

High Visibility, Even in Sunlight

The ultrabright LED indicator, featuring high-power LED and IP65 compliance, is now available.

MLC Ultrabright LED Indicator



IP65 compliant
RoHS Directive compliant

- A ultrabright LED type, which provides clear visibility even in sunlight:
TYP.7000cd/m² (reference value)
- Excellent visibility thanks to red, green, and yellow LED colors and diamond-cut cover
- Providing high visibility by introducing the ultrabright LED and diamond cut cover; expanding uses such as warning indicators
- The IP65 compliant type (providing protection from water flows) withstands both rain and dust (this applies to the front only when the panel is attached)
- Easy $\phi 25$ hole screwing and the flat and dorm shapes available with the 30 square and 30 round types
- Shade hood and terminal cover (for screw terminals) available as accessories

- The ultrabright white LED type is also available for lighting



Reference illuminance: Approx. 70 lux
(in a place 50-cm just below the lighting without the filter)

SPECIFICATIONS

Item	Specifications
Insulation resistance	100MΩ or greater with a DC 500V Megger
Dielectric strength	Between terminals and ground: AC1500VRMS, 50/60Hz for 60 sec. at normal temperature and humidity
Reverse dielectric strength	150V
Ambient temperature	-10°C to 50°C / -10°C to 40°C (Lighting)
Ambient humidity	80%RH or less

RATING

Voltage rating (V)	Current rating (mA)			
	Mono-color luminance			Lighting
	Red	Green	Yellow	White
DC12V (±5%)	56	26	48	44
DC24V (±5%)	28	13	24	22

* For externally attached LED resistors, see the last page.

Shapes and Dimensions

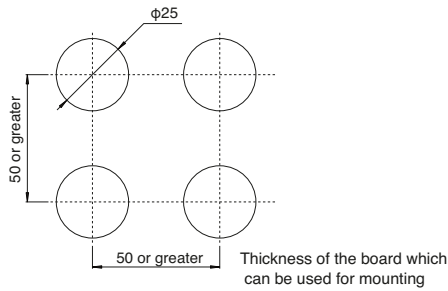
Square flat type			
Square dome type			
Round flat type			
Round dome type			

* Please note that height of the MLC type is different from the one of the current ML indicator.

Lighting

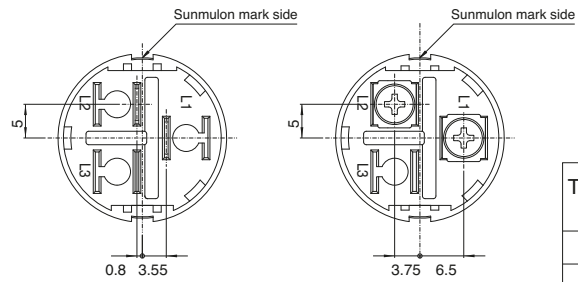
* The dimensions of the lighting are the same as those of the square flat and round flat types of the current ML indicator (See PDF data for ML indicator posted on our website.)

Panel Cut Dimensions



Note: To install together, please set apart from each other by at least 50mm from the panel cut center line for heat radiation.

Terminal Layout



Terminal No.	Mono-color illumination /Lighting
L1	Anode (+)
L2	Cathode (-)
L3	(No terminal)

Accessories

Terminal cover



PART No.	ML-1561
----------	---------

* For screw terminals

Shade hood

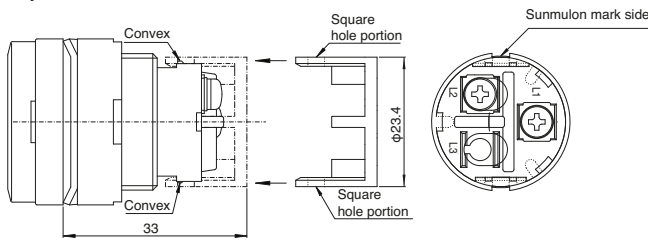


Shape	Part No.
Square	ML-1568
Round	ML-1567

* A piece of rubber packing is set inside.

