For detection: Seal Type Switches

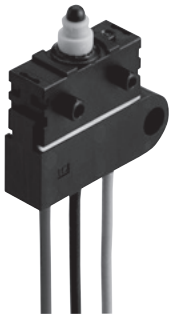
RoHS

# Two circuits detection Switches, Two steps detection type

## Just one switch can detect 2steps movement

Terminal type
( Solder terminal )

Terminal type
( Press fit terminal )



Wire leads type

### FEATURES

- Just one switch can detect 2steps movement
- Easy & simple mechanical design on your side
- Space saving of switch and actuator, compared to using two switches
- Wire saving and work saving compared to using two switches
- Customization of switch on off operating position is available

### TYPICAL APPLICATIONS

- Automotive: Door ajar detection to prevent pinching before door closing assist starts, etc.
- Home appliances: Door ajar detection to prevent pinching before door closing assist starts, etc.

## ORDERING INFORMATION ( PART NO. )

**ASQD1** □ □ □ □

- Mounting
  1: Without boss type
  6: Right 2 bosses type
  7: Left 2 bosses type
  8: Both sides 2 bosses type
- Terminal
  4 : Solder terminal
  E : Press fit terminal ( For t = 0.8 )
  F : Press fit terminal ( For t = 0.64 )
  6: Wire leads
- Type / Contact form
  B: Two steps detection type / Normally Closed type ( N.C. )
  C: Two steps detection type / Normally Open type ( N.O. )
- Actuator
  0: Pin plunger

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

## TYPES

| Terminal shape | Actuator | Right 2 boss type | | Left 2 boss type | | Both sides 2 bosses type | | Without boss 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. ) | Normally close ( N.C. ) | Normally open ( N.O. ) |
| Solder terminal | Pin plunger | ASQD164B0 | ASQD164C0 | ASQD174B0 | ASQD174C0 | ASQD184B0 | ASQD184C0 | ASQD114B0 | ASQD114C0 |
| Press fit terminal ( For t = 0.8 ) | Pin plunger | ASQD16EB0 | ASQD16EC0 | ASQD17EB0 | ASQD17EC0 | ASQD18EB0 | ASQD18EC0 | ASQD11EB0 | ASQD11EC0 |
| Press fit terminal ( For t = 0.64 ) | Pin plunger | ASQD16FB0 | ASQD16FC0 | ASQD17FB0 | ASQD17FC0 | ASQD18FB0 | ASQD18FC0 | ASQD11FB0 | ASQD11FC0 |
| Wire leads | Pin plunger | ASQD166B0 | ASQD166C0 | ASQD176B0 | ASQD176C0 | ASQD186B0 | ASQD186C0 | — | — |

## RATING

### ■ Contact rating

1 mA 5 V DC to 50 mA 16 V DC

### ■ Operation environment and conditions

| Item | Specifications |
|---|---|
| Ambient and storage temperature | −40 to +85 ℃ ( no freezing and condensing ) |
| Allowable operating speed | 30 to 500 mm/s |
| 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

### ■ Electrical characteristics

| Item | Specifications |
|---|---|
| Dielectric strength ( Initial ) | Between non-continuous terminals : 500 V rms for 1 min<br>Between each terminal and non-charging metal parts: 1,500 V rms for 1 min<br>Between each terminal and ground : 1,500 V rms for 1 min<br>( at detection current of 1 mA ) |
| Insulation resistance ( Initial ) | Min. 100 MΩ<br>( at 500 V DC insulation resistance meter ) ( Locations measured same as dielectric strength. ) |
| Voltage drop ( Initial ) | Max. 0.2 V ( by 50 mA 6 to 8 V DC ) |

