# MC Series Illuminated Control Units

## Bright LED lamp illumination
## Rectangular and square body control units

- Super LED improves visibility and saves energy.
- Removable contact blocks promote easy PC board mounting.
- Snap-action switching contacts.
- Slow-action and maintained types are also available.
- The solder terminal accepts quick connect receptacles enhancing safety and enabling easy wiring.
- Illumination face division: Full to 4-way split (MC3D) or 2-way split (MC2D)
- Lens and color screens can be changed easily without the need for removal of power, because contacts are not operated when the lens is first inserted into the housing.
- UL and c-UL recognized, EN compliant

- See website for details on approvals and standards.

## MC Series

| Item | MC3D (Rectangular) | | MC2D (Square) |
|---|---|---|---|
| | Horizontal Barrier | Horizontal Flange | Flange |
| Illumination Face Size | 18.8 × 26.6 mm | | 18.8 × 18.8 mm |
| Face Division | Full to 4-way split | | Full or horizontal 2-way split |
| No. of Lamps | Full illumination: 2<br>Vertical 2-way split: 2   Horizontal 2-way, 3-way, 4-way split: 4 | | Full: 1<br>Horizontal 2-way split: 2 |
| Illumination Color | Amber, Green, Pure White, Red, Blue, Yellow | | |
| Contact Material | Silver or gold plated silver | | |
| No. of Contacts | SPDT, DPDT, 3PDT | | SPDT, DPDT |
| Operation | Momentary (snap action or slow action), maintained, pilot light | | |
| Terminal Style | Solder tab terminal #110 (compatible with quick connect receptacles), PC board terminal | | |
| Housing Color | Black, gray | | |

## Specifications

| | |
|---|---|
| Operating Temperature | –25 to +40°C (no freezing) |
| Storage Temperature | –30 to +60°C (no freezing) |
| Operating Humidity | 35 to 90% RH (no condensation) |
| Insulation Resistance | Between live and dead metal parts:<br>100 MΩ (500V DC megger)<br>Between terminals of different poles:<br>100 MΩ (500V DC megger) |
| Dielectric Strength | Between live and dead metal parts:   2000V, 1 minute<br>Between live parts of different poles: 2000V, 1 minute<br>Between terminals of the same pole: 1000V, 1 minute |
| Contact Resistance | 50 mΩ maximum (initial value) |
| Vibration Resistance | Operating extremes: 5 to 55 Hz, amplitude 0.5 mm<br>Damage limits:        5 to 55 Hz, amplitude 0.5 mm<br>(2 hours each in 3 axes) |
| Shock Resistance | Operating extremes: 200 m/s$^2$<br>Damage limits:        500 m/s$^2$ |
| Mechanical Life | Momentary (snap action):1,000,000 operations min.<br>Maintained:  250,000 operations min. |
| Electrical Life | 100,000 operations min. |
| Operating Frequency | Momentary (snap action): 1,800 operations/hour<br>Maintained:  900 operations/hour |
| Degree of Protection | IP40 |

## Contact Ratings

### Silver Contact (switch base: gray)

| Rated Insulation Voltage | | | 250V | | |
|---|---|---|---|---|---|
| Rated Operating Voltage | | | 30V | 125V | 250V |
| Rated Operating Current | AC 50/60Hz | Resistive load | — | 3A | 2A |
| | | Inductive load | — | 2A | 1.5A |
| | DC | Resistive load | 2A | 0.4A | — |
| | | Inductive load | 1A | 0.2A | — |
| Rated Thermal Current | | | 5A | | |
| Contact Material | | | Silver | | |

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

### Gold Contact (Switch Base: Blue)

| Rated Insulation Voltage | 250V | |
|---|---|---|
| Rated Operating Voltage | 30V DC | 125V AC |
| Rated Operating Current (resistive load) | 0.1A | 0.1A |
| Rated Thermal Current | 3A | |
| Contact Material | Gold plated silver | |

Minimum applicable load (reference value): 5V AC/DC, 1 mA

# LED Lamps
## LFTD LED Lamp

| Part No. | LFTD-5∗N | LFTD-1∗N | LFTD-2∗N |
|---|---|---|---|
| Lamp Base | SX6S/8×5.4 | | |
| Operating Voltage | 5V DC±5% | 12V AC/DC±10% | 24V AC/DC±10% |
| Rated Voltage | 5V DC | 12V AC/DC | 24V AC/DC |
| Current Draw | 4mA | | |
| Illumination Color | The color code (∗1) is specified on the plastic part. | | |
| Voltage Marking | Die stamped on the lamp base | | |
| Life (reference value) | Approx. 50,000 hours<br>(When used on complete DC, the luminance is reduced to 50% of the initial intensity.) | | |
| Internal Circuit | X1 (+) Limited current circuit, Noise protection circuit, X2 (−) Dimmer protection circuit | | X1 Limited current circuit, Noise protection circuit, Rectifier circuit, X2 Dimmer protection circuit |

• Specify a color code in place of ∗ in the Part No. A (amber), G (green), PW (pure white), R (red), S (blue)
  Use a PW (pure white) LED lamp for yellow illumination.

• Required Quantity of LED Lamps
  MC3D — Full and horizontal 2-way split: 2 lamps; Horizontal 2-way, 3-way, and 4-way split: 4 lamps
  MC2D — Full: 1 lamp; Horizontal 2-way split: 2 lamps

∗1) The color code is the last code out of the 4 hexadecimal codes. (R: red, G: green, A: amber, S: blue, W: white, pure white)

## Illumination Faces for LED

| Series | Face Type | LED |
|---|---|---|
| MC3 | A, C | 2 |
| | B, D, E, F | 4 |
| MC2 | A | 1 |
| | B | 2 |



A   B   C   D   E   F

A   B

## Face Division

A   B   C   D   E   F

### MC3



Full or Vertical 2-way Split   [2 lamps]

Horizontal 2-way, 3-way, 4-way Split   [4 lamps]

Lamp

### MC2



Full   [1 lamp]

Horizontal 2-way Split   [2 lamps]

Lamp
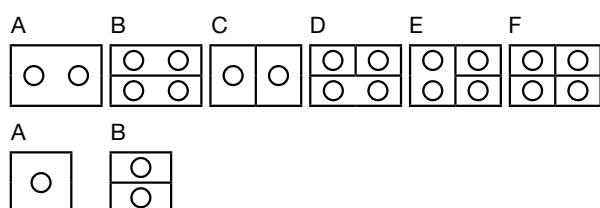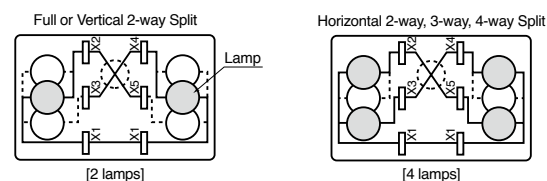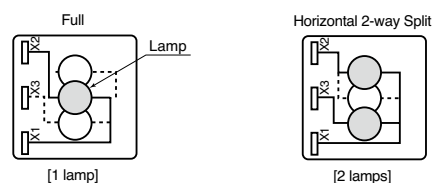
## Illumination Unit Structure

**MC3D (Full to 4-way split illumination)**



- Lens
- Color Screen (separately ordered) Amber, Clear, Green, Red, Blue, Yellow
- Marking Plate (attached) White acryl
- Light Barrier (separately ordered; supplied with split color screens)
- Lamp Holder
- LFTD LED Lamp (ordered separately)

