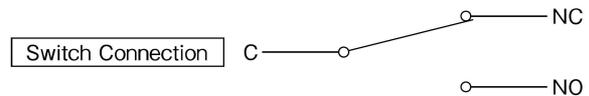


FH Miniature Lighted Pushbutton Switch

Built-in Resistor LED illumination makes free from wiring resistor.

■ FEATURES

- Depth behind panel : Only 19.8mm
- Full Face and Spot display type available.
- Built-in resistor for 5V,12V,24V use.
- Light Cartridge is removable from front panel.
- Button Size: 11.4mm square type, 11.4×16.4mm 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.



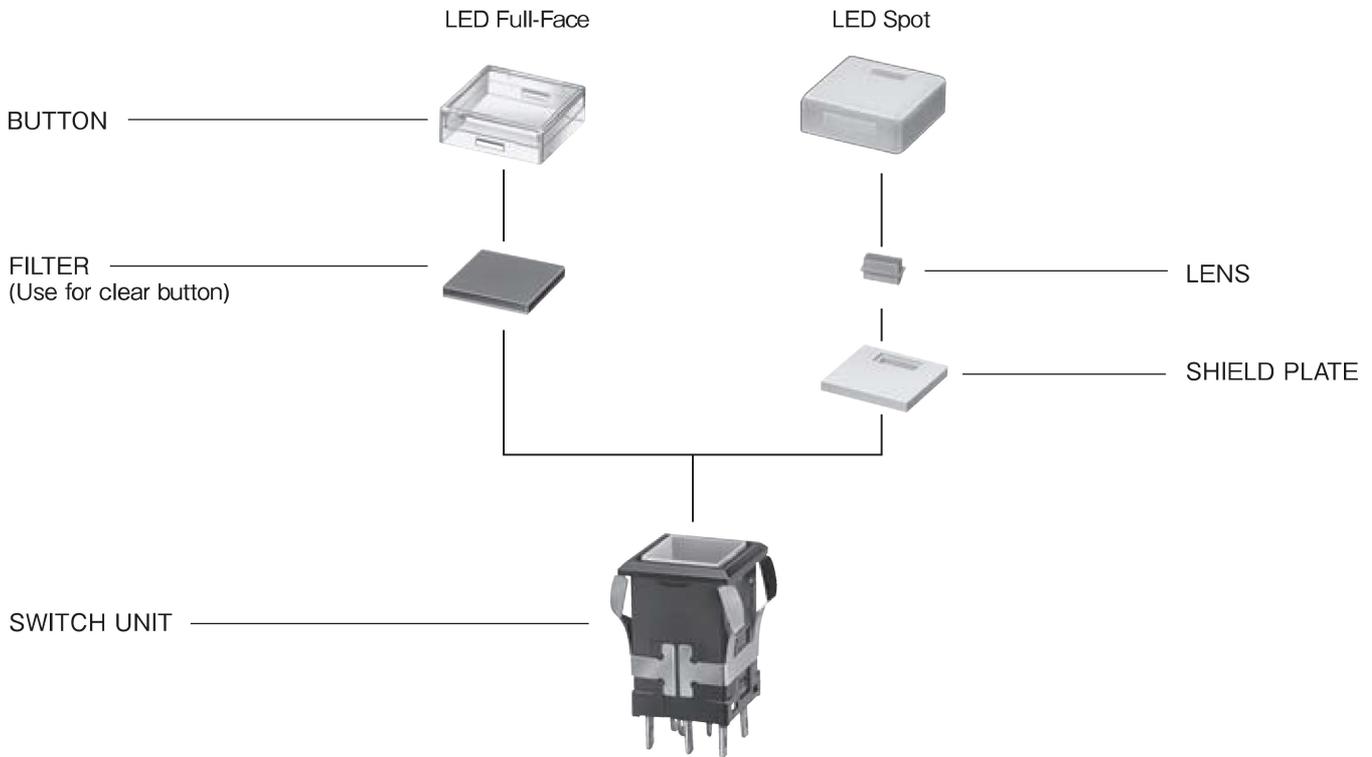
Specifications

Contact	Silver Contact (Gold-Plated)	Cross-bar Contact
Electrical Rating	AC125V,250V 5A(Resistive)	AC125V 0.1A, DC30V 0.1A(Resistive)
Insulation Resistance	More than 100M Ω 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 30m Ω (Initial) at DC6V 1A	Less than 50m Ω (Initial) at DC6V 0.1A
Mechanical Life	Momentary Action :more than 500,000 operations Alternate Action : more than 200,000 operations	
Electrical Life	More than 30,000 operations at max. rated load	
Ambient Temperature	-15 $^{\circ}$ C to +50 $^{\circ}$ C	
Ambient Humidity	80% RH (max.)	

