Sunmulon

CH Super Miniature Lighted Pushbutton Switch

CH

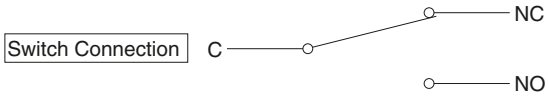
Only 16mm depth behind panel with built-in resistor.

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

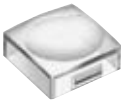
STRUCTURE

LIGHT CARTRIDGE

LED Full-Face

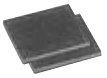
LED Split-Face

BUTTON
(Poly-Carbonate)



Dimple Button

FILTER
(Used with clear button)

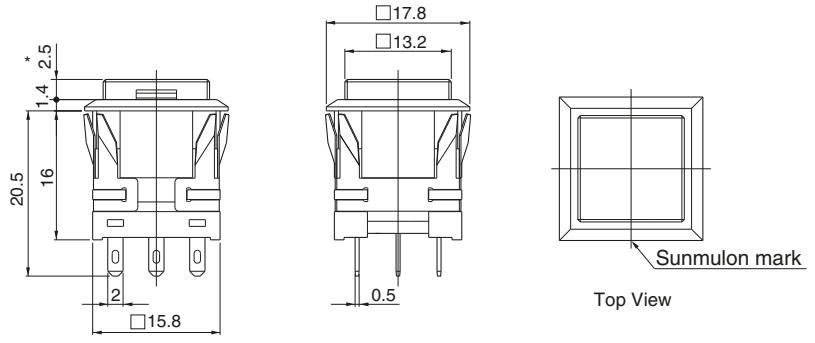


CARTRIDGE BASE
(LED mounted)

HOUSING

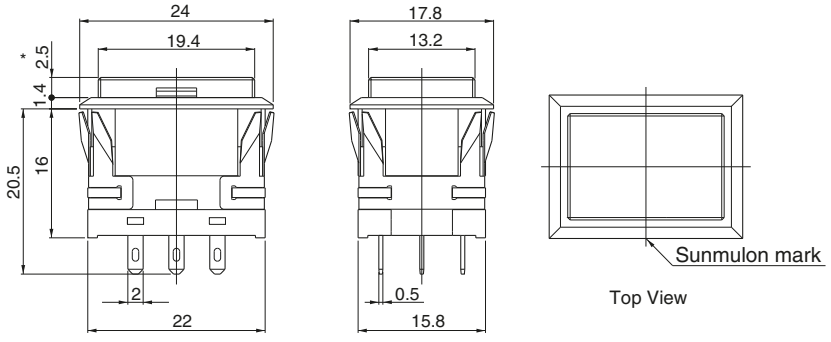
DIMENSIONS

13.2mm Square Button



*3.0 for Dimple Button

13.2×19.4mm Rect. Button

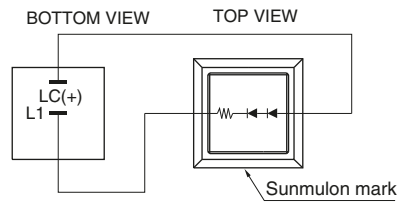
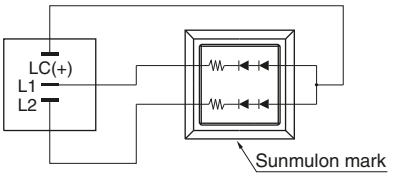
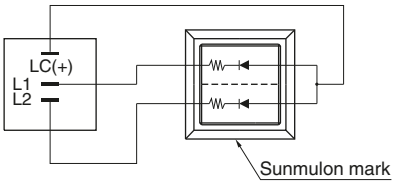
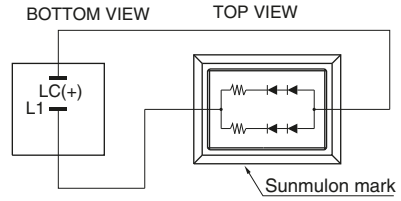
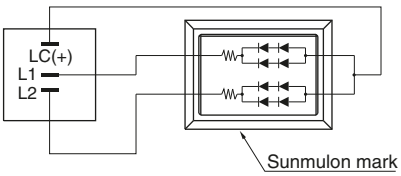
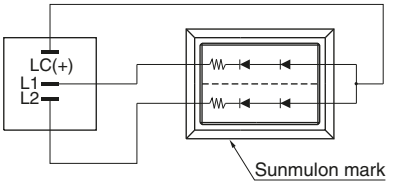
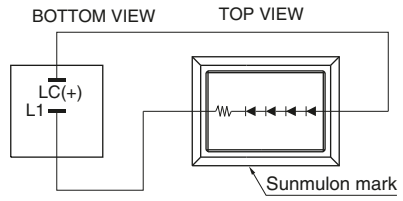
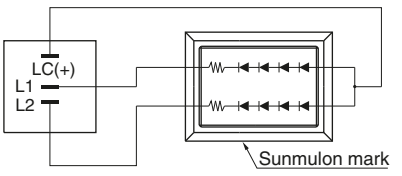
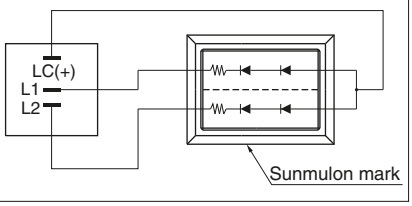


