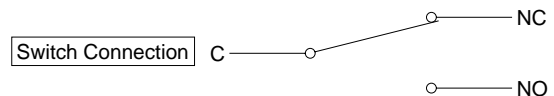


# KH Miniature Lighted Pushbutton Switch

**Full-Face, Split-Face, Dual-Color with built-in resistor.  
Oil and Water-Tight Version to IP65 available.**

## FEATURES

- $\phi 16\text{mm}$  (.627") mounting hole.
- Depth behind panel : Only 22mm.
- Full-Face, Split-Face, Dual-Color illumination available.
- Built-in resistor for 5V, 12V, 24V use.
- Light Cartridge is removable from front panel.
- Button Size: 14.2mm square type, 14.2×20.2mm rectangular type.
- Precision-snap action switch movement with coil spring assures long life and outstanding tactile feedback.
- Silver Contact (Gold-Plated) and W/E Alloy #1 Cross-bar Contact provided.
- Accessories: Guard Cover, Mounting Wrench, Switch Unit Removal Tool.



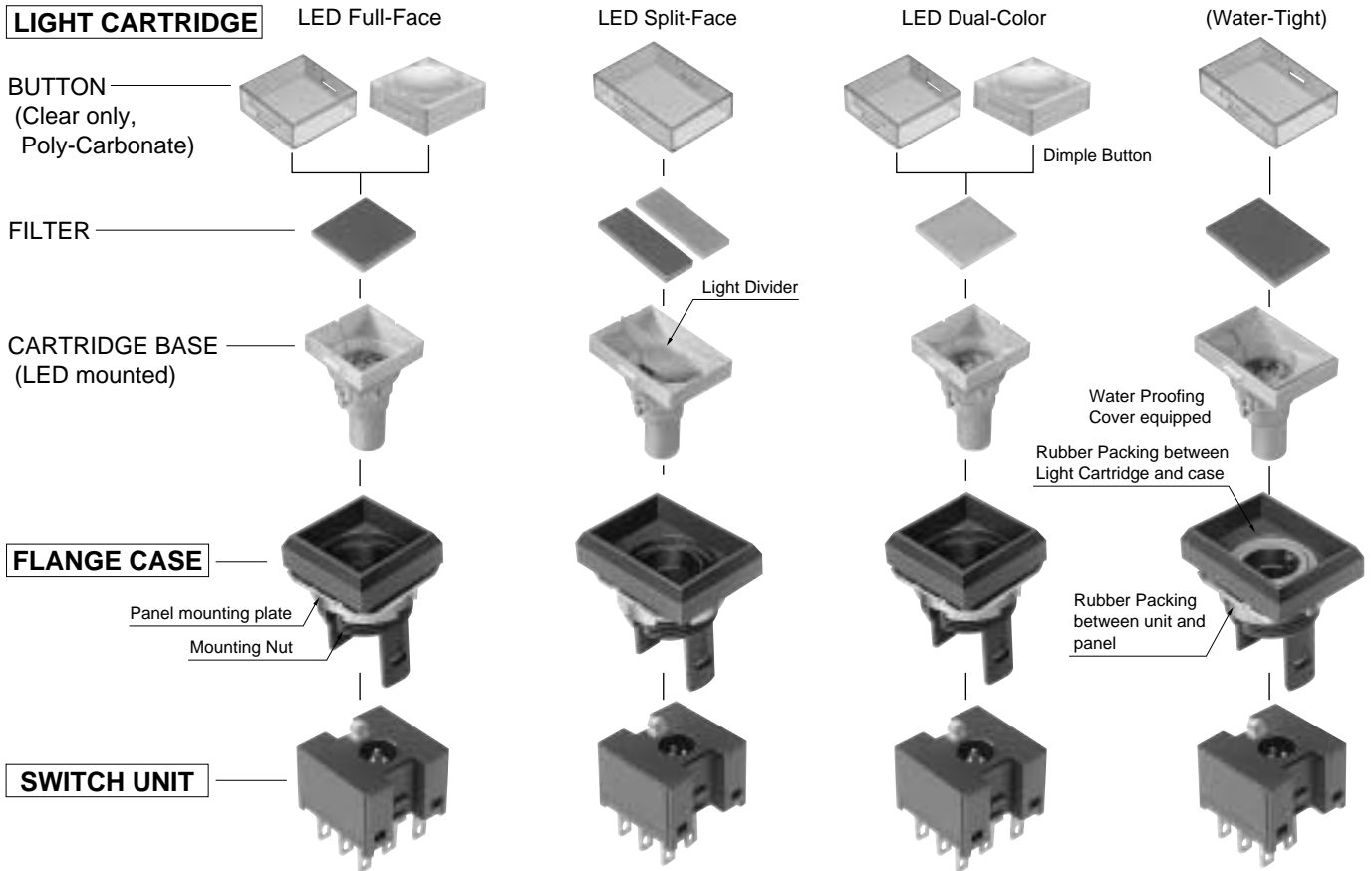
## SPECIFICATIONS

Contact	Silver Contact (Gold-Plated)	W/E Alloy #1 Cross-bar Contact
Electrical Rating	AC125V,250V 3A(Resistive)	AC125V 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 2,000,000 operations	Alternate Action : more than 200,000 operations
Electrical Life	More than 100,000 operations at max. rated load	
Ambient Temperature	-15°C to +50°C	
Ambient Humidity	80% RH (max.)	

## OPERATING CHARACTERISTICS

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



## DIMENSIONS

14.2mm Square Button			<p>Top View</p> <p>*3.9 for Dimple Button</p>
14.2×20.2mm Rect. Button			<p>Top View</p>

## INTERNAL CONNECTION ARRANGEMENTS

### ● LED (Red, Green, Yellow)

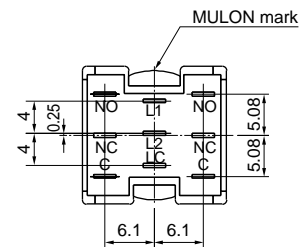
	(V)	Full-Face	Dual-Color	Split-Face
LED Full-Face (Square)	5V			
	12V, 24V			<p>*Cannot apply built-in resistor type for 24V. *Please inquire when cathode common type needed.</p>
LED Full-Face (Rectangular)	5V			
	12V, 24V			<p>*Cannot apply built-in resistor type for 24V. *Please inquire when cathode common type needed.</p>

## TERMINALS

### ● TERMINALS LAYOUT (Square, Rectangular)

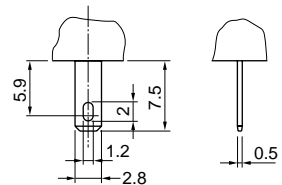
