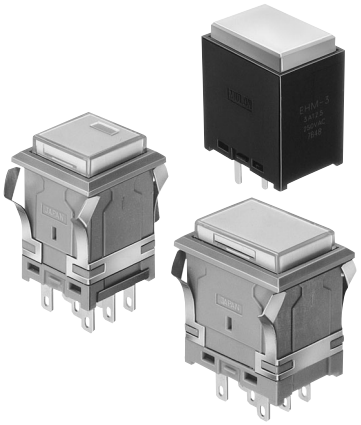
Sunmulon

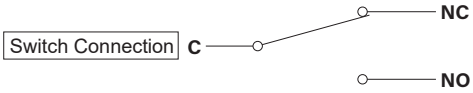
EH / EH-N Illuminated Pushbutton Switch

EH+Z

Only 22.5mm depth behind panel with built-in resistor

Bright and Variable Illumination makes easy planning of multiple design.





■**FEATURES**

- Depth behind panel : Only 22.5mm
- LED Full-Face, Split-Face, Dual-Color, Spot Illumination available.
- Hi-Bright LED Super Blue, Super White, Super Green added to Red, Green, Yellow.
- Built-in resistor for 5V,12V,24V use.
- Light Cartridge is removable from front panel.
- Button Size : 14.2mm square type, 14.2X20.4mm 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.

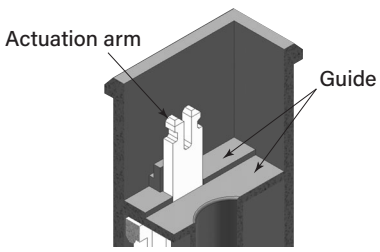
High reliability EH-N type

- EH-N type is enhanced the shape of crossbar contact, superior to stabilize a condition of contact compared with conventional EH type.
- Superior contact reliability was obtained by improving the dust resistance.
- EH-N type is Full-Face, Dual-Color, Split-Face illumination only.
- **EH and EH-N type are incompatible due to different internal structure. Please combine and use a part between the same models respectively.**

FEATURE (EH-N type)

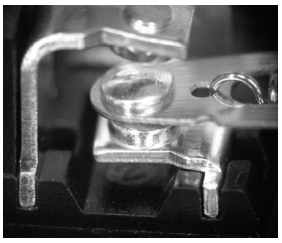
Dust proof structure

EH-N type prevents dust from getting inside due to removed a conventional opening, installed a Guide around the switch actuation arm.



Dust resistance test

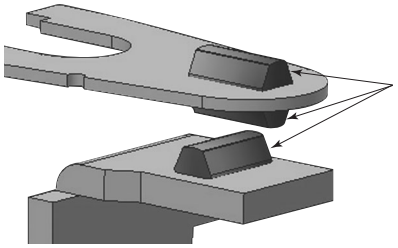
Test method: operate 5,000 frequency as rub a surface of button with towel cloth.
As a result of the test, EH-N type have virtually not entered fiber inside of the switch.



FEATURE (EH-N type)

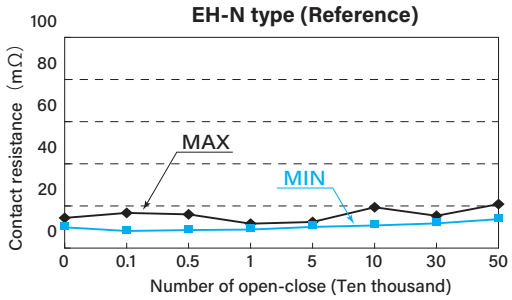
● Enhanced the shape of crossbar contact

EH-N type Crossbar contact shape have upgraded for superior contact reliability obtained.
Additionally, it can be obtained high reliability with stable long-term contact condition under the microload.



Contact resistance test for microload

After the work 500,000 turns with resistance load DC5V 1mA, EH-N type is exceptionally stable for contact condition.



CONTACT RATING (EH-N type)

● PGS Alloy Cross-bar Contact

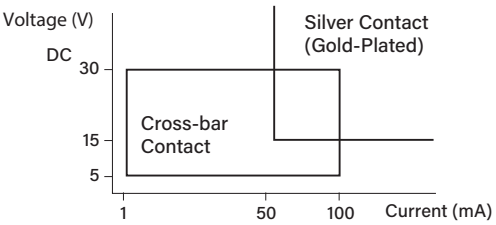
Electrical Rating	DC30V 0.1A(Resistive)
	AC35V 0.1A(Resistive)
Minimum Application Load	DC5V 1mA(Resistive)

The minimum applicable load is the N-level reference value (JIS C5003).
This level indicates only one ramdom failure caused by unstable contact resistance for every two million operations.

● Silver Contact (Gold-Plated)

DC Supply Voltage (V)	Resistance Load (A) Closing Load / Open Load
AC 35	1
DC 8	3
14	3
30	1

● Micro Load Application Range



Using switch rated for 3A max during the opening and closing of microload circuit, it may cause the loose connection.
Please see diagram above and use switch within an acceptable range.

Microload application range changes and differs depending on the type of load, operating conditions, environment conditions.

SPECIFICATIONS (EH-N type / EH type)

Contact	Silver Contact (Gold-Plated)	Cross-bar Contact
Electrical Rating	AC 35V 1A(Resistive)	AC35V 0.1A, DC30V 0.1A(Resistive)
Insulation Resistance	More than 100MΩ at 500V DC	
Dielectric Strength	1000V AC RMS between NC and NO terminal 1500V AC RMS between terminals and ground 50/60Hz for 60sec. at normal ambient temperature and humidity	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 30mΩ (Initial) at DC6V 1A	Less than 50mΩ (Initial) at DC6V 0.1A
Vibration	Frequency of vibration 10 to 55 Hz, Amplitude 1.5mm (operating limit)	
Shock resistance	30G (operating limit), 50G (sustained)	
Mechanical Life	Alternate Action : more than 200,000 operations Momentary Action :more than 2,000,000 operations	
Electrical Life	More than 30.000 operations at max. rated load	More than 100.000 operations at max. rated load
Ambient Temperature	−15℃ to +50℃	
Ambient Humidity	80% RH (max.)	

OPERATING CHARACTERISTICS (EH-N type / EH type)

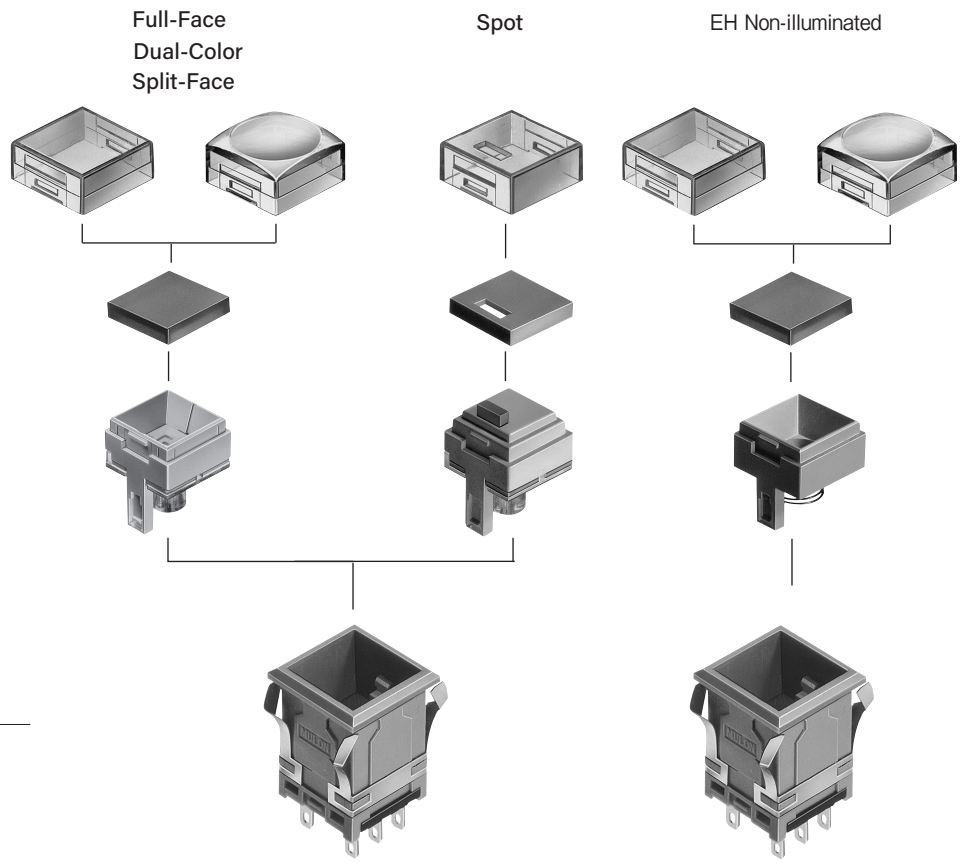
Operating Force (max.)	4.41N	Total Travel (max.)	3mm

DC Rated (Silver Contact)

