## A165S/W

CSM\_A165S\_W\_DS\_E\_4\_3

# **Separate Construction with Cylindrical 16-dia. Body**

- Same separate construction as the A16-series Pushbuttons with Miniature Design of 28.5 mm
- The same contacts can be used for both standard loads and microloads.
- Oil-resistant IP65 models
- Conforms to EN60947-5-1.





Refer to Safety Precautions for All Pushbutton Switches/ Indicators and Safety Precautions on page 15.

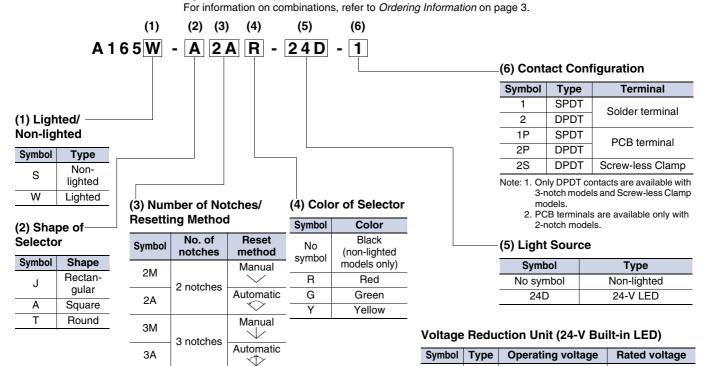
#### **List of Models**

	Model						
	Rectangular	Square	Round				
Solder terminals	A165□-J Series	A165□-A Series	A165□-T Series				
Voltage- reduction lighting	A165□-J Series	A165□-A Series	A165□-T Series				
Screw- less clamp connector	A165□-J Series	A165□-A Series	A165□-T Series				

OMRON 1

#### **Model Number Structure**

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



200/220 VAC/VDC Note: 1. Solder terminals are only available with 100-V models.

100/110 VAC/VDC

T1

T2

LED

110 VAC/VDC

220 VAC/VDC

<sup>2.</sup> The Voltage Reduction Unit is not available for models with

<sup>3. &</sup>quot;T2" is available only for the Screw-less Clamp type.

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** 

Rectangular



A165□-J

Oil-resistant IP65

No. of notches	Output	Reset method	Lighting method	Model
		Manual V	LED	A165W-J2M□-24D-1
	SPDT	Ivialiual 🗸	Non-lighted	A165S-J2M-1
	3501	Automatic 🔷	LED	A165W-J2A□-24D-1
Onatabaa		Automatic	Non-lighted	A165S-J2A-1
2 notches	DPDT	Manual 🗸	LED	A165W-J2M□-24D-2
			Non-lighted	A165S-J2M-2
		And an all a vox	LED	A165W-J2A□-24D-2
		Automatic 🗢	Non-lighted	A165S-J2A-2
3 notches	DPDT	Manual	LED	A165W-J3M□-24D-2
	וטייט	Manual 🗸	Non-lighted	A165S-J3M-2

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

Square

Oil-resistant IP65



A165□-A

No. of notches	Output	Reset method	Lighting method	Model
		Manual V	LED	A165W-A2M□-24D-1
	SPDT	Iviariuai 🗸	Non-lighted	A165S-A2M-1
	SFDT	Automatic 💙	LED	A165W-A2A -24D-1
2 notches		Automatic	Non-lighted	A165S-A2A-1
2 Holdries	DPDT	Manual 🗸	LED	A165W-A2M□-24D-2
			Non-lighted	A165S-A2M-2
		Automatic 💙	LED	A165W-A2A -24D-2
		Automatic	Non-lighted	A165S-A2A-2
3 notches	DPDT	Manual \/	LED	A165W-A3M□-24D-2
3 Holdries	וטרטו	Manual 🗸	Non-lighted	A165S-A3M-2

