

# CH Super Miniature Lighted Pushbutton Switch

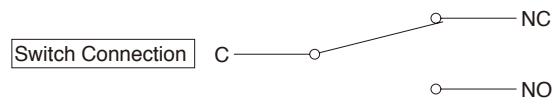
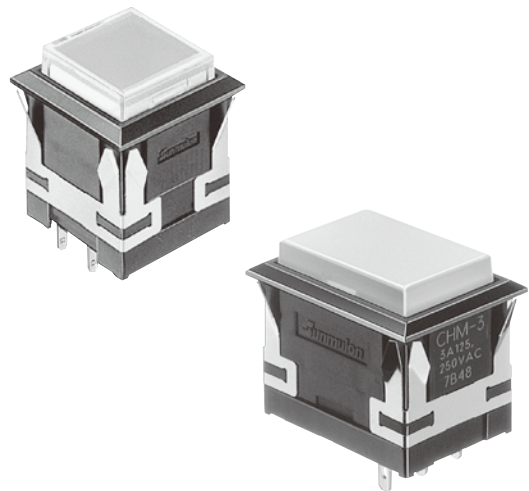
**Only 16mm depth behind panel with built-in resistor.**

**Full-Face, Split-Face, Dual-Color Illumination available.**

**Amazing bright and even LED illumination.**

**Features**

- Depth behind panel : Only 16mm.
- LED illumination for Full-Face, Split-Face, Dual-Color.
- Built-in resistor for 5V, 12V, 24V use.
- Light Cartridge is removable from front panel.
- Button Size: 13.2mm square type, 13.2×19.4mm rectangular type.
- Precision-snap action switch movement with coil spring assures long life and outstanding tactile feedback.
- Silver Contact (Gold-Plated) and W/E Alloy #1
- Cross-bar Contact provided.
- Accessories: Barriers, Guard Covers, Sockets, etc.



## SPECIFICATIONS

Contact	Silver Contact (Gold-Plated)	W/E Alloy #1 Cross-bar Contact
Electrical Rating	AC125V, 250V 3A(Resistive)	AC125V0.1A, DC30V 0.1A(Resistive)
Insulation Resistance	More than 100MΩ at 500V DC	
Dielectric Strength	600V AC RMS between NC and NO terminal 1500V AC RMS between terminals and ground 50/60Hz for 60sec. at normal ambient temperature and humidity	
Contact Resistance	Less than 50mΩ (Initial) at DC6V 1A	Less than 50mΩ (Initial) at DC6V 0.1A
Mechanical Life	Momentary Action : more than 1,000,000 operations	Alternate Action : more than 200,000 operations
Electrical Life	More than 30,000 operations at max. rated load	
Ambient Temperature	-15°C to +50°C	
Ambient Humidity	80% RH (max.)	

## OPERATING CHARACTERISTICS

Operating Force (max.)	4.41N	Total Travel (max.)	2.5mm
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## STRUCTURE

### LIGHT CARTRIDGE

BUTTON  
(Poly-Carbonate)

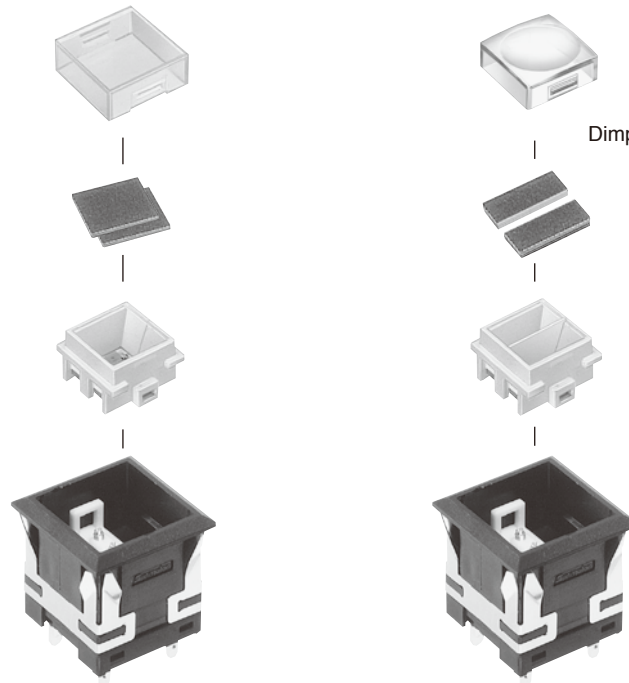
FILTER  
(Used with clear button)