Rated voltage (V)	Resistance Load (A)
DC 8	3
14	3
30	1

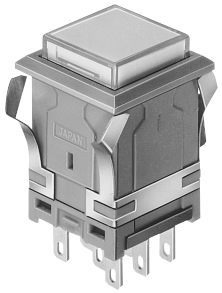
STRUCTURE

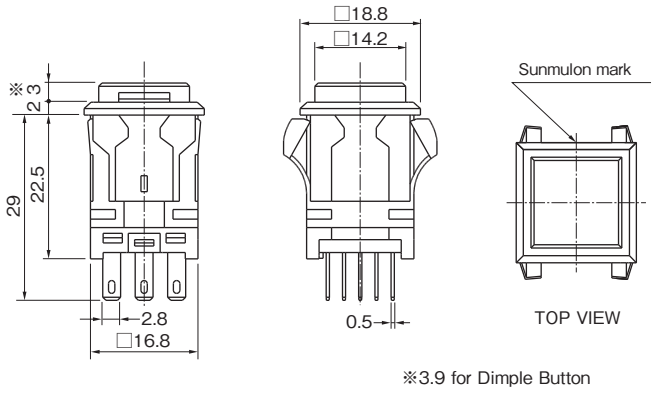
LIGHT CARTRIDGE



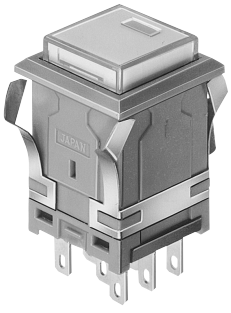
DIMENSIONS

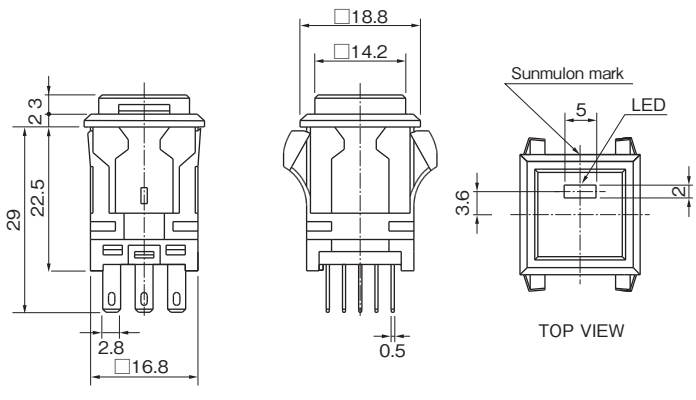
14.2mm Square Button (Full-Face)





14.2mm Square Button (Spot)

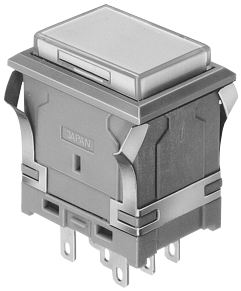


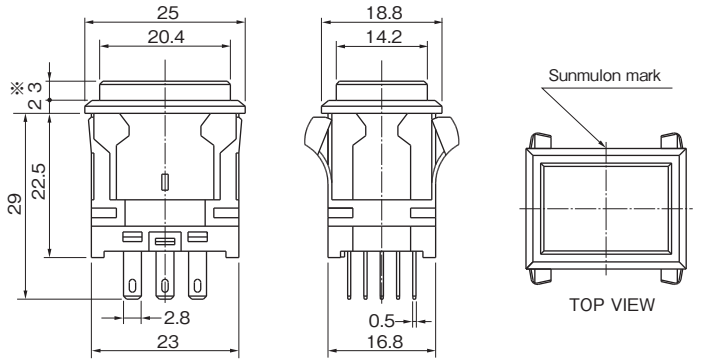


Tolerance : ±0.4mm

DIMENSIONS

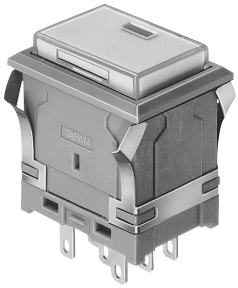
14.2×20.4mm Rectangular Button
(Full-Face)

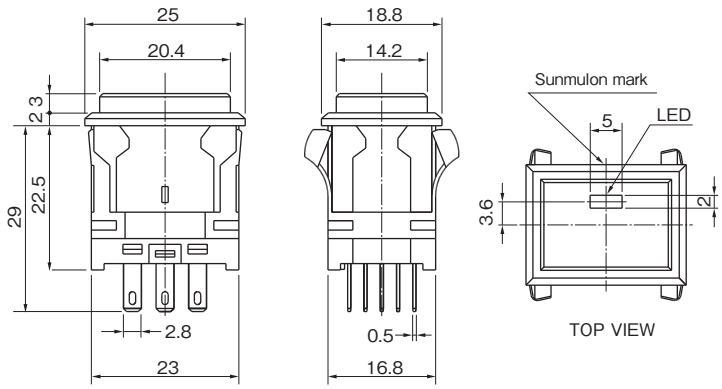




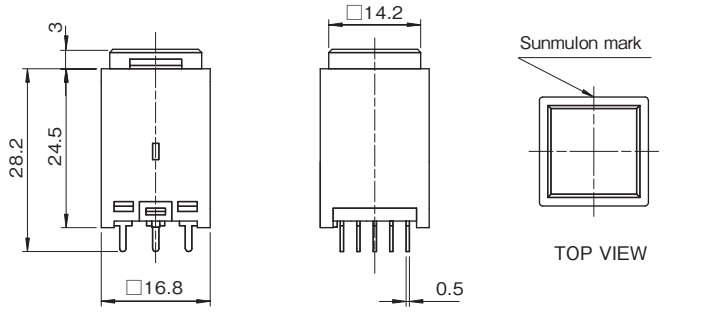
※3.9 for Dimple Button

14.2×20.4mm Rectangular Button
(Spot)



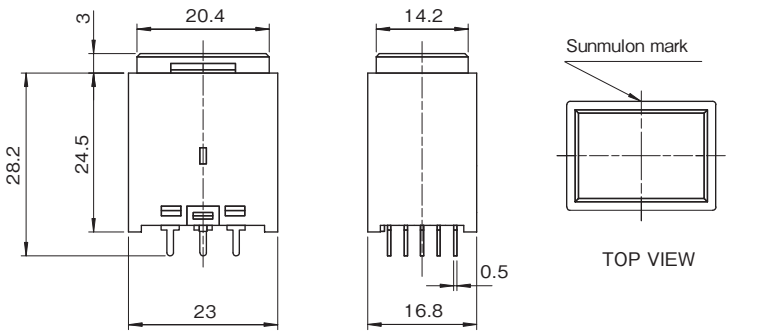


14.2mm Square Button
without Flange



※3.9 for Dimple Button

14.2×20.4mm Rectangular Button
without Flange

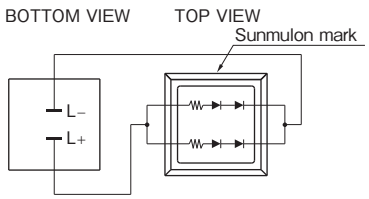
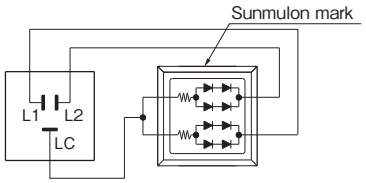
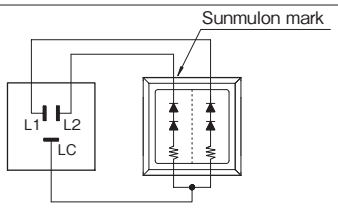
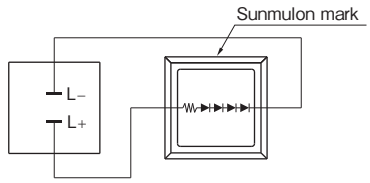
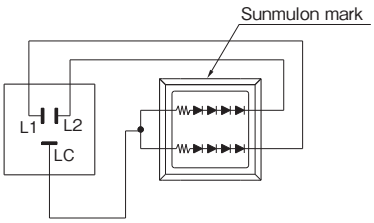
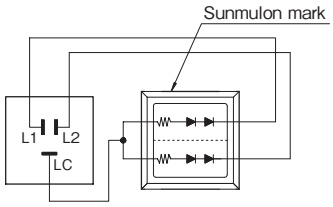


※3.9 for Dimple Button

Tolerance : ±0.4mm

INTERNAL CONNECTION ARRANGEMENTS

●LED (Red, Green, Yellow)

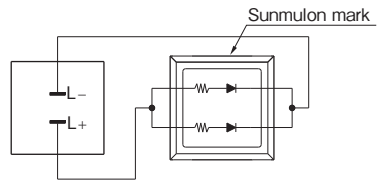
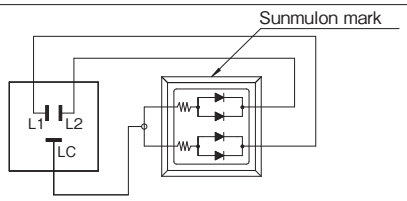
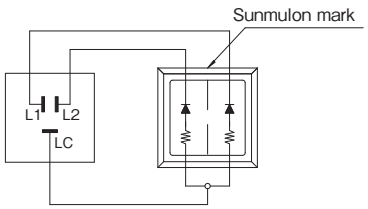
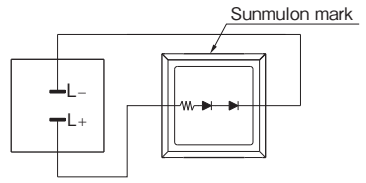
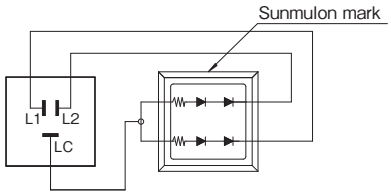
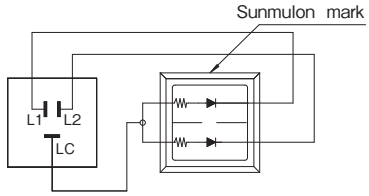
	Full-Face	Dual-Color	Split- Face
5V			
12V 24V			

