

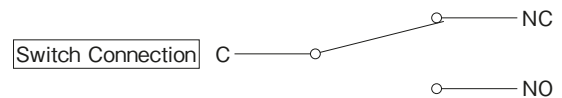
# MH Illuminated Pushbutton Switch

Only 22mm depth behind panel with  $\phi 16$  panel cutout.

Screw mounting and Snap-in mounting available.

### ■ FEATURES

- Depth behind panel : only 22mm
- Button size : 14.2mm square type, 14.2 × 20.2mm rectangular type and 15mm round type.
- Incorporating precision snap action switch mechanism assures long life (Mechanical : 2,000,000 operations min.).
- Contact mechanism has wiping action, and it's self-cleaning effect permits high reliability.



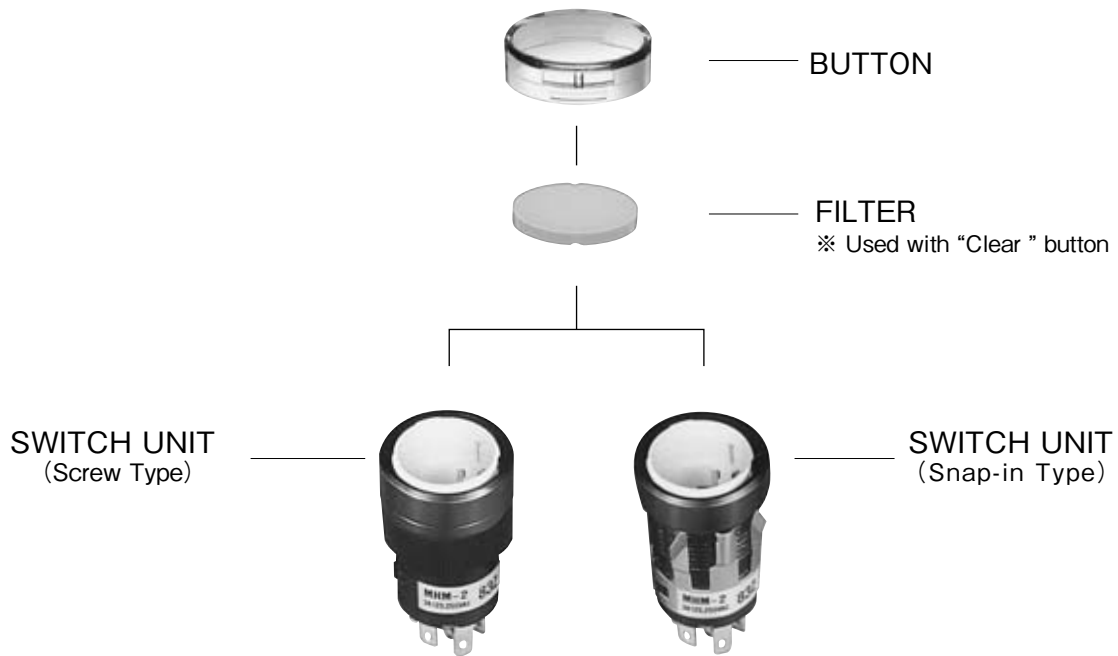
## SPECIFICATIONS

Contact	Silver Contact (Gold-Plated)
Electrical Rating	3A 125, 250V AC (Resistive)
Insulation Resistance	Over 100M $\Omega$ at 500V DC Meger
Dielectric Strength	Between terminals : 1,000V AC RMS Between terminals & Ground : 1,500V AC RMS Both 50/60Hz in normal temperature & humidity in one minute
Contact Resistance	Under 30m $\Omega$ (at initial) at 1A 6VDC
Mechanical Life	Momentary : 2,000,000 operations (min.), Alternate : 200,000 operations (min.)
Electrical Life	70,000 operations (min., at rated load)
Ambient Temperature	-15°C ~ 50°C
Ambient Humidity	80% RH (max.)

