Stylish and Functional

IDEC's extensive range of LB/LBW series switches can be used for a wide range of applications.

Flush Silhouette

Flush Silhouette
Projects only 2mm from the panel surface. For sleek and refined style.

2mm

LB Series Flush Silhouette Switches
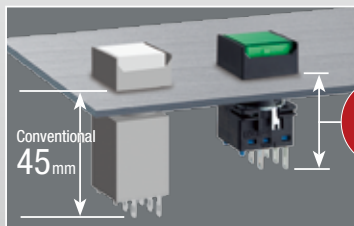Slim 2mm-thick bezels for stylish panels.

LBW Series Flush Silhouette Switches
Smart appearance with large surface for secure operation.

LB Series Bezel ø22/□22mm

LBW Series Bezel ø26/□26mm

Control Unit

ø16mm LB Series Miniature Switches and Pilot Lights
Short body for space-saving installation.

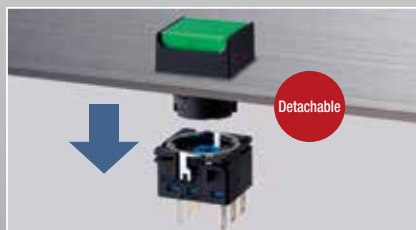Conventional 45mm

27.9 mm

Short Body
Depth of only 27.9mm behind panel. Reduces the size of machines and control panels.
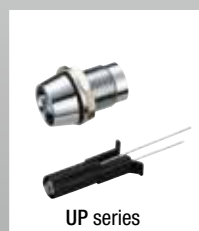
Compact

Flush Silhouette & Control Unit

Removable Contact Block /Single Board Mounting
Removable contacts enable easy wiring / Single board mounting for space-saving installation.

Detachable

UP series

Separate & One Board

UP series has the same depth as LB/LBW series. Mounts on the same panel.
(Flush bezel: 34.9mm, standard bezel: 27.9mm)

Waterproof
Degree of protection: IP65

Waterproof

ø16 LB-SERIES

Miniature Switches and Pilot Lights
(Standard Bezel)

Short
Shortest in the industry (as of February 2011)

Panel depth of only 27.9mm.
Removable contact blocks ideal for single board mounting.
Protection degree: IP65 (IEC 60529)

point For space-saving installation

∗ Panel cutout (mm)

Actual Size
27.9mm

Round ø16.2∗ Square □16.2∗ Rectangular 16.2×24∗

Illuminated Pushbuttons

Pushbuttons
Marking plates can be used with lens style pushbuttons
*Does not light on.

With 3-sided barrier

Pilot Lights

With 3-sided barrier

Dome Pilot Lights

Selector Switches
2- and 3-position selector switches.
Maintained and other various spring return actions available.
*Photo: knob operator (lever operator also available)
Illuminated selector switches available

Key Selectors ensure safety

Wave Key

Seven different keys to choose from.
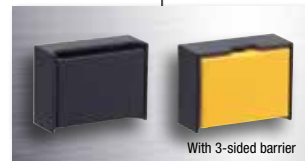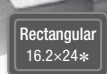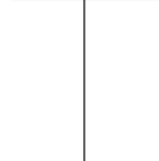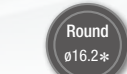Key removable in desired positions.

Buzzers
Steady sound at 80 dB minimum (at 0.1m)
IP54 tab terminals, PC board terminal, and IP40 solder terminals available.

IP54   IP40
Terminal side   Terminal side

Lever Switches
Degree of protection: IP67
Up/down operation.
2- and 3-positions available.
For 3-position switches, maintained and return two-way actions available.

Illuminated Pushbutton Color Variations »
R (red) G (green) Y (yellow) A (amber) S (blue) PW (pure white)

Pushbutton Color Variations »
B (black) G (green) R (red) Y (yellow) S (blue) W (white)

Buzzers

Specifications

Rated Insulation Voltage	30V
Rated Operating Voltage	12, 24V DC
Operating Voltage Range	12V DC±10%, 24V DC±10%
Current Draw	26mA
Inrush Current	80mA maximum
Sound Pressure (at 0.1m)	Steady sound: 80 dB minimum (at the rated voltage)
Sound Frequency	2.3±0.3kHz
Response Speed	50 ms maximum
Operating Temperature	−25 to +60°C (no freezing)
Storage Temperature	−30 to +80°C(no freezing)
Operating Humidity	45 to 85% (no condensation)
Insulation Resistance	100 MΩ minimum (500V DC megger)

Dielectric Strength	Between live and dead parts: 1,000V AC, 1 minute
Vibration Resistance	Operating extremes/Damage limits: 5 to 55 Hz, amplitude 0.5 mm
Shock Resistance	Operating extremes: 100m/s^2 Damage limits:1,000m/s^2
Life	1,000 hours minimum (beep sound)
Degree of Protection	LB3Z-1T0∗: IP54 (IEC60529) LB3Z-104K: IP40 (IEC60529)
Terminal Style	LB3Z-1T0∗: Solder/tab terminal #110 PC board terminal LB3Z-104K: Solder terminal
Weight (approx.)	11g (LB3Z-1T0∗), 8g (LB3Z-104K)

• For applicable standards and UL, CSA ratings, see B-089.

Name and Shape	Operating Voltage	Terminal Style	Part No. IP54	Part No. IP40
Rectangular (IP54 / IP40)	24V DC	Solder/tab terminal	LB3Z-1T04	—
		PC board terminal	LB3Z-1T04V	—
		Solder terminal	—	LB3Z-104K

• 12V DC operating voltages also available. Specify "-1T04" in place of "-1T03" in the Part No.
  Example: LB3Z-1T03

Dimensions

IP54

Terminal Arrangement (Bottom View)

All dimensions in mm.
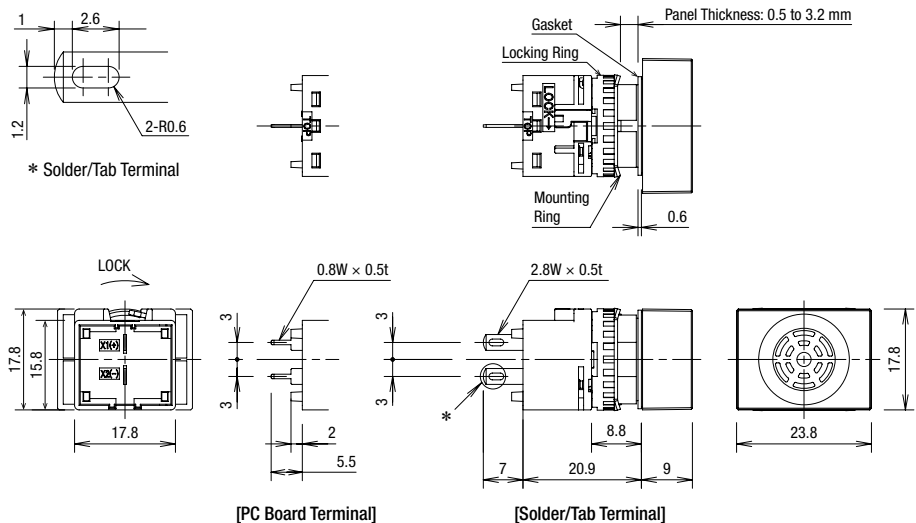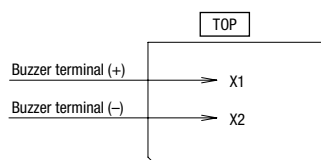
IP40