● Installing the terminal cover

*Only screw terminals can be used

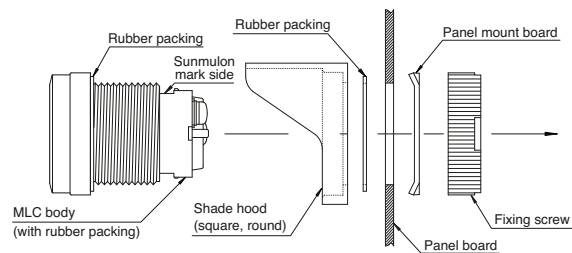


When the terminal cover is used

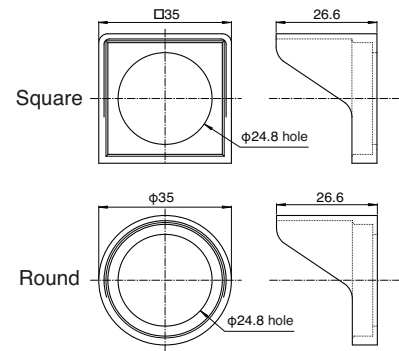
* Fit the convex and the square hole portion to the direction as illustrated above until it clicks.

● Installing the shade hood (square and round)

* With water resistant structure (Otherwise rubber packing is not required)



● Shade hood dimensions



Replacement Parts

● Indicator Cover (Diamond cut specifications)

Name	Square flat cover	Round flat cover	Square dome cover	Round dome cover
Part No.	ML-1556-CC	ML-1555-CC	ML-1558-CC	ML-1557-CC

● Lighting Cover (Clear color) ● Lighting Filter

Square flat cover	ML-0566-CC
Round flat cover	ML-0567-CC

	Milk white	Clear
Square filter	ML-0570-LM	ML-0570-CC
Round filter	ML-0572-LM	ML-0572-CC

Precautionary Notes for Handling

1. The MLC super hi-bright type is created based on the current ML indicator. However, please confirm the following points:
 - 1) The filter and cover of the current ML type can be used for the MLC type. Likewise, the diamond cut cover and shade hood of the MLC type can be used for the current ML type. The terminal cover can also be attached to the current ML model and the AC/DC 100V unit, so please purchase it as a replacement part.
 - 2) The AC/DC 100V unit of the current ML type cannot be used for the MLC type.
 - 3) The MLC type is available as an integrated product. We are unable to accept orders for the illumination part and the body separately.

2. Please make sure of the following points for outdoor use.
 - 1) The IP65 compliant type (providing protection from water flows) is available for both the MLC type and the current ML indicator. When it is used outdoors, please use in accordance with the IP65 standards and our specifications. When it is mounted, please be sure that there is no dust or burrs, and no twisted and bent packing.
 - 2) In the case of the water protection type, please apply 0.98-1.47Nm for the screw fastening torque when it is mounted on the panel. In the case of no water protection type, apply 1.47Nm or less.

3. About brightness
 - 1) The indicator is displayed in brightness. TYP.7000cd/m² (reference value) specified in the brochure represents the value in the brightest area on the surface of the MLC diamond cut cover (in a range of about four diamond cut spaces.)
 - 2) The brightness of the lighting is displayed as illuminance. However, brightness varies depending on the filter for use.

With the clear filter, it is about 70 lux (reference value) in the area 50-cm below the light.

With the milk white filter, it is half as bright as it is with the clear filter, providing soft lighting.

* Please do not look at the LED of the lighting directly. It may harm your eyes.

4. About handling replacement parts and accessories
 - 1) To exchange the diamond cut cover, fit the Δ portions (square hole and claw portions) as illustrated in Figure 1.

* A notch of the diamond cut cover is created during the production process. It has nothing to do with the fitting with the body.
 - 2) To install the shade hood for the round type in the panel, if you fasten the mount screw, the body may turn together. Please push both sides of the hood (x area) with your fingers as illustrated in Figure 2 for easy installation.

