# 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



 $\Lambda$ 

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

# **List of Models**

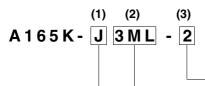
	Model							
	Rectangular	Square	Round					
Solder terminals	A165K-J Series	A165K-A Series	A165K-T Series					
Screw- less clamp connector	A165K-J Series	A165K-A Series	A165K-T Series					

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# **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	
Α	Square	Black
Т	Round	

# (2) Number of Notches/Resetting Method

•							
Symbol	No. of notches	Reset method	Key release position				
2ML			Left				
2MR	2 notches	Manual	Right				
2M	2 110101165		Left and right				
2AL		Automatic	Left				
ЗМС			Center				
3MR			Right				
3ML	3 notches	Manual	Left				
ЗМ			Left, right, and center				
3AC	3 notches	Automatic	Center				

# (3) Contact Configuration

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

Note: Only DPDT contacts are available with 3-notch 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, Switch and 2 Keys.

#### **Solder Terminals**

Rectangular Models

Oil-resistant IP65



Number of notches	Output	Reset method		Key release position	Model
				Left	A165K-J2ML-1
	SPDT	Manual	<b>/</b>	Right	A165K-J2MR-1
	3501			Left and right	A165K-J2M-1
2 notches		Automatic <	$\supset$	Left	A165K-J2AL-1
2 notches	DPDT		<u> </u>	Left	A165K-J2ML-2
		Manual		Right	A165K-J2MR-2
				Left and right	A165K-J2M-2
		Automatic	$\supset$	Left	A165K-J2AL-2
			<b>*</b>	Center	A165K-J3MC-2
O notoboo	DDDT	Manual		Right	A165K-J3MR-2
3 notches	DPDT	Iviariuai		Left	A165K-J3ML-2
				Left, right, and center	A165K-J3M-2

Square Models

Oil-resistant IP65



Number of notches	Output	Reset method		Key release position	Model
				Left	A165K-A2ML-1
	SPDT	Manual	<b>/</b>	Right	A165K-A2MR-1
	3501			Left and right	A165K-A2M-1
2 notches		Automatic <	$\Diamond$	Left	A165K-A2AL-1
2 Holdries	DPDT		V	Left	A165K-A2ML-2
		Manual		Right	A165K-A2MR-2
				Left and right	A165K-A2M-2
		Automatic <	$\Diamond$	Left	A165K-A2AL-2
			<b>\</b>	Center	A165K-A3MC-2
3 notches	DPDT	Manual		Right	A165K-A3MR-2
3 HOLLINES	וטרטו	Iviaiiuai		Left	A165K-A3ML-2
				Left, right, and center	A165K-A3M-2

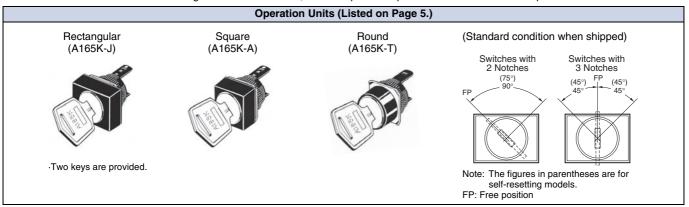
Round Models

Oil-resistant IP65

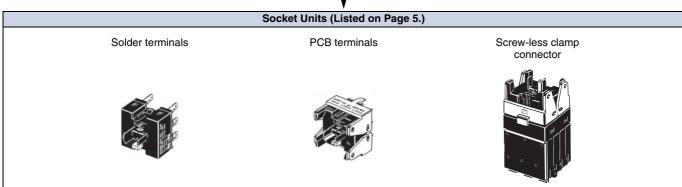


Number of notches	Output	Reset method		Key release position	Model
				Left	A165K-T2ML-1
	SPDT	Manual	$\checkmark$	Right	A165K-T2MR-1
	3501			Left and right	A165K-T2M-1
2 notches		Automatic	$\Diamond$	Left	A165K-T2AL-1
2 notches	DPDT		<u> </u>	Left	A165K-T2ML-2
		Manual		Right	A165K-T2MR-2
				Left and right	A165K-T2M-2
		Automatic	$\Diamond$	Left	A165K-T2AL-2
			<b>\</b>	Center	A165K-T3MC-2
3 notches	DPDT	Manual		Right	A165K-T3MR-2
3 notches	DPD1	Manuai		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.







