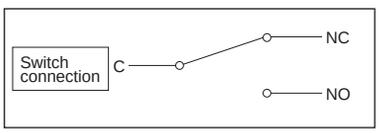
Sunmulon

XH Illuminated Pushbutton Switch

XH

Sophisticated design with soft and streamlined shape gives excellent panel appearance. Easy wiring without soldering also available.

- Depth behind panel：Only 22.5 mm
- LED Full-Face, Dual-Color, 2-3-4-Split-Face illumination available.
- Terminal：#110 Tab・Soldering
- Accessories：Guard covers, Sockets, Easy wiring unit, etc.



CHARACTERISTICS

Button Size		Square：□19 mm　Rectangle：19×26 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 2000 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 2000 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	
	Alternate	More than 200,000 operations	
Electrical Life (Resistive Load)		More than 50,000 operations at max. rated load	More than 100,000 operations at max. rated load
Operating Force		4.9 N max.	
Total Travel		3.5 mm max.	
Weight		Square：14 g　Rectangle：18 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/xh.html

◇Dimensions：page XH-4
◇Accessories：page XH-5
◇Ordering code：page XH-6～11
◇Internal connection arrangements：page XH-13～22
◇LED specifications：page XH-23～29
◇Terminals：page XH-30
◇Mounting design / Panel cutout：page XH-31～32
◇Accessories' dimensions / Panel cutout：XH-33～36

SPECIFICATIONS

		Square	Rectangle
Illumination type	Full-Face	A	A
	Dual-Color	A	A
	2-Split-Face	A	A
	3-Split-Face	N/A	A
	4-Split-Face	N/A	A
	Non-illumination	A	A
Contact	SPDT	A	A
	DPDT	A	A
	3PDT	N/A	A
Terminal	#110 Tab Soldering	A	A
	PCB	A	A
Other	Easy wiring	A	A
RoHS (10 Substances)		Conform to standards	

A : Applicable N/A : Not applicable

CONTACT RATINGS

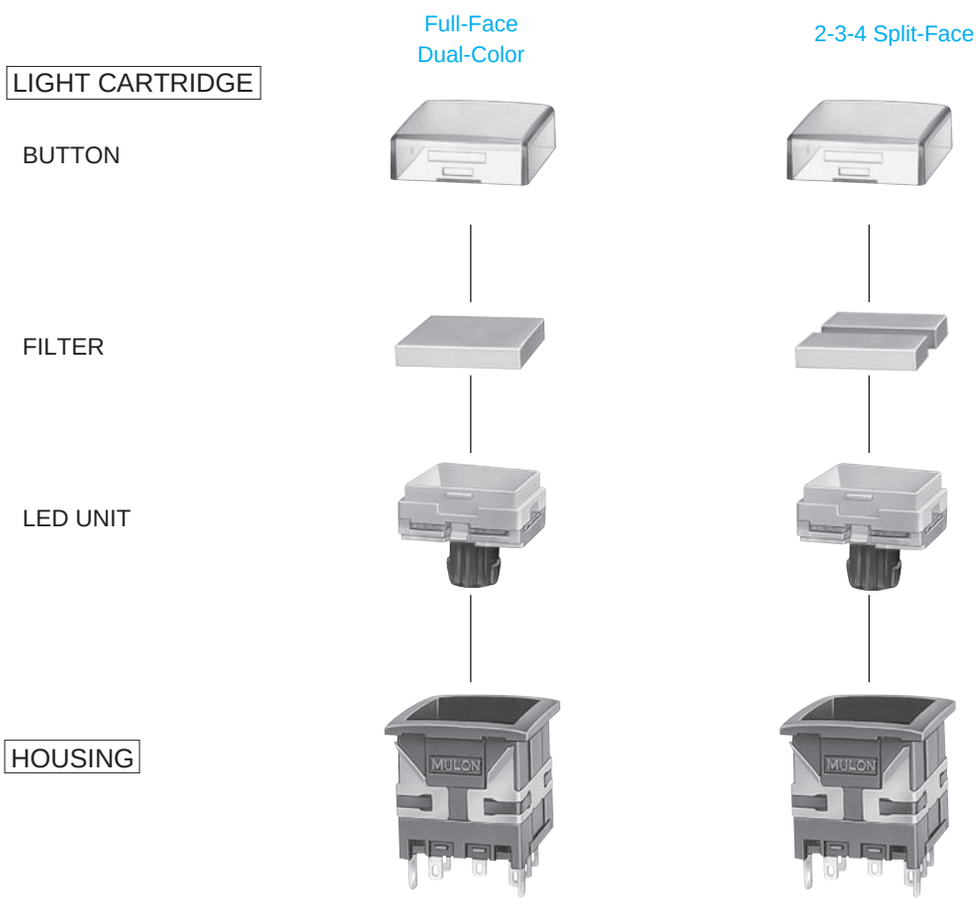
● Silver contact (Gold-plated)

Voltage	Current (A) (Resistive load)
AC 125 V	5
250 V	5
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)
Minimum applicable load	DC 5 V 1 mA (Resistive load)

STRUCTURE



ILLUMINATION TYPES

Common for each button size.

LED color symbol

70	Red	80	Green	90	Yellow	14	Super Blue	16	Super White	18	Super Green

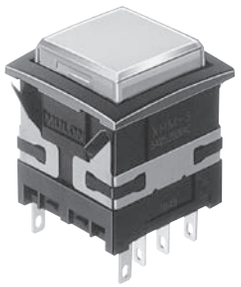
※ Yellow (90) is actually “ORANGE Yellow” not Lemon Yellow.

Full-Face	70 80 90 14 16 18
Dual-Color	70•80 70•14 70•16 70•18 80•90 90•70 90•14 90•16 90•18 14•16 16•18 18•14
2-Split-Face	All combinations of LEDs are available.  2-Split-Face (Vertical)  2-Split-Face (Horizontal)
3-Split-Face	All combinations of LEDs are available.  3-Split-Face (Vertical) Right  3-Split-Face (Horizontal) Downside
4-Split-Face	All combinations of LEDs are available.  4-Split-Face

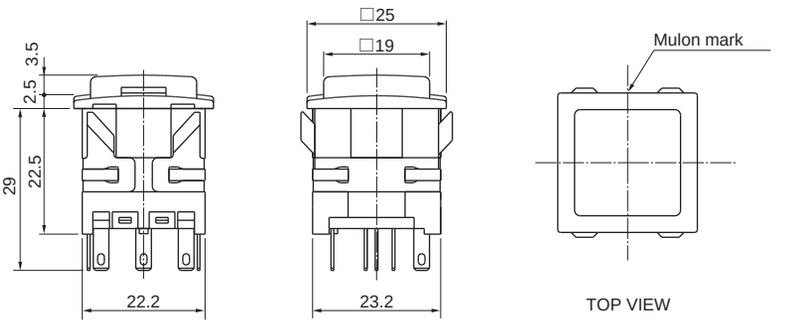
DIMENSIONS

● With Flange

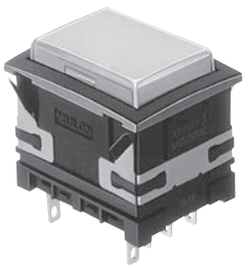
Square



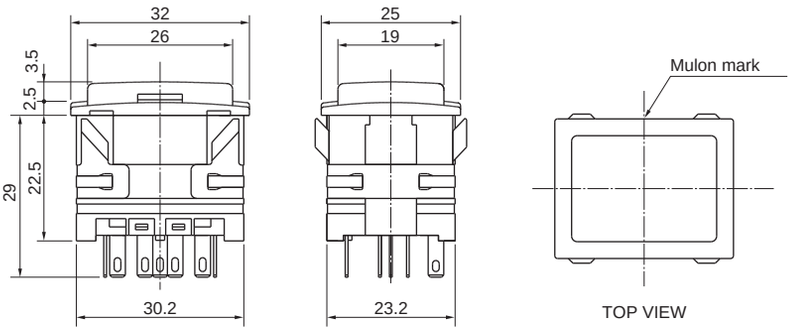
3D
DXF



Rectangle



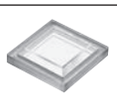
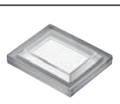
3D
DXF



