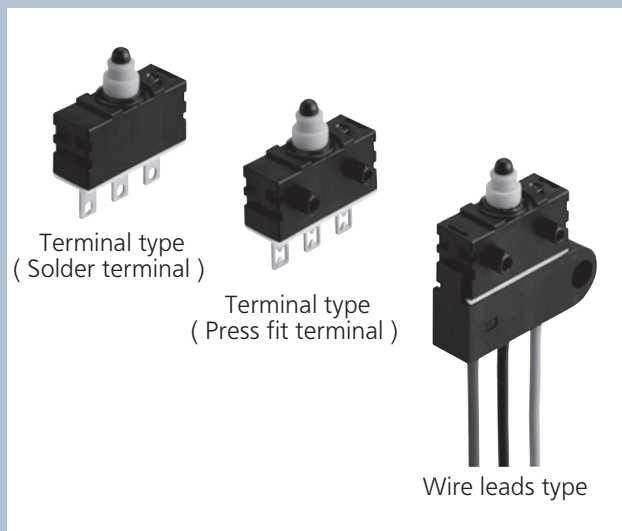


Two circuits detection Switches, **Redundancy type**

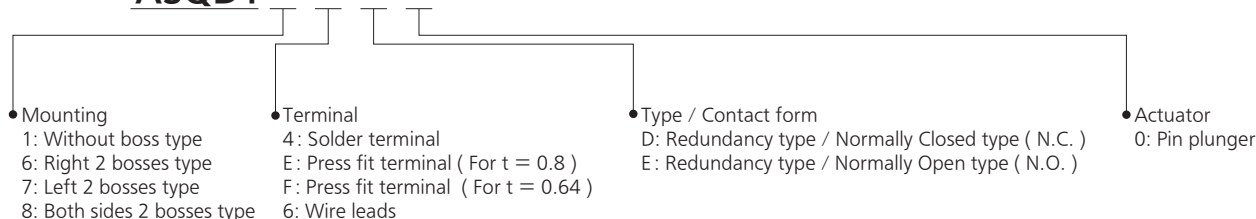
One switch has two circuits which can work independently to keep redundancy

**FEATURES**

- Even if a Failure happens on one circuit, other one can keep on working
- Just one switch can keep redundancy, no need two switches
- 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

TYPICAL APPLICATIONS

- Automotive: To keep redundancy of door open / close detection for Autonomous driving
- Other: To keep redundancy of safety devices

ORDERING INFORMATION (PART NO.)**ASQD1**

(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	ASQD164D0	ASQD164E0	ASQD174D0	ASQD174E0	ASQD184D0	ASQD184E0	ASQD114D0	ASQD114E0
Press fit terminal (For t = 0.8)	Pin plunger	ASQD16ED0	ASQD16EE0	ASQD17ED0	ASQD17EE0	ASQD18ED0	ASQD18EE0	ASQD11ED0	ASQD11EE0
Press fit terminal (For t = 0.64)	Pin plunger	ASQD16FD0	ASQD16FE0	ASQD17FD0	ASQD17FE0	ASQD18FD0	ASQD18FE0	ASQD11FD0	ASQD11FE0
Wire leads	Pin plunger	ASQD166D0	ASQD166E0	ASQD176D0	ASQD176E0	ASQD186D0	ASQD186E0	—	—

Two circuits detection Switches, Redundancy type (ASQD1)

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 °C (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 Between each terminal and non-charging metal parts: 1,500 V rms for 1 min Between each terminal and ground : 1,500 V rms for 1 min (at detection current of 1 mA)
Insulation resistance (Initial)	Min. 100 MΩ (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. 3×10^5 DC 16 V 50 mA (Resistive load) : Min. 3×10^5 Switching frequency: 20 times/min Conduction ratio: 1:1 Plunger operation speed: 100 mm/s Plunger switching position: Free Position (FP) ⇄ Total Travel Position (TTP)
Vibration resistance (malfunction vibration resistance)	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 vibration resistance)	Shock value: 980 m/s ² 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 °C 500 hours (Pin-plunger position: Free position)
Cold resistance	−40 °C 500 hours (Pin-plunger position: Free position and Total travel position)
Humidity resistance	40 °C 95 % RH 500 hours (Pin-plunger position: Free position and Total travel position)
Unit weight	Approx. 1.1 g (Terminal type) , Approx. 6.8 g (Wire leads type)
Protection grade	IP67 (except exposed terminal part of terminal type)

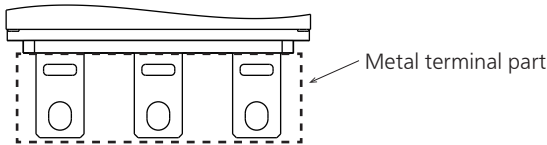
Notes) As long as there are no particular designations, the following conditions apply to the test environment.

