OMRON

# Pushbutton Switches

realizing

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| Read and Understand this Catalog |
| --- |
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| Warranty and Limitations of Liability |
| --- |
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| Application Considerations |
| --- |
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| Disclaimers |
| --- |
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# Safety Precautions

## ■ Meaning of Signal Words

The following signal word is used in this catalog.

| | |
|---|---|
| ⚠ WARNING | Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage. |

## ■ Meaning of Alert Symbols

The following alert symbol is used in this catalog.

| | |
|---|---|
| ⚠ | Indicates the possibility of electric shock under specific conditions. |

## ■ Alert Statement in this Catalog

The following alert statement applies to the products in this catalog. This alert statement also appears at the locations needed in this catalog to attract your attention.

Please read the *Technical Information* section (page 8) and *Safety Precautions* for each model for other operation precautions.

| ⚠ WARNING | |
|---|---|
| Electric shock may possibly occur. Do not perform wiring work or touch the charged parts of terminals while power is supplied to the Switch. | ⚠ |

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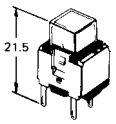
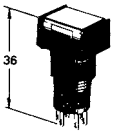
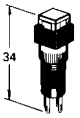
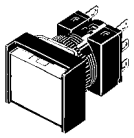
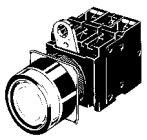
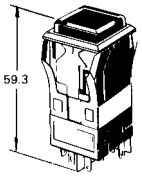
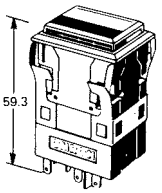
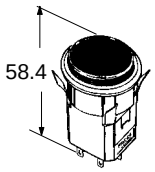
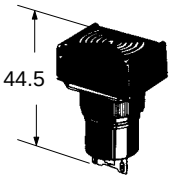
| Classification | Pushbutton switch | | |
|---|---|---|---|
| **Model** | A3A | A3C | A3D |
| **Appearance** |   |   |   |
| **Pushbutton shape** | □ ○ | □ □ ○ | □ □ ○ |
| **Panel cutout dimensions** | 11.5 × 11.5, 11.5 dia. | 12 dia. | 8 dia. |
| **Pushbutton color** | LED-lighted: red, yellow, green<br>Non-lighted: red, yellow, green, blue, gray, black, light gray, dark gray | LED-lighted: red, yellow, green, white<br>Incandescent lamp-lighted: red, yellow, green, blue, white<br>Non-lighted: red, yellow, green, blue, white, black | LED-lighted: red, yellow, green, white |
| **Indicator type (see note)** | NO | YES | YES |
| **Switch color** | Black | Black | Black |
| **Form** | SPST-NO, SPDT | SPST-NO+<br>SPST-NC | SPST-NO |
| **Rated load (resistive)** | 6 A, 125 VAC; 4 A, 30 VDC | 0.5 A, 250 VAC; 1 A, 30 VDC | 0.1 A, 30 VDC |
| **Mechanical life expectancy** | Momentary operation: 1,000 x $10^3$ operations min.<br>Alternate operation: 50 x $10^3$ operations min. (high capacitive load), 100 x $10^3$ operations min. (general-purpose, micro loads) | Momentary operation: 1,000 x $10^3$ operations min.<br>Alternate operation: 100 x $10^3$ operations min. | Momentary operation: 1,000 x $10^3$ operations min.<br>Alternate operation: 100 x $10^3$ operations min. |
| **Electrical life expectancy** | 50 x $10^3$ operations min. (high capacitive load)<br>100 x $10^3$ operations min. (general-purpose load)<br>1,000 x $10^3$ operations min. (micro load) | 100 x $10^3$ operations min. | 100 x $10^3$ operations min. |
| **Mounting style** | Snap-in panel mounting<br>PC board mounted, thru-panel | Nut mounting | Nut mounting |
| **Remarks** | Possible to switch wide range of loads | Accessories: socket, insulation cover<br>Series product: micro load type LED & lamp for A16 can be used. | Accessories: socket, insulation cover |
| **Approved standards** | UL CSA | UL CSA | --- |
| **Page** | 210 | 34 | 20 |

**Note:** Indication function only

## Selection Guide

| **Classification** | Pushbutton switch, knob-type selector switch, key-type selector switch | | Pushbutton switch | |
|---|---|---|---|---|
| **Model** | A16 | A22 | A3PA | A3PJ |
| **Appearance** |  |  |  |  |
| **Pushbutton shape** | ▭ ▭ ○ | ▭ ▭ ○ | ▭ | ▭ |
| **Panel cutout dimensions** | 16 dia. | 22 dia. | 23.5×22.5 | 23.5×30.5 |
| **Pushbutton color** | LED-lighted: red, yellow, pure yellow, green, white, blue<br>Incandescent lamp-lighted: red, yellow, green, pure yellow, white, blue<br>Non-lighted: red, yellow, pure yellow, green, white, blue, black | LED-lighted: red, yellow, green, white, blue<br>Incandescent lamp-lighted: red, yellow, green, white, blue<br>Non-lighted: red, yellow, green, white, blue, black | Lighted with built-in LED: red, white, green, orange<br>Incandescent lamp-lighted: red, green, white, blue, orange<br>LED-lighted: red, yellow, green, white (split types and 2-color types also available) | |
| **Indicator type (see note)** | YES | YES | YES | |
| **Switch color** | Black | Black, brown | Light gray, black | |
| **Form** | SPDT, DPDT | SPST-NO, SPST-NC, SPST-NO+SPST-NC, DPST-NO, DPST-NC | SPDT, DPDT | |
| **Rated load (resistive)** | 5 A, 125 VAC;<br>3 A, 250 VAC;<br>3 A, 30 VDC | 10 A, 110 VAC;<br>6 A, 220 VAC | 3 A, 250 VAC; 3 A, 30 VDC | |
| **Mechanical life expectancy** | Pushbutton Switch<br>Momentary operation: 2,000 x $10^3$ operations min.<br>Knob-type Selector Switch<br>250 x $10^3$ operations min.<br>Key-type Selector Switch<br>250 x $10^3$ operations min. | Pushbutton Switch<br>5,000 x $10^3$ operations min.<br>Knob-type Selector Switch Non-lighted: 500 x $10^3$ operations min.<br>Lighted: 100 x $10^3$ operations min.<br>Key-type Selector Switch<br>500 x $10^3$ operations min. | Momentary operation: 1,000 x $10^3$ operations min.<br>Alternate operation: 200 x $10^3$ operations min. | |
| **Electrical life expectancy** | Pushbutton Switch<br>100 x $10^3$ operations min.<br>Knob-type Selector Switch<br>100 x $10^3$ operations min.<br>Key-type Selector Switch<br>100 x $10^3$ operations min. | Pushbutton Switch<br>500 x $10^3$ operations min.<br>Knob-type Selector Switch Non-lighted: 500 x $10^3$ operations min.<br>Lighted: 100 x $10^3$ operations min.<br>Key-type Selector Switch<br>500 x $10^3$ operations min. | 100 x $10^3$ operations min. | |
| **Mounting style** | Nut mounting | Nut mounting | Snap-in panel mounting | |
| **Remarks** | Accessories: extractor, legend plate, screw fitting, panel plug, lock ring | Accessories: contact block, lamp socket, mounting latch, legend plate, metallic bezel ring, sealing cap, control box, snap-in legend plate | Accessories: socket, mounting plate, barrier, switch guard, protective cover<br>Series product: Microload version | |
| **Approved standards** | CE UL cUL CCC | CE UL cUL CCC | UL CSA CCC | |
| **Page** | 55 | 136 | 220 | 220 |

**Note:** Indication function only

| Classification | Pushbutton switch | Buzzer |
|---|---|---|
| **Model** | A3PT | M2BJ-B |
| **Appearance** |   |   |
| **Pushbutton shape** | ○ | ○ |
| **Panel cutout dimensions** | 29 dia. | 16 dia. |
| **Pushbutton color** | LED-lighted: white, red, yellow, green<br>Incandescent lamp-lighted:<br>red, green, white, blue, orange | Non-lighted |
| **Indicator type (see note)** | YES | NO |
| **Switch color** | Light grey | Black |
| **Form** | SPDT, DPDT | --- |
| **Rated load (resistive)** | 3 A, 250 VAC; 5 A, 125 VAC; 5 A, 8 VDC; 5 A, 14 VDC; 4A, 30 VDC; 0.4 A, 125 VDC; 0.2 A, 250 VDC | |
| **Mechanical life expectancy** | Momentary operation:<br>1,000,000 operations min.<br>Alternate operation:<br>200,000 operations min. | --- |
| **Electrical life expectancy** | 100,000 operations min. | --- |
| **Mounting style** | Spring mounting | Nut mounting<br>Snap-in panel mounting |
| **Remarks** | Same as the A3PA and A3PJ | Buzzer only<br>Accessories: snap-in mounting leaf spring, panel plug |
| **Approved standards** | UL CSA CCC | --- |
| **Page** | 220 | 131 |

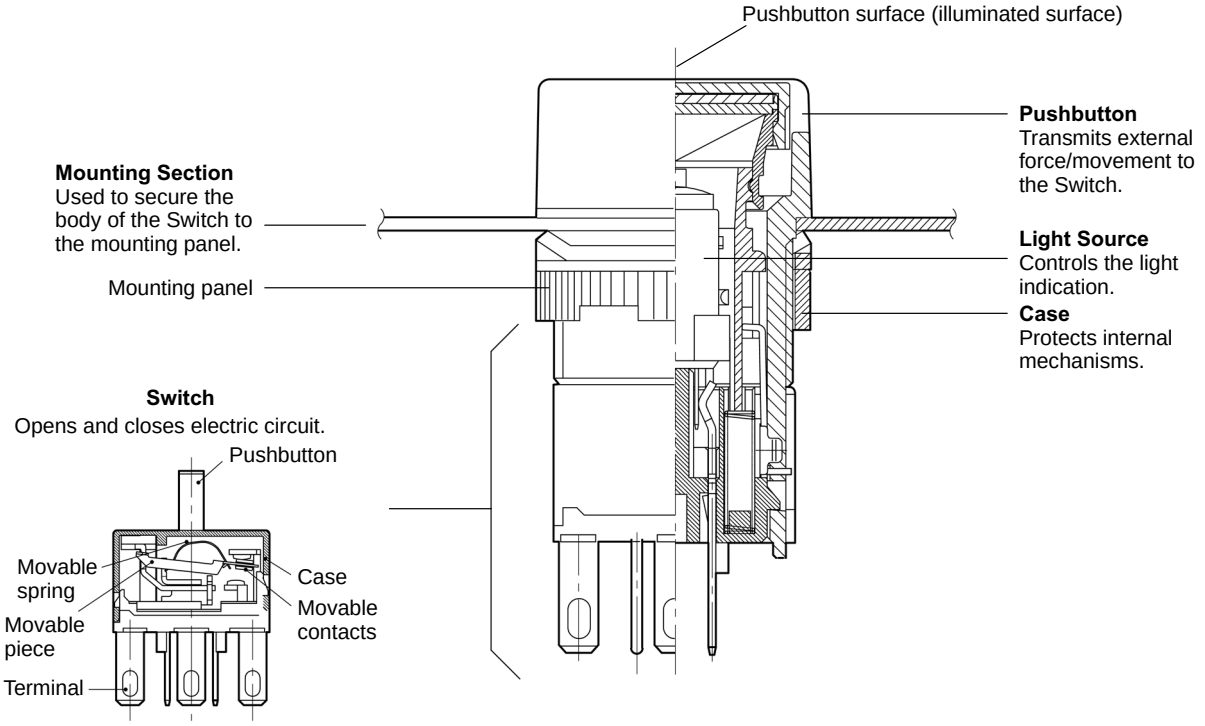
**Note:** Indication function only

# Technical Information

## ■ Terms for Configuration and Structure

A Pushbutton Switch is a switch designed so that its contacts are opened and closed by depressing and releasing a pushbutton on the Switch in the direction of its axis. Pushbutton Switches come in two categories: lighted and non-lighted. The structure of a typical Lighted Pushbutton Switch is shown below. Broadly speaking, Lighted Pushbutton Switches are made up of the 5 sections shown below. Non-lighted Pushbutton Switches are made up of 4 sections, the 5 sections shown below less the light source.

### Structure of Typical Lighted Pushbutton Switch

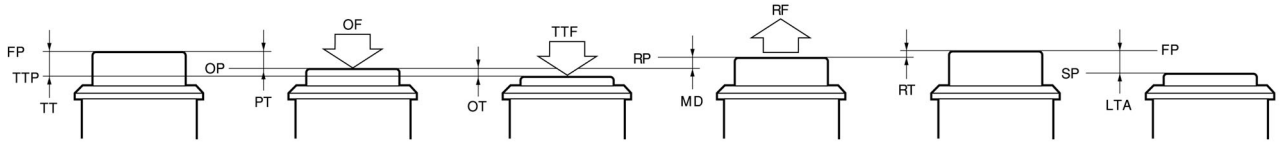



## ■ Terms for Operating Action

| Operation | Explanation |
|---|---|
| **Momentary operation** | The pushbutton returns to its original position after it is released. |
| **Alternate operation** | The first time the pushbutton is pressed, an internal lock mechanism holds it in the same position. The next time it is pressed, the lock is released and the pushbutton returns to its original position. |
| **Push-pull operation** | When the pushbutton is pressed, an internal lock mechanism holds it in the same position. The pushbutton is returned to its original position when the pushbutton is pulled to release the lock. |
| **Push-lock, turn-reset operation** | When the pushbutton is pressed, an internal lock mechanism holds it in the same position. The pushbutton is returned to its original position when the pushbutton is twisted to release the lock. |

## ■ Terms Related to Operating Characteristics

| Classification | Term | Abbreviation | Unit | Definition |
|---|---|---|---|---|
| Force | Operating Force | OF | N, N·m | The force (or torque) that must be applied to the pushbutton to move it from the free position to the operating position. |
| | Releasing Force | RF | N, N·m | The force (or torque) that must be applied to the pushbutton to move it from the operating limit position back to the returned position. |
| | Total Travel Force | TTF | N, N·m | The force (or toque) on the pushbutton when it reaches the stopper. |
| Position | Free Position | FP | mm, (°) | The position (or angle) of the pushbutton when there is no external force applied to it. |
| | Operating Position | OP | mm, (°) | The position (or angle) of the pushbutton when the movable contact changes from the free position state to the operating position state due to an external force. |
| | Release Position | RP | mm, (°) | The position (or angle) of the pushbutton when the movable contact changes from the operating position state to the free position state due to the reduction of external force. |
| | Total Travel Position | TTP | mm, (°) | The position (or angle) of the pushbutton when it reaches the stopper. |
| | Set Position | SP | mm, (°) | The position of an alternate operation pushbutton when it is in the self-holding state, or the position (or angle) of a selector switch when it is in the self-holding state. |
| Travel | Pretravel | PT | mm, (°) | The distance (or angle) through which the pushbutton moves in going from the free position to the operating position. |
| | Overtravel | OT | mm, (°) | The distance (or angle) through which the pushbutton moves in going from the operating position to the operating limit position. |
| | Movement Differential | MD | mm, (°) | The distance (or angle) through which the pushbutton moves in going from the operating position back to the returned position. |
| | Total Travel | TT | mm, (°) | The distance (or angle) through which the pushbutton moves in going from the free position to the operating limit position. |
| | Releasing Travel | RT | mm, (°) | The distance (or angle) through which the pushbutton moves in going from the returned position to the free position. |
| | Lock Travel Alternate | LTA | mm, (°) | The distance (or angle) through which the pushbutton moves in going from the free position to the set position. |

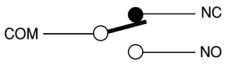
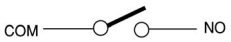
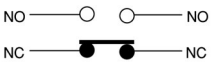



Free position | Operating position | Operating limit position | Returned position | Free position | Set position

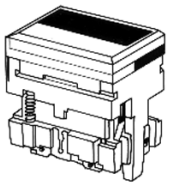
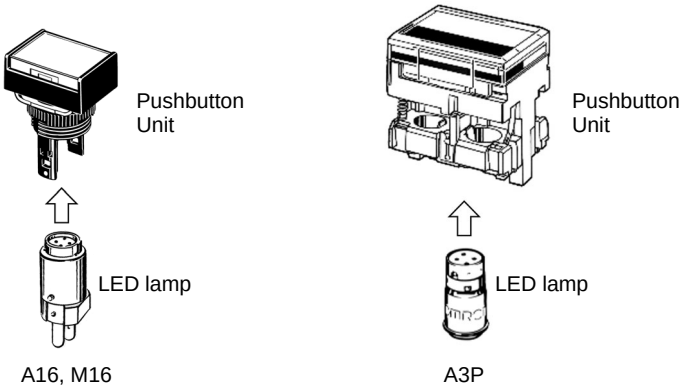
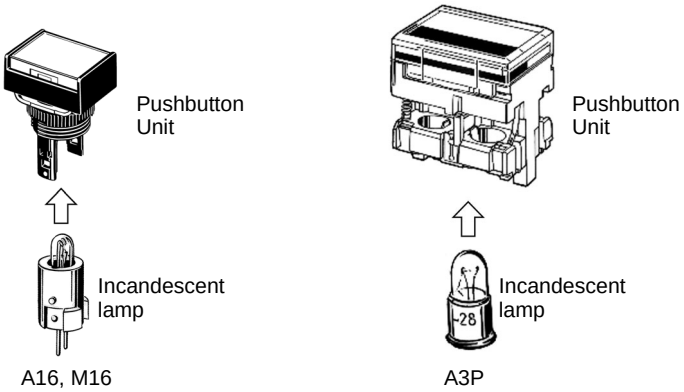
## ■ Terminal Symbols

| Symbol | Meaning |
|---|---|
| **COM** | Common terminal |
| **NC** | Normally closed terminal |
| **NO** | Normally open terminal |

## ■ Contact Form

| Name | Contact form |
|---|---|
| **SPDT** |   |
| **SPST-NC** | |
| **SPST-NO** |   |
| **Double-break** |   |

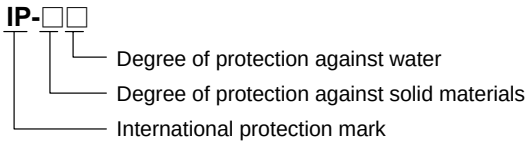
## ■ General Terms

| Term | Explanation | |
|---|---|---|
| Chameleon lighting | Full-screen lighting in one of 3 colors: red, green, or orange. (Orange is produced by simultaneous illumination of red and green.) | |
| Simultaneity | This term is used for switches that have more than one contact circuit. It indicates the difference in time or position between the contacts when all the contacts of the switch are opened or closed in one operation. | |
| LED lighting | LED-lighted models are lit with an LED installed in the base of the Pushbutton Unit.<br>The LED is mounted internally; it cannot be removed.<br>  | |
| LED-lamp lighting | LED lamp-lighted models use the same light source as incandescent lamp-lighted models, with an LED instead of a filament.<br>The Lamp (i.e., the LED lamp) and the Pushbutton Unit can be separated.<br>  <br> | |
| Incandescent lamp lighting | Incandescent lamp-lighted models are lit with an incandescent lamp.<br>The Lamp (i.e., the incandescent lamp) and the Pushbutton Unit can be separated.<br>  <br> | |
| Voltage Reduction Unit | For 16-dia. A16 (M16) models, 22-dia. A22 (M22) models, and 30-dia. A30 models | The Voltage Reduction Unit has a smoothing circuit and a resistance, and lights the LED lamp by applying 110 (220) VAC/VDC directly to the Lamp terminals. |
| Matrix mounting | Mounting several Switches in vertical and/or horizontal lines. | |
| Locking Switches | Switches that have the functionality to self-hold when the pushbutton is operated. | |
| Horizontal side-by-side mounting | Mounting Switches side-by-side with the long side of the Switch (rectangular models) horizontal. | |
| Vertical side-by-side mounting | Mounting Switches side-by-side with the long side of the Switch (rectangular models) vertical. | |

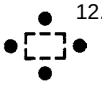
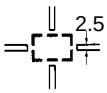
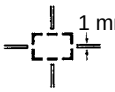
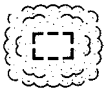
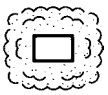
# Protection Ratings

**Note:** International protection degrees are determined by the following tests. Be sure to check the sealing capability under the actual operating environment and conditions before actual use.

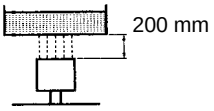
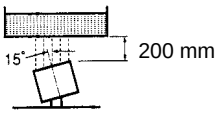
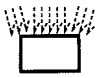
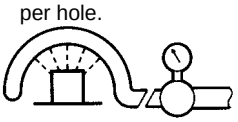
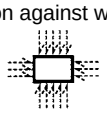
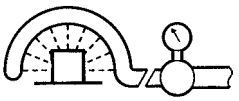
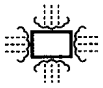
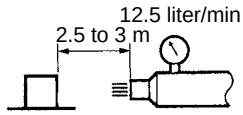
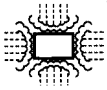
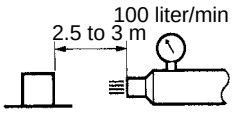
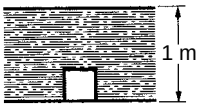
## ■ IEC (International Electrotechnical Commission) Standards (IEC 60529 January 1997)




### Degree of Protection from Solid Materials

| Degree | Protection | |
|---|---|---|
| 0 | | No protection |
| 1 | 50 mm dia. | Protects against penetration of any solid object, such as a hand, that is 50 mm or more in diameter. |
| 2 |  12.5 mm dia. | Protects against penetration of any solid object, such as a finger, that is 12.5 mm or more in diameter. |
| 3 |  2.5 mm | Protects against penetration of any solid object, such as a wire, that is 2.5 mm or more is diameter. |
| 4 |  1 mm | Protects against penetration of any solid object, such as a wire, that is 1 mm or more in diameter. |
| 5 |  | Protects against penetration of dust of a quantity that may cause malfunction or obstruct the safe operation of the product. |
| 6 |  | Protects against penetration of all dust. |

## Degree of Protection Against Water

| Degree | Protection | | Test method (with fresh water) |
|---|---|---|---|
| 0 | No protection | Not protected against water. | No test |
| 1 | Protection against water drops | Protects against vertical drops of water towards the product. | Water is dropped vertically towards the product from the test machine for 10 min.   |
| 2 | Protection against water drops | Protects against drops of water approaching at a maximum angle of 15° to the left, right, back, and front of vertical towards the product. | Water is dropped for 2.5 min each (i.e., 10 min in total) towards the product inclined 15° to the left, right, back, and front from the test machine.   |
| 3 | Protection against sprinkled water  | Protects against sprinkled water approaching at a maximum angle of 60° from vertical towards the product. | Water is sprinkled at a maximum angle of 60° to the left and right from vertical for 10 min from the test machine   |
| 4 | Protection against water spray  | Protects against water spray approaching at any angle towards the product. | Water is sprayed at any angle towards the product for 10 min from the test machine.   |
| 5 | Protection against water jet spray  | Protects against water jet spray approaching at any angle towards the product. | Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine.   |
| 6 | Protection against high-pressure water jet spray  | Protects against high-pressure water jet spray approaching at any angle towards the product. | Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine.   |
| 7 | Protection underwater | Resists the penetration of water when the product is placed underwater at specified pressure for a specified time. | The product is placed 1 m deep in water (if the product is 850 mm max. in height) for 30 min.   |
| 8 | Protection underwater | Can be used continuously underwater. | The test method is determined by the manufacturer and user. |

## ■ Terms Related to IEC947 and IEC950

| No. | Term | Explanation |
|---|---|---|
| 1 | Rated operating voltage (Ue) | VAC: 120, 240, 380, 480, 500, 600<br>VDC: 125, 250, 440, 500, 600 |
| 2 | Rated operating current (Ie) | Specified by the manufacturer on consideration of rated operating voltage (Ue), rated frequency, rated energizing time, area of application, and type of enclosure protection. |
| 3 | Rated insulation voltage (Ui) | Determined by creepage distance and the dielectric strength.<br>The maximum Ue value must not exceed the maximum Ui value.<br>If there is no Ui value specified, the maximum Ue value is taken as the Ui value. |
| 4 | Pollution degree | 1. Either no pollutants are present, or only dried, non-conductive pollutants are present (e.g., clean rooms).<br>2. Basically, only non-conductive pollutants are present, or only transient conductivity occurs due to condensation (indoor locations, such as offices).<br>3. Conductive pollutants are present, or non-conductive pollutants are present in locations where condensation is expected (e.g., factories).<br>4. Conductivity due to impurities is a constant possibility, or conductivity is caused by conductive dust, rain, or snow (e.g., outdoor locations). |
| 5 | Electric shock protection class | Class I: These devices require grounding. Electric shock is prevented by basic insulation and charged parts that would be subject to dangerously high voltages if the insulation was damaged, are grounded.<br>Class II: Electric shocks are prevented by double insulation or enforced insulation.<br>Class III: No countermeasures against electric shocks are required because the electric circuits in use operate in a low-enough voltage range.<br>Class II: Electric shocks are prevented by double insulation or enforced insulation.<br>Class III: No countermeasures against electric shocks are required because the electric circuits in use operate in a low-enough voltage range. |
| 6 | PTI | Proof tracking index.<br>Specified CTI values (comparative tracking indices):<br>Materials satisfying the 175, 250, 300, 375, and 500 levels are denoted as PTI-175, PTI-250, PTI-300, PTI-375, and PTI-500 respectively. |
| 7 | IP | **IP-□□**<br>Degree of protection against water (See below.)<br>Degree of protection against solid materials (See below.) |

### Degree of Protection

The meanings of the IP numbers are given in the following table.

| No. | Degree of protection against solid materials | Degree of protection against water |
|---|---|---|
| 0 | No protection | No protection |
| 1 | Protects against penetration of any solid object, such as a hand, that is 50 mm or more in diameter. | Protects against vertical drops of water. |
| 2 | Protects against penetration of any solid object, such as a finger, that is 12.5 mm or more in diameter. | Protects against drops of water approaching at a maximum angle of 15° to the vertical. |
| 3 | Protects against penetration of any solid object, such as a wire, that is 2.5 mm or more is diameter. | Protects against sprinkled water. |
| 4 | Protects against penetration of any solid object, such as a wire, that is 1 mm or more in diameter. | Protects against water spray. |
| 5 | Protects against penetration of dust of a quantity that may cause malfunction or obstruct the safe operation of the product. | Protects against water jet spray. |
| 6 | Protects against penetration of all dust. | Protects against high-pressure water jet spray. |

## ■ Common Precautions

For the individual precautions for a Switch, refer to the precautions in the section for that Switch.

### Cautions

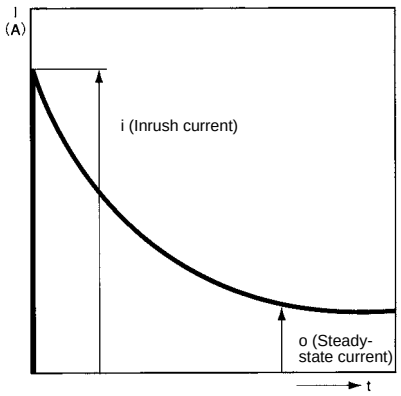
Do not perform wiring or touch the charged parts of terminals while power is being supplied to the Switch. Doing so may result in electric shock.

### Electrical Characteristics

#### Electrical Conditions

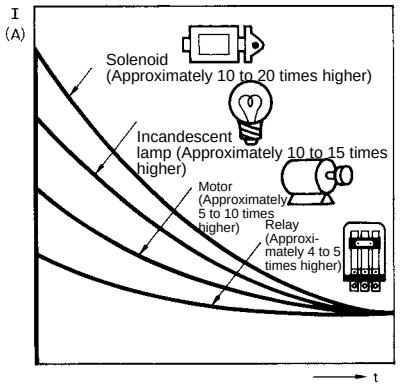
- The switching load capacity of the Switch greatly varies between AC and DC. Always be sure to apply the rated load. The control capacity will drastically drop if it is a DC load. This is because a DC load has no current zero-cross point, unlike an AC load. Therefore, if an arc is generated, it may continue for a comparatively long time. Furthermore, the current direction is always the same, which results in a contact relocation phenomena whereby the contacts easily stick to each other and do not separate when the surfaces of the contacts are uneven.
- Some types of load have a great difference between normal current and inrush current. Make sure that the inrush current is within the permissible value. The greater the inrush current in the closed circuit is, the greater the contact abrasion or shift will be. Consequently, contact weld, contact separation failures, or insulation failures may result. Furthermore, the Switch may be broken or damaged.
- If the load is inductive, counter-electromotive voltage will be generated. The higher the voltage is, the higher the generated energy will be, which will increase the abrasion of the contacts and contact relocation phenomena. Be sure to use the Switch within the rated conditions.

**Inrush Current**




- Approximate control capacities are given in ratings tables, but these alone are insufficient to guarantee correct operation. For special types of load, with unusual switching voltage or current waveforms, test whether correct operation is possible with the actual load before application.
- When switching for microloads (voltage or current), use a Switch with microload specifications. The reliability of silver-plated contacts, which are used in Switches for standard loads, will be insufficient for microloads.
- When switching microloads or very high loads that are beyond the switching capacity of the Switch, connect a relay suitable for the load.

**Type of Load vs. Inrush Current**




- All the performance ratings given are for operation under the following conditions unless otherwise specified.

  Inductive load: A minimum power factor of 0.4 (AC) and a maximum time constant of 7 ms (DC)

  Lamp load: An inrush current 10 times higher than the steady-state current

  Motor load: An inrush current 6 times higher than the steady-state current

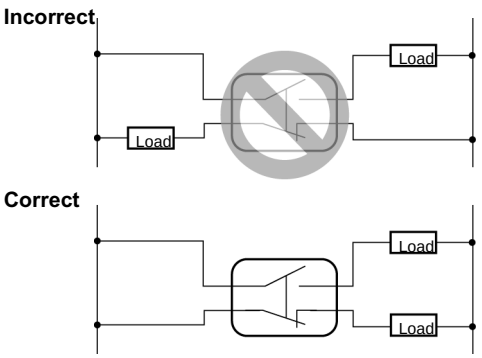
**Note:** Inductive loads can cause problems especially in DC circuitry. Therefore, it is essential to know the time constants (L/R) of the load.

### Load Connections

Do not contact a single Switch to two power supplies that are different in polarity or type.

**Connection of Different Polarities**

The power supply may short-circuit if the loads are connected in the way shown in the “incorrect” example below.

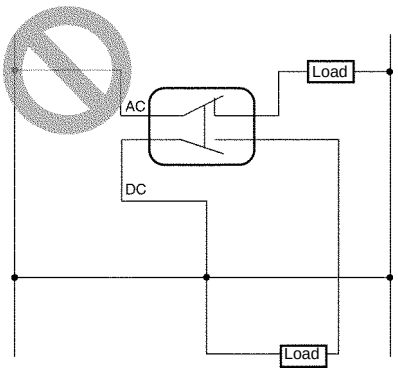



Even in the “correct” example, note that the insulation performance of the switch may deteriorate and the switch life may be shortened because loads are connected to both contacts.

**Connection of Different Power Supplies**

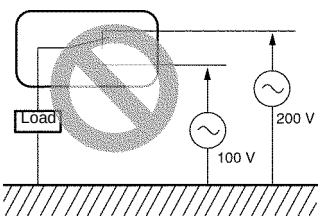
The DC and AC power may be mixed for the circuit shown below.

**Incorrect**




Do not design a circuit where voltage is imposed between contacts, otherwise contact weld may result.

**Incorrect**

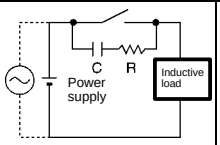
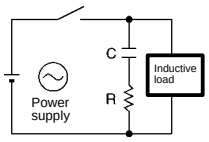
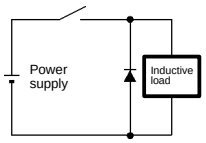
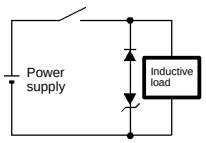
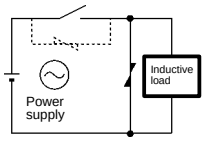



## Contact Protective Circuit

Apply a contact protective circuit to extend the contact life, prevent noise, and suppress the generation of carbide or nitric acid. Be sure to apply the contact protective circuit correctly, otherwise an adverse effect may occur.

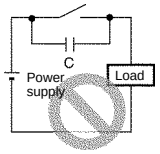
The following provides typical examples of contact protective circuits. If the Limit Switch is used in an excessively humid location for switching a load that easily generates arcs, such as an inductive load, the arcs may generate NOx, which will change into $HNO_3$ if it reacts with moisture. Consequently, the internal metal parts may corrode and the Limit Switch may fail. Be sure to select the ideal contact preventive circuit from the following.

**Typical Examples of Contact Protective Circuits**

| Circuit example | | Applicable current | | Feature | Element selection |
|---|---|---|---|---|---|
| | | AC | DC | | |
| CR circuit |   | * | Yes | *When AC is switched, the load impedance must be lower than the CR impedance. | C: 1 to 0.5 µF x switching current (A)<br>R: 0.5 to 1 Ω x switching voltage (V)<br>The values may change according to the characteristics of the load.<br>The capacitor suppresses the spark discharge of current when the contacts are open. The resistor limits the inrush current when the contacts are closed again. Consider the roles of the capacitor and resistor and determine ideal capacitance and resistance values through testing. Basically, use a capacitor with a dielectric strength between 200 and 300 V. When AC is switched, make sure that the capacitor has no polarity. |
| |   | Yes | Yes | The operating time will be greater if the load is a relay or solenoid. Connecting the CR circuit in parallel to the load is effective when the power supply voltage is 24 or 48 V and in parallel to the contacts when the power supply voltage is 100 to 200 V. | |
| Diode method |   | No | Yes | Energy stored in the coil is changed into current by the diode connected in parallel to the load. Then the current flowing to the coil is consumed and Joule heat is generated by the resistance of the inductive load. The reset time delay with this method is longer than that in the CR method. | The diode must withstand a peak inverse voltage 10 times higher than the circuit voltage and a forward current as high or higher than the load current. |
| Diode and Zener diode method |   | No | Yes | This method will be effective if the reset time delay caused by the diode method is too long. | Use a Zener diode with a Zener voltage that is approximately 1.2 × power supply voltage as, depending on the environment, the load may not operate. |
| Varistor method |   | Yes | Yes | This method makes use of constant-voltage characteristic of the varistor so that no high-voltage is imposed on the contacts. This method causes a reset time delay. Connecting a varistor in parallel to the load is effective when the supply voltage is 24 to 48 V and in parallel to the contacts when the supply voltage is 100 to 200 V. | --- |

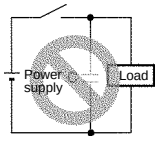
Do not apply contact protective circuits as shown below.

**Incorrect**




This circuit effectively suppresses arcs when the contacts are OFF. The capacitor will be charged, however, when the contacts are OFF. Consequently, when the contacts are ON again, short-circuited current from the capacitance may cause contact weld.

**Incorrect**




This circuit effectively suppresses arcs when the contacts are OFF. When the contacts are ON again, however, charge current will flow to the capacitor, which may result in contact weld.

Switching a DC inductive load is usually more difficult than switching a resistive load. By using an appropriate contact protective circuit, however, switching a DC inductive load will be as easy as switching a resistive load.

## Switching

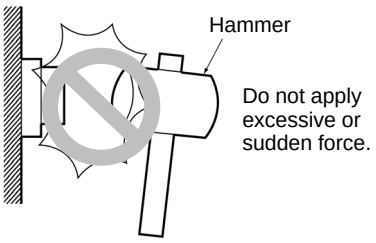
- Do not use the Switch for loads that exceed the rated switching capacity or other contact ratings. Doing so may result in contact weld, contact separation failures, or insulation failures. Furthermore, the Switch may be broken or damaged.
- Do not touch the charged switch terminals while power is supplied, otherwise an electric shock may be received.
- The life of the Switch varies greatly with switching conditions. Before using the Switch, be sure to test the Switch under actual conditions. Make sure that the number of switching operations is within the permissible range.
  If a deteriorated Switch is used continuously, insulation failures, contact weld, contact failures, switch damage, or switch burnout may result.
- Do not apply excessive or incorrect voltages to the Switch or incorrectly wire the terminals. Otherwise, the Switch may not function properly and have an adverse effect on external circuitry. Furthermore, the Switch itself may become damaged or burnt.
- Do not use the Switch in locations where flammable or explosive gases are present. Otherwise switching arcs or heat radiation may cause a fire or explosion.
- Do not drop or disassemble the Switch, otherwise it may not be capable of full performance. Furthermore, it may be broken or burnt.

## Mechanical Conditions

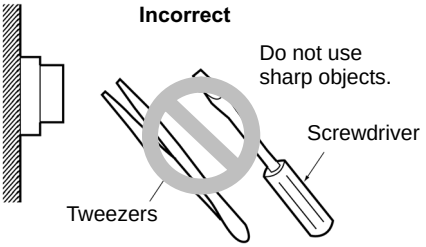
### Operating Force and Operating Method

- Fingertip operation is an important feature of Pushbutton Switches. In terms of Switch operation, Pushbutton Switches differ greatly from detection switches such as Microswitches. Operating the Switch using a hard object (e.g., metal), or with a large or sudden force, may deform or damage the Switch, resulting in faulty or rough operation, or shortening of the Switch life. The strength varies with the size and construction of the Switch. Use the appropriate Switch for the application after confirming the operating method and operating force with this catalog.

**Incorrect**

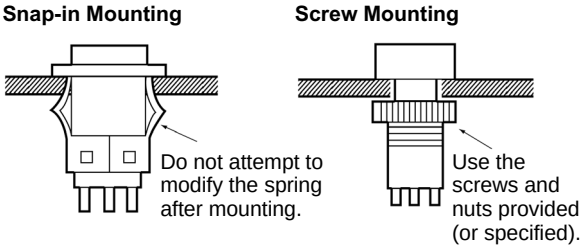



- The pushbutton surface is composed of resin. Therefore, do not attempt to operate the pushbutton using a sharp object, such as a screwdriver or a pair of tweezers. Doing so may damage or deform the pushbutton surface and result in faulty operation.



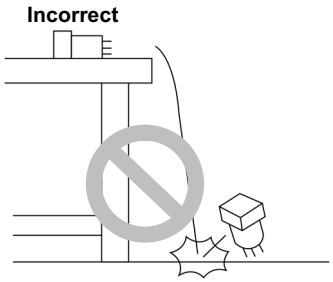

### Mounting

- Switches can be broadly divided into two categories according to mounting method: panel-mounting models and PCB-mounting models. Use the appropriate model for the mounting method required. Basically, panel-mounting Switches can withstand a greater operating force than PCB-mounting Switches. If, however, the panel thickness or the panel-cutout dimensions are not suitable for the Switch, it may not be able to withstand the normal operating force. With continuous mounting in particular, select a panel of a thickness that is easily sufficient to withstand the total operating force.
- Panel-mounting Switches can be divided into two categories according to the mounting method: snap-in mounting models and screw-mounting models. Snap-in mounting Switches are held in place with the elasticity of resin or a metal leaf spring. Do not attempt to modify the spring after mounting. Doing so may result in faulty operation or damage the mounting structure. Mount screw-mounting models using the screws and nuts provided (or individually specified). Tighten the screws to the specified torque. Mounting with different screws or nuts, or tightening beyond the specified torque may result in distortion of the inside of the case or damage to the screw section.

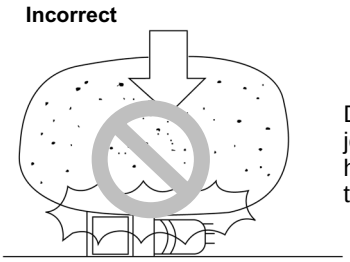



- Subjecting the Switch to severe vibrations or shock may result in faulty operation or damage. Also, many of the Switches are

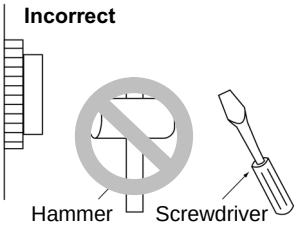
composed of resin so contact with sharp objects may result in damage to the surface. This kind of damage may spoil the appearance of the Switch or result in faulty operation. Do not throw or drop the Switch.




Do not drop or knock the Switch.




Do not drop objects or place heavy objects on the Switch.

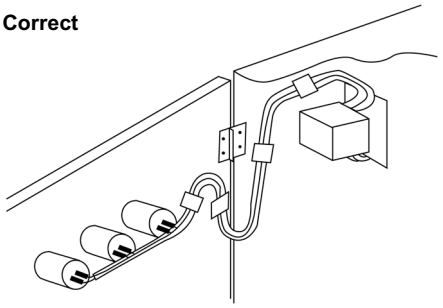


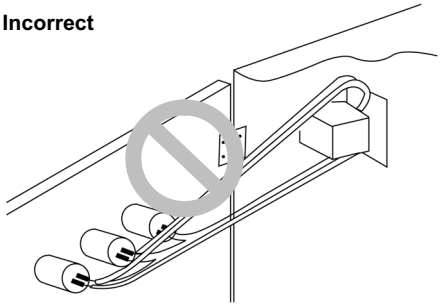

Do not operate the Switch with heavy or sharp objects.

## Mounting Precautions

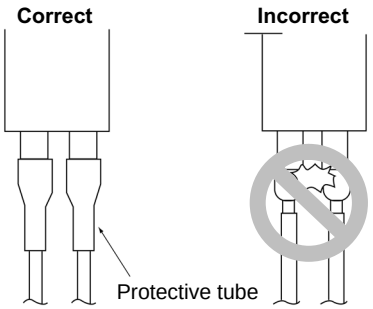
### Wiring

- Perform wiring so that the lead wires will not be caught on other objects as this will cause stress on the Switch terminals. Wire the Switch so that there is slack in the lead wires and fix lead wires at intermediate points. If the panel to which the Switch is mounted needs to be opened and closed for maintenance purposes, perform wiring so that the opening and closing of the panel will not interfere with the wiring.




- With miniature Switches, the gap between the terminals is very narrow. Use protective or heat-absorbing tubes to prevent burning of the wire sheath or shorting.



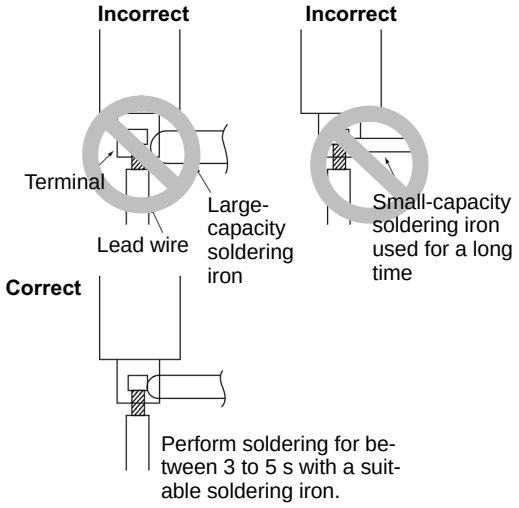

### Soldering

- There are two methods for soldering the Switch: hand soldering and automatic soldering. In addition, automatic soldering itself can be divided into two types : dip soldering and reflow soldering. Use the soldering method appropriate for the mounting method.

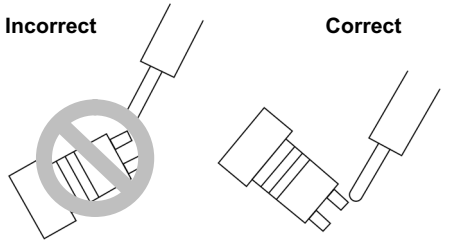
The following table gives some examples of applications using the types of soldering given above.

| Method | | Soldering device | Application |
|---|---|---|---|
| Hand soldering | | Soldering iron | Small quantities<br>Different materials<br>Lead wire terminals |
| Automatic soldering | Dip soldering | Jet soldering bath<br>Dip soldering bath | Large quantities of discrete terminals |
| | Reflow soldering | Infrared reflow (IR) soldering bath<br>Vapor-phase (VPS) reflow soldering bath | Large quantities of miniature SMD terminals |

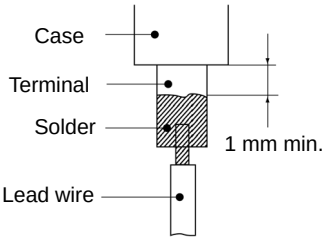
- Do not use soldering flux that contains chlorine. Doing so may result in metal corrosion.
- Perform hand soldering using the appropriate soldering iron.



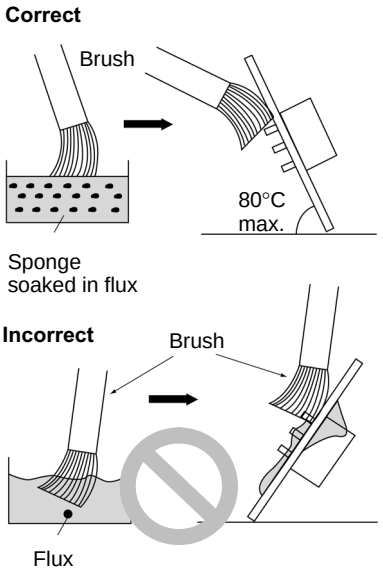

- With the exception of PCB-mounting Switches, when performing hand soldering, hold the Switch so that the terminals point downwards so that flux does not get inside the Switch.



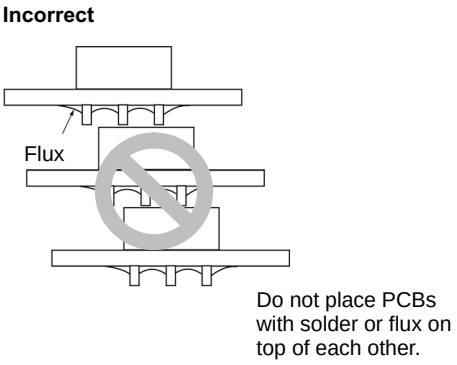

- Leave a gap of at least 1 mm between the soldered parts and the surface of the case so that flux does not get inside the Switch.



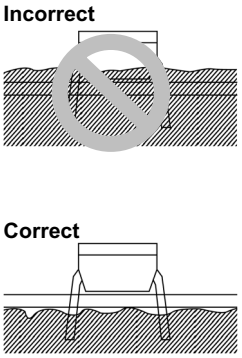

- When applying flux using a brush, use a sponge soaked in flux as shown below. Do not apply more than is necessary. Also, apply the flux with the PCB inclined at an angle of less than 80° so that flux does not flow onto the mounting surface of the Switch.



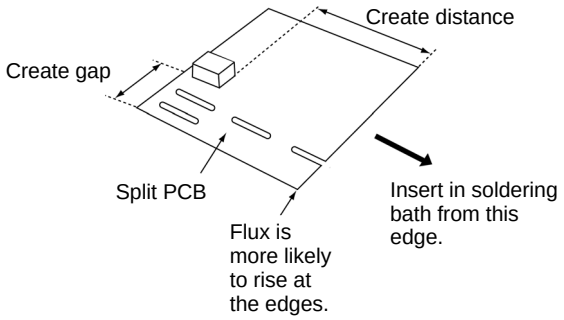

- Do not place PCBs that have had flux applied or have been soldered on top of each other. Otherwise, the flux on the PCB's solder surface may stain the upper part of the Switch or even permeate the inside of the Switch and cause contact failure.



- When performing soldering with a dip soldering bath, ensure that the flux does not reach a higher level than the PCB.

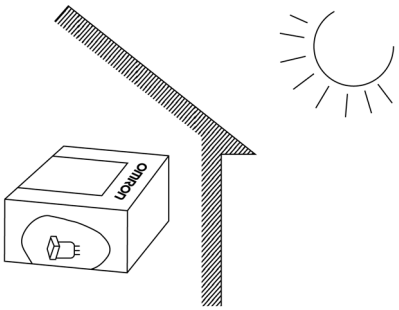



- Flux is especially likely to rise up at the edges of the PCB. If the Switch is mounted near the edge of the PCB, create a gap between the edge by using a split PCB, and insert the PCB in the soldering bath so that the edge that is farthest from the Switch enters the bath first.




**Storage**

- When the Switch is left unused or stored for long periods, the ambient conditions can have a great effect on the condition of the Switch. In certain environments, leaving the Switch exposed may result in deterioration (i.e., oxidation, or the creation of an oxide film) of the contacts and terminals, causing the contact resistance to increase, and making it difficult to solder the lead wires. Therefore, store in a well-ventilated room, inside, for example, a non-hygroscopic case, in a location where no corrosive gases are present.




- If the Switch is stored in a location where it will be exposed to direct light, colored resin in the colored plate may fade. Therefore, do not store the Switch in locations where it will be exposed to direct light.

# Lighted Pushbutton Switch

# A3D

## Lighted Pushbutton Switch with Cylindrical 18-mm × 8-dia. Body

- Good illumination with even surface brightness.
- Cylindrical body means panel cutouts can be made easily.
- Combines miniature design with excellent operating sensitivity.

## Ordering Information

### ■ Model Number Legend:

The model numbers used to order sets of Units are illustrated below. One set comprises the Pushbutton (LED lamp built-in) and Switch.

(1) (2) (3)

**A 3 D J - 9 0 A 1 - 0 0 E R**

**(1) Shape of Pushbutton**

| Symbol | Shape |
|---|---|
| J | Rectangular |
| A | Square |
| T | Round |

**(2) Switch Specifications**
**Microload (30 VDC, 0.1 A)**

| Symbol | Terminals | Operation | Contact |
|---|---|---|---|
| A | Solder | Momentary | SPST-NO |
| B | | Alternate | |

Minimum applicable load: 1 mA at 5 VDC

Standard load models are not available.

If PCB terminals are required, use the Socket given under *Accessories* on page 22.

Momentary operation: Self-resetting
Alternate operation: Self-holding

**(3) Color of Pushbutton**

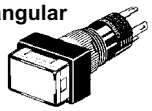
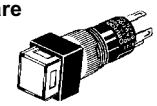
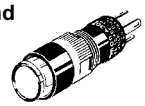
| Symbol | Color |
|---|---|
| R | Red |
| Y | Yellow |
| G | Green |
| W | White |

All models are illumination only. Colored-illumination models are not available.

Non-lighted models are not available.

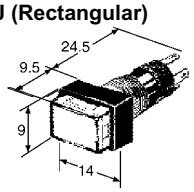
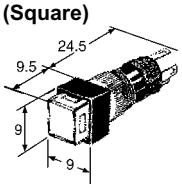
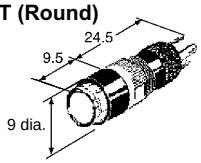
An external resistor is required. (Refer to page 28.)

### ■ List of Models

| Appearance | Model |
|---|---|
| **Rectangular**  | A3DJ |
| **Square**  | A3DA |
| **Round**  | A3DT |

## ■ Ordering as a Set

The model numbers used to order sets of Units are given in the following table. One set comprises the Pushbutton (LED lamp built-in), and Switch.

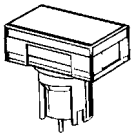
| Appearance | Degree of protection | Operation | Model number | Color symbol for Pushbutton |
|---|---|---|---|---|
| **A3DJ (Rectangular)**   | IP40 | Momentary | A3DJ-90A1-00E□ | R, Y, G, W |
| | | Alternate | A3DJ-90B1-00E□ | |
| **A3DA (Square)**   | | Momentary | A3DA-90A1-00E□ | |
| | | Alternate | A3DA-90B1-00E□ | |
| **A3DT (Round)**   | | Momentary | A3DT-90A1-00E□ | |
| | | Alternate | A3DT-90B1-00E□ | |

**Note:** 1. Enter the desired color symbol for the Pushbutton in □.
2. All the above are solder-terminal, microload, SPST-NO, LED lamp-lighted models.

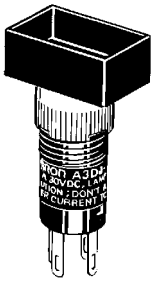
## ■ Ordering Individually

Pushbuttons and Switches can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.

**Pushbutton (LED built-in)**



**Switch**



### Pushbutton (All Lighted with LED Built-in)

| Appearance / Color | Rectangular | Square | Round |
|---|---|---|---|
| **Red** | A3DJ-500R | A3DA-500R | A3DT-500R |
| **Yellow** | A3DJ-500Y | A3DA-500Y | A3DT-500Y |
| **Green** | A3DJ-500GY | A3DA-500GY | A3DT-500GY |
| **White** | A3DJ-500W | A3DA-500W | A3DT-500W |

### Switch

| Sealing / Appearance | | | IP40 | | |
|---|---|---|---|---|---|
| **Contact type** | **Operating action** | **Terminal type** | **Rectangle** | **Square** | **Round** |
| SPST-NO | Momentary | Solder terminals | A3DJ-7111 | A3DA-7111 | A3DT-7111 |
| | Alternative | Solder terminals | A3DJ-7121 | A3DA-7121 | A3DT-7121 |

## ■ Accessories (Order Separately)

| Name | Appearance | Classification | Model | Application precautions |
|---|---|---|---|---|
| Socket | | Wire-wrap terminal | A3D-4101 | Cannot be used together with Insulation Cover. |
| | | PCB terminal | A3D-4102 | |
| | | Solder terminal | A3D-4103 | |
| Insulation Cover | | --- | A3D-3002 | Cannot be used together with the Socket. |
| Tightening Tool | | --- | A3D-3004 | Do not tighten to a torque exceeding 0.29 N·m. |
| Legend Plate | | Rectangular | A3DJ-5201 | One milky-white Legend Plate is included with standard products. |
| | | Square | A3DA-5201 | |
| | | Round | A3DT-5201 | |

# Specifications

## ■ Ratings

### Contact Rating: 30 VDC, 0.1 A (Minimum Applicable Load: 5 VDC, 1 mA)

The above ratings conform to JIS C4505, for testing under the following conditions.

1. Load: Resistive load
2. Mounting conditions: No vibration or shock
3. Ambient temperature: 20 ±2°C.
4. Operating frequency: 20 times/min.

### Built-in LED Lamp

| Item | | Color | | |
|---|---|---|---|---|
| | | Red | Yellow (White) (See note 4.) | Green |
| Forward voltage, $V_F$ | Reference value (See note 3.) | 1.7 V | 2.2 V | 2.1 V |
| | Maximum value | 2.0 V | 2.5 V | 2.5 V |
| Forward current, $I_F$ | Reference value | 20 mA | 20 mA | 20 mA |
| | Absolute maximum value | 50 mA | 50 mA | 50 mA |
| Permissible dissipation, PD | Absolute maximum value | 100 mW | 125 mW | 122 mW |
| Reverse voltage, $V_R$ | Absolute maximum value | 4 V | 4 V | 4 V |

**Note:**
1. The above ratings are for an ambient temperature of 25°C.
2. The built-in LED lamp has no limiting resistor and so it is necessary to connect an external resistor within the range shown in the above table. (For details of calculation formulas, refer to page 28.)
3. Refer to the characteristic graphs of $V_F$ – $I_F$ on page 24.
4. The same LED lamp is used for both yellow illumination and white illumination and so the ratings are the same.

## ■ Characteristics

| | |
|---|---|
| **Operating frequency** | Mechanical: 120 operations/minute max. (See note 1.)<br>Electrical: 20 operations/minute max. |
| **Insulation resistance** | 100 MΩ min. (at 500 VDC) |
| **Dielectric strength** | 1,000 VAC, 50/60 Hz for 1 minute between terminals of same polarity |
| | 2,000 VAC, 50/60 Hz for 1 minute between terminals of different polarity, and between each terminal and ground |
| | 1,000 VAC, 50/60 Hz for 1 minute between lamp terminals (See note 2.) |
| **Vibration resistance** | Malfunction: 10 to 55 Hz, 1.5 mm double amplitude (See note 3.) |
| **Shock resistance** | Destruction: 500 $m/s^2$<br>Malfunction: 150 $m/s^2$ (See note 3.) |
| **Life expectancy** | Mechanical:<br>Momentary operation models: 1,000,000 operations min.<br>Alternate operation models: 100,000 operations min.<br>(One operation consists of set and reset operations.) |
| | Electrical: 100,000 operations min. |
| **Weight** | Approx. 3 g |
| **Ambient operating temperature** | –10°C to 55°C (with no icing or condensation) |
| **Ambient operating humidity** | 35% to 85% |
| **Ambient storage temperature** | –25°C to 65°C |
| **Degree of protection** | IP40 |
| **Electric shock protection class** | Class II |
| **PTI (proof tracking index)** | 175 |
| **Pollution degree** | 3 (IEC947-5-1) |

**Note:**
1. With alternate operation models, 60 operations/minute max. One operation cycle consists of set and reset operations.
2. The figure for dielectric strength between lamp terminals is for when the LED lamp is not mounted.
3. “Malfunction” in the above table indicates malfunctions of less than 1 ms.

## ■ Operating Characteristics

| | |
|---|---|
| **OF max.** | 2.45 N |
| **RF min.** | 0.196 N |
| **TT** | Approx. 3.5 mm |
| **LTA min. (See note.)** | 0.5 mm |
| **PT max.** | 2.5 mm |

**Note:** The figure for LTA in the table applies only to models with alternate operation.

## ■ Contact Form

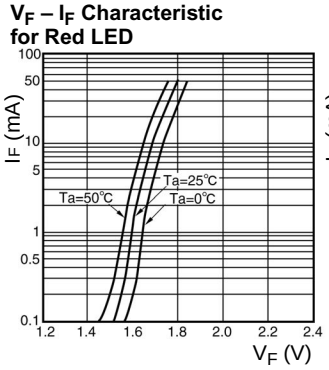
| Contact name | Contact form |
|---|---|
| SPST-NO | COM NO |

# Engineering Data

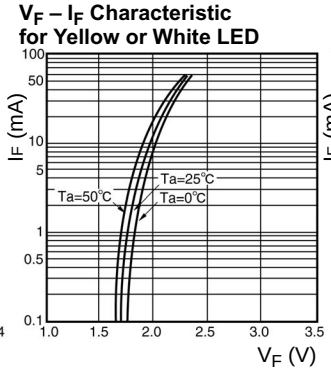
## ■ LED Characteristics

Ta: Ambient Temperature

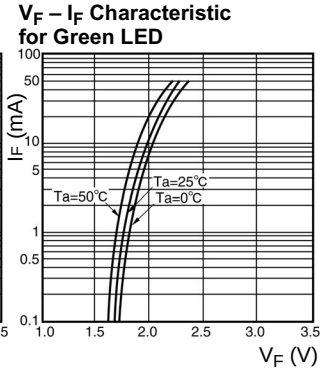
**$V_F$ – $I_F$ Characteristic for Red LED**



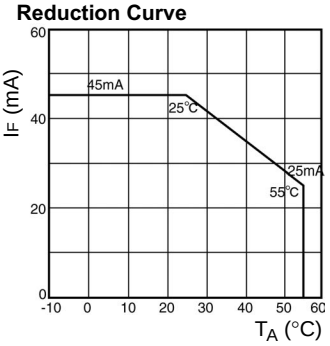

**$V_F$ – $I_F$ Characteristic for Yellow or White LED**



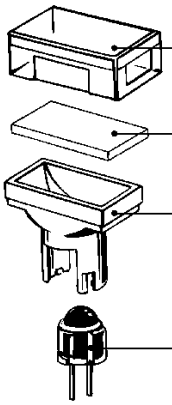

**$V_F$ – $I_F$ Characteristic for Green LED**




**Forward Current Reduction Curve**



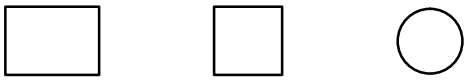
# Nomenclature

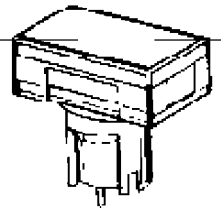



**Pushbutton**

**Shape of Pushbutton**

Rectangular (A3DJ) Square (A3DA) Round (A3DT)

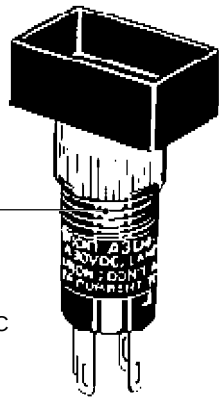




**Color of Pushbutton**
**(All models LED-lighted)**

Red, yellow, green, white

**Note:** The LED lamp is built into the Pushbutton.



**Switch**

**Switch Specifications**

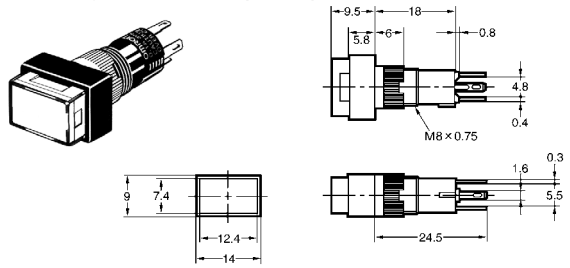
Microload
0.1 A at 30 VDC
Minimum applicable load: 1 mA at 5 VDC

**Note:** The A3DJ model is shown here as a representative example.

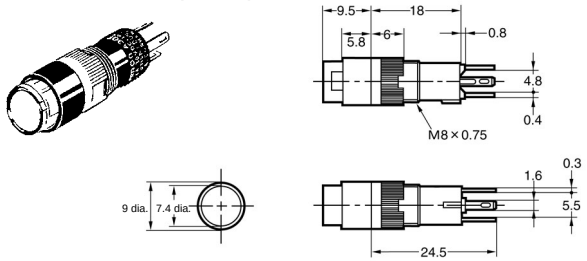
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

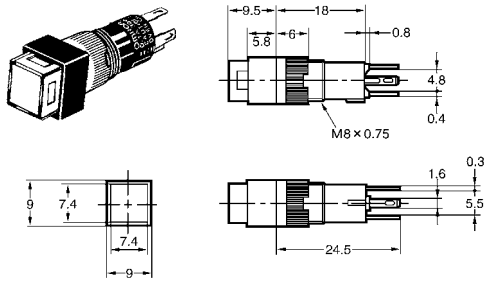
### Rectangular Models (A3DJ)




### Round Models (A3DT)

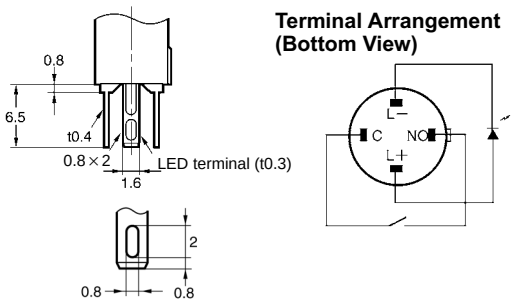



### Square Models (A3DA)

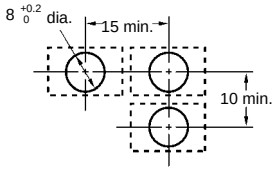
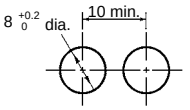



## ■ Terminals

### Solder Terminals of SPST-NO Lighted Models



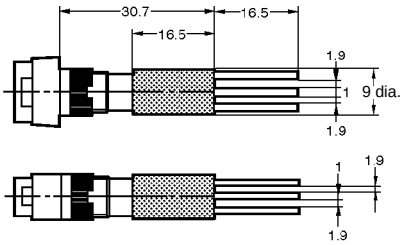

## ■ Panel Cutouts (Top View)

| Rectangular models (A3DJ) | Square models (A3DA) and round models (A3DT) |
|---|---|
|   **Note:** Recommended panel thickness: 1.0 to 3.2 mm. |   **Note:** Recommended panel thickness: 1.0 to 3.2 mm. |

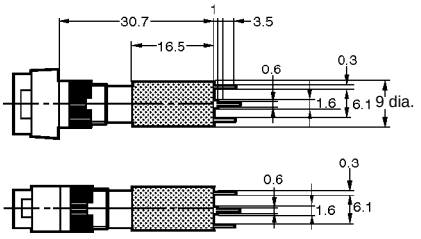
## ■ Accessory Mounting Dimensions

### Socket Mounting Dimensions

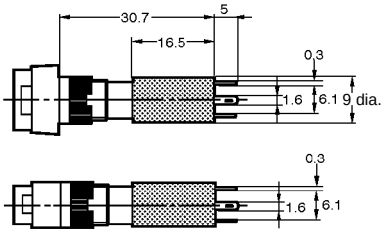
**Wire-wrap Terminal**
**A3D-4101**



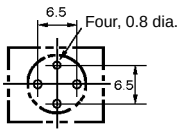

**PCB Terminal**
**A3D-4102**



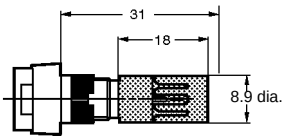

**Solder Terminal**
**A3D-4103**




**PCB Cutout (bottom view)**



### Insulation Cover Mounting Dimensions
**A3D-3002**

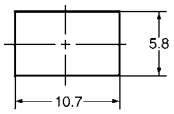



**Note:** 1. The diagram above shows the rectangular model as a representative example.
2. Unless specified, there is a tolerance of ±0.4 mm for dimensions.

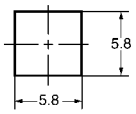
- After securing the Switch to the panel using the mounting nut, pass the lead wires through the holes in the Insulation Cover before performing wiring. Hold the Insulation Cover so that the cylindrical hole is facing the Switch, and insert the lead wires from the end with the barriers.
- After wiring is completed, mount the Insulation Cover by pushing it into the Switch.

### Legend Plate Mounting Dimensions

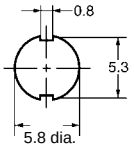
**Rectangular**
**A3DJ-5201**




**Square**
**A3DA-5201**




**Round**
**A3DT-5201**

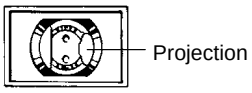



**Note:** 1. The thickness is 0.8 mm.
2. Since the legend plate is made of polycarbonate, use alcohol-based paints such as melanin, phthalic acid, or acryl paint when marking the legend.

# Installation

## Mounting and Replacing the Pushbutton

**Mounting Direction for the Pushbutton and Switch**




**Switch**

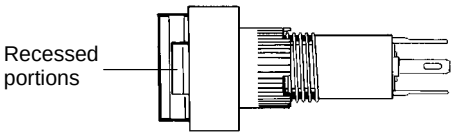
**Pushbutton**

Align the curved claw on the outside of the protruding part of the Pushbutton with the projection on the upper part of the Switch and insert.

Apply a pressure between 9.8 and 24.5 N.

**Note:** If the terminals of the LED lamp become bent, it may be impossible to fit them into the LED lamp terminal holes. Ensure that the terminals are straight when they are inserted. Be sure to insert the lamp terminals for round models with the correct orientation. Inserting the terminals with the reverse orientation will result in damage.

**Removing the Pushbutton**




Hold the recessed portions on the cap of the Pushbutton and pull.

**Note:** Do not use tools such as pliers to remove the Pushbutton as this may damage the cap.

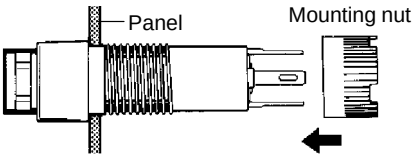
## Panel Mounting

**Using the Mounting Nut**

Insert the Switch from the front of the panel. Mount the mounting nut from the terminal end of the Switch and tighten it.

Tighten the nut to a torque 0.20 to 0.39 N·m.

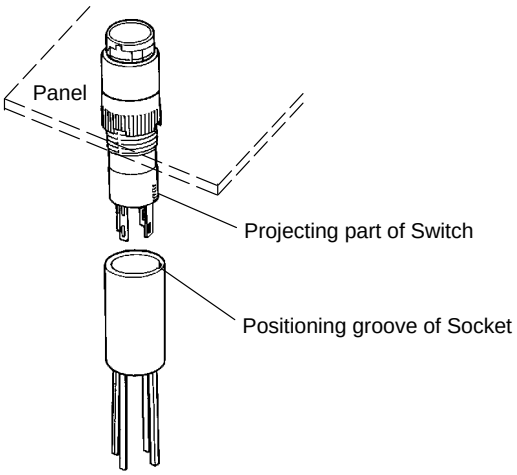
If soldering is used, mount the mounting nut first. Lead wires and mounds of solder may make it impossible to mount the nut after soldering.




**Socket Mounting**

After securing the Switch to the panel using the mounting nut, insert the Socket into the Switch.

When inserting the Socket, align the positioning groove of the Socket with the projecting part of the Switch.



# Precautions

Refer to the *Common Precautions* for Pushbutton Switches on page 14.

## Correct Use

### Mounting

Always make sure that the power is turned OFF before mounting, removing, or wiring the Switch, or performing maintenance.

Do not tighten the mounting ring excessively using pliers or a similar tool. Excessive tightening may damage the mounting ring. (Tightening torque: 0.20 to 0.29 N·m)

### Wiring

When wiring, use wires of a size appropriate for the applied voltage and carry current. Perform soldering correctly under the conditions given below. Using the Switch with the wires soldered incorrectly may cause the terminals to become abnormally hot and cause a fire.

1. Hand soldering: At 30 W within 5 seconds.
2. Dip soldering: At 240°C within 3 seconds.

Wait for one minute after soldering before exerting any external force on the solder.

Use a non-corrosive rosin liquid for the flux.

Perform wiring so that the wire sheaths do not come into contact with the Switch. If this is unavoidable, use wires that can withstand temperatures of 100°C min.

After wiring to the Switch has been completed, ensure an appropriate insulation distance.

### LED

The polarity of the LED is indicated on the back of the Switch. Wire the LED correctly according to the polarity.

The built-in LED does not have a limiting resistor. Connect a limiting resistor.

Make sure that the limiting resistor satisfies the characteristics of the built-in LED. The forward current of the built-in LED must be 8 mA minimum.

The resistance can be calculated by using the following expression.

$R = (E - V_F)/I_F$ (Ω)

E: Operating voltage (V)
$V_F$: LED forward voltage (V)
$I_F$: LED forward current (A)

### Recommended Values for Limiting Resistance

| Voltage | Red | Yellow (White) | Green |
|---|---|---|---|
| 5 VDC | 165 Ω | 140 Ω | 145 Ω |
| 12 VDC | 515 Ω | 490 Ω | 495 Ω |
| 24 VDC | 1,100 Ω | 1,090 Ω | 1,095 Ω |

**Note:** The above values are calculated values that can be used as reference.

### Calculation Example for Limiting Resistance

Conditions: Red LED with an $I_F$ of 20 mA at 24 V and a Ta of 25°C. From the red LED characteristic given previously, $V_F$ will be 1.7 V when $I_F$ is 20 mA. Therefore, R = (24 V – 1.7 V)/0.02 A = 1,100 Ω. Thus the recommended resistance is 1.1 kΩ at 1 W ($2 \times I_F^2R$). (see note)

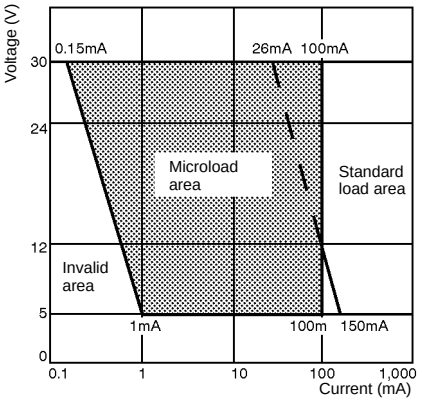
**Note:** A factor of 2 is applied because the permissible wattage of the resistor must be twice as large as the required wattage.

### Operating Environment

Ensure that dust, metal powder, or oil do not enter the interior of the Switch.

### Using Microloads

Using a standard load switch for opening and closing a microload circuit may cause wear on the contacts. Use the switch within the operating range. (Refer to the diagram below.) Even when using microload models within the operating range shown below, if inrush current occurs when the contact is opened or closed, it may cause the contact surface to become rough, and so decrease life expectancy. Therefore, insert a contact protection circuit where necessary. The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ 60) (conforming to JIS C5003). The equation, $\lambda 60 = 0.5 \times 10^{-4}$/times indicates that the estimated malfunction rate is less than 1/2,000,000 with a reliability level of 60%.




**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A031-E1-05

# Indicator

# M2D

## Cylindrical 8-dia. Indicator

- Same basic design as the A3D Pushbutton Switch.
- Good illumination with even surface brightness.
- Cylindrical body means panel cutouts can be made easily.

## Ordering Information

### ■ Model Number Legend:

The model numbers used to order sets of Units are illustrated below. One set comprises the Display (LED lamp built-in) and Socket Unit.

(1) (2) (3)

**M 2 D J - 9 0 A 1 - 0 0 E R**

**(1) Shape of Display**

| Symbol | Shape |
|---|---|
| J | Rectangular |
| A | Square |
| T | Round |

**(2) Terminal Type**

| Symbol | Terminal type |
|---|---|
| A | Solder terminals |

If PCB terminals are required, use the Socket given under *Accessories* on page 22.

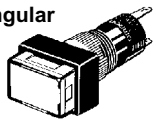
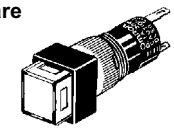
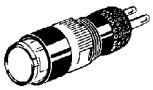
**(3) Color of Display**

| Symbol | Color |
|---|---|
| R | Red |
| Y | Yellow |
| G | Green |
| W | White |

All models are illumination-only. Colored-illumination models are not available.

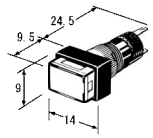
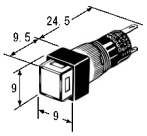
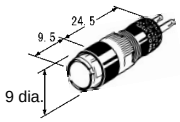
An external resistor is required. (Refer to page 28.)

### ■ List of Models

| Appearance | Model |
|---|---|
| **Rectangular**  | M2DJ |
| **Square**  | M2DA |
| **Round**  | M2DT |

## ■ Ordering as a Set

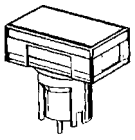
The model numbers used to order sets of Units are given in the following table. One set comprises the Display (LED lamp built-in), and Socket Unit.

| Appearance | Degree of protection | Model number | Color symbol for Display |
|---|---|---|---|
| **Rectangular**   | IP40 | M2DJ-90A1-00E□ | R, Y, G, W |
| **Square**   | | M2DA-90A1-00E□ | |
| **Round**   | | M2DT-90A1-00E□ | |

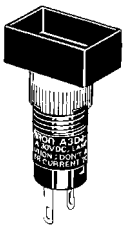
**Note:** 1. Enter the desired color symbol for the Display in □: R (red), Y (yellow), G (green), or W (white)
2. Degree of protection: IP40

## ■ Ordering Individually

Displays and Socket Units can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.

| Display (LED built-in) |
|---|
|  |

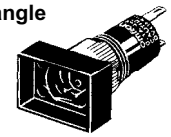
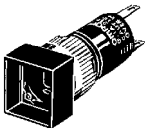
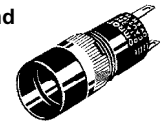
**Note:** Degree of protection: IP40

| Socket Unit |
|---|
|  |

## ■ Display (All Lighted with LED Built-in)

| Appearance / Color | Rectangular | Square | Round |
|---|---|---|---|
| **Red** | M2DJ-500R | M2DA-500R | M2DT-500R |
| **Yellow** | M2DJ-500Y | M2DA-500Y | M2DT-500Y |
| **Green** | M2DJ-500GY | M2DA-500GY | M2DT-500GY |
| **White** | M2DJ-500W | M2DA-500W | M2DT-500W |

### Socket Unit

| Sealing / Appearance / Terminal type | IP40 | | |
|---|---|---|---|
| | Rectangle  | Square  | Round  |
| Solder terminals | M2DJ-7001 | M2DA-7001 | M2DT-7001 |

## ■ Accessories

The accessories for the A3D Lighted Pushbutton Switch can also be used with the M2D. Refer to page 22.

# Specifications

## ■ Ratings

### Built-in LED Lamp

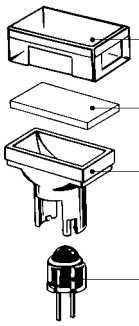
| Item | | Color | | |
|---|---|---|---|---|
| | | Red | Yellow (White) (See note 4.) | Green |
| Forward voltage, $V_F$ | Reference value (See note 3.) | 1.7 V | 2.2 V | 2.1 V |
| | Maximum value | 2.0 V | 2.5 V | 2.5 V |
| Forward current, $I_F$ | Reference value | 20 mA | 20 mA | 20 mA |
| | Absolute maximum value | 50 mA | 50 mA | 50 mA |
| Permissible dissipation, PD | Absolute maximum value | 100 mW | 125 mW | 122 mW |
| Reverse voltage, $V_R$ | Absolute maximum value | 4 V | 4 V | 4 V |

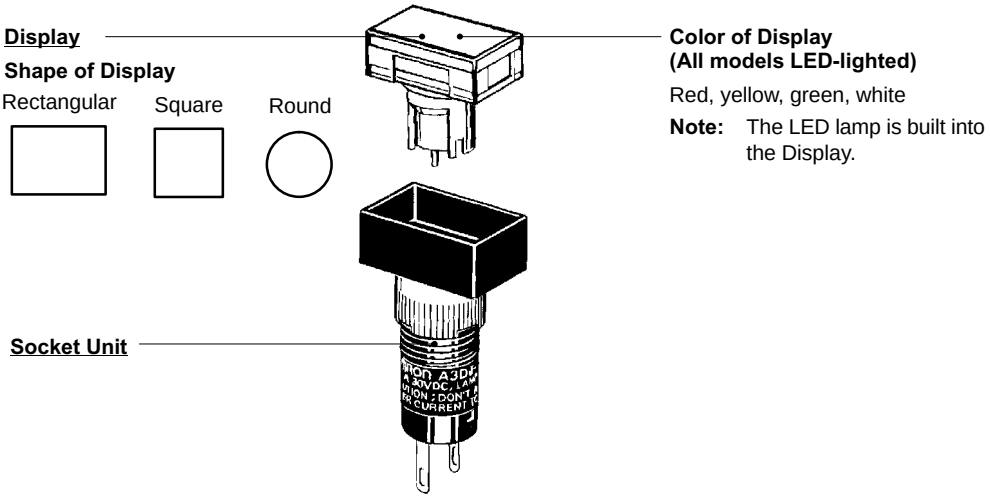
**Note:**
1. The above ratings are for an ambient temperature of 25°C.
2. The built-in LED lamp has no limiting resistor and so it is necessary to connect an external resistor within the range shown in the above table. (For details of calculation formulas, refer to page 28.)
3. Refer to the characteristic graph of $V_F$ – $I_F$ on page 24.
4. The same LED lamp is used for both yellow illumination and white illumination and so the ratings are the same.

## ■ Characteristics

| | |
|---|---|
| **Ambient operating temperature** | –10°C to 55°C (with no icing or condensation) |
| **Ambient operating humidity** | 35% to 85% |
| **Ambient storage temperature** | –25°C to 65°C |

# Nomenclature



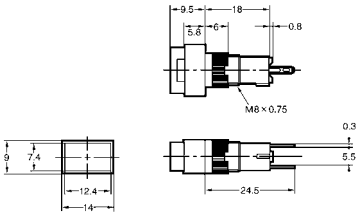




**Note:** The M2DJ model is shown here as a representative example.

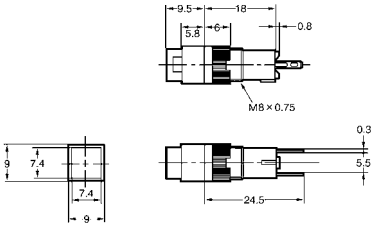
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

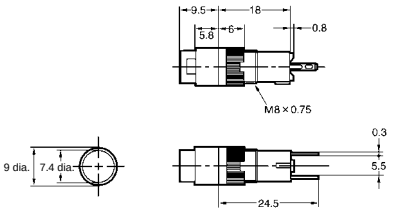
**Rectangular Models (M2DJ-90A1-00E□)**




**Square Models (M2DA-90A1-00E□)**



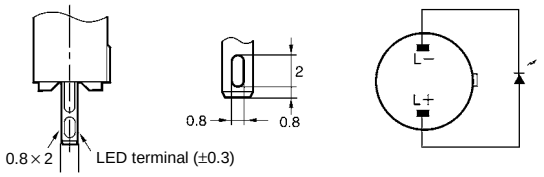

**Square Models (M2DT-90A1-00E□)**



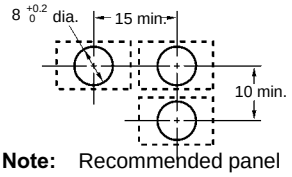
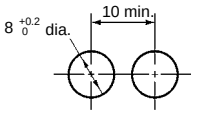

**Note:** Unless specified, there is a tolerance of ±0.4 mm for dimensions.

## ■ Terminals

### Solder Terminals




## ■ Panel Cutouts (Top View)

| Rectangular models (M2DJ) | Square models (M2DA) and round models (M2DT) |
|---|---|
|   **Note:** Recommended panel thickness: 1.0 to 3.2 mm. |   **Note:** Recommended panel thickness: 1.0 to 3.2 mm. |

**Note:** If the panel is to be finished (e.g., coated), make sure that the panel meets the specified dimensions after the coating.

# Precautions

## ■ Correct Use

Refer to the *Common Precautions* for Pushbutton Switches on page 14.
Refer to *Correct Use* for A3D on page 28.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A122-E1-02

OMRON

# Lighted Pushbutton Switch | A3C

## Cylindrical 12-dia. Series with Superb Operability, High Visibility, and Compact Housing

- Three models of Pushbuttons (round, square, and rectangular), two types of light-emitting elements (LED lamp and incandescent lamp), and two types of Switches (switching standard loads and microloads) available.
- Models that can be used as an indicator also available.
- Requires only 20 mm mounting depth
- Efficiency in wiring improved by terminals arranged on the same surface.
- All LED lamps, incandescent lamps, caps, and legends replaceable without tools.
- UL (E41515) and CSA (LR45258) approved.

## Ordering Information

### ■ Model Number Legend

When placing your order, specify the individual component part model numbers of the Pushbutton, Lamp (lighted models only), and Switch, as listed in the ordering tables below.

| (1) | | (2) | (3) | (4) | | (5) | (6) |
|---|---|---|---|---|---|---|---|
| A 3 C | J | - 9 | 0 | A | 1 - | 24E | R |

**(1) Shape of Pushbutton**

| Symbol | Shape |
|---|---|
| J | Rectangular |
| A | Square |
| T | Round |

**(2) Terminal Type**

| Symbol | Type |
|---|---|
| 0 | Solder terminal |

PCB terminals are also available. Refer to the *Switch* table on page 37.

**(3) Switch Specifications**

**Standard Load**

| Symbol | Operation | |
|---|---|---|
| A | Momentary | SPDT |
| B | Alternate | SPDT |

**Microload**

| Symbol | Operation | |
|---|---|---|
| E | Momentary | SPDT |
| F | Alternate | SPDT |

**Standard Load**

0.5 A at 250 VAC
1 A at 125 VAC
1 A at 30 VDC

**Microload**

0.1 A at 125 VAC
0.1 A at 30 VDC

Minimum applicable load
1 mA at 5 VDC

Momentary-action: Self-resetting
Alternate-action: Self-holding

**(4) Lighted/Non-lighted**

| Symbol | Type |
|---|---|
| 0 | Non-lighted |
| 1 | Illumination only |

Colored-illumination models are also available. Refer to page 36.

"Colored-illumination" models operate in the way shown below:

| Unlit | Lit |
|---|---|
| White | Color |

The built-in LED is colored.

**(5) Lighting Method**

**LED Lamp-lighted Models**

| Symbol | Operating voltage |
|---|---|
| 05E | 5 VDC |
| 12E | 12 VDC |
| 24E | 24 VDC |

**Incandescent Lamp-lighted Models**

| Symbol | Operating voltage |
|---|---|
| 06 | 5 VAC/VDC |
| 14 | 12 VAC/VDC |
| 28 | 24 VAC/VDC |

**Non-lighted Models**

No symbol

**(6) Color of Pushbutton**

**For LED Lamp**

| Symbol | Color |
|---|---|
| R | Red |
| Y | Yellow |
| G | Green |
| W | White |

**For Incandescent Lamp**

| Symbol | Color |
|---|---|
| R | Red |
| Y | Yellow |
| G | Green |
| A | Blue |
| W | White |

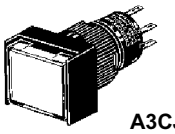
**For Non-lighted Models**

| Symbol | Color |
|---|---|
| R | Red |
| Y | Yellow |
| G | Green |
| W | White |
| A | Blue |
| B | Black |

## ■ Ordering as a Set

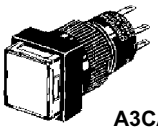
The model numbers used to order sets of Units are given in the following tables. One set comprises the Pushbutton, Lamp (lighted models only), and Switch.

**Rectangular Models**



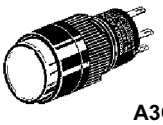
A3CJ

**Square Models**



A3CA

**Round Models**



A3CT

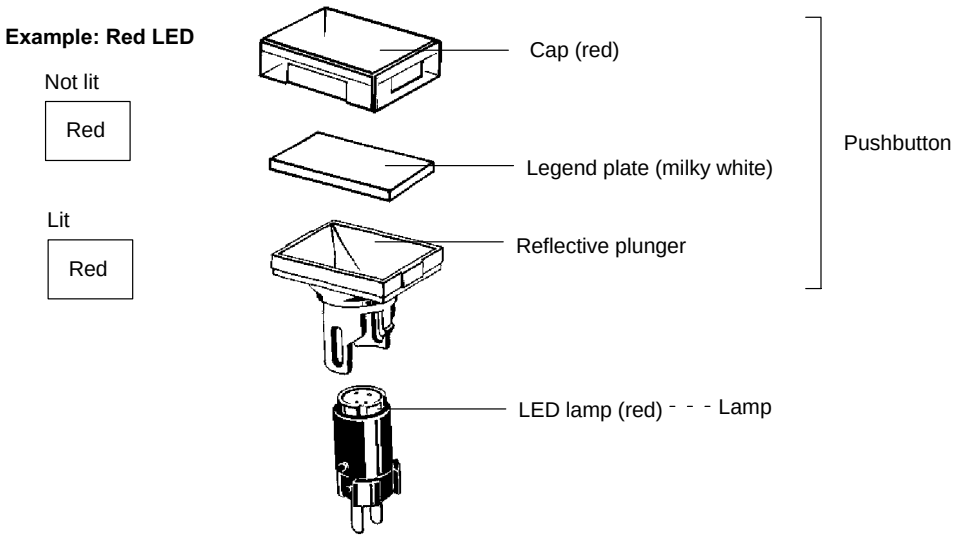
### Lighted Pushbutton Switches (SPST-NO+SPST-NC Solder Terminals)

| Shape | Contact type / Operation / Lighting | Standard load: Momentary operation (Self-resetting) | Standard load: Alternate operation (Self-holding) | Microload: Momentary operation (Self-resetting) | Pushbutton color symbol |
|---|---|---|---|---|---|
| Rectangular (A3CJ) | LED lamp | A3CJ-90A1-05E□ | A3CJ-90B1-05E□ | A3CJ-90E1-05E□ | R: red<br>Y: yellow<br>G: green<br>W: white |
| | | A3CJ-90A1-12E□ | A3CJ-90B1-12E□ | A3CJ-90E1-12E□ | |
| | | A3CJ-90A1-24E□ | A3CJ-90B1-24E□ | A3CJ-90E1-24E□ | |
| | Incandescent lamp | A3CJ-90A1-06□ | --- | | R: red<br>Y: yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 3.) |
| | | A3CJ-90A1-14□ | | | |
| | | A3CJ-90A1-28□ | | | |
| | Non-lighted | A3CJ-90A0-□ | A3CJ-90B0-□ | A3CJ-90E0-□ | |
| Square (A3CA) | LED lamp | A3CA-90A1-05E□ | A3CA-90B1-05E□ | A3CA-90E1-05E□ | R: red<br>Y: yellow<br>G: green<br>W: white |
| | | A3CA-90A1-12E□ | A3CA-90B1-12E□ | A3CA-90E1-12E□ | |
| | | A3CA-90A1-24E□ | A3CA-90B1-24E□ | A3CA-90E1-24E□ | |
| | Incandescent lamp | A3CA-90A1-06□ | --- | | R: red<br>Y: yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 3.) |
| | | A3CA-90A1-14□ | | | |
| | | A3CA-90A1-28□ | | | |
| | Non-lighted | A3CA-90A0-□ | A3CA-90B0-□ | A3CA-90E0-□ | |
| Round (A3CT) | LED lamp | A3CT-90A1-05E□ | A3CT-90B1-05E□ | A3CT-90E1-05E□ | R: red<br>Y: yellow<br>G: green<br>W: white |
| | | A3CT-90A1-12E□ | A3CT-90B1-12E□ | A3CT-90E1-12E□ | |
| | | A3CT-90A1-24E□ | A3CT-90B1-24E□ | A3CT-90E1-24E□ | |
| | Incandescent lamp | A3CT-90A1-06□ | --- | | R: red<br>Y: yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 3.) |
| | | A3CT-90A1-14□ | | | |
| | | A3CT-90A1-28□ | | | |
| | Non-lighted | A3CT-90A0-□ | A3CT-90B0-□ | A3CT-90E0-□ | |

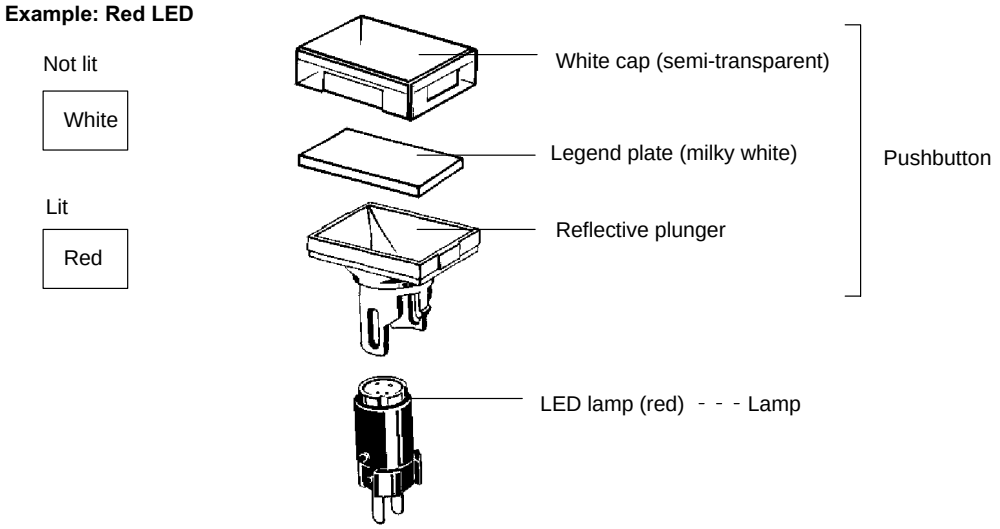
**Note:** 1. Enter the desired color symbol for the Pushbutton in the □ at the end of the model number.
2. There are also alternate-operation models that can be used for microloads. Refer to the *Switch* table on page 37.
3. Black (“B”) Pushbuttons are only available for non-lighted models.

## ■ Illumination-only and Colored-illumination LED Models

"Illumination only" describes LED models for which the screen color is the same whether the LED is lit or not. The screen simply becomes brighter when the LED lights.




"Colored illumination" describes LED models for which the screen color is white when the LED is not lit and changes to the color of the LED lamp when the LED is lit.




Ordering: With colored-illumination models, order the Pushbutton, Lamp, and Switch as shown in the following table.

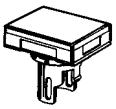
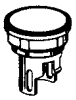
| Illuminated color | Pushbutton | Lamp (LED) | | Switch |
|---|---|---|---|---|
| Red | IP40<br>A3C□-500W | A16-□DR | Enter one of the following symbols in □.<br>5: 5 VDC<br>12: 12 VDC<br>24: 24 VDC | Refer to the following information. Order the Switch that is appropriate for the Pushbutton. |
| Yellow | Enter one of the following symbols in □.<br>J: Rectangular<br>A: Square<br>T: Round | A16-□DY | | |
| Green | | A16-□DG | | |

## ■ Ordering Individually

Pushbuttons, Lamps, and Switches can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.

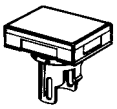
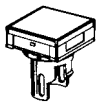
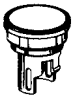
### Pushbuttons

**LED Lamp**

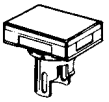
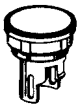
| Button color | Rectangular | Square | Round |
|---|---|---|---|
| |  | |  |
| **Red** | A3CJ-500R | A3CA-500R | A3CT-500R |
| **Yellow** | A3CJ-500Y | A3CA-500Y | A3CT-500Y |
| **Green** | A3CJ-500GY | A3CA-500GY | A3CT-500GY |
| **White** | A3CJ-500W | A3CA-500W | A3CT-500W |

**Note:** The red, yellow, and white Pushbuttons listed above can be used with either LED lamp-lighted models or incandescent lamp-lighted models.