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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			$\bigcirc$	A165K-J2ML
(A165K-J)	2 notches	Manual	$\bigcirc$	A165K-J2MR
	2 Holdries		$\otimes$	A165K-J2M
		Automatic 🕥	$\bigcirc$	A165K-J2AL
Ellis			1	A165K-J3MC
		Manual	Ø	A165K-J3MR
	3 notches	Manual	$\bigcirc$	A165K-J3ML
			*	A165K-J3M
		Automatic (1)	1	A165K-J3AC
Square			$\bigcirc$	A165K-A2ML
A165K-A)	2 notches	Manual	Ø	A165K-A2MR
	2 notches		$\otimes$	A165K-A2M
		Automatic 🕥	$\bigcirc$	A165K-A2AL
Elling			1	A165K-A3MC
	3 notches	Manual	Ø	A165K-A3MR
		Manual	$\bigcirc$	A165K-A3ML
			*	A165K-A3M
		Automatic (1)	(1)	A165K-A3AC
Round			$\bigcirc$	A165K-T2ML
A165K-T)	2 notches	Manual	(/)	A165K-T2MR
	2 notches		×	A165K-T2M
		Automatic (\hat{\cap})	$\bigcirc$	A165K-T2AL
			1	A165K-T3MC
Mail 1		Manual	Ø	A165K-T3MR
	3 notches	iviariuai	$\bigcirc$	A165K-T3ML
			*	A165K-T3M
		Automatic (i)	(1)	A165K-T3AC

#### **Switches**

Appearance	Classification					
≈ .		2 notches	SPDT		A16S-2N-1	
	Switch	2 Holdries	DPDT	Solder terminal	A16S-2N-2	
		3 notches	DPDT		A16S-3N-2	
			SPDT	DCD torminal	A16S-2N-1P	
		2 notches	DPDT	PCB terminal	A16S-2N-2P	

## **Switches with Screw-less Clamp**

Appearance		Model	Remarks			
	Common to standard load and microload.	DDDT	2 notches	Non lighted	A16-2S	Common to ones for pushbutton switches.
		DPDT	3 notches	<ul> <li>Non-lighted</li> </ul>	A16S-3N-2LS	

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# 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	
	The state of the s	Square	A16ZA-3003	expansion.	
		Round	A16ZT-3003	Degree of protection: IP40 Color: Black	

#### **Tools**

		Model						
Name	Appearance		Pushbutton Switch	Knob-type Selector Switch	Key-type Selector Switch	Emergency Stop Switch	Indicator	Remarks
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	COM NO		

## **Characteristics Socket Units**

		-		
Item Type		Key-type Selector Switch		
Allowable	Mechanical	20 operations/minute max.		
operating frequency	Electrical	10 operations/minute max.		
Insulation re	sistance	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 ter- minal 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/s <sup>2</sup>		
	Malfunction	150 m/s <sup>2</sup> max. (malfunction within 1 ms)		
Durability	Mechanical	250,000 operations min. (durability of key: 10,000 operations min.)		
	Electrical	100,000 operations min.		
Electric shoo	ck protection	Class II		
PTI (tracking	characteristic)	175		
Degree of co	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	Туре	Screw-less Clamp			
Recomme	nded wire size	0.5 mm² twisted wire or 0.8 mm-dia. solid wire			solid wire
Usable	Twisted wire	0.3 mm <sup>2</sup>	0.5 mm <sup>2</sup>	0.75 mm <sup>2</sup>	1.25 mm <sup>2</sup>
wires and tensile strength	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			
Complian	nt standards	JIS C 2811 Terminal Blocks for Industrial Use			

# **Operating Characteristics**

Туре	Key-type Selector Switch			
Characteristics	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 (75°)

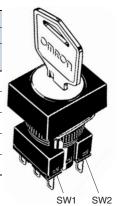




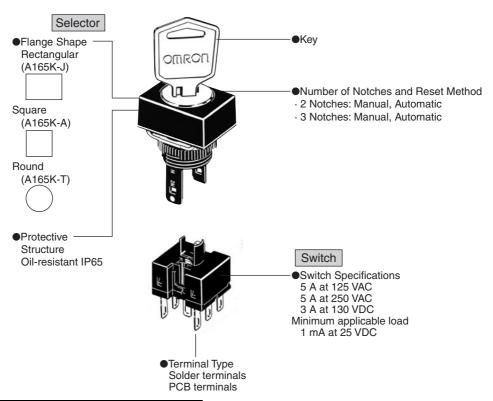
Note: The angle used for automatic reset is shown in parentheses. FP: Free position

