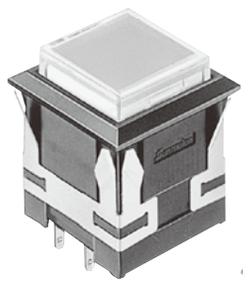
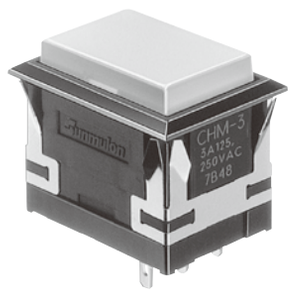
Sunmulon

Super-CH Illuminated Pushbutton Switch CH+Z

Only 16mm depth behind panel with built-in resistor. Full-Face, Split-Face, Dual-Color Illumination available.

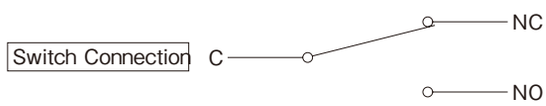
Amazing bright and even LED illumination.





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 Cross-bar Contact provided.
- Accessories: Barriers, Guard Covers, Sockets, etc.



SPECIFICATIONS

Contact	Silver Contact (Gold-Plated)	Cross-bar Contact
Electrical Rating	AC35V 3A(Resistive)	AC35V 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.)	

DC Rated (Silver Contact)

Rated voltage (V)	Resistance Load (A)
DC 8	2
14	2
30	1

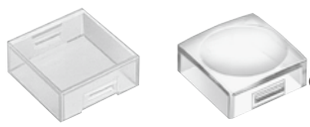
OPERATING CHARACTERISTICS

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

STRUCTURE

LIGHT CARTRIDGE

BUTTON
(Poly-Carbonate)



Full-Face
Dual-Color

Split-Face

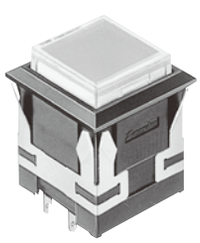
COLOR PLATE
(Used with clear button)

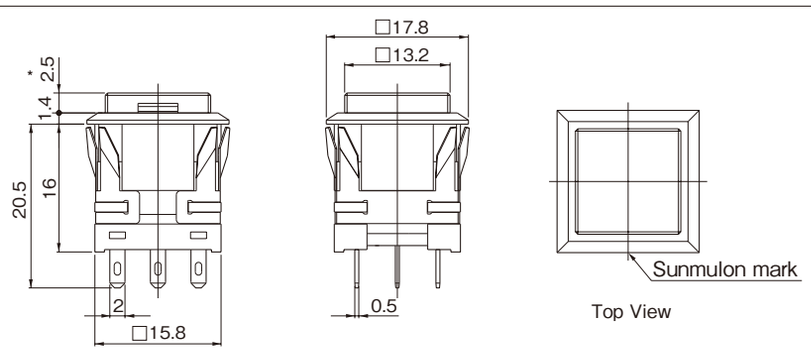
CARTRIDGE BASE
(LED mounted)

