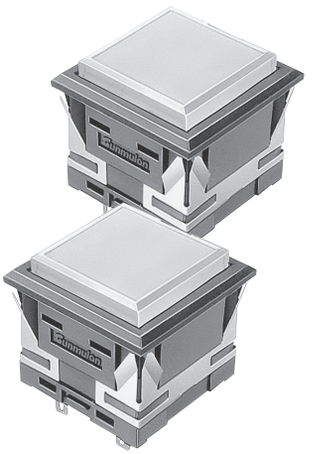
Sunmulon

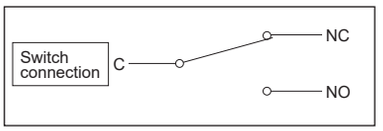
# YH Illuminated Pushbutton Switch

YH

## Big button size □25 mm.
## Easy to see and push.



- Depth behind panel：Only 22.5 mm
- LED Full-Face, Dual-Color, 2-Split-Face illumination available.
- Terminal：#110 Tab・Soldering・PCB
- Accessories：Barriers, Guard covers




## CHARACTERISTICS

| | | | |
|---|---|---|---|
| Button Size | | Square：□25 mm | |
| Contact Material | | Silver contact (Gold-plated) | Cross-bar contact |
| Rating (Resistive Load) | | AC 125 V 3 A<br>AC 250 V 3 A | AC 125 V 0.1 A<br>DC 30 V 0.1 A |
| Insulation Resistance | | More than 100 MΩ at DC 500 V | |
| Dielectric Strength | | AC 1000 V RMS between NC and NO terminal<br>AC 1500 V RMS between terminals and ground<br>50/60 Hz for 60 sec. at normal ambient temperature and humidity | AC 600 V RMS between NC and NO terminal<br>AC 1500 V RMS between terminals and ground<br>50/60 Hz for 60 sec. at normal ambient temperature and humidity |
| Contact Resistance | | Less than 30 mΩ (Initial value)<br>at DC 6 V 1 A | Less than 50 mΩ (Initial value)<br>at DC 6 V 0.1 A |
| Vibration Resistance | | 10 to 55 Hz, Amplitude 1.5 mm | |
| Mechanical Life | Momentary | More than 2,000,000 operations | |
| | Alternate | More than 200,000 operations | |
| Electrical Life (Resistive Load) | | More than 100,000 operations at max. rated load | |
| Operating Force | | 4.41 N max. | |
| Total Travel | | 3 mm max. | |
| Weight | | 21 g | |
| Ambient Operating Temperature | | −15℃ to 50℃ (No Freeze, No Condensation) | |
| Ambient Operating Humidity | | 80%RH max. (No Condensation) | |
| Ambient Storage Temperature | | −25℃ to 65℃ (No Freeze, No Condensation) | |
| Ambient Storage Humidity | | 80%RH max. (No Condensation) | |

https://www.sunmulon.co.jp/english/products/switch_e/yh.html


◇Dimensions：page YH-3
◇Accessories：page YH-4
◇Ordering code：page YH-5～10
◇Internal connection arrangements：page YH-12
◇LED specifications：page YH-13～14
◇Terminals / PCB hole cutout：page YH-15
◇Mounting design / Panel cutout：page YH-16
◇Accessories' dimensions：YH-17

## SPECIFICATIONS

| | | |
|---|---|---|
| Illumination type | Full-Face | A |
| | Dual-Color | A |
| | 2-Split-Face (Horiz.) | A |
| Contact | SPDT | A |
| | DPDT | A |
| Terminal | #110 Tab Soldering | A |
| | PCB | A |
| RoHS (10 Substances) | | Conform to standards |

A : Applicable

## CONTACT RATINGS

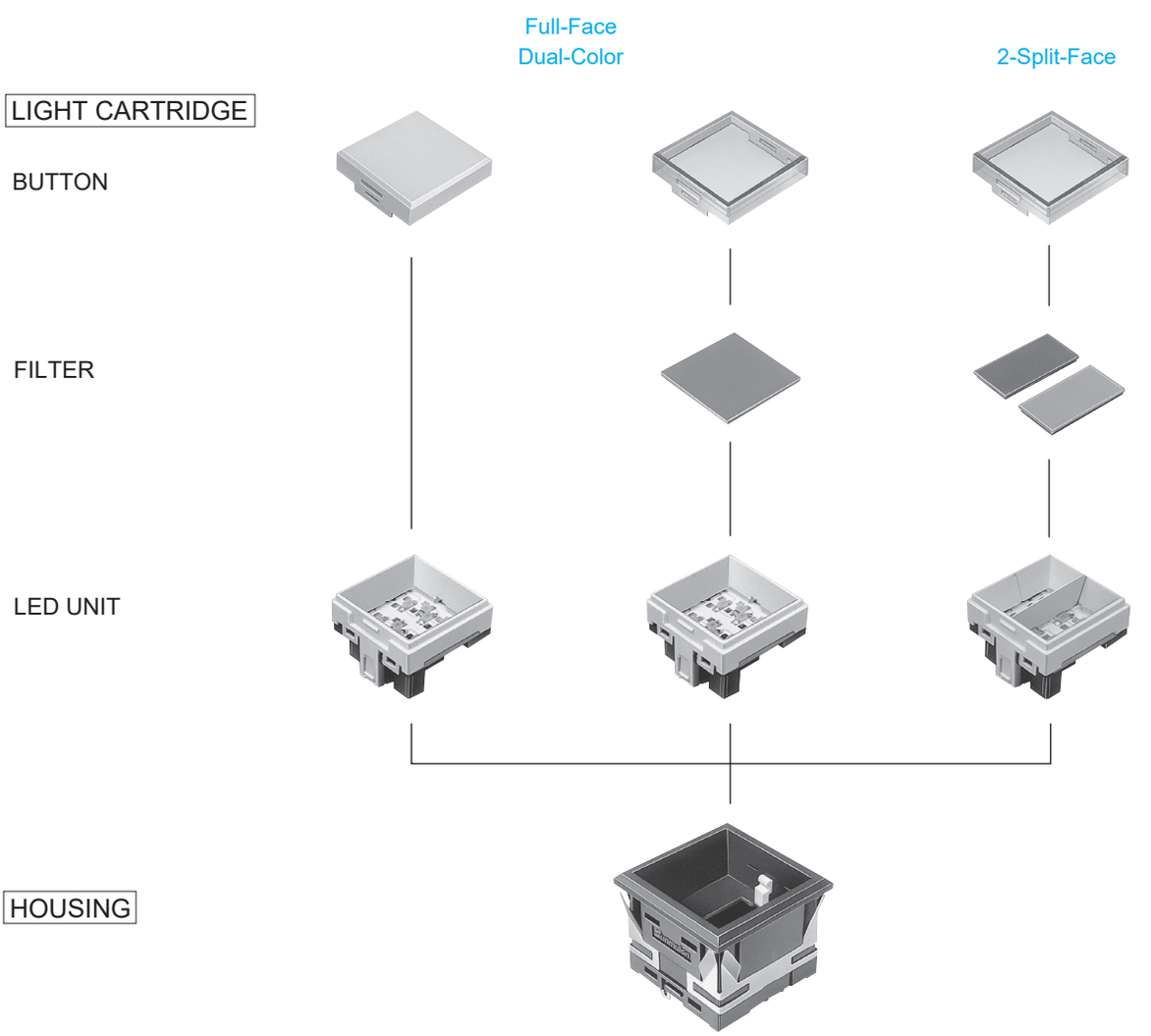
● Silver contact (Gold-plated)

| Voltage | Current (A) (Resistive load) |
|---|---|
| AC 125 V | 3 |
| 250 V | 3 |
| DC 8 V | 3 |
| 14 V | 3 |
| 30 V | 2 |
| 125 V | 0.4 |