Terminal Arrangement (Bottom View)
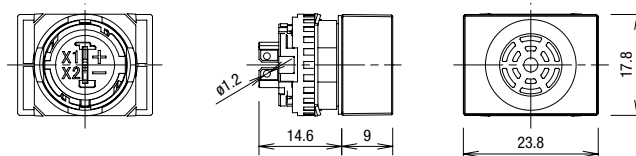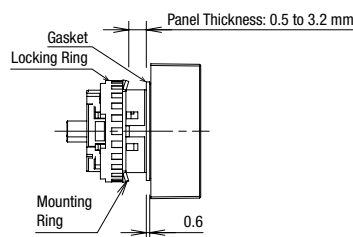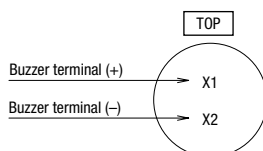
• For details on mounting hole layout, see B-110.
• For details on pc board and circuit design, see B-121.
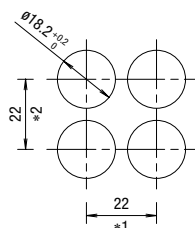• For details on single board mounting, see B-122.

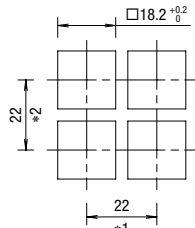## Mounting Hole Layout / PC Board Drilling Layout
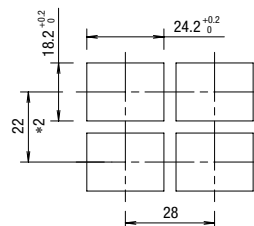
LB Series Flush Bezel

Round (LB6/LB6M)

∗1: 23.2 mm for 3PDT contacts
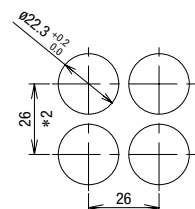∗2: 45 mm for switches with guard

Square (LB7/LB7M)

Note: When using the LB series with a rubber boot or terminal cover, make sure to note the dimensions on B-128.
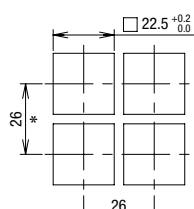
Rectangular (LB8/LB8M)

LBW Series Flush Bezel

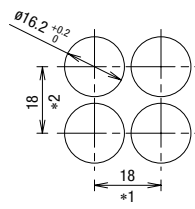**Round (LBW6/LB6M/LBW6G)**

∗ 53 mm for switches with guard

Square (LBW7/LBW7M/LBW7G)

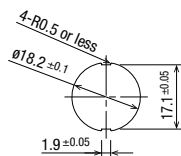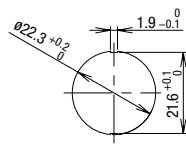∗ 53 mm for switches with guard

LB Series Standard Bezel

(LB1/LB2/LB3)

∗1: 24 mm for rectangular type
      23.2 mm for 3PDT contacts
∗2: 21 mm for 3PDT contacts

Panel Cut-out for Positioning

LB Series Flush Bezel
Round (LB6/LB6M)

LBW Series Flush Bezel
Round (LBW6/LBW6M/LBW6G)

LB Series Standard Bezel
Round (LB1/LB2/LB3)
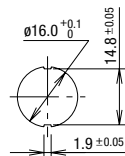
Approval Ratings and CCC Approval File No.

UL

Gold Contact

Rated Operating Voltage	30V DC	125V AC
Rated Operating Current	0.1A	0.1A

Silver Contact

Rated Operating Voltage			30V	125V	250V
Rated Operating Current	AC	Res.	—	3.5 A	2, 3, 5A
		Ind.	—	2A	1.5A
	DC	Res.	2, 3, 5A	0.4A	—
		Ind.	1A	0.2A	—

TÜV

Gold Contact

Rated Operating Voltage	30V DC	125V AC
Rated Operating Current	0.1A (DC-12)	0.1A (AC-12)

Silver Contact

Rated Operating Voltage		30V	125V	250V
Rated Operating Current	AC-12	—	3A	2, 5A
	DC-12	2, 5A	0.4A	—

CSA

Gold Contact

Rated Operating Voltage	30V DC	125V DC
Rated Operating Current	0.1A	0.1A

Silver Contact

Rated Operating Voltage			30V	125V	250V
Rated Operating Current	AC	Res.	—	3A	2, 3, 5A
		Ind.	—	2A	1.5A
	DC	Res.	2, 5A	0.4A	—
		Ind.	1A	0.2A	—

CCC

Gold Contact

Rated Operating Voltage	30V DC	125V AC
Rated Operating Current	0.1A (DC-12)	0.1A (AC-12)

Silver Contact

Rated Operating Voltage		30V	250V
Rated Operating Current	AC-12	—	2, 5A
	DC-12	2, 5A	—

Notes for Designing PC Board and Circuit

All dimensions in mm.

- Use 1.6-mm-thick glass epoxy PC board with drilled holes.
- Design a circuit so that the LB/LBW series can operate within the rated voltage and current range. Make sure that inrush current and voltage do not exceed the rating.
- Minimum applicable load is 5V AC/DC, 1 mA on gold contacts. Applicable range is subject to the operating condition and load.
- Since the *2.8-mm-wide terminal touches the PC board as shown on the right, short circuit may occur with pattern lines. Design a circuit that prevents short circuits.

SPDT/DPDT Contacts
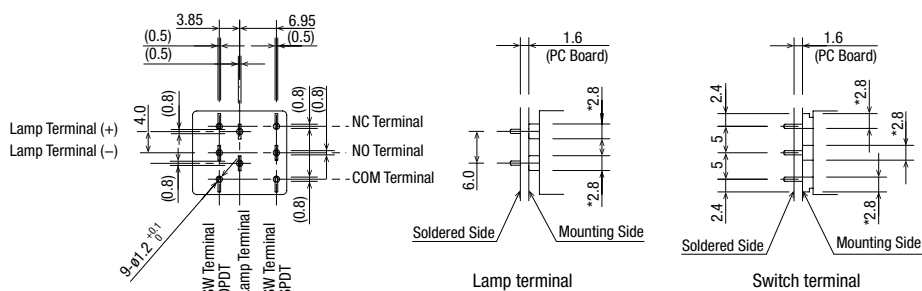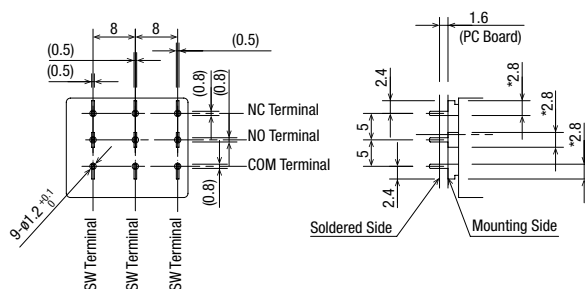
3PDT Contacts

PC Board Drilling Layout (Bottom View)

SPDT/DPDT Contacts
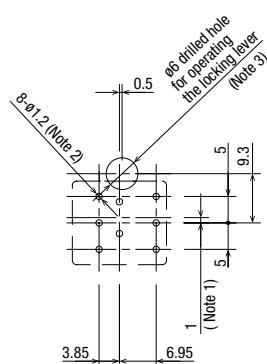
3PDT Contacts
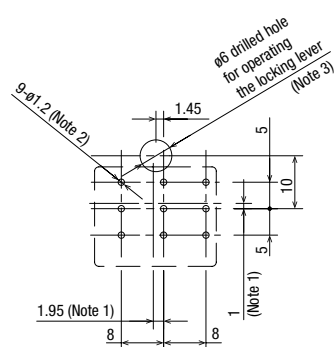
Note 1: When designing, note the alignment of center lines of the contact blocks and center lines of the operators.