HOUSING

DIMENSIONS

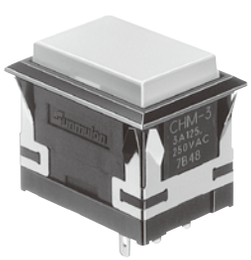
13.2mm Square Button

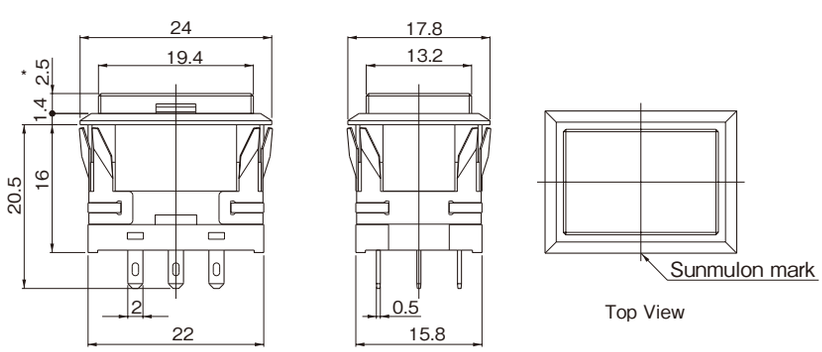




*3.0 for Concave Button

13.2 × 19.4mm Rect. Button



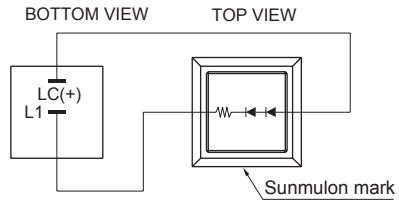
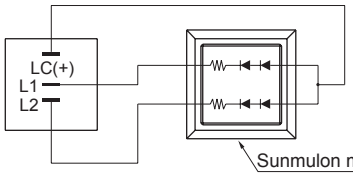
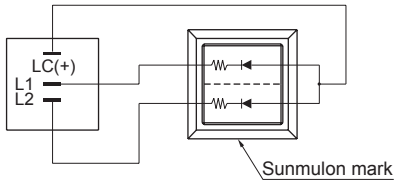
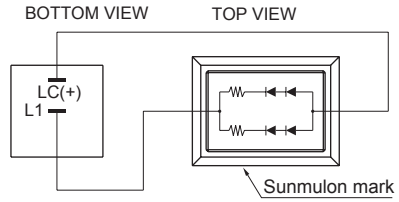
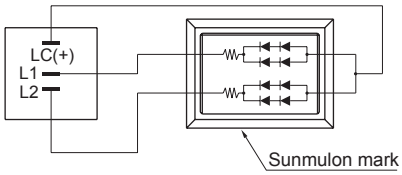
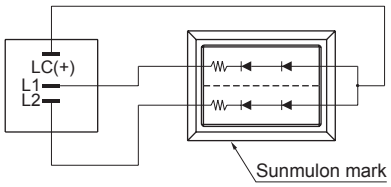
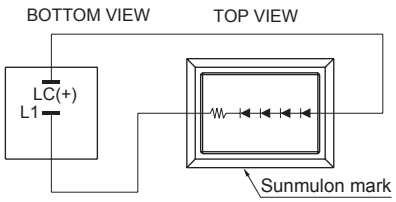
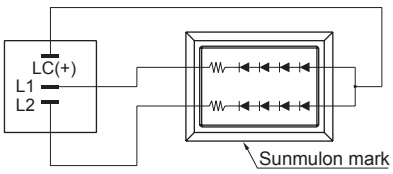
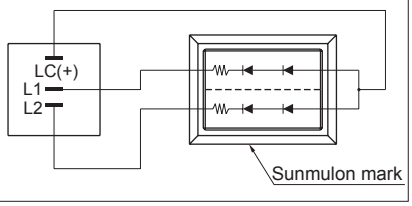


*3.0 for Concave Button

Tolerance : ±0.4mm

INTERNAL CONNECTION ARRANGEMENTS

● LED (Stanadard LED : 70-Red, 80-Green, 90-Yellow)

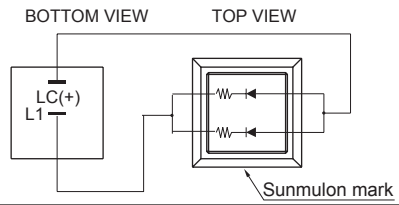
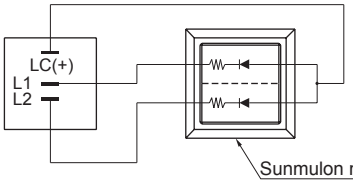
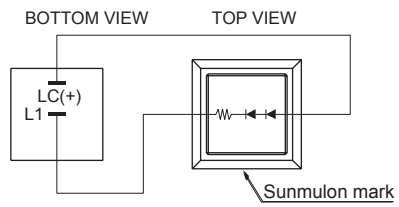
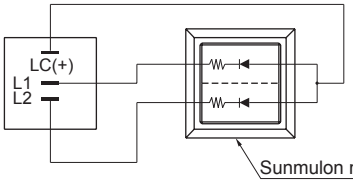
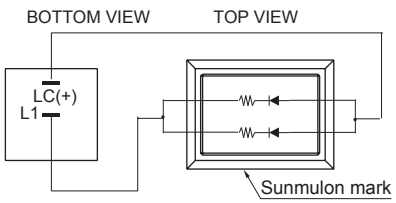
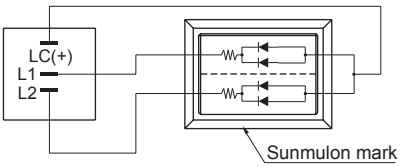
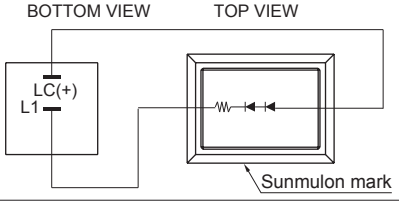
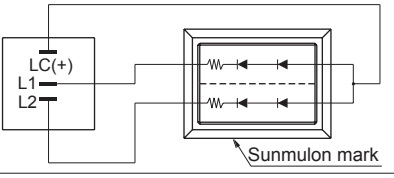
		Full-Face (Red, Green, Yellow)	Dual-Color (Red, Green, Yellow)	Split-Face(Red, Green, Yellow)
Square	5V·12V·24V			
Rectangular	5V			
Rectangular	12 24V			