### ■ Characteristics

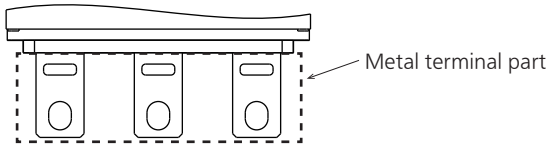
| Item | | Specifications | |
|---|---|---|---|
| Electrical switching life | DC 5 V 1 mA ( Resistive load ) | Min. $3 \times 10^5$ | Switching frequency: 20 times/min<br>Conduction ratio: 1:1<br>Plunger operation speed: 100 mm/s<br>Plunger switching position: Free Position ( FP ) ⇔ Total Travel Position ( TTP ) |
| | DC 16 V 50 mA ( Resistive load ) | Min. $3 \times 10^5$ | |
| Vibration resistance ( malfunction vibration resistance ) | | Single amplitude: 0.75 mm<br>Amplitude of vibration: 10 to 55 Hz ( 4 minutes cycle )<br>Direction and time: 30 minutes each in X, Y and Z directions | |
| | | Amplitude of vibration: 5 to 200 Hz ( 10 minutes cycle )<br>Acceleration: 43.1 $m/s^2$<br>Direction and time: 30 minutes each in X, Y and Z directions | |
| Shock resistance ( malfunction vibration resistance ) | | Shock value: 980 $m/s^2$<br>Direction and time: 5 times each in X, Y and Z directions | |
| Terminal strength | | Min. 6 N ( 1 min, each direction ) *Terminal deformation possible. | |
| Wire lead strength | | Min. 49 N ( Pull wire lead for 1 minute against switch body, wire lead shall not be cut. ) | |
| Heat resistance | | 85 ℃ 500 hours ( Pin-plunger position: Free position ) | |
| Cold resistance | | −40 ℃ 500 hours ( Pin-plunger position: Free position and Total travel position ) | |
| Humidity resistance | | 40 ℃ 95 % RH 500 hours ( Pin-plunger position: Free position and Total travel position ) | |
| Unit weight | | Approx. 1.1 g ( Terminal type ) ,<br>Approx. 6.8 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 ℃
- Relative humidity : 25 to 85% RH
- Air pressure : 86 to 106 kPa

# Two circuits detection Switches, Two steps detection type ( ASQD1 )

## ■ Protection grade

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




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

*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 ℃ ) .
*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 ℃ ) .

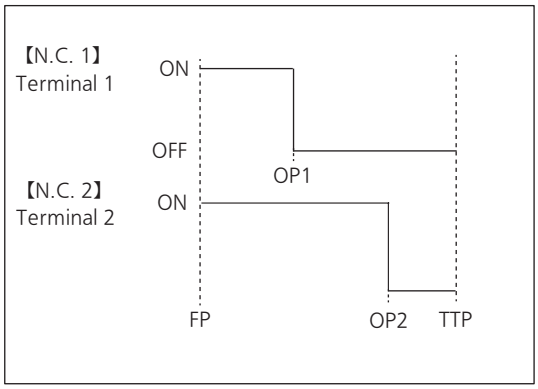
## ■ Operating characteristics

| Characteristics | Pin plunger | |
|---|---|---|
| | Right 2 bosses/Left 2 bosses/ Both sides 2 bosses type | Without boss type |
| Operating Force 1 ( OF 1 ) Max. | 1.6 N | 1.6 N |
| Operating Force 1 ( OF 2 ) Max. | 2.6 N | 2.6 N |
| Total Travel Force ( TF ) Max. ( Reference value ) | ( 4.2 N ) | ( 4.2 N ) |
| Free Position ( FP ) Max. | 10.1 mm | 11.55 mm |
| Operating Position 1 ( OP 1 ) | Initial : 9.45±0.25 mm<br>After test: 9.45±0.3 mm | Initial : 10.9±0.25 mm<br>After test: 10.9±0.3 mm |
| Release Position 1 ( RP 1 ) | Initial : 9.45±0.3 mm<br>After test: 9.45±0.35 mm | Initial : 10.9±0.3 mm<br>After test: 10.9±0.35 mm |
| Operating Position 2 ( OP 2 ) | Initial : 7.75±0.25 mm<br>After test: 7.75±0.3 mm | Initial : 9.2 ±0.25 mm<br>After test: 9.2 ±0.3 mm |
| Release Position 2 ( RP 2 ) | Initial : 7.75±0.3 mm<br>After test: 7.75±0.35 mm | Initial : 9.2 ±0.3 mm<br>After test: 9.2 ±0.35 mm |
| Over Travel 1 ( OT 1 ) | Initial : 2.9 mm<br>After test: 2.85 mm | Initial : 2.9 mm<br>After test: 2.85 mm |
| Over Travel 2 ( OT 2 ) | Initial : 1.2 mm<br>After test: 1.15 mm | Initial : 1.2 mm<br>After test: 1.15 mm |
| Total Travel Position ( TTP ) ( Reference value ) | ( 6.3 mm ) | ( 7.75 mm ) |

