



CAUTIONS IN USING PRODUCTS

This product is designed and manufactured assuming that it is to be used with the resistance for direct current. If you use other kinds of resistance (Inductive or Capacitor), please obtain our conformation beforehand.

Resistive Load

A resistive load is a load with a resistive component which has a power factor of $1 (\cos \phi = 1)$.

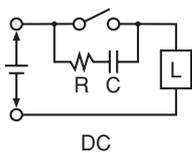
The rating indication is of rated voltage and current at resistive load.

Even resistive loads generally involve an inductive or capacitive component in addition to pure resistance.

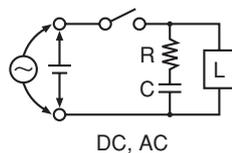
In actual applications, therefore, it is recommended that your switches be used at 80% of their rated current.

Inductive Load

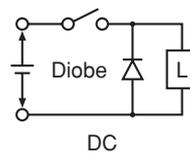
In the case of inductive loads, a peak current flows when the circuit is switched on, while a arc is generated by a reverse volatge when the circuit is turned off. Thus contact wear is more strigent than with a resistive load expected life is shorter. It is recommended, therefore, that the switch be used at less than 60% of the rated current with a satndard power factor of 0.6 ($\cos \phi = 0.6$)



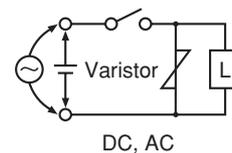
DC



DC, AC



DC



DC, AC

Motor Load

Motors in the starting mode draw a inrush current of about 3 to 8 times its specified steady state current which can cause switch contacts to melt. The inrush current varies with the motor type being used, so select the proper switch contact rating a few times greater than the specified state current of the motor. Refer to the Table 1. For various motor type inrush currents. Also, when rotating a motor reversely, such a consideration should be made as using an ON-OFF-ON switch to prevent total current

(startingcurrent+counter electromotive current)

If Your application involves the reverse rotation of a motor, please contact us so we can re recommend a switch suitable to load performance.

Table.1 JIS C4201 (1959)

Motor	Type	Inruch current
3 Phase Induction	Squirrel Cage	5 to 8 Times Steady State
Single Phase Induction	Spilt Phase Start	6 Time Steady State
	Condenser Start	4 to 5 Times Steady State
	Requulsion Start	3 Times Steady State



Lamp Load

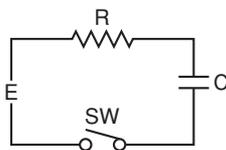
When a lamp is the switch load, the inrush current is about 10 to 15 times the steady state current possibly causing switch contacts to melt. Select a proper switch to handle such transient currents.

DC load

DC is unidirectional, therefore its continuation is longer than with AC. Use at 3A 30V DC or less is recommended. Also, common terminal shall be connected to ⊖ side.

Capacitor Load

Inrush currents will vary depending on the capacitance of the load. Use the switch within the range not exceeding the rated current, accordingly



$$E : AC. \quad R = \frac{\text{Rated Voltage}}{\text{Rated Current} \times 1.5}$$

$$E : DC. \quad R = \frac{1/5 \text{ of Rated Voltage}}{\text{Rated Current} \times 1.5}$$

Load Type	Max Voltage and Current
DC Load	1/5 of Rated Voltage
Lamp Load	1/15 to 1/10 of Rated Current
Motor Load	1/8 to 1/4 of Rated Current
Capacitor	differs according to the value of resistance
Inductive	1/10 to 1/3 of Rated Current

The above values vary with condition and should be used only for reference

Low current applications

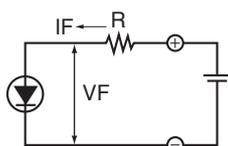
Silver contacts are subject to oxidation with passage of time and environmental factors. When using in dry circuits. Switches with gold-plated, contacts are recommended for low current applications.

For applications involving switches whose frequency of operation is very low, and current within 10mA, select a switch with gold-plated contacts.

Illuminated switches

The switches have no built-in resistor. Connect resistors by external wiring.

Current to be applied on LED must be lower than the forward current (IF) indicated in the column LED specifications. Value of the resistor must be calculated by the formula noted below.



$$R = \frac{E - V_F}{I_F}$$



1. Rate

The rate is indicated in the situation where the load is equal to the resistance
(power factor=1)

Even resistive loads generally involve an inductive or capacitive component in addition to pure resistance
In actual applications, therefore, it is recommended that your switches be used at 80% of their rated current.

2. Soldering

Shall not wash the switch in solvent after soldering. If flux is used for soldering, the flux shall not be painted excessively, otherwise it may invade the switch and insulate the connection of the switch.

Note that if the load is applied to the terminals during soldering it might cause deformation and defects in electrical performance.

Use of water-soluble soldering flux shall be avoided because it may cause corrosion of the switch.

Before soldering switches with locking mechanism, release the locks. If they are soldered without releasing the locks, the soldering heat may deform the locking mechanism.

When soldering on Push Button Switches, please avoid soldering when the switch position is "ON", or it may cause heat deformations of the internal parts.

3. Operating environment

The environment shall be free from contact with water, oil, chemicals (including detergents), dust, corrosive gas or high humidity, These may destroy the electrical and mechanical functions of the switch.

Shall reduce the voltage and current when the air pressure is lower than normal situation (86~106kpa).

The relative humidity shall be between 35~85%. Especially long exposure to high humidity will cause the problem of migration. It may also worsen the properties of the insulation.

Shall not be used in a environment where the switch is easily vibrated or strongly shocked.

These may insulate the connection of the switch connector or cause the parts to wear out.

4. Mounting size

Mounting size will depend on the material of the board, configuration, and the method of mounting. The mounting size in the painting is only for reference.

Tighten the mounting screws by applying the specified torque. Tightening with larger torque than the specified one will result in malfunction or breakage of screws.

Insert these switches to the specified mounting surface and mount them horizontally.

If not mounted horizontally, these switches will malfunction.

5. Cleaning of the plastic part

The plastic operating part should be cleaned by dried cloth when it becomes dirty.

It is possible that some kinds of solvents (including detergents) may destroy the plastic.



6. Custody environment

- * Shall be free of corrosive high temperatures, high humidity, vibration or shock.
- * If you don't use the product immediately, store it as delivered in the following environment: with neither direct sunshine nor corrosive gas and in normal temperatures. However, it is recommended that you should use it as soon as possible before six months at the maximum, from the date of their delivery.
- * After you break the seal, you should put the remaining in a plastic bag to separate it from the outside environment and store it in the same environment mentioned above. You should use it as soon as possible.
- * Do not stack too many switches for strafe.

7. Operation

The operating part should be moved to the appointed position in order to ensure proper operation.

The switch will be broken, if you give large stress than specified. Take most care not to give larger stress than specified to the switch.

Be sure to release the locks before removing the knobs. Otherwise, the locking mechanism may be deformed.

Keep it in mind to use the forced travel close to the position of the whole travel as much as possible.

8. Current Capacity of MJ Minomushi Clip, Maximum Capacity of Current of MJ IC Clip, Conductor Current of MC Metal Consent, and MT Terminal

Their current ratings do not mean the current flow of ON or OFF.

Please cut the circuit before connection or disconnection.

9. Ratings of AC Consent

The rating is maximum value at the load force of 0.95-1.

Accordingly the load force influences the life time. Please be careful about the load force.

The usage is suggested at the 80% more or less of the rated current

10. Insertion or Distraction Force of AC Consent

Please use a proper plug which keep the solid contact on the consent and prevents from abnormal overheat.

Please plug in and out vertically.