

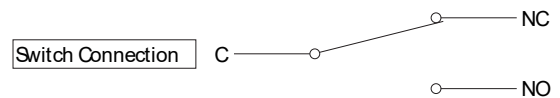
## FH Illuminated Pushbutton Switch

**Only 19.8mm depth behind panel with built-in resistor**

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

### ■ FEATURES

- Depth behind panel : Only 19.8mm
- Full Face and Spot display type available.
- 4pcs. LED illumination type.
- Built-in resistor for 5V,12V,24V use.
- Light Cartridge is removable from front panel.
- Button Size: 11.4mm square type, 11.4 x 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

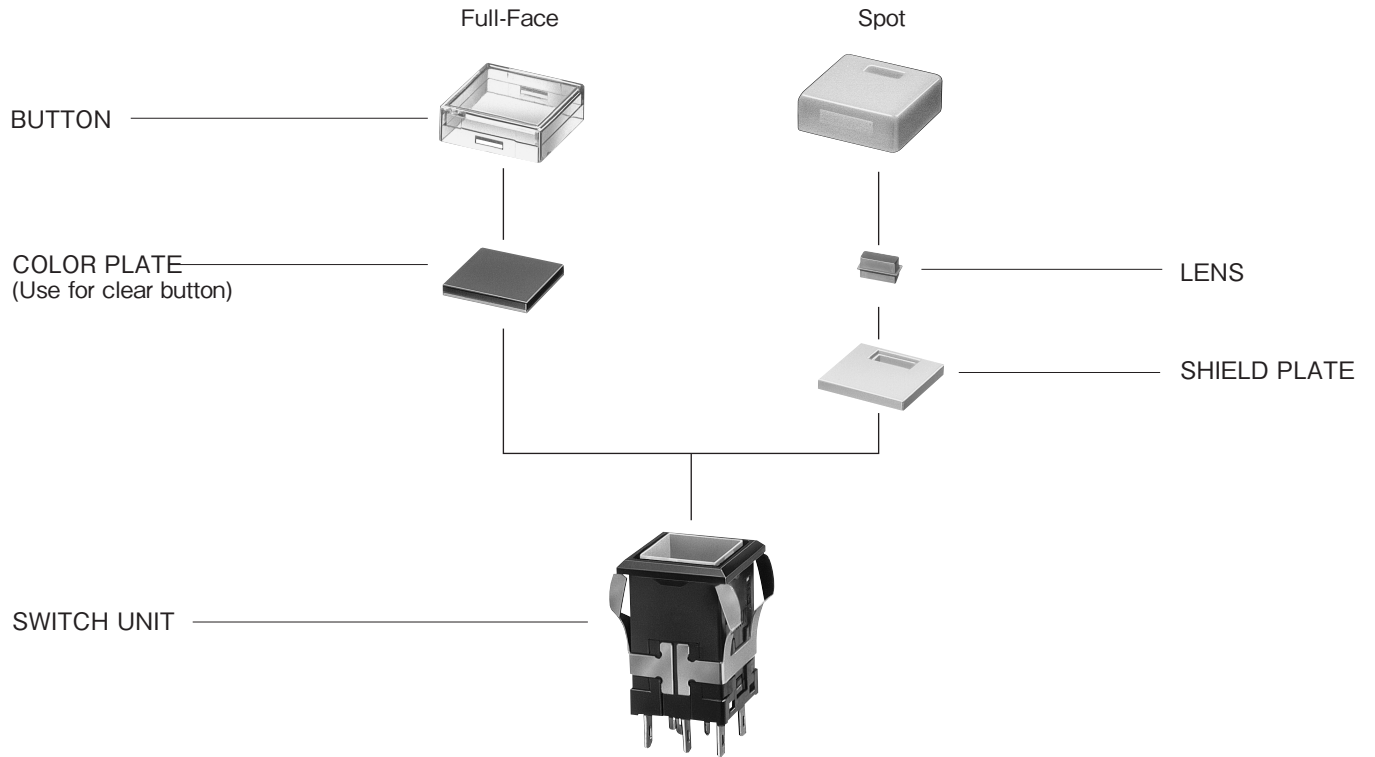
Contact	Silver Contact (Gold-Plated)	Cross-bar Contact
Electrical Rating	AC35V 1A(Resistive)	AC35V 0.1A, DC30V 0.1A(Resistive)
Insulation Resistance	More than 100M $\Omega$ at 500V DC	
Dielectric Strength	1000V AC RMS between NC and NO terminal 1500V AC RMS between terminals and ground 50/60Hz for 60sec. 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 $\Omega$ (Initial) at DC6V 1A	Less than 50m $\Omega$ (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.)	

