# OMRON

Lighted Pushbutton Switch | A3B

16-mm-dia. Cylindrical Series with Superb Operation, High Visibility, and Compact Housing

- Requires only 22 mm mounting depth
- All LEDs, lamps, lenses, and legends replaceable without tools
- Choice of general-purpose, or micro-voltage/current load switch
- Oil-resistant version (satisfies IP65) also available, making it ideal for machine tools subject to oil splashes
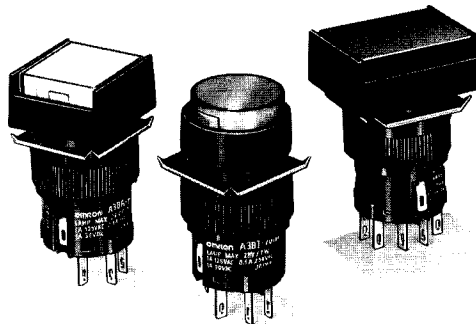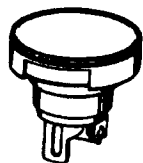
Ordering Information

Place your order for individual component parts by clearly specifying the type name, using the following information.

Lighted Pushbutton Unit

These are the ordering designations for the pushbutton unit, LED/lamp, and switch or indicator unit.
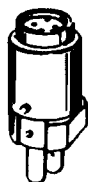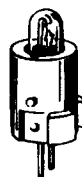
Pushbutton Unit

IP40: A3B□-500□
IP65: A3B□-510□

LED/Lamp

LED

A3B-0□□□

Incandescent Lamp

A3B-0□□

Note: Use exclusively for indicator lamp

Switch Unit

IP40	IP65
A3B□-7□□□-1	A3B□-7□□□-3
M2B□-7□□□-1	M2B□-7□□□-3
(see note)	(see note)

Non-lighted Pushbutton Unit

These are the ordering designations for the pushbutton and switch units.

Pushbutton Unit
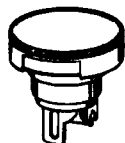
IP40: A3B□-501□
IP65: A3B□-511□
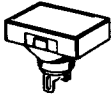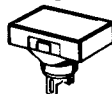
IP40: A3B□-502□
IP65: A3B□-512□

Switch Unit

IP40: A3B□-7□□□-1
IP65: A3B□-7□□□-3

Pushbutton Unit (Lighted Type)

LED

Degree of protection	IP40			IP65 (oil-tight)		
Shape Button color	Rectangular	Square	Round	Rectangular	Square	Round
Red	A3BJ-500R	A3BA-500R	A3BT-500R	A3BJ-510R	A3BA-510R	A3BT-510R
Yellow	A3BJ-500Y	A3BA-500Y	A3BT-500Y	A3BJ-510Y	A3BA-510Y	A3BT-510Y
Green	A3BJ-500GY	A3BA-500GY	A3BT-500GY	A3BJ-510GY	A3BA-510GY	A3BT-510GY
White	A3BJ-500W	A3BA-500W	A3BT-500W	A3BJ-510W	A3BA-510W	A3BT-510W

Note: With the exception of green, all pushbutton units can be used with either LED or incandescent lamps. Since the hue of green changes with and incandescent light source, use the green LED light source listed at the bottom of this page.

Incandescent Lamp

Degree of protection	IP40			IP65 (oil-tight)		
Shape Button color	Rectangular	Square	Round	Rectangular	Square	Round
Green	A3BJ-500G	A3BA-500G	A3BT-500G	A3BJ-510G	A3BA-510G	A3BT-510G
Blue	A3BJ-500A	A3BA-500A	A3BT-500A	A3BJ-510A	A3BA-510A	A3BT-510A

Note: For red, yellow and white pushbutton colors, order from the LED table above. However, use of other than an incandescent light with the green pushbutton units may render an undesirable hue of green.

Non-lighted (Standard) Type

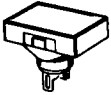| Degree of protection	IP40			IP65 (oil-tight)		
Shape Button color	Rectangular	Square	Round	Rectangular	Square	Round
Red	A3BJ-500R	A3BA-500R	A3BT-500R	A3BJ-510R	A3BA-510R	A3BT-510R
Yellow	A3BJ-500Y	A3BA-500Y	A3BT-500Y	A3BJ-510Y	A3BA-510Y	A3BT-510Y
Green	A3BJ-500G	A3BA-500G	A3BT-500G	A3BJ-510G	A3BA-510G	A3BT-510G
White	A3BJ-500W	A3BA-500W	A3BT-500W	A3BJ-510W	A3BA-510W	A3BT-510W
Blue	A3BJ-500A	A3BA-500A	A3BT-500A	A3BJ-510A	A3BA-510A	A3BT-510A
Black	A3BJ-500B	A3BA-500B	A3BT-500B	A3BT-510B	A3BT-510B	A3BT-510B

Mushroom Type

Degree of protection	IP40			IP65 (oil-tight)		
Shape Button color	Rectangular	Square	Round	Rectangular	Square	Round
Red	A3BJ-502R	A3BA-502R	A3BT-502R	A3BJ-512R	A3BA-512R	A3BT-512R
Yellow	A3BJ-502Y	A3BA-502Y	A3BT-502Y	A3BJ-512Y	A3BA-512Y	A3BT-512Y
Green	A3BJ-502G	A3BA-502G	A3BT-502G	A3BJ-512G	A3BA-512G	A3BT-512G
White	A3BJ-502W	A3BA-502W	A3BT-502W	A3BJ-512W	A3BA-512W	A3BT-512W
Blue	A3BJ-502A	A3BA-502A	A3BT-502A	A3BJ-512A	A3BA-512A	A3BT-512A
Black	A3BJ-502B	A3BA-502B	A3BT-502B	A3BT-512B	A3BT-512B	A3BT-512B

Indicator

LED

Rated voltage Color	5 VDC	12 VDC	24 VDC
Red	A3B-005R	A3B-012R	A3B-024R
Yellow	A3B-005Y	A3B-012Y	A3B-024Y
Green (see note)	*A3B-005G*	*A3B-012G*	*A3B-024G*
White	A3B-005W	A3B-012W	A3B-024W

Note: Green LEDs must be used with green LED-type pushbutton units to avoid an undesirable hue change.