*3.0 for Dimple Button

Tolerance : ±0.4mm

INTERNAL CONNECTION ARRANGEMENTS

● LED

		Full-Face	Dual-Color	Split-Face
Square	5V·12V·24V			
Rectangular	5V			
Rectangular	12·24V			

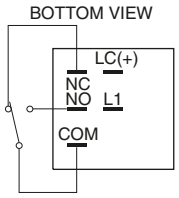
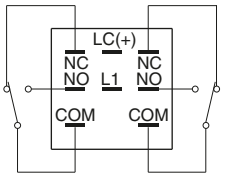
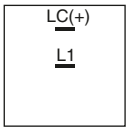
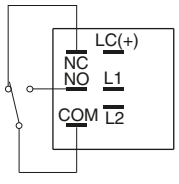
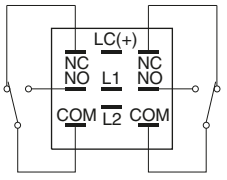
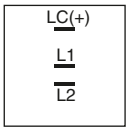
Tolerance : ±0.4mm

● Dual-Color Combination

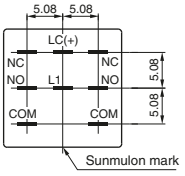
LC(+) −L1	Red
LC(+)−L2	Green

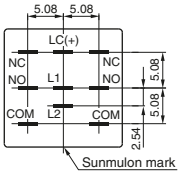
TERMINALS

● TERMINALS LAYOUT (Square, Rectangular)

	STDP	DTDP	INDICATOR
Full-Face			
Split-Face·Dual-Color			

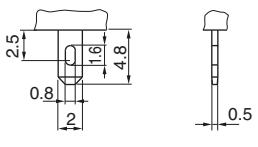
● TERMINALS DIMENSIONS (BOTTOM VIEW)





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%)	10	12		10	12		10	12
Rectangular 5(±5%)	20	24		10	12		20	24
Rectangular 12,24(±5%)	10	12		10	12		10	12

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	R	G	Y	R	G	Y	R	G	Y	R	G	R	G
Max. operating current I_{FM} (mA)	25	25		25	25		25	25	50	50		25	25		25	25		50	50	25	25
DC reverse voltage V_R (V)	10	10		5	5		10	10	10	10		20	20		10	10		10	10	20	20
Forward voltage V_F (V)	3.6	4.2		1.8	2.1		3.6	4.2	3.6	4.2		7.2	8.4		3.6	4.2		3.6	4.2	7.2	8.4
Recommended operating current I_F (mA)	18	18		18	18		18	18	36	36		18	18		18	18		36	36	18	18
Wiring diagram	Fig. 1			Fig. 2					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%)	11	13	11	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%)	21	25	21	11	13	11	29	15	25	26	14	22
	12(±5%)	7	9	7	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			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) I_F=5	4			4			2			2			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_F (mA)	13			10			13			10			30	15	21	15	8	11	15	8	11	10	5	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) I_F=5	4			8			4			4			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_F (mA)	25			10			13			10			30	15	21	15	8	11	15	15	21	10	5	8
Wiring diagram	Fig.1, Dual-Color Fig. 2						Fig. 2						Fig.1, Dual-Color 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:

$$R = \frac{Vcc - V_F}{I_F}$$

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

* Pulse Lighting :

