.+81(3)3726-1211

SPUN-S-501 1. General 1.1 Application This specification is applied to low current circuit (Secondary circuit) push switch used for electronic equipment. 1.2 Operating temperature range : -10 ~ 60℃ 1.3 Test conditions The standard test conditions shall be 5~35°C in temperature, 45~85% RH and 86~106kPa (860-1060mbar) in atmospheric pressure. Should any doubt arise in judgement, tests shall be conducted at 20±2°C, 65±5% RH and 86~106kPa {860~1060mbar} 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 30 V DC 0.1 A (Resistive load) A Minimum rating / V DC 1011A 3. Rating 4. Electrical performance Items Test conditions Criterion Contact resistance | Shall be measured at 1kHz ± 200Hz (20mV MAX , 50mA MAX) or 1A, 5V DC 20 mΩ HAX by voltage drop method.

Test voltage: 500 V DC, measured after 1 minute ±5 seconds. Insulation 100 HΩ HIN resistance Applied position : Between all terminals Between terminals and ground (frame) 4.3 Voltage proof Test voltage: 500 V AC (50~60Hz, cut-off current 2 mA) No dielectric breakdown shall occur. Applied position : Between all terminals Between terminals and ground (frame) 4.4 Shall be measured at 1MHz ± 10kHz Capacitance 1.5 pF MAX Between all terminals Between terminals and ground (frame) Between all circuits 4.5 Changeover timing As per individual product drawing. Mechanical performance Items Test conditions Criterion Operating force A static load shall be applied to the tip of actuator in operating As per individual product drawing. direction. Terminal strength A static load of 5 N + 510 xfl/shall be applied to the tip of Shall be free from terminal looseness terminal in a desired direction for 1 minute. The number of test shall and damage and breakage of terminal be once per terminal. holding portion. Terminals may be bent after test, electrical performance requirement specified in item 4 shall be satisfied. Mounting strength Thread shall be mounted at 0.7 N·m 17-14 ksf cm by normal Shall be free from damage of thread of thread portion mounting method. portion. Control strength (1) A static load of 50 N + 5 + keft shall be applied in the Shall be free from pronounced wobble, 5.4.1 Control operating direction of actuator for 15 seconds. bending and mechanical abnormalities. strength (2) A static load of 50 N = 5-1 kefl Ashall be applied in the pull direction of actuator for 15 seconds. (For construction with lock, the test shall be conducted at the condition of lock released.) (3) A-static load of 30 N - 63.06km shall be applied to the vertical direction of operation at the tip of actuator for 15 seconds. 5.4.2 Lock hold-(1) A static load of 10 N + 102 heft hall be applied in the pull Lock shall not be dislocated. ing strength of direction at the condition of locking actuator. Shall be free from pronounced wobble actuator and abnormalities in operation. (Applied to the switch with lock mechanism) Run-out(P-P) shall be measured by applying a static load of 1N {102sf}/P-P: O.8 mm MAX Wobble of actuator in the vertical direction of operation at the tip of actuator. Without frame: 1.2mm MAX 5.6 Switch shall be mounted as shown. Difference of sides shall be Row of actuator Difference between actuators (Applied to measured. $t_1 = Vithin 0.5$ multipul-key Maximum difference of actuator push switch) t2 = Within 0.8 mm Difference between mounting hole and actuator $t_3 = Within 0.5$ Hole for mounting frame APPD. CHKD. M. May12,'02 K Jun,4'93 Teb.19,18 TW DRAVING NO.

BACK GROUND ALPS ELECTRIC CO., LTD.