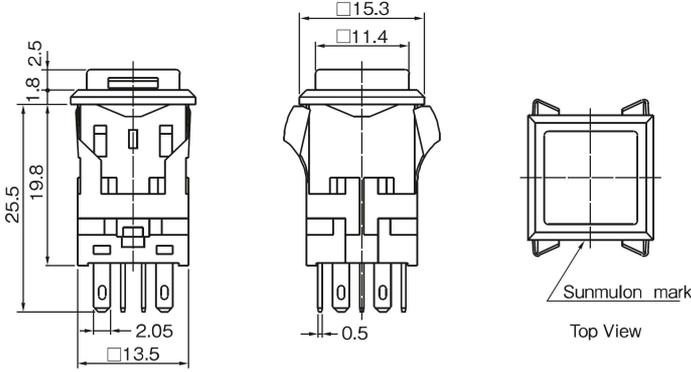
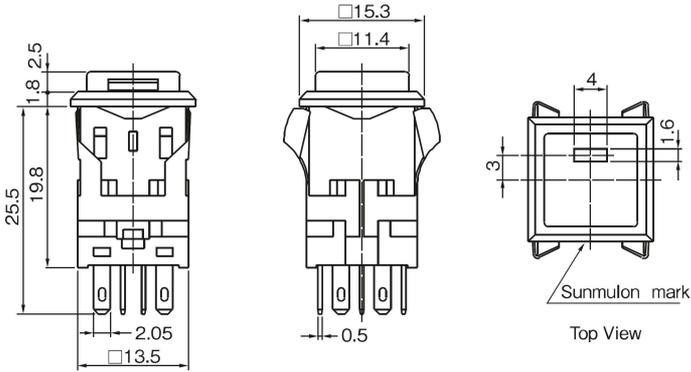
Operating Characteristics

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

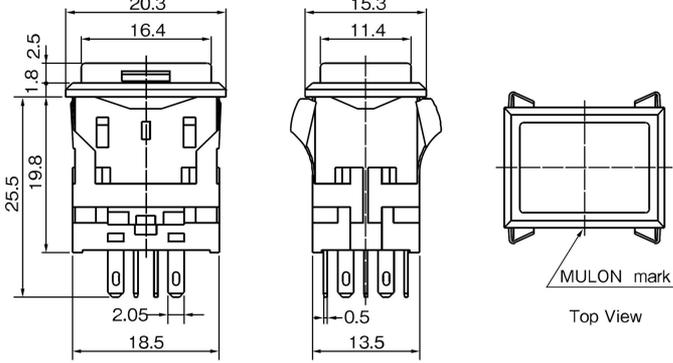
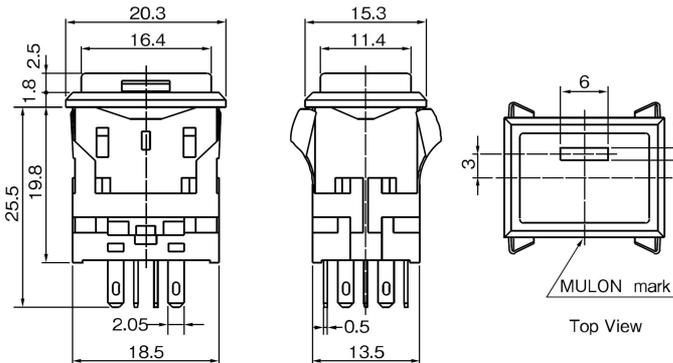