● Cross-bar contact

| | |
|---|---|
| Rating | AC 125 V 0.1 A (Resistive load) |
| | DC 30 V 0.1 A (Resistive load) |
| Minimum applicable load | DC 5 V 1 mA (Resistive load) |

## STRUCTURE

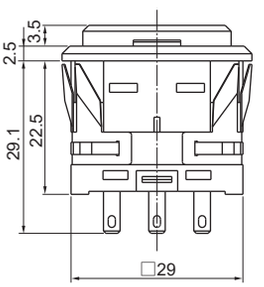


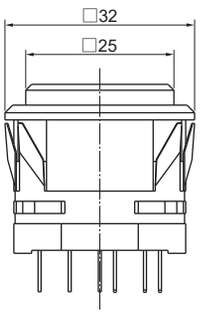
## ILLUMINATION TYPES

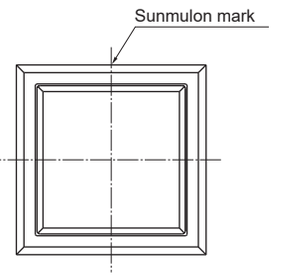
| | |
|---|---|
| LED color symbol | 7 Red　8 Green　9 Yellow<br>※ Yellow (9) is actually “ORANGE Yellow” not Lemon Yellow. |
| Full-Face | 7　8　9 |
| Dual-Color | 7・8　8・9　9・7 |
| 2-Split-Face (Horiz.) | 7/7　7/8　7/9<br>8/7　8/8　8/9<br>9/7　9/8　9/9 |

## DIMENSIONS

3D
DXF




3D・DXF data download site ： **https://www.sunmulon.co.jp/download/**

Tolerance : ± 0.4 mm

# ACCESSORIES

| Name | Appearance | Classification | Part no. | | Precautions for use |
|---|---|---|---|---|---|
| Barrier<br>3D<br>DXF |  | Center barrier | Black | WH-0741-K | - Cannot be used with guard cover. |
| | | | Gray | WH-0741-G | |
| |  | Side barrier | Black | WH-0740-K | |
| | | | Gray | WH-0740-G | |
| Guard cover<br>3D<br>DXF |  | For square button | Black | YH-2576-K | - The cover to be opened 180° and returned by spring force.<br>- Cannot be used with barrier. |
| | | | Gray | YH-2576-H | |
| Removing tool |  | For removal light cartridge | SJ-0001 | | - Be used to remove light cartridge from housing. |

3D・DXF data download site ： **https://www.sunmulon.co.jp/download/**

◇Accessories' dimensions：YH-17

# ORDERING CODE 【Full-Face】

Assembled Part (Light cartridge and Housing)

YH □ — □ S0 □ □ □ □ □ □ □

### ● OPERATION

| | |
|---|---|
| L | Indicator |
| M | Momentary |
| A | Alternate |

### ● CONTACT

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

### ● BUTTON SHAPE

| | |
|---|---|
| S0 | Square |

### ● LED COLOR

| | | |
|---|---|---|
| 7 | Red | |
| 8 | Green | ※2) |
| 9 | Yellow | ※1) |
| X | Without LED | |

### ● BUTTON COLOR

| | | |
|---|---|---|
| R | Red | |
| G | Green | |
| O | Yellow | ※1) |
| Y | Lemon Yellow | ※2) |
| M | Milk-white | |
| C | Clear | |

For without button type,
specify part numbers of light cartridge
and housing separately.

### ● HOUSING COLOR

| | |
|---|---|
| K | Black |
| H | Gray |

### ● FILTER COLOR

| | | |
|---|---|---|
| 1 | Red | |
| 2 | Green | |
| 3 | Yellow | ※1) |
| 4 | Milk-white | |
| 8 | Lemon Yellow | ※2) |
| X | Without filter | |

Filters cannot be used for
buttons other than clear button.

### ● TERMINAL

| | |
|---|---|
| P | ＃110 Tab・Soldering |
| C | PCB |

### ● Supply Voltage to LED

| | |
|---|---|
| 1 | DC 5V Built-in resistor |
| 2 | DC12V Built-in resistor |
| 3 | DC24V Built-in resistor |
| 4 | DC 5V Non-resistor |
| 5 | DC12V Non-resistor |
| 6 | DC24V Non-resistor |
| X | Without LED |

For Non-resistor type,
use external protective resistor.

### ● OPTION

| | |
|---|---|
| 0001 | Cathode common |
| Blank | No option |

For other options except for the above,
please contact us.

### ● NOTES

※1) The color of “Yellow” for LED (9), button (O) and filter (3) is actually “Orange Yellow” not Lemon Yellow.
※2) When using Lemon Yellow button (Y) and filter (8), specify LED color Green (8).


◇Dimensions：page YH-3
◇Accessories：page YH-4
◇Internal connection arrangements：page YH-12
◇LED specifications：page YH-13
◇Terminals / PCB hole cutout：page YH-15
◇Mounting design / Panel cutout：page YH-16
◇Accessories' dimensions：YH-17

# ORDERING CODE 【Full-Face】

LIGHT CARTRIDGE

YH − S0 □ □ □ □ □

● BUTTON SHAPE

| | |
|---|---|
| S0 | Square |

● LED COLOR

| | | |
|---|---|---|
| 7 | Red | |
| 8 | Green | ※2) |
| 9 | Yellow | ※1) |
| X | Without LED | |

● BUTTON COLOR

| | | |
|---|---|---|
| R | Red | |
| G | Green | |
| O | Yellow | ※1) |
| Y | Lemon Yellow | ※2) |
| M | Milk-white | |
| C | Clear | |
| X | Without button | |

● FILTER COLOR

| | | |
|---|---|---|
| 1 | Red | |
| 2 | Green | |
| 3 | Yellow | ※1) |
| 4 | Milk-white | |
| 8 | Lemon Yellow | ※2) |
| X | Without filter | |

Filters cannot be used for buttons other than clear button.

● OPTION

| | |
|---|---|
| 0001 | Cathode common |
| Blank | No option |

For other options except for the above, please contact us.

● Supply Voltage to LED

| | |
|---|---|
| 1 | DC 5V Built-in resistor |
| 2 | DC12V Built-in resistor |
| 3 | DC24V Built-in resistor |
| 4 | DC 5V Non-resistor |
| 5 | DC12V Non-resistor |
| 6 | DC24V Non-resistor |
| X | Without LED |

For Non-resistor type, use external protective resistor.