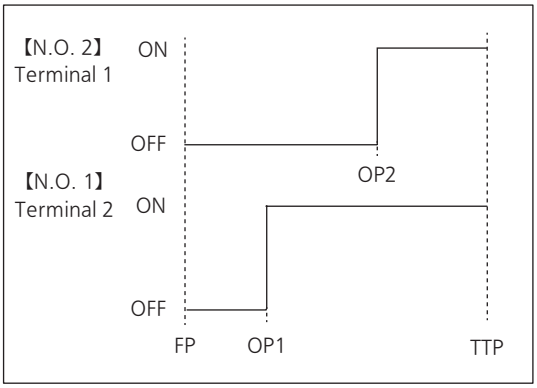
Note) The above indicates the characteristics when operating the actuator from the vertical direction.

## ■ Operating Chart

N.C. type




N.O. type

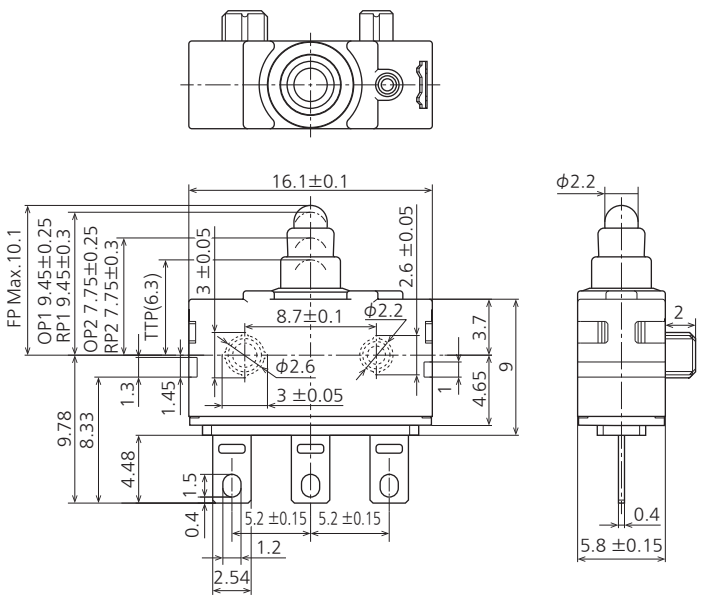


## DIMENSIONS ( Unit: mm )

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

### ■ Pin plunger Solder terminal type Right 2 bosses type

CAD External dimensions

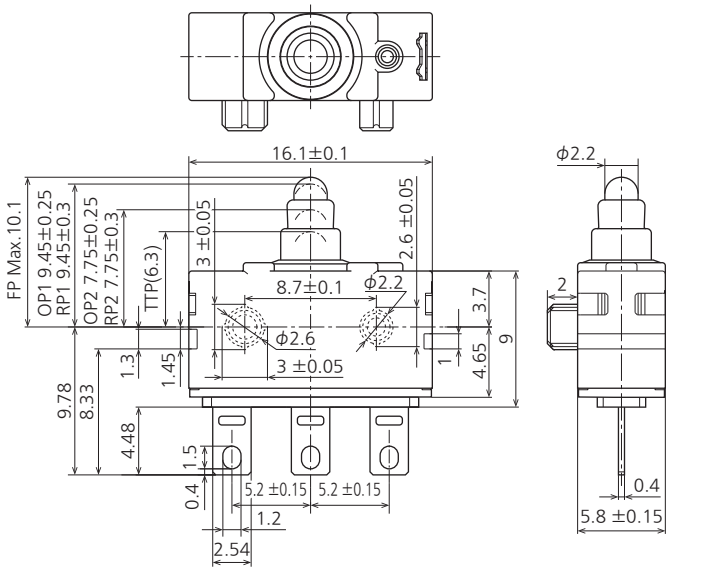



General tolerance: ±0.25

| | |
|---|---|
| Operating Force 1 ( OF 1 ) Max. | 1.6 N |
| Operating Force 1 ( OF 2 ) Max. | 2.6 N |
| Total Travel Force ( TF ) Max. ( Reference value ) | ( 4.2 N ) |
| Free Position ( FP ) Max. | 10.1 mm |
| Operating Position 1 ( OP 1 ) | Initial : 9.45±0.25 mm<br>After test: 9.45±0.3 mm |
| Release Position 1 ( RP 1 ) | Initial : 9.45±0.3 mm<br>After test: 9.45±0.35 mm |
| Operating Position 2 ( OP 2 ) | Initial : 7.75±0.25 mm<br>After test: 7.75±0.3 mm |
| Release Position 2 ( RP 2 ) | Initial : 7.75±0.3 mm<br>After test: 7.75±0.35 mm |
| Over Travel 1 ( OT 1 ) | Initial : 2.9 mm<br>After test: 2.85 mm |