Tolerance : ±0.4mm

● Dual-Color Combination

LC(+) −L1	Red	Green	Yellow
LC(+)−L2	Green	Yellow	Red

● LED (High-Brite LED : 14-Super Blue, 16-Super White, 18-Super Green)

		Full-Face (Super-Blue, Super White, Super Green)	Split-Face(Super-Blue, Super White, Super Green)
Square	5V		
Square	12 24V		
Rectangular	5V		
Rectangular	12 24V		

Tolerance : ±0.4mm

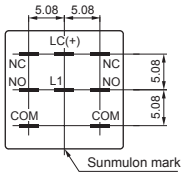
TERMINALS

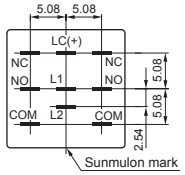
●TERMINALS LAYOUT (Square, Rectangular)

	SPDT	DPDT	INDICATOR
Full-Face	BOTTOM VIEW LC(+) NC NO L1 COM	LC(+) NC NC NO L1 NO COM COM	LC(+) L1
Split-Face · Dual-Color	BOTTOM VIEW LC(+) NC NO L1 COM L2	LC(+) NC NC NO L1 NO COM L2 COM	LC(+) L1 L2

※ Actual marking on switches is character upside down.

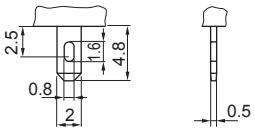
●TERMINALS DIMENSIONS (BOTTOM VIEW)





Tolerance : ±0.4mm

●TERMINAL SHAPE



SOLDERING TERMINAL

LED DATA

● 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	11	25	15	6	12
	12 (±5%)	9	11	9	8	11	8	14	6	13	11	4	10
	24 (±5%)	7	9	7	7	10	7	9	4	7	9	4	8
Rectangular	5 (±5%)	29	29	29	15	15	15	29	11	25	26	11	22
	12 (±5%)	9	9	9	8	11	8	14	6	13	11	4	10
	24 (±5%)	7	9	7	7	9	7	9	4	7	9	4	7

Red=R, Green=G, Yellow=Y
SB=Super Blue, SG=Super Green, SW=Super White

● 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			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_{FM}(mA)	20			20			20			20			40	40	40	20	20	20	20	20	20	20	20	20
DC reverse voltage V_R(V)	8			8			4			4			5	5	5	10	10	10	5	5	5	5	5	5
Forward voltage V_F(V)	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	2.9	5.8	6	5.8	2.9	3	2.9	2.9	3	2.9
Recommended operating current I_F(mA)	13			10			13			10			30	11	21	15	6	11	15	6	11	10	4	8
Wiring diagram	Fig.1, Dual-Color Fig. 2						Fig. 2						Fig. 1						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			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_{FM}(mA)	40			20			20			20			40	40	40	20	20	20	40	40	40	20	20	20
DC reverse voltage V_R(V)	8			16			8			8			5	5	5	10	10	10	5	5	5	10	10	10
Forward voltage V_F(V)	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	2.9	5.8	6	5.8	2.9	3	2.9	5.8	6	5.8
Recommended operating current I_F(mA)	25			10			13			10			30	11	21	15	6	11	15	11	21	10	4	8
Wiring diagram	Fig.1, Dual-Color Fig. 2						Fig. 2						Fig.1, Dual-Color Fig. 2						Fig. 2					

