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


List of Models

|  | Model |  |  |
| :---: | :---: | :---: | :---: |
|  | Rectangular | Square | Round |
| Solder terminals |  | A165K-A Series |  |
| Screwless clamp connector |  |  |  |

## 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 2.
(1) (2)
(3)

(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 |  |
| $2 S$ | 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

| Rectangula | dels |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Oil-resistant IP65 |  |  |  |  |  |
| Number of notches | Output | Reset method |  | Key release position | Model |
| 2 notches | SPDT | Manual | V | Left | A165K-J2ML-1 |
|  |  |  |  | Right | A165K-J2MR-1 |
|  |  |  |  | Left and right | A165K-J2M-1 |
|  |  | Automatic |  | Left | A165K-J2AL-1 |
|  |  |  |  | Left | A165K-J2ML-2 |
|  | DPDT | Manual |  | Right | A165K-J2MR-2 |
|  | DPDT |  |  | Left and right | A165K-J2M-2 |
|  |  | Automatic |  | Left | A165K-J2AL-2 |
| 3 notches | DPDT | Manual | $V$ | Center | A165K-J3MC-2 |
|  |  |  |  | Right | A165K-J3MR-2 |
|  |  |  |  | Left | A165K-J3ML-2 |
|  |  |  |  | Left, right, and center | A165K-J3M-2 |


| Square |  | 5 |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Oil-resista | P65 | (4) |  |  |
| 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 $\downarrow$ | Left | A165K-A2AL-1 |
|  | DPDT | Manual | Left | A165K-A2ML-2 |
|  |  |  | Right | A165K-A2MR-2 |
|  |  |  | Left and right | A165K-A2M-2 |
|  |  | Automatic $\downarrow$ | 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 |  |  |  |  |
| 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 $\quad$ | Left | A165K-T2AL-1 |
|  | DPDT |  | Left | A165K-T2ML-2 |
|  |  | Manual V | Right | A165K-T2MR-2 |
|  |  |  | Left and right | A165K-T2M-2 |
|  |  | Automatic $\quad$ | 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 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.

## Screw-less clamp connector

| Rectangular Models |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Oil-resistant IP65 |  |  |  |  |  |
| Number of notches | Output |  |  | Key release position | Model |
| 2 notches | DPDT | Manual | V | Left | A165K-J2ML-2S |
|  |  |  |  | Right | A165K-J2MR-2S |
|  |  |  |  | Left and right | A165K-J2M-2S |
|  |  | Automatic | $\nabla$ | Left | A165K-J2AL-2S |
| 3 notches | DPDT | Manual | $V$ | Center | A165K-J3MC-2S |
|  |  |  |  | Left | A165K-J3ML-2S |
|  |  |  |  | Right | A165K-J3MR-2S |
|  |  |  |  | Left, right, and center | A165K-J3M-2S |



| Number of notches | Output | Reset method |  | Key release position | Model |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2 notches | DPDT | Manual | V | Left | A165K-A2ML-2S |
|  |  |  |  | Right | A165K-A2MR-2S |
|  |  |  |  | Left and right | A165K-A2M-2S |
|  |  | Automatic | $\nabla$ | Left | A165K-A2AL-2S |
| 3 notches | DPDT | Manual | $\downarrow$ | Center | A165K-A3MC-2S |
|  |  |  |  | Right | A165K-A3MR-2S |
|  |  |  |  | Left | A165K-A3ML-2S |
|  |  |  |  | Left, right, and center | A165K-A3M-2S |



| Number of notches | Output | Reset method |  | Key release position | Model |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2 notches | DPDT | Manual | V | Left | A165K-T2ML-2S |
|  |  |  |  | Right | A165K-T2MR-2S |
|  |  |  |  | Left and right | A165K-T2M-2S |
|  |  | Automatic | $\nabla$ | Left | A165K-T2AL-2S |
| 3 notches | DPDT | Manual | $\downarrow$ | Center | A165K-T3MC-2S |
|  |  |  |  | Left | A165K-T3ML-2S |
|  |  |  |  | Right | A165K-T3MR-2S |
|  |  |  |  | Left, right, and center | A165K-T3M-2S |

## 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.

| Rectangular <br> (A165K-J) | Square <br> (A165K-A) |
| :---: | :---: | :---: | :---: |
| (A165K-T) |  |



