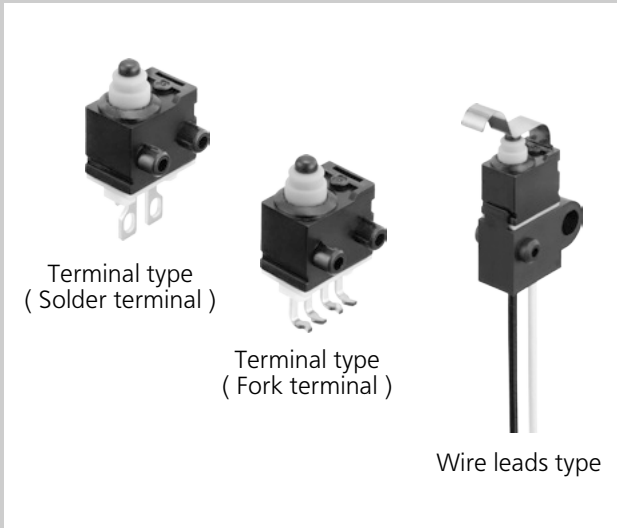


Turquoise Stroke mini Switch Resistor installed type

Small seal switches with wiring failure detecting function



FEATURES

- A built-in resistor has enabled detection of disconnection and short circuit of wiring.
- Miniaturization achieved with changing from 1 Form C to 1 Form A or 1 Form B contacts.
- Lever installation possible while it is small size. Operation possible by various moving parts such as metal cams.
- Contact force does not depend on the operation stroke.
- High contact reliability to support low level switching loads.
- Highly effective sealing for resistance against adverse environments. (IP67)
- Silent operation with sliding contacts.

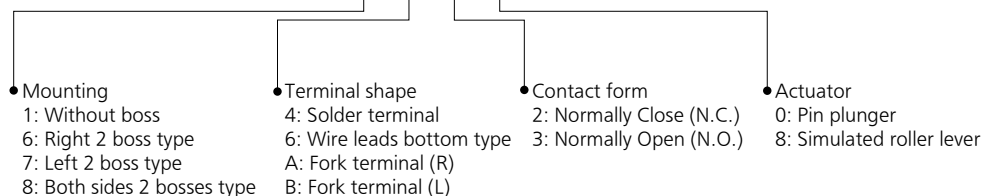
TYPICAL APPLICATIONS

- Automobiles (detection of door opening and closing, shift lever position, etc.)
- Household appliances (vacuum cleaners, air conditioners, washing machines, electric power tool, etc.)

ORDERING INFORMATION

ASQMR1

A



Note) Not every combination is available. Please refer to the following table, "PRODUCT TYPES".

PRODUCT TYPES

Terminal type

Carton: 1,000 pcs.

Shape	Actuator	Right 2 boss type		Left 2 boss type		Both sides 2 bosses type	
		Normally Close (N.C.)	Normally Open (N.O.)	Normally Close (N.C.)	Normally Open (N.O.)	Normally Close (N.C.)	Normally Open (N.O.)
Solder terminal	Pin plunger	ASQMR16420A	ASQMR16430A	ASQMR17420A	ASQMR17430A	ASQMR18420A	ASQMR18430A
	Simulated roller lever	ASQMR16428A	ASQMR16438A	ASQMR17428A	ASQMR17438A	ASQMR18428A	ASQMR18438A
Fork terminal	Pin plunger	ASQMR16A20A	ASQMR16A30A	ASQMR17B20A	ASQMR17B30A	-	-
	Simulated roller lever	ASQMR16A28A	ASQMR16A38A	ASQMR17B28A	ASQMR17B38A	-	-

Wire leads type

Carton: 240 pcs.

Direction	Actuator	Normally Close (N.C.)	Normally Open (N.O.)
Bottom	Pin plunger	ASQMR11620A	ASQMR11630A
	Simulated roller lever	ASQMR11628A	ASQMR11638A

Turquoise Stroke mini Switch Resistor installed type (ASQMR1)

SPECIFICATIONS

Rated

Please use within the range below.

- 1) Rated power: Environment temperature $-40^{\circ}\text{C} \leq T \leq 70^{\circ}\text{C}$ 0.50 W
 Environment temperature $70^{\circ}\text{C} < T \leq 75^{\circ}\text{C}$ 0.45 W
 Environment temperature $75^{\circ}\text{C} < T \leq 85^{\circ}\text{C}$ 0.40 W
- 2) Voltage: 4.5 to 16 V DC
- 3) Minimum current: 1 mA

Operation environment and conditions

Item	Specifications
Ambient and storage temperature	-40 to $+85^{\circ}\text{C}$ (no freezing and condensing)
Allowable operating speed	30 to 500 mm/sec.
Max. operating cycle rate	120 cpm

Note: When switching at low and high speeds or under vibration, or in high-temperature, high-humidity environments, life and performance may be reduced significantly depending on the load capacity. Please consult us.