For pure white illumination, use a clear (C) color screen.
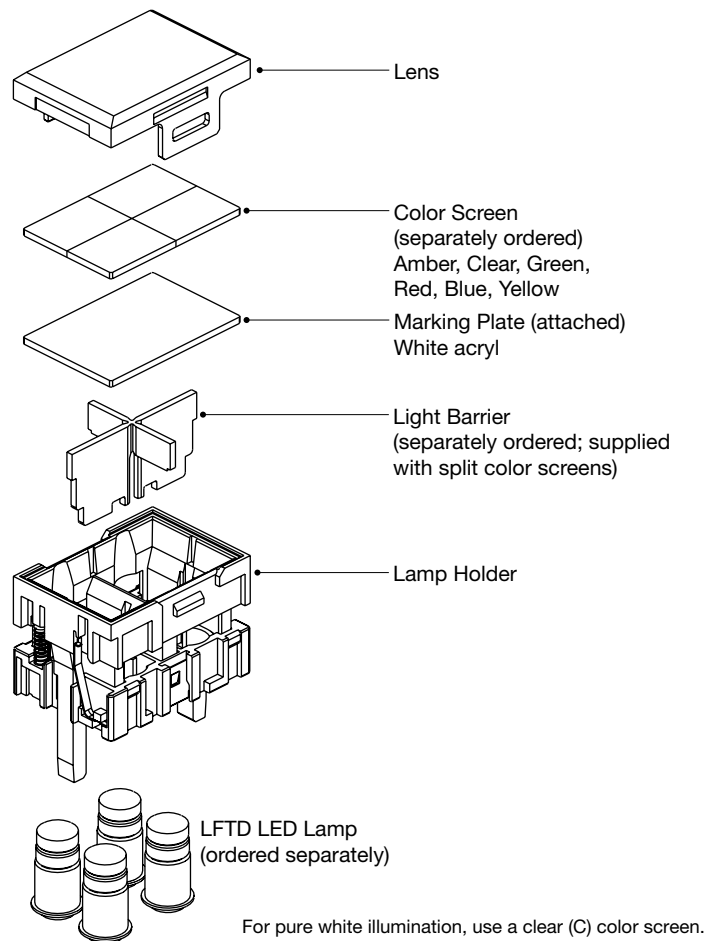
## Illumination Face Division & Illumination Color

| Used For | MC3D | | | | | | MC2D | |
|---|---|---|---|---|---|---|---|---|
| Part No. | MC9Z-PA3∗PN05 | MC9Z-3DB | MC9Z-3DC | MC9Z-3DD | MC9Z-3DE | MC9Z-3DF | MC9Z-PA2∗PN05 | MC9Z-2DB |
| Face Division | ⬚ | ⬚ | ⬚ | ⬚ | ⬚ | ⬚ | ⬚ | ⬚ |
| Illumination Color and Size | ∗ ∗ ∗ ∗ ∗ | R GD A C Y S | R C / GD Y / A S | R GD A C Y S / R C / GD Y / A S | R C / GD Y / A S / R C / GD Y / A S | R R / GD GD / A A / C C / Y Y / S S | ∗ ∗ ∗ ∗ ∗ | R GD A C Y S |
| | ∗: Color Code | Light Barrier | Light Barrier | Light Barrier | Light Barrier | Light Barrier | ∗: Color Code | Light Barrier |
| Quantity | Same color 5 pcs/set | 6 pcs/set | 6 pcs/set | 12 pcs/set | 12 pcs/set | 12 pcs/set | Same color 5 pcs/set | 6 pcs/set |

∗ Color Code: A (amber), C (clear), GD (green for LED), R (red), S (blue), Y (yellow)

∗ Use clear (C) color screen for pure white illumination.

## MC3D-∗∗0R (Rectangular Horizontal / Barrier)



| Full | 2-way Split | 3-way Split | 4-way Split |

Package Quantity: 1

| Operation | Contact | | Part No. | | | | Marking Plate | Color Screen | Light Source |
|---|---|---|---|---|---|---|---|---|---|
| | | | Solder/Tab Terminal | | PC Board Terminal | | | | |
| | | | Housing Color: Black | Housing Color: Gray | Housing Color: Black | Housing Color: Gray | | | |
| Momentary (Snap Action) | Silver | SPDT | MC3D-M10RB | MC3D-M10RN | — | — | White Size: 24.8 x 17 x 1 mm Material: Acrylic | Amber Clear Green Red Blue Yellow Material: Acrylic | Applicable LED Lamp 24V AC/DC: LFTD-2∗N 12V AC/DC: LFTD-1∗N 5V DC: LFTD-5∗N |
| | | DPDT | MC3D-M20RB | MC3D-M20RN | | | | | |
| | | 3PDT | MC3D-M30RB | MC3D-M30RN | | | | | |
| | Gold | SPDT | MC3D-M50RB | MC3D-M50RN | MC3D-M50VRB | MC3D-M50VRN | | | |
| | | DPDT | MC3D-M60RB | MC3D-M60RN | MC3D-M60VRB | MC3D-M60VRN | | | |
| | | 3PDT | MC3D-M70RB | MC3D-M70RN | MC3D-M70VRB | MC3D-M70VRN | | | |
| Momentary (Slow Action) | Silver | SPDT | MC3D-S10RB | MC3D-S10RN | — | — | | | |
| | | DPDT | MC3D-S20RB | MC3D-S20RN | | | | | |
| | | 3PDT | MC3D-S30RB | MC3D-S30RN | | | | | |
| | Gold | SPDT | MC3D-S50RB | MC3D-S50RN | MC3D-S50VRB | MC3D-S50VRN | | | |
| | | DPDT | MC3D-S60RB | MC3D-S60RN | MC3D-S60VRB | MC3D-S60VRN | | | |
| | | 3PDT | MC3D-S70RB | MC3D-S70RN | MC3D-S70VRB | MC3D-S70VRN | | | |
| Maintained | Silver | SPDT | MC3D-A10RB | MC3D-A10RN | — | — | | | |
| | | DPDT | MC3D-A20RB | MC3D-A20RN | | | | | |
| | | 3PDT | MC3D-A30RB | MC3D-A30RN | | | | | |
| | Gold | SPDT | MC3D-A50RB | MC3D-A50RN | MC3D-A50VRB | MC3D-A50VRN | Supplied | Order Separately | Order Separately |
| | | DPDT | MC3D-A60RB | MC3D-A60RN | MC3D-A60VRB | MC3D-A60VRN | | | |
| | | 3PDT | MC3D-A70RB | MC3D-A70RN | MC3D-A70VRB | MC3D-A70VRN | | | |
| Pilot Light | — | — | MC3D-P00RB | MC3D-P00RN | MC3D-P00VRB | MC3D-P00VRN | | | |

Note 1: Specify a color code in place of ∗ in the LED lamp Part No.: A (amber), G (green), PW (pure white), R (red), S (blue)
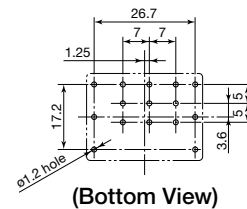Note 2: For pure white illumination, use a clear (C) color screen.

## Dimensions
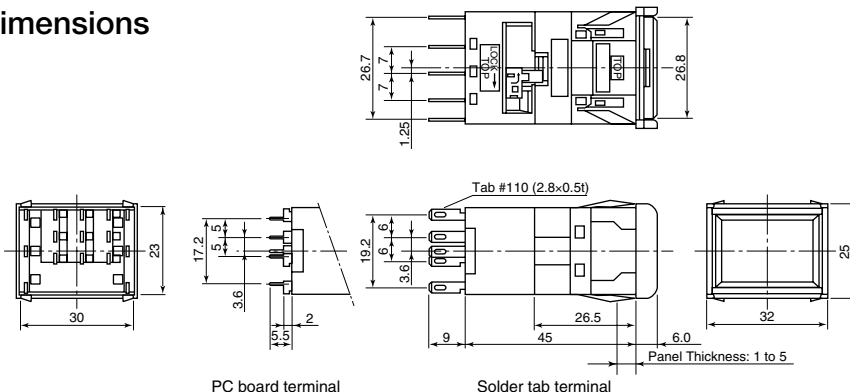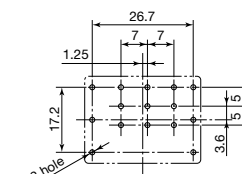


Tab #110 (2.8×0.5t)

Panel Thickness: 1 to 5

PC board terminal

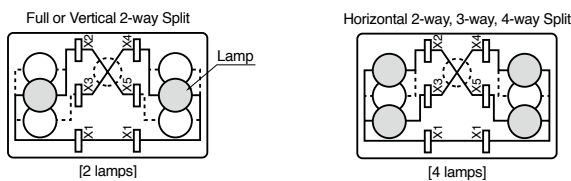Solder tab terminal

• For panel cut-out, see page 33.

## PC Board Drilling Layout (PC Board Terminal)



(Bottom View)

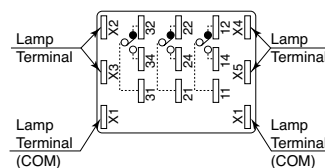• See Single Board Mounting on page 37 for details about PC boards.

All dimensions in mm.