※Cannot apply built-in resistor type for 24V

Dual-Color Combination

LC-L1	Red	Green	Yellow
LC-L2	Green	Yellow	Red

●Hi-Bright LED (Super Blue, Super White, Super Green)

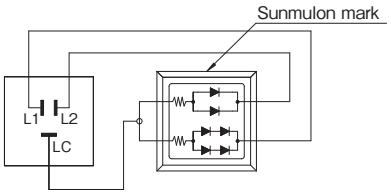
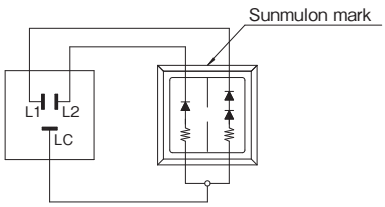
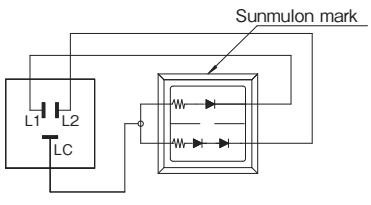
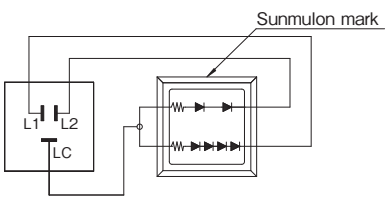
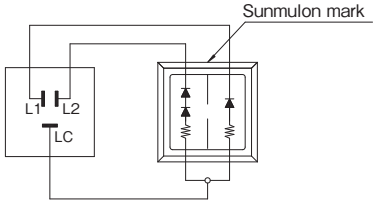
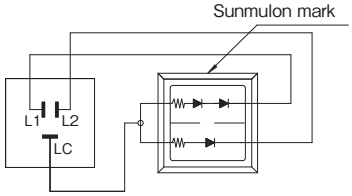
	Full-Face	Dual-Color	Split-Face
5V			
12V 24V			

※Cannot apply built-in resistor type for 24V

Dual-Color Combination

LC-L1	Super Blue	Super White	Super Green
LC-L2	Super White	Super Green	Super Blue

●LED combination with Hi-Bright LED

	Dual-Color	Split-Face (Vertical)	Split-Face (Horizontal)
5V			
12V 24V			

※Cannot apply built-in resistor type for 24V

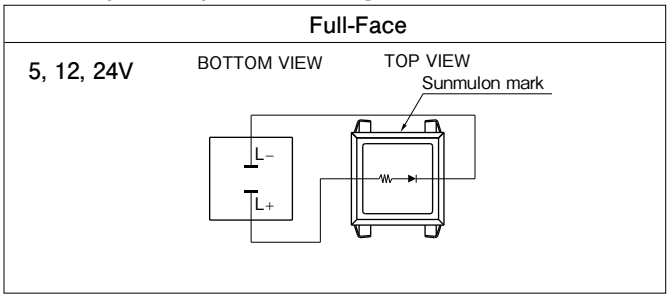
※Cannot apply built-in resistor tpe for 24V

Dual-Color Combination

LC-L1	Red	Red	Red	Yellow
LC-L2	Super Blue	Super White	Super Green	Super Blue

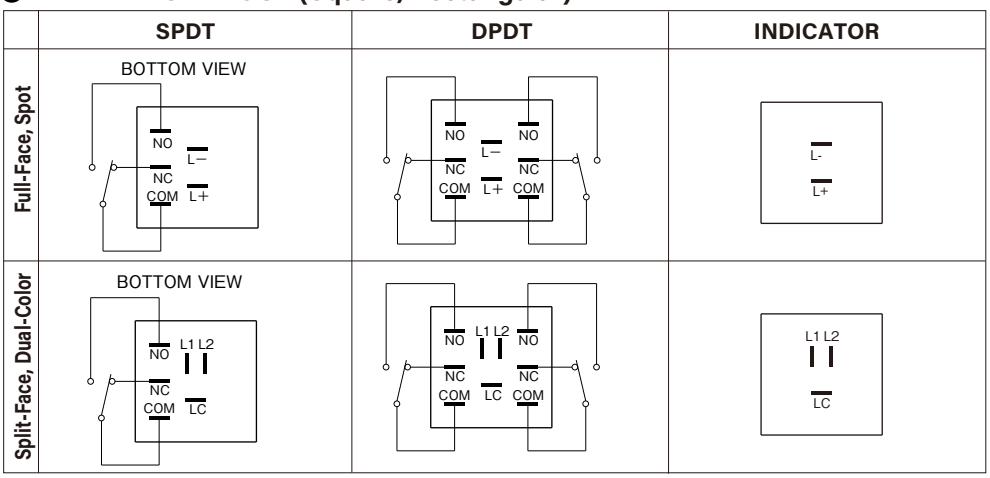
INTERNAL CONNECTION ARRANGEMENTS

●LED Spot (Square, Rectangular)

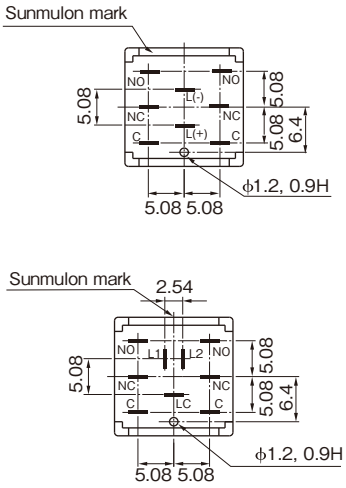


TERMINALS

●TERMINALS LAYOUT (Square, Rectangular)

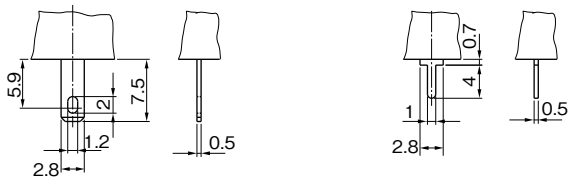


● DIMENSIONS (BOTTOM VIEW)



TERMINAL SHAPE / PCB HOLE CUT-OUT

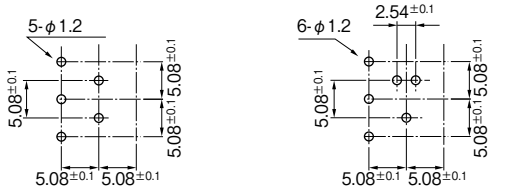
●TERMINAL SHAPE



#110 Tab Soldering Terminal　　PCB Terminal

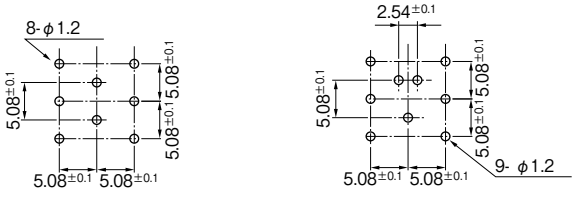
●PCB hole cut-out (BOTTOM VIEW)

SPDT



Full-Face・LED Spot　　Dual-Color・Split-Face

DPDT



Full-Face・LED Spot　　Dual-Color・Split-Face

Tolerance：±0.4mm

LED DATA

● LED RATINGS

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

	Full-face Dual-Color			Split-Face			Hi-Bright Full-face			Hi-Bright Dual-Color			Hi-Bright Sprit-face			Spot		
	Current Rating (mA)																	
DC Supply Voltage (V)	R	G	Y	R	G	Y	SB	SW	SG	SB	SW	SG	SB	SW	SG	R	G	Y
5(±5%)	30			15			12	18	10	12	18	10	6	9	5	5	20	10
12(±5%)	15						6	10	6	6	10	6	6	10	6	5	20	10
24(±5%)	9						6	10	6	6	10	6				5	20	10

● 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.

ITEM		Full-Face Dual-Color						Split-Face			Hi-Bright Full-Face Dual-Color						Hi-Bright Split-Face			Spot		
		DC5V			DC12V,24V			DC5V,12V,24V			DC5V			DC5V,12V,24V			DC12V,24V			DC5V,12V,24V		
		R	G	Y	R	G	Y	R	G	Y	SB	SW	SG	SB	SW	SG	SB	SW	SG	R	G	Y
Max. operating current IFM (mA)		50	40	50	25	20	25	25	20	25	40	40	40	20	20	20	20	20	20	10	30	20
DC reverse voltage VR (V)		10	10	10	20	20	20	10	10	10	5	5	5	10	10	10	5	5	5	5	5	4
Forward voltage VF (V)		3.8	4.2	3.8	7.6	8.4	7.6	3.8	4.2	3.8	2.9	2.9	3.0	5.8	5.8	6.0	2.9	2.9	3.0	1.9	2.1	1.9
Recommended operating current IF (mA)		30	30	30	15	15	15	15	15	15	12	18	10	6	10	6	6	10	6	5	20	10
Current Reduced Factor (Over 25℃working Temperature)		0.66mA/℃			0.33mA/°C			0.33mA/°C			0.54mA/°C			0.27mA/°C			0.27mA/°C			0.13 mA/°C	0.4 mA/°C	0.26 mA/°C
Pulse Lighting	Pulse Width PW (μS)				100			100						100		1000	100		1000	100		
	Duty Ratio D_R				10^{-1}			10^{-1}						10^{-1}		1/20	10^{-1}		1/20	10^{-1}		
	I_{FM} (mA)				90			90						50		48	50		48	50		
Wiring diagram		Fig. 1 Fig. 2						Fig. 2			Fig. 1 Fig. 2						Fig. 2			Fig. 1		

