Power Rocker Switches with a Contact for Low Level Current and 3 mm Contact Gap

AJ8S (J8S) Switches



FEATURES

- **Incorporates a contact for low level circuit**
- **Power switches for safety requirements.**
  - All versions comply with ClassII EN61058-1 insulation grade.
    Insulation distance: Min. 8mm (Power contact section)
    Contact gap: Min. 3mm (Power contact section)
  - Agency Standard approved
    UL/C-UL, TÜV
- **High inrush current resistance is ideal for power switches of office automation equipment.**
- **Operation that only requires a light touch**
- **Cadmium-free contact compatibility.**

ORDERING INFORMATION

AJ 8 S 7 0 □ □ □ C

- Number of poles and operation
  7: 3-pole, single throw (ON-OFF)
  (2 Form A: power contact and 1 Form A: signal contact)
- Actuator indication
  0: No indication
  1: I O indication
  2: – O indication
- Flange color
  Nil: Dark gray
  B: Black
- C: Connection for low level contact connectors
- Function
  S: With a contact for low level current
- Terminal shape
  0: .250 Quick-connect terminal
- Actuator color
  Z: Dark gray
  B: Black

Notes: 1. They come with a stamp indicating safety standards without your request.
2. The color of indication on the actuator is white.

PRODUCT TYPES

Standard actuator color is dark gray and black.
To order switches with a black actuator, replace the letter “Z” with “B” in the ordering part number.
EX) AJ8S701ZC (Actuator color: Dark gray, Flange color: Dark gray)
→ AJ8S701BC (Actuator color: Black, Flange color: Dark gray)

■ Without indication on actuator (Actuator color: Dark gray)

Terminal shape	Number of pole	Operation	Part No.	
			Flange color: Dark gray	Flange color: Black
.250 Quick connect terminal	3 poles	ON – OFF	AJ8S700ZC	AJ8S700ZBC

■ With indication on actuator

1) With I O indication (Actuator color: Dark gray)

Terminal shape	Number of pole	Operation	Part No.	
			Flange color: Dark gray	Flange color: Black
.250 Quick connect terminal	3 poles	ON – OFF	AJ8S701ZC	AJ8S701ZBC

2) With – O indication (Actuator color: Dark gray)

Terminal shape	Number of pole	Operation	Part No.	
			Flange color: Dark gray	Flange color: Black
.250 Quick connect terminal	3 poles	ON – OFF	AJ8S702ZC	AJ8S702ZBC

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SPECIFICATIONS

■ Contact rating

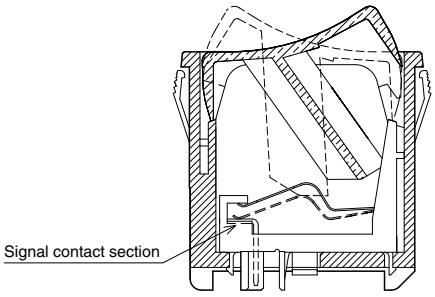
Contact	Contact voltage	Resistive load (Power factor = 1)	Motor load* (EN61058-1) (Power factor = 0.6)	Inrush load
Power section	250V AC	16A	4A	160A (8.3ms)
Signal section	5V DC	10mA	—	—

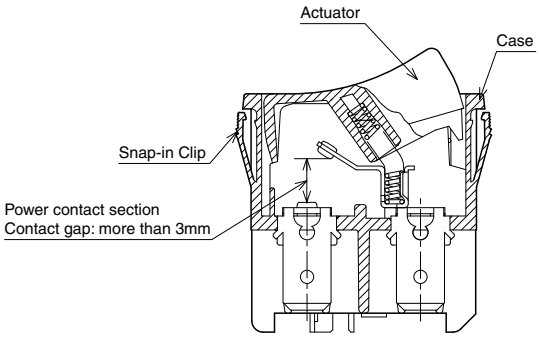
Note: * The motor load is in accordance with EN61058-1. Inrush current can be switched up to the value of 6 times the indicated rating.

