

## High-capacity Switch Capable of Handling 20 A Loads with Large Inrush Currents

- Same shape as OMRON Z Basic Switches except in pin plunger position, yet endures inrush currents as large as 75 A.



For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Be sure to read *Safety Precautions* on page 6 and *Safety Precautions for All Basic Switches*.

## Model Number Structure

### Model Number Legend

**A - 20 G □ - □**  
 (1) (2) (3) (4)

#### (1) Ratings

20 : 20 A (250 VAC)

#### (2) Contact Gap

G : 0.5 m

#### (3) Actuator

- None : Pin plunger
- D : Short spring plunger
- Q : Panel mount plunger
- Q21 : Panel mount cross roller plunger
- Q22 : Panel mount roller plunger
- V : Hinge lever
- V2 : Hinge roller lever
- V21 : Short hinge lever
- V22 : Short hinge roller lever

#### (4) Terminals

- None : Solder terminal
- B : Screw terminal (with toothed washer)

## Ordering Information

| Actuator                         | Terminal | Solder terminal | Screw terminal (-B) |
|----------------------------------|----------|-----------------|---------------------|
|                                  |          | Model           | Model               |
| Pin plunger                      |          | A-20G           | A-20G-B             |
| Short spring plunger             |          | A-20GD          | A-20GD-B            |
| Panel mount plunger              |          | A-20GQ          | A-20GQ-B            |
| Panel mount roller plunger       |          | A-20GQ22        | A-20GQ22-B          |
| Panel mount cross roller plunger |          | ---             | A-20GQ21-B          |
| Short hinge lever                |          | A-20GV21        | A-20GV21-B          |
| Hinge lever                      |          | A-20GV          | A-20GV-B            |
| Short hinge roller lever         |          | A-20GV22        | A-20GV22-B          |
| Hinge roller lever               |          | A-20GV2         | A-20GV2-B           |

## Specifications

### Ratings

| Rated voltage (V) | Non-inductive load (A) |      |           |    | Inductive load (A) |    |            |    |
|-------------------|------------------------|------|-----------|----|--------------------|----|------------|----|
|                   | Resistive load         |      | Lamp load |    | Inductive load     |    | Motor load |    |
|                   | NC                     | NO   | NC        | NO | NC                 | NO | NC         | NO |
| 125 VAC           | 20                     |      | 7.5       |    | 20                 |    | 12.5       |    |
| 250 VAC           | 20                     |      | 7.5       |    | 20                 |    | 8.3        |    |
| 500 VAC           | 15                     |      | 4         |    | 10                 |    | 2          |    |
| 8 VDC             | 20                     | 3    | 1.5       |    | 20                 |    | 12.5       |    |
| 14 VDC            | 20                     | 3    | 1.5       |    | 15                 |    | 12.5       |    |
| 30 VDC            | 6                      | 3    | 1.5       |    | 5                  |    | 5          |    |
| 125 VDC           | 0.5                    | 0.5  | 0.5       |    | 0.05               |    | 0.05       |    |
| 250 VDC           | 0.25                   | 0.25 | 0.25      |    | 0.03               |    | 0.03       |    |

- Note: 1. The above values are for steady-state current.  
 2. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).  
 3. Lamp load has an inrush current of 10 times the steady-state current.  
 4. Motor load has an inrush current of 6 times the steady-state current.  
 5. The ratings values apply under the following test conditions:  
 (1) Ambient temperature: 20±2°C  
 (2) Ambient humidity: 65±5%RH  
 (3) Operating frequency: 20 operations/min

### Certified Standard Ratings

Ask your OMRON representative for information on certified models. **UL/CSA (General ratings only)**

| Rated voltage | Model | A-20G         |
|---------------|-------|---------------|
| 125 VAC       |       | 1 HP 10 A "L" |
| 250 VAC       |       | 2 HP          |
| 480 VAC       |       | 20 A          |
| 125 VDC       |       | 0.5 A         |
| 250 VDC       |       | 0.25 A        |