Dimensions

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">11.4mm Square Button (Full-Face)</p> 	 <p>Technical drawings for the 11.4mm Square Button (Full-Face) showing dimensions:</p> <ul style="list-style-type: none"> Front view: Total height 25.5, button height 19.8, button width 13.5, button depth 2.05, button thickness 1.8, button offset 2.5. Side view: Total width 15.3, button width 11.4, button offset 0.5. Top view: Sunmulon mark.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">11.4mm Square Button (Spot)</p> 	 <p>Technical drawings for the 11.4mm Square Button (Spot) showing dimensions:</p> <ul style="list-style-type: none"> Front view: Total height 25.5, button height 19.8, button width 13.5, button depth 2.05, button thickness 1.8, button offset 2.5. Side view: Total width 15.3, button width 11.4, button offset 0.5. Top view: Sunmulon mark, button width 4, button offset 1.6, button depth 3.

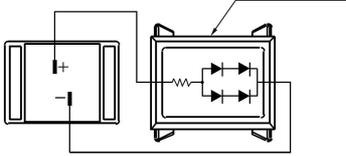
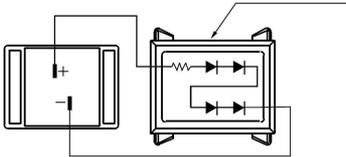
Tolerance : $\pm 0.4\text{mm}$

Dimensions

<p>11.4 × 16.4mm Rect. Button(Full-Face)</p> 	 <p>MULON mark Top View</p>
<p>11.4 × 16.4mm Rect. Button(Spot)</p> 	 <p>MULON mark Top View</p>

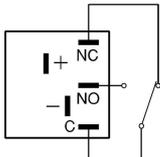
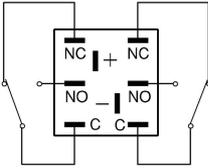
Internal Connection Arrangements

● LED (Square, Rect.)

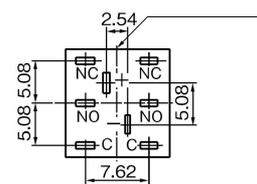
	Full-Face, Spot
<p>5 V</p>	
<p>12 V • 24 V</p>	

Terminals

● TERMINALS LAYOUT (Square, Rectangular)

STDP	DTDP	INDICATOR
<p>BOTTOM VIEW</p> 		

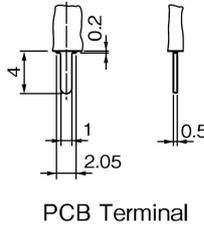
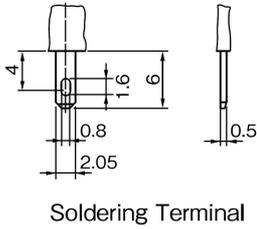
● TERMINALS DIMENSIONS (BOTTOM VIEW)



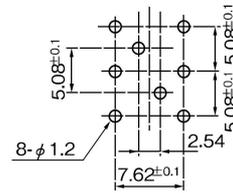
Tolerance : ±0.4mm

Terminal Shape

● TERMINAL SHAPE



● PCB HOLE DIMENSIONS (BOTTOM VIEW)



LED Ratings

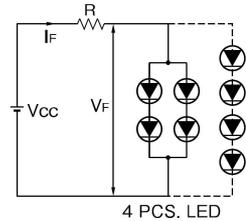
● LED RATINGS

	LED			
	DC5V(SERIES PARALLEL)		DC12, 24V (ALL SERIES)	
	Red, Yellow	Green	Red, Yellow	Green
Max. operating current I_{FM} (mA)	40	40	20	20
DC reverse voltage V_R (V)	10	10	20	20
Forward voltage V_F (V)	4	4.2	8	8.4
Recommended operating current I_F (mA)	15	25	8	13

※ In case of non-resistor type, suitable external current limiting resistors must be installed as shown by the table and formula.

