

1. GENERAL :

1.1 Scope : This specification covers the requirements for single key switches which have no keytop (SOFT PUSH SWITCHES).

1.2 Operating Temperature Range :
-20 to 60°C (normal humidity, normal press.)

1.3 Storage Temperature Range :
-30 to 70°C (normal humidity, normal press.)

1.4 Test Conditions : Tests and measurements shall be made in the following standard conditions unless otherwise specified:
Normal temperature (temperature 5 to 35°C)
Normal humidity (relative humidity 45 to 85%)
Normal pressure (pressure 860 to 1060 mm bars)
In case any question arises from the judgement made, tests shall be conducted in the following conditions :
Temperature (20 ± 2°C)
Relative humidity (65 ± 5%)
pressure (860 to 1060 mm bars)

2. APPEARANCE, STYLE, AND DIMENSIONS :

2.1 Appearance : There shall be no defects that affect the serviceability of the product.

2.2 Style and Dimensions : Shall conform to the assembly drawings.

3. TYPE OF ACTUATION : Momentary

4. CONTACT ARRANGEMENT : 1 poles 1 throws (Details of contact arrangement are given in the assembly drawings.)

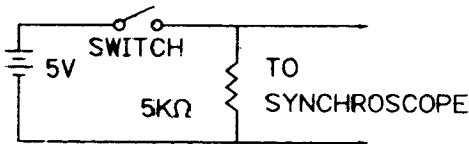
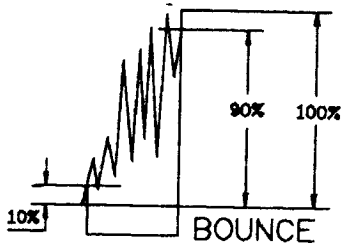
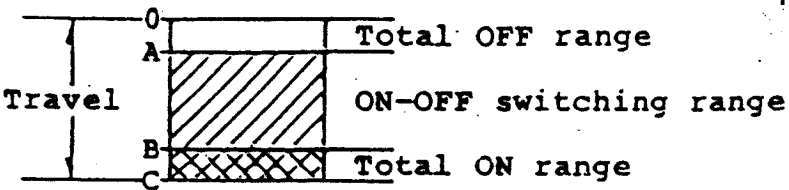
5. MAXIMUM RATINGS : DC 12 V 100 mA

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6. PERFORMANCE :

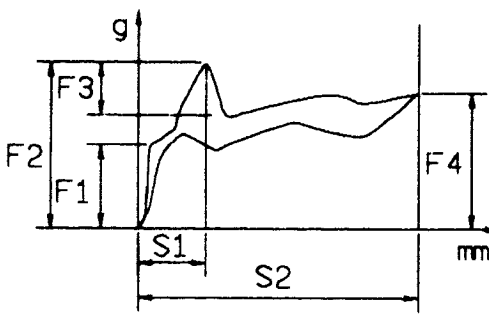
6.1 Electrical Inspection

Item	Test Conditions	Requirements
6.1.1 Contact Resistance	Applying a static load twice the actuating force to the center of the stem, measurements shall be made with a 1 kHz small-current contact resistance meter.	1 ohm max.
6.1.2 Insulation Resistance	Measurements shall be made following application of DC 100 V potential across terminals and across terminals and metal frame for one minute.	50 M ohm min.
6.1.3 Dielectric with- standing Voltage	AC 100 V (50Hz or 60Hz) shall be applied across terminals and across terminals and metal frame for one minute.	There shall be no breakdown.
6.1.4 Bounce	Lightly striking the center of the stem at a rate encountered in normal use (3 to 4 operations per sec.), bounce shall be tested at "ON" and "OFF".  	5 m sec max.
6.1.5 Switching Positions	Placing the switch such that the direction of switch operation is vertical and then carefully operating the stem, positions at which the switch makes and breaks the required circuit shall be measured. 	Total "OFF" range 0 - A: 1 mm min. Total "ON" range B - C: 1 mm min.

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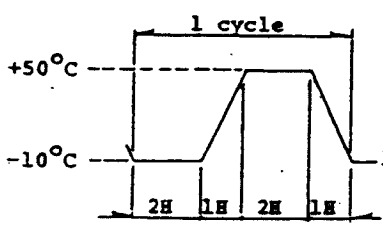
6.2 Mechanical :

Item	Test Conditions	Requirements
6.2.1 Actuating Force	Placing the switch such that the direction of switch operation is vertical and then gradually increasing the load applied to the center of the stem, the maximum load required for the stem to come to a stop shall be measured.	70 ± 25 gf
6.2.2 Travel	Placing the switch such that the direction of switch operation is vertical and then applying a static load twice the actuating force to the center of the stem, the travel distance for the stem to come to a stop shall be measured.	3.5 ± 0.5 mm
6.2.3 Stop Strength	Placing the switch such that the direction of switch operation is vertical, a static load of 5 kgf shall be applied in the direction of stem operation for a period of 60 seconds.	There shall be no sign of damage mechanically and electrically.
6.2.4 Stem Strength	Placing the switch such that the direction of switch operation is vertical, the maximum force to withstand a pull applied opposite to the direction of stem operation shall be measured.	5 kgf
6.2.5 Tactility	The center of the stem shall be struck lightly at a rate encountered in normal use (3 to 4 operations per second).	Free of noticeable binding
6.2.6 Click "Feel"	 <p> F1 Pre Load 30 ± 10 grf F2 Peak Load 70 ± 25 grf F3 Drop Load $10 + 20 - 5$ grf F4 End Pressure 60 ± 25 grf S1 Peak Point 1.5 ± 0.5 S2 End Travel 3.5 ± 0.5 </p>	

