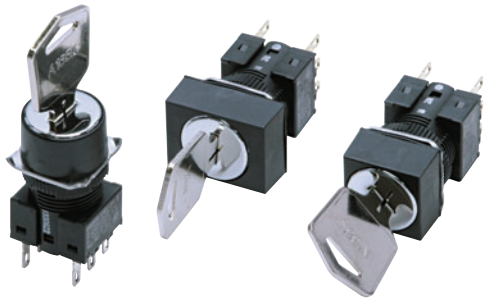
# A165K

CSM_A165K_DS_E_3_1

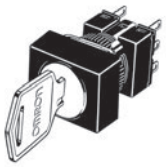
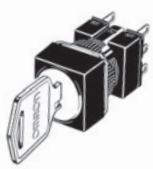
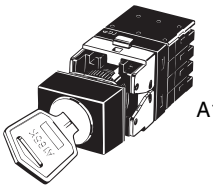
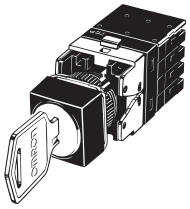
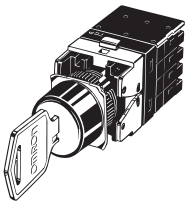
## Separate Construction with Cylindrical 16-dia. Body

- Short mounting depth, less than 28.5 mm below panel
- Wide range of switching capacity from standard to microload
- Oil-resistant IP65 models



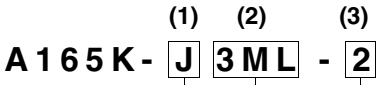
Refer to *Safety Precautions for All Pushbutton Switches* and *Safety Precautions* on page 11.

## List of Models

| | Model | | |
|---|---|---|---|
| | **Rectangular** | **Square** | **Round** |
| **Solder terminals** |  A165K-J Series |  A165K-A Series | A165K-T Series |
| **Screw-less clamp connector** |  A165K-J Series |  A165K-A Series |  A165K-T Series |

## Model Number Structure

**Model Number Legend** ..... The model numbers used to order sets of Units are illustrated below. One set comprises the Selector, Switch, and 2 Keys.
For information on combinations, refer to *Ordering Information* on page 3.




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

## Ordering Information

**Ordering as a Set** ..... The model numbers used to order sets of Units are given in the following tables. One set comprises the Selector, Switch and 2 Keys.

### Solder Terminals

Rectangular Models

Oil-resistant IP65

A165K-J

| 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** |

Square Models

Oil-resistant IP65

A165K-A

| 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** |

Round Models

Oil-resistant IP65

A165K-T

| 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 Information

**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.

**Operation Units (Listed on Page 5.)**

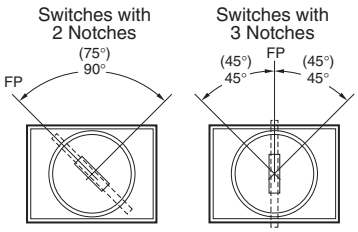
Rectangular (A165K-J)

·Two keys are provided.

Square (A165K-A)

Round (A165K-T)

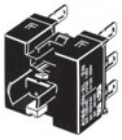
(Standard condition when shipped)



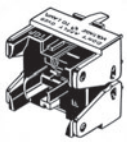

Note: The figures in parentheses are for self-resetting models.
FP: Free position

**Socket Units (Listed on Page 5.)**

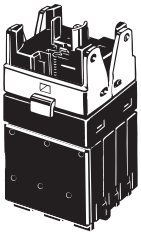
Solder terminals



PCB terminals



Screw-less clamp connector



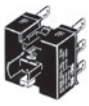
## Ordering Information

**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 standard load and microload. | DPDT | 2 notches | Non-lighted | **A16-2S** | Common to ones for pushbutton switches. |
| | | | 3 notches | | **A16S-3N-2LS** | --- |

# Ordering Information

## Accessories and Tools (Order Separately)

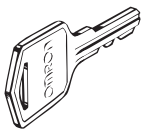
### Accessories

| 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<br>Color: Black |
| | | 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. |
| Extractor | | **A16Z-5080** | Yes | Yes | Yes | Yes | Yes | Convenient for extracting the Lamp from a Solder-terminal Socket Unit. |

### Key

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

Note: Two Keys are provided.