● NOTES

※1) The color of “Yellow” for LED (9), button (O) and filter (3) is actually “Orange Yellow” not Lemon Yellow.
※2) When using Lemon Yellow button (Y) and filter (8), specify LED color Green (8).

HOUSING

YH □ − □ S0 □ □

● OPERATION

| | |
|---|---|
| L | Indicator |
| M | Momentary |
| A | Alternate |

● CONTACT

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

● BUTTON SHAPE

| | |
|---|---|
| S0 | Square |

● TERMINAL

| | |
|---|---|
| P | #110 Tab・Soldering |
| C | PCB |

● HOUSING COLOR

| | |
|---|---|
| K | Black |
| H | Gray |

# ORDERING CODE 【Dual-Color】

Assembled Part (Light cartridge and Housing)

YH □ — □ S3 1 2 □ □ □ □ □ □

### ● OPERATION

| | |
|---|---|
| L | Indicator |
| M | Momentary |
| A | Alternate |

### ● CONTACT

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

### ● BUTTON SHAPE

| | |
|---|---|
| S3 | Square |

### ● LED COLOR

| | |
|---|---|
| 7 | Red |
| 8 | Green |
| 9 | Yellow |

Put the color numbers into frame 1, 2.
(Dual-Color combination)
78・89・97

Yellow (9) is actually "ORANGE Yellow" not Lemon Yellow.

### ● BUTTON COLOR ※1)

| | |
|---|---|
| C | Clear |
| M | Milk-white |

For without button type,
specify part numbers of light cartridge
and housing separately.

### ● HOUSING COLOR

| | |
|---|---|
| K | Black |
| H | Gray |

### ● OPTION

| | |
|---|---|
| 0001 | Cathode common |
| Blank | No option |

For other options except for the above,
please contact us.

### ● Supply Voltage to LED

| | | |
|---|---|---|
| 1 | DC 5V Built-in resistor | |
| 2 | DC12V Built-in resistor | ※2) |
| 3 | DC24V Built-in resistor | ※2) |
| 4 | DC 5V Non-resistor | |
| 5 | DC12V Non-resistor | |
| 6 | DC24V Non-resistor | |

For Non-resistor type,
use external protective resistor.

### ● TERMINAL

| | |
|---|---|
| P | #110 Tab・Soldering |
| C | PCB |

### ● FILTER COLOR ※1)

| | |
|---|---|
| 4 | Milk-white |
| X | Without filter |

Filters cannot be used for
buttons other than clear button.

### ● NOTES

※1) Button should be C (Clear) with Milk-white filter (4) or M (Milk-white) without filter (X).

※2) Simultaneous lighting is not possible for DC12V or DC24V Built-in resistor type.
Please select DC12V or DC24V Non-resistor type and apply required external resistor for simultaneous lighting.


◇Dimensions：page YH-3
◇Accessories：page YH-4
◇Internal connection arrangements：page YH-12
◇LED specifications：page YH-13
◇Terminals / PCB hole cutout：page YH-15
◇Mounting design / Panel cutout：page YH-16
◇Accessories' dimensions：YH-17

# ORDERING CODE 【Dual-Color】

LIGHT CARTRIDGE

YH − S3 [1][2] □ □ □ □

● BUTTON SHAPE

| | |
|---|---|
| S3 | Square |

● LED COLOR

| | |
|---|---|
| 7 | Red |
| 8 | Green |
| 9 | Yellow |

Put the color numbers into frame 1, 2.
(Dual-Color combination)
78・89・97

Yellow (9) is actually "ORANGE Yellow" not Lemon Yellow.

● BUTTON COLOR ※1)

| | |
|---|---|
| C | Clear |
| M | Milk-white |
| X | Without button |

● FILTER COLOR ※1)

| | |
|---|---|
| 4 | Milk-white |
| X | Without filter |

Filters cannot be used for buttons other than clear button.

● OPTION

| | |
|---|---|
| 0001 | Cathode common |
| Blank | No option |

For other options except for the above, please contact us.

● Supply Voltage to LED

| | | |
|---|---|---|
| 1 | DC 5V Built-in resistor | |
| 2 | DC12V Built-in resistor | ※2) |
| 3 | DC24V Built-in resistor | ※2) |
| 4 | DC 5V Non-resistor | |
| 5 | DC12V Non-resistor | |
| 6 | DC24V Non-resistor | |

For Non-resistor type, use external protective resistor.

● NOTES

※1) Button should be C (Clear) with Milk-white filter (4) or M (Milk-white) without filter (X).

※2) Simultaneous lighting is not possible for DC12V or DC24V Built-in resistor type.
Please select DC12V or DC24V Non-resistor type and apply required external resistor for simultaneous lighting.

HOUSING

YH □ − □ S0 □ □

● OPERATION

| | |
|---|---|
| L | Indicator |
| M | Momentary |
| A | Alternate |

● CONTACT

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

● BUTTON SHAPE

| | |
|---|---|
| S0 | Square |

● HOUSING COLOR

| | |
|---|---|
| K | Black |
| H | Gray |

● TERMINAL

| | |
|---|---|
| P | #110 Tab・Soldering |
| C | PCB |

# ORDERING CODE 【2-Split-Face】

Assembled Part (Light cartridge and Housing)

YH □ – □ S2 1 2 C □ 1 2 □ □ □

### ● OPERATION

| | |
|---|---|
| L | Indicator |
| M | Momentary |
| A | Alternate |

### ● CONTACT

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

### ● BUTTON SHAPE

| | |
|---|---|
| S2 | Square |

### ● LED COLOR ※1)※2)

| | |
|---|---|
| 7 | Red |
| 8 | Green |
| 9 | Yellow |
| X | Without LED |

Put the color numbers into frame 1, 2.
(2-Split-Face combination)
77・78・79・87・88・89・97・98・99
For Non-illuminated
Put XX into frame 1, 2.

The combination of With LED and Without LED cannot be specified.

### ● BUTTON COLOR

| | |
|---|---|
| C | Clear |

For without button type,
specify part numbers of light cartridge
and housing separately.

### ● HOUSING COLOR

| | |
|---|---|
| K | Black |
| H | Gray |

### ● OPTION

| | |
|---|---|
| 0001 | Cathode common |
| Blank | No option |

For other options except for the above,
please contact us.

### ● Supply Voltage to LED

| | | |
|---|---|---|
| 1 | DC 5V Built-in resistor | |
| 2 | DC12V Built-in resistor | ※4) |
| 3 | DC24V Built-in resistor | ※4) |
| 4 | DC 5V Non-resistor | |
| 5 | DC12V Non-resistor | |
| 6 | DC24V Non-resistor | |
| X | Without LED | ※3) |

For Non-resistor type,
use external protective resistor.

### ● TERMINAL

| | |
|---|---|
| P | ♯110 Tab・Soldering |
| C | PCB |

### ● FILTER COLOR ※1)※2)

| | |
|---|---|
| 1 | Red |
| 2 | Green |
| 3 | Yellow |
| 4 | Milk-white |
| 8 | Lemon Yellow |
| X | Without filter |

Put the color numbers into frame 1, 2.

For Without filter
Put XX into frame 1, 2.

The combination of With filter and Without filter cannot be specified.