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 3D DXF		Center barrier	Black	XH-1872-K	- Cannot be used with dust-proof / oil water-tight cover.
			Gray	XH-1872-H	
		Side barrier	Black	XH-1873-K	
			Gray	XH-1873-H	
Guard cover 3D DXF		For square button	XH-2024		- Can be used with barriers, also possible to install after switch be mounted on panel. - Cannot be used with dust-proof / oil water-tight cover. - The cover to be opened 180° and returned by spring force.
		For rectangle button	XH-2025		
Socket		Soldering terminal	Black	XH-2959-1	- Place the metal fittings firmly in the groove of the housing. XH-2959-1：With Lock Lever XH-2960-1：With Lock Lever XH-2960-2：Without Lock Lever
		PCB terminal	Black	XH-2960-1	
				XH-2960-2	
Easy wiring unit 3D DXF		Terminal cover unit	XH-4633		- Do not re-press of wire into terminal crimping holder. - When applying current, do not insert or remove the terminal crimping holder. - Placing consecutive vertical direction, more than 40 mm pitch is required.
		Terminal crimping holder Single	PA-4634		
		Terminal crimping holder Double	PA-4635		
Dust-proof / oil water-tight cover 3D		For square button	WH-0783		- Cannot be used with barrier and guard cover. - For using as oil water-tight, rubber packing needed. (Equivalent to IP63)
		For rectangle button	WH-0784		
Rubber packing		For square button	WH-0767		- For using as oil water-tight, rubber packing needed.
		For rectangle button	WH-0768		
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 / Panel cutout：XH-33～36

ORDERING CODE 【Full-Face】

Assembled Part (Light cartridge and Housing)

XH □ — □ □ □ □ □ □ P □ □

● OPERATION

L	Indicator
F	Flat 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
W0	Rectangle

● LED COLOR

70	Red	
80	Green	
90	Yellow	※1)
14	Super-Blue	
16	Super-White	
18	Super-Green	
X	Without LED	※3)

● BUTTON COLOR

R	Red	
G	Green	
Y	Yellow	※1)
M	Milk-white	
B	Blue	
C	Clear	

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

● HOUSING COLOR

K	Black
H	Gray

● OPTION

0759	Low brightness	※2)
001	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)
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	
X	Without LED	※3)

For Non-resistor type,
use external protective resistor.

● TERMINAL

P	#110 Tab・Soldering

● FILTER COLOR

1	Red	
2	Green	
3	Yellow	※1)
4	Milk-white	
6	Blue	
X	Without filter	

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

● NOTES

※1) The color of “Yellow” for LED (90), button (Y) and filter (3) is actually “Orange Yellow” not Lemon Yellow.
※2) For optional low brightness type (0759), specify supply voltage to LED 1, 2, or 3 (Built-in resistor type).
※3) For without LED (X), specify supply voltage to LED X (Without LED).

◇Dimensions：page XH-4
◇Accessories：page XH-5
◇Internal connection arrangements：page XH-13
◇LED specifications：page XH-23～24
◇Terminals：page XH-30
◇Mounting design / Panel cutout：page XH-31～32
◇Accessories' dimensions / Panel cutout：page XH-33～36

ORDERING CODE 【Full-Face】

LIGHT CARTRIDGE

XH — □ □ □ □ □ □

● BUTTON SHAPE

S0	Square
W0	Rectangle

● LED COLOR

70	Red
80	Green
90	Yellow ※1)
14	Super-Blue
16	Super-White
18	Super-Green
X	Without LED ※3)

● BUTTON COLOR

R	Red
G	Green
Y	Yellow ※1)
M	Milk-white
B	Blue
C	Clear
X	Without button

● FILTER COLOR

1	Red
2	Green
3	Yellow ※1)
4	Milk-white
6	Blue
X	Without filter

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

● OPTION

0759	Low brightness ※2)
001	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)
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
X	Without LED ※3)

For Non-resistor type, use external protective resistor.

● NOTES

※1) The color of “Yellow” for LED (90), button (Y) and filter (3) is actually “Orange Yellow” not Lemon Yellow.
※2) For optional low brightness type (0759), specify supply voltage to LED 1, 2, or 3 (Built-in resistor type).
※3) For without LED (X), specify supply voltage to LED X (Without LED).

HOUSING

XH □ — □ □ □ P □

● OPERATION

L	Indicator
F	Flat 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

S0A	Square
W0A	Rectangle

● Supply Voltage to LED

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

For Non-resistor type, use external protective resistor.

● TERMINAL

P	＃110 Tab・Soldering

● HOUSING COLOR

K	Black
H	Gray

● NOTES

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

ORDERING CODE 【Dual-Color】

Assembled Part (Light cartridge and Housing)

XH □ — □ □ 1 2 □ □ □ P □ □

● OPERATION

L	Indicator
F	Flat 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
W3	Rectangle

● LED COLOR ※1)

70	Red
80	Green
90	Yellow
14	Super-Blue
16	Super-White
18	Super-Green

Put the color numbers into frame 1, 2.

(Dual-Color combination)

7080・7014・7016・7018
8090・9070・9014・9016
9018・1416・1618・1814

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

● BUTTON COLOR ※2)

C	Clear
M	Milk-white

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

● OPTION

0759	Low brightness ※3)
001	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 ※3)
2	DC12V Built-in resistor ※3)
3	DC24V Built-in resistor ※3)
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

● FILTER COLOR ※2)

4	Milk-white
X	Without filter

● HOUSING COLOR

K	Black
H	Gray

● NOTES

※1) The above LED color numbers (1, 2) do not always match terminal numbers (L1, L2).
※2) Button should be C (Clear) with Milk-white filter (4) or M (Milk-white) without filter (X).
※3) For optional low brightness type (0759), specify supply voltage to LED 1, 2, or 3 (Built-in resistor type).

◇Dimensions：page XH-4
◇Accessories：page XH-5
◇Internal connection arrangements：page XH-14～15
◇LED specifications：page XH-25～26
◇Terminals：page XH-30
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◇Accessories' dimensions / Panel cutout：page XH-33～36

ORDERING CODE 【Dual-Color】

LIGHT CARTRIDGE

XH — □ 1 2 □ □ □ □

● BUTTON SHAPE

S3	Square
W3	Rectangle

● LED COLOR ※1)

70	Red
80	Green
90	Yellow
14	Super-Blue
16	Super-White
18	Super-Green

Put the color numbers into frame 1, 2.

(Dual-Color combination)

7080・7014・7016・7018
8090・9070・9014・9016
9018・1416・1618・1814

Yellow (90) is actually “ORANGE Yellow” not Lemon Yellow.

● FILTER COLOR ※2)

4	Milk-white
X	Without filter

● BUTTON COLOR ※2)

C	Clear
M	Milk-white
X	Without button

● OPTION

0759	Low brightness	※3)
001	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	※3)
2	DC12V Built-in resistor	※3)
3	DC24V Built-in resistor	※3)
4	DC 5V Non-resistor	
5	DC12V Non-resistor	
6	DC24V Non-resistor	

For Non-resistor type, use external protective resistor.

● NOTES

※1) The above LED color numbers (1, 2) do not always match terminal numbers (L1, L2).
※2) Button should be C (Clear) with Milk-white filter (4) or M (Milk-white) without filter (X).
※3) For optional low brightness type (0759), specify supply voltage to LED 1, 2, or 3 (Built-in resistor type).

HOUSING

XH □ — □ □ □ P □

● OPERATION

L	Indicator
F	Flat 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 COLOR

S3A	Square	(Dual-Color combination) 7080・8090・9070
W3A	Rectangle	
S3B	Square	7014・7016・7018 9014・9016・9018 1416・1618・1814
W3B	Rectangle	

Specify part numbers depend on LED color combination of light cartridge.

● Supply Voltage to LED

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

For Non-resistor type, use external protective resistor.