**Incandescent Lamp**

| Button color | Rectangular | Square | Round |
|---|---|---|---|
| |  |  |  |
| **Red** | A3CJ-500R | A3CA-500R | A3CT-500R |
| **Yellow** | A3CJ-500Y | A3CA-500Y | A3CT-500Y |
| **Green** | A3CJ-500G | A3CA-500G | A3CT-500G |
| **White** | A3CJ-500W | A3CA-500W | A3CT-500W |
| **Blue** | A3CJ-500A | A3CA-500A | A3CT-500A |

**Non-lighted Models**

| Button color | Rectangular | Square | Round |
|---|---|---|---|
| |  | |  |
| **Red** | A3CJ-500R | A3CA-500R | A3CT-500R |
| **Yellow** | A3CJ-500Y | A3CA-500Y | A3CT-500Y |
| **Green** | A3CJ-500G | A3CA-500G | A3CT-500G |
| **White** | A3CJ-500W | A3CA-500W | A3CT-500W |
| **Blue** | A3CJ-500A | A3CA-500A | A3CT-500A |
| **Black** | A3CJ-501B | A3CA-501B | A3CT-501B |

### Lamps

**LED Lamp**

| Color | Rated voltage | | |
|---|---|---|---|
| | **5 VDC** | **12 VDC** | **24 VDC** |
| **Red** | A16-5DR | A16-12DR | A16-24DR |
| **Yellow** | A16-5DY | A16-12DY | A16-24DY |
| **Green** | A16-5DG | A16-12DG | A16-24DG |
| **White** | A16-5DW | A16-12DW | A16-24DW |

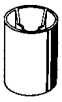
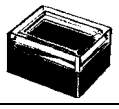
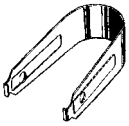
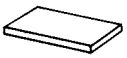
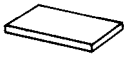
**Incandescent Lamp**

| Rated voltage | 6 VAC/VDC | 14 VAC/VDC | 28 VAC/VDC |
|---|---|---|---|
| **Model** | A16-5 | A16-12 | A16-24 |

### Switches

| Configuration | Contact | Switch action | Terminal | Degree of protection: IP40 | | |
|---|---|---|---|---|---|---|
| | | | | **Rectangular** | **Square** | **Round** |
| **Standard** | **SPST-NO+ SPST-NC** | **Momentary** | **Solder** | A3CJ-7011 | A3CA-7011 | A3CT-7011 |
| | | **Alternate** | | A3CJ-7021 | A3CA-7021 | A3CT-7021 |
| **Microload** | | **Momentary** | | A3CJ-7111 | A3CA-7111 | A3CT-7111 |
| | | **Alternate** | | A3CJ-7121 | A3CA-7121 | A3CT-7121 |

# Accessories (Order Separately)

| Name | Appearance | Classification | Model | Remarks |
|---|---|---|---|---|
| **Socket** | | Wire-wrap terminal | A3C-4101 | Cannot be used with Insulation Cover. |
| | | PCB terminal | A3C-4102 | |
| | | Solder terminal | A3C-4103 | |
| **Insulation Cover** |  | --- | A3C-3002 | Cannot be used with Socket. |
| **Switch Guard** | | For rectangular models | A3CJ-5050 | Cannot be used with Dust Cover. |
| | | For square, round models | A3CA-5050 | |
| **Dust Cover** |  | For rectangular models | A3CJ-5060 | Cannot be used with Switch Guard. |
| **Tightening Tool** | | --- | A3C-3004 | The tightening torque is 0.20 to 0.39 N·m. |
| **Extractor** |  | --- | A3PJ-5080 | --- |
| **Legend Plate** |  | For rectangular models | A3CJ-5201 | One Legend Plate is supplied per standard Switch. |
| |  | For square models | A3CA-5201 | |
| | | For round models | A3CT-5201 | |

# Specifications

## ■ Contact Ratings

| Model | Item | |
|---|---|---|
| | AC resistive load | DC resistive load |
| **Standard load** | 0.5 A at 250 VAC<br>1 A at 125 VAC | 1 A at 30 VDC |
| **Microload (See note 1.)** | 0.1 A at 125 VAC | 0.1 A at 30 VDC |

**Note:** 1. The minimum permissible load is 1 mA, 5 VDC.
2. The above ratings are for testing under the following conditions:
1) Load: Resistive load
2) Mounting conditions: No vibrations or shock
3) Temperature: 20°C ± 2°C
4) Operation frequency: 20 operations/minute

## ■ LED Lamp Ratings

| Rated voltage | Rated current | Operating voltage | Internal limiting resistance |
|---|---|---|---|
| 5 VDC | 30 mA | 5 VDC±5% | 33 Ω |
| 12 VDC | 15 mA | 12 VDC±5% | 270 Ω |
| 24 VDC | 10 mA | 24 VDC±5% | 1,600 Ω |

## ■ Incandescent Lamp Ratings

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 6 VAC/VDC | 60 mA | 5 VAC/VDC |
| 14 VAC/VDC | 40 mA | 12 VAC/VDC |
| 28 VAC/VDC | 24 mA | 24 VAC/VDC |

## ■ Characteristics

| | |
|---|---|
| **Operating frequency** | Mechanical:<br>Momentary-action models: 120 operations/minute max.<br>Alternate-action models: 60 operations/minute max. (See note 1.)<br>Electrical: 20 operations/minute max. |
| **Insulation resistance** | 100 MΩ min. (at 500 VDC) |
| **Dielectric strength** | 1,000 VAC, 50/60 Hz for 1 minute between terminals of same polarity and between lamp terminals (See note 2.)<br>2,000 VAC, 50/60 Hz for 1 minute between terminals of different polarity and also between each terminal and ground |
| **Vibration** | Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (No malfunctions for more than 1 s.) |
| **Shock** | Destruction: 500 $m/s^2$<br>Malfunction: 150 $m/s^2$ (No malfunctions for more than 1 s.) |
| **Life expectancy** | Mechanical:<br>Momentary-action models: 1,000,000 operations min.<br>Alternate-action models: 100,000 operations min. (See note 1.)<br>Electrical: 100,000 operations min. |
| **Weight** | Approx. 5 g (See note 3.) |
| **Ambient operating temperature** | –10°C to 55°C (with no icing or condensation) |
| **Ambient operating humidity** | 35% to 85% |
| **Ambient storage temperature** | –25°C to 65°C |
| **Degree of protection** | IP40 |
| **Electric shock protection class** | Class II |
| **PTI (proof tracking index)** | 175 |
| **Pollution degree** | 3 (IEC947-5-1) |

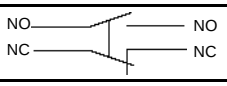
**Note:** 1. With alternate-operation models, one operation cycle consists of set and reset operations.
2. The figure given above for the dielectric strength between lamp terminals is for when there is no LED lamp or incandescent lamp mounted.
3. The weight indicated here applies to the lighted models (SPST-NO+SPST-NC).

## ■ Operating Characteristics

| | |
|---|---|
| **OF max.** | 2.45 N |
| **RF min.** | 0.29 N |
| **TT** | Approx. 3.5 mm |
| **LTA min. (See note.)** | 0.5 mm |
| **PT max.** | 2.5 mm |

**Note:** The value for LTA min. applies to alternate-operation models only.

## ■ Contact Form

| Contact name | Contact form |
|---|---|
| SPDT |   |

## ■ Approved by Standards

UL (File No. E41515)
CSA (File No. LR45258-31)

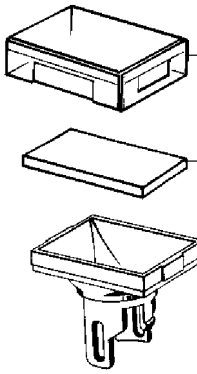
**Rating**
**Standard**

1 A at 125 VAC
0.5 A at 250 VAC
1 A at 30 VDC

**Microload**

0.1 A at 125 VAC
0.1 A at 30 VDC

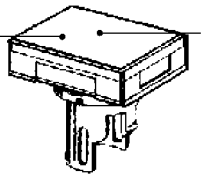
# Nomenclature




**Pushbutton**

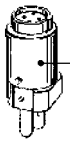
**Shape of Pushbutton**

Rectangular (A3CJ) | Square (A3CA) | Round (A3CT)



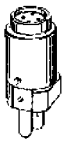
**Color of Pushbutton**

- LED lamp-lighted Models:
  Red, yellow, green, white
- Incandescent lamp-lighted Models:
  Red, yellow, green, white, blue
- Non-lighted Models:
  Red, yellow, green, white, blue, black

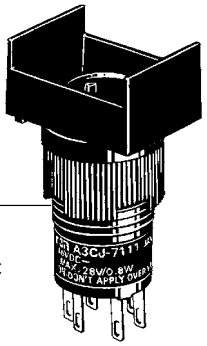


**Lamp**

**LED Lamp**



**Incandescent Lamp**



**Switch**

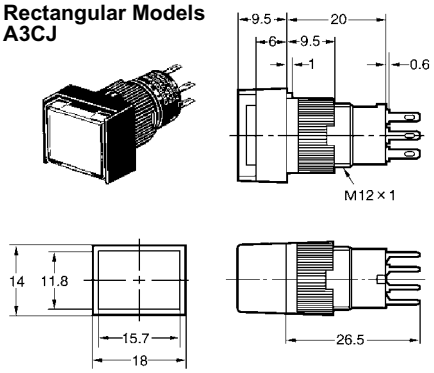
- Standard load:
  0.5 A at 250 VAC
  1 A at 125 VAC
  1 A at 30 VDC
- Microload:
  0.1 A at 125 VAC,
  0.1 A at 30 VDC
  Minimum applicable load: 1 mA at 5 VDC

**Note:** The A3CJ model is shown here as a representative example.

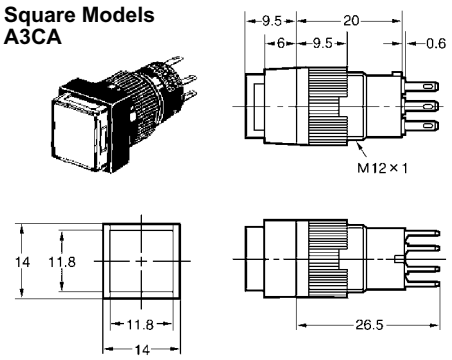
# Dimensions

The following dimensions apply to the Switch with SPST-NO+SPST-NC contact configuration, with solder terminals.

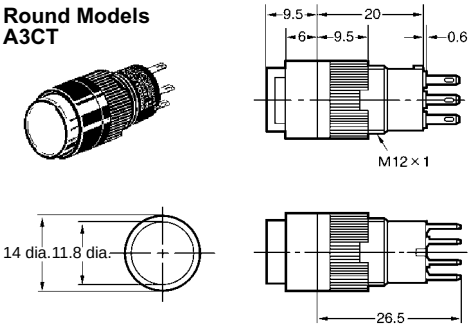
**Rectangular Models**
**A3CJ**




**Square Models**
**A3CA**




**Round Models**
**A3CT**

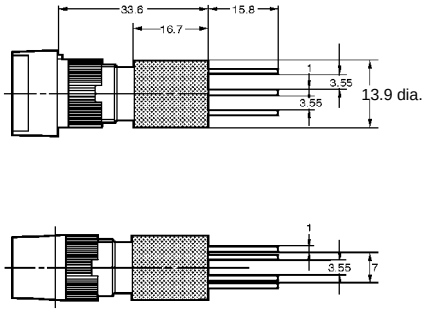


## ■ Accessory Mounting Dimensions

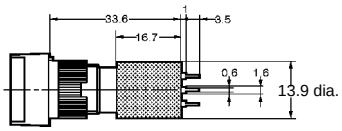
### Dimensions with Socket Mounted

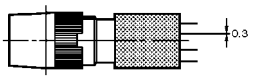
The diagrams below show the external dimensions for rectangular models as representative models.

**Wire-wrap Terminal**
**A3C-4101**

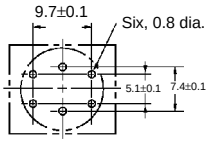



**PCB Terminal**
**A3C-4102**

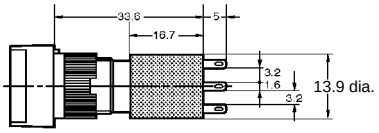


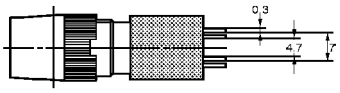




**PCB Cutout (bottom view)**

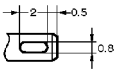



**Solder Terminal**
**A3C-4103**



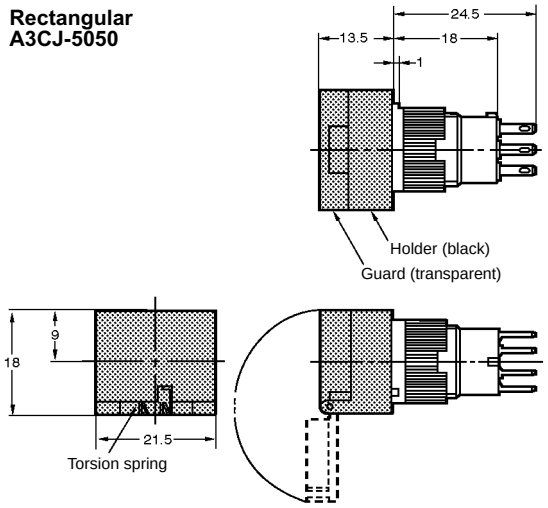




**Terminal Hole Dimensions**

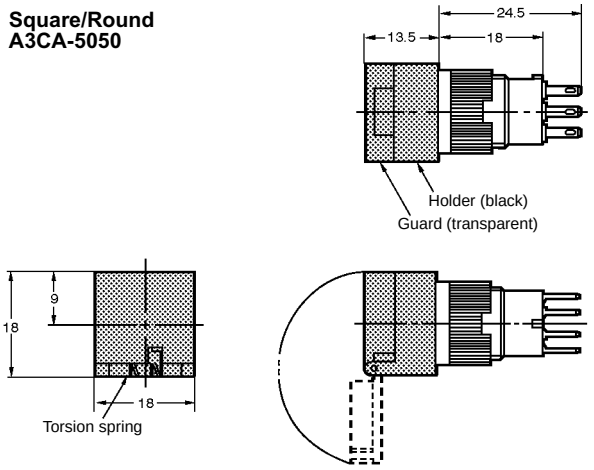



### Switch Guard

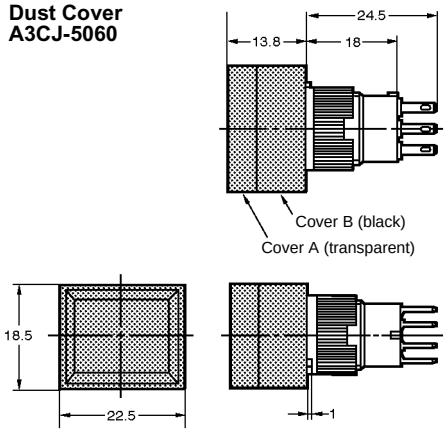
**Rectangular**
**A3CJ-5050**




**Square/Round**
**A3CA-5050**

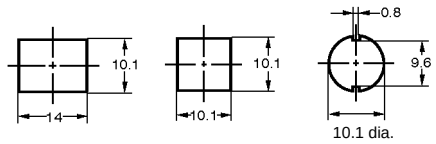



**Dust Cover**
**A3CJ-5060**



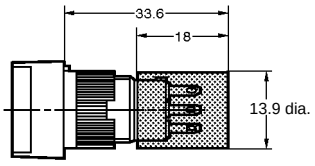

**Legend Plate**

**Rectangular** **Square** **Round**

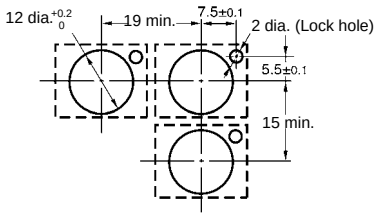
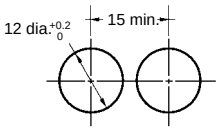
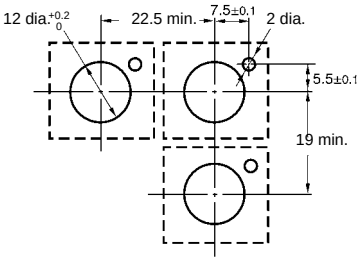
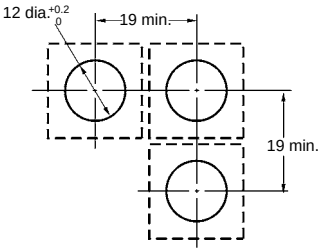
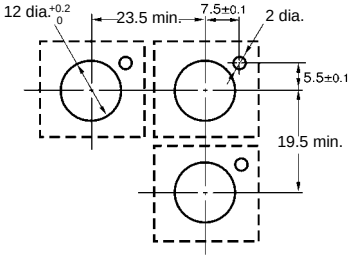



**Note:** 1. The thickness is 0.8 mm.
2. Since the Legend Plate is made of polycarbonate, use alcohol-based paints such as melanin, phthalic acid, or acryl paint when marking the legend.

**Insulation Cover**
**A3C-3002**



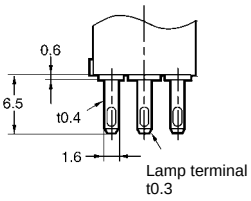
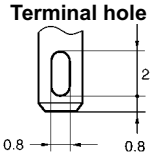
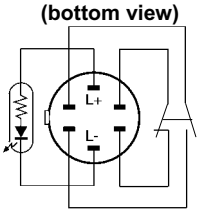
## ■ Panel Cutout (Top View)

| Accessories used | Rectangular/A3CJ | Square/A3CA, Round/A3CT |
|---|---|---|
| **Switch only** |  <br>**Note:** Recommended panel thickness: 1.0 to 3.2 mm. |  <br>**Note:** Recommended panel thickness: 1.0 to 3.2 mm. |
| **With Switch Guard** |  |  |
| **With Dust Cover** |  | --- |

**Note:** If the panel is to be finished (e.g., coated), make sure that the panel meets the specified dimensions after the coating.

# Operation

## ■ Terminal Connections

| Terminal | Type |
|---|---|
| | **SPST-NO+SPST-NC** |
| **Solder terminal** | **Lighted and non-lighted models**<br>  <br>**Terminal hole**<br>  <br>**(bottom view)**<br>  |

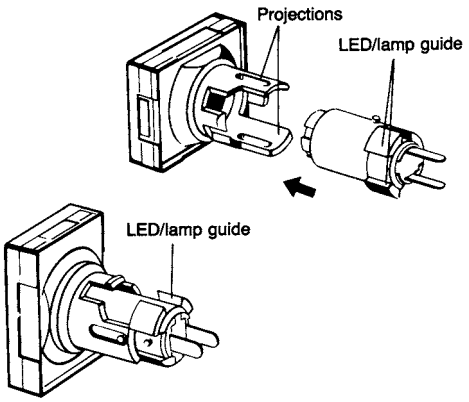
# Installation

## Mounting and Replacing the Pushbutton

### Mounting Direction for the Pushbutton/Display and Lamp

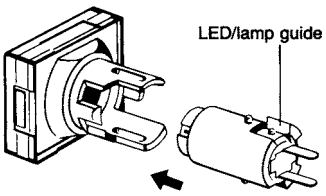
**Lighted Pushbutton Switch**

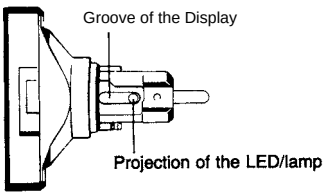
- Insert the Lamp (incandescent lamp or LED lamp) into the Pushbutton so that the lamp guide fits into the wider gap between the projections on the Pushbutton.




**Indicator**

- With Indicators, the Lamp is inserted facing the opposite direction (i.e., at 180°) to that for Lighted Pushbutton Switches.



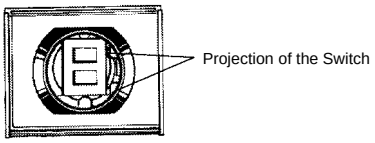

**Note:** 1. Push the projections on the Lamp into the grooves on the Pushbutton/Display.

2. The Lamp for Lighted Pushbutton Switches moves, but the Lamp for Indicators is fixed.

### Mounting Direction for the Pushbutton/Display and Switch

Insert the Pushbutton/Display into the Switch so that the lamp guide is aligned with the non-projecting part of the Switch.

Apply a pressure between 9.8 and 24.5 N.



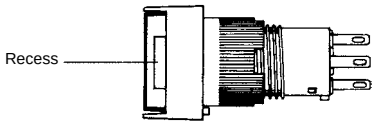

**Note:** 1. The mounting direction for Indicators is 180° to that for Lighted Pushbutton Switches. Be sure to insert the Legend Plate and other parts with the correct orientation.

2. If the terminals of the Lamp become bent, it may be impossible to fit them into the lamp terminal holes. Ensure that the terminals are straight when they are inserted.

3. Take particular care about the mounting direction with the round models (A3CT).

### Removing the Pushbutton/Display

Hold the recessed portions on the cap of the Pushbutton and pull.



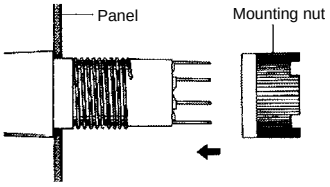

**Note:** Do not use tools such as pliers to remove the Pushbutton as this may damage the cap.

## Panel Mounting

Insert the Switch from the front of the panel. Mount the mounting nut from the terminal end of the Switch and tighten it.

There are projections on the terminal end of the Switch which may, depending on the orientation, block the nut. In this case, turn the nut until it is possible to mount it. Tighten the nut to a torque between 0.20 and 0.39 N·m.

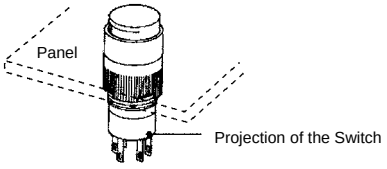
If soldering is used, mount the mounting nut first. Lead wires and mounds of solder may make it impossible to mount the nut after soldering.

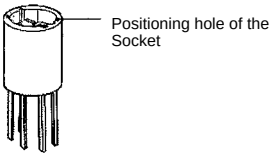



## Socket Mounting

After securing the Switch to the panel using the mounting nut, insert the Socket into the Switch.

Align the positioning holes of the Socket with the projections of the Switch before inserting the Socket.

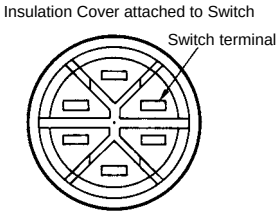


## Mounting the Insulation Cover

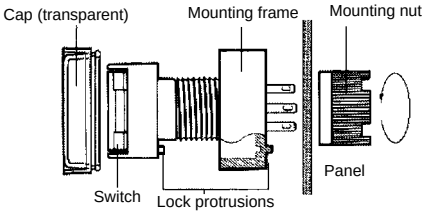
After securing the Switch to the panel using the mounting nut, pass the lead wires through the holes in the Insulation Cover and then perform wiring. Hold the Insulation Cover so that the cylindrical hole is facing the Switch, and insert the lead wires from the end with the barriers.

After wiring is completed, mount the Insulation Cover by pushing it into the Switch.



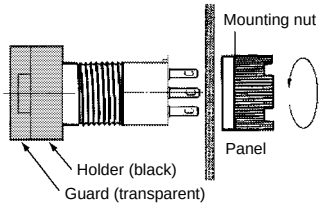

## Mounting the Dust Cover

1. The Dust Cover separates into 2 parts: the cap and the mounting frame.
2. Insert the Switch into the mounting frame. (Align the lock projection with the recess on the mounting frame.)
3. Insert the Switch in the state described in step 2 into the panel. (Align the lock protrusion on the mounting frame with the hole in the panel.)
4. Mount the mounting nut from the back of the panel and tighten it.
5. Insert the cap into the mounting frame. Ensure that the entire perimeter of the cap is properly inserted into the mounting frame by pressing down on the cap from different directions.




## Mounting the Switch Guard

1. Insert the Switch into the Switch Guard.
2. Insert the Switch into the panel in the state described in step 1.
3. Mount the mounting nut from the back of the panel and tighten it.



# Precautions

**⚠ Caution**

Do not apply a voltage higher than the maximum rated operating voltage between the lamp terminals, as there is a risk that the incandescent lamp or LED lamp will be damaged, and the Pushbutton will be ejected.

When replacing the incandescent lamp, first turn OFF the power supply, and then wait 10 minutes before performing replacement, as the lamp is still hot immediately after the power is turned OFF, so there is a risk of burns.

Refer to the *Common Precautions* for Pushbutton Switches on page 14.

## Correct Use

### Mounting

To prevent electric shock or a fire, always make sure that the power is turned OFF before mounting, removing, or wiring the Switch, or performing maintenance.

Do not tighten the mounting ring excessively using pliers or a similar tool. Excessive tightening may damage the mounting ring. (Tightening torque: 0.20 to 0.39 N·m)

### Wiring

When wiring, use wires of a size appropriate for the applied voltage and carry current. Perform soldering correctly under the conditions given below. Using the Switch with the wires soldered incorrectly may cause the terminals to become abnormally hot and cause a fire.

1. Hand soldering: At 30 W within 5 seconds.
2. Dip soldering: At 240°C within 3 seconds.

Wait for one minute after soldering before exerting any external force on the solder.

Use a non-corrosive rosin liquid for the flux.

Perform wiring so that the wire sheaths do not come into contact with the Switch. If this is unavoidable, use wires that can withstand temperatures of 100°C min.

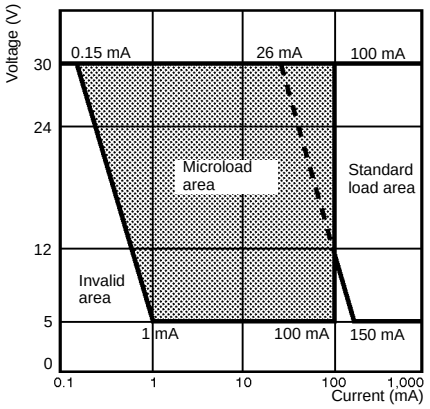
After wiring to the Switch has been completed, ensure an appropriate insulation distance.

### Operating Environment

Do not use in locations that are subject to dust, oil, or metal filings as these may penetrate the interior of the Switch and cause malfunction.

### Using Microloads

Using a standard load switch for opening and closing a microload circuit may cause wear on the contacts. Use the switch within the operating range. (Refer to the diagram below.) Even when using microload models within the operating range shown below, if inrush current occurs when the contact is opened or closed, it may cause the contact surface to become rough, and so decrease life expectancy. Therefore, insert a contact protection circuit where necessary. The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% ($\lambda$ 60) (conforming to JIS C5003). The equation, $\lambda 60 = 0.5 \times 10^{-4}$/times indicates that the estimated malfunction rate is less than 1/2,000,000 with a reliability level of 60%.




### LED

Resistance to limit the LED current is provided internally and so an external resistance is not required.

| Rated voltage | Internal limiting resistance |
|---|---|
| **5 VDC** | 33 Ω |
| **12 VDC** | 270 Ω |
| **24 VDC** | 1600 Ω |

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A030-E1-05

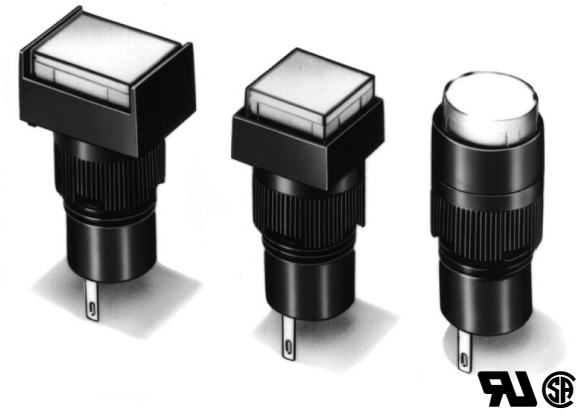
OMRON

# Indicator

# M2C

## Indicator with Cylindrical 20-mm × 12-dia. Body

- Same basic design as the A3C Pushbutton Switch.
- Good illumination with even surface brightness.
- Cylindrical body means panel cutouts can be made easily.
- UL (E41515) and CSA (LR45258) approved.



## Ordering Information

### ■ Model Number Legend:

The model numbers used to order sets of Units are illustrated below. One set comprises the Display, Lamp, and Socket Unit.

(1) (2) (3) (4) (5)

**M 2 C J - 9 0 A 1 - 24E R**

**(1) Shape of Display**

| Symbol | Shape |
|---|---|
| J | Rectangular |
| A | Square |
| T | Round |

**(2) Terminal Type**

| Symbol | Terminal type |
|---|---|
| 0 | Solder terminals |

**(3) Lighting Type**

| Symbol | Lighting type |
|---|---|
| 1 | Illumination only |

Colored-illumination models are also available. For details, refer to page 49.

"Colored-illumination" models operate in the way shown below:

| Unlit | Lit |
|---|---|
| White | Color |

The built-in LED is colored.

**(4) Lighting Method**

**LED lamp-lighted Models**

| Symbol | Operating voltage |
|---|---|
| 05E | 5 VDC |
| 12E | 12 VDC |
| 24E | 24 VDC |

**Incandescent Lamp-lighted Models**

| Symbol | Operating voltage |
|---|---|
| 06 | 5 VAC/VDC |
| 14 | 12 VAC/VDC |
| 28 | 24 VAC/VDC |

**(5) Color of Display**

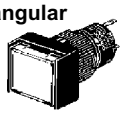
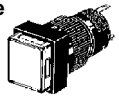
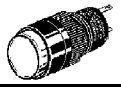
**For LED lamp**

| Symbol | Color |
|---|---|
| R | Red |
| Y | Yellow |
| G | Green |
| W | White |

**For incandescent lamp**

| Symbol | Color |
|---|---|
| R | Red |
| Y | Yellow |
| G | Green |
| A | Blue |
| W | White |

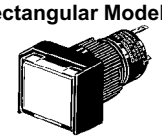
## ■ List of Models

| Appearance | Model |
|---|---|
| Rectangular  | M2CJ |
| Square  | M2CA |
| Round  | M2CT |

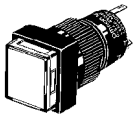
## ■ Ordering as a Set

The model numbers used to order sets of Units are given in the following tables. One set comprises the Display, Lamp, and Socket Unit.

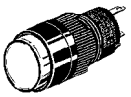
**Rectangular Models**



**Square Models**



**Round Models**



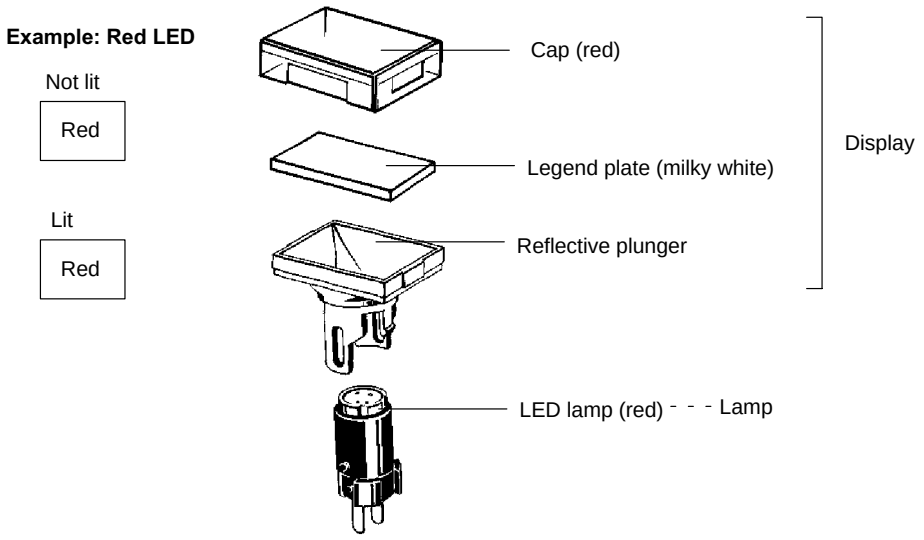
### Indicators (Solder Terminals)

| Appearance | Lighting | Model number (for set) | Display color symbol |
|---|---|---|---|
| Rectangular (M2CJ) | LED lamp | M2CJ-90A1-05E□ | R: red<br>Y: yellow<br>G: green<br>W: white |
| | | M2CJ-90A1-12E□ | |
| | | M2CJ-90A1-24E□ | |
| | Incandescent lamp | M2CJ-90A1-06□ | R: red<br>Y: yellow<br>G: green<br>W: white<br>A: blue |
| | | M2CJ-90A1-14□ | |
| | | M2CJ-90A1-28□ | |
| Square (M2CA) | LED lamp | M2CA-90A1-05E□ | R: red<br>Y: yellow<br>G: green<br>W: white |
| | | M2CA-90A1-12E□ | |
| | | M2CA-90A1-24E□ | |
| | Incandescent lamp | M2CA-90A1-06□ | R: red<br>Y: yellow<br>G: green<br>W: white<br>A: blue |
| | | M2CA-90A1-14□ | |
| | | M2CA-90A1-28□ | |
| Round (M2CT) | LED lamp | M2CT-90A1-05E□ | R: red<br>Y: yellow<br>G: green<br>W: white |
| | | M2CT-90A1-12E□ | |
| | | M2CT-90A1-24E□ | |
| | Incandescent lamp | M2CT-90A1-06□ | R: red<br>Y: yellow<br>G: green<br>W: white<br>A: blue |
| | | M2CT-90A1-14□ | |
| | | M2CT-90A1-28□ | |

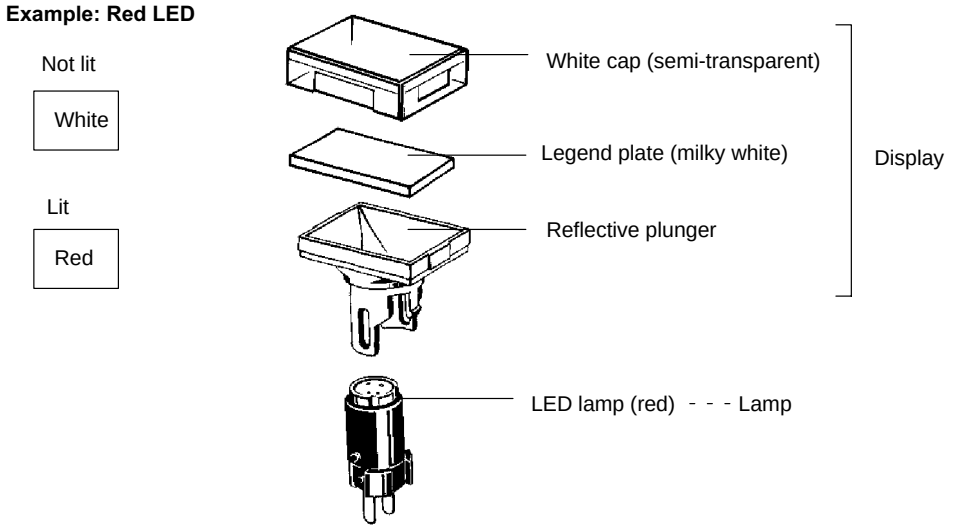
**Note:** Enter the desired color symbol for the Display in the □ at the end of the model number.

## ■ Illumination-only and Colored-illumination LED Models

"Illumination only" describes LED models for which the screen color is the same whether the LED is lit or not. The screen simply becomes brighter when the LED lights.




"Colored illumination" describes LED models for which the screen color is white when the LED is not lit and changes to the color of the LED lamp when the LED is lit.

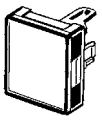
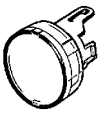


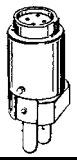
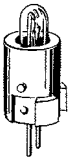

Ordering: With colored-illumination models, order the Display, Lamp, and Socket Unit as shown in the following table.

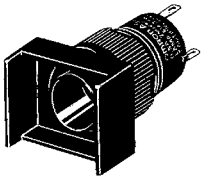
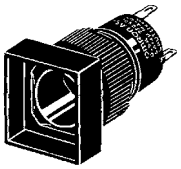
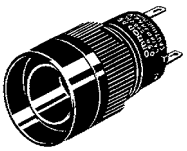
| Illuminated color | Display | Lamp (LED) | | Socket Unit |
|---|---|---|---|---|
| Red | IP40<br>A3C□-500W<br>Enter one of the following symbols in □.<br>J: Rectangular<br>A: Square<br>T: Round | A16-□DR | Enter one of the following symbols in □.<br>5: 5 VDC<br>12: 12 VDC<br>24: 24 VDC | Refer to the following information. Order the Socket Unit that is appropriate for the Display. |
| Yellow | | A16-□DY | | |
| Green | | A16-□DG | | |

## ■ Ordering Individually

Displays, Lamps, and Socket Units can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.

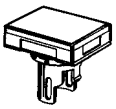
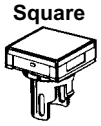
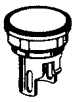
| Display | | |
|---|---|---|
| Rectangular | Square | Round |
| |  |  |

| Lamp | |
|---|---|
| LED Lamp | Incandescent lamp |
|  |  |

| Socket Unit | | |
|---|---|---|
| Rectangular | Square | Round |
|  |  |  |

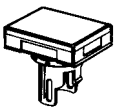
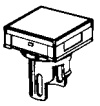
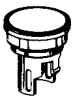
### Display (Lighted Models)

**LED Lamp**

| Button color | Rectangular | Square | Round |
|---|---|---|---|
| |  |  |  |
| **Red** | A3CJ-500R | A3CA-500R | A3CT-500R |
| **Yellow** | A3CJ-500Y | A3CA-500Y | A3CT-500Y |
| **Green** | A3CJ-500GY | A3CA-500GY | A3CT-500GY |
| **White** | A3CJ-500W | A3CA-500W | A3CT-500W |

**Note:** The red, yellow, and white Displays listed above can be used with either LED lamp-lighted models or incandescent lamp-lighted models.

**Incandescent Lamp**

| Button color | Rectangular | Square | Round |
|---|---|---|---|
| |  |  |  |
| **Red** | A3CJ-500R | A3CA-500R | A3CT-500R |
| **Yellow** | A3CJ-500Y | A3CA-500Y | A3CT-500Y |
| **Green** | A3CJ-500G | A3CA-500G | A3CT-500G |
| **White** | A3CJ-500W | A3CA-500W | A3CT-500W |
| **Blue** | A3CJ-500A | A3CA-500A | A3CT-500A |

### Lamp

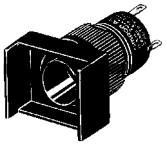
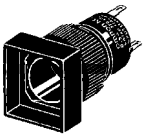
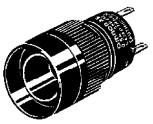
**LED Lamp**

| Color | Rated voltage | | |
|---|---|---|---|
| | **5 VDC** | **12 VDC** | **24 VDC** |
| **Red** | A16-5DR | A16-12DR | A16-24DR |
| **Yellow** | A16-5DY | A16-12DY | A16-24DY |
| **Green** | A16-5DG | A16-12DG | A16-24DG |
| **White** | A16-5DW | A16-12DW | A16-24DW |

**Incandescent Lamp**

| Rated voltage | Model |
|---|---|
| 6 VAC/VDC | A16-5 |
| 14 VAC/VDC | A16-12 |
| 28 VAC/VDC | A16-24 |

### Socket Unit

| Sealing / Appearance / Terminal | IP40 | | |
|---|---|---|---|
| |  |  |  |
| Solder terminals | M2CJ-7001 | M2CA-7001 | M2CT-7001 |

## ■ Accessories

The accessories for the A3C Lighted Pushbutton Switch can also be used with the M2C. Refer to page 38.

# Specifications

## ■ Ratings

### LED Lamp

| Rated voltage | Rated current | Operating voltage | Internal limiting resistance |
|---|---|---|---|
| 5 VDC | 30 mA | 5 VDC ±5% | 33 Ω |
| 12 VDC | 15 mA | 12 VDC ±5% | 270 Ω |
| 24 VDC | 10 mA | 24 VDC ±5% | 1,600 Ω |

### Incandescent Lamp

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 6 VAC/VDC | 60 mA | 5 VAC/VDC |
| 14 VAC/VDC | 40 mA | 12 VAC/VDC |
| 28 VAC/VDC | 24 mA | 24 VAC/VDC |

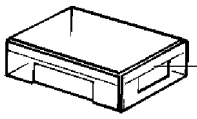
## ■ Characteristics

| | |
|---|---|
| **Ambient operating temperature** | –10°C to 55°C (with no icing or condensation) |
| **Ambient operating humidity** | 35% to 85% |
| **Ambient storage temperature** | –25°C to 65°C |

## ■ Approved Standards

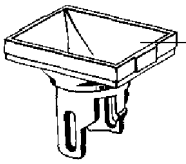
UL, CSA

# Nomenclature



**Color cap**

**Legend plate (milky white)**



**Reflective plunger**

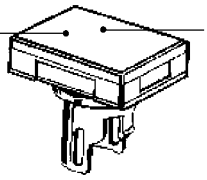
**Display**

**Shape of Display**

Rectangular (M2CJ)

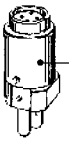
Square (M2CA)

Round (M2CT)



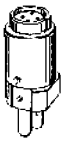
**Color of Display**

- LED Lamp-lighted Models: Red, yellow, green, white
- Incandescent Lamp-lighted Models: Red, yellow, green, white, blue



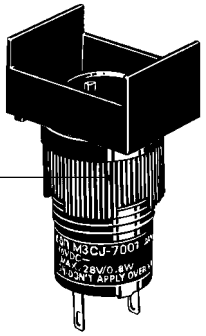
**Lamp**

**LED Lamp**



**Incandescent Lamp**

**Socket Unit**

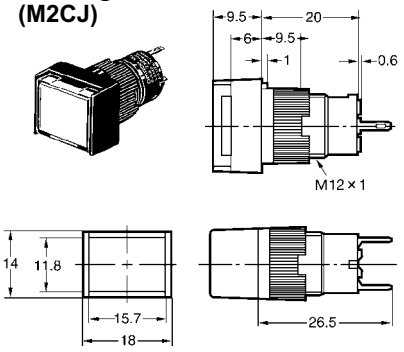


**Note:** The M2CJ model is shown here as a representative example.

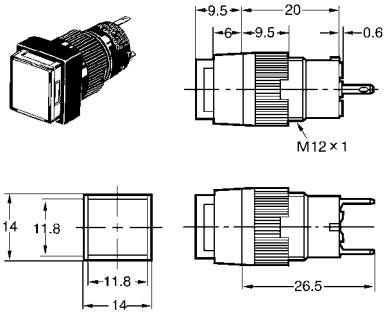
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

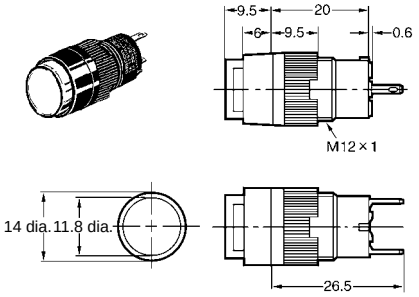
**Rectangular Models (M2CJ)**




**Square Models (M2CA)**



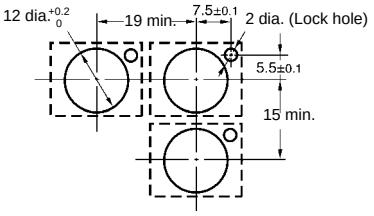
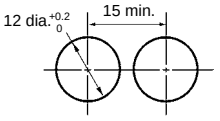
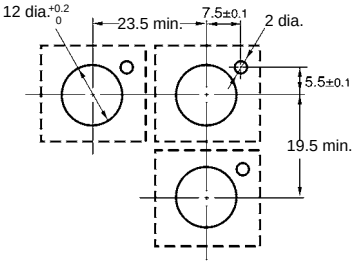

**Round Models (M2CT)**




**Note:** Unless specified, there is a tolerance of ±0.4 mm for dimensions.

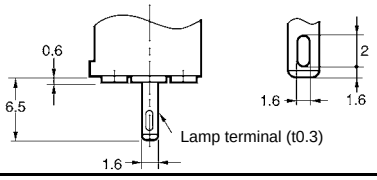
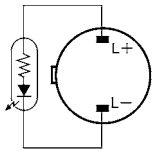
# Operation

## ■ Panel Cutout (Top View)

| Accessories used | Rectangular/M2CJ | Square/M2CA, Round/M2CT |
|---|---|---|
| **Indicator Unit only** |   **Note:** Recommended panel thickness: 1.0 to 3.2 mm. |   **Note:** Recommended panel thickness: 1.0 to 3.2 mm. |
| **With Dust Cover** |   | --- |

**Note:** If the panel is to be finished (e.g., coated), make sure that the panel meets the specified dimensions after the coating.

## ■ Terminal Connections

| Terminal | Type |
|---|---|
| | **SPST-NO+SPST-NC** |
| **Solder terminal** | **Lighted and non-lighted models**<br>**Terminal Hole Dimensions**<br>  <br>**Terminal Arrangement (bottom view)**<br>   |

# Precautions

## ■ Correct Use

Refer to the *Common Precautions* for Pushbutton Switches on page 14.
Refer to *Correct Use* for A3C on page 46.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A123-E1-02

# Pushbutton Switch
# A16

## Mounting Aperture of 16 mm

- Modular construction (Pushbutton + Case + Lamp + Switch)
- Wide Variety of Control and Signal Devices: Lighted, Non-Lighted, and Buzzer
- UL and cUL approved.
- Conforms to EN60947-5-1, IEC947-5-1
- Quick and easy assembly, snap-in Switch.
- Wide range of switching capacity from standard to microload
- High reliability, IP65
- Short mounting depth, less than 28.5 mm below panel

# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

The model numbers used to order sets of Units are illustrated below. One set comprises the Pushbutton, Lamp (lighted models only), Case, and Switch.

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| 5 | L | J | R | M | 24D | 2 |

A 1 6 5 L - J R M - 24D - 2

**(1) Degree of Protection**

| Symbol | Protection |
|---|---|
| No symbol | IP40 |
| 5 | IP65 oil-resistant |

**(2) Lighted/Non-lighted**

| Symbol | Type |
|---|---|
| No symbol | Non-lighted |
| L | Lighted |

**(3) Shape of Pushbutton**

| Symbol | Shape | |
|---|---|---|
| J | Rectangular | 2-way guard |
| A | Square | 2-way guard |
| T | Round | Projecting model |

**(4) Color of Pushbutton**

| Symbol | Color |
|---|---|
| R | Red |
| Y | Yellow |
| PY | Pure yellow |
| G | Green |
| W | White |
| A | Blue |
| B | Black (non-lighted models only) |

"Colored-illumination" models operate in the way shown below:

| Unlit | Lit |
|---|---|
| White | Color |

The built-in LED is colored.

**(5) Switch Operation**

| Symbol | Operation |
|---|---|
| M | Momentary |
| A | Alternate |

Momentary-action: Self-resetting
Alternate-action: Self-holding

**(6) Light Source**

| Symbol | Type | Operating voltage | Rated voltage |
|---|---|---|---|
| No symbol | Non-lighted | | |
| 5 | Incandescent lamp | 5 VAC/VDC | 6 VAC/VDC |
| 12 | | 12 VAC/VDC | 14 VAC/VDC |
| 24 | | 24 VAC/VDC | 28 VAC/VDC |
| 5D | LED | 5 ±5% VDC | 5 VDC |
| 12D | | 12 ±5% VDC | 12 VDC |
| 24D | | 24 ±5% VDC | 24 VDC |

**Voltage Reduction Unit (24-V Built-in LED)**

| Symbol | Type | Operating voltage | Rated voltage |
|---|---|---|---|
| T1 | LED | 90 to 121 VAC/VDC | 110 VAC |
| T2 | | 180 to 242 VAC/VDC | 220 VAC |

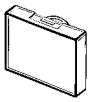
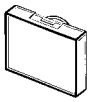
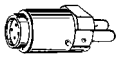
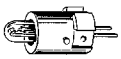
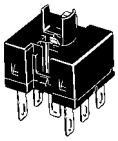
**Note:** 1. Solder terminals are available only with 100-V models.
2. The Voltage Reduction Unit is not available for models with PCB terminals.
3. "T2" is available only for the Screw-Less Clamp type.

**(7) Contact Configuration**

| Symbol | Type | Terminal |
|---|---|---|
| 1 | SPDT | Solder Terminal |
| 2 | DPDT | |
| 1P | SPDT | PCB Terminal |
| 2P | DPDT | |
| 2S | DPDT | Screw-Less Clamp |

Only DPDT contacts are available with Screw-Less Clamp.

Neon lamps are not available with models that are ordered as a set. They must be ordered individually if required. Refer to page 62.

| Model | Lighted Pushbutton Switches | Non-lighted Pushbutton Switches |
|---|---|---|
| Pushbutton | Rectangular  <br>Square <br>Round | Rectangular  <br>Square <br>Round |
| Lamp | LED lamp  Incandescent lamp  | |
| Case | | |
| Switch | Solder Terminals<br>(Without Voltage Reduction Unit)<br>  | |

**Note:** There is no Lamp with non-lighted models.

# Subassembled

## 1. Pushbutton

### Non-lighted/Lighted

**A16□L-□□**
1 2 3

1. **Degree of Protection**
   None: IP40
   5: IP65
2. **Flange Shape**
   J: Rectangular
   T: Round
   A: Square
3. **Illumination Color for Non-lighted Models**
   R: Red
   G: Green
   Y: Yellow
   W: White
   A: Blue
   B: Black

**Illumination Color for Lighted Models**

**LED/Incandescent Lamp**
R: Red
Y: Yellow
PY: Pure yellow
W: White
A: Blue

**LED**
GY: Green

**Incandescent Lamp**
G: Green

## 2. Lamp

### A16-□□
1 2

**1. Operating Voltage (Rated Voltage)**

**Incandescent Lamp**

5: 5 VAC/VDC (6 VAC/VDC)
12: 12 VAC/VDC (14 VAC/VDC)
24: 24 VAC/VDC (28 VAC/VDC)

**LED**

5DS: 5 VDC (5 VDC)
12DS: 12 VDC (12 VDC)
24DS: 24 VDC (24 VDC)

**2. Illumination Color**

None: Incandescent Lamp
R: Red (LED)
G: Green (LED)
Y: Yellow (LED)
W: White (LED)
A: Blue (LED)

## 3. Case

### A16□-□□
1 2 3

**1. Degree of Protection**

None: IP40
5: IP65 Oil-resistant

**2. Flange Shape**

CJ: Rectangular
CT: Round
CA: Square

**3. Switch Action**

M: Momentary
A: Alternate

## 4. Switch (Solder Terminals)

### A16-□-□
1 2

**1. Voltage Reduction Circuit (Operating Voltage/Rated Voltage)**

None: Without Voltage Reduction Unit
T1: 100 VAC/110 VAC

**2. Contacts**

1: SPDT
2: DPDT

## 5. Socket (Solder Terminals Only)

### M16-□
1

**1. Voltage Reduction Circuit (Operating Voltage/Rated Voltage)**

0: Without Voltage Reduction Unit
T1: 100 VAC/110 VAC

# Ordering Information

## ■ List of Models

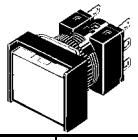
### Ordering as a Set

The model numbers used to order sets of Units are given in the following tables. One set comprises the Pushbutton, Lamp (lighted models only), Case, and Switch.

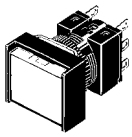
### A16□-J (Rectangular) Models

**Solder Terminal Models**

**IP40**



| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| SPDT | LED without Voltage Reduction Unit | 5 VDC | A16L-J□M-5D-1 | A16L-J□A-5D-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A16L-J□M-12D-1 | A16L-J□A-12D-1 | |
| | | 24 VDC | A16L-J□M-24D-1 | A16L-J□A-24D-1 | |
| | Incandescent lamp | 5 VDC/VAC | A16L-J□M-5-1 | A16L-J□A-5-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A16L-J□M-12-1 | A16L-J□A-12-1 | |
| | | 24 VDC/VAC | A16L-J□M-24-1 | A16L-J□A-24-1 | |
| | Non-lighted | | A16-J□M-1 | A16-J□A-1 | |
| DPDT | LED without Voltage Reduction Unit | 5 VDC | A16L-J□M-5D-2 | A16L-J□A-5D-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A16L-J□M-12D-2 | A16L-J□A-12D-2 | |
| | | 24 VDC | A16L-J□M-24D-2 | A16L-J□A-24D-2 | |
| | Incandescent lamp | 5 VDC/VAC | A16L-J□M-5-2 | A16L-J□A-5-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A16L-J□M-12-2 | A16L-J□A-12-2 | |
| | | 24 VDC/VAC | A16L-J□M-24-2 | A16L-J□A-24-2 | |
| | Non-lighted | | A16-J□M-2 | A16-J□A-2 | |



**IP65 Oil-resistant**

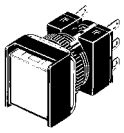
| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| SPDT | LED without Voltage Reduction Unit | 5 VDC | A165L-J□M-5D-1 | A165L-J□A-5D-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A165L-J□M-12D-1 | A165L-J□A-12D-1 | |
| | | 24 VDC | A165L-J□M-24D-1 | A165L-J□A-24D-1 | |
| | Incandescent lamp | 5 VDC/VAC | A165L-J□M-5-1 | A165L-J□A-5-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A165L-J□M-12-1 | A165L-J□A-12-1 | |
| | | 24 VDC/VAC | A165L-J□M-24-1 | A165L-J□A-24-1 | |
| | Non-lighted | | A165-J□M-1 | A165-J□A-1 | |
| DPDT | LED without Voltage Reduction Unit | 5 VDC | A165L-J□M-5D-2 | A165L-J□A-5D-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A165L-J□M-12D-2 | A165L-J□A-12D-2 | |
| | | 24 VDC | A165L-J□M-24D-2 | A165L-J□A-24D-2 | |
| | Incandescent lamp | 5 VDC/VAC | A165L-J□M-5-2 | A165L-J□A-5-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A165L-J□M-12-2 | A165L-J□A-12-2 | |
| | | 24 VDC/VAC | A165L-J□M-24-2 | A165L-J□A-24-2 | |
| | Non-lighted | | A165-J□M-2 | A165-J□A-2 | |

**Note: 1.** Enter the desired color symbol for the Pushbutton in the □.

**2.** Black (“B”) Pushbuttons are only available for non-lighted models.

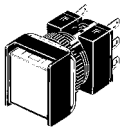
## A16□-A (Square) Models

### Solder Terminal Models



**IP40**

| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| SPDT | LED without Voltage Reduction Unit | 5 VDC | A16L-A□M-5D-1 | A16L-A□A-5D-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A16L-A□M-12D-1 | A16L-A□A-12D-1 | |
| | | 24 VDC | A16L-A□M-24D-1 | A16L-A□A-24D-1 | |
| | Incandescent lamp | 5 VDC/VAC | A16L-A□M-5-1 | A16L-A□A-5-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A16L-A□M-12-1 | A16L-A□A-12-1 | |
| | | 24 VDC/VAC | A16L-A□M-24-1 | A16L-A□A-24-1 | |
| | Non-lighted | | A16-A□M-1 | A16-A□A-1 | |
| DPDT | LED without Voltage Reduction Unit | 5 VDC | A16L-A□M-5D-2 | A16L-A□A-5D-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A16L-A□M-12D-2 | A16L-A□A-12D-2 | |
| | | 24 VDC | A16L-A□M-24D-2 | A16L-A□A-24D-2 | |
| | Incandescent lamp | 5 VDC/VAC | A16L-A□M-5-2 | A16L-A□A-5-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A16L-A□M-12-2 | A16L-A□A-12-2 | |
| | | 24 VDC/VAC | A16L-A□M-24-2 | A16L-A□A-24-2 | |
| | Non-lighted | | A16-A□M-2 | A16-A□A-2 | |



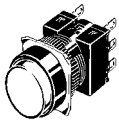
**IP65 Oil-resistant**

| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| SPDT | LED without Voltage Reduction Unit | 5 VDC | A165L-A□M-5D-1 | A165L-A□A-5D-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A165L-A□M-12D-1 | A165L-A□A-12D-1 | |
| | | 24 VDC | A165L-A□M-24D-1 | A165L-A□A-24D-1 | |
| | Incandescent lamp | 5 VDC/VAC | A165L-A□M-5-1 | A165L-A□A-5-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A165L-A□M-12-1 | A165L-A□A-12-1 | |
| | | 24 VDC/VAC | A165L-A□M-24-1 | A165L-A□A-24-1 | |
| | Non-lighted | | A165-A□M-1 | A165-A□A-1 | |
| DPDT | LED without Voltage Reduction Unit | 5 VDC | A165L-A□M-5D-2 | A165L-A□A-5D-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A165L-A□M-12D-2 | A165L-A□A-12D-2 | |
| | | 24 VDC | A165L-A□M-24D-2 | A165L-A□A-24D-2 | |
| | Incandescent lamp | 5 VDC/VAC | A165L-A□M-5-2 | A165L-A□A-5-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A165L-A□M-12-2 | A165L-A□A-12-2 | |
| | | 24 VDC/VAC | A165L-A□M-24-2 | A165L-A□A-24-2 | |
| | Non-lighted | | A165-A□M-2 | A165-A□A-2 | |

**Note: 1.** Enter the desired color symbol for the Pushbutton in the □.
**2.** Black (“B”) Pushbuttons are only available for non-lighted models.

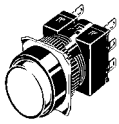
## A16□-T (Round) Models

### Solder Terminals



### IP40

| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| SPDT | LED without Voltage Reduction Unit | 5 VDC | A16L-T□M-5D-1 | A16L-T□A-5D-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A16L-T□M-12D-1 | A16L-T□A-12D-1 | |
| | | 24 VDC | A16L-T□M-24D-1 | A16L-T□A-24D-1 | |
| | Incandescent lamp | 5 VDC/VAC | A16L-T□M-5-1 | A16L-T□A-5-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A16L-T□M-12-1 | A16L-T□A-12-1 | |
| | | 24 VDC/VAC | A16L-T□M-24-1 | A16L-T□A-24-1 | |
| | Non-lighted | | A16-T□M-1 | A16-T□A-1 | |
| DPDT | LED without Voltage Reduction Unit | 5 VDC | A16L-T□M-5D-2 | A16L-T□A-5D-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A16L-T□M-12D-2 | A16L-T□A-12D-2 | |
| | | 24 VDC | A16L-T□M-24D-2 | A16L-T□A-24D-2 | |
| | Incandescent lamp | 5 VDC/VAC | A16L-T□M-5-2 | A16L-T□A-5-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A16L-T□M-12-2 | A16L-T□A-12-2 | |
| | | 24 VDC/VAC | A16L-T□M-24-2 | A16L-T□A-24-2 | |
| | Non-lighted | | A16-T□M-2 | A16-T□A-2 | |



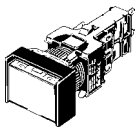
### IP65 Oil-resistant

| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| SPDT | LED without Voltage Reduction Unit | 5 VDC | A165L-T□M-5D-1 | A165L-T□A-5D-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A165L-T□M-12D-1 | A165L-T□A-12D-1 | |
| | | 24 VDC | A165L-T□M-24D-1 | A165L-T□A-24D-1 | |
| | Incandescent lamp | 5 VDC/VAC | A165L-T□M-5-1 | A165L-T□A-5-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A165L-T□M-12-1 | A165L-T□A-12-1 | |
| | | 24 VDC/VAC | A165L-T□M-24-1 | A165L-T□A-24-1 | |
| | Non-lighted | | A165-T□M-1 | A165-T□A-1 | |
| DPDT | LED without Voltage Reduction Unit | 5 VDC | A165L-T□M-5D-2 | A165L-T□A-5D-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>A: blue<br>W: white |
| | | 12 VDC | A165L-T□M-12D-2 | A165L-T□A-12D-2 | |
| | | 24 VDC | A165L-T□M-24D-2 | A165L-T□A-24D-2 | |
| | Incandescent lamp | 5 VDC/VAC | A165L-T□M-5-2 | A165L-T□A-5-2 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC/VAC | A165L-T□M-12-2 | A165L-T□A-12-2 | |
| | | 24 VDC/VAC | A165L-T□M-24-2 | A165L-T□A-24-2 | |
| | Non-lighted | | A165-T□M-2 | A165-T□A-2 | |

**Note: 1.** Enter the desired color symbol for the Pushbutton in the □.
**2.** Black (“B”) Pushbuttons are only available for non-lighted models.

## Other Models

### Models with Reduced-voltage Lighting and Solder Terminals



**IP40**

| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| SPDT | LED (with built-in reduced-voltage lighting function) | 100/110 VAC/VDC | A16L-Δ□M-T1-1 | A16L-Δ□A-T1-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue |
| DPDT | | 100/110 VAC/VDC | A16L-Δ□M-T1-2 | A16L-Δ□A-T1-2 | |

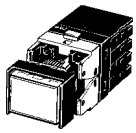
**IP65**

| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| SPDT | LED (with built-in reduced-voltage lighting function) | 100/110 VAC/VDC | A165L-Δ□M-T1-1 | A165L-Δ□A-T1-1 | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue |
| DPDT | | 100/110 VAC/VDC | A165L-Δ□M-T1-2 | A165L-Δ□A-T1-2 | |

**Note: 1.** Enter the desired shape for the Pushbutton in Δ: J (rectangular), A (square), or T (round). Enter the desired color symbol for the Pushbutton in the □.

**2.** Models with rated voltage 200 to 220 VAC/VDC (T2 models) are only available with Screw-Less Clamps.

### Screw-Less Clamp Models



**IP40**

| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| DPDT | LED | 5 VDC | A16L-Δ□M-5D-2S | A16L-Δ□A-5D-2S | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC | A16L-Δ□M-12D-2S | A16L-Δ□A-12D-2S | |
| | | 24 VDC | A16L-Δ□M-24D-2S | A16L-Δ□A-24D-2S | |
| | LED (with built-in reduced-voltage lighting function) | 100/110 VAC/VDC | A16L-Δ□M-T1-2S | A16L-Δ□A-T1-2S | |
| | | 200/220 VAC/VDC | A16L-Δ□M-T2-2S | A16L-Δ□A-T2-2S | |
| | Non-lighted | | A16-Δ□M-2S | A16-Δ□A-2S | |

**IP65**

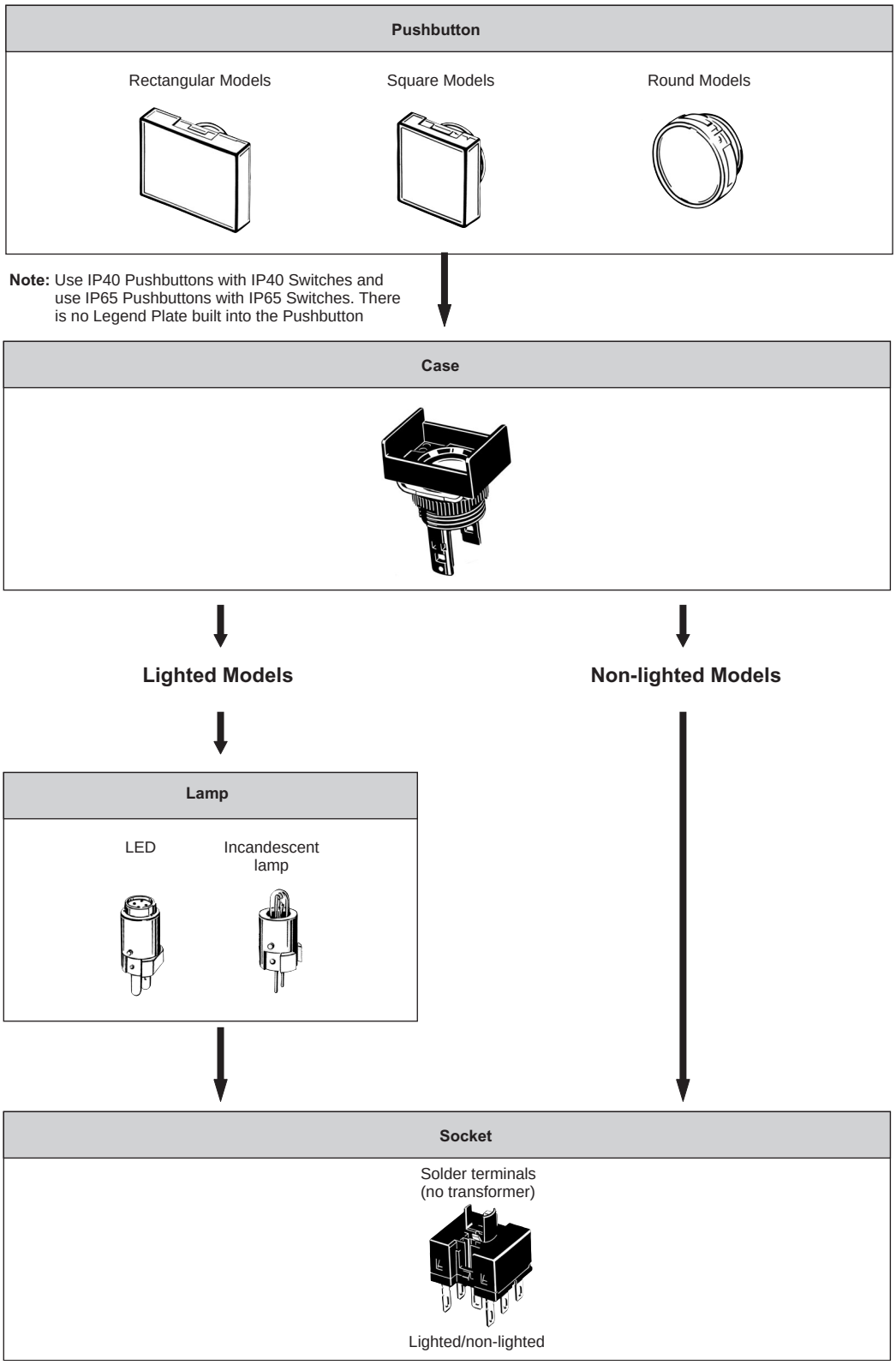
| Output | Lighting | Operating voltage | Momentary operation (Self-resetting) | Alternate operation (Self-holding) | Pushbutton color symbol (See note 1.) |
|---|---|---|---|---|---|
| DPDT | LED | 5 VDC | A165L-Δ□M-5D-2S | A165L-Δ□A-5D-2S | R: red<br>Y: yellow<br>PY: pure yellow<br>G: green<br>W: white<br>A: blue<br>B: black (See note 2.) |
| | | 12 VDC | A165L-Δ□M-12D-2S | A165L-Δ□A-12D-2S | |
| | | 24 VDC | A165L-Δ□M-24D-2S | A165L-Δ□A-24D-2S | |
| | LED (with built-in reduced-voltage lighting function) | 100/110 VAC/VDC | A165L-Δ□M-T1-2S | A165L-Δ□A-T1-2S | |
| | | 200/220 VAC/VDC | A165L-Δ□M-T2-2S | A165L-Δ□A-T2-2S | |
| | Non-lighted | | A165-Δ□M-2S | A165-Δ□A-2S | |

**Note: 1.** Enter the desired shape for the Pushbutton in Δ: J (rectangular), A (square), or T (round). Enter the desired color symbol for the Pushbutton in the □.

**2.** Black (“B”) Pushbuttons are only available for non-lighted models.

## Ordering Individually

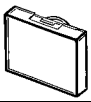
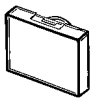
Pushbuttons, Lamps, Cases, and Switches (Sockets) can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.



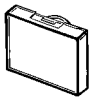
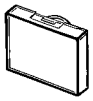
## Pushbuttons

Illumination: red, yellow, and white use either LED or incandescent lamps.

### LED

| Degree of protection | IP40 | | | Oil-resistant IP65 | | |
|---|---|---|---|---|---|---|
| Color | Rectangular  | Square | Round | Rectangular  | Square | Round |
| **Red** | A16L-JR | A16L-AR | A16L-TR | A165L-JR | A165L-AR | A165L-TR |
| **Yellow** | A16L-JY | A16L-AY | A16L-TY | A165L-JY | A165L-AY | A165L-TY |
| **Pure yellow** | A16L-JPY | A16L-APY | A16L-TPY | A165L-JPY | A165L-APY | A165L-TPY |
| **Green** | A16L-JGY | A16L-AGY | A16L-TGY | A165L-JGY | A165L-AGY | A165L-TGY |
| **White** | A16L-JW | A16L-AW | A16L-TW | A165L-JW | A165L-AW | A165L-TW |
| **Blue** | A16L-JA | A16L-AA | A16L-TA | A165L-JA | A165L-AA | A165L-TA |

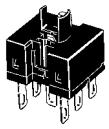
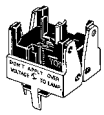
### Incandescent Lamps (With the exception of green, the Units are the same as for LEDs.)

| Degree of protection | IP40 | | | Oil-resistant IP65 | | |
|---|---|---|---|---|---|---|
| Color | Rectangular  | Square | Round | Rectangular  | Square | Round |
| **Red** | A16L-JR | A16L-AR | A16L-TR | A165L-JR | A165L-AR | A165L-TR |
| **Yellow** | A16L-JY | A16L-AY | A16L-TY | A165L-JY | A165L-AY | A165L-TY |
| **Pure yellow** | A16L-JPY | A16L-APY | A16L-TPY | A165L-JPY | A165L-APY | A165L-TPY |
| **Green** | A16L-JG | A16L-AG | A16L-TG | A165L-JG | A165L-AG | A165L-TG |
| **White** | A16L-JW | A16L-AW | A16L-TW | A165L-JW | A165L-AW | A165L-TW |
| **Blue** | A16L-JA | A16L-AA | A16L-TA | A165L-JA | A165L-AA | A165L-TA |

### Non-lighted (Same as Units for incandescent lamps.)

| Degree of protection | IP40 | | | Oil-resistant IP65 | | |
|---|---|---|---|---|---|---|
| Color | Rectangular | Square | Round | Rectangular | Square | Round |
| **Red** | A16L-JR | A16L-AR | A16L-TR | A165L-JR | A165L-AR | A165L-TR |
| **Yellow** | A16L-JY | A16L-AY | A16L-TY | A165L-JY | A165L-AY | A165L-TY |
| **Pure yellow** | A16L-JPY | A16L-APY | A16L-TPY | A165L-JPY | A165L-APY | A165L-TPY |
| **Green** | A16L-JG | A16L-AG | A16L-TG | A165L-JG | A165L-AG | A165L-TG |
| **White** | A16L-JW | A16L-AW | A16L-TW | A165L-JW | A165L-AW | A165L-TW |
| **Blue** | A16L-JA | A16L-AA | A16L-TA | A165L-JA | A165L-AA | A165L-TA |
| **Black** | A16L-JB | A16L-AB | A16L-TB | A165L-JB | A165L-AB | A165L-TB |

## Switches

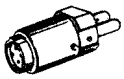
| Appearance | Classification | | | | Model |
|---|---|---|---|---|---|
|  | Lighted/non-lighted (common use) | Standard load/microload (common use) | SPDT | Solder terminal | A16-1 |
| | | | DPDT | | A16-2 |
|  | | | SPDT | PCB terminal | A16-1P |
| | | | DPDT | | A16-2P |
| | | | DPDT | Screw-Less Clamp | A16-2S |

## Switches with Reduced-voltage Lighting

| Appearance | Classification | | | | Model |
|---|---|---|---|---|---|
| | 100 V | Standard load/microload (common use) | SPDT | Solder terminal | A16-T1-1 |
| | | | DPDT | | A16-T1-2 |
| | 100 V | | DPDT | Screw-less clamp | A16-T1-2S |
| | 200 V | | | | A16-T2-2S |

## Lamps

### LED

| Operating voltage / Light color  | 5 VDC | 12 VDC | 24 VDC |
|---|---|---|---|
| **Red** | A16-5DSR | A16-12DSR | A16-24DSR |
| **Yellow** | A16-5DSY | A16-12DSY | A16-24DSY |
| **Green** | A16-5DSG | A16-12DSG | A16-24DSG |
| **White (See note.)** | A16-5DSW | A16-12DSW | A16-24DSW |
| **Blue** | A16-5DA | A16-12DA | A16-24DA |

**Note:** Use the white LED together with white or pure yellow Pushbuttons.

### Incandescent Lamp

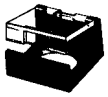
| Operating voltage | 5 VAC/VDC | 12 VAC/VDC | 24 VAC/VDC |
|---|---|---|---|
| **Model** | A16-5 | A16-12 | A16-24 |

## Cases

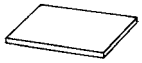
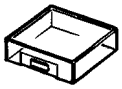
| Appearance | Classification | | | Model |
|---|---|---|---|---|
| | IP40 | Momentary operation | Rectangular (2-way guard) | A16-CJM |
| | | | Square | A16-CAM |
| | | | Round | A16-CTM |
| | | Alternate operation | Rectangular (2-way guard) | A16-CJA |
| | | | Square | A16-CAA |
| | | | Round | A16-CTA |
| | Oil-resistant IP65 | Momentary operation | Rectangular (2-way guard) | A165-CJM |
| | | | Square | A165-CAM |
| | | | Round | A165-CTM |
| | | Alternate operation | Rectangular (2-way guard) | A165-CJA |
| | | | Square | A165-CAA |
| | | | Round | A165-CTA |

# Accessories (Order Separately)

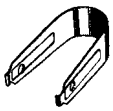
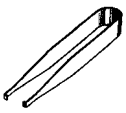
## Accessories

| Name | Appearance | Classification | Model | Remarks |
|---|---|---|---|---|
| **Switch Guards** |  | For rectangular models | A16ZJ-5050 | Cannot be used with the Dust Cover. |
| | | For square and round models | A16ZA-5050 | |
| **Dust Covers** | | For rectangular models | A16ZJ-5060 | Cannot be used with the Switch Guard. |
| | | For square models | A16ZA-5060 | |
| | | For round models | A16ZT-5060 | |
| **Panel Plugs** | | For rectangular models | A16ZJ-3003 | Used for covering the panel cutouts for future panel expansion.<br>Protective structure: IP40<br>Color: Black |
| | | For square models | A16ZA-3003 | |
| | | For round models | A16ZT-3003 | |

## Replacements

| Name | Appearance | Classification | | | Model | Remarks |
|---|---|---|---|---|---|---|
| **Legend Plates** |  | Rectangular | IP40 | Milky | A16ZJ-5204 | A single Legend Plate (transparent) is included with a standard model.<br>The milky Legend Plate can be used with the IP40 and oil-resistant IP65. |
| | | | | Transparent | A16ZJ-5202 | |
| | | | Oil-resistant IP65 | Milky | A16ZJ-5204 | |
| | | | | Transparent | A16ZJ-5203 | |
| | | Square | IP40 | Milky | A16ZA-5204 | |
| | | | | Transparent | A16ZA-5202 | |
| | | | Oil-resistant IP65 | Milky | A16ZA-5204 | |
| | | | | Transparent | A16ZA-5203 | |
| | | Round | IP40 | Milky | A16ZT-5204 | |
| | | | | Transparent | A16ZT-5202 | |
| | | | Oil-resistant IP65 | Milky | A16ZT-5204 | |
| | | | | Transparent | A16ZT-5203 | |
| **Color Caps (for IP40)** | Rectangular<br> <br>Square<br>  <br>Round<br> | LED indicator/incandescent lamp/non-lighted | | White | A16Z□-5001W | Insert one of the following letters into the box (□).<br>J: Rectangular<br>A: Square<br>T: Round<br>The Color Cap is usually supplied. Replace the Cap if the color is to be changed.<br>When using an LED indicator, be sure to use a Color Cap that matches the luminescent color of the LED.<br>The materials used for the IP40 and oil-resistant IP65 are different so be sure to use a Color Cap that matches the specifications of the Switch. |
| | | | | Red | A16Z□-5001R | |
| | | | | Yellow | A16Z□-5001Y | |
| | | | | Pure yellow | A16Z□-5001PY | |
| | | | | Blue | A16Z□-5001A | |
| | | LED indicator | | Green | A16Z□-5001GY | |
| | | Incandescent lamp/non-lighted | | Green | A16Z□-5001G | |
| | | Non-lighted | | Black | A16Z□-5011B | |
| **Color Caps (for oil-resistant IP65)** | | LED indicator/incandescent lamp/non-lighted | | White | A16Z□-5101W | |
| | | | | Red | A16Z□-5101R | |
| | | | | Yellow | A16Z□-5101Y | |
| | | | | Pure yellow | A16Z□-5101PY | |
| | | | | Blue | A16Z□-5101A | |
| | | LED indicator | | Green | A16Z□-5101GY | |
| | | Incandescent lamp/non-lighted | | Green | A16Z□-5101G | |
| | | Non-lighted | | Black | A16Z□-5111B | |

## Tools

| Name | Appearance | Model | Applicable types | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | Pushbutton Switch | Knob-type Selector Switch | Key-type Selector Switch | Emergency Stop Switch | Indicator | |
| **Extractor** |  | A3PJ-5080 | Yes | No | No | No | Yes | Convenient for extracting Pushbutton Switches |
| **Screw Fitting** | | A16Z-3004 | Yes | Yes | Yes | Yes | Yes | Convenient for ganged installation.<br>Tighten to a torque of 0.39 N · m min. |
| **Extractor** |  | A16Z-5080 | Yes | Yes | Yes | Yes | Yes | Convenient for extracting the Switch and Lamps. |

# Specifications

## ■ Approved Standards

| Agency | Standards | File No. |
|---|---|---|
| UL, cUL (See note.) | UL508 | E41515 |
| --- | EN60947-5-1 | --- |

**Note:** cUL: CSA, C22.2 No. 14

## ■ Approved Standard Ratings

### UL, cUL (File No. E41515)

5 A at 125 VAC, 3 A at 250 VAC (general use)
3 A at 30 VDC (resistive)

### EN60947-5-1 (Low Voltage Directive)

3 A at 250 VAC (AC12), 3 A at 30 VDC (DC12)

## ■ Ratings

### Contacts

| AC resistive load | DC resistive load |
|---|---|
| 3 A at 250 VAC<br>5 A at 125 VAC | 3 A at 30 VDC |

Minimum applicable load: 1 mA at 5 VDC
Rated values are obtained from tests conducted under the following conditions.

1. Load: Resistive load
2. Mounting conditions: No vibration and no shock
3. Temperature: 20±2°C
4. Operating frequency: 20 operations/min

### Super-bright LED

| Rated voltage | Rated current | Operating voltage | Internal limiting resistor |
|---|---|---|---|
| 5 VDC | 30 mA (red: 15 mA) | 5 VDC±5% | 33 Ω (blue: 51 Ω, red: 68 Ω) |
| 12 VDC | 15 mA | 12 VDC±5% | 270 Ω (blue: 270 Ω, red: 560 Ω) |
| 24 VDC | 10 mA | 24 VDC±5% | 1600 Ω (blue: 1.8 kΩ, red 2 kΩ) |

**Note:** The values in parentheses are for models with blue or red Pushbuttons.

### Incandescent Lamp

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 6 VAC/VDC | 60 mA | 5 VAC/VDC |
| 14 VAC/VDC | 40 mA | 12 VAC/VDC |
| 28 VAC/VDC | 24 mA | 24 VAC/VDC |

## ■ Characteristics

| Item | | Pushbutton Switch |
|---|---|---|
| **Allowable operating frequency** | **Mechanical** | Momentary operation: 120 operations/minute max.<br>Alternate operation: 60 operations/minute max. (See note 1.) |
| | **Electrical** | 20 operations/minute max. (See note 1.) |
| **Insulation resistance** | | 100 MΩ min. (at 500 VDC) |
| **Dielectric strength** | | 1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity<br>2,000 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground<br>1,000 VAC, 50/60 Hz for 1 min between lamp terminals (See note 2.) |
| **Vibration resistance** | **Malfunction** | 10 to 55 Hz, 1.5-mm double amplitude (malfunction within 1 ms) |
| **Shock resistance** | **Destruction** | 500 $m/s^2$ |
| | **Malfunction** | 150 $m/s^2$ max. (malfunction within 1 ms) |
| **Durability** | **Mechanical** | Momentary operation: 2,000,000 operations min.<br>Alternate operation: 200,000 operations min. (See note 1.) |
| | **Electrical** | 100,000 operations min. (See note 1.) |
| **Ambient temperature** | | Operating: –10°C to 55°C (with no icing or condensation)<br>Storage: –25°C to 65°C (with no icing or condensation) |
| **Ambient humidity** | | Operating: 35% to 85% |
| **Electric shock protection class** | | Class II |
| **PTI (tracking characteristic)** | | 175 |
| **Degree of contamination** | | 3 (IEC947-5-1) |
| **Weight** | | Approx. 10 g (in the case of a lighted DPDT switch with solder terminals) |

**Note: 1.** Set and reset constitute one operation.
**2.** With LED and incandescent lamp not mounted.

## Screw-Less Clamp

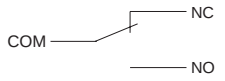
| Item | | Screw-Less Clamp | | | |
|---|---|---|---|---|---|
| Recommended wire size | | 0.5 $mm^2$ twisted wire or 0.8 mm-dia. solid wire | | | |
| Usable wires and tensile strength | Twisted wire | 0.3 $mm^2$ | 0.5 $mm^2$ | 0.75 $mm^2$ | 1.25 $mm^2$ |
| | Solid wire | 0.5 mm dia. | 0.8 mm dia. | 1.0 mm dia. | --- |
| | Tensile strength | 10 N | 20 N | 30 N | 40 N |
| Length of exposed wire | | 10 ±1 mm | | | |

# ■ Operating Characteristics

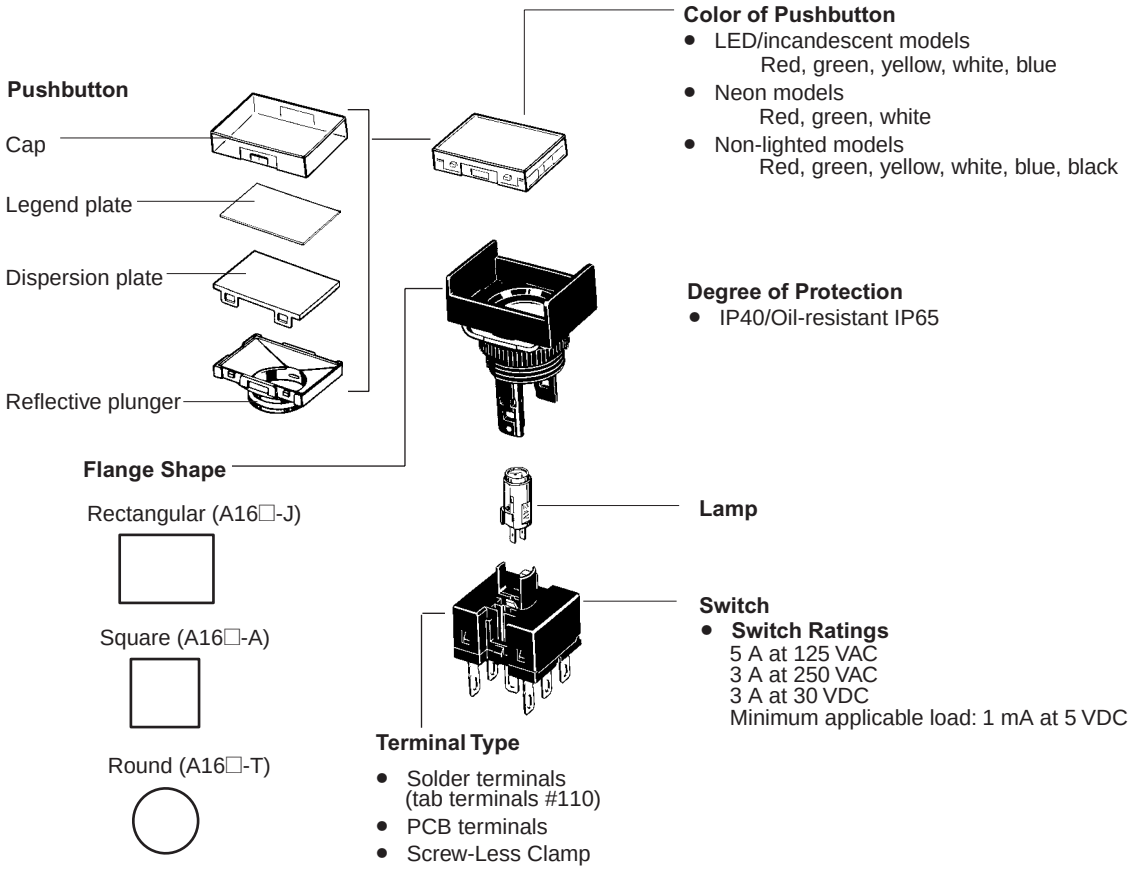
| Type / Features | Pushbutton Switch | |
|---|---|---|
| | IP40 | Oil-resistant IP65 |
| **Operating force (OF) max.** | 4.41 N | 4.91 N |
| **Releasing force (RF) min.** | 0.29 N | |
| **Total travel (TT)** | Approx. 3 mm | |
| **Pretravel (PT) max.** | 2.5 mm | |
| **Lock stroke (LTA) min. (See note.)** | 0.5 mm | |

**Note:** Lock stroke is only for alternate operation.

# ■ Contact Form

| Name | Contact |
|---|---|
| DPDT |   |

# Nomenclature



# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

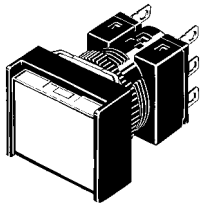
## ■ Lighted/Non-lighted Pushbutton Switches without Voltage Reduction Unit

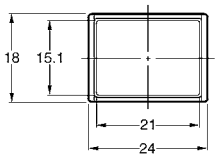
The lamp terminal is also provided with non-lighted models.

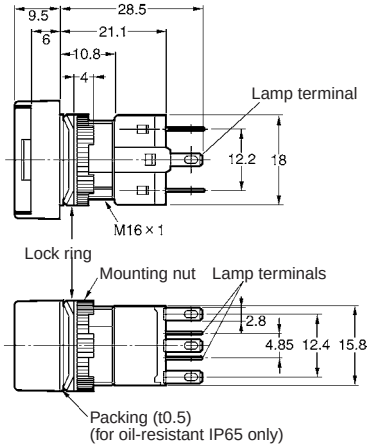
Solder terminals and tab terminals (#110) can be both used with Lighted and Non-lighted Pushbutton Switches.

### Rectangular
**A16□-J**

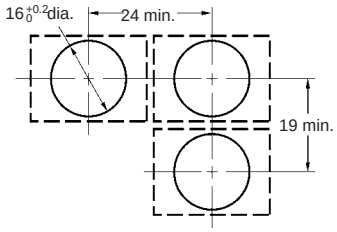
Solder terminals (tab terminals #110)





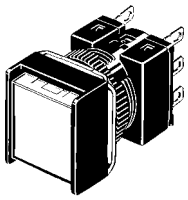



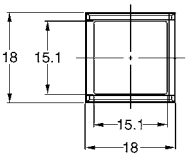

**Panel Cutouts**
See page 77 for panel cutouts

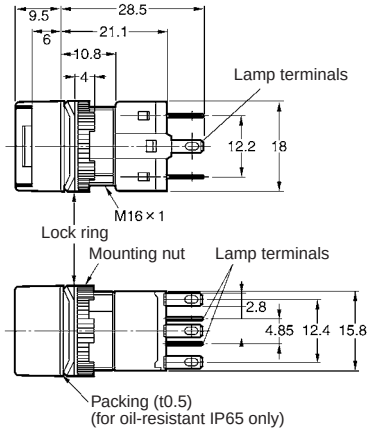



### Square
**A16□-A**

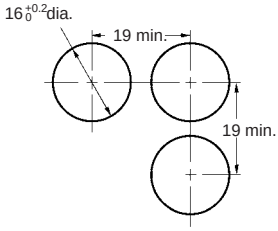
Solder terminals (tab terminals #110)





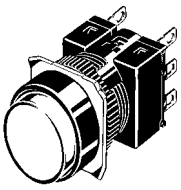



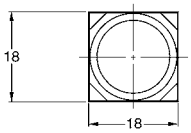

**Panel Cutouts**
See page 77 for panel cutouts

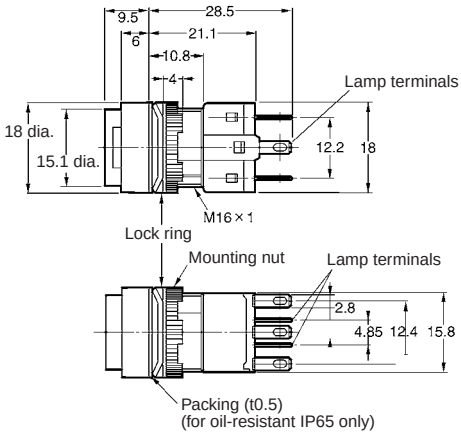



### Round
**A16□-T**

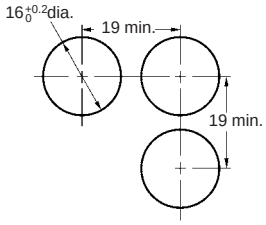
Solder terminals (tab terminals #110)





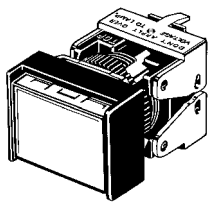



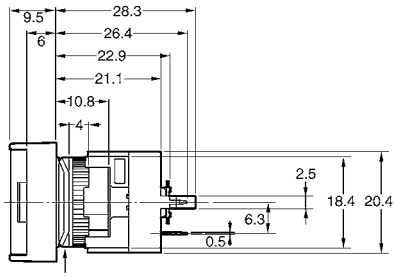

**Panel Cutouts**
See page 77 for panel cutouts

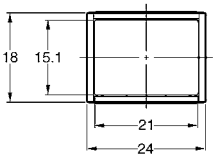


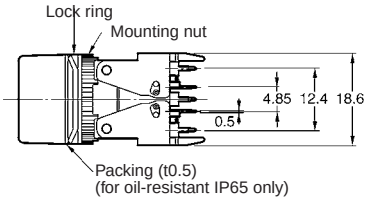
The following diagrams show the rectangular model as a representative example.

**Rectangular**
**A16□-J□-□P**
PCB terminals

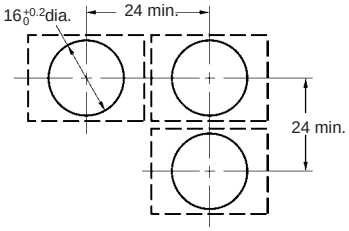




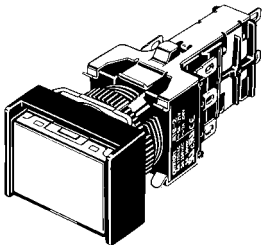



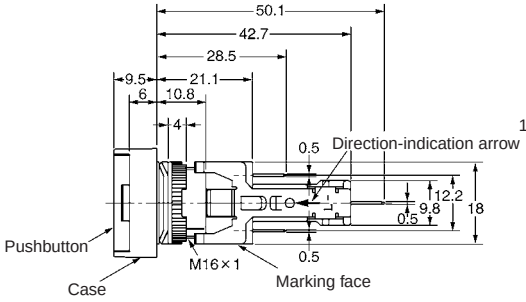



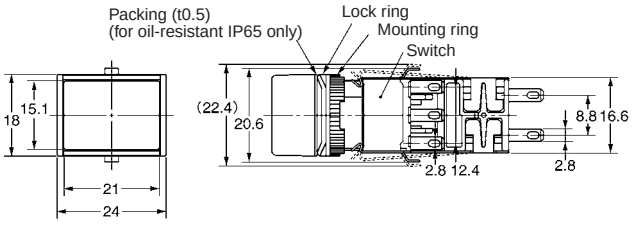

**Panel Cutouts**
See page 77 for panel cutouts



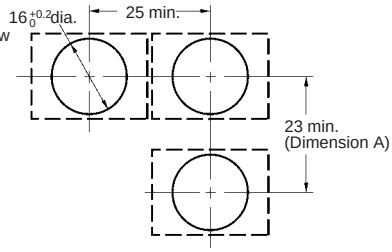

**Rectangular**
**A16□-J□-T1**
Voltage-reduction lighting,
solder terminals
(tab terminals #110)





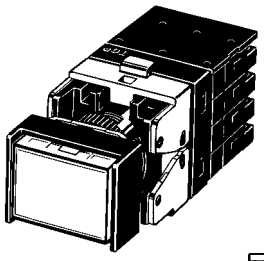



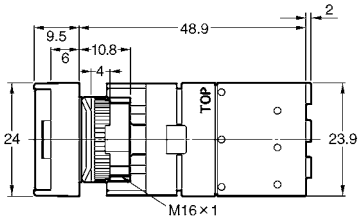

**Panel Cutouts**
See page 77 for panel cutouts

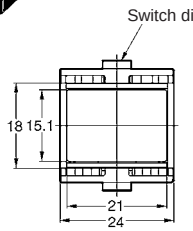


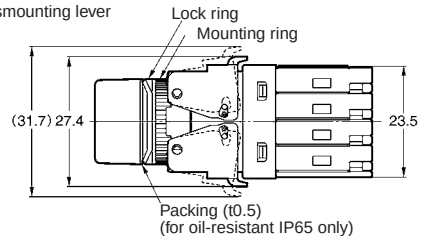

Recommended panel thickness: 0.5 to 3.2 mm

**Rectangular**
**A16□-J□-2S, T1-2S, T2-2S**
Screw-Less Clamp

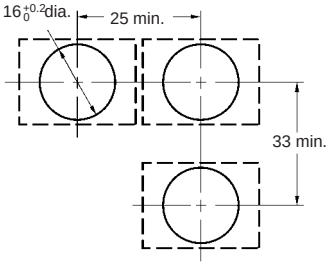




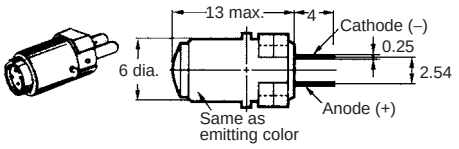




**Panel Cutouts**
See page 77 for panel cutouts

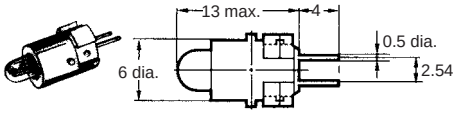


# ■ Lamps

**LED**
**A16-5DS□/-12DS□/-24DS□**

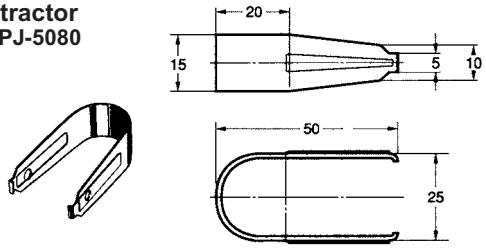



**Incandescent Lamp**
**A16-5/-12/-24**

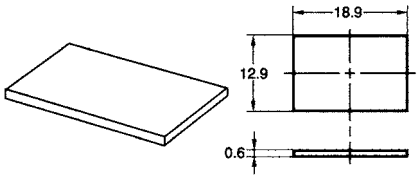



# ■ Accessories, Tools, and Components

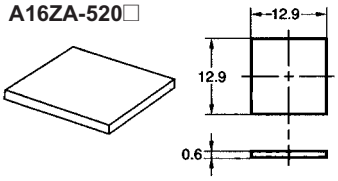
**Extractor**
**A3PJ-5080**



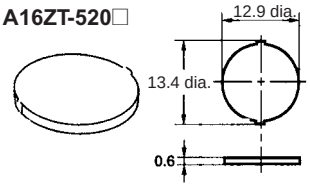

**Legend Plates**
**A16ZJ-520□**




**A16ZA-520□**




**A16ZT-520□**

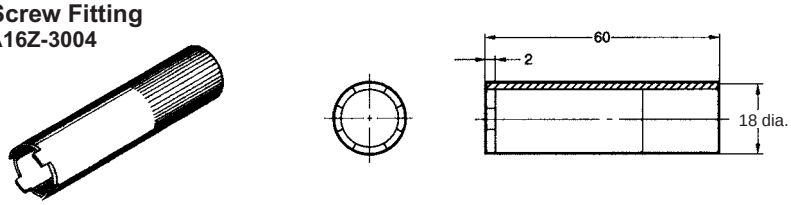



**Note:** 1. The panel is 0.6 mm thick.
2. The panel is made of the materials listed in the following table.

| Color | Degree of protection | Materials |
|---|---|---|
| Milky | IP40 | Polyalylate resin |
| | IP65 | |
| Transparent | IP40 | Polycarbonate resin |
| | IP65 | Polyalylate resin |

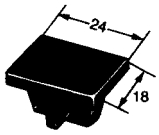
**Note:** The standard model is transparent.