Electric characteristics

Item	Specifications												
Circuit diagram	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><Normally Close></p> </div> <div style="text-align: center;"> <p><Normally Open></p> </div> </div>												
Output resistance (Initial)	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%;"> FP: 510 Ω $\pm 1.5\%$(25°C) $\pm 2.5\%$(-40 to +85°C) </td> <td style="width: 33%;"></td> </tr> <tr> <td></td> <td>TTP: 1,510 Ω $\pm 1.5\%$(25°C) $\pm 2.5\%$(-40 to +85°C)</td> <td></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;"> FP: 1,510 Ω $\pm 1.5\%$(25°C) $\pm 2.5\%$(-40 to +85°C) </td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;"> TTP: 510 Ω $\pm 1.5\%$(25°C) $\pm 2.5\%$(-40 to +85°C) </td> </tr> </table>		FP: 510 Ω $\pm 1.5\%$ (25°C) $\pm 2.5\%$ (-40 to +85°C)			TTP: 1,510 Ω $\pm 1.5\%$ (25°C) $\pm 2.5\%$ (-40 to +85°C)				FP: 1,510 Ω $\pm 1.5\%$ (25°C) $\pm 2.5\%$ (-40 to +85°C)			TTP: 510 Ω $\pm 1.5\%$ (25°C) $\pm 2.5\%$ (-40 to +85°C)
	FP: 510 Ω $\pm 1.5\%$ (25°C) $\pm 2.5\%$ (-40 to +85°C)												
	TTP: 1,510 Ω $\pm 1.5\%$ (25°C) $\pm 2.5\%$ (-40 to +85°C)												
		FP: 1,510 Ω $\pm 1.5\%$ (25°C) $\pm 2.5\%$ (-40 to +85°C)											
		TTP: 510 Ω $\pm 1.5\%$ (25°C) $\pm 2.5\%$ (-40 to +85°C)											

Characteristics

Item	Specifications
Electrical switching life	DC 4.5 to 5.5 V Min. 3×10^5
	DC 8 to 16 V Min. 2×10^5
Vibration resistance (malfunction vibration resistance)	Switching frequency: 20 times/min. Plunger operation speed: 100 mm/s Plunger switching position: Free Position (FP) to Total Travel Position (TTP)
	Single amplitude: 0.75 mm Amplitude of vibration: 10 to 55 Hz (4 minutes cycle) Direction and time: 30 minutes each in X, Y and Z directions
	Amplitude of vibration: 5 to 200 Hz (10 minutes cycle) Acceleration: 43.1 m/s ² Direction and time: 30 minutes each in X, Y and Z directions
Shock resistance (malfunction shock resistance)	Shock value: 980 m/s ² Direction and time: 5 times each in X, Y and Z directions
Terminal strength	Min. 6 N (each direction) *Terminal deformation possible.
Heat resistance	85°C 500 hours
Cold resistance	-40°C 500 hours
Humidity resistance	40°C 95% RH 500 hours
Unit weight	Approx. 0.5 g (Terminal type), Approx. 4.1 g (Wire leads type)
Protection grade	IP67 (except exposed terminal part of terminal type)

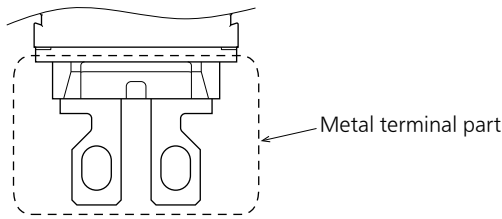
Notes: As long as there are no particular designations, the following conditions apply to the test environment.

- Ambient temperature: 5 to 35°C
- Relative humidity: 25 to 85% RH
- Air pressure: 86 to 106 kPa

Turquoise Stroke mini Switch Resistor installed type (ASQMR1)

■ Protective structure

1) IEC 60529 (rating for outer shell protection): IP67 (Immersion protected) except metal terminal part (See below drawing) (Note 1)



2) JIS D0203 (method for testing moisture resistance and water resistance in automotive components) Equivalent of D2 (Note 2)

Note 1) A concrete testing method is to check for any adverse effect on the structure after leaving it submerged for 30 minutes under 1 m of water (with temperature difference between water and switch no larger than 5°C).

Note 2) A concrete testing method is to check for any adverse effect on the structure after leaving it submerged for 10 minutes under 10 cm water (with temperature difference between water and switch no larger than 30°C).