#### **Contact Configuration**

	Contact configuration				
No. of			DPDT		
notches	Posi- tion	sw	Posi- tion	SW1	SW2
2	2 🕙 o		$\odot$	••	•
notches	$\bigcirc$	δ.	$\bigcirc$	δ.	<i>§</i> •
			$\odot$	• 6	••
notches			$\bigcirc$	90	•
			$\bigcirc$	10	\$



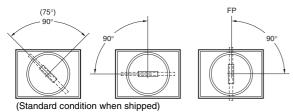
## **Model Structure**



#### 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.

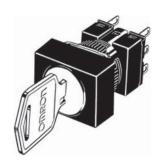
Example: Knob-type Selector Switch with Two Notches

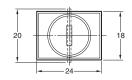


Note: The angle is 75° for self-resetting models.

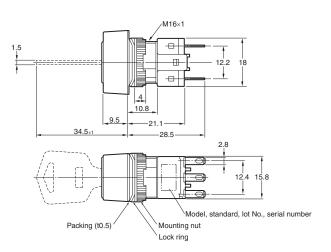
(Unit: mm)

# Rectangular A165K-J Solder terminals (tab terminals #110)





\* Refer to the A165S/W for Panel cutouts.

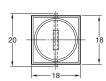


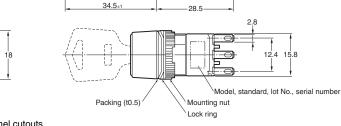
/M16×1

Square A165K-A

# Solder terminals (tab terminals #110)





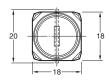


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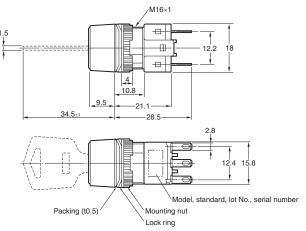
\* Refer to the A165S/W for Panel cutouts.

# Round A165K-T Solder terminals (tab terminals #110)

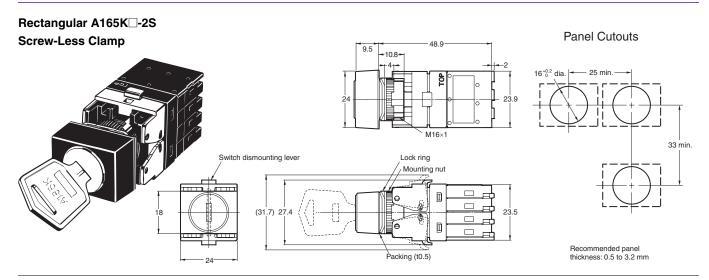




\* Refer to the A165S/W for Panel cutouts.



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)



# **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.

# **MARNING**

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 mm²). 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
- 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.

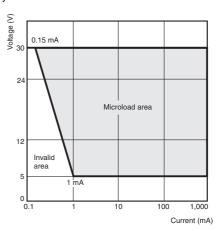
#### **Operating Environment**

• 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**

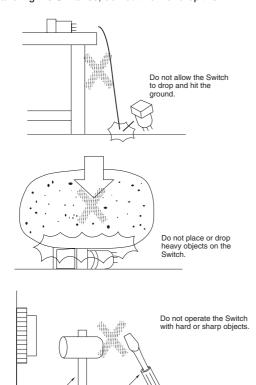
- Insert a contact protection circuit, if necessary, to prevent the reduction of life expectancy due to extreme wear on the contacts caused by loads where inrush current occurs when the contact is opened and closed.
- The A16 allows both a standard load (125 V at 5A, 250 V at 3 A) and a microload. If 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% (λ 60) (conforming to JIS C5003).

The equation,  $\lambda$  60 = 0.5 × 10<sup>-4</sup>/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.



#### Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

#### Warranty and Limitations of Liability

#### WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

#### LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

#### **Application Considerations**

#### **SUITABILITY FOR USE**

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

# PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

#### **Disclaimers**

#### **CHANGE IN SPECIFICATIONS**

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

#### **DIMENSIONS AND WEIGHTS**

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

#### PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

#### **ERRORS AND OMISSIONS**

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

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