## OPERATING CHARACTERISTICS

Operating Force (Max.)	4.41N	Total Travel (mm Max.)	2.5
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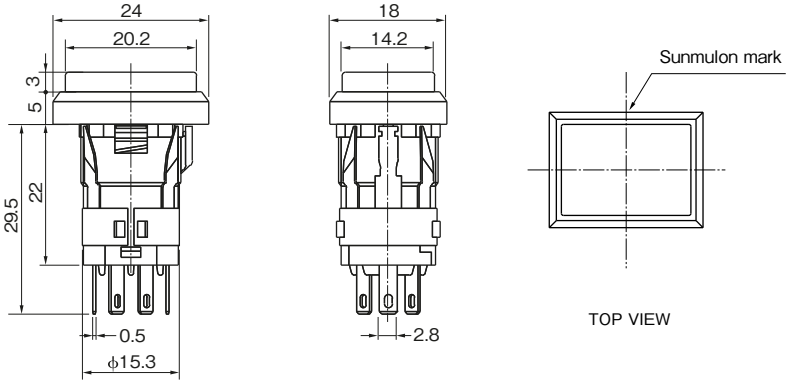

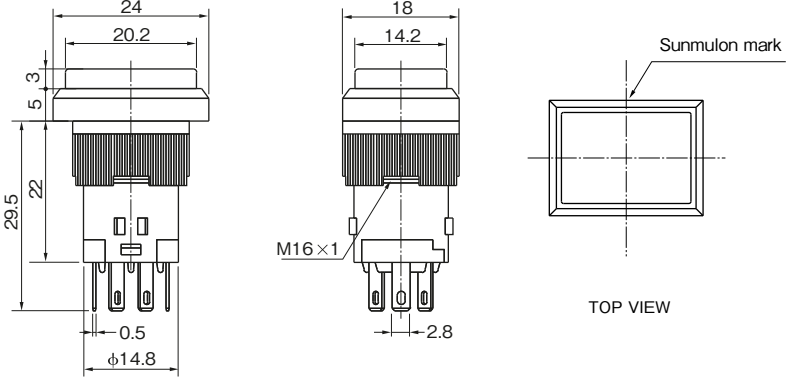

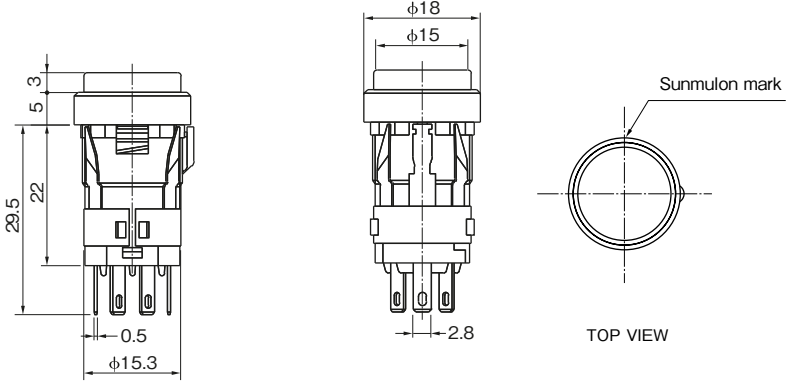

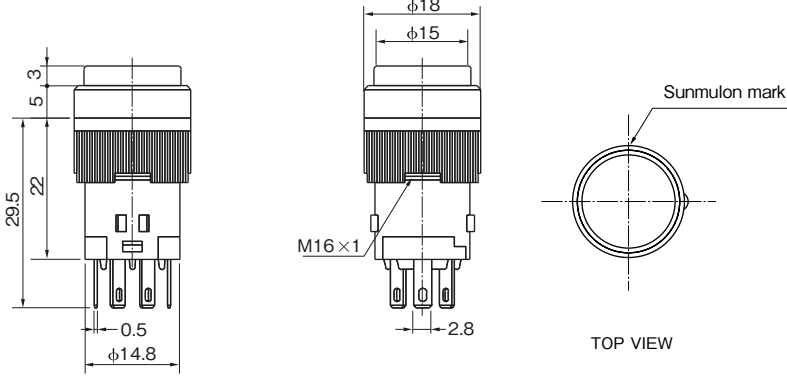
## STRUCTURE



## DIMENSIONS

14.2 Square Button	Snap-in Type			<p>TOP VIEW</p>
	Screw Type			<p>TOP VIEW</p>

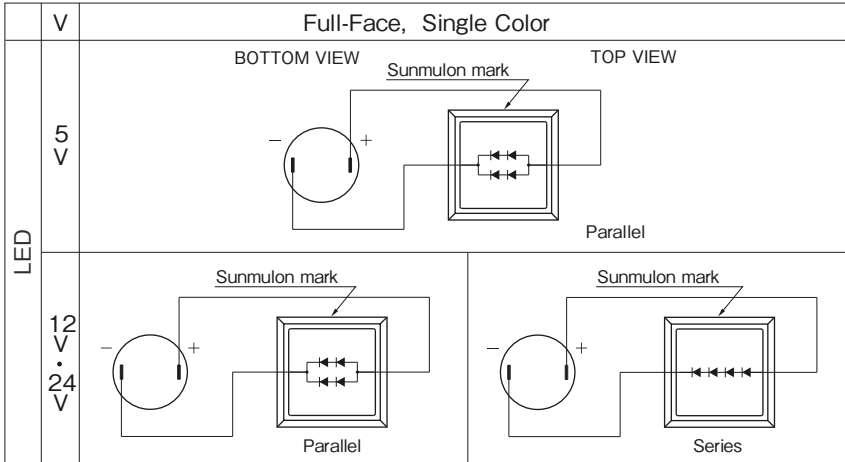
DIMENSIONS

14.2 × 20.2 Rectangular Button	<p>Snap-in Type</p> 	
	<p>Screw Type</p> 	
φ15 Round Button	<p>Snap-in Type</p> 	
	<p>Screw Type</p> 	

Tolerance : ±0.4mm

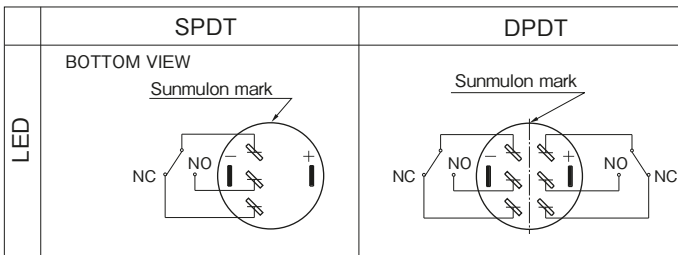
## INTERNAL CONNECTION ARRANGEMENTS

### ● LED (Any size)

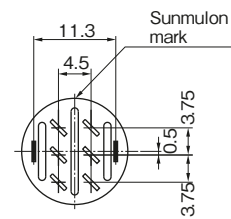


