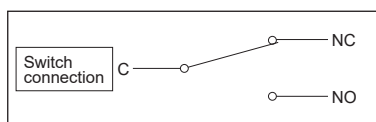


## AH Illuminated Pushbutton Switch

**Slim and characteristic size.**

**Easy to use as an indicator,  
also available a flat type with a low button.**

- Depth behind panel : Only 16 mm
- LED Full-Face, Dual-Color illumination available.
- Terminal : Soldering



### CHARACTERISTICS

Button Size	Rectangle : 7.8×23.1 mm	
Contact Material	Silver contact (Gold-plated)	Cross-bar contact
Rating (Resistive Load)	AC 125 V 3 A AC 250 V 3 A	AC 125 V 0.1 A DC 30 V 0.1 A
Insulation Resistance	More than 100 MΩ at DC 500 V	
Dielectric Strength	AC 600 V RMS between NC and NO terminal AC 1500 V RMS between terminals and ground 50/60 Hz for 60 sec. at normal ambient temperature and humidity	
Contact Resistance	Less than 50 mΩ (Initial value) at DC 6 V 1 A	Less than 50 mΩ (Initial value) at DC 6 V 0.1 A
Vibration Resistance	10 to 55 Hz, Amplitude 1.5 mm	
Mechanical Life	Momentary	More than 1,000,000 operations
Electrical Life (Resistive Load)	More than 30,000 operations at max. rated load	
Operating Force	1.96 N max.	
Total Travel	2.5 mm max.	
Weight	5 g	
Ambient Operating Temperature	-15°C to 50°C (No Freeze, No Condensation)	
Ambient Operating Humidity	80%RH max. (No Condensation)	
Ambient Storage Temperature	-25°C to 65°C (No Freeze, No Condensation)	
Ambient Storage Humidity	80%RH max. (No Condensation)	

[https://www.sunmulon.co.jp/english/products/switch\\_e/ah.html](https://www.sunmulon.co.jp/english/products/switch_e/ah.html)



◇Dimensions : page AH-3  
◇LED specifications : page AH-7

◇Ordering code : page AH-4~5  
◇Terminals : page AH-8

◇Internal connection arrangements : page AH-6  
◇Mounting design / Panel cutout : page AH-8

## SPECIFICATIONS

Illumination type	Full-Face	A
	Dual-Color	A
	Non-illumination	A
Contact	SPDT	A
Terminal	Soldering	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	2
14 V	2
30 V	1
125 V	0.3

### ● Cross-bar contact

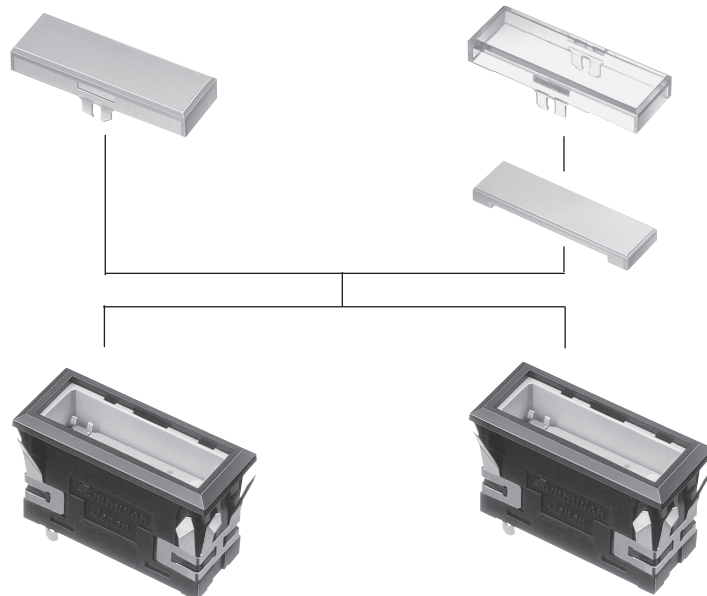
Rating	AC 125 V 0.1 A (Resistive load)
	DC 30 V 0.1 A (Resistive load)