CARTRIDGE BASE  
(LED mounted)

### HOUSING

LED Full-Face

LED Split-Face



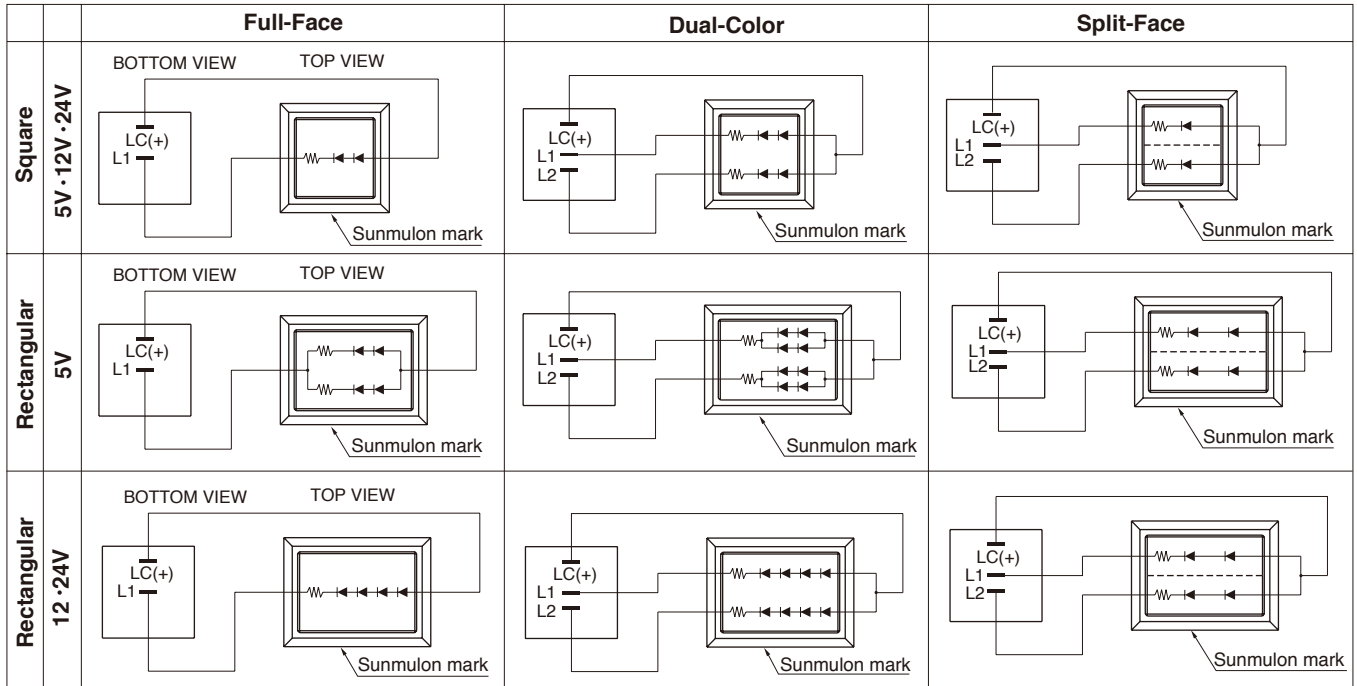
## DIMENSIONS

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">13.2mm Square Button</p>				<p>Top View</p> <p>Sunmulon mark</p> <p>*3.0 for Dimple Button</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">13.2×19.4mm Rect. Button</p>				<p>Top View</p> <p>Sunmulon mark</p> <p>*3.0 for Dimple Button</p>

