TONELUCK *Micro Switch* Product Specifications

Customer P/N:		Toneluck P/N:	MQS-216TA04AAK-01	Page:	1 / 6
Project Code:		Product Version:	A2	Issued Date:	7/7/2021

File/Edition:MQS-216TA04AAK-01-SPC.001

Description: Miniature Quick Switch

Customer Name: Model No.: MQS-216T (Series)

Customer P/N: Toneluck P/N: MQS-216TA04AAK-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: Shan Hong 2021-07-07

Checked by: Bink Wan 2021-07-07

Approved by: Norris Xie 2021-07-07

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

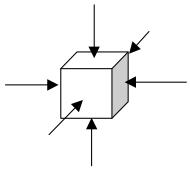
Rating	Operating Life with Load	Operating Life without Load
Refer to individual product drawing.		

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.

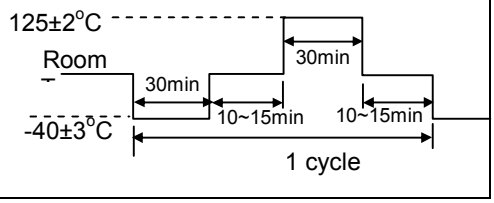
5.7	Vibration Proof	After test, - Insulation Res.: 50MΩ Min. - Electrical performance requirements specified in item 4.2 shall be satisfied. -Operating force: Within ±10% of specified value. -No abnormalities shall be recognized in appearance and construction.	Switch shall be secured to a testing machine by a normal mounting device and method. Switch shall be measured after following test. (1) Vibration frequency range = 10~55 Hz (2) Total amplitude = 1.5mm (3) Sweep ratio: 10~55~10Hz Approx. 1 min. (4) Method of changing the sweep vibration frequency: logarithmic or linear (5) Direction of vibration: Three perpendicular directions including actuating direction. (6) Duration: 2 hours @ (6 hours in total)
5.8	Mechanical Shock	After test, - Insulation Res.:50MΩ Min. - Electrical performance requirements specified in item 4.2 shall be satisfied. -Operating force: Within ±10% of specified value. -Shall be free from mechanical abnormalities.	Switch shall be measured after following test : (1) Mounting Method: Normal (2) Acceleration: 490m/s^2 (50G) (3) Duration: 11 ms (4) Test Direction: 6 directions  (5)Number of shocks: 3 times per direction (18 times in total)

6.Durability Characteristics

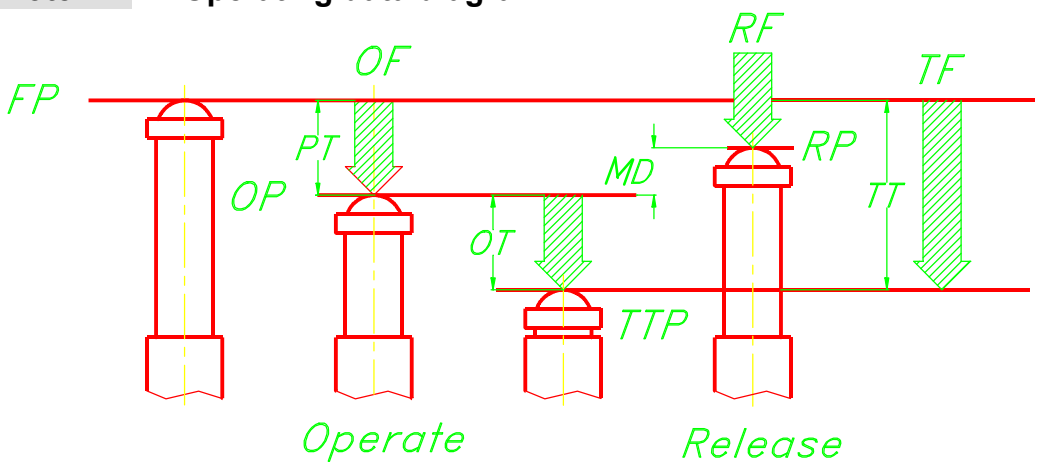
	Item	Criteria	Test Method
6.1	Operating Life without Load	After test, - Insulation Res.: 50MΩ Min. - Electrical performance requirements specified in item 4.2shall be satisfied. - The switch shall be free from abnormalities in appearance & construction.	The operation shall be performed continuously at a rate of 200~300 cycles per minute without any load. (The cycles of operation refer to individual product drawing)
6.2	Operating Life with Load	After test, - Insulation Res. : 50MΩ Min. - Dielectric Voltage shall comply with corresponding standard. - Operating force shall be within ±20% of specified value. - The switch shall be free from abnormalities in appearance & construction.	①According to UL61058-1, Switch shall be operated Correspondingcycles with load .(The load refer to individual product drawing) ②According to IEC61058.1, Switch shall be operated Corresponding cycles with load. (The load refer to individual product drawing)

7.Weather Proof Characteristics

	Item	Criteria	Test Method
7.1	Cold Proof	After test, - Insulation Res. : 50MΩ Min. - Electrical performance requirements specified in item 4.2 shall be satisfied. - Operating force shall be within ±10% of specified value. - The switch shall be free from abnormalities in appearance & construction.	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.
7.2	Hot Proof		After testing at 125±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.

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		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. 