## STRUCTURE

BUTTON

FILTER

HOUSING


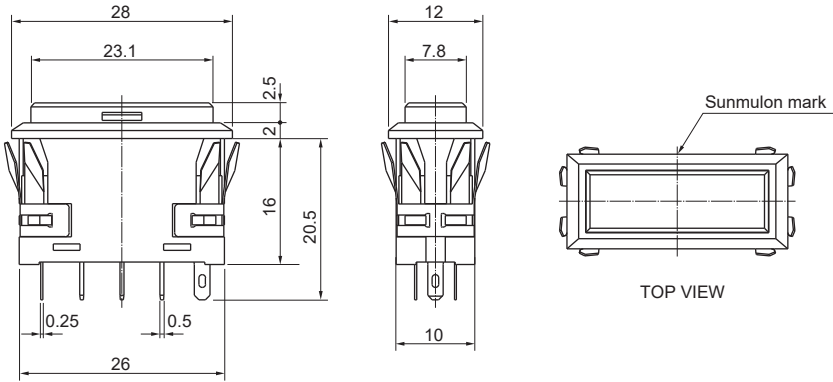

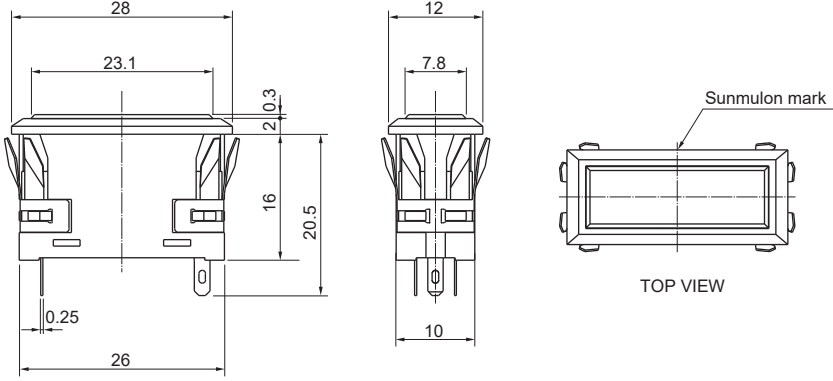


## ILLUMINATION TYPES


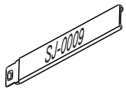
LED color symbol		70	Red	80	Green	90	Yellow
		※ Yellow (90) is actually "ORANGE Yellow" not Lemon Yellow.					
Full-Face		70	80	90			
Dual-Color		70•80	80•90	90•70			

## DIMENSIONS

### ● With Flange

<p>Rectangle</p>  <p>3D DXF</p>	
<p>Flat Indicator</p>  <p>3D DXF</p>	

## ACCESSORIES

Name	Appearance	Classification	Part no.	Precautions for use
Removing tool		For removal button	SJ-0001	- Be used to remove button from housing.
		For removal flat indicator	SJ-0009	- Be used to remove button of flat indicator from housing.

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

Tolerance :  $\pm 0.4$  mm

## ORDERING CODE 【Full-Face】

Assembled Part

AH   —   W0         S    

### ● OPERATION

L	Indicator
F	Flat Indicator
M	Momentary

Flat indicator button level is Flat. (Locked position)

### ● CONTACT

0	Indicator
3	SPDT • Silver (Gold-Plated)
5	SPDT • Crossbar

### ● BUTTON SHAPE

W0	Rectangle
----	-----------

### ● LED COLOR

70	Red
80	Green ※2)
90	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 ※3)

### ● HOUSING COLOR

K	Black
H	Gray

### ● LED CIRCUIT

D	Full-Face
X	Without LED

### ● 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.

### ● TERMINAL

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

### ● FILTER COLOR

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

Generally, in case of using color button,  
filter is not necessary.

### ● NOTES

- ※1) The color of "Yellow" for LED (90), 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 (80).
- ※3) For without button (X), specify without filter (X).

