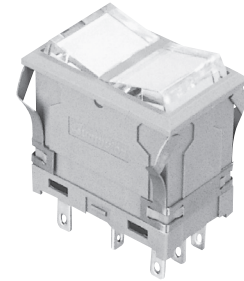
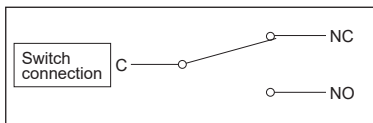


TA Illuminated Pushbutton Switch

Long-life 2-action illuminated switch which is useful to control two directions such UP/DOWN, LEFT/RIGHT etc.



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



CHARACTERISTICS

Button Size	14.2×25 mm	
Contact Material	Silver contact (Gold-plated)	Cross-bar contact
Rating (Resistive Load)	AC 125 V 5 A AC 250 V 5 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 1000 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	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 30 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 (For M-N-M, 1,000,000 times each side.)
	Alternate	More than 200,000 operations
Electrical Life (Resistive Load)	More than 30,000 operations at max. rated load More than 70,000 operations at 3 A load	More than 100,000 operations at max. rated load
Operating Force	TA1, TA2, TA5, TA6, TA7 TA3, TA4	3.92 N max. 4.9 N max.
Total Travel	TA1, TA2, TA5 TA3, TA4, TA6, TA7	3 mm max. 5 mm max.
Weight	11 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/ta.html



◇Dimensions : page TA-4 ◇Accessories : page TA-4 ◇Ordering code : page TA-5~10 ◇Internal connection arrangements : page TA-12
 ◇LED specifications : page TA-13~14 ◇Terminals : page TA-15 ◇Mounting design / Panel cutout : page TA-16

SPECIFICATIONS

Illumination type	Full-Face	A
	Dual-Color	A
	2-Split-Face	A
	Non-illumination	A
Contact	SPDT×1	A
	SPDT×2	A
Terminal	#110 Tab Soldering	A
RoHS (10 Substances)		Conform to standards

A : Applicable

CONTACT RATINGS

● Silver contact (Gold-plated)

Voltage	Current (A) (Resistive load)
AC 125 V	5
250 V	5
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)

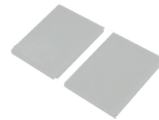
STRUCTURE

LIGHT CARTRIDGE

BUTTON



FILTER



LED UNIT



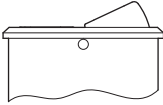
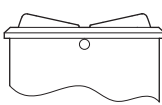
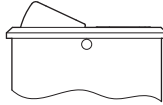
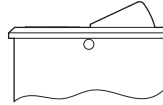
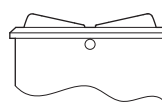
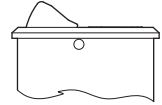
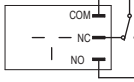
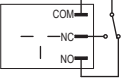
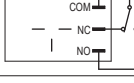
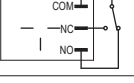
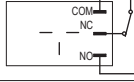
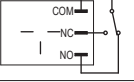
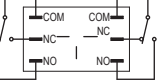
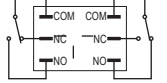
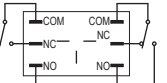
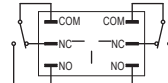
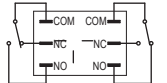
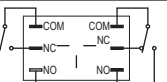
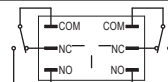
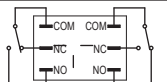
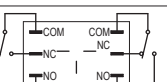
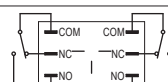
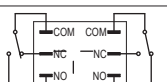
HOUSING



