Flush Silhouette Switches

# LB/LBW Series

ø16mm

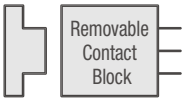
# LB Series

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

• See website for details on approvals and standards.

## Slim Profile for Flexible Installation Options

[Shape]




[Contact Rating]

3A

[Action]

Light

[Operating Stroke]

3
mm

| | Series | page |
|---|---|---|
| | Flush Silhouette Switches LB Series | B-073 |
| | Flush Silhouette Switches LBW Series | B-091 |
| | ø16mm LB Series | B-103 |
| | UP Series | B-123 |



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# Stylish and Functional

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

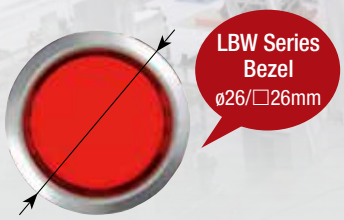
## Flush Silhouette

### Flush Silhouette

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

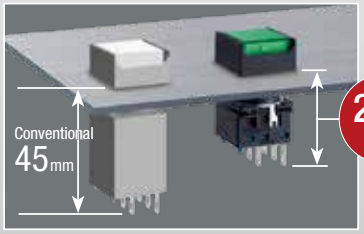
**LB Series Flush Silhouette Switches**
Slim 2mm-thick bezels for stylish panels.

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




## Control Unit

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

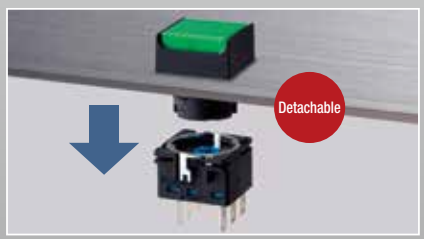


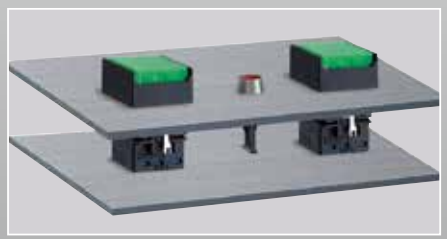

**Short Body**
Depth of only 27.9mm behind panel.
Reduces the size of machines and control panels.

Compact

## Flush Silhouette & Control Unit

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



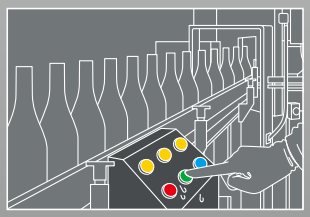


Separate & One Board

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




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

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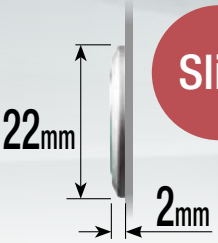
# Flush Silhouette Switches




Actual Size

**Slim**

Protection degree: IP65 (IEC 60529)

point For sleek and refined style

* Panel cutout (mm)

Round ø18.2* | Square □18.2* | Rectangular 18.2 × 24.2*

## Illuminated Pushbuttons

Illuminated pushbuttons with switch guard available

## Pushbuttons

Marking plates can be used with lens style pushbuttons

*Does not light on.

Pushbuttons with switch guard available

## Pilot Lights

## Dome Pilot Lights

## Selector Switches

2-position and 3-position selector switches. Maintained and other various spring return actions available.

*Photo: lever operator (knob operator also available)

Illuminated selector switches available

Key Selectors ensure safety

Wave Key

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

## Buzzer

Protection degree: IP54
Steady sound at 80 dB minimum (at 0.1m)

## 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.

Black bezel only

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Flush Silhouette
ø16
ø22
ø30
Miniature
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CW
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LB
LBW
UP
Flush Bezel



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# Flush Silhouette Switches LB Series

## Flush bezel projects only 2 mm from front of panel.

### Contact Ratings (See B-120 for approval ratings)

**Gold Contact (switch base: blue)**

| | | | | | |
|---|---|---|---|---|---|
| Rated Insulation Voltage | | | 250V | | |
| Rated Thermal Current | | | 3A | | |
| Rated Operating Voltage | | | 30V DC | 125V AC | 250V |
| Rated Operating Current (electrical life: 100,000 operations) | AC 50/60Hz | Resistive load | | 1A | 0.5A |
| | | Inductive load | | 0.7A | 0.5A |
| | DC | Resistive load | 1A | 0.2A | |
| | | Inductive load | 0.7A | 0.1A | |
| Contact Material | | | Gold plated silver | | |

- Minimum applicable load (reference value): 5V AC/DC, 1 mA
  Applicable range is subject to the operating conditions and load.
- See electrical life in Specifications.

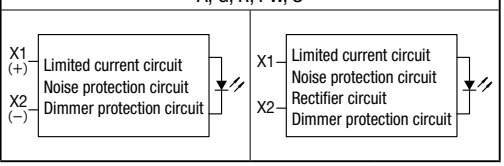
**Silver Contact (switch base: black)**

| | | | | | | |
|---|---|---|---|---|---|---|
| Rated Insulation Voltage | | | | 250V | | |
| Rated Operating Voltage | | | | 30V | 125V | 250V |
| Rated Thermal Current | | | | 5A | | |
| Rated Operating Current | Electrical Life 50,000・100,000 operations | AC 50/60Hz | Resistive load | — | 5A 3A | 3A |
| | | | Inductive load | — | 3A | 1.5A |
| | | DC | Resistive load | 3A | 0.6A | — |
| | | | Inductive load | 2A | 0.22A | — |
| Contact Material | | | | Silver | | |

- AC inductive load: PF=0.6 to 0.7 DC inductive load: L/R=7 ms max.

### LED Ratings

| | | | |
|---|---|---|---|
| Rated Voltage | 5V DC | 12V AC/DC | 24V AC/DC |
| Voltage Range | 5V DC±5% | 12V AC/DC ±10% | 24V AC/DC ±10% |
| LED Part No. | LB9Z-LED5② | LB9Z-LED1② | LB9Z-LED2② |
| Current Draw | 5 mA (typ.) | | |
| Voltage Marking | Marked on the side of the LED unit | | |
| LED Life (reference value) | Approx. 30,000 hours [until the brightness reduces to 50% of the initial value when lit at the rated voltage (direct current) under 25°C environment.] | | |
| Internal Circuit | A, G, R, PW, S | | |




- ② (color code): A (amber), G (green), PW (pure white), R (red), S (blue)
- Use the pure white (PW) module for yellow illumination.
- LED lamp contains a current-limiting resistor.

### Specifications

| | | |
|---|---|---|
| Operating Temperature | | –25 to +60°C (no freezing)<br>Illuminated units: –25 to +55°C |
| Storage Temperature | | –30 to +80°C (no freezing) |
| Operating Humidity | | 45 to 85% RH (no condensation) |
| Contact Resistance | | 50 mΩ maximum (initial value) |
| Insulation Resistance | | 100 MΩ minimum (500V DC megger) |
| Dielectric Strength | Switch Unit | Between live part and ground:<br>2,000V AC, 1 minute<br>Between terminals of different poles:<br>2,000V AC, 1 minute<br>Between terminals of the same poles:<br>1,000V AC, 1 minute |
| | Illumination Unit | Between live part and ground:<br>2,000V AC, 1 minute |
| Vibration Resistance | | Operating extremes/Damage limits:<br>5 to 55 Hz, amplitude 0.5 mm |
| Shock Resistance | | Operating extremes: 100 m/s²<br>Damage limits: 1,000 m/s² |
| Mechanical Life (minimum operations) | | Momentary: 2,000,000<br>Maintained: 250,000<br>Selector switches: 250,000<br>Key selector switches: 250,000 |
| Electrical Life (minimum operations) | | Momentary: 50,000 / 100,000 (*1)<br>Maintained: 50,000 / 100,000 (*2)<br>Selector switches: 50,000 / 100,000 (*2)<br>Key selector switches: 50,000 / 100,000 (*2) |
| Degree of Protection | | IP65 (IEC 60529) |
| Terminal Style | | Solder/tab terminal #110<br>PC board terminal |
| Weight (approx.) | | 14g (LB8L-M1T24)<br>13g (LB8P-1T04)<br>13g (LB8B-M1T2)<br>15g (LB8S-2T2)<br>27g (LB8K-2ST2A)<br>15g (LB8GL-M1T24)<br>14g (LB8GB-M1T2) |

*1: Switching frequency 1,200 operations/h.
*2: Switching frequency 1,200 operations/h.





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## Illuminated Pushbuttons

### Solder/Tab Terminal

Quantity:1

Part No. / Shape: LB①L-②1T③④⑤∗

Round / Black Bezel

Square / Black Bezel

Rectangular / Black Bezel

Round / Metallic Bezel

Square / Metallic Bezel

Rectangular / Metallic Bezel

Round with Guard

Square with Guard

Rectangular with Guard

| ① Shape | ② Operation | ③ Contact | ④ LED Operating Voltage | Part No. | ∗ Illumination Color Code |
|---|---|---|---|---|---|
| Black bezel | Momentary | Gold/SPDT | 24V AC/DC | LB①L-M1T14∗ | Specify the color code in place of ∗ in the Part No.<br>A: amber<br>G: green<br>PW: pure white<br>R: red<br>S: blue<br>Y: yellow |
| | | Gold/DPDT | | LB①L-M1T24∗ | |
| | Maintained | Gold/SPDT | 24V AC/DC | LB①L-A1T14∗ | |
| | | Gold/DPDT | | LB①L-A1T24∗ | |
| Metallic bezel | Momentary | Gold/SPDT | 24V AC/DC | LB①L-M1T14∗ | |
| | | Gold/DPDT | | LB①L-M1T24∗ | |
| | Maintained | Gold/SPDT | 24V AC/DC | LB①L-A1T14∗ | |
| | | Gold/DPDT | | LB①L-A1T24∗ | |
| Guard Type | Momentary | Gold/SPDT | 24V AC/DC | LB①L-M1T14∗ | |
| | | Gold/DPDT | | LB①L-M1T24∗ | |
| | Maintained | Gold/SPDT | 24V AC/DC | LB①L-A1T14∗ | |
| | | Gold/DPDT | | LB①L-A1T24∗ | |

- Illuminated pushbuttons contain an LED unit. For details on LED units, see B-130.
- The guard opens 180 degrees spring-return.
- Illuminated pushbuttons can be used with legend markings. Engraving can be done on a marking plate which is placed in the lens, or a clear film can be printed and placed in the lens. See B-133 for details on the marking plate and film.
- PC board terminals available for gold contacts. Silver contacts also available. To specify, see Part Number Development below.
- 5V DC and 12V AC/DC LED operating voltages also available.
- Other bezel sizes available (LBW series). For details, see B-093.

## Part Number Development

### LB①L-②1T③④⑤∗

#### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 8 | Rectangular / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |
| 8M | Rectangular / Metallic Bezel |
| 6G | Round with Guard |
| 7G | Square with Guard |
| 8G | Rectangular with Guard |

#### ② Operation

| Code | Operation |
|---|---|
| A | Maintained |
| M | Momentary |

#### ③ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT |
| 2 | Gold/DPDT |
| 5 | Silver/SPDT |
| 6 | Silver/DPDT |

#### ④ LED Operating Voltage

| Code | Rated Operating Voltage |
|---|---|
| 1 | 5V DC |
| 3 | 12V AC/DC |
| 4 | 24V AC/DC |

#### ⑤ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LB6L-M1T14V∗ |

- Specify the color code in place of ∗ in the table above.





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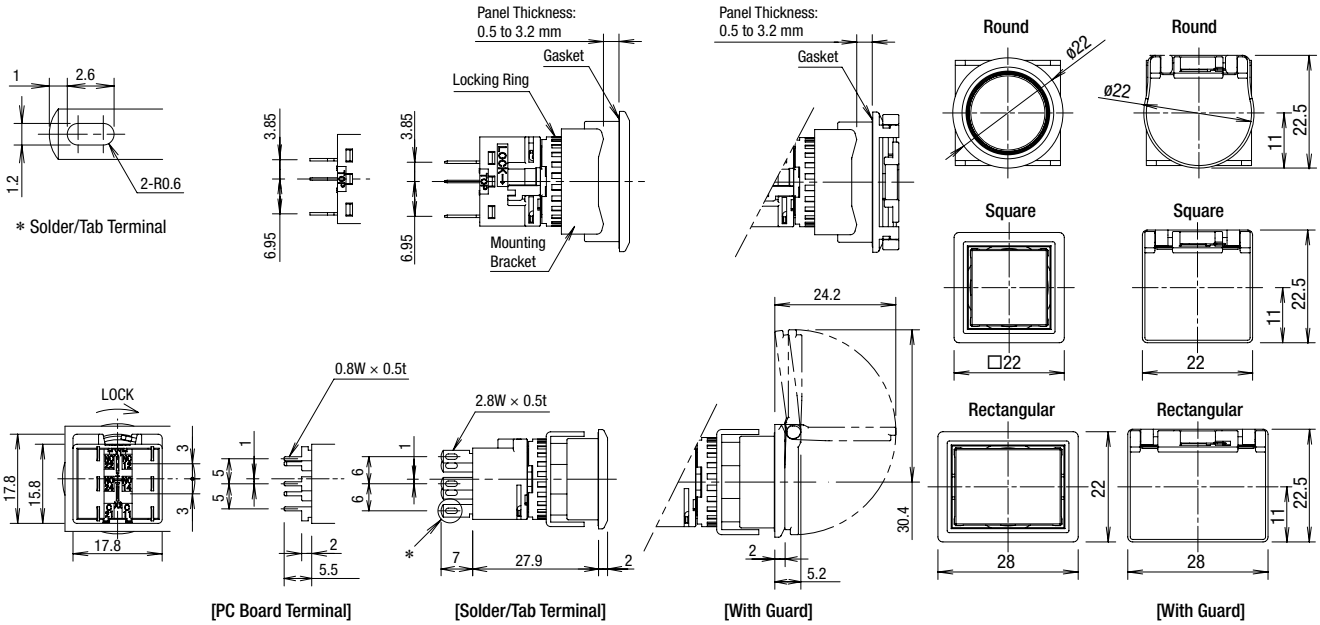
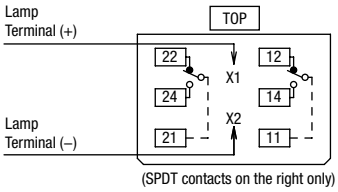
## Dimensions

All dimensions in mm.



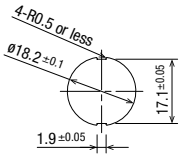

* Solder/Tab Terminal

## Terminal Arrangement (Bottom View)



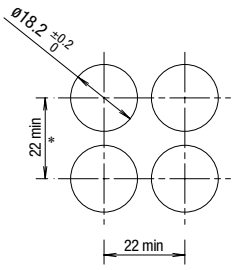

## Panel Cut-out for Positioning

### Round (LB6L/LB6ML/LB6GL)

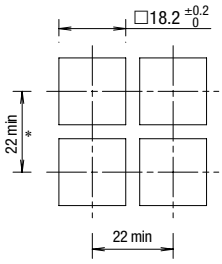



## Mounting Hole Layout

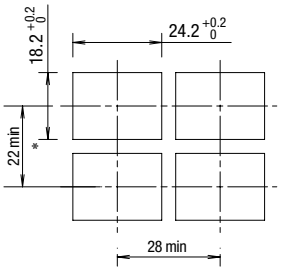
### Round (LB6L/LB6ML/LG6GL)




### Square (LB7/LB7ML/LB7GL)




### Square (LB8L/LB8ML/LB8GL)




* 45 mm minimum for switches with guard

Note: When using rubber boot or terminal cover, see dimensions on B-127 and B-128.

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.


APEM
Switches & Pilot Lights
Control Boxes
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ø16
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Miniature
Pilot Lights
CW
LW-F
LB
LBW
UP
Flush Bezel




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## Pilot Lights

### Solder/Tab Terminal

Quantity:1

| Part No. / Shape | LB①P-②T0③④∗ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Round / Black Bezel | Square / Black Bezel | Rectangular / Black Bezel | Round / Metallic Bezel | Dome / Black Bezel | Square / Metallic Bezel | Rectangular / Metallic Bezel | Dome / Metallic Bezel |

| ② Lens Shape | ① Shape | ③ LED Operating Voltage | Part No. | ∗ Illumination Color Code |
|---|---|---|---|---|
| Flush | Black Bezel | 24V AC/DC | LB①P-1T04∗ | Specify the color code in place of ∗ in the Part No.<br>A: amber<br>G: green<br>PW: pure white<br>R: red<br>S: blue<br>Y: yellow |
| | Metallic Bezel | 24V AC/DC | LB①P-1T04∗ | |
| Dome | Black Bezel | 24V AC/DC | LB6P-2T04∗ | |
| | Metallic Bezel | 24V AC/DC | LB6MP-2T04∗ | |

- Pilot lights contain an LED unit. For maintenance LED units see B-130.
- Legends and symbols can be engraved on a marking plate or film to be inserted under the lens by users for labelling purposes. See B-133 for details.
- PC board terminals available. To specify, see Part Number Development below.
- 5V DC and 12V AC/DC LED operating voltages also available.
- Other bezel sizes available (LBW series). For details, see B-095.

## Part Number Development

### LB①P-②T0③④∗

#### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 8 | Rectangular / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |
| 8M | Rectangular / Metallic Bezel |

- Round only for dome.

#### ② Lens Shape

| Code | Lens Shape |
|---|---|
| 1 | Flush |
| 2 | Dome |

#### ③ LED Operating Voltage

| Code | Rated Operating Voltage |
|---|---|
| 1 | 5V DC |
| 3 | 12V AC/DC |
| 4 | 24V AC/DC |

#### ④ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal | LB6P-1T04V∗ |

- Specify the color code in place of ∗ in the table above.





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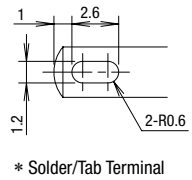
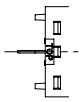
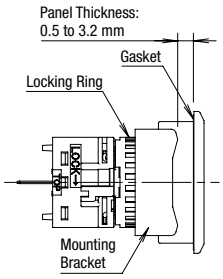
## Dimensions

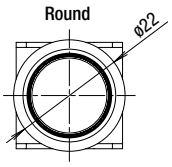
All dimensions in mm.

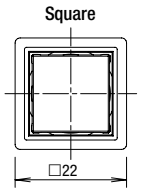


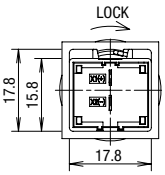

* Solder/Tab Terminal

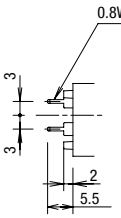




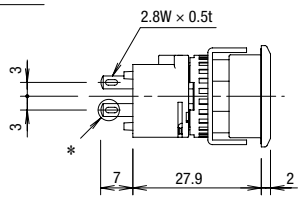



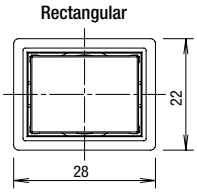



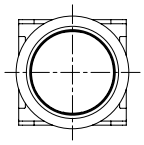

[PC Board Terminal]



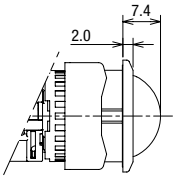

[Flush, Solder/Tab Terminal]




[Flush]

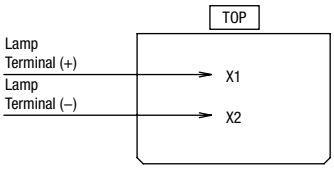


[Dome]



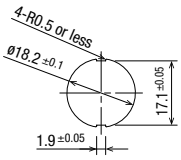

[Dome]

## Terminal Arrangement (Bottom View)



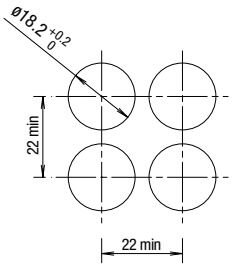

## Panel Cut-out for Positioning

### Round (LB6P/LB6MP)

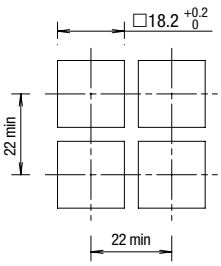



## Mounting Hole Layout

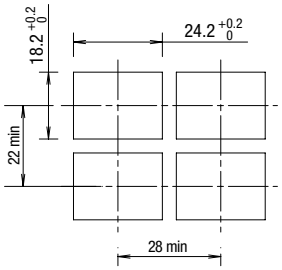
### Round (LB6P/LB6MP)




### Square (LB7P/LB7MP)




### Square (LB8P/LB8MP)




Note: When using rubber boot or terminal cover, see dimensions on B-127 and B-128.

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

APEM
Switches & Pilot Lights
Control Boxes
Emergency Stop Switches
Enabling Switches
Safety Products
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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



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## Pushbuttons

### Solder/Tab Terminal

Quantity:1

Part No. / Shape: LB①B-②1T③④∗

Round / Black Bezel

Square / Black Bezel

Rectangular / Black Bezel

Round / Metallic Bezel

Square / Metallic Bezel

Rectangular / Metallic Bezel

Round with Guard

Square with Guard

Rectangular with Guard

| ① Shape | Button Style | ② Operation | ③ Contact | Part No. Gold Contact | Part No. Silver Contact | ∗ Color Code |
|---|---|---|---|---|---|---|
| Black bezel | Button | Momentary | SPDT | LB①B-M1T1∗ | LB①B-M1T5∗ | B: black<br>G: green<br>R: red<br>S: blue<br>W: white<br>Y: yellow |
| | | | DPDT | LB①B-M1T2∗ | LB①B-M1T6∗ | |
| | | | 3PDT | LB①B-M1T3∗ | LB①B-M1T7∗ | |
| | | Maintained | SPDT | LB①B-A1T1∗ | LB①B-A1T5∗ | |
| | | | DPDT | LB①B-A1T2∗ | LB①B-A1T6∗ | |
| | | | 3PDT | LB①B-A1T3∗ | LB①B-A1T7∗ | |
| | Lens | Momentary | SPDT | LB①B-M1T1L∗ | LB①B-M1T5L∗ | A: amber<br>G: green<br>R: red<br>S: blue<br>W: white<br>Y: yellow |
| | | | DPDT | LB①B-M1T2L∗ | LB①B-M1T6L∗ | |
| | | | 3PDT | LB①B-M1T3L∗ | LB①B-M1T7L∗ | |
| | | Maintained | SPDT | LB①B-A1T1L∗ | LB①B-A1T5L∗ | |
| | | | DPDT | LB①B-A1T2L∗ | LB①B-A1T6L∗ | |
| | | | 3PDT | LB①B-A1T3L∗ | LB①B-A1T7L∗ | |
| Metallic bezel | Button | Momentary | SPDT | LB①B-M1T1∗ | LB①B-M1T5∗ | B: black<br>G: green<br>R: red<br>S: blue<br>W: white<br>Y: yellow |
| | | | DPDT | LB①B-M1T2∗ | LB①B-M1T6∗ | |
| | | | 3PDT | LB①B-M1T3∗ | LB①B-M1T7∗ | |
| | | Maintained | SPDT | LB①B-A1T1∗ | LB①B-A1T5∗ | |
| | | | DPDT | LB①B-A1T2∗ | LB①B-A1T6∗ | |
| | | | 3PDT | LB①B-A1T3∗ | LB①B-A1T7∗ | |
| | Lens | Momentary | SPDT | LB①B-M1T1L∗ | LB①B-M1T5L∗ | A: amber<br>G: green<br>R: red<br>S: blue<br>W: white<br>Y: yellow |
| | | | DPDT | LB①B-M1T2L∗ | LB①B-M1T6L∗ | |
| | | | 3PDT | LB①B-M1T3L∗ | LB①B-M1T7L∗ | |
| | | Maintained | SPDT | LB①B-A1T1L∗ | LB①B-A1T5L∗ | |
| | | | DPDT | LB①B-A1T2L∗ | LB①B-A1T6L∗ | |
| | | | 3PDT | LB①B-A1T3L∗ | LB①B-A1T7L∗ | |
| Guard Type | Button | Momentary | SPDT | LB①B-M1T1∗ | LB①B-M1T5∗ | B: black<br>G: green<br>R: red<br>S: blue<br>W: white<br>Y: yellow |
| | | | DPDT | LB①B-M1T2∗ | LB①B-M1T6∗ | |
| | | | 3PDT | LB①B-M1T3∗ | LB①B-M1T7∗ | |
| | | Maintained | SPDT | LB①B-A1T1∗ | LB①B-A1T5∗ | |
| | | | DPDT | LB①B-A1T2∗ | LB①B-A1T6∗ | |
| | | | 3PDT | LB①B-A1T3∗ | LB①B-A1T7∗ | |
| | Lens | Momentary | SPDT | LB①B-M1T1L∗ | LB①B-M1T5L∗ | A: amber<br>G: green<br>R: red<br>S: blue<br>W: white<br>Y: yellow |
| | | | DPDT | LB①B-M1T2L∗ | LB①B-M1T6L∗ | |
| | | | 3PDT | LB①B-M1T3L∗ | LB①B-M1T7L∗ | |
| | | Maintained | SPDT | LB①B-A1T1L∗ | LB①B-A1T5L∗ | |
| | | | DPDT | LB①B-A1T2L∗ | LB①B-A1T6L∗ | |
| | | | 3PDT | LB①B-A1T3L∗ | LB①B-A1T7L∗ | |

- The guard opens 180 degrees spring-return.
- Pushbuttons can be used with legend markings. Engraving can be done on a marking plate which is placed in the lens, or a clear film can be printed and placed in the lens. See B-133 for details on the marking plate and film.
- Black is available for lens. Black lens consists of a transparent lens and a black marking plate. To specify, see Part Number Development below.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- Other bezel sizes available (LBW series). For details, see B-097.

## Part Number Development

LB①B-②1T③④∗

### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 8 | Rectangular / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |
| 8M | Rectangular / Metallic Bezel |
| 6G | Round with Guard |
| 7G | Square with Guard |
| 8G | Rectangular with Guard |

### ② Operation

| Code | Operation |
|---|---|
| A | Maintained |
| M | Momentary |

### ③ Contacts

| Code | Contact | Code | Contact |
|---|---|---|---|
| 1 | Gold/SPDT | 5 | Silver/SPDT |
| 2 | Gold/DPDT | 6 | Silver/DPDT |
| 3 | Gold/3PDT | 7 | Silver/3PDT |

### ④ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| B | Black Translucent Lens (Lens Only) | LB6B-M1T1LB |
| V | PC Board Terminal (Gold Contact Only) | LB6B-M1T1V∗ |





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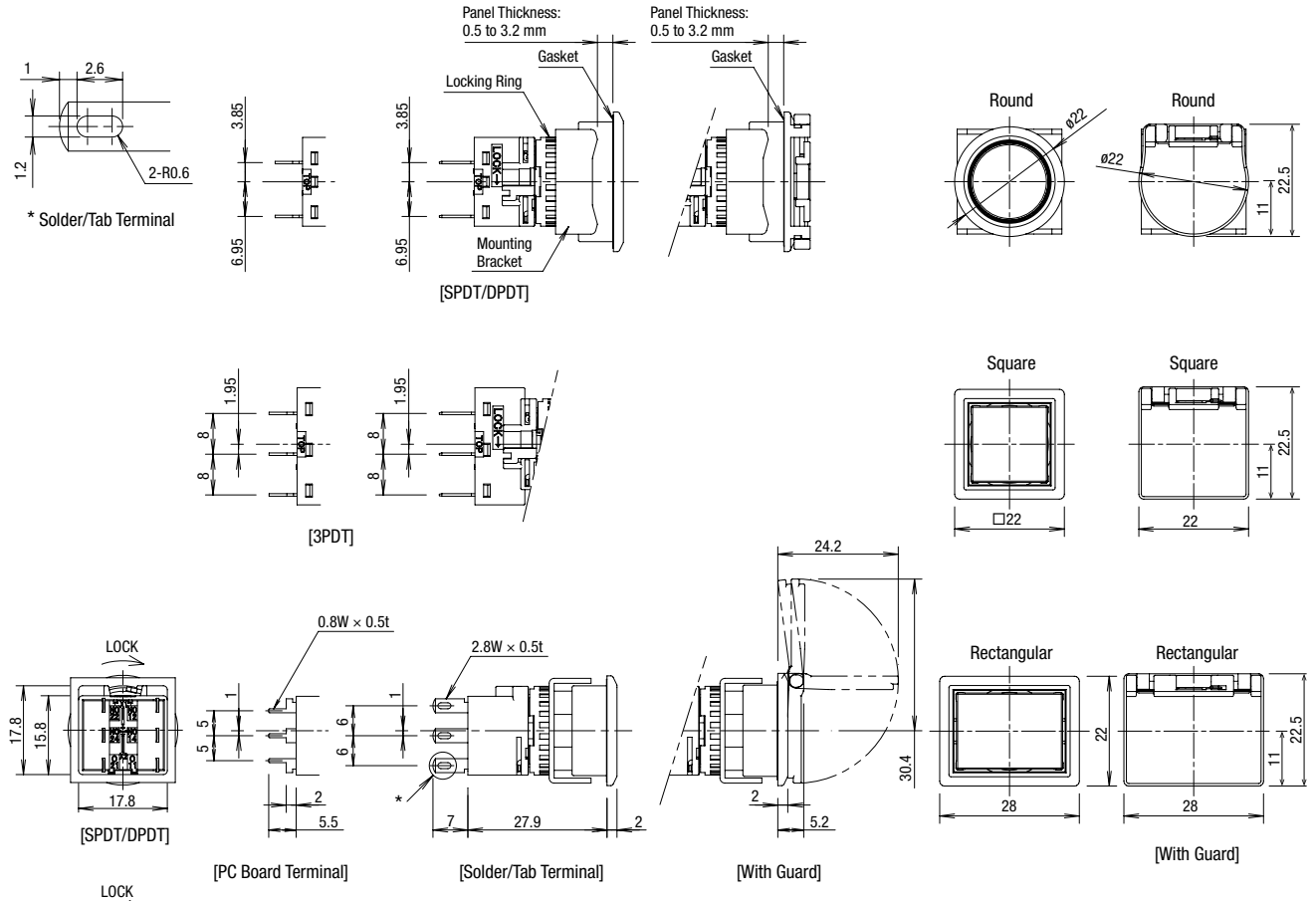
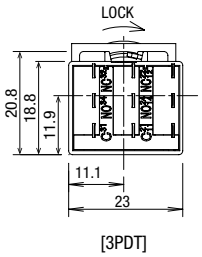
## Dimensions

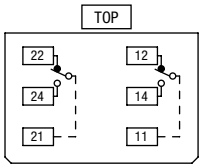
All dimensions in mm.