Incandescent Lamp

Rated voltage	6 V	14 V	28 V
Model	A3B-006	A3B-014	A3B-028

Switch Unit (can be used for both lighted and non-lighted pushbutton units, except indicator)

IP40 Protection

Application	Contacts	Switch action	Termi-nal	Rectangular	Square	Round
General-purpose	SPST-NO + SPST-NC	Momentary	Solder	A3BJ-7011-1	A3BA-7011-1	A3BT-7011-1
		Alternate		A3BJ-7021-1	A3BA-7021-1	A3BT-7021-1
	DPST-NO + DPST-NC	Momentary		A3BJ-7031-1	A3BA-7031-1	A3BT-7031-1
		Alternate		A3BJ-7041-1	A3BA-7041-1	A3BT-7041-1
Microload	SPST-NO + SPST-NC	Momentary		A3BJ-7111-1	A3BA-7111-1	A3BT-7111-1
		Alternate		A3BJ-7121-1	A3BA-7121-1	A3BT-7121-1
	DPST-NO + DPST-NC	Momentary		A3BJ-7131-1	A3BA-7131-1	A3BT-7131-1
For indication (without switch unit)				M2BJ-7001-1	M2BA-7001-1	M2BT-7001-1

Models A3BP and A3BK are available in micro-load, and indication types.

IP65 (oil-tight) Protection

Application	Contacts	Switch action	Termi-nal	Rectangular	Square	Round
General-purpose	SPST-NO + SPST-NC	Momentary	Solder	A3BJ-7011-3	A3BA-7011-3	A3BT-7011-3
		Alternate		A3BJ-7021-3	A3BA-7021-3	A3BT-7021-3
	DPST-NO + DPST-NC	Momentary		A3BJ-7031-3	A3BA-7031-3	A3BT-7031-3
		Alternate		A3BJ-7041-3	A3BA-7041-3	A3BT-7041-3
Microload	SPST-NO + SPST-NC	Momentary		A3BJ-7111-3	A3BA-7111-3	A3BT-7111-3
		Alternate		A3BJ-7121-3	A3BA-7121-3	A3BT-7121-3
	DPST-NO + DPST-NC	Momentary		A3BJ-7131-3	A3BA-7131-3	A3BT-7131-3
		Alternate		A3BJ-7141-3	A3BA-7141-3	A3BT-7141-3
For indication (without switch unit)				M2BJ-7001-3	M2BA-7001-3	M2BT-7001-3

Models A3BP and A3BK are available in micro-load, and indication types.

Note: 1. These switch units usually are mounted with a nut. However, an optional leaf spring for snap-in mounting is also available.

2. The switch unit bears UL and CSA markings to indicate the standards by which the switch unit is recognized. The SEV marking can also be marked on the switch unit, if requested.

Specifications

■ Contact Ratings

| Type	AC resistive load	DC resistive load
General purpose	0.5 A, 250 VAC 1 A, 125 VAC	1 A, 30 VDC
Micro voltage/current load (see note)	0.1 A, 125 VAC	0.1 A, 30 VDC

Note: The minimum permissible load is 1 mA at 5 VDC.

■ LED Ratings

Rated voltage	Rated current	Operating voltage
5 VDC	30 mA	5 VDC ± 5%
14 VDC	15 mA	12 VDC ± 5%
24 VDC	10 mA	24 VDC ± 5%

■ Lamp Ratings

Rated voltage	Rated current	Operating voltage
6 V	60 mA	5 V
14 V	40 mA	12 V
28 V	24 mA	24 V

Applicable Load Range
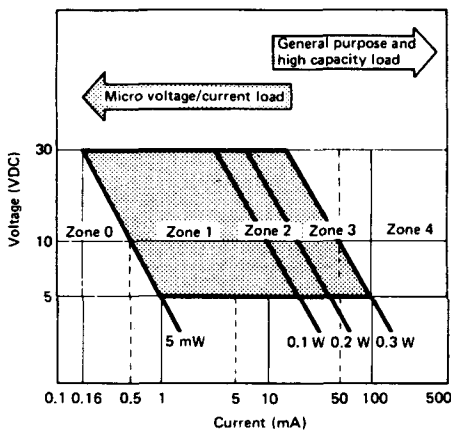
Note: The load range shown above is applicable only during the standard conditions.