## Internal Connection (Bottom View)



Full or Vertical 2-way Split
[2 lamps]

Horizontal 2-way, 3-way, 4-way Split
[4 lamps]
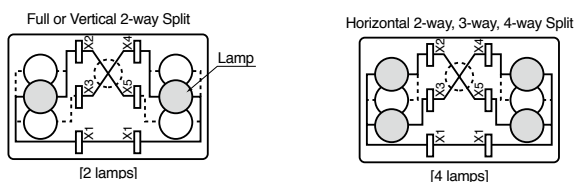
• Because terminals X2 through X5 are connected together internally, external jumper wiring is not needed for full illumination.
• When using split illumination, cut out the internal jumper using the jumper cutter (MC9Z-J1). See page 36.
• LED lamps are not supplied and must be ordered separately.

## Internal Connection (Bottom View)
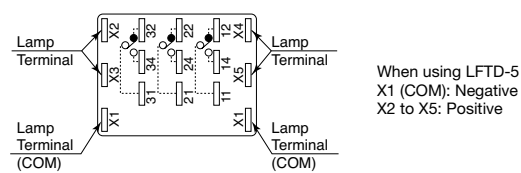


Lamp Terminal
Lamp Terminal
Lamp Terminal (COM)
Lamp Terminal (COM)

When using LFTD-5
X1 (COM): Negative
X2 to X5: Positive

• SPDT contact type has lamp terminals and contact terminals in the middle only.
• DPDT contact type has lamp terminals and contact terminals on both sides (not in the middle).
• Pilot light has lamp terminals only.

IDEC

## MC3D-∗∗0F (Rectangular Horizontal / Flange)

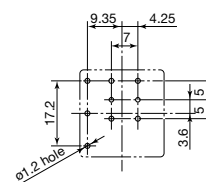| Full | 2-way Split | 3-way Split | 4-way Split |
|------|-------------|-------------|-------------|

Package Quantity: 1

| Operation | Contact | | Part No. | | | | Marking Plate | Color Screen | Light Source |
|---|---|---|---|---|---|---|---|---|---|
| | | | Solder/Tab Terminal | | PC Board Terminal | | | | |
| | | | Housing Color: Black | Housing Color: Gray | Housing Color: Black | Housing Color: Gray | | | |
| Momentary (Snap Action) | Silver | SPDT | MC3D-M10FB | MC3D-M10FN | — | — | White Size: 24.8 x 17 x 1 mm Material: Acrylic | Amber Clear Green Red Blue Yellow Material: Acrylic | Applicable LED Lamp 24V AC/DC: LFTD-2∗N 12V AC/DC: LFTD-1∗N 5V DC: LFTD-5∗N |
| | | DPDT | MC3D-M20FB | MC3D-M20FN | | | | | |
| | | 3PDT | MC3D-M30FB | MC3D-M30FN | | | | | |
| | Gold | SPDT | MC3D-M50FB | MC3D-M50FN | MC3D-M50VFB | MC3D-M50VFN | | | |
| | | DPDT | MC3D-M60FB | MC3D-M60FN | MC3D-M60VFB | MC3D-M60VFN | | | |
| | | 3PDT | MC3D-M70FB | MC3D-M70FN | MC3D-M70VFB | MC3D-M70VFN | | | |
| Momentary (Slow Action) | Silver | SPDT | MC3D-S10FB | MC3D-S10FN | — | — | | | |
| | | DPDT | MC3D-S20FB | MC3D-S20FN | | | | | |
| | | 3PDT | MC3D-S30FB | MC3D-S30FN | | | | | |
| | Gold | SPDT | MC3D-S50FB | MC3D-S50FN | MC3D-S50VFB | MC3D-S50VFN | | | |
| | | DPDT | MC3D-S60FB | MC3D-S60FN | MC3D-S60VFB | MC3D-S60VFN | | | |
| | | 3PDT | MC3D-S70FB | MC3D-S70FN | MC3D-S70VFB | MC3D-S70VFN | | | |
| Maintained | Silver | SPDT | MC3D-A10FB | MC3D-A10FN | — | — | | | |
| | | DPDT | MC3D-A20FB | MC3D-A20FN | | | | | |
| | | 3PDT | MC3D-A30FB | MC3D-A30FN | | | | | |
| | Gold | SPDT | MC3D-A50FB | MC3D-A50FN | MC3D-A50VFB | MC3D-A50VFN | Supplied | Order Separately | Order Separately |
| | | DPDT | MC3D-A60FB | MC3D-A60FN | MC3D-A60VFB | MC3D-A60VFN | | | |
| | | 3PDT | MC3D-A70FB | MC3D-A70FN | MC3D-A70VFB | MC3D-A70VFN | | | |
| Pilot Light | — | — | MC3D-P00FB | MC3D-P00FN | MC3D-P00VFB | MC3D-P00VFN | | | |

Note 1: Specify a color code in place of ∗ in the LED lamp Part No.: A (amber), G (green), PW (pure white), R (red), S (blue)
Note 2: For pure white illumination, use a clear (C) color screen.
• The rectangular flange unit can be mounted vertically. Replace the leaf springs with optional vertical mounting leaf springs (MC9Z-T3).

## Dimensions

PC board terminal

Solder tab terminal
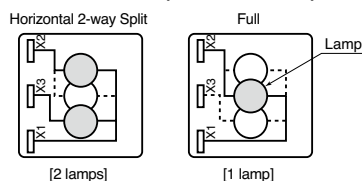
• For panel cut-out, see page 33.

## PC Board Drilling Layout (PC Board Terminal)

(Bottom View)

• See Single Board Mounting on page 37 for details about PC boards.

All dimensions in mm.

## Internal Connection (Bottom View)

Full or Vertical 2-way Split

[2 lamps]

Horizontal 2-way, 3-way, 4-way Split

[4 lamps]

• Because terminals X2 through X5 are connected together internally, external jumper wiring is not needed for full illumination.
• When using split illumination, cut out the internal jumper using the jumper cutter (MC9Z-J1). See page 36.
• LED lamps are not supplied and must be ordered separately.
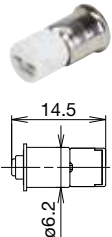
## Terminal Arrangement (Bottom View)

Lamp Terminal
Lamp Terminal
Lamp Terminal (COM)
Lamp Terminal (COM)

When using LFTD-5
X1 (COM): Negative
X2 to X5: Positive

• SPDT contact type has lamp terminals and contact terminals in the middle only.
• DPDT contact type has lamp terminals and contact terminals on both sides (not in the middle).
• Pilot light has lamp terminals only.

## MC2D-∗∗0 (Square / Flange)

Full

2-way Split

Package Quantity: 1

| Operation | Contact | | Part No. | | | | Marking Plate | Color Screen | Light Source |
|---|---|---|---|---|---|---|---|---|---|
| | | | Solder/Tab Terminal | | PC Board Terminal | | | | |
| | | | Housing Color: Black | Housing Color: Gray | Housing Color: Black | Housing Color: Gray | | | |
| Momentary (Snap Action) | Silver | SPDT | MC2D-M10B | MC2D-M10N | — | — | White | Amber | Applicable LED Lamp |
| | | DPDT | MC2D-M20B | MC2D-M20N | | | | Clear | 24V AC/DC: LFTD-2∗N |
| | Gold | SPDT | MC2D-M50B | MC2D-M50N | MC2D-M50VB | MC2D-M50VN | Size: 17 x 17 x 1 mm | Green | 12V AC/DC: LFTD-1∗N |
| | | DPDT | MC2D-M60B | MC2D-M60N | MC2D-M60VB | MC2D-M60VN | | Red | 5V DC: LFTD-5∗N |
| Momentary (Slow Action) | Silver | SPDT | MC2D-S10B | MC2D-S10N | — | — | Material: Acrylic | Blue | |
| | | DPDT | MC2D-S20B | MC2D-S20N | | | | Yellow | |
| | Gold | SPDT | MC2D-S50B | MC2D-S50N | MC2D-S50VB | MC2D-S50VN | | | |
| | | DPDT | MC2D-S60B | MC2D-S60N | MC2D-S60VB | MC2D-S60VN | | Material: Acrylic | |
| Maintained | Silver | SPDT | MC2D-A10B | MC2D-A10N | — | — | | | |
| | | DPDT | MC2D-A20B | MC2D-A20N | | | | | |
| | Gold | SPDT | MC2D-A50B | MC2D-A50N | MC2D-A50VB | MC2D-A50VN | Supplied | Order Separately | Order Separately |
| | | DPDT | MC2D-A60B | MC2D-A60N | MC2D-A60VB | MC2D-A60VN | | | |
| Pilot Light | — | — | MC2D-P00B | MC2D-P00N | MC2D-P00VB | MC2D-P00VN | | | |

Note 1: Specify a color code in place of ∗ in the LED lamp Part No.: A (amber), G (green), PW (pure white), R (red), S (blue), Y (yellow)
Note 2: For pure white illumination, use a clear (C) color screen.
• 2-way split unit can be mounted vertically. Replace the leaf springs with optional vertical mounting leaf springs (MC9Z-T3).