**Screw Fitting**
**A16Z-3004**

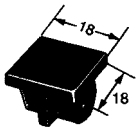



**Panel Plugs (Black Resin)**
Select the Plug that fits the panel design and mount from the front of the Panel. Panel cutouts are the same as those for Switches.
Protective structure: IP40

**Rectangular**
**A16ZJ-3003**

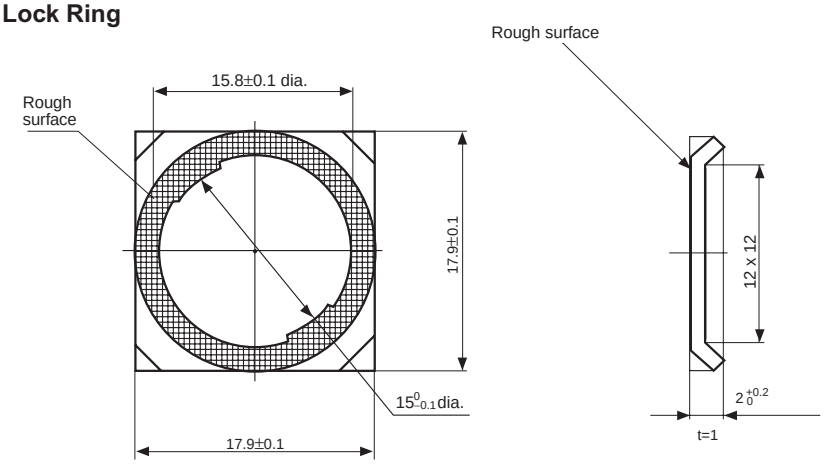



**Square**
**A16ZA-3003**

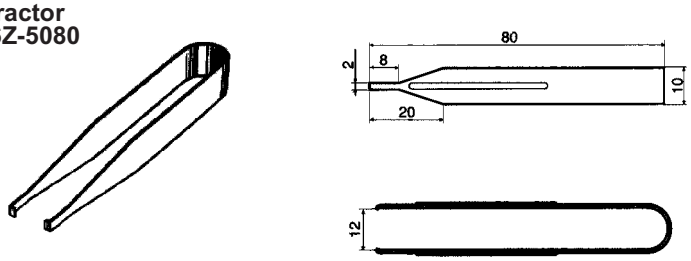



**Round**
**A16ZT-3003**

## Lock Ring



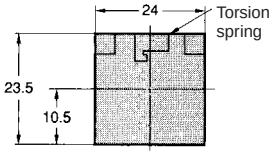

## Extractor A16Z-5080

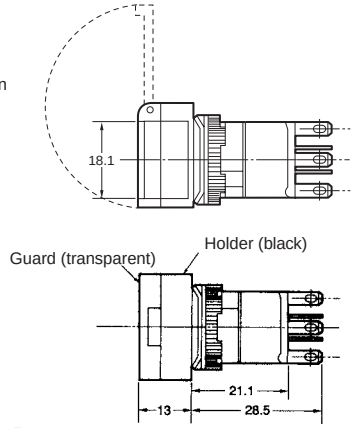


# ■ Dimensions with Accessories

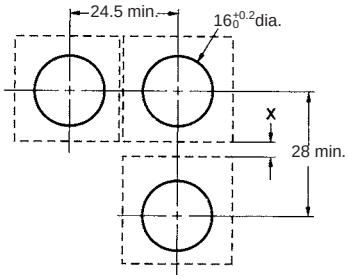
## Switch Guards

**Rectangular**
**A16ZJ-5050**



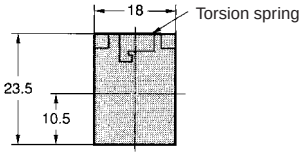



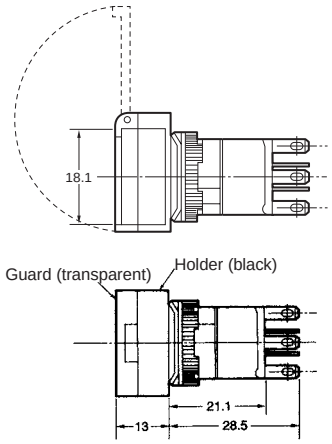

**Panel Cutouts (Top View)**



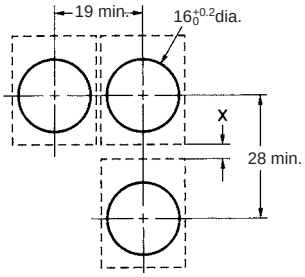

**Note:** The above illustration shows the case where 4.5 mm is provided for the distance "x." If no clearance is required for the "x" section, the vertical mounting dimension can be as small as 24 mm. Set this distance according to operating conditions.

**Square**
**A16ZA-5050**



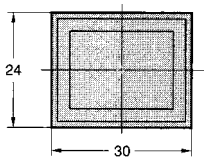

**Panel Cutouts (Top View)**

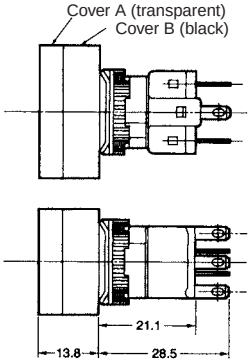



**Note:** The above illustration shows the case where 4.5 mm is provided for the distance "x." If no clearance is required for the "x" section, the vertical mounting dimension can be as small as 24 mm.Set this distance according to operating conditions.For models with PCB terminals, the horizontal mounting dimension is 24 mm min.

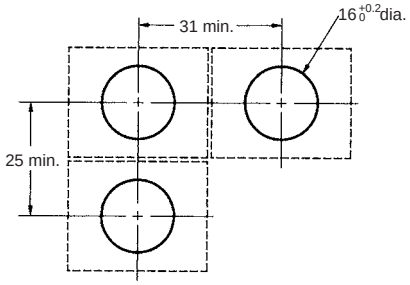
# Dust Covers

## Rectangular
## A16ZJ-5060

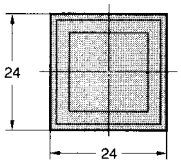


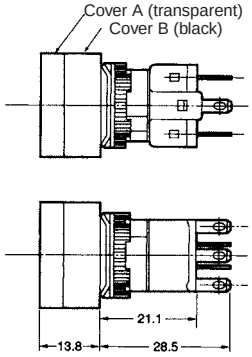




**Panel Cutouts**

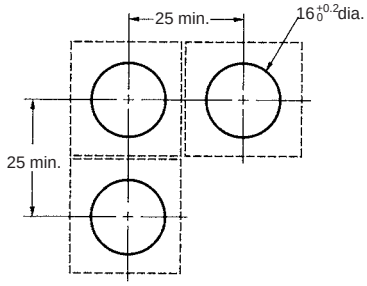



## Square
## A16ZA-5060

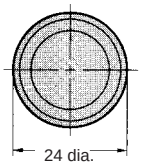


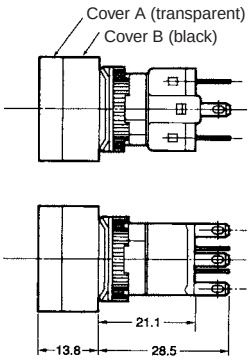




**Panel Cutouts**

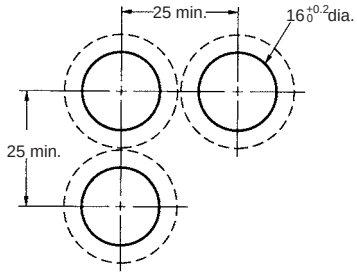



## Round
## A16ZT-5060




**Panel Cutouts**



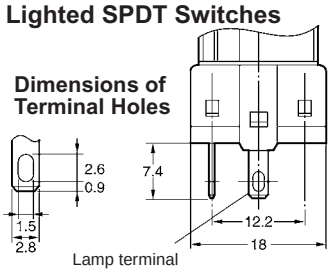
# ■ Terminal Arrangement

## Models without Reduced-voltage Lighting

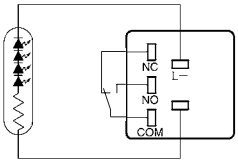
Non-lighted Pushbutton Switches are also provided with lamp terminals.

### Solder Terminals

**Lighted SPDT Switches**

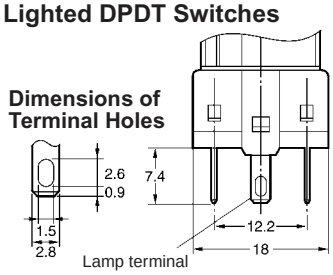



**Terminal Arrangement (Bottom View)**

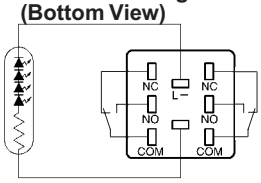



**Note:** The L+ is not shown on the Switch.

**Lighted DPDT Switches**



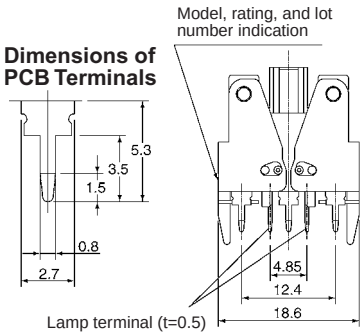

**Terminal Arrangement (Bottom View)**



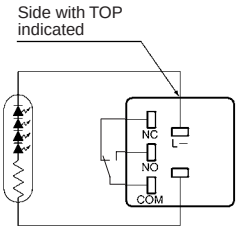

**Note:** The L+ is not shown on the Switch.

### PCB Terminals

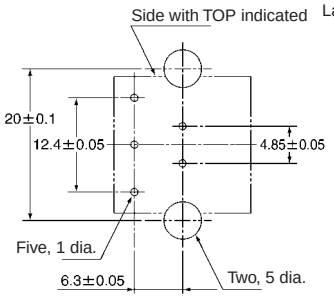
**Lighted SPDT Switches**



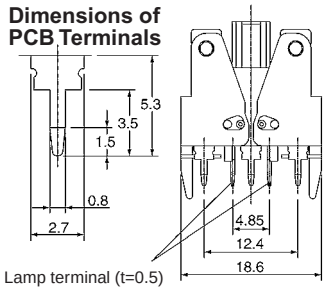

**Terminal Arrangement (Bottom View)**



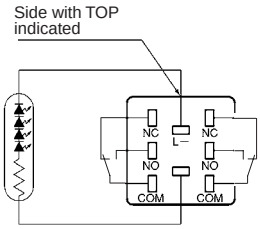

**PCB Cutouts (Bottom View)**



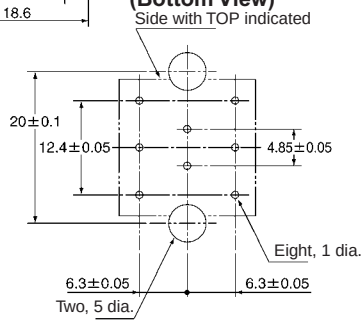

**Lighted DPDT Switches**




**Terminal Arrangement (Bottom View)**




**PCB Cutouts (Bottom View)**

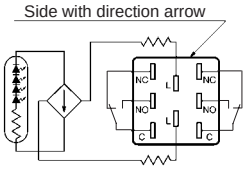



## Voltage Reduction Units

**DPDT lighted models**

(Bottom view)

Side with direction arrow

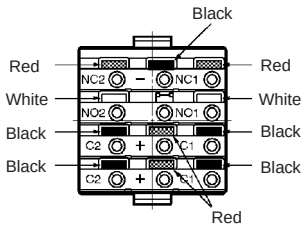



• The voltage-reduction circuit is built in.

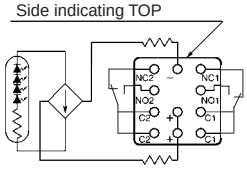
## Screw-Less Clamps

**DPDT lighted models**

(Bottom view)




Side indicating TOP

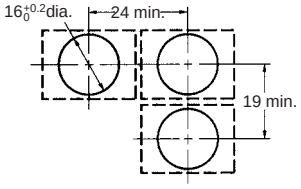



• Voltage-reduction lighting models with Screw-Less Clamps (A16L-□T1-2S, A16L-□T2-2S) incorporate voltage-reduction circuits.

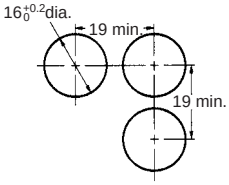
# ■ Panel Cutouts

## Solder Terminals

**Rectangular A16□-J/M16□-□J (Top View)**




**Square A16□-A/M16□-A Round A16□-T/M16□-T (Top View)**

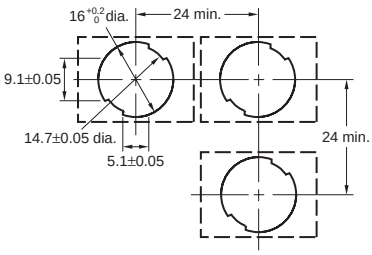



**Note: 1.** Make sure the thickness of the mounting panel is between 0.5 and 3.2 mm. If, however, a Switch Guard or Dust Cover is used, the thickness of the mounting panel must be between 0.5 and 2 mm.

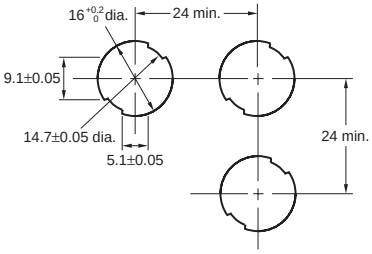
**2.** If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after coating.

## PCB Terminals

**Rectangular A16□-J/M16□-J (Top View)**




**Square A16□-A/M16□-A Round A16□-T/M16□-T (Top View)**




**Note: 1.** Ensure that the variation in the distance between the centers of neighboring mounting holes is less than ±0.1 mm.

**2.** Make sure the thickness of the mounting panel is between 0.5 and 3.2 mm. If, however, a Switch Guard or Dust Cover is used, the thickness of the mounting panel must be between 0.5 and 2 mm.

**3.** If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after coating.

# Installation

## ■ Panel Mounting

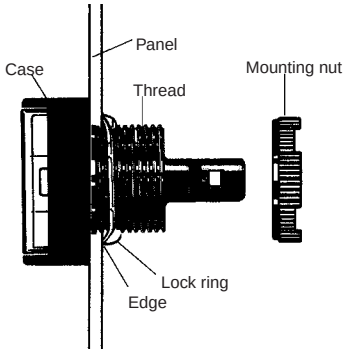
After mounting the Pushbutton Unit (i.e., the Pushbutton and the Case) to the panel, snap in the Switch Unit (i.e., the Switch and the Lamp) from the back of the panel.

### Mounting to the Panel

Insert the Pushbutton Unit into the front of the panel, and fix the lock ring and mounting nut from the terminal side.

Make sure that the lock ring is aligned with the thread of the Case and the edge of the lock ring is touching the panel.

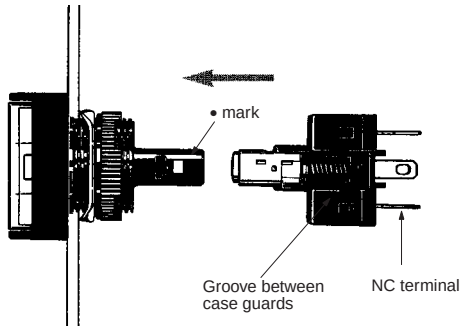
Tighten the mounting nuts to a torque of 0.29 to 0.49 N·m.




### Mounting the Switch Unit

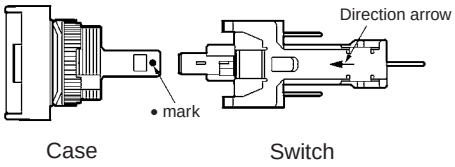
Snap on the Switch Unit to the Pushbutton Unit.

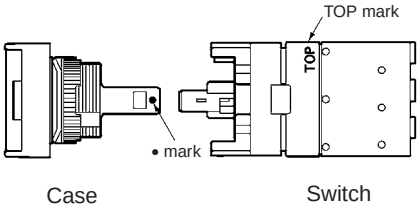
Make sure that the Switch Unit has the correct orientation when snapping it onto the Case. Align the • mark on the Case with the groove between the case guards on the NC terminal side of the Switch Unit in the way shown below, and push the Switch Unit into the Case until it clicks into place. Confirm that the Switch Unit is securely in place before using.




### Mounting the Switch Unit for Voltage Reduction Types

1. The mounting panel thickness must be 0.5 to 3.2 mm.
2. The mounting ring must be tightened to a torque 0.29 to 0.49 N·m.
3. The mounting hole must be cut out in the way described previously. The dimension A is the length required for removing the Switch when it is in the mounted state. If Switches are mounted side-by-side separated by less than the specified distance, it may not be possible to remove the Switch.
4. Be sure to mount the Case to the Switch with the correct orientation. Mount with the • mark on the Case facing in the same direction as the side of the Switch with the direction arrow or the word TOP.

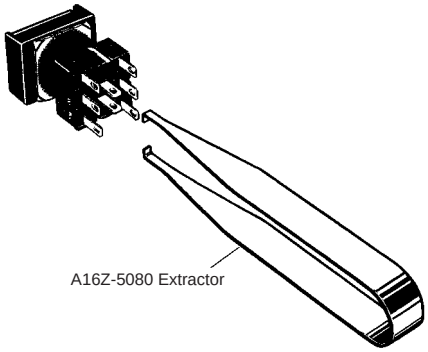


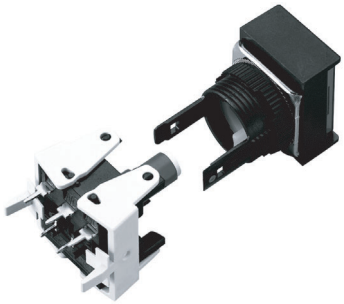
## Removing the Switch Unit

Grip the part between the Switch holder of the Case and the Switch Unit using the A16Z-5080 Extractor, and pull to remove the Switch Unit.

• 16-mm Models




• A16-P Models (with PCB Terminals)

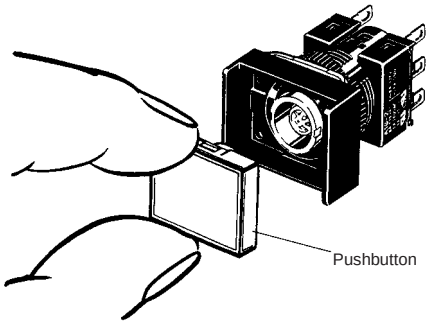


The Switch Unit can be mounted or dismounted by simply opening or closing the lever.

# ■ Mounting and Replacing the Pushbutton

## Removing and Mounting the Pushbutton

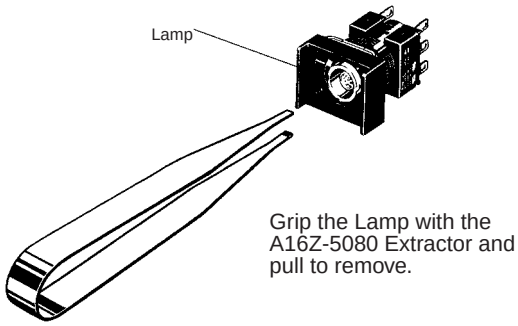
1. Remove the Pushbutton as shown in the following diagram. If the Pushbutton cannot be removed by hand, use the A3PJ-5080 Extractor.




2. To attach the Pushbutton, push until it clicks into place.

## Removing the Lamp

### Removing from the Pushbutton End

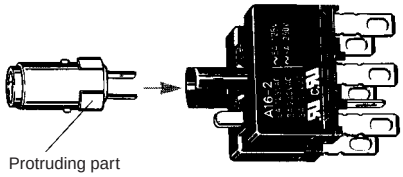



### Removing from the Switch End

The Lamp can be removed by hand once the Switch is removed using the A16Z-5080 Extractor.

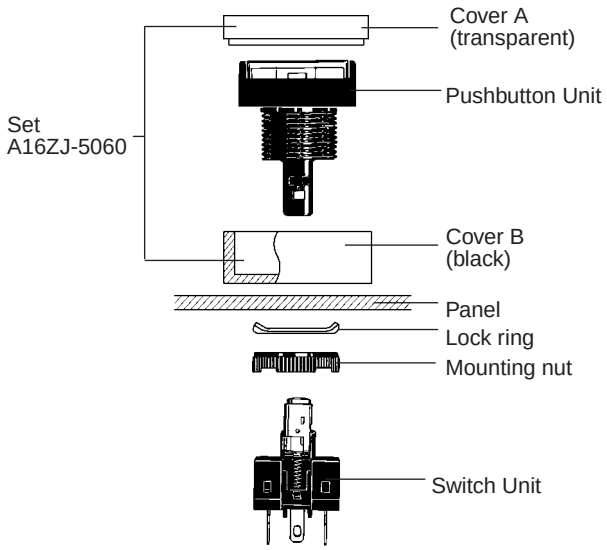
## Installing the Lamp

When mounting the Lamp, make sure it is facing the direction shown in the following diagram. Insert the Lamp while matching the protruding part of the Lamp and the small guides on the outer surface of the Case.




The Lamp can be mounted from the Pushbutton end by using the A16Z-5080 Extractor. The lamp can be mounted by following the opposite procedure for removing the Lamp.

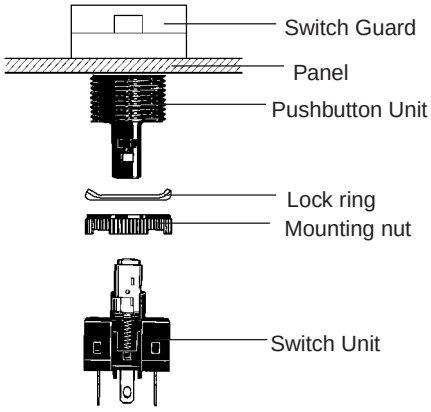
## ■ Mounting the A16Z Dust Cover




1. Separate the Dust Cover into 2 parts: cover A and cover B.
2. Insert the Case (Pushbutton Unit) into cover B.
3. Mount these parts together onto the panel.
4. From the back of the panel, mount the lock ring and secure with the mounting nut.
5. Insert cover A into cover B. Ensure that the entire perimeter of cover A is securely attached to cover B by pressing in different directions.
6. Mount the Switch Unit to the Case.

**Note:** Recommended panel thickness: 0.5 to 2 mm.

## ■ Mounting the A16Z Switch Guard




1. Insert the Case (Pushbutton Unit) into the Switch Guard.
2. Mount these parts together onto the panel.
3. From the back of the panel, mount the lock ring and secure with the mounting nut.
4. Attach the Switch Unit to the Case.

**Note:** Recommended panel thickness: 0.5 to 2 mm.

# Precautions

Refer to the *Technical Information for Pushbutton Switches* (Cat. No. A143).

**⚠ WARNING**

Do not apply a voltage between the incandescent lamp and the terminal that is greater than the rated voltage. If the incandescent lamp is broken, the operating part may pop out.

Always turn OFF the power and wait for 10 minutes before replacing the incandescent lamp. If the lamp is replaced immediately after the power is turned OFF, the remaining heat may cause burns.

## ■ Correct Use

### Mounting

Always make sure that the power is turned OFF before mounting, removing, or wiring the Switch, or performing maintenance.

Do not tighten the mounting nut more than necessary using tools such as pointed-nose pliers. Doing so will damage the mounting nut. The tightening torque is 0.29 to 0.49 N·m.

### Wiring

#### Solder Terminal

Solder terminals and quick-connect terminals (#110) are commonly used for terminals.

Be sure to use electrical wires that are a size appropriate for the applied voltage and carry current (conductor size is 0.5 to 0.75 $mm^2$). Perform soldering according to the conditions provided below. If the soldering is not properly performed, the lead wires will become detached, resulting in short-circuits.

1. Hand soldering: 30 W, within 5 s
2. Dip soldering: 240°C, within 3 s

Wait for one minute after soldering before exerting any external force on the solder.

Use non-corrosive resin fluid as the flux.

Make sure that the electric cord is wired so that it does not touch the Unit. If the electric cord touches the Unit, then electric wires with a heat resistance of 100°C min. must be used.

After wiring the Switch, maintain an appropriate clearance and creepage distance.

#### Screw-Less Clamps

**Mounting Procedure**

1. Strip a length of 10 mm off the end of the wire (allowable range: 10±1 mm).
2. Bunch wire strands together and straighten them.
3. Insert the wire into the insertion hole while pressing the release button at the side of the hole. (Using a precision screwdriver is recommended.)
4. Let go of the release button to lock the wire into place.
5. After locking, pull on the wire gently to confirm that it is securely locked.

**Removing Procedure**

Remove wires by pulling them while pressing the release button.

**Note:** When reusing wires that have already been locked, cut off the end of the wire and strip the wire again before using.

### Operating Environment

The IP65 model is designed with a degree of protection so that it will not sustain damage if it is subjected to water from any direction to the front of the panel.

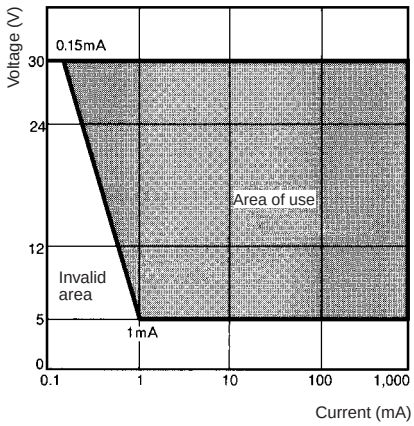
### Using the Microload

Insert a contact protection circuit, if necessary, to prevent the reduction of life expectancy due to extreme wear on the contacts caused by loads where inrush current occurs when the contact is opened and closed.

The A16 allows both a standard load (125 V at 5A, 250 V at 3 A) and a microload. If a standard load is applied, however, the microload area cannot be used. If the microload area is used with a standard load, the contact surface will become rough, and the opening and closing of the contact for a microload may become unreliable.

The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ 60) (conforming to JIS C5003).

The equation, $\lambda\ 60 = 0.5 \times 10^{-4}$/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.




### LED

The LED current-limiting resistor is built-in, so external resistance is not required.

| Rated voltage | Internal limiting resistor |
|---|---|
| 5 VDC | 33 Ω (blue: 51 Ω, red: 68 Ω) |
| 12 VDC | 270 Ω (blue: 270 Ω, red: 560 Ω) |
| 24 VDC | 1600 Ω (blue: 1.8 kΩ, red: 2 kΩ) |

**Note:** The values in parentheses are for models with blue or red Pushbutton Units.

### Others

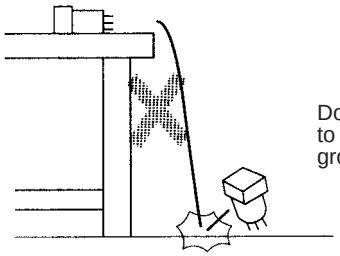
The oil-resistant IP65 uses NBR rubber and is resistant to general cutting oil and cooling oil. Some particular oils cannot be used with the oil-resistant IP65, however, so contact your OMRON representative for details.

If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after the coating.

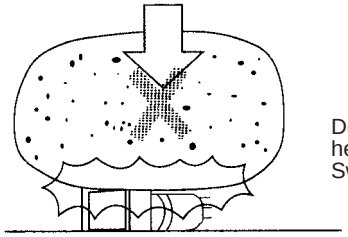
Do not subject the Switch to extreme shock or vibration. Doing so will cause malfunctions and damage to the Switch.

Do not let sharp objects come into contact with the Switches that are made of resin. Doing so will damage the Switches, causing scratches on the outside of the operating parts, and malfunction.

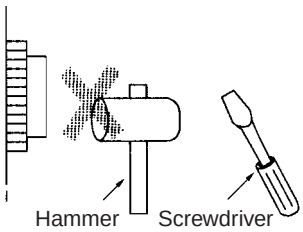
When handling the Switches, do not throw or drop them.



Do not allow the Switch to drop and hit the ground.



Do not place or drop heavy objects on the Switch.




Do not operate the Switch with hard or sharp objects.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

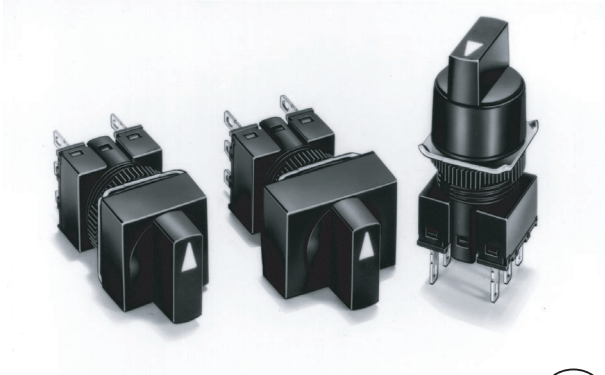
Cat. No. A124-E1-03

In the interest of product improvement, specifications are subject to change without notice.

# Knob-type Selector Switch
# A165S/W

## Mounting Aperture of 16 mm

- Modular construction
- Oil-resistant IP65 models
- UL and cUL approved.
- Conforms to EN60947-5-1, IEC947-5-1
- Short mounting depth, less than 28.5 mm below panel
- Wide range of switching capacity from standard to microload
- Lighted and non-lighted models
- 2 and 3-notch models
- Manual and automatic reset models



# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

The model numbers used to order sets of Units are illustrated below. One set comprises the Selector, Lamp (lighted models only), and Switch.

| (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|
| W | A | 2A | R | 24D | 1 |

**A165W-A2AR-24D-1**

**(1) Lighted/Non-lighted**

| Symbol | Type |
|---|---|
| S | Non-lighted |
| W | Lighted |

**(2) Shape of Selector**

| Symbol | Shape |
|---|---|
| J | Rectangular |
| A | Square |
| T | Round |

**(3) Number of Notches/Resetting Method**

| Symbol | No. of notches | Reset method |
|---|---|---|
| 2M | 2 notches | Manual |
| 2A | | Automatic |
| 3M | 3 notches | Manual |
| 3A | | Automatic |

**(4) Color of Selector**

| Symbol | Color |
|---|---|
| No symbol | Black (non-lighted models only) |
| R | Red |
| G | Green |
| Y | Yellow |

**(5) Light Source**

| Symbol | Type |
|---|---|
| No symbol | Non-lighted |
| 24D | 24 V-LED |

**Voltage Reduction Unit (24-V Built-in LED)**

| Symbol | Type | Operating voltage | Rated voltage |
|---|---|---|---|
| T1 | LED | 90 to 121 VAC/VDC | 110 VAC/VDC |
| T2 | | 180 to 242 VAC/VDC | 220 VAC/VDC |

**Note: 1.** Solder terminals are only available with 100-V models.
**2.** The Voltage Reduction Unit is not available for models with PCB terminals.

**(6) Contact Configuration**

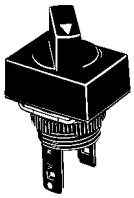
| Symbol | Type | Terminal |
|---|---|---|
| 1 | SPDT | Solder terminal |
| 2 | DPDT | |
| 1P | SPDT | PCB terminal |
| 2P | DPDT | |
| 2S | DPDT | Screw-Less Clamp |

**Note: 1.** Only DPDT contacts are available with 3-notch models and Screw-Less Clamp models.
**2.** PCB terminals are available only with 2-notch models.

# Subassembled

## 1. Selector

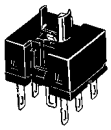
**A165□-□□□**
1 2 3 4



1. **Lighted/Non-lighted**
   S: Non-lighted
   W: Lighted
2. **Flange Shape**
   J: Rectangular
   A: Square
   T: Round
3. **Number of Notches/Reset Method**
   2M: 2 notches/Manual
   2A: 2 notches/Automatic
   3M: 3 notches/Manual
   3A: 3 notches/Mixed-operation
4. **Illumination Color**
   None: Black (Non-lighted models only)
   R: Red
   G: Green
   Y: Yellow

## 2. Switch (Same as for Key-type Selector Switches)

**A16S-□-□□□**
1 2 3 4



1. **Number of Notches**
   2N: 2 notches
   3N: 3 notches
2. **Contacts**
   1: SPDT
   2: DPDT
3. **Lighted/Non-lighted**
   None: Non-lighted
   L: Lighted
4. **Terminals**
   None: Solder terminals (tab terminals #110)

## 3. Lamp

**A16-□□**
1 2

1. **Operating Voltage (Rated Voltage)**
   **LED**
   5DS: 5 VDC (5 VDC)
   12DS: 12 VDC (12 VDC)
   24DS: 24 VDC (24 VDC)
2. **Illumination Color**
   R: Red (LED)
   G: Green (LED)
   Y: Yellow (LED)

# Ordering Information

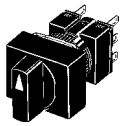
## ■ List of Models

### Ordering as a Set

The model numbers used to order sets of Units are given in the following tables. One set comprises the Selector, Lamp (lighted models only), and Switch.

### Solder Terminals

#### A165□-J (Rectangular) Models

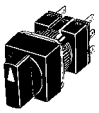


**IP65 Oil-resistant**

| No. of notches | Output | Reset method | Lighting method | Operating voltage | Model |
|---|---|---|---|---|---|
| 2 notches | SPDT | Manual | LED | 24 VDC | A165W-J2M□-24D-1 |
| | | | Non-lighted | --- | A165S-J2M-1 |
| | | Automatic | LED | 24 VDC | A165W-J2A□-24D-1 |
| | | | Non-lighted | --- | A165S-J2A-1 |
| | DPDT | Manual | LED | 24 VDC | A165W-J2M□-24D-2 |
| | | | Non-lighted | --- | A165S-J2M-2 |
| | | Automatic | LED | 24 VDC | A165W-J2A□-24D-2 |
| | | | Non-lighted | --- | A165S-J2A-2 |
| 3 notches | DPDT | Manual | LED | 24 VDC | A165W-J3M□-24D-2 |
| | | | Non-lighted | --- | A165S-J3M-2 |

**Note:** Enter the desired color symbol for the Selector in □: R (red); Y (yellow); G (green). The Selector for non-lighted models is black.

#### A165□-A (Square) Models

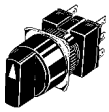


**IP65 Oil-resistant**

| No. of notches | Output | Reset method | Lighting method | Operating voltage | Model |
|---|---|---|---|---|---|
| 2 notches | SPDT | Manual | LED | 24 VDC | A165W-A2M□-24D-1 |
| | | | Non-lighted | --- | A165S-A2M-1 |
| | | Automatic | LED | 24 VDC | A165W-A2A□-24D-1 |
| | | | Non-lighted | --- | A165S-A2A-1 |
| | DPDT | Manual | LED | 24 VDC | A165W-A2M□-24D-2 |
| | | | Non-lighted | --- | A165S-A2M-2 |
| | | Automatic | LED | 24 VDC | A165W-A2A□-24D-2 |
| | | | Non-lighted | --- | A165S-A2A-2 |
| 3 notches | DPDT | Manual | LED | 24 VDC | A165W-A3M□-24D-2 |
| | | | Non-lighted | --- | A165S-A3M-2 |

**Note:** Enter the desired color symbol for the Selector in □: R (red); Y (yellow); G (green). The Selector for non-lighted models is black.

**A165□-T (Round) Models**



**IP65 Oil-resistant**

| No. of notches | Output | Reset method | Lighting method | Operating voltage | Model |
|---|---|---|---|---|---|
| 2 notches | SPDT | Manual | LED | 24 VDC | A165W-T2M□-24D-1 |
| | | | Non-lighted | --- | A165S-T2M-1 |
| | | Automatic | LED | 24 VDC | A165W-T2A□-24D-1 |
| | | | Non-lighted | --- | A165S-T2A-1 |
| | DPDT | Manual | LED | 24 VDC | A165W-T2M□-24D-2 |
| | | | Non-lighted | --- | A165S-T2M-2 |
| | | Automatic | LED | 24 VDC | A165W-T2A□-24D-2 |
| | | | Non-lighted | --- | A165S-T2A-2 |
| 3 notches | DPDT | Manual | LED | 24 VDC | A165W-T3M□-24D-2 |
| | | | Non-lighted | --- | A165S-T3M-2 |

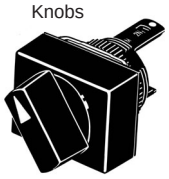
**Note:** Enter the desired color symbol for the Selector in □: R (red); Y (yellow); G (green). The Selector for non-lighted models is black.

## Ordering Individually

Selectors, Lamps, and Switches (Sockets) can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.

**Selector**

Selectors with Knobs



Rectangular Models

Square Models

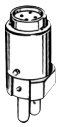
Round Models

**Lighted Models**

**Non-lighted Models**

**Lamp**

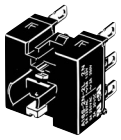
LED only



**Note:** Temperature rises in incandescent lamps can cause heat deformation.

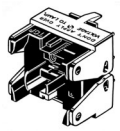
**Switch**

Solder terminals (no transformer)



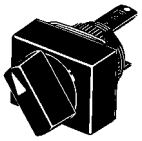
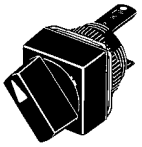
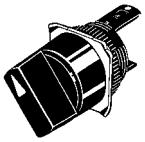
Lighted/non-lighted

PCB terminals



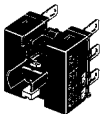
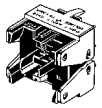
Lighted/non-lighted

## Selectors (Oil-resistant IP65 Models Only)

| Appearance | Number of notches | Reset method | Lighting method | Operating voltage | Model | Selector color symbol |
|---|---|---|---|---|---|---|
| **Rectangular (A165□-J)**  | 2 notches | Manual | LED | 24 VDC | A165W-J2M□ | R (red), Y (yellow), G (green) |
| | | | Non-lighted | --- | A165S-J2M | |
| | | Automatic | LED | 24 VDC | A165W-J2A□ | |
| | | | Non-lighted | --- | A165S-J2A | |
| | 3 notches | Manual | LED | 24 VDC | A165W-J3M□ | |
| | | | Non-lighted | --- | A165S-J3M | |
| | | Fully automatic | LED | 24 VDC | A165W-J3A□ | |
| | | | Non-lighted | --- | A165S-J3A | |
| **Square (A165□-A)**  | 2 notches | Manual | LED | 24 VDC | A165W-A2M□ | R (red), Y (yellow), G (green) |
| | | | Non-lighted | --- | A165S-A2M | |
| | | Automatic | LED | 24 VDC | A165W-A2A□ | |
| | | | Non-lighted | --- | A165S-A2A | |
| | 3 notches | Manual | LED | 24 VDC | A165W-A3M□ | |
| | | | Non-lighted | --- | A165S-A3M | |
| | | Fully automatic | LED | 24 VDC | A165W-A3A□ | |
| | | | Non-lighted | --- | A165S-A3A | |
| **Round (A165□-T)**  | 2 notches | Manual | LED | 24 VDC | A165W-T2M□ | R (red), Y (yellow), G (green) |
| | | | Non-lighted | --- | A165S-T2M | |
| | | Automatic | LED | 24 VDC | A165W-T2A□ | |
| | | | Non-lighted | --- | A165S-T2A | |
| | 3 notches | Manual | LED | 24 VDC | A165W-T3M□ | |
| | | | Non-lighted | --- | A165S-T3M | |
| | | Fully automatic | LED | 24 VDC | A165W-T3A□ | |
| | | | Non-lighted | --- | A165S-T3A | |

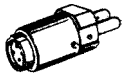
**Note: 1.** Enter the desired color symbol for the Selector in the □.
**2.** The selector for non-lighted models is black.

## Switches

| Appearance | Classification | | | | | Model |
|---|---|---|---|---|---|---|
|  | Lighted | Socket (without voltage-reduction lighting) | 2 notches | SPDT | Solder terminal | A16S-2N-1L |
| | | | | DPDT | | A16S-2N-2L |
| | | | 3 notches | DPDT | | A16S-3N-2L |
| | Non-lighted | | 2 notches | SPDT | | A16S-2N-1 |
| | | | | DPDT | | A16S-2N-2 |
| | | | 3 notches | DPDT | | A16S-3N-2 |
|  | Lighted | | 2 notches | SPDT | PCB terminal | A16S-2N-1LP |
| | | | | DPDT | | A16S-2N-2LP |
| | Non-lighted | | | SPDT | | A16S-2N-1P |
| | | | | DPDT | | A16S-2N-2P |

## Lamps

### LED

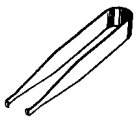
| Operating voltage / Light color  | 5 VDC | 12 VDC | 24 VDC |
|---|---|---|---|
| **Red** | A16-5DSR | A16-12DSR | A16-24DSR |
| **Yellow** | A16-5DSY | A16-12DSY | A16-24DSY |
| **Green** | A16-5DSG | A16-12DSG | A16-24DSG |

## Accessories (Order Separately)

### Accessories

| Name | Appearance | Classification | Model | Remarks |
|---|---|---|---|---|
| **Panel Plugs** | | Rectangular | A16ZJ-3003 | Used for covering the panel cutouts for future panel expansion.<br>Degree of protection: IP40 |
| | | Square | A16ZA-3003 | |
| | | Round | A16ZT-3003 | |

### Tools

| Name | Appearance | Model | Applicable types | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | Pushbutton Switch | Knob-type Selector Switch | Key-type Selector Switch | Emergency Stop Switch | Indicator | |
| **Screw Fitting** | | A16Z-3004 | Yes | Yes | Yes | Yes | Yes | Convenient for ganged installation.<br>Tighten to a torque of 0.39 N·m min. |
| **Extractor** |  | A16Z-5080 | Yes | Yes | Yes | Yes | Yes | Convenient for extracting the Switches and Lamps. |

# Specifications

## ■ Approved Standards

| Agency | Standards | File No. |
|---|---|---|
| UL, cUL (See note.) | UL508 | E41515 |
| --- | EN60947-5-1 | --- |

**Note:** cUL: CSA, C22.2 No. 14

## ■ Approved Standard Ratings

### UL, cUL (File No. E41515)

5 A at 125 VAC, 3 A at 250 VAC (general use)
3 A at 30 VDC (resistive)

### EN60947-5-1 (Low Voltage Directive)

3 A at 250 VAC (AC12), 3 A at 30 VDC (DC12)

## ■ Ratings

### Contacts

| AC resistive load | DC resistive load |
|---|---|
| 3 A at 250 VAC<br>5 A at 125 VAC | 3 A at 30 VDC |

Minimum applicable load: 1 mA at 5 VDC
Rated values are obtained from tests conducted under the following conditions.

1. Load: Resistive load
2. Mounting conditions: No vibration and no shock
3. Temperature: 20±2°C
4. Operating frequency: 20 times/min

### Super-bright LED

| Rated voltage | Rated current | Operating voltage | Internal limiting resistor |
|---|---|---|---|
| 5 VDC | 30 mA (15 mA) | 5 VDC±5% | 33 Ω (68 Ω) |
| 12 VDC | 15 mA | 12 VDC±5% | 270 Ω (560 Ω) |
| 24 VDC | 10 mA | 24 VDC±5% | 1600 Ω (2,000 Ω) |

**Note:** The values in parentheses are for red Selectors.

## ■ Characteristics

| Item | | Knob-type Selector Switch |
|---|---|---|
| **Allowable operating frequency** | **Mechanical** | 20 operations/minute max. |
| | **Electrical** | 10 operations/minute max. |
| **Insulation resistance** | | 100 MΩ min. (at 500 VDC) |
| **Dielectric strength** | | 1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity<br>2,000 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground<br>1,000 VAC, 50/60 Hz for 1 min between lamp terminals (See note.) |
| **Vibration resistance** | **Malfunction** | 10 to 55 Hz, 1.5-mm double amplitude (malfunction within 1 ms) |
| **Shock resistance** | **Destruction** | 500 m/s$^2$ |
| | **Malfunction** | 150 m/s$^2$ max. (malfunction within 1 ms) |
| **Durability** | **Mechanical** | 250,000 operations min. |
| | **Electrical** | 100,000 operations min. |
| **Ambient temperature** | | Operating: –10°C to 55°C (with no icing or condensation)<br>Storage: –25°C to 65°C (with no icing or condensation) |
| **Ambient humidity** | | Operating: 35% to 85% |
| **Electric shock protection class** | | Class II |
| **PTI (tracking characteristic)** | | 175 |
| **Degree of contamination** | | 3 (IEC947-5-1) |
| **Weight** | | Approx. 13 g (in the case of a lighted DPDT switch) |

**Note:** With LED not mounted.

### Screw-less Clamp

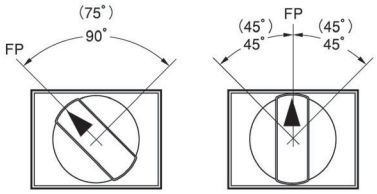
| Item | | Screw-less Clamp | | | |
|---|---|---|---|---|---|
| Recommended wire size | | 0.5 mm$^2$ twisted wire or 0.8 mm-dia. solid wire | | | |
| Usable wires and tensile strength | Twisted wire | 0.3mm$^2$ | 0.5 mm$^2$ | 0.75 mm$^2$ | 1.25 mm$^2$ |
| | Solid wire | 0.5 mm dia. | 0.8 mm dia. | 1.0 mm dia. | --- |
| | Tensile strength | 10 N | 20 N | 30 N | 40 N |
| Length of exposed wire | | 10 ±1 mm | | | |

## ■ Operating Characteristics

| Type / Features | Knob-type Selector Switch | |
|---|---|---|
| | **2 notches** | **3 notches** |
| **Operating force (OF) max.** | 0.1 N·m | |
| **Set position (SP)** | 90±5° | $45^{+10°}_{0}$ |

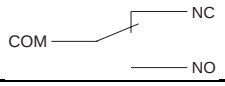
## ■ Operation Angle

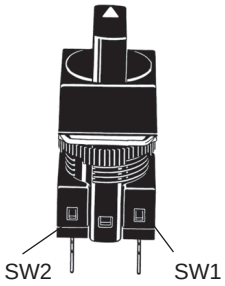
**Two notches** **Three notches**




**Note: 1.** The angle used for automatic reset is shown in parentheses.
**2.** FP: Free Position

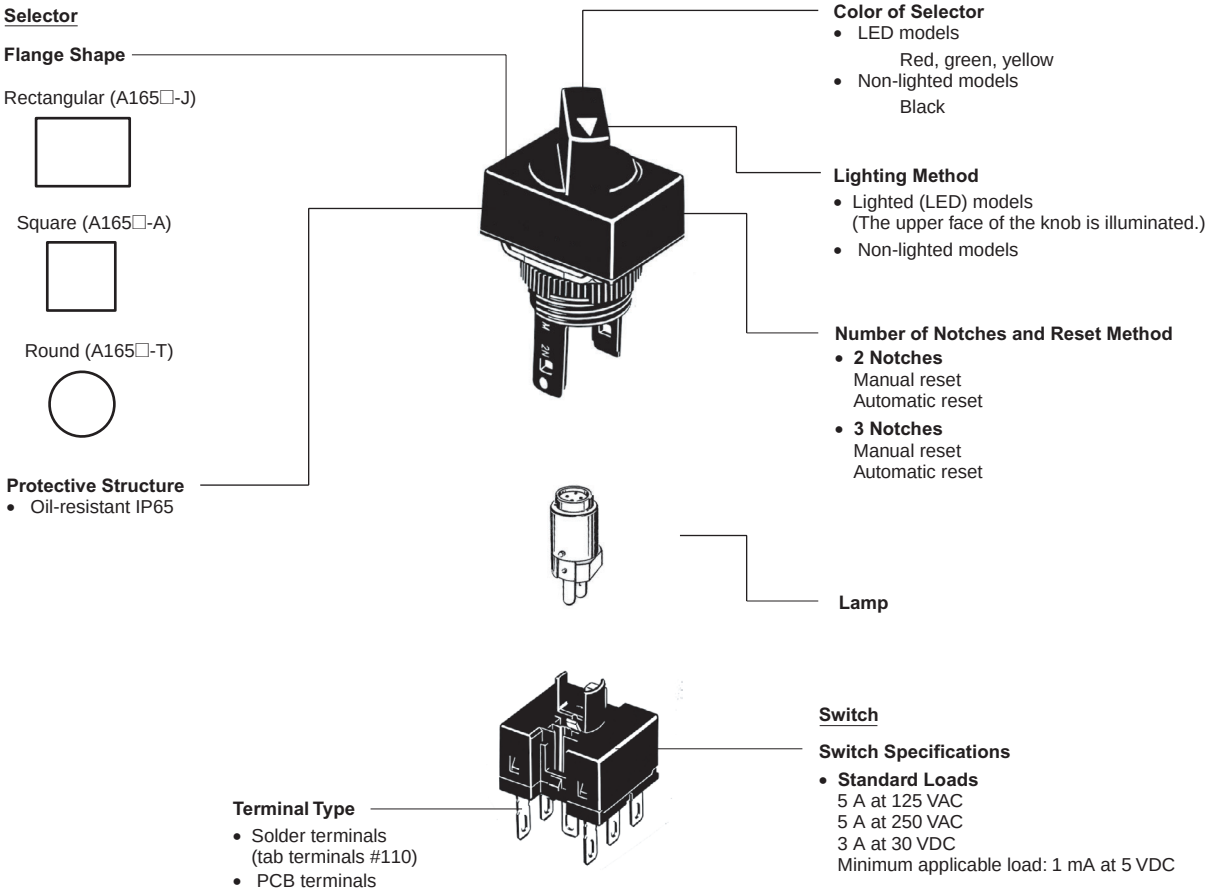
## ■ Contact Form

| Name | Contact |
|---|---|
| SPDT |  |




| Notch | Contact | | | | |
|---|---|---|---|---|---|
| | SPDT | | DPDT | | |
| | Position | SW | Position | SW2 | SW1 |
| 2 notches | | | | | |
| | | | | | |
| 3 notches | --- | | | | |
| | | | | | |
| | | | | | |

# Nomenclature



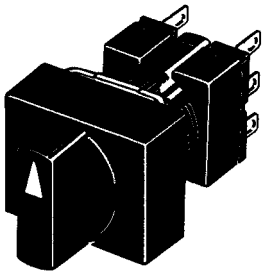
# Dimensions

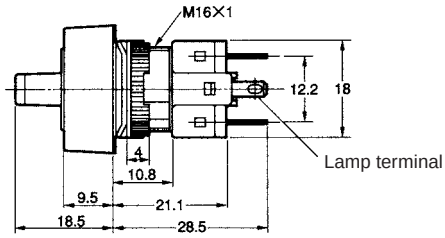
**Note:** All units are in millimeters unless otherwise indicated.

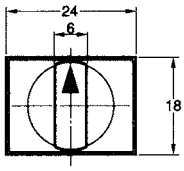
## ■ Knob-type Selector Switches without Voltage Reduction Unit

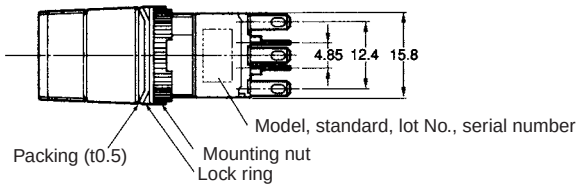
**Rectangular**
**A165□-J**

Solder terminals (tab terminals #110)





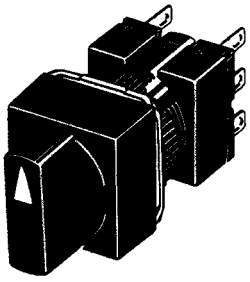



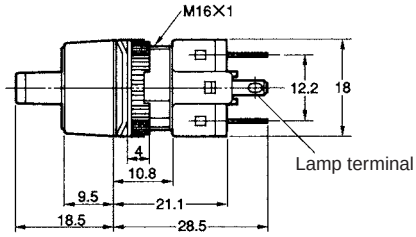



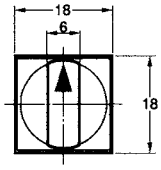

**Note:** See page 96 for panel cutouts.

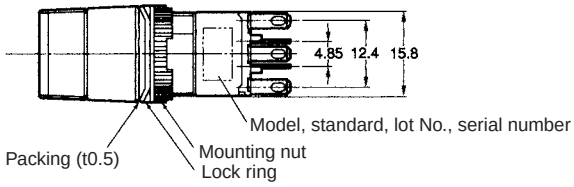
**Square**
**A165□-A**

Solder terminals (tab terminals #110)





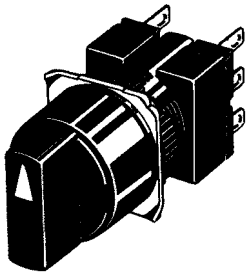



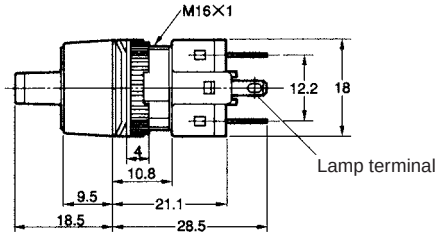



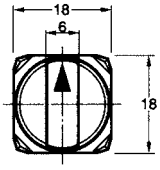

**Note:** See page 96 for panel cutouts.

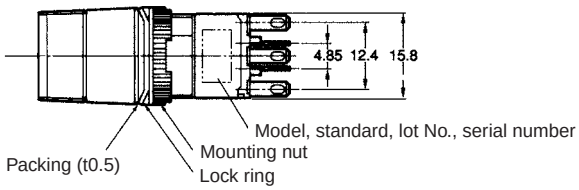
**Round**
**A165□-T**

Solder terminals (tab terminals #110)





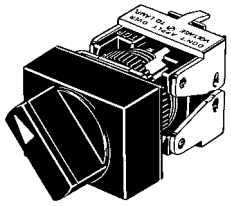



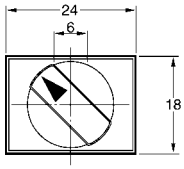

**Note:** See page 96 for panel cutouts.

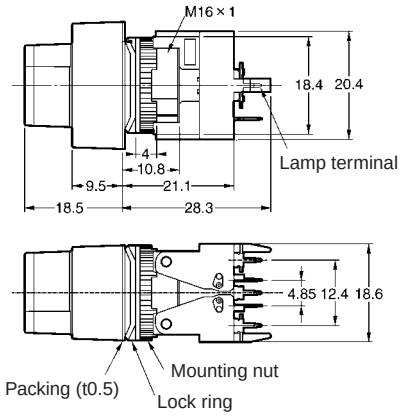
The following diagrams show the rectangular model as a representative example. The lamp terminal is also provided with non-lighted models.

**Rectangular**
**A165□-J**

PCB terminals



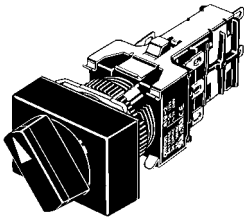


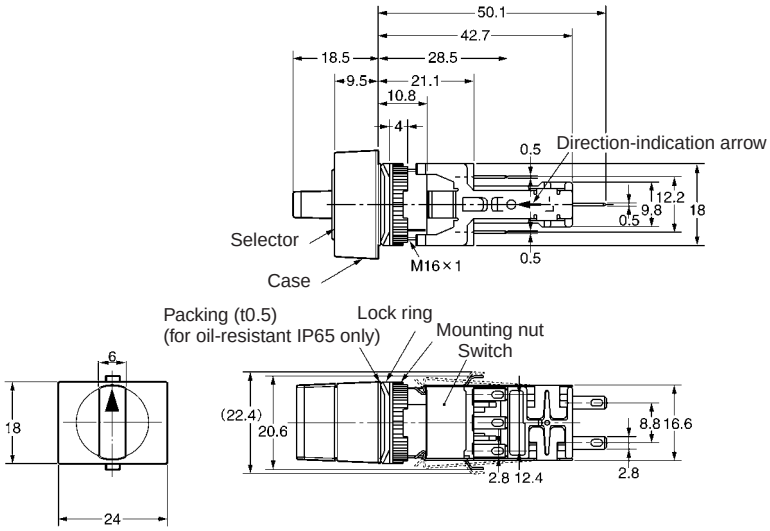




**Note:** See page 96 for panel cutouts.

**Rectangular**
**A165W□-T**

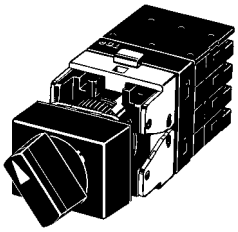
Reduced-voltage lighting, solder terminals (tab terminals #110)

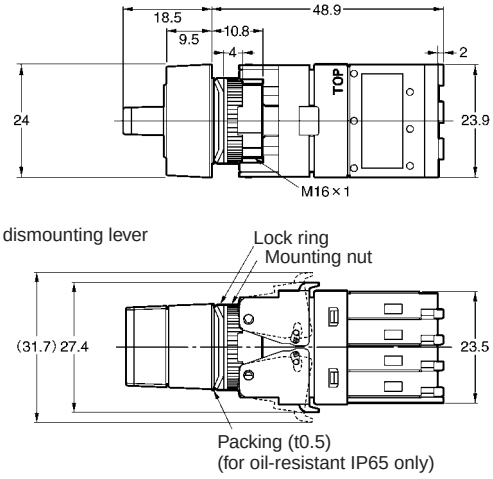





**Rectangular**
**A165□-2S**

Screw-Less Clamp



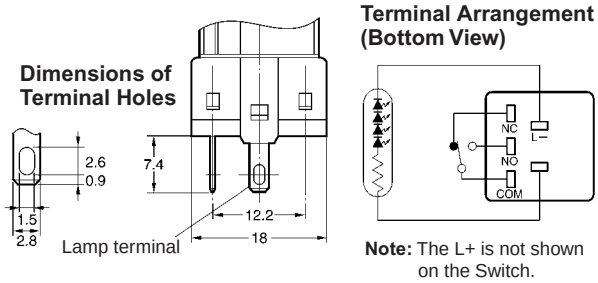


# ■ Terminal Arrangement

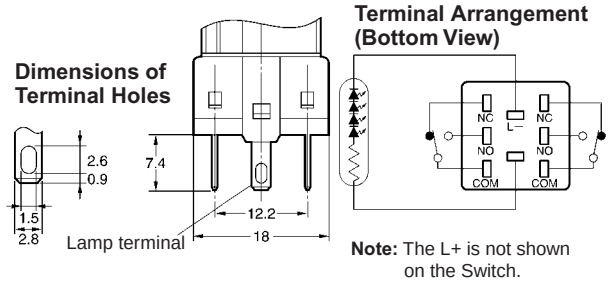
## Models with Solder Terminals without Reduced-voltage Lighting

Lamp terminals are not provided with the Non-lighted Knob-type Selector Switches and Key-type Selector Switches.

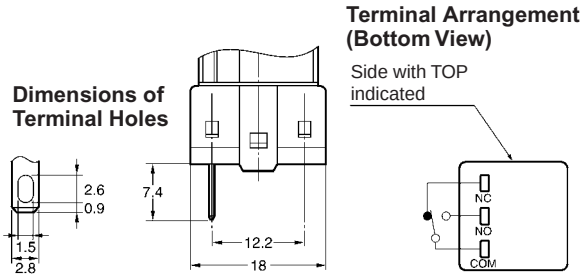
### Lighted SPDT Switches



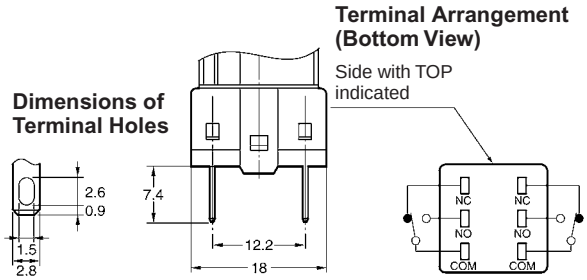

### Lighted DPDT Switches




### Non-lighted SPDT Switches

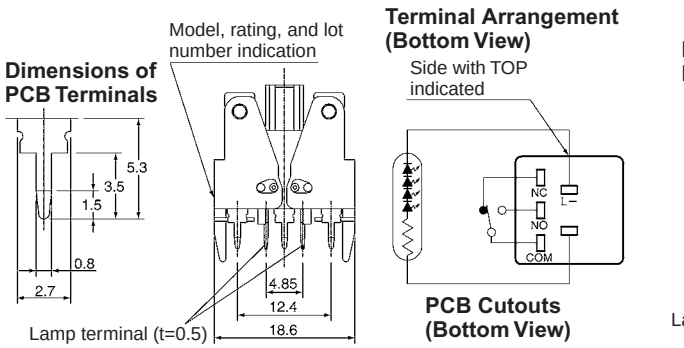



### Non-lighted DPDT Switches

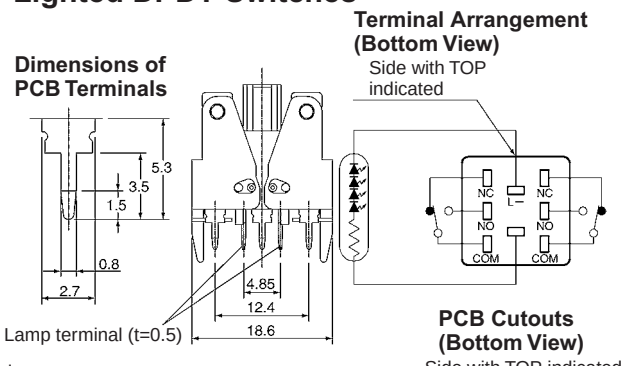


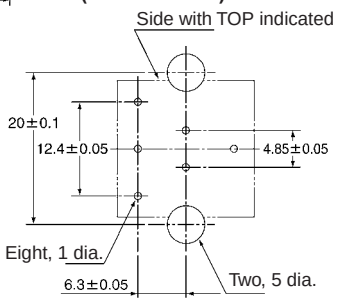

## Models with PCB Terminals

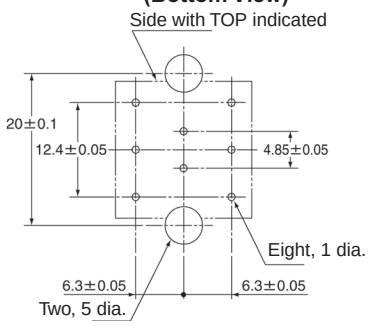
### Lighted SPDT Switches




### Lighted DPDT Switches



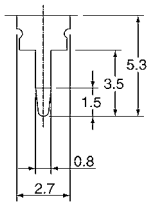

**Note:** For details of the terminal arrangement for Screw-Less Clamps, refer to the corresponding section for the A16.

## Non-lighted Models with PCB Terminals

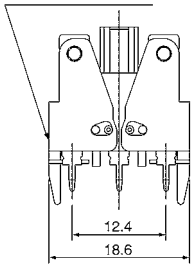
Lamp terminals are not provided with the Non-lighted Knob-type Selector Switches and Key-type Selector Switches.

### Non-lighted SPDT Switches

**Dimensions of PCB Terminals**

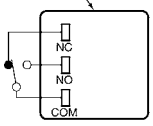



Model, rating, and lot number indication



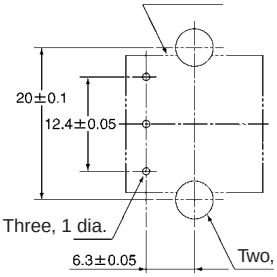

**Terminal Arrangement (Bottom View)**

Side with TOP indicated



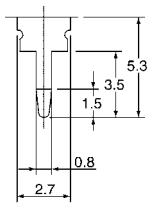

**PCB Cutouts (Bottom View)**

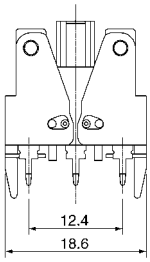
Side with TOP indicated



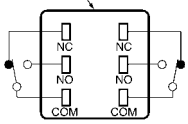

### Non-lighted DPDT Switches

**Dimensions of PCB Terminals**



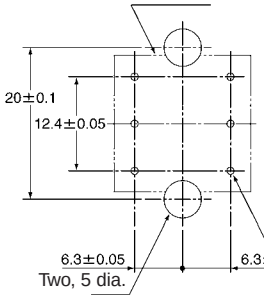




Side with TOP indicated




**PCB Cutouts (Bottom View)**

Side with TOP indicated

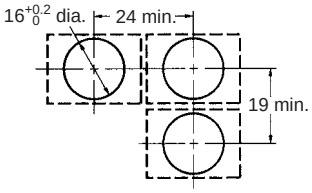



## ■ Panel Cutouts

## Models with Solder Terminals

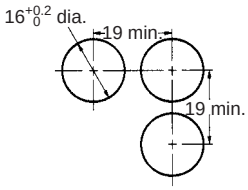
**Rectangular**
**A165□-J**

**(Top View)**




**Square A165□-A**
**Round A165□-T**

**(Top View)**

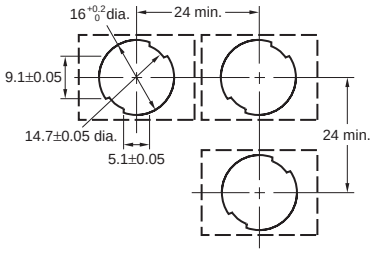



**Note: 1.** Make sure the thickness of the mounting panel is 0.5 to 3.2 mm.
**2.** If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after coating.

## Models with PCB Terminals

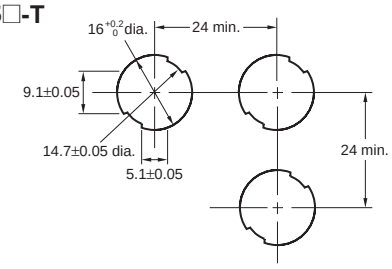
**Rectangular A165□-J**

**(Top View)**

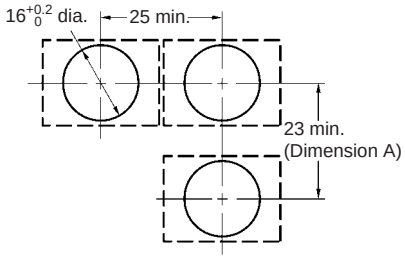



**Square A165□-A**
**Round A165□-T**

**(Top View)**

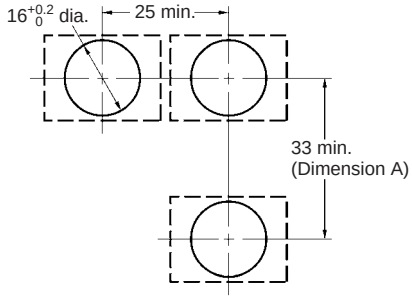



**Rectangular A165W□-T**




Recommended panel thickness: 0.5 to 3.2 mm

**Rectangular A165□-2S**




Recommended panel thickness: 0.5 to 3.2 mm

**Note: 1.** Ensure that the variation in the distance between the centers of neighboring mounting holes is less than ±0.1 mm.
**2.** Make sure the thickness of the mounting panel is 0.5 to 3.2 mm. If, however, a Switch Guard or Dust Cover is used, the thickness of the mounting panel must be 0.5 to 2 mm.
**3.** If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after coating.

# Installation

For details on mounting the Switch to a panel, and mounting and dismounting the Switch, refer to installation details for the A16 Pushbutton Switch.

## ■ Panel Mounting

Refer to the *Installation* section for the A16.

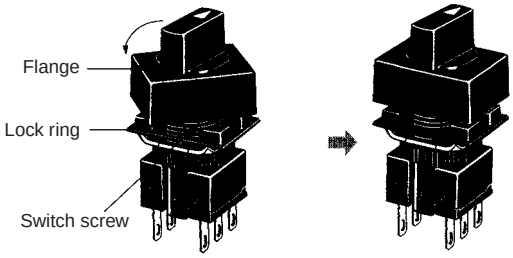
## ■ Mounting and Replacing the Pushbutton

Refer to the *Installation* section for the A16.

## ■ Flange Rotation

### A165 Knob-type Selector Switch

Fix the Switch screw and rotate the flange in 45° turns.




# Precautions

Refer to the *Technical Information for Pushbutton Switches* (Cat. No. A143) and the *Precautions* section for the A16.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

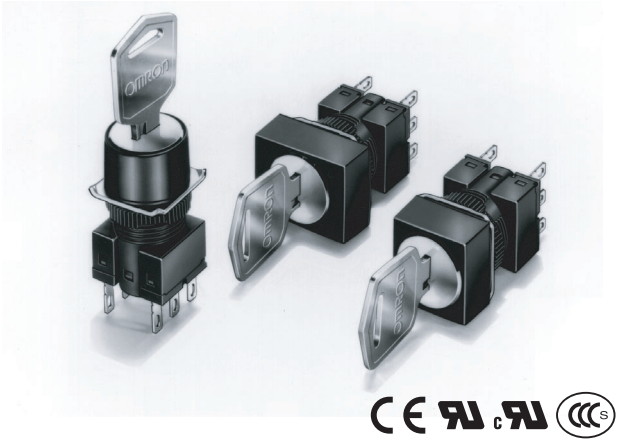
Cat. No. A125-E1-03

In the interest of product improvement, specifications are subject to change without notice.

# Key-type Selector Switch
# A165K

## Mounting Aperture of 16 mm

- Modular construction
- Oil-resistant IP65 models
- UL and cUL approved.
- Conforms to EN60947-5-1, IEC947-5-1
- Short mounting depth, less than 28.5 mm below panel
- Wide range of switching capacity from standard to microload
- Automatic and manual models available



# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

The model numbers used to order sets of Units are illustrated below. One set comprises the Selector, Switch, and 2 Keys.

(1) (2) (3)

**A 1 6 5 K - J 3ML - 2**

**(1) Shape of Selector**

| Symbol | Shape | Color |
|---|---|---|
| J | Rectangular | Black |
| A | Square | |
| T | Round | |

**(2) Number of Notches/Resetting Method**

| Symbol | No. of notches | Reset method | Key release position |
|---|---|---|---|
| 2ML | 2 notches | Manual | Left |
| 2MR | | | Right |
| 2M | | | Left and right |
| 2AL | | Automatic | Left |
| 3MC | 3 notches | Manual | Center |
| 3MR | | | Right |
| 3ML | | | Left |
| 3M | | | Left, right, and center |
| 3AC | 3 notches | Automatic | Center |

**(3) Contact Configuration**

| Symbol | Type | Terminal |
|---|---|---|
| 1 | SPDT | Solder Terminal |
| 2 | DPDT | |
| 2S | DPDT | Screw-Less Clamp |

**Note: 1.** Only DPDT contacts are available with 3-notch models

**2.** PCB terminals are available only with 2-notch models.

# Subassembled

## 1. Selector

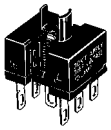
**A165K-□□**
1 2

1. **Flange Shape**
   J: Rectangular
   A: Square
   T: Round

2. **Number of Notches/Reset Method/Key Release Position**
   2ML: 2 notches/Manual/Left
   2MR: 2 notches/Manual/Right
   2M: 2 notches/Manual/Right and left
   2AL: 2 notches/Automatic/Left
   3MC: 3 notches/Manual/Center
   3MR: 3 notches/Manual/Right
   3ML: 3 notches/Manual/Left
   3M: 3 notches/Manual/Right, left, and center
   3AC: 3 notches/Automatic/Center

## 2. Switch (Same as for Knob-type Selector Switches)

**A16S-□-□□**
1 2 3



1. **Number of Notches**
   2N: 2 notches
   3N: 3 notches
2. **Contacts**
   1: SPDT
   2: DPDT
3. **Terminals**
   None: Solder terminals (tab terminals #110)

# Ordering Information

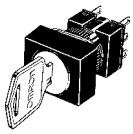
## ■ List of Models

### Ordering as a Set

The model numbers used to order sets of Units are given in the following tables. One set comprises the Selector and Switch.

### Solder Terminals

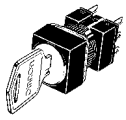
**A165K-J (Rectangular) Models**



**IP65 Oil-resistant**

| Number of notches | Output | Reset method | Key release position | Model |
|---|---|---|---|---|
| 2 notches | SPDT | Manual | Left | A165K-J2ML-1 |
| | | | Right | A165K-J2MR-1 |
| | | | Left and right | A165K-J2M-1 |
| | | Automatic | Left | A165K-J2AL-1 |
| | DPDT | Manual | Left | A165K-J2ML-2 |
| | | | Right | A165K-J2MR-2 |
| | | | Left and right | A165K-J2M-2 |
| | | Automatic | Left | A165K-J2AL-2 |
| 3 notches | DPDT | Manual | Center | A165K-J3MC-2 |
| | | | Right | A165K-J3MR-2 |
| | | | Left | A165K-J3ML-2 |
| | | | Left, right, and center | A165K-J3M-2 |

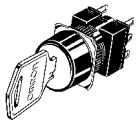
**A165K-A (Square) Models**



**IP65 Oil-resistant**

| Number of notches | Output | Reset method | Key release position | Model |
|---|---|---|---|---|
| 2 notches | SPDT | Manual | Left | A165K-A2ML-1 |
| | | | Right | A165K-A2MR-1 |
| | | | Left and right | A165K-A2M-1 |
| | | Automatic | Left | A165K-A2AL-1 |
| | DPDT | Manual | Left | A165K-A2ML-2 |
| | | | Right | A165K-A2MR-2 |
| | | | Left and right | A165K-A2M-2 |
| | | Automatic | Left | A165K-A2AL-2 |
| 3 notches | DPDT | Manual | Center | A165K-A3MC-2 |
| | | | Right | A165K-A3MR-2 |
| | | | Left | A165K-A3ML-2 |
| | | | Left, right, and center | A165K-A3M-2 |

### A165K-T (Round) Models



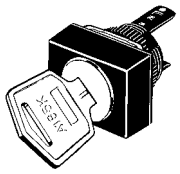
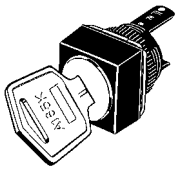
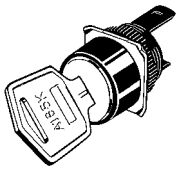
### IP65 Oil-resistant

| Number of notches | Output | Reset method | Key release position | Model |
|---|---|---|---|---|
| 2 notches | SPDT | Manual | Left | A165K-T2ML-1 |
| | | | Right | A165K-T2MR-1 |
| | | | Left and right | A165K-T2M-1 |
| | | Automatic | Left | A165K-T2AL-1 |
| | DPDT | Manual | Left | A165K-T2ML-2 |
| | | | Right | A165K-T2MR-2 |
| | | | Left and right | A165K-T2M-2 |
| | | Automatic | Left | A165K-T2AL-2 |
| 3 notches | DPDT | Manual | Center | A165K-T3MC-2 |
| | | | Right | A165K-T3MR-2 |
| | | | Left | A165K-T3ML-2 |
| | | | Left, right, and center | A165K-T3M-2 |

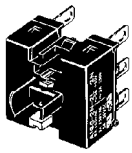
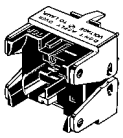
# Ordering Individually

Selectors and Switches can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.

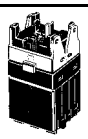
## Selectors

| Appearance | Number of notches | Reset method | Key release position | Model |
|---|---|---|---|---|
| **Rectangular (A165K-J)**  | 2 notches | Manual | | A165K-J2ML |
| | | | | A165K-J2MR |
| | | | | A165K-J2M |
| | | Automatic | | A165K-J2AL |
| | 3 notches | Manual | | A165K-J3MC |
| | | | | A165K-J3MR |
| | | | | A165K-J3ML |
| | | | | A165K-J3M |
| | | Automatic | | A165K-J3AC |
| **Square (A165K-A)**  | 2 notches | Manual | | A165K-A2ML |
| | | | | A165K-A2MR |
| | | | | A165K-A2M |
| | | Automatic | | A165K-A2AL |
| | 3 notches | Manual | | A165K-A3MC |
| | | | | A165K-A3MR |
| | | | | A165K-A3ML |
| | | | | A165K-A3M |
| | | Automatic | | A165K-A3AC |
| **Round (A165K-T)**  | 2 notches | Manual | | A165K-T2ML |
| | | | | A165K-T2MR |
| | | | | A165K-T2M |
| | | Automatic | | A165K-T2AL |
| | 3 notches | Manual | | A165K-T3MC |
| | | | | A165K-T3MR |
| | | | | A165K-T3ML |
| | | | | A165K-T3M |
| | | Automatic | | A165K-T3AC |

## Switches

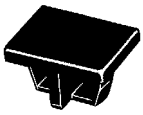
| Appearance | Classification | | | | Model |
|---|---|---|---|---|---|
|  | Switch | 2 notches | SPDT | Solder terminal | A16S-2N-1 |
| | | | DPDT | | A16S-2N-2 |
| | | 3 notches | DPDT | | A16S-3N-2 |
|  | | 2 notches | SPDT | PCB terminal | A16S-2N-1P |
| | | | DPDT | | A16S-2N-2P |

## Switches with Screw-Less Clamp

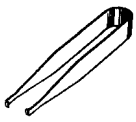
| Appearance | Classification | | | | Model | Remarks |
|---|---|---|---|---|---|---|
|  | Common to general load and micro load. | DPDT | 2 notches | Non-lighted | A16-2S | Common to ones for pushbutton switches. |
| | | | 3 notches | | A16S-3N-2LS | --- |

# Accessories (Order Separately)

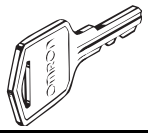
## Accessories

| Name | Appearance | Classification | Model | Remarks |
|---|---|---|---|---|
| **Panel Plugs** |  | Rectangular | A16ZJ-3003 | Used for covering the panel cutouts for future panel expansion.<br>Degree of protection: IP40 |
| | | Square | A16ZA-3003 | |
| | | Round | A16ZT-3003 | |

## Tools

| Name | Appearance | Model | Applicable types | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | Pushbutton Switch | Knob-type Selector Switch | Key-type Selector Switch | Emer-gency Stop Switch | Indicator | |
| **Screw Fitting** | | A16Z-3004 | Yes | Yes | Yes | Yes | Yes | Convenient for ganged installation.<br>Tighten to a torque of 0.98 N·m |
| **Extractor** |  | A16Z-5080 | Yes | Yes | Yes | Yes | Yes | Convenient for extract-ing the Switches and Lamps. |

## Key

| Appearance | Model |
|---|---|
|  | A165K-KEY |

**Note:** Two Keys are provided.

# Specifications

## ■ Approved Standards

| Agency | Standards | File No. |
|---|---|---|
| UL, cUL (See note.) | UL508 | E41515 |
| --- | EN60947-5-1 | --- |

**Note:** cUL: CSA, C22.2 No. 14

## ■ Approved Standard Ratings

### UL, cUL (File No. E41515)

5 A at 125 VAC, 3 A at 250 VAC (general use)
3 A at 30 VDC (resistive)

### EN60947-5-1 (Low Voltage Directive)

3 A at 250 VAC (AC12), 3 A at 30 VDC (DC12)

## ■ Ratings

### Contacts

| AC resistive load | DC resistive load |
|---|---|
| 3 A at 250 VAC<br>5 A at 125 VAC | 3 A at 30 VDC |

Minimum applicable load: 1 mA at 5 VDC
Rated values are obtained from tests conducted under the following conditions.

1. Load: Resistive load
2. Mounting conditions: No vibration and no shock
3. Temperature: 20±2°C
4. Operating frequency: 20 times/min

## ■ Characteristics

| Item | | Key-type Selector Switch |
|---|---|---|
| **Allowable operating frequency** | **Mechanical** | 20 operations/minute max. |
| | **Electrical** | 10 operations/minute max. |
| **Insulation resistance** | | 100 MΩ min. (at 500 VDC) |
| **Dielectric strength** | | 1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity<br>2,000 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground |
| **Vibration resistance** | **Malfunction** | 10 to 55 Hz, 1.5-mm double amplitude (malfunction within 1 ms) |
| **Shock resistance** | **Destruction** | 500 $m/s^2$ |
| | **Malfunction** | 150 $m/s^2$ max. (malfunction within 1 ms) |
| **Durability** | **Mechanical** | 250,000 operations min. (durability of key: 10,000 operations min.) |
| | **Electrical** | 100,000 operations min. |
| **Ambient temperature** | | Operating: –10°C to 55°C (with no icing or condensation)<br>Storage: –25°C to 65°C (with no icing or condensation) |
| **Ambient humidity** | | Operating: 35% to 85% |
| **Electric shock protection class** | | Class II |
| **PTI (tracking characteristic)** | | 175 |
| **Degree of contamination** | | 3 (IEC947-5-1) |
| **Weight** | | Approx. 26.5 g (in the case of a DPDT switch key) |

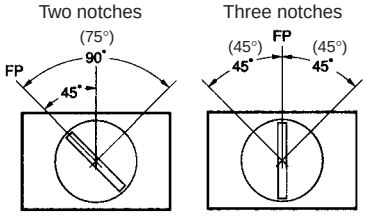
### Screw-less Clamp

| Item | | Screw-less Clamp | | | |
|---|---|---|---|---|---|
| Recommended wire size | | 0.5 $mm^2$ twisted wire or 0.8 mm-dia. solid wire | | | |
| Usable wires and tensile strength | Twisted wire | 0.3$mm^2$ | 0.5 $mm^2$ | 0.75 $mm^2$ | 1.25 $mm^2$ |
| | Solid wire | 0.5 mm dia. | 0.8 mm dia. | 1.0 mm dia. | --- |
| | Tensile strength | 10 N | 20 N | 30 N | 40 N |
| Length of exposed wire | | 10 ±1 mm | | | |

## ■ Operating Characteristics

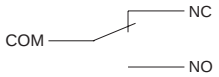
| Type / Features | Key-type Selector Switch | |
|---|---|---|
| | 2 notches | 3 notches |
| **Operating force (OF) max.** | 0.1 N·m | |
| **Set position (SP)** | 90±5° | $45^{\circ}{}^{+10}/_{0}$ |

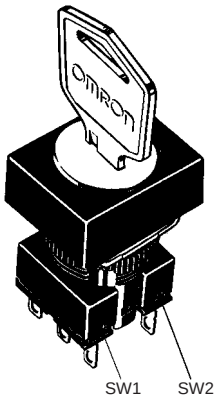
## ■ Operation Angle




**Note:** The angle used for automatic reset is shown in parentheses.

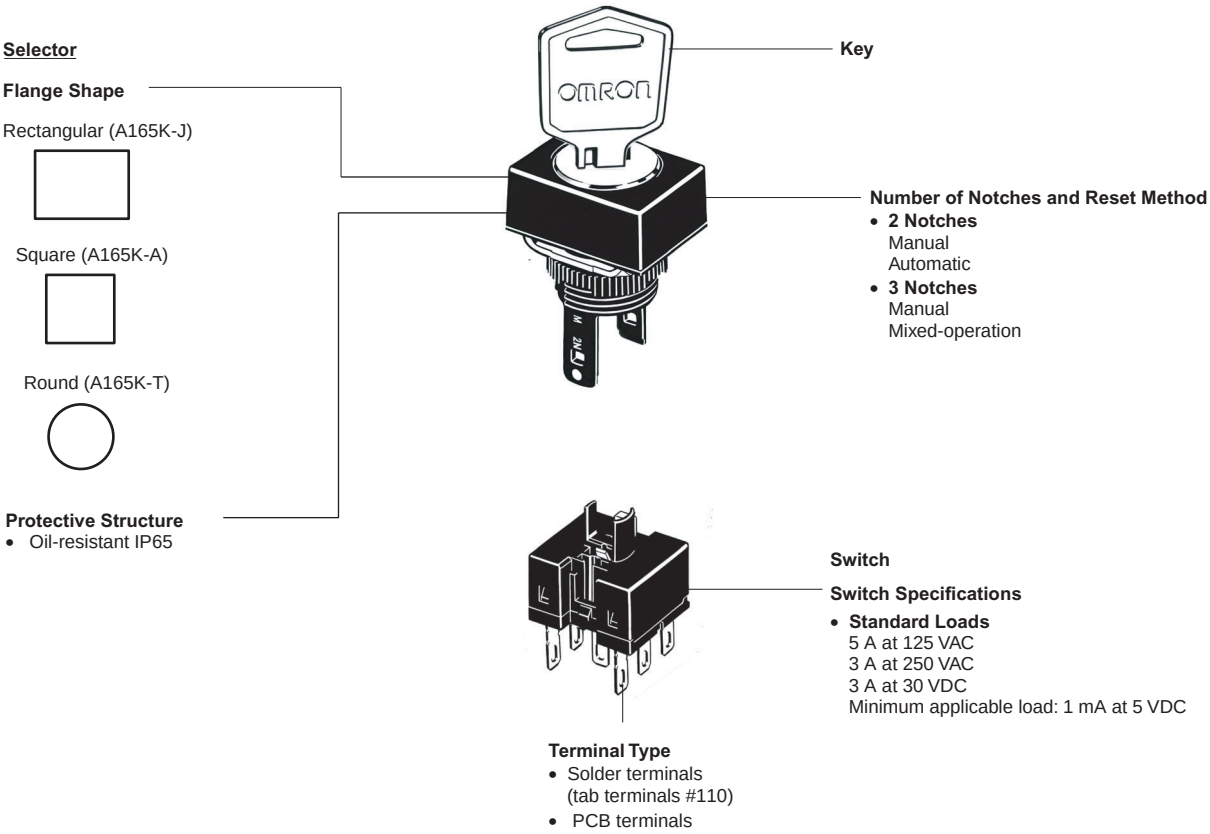
## ■ Contact Form

| Name | Contact |
|---|---|
| DPDT |   |




| Notch | Contact | | | | |
|---|---|---|---|---|---|
| | SPDT | | DPDT | | |
| | Position | SW | Position | SW1 | SW2 |
| 2 notches | ↖ | | ↖ | | |
| | ↗ | | ↗ | | |
| 3 notches | --- | | ↖ | | |
| | | | ↑ | | |
| | | | ↗ | | |

# Nomenclature



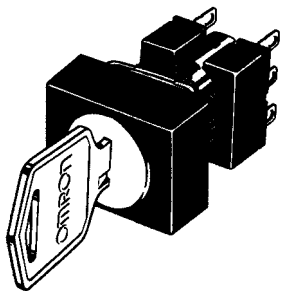
# Dimensions

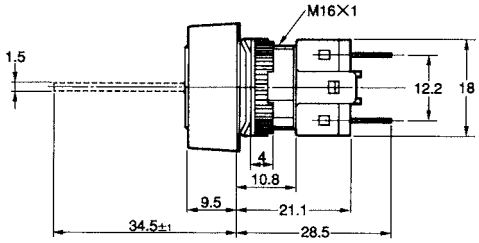
**Note:** All units are in millimeters unless otherwise indicated.

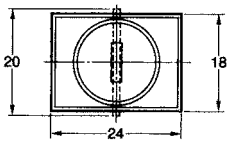
## ■ Key-type Selector Switches

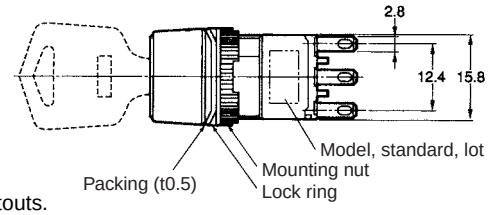
### Rectangular
### A165K-J

Solder terminals (tab terminals #110)





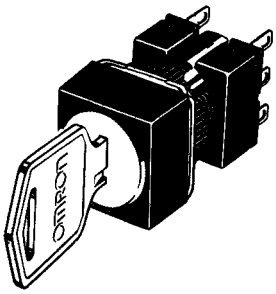



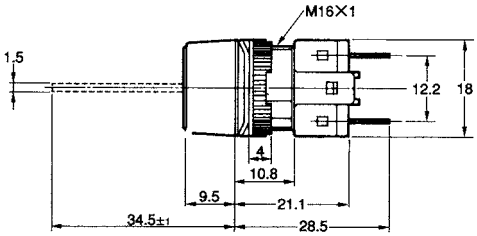



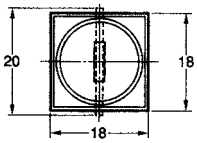

**Note:** See page 110 for panel cutouts.

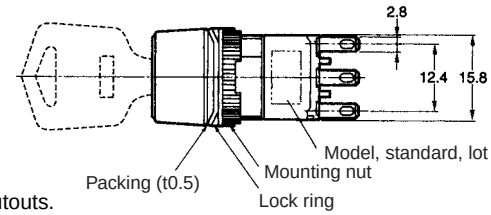
### Square
### A165K-A

Solder terminals
(tab terminals #110)





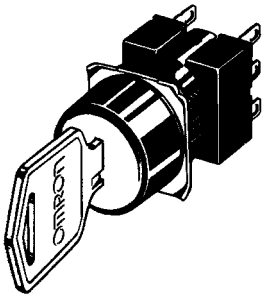



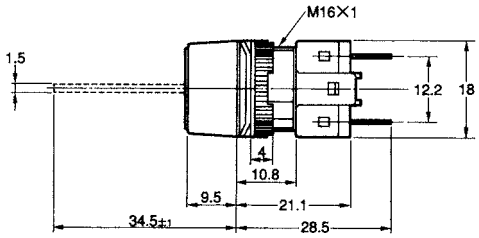



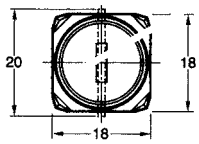

**Note:** See page 110 for panel cutouts.

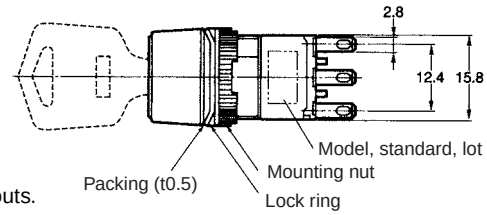
### Round
### A165K-T

Solder terminals
(tab terminals #110)





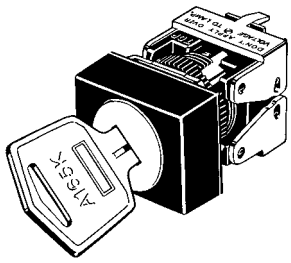



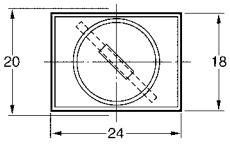



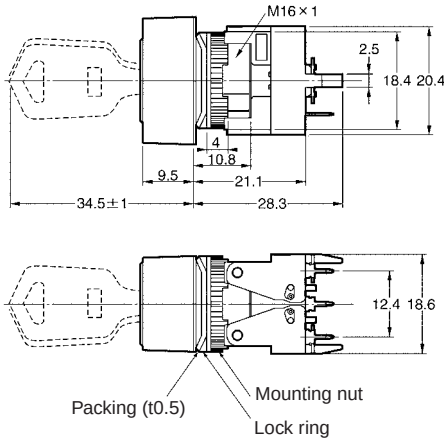

**Note:** See page 110 for panel cutouts.

The following diagrams show the rectangular model as a representative example.

**Rectangular**
**A165K-J**
PCB terminals

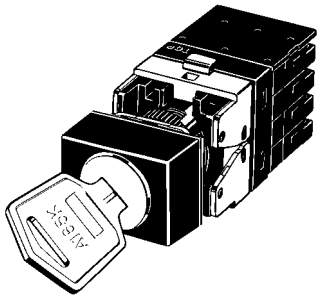


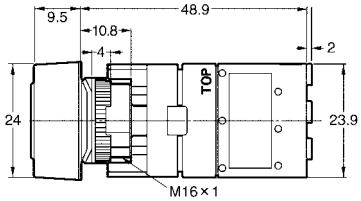


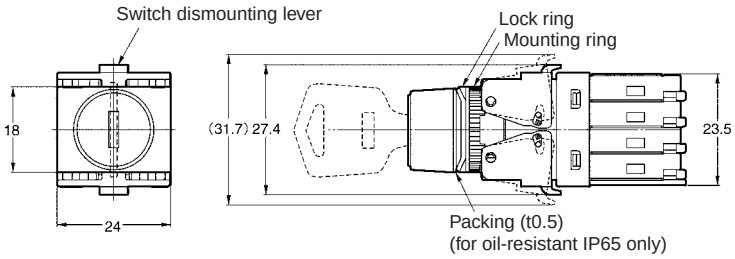




**Note:** See page 110 for panel cutouts.

**Rectangular**
**A165K□-2S**
Screw-Less Clamp





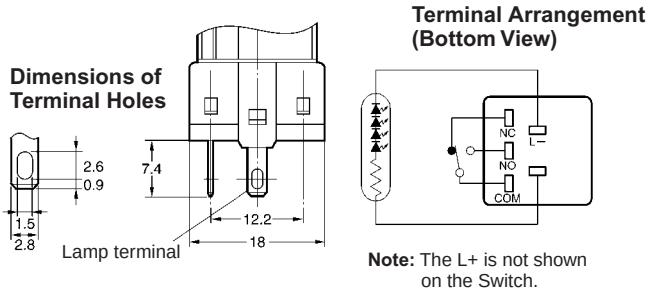



# ■ Terminal Arrangement

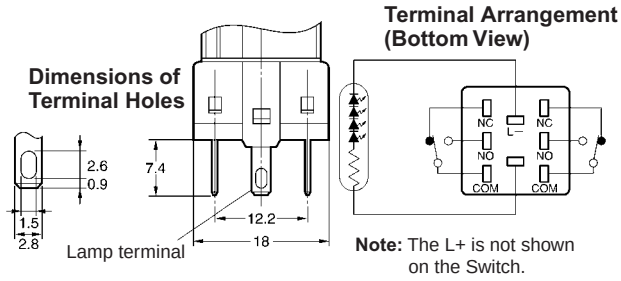
## Models with Solder Terminals without Reduced-voltage Lighting

Lamp terminals are not provided with the Non-lighted Knob-type Selector Switches and Key-type Selector Switches.