■ Characteristics

Operating frequency	Mechanical: Momentary-action type: 120 operations per minute max.
	Alternate-action type: 60 operations per minute max.
	Electrical: 20 operations per 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 also between each terminal and ground
Vibration	Mechanical/malfunction durability: 10 to 55 Hz, 1.5 mm double amplitude
Shock	Mechanical durability: 500 m/s^2 (approx. 50 G)
	Malfunction durability: 150 m/s^2 (approx. 15 G)
Ambient temperature	Operating: −10° to 55°C
Humidity	35 to 85% RH
Life expectancy	Mechanical: Momentary-action type: 2,000,000 operations min.
	Alternate-action type: 100,000 operations min.
	Electrical: See "ENGINEERING DATA"
Weight	Approx. 7 g

Note: The weight indicated is for the lighted type (DPST-NO + DPST-NC).

■ Operating Characteristics

| Model	A3B☐-7☐☐☐-1		A3B☐-7☐☐☐-3	
Contacts	SPST-NO + SPST-NC	DPST-NO + DPST-NC	SPST-NO + SPST-NC	DPST-NO + DPST-NC
OF max.	250 g	350 g	400 g	500 g
RF min.	30 g			
TT	Approx. 3.5 mm			
LTA min. (see note)	0.5 mm			
PT max.	2.5 mm			

Note: LTA denotes the distance from the free position (FP) to where the actuator locks after it reaches the operating position (OP).

Approved by Standards
UL (File No. E41515)
CSA (File No. LR45258)
Rating: General-purpose type
3 A, 250 VAC
5 A, 125 VAC
1 A, 30 VDC
Microvoltage/current load type
0.1 A, 125 VAC
0.1 A, 30 VDC

Engineering Data ——————————————————————————

Electrical Service Life
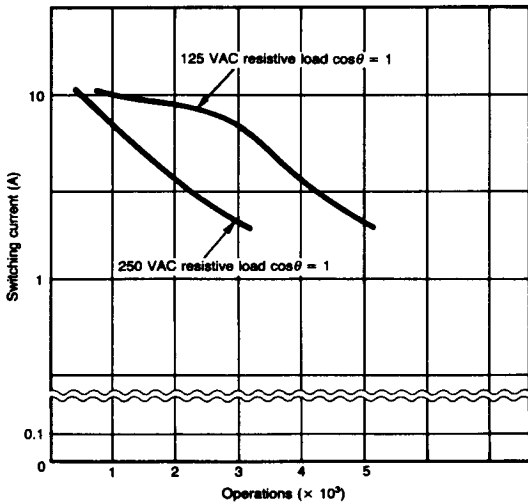
Dimensions

The following dimensions are applicable to the switch units with solder terminals, and SPST-NO + SPST-NC contact configuration. Unless otherwise specified, a tolerance of ± 0.4 mm applies to all the dimensions.

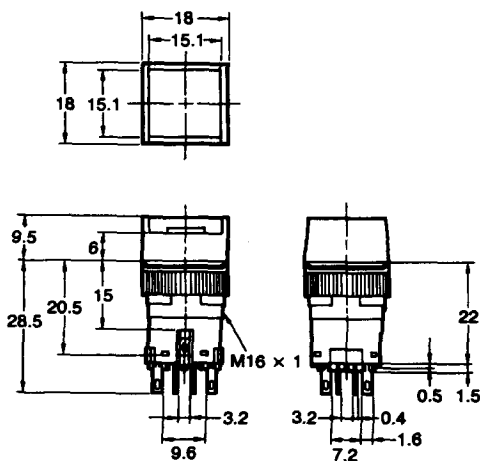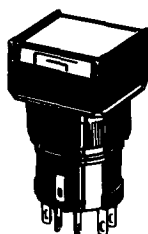### A3BJ (M2BJ), with Standard Pushbutton Unit
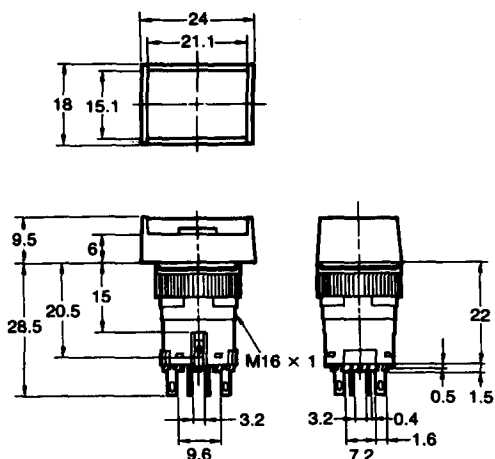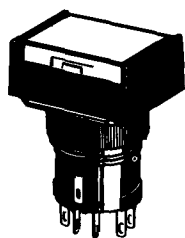
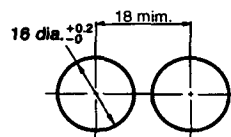### Panel Cutout (for Mounting Switch Unit Only) (Top View)
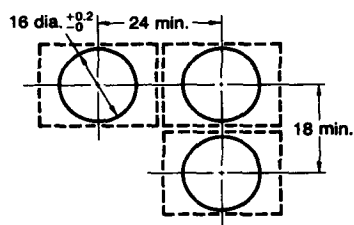
Note:
1. Recommended panel thickness is 1.0 to 3.2 mm.
2. Use an optional leaf spring to snap-in mount the switch. At this time, the panel cutout should be 16.2 dia. + 0.3, − 0 mm.
3. Use sockets when mounting many switch units in a matrix.