- Pulse Width P_W=100μsec.
- Duty Ratio D_R=10^{-1}
- I_{FM}= 100mA

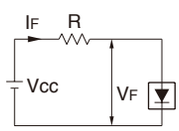


Fig. 1

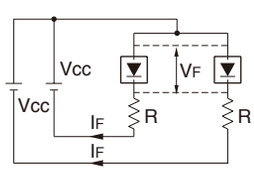
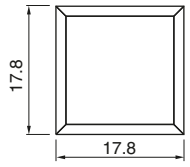
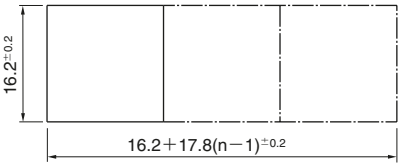
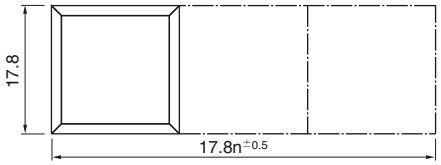
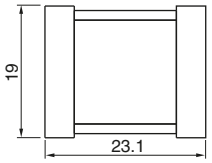
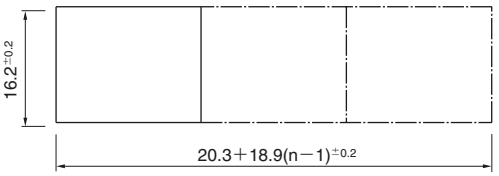
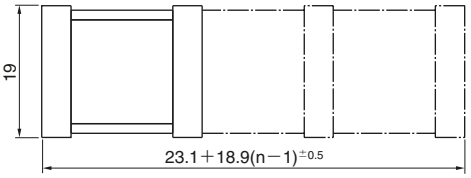


Fig. 2

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

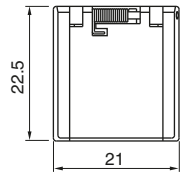
Panel Layout / Panel Cut Dimensions

●13.2mm Square

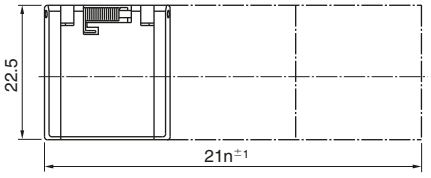
Panel thickness: 1.0 ~ 2.5mm

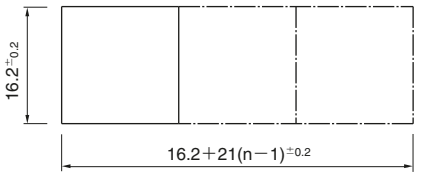
With Guard Cover

Independent



Serial



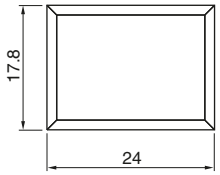
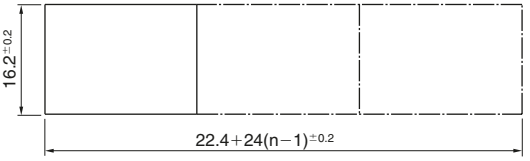
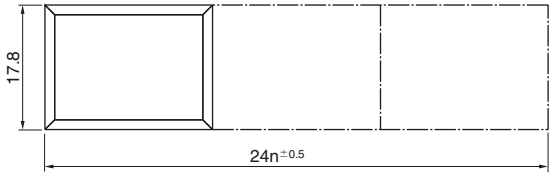
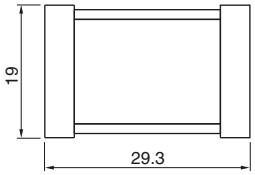
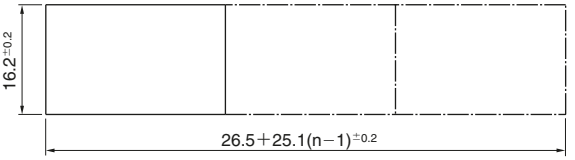
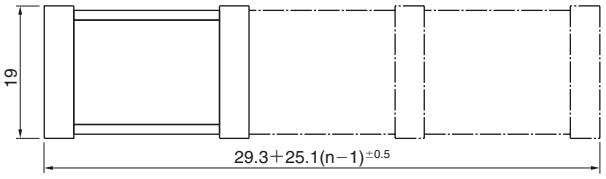


*Panel Cut Dimension should be after panel paintings.

