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 Vertical 2-way split: 2 Horizontal 2-way, 3-way, 4-way split: 4		Full: 1 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: 100 MΩ (500V DC megger) Between terminals of different poles: 100 MΩ (500V DC megger)
Dielectric Strength	Between live and dead metal parts: 2000V, 1 minute Between live parts of different poles: 2000V, 1 minute 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 Damage limits: 5 to 55 Hz, amplitude 0.5 mm (2 hours each in 3 axes)
Shock Resistance	Operating extremes: 200 m/s^2 Damage limits: 500 m/s^2
Mechanical Life	Momentary (snap action):1,000,000 operations min. Maintained: 250,000 operations min.
Electrical Life	100,000 operations min.
Operating Frequency	Momentary (snap action): 1,800 operations/hour 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.

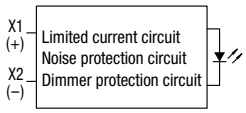
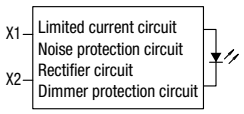
Gold Contact (Switch Base: Blue)

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 (When used on complete DC, the luminance is reduced to 50% of the initial intensity.)		
Internal Circuit			

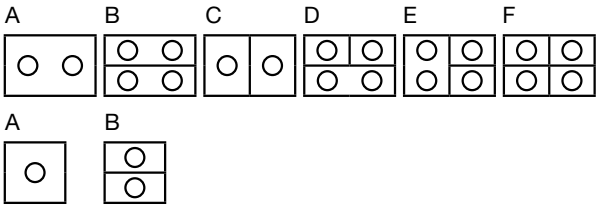
• Specify a color code in place of ∗ in the Part No. A (amber), G (green), PW (pure white), R (red), S (blue)
Use a PW (pure white) LED lamp for yellow illumination.

• 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

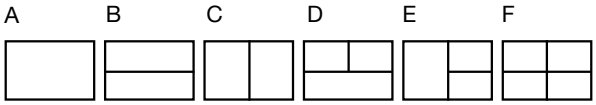
*1) The color code is the last code out of the 4 hexadecimal codes. (R: red, G: green, A: amber, S: blue, W: white, pure white)

Illumination Faces for LED

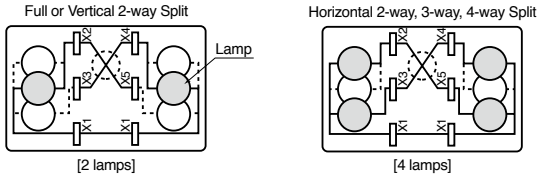
Series	Face Type	LED
MC3	A, C	2
	B, D, E, F	4
MC2	A	1
	B	2



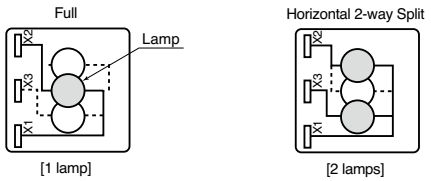
Face Division



MC3

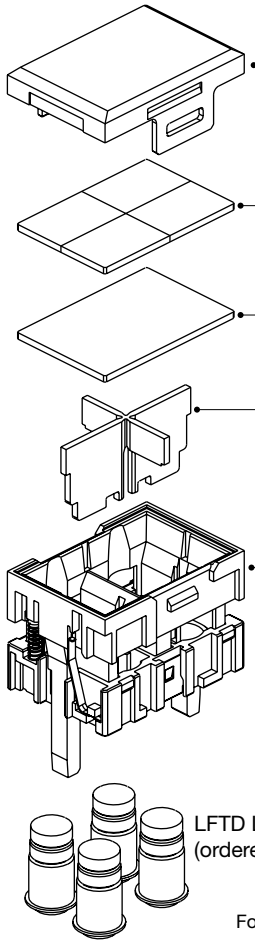


MC2



Illumination Unit Structure

MC3D (Full to 4-way split illumination)



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	∗ ∗ ∗ ∗ ∗ ∗: Color Code	R GD A C Y S Light Barrier	R C GD Y A S Light Barrier	R GD A C Y S R C GD Y A S Light Barrier	R C GD Y A S R C GD Y A S Light Barrier	R R GD GD A A C C Y Y S S Light Barrier	∗ ∗ ∗ ∗ ∗ ∗: Color Code	R GD A C Y S 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