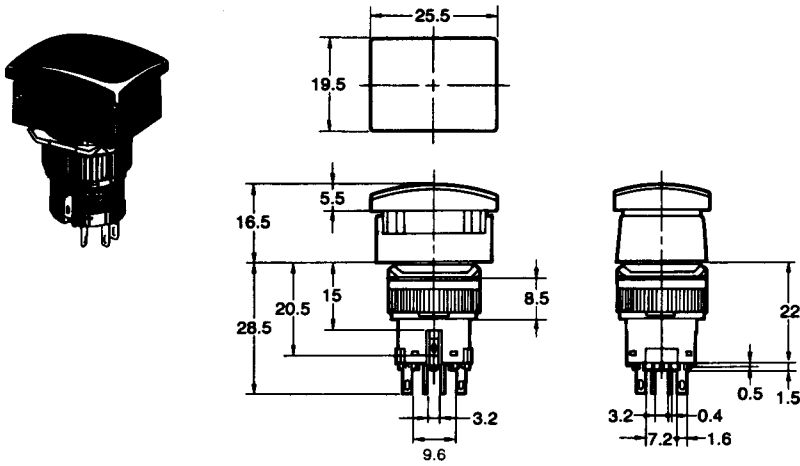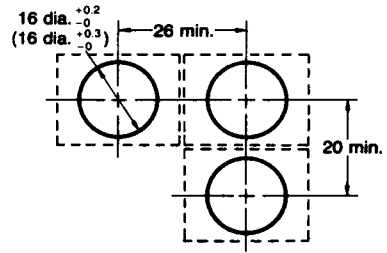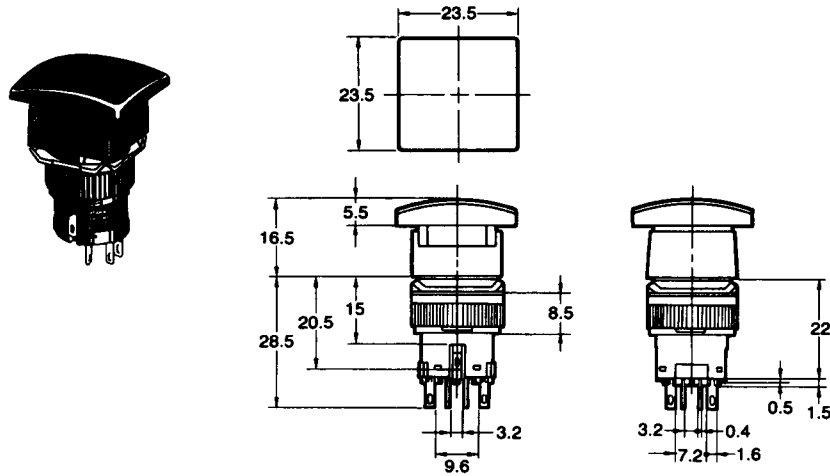### A3BA (M2BA), with Standard Pushbutton Unit

Panel Cutout (Top View)

Note:
1. Recommended panel thickness is 1.0 to 3.2 mm.
2. Use sockets when mounting many switch units in a matrix.
3. A switch guard and dust-protective cover cannot be attached.

A3BT (M2BT), with Standard Pushbutton Unit

20

A3BJ, with Mushroom Pushbutton Unit

25.5
19.5

5.5
16.5
20.5 15 8.5
28.5
22
0.5 1.5
3.2
3.2 0.4
9.6
7.2 1.6

16 dia. $^{+0.2}_{-0}$
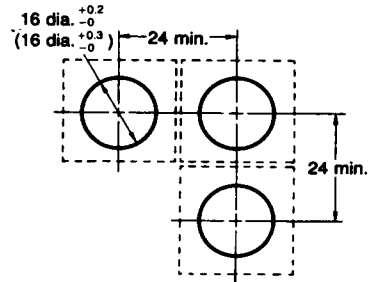(16 dia. $^{+0.3}_{-0}$)
26 min.
20 min.

Note: 1. Recommended panel thickness is 1.0 to 3.2 mm.

2. Use sockets when mounting many switch units in a matrix.
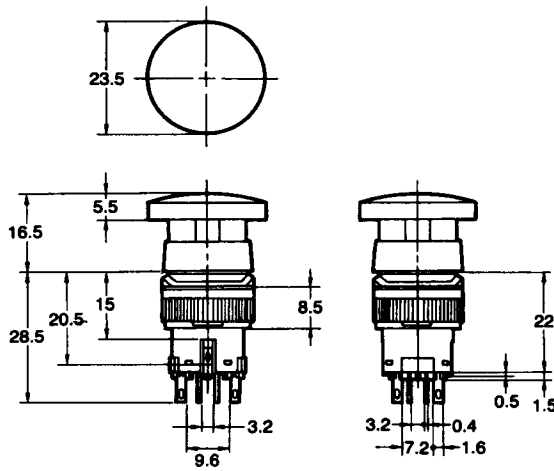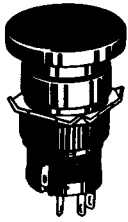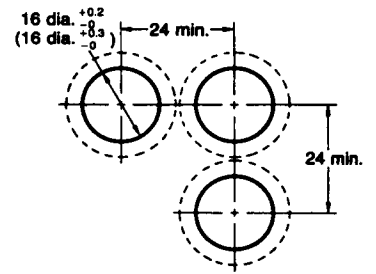
A3BA, with Mushroom Pushbutton Unit

Panel Cutout (Top View)

23.5
23.5

5.5
16.5
20.5 15 8.5
28.5
22
0.5 1.5
3.2
3.2 0.4
9.6
7.2 1.6

16 dia. $^{+0.2}_{-0}$
(16 dia. $^{+0.3}_{-0}$)
24 min.
24 min.