## Dimensions



PC board terminal

Solder tab terminal

Panel Thickness: 1 to 5

• For panel cut-out, see page 33.

## PC Board Drilling Layout (PC Board Terminal)



(Bottom View)

• See Single Board Mounting on page 37 for details about PC boards.

All dimensions in mm.

## Internal Connection (Bottom View)



Horizontal 2-way Split [2 lamps]

Full [1 lamp]

• LED lamps are not supplied and must be ordered separately.

## Terminal Arrangement (Bottom View)



When using LFTD-5
X1 (COM): Negative
X2 to X5: Positive
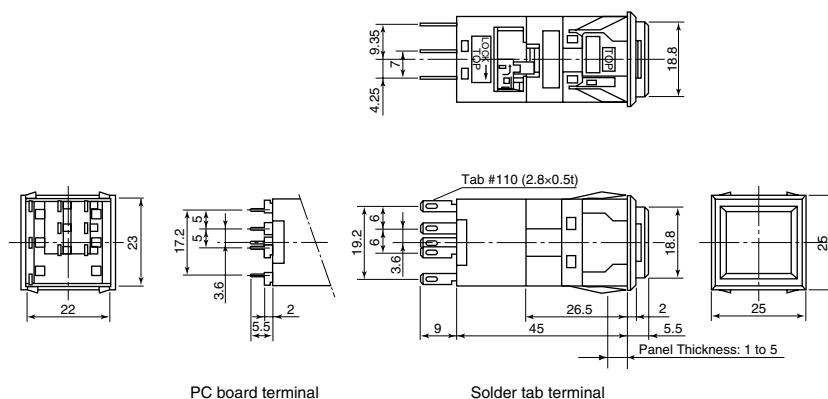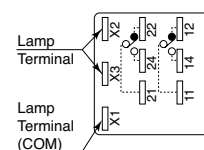
• SPDT contact has lamp terminals and contact terminals on the right only.
• Pilot light has lamp terminals only.

## Accessories
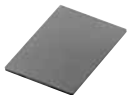
| Name & Shape | For Use On | Specifications | | Part No. | Ordering No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|---|
| Lamp Holder Removal Tool | All Series | — | | MCM-T001 | MCM-T001 | 1 | • Used to remove the lamp holder from the housing.<br>• Material: Stainless Steel |
| Jumper Cutter | MC3D | — | | MC9Z-J1 | MC9Z-J1 | 1 | • Used to cut the built-in jumper when changing the MC3D for 2-way, 3-way, or 4-way split illumination. See page 36.<br>• Material: Metal |
| Switch Guard with Lens | MC3D | Horizontal type | | MC9Z-KF3 | MC9Z-KF3 | 1 | • Used in place of the standard lens to protect the operator, and can be installed in the same manner as the standard lens.<br>• When guard barriers are installed, the lens switch guard cannot be used.<br>• Material: Polycarbonate |
| | | Vertical type | | MC9Z-KT3 | MC9Z-KT3 | 1 | |
| | MC2D | Horizontal type | | MC9Z-KF2 | MC9Z-KF2 | 1 | |
| Barrier<br><br>End Barrier    Spacer Barrier | MC3D Horizontal Flange<br>MC2D | End barrier | Black | MC9Z-BF1B | MC9Z-BF1BPN10 | 10 | • The barrier is used to separate adjoining operators of flange type MC3D/2D units to prevent inadvertent operation and to improve panel appearance.<br>• See page 33 for panel cut-out.<br>• Material: Polycarbonate |
| | | | Gray | MC9Z-BF1N | MC9Z-BF1NPN10 | | |
| | | Spacer barrier | Black | MC9Z-BF2B | MC9Z-BF2BPN10 | 10 | |
| | | | Gray | MC9Z-BF2N | MC9Z-BF2NPN10 | | |
| | MC3D Vertical Flange | End barrier | Black | MC9Z-BT1B | MC9Z-BT1BPN10 | 10 | |
| | | | Gray | MC9Z-BT1N | MC9Z-BT1NPN10 | | |
| | | Spacer barrier | Black | MC9Z-BT2B | MC9Z-BT2BPN10 | 10 | |
| | | | Gray | MC9Z-BT2N | MC9Z-BT2NPN10 | | |
| Guard Barrier<br><br>End Guard Barrier    Spacer Guard Barrier | MC3D Horizontal Flange<br>MC2D Horizontal | End guard barrier | Black | MCM-BF3B | MCM-BF3BPN10 | 10 | • The guard barrier is used to surround the operator of flange type MC3D/2D units for preventing inadvertent operation.<br>• The guard barrier cannot be used on barrier type or vertical flange type MC3D units.<br>• See page 33 for panel cut-out.<br>• Material: Polyamide |
| | | | Gray | MCM-BF3N | MCM-BF3NPN10 | | |
| | | Spacer guard barrier | Black | MCM-BF4B | MCM-BF4BPN10 | 10 | |
| | | | Gray | MCM-BF4N | MCM-BF4NPN10 | | |
| Terminal Socket | MC3D | With solder terminals | | MC9Z-C3 | MC9Z-C3 | 1 | • Material: Polyamide |
| | | With PC board terminals | | MC9Z-C3V | MC9Z-C3V | 1 | |
| | MC2D | With solder terminals | | MC9Z-C2 | MC9Z-C2 | 1 | |
| | | With PC board terminals | | MC9Z-C2V | MC9Z-C2V | 1 | |
| Terminal Cover | MC3D | — | | MC9Z-VL23 | MC9Z-VL23 | 5 | • When wiring, insert lead wires through terminal cover holes before soldering the lead wires to the MC3D/2D terminals.<br>• White<br>• Material: PBT |
| | MC2D | — | | MC9Z-VL22 | MC9Z-VL22 | 5 | |
| Dustproof Cover | MC3D | Flange (horizontal/vertical) | | MCM-D3 | MCM-D3 | 1 | • The dustproof cover is not waterproof.<br>• See page 33 for panel cut-out.<br>• Material<br>  Base: Polypropylene<br>  Cover: PVC elastomer |
| | MC2D | Flange | | MCM-D2 | MCM-D2 | 1 | |
| Vertical Mounting Leaf Spring | MC3D MC2D | — | | MC9Z-T3 | MC9Z-T3PN10 | 10 | • Leaf springs for mounting the flange type MC3D vertically.<br>• When using the vertical mounting leaf springs, remove the existing leaf springs from the MC3D and install the vertical mounting leaf springs. See page 35.<br>• Material: Stainless Steel |

## Accessories

### LED Lamps (LFTD)

| | Operating Voltage | Rated Current | Part No. | Ordering No. | Illumination Color Code | Package Quantity | Base |
|---|---|---|---|---|---|---|---|
| LFTD LED Lamp | 5V DC±5% | 4mA | LFTD-5*N | LFTD-5*N | Specify a color code in place of * in the Ordering Part No.<br><br>A: amber<br>G: green<br>PW: pure white<br>R: red<br>S: blue<br>Use a PW (pure white) LED lamp for yellow illumination. | 1 | SX6S/8×5.4 |
| | | | | LFTD-5*NPN10 | | 10 | |
| | 12V AC/DC±10% | | LFTD-1*N | LFTD-1*N | | 1 | |
| | | | | LFTD-1*NPN10 | | 10 | |
| | 24V AC/DC±10% | | LFTD-2*N | LFTD-2*N | | 1 | |
| | | | | LFTD-2*NPN10 | | 10 | |

14.5
ø6.2

### Color Screen

| Name & Shape | For Use On | Specifications | Part No. | Ordering No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|
| Color Screen | MC3D | Full illumination | MC9Z-PA3* | MC9Z-PA3*PN05 | 1 set (5 pcs) | Specify a color code in place of * in the Ordering No.<br><br>A: amber<br>C: clear<br>GD: green for LED<br>R: red<br>S: blue<br>Y: yellow<br><br>Use a clear (C) screen for white or pure white illumination. |
| | | Horizontal 2-way split | MC9Z-3DB | MC9Z-3DB | 1 set | |
| | | Vertical 2-way split | MC9Z-3DC | MC9Z-3DC | 1 set | |
| | | Horizontal 3-way split | MC9Z-3DD | MC9Z-3DD | 1 set | |
| | | Vertical 3-way split | MC9Z-3DE | MC9Z-3DE | 1 set | |
| | | 4-way split | MC9Z-3DF | MC9Z-3DF | 1 set | |
| | MC2D | Full illumination | MC9Z-PA2* | MC9Z-PA2*PN05 | 1 set (5 pcs) | |
| | | Horizontal 2-way split | MC9Z-2DB | MC9Z-2DB | 1 set | |