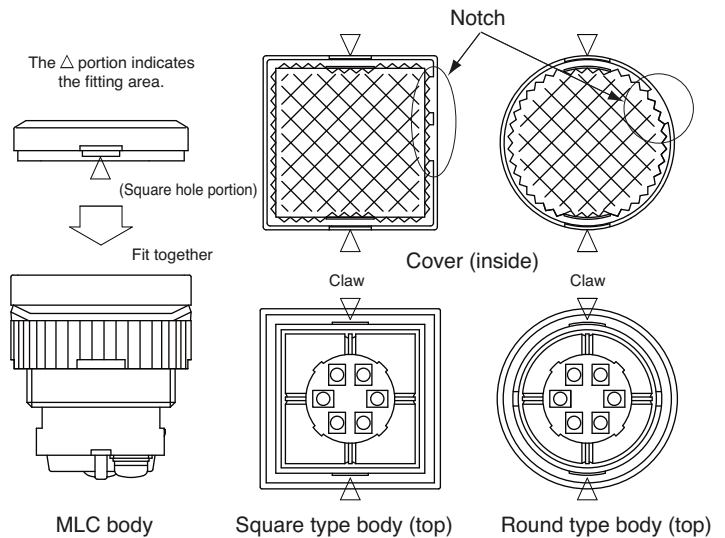


Figure 1: Installing the Diamond Cut Cover

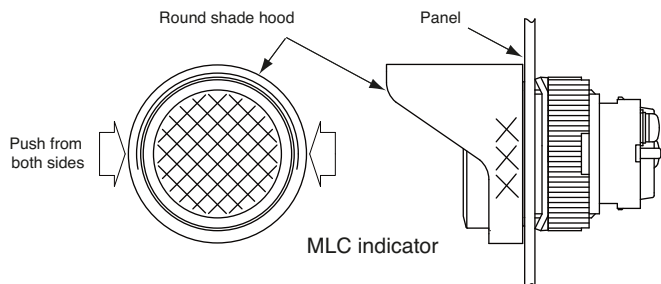


Figure 2: Installing the Round Shade Hood

Tolerance : $\pm 0.4\text{mm}$

ORDERING CODE

Indicator

MLC-□□□□X□□□

● Shapes and Illumination Methods

S0	Square flat	Mono-color illumination
T0	Square dome	Mono-color illumination
R0	Round flat	Mono-color illumination
M0	Round dome	Mono-color illumination

● LED Colors

701	Red
181	Green
901	Yellow
X	No LED

● Cover Colors

DC	Clear (diamond cut)	*1)
X	No cover	*3)

● Case Colors

K	Black
H	Gray

● Filter Colors

X	No filter
---	-----------

● Terminal Shapes

B	Fastening screw
P	#187 tab/solder
X	No terminal

● PROTECTION

A	No Protection
B	Oil and Water-tight (IP65) version

● Operating Voltage

2	12V with a built-in resistor	
3	24V with a built-in resistor	
5	12V without a resistor	*2)
6	24V without a resistor	*2)
X	No LED	

Notes

*1) Only the diamond cut shape is available for the cover of the MLC indicator.

*2) See the PDF document for externally installed LED resistors.

*3) In case of No cover Square dome and Round dome type, Please select No cover Square flat and Round flat type, for our convenience.

Lighting

MLC-□ S16 C□□□□□□

● Shapes and Illumination Methods

S	Square flat shape
R	Round flat shape

● LED Colors

S16	White for lighting
-----	--------------------

● Cover Colors

C	Clear	Square flat/Round flat shapes	*1)
---	-------	-------------------------------	-----

● Case Colors

K	Black
H	Gray

● Filter Colors

4	Milk white	*2)
9	Clear	

● Terminal Shapes

B	Fastening screw
P	#187 tab/solder

● PROTECTION

A	No Protection
B	Oil and Water-tight (IP65) version

● Operating Voltage

2	12V
3	24V

Notes

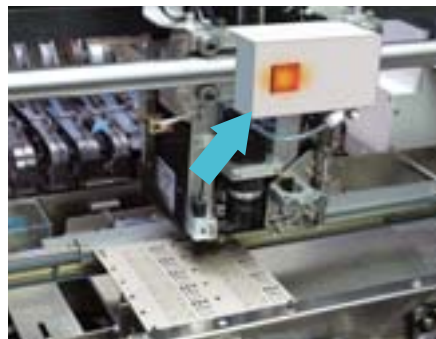
*1) The clear flat-shape cover, instead of the diamond cut type, is available for lighting.