Note: 1. Recommended panel thickness is 1.0 to 3.2 mm.

2. Use sockets when mounting many switch units in a matrix.

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A3BT, with Mushroom Pushbutton Unit
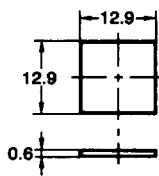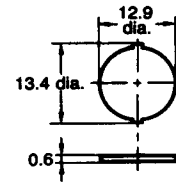
Panel Cutout (Top View)

23.5

16 dia. $^{+0.2}_{-0}$
(16 dia. $^{+0.3}_{-0}$) 24 min.

24 min.

5.5
16.5
15
20.5
28.5
8.5
22
0.5 1.5
3.2
3.2 0.4
7.2 1.6
9.6

Note: 1. Recommended panel thickness is 1.0 to 3.2 mm.
2. Use sockets when mounting many switch units in a matrix.

Legend Plate
A3BJ

18.9
12.9
0.6

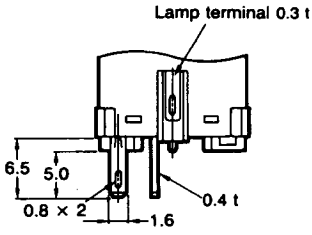**A3BA**

12.9
12.9
0.6

A3BT

12.9 dia.
13.4 dia.
0.6
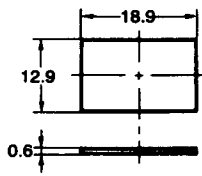
Note: 1. Recommended panel thickness is 0.6 mm.
2. The materials used in the switches are polycarbonate resin (in the products satisfying (P40) and polyacrylate resin (in the products satisfying (P65).
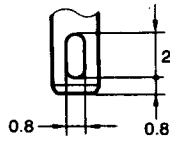
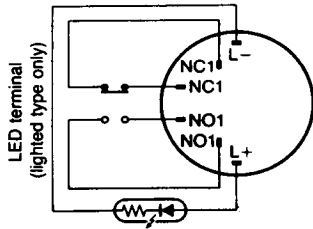# Terminal and Terminal Arrangement

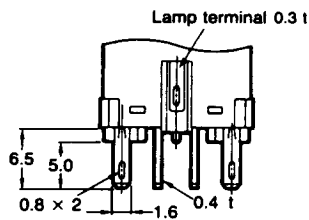## Solder Terminals

SPST-NO + SPST-NC Lighted Type

Lamp terminal 0.3 t

6.5 5.0
0.8 × 2 — 1.6 0.4 t

Terminal Hole

2
0.8 — 0.8

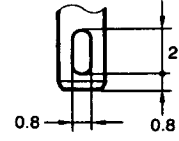**Terminal Arrangement (Bottom View)**

LED terminal (lighted type only)

NC1 L−
NC1
NO1
NO1 L+

DPST-NO + DPST-NC Lighted Type
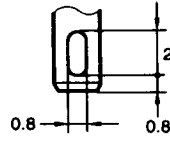
Lamp terminal 0.3 t

6.5 5.0
0.8 × 2 — 1.6 0.4 t

Terminal Hole

2
0.8 — 0.8

Terminal Arrangement (Bottom View)

NC1 L− NO2
NC1 NO2
NO1 NC2
NO1 L+ NC2

Lighted Type

Lamp terminal 0.3 t

Terminal Hole

2
0.8 — 0.8

Terminal Arrangement (Bottom View)

L−

L+
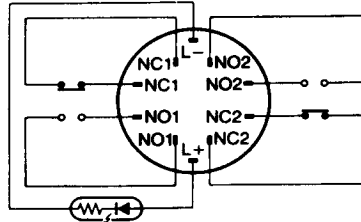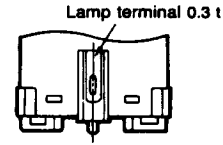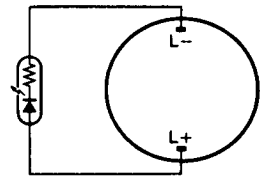
Accessories (Order Separately)

| Name	Shape	Classification		Model	Remarks
Socket		Wire-wrap terminal		A3B-4101	Cannot be used with insulation cover
		PCB terminal		A3B-4102	
		Solder terminal		A3B-4103	
Switch Guard		Rectangular		A3BJ-5050	Cannot be used with protective cover Cannot be used for A3BP switch unit
		Square, round		A3BA-5050	
Protective Cover		Rectangular		A3BJ-5060	Cannot be used with protective cover Cannot be used for A3BP switch unit
		Square		A3BA-5060	
		Round		A3BT-5060	
Snap-in Mounting Leaf Spring		---		A3B-3001	Cannot be used with mounting nut
Insulation Cover		---		A3B-3002	Cannot be used with socket
Panel Plug		Rectangular		A3BJ-3003	To reserve a hole cut out on a panel for future mounting
		Square		A3BA-3003	
		Round		A3BT-3003	
Tightening Tool		---		A3B-3004	Useful for mounting switch units one after another. Do not over-tighten.
Legend Plate		Rect-angular	IP40 (white)	A3BJ-5201	One legend plate is supplied with the standard unit.
			IP40 (transparent)	A3BJ-5202	
			IP65 (transparent)	A3BJ-5203	
		Square	IP40 (white)	A3BA-5201	
			IP40 (transparent)	A3BA-5202	
			IP65 (transparent)	A3BA-5203	
		Round	IP40 (white)	A3BT-5201	
			IP40 (transparent)	A3BT-5202	
			IP65 (transparent)	A3BT-5203	
Puller		---		A3PJ-5080	Aids in getting a non-slip grip when removing keytops

