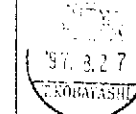


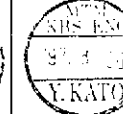

 0214

 キーボード製品規格書
 SPECIFICATION OF
 KEYBOARD SWITCH
 KFK type

Approved



Checked



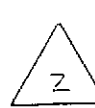
Drawn



AUG.06.1997 enact

1. Scope : This specification covers MITSUMI keyboard switch KFK series.
2. Electrical Specifications :
 - 2-1. Maximum Rating : D.C. 12V (with pulse width of 200 μ sec., duty ratio 1/50), 1mA.
 - 2-2. Contact Bounce : 5msec. Max ... Initial
10msec. Max ... Over life
(at normal pushing)
 - 2-3. Contact Resistance : 1.5K Ω Max (resistance value of membrane circuit board is included.)
 - 2-4. Insulation Resistance : 50M Ω Max (at D.C. 200V)
 - 2-5. Withstand voltage : A.C.250V , 1 minute.
 - 2-6. Circuit : Make Contact , 1 circuit.
3. Mechanical Specifications :
 - 3-1. Force :
 - (1) Operating Force : 30g typical (0.294 N typical)
 - (2) Maximum Force : 50 \pm 20g (0.490 N \pm 0.196 N)
 - (3) Click Rate : 45 \pm 20%
 (Decline of Clicking Force after 10 millions operation : within 30%)
 - 3-2. Operating point : 1.0~3.5mm stroke
 - 3-3. Full Travel : 4.2 \pm 0.5mm (at 200g) (at 1.96 N)
 - 3-4. Key Touch Feeling : Keytop must be operated without squeaking , catching , locking with normal pushing.




| | | CODE | DRAWING NO. |
|-------------|---|-------|--|
| R E V | | S 5 6 | 0214  |
| | 99.8.21 Add SI unit H.WATANABE Z | | |
| | 98.12.7 Change Spec. 2.2 \rightarrow 1.0 T.Sato J | | |

4. Endurance Specifications :

- 4-1. Operating Life : After 10 millions pushing , the switch must be satisfied with electrical and mechanical specifications shown on item 2&3.
- 4-2. Operating Temperature Range : $-5^{\circ}\text{C} \sim +50^{\circ}\text{C}$
- 4-3. Storage Temperature Range : $-20^{\circ}\text{C} \sim +65^{\circ}\text{C}$ (1000H)
- 4-4. Shock Proof : 20G in 3 Axis

5. Test Condition :

5-1. Measuring Conditions :

Measuring conditions :

Measuring conditions must be at temperature $23 \pm 1^{\circ}\text{C}$ humidity $50 \pm 2\% \text{RH}$.

However the measurement may be conducted under condition of normal temperature ($15 \sim 35^{\circ}\text{C}$) and normal humidity ($45 \sim 75\% \text{RH}$) unless such conditions affect test results.

5-2. Contact Bounce :

Test shall be made by normal pushing at a speed of 3~5 times per second with D.C 3V, $50 \mu\text{A}$ resistance load. Contact bounce range will be measured at 80% level as shown below.

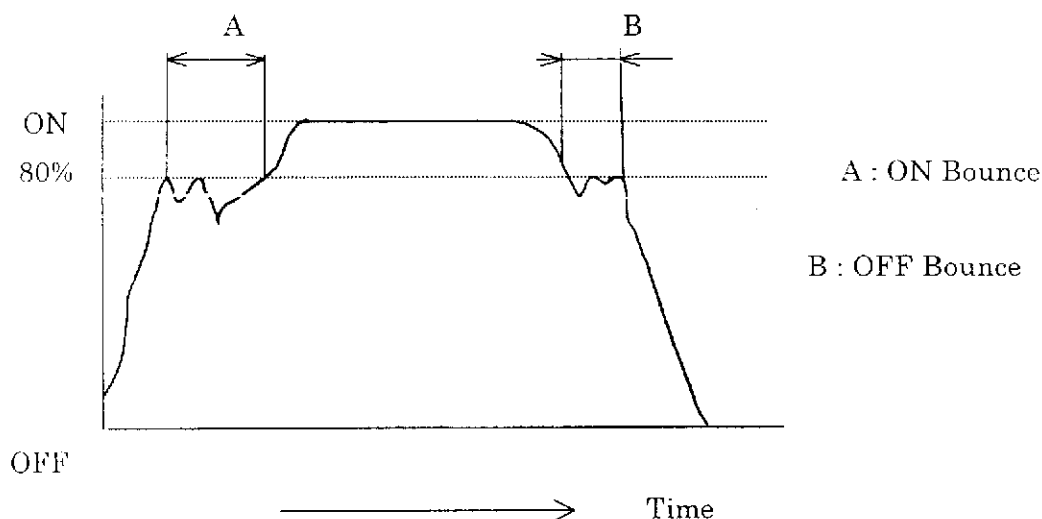


Fig.1.

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5-3. Contact Resistance :

Contact resistance included resistance value of membrane circuit board shall be measured at D.C.24V , 0.1mA (voltage drop method) , applying static load of the keytop.