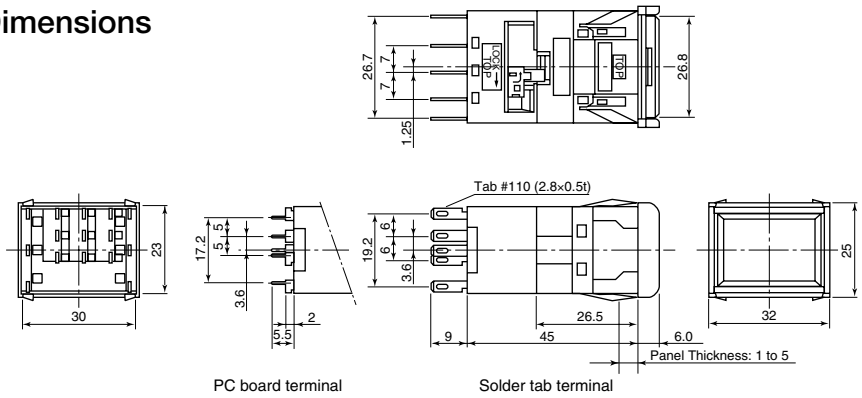
4-way Split

Package Quantity: 1

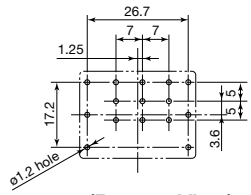
Operation	Contact		Part No. Solder/Tab Terminal Housing Color: Black	Solder/Tab Terminal Housing Color: Gray	PC Board Terminal Housing Color: Black	PC Board Terminal Housing Color: Gray	Marking Plate	Color Screen	Light Source
Momentary (Snap Action)	Silver	SPDT	MC3D-M10RB	MC3D-M10RN	–	–	White Size: 24.8 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			
		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			
							Supplied	Order Separately	Order Separately

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



PC Board Drilling Layout (PC Board Terminal)



(Bottom View)

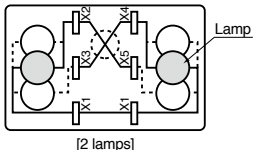
- See Single Board Mounting on page 37 for details about PC boards.

All dimensions in mm.

- For panel cut-out, see page 33.

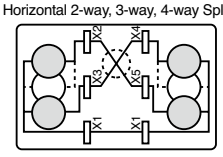
Internal Connection (Bottom View)

Full or Vertical 2-way Split



[2 lamps]

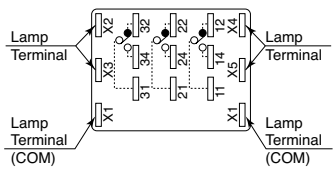
Horizontal 2-way, 3-way, 4-way Split



[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)

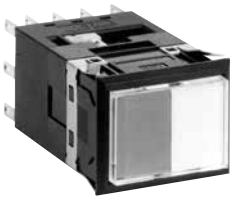


When using LFTD-5
X1 (COM): Negative
X2 to X5: Positive

- 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.

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

Full



2-way Split

3-way Split

4-way Split

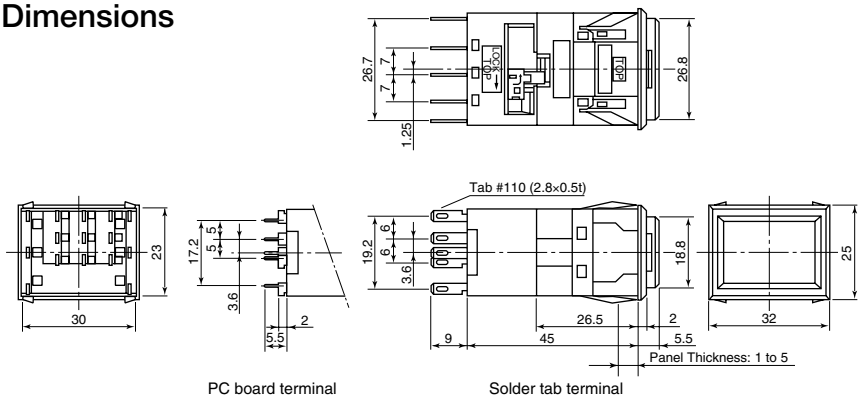
Package Quantity: 1

Operation	Contact		Part No. Solder/Tab Terminal Housing Color: Black	Solder/Tab Terminal Housing Color: Gray	PC Board Terminal Housing Color: Black	PC Board Terminal Housing Color: Gray	Marking Plate	Color Screen	Light Source
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**			
		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**	Supplied	Order Separately	Order Separately

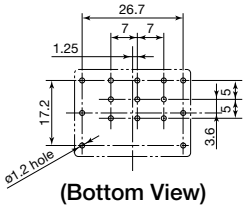
Note 1: Specify a color code in place of ∗ in the LED lamp Part No.: A (amber), G (green), PW (pure white), R (red), S (blue)
Note 2: For pure white illumination, use a clear (C) color screen.