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Soft and of position of the property of the pr								
Strength (poplied to multi- multi-multiple punh multiple p	F		Test conditions		Criterion			
Fixed Settle shall be secured to a testing machine by a regular abunting device and sethed. (1) Vibration Froquency ranges 190—586z (2) Tutal smalltudes 1.5mm (3) Sweep ratio 10-55:10(80) Approx. 1 sinute (4) Method of chemsing the encepe vibration frequency: logarithmic or linear (5) Direction of vibration: Three vertical directions including actuator. (6) Time: 2 hours each (6) hours in total) 5.9 Mechanical shock (3) Sweet ratio (10-55:10(80) Approx. 1 sinute (4) Method of chemsing sathed (2) Acceleration: (6) Acceleration: (7) Acceleratio	3	strength (Applied to multi pul-key push	30 1 13.06 hef 2 shall be applied to the center of mounting frame	Warp on mounting frame shall be 0.5mm max. Shall be free from abnormalities				
Switch shall be secured to a testing machine by a resular mounting device and method. (1) Vibration Switch shall be secured to a testing machine by a resular mounting device and method. (1) Vibration frequency range: 10-55812 (2) Total subjictive: 1.5m (3) Sweep ratio: 10-5510(61) Approx. 1 minute (4) Method of chamsing the sweep vibration frequency: Logarithmic or incomplete to the state of the sta		switch)	A - B					
Switch shall be secured to a testing machine by a resular mounting device and method. (1) Vibration Switch shall be secured to a testing machine by a resular mounting device and method. (1) Vibration frequency range: 10-55812 (2) Total subjictive: 1.5m (3) Sweep ratio: 10-5510(61) Approx. 1 minute (4) Method of chamsing the sweep vibration frequency: Logarithmic or incomplete to the state of the sta			c 771111					
device and aethod. (1) Wibration frequency rags: 10-5582 (2) Total amplitude: 1.5ms (3) Seep ratio: 10-55-10 (12) Approx. 1 ainute (4) Method of changing the every vibration frequency: Logarithmic or linear (15) Direction of vibration: Three vertical directions including actuator. (6) Direction of vibration: Three vertical directions including actuator. (6) Time: 2 hours each (6 hours in total) (6) Time: 2 hours each (6 hours in total) (7) Mounting method: Sortich shall be measured after following test. (8) Acceleration: 400a/s² -660d-2A (8) Breation: 11ms (9) Eact direction: 6 directions (10) Mounting method: 1 Horra and including actuator. (11) Mounting method: 1 Horra and including actuator. (12) Mounting method: 1 Horra and including actuator. (13) Mounting method: 1 Horra and including actuator. (14) Mounting sthed: 1 Horra and including actuator. (15) Number of shock: 3 times per direction (15) Number of shock: 3 times per direction. (15) Mounting sthed: 1 Horra and including actuator. (16) Mounting sthed: 1 Horra and including actuator. (17) Mounting sthed: 1 Horra and including actuator. (18) Mounting sthed: 1 Horra and including actuator. (18) Mounting sthed: 1 Horra and including actuator. (20) Deration: 1 Horra and including actuator. (21) Mounting sthed: 1 Horra and including actuator. (22) Plux: Rosin flux (JIS x 5902) Horra and including actuator. (23) Test direction: 6 directions (24) Number of shock: 3 times per direction (25) Deration: 1 Horra and including actuator. (26) Deration: 1 Horra and including actuator. (27) Deration: 1 Horra and including actuator. (28) Deration: 1 Horra and including actuator. (29) Plux: Rosin flux (JIS x 5902) Horra and including actuator. (29) Plux: Including actuator. (20) Deration: 1 Horra and including actuator. (21) Mounting actuator. (20) Deration: 1 Horra and including actu			Fixed D D					
Comparison of the content of the c	5.	8 Vibration	Switch shall be secured to a testing machine by a regular mounting	Contact re	esistance (Item 4.1) :			
Soldering heat Sold		,	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	Insulation 100 Mg Voltage pr Apply 5 No diele Operating	nΩ MAX n resistance (Item 4.2): Ω MIN roof (Item 4.3): Ω OO V AC for 1 minute. setric breakdown shall occur. force (Item 5.1):			
S. 9.1	5.9	9 Mechanical shock	(6) Time : 2 hours each (6 hours in total)	Within _ No abnorma in appeara	±30 % of specified value. Alities shall be recognized unce and construction.			