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

## INTERNAL CONNECTION ARRANGEMENTS

### ● LED



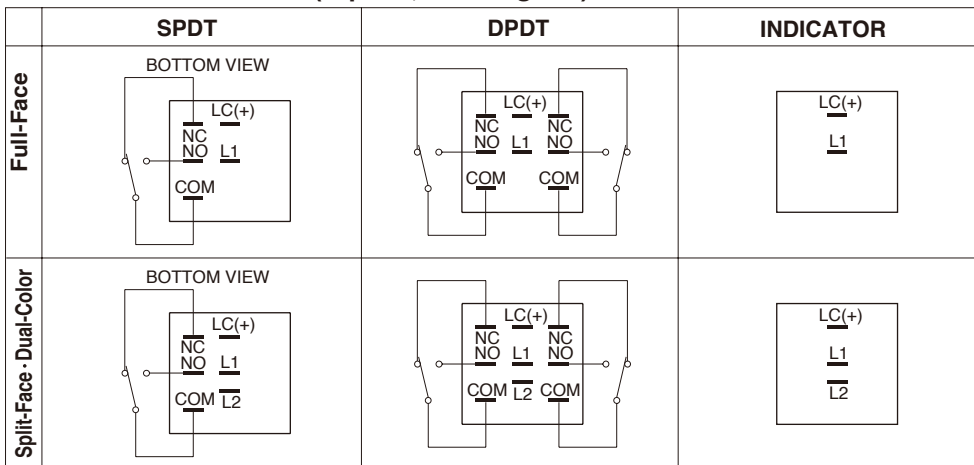
Tolerance : ±0.4mm

### ● Dual-Color Combination

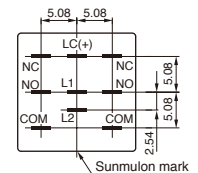
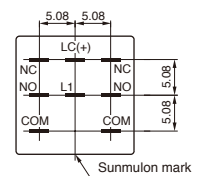
LC(+) - L1	Red
LC(+) - L2	Green

## TERMINALS

### ● TERMINALS LAYOUT (Square, Rectangular)

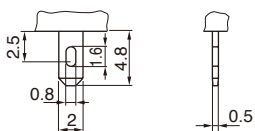


### ● TERMINALS DIMENSIONS (BOTTOM VIEW)



Tolerance : ±0.4mm

### ● TERMINAL SHAPE



SOLDERING TERMINAL

## LED DATA

### ● LED RATINGS

DC Supply Voltage (V)	Current Rating (mA)								
	Full-Face			Split-Face			Dual-Color		
	R	G	Y	R	G	Y	R	G	
Square 5,12,24(±5%)	2	6	4	2	6	4	2	6	
Rectangular 5(±5%)	4	10	8	2	5	4	4	10	
Rectangular 12,24(±5%)	2	5	4	2	5	4	2	5	

Red=R, Yellow=Y, Green=G

### ● EXTERNAL RESISTOR

Switches are normally fitted with internal resistors to operate on 5, 12, 24V DC supply. In case of non-resistor type, suitable external current limiting resistors must be installed as shown by the table and formula:

	Square, Full-Face			Square, Split-Face			Square Dual-Color			Rect. Full-Face			Rect. Split-Face			Rect. Dual-Color								
	5,12,24V			5,12,24V			5,12,24V			5V			12,24V			5,12,24V			5V			12,24V		
	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	R	G	R	G
Max. operating current I <sub>FM</sub> (mA)	20	20	20	20	20	20	20	20	20	40	40	40	20	20	20	20	20	20	40	40	20	20	20	20
DC reverse voltage V <sub>R</sub> (V)	8	8	8	4	4	4	8	8	8	8	8	16	16	16	8	8	8	8	8	8	16	16	16	16
Forward voltage V <sub>F</sub> (V)	3.6	4.2	3.6	1.8	2.1	1.8	3.6	4.2	3.6	4.2	3.6	7.2	8.4	7.2	3.6	4.2	3.6	3.6	4.2	7.2	8.4	7.2	8.4	
Recommended operating current I <sub>F</sub> (mA)	1.5	5	3	1.5	5	3	1.5	5	3	8	6	1.5	4	3	1.5	4	3	3	8	1.5	4	1.5	4	
Wiring diagram	Fig. 1			Fig. 2			Fig. 1			Fig. 1			Fig. 2			Fig. 2								

Red=R, Yellow=Y, Green=G

### ● LED RATINGS (Super CH LED COLOR)

DC Supply Voltage (V)	Current Rating (mA)												
	Full-Face, Dual-Color			Split-Face			Full-Face			Split-Face			
	R	G	Y	R	G	Y	SB	SG	SW	SB	SG	SW	
Square	5 (±5%)	15	15	15	10	14	10	29	15	25	15	8	12
	12 (±5%)	9	11	9	8	11	8	14	8	13	11	6	10
	24 (±5%)	7	9	7	7	10	7	9	5	7	9	5	8
Rectangular	5 (±5%)	29	29	29	15	15	15	29	15	25	26	14	22
	12 (±5%)	9	9	9	8	11	8	14	8	13	11	6	10
	24 (±5%)	7	9	7	7	9	7	9	5	7	9	5	7