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

## OPERATING CHARACTERISTICS

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

## STRUCTURE


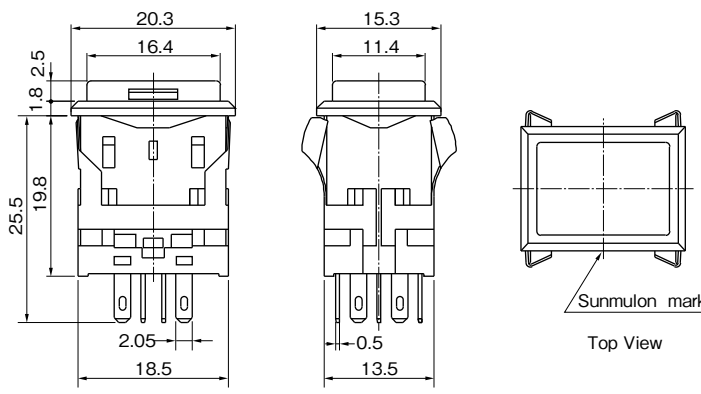

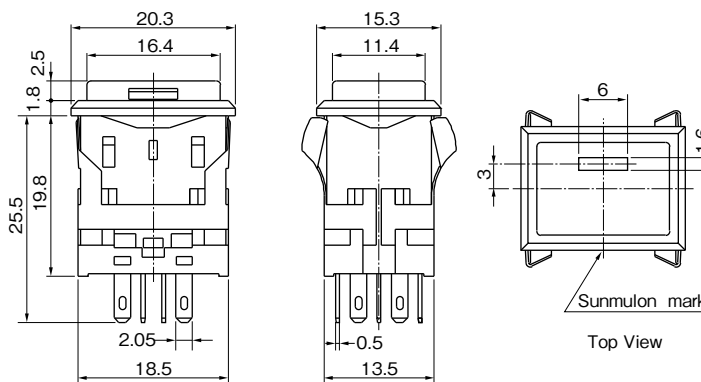


## DIMENSIONS

<p>11.4mm Square Button ( Full-Face )</p>	<p>Technical drawings for the 11.4mm Square Button (Full-Face) showing dimensions: 15.3mm (total width), 11.4mm (inner width), 1.8mm (button height), 2.5mm (button offset), 25.5mm (total height), 19.8mm (mounting height), 2.05mm (pin spacing), 13.5mm (pin width), and 0.5mm (pin offset). The top view shows the Sunmulon mark.</p>
<p>11.4mm Square Button ( Spot )</p>	<p>Technical drawings for the 11.4mm Square Button (Spot) showing dimensions: 15.3mm (total width), 11.4mm (inner width), 1.8mm (button height), 2.5mm (button offset), 25.5mm (total height), 19.8mm (mounting height), 2.05mm (pin spacing), 13.5mm (pin width), and 0.5mm (pin offset). The top view shows the Sunmulon mark with a 4mm width and 1.6mm offset.</p>

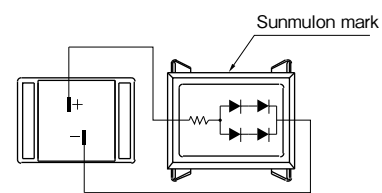
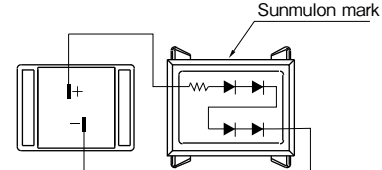
Tolerance :  $\pm 0.4\text{mm}$

**DIMENSIONS**

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

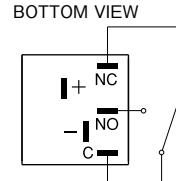
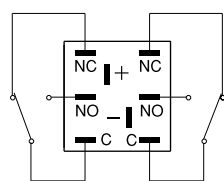
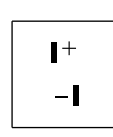
**INTERNAL CONNECTION ARRANGEMENTS**

● LED (Square, Rect.)