Ordering as a Set: Refer to page 3.

■ Specifications, and dimensions: Refer to page 7 to 10.
■ Accessories, replacements, and tools: Refer to this page.

# Specifications

## 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)
Note: Certification has been obtained for the Switch Unit. For detailed information on individual products that have received certification, consult your supplier.

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

3 A at 250 VAC
3 A at 30 VDC

### CCC (GB14048.5)

5 A at 125 VAC
3 A at 250 VAC
3 A at 30 VDC

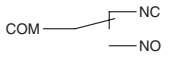
## Ratings

### Contacts

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

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

### Contact Form

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



## Characteristics

### Socket Units

| Item | Type | 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 | Between terminals of same polarity | 1,000 VAC, 50/60 Hz for 1 minute |
| | Between terminals of different polarity | 2,000 VAC, 50/60 Hz for 1 minute |
| | Between each terminal and ground | 2,000 VAC, 50/60 Hz for 1 minute |
| Vibration resistance | Malfunction | 10 to 55 Hz, 1.5-mm double amplitude (malfunction within 1 ms) |
| Shock resistance | Destruction | 500 m/s² |
| | Malfunction | 150 m/s² max. (malfunction within 1 ms) |
| Durability | Mechanical | 250,000 operations min. (durability of key: 10,000 operations min.) |
| | Electrical | 100,000 operations min. |
| Electric shock protection class | | Class II |
| PTI (tracking characteristic) | | 175 |
| Degree of contamination | | 3 (IEC60947-5-1) |
| Weight | | Approx. 26.5 g (in the case of a DPDT switch key) |
| Ambient operating temperature | | −10°C to 55°C (with no icing or condensation) |
| Ambient operating humidity | | 35% to 85%RH |
| Ambient storage temperature | | −25°C to 65°C (with no icing or condensation) |

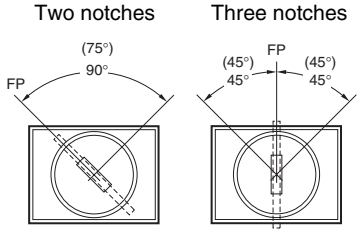
### Screw-less Clamp

| Item | Type | Screw-less Clamp | | | |
|---|---|---|---|---|---|
| Recommended wire size | | 0.5 mm² twisted wire or 0.8 mm-dia. solid wire | | | |
| Usable wires and tensile strength | Twisted wire | 0.3 mm² | 0.5 mm² | 0.75 mm² | 1.25 mm² |
| | 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 | | | |
| Compliant standards | | JIS C 2811 Terminal Blocks for Industrial Use | | | |

## Operating Characteristics

| Characteristics \ Type | Key-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

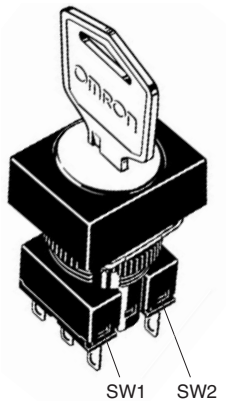




Note: The angle used for automatic reset is shown in parentheses.
FP: Free position