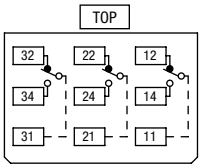

## Terminal Arrangement (Bottom View)

### SPDT/DPDT Contacts



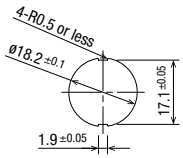

(SPDT contacts on the right only)

### 3PDT Contacts



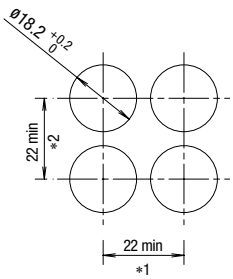

## Panel Cut-out for Positioning

### Round (LB6B/LB6MB/LB6GB)

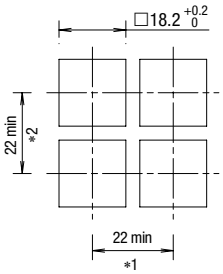



## Mounting Hole Layout

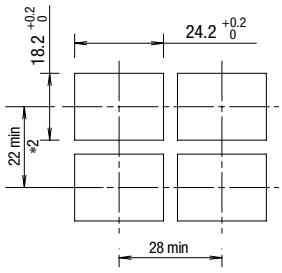
### Round (LB6B/LB6MB/LB6GB)




### Square (LB7B/LB7MB/LB7GB)




### Rectangular (LB8B/LB8MB/LB8GB)




*1: 23.2 mm minimum for 3PDT
*2: 45 mm minimum for switches with guard
Note: When using rubber boot or terminal cover, see dimensions on B-127 and B-128.

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.





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## Selector Switches

### Solder/Tab Terminal

Quantity:1

Part No. / Shape: LB①S-②③T④⑤

Knob Operator

Round / Black Bezel

Square / Black Bezel

Rectangular / Black Bezel

Round / Metallic Bezel

Square / Metallic Bezel

Rectangular / Metallic Bezel

Lever Operator

Round / Metallic Bezel

Square / Metallic Bezel

Rectangular / Metallic Bezel

| ① Shape | ② Operator Position | | | ③ Contact | Part No. Gold Contact | Part No. Silver Contact |
|---|---|---|---|---|---|---|
| Black bezel | 90° 2-position | Maintained | L R | SPDT | LB①S-2T1 | LB①S-2T5 |
| | | | | DPDT | LB①S-2T2 | LB①S-2T6 |
| | | | | 3PDT | LB①S-2T3 | LB①S-2T7 |
| | 45° 3-position | Maintained | L C R | DPDT | LB①S-3T2 | LB①S-3T6 |
| | | | | 3PDT | LB①S-3T3 | LB①S-3T7 |
| | | Spring return two-way | L C R | DPDT | LB①S-33T2 | LB①S-33T6 |
| | | | | 3PDT | LB①S-33T3 | LB①S-33T7 |
| Metallic bezel | 90° 2-position | Maintained | L R | SPDT | LB①S-2T1 | LB①S-2T5 |
| | | | | DPDT | LB①S-2T2 | LB①S-2T6 |
| | | | | 3PDT | LB①S-2T3 | LB①S-2T7 |
| | 45° 3-position | Maintained | L C R | DPDT | LB①S-3T2 | LB①S-3T6 |
| | | | | 3PDT | LB①S-3T3 | LB①S-3T7 |
| | | Spring return two-way | L C R | DPDT | LB①S-33T2 | LB①S-33T6 |
| | | | | 3PDT | LB①S-33T3 | LB①S-33T7 |

- Lever operators also available. To specify, see Part Number Development below.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- 2-position spring return from right, 3-position spring return from right, and 3-position spring return from left also available. To specify, see Part Number Development below.
- For contact operation, see B-119.
- Other bezel sizes available (LBW series). For details, see B-099.

## Part Number Development

### LB①S-②③T④⑤

#### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 8 | Rectangular / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |
| 8M | Rectangular / Metallic Bezel |

#### ② Operator Position

2-position

| Operator Position | |
|---|---|
| 2 Maintained | 21 Spring return from right |
| L R | L R |

3-position

| Operator Position | | | |
|---|---|---|---|
| 3 Maintained | 31 Spring return from right | 32 Spring return from left | 33 Spring return two-way |
| L C R | L C R | L C R | L C R |

#### ③ Operator

| Code | Operator Shape |
|---|---|
| Blank | Knob |
| L | Lever |

#### ④ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT (90° 2-position only) |
| 2 | Gold/DPDT |
| 3 | Gold/3PDT |
| 5 | Silver/SPDT (90° 2-position only) |
| 6 | Silver/DPDT |
| 7 | Silver/3PDT |

#### ⑤ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LB6S-2T1V |





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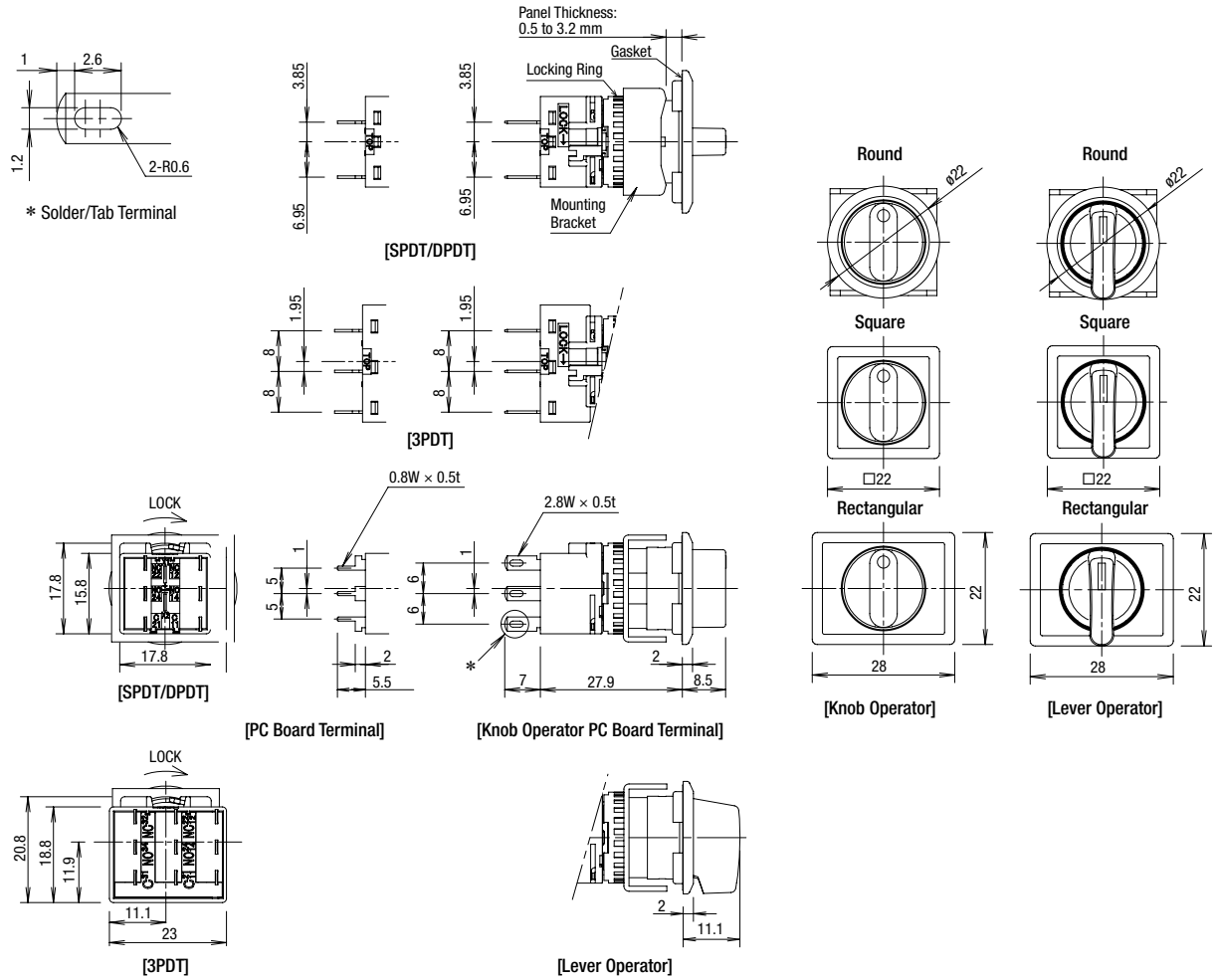
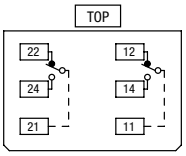
## Dimensions

All dimensions in mm.



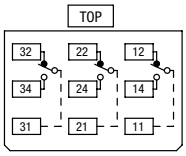

## Terminal Arrangement (Bottom View)

### SPDT/DPDT Contacts



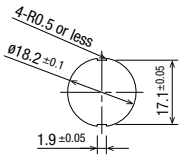

(SPDT contacts on the right only)

### 3PDT Contacts



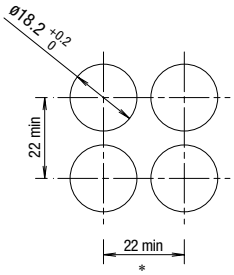

## Panel Cut-out for Positioning

### Round (LB6S/LB6MS)

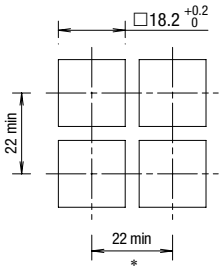



## Mounting Hole Layout

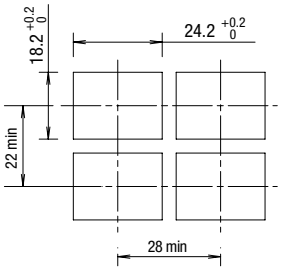
### Round (LB6S/LB6MS)




### Square (LB7S/LB7MS)




### Rectangular (LB8S/LB8MS)




*: 23.2 mm minimum for 3PDT

Note: When using rubber boot or terminal cover, see dimensions on B-128.

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.


APEM
Switches & Pilot Lights
Control Boxes
Emergency Stop Switches
Enabling Switches
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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




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## Illuminated Selector Switches

### Solder/Tab Terminal

Quantity:1

Part No. / Shape: LB①F-②T③④⑤∗

Round / Black Bezel

Square / Black Bezel

Round / Metallic Bezel

| ① Shape | ② Operator Position | | | ③ Contact | ④ LED Operating Voltage | Part No. Gold Contact | Part No. Silver Contact | ∗ Illumination Color Code |
|---|---|---|---|---|---|---|---|---|
| Black bezel | 90° 2-position | Maintained | L R | SPDT | 24V AC/DC | LB①F-2T14∗ | LB①F-2T54∗ | Specify the color code in place of ∗ in the Part No.<br>G: green<br>R: red<br>PW: pure white |
| | | | | DPDT | 24V AC/DC | LB①F-2T24∗ | LB①F-2T64∗ | |
| | 45° 3-position | Maintained | L C R | DPDT | 24V AC/DC | LB①F-3T24∗ | LB①F-3T64∗ | |
| Metallic bezel | 90° 2-position | Maintained | L R | SPDT | 24V AC/DC | LB①F-2T14∗ | LB①F-2T54∗ | |
| | | | | DPDT | 24V AC/DC | LB①F-2T24∗ | LB①F-2T64∗ | |
| | 45° 3-position | Maintained | L C R | DPDT | 24V AC/DC | LB①F-3T24∗ | LB①F-3T64∗ | |

- Illuminated selector switches contain an LED unit. For maintenance LED units see B-130.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- 5V DC and 12V AC/DC LED operating voltages also available. To specify, see Part Number Development below.
- For contact operation, see B-119.

## Part Number Development

### LB①F-②T③④⑤∗

#### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 6M | Round / Metallic Bezel |

#### ② Operator Position

2-position 3-position

| Operator Position | |
|---|---|
| 2 Maintained | 3 Maintained |
| L R | L C R |

#### ③ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT (90° 2-position only) |
| 2 | Gold/DPDT |
| 5 | Silver/SPDT (90° 2-position only) |
| 6 | Silver/DPDT |

#### ④ LED Operating Voltage

| Code | Rated Operating Voltage |
|---|---|
| 1 | 5V DC |
| 3 | 12V AC/DC |
| 4 | 24V AC/DC |

#### ⑤ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LB6F-2T14V∗ |

- Specify a color code in place of ∗ in the Part No.





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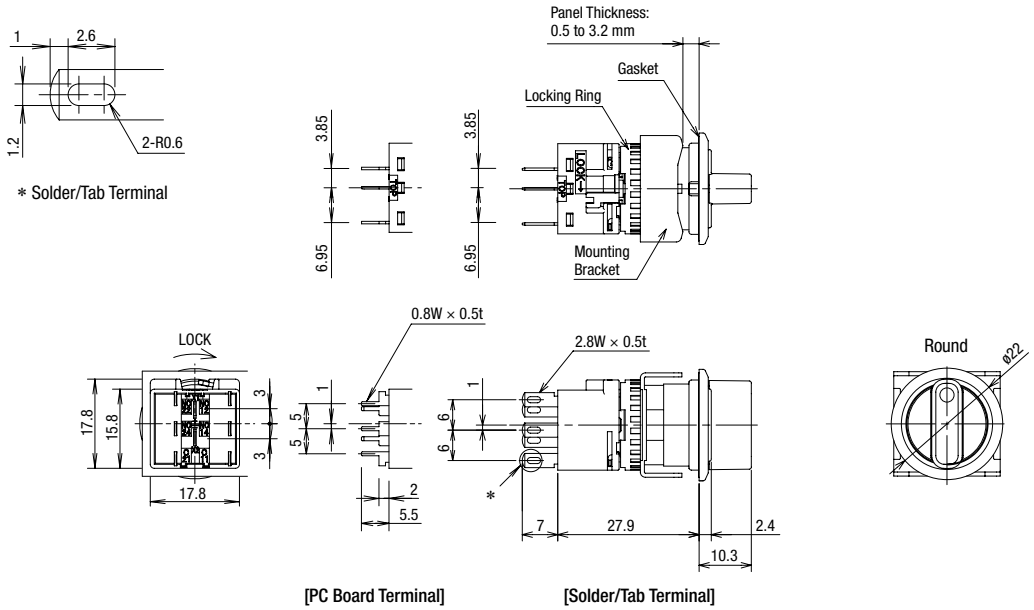
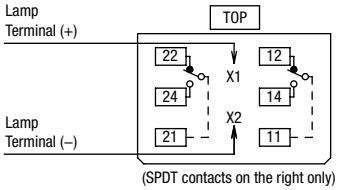
## Dimensions

All dimensions in mm.

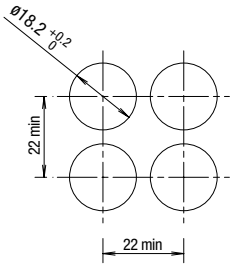



## Terminal Arrangement (Bottom View)



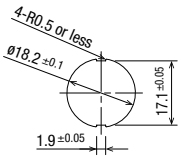

## Mounting Hole Layout

### Round (LB6F/LB6MF)




## Panel Cut-out for Positioning

### Round (LB6F/LB6MF)




Note: When using terminal cover, see dimensions on B-128.

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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ø30
Miniature
Pilot Lights
CW
LW-F
LB
LBW
UP
Flush Bezel



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## Key Selector Switches

### Solder/Tab Terminal

Quantity:1

| Part No. / Shape | LB①K-②③T④⑤-⑥ | | | | | |
|---|---|---|---|---|---|---|
| | Round / Black Bezel | Square / Black Bezel | Rectangular / Black Bezel | Round / Metallic Bezel | Square / Metallic Bezel | Rectangular / Metallic Bezel |

| ① Shape | ② Operator Position | | ⑤ Key Removable Position | | ④ Contact | Part No. Gold Contact | Part No. Silver Contact |
|---|---|---|---|---|---|---|---|
| Black bezel | 90° 2-position | Maintained | A: Key removable in all positions | | SPDT | LB①K-2ST1A | LB①K-2ST5A |
| | | | | | DPDT | LB①K-2ST2A | LB①K-2ST6A |
| | | | | | 3PDT | LB①K-2ST3A | LB①K-2ST7A |
| | 45° 3-position | Maintained | A: Key removable in all positions | | DPDT | LB①K-3ST2A | LB①K-3ST6A |
| | | | | | 3PDT | LB①K-3ST3A | LB①K-3ST7A |
| Metallic bezel | 90° 2-position | Maintained | A: Key removable in all positions | | SPDT | LB①K-2ST1A | LB①K-2ST5A |
| | | | | | DPDT | LB①K-2ST2A | LB①K-2ST6A |
| | | | | | 3PDT | LB①K-2ST3A | LB①K-2ST7A |
| | 45° 3-position | Maintained | A: Key removable in all positions | | DPDT | LB①K-3ST2A | LB①K-3ST6A |
| | | | | | 3PDT | LB①K-3ST3A | LB①K-3ST7A |

- For operator position, see Part Number Development below.
- For key removable position, see Part Number Development below. The key cannot be removed at the return position.
- Two keys are supplied.
- Besides the standard key (key number 0H), six other keys are available. To specify, see Part Number Development below.
- Disc tumbler keys also available. Only the standard key is available. To specify, see Part Number Development below.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- For contact operation, see B-119.
- Other bezel sizes available (LBW series). For details, see B-101.

## Part Number Development

### LB①K-②③T④⑤-⑥

#### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 8 | Rectangular / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |
| 8M | Rectangular / Metallic Bezel |

#### ② Operator Position

| Code | Operator Position |
|---|---|
| 2 | 90° 2-position maintained |
| 21 | 90° 2-position spring return from right |
| 3 | 45° 3-position maintained |
| 31 | 45° 3-position spring return from right |
| 32 | 45° 3-position spring return from left |
| 33 | 45°-3-position spring return two-way |

#### ③ Key Style

| Code | Key Style |
|---|---|
| S | Wave key |
| Blank | Disc tumbler key |

#### ④ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT (90° 2-position only) |
| 2 | Gold/DPDT |
| 3 | Gold/3PDT |
| 5 | Silver/SPDT (90° 2-position only) |
| 6 | Silver/DPDT |
| 7 | Silver/3PDT |

#### ⑤ Key Removal Position

2-position

| Key Removable Position | | | Spring return from right |
|---|---|---|---|
| A: Key removable in all positions | B: Key removable at left | C: Key removable at right | |

3-position

| Key Removable Position | | | |
|---|---|---|---|
| A: Key removable in all positions | B: Key removable at left / center | C: Key removable at center / right | D: Key removable at center |
| E: Key removable at right / left | G: Key removable at left | H: Key removable at right | |

For key selectors with the following operations, the key cannot be removed at the return position.

3-position

| Spring return from right | Spring return from left | Spring return two-way |
|---|---|---|
| | | |

- Key is removable at Ⓛ, Ⓒ, Ⓡ. Key is retained at ❶, ❸, and ❶.

#### ⑥ Key Number

| Code | |
|---|---|
| Blank | Standard key (0H) |
| 1H to 2H | Reversible key |
| 3H to 6H | Non-reversible key |

- Wave key only.

#### Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LB6K-2ST1VA |





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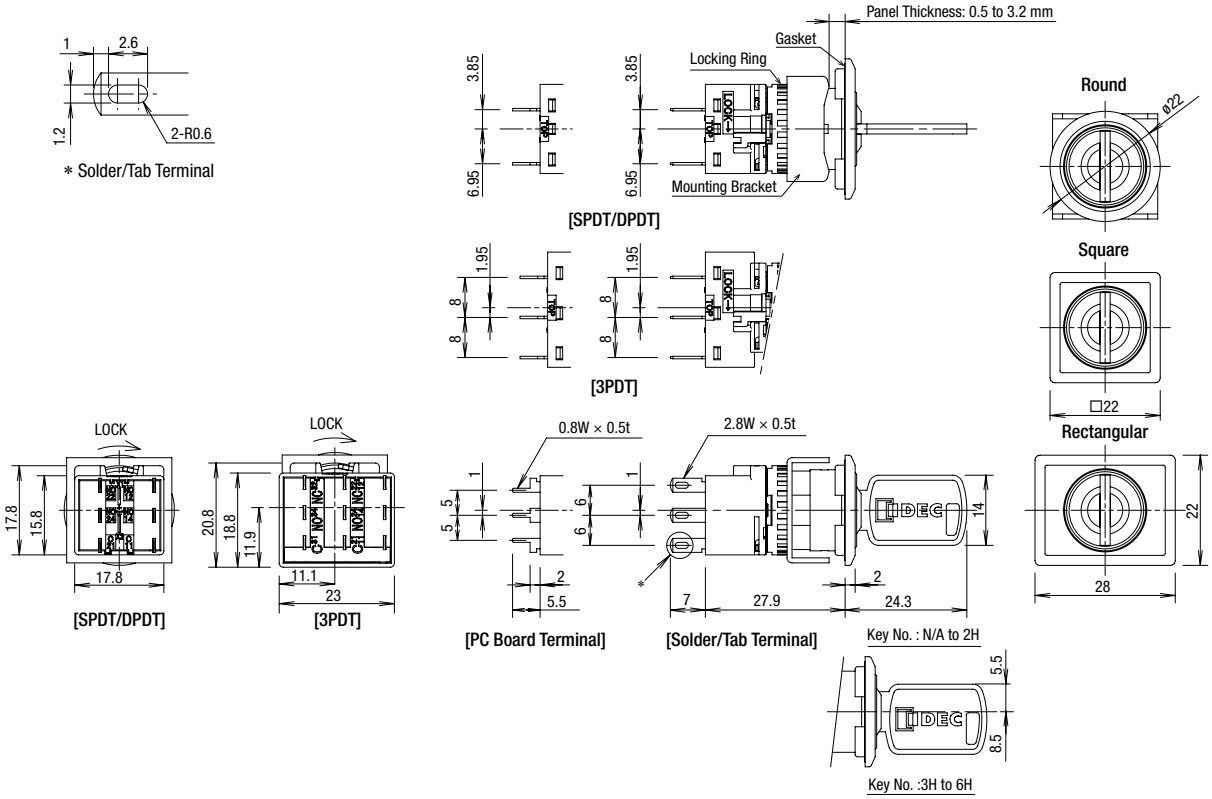
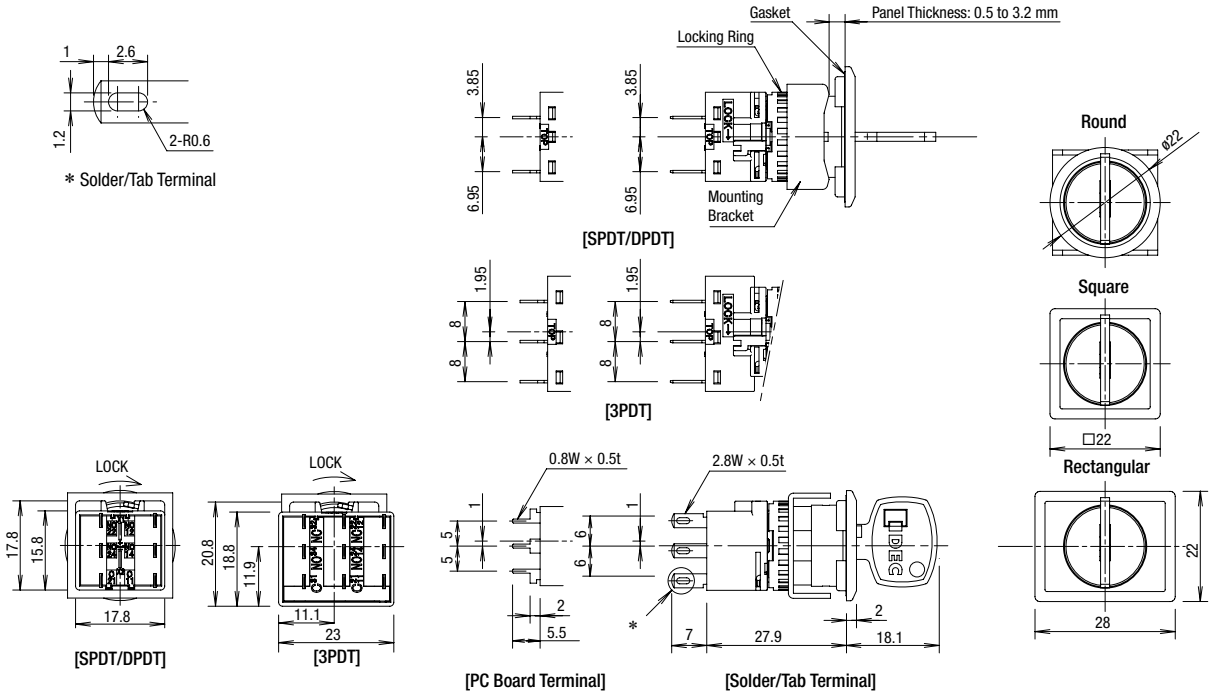
## Dimensions

All dimensions in mm.

### Key Selector Switches with Wave Key

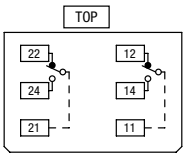



### Key Selector Switches with Disc Tumbler Key



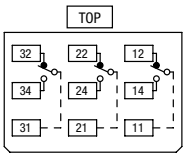

### Terminal Arrangement (Bottom View)

**SPDT/DPDT Contacts**




(SPDT contacts on the right only)

**3PDT Contacts**




- For details on mounting hole layout, see B-120.
- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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LB
LBW
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## Lever Switches

### Solder/Tab Terminal

Quantity: 1

Part No. / Shape

Round / Black Bezel

| Shape | Operator Position | | | Contact | Part No. Gold Contact | Part No. Silver Contact |
|---|---|---|---|---|---|---|
| Black bezel | 2-position | Maintained | U D | SPDT | LB6T-2T1 | LB6T-2T5 |
| | | | | DPDT | LB6T-2T2 | LB6T-2T6 |
| | | | | 3PDT | LB6T-2T3 | LB6T-2T7 |
| | 3-position | Maintained | U C D | DPDT | LB6T-3T2 | LB6T-3T6 |
| | | | | 3PDT | LB6T-3T3 | LB6T-3T7 |
| | | Spring return from top/bottom | U C D | DPDT | LB6T-33T2 | LB6T-33T6 |
| | | | | 3PDT | LB6T-33T3 | LB6T-33T7 |

- PC board terminals available for gold contacts. Add "**V**" to the Part No.
  Example: **LB6T-2T1V**
- For contact operation, see B-119.





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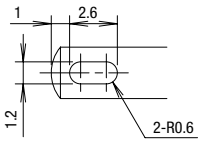
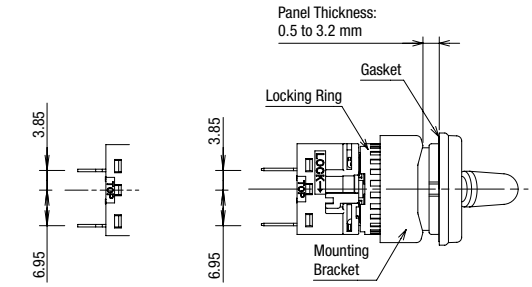
## Dimensions

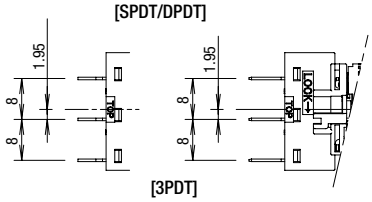
All dimensions in mm.