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

Round

**Oil-resistant IP65** 

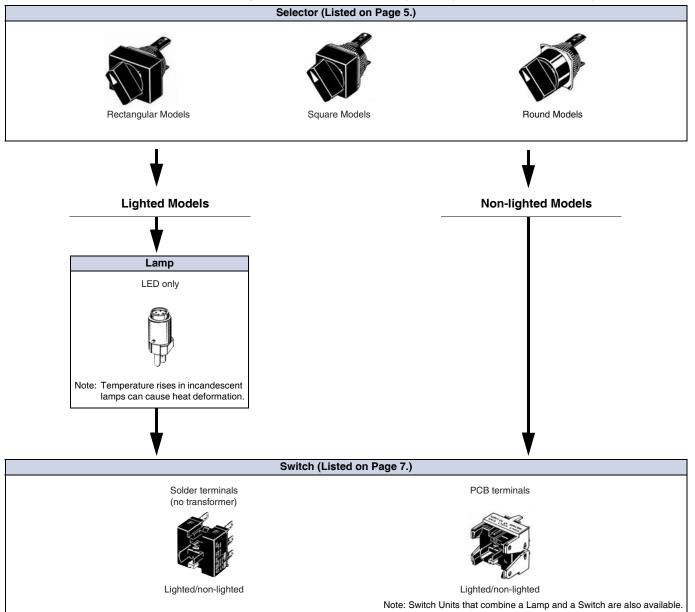


A165□-T

No. of notches	Output	Reset method	Lighting method	Model
		Manual \	LED	A165W-T2M□-24D-1
	SPDT	Manual V	Non-lighted	A165S-T2M-1
	SPDT	Automatic 💙	LED	A165W-T2A□-24D-1
2 notches		Automatic	Non-lighted	A165S-T2A-1
2 Holdries	DPDT	Manual \/	LED	A165W-T2M□-24D-2
		Maridai 🗸	Non-lighted	A165S-T2M-2
		Automatic 🔝	LED	A165W-T2A□-24D-2
3 notches		Automatic	Non-lighted	A165S-T2A-2
	DPDT	Manual 🗸	LED	A165W-T3M□-24D-2
3 Holdries	DFDT	Mariuai 🗸	Non-lighted	A165S-T3M-2

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

**Ordering Individually**........ Selectors, 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.

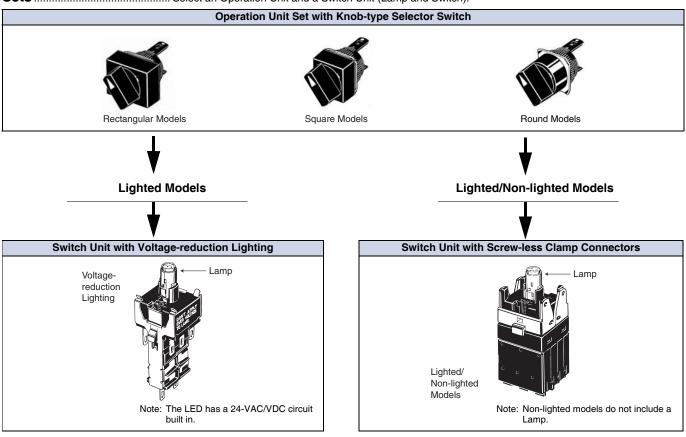


Ordering Individually ........ Selectors, Lamps, and Switches (Sockets) can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs. Selectors (Oil-resistant IP65 Models Only)

Appearance	Number of notches	Reset method	Lighting method	Model	Selector color symbol
Rectangular		Manual	LED	A165W-J2M□	
(A165□-J)	2 notches	Iviariuai	Non-lighted	A165S-J2M	Enter the desired color
	2 Holdries	Automatic 🕥	LED	A165W-J2A□	symbol for the Selec-
		Automatic	Non-lighted	A165S-J2A	tor in $\square$ .
		Manual	LED	A165W-J3M□	R (red),
	3 notches	Iviariuai	Non-lighted	A165S-J3M	Y (yellow), G (green)
	Fully		LED	A165W-J3A□	a (green)
		automatic U	Non-lighted	A165S-J3A	
Square		Manual	LED	A165W-A2M□	
(A165□-A)	2 notches	iviariuai	Non-lighted	A165S-A2M	Enter the desired color
		Automatic LED A165W-A2A sym Non-lighted A165S-A2A  Manual LED A165W-A3M	LED	A165W-A2A□	symbol for the Selec-
			Non-lighted	A165S-A2A	tor in □.
			R (red),		
	3 notches	Warraar	Non-lighted	A165S-A3M	Y (yellow), G (green)
	3 Holdries	Fully automatic	LED	A165W-A3A□	a (giccii)
		automatic U	Non-lighted	A165S-A3A	
Round		Manual	LED	A165W-T2M□	
(A165□-T)	2 notches	Iviariuai	Non-lighted	A165S-T2M	Enter the desired color
	2 Holdries	Automatic 🕥	LED	A165W-T2A□	
		Automatic	Non-lighted	LED A165W-T2A symbol for the Selector in □.  LED A165W-T3M□ R (red),	
		Manual	LED		
	3 notches	iviariuai	Non-lighted	A165S-T3M	Y (yellow), G (green)
	3 110101165	Fully (1)	LED	A165W-T3A□	G (green)
		automatic U	Non-lighted	A165S-T3A	

Note: The selector for non-lighted models is black.