■ Characteristics

Item		Specifications
Electrical life		Min.10^4 (at 7 cpm.,at rated load)
Mechanical life		Min.5×10^4 (at 20 cpm.)
Contact resistance	Power contact	Initial, Max. 100mΩ (by voltage drop at 1A, 2 to 4V DC)
	Signal contact	Initial, Max. 1Ω (measured by a milliohm meter)
Dielectric strength	Power contact	Initial, 2,000 V AC rms (detection current: 1mA)
	Signal contact	Initial, 100 V DC rms (detection current: 1mA)
Ambient temperature		–25°C to +85°C (no freezing and condensing)
Vibration resistance		10 to 55 Hz at single amplitude of 0.75mm, 2 hours each in X, Y and Z directions, Contact opening Max. 1ms
Shock resistance	Functional	Min. 294m/s² Contact opening Max. 1ms
	Destructive	Min. 980m/s²
Terminal strength		.250 Quick-connect terminal: Min. 98N/min. (Pull & push direction)
Actuator strength		Min. 39.2N (for 1min. operating direction)
Operating force (Initial) *Reference value		4.9N or less
Flame retardancy		UL94V-0
Tracking resistance		Min. 175
Unit weight		Approx. 13g
Contact material		$AgSnO_2$ alloy (Power section), Cu alloy and Au plating (Signal section)

CONSTRUCTION





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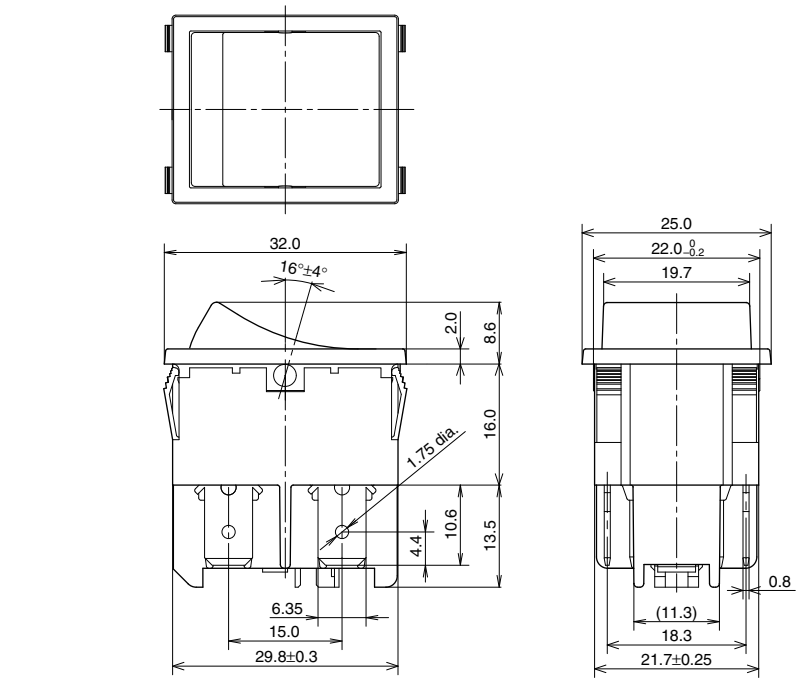
DIMENSIONS

(Unit: mm)

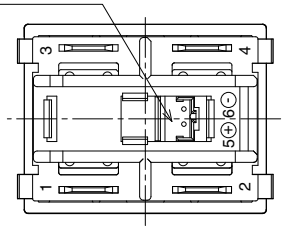
CAD Data The CAD data of the products with a "CAD Data" mark can be downloaded from our Website.

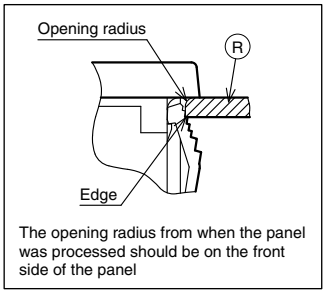
CAD Data

External dimensions



Suitable connector: CT connector





The opening radius from when the panel was processed should be on the front side of the panel

Wiring diagram

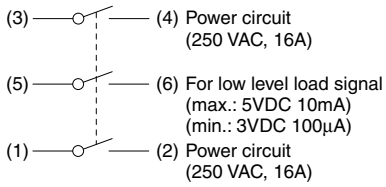
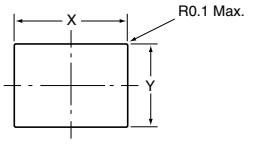


Diagram of recommended panel mounting holes



Panel thickness (T)	X	Y
1 to less than 1.8	$30.4^{0}_{-0.1}$	$22.0^{+0.1}_{0}$
1.8 or more to 2.3	$31.1^{0}_{-0.1}$	$22.0^{+0.1}_{0}$

Note: Please contact us if you are considering using a panel of other than the recommended size and shape.

CAUTIONS FOR USE

■ Mounting panel

Mount the switch with the hole cutting dimensions shown in the dimensions. Please contact us if you are considering using a panel of other than the recommended size and shape.