5-4. Insulation Resistance :

Measure , applying D.C.250V between the terminals.

5-5. Withstand Voltage :

After A.C.250V is applied between the terminals for 1 minute , any change and damage will not be appeared.

5-6. Force :

(1) Operating force :

Measure the operating force when switch makes contact by pushing the center of the keytop.

(2) Maximum Force :

Measure the maximum Force among the full travel except the full travel force.

(3) Minimum Force :

Measure the minimum Force among the travel after the maximum force.

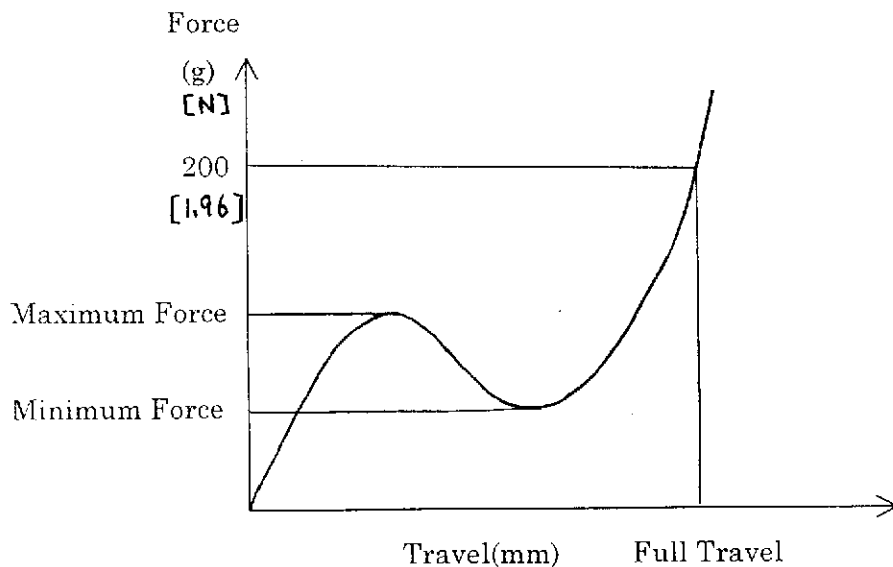



Fig.2.

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5-7. Operating Point :

Measure the distance when switch makes contact by pushing the center of the keytop.

5-8. Full Travel :

Measure the distance when static load of 200g is to be applied onto the center of the keytop.
(1.96N)

5-9. Key touch feeling :

Keytop must be operated , without squeaking , catching , locking with normal pushing of full travel at a speed of 3~5 times per second.

5-10. Operating Life :

As illustrated in Fig.3 , operating life test shall be made at a speed of 3~7 meter per second pushing the center of the keytop with a plunger of cam life tester.

Life test condition

D.C.22V

On time : 25mmsec

Cycle : 3~7 time/sec

Pushing force : 200g (1.96N)
(Typical)

↓
200g (1.96N)

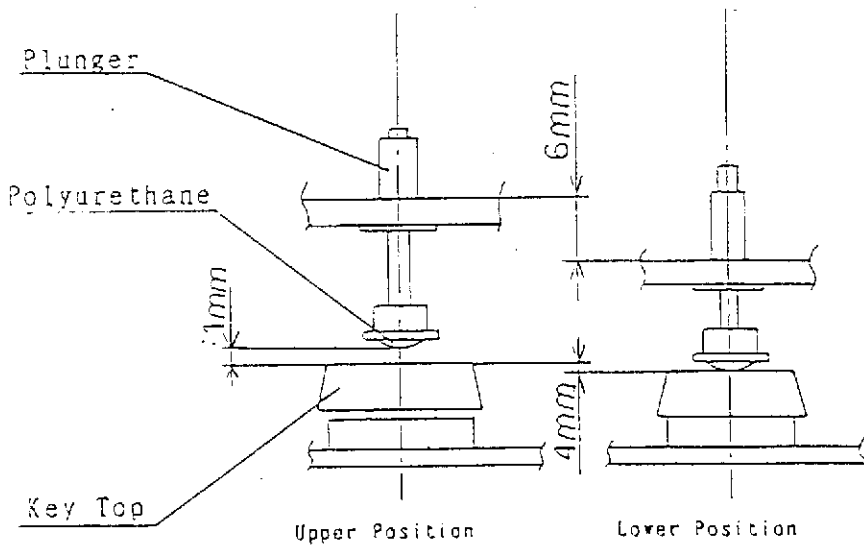



Fig.3.

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6. Test Form :

6-1. Humidity Test :

After unit is kept for 96 hours in a chamber of temperature $+40 \pm 2^{\circ}\text{C}$, and relative humidity 90~95% and then is left in ambient condition for 1 hour , electrical & mechanical specifications item 2&3 shall be satisfied.

6-2. Low Temperature Test :

After unit is kept for 96 hours in a chamber of temperature $-20 \pm 2^{\circ}\text{C}$, then is left in ambient condition for 1 hour , electrical & mechanical specifications item 2&3 shall be satisfied.