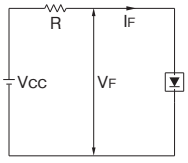


Fig.1

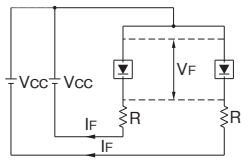


Fig.2

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

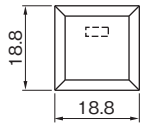
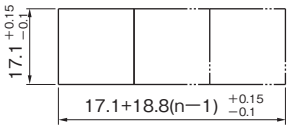
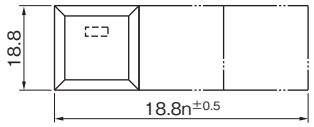
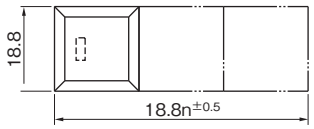
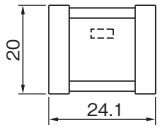
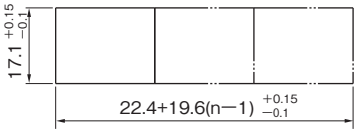
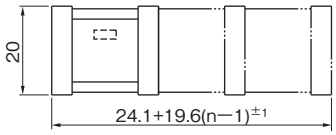
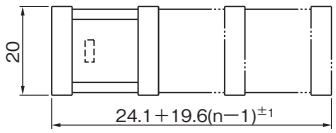
$$R = \frac{Vcc - VF}{IF}$$

Vcc: Supply Voltage
VF: Forward Voltage
IF: Recommend operating current

Panel Layout/Panel Cut Dimensions

● 14.2mm Square

Panel thickness: 1.0 ~ 3.2mm

		Panel Layout	Panel Cut Dimensions
Without Barriers	Independent		
	Serial (Horizontal)		
	Serial (Vertical)		
With Barriers	Independent		
	Serial (Horizontal)		
	Serial (Vertical)		

In case of Serial (Vertical) mounting, please add 002 suffix to ordering code of switch, which retaining clip come out horizontally.

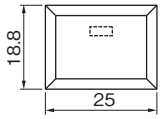
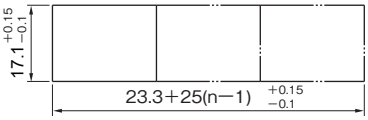
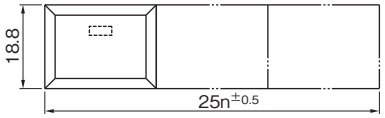
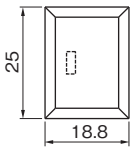
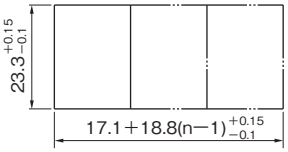
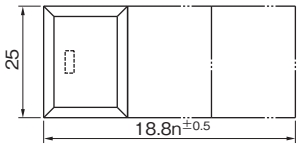
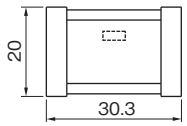
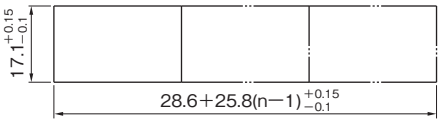
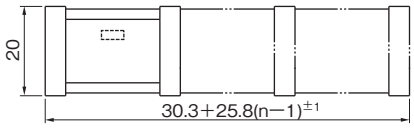
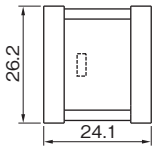
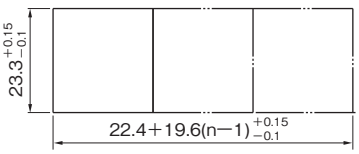
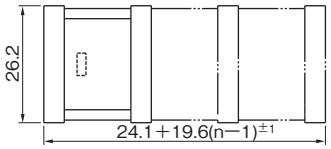
Converting horizontally mounting switch to vertically mounting, just rotate retaining clip 90° for square type.
And in case of rectangular type, 2pcs. of Long version retaining clips are necessary.

n : number of switches
Tolerance : ±0.4mm

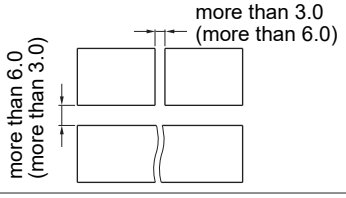
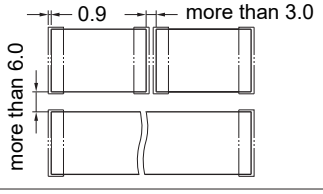
Panel Layout / Panel Cut Dimensions

● 14.2×20.4mm Rectangular

Panel thickness: 1.0～ 3.2mm

		Panel Layout	Panel Cut Dimensions
Without Barriers	Independent (Horizontal)		
	Serial (Horizontal)		
	Independent (Vertical)		
	Serial (Vertical)	 In case of Serial (Vertical) mounting, please add 002 suffix to ordering code of switch, which retaining clip come out horizontally	
With Barriers	Independent (Horizontal)		
	Serial (Horizontal)		
	Independent (Vertical)		
	Serial (Vertical)	 In case of Serial (Vertical) mounting, please add 002 suffix to ordering code of switch, which retaining clip come out horizontally	

※Panel Cut Dimension should be after panel paintings.

Note	Without Barriers	With Barriers
In case of Group Mounting, please leave space as below. ( ) Vertical Mounting		

n : number of switches

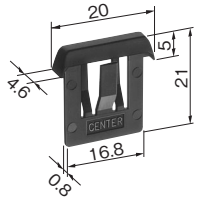
Tolerance : ±0.4mm

ACCESSORIES

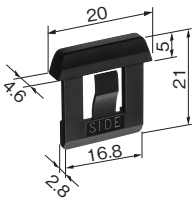
BARRIERS

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

●Short Barrier



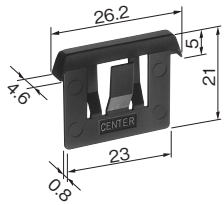
Center Barrier



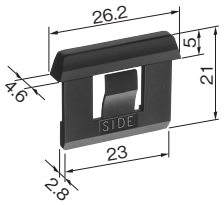
Side Barrier

PART NO.		
Color	Short Center Barrier	Short Side Barrier
Black	EH-1084-K	EH-1085-K
Gray	EH-1084-H	EH-1085-H

●Long Barrier（Rectangular, Long Side）



Center Barrier



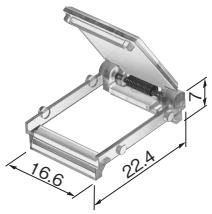
Side Barrier

PARTS NO.		
Color	Long Center Barrier	Long Side Barrier
Black	EH-1086-K	EH-1087-K
Gray	EH-1086-H	EH-1087-H

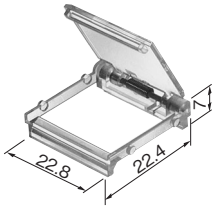
GUARD COVER

Guard Cover prevents inadvrtent and unintentional operations. In EH series Guard Cover should be used with Side/Center Barriers for Guard Cover. Panel cut-out dimension is same as “with barrier”. Cannot be used for Dimple Button.

●14.2mm Square

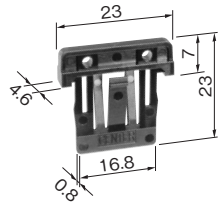


●14.2×20.4mm Rectangular

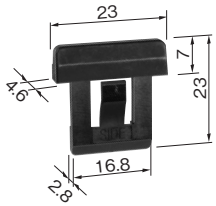


PART NO.	
Square	EH-1080
Rect.	EH-1081

※The cover to be opened 180° and returned by spring force.
※Guard Cover with barrier for guard cover.



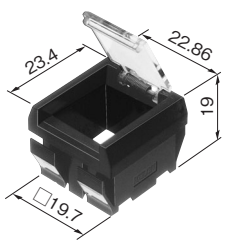
Center Barrier for Guard Cover



Side Barrier for Guard Cover

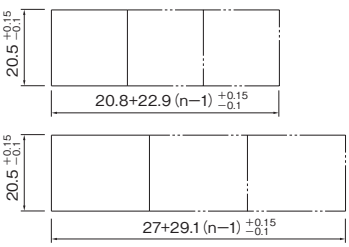
PART NO.		
Color	Center Barrier for Guard Cover	Side Barrier for Guard Cover
Black	EH-1091-K	EH-1092-K
Gray	EH-1091-H	EH-1092-H

Guard Cover for PCB terminal switch (without Flange type)



PART NO.		
Color	Square	Rectangular
Black	EH-1545-K	EH-3409-K
Gray	EH-1545-H	EH-3409-H

●Panel Cut Dimensions



n：number of switch　Panel thickness：1～3.2mm

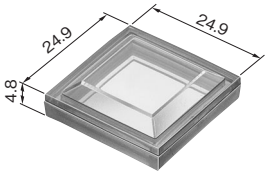
Tolerance：±0.4mm

ACCESSORIES

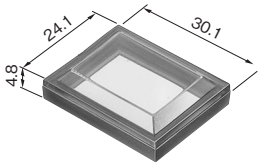
Dust-Proot Cover

Cannot be used for Dimple Button.