- The rectangular flange unit can be mounted vertically. Replace the leaf springs with optional vertical mounting leaf springs (MC9Z-T3).

Dimensions



PC Board Drilling Layout (PC Board Terminal)



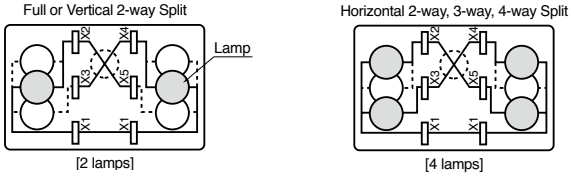
(Bottom View)

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

All dimensions in mm.

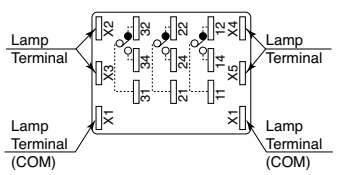
- For panel cut-out, see page 33.

Internal Connection (Bottom View)



- 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)



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

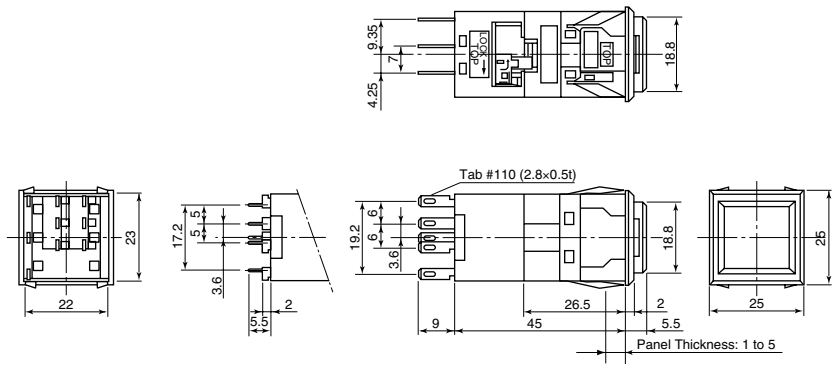
2-way Split

Package Quantity: 1

Operation	Contact		Part No. Solder/Tab Terminal Housing Color: Black	Solder/Tab Terminal Housing Color: Gray	PC Board Terminal Housing Color: Black	PC Board Terminal Housing Color: Gray	Marking Plate	Color Screen	Light Source
Momentary (Snap Action)	Silver	SPDT	MC2D-M10B	MC2D-M10N	–	–	White Size: 17 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	MC2D-M20B	MC2D-M20N					
	Gold	SPDT	MC2D-M50B	MC2D-M50N	MC2D-M50VB	MC2D-M50VN			
		DPDT	MC2D-M60B	MC2D-M60N	MC2D-M60VB	MC2D-M60VN			
Momentary (Slow Action)	Silver	SPDT	MC2D-S10B	MC2D-S10N	–	–			
		DPDT	MC2D-S20B	MC2D-S20N					
	Gold	SPDT	MC2D-S50B	MC2D-S50N	MC2D-S50VB	MC2D-S50VN			
		DPDT	MC2D-S60B	MC2D-S60N	MC2D-S60VB	MC2D-S60VN			
Maintained	Silver	SPDT	MC2D-A10B	MC2D-A10N	–	–			
		DPDT	MC2D-A20B	MC2D-A20N					
	Gold	SPDT	MC2D-A50B	MC2D-A50N	MC2D-A50VB	MC2D-A50VN			
		DPDT	MC2D-A60B	MC2D-A60N	MC2D-A60VB	MC2D-A60VN			
Pilot Light	–	–	MC2D-P00B	MC2D-P00N	MC2D-P00VB	MC2D-P00VN			
							Supplied	Order Separately	Order Separately

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).

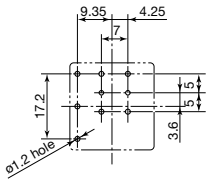
Dimensions



PC board terminal

Solder tab terminal

PC Board Drilling Layout (PC Board Terminal)



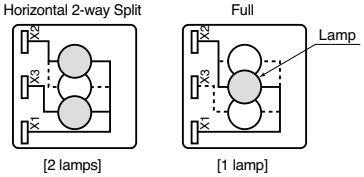
(Bottom View)

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

All dimensions in mm.

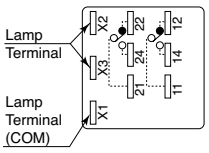
• For panel cut-out, see page 33.