■ Operating characteristics

Characteristics		Pin plunger	Simulated roller lever
Operating Force (OF) Max.		1.2 N	1.5 N
Total Travel Force (TF) Max. reference value		(3.0 N)	(2.8 N)
Free Position (FP) Max.	Terminal type	7.7 mm	13.4 mm
	Wire leads type	14.45 mm	20.15 mm
Operating Position (OP)	Terminal type	Initial : 7.1±0.25 mm After test: 7.1±0.3 mm	Initial : 10.75±0.6 mm After test: 10.75±0.7 mm
	Wire leads type	Initial : 13.75±0.35 mm After test: 13.75±0.4mm	Initial : 17.4±0.7 mm After test: 17.4±0.8 mm
Release Position (RP)	Terminal type	Initial : 7.15±0.3 mm After test: 7.15±0.35 mm	Initial : 11.05±0.7 mm After test: 11.05±0.8 mm
	Wire leads type	Initial : 13.8±0.4 mm After test: 13.8±0.45 mm	Initial : 17.7±0.8 mm After test: 17.7±0.9 mm
Over Travel (OT) Min.	Terminal type	Initial : 1.75 mm After test: 1.70 mm	Initial : 2.25 mm After test: 2.15 mm
	Wire leads type	Initial : 1.65 mm After test: 1.60 mm	Initial : 2.15 mm After test: 2.05 mm
Total Travel Position (TTP) Reference value	Terminal type	(5.1 mm)	(7.9 mm)
	Wire leads type	(11.75 mm)	(14.55 mm)

Note: The above indicates the characteristics when operating the actuator from the vertical direction.

Turquoise Stroke mini Switch Resistor installed type (ASQMR1)

DIMENSIONS

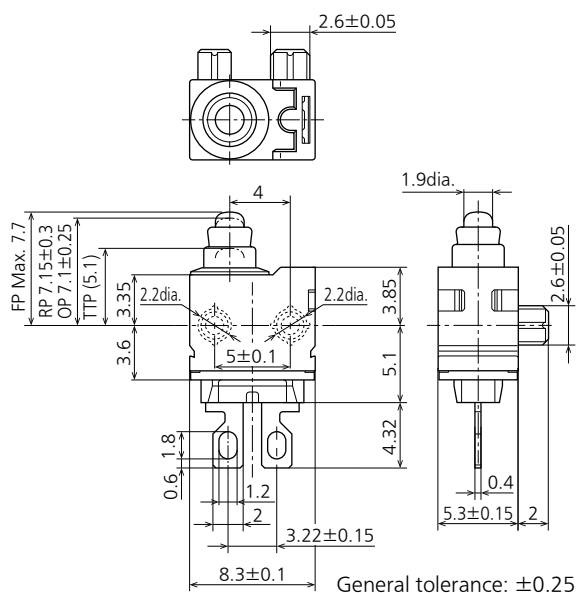
CAD The CAD data of the products with a "CAD" mark can be downloaded from our Website.

Unit: mm

Terminal type (Solder terminal), Right 2 boss type, Pin plunger

CAD

External dimensions

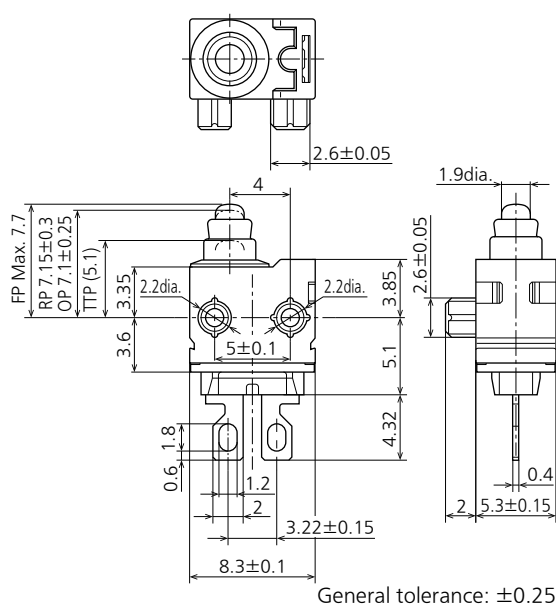


Operating Force (OF) Max.	1.2 N
Total Travel Force (TF) Max. reference value	(3.0 N)
Free Position (FP) Max.	7.7 mm
Operating Position (OP)	Initial : 7.1 ± 0.25 mm After test: 7.1 ± 0.3 mm
Release Position (RP)	Initial : 7.15 ± 0.3 mm After test: 7.15 ± 0.35 mm
Over Travel (OT) Min.	Initial : 1.75 mm After test: 1.70 mm
Total Travel Position (TTP) Reference value	(5.1 mm)