◇Dimensions : page AH-3  
◇LED specifications : page AH-7

◇Internal connection arrangements : page AH-6  
◇Terminals : page AH-8

◇Mounting design / Panel cutout : page AH-8

## ORDERING CODE 【Dual-Color】

Assembled Part

AH  —  W3  1  2    S

### ● OPERATION

L	Indicator
F	Flat Indicator
M	Momentary

Flat indicator button level is Flat. (Locked position)

### ● CONTACT

0	Indicator
3	SPDT • Silver (Gold-Plated)
5	SPDT • Crossbar

### ● BUTTON SHAPE

W3	Rectangle
----	-----------

### ● LED COLOR

70	Red	Put the color numbers into frame 1, 2. (Dual-Color combination) 7080 • 8090 • 9070
80	Green	
90	Yellow	

Yellow (90) is actually "ORANGE Yellow" not Lemon Yellow.

### ● BUTTON COLOR ※2)

C	Clear
M	Milk-white
X	Without button ※1)

### ● HOUSING COLOR

K	Black
H	Gray

### ● LED CIRCUIT

A	Dual-Color Anode common (+)
K	Dual-Color Cathode common (—)

### ● Supply Voltage to LED

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

For Non-resistor type,  
use external protective resistor.

### ● TERMINAL

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

### ● FILTER COLOR ※2)

4	Milk-white
X	Without filter ※1)

### ● NOTES

※1) For without button (X), specify without filter (X).

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

※3) Simultaneous lighting is not possible for DC24V Built-in resistor type (3).  
Please select DC24V Non-resistor type (6) and apply required external resistor for simultaneous lighting.

◇Dimensions : page AH-3  
◇LED specifications : page AH-7

◇Internal connection arrangements : page AH-6  
◇Terminals : page AH-8

◇Mounting design / Panel cutout : page AH-8

## REPLACEMENT PARTS

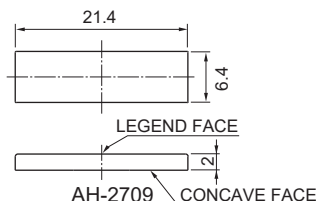
### ● Full-Face BUTTON/FILTER

	Red	Green	Yellow	Lemon Yellow	Milk-white	Clear
BUTTON	AH-2708-1LR	AH-2708-1LG	AH-2708-1LO	AH-2708-1LY	AH-2708-1LM	AH-2708-2CC
FILTER	AH-2709-LR	AH-2709-LG	AH-2709-LO	AH-2709-LY	AH-2709-LM	

### ● Dual-Color BUTTON/FILTER

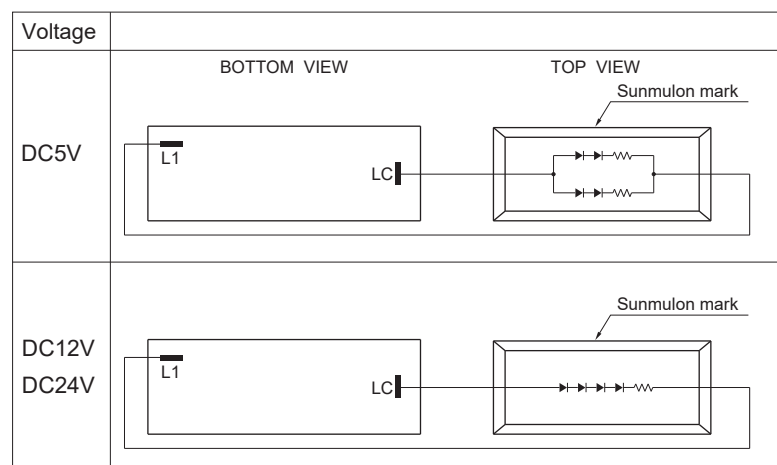
	Milk-white	Clear
BUTTON	AH-2708-1LM	AH-2708-2CC
FILTER	AH-2709-LM	