Internal Connection (Bottom View)



• 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

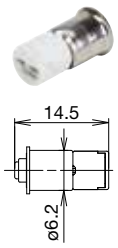
• SPDT contact has lamp terminals and contact terminals on the right only.
• Pilot light has lamp terminals only.

Accessories

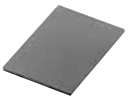
Name & Shape	For Use On	Specifications		Part No.	Ordering No.	Package Quantity	Remarks
Lamp Holder Removal Tool 	All Series	—		**MCM-T001**	**MCM-T001**	1	• Used to remove the lamp holder from the housing. • Material: Stainless Steel
Jumper Cutter 	MC3D	—		**MC9Z-J1**	**MC9Z-J1**	1	• Used to cut the built-in jumper when changing the MC3D for 2-way, 3-way, or 4-way split illumination. See page 36. • 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. • When guard barriers are installed, the lens switch guard cannot be used. • Material: Polycarbonate
		Vertical type		**MC9Z-KT3**	**MC9Z-KT3**	1	
	MC2D	Horizontal type		**MC9Z-KF2**	**MC9Z-KF2**	1	
Barrier   End Barrier Spacer Barrier	MC3D Horizontal Flange 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. • See page 33 for panel cut-out. • 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  End Guard Barrier Spacer Guard Barrier	MC3D Horizontal Flange 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. • The guard barrier cannot be used on barrier type or vertical flange type MC3D units. • See page 33 for panel cut-out. • 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. • White • 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. • See page 33 for panel cut-out. • Material Base: Polypropylene 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. • 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. • 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. A: amber G: green PW: pure white R: red S: blue 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	

Color Screen

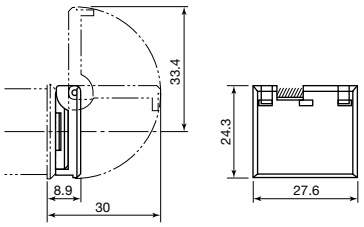
Name & Shape	For Use On	Specifications	Part No.	Ordering No.	Package Quantity	Remarks
Color Screen 	MC3D	Full illumination	**MC9Z-PA3∗**	**MC9Z-PA3∗PN05**	1 set (5 pcs)	Specify a color code in place of ∗ in the Ordering No. A: amber C: clear GD: green for LED R: red S: blue Y: yellow Use a clear (C) 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)

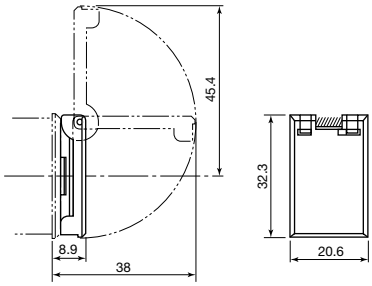
All dimensions in mm.

Lens Switch Guard

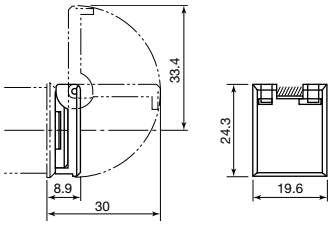
For MC3D Horizontal (MC9Z-KF3)



For MC3D Vertical (MC9Z-KT3)

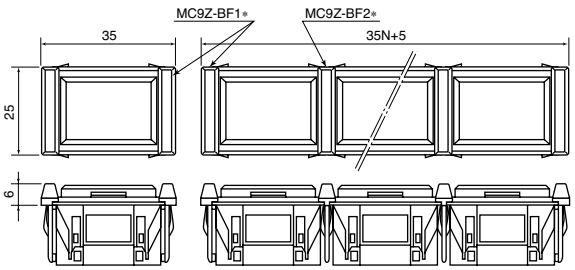


For MC2D (MC9Z-KF2)

