TOTAL PAGE : 6

Customer :

No. SW016419A

Date :

ALBS

Attention :

Your ref. No. :

Your Part No. : 401947

SPECIFICATION

ALPS' ;

MODEL : SPPH110300

Spec. No. : SPPH-S-501

G6231356M

Order No. : SPPH11-LB

RECEIPT STATUS

RECEIVED

By. Date

Signature

Name

Title

ALPS ELECTRIC CO., LTD.

HEAD OFFICE
1-7, YUKIGAYA-OHTSUKA-CHO,
OHTA-KU, TOKYO 145 JAPAN

DSG'D S. Takahashi

APP'D H. Yamaguchi

ENG. DEPT. DIVISION

Sales

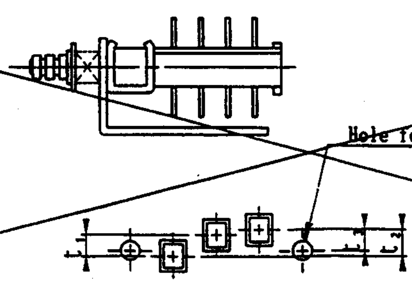
(Push)

SPPH-S-501	SPPH1 PRODUCT SPECIFICATIONS	

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℃ 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℃, 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
3. Rating 30 V DC 0.1 A (Resistive load)
4. Electrical performance

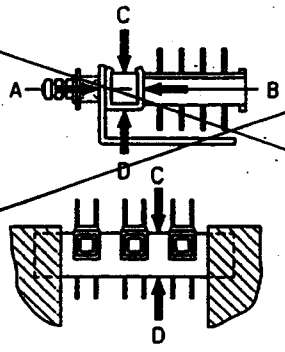
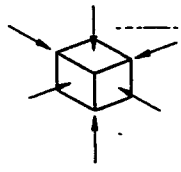
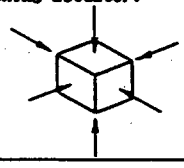
	Items	Test conditions	Criterion
4.1	Contact resistance △▼	Shall be measured at 1kHz±200Hz (20mV MAX , 50mA MAX) or 1A, 5V DC by voltage drop method.	20 mΩ MAX
4.2	Insulation resistance	Test voltage : 500 V DC, measured after 1 minute±5 seconds. Applied position : Between all terminals Between terminals and ground (frame)	100 MΩ MIN
4.3	Voltage proof	Test voltage : 500 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 1MHz ± 10kHz Between all terminals Between terminals and ground (frame) Between all circuits	1.5 pF MAX
4.5	Changeover timing		As per individual product drawing.

5. Mechanical performance

	Items	Test conditions	Criterion
5.1	Operating force	A static load shall be applied to the tip of actuator in operating direction.	As per individual product drawing.
5.2	Terminal strength	A static load of 5 N {510 gf} shall be applied to the tip of terminal in a desired direction for 1 minute. The number of test 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.
~~5.3~~	~~Mounting strength of thread portion~~	~~Thread shall be mounted at ___ N·m { ___ kgf·cm} by normal mounting method.~~	~~Shall be free from damage of thread portion.~~
5.4	Control strength 5.4.1 Control strength	(1) A static load of 50N { 5.1 kgf} shall be applied in the operating direction of actuator for 15 seconds. (2) A static load of 30N {3.06 kgf} shall 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 10N {1.02kgf} shall be applied to the vertical direction of operation at the tip of actuator for 15 seconds.	Shall be free from pronounced wobble, bending and mechanical abnormalities.
	5.4.2 Lock holding strength of actuator (Applied to the switch with lock mechanism)	(1) A static load of 5N {0.51kgf} shall be applied in the pull direction at the condition of locking actuator.	Lock shall not be dislocated. Shall be free from pronounced wobble and abnormalities in operation.
5.5	Wobble of actuator	Run-out(P-P) shall be measured by applying a static load of 1N {102gf} in the vertical direction of operation at the tip of actuator.	P-P : 1 mm MAX
~~5.6~~	~~Row of actuator (Applied to multipul-key push switch)~~	~~Switch shall be mounted as shown. Difference of sides shall be measured.~~ 	~~Difference between actuators t_1 = Within ___ mm Maximum difference of actuator t_2 = Within ___ mm Difference between mounting hole and actuator t_3 = Within ___ mm~~

	APPD.	CHKD.	DSGD.	TITLE
SPPH13156A-1 | 1/4 | △1 | Apr.11.'97 | Y.Y. | Y.Y. | E.K	M. Kiza	S. Takahashi	Jun. 1. '93 F. Umezaki	DRAWING NO.
BACK GROUND | PAGE | SYMB | DATE | APPD | CHKD | DSGD				(1/4)