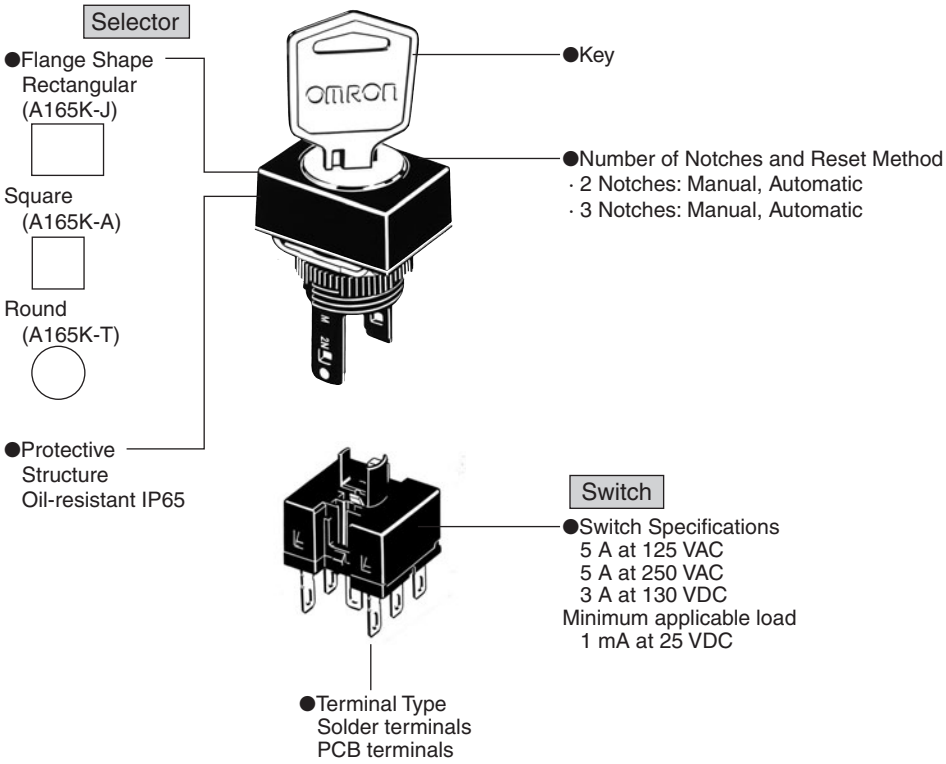
## Contact Configuration

| No. of notches | Contact configuration | | | | |
|---|---|---|---|---|---|
| | SPDT | | DPDT | | |
| | Position | SW | Position | SW1 | SW2 |
| 2 notches | | | | | |
| | | | | | |
| 3 notches | --- | | | | |
| | | | | | |
| | | | | | |



## Nomenclature

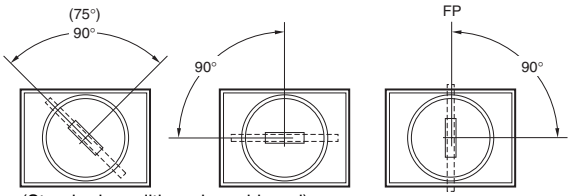
### Model Structure




**The flange can be rotated to easily change the operation angle of the knob.**

For information on rotating the flange, refer to the A165S/W datasheet.

Example: Knob-type Selector Switch with Two Notches




(Standard condition when shipped)
Note: The angle is 75° for self-resetting models.

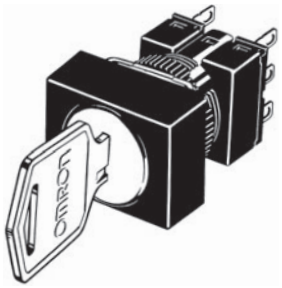
## Dimensions

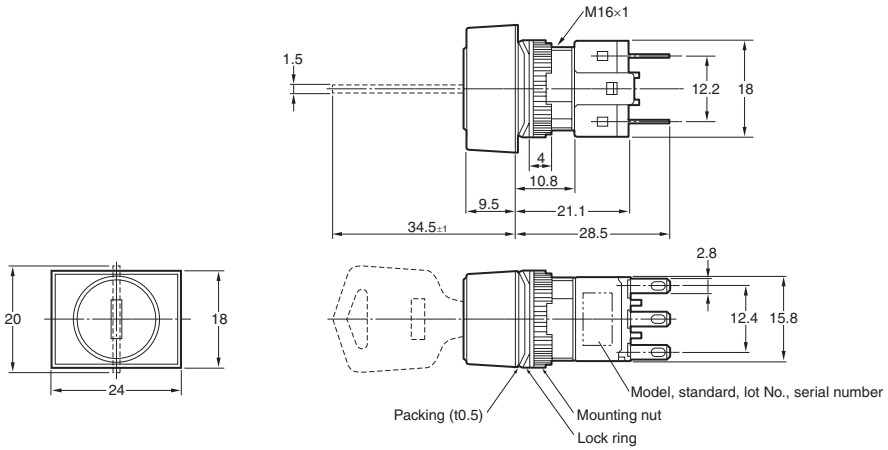
The Dimension shows 2-switch outputs.