Red=R, Green=G, Yellow=Y
SB=Super Blue, SG=Super Green, SW=Super White

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

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

Vcc: Supply Voltage
V_F: Forward Voltage
I_F: Recommended operating Current

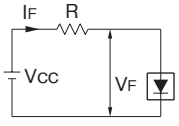


Fig. 1

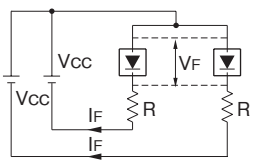
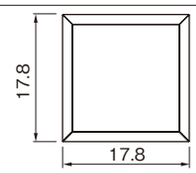
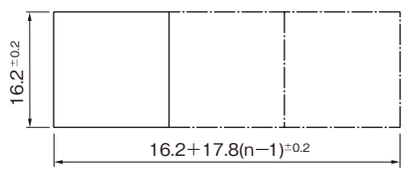
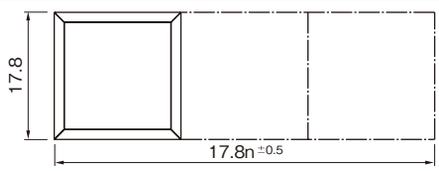
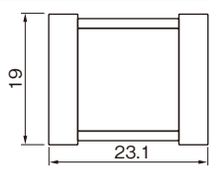
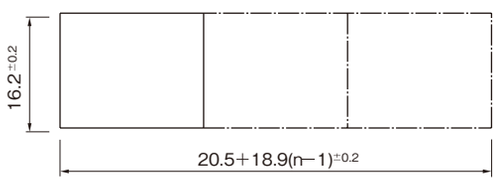
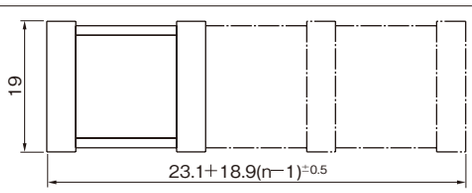


Fig. 2

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

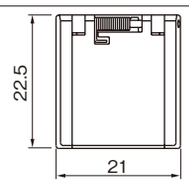
Panel Layout / Panel Cut Dimensions

●13.2mm Square

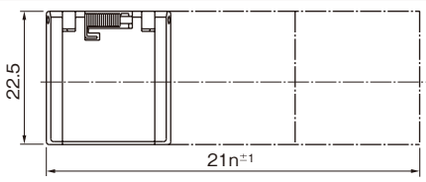
Panel thickness: 1.0 ~ 2.5mm

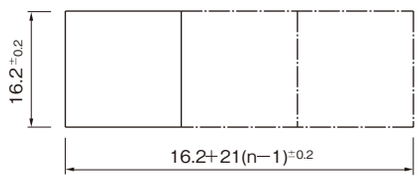
With Guard Cover

Independent



Serial



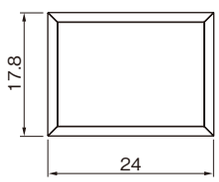
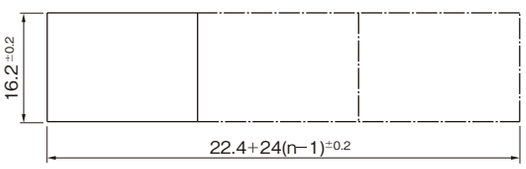
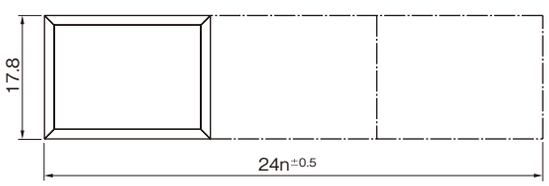
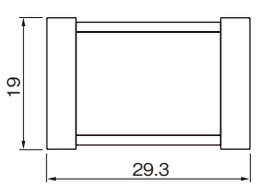
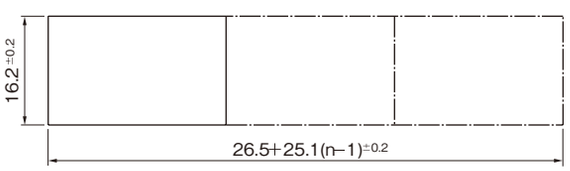
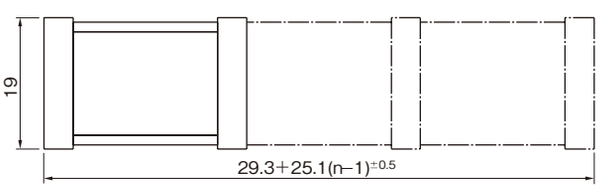


*Panel Cut Dimension should be after panel paintings.