Dimensions with Accessories Attached

Dimensions with Socket Mounted

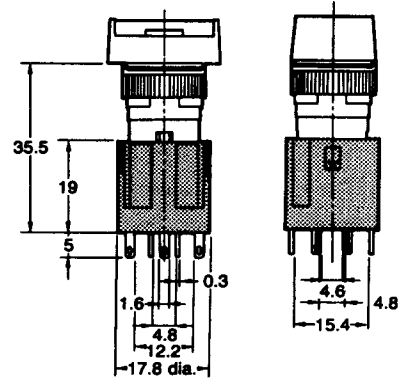The following dimensions are applicable to the rectangular type.
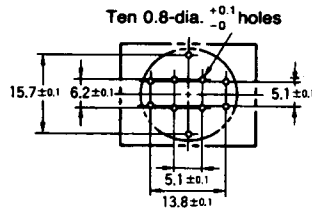
Wire-wrap Terminal
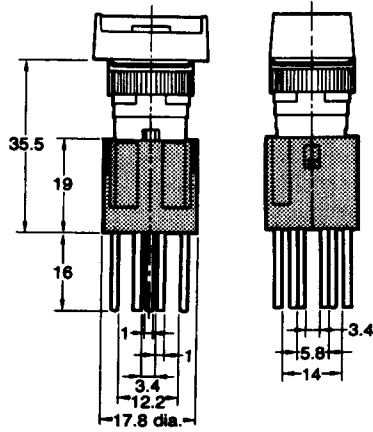
PCB Terminal
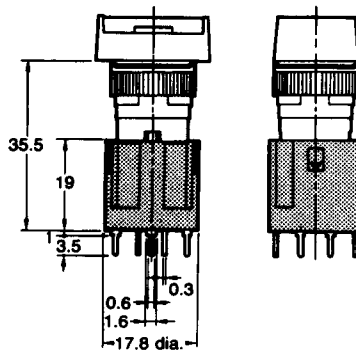
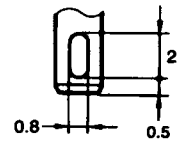**Solder Terminal**

Mounting Hole (Bottom view)
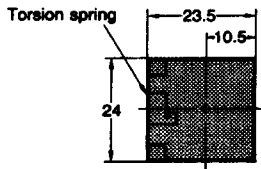

Ten 0.8-dia. $^{+0.1}_{-0}$ holes
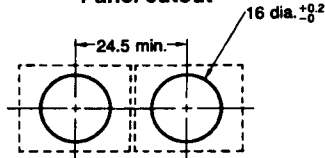
Terminal Hole

Note: When mounting the socket, the side of the socket groove is the L + terminal side.

Dimensions with Switch Guard Attached
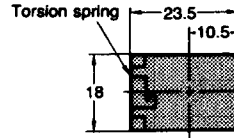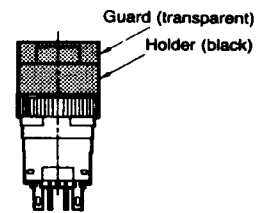
Rectangular

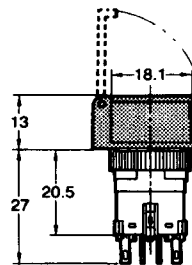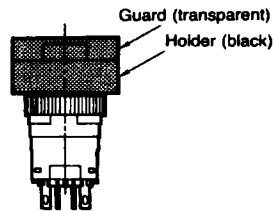

Torsion spring

Panel cutout

16 dia. $^{+0.2}_{-0}$

Square, Round

Torsion spring

Panel Cutout

16 dia. $^{+0.2}_{-0}$

Guard (transparent)
Holder (black)

Guard (transparent)
Holder (black)

25

Dimensions with Protection Cover Attached

Rectangular

Panel cutout

31 min.
16 dia.$^{+0.2}_{-0}$
24
30
25 min.

13.8
20.5
27

Cover A (transparent)
Cover B (black)

Square

Panel Cutout

25 min.
16 dia.$^{+0.2}_{-0}$
24
24
25 min.

13.8
20.5
27

Cover A (transparent)
Cover B (black)

Round

Panel Cutout

24 dia.
25 min.
16 dia.$^{+0.2}_{-0}$
25 min.

13.8
20.5
27

Cover A (transparent)
Cover B (black)