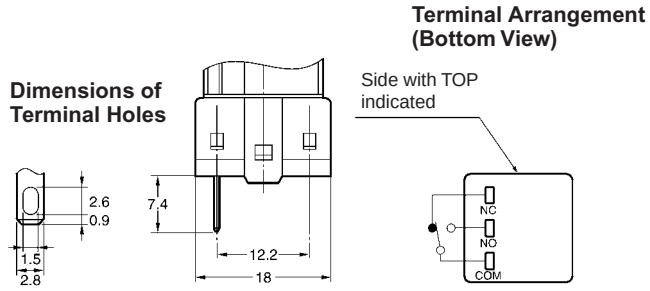
### Lighted SPDT Switches



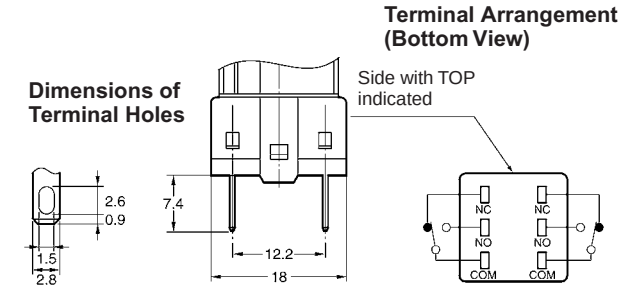

### Lighted DPDT Switches




### Non-lighted SPDT Switches

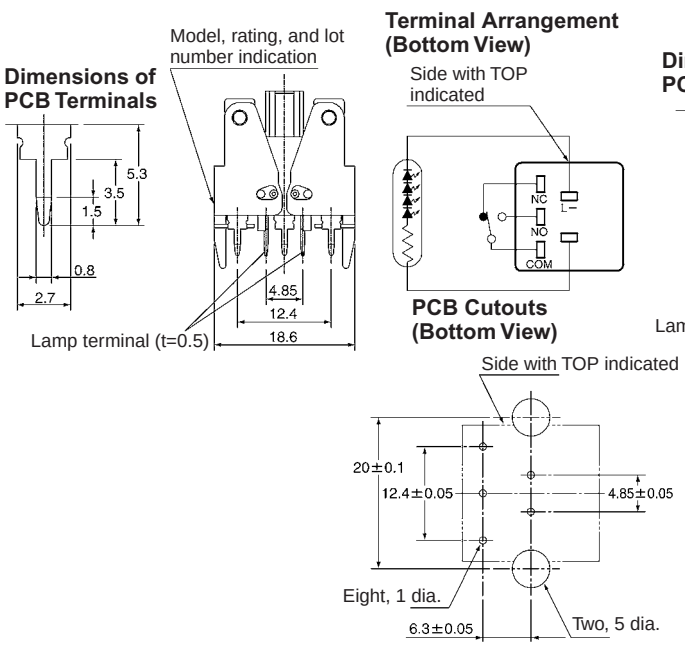



### Non-lighted DPDT Switches

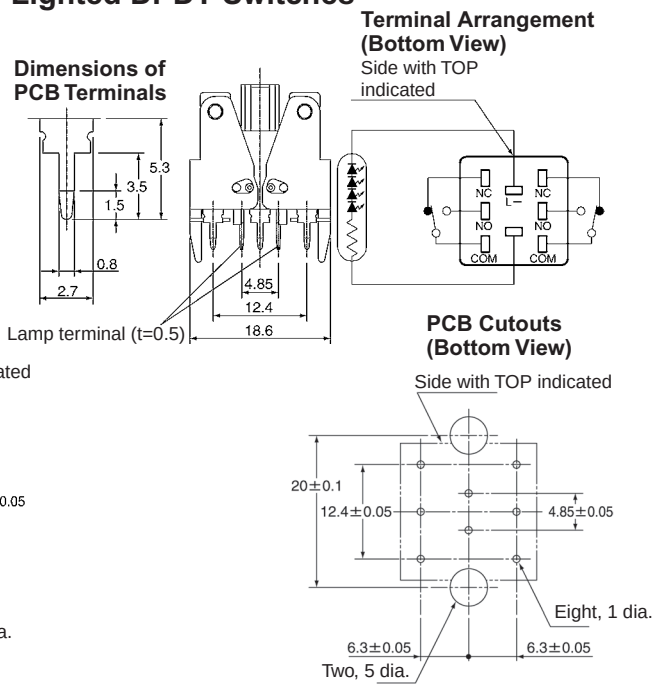



## Lighted Models with PCB Terminals

### Lighted SPDT Switches




### Lighted DPDT Switches



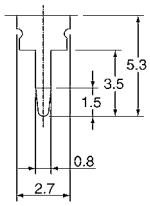

**Note:** For details of the terminal arrangement for Screw-Less Clamps, refer to the corresponding section for the A16.

## Non-lighted Models with PCB Terminals

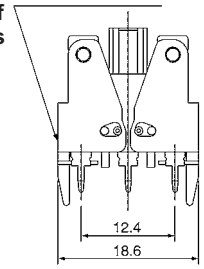
Lamp terminals are not provided with the Non-lighted Knob-type Selector Switches and Key-type Selector Switches.

### Non-lighted SPDT Switches

**Dimensions of PCB Terminals**

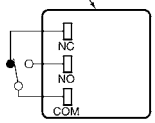



Model, rating, and lot number indication



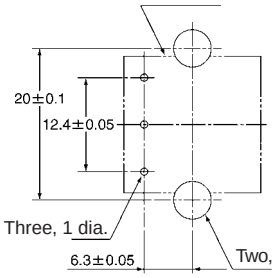

**Terminal Arrangement (Bottom View)**

Side with TOP indicated



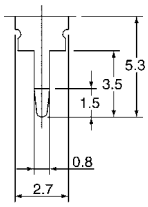

**PCB Cutouts (Bottom View)**

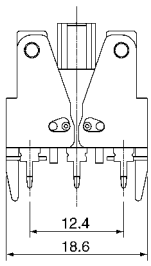
Side with TOP indicated



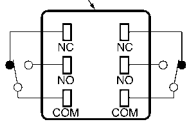

### Non-lighted DPDT Switches

**Dimensions of PCB Terminals**



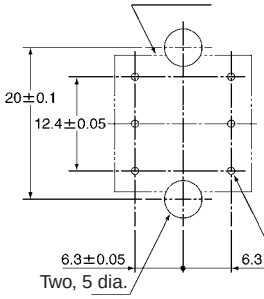




Side with TOP indicated




**PCB Cutouts (Bottom View)**

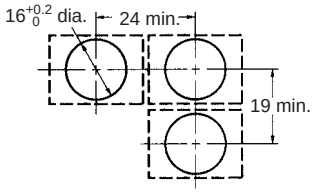
Side with TOP indicated



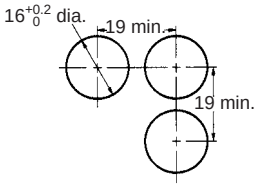

## ■ Panel Cutouts

## Models with Solder Terminals

**Rectangular**
**A165□-J**
**(Top View)**



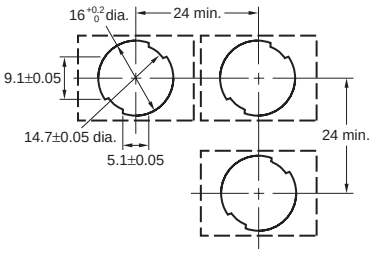

**Square A165□-A**
**Round A165□-T**
**(Top View)**



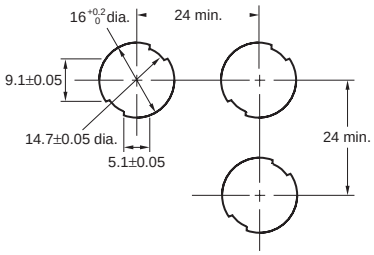

**Note: 1.** Make sure the thickness of the mounting panel is 0.5 to 3.2 mm.
**2.** If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after coating.

## Models with PCB Terminals

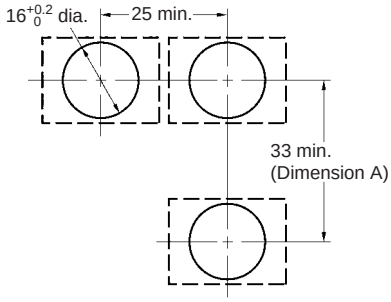
**Rectangular**
**A165K-J**
**(Top View)**




**Square A165K-A**
**Round A165K-T**
**(Top View)**




**Rectangular**
**A165K□-2S**
**(Top View)**




Recommended panel thickness: 0.5 to 3.2 mm

**Note: 1.** Ensure that the variation in the distance between the centers of neighboring mounting holes is less than ±0.1 mm.
**2.** Make sure the thickness of the mounting panel is 0.5 to 3.2 mm. If, however, a Switch Guard or Dust Cover is used, the thickness of the mounting panel must be 0.5 to 2 mm.
**3.** If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after coating.

# Installation

For details on mounting the Switch to a panel, and mounting and dismounting the Switch, refer to installation details for the A16 Pushbutton Switch.

## ■ Panel Mounting

Refer to the *Installation* section for the A16.

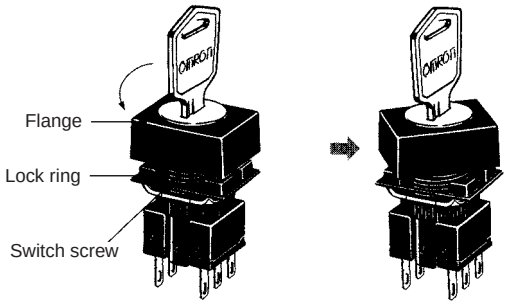
## ■ Mounting and Replacing the Pushbutton

Refer to the *Installation* section for the A16.

## ■ Flange Rotation

### A165 Key-type Selector Switch

Fix the Switch screw and rotate the flange in 45° turns.




# Precautions

Refer to the *Technical Information for Pushbutton Switches* (Cat. No. A143) and the *Precautions* section for the A16.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A126-E1-03

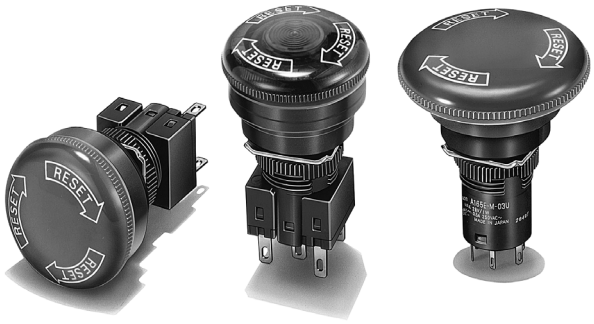
In the interest of product improvement, specifications are subject to change without notice.

# Emergency Stop Switch
# A165E

## Separate Construction with Smallest Class of Depth in the World

- Direct opening mechanism to open contacts in emergencies, such as when they are welded.
- Conforms to EN418.
- Includes a safety lock to prevent misuse.
- Features separate construction that allows the Switch to be separated for easier wiring and one-piece-like construction that allows easier handling.
- Models available with 3 contacts built into a single block (A165E-U).

**Note:** Refer to the *Common Precautions* for Pushbutton Switches on page 14, as well as the *"Safety Precautions" on page 121*.




# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

Shipped as a set that includes the Operation Unit and light source.

**A165E□-□-□** (1 2 3)

IP65 (Oil-resistant)

**1. Operation Unit Shape and Functions**

| Code | Functions | | Pushbutton |
|---|---|---|---|
| S | Non-lighted | Push-lock, turn-reset | 30 dia. |
| LS | Lighted | | |
| M | Non-lighted | | 40 dia. |
| LM | Lighted | | |

**2. Light Source**

| Code | Type | Operation voltage | Rated voltage |
|---|---|---|---|
| None | Non-lighted | --- | --- |
| 24D | LED | 24 VDC | 24 VDC |

**Note:** Models with separate construction (SPST-NC and DPST-NC) are for normal loads only. One-piece models (TPST-NC) are for either normal loads or microloads.

**3. Contacts**

| Code | Description |
|---|---|
| 01 | SPST-NC |
| 02 | DPST-NC |
| 03U | TPST-NC (See note.) |

**Note:** TPST-NC models have one-piece construction with the contact unit. Only non-lighted models are available.

# Ordering Information

## ■ List of Models

| Illumination | Rated voltage | Pushbutton color | Pushbutton size | Terminal | Contact | Model |
|---|---|---|---|---|---|---|
| LED | 24 VDC | Red | 30 dia. | Solder terminal | SPST-NC | A165E-LS-24D-01 |
| | | | | | DPST-NC | A165E-LS-24D-02 |
| Non-lighted | --- | | | | SPST-NC | A165E-S-01 |
| | | | | | DPST-NC | A165E-S-02 |
| LED | 24 VDC | | 40 dia. | | SPST-NC | A165E-LM-24D-01 |
| | | | | | DPST-NC | A165E-LM-24D-02 |
| Non-lighted | --- | | | | SPST-NC | A165E-M-01 |
| | | | | | DPST-NC | A165E-M-02 |
| | | | 30 dia. | | TPST-NC | A165E-M-03U |
| | | | 40 dia. | | | A165E-S-03U |

**Note:** The above models have a surface indication of “RESET.” Models with “STOP” indication are also available. For further information, contact your OMRON representative.

## ■ Individual Parts (for Switches with Separate Construction)

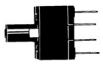
### Operation Units

| Appearance | Illumination | Model |
|---|---|---|
| 30 dia. | Non-lighted | A165E-S |
| | Lighted | A165E-LS |
| 40 dia. | Non-lighted | A165E-M |
| | Lighted | A165E-LM |

### Lamps

| Appearance | LED color | | Rated voltage | Model |
|---|---|---|---|---|
| | Red | Standard | 5 VDC | A16-5DR |
| | | | 12 VDC | A16-12DR |
| | | | 24 VDC | A16-24DR |
| | | Bright | 5 VDC | A16-5DSR |
| | | | 12 VDC | A16-12DSR |
| | | | 24 VDC | A16-24DSR |

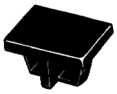
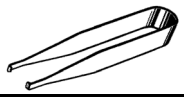
### Sockets

| Appearance | Illumination | Contact form | Model |
|---|---|---|---|
|  | Non-lighted | SPST-NC | A165E-01 |
| | | DPST-NC | A165E-02 |
| | Lighted | SPST-NC | A165E-01L |
| | | DPST-NC | A165E-02L |

### Socket Units

| Appearance | Illumination | Contact form | Model |
|---|---|---|---|
| | Lighted | SPST-NC | A165E-R-24D-01 |
| | | DPST-NC | A165E-R-24D-02 |

## ■ Accessories (Order Separately)

| Item | Appearance | Type | Model | Precautions |
|---|---|---|---|---|
| Yellow Plate | | Yellow, 45 dia. | A16Z-5070 | Use this as an emergency stop name-plate. |
| Panel Plug |  | Rectangular | A16ZJ-3003 | Used for covering the panel cutouts for future panel expansion.<br>Degree of protection: IP40<br>Color: Black |
| | | Square | A16ZA-3003 | |
| | | Round | A16ZT-3003 | |
| Tightening Tool | | --- | A16Z-3004 | Useful for repetitive mounting. Be careful not to tighten excessively. |
| Extractor |  | | A16Z-5080 | Convenient for extracting the Switch and Lamp. |

# Specifications

## ■ Certified Standards

| Certification body | Standards | File No. |
|---|---|---|
| UL, cUL (See note.) | UL508, CSA C22.2 No.14 | E41515 |
| TÜV Product Service | EN60947-5-1, EN60947-5-5 | Inquire |
| CQC (CCC) | GB14048.5 | 2003010303070678 |

**Note:** Certification for CSA C22.2 No. 14 is indicated by the c UL us mark.

## ■ Certified Standard Ratings

### UL508, CSA C22.2 No.14, CCC(GB14048.5)

### Models with Separate Construction

| Rated voltage | Resistive load |
|---|---|
| 125 VAC | 5 A |
| 250 VAC | 3 A |
| 30 VDC | 3 A |

### Models with One-piece Construction

| Rated voltage | Resistive load |
|---|---|
| 125 VAC | 1 A |
| 250 VAC | 0.5 A |
| 30 VDC | 1 A |

### TÜV(EN60947-5-1)

### Models with Separate Construction

| Rated voltage | Resistive load |
|---|---|
| 250 VAC | 3 A |
| 30 VDC | 3 A |

### Models with One-piece Construction

| Rated voltage | Resistive load |
|---|---|
| 250 VAC | 0.5 A |
| 30 VDC | 1 A |

# ■ Ratings

## Switch Ratings

| Rated voltage | Resistive load | |
|---|---|---|
| | Models with Separate Construction | Models with One-piece Construction |
| | A165E series | A165E□-U series |
| 125 VAC<br>250 VAC<br>30 VDC | 5 A<br>3 A<br>3 A | 1 A<br>0.5 A<br>1 A |
| Minimum applicable load | 150 mA at 5 VDC | 1 mA at 5 VDC |

## LED Ratings (only for Models with LEDs)

| Rated voltage | Rated current | Operation voltage |
|---|---|---|
| 24 VDC | 10 mA | 24 VDC±5% |

# ■ Characteristics

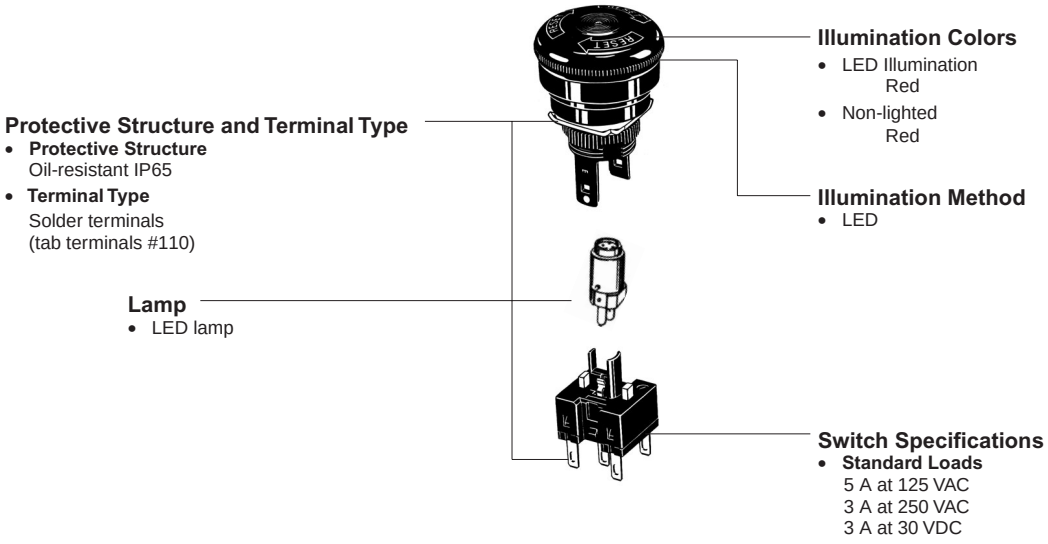
| Item | | Emergency Stop Switch | | |
|---|---|---|---|---|
| | | Non-lighted A165E-S/A165E-M | Lighted A165E-LS/A165-LM | Non-lighted, One-piece construction A165E-U |
| Allowable operating frequency | Mechanical | 20 operations/minute max. | | |
| | Electrical | 10 operations/minute max. | | |
| Insulation resistance | | 100 MΩ min. (at 500 VDC) | | |
| Dielectric strength | | 1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity<br>2,000 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground | | |
| | | 1,000 VAC, 50/60 Hz for 1 min between lamp terminals (See note 1.) | | --- |
| Vibration resistance | Malfunction | 10 to 55 Hz, 1.5-mm double amplitude (malfunction within 1 ms) | | |
| Shock resistance | Destruction | 500 m/s$^2$ | | |
| | Malfunction | 300 m/s$^2$ max.<br>(malfunction within 1 ms) | | 150 m/s$^2$ max.<br>(malfunction within 1 ms) |
| Durability | Mechanical | 100,000 operations min. | | |
| | Electrical | 100,000 operations min. | | |
| Ambient temperature | | Operating: –10°C to 55°C (with no icing or condensation)<br>Storage: –25°C to 65°C (with no icing or condensation) | | |
| Ambient humidity | | Operating: 35% to 85% | | |
| Degree of protection | | IP65 Oil-resistant | IP65 (See note 2.) | IP65 Oil-resistant (See note 2.) |
| Electric shock protection class | | Class II | | |
| PTI (tracking characteristic) | | 175 | | |
| Degree of contamination | | 3 (EN60947-5-1) | | |
| Weight | | Approx. 16 g (in case of DPST-NC Switches) | | |

**Note: 1.** LED not mounted. Test them with the LED removed.
**2.** Degree of protection from the front of the panel.

# ■ Operating Characteristics

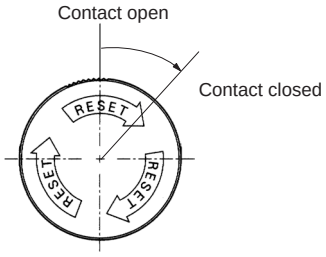
| Features | Characteristics |
|---|---|
| Operating force (OF) max. | 14.7 N |
| Releasing force (RF) min. | 0.1 N·m |
| Pretravel (PT) | 3.5±0.5 mm (3±0.5 mm In case of A165E□-U series) |

# Nomenclature (Models with Separate Construction)



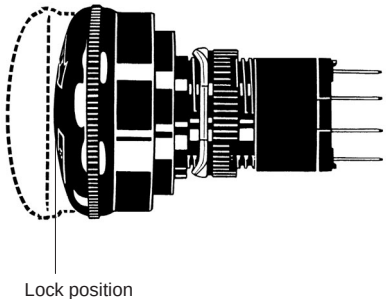

**Note:** A165E Emergency Stop Switch must be ordered as a set.
No LED is installed for the non-lighted models.

## Push-lock, Turn-reset System Prevents Misuse




## Safety Lock Prevents Misuse

Enables emergency stops only when the pushbutton is pressed intentionally and firmly.
Even if an object or person touches the pushbutton by mistake, the contact will not be released unless the pushbutton reaches the lock position.

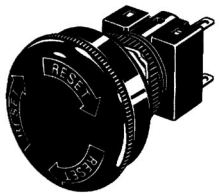


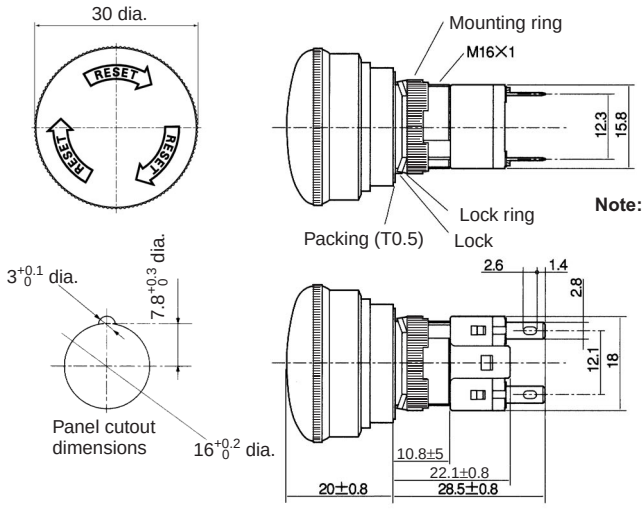
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

## A165E-S

Non-lighted models
30 mm diameter



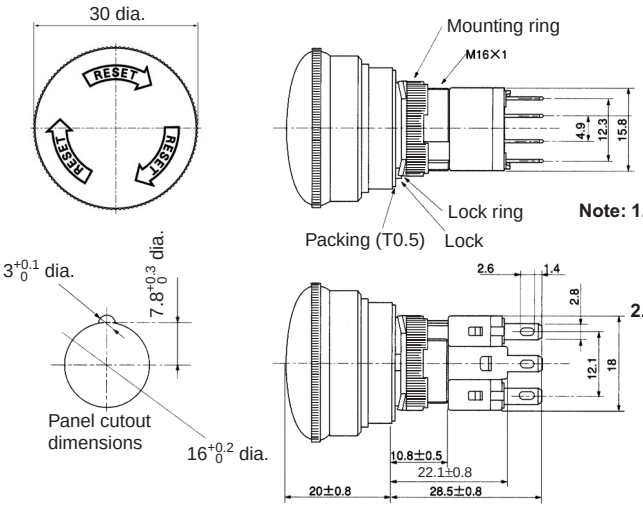



**Note: 1.** When applying a coating such as paint to the panel, dimensions after the coating must satisfy the specified dimensions.

**2.** Recommended panel thickness: 0.5 to 3.2 mm.

## A165E-LS

Lighted models
30 mm diameter

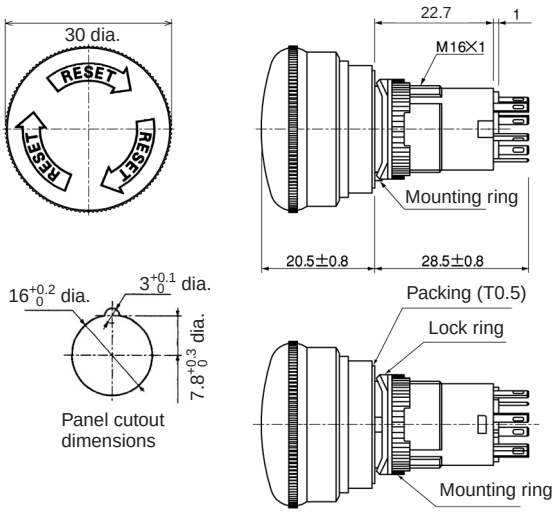



**Note: 1.** When applying a coating such as paint to the panel, dimensions after the coating must satisfy the specified dimensions.

**2.** Recommended panel thickness: 0.5 to 3.2 mm.

## A165E-S-03U

Non-lighted,
one-body models
30 mm diameter

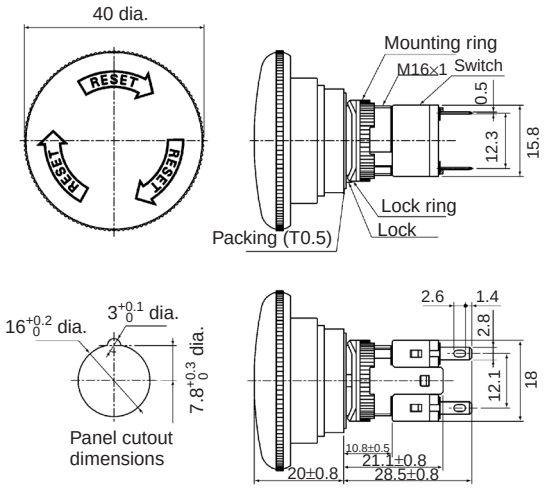



**Note: 1.** When applying a coating such as paint to the panel, dimensions after the coating must satisfy the specified dimensions.

**2.** Recommended panel thickness: 0.5 to 3.2 mm.

## A165E-M

Non-lighted models
40 mm diameter

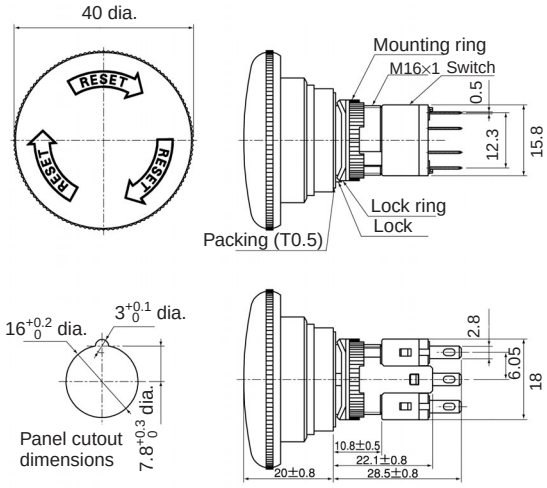



**Note: 1.** When applying a coating such as paint to the panel, dimensions after the coating must satisfy the specified dimensions.

**2.** Recommended panel thickness: 0.5 to 3.2 mm.

## A165E-LM

Lighted models
40 mm diameter

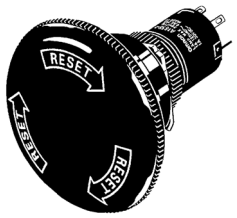


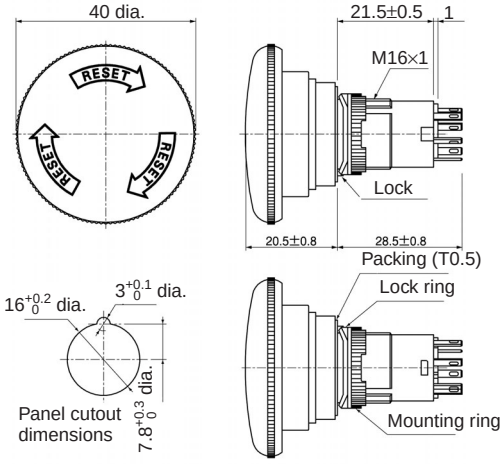

**Note: 1.** When applying a coating such as paint to the panel, dimensions after the coating must satisfy the specified dimensions.

**2.** Recommended panel thickness: 0.5 to 3.2 mm.

## A165E-M-03U

One-body models
40 mm diameter



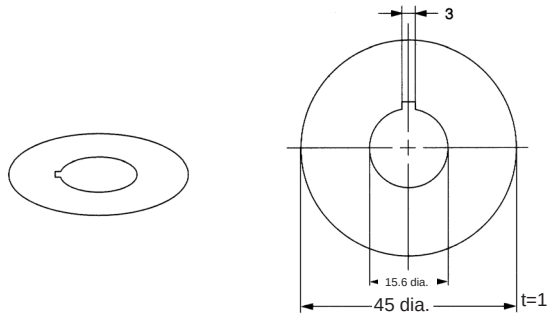

**Note: 1.** When applying a coating such as paint to the panel, dimensions after the coating must satisfy the specified dimensions.

**2.** Recommended panel thickness: 0.5 to 3.2 mm.

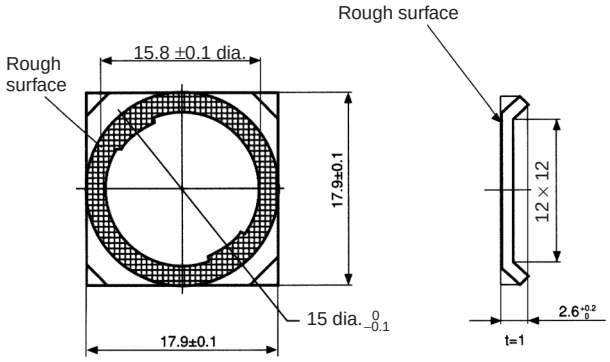
# ■ Accessories

## Yellow Plate (Vinyl Chloride)

**A16Z-5070**

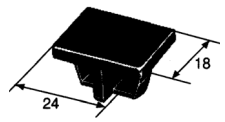
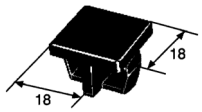
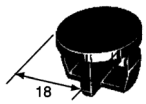



## Lock Ring




## Panel Plugs

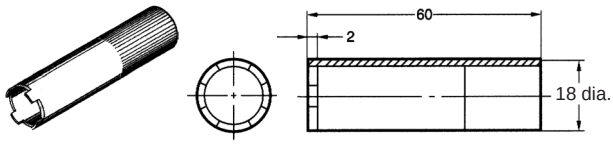
Select an appropriate Panel Plug according to the panel design and mount from the front side of the panel. Panel cutout dimensions are the same as those for the Switch.

| Rectangular | Square | Round |
|---|---|---|
|  |  |  |



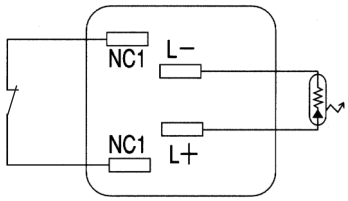
## Screw Fitting

**A16Z-3004**

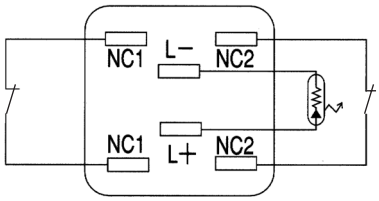



# ■ Terminal Arrangement

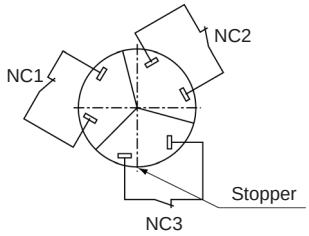
**SPST Switches**




**DPST Switches**




**TPST Switches**




**Note:** The L+ and L– terminals are not available with the non-lighted models.

# Installation

## ■ Mounting to the Panel

After installing the Operation Unit, snap in the Switch from the back of the panel.

### 1. Installing the Switch

Attach rubber packing or the Yellow Plate onto the Switch from its terminal side. Insert the Switch into the panel from the front. Install the lock ring and mounting nut from the terminal side and tighten.

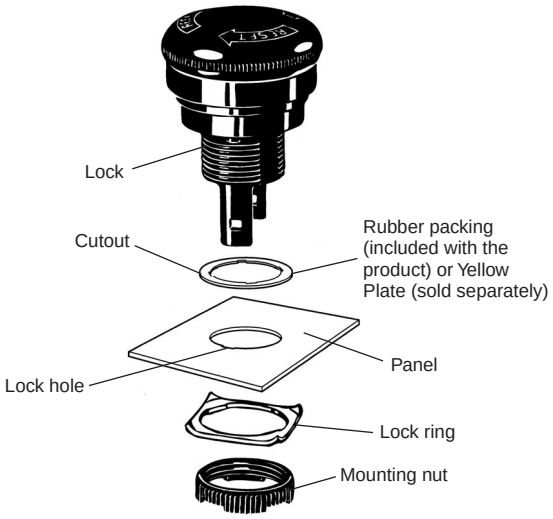
Adjust the slits on the hole of rubber packing and Yellow Plate to the protruding part of the Unit.

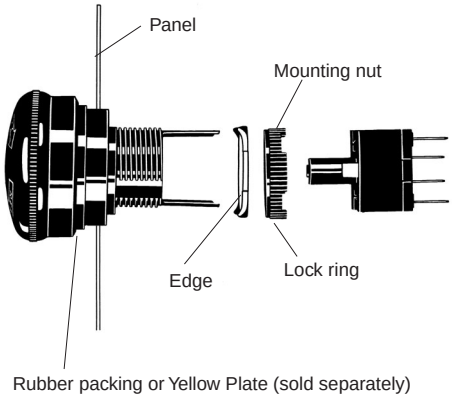
Rubber packing is not necessary when the Yellow Plate is used.

Tighten the nut to the torque of 0.29 to 0.49 N·m.

Casing should be installed with its protruding part adjusted to the slit of the panel hole.

Align the lock ring to the groove of the casing so that the edge is drawn to the panel side.

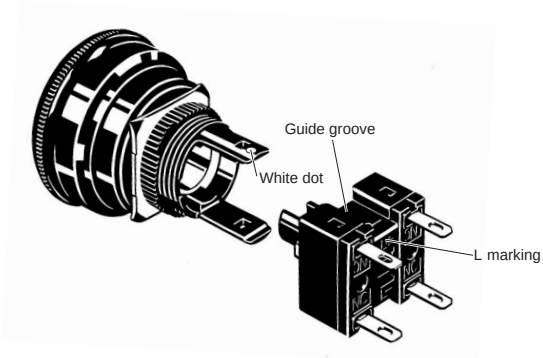



### 2. Mounting the Switch

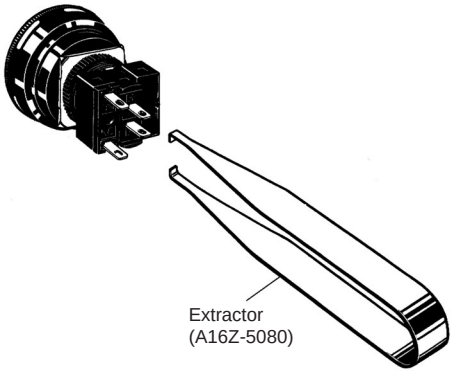
Snap on the Switch to the Operation Unit.

Make sure that the Switch has the correct orientation when snapping it onto the Operation Unit. Align the white dot on the Operation Unit with the guide groove on the side of the Switch marked with an “L” as shown below, and push the Switch into the Operation Unit until it clicks into place. Confirm that the Switch is securely in place before using.



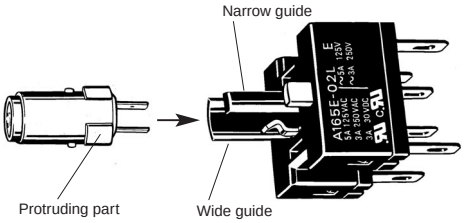

### 3. Removing the Switch

Insert the prongs of the A16Z-5080 Extractor between the Switch and the Operation Unit, grip the Switch, and pull to remove.




### 4. Installing the LED Lamp

When mounting the Lamp, make sure it is facing the direction shown in the following diagram. Insert the Lamp while matching the protruding part of the Lamp and the small guides on the outer surface of the casing.



# Safety Precautions

Refer to the *Common Precautions* for Pushbutton Switches on page 14.

## ■ Precautions for Correct Use

### Mounting

Always make sure that the power is turned OFF before mounting, removing, or wiring the Switch, or performing maintenance. Electrical shock or fire may result if the power is not turned OFF.

The tightening torque is 0.29 to 0.49 N·m.

### Wiring

Be sure to use electrical wires that are a size appropriate for the applied voltage and carry current. Perform soldering according to the conditions given below. If the soldering is not properly performed, abnormal heating may result, possibly resulting in fire.

1. Hand soldering: 30 W, within 5 s
2. Dip soldering: 240°C, within 3 s

Wait for one minute after soldering before exerting any external force on the solder.

Use non-corrosive resin fluid as the flux.

Make sure that the electric cord is wired so that it does not touch the Unit. If the electric cord will touch the Unit, then electric wires with a heat resistance of 100°C min. must be used.

After wiring the Switch, maintain an appropriate clearance and creepage distance.

### Operating Environment

The IP65 model is designed with a degree of protection so that it will not sustain damage if it is subjected to water from any direction to the front of the panel.

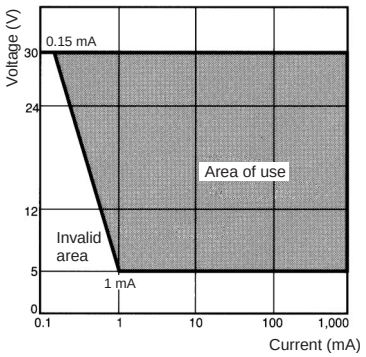
### Using the Microload

Insert a contact protection circuit, if necessary, to prevent the reduction of life expectancy due to extreme wear on the contacts caused by loads where inrush current occurs when the contact is opened and closed.

The A165E-□U allows both a standard load (125 V at 1 A, 250 V at 0.5 A) and a microload. If a standard load is applied, however, the microload area cannot be used. If the microload area is used with a standard load, the contact surface will become rough, and the opening and closing of the contact for a microload may become unreliable.

The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ 60) (conforming to JIS C5003).

The equation, $\lambda 60 = 0.5 \times 10^{-6}$/time indicates that the estimated malfunction rate is less than 1/2,000,000 with a reliability level of 60%.




### LEDs

The LED current-limiting resistor is built-in, so internal resistance is not required.

| Rated voltage | Internal limiting resistor |
|---|---|
| 24 VDC | 2000 Ω |

### Operating Torque

Do not exceed an operating torque of 0.49 N·m in the direction of rotation.

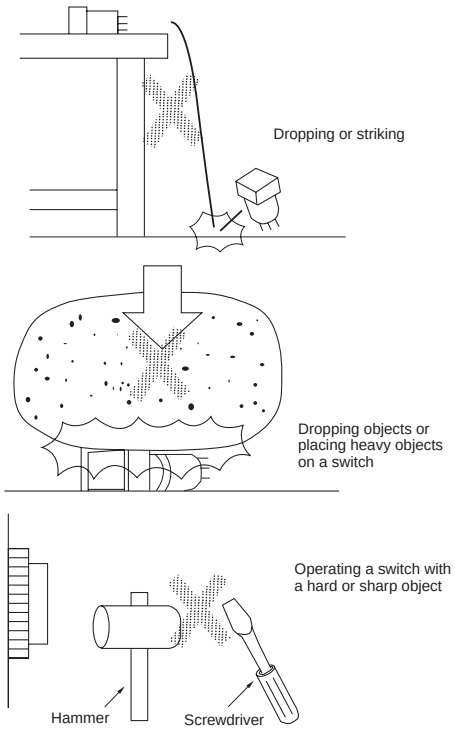
Do not pull the operating button or apply excessive force to any side of the button. Otherwise it may be damaged.

### Others

The oil-resistant IP65 uses NBR rubber and is resistant to general cutting oil and cooling oil. Some particular oils cannot be used with the oil-resistant IP65, however, so contact your OMRON representative for details.

When painting or coating the panel, make sure that the specified panel dimensions apply to the panel after painting or coating.

Due to the structure of the switch, severe shock or vibration may cause malfunctions or damage to the switch. Also, most switches are made from resin and will be damaged if they come into contact with sharp objects. Particularly scratches on the Operation Unit may create visual and operational obtrusions. Handle the switches with care, and do not throw or drop them.




ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

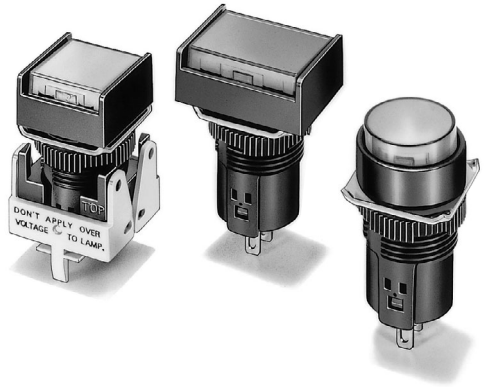
Cat. No. A120-E1-06

In the interest of product improvement, specifications are subject to change without notice.

# Indicator
# M16

## Cylindrical 16-dia. Indicator

- Same basic design as the A16 Pushbutton Switch.
- UL and cUL approved (File No. E41515).




# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

The model numbers used to order sets of Units are illustrated below. One set comprises the Display, Case, Lamp, and Socket.

(1) (2) (3) (4) (5)

**M 1 6 5 - T R - 24D - S**

**(5) Terminal Type**

| Symbol | Terminal type |
|---|---|
| No symbol | Solder terminals |
| S | Screw-Less Clamp |

**(1) Degree of Protection**

| Symbol | Protection |
|---|---|
| No symbol | IP40 |
| 5 | IP65 oil-resistant |

**(2) Shape of Display**

| Symbol | Shape |
|---|---|
| J | Rectangular |
| A | Square |
| T | Round |

**(3) Color of Display**

| Symbol | Color |
|---|---|
| R | Red |
| G | Green |
| Y | Yellow |
| PY | Pure yellow |
| W | White |
| A | Blue |

**(4) Light Source**

| Symbol | Type | Operating voltage | Rated voltage |
|---|---|---|---|
| 5 | Incandescent lamp | 5 VAC/VDC | 6 VAC/VDC |
| 12 | | 12 VAC/VDC | 14 VAC/VDC |
| 24 | | 24 VAC/VDC | 28 VAC/VDC |
| 5D | LED | 5 ±5% VDC | 5 VDC |
| 12D | | 12 ±5% VDC | 12 VDC |
| 24D | | 24 ±5% VDC | 24 VDC |

**Voltage Reduction Unit (24-V Built-in LED)**

| Symbol | Type | Operating voltage | Rated voltage |
|---|---|---|---|
| T1 | LED | 90 to 121 VAC/VDC | 110 VAC/VDC |
| T2 | | 180 to 242 VAC/VDC | 220 VAC/VDC |

Solder terminals are available only with 100-V models.

# Ordering Information

## ■ List of Models

### Ordering as a Set

The model numbers used to order sets of Units are given in the following tables. One set comprises the Display, Case, Lamp, and Socket.

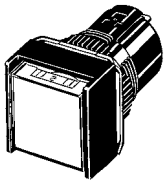
### M16□-J (Rectangular) Models

**Solder Terminal Models**

| Appearance | Lighting | Operating voltage | IP40 | IP65 oil-resistant | Display color symbol (See note.) |
|---|---|---|---|---|---|
| | LED without Voltage Reduction Unit | 5 VDC | M16-J□-5D | M165-J□-5D | R: red<br>Y: yellow<br>G: green<br>A: blue<br>W: white<br>PY: Pure yellow |
| | | 12 VDC | M16-J□-12D | M165-J□-12D | |
| | | 24 VDC | M16-J□-24D | M165-J□-24D | |
| | Incandescent lamp | 5 VDC/VAC | M16-J□-5 | M165-J□-5 | |
| | | 12 VDC/VAC | M16-J□-12 | M165-J□-12 | |
| | | 24 VDC/VAC | M16-J□-24 | M165-J□-24 | |

### M16□-A (Square) Models

**Solder Terminal Models**

| Appearance | Lighting | Operating voltage | IP40 | IP65 oil-resistant | Display color symbol (See note.) |
|---|---|---|---|---|---|
|  | LED without Voltage Reduction Unit | 5 VDC | M16-A□-5D | M165-A□-5D | R: red<br>Y: yellow<br>G: green<br>A: blue<br>W: white<br>PY: Pure yellow |
| | | 12 VDC | M16-A□-12D | M165-A□-12D | |
| | | 24 VDC | M16-A□-24D | M165-A□-24D | |
| | Incandescent lamp | 5 VDC/VAC | M16-A□-5 | M165-A□-5 | |
| | | 12 VDC/VAC | M16-A□-12 | M165-A□-12 | |
| | | 24 VDC/VAC | M16-A□-24 | M165-A□-24 | |

### M16□-T (Round) Models

**Solder Terminal Models**

| Appearance | Lighting | Operating voltage | IP40 | IP65 oil-resistant | Display color symbol (See note.) |
|---|---|---|---|---|---|
| | LED without Voltage Reduction Unit | 5 VDC | M16-T□-5D | M165-T□-5D | R: red<br>Y: yellow<br>G: green<br>A: blue<br>W: white<br>PY: Pure yellow |
| | | 12 VDC | M16-T□-12D | M165-T□-12D | |
| | | 24 VDC | M16-T□-24D | M165-T□-24D | |
| | Incandescent lamp | 5 VDC/VAC | M16-T□-5 | M165-T□-5 | |
| | | 12 VDC/VAC | M16-T□-12 | M165-T□-12 | |
| | | 24 VDC/VAC | M16-T□-24 | M165-T□-24 | |

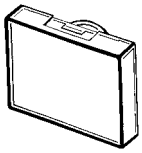
**Note:** Enter the desired color symbol for the Display in □.

## Ordering Individually

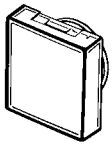
Displays, Cases, Lamps, and Sockets can be ordered separately. Combinations that are not available as sets can be created using individual parts. Also, store the parts as spares for maintenance and repairs.

**Display (Refer to page 125.)**

**Rectangular**



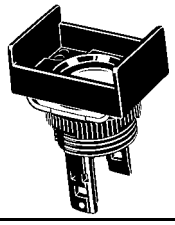
**Square**



**Round**

**Note:** Use IP40 Displays in combination with IP40 Sockets and use IP65 Displays in combination with IP65 Sockets.

**Case (Refer to page 125.)**

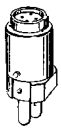


**Note:** Display Units, which are combinations of Displays and Cases, are also available.

Lighted Models

**Lamp (Refer to page 125.)**

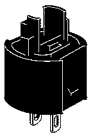
**LED**



**Incandescent Lamp**

**Socket (Refer to page 126.)**

**Solder Terminals**
**(Without Voltage Reduction Unit)**



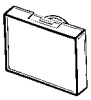
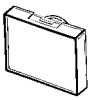
**Note:** Socket Units, which are combinations of Lamps and Sockets, are also available.

## Display

### For LED-lighted Models

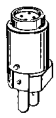
| Sealing / Appearance / Color of Display | IP40 | | | IP65 oil-resistant | | |
|---|---|---|---|---|---|---|
| | Rectangular | Square | Round | Rectangular | Square | Round |
| Red | A16L-JR | A16L-AR | A16L-TR | A165L-JR | A165L-AR | A165L-TR |
| Yellow | A16L-JY | A16L-AY | A16L-TY | A165L-JY | A165L-AY | A165L-TY |
| Pure yellow | A16L-JPY | A16L-APY | A16L-TPY | A165L-JPY | A165L-APY | A165L-TPY |
| Green | A16L-JGY | A16L-AGY | A16L-TGY | A165L-JGY | A165L-AGY | A165L-TGY |
| White | A16L-JW | A16L-AW | A16L-TW | A165L-JW | A165L-AW | A165L-TW |
| Blue | A16L-JA | A16L-AA | A16L-TA | A165L-JA | A165L-AA | A165L-TA |

### Incandescent Lamps (With the exception of green, the Units are the same as for LEDs.)

| Sealing / Appearance / Color of Display | IP40 | | | IP65 oil-resistant | | |
|---|---|---|---|---|---|---|
| | Rectangular  | Square | Round | Rectangular  | Square | Round |
| Red | A16L-JR | A16L-AR | A16L-TR | A165L-JR | A165L-AR | A165L-TR |
| Yellow | A16L-JY | A16L-AY | A16L-TY | A165L-JY | A165L-AY | A165L-TY |
| Pure yellow | A16L-JPY | A16L-APY | A16L-TPY | A165L-JPY | A165L-APY | A165L-TPY |
| Green | A16L-JG | A16L-AG | A16L-TG | A165L-JG | A165L-AG | A165L-TG |
| White | A16L-JW | A16L-AW | A16L-TW | A165L-JW | A165L-AW | A165L-TW |
| Blue | A16L-JA | A16L-AA | A16L-TA | A165L-JA | A165L-AA | A165L-TA |

## Lamp

### LED

| | Color | Operating voltage | | |
|---|---|---|---|---|
| | | 5 VDC | 12 VDC | 24 VDC |
|  | Red | A16-5DSR | A16-12DSR | A16-24DSR |
| | Yellow | A16-5DSY | A16-12DSY | A16-24DSY |
| | Green | A16-5DSG | A16-12DSG | A16-24DSG |
| | White (See note.) | A16-5DSW | A16-12DSW | A16-24DSW |
| | Blue | A16-5DA | A16-12DA | A16-24DA |

**Note:** Use the white LED when the required illumination color is white or pure yellow.

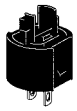
### Incandescent Lamp

| | Operating voltage | 5 VAC/VDC | 12 VAC/VDC | 24 VAC/VDC |
|---|---|---|---|---|
| | **Model** | A16-5 | A16-12 | A16-24 |

## Case

| Appearance | Classification | | Model number |
|---|---|---|---|
| | IP40 | Rectangular | A16-CJM |
| | | Square | A16-CAM |
| | | Round | A16-CTM |
| | IP65 oil-resistant | Rectangular | A165-CJM |
| | | Square | A165-CAM |
| | | Round | A165-CTM |

### Socket

| Appearance | Classification | | | Model number |
|---|---|---|---|---|
|  Solder terminals | Solder terminals | | | M16-0 |
| | PCB terminals | | | M16-0P |
| | Screw-Less Clamp | | | M16-S |
| | Solder terminals | Voltage-reduction lighting | 100 V | M16-T1 |
| | Screw-Less Clamp | | 100 V | M16-T1-S |
| | | | 200 V | M16-T2-S |

# Specifications

## ■ Approved Standards

| Agency | Standards | File No. |
|---|---|---|
| UL, cUL (See note.) | UL508 | E41515 |

**Note:** cUL: CSA, C22.2 No. 14

## ■ Ratings

### Super-bright LED

| Rated voltage | Rated current | Operating voltage | Built-in limiting resistance |
|---|---|---|---|
| 5 VDC | 30 mA (red: 15 mA) | 5 VDC ±5% | 33 Ω (blue: 51 Ω, red: 68 Ω) |
| 12 VDC | 15 mA | 12 VDC ±5% | 270 Ω (blue: 270 Ω, red 560 Ω) |
| 24 VDC | 10 mA | 24 VDC ±5% | 1,600 Ω (blue: 1.8 kΩ, red: 2 kΩ) |

**Note:** The values in parentheses are for blue or red Pushbuttons.

### Incandescent Lamp

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 6 VAC/VDC | 60 mA | 5 VAC/VDC |
| 14 VAC/VDC | 40 mA | 12 VAC/VDC |
| 28 VAC/VDC | 24 mA | 24 VAC/VDC |

### Neon Lamp

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 110 VAC | 1.5 mA | 100 VAC ±10% |
| 220 VAC | 1.5 mA | 200 VAC ±10% |

## ■ Characteristics

| | |
|---|---|
| Ambient operating temperature | –10°C to 55°C (with no icing or condensation) |
| Ambient operating humidity | 35% to 85% |
| Ambient storage temperature | –25°C to 65°C |

**Note:** Characteristics not provided above are the same as those for the A16.

### Screw-less Clamp

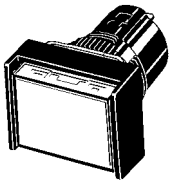
| Item | | Screw-less Clamp | | | |
|---|---|---|---|---|---|
| Recommended wire size | | 0.5 $mm^2$ twisted wire or 0.8 mm-dia. solid wire | | | |
| Usable wires and tensile strength | Twisted wire | 0.3 $mm^2$ | 0.5 $mm^2$ | 0.75 $mm^2$ | 1.25 $mm^2$ |
| | Solid wire | 0.5 mm dia. | 0.8 mm dia. | 1.0 mm dia. | --- |
| | Tensile strength | 10 N | 20 N | 30 N | 40 N |
| Length of exposed wire | | 10 ±1 mm | | | |

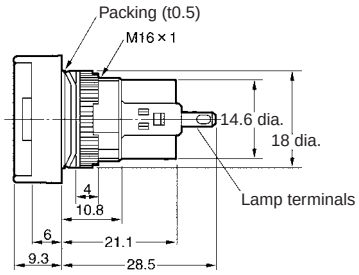
# Dimensions

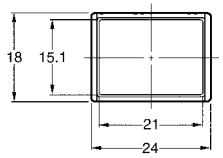
**Note: 1.** All units are in millimeters unless otherwise indicated.
**2.** Refer to page 129 for details of panel cutout dimensions.

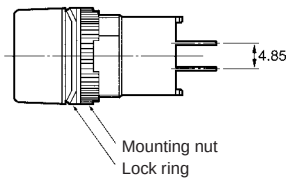
## Rectangular
### M16-J

Solder terminals



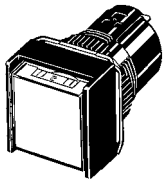


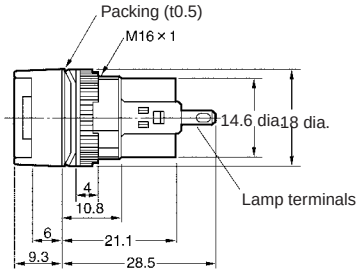



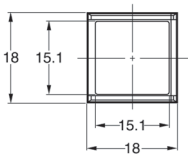



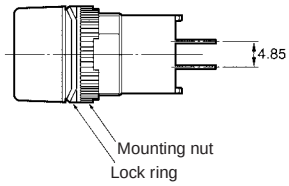

## Square
### M16-A

Solder terminals



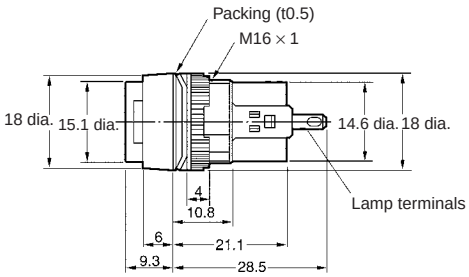


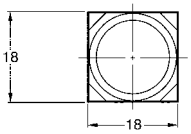



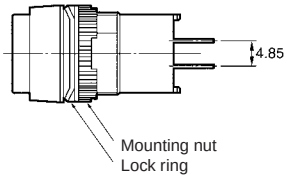




## Round
### M16-T

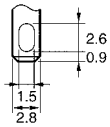
Solder terminals

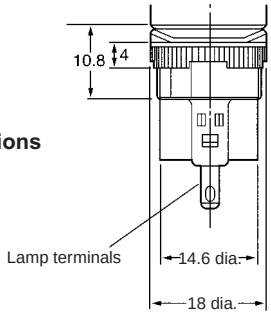



### Terminal Hole Dimensions

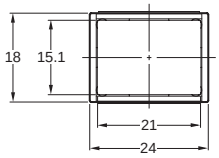


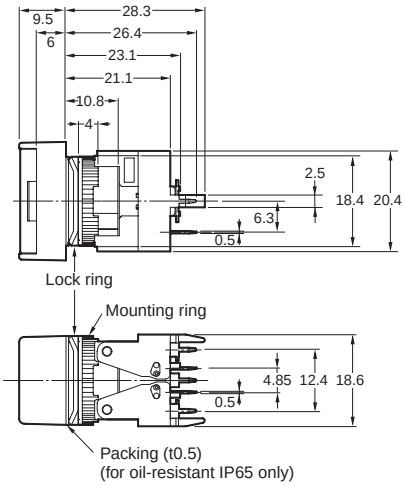



## Rectangular
### M16□-P

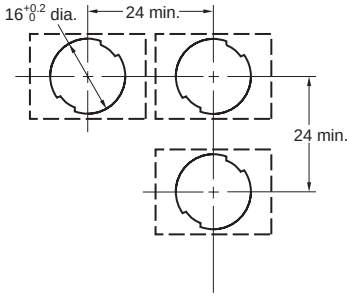
PCB terminals

The rectangular model is given here as a representative example.
Lamp terminals are provided even for non-lighting applications.



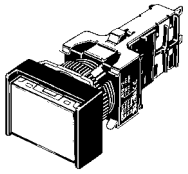

**Panel Cutouts**

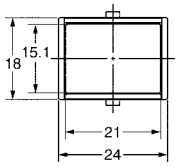


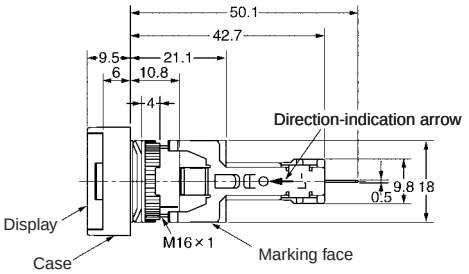

Recommended panel thickness: 0.5 to 3.2 mm

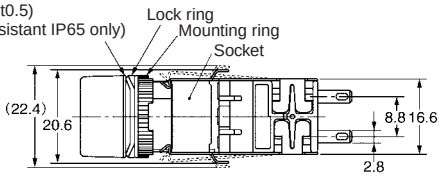
## Rectangular
### M16□-T1, T2

Voltage-reduction lighting,
solder terminals

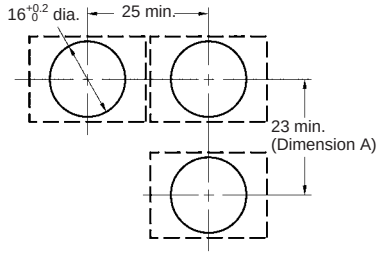




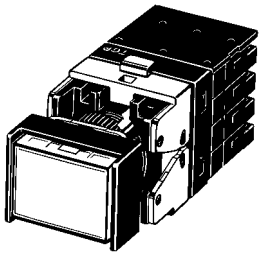

**Panel Cutouts**

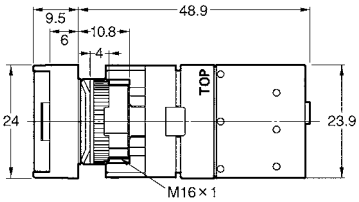


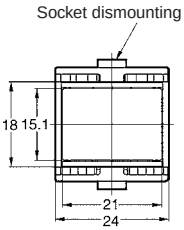

Recommended panel thickness: 0.5 to 3.2 mm

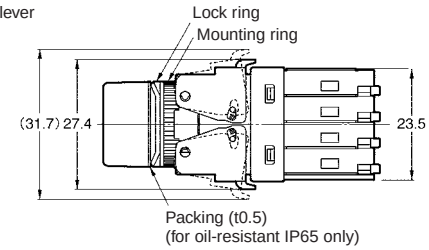
## Rectangular
### M16□-S

Screw-Less Clamp





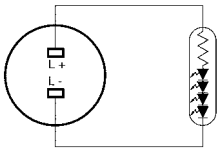



## ■ Terminal Arrangement

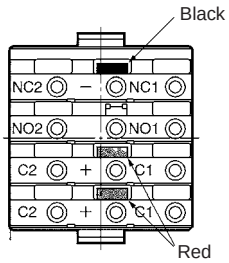
**Solder Terminals**

**Bottom View**

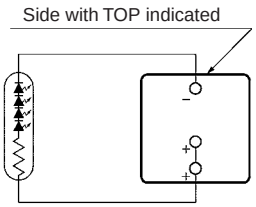



**Note:** The L+ is not shown on the Socket Unit.

**Screw-Less Clamp**

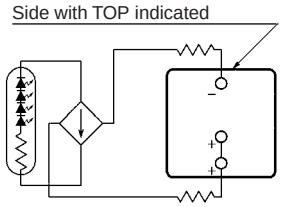



**Bottom View**




**Voltage-reduction Lighting**

**Bottom View**




**Note:** Voltage-reduction lighting models with Screw-Less Clamps (A16L-□T1-2S, A16L-□T2-2S) incorporate voltage-reduction circuits.

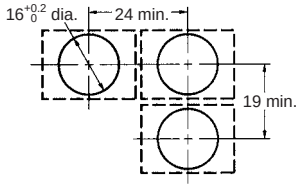
## ■ Panel Cutouts

### Solder Terminals

**Solder Terminals**

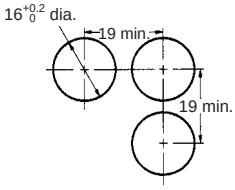
**Rectangular M16□-J**

**(Top View)**




**Square M16□-A**
**Round M16□-T**

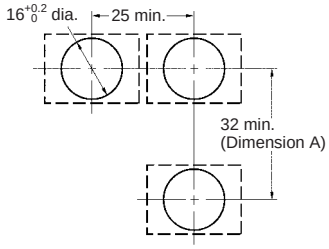
**(Top View)**




**Screw-Less Clamp**

**Rectangular**
**M16□-S**

**(Top View)**




**Note: 1.** Make sure the thickness of the mounting panel is 0.5 to 3.2 mm. If, however, a Switch Guard or Dust Cover is used, the thickness of the mounting panel must be 0.5 to 2 mm.

**2.** If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after coating.

# Installation

Refer to the *Installation* section for the A16.

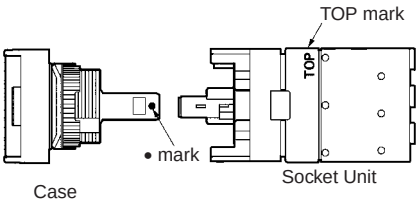
# Precautions

Refer to the *Technical Information for Pushbutton Switches* (Cat. No. A143) and the *Precautions* section for the A16.

## ■ Correct Use

### Mounting

When mounting the Case onto the Socket Unit, ensure that the orientation is correct. Perform mounting with the • mark on the Case and the TOP mark on the Socket Unit facing in the same direction.




### Wiring

When using stranded wire, gather the ends of the strands together before wiring.

When wiring, insert the wire until it comes into contact with something. After wiring is completed, pull on the wires to confirm that they are connected securely.

After wiring, ensure that continuous pressure is not applied to the terminals.

Refer to internal connections diagrams and confirm the terminal numbers before performing wiring.

### Screw-Less Clamps

#### Mounting Procedure

1. Strip a length of 10 mm off the end of the wire (allowable range: 10±1 mm).
2. Bunch wire strands together and straighten them.
3. Insert the wire into the insertion hole while pressing the release button at the side of the hole. (Using a precision screwdriver is recommended.)
4. Let go of the release button to lock the wire into place.
5. After locking, pull on the wire gently to confirm that it is securely locked.

#### Removing Procedure

Remove wires by pulling them while pressing the release button.

**Note:** When reusing wires that have already been locked, cut off the end of the wire and strip the wire again before using.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A127-E1-03

In the interest of product improvement, specifications are subject to change without notice.

OMRON

# Buzzer

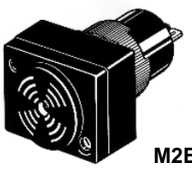
# M2BJ-B

## 16-mm Diameter Panel-Mounted Buzzer Unit

- Four models offer eight different types of sounds, plus two modes newly added to the high-sound models
- Intermittent or continuous sound selected by jumper setting
- Three supply voltages: 6 VAC/VDC and 12 to 24 VAC/VDC
- Jumper storage provided at bottom of Unit
- Complements the A16 range of Pushbuttons, Selector Switches, and Key Switches.

# Ordering Information

## ■ List of Models

| Item | | Standard sound M2BJ-B | | | | High sound  M2BJ-BH | |
|---|---|---|---|---|---|---|---|
| **Sound** | **w/jumper** | Intermittent | Intermittent (short) | Intermittent (high-pitched) | Intermittent (short, high-pitched) | Intermittent (high-pitched) | Intermittent (short) |
| | **w/o jumper** | Continuous | Intermittent (long) | Continuous (high-pitched) | Intermittent (long, high-pitched) | Continuous | Intermittent (long) |
| **Supply voltage** | **6 VAC/VDC** | M2BJ-B06 | M2BJ-B06A | M2BJ-B06B | M2BJ-B06C | M2BJ-BH06D | M2BJ-BH06E |
| | **12 to 24 VAC/VDC** | M2BJ-B24 | M2BJ-B24A | M2BJ-B24B | M2BJ-B24C | M2BJ-BH24D | M2BJ-BH24E |
| | **12 to 24 VDC** | M2BJ-B24-D | --- | M2BJ-B24B-D | --- | M2BJ-BH24D-D | M2BJ-BH24E-D |

**Note:** High-sound models incorporate an LED, which lights when the Buzzer sounds.

# Specifications

## ■ Standard-sound Models

### 6-V Models

| Model | | M2BJ-B06 | M2BJ-B06A | M2BJ-B06B | M2BJ-B06C |
|---|---|---|---|---|---|
| Rated voltage | | 6 VAC/VDC | | | |
| Sound pressure (See note.) | | Continuous sound: 80 dB (phons) min. | | | |
| Driving frequency | | 2±0.5 kHz | | 4±0.5 kHz | |
| Intervals | | 190 times/minute±10% | Long:<br>55 times/minute±10%<br>Short:<br>700 times/minute±10% | 190 times/minute±10% | Long:<br>55 times/minute±10%<br>Short:<br>700 times/minute±10% |
| Current consumption | DC | 7 mA max. | | 20 mA max. | |
| | AC | 20 mA max. | | | |
| Inrush current | | 1 A max. | | | |
| Life expectancy | | 1,000 hours min. | | | |
| Insulation resistance | | 100 MΩ min. (between ground and current-carrying parts) | | | |
| Dielectric strength | | 1,000 VAC for 1 minute (between grounds) | | | |
| Ambient temperature | | Operating: –10°C to 55°C (no icing or condensation)<br>Storage: –25°C to 65°C (no icing or condensation) | | | |
| Humidity | | 35% to 85% | | | |
| Weight | | Approx. 9 g | | | |

**Note:** The figure for sound pressure given above is for measurement at a distance of 0.1 m at the rated voltage.

### 12 to 24-V Models

| Model | | M2BJ-B24 | M2BJ-B24A | M2BJ-B24B | M2BJ-B24C | M2BJ-B24-D | M2BJ-B24B-D |
|---|---|---|---|---|---|---|---|
| Rated voltage | | 12 to 24 VAC/VDC | | | | 12 to 24 VDC | |
| Sound pressure (See note.) | | Continuous sound: 80 dB (phons) min. | | | | | |
| Driving frequency | | 2±0.5 kHz | | 4±0.5 kHz | | 2±0.5 kHz, 4±0.5 kHz | |
| Intervals | | 190 times/minute ±10% | Long:<br>55 times/minute± 10%<br>Short:<br>700 times/minute ±10% | 190 times/minute ±10% | Long:<br>55 times/minute± 10%<br>Short:<br>700 times/minute ±10% | 190 times/minute±10% | |
| Current consumption | DC | 7 mA max. | | 20 mA max. | | 7 mA max. | 20 mA max. |
| | AC | 20 mA | | | | --- | |
| Inrush current | | 1 A max. | | | | --- | |
| Life expectancy | | 1,000 hours min. | | | | | |
| Insulation resistance | | 100 MΩ min. (between ground and current-carrying parts) | | | | | |
| Dielectric strength | | 1,000 VAC for 1 minute (between grounds) | | | | | |
| Ambient temperature | | Operating: –10°C to 55°C (no icing or condensation)<br>Storage: –25°C to 65°C (no icing or condensation) | | | | | |
| Humidity | | 35% to 85% | | | | | |
| Weight | | Approx. 9 g | | | | | |

**Note:** The figure for sound pressure given above is for measurement at a distance of 0.1 m at the rated voltage.

## ■ High-sound Models (LED is incorporated)

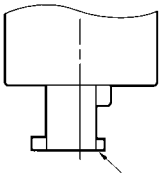
| Model | | M2BJ-BH06D | M2BJ-BH24D | M2BJ-BH06E | M2BJ-BH24E | M2BJ-BH24D-D | M2BJ-BH24E-D |
|---|---|---|---|---|---|---|---|
| Rated voltage | | 6 VAC/VDC | 12 to 24 VAC/VDC | 6 VAC/VDC | 12 to 24 VAC/VDC | 12 to 24 VDC | |
| Sound pressure (See note.) | | 70 to 100 dB (phons) | | | | | |
| Driving frequency | | 2.8±0.5 kHz | | | | | |
| Intervals | | Approx. 190 times/min. | | Long: Approx. 55 times/min. Short: Approx. 700 times/min. | | Approx. 190 times/min. | Long: Approx. 55 times/min. Short: Approx. 700 times/min. |
| Current consumption | DC | 50 mA max. | | | | | |
| | AC | 100 mA max. | | | | --- | |
| Inrush current | | 1 A max. | | | | --- | |
| Life expectancy | | 1,000 hours min. | | | | | |
| Insulation resistance | | 100 MΩ min. (between ground and current-carrying parts) | | | | | |
| Dielectric strength | | 1,000 VAC for 1 minute (between grounds) | | | | | |
| Ambient temperature | | Operating: –10°C to 55°C (no icing or condensation)<br>Storage: –25°C to 65°C (no icing or condensation) | | | | | |
| Humidity | | 35% to 85% | | | | | |
| Weight | | Approx. 13 g | | | | | |

**Note:** The sound pressure can be adjusted. The figure for sound pressure given above is for measurement at a distance of 0.1 m at the rated voltage.

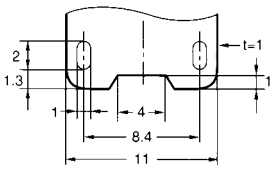
# Operation

## ■ Contact Form

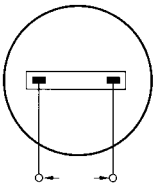
**All Models**
**(Standard and High-sound Models)**




**Terminal Hole Dimensions**




**Terminal Arrangement**
**(Bottom view)**

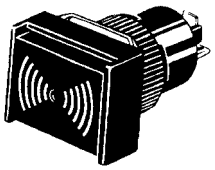


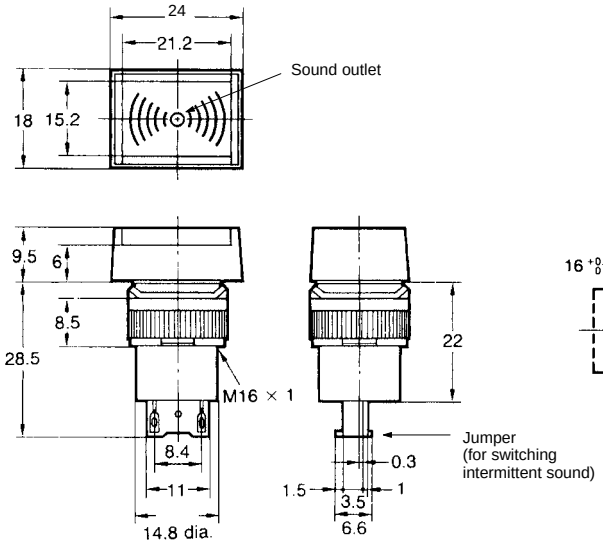

**Note:** There is no +/– polarity.

# Dimensions

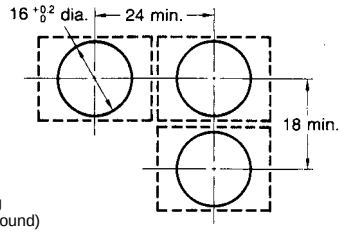
**Note:** All units are in millimeters unless otherwise indicated.

### M2BJ-B
### Standard-sound Models

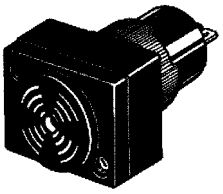


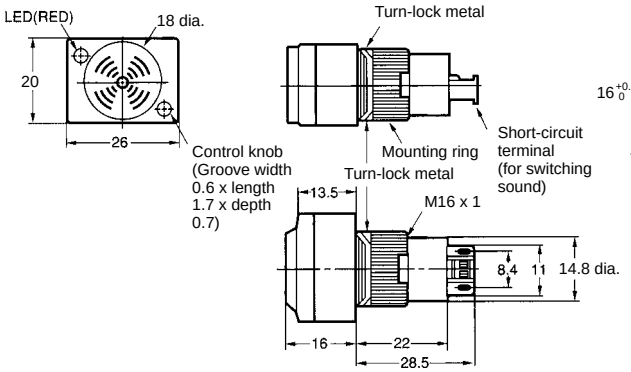



**Panel cutout (Top view)**

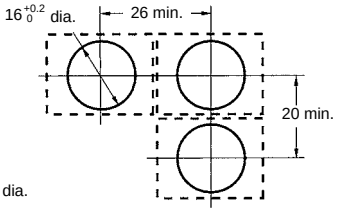



### M2BJ-BH
### High-sound Models





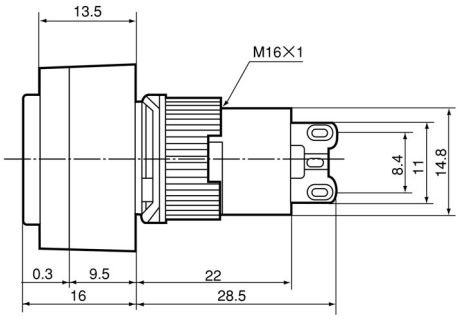

**Panel cutout (Top view)**

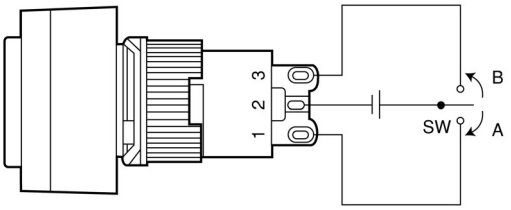



**Note:** Recommended panel thickness: 1.0 to 3.2 mm.

### M2BJ-BH24D-DA
### External Signal Selection Model

An external signal selection model is also available. With this model, it is possible to switch between continuous and intermittent sound using an external signal instead of the jumper.




SW:
When A direction is ON (terminals 1, 2 ON): intermittent sound
When B direction is ON (terminals 2, 3 ON): continuous sound

**Note:** Ensure that voltage is not applied simultaneously between terminals 1, 2, and 3.

# Precautions

## ■ Correct Use

### Application Precautions

When power is supplied, there is an inrush current of up to 1 A. Confirm that this will not adversely affect operation or damage any devices before using the M2BJ in application. There is no inrush current with DC-only models (M2BJ-□□□-D).

### Wiring

Perform soldering promptly and correctly at 30 W within 5 seconds or at a temperature of 240°C within 3 seconds. Wait for one minute after soldering before exerting any external force on the solder.

If flux is required, use non-corrosive rosin liquid. Ensure that the flux does not penetrate the inside of the case.

In order to improve the reliability of the soldering and to prevent pattern burnout, loop the wire through the terminal hole before soldering.

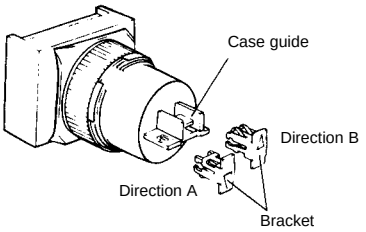
In order to fit the terminal holes, use lead wires with a nominal cross-sectional area of 0.25 $mm^2$ max.

### Operating Environment

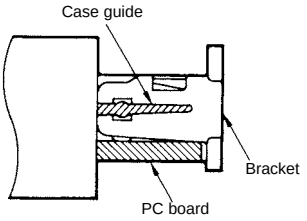
Do not use the Buzzer in environments where foreign substances may enter the sound outlet. Otherwise, the Buzzer may not sound.

### Short-circuiting Jumper (M2BJ-BTH)

The Buzzer sounds continuously or intermittently depending on how the short-circuiting bracket is attached to the case guide. When the bracket is attached with the triangle on it facing direction A (PC board side), the Buzzer sounds intermittently.



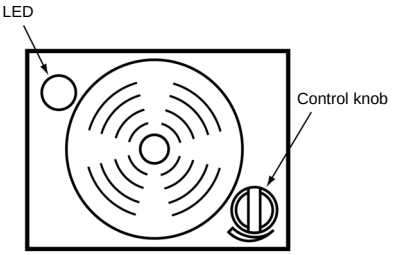

To produce continuous sounds, attach the bracket to the case guide so that the triangle on the bracket faces direction B.




### Volume Adjustment Mechanism (M2BJ-BH Only)

Adjust the volume by turning the control knob on the face of the Buzzer using a screwdriver. Turn to the right to increase the volume and turn to the left to decrease the volume.

Turn the control knob with a torque of 0.98 to 2.94 mN·m.




**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A046-E1-04

# Pushbutton Switch
# A22

## Install in 22-dia. or 25-dia. Panel Cutout

- Easy mounting and removal of Switch Unit.
- Increase wiring efficiency with three-row mounting of Switch Blocks.
- Finger protection mechanism on Switch Unit provided as a standard feature.
- Use 25-dia. ring to install in 25-dia. panel cutouts.
- Mounted using either open-type (fork-type) or closed-type (round-type) crimp terminals.
- Wide range of shapes and colors.
- IP65 oil resistance (non-lighted models)
  IP65 (lighted models)
- EN60947-5-1
- UL and cUL approved (File No. E41515)

# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

Shipped as a set which includes the Pushbutton, Lamp (lighted type only), and Switch.

**A22□-□□-□-□□□**
(1 2 3 4 5 6)

**1 Lighted/Non-lighted**

| Code | Description |
|---|---|
| No symbol | Non-lighted |
| L | Lighted |

**2 Flange Shape**

| Code | Description |
|---|---|
| **Non-lighted** | |
| F | Round/Flat |
| T | Round/Projection |
| G | Round/Full-guard |
| H | Round/Half-guard |
| C | Square/Projection |
| D | Square/Full-guard |
| S | Round/Mushroom (30-dia. head) |
| M | Round/Mushroom (40-dia. head) |
| **Lighted** | |
| T | Round/Projection |
| G | Round/Full-guard |
| H | Round/Half-guard |
| C | Square/Projection |
| D | Square/Full-guard |

**3 Illumination Color**

| Code | Description |
|---|---|
| R | Red |
| G | Green |
| Y | Yellow |
| W | White |
| A | Blue |
| B | Black (for non-lighted type only) |

**4 Light Source**

| Code | Operating Voltage | |
|---|---|---|
| **Without Voltage Reduction Unit** | | |
| No symbol | Non-lighted | |
| 6D | LED | 6 VDC |
| 6A | | 6 VAC |
| 12A | | 12 VAC/VDC |
| 24A | | 24 VAC/VDC |
| 5 | Incandescent lamp | 5 VAC/VDC |
| 12 | | 12 VAC/VDC |
| 24 | | 24 VAC/VDC |
| H1 | | 100 VAC/VDC |
| **With Voltage Reduction Unit** | | |
| T1 | LED | 100 VAC (See note 1) |
| T2 | | 200 VAC (See note 2) |

**5 Contacts**

| Code | Description |
|---|---|
| 10 | SPST-NO |
| 01 | SPST-NC |
| 11 | SPST-NO + SPST-NC |
| 20 | DPST-NO |
| 02 | DPST-NC |

**Note:** Refer to page 149 for contact ratings.

**6 Switch Action**

| Code | Description |
|---|---|
| M | Momentary |
| A | Alternate |

**Note: 1.** Operational voltage: 95 to 115 VAC
**2.** Operational voltage: 190 to 230 VAC
**3.** The LED lamp (24 VAC/VDC) can be lit by directly applying 100 VAC/VDC (200 VAC/VDC) to the lamp terminal.
**4.** LED incorporates the 24-VAC/VDC type to the Voltage Reduction Unit models.

## Subassembled

The Pushbutton, Lamp, or Switch can be ordered separately. Use them in combination for models that are not available as assembled Units. These can also be used as inventory for maintenance parts.