Terminal type (Solder terminal), Left 2 boss type, Pin plunger

CAD

External dimensions



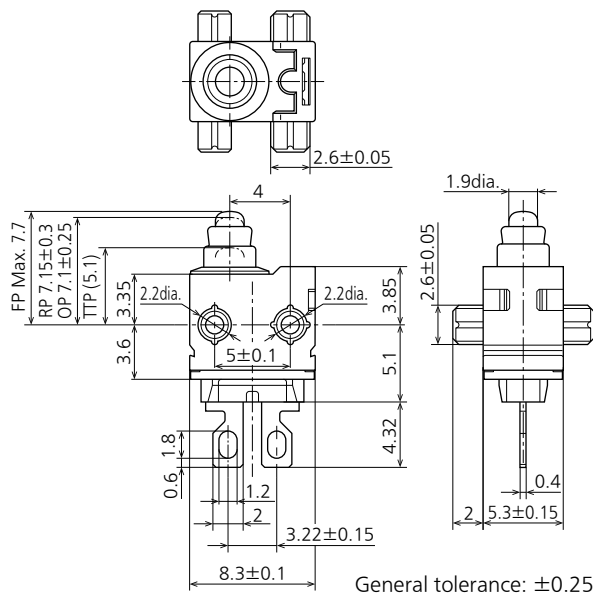
Operating Force (OF) Max.	1.2 N
Total Travel Force (TF) Max. reference value	(3.0 N)
Free Position (FP) Max.	7.7 mm
Operating Position (OP)	Initial : 7.1 ± 0.25 mm After test: 7.1 ± 0.3 mm
Release Position (RP)	Initial : 7.15 ± 0.3 mm After test: 7.15 ± 0.35 mm
Over Travel (OT) Min.	Initial : 1.75 mm After test: 1.70 mm
Total Travel Position (TTP) Reference value	(5.1 mm)

Turquoise Stroke mini Switch Resistor installed type (ASQMR1)

Terminal type (Solder terminal), Both sides 2 bosses type, Pin plunger

CAD

External dimensions

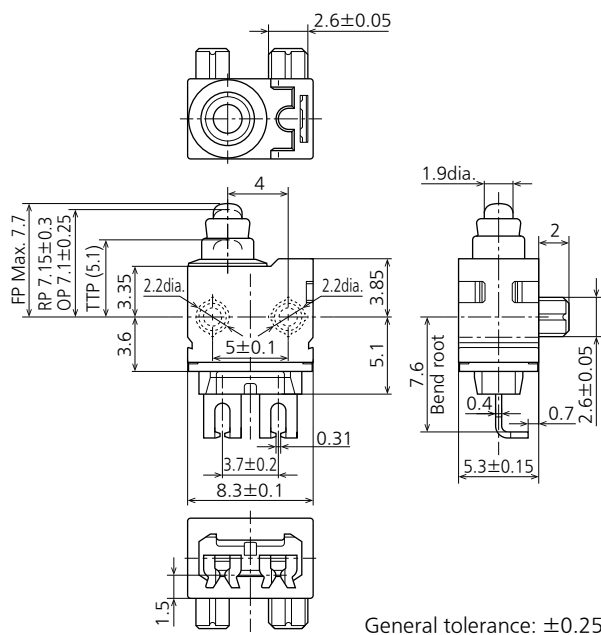


Operating Force (OF) Max.	1.2 N
Total Travel Force (TF) Max. reference value	(3.0 N)
Free Position (FP) Max.	7.7 mm
Operating Position (OP)	Initial : 7.1 ± 0.25 mm After test: 7.1 ± 0.3 mm
Release Position (RP)	Initial : 7.15 ± 0.3 mm After test: 7.15 ± 0.35 mm
Over Travel (OT) Min.	Initial : 1.75 mm After test: 1.70 mm
Total Travel Position (TTP) Reference value	(5.1 mm)

Terminal type (Fork terminal), Right 2 boss type, Pin plunger

CAD

External dimensions



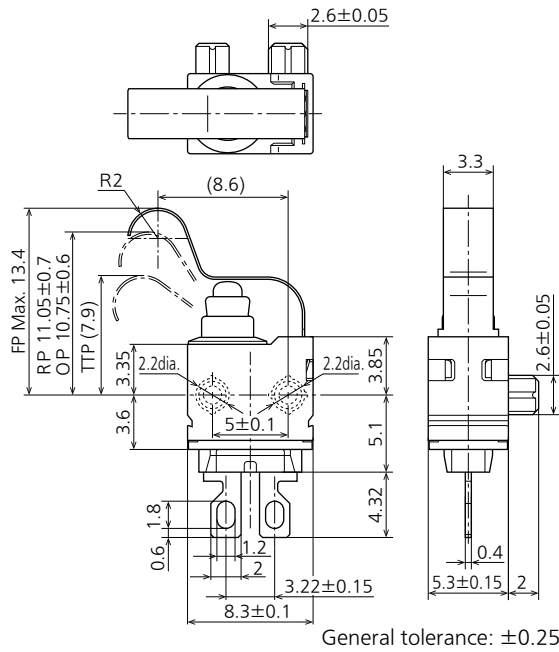
Operating Force (OF) Max.	1.2 N
Total Travel Force (TF) Max. reference value	(3.0 N)
Free Position (FP) Max.	7.7 mm
Operating Position (OP)	Initial : 7.1 ± 0.25 mm After test: 7.1 ± 0.3 mm
Release Position (RP)	Initial : 7.15 ± 0.3 mm After test: 7.15 ± 0.35 mm
Over Travel (OT) Min.	Initial : 1.75 mm After test: 1.70 mm
Total Travel Position (TTP) Reference value	(5.1 mm)