Note 2: The diameter of the terminal hole is ø1.2.

Note 3: Hole diameter may vary to meet installation requirements. Determine the location and the size of the hole so that the locking lever can be operated.

Single Board Mounting

IDEC's LB/LBW Series is available for single board mounting.

ø6 drilled hole for operating the locking lever

Front   Rear
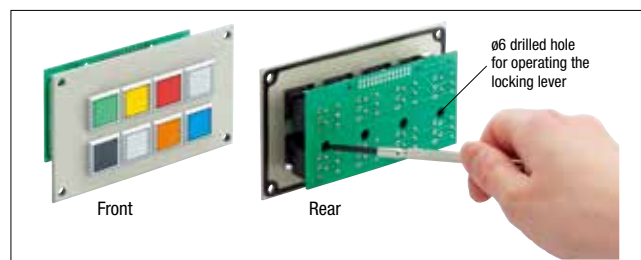
Installing and Removing Contact Blocks

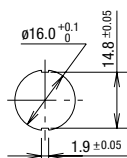Turn the locking lever to install and remove contact blocks on the PC using a screwdriver from a hole in the PC board. See "Notes for Designing PC Board and Circuit" on B-121. Determine the location of the switches so that the locking lever can be operated. See "Removing and Installing the Contact Block" on B-131.

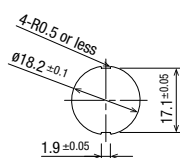### Mounting Holes and Assembly Procedure

Drill mounting holes in the panel as shown below. When the units are mounted collectively, provide adequate clearance.

Panel Cut-out for Positioning

Standard Bezel (LB1/LB2/LB3/LB4)

$ø16.0^{+0.1}_{0}$ $14.8 ±0.05$ $1.9 ±0.05$

LB Series Flush Bezel (LB6/LB6M/LB6G)

4-R0.5 or less $ø18.2 ±0.1$ $17.1 ±0.05$ $1.9 ±0.05$

LBW Series Flush Bezel (LBW6/LBW6M/LBW6G)

$ø22.3^{+0.2}_{0}$ $1.9^{0}_{-0.1}$ $21.6^{+0.1}_{0}$
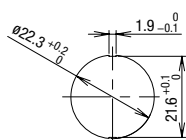
Mounting Hole Layout

Standard Bezel (LB1/LB2/LB3/LB4)

SPDT/DPDT Contacts

$ø16.0^{+0.1}_{0}$ 18 or more   18 or more
(24 or more for rectangular units)

3PDT Contacts
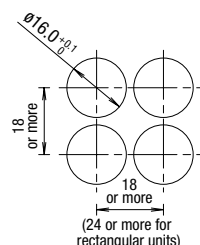
$ø16.0^{+0.1}_{0}$ 21 or more   23.2 or more
(24 or more for rectangular units)
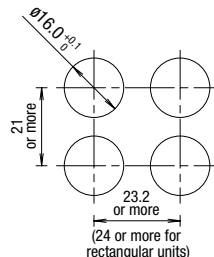
LB Series Flush Bezel

SPDT/DPDT Contacts   3PDT Contacts

LB6/LB6M/LB6G

$ø18.2 ±0.1$ 22 min *   22 min

$ø18.2 ±0.1$ 22 min *   23.2 min

LB7/LB7M/LB7G

$□18.2 ±0.1$ 22 min *   22 min

$□18.2 ±0.1$ 22 min *   23.2 min

LB8/LB8M/LB8G

$18.2 ±0.1$ $24.2 ±0.1$ 22 min *   28 min

$18.2 ±0.1$ $24.2 ±0.1$ 22 min *   28 min
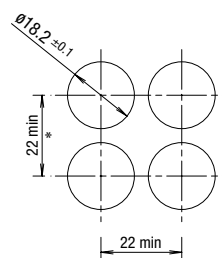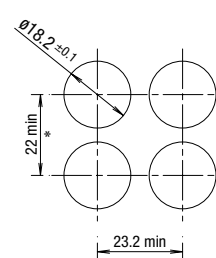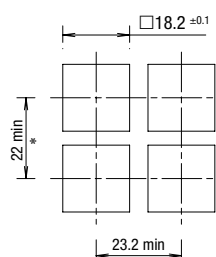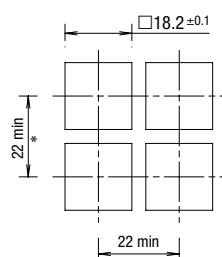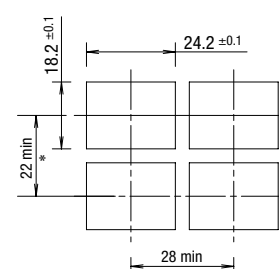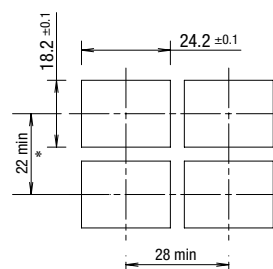
* 45 mm minimum for switches with guard

LBW Series Flush Bezel   **LBW Series Flush Bezela**

LBW6/LBW6M/LBW6G   **LBW7/LBW7M/LBW7G**

$ø22.3^{+0.2}_{0.0}$ 26 min. *   26 min.

$□22.5^{+0.2}_{0.0}$ 26 min. *   26 min.
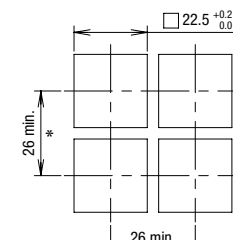
* 53 mm minimum for switches with guard

Assembly Procedure

1. Install the operator to the panel.
2. Mount the contact block to the operator from the rear.
3. Turn the locking lever to lock the contact block.
4. Insert the PC board to terminals and solder.

Note 1: Make sure that each terminal is inserted into the PC board correctly.

Note 2: Do not apply tensile force to the connector cable for an extended period of time.

Note 3: Do not expose the contact block to water.

Note 4: Ensure to lock contact blocks when the contact blocks are installed on the operators.

• UP series can be installed on the same board. For details, see B-123.

