

Notes for Turquoise Switches (BJ, BS, BV type)

CAUTIONS FOR USE (Common for BJ, BS and BV types)

■ Fastening of the switch body

- 1) Fasten the switch body onto a smooth surface using the correct screw as shown in the chart below and tighten it with the prescribed torque.

The switch case may deform depending on the type of screw (screw head diameter, etc.), the size of the washer, and the use or non-use of a washer. Therefore, please confirm the appropriate torque of actual conditions. Also, it is recommended that adhesive be applied to lock the screws to prevent loosening of the screws. When doing so, please be careful not let any adhesive get inside the switch.

	Screws	Tightening torque
ABJ (BJ) switches	M1.2	Not more than 0.098 N·m
	M2.3	Not more than 0.29 N·m
	M3.0	Not more than 0.29 N·m
ABS (BS) switches	M2.3	Not more than 0.29 N·m
ABV (BV) switches	M3.0	Not more than 0.49 N·m

- 2) Fixed pin type

To secure the switch unit, thermally crimp or press-fit the mounting pins. If the pins are to be press-fitted, install a guide on the opposite surface to the mounting pins to prevent them from slipping out of position and developing play.

- 3) Be sure to maintain adequate insulating clearance between each terminal and ground.
- 4) The positioning of the switch should be such that direct force is not applied to the pushbutton or actuator in its free position.

The operating force to the pushbutton should only be applied in a perpendicular direction.

- 5) The standard value of overtravel used should be within the range of 70 % to 100 % of the rated OT value.
- 6) When soldering the BV type turquoise switch or the immersion protected type of the BJ and BS type switches, the sealing material sometimes forms a lump or bulge at the base of the terminal or lead. Be sure to allow enough space for this when attaching the switch.

■ Soldering operations

- 1) Manual soldering: Perform soldering in less than 3 seconds with maximum 350 °C iron. Care should be taken not to apply force to the terminals during soldering. We recommend a soldering iron with temperature adjustment in order to prevent poor quality soldering. Please consult us if you intend to use a soldering iron of 60 W or higher.
- 2) Terminal portions should not be moved within 1 minute after soldering.

	Soldering time
ABJ (BJ) switches	Within 3 seconds
ABS (BS) switches	Within 3 seconds
ABV (BV) switches	Within 5 seconds

■ Selection of the switch

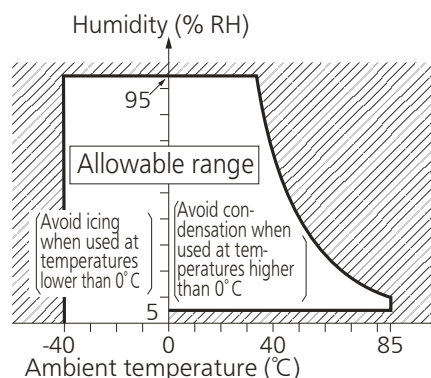
Allow for up to 20 % variation of the specified characteristics values to compensate for long term operational wear of the switch in your design.

■ Cautions regarding use

- 1) When switching inductive loads (relays, solenoids, buzzers, etc.), an arc absorbing circuit is recommended to protect the contacts.
- 2) If switching of the contact is synchronized with the phase of the AC power, reduced electrical life or welded contact may occur. Therefore, test the switch while it is operating under actual loads for this condition. If found, you may wish to take corrective action in your design.
- 3) In the slow or high speed operating condition, the electrical life might be greatly reduced depending upon the switching load. Please consult us before use.
- 4) Using lever type in do not condition, there is the concern that the flexible part may be impeded and return movement may not be possible. In this situation take the following precautions:
 - Select a product of higher OF or use a leaf type lever.
 - Attach a protective cover to the lever.
- 5) If the leaf lever type switch is excessively pushed (pushed further than the operational limit position) or switching is done at high speed or is accompanied by the impact, the lever will break. Please be careful. Also, be careful with the short roller lever type ABV (BV) switch as improper return may result from pressing too much.

■ Usage environment

- 1) 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 following should be used. Continuous use near the limit of the range should be avoided.
- 2) This humidity range does not guarantee permanent performance.



Notes for Turquoise Switches (BJ, BS, BV type)

■ Protection from dust, water and corrosive gas

1) The pin button and the space around the body cap
Turquoise switches are sealed with elastic material, the terminal portion is integrally molded. This prevents dust entry and protects the switch against corrosive gases. Wireleaded types are recommended for applications subject to water or oil splash.
However, avoid soaking these immersion protected types in oil or water, because those types are not of completely oil tight construction.

2) Switch operation or rapid temperature change while water droplets are on the switch may cause the water invasion inside the switch because of breathing action on condensation.

Especially do not use switch in a bath.