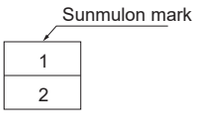
### ● NOTES

※1) How to specify the color of LED and filter

Select the color symbols listed in the ordering code, and put them into the frame 1 and 2, referring to the figure below.

The numbers in the figure match the location specified in the ordering code.

The color of “Yellow” for LED (9) and filter (3) is actually “Orange Yellow” not Lemon Yellow.




※2) When using Lemon Yellow filter (8), specify LED color Green (8).

※3) For without LED (X), specify supply voltage to LED X (Without LED).

※4) Simultaneous lighting is not possible for DC12V or DC24V Built-in resistor type.
Please select DC12V or DC24V Non-resistor type and apply required external resistor for simultaneous lighting.


◇Dimensions：page YH-3
◇Accessories：page YH-4
◇Internal connection arrangements：page YH-12
◇LED specifications：page YH-14
◇Terminals / PCB hole cutout：page YH-15
◇Mounting design / Panel cutout：page YH-16
◇Accessories’ dimensions：YH-17

# ORDERING CODE 【2-Split-Face】

LIGHT CARTRIDGE

**YH − S2 □□ □□ □ □**

### ● BUTTON SHAPE

| | |
|---|---|
| S2 | Square |

### ● LED COLOR ※1) ※2)

| | |
|---|---|
| 7 | Red |
| 8 | Green |
| 9 | Yellow |
| X | Without LED |

Put the color numbers into frame 1, 2.
(2-Split-Face combination)
77・78・79・87・88・89・97・98・99
For Non-illuminated
Put XX into frame 1, 2.

The combination of With LED and Without LED cannot be specified.

### ● BUTTON COLOR

| | |
|---|---|
| C | Clear |
| X | Without button |

### ● FILTER COLOR ※1) ※2)

| | |
|---|---|
| 1 | Red |
| 2 | Green |
| 3 | Yellow |
| 4 | Milk-white |
| 8 | Lemon Yellow |
| X | Without filter |

Put the color numbers into frame 1, 2.

For Without filter
Put XX into frame 1, 2.

The combination of With filter and Without filter cannot be specified.

### ● OPTION

| | |
|---|---|
| 0001 | Cathode common |
| Blank | No option |

For other options except for the above, please contact us.

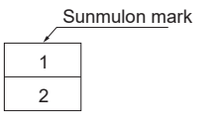
### ● Supply Voltage to LED

| | | |
|---|---|---|
| 1 | DC 5V Built-in resistor | |
| 2 | DC12V Built-in resistor | ※4) |
| 3 | DC24V Built-in resistor | ※4) |
| 4 | DC 5V Non-resistor | |
| 5 | DC12V Non-resistor | |
| 6 | DC24V Non-resistor | |
| X | Without LED | ※3) |

For Non-resistor type,
use external protective resistor.

### ● NOTES

※1) How to specify the color of LED and filter
Select the color symbols listed in the ordering code, and put them into the frame 1 and 2, referring to the figure on the right.
The numbers in the figure match the location specified in the ordering code.
The color of “Yellow” for LED (9) and filter (3) is actually “Orange Yellow” not Lemon Yellow.




※2) When using Lemon Yellow filter (8), specify LED color Green (8).
※3) For without LED (X), specify supply voltage to LED X (Without LED).
※4) Simultaneous lighting is not possible for DC12V or DC24V Built-in resistor type.
Please select DC12V or DC24V Non-resistor type and apply required external resistor for simultaneous lighting.

HOUSING

**YH □ − □ S0 □ □**

### ● OPERATION

| | |
|---|---|
| L | Indicator |
| M | Momentary |
| A | Alternate |

### ● CONTACT

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

### ● BUTTON SHAPE

| | |
|---|---|
| S0 | Square |

### ● TERMINAL

| | |
|---|---|
| P | ＃110 Tab・Soldering |
| C | PCB |

### ● HOUSING COLOR

| | |
|---|---|
| K | Black |
| H | Gray |

## REPLACEMENT PARTS

● Full-Face BUTTON／FILTER

| | Red | Green | Yellow | Lemon Yellow | Milk-White | Clear |
|---|---|---|---|---|---|---|
| BUTTON | YH-2556-1LR | YH-2556-1LG | YH-2556-1LO | YH-2556-1LY | YH-2556-1LM | YH-2556-2CC |
| FILTER | YH-2558-LR | YH-2558-LG | YH-2558-LO | YH-2558-LY | YH-2558-LM | |

● Dual-Color BUTTON／FILTER

| | Milk-White | Clear |
|---|---|---|
| BUTTON | YH-2556-1LM | YH-2556-2CC |
| FILTER | YH-2558-LM | |

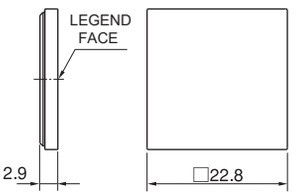
● 2-Split-Face BUTTON／FILTER

| | Red | Green | Yellow | Lemon Yellow | Milk-White | Clear |
|---|---|---|---|---|---|---|
| BUTTON | | | | | | YH-2556-2CC |
| FILTER | YH-2559-LR | YH-2559-LG | YH-2559-LO | YH-2559-LY | YH-2559-LM | |

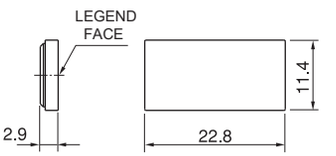
● DIVIDER

| | Part no. |
|---|---|
| For 2-Split-Face | YH-2560 |

## FILTER DIMENSIONS



YH-2558

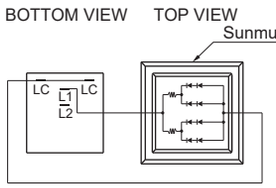
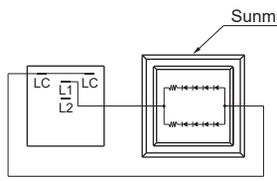
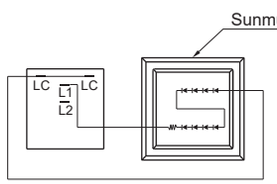


YH-2559

Tolerance : ± 0.4 mm

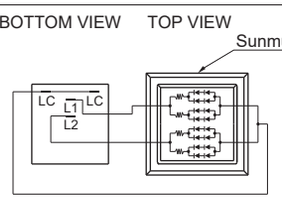
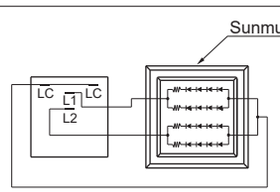
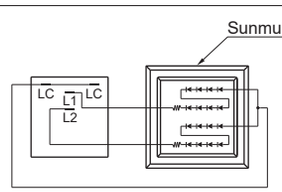
# INTERNAL CONNECTION ARRANGEMENTS

## ● Full-Face

| Voltage | |
|---|---|
| DC 5V |   |
| DC12V |   |
| DC24V |   |

※ These are all internal connection diagrams for built-in resistor type.
※ For Non-resistor type, the resistor part in the diagram should be short- circuited.
※ For Cathode Common type, LED polarity (current flow direction) is opposite.