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

V_{CC} : Supply Voltage
 V_F : Forward Voltage
 I_F : Forward Current



Panel Layout / Panel Cut-Out Dimensions

● 11.4mm Square Button

Panel thickness: 1mm ~ 3.2mm

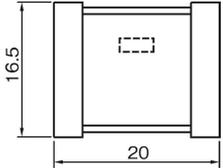
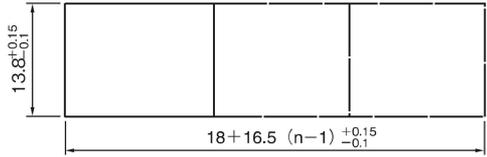
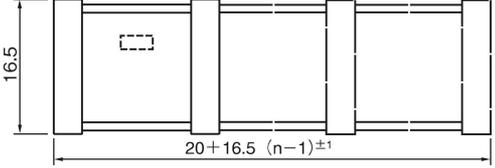
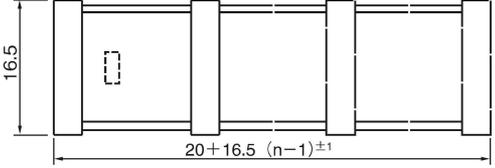
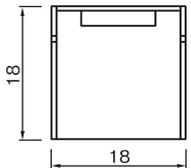
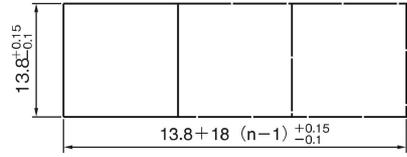
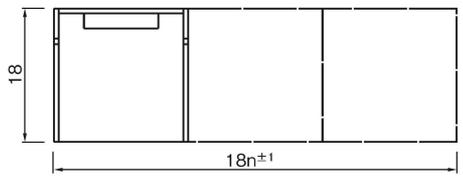
		Panel Layout	Panel Cut Dimensions
Without Barriers	Independent		
	Serial (Horizontal) ※1		
	Serial (Vertical) ※2		

n : number of switches

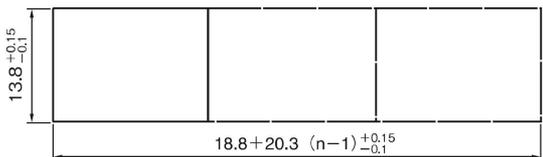
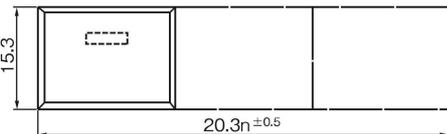
Panel Layout / Panel Cut-Out Dimensions

●11.4mm Square Button

Panel thickness : 1mm~3.2mm
 Panel thickness for Guard Cover use : 1mm~2.5mm

		Panel Layout	Panel Cut Dimensions
With Barriers	Independent		
	Serial (Horizontal)		
	Serial (Vertical)		
With Guard Covers	Independent		
	Serial (Horizontal)		