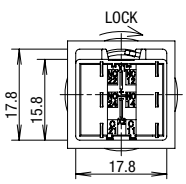

∗ Solder/Tab Terminal



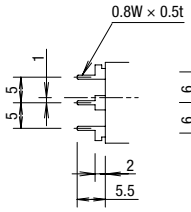

[SPDT/DPDT]



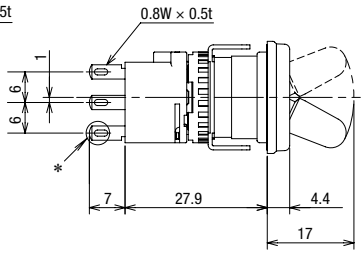

[3PDT]



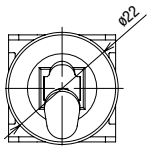

[SPDT/DPDT]

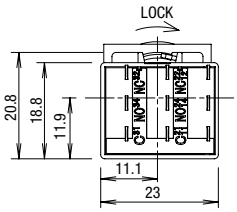



[PC Board Terminal]




[Solder/Tab Terminal]

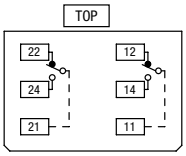



[3PDT]

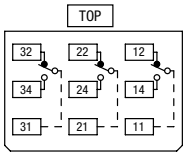
## Terminal Arrangement (Bottom View)

### SPDT/DPDT Contacts



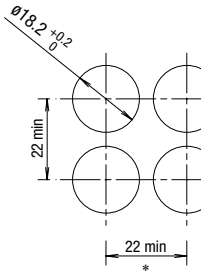

(SPDT contacts on the right only)

### 3PDT Contacts




## Mounting Hole Layout

### Round (LB6T)

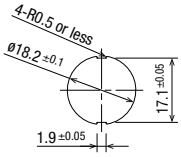



∗: 23.2 mm minimum for 3PDT

Note: When using terminal cover, see dimensions on B-128.

## Panel Cut-out for Positioning

### Round (LB6T)




- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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Pilot Lights
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LW-F
LB
LBW
UP
Flush Bezel



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## Buzzers

### Specifications

| | |
|---|---|
| Rated Insulation Voltage | 30V |
| Rated Operating Voltage | 12, 24V DC |
| Operating Voltage Range | 12V DC±10%, 24V DC±10% |
| Current Draw | 26 mA |
| Inrush Current | 80 mA 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 | IP54 (IEC60529) |
| Terminal Style | Solder/tab terminal #110 PC board terminal |
| Weight (approx.) | 13g (round), 14g (square) |

### Standards

- UL, CSA ratngs: Operating voltage 12, 24V DC.
- See website for details on approvals and standards.

Quantity: 1

Part No. / Shape

Round / Black Bezel

Rectangular / Black Bezel

Round / Metallic Bezel

Rectangular / Metallic Bezel

| Shape | | Operating Voltage | Degree of Protection | Part No. Terminal Style: Solder/tab terminal | Part No. Terminal Style: PC board terminal |
|---|---|---|---|---|---|
| Black bezel | Round | 24V DC | IP54 | LB6Z-1T04 | LB6Z-1T04V |
| | Rectangular | 24V DC | IP54 | LB8Z-1T04 | LB8Z-1T04V |
| Metallic bezel | Round | 24V DC | IP54 | LB6MZ-1T04 | LB6MZ-1T04V |
| | Rectangular | 24V DC | IP54 | LB8MZ-1T04 | LB8MZ-1T04V |

- 12V DC operating voltages also available. Specify "**-1T04**" in place of "**-1T03**" in the Part No.
  Example: **LB6Z-1T03**





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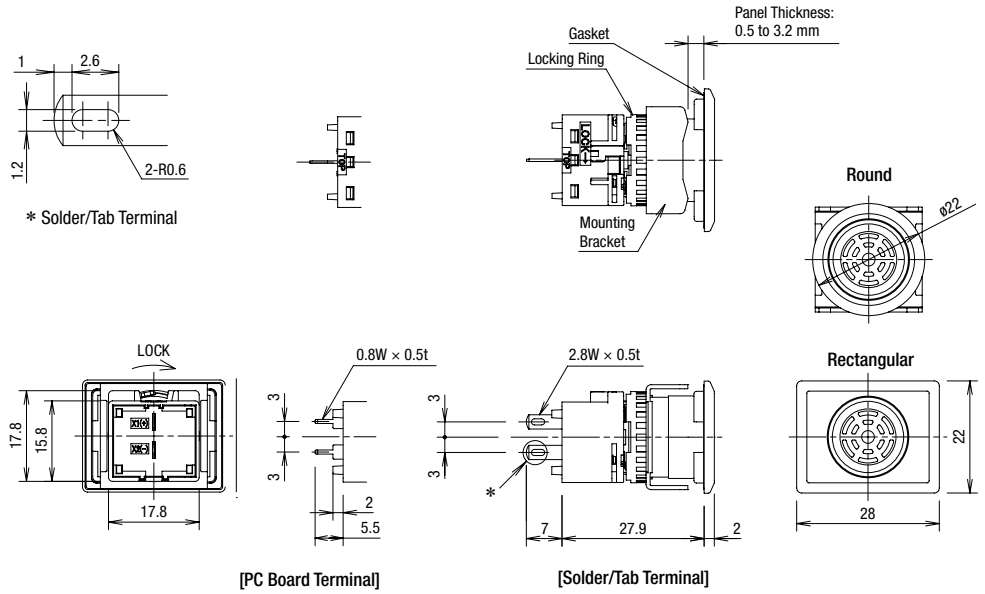
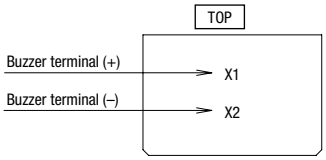
## Dimensions

All dimensions in mm.

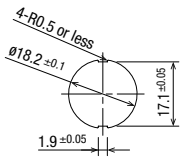



## Terminal Arrangement (Bottom View)



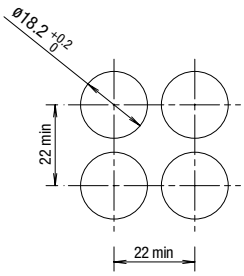

## Panel Cut-out for Positioning

### Round (LB6Z/LB6MZ)

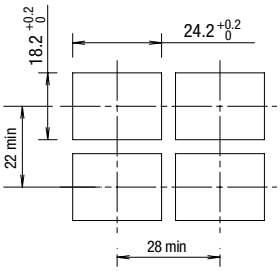



## Mounting Hole Layout

### Round (LB6Z/LB6MZ)




### Rectangular (LB8Z/LB8MZ)




Note: When using rubber boot or terminal cover, see dimensions on B-127 and B-128.

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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Flush Bezel

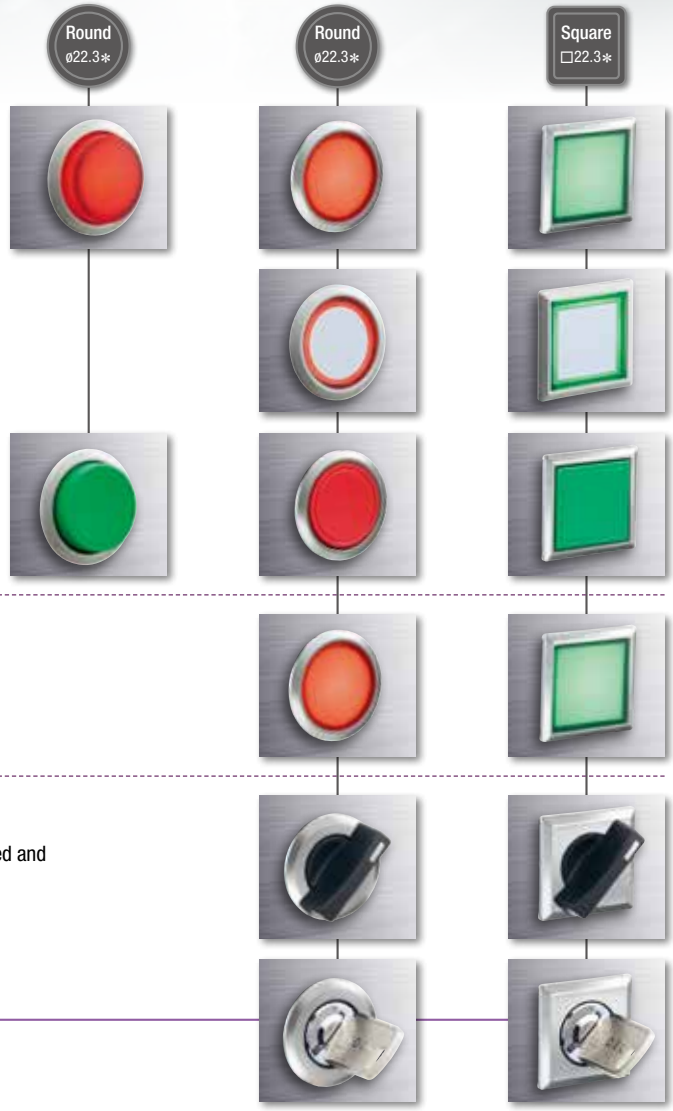
# Flush Silhouette Switches

**Slim**

Projects only 2mm from the panel. Removable contact blocks ideal for single board mounting. ø26/□26 bezel size for easy operation.

point For sleek and refined style

* Panel cutout (mm)




## Illuminated Pushbuttons

Illuminated pushbuttons with switch guard available

## Ring-illuminated Pushbuttons

## Pushbuttons

Marking plates can be used with lens style pushbuttons

*Does not light on.

Pushbuttons with switch guard available

## Pilot Lights

## Selector Switches

2-position and 3-position selector switches. Maintained and spring return actions available.

Key Selectors ensure safety

Wave Key

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

### Stylish Appearance with Advanced Functions

Operation status is easily visible due to illumination on the operator.

Illuminated Selector Switch (LB series only)

Switch guard prevents inadvertent switch operation

**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)

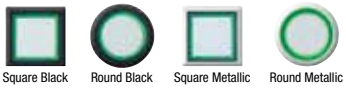
**Bezel Color Variations**

Metallic Black

**Ring-Illuminated Pushbutton Color Variations**

R (red) G (green) A (amber) S (blue) PW (pure white)

**Ring-Illuminated Pushbutton Bezels**



Square Black Round Black Square Metallic Round Metallic



IDEC

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# Flush Silhouette Switches LBW Series

## Flush bezel projects only 2 mm from front of panel.

### Contact Ratings

**Gold Contact (switch base: blue)**

| | | | | | |
|---|---|---|---|---|---|
| Rated Insulation Voltage | | | 250V | | |
| Rated Thermal Current | | | 3A | | |
| Rated Operating Voltage | | | 30V DC | 125V AC | 250V |
| Rated Operating Current (electrical life: 100,000 operations) | AC 50/60Hz | Resistive load | | 1A | 0.5A |
| | | Inductive load | | 0.7A | 0.5A |
| | DC | Resistive load | 1A | 0.2A | |
| | | Inductive load | 0.7A | 0.1A | |
| Contact Material | | | Gold plated silver | | |

- Minimum applicable load (reference value): 5V AC/DC, 1 mA
  Applicable range is subject to the operating conditions and load.
- See electrical life in Specifications.

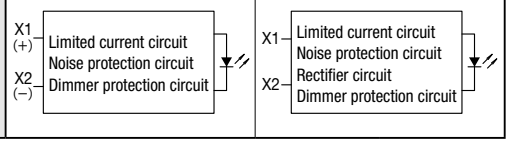
**Silver Contact (switch base: black)**

| | | | | | | |
|---|---|---|---|---|---|---|
| Rated Insulation Voltage | | | | 250V | | |
| Rated Operating Voltage | | | | 30V | 125V | 250V |
| Rated Thermal Current | | | | 5A | | |
| Rated Operating Current | Electrical Life 50,000・100,000 operations | AC 50/60Hz | Resistive load | — | 5A 3A | 3A |
| | | | Inductive load | — | 3A | 1.5A |
| | | DC | Resistive load | 3A | 0.6A | — |
| | | | Inductive load | 2A | 0.22A | — |
| Contact Material | | | | Silver | | |

- AC inductive load: PF=0.6 to 0.7 DC inductive load: L/R=7 ms max.

### LED Ratings

| | | | |
|---|---|---|---|
| Rated Voltage | 5V DC | 12V AC/DC | 24V AC/DC |
| Voltage Range | 5V DC±5% | 12V AC/DC ±10% | 24V AC/DC ±10% |
| LED Part No. | LB9Z-LED5② | LB9Z-LED1② | LB9Z-LED2② |
| Current Draw | 5 mA (typ.) | | |
| Voltage Marking | Marked on the side of the LED unit | | |
| LED Life (reference value) | Approx. 30,000 hours [until the brightness reduces to 50% of the initial value when lit at the rated voltage (direct current) under 25°C environment.] | | |
| Internal Circuit | A, G, R, PW, S | | |




- ② (color code): A (amber), G (green), PW (pure white), R (red), S (blue)
- Use the pure white (PW) module for yellow illumination.
- LED lamp contains a current-limiting resistor.

### Specifications

| | | |
|---|---|---|
| Operating Temperature | | –25 to +60°C (no freezing)<br>Illuminated units: –25 to +55°C |
| Storage Temperature | | –30 to +80°C (no freezing) |
| Operating Humidity | | 45 to 85% RH (no condensation) |
| Contact Resistance | | 50 mΩ maximum (initial value) |
| Insulation Resistance | | 100 MΩ minimum (500V DC megger) |
| Dielectric Strength | Switch Unit | Between live part and ground:<br>2,000V AC, 1 minute<br>Between terminals of different poles:<br>2,000V AC, 1 minute<br>Between terminals of the same poles:<br>1,000V AC, 1 minute |
| | Illumination Unit | Between live part and ground:<br>2,000V AC, 1 minute |
| Vibration Resistance | | Operating extremes/Damage limits:<br>5 to 55 Hz, amplitude 0.5 mm |
| Shock Resistance | | Operating extremes: 100 m/s²<br>Damage limits: 1,000 m/s² |
| Mechanical Life (minimum operations) | | Momentary: 2,000,000<br>Maintained: 250,000<br>Selector switches: 250,000<br>Key selector switches: 250,000 |
| Electrical Life (minimum operations) | | Momentary: 50,000 / 100,000 (*1)<br>Maintained: 50,000 / 100,000 (*2)<br>Selector switches: 50,000 / 100,000 (*2)<br>Key selector switches: 50,000 / 100,000 (*2) |
| Degree of Protection | | IP65 (IEC 60529) |
| Terminal Style | | Solder/tab terminal #110<br>PC board terminal |
| Weight (approx.) | | 16g (LBW7L-M1T24)<br>14g (LBW7P-1T04)<br>15g (LBW7B-M1T2)<br>17g (LBW7S-2T2)<br>29g (LBW7K-2ST2A)<br>17g (LBW7GL-M1T24)<br>18g (LBW7GB-M1T2) |

*1: Switching frequency 1,200 operations/h.
*2: Switching frequency 1,200 operations/h.

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Operator Interfaces
Sensors
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ø30
Miniature
Pilot Lights
CW
LW-F
LB
LBW
UP
Flush Bezel



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## Illuminated Pushbuttons

### Solder/Tab Terminal

Package Quantity:1

Part No. / Shape: LBW①L-②③T④⑤⑥∗

Flush

Round / Black Bezel | Square / Black Bezel | Round / Metallic Bezel | Square / Metallic Bezel | Round with Guard | Square with Guard

Extended

(black bezel is also available)

Flush Ring-illuminated

(black bezel is also available)

| ① Shape | ② Operation | ④ Contact | ⑤ LED Operating Voltage | Part No. | ∗ Illumination Color Code |
|---|---|---|---|---|---|
| Black bezel | Momentary | Gold/SPDT | 24V AC/DC | LBW①L-M③T14∗ | Specify the color code in place of ∗ in the Part No.<br>A: amber<br>G: green<br>PW: pure white<br>R: red<br>S: blue<br>Y: yellow |
| | | Gold/DPDT | | LBW①L-M③T24∗ | |
| | Maintained | Gold/SPDT | 24V AC/DC | LBW①L-A③T14∗ | |
| | | Gold/DPDT | | LBW①L-A③T24∗ | |
| Metallic bezel | Momentary | Gold/SPDT | 24V AC/DC | LBW①L-M③T14∗ | |
| | | Gold/DPDT | | LBW①L-M③T24∗ | |
| | Maintained | Gold/SPDT | 24V AC/DC | LBW①L-A③T14∗ | |
| | | Gold/DPDT | | LBW①L-A③T24∗ | |
| Guard Type | Momentary | Gold/SPDT | 24V AC/DC | LBW①L-M③T14∗ | |
| | | Gold/DPDT | | LBW①L-M③T24∗ | |
| | Maintained | Gold/SPDT | 24V AC/DC | LBW①L-A③T14∗ | |
| | | Gold/DPDT | | LBW①L-A③T24∗ | |

- Flush/Extended color code: A (amber), G (green), PW (pure white), R (red), S (blue), Y (yellow)
- Ring-illuminated color code: PW (pure white), WA (amber), WG (green), WR (red), WS (blue)
- Illuminated pushbuttons contain an LED unit. For details on LED units, see B-130.
- The guard opens 180 degrees spring-return.
- Illuminated pushbuttons can be used with legend markings. Engraving can be done on a marking plate which is placed in the lens, or a clear film can be printed and placed in the lens. See B-134 for details on the marking plate and film.
- PC board terminals available for gold contacts. Silver contacts also available. To specify, see Part Number Development below.
- Extended pushbuttons available. To specify, see Part Number Development below. Pushbuttons with guard is not available. Extended pushbutton is available with momentary operation only.
- Flush ring-illuminated style is available. See Part Number Development below (③). Guard is not available with flush ring-illuminated style.
- 5V DC and 12V AC/DC LED operating voltages also available.
- Other bezel sizes available (LB series). For details, see B-075.

## Part Number Development

### LBW①L-②③T④⑤⑥∗

#### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |
| 6G | Round with Guard |
| 7G | Square with Guard |

#### ② Operation

| Code | Operation |
|---|---|
| A | Maintained |
| M | Momentary |

#### ③ Operator Style

| Code | Operator Style |
|---|---|
| 1 | Flush |
| 2 | Extended |
| 1R | Flush Ring-illuminated |

- Extended style is available only for round (black/metallic bezel) and in momentary operation.
- Guard model is not available for Flush Ring-illuminated types. Also, Y (yellow) is not available.

#### ④ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT |
| 2 | Gold/DPDT |
| 5 | Silver/SPDT |
| 6 | Silver/DPDT |

#### ⑤ LED Operating Voltage

| Code | Rated Operating Voltage |
|---|---|
| 1 | 5V DC |
| 3 | 12V AC/DC |
| 4 | 24V AC/DC |

#### ⑥ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LBW6L-M1T14V∗ |

- Specify the color code in place of ∗ in the table above.





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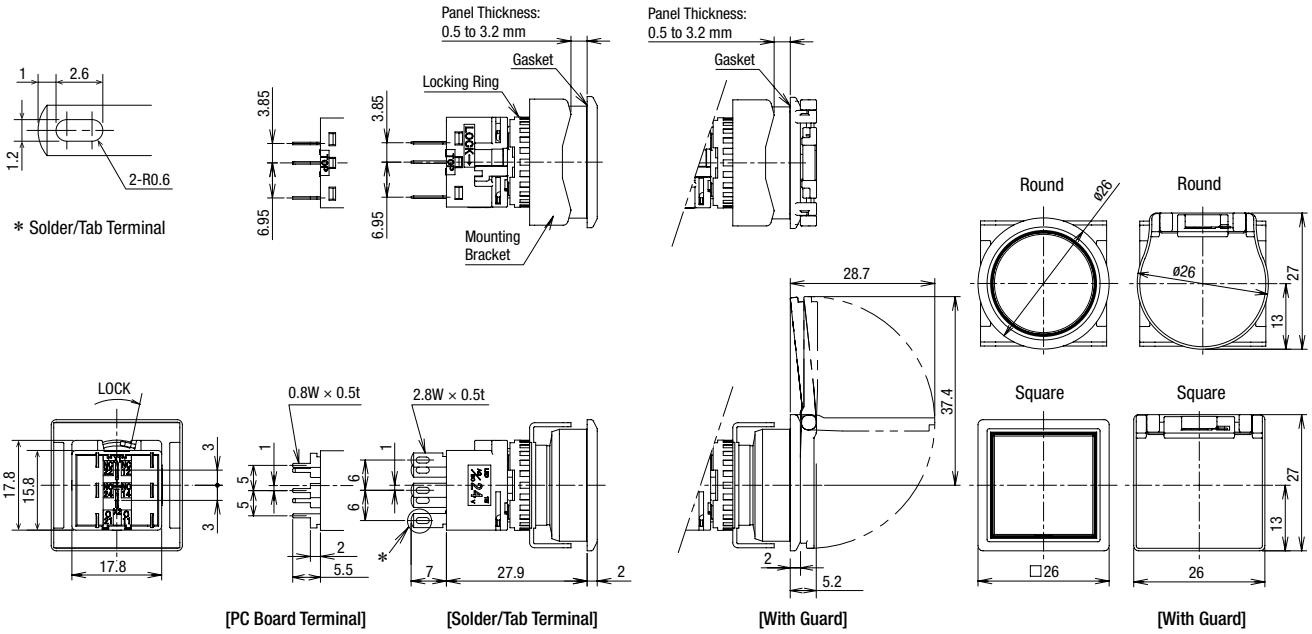
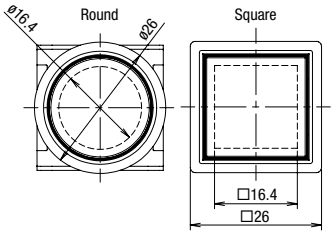
## Dimensions

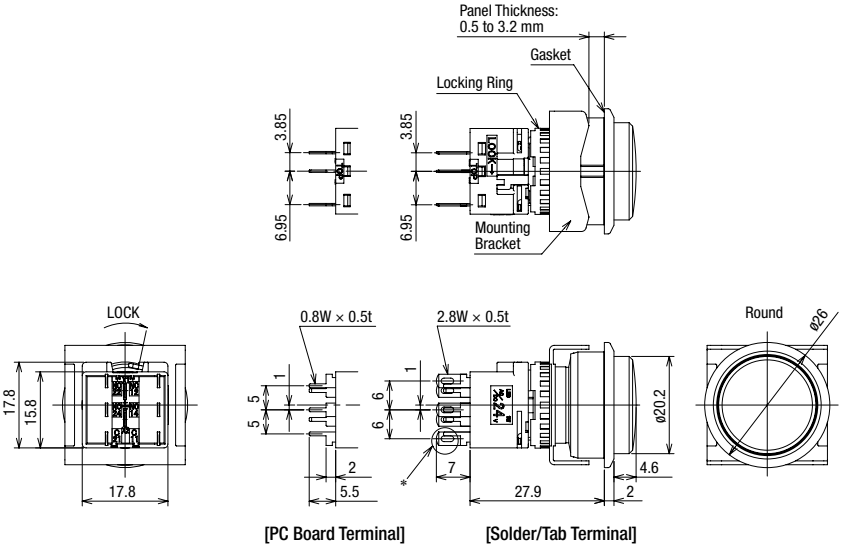
All dimensions in mm.

### Flush/Ring-illuminated

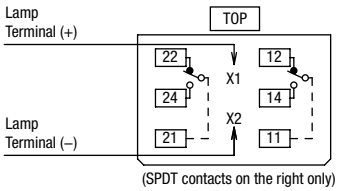



### Extended



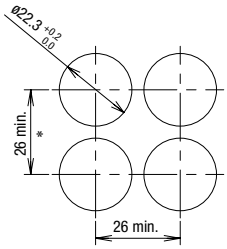

### Terminal Arrangement (Bottom View)



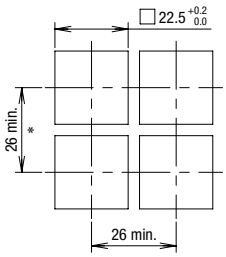

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

### Mounting Hole Layout

**Round (LBW6/LBW6M)**




**Square (LBW7/LBW7M)**




*: 53 mm minimum for switches with guard.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Pilot Lights
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LB
LBW
UP
Flush Bezel




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## Pilot Lights

### Solder/Tab Terminal

Package Quantity:1

| Part No. / Shape | LBW①P-1T0②③∗ | | | |
|---|---|---|---|---|
| | Round / Black Bezel | Square / Black Bezel | Round / Metallic Bezel | Square / Metallic Bezel |
| ① Shape | ③ LED Operating Voltage | Part No. | ∗ Illumination Color Code | |
| Black Bezel | 24V AC/DC | LBW①P-1T04∗ | Specify the color code in place of ∗ in the Part No.<br>A: amber<br>G: green<br>PW: pure white<br>R: red<br>S: blue<br>Y: yellow | |
| Metallic Bezel | 24V AC/DC | LBW①P-1T04∗ | | |

- Pilot lights contain an LED unit. For maintenance LED units see B-130.
- Legends and symbols can be engraved on a marking plate or film to be inserted under the lens by users for labelling purposes. See B-134 for details.
- PC board terminals available. To specify, see Part Number Development below.
- 5V DC and 12V AC/DC LED operating voltages also available.
- Other bezel sizes available (LB series). For details, see B-077.

## Part Number Development

### LBW①P-1T0②③∗

#### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |

#### ② LED Operating Voltage

| Code | Rated Operating Voltage |
|---|---|
| 1 | 5V DC |
| 3 | 12V AC/DC |
| 4 | 24V AC/DC |

#### ③ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal | LBW6P-1T04V∗ |

- Specify the color code in place of ∗ in the table above.





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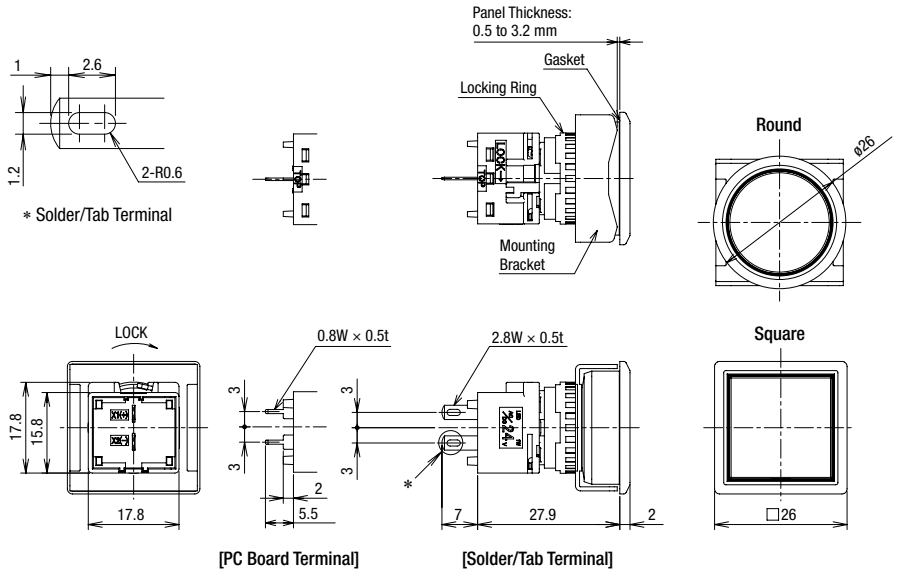
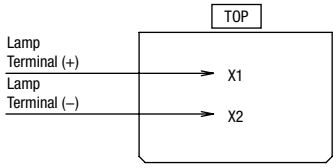
## Dimensions

All dimensions in mm.

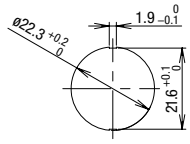



## Terminal Arrangement (Bottom View)



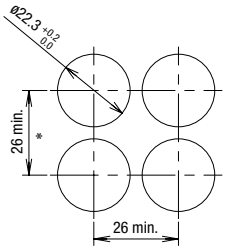

## Panel Cut-out for Positioning

### Round (LBW6P/LBW6MP)

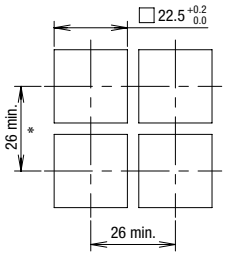



## Mounting Hole Layout

### Round (LBW6P/LBW6MP)




### Square (LBW7P/LBW7MP)




- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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LBW
UP
Flush Bezel



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## Pushbuttons

### Solder/Tab Terminal

Package Quantity:1

Part No. / Shape: LBW①B-②1T③④∗

Flush

Round / Black Bezel

Square / Black Bezel

Round / Metallic Bezel

Square / Metallic Bezel

Round with Guard

Square with Guard

Extended

Round only
(metallic bezel available)

| ① Shape | Button Style | ② Operation | ③ Contact | Part No. Gold Contact | Part No. Silver Contact | ∗ Illumination Color Code |
|---|---|---|---|---|---|---|
| Black bezel | Button | Momentary | SPDT | LBW①B-M1T1∗ | LBW①B-M1T5∗ | Specify the color code in place of ∗ in the Part No.<br>B: black<br>G: green<br>R: red<br>S: blue<br>W: white<br>Y: yellow |
| | | | DPDT | LBW①B-M1T2∗ | LBW①B-M1T6∗ | |
| | | | 3PDT | LBW①B-M1T3∗ | LBW①B-M1T7∗ | |
| | | Maintained | SPDT | LBW①B-A1T1∗ | LBW①B-A1T5∗ | |
| | | | DPDT | LBW①B-A1T2∗ | LBW①B-A1T6∗ | |
| | | | 3PDT | LBW①B-A1T3∗ | LBW①B-A1T7∗ | |
| Metallic bezel | Button | Momentary | SPDT | LBW①B-M1T1∗ | LBW①B-M1T5∗ | |
| | | | DPDT | LBW①B-M1T2∗ | LBW①B-M1T6∗ | |
| | | | 3PDT | LBW①B-M1T3∗ | LBW①B-M1T7∗ | |
| | | Maintained | SPDT | LBW①B-A1T1∗ | LBW①B-A1T5∗ | |
| | | | DPDT | LBW①B-A1T2∗ | LBW①B-A1T6∗ | |
| | | | 3PDT | LBW①B-A1T3∗ | LBW①B-A1T7∗ | |
| Guard Type | Button | Momentary | SPDT | LBW①B-M1T1∗ | LBW①B-M1T5∗ | |
| | | | DPDT | LBW①B-M1T2∗ | LBW①B-M1T6∗ | |
| | | | 3PDT | LBW①B-M1T3∗ | LBW①B-M1T6∗ | |
| | | Maintained | SPDT | LBW①B-A1T1∗ | LBW①B-A1T5∗ | |
| | | | DPDT | LBW①B-A1T2∗ | LBW①B-A1T6∗ | |
| | | | 3PDT | LBW①B-A1T3∗ | LBW①B-A1T7∗ | |

- The guard opens 180 degrees spring-return.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- Pushbuttons can be used with legend markings engraved on marking plates and lens buttons with clear film inserted in the lens is available. To specify, see Part Number Development below. See B-134 for details on the marking plate and film.
- Extended pushbuttons available. To specify, see Part Number Development below. Pushbuttons with guard is not available. Extended pushbutton is available with momentary operation only.
- Other bezel sizes available (LB series). For details, see B-079.