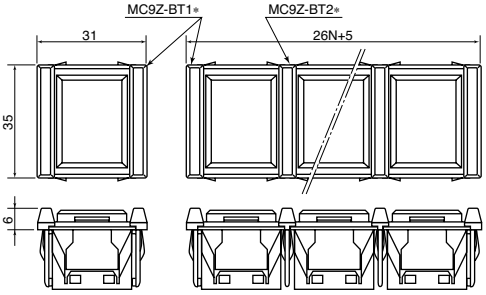


Barrier

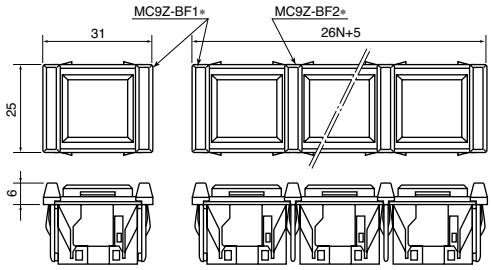
When using on MC3D Horizontal Flange



When using on MC3D Vertical Flange

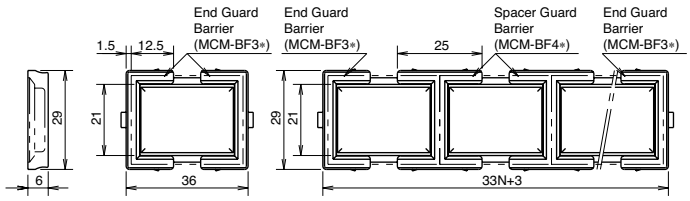


When using on MC2D

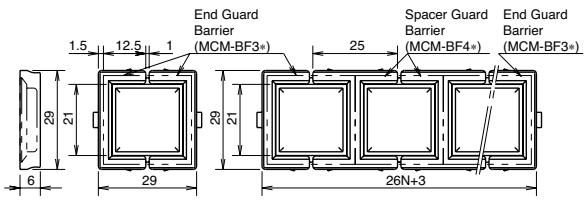


Guard Barrier

When using on MC3D Horizontal Flange

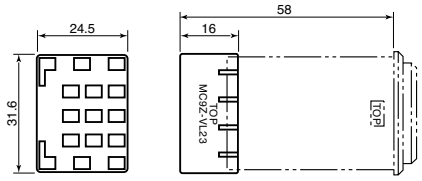


When using on MC2D

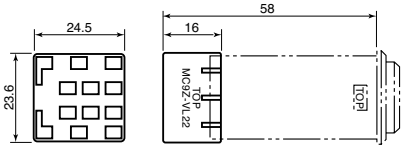


Terminal Cover

For MC3D (MC9Z-VL23)



For MC2D (MC9Z-VL22)



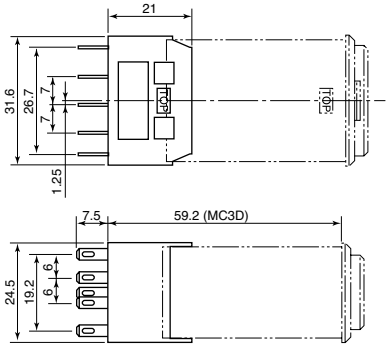
Accessories (Dimensions)

All dimensions in mm.

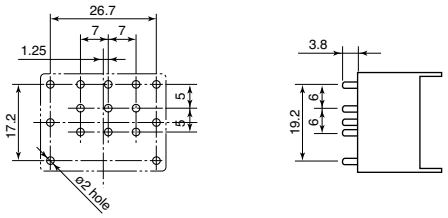
Socket

For MC3D

With solder terminals (MC9Z-C3)



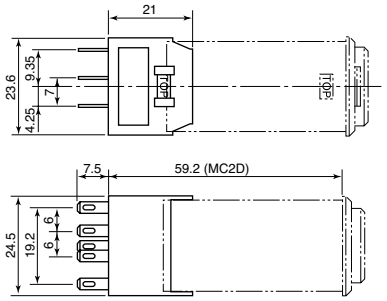
With PC board terminals (MC9Z-C3V)



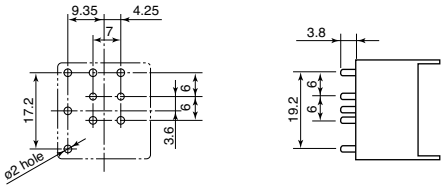
PC Board Drilling Layout
(Bottom View)

For MC2D

With solder terminals (MC9Z-C2)

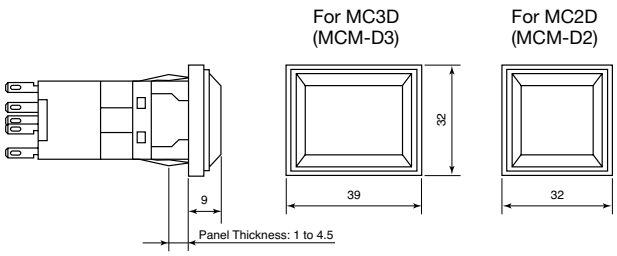


With PC board terminals (MC9Z-C2V)