	STDP	DTDP	INDICATOR
Full-Face			
Dual-Color, Split-Face			

### ● TERMINALS DIMENSIONS (BOTTOM VIEW)



\*Full Face type has no L2 terminal.

### ● TERMINAL SHAPE



110 TAB, Soldering Terminal

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

## LED DATA

\* Red=R, Yellow=Y, Green=G,

### ● LED RATINGS

DC Supply Voltage (V)	Current Rating (mA)		
	Full-Face	Split-Face	Dual-Color
5 (±5%)	32	16	32
12 (±5%)	16	16	16
24 (±5%)	12	*	8

### ● 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						Split-Face			Dual-Color			
	DC5V			DC12V,24V			DC5V,12V,24V			DC5V		DC12V,24V	
	R	G	Y	R	G	Y	R	G	Y	R	G	R	G
Max. operating current I <sub>FM</sub> (mA)	40	40	40	20	20	20	20	20	20	40	40	20	20
DC reverse voltage V <sub>R</sub> (V)	10	10	10	20	20	20	10	10	10	10	12	20	24
Forward voltage V <sub>F</sub> (V)	3.6	4.3	4.0	7.1	8.6	8.0	3.6	4.3	4.0	3.8	4.4	7.6	8.8
Recommended operating current I <sub>F</sub> (mA)	32	32	32	16	16	16	16	16	16	32	32	16	16
Wiring diagram	Fig. 1						Fig. 2						

Figure 1

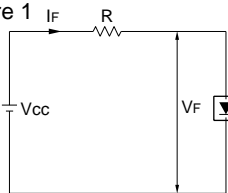
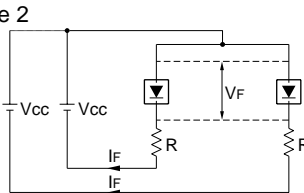


Figure 2



The value of the series resistor can be determined by the 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

### ● 14.2mm Square

Panel thickness: 0.5 ~ 3.2mm

	Panel Layout	Panel Cut Dimensions
Without Guard Cover		
With Guard Cover		

### ● 14.2×20.2mm Rect. Button

	Panel Layout	Panel Cut Dimensions
Without Guard Cover		
With Guard Cover		

n : number of switches (horizontal) m : number of switches (vertical)

\*Panel Cut Dimension should be after panel paintings.

Note : Panel thickness: 0.5~2.2mm for Guard Cover use

Panel thickness: 0.5~2.7mm for Oil and Water-Tight Version

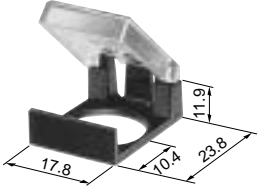
Tolerance : ±0.4mm

## ACCESSORIES

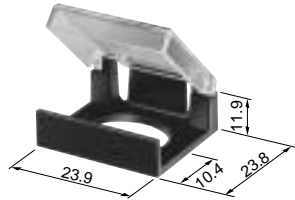
### GUARD COVER

Guard Cover prevents inadvertent and unintentional operations.

