Customer P/N:		Toneluck P/N:	S12AAF201-S01	Page:	1 / 7
Project Code:		Product Version:	A1	Issued Date:	9/14/2020

File/Edition:S12AAF201-S01 -SPC.001

Description: Sub-Miniature Switch

Customer Name: Model No.: S12 (Series)

Customer P/N: Toneluck P/N: S12AAF201-S01

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 2020-09-15

Checked by: Jerry 2020-09-15

Approved by: Norris Xie 2020-09-15

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% 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.

3.Ratings & Life

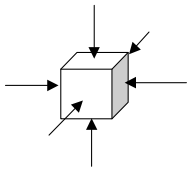
Rating	Operating Life with Load	Operating Life without Load
Refer to individual product drawing.		

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

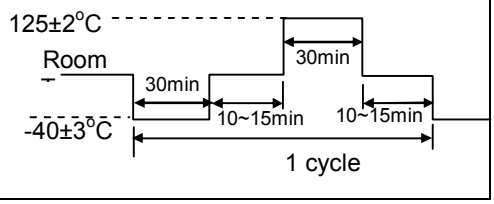
	Item	Criteria	Test Method
5.1	Operating Force	Refer to individual product drawing.	Apply a tension meter on the midpoint of the actuator (or tip of the shaft) to supply a pressure vertically from its free position to operating position.
5.2	Releasing Force	Refer to individual product drawing.	The value 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 20N 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 = 1.0mm (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: 300m/s^2 (30G) (3) Duration: 11 ms (4) Test Direction: 6 directions  (5)Number of shocks: 3 times per direction (18 times in total)
5.9	Solderability	-More than 90% of immersed part shall be covered with solder.	Switch shall be checked after following test : (1) Soldering Temperature: 260±5°C Immersing Time: 3±0.5 s Flux immersing time shall be 5~10s in normal room temperature. (2) Immersion Depth: It should be immersed up to 1.6mm from the root of terminal.
5.10	Solder Heat Resistance	-No abnormalities shall be observed in appearance and operation. -The electrical performance requirements specified in item 4 shall be satisfied.	Switch shall be measured after following test: (1) Soldering Temperature & Immersing Time Dip Soldering: 260±5°C, 5±1s Manual Soldering: 350±10°C, 3~4s (2) Immersion Depth:(For Dip Soldering) It should be immersed up to 1.6mm from the root of terminal.

6.Durability Characteristics

	Item	Criteria	Test Method
6.1	Operating Life with Load	After test, - Insulation Res. : 10MΩ 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 UL1054, Switch shall be operated corresponding cycles with load (The load refer to individual product drawing). ② According to IEC61058-1, Switch shall be operated corresponding cycles with load (The load refer to individual product drawing).

7.Weather Proof Characteristics

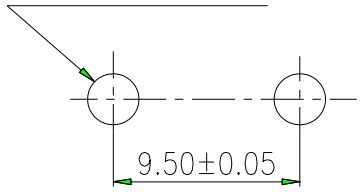
	Item	Criteria	Test Method
7.1	Cold Proof	After test, - Insulation Res. : 10MΩ Min. - Electrical performance requirements specified in item 4.2 shall be satisfied. - Operating force shall be within ±10% of specified value. - The switch shall be free from abnormalities in appearance & construction.	After 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 at125±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. 

Special Notes:

1. Switch Mounting

(1) Switch Mounting

- Please use the screwdriver with torsional moment reading to tighten the switch, torsional moment shall be 2-4kg·cm.
- Tighten washer and spring washer are to be applied together.
- Mounting Holes graphics, Show as below:

The graphics to mounting holes. 2-Φ2.4 dia. mounting holes or 2-M2.3 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 accord with the drawing. ✓ Operating parts' linear velocity shall be lower than 25mm/s to avoid shocking to button. ✓ 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

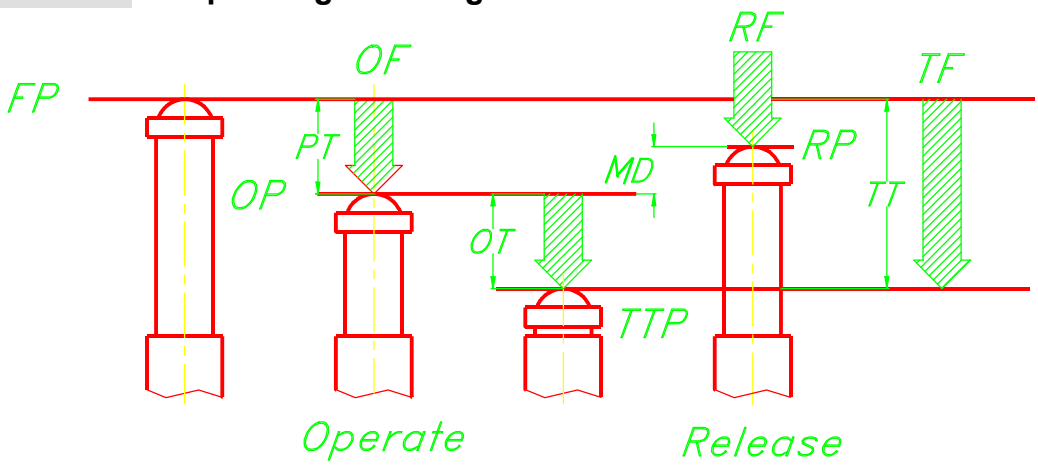
Select suitable socket and wire to connect to switch, confirm it is tightened totally. (Refer to the spec. of the drawing)

(4) No pressure on the terminals when soldering、mounting and using.