## Accessories (Dimensions)

### Lens Switch Guard

**For MC3D Horizontal (MC9Z-KF3)**

33.4

24.3

8.9

30

27.6
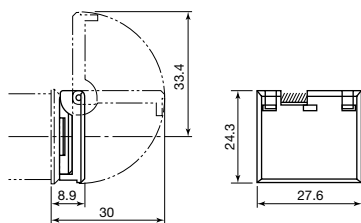
**For MC3D Vertical (MC9Z-KT3)**

45.4

32.3

8.9

38

20.6

**For MC2D (MC9Z-KF2)**

33.4

24.3

8.9

30

19.6

### Barrier

**When using on MC3D Horizontal Flange**

MC9Z-BF1∗    MC9Z-BF2∗

35    35N+5

25

6
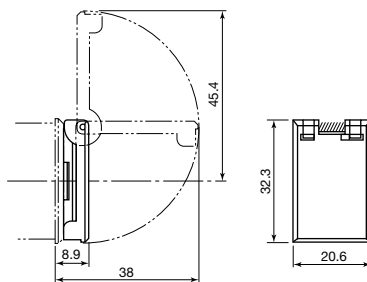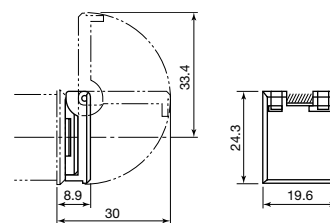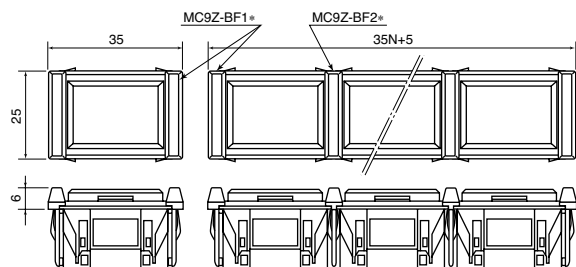
**When using on MC3D Vertical Flange**
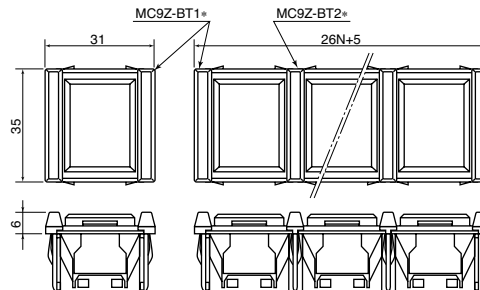
MC9Z-BT1∗    MC9Z-BT2∗

31    26N+5

35

6

**When using on MC2D**

MC9Z-BF1∗    MC9Z-BF2∗

31    26N+5

25

6

### Guard Barrier

**When using on MC3D Horizontal Flange**

End Guard Barrier (MCM-BF3∗)    End Guard Barrier (MCM-BF3∗)    Spacer Guard Barrier (MCM-BF4∗)    End Guard Barrier (MCM-BF3∗)

1.5    12.5    25

29    21    29    21

6    36    33N+3

**When using on MC2D**

End Guard Barrier (MCM-BF3∗)    Spacer Guard Barrier (MCM-BF4∗)    End Guard Barrier (MCM-BF3∗)

1.5    12.5    1    25

29    21    29    21

6    29    26N+3
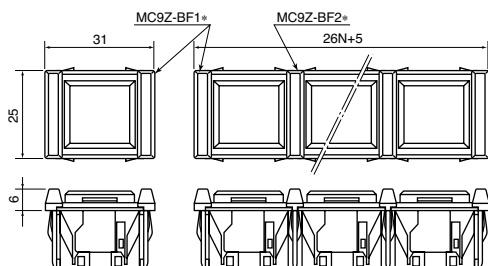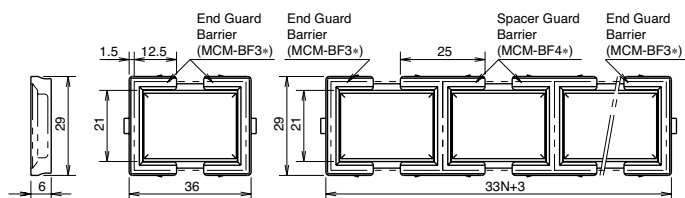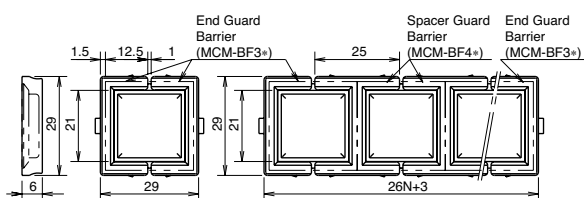
### Terminal Cover

**For MC3D (MC9Z-VL23)**

24.5

31.6

58

16

MC9Z-VL23 TOP

**For MC2D (MC9Z-VL22)**

24.5

23.6

58

16
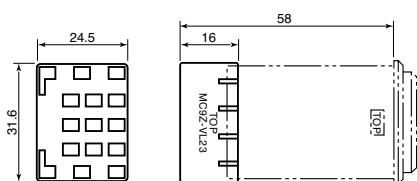
MC9Z-VL22 TOP
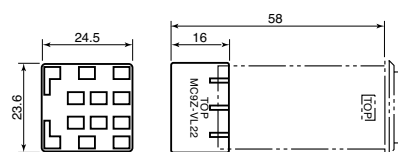
## Accessories (Dimensions)

**All dimensions in mm.**

### Socket

**For MC3D**
**With solder terminals (MC9Z-C3)**
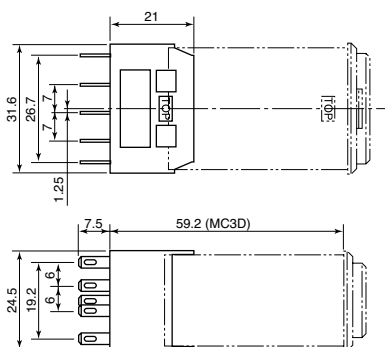
**With PC board terminals (MC9Z-C3V)**
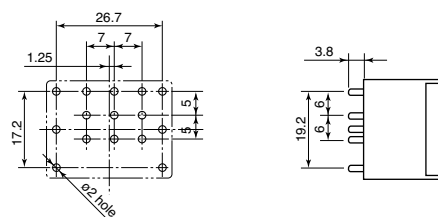
PC Board Drilling Layout
(Bottom View)

**For MC2D**
**With solder terminals (MC9Z-C2)**
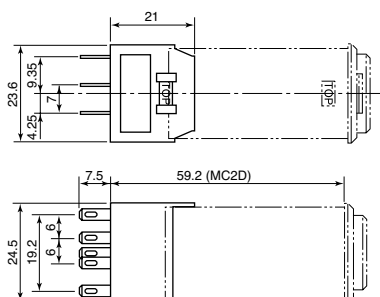
**With PC board terminals (MC9Z-C2V)**
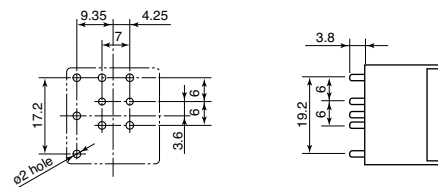
PC Board Drilling Layout
(Bottom View)

### Dustproof Cover

For MC3D
(MCM-D3)

For MC2D
(MCM-D2)