| Over Travel 2 ( OT 2 ) | Initial : 1.2 mm<br>After test: 1.15 mm |
| Total Travel Position ( TTP ) ( Reference value ) | ( 6.3 mm ) |

### ■ Pin plunger Solder terminal type Left 2 bosses type

CAD External dimensions




General tolerance: ±0.25

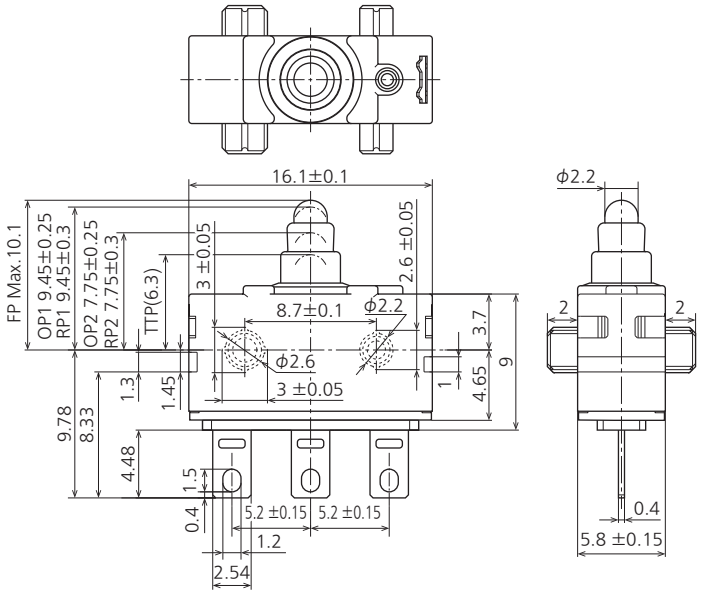
| | |
|---|---|
| Operating Force 1 ( OF 1 ) Max. | 1.6 N |
| Operating Force 1 ( OF 2 ) Max. | 2.6 N |
| Total Travel Force ( TF ) Max. ( Reference value ) | ( 4.2 N ) |
| Free Position ( FP ) Max. | 10.1 mm |
| Operating Position 1 ( OP 1 ) | Initial : 9.45±0.25 mm<br>After test: 9.45±0.3 mm |
| Release Position 1 ( RP 1 ) | Initial : 9.45±0.3 mm<br>After test: 9.45±0.35 mm |
| Operating Position 2 ( OP 2 ) | Initial : 7.75±0.25 mm<br>After test: 7.75±0.3 mm |
| Release Position 2 ( RP 2 ) | Initial : 7.75±0.3 mm<br>After test: 7.75±0.35 mm |
| Over Travel 1 ( OT 1 ) | Initial : 2.9 mm<br>After test: 2.85 mm |
| Over Travel 2 ( OT 2 ) | Initial : 1.2 mm<br>After test: 1.15 mm |
| Total Travel Position ( TTP ) ( Reference value ) | ( 6.3 mm ) |