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

Two circuits detection Switches, Redundancy 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 ℃) .

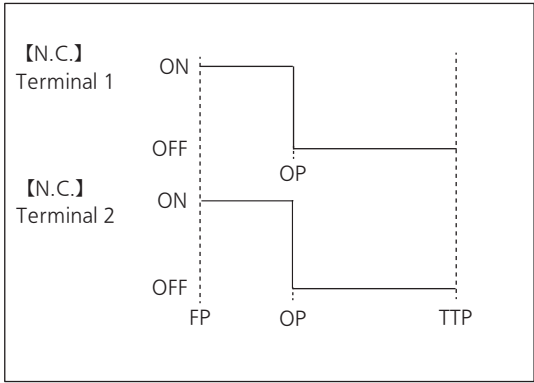
Operating characteristics

Characteristics	Pin plunger	
	Right 2 bosses/Left 2 bosses/ Both sides 2 bosses type	Without boss type
Operating Force (OF) Max.	1.6 N	1.6 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 (OP)	Initial : 9.45±0.25 mm After test: 9.45±0.3 mm	Initial : 10.9±0.25 mm After test: 10.9±0.3 mm
Release Position (RP)	Initial : 9.45±0.3 mm After test: 9.45±0.35 mm	Initial : 10.9±0.3 mm After test: 10.9±0.35 mm
Over Travel (OT)	Initial : 2.9 mm After test: 2.85 mm	Initial : 2.9 mm After test: 2.85 mm
Total Travel Position (TTP) (Reference value)	(6.3 mm)	(7.75 mm)

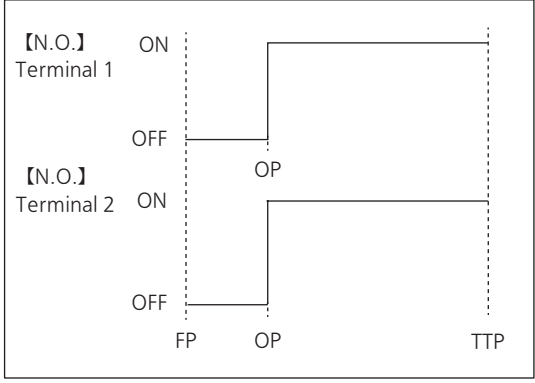
Note) The above indicates the characteristics when operating the actuator from the vertical direction.

Operating Chart

N.C. type



N.O. type



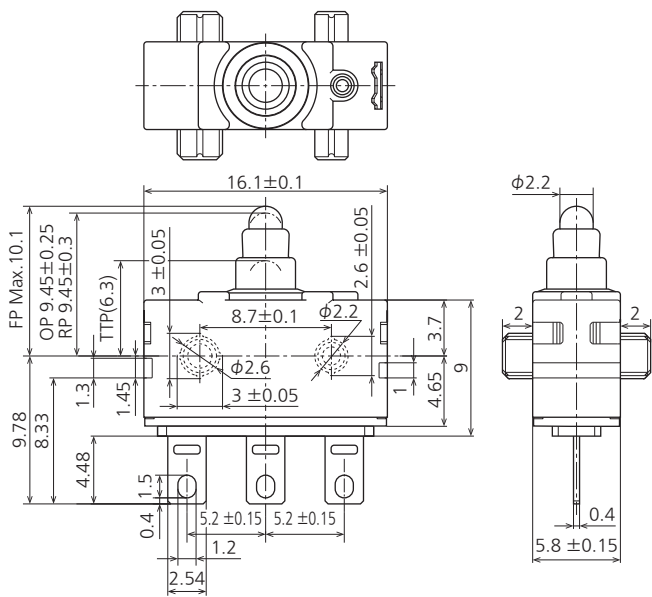


Two circuits detection Switches, Redundancy type (ASQD1)