## Characteristics

|  |                    |   |
|--|--------------------|---|
| <b>Operating speed</b>                             |                    | 0.01 mm to 1m/s *1  |
| <b>Operating frequency</b>                         | <b>Mechanical</b>  | 240 operations/min  |
|  | <b>Electrical</b>  | 20 operations/min   |
| <b>Insulation resistance</b>                       |                    | 100 MΩ min. (at 500 VDC)  |
| <b>Contact resistance</b>                          |                    | 15 mΩ max. (initial value)  |
| <b>Dielectric strength</b>                         |                    | 1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarity<br>2,000 VAC, 50/60 Hz for 1 min between the current-carrying metal parts and the ground, and between each terminal and non-current-carrying metal parts |
| <b>Vibration resistance</b>                        | <b>Malfunction</b> | 10 to 55 Hz, 1.5-mm double amplitude *2   |
| <b>Shock resistance</b>                            | <b>Destruction</b> | 1,000 m/s <sup>2</sup> max.   |
|  | <b>Malfunction</b> | 300 m/s <sup>2</sup> max. *1 *2   |
| <b>Durability</b>                                  | <b>Mechanical</b>  | 1,000,000 operations min.   |
|  | <b>Electrical</b>  | 500,000 operations min.   |
| <b>Degree of protection</b>                        |                    | IP00  |
| <b>Degree of protection against electric shock</b> |                    | Class I   |
| <b>Proof tracking index (PTI)</b>                  |                    | 175   |
| <b>Ambient operating temperature</b>               |                    | -25°C to 80°C (with no icing)   |
| <b>Ambient operating humidity</b>                  |                    | 35% to 85%RH  |
| <b>Weight</b>                                      |                    | Approx. 22 to 58 g  |

\*1. The value is for the pin plunger. (Contact your OMRON representative for other models.)

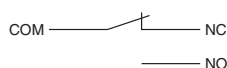
\*2. Malfunction: 1 ms max.

## Contact Specification

|                       |                             |              |
|-----------------------|-----------------------------|--------------|
| <b>Contacts</b>       | <b>Shape</b>                | Rivet        |
|                       | <b>Material</b>             | Silver alloy |
|                       | <b>Gap (standard value)</b> | 0.5 mm       |
| <b>Inrush current</b> | <b>NC</b>                   | 75 A max.    |
|                       | <b>NO</b>                   | 75 A max.    |

## Structure

### Contact Form (SPDT)

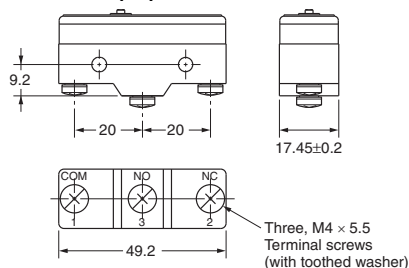


## Dimensions

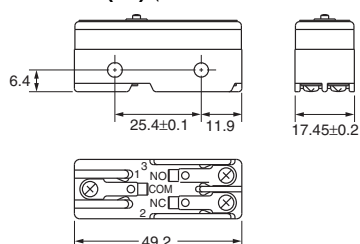
(Unit: mm)

### Terminals

#### Screw Terminals (-B)



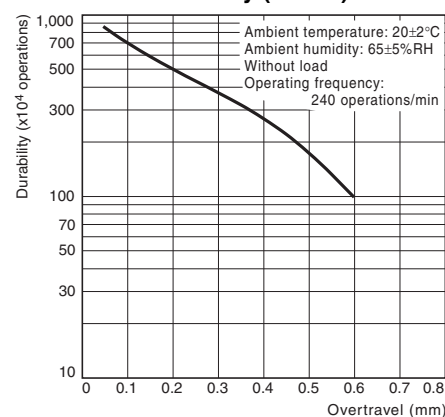
#### Solder Terminal (-A) ("A" is not included in the model numbers.)



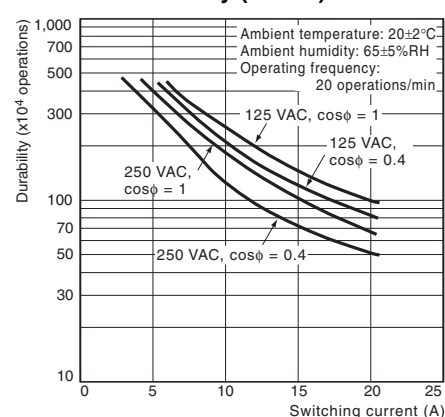
Note: 1. Appropriate terminal screw tightening torque: 0.78 to 1.18 N·m.  
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

## Engineering Data

### Mechanical Durability (A-20G)

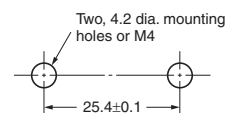


### Electrical Durability (A-20G)



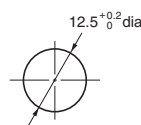
### Mounting Holes

Use M4 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 1.18 to 1.47 N·m.