ILLUMINATION TYPES

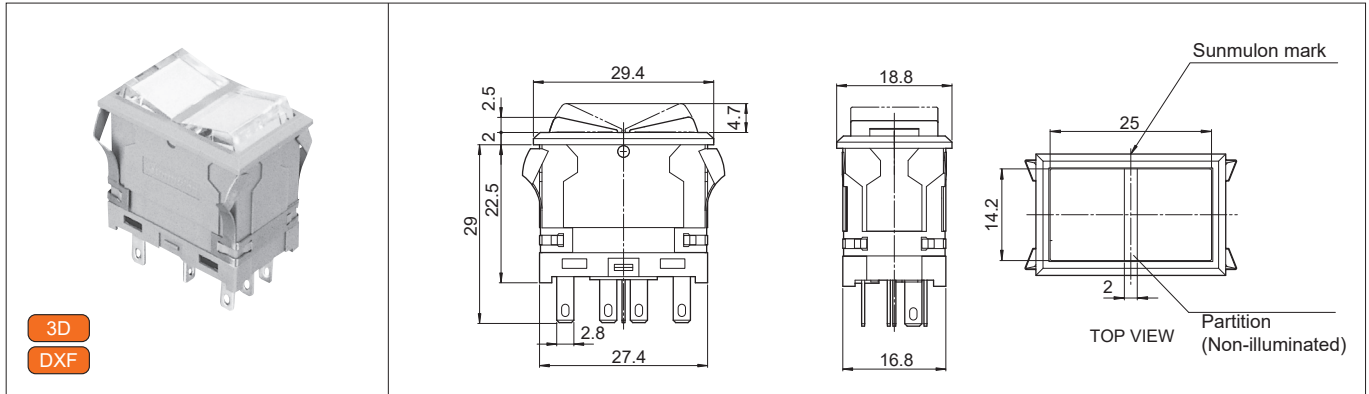
LED color symbol	7 Red	8 Green	9 Yellow	14 Super Blue	18 Super Green	
※ Yellow (9) is actually "ORANGE Yellow" not Lemon Yellow.						
Full-Face	7	8	9	14	18	
Dual-Color	7·8	8·9	9·7			
2-Split-Face	7 7	7 8	7 9	8 7	8 8	8 9
	9 7	9 8	9 9	14 14	14 18	18 14
	18 18					

OPERATIONS / SWITCH CONNECTIONS




		View from "Part number mark" side					
		Operation		Switch connection (BOTTOM VIEW)			
							
TA1	Impossible to push from N position.	N	M	No switch			
TA2	Impossible to push from N position.	N	A	No switch			
TA3	No switch	—	A				
TA4	A	—	A				
TA5	M	N	M				
TA6	A	N	M				
TA7	A	N	A				

※ M : Momentary • A : Alternate • N : Neutral (When the switch is not active.)
 ※ TA8 (Indicator) button position is N.

DIMENSIONS



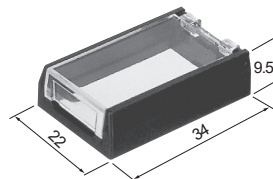
ACCESSORIES

Name	Appearance	Classification	Part no.		Precautions for use
Guard cover 3D DXF		Guard cover	Black	TA-3305-K	- The cover to be opened 180° and returned by spring force.
			Gray	TA-3305-H	
Removing tool		For removal button	SJ-0001		- Be used to remove button from housing.
		For removal LED unit	CL-0218-3		- Be used to remove LED unit from housing.

GUARD COVER

Black	TA-3305-K
Gray	TA-3305-H

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



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

Tolerance : ± 0.4 mm

ORDERING CODE [Full-Face]

Assembled Part (Light cartridge and Housing)

TA

1

2

● OPERATION

1	N-M	※1)
2	N-A	※1)
3	-A	※1)
4	A-A	※2)
5	M-N-M	※2)
6	A-N-M	※2)
7	A-N-A	※2)
8	Indicator	

● CONTACT

0	Indicator	
3	SPDT · Silver (Gold-Plated)	※1)
4	SPDT×2 · Silver (Gold-Plated)	※2)
5	SPDT · Crossbar	※1)
6	SPDT×2 · Crossbar	※2)

● ILLUMINATION TYPE

0	Full-Face
X	Without LED

● LED COLOR

7	Red
8	Green
9	Yellow
14	Super-Blue
18	Super-Green
X	Without LED

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

● HOUSING COLOR

K	Black
H	Gray

● MOUNTING

1	For Vertical Mtg.
2	For Horizontal Mtg.
X	Without Snap spring

● 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.

● LED CIRCUIT

A	Anode common
X	Without LED

● TERMINAL

P	# 110 Tab · Soldering
X	Without terminal

● FILTER COLOR ※3)

1	Red	Put the color numbers into frame 1, 2.
2	Green	
3	Orange Yellow	
4	Milk-white	
6	Blue	For Without filter Put XX into frame 1, 2.
7	Black	
X	Without filter	

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

● NOTES

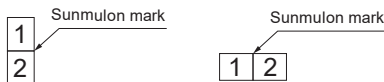
※1) For 1-Action type, specify SPDT (3 or 5).

※2) For 2-Action type, specify SPDT x 2 (4 or 6).

※3) How to specify the color of 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.



※4) The button color is Clear only. For without button, specify without filter (X).

※5) For only Indicator can be specified. For Indicator without LED (Dummy use), specify ordering code TA8-0XX□□□XXX□.

◇Dimensions : page TA-4

◇LED specifications : page TA-13

◇Accessories : page TA-4

◇Terminals : page TA-15

◇Internal connection arrangements : page TA-12

◇Mounting design / Panel cutout : page TA-16

ORDERING CODE [Full-Face]

BUTTON & FILTER SET

TA - 3345 - 1 2

● PARTITION COLOR

K	Black
H	Gray

Specify the same color as the housing.