## TERMINALS

### ● TERMINALS LAYOUT(Any size)

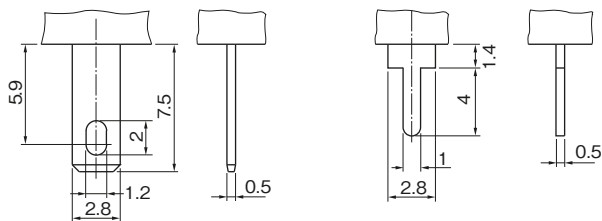


### ● TERMINALS DIMENSIONS (BOTTOM VIEW)



## TERMINAL SHAPES / DIMENSIONS

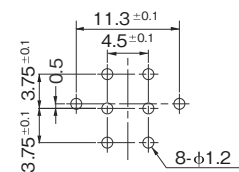
### ● TERMINAL SHAPE



#110Tab / Soldering Terminal

Printed circuit Terminal

### ● Printed circuit Terminal Hole (BOTTOM VIEW)



## LED RATING

### ● LED Rating (Calculated at 4-chip LED)

Item	LED			
	Parallel		Series	
	Red, Yellow	Green	Red, Yellow	Green
Max. Operating Current $I_{FM}$ (mA)	40	40	20	20
DC Reverse Voltage $V_R$ (V)	10	10	20	20
Forward Voltage $V_F$ (V)	4	4.2	8	8.4
Forward Current $I_F$ (mA)	15	25	8	13

※ In case of pulse lighting, please note following conditions.