LB/LBW Series

Accessories

Package Quantity:1

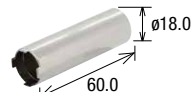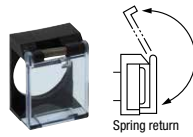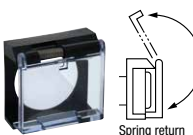| Shape			Specification	Part No.	Package Quantity	Remarks
Locking Ring Wrench ø18.0 60.0			Metal (Nickel-plated brass)	MT-001	1	Used to tighten the locking ring when installing the units on to the panel.
	Lens Removal Tool 60.0		Stainless Steel	MT-101	1	Used to remove the lens or button. (for standard bezels)
For Standard Bezels	Switch Guard (spring return)	180° Spring return — For round / square units (LB1/LB2)	Guard (Polyacetal) Base (Polyarylate)	AL-K6SP	1	Degree of protection: IP65 Used to protect pushbuttons and illuminated pushbuttons from inadvertent operation. See B-127 for dimensions. With the gasket mounted on the switch, attach the switch guard and mount on the panel.
		Spring return — For rectangular units (LB3/LB4)		AL-KH6SP	1	
		180° Spring return for Single Board Mounting — For rectangular units (LB3/LB4)	Guard (Polyacetal) Base (Polyarylate)	LA9Z-K3	1	Degree of protection: IP65 With the gasket mounted on the switch, attach the switch guard and mount on the panel. See B-127 for dimensions.
	Switch guard (remains open)	Remains 110°/180° open (Can be used for single board mounting) — For round / square units (LB1/LB2)	Guard (Polyacetal) Base (Polyarylate)	LB9Z-K2	1	Degree of protection: IP40 Used to protect pushbuttons and illuminated pushbuttons from inadvertent operation. See B-127 for dimensions. With the gasket mounted on the switch, attach the switch guard and mount on the panel. See B-136 for dimensions. When using for single board mounting, remove the rubber gasket from the switch.
		For rectangular units (LB3/LB4)		LB9Z-K3P	1	Degree of protection: IP65 With the gasket mounted on the switch, attach the switch guard and mount on the panel. See B-127 for dimensions.
	Rubber Boot ①	1. For round units (LB1)	Rubber (Transparent silicon rubber)	LB9Z-D1	1	Degree of protection: IP65 See B-127 for dimensions. See B-135 for mounting.
	②	2. For square units (LB2)		LB9Z-D2	1	
	③	3. For rectangular units (LB3/LB4)		LB9Z-D3	1	
	Mounting Hole Plug	Metal	[Plug] Metal (Zinc diecast) [Locking nut] Polyacetal [Gasket] Nitrile rubber	AL-BM6	1	Degree of protection: IP65 Tightening torque: 0.1 to 0.29 N·m See B-127 for dimensions.
	Mounting Hole Plug	Rubber	Nitrile rubber (black)	AL-B6	5	Degree of protection: IP65 See B-127 for dimensions.

Spring return

110° 180°

APEM

Switches & Pilot Lights

Control Boxes

Emergency Stop Switches

Enabling Switches

Safety Products

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Operator Interfaces

Sensors

AUTO-ID

Flush Silhouette

ø16

ø22

ø30

Miniature

Pilot Lights

CW

LW-F

LB

LBW

UP

Flush Bezel

www.apem-idec.eu

Accessories

Package Quantity:1

Shape			Specification	Part No.	Package Quantity	Remarks
For LB Series Flush Bezels	Rubber Boot ① ② ③	1. For round units (LB6/LB6M)	Rubber (Transparent silicon rubber)	LB9Z-D6	1	Degree of protection: IP65 See B-128 for dimensions. See B-135 for mounting.
		2. For square units (LB7/LB7M)		LB9Z-D7	1	
		3. For rectangular units (LB8/LB8M)		LB9Z-D8	1	
	Mounting Hole Plug ① ② ③	1. For round units (LB6/LB6M)	[Plug] Polyamide (Black) [Gasket] Nitrile rubber [Mounting Plate] Stainless Steel	LB9Z-BS6∗	1	∗ Color code: blank (black), W (white) Degree of protection: IP65 Panel thickness: 0.5 to 3.2 mm See B-128 for dimensions.
		2. For square units (LB7/LB7M)		LB9Z-BS7∗	1	
		3. For rectangular units (LB8/LB8M)		LB9Z-BS8∗	1	
For LBW Series Flush Bezels	Mounting Hole Plug ① ②	1. For round units (LBW6/LB6W6M)	[Plug] Polyamide (Black) [Gasket] Nitrile rubber [Mounting Plate] Stainless Steel	LBW9Z-BS6∗	1	∗ Color code: blank (black), W (white) Degree of protection: IP65 Panel thickness: 0.5 to 3.2 mm See B-128 for dimensions.
		2. For rectangular units (LBW7/LB6W7M)		LBW9Z-BS7∗	1	
	Mounting Hole Plug	Metal	[Plug] Zinc diecast [Locking Ring] Polyamide [Gasket] Nitrile rubber	LW9Z-BM	1	Degree of protection: IP66 Tightening torque: 1.2 N·m See B-128 for dimensions.
	Mounting Hole Plug	Rubber	Nitrile rubber	LW9Z-BP1	1	Degree of protection: IP65 Tightening torque: 2.0 N·m See B-128 for dimensions.
Terminal Cover ① ②		1. For SPDT/DPDT contacts	PBT (White)	LB9Z-VL2	10	See B-128 for dimensions. See B-131 for mounting.
		2. For 3PDT contacts		LB9Z-VL3	10	
Key Reversible key Non-reversible key		For key selector switches (wave key)	Metal (zinc nickel-plated)	LA9Z-SK-∗	2	Specify a key number in place of ∗ in the Part No. Blank: Standard key 0H (reversible) 1H to 2H: Reversible key 3H to 6H: Non-reversible key See B-128 for dimensions.
Keys		For key selector switches (disc tumbler key)	Metal (brass nickel-plated) 18×1.8×25.1 t1.8	AS6-SK-132	2	

Maintenance Parts

LB Series Maintenance LED Unit

Package Quantity: 1

Shape	Rated Operating Voltage	Part No. (Ordering No.)	∗ Color Code
LED Unit	5V DC	LB9Z-LED5∗	A: Amber
	12V AC/DC	LB9Z-LED1∗	G: Green / PW: Pure White / R: Red
	24V AC/DC	LB9Z-LED2∗	S: Blue / W: White

• All LB/LBW series contain an LED unit.
• Use a pure white (PW) LED unit for yellow (Y) illumination.

Transformer

Package Quantity: 1

Transformer	Primary Voltage	Secondary Voltage	Part No. (Ordering No.)	Applicable Load
For 24V	100/110V AC	100/110V AC ±10%	TWR512	LB9Z-LED2∗ (24V AC/DC LED unit)
	200/220V AC	200/220V AC ±10%	TWR522	
	400/440V AC	400/440V AC±10%	TWR542	

• Terminal cover (TWR-VL3) is supplied as standard.
• Connect one LB9Z-LED2∗ to a transformer.