● TERMINAL

P	#110 Tab・Soldering

● HOUSING COLOR

K	Black
H	Gray

ORDERING CODE 【2・3・4-Split-Face】

Assembled Part (Light cartridge and Housing)

XH □ — □ □ 1234 C □ 1234 P □ □

● OPERATION

L	Indicator
F	Flat 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・ILLUMINATION TYPE

S2	Square 2-Split-Face (Horizontal)
W1	Rect. 2-Split-Face (Vertical)
W2	Rect. 2-Split-Face (Horizontal)
W5	Rect. 3-Split-Face (Vertical)
W6	Rect. 3-Split-Face (Horizontal)
W7	Rect. 4-Split-Face

● LED COLOR ※1) ※3)

70	Red	2-Split-Face : Put the color numbers into frame 1, 2. 3-Split-Face : Put the color numbers into frame 1, 2, 3. 4-Split-Face : Put the color numbers into frame 1, 2, 3, 4.
80	Green	
90	Yellow	
14	Super-Blue	For Non-illuminated 2-Split-Face : Put XX into frame 1, 2. 3-Split-Face : Put XXX into frame 1, 2, 3. 4-Split-Face : Put XXXX into frame 1, 2, 3, 4.
16	Super-White	
18	Super-Green	
X	Without LED	

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

● FILTER COLOR ※1)

1	Red	2-Split-Face : Put the color numbers into frame 1, 2. 3-Split-Face : Put the color numbers into frame 1, 2, 3. 4-Split-Face : Put the color numbers into frame 1, 2, 3, 4. For Without filter 2-Split-Face : Put XX into frame 1, 2. 3-Split-Face : Put XXX into frame 1, 2, 3. 4-Split-Face : Put XXXX into frame 1, 2, 3, 4.
2	Green	
3	Yellow	
4	Milk-white	
6	Blue	
X	Without filter	

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

● TERMINAL

P	#110 Tab・Soldering

● OPTION

0759	Low brightness	※2)
001	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)
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	
X	Without LED	※3)

For Non-resistor type, use external protective resistor.

● NOTES

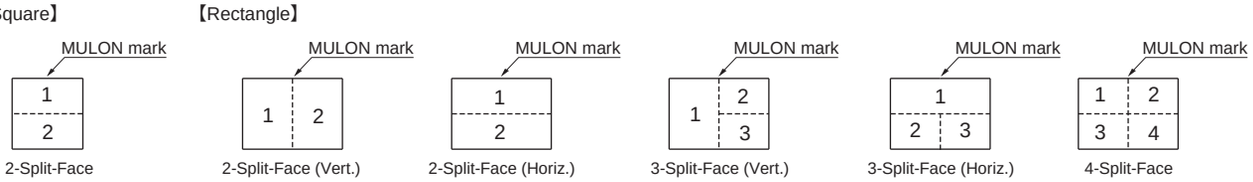
※1) How to specify the color of LED and filter

Select the color symbols listed in the ordering code, and put them into the frame 1, 2, 3 and 4, referring to the figure below.

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

The color of “Yellow” for LED (90) and filter (3) is actually “Orange Yellow” not Lemon Yellow.

【Square】 【Rectangle】



※2) For optional low brightness type (0759), specify supply voltage to LED 1, 2, or 3 (Built-in resistor type).

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

◇Dimensions：page XH-4
◇Accessories：page XH-5
◇Internal connection arrangements：page XH-16～22
◇LED specifications：page XH-27～29
◇Terminals：page XH-30
◇Mounting design / Panel cutout：page XH-31～32
◇Accessories' dimensions / Panel cutout：page XH-33～36

ORDERING CODE 【2・3・4-Split-Face】

LIGHT CARTRIDGE

XH — □ 1234 □ 1234 □ □

● BUTTON SHAPE・ILLUMINATION TYPE

S2	Square 2-Split-Face (Horizontal)
W1	Rect. 2-Split-Face (Vertical)
W2	Rect. 2-Split-Face (Horizontal)
W5	Rect. 3-Split-Face (Vertical)
W6	Rect. 3-Split-Face (Horizontal)
W7	Rect. 4-Split-Face

● BUTTON COLOR

C	Clear
X	Without button

● FILTER COLOR ※1)

1	Red	2-Split-Face : Put the color numbers into frame 1, 2. 3-Split-Face : Put the color numbers into frame 1, 2, 3. 4-Split-Face : Put the color numbers into frame 1, 2, 3, 4. For Without filter 2-Split-Face : Put XX into frame 1, 2. 3-Split-Face : Put XXX into frame 1, 2, 3. 4-Split-Face : Put XXXX into frame 1, 2, 3, 4.
2	Green	
3	Yellow	
4	Milk-white	
6	Blue	
X	Without filter	

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

● OPTION

0759	Low brightness	※2)
001	Cathode common	
Blank	No option	

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

● LED COLOR ※1) ※3)

70	Red	2-Split-Face : Put the color numbers into frame 1, 2. 3-Split-Face : Put the color numbers into frame 1, 2, 3. 4-Split-Face : Put the color numbers into frame 1, 2, 3, 4. For Non-illuminated 2-Split-Face : Put XX into frame 1, 2. 3-Split-Face : Put XXX into frame 1, 2, 3. 4-Split-Face : Put XXXX into frame 1, 2, 3, 4.
80	Green	
90	Yellow	
14	Super-Blue	
16	Super-White	
18	Super-Green	
X	Without LED	

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

● Supply Voltage to LED

1	DC 5V Built-in resistor	※2)
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	
X	Without LED	※3)

For Non-resistor type, use external protective resistor.

● NOTES

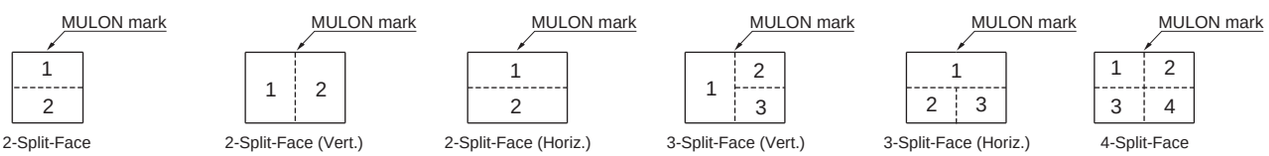
※1) How to specify the color of LED and filter

Select the color symbols listed in the ordering code, and put them into the frame 1, 2, 3 and 4, referring to the figure below.

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

The color of “Yellow” for LED (90) and filter (3) is actually “Orange Yellow” not Lemon Yellow.

【Square】 【Rectangle】



※2) For optional low brightness type (0759), specify supply voltage to LED 1, 2, or 3 (Built-in resistor type).

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

HOUSING

XH □ — □ □ □ P □

● OPERATION

L	Indicator
F	Flat 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

S2A	Square 2-Split-Face (Horizontal)
W1A	Rect. 2-Split-Face (Vertical)
W2A	Rect. 2-Split-Face (Horizontal)
W5A	Rect. 3・4-Split-Face

● Supply Voltage to LED

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

For Non-resistor type, use external protective resistor.

● TERMINAL

P	#110 Tab・Soldering

● HOUSING COLOR

K	Black
H	Gray

● NOTES

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

REPLACEMENT PARTS

● Full-Face BUTTON／FILTER

		No.	Red	Green	Yellow	Blue	Milk-White	Clear
BUTTON	Square	—	XH-1834-LR	XH-1834-LG	XH-1834-LY	XH-1834-LB	XH-1834-LM	XH-1834-CC
	Rectangle	—	XH-1833-LR	XH-1833-LG	XH-1833-LY	XH-1833-LB	XH-1833-LM	XH-1833-CC
FILTER	Square	1	XH-1832-LR	XH-1832-LG	XH-1832-LY	XH-1832-LB	XH-1832-LM	
	Rectangle	3	XH-1831-LR	XH-1831-LG	XH-1831-LY	XH-1831-LB	XH-1831-LM	

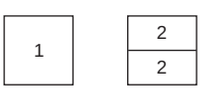
● Dual-Color BUTTON／FILTER

		No.	Milk-White	Clear
BUTTON	Square	—	XH-1834-LM	XH-1834-CC
	Rectangle	—	XH-1833-LM	XH-1833-CC
FILTER	Square	1	XH-1832-LM	
	Rectangle	3	XH-1831-LM	

● Split-Face BUTTON／FILTER

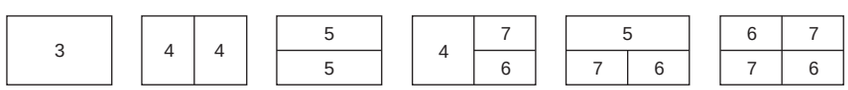
			No.	Red	Green	Yellow	Blue	Milk-White	Clear
BUTTON	Square		—						XH-1834-CC
	Rectangle		—						XH-1833-CC
FILTER	Square	2-Split-Face (Horiz.)	2	XH-1909-LR	XH-1909-LG	XH-1909-LY	XH-1909-LB	XH-1909-LM	
	Rectangle	2・3-Split-Face (Vert.)	4	XH-1910-LR	XH-1910-LG	XH-1910-LY	XH-1910-LB	XH-1910-LM	
		2・3-Split-Face (Horiz.)	5	XH-1911-LR	XH-1911-LG	XH-1911-LY	XH-1911-LB	XH-1911-LM	
		3・4-Split-Face	6	XH-1913-LR	XH-1913-LG	XH-1913-LY	XH-1913-LB	XH-1913-LM	
			7	XH-1912-LR	XH-1912-LG	XH-1912-LY	XH-1912-LB	XH-1912-LM	

【Square】



Full-Face Dual-Color　2-Split-Face (Horiz.)