# Two circuits detection Switches, Two steps detection type ( ASQD1 )

## ■ Pin plunger Solder terminal type Both sides 2 bosses type

CAD

External dimensions



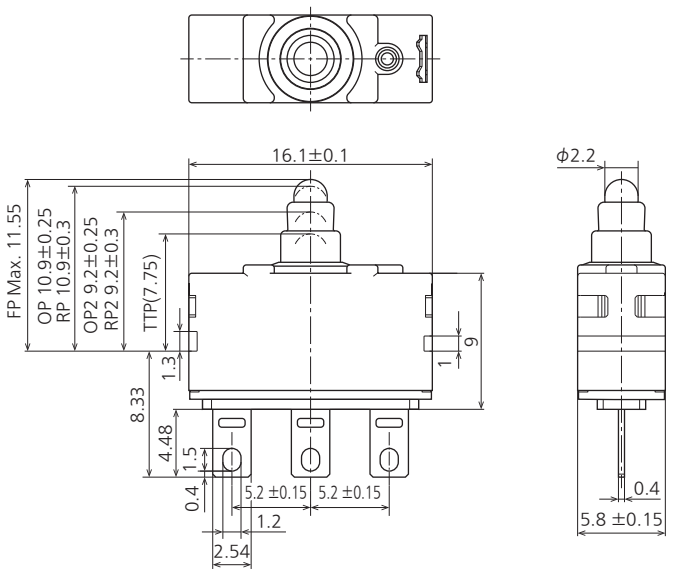

General tolerance: ±0.25

| | |
|---|---|
| Operating Force 1 ( OF 1 ) Max. | 1.6 N |
| Operating Force 1 ( OF 2 ) Max. | 2.6 N |
| Total Travel Force ( TF ) Max. ( Reference value ) | ( 4.2 N ) |
| Free Position ( FP ) Max. | 10.1 mm |
| Operating Position 1 ( OP 1 ) | Initial : 9.45±0.25 mm<br>After test: 9.45±0.3 mm |
| Release Position 1 ( RP 1 ) | Initial : 9.45±0.3 mm<br>After test: 9.45±0.35 mm |
| Operating Position 2 ( OP 2 ) | Initial : 7.75±0.25 mm<br>After test: 7.75±0.3 mm |
| Release Position 2 ( RP 2 ) | Initial : 7.75±0.3 mm<br>After test: 7.75±0.35 mm |
| Over Travel 1 ( OT 1 ) | Initial : 2.9 mm<br>After test: 2.85 mm |
| Over Travel 2 ( OT 2 ) | Initial : 1.2 mm<br>After test: 1.15 mm |
| Total Travel Position ( TTP ) ( Reference value ) | ( 6.3 mm ) |

## ■ Pin plunger Solder terminal type Without boss type

CAD

External dimensions




General tolerance: ±0.25

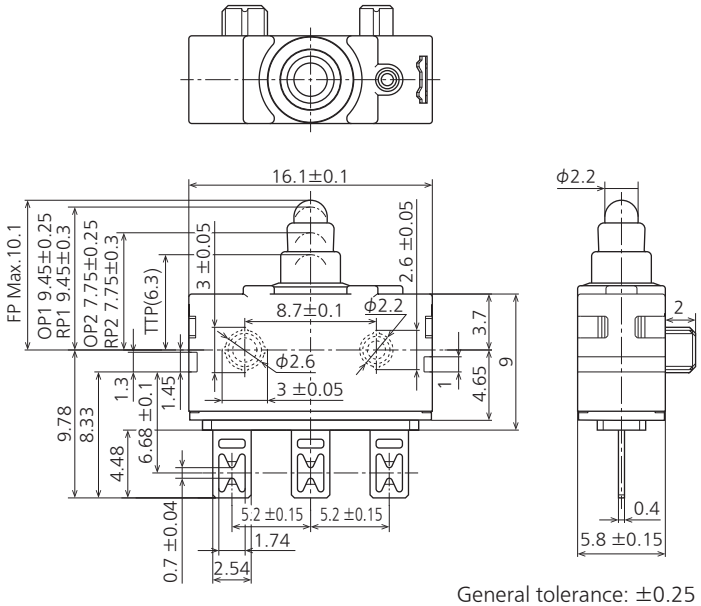
| | |
|---|---|
| Operating Force 1 ( OF 1 ) Max. | 1.6 N |
| Operating Force 1 ( OF 2 ) Max. | 2.6 N |
| Total Travel Force ( TF ) Max. ( Reference value ) | ( 4.2 N ) |
| Free Position ( FP ) Max. | 11.55 mm |
| Operating Position 1 ( OP 1 ) | Initial : 10.9±0.25 mm<br>After test: 10.9±0.3 mm |
| Release Position 1 ( RP 1 ) | Initial : 10.9±0.3 mm<br>After test: 10.9±0.35 mm |
| Operating Position 2 ( OP 2 ) | Initial : 9.2±0.25 mm<br>After test: 9.2±0.3 mm |
| Release Position 2 ( RP 2 ) | Initial : 9.2±0.3 mm<br>After test: 9.2±0.35 mm |
| Over Travel 1 ( OT 1 ) | Initial : 2.9 mm<br>After test: 2.85 mm |
| Over Travel 2 ( OT 2 ) | Initial : 1.2 mm<br>After test: 1.15 mm |
| Total Travel Position ( TTP ) ( Reference value ) | ( 7.75 mm ) |