Tightening Tool
A3B-3004

60
2
18 dia.
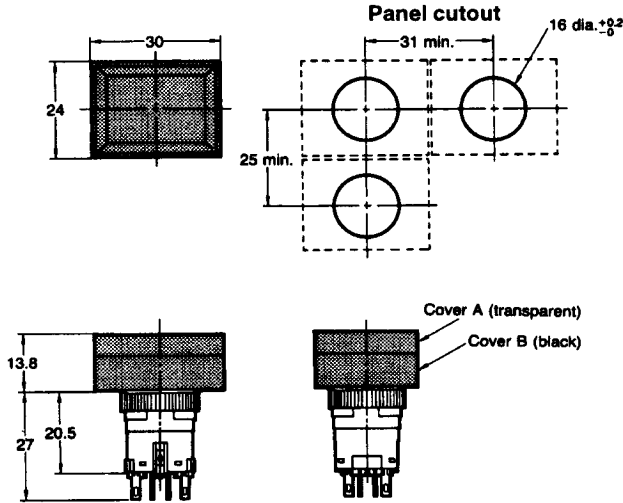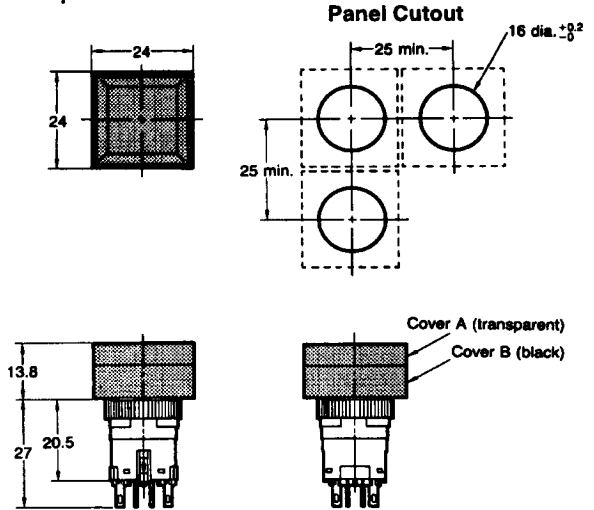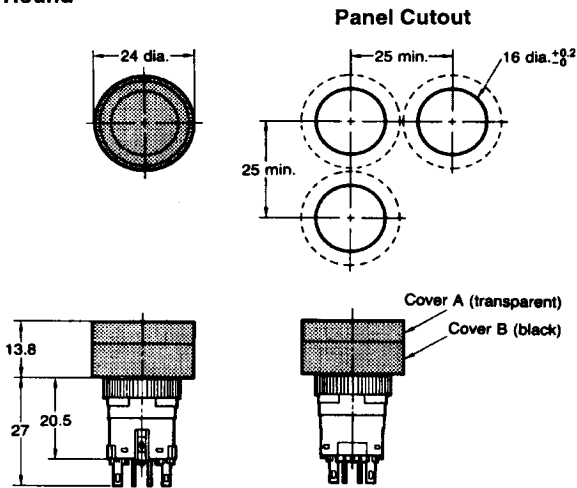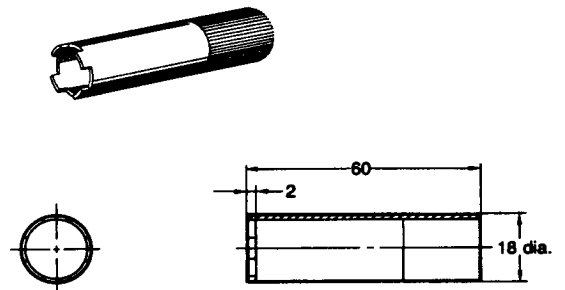
Dimensions with Insulation Cover Attached

The following dimensions are applicable to the rectangular pushbutton unit.

36
19.5
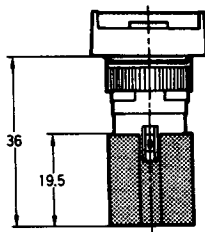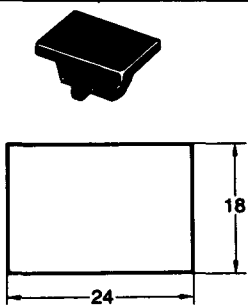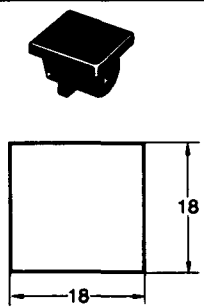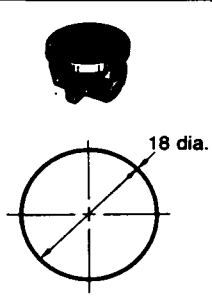
After mounting the switch unit on a panel, and after tightening the mounting nut, insert the lead wires into the hole on the insulation cover before wiring. Align the insulation cover so that the cylindrical portion of the insulation cover will face the switch unit. This means that the lead wires will be inserted from the barrier side of the insulation cover. After wiring has been completed, slide the insulation cover over the switch unit.

Panel Plug

Select a panel plug which best compliments the design of the mounting panel.
The dimensions of the hole cutout for the panel plugs are the same as those of the switch unit.

Rectangular	Square	Round
18 / 24	18 / 18	18 dia.

# Assembly/Disassembly

Mounting and Replacing Pushbutton Unit

Mounting Directions for the LED/Lamp and Pushbutton Unit

The OMRON pushbutton unit doubles the roles in which a pushbutton switch is normally used. The pushbutton unit may be inserted one of two ways:

1. For operation as a lighted pushbutton switch, fit the LED/lamp so that its guide projection is inserted into the wider opening in the receptacle of the pushbutton unit.


LED/lamp guide
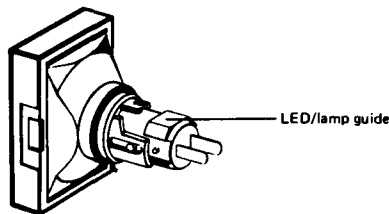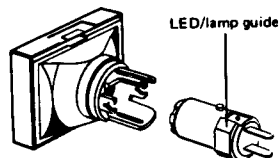
LED/lamp guide

2. For operation as an indicator unit, insert the LED/lamp guide projection into the narrower opening in the indicator unit's receptacle.