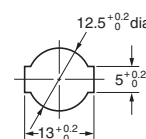


The Switch can be panel mounted, provided that the hexagonal nut of the actuator is tightened to a torque of 2.94 to 4.9 N·m.

#### Panel Mount Plunger



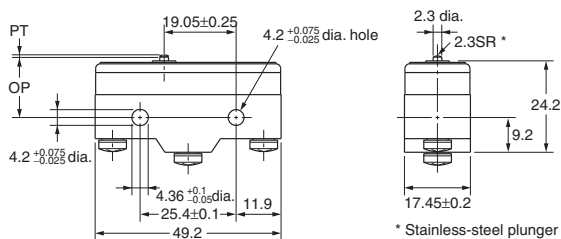
#### Panel Mount Roller Plunger



## Dimensions and Operating Characteristics

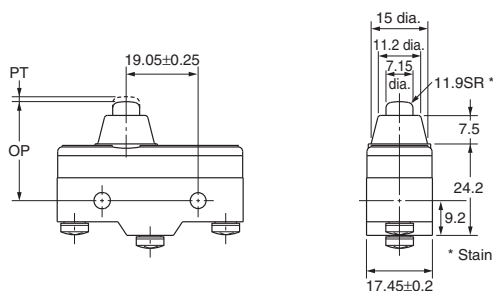
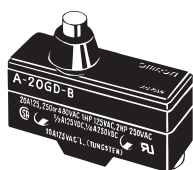
The models, illustrations, and graphics are for screw-terminal models. (The dimensions for models that are omitted here are the same as for pin-plunger models.)

### Pin Plunger A-20G-B



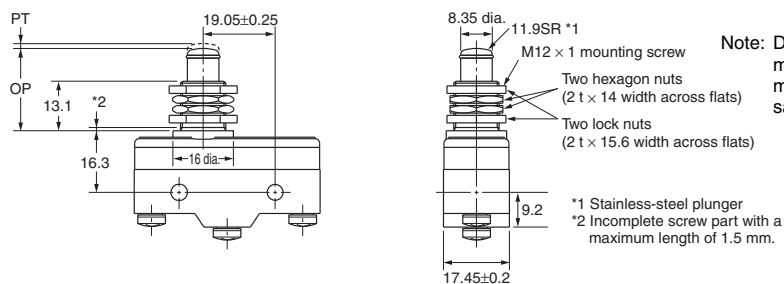
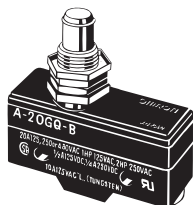
\* Stainless-steel plunger

### Short Spring Plunger A-20GD-B



\* Stainless-steel plunger

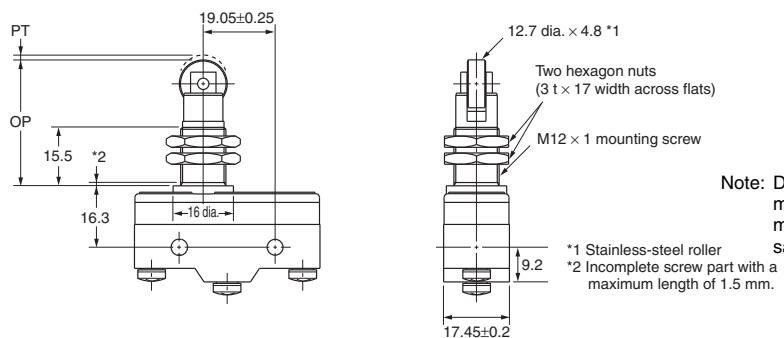
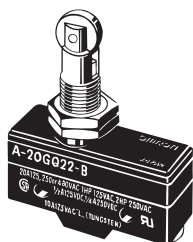
### Panel Mount Plunger A-20GQ-B



Note: Do not use both M12 mounting screw and mounting holes at the same time.

\*1 Stainless-steel plunger  
\*2 Incomplete screw part with a maximum length of 1.5 mm.