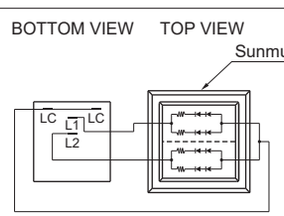
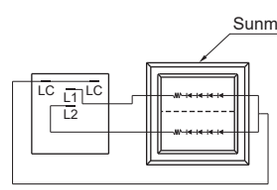
## ● Dual-Color

| Voltage | |
|---|---|
| DC 5V |   |
| DC12V |   |
| DC24V |   |

## ● Dual-Color combination (Common for each voltage)

| Terminals | LED Color | | |
|---|---|---|---|
| LC-L1 | Red | Yellow | Red |
| LC-L2 | Green | Green | Yellow |

## ● 2-Split-Face

| Voltage | |
|---|---|
| DC 5V |   |
| DC12V<br>DC24V |   |

## LED SPECIFICATIONS 【Full-Face】

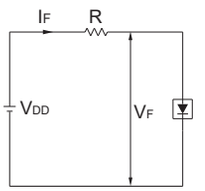
### ● BUILT-IN RESISTOR

| Voltage | Rated Current (mA) | | |
|---|---|---|---|
| | Red | Green | Yellow |
| DC 5V ±5% | 40 | 60 | 68 |
| DC 12V ±5% | 20 | 30 | 34 |
| DC 24V ±5% | 10 | 15 | 17 |

### ● NON-RESISTOR (EXTERNAL RESISTOR)

| Supply Voltage | | DC5V | | | DC12V | | | DC24V | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LED Color | | Red | Green | Yellow | Red | Green | Yellow | Red | Green | Yellow |
| Max. Forward Current $I_{FM}$ (mA) | | 100 | 100 | 100 | 50 | 50 | 50 | 25 | 25 | 25 |
| DC Reverse Voltage $V_R$ (V) | | 10 | 10 | 10 | 20 | 20 | 20 | 40 | 40 | 40 |
| Forward Voltage $V_F$ (Typ.)【IF=20mA】 (V) | | 3.6 | 4.4 | 4.2 | 7.2 | 8.8 | 8.4 | 14.4 | 17.6 | 16.8 |
| Derating (Operating temperature) (over 25℃ working temperature) (mA/℃) | | 1.6 | | | 0.8 | | | 0.4 | | |
| Pulse Lighting | Pulse Width PW (μs) | | | | 100 | | | | | |
| | Duty Ratio DR | | | | $10^{-1}$ | | | | | |
| | Allowable forward current $I_{FP}$ (mA) | | | | 100 | | | | | |

### ● Wiring Diagram




Refer to the following formula
to calculate external resistance values.

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

$V_{DD}$ : Supply Voltage
$V_F$ : Forward Voltage
$I_F$ : Forward Current

$I_F$ (Forward Current) :
Refer to the Rated Current of BUILT-IN RESISTOR type,
and be sure to set less than $I_{FM}$ (Max. Forward Current).

## LED SPECIFICATIONS 【Dual-Color】

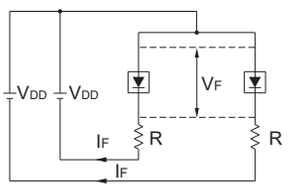
### ● BUILT-IN RESISTOR

| Voltage | Rated Current (mA) | | |
|---|---|---|---|
| | Red | Green | Yellow |
| DC 5V ±5% | 40 | 60 | 68 |
| DC 12V ±5% | 20 | 30 | 34 |
| DC 24V ±5% | 10 | 15 | 17 |

### ● NON-RESISTOR (EXTERNAL RESISTOR)

| Supply Voltage | | DC5V | | | DC12V | | | DC24V | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LED Color | | Red | Green | Yellow | Red | Green | Yellow | Red | Green | Yellow |
| Max. Forward Current $I_{FM}$ (mA) | | 100 | 100 | 100 | 50 | 50 | 50 | 25 | 25 | 25 |
| DC Reverse Voltage $V_R$ (V) | | 10 | 10 | 10 | 20 | 20 | 20 | 40 | 40 | 40 |
| Forward Voltage $V_F$ (Typ.)【IF=20mA】 (V) | | 3.6 | 4.4 | 4.2 | 7.2 | 8.8 | 8.4 | 14.4 | 17.6 | 16.8 |
| Derating (Operating temperature) (over 25℃ working temperature) (mA/℃) | | 1.6 | | | 0.8 | | | 0.4 | | |
| Pulse Lighting | Pulse Width PW (μs) | | | | 100 | | | | | |
| | Duty Ratio DR | | | | $10^{-1}$ | | | | | |
| | Allowable forward current $I_{FP}$ (mA) | | | | 100 | | | | | |

### ● Wiring Diagram




Refer to the following formula
to calculate external resistance values.

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

$V_{DD}$ : Supply Voltage
$V_F$ : Forward Voltage
$I_F$ : Forward Current

$I_F$ (Forward Current) :
Refer to the Rated Current of BUILT-IN RESISTOR type,
and be sure to set less than $I_{FM}$ (Max. Forward Current).

For resistance value calculation
https://www.sunmulon.co.jp/english/products/led.html
The resistance value can be calculated just by entering the items.

# LED SPECIFICATIONS 【2-Split-Face】

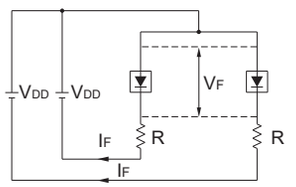
## ● BUILT-IN RESISTOR

| Voltage | Rated Current (mA) | | |
|---|---|---|---|
| | Red | Green | Yellow |
| DC 5V ±5% | 20 | 30 | 34 |
| DC 12V ±5% | 10 | 15 | 17 |
| DC 24V ±5% | 10 | 15 | 17 |

## ● NON-RESISTOR (EXTERNAL RESISTOR)

| Supply Voltage | | DC5V | | | DC12V・24V | | |
|---|---|---|---|---|---|---|---|
| LED Color | | Red | Green | Yellow | Red | Green | Yellow |
| Max. Forward Current $I_{FM}$ (mA) | | 50 | 50 | 50 | 25 | 25 | 25 |
| DC Reverse Voltage $V_R$ (V) | | 10 | 10 | 10 | 20 | 20 | 20 |
| Forward Voltage $V_F$ (Typ.)【IF=20mA】 (V) | | 3.6 | 4.4 | 4.2 | 7.2 | 8.8 | 8.4 |
| Derating (Operating temperature) (over 25℃ working temperature) (mA/℃) | | 0.8 | | | 0.4 | | |
| Pulse Lighting | Pulse Width PW (μs) | | | | 100 | | |
| | Duty Ratio DR | | | | $10^{-1}$ | | |
| | Allowable forward current $I_{FP}$ (mA) | | | | 100 | | |

## ● Wiring Diagram




Refer to the following formula
to calculate external resistance values.

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

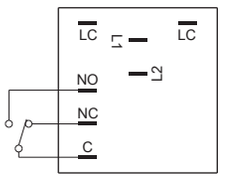
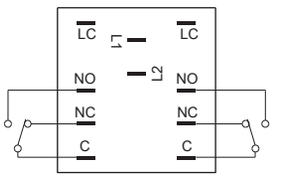
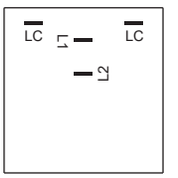
$V_{DD}$ : Supply Voltage
$V_F$ : Forward Voltage
$I_F$ : Forward Current

$I_F$ (Forward Current) :
Refer to the Rated Current of BUILT-IN RESISTOR type,
and be sure to set less than $I_{FM}$ (Max. Forward Current).