Specifications

Part No.	TWR5□2
Operating Voltage	100/110V AC, 200/220V AC, 400/440V AC (50/60Hz)
Current Draw	2.4VA
Rated Insulation Voltage	600V
Insulation Resistance	100 MΩ minimum (500V DC megger)
Operating Temperature	−30 to +60°C (no freezing)
Storage Temperature	−40 to +80°C (no freezing)
Operating Humidity	35 to 85% RH (no condensation)
Vibration Resistance	Damage Limits: 30 Hz, amplitude 1.5 mm / Operating extremes: 5 to 55 Hz, amplitude 0.5 mm
Shock Resistance	Damage limits: 1,000 m/s² / Operating Extremes: 100 m/s²
Dielectric Strength	2,500V AC, 1 minute
Terminal Screw	M3.5
Applicable Wire	2 mm² maximum, 2 wires maximum
Weight (approx.)	87g

Dimensions

All dimensions in mm.
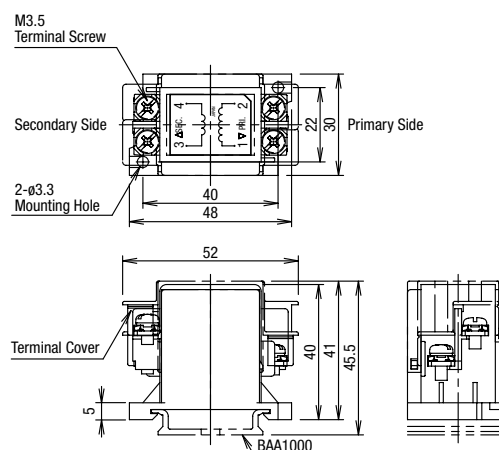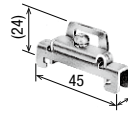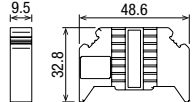
Accessories

35mm DIN Rail

Part No.	Length	Material	Package Quantity
BAA1000	1,000mm	Aluminum (approx. 200g)	10
BAP1000	1,000mm	Steel (approx. 320g)	10

End Clip

Part No.	Applicable DIN Rail	Package Quantity	Dimensions
BNL6	BAA1000 BAP1000	10	Approx. 15g Steel (Zinc-plated)
BC9Z-E/NS35N	BAA1000 BAP1000	10	Approx. 15g

• See H-071 for DIN rail products.
• Use end clip BC9Z-E/N35NPN10 when using 400/440V AC primary voltage transformers.

LB/LBW Series

⚠ Safety Precautions

- Turn off the power to the LB/LBW series before installation, removal, wiring, maintenance, and inspection. Failure to turn power off may cause electrical shocks or fire hazard.

- To avoid burning your hand, use the lamp holder tool when replacing the lamps.

- For wiring, use wires of a proper size to meet voltage and current requirements. Solder correctly according to the instructions in "Wiring" and "Notes on Terminal Cover." Improper soldering may cause overheating and create a fire hazard. Also, when using tab terminals, use receptacles of appropriate size.

Instructions

Wiring

1) Solder the terminals at 350°C within 3 seconds using a 60W soldering iron. Sn-Ag-Cu type is recommended when using leadfree solder. When soldering, do not touch the LB series with the soldering iron. Also ensure that no tensile force is applied to the terminal. Do not bend the terminal or apply excessive force to the terminal.

2) Use non-corrosive liquid flux.

Terminal Cover

Solder/tab terminal

Insert the terminal cover into the contact block with the TOP markings on the contact block and the terminal cover in the same direction.

Note: When wiring, insert the lead wires into the terminal cover holes before soldering.
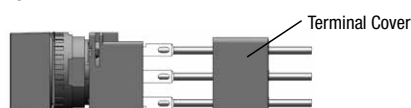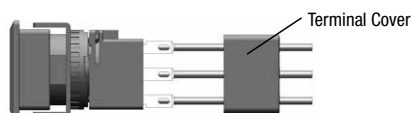After wiring, the terminal covers cannot be installed.

Standard Bezel

Terminal Cover

Flush Bezel

Terminal Cover

Operating Environment

- Do not use the LB/LBW series where corrosive gases exist or under an environment exceeding the operating temperature and humidity ranges. Otherwise, damages due to contact failure or change of surface color may occur.

- Major parts of the switch are plastic. Scratches or damages may occur when scraped with a sharp object or applied with excessive load or shock. Note that this may cause operation and appearance failure of the operator and bezel.

- Adherence of detergent, cutting oil, or special chemicals to the switch may result in operation failures and appearance failures such as change of surface color.

Handling

Contacts (micro switch)

When using NC (normally closed) and NO (normally open) contacts of the same microswitch, avoid connections of different voltages, or connections of different types of power supplies. Failure to observe this instruction may cause a short-circuit.

Protection against oil (IP65)

The LB series has been tested according to JIS C 0920: Appendix 1 by using water insoluble cutting oil Class N3, No. 8 (JIS K 2241) to prove that the switches will not be damaged by oil drops or splashes. This may not apply to special types of oils. Contact IDEC for details.

Removing and Installing the Contact Block

1) Turn the locking lever on the contact block in the direction opposite to the arrow on the housing. Then the contact block can be removed.

2) Insert the contact block with the TOP markings on the contact block and the operator placed in the same direction. Then lock the units, turning the locking lever in the direction of the arrow.

Note: When removing/installing the contact block, or when using the contact block alone, do not apply excessive force on the actuator. Deformed actuator may affect contact operation.

Locking Lever

Actuator

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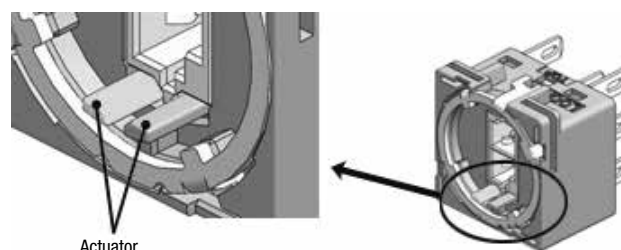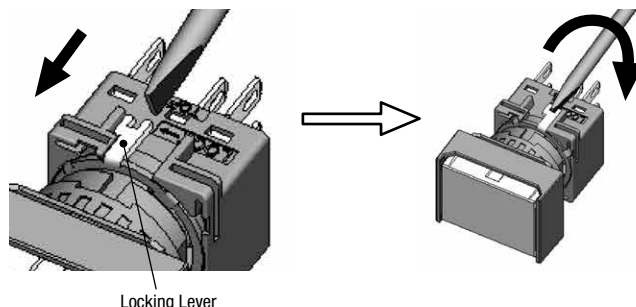
Instructions

Panel Mounting
Remove the contact block from the operator. Insert the operator into the panel cut-out from the front, then install the contact block to the operator.

(For Standard Bezel)

Panel

TOP

① Anti-rotation Ring

② Locking Ring

TOP

③ Contact Block

(For Flush Bezel)

Panel

TOP

① Anti-rotation Ring

② Locking Ring

TOP

③ Contact Block

Notes on Mounting
Use the optional ring wrench (MT-001) to mount the operator onto the panel. The recommended tightening torque is 0.5 to 0.7 N·m. Do not use pliers. Excessive tightening will damage the locking ring.