$I_{FM}$ =100mA (DC current for one LED. all colors)

Where : Pulse width (PW)= 100  $\mu$  sec.

Duty Ratio (DR) =  $10^{-1}$

Tolerance :  $\pm 0.4$ mm

## EXTERNAL RESISTOR

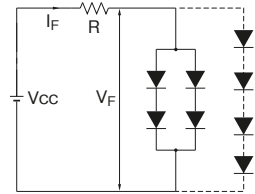
- Internal LED protective resistor is not incorporated.  
Refer to the following valued series connection. (Calculated at 4-chip LED)

Voltage(V)	Parallel		Series	
	Red, Yellow	Green	Red, Yellow	Green
5(±5%)	100Ω 1/8W	33Ω 1/8W		
12(±5%)	620Ω 1/4W	330Ω 1/4W	620Ω 1/8W	300Ω 1/8W
24(±5%)	1500Ω 1/2W	820Ω 1/2W	2100Ω 1/2W	1300Ω 1/2W

The value of the series resistor can be determined by the formula:

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

V<sub>CC</sub> : Supply Voltage  
V<sub>F</sub> : Forward Voltage  
I<sub>F</sub> : Forward Current



## PANEL LAYOUT / PANEL CUT DIMENSIONS

- 14.2 Square Button

	Panel Layout	Panel Cut Dimensions
Without Guard Cover		
With Guard Cover		

- 14.2×20.2 Rect. Button

	Panel Layout	Panel Cut Dimensions
Without Guard Cover		
With Guard Cover		

※ Panel Cut Dimension should be after Panel Painting.

n : number of switches(horizontal)  
m : number of switches(vertical)

○ Panel thickness    Screw    0.5mm~5mm  
Snap-in    1mm~3.2mm  
With guard cover    0.5mm~2.7mm

## ● $\phi 15$ Round Button

	Panel Layout	Panel Cut Dimensions
Without Guard Cover		
With Guard Cover		

※ Panel Cut Dimension should be after Panel Painting.

n : number of switches(horizontal)  
m : number of switches(vertical)

○ Panel thickness

Screw

0.5mm~5mm

Snap-in

1mm~3.2mm

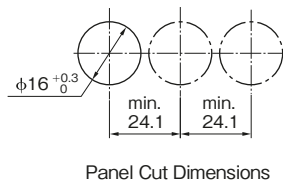
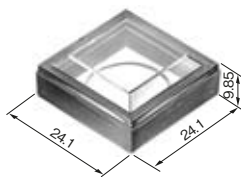
With guard cover 0.5mm~2.7mm

## OPTIONAL ACCESSORIES

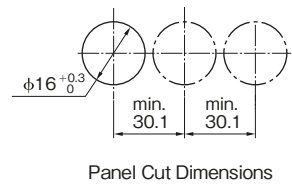
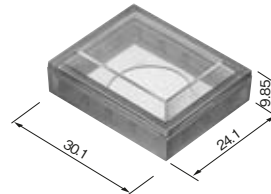
### Water-Proof Cover

※ USE FOR SCREW TYPE ONLY

#### ● $\phi 15$ Round Button/ □ 14.2 Square Button



#### ● 14.2×20.2 Rectangular Button



● Please indicate part numbers when order.

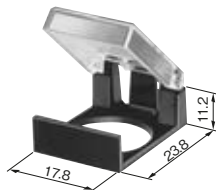
Button Shape	Part Nos.
$\phi 15$ Round Button, □ 14.2 Square Button	MH-456
14.2×20.2 Rectangular Button	MH-494

### Guard Cover

Guard Cover prevents inadvertent or unintentional operations. Button can not be operated unless open clear cover.