■ Regarding fastening lead wires to terminals

1) When connecting the tab terminals, use a .250 Quick-connect and insert the terminals straight in. If they are skewed, the terminals will require excessive insertion force. In addition, there is some variation in the insertion force required for different receptacles from different manufacturers, so confirm how much force is needed under actual conditions. Do not solder wires onto tab terminals.

2) The terminals should be connected in such a way that they are not under constant stress from the connecting wires.

3) Terminal material is copper alloy which may discolor due to finger's oil or after a long time. But that discoloration does not effect actual performance.

■ Resistance to chemicals

To clean the switch unit, use a neutral detergent diluted with water. Do not use acidic or alkaline solvents as they may damage the switch. Furthermore, be careful not to get any of the detergent solution inside of the switch while cleaning it.

■ Environment

Avoid using and storing these switches in a location where they will be exposed to corrosive gases, silicon, or high dust levels, all of which can have an adverse effect on the contacts.

■ Take care not to drop the product as it may impair perfomance.

■ For general precautions for operation switches, please visit our website.

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REFERENCE

■ **Outline of UL1054 test**

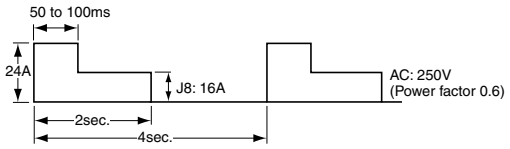
Overload test: 20A 250V AC
(Power factor 0.75 to 0.8)
50 operation

Endurance test: 16A 250V AC
(Power factor 0.75 to 0.8)
10,000 operation

After testing, temperature rise of terminals should be less than 30°C and no abnormality should be observed in characteristics.

■ **Outline of EN61058-1 test**

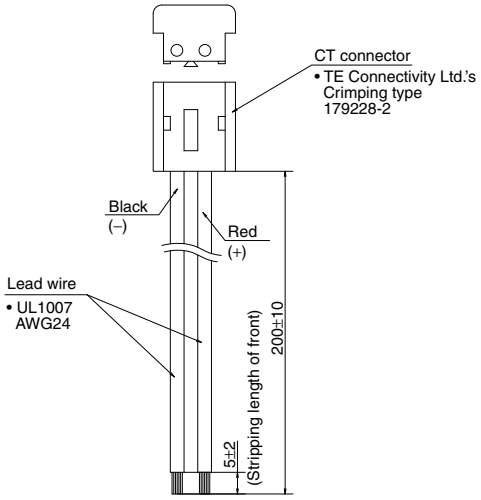
After switching 5×10^3 times on the above load condition at both 85^{+5}_{0}°C and 25±10°C, temperature rise of terminals should be less than 55°C and no abnormality should be observed in characteristics.



CONNECTION OF SIGNAL CONTACT TERMINALS

■ **Cable with connector** Min. order unit: 1 bag (set of 10)
AJ8C0001 Outer carton: contains 20 bags (total of 200 sets)

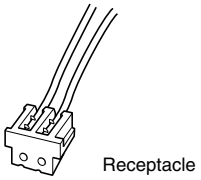




(Reference)

Because CT terminals are used for the signal contact terminals, TE Connectivity Ltd.'s CT connector can be used.

TE Connectivity Ltd.'s CT connector



- **Pressure welding type:**
  173977-2: for AWG26, 28
  2-179694-2: for AWG24

- **Crimping type:**
  179228-2

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Technical Terminology & Cautions for Use

(Operation Switches)

TECHNICAL TERMINOLOGY

■ Rated values
Values indicating the characteristics and performance guarantee standards of the switches. The rated current and rated voltage, for instance, assume specific conditions.

■ Electrical life
The service life when the rated load is connected to the contact and switching operations are performed.

■ Mechanical life
The service life when operated at a preset operating frequency without passing electricity through the contacts.

■ Dielectric strength
Threshold limit value that a high voltage can be applied to a predetermined measuring location for one minute without causing damage to the insulation.

■ Insulation resistance
This is the resistance value at the same place the dielectric strength is measured.

■ Contact resistance
This indicates the electrical resistance at the contact part. Generally, this resistance includes the conductor resistance of the spring and terminal portions.

■ Vibration resistance
Vibration range where a closed contact does not open for longer than a specified time due to vibrations during use of the snap-action switches.

■ Shock resistance
Max. shock value where a closed contact does not open for longer than a specified time due to shocks during use of the switches.

■ Allowable switching frequency
This is the maximum switching frequency required to reach the end of mechanical life (or electrical life).

