

**TONELUCK***Micro Switch***Product Specifications**

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Project Code:		Product Version:	A3	Issued Date:	1/31/2023

File/Edition: E42CP-BA03Ag-01-SPC.001

Description: Miniature Quick Switch

Customer Name: \_\_\_\_\_

Model No.: E4 (Series)

Customer P/N: \_\_\_\_\_

Toneluck P/N: E42CP-BA03Ag-01

Representative: \_\_\_\_\_

Project Code: \_\_\_\_\_

**Specification Receipt Confirmation**

Received by: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Remark :

1. This Product Specification is considered as the technical agreement between the receiving customer and TONELUCK. Any information on the general Product Catalogue which is in conflict with or different from the corresponding information of this document is considered as invalid.
2. If customer issue purchase orders without confirmation by signature of this specification after receipt, such confirmation will be considered as granted upon receipt of the first purchase order.

Prepared by: Binky Wan 2023-01-31Checked by: Wang Xunde 2023-01-31Approved by: Jerry 2023-01-31

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**1. General Characteristics**

1.1 Application :	This specification is applied to the miniature quick switch for general applications.
1.2 Operating Temperature Range :	Refer to individual product drawing.
1.3 Operating Relative Humidity :	≤96%RH at +40°C
1.4 Test Conditions :	Unless otherwise specified, the atmospheric conditions for making measurements and tests are as follows : Ambient Temperature : 5~35°C Relative Humidity: 45~85% Air Pressure : 86~106kPa (860~1060mbar)

**2. Appearance, Structure & Dimensions**

2.1 Appearance :	The switch shall have good finishing, and no rust, crack or plating defects.
2.2 Structure & Dimensions :	Refer to individual product drawing.
2.3 Markings :	Refer to individual product drawing.
2.4 Approved by Standards:	Refer to individual product drawing.
2.5 Housing Material :	Refer to individual product drawing.

**3.Ratings & Life**

Rating	Operating Life with Load	Operating Life without Load
Refer to individual product drawing.		

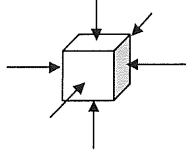
**4.Electrical Characteristics**

Item	Criteria	Test Method
4.1 Insulation Resistance	100MΩ Min.	500±50VDC voltage is applied between all terminals and between terminals and ground (frame) for 60±5s.
4.2 Dielectric Voltage	No dielectric breakdown shall occur.	1000VAC (50~60Hz, cut-off current 10mA) is applied between non-connected terminals and 1500VAC (50~60Hz, cut-off current 10mA) between terminals and ground (frame) for 60±5s.

**5.Mechanical Characteristics**

Item	Criteria	Test Method
5.1 Operating Force	Refer to individual product drawing.	Apply a tension meter on the midpoint of the actuator (or tip of the shaft) to supply a pressure vertically from its free position to operating position.
5.2 Releasing Force	Refer to individual product drawing.	The value to which the force in the actuator midpoint (or tip of the shaft) must be reduced to allow the contact to the normal position.
5.3 Operation Position	Refer to individual product drawing.	When switch is being converted, the distance between the actuator midpoint (or tip of the shaft) and the center of mounting hole.
5.4 Pre Travel	Refer to individual product drawing.	The distance vertically through which the midpoint of the actuator (or tip of the shaft) trip move from its free position to operating position.
5.5 Movement Differential travel	Refer to individual product drawing.	The distance vertically through which the midpoint of the actuator (or tip of the shaft) trip move from its operating position to releasing position.
5.6 Terminal Strength	- Shall be free from terminal looseness, damage and insulator breakage. - The electrical performance requirements specified in section 4 shall be satisfied.	A static load of 89N shall be applied to the tip of terminal in a desired direction for 10±1s. The test shall be done once per terminal.