### 1. Pushbutton

1 2 3

**A22□-□□**

**1 Lighted/Non-lighted**

| Code | Description |
|---|---|
| None | Non-lighted |
| L | Lighted |

**2 Flange Shape**

| Code | Description |
|---|---|
| **Non-lighted** | |
| F | Round/Flat |
| T | Round/Projection |
| G | Round/Full-guard |
| H | Round/Half-guard |
| C | Square/Projection |
| D | Square/Full-guard |
| S | Round/Mushroom (30-dia. head) |
| M | Round/Mushroom (40-dia. head) |
| **Lighted** | |
| T | Round/Projection |
| G | Round/Full-guard |
| H | Round/Half-guard |
| C | Square/Projection |
| D | Square/Full-guard |

**3 Illumination Color**

| Code | Description |
|---|---|
| R | Red |
| G | Green |
| Y | Yellow |
| W | White |
| A | Blue |
| B | Black (for non-lighted type only) |

### 2. Lamp

1 2

**A22-□□**

**1 Operating Voltage (Rated Voltage)**

| Code | Description |
|---|---|
| **Incandescent lamp** | |
| 5 | 5 VAC (6 VAC) |
| 12 | 12 VAC (14 VAC) |
| 24 | 24 VAC (28 VAC) |
| **LED lamp** | |
| 6D | 6 VDC (6 VDC) |
| 6A | 6 VAC (6 VAC) |
| 12A | 12 VAC/VDC (12 VAC/VDC) |
| 24A | 24 VAC/VDC (24 VAC/VDC) |

**2 Illumination Color**

| Code | Description |
|---|---|
| None | Incandescent lamp |
| R | Red |
| G | Green |
| Y | Yellow |
| A | Blue |

## 3. Switch (Standard Load)

**A22□-□□-□** (1 2 3 4)

**1 Lighted/Non-lighted**

| Code | Description |
|---|---|
| None | Non-lighted |
| L | Lighted |

**2 Contacts**

| Code | Description |
|---|---|
| 10 | SPST-NO |
| 01 | SPST-NC |
| 11 | SPST-NO + SPST-NC |
| 20 | DPST-NO |
| 02 | DPST-NC |

**3 Switch Action**

| Code | Description |
|---|---|
| M | Momentary |
| A | Alternate |

**4 Voltage Reduction Unit (Lighted Type Only)**

| Code | Description |
|---|---|
| None | Without Voltage Reduction Unit |
| T1 | 100 VAC (See note 1) |
| T2 | 200 VAC (See note 2) |

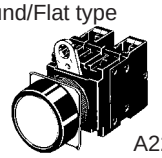
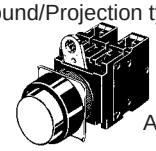
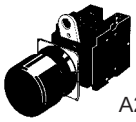
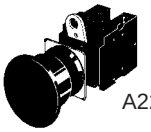
**Note: 1.** Operational voltage: 95 to 115 VAC
**2.** Operational voltage: 190 to 230 VAC

# Ordering Information

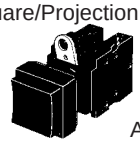
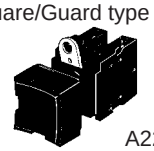
## ■ List of Models

### Ordering as a Set

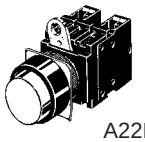
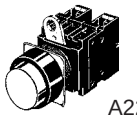
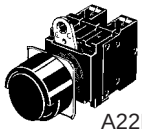
#### Non-lighted (Round Type)

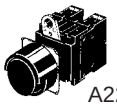
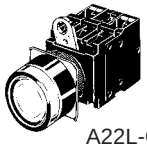
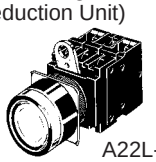
| Appearance | Output | Momentary operation (self-resetting) | Alternate operation (self-holding) | Illumination color |
|---|---|---|---|---|
| Round/Flat type  A22-F | SPST-NO | A22-F□-10M | A22-F□-10A | Insert one of the following letters into the box □.<br>R (red)<br>Y (yellow)<br>G (green)<br>W (white)<br>A (blue)<br>B (black) |
| | SPST-NC | A22-F□-01M | A22-F□-01A | |
| | SPST-NO + SPST-NC | A22-F□-11M | A22-F□-11A | |
| | DPST-NO | A22-F□-20M | A22-F□-20A | |
| | DPST-NC | A22-F□-02M | A22-F□-02A | |
| Round/Projection type  A22-T | SPST-NO | A22-T□-10M | A22-T□-10A | |
| | SPST-NC | A22-T□-01M | A22-T□-01A | |
| | SPST-NO + SPST-NC | A22-T□-11M | A22-T□-11A | |
| | DPST-NO | A22-T□-20M | A22-T□-20A | |
| | DPST-NC | A22-T□-02M | A22-T□-02A | |
| Round/Full-guard type A22-G | SPST-NO | A22-G□-10M | A22-G□-10A | |
| | SPST-NC | A22-G□-01M | A22-G□-01A | |
| | SPST-NO + SPST-NC | A22-G□-11M | A22-G□-11A | |
| | DPST-NO | A22-G□-20M | A22-G□-20A | |
| | DPST-NC | A22-G□-02M | A22-G□-02A | |
| Round/Half-guard type A22-H | SPST-NO | A22-H□-10M | A22-H□-10A | |
| | SPST-NC | A22-H□-01M | A22-H□-01A | |
| | SPST-NO + SPST-NC | A22-H□-11M | A22-H□-11A | |
| | DPST-NO | A22-H□-20M | A22-H□-20A | |
| | DPST-NC | A22-H□-02M | A22-H□-02A | |
| Round/Small-size Mushroom type (30-dia. head)  A22-S | SPST-NO | A22-S□-10M | --- | |
| | SPST-NC | A22-S□-01M | | |
| | SPST-NO + SPST-NC | A22-S□-11M | | |
| | DPST-NO | A22-S□-20M | | |
| | DPST-NC | A22-S□-02M | | |
| Round/Medium-size Mushroom type (40-dia head)  A22-M | SPST-NO | A22-M□-10M | | |
| | SPST-NC | A22-M□-01M | | |
| | SPST-NO + SPST-NC | A22-M□-11M | | |
| | DPST-NO | A22-M□-20M | | |
| | DPST-NC | A22-M□-02M | | |

## Non-lighted (Square Type)

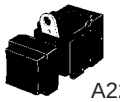
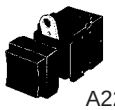
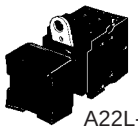
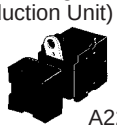
| Appearance | Output | Momentary operation (self-reset) | Alternate operation (self-holding) | Illumination color |
|---|---|---|---|---|
| Square/Projection type  A22-C | SPST-NO | A22-C□-10M | A22-C□-10A | Insert one of the following letters into the box □.<br>R (red)<br>Y (yellow)<br>G (green)<br>W (white)<br>A (blue)<br>B (black) |
| | SPST-NC | A22-C□-01M | A22-C□-01A | |
| | SPST-NO + SPST-NC | A22-C□-11M | A22-C□-11A | |
| | DPST-NO | A22-C□-20M | A22-C□-20A | |
| | DPST-NC | A22-C□-02M | A22-C□-02A | |
| Square/Guard type  A22-D | SPST-NO | A22-D□-10M | A22-D□-10A | |
| | SPST-NC | A22-D□-01M | A22-D□-01A | |
| | SPST-NO + SPST-NC | A22-D□-11M | A22-D□-11A | |
| | DPST-NO | A22-D□-20M | A22-D□-20A | |
| | DPST-NC | A22-D□-02M | A22-D□-02A | |

## Lighted (Round Type)

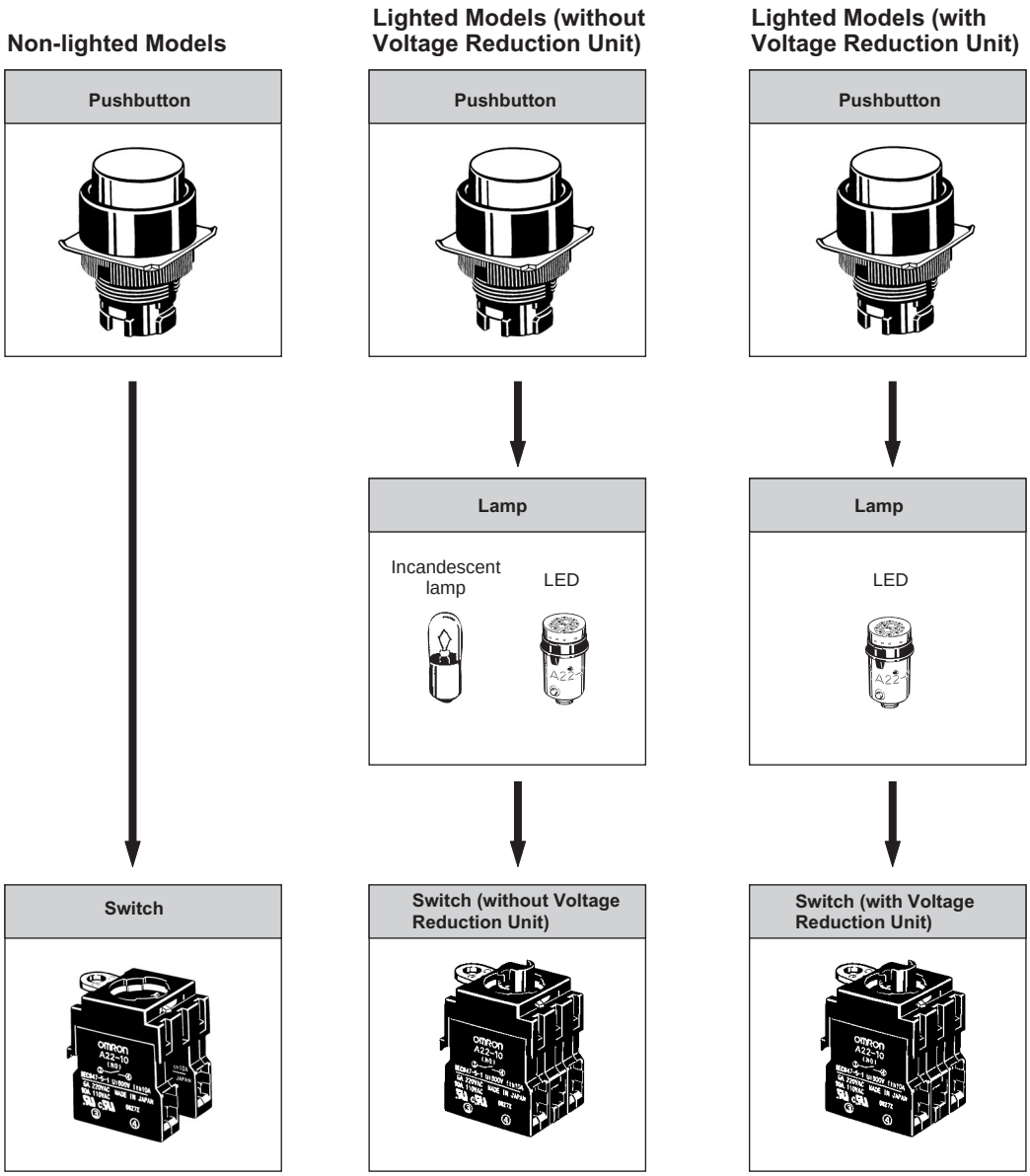
| Appearance | Output | Lighting | Operating voltage | Momentary operation (self-resetting) | Alternate operation (self-holding) | Illumination color |
|---|---|---|---|---|---|---|
| Round/Projection type<br>LED lighting (without Voltage Reduction Unit)  A22L-T | SPST-NO | LED | 6 VDC | A22L-T□-6D-10M | A22L-T□-6D-10A | Insert one of the following letters into the box □.<br>R (red)<br>Y (yellow)<br>G (green)<br>W (white)<br>A (blue) |
| | | | 6 VAC | A22L-T□-6A-10M | A22L-T□-6A-10A | |
| | | | 12 VAC/VDC | A22L-T□-12A-10M | A22L-T□-12A-10A | |
| | | | 24 VAC/VDC | A22L-T□-24A-10M | A22L-T□-24A-10A | |
| | SPST-NC | | 6 VDC | A22L-T□-6D-01M | A22L-T□-6D-01A | |
| | | | 6 VAC | A22L-T□-6A-01M | A22L-T□-6A-01A | |
| | | | 12 VAC/VDC | A22L-T□-12A-01M | A22L-T□-12A-01A | |
| | | | 24 VAC/VDC | A22L-T□-24A-01M | A22L-T□-24A-01A | |
| | SPST-NO + SPST-NC | | 6 VDC | A22L-T□-6D-11M | A22L-T□-6D-11A | |
| | | | 6 VAC | A22L-T□-6A-11M | A22L-T□-6A-11A | |
| | | | 12 VAC/VDC | A22L-T□-12A-11M | A22L-T□-12A-11A | |
| | | | 24 VAC/VDC | A22L-T□-24A-11M | A22L-T□-24A-11A | |
| | DPST-NO | | 6 VDC | A22L-T□-6D-20M | A22L-T□-6D-20A | |
| | | | 6 VAC | A22L-T□-6A-20M | A22L-T□-6A-20A | |
| | | | 12 VAC/VDC | A22L-T□-12A-20M | A22L-T□-12A-20A | |
| | | | 24 VAC/VDC | A22L-T□-24A-20M | A22L-T□-24A-20A | |
| | DPST-NC | | 6 VDC | A22L-T□-6D-02M | A22L-T□-6D-02A | |
| | | | 6 VAC | A22L-T□-6A-02M | A22L-T□-6A-02A | |
| | | | 12 VAC/VDC | A22L-T□-12A-02M | A22L-T□-12A-02A | |
| | | | 24 VAC/VDC | A22L-T□-24A-02M | A22L-T□-24A-02A | |
| Round/Projection type<br>LED voltage-reduction lighting (with Voltage Reduction Unit)  A22L-T | SPST-NO | LED | 100 VAC | A22L-T□-T1-10M | A22L-T□-T1-10A | |
| | | | 200 VAC | A22L-T□-T2-10M | A22L-T□-T2-10A | |
| | SPST-NC | | 100 VAC | A22L-T□-T1-01M | A22L-T□-T1-01A | |
| | | | 200 VAC | A22L-T□-T2-01M | A22L-T□-T2-01A | |
| | SPST-NO + SPST-NC | | 100 VAC | A22L-T□-T1-11M | A22L-T□-T1-11A | |
| | | | 200 VAC | A22L-T□-T2-11M | A22L-T□-T2-11A | |
| | DPST-NO | | 100 VAC | A22L-T□-T1-20M | A22L-T□-T1-20A | |
| | | | 200 VAC | A22L-T□-T2-20M | A22L-T□-T2-20A | |
| | DPST-NC | | 100 VAC | A22L-T□-T1-02M | A22L-T□-T1-02A | |
| | | | 200 VAC | A22L-T□-T2-02M | A22L-T□-T2-02A | |
| Round/Half-guard type<br>LED lighting (without Voltage Reduction Unit)  A22L-H | SPST-NO | | 24 VAC/VDC | A22L-H□-24A-10M | A22L-H□-24A-10A | |
| | SPST-NC | | | A22L-H□-24A-01M | A22L-H□-24A-01A | |
| | SPST-NO + SPST-NC | | | A22L-H□-24A-11M | A22L-H□-24A-11A | |
| | DPST-NO | | | A22L-H□-24A-20M | A22L-H□-24A-20A | |
| | DPST-NC | | | A22L-H□-24A-02M | A22L-H□-24A-02A | |

| Appearance | Output | Lighting | Operating voltage | Momentary operation (self-resetting) | Alternate operation (self-holding) | Illumination color |
|---|---|---|---|---|---|---|
| Round/Half-guard type<br>LED voltage-reduction lighting (with Voltage Reduction Unit)<br>  <br>A22L-H | SPST-NO | LED | 100 VAC | A22L-H□-T1-10M | A22L-H□-T1-10A | Insert one of the following letters into the box □.<br>R (red)<br>Y (yellow)<br>G (green)<br>W (white)<br>A (blue) |
| | | | 200 VAC | A22L-H□-T2-10M | A22L-H□-T2-10A | |
| | SPST-NC | | 100 VAC | A22L-H□-T1-01M | A22L-H□-T1-01A | |
| | | | 200 VAC | A22L-H□-T2-01M | A22L-H□-T2-01A | |
| | SPST-NO + SPST-NC | | 100 VAC | A22L-H□-T1-11M | A22L-H□-T1-11A | |
| | | | 200 VAC | A22L-H□-T2-11M | A22L-H□-T2-11A | |
| | DPST-NO | | 100 VAC | A22L-H□-T1-20M | A22L-H□-T1-20A | |
| | | | 200 VAC | A22L-H□-T2-20M | A22L-H□-T2-20A | |
| | DPST-NC | | 100 VAC | A22L-H□-T1-02M | A22L-H□-T1-02A | |
| | | | 200 VAC | A22L-H□-T2-02M | A22L-H□-T2-02A | |
| Round/Full-guard type<br>LED lighting (without Voltage Reduction Unit)<br>  <br>A22L-G | SPST-NO | | 6 VDC | A22L-G□-6D-10M | A22L-G□-6D-10A | |
| | | | 6 VAC | A22L-G□-6A-10M | A22L-G□-6A-10A | |
| | | | 12 VAC/VDC | A22L-G□-12A-10M | A22L-G□-12A-10A | |
| | | | 24 VAC/VDC | A22L-G□-24A-10M | A22L-G□-24A-10A | |
| | SPST-NC | | 6 VDC | A22L-G□-6D-01M | A22L-G□-6D-01A | |
| | | | 6 VAC | A22L-G□-6A-01M | A22L-G□-6A-01A | |
| | | | 12 VAC/VDC | A22L-G□-12A-01M | A22L-G□-12A-01A | |
| | | | 24 VAC/VDC | A22L-G□-24A-01M | A22L-G□-24A-01A | |
| | SPST-NO + SPST-NC | | 6 VDC | A22L-G□-6D-11M | A22L-G□-6D-11A | |
| | | | 6 VAC | A22L-G□-6A-11M | A22L-G□-6A-11A | |
| | | | 12 VAC/VDC | A22L-G□-12A-11M | A22L-G□-12A-11A | |
| | | | 24 VAC/VDC | A22L-G□-24A-11M | A22L-G□-24A-11A | |
| | DPST-NO | | 6 VDC | A22L-G□-6D-20M | A22L-G□-6D-20A | |
| | | | 6 VAC | A22L-G□-6A-20M | A22L-G□-6A-20A | |
| | | | 12 VAC/VDC | A22L-G□-12A-20M | A22L-G□-12A-20A | |
| | | | 24 VAC/VDC | A22L-G□-24A-20M | A22L-G□-24A-20A | |
| | DPST-NC | | 6 VDC | A22L-G□-6D-02M | A22L-G□-6D-02A | |
| | | | 6 VAC | A22L-G□-6A-02M | A22L-G□-6A-02A | |
| | | | 12 VAC/VDC | A22L-G□-12A-02M | A22L-G□-12A-02A | |
| | | | 24 VAC/VDC | A22L-G□-24A-02M | A22L-G□-24A-02A | |
| Round/Full-guard type<br>LED voltage-reduction lighting (with Voltage Reduction Unit)<br>  <br>A22L-G | SPST-NO | | 100 VAC | A22L-G□-T1-10M | A22L-G□-T1-10A | |
| | | | 200 VAC | A22L-G□-T2-10M | A22L-G□-T2-10A | |
| | SPST-NC | | 100 VAC | A22L-G□-T1-01M | A22L-G□-T1-01A | |
| | | | 200 VAC | A22L-G□-T2-01M | A22L-G□-T2-01A | |
| | SPST-NO + SPST-NC | | 100 VAC | A22L-G□-T1-11M | A22L-G□-T1-11A | |
| | | | 200 VAC | A22L-G□-T2-11M | A22L-G□-T2-11A | |
| | DPST-NO | | 100 VAC | A22L-G□-T1-20M | A22L-G□-T1-20A | |
| | | | 200 VAC | A22L-G□-T2-20M | A22L-G□-T2-20A | |
| | DPST-NC | | 100 VAC | A22L-G□-T1-02M | A22L-G□-T1-02A | |
| | | | 200 VAC | A22L-G□-T2-02M | A22L-G□-T2-02A | |

## Lighted (Square Type)

| Appearance | Output | Lighting | Operating voltage | Momentary operation (self-resetting) | Alternate operation (self-holding) | Illumination color |
|---|---|---|---|---|---|---|
| Square/Projection type<br>LED lighting (without Voltage Reduction Unit)<br>  <br>A22L-C | SPST-NO | LED | 24 VAC/VDC | A22L-C□-24A-10M | A22L-C□-24A-10A | Insert one of the following letters into the box □.<br>R (red)<br>Y (yellow)<br>G (green)<br>W (white)<br>A (blue) |
| | SPST-NC | | | A22L-C□-24A-01M | A22L-C□-24A-01A | |
| | SPST-NO + SPST-NC | | | A22L-C□-24A-11M | A22L-C□-24A-11A | |
| | DPST-NO | | | A22L-C□-24A-20M | A22L-C□-24A-20A | |
| | DPST-NC | | | A22L-C□-24A-02M | A22L-C□-24A-02A | |
| Square/Projection type<br>LED voltage-reduction lighting (with Voltage Reduction Unit)<br>  <br>A22L-C | SPST-NO | | 100 VAC | A22L-C□-T1-10M | A22L-C□-T1-10A | |
| | | | 200 VAC | A22L-C□-T2-10M | A22L-C□-T2-10A | |
| | SPST-NC | | 100 VAC | A22L-C□-T1-01M | A22L-C□-T1-01A | |
| | | | 200 VAC | A22L-C□-T2-01M | A22L-C□-T2-01A | |
| | SPST-NO + SPST-NC | | 100 VAC | A22L-C□-T1-11M | A22L-C□-T1-11A | |
| | | | 200 VAC | A22L-C□-T2-11M | A22L-C□-T2-11A | |
| | DPST-NO | | 100 VAC | A22L-C□-T1-20M | A22L-C□-T1-20A | |
| | | | 200 VAC | A22L-C□-T2-20M | A22L-C□-T2-20A | |
| | DPST-NC | | 100 VAC | A22L-C□-T1-02M | A22L-C□-T1-02A | |
| | | | 200 VAC | A22L-C□-T2-02M | A22L-C□-T2-02A | |
| Square/Full-guard type<br>LED lighting (without Voltage Reduction Unit)<br>  <br>A22L-D | SPST-NO | | 24 VAC/VDC | A22L-D□-24A-10M | A22L-D□-24A-10A | |
| | SPST-NC | | | A22L-D□-24A-01M | A22L-D□-24A-01A | |
| | SPST-NO + SPST-NC | | | A22L-D□-24A-11M | A22L-D□-24A-11A | |
| | DPST-NO | | | A22L-D□-24A-20M | A22L-D□-24A-20A | |
| | DPST-NC | | | A22L-D□-24A-02M | A22L-D□-24A-02A | |
| Square/Full-guard type<br>LED voltage-reduction lighting (with Voltage Reduction Unit)<br>  <br>A22L-D | SPST-NO | | 100 VAC | A22L-D□-T1-10M | A22L-D□-T1-10A | |
| | | | 200 VAC | A22L-D□-T2-10M | A22L-D□-T2-10A | |
| | SPST-NC | | 100 VAC | A22L-D□-T1-01M | A22L-D□-T1-01A | |
| | | | 200 VAC | A22L-D□-T2-01M | A22L-D□-T2-01A | |
| | SPST-NO + SPST-NC | | 100 VAC | A22L-D□-T1-11M | A22L-D□-T1-11A | |
| | | | 200 VAC | A22L-D□-T2-11M | A22L-D□-T2-11A | |
| | DPST-NO | | 100 VAC | A22L-D□-T1-20M | A22L-D□-T1-20A | |
| | | | 200 VAC | A22L-D□-T2-20M | A22L-D□-T2-20A | |
| | DPST-NC | | 100 VAC | A22L-D□-T1-02M | A22L-D□-T1-02A | |
| | | | 200 VAC | A22L-D□-T2-02M | A22L-D□-T2-02A | |

## Ordering Individually



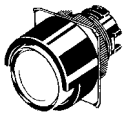
## Pushbutton

### Non-lighted

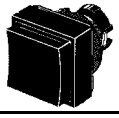
| Color | IP65 oil-resistant models | | | |
|---|---|---|---|---|
| | Flat type | Projection type | Full-guard type | Half-guard type |
| **Red** | A22-FR | A22-TR | A22-GR | A22-HR |
| **Green** | A22-FG | A22-TG | A22-GG | A22-HG |
| **Yellow** | A22-FY | A22-TY | A22-GY | A22-HY |
| **White** | A22-FW | A22-TW | A22-GW | A22-HW |
| **Blue** | A22-FA | A22-TA | A22-GA | A22-HA |
| **Black** | A22-FB | A22-TB | A22-GB | A22-HB |

| Color | IP65 oil-resistant models | | | |
|---|---|---|---|---|
| | Square/Projection type | Square/Full-guard type | Round/Mushroom type (30-dia. head) | Round/Mushroom type (40-dia. head) |
| **Red** | A22-CR | A22-DR | A22-SR | A22-MR |
| **Green** | A22-CG | A22-DG | A22-SG | A22-MG |
| **Yellow** | A22-CY | A22-DY | A22-SY | A22-MY |
| **White** | A22-CW | A22-DW | A22-SW | A22-MW |
| **Blue** | A22-CA | A22-DA | A22-SA | A22-MA |
| **Black** | A22-CB | A22-DB | A22-SB | A22-MB |

### Lighted

| Color | IP65 | | |
|---|---|---|---|
| | Projection type | Full-guard type | Half-guard type  |
| **Red** | A22L-TR | A22L-GR | A22L-HR |
| **Green** | A22L-TG | A22L-GG | A22L-HG |
| **Yellow** | A22L-TY | A22L-GY | A22L-HY |
| **White** | A22L-TW | A22L-GW | A22L-HW |
| **Blue** | A22L-TA | A22L-GA | A22L-HA |

**Note:** Common to incandescent lamps and LED lamps.

| Color | IP65 | |
|---|---|---|
| | Square/Projection  | Square/Full-guard type |
| **Red** | A22L-CR | A22L-DR |
| **Green** | A22L-CG | A22L-DG |
| **Yellow** | A22L-CY | A22L-DY |
| **White** | A22L-CW | A22L-DW |
| **Blue** | A22L-CA | A22L-DA |

## Lamp

### LED Lamp

| Appearance | AC/DC | LED light | Operating voltage: 6 V | 12 V | 24 V | 24 V Super-bright |
|---|---|---|---|---|---|---|
| | | | Model | | | |
| | DC | Red | A22-6DR | --- | --- | --- |
| | | Green | A22-6DG | --- | --- | --- |
| | | Yellow (See note 2.) | A22-6DY | --- | --- | --- |
| | | Blue | A22-6DA | --- | --- | --- |
| | AC | Red | A22-6AR | --- | --- | --- |
| | | Green | A22-6AG | --- | --- | --- |
| | | Yellow (See note 2.) | A22-6AY | --- | --- | --- |
| | | Blue | A22-6AA | --- | --- | --- |
| | AC and DC | Red | --- | A22-12AR | A22-24AR | A22-24ASR |
| | | Green | --- | A22-12AG | A22-24AG | A22-24ASG |
| | | Yellow (See note 2.) | --- | A22-12AY | A22-24AY | A22-24ASY |
| | | Blue | --- | A22-12AA | A22-24AA | A22-24ASA |

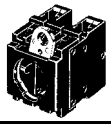
**Note: 1.** For voltage-reduction lighting, use the A22-24A□.
**2.** Used when the Pushbutton color is yellow or white.

### Incandescent Lamp

| Operating voltage | 5 VAC/VDC | 12 VAC/VDC | 24 VAC/VDC |
|---|---|---|---|
| | A22-5 | A22-12 | A22-24 |

## Switch (Standard Load)

### Non-lighted

| Switch operation  | Contacts | Model |
|---|---|---|
| Momentary | SPST-NO | A22-10M |
| | SPST-NC | A22-01M |
| | SPST-NO + SPST-NC | A22-11M |
| | DPST-NO | A22-20M |
| | DPST-NC | A22-02M |
| Alternate | SPST-NO | A22-10A |
| | SPST-NC | A22-01A |
| | SPST-NO + SPST-NC | A22-11A |
| | DPST-NO | A22-20A |
| | DPST-NC | A22-02A |

**Lighted**

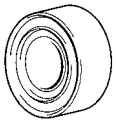
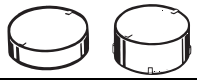
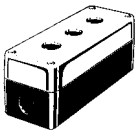
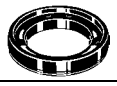
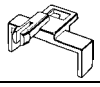
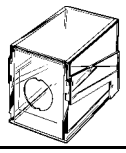
| Switch operation | Contacts | Voltage reduction circuits | | |
|---|---|---|---|---|
| | | Without Voltage Reduction Unit | With Voltage Reduction Unit | |
| | | | 110 VAC | 220 VAC |
| Momentary | SPST-NO | A22L-10M | A22L-10M-T1 | A22L-10M-T2 |
| | SPST-NC | A22L-01M | A22L-01M-T1 | A22L-01M-T2 |
| | SPST-NO + SPST-NC | A22L-11M | A22L-11M-T1 | A22L-11M-T2 |
| | DPST-NO | A22L-20M | A22L-20M-T1 | A22L-20M-T2 |
| | DPST-NC | A22L-02M | A22L-02M-T1 | A22L-02M-T2 |
| Alternate | SPST-NO | A22L-10A | A22L-10A-T1 | A22L-10A-T2 |
| | SPST-NC | A22L-01A | A22L-01A-T1 | A22L-01A-T2 |
| | SPST-NO + SPST-NC | A22L-11A | A22L-11A-T1 | A22L-11A-T2 |
| | DPST-NO | A22L-20A | A22L-20A-T1 | A22L-20A-T2 |
| | DPST-NC | A22L-02A | A22L-02A-T1 | A22L-02A-T2 |

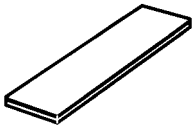
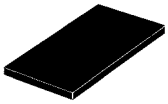
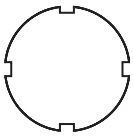
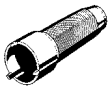
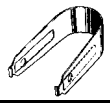
**Note: 1.** The above diagrams show the DPST-NO contact models as representative examples.
**2.** For voltage-reduction lighting, use the A22-24A□.

# ■ Accessories (Order Separately)

## Common to A22, A22S/W, A22K, M22, and A22E

| Item | | Appearance | Classification | | Model | Remarks |
|---|---|---|---|---|---|---|
| Switch Blocks | | | SPST-NO | Standard load | A22-10 | Provided as standard. Order Switch Blocks only when adding or replacing them. |
| | | | | Microload | A22-10S | |
| | | | SPST-NC | Standard load | A22-01 | |
| | | | | Microload | A22-01S | |
| | | | DPST-NO | Standard load | A22-20 | |
| | | | | Microload | A22-20S | |
| | | | DPST-NC | Standard load | A22-02 | |
| | | | | Microload | A22-02S | |
| Lamp Sockets | | | Direct lighting | | A22-TN | Used when changing the lighting method. (LED only) |
| | | | Voltage-reduction lighting | 110 VAC | A22-T1 | |
| | | | | 220 VAC | A22-T2 | |
| Mounting Latches | | | For momentary models | | A22-3200 | Provided as standard. Order Mounting Latches only when mounting Switch Blocks or Lamp Sockets that are purchased individually. |
| | | | For alternate models | | A22-3210 | |
| Legend Plate Frames | Standard size | | With Snap-in Legend Plate (Without text) | White | A22Z-3321 | Snap-in Legend Plate is acrylic. |
| | | | | Red | A22Z-3322 | |
| | | | | Black | A22Z-3323 | |
| | | | Without Snap-in Legend Plate | | A22Z-3320 | |
| | Large size | | With Snap-in Legend Plate (Without text) | White | A22Z-3331 | |
| | | | | Red | A22Z-3332 | |
| | | | | Black | A22Z-3333 | |
| | | | Without Snap-in Legend Plate | | A22Z-3330 | |
| Lock Ring | | | Round | | A22Z-3360 | The body is equipped with a Lock Ring. This Lock Ring is used when a more secure lock feature is required. |
| Metallic Bezel Rings | | | For flat or projection models | | A22Z-3580 | Replace with the standard model. Material: nickel-plated zinc |
| | | | For full-guard models | | A22Z-3582 | |

| Item | | Appearance | Classification | | Model | Remarks |
|---|---|---|---|---|---|---|
| Sealing Caps | |  | For flat models | | A22Z-3600F | Used to prevent dust or water from entering the Operation Unit (Push-button, etc.).<br>Color: opaque<br>Material: silicon |
| | | | For projection models | | A22Z-3600T | |
| | | | For full-guard models | | A22Z-3600G | |
| Caps | A22 | For A22 For M22<br>  | For projection, full-guard, or half-guard models | | A22Z-3490 | Material: polycarbonate resin |
| | M22 | | For round models | | A22Z-3495 | |
| Color Caps | | | Red | | A22Z-30TR | Used for changing the Pushbutton color of the (round) Pushbutton Switches. |
| | | | Green | | A22Z-30TG | |
| | | | Yellow | | A22Z-30TY | |
| | | | White | | A22Z-30TW | |
| | | | Blue | | A22Z-30TA | |
| Three-throw Spacer | | | | | A22Z-3003 | Used when mounting three Non-lighted Switches.<br>(See page 164.) |
| Hole Plug | | | Round | | A22Z-3530 | Can be plugged into pre-cut panel holes for future expansion. The color is black. |
| Control Boxes (Enclosures) | |  | One hole | Exclusively for A22 | A22Z-B101 | For those designed exclusively for A22, DPST-NO or DPST-NC Switches cannot be used.<br>Material: Polycarbonate resin |
| | | | | Compatible with A3T | A22Z-B201 | |
| | | | One hole, yellow box (for emergency stop) | Exclusively for A22 | A22Z-B101Y | |
| | | | | Compatible with A3T | A22Z-B201Y | |
| | | | Two holes | Exclusively for A22 | A22Z-B102 | |
| | | | | Compatible with A3T | A22Z-B202 | |
| | | | Three holes | Exclusively for A22 | A22Z-B103 | |
| | | | | Compatible with A3T | A22Z-B203 | |
| Connectors | | | Applicable cable diameter (mm) | 7 to 9 dia. | A22Z-3500-1 | Plastic connector used to extend a cable from the Switch Box. (See page 162.) |
| | | | | 9 to 11 dia. | A22Z-3500-2 | |
| 25-dia. Ring | | | --- | | A22Z-R25 | Use when mounting to a panel with a 25-dia. hole. For details, refer to page 153. Since this is not attached to the main body, order separately. |
| 30-dia. Resin Attachment | |  | Round | | A22Z-A30 | Use when mounting to a panel with a 30-dia. hole. For details, refer to page 155. |
| Lock Plate | |  | --- | | A22Z-3380 | Use to fix the lever on the Switch. |
| Simple Protective Cover | |  | --- | | A11Z-3700 | Prevents foreign matter entering into the Switch from the back of the panel. |

| Item | | Appearance | Classification | | Model | Remarks |
|---|---|---|---|---|---|---|
| Snap-in Legend Plates | Standard size |  | Without text | Black | A22Z-3443B | Attached to the Standard-size Legend Plate Frame. Material: Acrylic (See page 154.) |
| | | | | Red | A22Z-3443R | |
| | | | | White | A22Z-3443W | |
| | | | | Transparent | A22Z-3443C | |
| | | | White text on red background | m | A22Z-3443R-2 | |
| | | | | STOP | A22Z-3443R-4 | |
| | | | White text on black back-ground | \| | A22Z-3443B-1 | |
| | | | | START | A22Z-3443B-3 | |
| | | | | ON | A22Z-3443B-5 | |
| | | | | OFF | A22Z-3443B-6 | |
| | | | | UP | A22Z-3443B-7 | |
| | | | | DOWN | A22Z-3443B-8 | |
| | | | | POWER ON | A22Z-3443B-9 | |
| | | | | OFF-ON | A22Z-3443B-10 | |
| | Large size |  | Without text | Black | A22Z-3453B | Attached to the Large-size Legend Plate Frame Material: Acrylic (See page 154.) |
| | | | | Red | A22Z-3453R | |
| | | | | White | A22Z-3453W | |
| | | | | Transparent | A22Z-3453C | |
| | For Emer-gency Stop Switch | | 60-dia. round plate with black let-ters on a yellow background | | A22Z-3466-1 | “EMERGENCY STOP” is en-graved on the plate. Used as an Emergency Stop Switch Legend Plate |
| | | | 90-dia. round plate with black let-ters on a yellow background | | A22Z-3476-1 | |
| Character Films | |  | No print (Round) | | A22Z-3460 | After printing on a film, affix to the indicator plate of the Lighted Push-button Switch. (The back is coated with adhesive.) |
| | | | Character print (Round) | \| | A22Z-3460-1 | |
| | | | | ❍ | A22Z-3460-2 | |
| | | | | START | A22Z-3460-3 | |
| | | | | STOP | A22Z-3460-4 | |
| | | | No print (Square) | | A22Z-3480 | |
| Lamp Extractor | | | --- | | A22Z-3901 | Rubber tool used to easily replace Lamps |
| Tightening Wrench | |  | --- | | A22Z-3905 | Tool used to tighten nuts from the back of the panel |
| Cap Tightening Tool | | | --- | | A22Z-3908 | Used for replacing the cap of the Half-guard Pushbutton Switch. |
| Cap Puller | |  | --- | | A3PJ-5080 | Used for removing the cap from the Pushbutton of the Square Lighted Pushbutton Switch. |

# Specifications

## Common to A22, A22S/W, A22K, and A22E

## ■ Approved Standards

| Recognized organization | Standards | File No. |
|---|---|---|
| UL (See note.) | UL508 | E41515 |
| TÜV Product Service | EN60947-5-1 | Inquire |
| CQC (CCC) | GB14048.5 | 2003010303070635 |

**Note:** UL-certification for CSA C22.2 No. 14 and bears the cULus mark.

## ■ Approved Standard Ratings

**UL, cUL (File No. E41515)**

6 A at 220 VAC, 10 A at 110 VAC

**EN60947-5-1 (Low Voltage Directive)**

3 A at 220 VAC

**CCC (GB14048.5)**

3 A at 240 VAC, 1.5 A at 24 VDC

## ■ Ratings

### Contacts (Standard Load)

| Rated carry current | Rated voltage | Rated current (A) | | | |
|---|---|---|---|---|---|
| | | AC15 (inductive load) | AC12 (resistive load) | DC13 (inductive load) | DC12 (resistive load) |
| 10 | 24 VAC | 10 | 10 | --- | --- |
| | 110 VAC | 5 | 10 | | |
| | 220 VAC | 3 | 6 | | |
| | 380 VAC | 2 | 3 | | |
| | 440 VAC | 1 | 2 | | |
| | 24 VDC | --- | --- | 1.5 | 10 |
| | 110 VDC | | | 0.5 | 2 |
| | 220 VDC | | | 0.2 | 0.6 |
| | 380 VDC | | | 0.1 | 0.2 |

**Note: 1.** Rated current values are determined according to the testing conditions. The above ratings were obtained by conducting tests under the following conditions.
(1) Ambient temperature: 20°±2°C
(2) Ambient humidity: 65±5%
(3) Operating frequency: 20 operations/minute

**2.** Minimum applicable load: 10 mA at 5 VDC

### Contacts (Microload)

| Rated applicable load | Minimum applicable load |
|---|---|
| 50 mA at 24 VDC (Resistive load) | 1 mA at 5 VDC |

### LED Indicators without Voltage Reduction Unit

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 6 VDC | 60 mA (20 mA) | 6 VDC±5% |
| 6 VAC | 60 mA (20 mA) | 6 VAC/VDC±5% |
| 12 VAC/VDC | 30 mA (10 mA) | 12 VAC/VDC±5% |
| 24 VAC/VDC | 15 mA (10 mA) | 24 VAC/VDC±5% |

**Note:** Values in parentheses are for blue Pushbuttons.

### Super-bright LED Indicator

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 24 VAC/VDC | 15 mA | 24 VAC/VDC ±5% |

### Incandescent Lamp

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 6 VAC/VDC | 200 mA | 5 VAC/VDC |
| 14 VAC/VDC | 80 mA | 12 VAC/VDC |
| 28 VAC/VDC | 40 mA | 24 VAC/VDC |
| 130 VAC/VDC | 20 mA | 100 VAC/VDC |

### Voltage-reduction Lighting

| Rated voltage | Operational voltage | Applicable lamp (BA8S/13□ gold) |
|---|---|---|
| 110 VAC | 95 to 115 VAC | LED Lamp (A22-24A□) |
| 220 VAC | 190 to 230 VAC | |

## ■ Characteristics

| Item | | Pushbutton Switches | | Emergency Stop Switches | | Knob-type Selector Switches | | Key-type Selector Switch |
|---|---|---|---|---|---|---|---|---|
| | | Non-lighted models: A22-F A22-T A22-G A22-S A22-C A22-D A22-H A22-M | Lighted models: A22L-T A22L-G A22L-H A22L-D A22L-C | Non-lighted model: A22E | Lighted model: A22EL | Non-lighted model: A22S | Lighted model: A22W | Non-lighted model: A22K |
| **Allowable operating frequency** | **Mechanical** | Momentary operation: 60 operations/minute max. | | 30 operations/minute max. | | Manual reset: 30 operations/minute max. Automatic reset: 30 operations/minute max. | | |
| | **Electrical** | 30 operations/minute max. | | | | 30 operations/minute max. | | |
| **Insulation resistance** | | 100 MΩ min. (at 500 VDC) | | | | | | |
| **Dielectric strength** | | 2,500 VAC, 50/60 Hz for 1 min between terminals of same polarity<br>2,500 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground | | | | | | |
| **Vibration resistance** | | Malfunction (See note 2.): 10 to 55 Hz, 1.5-mm double amplitude | | | | | | |
| **Shock resistance** | **Destruction** | 1,000 $m/s^2$ | 1,000 $m/s^2$ | 1,000 $m/s^2$ | | 1,000 $m/s^2$ | 1,000 $m/s^2$ | 1,000 $m/s^2$ |
| | **Malfunction (See note 2.)** | 1,000 $m/s^2$ max. | 600 $m/s^2$ max. | 250 $m/s^2$ max. | | 1,000 $m/s^2$ max. | 600 $m/s^2$ max. | 1,000 $m/s^2$ max. |
| **Durability** | **Mechanical** | Momentary operation: 5,000,000 operations min. | | 300,000 operations min. | | 500,000 operations min. | 100,000 operations min. | 500,000 operations min. |
| | **Electrical** | 500,000 operations min. | | 300,000 operations min. | 300,000 operations min. | 500,000 operations min. | 100,000 operations min. | 500,000 operations min. |
| **Ambient temperature (See note 1.)** | | Operating: –20°C to 70°C Storage: –40°C to 70°C | Operating: –20°C to 55°C Storage: –40°C to 70°C | Operating: –20°C to 70°C Storage: –40°C to 70°C | Operating: –20°C to 55°C Storage: –40°C to 70°C | Operating: –20°C to 70°C Storage: –40°C to 70°C | Operating: –20°C to 55°C Storage: –40°C to 70°C | Operating: –20°C to 70°C Storage: –40°C to 70°C |
| **Ambient humidity** | | Operating: 35% to 85% | | | | | | |
| **Degree of protection** | | IP65 (oil-resistant) | IP65 | IP65 (oil-resistant) | IP65 | IP65 (oil-resistant) | IP65 | IP65 (oil-resistant) |
| **Electric shock protection class** | | Class II | | | | | | |
| **PTI (tracking characteristic)** | | 175 | | | | | | |
| **Degree of contamination** | | 3 (IEC947-5-1) | | | | | | |

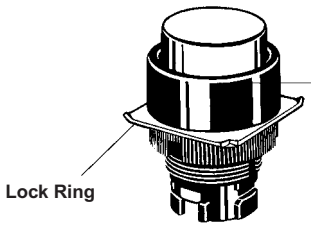
**Note: 1.** With no icing or condensation.
**2.** Malfunction within 1 ms.

## ■ Operating Characteristics (for SPST-NO/SPST-NC)

| Item | Pushbutton Switches | Emergency Stop Switches | Knob-type Selector Switches | | Key-type Selector Switch | |
|---|---|---|---|---|---|---|
| | Lighted Non-lighted Pushbutton Switches | Push-lock turn-reset system | Manual reset | Automatic reset | Manual reset | Automatic reset |
| | A22-F A22-G A22-C A22-S A22-T A22-H A22-D A22-M A22L-T A22L-H A22L-D A22L-G A22L-C | A22E, A22EL | A22S, A22W | A22S, A22W | A22K | |
| **Total travel force (TTF) max.** | 29.4 N | 44.1 N | 0.34 N·m (See note.) | 0.25 N·m for two notches (See note.) | 0.34 N·m (See note.) | 0.25 N·m for two notches (See note.) |
| | | | | 0.34 N·m for three notches (See note.) | | 0.34 N·m for three notches (See note.) |
| **Total travel (TT)** | 5.5 mm max. | 10±1 mm | Approx. 90° for two notches (Approx. 45° for three notches) | | Approx. 90° for two notches (Approx. 45° for three notches) | |
| **Resetting force (RF) min.** | --- | 0.25 N·m max. (See note.) | 0.34 N·m max. (See note.) | --- | 0.34 N·m max. (See note.) | --- |

**Note:** Rotation torque for Emergency Stop Pushbutton, Knob-type Selector, and Key-type Selector Switches.

# Nomenclature

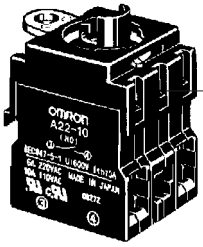



**Pushbutton**

- **Available Colors**
  Non-lighted:
  Red, green, yellow, white, blue, black
  Lighted:
  Red, green yellow, white, blue

**Lamp**

- **Light Source**
  LED lamp
  Incandescent lamp



**Switch**

- **Contacts**
  SPST-NO, SPST-NC, SPST-NO + SPST-NC, DPST-NO, DPST-NC
  (Minimum applicable load: 10 mA at 5 VDC)
- **Lighting Method**
  Non-lighted
  Lighted (without Voltage Reduction Unit)
  Lighted (with Voltage Reduction Unit)

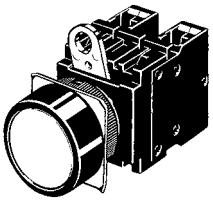
The above illustration shows a lighted model.

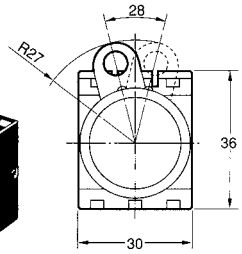
# Dimensions

**Note: 1.** All units are in millimeters unless otherwise indicated.
**2.** The following illustrations are for momentary operation.

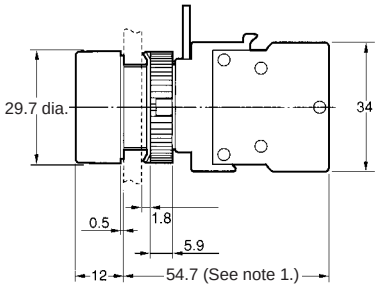
## ■ Lighted/Non-lighted Pushbutton Switches

### Flat Type
**A22-F**

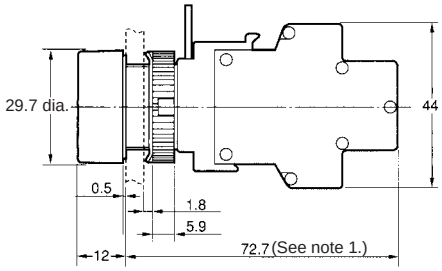




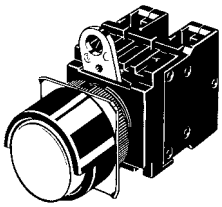

For SPST-NO (SPST-NC) Switches

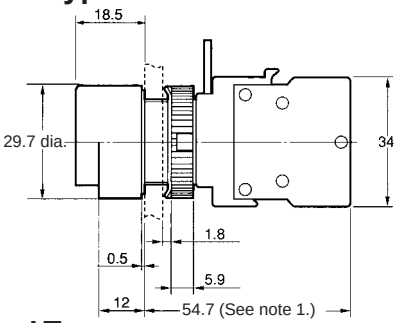



For DPST-NO (DPST-NC) Monoblock-contact Switches

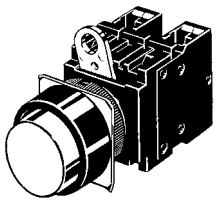


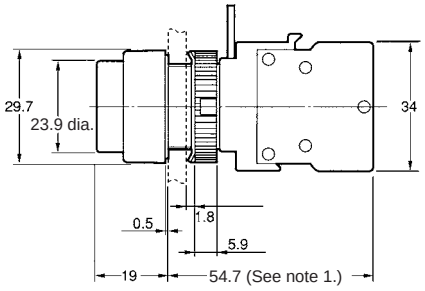

### Round/Half-guard Type
**A22-H, A22L-H**



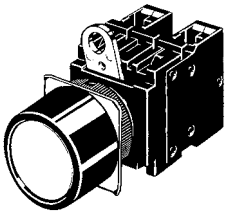


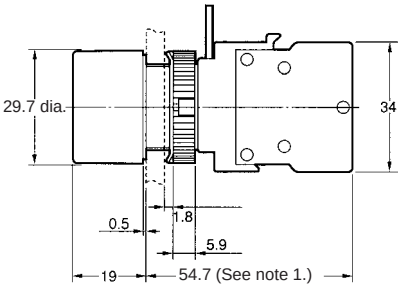

### Round/Projection Type
**A22-T, A22L-T**



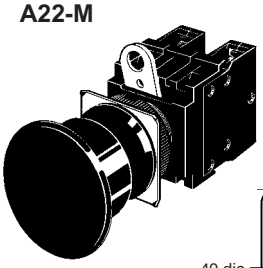


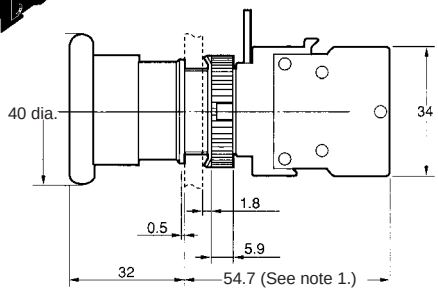

### Round/Full-guard Type
**A22-G, A22L-G**



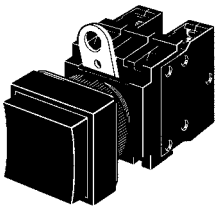


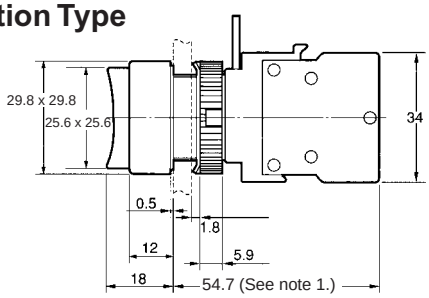

### 40-dia. Mushroom Type
**A22-M**



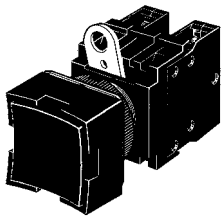


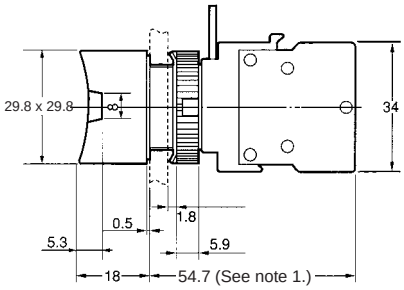

### Square/Projection Type
**A22-C, A22L-C**






### Square/Full-guard Type
**A22-D, A22L-D**





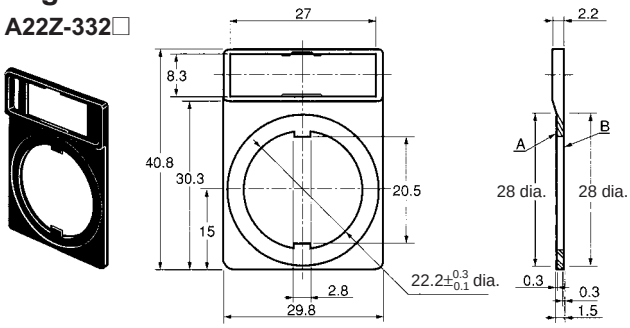

**Note: 1.** Alternate operation models are 9.3 mm longer.
**2.** Lighted models have the same dimensions as shown above, whether they are with or without Voltage Reduction Units.

# ■ Accessories

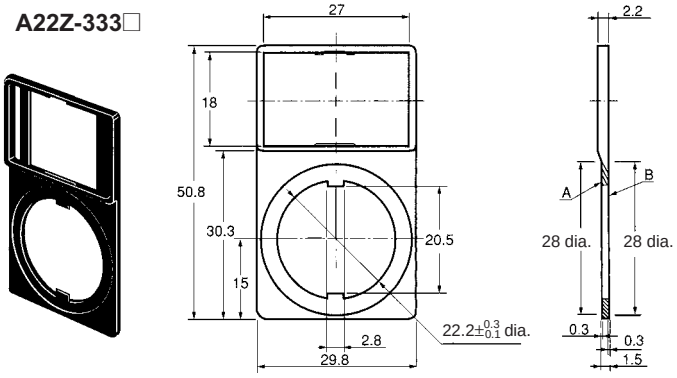
**Note:** All units are in millimeters unless otherwise indicated.

## Legend Plate Frames

**A22Z-332□**

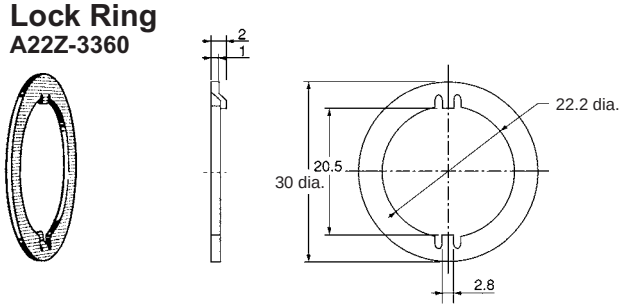



**A22Z-333□**



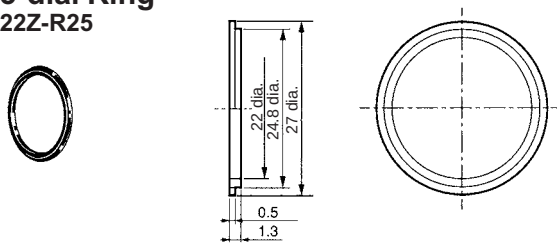

## Lock Ring

**A22Z-3360**



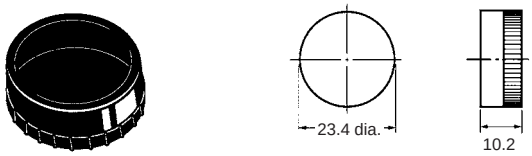

## 25-dia. Ring

**A22Z-R25**



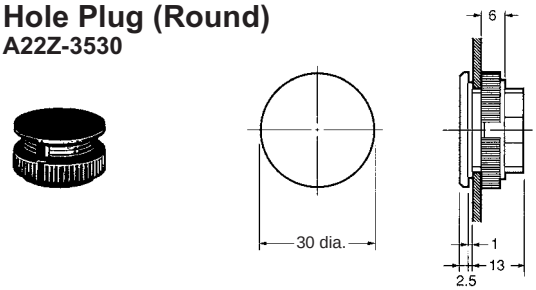

## Color Cap

**A22L-30T□**



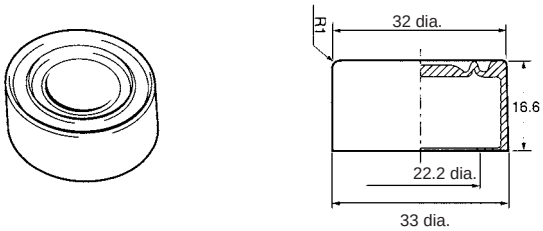

## Hole Plug (Round)

**A22Z-3530**

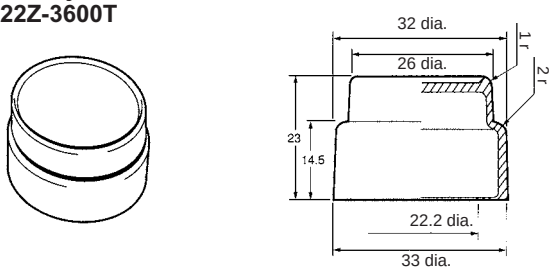



## Sealing Caps

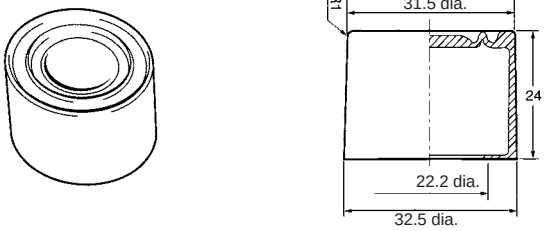
**For Flat Models**
**A22Z-3600F**




**For Projection Models**
**A22Z-3600T**

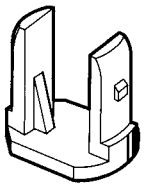


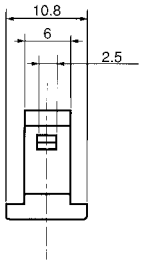

**For Full-guard Models**
**A22Z-3600G**

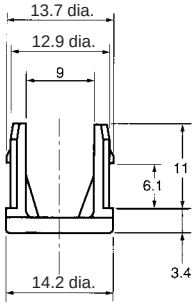


## Three-throw Spacer

**A22Z-3003**

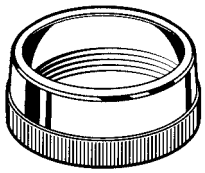


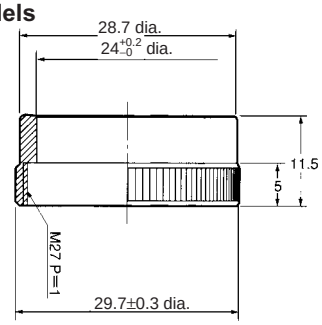


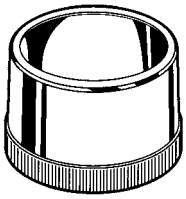

## Metallic Bezel Rings

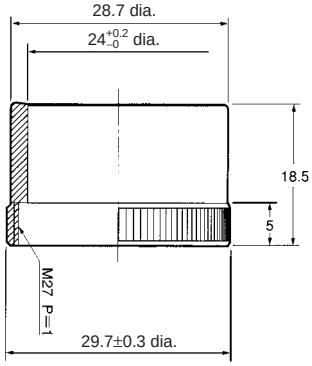
**For Flat/Projection Models**
**A22Z-3580**





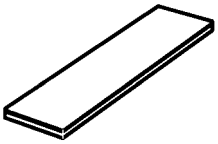

**For Full-guard Models**
**A22Z-3582**

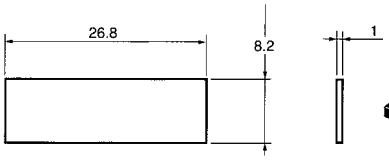




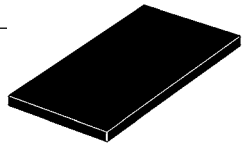

## Snap-in Legend Plates

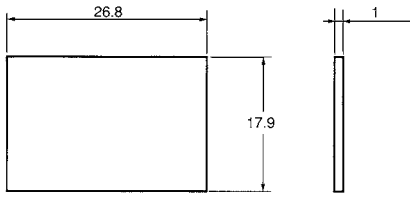
**For Standard Models**
**A22Z-3443□-□**





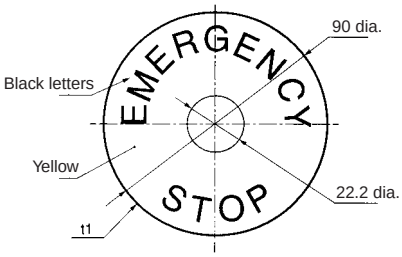

**For Large Models**
**A22Z-3453□**



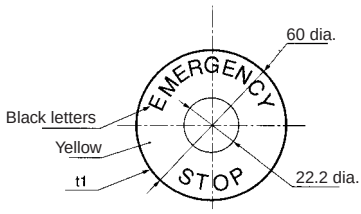



**For Emergency-stop Models**

**A22Z-3476-1 (90 dia.)**

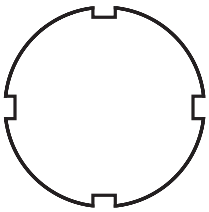


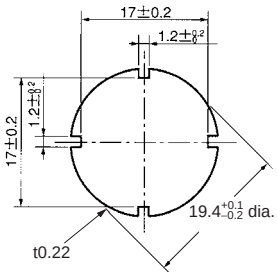

**A22Z-3466-1 (60 dia.)**



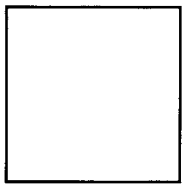

## Character Film

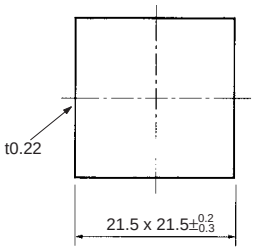
**For Round Models**
**A22Z-3460-□**





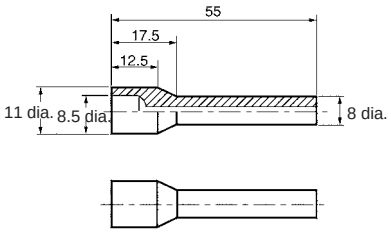

**For Square Models**
**A22Z-3480**





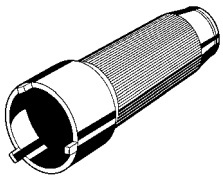
## Lamp Extractor

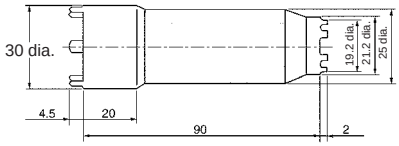
**A22Z-3901**




## Tightening Wrench

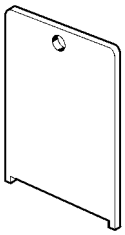
**A22Z-3905**

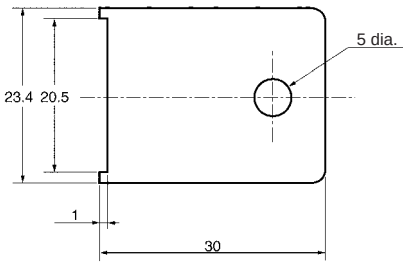





## Cap Tightening Tool

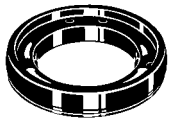
**A22Z-3908**

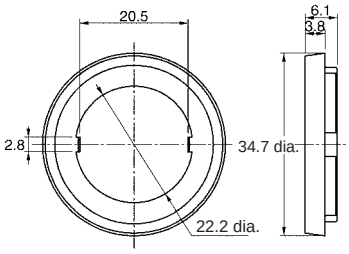





## 30-dia. Resin Attachment

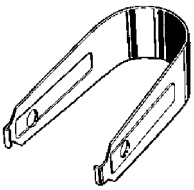
**A22Z-A30**

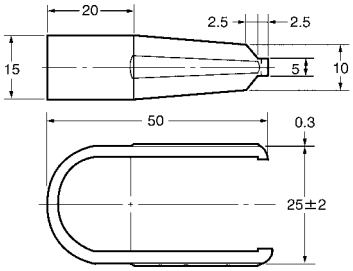





## Cap Puller

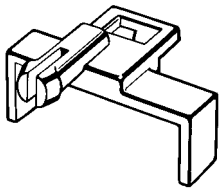
**A3PJ-5080**

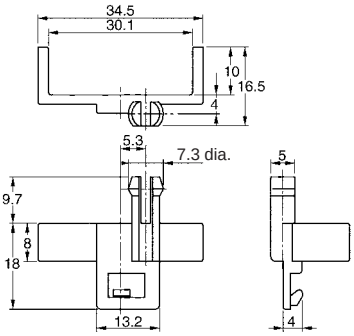





## Lock Plate

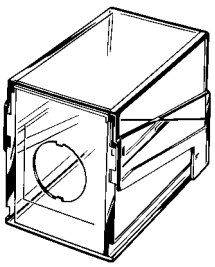
**A22Z-3380**

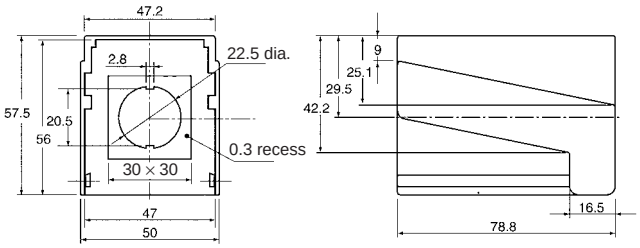





## Simple Protective Cover

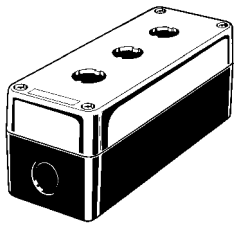
**A22Z-3700**



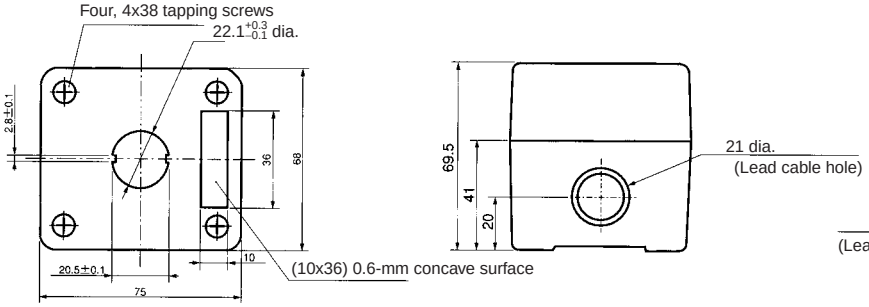


## Control Box (Enclosure)

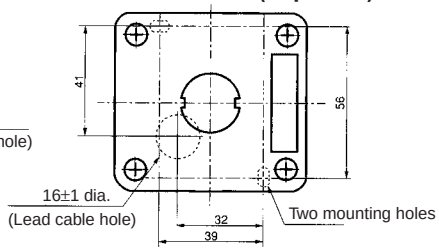
### A22Z-B10□



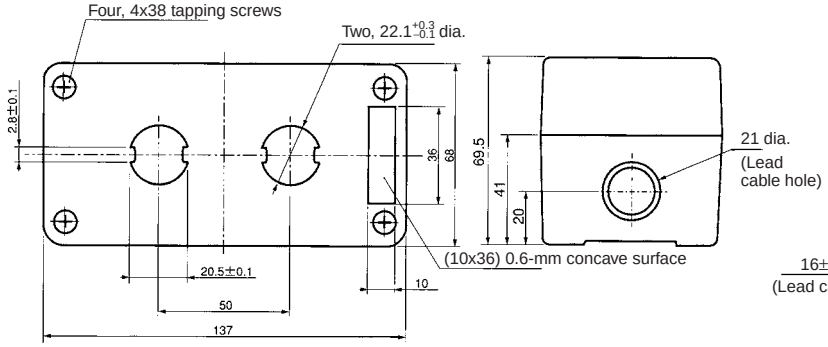
### A22Z-B101 (One Hole)
### A22Z-B101Y



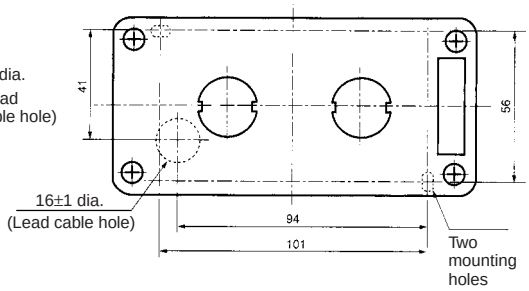

**Cable Port Hole (Top View)**



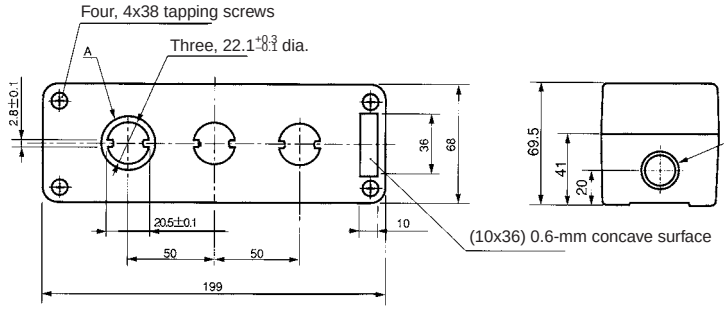

### A22Z-B102 (Two Holes)



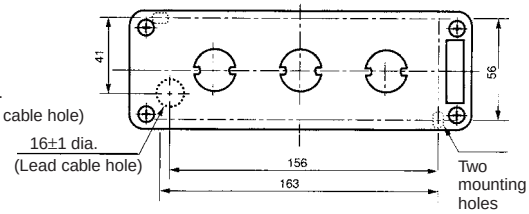

**Cable Port Hole (Top View)**



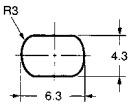

### A22Z-B103 (Three Holes)



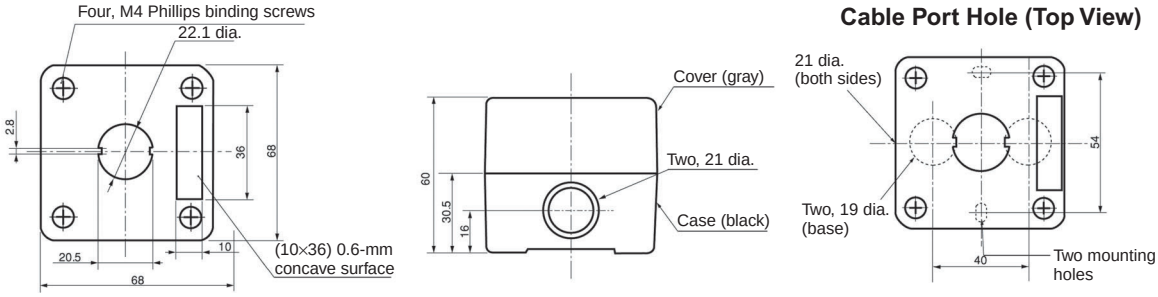

**Cable Port Hole (Top View)**



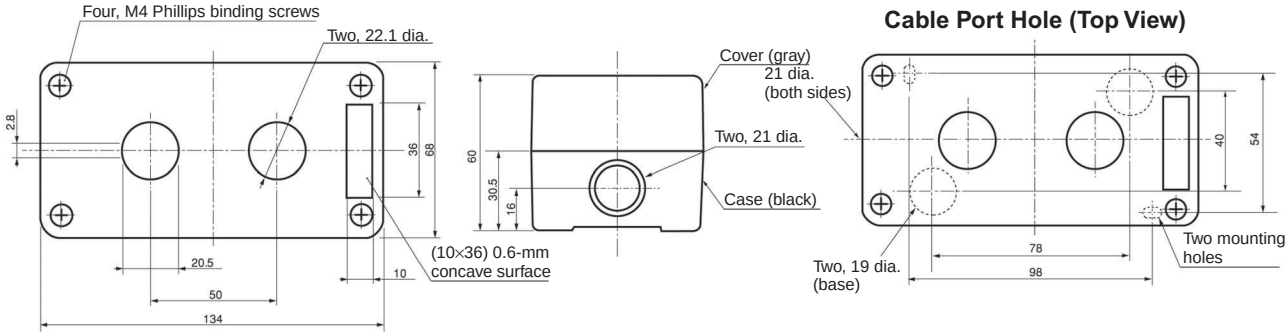

**Panel Mounting Hole**



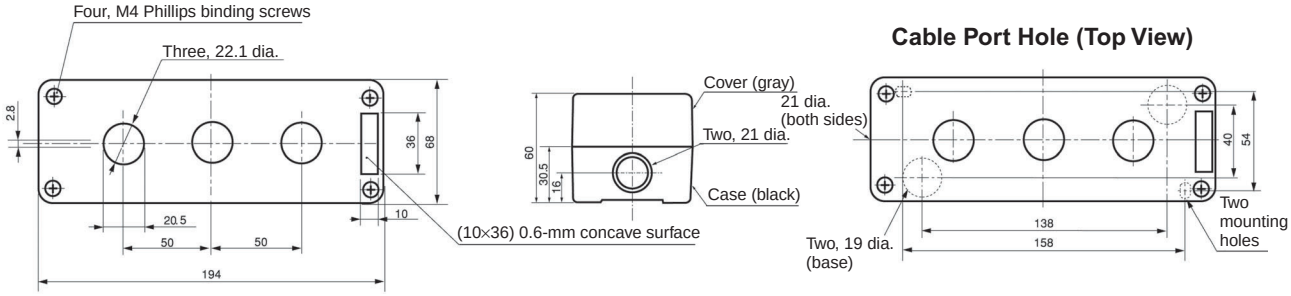
**A22Z-B201 (One Hole)**
**A22Z-B201Y**



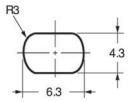

**A22Z-B202 (Two Holes)**



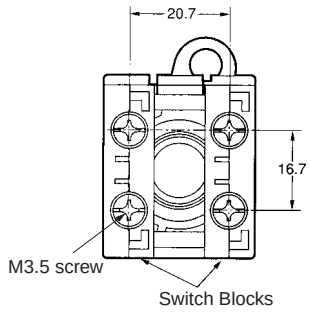
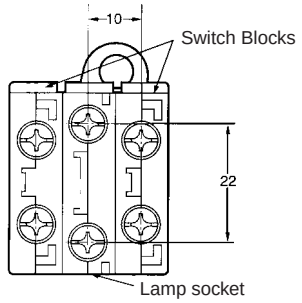
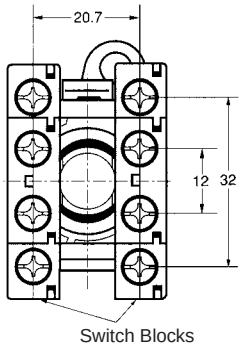

**A22Z-B203 (Three Holes)**



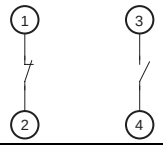
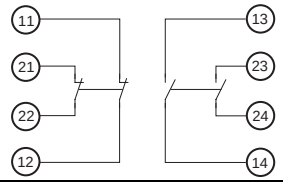
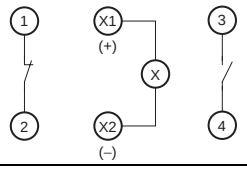
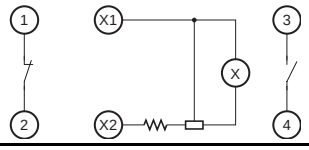

**Panel Mounting Hole**



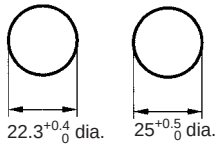

## ■ Terminal Arrangement (Bottom View)

| Non-lighted (SPST-NO + SPST-NC) | Lighted (SPST-NO + SPST-NC) | Non-lighted (DPST-NO + DPST-NC) |
|---|---|---|
|   |   |   |

## ■ Terminal Connection

| Type | Terminal connection |
|---|---|
| Non-lighted (SPST-NO + SPST-NC) | **Bottom view**   |
| Non-lighted (DPST-NO + DPST-NC) | **Bottom view**   |
| Lighted without Voltage Reduction Unit (SPST-NO + SPST-NC) | **Bottom view**   |
| Lighted with Voltage Reduction Unit (SPST-NO + SPST-NC) | **Bottom view**   |

## ■ Panel Cutouts




**Note: 1.** When applying coating such as paint to the panel, the dimensions should be those after the application of coating. Lock ring is provided as a standard item.

**2.** Recommended panel thickness: 1 to 5 mm.

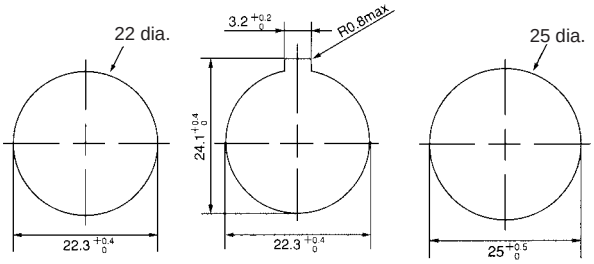
**3.** Use an A22Z-R25 Ring when mounting to a panel with 25-mm holes.

# Installation

## Common to A22, A22S/W, A22K, M22, and A22E

## ■ Mounting to the Panel

### Panel Hole Dimensions



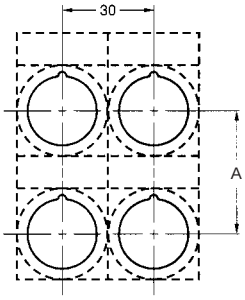

For 25-dia. holes, always use 25-dia. Rings. (Since the cutout dimensions are large, IP65 cannot be guaranteed unless 25-dia. Rings are used.)

If outer surface treatment such as coating is performed for the panel, the panel dimensions after outer surface treatment must meet the specified panel dimensions.

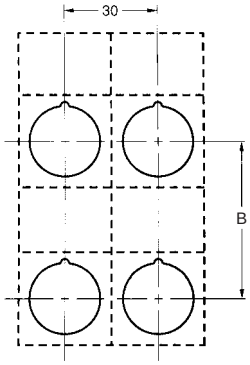
**Note:** Recommended panel thickness: 1 to 5 mm.

### Matrix Installation

1. The following panel hole dimensions apply when Switch Unit and the Standard-size Legend Plate Frame and Lock Ring are mounted, and lead wires are connected directly to the Switch Block.




2. The following panel hole dimensions apply when the Large-size Legend Plate Frame is mounted, and when crimp terminals are connected to the Switch Block terminals.




Pitches A and B between the centers of the mounting holes are as follows:

For 1. above:

| Switch Blocks | A |
|---|---|
| A22-10, A22-10S, A22-01, A22-01S | 45 mm min. |
| A22-20, A22-20S, A22-02, A22-02S, A22-11, A22-11S | 55 mm min. |

For 2. above:

| Type of crimp terminal | Switch Blocks | B |
|---|---|---|
| Bare crimp terminals | A22-10, A22-10S, A22-01, A22-01S | 51 mm min. |
| | A22-20, A22-20S, A22-02, A22-02S, A22-11, A22-11S | 61 mm min. |
| Crimp terminals with insulating sheath | A22-10, A22-10S, A22-01, A22-01S | 60 mm min. |
| | A22-20, A22-20S, A22-02, A22-02S, A22-11, A22-11S | 70 mm min. |

**Note: 1.** The above dimensions are the minimum dimensions for when the wires described under *Applicable Wire Size* on page 165 are used. If a different wires are used, the wiring dimensions may be different so determine an appropriate pitch before setup.

**2.** With pushbuttons of external dimensions greater than 30 mm, set the pitch according to the dimensions. (When using matrix installation for the A22-M□, mount with a pitch of 40 mm instead of 30 mm in the diagram above.)

**3.** When using a pushbutton with external dimensions exceeding 30 mm, use a pitch appropriate for the pushbutton.

## Mounting the Operation Unit on the Panel

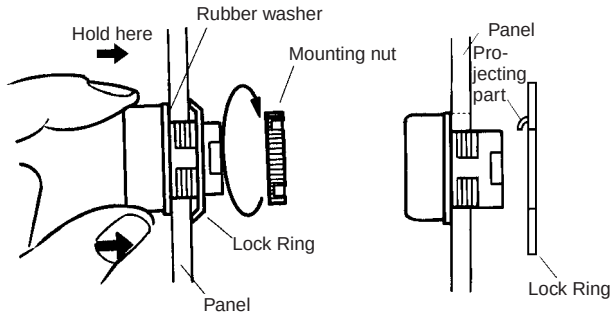
Insert the Operation Unit (Pushbutton, etc.) from the front surface of the panel, insert the Lock Ring and the mounting nut from the terminal side, then tighten the nut. Before tightening, check that the rubber washer is present between the Pushbutton Unit and the panel.

When using a Legend Plate Frame, put one rubber washer each between the Legend Plate Frame and the panel and between the Operation Unit and the Legend Plate Frame. (One rubber washer will be provided when one Legend Plate Frame is ordered.)

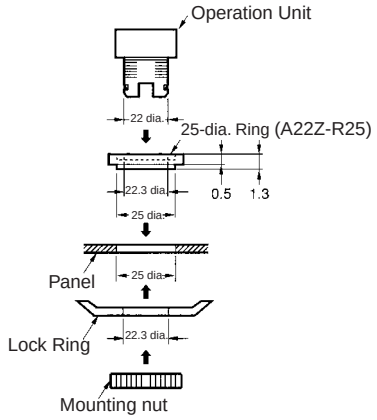
Align the Lock Ring with the groove in the casing, then insert the Lock Ring so that its edge is located on the panel side.

Tighten the mounting nut at a torque of 0.98 to 1.96 N·m.

When using a Lock Ring, replace with the supplied Lock Ring, insert the projecting part into the lock slot, and then tighten the mounting nut.

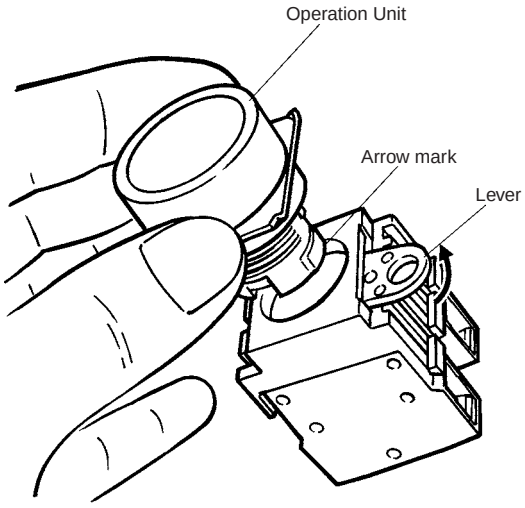



When the panel cutout dimension is 25 dia., remove the supplied rubber washer and mount the 25-dia. Ring as shown below. (Since the A22Z-R25 is not attached to the main body, order separately.)




## Mounting the Switch on the Pushbutton Unit

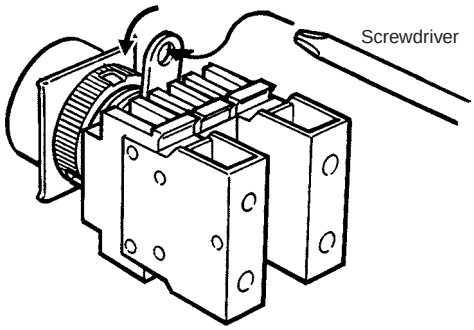
Insert the Pushbutton Unit into the Switch Unit, aligning the arrow mark inscribed on the Case with the lever on the Switch Blocks, then move the lever in the direction indicated by the arrow in the following figure.




## Removing the Switch

Move the lever in the direction indicated by the arrow in the following figure, then pull the Pushbutton Unit or the Switch Blocks.

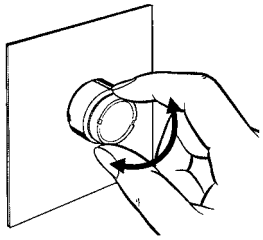
Since the lever has a hole with an inside diameter of 6.5 mm, the lever can be moved in the specified direction by inserting a screwdriver into the hole and then moving the screwdriver.




# ■ Mounting/Replacing the Color Cap

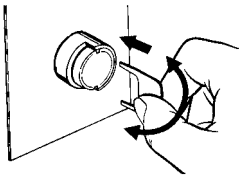
## Projection, Fall-guard

Grip and rotate the Color Cap with your fingers.



## Half-guard Indicators

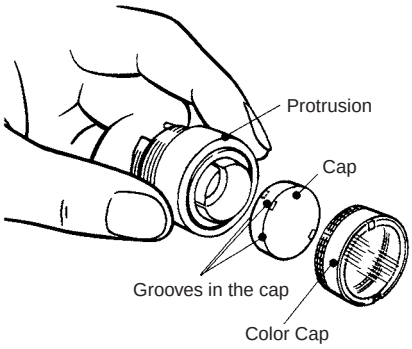
Put the tips of the Cap Tightening Tool (A22Z-3908) into the Color Cap slot and turn the Tool.



# ■ Assembling the Cap

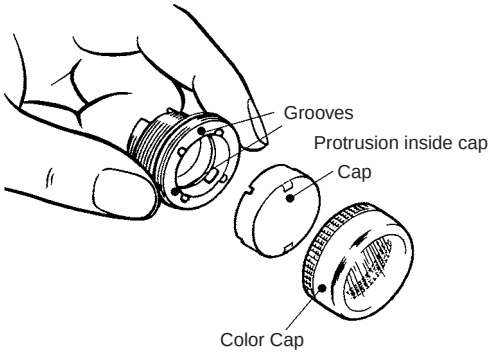
## Lighted Pushbutton Switch

Mount the Color Cap so that the protrusions inside the cap fit into the grooves in the Pushbutton Unit.



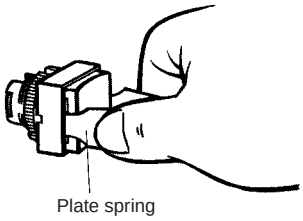

## Indicator

Mount the Color Cap so that the protrusions inside the Pushbutton Unit fit into the grooves in the cap.

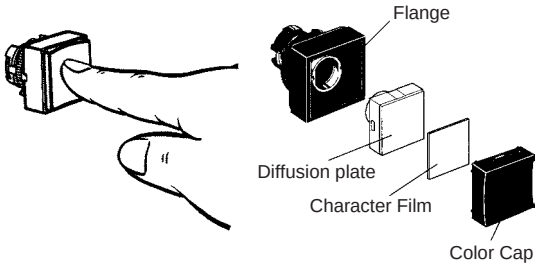



## Square Pushbutton/Indicator

Removing the Color Cap**:**
Insert the protruding tip of the Cap Puller (A3PJ-5080) into the Cap slot, hold the plate spring, and pull them to remove the Color Cap.

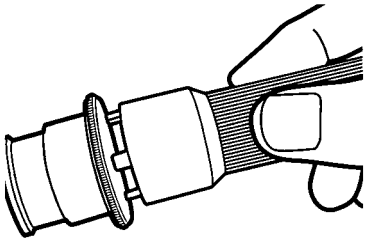



Mounting the Color Cap:
Mount the Color Cap on the flange and firmly push the Color Cap. When the Color Cap is inserted, check whether it operates properly. When replacing the Lamp, remove the Color Cap and diffusion plate with fingers or Cap Puller.
Attach the Character Film properly so that it fits inside the protruding part of the diffusion plate. Then, match the diffusion plate to the square flange and insert the Cap.




## Emergency Stop Switch

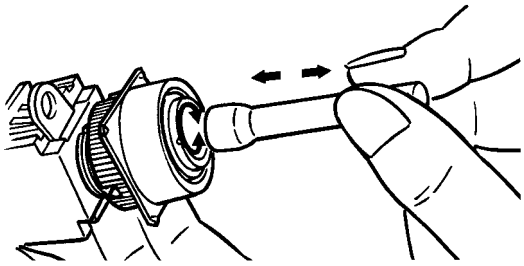
Insert the protrusion of the Tightening Wrench (A22Z-3905) into the Cap slot and then turn to remove the Cap.



# ■ Installing/Replacing the Lamp

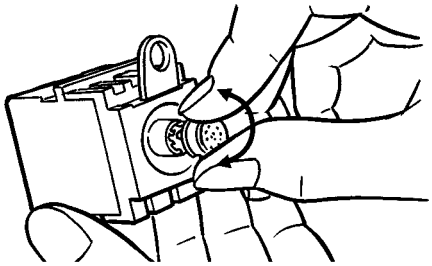
## Installing/Replacing from the Panel Surface

Insert the Lamp Extractor (A22Z-3901) into the lamp, then rotate the Extractor while pressing it.



## Installing/Replacing on the Switch

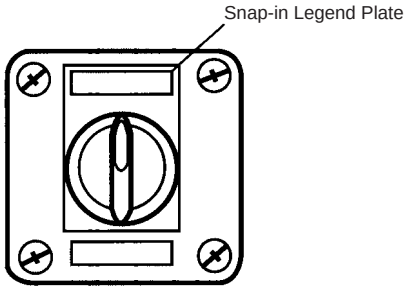
Grip the lamp with your fingers, then rotate the lamp while pressing it against the Switch.



# ■ Control Box (Enclosure)

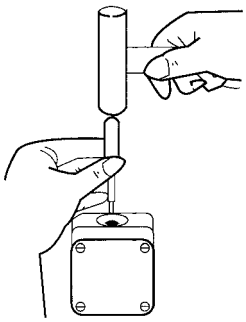
## Mounting the Switch

The Standard-size Legend Plate Frame can be mounted. Mount the Frame as shown in the following diagram. Mount the Switch in the same way as for an ordinary panel.



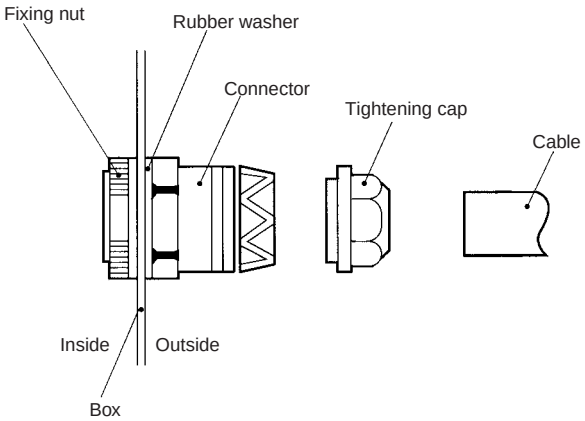

## Creating a Cable Port Hole

Place the tip of a screwdriver on the surface where the cable port hole is to be created with the cover attached and strike the screwdriver to punch a hole. Attempts to punch a hole on the other side of the case will damage the Box.



## Securing the Connector Cable

1. Insert the connector into the cable port hole in the Box and secure with the fixing nut inside the box.
2. Open a hole in the thin rubber section of the rubber ring.
3. Pass the tightening cap through the cable, insert the cable into the connector, and tighten the hexagonal nut to secure the cable.

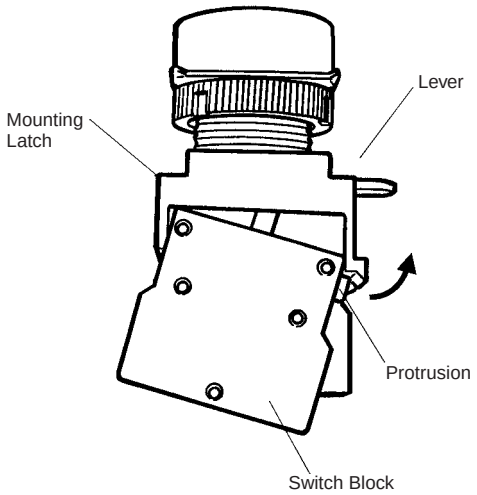



| Cable diameter | Connector |
|---|---|
| 7 to 9 dia. | A22Z-3500-1 |
| 9 to 11 dia. | A22Z-3500-2 |

# ■ Installing/Removing the Switch Blocks

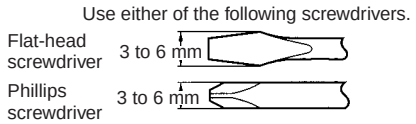
## Installing the Switch Blocks

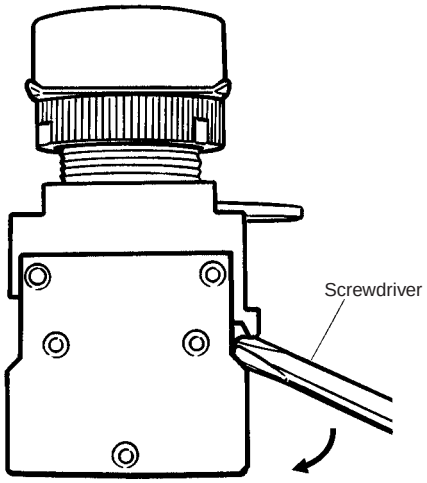
Hook the small protrusion on the Switch Block into the groove on the Mounting Latch on the other side of the lever, then push up the Switch Block in the direction indicated by the arrow in the figure below.




## Removing the Switch Blocks

Insert a screwdriver between the Mounting Latch and the Switch Block, then push down the screwdriver in the direction indicated by the arrow in the following figure.

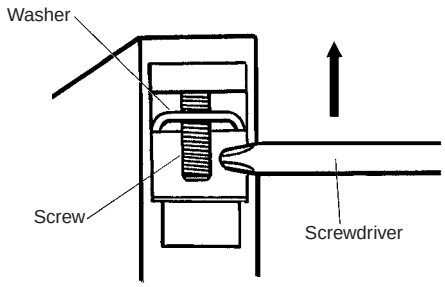


# ■ Wiring

## Wiring Round Crimp Terminals

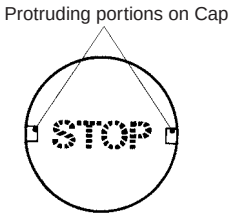
Loosen the terminal screw from the Switch Unit until it completely comes off the groove, insert a screwdriver as shown in the following figure, then push up the washer in the direction indicated by the arrow to temporarily secure it. Now, a round crimp terminal can be connected. After inserting the terminal, tighten the screws to complete wiring.




# ■ Engraving

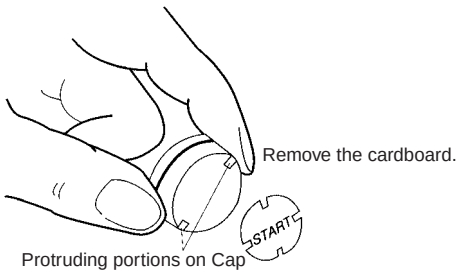
Engrave the characters on the surface on the Cap. Make sure that the characters are aligned parallel to the imaginary line connecting the two protruding portions to the left and right of the Cap.

The characters must not be engraved deeper than 0.5 mm. Apply an alcohol-based paint coating, such as melamine, alkyd, or acrylic resin paint coating, to the engraved characters.




# ■ Affixing Character Film

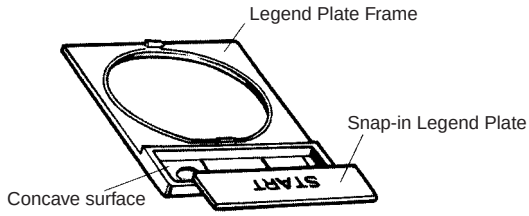
Hold the Cap, remove the cardboard on the Film, and attach the Film to the Cap. Make sure that the protruding portions of the Cap engage the cutout portions of the Film and that the characters are aligned parallel to the imaginary line connecting the two protruding portions to the left and right of the Cap.



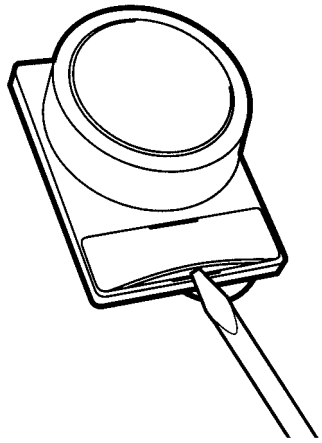

# ■ Mounting and Dismounting Snap-in Legend

Press and secure the Snap-in Legend Plate onto the Legend Plate Frame.

The direction of the characters will vary with the mounting direction of the control panel if the Switch is a knob or key selector model.

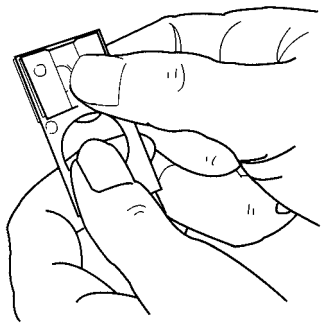



To easily remove the Snap-in Legend Plate from the Legend Plate Frame mounted to the panel, insert a Tool with a thin tip into the space between the Snap-in Legend Plate and the Legend Plate Frame.



The Snap-in Legend Plate is easily removed by pressing the Snap-in Legend Plate from the back of the Legend Plate Frame.

The Legend Plate Frame is made of acrylic resin, which is easily damaged by shock. Be sure to handle the Legend Plate Frame with care.



# ■ Engraving Method

## Material: Acrylic

Engrave the characters directly on the matted side of the Snap-in Legend Plate.

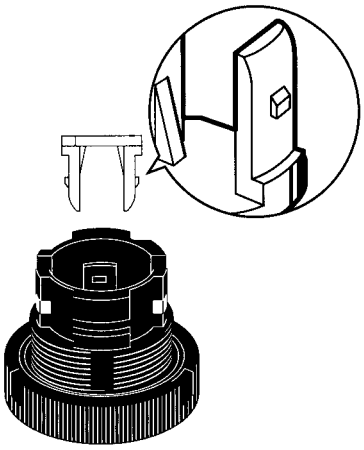
The characters must be engraved no deeper than 0.5 mm.

Apply alcohol-based paint coating to the engraved characters.

If the Snap-in Legend Plate is transparent, engrave the mirror-written characters on the back of the Snap-in Legend Plate and apply paint coating to the characters. Then apply paint coating of a different color to the remaining part of the Snap-in Legend Plate.

# ■ Mounting Three-throw Spacer (A22Z-3003)

Press and secure the two protruding portions of the Three-throw Spacer to the two indented portions of the inner side of the control panel.



# Precautions

## Common to A22, A22S/W, A22K, M22, and A22E

**⚠ WARNING**

Do not apply a voltage between the incandescent lamp and the terminal that is greater than the rated voltage. If the incandescent lamp is broken, the Operation Units may pop out.
Always turn OFF the power and wait for 10 minutes before replacing the incandescent lamp. If the lamp is replaced immediately after the power is turned OFF, the remaining heat may cause burns.

## ■ Correct Use

### Mounting

Always make sure that the power is turned OFF before mounting, removing, or wiring the Switch, or performing maintenance.

Do not tighten the mounting ring more than necessary using tools such as pointed-nose pliers. Doing so will damage the mounting ring. The tightening torque is 0.98 to 1.96 N·m.

Recommended panel thickness: 1 to 5 mm.

### Wiring

After wiring the Switch, maintain an appropriate clearance and creepage distance.

When DC-specific LEDs are used, wire the Switch so that the X1 terminal is positive.

Terminal screws must be Phillips or slotted M3.5 screws with a square washer.

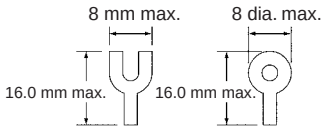
The tightening torque is 1.08 to 1.27 N·m.

Single wires, stranded wires, and crimp terminals can be connected to the Switch.

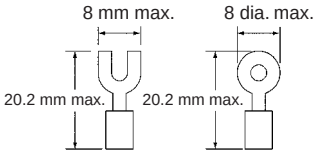
### Applicable Wire Size

Stranded wire: 2 $mm^2$ max.
Solid wire: 1.6 dia. max.

**Bare Crimp Terminals**




**Crimp Terminals with Insulating Sheath**




### Operating Environment

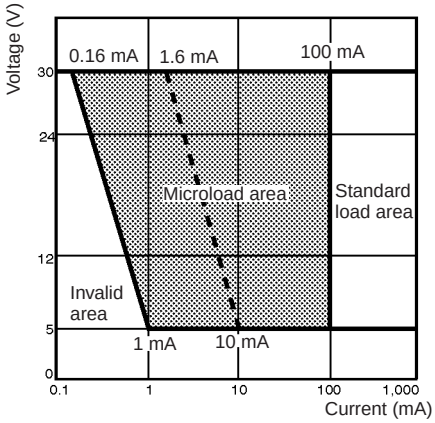
The IP65 model is designed with a degree of protection so that it will not sustain damage if it is subjected to water from any direction to the front of the panel.

### Using the Microload

Insert a contact protection circuit, if necessary, to prevent the reduction of life expectancy due to extreme wear on the contacts caused by loads where inrush current occurs when the contact is opened and closed.

The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ 60) (conforming to JIS C5003).

The equation, λ 60 = 0.5 x $10^{-6}$/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.




### LED

The LED current-limiting resistor is built-in, so internal resistance is not required.

If commercially available LEDs are used, select the ones that meet the following conditions:

Base: BA9S/13□

Overall length: 26 mm max.

Power consumption: 2.6 W max.

### Others

If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after the coating.

Do not subject the Switch to extreme shock or vibration. Doing so will cause malfunctions and damage to the Switch.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

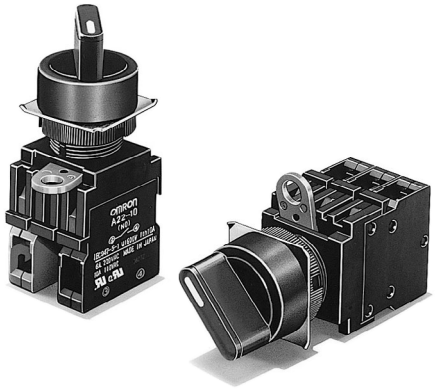
Cat. No. A128-E1-03

In the interest of product improvement, specifications are subject to change without notice.

# Knob-type Selector Switch
# A22S/W

## Install in 22-dia. or 25-dia. Panel Cutout

- Easy mounting and removal of Switch Unit.
- Increase wiring efficiency with three-row mounting of Switch Blocks.
- Finger protection mechanism on Switch Unit provided as a standard feature.
- Use 25-dia. ring to install in 25-dia. panel cutouts.
- Mounted using either open-type (fork-type) or closed-type (round-type) crimp terminals.
- IP65 oil resistance (non-lighted models)
  IP65 (lighted models)
- EN60947-5-1
- UL and cUL approved (File No. E41515).



# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

Shipped as a set which includes the Selector, Lamp (lighted models only), and Switch.

**A22□-□□-□-□**
(1 2 3 4 5)

**1 Lighted/Non-lighted**

| Code | Description |
|---|---|
| S | Non-lighted |
| W | Lighted |

**2 Number of Notches/Reset Method**

| Code | Description |
|---|---|
| 2M | 2 notches/Manual |
| 2A | 2 notches/Automatic |
| 3M | 3 notches/Manual |
| 3A | 3 notches/Automatic |

**3 Illumination Color**

| Code | Description |
|---|---|
| None | Black (for non-lighted models only) |
| R | Red |
| G | Green |
| Y | Yellow |
| A | Blue |

**4 Light Source**

| Without Voltage Reduction Unit | | |
|---|---|---|
| **Code** | **Operating Voltage** | |
| None | Non-lighted | |
| 6D | LED | 6 VDC |
| 6A | | 6 VAC |
| 12A | | 12 VAC/VDC |
| 24A | | 24 VAC/VDC |
| 5 | Incandescent lamp | 5 VAC/VDC |
| 12 | | 12 VAC/VDC |
| 24 | | 24 VAC/VDC |

| With Voltage Reduction Unit | | |
|---|---|---|
| None | Non-lighted | |
| T1 | LED | 100 VAC (See note 2.) |
| T2 | | 200 VAC (See note 3.) |

**Note: 1.** The LED lamp (24 VAC/VDC) can be lit by directly applying 100 VAC/VDC (200 VAC/VDC) to the lamp terminal. LED incorporates the 24-VAC/VDC models.
**2.** Operational voltage: 95 to 115 VAC
**3.** Operational voltage: 190 to 230 VAC

**5 Contacts**

| Code | Description |
|---|---|
| 10 | SPST-NO (See note 1.) |
| 01 | SPST-NC (See note 1.) |
| 11 | SPST-NO + SPST-NC |
| 20 | DPST-NO |
| 02 | DPST-NC |

**Note: 1.** For models with 2 notches
**2.** The contacts are rated for standard loads. For microloads, refer to *Accessories* section for the A22.

## Subassembled

The Selector, Lamp, or Switch can be ordered separately. Use them in combination for models that are not available as assembled Units. These can also be used as inventory for maintenance parts.