## FILTER DIMENSIONS



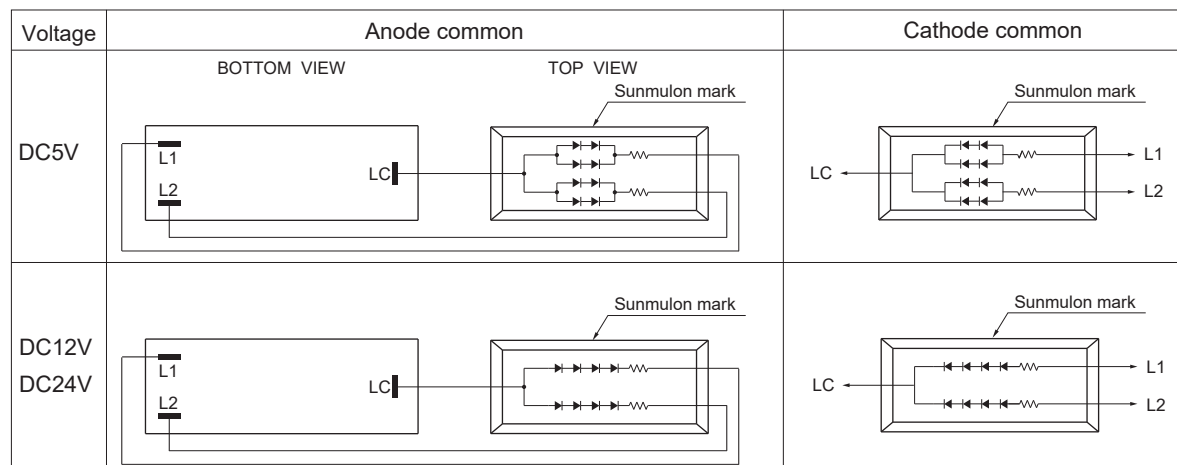
## INTERNAL CONNECTION ARRANGEMENTS

### ● Full-Face



※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.

### ● Dual-Color



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

Terminals	LED Color		
LC1-L1	Red	Green	Yellow
LC1-L2	Green	Yellow	Red

Tolerance :  $\pm 0.4$  mm

## LED SPECIFICATIONS [Full-Face]

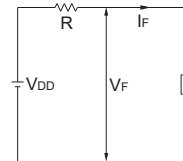
### ● BUILT-IN RESISTOR

Voltage	Rated Current (mA)		
	Red	Green	Yellow
DC 5V ±5%	30	30	30
DC 12V ±5%	15	15	15
DC 24V ±5%	10	10	10

### ● NON-RESISTOR (EXTERNAL RESISTOR)

Supply Voltage		DC5V			DC12V・24V		
LED Color		Red	Green	Yellow	Red	Green	Yellow
Max. Forward Current $I_{FM}$ (mA)		40	40	40	20	20	20
DC Reverse Voltage $V_R$ (V)		10	10	10	20	20	20
Forward Voltage $V_F$ (Typ.) [ $I_F=20mA$ ] (V)		4	4.2	4	8	8.4	8
Derating (Operating temperature) (over 25°C working temperature) (mA/°C)		0.36			0.36		
Pulse Lighting	Pulse Width PW ( $\mu s$ )				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

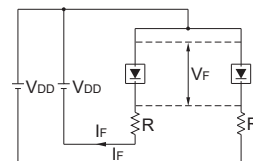
Voltage	Rated Current (mA)		
	Red	Green	Yellow
DC 5V ±5%	30	30	30
DC 12V ±5%	15	15	15
DC 24V ±5%	10	10	10

※ DC 24 V Built-in resistor type (3) cannot be lit simultaneous lighting.  
 For simultaneous lighting, specify DC 24 V Non-resistor type (6)  
 and use external protective resistor.