※ USE FOR SCREW TYPE ONLY

#### ● $\phi 15$ Round Button, □ 14.2 Square Button



#### ● 14.2×20.2 Rectangular Button



Panel Thickness : 0.5mm ~ 2.7mm

Button Shape	Black	Gley
$\phi 15$ Round Button, □ 14.2 Square Button	MH-0931-B	MH-0931-G
14.2 × 20.2 Rectangular Button	MH-0930-B	MH-0930-G

### Mounting Wrench (Part No. MH-448)

To mount screw type tightly.

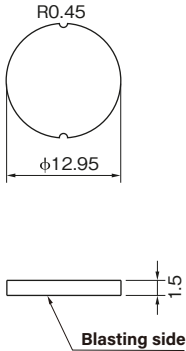


※ tightening torque  $\leq 0.49\text{N} \cdot \text{m}$

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

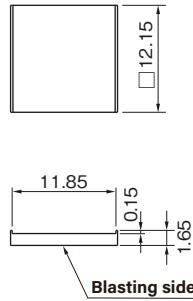
### FILTER DIMENSIONS

●  $\phi 15$  Round Button



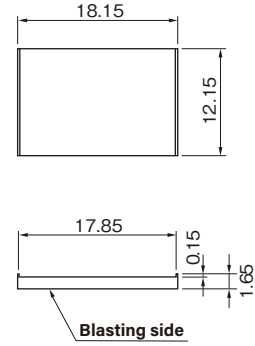
MH-399

● 14.2 Square Button



DH-339

● 14.2x20.2 Rectangular Button



MH-486

Tolerance :  $\pm 0.4$ mm

### REPLACEMENT PARTS

Please indicate part numbers when order.

● Buttons / Filters

Color	Red	Green	Yellow	Milk White	Clear
$\phi 15$ Round Button	MH-393-1LR	MH-393-1LG	MH-393-1LY	MH-393-1LM	MH-393-2C
14.2 Square Button	MH-400-1LR	MH-400-1LG	MH-400-1LY	MH-400-1LM	MH-400-2C
14.2x20.2 Rectangular Button	MH-485-1LR	MH-485-1LG	MH-485-vLY	MH-485-1LM	MH-485-2C
$\phi 15$ Round Filter	MH-399-LR	MH-399-LG	MH-399-LY	MH-399-LM	
14.2 Square Filter	DH-339-LR	DH-339-LG	DH-339-LY	DH-339-M	
14.2x20.2 Rectangular Filter	MH-486-LR	MH-486-LG	MH-486-LY	MH-486-LM	

### ORDERING CODE Order as a Set

Full-Face, Single Color

MH  -

● Operation

M	Momentary
A	Alternate

● Contact

1	Silver, SPDT
2	Silver, DPDT

● Button Shape

R	$\phi 15$ Round
S	$\square$ 14.2 Square
W	14.2x20.2 Rectangular

● LED Color

Parallel		Series	
70	Red	71	Red
80	Green	81	Green
90	Yellow	91	Yellow

★ Please select Parallel for using less than 9V.

● Mounting

1	Snap-in
2	Screw

● Terminal Shape

S	#110 Tab/Solder
C	PCB

● Filter (For only Clear Button)

Blank	Without Filter
1	Red
2	Green
3	Yellow
4	Milk White

★ Without Filter for colored Button.

● Case Color

B	Black
G	Gray

● Button Color

R	Red
G	Green
Y	Yellow
M	Milk White
C	Clear

※ "Yellow" color for LED/ Button/Filter is actually "Orange Yellow".

## ASSEMBLY &amp; DISASSEMBLY

## ● Fixing Water-proof cover

Insert switch into round hole of packing and mount to the panel. Screw tightly with fitted nut. Fix transparent cap to the packing firmly.