Turquoise Stroke mini Switch Resistor installed type (ASQMR1)

Terminal type (Solder terminal), Right 2 boss type, Simulated roller lever

CAD

External dimensions

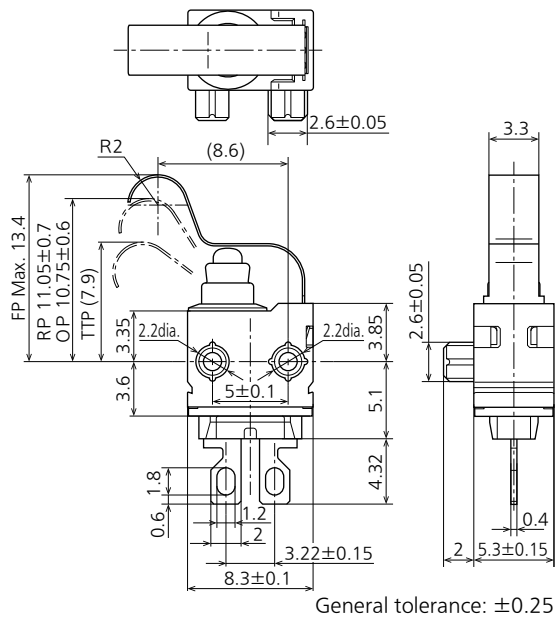


Operating Force (OF) Max.	1.5 N
Total Travel Force (TF) Max. reference value	(2.8 N)
Free Position (FP) Max.	13.4 mm
Operating Position (OP)	Initial : 10.75±0.6 mm After test: 10.75±0.7 mm
Release Position (RP)	Initial : 11.05±0.7 mm After test: 11.05±0.8 mm
Over Travel (OT) Min.	Initial : 2.25 mm After test: 2.15 mm
Total Travel Position (TTP) Reference value	(7.9 mm)

Terminal type (Solder terminal), Left 2 boss type, Simulated roller lever

CAD

External dimensions

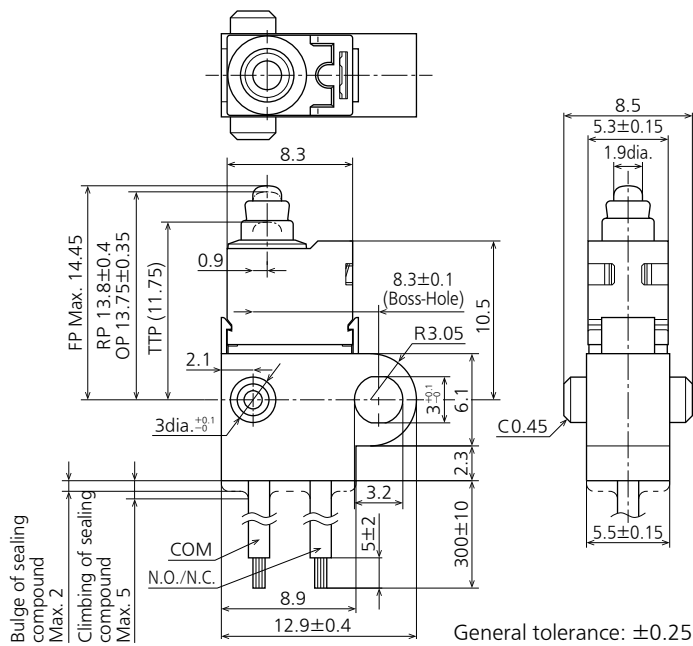


Operating Force (OF) Max.	1.5 N
Total Travel Force (TF) Max. reference value	(2.8 N)
Free Position (FP) Max.	13.4 mm
Operating Position (OP)	Initial : 10.75±0.6 mm After test: 10.75±0.7 mm
Release Position (RP)	Initial : 11.05±0.7 mm After test: 11.05±0.8 mm
Over Travel (OT) Min.	Initial : 2.25 mm After test: 2.15 mm
Total Travel Position (TTP) Reference value	(7.9 mm)