■ Pin plunger Solder terminal type Both sides 2 bosses type

CAD

External dimensions



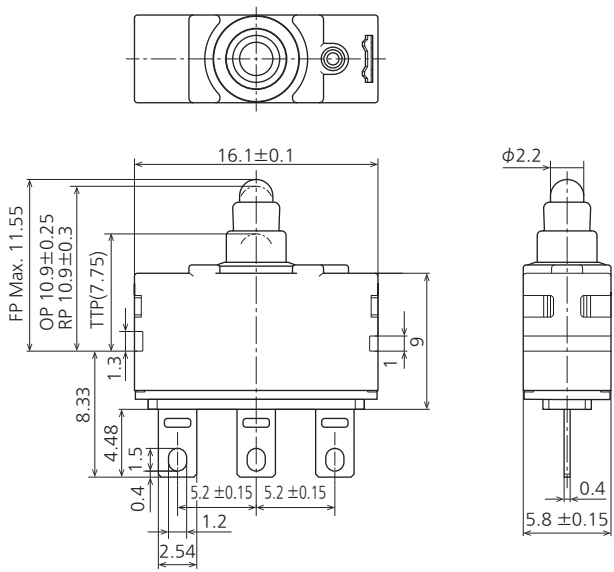
General tolerance: ±0.25

Operating Force (OF) Max.	1.6 N
Total Travel Force (TF) Max. (Reference value)	(4.2 N)
Free Position (FP) Max.	10.1 mm
Operating Position (OP)	Initial : 9.45±0.25 mm After test: 9.45±0.3 mm
Release Position (RP)	Initial : 9.45±0.3 mm After test: 9.45±0.35 mm
Over Travel (OT)	Initial : 2.9 mm After test: 2.85 mm
Total Travel Position (TTP) (Reference value)	(6.3 mm)