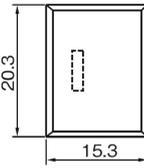
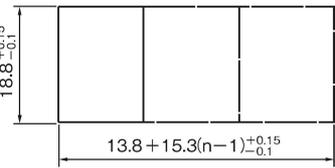
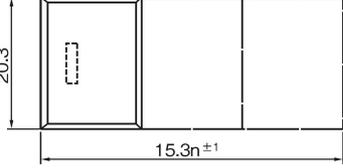
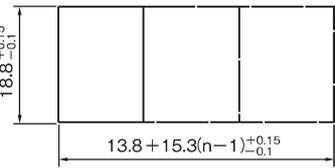
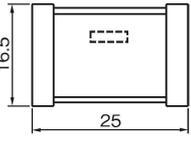
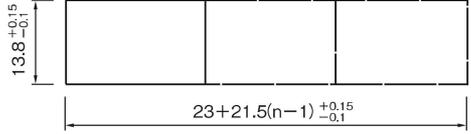
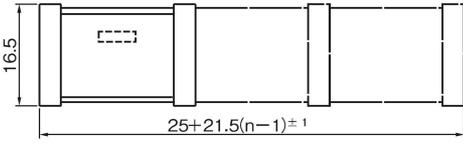
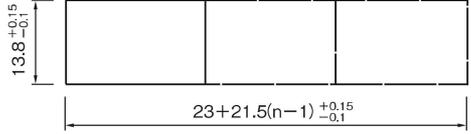
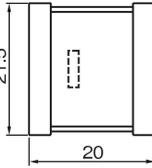
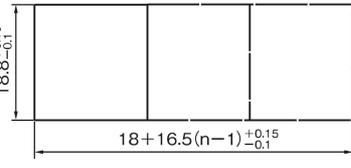
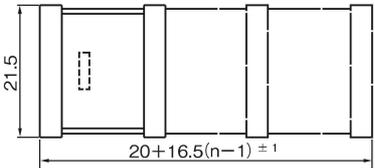
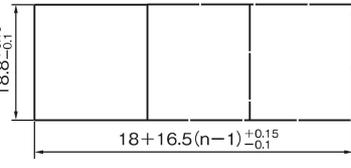
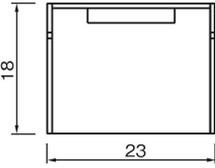
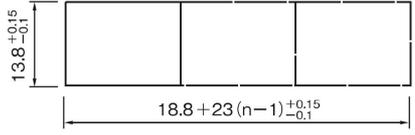
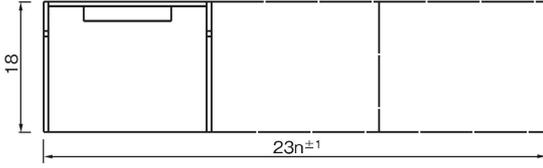
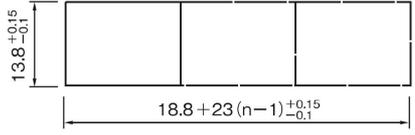
●11.4×16.4 Rect. Button

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

n : number of switches
 Tolerance : ±0.4mm

Panel Layout / Panel Cut-Out Dimensions

● 11.4mm×16.4mm Rectangular Button

		Panel Layout	Panel Cut Dimensions
Without Barriers	Independent		
	Serial (Vert.)		
With Barriers	Independent		
	Serial (Horiz.)		
	Independent		
	Serial (Vert.)		
With Guard Covers	Independent		
	Serial (Horiz.)		

n : number of switches
 Panel thickness : 1mm~3.2mm
 Panel thickness for Guard Cover use : 1mm~2.5mm
 Tolerance : ±0.4mm

Panel Layout / Panel Cut-Out Dimensions

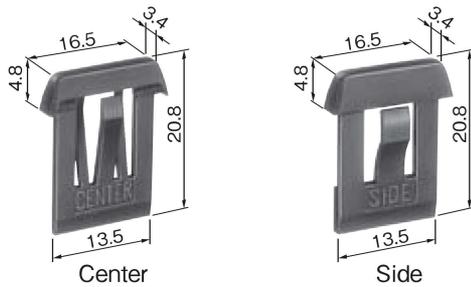
Without Barriers	With Barriers
<p>In case of block mounting, leave space between arrays as a figure.</p>	<p>In case of block mounting, leave space between arrays as a figure.</p>

Accessories

BARRIERS

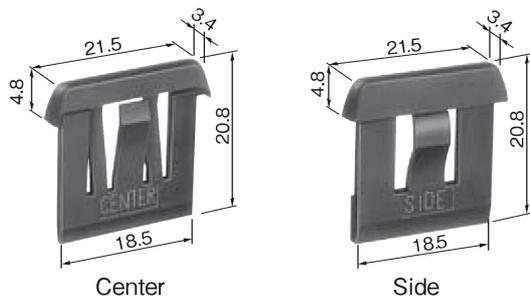
In case of mounting switches in series, barriers can be used to prevent inadvertent pushing neighbor switches.

● Short Barrier



PART NO.		
Color	Short Center Barrier	Short Side Barrier
Black	FH-592-K	FH-593-K
Gray	FH-592-G	FH-593-G

● Long Barrier (For Rectangular, Longer Side)

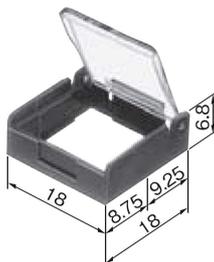


PART NO.		
Color	Long Center Barrier	Long Side Barrier
Black	FH-594-K	FH-595-K
Gray	FH-594-G	FH-595-G

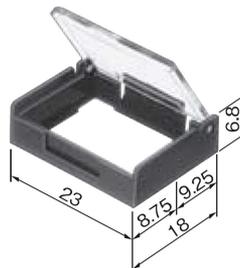
GUARD COVER

Guard Cover prevents inadvertent and unintentional operations. (cannot be used with barriers.)