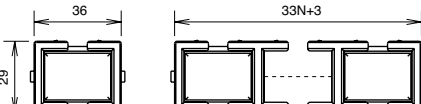Panel Thickness: 1 to 4.5

### Panel Cut-out

MC3D

MC2D

---
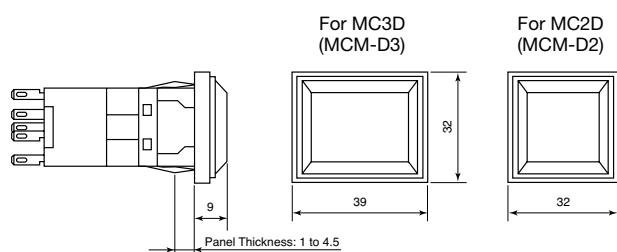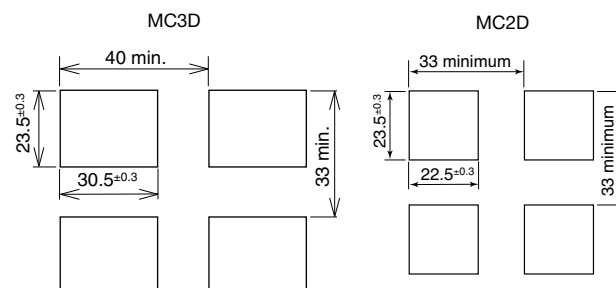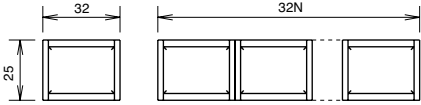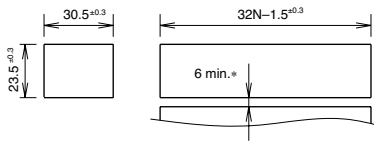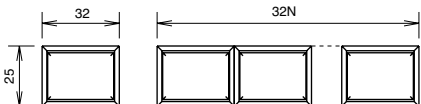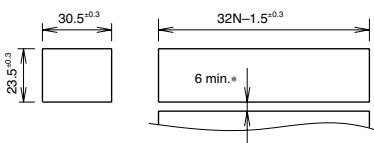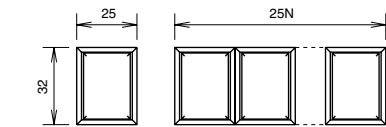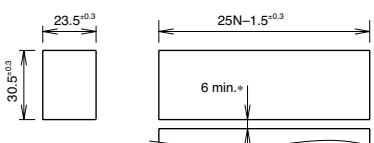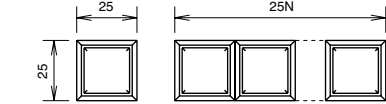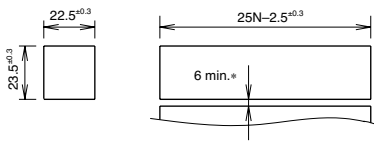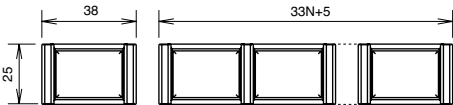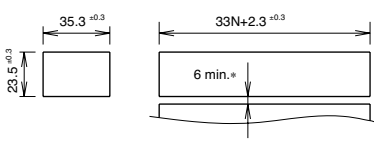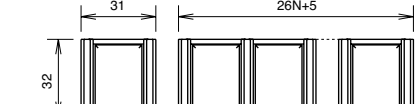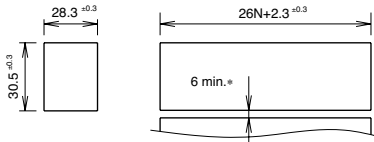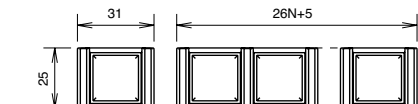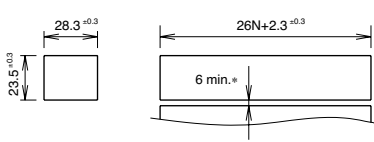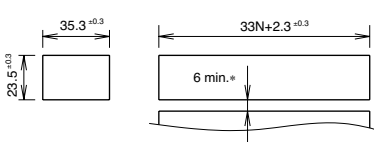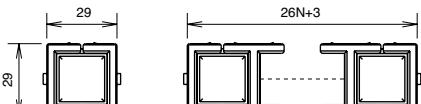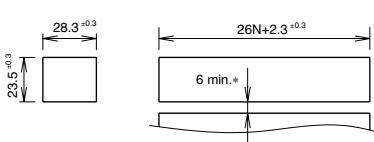
## Maintenance Parts

| Name & Shape | For Use On | Specifications | Part No. | Ordering No. | Package Quantity | Remarks |
|---|---|---|---|---|---|---|
| Marking Plate | MC3D | 17 × 24.8 × 1 mm | MC9Z-P3W | MC9Z-P3WPN05 | 5 | • Color: white<br>• One marking plate is supplied with each MC3D/2D unit.<br>• Material: Acryl |
| | MC2D | 17 × 17 × 1 mm | MC9Z-P2W | MC9Z-P2WPN05 | 5 | |
| Light Barrier | MC3D | 4-way split | MC9Z-S3 | MC9Z-S3PN05 | 5 | • Supplied with split color screens.<br>• Material: PBT |
| | MC2D | 2-way split | MC9Z-S2 | MC9Z-S2PN05 | 5 | |
| Lens | MC3D | — | MC9Z-L3 | MC9Z-L3PN05 | 5 | • Material: Polycarbonate |
| | MC2D | — | MC9Z-L2 | MC9Z-L2PN05 | 5 | |

## Panel Cut-Out

| Model | | Front View | Panel Cut-Out | Remarks |
|---|---|---|---|---|
| Barrier | MC3D Horizontal | 32 / 32N / 25 | 30.5±0.3 / 32N–1.5±0.3 / 23.5±0.3 / 6 min.* | N: No. of MC units mounted<br><br>Notes:<br>• When all four LED lamps are lit continuously, the maximum number of MC3D units that can be mounted is 3 rows by 10 columns.<br>• When both LED lamps are lit continuously, the maximum number of MC2D units that can be mounted is 10 rows by 10 columns.<br>• The panel cut-out dimensions are identical whether the MC3D/MC2D is mounted with or without a dustproof cover. See page 32.<br>• The applicable panel thickness is 1 to 5 mm.<br>• The strength of the panel must be taken into consideration for collective mounting. |
| Flange | MC3D Horizontal | 32 / 32N / 25 | 30.5±0.3 / 32N–1.5±0.3 / 23.5±0.3 / 6 min.* | |
| | MC3D Vertical | 25 / 25N / 32 | 23.5±0.3 / 25N–1.5±0.3 / 30.5±0.3 / 6 min.* | |
| | MC2D Horizontal | 25 / 25N / 25 | 22.5±0.3 / 25N–2.5±0.3 / 23.5±0.3 / 6 min.* | |
| Flange with Barriers | MC3D Horizontal | 38 / 33N+5 / 25 | 35.3±0.3 / 33N+2.3±0.3 / 23.5±0.3 / 6 min.* | |
| | MC3D Vertical | 31 / 26N+5 / 32 | 28.3±0.3 / 26N+2.3±0.3 / 30.5±0.3 / 6 min.* | |
| | MC2D | 31 / 26N+5 / 25 | 28.3±0.3 / 26N+2.3±0.3 / 23.5±0.3 / 6 min.* | |
| Flange with Guard Barriers | MC3D Horizontal | 36 / 33N+3 / 29 | 35.3±0.3 / 33N+2.3±0.3 / 23.5±0.3 / 6 min.* | |
| | MC2D | 29 / 26N+3 / 29 | 28.3±0.3 / 26N+2.3±0.3 / 23.5±0.3 / 6 min.* | |

All dimensions in mm.

## Ordering Information

### Notes for Ordering

- MC3D/2D units are not supplied with LED lamps, and color screens. Order these accessories separately. When ordering, specify the Ordering No. and quantity.

**[Example]**

- MC3D Horizontal Barrier, Momentary Operation (snap action), Silver Contact, SPDT, Black Housing, Full Illumination
  Part No.: MC3D-M10RB    5 pcs
- LED Lamp (12V AC/DC, Red)
  Part No.: LFTD-1RNPN10    1 pack (10 pcs/pack)

- Color Screen (Full, Red)
  Part No.: MC9Z-PA3RPN05    1 pack (5 pcs of the same color)

### Other Notes

- Sockets, lens switch guard, barriers, and guard barriers are ordered separately. When ordering these accessories, specify the Ordering Part No. and quantity.
- When using MC3D flange in vertical alignment, order vertical mounting leaf springs (MC9Z-T3) separately, and replace the existing leaf springs on the MC3D vertical flange. See page 35.

## Safety Precautions

- Turn power off to the MC series before installation, removal, wiring, maintenance, or inspection. Failure to turn power off may cause electrical shocks or fire hazard.
- Use the MC series within the specification values. Exceeding the specification values may cause electrical shocks or fire hazard.

- Use wires of proper size to meet the voltage and current requirements. Solder the wires correctly to the terminals. Incomplete soldering will cause excessive heating and fire hazard.