### 1. Selector

**A22□-□□** (1 2 3)

**1 Lighted/Non-lighted**

| Code | Description |
|---|---|
| S | Non-lighted |
| W | Lighted |

**2 Number of Notches/Reset Method**

| Code | Description |
|---|---|
| 2M | 2 notches/Manual |
| 2A | 2 notches/Automatic |
| 3M | 3 notches/Manual |
| 3A | 3 notches/Automatic |

**3 Illumination Color**

| Code | Description |
|---|---|
| None | Black (for non-lighted models only) |
| R | Red |
| G | Green |
| Y | Yellow |
| A | Blue |

### 2. Lamp

**A22-□□** (1 2)

**1 Operating Voltage (Rated Voltage)**

| Incandescent lamp | |
|---|---|
| **Code** | **Description** |
| 5 | 5 VAC (6 VAC) |
| 12 | 12 VAC (14 VAC) |
| 24 | 24 VAC (28 VAC) |
| **LED lamp** | |
| 6D | 6 VDC (6 VDC) |
| 6A | 6 VAC (6 VAC) |
| 12A | 12 VAC/VDC (12 VAC/VDC) |
| 24A | 24 VAC/VDC (24 VAC/VDC) |

**2 Illumination Color**

| Code | Description |
|---|---|
| None | Incandescent lamp |
| R | Red |
| G | Green |
| Y | Yellow |
| A | Blue |

### 3. Switch (General-purpose Load)

**A22□-□M-□** (1 2 3)

**1 Lighted/Non-lighted**

| Code | Description |
|---|---|
| None | Non-lighted |
| L | Lighted |

**2 Contacts**

| Code | Description |
|---|---|
| 10 | SPST-NO (2-notch only) |
| 01 | SPST-NC (2-notch only) |
| 11 | SPST-NO + SPST-NC |
| 20 | DPST-NO |
| 02 | DPST-NC |

**3 Voltage Reduction Unit (Lighted Models Only)**

| Code | Description |
|---|---|
| None | Without Voltage Reduction Unit |
| T1 | 100 VAC (See note 1) |
| T2 | 200 VAC (See note 2) |

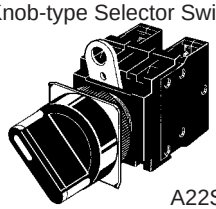
**Note: 1.** Operational voltage: 95 to 115 VAC
**2.** Operational voltage: 190 to 230 VAC

# Ordering Information

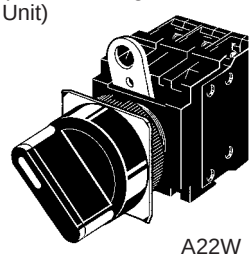
## ■ List of Models

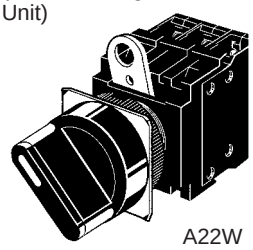
### Ordering as a Set

#### Non-lighted

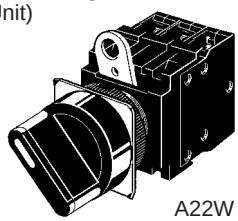
| Appearance | Number of notches | Resetting method | Output | Model | Color of Selector |
|---|---|---|---|---|---|
| Knob-type Selector Switch  A22S | 2 notches | Manual | SPST-NO | A22S-2M-10 | Black |
| | | | SPST-NC | A22S-2M-01 | |
| | | | SPST-NO + SPST-NC | A22S-2M-11 | |
| | | | DPST-NO | A22S-2M-20 | |
| | | | DPST-NC | A22S-2M-02 | |
| | | Automatic | SPST-NO | A22S-2A-10 | |
| | | | SPST-NC | A22S-2A-01 | |
| | | | SPST-NO + SPST-NC | A22S-2A-11 | |
| | | | DPST-NO | A22S-2A-20 | |
| | | | DPST-NC | A22S-2A-02 | |
| | 3 notches | Manual | SPST-NO + SPST-NC | A22S-3M-11 | |
| | | | DPST-NO | A22S-3M-20 | |
| | | | DPST-NC | A22S-3M-02 | |
| | | Automatic | SPST-NO + SPST-NC | A22S-3A-11 | |
| | | | DPST-NO | A22S-3A-20 | |
| | | | DPST-NC | A22S-3A-02 | |

## Lighted (Without Voltage Reduction Unit)

| Appearance | Number of notches | Resetting method | Output | Operating voltage | Model | Illumination color |
|---|---|---|---|---|---|---|
| Knob-type Selector Switch<br>LED lighting (without Voltage Reduction Unit)<br>  <br>A22W | 2 notches | Manual | SPST-NO | 6 VDC | A22W-2M□-6D-10 | Insert one of the following letters into the box □.<br>R (red)<br>Y (yellow)<br>G (green)<br>A (blue) |
| | | | | 6 VAC | A22W-2M□-6A-10 | |
| | | | | 12 VAC/VDC | A22W-2M□-12A-10 | |
| | | | | 24 VAC/VDC | A22W-2M□-24A-10 | |
| | | | SPST-NC | 6 VDC | A22W-2M□-6D-01 | |
| | | | | 6 VAC | A22W-2M□-6A-01 | |
| | | | | 12 VAC/VDC | A22W-2M□-12A-01 | |
| | | | | 24 VAC/VDC | A22W-2M□-24A-01 | |
| | | | SPST-NO + SPST-NC | 6 VDC | A22W-2M□-6D-11 | |
| | | | | 6 VAC | A22W-2M□-6A-11 | |
| | | | | 12 VAC/VDC | A22W-2M□-12A-11 | |
| | | | | 24 VAC/VDC | A22W-2M□-24A-11 | |
| | | | DPST-NO | 6 VDC | A22W-2M□-6D-20 | |
| | | | | 6 VAC | A22W-2M□-6A-20 | |
| | | | | 12 VAC/VDC | A22W-2M□-12A-20 | |
| | | | | 24 VAC/VDC | A22W-2M□-24A-20 | |
| | | | DPST-NC | 6 VDC | A22W-2M□-6D-02 | |
| | | | | 6 VAC | A22W-2M□-6A-02 | |
| | | | | 12 VAC/VDC | A22W-2M□-12A-02 | |
| | | | | 24 VAC/VDC | A22W-2M□-24A-02 | |
| | | Automatic | SPST-NO | 6 VDC | A22W-2A□-6D-10 | |
| | | | | 6 VAC | A22W-2A□-6A-10 | |
| | | | | 12 VAC/VDC | A22W-2A□-12A-10 | |
| | | | | 24 VAC/VDC | A22W-2A□-24A-10 | |
| | | | SPST-NC | 6 VDC | A22W-2A□-6D-01 | |
| | | | | 6 VAC | A22W-2A□-6A-01 | |
| | | | | 12 VAC/VDC | A22W-2A□-12A-01 | |
| | | | | 24 VAC/VDC | A22W-2A□-24A-01 | |
| | | | SPST-NO + SPST-NC | 6 VDC | A22W-2A□-6D-11 | |
| | | | | 6 VAC | A22W-2A□-6A-11 | |
| | | | | 12 VAC/VDC | A22W-2A□-12A-11 | |
| | | | | 24 VAC/VDC | A22W-2A□-24A-11 | |
| | | | DPST-NO | 6 VDC | A22W-2A□-6D-20 | |
| | | | | 6 VAC | A22W-2A□-6A-20 | |
| | | | | 12 VAC/VDC | A22W-2A□-12A-20 | |
| | | | | 24 VAC/VDC | A22W-2A□-24A-20 | |
| | | | DPST-NC | 6 VDC | A22W-2A□-6D-02 | |
| | | | | 6 VAC | A22W-2A□-6A-02 | |
| | | | | 12 VAC/VDC | A22W-2A□-12A-02 | |
| | | | | 24 VAC/VDC | A22W-2A□-24A-02 | |
| | 3 notches | Manual | SPST-NO + SPST-NC | 6 VDC | A22W-3M□-6D-11 | |
| | | | | 6 VAC | A22W-3M□-6A-11 | |
| | | | | 12 VAC/VDC | A22W-3M□-12A-11 | |
| | | | | 24 VAC/VDC | A22W-3M□-24A-11 | |
| | | | DPST-NO | 6 VDC | A22W-3M□-6D-20 | |
| | | | | 6 VAC | A22W-3M□-6A-20 | |
| | | | | 12 VAC/VDC | A22W-3M□-12A-20 | |
| | | | | 24 VAC/VDC | A22W-3M□-24A-20 | |
| | | | DPST-NC | 6 VDC | A22W-3M□-6D-02 | |
| | | | | 6 VAC | A22W-3M□-6A-02 | |
| | | | | 12 VAC/VDC | A22W-3M□-12A-02 | |
| | | | | 24 VAC/VDC | A22W-3M□-24A-02 | |

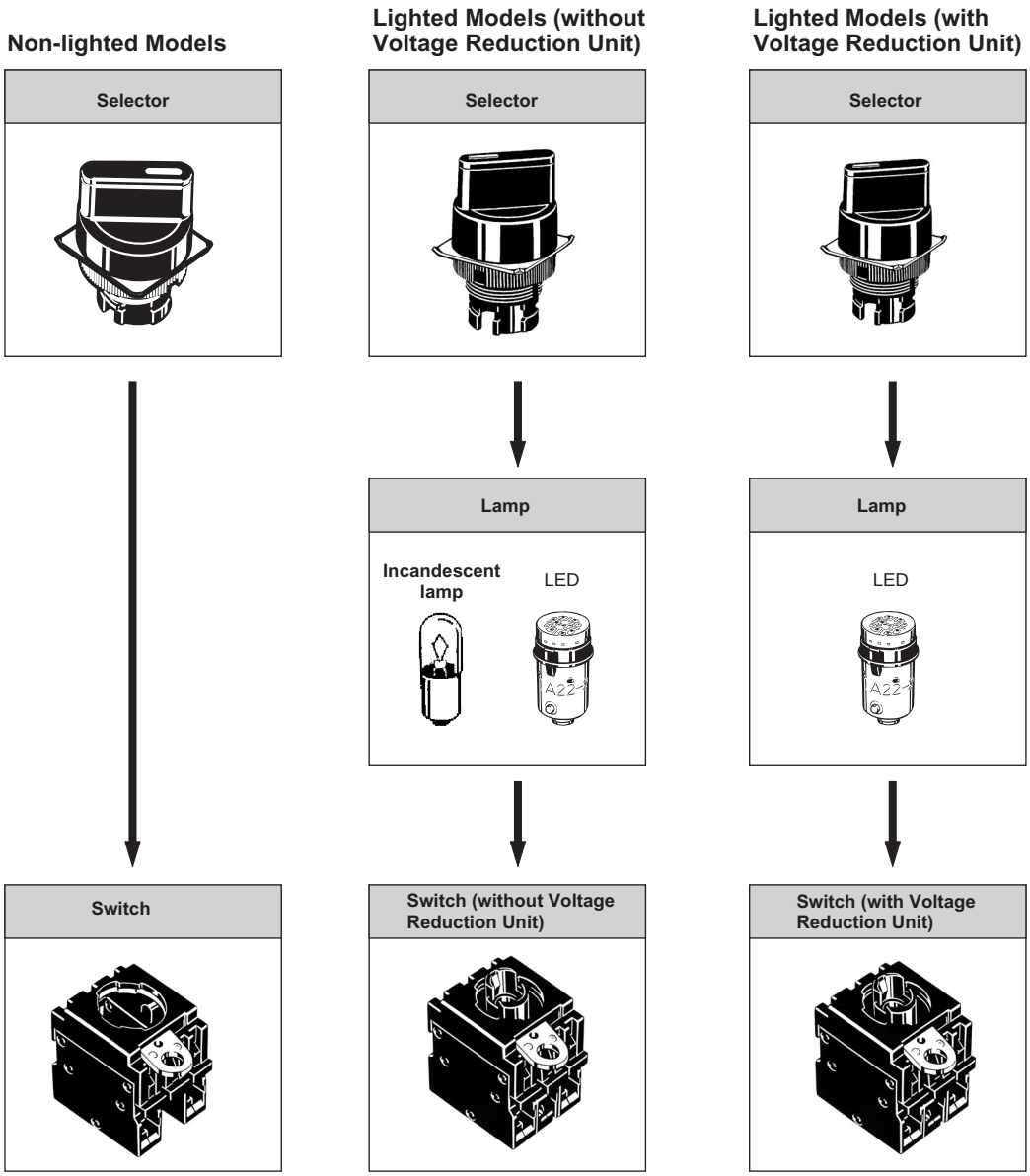
| Appearance | Number of notches | Resetting method | Output | Operating voltage | Model | Illumination color |
|---|---|---|---|---|---|---|
| Knob-type Selector Switch<br>LED lighting<br>(without Voltage Reduction Unit)<br>  <br>A22W | 3 notches | Automatic | SPST-NO + SPST-NC | 6 VDC | A22W-3A□-6D-11 | Insert one of the following letters into the box □.<br>R (red)<br>Y (yellow)<br>G (green)<br>A (blue) |
| | | | | 6 VAC | A22W-3A□-6A-11 | |
| | | | | 12 VAC/VDC | A22W-3A□-12A-11 | |
| | | | | 24 VAC/VDC | A22W-3A□-24A-11 | |
| | | | DPST-NO | 6 VDC | A22W-3A□-6D-20 | |
| | | | | 6 VAC | A22W-3A□-6A-20 | |
| | | | | 12 VAC/VDC | A22W-3A□-12A-20 | |
| | | | | 24 VAC/VDC | A22W-3A□-24A-20 | |
| | | | DPST-NC | 6 VDC | A22W-3A□-6D-02 | |
| | | | | 6 VAC | A22W-3A□-6A-02 | |
| | | | | 12 VAC/VDC | A22W-3A□-12A-02 | |
| | | | | 24 VAC/VDC | A22W-3A□-24A-02 | |

## Lighted (With Voltage Reduction Unit)

| Appearance | Number of notches | Resetting method | Output | Operating voltage | Model | Selector symbol (color) |
|---|---|---|---|---|---|---|
| Knob-type Selector Switch<br>LED voltage-reduction lighting<br>(with Voltage Reduction Unit)<br>  <br>A22W | 2 notches | Manual | SPST-NO | 100 VAC | A22W-2M□-T1-10 | Insert one of the following letters into the box □.<br>R (red)<br>Y (yellow)<br>G (green)<br>A (blue) |
| | | | | 200 VAC | A22W-2M□-T2-10 | |
| | | | SPST-NC | 100 VAC | A22W-2M□-T1-01 | |
| | | | | 200 VAC | A22W-2M□-T2-01 | |
| | | | SPST-NO + SPST-NC | 100 VAC | A22W-2M□-T1-11 | |
| | | | | 200 VAC | A22W-2M□-T2-11 | |
| | | | DPST-NO | 100 VAC | A22W-2M□-T1-20 | |
| | | | | 200 VAC | A22W-2M□-T2-20 | |
| | | | DPST-NC | 100 VAC | A22W-2M□-T1-02 | |
| | | | | 200 VAC | A22W-2M□-T2-02 | |
| | | Automatic | SPST-NO | 100 VAC | A22W-2A□-T1-10 | |
| | | | | 200 VAC | A22W-2A□-T2-10 | |
| | | | SPST-NC | 100 VAC | A22W-2A□-T1-01 | |
| | | | | 200 VAC | A22W-2A□-T2-01 | |
| | | | SPST-NO + SPST-NC | 100 VAC | A22W-2A□-T1-11 | |
| | | | | 200 VAC | A22W-2A□-T2-11 | |
| | | | DPST-NO | 100 VAC | A22W-2A□-T1-20 | |
| | | | | 200 VAC | A22W-2A□-T2-20 | |
| | | | DPST-NC | 100 VAC | A22W-2A□-T1-02 | |
| | | | | 200 VAC | A22W-2A□-T2-02 | |
| | 3 notches | Manual | SPST-NO + SPST-NC | 100 VAC | A22W-3M□-T1-11 | |
| | | | | 200 VAC | A22W-3M□-T2-11 | |
| | | | DPST-NO | 100 VAC | A22W-3M□-T1-20 | |
| | | | | 200 VAC | A22W-3M□-T2-20 | |
| | | | DPST-NC | 100 VAC | A22W-3M□-T1-02 | |
| | | | | 200 VAC | A22W-3M□-T2-02 | |
| | | Automatic | SPST-NO + SPST-NC | 100 VAC | A22W-3A□-T1-11 | |
| | | | | 200 VAC | A22W-3A□-T2-11 | |
| | | | DPST-NO | 100 VAC | A22W-3A□-T1-20 | |
| | | | | 200 VAC | A22W-3A□-T2-20 | |
| | | | DPST-NC | 100 VAC | A22W-3A□-T1-02 | |
| | | | | 200 VAC | A22W-3A□-T2-02 | |

**Note:** When ordering, specify the symbol that indicates color of the Selector in the □ of the model number.

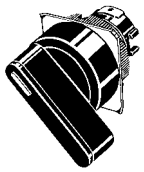
## Ordering Individually



## Selectors

### Non-lighted (Color: Only Black is Available)

| Notches | Reset method | Standard lever IP65 (oil-resistant) |
|---|---|---|
| 2 notches | Manual | A22S-2M |
| | Automatic | A22S-2A |
| 3 notches | Manual | A22S-3M |
| | Automatic | A22S-3A |

| Notches | Reset method | Standard lever IP65 (oil-resistant)  |
|---|---|---|
| 2 notches | Manual | A22S-C2M |
| | Automatic | A22S-C2A |
| 3 notches | Manual | A22S-C3M |
| | Automatic | A22S-C3A |

### Lighted

| Notches | Reset method | Selector color | Standard lever IP65 |
|---|---|---|---|
| 2 notches | Manual | Red | A22W-2MR |
| | | Green | A22W-2MG |
| | | Yellow | A22W-2MY |
| | | Blue | A22W-2MA |
| | Automatic | Red | A22W-2AR |
| | | Green | A22W-2AG |
| | | Yellow | A22W-2AY |
| | | Blue | A22W-2AA |
| 3 notches | Manual | Red | A22W-3MR |
| | | Green | A22W-3MG |
| | | Yellow | A22W-3MY |
| | | Blue | A22W-3MA |
| | Automatic | Red | A22W-3AR |
| | | Green | A22W-3AG |
| | | Yellow | A22W-3AY |
| | | Blue | A22W-3AA |

**Note:** Either incandescent lamps or LED lamps can be used with the above models.

## Lamps

### LED Lamp

| Appearance | AC/DC | LED light \ Operating voltage | 6 V | 12 V | 24 V | 24 V Super-bright |
|---|---|---|---|---|---|---|
| | | | Model | | | |
| | DC | Red | A22-6DR | --- | --- | --- |
| | | Green | A22-6DG | --- | --- | --- |
| | | Yellow (See note 2.) | A22-6DY | --- | --- | --- |
| | | Blue | A22-6DA | --- | --- | --- |
| | AC | Red | A22-6AR | --- | --- | --- |
| | | Green | A22-6AG | --- | --- | --- |
| | | Yellow (See note 2.) | A22-6AY | --- | --- | --- |
| | | Blue | A22-6AA | --- | --- | --- |
| | AC and DC | Red | --- | A22-12AR | A22-24AR | A22-24ASR |
| | | Green | --- | A22-12AG | A22-24AG | A22-24ASG |
| | | Yellow (See note 2.) | --- | A22-12AY | A22-24AY | A22-24ASY |
| | | Blue | --- | A22-12AA | A22-24AA | A22-24ASA |

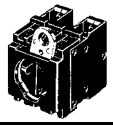
**Note: 1.** For voltage-reduction lighting, use the A22-24A□.
**2.** Used when the Selector color is yellow or white.

## Incandescent Lamp

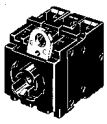
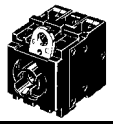
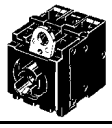
| Operating voltage | 5 VAC/VDC | 12 VAC/VDC | 24 VAC/VDC |
|---|---|---|---|
| | A22-5 | A22-12 | A22-24 |

## Switches (General-purpose Load)

### Non-lighted

| Switch operation  | Contacts | Model |
|---|---|---|
| Automatic | SPST-NO | A22-10M |
| | SPST-NC | A22-01M |
| | SPST-NO + SPST-NC | A22-11M |
| | DPST-NO | A22-20M |
| | DPST-NC | A22-02M |

### Lighted

| Switch operation | Contacts | Voltage-reduction circuit | | |
|---|---|---|---|---|
| | | Without Voltage Reduction Unit  | With Voltage Reduction Unit | |
| | | | 110 VAC  | 220 VAC  |
| Automatic | SPST-NO | A22L-10M | A22L-10M-T1 | A22L-10M-T2 |
| | SPST-NC | A22L-01M | A22L-01M-T1 | A22L-01M-T2 |
| | SPST-NO + SPST-NC | A22L-11M | A22L-11M-T1 | A22L-11M-T2 |
| | DPST-NO | A22L-20M | A22L-20M-T1 | A22L-20M-T2 |
| | DPST-NC | A22L-02M | A22L-02M-T1 | A22L-02M-T2 |

**Note:** For voltage-reduction lighting, use the A22-24A□.

# ■ Accessories (Order Separately)

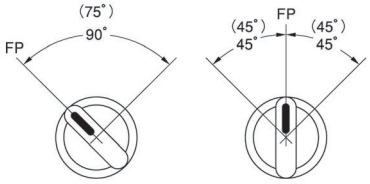
The A22S/W uses the same accessories as the A22. Refer to the relevant information in the section for the A22.

# Specifications

With the exception of the following items, the specifications are the same as for the A22. Refer to the relevant information in the *Specifications* section for the A22.

## ■ Operation Angle

**Two notches** **Three notches**




**Note: 1.** The angle used for automatic reset is shown in parentheses.
**2.** FP: Free Position

## ■ Contacts

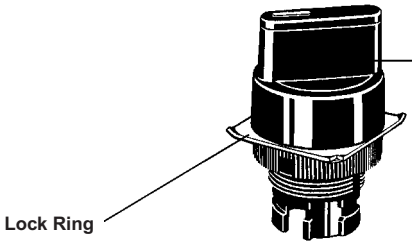
### 2-notch Type

| Knob position | SPST-NO | SPST-NC | SPST-NO + SPST-NC | DPST-NO | DPST-NC |
|---|---|---|---|---|---|
| | |  | | |  |
| | | | | | |

### 3-notch Type

| Knob position | SPST-NO + SPST-NC | DPST-NO | DPST-NC |
|---|---|---|---|
| | | | |
| | | |  |
| | | | |

# Nomenclature

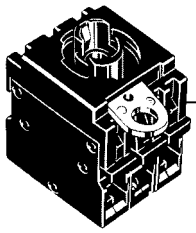



**Selector**

- **Number of Notches**
  2 notches/3 notches
- **Applicable Colors**
  Non-lighted: Black
  Lighted: Red, green yellow, blue

**Lamp**

- **Light Source**
  LED lamp
  Incandescent lamp



**Switch**

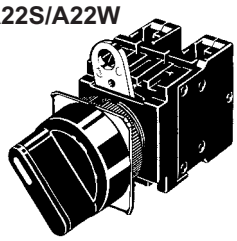
- **Contacts**
  SPST-NO, SPST-NC, SPST-NO + SPST-NC,
  DPST-NO, DPST-NC
  (Minimum applicable load: 10 mA at 5 VDC)
- **Lighting Method**
  Non-lighted
  Lighted (without Voltage Reduction Unit)
  Lighted (with Voltage Reduction Unit)

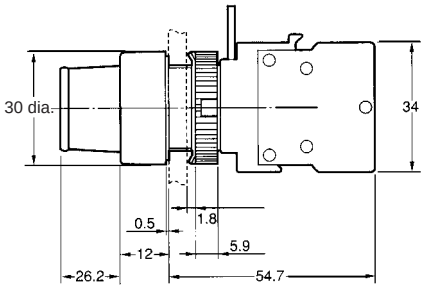
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

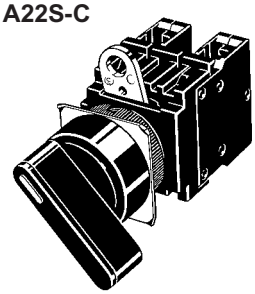
## ■ Knob-type Selector Switch (Lighted/Non-lighted)

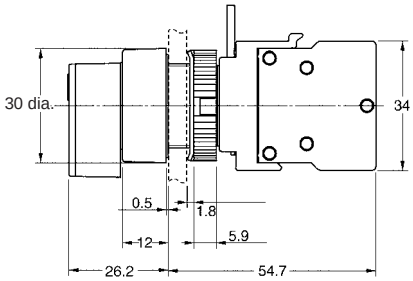
**A22S/A22W**






**A22S-C**

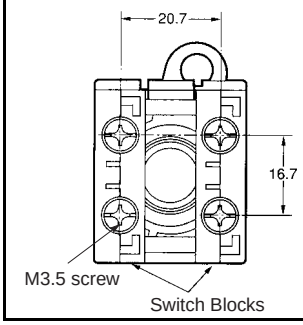
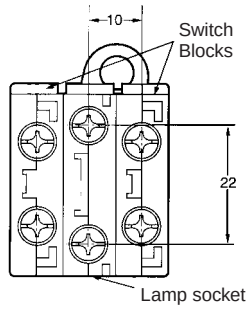




## ■ Accessories (Common to A22, A22S/W, A22K, M22, and A22E)

The A22S/W uses the same accessories as the A22. Refer to the relevant information in the corresponding section for the A22.

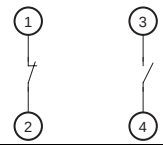
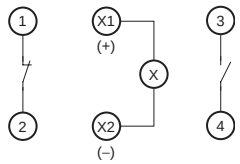
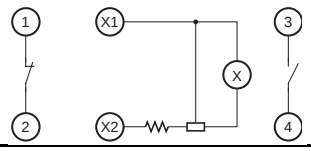
## ■ Terminal Arrangement (Bottom View)

| Non-lighted (SPST-NO + SPST-NC) | Lighted (SPST-NO + SPST-NC) |
|---|---|
|  |  |





## ■ Terminal Connection

| Type | Connection diagram |
|---|---|
| Non-lighted |  |
| Lighted without Voltage Reduction Unit |  |
| Lighted with Voltage Reduction Unit |  |

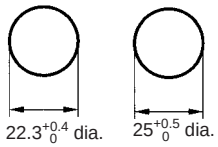






**Note:** The above terminal connection diagrams are examples for SPST-NO + SPST-NC.

## ■ Panel Cutouts (Top View)





**Note: 1.** When applying coating such as paint to the panel, the dimensions should be those after the application of coating. Lock Ring is provided as a standard item.

**2.** Recommended panel thickness: 1 to 5 mm.

**3.** Use an A22Z-R25 Ring when mounting to a panel with 25-mm holes.

# Installation

The A22S/W uses the same installation method as the A22. Refer to the relevant information in the *Installation* section for the A22.

# Precautions

The precautions for the A22S/W are the same as those for the A22. Refer to the relevant information in the *Precautions* section for the A22 and the *Technical Information for Pushbutton Switches* (Cat. No. A143).

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A129-E1-03

In the interest of product improvement, specifications are subject to change without notice.

# 3Key-type Selector Switch
# A22K

## Install in 22-dia. or 25-dia. Panel Cutout

- Easy mounting and removal of Switch Unit.
- Increase wiring efficiency with three-row mounting of Switch Blocks.
- Finger protection mechanism on Switch Unit provided as a standard feature.
- Use 25-dia. ring to install in 25-dia. panel cutouts.
- Mounted using either open-type (fork-type) or closed-type (round-type) crimp terminals.
- IP65 oil resistance
- EN60947-5-1
- UL and cUL approved (File No. E41515).

# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

Shipped as a set which includes the Selector and Switch.

**A22K-□-□** (1 = Number of Notches/Reset Method; 2 = Contacts)

**1 Number of Notches/Reset Method**

| Code | Notches | Reset method | Key release position |
|---|---|---|---|
| 2ML | 2 notches | Manual | Left |
| 2M | | | Left and right |
| 2AL | | Automatic | Left |
| 3ML | 3 notches | Manual | Left |
| 3M | | | Left and right |
| 3MC | | | Center |
| 3AC | | Automatic | Center |

**2 Contacts**

| Code | Description |
|---|---|
| 10 | SPST-NO (See note.) |
| 01 | SPST-NC (See note.) |
| 11 | SPST-NO + SPST-NC |
| 20 | DPST-NO |
| 02 | DPST-NC |

**Note:** For models with 2 notches Contact Rating is standard load. (Refer to the *Specification* section for the A22.)

# Subassembled

The Selector, Lamp, or Switch can be ordered separately. Use them in combination for models that are not available as assembled Units. These can also be used as inventory for maintenance parts.

## 1. Selector

1

**A22K-□**

**1 Number of Notches/Reset Method**

| Code | Notches | Reset method | Key release position |
|---|---|---|---|
| 2ML | 2 notches | Manual | Left |
| 2M | | | Left and right |
| 2AL | | Automatic | Left |
| 3ML | 3 notches | Manual | Left |
| 3M | | | Left and right |
| 3MC | | | Center |
| 3AC | | Automatic | Center |

## 2. Switch

### Non-lighted

1

**A22-□M**

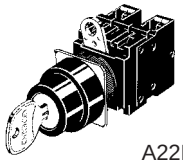
**1 Contacts**

| Code | Description |
|---|---|
| 10 | SPST-NO (2-notch models only) |
| 01 | SPST-NC (2-notch models only) |
| 11 | SPST-NO + SPST-NC |
| 20 | DPST-NO |
| 02 | DPST-NC |

# Ordering Information

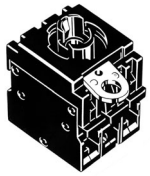
## ■ List of Models

### Ordering as a Set

| Appearance | Number of notches | Reset method | Output | Key release position | Model | Color of Selector |
|---|---|---|---|---|---|---|
| Key-type Selector Switch  A22K | 2 notches | Manual | SPST-NO | | A22K-2ML-10 | Black |
| | | | | | A22K-2M-10 | |
| | | | SPST-NC | | A22K-2ML-01 | |
| | | | | | A22K-2M-01 | |
| | | | SPST-NO + SPST-NC | | A22K-2ML-11 | |
| | | | | | A22K-2M-11 | |
| | | | DPST-NO | | A22K-2ML-20 | |
| | | | | | A22K-2M-20 | |
| | | | DPST-NC | | A22K-2ML-02 | |
| | | | | | A22K-2M-02 | |
| | | Automatic | SPST-NO | | A22K-2AL-10 | |
| | | | SPST-NC | | A22K-2AL-01 | |
| | | | SPST-NO + SPST-NC | | A22K-2AL-11 | |
| | | | DPST-NO | | A22K-2AL-20 | |
| | | | DPST-NC | | A22K-2AL-02 | |
| | 3 notches | Manual | SPST-NO + SPST-NC | | A22K-3ML-11 | |
| | | | | | A22K-3M-11 | |
| | | | | | A22K-3MC-11 | |
| | | | DPST-NO | | A22K-3ML-20 | |
| | | | | | A22K-3M-20 | |
| | | | | | A22K-3MC-20 | |
| | | | DPST-NC | | A22K-3ML-02 | |
| | | | | | A22K-3M-02 | |
| | | | | | A22K-3MC-02 | |
| | | Automatic | SPST-NO + SPST-NC | | A22K-3AC-11 | |
| | | | DPST-NO | | A22K-3AC-20 | |
| | | | DPST-NC | | A22K-3AC-02 | |

**Note:** Two Keys are provided.

# Ordering Individually

| Selector | | Switch |
|---|---|---|
| Two Keys are provided. | → |  |

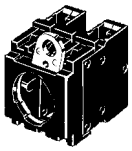
## Selector

(Color: Only Black is available)

| Appearance | Number of notches | Reset method | Key release position | Model |
|---|---|---|---|---|
| | 2 notches | Manual | | A22K-2ML |
| | | | | A22K-2M |
| | | Automatic | | A22K-2AL |
| | 3 notches | Manual | | A22K-3ML |
| | | | | A22K-3M |
| | | | | A22K-3MC |
| | | Automatic | | A22K-3AC |

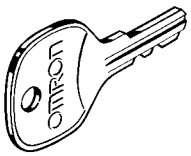
**Note:** Two keys are provided.

## Switch

| Appearance | Classification | | | Model |
|---|---|---|---|---|
|  | Lighted | Socket (without voltage-reduction circuit) | SPST-NO | A22-10M |
| | | | SPST-NC | A22-01M |
| | | | SPST-NO + SPST-NC | A22-11M |
| | | | DPST-NO | A22-20M |
| | | | DPST-NC | A22-02M |

**Note:** DPST-NO + DPST-NC combination is also possible.

## Accessories

| Appearance | Model |
|---|---|
|  | A22K-K |

**Note:** Two keys are provided.

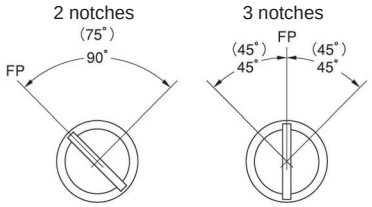
# Accessories

The A22K uses the same accessories as the A22. Refer to the relevant information in the corresponding section for the A22.

# Specifications

With the exception of the following items, the specifications are the same as for the A22. Refer to the relevant information in the *Specifications* section for the A22.

## ■ Operation Angle




**Note: 1.** The angles in parentheses are for automatic-reset models.
**2.** FP: Free position

## ■ Contacts

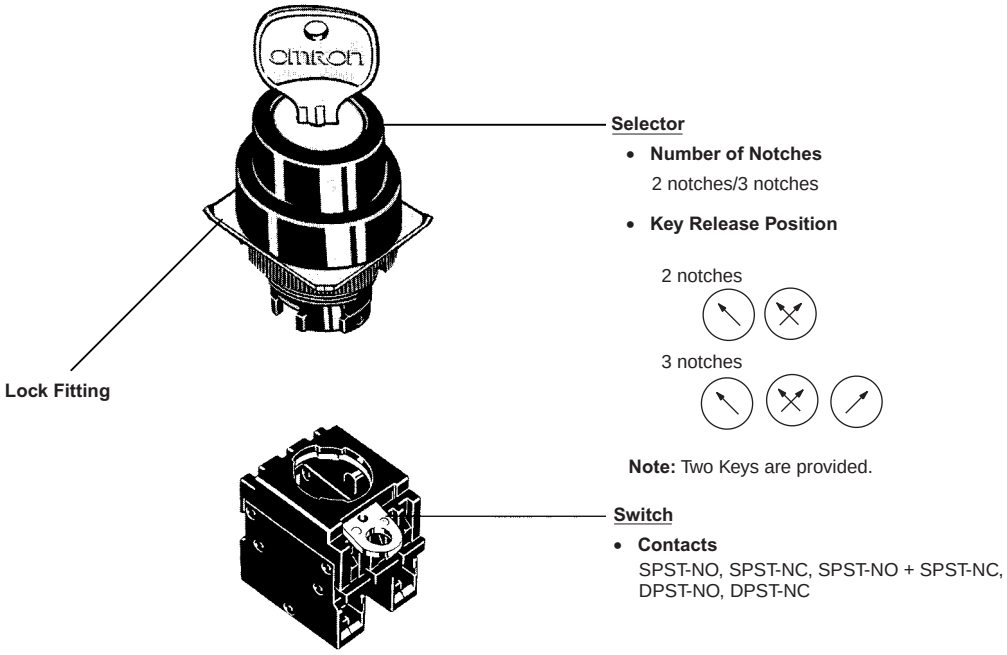
### 2-notch Type

| Knob position | SPST-NO | SPST-NC | SPST-NO + SPST-NC | DPST-NO | DPST-NC |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

### 3-notch Type

| Knob position | SPST-NO + SPST-NC | DPST-NO | DPST-NC |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

# Nomenclature

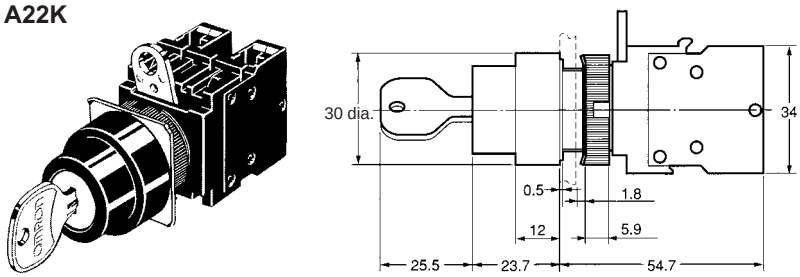



# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

## ■ Key-type Selector Switch

**A22K**

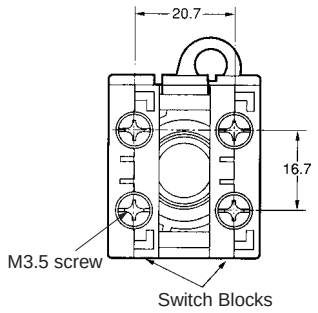



## ■ Accessories

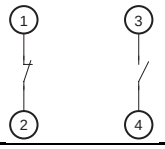
The A22K uses the same accessories as the A22. Refer to the relevant information in the corresponding section for the A22.

## ■ Terminal Arrangement (Bottom View)

**Non-lighted (SPST-NO + SPST-NC)**

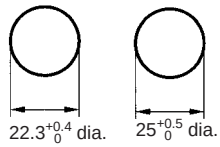


## ■ Terminal Connection

| Type | Terminal connection |
|---|---|
| Non-lighted | **Bottom view**   |

**Note:** The above terminal connection diagrams are examples for SPST-NO + SPST-NC.

## ■ Panel Cutouts (Top View)




**Note: 1.** When applying coating such as paint to the panel, the dimensions should be those after the application of coating. Lock fitting is provided as a standard item.

**2.** Recommended panel thickness: 1 to 5 mm.

**3.** Use an A22Z-R25 Ring when mounting to a panel with 25-mm holes.

# Installation

The A22K uses the same installation method as the A22. Refer to the relevant information in the *Installation* section for the A22.

# Precautions

The precautions for the A22K are the same as those for the A22. Refer to the relevant information in the *Precautions* section for the A22 and the *Technical Information for Pushbutton Switches* (Cat. No. A143).

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A130-E1-03

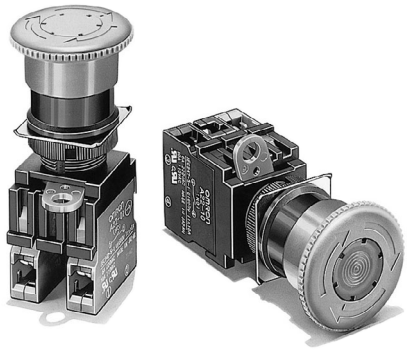
In the interest of product improvement, specifications are subject to change without notice.

# Emergency Stop Switch
# A22E

## Install in 22-dia. or 25-dia. Panel Cutout

- Direct opening mechanism to open the circuit when the contact welds ⊖.
- Safety lock mechanism prevents operating errors.
- Easy mounting and removal of Switch Blocks using a lever.
- Mount three Switch Units in series to improve wiring efficiency.
- Finger protection mechanism on Switch Unit provided as a standard feature.
- Install using either round, or forked crimp terminals.
- Oil-resistant to IP65 (non-lighted models)/IP65 (lighted models)

**Note:** Refer to the *Common Precautions* for Pushbutton Switches on page 14, as well as the *"Safety Precautions" on page 201*.



# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

Shipped as a set which includes the Operation Unit, Lamp (lighted models only), and Switch.

**A22E□-□-□-□-□**

(1 2 3 4 5)

**1. Lighted/Non-lighted**

| Code | Description |
|---|---|
| None | Non-lighted |
| L | Lighted (See note.) |

**Note:** Lighted Emergency Stop Switches are available only for the medium (M). push-lock turn-reset models.

**2. Head Size**

| Code | Size | Description |
|---|---|---|
| MP | Medium 40 dia. | Push-pull |
| LP | Large 60 dia. | |
| S | Small 30 dia. | Push-lock turn-reset |
| M | Medium 40 dia. | |
| L | Large 60 dia. | |
| SK | Small 30 dia. | Push-lock key reset |
| MK | Medium 40 dia. | |

**3. Light Source**

| Without Voltage Reduction Unit | | |
|---|---|---|
| **Code** | **Operating Voltage** | |
| None | Non-lighted | |
| 6D | LED | 6 VDC |
| 6A | | 6 VAC |
| 12A | | 12 VAC/VDC |
| 24A | | 24 VAC/VDC |
| **With Voltage Reduction Unit** | | |
| None | Non-lighted | |
| T1 | LED | 100 VAC |
| T2 | | 200 VAC |

**Note: 1** The LED lamp (24 VAC/VDC) can be lit by directly applying 110 VAC/VDC (220 VAC/VDC) to the lamp terminal. LED incorporates the 24-VAC/VDC models.
**2.** Equipped with 24-VAC/DC LED.

**4. Contacts**

| Code | Description |
|---|---|
| 01 | SPST-NC |
| 11 | SPST-NO + SPST-NC |
| 02 | DPST-NC |

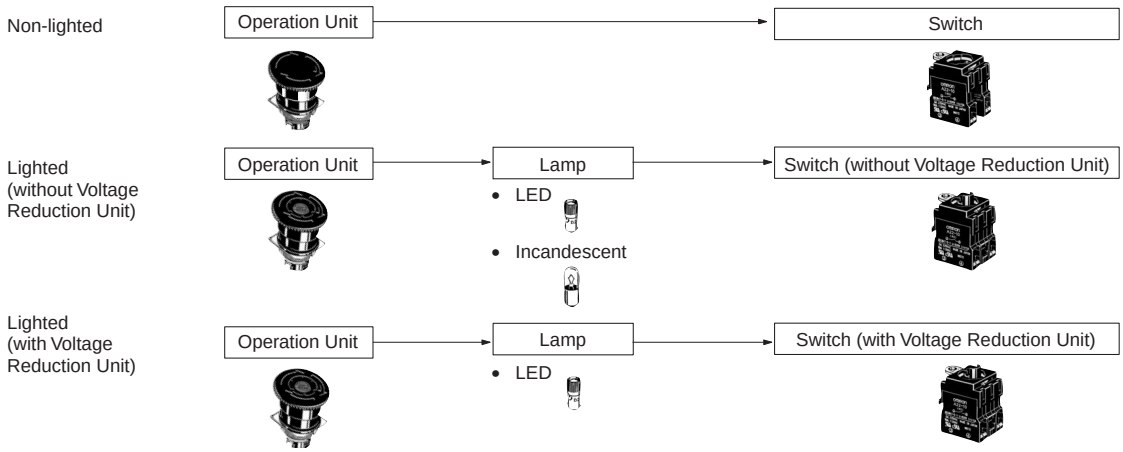
**5. Configuration**

| Code | Configuration |
|---|---|
| None | Switch only |
| B | Switch with Integrated Control Box |

# Subassembled

The Pushbutton, Lamp, or Switch can be ordered separately. Use them in combination for models that are not available as assembled Units. These can also be used as inventory for maintenance parts.

## Unit Combinations




## 1. Operation Unit

### Lighted/Non-lighted

**A22E□-□** (1 = Lighted/Non-lighted, 2 = Head Size)

**1 Lighted/Non-lighted**

| Code | Description |
|---|---|
| None | Non-lighted |
| L | Lighted (See note.) |

**Note:** Lighted Emergency Stop Switches are available only for the 40-dia. push-lock turn-reset models.

**2 Head Size**

| Code | Description | |
|---|---|---|
| MP | 40 dia. | Push-pull |
| LP | 60 dia. | |
| S | 30 dia. | Push-lock, turn-reset |
| M | 40 dia. | |
| L | 60 dia. | |
| SK | 30 dia. | Push-lock key reset |
| MK | 40 dia. | |

## 2. Lamp

**A22-□□** (1 = Operating Voltage (Rated Voltage), 2 = Illumination Color)

**1 Operating Voltage (Rated Voltage)**

| Incandescent | |
|---|---|
| **Code** | **LED** |
| 6D | 6 VDC (6 VDC) |
| 6A | 6 VAC (6 VAC) |
| 12A | 12 VAC/VDC (12 VAC/VDC) |
| 24A | 24 VAC/VDC (24 VAC/VDC) |

**2 Illumination Color**

| Code | Description |
|---|---|
| R | Red |

### 3. Switch
**Lighted/Non-lighted**

**A22□-□M-□** (1 2 3)

**1 Lighted/Non-lighted**

| Code | Description |
|---|---|
| None | Non-lighted |
| L | Lighted |

**2 Contacts**

| Code | Description |
|---|---|
| 01 | SPST-NC |
| 11 | SPST-NO + SPST-NC |
| 02 | DPST-NC |

**3 Voltage Reduction Unit (Lighted Models Only)**

| Code | Description |
|---|---|
| None | Without Voltage Reduction Unit |
| T1 | 110 VAC |
| T2 | 220 VAC |

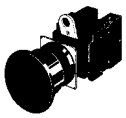
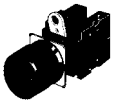
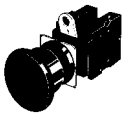
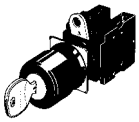
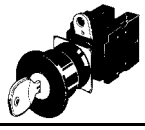
**Note:** Equipped with 24-VAC/DC LED.

# Ordering Information

## ■ List of Models

### Completely Assembled

### Non-lighted Models

| Appearance | Output | Push-lock turn-reset system | Color of cap |
|---|---|---|---|
| 40-dia. head<br>Medium Push-pull<br>A22E-MP  | SPST-NC | A22E-MP-01 | Red |
| | SPST-NO/SPST-NC | A22E-MP-11 | |
| | DPST-NC | A22E-MP-02 | |
| 60-dia. head<br>Large Push-pull<br>A22E-LP | SPST-NC | A22E-LP-01 | |
| | SPST-NO/SPST-NC | A22E-LP-11 | |
| | DPST-NC | A22E-LP-02 | |
| 30-dia. head<br>Small Push-lock<br>Turn-reset<br>A22E-S  | SPST-NC | A22E-S-01 | |
| | SPST-NO/SPST-NC | A22E-S-11 | |
| | DPST-NC | A22E-S-02 | |
| | DPST-NC + SPST-NO | A22E-S12 | |
| | TPST-NC | A22E-S-03 | |
| 40-dia. head<br>Medium Push-lock Turn-reset<br>A22E-M  | SPST-NC | A22E-M-01 | |
| | SPST-NO/SPST-NC | A22E-M-11 | |
| | DPST-NC | A22E-M-02 | |
| | DPST-NC + SPST-NO | A22E-M-12 | |
| | TPST-NC | A22E-M-03 | |
| 60-dia. head<br>Large Push-lock Turn-reset<br>A22E-L | SPST-NC | A22E-L-01 | |
| | SPST-NO/SPST-NC | A22E-L-11 | |
| | DPST-NC | A22E-L-02 | |
| 30-dia. head<br>Small Push-lock Key-reset<br>A22E-SK  | SPST-NC | A22E-SK-01 | |
| | SPST-NO/SPST-NC | A22E-SK-11 | |
| | DPST-NC | A22E-SK-02 | |
| 40-dia. head<br>Medium Push-lock<br>Key-reset<br>A22E-MK  | SPST-NC | A22E-MK-01 | |
| | SPST-NO/SPST-NC | A22E-MK-11 | |
| | DPST-NC | A22E-MK-02 | |

### Lighted Models

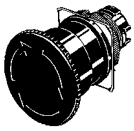
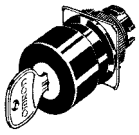
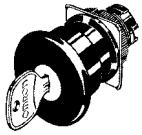
| Appearance | Output | Lighting | Rated voltage | Push-lock turn-reset system | Color of cap |
|---|---|---|---|---|---|
| 40-dia. head<br>Push-lock<br>Turn-reset without voltage Reduction Unit<br> | SPST-NC | LED | 6 VDC | A22EL-M-6D-01 | Red |
| | | | 6 VAC | A22EL-M-6A-01 | |
| | | | 12 VAC/VDC | A22EL-M-12A-01 | |
| | | | 24 VAC/VDC | A22EL-M-24A-01 | |
| | SPST-NO/SPST-NC | | 6 VDC | A22EL-M-6D-11 | |
| | | | 6 VAC | A22EL-M-6A-11 | |
| | | | 12 VAC/VDC | A22EL-M-12A-11 | |
| | | | 24 VAC/VDC | A22EL-M-24A-11 | |
| | DPST-NC | | 6 VDC | A22EL-M-6D-02 | |
| | | | 6 VAC | A22EL-M-6A-02 | |
| | | | 12 VAC/VDC | A22EL-M-12A-02 | |
| | | | 24 VAC/VDC | A22EL-M-24A-02 | |
| 40-dia. head<br>Push-lock<br>Turn-reset with Voltage Reduction Unit<br> | SPST-NC | | 110 VAC | A22EL-M-T1-01 | |
| | | | 220 VAC | A22EL-M-T2-01 | |
| | SPST-NO/SPST-NC | | 110 VAC | A22EL-M-T1-11 | |
| | | | 220 VAC | A22EL-M-T2-11 | |
| | DPST-NC | | 110 VAC | A22EL-M-T1-02 | |
| | | | 220 VAC | A22EL-M-T2-02 | |

## ■ Switch with Integrated Control Box

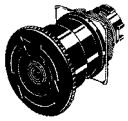
| Appearance | Output | Model |
|---|---|---|
| | SPST-NC | A22E-M-01B |
| | SPST-NO/SPST-NC | A22E-M-11B |
| | DPST-NC | A22E-M-02B |

## ■ Operation Units

**Non-lighted**

| Sealing capability and size | IP65 oil-resistant models | | |
|---|---|---|---|
| | Small (30 dia.) | Medium (40 dia.) | Large (60 dia.) |
| Push-pull | --- | A22E-MP | A22E-LP |
| Push-lock, Turn-reset | A22E-S | A22E-M  | A22E-L |
| Push-lock, key-reset<br>(push-lock, turn-reset) | A22E-SK  | A22E-MK  | --- |

### Lighted

| Sealing capability and size | IP65 |
|---|---|
| | Medium (40 dia.) |
| Push-lock, Turn-reset | A22EL-M  |

## Lamp

### LED

| Appearance | LED light | | Rated voltage | Model |
|---|---|---|---|---|
| | Red | Standard | 6 VDC | A22-6DR |
| | | | 6 VAC | A22-6AR |
| | | | 12 VAC/VDC | A22-12AR |
| | | | 24 VAC/VDC | A22-24AR |
| | | Bright | 24 VAC/VDC | A22-24ASR |

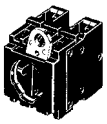
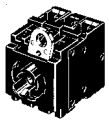
**Note:** For voltage-reduction lighting, use the A22-24AR.

### Incandescent

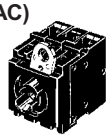
| Appearance | Rated voltage | Model |
|---|---|---|
| | 6 VDC | A22-5 |
| | 14 VAC | A22-12 |
| | 28 VAC | A22-24 |
| | 130 VAC | A22-H1 |

## Switch (Standard Load)

### Without Voltage Reduction Unit

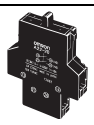
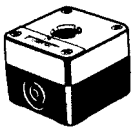
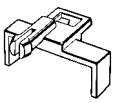
| Classification / Appearance | | Non-lighted  | Lighted  |
|---|---|---|---|
| Switch Action / Contacts | | Momentary | Momentary |
| For standard loads | SPST-NO | A22-10M | A22L-10M |
| | SPST-NC | A22-01M | A22L-01M |
| | SPST-NO + SPST-NC | A22-11M | A22L-11M |
| | DPST-NO | A22-20M | A22L-20M |
| | DPST-NC | A22-02M | A22L-02M |

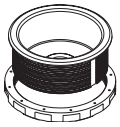
### With Voltage Reduction Unit

| Classification / Appearance | | Lighted (110 VAC) | Lighted (220 VAC)  |
|---|---|---|---|
| Switch Action / Contacts | | Momentary | Momentary |
| For standard loads | SPST-NO | A22L-10M-T1 | A22L-10M-T2 |
| | SPST-NC | A22L-01M-T1 | A22L-01M-T2 |
| | SPST-NO + SPST-NC | A22L-11M-T1 | A22L-11M-T2 |
| | DPST-NO | A22L-20M-T1 | A22L-20M-T2 |
| | DPST-NC | A22L-02M-T1 | A22L-02M-T2 |

**Note: 1.** The above illustrations are for the DPST-NO contact.
**2.** When using with a Voltage Reduction Unit, use the A22-24AR.

## Accessories (Order Separately)

| Item | Appearance | Classification | | Model | Remarks |
|---|---|---|---|---|---|
| Switch Blocks | | SPST-NO | | A22-10 | Provided as standard. Order Switch Blocks only when adding or replacing them. |
| | | SPST-NC | | A22-01 | |
| |  | DPST-NO, one-piece | | A22-20 | |
| | | DPST-NC, one-piece | | A22-02 | |
| Lamp Sockets | | Direct lighting | | A22-TN | Used when changing the lighting method. |
| | | Voltage-reduction lighting | 100 VAC | A22-T1 | |
| | | | 220 VAC | A22-T2 | |
| Mounting Latches | | --- | | A22-3200 | Provided as standard. Order Mounting Latches only when mounting Switch Blocks or Lamp Sockets that are purchased individually. |
| Lock Ring | | Rounded shape | | A22Z-3360 | The body is equipped with a Lock Fitting. This Lock Fitting is used when a more secure lock feature is required. (Refer to page 194.) |
| Hole Plug | | Round | | A22Z-3530 | Can be plugged into pre-cut panel holes for future expansion. The color is black. |
| Control Boxes (Enclosures) |  | One hole, yellow box (for emergency stop) | | A22Z-B101Y | Material: Polycarbonate resin |
| Operation Keys | | --- | | A22K-K | Two keys are provided. |
| Connectors | | Applicable cable diameter (mm) | 7 to 9 dia. | A22Z-3500-1 | Plastic connector used to extend a cable from the Switch Box. |
| | | | 9 to 11 dia. | A22Z-3500-2 | |
| 25-dia. Ring | | --- | | A22Z-R25 | Can be fit into a 25-dia. hole in the panel. Since this is not attached to the main body, order separately. (Refer to page 194.) |
| 30-dia. Resin Attachment | | --- | | A22Z-A30 | Can be fit into a 30-dia. hole in the panel. (Refer to page 194.) |
| Legend Plates for Emergency Stop | | 60-dia. black letters on yellow back-ground | | A22Z-3466-1 | “EMERGENCY STOP” is indicated on the plate. |
| | | 90-dia. black letters on yellow back-ground | | A22Z-3476-1 | |
| | | 60-dia. black letters on yellow back-ground | | A22Z-3466-2 | “EMERGENCY OFF” is indicated on the plate. |
| Lamp Extractor | | --- | | A22Z-3901 | Rubber tool used to replace Lamps easily |
| Tightening Tool | | --- | | A22Z-3905 | Tool used to tighten nuts from the back of the panel and to attach caps to lighted models. |
| Lock Plate |  | --- | | A22Z-3380 | Use to fix the lever on the Switch. |

| Item | Appearance | Classification | Model | Remarks |
|---|---|---|---|---|
| E-stop Shroud (See note.) | | --- | A22Z-EG1 | The SEMI S2-compatible Shroud and legend plate for EMERGENCY OFF come as a set. Use with an A22E Emergency Stop Switch. |
| E-stop Shroud (See note.) |  | --- | A22Z-EG2 | SEMI-S2/SEMATECH Application Guide for SEMI 2S-compatible Shroud. Used together with an A22E Emergency Stop Pushbutton. |

**Note:** These E-stop Shrouds are designed for use only in semiconductor manufacturing equipment. Do not use them for any other application.

# Specifications

## ■ Certified Standards

| Certification body | Standards | File No. |
|---|---|---|
| UL (See note 2.) | UL508 | E41515 |
| TÜV Product Service | EN60947-5-1, EN60947-5-5 (certified direct opening mechanism) | Inquire |
| CQC (CCC) | GB14048.5 | 2003010303070635 |
| KOSHA (See note 3.) | EN60947-5-1 | 2004-220 |

**Note: 1.** Only models with NC contacts have a direct opening mechanism.
**2.** UL-certification for CSA C22.2 No. 14 and bears the c UL us mark.
**3.** Some models have been certified. Contact your OMRON sales representative.

## ■ Certified Standard Ratings

- UL, cUL (File No.E41515)
  6A at 220 VAC, 10 A at 110 VAC
- TÜV (EN60947-5-1) (Low Voltage Directive)
  3 A at 220VAC
- CCC (GB14048.5)
  3 A at 240 VAC, 1.5 A at 24 VDC

## ■ Ratings

### Contacts (Standard Load)

| Rated carry current | Rated voltage | Rated current (A) | | | |
|---|---|---|---|---|---|
| | | AC15 (inductive load) | AC12 (resistive load) | DC13 (inductive load) | DC12 (resistive load) |
| 10 | 24 VAC | 10 | 10 | --- | --- |
| | 110 VAC | 5 | 10 | | |
| | 220 VAC | 3 | 6 | | |
| | 380 VAC | 2 | 3 | | |
| | 440 VAC | 1 | 2 | | |
| | 24 VDC | --- | --- | 1.5 | 10 |
| | 110 VDC | | | 0.5 | 2 |
| | 220 VDC | | | 0.2 | 0.6 |
| | 380 VDC | | | 0.1 | 0.2 |

**Note: 1.** Rated current values are determined according to the testing conditions. The above ratings were obtained by conducting tests under the following conditions.
(1) Ambient temperature: 20°±2°C
(2) Ambient humidity: 65±5%
(3) Operating frequency: 20 operations/minute
**2.** Minimum applicable load: 10 mA at 5 VDC

### LED Indicators without Voltage Reduction Unit

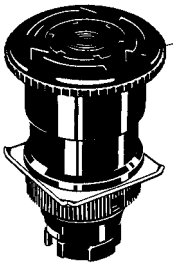
| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 6 VDC | 60 mA | 6 VDC±5% |
| 6 VAC | 60 mA | 6 VAC/VDC±5% |
| 12 VAC/VDC | 30 mA | 12 VAC/VDC±5% |
| 24 VAC/VDC | 15 mA | 24 VAC/VDC±5% |

## ■ Characteristics

| Item | | Emergency Stop Switches | |
|---|---|---|---|
| | | Non-lighted model: A22E | Lighted model: A22EL |
| Allowable operating frequency | Mechanical | 30 operations/minute max. (See note 3.) | |
| | Electrical | 30 operations/minute max. (See note 3.) | |
| Insulation resistance | | 100 MΩ min. (at 500 VDC) | |
| Dielectric strength | | 2,500 VAC, 50/60 Hz for 1 min between terminals of same polarity<br>2,500 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground | |
| Vibration resistance | | Malfunction (See note 2.): 10 to 55 Hz, 1.5-mm double amplitude | |
| Shock resistance | Mechanical | 1,000 $m/s^2$ | |
| | Malfunction (See note 2.) | 250 $m/s^2$ max. | |
| Durability | Mechanical | Momentary operation: 300,000 operations min. (See note 3.) | |
| | Electrical | 300,000 operations min. (See note 3.) | |
| Ambient temperature (See note 1.) | | Operating: –20°C to 70°C<br>Storage: –40°C to 70°C | Operating: –20°C to 55°C<br>Storage: –40°C to 70°C |
| Ambient humidity | | Operating: 35% to 85% | |
| Degree of protection | | IP65<br>(oil-resistant) (See note 4.) | IP65 (See note 4.) |
| Electric shock protection class | | Class II | |
| PTI (tracking characteristic) | | 175 | |
| Degree of contamination | | 3 (IEC60947-5-1) | |

**Note: 1.** With no icing or condensation.
**2.** Malfunction within 1 ms.
**3.** Setting and resetting once is counted as one operation.
**4.** The degree of protection from the front of the panel.

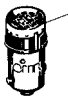
# Nomenclature



**Pushbutton**

**Push-lock Turn-reset System**
**Available Color: Red**

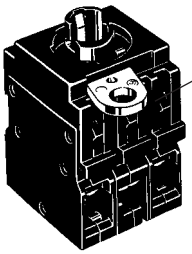
Non-lighted
Lighted



**Lamp**

- **Light source**

  LED Lamp
  Incandescent Lamp

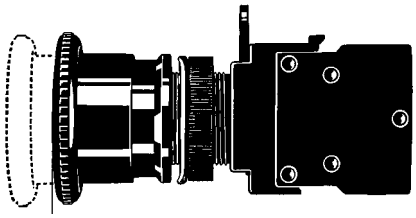


**Switch**

- **Contact Ratings**
  10 A at 110 VAC (resistive load)
  10 A at 24 VDC (resistive load)
- **Lighting Method**
  Non-lighted
  Lighted (without Voltage Reduction Unit)
  Lighted (with Voltage Reduction Unit)

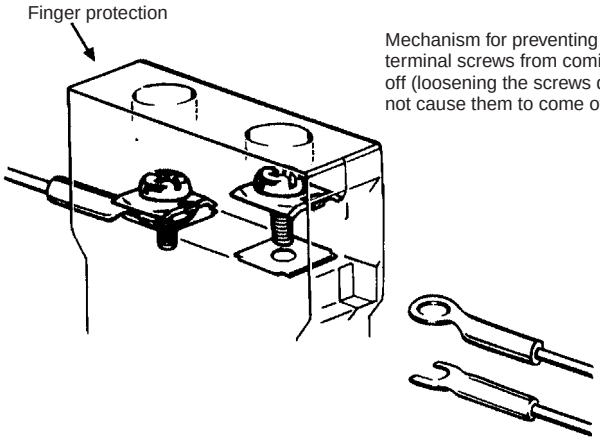
(The above figures are examples of the lighted model.)

## Safety Lock Mechanism to Prevent Misuse




This Switch can be intentionally used to stop equipment in an emergency. Even if an object or person touches the Pushbutton by mistake, the contact will not be released unless the Pushbutton reaches the lock position.

## This Switch uses a finger protection mechanism to prevent electrical shocks. Moreover, it is provided with a mechanism to prevent terminal screws from coming off and also allows connection to either round or forked crimp terminals.

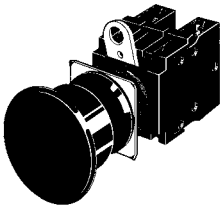


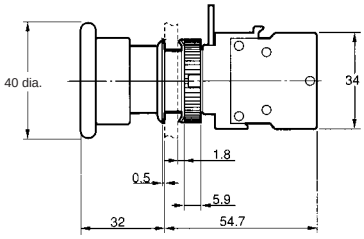
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

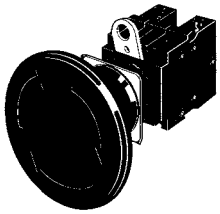
## Non-lighted Models

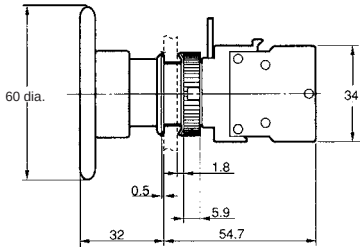
### A22E-MP
Medium Push-pull (40-dia.)



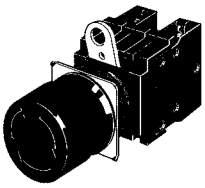


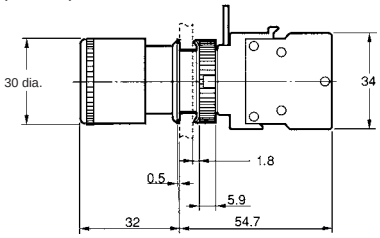

### A22E-LP
Large Push-pull (60-dia. )



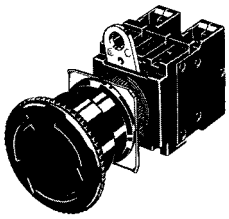


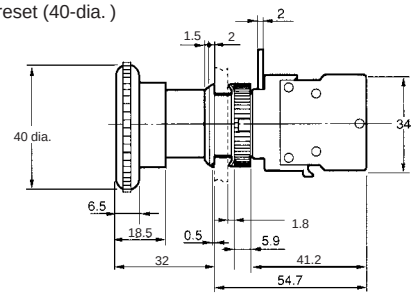

### A22E-S
Small Push-lock, Turn-reset (30-dia. )



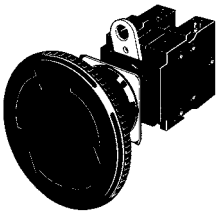


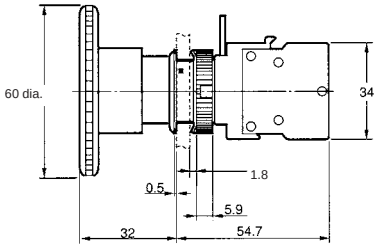

### A22E-M
Medium Push-lock, Turn-reset (40-dia. )



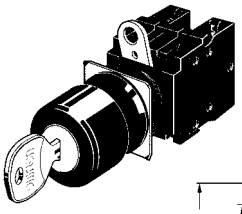


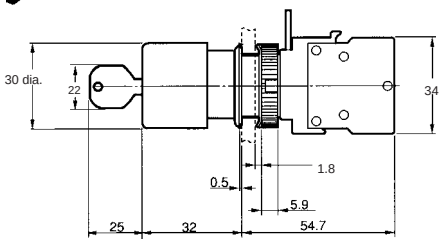

### A22E-L
Large Push-lock, Turn-reset (60-dia.)



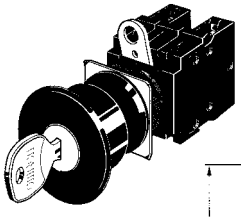


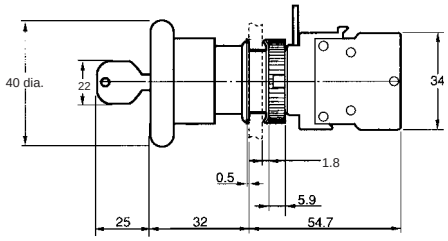

### A22E-SK
Small Push-lock, Key-reset (30-dia.)






### A22E-MK
Medium Push-lock, Key-reset (40-dia.)

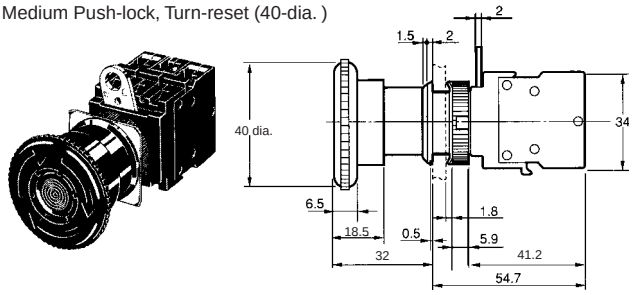




## Lighted Models

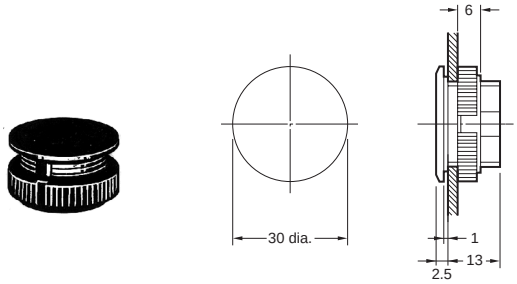
**A22EL-M**

Medium Push-lock, Turn-reset (40-dia. )

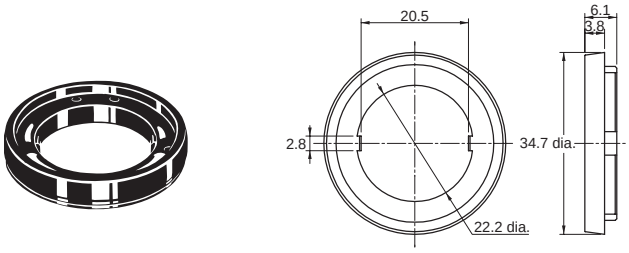



# ■ Dimensions for Accessories

**Hole Plug**
**Round A22Z-3530**

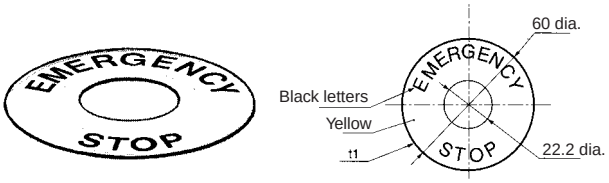



**30-dia. Resin Attachment**
**A22Z-A30**

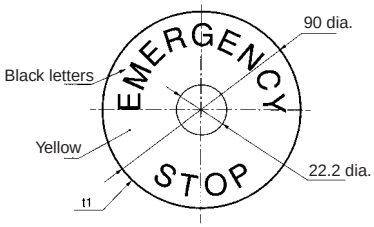



**Legend Plates for Emergency Stop**

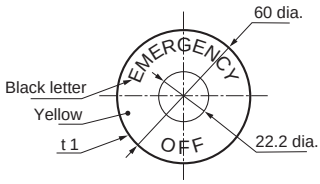
**A22Z-3466-1 (ϕ60)**



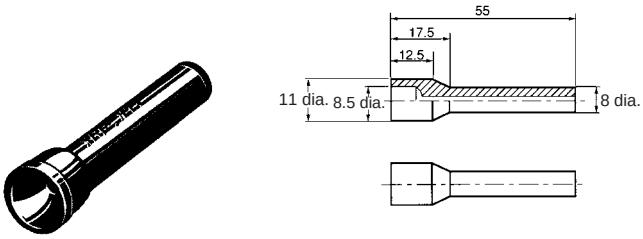

**A22Z-3476-1 (ϕ90)**




**A22Z-3466-2 (ϕ60)**

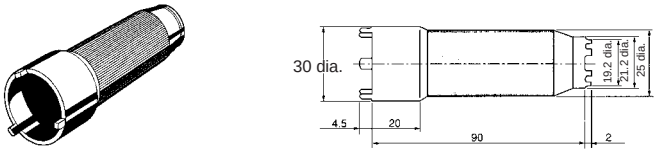



**Lamp Extractor**
**A22Z-3901**

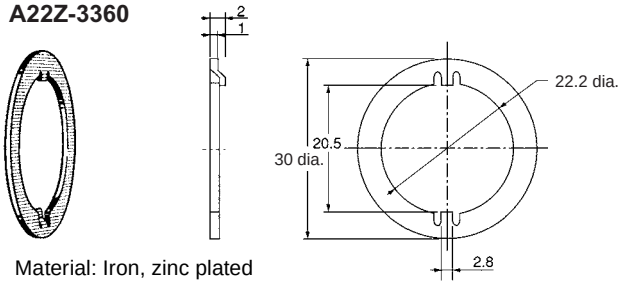



Material: Chloroprene rubber

**Tightening Wrench**
**A22Z-3905**

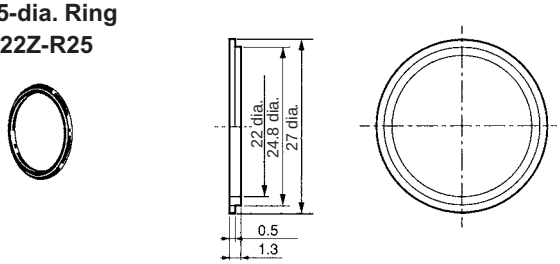



**Lock Ring**
**A22Z-3360**




Material: Iron, zinc plated

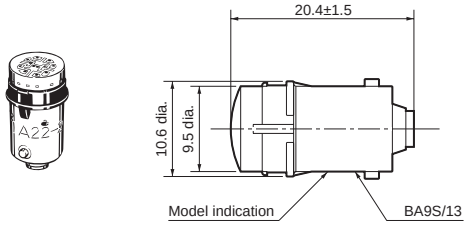
**25-dia. Ring**
**A22Z-R25**



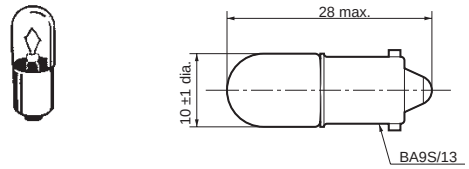

Material: NBR (black)

## Lamp

### LED A22-6□, 12□, 24□

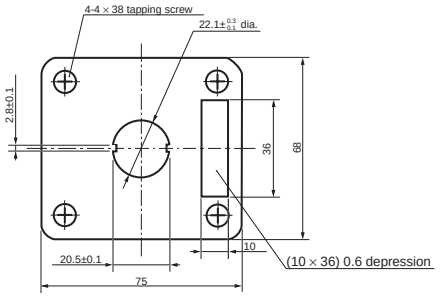


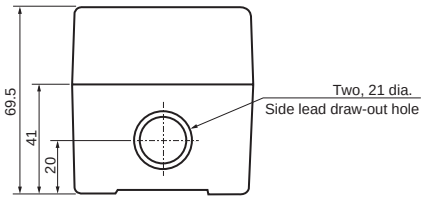

### Incandescent Lamp A22-5, 12, 24, H1



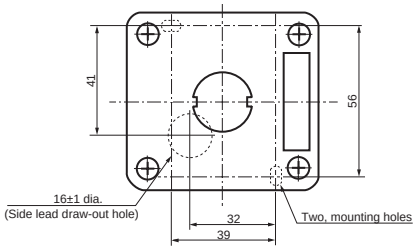

## Control Box

### A22Z-B101Y (1 hole)



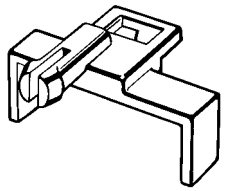



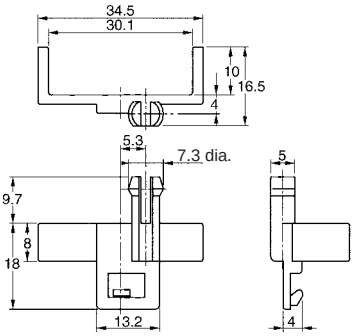

### Cable Draw-out Hole (Top View)




## Lock Plate

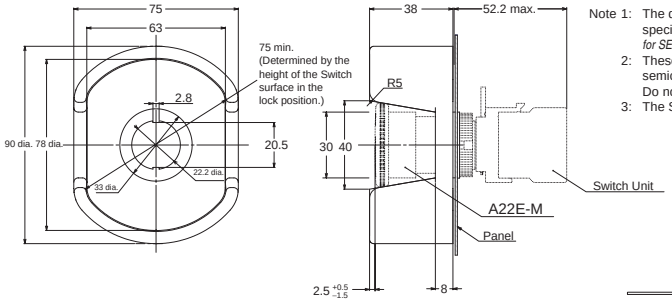
### A22Z-3380





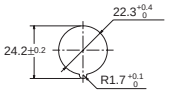

## E-stop Shroud

### A22Z-EG1

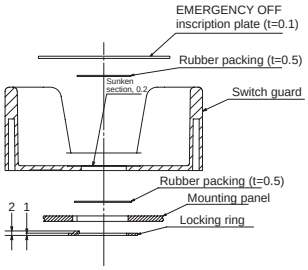



Note 1: The dimensions of the Shroud conform to the specifications of the *SEMATECH Application Guide for SEMI S2-93.*
2: These Shrouds are designed for use only in semiconductor manufacturing equipment. Do not use them for any other application.
3: The Shroud is not provided with the Switch.

Panel Cutout Dimensions

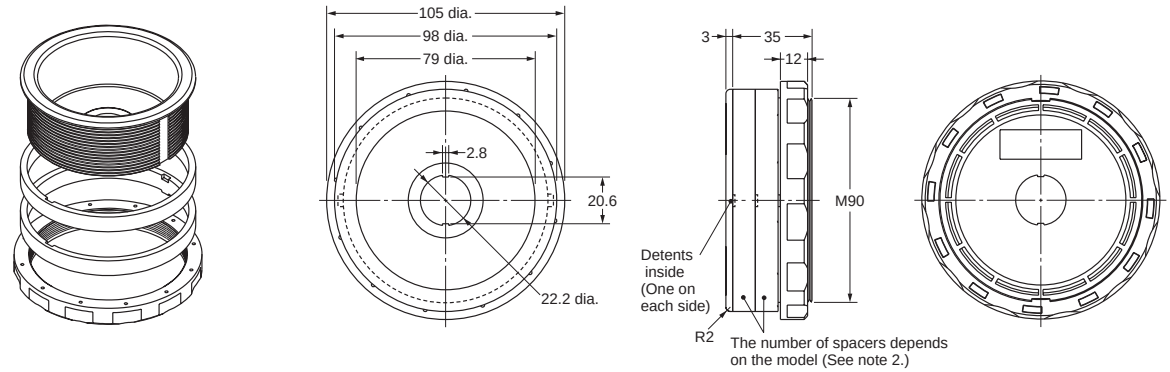


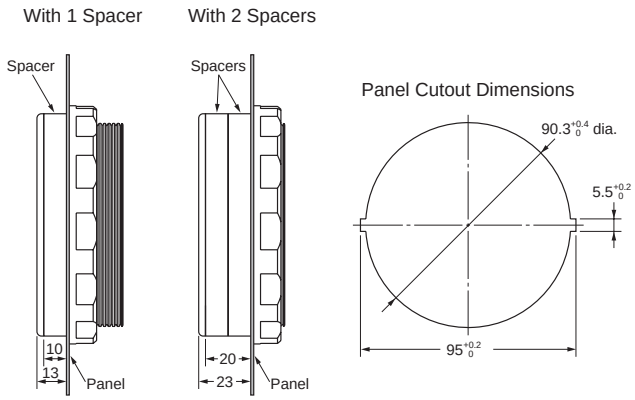

Allowable panel thickness: 1 to 3 mm

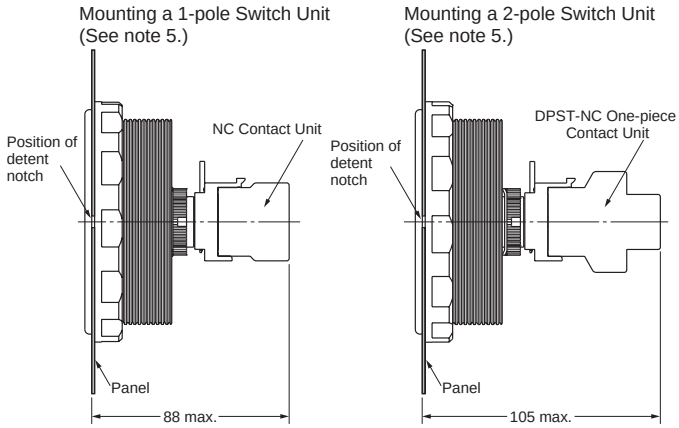


**E-stop Shroud**

**A22Z-EG2, A22Z-EG21, A22Z-EG22**




**Note: 1.** These Shrouds are designed for use only in semiconductor manufacturing equipment. Do not use them for any other application.

**2.** The number of Spacers that are combined depends on the model.

| Model | No. of Spacers |
|---|---|
| A22Z-EG2 | 0 |
| A22Z-EG21 | 1 |
| A22Z-EG22 | 2 |

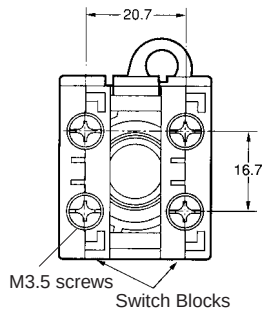
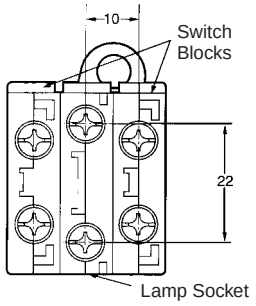
**3.** Tighten to a torque of 1.96 to 2.94 N·m.

**4.** The allowable panel thicknesses are as follows:
Without Spacers: t=1.3 to 22.5 mm
With 1 Spacer: t=1.3 to 12.5 mm
With 2 Spacers: t=1.3 to 2.5 mm

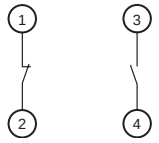
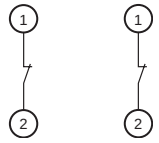
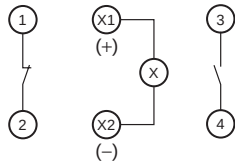
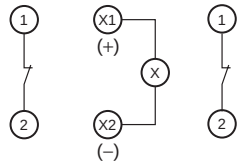
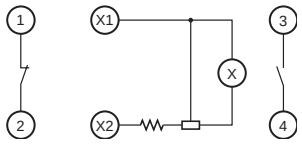
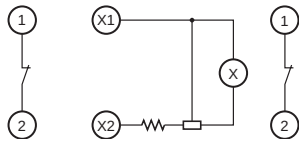
**5.** These are the dimension from the front of the panel when the Switch Unit is attached.

# ■ Terminal Arrangement

## Terminal Arrangement (Bottom View)

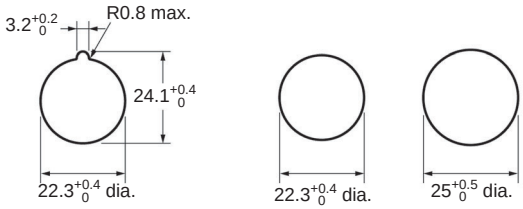
| Non-lighted | Lighted |
|---|---|
|  |  |

## Terminal Connection

| Type | Terminal connection (BOTTOM VIEW) | |
|---|---|---|
| | SPST-NO + SPST-NC | DPST-NC |
| Non-lighted |  |  |
| Lighted without Voltage Reduction Unit |  |  |
| Lighted with Voltage Reduction Unit |  |  |

**Note:** The above terminal connection diagrams are examples for SPST-NO + SPST-NC and DPST-NC.

## ■ Panel Cutouts




**With Lock Fitting** **Without Lock Fitting**

A Lock Ring is provided as a standard feature.

**Note: 1.** When painting or coating the panel, make sure that the specified panel dimensions apply to the panel after painting or coating.

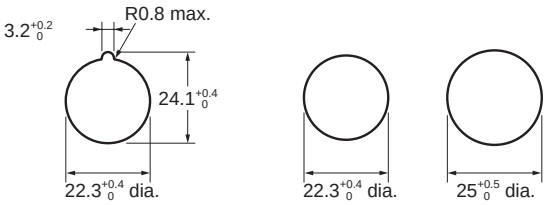
**2.** Use an A22Z-R25 Ring when mounting to a panel with a 25-mm diameter hole.

# Installation

## ■ Mounting to the Panel

### Preparing the Panel

- The panel dimensions are shown below.
- The panel thickness must be 1 to 5 mm.




With Lock Ring Without Lock Ring

- Always use a 25-mm-dia. Lock Ring for a 25-mm-dia. hole. IP65 degree of protection will be lost if the 25-mm-dia. Lock Ring is not used because of the larger size of a 25-mm-dia. hole.
- When painting or coating the panel, make sure that the specified panel dimensions apply to the panel after painting or coating.

### Mounting the Operation Unit on the Panel

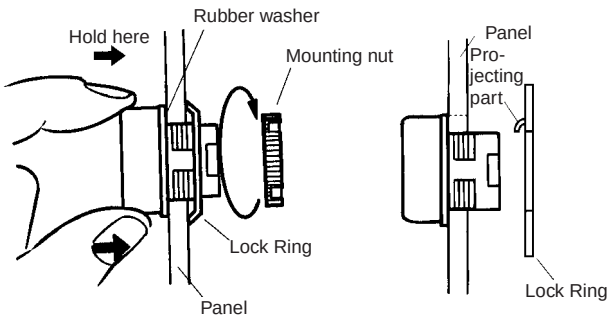
Insert the Operation Unit (Pushbutton) from the front surface of the panel, insert the Lock Ring and the mounting nut from the terminal side, then tighten the nut. Before tightening, check that the rubber washer is present between the Operation Unit and the panel.

When using a Legend Plate Frame, put one rubber washer each between the Legend Plate Frame and the panel and between the Operation Unit and the Legend Plate Frame. (One rubber washer will be provided when one Legend Plate Frame is ordered.)

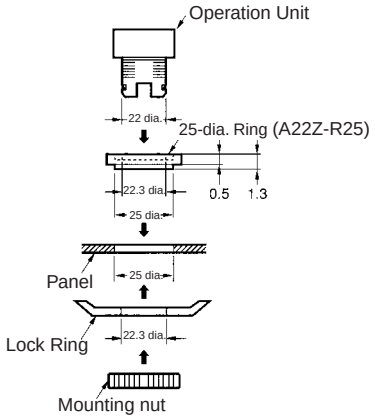
Align the Lock Ring with the groove in the casing, then insert the Lock Ring so that its edge is located on the panel side.

Tighten the mounting nut at a torque of 0.98 to 1.96 N·m.

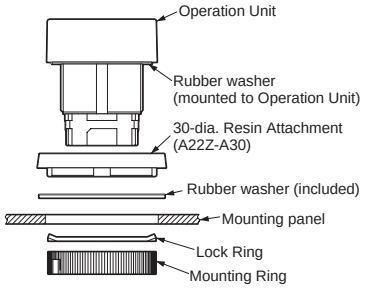
When using a Lock Ring, replace with the supplied Lock Ring, insert the projecting part into the lock slot, and then tighten the mounting nut.




1. When the panel cutout dimension is 25 dia., remove the supplied rubber washer and mount the 25-dia. Ring as shown below. (Since the A22Z-R25 is not attached to the main body, order separately.)

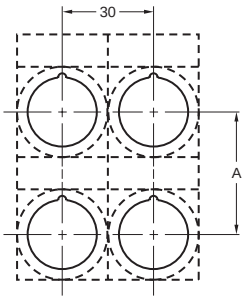



2. When the panel cutout dimension is 30 dia., the A22Z-A30 Attachment is not attached to the main body, order separately.

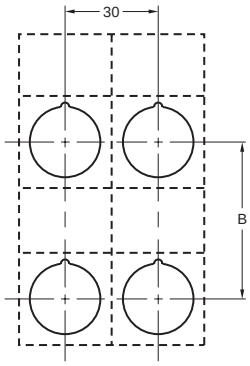



## Matrix Mounting

1. The following diagram provides the dimensions for mounting individual Switches, Legend Plates, and Lock Rings with leads connected directly to Switch terminals.




2. The following diagram provides the dimensions for mounting Large Legend Plates with crimp terminals connected to Switch terminals.




Dimensions A and B between mounting hole centers are given in the following tables.

For 1., Above

| Switch model | Dimension A |
|---|---|
| A22-10, A22-10S, A22-01, A22-01S | 45 mm min. |
| A22-20, A22-20S, A-22-02, A22-02S, A22-11, A22-11S | 55 mm min. |

For 2., Above

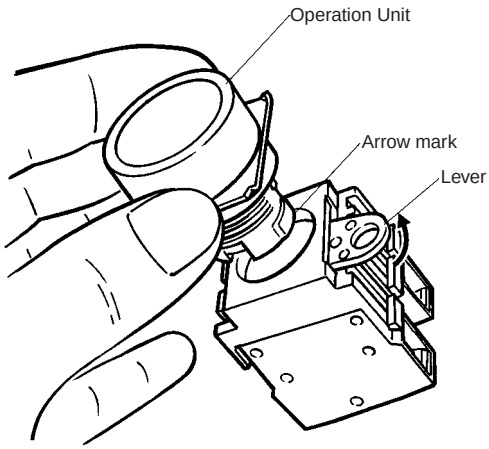
| Type of crimp terminal | Switch model | Dimension B |
|---|---|---|
| Naked crimp terminals | A22-10, A22-10S, A22-01, A22-01S | 51 mm min. |
| | A22-20, A22-20S, A22-02, A22-02S, A22-11, A22-11S | 61 mm min. |
| Crimp terminals with insulating sheaths | A22-10, A22-10S, A22-01, A22-01S | 60 mm min. |
| | A22-20, A22-20S, A22-02, A22-02S, A22-11, A22-11S | 70 mm min. |

**Note: 1.** The above dimensions are the minimum dimensions when using the applicable wiring materials listed on page 201. If any other materials are used, check the suitability of dimensions in advance.

**2.** When using pushbuttons exceeding 30 mm, adjust dimension A or B accordingly. (When mounting the A22-M□ in a matrix, “30 mm” would have to be increased to 40 mm.

## Mounting the Switch on the Operation Unit

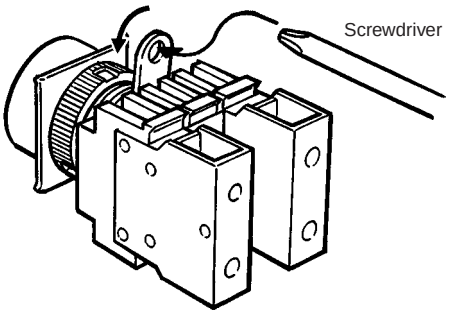
Insert the Operation Unit into the Switch Unit, aligning the arrow mark inscribed on the Case with the lever on the Switch Blocks, then move the lever in the direction indicated by the arrow in the following figure.




## Removing the Switch

Move the lever in the direction indicated by the arrow in the following figure, then pull the Operation Unit or the Switch Blocks.

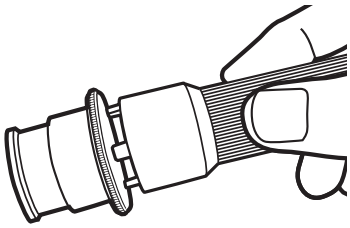
Since the lever has a hole with an inside diameter of 6.5 mm, the lever can be moved in the specified direction by inserting a screwdriver into the hole and then moving the screwdriver.




# ■ Assembling the Cap

## Emergency Stop Switch

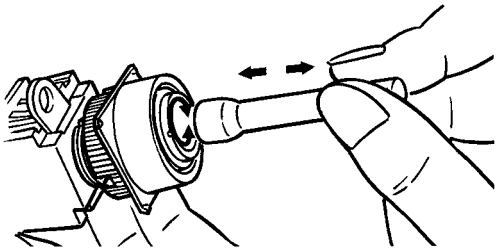
Insert the protrusion of the Tightening Wrench (A22Z-3905) into the Cap slot and then turn to remove the Cap.



# ■ Installing/Replacing the Lamp

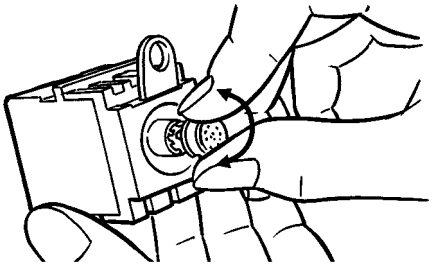
## Installing/Replacing from the Panel Surface

Insert the Lamp Extractor (A22Z-3901) into the lamp, then rotate the Extractor while pressing it.



## Installing/Replacing on the Switch

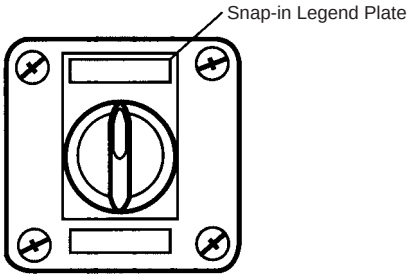
Grip the indicator with your fingers, then rotate the indicator while pressing it against the Switch.



# ■ Control Box (Enclosure)

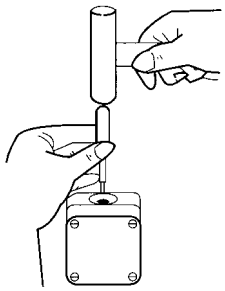
## Mounting the Switch

The Standard-size Legend Plate Frame can be mounted. Mount the Frame as shown in the following diagram. Mount the Switch in the same way as for an ordinary panel.



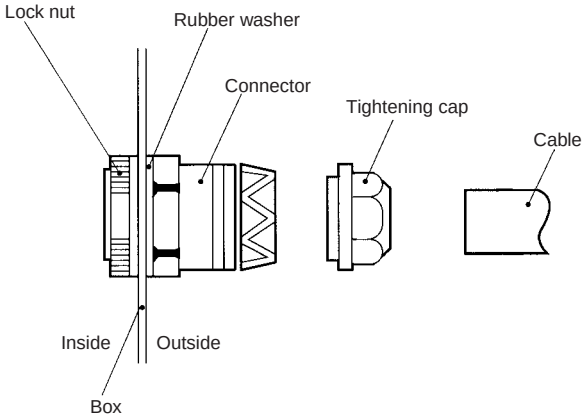

## Creating a Cable Port Hole

Place the tip of a screwdriver on the surface where the cable port hole is to be created with the cover attached and strike the screwdriver to punch a hole. Attempts to punch a hole on the other side of the case will damage the Box.



## Securing the Connector Cable

1. Insert the connector into the cable port hole in the Box and secure with the fixing nut inside the box.
2. Open a hole in the thin rubber section of the rubber ring.
3. Pass the tightening cap through the cable, insert the cable into the connector, and tighten the hexagonal nut to secure the cable.

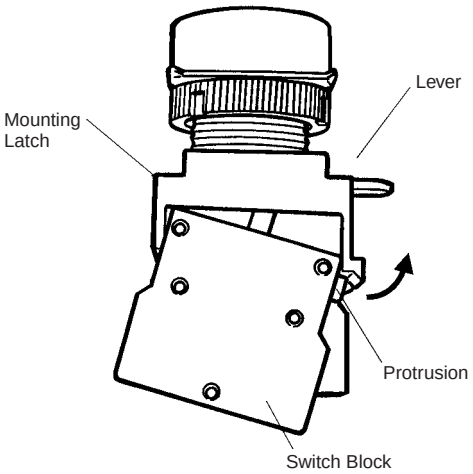



| Cable diameter | Connector |
|---|---|
| 7 to 9 dia. | A22Z-3500-1 |
| 9 to 11 dia. | A22Z-3500-2 |

# ■ Installing/Removing the Switch Blocks

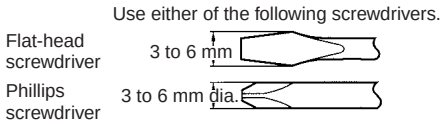
## Installing the Switch Blocks

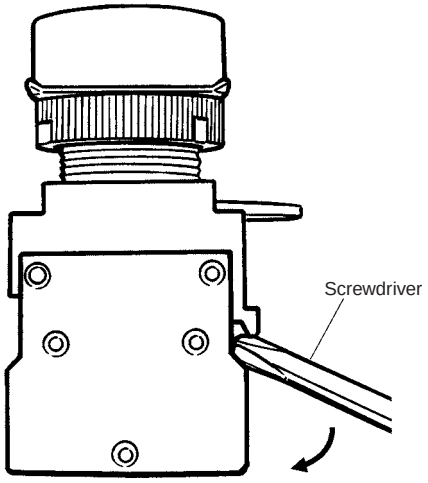
Hook the small protrusion on the Mounting Latch into the groove on the other side of the lever, then push up the Switch Block in the direction indicated by the arrow in the figure below.




## Removing the Switch Blocks

Insert a screwdriver between the Mounting Latch and the Switch Block, then push down the screwdriver in the direction indicated by the arrow in the following figure.

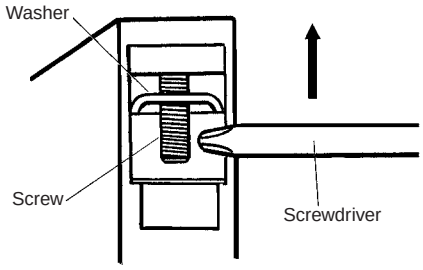



# ■ Wiring

## Wiring Round Crimp Terminals

Loosen the terminal screw from the Switch Unit until it completely comes off the groove, insert a screwdriver as shown in the following figure, then push up the washer in the direction indicated by the arrow to temporarily secure it. Now, a round crimp terminal can be connected. After inserting the terminal, tighten the screws to complete wiring.