(Unit: mm)

### Rectangular A165K-J

**Solder terminals (tab terminals #110)**

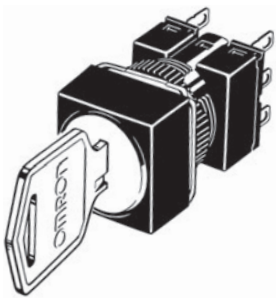


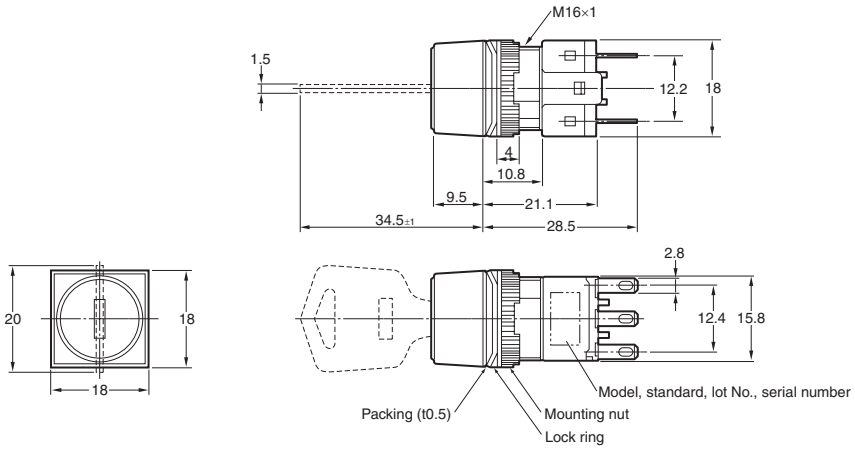



* Refer to the A165S/W for Panel cutouts.

### Square A165K-A

**Solder terminals (tab terminals #110)**

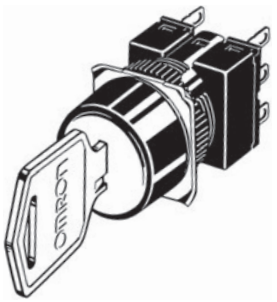


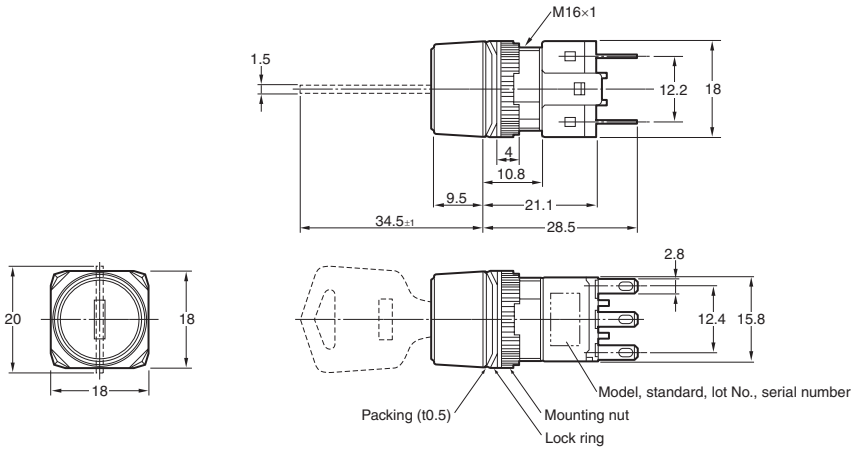



* Refer to the A165S/W for Panel cutouts.