Switches (Listed on Page 5.)

|  | Switches (Listed on Page 5.) |  |
| :---: | :---: | :---: |
| Solder terminals | PCB terminals | Screw-less clamp <br> 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 | Res |  | Key release position | Model |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { Rectangular } \\ & \text { (A165K-J) } \end{aligned}$ | 2 notches | Manual |  | (1) | A165K-J2ML |
|  |  |  |  | (1) | A165K-J2MR |
|  |  |  |  | * | A165K-J2M |
|  |  | Automatic | © | (1) | A165K-J2AL |
|  | 3 notches | Manual |  | (1) | A165K-J3MC |
|  |  |  |  | (1) | A165K-J3MR |
|  |  |  |  | (1) | A165K-J3ML |
|  |  |  |  | (*) | A165K-J3M |
|  |  | Automatic | (1) | (1) | A165K-J3AC |
| $\begin{aligned} & \text { Square } \\ & \text { (A165K-A) } \end{aligned}$ | 2 notches | Manual |  | (1) | A165K-A2ML |
|  |  |  |  | (1) | A165K-A2MR |
|  |  |  |  | * | A165K-A2M |
|  |  | Automatic | (1) | (1) | A165K-A2AL |
|  | 3 notches | Manual |  | (1) | A165K-A3MC |
|  |  |  |  | (1) | A165K-A3MR |
|  |  |  |  | (1) | A165K-A3ML |
|  |  |  |  | * | A165K-A3M |
|  |  | Automatic | (1) | (1) | A165K-A3AC |
| $\begin{aligned} & \text { Round } \\ & \text { (A165K-T) } \end{aligned}$ | 2 notches | Manual |  | (1) | A165K-T2ML |
|  |  |  |  | (1) | A165K-T2MR |
|  |  |  |  | * | A165K-T2M |
|  |  | Automatic | © | (1) | A165K-T2AL |
|  | 3 notches | Manual |  | (1) | A165K-T3MC |
|  |  |  |  | (1) | A165K-T3MR |
|  |  |  |  | (1) | A165K-T3ML |
|  |  |  |  | * | A165K-T3M |
|  |  | Automatic | (1) | (1) | A165K-T3AC |

Switches

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

Switch Units with Screw-less Clamp Connectors

| 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 |
|  |  |  |  |  |
|  |  |  |  |  |
| Degree of protection: IP40 |  |  |  |
| Color: Black |  |  |  |  |

## Tools

| Name | Appearance | Model | Applicable types |  |  |  |  | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Pushbutton Switch | Knob-type Selector Switch | Key-type Selector Switch | $\begin{gathered} \text { Emergency } \\ \text { Stop } \\ \text { Switch } \end{gathered}$ | Indicator |  |
| Screw Fitting | 1 | 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 |
| :---: | :---: |
|  |  |

Note: Two Keys are provided.

## Specifications

## Approved Standard Ratings

UL, cUL (File No. E41515)
5 A at $125 \mathrm{VAC}, 3 \mathrm{~A}$ 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: $20 \pm 2^{\circ} \mathrm{C}$
4. Operating frequency: 20 times $/ \mathrm{min}$

## Characteristics

## Socket Units

| Item Type |  | Key-type Selector Switch |
| :---: | :---: | :---: |
| Allowable operating frequency | Mechanical | 20 operations/minute max. |
|  | Electrical | 10 operations/minute max. |
| Insulation resistance |  | $100 \mathrm{M} \Omega \mathrm{min}$. (at 500 VDC ) |
| Contact resistance |  | $100 \mathrm{~m} \Omega$ max. (intial value) |
| Dielectric strength | Between terminals of same polarity | 1,000 VAC, $50 / 60 \mathrm{~Hz}$ for 1 minute |
|  | Between terminals of different polarity | 2,000 VAC, $50 / 60 \mathrm{~Hz}$ for 1 minute |
|  | Between each terminal and ground | 2,000 VAC, $50 / 60 \mathrm{~Hz}$ for 1 minute |
| Vibration resistance | Malfunction | 10 to $55 \mathrm{~Hz}, 1.5-\mathrm{mm}$ double amplitude (malfunction within 1 ms ) |
| Shock resistance | Destruction | $500 \mathrm{~m} / \mathrm{s}^{2} \mathrm{max}$. |
|  | Malfunction | $150 \mathrm{~m} / \mathrm{s}^{2} \mathrm{max}$. (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 |  | $-10^{\circ} \mathrm{C}$ to $55^{\circ} \mathrm{C}$ (with no icing or condensation) |
| Ambient operating humidity |  | $35 \%$ to $85 \%$ RH |
| Ambient storage temperature |  | $-25^{\circ} \mathrm{C} \text { to } 65^{\circ} \mathrm{C}$ <br> (with no icing or condensation) |