For resistance value calculation
https://www.sunmulon.co.jp/english/products/led.html
The resistance value can be calculated just by entering the items.

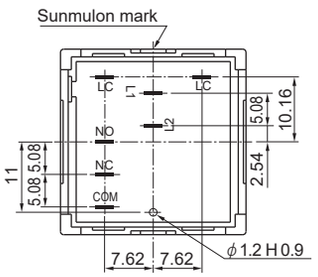
## TERMINALS／PCB HOLE CUTOUT

### ● TERMINALS LAYOUT (BOTTOM VIEW)

| SPDT | DPDT | INDICATOR |
|---|---|---|
| Sunmulon mark | Sunmulon mark | Sunmulon mark |
|  |  |  |

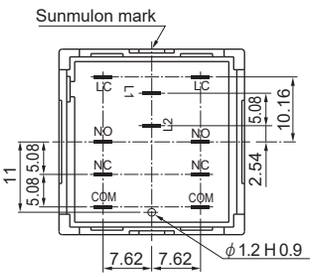


### ● TERMINALS DIMENSIONS (BOTTOM VIEW)





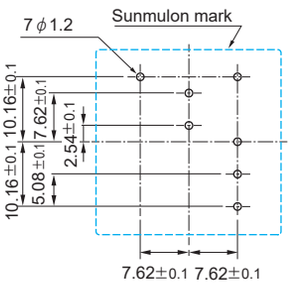
SPDT





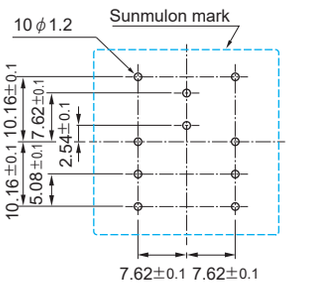
DPDT

### ● PCB hole cut-out (TOP VIEW)





SPDT

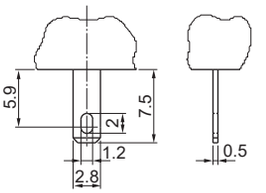




DPDT

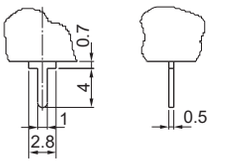
※ Actually, the terminal function letters are upside down. (e.g. NC → ↄN )

## TERMINAL SHAPE





＃110 Tab・Soldering Terminal

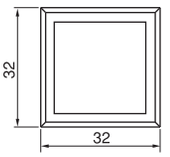
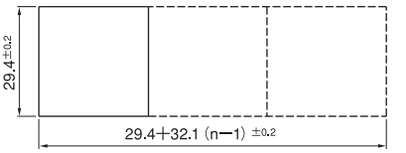
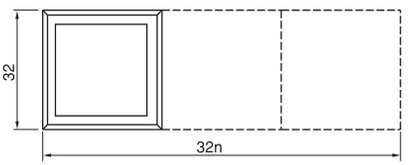
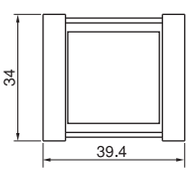
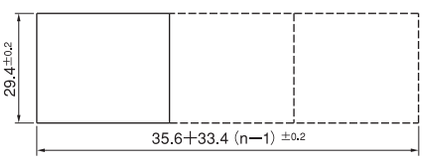
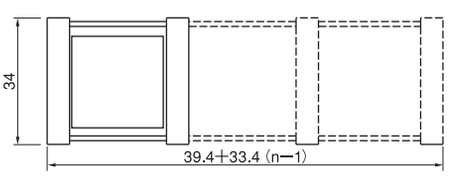
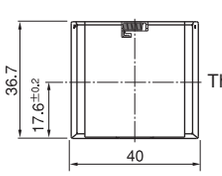
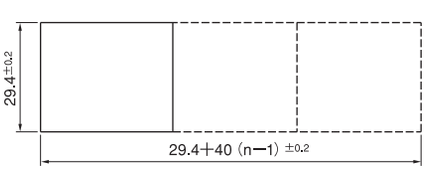
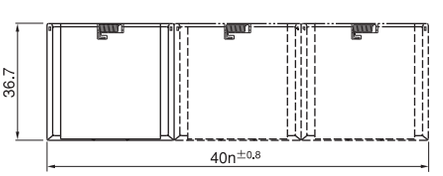




PCB Terminal

Tolerance : ± 0.4 mm

# MOUNTING DESIGN／PANEL CUTOUT

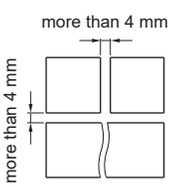
| | Mounting design | Panel cutout |
|---|---|---|
| Without Barriers | Individual   | Recommended panel thickness : 1 to 5 mm   n : Number of Units |
| | Multiple   | |
| With Barriers | Individual   | Recommended panel thickness : 1 to 5 mm   n : Number of Units |
| | Multiple   | |
| With Guard cover | Individual   The centerline is the center of the button. | Recommended panel thickness : 1 to 4.3 mm   n : Number of Units |
| | Multiple   | |

※ If the panel is to be finished (e.g. coated), make sure that the panel meets the specified dimensions after the coating.
In case the panel cut dimension is too small, it may cause malfunction.

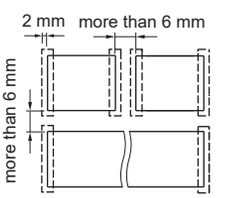
※ After the panel-cutting process, make sure to remove burrs on the surface.

## ● Panel cut spacing dimensions for spaced individual mounting

With Flange




With Barriers



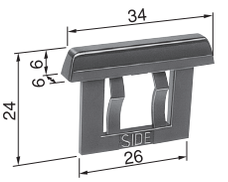

Tolerance：±0.4 mm

# ACCESSORIES

## BARRIER

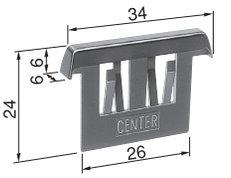
| Color | Side barrier | Center barrier |
|---|---|---|
| Black | WH-0740-K | WH-0741-K |
| Gray | WH-0740-G | WH-0741-G |

※ Cannot be used with guard cover.




3D
DXF

Side barrier



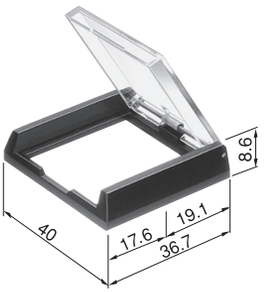

Center barrier

## GUARD COVER

| | |
|---|---|
| Black | YH-2576-K |
| Gray | YH-2576-H |

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

※ Cannot be used with barrier.