2. Deposition of switch

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

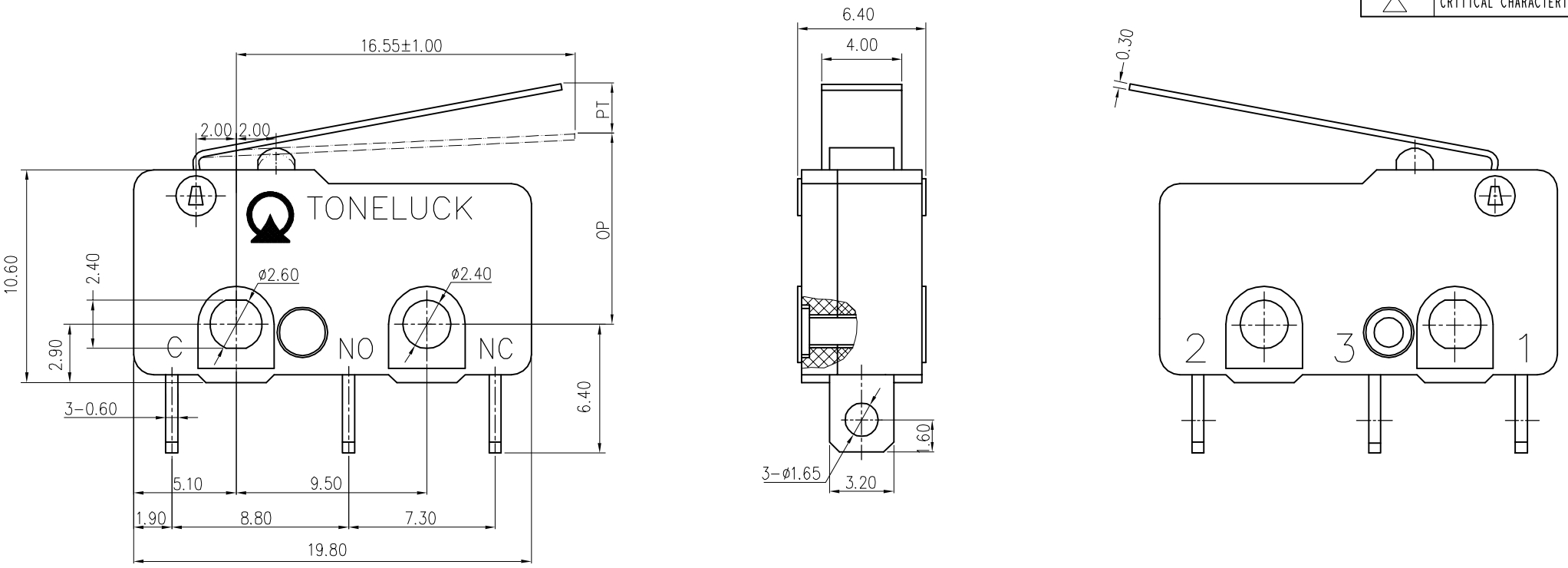
Note: **Operating data diagram**



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

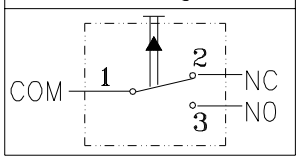
OUTLINE	File/Edition:	S12AAF201-S01.001

XX.XX	CONTROL DIMENSION
△	CRITICAL CHARACTERISTIC



Mechanical Characteristics:	
Item	Criteria
Operating Force(OF)	25±15gf
Releasing Force(RF)	4.0gf Min.
Pre Travel(PT)	3.6mm Max.
Over Travel(OT)	1.0mm Min.
Movement Differential Travel(MD)	1.2mm Max.
Operating Position(OP)	9.0±2.0mm
Free Position(FP)	13.2mm Max.

Circuit Diagram



Electrical Characteristics:		
Ratings:		Operating Life :
2A 30VDC or 5A 125/250VAC (UL cUL)		6,000 cycles with load
2A 30VDC or 5(2.5)A 125/250VAC (ENEC)		50,000 cycles with load
2A 30VDC or 5(2.5)A 125/250VAC (CQC)		50,000 cycles with load
Insulation Resistance:	100MΩ Min.	
Dielectric:	1000VAC(50~60HZ)- between non-connected terminals	
	1500VAC(50~60HZ) - between terminals and ground - between terminals and non-live-metal parts	
Operating Temperature Range:	-40°C~+125°C	

Material List	
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
Aux Actuator (Lever)	Stainless Steel

MASS PRODUCTION RELEASE

REV.	DATE	MODIFICATION	ECN NO.	PRIOR VERSION

Project Ref:	Miniature Microswitch			Tolerance Unless Otherwise Specified					
Part No:	S12AAF201-S01			~3	>3~10	>10~30	>30~80	>80~180	Angle
Drawing No:	- - -	Eng Ver	A1	±0.20	±0.30	±0.40	±0.60	±0.80	±3°
Drafted by:	Shan Hong	Date:	2020-09-15	Unit: mm		Size: A4		Scale:	
Checked by:	Jerry	Date:	2020-09-15	THIRD ANGLE					
Approved by:	Norris Xie	Date:	2020-09-15						

TONELUCK
Switches & Control Solutions

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