*2) When the milk white filter is attached, the lighting provides soft illumination by diffusion, and brightness is halved.

Examples of Use



● As an indicator for confirming operations outdoors



● For warning display when the device stops



● As lighting in a dark place

* Composite photographs are shown in the examples of use. There is no relationship between our products and other items in the pictures.

Externally Installed Resistor Data

● See the table below for externally installed LED resistors

T a = 25°C

ITEM	DC12V			DC24V			
	Red	Green	Yellow	Red	Green	Yellow	
Max. operating current	60	60	60	30	30	30	
DC reverse voltage	150						
Diode voltage in regular direction	0.8						
Voltage in regular direction V _F (V) (reference value)	6.3	6.2	6.6	12.6	12.4	13.2	
*1) Recommended operating current I _F (mA)	50	30	50	25	15	25	
*2 Current decrease rate of LED (mA/ °C) (between t ₁ °C and t ₂ °C) (Reference value)	2 (85 ~ 100)	1.2 (75 ~ 110)	2 (85 ~ 100)	1 (85 ~ 100)	0.6 (75 ~ 110)	1 (85 ~ 100)	
Conditions at the time of pulse lightening	Pulse width PW (mS)	0.1	10	0.1	10	0.1	
	Duty ratio D _R	10 ⁻¹					
	Max. pulse allowable voltage in regular direction 1 _{FP} (mA)	240	200	240	120	100	120
	*1 Recommended operating current 1 _F (mA)	200	100	200	100	50	100
	*2 Current decrease rate of LED (mA/ °C) (between t ₁ °C and t ₂ °C) (Reference value)	8 (85 ~ 100)	1.2 (75 ~ 110)	8 (85 ~ 100)	4 (85 ~ 100)	0.6 (75 ~ 110)	4 (85 ~ 100)
Wiring figure	Figure 1			Figure 2			

*1) The recommended operating current indicates the standard set value when the ambient temperature for the MLC indicator is 50°C (upper limit), and when the internal temperature increase is taken into consideration.

*2 (between t₁ °C and t₂ °C) indicates the range of current decreases (current derating) (temperature at the beginning-max. temperature.)

● Use the following formulas to calculate the externally installed resistor R.

Figure 1

$$R = \frac{V_{CC} - V_D - V_r - V_F}{I_F}$$

however XXXX

Figure 2

$$R = \frac{V_{CC} - V_D - V_F}{I_F}$$

V_{CC} : Power supply voltage

I_F : Recommended operating current

V_F : LED voltage in regular direction

V_D : Diode voltage in regular direction

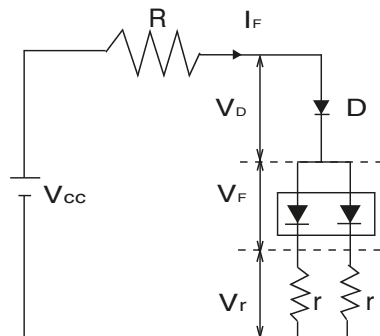


Figure 1

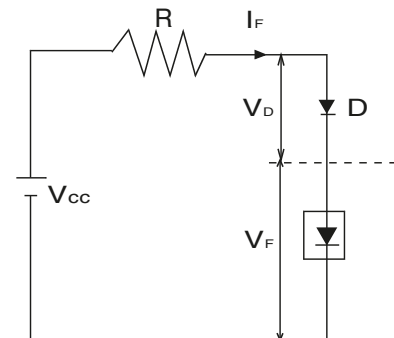


Figure 2

r : Install the resistor to ensure the V_F balance stability of the LED