# Two circuits detection Switches, Two steps detection type ( ASQD1 )

## ■ Pin plunger Press fit terminal type ( For t = 0.8 ) Right 2 bosses type

CAD

External dimensions



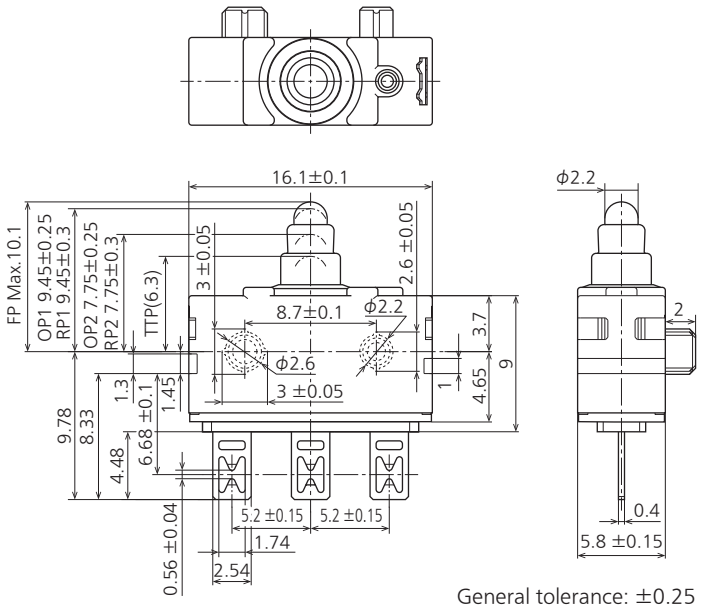

General tolerance: ±0.25

| | |
|---|---|
| Operating Force 1 ( OF 1 ) Max. | 1.6 N |
| Operating Force 1 ( OF 2 ) Max. | 2.6 N |
| Total Travel Force ( TF ) Max. ( Reference value ) | ( 4.2 N ) |
| Free Position ( FP ) Max. | 10.1 mm |
| Operating Position 1 ( OP 1 ) | Initial : 9.45±0.25 mm<br>After test: 9.45±0.3 mm |
| Release Position 1 ( RP 1 ) | Initial : 9.45±0.3 mm<br>After test: 9.45±0.35 mm |
| Operating Position 2 ( OP 2 ) | Initial : 7.75±0.25 mm<br>After test: 7.75±0.3 mm |
| Release Position 2 ( RP 2 ) | Initial : 7.75±0.3 mm<br>After test: 7.75±0.35 mm |
| Over Travel 1 ( OT 1 ) | Initial : 2.9 mm<br>After test: 2.85 mm |
| Over Travel 2 ( OT 2 ) | Initial : 1.2 mm<br>After test: 1.15 mm |
| Total Travel Position ( TTP ) ( Reference value ) | ( 6.3 mm ) |