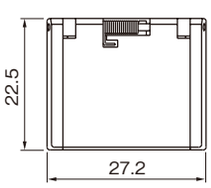
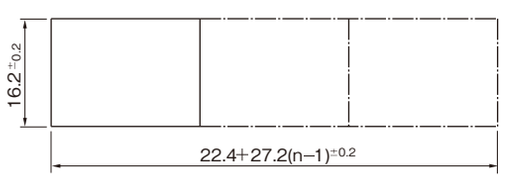
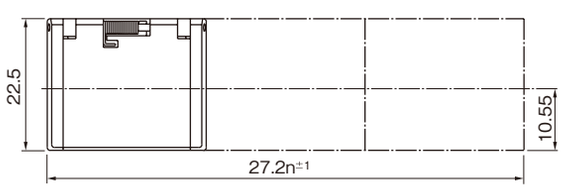
n : number of switches

● 13.2 × 19.4mm Rectangular

Panel thickness: 1.0 ~ 3.2mm

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

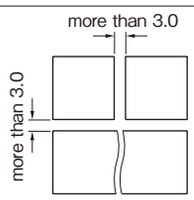
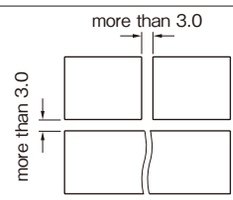
Panel thickness: 1.0~ 2.5mm

		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

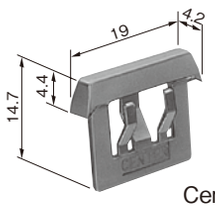
Panel Layout / Panel Cut Dimensions

Without Barriers	With Barriers
In case of Group Mounting, please leave space as below. 	In case of Group Mounting, please leave space as below. 

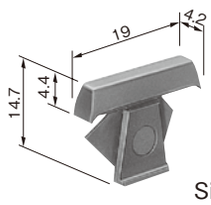
ACCESSORIES

BARRIERS

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



Center Barrie



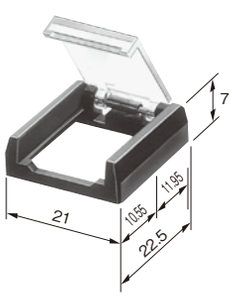
Side Barrie

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

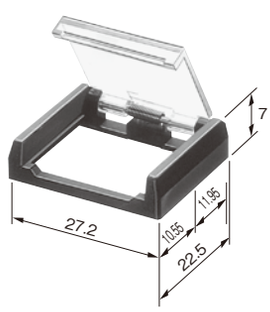
GUARD COVER

Guard Cover prevents inadvertent and unintentional operations.

●13.2mm Square



● 13. 2 × 19.4mm Rectangular



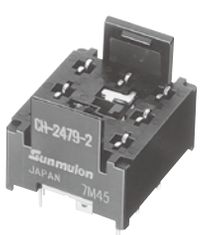
PART NO.		
Square	Black	CH-2564-K
	Gray	CH-2564-H
Rect.	Black	CH-2565-K
	Gray	CH-2565-H