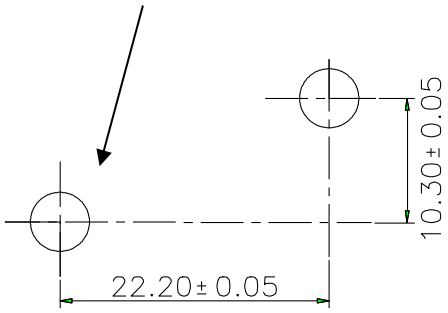
Note: **Operating data diagram**



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

Special Notes:

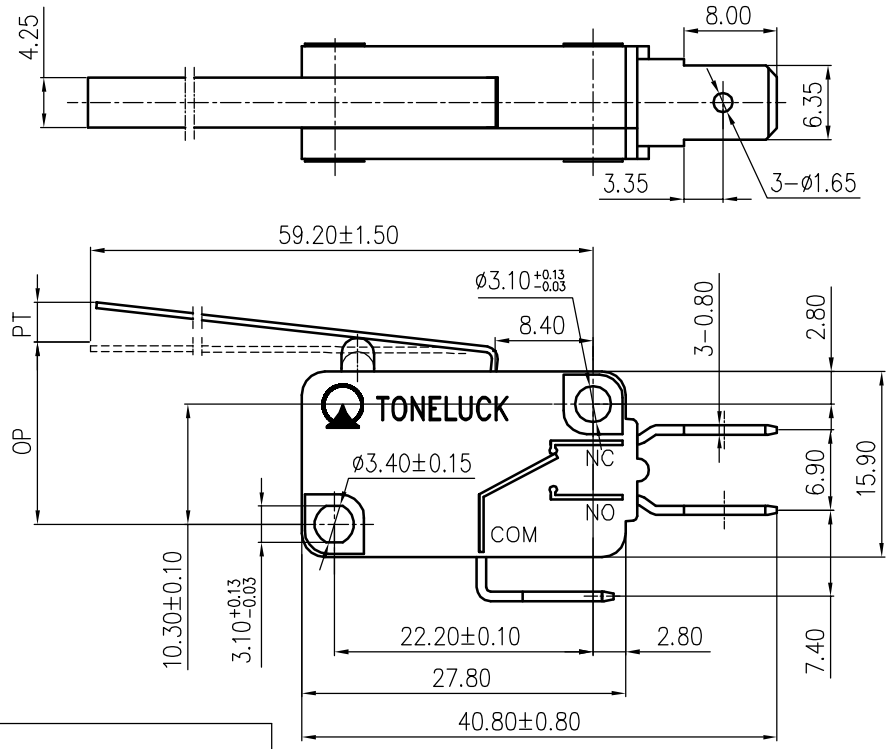
1. Switch Mounting
   (1) Switch Mounting
   - Please use the screwdriver with torsional moment reading to tighten the switch, torsional moment shall be 4-6kg·cm.
   - Mounting Holes graphics, Show as below:

The graphics to mounting holes. 2-Φ3.1 dia. mounting holes or 2-M3 screw holes.  	Notes of switch operation ✓ Operation parts shall keep away from switch button, and enough spacing for motion is required. ✓ The specified over travel, which is the travel after switching, shall be advised to reach 60-90% of OT(Min.) after movement. ✓ Please negotiate with us in advance if inertial lash company with operation. ✓ Please take into account the operating force when you specified the location of operating parts.

   (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 stave), dust and humidity.
   - Storage temperature: 5～35℃; Humidity: ≤80%RH.

OUTLINE	File/Edition:	MQS-216TA04AAK-01.003

XX.XX	CONTROL DIMENSION
△	CRITICAL CHARACTERISTIC



Mechanical Characteristics:	
Item	Criteria
Operating Force	12±5gf
Releasing Force	4gf Min.
Operating Position	15.3±2.5mm
Movement Differential Travel	2.2mm Max.
Pre Travel	6.5 mm Max.
Over Travel	4.4 mm Min.

Electrical Characteristics:		
Ratings		Operating Life
16A 125/250VAC;1/2HP 125VAC;3/4HP 250VAC		6,000cycles with load(UL、cUL)
0.4A 125VDC;0.2A 250VDC;10.1A 125VL 10.1A 277VAC		6,000cycles with load(UL、cUL)
16(4)A 125/250VAC		50,000 cycles with load(ENEC,CQC)
Insulation Resistance:		100MΩMin.
Dielectric:	1000VAC(50~60HZ) – between non-connected terminals	
	1500VAC(50~60HZ) – 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℃~+125℃

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

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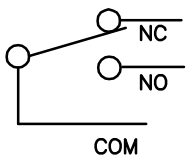
Circuit Diagram



REV.	DATE	MODIFICATION	ECN NO.	PRIOR VERSION
	2021-07-07	Update the drawing frame		002

					Tolerance Unless Otherwise Specified					
Project Ref:	MQS-2 SERIES MICROSWITCH				~3	>3~10	>10~30	>30~80	>80~180	Angle
Part No:	MQS-216TA04AAK-01				±0.20	±0.30	±0.40	±0.60	±0.80	±3°
Drawing No:	– – –	Eng Ver	A2		Unit: mm		Size: A4		Scale:	
Drafted by:	Shan Hong	Date:	2021-07-07							
Checked by:	Bink Wan	Date:	2021-07-07	THIRD ANGLE						
Approved by:	Norris Xie	Date:	2021-07-07							

TONELUCK
Switches & Control Solutions