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5.7	Vibration Proof	<p>After test,</p> <ul style="list-style-type: none"> <li>- Insulation Res.: 50MΩ Min.</li> <li>- Electrical performance requirements specified in item 4.2 shall be satisfied.</li> <li>- Operating force: Within ±10% of specified value.</li> <li>- No abnormalities shall be recognized in appearance and construction.</li> </ul>	<p>Switch shall be secured to a testing machine by a normal mounting device and method. Switch shall be measured after following test.</p> <ol style="list-style-type: none"> <li>(1) Vibration frequency range = 10~55 Hz</li> <li>(2) Total amplitude = 1.5mm</li> <li>(3) Sweep ratio: 10~55~10Hz Approx. 1 min.</li> <li>(4) Method of changing the sweep vibration frequency: logarithmic or linear</li> <li>(5) Direction of vibration: Three perpendicular directions including actuating direction.</li> <li>(6) Duration: 2 hours @ (6 hours in total)</li> </ol>
5.8	Mechanical Shock	<p>After test,</p> <ul style="list-style-type: none"> <li>- Insulation Res.: 50MΩ Min.</li> <li>- Electrical performance requirements specified in item 4.2 shall be satisfied.</li> <li>- Operating force: Within ±10% of specified value.</li> <li>- Shall be free from mechanical abnormalities.</li> </ul>	<p>Switch shall be measured after following test :</p> <ol style="list-style-type: none"> <li>(1) Mounting Method: Normal</li> <li>(2) Acceleration: 490m/s<sup>2</sup> (50G)</li> <li>(3) Duration: 11 ms</li> <li>(4) Test Direction: 6 directions</li> </ol>  <p>(5) Number of shocks: 3 times per direction (18 times in total)</p>

**6. Durability Characteristics**

Item	Criteria	Test Method
6.1 Operating Life without Load	<p>After test,</p> <ul style="list-style-type: none"> <li>- Insulation Res.: 50MΩ Min.</li> <li>- Electrical performance requirements specified in item 4.2 shall be satisfied.</li> <li>- The switch shall be free from abnormalities in appearance &amp; construction.</li> </ul>	<p>The operation shall be performed continuously at a rate of 200~300 cycles per minute without any load. (The cycles of operation refer to individual product drawing)</p>
6.2 Operating Life with Load	<p>After test,</p> <ul style="list-style-type: none"> <li>- Insulation Res. : 50MΩ Min.</li> <li>- Dielectric Voltage shall comply with corresponding standard.</li> <li>- Operating force shall be within ±20% of specified value.</li> <li>- The switch shall be free from abnormalities in appearance &amp; construction.</li> </ul>	<ol style="list-style-type: none"> <li>① According to UL61058-1, Switch shall be operated Corresponding cycles with load .(The load refer to individual product drawing)</li> <li>② According to IEC61058.1, Switch shall be operated Corresponding cycles with load. (The load refer to individual product drawing)</li> </ol>