Replacing the Lens and Marking Plate
Removing
[Removing the operator]
Standard Bezel
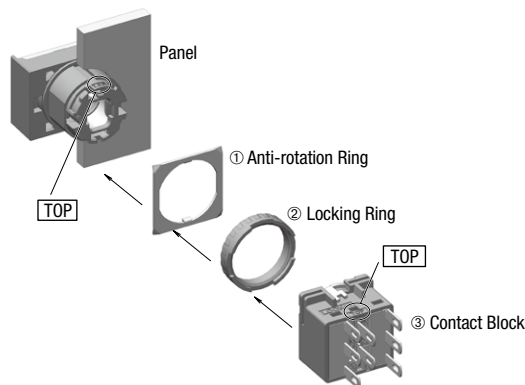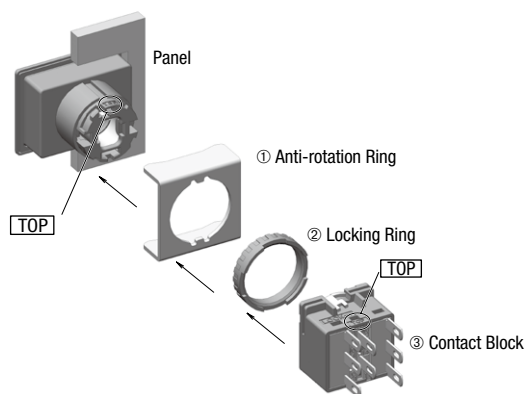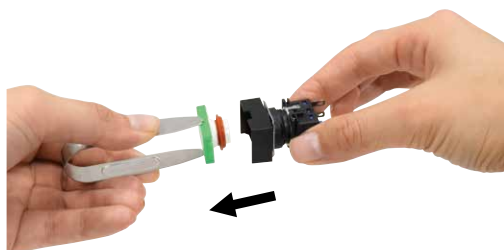1) From the opposite side of the TOP marking, remove the operator (lens, marking plate, and lens holder) using the optional lens removal tool (MT-101) by gripping the recesses of the color lens.

Flush Bezel
1) From the opposite side of the TOP marking, push the tip (width: 3 mm, thickness: 0.5 mm) of the flat screwdriver to the groove of the color lens and pull out the operator (lens, marking plate, lens holder).

Note: For metallic bezels, the bezel may be damaged if the screwdriver is inserted from the TOP side or inserted deeply or with force into the groove of the lens.

TOP

Remove from the opposite side of the TOP marking

[Removing the Operator]
2) Remove the marking plate by pushing the lens from the rear to disengage the latches between the lens and holder, using the screwdriver as shown below.

Note: The translucent in the lens holder cannot be removed because this filter is sealed to make the unit waterproof and oiltight.

LBW Series Pushbutton (button style)
LBW series pushbuttons (button style, see B-097) can be removed according to the following procedure. LBW series pushbuttons (button style) cannot be removed from the front of the panel.

[Removing the Operator]
1) Detach the operator unit and contact block. (See Removing and Installing the Contact Block on B-131)
2) Remove the button unit (button, button holder) by pushing out the cross-shaped protrusion (white) at the back of the operator with a screwdriver.

LBW Series Illuminated Pushbutton (round extended)
Screw-in lens. The lens can be removed by turning anticlockwise.

Push out the cross-shaped protrusion (white) from the back of the operator unit.

APEM

Switches & Pilot Lights

Control Boxes

Emergency Stop Switches

Enabling Switches

Safety Products

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Terminal Blocks

Relays & Sockets

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Power Supplies

LED Illumination

Controllers

Operator Interfaces

Sensors

AUTO-ID

Flush Silhouette

ø16

ø22

ø30

Miniature

Pilot Lights

CW

LW-F

LB

LBW

UP

Flush Bezel

LB/LBW Series

Instructions

APEM

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Flush Silhouette

ø16

ø22

ø30

Miniature

Pilot Lights

CW

LW-F

LB

LBW

UP

Flush Bezel

Removing the Button

The button can be removed by inserting a small screwdriver into the groove of the button holder.

Miniature screwdriver

Button holder (white)

Button holder groove
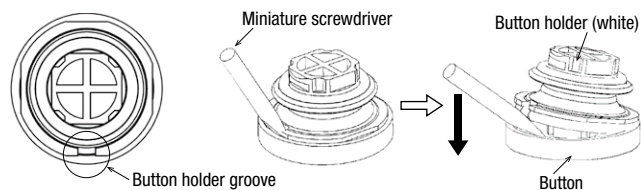
Button

To attach the button to the button holder, align the groove on cross-shaped protrusion with the positioning protrusion on the button and insert securely.

Installing

Cross-shaped protrusion
Button holder (white)

Positioning protrusion
Button

Insert the marking plate into the color lens, and press the lens onto the lens holder to engage the latches. Pay attention to the orientation of the marking plate.
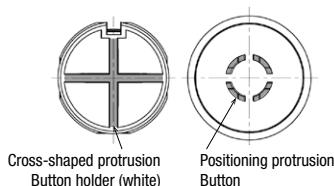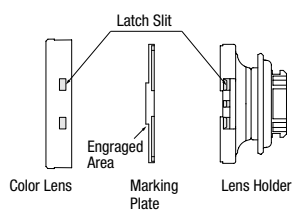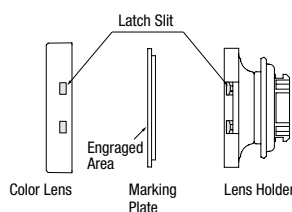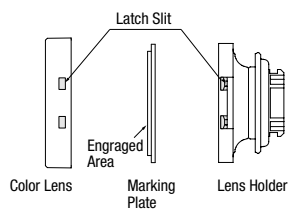
LB/LBW Series Round

Latch Slit

Engraged Area

Color Lens   Marking Plate   Lens Holder

LB Series Square/Rectangular

Latch Slit

Engraged Area

Color Lens   Marking Plate   Lens Holder

LBW Series Square
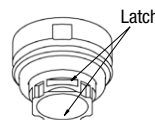
Latch Slit

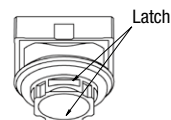Engraged Area

Color Lens   Marking Plate   Lens Holder

Installing the Lens Unit and Contact Block

To insert the lens unit into the operator, press in the lens unit by making sure that the latch on the operator is aligned with the latch on the lens unit.
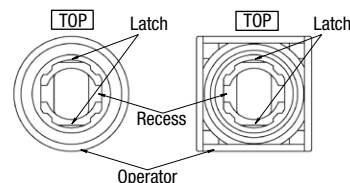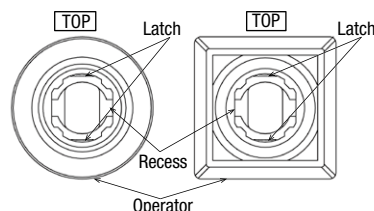
Round Lens Unit   **Square Lens Unit**

Latch   Latch

Standard Bezel

TOP   Latch   TOP   Latch

Recess

Operator

Flush Bezel

TOP   Latch   TOP   Latch

Recess

Operator

Marking Plates and Films

For illuminated pushbuttons, pushbuttons with lens, and pilot lights, legends and symbols can be engraved on the marking plates, or printed film can be inserted under the lens for labelling purposes.