● 14.2mm Square Button



● 14.2×20.2mm Rect. Button



PART NO.		
Color	Squre	Rectangular
Black	KH-1565-K	KH-1566-K
Gray	KH-1565-H	KH-1566-H

\*The cover to be opened 90° and stopped.

### MOUNTING WRENCH

Recommended tool for mounting KH series.



PART NO. MH-448

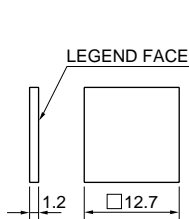
### SWITCH UNIT REMOVING TOOL

Recommended for removing switch unit from flange case.

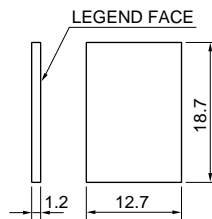


PART NO. KH-1496

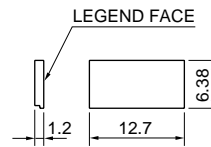
## FILTER DIMENSIONS



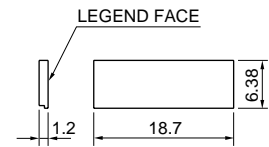
KH-1491



KH-1494



KH-1492



KH-1495

## REPLACEMENT PARTS

### ● Button

ITEM	PART NO.
Square Button	KH-1490
Rect. Button	KH-1493
Square Dimple Button	KH-1597

### ● Filter

ITEM	Color	Red	Green	Yellow	Milk-White
Square Full-Face Filter		KH-1491-LR	KH-1491-LG	KH-1491-LY	KH-1491-LM
Rect. Full-Face Filter		KH-1494-LR	KH-1494-LG	KH-1494-LY	KH-1494-LM
Square Split-Face Filter		KH-1492-LR	KH-1492-LG	KH-1492-LY	KH-1492-LM
Rect. Split-Face Filter		KH-1495-LR	KH-1495-LG	KH-1495-LY	KH-1495-LM

### ● Panel Mounting Washer KH-1473



### ● Panel Mounting Nut KH-1474



### ● Rubber Packing for Panel Mounting KH-1475 (Water-Tight Type)



### ● Split-Face Divider

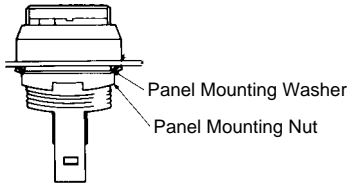
Square Split-Face	KH-1497-1
Rect. Split-Face	KH-1498-1

Tolerance : ±0.4mm

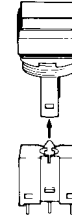
## ASSEMBLY & DISASSEMBLY

### 1. Mounting Switch

(1) Insert Flange Case from front of panel, and fit the panel mounting washer from rear and tighten mounting nut with mounting wrench (MH-448).

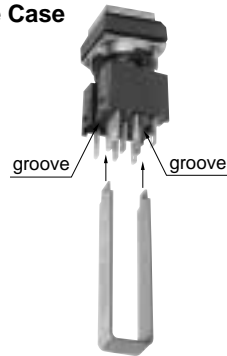


(2) Combine Flange Case and Switch Unit with right direction until click.



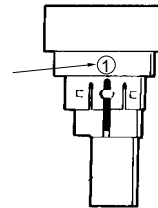
### 2. Removing Switch Unit from Flange Case with removing tool(KH-1496).

Insert nails into grooves as shown and push in until click. And remove carefully not to break legs of Flange Case.



### 3. Indicating supply voltage to LED

Indicating code number of voltage as shown.



No.	Voltage
1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor
4	5V Non-Resistor
5	21V, 24V Non-Resistor
6	Split-Face non resistor
	Without LED

## ORDERING CODE

### LED Illumination

KH    —          1 2          1 2         

● **OPERATION**

M	Momentary
A	Alternate
L	Indicator

● **CONTACT**

0	Indicator
3	SPDT · Silver (Gold-Plated)
4	DPDT · Silver (Gold-Plated)
5	SPDT · W/E Alloy #1 Crossbar
6	DPDT · W/E Alloy #1 Crossbar

● **BUTTON SHAPE, ILLUMINATION TYPE**

* S0	Square Full-Face
W0	Rect. Full-Face
S2	Square Split-Face
W2	Rect. Split-Face
S3	Square Dual-Color
W3	Rect. Dual-Color
K0	Square Dimple Button Full-Face
K2	Square Dimple Button Split-Face
K3	Square Dimple Button Dual-Color