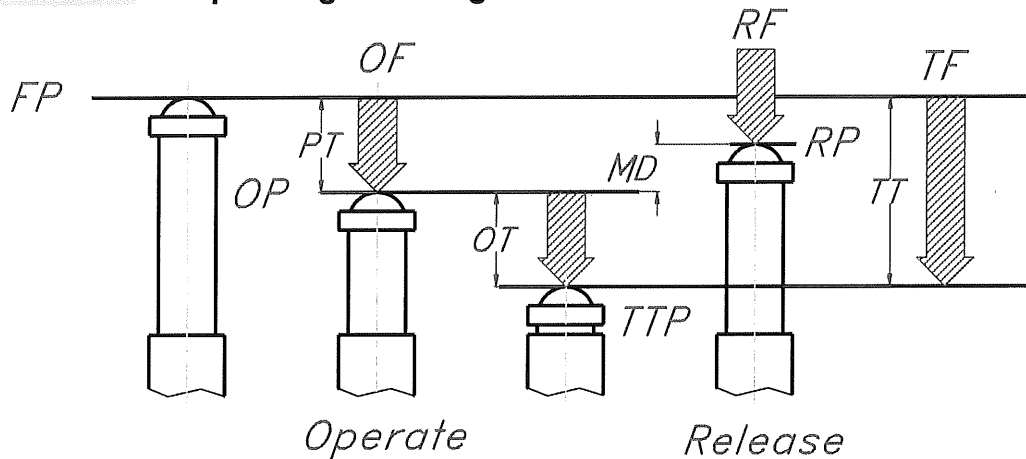
**7. Weather Proof Characteristics**

Item	Criteria	Test Method
7.1 Cold Proof	<p>After test,</p> <ul style="list-style-type: none"> <li>- Insulation Res. : 50MΩ Min.</li> <li>- Electrical performance requirements specified in item 4.2 shall be satisfied.</li> </ul>	<p>After testing at -40±3°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. Water drops shall be eliminated.</p>
7.2 Hot Proof	<ul style="list-style-type: none"> <li>- Operating force shall be within ±10% of specified value.</li> <li>- The switch shall be free from abnormalities in appearance &amp; construction.</li> </ul>	<p>After testing at 85±2°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.</p>

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7.3	Moisture Resistance		After testing at 40±2°C, 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 eliminated.
7.4	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 eliminated.</p>

**Note:** Operating data diagram



- OF** : Operating Force
- RF** : Release Force
- TF** : Total travel Force
- FP** : Free Position
- OP** : Operating Position
- TTP**: Total Travel Position
- RP** : Release Position
- PT** : Pre Travel
- OT** : Over Travel
- MD** : Movement Differential Travel
- TT** : Total Travel

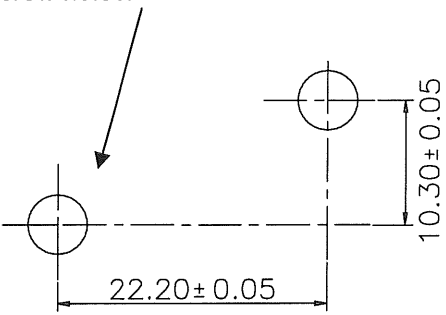
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**Special Notes:**

1. Switch Mounting

(1) Switch Mounting

- Please use the screwdriver with torsional moment reading to tighten the switch, torsional moment shall be 4-6kg·cm.
- Mounting Holes graphics, Show as below:

<p>The graphics to mounting holes. 2-Φ3.1 dia. mounting holes or 2-M3 screw holes.</p> 	<p>Notes of switch operation</p> <ul style="list-style-type: none"> <li>✓ Operation parts shall keep away from switch button, and enough spacing for motion is required.</li> <li>✓ The specified over travel, which is the travel after switching, shall be advised to reach 60-90% of OT(Min.) after movement.</li> <li>✓ Please negotiate with us in advance if inertial lash company with operation.</li> <li>✓ Please take into account the operating force when you specified the location of operating parts.</li> </ul>
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(2) Insulated wire used in switches mounting