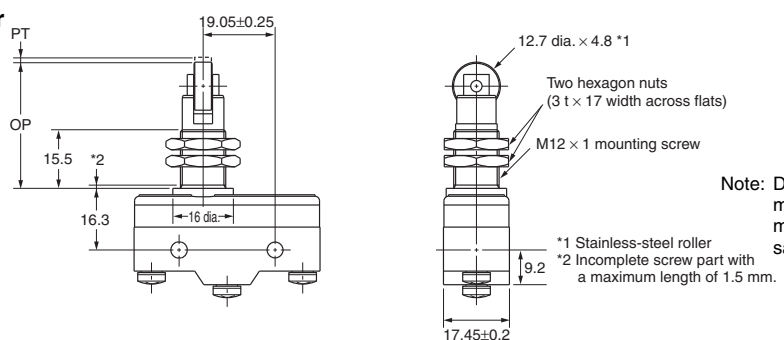
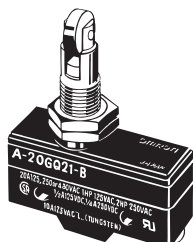
### Panel Mount Roller Plunger A-20GQ22-B



Note: Do not use both M12 mounting screw and mounting holes at the same time.

\*1 Stainless-steel roller  
\*2 Incomplete screw part with a maximum length of 1.5 mm.

### Panel Mount Cross Roller Plunger A-20GQ21-B



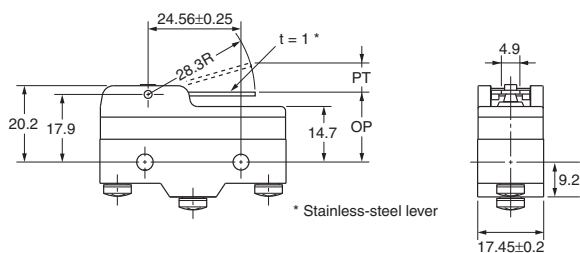
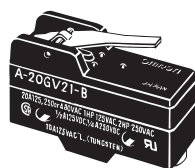
Note: Do not use both M12 mounting screw and mounting holes at the same time.

\*1 Stainless-steel roller  
\*2 Incomplete screw part with a maximum length of 1.5 mm.

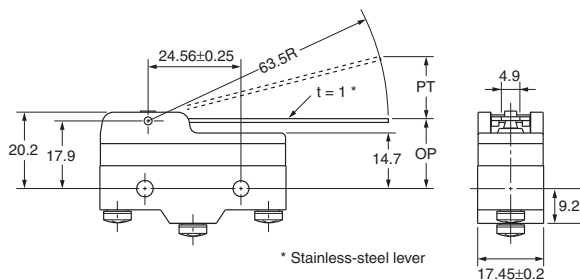
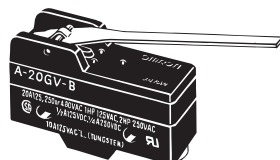
Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

| Operating Characteristics | Model   | A-20G-B        | A-20GD-B       | A-20GQ-B       | A-20GQ22-B    | A-20GQ21-B    |
|---------------------------|---------|----------------|----------------|----------------|---------------|---------------|
| Operating force           | OF      | 3.92 to 6.13 N | 3.92 to 6.13 N | 3.92 to 6.13 N | 6.18 N max.   | 6.18 N max.   |
| Release force             | RF min. | 2.79 N         | 2.79 N         | 2.79 N         | 2.75 N        | 2.75 N        |
| Pretravel                 | PT max. | 1.3 mm         | 1.3 mm         | 1.3 mm         | 1.3 mm        | 1.3 mm        |
| Over Travel               | OT min. | 0.25 mm        | 3 mm           | 5.6 mm         | 3.58 mm       | 3.58 mm       |
| Movement differential     | MD max. | 0.2 mm         | 0.2 mm         | 0.2 mm         | 0.35 mm       | 0.35 mm       |
| Operating Position        | OP      | 16.3 ± 0.4 mm  | 26.2 ± 0.5 mm  | 21.8 ± 0.8 mm  | 33.4 ± 1.2 mm | 33.4 ± 1.2 mm |