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

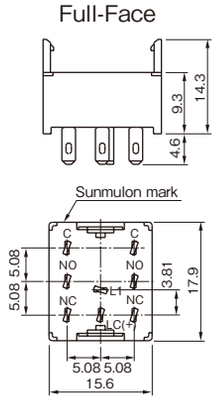
SOCKET

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

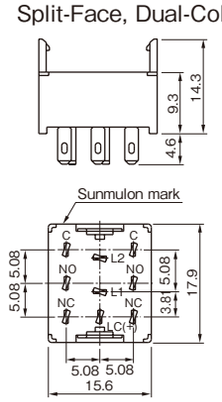
● Soldering Terminal



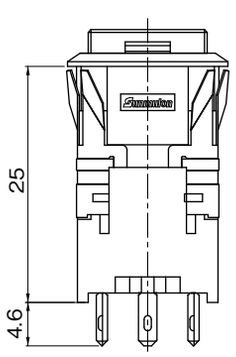
Full-Face



Split-Face, Dual-Color



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

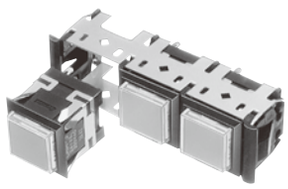


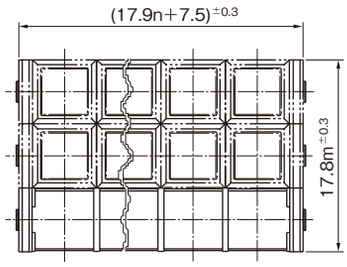
Tolerance : 0.4mm

ACCESSORIES

MATRIX FITTING FRAME

- **Square**

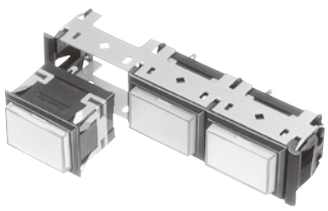


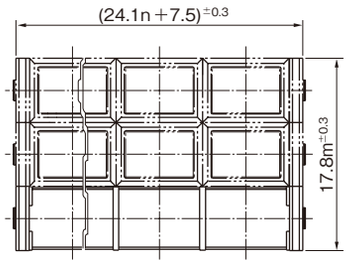


PART NO.		
Square	Black	CH-2687-K□
	Gray	CH-2687-H□

□ = number of switch (1-15)

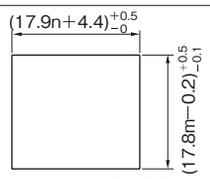
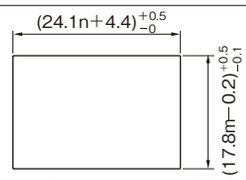
- **Rectangular**





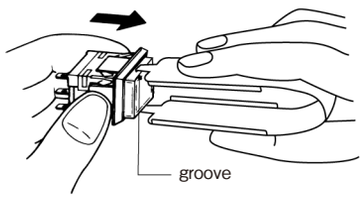
PART NO.		
Rect.	Black	CH-2688-K□
	Gray	CH-2688-H□

□ = number of switch (1-10)

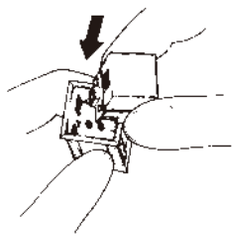
	Square	Rectangular
Panel Cut Dimensions	 Panel thickness: 1.0 ~ 3.2mm n : horizontal number of switch m : vertical number of switch	 Panel thickness: 1.0 ~ 3.2mm n : horizontal number of switch m : vertical number of switch

ASSEMBLY & DISASSEMBLY

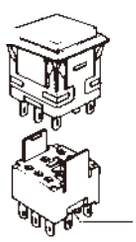
1. Removing Light Cartridge
   Hang the cartridge with hooking Removing Tool in the groove, and pull out.



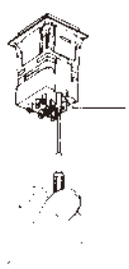
2. Fitting Light Cartridge
   Insert Light Cartridge into Housing with right direction and push in until click.



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



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



Light Cartridge Removing Tool

Part No	SJ-0001

ORDERING CODE Ordering as a Set ([Light Cartridge] + [Housing])

CH □ — □ □ 1 2 □ □ 1 2 □ □ +Z

● OPERATION

M	Momentary
A	Alternate
L	Indicator

● CONTACT

0	Indicator
3	SPDT· Silver (Gold-Plated)
4	DPDT· Silver (Gold-Plated)
5	SPDT· Crossbar
6	DPDT· Crossbar

● BUTTON SHAPE / ILLUMINATION TYPE

	S0	Square Full-Face
	W0	Rect. Full-Face
2) 3)	S2	Square Split-Face
2) 3)	W2	Rect. Split-Face
2) 4)	S3	Square Dual-Color
2) 4)	W3	Rect. Dual-Color
5)	K0	Concave B. Square Full-Face
2) 3) 5)	K2	Concave B. Square Split-Face
2) 4) 5)	K3	Concave B. Square Dual-Color
5)	N0	Concave B. Rect Full-Face
2) 3) 5)	N2	Concave B. Rect Split-Face
2) 4) 5)	N3	Concave B. Rect Dual-Color

● Super CH LED COLOR

6)	70	Red	Split-Face 70,80,90 combination or 14,16,18 combination Dual-Color 7080,8090,9070 only
	80	Green	
	90	Yellow	
	14	Super Blue	
	16	Super White	
	18	Super Green	
	X	Without LED	

● Supply Voltage to LED

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

● TERMINAL

	S	#110 Tab/Solder
	K	Connector (with Accessories:EH3251 or 5180)
7)	N	Connector (without Accessories:EH3251 or 5180)

● COLOR PLATE

	1	Red	Full-Face : Put color no. into the frame 1 Split-Face : Put color no. into the frame 1,2
	2	Green	
6)	3	Yellow	
	4	Milk-White	
	6	Blue	
*	X	Without Color Plate	

*Generally, in case of using color button, Color Plate are not necessary.