● FILTER COLOR ※1)

1	Red
2	Green
3	Orange Yellow
4	Milk-white
6	Blue
7	Black

Put the color numbers into frame 1, 2.

● NOTES

※1) How to specify the color of 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.



LED UNIT

TA -

● ILLUMINATION TYPE

0	Full-Face
X	Without LED

● LED COLOR

7	Red
8	Green
9	Yellow
14	Super-Blue
18	Super-Green
X	Without LED

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

● LED CIRCUIT

A	Anode common
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.

HOUSING

TA -

● OPERATION

1	N-M	※1)
2	N-A	※1)
3	-A	※1)
4	A-A	※2)
5	M-N-M	※2)
6	A-N-M	※2)
7	A-N-A	※2)
8	Indicator	

● CONTACT

0	Indicator	
3	SPDT • Silver (Gold-Plated)	※1)
4	SPDT×2 • Silver (Gold-Plated)	※2)
5	SPDT • Crossbar	※1)
6	SPDT×2 • Crossbar	※2)

● MOUNTING

1	For Vertical Mtg.
2	For Horizontal Mtg.
X	Without Snap spring

● TERMINAL

P	# 110 Tab • Soldering
X	Without terminal (Dummy use) ※3)

● HOUSING COLOR

K	Black
H	Gray

● NOTES

※1) For 1-Action type, specify SPDT (3 or 5).

※2) For 2-Action type, specify SPDT x 2 (4 or 6).

※3) For only Indicator can be specified. For Indicator without LED (Dummy use), specify ordering code TA8-0 X .

ORDERING CODE [Dual-Color]

Assembled Part (Light cartridge and Housing)

TA

-31 21 2
P

● OPERATION

1	N-M	※1)
2	N-A	※1)
3	-A	※1)
4	A-A	※2)
5	M-N-M	※2)
6	A-N-M	※2)
7	A-N-A	※2)
8	Indicator	

● CONTACT

0	Indicator	
3	SPDT · Silver (Gold-Plated)	※1)
4	SPDT×2 · Silver (Gold-Plated)	※2)
5	SPDT · Crossbar	※1)
6	SPDT×2 · Crossbar	※2)

● ILLUMINATION TYPE

3	Dual-Color
---	------------

● LED COLOR

7	Red	Put the color numbers into frame 1, 2. (Dual-Color combination) 78 · 89 · 97
8	Green	
9	Yellow	

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

● MOUNTING

1	For Vertical Mtg.
2	For Horizontal Mtg.
X	Without Snap spring

● Supply Voltage to LED

1	DC 5V Built-in resistor	※4)
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	

For Non-resistor type, use external protective resistor.

● LED CIRCUIT

A	Anode common
K	Cathode common

● TERMINAL

P	# 110 Tab · Soldering
---	-----------------------

● FILTER COLOR ※3)

4	Milk-white	For With filter : 44
X	Without filter	For Without filter : XX

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

● HOUSING COLOR

K	Black
H	Gray

● NOTES

- ※1) For 1-Action type, specify SPDT (3 or 5).
- ※2) For 2-Action type, specify SPDT x 2 (4 or 6).
- ※3) The button color is Clear only. For without button, specify without filter (XX).
- ※4) Simultaneous lighting is possible for each voltage.

◇Dimensions : page TA-4 ◇Accessories : page TA-4 ◇Internal connection arrangements : page TA-12
 ◇LED specifications : page TA-13 ◇Terminals : page TA-15 ◇Mounting design / Panel cutout : page TA-16

ORDERING CODE 【Dual-Color】

BUTTON & FILTER SET

TA — 3345 — 44

● PARTITION COLOR

K	Black
H	Gray

Specify the same color as the housing.

● FILTER COLOR

44	Milk-white
----	------------

LED UNIT

TA — 3 1 2

● ILLUMINATION TYPE

3	Dual-Color
---	------------

● 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.

● LED CIRCUIT

A	Anode common
K	Cathode common

● 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

For Non-resistor type,
use external protective resistor.