## Part Number Development

LBW①B-②③T④⑤∗

### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |
| 6G | Round with Guard |
| 7G | Square with Guard |

### ② Operation

| Code | Operation |
|---|---|
| A | Maintained |
| M | Momentary |

### ③ Operator Style

| Code | Operation |
|---|---|
| 1 | Flush |
| 2 | Extended * |

* Extended style is available only for round (black/metallic bezel) and in momentary operation. Guard model is not available.

### ④ Contacts

| Code | Contact | Code | Contact |
|---|---|---|---|
| 1 | Gold/SPDT | 5 | Silver/SPDT |
| 2 | Gold/DPDT | 6 | Silver/DPDT |
| 3 | Gold/3PDT | 7 | Silver/3PDT |

### ⑤ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| L (Note 1) | Lens | LBW6B-M1T1L∗ |
| V | PC Board Terminal (Gold Contact Only) | LB6WB-M1T1V∗ |
| VL (Note 1) | PC Board Terminal with Lens (Gold Contact Only) | LB6WB-M1T1VL∗ |

Note 1: Codes L and VL are available with flush operator only.

- Color code (∗) for lens:
  A (amber), B (translucent lens with black nameplate), G (green), R (red), S (blue), W (white), Y (yellow)





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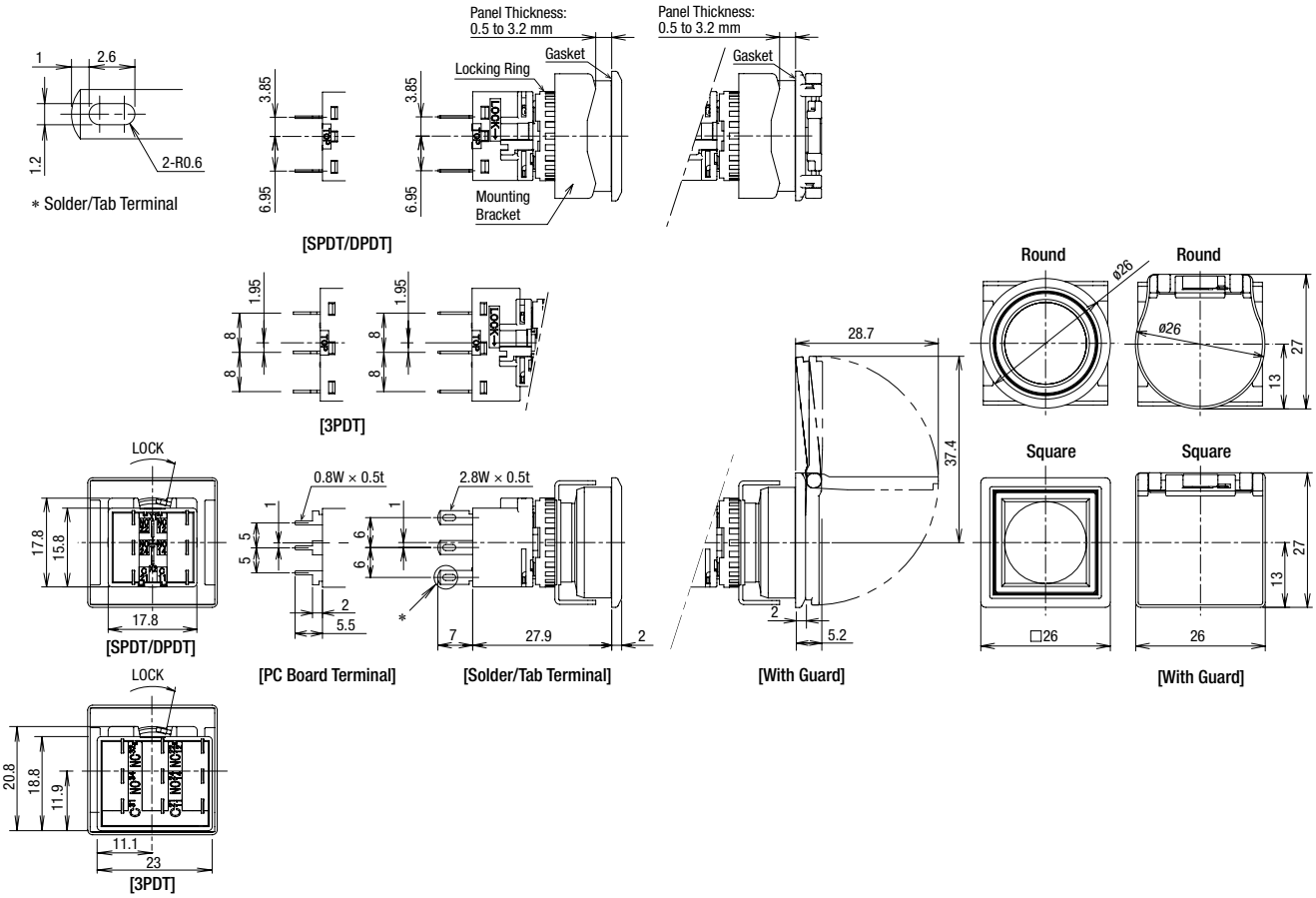
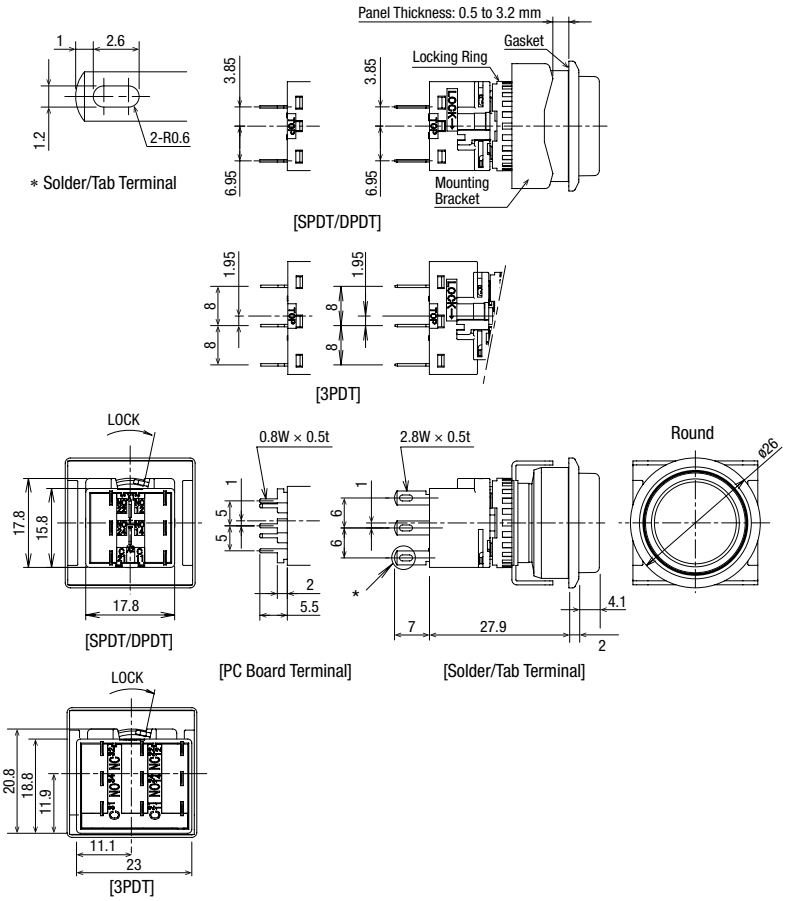
## Dimensions

All dimensions in mm.

### Flush Pushbutton

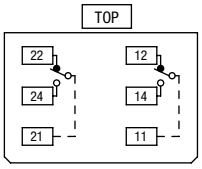



### Extended Pushbutton



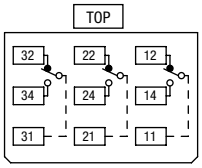

## Terminal Arrangement (Bottom View)

### SPDT/DPDT Contacts




(SPDT contacts on the right only)

### 3PDT Contacts




- For details on mounting hole layout, see B-120.
- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.





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## Selector Switches

### Solder/Tab Terminal

Package Quantity:1

Part No. / Shape: LBW①S-②T③④

Round / Black Bezel

Square / Black Bezel

Round / Metallic Bezel

Square / Metallic Bezel

| ① Shape | ② Operator Position | | | ③ Contact | Part No. Gold Contact | Part No. Silver Contact |
|---|---|---|---|---|---|---|
| Black bezel | 90° 2-position | Maintained | L R | SPDT | LBW①S-2T1 | LBW①S-2T5 |
| | | | | DPDT | LBW①S-2T2 | LBW①S-2T6 |
| | | | | 3PDT | LBW①S-2T3 | LBW①S-2T7 |
| | 45° 3-position | Maintained | L C R | DPDT | LBW①S-3T2 | LBW①S-3T6 |
| | | | | 3PDT | LBW①S-3T3 | LBW①S-3T7 |
| | | Spring return two-way | L C R | DPDT | LBW①S-33T2 | LBW①S-33T6 |
| | | | | 3PDT | LBW①S-33T3 | LBW①S-33T7 |
| Metallic bezel | 90° 2-position | Maintained | L R | SPDT | LBW①S-2T1 | LBW①S-2T5 |
| | | | | DPDT | LBW①S-2T2 | LBW①S-2T6 |
| | | | | 3PDT | LBW①S-2T3 | LBW①S-2T7 |
| | 45° 3-position | Maintained | L C R | DPDT | LBW①S-3T2 | LBW①S-3T6 |
| | | | | 3PDT | LBW①S-3T3 | LBW①S-3T7 |
| | | Spring return two-way | L C R | DPDT | LBW①S-33T2 | LBW①S-33T6 |
| | | | | DPDT | LBW①S-33T3 | LBW①S-33T7 |

- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- For contact operation, see B-119.
- Other bezel sizes available (LB series). For details, see B-081.

## Part Number Development

# LBW①S-②T③④

### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |

### ② Operator Position

2-position

| Operator Position |
|---|
| 2 Maintained |

3-position

| Operator Position | |
|---|---|
| 3 Maintained | 33 Spring return two-way |

### ③ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT (90° 2-position only) |
| 2 | Gold/DPDT |
| 3 | Gold/3PDT |
| 5 | Silver/SPDT (90° 2-position only) |
| 6 | Silver/DPDT |
| 7 | Silver/3PDT |

### ④ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LBW6S-2T1V |





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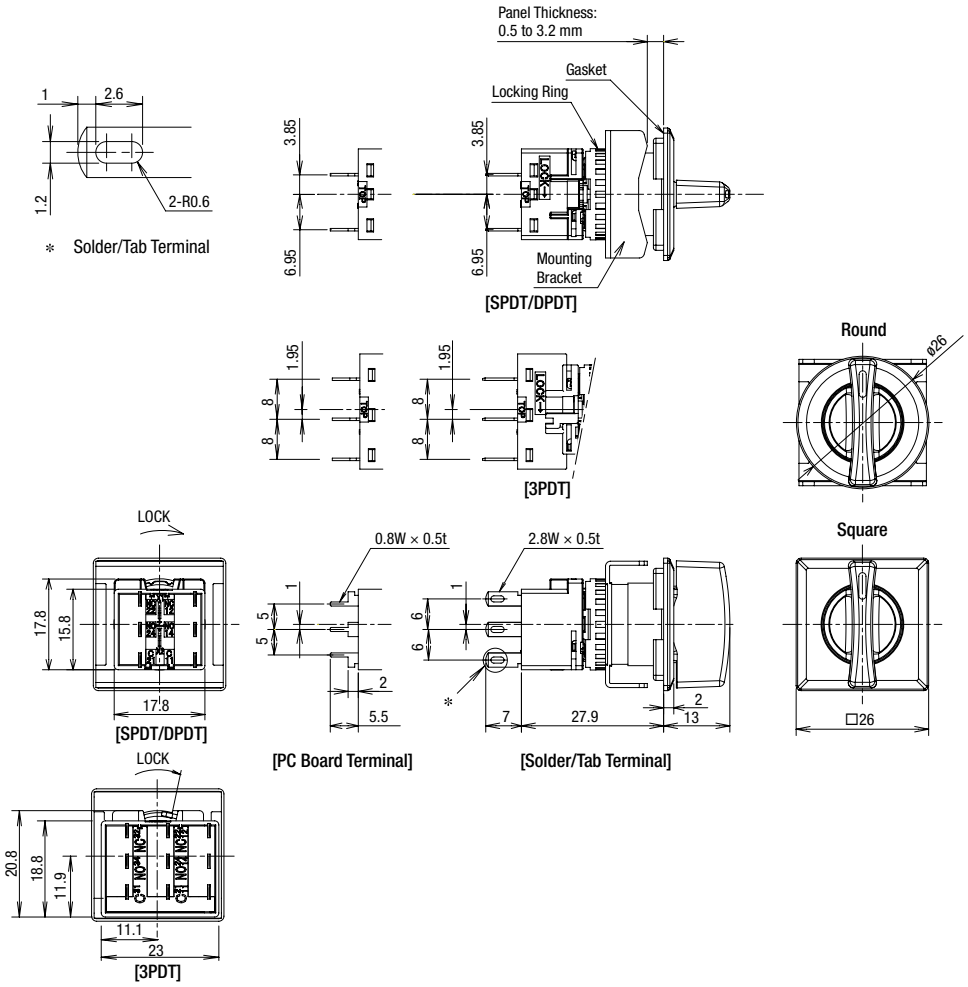
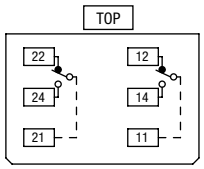
## Dimensions

All dimensions in mm.



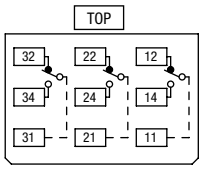

## Terminal Arrangement (Bottom View)

### SPDT/DPDT Contacts



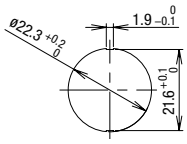

(SPDT contacts on the right only)

### 3PDT Contacts



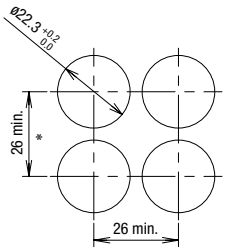

## Panel Cut-out for Positioning

### Round (LBW6S/LBW6MS)

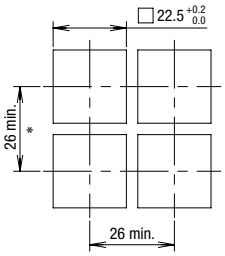



## Mounting Hole Layout

### Round (LBW6S/LBW6MS)




### Square (LBW7S/LBW7MS)




- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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



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## Key Selector Switches

### Solder/Tab Terminal

Package Quantity:1

Part No. / Shape: LBW①K-②③T④⑤-⑥

Wave Key

Round / Black Bezel

Square / Black Bezel

Round / Metallic Bezel

Square / Metallic Bezel

Disc Tumbler Key

Round /Metallic Bezel

Square / Metallic Bezel

| ① Shape | ② Operator Position | | ⑤ Key Removable Position | ⑤ Contact | Part No. Gold Contact | Part No. Silver Contact |
|---|---|---|---|---|---|---|
| Black bezel | 90° 2-position | Maintained | A: Key removable in all positions (Ⓛ Ⓡ) | SPDT | LBW①K-2ST1A | LBW①K-2ST5A |
| | | | | DPDT | LBW①K-2ST2A | LBW①K-2ST6A |
| | | | | 3PDT | LBW①K-2ST3A | LBW①K-2ST7A |
| | 45° 3-position | Maintained | A: Key removable in all positions (Ⓛ Ⓒ Ⓡ) | DPDT | LBW①K-3ST2A | LBW①K-3ST6A |
| | | | | 3PDT | LBW①K-3ST3A | LBW①K-3ST7A |
| Metallic bezel | 90° 2-position | Maintained | A: Key removable in all positions (Ⓛ Ⓡ) | SPDT | LBW①K-2ST1A | LBW①K-2ST5A |
| | | | | DPDT | LBW①K-2ST2A | LBW①K-2ST6A |
| | | | | 3PDT | LBW①K-2ST3A | LBW①K-2ST7A |
| | 45° 3-position | Maintained | A: Key removable in all positions (Ⓛ Ⓒ Ⓡ) | DPDT | LBW①K-3ST2A | LBW①K-3ST6A |
| | | | | 3PDT | LBW①K-3ST3A | LBW①K-3ST7A |

- For operator position, see Part Number Development below.
- For key removable position. see Part Number Development below. The key cannot be removed at the return position.
- Two keys are supplied.
- Besides the standard key (key number 0H), six other keys are available.
- Disc tumbler keys also available. Only the standard key is available. To specify, see Part Number Development below.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- For contact operation, see B-119.
- Other bezel sizes available (LB series). For details, see B-085.

## Part Number Development

### LBW①K-②③T④⑤-⑥

#### ① Shape

| Code | Shape |
|---|---|
| 6 | Round / Black Bezel |
| 7 | Square / Black Bezel |
| 6M | Round / Metallic Bezel |
| 7M | Square / Metallic Bezel |

#### ② Operator Position

| Code | Operator Position |
|---|---|
| 2 | 90° 2-position maintained |
| 3 | 45° 3-position maintained |
| 33 | 45°-3-position spring return two-way |

#### ③ Key Style

| Code | Key Style |
|---|---|
| S | Wave key |
| Blank | Disc tumbler key |

#### ④ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT (90° 2-position only) |
| 2 | Gold/DPDT |
| 3 | Gold/3PDT |
| 5 | Silver/SPDT (90° 2-position only) |
| 6 | Silver/DPDT |
| 7 | Silver/3PDT |

#### ⑤ Key Removal Position

The key cannot be removed at the return position.

2-position

| Key Removable Position | |
|---|---|
| A: Key removable in all positions (Ⓛ Ⓡ) | B: Key removable at left (Ⓛ ❽) |

3-position

| Key Removable Position | |
|---|---|
| A: Key removable in all positions (Ⓛ Ⓒ Ⓡ) | D: Key removable at center (❶ Ⓒ ❽) |

3-position

| Spring return two-way |
|---|
| ❶ C ❽ |

- Key is removable at Ⓛ, Ⓒ, Ⓡ.
  Key is retained at ❶, ❍, and ❽.

#### ⑥ Key Number

| Code | |
|---|---|
| 0H | Standard key |
| 1H to 2H | Reversible key |
| 3H to 6H | Non-reversible key |

- Wave keys only.

#### Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LBW6K-2T1VA |





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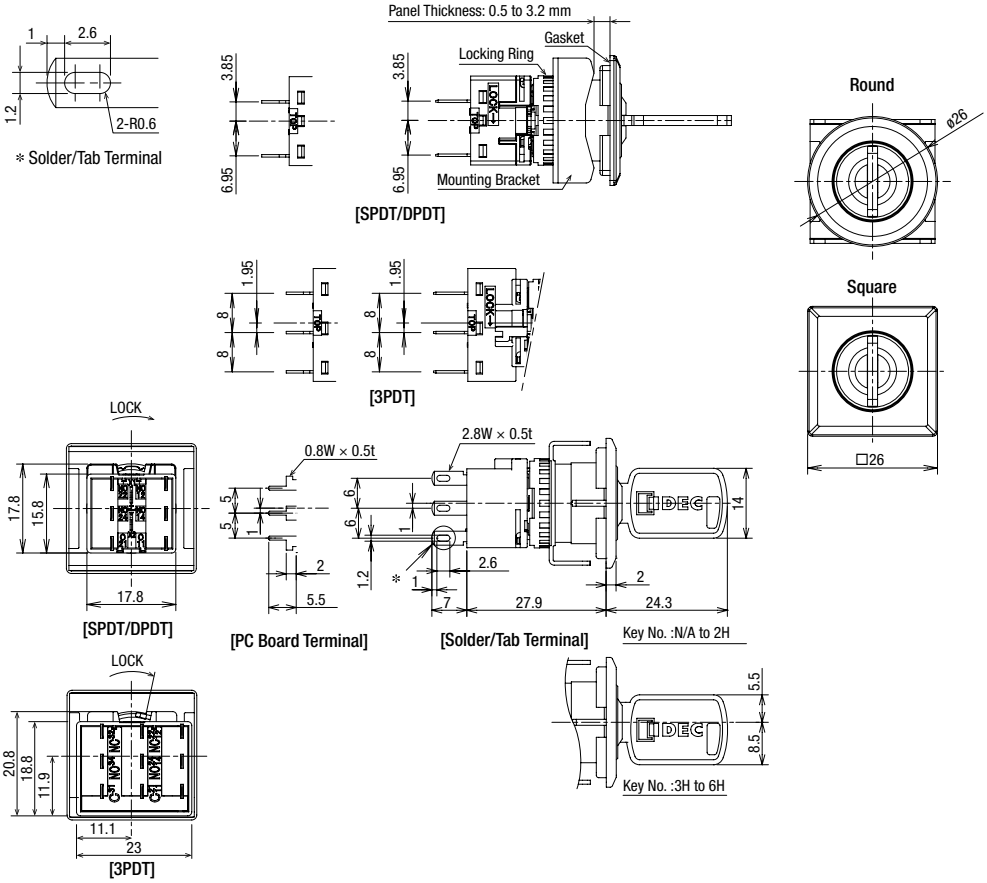
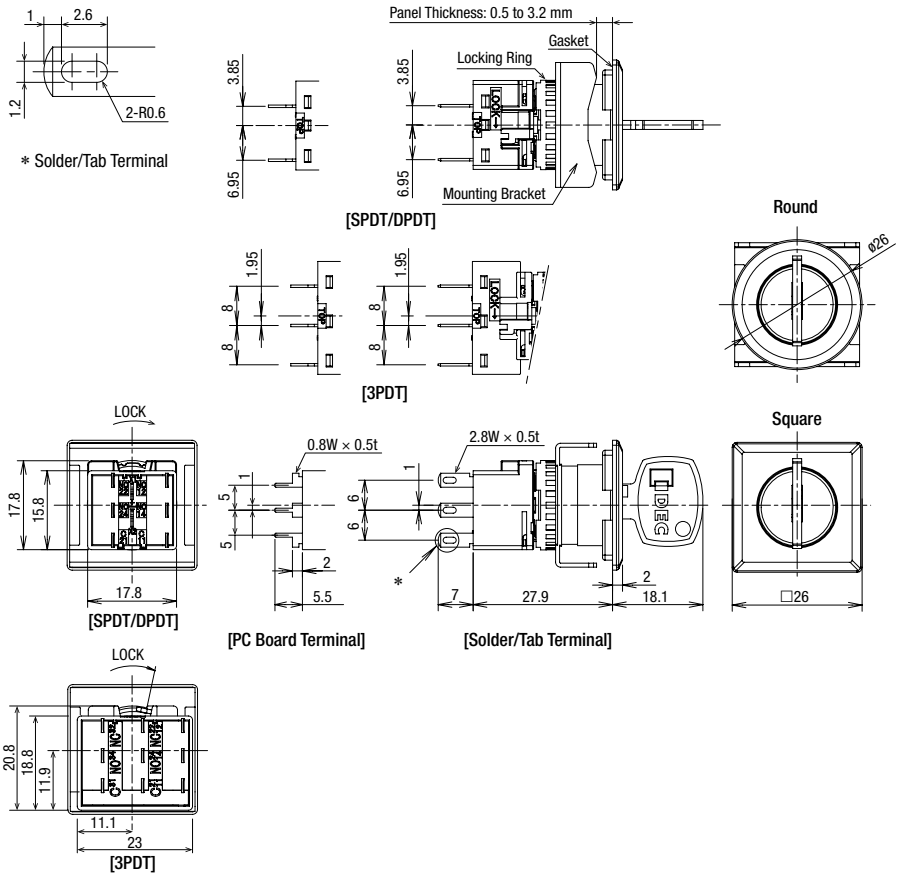
## Dimensions

All dimensions in mm.

### Key Selector Switches with Wave Key

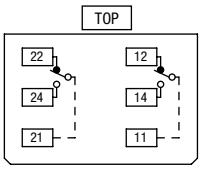



### Key Selector Switches with Disc Tumbler Key



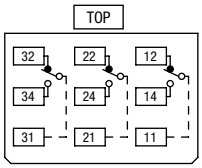

## Terminal Arrangement (Bottom View)

### SPDT/DPDT Contacts




(SPDT contacts on the right only)

### 3PDT Contacts




- For details on mounting hole layout, see B-120.
- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.





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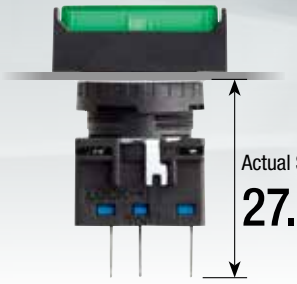
# ø16 LB-SERIES

## Miniature Switches and Pilot Lights
(Standard Bezel)



Actual Size
**27.9mm**

**Short**

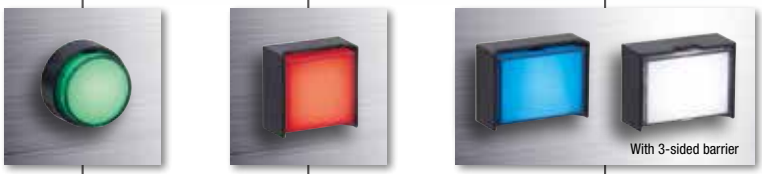
Panel depth of only 27.9mm.
Removable contact blocks ideal for single board mounting.
Protection degree: IP65 (IEC 60529)

point For space-saving installation

* Panel cutout (mm)

Round ø16.2* | Square □16.2* | Rectangular 16.2×24*

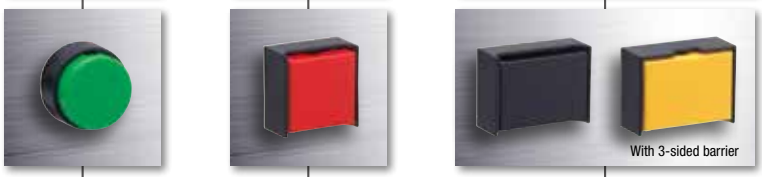
### Illuminated Pushbuttons




### Pushbuttons

Marking plates can be used with lens style pushbuttons

*Does not light on.




### Pilot Lights

### Dome Pilot Lights

### Selector Switches

2- and 3-position selector switches. Maintained and other various spring return actions available.

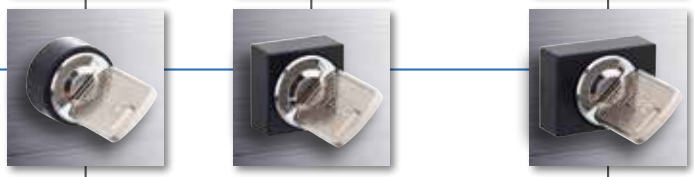
*Photo: knob operator (lever operator also available)

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.

### 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)





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# ø16mm LB Series Switches and Pilot Lights

## Panel depth of only 27.9mm.
## Removable contact blocks ideal for single board mounting.

## Contact Ratings

### Gold Contact (switch base: blue)

| | | | | | |
|---|---|---|---|---|---|
| Rated Insulation Voltage | | | 250V | | |
| Rated Thermal Current | | | 3A | | |
| Rated Operating Voltage | | | 30V DC | 125V AC | 250V |
| Rated Operating Current (electrical life: 100,000 operations) | AC 50/60Hz | Resistive load | | 1A | 0.5A |
| | | Inductive load | | 0.7A | 0.5A |
| | DC | Resistive load | 1A | 0.2A | |
| | | Inductive load | 0.7A | 0.1A | |
| Contact Material | | | Gold plated silver | | |

- Minimum applicable load (reference value): 5V AC/DC, 1 mA
  Applicable range is subject to the operating conditions and load.
- See electrical life in Specifications.