# Safety Precautions

Refer to the *Common Precautions* for Pushbutton Switches on page 14.

**⚠ Caution**

Do not apply a voltage exceeding the rated voltage across the incandescent lamp terminals.
The lamp may be destroyed and the operation unit may fly out.

## ■ Precautions for Correct Use

### Mounting

Always make sure that the power is turned OFF before mounting, removing, or wiring the Switch, or performing maintenance. Electric shock may occur.
Do not tighten the mounting ring more than necessary using tools such as pointed-nose pliers. Doing so will damage the mounting ring.
The tightening torque is 0.98 to 1.96 N·m.
Recommended panel thickness: 1 to 5 mm.

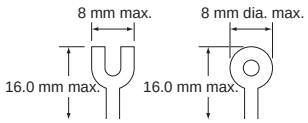
### Wiring

When DC-specific LEDs are used, wire the Switch so that the X1 terminal is positive.
Terminal screws must be Phillips or slotted M3.5 screws with a square washer.
The tightening torque is 1.08 to 1.27 N·m.
Single wires, stranded wires, and crimp terminals can be connected to the Switch.

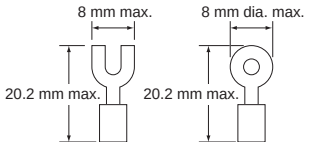
Applicable Wiring Materials:

Twisted strands: 2 $mm^2$ max.
Solid wire: 1.6 mm dia.

Naked Crimp Terminals




Crimp Terminals with Insulating Sheaths



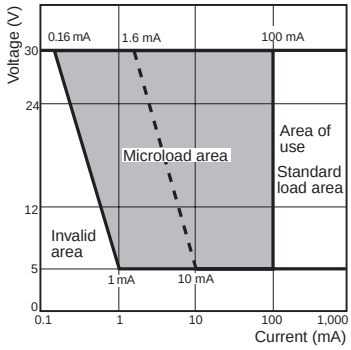

After wiring the Switch, maintain an appropriate clearance and creepage distance.

### Operating Environment

The IP65 model is designed with a protective structure so that it will not sustain damage if it is subjected to water from any direction to the front of the panel.

### Using the Microload

Contact failure may occur is a Switch designed for a standard load is used to switch a microload. Use Switches within the application ranges shown in the following graph. Even within the application range, insert a contact protection circuit, if necessary, to prevent the reduction of life expectancy due to extreme wear on the contacts caused by loads where inrush current occurs when the contact is opened and closed.
The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ 60) (conforming to JIS C5003).
The equation, λ 60 = 0.5 x $10^{-6}$/time indicates that the estimated malfunction rate is less than 1/2,000,000 with a reliability level of 60%.




### LEDs

The LED current-limiting resistor is built-in, so internal resistance is not required.
If commercially available LEDs are used, select the ones that meet the following conditions:

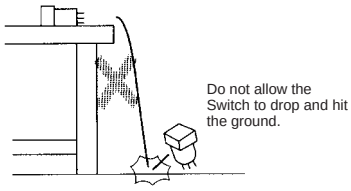
Base: BA9S/13□

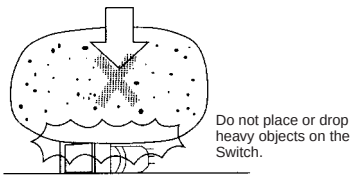
Overall length: 26 mm max.

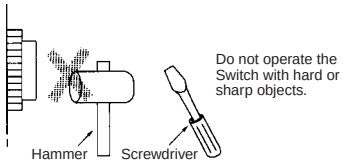
Power consumption: 2.6 W max.

### Others

The oil-resistant IP65 uses NBR rubber and is resistant to general cutting oil and cooling oil. Some particular oils cannot be used with the oil-resistant IP65, however, so contact your OMRON representative for details.
If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after the coating.
Do not subject the Switch to extreme shock or vibration. Doing so will cause malfunctions and damage to the Switch.
Do not let sharp objects come into contact with the Switches that are made of resin. Doing so will damage the Switches, causing scratches on the outside of the Pushbuttons, and malfunction.
When handling the Switches, do not throw or drop them.




ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

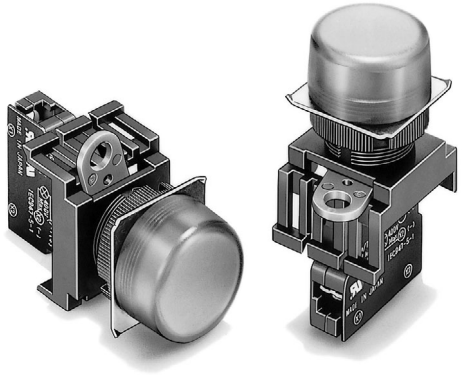
Cat. No. A119-E1-06

In the interest of product improvement, specifications are subject to change without notice.

# Indicator
# M22

## 22-dia. and 25-dia. Round Indicator Series

- Easy mounting and removal of Socket Unit.
- Use 25-dia. ring to install in 25-dia. panel cutouts.
- Finger protection mechanism on Lamp provided as a standard feature.
- UL and cUL approved (File No. E41515)



# Model Number Structure

## ■ Model Number Legend

### Completely Assembled

Shipped as a set which includes the Display, Lamp, and Socket Unit.

**M22-□□-□**
(1 = Display Shape, 2 = Illumination Color, 3 = Light Source)

**1 Display Shape**

| Code | Description |
|---|---|
| F | Round/Flat |
| C | Square/Projection |

**2 Illumination Color**

| Code | Description |
|---|---|
| R | Red |
| G | Green |
| Y | Yellow |
| W | White |
| A | Blue |

**3 Light Source**

| Code | Operating voltage | |
|---|---|---|
| **Without Voltage Reduction Unit** | | |
| 6D | LED | 6 VDC |
| 6A | | 6 VAC |
| 12A | | 12 VAC/VDC |
| 24A | | 24 VAC/VDC |
| 5 | Incandescent lamp | 5 VAC/VDC |
| 12 | | 12 VAC/VDC |
| 24 | | 24 VAC/VDC |
| **With Voltage Reduction Unit** | | |
| T1 | LED | 100 VAC |
| T2 | | 200 VAC |

**Note:** The LED lamp (24 VAC/VDC) can be lit by directly applying 110 VAC/VDC (220 VAC/VDC) to the lamp terminal. LED incorporates the 24-VAC/VDC type.

## Subassembled

The Display, Lamp, or Socket Unit can be ordered separately. Use them in combination for models that are not available as assembled Units. These can also be used as inventory for maintenance parts.

### 1. Display

**M22-□□** (1 2)

**1 Flange Shape**

| Code | Description |
|---|---|
| F | Round/Flat |
| C | Square/Projection |

**2 Cap Color**

| Code | Description |
|---|---|
| R | Red |
| G | Green |
| Y | Yellow |
| W | White |
| A | Blue |

### 2. Lamp

**A22-□□** (1 2)

**1 Operating Voltage (Rated Voltage)**

| Incandescent | |
|---|---|
| **Code** | **Description** |
| 5 | 5 VAC (6 VAC) |
| 12 | 12 VAC (14 VAC) |
| 24 | 24 VAC (28 VAC) |
| **LED** | |
| 6D | 6 VDC (6 VDC) |
| 6A | 6 VAC (6 VAC) |
| 12A | 12 VAC/VDC (12 VAC/VDC) |
| 24A | 24 VAC/VDC (24 VAC/VDC) |

**2 Illumination Color**

| Code | Description |
|---|---|
| None | Incandescent lamp |
| R | Red |
| G | Green |
| Y | Yellow |
| A | Blue |

### 3. Socket Unit

**M22-00-□** (1)

**1 Voltage Reduction Unit**

| Code | Description |
|---|---|
| None | Without Voltage Reduction Unit |
| T1 | 110 VAC |
| T2 | 220 VAC |

# Ordering Information

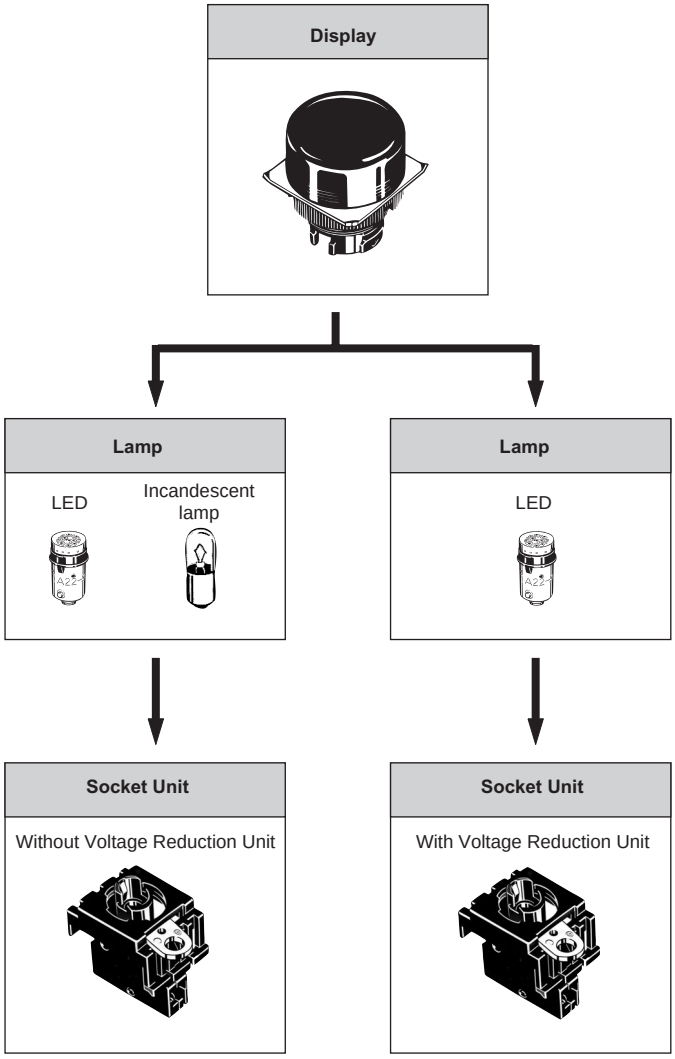
## ■ List of Models

### Completely Assembled

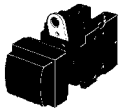
#### Indicator

| Appearance | Lighting | Operating voltage | Model | Illumination color |
|---|---|---|---|---|
| Round/Flat without Voltage Reduction Unit M22-F | LED | 6 VDC | M22-F□-6D | Insert one of the following letters into the box □.<br>R (red)<br>Y (yellow)<br>G (green)<br>W (white)<br>A (blue) |
| | | 6 VAC | M22-F□-6A | |
| | | 12 VAC/VDC | M22-F□-12A | |
| | | 24 VAC/VDC | M22-F□-24A | |
| Round/Flat with Voltage Reduction Unit M22-F | | 100 VAC | M22-F□-T1 | |
| | | 200 VAC | M22-F□-T2 | |
| Square/Projection without Voltage Reduction Unit M22-C | | 6 VDC | M22-C□-6D | |
| | | 6 VAC | M22-C□-6A | |
| | | 12 VAC/VDC | M22-C□-12A | |
| | | 24 VAC/VDC | M22-C□-24A | |
| Square/Projection with Voltage Reduction Unit M22-C | | 100 VAC | M22-C□-T1 | |
| | | 200 VAC | M22-C□-T2 | |

## Subassembled




## Display

| Appearance | IP65 oil-resistant | |
|---|---|---|
| | Color of Display | Model |
| Round/Flat M22-F | Red | M22-FR |
| | Green | M22-FG |
| | Yellow | M22-FY |
| | White | M22-FW |
| | Blue | M22-FA |
| Square/Projection  M22-C | Red | M22-CR |
| | Green | M22-CG |
| | Yellow | M22-CY |
| | White | M22-CW |
| | Blue | M22-CA |

## Lamp

### LED

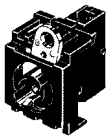
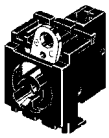
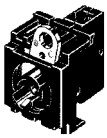
| Appearance | AC/DC | LED light | Operating voltage: 6 V | 12 V | 24 V | 24 V Super-bright |
|---|---|---|---|---|---|---|
| | | | Model | | | |
| | AC | Red | A22-6DR | --- | --- | --- |
| | | Green | A22-6DG | --- | --- | --- |
| | | Yellow (see note 2) | A22-6DY | --- | --- | --- |
| | | Blue | A22-6DA | --- | --- | --- |
| | DC | Red | A22-6AR | --- | --- | --- |
| | | Green | A22-6AG | --- | --- | --- |
| | | Yellow (see note 2) | A22-6AY | --- | --- | --- |
| | | Blue | A22-6AA | --- | --- | --- |
| | AC and DC | Red | --- | A22-12AR | A22-24AR | A22-24ASR |
| | | Green | --- | A22-12AG | A22-24AG | A22-24ASG |
| | | Yellow (see note 2) | --- | A22-12AY | A22-24AY | A22-24ASY |
| | | Blue | --- | A22-12AA | A22-24AA | A22-24ASA |

**Note: 1.** For voltage-reduction lighting, use the A22-24A□.
**2.** Used when the Display color is yellow or white.

### Incandescent

| Operating voltage | 6 VAC/VDC | 12 VAC/VDC | 24 VAC/VDC |
|---|---|---|---|
| | A22-5 | A22-12 | A22-24 |

## Socket Unit

| Voltage-reduction circuits | | |
|---|---|---|
| Without Voltage Reduction Unit | With Voltage Reduction Unit | |
|  |  |  |
| Without Voltage Reduction Unit | With Voltage Reduction Unit (100 VAC) | With Voltage Reduction Unit (200 VAC) |
| M22-00 | M22-00-T1 | M22-00-T2 |

**Note:** For voltage-reduction lighting, use the A22-24A□.

## Accessories (Order Separately)

The M22 uses the same accessories as the A22. Refer to the relevant information in the corresponding section for the A22.

# Specifications

## ■ Approved Standards

| Recognized organization | Standards | File No. |
|---|---|---|
| UL, cUL (See note.) | UL508 | E41515 |

**Note:** cUL: CSA C22.2 No. 14

## ■ Approved Standard Ratings

**UL, cUL (File No. E41515)**

2-6W, 120 V max.

## ■ Ratings

### LED Lamp

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 6 VDC | 60 mA (20 mA) | 6 VDC±5% |
| 6 VAC | 60 mA (20 mA) | 6 VAC±5% |
| 12 VAC/VDC | 30 mA (10 mA) | 12 VAC/VDC±5% |
| 24 VAC/VDC | 15 mA (10 mA) | 24 VAC/VDC±5% |

**Note:** The values in parentheses are for blue Indicators.

### Super-bright LED Indicator

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 24 VAC/VDC | 15 mA | 24 VAC/VDC±5% |

### Incandescent Lamp

| Rated voltage | Rated current | Operating voltage |
|---|---|---|
| 6 VAC/VDC | 200 mA | 5 V |
| 14 VAC/VDC | 80 mA | 12 V |
| 28 VAC/VDC | 40 mA | 24 V |
| 130 VAC/VDC | 20 mA | 100 V |

### Voltage-reduction Lighting

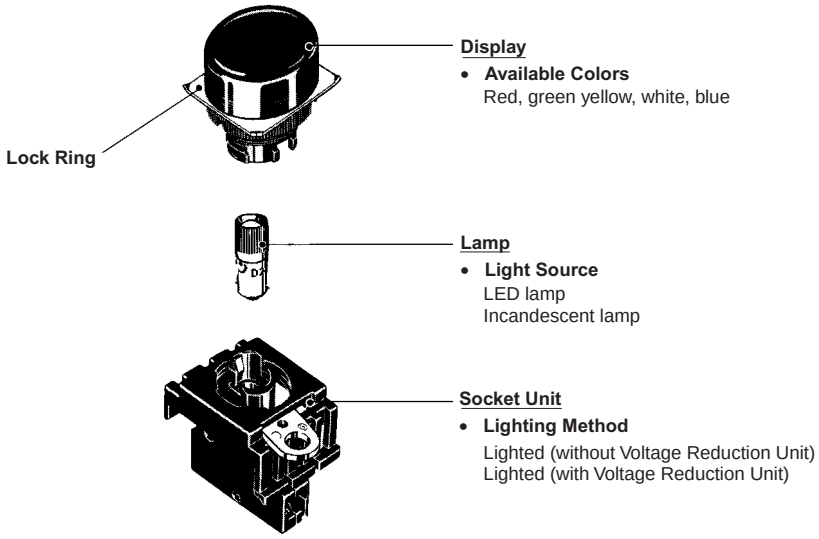
| Rated voltage | Operational voltage | Applicable lamp (BA9S/13□ gold) |
|---|---|---|
| 110 VAC | 95 to 115 VAC | LED lamp (A22-24□) |
| 220 VAC | 190 to 230 VAC | |

## ■ Characteristics

| Item | | Indicator |
|---|---|---|
| | | M22 |
| **Insulation resistance** | | 100 MΩ min. (at 500 VDC) |
| **Dielectric strength** | | 2,500 VAC, 50/60 Hz for 1 min between terminals of same polarity<br>2,500 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground |
| **Vibration resistance** | | Malfunction (See note 2.): 10 to 55 Hz, 1.5-mm double amplitude |
| **Shock resistance** | **Destruction** | 1,000 $m/s^2$ |
| | **Malfunction (See note 2.)** | 600 $m/s^2$ max. |
| **Ambient temperature (See note 1.)** | | Operating: –20°C to 55°C<br>Storage: –40°C to 70°C |
| **Ambient humidity** | | Operating: 35°C to 85°C |
| **Degree of protection** | | IP65 |
| **Electric shock protection class** | | Class II |
| **PTI (tracking characteristic)** | | 175 |
| **Degree of contamination** | | 3 (IEC947-5-1) |

**Note: 1.** With no icing or condensation.
**2.** Malfunction within 1 ms.

# Nomenclature



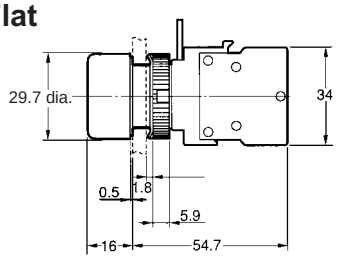
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

## ■ Indicators

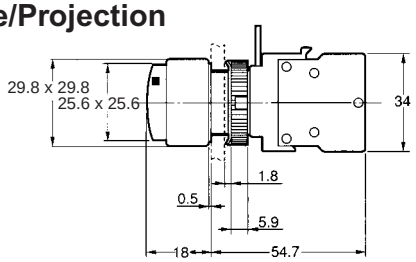
### Round/Flat

**M22-F**




### Square/Projection

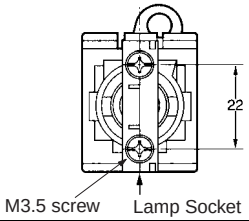
**M22-C**




## ■ Accessories

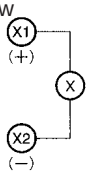
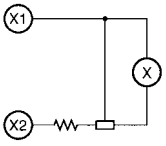
The M22 uses the same accessories as the A22. Refer to the relevant information in the corresponding section for the A22.

## ■ Terminal Arrangement (Bottom View)

| With/Without Voltage Reduction Unit |
|---|
|  |



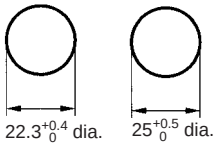
## ■ Terminal Connection

| Without Voltage Reduction Unit | With Voltage Reduction Unit |
|---|---|
| Bottom view  | Top view  |





## ■ Panel Cutouts (Top View)




**Note: 1.** When applying coating such as paint to the panel, the dimensions should be those after the application of coating. Lock Ring is provided as a standard item.

**2.** Recommended panel thickness: 1 to 5 mm.

**3.** Use an A22Z-R25 Ring when mounting to a panel with 25-mm holes.

# Installation

The M22 uses the same installation method as the A22. Refer to the relevant information in the *Installation* section for the A22.

# Precautions

The precautions for the M22 are the same as those for the A22. Refer to the relevant information in the *Precautions* section for the A22 and the *Technical Information for Pushbutton Switches* (Cat. No. A143).

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A131-E1-03

In the interest of product improvement, specifications are subject to change without notice.

OMRON

# Lighted Pushbutton Switch

# A3A

## Compact Switch Allows Signal and Power Switching with the Same Model

- Compact, high-capacity push-button switch that has contacts with a 3-mm gap and is ideal as a power switch.
- Capable of switching within the range of 1 mA, 5 VDC to 6 A, 125 VAC.
- Requires only 14.5 mm behind the panel.
- Options include the following:
  - Round or square
  - Momentary or alternate
  - Surface illumination or non-lighted
- UL and CSA approved.

## Ordering Information

### Model Number Legend

(1) (2) (3) (4) (5)

**A 3 A A - 9 0 K 1 - 00E R**

**(1) Shape**

| Symbol | Protection |
|---|---|
| A | Square |
| T | Round |

**(2) Terminal**

| Symbol | Type |
|---|---|
| 0 | Solder |
| 1 | PCB |

**(3) Switch**

| Symbol | Operation | Contact type | |
|---|---|---|---|
| A (See note) | Momentary | SPDT | 3 A at 125 VAC, 2 A at 30 VDC |
| B (See note) | Alternate | | |
| K | Momentary | SPST-NO | 6 A at 125 VAC, 2 A at 250 VAC, 4 A at 30 VDC |
| L | Alternate | | |

**(4) Illumination**

| Symbol | Operation |
|---|---|
| 00 | Non-lighted |
| 00E | Surface illumination |

**(5) Color**

**Pushbutton (Non-lighted Models)**

| Symbol | Color |
|---|---|
| L | Light gray |
| R | Red (See note) |
| Y | Yellow (See note) |
| G | Green (See note) |
| A | Blue |
| B | Black |
| D | Dark gray |
| H | Gray |

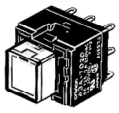
**LED (Surface Illumination Models)**

| Symbol | Color |
|---|---|
| R | Red |
| Y | Yellow |
| G | Green |

**Note:** Common to both lighted and non-lighted models.

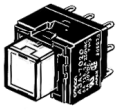
## ■ List of Models

### SPST-NO

| Appearance | Terminal | Action | Illumination | Model | Color |
|---|---|---|---|---|---|
| **Square**<br>**A3AA-9□□1-00□**<br>**A3AA-9□□1-00E□**<br>  | Solder | Momentary | Non-lighted | A3AA-90K1-00□ | (Non-lighted) |
| | | | Surface illumination | A3AA-90K1-00E□ | R: red |
| | | Alternate | Non-lighted | A3AA-90L1-00□ | Y: yellow |
| | | | Surface illumination | A3AA-90L1-00E□ | G: green |
| | PCB | Momentary | Non-lighted | A3AA-91K1-00□ | L: light gray (see note) |
| | | | Surface illumination | A3AA-91K1-00E□ | A: blue (see note) |
| | | Alternate | Non-lighted | A3AA-91L1-00□ | B: black (see note) |
| | | | Surface illumination | A3AA-91L1-00E□ | D: dark gray (see note) |
| **Round**<br>**A3AT-9□□1-00□**<br>**A3AT-9□□1-00E□**<br> | Solder | Momentary | Non-lighted | A3AT-90K1-00□ | H: gray (see note) |
| | | | Surface illumination | A3AT-90K1-00E□ | (Lighted) |
| | | Alternate | Non-lighted | A3AT-90L1-00□ | R: red |
| | | | Surface illumination | A3AT-90L1-00E□ | Y: yellow |
| | PCB | Momentary | Non-lighted | A3AT-91K1-00□ | G: green |
| | | | Surface illumination | A3AT-91K1-00E□ | |
| | | Alternate | Non-lighted | A3AT-91L1-00□ | |
| | | | Surface illumination | A3AT-91L1-00E□ | |

**Note:** The above models each have a SPST-NO contact that can switch 6 A at 125 VAC, 2 A at 250 VAC, and 4 A at 30 VDC. When ordering any of the above models, replace □ of the model number with a code to indicate the pushbutton color of the model (i.e., replace □ with R, Y, G, L, A, B, D, H, and L). The pushbutton of an A3A does not illuminate if the color of the pushbutton is dark gray, gray, light gray, blue, or black.

### SPDT

| Appearance | Terminal | Action | Illumination | Model | Color |
|---|---|---|---|---|---|
| **Square**<br>**A3AA-9□□1-00□**<br>**A3AA-9□□1-00E□**<br>  | Solder | Momentary | Non-lighted | A3AA-90A1-00□ | R: red |
| | | | Surface illumination | A3AA-90A1-00E□ | Y: yellow |
| | | Alternate | Non-lighted | A3AA-90B1-00□ | G: green |
| | | | Surface illumination | A3AA-90B1-00E□ | L: light gray (see note) |
| | PCB | Momentary | Non-lighted | A3AA-91A1-00□ | A: blue (see note) |
| | | | Surface illumination | A3AA-91A1-00E□ | B: black (see note) |
| | | Alternate | Non-lighted | A3AA-91B1-00□ | D: dark gray (see note) |
| | | | Surface illumination | A3AA-91B1-00E□ | H: gray (see note) |
| **Round**<br>**A3AT-9□□1-00□**<br>**A3AT-9□□1-00E□**<br> | Solder | Momentary | Non-lighted | A3AT-90A1-00□ | (Lighted) |
| | | | Surface illumination | A3AT-90A1-00E□ | R: red |
| | | Alternate | Non-lighted | A3AT-90B1-00□ | Y: yellow |
| | | | Surface illumination | A3AT-90B1-00E□ | G: green |
| | PCB | Momentary | Non-lighted | A3AT-91A1-00□ | |
| | | | Surface illumination | A3AT-91A1-00E□ | |
| | | Alternate | Non-lighted | A3AT-91B1-00□ | |
| | | | Surface illumination | A3AT-91B1-00E□ | |

**Note:** The above models each have a SPDT contact that can switch 3 A at 125 VAC and 2 A at 30 VDC. When ordering any of the above models, replace □ of the model number with a code to indicate the pushbutton color of the model (i.e., replace □ with R, Y, G, L, A, B, D, H, and L). The pushbutton of an A3A does not illuminate if the color of the pushbutton is dark gray, gray, light gray, blue, or black.

## ■ Accessories (Order Separately)

### Flange

Select according to panel color.

| Name | Shape | Classification | | Model |
|---|---|---|---|---|
| **Flange** | Square, 12.7 x 12.7 | Flange alone | Black | A3A-241 |
| | | | Light gray | A3A-242 |
| | Round, 12.7 dia. | | Black | A3A-251 |
| | | | Light gray | A3A-252 |
| | | Leaf spring | | A3A-200 |
| | Square, 12.7 x 12.7 | Flange and leaf spring (one each) | Black | A3A-211 |
| | | | Light gray | A3A-212 |
| | Round, 12.7 dia. | | Black | A3A-221 |
| | | | Light gray | A3A-222 |

**Note:** An A3A with solder terminals is provided with a round or square black flange and leaf spring for the switching mechanism of the A3A. A round black flange is provided with each A3A having solder terminals and a round pushbutton. A square black flange is provided with each A3A having solder terminals and a square pushbutton.

# Specifications

## ■ Contact Ratings

| Type | Contact form | Resistive load | |
|---|---|---|---|
| **High capacity** | SPST-NO | 6 A at 125 VAC<br>2 A at 250 VAC | 4 A at 30 VDC |

**Note:** 1. Minimum allowable load: 5 VDC 1 mA (Resistive)

2. The ratings given above are for testing under the following conditions:
   1. Ambient temperature: 20 ±2°C
   2. Ambient humidity: 65 ±5%
   3. Operating frequency: 20 times/minute

## ■ LED Ratings

| Item | | Surface illumination | | |
|---|---|---|---|---|
| | | **Red** | **Yellow** | **Green** |
| **Forward voltage $V_F$** | **Standard value** | 2.0 V | 2.1 V | 2.1 V |
| | **Maximum value** | 3 V | | |
| **Forward current $I_F$** | **Standard value** | 10 mA | | |
| | **Maximum value** | 20 mA | 25 mA | 25 mA |
| **Permissible loss PD** | **Absolute max. value** | 60 mW | 75 mW | 75 mW |
| **Reverse voltage $V_R$** | **Absolute max. value** | 3 V | | |

**Note:** 1. The above built-in LEDs do not have a resistor. Connect to each of the above built-in LEDs a resistor that satisfies the above conditions.

2. Refer to the $V_F$ – $I_F$ characteristic graphs on page 219.

## ■ Characteristics

| | |
|---|---|
| **Operating frequency** | Mechanical:<br>Momentary action: 120 operations/minute max.<br>Alternate action: 60 operations/minute max. (See note 1.)<br>Electrical: 20 operations/minute max. |
| **Insulation resistance** | 100 MΩ min. (at 500 VDC) |
| **Contact resistance** | 100 mΩ max. (initial value) |
| **Dielectric strength** | 600 VAC, 50/60 Hz for 1 min between terminals of same polarity<br>2,000 VAC, 50/60 Hz for 1 min between each terminal and ground<br>600 VAC, 50/60 Hz for 1 min between LED terminals (See note 2.) |
| **Vibration resistance** | Malfunction: 10 to 55 Hz, 1.5-mm double amplitude (See note 3.) |
| **Shock resistance** | Destruction: 500 $m/s^2$<br>Malfunction: 150 $m/s^2$ (See note 3.) |
| **Life expectancy** | Mechanical:<br>Momentary action: 1,000,000 operations min.<br>Alternate action: 50,000 operations min. (See note 1.)<br>Electrical: 50,000 operations min. |
| **Weight** | Approx. 3.2 g |
| **Ambient temperature** | Operating: –10°C to 55°C (with no icing)<br>Storage: –25°C to 65°C |
| **Ambient humidity** | Operating: 35% to 85% |
| **Degree of protection** | IP00 |
| **Electric shock protection class** | Class II |
| **PTI (proof tracking index)** | 175 |
| **Pollution degree** | 3 (IEC947-5-1) |

**Note:** 1. With alternate-action models, a setting and resetting is regarded as one operation.
2. The figure for the dielectric strength between LED terminals in the above table is for when the LED is not installed in the Switch.
3. The figures for malfunctions in the above table are for malfunctions of at least 1 ms.

## ■ Approved Standards

### UL (File No. E41515)/CSA (File No. LR45258)

SPST-NO: 6 A at 125 VAC, 2 A at 250 VAC, 4 A at 30 VDC
SPDT: 3 A at 125 VAC, 2 A at 30 VDC

## ■ Operating Characteristics

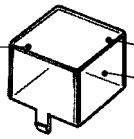
| | |
|---|---|
| **OF max.** | 2.45 N |
| **RF min.** | 0.15 N |
| **TT** | Approx. 2 mm |
| **PT max.** | 1.5 mm |
| **LTA min. (See note.)** | 0.5 mm |

**Note:** The above lock stroke figure applies to A3A alternate operation models only.

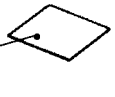
# Nomenclature

**Pushbutton**

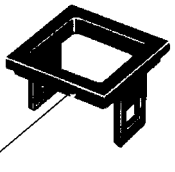
Square (A3AA) Round (A3AT)



**Color cap**



Diffusion sheet (milky white)



Flange

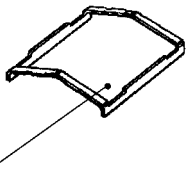
**Color**

**Non-lighted Model**

Red, yellow, light gray, gray, dark gray, green blue, black

**Surface Illumination Model**

Red, yellow, green

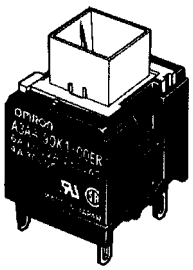


Leaf spring

**Switch**

**Ratings (Standard load)**

6 A at 125 VAC
2 A at 250 VAC
4 A at 30 VDC
Minimum applicable load:
1 mA at 5 VDC (resistive load)



**Terminals**

Solder terminal
PCB terminal

## ■ Contact Form

**Contact Type**

| Contact form | Contact type |
|---|---|
| SPST-NO | NO NO |
| SPDT | NC COM NO |

**Note:** 1. The above is for the A3AA.

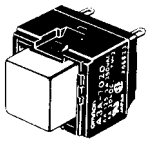
2. An A3A with solder terminals is provided with a black flange and leaf spring for the switching mechanism, however an A3A with PCB terminals is not provided with them. If a black flange and leaf spring are required for an A3A with PCB terminals, order them from your OMRON representative.

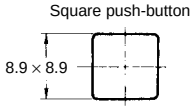
# Dimensions

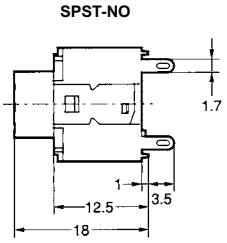
**Note:** 1. All units are in millimeters unless otherwise indicated.
2. The illustrations below show switches with solder terminals, without a flange or leaf spring.

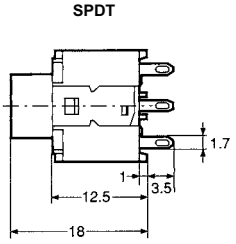
## Non-lighted Model

### Square Pushbutton

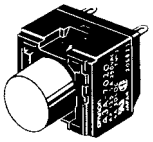


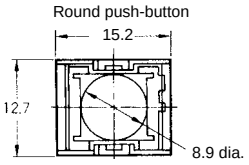


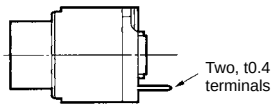



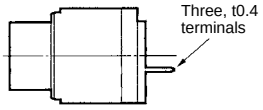




### Round Pushbutton



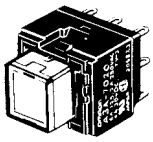


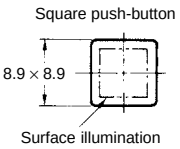



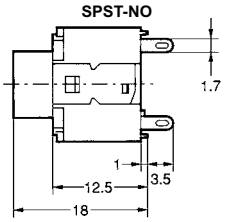



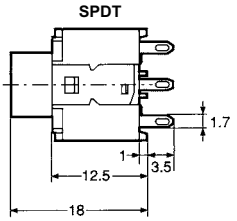

## Surface Illumination Model

### Square Pushbutton

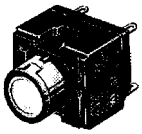


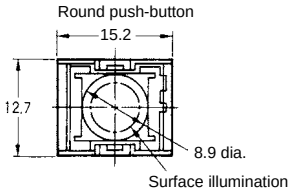


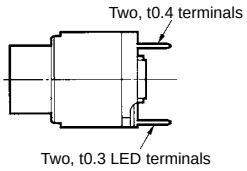



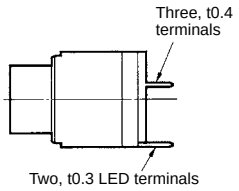




### Round Pushbutton





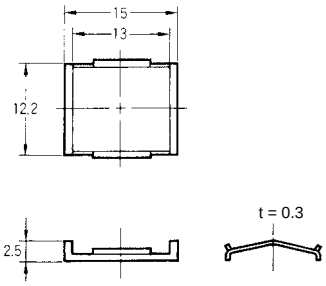



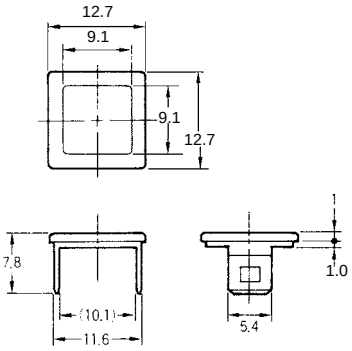

## Accessories (Order Separately)

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

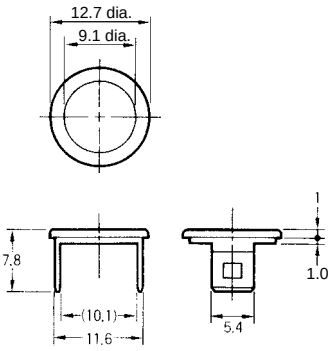
### Leaf Spring
### A3A-200




### Flange (Square)
### A3A-24□

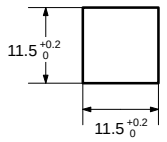



### Flange (Round)
### A3A-25□

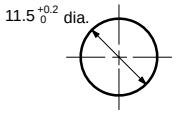


## ■ Panel Cutouts

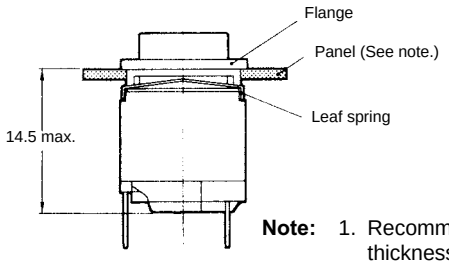
**Square Pushbutton**




**Round Pushbutton**



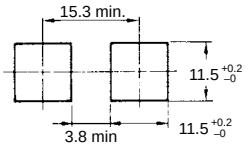
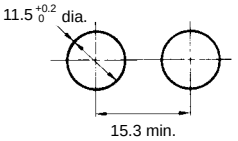
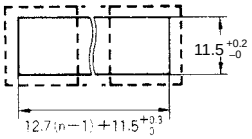
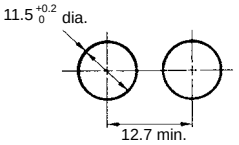

**Panel Mounting Dimensions**



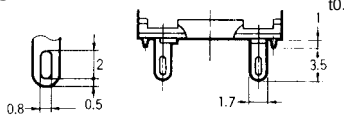
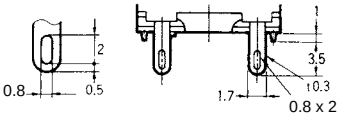
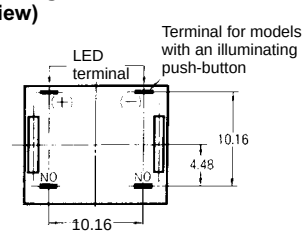
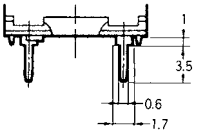
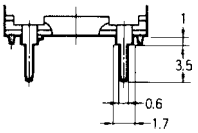
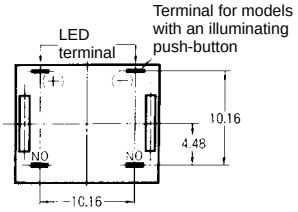
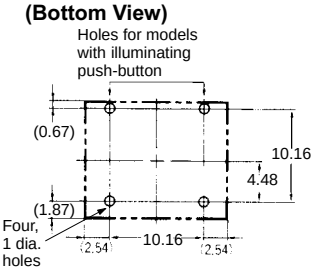
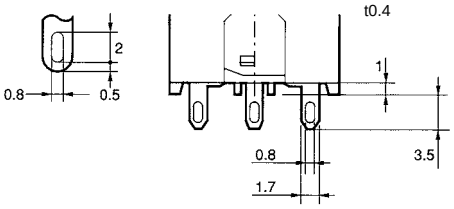
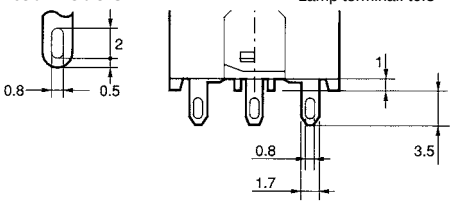
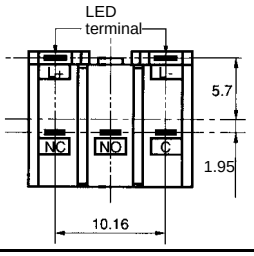
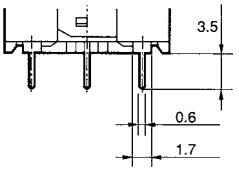
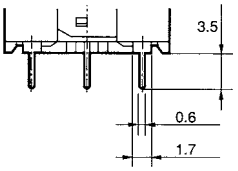
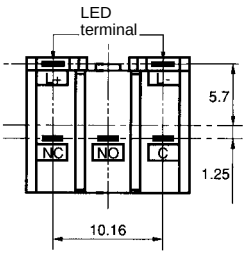
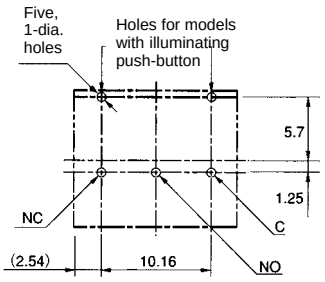

**Note:** 1. Recommended panel thickness: 1 to 1.6 mm

2. The diagram shows the lighted SPST-NO model.

**For Side-by-side Mounting**

| Mounting | Square pushbutton | Round pushbutton |
|---|---|---|
| **Horizontal multiple mounting** |   |   |
| **Vertical multiple mounting** |   |   |

## ■ Terminals

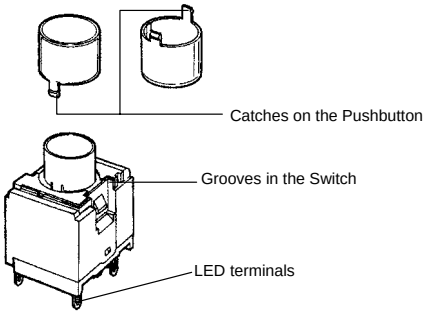
| | Solder terminal | PCB terminal |
|---|---|---|
| SPST-NO | **Non-lighted Models**<br>Switch terminal: t0.4<br>  <br>**Lighted Models**<br>Switch terminal: t0.4<br>Lamp terminal: t0.3<br>  <br>**Terminal Arrangement (Bottom View)**<br>  <br> | **Non-lighted Models**<br>  <br>Switch terminal: t0.4<br>**Lighted Models**<br>  <br>Switch terminal: t0.4<br>Lamp terminal: t0.3<br>**Terminal Arrangement (Bottom View)**<br>  <br><br>**PCB Dimensions (Bottom View)**<br>  <br> |
| SPDT | **Non-lighted Models**<br>Switch terminal: t0.4<br>  <br>**Lighted Models**<br>Switch terminal: t0.4<br>Lamp terminal: t0.3<br>  <br>**Terminal Arrangement (Bottom View)**<br>  <br> | **Non-lighted Models**<br>  <br>Switch terminal: t0.4<br>**Lighted Models**<br>  <br>Switch terminal: t0.4<br>LED terminal: t0.3<br>**Terminal Arrangement (Bottom View)**<br>  <br><br>**PCB Dimensions (Bottom View)**<br>  <br> |

# Installation

## Mounting and Replacing the Pushbutton

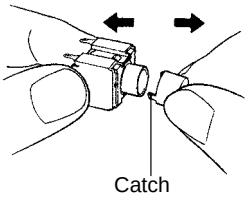
### Mounting Direction for the Pushbutton and Switch

- Insert the catches of the Pushbutton into the grooves of the Switch and push down on the Pushbutton until it is fixed securely to the Switch.
- With lighted models, the LED is built into the Switch and cannot be replaced.

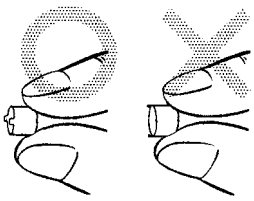



### Removing the Pushbutton (Non-lighted Models Only)

- To remove the Pushbutton, hold both the Pushbutton and the Switch on the longer sides and pull the Pushbutton away from the Switch. (If the catches on the Pushbutton are bent outwards, it may result in malfunction.)



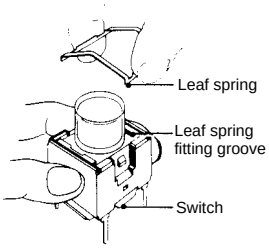

- When replacing the Pushbutton, if the cap is held on the sides with catches, internal components (e.g., plate) may come loose. Be sure to hold the Pushbutton by the sides without catches (i.e., the longer sides of the Switch) when removing.



## Mounting Switch on a Panel

### Mount Leaf Spring

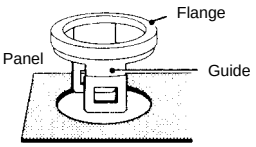
Press the leaf spring into the fitted groove on the upper surface of the Switch. For an easier fitting, first fit one side of the leaf spring, then press the other side into the fitting groove.




**Note:** Be sure to fit the leaf spring exactly into the groove, and do not allow it to slip out of the groove.

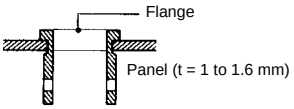
### Mount Flange on Panel

Insert the flange from the front surface of the panel.




The flange has two opposing guides to facilitate its insertion into the panel cutout hole. Be sure the flange does not remain tilted with respect to the panel surface after being installed.

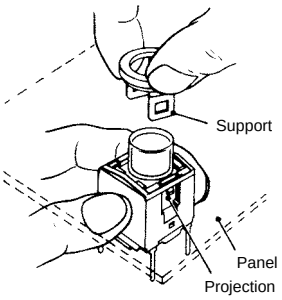
**Cross Section**




**Note:** The mounting direction of the flange determines the orientation of the Switch.

### Fit Flange with Switch

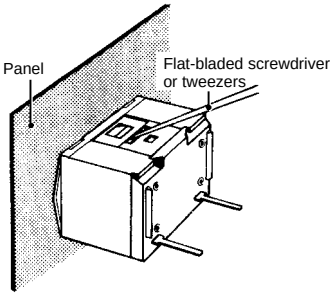
While holding the flange, insert the opposing supports into the gaps between the leaf spring and Switch on the longer sides of the housing, and fit the rectangular hole of the flange with the projections of the switch housing.




**Note:** Completely remove any burrs on the panel cutout surface; otherwise, the flange and Switch will not attach solidly.

### Removing Switch

Insert a small flat-bladed screwdriver or tweezers into the flange support exposed on the rear of the panel. Pry up on each side to pull out the Switch.




**Note:** Do not pry up the flange support more than necessary or the switch holding portions may be damaged.

# Precautions

## Operation

When operating an A3A, make sure that the A3A has a pushbutton. Do not operate the A3A with a screwdriver or tweezers without mounting a pushbutton to the A3A, otherwise the A3A may malfunction.

## Mounting

When opening a hole on a panel to mount an A3A to the panel, make sure that the hole has no burr.

When mounting a flange to the switching mechanism of an A3A, make sure that the flange and the casing of the switching mechanism are engaged securely.

## Wiring

When soldering the terminals of an A3A, refer to the following.

1. For manual soldering: Use a soldering iron with the terminals at a temperature of 350°C maximum within three seconds.
2. Do not impose any external force on the terminals for one minute after the terminals are soldered.

Do not pull the terminals of any A3A with a force exceeding 5.34 N, otherwise the joint part of the A3A may be damaged.

When soldering the terminals of an A3A, apply non-corrosive rosin flux to the terminals.

After soldering the terminals of an A3A, do not wash the A3A with any solvent.

When mounting an A3A to a PCB and soldering the terminals of the A3A to the PCB, make sure that the flux will not rise above the surface of the PCB.

## Operating Environment

When using an A3A, make sure that dust, metal powder, or oil will not penetrate into the interior of the A3A.

## LED

The polarity of the LED is indicated on the back of the Switch. Wire the LED correctly according to the polarity.

An A3A with a built-in LED does not have a limiting resistor. Connect a limiting resistor.

The resistance can be calculated by using the following expression.

$R = (E - V_F)/I_F$ (Ω)

E: Applied voltage (V)
$V_F$: LED forward voltage (V)
$I_F$: LED forward current (A)

**Note:** Make sure that the limiting resistor connected to the built-in LED of an A3A satisfies the characteristics of the built-in LED. The mean forward current of the built-in LED must be 8 mA minimum.

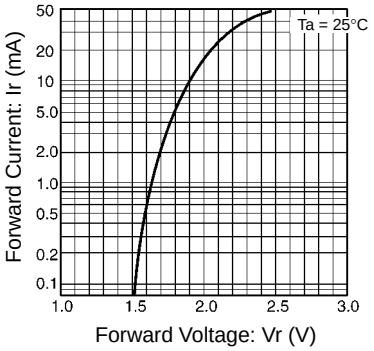
**Example**

Conditions: Red LED with an $I_F$ of –10 mA at 24 V and a Ta of 25°C. From the red LED characteristic below, $V_F$ will be 2 V when $I_F$ is 10 mA. Therefore, R = (24 V – 2 V)/0.01 A = 2,200 Ω.
Thus the recommended resistance is 2.2 kΩ at 0.5 W (2* x $I_F^2R$).

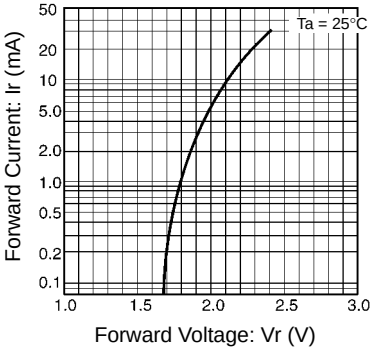
**Note:** A factor of 2 (marked with an asterisk) is applied because the permissible wattage of the resistor must be twice as large as the required wattage.

**LED Characteristics ($V_F$ – $I_F$ Characteristics)**
**Ta: Ambient Temperature**

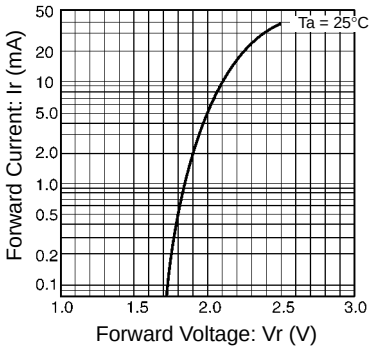
**Red**




**Green**




**Yellow**




## Pushbutton

When exchanging the Pushbutton (except the ones for the mechanical indicator models) with a new one, pull out the Pushbutton from the Switch, holding the Pushbutton in the longitudinal direction.

Do not remove the Pushbutton of the mechanical indicator model.

## Engraving of Pushbutton

Depth of engraving:
0.3 mm max. for illuminating pushbutton

Since the Pushbutton is made of polycarbonate, use an alcohol-based solvent when cleaning the Unit.

## Pressing of Pushbutton

Apply firm pressure to the Pushbutton when operating it. In doing so, however, do not apply a pressure greater than 11.8 N.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

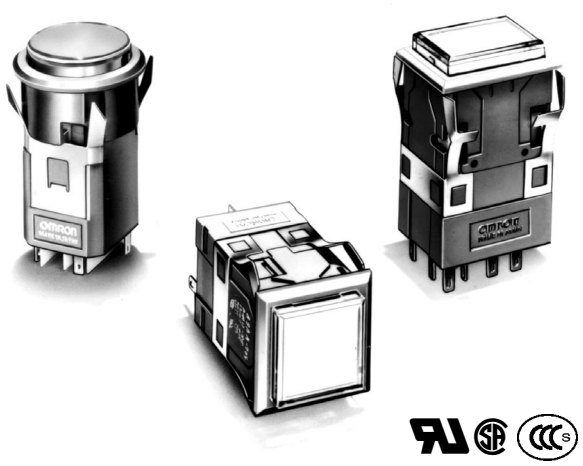
Cat. No. A25-E1-06

OMRON

# Lighted Pushbutton Switches | A3P

## Large Rectangular-bodied Lighted Pushbutton Switches

- Excellent operating sensitivity.
- Good illumination with even surface brightness.
- Three-color models (green, orange, red; chameleon lighting) included in lineup.
- UL and CSA approved.



## Ordering Information

### ■ Model Number Legend

The model numbers used to order sets of Units are illustrated below. One set comprises the Pushbutton, Lamp, and Switch.

(5) (6)

**24E** **R** - - - Single screen

(1) (2) (3) (4) Upper Lower

**A 3 P J - 90 B 1 1 - 24E RW** - - - Horizontal 2-split screen

| | |
|---|---|
| R (Red) | Upper |
| W (White) | Lower |

**(1) Shape of Pushbutton**

| Symbol | Shape |
|---|---|
| J | Rectangular |
| A | Square |
| T | Round |

Momentary operation: Self-resetting
Alternate operation: Self-holding

**(2) Switch Specifications**

**Standard Load**

| Symbol | Operation | |
|---|---|---|
| A | Momentary | SPDT |
| B | Alternate | |
| C | Momentary | DPDT |
| D | Alternate | |

**Microload**

| Symbol | Operation | |
|---|---|---|
| E | Momentary | SPDT |
| F | Alternate | |
| G | Momentary | DPDT |
| H | Alternate | |

**Standard Load**

250 VAC, 3 A
30 VDC, 3 A

**Microload**

125 VAC, 0.1 A
30 VDC, 0.1 A

Minimum applicable load
5 VDC, 1 mA

3PDT models are also available. Select from among the individual products shown on page 233.

**(3) Screen Pattern**

| Illumination-only models | |
|---|---|
| Symbol | Screen pattern |
| 1 | Single screen |
| 2 | 2-split screen |
| G | Chameleon (see note 1, 2, 3) |

**Note:** 1. The chameleon screen pattern is not available with A3PT models.
2. The chameleon screen pattern is only available with 12 or 24-VDC models.
3 With chameleon models, the whole screen lights red, green, or orange. When not lit, the display is white.

The available rectangular models are shown below. Select from among the individual products shown on page 231.

Vertical 2-split screen models
4-split screen models
Horizontal 3-split screen models
Vertical 3-split screen models

The above diagrams show the Switches with the "OMRON" mark facing down.

**(4) Case Color**

| Symbol | Color |
|---|---|
| 1 | Black |
| 2 | Light gray |

**Note: A3PT models are available in light gray only.**

Colored-illumination models up to the 4-split screen models are available as individual Units. Refer to page 229.

"Colored-illumination" models operate in the way shown below:

| Unlit | Lit |
|---|---|
| White | Color |

The built-in LED is colored.

**(5) Lighting Method**

**LED-lighted Models (A3PJ and A3PA Models Only)**

| Symbol | Rated voltage |
|---|---|
| 05E | 5 VDC |
| 12E | 12 VDC |
| 24E | 24 VDC |

**LED Lamp-lighted Models (A3PT Only)**

| Symbol | Rated voltage |
|---|---|
| 05C | 5 VDC |
| 12C | 12 VDC |
| 24C | 24 VDC |

A3PJ and A3PA can also be ordered separately. Refer to page 231 for details.

**Incandescent Lamp-lighted Models**

| Symbol | Rated voltage |
|---|---|
| 06 | 6 VAC/VDC |
| 14 | 14 VAC/VDC |
| 28 | 28 VAC/VDC |

**(6) Color of Pushbutton**

**For LED**

| Symbol | Color |
|---|---|
| R | Red |
| O | Orange |
| G | Green |
| W | White |
| K | Chameleon |

The chameleon screen pattern is not available with A3PT models.

The chameleon screen pattern is only available with 12 or 24-VDC models.

**For Incandescent Lamp**

| Symbol | Color |
|---|---|
| No symbol | Red, orange, white, blue, green |

Includes colored plate. Refer to page 232 for details.

**Number of LED Lamps**

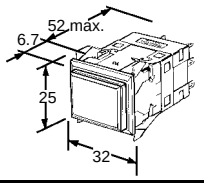
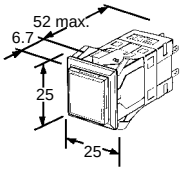
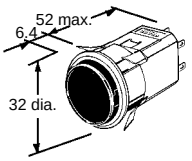
| Screen pattern | A3PJ | A3PA | A3PT |
|---|---|---|---|
| Single screen | Models with built-in LED | | 2 |
| Horizontal 2-split screen | | | 2 |
| Vertical 2-split screen | 4 (See note.) | --- | --- |
| Horizontal 3-split screen | | --- | --- |
| Vertical 3-split screen | | --- | --- |
| 4-split screen | | --- | --- |

**Number of Incandescent Lamps**

| Screen pattern | A3PJ | A3PA | A3PT |
|---|---|---|---|
| Single screen | 2 | 1 | 2 |
| Horizontal 2-split screen | 4 (Low-power incandescent lamp) | 2 | 2 |
| Vertical 2-split screen | | --- | --- |
| Horizontal 3-split screen | | --- | --- |
| Vertical 3-split screen | | --- | --- |
| 4-split screen | | --- | --- |

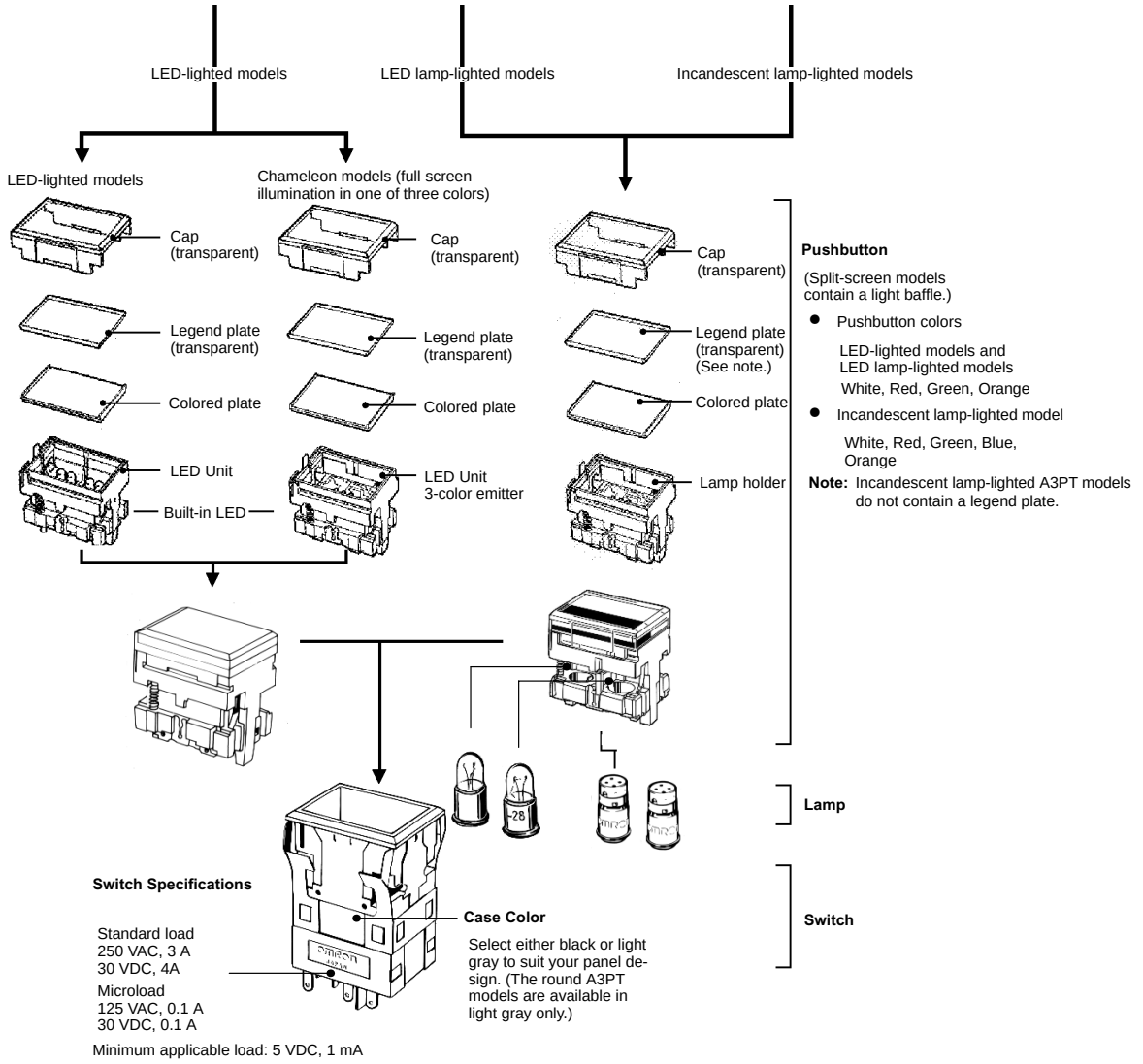
**Note:** These split screen models are available only as individual Units. They cannot be ordered as sets.

## ■ List of Models

| Model | A3PJ (Rectangular) | A3PA (Square) | A3PT (Round) |
|---|---|---|---|
| Appearance |  |  |  |

## ■ Construction

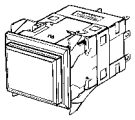
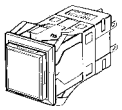
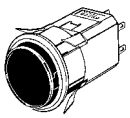
| Lighting method | LED-lighted models (LED is built-in.) | | LED lamp-lighted models (LED lamp is not built-in.) | | | Incandescent lamp-lighted models (Incandescent lamp is not built-in.) | | |
|---|---|---|---|---|---|---|---|---|
| Models | A3PJ | A3PA | A3PJ | A3PA | A3PT | A3PJ | A3PA | A3PT |
| Screen patterns | Single screen<br>Horizontal 2-split screen<br>Chameleon (3-color) | Single screen<br>Horizontal 2-split screen<br>Chameleon (3-color) | Single screen<br>Horizontal 2-split screen<br>Vertical 2-split screen<br>Vertical 3-split screen<br>Horizontal 3-split screen<br>4-split screen | Single screen<br>Horizontal 2-split screen | Single screen | Single screen<br>Horizontal 2-split screen<br>Vertical 2-split screen<br>Vertical 3-split screen<br>Horizontal 3-split screen<br>4-split screen | Single screen<br>Horizontal 2-split screen | Single screen |




**Note:** The above diagram for LED lamp-lighted models and incandescent lamp-lighted models shows the A3PJ model.

## ■ A3P Lighting Method Diagram

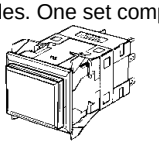
The following diagram shows the Switches with the OMRON mark facing down.

| | | | | Ordering Information |
|---|---|---|---|---|
| A3PJ (rectangular)  | LED models | LED-lighted models | Single screen models; Horizontal 2-split screen models | As a set: See page 224. Individually: See page 230. |
| | | LED lamp-lighted models | Single screen models; Horizontal 2-split screen models; Vertical 2-split screen models; Vertical 3-split screen models; Horizontal 3-split screen models; 4-split screen | Individually: See page 230. (Not available as a set.) |
| | | Chameleon models | Single screen (Full screen illumination in one of three colors) | As a set: See page 224. Individually: See page 230. |
| | Incandescent lamp-lighted models | | Single screen models; Horizontal 2-split screen models; Vertical 2-split screen models*; Vertical 3-split screen models*; Horizontal 3-split screen models*; 4-split screen models* | As a set: See page 224. Individually: See page 230. *Models indicated with an asterisk are only available individually. |
| A3PA (square)  | LED models | LED-lighted models | Single screen models; Horizontal 2-split screen models | As a set: See page 224. Individually: See page 230. |
| | | LED lamp-lighted models | Single screen models; Horizontal 2-split screen models | Individually: See page 230. (Not available as a set.) |
| | | Chameleon models | Single screen models | As a set: See page 224. Individually: See page 230. |
| | Incandescent lamp-lighted models | | Single screen models; Horizontal 2-split screen models | As a set: See page 224. Individually: See page 230. |
| A3PT (round)  | LED models | LED lamp-lighted models | Single screen models | As a set: See page 224. Individually: See page 230. |
| | Incandescent lamp-lighted models | | Single screen models | As a set: See page 224. Individually: See page 230. |

## ■ Ordering as a Set

The model numbers used to order sets of Units are given in the following tables. One set comprises the Pushbutton, Lamp, and Switch.

## ■ A3PJ (Rectangular) Single Screen Models



(1)

### Standard Loads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Standard load (250 VAC, 3 A; 30 VDC, 4 A) Momentary operation (Self-resetting) Black | Momentary operation (Self-resetting) Light gray | Alternate operation (Self-holding) Black | Alternate operation (Self-holding) Light gray | Pushbutton color symbol |
|---|---|---|---|---|---|---|---|
| SPDT | LED | 5 VDC | A3PJ-90A11-05E(1) | A3PJ-90A12-05E(1) | A3PJ-90B11-05E(1) | A3PJ-90B12-05E(1) | R O G W |
| | | 12 VDC | A3PJ-90A11-12E(1) | A3PJ-90A12-12E(1) | A3PJ-90B11-12E(1) | A3PJ-90B12-12E(1) | |
| | | 24 VDC | A3PJ-90A11-24E(1) | A3PJ-90A12-24E(1) | A3PJ-90B11-24E(1) | A3PJ-90B12-24E(1) | |
| | Chameleon | 12 VDC | A3PJ-90AG1-12EK | --- | A3PJ-90BG1-12EK | A3PJ-90BG2-12EK | (See note 1.) |
| | | 24 VDC | A3PJ-90AG1-24EK | A3PJ-90AG2-24EK | A3PJ-90BG1-24EK | A3PJ-90BG2-24EK | |
| | Incandescent lamp | 6 VDC/VAC | A3PJ-90A11-06 | A3PJ-90A12-06 | A3PJ-90B11-06 | A3PJ-90B12-06 | (See note 2.) |
| | | 14 VDC/VAC | A3PJ-90A11-14 | A3PJ-90A12-14 | A3PJ-90B11-14 | A3PJ-90B12-14 | |
| | | 28 VDC/VAC | A3PJ-90A11-28 | A3PJ-90A12-28 | A3PJ-90B11-28 | A3PJ-90B12-28 | |
| DPDT | LED | 5 VDC | A3PJ-90C11-05E(1) | A3PJ-90C12-05E(1) | A3PJ-90D11-05E(1) | A3PJ-90D12-05E(1) | R O G W |
| | | 12 VDC | A3PJ-90C11-12E(1) | A3PJ-90C12-12E(1) | A3PJ-90D11-12E(1) | A3PJ-90D12-12E(1) | |
| | | 24 VDC | A3PJ-90C11-24E(1) | A3PJ-90C12-24E(1) | A3PJ-90D11-24E(1) | A3PJ-90D12-24E(1) | |
| | Chameleon | 12 VDC | A3PJ-90CG1-12EK | A3PJ-90CG2-12EK | A3PJ-90DG1-12EK | --- | (See note 1.) |
| | | 24 VDC | A3PJ-90CG1-24EK | A3PJ-90CG2-24EK | A3PJ-90DG1-24EK | A3PJ-90DG2-24EK | |
| | Incandescent lamp | 6 VDC/VAC | A3PJ-90C11-06 | A3PJ-90C12-06 | A3PJ-90D11-06 | A3PJ-90D12-06 | (See note 2.) |
| | | 14 VDC/VAC | A3PJ-90C11-14 | A3PJ-90C12-14 | A3PJ-90D11-14 | A3PJ-90D12-14 | |
| | | 28 VDC/VAC | A3PJ-90C11-28 | A3PJ-90C12-28 | A3PJ-90D11-28 | A3PJ-90D12-28 | |

Enter the desired color symbol for the Pushbutton in (1). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example: Red A3PJ-90A11-24E R

### Microloads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Microload (125 VAC, 0.1 A; 30 VDC, 0.1 A) Momentary operation (Self-resetting) Black | Momentary operation (Self-resetting) Light gray | Pushbutton color symbol |
|---|---|---|---|---|---|
| SPDT | LED | 5 VDC | A3PJ-90E11-05E(1) | A3PJ-90E12-05E(1) | R O G W |
| | | 12 VDC | A3PJ-90E11-12E(1) | A3PJ-90E12-12E(1) | |
| | | 24 VDC | A3PJ-90E11-24E(1) | A3PJ-90E12-24E(1) | |
| | Chameleon | 12 VDC | A3PJ-90EG1-12EK | --- | (See note 1.) |
| | | 24 VDC | A3PJ-90EG1-24EK | A3PJ-90EG2-24EK | |
| | Incandescent lamp | 6 VDC/VAC | A3PJ-90E11-06 | A3PJ-90E12-06 | (See note 2.) |
| | | 14 VDC/VAC | A3PJ-90E11-14 | A3PJ-90E12-14 | |
| | | 28 VDC/VAC | A3PJ-90E11-28 | A3PJ-90E12-28 | |
| DPDT | LED | 5 VDC | A3PJ-90G11-05E(1) | A3PJ-90G12-05E(1) | R O G W |
| | | 12 VDC | A3PJ-90G11-12E(1) | A3PJ-90G12-12E(1) | |
| | | 24 VDC | A3PJ-90G11-24E(1) | A3PJ-90G12-24E(1) | |
| | Chameleon | 12 VDC | A3PJ-90GG1-12EK | --- | (See note 1.) |
| | | 24 VDC | A3PJ-90GG1-24EK | --- | |
| | Incandescent lamp | 6 VDC/VAC | A3PJ-90G11-06 | A3PJ-90G12-06 | (See note 2.) |
| | | 14 VDC/VAC | A3PJ-90G11-14 | A3PJ-90G12-14 | |
| | | 28 VDC/VAC | A3PJ-90G11-28 | A3PJ-90G12-28 | |

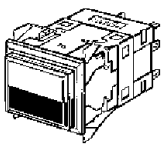
Enter the desired color symbol for the Pushbutton in (1). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example: Red A3PJ-90E11-24E R

**Note:** 1. You can change the screen colors of chameleon models between red, green, and orange, by changing the terminal wiring. Refer to page 240 for details.

2. Incandescent lamps are supplied with colored plates (white, red, green, blue, and orange) and legend plates (milk-white and transparent). Use the appropriate combination.

## ■ A3PJ (Rectangular) Horizontal 2-split Screen Models



| |
|---|
| (1) |
| (2) |

### Standard Loads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Standard load (250 VAC, 3 A; 30 VDC, 4 A) Momentary operation (Self-resetting) Black | Momentary operation (Self-resetting) Light gray | Alternate operation (Self-holding) Black | Alternate operation (Self-holding) Light gray | Pushbutton color symbol |
|---|---|---|---|---|---|---|---|
| SPDT | LED | 24 VDC | A3PJ-90A21-24E(1)(2) | A3PJ-90A22-24E(1)(2) | A3PJ-90B21-24E(1)(2) | A3PJ-90B22-24E(1)(2) | R O G W |
| | Incandescent lamp | 6 VDC/VAC | A3PJ-90A21-06 | A3PJ-90A22-06 | A3PJ-90B21-06 | A3PJ-90B22-06 | (See note) |
| | | 14 VDC/VAC | A3PJ-90A21-14 | A3PJ-90A22-14 | A3PJ-90B21-14 | A3PJ-90B22-14 | |
| | | 28 VDC/VAC | A3PJ-90A21-28 | A3PJ-90A22-28 | A3PJ-90B21-28 | A3PJ-90B22-28 | |
| DPDT | LED | 24 VDC | A3PJ-90C21-24E(1)(2) | A3PJ-90C22-24E(1)(2) | A3PJ-90D21-24E(1)(2) | A3PJ-90D22-24E(1)(2) | R O G W |
| | Incandescent lamp | 6 VDC/VAC | A3PJ-90C21-06 | A3PJ-90C22-06 | A3PJ-90D21-06 | A3PJ-90D22-06 | (See note) |
| | | 14 VDC/VAC | A3PJ-90C21-14 | A3PJ-90C22-14 | A3PJ-90D21-14 | A3PJ-90D22-14 | |
| | | 28 VDC/VAC | A3PJ-90C21-28 | A3PJ-90C22-28 | A3PJ-90D21-28 | A3PJ-90D22-28 | |

Enter the desired color symbols for the Pushbutton in (1) and (2). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example:

| | |
|---|---|
| Red | Upper |
| White | Lower |

A3PJ-90A21-24E R W
Red White

### Microloads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Microload (125 VAC, 0.1 A; 30 VDC, 0.1 A) Momentary operation (Self-resetting) Black | Momentary operation (Self-resetting) Light gray | Pushbutton color symbol |
|---|---|---|---|---|---|
| SPDT | LED | 24 VDC | A3PJ-90E21-24E(1)(2) | A3PJ-90E22-24E(1)(2) | R O G W |
| | Incandescent lamp | 6 VDC/VAC | A3PJ-90E21-06 | A3PJ-90E22-06 | (See note.) |
| | | 14 VDC/VAC | A3PJ-90E21-14 | A3PJ-90E22-14 | |
| | | 28 VDC/VAC | A3PJ-90E21-28 | A3PJ-90E22-28 | |
| DPDT | LED | 24 VDC | A3PJ-90G21-24E(1)(2) | A3PJ-90G22-24E(1)(2) | R O G W |
| | Incandescent lamp | 6 VDC/VAC | A3PJ-90G21-06 | A3PJ-90G22-06 | (See note.) |
| | | 14 VDC/VAC | A3PJ-90G21-14 | A3PJ-90G22-14 | |
| | | 28 VDC/VAC | A3PJ-90G21-28 | A3PJ-90G22-28 | |

Enter the desired color symbols for the Pushbutton in (1) and (2). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

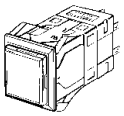
Example:

| | |
|---|---|
| Red | Upper |
| White | Lower |

A3PJ-90E21-24E R W
Red White

**Note:** Incandescent lamps are supplied with colored plates (white, red, green, blue, and orange) and legend plates (milk-white and transparent). Use the appropriate combination.

## ■ A3PA (Square) Single Screen Models



(1)

### Standard Loads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Standard load (250 VAC, 3 A; 30 VDC, 4 A) Momentary operation (Self-resetting) Black | Momentary operation (Self-resetting) Light gray | Alternate operation (Self-holding) Black | Alternate operation (Self-holding) Light gray | Pushbutton color symbol |
|---|---|---|---|---|---|---|---|
| SPDT | LED | 5 VDC | A3PA-90A11-05E(1) | A3PA-90A12-05E(1) | A3PA-90B11-05E(1) | A3PA-90B12-05E(1) | R O G W |
| | | 12 VDC | A3PA-90A11-12E(1) | A3PA-90A12-12E(1) | A3PA-90B11-12E(1) | A3PA-90B12-12E(1) | |
| | | 24 VDC | A3PA-90A11-24E(1) | A3PA-90A12-24E(1) | A3PA-90B11-24E(1) | A3PA-90B12-24E(1) | |
| | Chameleon | 12 VDC | A3PA-90AG1-12EK | A3PA-90AG2-12EK | A3PA-90BG1-12EK | A3PA-90BG2-12EK | (See note 1.) |
| | | 24 VDC | A3PA-90AG1-24EK | A3PA-90AG2-24EK | A3PA-90BG1-24EK | A3PA-90BG2-24EK | |
| | Incandescent lamp | 6 VDC/VAC | A3PA-90A11-06 | A3PA-90A12-06 | A3PA-90B11-06 | A3PA-90B12-06 | (See note 2.) |
| | | 14 VDC/VAC | A3PA-90A11-14 | A3PA-90A12-14 | A3PA-90B11-14 | A3PA-90B12-14 | |
| | | 28 VDC/VAC | A3PA-90A11-28 | A3PA-90A12-28 | A3PA-90B11-28 | A3PA-90B12-28 | |
| DPDT | LED | 5 VDC | A3PA-90C11-05E(1) | A3PA-90C12-05E(1) | A3PA-90D11-05E(1) | A3PA-90D12-05E(1) | R O G W |
| | | 12 VDC | A3PA-90C11-12E(1) | A3PA-90C12-12E(1) | A3PA-90D11-12E(1) | A3PA-90D12-12E(1) | |
| | | 24 VDC | A3PA-90C11-24E(1) | A3PA-90C12-24E(1) | A3PA-90D11-24E(1) | A3PA-90D12-24E(1) | |
| | Chameleon | 12 VDC | A3PA-90CG1-12EK | A3PA-90CG2-12EK | A3PA-90DG1-12EK | A3PA-90DG2-12EK | (See note 1.) |
| | | 24 VDC | A3PA-90CG1-24EK | A3PA-90CG2-24EK | A3PA-90DG1-24EK | A3PA-90DG2-24EK | |
| | Incandescent lamp | 6 VDC/VAC | A3PA-90C11-06 | A3PA-90C12-06 | A3PA-90D11-06 | A3PA-90D12-06 | (See note 2.) |
| | | 14 VDC/VAC | A3PA-90C11-14 | A3PA-90C12-14 | A3PA-90D11-14 | A3PA-90D12-14 | |
| | | 28 VDC/VAC | A3PA-90C11-28 | A3PA-90C12-28 | A3PA-90D11-28 | A3PA-90D12-28 | |

Enter the desired color symbol for the Pushbutton in (*). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example: Red A3PA-90A11-24E R

### Microloads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Microload (125 VAC, 0.1 A; 30 VDC, 0.1 A) Momentary operation (Self-resetting) Black | Momentary operation (Self-resetting) Light gray | Pushbutton color symbol |
|---|---|---|---|---|---|
| SPDT | LED | 5 VDC | A3PA-90E11-05E(1) | A3PA-90E12-05E(1) | R O G W |
| | | 12 VDC | A3PA-90E11-12E(1) | A3PA-90E12-12E(1) | |
| | | 24 VDC | A3PA-90E11-24E(1) | A3PA-90E12-24E(1) | |
| | Chameleon | 12 VDC | A3PA-90EG1-12EK | --- | (See note 1.) |
| | | 24 VDC | A3PA-90EG1-24EK | A3PA-90EG2-24EK | |
| | Incandescent lamp | 6 VDC/VAC | A3PA-90E11-06 | A3PA-90E12-06 | (See note 2.) |
| | | 14 VDC/VAC | A3PA-90E11-14 | A3PA-90E12-14 | |
| | | 28 VDC/VAC | A3PA-90E11-28 | A3PA-90E12-28 | |
| DPDT | LED | 5 VDC | A3PA-90G11-05E(1) | A3PA-90G12-05E(1) | R O G W |
| | | 12 VDC | A3PA-90G11-12E(1) | A3PA-90G12-12E(1) | |
| | | 24 VDC | A3PA-90G11-24E(1) | A3PA-90G12-24E(1) | |
| | Chameleon | 12 VDC | A3PA-90GG1-12EK | --- | (See note 1.) |
| | | 24 VDC | A3PA-90GG1-24EK | --- | |
| | Incandescent lamp | 6 VDC/VAC | A3PA-90G11-06 | A3PA-90G12-06 | (See note 2.) |
| | | 14 VDC/VAC | A3PA-90G11-14 | A3PA-90G12-14 | |
| | | 28 VDC/VAC | A3PA-90G11-28 | A3PA-90G12-28 | |

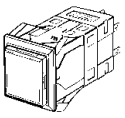
Enter the desired color symbol for the Pushbutton in (1). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example: Red A3PA-90E11-24E R

**Note:** 1. You can change the screen colors of chameleon models between red, green, and orange, by changing the terminal wiring. Refer to page 240 for details.

2. Incandescent lamps are supplied with colored plates (white, red, green, blue, and orange) and legend plates (milk-white and transparent). Use the appropriate combination.

## ■ A3PA (Square) Horizontal 2-split Screen Models



| |
|---|
| (1) |
| (2) |

### Standard Loads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Standard load (250 VAC, 3 A; 30 VDC, 4 A) | | | | Push-button color symbol |
|---|---|---|---|---|---|---|---|
| | | | Momentary operation (Self-resetting) | | Alternate operation (Self-holding) | | |
| | | | Black | Light gray | Black | Light gray | |
| SPDT | LED | 24 VDC | A3PA-90A21-24E(1)(2) | A3PA-90A22-24E(1)(2) | A3PA-90B21-24E(1)(2) | A3PA-90B22-24E(1)(2) | R O G W |
| | Incandescent lamp | 6 VDC/VAC | A3PA-90A21-06 | A3PA-90A22-06 | A3PA-90B21-06 | A3PA-90B22-06 | (See note.) |
| | | 14 VDC/VAC | A3PA-90A21-14 | A3PA-90A22-14 | A3PA-90B21-14 | A3PA-90B22-14 | |
| | | 28 VDC/VAC | A3PA-90A21-28 | A3PA-90A22-28 | A3PA-90B21-28 | A3PA-90B22-28 | |
| DPDT | LED | 24 VDC | A3PA-90C21-24E(1)(2) | A3PA-90C22-24E(1)(2) | A3PA-90D21-24E(1)(2) | A3PA-90D22-24E(1)(2) | R O G W |
| | Incandescent lamp | 6 VDC/VAC | A3PA-90C21-06 | A3PA-90C22-06 | A3PA-90D21-06 | A3PA-90D22-06 | (See note.) |
| | | 14 VDC/VAC | A3PA-90C21-14 | A3PA-90C22-14 | A3PA-90D21-14 | A3PA-90D22-14 | |
| | | 28 VDC/VAC | A3PA-90C21-28 | A3PA-90C22-28 | A3PA-90D21-28 | A3PA-90D22-28 | |

Enter the desired color symbols for the Pushbutton in (1) and (2). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example:

| | |
|---|---|
| Red | Upper |
| White | Lower |

A3PA-90A21-24E R W
Red White

### Microloads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Microload (125 VAC, 0.1 A; 30 VDC, 0.1 A) | | Push-button color symbol |
|---|---|---|---|---|---|
| | | | Momentary operation (Self-resetting) | | |
| | | | Black | Light gray | |
| SPDT | LED | 24 VDC | A3PA-90E21-24E(1)(2) | A3PA-90E22-24E(1)(2) | R O G W |
| | Incandescent lamp | 6 VDC/VAC | A3PA-90E21-06 | A3PA-90E22-06 | (See note.) |
| | | 14 VDC/VAC | A3PA-90E21-14 | A3PA-90E22-14 | |
| | | 28 VDC/VAC | A3PA-90E21-28 | A3PA-90E22-28 | |
| DPDT | LED | 24 VDC | A3PA-90G21-24E(1)(2) | A3PA-90G22-24E(1)(2) | R O G W |
| | Incandescent lamp | 6 VDC/VAC | A3PA-90G21-06 | A3PA-90G22-06 | (See note.) |
| | | 14 VDC/VAC | A3PA-90G21-14 | A3PA-90G22-14 | |
| | | 28 VDC/VAC | A3PA-90G21-28 | A3PA-90G22-28 | |

Enter the desired color symbols for the Pushbutton in (1) and (2). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example:

| | |
|---|---|
| Red | Upper |
| White | Lower |

A3PA-90E21-24E R W
Red White

**Note:** Incandescent lamps are supplied with colored plates (white, red, green, blue, and orange) and legend plates (milk-white and transparent). Use the appropriate combination.

## ■ A3PT (Round) Single Screen Models

(1)

### Standard Loads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Standard load (250 VAC, 3 A; 30 VDC, 4 A) Momentary operation (Self-resetting) Light gray | Standard load (250 VAC, 3 A; 30 VDC, 4 A) Alternate operation (Self-holding) Light gray | Pushbutton color symbol |
|---|---|---|---|---|---|
| SPDT | LED | 24 VDC | A3PT-90A12-24C(1) | A3PT-90B12-24C(1) | R<br>O<br>G<br>W |
| | Incandescent lamp | 6 VDC/VAC | A3PT-90A12-06 | A3PT-90B12-06 | (See note.) |
| | | 14 VDC/VAC | A3PT-90A12-14 | A3PT-90B12-14 | |
| | | 28 VDC/VAC | A3PT-90A12-28 | A3PT-90B12-28 | |
| DPDT | LED | 24 VDC | A3PT-90C12-24C(1) | A3PT-90D12-24C(1) | R<br>O<br>G<br>W |
| | Incandescent lamp | 6 VDC/VAC | A3PT-90C12-06 | A3PT-90D12-06 | (See note.) |
| | | 14 VDC/VAC | A3PT-90C12-14 | A3PT-90D12-14 | |
| | | 28 VDC/VAC | A3PT-90C12-28 | A3PT-90D12-28 | |

Enter the desired color symbols for the Pushbutton in (1) and (2). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example: (Red) A3PT-90A12-24C R

### Microloads

| Output | Lighting | Contact type / Operation / Case color / Rated voltage | Microload (125 VAC, 0.1 A; 30 VDC, 0.1 A) Momentary operation (Self-resetting) Light gray | Pushbutton color symbol |
|---|---|---|---|---|
| SPDT | LED | 24 VDC | A3PT-90E12-24C(1) | R<br>O<br>G<br>W |
| | Incandescent lamp | 28 VDC/VAC | A3PT-90E12-28 | (See note.) |
| DPDT | LED | 24 VDC | A3PT-90G12-24C(1) | R<br>O<br>G<br>W |
| | Incandescent lamp | 28 VDC/VAC | A3PT-90G12-28 | (See note.) |

Enter the desired color symbols for the Pushbutton in (1). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example: (Red) A3PT-90E12-24C R

**Note:** Incandescent lamps are supplied with a colored plates (white, red, green, blue, and orange). Use the appropriate combination. Models A3PT (round models), however, are not supplied with legend plates.

## ■ Illumination-only and Colored-illumination LED Models

- "Illumination only" describes LED models for which the screen color is the same whether the LED is lit or not. The screen simply becomes brighter when the LED lights.

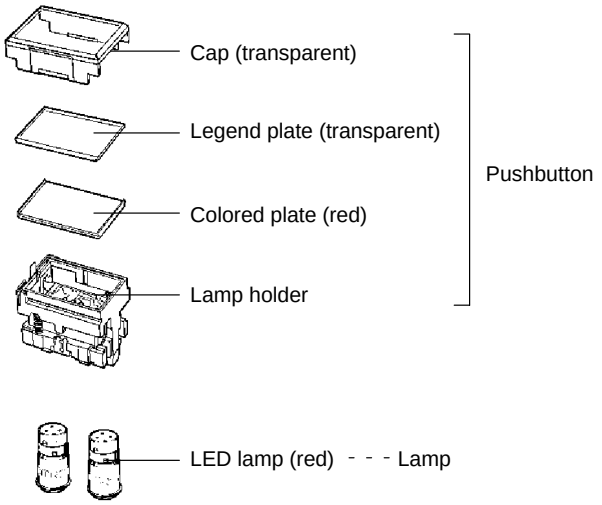
**Example: Red LED**

Not lit

Red

Lit

Red




- "Colored illumination" describes LED models for which the screen color is white when the LED is not lit and changes to the color of the LED lamp when the LED is lit.

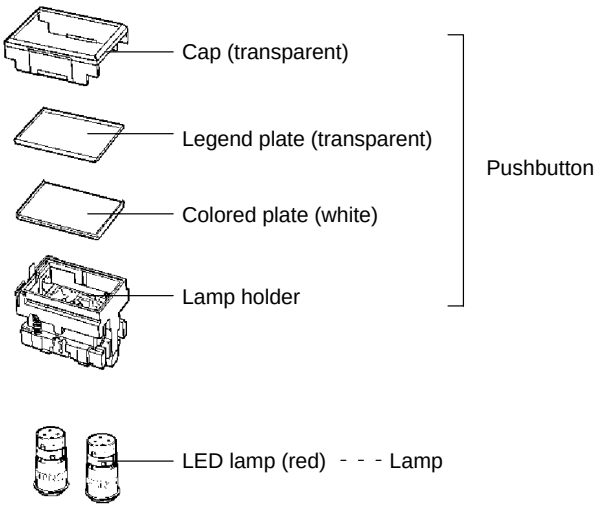
**Example: Red LED**

Not lit

White

Lit

Red




Ordering: With colored-illumination models, order the Pushbutton, Lamp, and Switch as shown in the following table.

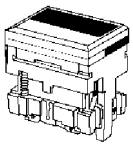
| Pushbutton | Lamp | Switch |
|---|---|---|
| Select the LED lamp-lighted model required from the selection on page 231. Each assembly includes the number of white colored plates required to enable colored illumination for the corresponding screen-split configuration. For example, 4-split screen models include 4 white colored plates. | Select the LED lamps to suit your desired coloration from the selection on page 232.<br>Number of necessary LED lamps (standard)<br>A3PJ (rectangular): 4<br>A3PA (square): 2<br>A3PT (round): 2 | Select from the Switches on page 233. |

## ■ Ordering Individually

Pushbuttons, Lamps, and Switches can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.

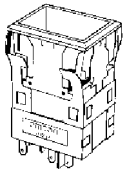
**LED-lighted/Chameleon Models**
(LED is built into the Pushbutton.)

**Pushbutton**
Round (A3PT) models not available.



A3P□-5□□□-□□E
(for Pushbutton Switch)

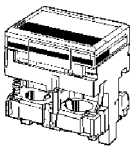
**Switch (See note 1.)**
Round (A3PT) models not available.



A3P□-7□□□-□
(for Pushbutton Switch)

**LED Lamp-lighted Models**
(LED lamp and Pushbutton are separate.)

**Pushbutton**

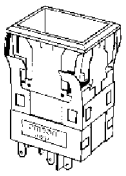


A3P□-502□
(for Pushbutton Switch)

**Lamp (LED Lamp)**
**(See note 2.)**

SLL-□□E□

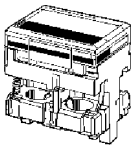
**Switch (See note 1.)**



A3P□-7□□□-□
(for Pushbutton Switch)

**Incandescent Lamp-lighted Models**
(Incandescent lamp and Pushbutton are separate.)

**Pushbutton**

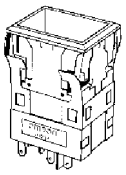


A3P□-501□
(for Pushbutton Switch)

**Lamp (Incandescent Lamp)**
**(See note 3.)**

Standard lamp: SLL-□□
Low-power lamp: SLL-□□H

**Switch (See note 1.)**



A3P□-7□□□-□
(for Pushbutton Switch)

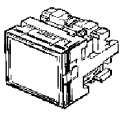
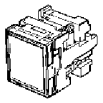
**Note:** 1. The Switch is compatible with LED-lighted models, LED lamp-lighted models, and incandescent lamp-lighted models.
2. Number of necessary LED lamps.
3. Number of necessary incandescent lamps.

| Screen pattern | A3PJ | A3PA | A3PT |
|---|---|---|---|
| Single screen | 4 | 2 | 2 |
| Horizontal 2-split screen | | 2 | 2 |
| Vertical 2-split screen | | --- | --- |
| Vertical 3-split screen<br>Horizontal 3-split screen | | --- | --- |
| 4-split screen | | --- | --- |

| Screen pattern | A3PJ | A3PA | A3PT |
|---|---|---|---|
| Single screen | 2 | 1 | 2 |
| Horizontal 2-split screen | 4 (low-power incandescent lamp) | 2 | 2 |
| Vertical 2-split screen | | --- | --- |
| Vertical 3-split screen<br>Horizontal 3-split screen | | --- | --- |
| 4-split screen | | --- | --- |

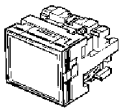
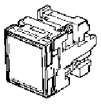
## Pushbutton

**LED-lighted Models (LED is built-in.)**

| Model | Split-screen color (color symbol) | | White (W) | Red (R) | Green (G) | Orange (O) | Selection precautions |
|---|---|---|---|---|---|---|---|
| Rectangular models  | Single screen | | A3PJ-5701-□□E | A3PJ-5702-□□E | A3PJ-5703-□□E | A3PJ-5706-□□E | Enter the voltage to be used in the □□ at the end of the model number.<br>Examples of voltages used:<br>5 V = 05 E<br>12 V = 12 E<br>24 V = 24 E<br>For the color of the shaded part, select the model according to the colors given at the top of the table. |
| | Horizontal 2-split screen | White | A3PJ-5711-□□E | A3PJ-5712-□□E | A3PJ-5713-□□E | A3PJ-5716-□□E | |
| | | Red | A3PJ-5721-□□E | A3PJ-5722-□□E | A3PJ-5723-□□E | A3PJ-5726-□□E | |
| | | Green | A3PJ-5731-□□E | A3PJ-5732-□□E | A3PJ-5733-□□E | A3PJ-5736-□□E | |
| | | Orange | A3PJ-5741-□□E | A3PJ-5742-□□E | A3PJ-5743-□□E | A3PJ-5746-□□E | |
| Square models  | Single screen | | A3PA-5701-□□E | A3PA-5702-□□E | A3PA-5703-□□E | A3PA-5706-□□E | |
| | Horizontal 2-split screen | White | A3PA-5711-□□E | A3PA-5712-□□E | A3PA-5713-□□E | A3PA-5716-□□E | |
| | | Red | A3PA-5721-□□E | A3PA-5722-□□E | A3PA-5723-□□E | A3PA-5726-□□E | |
| | | Green | A3PA-5731-□□E | A3PA-5732-□□E | A3PA-5733-□□E | A3PA-5736-□□E | |
| | | Orange | A3PA-5741-□□E | A3PA-5742-□□E | A3PA-5743-□□E | A3PA-5746-□□E | |

**Note:** 1. A cap, legend plate (transparent), colored plate, white plunger case, and LED (with a current-limiting resistor) are built into the standard lighting unit.
2. Split-screen coloring configurations are given with the OMRON mark on the Switch facing down.
3. The LED is built-in and cannot be replaced individually.