HOUSING

TA — P

● OPERATION

1	N-M	※1)
2	N-A	※1)
3	-A	※1)
4	A-A	※2)
5	M-N-M	※2)
6	A-N-M	※2)
7	A-N-A	※2)
8	Indicator	

● CONTACT

0	Indicator	
3	SPDT · Silver (Gold-Plated)	※1)
4	SPDT×2 · Silver (Gold-Plated)	※2)
5	SPDT · Crossbar	※1)
6	SPDT×2 · Crossbar	※2)

● MOUNTING

1	For Vertical Mtg.
2	For Horizontal Mtg.
X	Without Snap spring

● TERMINAL

P	# 110 Tab · Soldering
---	-----------------------

● HOUSING COLOR

K	Black
H	Gray

● NOTES

- ※1) For 1-Action type, specify SPDT (3 or 5).
- ※2) For 2-Action type, specify SPDT x 2 (4 or 6).

ORDERING CODE [2-Split-Face]

Assembled Part (Light cartridge and Housing)

TA

-1

1

2

1

2

P

● OPERATION

1	N-M	※1)
2	N-A	※1)
3	-A	※1)
4	A-A	※2)
5	M-N-M	※2)
6	A-N-M	※2)
7	A-N-A	※2)
8	Indicator	

● CONTACT

0	Indicator	
3	SPDT · Silver (Gold-Plated)	※1)
4	SPDT×2 · Silver (Gold-Plated)	※2)
5	SPDT · Crossbar	※1)
6	SPDT×2 · Crossbar	※2)

● ILLUMINATION TYPE

1	2-Split-Face
---	--------------

● LED COLOR ※3)

7	Red	Put the color numbers into frame 1, 2. (2-Split-Face combination) 77 · 78 · 79 · 87 · 88 · 89 · 97 · 98 · 99 1414 · 1418 · 1814 · 1818
8	Green	
9	Yellow	
14	Super-Blue	
18	Super-Green	

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

● HOUSING COLOR

K	Black
H	Gray

● MOUNTING

1	For Vertical Mtg.
2	For Horizontal Mtg.
X	Without Snap spring

● Supply Voltage to LED

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

For Non-resistor type, use external protective resistor.

● LED CIRCUIT

A	Anode common
K	Cathode common

● TERMINAL

P	# 110 Tab · Soldering
---	-----------------------

● FILTER COLOR ※3)

1	Red	Put the color numbers into frame 1, 2.
2	Green	
3	Orange Yellow	
4	Milk-white	
6	Blue	
7	Black	For Without filter Put XX into frame 1, 2.
X	Without filter	

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

● NOTES

※1) For 1-Action type, specify SPDT (3 or 5).

※2) For 2-Action type, specify SPDT x 2 (4 or 6).

※3) 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.



※4) The button color is Clear only. For without button, specify without filter (X).

※5) Simultaneous lighting is possible for each voltage.

◇Dimensions : page TA-4

◇LED specifications : page TA-14

◇Accessories : page TA-4

◇Terminals : page TA-15

◇Internal connection arrangements : page TA-12

◇Mounting design / Panel cutout : page TA-16

ORDERING CODE [2-Split-Face]

BUTTON & FILTER SET

TA - 3345 - 1 2

● **PARTITION COLOR**

K	Black
H	Gray

Specify the same color as the housing.

● **FILTER COLOR ※1)**

1	Red	Put the color numbers into frame 1, 2.
2	Green	
3	Orange Yellow	
4	Milk-white	
6	Blue	
7	Black	

LED UNIT

TA - 1 1 2

● **ILLUMINATION TYPE**

1	2-Split-Face
---	--------------

● **LED COLOR ※1)**

7	Red	Put the color numbers into frame 1, 2.
8	Green	
9	Yellow	(2-Split-Face combination)
14	Super-Blue	77 · 78 · 79 · 87 · 88 · 89 · 97 · 98 · 99
18	Super-Green	1414 · 1418 · 1814 · 1818

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

● **LED CIRCUIT**

A	Anode common
K	Cathode common

● **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

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



HOUSING

TA - **P**

● **OPERATION**

1	N-M	※1)
2	N-A	※1)
3	-A	※1)
4	A-A	※2)
5	M-N-M	※2)
6	A-N-M	※2)
7	A-N-A	※2)
8	Indicator	

● **MOUNTING**

1	For Vertical Mtg.
2	For Horizontal Mtg.
X	Without Snap spring

● **TERMINAL**

P	# 110 Tab · Soldering
---	-----------------------

● **CONTACT**

0	Indicator	
3	SPDT · Silver (Gold-Plated)	※1)
4	SPDT×2 · Silver (Gold-Plated)	※2)
5	SPDT · Crossbar	※1)
6	SPDT×2 · Crossbar	※2)

● **HOUSING COLOR**

K	Black
H	Gray

● **NOTES**

※1) For 1-Action type, specify SPDT (3 or 5).

※2) For 2-Action type, specify SPDT x 2 (4 or 6).