6-3. High Temperature Test :

After unit is kept for 96 hours in a chamber of temperature $+70 \pm 2^{\circ}\text{C}$, then is left in ambient condition for 1 hour , electrical & mechanical specifications item 2&3 shall be satisfied.

6-4. Thermal Shock Test :

After unit is kept for 5 cycles (one cycle consists of $-20 \pm 2^{\circ}\text{C}$, 1 hour and $+60 \pm 2^{\circ}\text{C}$, 1 hour) and then is left in ambient condition for 1 hour , electrical & mechanical specifications item 2&3 shall be satisfied.

6-5. Vibration Proof Test :

Unit shall satisfy electrical & mechanical specifications item 2&3 after the following vibration is applied.

Frequency : 10~55 Hz (cycle : 1 minute)
Full amplitude : 1.5mm
Duration : 2 hours each in 3 directions

6-6. Shock Proof Test :

After 20 G (half-sine wave) is applied to unit 3 times each in 3 directions , electrical & mechanical specifications item 2&3 shall be satisfied.

cf) The test (6-1~6-6) must be done under the open-circuit condition.

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7. Appearance of keytop :

7-1. Disposition of keytop :

Disposition of the keytop shall be within the limit of 0.5mm as illustrated in Fig.4 in both vertical and horizontal lines.

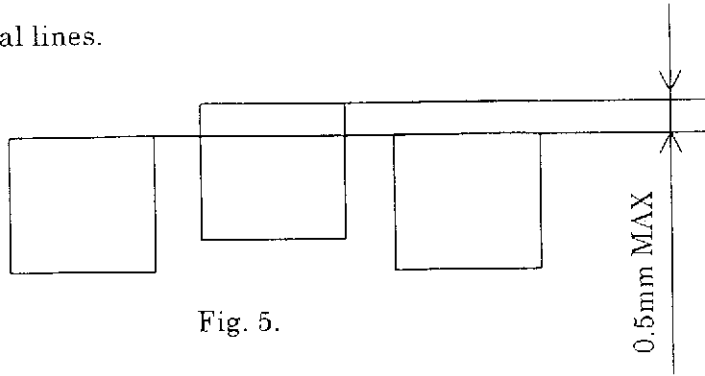


Fig. 5.

7-2. Tilt of keytop :

Tilt of keytop shall be within the limit of 0.5mm as illustrated in Fig.5.

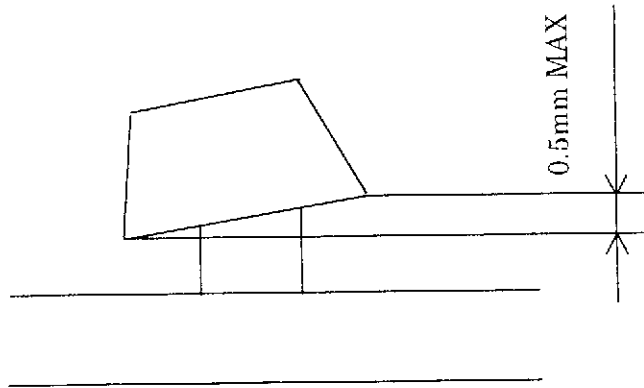


Fig .6.

7-3. Angular deviation of keytop

Angular deviation of keytop shall be within the limit of 0.5mm as illustrated in Fig 6.

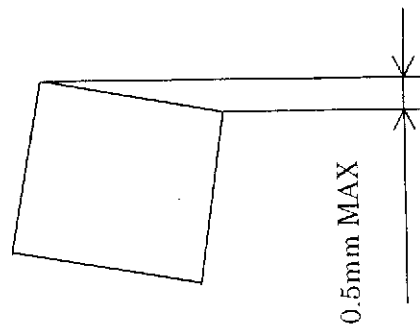
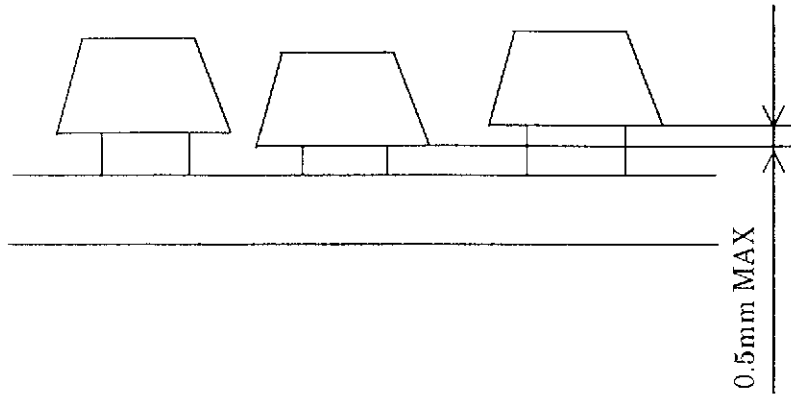


Fig .7.

7-4. Uneven level of keytop :

Uneven level of keytop shall be within the limit of 0.5mm as illustrated in Fig.7.

However , exclude the bend of the frame.



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