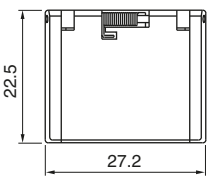
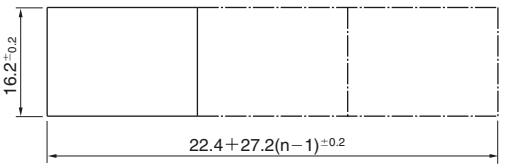
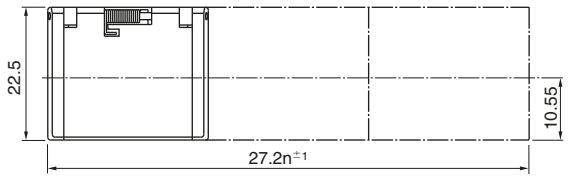
n : number of switches

● 13.2 × 19.4mm Rectangular

Panel thickness: 1.0 ~ 3.2mm

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

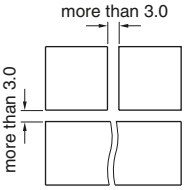
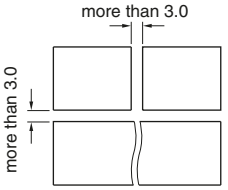
Panel thickness: 1.0 ~ 2.5mm

		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

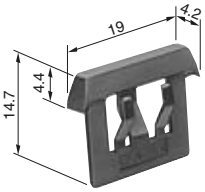
Panel Layout / Panel Cut Dimensions

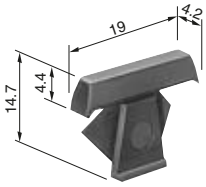
Without Barriers	With Barriers
In case of Group Mounting, please leave space as below. 	In case of Group Mounting, please leave space as below. 

ACCESSORIES

BARRIERS

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



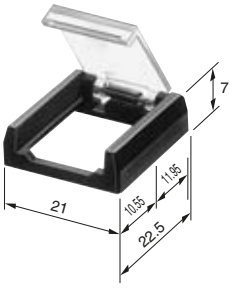


PART NO.		
Color	Center Barrier	Side Barrier
Black	VH-0975-K	VH-0976-K
Gray	VH-0975-G	VH-0976-G

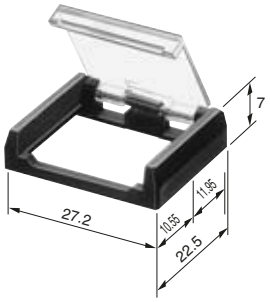
GUARD COVER

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

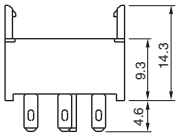
* The cover to be opened 180 and returned by spring force.

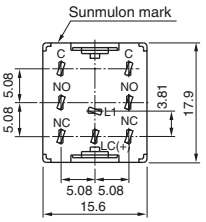
SOCKET

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

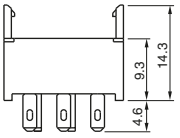
● Soldering Terminal

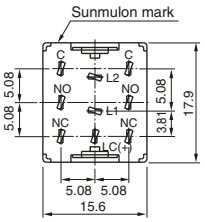
Full-Face





Split-Face, Dual-Color





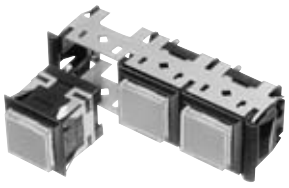
PART NO.		
Full-Face		CH-2479-1
Split-Face	Dual-Color	CH-2479-2