Red=R, Yellow=Y, Green=G

### ● EXTERNAL RESISTOR (Super CH LED COLOR)

Square	Square, Full-Face, Dual-Color			Square, Split-Face			Square Full-Face			Square Split-Face																	
	5V			12V·24V			5V			12V·24V			5V			12V·24V											
	R	G	Y	R	G	Y	R	G	Y	R	G	Y	SB	SG	SW	SB	SG	SW	SB	SG	SW	SB	SG	SW			
Max. operating current I <sub>FM</sub> (mA)	20			20			20			20			40			40			40			20			20		
DC reverse voltage V <sub>R</sub> (V)	8			8			4			4			5			5			5			5			5		
Forward voltage V <sub>F</sub> (V) I <sub>F</sub> =5	3.6	4.2	3.6	3.6	4.2	3.6	1.8	2.1	1.8	1.8	2.1	1.8	2.9	3.1	2.9	5.8	6.2	5.8	2.9	3.1	2.9	2.9	3.1	2.9			
Recommended operating current I <sub>F</sub> (mA)	13			10			13			10			30			15			21			15			8		
Wiring diagram	Fig.1, Dual-Color			Fig. 2			Fig. 2			Fig. 1			Fig. 1			Fig. 2			Fig. 2			Fig. 2					

Rect.	Rect. Full-Face, Dual-Color			Rect. Split-Face			Rect. Full-Face			Rect. Split-Face																	
	5V			12V·24V			5V			12V·24V			5V			12V·24V											
	R	G	Y	R	G	Y	R	G	Y	R	G	Y	SB	SG	SW	SB	SG	SW	SB	SG	SW	SB	SG	SW			
Max. operating current I <sub>FM</sub> (mA)	40			20			20			20			40			40			40			20			20		
DC reverse voltage V <sub>R</sub> (V)	8			16			8			8			5			5			5			5			5		
Forward voltage V <sub>F</sub> (V) I <sub>F</sub> =5	3.6	4.2	3.6	7.2	8.4	7.2	3.6	4.2	3.6	3.6	4.2	3.6	2.9	3.1	2.9	5.8	6.2	5.8	2.9	3.1	2.9	5.8	6.2	5.8			
Recommended operating current I <sub>F</sub> (mA)	25			10			13			10			30			15			21			15			10		
Wiring diagram	Fig.1, Dual-Color			Fig. 2			Fig. 2			Fig. 1, Dual-Color			Fig. 2			Fig. 2			Fig. 2			Fig. 2					

SB=Super Blue, SW=Super White, SG=Super Green

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

\* Pulse Lighting :

- Pulse Width P<sub>W</sub>=100μsec.
- Duty Ratio D<sub>R</sub>=10<sup>-1</sup>
- I<sub>FM</sub>= 100mA

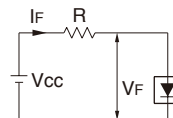


Fig. 1

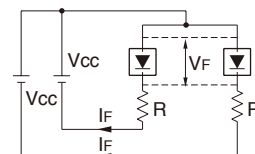


Fig. 2

## Panel Layout / Panel Cut Dimensions

● 13.2mm Square

Panel thickness: 1.0 ~ 3.2mm

		Panel Layout	Panel Cut Dimensions
Without Barriers	Independent		
	Serial		
With Barriers	Independent		
	Serial		

Tolerance : ±0.4mm

## Panel Layout / Panel Cut Dimensions

### ● 13.2mm Square

Panel thickness: 1.0 ~ 2.5mm

With Guard Cover	Independent		
	Serial		

\*Panel Cut Dimension should be after panel paintings.

n : number of switches

### ● 13.2 × 19.4mm Rectangular

Panel thickness: 1.0 ~ 3.2mm

		Panel Layout	Panel Cut Dimensions
Without Barriers	Independent		
	Serial		
With Barriers	Independent		
	Serial		

Panel thickness: 1.0 ~ 2.5mm

		Panel Layout	Panel Cut Dimensions
With Guard Cover	Independent		
	Serial		

\*Panel Cut Dimension should be after panel paintings.

n : number of switches  
Tolerance : ±0.4mm

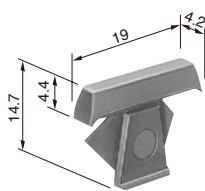
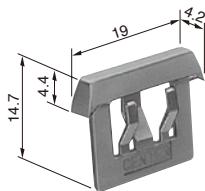
Panel Layout / Panel Cut Dimensions

Without Barriers	With Barriers
<p>In case of Group Mounting, please leave space as below.</p>	<p>In case of Group Mounting, please leave space as below.</p>

ACCESSORIES

**BARRIERS**

In case of mounting switches in series, barriers can be used to prevent inadvertent pushing neighbor switch.