OR

	Items	Test conditions	Criterion
5.7	Mounting frame strength (Applied to multi-pul-key push switch)	Both ends of mounting frame shall be secured. A static load of __ N { __ kgf} shall be applied to the center of mounting frame in A, B, C and D directions each 15 seconds. 	Warp on mounting frame shall be 0.5mm max. Shall be free from abnormalities in operation.
5.8	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) : 20 mΩ MAX Insulation resistance (Item 4.2) : 100 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 ±18 % of specified value. No abnormalities shall be recognized in appearance and construction.
5.9	Mechanical shock 5.9.1 Mechanical shock	Switch shall be measured after following test. (1) Mounting method : Normal mounting method (2) Acceleration : 490m/s² { 50G } (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) : 20 mΩ MAX Operating force (Item 5.1) Within ±18 % of specified value. Shall be free from mechanical abnormalities. (Dislocation of lock of actuator shall not be regarded as abnormalities.)
	5.9.2 Lock holding shock (Applied to the switch with lock mechanism.)	Switch shall be conducted at the condition of locking actuator. (1) Acceleration : 147m/s² { 15 G } (2) Duration : 11 ms (3) Test direction : 6 directions (4) Number of shock : 3 times per direction (18 times in total) 	Lock of actuator shall not be dislocated. Shall be free from abnormalities in operation.
5.10	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±5℃ Immersing time : 3±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 Immersion depth shall be at wiring portion of lead wire for lead wire terminal.	More than 90% of immersed part shall be covered with solder.
5.11	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	No abnormalities shall be recognized in appearance. The electrical performance requirements specified in item 4 shall be satisfied.

	Temperature (℃)	Time (s)
Automatic soldering	260± 5	10±1
Manual soldering	350±10	3 +1 0

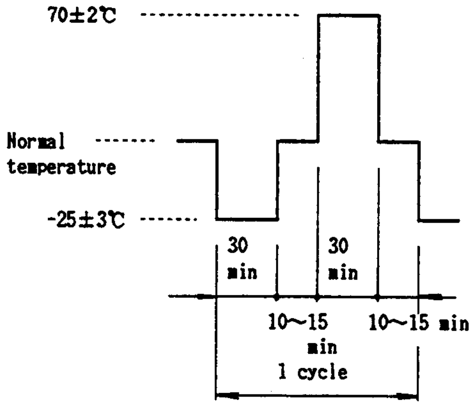
	Items	Test conditions	Criterion
		(4) Immersion depth : Immersion depth shall be at copper plating portion for P.C.B. terminal after mounting. Thickness of P.C. board (Single sided copper clad P.C.B.) : 1.6mm Immersion depth shall be at wiring portion of lead wire for lead wire terminal.	
5.12	Resistance 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℃ (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 contact. Shall be free from abnormalities in operation.

6. Durability

	Items	Test conditions	Criterion
6.1	Operating life without load	Switch shall be operated 10,000 cycles at 15~20 cycles/minute without load.	Contact resistance (Item 4.1) : 40 mΩ 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.
6.2	Operating life with load	Switch shall be operated 10,000 cycles at 15~20 cycles/minute with 30 V DC 0.1 A. (Resistive load)	Contact resistance (Item 4.1) : 40 mΩ 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.

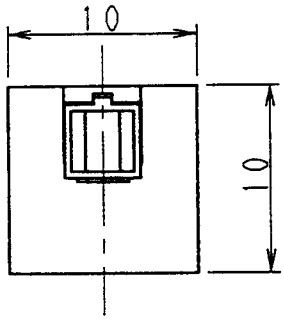
7. Weather proof

	Items	Test conditions	Criterion
7.1	Cold proof	After testing at -20±2℃ 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) : 40 mΩ 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.
7.2	Dry heat	After testing at 85±2℃ 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.	Contact resistance (Item 4.1) : 40 mΩ 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.