■ Wire leads type (Bottom), Pin plunger

CAD

External dimensions

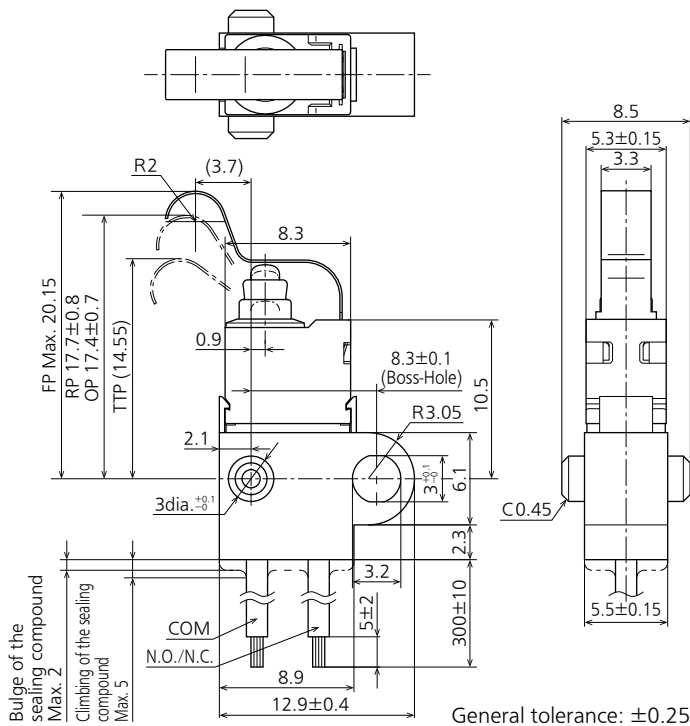


Operating Force (OF) Max.	1.2 N
Total Travel Force (TF) Max. reference value	(3.0 N)
Free Position (FP) Max.	14.45 mm
Operating Position (OP)	Initial : 13.75±0.35 mm After test: 13.75±0.4 mm
Release Position (RP)	Initial : 13.8±0.4mm After test: 13.8±0.45 mm
Over Travel (OT) Min.	Initial : 1.65 mm After test: 1.60 mm
Total Travel Position (TTP) Reference value	(11.75 mm)

■ Wire leads type (Bottom), Simulated roller lever

CAD

External dimensions



Operating Force (OF) Max.	1.5 N
Total Travel Force (TF) Max. reference value	(2.8 N)
Free Position (FP) Max.	20.15 mm
Operating Position (OP)	Initial : 17.4±0.7 mm After test: 17.4±0.8 mm
Release Position (RP)	Initial : 17.7±0.8 mm After test: 17.7±0.9 mm
Over Travel (OT) Min.	Initial : 2.15 mm After test: 2.05 mm
Total Travel Position (TTP) Reference value	(14.55 mm)

Turquoise Stroke mini Switch Resistor installed type (ASQMR1)

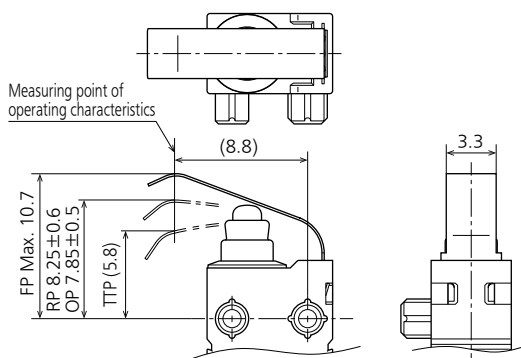
Customized

Unit: mm

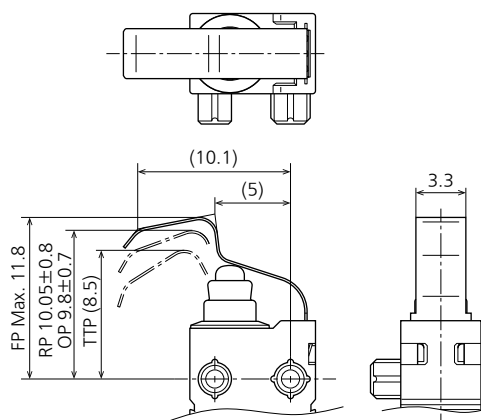
The custom products shown below are available.
Please make a contact with our sales office for detail information.

■ Lever variation

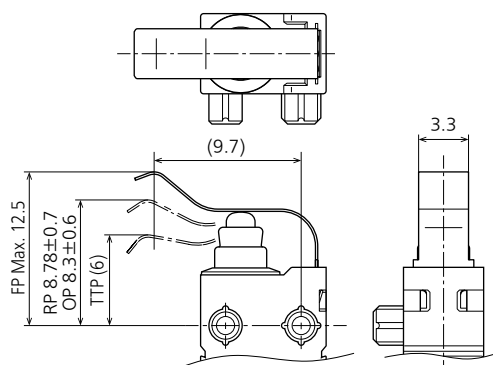
Leaf lever A



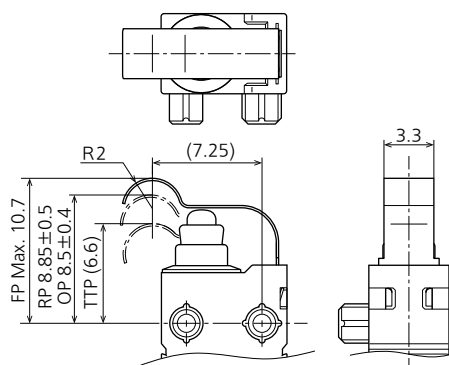
Leaf lever B



Leaf lever C



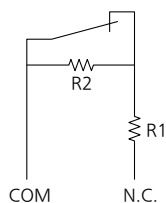
Leaf lever D



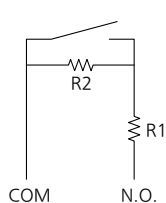
■ Resistance value

The resistance values of R1 and R2 in the circuits below can be changed.
Please make a contact with our sales office for detail information.