REPLACEMENT PARTS

● Full-Face • 2-Split-Face BUTTON/FILTER

	Red	Green	Orange Yellow	Milk-White	Blue	Black	Clear Partition Black	Clear Partition Gray
BUTTON	/	/	/	/	/	/	/	/
FILTER	TA-3279-LR	TA-3279-LG	TA-3279-LY	TA-3279-LM	TA-3279-LB	TA-3279-K	/	/

※ Black filters do not transmit light.

● Dual-Color BUTTON/FILTER

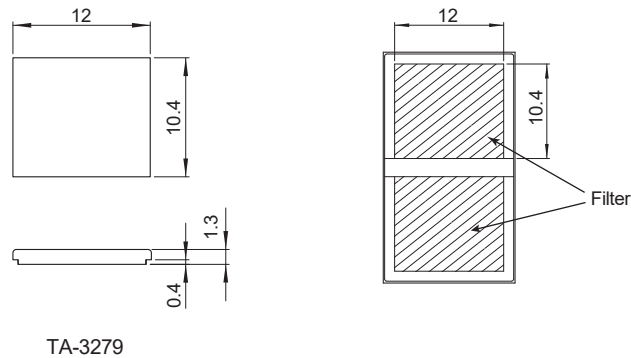
	Milk-White	Clear Partition Black	Clear Partition Gray
BUTTON	/	TA-3333-K	TA-3333-H
FILTER	TA-3279-LM	/	/

※ Button with partition. Specify the partition color the same as the housing.

※ Using 2 filters is standard.

FILTER DIMENSIONS

※ Filter insertion orientation



Tolerance : ± 0.4 mm

INTERNAL CONNECTION ARRANGEMENTS

● Full-Face

Voltage	LED (7 · 8 · 9)	LED (14 · 18)
DC 5V		
DC12V DC24V		

● Dual-Color

Voltage	LED (7 · 8 · 9)
DC 5V	
DC12V DC24V	

● Dual-Color combination (Common for each voltage)

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

● 2-Split-Face

Voltage	LED (7 · 8 · 9)	LED (14 · 18)
Common for each voltage		

LED color : 7 (Red), 8 (Green), 9 (Yellow), 14 (Super-Blue), 18 (Super-Green)

LED SPECIFICATIONS [Full-Face]

● BUILT-IN RESISTOR

Voltage	Rated Current (mA)				
	Red	Green	Yellow	Super Blue	Super Green
DC 5V ±5%	32	32	32	20	18
DC12V ±5%	16	16	16	10	9
DC24V ±5%	16	16	16	10	9

● NON-RESISTOR (EXTERNAL RESISTOR)

Supply Voltage	DC5V			DC12V・24V			DC5V		DC12V・24V		
LED Color	Red	Green	Yellow	Red	Green	Yellow	Super Blue	Super Green	Super Blue	Super Green	
Max. Forward Current I_{FM} (mA)	50	40	50	25	20	25	40	40	20	20	
DC Reverse Voltage V_R (V)	10	10	10	20	20	20	5	5	10	10	
Forward Voltage V_F (Typ.) (V)	3.8	4.2	3.8	7.6	8.4	7.6	3.4	3.4	6.8	6.8	
Derating (Operating temperature) (over 25°C working temperature) (mA/°C)	0.66			0.33			0.5		0.25		
Pulse Lighting	Pulse Width PW (μ s)	90			90			100		100	
	Duty Ratio DR	10^{-1}			10^{-1}			10^{-1}		10^{-1}	
	Allowable forward current I_{FP} (mA)	90			90			100		100	
Wiring Diagram	Diagram 1			Diagram 2			Diagram 1		Diagram 2		

Forward Voltage V_F of LED color : Red・Green・Yellow 【 $I_F=20mA$ 】 Super Blue・Super Green 【 $I_F=5mA$ 】

● Wiring Diagram

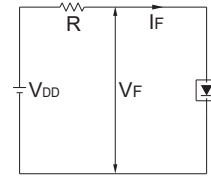


Diagram 1

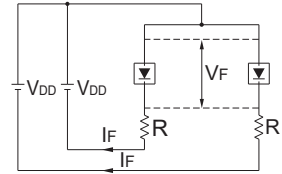


Diagram 2

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%	20	20	20
DC12V ±5%	10	10	10
DC24V ±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)	50	40	50	25	20	25	
DC Reverse Voltage V_R (V)	10	10	10	20	20	20	
Forward Voltage V_F (Typ.) 【 $I_F=20mA$ 】 (V)	3.8	4.2	3.8	7.6	8.4	7.6	
Derating (Operating temperature) (over 25°C working temperature) (mA/°C)	0.66			0.33			
Pulse Lighting	Pulse Width PW (μ s)	90			90		
	Duty Ratio DR	10^{-1}			10^{-1}		
	Allowable forward current I_{FP} (mA)	90			90		
Wiring Diagram	Diagram 1			Diagram 2			