【Rectangle】

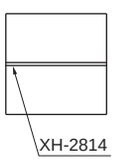


Full-Face Dual-Color　2-Split-Face (Vert.)　2-Split-Face (Horiz.)　3-Split-Face (Vert.)　3-Split-Face (Horiz.)　4-Split-Face

● DIVIDER

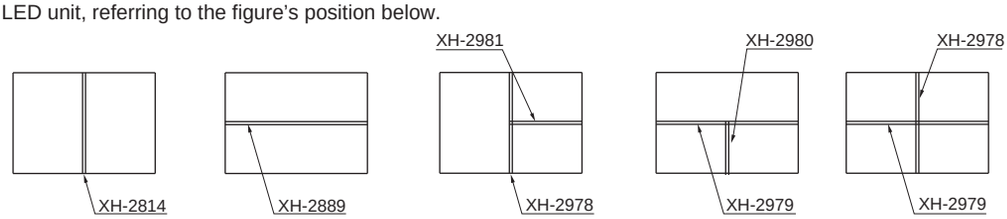
Place divider in the groove inside the LED unit, referring to the figure's position below.

【Square】



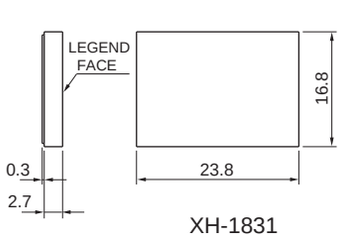
2-Split-Face (Horiz.)

【Rectangle】

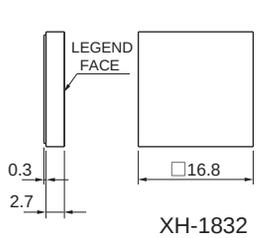


2-Split-Face (Vert.)　2-Split-Face (Horiz.)　3-Split-Face (Vert.)　3-Split-Face (Horiz.)　4-Split-Face

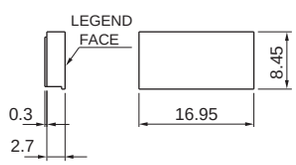
FILTER DIMENSIONS



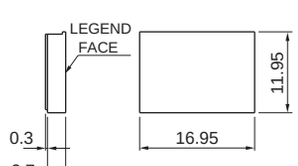
XH-1831



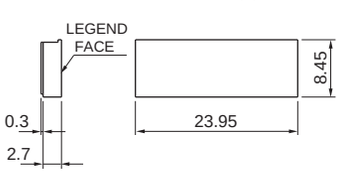
XH-1832



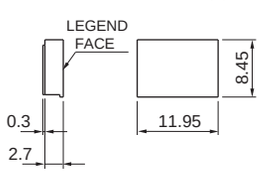
XH-1909



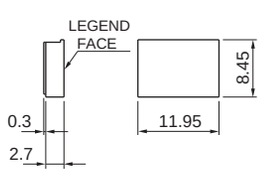
XH-1910



XH-1911



XH-1912

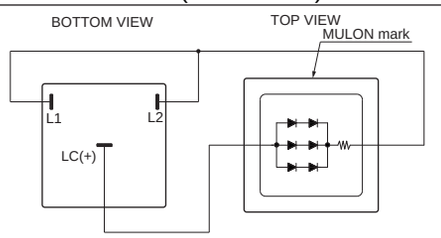
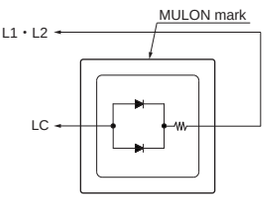
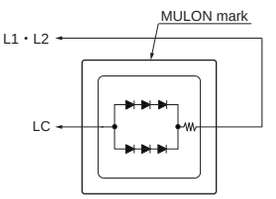
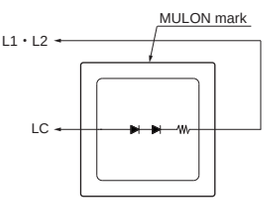
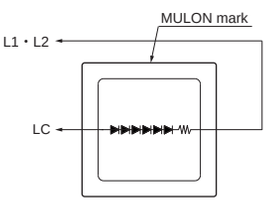
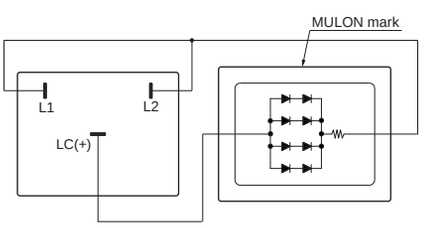
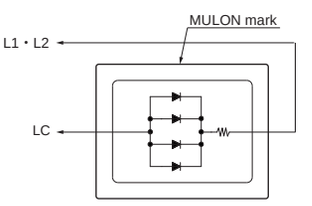
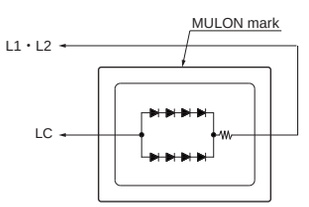
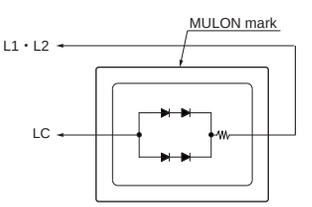
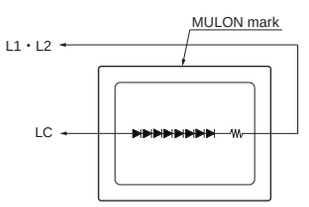
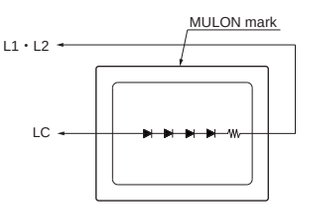


XH-1913

Tolerance : ± 0.4 mm

INTERNAL CONNECTION ARRANGEMENTS

● Full-Face

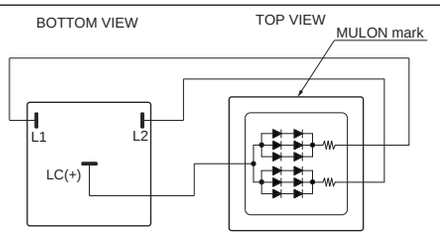
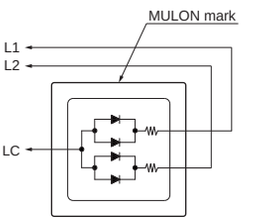
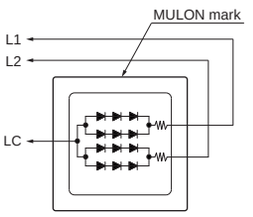
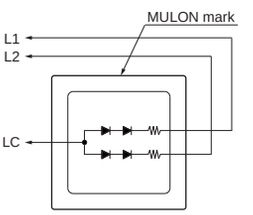
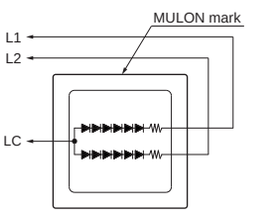
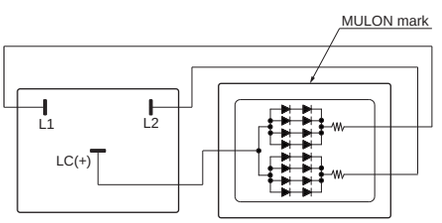
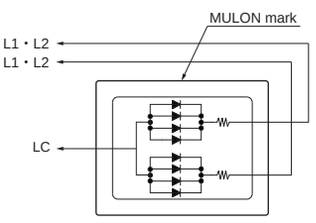
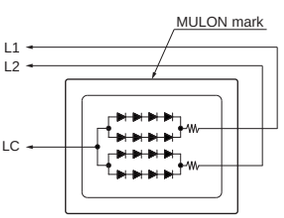
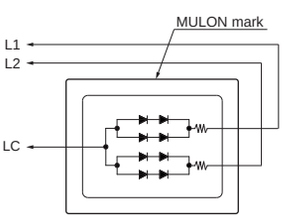
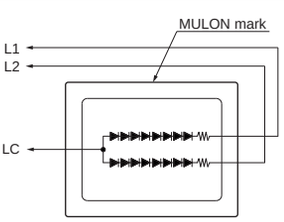
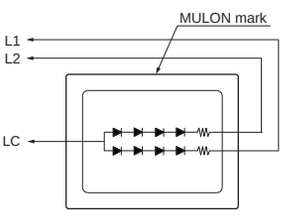
	Voltage	LED (70・80・90)	LED (14・16・18)
Square	DC5V		
	DC12V		 Common for DC12V・24V
	DC24V		
Rectangle	DC5V		
	DC12V		
	DC24V		

LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

※ 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.