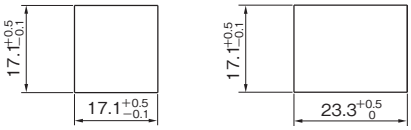
●14.2mm Square



●14.2×20.4mm Rectangular



●Panel Cut Dimesions



Panel thickness : 1~2.5mm

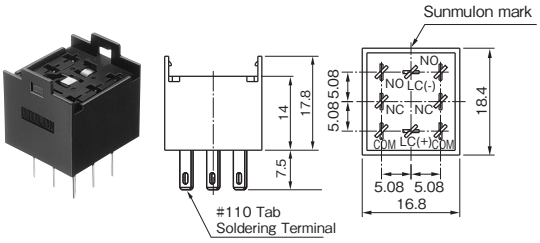
PART NO.	
14.2mm Square	14.2×20.4mm Rectangular
DH-361	EH-1083

SOCKET

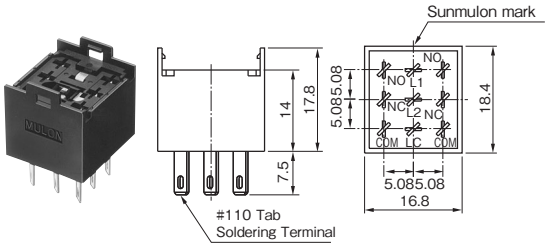
For easy maintenance. (Can be used for both square and rectangular)

●Solering Terminal

Full-Face, Spot

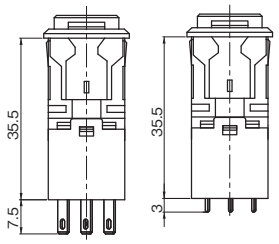


Split-Face, Dual-Color



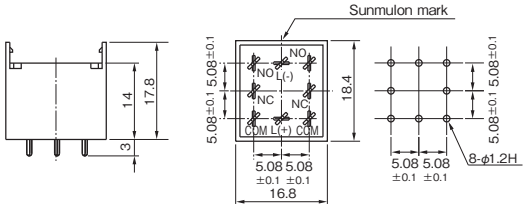
PART NO.			
Application	Resistance	Part No.	Note
Full-Face, Spot	0Ω	EH-1088-1	Use for built-in resistor type
Split-Face, Dual-Color	0Ω	EH-1088-2	
Split-Face 12V	510Ω 1/4W	EH-3210-2A	Use for non-resistor type ※Simultaneous lighting is possible.
Split-Face 24V	1.3kΩ 1/2W	EH-3210-2B	
Dual-Color 5V	36Ω 1/4W	EH-3210-2C	
Dual-Color 12V	270Ω 1/4W	EH-3210-2D	
Dual-Color 24V	1.1kΩ 1/2W	EH-3210-2E	

Switch +Socket

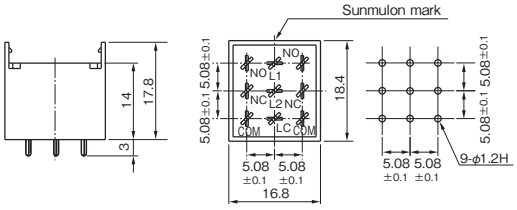


●Socket for PCB terminal switch (non-resistor type)

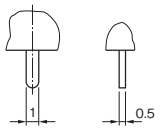
Full-Face, Spot



Split-Face, Dual-Color



●Terminal Shape



PART NO.			
Application	Resistance	Part No.	Note
Full-Face, Spot	0Ω	EH-1196-1	Use for Sodering terminal Housing
Split-Face, Dual-Color	0Ω	EH-1196-2	

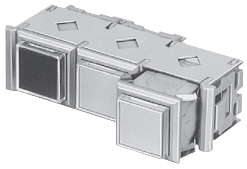
Tolerance : ±0.4mm

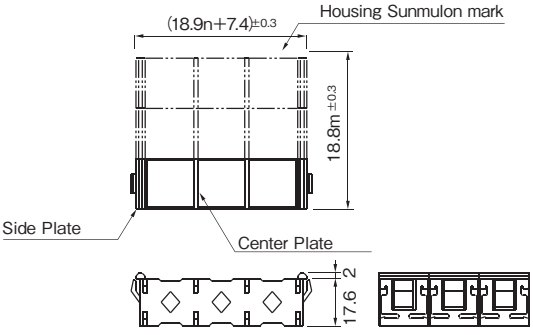
ACCESSORIES

MATRIX FITTING FRAME

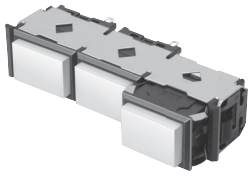
When using a matrix fitting frame, use a vertical mounting type switch.
For vertical mounting type, please specify 002 at the end of the Switch model number.

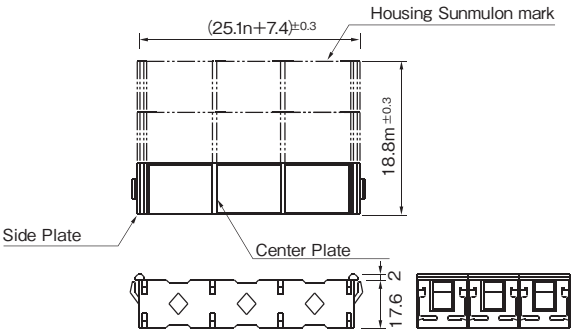
●14.2mm Square



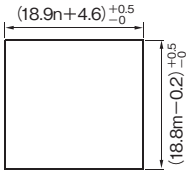
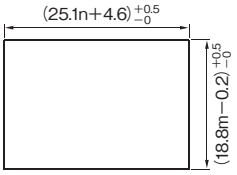


●14.2×20.2mm Rectangular





●Panel Cut Dimensions

14.2mm Square	14.2×20.4mm Rectangular
	

Color	14.2mm Square	14.2×20.4mm Rectangular
Black	EH-1610-K□	EH-1815-K□
Gray	EH-1610-H□	EH-1815-H□

□= number of switch (1～15)
n : number of switches (Horizontal)
m : number of switches (Vertical)
Panel thickness : 1mm～3.2mm

Tolerance : ±0.4mm

Removing Tool

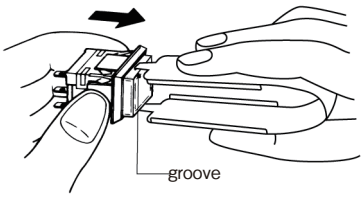
Using a removing tool makes it easy to remove the Light cartridge.

PART NO.	SJ-0001

ASSEMBLY & DISASSEMBLY

1. Removing Light Cartridge

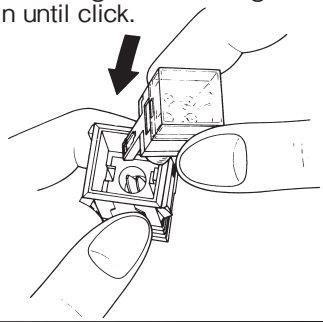
Hang the cartridge with hooking Removing Tool in the groove, and pull out.



Light Cartridge Removing Tool	
Part No	SJ-0001

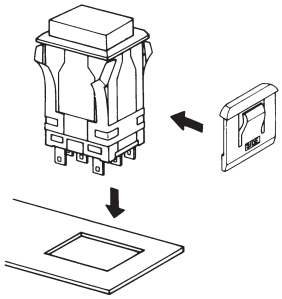
2. Fitting Light Cartridge

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



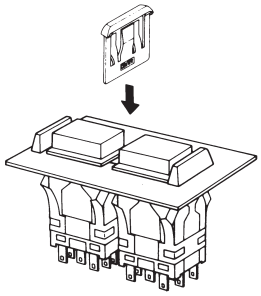
3. Installing Barriers (Independent)

After put side barriers on the Housing, and insert it into the panel cut-out.



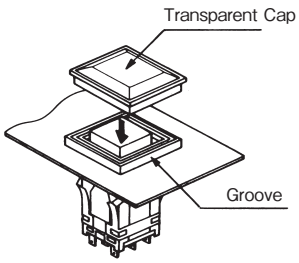
● Installing Barriers (Serial)

Insert the center barrier between the swiches after mounting the switches with side barriers into the panel cut-out.



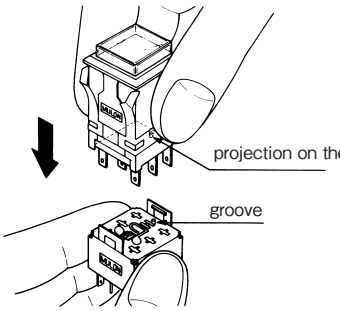
4. Installing Dustproof Cover

Put the switch through the Frame of cover and mount on panel. And then, install transparent cap with fitting projection and groove of frame.



5. Fitting Socket

Insert switch into socket with right direction and push until stop.



Sunmulon mark of switch and MULON mark of socket should be same side.

6. Installing Guard Cover

●Independent mounting (Fig.1)
Fit one side barrier and switch, then fit guard cover and the ather side barrier. After that mount on panel.