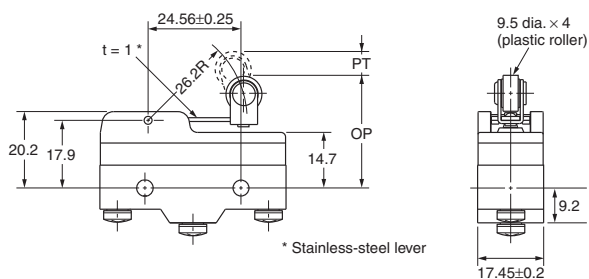
**Short Hinge Lever  
A-20GV21-B**



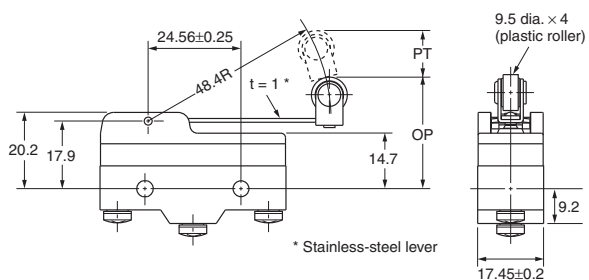
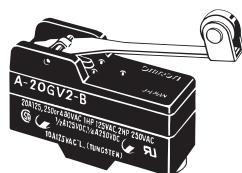
**Hinge Lever  
A-20GV-B**



**Short Hinge Roller Lever  
A-20GV22-B**



**Hinge Roller Lever  
A-20GV2-B**



Note: Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions.

| Operating Characteristics | Model | A-20GV21-B | A-20GV-B  | A-20GV22-B  | A-20GV2-B   |
|---------------------------|-------|------------|-----------|-------------|-------------|
| OF max.                   |       | 1.57 N     | 0.69 N    | 1.57 N      | 0.88 N      |
| RF min.                   |       | 0.41 N     | 0.14 N    | 0.41 N      | 0.14 N      |
| PT max.                   |       | 6.5 mm     | 15.9 mm   | 6.3 mm      | 12 mm       |
| OT min.                   |       | 1.2 mm     | 4 mm      | 1.2 mm      | 2.4 mm      |
| MD max.                   |       | 1.2 mm     | 2.4 mm    | 1.2 mm      | 2.2 mm      |
| OP                        |       | 19±0.8 mm  | 19±0.8 mm | 29.8±0.8 mm | 30.2±0.8 mm |

## Accessories (Order Separately)

A Terminal Protective Cover and a Separator are available.

### Terminal Covers (Sold Separately)

The Terminal Covers can be attached to Z, A, X, and DZ Switches.

The Terminal Cover is secured with mounting screws and protects the casing and terminal wires from dust, vibration, or fingers, thus preventing terminal short-circuiting, ground faults, wire disconnection or improper connection, and electric shock accidents.

Terminal Covers made of phenol resin have five or six thin wall sections. These sections can be torn open for providing holes for lead cables at desired points.

A terminal cover can't be used in the case of using an actuator sold separately.

### Operation Information

| Material         | Application<br>Mounting direction | Soldering terminal use | Screw terminal use | Remarks                |
|------------------|-----------------------------------|------------------------|--------------------|------------------------|
|                  |                                   | Model                  |                    |                        |
| Phenol resin     | Side mounting                     | AP-A                   | AP-B               | ---                    |
| Metal press mold | Side mounting                     | AP1-A                  | AP1-B              | Used for AP-A and AP-B |
| Vinyl chloride   | Side mounting                     | AP-Z                   |                    | ---                    |

Note: Use a Terminal Cover for screw terminals for DZ-series Switches with soldering terminals.

### Separator (Sold Separately)

Use a Separator when it is difficult to provide a sufficient insulation distance or when using the Switch near metal parts or copper wires.

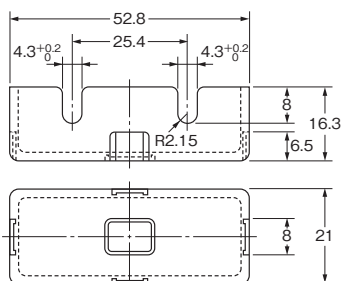
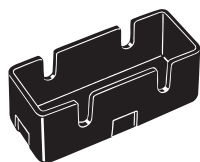
### Operation Information

| Model           |
|-----------------|
| SEPARATOR FOR Z |

## Dimensions (Unit: mm)

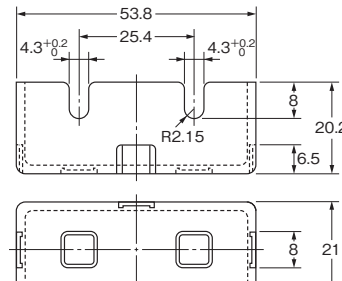
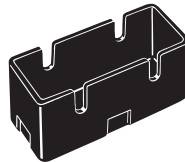
### Terminal Covers

#### AP-A Soldering Terminal Use (Phenol Resin)



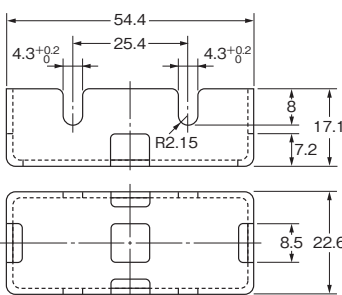
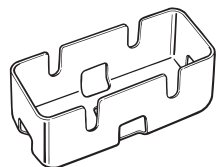
Note: The Cover has five thin, easy-to-separate portions for easy lead wire connections.