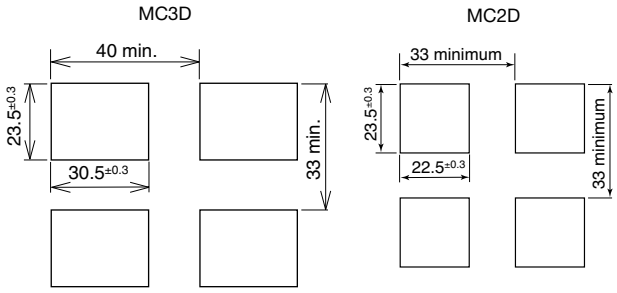


PC Board Drilling Layout
(Bottom View)

Dustproof Cover



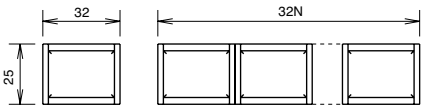
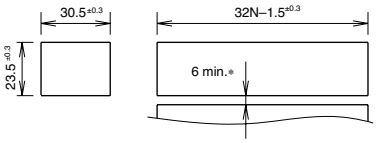
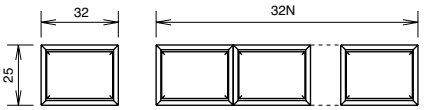
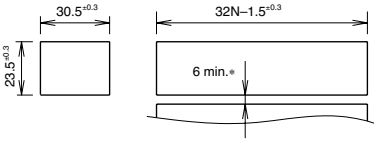
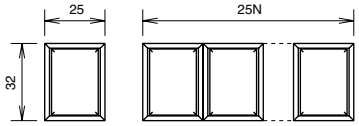
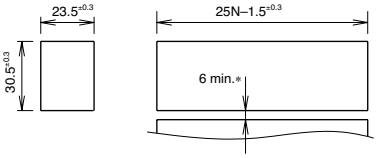
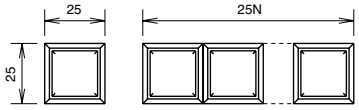
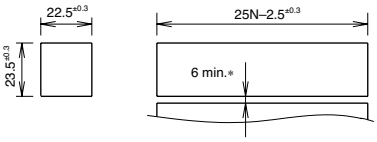
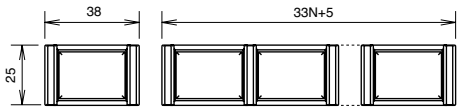
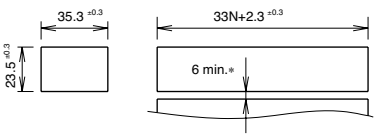
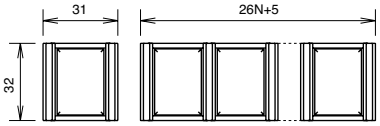
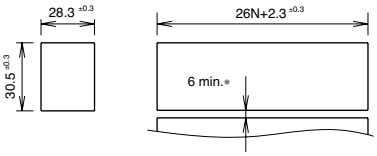
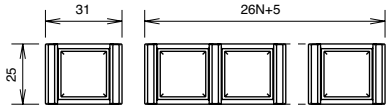
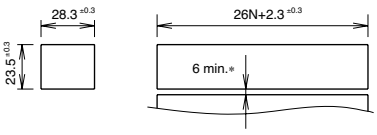
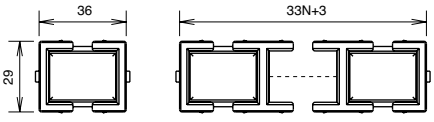
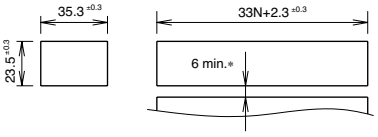
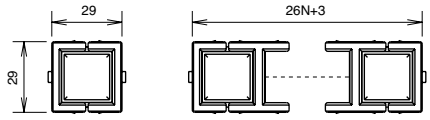
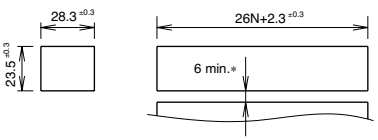
Panel Cut-out



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 • One marking plate is supplied with each MC3D/2D unit. • 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. • 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			N: No. of MC units mounted Notes: • When all four LED lamps are lit continuously, the maximum number of MC3D units that can be mounted is 3 rows by 10 columns. • When both LED lamps are lit continuously, the maximum number of MC2D units that can be mounted is 10 rows by 10 columns. • The panel cut-out dimensions are identical whether the MC3D/MC2D is mounted with or without a dustproof cover. See page 32. • The applicable panel thickness is 1 to 5 mm. • The strength of the panel must be taken into consideration for collective mounting.
Flange	MC3D Horizontal			
	MC3D Vertical			
	MC2D Horizontal			
Flange with Barriers	MC3D Horizontal			
	MC3D Vertical			
	MC2D			
Flange with Guard Barriers	MC3D Horizontal			
	MC2D			