INTERNAL CONNECTION ARRANGEMENTS

● Dual-Color

	Voltage	LED (7080 · 8090 · 9070)	LED (1416 · 1618 · 1814)
Square	DC5V		
	DC12V		
	DC24V		Common for DC12V · 24V
Rectangle	DC5V		
	DC12V		
	DC24V		

LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

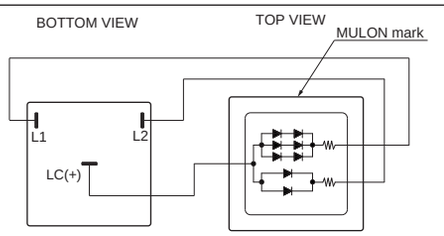
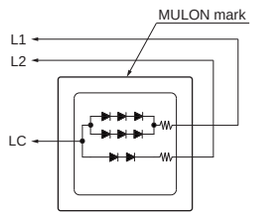
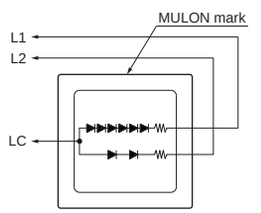
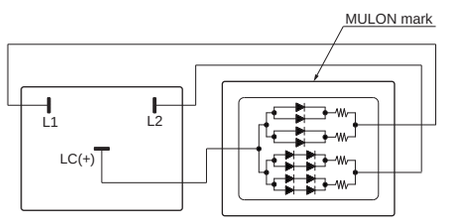
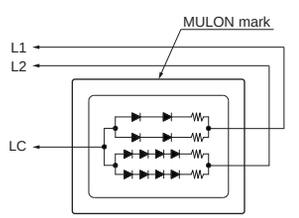
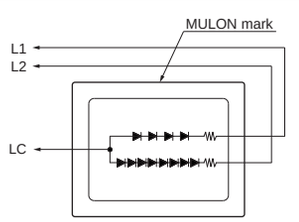
● Dual-Color combination (Common for each voltage)

Terminals	LED Color					
LC-L1	Red	Red	Yellow	Super Blue	Super Blue	Super Green
LC-L2	Green	Yellow	Green	Super Green	Super White	Super White

※ 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.

INTERNAL CONNECTION ARRANGEMENTS

● Dual-Color

	Voltage	LED (7014 • 7016 • 7018 • 9014 • 9016 • 9018)
Square	DC5V	
	DC12V	
	DC24V	
Rectangle	DC5V	
	DC12V	
	DC24V	

LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

● Dual-Color combination (Common for each voltage)

Square

Terminals	LED Color					
LC-L1	Red	Yellow	Red	Yellow	Red	Yellow
LC-L2	Super Blue	Super Blue	Super Green	Super Green	Super White	Super White

Rectangle

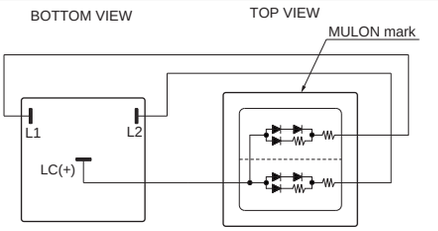
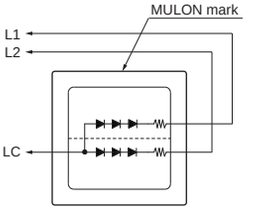
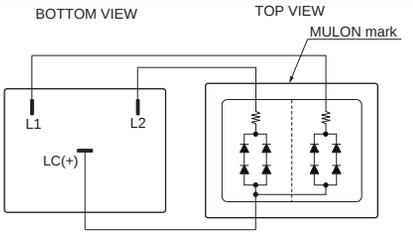
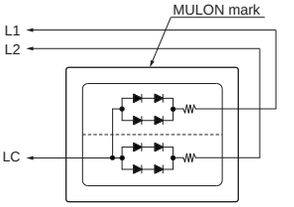
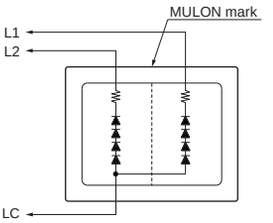
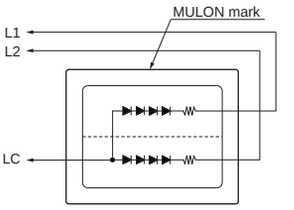
Terminals	LED Color					
LC-L1	Super Blue	Super Blue	Super Green	Super Green	Super White	Super White
LC-L2	Red	Yellow	Red	Yellow	Red	Yellow

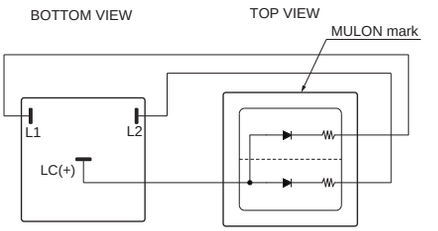
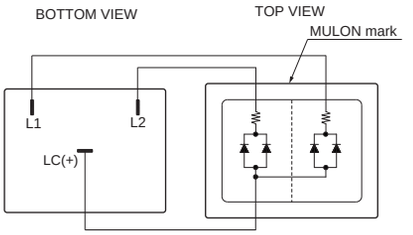
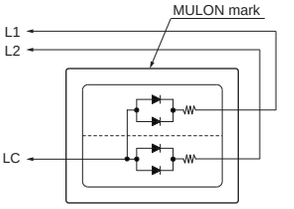
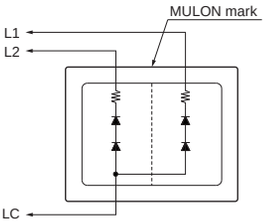
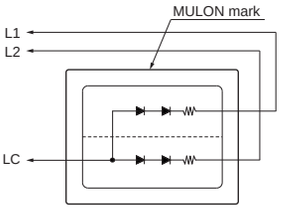
※ For rectangle, LED color orders and terminal numbers (L1 • L2) are opposite.

※ 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.

INTERNAL CONNECTION ARRANGEMENTS

● 2-Split-Face

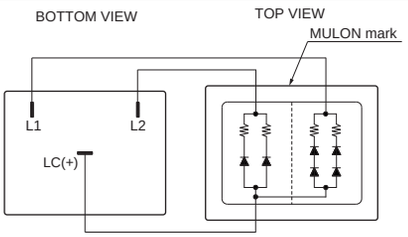
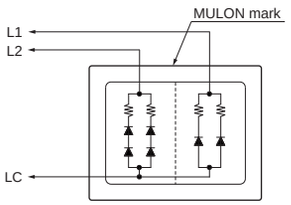
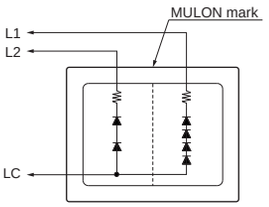
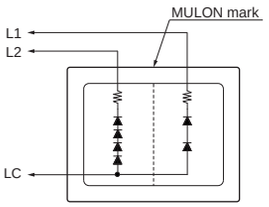
	Voltage	L1 : LED (70 • 80 • 90) L2 : LED (70 • 80 • 90)	
		Vertical	Horizontal
Square	DC5V		
	DC12V DC24V		
Rectangle	DC5V		
	DC12V DC24V		