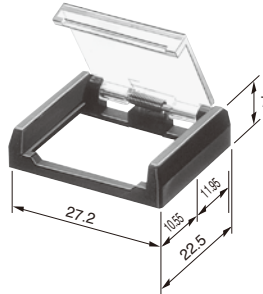
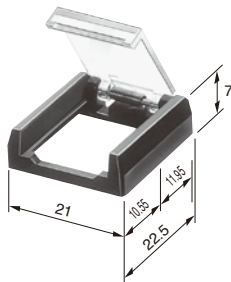
PART NO.		
Color	Center Barrier	Side Barrier
Black	VH-0975-K	VH-0976-K
Gray	VH-0975-G	VH-0976-G

**GUARD COVER**

Guard Cover prevents inadvertent and unintentional operations.

● 13.2mm Square

● 13.2 × 19.4mm Rectangular



PART NO.		
Square	Black	CH-2564-K
	Gray	CH-2564-H
Rect.	Black	CH-2565-K
	Gray	CH-2565-H

\* The cover to be opened 180° and returned by spring force.

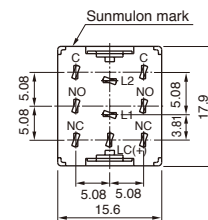
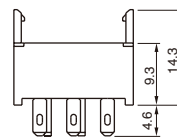
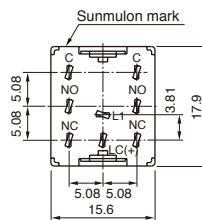
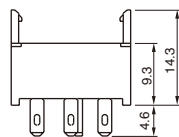
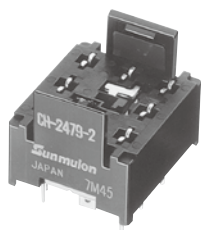
**SOCKET**

For easy maintenance. (Can be used for both square and rectangular)

● Soldering Terminal

Full-Face

Split-Face, Dual-Color

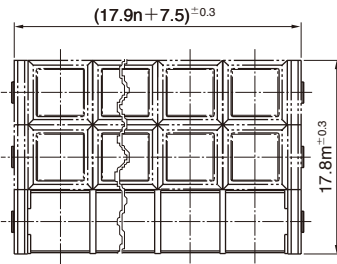
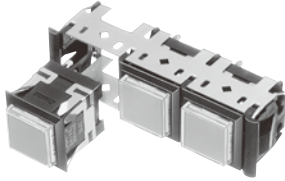


PART NO.		
Full-Face		CH-2479-1
Split-Face	Dual-Color	CH-2479-2

## ACCESSORIES

### MATRIX FITTING FRAME

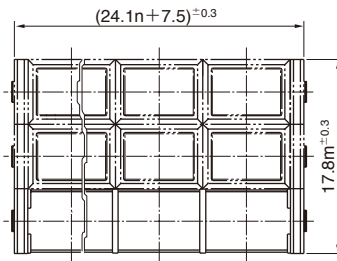
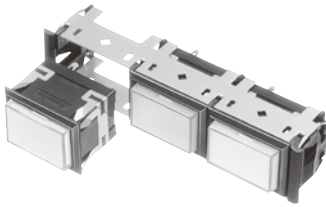
• Square



PART NO.		
Square	Black	CH-2687-K□
	Gray	CH-2687-H□

□ = number of switch (1-15)

• Rectangular

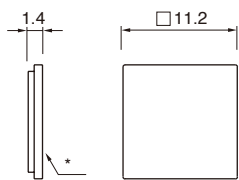


PART NO.		
Rect.	Black	CH-2688-K□
	Gray	CH-2688-H□

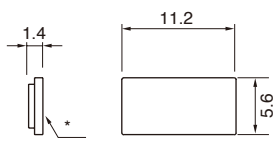
□ = number of switch (1-10)