### Round A165K-T

**Solder terminals (tab terminals #110)**





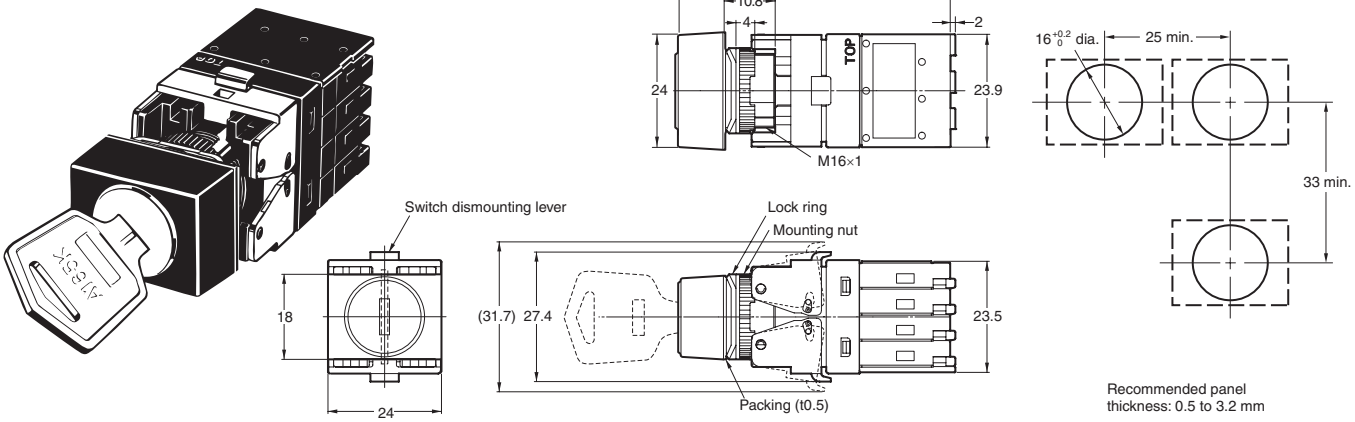

* Refer to the A165S/W for Panel cutouts.

## Dimensions

• The Dimension shows 2-switch outputs. • The lamp terminal is also provided with non-lighted models. • A rectangular model is listed as an example. **(Unit: mm)**

**Rectangular A165K□-2S**

**Screw-Less Clamp**




### Terminal Arrangement

For information on the terminal arrangement, refer to the A165S/W datasheet.

### Panel Mounting and Socket Unit Mounting and Removal

Refer to the A16 Pushbutton Switch datasheet.

### Flange Rotation

Refer to the A165S/W datasheet.

## Safety Precautions

**Refer to *Safety Precautions for All Pushbutton Switches*.**

**⚠ 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.**

### Precautions for 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

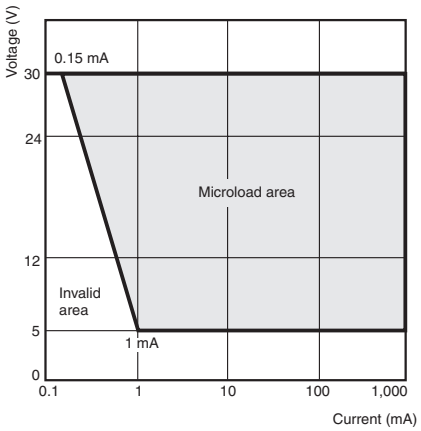
- Solder terminals and quick-connect terminals (#110) are commonly used for terminals.
- Be sure to use electrical wires that are a size appropriate for the applied voltage and carry current (conductor size is 0.5 to 0.75 $mm^2$). Perform soldering according to the conditions provided below. If the soldering is not properly performed, the lead wires will become detached, resulting in short-circuits.
  1. Hand soldering: 350°C, within 3 s
  2. Dip soldering: 350°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.

#### 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.

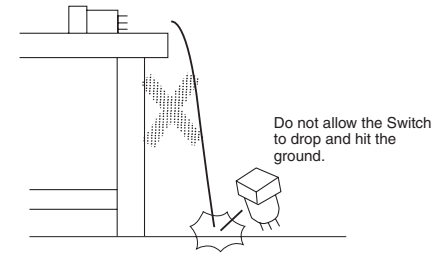
#### Using the Microload

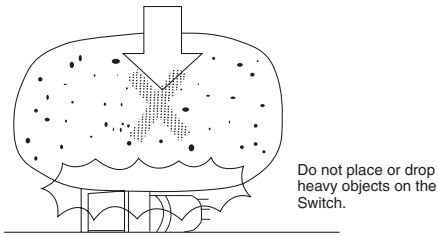
- Insert a contact protection circuit, if necessary, to prevent the reduction of life expectancy due to extreme wear on the contacts caused by loads where inrush current occurs when the contact is opened and closed.
- The A16 allows both a standard load (125 V at 5A, 250 V at 3 A) and a microload. If 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% ($\lambda$ 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%.

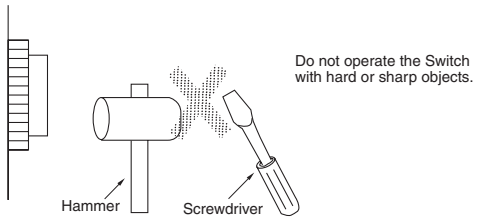


### Others

- 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.



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2009.9

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**OMRON Corporation**
**Industrial Automation Company**

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