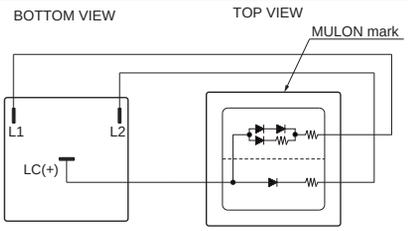
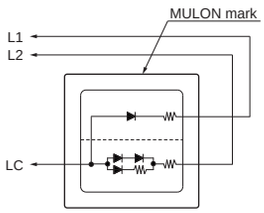
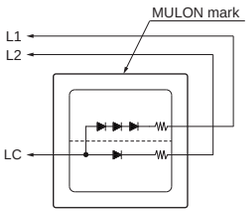
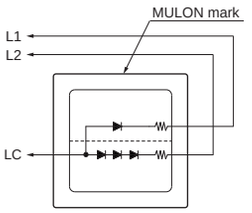
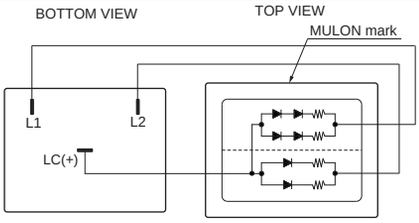
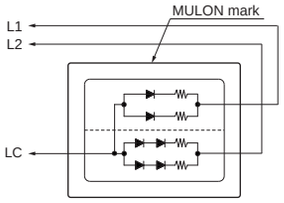
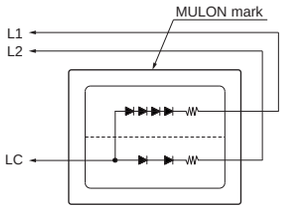
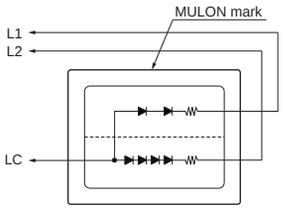
	Voltage	L1 : LED (14 • 16 • 18) L2 : LED (14 • 16 • 18)	
		Vertical	Horizontal
Square	DC5V DC12V DC24V		
Rectangle	DC5V		
	DC12V DC24V		

LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

INTERNAL CONNECTION ARRANGEMENTS

● 2-Split-Face

	Voltage	Vertical	
		L1 : LED (70 • 80 • 90) L2 : LED (14 • 16 • 18)	L1 : LED (14 • 16 • 18) L2 : LED (70 • 80 • 90)
Rectangle	DC5V		
	DC12V DC24V		

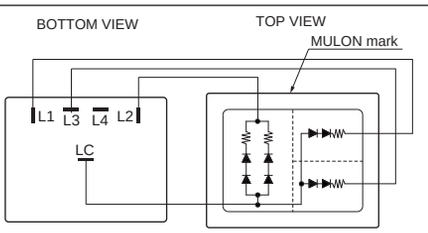
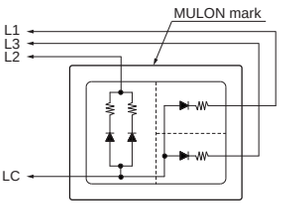
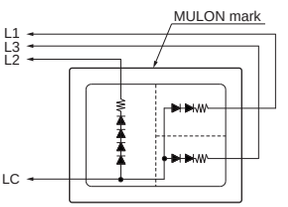
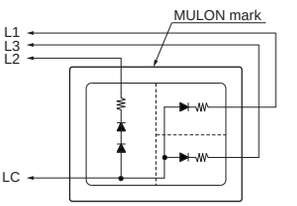
	Voltage	Horizontal	
		L1 : LED (70 • 80 • 90) L2 : LED (14 • 16 • 18)	L1 : LED (14 • 16 • 18) L2 : LED (70 • 80 • 90)
Square	DC5V		
	DC12V DC24V		
Rectangle	DC5V		
	DC12V DC24V		

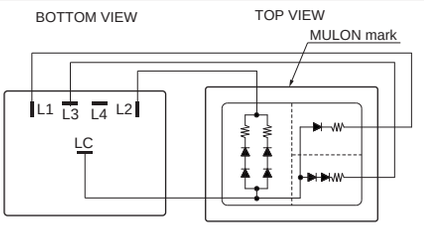
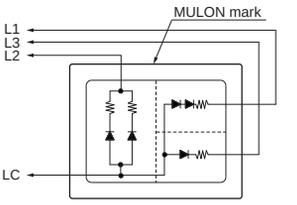
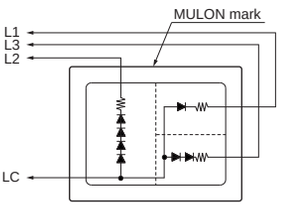
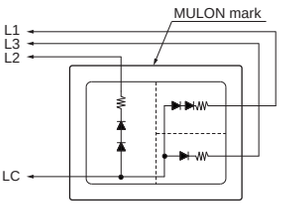
LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

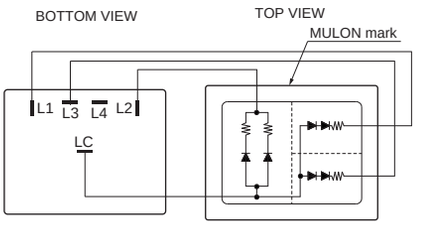
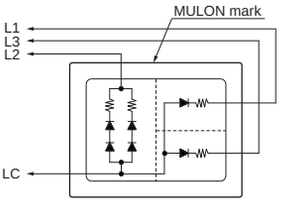
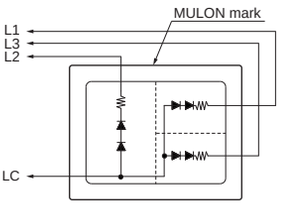
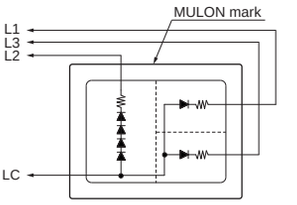
※ These are all internal connection diagrams for built-in resistor type.
※ For Non-resistor type, the resistor part in the diagram should be short- circuited.
※ For Cathode Common type, LED polarity (current flow direction) is opposite.

INTERNAL CONNECTION ARRANGEMENTS

● 3-Split-Face

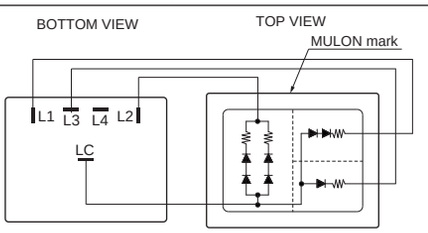
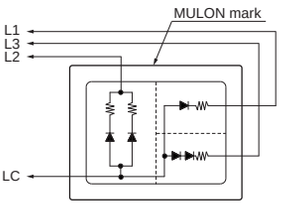
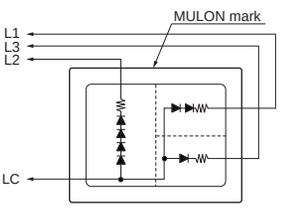
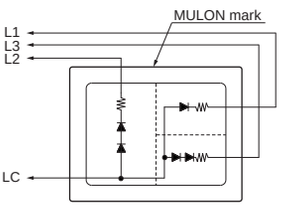
	Voltage	Vertical	
		L1 : LED (70・80・90) L2 : LED (70・80・90) L3 : LED (70・80・90)	L1 : LED (14・16・18) L2 : LED (14・16・18) L3 : LED (14・16・18)
Rectangle	DC5V		
	DC12V DC24V		

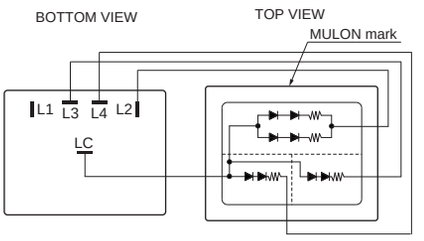
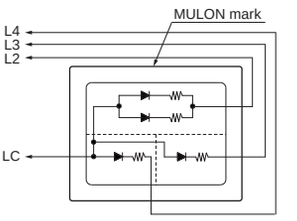
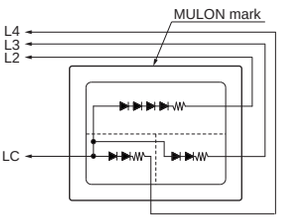
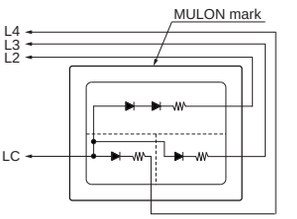
	Voltage	Vertical	
		L1 : LED (14・16・18) L2 : LED (70・80・90) L3 : LED (70・80・90)	L1 : LED (70・80・90) L2 : LED (14・16・18) L3 : LED (14・16・18)
Rectangle	DC5V		
	DC12V DC24V		