■ Temperature rise value
This is the maximum temperature rise value that heats the terminal portion when the rated current is flowing through the contacts.

■ Actuator strength
When applying a static load for a certain period on the actuator in the operation direction, this is the maximum load it can withstand before the switch loses functionality.

■ Terminal strength
When applying a static load for a certain period (in all directions if not stipulated) on a terminal, this is the maximum load it can withstand before the terminal loses functionality (except when the terminal is deformed).

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TYPES OF LOAD

■ Resistance load

Resistance load is a power factor of 1 ($\cos\phi$ = 1) where the load is only for the resistance portion. The displayed switch rating indicates the current capacity when using AC current.

■ DC load

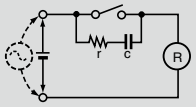
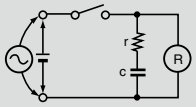
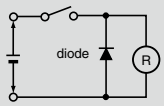
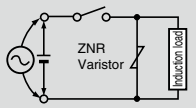
Differing from AC, since the direction of current is fixed for DC, the continuous arc time lengthens when the same voltage is applied.

■ Incandescent lamp load

Since an inrush current of 10 to 15 times the rated current flows for an instant when the switch is turned on for the lamp, adhesion of the contacts may occur. Therefore, please take into consideration this transient current when selecting a switch.

■ Induction load

Since arc generation due to reverse voltage can cause contact failure to occur when there is an induction load (in relays, solenoids and buzzers, etc.), we recommend you insert a suitable spark quenching circuit (see figure below).

Circuit example	Notes
Switch contact 	(1) r = more than 10 Ω (2) In an AC circuit, impedance of R is to be slightly smaller than impedance of r and c.
Switch contact 	Can be used for both AC and DC circuits. r = R C: 0.1 μF
Switch contact 	For DC circuits only.
Switch contact 	Can be used for both AC and DC circuits.

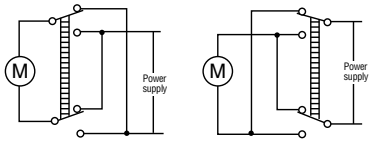
■ Motor load

Contacts may adhere due to the starting current at the start of motor operation which is three to eight times the steady-state current. Although it differs depending on the motor, since a current flows that is several times that of the nominal current, please select a switch taking into consideration the values in the table below. To make the motor rotate in reverse, use an ON-OFF-ON switch and take measures to prevent a multiplier current (starting current + reverse current) from flowing.

Motor type	Type	Starting current
Three-phase induction motor	Squirrel-cage	Approx. 5 to 8 times current listed on nameplate
Single-phase induction motor	Split-phase-start	Approx. 6 times current listed on nameplate
	Capacitor-start	Approx. 4 to 5 times current listed on nameplate
	Repulsion-start	Approx. 3 times current listed on nameplate

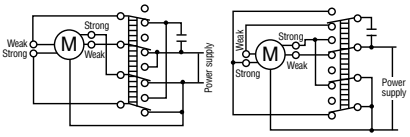
A current that is approximately two times that of the starting current will flow when reverse rotation is caused during operation. Also, when using for a load that will cause transient phenomena such as when operating the motor in reverse rotation or switching the poles, an arc short (circuit short) may occur due to the time lag between poles when switching. Please be careful.

Example of 1-pole motor reverse rotation circuit



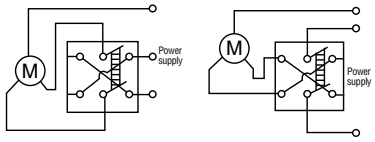
Good wiring Bad wiring

Example of single-phase induction motor (capacitor) strong-weak switching circuit



Good wiring Bad wiring

Example of three-phase motor reverse rotation circuit



Good wiring Bad wiring

■ Capacitor load

In the case of mercury lamps, florescent lamps and the capacitor loads of capacitor circuits, since an extremely large inrush current flows when the switch is turned on, please measure that transient value with the actual load and then either use the product keeping within the range of the rated current or after verifying the actual load.

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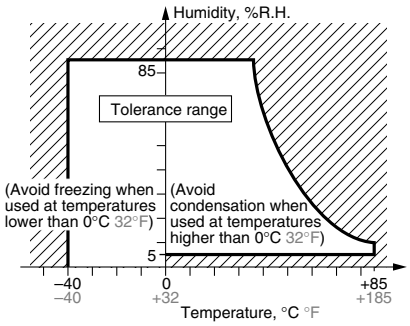
CAUTIONS FOR USE

■ Environment of use

1) Please consult us when using under the following conditions:
• Environments where hydrogen sulfide or other corrosive gases are present.
• Environments where gasoline, thinner or other flammable, explosive gases are present.
• Dusty environments (for non-seal type snap action switches).
• Use in environments not in the prescribed temperature or humidity range.
• Places with low air pressure.
2) Unless specified the product will not be constructed to withstand water, oil or explosions. Please inquire if you intend to use the product in special applications.