	Square	Rectangular
Panel Cut Dimensions	<p>Panel thickness: 1.0 ~ 3.2mm n : horizontal number of switch m : vertical number of switch</p>	<p>Panel thickness: 1.0 ~ 3.2mm n : horizontal number of switch m : vertical number of switch</p>

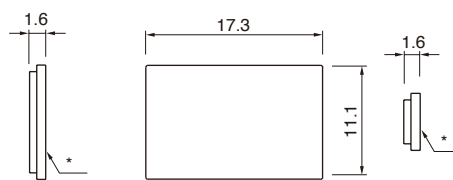
## FILTER DIMENSIONS



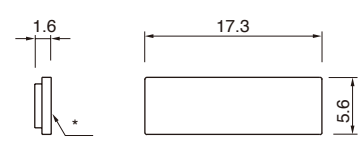
CH-2326



CH-2327



CH-2467



CH-2468

\* LEGEND FASE  
Tolerance : ±0.4mm



## REPLACEMENT PARTS

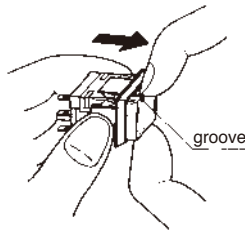
### ● BUTTON/FILTER

	Red	Green	Yellow	Milk-White	Clear	Dimple
Square Button	CH-2325-LR	CH-2325-LG	CH-2325-LY	CH-2325-LM	CH-2325-CC	CH-2524-CC
Rect. Button	CH-2466-LR	CH-2466-LG	CH-2466-LY	CH-2466-LM	CH-2466-CC	CH-2525-CC
Square Full-Face Filter	CH-2326-LR	CH-2326-LG	CH-2326-LY	CH-2326-LM		
Square Split-Face Filter	CH-2327-LR	CH-2327-LG	CH-2327-LY	CH-2327-LM		
Rect. Full-Face Filter	CH-2467-LR	CH-2467-LG	CH-2467-LY	CH-2467-LM		
Rect. Split-Face Filter	CH-2468-LR	CH-2468-LG	CH-2468-LY	CH-2468-LM		

## ASSEMBLY & DISASSEMBLY

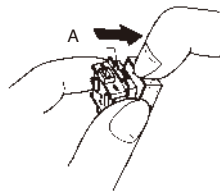
#### 1. Removing Light Cartridge

Hang the cartridge with hooking fingernails in the groove, and pull out.



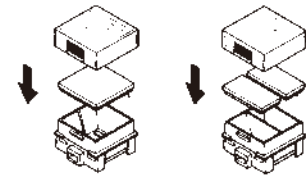
#### 2. Removing Button

Hook fingernails at A and gently release the clip, and release another side as well.



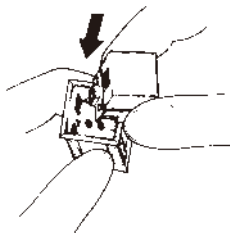
#### 3. Fitting Filter(s)

Set Filter(s) as shown onto cartridge carefully, then put button on and push until click.



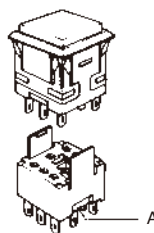
#### 4. Fitting Light Cartridge

Insert Light Cartridge into Housing with right direction and push in until click.



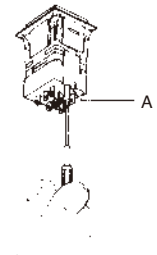
#### 5. Fitting Socket

Insert Switch into Socket with right direction (Both Sunmulon Mark should be same side) and push in until stop.



#### 6. Removing Socket

Push up metal plate A with -screw driver, and pull out socket.



## ORDERING CODE I

CH  -     1 2   1 2

### ● OPERATION

M	Momentary
A	Alternate
L	Indicator

### ● CONTACT

0	Indicator
3	SPDT · Silver (Gold-Plated)
4	DPDT · Silver (Gold-Plated)
5	SPDT · W/E Alloy #1Crossbar
6	DPDT · W/E Alloy #1Crossbar

### ● BUTTON SHAPE / ILLUMINATION TYPE

S0	Square Full-Face
W0	Rect. Full-Face
S2	Square Split-Face
W2	Rect. Split-Face
S3	Square Dual-Color
W3	Rect. Dual-Color
K0	Dimple B. Square Full-Face
K2	Dimple B. Square Split-Face
K3	Dimple B. Square Dual-Color
N0	Dimple B. Rect Full-Face
N2	Dimple B. Split-Face
N3	Dimple B. Dual-Color