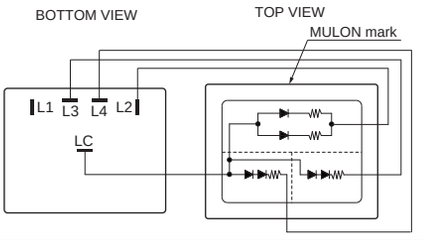
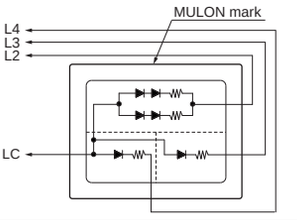
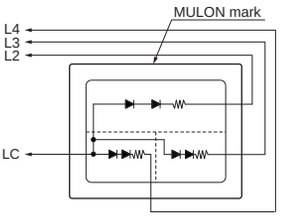
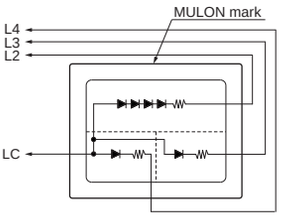
	Voltage	Vertical	
		L1 : LED (70・80・90) L2 : LED (14・16・18) L3 : LED (70・80・90)	L1 : LED (14・16・18) L2 : LED (70・80・90) L3 : LED (14・16・18)
Rectangle	DC5V		
	DC12V DC24V		

INTERNAL CONNECTION ARRANGEMENTS

● 3-Split-Face

	Voltage	Vertical	
		L1 : LED (70・80・90) L2 : LED (70・80・90) L3 : LED (14・16・18)	L1 : LED (14・16・18) L2 : LED (14・16・18) L3 : LED (70・80・90)
Rectangle	DC5V		
	DC12V DC24V		

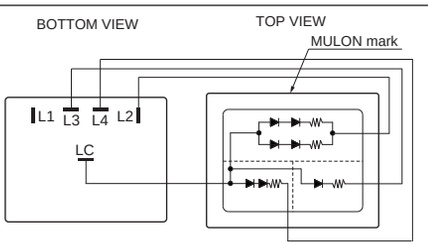
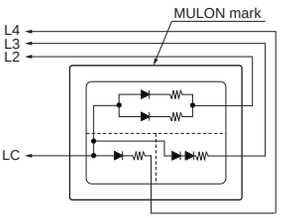
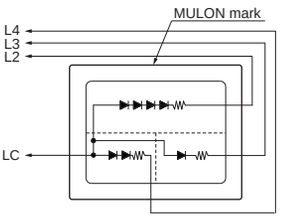
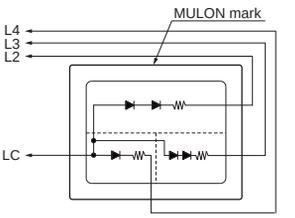
	Voltage	Horizontal	
		L2 : LED (70・80・90) L3 : LED (70・80・90) L4 : LED (70・80・90)	L2 : LED (14・16・18) L3 : LED (14・16・18) L4 : LED (14・16・18)
Rectangle	DC5V		
	DC12V DC24V		

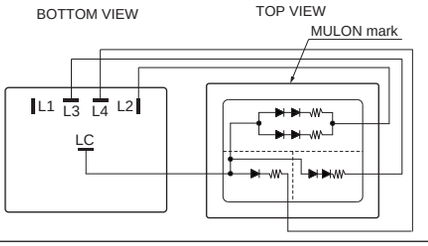
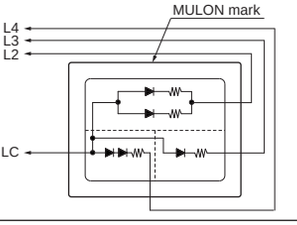
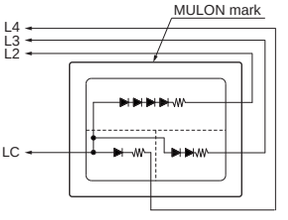
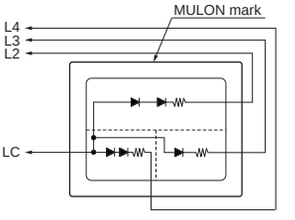
	Voltage	Horizontal	
		L2 : LED (14・16・18) L3 : LED (70・80・90) L4 : LED (70・80・90)	L2 : LED (70・80・90) L3 : LED (14・16・18) L4 : LED (14・16・18)
Rectangle	DC5V		
	DC12V DC24V		

LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

INTERNAL CONNECTION ARRANGEMENTS

● 3-Split-Face

	Voltage	Horizontal	
		L2 : LED (70・80・90) L3 : LED (14・16・18) L4 : LED (70・80・90)	L2 : LED (14・16・18) L3 : LED (70・80・90) L4 : LED (14・16・18)
Rectangle	DC5V		
	DC12V DC24V		

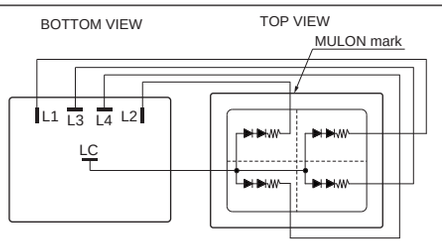
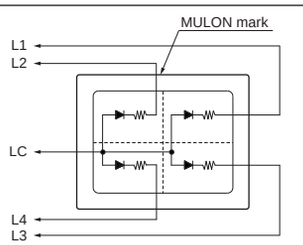
	Voltage	Horizontal	
		L2 : LED (70・80・90) L3 : LED (70・80・90) L4 : LED (14・16・18)	L2 : LED (14・16・18) L3 : LED (14・16・18) L4 : LED (70・80・90)
Rectangle	DC5V		
	DC12V DC24V		

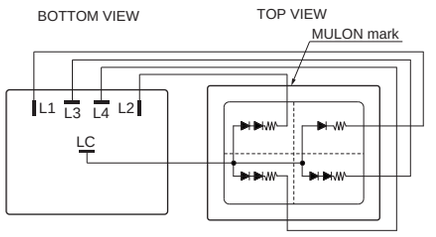
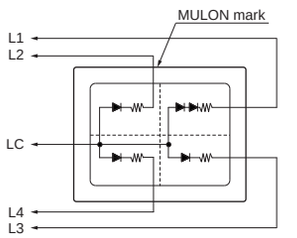
LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

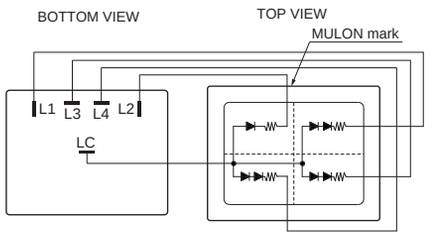
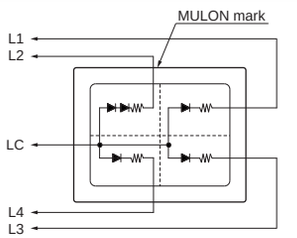
※ These are all internal connection diagrams for built-in resistor type.
※ For Non-resistor type, the resistor part in the diagram should be short- circuited.
※ For Cathode Common type, LED polarity (current flow direction) is opposite.

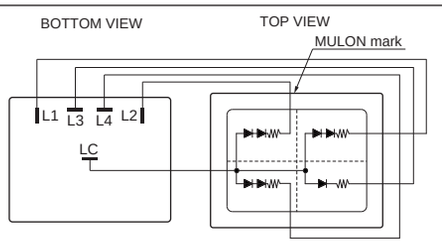
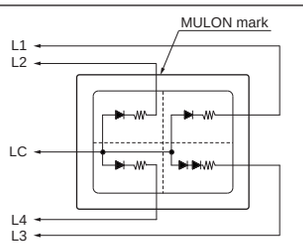
INTERNAL CONNECTION ARRANGEMENTS

● 4-Split-Face

	Voltage	L1 : LED (70 • 80 • 90) L2 : LED (70 • 80 • 90) L3 : LED (70 • 80 • 90) L4 : LED (70 • 80 • 90)	L1 : LED (14 • 16 • 18) L2 : LED (14 • 16 • 18) L3 : LED (14 • 16 • 18) L4 : LED (14 • 16 • 18)
Rectangle	DC5V DC12V DC24V		

	Voltage	L1 : LED (14 • 16 • 18) L2 : LED (70 • 80 • 90) L3 : LED (70 • 80 • 90) L4 : LED (70 • 80 • 90)	L1 : LED (70 • 80 • 90) L2 : LED (14 • 16 • 18) L3 : LED (14 • 16 • 18) L4 : LED (14 • 16 • 18)
Rectangle	DC5V DC12V DC24V		