<Normally Close>



<Normally Open>



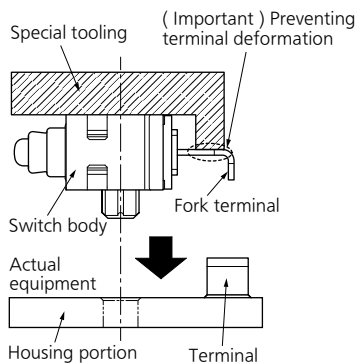
CAUTIONS FOR USE

■ Soldering conditions

- The application of excessive heat upon the switch when soldering can cause degradation of switch operation. Therefore, be sure to keep within the conditions given below.
- Manual soldering: Use soldering irons (max. 350°C, within 3 seconds) capable of temperature adjustment. This is to prevent deterioration due to soldering heat. Care should be taken not to apply force to the terminals during soldering. (More than one second interval is required to apply heat at each terminal.)
Please consult us if you intend to use a soldering iron that exceeds 60 W.

■ Mounting

- <Important> To prevent deterioration of contact reliability due to the deformation of the fork terminal, the fork terminal switch should be mounted by using the special tooling to keep the switch in the vertical state to the actual equipment and insert the terminal while supporting the terminal part with the tooling (Please see the below).



- <Important> Be sure to apply a sealing material to the terminal part, fix the switch completely and seal the terminal part to prevent deterioration of contact reliability in the connected part by the fork terminal of the switch and the terminal of the actual equipment due to vibration, impact, humidity and gas. (An unsealed switch should not be used.) Additionally, it is necessary to select a sealing material which does not cause sulfuration, oxidation or generation of low molecular siloxane gas because there is a risk that contact failure occurs due to sealing materials. For the selection of a sealing material, the sufficient verification by using the actual equipment should be implemented in advance.
- <Important> The contact reliability at terminal connecting portion may highly deteriorate because of using unmatched material or size accuracy of connected side terminals or inadequate switch insertion method. Please make sure to consult us if you consider using fork terminal type.
- To secure the wire leads type switch, please use M3 small screws on a flat surface and tighten using a maximum torque of 0.29 N·m.
Be sure to verify the quality under actual conditions of use because the switch plastic might be deformed according to that the kind of the screw (size of screw head etc.), the diameter of the washer and the presence of washer.
And use of adhesive lock is recommended to prevent loosening of the screws. When using an adhesive, care should be taken not to apply the adhesive to the switch operating portion.

- Be sure to maintain adequate insulating clearance between each terminal and ground.
- After mounting please make sure no pulling load will be applied to the switch terminals.
- The positioning of the switch should be such that direct force is not applied to the plunger or actuator in its free position. The operating force to the plunger should only be applied in a perpendicular direction.
- When slanted press operation is applied to pin plunger type switches by an operation cam, the endurance life may greatly vary depending on the use of grease for sliding, operation angle, operation speed, operation frequency, press amount of the pin plunger, cam material, cam shape, cam surface condition, etc. Therefore fully verification by using the actual equipment in advance should be implemented.

■ Cautions regarding the circuit

- In order to prevent malfunction in set devices caused by bounce and chattering during the ON-OFF switch operation, please verify the validity of the circuit under actual operating conditions and temperature range.

■ Please verify under actual conditions.

- Please be sure to conduct quality verification under actual operating conditions in order to increase reliability during actual use.

■ Switch selection

- Please make your selection so that there will be no problems even if the operating characteristics vary up to $\pm 20\%$ from the standard values.

■ Oil-proof and chemical-proof characteristics

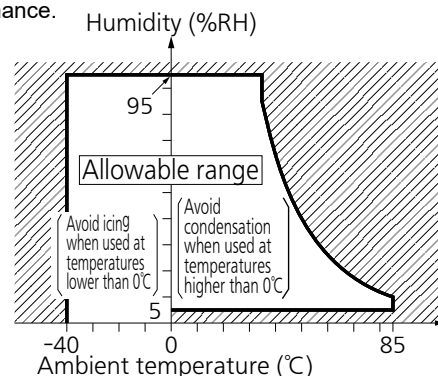
- The rubber cap swells when exposed to oil and chemicals. The extent of swelling will vary widely depending on the type and amount of oil and chemicals. Check with the actual oil or chemicals used. In particular, be aware that solvents such as freon, chlorine, toluene, alcohol etc., cannot be used.