## Instructions
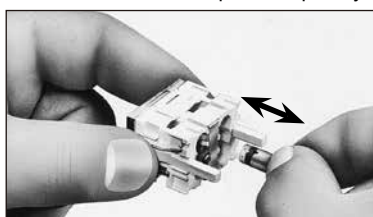
### Illumination Unit

#### Removing the Illumination Unit

Use the lamp holder removal tool (MCM-T001) to pull out the illumination unit, nipping the slots on the sides of the lens.

If the cover of the lens with switch guard is pulled, the hinge of the cover may be damaged. Pull out the illumination unit, nipping the lens.

#### Installation and Replacement of LED Lamps

Insert the LED lamp into the lamp receptacle from the rear of the lamp holder, bulb first. Push the lamp in completely.
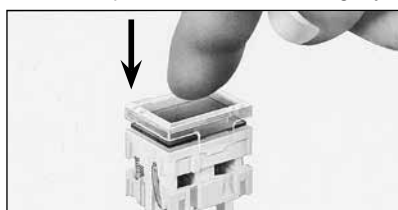


#### Replacing the Lens

**(Removal)**

Remove the illumination unit as described above. Insert a flat screwdriver into the latch between the lens and lens holder, and remove the lens.
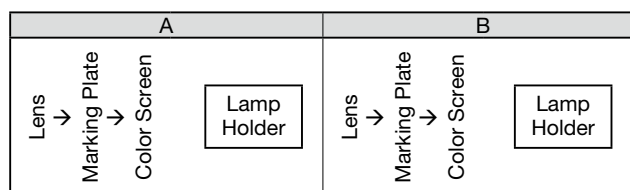


**(Installation)**

Put the latches on both sides of the lens onto the latches on the lens holder, and depress the lens surface lightly.



#### Mounting Order of Color Screen and Marking Plate

Insert the color screen and marking plate in the order described below.

| Illumination Color (Lamp On) | Display Color (Lamp Off) | Order Insertion |
|---|---|---|
| Amber, Green, Red Blue, Yellow | Color | B |
| | White | A |
| Pure White | White | A or B |

| A | B |
|---|---|
| Lens → Marking Plate → Color Screen    Lamp Holder | Lens → Marking Plate → Color Screen    Lamp Holder |

#### Illumination Color and LED Lamp

Insert the color screen and marking plate in the proper order as described below.

| Illumination Color | Color Screen | LED Lamp |
|---|---|---|
| Amber | Amber | Amber |
| Red | Red | Red |
| Green | Green | Green |
| Blue | Blue | Blue |
| Yellow | Yellow | Yellow |
| Pure White | Clear | Pure White |

Note:
- Marking plates are identical in material and thickness.
- Engraving is possible on both marking plates and screens.

#### Using the Light Barrier

A light barrier is supplied with color plates for split illumination. Use the light barrier according to the required split color illumination.

**MC3D (Rectangular)**

**[Full Illumination]** Light barrier is not needed.
**[2- or 3-way Split]** Cut off the unnecessary part using cutting pliers.
**[4-way Split]** Use the light barrier for 4-way split illumination as it is.
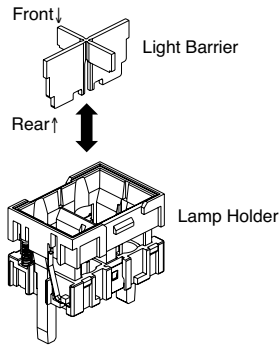
**MC2D (Square)**

**[Full Illumination]** Light barrier is not needed.
**[2-way Split]** Install the light barrier for 2-way horizontal split illumination correctly.
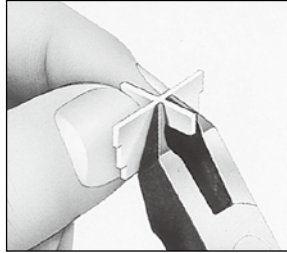
**IDEC**

## Instructions

### Handling the Light Barrier (Replacing the Light Barrier)
When inserting, note the orientation of the light barrier, illumination unit, and housing.



Front↓
Light Barrier
Rear↑
Lamp Holder

### (Cutting the Light Barrier)
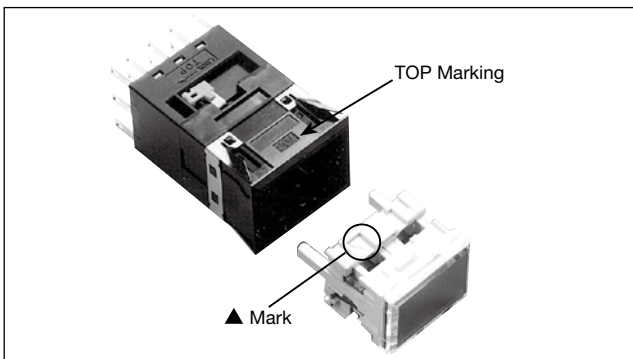Cut off the unnecessary part using cutting pliers.



### Installing the Illumination Unit into the Housing
The illumination unit has an orientation for insertion into the MC3D/2D housing.

**[MC3D]**
Place the ▲ mark on the lamp holder in the same direction as the TOP marking on the housing, and insert the illumination unit.
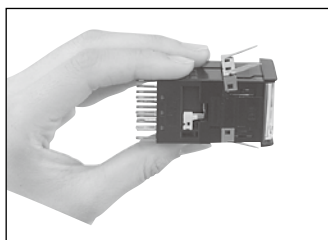


TOP Marking

▲ Mark

### Vertical Mounting
First, insert a small flat-blade screwdriver under the leaf spring on the MC unit, and remove the leaf spring for horizontal mounting.
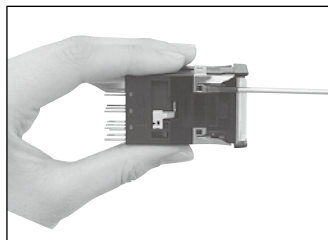


Place the vertical leaf spring on the MC unit temporarily, and then press the spring until it is secured on the MC unit.



## Removing the Contact Block

### Removal
Push the yellow lever latch on the top surface of the housing in the direction of arrow using a small screwdriver. The yellow lever latch will rise up. Then turn the lever in the opposite direction indicated with Lock →. The contact block is unlocked and can be removed from the operator housing.



Push
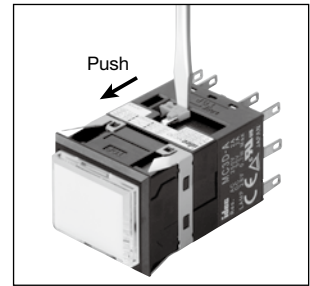
### Installation
Open the lever as described above, and align the TOP markings on the operator housing and contact block in the same direction. Insert the contact block into the operator housing, and turn the lever in the direction indicated with Lock→. The contact block is locked to the operator housing.



TOP Marking
Turn the lever
TOP Marking
Insert
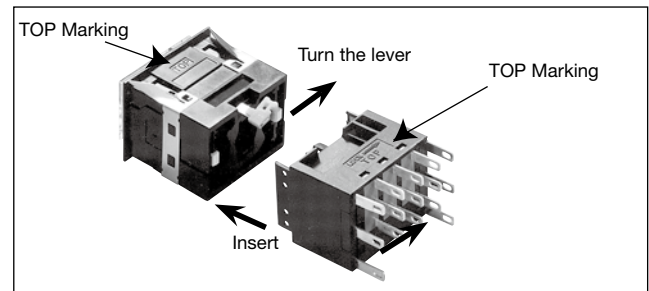
## Installing Accessories
### Installing the Socket or Terminal Cover
Align the TOP markings on the operator housing and socket or terminal cover in the same direction, and press the socket or terminal cover toward the housing.
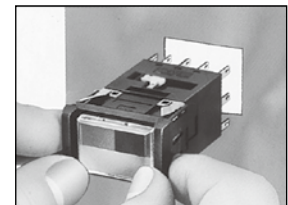


Top Marking
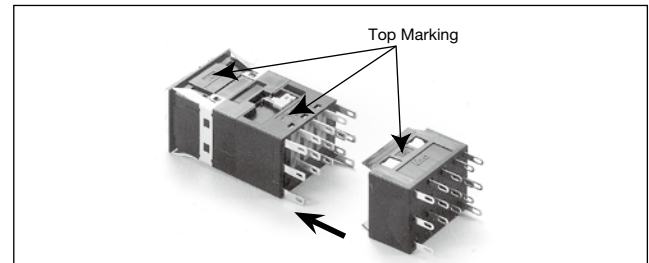
### Installing the Lens with Switch Guard
The lens with switch guard can be installed and removed as with the standard lens. See Installation and Replacement of LED Lamps on page 34.