LED/lamp guide

Groove of the indicator unit

Projection of the LED/lamp
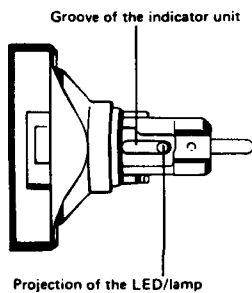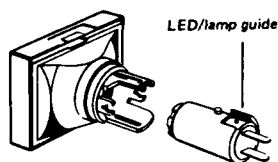
Removing the Pushbutton Unit

With your thumb and forefinger, while holding the recessed portions on both sides, firmly and steadily pull out the top of the pushbutton unit. Pulling out the cap with pliers or a similar tool will damage the cap.

Recess
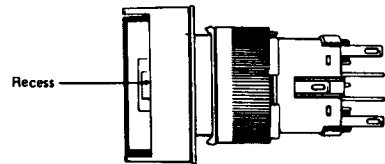
Mounting Switch Unit on Panel

Nut Mounting

- Insert the switch unit from the front of the panel (a rubber seal is provided for the IP65 type only) and tighten the mounting nut inserted from the rear of the panel.

- Since a projection exists on the rear portion of the switch unit, if the mounting nut cannot be fitted into position, turn the nut slightly.

- The tightening torque of the mounting nut should be less than 5 kg-cm.

- Solder the terminals after mounting the nut. Otherwise, the terminals, when thickened by solder, may prevent the nut from being screwed down onto the switch unit.

Panel Groove Mounting nut
Projection
Stopper
Edge
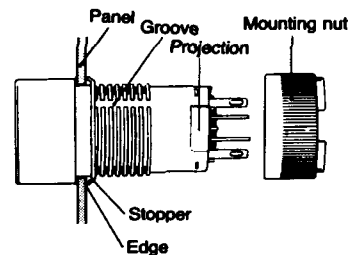
Snap-in Mounting

- Fit the spring mounting clip for snap-in mounting to the switch unit.

- Insert the tab of the spring mounting clip into the two grooves on the threaded part of the switch unit.

- Be sure to use two spring mounting clips. Ensure that each tab is firmly inserted into the grooves.

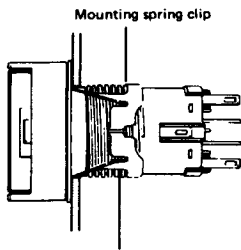- Do not use the spring mounting clips for the switch unit conforming to IP65. The rubber seal may not be held in close enough contact to prevent the inflow of liquid. Use a nut to secure the switch.
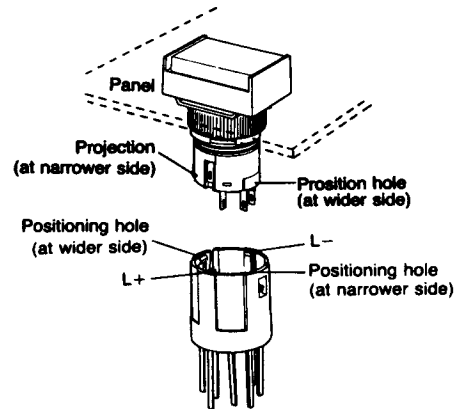

Mounting spring clip
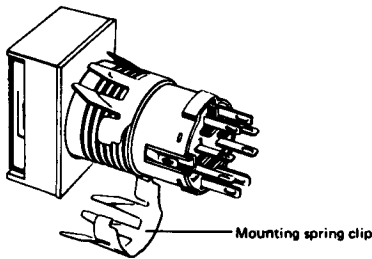
- Insert the switch unit from the front of the panel, and push until the clips are heard to snap into place.

Mounting spring clip

Push the tab of the spring mounting clips firmly into the grooves.

Socket Mounting

- After mounting the switch unit on the panel, secured by the mounting nut, attach the socket to the switch unit.

- In doing so, make sure that the projection (at the side) on the switch unit fits the positioning hole (at the wider side) of the socket.
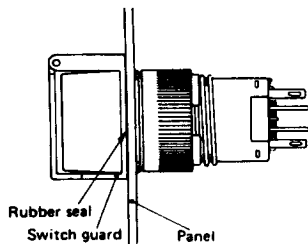

Panel

Projection (at narrower side)

Prosition hole (at wider side)

Positioning hole (at wider side)

L−

L+

Positioning hole (at narrower side)

Hints on Correct Use

Soldering

When soldering, quickly complete the heating operation, Apply a 30 W soldering iron for 5 seconds or less, or for 3 seconds if the tip temperature is 240°C. Do not apply any external force on the switch for 1 minute after soldering to avoid possible plastic deformation.

Mounting with Switch Guard

With the switch guard first inserted into the hole of the mounting panel, insert the switch and secure it with a mounting nut. In an application where IP65 must be satisfied, be sure to also use the rubber seal.

Rubber seal

Switch guard   Panel

Seal Cover Mounting

First insert the switch in the mounting bracket of the seal cover. Mount the switch in the panel, and secure it with a mounting nut. Finally, attach the seal cover to the mounting bracket. In an application where IP65 must be satisfied, be sure to insert the rubber seal between the mounting bracket and the panel.

Panel

Cover   Mounting bracket   Rubber seal
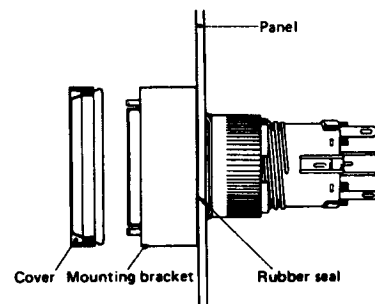
ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A26-E1-3