● **LED COLOR**

7	Red	Full-Face : Put color no. into the frame 1 Split-Face : Put color no. into the frame 1,2 Dual-Color Put 7,8 . into the frame 1,2
8	Green	
9	Yellow	
×	Without LED	

● **PROTECTION**

A	No Protection
B	Oil and Water-tight (IP65) version

● **Supply Voltage to LED**

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor
4	5V Non-Resistor
5	12V, 24V Non-Resistor
6	Non-Resistor Split-Face
×	Without LED

● **HOUSING**

K	Black
H	Gray

● **BUTTON COLOR**

C	Clear
×	W/O Button

● **TERMINAL**

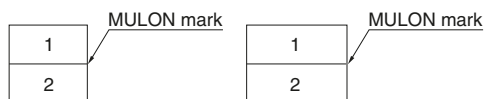
P	#110 Tab, Soldering
C	PCB

● **FILTER COLOR**

1	Red	Full-Face : Put color no. into the frame 1 Split-Face : Put color no. into the frame 1,2 Dual-Color Put 4 . into the frame 1
2	Green	
3	Yellow	
4	Milk-White	
×	Without-Filter	

● **NOTES**

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



- 2) In case of Dual-Color, Red and Green combination only, filter color to be Milk-White.  
 3) Dimple Button type is only for Square button.  
 4) Please be noted that the color of "Yellow" for LED, Filter is actually "Orange Yellow" not Lemon Yellow.

**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

- (1) 5V use : Select 1 (5V built-in resistor). Simultaneous lighting is possible.  
 (2) 12V use: Select 2 (12V built-in resistor). However in case of simultaneous lighting, please select 6 (Split-Face non resistor) and apply external resistor accordingly.  
 (3) 24V use : Either do or not do simultaneous lighting, cannot select 3 (24V built-in resistor). Please select 6 (Split-Face non resistor) and apply external resistor accordingly. Simultaneous lighting is possible.

2. Dual Color

It is impossible to do simultaneous lighting with all 5V,12V,24V. In case of simultaneous lighting , please select 4,5, respectively and apply external resistor.

## ORDERING CODE2

It is possible to order Light Cartridge, Flange Case, Switch Unit individually.

### LIGHT CARTRIDGE

**KH** —

#### ● BUTTON SHAPE, ILLUMINATION TYPE

S0	Square Full-Face	K0	Dimple B. Sq. Full-Face
W0	Rect. Full-Face	K2	Dimple B. Sq. Split-Face
S2	Square Split-Face	K3	Dimple B. Sq. Dual-Color
W2	Rect. Split-Face		
S3	Square Dual-Color		
W3	Rect. Dual-Color		

#### ● BUTTON COLOR

C	Clear
×	Without Button

#### ● PROTECTION

A	No Protection
B	Oil and Water-tight (IP65) version

#### ● FILTER COLOR

1	Red	Full-Face : Put color no. into the frame 1 Split-Face : Put color no. into the frame 1,2 Dual-Color Put 4 . into the frame 1
2	Green	
3	Yellow	
4	Milk-White	
×	Without Filter	

#### ● Supply Voltage to LED

1	5V Built-in Resistor
2	12V Built-in Resistor
3	24V Built-in Resistor
4	5V Non-Resistor
5	12V, 24V Non-Resistor
6	Non-Resistor Split-Face
×	Without LED

#### ● LED COLOR

7	Red	Full-Face : Put color no. into the frame 1 Split-Face : Put color no. into the frame 1,2 Dual-Color Put 7,8 . into the frame 1,2
8	Green	
9	Yellow	
×	Without LED	

## ORDERING CODE2

### FLANGE CASE

**KH**  —

#### ● OPERATION

S	Momentary or Alternate
L	Indicator

#### ● PROTECTION

A	No Protection
B	Oil and Water-tight (IP65) version

#### ● HOUSING

S	Square
W	Rect.

#### ● HOUSING COLOR

K	Black
H	Gray

### SWITCH UNIT

**KH**  —

#### ● OPERATION

M	Momentary
A	Alternate
L	Indicator

#### ● TERMINAL

P	#110 Tab, Soldering
C	PCB

#### ● CONTACT

0	Indicator
3	SPDT· Silver (Gold-Plated)
4	DPDT· Silver (Gold-Plated)
5	SPDT· W/E Alloy #1Crossbar
6	DPDT· W/E Alloy #1Crossbar

#### ● ILLUMINATION TYPE

D	FULL FACE
E	SPLIT FACE, DUAL-COLOR
×	WITHOUT LED