#### AP-B Screw Terminal Use (Phenol Resin)



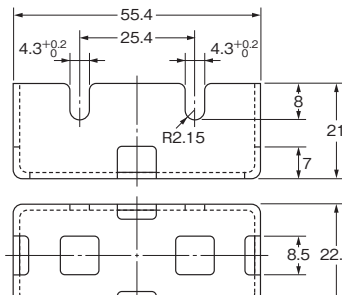
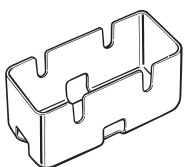
Note: The Cover has six thin, easy-to-separate portions for easy lead wire connections.

#### AP1-A Soldering Terminal Use (Metal Press Mold)



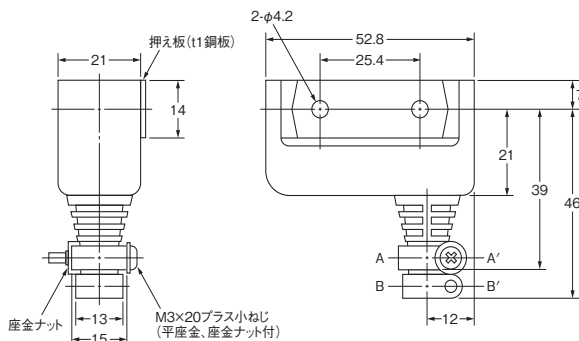
Note: The Cover has five holes for easy lead wire connections.

#### AP1-B Screw Terminal Use (Metal Press Mold)



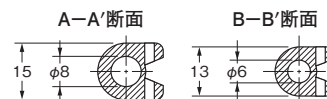
Note: The Cover has six holes for easy lead wire connections.

#### AP-Z Soldering or Screw Terminal Use (Vinyl Chloride)



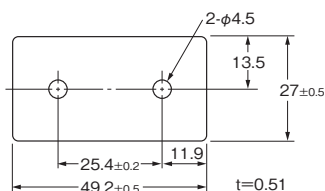
Note: Each dimension has a tolerance of  $\pm 0.4$  mm unless otherwise specified. ( $\pm 0.8$  mm for the AP-Z)

### Cable Pull-out Dimension



Note: A 6-dia. or 8-dia. cable can be used by cutting the cable pull-out hole to the size of the cable to be used.

### Separator



Note: 1. Each dimension has a tolerance of  $\pm 0.4$  mm unless otherwise specified.  
2. The material is EAVTC (Epoxy Alkyd Varnished Tetrone Cloth) and its heat-resisting temperature is 130°C.

## Safety Precautions

Refer to *Safety Precautions for All Basic Switches*.

### Precautions for Safe Use

#### Terminal Connection

When you wire a Switch, use a wire size that is suitable for the applied voltage and current flow. When soldering wires to the Switch, make sure that the capacity of the soldering iron is 60 W maximum and complete soldering within 5 s. If soldering is not performed correctly, heat may be abnormally generated when the Switch is used, which may cause burning. The characteristics of the Switch will deteriorate if a soldering iron with a capacity of more than 60 W is used or if heat is applied to the Switch for more than 5 s.

#### Operation

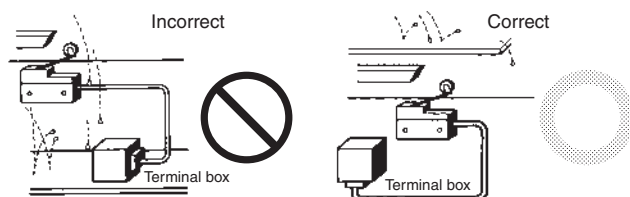
- Make sure that the switching frequency or speed is within the specified range.
  1. If the switching speed is extremely slow, the contact may not be switched smoothly, which may result in a contact failure or contact welding.
  2. If the switching speed is extremely fast, switching shock may damage the Switch soon. If the switching frequency is too high, the contact may not catch up with the speed.