● Wiring Diagram

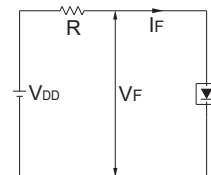


Diagram 1

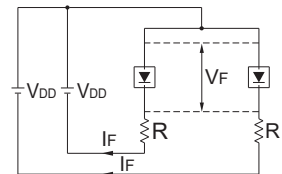


Diagram 2

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	Super Blue	Super Green
DC 5V ±5%	10	10	10	10	9
DC12V ±5%	10	10	10	10	9
DC24V ±5%	10	10	10	10	9

● NON-RESISTOR (EXTERNAL RESISTOR)

Supply Voltage	Common for each voltage				
LED Color	Red	Green	Yellow	Super Blue	Super Green
Max. Forward Current I_{FM} (mA)	25	20	25	20	20
DC Reverse Voltage V_R (V)	10	10	10	5	5
Forward Voltage V_F (Typ.) (V)	3.8	4.2	3.8	3.4	3.4
Derating (Operating temperature) (over 25°C working temperature) (mA/°C)	0.33		0.25		
Pulse Lighting	Pulse Width PW (μs)	90		100	
	Duty Ratio DR	10^{-1}		10^{-1}	
	Allowable forward current I_{FP} (mA)	90		100	
Wiring Diagram	Diagram 2				

Forward Voltage V_F of LED color : Red • Green • Yellow 【 $I_F=20mA$ 】 Super Blue • Super Green 【 $I_F=5mA$ 】

For resistance value calculation

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

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

● Wiring Diagram

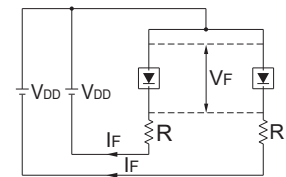


Diagram 2

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

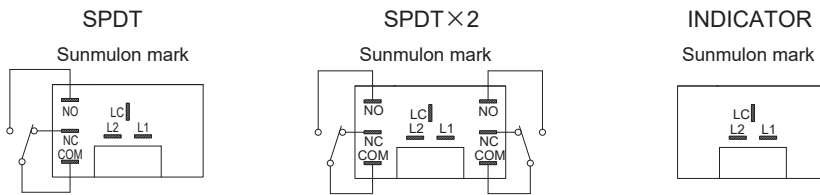
I_F : Forward Current

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).

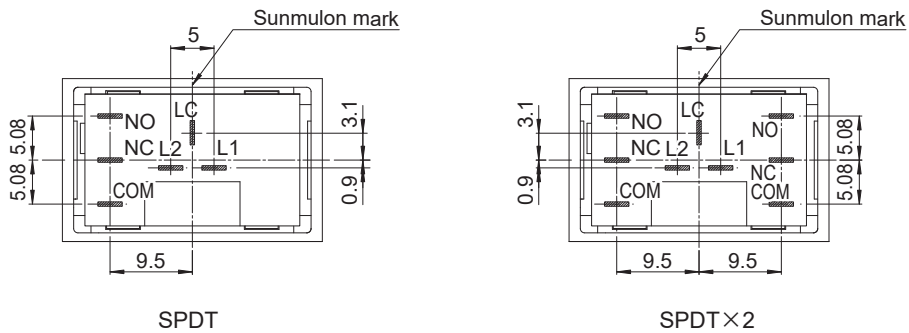
TERMINALS

● TERMINALS LAYOUT (BOTTOM VIEW)

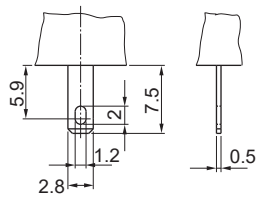


※ When "Without LED (X)" and "Without terminal (X)" is specified for Indicator, there are no LED terminals (LC, L1 & L2).