■ Pin plunger Solder terminal type Without boss type

CAD

External dimensions

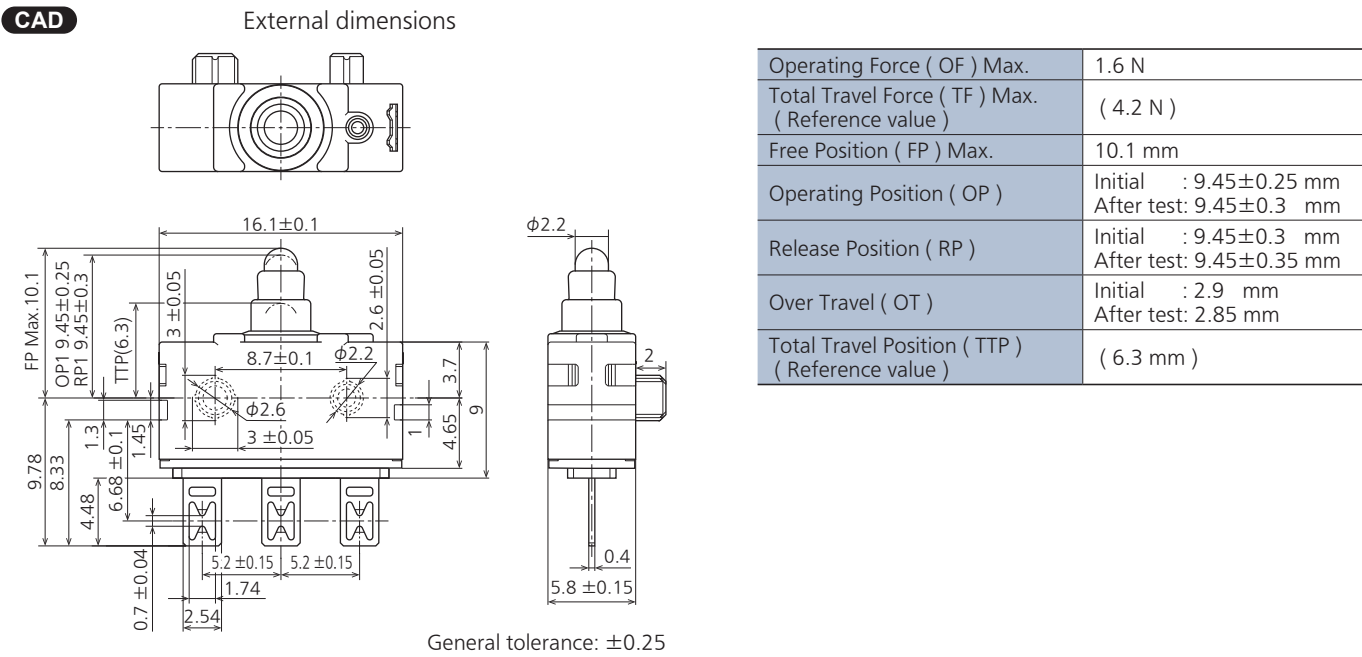


General tolerance: ±0.25

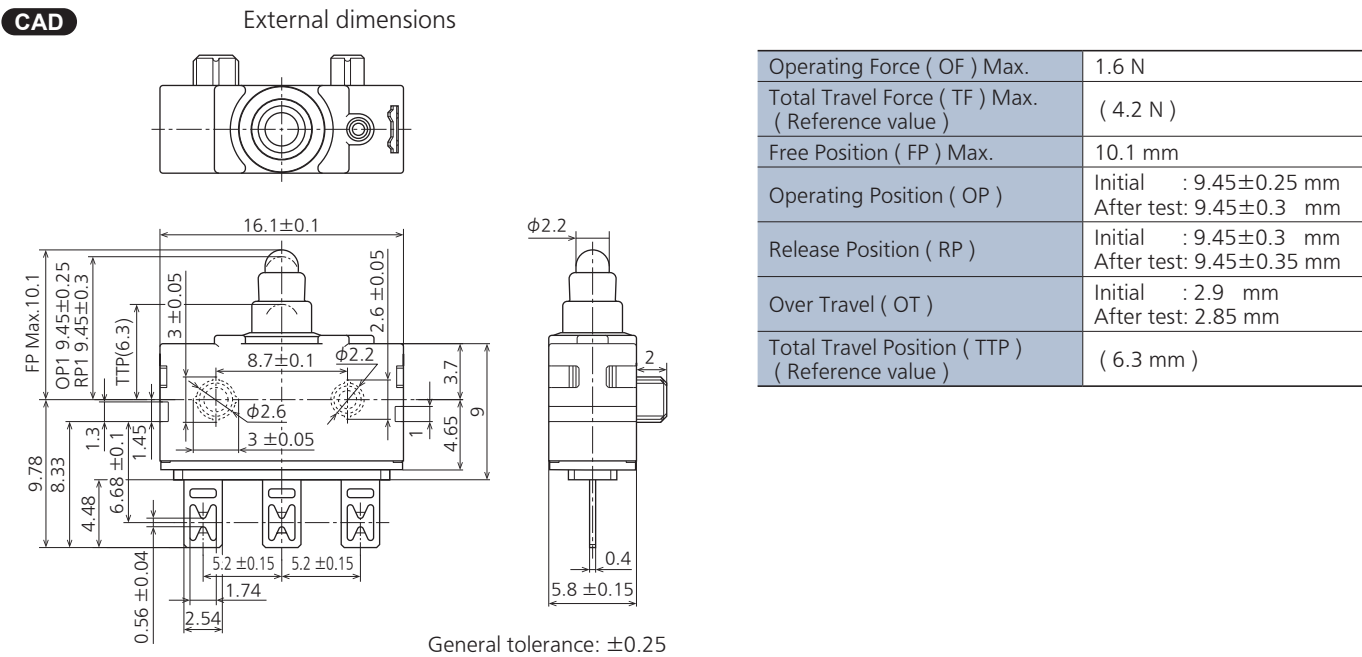
Operating Force (OF) Max.	1.6 N
Total Travel Force (TF) Max. (Reference value)	(4.2 N)
Free Position (FP) Max.	11.55 mm
Operating Position (OP)	Initial : 10.9±0.25 mm After test: 10.9±0.3 mm
Release Position (RP)	Initial : 10.9±0.3 mm After test: 10.9±0.35 mm
Over Travel (OT)	Initial : 1.8 mm After test: 1.75 mm
Total Travel Position (TTP) (Reference value)	(8.85 mm)

Two circuits detection Switches, Redundancy type (ASQD1)

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



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

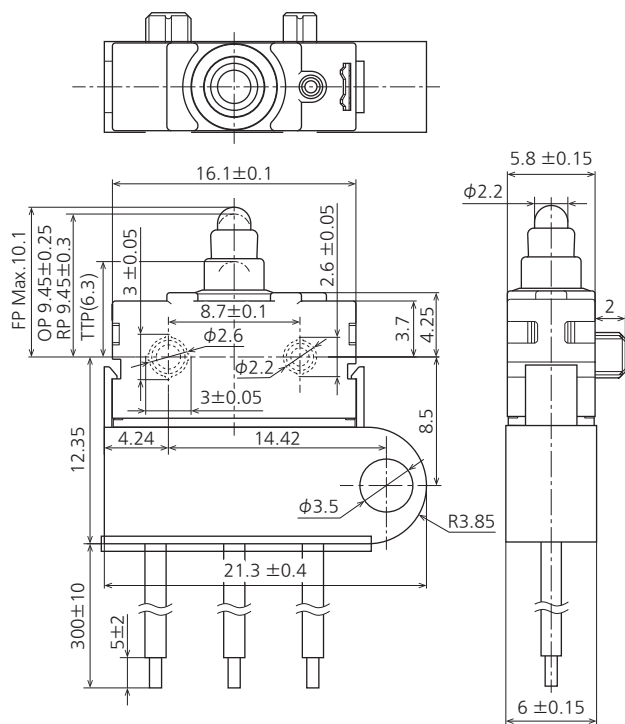


Two circuits detection Switches, Redundancy type (ASQD1)

Pin plunger Wire leads type Right 2 bosses type

CAD

External dimensions



General tolerance: ±0.25

Operating Force (OF) Max.	1.6 N
Total Travel Force (TF) Max. (Reference value)	(4.2 N)
Free Position (FP) Max.	10.1 mm
Operating Position (OP)	Initial : 9.45±0.25 mm After test: 9.45±0.3 mm
Release Position (RP)	Initial : 9.45±0.3 mm After test: 9.45±0.35 mm
Over Travel (OT)	Initial : 2.9 mm After test: 2.85 mm
Total Travel Position (TTP) (Reference value)	(6.3 mm)