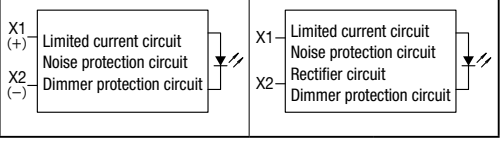
### Silver Contact (switch base: gray)

| | | | | | | |
|---|---|---|---|---|---|---|
| Rated Insulation Voltage | | | | 250V | | |
| Rated Operating Voltage | | | | 30V | 125V | 250V |
| Rated Thermal Current | | | | 5A | | |
| Rated Operating Current | Electrical Life 50,000・100,000 operations | AC 50/60Hz | Resistive load | — | 5A 3A | 3A |
| | | | Inductive load | — | 3A | 1.5A |
| | | DC | Resistive load | 3A | 0.6A | — |
| | | | Inductive load | 2A | 0.22A | — |
| Contact Material | | | | Silver | | |

- AC inductive load: PF=0.6 to 0.7 DC inductive load: L/R=7 ms max.

## LED Ratings

| | | | |
|---|---|---|---|
| Rated Voltage | 5V DC | 12V AC/DC | 24V AC/DC |
| Voltage Range | 5V DC±5% | 12V AC/DC ±10% | 24V AC/DC ±10% |
| LED Part No. | LB9Z-LED5② | LB9Z-LED1② | LB9Z-LED2② |
| Current Draw | 5 mA (typ.) | | |
| Voltage Marking | Marked on the side of the LED unit | | |
| LED Life (reference value) | Approx. 30,000 hours [until the brightness reduces to 50% of the initial value when lit at the rated voltage (direct current) under 25°C environment.] | | |
| Internal Circuit | A, G, R, PW, S | | |




- ② (color code): A (amber), G (green), PW (pure white), R (red), S (blue)
- Use the pure white (PW) module for yellow illumination.
- LED lamp contains a current-limiting resistor.

## Specifications

| | | |
|---|---|---|
| Operating Temperature | | –25 to +60°C (no freezing)<br>Illuminated units: –25 to +55°C |
| Storage Temperature | | –30 to +80°C (no freezing) |
| Operating Humidity | | 45 to 85% RH (no condensation) |
| Contact Resistance | | 50 mΩ maximum (initial value) |
| Insulation Resistance | | 100 MΩ minimum (500V DC megger) |
| Dielectric Strength | Switch Unit | Between live part and ground:<br>2,000V AC, 1 minute<br>Between terminals of different poles:<br>2,000V AC, 1 minute<br>Between terminals of the same poles:<br>1,000V AC, 1 minute |
| | Illumination Unit | Between live part and ground:<br>2,000V AC, 1 minute |
| Vibration Resistance | | Operating extremes/Damage limits:<br>5 to 55 Hz, amplitude 0.5 mm |
| Shock Resistance | | Operating extremes: 100 m/s²<br>Damage limits: 1,000 m/s² |
| Mechanical Life (minimum operations) | | Momentary: 2,000,000<br>Maintained: 250,000<br>Selector switches: 250,000<br>Key selector switches: 250,000 |
| Electrical Life (minimum operations) | | Momentary: 50,000 / 100,000 (*1)<br>Maintained: 50,000 / 100,000 (*2)<br>Selector switches: 50,000 / 100,000 (*2)<br>Key selector switches: 50,000 / 100,000 (*2) |
| Degree of Protection | | IP65 (IEC 60529) |
| Terminal Style | | Solder/tab terminal #110<br>PC board terminal |
| Weight (approx.) | | 11g (LB3L-M1T24)<br>10g (LB3P-1T04)<br>10g (LB3B-M1T2)<br>12g (LB3S-2T2)<br>25g (LB3K-2ST2A) |

*1: Switching frequency 1,200 operations/h.
*2: Switching frequency 1,200 operations/h.





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# ø16mm LB Series Switches and Pilot Lights

## Illuminated Pushbuttons

### Solder/Tab Terminal

Package Quantity:1

| Part No. / Shape | LB①L-②1T③④⑤∗ |
|---|---|

Round | Square | Rectangular | Rectangular with 3-sided Barrier

| ② Operation | ③ Contact | ④ LED Operating Voltage | Part No. Gold Contact | Part No. Silver Contact | ∗ Illumination Color Code |
|---|---|---|---|---|---|
| Momentary | SPDT | 24V AC/DC | LB①L-M1T14∗ | LB①L-M1T54∗ | Specify the color code in place of ∗ in the Part No.<br>A: amber<br>G: green<br>PW: pure white<br>R: red<br>S: blue<br>Y: yellow |
| | DPDT | | LB①L-M1T24∗ | LB①L-M1T64∗ | |
| Maintained | SPDT | 24V AC/DC | LB①L-A1T14∗ | LB①L-A1T54∗ | |
| | DPDT | | LB①L-A1T24∗ | LB①L-A1T64∗ | |

- Illuminated pushbuttons contain an LED unit. For details on LED units, see B-130.
- Illuminated pushbuttons can be used with legend markings. Engraving can be done on a marking plate which is placed in the lens, or a clear film can be printed and placed in the lens. See B-133 for details on the marking plate and film.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- 5V DC and 12V AC/DC LED operating voltages also available. To specify, see Part Number Development below.

## Part Number Development

### LB①L-②1T③④⑤∗

#### ① Shape

| Code | Shape |
|---|---|
| 1 | Round |
| 2 | Square |
| 3 | Rectangular |
| 4 | Rectangular with 3-sided Barrier |

#### ② Operation

| Code | Operation |
|---|---|
| A | Maintained |
| M | Momentary |

#### ③ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT |
| 2 | Gold/DPDT |
| 5 | Silver/SPDT |
| 6 | Silver/DPDT |

#### ④ LED Operating Voltage

| Code | Rated Operating Voltage |
|---|---|
| 1 | 5V DC |
| 3 | 12V AC/DC |
| 4 | 24V AC/DC |

#### ⑤ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LB1L-M1T14V∗ |

- Specify the color code in place of ∗ in the table above



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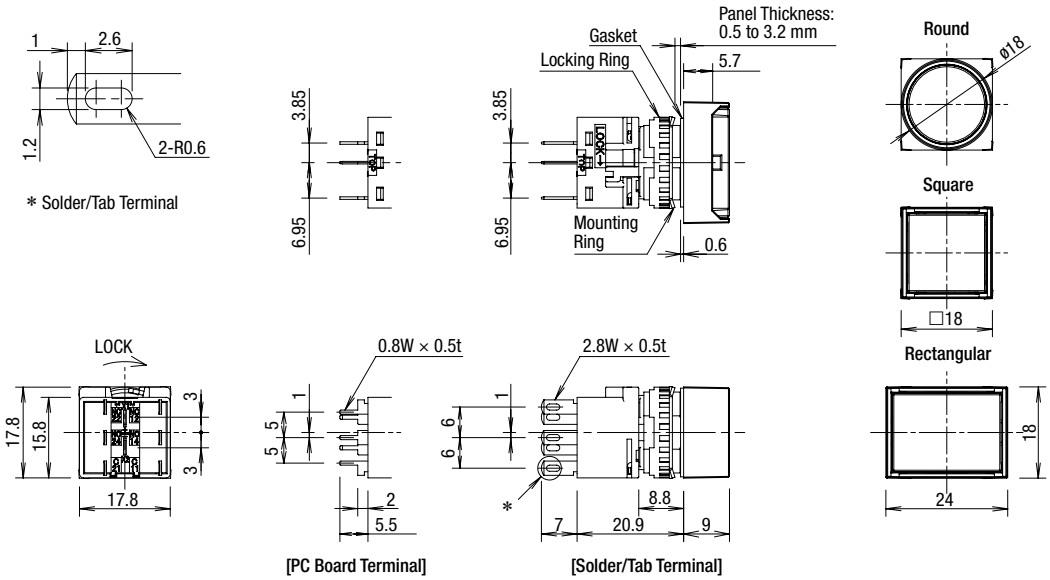
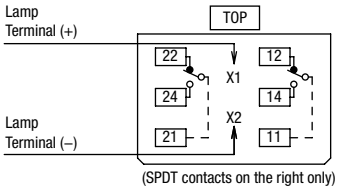
## Dimensions

All dimensions in mm.

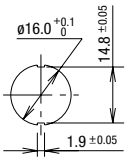



## Terminal Arrangement (Bottom View)



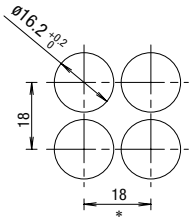

## Panel Cut-out for Positioning

(LB1L/LB2L/LB3L/LB4L)




## Mounting Hole Layout

(LB1L/LB2L/LB3L/LB4L)




*: 24 mm for rectangular units.

Note: When using rubber boot or terminal cover, see dimensions on B-127 and B-128.

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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
LB
A6



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# ø16mm LB Series Switches and Pilot Lights

## Pilot Lights

### Solder/Tab Terminal

Package Quantity:1

| Part No. / Shape | LB①P-②T0③④∗ | | | |
|---|---|---|---|---|
| | Round / Square / Rectangular / Rectangular with 3-sided Barrier / Dome | | | |
| ② Lens Shape | ③ LED Operating Voltage | Part No. | ∗ Illumination Color Code | |
| Flush | 24V AC/DC | LB①P-1T04∗ | Specify the color code in place of ∗ in the Part No.<br>A: amber<br>G: green<br>PW: pure white<br>R: red<br>S: blue<br>Y: yellow | |
| Dome | 24V AC/DC | LB1P-2T04∗ | | |

- Pilot lights contain an LED unit. For maintenance LED units see B-130.
- Legends and symbols can be engraved on a marking plate or film to be inserted under the lens by users for labelling purposes. See B-133 for details.
- PC board terminals available. To specify, see Part Number Development below.
- 5V DC and 12V AC/DC LED operating voltages also available. To specify, see Part Number Development below.

## Part Number Development

### LB①P-②T0③④∗

#### ① Shape

| Code | Shape |
|---|---|
| 1 | Round |
| 2 | Square |
| 3 | Rectangular |
| 4 | Rectangular with 3-sided Barrier |

- Round only for dome.

#### ② Lens Shape

| Code | Lens Shape |
|---|---|
| 1 | Flush |
| 2 | Dome |

#### ③ LED Operating Voltage

| Code | Rated Operating Voltage |
|---|---|
| 1 | 5V DC |
| 3 | 12V AC/DC |
| 4 | 24V AC/DC |

#### ④ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal | LB1P-1T04V∗ |

- Specify the color code in place of ∗ in the table above



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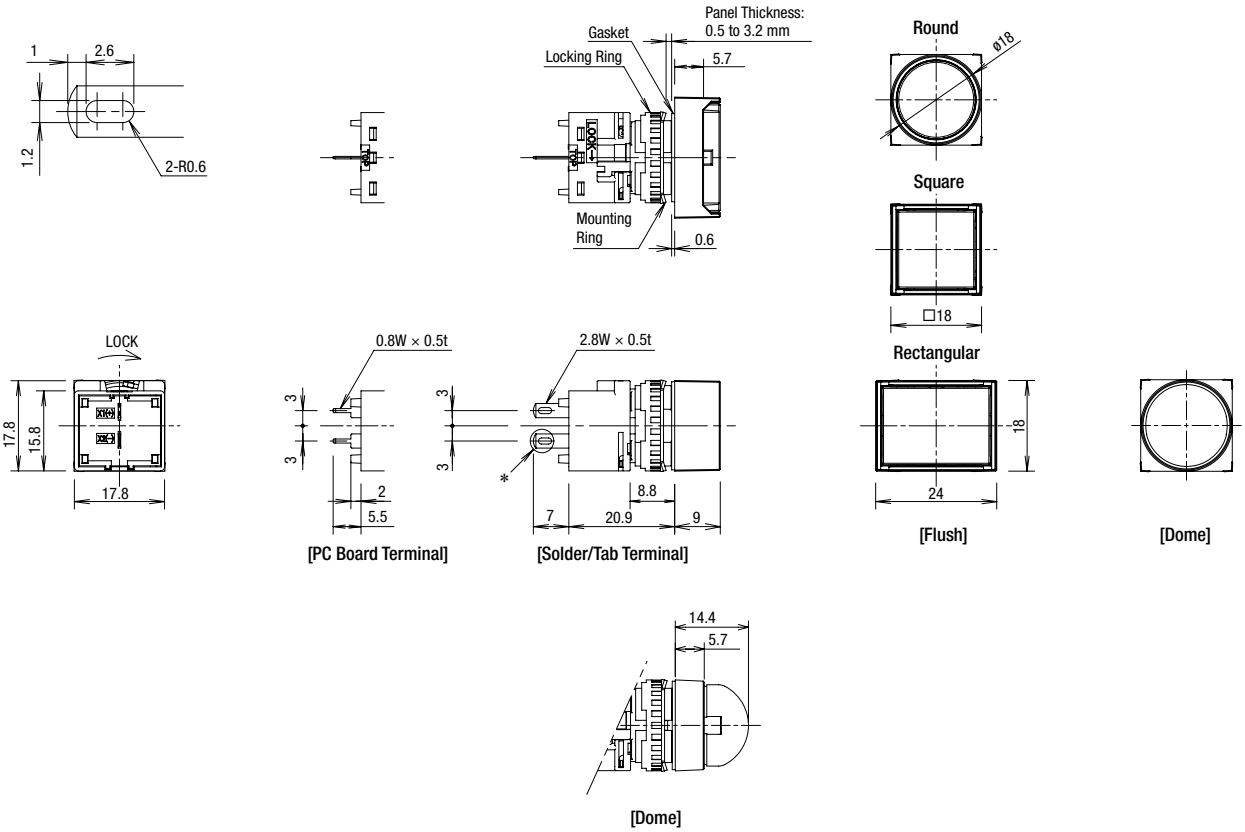
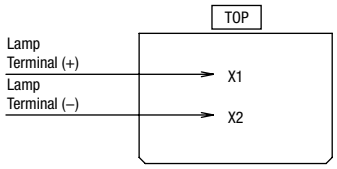
## Dimensions

All dimensions in mm.

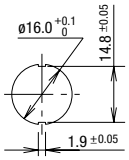



## Terminal Arrangement (Bottom View)



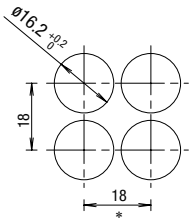

## Panel Cut-out for Positioning

(LB1P/LB2P/LB3P/LB4P)




## Mounting Hole Layout

(LB1P/LB2P/LB3P/LB4P)




*: 24 mm for rectangular units.

Note: When using rubber boot or terminal cover, see dimensions on B-127 and B-128.

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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# ø16mm LB Series Switches and Pilot Lights

## Pushbuttons

### Solder/Tab Terminal

Package Quantity:1

Part No. / Shape: LB①B-②1T③④∗

Round | Square | Rectangular | Rectangular with 3-sided Barrier

| Button Style | ② Operation | ③ Contact | Part No. Gold Contact | Part No. Silver Contact | ∗ Illumination Color Code |
|---|---|---|---|---|---|
| Button | Momentary | SPDT | LB①B-M1T1∗ | LB①B-M1T5∗ | B: black<br>G: green<br>R: red<br>S: blue<br>W: white<br>Y: yellow |
| | | DPDT | LB①B-M1T2∗ | LB①B-M1T6∗ | |
| | | 3PDT | LB①B-M1T3∗ | LB①B-M1T7∗ | |
| | Maintained | SPDT | LB①B-A1T1∗ | LB①B-A1T5∗ | |
| | | DPDT | LB①B-A1T2∗ | LB①B-A1T6∗ | |
| | | 3PDT | LB①B-A1T3∗ | LB①B-A1T7∗ | |
| Lens | Momentary | SPDT | LB①B-M1T1L∗ | LB①B-M1T5L∗ | A: amber<br>G: green<br>R: red<br>S: blue<br>W: white<br>Y: yellow |
| | | DPDT | LB①B-M1T2L∗ | LB①B-M1T6L∗ | |
| | | 3PDT | LB①B-M1T3L∗ | LB①B-M1T7L∗ | |
| | Maintained | SPDT | LB①B-A1T1L∗ | LB①B-A1T5L∗ | |
| | | DPDT | LB①B-A1T2L∗ | LB①B-A1T6L∗ | |
| | | 3PDT | LB①B-A1T3L∗ | LB①B-A1T7L∗ | |

- Lens can be used with legend markings. Engraving can be done on a marking plate which is placed in the lens, or a clear film can be printed and placed in the lens. See B-133 for details on the marking plate and film.
- Black is available for lens. Black lens consists of a transparent lens and a black marking plate. To specify, see Part Number Development below.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.

## Part Number Development

# LB①B-②1T③④∗

### ① Shape

| Code | Shape |
|---|---|
| 1 | Round |
| 2 | Square |
| 3 | Rectangular |
| 4 | Rectangular with 3-sided Barrier |

### ② Operation

| Code | Operation |
|---|---|
| A | Maintained |
| M | Momentary |

### ③ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT |
| 2 | Gold/DPDT |
| 3 | Gold/3PDT |
| 5 | Silver/SPDT |
| 6 | Silver/DPDT |
| 7 | Silver/3PDT |

### ④ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| B | Black Translucent Lens (Lens Only) | LB1B-M1T1LB |
| V | PC Board Terminal (Gold Contact Only) | LB1B-M1T1V∗ |



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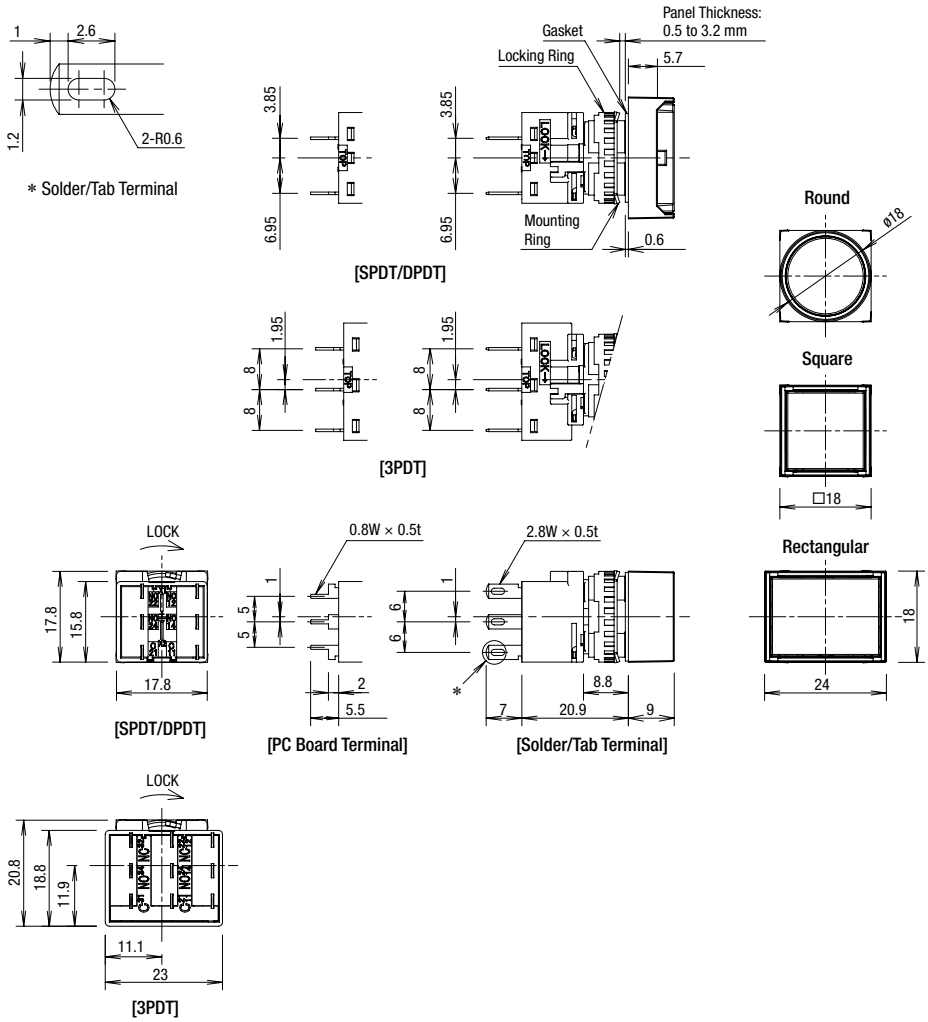
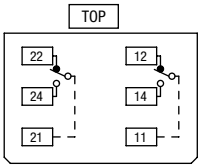
## Dimensions

All dimensions in mm.



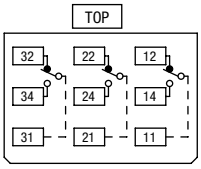

## Terminal Arrangement (Bottom View)

**SPDT/DPDT Contacts**



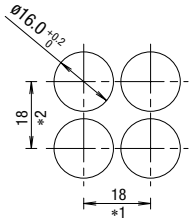

(SPDT contacts on the right only)

**3PDT Contacts**




## Mounting Hole Layout

**(LB1B/LB2B/LB3B/LB4B)**

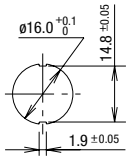



*1: 24 mm for rectangular units, 23.2 mm for 3PDT
*2: 21 mm for 3PDT

Note: When using rubber boot or terminal cover, see dimensions on B-127 and B-128.

## Panel Cut-out for Positioning

**(LB1B/LB2B/LB3B/LB4B)**




- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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## Selector Switches

**Solder/Tab Terminal**

Package Quantity:1

| Part No. / Shape | LB①S-②③T④⑤ |
|---|---|

Knob Operator: Round, Square, Rectangular

Lever Operator: Round, Square, Rectangular

| ② Operator Position | | | ③ Contact | Part No. Gold Contact | Part No. Silver Contact |
|---|---|---|---|---|---|
| 90° 2-position | Maintained | L R | SPDT | LB①S-2T1 | LB①S-2T5 |
| | | | DPDT | LB①S-2T2 | LB①S-2T6 |
| | | | 3PDT | LB①S-2T3 | LB①S-2T7 |
| 45° 3-position | Maintained | L C R | DPDT | LB①S-3T2 | LB①S-3T6 |
| | | | 3PDT | LB①S-3T3 | LB①S-3T7 |
| | Spring return two-way | L C R | DPDT | LB①S-33T2 | LB①S-33T6 |
| | | | 3PDT | LB①S-33T3 | LB①S-33T7 |

- Lever operators also available. To specify, see Part Number Development below.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- 2-position spring return from right, 3-position spring return from right, 3-position spring return from left also available. To specify, see Part Number Development below.
- For contact operation, see B-119.

## Part Number Development

### LB①S-②③T④⑤

**① Shape**

| Code | Shape |
|---|---|
| 1 | Round |
| 2 | Square |
| 3 | Rectangular |

**② Operator Position**

2-position

| Operator Position | |
|---|---|
| 2 Maintained | 21 Spring return from right |
| L R | L R |

3-position

| Operator Position | | | |
|---|---|---|---|
| 3 Maintained | 31 Spring return from right | 32 Spring return from left | 33 Spring return two-way |
| L C R | L C R | L C R | L C R |

**③ Operator**

| Code | Operator Shape |
|---|---|
| Blank | Knob |
| L | Lever |

**④ Contacts**

| Code | Contact |
|---|---|
| 1 | Gold/SPDT (90° 2-position only) |
| 2 | Gold/DPDT |
| 3 | Gold/3PDT |
| 5 | Silver/SPDT (90° 2-position only) |
| 6 | Silver/DPDT |
| 7 | Silver/3PDT |

**⑤ Others**

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LB1S-2T1V |





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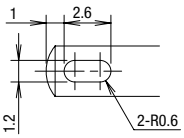
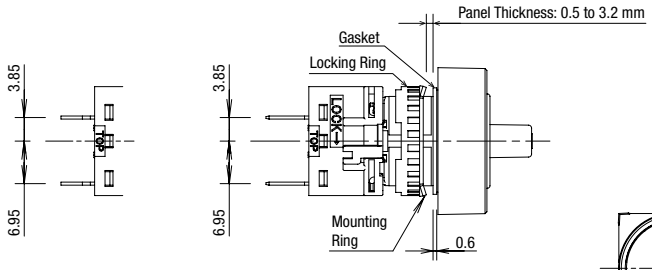
## Dimensions

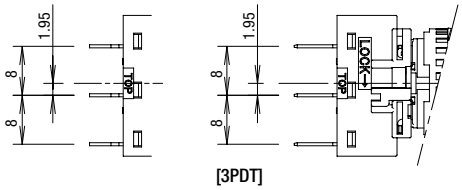
All dimensions in mm.



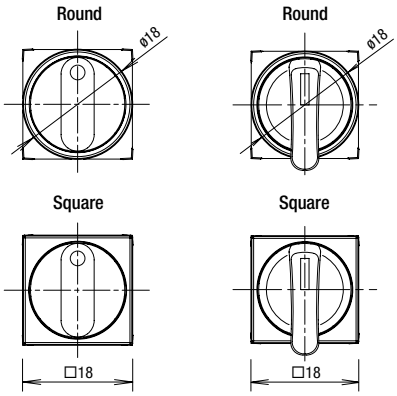

* Solder/Tab Terminal

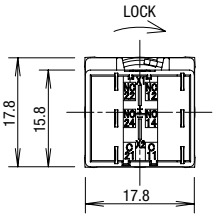



[SPDT/DPDT]

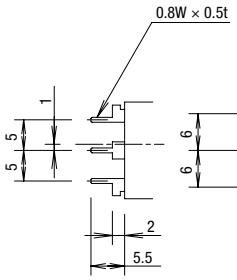



[3PDT]

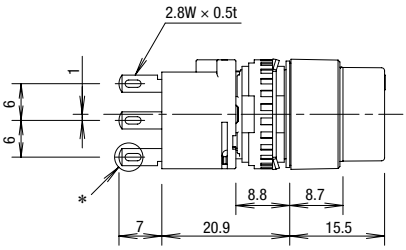


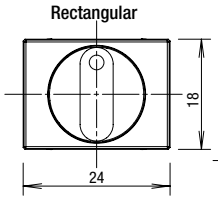

[SPDT/DPDT]



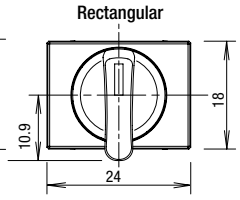

[PC Board Terminal]



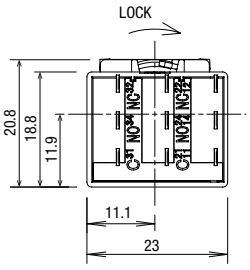

[Knob Operator PC Board Terminal]



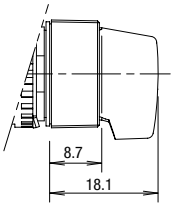

[Knob Operator]




[Lever Operator]



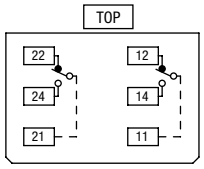

[3PDT]




[Lever Operator]

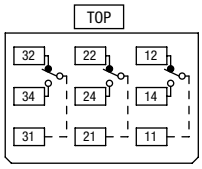
## Terminal Arrangement (Bottom View)

### SPDT/DPDT Contacts



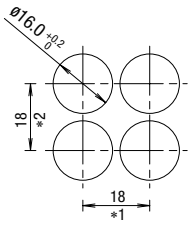

(SPDT contacts on the right only)

### 3PDT Contacts




## Mounting Hole Layout

(LB1S/LB2S/LB3S)

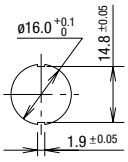



*1: 24 mm for rectangular units, 23.2 mm for 3PDT
*2: 21 mm for 3PDT

Note: When using terminal cover, see dimensions on B-128.

## Panel Cut-out for Positioning

(LB1S/LB2S/LB3S)




- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.



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# ø16mm LB Series Switches and Pilot Lights

## Illuminated Selector Switches

### Solder/Tab Terminal

Package Quantity:1

Part No. / Shape: LB①F-②T③④⑤∗

Round

Square

Rectangular

| ② Operator Position | | ③ Contact | ④ LED Operating Voltage | Part No. Gold Contact | Part No. Silver Contact | ∗ Illumination Color Code |
|---|---|---|---|---|---|---|
| 90° 2-position | Maintained L R | SPDT | 24V AC/DC | LB①F-2T14∗ | LB①F-2T54∗ | Specify the color code in place of ∗ in the Part No.<br>G: green<br>R: red<br>PW: pure white |
| | | DPDT | 24V AC/DC | LB①F-2T24∗ | LB①F-2T64∗ | |
| 45° 3-position | Maintained L C R | DPDT | 24V AC/DC | LB①F-3T24∗ | LB①F-3T64∗ | |

- Illuminated selector switches contain an LED unit. For maintenance LED units see B-130.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- 5V DC and 12V AC/DC LED operating voltages also available. To specify, see Part Number Development below.
- For contact operation, see B-119.