● TERMINALS DIMENSIONS (BOTTOM VIEW)



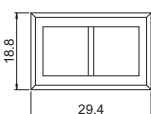
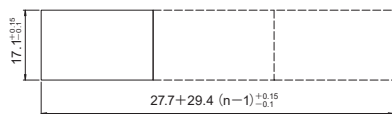
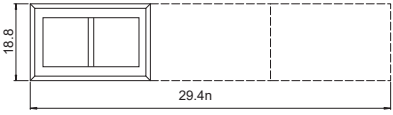
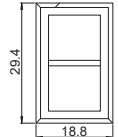
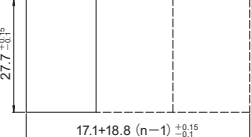
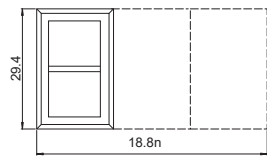
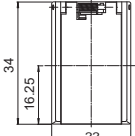
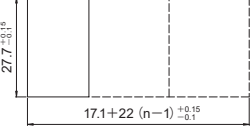
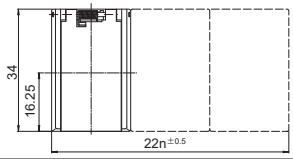
TERMINAL SHAPE



110 Tab • Soldering Terminal

Tolerance : ±0.4 mm

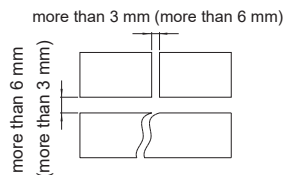
MOUNTING DESIGN / PANEL CUTOUT

Mounting design		Panel cutout
Without Guard cover	Individual (Horizontal) 	Recommended panel thickness : 1 to 3.2 mm 
	Multiple (Horizontal) 	
	Individual (Vertical) 	Recommended panel thickness : 1 to 3.2 mm 
	Multiple (Vertical) 	
With Guard cover	Individual 	Recommended panel thickness : 1 to 3.2 mm 
	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

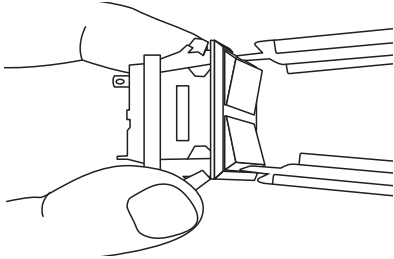
Dimensions in parentheses are for Individual (Vertical) mounting.



Tolerance : ±0.4 mm

1. Removing Button

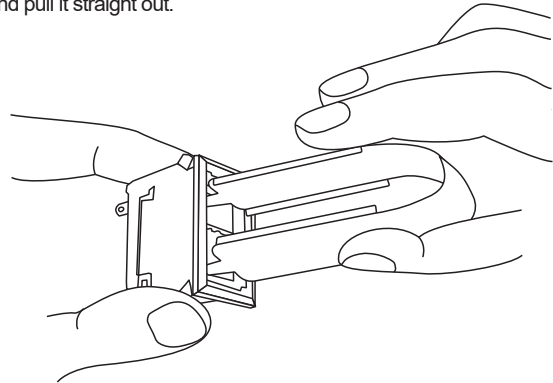
Be sure to remove with the removing tool (SJ-0001). Hang the button with the removing tool in the groove, and pull it straight out.



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

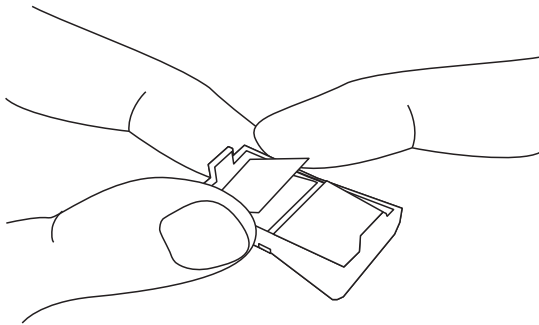
2. Removing LED unit

Hook the L-shaped tips of the removing tool (CL-0218-3) onto the inside square grooves of the LED unit and pull it straight out.



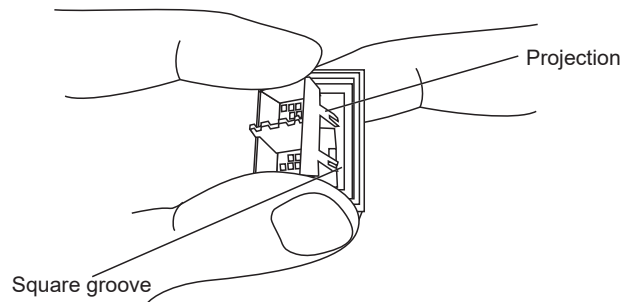
3. Fitting Filter

With the glossy side of the filter facing the button, align the edge of the filter with the edge of the button, and fit the filter into the button tightly.



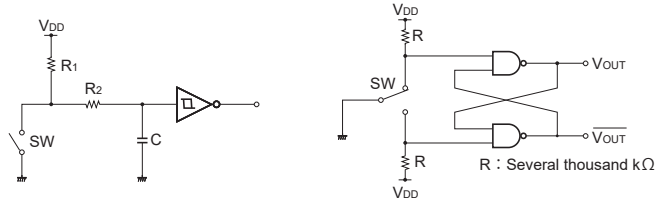
4. Fitting LED unit

Align the two projections of the LED unit with the square grooves of the housing, and push the top of the LED unit parallel to the housing until it stops.