●Serial mounting (Fig.2)
Fit one side barrier and switch, then mount on panel.
Install center barriers between switches,
attached the Guard cover while inseting the round convex part of the guard cover into the hole of the barrier one by one

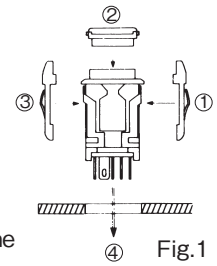


Fig.1

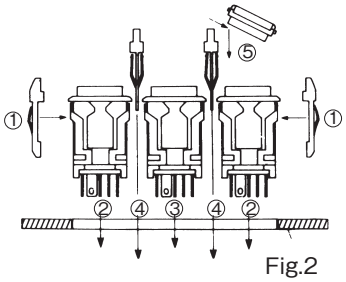
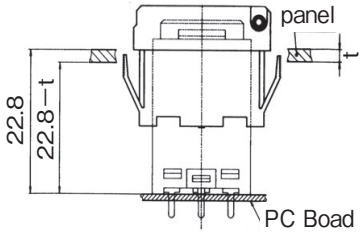


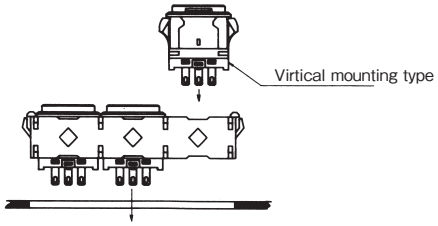
Fig.2

7. Installing Guard cover of without Flange type



8. Matrix Fitting Frame

Fit switches and the matrix fitting frame.
After that mount on panel.
※Cannot be used with Barriers, Guard cover, Dustproof cover.



ORDERING CODE (EH-N type) Ordering as a Set ([Light Cartridge] + [Housing])

Full-Face, Dual- Color, Split-Face

EH □ – N □ □ 1 2 □ □ 1 2 □ □ □ +Z

● OPERATION

	M	Momentary
	A	Alternate
	L	Indicator
※	F	Flat Indicator

※ Button level is flat.(locked position)

● 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)	S1	Square Split-Face (Vert.)
2)	S2	Square Split-Face (Horiz.)
2)	W1	Rect. Split-Face (Vert.)
2)	W2	Rect. Split-Face (Horiz.)
3)	S3	Square Dual-Color
3)	W3	Rect. Dual-Color

4)	K0	Concave B. Square Full-Face
4)	K1	Concave B. Square SplitFace (Vert.)
4)	K2	Concave B. Square Split-Face (Horiz.)
4)	K3	Concave B. Square Dual-Color
4)	N0	Concave B. Rect. Full-Face
4)	N1	Concave B. Rect. Split-Face (Vert.)
4)	N2	Concave B. Rect. Split-Face (Horiz.)
4)	N3	Concave B. Rect. Dual-Color

● LED COLOR

	70	Red
	80	Green
5)	90	Yellow
	14	Super Blue
	16	Super White
	18	Super Green
	X	Without LED

Full-Face : Put color no. into the frame 1
Split-Face : Put color no. into the frame 1,2
(7070 , 7080 , 7090 , 8070 , 8080 , 8090
9070 , 9080 , 9090 , 1414 , 1416 , 1418
1614 , 1616 , 1618 , 1814 , 1816 , 1818
7014 , 7016 , 7018 , 9014 , 1470 , 1670
1870 , 1490 Combination only)
Dual-Color : Put color no. into the frame 1,2
(7080 , 8090 , 9070 , 7014 , 7016 , 7018
9014 , 1416 , 1618 , 1814 Combination only)

● BUTTON COLOR

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

● Mounting Direction

Blank	For Horizontal mounting
002	For Virtical mounting

In case of only Serial Virtical mouting, please select "002". In case of Independent use, it does not matter. ("blank" at this column ordinary)

● Supply Voltage to LED

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor(not for Split-Face)
4	5V Non-Resistor, Split-Face Non-Resistor
5	12V Non-Resistor
6	24V Non-Resistor
X	Without LED

In case of Split-Face non resistor type, please select 4 though the circuits are same for 5, 12, 24V, for our convenience.

● TERMINAL

	P	#110Tab, Soldering
	C	PCB
6)	K	Connector with Accessories
6)	N	Connector without Accessories

● COLOR PLATE

	1	Red
	2	Green
5)	3	Yellow
	4	Milk White
	6	Blue
★	X	Without Color Plate

Full-Face: Put color no. into the frame 1
Split-Face: Put color no. into the frame 1,2

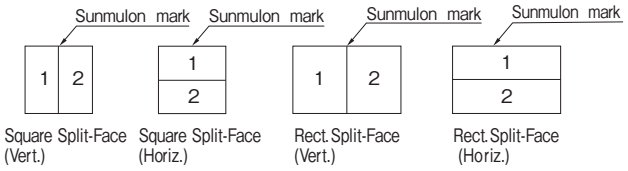
★Generally, in case of using color button, Color Plate are not necessary.

● Housing

K	Black Color	KN	Black Color, without Flange
H	Gray Color	HN	Gray Color, without Flange

● NOTES

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



※ In case of Split-Face(Vert.), LED Color 1 is connected to Terminal L2, LED Color 2 is connected to Terminal L1.

2) In case of Split-Face, button color should be C (clear).
3) In case of Dual-Color, button should be C (clear) with Milk-White Color Plate or Milk-White button.
4) Concave Button type is only clear color. Therefore, button color should be C (clear)
5) Please be noted that the color of "Yellow" for LED, Button, Color Plate is actually "Orange Yellow" not Lemon Yellow.
6) For Accessories, EH-3251 for SPDT, Indicator is a set of 1 housing and 6 contacts. EH-5180 for DPDT is a set of 1 housing and 9 contacts. If you purchase a wire harness separately, please specify Terminal N (Connector without accessories).

Notes for Split-Face and Dual-Color Illumination type

In case of using Split-Face & Dual-Color, sometimes built-in resistor type can not be used because of heating. Please note followings:

1 Split-Face

5V use : Select 1 (5V built-in resistor). Simultaneous lighting is possible.

12V use : Select 2 (12V built-in resistor). However in case of simultaneous lighting, please select 4 (non resistor) and apply external resistor 510 Ω 1/4W in series or use socket (EH-3210-2A)

24V use : Either do or not do simultaneous lighting, cannot select 3 (24V built-in resistor). Please select 4 (non resistor) and apply external resistor 1.3kΩ 1/2W in series or use socket (EH-3210-2B). Simultaneous lighting is possible for both way.

In 5V, 12V, 24V Split-Face non resistor type, they are the same circuits actually, however please select 4 (Split-Face non resistor) for our convenience.

2 Dual Color

It is impossible to do simultaneous lighting with all 5V,12V,24V. In case of simultaneous lighting , please select 4,5,6 respectively and apply external resistor 36Ω 1/4W, 270Ω 1/4W, 1.1kΩ 1/2W in series or use socket (EH-3210-2C),(EH-3210-2D)(EH-3210-2E) respectively.

Even a case of "simultaneous lighting impossible", it is all right for couple of minutes.

ORDERING CODE (EH-N type) Ordering Individually ([Light Cartridge] , [Housing])

● LIGHT CARTRIDGE (EH-N type)

Full-Face, Dual- Color, Split-Face

EH —N □ 1 2 □ 1 2 □ +Z

● BUTTON SHAPE ILLUMINATION TYPE

	S0	Square Full-Face
	W0	Rect. Full-Face
2)	S1	Square Split-Face (Vert.)
2)	S2	Square Split-Face (Horiz.)
2)	W1	Rect. Split-Face (Vert.)
2)	W2	Rect. Split-Face (Horiz.)
3)	S3	Square Dual-Color
3)	W3	Rect. Dual-Color
4)	K0	Concave B. Square Full-Face
4)	K1	Concave B. Square Split-Face (Vert.)
4)	K2	Concave B. Square Split-Face (Horiz.)
4)	K3	Concave B. Square Dual-Color
4)	N0	Concave B. Rect. Full-Face
4)	N1	Concave B. Rect. Split-Face (Vert.)
4)	N2	Concave B. Rect. Split-Face (Horiz.)
4)	N3	Concave B. Rect. Dual-Color

● Supply Voltage to LED

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor(not for Split-Face)
4	5V Non-Resistor, Split-Face non resistor
5	12V Non-Resistor
6	24V Non-Resistor
X	Without LED

In case of Split-Face non resistor type, please select 4 though the circuits are samefor 5, 12, 24v, for our convenience.

● COLOR PLATE

	1	Red
	2	Green
5)	3	Yellow
	4	Milk White
	6	Blue
★	X	Without Color Plate

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

● LED COLOR

	70	Red
	80	Green
5)	90	Yellow
	14	Super Blue
	16	Super White
	18	Super Green
	X	Without LED

Full-Face: Put color no. into the frame 1
Split-Face: Put color no. into the frame 1,2
(7070 , 7080 , 7090 , 8070 , 8080 , 8090
9070 , 9080 , 9090 , 1414 , 1416 , 1418
1614 , 1616 , 1618 , 1814 , 1816 , 1818
7014 , 7016 , 7018 , 9014 , 1470 , 1670
1870 , 1490 Combination only)
Dual-Color: Put color no. into the frame 1,2
(7080 , 8090 , 9070 , 7014 , 7016 , 7018
9014 , 1416 , 1618 , 1814 Combination only)

● BUTTON COLOR

	R	Red
	G	Green
5)	Y	Yellow
	M	Milk White
	C	Clear
	B	Blue
	X	Without Button

HOUSING (EH-N type)

EH □ —N □ □ □ □ □ +Z

● OPERATION

	M	Momentary
	A	Alternate
	L	Indicator
※	F	Flat Indicator

※ Button level is flat.(locked position)

● Mounting Direction

Blank	For Horizontal mounting
002	For Virtical mounting

In case of only Serial Virtical mouting, please select “002”. In case of Independent use, it does not matter. (”blank” at this column ordinary)

● CONTACT

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

● TERMINAL

	P	#110Tab/Solder
	C	PCB
6)	K	Connector, with Accessories
6)	N	Connector, without Accessories