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

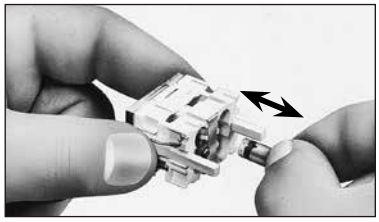
Removing the Illumination Unit

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

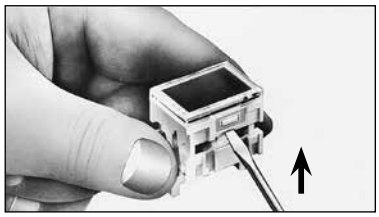
Insert the LED lamp into the lamp receptacle from the rear of the lamp holder, bulb first. Push the lamp in completely.



Replacing the Lens

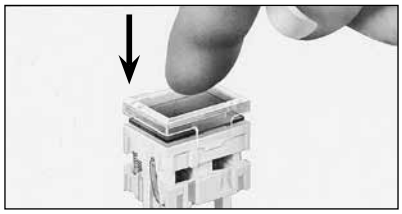
(Removal)

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)

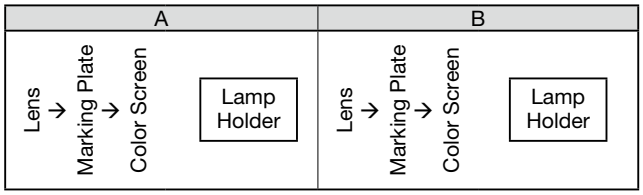
Put the latches on both sides of the lens onto the latches on the lens holder, and depress the lens surface lightly.



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



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.

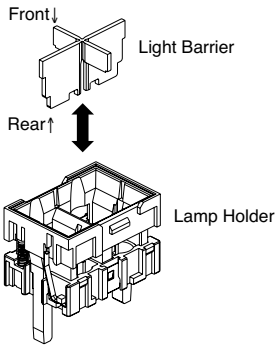
MC2D (Square)

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

Instructions

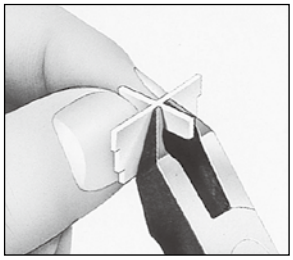
Handling the Light Barrier (Replacing the Light Barrier)

When inserting, note the orientation of the light barrier, illumination unit, and housing.



(Cutting the Light Barrier)

Cut off the unnecessary part using cutting pliers.

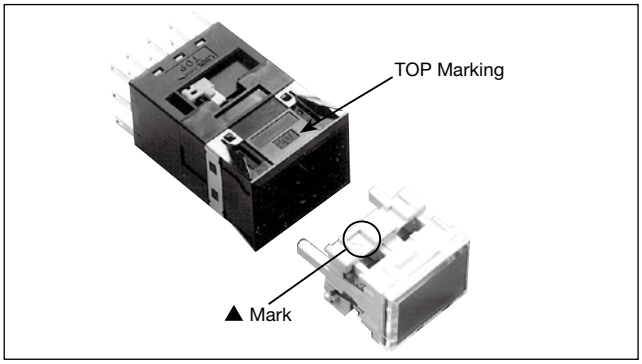


Installing the Illumination Unit into the Housing

The illumination unit has an orientation for insertion into the MC3D/2D housing.

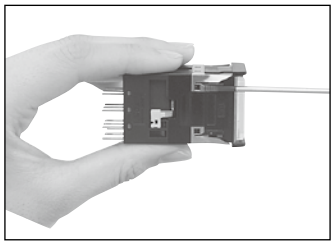
[MC3D]

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

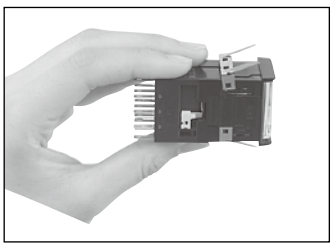


Vertical Mounting

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



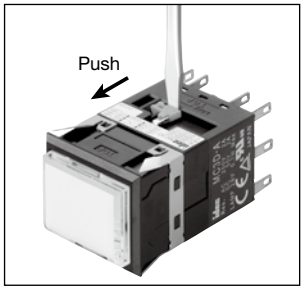
Place the vertical leaf spring on the MC unit temporarily, and then press the spring until it is secured on the MC unit.