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#### Switch Units (A Switch Unit includes a Switch and a Lamp.)

Appearance	Number of notches		Classification		Model
9	2 notches	SPDT			A16W-2N□-24D-1
	2 Holdnes	DPDT	24 V	Solder terminals	A16W-2N□-24D-2
	3 notches	DPDT	LT V		A16W-3N□-24D-2

#### **Switch Units with Voltage Reduction Units (Solder Terminals)**

Appearance		Classification			Model
	Standard loads and	2 notches	SPDT	400/440 \/AGA/DG	A16L-□-T1-1
	microloads	2 notches	DPDT	100/110 VAC/VDC	A16L-□-T1-2
		3 notches	DEDI		A16W-3N□-T1-2

Note: The LED has a 24-VAC/VDC circuit built in.

#### Insert one of the following letters into the box ( $\square$ ).

Symbol	Light color
R	Red
Υ	Yellow
G	Green

6

#### **Switch Units with Screw-less Clamp Connectors**

Appearance		Classification Model Model			Remarks		
				Non-lighted		A16-2S	Used for Pushbutton
		2 notches		No voltage-reduction	n lighting	A16L-∆-□-2S	Switches and
	0	DPDT	Lighted	Voltage-reduction	100/110 VAC/VDC	A16L-∆-T1-2S	Knob-type Selector
	Standard loads and			lighting	200/220 VAC/VDC	A16L-∆-T2-2S	Switches.
	microloads			Non-lighted	!	A16S-3N-2LS	
	mororodao	3 notches		No voltage-reduction	n lighting	A16W-3N∆-□-2S	
		DPDT	Lighted	Voltage-reduction	100/110 VAC/VDC	A16W-3N-∆-T1-2S	
				lighting	200/220 VAC/VDC	A16W-3N-∆-T2-2S	

Note: The 100-V models and 200-V models have a 24-VAC/VDC circuit built in.

Insert symbols in  $\Delta$  and  $\square$ .

Δ	
Symbol	Light color
R	Red
Υ	Yellow
G	Green

Symbol	Type	Operating voltage
5D		5 VDC
12D	LED	12 VAC/VDC
24D		24 VAC/VDC

### Ordering Individually Switches

Appearance		Classification					
			0	SPDT		A16S-2N-1L	
~0	Lighted		2 notches	DPDT		A16S-2N-2L	
Took.			3 notches	DPDT	Solder terminal	A16S-3N-2L	
		0 11 / 11	2 notches	SPDT	Solder terminal	A16S-2N-1	
de la	Non-lighted	Switches (without		DPDT		A16S-2N-2	
		voltage-reduction     lighting)	3 notches	DPDT		A16S-3N-2	
600	Limbtod	iigriiiig)	0	SPDT		A16S-2N-1LP	
	Lighted			DPDT	PCB terminal	A16S-2N-2LP	
	Nice Pelated		2 notches	SPDT	POB terminal	A16S-2N-1P	
	Non-lighted			DPDT		A16S-2N-2P	

#### Lamps

Operating voltage	Super-bright		
Light color	5 VDC	12 VAC/VDC	24 VAC/VDC
Red	A16-5DSR	A16-12DSR	A16-24DSR
Yellow	A16-5DSY	A16-12DSY	A16-24DSY
Green	A16-5DSG	A16-12DSG	A16-24DSG

### Accessories and Tools (Order Separately) Accessories

Name	Appearance	Classification	Model	Remarks
		Rectangular	A16ZJ-3003	Used for covering the panel cut-
Panel Plugs		Square		outs for future panel expansion.
	E L	Round	A16ZT-3003	Degree of protection: IP40

#### **Tools**

				Α	pplicable type	es		
Name	Appearance	Model	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. 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.

Ordering as a Set: Refer to page 3.