Solderability Svitch shall be conducted at the condition of locking actuator. (1) Acceleration: 147 m/s² + 5 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1			(1) Hounting method: Hormal mounting method (2) Acceleration: 490m/s² (500) 1/2 (3) Duration: 11ms (4) Test direction: 6 directions	20 m Operating Within Shall be for abnormalit	$Ω$ MAX force (Item 5.1) $\frac{\pm 30}{2}$ % of specified value. ree from mechanical ies.			
Shock (Applied to the switch with lock mechanism.) 5.10 Solderability 5.11 Solder : H63A (JIS Z 3282) (2) Flux: Rosin flux (JIS K 5902) having a nominal composition of 25x solids by weight of water white rosin in methyl alcohol (3) Soldering temperature: 230±5°C 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 5.11 Soldering heat resistance (1) Solder: H63A (JIS Z 3282) (2) Flux: Rosin flux (JIS K 5902) having a nominal composition of 10x solids by weight of water white rosin in methyl alcohol (3) Soldering heat resistance (1) Solder: H63A (JIS Z 3282) (2) Flux: Rosin flux (JIS K 5902) having a nominal composition of 10x solids by weight of water white rosin in methyl alcohol (3) Temperature and immersing time Temperature (*C) Time (s) Dip soldering 260±5 10±1 Hanual soldering 350±10 3 * † APPD. CHKD. DSGD. TITLE PARAUSE M811 be factuator shall not be disclocked. Shall be free from abnormalities in operation. Lock of actuator shall not be disclocked. Shall be free from abnormalities in operation. Lock of actuator shall not be disclocked. Shall be free from abnormalities in operation. Hore than 90% of immersed part shall be covered with solder. No abnormalities shall be recognized in appearance. The electrical performance requirements specified in item 4 shall be satisfied.			(18 times in total)	(Dislocation	on of lock of actuator shall			
Solderability Switch shall be checked after following test. (1) Solder: H63A (JIS Z 3282) Lamersing time shall be 5~10 seconds in normal temperature. (4) Immersion depth: lamersion depth shall be at copper plating portion for P.C.B. terminal after mounting. Thickness of P.C. board: 1.6 mm Switch shall be recognized in appearance. The electrical performance resistance (2) Flux: Rosin flux (JIS K 5902) having a nominal composition of 10% solider: H63A (JIS Z 3282) (2) Flux: Rosin flux (JIS K 5902) having a nominal composition of 10% solides by weight of water white rosin in methyl alcohol (JIS K 1501) solution. (3) Temperature and immersing time Temperature (T) Time (s) Dip soldering 280± 5 10±1 Hanual soldering 350±10 3 * 15 DESCO.		shock (Applied to the	Switch shall be conducted at the condition of locking actuator. (1) Acceleration: 147 m/s ² + 156 A (2) Duration: 11 ms	Lock of ac located. S	tuator shall not be dis- hall be free from			
(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±5°C 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 5.11 Soldering heat resistance (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 Temperature (°C) Time (s) Dip soldering 280±5 10±1 Henual soldering 350±10 3 † APPD. CHKD. DSGD. APPD. CHKD. DSGD. TITLE TITLE TOTAL TITLE T			(4) Number of shock : 3 times per direction (18 times in total)					
(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 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 (3) Temperature and immersing time Temperature (©) Time (s) Dip soldering 260±5 10±1 Hanual soldering 350±10 3+1 APPD. CHKD. DSGD. TITLE APPD. CHKD. DSGD. TITLE APPD. CHKD. DSGD. TITLE APPD. CHKD. DSGD. TITLE	5.1	U Solderability	(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±5℃ Immersing time: 3±0.5 s					
(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 Temperature (°C) Time (s) Dip soldering 260± 5 10±1 Hanual soldering 350±10 3 + 1 APPD. CHKD. DSGD. JEMPANYIC NO. DEPARTITES SNAIL be recognized in appearance. The electrical performance requirements specified in item 4 shall be satisfied.			(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	-				
Temperature (°C) Time (s) Dip soldering 260± 5 10±1	5.1	1	(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.	in appearance ance require	ce. The electrical perform- ements specified in item 4			
8. Jun. 4 '93 RPANTING NO.			Temperature (°C) Time (s) Dip soldering 260 ± 5 10 ± 1					
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S	PUN-S-501	SPUN PRODUCT SPECIFICATIONS					