### ● LED COLOR

7	Red	Full-Face : Put color no. into the frame 1 Split-Face : Put color no. into the frame 1,2 Dual-Color Put color no. 78 into the frame 1,2 (available 78 only)
8	Green	
9	Yellow	
×		Without LED

### ● Super CH LED COLOR

70	Red	Split-Face
80	Green	70,80,90 combination or
90	Yellow	14,16,18 combination
14	Super Blue	Dual-Color
16	Super White	7080,8090,9070 only
18	Super Green	

### ● Supply Voltage to LED

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor
4	5V Non-Resistor
5	12V Non-Resistor
6	24V Non-Resistor
×	Without LED

### ● TERMINAL

S	#110 Tab/Solder
C	PCB
K	With Connector
N	Without Connector

### ● FILTER COLOR

1	Red	Full-Face : Put color no. into the frame 1 Split-Face : Put color no. into the frame 1,2
2	Green	
3	Yellow	
4	Milk-White	
6	Blue	
×		Without Filter

\*Generally, in case of using color button, filters are not necessary.

### ● HOUSING COLOR

K	Black
H	Gray

### ● BUTTON COLOR

R	Red
G	Green
Y	Yellow
M	Milk-White
B	Blue
C	Clear

### ● NOTES

1) In case of Split-Face, LED and Filter color location should be specified as follow:



2) In case of Split-Face and Dual-Color, simultaneous illumination is not possible for 24V built-in resistor type, cause of heat, please select non resistor type and apply required external resistor.

3) In case of Split-Face, button color should be C (clear).

4) In case of Dual-Color, button should be C (clear) with Milk-White filter or Milk-White button.

5) In case of simultaneous illumination for Split-Face and Dual-Color with 24V, use 6. Non Resistor type and apply external resistor accordingly.

6) Dimple Button type is only clear color. Therefore, button color should be C (clear).

7) Please be noted that the color of "Yellow" for LED ·Button ·Filter is actually "Orange Yellow" not Lemon Yellow.

8) If you purchase a wire harness separately, please specify N (without connector).

ORDERING CODE II

It is possible to order individually Light Cartridge and Housing.

LIGHT CARTRIDGE

CH — [ ] [1] [2] [ ] [1] [2] [ ]

● BUTTON SHAPE / LLUMINATION TYPE

S0	Square Full-Face
W0	Rect. Full-Face
S2	Square Split-Face
W2	Rect. Split-Face
S3	Square Dual-Color
W3	Rect. Dual-Color
K0	Dimple B. Square Full-Face
K2	Dimple B. Rect. Split-Face
K3	Dimple B. Square Dual-Color
N0	Dimple B. Rect. Full-Face
N2	Dimple B. Rect. Split-Face
N3	Rect. Dual-Color

● LED COLOR

7	R	Full-Face : Put color no. into the frame 1 Split-Face : Put color no. into the frame 1,2 Dual-Color Put color no. 78 into the frame 1,2 (available 78 only)
8	G	
9	Y	
×		Without LED

● Super CH LED COLOR

70	Red	Split-Face 70,80,90 combination or 14,16,18 combination
80	Green	
90	Yellow	
14	Super Blue	Dual-Color 7080,8090,9070 only
16	Super White	
18	Super Green	

● BUTTON COLOR

R	Red
G	Green
Y	Yellow
M	Milk-White
B	Blue
C	Clear

● Supply Voltage to LED

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor
4	5V Non-Resistor
5	12V Non-Resistor
6	24V Non-Resistor
×	Without LED

● FILTER COLOR

1	Red	Full-Face : Put color no. into the frame 1
2	Green	
3	Yellow	
4	Milk-White	Split-Face : Put color no. into the frame 1,2
6	Blue	
×		Without Filter

\*Generally, in case of using color button, filters are not necessary.

HOUSING

CH [ ] — [ ] [ ] [ ] [ ]

● OPERATION

M	Momentary
A	Alternate
L	Indicator

● CONTACT

0	Indicator
3	SPDT/Silver (Gold-Plated)
4	DPDT/Silver (Gold-Plated)
5	SPDT/W/E Alloy #1Crossbar
6	DPDT/W/E Alloy #1Crossbar

● TERMINAL

S	#110 Tab/Solder
C	PCB
K	With Connector
N	Without Connector

● HOUSING COLOR

K	Black
H	Gray

● BUTTON SHAPE/ILLUMINATION TYPE

S0	Square
W0	Rect.
S2	Square Split-Face, Dual-Color
W2	Rect. Split-Face, Dual-Color

## Connector Type

Reduced wiring

Without soldering, mounting and maintenance is a connector type available.