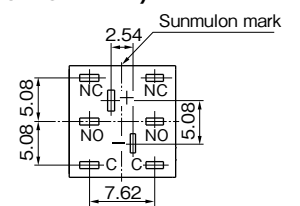
<p>LED (Full-Face)</p>	<p>5 V</p> <p>4 PCS. LED</p> 
<p>12 V 24 V</p>	

**TERMINALS**

● TERMINALS LAYOUT (Square, Rectangular)

<p><b>SPDT</b></p> <p>BOTTOM VIEW</p> 	<p><b>DPDT</b></p> 	<p><b>INDICATOR</b></p> 
---	--	---

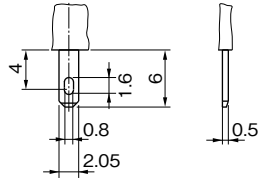
● TERMINALS DIMENSIONS (BOTTOM VIEW)



Tolerance : ±0.4mm

## TERMINAL SHAPE

### ● TERMINAL SHAPE



Soldering Terminal

## LED RATINGS

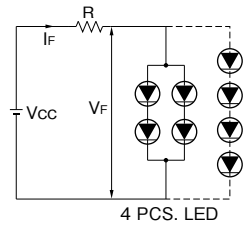
### ● LED RATINGS

	4 PCS. LED			
	DC5V(SERIES PARALLEL)		DC12, 24V (ALL SERIES)	
	Red, Yellow	Green	Red, Yellow	Green
Max. operating current I <sub>FM</sub> (mA)	40	40	20	20
DC reverse voltage V <sub>R</sub> (V)	10	10	20	20
Forward voltage V <sub>F</sub> (V)	4	4.2	8	8.4
Recommended operating current I <sub>F</sub> (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<sub>CC</sub>: Supply Voltage  
V<sub>F</sub>: Forward Voltage  
I<sub>F</sub>: Forward Current



## PANEL LAYOUT/PANEL CUT DIMENSIONS

### ● 11.4mm Square Button

Panel thickness: 1mm ~ 3.2mm

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

※ 1 In case of Serial ( Vertical ) mounting, please select Mouting suffix 1.

※ 2 In case of Serial ( Horizontal ) mounting, please select Mouting suffix 2.

n : number of switches

## PANEL LAYOUT/PANEL CUT 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) ※2		
	Serial (Vertical) ※1		
With Guard Covers	Independent		
	Serial (Horizontal) ※2		

### ●11.4×16.4 Rect. Button

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

※ 1 In case of Serial ( Vertical ) mounting, please select Mouting suffix 1.

※ 2 In case of Serial ( Horizontal ) mounting, please select Mouting suffix 2.

n : number of switches  
 Tolerance : ±0.4mm

## PANEL LAYOUT/PANEL CUT DIMENSIONS

### ● 11.4mm×16.4mm Rectangular Button

		Panel Layout	Panel Cut Dimensions
Without Barriers	Independent		
	Serial (Vert.) ※1		
With Barriers	Independent		
	Serial (Horiz.) ※2		
	Independent		
	Serial (Vert.) ※1		
With Guard Covers	Independent		
	Serial (Horiz.) ※2		

※ 1 In case of Serial ( Vertical ) mounting, please select Mouting suffix 1.  
 ※ 2 In case of Serial ( Horizontal ) mounting, please select Mouting suffix 2.

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 DIMENSIONS

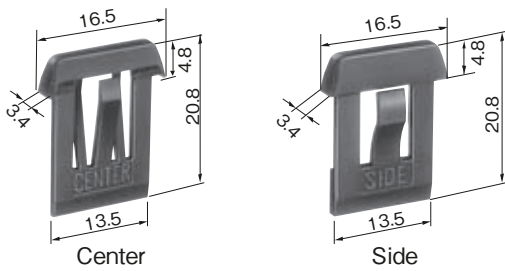
Without Barriers	With Barriers
<p>In case of block mounting, leave space between arrays as a figure.</p>	<p>In case of block mounting, leave space between arrays as a figure.</p>

ACCESSORIES

**BARRIERS**

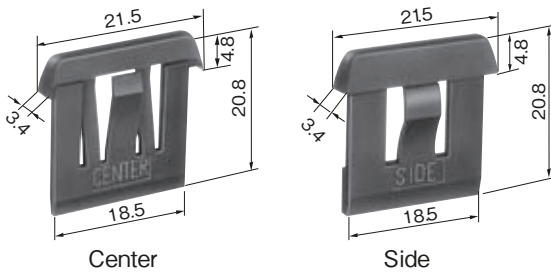
In case of mounting switches in series, barriers can be used to prevent inadvertent pushing neighbor switches.

● 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)

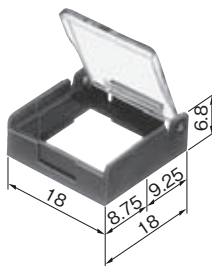


PART NO.		
Color	Long Center Barrier	Long Side Barrier
Black	FH-594-K	FH-595-K
Gray	FH-594-G	FH-595-G

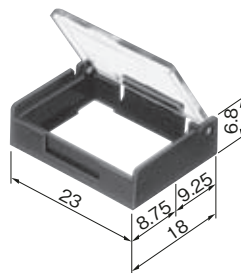
**GUARD COVER**

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

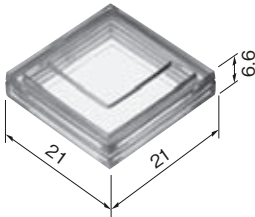
※The cover to be opened 90° and stopped.