Marking Plate and Marking Film Size

LB Series (flush bezel / standard bezel)

Lens		Round	Square	Rectangular
Built-in Marking Plate		ø12.0, 0.8, Engraving Area, 12.0, ø13.7, Anti-rotation edge	Engraving Area, 0.8, □12.0, □13.7	12.0, 0.8, Engraving Area, 18.0, 19.7×13.7
		• Engraving must be made on the engraving area within 0.5 mm deep. • The marking plate is made of white acrylic resin.		
Applicable Marking Film		ø13.6, 11.8	□13.6	13.6, 19.6
		• Film thickness: 0.1 mm per film • Marking film is not included. • Recommended marking film: Polyester film		

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Instructions

LBW Series

Lens	Round Flush	Square	Round Extended
Built-in Marking Plate	ø16.8 / Engraving Area / Anti-rotation edge / 16.4 / 1.1 / 0.85 / ø17	Engraving Area / □16.4 / 0.85 / □18.4	ø14 / Engraving Area / Anti-rotation edge / 14.0 / 5.15 / 0.85 / ø15.8
	• Engraving thickness: 0.5 mm max. • The marking plate is made of white acrylic resin.		
Applicable Marking Film	ø18.4 / 16.4	□18.4	ø15.8 / 14.0
	• Film thickness: 0.1 mm per 2 films or 0.2 mm per film. • Marking film is not included. • Recommended marking film: Polyester film		

LBW Series (ring-illuminated model)

Lens	Round (Note)	Square
Applicable Marking Film	ø16 max.	□18.4
	• Film thickness: 0.1 mm max.	

Note: Use a film with adhesive and attach on the light shield sheet. Make sure that the marking film is properly installed and does not protrude from the edge of light shield sheet.

Ring Illuminated Model Lens Holder

Light shield sheet
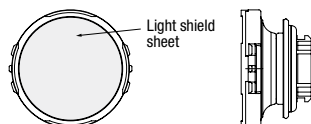
Insertion Order of Marking Plate and Film

LB/LBW Series Round

Color Lens | Film | Engraged Area | Marking Plate | Lens Holder

LB/LBW Series Square/Rectangular

Color Lens | Film | Engraged Area | Marking Plate | Lens Holder

Note: Film is not included.

The marking plate must be engraved on the specified side as shown above. Pay attention to the orientation of the marking plate. When inserting a film, make sure to insert between the color lens and marking plate.

Note: Marking plate is not supplied with ring-illuminated model.

Replacing the LED Unit

The LED unit can be replaced without tools by pulling out the lens unit from the contact block.

Contact Block | LED Unit
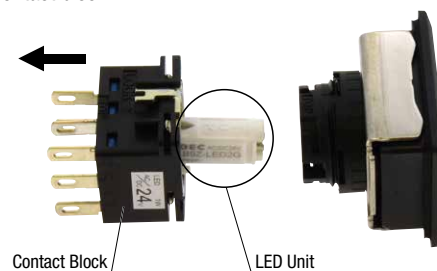
Orientation of the LED unit

Insert the LED unit into the contact block with the TOP markings on the contact block and LED unit in the same orientation.

TOP | TOP
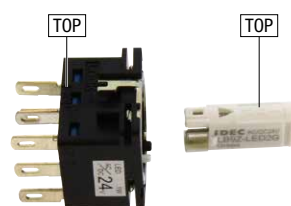
Notes on replacing the LED Unit

When replacing the LED unit, make sure that static electricity is not applied.
Make sure that the LB/LBW series has cooled down before replacing the LED unit. To avoid burn injuries, be careful not to touch the unit while it is still hot.

Notes on Using Quick Connect Terminals

1) Use #110 tab quick connects, 0.5 mm-thick.
2) When connecting the terminals on the left and center, make sure that surfaces of the quick connects face each other. Otherwise, short-circuit may occur.

TOP | TOP

Correct | **Incorrect**
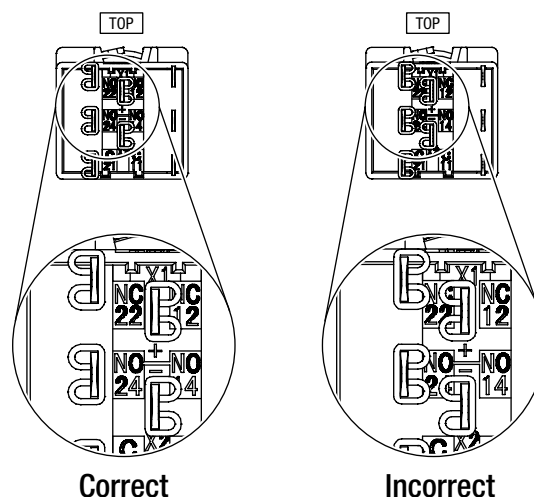
3) Apply only horizontal force against the panel to the tab. The switch may be damaged if a force other than a horizontal force is applied.

Switches & Pilot Lights

APEM
Switches & Pilot Lights
Control Boxes
Emergency Stop Switches
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Power Supplies
LED Illumination
Controllers
Operator Interfaces
Sensors
AUTO-ID

Flush Silhouette
ø16
ø22
ø30
Miniature
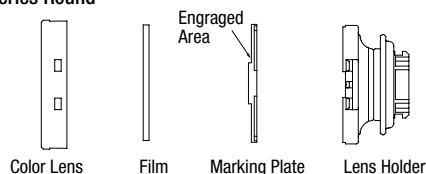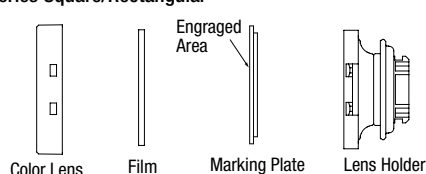Pilot Lights

CW
LW-F
LB
LBW
UP
Flush Bezel

LB/LBW Series

Instructions

Installing the Rubber Boot

When using in places where the switches are subjected to water splash or an excessive amount of dust, make sure to use the optional rubber boot.
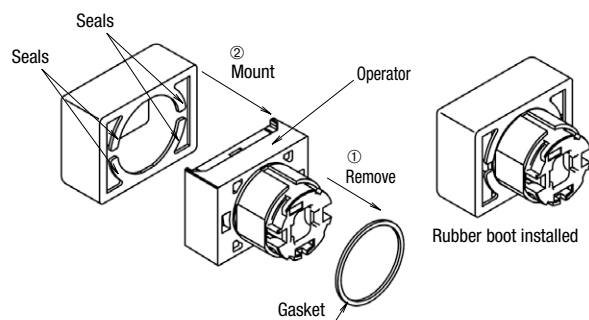
As shown in the drawing below, ① remove the gasket from the operator, and ② attach the rubber boot from the front (button side).
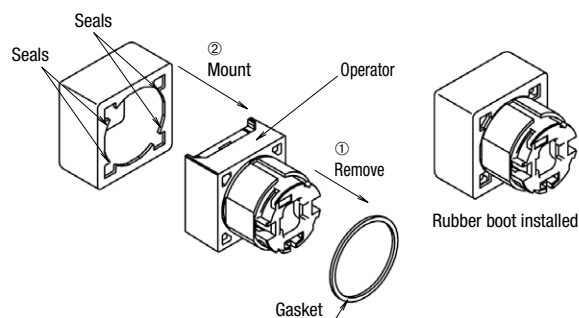
Standard Bezel

For rectangular and square units, pull out the seals of the rubber boot and place them around the operator sleeve as shown below. Make sure that the seals are not twisted or tucked inside and that the gasket is removed, otherwise waterproof and dustproof characteristics are not ensured.