## ■ Pin plunger Press fit terminal type ( For t = 0.64 ) Right 2 bosses type

CAD

External dimensions




General tolerance: ±0.25

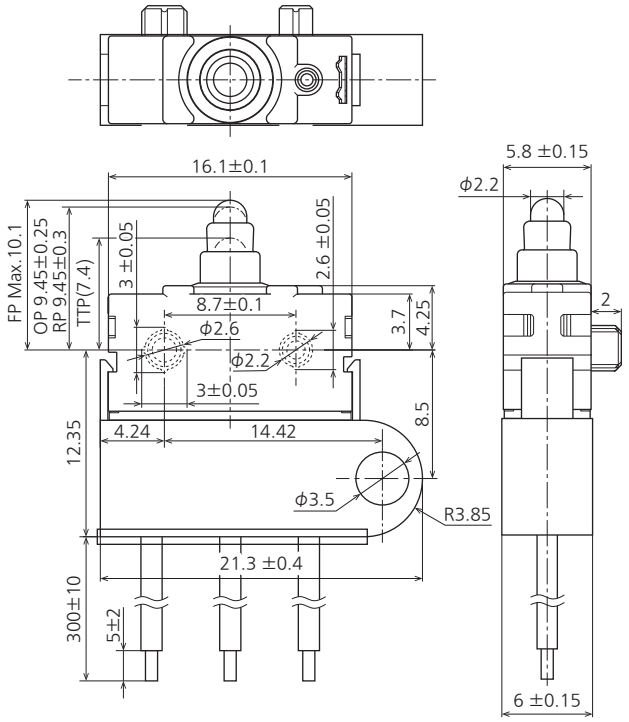
| | |
|---|---|
| Operating Force 1 ( OF 1 ) Max. | 1.6 N |
| Operating Force 1 ( OF 2 ) Max. | 2.6 N |
| Total Travel Force ( TF ) Max. ( Reference value ) | ( 4.2 N ) |
| Free Position ( FP ) Max. | 10.1 mm |
| Operating Position 1 ( OP 1 ) | Initial : 9.45±0.25 mm<br>After test: 9.45±0.3 mm |
| Release Position 1 ( RP 1 ) | Initial : 9.45±0.3 mm<br>After test: 9.45±0.35 mm |
| Operating Position 2 ( OP 2 ) | Initial : 7.75±0.25 mm<br>After test: 7.75±0.3 mm |
| Release Position 2 ( RP 2 ) | Initial : 7.75±0.3 mm<br>After test: 7.75±0.35 mm |
| Over Travel 1 ( OT 1 ) | Initial : 2.9 mm<br>After test: 2.85 mm |
| Over Travel 2 ( OT 2 ) | Initial : 1.2 mm<br>After test: 1.15 mm |
| Total Travel Position ( TTP ) ( Reference value ) | ( 6.3 mm ) |

# Two circuits detection Switches, Two steps detection type ( ASQD1 )

## ■ Pin plunger Wire leads type Right 2 bosses type

CAD

External dimensions




General tolerance: ±0.25

| | |
|---|---|
| Operating Force 1 ( OF 1 ) Max. | 1.6 N |
| Operating Force 1 ( OF 2 ) Max. | 2.6 N |
| Total Travel Force ( TF ) Max. ( Reference value ) | ( 4.2 N ) |
| Free Position ( FP ) Max. | 10.1 mm |
| Operating Position 1 ( OP 1 ) | Initial : 9.45±0.25 mm<br>After test: 9.45±0.3 mm |
| Release Position 1 ( RP 1 ) | Initial : 9.45±0.3 mm<br>After test: 9.45±0.35 mm |
| Operating Position 2 ( OP 2 ) | Initial : 7.75±0.25 mm<br>After test: 7.75±0.3 mm |
| Release Position 2 ( RP 2 ) | Initial : 7.75±0.3 mm<br>After test: 7.75±0.35 mm |
| Over Travel 1 ( OT 1 ) | Initial : 2.9 mm<br>After test: 2.85 mm |
| Over Travel 2 ( OT 2 ) | Initial : 1.2 mm<br>After test: 1.15 mm |
| Total Travel Position ( TTP ) ( Reference value ) | ( 6.3 mm ) |

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