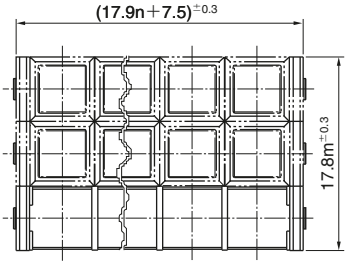
Tolerance : 0.4mm

ACCESSORIES

MATRIX FITTING FRAME

● Square

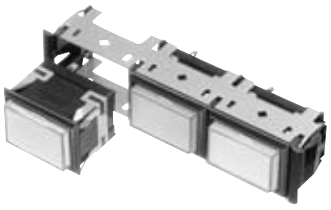


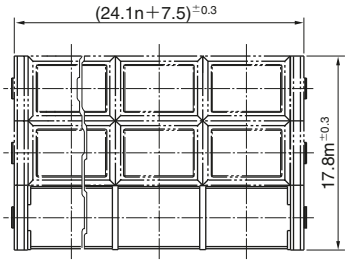


PART NO.		
Square	Black	CH-2687-K□
	Gray	CH-2687-H□

□ = number of switch (1-15)

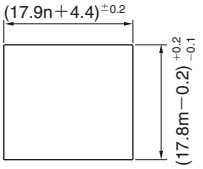
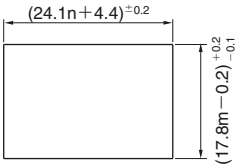
● Rectangular



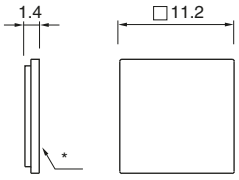


PART NO.		
Rect.	Black	CH-2688-K□
	Gray	CH-2688-H□

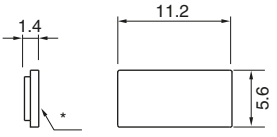
□ = number of switch (1-10)

	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

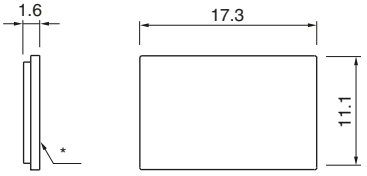
FILTER DIMENSIONS



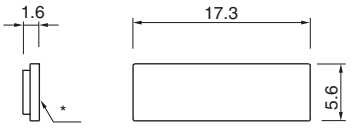
CH-2326



CH-2327



CH-2467



CH-2468

* LEGEND FASE

Tolerance : ±0.4mm

REPLACEMENT PARTS

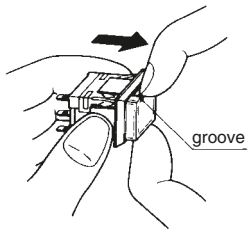
●BUTTON/FILTER

	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

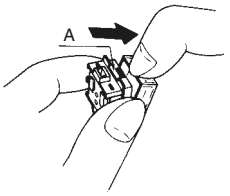
1. Removing Light Cartridge

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



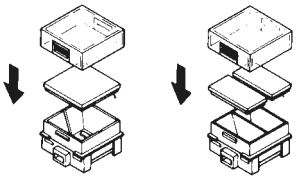
2. Removing Button

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



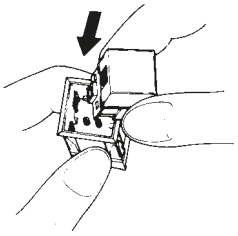
3. Fitting Filter(s)

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



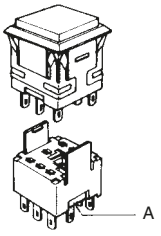
4. Fitting Light Cartridge

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



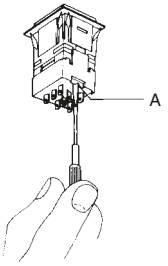
5. Fitting Socket

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

● 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

● 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

● 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.

● 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

● HOUSING COLOR

K	Black
H	Gray

● BUTTON COLOR

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

● 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 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	

● NOTES

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

1
2

Sunmulon

1
2

Sunmulon

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.

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 Dual-Color 7080,8090,9070 only
80	Green	
90	Yellow	
14	Super Blue	
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 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

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

● BUTTON SHAPE/ILLUMINATION TYPE

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

● TERMINAL

S	#110 Tab/Solder
C	PCB

● HOUSING COLOR

K	Black
H	Gray