### ● NON-RESISTOR (EXTERNAL RESISTOR)

Supply Voltage		DC5V			DC12V・24V		
LED Color		Red	Green	Yellow	Red	Green	Yellow
Max. Forward Current $I_{FM}$ (mA)		40	40	40	20	20	20
DC Reverse Voltage $V_R$ (V)		10	10	10	20	20	20
Forward Voltage $V_F$ (Typ.) [ $I_F=20mA$ ] (V)		4	4.2	4	8	8.4	8
Derating (Operating temperature) (over 25°C working temperature) (mA/°C)		0.36			0.36		
Pulse Lighting	Pulse Width PW ( $\mu s$ )				100		
	Duty Ratio DR				$10^{-1}$		
	Allowable forward current $I_{FP}$ (mA)				100		

### ● Wiring Diagram



※ The diagram above shows for Anode common.

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).

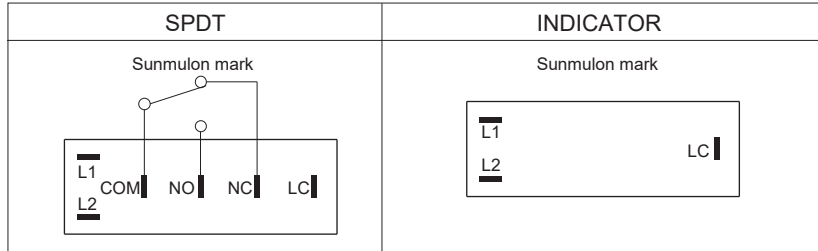
For resistance value calculation

<https://www.sunmulon.co.jp/english/products/led.html>

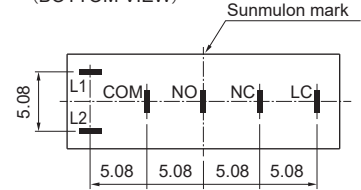
The resistance value can be calculated just by entering the items.

## TERMINALS

### ● TERMINALS LAYOUT (BOTTOM VIEW) (Common to all illumination types)



### ● TERMINALS DIMENSIONS (BOTTOM VIEW)



## TERMINAL SHAPE

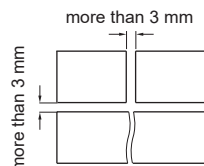


## MOUNTING DESIGN / PANEL CUTOUT

Mounting design	Panel cutout
<b>Individual (Horizontal)</b>	<b>Recommended panel thickness : 1 to 3.2 mm</b>
<b>Multiple (Horizontal)</b>	<p style="text-align: right;">n : Number of Units</p>
<b>Individual (Vertical)</b>	<b>Recommended panel thickness : 1 to 3.2 mm</b>
<b>Multiple (Vertical)</b>	<p style="text-align: right;">n : Number of Units</p>

- ※ 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



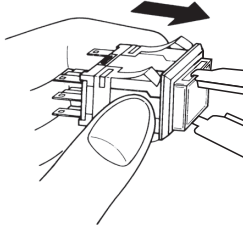
Tolerance :  $\pm 0.4$  mm



## ASSEMBLY & DISASSEMBLY

### 1. Removing Button

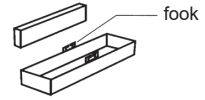
Be sure to remove with the removing tool (SJ-0001).  
Hang the button with the removing tool in the groove,  
and pull it straight out.



- ※ In case removing in any other way than the above,  
it may cause damage to the button.
- ※ Do not reuse buttons that have been removed and deformed.

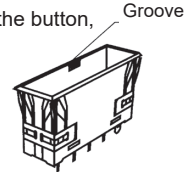
### 2. Fitting Filter

Put the filter in the button with the horizontal face down.



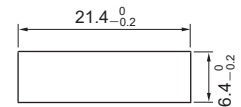
### 3. Fitting Button

Align the fooks on both sides of the button,  
the groove on the housing,  
and fit the button until click.



## PRECAUTIONS FOR CORRECT USE

1. Solder quickly and correctly at 350°C 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 housing, 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 on the right.
5. LED elements cannot be replaced, so please do not touch them.