Tolerance : ±0.4mm

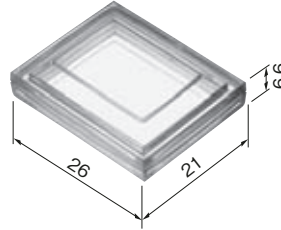
## ACCESSORIES

### Dust-Proof Cover

#### ● 11.4mm Square Button

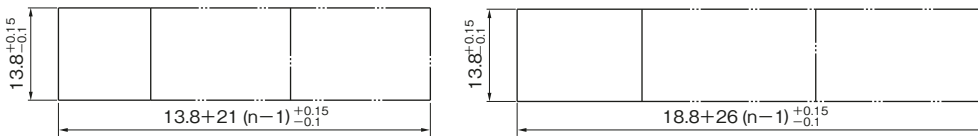


#### ● 11.4 × 16.4mm Rectangular Button



PART NO.	
Square	Rectangular
FH-598	FH-599

#### ● Panel Cut Dimensions for Dust-Proof Cover use.

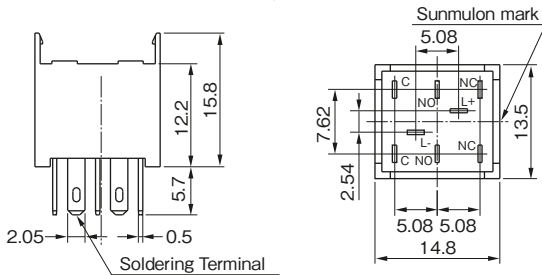


Panel Thickness : 1~2.5mm

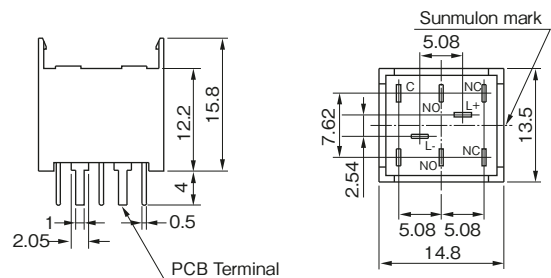
### SOCKET

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

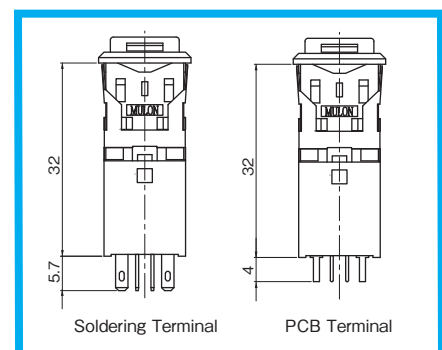
#### ● Soldering Terminal Socket



#### ● PCB Terminal Socket



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



Tolerance : ±0.4mm



## ORDERING CODE

**Full-Face**

**FH** [ ] - [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] **+Z**

● **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 X 16.4mm Rect. Button

● **Supply Voltage to LED**

4	Non-Resistor (4 PCS. LED, All Series)
5	Non-Resistor (4 PCS. LED, 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	Grey

● **BUTTON COLOR**

R	Red
G	Green
Y	Yellow
M	Milk White
C	Clear

● **MOUNTING DIRECTION**

1	For Vertical Mtg.
2	For Horizontal Mtg.

In case of independent use, it does not matter. (select 2 Horizontal ordinary)

● **TERMINAL**

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

● **COLOR PLATE**

1	Red
2	Green
3	Yellow
4	Milk White
×	Without Color Plate

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

※ "Yellow" color for LED/Button/Color Plate is actually "Orange Yellow".

**SPOT**

**FH** [ ] - [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] **+Z**

● **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 X 16.4mm Rect. Button

● **Supply Voltage to LED**

4	Non-Resistor (4 PCS. LED, All Series)
5	Non-Resistor (4 PCS. LED, 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	Grey

● **BUTTON COLOR**

R	Red
G	Green
Y	Yellow
M	Milk White
B	Blue
K	Black

● **MOUNTING DIRECTION**

1	For Vertical Mtg.
2	For Horizontal Mtg.

In case of independent use, it does not matter. (select 2 Horizontal ordinary)

● **TERMINAL**

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

● **LENS COLOR**

1	Red
2	Green
3	Yellow
4	Milk White

※ "Yellow" color for LED/Button/Lens is actually "Orange Yellow".