## Part Number Development

### LB①F-②T③④⑤∗

#### ① Shape

| Code | Shape |
|---|---|
| 1 | Round |
| 2 | Square |
| 3 | Rectangular |

#### ② Operator Position

2-position 3-position

| Operator Position | |
|---|---|
| 2 Maintained | 3 Maintained |
| L R | L C R |

#### ③ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT (90° 2-position only) |
| 2 | Gold/DPDT |
| 5 | Silver/SPDT (90° 2-position only) |
| 6 | Silver/DPDT |

#### ④ LED Operating Voltage

| Code | Rated Operating Voltage |
|---|---|
| 1 | 5V DC |
| 3 | 12V AC/DC |
| 4 | 24V AC/DC |

#### ⑤ Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LB1F-2T14V∗ |

- Specify a color code in place of * in the Part No.



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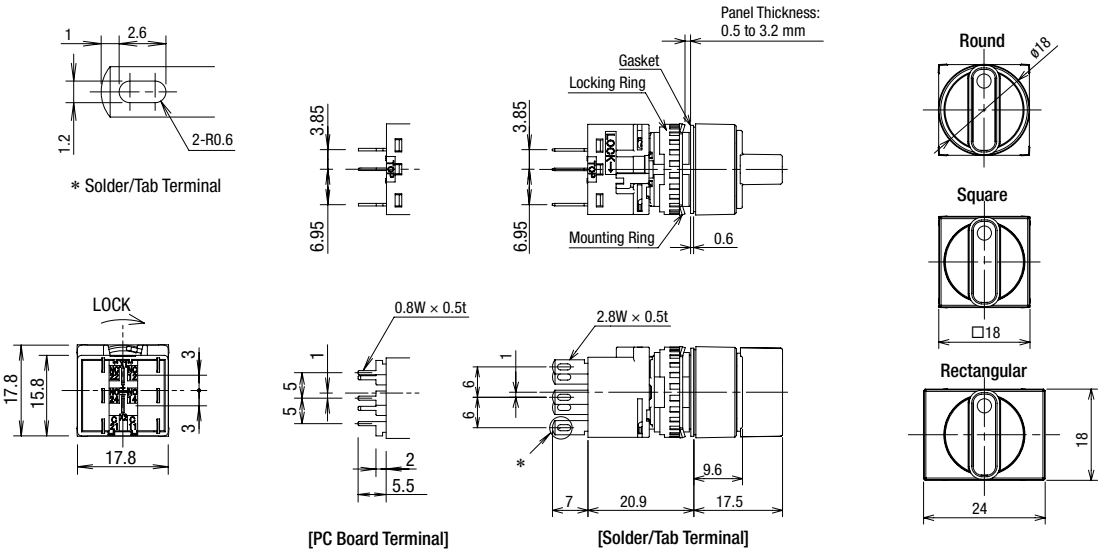
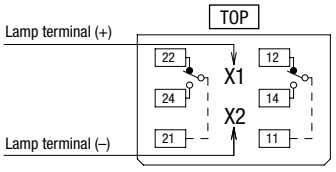
## Dimensions

All dimensions in mm.



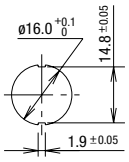

## Terminal Arrangement (Bottom View)




(SPDT contacts on the right only)

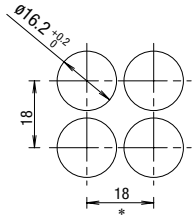
## Panel Cut-out for Positioning

### Round (LB1F/LB2F/LB3F)




## Mounting Hole Layout

### Round (LB1F/LB2F/LB3F)




*: 24 mm for rectangular units.

Note: When using terminal cover, see dimensions on B-128

- For details on pc board and circuit design, see B-121.
- For details on single board mounting, see B-122.

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
LB
A6



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## Key Selector Switches

### Solder/Tab Terminal

Package Quantity:1

Part No. / Shape: LB①K-②③T④⑤-⑥

Round

Square

Rectangular

| ② Operator Position | | ⑤ Key Removable Position | ④ Contact | Part No. Gold Contact | Part No. Silver Contact |
|---|---|---|---|---|---|
| 90° 2-position | Maintained | A: Key removable in all positions (Ⓛ Ⓡ) | SPDT | LB①K-2ST1A | LB①K-2ST5A |
| | | | DPDT | LB①K-2ST2A | LB①K-2ST6A |
| | | | 3PDT | LB①K-2ST3A | LB①K-2ST7A |
| 45° 3-position | Maintained | A: Key removable in all positions (Ⓛ Ⓒ Ⓡ) | DPDT | LB①K-3ST2A | LB①K-3ST6A |
| | | | 3PDT | LB①K-3ST3A | LB①K-3ST7A |

- For operator position, see Part Number Development below.
- For key removable position, see Part Number Development below. The key cannot be removed at the return position.
- Two keys are supplied.
- Besides the standard key (key number 0H), six other keys are available.
- Disc tumbler keys also available. Only the standard key is available. To specify, see Part Number Development below.
- PC board terminals available for gold contacts. To specify, see Part Number Development below.
- For contact operation, see B-119.

## Part Number Development

### LB①K-②③T④⑤-⑥

#### ① Shape

| Code | Shape |
|---|---|
| 1 | Round |
| 2 | Square |
| 3 | Rectangular |

#### ② Operator Position

| Code | Operator Position |
|---|---|
| 2 | 90° 2-position maintained |
| 21 | 90° 2-position spring return from right |
| 3 | 45° 3-position maintained |
| 31 | 45° 3-position spring return from right |
| 32 | 45° 3-position spring return from left |
| 33 | 45°-3-position spring return two-way |

#### ③ Key Style

| Code | Key Style |
|---|---|
| S | Wave key |
| Blank | Disc tumbler key |

#### ④ Contacts

| Code | Contact |
|---|---|
| 1 | Gold/SPDT (90° 2-position only) |
| 2 | Gold/DPDT |
| 3 | Gold/3PDT |
| 5 | Silver/SPDT (90° 2-position only) |
| 6 | Silver/DPDT |
| 7 | Silver/3PDT |

#### ⑤ Key Removal Position

2-position

| Key Removable Position | | | Spring return from right |
|---|---|---|---|
| A: Key removable in all positions (Ⓛ Ⓡ) | B: Key removable at left (Ⓛ ❽) | C: Key removable at right (❶ Ⓡ) | (Ⓛ ❽) |

3-position

| Key Removable Position | | | |
|---|---|---|---|
| A: Key removable in all positions (Ⓛ Ⓒ Ⓡ) | B: Key removable at left / center (Ⓛ Ⓒ ❽) | C: Key removable at center / right (❶ Ⓒ Ⓡ) | D: Key removable at center (❶ Ⓒ ❽) |
| E: Key removable at right / left (Ⓛ ❸ Ⓡ) | G: Key removable at left (Ⓛ ❸ ❽) | H: Key removable at right (❶ ❸ Ⓡ) | |

For key selectors with the following operations, the key cannot be removed at the return position.

3-position

| Spring return from right | Spring return from left | Spring return two-way |
|---|---|---|
| (Ⓛ Ⓒ ❽) | (❶ Ⓒ Ⓡ) | (❶ Ⓒ ❽) |

- Key is removable at Ⓛ, Ⓒ, Ⓡ. Key is retained at ❶, ❸, and ❽.

#### ⑥ Key Number

| Code | |
|---|---|
| Blank | Standard key (0H) |
| 1H to 2H | Reversible key |
| 3H to 6H | Non-reversible key |

- Wave key only.

#### Others

| Code | Specification | Part No. Example |
|---|---|---|
| Blank | Solder/Tab Terminal | — |
| V | PC Board Terminal (Gold Contact Only) | LB1K-2ST1VA |





IDEC
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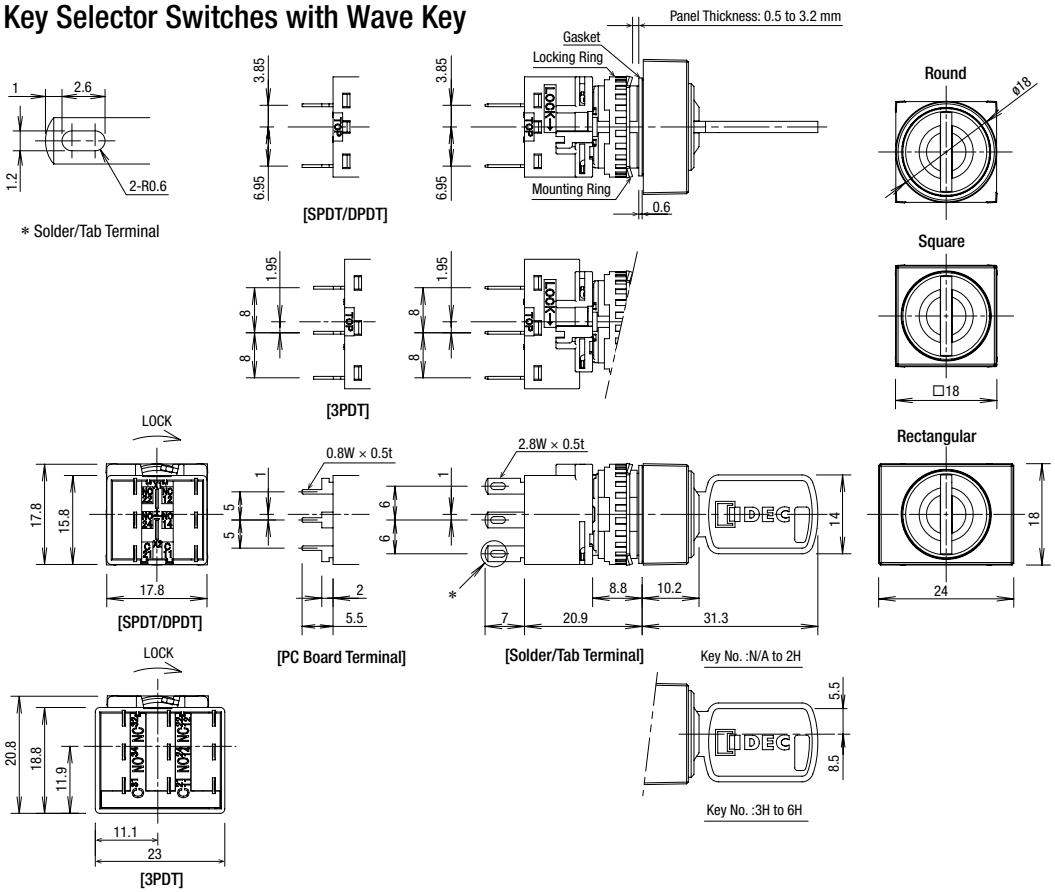
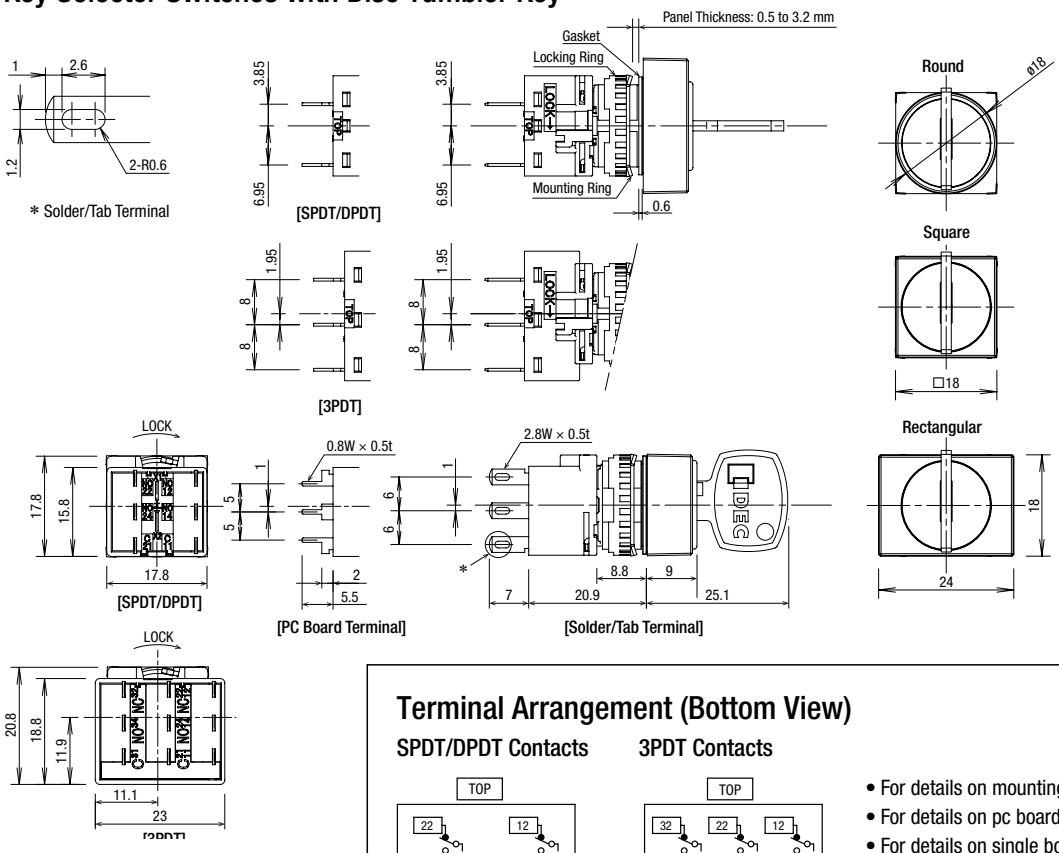
## Dimensions

All dimensions in mm.

### Key Selector Switches with Wave Key

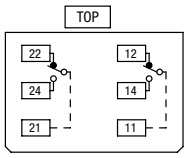



### Key Selector Switches with Disc Tumbler Key



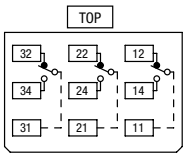

### Terminal Arrangement (Bottom View)

**SPDT/DPDT Contacts**




(SPDT contacts on the right only)

**3PDT Contacts**




- 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.

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
LB
A6



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# ø16mm LB Series Switches and Pilot Lights

## Lever Switches

### Solder/Tab Terminal

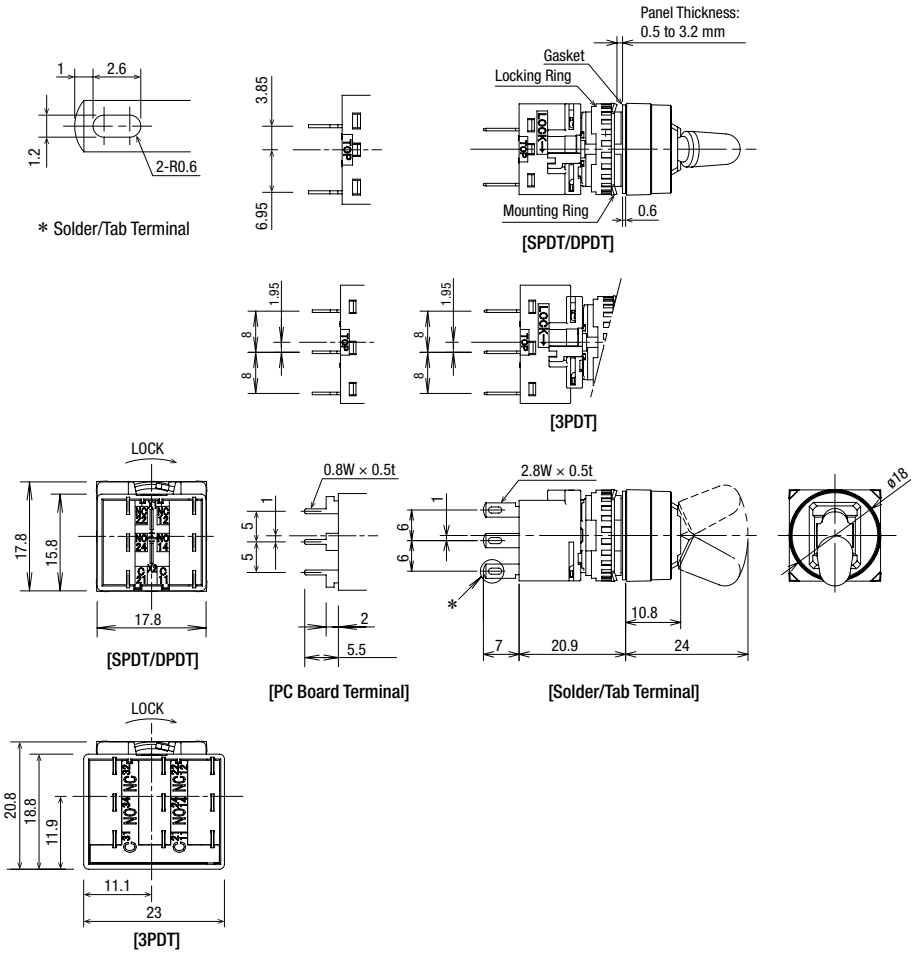
Package Quantity:1

| Part No. / Shape | | | | |
|---|---|---|---|---|
| | Round | | | |
| Operator Position | | Contact | Part No. Gold Contact | Part No. Silver Contact |
| 2-position | Maintained (U, D) | SPDT | LB1T-2T1 | LB1T-2T5 |
| | | DPDT | LB1T-2T2 | LB1T-2T6 |
| | | 3PDT | LB1T-2T3 | LB1T-2T7 |
| 3-position | Maintained (U, C, D) | DPDT | LB1T-3T2 | LB1T-3T6 |
| | | 3PDT | LB1T-3T3 | LB1T-3T7 |
| | Spring return from top/bottom (U, C, D) | DPDT | LB1T-33T2 | LB1T-33T6 |
| | | 3PDT | LB1T-33T3 | LB1T-33T7 |

- PC board terminals available for gold contacts. Add "**V**" to the Part No.
  Example: **LB1T-2T1V**
- For contact operation, see B-119.

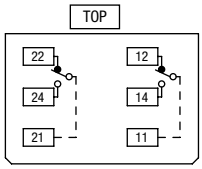
## Dimensions

All dimensions in mm.



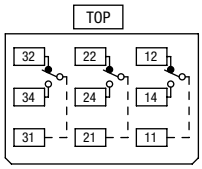

## Terminal Arrangement (Bottom View)

### SPDT/DPDT Contacts




(SPDT contacts on the right only)

### 3PDT Contacts




- 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.



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## 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$^2$<br>Damage limits:1,000m/s$^2$ |
| Life | 1,000 hours minimum (beep sound) |
| Degree of Protection | LB3Z-1T0∗: IP54 (IEC60529)<br>LB3Z-104K: IP40 (IEC60529) |
| Terminal Style | LB3Z-1T0∗: Solder/tab terminal #110<br>PC board terminal<br>LB3Z-104K: Solder terminal |
| Weight (approx.) | 11g (LB3Z-1T0∗), 8g (LB3Z-104K) |

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

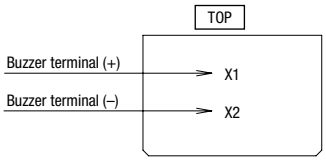
| Name and Shape | Operating Voltage | Terminal Style | Part No. | |
|---|---|---|---|---|
| | | | IP54 | IP40 |
| Rectangular IP54 IP40 | 24V DC | Solder/tab terminal | LB3Z-1T04 | — |
| | | PC board terminal | LB3Z-1T04V | — |
| | | Solder terminal | — | LB3Z-104K |

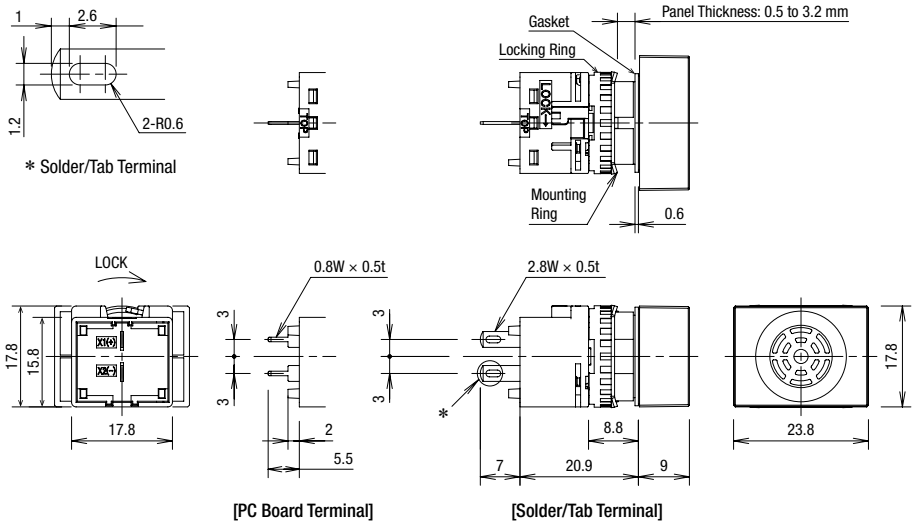
• 12V DC operating voltages also available. Specify "**-1T04**" in place of "**-1T03**" in the Part No.
Example: **LB3Z-1T03**

### Dimensions

#### IP54

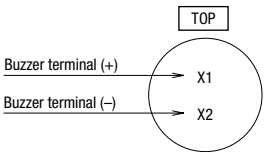
**Terminal Arrangement (Bottom View)**

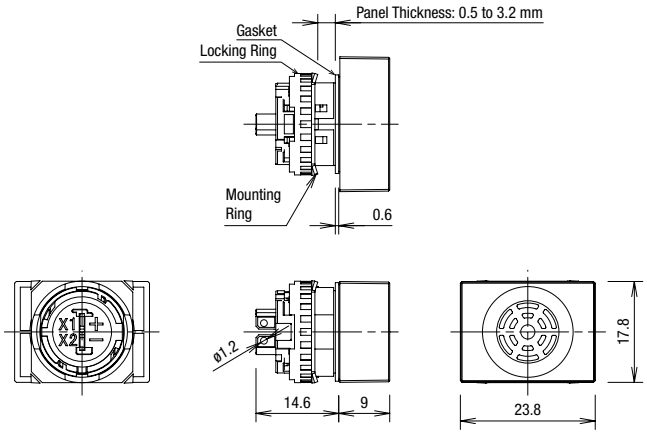



#### IP40

**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.

All dimensions in mm.





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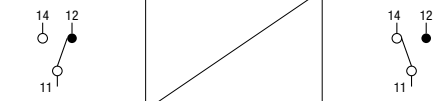
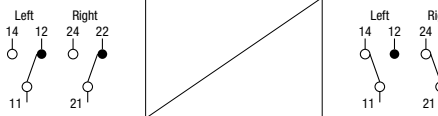
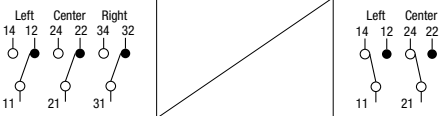
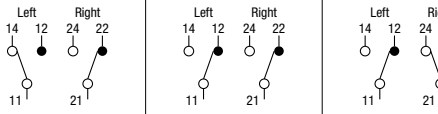
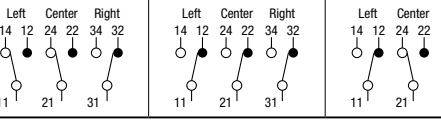
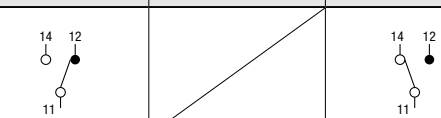
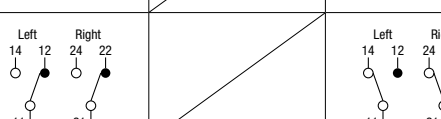
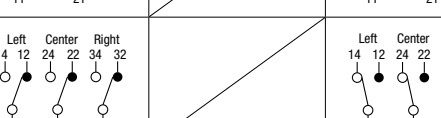
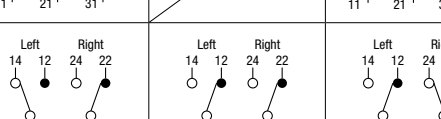
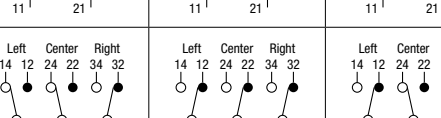
## Contact Operation

### Selector Switch / Illuminated Selector Switch / Key Selector Switch

| Operator Position & Contact Operation (Top View) | | | | | |
|---|---|---|---|---|---|
| Position | | Contact | Left | Center | Right |
| 90° 2-position | L R Maintained; L R Spring return from right | SPDT |  | | |
| | | DPDT |  | | |
| | | 3PDT |  | | |
| 45° 3-position | L C R Maintained; L C R Spring return from right; L C R Spring return from left; L C R Spring return two-way | DPDT |  |  |  |
| | | 3PDT |  |  |  |

### Lever Switch

| Lever Position & Contact Operation (Top View) | | | | | |
|---|---|---|---|---|---|
| Position | | Contact | Down | Center | Up |
| 90° 2-position | U D Maintained | SPDT |  | | |
| | | DPDT |  | | |
| | | 3PDT |  | | |
| 45° 3-position | U C D Maintained; U C D Spring return two-way | DPDT |  |  |  |
| | | 3PDT |  |  |  |





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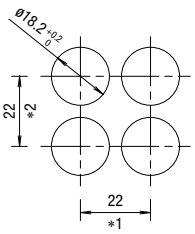
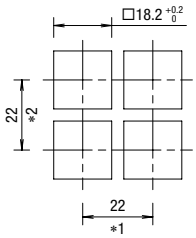
## Mounting Hole Layout / PC Board Drilling Layout

### LB Series Flush Bezel

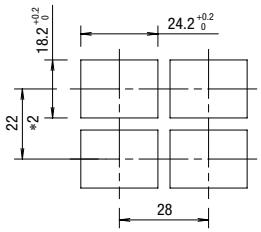
**Round (LB6/LB6M)**




**Square (LB7/LB7M)**




**Rectangular (LB8/LB8M)**

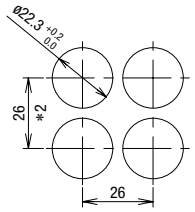



*1: 23.2 mm for 3PDT contacts
*2: 45 mm for switches with guard

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

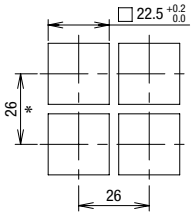
### LBW Series Flush Bezel

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




* 53 mm for switches with guard

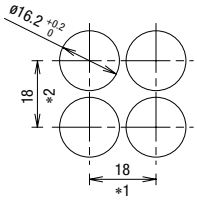
**Square (LBW7/LBW7M/LBW7G)**




* 53 mm for switches with guard

### LB Series Standard Bezel

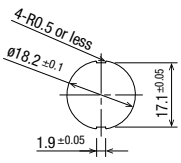
**(LB1/LB2/LB3)**



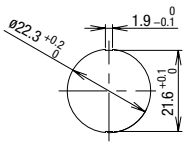

*1: 24 mm for rectangular type
23.2 mm for 3PDT contacts
*2: 21 mm for 3PDT contacts

### Panel Cut-out for Positioning

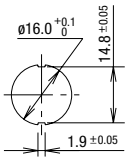
**LB Series Flush Bezel**
**Round (LB6/LB6M)**




**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 | 1A | 1A |

**Silver Contact**

| Rated Operating Voltage | | | 30V | 125V | 250V |
|---|---|---|---|---|---|
| Rated Operating Current | AC | Res. | — | 3.5A | 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 | 0.2, 1A (DC-12) | 0.5, 1A (AC-12) |

**Silver Contact**

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





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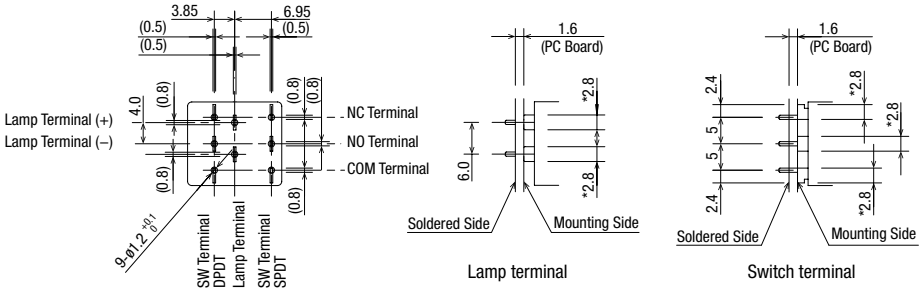
## Notes for Designing PC Board and Circuit

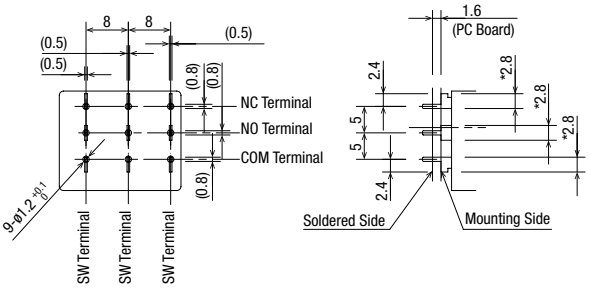
All dimensions in mm.