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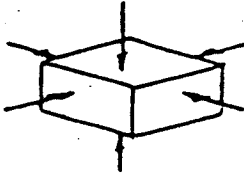
6.3 Environmental

Item	Test Conditions	Requirements
6.3.1 Resistance to Low Temperatures	Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made : (1)Temperature: $-30 \pm 2^{\circ}\text{C}$ (2)Time : 96 hours (3)Waterdrops shall be removed.	Item 6.1 Item 6.2.1 Item 6.2.2
6.3.2 Heat Resistance	Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made : (1)Temperature: $70 \pm 2^{\circ}\text{C}$ (2)Time : 96 hours	Item 6.1 Item 6.2.1 Item 6.2.2
6.3.3 Moisture Resistance	Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made : (1)Temperature : $60 \pm 2^{\circ}\text{C}$ (2)Relative humidity: 90 to 95% (3)Time : 96 hours (4)Waterdrops shall be removed.	Contact resistance: 1 ohm max. Insulation resistance: 10 M ohm min. Item 6.1.3 Item 6.1.4 Item 6.2.1 Item 6.2.2
6.3.4 Temperature Cycling	Following five cycles of the temperature cycling test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made. During this test, waterdrops shall be removed 	Item 6.1 Item 6.2.1 Item 6.2.2

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6.4 Endurance

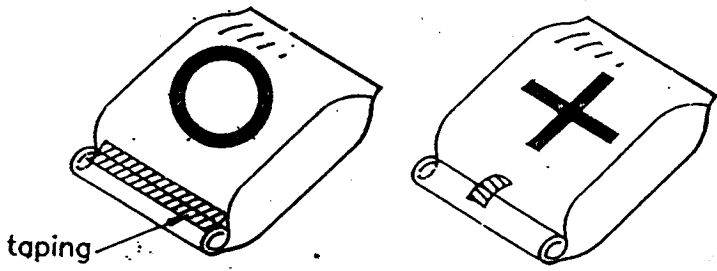
Item	Test Conditions	Requirements
6.4.1 Operating Life	Measurements shall be made following the test set forth below : (1)DC 5V 5mA resistive load (2)Rate of operation: 3 to 5 operations per second (3)Depression: Twice the actuating force (4)Cycles of operation: 1000×10^4 cycles	Contact resistance: 5 ohm max. Insulation resistance: 50 M ohm max. Bounce: 5 m sec max. Actuating force +50 % or -30 % of initial force Item 6.1.3 Item 6.1.5 Item 6.2.2
6.4.2 Vibration Resistance	Measurements shall be made following the test set forth below : (1)Range of oscillation: 10 to 55 Hz (2)Amplitude, pk-to-pk: 1.5 mm (3)Cycle of sweep: 10 - 55 - 10 Hz in one minute, approx. (4)Mode of sweep: Logarithmical sweep or uniform sweep (5)Direction of oscillation: Three mutually perpendicular directions, including the direction of stem travel (6)Duration of testing: 2 hours each, for a total of 6 hours	Item 6.1 Item 6.2.1 Item 6.2.2
6.4.3 Impact Shock Resistance	Measurements shall be made following the test set forth below : (1)Acceleration: 80g (2)Cycles of test: 3 cycles each in 6 directions, for a total of 18 cycles 	Item 6.1 Item 6.2.1 Item 6.2.2

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6.5 Recommended practice on opening the bag

(Storage condition)

Storage in locations subject to direct exposure to the sun, elevated temperatures, damp atmosphere and other adverse environmental conditions on purpose will nullify the above stated assurance as a matter of course.

Item	Storage period & method
6.5.1 Guaranteed storage period of sealed packs	3 months from the time of shipping FORWARD
6.5.2 Guaranteed storage period of unsealed packs	<p>(1) Not all the 4000 pieces a pack have been used-some leftovers.</p> <p>By folding the unsealed end of the bag twice or thrice and taping it to reseal will allow storage for another 1 months from the time of unpacking.</p>  <p>(2) Installed in the panel, awaiting soldering for later time.</p> <p>Basically speaking, a good practice is to complete soldering without delay. If keeping in storage is unavoidable for some reason, soldering should be finished within 7 days.</p>

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*** Switch Handling Precaution ***

1. In case an automatic flow soldering apparatus is used for soldering, adhere to the following conditions:

Item	Soldering Condition
(1)Preheat Temperature	100°C max. (Ambient temperature of printed circuit board on its soldering side)
(2)Preheat Time	45 sec.max.
(3)The way of flux application	The structure of the switch is designed with care of a flux. But please take care that the flux will not invade inside of the switch when the flux is used and applied . The recommendable flux is TAMURA SEISAKUSHO'S MH-820V or an equivalent to that.
(4)Soldering Temperature	255°C max.
(5)Duration of Solder Immersion	5 sec.max.
(6)Allowable Frequency Soldering Process	2 times max.

2. Other Precautions

- (1)Following the soldering process, do not try to clean the switch with a solvent or the like.
- (2)Safeguard the switch assembly against flux penetration from its top side.
- (3)No holes shall be designed under the switches except holes for the switches when designing a P.C.board.
- (4)Please have the products keep in close status and the storage time is 90 days guaranty after delivering the goods at most.

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