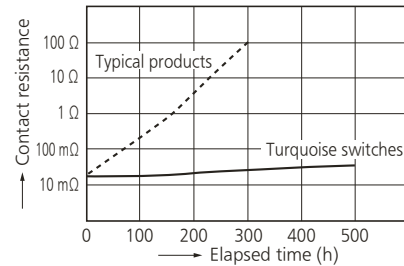
If sources of silicon gas are existing in the vicinity of the switch (silicon rubber, silicon oil, silicon coating, and silicon filler, etc.), silicon gas (low molecular siloxane, etc.) will be emitted and it will get into the product due to the permeability of the plastic.

If the switch is used or stored in such an environment, silicon compound might generate on the contacts, cause the and faulty contacting. Therefore, please do not use sources that can emit silicon gas in the vicinity of the switch.

Do not use in areas where flammable or explosive gases from gasoline and thinner, etc., may be present.

● Hydrogen sulfide exposure test

Test conditions: Concentration: 3 ppm,
Temperature: 40 °C,
Humidity: 75 % RH



■ Oil-proof and chemical-proof characteristics

The rubber elastomer 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, and toluene cannot be used.

■ Washability [ABJ (BJ) and ABS (BS)]

Do not clean the switch. Doing so can cause problems.

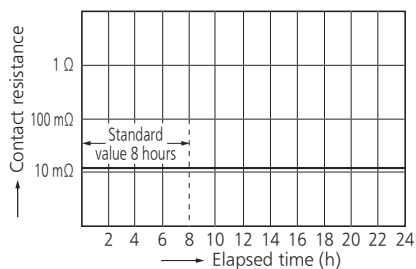
Please contact us if cleaning is necessary.

● Dust protection test

Test conditions: The talcum powder used shall be able to pass through a square- meshed sieve the nominal wire diameter of 7 μm.

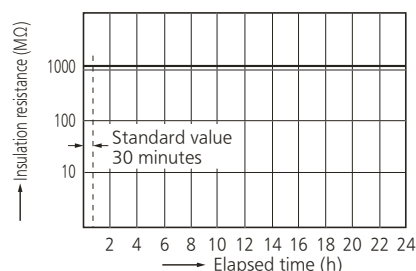
The amount of talcum powder to be used is 2 kg per cubic metre of the test chamber volume. The duration of the test is 8 hours.

No damage observed after the test.



● Waterproof test

Test conditions: Immersion protected IP67 switches ...
Submerge at 1 m below the water surface for 30 minutes.



REFERENCE

■ Dust-protected type

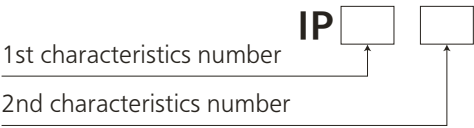
This type of construction prevents dust that is large enough to have an effect on operation from getting inside the unit. This construction is stipulated by protective classes against solid matter in the IEC standards (IEC60529) .
The talcum powder used shall be able to pass through a squaremeshed sieve the nominal wire diameter of 7 μm. The amount of talcum powder to be used is 2 kg per cubic metre of the test chamber volume. The duration of the test is 8 hours.
No damage observed after the test.

■ Immersion-protected type

This type of construction prevents any harmful effects even after the device is left underwater at a depth of 1 m for 30 minutes.
This construction is stipulated by protective classes against water in the IEC standards (IEC60529) .

■ IEC's IP Codes

The IEC (International Electrotechnical Commission) has defined the IP characteristic code that represents the levels of protection described in IEC standard (IEC60529) .
The two numbers that follow the IP code (the characteristics numbers) indicate the suitability of this protection for all environmental conditions.



● Level of protection indicated by the 1st Characteristics number

1st Characteristics number	Protection level (IEC60529/Solid matter)
0	No protection
1	Protected against solid matter larger than 50 mm
2	Protected against solid matter larger than 12 mm
3	Protected against solid matter larger than 2.5 mm
4	Protected against solid matter larger than 1.0 mm
5	Dust-protected type Prevents dust that is large enough to have an effect on operation from getting inside the unit
6	Dust-resistant type Prevents dust from getting inside the unit

● Level of protection indicated by the 2nd Characteristics number

JIS C 0920	2nd Characteristics number	Protection level (IEC60529/Liquid matter)
	0	No protection
Droplet-protected type I	1	Protected against water droplets that fall perpendicular to the unit
Droplet-protected type II	2	Protected against water droplets that fall from within 15° of perpendicular to the unit
Rain-protected type	3	Protected against water droplets that fall from within 60° of perpendicular to the unit
Splash-protected type	4	Protected against water that splashes on the unit from any direction
Spray-protected type	5	Free from adverse effects even if sprayed directly with water from any direction
Water-resistant type	6	Protected against water sprayed directly on the unit from any direction
Immersion-protected type	7	Water does not get inside of the unit when submerged in water according to the specified conditions
Underwater type	8	Unit can be used underwater

Note) Details of test conditions are the same as NECA C 0920.
Please refer to them.