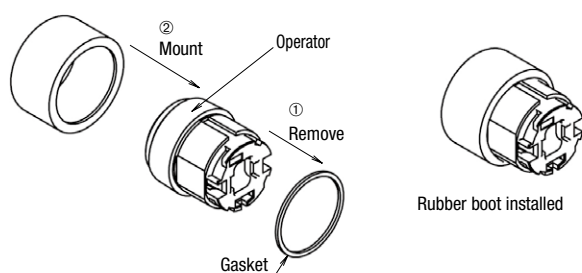### How to Install the Rubber Boot
Rectangular

Seals
Seals
② Mount
Operator
① Remove
Gasket
Rubber boot installed

Square

Seals
Seals
② Mount
Operator
① Remove
Gasket
Rubber boot installed

Round

② Mount
Operator
① Remove
Gasket
Rubber boot installed

Flush Bezel

Mount the rubber boot so that the protrusion at the bottom surface of the operator fits with the recess on the operator, placing the rubber boot all around the operator sleeve.

Make sure that the protrusion on the rubber boot and the recess on the operator is properly fitted, otherwise, the waterproof and dustproof characteristics are not ensured.

How to Install the Rubber Boot

Protrusion
Recess
① Remove
② Mount
Gasket
Good Example
Bad Example
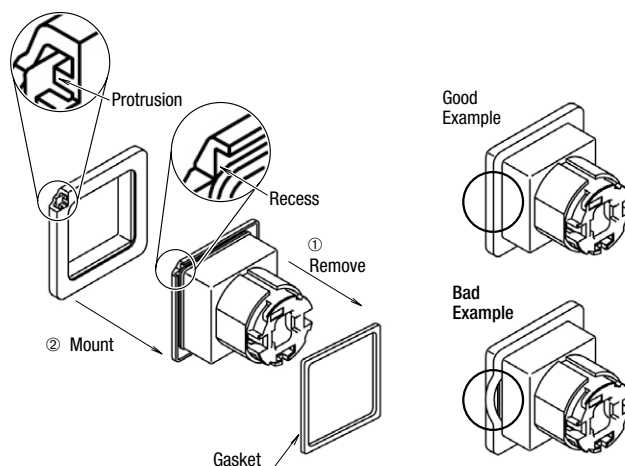
Note: Install the rubber boot before mounting the unit to the panel.

Maintained Pushbuttons

Do not replace the buttons when the pushbutton is in the maintained position. Replacing the button in the maintained position may damage the internal mechanism. Also, do not remove the contact block with the button in the maintained position. The contact may not operate properly when the contact block is remounted. Make sure to push down fully when using the pushbuttons.

Pushbuttons and Illuminated Pushbuttons with Switch Guard

Do not apply force to the switch guard when the switch guard is not attached to a panel. When opening the switch guard, do not open more than 180°. The hinge may break.

Selector Switches

When turning the operator or key, make sure that they are properly turned to each position.

Selector Switches with Key

Observe the following instructions to prevent malfunction or damage.

• Insert the key to the bottom of the key hole.

• Do not remove the key from any key retained position.

• Besides the standard key (key number 0H), six other key numbers are available. Use a key of the matching number with the key cylinder. The standard key does not have a key number indication.

• Keys are available in two types.
Key numbers 0H (standard), 1H, and 2H are reversible keys which can be inserted in two ways.
Key numbers 3H, 4H, 5H, and 6H are non-reversible keys. Make sure of correct insertion direction.

Instructions

Countermeasures against Dim Lighting

Leakage currents through transistors or a contact protection circuit may cause the LED lamp to illuminate dimly even when the output is off.

When the LED lamp is illuminated by a transistor output, take the following measure.

Shunt Resistor
R

LED Pilot Light
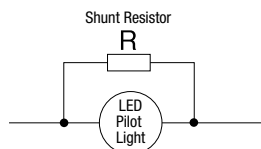
Leakage Current Shunt Resistor Allotment Table (Recommended)

Leakage Current Io	Shunt resistance R			
	Red (R), White (W)		Green (G)	
	Resistance	Rated Power	Resistance	Rated Power
0.1 mA max.	13kΩ	0.25W	18kΩ	0.25W
0.1 to 0.7 mA	2kΩ	0.25W	2.7kΩ	0.25W

Noise

LED elements deteriorate due to extraneous noise, resulting in significant decrease in luminance, hue change, or failure of lighting. When such effects are anticipated, take a protection measure shown below. However, measures may differ according to operating environment and condition

Zener Diode

(Zener diode reference value)
Zener voltage: 4.3 to 4.7V

(+)   (−)
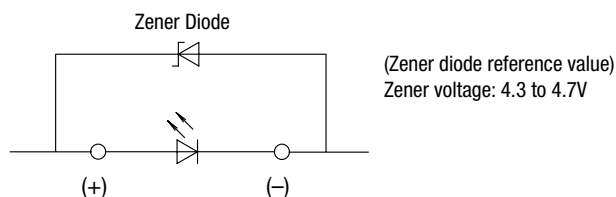
Static Electricity (UP Series)

UP series are delicate products that may be damaged by static electricity Make sure to take measures to prevent static electricity.

Switch Guards

Opening/closing the Switch Guard

When opening/closing the switch guard while the switch guard is not installed on a panel, make sure to hold the hinge. Holding the base might result in damage. Also do not apply force on the guard in other than open/close directions, otherwise the hinge may be damaged.

Hinge

Base
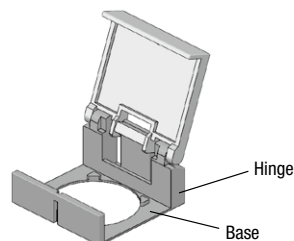
Rubber Gasket when using LB9Z-K2 Switch Guard (remains open) for Round/Square Units

Choose to use or not to use the rubber gasket for the switch referring to the conditions described below. Note that the degree of protection is IP40 with or without the rubber gasket.
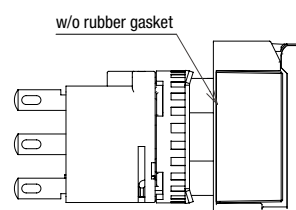
- **When the panel thickness is up to 2.8mm**

  Install the switch onto the switch guard with rubber gasket, and mount on the panel.
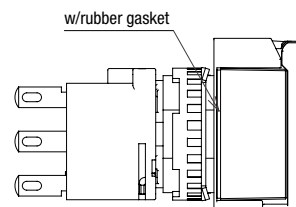
  w/rubber gasket

- **When the panel thickness is 2.8 to 3.2mm**

  Remove the rubber gasket from the switch and install the switch onto the switch guard, and mount on the panel (discard the rubber gasket).

  w/o rubber gasket

- **Single board mounting**

  Remove the rubber gasket from the switch and install the switch onto the switch guard, and mount on the panel (discard the rubber gasket).

  w/o rubber gasket