- 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

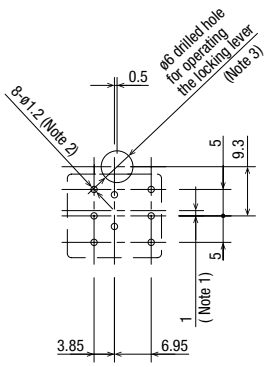



### 3PDT Contacts

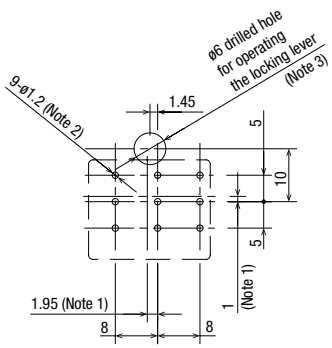



## PC Board Drilling Layout (Bottom View)

### 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.





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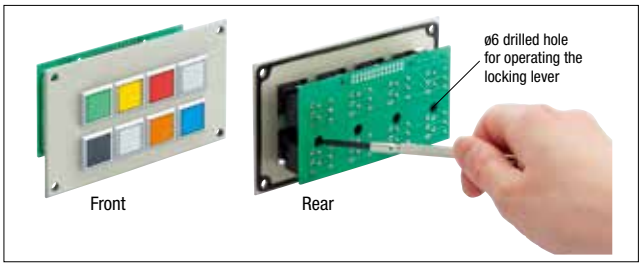
## Single Board Mounting

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




### Installing and Removing Contact Blocks

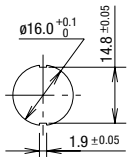
Turn the locking lever to install and remove contact blocks on the PC using a screwdriver from a hole in the PC board. See "Notes for Designing PC Board and Circuit" on B-121. Determine the location of the switches so that the locking lever can be operated. See "Removing and Installing the Contact Block"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

### Mounting Holes and Assembly Procedure

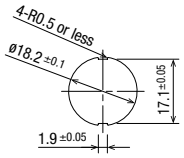
Drill mounting holes in the panel as shown below. When the units are mounted collectively, provide adequate clearance.

#### Panel Cut-out for Positioning

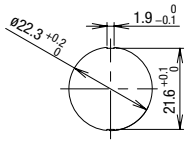
**Standard Bezel (LB1/LB2/LB3/LB4)**




**LB Series Flush Bezel (LB6/LB6M/LB6G)**



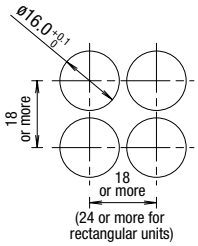

**LBW Series Flush Bezel (LBW6/LBW6M/LBW6G)**



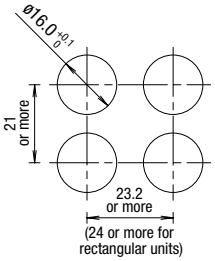

#### Mounting Hole Layout

**Standard Bezel (LB1/LB2/LB3/LB4)**

**SPDT/DPDT Contacts**



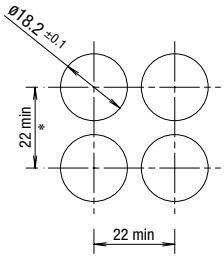

**3PDT Contacts**



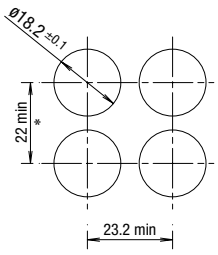

**LB Series Flush Bezel**

**SPDT/DPDT Contacts**

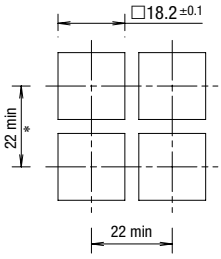
**LB6/LB6M/LB6G**

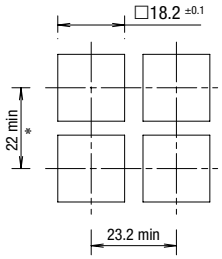



**3PDT Contacts**

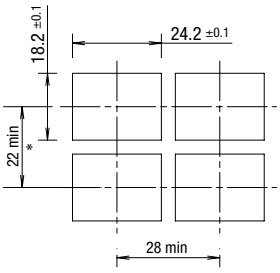


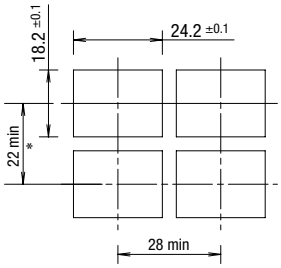

**LB7/LB7M/LB7G**




**LB8/LB8M/LB8G**

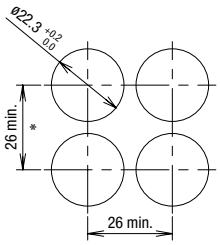



∗ 45 mm minimum for switches with guard

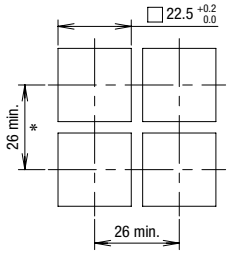
**LBW Series Flush Bezel**

**LBW6/LBW6M/LBW6G**




**LBW Series Flush Bezela**

**LBW7/LBW7M/LBW7G**




∗ 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.





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# UP Series Single Board Mount Pilot Lights

## Mounts on the same panel as LB/LBW series

- Three illumination colors: Green (G), red (R), and white (W)

## Specifications

| | | | |
|---|---|---|---|
| Color Code | | Red (R), White (W) | G (Green) |
| Rated Current (I) | | 7mA | 2mA |
| Maximum Current (Ta: 25°C) | Reverse Voltage ($V_R$) | 9V | 5V |
| | Operating Temperature ($T_{opr}$) | –25 to +55ºC (no freezing) | |
| | Storage Temperature ($T_{stg}$) | –30 to +80ºC (no freezing) | |
| Forward Voltage ($V_f$) | | Standard value: 2V (If=7mA) | Standard value: 2.7V (If=2 mA) |
| Dielectric Voltage | | Between live and dead parts: 500V AC, 1 minute | |
| Weight (approx.) | | 4.3g (UP8-89V1), 5.1g (UP8-89V2) | |

## UP Series

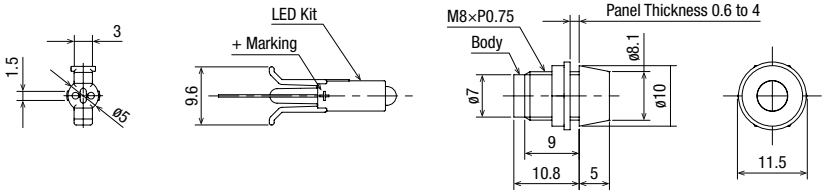
| Mounting Hole Size | Shape | Degree of Protection (IEC 60529) | Mountable Unit | Part No. | Ordering No. | Illumination Color Code | Package Quantity |
|---|---|---|---|---|---|---|---|
| ø8 UP8 With standard bezel / With flush bezel | Shroud | IP40 | Standard Bezel | UP8-89V1∗ | UP8-89V1∗PN10 | Specify the color code in place of ∗ in the Part No.<br>G: green<br>R: red<br>W: white | 10 |
| | | | Flush Bezel | UP8-89V2∗ | UP8-89V2∗PN10 | | |
| ø9 UP9P | Shroud | IP65 | Standard bezel Flush bezel | UP9P-99V1∗ | UP9P-99V1∗PN10 | | 10 |

- LED cannot be replaced.

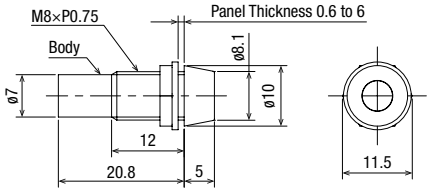
Note: Connect an external current limiting resistor in series. Otherwise, the LED may be damaged.

## Dimensions

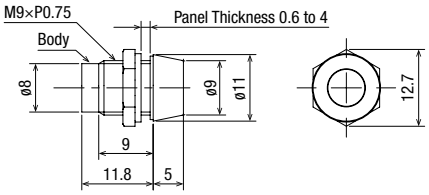
All dimensions in mm.




UP8-89V1

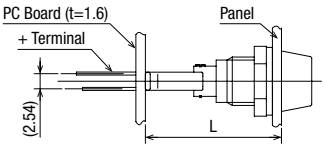



UP8-89V2




UP9P-99V1

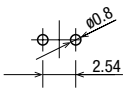
### [Assembly Drawing]




### Dimensions (L )

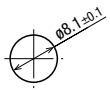
| | |
|---|---|
| Standard Bezel | 22.5mm |
| Flush Bezel | 29.9mm |

## PC Board Mounting Hole

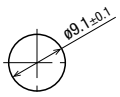



## Panel Cut-out

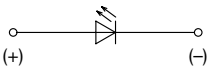
UP8




UP9P




## Internal Circuit




The longer pin is the positive terminal





IDEC
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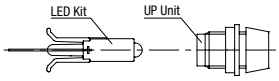
## Safety Precautions

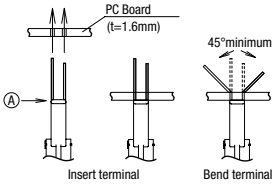
- Turn off power to the unit before installation, removal, wiring, maintenance, and inspection.
  Failure to turn off may cause electrical shocks or fire hazard.
- For wiring, use wires of a proper size to meet the voltage and current requirements.
- Improper soldering or failure to tighten the terminal screw may cause overheating and fire.

## Single Board Mounting

UP series miniature pilot light single board mounting types can be mounted with LB/ LBW series on the same panel.
Follow the instructions below on single board mounting.



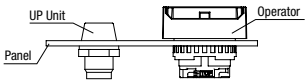

1. Mount the LED kit to the PC board.



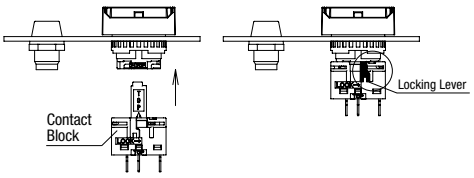

**Temporary mounting**

1. Note the polarity of the terminals and insert the terminals to the PC board.
2. Make sure that part A of the LED kit is pressed tightly to the PC board. Bend the terminals sideways as shown on the left.

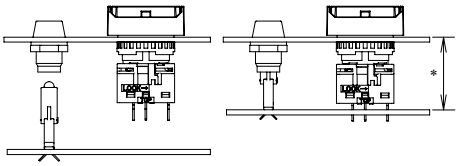
2. Mount the operator and the UP series pilot lights on to the control panel.




3. Mount the contact block to the operator of the miniature control unit and lock the unit by turning the locking lever.




4. Install the PC board in 1. to the panel in 3.




Note: Make surethat the LED kit is inserted into the UP series unit.

* When mounting LB/LBW and UP series on a single board, make sure that the distance between the front of the panel and the mounting side of the PC board (gasket distortion is taken into consideration) is as shown in the table below.

| Part No. | Mountable Unit | Distance (*) |
|---|---|---|
| UP8-89V1* | Standard bezel | 22.5mm |
| UP8-89V2* | Flush bezel | 29.9mm |
| UP9P-99V1* | Standard bezel | 22.5mm |
| | Flush bezel | 29.9mm |

5. Solder the terminals.
   Before soldering, make sure that each terminal of the contact block is securely inserted into the PC board holes.

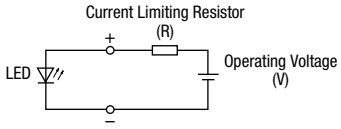
## Instructions

### Polarity

Pay attention to the polarity of the power supply as UP series units do not contain a diode for protection against reverse polarity. The long terminal is positive and the short terminal is negative.

### Current Limiting Resistor

When using a UP series unit without a built-in current limiting resistor, connect an external current limiting resistor. Calculate the resistance using the following formula.




$$\text{Resistance } (\Omega) = \frac{\text{Operating Voltage (V)} - \text{Forward Voltage (Vf)}}{\text{Rated Current (I)} *}$$

* Rated Current (I) = R (red), W (white) : 0.007A
G (green) : 0.002A
Forward Voltage (Vf) = R (red), W (white) : 2V
G (green) : 2.7V

Note: Use a resistor of higher resistance than the calculated value (Ω)

$$\text{Rated Wattage of Resistor (W)} = \text{Rated Current (I)} \times \text{Operating Voltage (V)} \times 2 \text{ to } 3 *$$

* 2 to 3 is a safety factor

**<Current Limiting Resistor Reference Value>**

| Operating Voltage \ Color | Red (R), White (W) | Green (G) |
|---|---|---|
| 5V DC | 430Ω (1/4W) | 1200Ω (1/4W) |
| 6V DC | 560Ω (1/4W) | 1600Ω (1/4W) |
| 12V DC | 1500Ω (1/4W) | 4700Ω (1/4W) |
| 24V DC | 3000Ω (1/2W) | 11000Ω (1/4W) |

### Countermeasures against Dim Lighting

See B-136.

### Wiring

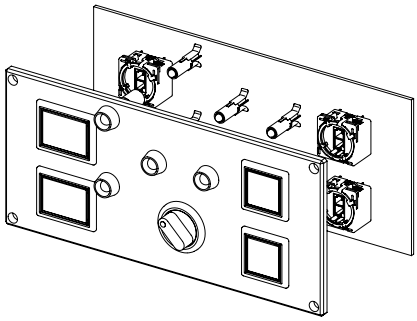
Solder the terminal at 350°C within 3 seconds using a 60W soldering iron. SnAgCu type lead-free solder is recommended.
When soldering, do not touch the pilot light housing with the terminal. Do not bend the terminal or apply excessive force to the terminal.

## Notes on Panel Mounting

Tightening torque should not exceed 0.49 N·m. Do not use pliers. Do not tighten with excessive force, otherwise the locking ring will be damaged.

## PC Board and Circuit Design

Use glass epoxy copper clad laminate, double-sided through-hole PC boards with a thickness of 1.6 mm.



Example of single board mounting





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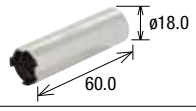
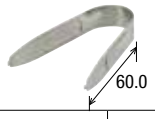
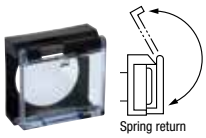
## Accessories

Package Quantity:1

| Shape | | | Specification | Part No. | Ordering No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|---|
| Locking Ring Wrench   | | | Metal (Nickel-plated brass) | MT-001 | MT-001 | 1 | Used to tighten the locking ring when installing the units on to the panel. |
| For Standard Bezels | Lens Removal Tool   | | Stainless Steel | MT-101 | 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 | 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. |
| For Standard Bezels | Switch Guard (spring return) | For rectangular units (LB3/LB4) | Guard (Polyacetal) Base (Polyarylate) | AL-KH6SP | AL-KH6SP | 1 | |
| For Standard Bezels | Switch Guard (spring return) | 180° Spring return for Single Board Mounting   For rectangular units (LB3/LB4) | Guard (Polyacetal) Base (Polyarylate) | LA9Z-K3 | 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. |
| For Standard Bezels | 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 | 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 Standard Bezels | Switch guard (remains open) | For rectangular units (LB3/LB4) | Guard (Polyacetal) Base (Polyarylate) | LB9Z-K3P | 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. |
| For Standard Bezels | Rubber Boot ①  | 1. For round units (LB1) | Rubber (Transparent silicon rubber) | LB9Z-D1 | LB9Z-D1 | 1 | Degree of protection: IP65 See B-127 for dimensions. See B-135 for mounting. |
| For Standard Bezels | Rubber Boot ②  | 2. For square units (LB2) | Rubber (Transparent silicon rubber) | LB9Z-D2 | LB9Z-D2 | 1 | |
| For Standard Bezels | Rubber Boot ③ | 3. For rectangular units (LB3/LB4) | Rubber (Transparent silicon rubber) | LB9Z-D3 | LB9Z-D3 | 1 | |
| For Standard Bezels | Mounting Hole Plug | Metal | [Plug] Metal (Zinc diecast) [Locking nut] Polyacetal [Gasket] Nitrile rubber | AL-BM6 | AL-BM6 | 1 | Degree of protection: IP65 Tightening torque: 0.1 to 0.29 N·m See B-127 for dimensions. |
| For Standard Bezels | Mounting Hole Plug | Rubber | Nitrile rubber (black) | AL-B6 | AL-B6PN05 | 5 | Degree of protection: IP65 See B-127 for dimensions. |





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## Accessories

Package Quantity:1

| | Shape | | Specification | Part No. | Ordering 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 | LB9Z-D6 | 1 | Degree of protection: IP65<br>See B-128 for dimensions.<br>See B-135 for mounting. |
| | | 2. For square units (LB7/LB7M) | | LB9Z-D7 | LB9Z-D7 | 1 | |
| | | 3. For rectangular units (LB8/LB8M) | | LB9Z-D8 | LB9Z-D8 | 1 | |
| | Mounting Hole Plug ① ② ③ | 1. For round units (LB6/LB6M) | [Plug]<br>Polyamide (Black)<br>[Gasket]<br>Nitrile rubber<br>[Mounting Plate]<br>Stainless Steel | LB9Z-BS6∗ | LB9Z-BS6∗ | 1 | ∗ Color code: blank (black), W (white)<br>Degree of protection: IP65<br>Panel thickness: 0.5 to 3.2 mm<br>See B-128 for dimensions. |
| | | 2. For square units (LB7/LB7M) | | LB9Z-BS7∗ | LB9Z-BS7∗ | 1 | |
| | | 3. For rectangular units (LB8/LB8M) | | LB9Z-BS8∗ | LB9Z-BS8∗ | 1 | |
| For LBW Series Flush Bezels | Mounting Hole Plug ① ② | 1. For round units (LBW6/LB6W6M) | [Plug]<br>Polyamide (Black)<br>[Gasket]<br>Nitrile rubber<br>[Mounting Plate]<br>Stainless Steel | LBW9Z-BS6∗ | LBW9Z-BS6∗ | 1 | ∗ Color code: blank (black), W (white)<br>Degree of protection: IP65<br>Panel thickness: 0.5 to 3.2 mm<br>See B-128 for dimensions. |
| | | 2. For rectangular units (LBW7/LB6W7M) | | LBW9Z-BS7∗ | LBW9Z-BS7∗ | 1 | |
| | Mounting Hole Plug | Metal | [Plug]<br>Zinc diecast<br>[Locking Ring]<br>Polyamide<br>[Gasket]<br>Nitrile rubber | LW9Z-BM | LW9Z-BM | 1 | Degree of protection: IP66<br>Tightening torque: 1.2 N·m<br>See B-128 for dimensions. |
| | Mounting Hole Plug | Rubber | Nitrile rubber | LW9Z-BP1 | LW9Z-BP1 | 1 | Degree of protection: IP65<br>Tightening torque: 2.0 N·m<br>See B-128 for dimensions. |
| Terminal Cover ① ② | | 1. For SPDT/DPDT contacts | PBT (White) | LB9Z-VL2 | LB9Z-VL2PN10 | 10 | See B-128 for dimensions.<br>See B-131 for mounting. |
| | | 2. For 3PDT contacts | | LB9Z-VL3 | LB9Z-VL3PN10 | 10 | |
| Key Reversible key Non-reversible key | | For key selector switches (wave key) | Metal (zinc nickel-plated) | LA9Z-SK-∗ | LA9Z-SK-∗PN02 | 2 | Specify a key number in place of ∗ in the Part No.<br>Blank: Standard key 0H (reversible)<br>1H to 2H: Reversible key<br>3H to 6H: Non-reversible key<br>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 | AS6-SK-132PN02 | 2 | |





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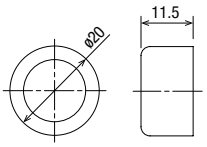
## Dimensions for Accessories

All dimensions in mm.

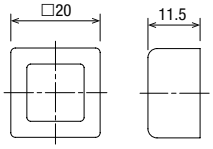
# For LB Series Standard Bezel

## Rubber Boot

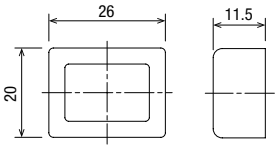
### For round units (LB9Z-D1)




### For square units (LB9Z-D2)

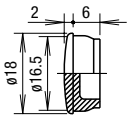



### For rectangular units (LB9Z-D3)

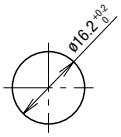



## Mounting Hole Plug

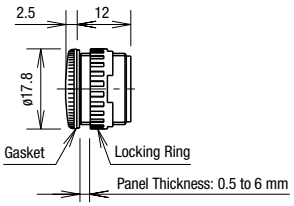
### AL-B6



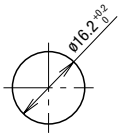

### Mounting Hole Layout




### AL-BM6

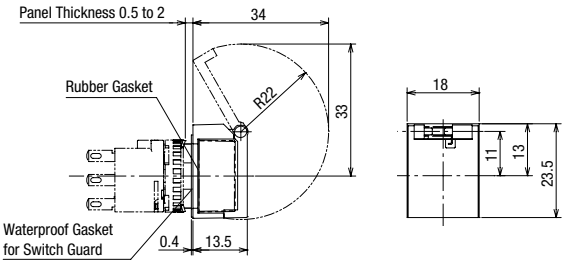



### Mounting Hole Layout

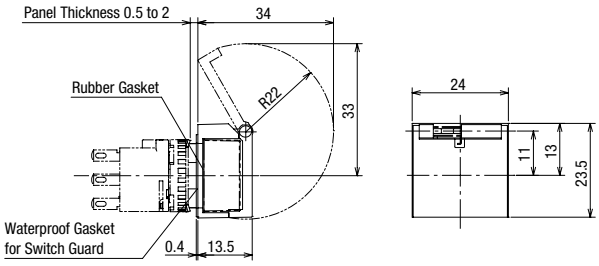



## Switch Guard (Spring Return)

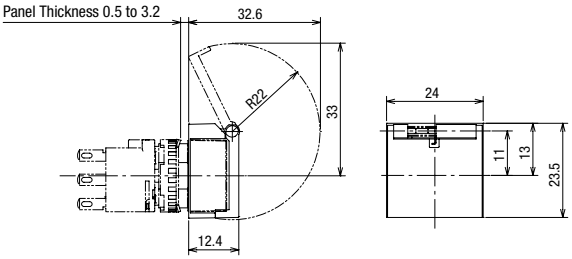
### For round / square units (AL-K6SP)




### For rectangular units (AL-KH6SP )



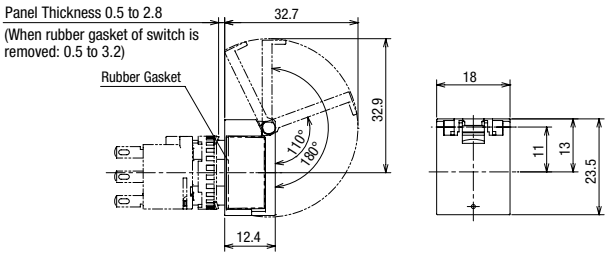

### For Single Board Mounting (LA9Z-K3) (Note)



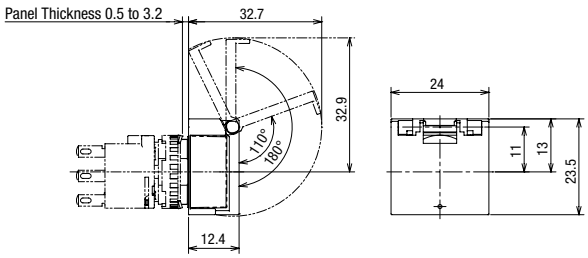

Note: The panel depth is the same for switches with or without switch guards. Both types can be installed on the same PC board.

## Switch Guard (Remains Open)

### For round / square units (Note) (LB9Z-K2)




### For rectangular units (Note) (LB9Z-K3P)




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



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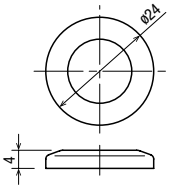
## Dimensions for Accessories

All dimensions in mm.

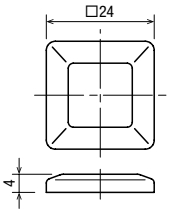
### For LB Series Flush Bezel

#### Rubber Boot

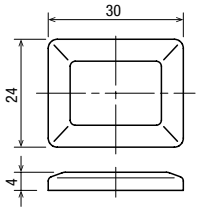
For round units (LB9Z-D6)




For square units (LB9Z-D7)

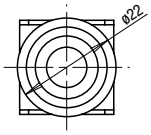



For rectangular units (LB9Z-D8)

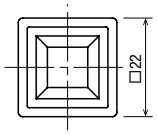



#### Mounting Hole Plug

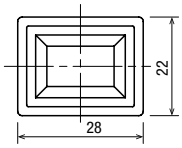
For round units (LB9Z-BS6∗)

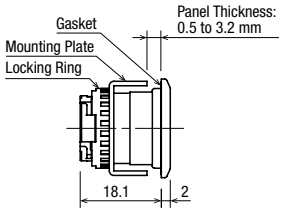



For square units (LB9Z-BS7∗)

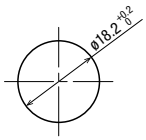



For rectangular units (LB9Z-BS8∗)

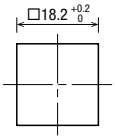


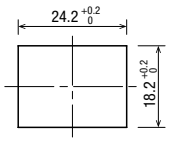

Mounting Hole Layout




Mounting Hole Layout



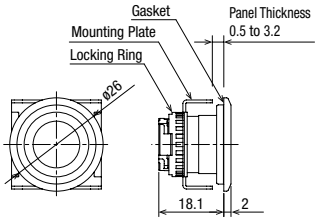

Mounting Hole Layout



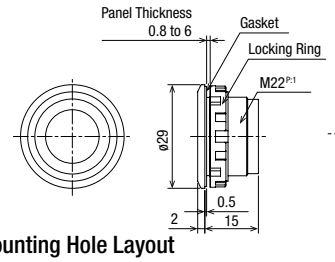

### For LBW Series Flush Bezel

#### For round units

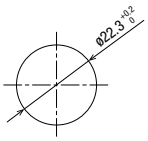
LBW9Z-BS6∗



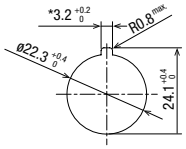

LW9Z-BP1




Mounting Hole Layout



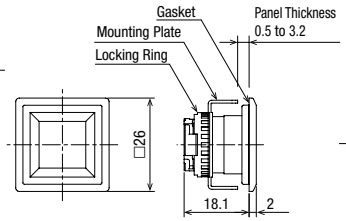

Mounting Hole Layout



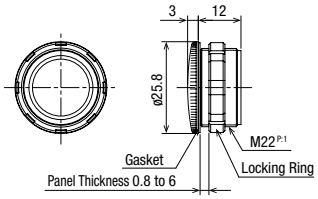

*The 3.2 +0.2 0 recess is not necessary when neither nameplate nor anti-rotation ring is used.