● HOUSING COLOR

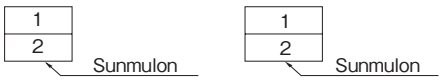
K	Black
H	Gray

● BUTTON COLOR

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

● NOTES

1) In case of Split-Face, LED and Color Plate 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 color plate or Milk-White button.
5) Concave Button type is only clear color. Therefore, button color should be C (clear).
6) Please be noted that the color of "Yellow" for LED Button Filter is actually "Orange Yellow" not Lemon Yellow.
7) If you purchase a wire harness separately, please specify N (Without Accessories).

ORDERING CODE Ordering Individually ([Light Cartridge] , [Housing])

It is possible to order individually Light Cartridge and Housing.

LIGHT CARTRIDGE

CH – □ 1 2 □ 1 2 □ +Z

● 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

● Super CH LED COLOR

70	Red	Split-Face 70,80,90 combination or 14,16,18 combination Dual-Color 7080,8090,9070 only
80	Green	
90	Yellow	
14	Super Blue	
16	Super White	
18	Super Green	
X	Without LED	

● 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
X	Without LED

● COLOR PLATE

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	
* X	Without Color Plate	

*Generally, in case of using color button, Color Plates are not necessary.

HOUSING

CH □ – □ □ □ □ +Z

● OPERATION

M	Momentary
A	Alternate
L	Indicator

● CONTACT

0	Indicator
3	SPDT/Silver (Gold-Plated)
4	DPDT/Silver (Gold-Plated)
5	SPDT/ Crossbar
6	DPDT/ Crossbar

● TERMINAL

S	#110 Tab/Solder
K	Connector (with Accessories EH3251 or 5180)
N	Connector (without Accessories EH3251 or 5180)

● HOUSING COLOR

K	Black
H	Gray

● BUTTON SHAPE/ILLUMINATION TYPE

S0	Square Full-Face
W0	Rect. Full-Face
S2	Square Split-Face, Dual-Color
W2	Rect. Split-Face, Dual-Color
SX	Square without LED-terminal
WX	Rect. without LED-terminal

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.

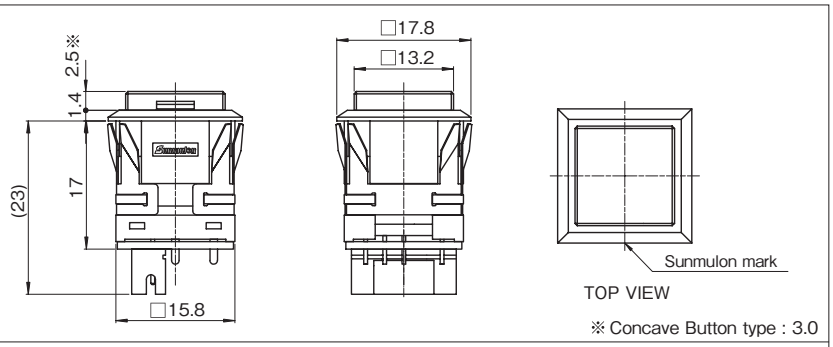
SPECIFICATIONS

Contact	Silver Contact (Gold-Plated)	Cross-bar Contact
Electrical Rating	AC 35V 1A, DC30V 1A (Resistive)	AC 35V 0.1A, DC30V 0.1A (Resistive)
Insulation Resistance	More than 100MΩ at 500V DC	
Dielectric Strength	[Connector] 800V AC : for SPDT/Indicator, 500V AC : for DPDT [Switch] 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 60mΩ (Initial) at DC6V 1A	Less than 60mΩ (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℃ to +50℃	
Ambient Humidity	80% RH (max.)	