● HOUSING COLOR

K	Black Color
H	Gray Color
KN	Black, without Flange
HN	Gray, without Flange

● BUTTON SHAPE ILLUMINATION TYPE

S0	Square Full-Face
W0	Rect. Full-Face
S1	Square Split-Face, Dual-Color
W1	Rect. Split-Face, Dual-Color

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

Full-Face, Dual- Color, Split-Face

EH □ — □ □ 1 2 □ □ 1 2 □ □ □ +Z

● OPERATION

	M	Momentary
	A	Alternate
	L	Indicator
※	F	Flat Indicator

※ Button level is flat.(locked position)

● 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)	S1	Square Split-Face (Vert.)
2)	S2	Square Split-Face (Horiz.)
2)	W1	Rect. Split-Face (Vert.)
2)	W2	Rect. Split-Face (Horiz.)
3)	S3	Square Dual-Color
3)	W3	Rect. Dual-Color

4)	K0	Concave B. Square Full-Face
4)	K1	Concave B. Square Split-Face (Vert.)
4)	K2	Concave B. Square Split-Face (Horiz.)
4)	K3	Concave B. Square Dual-Color
4)	N0	Concave B. Rect. Full-Face
4)	N1	Concave B. Rect. Split-Face (Vert.)
4)	N2	Concave B. Rect. Split-Face (Horiz.)
4)	N3	Concave B. Rect. Dual-Color

● LED COLOR

	70	Red
	80	Green
5)	90	Yellow
	14	Super Blue
	16	Super White
	18	Super Green

Full-Face: Put color no. into the frame 1
Split-Face: Put color no. into the frame 1,2
(7070 , 7080 , 7090 , 8070 , 8080 , 8090
9070 , 9080 , 9090 , 1414 , 1416 , 1418
1614 , 1616 , 1618 , 1814 , 1816 , 1818
7014 , 7016 , 7018 , 9014 , 1470 , 1670
1870 , 1490 Combination only)
Dual-Color: Put color no. into the frame 1,2
(7080 , 8090 , 9070 , 7014 , 7016 , 7018
9014 , 1416 , 1618 , 1814 Combination only)

● BUTTON COLOR

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

● Mounting Direction

Blank	For Horizontal mounting
002	For Virtical mounting

In case of only Serial Virtical mouting , please select “002”.
In case of Independent use, it does not matter. (”blank” at this column ordinary)

● Supply Voltage to LED

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor(not for Split-Face)
4	5V Non-Resistor, Split-Face non resistor
5	12V Non-Resistor
6	24V Non-Resistor

In case of Split- Face non resistor type, please select 4 though the circuits are same for 5, 12, 24 v, for our convenience.

● TERMINAL

	P	#110Tab, Soldering
	C	PCB
6)	K	Connector, with Accessories
6)	N	Connector, without Accessories

● 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	
5)	3	Yellow	
	4	Milk White	
	6	Blue	
★	X	Without Color Plate	

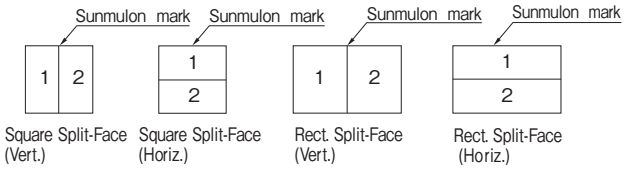
★Generally, in case of using color button, Color Plate are not necessary.

● Housing

	K	Black	KN Black, without Flange
	H	Gray	HN Gray without Flange

● NOTES

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



2) In case of Split-Face, button color should be C (clear).
3) In case of Dual-Color, button should be C (clear) with Milk-White Color plate or Milk-White button.
4) Dimple Button type is only clear color. Therefore, button color should be C (clear)
5) Please be noted that the color of “Yellow” for LED, Button, Color Plate is actually “OangeYellow” not Lemon Yellow.
6) For Accessories, EH-3251 for SPDT, Indicator is a set of 1 housing and 6 contacts. EH-5180 for DPDT is a set of 1 housing and 9 contacts. If you purchase a wire harness separately, please specify Terminal N (Connector without accessories).

Notes for Split-Face and Dual-Color Illumination type

In case of using Split- Face & Dual-Color , sometimes built-in resistor type Cannot be used because of heating . Please note followings:

1 Split-Face

5V use : Select 1 (5V built-in resistor). Simultaneous lighting is possible.

12V use : Select 2 (12V built-in resistor). However in case of simultaneous lighting, please select 4 (non resistor) and apply external resistor 510 Ω 1/4W in series or use socket (EH-3210-2A)

24V use : Either do or not do simultaneous lighting, cannot select 3 (24V built-in resistor). Please select 4 (non resistor) and apply external resistor 1.3kΩ 1/2W in series or use socket (EH-3210-2B). Simultaneous lighting is possible for both way.

In 5V, 12V, 24V Split-Face non resistor type, they are the same circuits actually, however please select 4 (Split-Face non resistor) for our convenience.

2 Dual Color

It is impossible to do simultaneous lighting with all 5V,12V,24V. In case of simultaneous lighting , please select 4,5,6 respectively and apply external resistor 36Ω 1/4W, 270Ω 1/4W, 1.1kΩ 1/2W in series or use socket (EH-3210-2C),(EH-3210-2D)(EH-3210-2E) respectively.

In 5V, 12V, 24V Dual-Color non resistor type, the circuit is different. Even a case of “simultaneous lighting impossible”, it is all right for couple of minutes.

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

SPOT Illumination

EH □ — □ □ □ □ □ □ □ □ □ +Z

● OPERATION

M	Momentary
A	Alternate
L	Indicator
※ F	Flat Indicator

※ Button level is flat.(locked position)

● CONTACT

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

● BUTTON SHAPE

S0	Square
W0	Rect.

● LED COLOR

4	Red
5	Green
6	Yellow

● BUTTON COLOR

R	Red
G	Green
Y	Yellow
M	Milk White

B	Blue
K	Black
C	Clear

● HOUSING COLOR

K	Black
H	Gray
KN	Black, without Flange
HN	Gray, without Flange

● TERMINAL

P	#110Tab/Soldering
C	PCB
K	Connector, with Accessories
N	Connector, without Accessories

● Mounting Direction

Blank	For Horizontal mounting
002	For Virtical mounting

In case of only Serial Virtical mouting, please select “002”. In case of Independent use, it does not matter. (”blank” at this column ordinary)

● Supply Voltage to LED

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor
4	Non-Resistor

● COLOR PLATE

1	Red
2	Green
3	Yellow
4	Milk-White
6	Blue
7	Black
×	Without Color Plate

Non-illuminated

EH □ — □ □ 0 □ □ □ □ +Z

● OPERATION

M	Momentary
A	Alternate
L	Indicator
※ F	Flat Indicator

※ Button level is flat.(locked position)

● CONTACT

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

● BUTTON SHAPE

S	Square
W	Rect.
K	Square Concave
N	Rect. Concave

● TERMINAL

P	#110Tab/Soldering
C	PCB
K	Connector with Accessories
N	Connector without Accessories

● HOUSING COLOR

K	Black
H	Gray
KN	Black without Flange
HN	Gray without Flange

● COLOR PLATE

1	Red
2	Green
3	Yellow
4	Milk-White
6	Blue
7	Black
×	Without Color Plate

● BUTTON COLOR

R	Red
G	Green
Y	Yellow
M	Milk White

B	Blue
K	Black
C	Clear

ORDERING CODE(EH type) Ordering Individually ([Light Cartridge])

LIGHT CARTRIDGE

Full-Face, Dual- Color, Split-Face

EH — □ 1 2 □ 1 2 □ +Z

● BUTTON SHAPE ILLUMINATION TYPE

	S0	Square Full-Face
	W0	Rect. Full-Face
2)	S1	Square Split-Face (Vert.)
2)	S2	Square Split-Face (Horiz.)
2)	W1	Rect. Split-Face (Vert.)
2)	W2	Rect. Split-Face (Horiz.)
3)	S3	Square Dual-Color
3)	W3	Rect. Dual-Color
4)	K0	Concave B. Square Full-Face
4)	K1	Concave B. Square Split-Face (Vert.)
4)	K2	Concave B. Square Split-Face (Horiz.)
4)	K3	Concave B. Square Dual-Color
4)	N0	Concave B. Rect. Full-Face
4)	N1	Concave B. Rect. Split-Face (Vert.)
4)	N2	Concave B. Rect. Split-Face (Horiz.)
4)	N3	Concave B. Rect. Dual-Color

● LED COLOR

	70	Red
	80	Green
5)	90	Yellow
	14	Super Blue
	16	Super White
	18	Super Green

Full-Face : Put color no. into the frame 1
Split-Face : Put color no. into the frame 1,2
(7070 , 7080 , 7090 , 8070 , 8080 , 8090
9070 , 9080 , 9090 , 1414 , 1416 , 1418
1614 , 1616 , 1618 , 1814 , 1816 , 1818
7014 , 7016 , 7018 , 9014 , 1470 , 1670
1870 , 1490 Combination only)
Dual-Color : Put color no. into the frame 1,2
(7080 , 8090 , 9070 , 7014 , 7016 , 7018
9014 , 1416 , 1618 , 1814 Combination only)

● Supply Voltage to LED

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor(not for Split-Face)
4	5V Non-Resistor, Split-Face non resistor
5	12V Non-Resistor
6	24V Non-Resistor

In case of Split-Face non resistor type, please select 4 though the circuits are same for 5, 12, 24v, for our convenience.