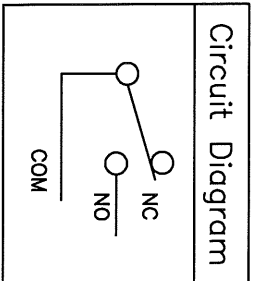
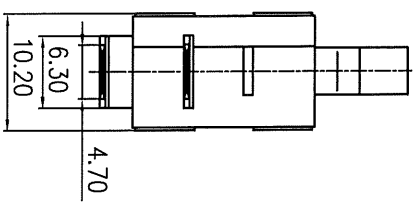
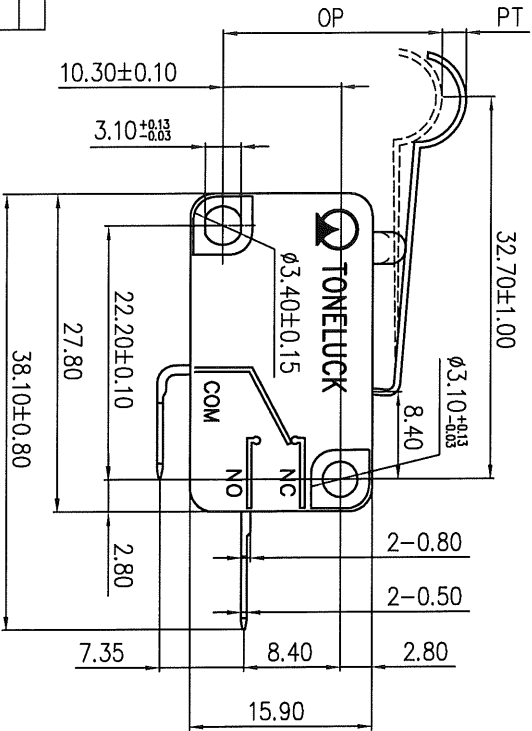
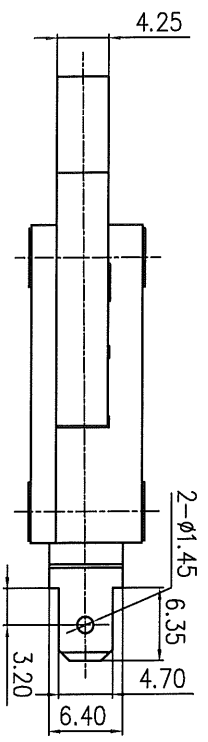
Please pay attention to the spacing and border after matching wire, special insulation plate is available, that's recommended.

(3) Connecting wire to switch

Select suitable socket and wire to connect to switch, confirm it is tightened totally. (Refer to the spec. of the drawing)

2. Deposition of switch

- Please keep away from polluted gas, organic gas (e.g. oil stove), dust and humidity.
- Storage temperature: 5~35°C; Humidity: ≤80%RH.



Mechanical Characteristics:	Criteria
Item	195±60gf
Operating Force	40gf Min.
Releasing Force	18.7±1.5mm
Operating Position	1.5mm Max.
Movement Differential Travel	3.5mm Max.
Pre Travel	2.0mm Min.
Over Travel	

Electrical Characteristics:	Operating Life
Ratings	
16A 125/250VAC;1/2HP 125VAC;3/4HP 250VAC	6,000cycles with load (UL-dll)
0.4A 125VDC;0.2A 250VDC;10.1A 125VIL	6,000cycles with load (UL-dll)
16(A) 125/250VAC	50,000cycles with load(ENEC-COC)
Insulation Resistance:	100MΩMin.
1000VAC(50~60HZ)	
- between non-connected terminals	
- between terminals and ground	
- between terminals and non-live-metal parts	

Other Spec.:	
Operating Life Without Load:	1,000,000 cycles.
Operating Temperature Range:	-40°C~+85°C

Material List	
Aux Actuator(Lever)	Stainless Steel
Switch Base	Thermoplastics UL94-V-0
Switch Cover	Thermoplastics UL94-V-0
Terminals	Copper Alloy, Silver plated
Actuator	Thermoplastics UL94-V-0
Contacts	Silver Alloy

MASS PRODUCTION RELEASE

REV.	DATE	MODIFICATION	ECN NO.	PRIOR VERSION
①	2021-09-01	The plastic material of actuator changed.	ECN-21104	A2
Project Ref:	E SERIES MICROSWITCH			
Part No.:	E42CP-BA03Ag-01			
Drawing No.:	Eng Ver	Unit:	Tolerance Unless Otherwise Specified	
	A3	mm	<3	>3-10
Drawn by:	Shan Hong	Size:	>10-30	>30-80
Checked by:	Binik Wan	Scale:	>80-180	>180
Approved by:	Norris Xie	Angle:	±0.20	±0.30
			±0.40	±0.60
			±0.80	±3°

THIRD ANGLE  
**TONELUCK**  
 Switches & Control Solutions