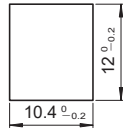


PRECAUTIONS FOR CORRECT USE

- For types with N (Neutral) such as M-N-M, chattering may occur due to inertia of the switch when one side is turned ON and the hand is released to return to N. (For A, when the other side is pushed.)
In such cases, please install an anti-chattering circuit. (Refer to diagrams below.)



- For A-N-M and A-N-A, when returning the alternate to N, be sure how to push, as pushing the other side too hard may cause the other side to operate without activating N.
- When using for CPU or other devices with high-speed responsivity, please install an anti-chattering circuit. (Refer to diagrams above.)
- Solder quickly and correctly at 380°C max. and for 3 seconds or less. Be careful not to touch the soldering iron to the main body.
- Wait for one minute during and after soldering before exerting any external force on the solder.
- The rated voltage is shown on the side of the LED unit, so be sure before use.
- 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 July 2023

Safety Precautions for All Illuminated Pushbutton Switches

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

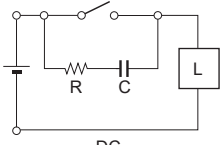
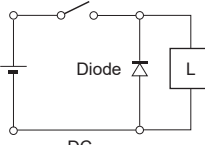
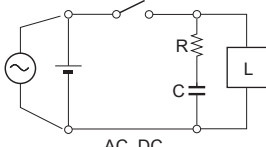
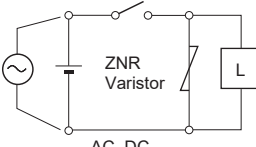
- (1) The warranty period for Sunmulon products shall be 1 year after purchase or delivery to the specified location.
- (2) Warranty scope should a failure occur in Sunmulon product during the above warranty period for reasons attributable to Sunmulon, then Sunmulon shall provide that product, free of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

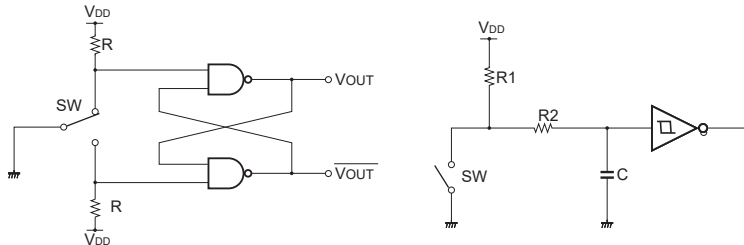
- (1) Do not perform wiring with power supplied to the switch. Do not touch the terminals or other charged parts of the switch while power is being supplied. Doing so may result in electric shock.
- (2) Be careful of electrostatic breakdown when handling.
- (3) Do not drop or otherwise apply strong force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

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.

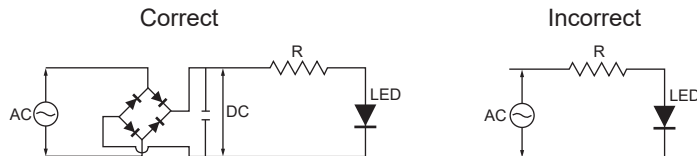
Circuit	Element selection	Circuit	Element selection
 <p style="text-align: center;">DC</p>	<p>C : 1 to 0.5 μF \times switch current (A) R : 0.5 to 1 Ω \times switch voltage (V)</p> <p>The values may change according to the characteristics of the load. Determine ideal capacitance and resistance values 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>	

(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

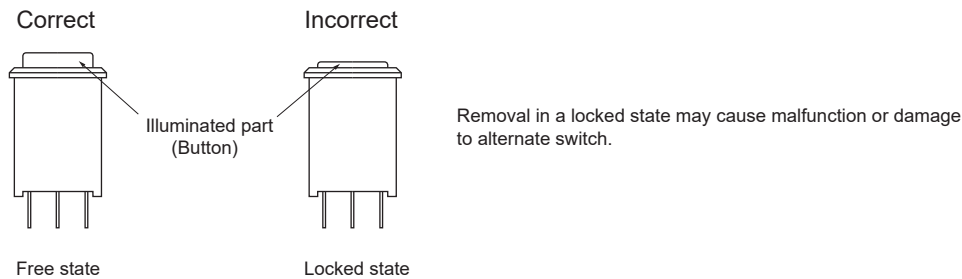
(12) Usage environment

- (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°C to 65°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.