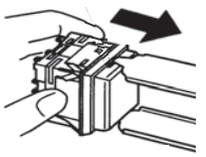

3D
DXF

3D・DXF data download site ： **https://www.sunmulon.co.jp/download/**

Tolerance：±0.4 mm

## 1. Removing Light cartridge

Be sure to remove with the removing tool (SJ-0001).
Hang the cartridge with the removing tool in the groove, and pull it straight out.

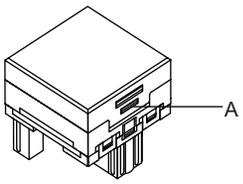


※ In case removing in any other way than the above, it may cause damage to the light cartridge.

※ Do not touch the other parts such as spring incorporated in the light cartridge.

## 2. Removing Button

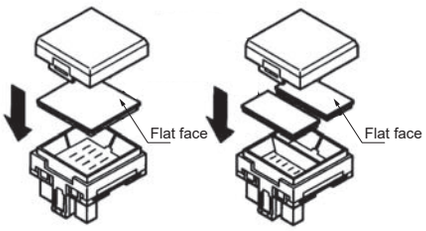
Remove the part A by pushing it open.




Do not reuse buttons that have been removed and deformed.

## 3. Fitting Filter

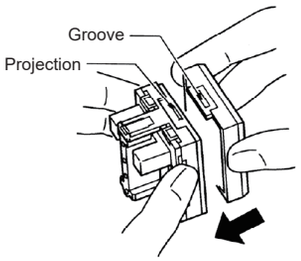
Place the filter with the flat face upward on to the LED unit, then put button on it.




Full-Face 2-Split-Face

## 4. Fitting Button

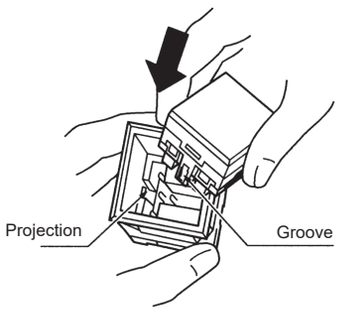
Align the groove on the button, the projection on the LED unit, and fit the button until click.




※ If it is not fitted correctly, it may cause malfunction.

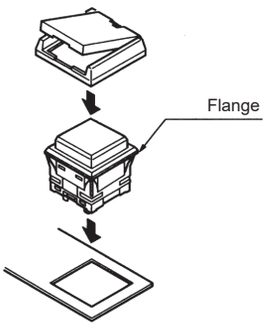
## 5. Fitting Light cartridge

Align the light cartridge with the housing with correct direction as shown in the drawing below and push in until click.




## 6. Installing Guard Cover

Align the guard cover with the flange of housing, and fit it until click.
And then, insert it into the panel cut-out.



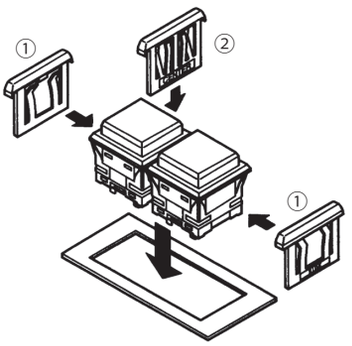

## 7. Installing Barriers

### ① Side Barriers

After setting the side barriers on the sides of the housing, insert it into the panel cut-out.

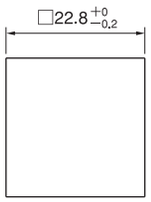
### ② Center Barriers

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



## PRECAUTIONS FOR CORRECT USE

1. Solder quickly and correctly at 380℃ max. and for 3 seconds or less.
   Be careful not to touch the soldering iron to the main body.
2. Wait for one minute during and after soldering before exerting any external force on the solder.
3. The rated voltage is shown on the side of the LED unit, so be sure before use.
4. Character films are not included.
   If preparing the character film separately, use a heat-resistant film with a thickness of 0.1 mm.
   For dimensions, please refer to the figure below.




※ For handling instructions and precautions other than the above, please refer to “Safety Precautions for All Illuminated Pushbutton Switches”.

Tolerance : ± 0.4 mm

As of September 2024

# Safety Precautions for All Illuminted Pushbutton Switches

## 1. Notes on contents of Catalogs

(1) Rated values, performance values, and specification values of Sumulon products listed in this catalog are values acquired under respective conditions in independent testing, and do not guarantee values gained in combined conditions.

(2) The ambient operating temperature(humidity) is guaranteed by evaluation based on characteristics, and does not guarantee continuous use for a long period of time near the upper or lower limit of the ambient operating temperature(humidity) or permanent use at that temperature(humidity).

(3) Reference data and reference values listed in catalogs are for reference purposes only, and do not guarantee that the product will always operate appropriately in that range.

(4) The specifications / appearance and accessories of Sunmulon products listed in catalogs are subject to change or termination of sales without notice, for improvemnet or other reasons.

(5) The content of catalogs is subject to change without notice.

## 2. Note on applications

(1) If using Sunmulon products in combination with other products, confirm the following suitability by yourself. Sunmulon shall provide no guarantees regarding the combination suitability.
(a) Regulations, satndards, or laws to which your machinery, equipment, ect. must conform
(b) Functionality and safety of your machinery and equipment

(2) Wiring and installation that ensures the Sunmulon product used in your system, machine, device, or the like can perform and function according to its specifications.

(3) When using Sunmulon products, be cautious when implementing the following.
(a) Use of Sunmulon products with sufficient allowance for rating and performance.
(b) Safety design, including redundant design and malfunction prevention design that prevents other danger and damage even in the event that Sumulon product fails.

(4) Sunmulon products are designed and manufactured as general-purpose products for general industrial products. They are not intended for use in the following applications, and in the event that you use Sunmulon product for these applications, unless otherwise agreed upon between you and Sunmulon, Sunmulon shall provide no guarantees whatsoever regarding Sunmulon products.
(a) Safety devices intended for human body protection
(b) Direct control of transport equipmnt (railroads / airplanes / ships / vehicles / vehicle instruments, etc.)
(c) Space equipment, submarine equipment
(d) Nuclear power control equipment, radiation related equipment
(e) Combustion equipment, electric heat equipment
(f) Disaster prevention and security equipment
(g) Elevating equipment
(h) Amusement facilities
(i) Facilities subject to government or industry regulations
(j) Use in applications that require a high degree of safety, any other equipment, instruments, or the like that could endanger life or human health

## 3. Warranty

(1) The warranty period for Sunmulon products shall be 1 year after purchase or delivery to the specified location.

(2) Warranty scope should a failure occur in Sunmulon product during the above warranty period for reasons attributable to Sunmulon, then Sunmulon shall provide that product, free of charge, the same quantity. Further, in no event shall liability of Sunmulon exceed the individual price of the product on which liability is asserted.

(3) Failures cause by the following reasons shall be deemed outside the scope of this warranty.
(a) The product was handled or used deviating from conditions / environment listed in the catalogs
(b) The failure was caused by reasons other than Sunmulon product
(c) Modification or repair was performed by a party other than Sunmulon
(d) Replacement of maintenance parts, installation of accessories, or the like was not performed properly in accordance with the user's manual and catalogs
(e) The failure could not have been predicted with the scientific and technical standards at the time when the product was shipped from Sunmulon
(f) The failure was due to other causes not attributable to Sunmulon (including cases of force majeure such as natural disasters and other disasters)

(4) The warranty listed in this Safety Precautions is the full and complete warranty for Sunmulon products, and Sunmulon shall bear no liability whatsoever regarding special damages, indirect damages, incidental damages, or passive damages that occurred due to Sunmulon product.