Removing the Contact Block

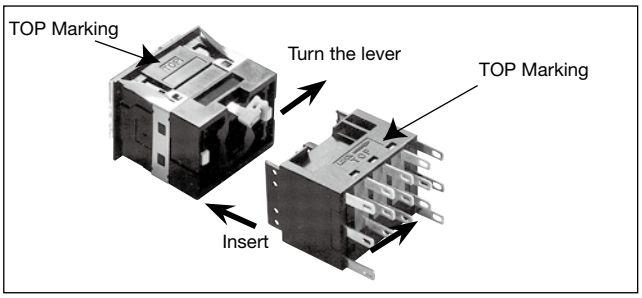
Removal

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.



Installation

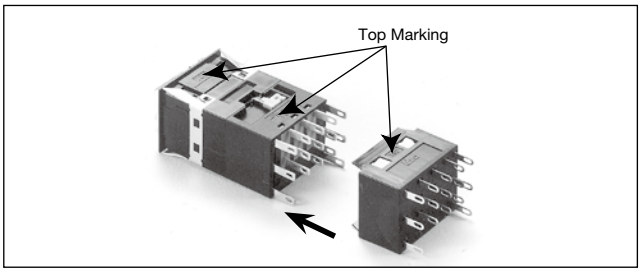
Open the lever as described above, and align the TOP markings on the operator housing and contact block in the same direction. Insert the contact block into the operator housing, and turn the lever in the direction indicated with Lock→. The contact block is locked to the operator housing.



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.

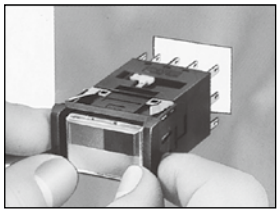


Installing the Lens with Switch Guard

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.

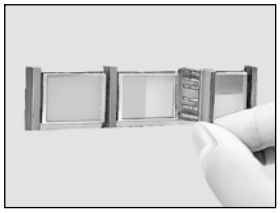
[Single Mounting]

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



[Row Mounting]

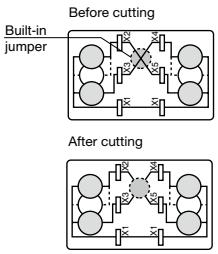
Insert an end barrier at one end of the panel cutout, then a unit, a spacer barrier, another unit, and so forth up to the other end of the row. With another end barrier in place, insert the last unit before inserting the last spacer barrier.



Instructions

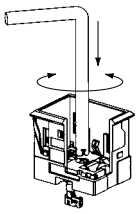
Cutting the Built-in Jumper

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.



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.



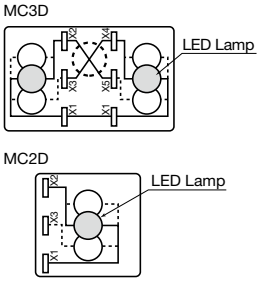
Notes for Operation

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

(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

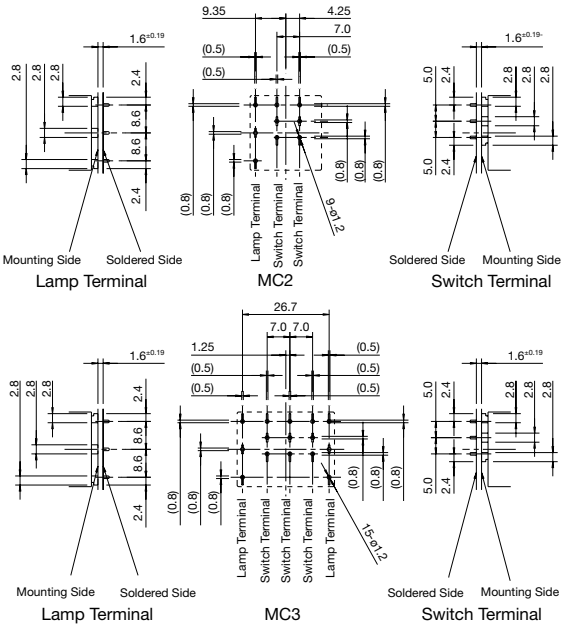
Mounting MC series illuminated control units on a PC board offers the following features.

Features

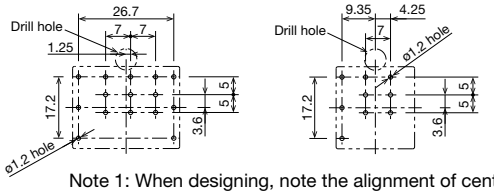
- Reduced installation labor, easy wiring, space saving, and standardization.
- Because the contact blocks on the PC board can be removed easily using a locking lever, the MC series control units are easy to maintain.
- Because the MC series control units require no studs for fastening the control unit 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.



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.

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