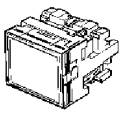
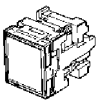
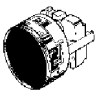
**LED Lamp-lighted Models (LED is not built-in.)**

| Model | Rectangular models  | | Square models  | | Round models | |
|---|---|---|---|---|---|---|
| Screen pattern | Screen | Model | Screen | Model | Screen | Model |
| Single screen | | A3PJ-5021 | | A3PA-5021 | | A3PT-5021 |
| Horizontal 2-split screen | | A3PJ-5022 | | A3PA-5022 | --- | |
| Vertical 2-split screen | | A3PJ-5023 | --- | | --- | |
| Horizontal 3-split screen | | A3PJ-5024 | --- | | --- | |
| Vertical 3-split screen | | A3PJ-5025 | --- | | --- | |
| 4-split screen | | A3PJ-5026 | --- | | --- | |

**Note:** 1. Colored plates (white, red, green, and orange), a legend plate (transparent), and a light baffle (split-screen models only) are included. Use the appropriate combination for the LED coloring required.
2. The number of white colored plates required to enable colored illumination for the corresponding screen-split configuration is included. (For example, 4-split screen models include 4 white colored plates). The number of colored plates included for each model are shown in the following table.

| Screen pattern | White | Red | Green | Orange |
|---|---|---|---|---|
| Single screen | 1 | 1 | 1 | 1 |
| Horizontal 2-split screens<br>Vertical 2-split screens | 2 | 1 | 1 | 1 |
| Horizontal 3-split screens<br>Vertical 3-split screens | 3 | 2 | 2 | 2 |
| 4-split screen | 4 | 1 | 1 | 1 |

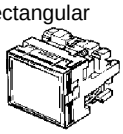
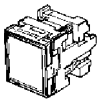
**Incandescent Lamp-lighted Models (Incandescent lamp is not built-in.)**

| Model | Rectangular models  | | Square models  | | Round models  | |
|---|---|---|---|---|---|---|
| **Screen pattern** | **Screen** | **Model** | **Screen** | **Model** | **Screen** | **Model** |
| Single screen | | A3PJ-5011 | | A3PA-5011 | | A3PT-5011 |
| Horizontal 2-split screen | | A3PJ-5012 | | A3PA-5012 | --- | |
| Vertical 2-split screen | | A3PJ-5013 | --- | | --- | |
| Horizontal 3-split screen | | A3PJ-5014 | --- | | --- | |
| Vertical 3-split screen | | A3PJ-5015 | --- | | --- | |
| 4-split screen | | A3PJ-5016 | --- | | --- | |

**Note:** 1. Colored plates (white, red, green, orange, and blue), a legend plate (transparent), and a light baffle (split-screen models only) are supplied.
2. A3PT (round) models do not contain a legend plate.
3. The number of colored plates included is shown in the following table.

| Screen pattern | White | Red | Green | Orange | Blue |
|---|---|---|---|---|---|
| Single screen | 1 | 1 | 1 | 1 | 1 |
| Horizontal and vertical 2-split screens | 1 | 1 | 1 | 1 | 1 |
| Horizontal and vertical 3-split screens | 2 | 2 | 2 | 2 | 2 |
| 4-split screen | 2 | 2 | 2 | 2 | 2 |

**Chameleon Models (with Built-in LED)**

| Shape | Rated voltage | Chameleon pushbutton switch |
|---|---|---|
| Rectangular  | 12 VDC | A3PJ-5800-12E |
| | 24 VDC | A3PJ-5800-24E |
| Square  | 12 VDC | A3PA-5800-12E |
| | 24 VDC | A3PA-5800-24E |

**Note:** 1. With chameleon models the whole screen lights red, green, or orange (i.e., red and green simultaneously).
2. A cap, legend plate (transparent), white colored plate, and LED (with a current-limiting resistor) are built into the Pushbutton.

## Lamp (For details on mounting, refer to page 246.)

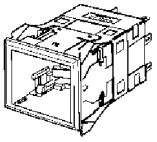
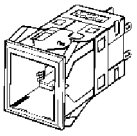
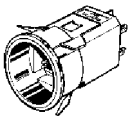
**LED Lamp**

| Voltage | 5 VDC | 12 VDC | 24 VDC | Applicable cap (color) (colored plate) | Selection precautions |
|---|---|---|---|---|---|
| **Color** | **Model (DC only)** | **Model (DC only)** | **Model (DC only)** | | |
| Red | SLL-05ER | SLL-12ER | SLL-24ER | Red | In the standard setup, 4 LED lamps are used with A3PJ models and 2 LED lamps are used with A3PA and A3PT models. |
| Yellow | SLL-05EY | SLL-12EY | SLL-24EY | Orange | |
| Green | SLL-05EG | SLL-12EG | SLL-24EG | Green | |
| White | SLL-05EW | SLL-12EW | SLL-24EW | White | |

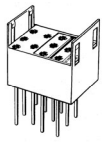
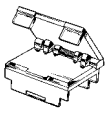
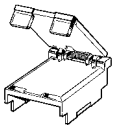
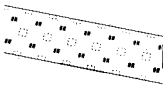
**Incandescent Lamp**

| Lamp type / Voltage | Standard lamp | Low-voltage lamp | Selection precautions |
|---|---|---|---|
| 5 VAC/VDC | SLL-06 | SLL-06H | In the standard setup for A3PJ models, 2 lamps are used with single screen models, and 4 lamps are used with split-screen models. If 3 or 4 lamps are lit continuously, use low-power lamps.<br>In the standard setup for A3PA models, 1 lamp is used with single screen models, and 2 lamps are used with split-screen models.<br>In the standard setup for A3PT models, 2 lamps are used. |
| 12 VAC/VDC | SLL-14 | SLL-14H | |
| 24 VAC/VDC | SLL-28 | SLL-28H | |

## Switch (common to both incandescent lamp-lighted models and LED models)

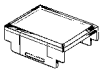
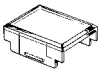
| Contact type | Switch | Number of outputs | Operation | Rectangular models  | Square models  | Round models  | Selection precautions |
|---|---|---|---|---|---|---|---|
| Standard load | Silver alloy contact | 1 | Momentary operation | A3PJ-7010-1 | A3PA-7010-1 | A3PT-7010-2 | The end digit denotes the color of the flange: -1 denotes a black flange, and -2 denotes a light gray flange. Round switches are available only in light gray, and not in black.<br>Use the Switch in combination with the same shape Lamp (rectangular, square, or round). Example: For rectangular Lamp A3PJ-5011, select Switch A3PJ-7□□0-□. On the Switch itself, however, only 3 digits are shown, as follows: A3PJ-7□□.<br>Momentary operation is self-resetting, and alternate operation is self-holding (i.e., push-on, push-off). |
| | | | Alternate operation | A3PJ-7020-1 | A3PA-7020-1 | A3PT-7020-2 | |
| | | 2 | Momentary operation | A3PJ-7030-1 | A3PA-7030-1 | A3PT-7030-2 | |
| | | | Alternate operation | A3PJ-7040-1 | A3PA-7040-1 | A3PT-7040-2 | |
| | | 3 | Momentary operation | A3PJ-7150-1 | --- | --- | |
| | | | Alternate operation | A3PJ-7160-1 | --- | --- | |
| Microload | Gold alloy contact | 1 | Momentary operation | A3PJ-7050-1 | A3PA-7050-1 | A3PT-7050-2 | |
| | | | Alternate operation | A3PJ-7060-1 | A3PA-7060-1 | A3PT-7060-2 | |
| | | 2 | Momentary operation | A3PJ-7070-1 | A3PA-7070-1 | A3PT-7070-2 | |
| | | | Alternate operation | A3PJ-7080-1 | A3PA-7080-1 | A3PT-7080-2 | |
| | | 3 | Momentary operation | A3PJ-7170-1 | --- | --- | |
| | | | Alternate operation | A3PJ-7180-1 | --- | --- | |

## ■ Accessories

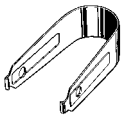
| Name | Appearance | Classification | | Rectangular | Square | Application precautions |
|---|---|---|---|---|---|---|
| Socket |  | Wire-wrap terminal | | A3PJ-4101 | A3PA-4101 | Multiple sockets cannot be mounted. |
| | | PCB terminal | | A3PJ-4102 | A3PA-4102 | |
| | | Solder terminal | | A3PJ-4103 | A3PA-4103 | |
| Barrier | | Short edge barrier (Horizontal mounting) (1 pair) | Black | A3PJ-4001 | A3PA-4001 | The purpose of the barrier is to prevent malfunctioning and to improve design image of the mounting panel.<br>Intermediate barrier x 1.<br>Edge barriers x 1 pair (2 Units).<br>Mount short barriers horizontally.<br>Mount long barriers vertically.<br>For details on mounting, refer to page 246. |
| | | | Light gray | A3PJ-4002 | A3PA-4002 | |
| | | Long edge barrier (Vertical mounting) (1 pair) | Black | A3PJ-4004 | --- | |
| | | | Light gray | A3PJ-4005 | | |
| | | Short intermediate barrier (Horizontal mounting) | Black | A3PJ-4007 | A3PA-4007 | |
| | | | Light gray | A3PJ-4008 | A3PA-4008 | |
| | | Long intermediate barrier (Vertical mounting) | Black | A3PJ-4010 | --- | |
| | | | Light gray | A3PJ-4011 | | |
| Switch guard |  | For horizontal mounting (with OMRON logo facing down) | | A3PJN-5050 | A3PAN-5050 | Can be used by exchanging with the cap.<br>Cannot be used with seal cover.<br>Can be used with barrier.<br>Use horizontal mounting guard for consecutive horizontal mounting, and use vertical mounting guard for consecutive vertical mounting. |
| |  | For vertical mounting (with OMRON logo facing to the right) | | A3PJN-5055 | A3PAN-5055 | |
| Seal cover | | --- | | A3PJ-5060 | A3PA-5060 | Cannot be used with barrier and/or switch guard.<br>For details on mounting, refer to page 246.<br>Cap is manufactured from vinyl chloride. |
| Character plate (character film) |  | 1 sheet (for 20 Switches) | Printed | A3PJ-5205 | A3PA-5205 | Words printed are ON, OFF, START, STOP, RESET, OK, OUT, POWER, COOL, and MOTOR. Other characters can be printed by request. |
| | | | Non-printed (transparent film) | A3PJ-5207 | A3PA-5207 | |
| | | 1 sheet (for 1 Switch) | Printed | A3PJ-5206 | A3PA-5206 | |
| | | | Non-printed (transparent film) | A3PJ-5208 | A3PA-5208 | |
| Long mounting plate | | --- | | A3PJ-3002 | --- | Use when vertically mounting individual (with barrier) or multiple Switches (in standard mounting style and with barrier). Since a short mounting plate is attached to the Switch, replace it with the long one. |

## Parts

| Name | Appearance | Screen pattern and color | | Rectangular | Square | Application precautions |
|---|---|---|---|---|---|---|
| Colored plate for incandescent lamp | | Single screen | White | A3PJ-5101 | A3PA-5101 | Keep mounted at all times. If the colored plate becomes discolored, contact OMRON.<br>For details on mounting, refer to page 246. |
| | | | Red | A3PJ-5102 | A3PA-5102 | |
| | | | Green | A3PJ-5103 | A3PA-5103 | |
| | | | Blue | A3PJ-5104 | A3PA-5104 | |
| | | | Yellow | A3PJ-5105 | A3PA-5105 | |
| | | | Orange | A3PJ-5106 | A3PA-5106 | |
| | | Horizontal 2-split screen | White | A3PJ-5121 | A3PA-5121 | |
| | | | Red | A3PJ-5122 | A3PA-5122 | |
| | | | Green | A3PJ-5123 | A3PA-5123 | |
| | | | Blue | A3PJ-5124 | A3PA-5124 | |
| | | | Yellow | A3PJ-5125 | A3PA-5125 | |
| | | | Orange | A3PJ-5126 | A3PA-5126 | |
| | | Vertical 2-split screen | White | A3PJ-5131 | --- | |
| | | | Red | A3PJ-5132 | --- | |
| | | | Green | A3PJ-5133 | --- | |
| | | | Blue | A3PJ-5134 | --- | |
| | | | Yellow | A3PJ-5135 | --- | |
| | | | Orange | A3PJ-5136 | --- | |
| | | 4-split screen | White | A3PJ-5161 | --- | |
| | | | Red | A3PJ-5162 | --- | |
| | | | Green | A3PJ-5163 | --- | |
| | | | Blue | A3PJ-5164 | --- | |
| | | | Yellow | A3PJ-5165 | --- | |
| | | | Orange | A3PJ-5166 | --- | |
| Colored plate for LED | | Single screen | White | A3PJ-5301 | A3PA-5301 | Keep mounted at all times. If the colored plate is lost or damaged, contact OMRON.<br>Use in accordance with coloring of the built-in LED.<br>For details on mounting, refer to page 246. |
| | | | Red | A3PJ-5302 | A3PA-5302 | |
| | | | Green | A3PJ-5303 | A3PA-5303 | |
| | | | Yellow | A3PJ-5305 | A3PA-5305 | |
| | | | Orange | A3PJ-5306 | A3PA-5306 | |
| | | Horizontal 2-split screen | White | A3PJ-5321 | A3PA-5321 | |
| | | | Red | A3PJ-5322 | A3PA-5322 | |
| | | | Green | A3PJ-5323 | A3PA-5323 | |
| | | | Yellow | A3PJ-5325 | A3PA-5325 | |
| | | | Orange | A3PJ-5326 | A3PA-5326 | |
| | | Vertical 2-split screen | White | A3PJ-5331 | --- | |
| | | | Red | A3PJ-5332 | --- | |
| | | | Green | A3PJ-5333 | --- | |
| | | | Yellow | A3PJ-5335 | --- | |
| | | | Orange | A3PJ-5336 | --- | |
| | | 4-split screen | White | A3PJ-5361 | --- | |
| | | | Red | A3PJ-5362 | --- | |
| | | | Green | A3PJ-5363 | --- | |
| | | | Yellow | A3PJ-5365 | --- | |
| | | | Orange | A3PJ-5366 | --- | |
| Light baffle | | Horizontal 2-split screen | | A3PJ-4302 | A3PA-4302 | Keep mounted at all times. If the light baffle is lost, contact OMRON.<br>Used in LED lamp-lighted models. Cannot be used in LED-lighted models. |
| | | Vertical 2-split screen | | A3PJ-4303 | --- | |
| | | Horizontal 3-split screen | Long axis | A3PJ-4304 | --- | |
| | | | Short axis | A3PJ-4305 | --- | |
| | | Vertical 3-split screen | Long axis | A3PJ-4306 | --- | |
| | | | Short axis | A3PJ-4307 | --- | |
| | | 4-split screen | Long axis | A3PJ-4304 | --- | |
| | | | Short axis | A3PJ-4308 | | |

| Name | Appearance | Screen pattern and color | Rectangular | Square | Application precautions |
|---|---|---|---|---|---|
| Legend plate | | Transparent legend plate | A3PJ-5202 | A3PA-5202 | A transparent legend plate is mounted on the Pushbutton. |
| | | Milk-white legend plate | A3PJ-5201 | A3PA-5201 | |
| Cap |  | Transparent cap | A3PJ-5600 | A3PA-5600 | --- |
| | | Crimp-processed transparent cap | A3PJ-5600-A | A3PA-5600-A | The surface is crimp-processed, so there is no reflection. |
| |  | Smokey-blue transparent cap | A3PJ-5600-SB | A3PA-5600-SB | You can easily tell if the button is lit, even in bright locations. |

## Tools

| Name | Appearance | Classification | Model | Application precautions |
|---|---|---|---|---|
| Extractor |  | --- | A3PJ-5080 | Use to extract components when replacing the Pushbutton. |

# Specifications

## ■ Ratings

### Contact Ratings

**Silver Alloy Contacts (for Standard Loads)**

| 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<br>250 VAC | 5<br>3 | | 0.7<br>0.5 | | 3<br>2 | | 1.3<br>0.8 | |
| 8 VDC<br>14 VDC<br>30 VDC<br>125 VDC<br>250 VDC | 5<br>5<br>4<br>0.4<br>0.2 | | 2<br>2<br>2<br>0.05<br>0.03 | | 4<br>4<br>3<br>0.4<br>0.2 | | 3<br>3<br>3<br>0.05<br>0.03 | |

**Note:** 1. The above values are for steady-state currents.
2. Inductive load: Power factor = 0.4; time constant = 7 ms.
3. The lamp load has an inrush current of 10 times the steady-state current.
4. The motor load has an inrush current of 6 times the steady-state current.
The above ratings conform to JIS C4505, for testing under the following conditions.
(1) Ambient temperature: 20 ±2°C.
(2) Ambient humidity: 65 ±5%
(3) Operating frequency: 20 times/min.

**Gold Alloy Contacts (for Microloads)**

| | |
|---|---|
| **Rated voltage (V)** | 0.1 A at 30 VDC (resistive load);<br>0.1 A at 125 VAC (resistive load) |
| **Minimum applicable load** | 1 mA at 5 VDC |

## ■ LED and Incandescent Lamp Ratings

### LED for LED-lighted Models

| Model | | A3PJ/M2PJ | | | | A3PA/M2PA | |
|---|---|---|---|---|---|---|---|
| | | Rated current | | | | | |
| Applicable voltage | Rated voltage | Single screen | 2-split screen | 3-split screen | 4-split screen | Single screen | 2-split screen |
| 5 VDC ±5% | 5 VDC | 80 mA | 40 mA x 2 | 20 mA x 2 | 20 mA x 4 | 80 mA | 40 mA x 2 |
| 12 VDC ±5% | 12 VDC | 40 mA | 20 mA x 2 | 15 mA x 2 | 15 mA x 4 | 40 mA | 20 mA x 2 |
| 24 VDC ±5% | 24 VDC | 20 mA | 15 mA x 2 | 15 mA x 2 | 15 mA x 2 | 20 mA | 13 mA x 2 |

### LED for Chameleon Models

| Applied voltage | Rated voltage | Rated current | |
|---|---|---|---|
| | | Green | Red |
| 12 VDC ±5% | 12 VDC | 26 mA | 20 mA |
| 24 VDC ±5% | 24 VDC | 13 mA | 10 mA |

### Incandescent Lamp

| Item | | Standard lamp | | Low-power lamp | |
|---|---|---|---|---|---|
| Applied voltage | Rated voltage | Rated current | Model | Rated current | Model |
| 5 VDC | 6 V | 200 mA | SLL-06 | 100 mA | SLL-06H |
| 12 VDC | 14 V | 80 mA | SLL-14 | 40 mA | SLL-14H |
| 24 VDC | 28 V | 40 mA | SLL-28 | 25 mA | SLL-28H |

### LED Lamp (for LED Lamp-lighted Models)

| Applied voltage | Rated voltage | Rated current | Model |
|---|---|---|---|
| 5 VDC ±5% | 5 VDC | 30 mA | SLL-05E□ |
| 12 VDC ±5% | 12 VDC | 15 mA | SLL-12E□ |
| 24 VDC ±5% | 24 VDC | 12.5 mA | SLL-24E□ |

**Note:** Only DC LED lamps are available.

## ■ Characteristics

| | |
|---|---|
| **Operating frequency** | Mechanical: 120 operations/minute max. (See note 1.)<br>Electrical: 30 operations/minute max. |
| **Insulation resistance** | 100 MΩ min. (at 500 VDC) |
| **Dielectric strength** | 1,000 VAC, 50/60 Hz for 1 minute between terminals of same polarity (See note 2.) |
| | 2,000 VAC, 50/60 Hz for 1 minute between terminals of different polarity, between current-carrying metal part and ground, and between each terminal and non-current-carrying metal part. |
| | 1,000 VAC, 50/60 Hz for 1 minute between lamp terminals (See note 3.) |
| **Vibration resistance** | Malfunction: 10 to 55 Hz, 1.5 mm double amplitude |
| **Shock resistance** | Destruction: 500 $m/s^2$<br>Malfunction: 200 $m/s^2$ |
| **Life expectancy** | Mechanical:<br>Momentary operation models: 1,000,000 operations min.<br>Alternate operation models: 200,000 operations min.<br>(One operation consists of set and reset operations.) |
| | Electrical: 100,000 operations min. |
| **Weight** | Approx. 30 g |
| **Inrush current** | NC: Silver alloy contact: 10 A max.<br>NO: Silver alloy contact: 10 A max. |
| **Ambient operating temperature** | LED-lighted models: –10°C to 40°C (with no icing or condensation)<br>Incandescent lamp-lighted models: –10°C to 50°C (with no icing or condensation) |
| **Ambient operating humidity** | 35% to 85% |
| **Ambient storage temperature** | –25°C to 65°C |
| **Degree of protection** | IP40 |
| **Electric shock protection class** | Class II |
| **PTI (proof tracking index)** | 175 |
| **Pollution degree** | 3 (IEC947-5-1) |

**Note:** 1. With alternate operation models, 60 operations/minute max. One operation cycle consists of set and reset operations.
2. 600 VAC for microloads.
3. With no incandescent lamp or LED lamp mounted.

## ■ Approved Standard Ratings

UL508 General Use: 5A at 125 V
CSA C22 No. 14 General Use: 5 A at 125 VAC, 3 A at 250 VAC

## ■ Operating Characteristics

| Operating characteristics | A3PJ series | | A3PA series | | A3PT series | |
|---|---|---|---|---|---|---|
| | Momentary operation models | Alternate operation models | Momentary operation models | Alternate operation models | Momentary operation models | Alternate operation models |
| OF max. | 5.88 N | 6.86 N | 5.88 N | 6.86 N | 3.92 N | 4.90 N |
| RF min. | 0.39 N | 0.29 N | 0.39 N | 0.29 N | 0.39 N | 0.29 N |
| TT | Approx. 3.5 mm | Approx. 3.5 mm | Approx. 3.5 mm | Approx. 3.5 mm | Approx. 3.5 mm | Approx. 3.5 mm |
| PT max. | 3 mm | 3 mm | 3 mm | 3 mm | 3 mm | 3 mm |
| LTA min. | --- | 0.5 mm | --- | 0.5 mm | --- | 0.5 mm |

# Operation

## ■ Terminal connections

### LED-lighted Models

(The terminal arrangement diagram shows a 1-switch output. Connections to terminals from the lighting block are the same for 2 outputs.)

| Rated voltage | | 5 VDC | 12 VDC | 24 VDC |
|---|---|---|---|---|
| **Model** | **Screen pattern** | | | |
| A3PJ | Single screen | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block |
| | 2-split screen | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block | |
| A3PA | Single screen | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block |
| | 2-split screen | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block | |

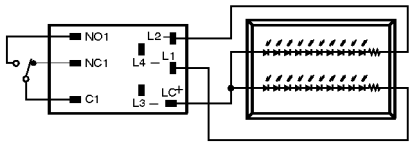
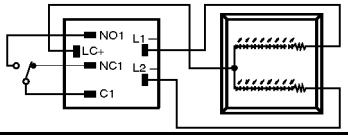
### Incandescent Lamp-lighted/LED Lamp-lighted Models

(All are shown with the OMRON logo facing down. The terminal arrangements are the same as for the LED-lighted models.)

| Model | Rectangular A3PJ models | Square A3PA models | Round A3PT models |
|---|---|---|---|
| Silver/gold alloy contacts (1 output) | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block |
| Silver/gold alloy contacts (2 outputs) | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block | Bottom view / Top view<br>Terminal arrangement / Lighting block |
| Silver/gold alloy contacts (3 outputs) | Bottom view / Top view<br>Terminal arrangement / Lighting block | --- | --- |

### LED Chameleon Models

(The terminal arrangement diagram shows a 1-switch output. Connections to terminals from the lighting block are the same for 2 outputs.)

| Rated voltage | 24 VDC |
|---|---|
| Rectangular A3PJ model |   |
| Square A3PA model |   |

## ■ Terminal Arrangement and Coloring

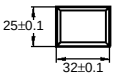
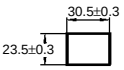
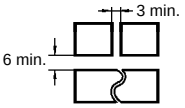
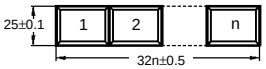
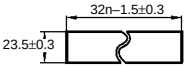
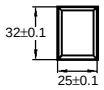
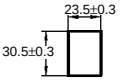
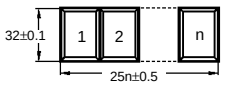
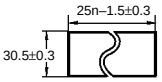
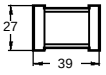
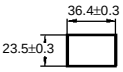
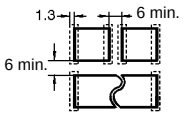
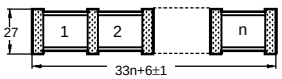
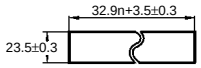
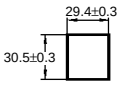
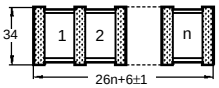
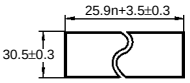
### Chameleon Models

| | | | |
|---|---|---|---|
| **Wiring** | LC+ | LC+ | LC+ |
| | L1– | L2– | L1– and L2– shorted |
| **Coloring** | Green | Red | Orange |

## ■ Panel Cutout

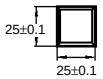
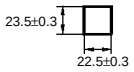
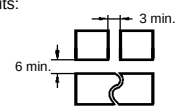
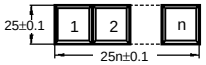
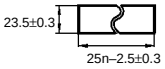
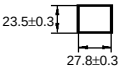
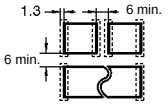
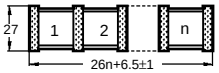
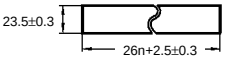
(If using a Switch Guard or Seal Cover, refer to the panel cutout diagrams on page 244.)

### A3PJ (Rectangular) Models

| Classification | | Mounting design | Panel cutout | Remarks |
|---|---|---|---|---|
| Flange mount models | Individual mounting (Horizontal) |   |   | Panel cutout spacing between rows of Units:   |
| | Multiple mounting (Horizontal) |   |   | |
| | Individual mounting (Vertical) |   Mount to long mounting plate (A3PJ-3002) before use. |   | |
| | Multiple mounting (Vertical) |   Mount to long mounting plate (A3PJ-3002) before use. |   | |
| Barrier mount models | Individual mounting (Horizontal) |   |   | For barrier mount models, refer to *Accessories* on page 234. Panel cutout spacing between rows of Units: (Dotted line indicates the position of each mounting barrier.)   |
| | Multiple mounting (Horizontal) |   |   | |
| | Individual mounting (Vertical) | Mount to long mounting plate (A3PJ-3002) before use. |   | |
| | Multiple mounting (Vertical) |   Mount to long mounting plate (A3PJ-3002) before use. |   | |

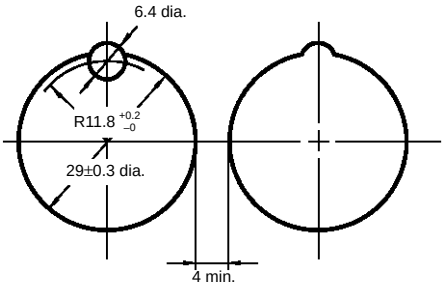
**Note:** 1. n: Number of Units
2. Recommended panel thickness: 1 to 5 mm
3. Mount the panel before mounting the Switch Guard.
4. If the panel is to be finished (e.g., coated), make sure that the panel meets the specified dimensions after the coating.

## A3PA (Square) Models

| Classification | | Mounting design | Panel cutout | Remarks |
|---|---|---|---|---|
| Flange mount models | Individual mounting |  |  | Panel cutout spacing between rows of Units:  |
| | Multiple mounting |  |  | |
| Barrier mount models | Individual mounting | |  | Panel cutout spacing between rows of Units:<br>(Dotted line indicates the position of each mounting barrier.)  |
| | Multiple mounting |  |  | |

**Note:** 1. n: Number of Units
2. Recommended panel thickness: 1 to 5 mm
3. Mount the panel before mounting the Switch Guard.
4. If the panel is to be finished (e.g., coated), make sure that the panel meets the specified dimensions after the coating.

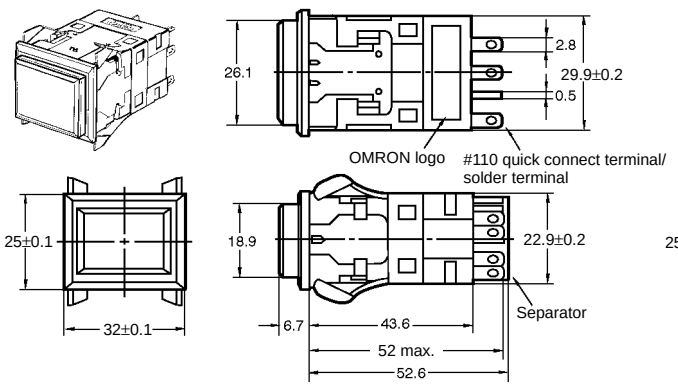
## A3PT (Round) Models



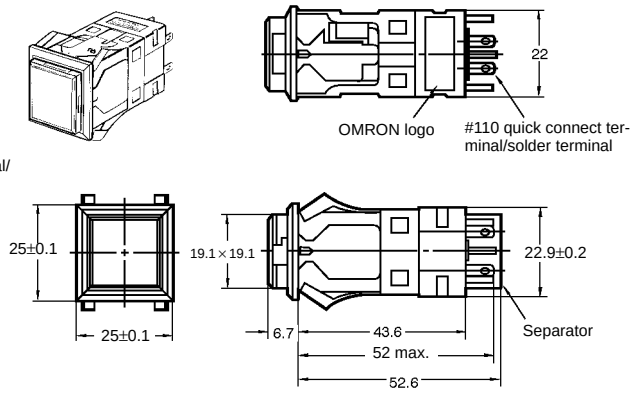
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

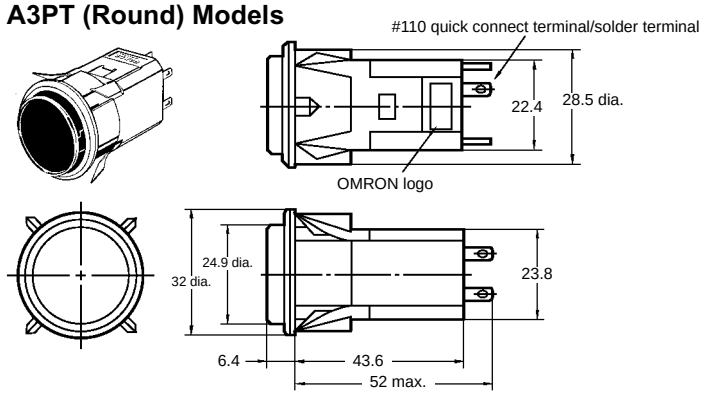
### A3PJ (Rectangular) Models




### A3PA (Square) Models



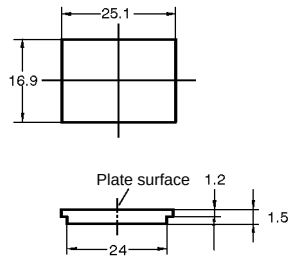

### A3PT (Round) Models



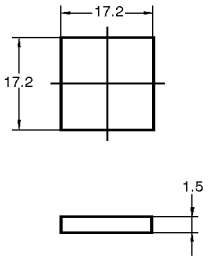

## ■ Accessory Mounting Dimensions

### ● Legend Plate

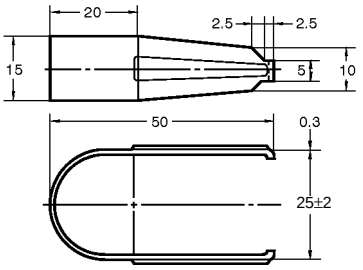
**Rectangular Models**
**A3PJ-5201/-5202**




**Square Models**
**A3PA-5201/-5202**




**Extractor**
**A3PJ-5080**

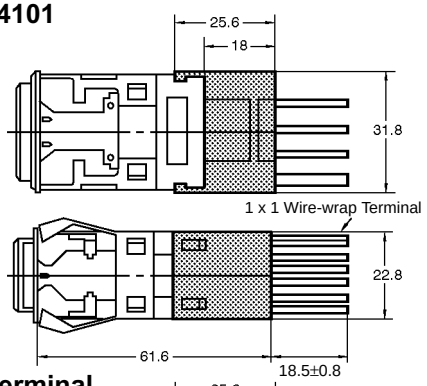



**Note:** Made from stainless steel.

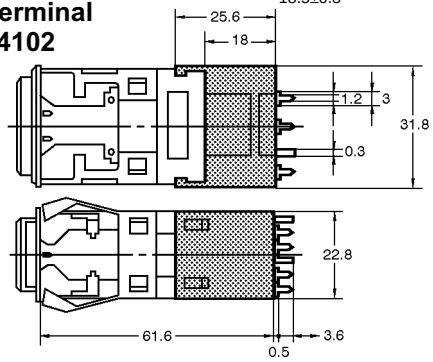
## ● Socket-mounting Dimensions

### Rectangular Models
### A3PJ (M2PJ)

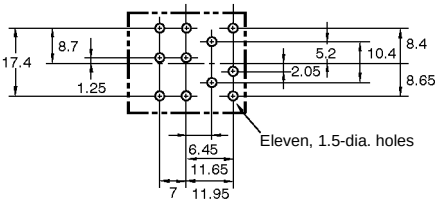
**Wire-wrap Terminal**
**A3PJ-4101**



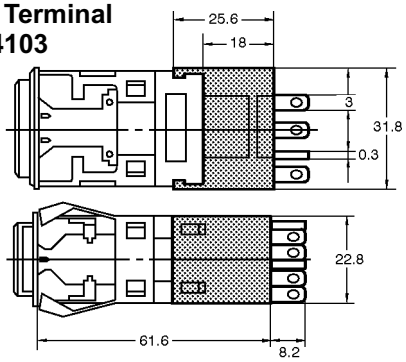

**PCB Terminal**
**A3PJ-4102**



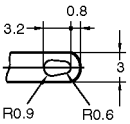

**PCB Cutout (bottom view)**




**Solder Terminal**
**A3PJ-4103**

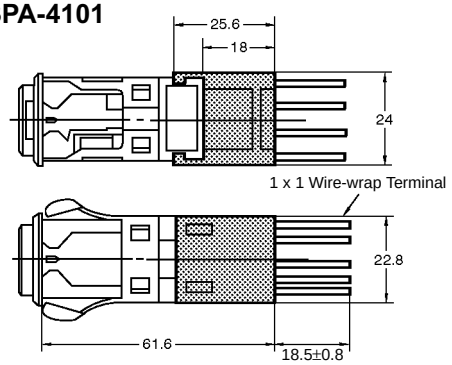



**Terminal Hole Dimensions**

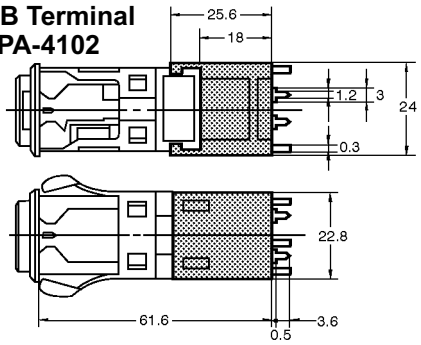



### Square Models
### A3PA (M2PA)

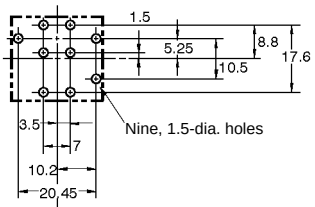
**Wire-wrap Terminal**
**A3PA-4101**



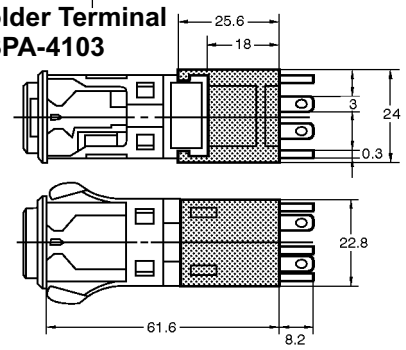

**PCB Terminal**
**A3PA-4102**



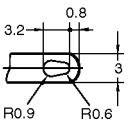

**PCB Cutout (bottom view)**




**Solder Terminal**
**A3PA-4103**



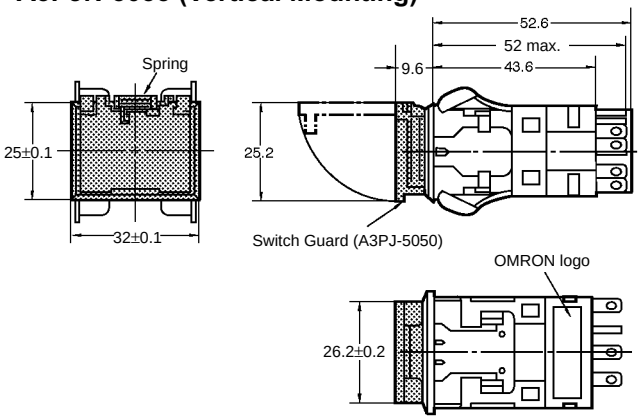

**Terminal Hole Dimensions**




**Note:** PCB cutout dimensions show the switch mounted to the socket with the OMRON logo facing down.

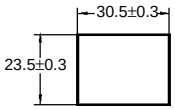
## ● Switch and Guard Mounting Dimensions

### Rectangular Models
### A3PJN-5050 (Horizontal Mounting)
### A3PJN-5055 (Vertical Mounting)

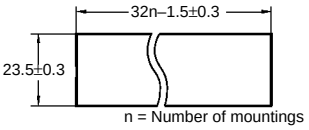



**Panel Cutouts**

**Individual Mounting (Horizontal)**

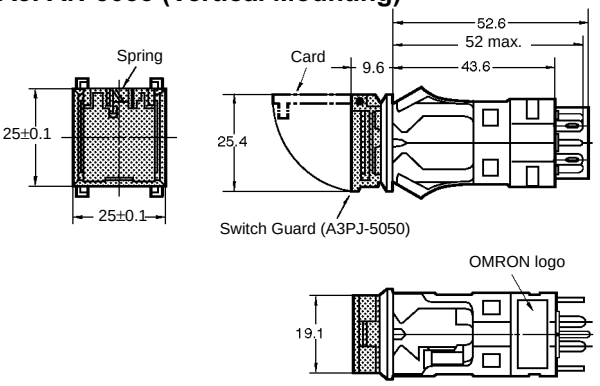



**Multiple Mounting (Horizontal)**



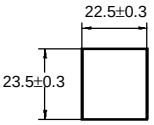

**Note:** Multiple vertical mounting is not possible.

### Square Models
### A3PAN-5050 (Horizontal Mounting)
### A3PAN-5055 (Vertical Mounting)

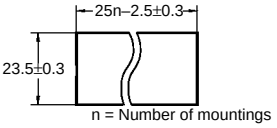



**Panel Cutouts**

**Individual Mounting (Horizontal)**



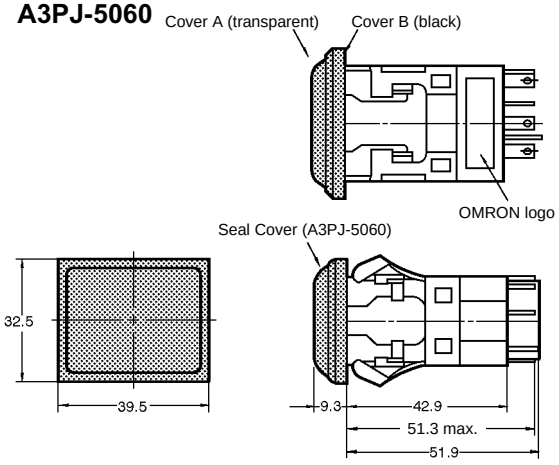

**Multiple Mounting (Horizontal)**




**Note:** Multiple vertical mounting is not possible.

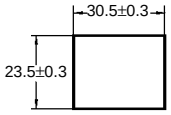
## ● Seal Cover Mounting Dimensions

### Rectangular Models
### A3PJ-5060

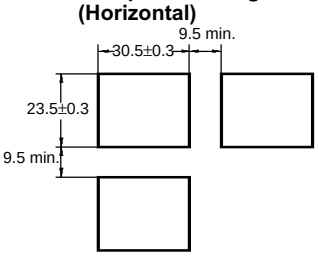



**Panel Cutouts**

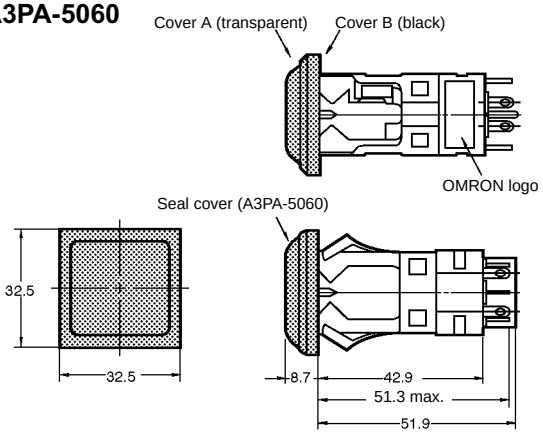
**Individual Mounting (Horizontal)**




**Multiple Mounting (Horizontal)**

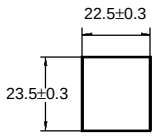



### Square Models
### A3PA-5060

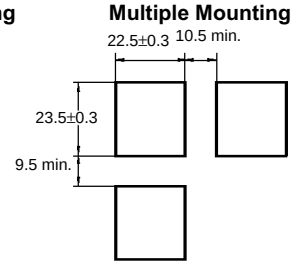



**Panel Cutouts**

**Individual Mounting**




**Multiple Mounting**




**Note:** 1. Recommended panel thickness: 1 to 5 mm
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

# Precautions

**Caution**

Do not apply a voltage higher than the maximum rated operating voltage between the lamp terminals, as there is a risk that the incandescent lamp or LED will be damaged, and the Pushbutton will be ejected.

When replacing the incandescent lamp, first turn OFF the power supply, and then wait 10 minutes before performing replacement, as the lamp is still hot immediately after the power is turned OFF, so there is a risk of burns.

Refer to the *Common Precautions* for Pushbutton Switches on page 14.

## Correct Use

### Mounting

Always make sure that the power is turned OFF before mounting, removing, or wiring the Switch, or performing maintenance.

After wiring the Switch, make sure that there is a suitable isolation distance.

### Wiring

Perform soldering promptly and correctly at 60 W maximum and within 3 seconds. (Dip soldering temperature 280°C max.) Wait for one minute after soldering before exerting any external force on the solder.

### Operating Environment

Do not use in locations that are subject to dust, oil, or metal filings as these may penetrate the interior of the Switch and cause malfunction.

### LED (for VDC)

Check the terminal polarity when wiring.

The rated voltage is shown on the plate on the back of the lighting unit, so be sure to use within the voltage shown.

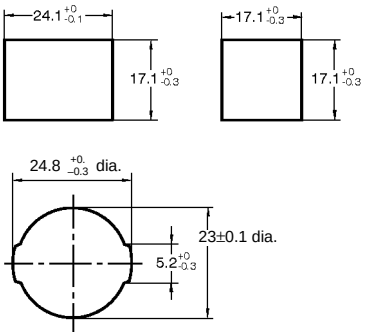
An LED current-limiting resistor is built in, so there is no need to mount an external resistor.

### Incandescent Lamp

Apply 80% of the rated voltage (operating voltage) to the incandescent lamp to improve life expectancy and incandescence.

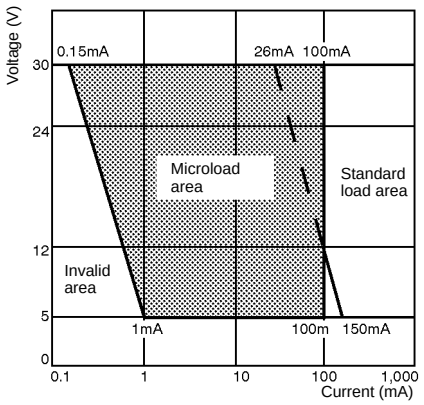
### Character Plate (Character Film)

If preparing the character plate separately, use a heat-resistant film with a thickness of 0.1 to 0.3 mm.




### Using Microloads

Using a standard load switch when a microload circuit is opened or closed may cause wear on the contacts. Use the switch within the operating range. (Refer to the diagram below.) Even when using microload models within the operating range shown below, if inrush current occurs when the contact is opened or closed, it may cause the contact surface to become rough, and so decrease life expectancy. Therefore, insert a contact protection circuit where necessary. The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ 60) (conforming to JIS C5003). The equation, λ 60 = 0.5 x $10^{-4}$/time indicates that the estimated malfunction rate is less than 1/2,000,000 with a reliability level of 60%.



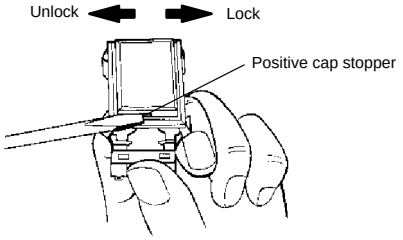

### Others

If the panel is to be finished (e.g., coated), make sure that the panel meets the specified dimensions after the coating.

## ■ Assembly/Disassembly

### A3PJ/M2PJ (Rectangular Models)
### A3PA/M2PA (Square Models)

**1. Locking/Unlocking Positive Cap Lock Mechanism**




**2. Mounting Pushbutton**

Be sure to mount the Pushbutton with the correct orientation. Align the groove on the Pushbutton, the projections in the Switch, and the LED contact piece before pushing the Pushbutton into the Switch.

When dismounting the Pushbutton, use the Extractor (A3PJ-5080) for easy dismounting.

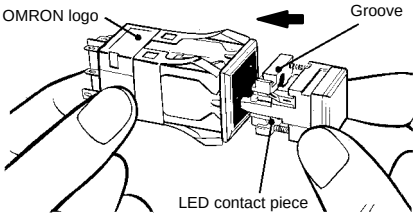
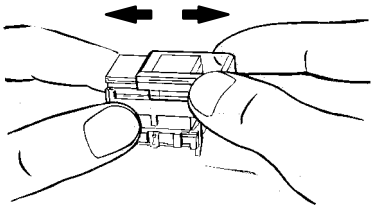



Diagram shows A3PA model.

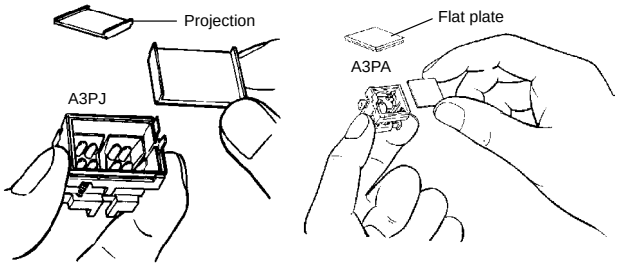
**3. Removing/Mounting Cap**

Insert the A3PA from the open side into the theft-prevention stopper.



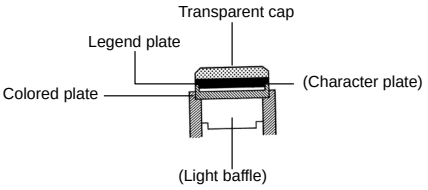
**4. Mounting Colored Plate**

Place the colored plate on the plunger case with the dull side of the colored plate facing downward. With A3PJ split-screen models, be sure that the projections on the upper surface of the colored plate face outward. For the A3PA, make sure that the flat plate is facing upwards.



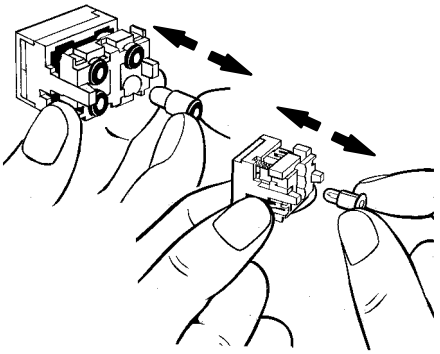

**5. Mounting Character Plate (Character Frame) and Legend Plate**

Mount the legend plate for the A3PJ under the layered surfaces and mount the cap, as shown below.




**6. Mounting and Replacing LED and Incandescent Lamps**

If using an A3PA (square) model with one incandescent lamp, insert the lamp in the center hole.

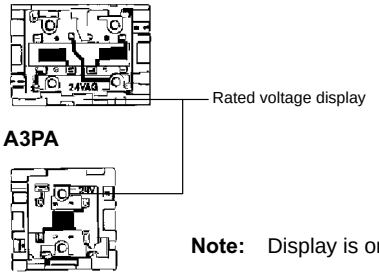


**Note:** Built-in LEDs cannot be replaced.

**7. LED Rated Voltage Display (LED Models Only)**

The LED rated voltage is shown between the built-in resistors on the back of the lighting unit. Use within a range of ± 5%.

**A3PJ**

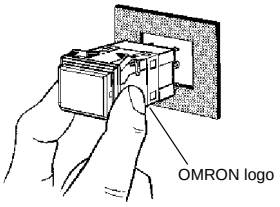



**Note:** Display is on the back.

**8. Mounting Switch onto Panel**

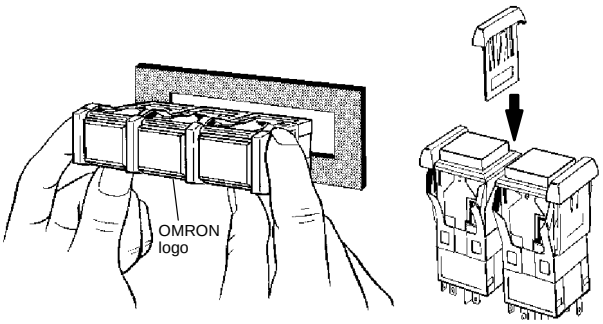
- Individual Mounting and Barrier Mounting

When mounting the Switch, push it into the panel cutout from the front of the mounting panel by holding it with the logo mark "OMRON" facing downward.




- Multiple Barrier Mounting (A3PJ)

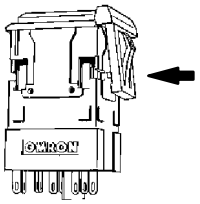
When mounting a number of Switches in line on the panel, link the Switches with spacing barriers in between, attach mounting barriers at both sides of this block of Switches and, pushing in on the mounting barriers at the side, insert the Switches into the panel cutout together.




**9. Mounting Barriers**

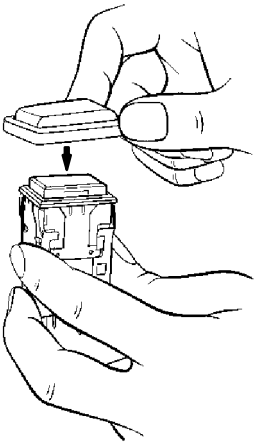
Mount each part by pushing it in the direction of the arrow shown in the corresponding illustration below.

Barrier mounting




**10. Mounting Seal Cover**

After mounting the seal cover onto the flange of the Switch, push the Switch into the panel cutout.



**11. Inscribing the Legend Plate**

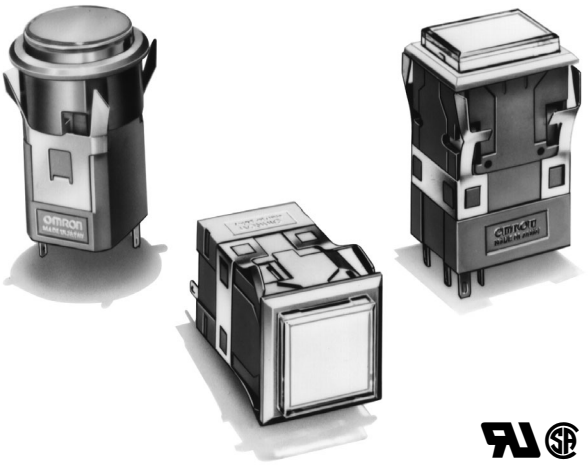
- Inscribe the legend plate to a depth of 0.5 mm max.
- The legend plate is made from polycarbonate resin. To coat the legend plate, use an alcohol-based coating such as melamine, phthalic acid, or acrylic.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A135-E1-02

## Large Rectangular-bodied Indicators

- Good illumination with even surface brightness.
- Three-color models (green, orange, red; chameleon lighting) included in lineup.
- UL and CSA approved.



# Ordering Information

## ■ Model Number Legend

The model numbers used to order sets of Units are illustrated below. One set comprises the Display, Lamp, and Socket.

(4) **24E** (5) **R** - - - Single screen

(1) (2) (3) Upper Lower

**M 2 P J - 90 A 1 1 - 24E RW** - - - Horizontal 2-split screen

| | |
|---|---|
| R (Red) | Upper |
| W (White) | Lower |

**(1) Shape of Display**

| Symbol | Shape |
|---|---|
| J | Rectangular |
| A | Square |
| T | Round |

**(2) Screen Pattern**

| Illumination-only models | |
|---|---|
| Symbol | Screen pattern |
| 1 | Single screen |
| 2 | 2-split screen |
| G | Chameleon (see note 1, 2) |

**Note:** 1. The chameleon screen pattern is not available with M2PT models.
2. The chameleon screen pattern is only available with 12 or 24-VDC models.
3. With chameleon models, the whole screen lights red, green, or orange. When not lit, the display is white.

The available rectangular models are shown below. Select from among the individual products shown on page 257.

Vertical 2-split screen models

4-split screen models

Horizontal 3-split screen models

Vertical 3-split screen models

The above diagrams show the Sockets with the "OMRON" mark facing down.

Colored-illumination models up to the 4-split screen models are available as individual Units. Refer to page 255.

"Colored-illumination" models operate in the way shown below:

| Unlit | Lit |
|---|---|
| White | Color |

The built-in LED is colored.

**(3) Case Color**

| Symbol | Color |
|---|---|
| 1 | Black |
| 2 | Light gray |

Note: M2PT model is available in light gray only.

**(4) Lighting Method**

**LED-lighted Models (M2PJ and M2PA Only)**

| Symbol | Rated voltage |
|---|---|
| 05E | 5 VDC |
| 12E | 12 VDC |
| 24E | 24 VDC |

**LED Lamp-lighted Models (M2PT Only)**

| Symbol | Rated voltage |
|---|---|
| 05C | 5 VDC |
| 12C | 12 VDC |
| 24C | 24 VDC |

M2PJ and M2PA can also be ordered separately. Refer to page 257 for details.

**Incandescent Lamp-lighted Models**

| Symbol | Rated voltage |
|---|---|
| 06 | 6 VAC/VDC |
| 14 | 14 VAC/VDC |
| 28 | 28 VAC/VDC |

**(5) Color of Display**

**For LED**

| Symbol | Color |
|---|---|
| R | Red |
| O | Orange |
| G | Green |
| W | White |
| K | Chameleon |

The chameleon screen pattern is not available with M2PT models.

The chameleon screen pattern is only available with 12 or 24-VDC models.

**For Incandescent Lamp**

| Symbol | Color |
|---|---|
| No symbol | Red, orange, white, blue, green |

Includes colored plate. Refer to page 258 for details.

**Number of Built-in LED Lamps**

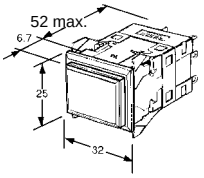
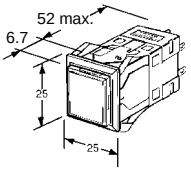
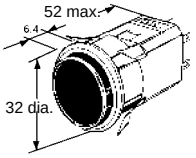
| Screen pattern | A3PJ | A3PA | A3PT |
|---|---|---|---|
| Single screen | Built-in LED models | | 2 |
| Horizontal 2-split screen | | | 2 |
| Vertical 2-split screen | 4 (See note.) | --- | --- |
| Horizontal 3-split screen | | --- | --- |
| Vertical 3-split screen | | --- | --- |
| 4-split screen | | --- | --- |

**Number of Built-in Incandescent Lamps**

| Screen pattern | A3PJ | A3PA | A3PT |
|---|---|---|---|
| Single screen | 2 | 1 | 2 |
| Horizontal 2-split screen | 4 (Low-power incandescent lamp) | 2 | 2 |
| Vertical 2-split screen | | --- | --- |
| Horizontal 3-split screen | | --- | --- |
| Vertical 3-split screen | | --- | --- |
| 4-split screen | | --- | --- |

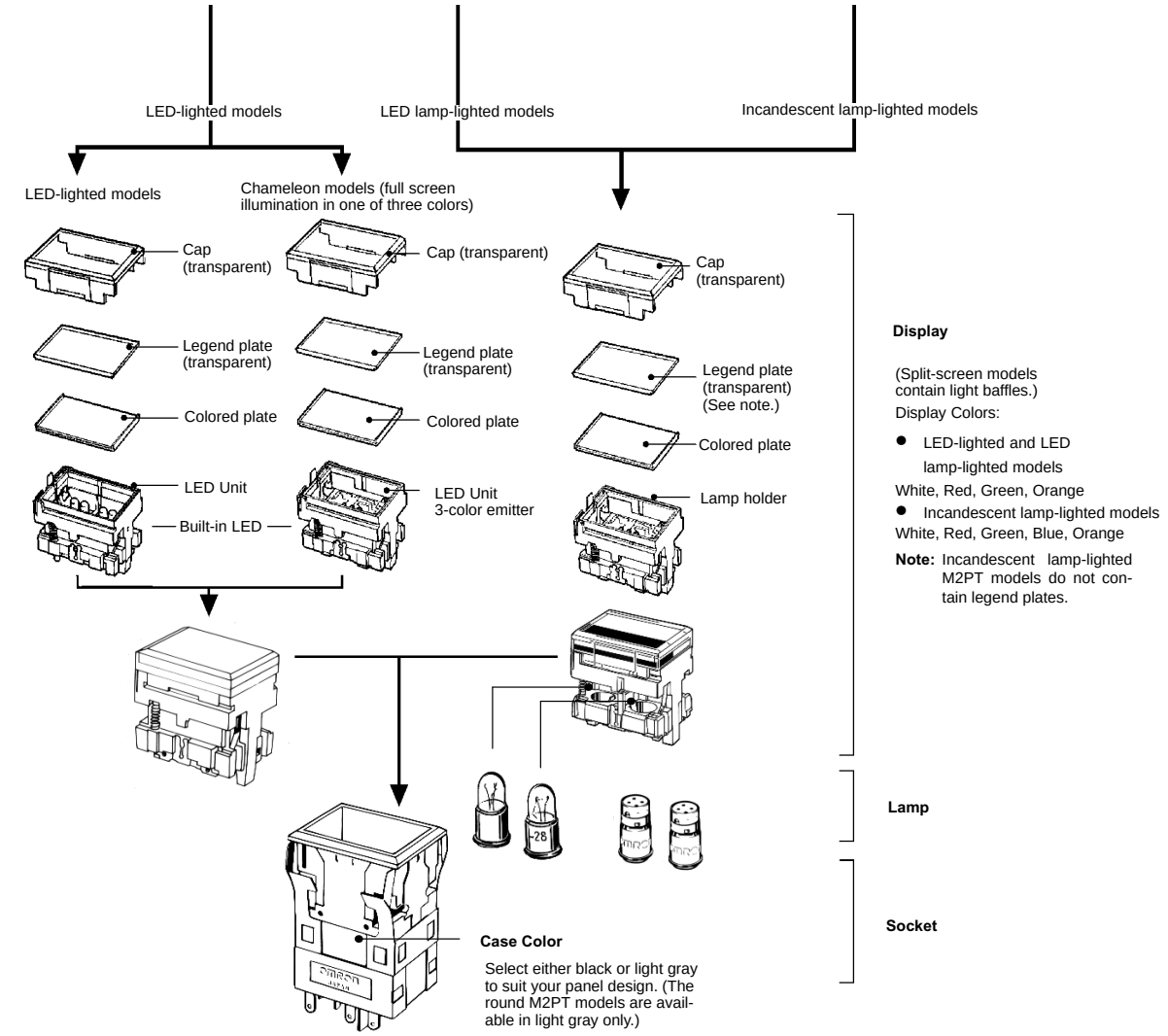
**Note:** These split screen models are available only as individual Units. They cannot be ordered as sets.

## ■ List of Models

| Model | M2PJ (Rectangular) | M2PA (Square) | M2PT (Round) |
|---|---|---|---|
| **Appearance** |   |   |   |

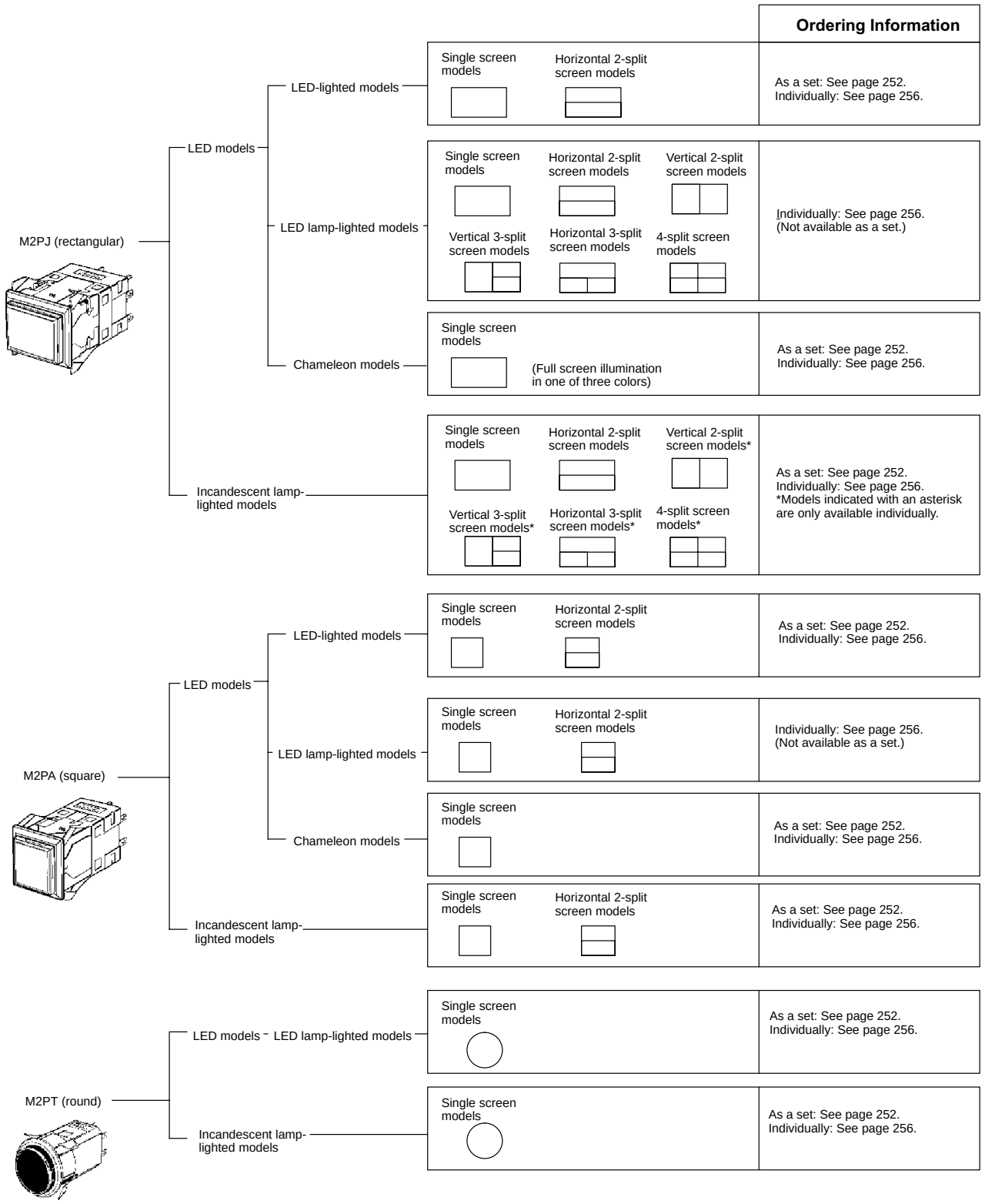
## ■ Construction

| Lighting method | LED-lighted models (LED is built-in.) | | LED lamp-lighted models (LED is not built-in.) | | | Incandescent lamp-lighted models (Incandescent lamp is not built-in.) | | |
|---|---|---|---|---|---|---|---|---|
| Models | M2PJ | M2PA | M2PJ | M2PA | M2PT | M2PJ | M2PA | M2PT |
| Screen pattern | Single screen<br>Horizontal 2-split screen<br>Chameleon (3-color) | Single screen<br>Horizontal 2-split screen<br>Chameleon (3-color) | Single screen<br>Vertical 3-split screen<br>Horizontal 2-split screen<br>Horizontal 3-split screen<br>Vertical 2-split screen<br>4-split screen | Single screen<br>Horizontal 2-split screen | Single screen | Single screen<br>Vertical 3-split screen<br>Horizontal 2-split screen<br>Horizontal 3-split screen<br>Vertical 2-split screen<br>4-split screen | Single screen<br>Horizontal 2-split screen | Single screen |




**Note:** The above diagram for LED lamp-lighted and incandescent lamp-lighted models shows the M2PJ model.

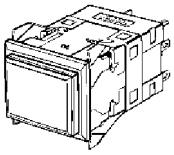
## ■ M2P Lighting Method Diagram



## ■ Ordering as a Set

The model numbers used to order sets of Units are given in the following tables. One set comprises the Display, Lamp, and Socket.

### M2PJ (Rectangular) Single Screen Models



(1)

| Lighting method | Case color | Black | Light gray | Display color symbol |
|---|---|---|---|---|
| LED | 5 VDC | M2PJ-90A11-05E(1) | M2PJ-90A12-05E(1) | R<br>O<br>G<br>W |
| | 12 VDC | M2PJ-90A11-12E(1) | M2PJ-90A12-12E(1) | |
| | 24 VDC | M2PJ-90A11-24E(1) | M2PJ-90A12-24E(1) | |
| Chameleon | 12 VDC | M2PJ-90AG1-12EK | M2PJ-90AG2-12EK | (See note 1.) |
| | 24 VDC | M2PJ-90AG1-24EK | M2PJ-90AG2-24EK | |
| Incandescent lamp | 6 VDC/VAC | M2PJ-90A11-06 | M2PJ-90A12-06 | (See note 2.) |
| | 14 VDC/VAC | M2PJ-90A11-14 | M2PJ-90A12-14 | |
| | 28 VDC/VAC | M2PJ-90A11-28 | M2PJ-90A12-28 | |

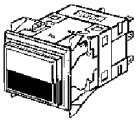
Enter the desired color symbol for the Display in (1). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example: Red MPJ-90A11-24E R

**Note:** 1. You can change the screen colors of chameleon models between red, green, and orange by changing the terminal wiring. Refer to page 260 for details.

2. Incandescent lamps are supplied with colored plates (white, red, green, blue, and orange) and legend plates (milk-white and transparent). Use the appropriate combination.

### M2PJ (Rectangular) Horizontal 2-split Screen Models



(1)
(2)

| Lighting method | Case color | Black | Light gray | Display color symbol |
|---|---|---|---|---|
| LED | 24 VDC | M2PJ-90A21-24E(1)(2) | M2PJ-90A22-24E(1)(2) | R<br>O<br>G<br>W |
| Incandescent lamp | 6 VDC/VAC | M2PJ-90A21-06 | M2PJ-90A22-06 | (See note.) |
| | 14 VDC/VAC | M2PJ-90A21-14 | M2PJ-90A22-14 | |
| | 28 VDC/VAC | M2PJ-90A21-28 | M2PJ-90A22-28 | |

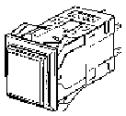
Enter the desired color symbols for the Display in (1) and (2). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example:

| | | |
|---|---|---|
| Red | Upper | M2PJ-90A21-24E R W |
| White | Lower | Red White |

**Note:** Incandescent lamps are supplied with colored plates (white, red, green, blue, and orange) and legend plates (milk-white and transparent). Use the appropriate combination.

## M2PA (Square) Single Screen Models



(1)

| Lighting method | Case color | Black | Light gray | Display color symbol |
|---|---|---|---|---|
| LED | 5 VDC | M2PA-90A11-05E(1) | M2PA-90A12-05E(1) | R<br>O<br>G<br>W |
| | 12 VDC | M2PA-90A11-12E(1) | M2PA-90A12-12E(1) | |
| | 24 VDC | M2PA-90A11-24E(1) | M2PA-90A12-24E(1) | |
| Chameleon | 12 VDC | M2PA-90AG1-12EK | M2PA-90AG2-12EK | (See note 1.) |
| | 24 VDC | M2PA-90AG1-24EK | M2PA-90AG2-24EK | |
| Incandescent lamp | 6 VDC/VAC | M2PA-90A11-06 | M2PA-90A12-06 | (See note 2.) |
| | 14 VDC/VAC | M2PA-90A11-14 | M2PA-90A12-14 | |
| | 28 VDC/VAC | M2PA-90A11-28 | M2PA-90A12-28 | |

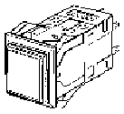
Enter the desired color symbol for the Display in (1). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example: Red M2PA-90A11-24E R

**Note:** 1. You can change the screen colors of chameleon models between red, green, and orange, by changing the terminal wiring. Refer to page 260 for details.

2. Incandescent lamps are supplied with colored plates (white, red, green, blue, and orange) and legend plates (milk-white and transparent). Use the appropriate combination.

## M2PA (Square) Horizontal 2-split Screen Models



| |
|---|
| (1) |
| (2) |

| Lighting method | Case color | Black | Light gray | Display color symbol |
|---|---|---|---|---|
| LED | 24 VDC | M2PA-90A21-24E(1)(2) | M2PA-90A22-24E(1)(2) | R<br>O<br>G<br>W |
| Incandescent lamp | 6 VDC/VAC | M2PA-90A21-06 | M2PA-90A22-06 | (See note.) |
| | 14 VDC/VAC | M2PA-90A21-14 | M2PA-90A22-14 | |
| | 28 VDC/VAC | M2PA-90A21-28 | M2PA-90A22-28 | |

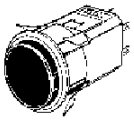
Enter the desired color symbols for the Display in (1) and (2). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example:

| | | |
|---|---|---|
| Red | Upper | M2PA-90A21-24E R W |
| White | Lower | Red White |

**Note:** Incandescent lamps are supplied with colored plates (white, red, green, blue, and orange) and legend plates (milk-white and transparent). Use the appropriate combination.

## M2PT (Round) Single Screen Models



(1)

| Lighting method | Case color | Light gray | Display color symbol |
|---|---|---|---|
| LED | 5 VDC | M2PT-90A12-05C(1) | R<br>O<br>G<br>W |
| | 12 VDC | M2PT-90A12-12C(1) | |
| | 24 VDC | M2PT-90A12-24C(1) | |
| Incandescent lamp | 6 VDC/VAC | M2PT-90A12-06 | (See note.) |
| | 14 VDC/VAC | M2PT-90A12-14 | |
| | 28 VDC/VAC | M2PT-90A12-28 | |

Enter the desired color symbol for the Display in (1). (R) = Red, (O) = Orange, (G) = Green, (W) = White.

Example: (Red) M2PT-90A12-24C[R]

**Note:** Incandescent lamps are supplied with a colored plates (white, red, green, blue, and orange). Use the appropriate combination. Models A3PT and M2PT (round models), however, are not supplied with legend plates.

## ■ Illumination-only and Colored-illumination LED Models

- "Illumination only" describes LED models for which the screen color is the same whether the LED is lit or not. The screen simply becomes brighter when the LED lights.

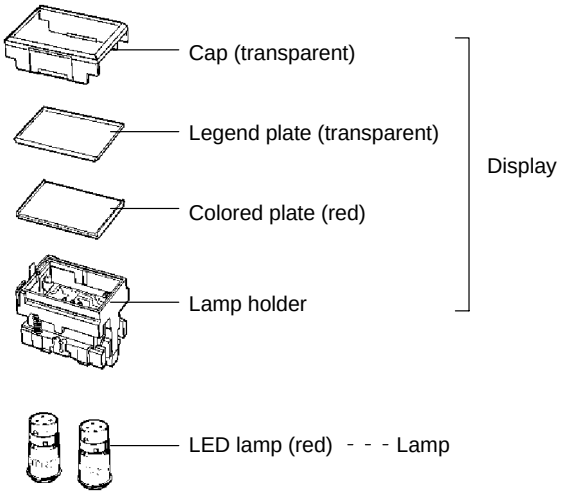
**Example: Red LED**

Not lit

Red

Lit

Red




- "Colored illumination" describes LED models for which the screen color is white when the LED is not lit and changes to the color of the LED lamp when the LED is lit.

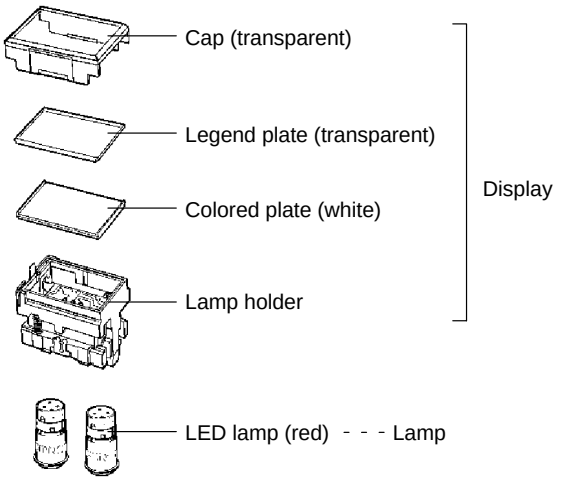
**Example: Red LED**

Not lit

White

Lit

Red




Ordering: For a colored-illumination Indicator, order the Display, Lamp, and Socket as shown in the following table.

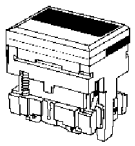
| Display | Lamp | Socket |
|---|---|---|
| Select the LED lamp-lighted model required from the selection on page 257. Each assembly includes the number of white colored plates required to enable colored illumination for the corresponding screen-split configuration. For example, 4-split screen models includes 4 white colored plates. | Select the LED lamps to suit your desired coloration from the selection on page 258.<br>Number of necessary LED lamps (standard):<br>M2PJ (rectangular): 4<br>M2PA (square): 2<br>M2PT (round): 2 | Select from the *Sockets* on page 259. |

## ■ Ordering Individually

Displays, Lamps, and Sockets can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.

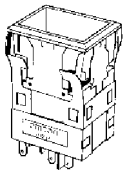
**LED-lighted/Chameleon Models**
(LED is built into the Display.)

**Display**
Round (M2PT) models not available.



M2P□-5□□□-□□E
(for Indicator)

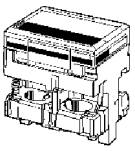
**Socket (See note 1.)**



M2P□-7□□□-□
(for Indicator)

**LED Lamp-lighted Models**
(LED lamp and Display are separate.)

**Display**

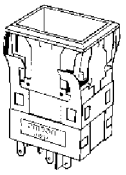


M2P□-502□
(for Indicator)

**Lamp (LED Lamp)**
**(See note 2.)**

SLL-□□E□

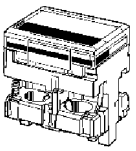
**Socket**



M2P□-7□□□-□
(for Indicator)

**Incandescent Lamp-lighted Models**
(Incandescent lamp and Display are separate.)

**Display**

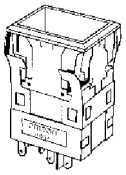


M2P□-501□
(for Indicator)

**Lamp (Incandescent Lamp)**
**(See note 3.)**

Standard lamp: SLL-□□
Low-power lamp: SLL-□□H

**Socket**



M2P□-7□□□-□
(for Indicator)

**Note:** 1. The Socket is compatible with LED-lighted, LED lamp-lighted, and incandescent lamp-lighted models.
2. Number of necessary LED lamps.

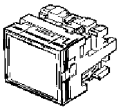
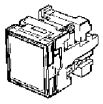
| Screen pattern | M2PJ | M2PA | M2PT |
|---|---|---|---|
| Single screen | 4 | 2 | 2 |
| Horizontal 2-split screen | | 2 | 2 |
| Vertical 2-split screen | | --- | --- |
| Vertical 3-split screen<br>Horizontal 3-split screen | | --- | --- |
| 4-split screen | | --- | --- |

3. Number of necessary incandescent lamps.

| Screen pattern | M2PJ | M2PA | M2PT |
|---|---|---|---|
| Single screen | 2 | 1 | 2 |
| Horizontal 2-split screen | 4 (low-power incandescent lamp) | 2 | 2 |
| Vertical 2-split screen | | --- | --- |
| Vertical 3-split screen<br>Horizontal 3-split screen | | --- | --- |
| 4-split screen | | --- | --- |

## Display

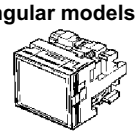
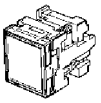
**LED-lighted Models (LED is built-in.)**

| Appearance | Split-screen color (color symbol) | | White (W) | Red (R) | Green (G) | Orange (O) | Selection precautions |
|---|---|---|---|---|---|---|---|
| Rectangular models  | Single screen | | M2PJ-5701-□□E | M2PJ-5702-□□E | M2PJ-5703-□□E | M2PJ-5706-□□E | Enter the voltage to be used in the □ □ at the end of the model number.<br>Examples of voltage used:<br>5 V = 05E<br>12 V = 12E<br>24 V = 24E<br>For the color of the shaded part, select the model according to the colors given at the top of the table. |
| | Horizontal 2-split screen | White | M2PJ-5711-□□E | M2PJ-5712-□□E | M2PJ-5713-□□E | M2PJ-5716-□□E | |
| | | Red | M2PJ-5721-□□E | M2PJ-5722-□□E | M2PJ-5723-□□E | M2PJ-5726-□□E | |
| | | Green | M2PJ-5731-□□E | M2PJ-5732-□□E | M2PJ-5733-□□E | M2PJ-5736-□□E | |
| | | Orange | M2PJ-5741-□□E | M2PJ-5742-□□E | M2PJ-5743-□□E | M2PJ-5746-□□E | |
| Square models  | Single screen | | M2PA-5701-□□E | M2PA-5702-□□E | M2PA-5703-□□E | M2PA-5706-□□E | |
| | Horizontal 2-split screen | White | M2PA-5711-□□E | M2PA-5712-□□E | M2PA-5713-□□E | M2PA-5716-□□E | |
| | | Red | M2PA-5721-□□E | M2PA-5722-□□E | M2PA-5723-□□E | M2PA-5726-□□E | |
| | | Green | M2PA-5731-□□E | M2PA-5732-□□E | M2PA-5733-□□E | M2PA-5736-□□E | |
| | | Orange | M2PA-5741-□□E | M2PA-5742-□□E | M2PA-5743-□□E | M2PA-5746-□□E | |

**Note:** 1. A cap, legend plate (transparent), colored plate, white plunger case, and LED (with a current-limiting resistor) are built into the standard lighting unit.

2. Split-screen coloring configurations are given with the OMRON mark on the Sockets facing down.

**LED Lamp-lighted Models (LED is not built-in.)**

| Model | Rectangular models  | | Square models  | | Round models | |
|---|---|---|---|---|---|---|
| Screen pattern | Screen | Model | Screen | Model | Screen | Model |
| Single screen | | M2PJ-5021 | | M2PA-5021 | | M2PT-5021 |
| Horizontal 2-split screen | | M2PJ-5022 | | M2PA-5022 | --- | |
| Vertical 2-split screen | | M2PJ-5023 | --- | | --- | |
| Horizontal 3-split screen | | M2PJ-5024 | --- | | --- | |
| Vertical 3-split screen | | M2PJ-5025 | --- | | --- | |
| 4-split screen | | M2PJ-5026 | --- | | --- | |

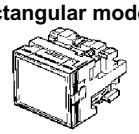
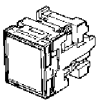
**Note:** 1. Colored plates (white, red, green, and orange), a legend plate (transparent), and a light baffle (split-screen models only) are included. Use the appropriate combination for the LED coloring required.

2. The number of white colored plates required to enable colored illumination for the corresponding screen-split configuration is included. (For example, 4-split screen models include 4 white colored plates). The number of colored plates included for each model are shown in the following table.

| Screen pattern | White | Red | Green | Orange |
|---|---|---|---|---|
| Single screen | 1 | 1 | 1 | 1 |
| Horizontal 2-split screen<br>Vertical 2-split screen | 2 | 1 | 1 | 1 |
| Horizontal 3-split screen<br>Vertical 3-split screen | 3 | 2 | 2 | 2 |
| 4-split screen | 4 | 1 | 1 | 1 |

## Display

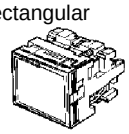
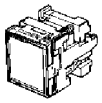
**Incandescent Lamp-lighted Models (Incandescent lamp is not built-in.)**

| Model | Rectangular models  | | Square models  | | Round models | |
|---|---|---|---|---|---|---|
| **Screen pattern** | **Screen** | **Model** | **Screen** | **Model** | **Screen** | **Model** |
| Single screen | | M2PJ-5011 | | M2PA-5011 | | M2PT-5011 |
| Horizontal 2-split screen | | M2PJ-5012 | | M2PA-5012 | --- | |
| Vertical 2-split screen | | M2PJ-5013 | --- | | --- | |
| Horizontal 3-split screen | | M2PJ-5014 | --- | | --- | |
| Vertical 3-split screen | | M2PJ-5015 | --- | | --- | |
| 4-split screen | | M2PJ-5016 | --- | | --- | |

**Note:** 1. Colored plates (white, red, green, orange, and blue), a legend plate (transparent), and a light baffle (split-screen models only) are supplied.
2. M2PT (round) models do not contain a legend plate.
3. The number of colored plates supplied is shown in the following table.

| Screen pattern | White | Red | Green | Orange | Blue |
|---|---|---|---|---|---|
| Single screen | 1 | 1 | 1 | 1 | 1 |
| Horizontal 2-split screen<br>Vertical 2-split screen | 1 | 1 | 1 | 1 | 1 |
| Horizontal 3-split screen<br>Vertical 3-split screen | 2 | 2 | 2 | 2 | 2 |
| 4-split screen | 2 | 2 | 2 | 2 | 2 |

**Chameleon Models (with Built-in LED)**

| Shape | Rated voltage | Chameleon indicator |
|---|---|---|
| Rectangular  | 12 VDC | M2PJ-5800-12E |
| | 24 VDC | M2PJ-5800-24E |
| Square  | 12 VDC | M2PA-5800-12E |
| | 24 VDC | M2PA-5800-24E |

**Note:** 1. With the chameleon models, the whole screen lights red, green, or orange (i.e., red and green simultaneously).
2. A cap, legend plate (transparent), white colored plate, and LED (with a current-limiting resistor) are built into the Display.

## Lamp (For mounting, refer to page 246.)

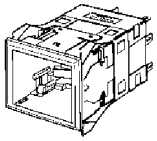
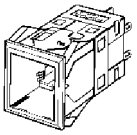
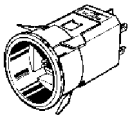
**LED Lamp**

| Voltage / Color | 5 VDC Model (DC only) | 12 VDC Model (DC only) | 24 VDC Model (DC only) | Applicable cap (color) (colored plate) | Selection precautions |
|---|---|---|---|---|---|
| Red | SLL-05ER | SLL-12ER | SLL-24ER | Red | In the standard setup, 4 LED lamps are used with M2PJ models and 2 LED lamps are used with M2PA and M2PT models. |
| Yellow | SLL-05EY | SLL-12EY | SLL-24EY | Orange | |
| Green | SLL-05EG | SLL-12EG | SLL-24EG | Green | |
| White | SLL-05EW | SLL-12EW | SLL-24EW | White | |

**Incandescent Lamp**

| Lamp type / Voltage | Standard lamp | Low-voltage lamp | Selection precautions |
|---|---|---|---|
| 5 VAC/VDC | SLL-06 | SLL-06H | In the standard setup for M2PJ models, 2 lamps are used with single screen models, and 4 lamps are used with split-screen models. If 3 or 4 lamps are lit continuously, use low-power lamps.<br>In the standard setup for M2PA models, 1 lamp is used with single screen models, and 2 lamps are used with split-screen models.<br>In the standard setup for M2PT models, 2 lamps are used. |
| 12 VAC/VDC | SLL-14 | SLL-14H | |
| 24 VAC/VDC | SLL-28 | SLL-28H | |

### Socket (common to both incandescent lamp-lighted and LED-lighted models)

| Rectangular | Square | Round | Selection precautions |
|---|---|---|---|
|  |  |  | |
| M2PJ-7010-1 | M2PA-7010-1 | M2PT-7010-2 | The end digit denotes the color of the flange: -1 denotes a black flange, and -2 denotes a light gray flange. Round switches are available only in light gray, and not in black. |

## ■ Accessories

Accessories are the same as those for the A3P Lighted Pushbutton Switches. Refer to page 234.

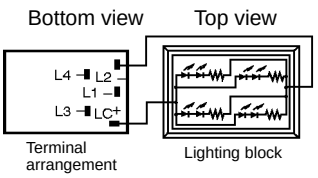
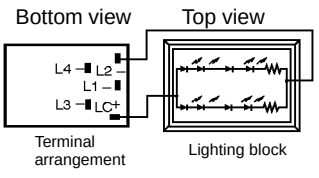
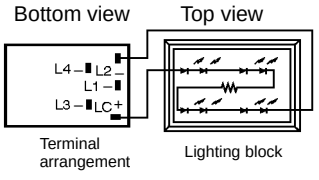
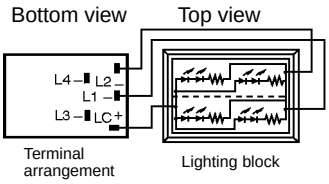
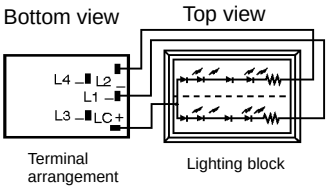
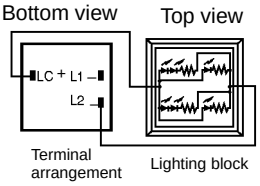
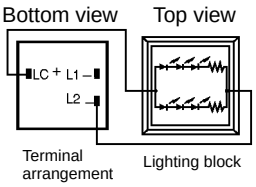
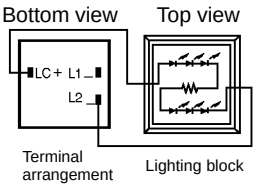
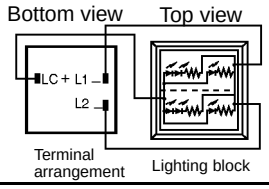
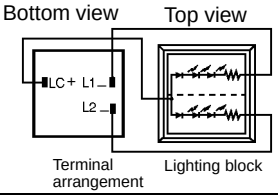
## ■ LED and Incandescent Lamp Ratings and Characteristics

Ratings and characteristics the same as those for the A3P Lighted Pushbutton Switches. Refer to page 237.

# Operation

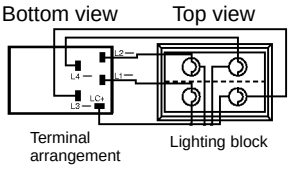
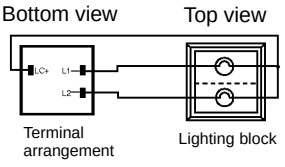
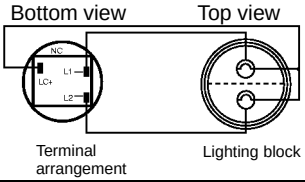
## ■ Terminal connections

### LED-lighted Models

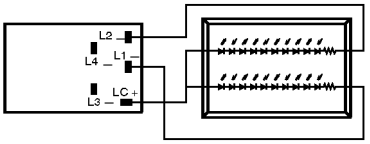
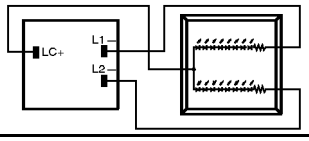
| Model | Screen pattern | 5 VDC | 12 VDC | 24 VDC |
|---|---|---|---|---|
| M2PJ | Single screen |  |  |  |
| | 2-split screen |  |  | |
| M2PA | Single screen |  |  |  |
| | 2-split screen |  |  | |

### Incandescent Lamp-lighted/LED Lamp-lighted Models

(All are shown with the OMRON logo facing down. The terminal arrangements are the same as for the LED-lighted models.)

| Model | Rectangular M2PJ models | Square M2PA models | Round M2PT models |
|---|---|---|---|
| Indicator |  |  |  |

### LED Chameleon Models

| Rated voltage / Model | 24 VDC |
|---|---|
| Rectangular M2PJ model |  |
| Square M2PA model |  |

## ■ Terminal Arrangement and Coloring

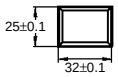
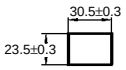
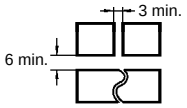
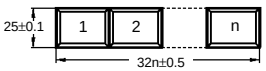
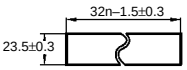
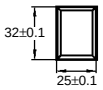
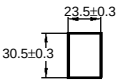
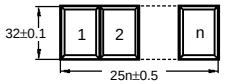
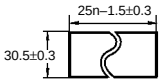
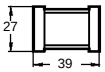
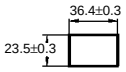
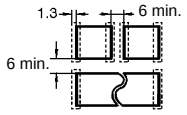
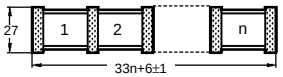
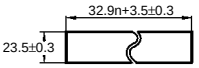
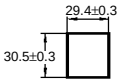
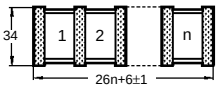
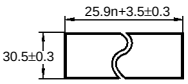
### Chameleon Models

| | | | |
|---|---|---|---|
| **Wiring** | LC+ | LC+ | LC+ |
| | L1– | L2– | L1– and L2– shorted |
| **Coloring** | Green | Red | Orange |

## ■ Panel Cutout

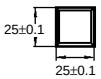
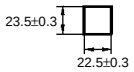
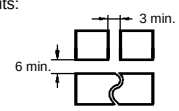
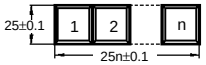
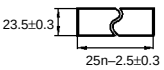
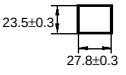
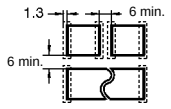
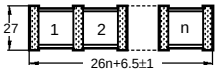
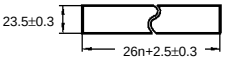
(If using a Switch Guard or Seal Cover, refer to the panel cutout diagrams.)

### M2PJ (Rectangular) Models

| Classification | | Mounting design | Panel cutout | Remarks |
|---|---|---|---|---|
| Flange mount models | Individual mounting (Horizontal) |  |  | Panel cutout spacing between rows of Units:  |
| | Multiple mounting (Horizontal) |  |  | |
| | Individual mounting (Vertical) |  Mount to long mounting plate (A3PJ-3002) before use. |  | |
| | Multiple mounting (Vertical) |  Mount to long mounting plate (A3PJ-3002) before use. |  | |
| Barrier mount models | Individual mounting (Horizontal) |  |  | For barrier mount models, refer to *Accessories* on page 234.<br>Panel cutout spacing between rows of Units:<br>(Dotted line indicates the position of each mounting barrier.)  |
| | Multiple mounting (Horizontal) |  |  | |
| | Individual mounting (Vertical) | Mount to long mounting plate (A3PJ-3002) before use. |  | |
| | Multiple mounting (Vertical) |  Mount to long mounting plate (A3PJ-3002) before use. |  | |

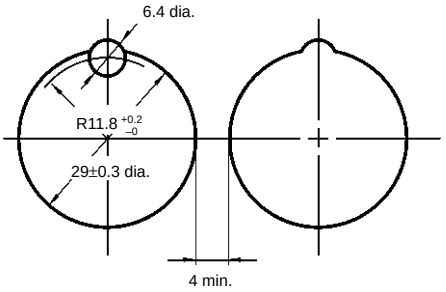
**Note:** 1. n: Number of Units
2. Recommended panel thickness: 1 to 5 mm
3. Mount the panel before mounting the Switch Guard.
4. If the panel is to be finished (e.g., coated), make sure that the panel meets the specified dimensions after the coating.

### M2PA (Square) Models

| Classification | | Mounting design | Panel cutout | Remarks |
|---|---|---|---|---|
| Flange mount models | Individual mounting |  |  | Panel cutout spacing between rows of Units:  |
| | Multiple mounting |  |  | |
| Barrier mount models | Individual mounting | |  | Panel cutout spacing between rows of Units:<br>(Dotted line indicates the position of each mounting barrier.)  |
| | Multiple mounting |  |  | |

**Note:** 1. n: Number of Units
2. Recommended panel thickness: 1 to 5 mm
3. If the panel is to be finished (e.g., coated), make sure that the panel meets the specified dimensions after the coating.

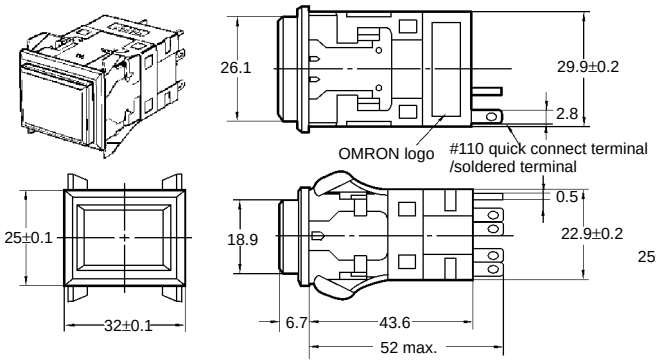
### M2PT (Round) Models



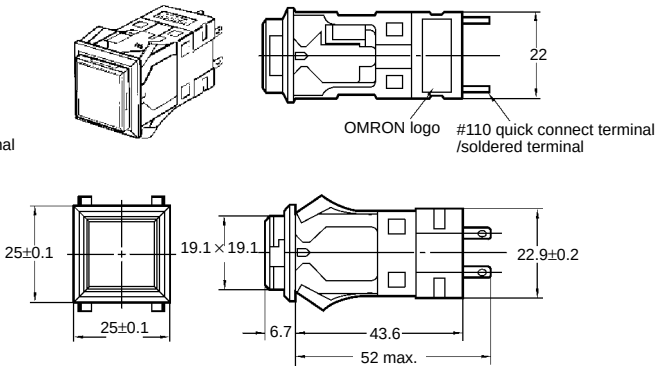

# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

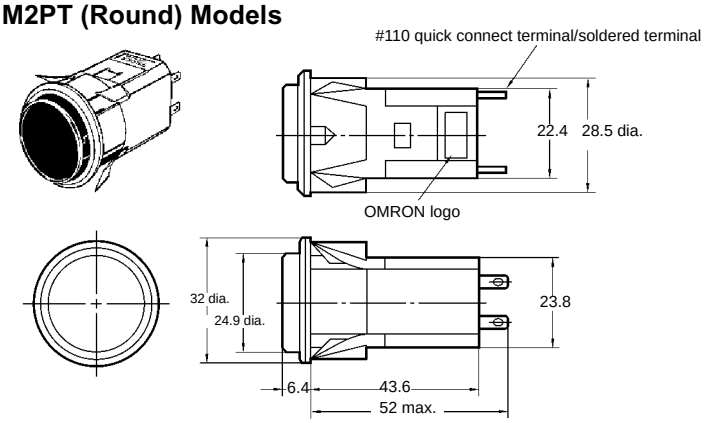
### M2PJ (Rectangular) Models




### M2PA (Square) Models




### M2PT (Round) Models




## ■ Accessory Mounting Dimensions

Dimensions for mounting accessories are the same as those for the A3P Lighted Pushbutton Switches. Refer to page 242.

# Precautions

## ■ Correct Use

Refer to the *Common Precautions* for Pushbutton Switches on page 14.
Refer to *Correct Use* for A3P on page 245.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A137-E1-02

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