- Specifications and dimensions: Refer to pages 8 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. 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**

#### **Switch Ratings**

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 NC

#### Super-bright LED

Rated voltage	Rated current	Operating voltage	Internal limiting resistor
5 VDC		5 VDC±5%	Red, yellow: 300 $\Omega$ Green: 160 $\Omega$
12 VAC/VDC	8 mA	12 VAC/VDC±5%	Red, yellow: 1 k $\Omega$ Green: 910 $\Omega$
24 VAC/VDC		24 VAC/VDC±5%	2.4 kΩ

#### **Screw-less Clamp**

Item	Туре	Screw-less Clamp				
Recomm 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	Solid wire	0.5 mm dia.	0.8 mm dia.	1.0 mm dia.		
strength	Tensile strength	10 N	20 N	30 N	40 N	
Length of wire	exposed	10 ±1 mm				
Complia standard		JIS C 2811 Terminal Blocks for Industrial Use			ustrial Use	

#### **Operating Characteristics**

Туре	Knob-type Selector Switch		
Characteristics	2 notches	3 notches	
Operating torque (OF) max.	0.1 N·m		
Set position (SP)	90±5°	45°+10	

#### Characteristics **Socket Unit**

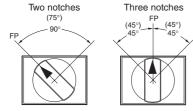
Item	Туре	Knob-type Selector Switch
Allowable	Mechanical	20 operations/minute max.
operating frequency	Electrical	10 operations/minute max.
Insulation resistance		100 MΩ min. (at 500V DC)
Contact res	sistance	100 mΩ max. (initial value)
	Between termi- nals of same polarity	1,000 VAC, 50/60 Hz for 1 min
Dielectric strength	Between ter- minals of dif- ferent polarity	2,000 VAC, 50/60 Hz for 1 min
oog	Between each terminal and ground	2,000 VAC, 50/60 Hz for 1 min
	Between lamp terminals	1,000 VAC, 50/60 Hz for 1 min*
Vibration resistance	Malfunction	10 to 55 Hz, 1.5-mm double amplitude (malfunction within 1 ms)
Shock	Destruction	500 m/s <sup>2</sup> max.
resistance	Malfunction	150 m/s <sup>2</sup> max. (malfunction within 1 ms)
Durability	Mechanical	250,000 operations min.
Durability	Electrical	100,000 operations min.
Electric she	ock protection	Class II
PTI (trackin	g characteristic)	175
Degree of o	contamination	3 (IEC60947-5-1)
Weight		Approx. 13 g (in the case of a lighted DPDT switch)
Ambient operating temperature		-10°C to 55°C (with no icing or condensation)
Ambient operating humidity		35% to 85%RH
Ambient st temperatur		-25°C to 65°C (with no icing or condensation)
* With LED not mounted		-

<sup>\*</sup> With LFD not mounted.

(Perform testing with the LED not mounted.)

#### **Specifications**

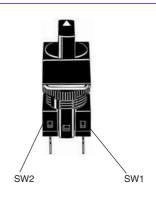
#### **Operation Angle**



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

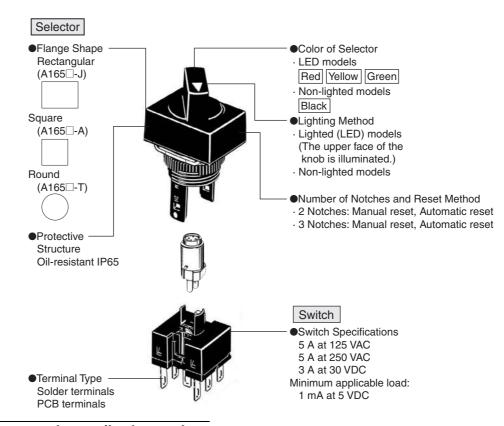
#### **Contact Form**

		Contact from			
No. of	S	PDT		DPDT	
notches	Posi- tion	sw	Posi- tion	SW2	SW1
2 notches	$\bigcirc$	••	$\bigcirc$	••	10
2 110101163	$\bigcirc$	•	$\bigcirc$	•• ••	• 6
			$\bigcirc$	•• ••	90
3 notches			$\bigcirc$	••	90
			$\bigcirc$	••	۰۶



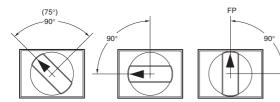
#### **Nomenclature**

#### **Model structure**



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

For information on rotating the flange, refer to page 14. Example: Knob-type Selector Switch with Two Notches



(Standard condition when shipped)

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

(Unit: mm)

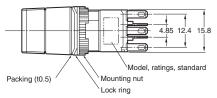
#### Rectangular A165□-J Solder terminals (tab terminals #110)







12.2 18 Lamp terminal 10.8 28.5 28.5

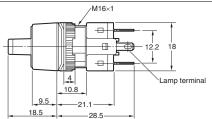


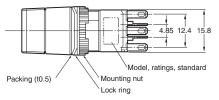
#### Square A165□-A Solder terminals (tab terminals #110)





Note: See page 12 for panel cutouts.