DIMENSIONS

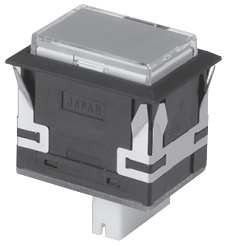
SPDT, Indicator

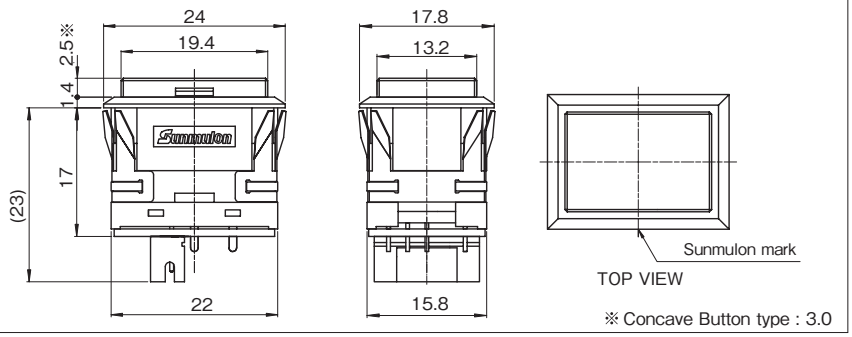
13.2mm Square Button



※ Concave Button type : 3.0

13.2×19.4mm Rect. Button

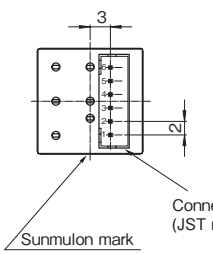




※ Concave Button type : 3.0

TERMINAL LAYOUT

SPDT, Indicator



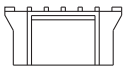
Pin No.	Terminal
6	L2 (L−)
5	L1 (L−)
4	LC
3	NO
2	NC
1	COM

ACCESSORIES

SPDT, Indicator

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

EH-3251 is attached with Terminal type " K " of SPDT and Indicator.



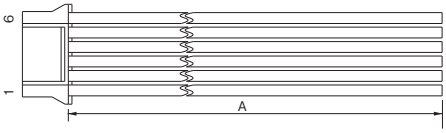
Housing
(JST made PHR-6)

Contact Pin
(JST made SPH-002T-P0.5S)

Applicable wire : AWG#30～ #24

Wire Harness

Wire : UL1061, AWG26 equivalent

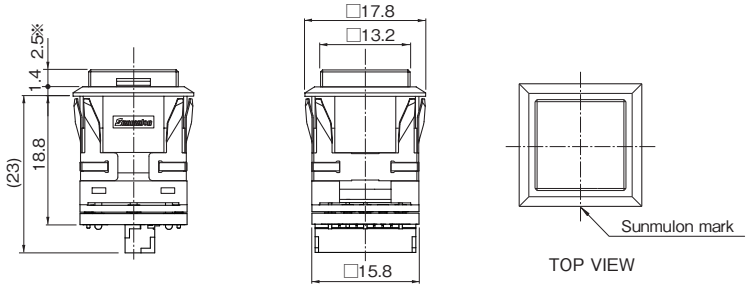
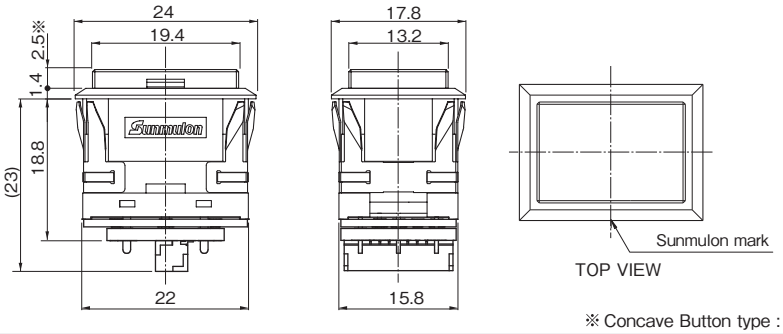


A length	Part No
100cm	EH-3250-1
200cm	EH-3250-2

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

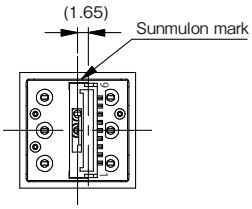
DIMENSIONS

DPDT

13.2mm Square Button		 ※ Concave Button type : 3.0
13.2×19.4mm Rect. Button		 ※ Concave Button type : 3.0

TERMINAL LAYOUT

DPDT



(BOTTOM VIEW)

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

Connetcor
JST made
BM09B-GHS-TBT

ACCESSORIES

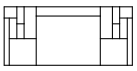
DPDT

● Connector

Part No	EH-5180

Connector (1 Housing & 9 contact Pins) to be appended.

EH-5180 is attached with Terminal type " K " of DPDT.



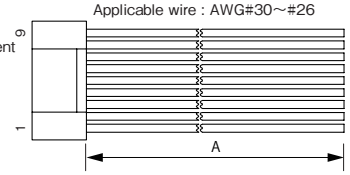
Housing
(JST made GHR-09V-S)

Contact Pin
(JST made SSHL-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