#### For square units

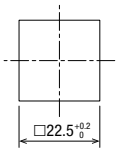
LBW9Z-BS7∗



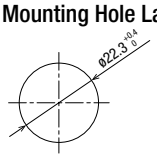

LW9Z-BM




Mounting Hole Layout

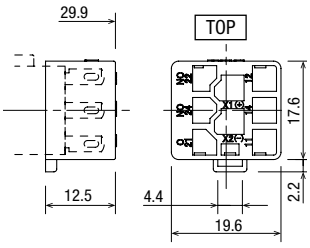



Mounting Hole Layout

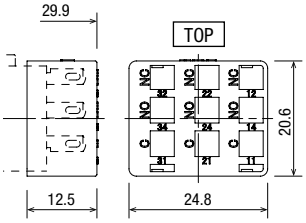



#### Terminal Cover

For SPDT/DPDT contacts (LB9Z-VL2)

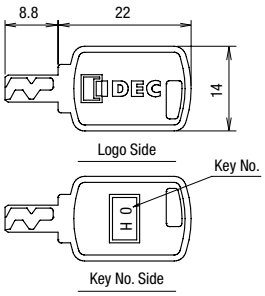



For 3PDT contacts (LB9Z-VL3)

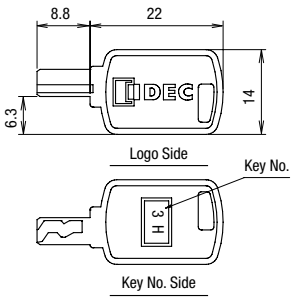



#### Key (Wave Key)

Reversible key




Non-reversible key





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

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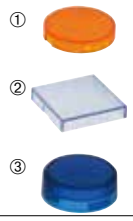
## Accessories

| Shape | | | Material / Dimensions (W×H×D) | Part No. | Ordering No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|---|
| LB Series | Lens | 1. For round units | Polyarylate ø15.4 H4 | AL6M-L∗ | AL6M-L∗PN05 | 5 | Specify the color code in place of ∗ in the part no. A: Amber, C: Clear, G: Green, R: Red, S: Blue, Y: Yellow<br>Note: Use a clear lens for pure white (PW) illumination. |
| | | 2. For square units | Polyarylate □15.4 H4 | AL6Q-L∗ | AL6Q-L∗PN05 | 5 | |
| | | 3. For rectangular units | Polyarylate W21.4 H4 D15.4 | AL6H-L∗ | AL6H-L∗PN05 | 5 | |
| | | 4. For dome units | Polyarylate ø16 H9.4 | AL6D-L∗ | AL6D-L∗PN05 | 5 | |
| | Buttons | 1. For round units | Polyarylate ø15.4 H4 | AB6M-B∗ | AB6M-B∗PN05 | 5 | Specify the color code in place of ∗ in the part no. B: Black, G: Green, R: Red, S: Blue W: White, Y: Yellow |
| | | 2. For square units | Polyarylate □15.4 H4 | AB6Q-B∗ | AB6Q-B∗PN05 | 5 | |
| | | 3. For rectangular units | Polyarylate W21.4 H4 D15.4 | AB6H-B∗ | AB6H-B∗PN05 | 5 | |
| | Marking plate | 1. For round units | Acrylic ø13.7 H0.8 | AL6M-∗ | AL6M-∗PN05 | 5 | Specify the color code in place of ∗ in the part no. B: Black, W: White<br>See B-133 for dimensions and engraving area. |
| | | 2. For square units | Acrylic □13.7 H0.8 | AL6Q-∗ | AL6Q-∗PN05 | 5 | |
| | | 3. For rectangular units | Acrylic W19.7 H0.8 (0.4) D13.7 | AL6H-∗ | AL6H-∗PN05 | 5 | |
| | Diffusion plate  | For dome units | Acrylic ø13.6 H2.8 | AL6D-W | AL6D-WPN05 | 5 | White |
| | Anti-rotation Ring | Standard bezel | Metal (Stainless steel) □17.9 t0.6 | LB9Z-LP1 | LB9Z-LP1PN10 | 10 | |
| | Anti-rotation Ring | Flush bezel | Metal (Stainless steel) 21×8.2×20.6 t0.8 | LB9Z-LP6 | LB9Z-LP6PN10 | 10 | |
| LBW Series | Lens  | 1. For round flush units | Polyarylate ø20 H4 | HA9Z-L11∗ | HA9Z-L11∗PN05 | 5 | Specify the color code in place of ∗ in the part no. A: Amber, C: Clear, G: Green, R: Red, S: Blue, Y: Yellow<br>Note: Use a clear lens for pure white (PW) illumination. |
| | | 2. For square flush units | Polyarylate ø20 H4 | HA9Z-L21∗ | HA9Z-L21∗PN05 | 5 | |
| | | 3. For round extended units | Polyarylate ø20.2 H7.8 | LBW9Z-L12∗ | LBW9Z-L12∗PN05 | 5 | Specify the color code in place of ∗ in the part no. A: Amber, G: Green, R: Red, S: Blue, W: clear, Y: Yellow<br>Note: Use a clear lens for pure white (PW) illumination. |
| | Buttons | 1. For round flush units | Polyacetal ø20 H3.2 (L5) | HA9Z-B11∗ | HA9Z-B11∗PN05 | 5 | Specify the color code in place of ∗ in the part no. B: Black, G: Green, R: Red, S: Blue W: White, Y: Yellow |
| | | 2. For square flush units | Polyacetal ø20 H3.9 (L5) | HA9Z-B21∗ | HA9Z-B21∗PN05 | 5 | |
| | | 3. For round extended units | Polyacetal ø19.8 H7.3 (L9.1) | HA9Z-B12∗ | HA9Z-B12∗PN05 | 5 | |
| | | 4. For square extended units | Polyacetal ø19.8 H8 (L9.1) | HA9Z-B22∗ | HA9Z-B22∗PN05 | 5 | |
| | Marking plate | 1. For round flush units | Acrylic ø18.4 t0.85 (L1.1) | HA9Z-P1∗ | HA9Z-P1∗PN05 | 5 | Specify the color code in place of ∗ in the part no. B: Black, W: White<br>See B-134 for dimensions and engraving area. |
| | | 2. For square units | Acrylic □18.4 t0.85 | HA9Z-P2∗ | HA9Z-P2∗PN05 | 5 | |
| | Anti-rotation Ring | LBW series | Metal (Stainless steel) 25×8.2×24.8 t0.8 | LBW9Z-LP6 | LBW9Z-LP6PN10 | 10 | |
| Locking ring | | All models | Polyamide ø17.9 H3.9 | LB9Z-LN | LB9Z-LNPN10 | 10 | |
| Illuminated selector knob operator | | Illuminated selector switches | <For operator> Polyarylate Waterproof O-gasket Nitryl rubber ø15.4 H13 | LA1A-F∗ | LA1A-F∗PN02 | | Specify the color code in place of ∗ in the part no. G: green, R: red, W: white |





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## 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<br>G: Green<br>PW: Pure White<br>R: Red<br>S: Blue |
| | 12V AC/DC | LB9Z-LED1∗ | |
| | 24V AC/DC | LB9Z-LED2∗ | |

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

## Transformer

Package Quantity: 1

| Transformer | Operating Voltage | Operating Voltage Range | 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 | |

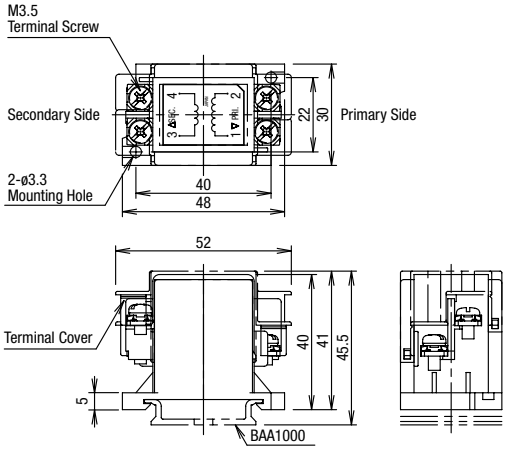
- Terminal cover (TWR-VL3) is supplied as standard.
- Connect one LB9Z-LED2∗ to a transformer.

### 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<br>Operating extremes: 5 to 55 Hz, amplitude 0.5 mm |
| Shock Resistance | Damage limits: 1,000 m/s$^2$<br>Operating Extremes: 100 m/s$^2$ |
| Dielectric Strength | 2,500V AC, 1 minute |
| Terminal Screw | M3.5 |
| Applicable Wire | 2 mm$^2$ maximum, 2 wires maximum |
| Weight (approx.) | 87g |

### Dimensions

All dimensions in mm.

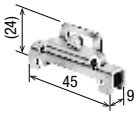



### Accessories

#### 35mm DIN Rail

| Part No. | Ordering No. | Length | Material | Package Quantity |
|---|---|---|---|---|
| BAA1000 | BAA1000PN10 | 1,000mm | Aluminum (approx. 200g) | 10 |

#### End Clip

| Part No. | Ordering No. | Applicable DIN Rail | Package Quantity | Dimensions |
|---|---|---|---|---|
| BNL6 | BNL6PN10 | BAA1000 | 10 |  Approx. 15g<br>Steel (Zinc-plated) |

- See H-071 for DIN rail products.

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



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## 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.

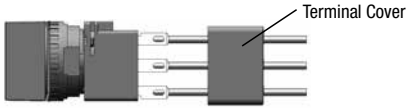
### Terminal Cover

**Solder/tab terminal**

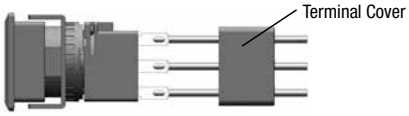
Insert the terminal cover into the contact block with the TOP markings on the contact block and the terminal cover in the same direction.

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

**Standard Bezel**




**Flush Bezel**




### 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.

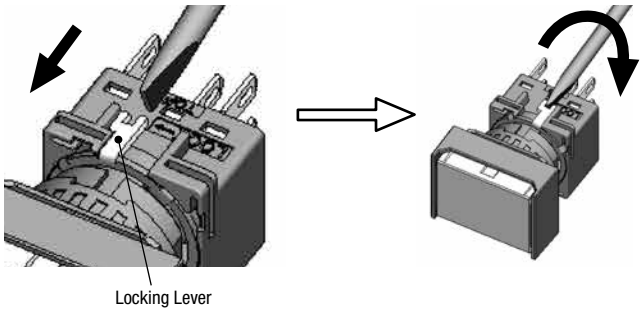
**Protection against oil (IP65)**

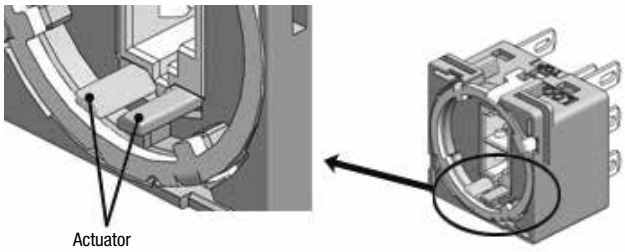
The LB series has been tested according to JIS C 0920: Appendix 1 by using water insoluble cutting oil Class N3, No. 8 (JIS K 2241) to prove that the switches will not be damaged by oil drops or splashes. This may not apply to special types of oils. Contact IDEC for details.

### 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.





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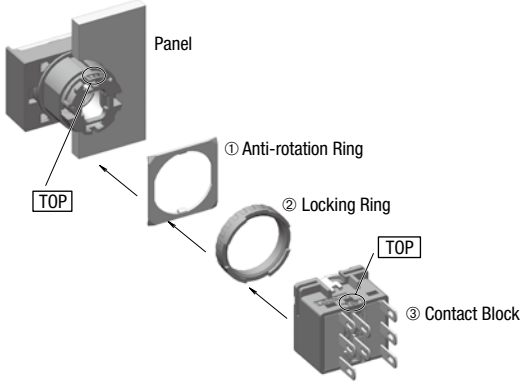
## Instructions

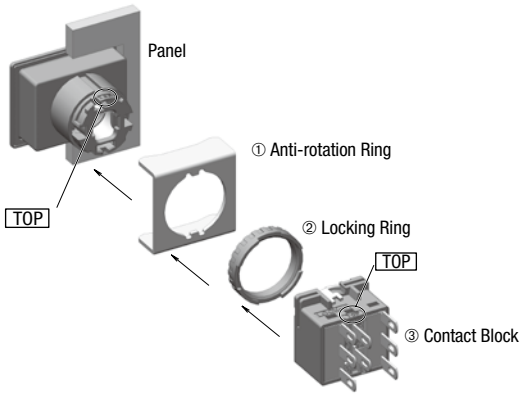
### Panel Mounting

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)**




**(For Flush Bezel)**




**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.

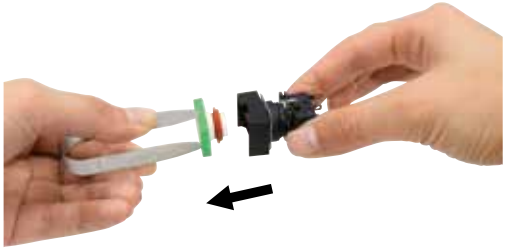
### Replacing the Lens and Marking Plate

**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.

**[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)**

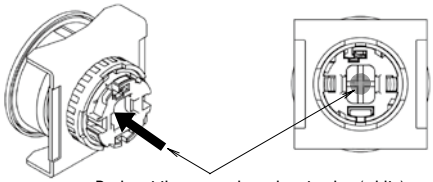
LBW series pushbuttons (button style, see B-097) can be removed according to the following procedure. LBW series pushbuttons (button style) cannot be removed from the front of the panel.

**[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.





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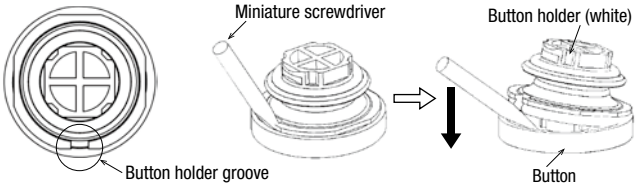
## Instructions

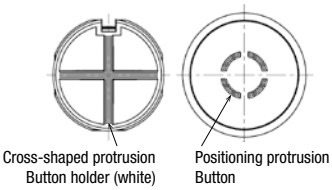
### Removing the Button

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



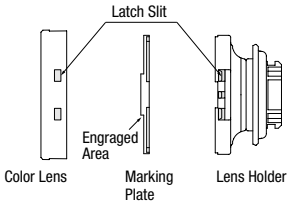

To attach the button to the button holder, align the groove on cross-shaped protrusion with the positioning protrusion on the button and insert securely.

### Installing

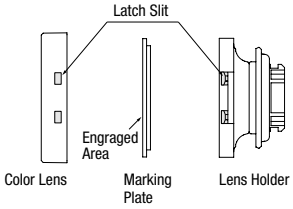



Insert the marking plate into the color lens, and press the lens onto the lens holder to engage the latches. Pay attention to the orientation of the marking plate.

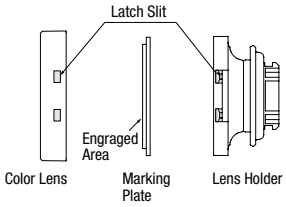
LB/LBW Series Round




LB Series Square/Rectangular

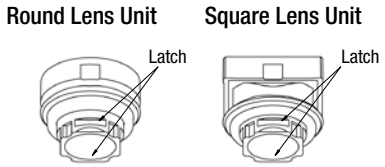



LBW Series Square

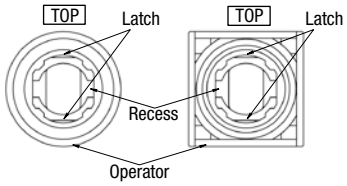



## Installing the Lens Unit and Contact Block

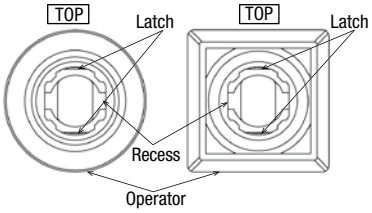
To insert the lens unit into the operator, press in the lens unit by making sure that the latch on the operator is aligned with the latch on the lens unit.




### Standard Bezel




### Flush Bezel

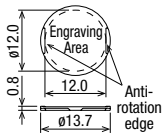
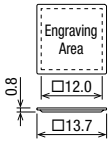
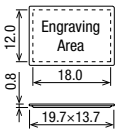
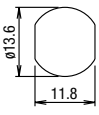
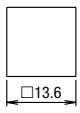
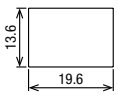



## Marking Plates and Films

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 |   |   |   |
| | • Engraving must be made on the engraving area within 0.5 mm deep.<br>• The marking plate is made of white acrylic resin. | | |
| Applicable Marking Film |   |   |   |
| | • Film thickness: 0.1 mm per film<br>• Marking film is not included.<br>• Recommended marking film: Polyester film | | |





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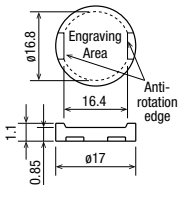
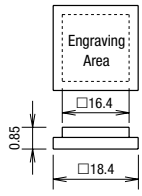
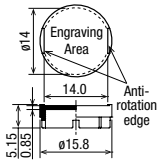
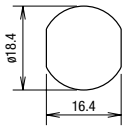
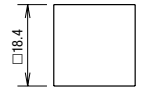
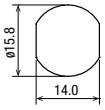
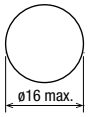
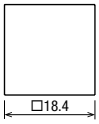
## Instructions

### LBW Series

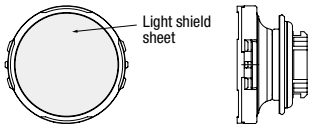
| Lens | Round Flush | Square | Round Extended |
|---|---|---|---|
| Built-in Marking Plate |   |   |   |
| | • Engraving thickness: 0.5 mm max.<br>• The marking plate is made of white acrylic resin. | | |
| Applicable Marking Film |   |   |   |
| | • Film thickness: 0.1 mm per 2 films or 0.2 mm per film.<br>• Marking film is not included.<br>• Recommended marking film: Polyester film | | |

### LBW Series (ring-illuminated model)

| Lens | Round (Note) | Square |
|---|---|---|
| Applicable Marking Film |   |   |
| | • Film thickness: 0.1 mm max. | |

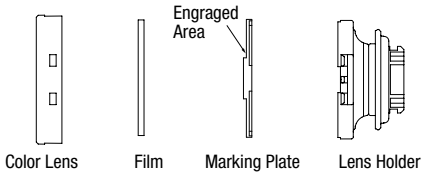
Note: Use a film with adhesive and attach on the light shield sheet. Make sure that the marking film is properly installed and does not protrude from the edge of light shield sheet.

#### Ring Illuminated Model Lens Holder

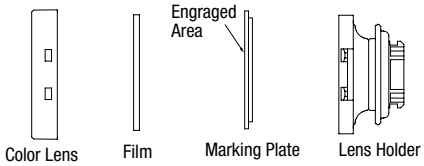



### Insertion Order of Marking Plate and Film

#### LB/LBW Series Round




#### LB/LBW Series Square/Rectangular



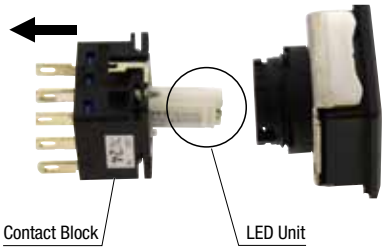

Note: Film is not included.

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.

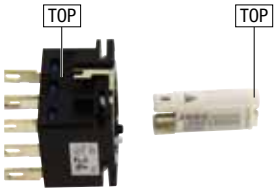
## Replacing the LED Unit

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




### 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.




### Notes on replacing the LED Unit

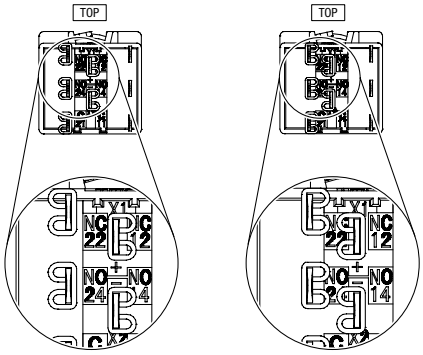
When replacing the LED unit, make sure that static electricity is not applied.

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.




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.

## Connection

The Easy Lock Connector can be used for tab terminals.

The below connector is recommended for use as connectors.

| Item | Easy Lock Connector (Nichifu) | |
|---|---|---|
| Chain terminal | 0.2 to 0.3mm² | CSS 62832-F4 |
| | 0.5 to 1.25mm² | CSS 62815-F4 |
| Loose terminal | 0.2 to 0.3mm² | OSS 62832-F4 |
| | 0.5 to 1.25mm² | OSS 62815-F4 |
| Housing | NES 1-28-1P-V2 | |
| Applicator | Chain terminal: FB 74 (CSS 62832-F4)<br>FB 75 (CSS 62815-F4) | |
| Special tool | Loose terminal: NH 72 | |





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## Instructions

### Installing the Rubber Boot

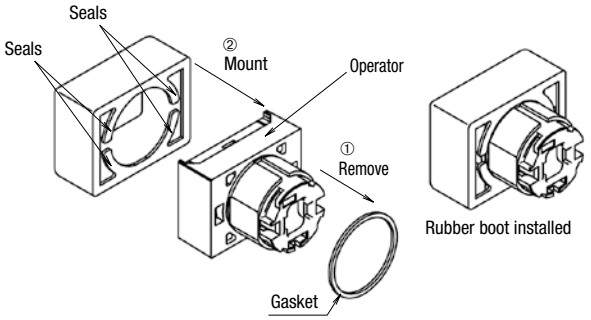
When using in places where the switches are subjected to water splash or an excessive amount of dust, make sure to use the optional rubber boot.
As shown in the drawing below, ① remove the gasket from the operator, and ② attach the rubber boot from the front (button side).

#### Standard Bezel

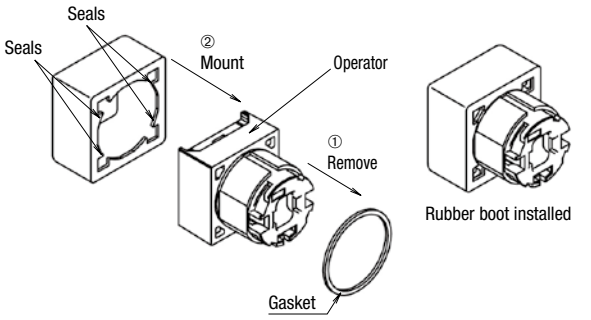
For rectangular and square units, pull out the seals of the rubber boot and place them around the operator sleeve as shown below. Make sure that the seals are not twisted or tucked inside and that the gasket is removed, otherwise waterproof and dustproof characteristics are not ensured.

#### How to Install the Rubber Boot

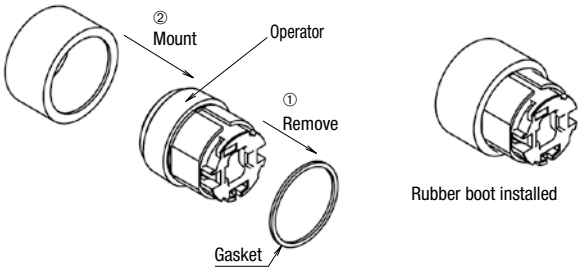
**Rectangular**




**Square**



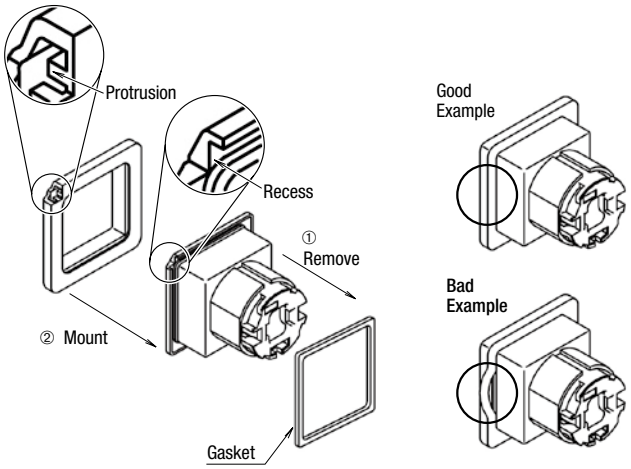

**Round**




#### 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**




Note: Install the rubber boot before mounting the unit to the panel.

### Maintained Pushbuttons

Observe the following instructions to prevent malfunction or damage.

- Do not stop halfway when operating pushbuttons or illuminated pushbuttons. Make sure to push the button fully.
- Do not replace the operator or lens unit with the pushbutton in a locked status.
- Do not remove the contact unit with the pushbutton in a locked status.
- Do not operate the pushbutton without the contact unit.

### 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.





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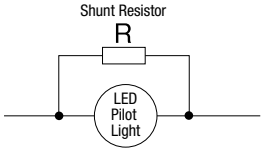
## Instructions

### 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.

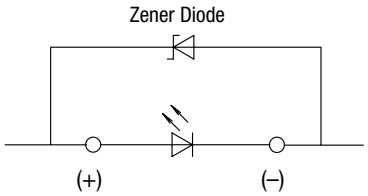



**Leakage Current Shunt Resistor Allotment Table (Recommended)**

| 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 reference value)
Zener voltage: 4.3 to 4.7V

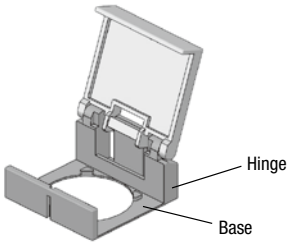
### Static Electricity (UP Series)

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

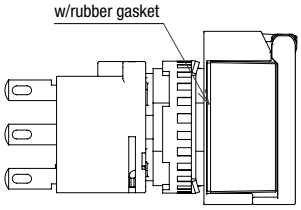
When opening/closing the switch guard while the switch guard is not installed on a panel, make sure to hold the hinge. Holding the base might result in damage. Also do not apply force on the guard in other than open/close directions, otherwise the hinge may be damaged.



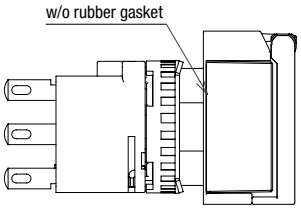

#### Rubber Gasket when using LB9Z-K2 Switch Guard (remains open) for Round/Square Units

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.

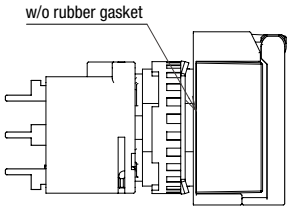
- **When the panel thickness is up to 2.8mm**
  Install the switch onto the switch guard with rubber gasket, and mount on the panel.




- **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).




- **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).







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# Ordering Terms and Conditions

Thank you for using IDEC Products.

By purchasing products listed in our catalogs, datasheets, and the like (hereinafter referred to as "Catalogs") you agree to be bound by these terms and conditions. Please read and agree to the terms and conditions before placing your order.

## 1. Notes on contents of Catalogs

(1) Rated values, performance values, and specification values of IDEC products listed in this Catalog are values acquired under respective conditions in independent testing, and do not guarantee values gained in combined conditions.
Also, durability varies depending on the usage environment and usage conditions.

(2) Reference data and reference values listed in Catalogs are for reference purposes only, and do not guarantee that the product will always operate appropriately in that range.

(3) The specifications / appearance and accessories of IDEC products listed in Catalogs are subject to change or termination of sales without notice, for improvement or other reasons.

(4) The content of Catalogs is subject to change without notice.

## 2. Note on applications

(1) If using IDEC products in combination with other products, confirm the applicable laws / regulations and standards.
Also, confirm that IDEC products are compatible with your systems, machines, devices, and the like by using under the actual conditions. IDEC shall bear no liability whatsoever regarding the compatibility with IDEC products.

(2) The usage examples and application examples listed in Catalogs are for reference purposes only. Therefore, when introducing a product, confirm the performance and safety of the instruments, devices, and the like before use. Furthermore, regarding these examples, IDEC does not grant license to use IDEC products to you, and IDEC offers no warranties regarding the ownership of intellectual property rights or non-infringement upon the intellectual property rights of third parties.

(3) When using IDEC products, be cautious when implementing the following.

i. Use of IDEC products with sufficient allowance for rating and performance

ii. Safety design, including redundant design and malfunction prevention design that prevents other danger and damage even in the event that an IDEC product fails

iii. Wiring and installation that ensures the IDEC product used in your system, machine, device, or the like can perform and function according to its specifications

(4) Continuing to use an IDEC product even after the performance has deteriorated can result in abnormal heat, smoke, fires, and the like due to insulation deterioration or the like. Perform periodic maintenance for IDEC products and the systems, machines, devices, and the like in which they are used.

(5) IDEC products are developed and manufactured as general-purpose products for general industrial products. They are not intended for use in the following applications, and in the event that you use an IDEC product for these applications, unless otherwise agreed upon between you and IDEC, IDEC shall provide no guarantees whatsoever regarding IDEC products.

i. Use in applications that require a high degree of safety, including nuclear power control equipment, transportation equipment (railroads / airplanes / ships / vehicles / vehicle instruments, etc.), equipment for use in outer space, elevating equipment, medical instruments, safety devices, or any other equipment, instruments, or the like that could endanger life or human health

ii. Use in applications that require a high degree of reliability, such as provision systems for gas / waterworks / electricity, etc., systems that operate continuously for 24 hours, and settlement systems

iii. Use in applications where the product may be handled or used deviating from the specifications or conditions / environment listed in the Catalogs, such as equipment used outdoors or applications in environments subject to chemical pollution or electromagnetic interference
If you would like to use IDEC products in the above applications, be sure to consult with an IDEC sales representative.

## 3. Inspections

We ask that you implement inspections for IDEC products you purchase without delay, as well as thoroughly keep in mind management/maintenance regarding handling of the product before and during the inspection.

## 4. Warranty

(1) Warranty period

The warranty period for IDEC products shall be one (1) year after purchase or delivery to the specified location. However, this shall not apply in cases where there is a different specification in the Catalogs or there is another agreement in place between you and IDEC.

(2) Warranty scope

Should a failure occur in an IDEC product during the above warranty period for reasons attributable to IDEC, then IDEC shall replace or repair that product, free of charge, at the purchase location / delivery location of the product, or an IDEC service base. However, failures caused by the following reasons shall be deemed outside the scope of this warranty.

i. The product was handled or used deviating from the conditions / environment listed in the Catalogs

ii. The failure was caused by reasons other than an IDEC product

iii. Modification or repair was performed by a party other than IDEC

iv. The failure was caused by a software program of a party other than IDEC

v. The product was used outside of its original purpose

vi. Replacement of maintenance parts, installation of accessories, or the like was not performed properly in accordance with the user's manual and Catalogs

vii. The failure could not have been predicted with the scientific and technical standards at the time when the product was shipped from IDEC

viii. The failure was due to other causes not attributable to IDEC (including cases of force majeure such as natural disasters and other disasters)

Furthermore, the warranty described here refers to a warranty on the IDEC product as a unit, and damages induced by the failure of an IDEC product are excluded from this warranty.

## 5. Limitation of liability

The warranty listed in this Agreement is the full and complete warranty for IDEC products, and IDEC shall bear no liability whatsoever regarding special damages, indirect damages, incidental damages, or passive damages that occurred due to an IDEC product.

## 6. Service scope

The prices of IDEC products do not include the cost of services, such as dispatching technicians. Therefore, separate fees are required in the following cases.

(1) Instructions for installation / adjustment and accompaniment at test operation (including creating application software and testing operation, etc.)

(2) Maintenance inspections, adjustments, and repairs

(3) Technical instructions and technical training

(4) Product tests or inspections specified by you

The above content assumes transactions and usage within your region. Please consult with an IDEC sales representative regarding transactions and usage outside of your region. Also, IDEC provides no guarantees whatsoever regarding IDEC products sold outside your region.


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