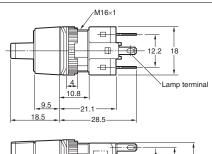


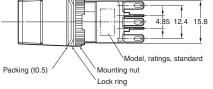
### Round A165□-T Solder terminals (tab terminals #110)





Note: See page 12 for panel cutouts.



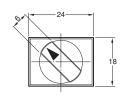


(Unit: mm)

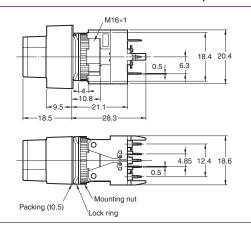
#### Rectangular A165□-J PCB terminals



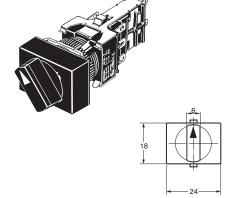
 The lamp terminal is not also provided with nonlighted models.

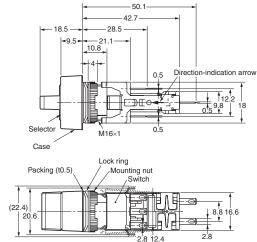


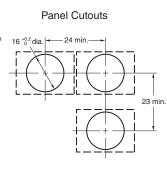
Note: See page 12 for panel cutouts.



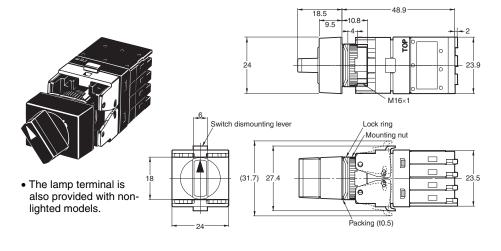
Rectangular A165W□-T Reduced-voltage lighting solder terminals (tab terminals #110)

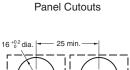






#### Rectangular A165□-2S Screw-Less Clamp

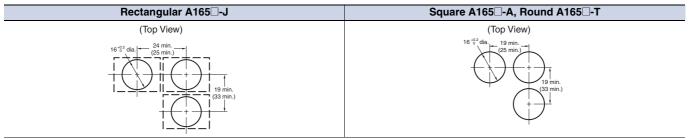




Dimensions (Unit: mm)

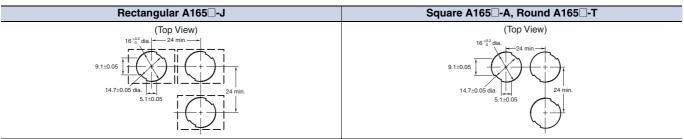
#### **Panel Cutouts**

Models with Solder Terminals and Models with Screw-less Clamp Connectors



- 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.
  - 3. Figures in parentheses are for screw-less clamp connectors.

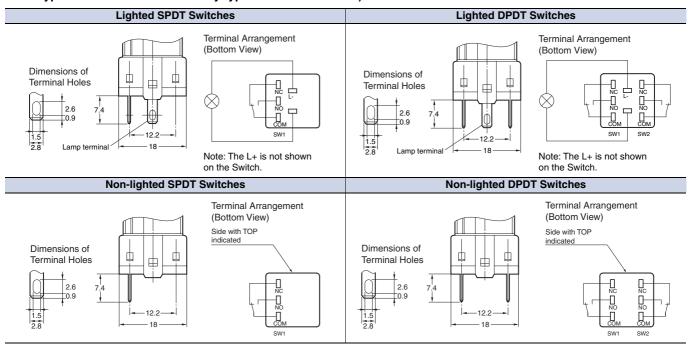
#### **Models with PCB Terminals**



- Note: 1. Ensure that the variation in the distance between the centers of neighboring mounting holes is less than  $\pm 0.1$  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.