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	Items	Test conditions (4) Immersion depth: Immersion depth shall be at copper plating	Criterion				
		portion for P.C.B. terminal after mounting. Thickness of P.C. board (Single sided copper clad P.C.B.) : 1.6mm					
5.12	Resistance to flux (Applied to the switch for P.C. board)	Switch shall be checked after following test. (1) Equipment: Auto-dip chamber (2) Solder: H63A (JIS Z 3282) (3) 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. (4) Temperature: 260±5°C (5) Immersing time: 5±1 s (6) 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	Flux shall not be risen up to contac Shall be free from abnormalities in operation.				
6 0	Ourability						
_v, D	Items	Test conditions	Criterion				
6.1	Operating life without load	Switch shall be operated 30,000 cycles at 15~20 cycles/minute without load.	Let Contact resistance (Item 4.1): 4Om\Omega_MAX Insulation resistance (Item 4.2):1OH\Omega_MIN Voltage proof (Item 4.3):Apply _5OOV AC for 1 minuteNo dielectric breakdown shall occur				
6.2	Operating life		Operating force (Item 5.1): Within				
	with load						
7 U	eather proof		- AFFOR ONCO BING CONDO GCC10().				
<u>,, ,</u>	Items	Test conditions	Criterion				
7.1	Cold proof	After testing at -20±2°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) :				
.2		After testing at 85±2°C for 96 hours, the switch shall be allowed to (Contact resistance (Item 4.1) :				
-		stand under normal temperature and humidity conditions for 1 hour, and then measurement shall be made within 1 hour.	40 mQ MAX Insulation resistance (Item 4.2): 10 MΩ MIN Voltage proof (Item 4.3): Apply 500 V AC for 1 minute. No dielectric breakdown shall occur. Operating force (Item 5.1): Within ±30 % of specified value. No abnormalities shall be recognized in appearance and construction.				
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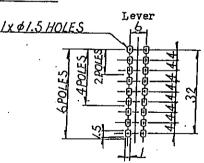
SPUN PRODUCT SPECIFICATIONS Items Test conditions Criterion 7.3 After testing at 40±2°C and 90~95%RH for 96 hours, the switch shall Damp heat Contact resistance (Item 4.1) be allowed to stand under normal temperature and humidity conditions 40 ±Ω HAX for 1 hour, and measurement shall be made within 1 hour after that. Insulation resistance (Item 4.2) : Water drops shall be removed. <u>10. HQ HIH</u> Voltage proof (Item 4.3) :
Apply 500 V AC for 1 minute. No dielectric breakdown shall occur. Operating force (Item 5.1) : Within _ 18 % of specified value. No abnormalities shall be recognized in appearance and construction. Salt mist Switch shall be checked after following test. No remarkable corresion shall be (1) Temperature : 35±2℃ recognized in metal part. (2) Salt solution : 5±1% (Solids by weight) (3) Duration : 24±1 h · After the test, salt deposit shall be removed in running water. 7.5 Temperature After 5 cycles of following conditions, the switch shall be allowed to Contact resistance (Item 4.1) : cycling stand under normal temperature and humidity conditions for 1 hour, and 40 ±Ω HAX measurement shall be made within 1 hour after that. Insulation resistance (Item 4.2) : Water drops shall be removed. <u>10</u> HQ HIN Voltage proof (Item 4.3) : 70±2°C -----Apply 500 V AC for 1 minute. Ho dielectric breakdown shall occur. Operating force (Item 5.1):

Within _____ % of specified value. No abnormalities shall be recognized Normal in appearance and construction. temperature -25±3°C -----30 min **min** 10~15 10~15 min min 1 cycle

Precaution in use

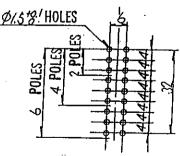
- 1. Note that if the load is applied to the terminals during soldering they might suffer deformation and defects in electrical performance.
- 2. Use of water-soluble soldering flux shall be avoided because it may cause corrosion of the switch.
- 3. The knob should be mounted or demounted after single-lock releasing. If attempted under single locked condition, the single-acting mechanism may be damaged.
- Printed circuit board mounting hole diagram (±0.05 tolerance unless otherwise specified)





STRAIGHT TERMINALS

Lever



4. Soldering should be performed after single lock released. If attempted under single locked condition, the single-acting mechanism may be deformed by soldering heat.

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