● 11.4mm Square Button



● 11.4×16.4mm Rect. Button



PART NO.		
Sq.	Black	FH-596-K
	Gray	FH-596-G
Rect.	Black	FH-597-K
	Gray	FH-597-G

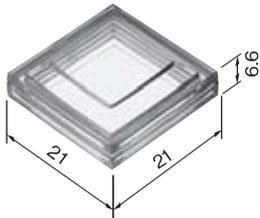
※The cover to be opened 90° and stopped.

Tolerance : ±0.4mm

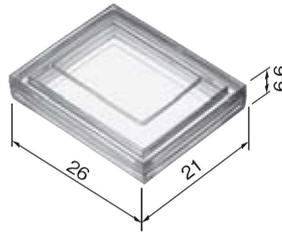
Accessories

Dust-Proof Cover

● 11.4mm Square Button

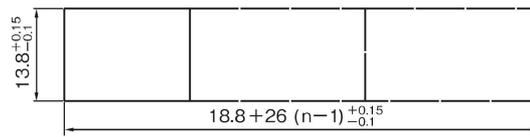
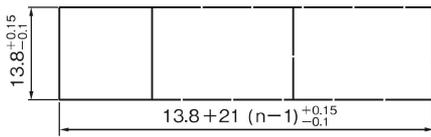


● 11.4×16.4mm Rectangular Button



PART NO.	
Square	Rectangular
FH-598	FH-599

● Panel Cut Dimensions for Dust-Proof Cover use.



Panel Thickness : 1~2.5mm

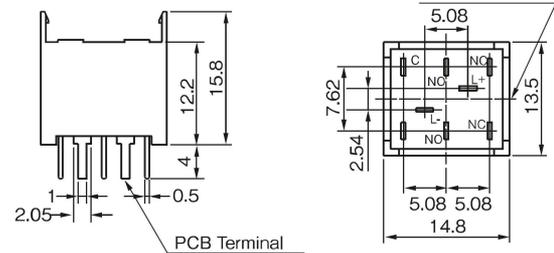
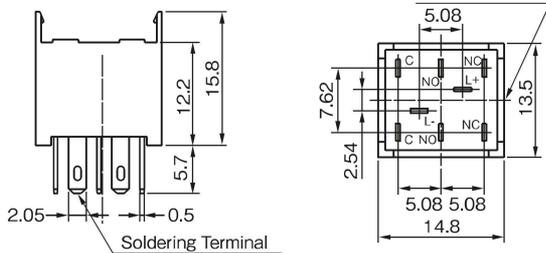
SOCKET

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

● Soldering Terminal Socket

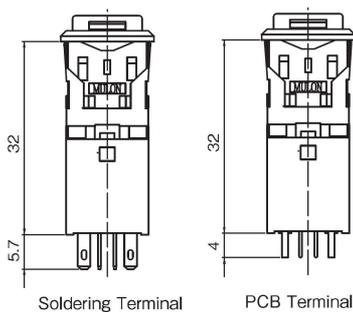


● PCB Terminal Socket



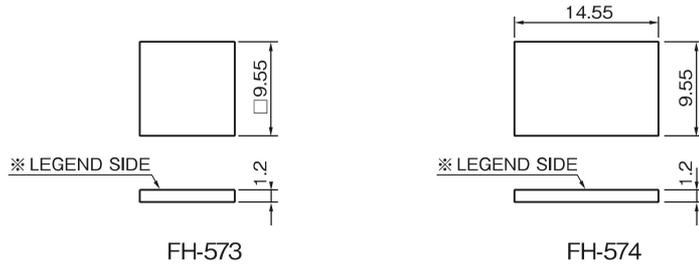
※ Switch Unit Terminal should be Soldering Type for both sockets.