The rated permissible switching speed and frequency indicate the switching reliability of the Switch.  
The life of a Switch is determined at the specified switching speed. The life varies with the switching speed and frequency even when they are within the permissible ranges. In order to determine the life of a Switch model to be applied to a particular use, it is best to conduct an appropriate durability test on some samples of the model under actual conditions.
- Make sure that the actuator travel does not exceed the permissible OT position. The operating stroke must be set to 70% to 100% of the rated OT.

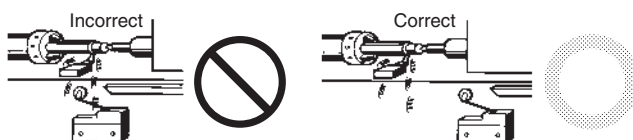
### Precautions for Correct Use

#### Mounting Location

- Do not use the switch alone in atmospheres such as flammable or explosive gases. Arcing and heat generation associated with switching may cause fires or explosions.
- Switches are generally not constructed with resistance against water. Use a protective cover to prevent direct spraying if the switch is used in locations subject to splashing or spurring oil or water, dust adhering.

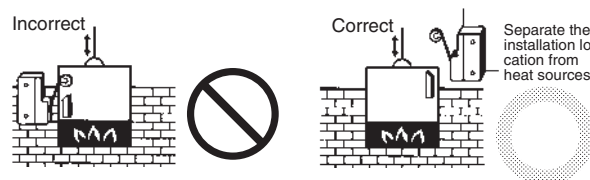


- Install the switch in a location that is not directly subject to debris and dust from cutting. The actuator and the switch body must be protected from accumulated cutting debris and dirt.



- Do not use the switch in locations subject to hot water (greater than 60°C) or in water vapor.

- Do not use the switch outside the specified temperature and atmospheric conditions.  
The permissible ambient temperature depends on the model. (Refer to the specifications in this catalog.) Sudden thermal changes may cause thermal shock to distort the switch and result in faults.



- Mount a cover if the switch is to be installed in a location where worker inattention could result in incorrect operation or accidents.



- Subjecting the switch to continuous vibration or shock may result in contact failure or faulty operation due to abrasion powder and in reduced durability. Excessive vibration or shock will cause the contacts to operate malfunction or become damaged. Mount the switch in a location that is not subject to vibration or shock and in a direction that does not subject the switch to resonance.
- If silver contacts are used with relatively low frequency for a long time or are used with microloads, the sulfide coating produced on the contact surface will not be broken down and contact faults will result. Use a microload switch that uses gold contacts.
- Do not use the switch in atmospheres with high humidity or heat or in harmful gases, such as sulfide gas ( $\text{H}_2\text{S}$ ),  $\text{SO}_2$ , ammonia gas ( $\text{NH}_3$ ), nitric acid gas ( $\text{HNO}_3$ ), or chlorine gas ( $\text{Cl}_2$ ). Doing so may impair functionality, such as with damage due to contacting faults or corrosion.
- The switch includes contacts. If the switch is used in an atmosphere with silicon gas, arc energy may cause silicon oxide ( $\text{SiO}_2$ ) to accumulate on the contacts and result in contact failure. If there is silicon oil, silicon filling, silicon wiring, or other silicon products in the vicinity of the switch, use a contact protection circuit to limit arcing and remove the source of the silicon gas.

#### Wiring

- Use wire sizes that are suitable to the applied voltage and carried current.
- If you use a soldering iron to solder the wires, do not allow the tip of the soldering iron to exceed 380°C. If a Switch is used with insufficient soldering, abnormal heat and burning may occur.
- Solder for no more than 5 s at 350°C and for no more than 3 s at 380°C. If heat is applied for too long, the case may melt, the lead wire coverings may be scorched, and other characteristics of the Switch may deteriorate.

#### Panel-mounting model (A-20GQ□)

- If a Switch is side-mounted with screws, remove the hexagonal nut of the actuator.
- If a Switch is side-mounted and secured with screws, make sure that the angle or speed of the actuating object is not excessively large or too high, otherwise the Switch may be damaged.
- If a Switch is panel-mounted, pay utmost attention to make sure that the actuating speed or OT distance is not excessively high or large. Not doing so may damage the Switch.

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