## 4. Handling precautions for switch

(1) Do not perform wiring with power supplied to the switch. Do not touch the terminals or other charged parts of the switch while power is being supplied. Doing so may result in electric shock.

(2) Be careful of electrostatic breakdown when handling.

(3) Do not drop or otherwise apply strong force to the switch.

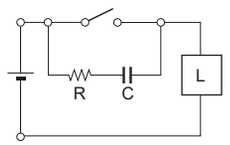
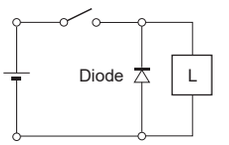
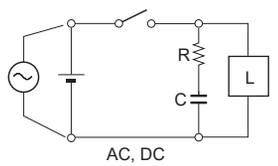
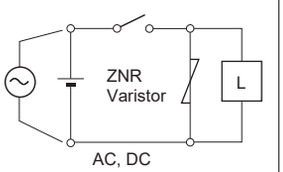
(4) Do not place heavy objects on the switch.

(5) Do not operate or use the housing (switch unit) by itself. Use the switch with assembled the illuminated part (LED module or button).

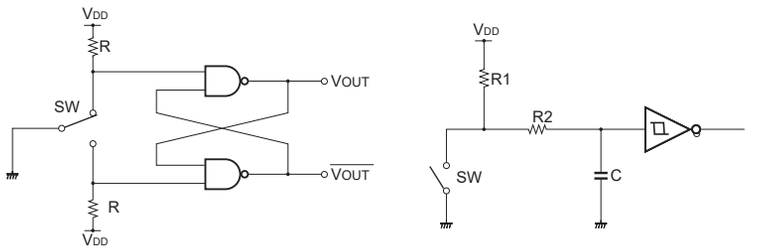
(6) Pushbutton switches are designed to be operated by fingertips. Operating the switch using a sharp object (screwdrivers, tweezers, etc.), hard object (metal, etc.), or with a large or sudden force, may cause deform or damage the switch.

(7) Do not use the switch under loads that exceed the rated switching capacity or other contact ratings. Doing so may result in welding of the contact, or burnout accidents.

(8) For inductive load, the arc by back EMF may cause contact failure. Insertion of arc prevention circuit as the following is recommended.

<table>
<tr><th>Circuit</th><th>Element selection</th><th>Circuit</th><th>Element selection</th></tr>
<tr><td> 
</td><td rowspan="2">C：1 to 0.5 μF × switch current (A)<br>R：0.5 to 1 Ω × switch voltage (V)<br><br>The values may change according to the characteristics of the load. Determine ideal capacitance and resistance values through testing.</td><td> 
</td><td>The diode must withstand a peak inverse voltage 4 times higher than the power supply voltage and regarding a forward current must as high or higher than the load current.</td></tr>
<tr><td> 
</td><td> 
</td><td>Use a varistor that can withstand the power supply voltage sufficiently. (1.5 times or more)</td></tr>
</table>

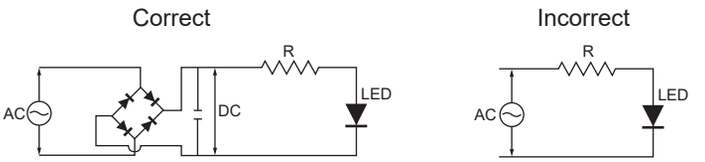
(9) Following circuits show examples of an anti-chattering circuit.




(10) Illumination

(a) Do not apply a voltage between the LED terminal that is greater than the rated voltage. Doing so may damage the LED, cause lighting failure.

(b) LEDs cannot be lit directly by AC circuit should be provided rectifier smoothing circuit for products other than AC input type.




(c) When wiring, pay attention to the polarity of the terminals.

(d) Simultaneous lighting may not be possible with Dual-Color illumination or Split-Face illumination (2, 3, or 4 split illumination), check the catalog.

(e) Apply voltage directly to LEDs of Non-built-in resistor type will damage the LEDs, so connect an appropriate external resistor.

(11) Wiring

(a) Do not apply a soldering iron to the switch housing. Doing so may deform the terminals and cause defects.

(b) See catalog for models compatible with flux prevention measures terminal. Be careful not to allow flux to panetrate sliding parts such as buttons. Use non-corrosive rosin solution as flux for dip soldering.

(c) For soldering other than flux-preventive models, hand solder with the terminals facing down to prevent flux from penetrating into the switch.


(d) The housing of KA, K2, and K9 series are designed for reflow soldering.

(e) Use the appropriate wire size for the applied voltage and current, and solder properly. Use of the product with incomplete soldering may cause abnormal heat generation, resulting in a fire hazard.

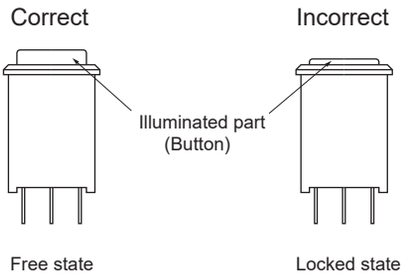
(f) After wiring is completed, maintain an appropriate insulation distance.

(12) Usage environment
(a) Do not use in the presence of flammable or explosive gases such as gasoline, thinner, LPG, etc.
(b) Avoid using the product in places where corrosive or silicon gas is generated, high temperature, high humidity, sea breeze or direct sunlight.
(c) Provide appropriate protection when using the product in places where it is exposed to water, oil, metal powder, or dust.
(d) Do not use the product in a place subject to vibration or shock. It may cause malfunction or damage.
(e) When installed in a close grouping or continuously lit, the ambient temperature may exceed the specified value due to heat generation. Take measures such as ventilation and lowering the operating voltage.
(f) When checking the actual equipment, load conditions and operating environment should be the same as the actual operating conditions.
(g) The ambient temperature for storage is －25℃ to 65 ℃ (No freeze, no condensation).

(13) When wiping off dirt on the exterior of the switch and accessories such as side plates, wipe lightly with a soft, dry cloth. Organic solvents such as thinner, benzene, alcohol, or other acidic chemicals may cause deformation, discoloration, or malfunction.

(14) Store the product away from malignant gases, dust, high temperature and high humidity, and keep it in our packing condition.

(15) When removing the illuminated part (or button) from the alternate switch housing, switch state should be in a free state.




Removal in a locked state may cause malfunction or damage to alternate switch.

(16) Periodic inspection and replacement
(a) Although mechanical and electrical durability are listed in the specifications column, deterioration of various parts (deterioration of resins and corrosion of metal parts) is possible due to the operating environment and method of use. We ask that you implement inspections for Sunmulon products to prevent accidents from occurring by conducting periodic inspections and replacements.
(b) When the switch is left unused or stored for long periods, contact reliability may deteriorate due to oxidation of contacts, which may cause continuity failure, etc. Therefore, it is necessary to check the operation before use.

(17) Service scope
The price of Sunmulon products do not include the cost of services, such as dispatching technicians.