There are dedicated connectors for SPDT and Indicator and for DPDT. Wire harness is also dedicated to each contact. Please refer to ACCESSORIES for details.

## SPECIFICATIONS

Contact	Silver Contact (Gold-Plated)	W/E Alloy #1 Cross-bar Contact
Electrical Rating	AC100V 1A, DC30V 1A (Resistive)	AC100V 0.1A, DC30V 0.1A (Resistive)
Insulation Resistance	More than 100MΩ at 500V DC	
Dielectric Strength	600V AC RMS between NC and NO terminal 1500V AC RMS between terminals and ground 50/60Hz for 60sec. at normal ambient temperature and humidity	
Contact Resistance	Less than 50mΩ (Initial) at DC6V 1A	Less than 50mΩ (Initial) at DC6V 0.1A
Mechanical Life	Momentary Action : more than 1,000,000 operations    Alternate Action : more than 200,000 operations	
Electrical Life	More than 30,000 operations at max. rated load	
Ambient Temperature	-15°C to +50°C	
Ambient Humidity	80% RH (max.)	

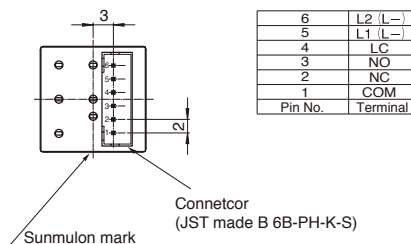
## DIMENSIONS

### ● SPDT, Indicator

13.2mm Square Button			
			TOP VIEW ※ Dimple Button type : 3.0
13.2×19.4mm Rect. Button			
			TOP VIEW ※ Dimple Button type : 3.0

## TERMINAL LAYOUT

### ● SPDT, Indicator

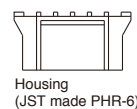


## ACCESSORIES

### ● SPDT, Indicator

#### ● Connector

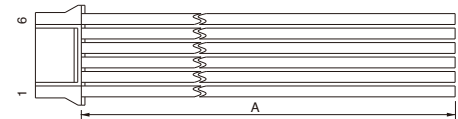
Part No EH-3251 Connector (1Housing & 6 Contact Pins) to be appended.



Applicable wire : AWG#30~#24

#### ● Wire Harness

Wire : UL1061, AWG26 equivalent



A length	Part No
100cm	EH-3250-1
200cm	EH-3250-2

Pin no.	1	2	3	4	5	6
Wire Color	Brown	Red	Orange	Yellow	Green	Blue

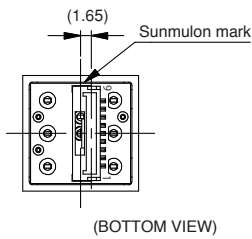
DIMENSIONS

● DPDT

13.2mm Square Button			
			TOP VIEW ※ Dimple Button type : 3.0
13.2×19.4mm Rect. Button			
			TOP VIEW ※ Dimple Button type : 3.0

TERMINAL LAYOUT

● DPDT



9	NO2
8	NC2
7	COM2
6	L2
5	L1
4	LC
3	NO1
2	NC1
1	COM1
Pin No.	Terminal

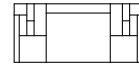
Connector  
JST made  
BM09B-GHS-TBT

ACCESSORIES

● DPDT

● Connector

Part No EH-5180 Connector (1 Housing & 9 contact Pins) to be appended.



Housing  
(JST made GHR-09V-S)

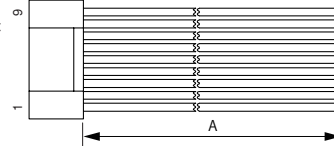


Contact Pin  
(JST made SSSL-002T-P02)

● Wire Harness

Wire : UL1061, AWG26 equivalent

Applicable wire : AWG#30~#26



A length	Part No
100cm	EH-5177-1
200cm	EH-5177-2

Pin no.	1	2	3	4	5	6	7	8	9
Wire Color	Brown	Red	Orange	Yellow	Green	Blue	Purple	Gray	White