■ Usage, storage, and transport conditions

1) During usage, storage, or transportation, avoid locations subject to direct sunlight and maintain normal temperature, humidity, and pressure conditions.
2) The allowable specifications for environments suitable for usage, storage, and transportation are given below.
(1) Temperature: The allowable temperature range differs for each switch, so refer to the switch's individual specifications.
(2) Humidity: 5 to 85% R.H.
(3) Pressure: 86 to 106 kPa
The humidity range varies with the temperature. Use within the range indicated in the graph below.
(The allowable temperature depends on the switch.)



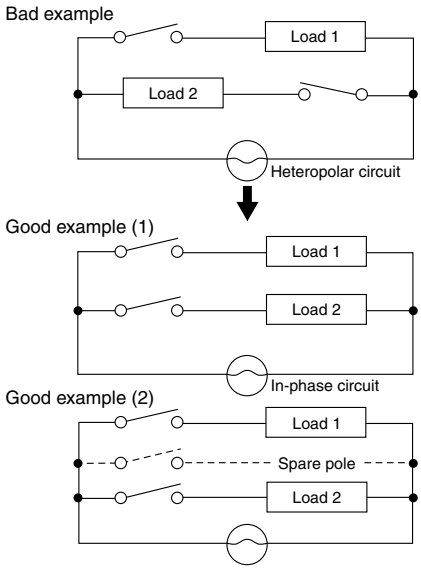
• Condensation will occur inside the switch if there is a sudden change in ambient temperature when used in an atmosphere of high temperature and high humidity. This is particularly likely to happen when being transported by ship, so please be careful of the atmosphere when shipping. Condensation is the phenomenon whereby steam condenses to cause water droplets that adhere to the switch when an atmosphere of high temperature and humidity rapidly changes from a high to low temperature or when the switch is quickly moved from a low humidity location to one of high temperature and humidity. Please be careful because condensation can cause adverse conditions such as deterioration of insulation, coil cutoff, and rust.
• Condensation or other moisture may freeze on the switch when the temperatures is lower than 0°C 32°F. This causes problems such as sticking of movable parts or operational time lags.
• The plastic becomes brittle if the switch is exposed to a low temperature, low humidity environment for long periods of time.
• Storage for extended periods of time (including transportation periods) at high temperatures or high humidity levels or in atmospheres with organic gases or sulfide gases may cause a sulfide film or oxide film to form on the surfaces of the contacts and/or it may interfere with the functions. Check out the atmosphere in which the units are to be stored and transported.
• In terms of the packing format used, make every effort to keep the effects of moisture, organic gases and sulfide gases to the absolute minimum.

■ Wiring

1) When using a PC board terminal switch as soldering terminals, use thin lead wires and be sure to wind them on the terminals before soldering.
2) Cautions when soldering
Perform soldering quickly in accordance with the specified conditions. Be careful not to let flux flow into the product. When no instruction is specified, use a soldering iron with a tip temperature of 350°C or lower and complete soldering within five seconds. Do not pull on the lead wires immediately after soldering. Wait some time before verifying.

■ Others

1) Failure modes of switches include short-circuiting, open-circuiting and temperature rises. If this switch is to be used in equipment where safety is a prime consideration, examine the possible effects of these failures on the equipment concerned, and ensure safety by providing protection circuits or protection devices. In terms of the systems involved, make provision for redundancy in the design and take steps to achieve safety design.
2) The ambient operating temperature (and humidity) range quoted is the range in which the switch can be operated on a continuous basis: it does not mean that using the switch within the rating guarantees the durability performance and environment withstanding performance of the switch. For details on the performance guarantee, check the specifications of each product concerned.
3) Even if 2-pole, 3-pole or 4-pole switches are used as single-pole switches in order to increase contact reliability, please keep the maximum current no higher than the rated value.
4) If there is the possibility of a short between poles, please use an in-phase circuit as shown below or provide a spare pole.



5) Be careful not to drop the product as this may cause loss of functionality.
6) Do not apply an unreasonable vertical force against the direction of operation of the product.
7) Use your hand to operate the actuator.
(Operation using a tool such as a screwdriver or hammer can cause breakdown.)

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Please contact .....

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