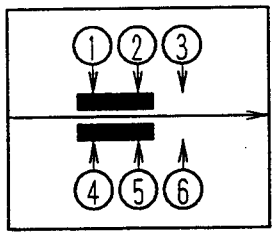
	Items	Test conditions	Criterion
7.3	Damp heat	After testing at 40±2℃ and 90~95%RH for 96 hours, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be removed.	Contact resistance (Item 4.1) : 40 mΩ 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 $^{+10}_{-30}$ % 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±2℃ (2) Salt solution : 5±1% (Solids by weight) (3) Duration : 24±1 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) : 40 mΩ 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 $^{+10}_{-30}$ % of specified value. No abnormalities shall be recognized in appearance and construction.
7.6	Damp heat with load (Silver migration)	DC voltage 1.5 times as much as rated voltage shall be applied continuously between adjacent terminal at 60±2℃ and 90~95%RH. After 500 hours testing, switch shall be allowed to stand under normal temperature and humidity condition for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be removed.	Insulation resistance (50V DC) : 10 MΩ min. Voltage proof : Apply 100V AC for 1 minute. No dielectric breakdown shall occur.

Precaution in use

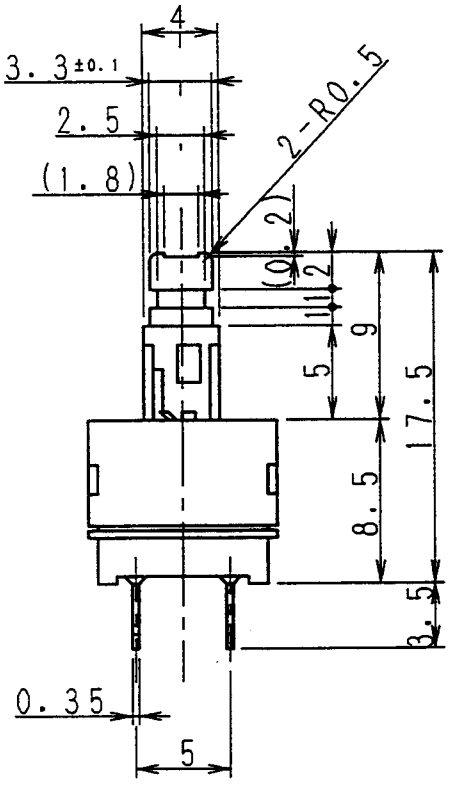
1. Note that if the load is applied to the terminals during soldering they might suffer deformation and defects in electrical performance.
2. Use of water-soluble soldering flux shall be avoided because it may cause corrosion of the switch.
3. The knob should be mounted or demounted after single-lock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



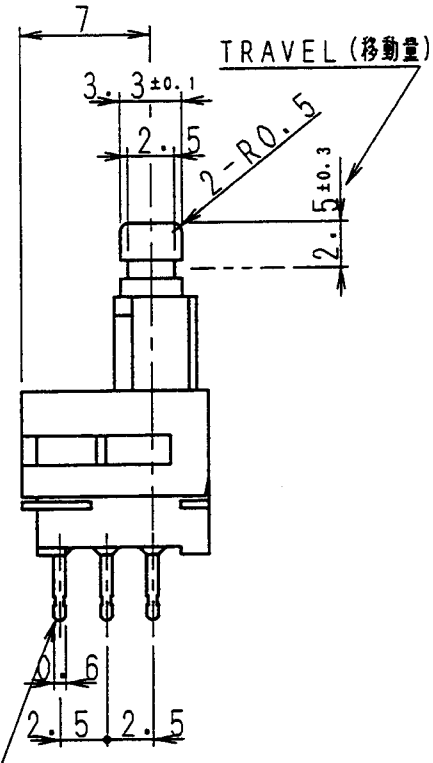
CIRCUIT DIAGRAM (回路図)
SEE DIRECTION "A" (A方向より見る)



MOMENTARY (ノンロック)



A



TERMINAL NO.④
(タンシ番号)

TOLERANCES UNLESS OTHERWISE SPEC.	
BASIC DIMENSION	TOLERANCE
UP TO 4	±0.2
ABOVE 4 TO 16	±0.3
ABOVE 16 TO 63	±0.4
ABOVE 63 TO 250	±0.5
ABOVE 250	±0.7
ANGULAR DIMENSION	±3°

2. OPERATING FORCE : $2^{+1}_{-0.7}$N{204^{+102}_{-71}gf}
(作動力)

NOTES 1. CHANGEOVER TIMING OF CONTACTS : NONSHORTING
(接点の切換タイミング : ノンショーティング)

SYMB	DATE	APPD	CHKD	DSGD

ALPS ELECTRIC CO., LTD.

DSGD. Mar. 30, '98 H. Yamaguchi	SCALE 1/1	MODEL No. (製品番号) SPPH110300	
CHKD. Mar. 30, '98 M. Kise		TITLE PRODUCT DRAWING (製品図)	
APPD. Mar. 30, '98 H. Yoshizawa	UNIT mm	DOCUMENT NO. SPPH110300.AE11.004	

FURUKAWA DIV. (A4)