PART NO	
Soldering Terminal Socket	PCB Terminal Socket
FH-0735	FH-0736



Tolerance : ±0.4mm

Filter Dimensions



Tolerance : ±0.4mm

Replacement Parts

Please order buttons and filters as replacement parts as follow.

LED Full-Face

FH - [] [] [] - [] []

● BUTTON SHAPE

573	11.4mm Square Button
574	11.4×16.4mm Rect. Button

● BUTTON COLOR

R	Red
LG	Green
※ Y	Yellow
M	Milk White
C	Clear
K	Black
×	Without Button

● FILTER COLOR

1	Red
L2	Green
※ 3	Yellow
4	Milk White
0	Without Filter

LED SPOT

FH - [] [] [] - [] []

● BUTTON SHAPE

575	11.4mm Square Button
576	11.4×16.4mm Rect. Button

● BUTTON COLOR

R	Red
G	Green
※ Y	Yellow
M	Milk White
B	Blue
K	Black
×	Without Button

● LENS COLOR

1	Red
2	Green
※ 3	Yellow
4	Milk White
0	Without LED

Ordering Code

LED Full-Face

FH □ — □ □ □ □ □ □ □ □ □ □

● **OPERATION**

M	Momentary
A	Alternate
L	Indicator

● **CONTACT**

0	Indicator
1	SPDT • Silver (Gold-Plated)
2	DPDT • Silver (Gold-Plated)
3	SPDT • Crossbar
4	DPDT • Crossbar

● **BUTTON SHAPE**

S	11.4mm Square Button
W	11.4×16.4mm Rect. Button

● **Supply Voltage to LED**

4	Non-Resistor (All Series)
5	Non-Resistor (Series Pararell)
6	5V Built-in Resistor
7	12V Built-in Resistor
8	24V Built-in Resistor
×	Without LED

● **LED COLOR**

70	Red
80	Green
90	Yellow
×	Without LED

● **HOUSING COLOR**

B	Black
G	Gray

● **BUTTON COLOR**

R	Red
G	Green
Y	Yellow
M	Milk White
C	Clear
×	Without Button

● **MOUNTING** ※1

1	For Vertical Mtg.
2	For Horizontal Mtg.

● **TERMINAL**

S	Soldering
---	-----------

● **FILTER COLOR**

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

★ Generally, in case of using color button, filters are not necessary.
※ "Yellow" color for LED/Button/Filter is actually "Orange Yellow".

※1) Snap-spring metal plates come out Left/Right direction for Vertical Mounting, and Top/Bottom direction for Horizontal Mounting to avoid interfering mutually. Therefore, in case of independent use, it does not matter. (select 2 Horizontal ordinary)

LED SPOT

FH □ — □ □ □ □ □ □ □ □ □ □

● **OPERATION**

M	Momentary
A	Alternate
L	Indicator

● **CONTACT**

0	Indicator
1	SPDT • Silver (Gold-Plated)
2	DPDT • Silver (Gold-Plated)
3	SPDT • Crossbar
4	DPDT • Crossbar

● **BUTTON SHAPE**

P	11.4mm Square Button
L	11.4×16.4mm Rect. Button

● **Supply Voltage to LED**

4	Non-Resistor (All Series)
5	Non-Resistor (Series Pararell)
6	5V Built-in Resistor
7	12V Built-in Resistor
8	24V Built-in Resistor
×	Without LED

● **LED COLOR**

70	Red
80	Green
90	Yellow
×	Without LED

● **HOUSING COLOR**

B	Black
G	Gray

● **BUTTON COLOR**

R	Red
G	Green
Y	Yellow
M	Milk White
B	Blue
K	Black
×	Without Button

● **MOUNTING** ※1

1	For Vertical Mtg.
2	For Horizontal Mtg.

● **TERMINAL**

S	Soldering
---	-----------

● **LENS COLOR**

1	Red
2	Green
3	Yellow
4	Milk White

※ "Yellow" color for LED/Button/Lens is actually "Orange Yellow".
※1) Snap-spring metal plates come out Left/Right direction for Vertical Mounting, and Top/Bottom direction for Horizontal Mounting to avoid interfering mutually. Therefore, in case of independent use, it does not matter. (select 2 Horizontal ordinary)