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

Tolerance :  $\pm 0.4$  mm

As of September 2024

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## Safety Precautions for All Illuminated Pushbutton Switches

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### 1. Notes on contents of Catalogs

- (1) Rated values, performance values, and specification values of Sunmulon 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 improvement 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, standards, or laws to which your machinery, equipment, etc. 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 Sunmulon 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 equipment (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

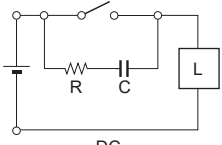
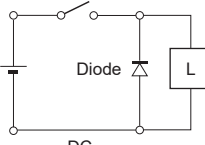
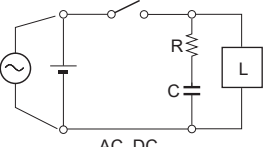
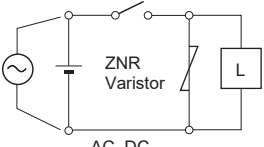
- (1) The warranty period for Sunmulon products shall be 1 year after purchase or delivery to the specified location.
- (2) Warranty scope should a failure occur in Sunmulon product during the above warranty period for reasons attributable to Sunmulon, then Sunmulon shall provide that product, free of 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 caused 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

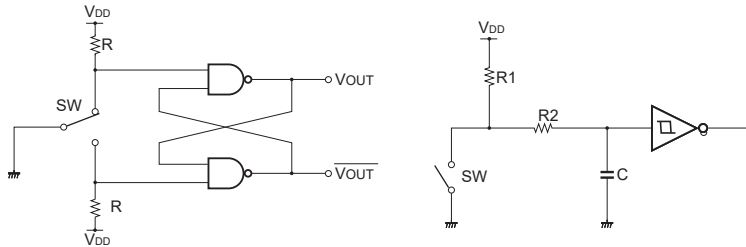
- (1) Do not perform wiring with power supplied to the switch. Do not touch the terminals or other charged parts of the switch while power is being supplied. Doing so may result in electric shock.
- (2) Be careful of electrostatic breakdown when handling.
- (3) Do not drop or otherwise apply strong force 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.

## Safety Precautions for All Illuminated Pushbutton Switches

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

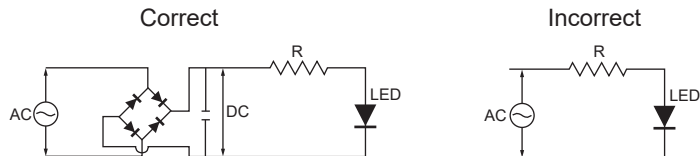
Circuit	Element selection	Circuit	Element selection
 <p style="text-align: center;">DC</p>	<p> <math>C : 1 \text{ to } 0.5 \mu\text{F} \times \text{switch current (A)}</math>  <math>R : 0.5 \text{ to } 1 \Omega \times \text{switch voltage (V)}</math> </p> <p>The values may change according to the characteristics of the load. Determine ideal capacitance and resistance values through testing.</p>	 <p style="text-align: center;">DC</p>	<p>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.</p>
 <p style="text-align: center;">AC, DC</p>		 <p style="text-align: center;">AC, DC</p>	<p>Use a varistor that can withstand the power supply voltage sufficiently. (1.5 times or more)</p>

(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 penetrate 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.

## Safety Precautions for All Illuminated Pushbutton Switches

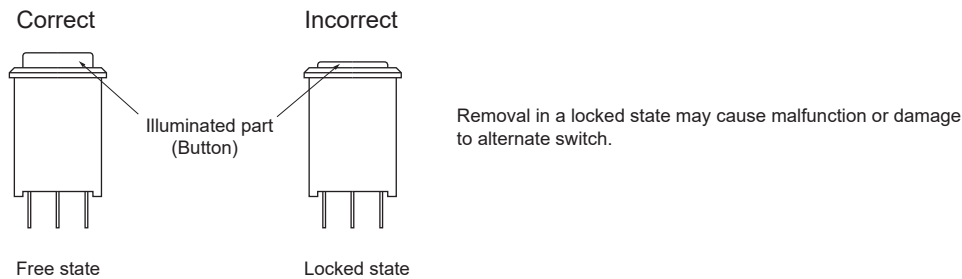
(12) Usage environment

- (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  $-25^{\circ}\text{C}$  to  $65^{\circ}\text{C}$  (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.



(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.