**[Single Mounting]**
Put end barriers on both sides of the housing and insert it into the panel cut-out from the front.



**[Row Mounting]**
Insert an end barrier at one end of the panel cutout, then a unit, a spacer barrier, another unit, and so forth up to the other end of the row. With another end barrier in place, insert the last unit before inserting the last spacer barrier.

## Instructions

### Cutting the Built-in Jumper
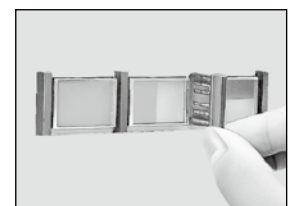
The MC3D has a built-in jumper for full illumination. When using the MC3D for split illumination, cut out the jumper ⊗ in the housing, using the jumper cutter (MC9Z-J1). When cutting the built-in jumper, remove the contact block and illumination unit. Place the operator housing upright, insert the jumper cutter, and turn the jumper cutter to cut out the jumper. Remove the cut jumper from the housing. Always use the MC9Z-J1 jumper cutter, otherwise the internal elements may be damaged. Do not touch the lamp contacts, which are easily deformed.

Before cutting
Built-in jumper

After cutting
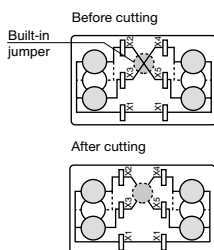
### Wiring Precautions

Run the LED illumination wiring away from other motor lines.
Solder the terminals at 350°C within 3 seconds, using a 60W soldering iron. Sn-Ag-Cu solder is recommended. While soldering, keep the soldering iron as far from the plastic part of the switch as possible. Do not apply excessive force while soldering the terminal.
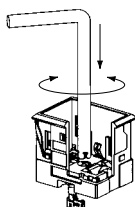
### Notes for Operation

#### When Using LED Lamps

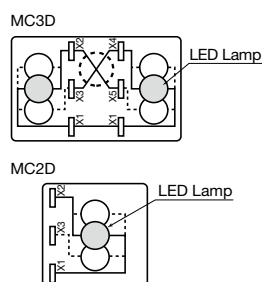When using the MC series for full illumination, make sure of correct number of lamps.

**(Number of Lamps)**
MC3D: 2 LED lamps
MC2D: 1 LED lamp

MC3D
LED Lamp

MC2D
LED Lamp

**(Leakage Current)**
The LED lamp may light dimly due to a leakage current or induction current from the solid-state switch or contact protection circuit used for the LED lamp. Take a measure, if necessary.

**(Installation Location)**
Do not install the LED illuminated MC series where the LED lamps are subjected to infrared rays.

#### Microswitch Contacts

When inductive loads are switched, arcing will increase contact resistance, so it is recommended to connect a contact protection circuit for higher contact reliability.

#### Slow Action Type

On the momentary slow action 3PDT type, the three microswitches may operate at a slightly different timing.

### Connection

Positive-lock connector and easy-lock connectors are applicable to tab terminals.

| Item | Positive-lock Connector (Tyco Electronics) | | Easy-lock Connector (Nichifu Co., Ltd) | |
|---|---|---|---|---|
| Terminal | 0.2 to 0.5 mm$^2$ | 175412-1 | 0.2 to 0.3 mm$^2$ | OSS-62852F3 |
| | 0.2 to 1.25 mm$^2$ | 174778-1 | 0.5 to 1.25 mm$^2$ | OSS-62815F3 |
| Housing | 174779-1 | | NET1-28-1P | |

Note: Positive-lock is a registered trademark of Tyco Electronics.

## Single Board Mounting

Mounting MC series illuminated control units on a PC board offers the following features.

### Features

- Reduced installation labor, easy wiring, space saving, and standardization.
- Because the contact blocks on the PC board can be removed easily using a locking lever, the MC series control units are easy to maintain.
- Because the MC series control units require no studs for fastening the control unit to a PC board, special preparation of the control panel is not needed.

### Notes for Designing PC Board and Circuit

- Use 1.6-mm-thick glass epoxy PC board with drilled holes.
- Design a circuit so that the MC series control unit 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.
- Because 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 carefully to prevent short circuit.

Lamp Terminal | MC2 | Switch Terminal

Lamp Terminal | MC3 | Switch Terminal
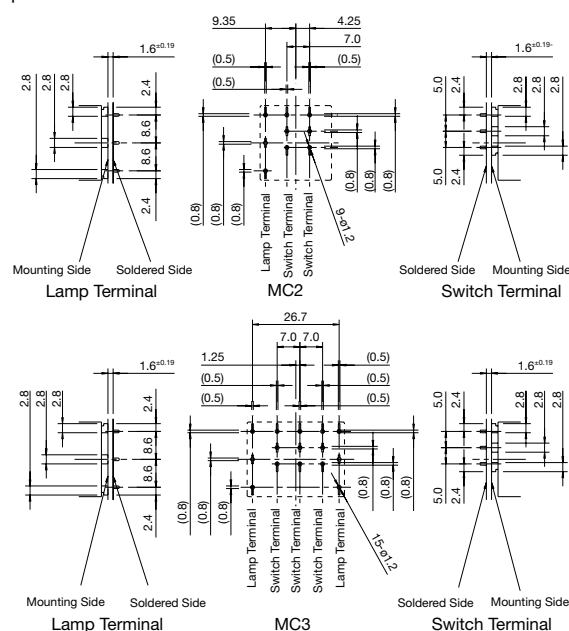
### PC Board Drilling Layout (Bottom View)
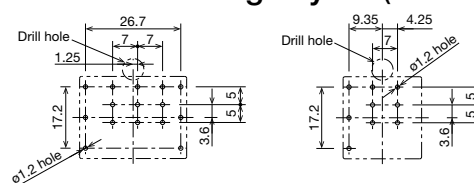
Note 1: When designing, note the alignment of center lines of the contact blocks and center lines of the operators.
Note 2: The diameter of the terminal hole is 1.2 mm.
Drill hole will enable easy operation of the locking lever.

# 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.

# IDEC CORPORATION

## www.idec.com

**Head Office**    6-64, Nishi-Miyahara-2-Chome, Yodogawa-ku, Osaka 532-0004, Japan

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **USA** | IDEC Corporation | **Singapore** | IDEC Izumi Asia Pte. Ltd. | **China** | IDEC (Shanghai) Corporation | **Japan** | IDEC Corporation |
| **EMEA** | APEM SAS | **Thailand** | IDEC Asia (Thailand) Co., Ltd. | | IDEC Izumi (H.K.) Co., Ltd. | | |
| | | **India** | IDEC Controls India Private Ltd. | **Taiwan** | IDEC Taiwan Corporation | | |

Specifications and other descriptions in this brochure are subject to change without notice.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[IDEC](): 

MCM-BF3B  MC3D-M70RB  MC3D-A20RB  MC9Z-PA2C  MC9Z-BF1B  MC3D-M50RB  MC9Z-PA2A  MCM-BF4N  MC2D-M10B  MC3D-A20RN  MC9Z-3DB  MC9Z-C3  MC3D-A10RB  MC3D-P00RB  MC3D-P00RN  MC9Z-PA2GL  MC9Z-PA2R  MC9Z-KF2  MC9Z-C2V  MC2D-M20B  MC9Z-PA2Y  MC2D-M50B  MC3D-P00FN  MC3D-A20F-B  MC3D-M30FN  MC3D-M20RB  MC3D-M30FB  MC9Z-BT1B  MC9Z-PA3R  MCM-D2  MC2D-A20B  MC9Z-J1  MC9Z-P2WPN05  MC2D-A50B  MC3D-A30RB  MC3D-M10FB  MC9Z-PA3A  MC9Z-T3  MC3D-M10RB  MC3D-M50FB  MC2D-A50VB  MC3D-M60FB  MC9Z-2DB  MCM-T001  MC9Z-BT2B  MC3D-M20RN  MC9Z-3DF  MC9Z-PA3GL  MC9Z-PA3S  MC9Z-PA2GD  MC3D-P00FB  MC2D-A10B  MC9Z-3DE  MC9Z-PA3GD  MC9Z-PA3Y  MCM-BF3N  MCM-BF3R  MC9Z-S3  MC9Z-C2  MC3D-A70RB  MC9Z-3DC  MCM-BF4B  MC3D-M20FB  MCM-D3  MC9Z-KF3  MC9Z-PA2S  MC2D-M50VB  MC2D-P00B  MC3D-A30RN  MC9Z-3DD