■ ESD

- In order to prevent damage to the chip resistance due to static electricity, please take measures for static electricity to the worker and equipment etc. that contact to terminal area.

■ Operation environment

- Although continuous operation of the switch is possible within the range of ambient temperature (humidity), as the humidity range differs depending on the ambient temperature, the humidity range indicated below should be used. Continuous use near the limit of the range should be avoided. This temperature-humidity range does not guarantee permanent performance.

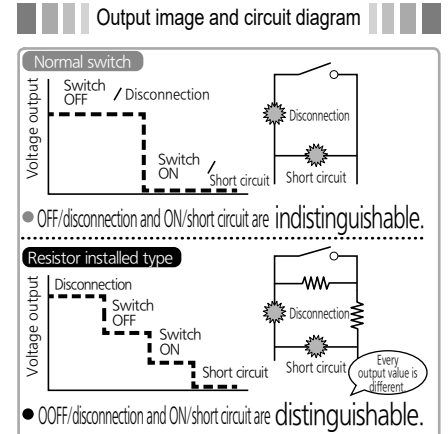
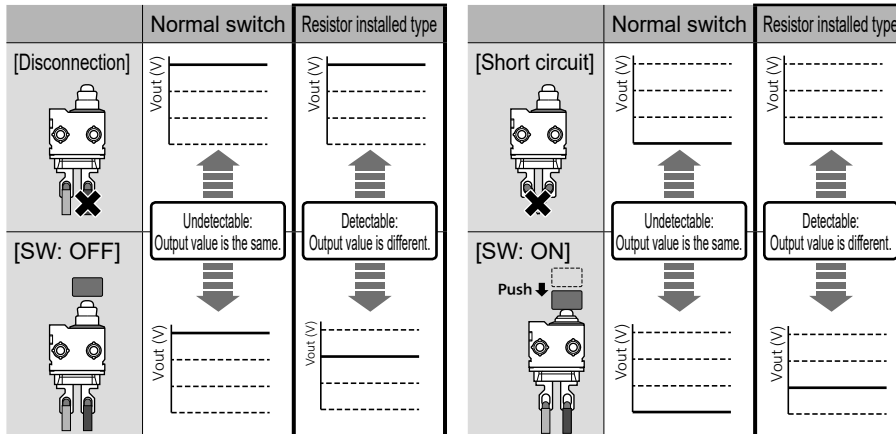


Turquoise Stroke mini Switch Resistor installed type (ASQMR1)

Others

- Do not handle the switch in a way that may cause damage to the sealing rubber cap.
- Please remember that this switch cannot be used under water. Also, please be warned that switching and sudden temperature changes with the presence of water droplets can cause seepage into the unit.
- Keep away from environments where silicon based adhesives, oil or grease are present as faulty contacts may result from silicon oxide. Do not use in areas where flammable or explosive gases from gasoline and thinner, etc., may be present.
- When using the lever type, please be careful not to apply unreasonable load from the reverse or lateral directions of operation.
- Do not exceed the total travel position (TTP) and press the actuator. This could cause operation failure. Also, when switching at high speed or under shock even within the operation limit, the working life may decrease. Therefore, please be sure to verify the quality under actual conditions of use.
- If the switch is used while the plunger is pressed all the time, the performance of switching release may largely deteriorate due to surrounding temperature and humidity, adherence of oils such as oil, grease, etc., solvents and chemicals. Please be sure to verify the quality under the actual use conditions
- Please make considerations so that the switch does not become the stopper for the moving part.
- Do not use the switch which was dropped by mistakes when handling. If it is used, abnormal operation characteristics and sealing performance may occur.
- In case of applying coating to movable parts (actuator, plunger, etc.), the quality of the product is not guaranteed because it may cause a product failure.
- In case of cleaning a switch, the quality of the product is not guaranteed because it may cause a product failure.
- Do not apply ultrasonic vibrations and high frequency vibration to a switch because it may have an impact on the characteristics of the switch.
- Please do not constantly apply a tensile load to wire leads when fixing them.
- Please avoid applying stress to the terminal area. Abnormal bonding of the chip resistor may occur.
- Examine and confirm the performance and reliability before you use the switch under the following environments or condition.
 - (1) In places where products are exposed to sea breeze or corrosive gases including SO₂, H₂S, Cl₂, NH₃, NO₂, NaCl, etc.
 - (2) In places with large static electricity and strong electromagnetic waves.
 - (3) In case of excessive load such as pulse (large load in a short time) is loaded.
- Since switch implements chip resistors, joule heat is generated by conduction. Please make consideration to the mounting position to avoid the thermal effect to other parts.

Difference between a normal switch and a resistor installed type



Please refer to "the latest product specifications" when designing your product.

•Requests to customers:

<https://industrial.panasonic.com/ac/e/salespolicies/>