## Screw-less Clamp

| Item | Type | Screw-less Clamp |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Recommended wire size |  | $0.5 \mathrm{~mm}^{2}$ twisted wire or 0.8 mm -dia. solid wire |  |  |  |
| Usable wires and tensile strength | Twisted wire | $0.3 \mathrm{~mm}^{2}$ | $0.5 \mathrm{~mm}^{2}$ | $0.75 \mathrm{~mm}^{2}$ | $1.25 \mathrm{~mm}^{2}$ |
|  | 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 |  | $10 \pm 1 \mathrm{~mm}$ |  |  |  |
| Compliant standards |  | JIS C 2811 Terminal Blocks for Industrial Use |  |  |  |

## 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 $75^{\circ}$ for self-resetting models.

## 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.

Rectangular A165K $\square$-2S
Screw-Less Clamp


Panel Cutouts


Recommended panel
thickness: 0.5 to 3.2 mm

## 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/Indicators.

## 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 $0.49 \mathrm{~N} \cdot \mathrm{~m}$.


## 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 $\mathrm{mm}^{2}$ ). 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: $350^{\circ} \mathrm{C}$, within 3 s
2. Dip soldering: $350^{\circ} \mathrm{C}$, 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 $100^{\circ} \mathrm{C}$ 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 $5 \mathrm{~A}, 250 \mathrm{~V}$ 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, $\lambda 60=0.5 \times 10^{-6} /$ operations indicates that the estimated malfunction rate is less than $1 / 2,000,000$ operations with a reliability level of $60 \%$.



## Screw-less Clamp Wiring Procedure

## Connecting Wires

1. Strip the wires for 10 mm (allowable range: $10 \pm 1 \mathrm{~mm}$ ).
2. If braided wire is used, twist the wire to straighten it out
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 Wires

1. Remove wires by pulling them while pressing the release button.

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

## 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 place or drop heavy objects on the Switch.


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Omron:
A165K-A2ML-1 A165K-A2ML-2 A165K-T2M-2 A165K-T2AL-2 A165K-J2ML-2 A165K-J3M-2 A165K-T2MR-2
A165K-T3MC-2 A165K-A2AL-2 A165K-A2AL-1 A165K-A2M-2 A165K-J2AL-2 A165K-A2MR-1 A165K-A3M-2
A165K-T3ML-2 A165K-J2M-2 A165K-T2ML A165K-A2MR-2 A165K-T2ML-2 A165K-J2AL A165K-A3MAL A165K-
T3AMC A165K-J3MAC A165K-J3AMR A165K-A3AMR A165K-A3MAC A165K-A3AMC A165K-T3MA A165K-J3MA
A165K-J2MR-1 A165K-J3AM A165K-T3MAL A165K-J3AMC A165K-T3M-2 A165K-J3MAL A165K-T3MAC A165KT3AM A165K-A3AM A165K-T3AMR A165K-T3MR A165K-T3AC A165K-A3M A165K-J2M-1 A165K-KEY A165KJ3M A165K-A2M-1 A165K-J2AL-1 A165K-J3MC A165K-J3ML A165K-T3ML A165K-A3MC A165K-A2M A165K-J3ML-2 A165K-A3MR A165K-T2M-1 A165K-A3ML-2 A165K-J2MR A165K-J3MC-2 A165K-A3ML A165K-A2MR A165K-T2MR-1 A165K-T3MR-2 A165K-T3M A165K-J2MR-2 A165K-T2ML-1 A165K-J3AC A165K-A3AC A165KT2M A165K-T2MR A165K-J2ML-1 A165K-J3MR-2 A165K-A3MC-2 A165K-A2AL A165K-A2ML A165K-T2AL-1 A165K-J2M A165K-T3MC A165K-J3MR A165K-T2AL A165K-A3MR-2 A165K-J2ML A165K-T2M-2S