#### **Terminal Arrangement**

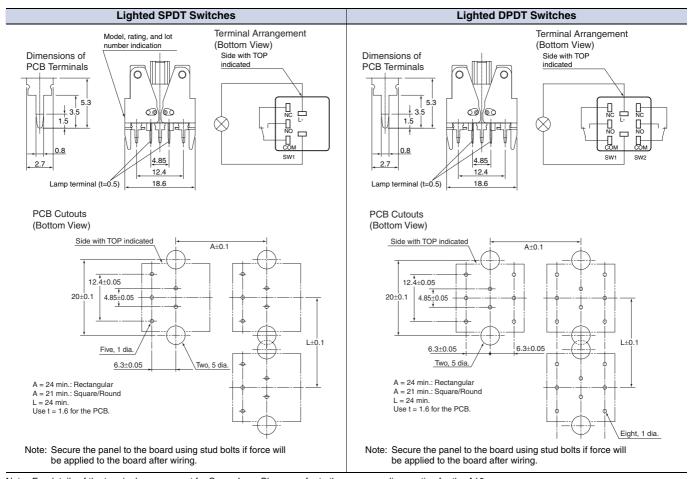
Models with Solder Terminals without Reduced-voltage Lighting (Lamp terminals are not provided with the Non-lighted Knob-type Selector Switches and Key-type Selector Switches.)



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Dimensions (Unit: mm)

#### **Models with PCB Terminals**

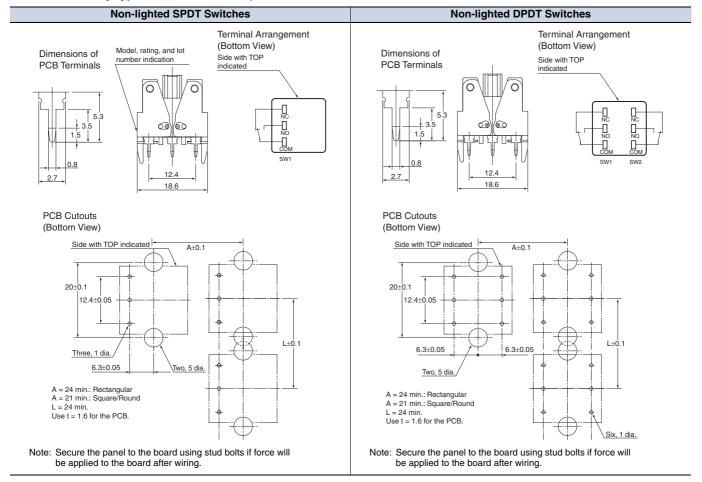


Note: For details of the terminal arrangement for Screw-Less Clamps, refer to the corresponding section for the A16.

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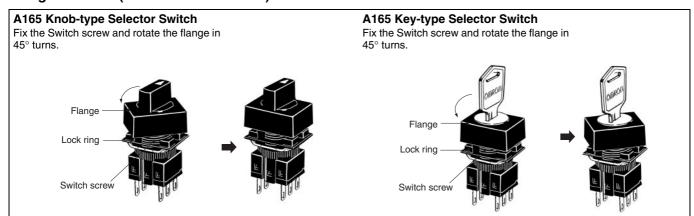
Dimensions (Unit: mm)

Non-lighted Models with PCB Terminals (Lamp terminals are not provided with the Non-lighted Knob-type Selector Switches and Key-type Selector Switches.)



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

#### Flange Rotation (All Selector Switches)



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#### **Safety Precautions**

#### Refer to Safety Precautions for All Pushbutton Switches/Indicators.

#### **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.

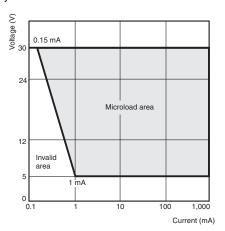
#### **Operating Environment**

 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>-6</sup>/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.



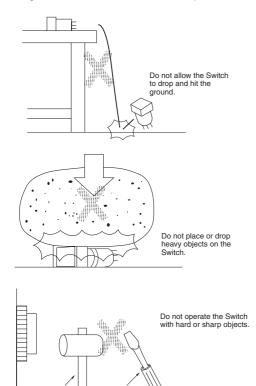
#### **LED**

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

Rated voltage	Internal limiting resistor
5 VDC	Red, yellow: 300 $\Omega$ Green: 160 $\Omega$
12 VAC/VDC	Red, yellow: 1 k $\Omega$ Green: 910 $\Omega$
24 VAC/VDC	2.4 kΩ

#### **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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