● COLOR PLATE

	1	Red
	2	Green
5)	3	Yellow
	4	Milk White
	6	Blue
	X	Without Color Plate

● BUTTON COLOR

	R	Red
	G	Green
5)	Y	Yellow
	M	Milk White
	C	Clear
	B	Blue
	X	Without Button

LIGHT CARTRIDGE

SPOT Illumination

EH — □ □ □ □ □ +Z

● BUTTON SHAPE

S0	Square
W0	Rect.

● LED COLOR

4	Red
5	Green
6	Yellow

● BUTTON COLOR

R	Red	M	Milk-White	C	Clear
G	Green	B	Blue	X	Without Button
Y	Yellow	K	Black		

● Supply Voltage to LED

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor
4	Non-Resistor

● COLOR PLATE

1	Red			6	Blue
2	Green			7	Black
3	Yellow			X	Without Color Plate
4	Milk-White				

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

LIGHT CARTRIDGE

Non-illuminated

EH — □ 0 □ □ +Z

● BUTTON SHAPE

S	Square
W	Rect.
K	Square Concave
N	Rect. Concave

● BUTTON COLOR

R	Red	M	Milk-White	C	Clear
G	Green	B	Blue	X	Without Button
Y	Yellow	K	Black		

● COLOR PLATE

1	Red	6	Blue
2	Green	7	Black
3	Yellow	X	Without Color Plate
4	Milk-White		

HOUSING (EH type)

EH □ — □ □ □ □ □ +Z

● OPERATION

	M	Momentary
	A	Alternate
	L	Indicator
※	F	Flat Indicator

※ Button level is flat.(locked position)

● CONTACT

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

● Mounting Direction

Blank	For Horizontal mounting
002	For Virtical mounting

In case of only Serial Virtical mouting, please select “002”. In case of Independent use, it does not matter. (”blank” at this column ordinary)

● TERMINAL

P	#110Tab/Solder
C	PCB
K	Connector, with Accessories
N	Connector, without Accessories

● HOUSING COLOR

K	Black
H	Gray
KN	Black, without Flange
HN	Gray, without Flange

● BUTTON SHAPE ILLUMINATION TYPE

S	Square Non-illuminated
W	Rect. Non-illuminated
S0	Square Full-Face, Spot
W0	Rect. Full-Face, Spot
S1	Square Split-Face, Dual-Color
W1	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.

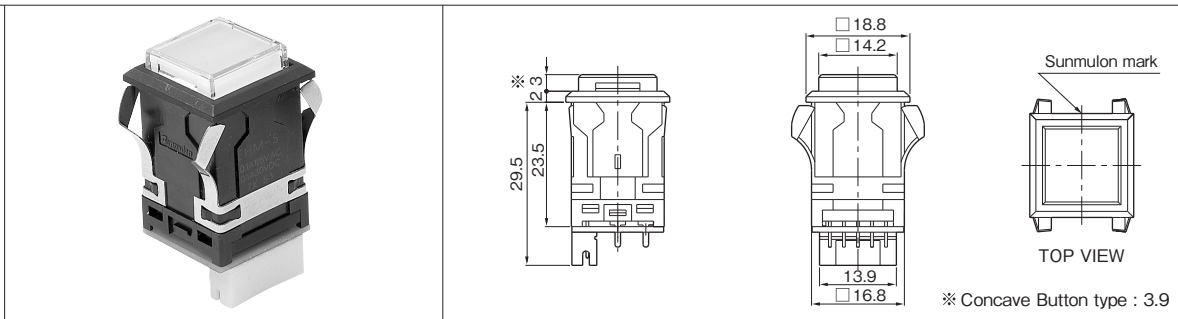
SPECIFICATIONS

Contact	Silver Contact (Gold-Plated)	Cross-bar Contact
Electrical Rating	AC35V 1A, DC30V 1A (Resistive)	AC35V 0.1A, DC30V 0.1A (Resistive)
Insulation Resistance	More than 100M Ω at 500V DC	
Dielectric Strength (Connector)	800V AC / SPDT Connector Type 500V AC / DPDT Connector Type	
Dielectric Strength (Switch)	1000V AC RMS between NC and NO terminal 1500V AC RMS between terminals and ground 50/60Hz for 60sec. at normal ambient temperature and humidity	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 40mΩ (Initial) at DC6V 1A	Less than 60mΩ (Initial) at DC6V 0.1A
Mechanical Life	Momentary Action : more than 2,000,000 operations	Alternate Action : more than 200,000 operations
Electrical Life	More than 30,000 operations at max. rated load	More than 100,000 operations at max. rated load
Ambient Temperature	−15℃ to +50℃	
Ambient Humidity	80% RH (max.)	

DIMENSIONS

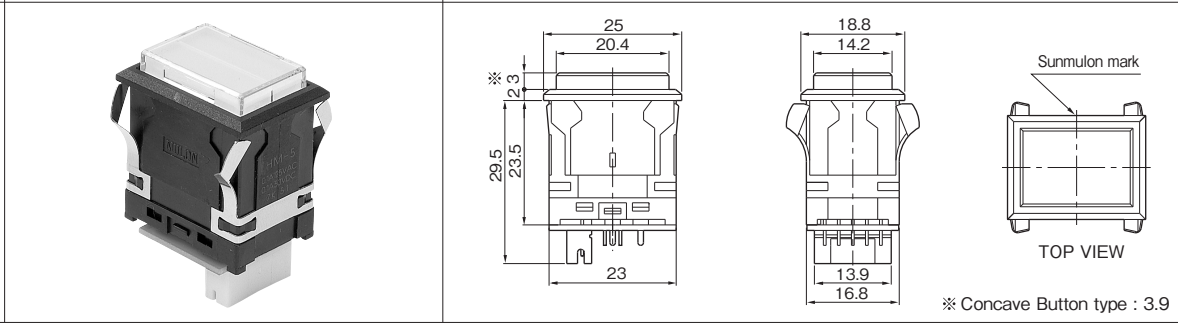
● SPDT, Indicator

14.2 mm Square Button



※ Concave Button type : 3.9

14.2 X 20.4 mm Rect. Button

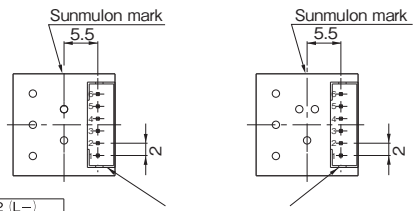


※ Concave Button type : 3.9

TERMINAL LAYOUT

SPDT, Indicator

● **Full-Face, Spot** ● **Split-Face, Dual-Color**



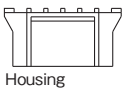
Pin No.	Terminal
6	L2 (L−)
5	L1 (L−)
4	LC
3	NO
2	NC
1	COM

ACCESSORIES

SPDT, Indicator

● **Connector**

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



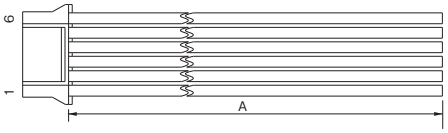
Housing
(JST made PHR-6)

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

● **Wire Harness**

Wire : UL1061, AWG26 equivalent

Applicable wire : AWG#30 ~ #24

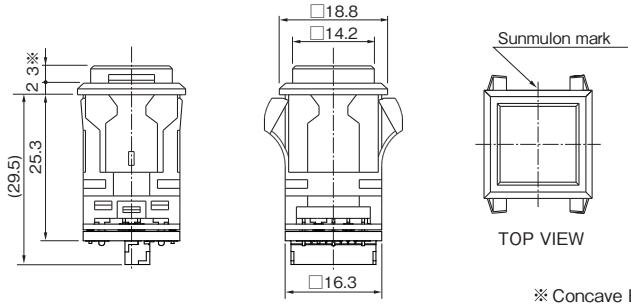
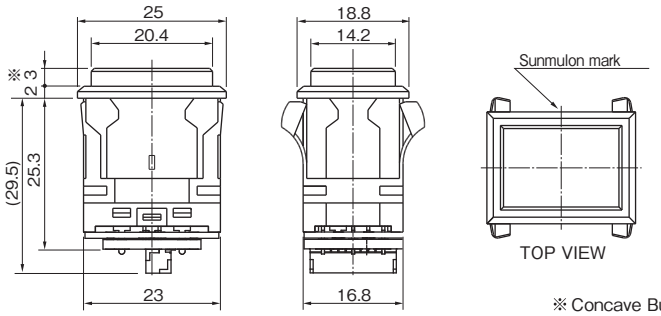


A length	Part No
100cm	EH-3250-1
200cm	EH-3250-2

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

DIMENSIONS

● DPDT

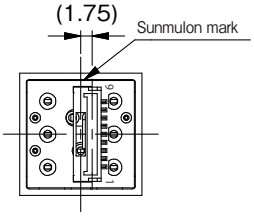
14.2 mm Square Button		 ※Concave Button type : 3.9
14.2 x 20.4 mm Rect. Button		 ※Concave Button type : 3.9

TERMINAL LAYOUT

● DPDT

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

Connetcor
JST made
BM09B-GHS-TBT



(BOTTOM VIEW)

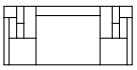
ACCESSORIES

● DPDT

● Connector

Part No	EH-5180

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

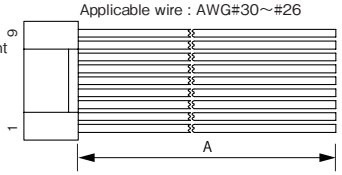


Housing
(JST made GHR-09V-S)

Contact Pin
(JST made 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