	Voltage	L1 : LED (70 • 80 • 90) L2 : LED (14 • 16 • 18) L3 : LED (70 • 80 • 90) L4 : LED (70 • 80 • 90)	L1 : LED (14 • 16 • 18) L2 : LED (70 • 80 • 90) L3 : LED (14 • 16 • 18) L4 : LED (14 • 16 • 18)
Rectangle	DC5V DC12V DC24V		

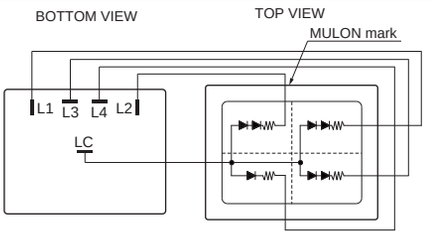
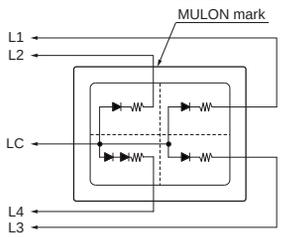
	Voltage	L1 : LED (70 • 80 • 90) L2 : LED (70 • 80 • 90) L3 : LED (14 • 16 • 18) L4 : LED (70 • 80 • 90)	L1 : LED (14 • 16 • 18) L2 : LED (14 • 16 • 18) L3 : LED (70 • 80 • 90) L4 : LED (14 • 16 • 18)
Rectangle	DC5V DC12V DC24V		

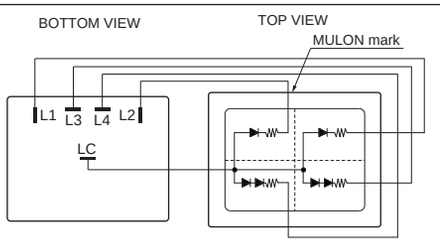
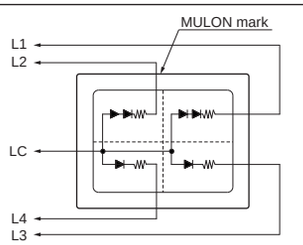
LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

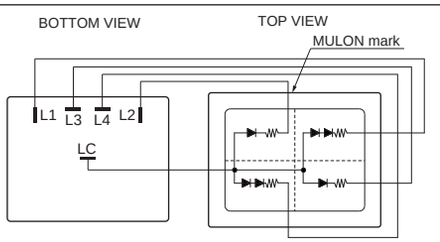
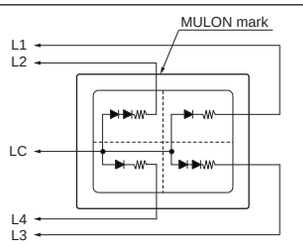
※ These are all internal connection diagrams for built-in resistor type.
※ For Non-resistor type, the resistor part in the diagram should be short- circuited.
※ For Cathode Common type, LED polarity (current flow direction) is opposite.

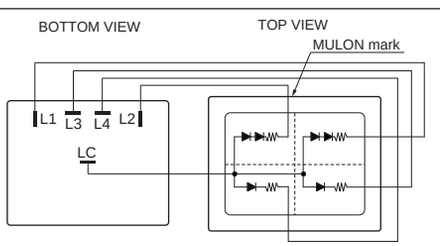
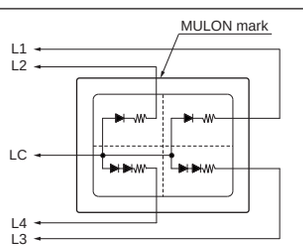
INTERNAL CONNECTION ARRANGEMENTS

● 4-Split-Face

	Voltage	L1 : LED (70 • 80 • 90) L2 : LED (70 • 80 • 90) L3 : LED (70 • 80 • 90) L4 : LED (14 • 16 • 18)	L1 : LED (14 • 16 • 18) L2 : LED (14 • 16 • 18) L3 : LED (14 • 16 • 18) L4 : LED (70 • 80 • 90)
Rectangle	DC5V DC12V DC24V		

	Voltage	L1 : LED (14 • 16 • 18) L2 : LED (14 • 16 • 18) L3 : LED (70 • 80 • 90) L4 : LED (70 • 80 • 90)	L1 : LED (70 • 80 • 90) L2 : LED (70 • 80 • 90) L3 : LED (14 • 16 • 18) L4 : LED (14 • 16 • 18)
Rectangle	DC5V DC12V DC24V		

	Voltage	L1 : LED (70 • 80 • 90) L2 : LED (14 • 16 • 18) L3 : LED (14 • 16 • 18) L4 : LED (70 • 80 • 90)	L1 : LED (14 • 16 • 18) L2 : LED (70 • 80 • 90) L3 : LED (70 • 80 • 90) L4 : LED (14 • 16 • 18)
Rectangle	DC5V DC12V DC24V		

	Voltage	L1 : LED (70 • 80 • 90) L2 : LED (70 • 80 • 90) L3 : LED (14 • 16 • 18) L4 : LED (14 • 16 • 18)	L1 : LED (14 • 16 • 18) L2 : LED (14 • 16 • 18) L3 : LED (70 • 80 • 90) L4 : LED (70 • 80 • 90)
Rectangle	DC5V DC12V DC24V		

LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

※ 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.

● BUILT-IN RESISTOR

Square

Voltage	Rated Current (mA)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	20	52	35	23	20	18
DC12V ±5%	15	30	20	13	10	10
DC24V ±5%	8	15	10	13	10	10

Rectangle

Voltage	Rated Current (mA)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	30	70	45	45	37	33
DC12V ±5%	15	30	20	23	20	18
DC24V ±5%	8	17	10	13	10	10

Square (Low brightness type)

Voltage	Rated Current (mA)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	10	23	11	7	7	5
DC12V ±5%	7	16	7	4	4	3
DC24V ±5%	4	8	4	4	4	3

Rectangle (Low brightness type)

Voltage	Rated Current (mA)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	13	31	14	13	13	9
DC12V ±5%	7	16	7	7	7	5
DC24V ±5%	4	8	4	4	4	3

LED SPECIFICATIONS 【Full-Face】

● NON-RESISTOR (EXTERNAL RESISTOR)

Square

Supply Voltage		DC5V			DC12V			DC24V			DC5V			DC12V・24V		
LED Color		Red	Green	Yellow	Red	Green	Yellow	Red	Green	Yellow	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		60	60	60	40	40	40	20	20	20	40	40	40	20	20	20
DC Reverse Voltage V_R (V)		8	8	8	12	12	12	24	24	24	5	5	5	10	10	10
Forward Voltage V_F (V)		3.6	4.2	3.6	5.4	6.3	5.4	10.8	12.6	10.8	2.9	2.9	3	5.8	5.8	6
Derating (Operating temperature) (over 25℃ working temperature) (mA/℃)		1			0.7			0.4			0.6			0.3		
Pulse Lighting	Pulse Width PW (μS)	100									100					
	Duty Ratio DR	10^{-1}									10^{-1}					
	I_{FM} (mA)	100									100					

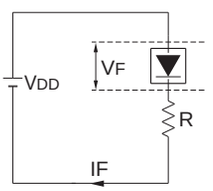
Forward Voltage V_F of LED color : Red・Green・Yellow【IF=20mA】
Super Blue・Super White・Super Green【IF=5mA】

Rectangle

Supply Voltage		DC5V			DC12V			DC24V			DC5V			DC12V			DC24V		
LED Color		Red	Green	Yellow	Red	Green	Yellow	Red	Green	Yellow	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		80	80	80	40	40	40	20	20	20	80	80	80	40	40	40	20	20	20
DC Reverse Voltage V_R (V)		8	8	8	16	16	16	32	32	32	5	5	5	10	10	10	20	20	20
Forward Voltage V_F (V)		3.6	4.2	3.6	7.2	8.4	7.2	14.4	16.8	14.4	2.9	2.9	3	5.8	5.8	6	11.6	11.6	12
Derating (Operating temperature) (over 25℃ working temperature) (mA/℃)		1.4			0.7			0.4			1.2			0.6			0.3		
Pulse Lighting	Pulse Width PW (μS)	100									100								
	Duty Ratio DR	10^{-1}									10^{-1}								
	I_{FM} (mA)	100									100								

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

● 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 【Dual-Color】

● BUILT-IN RESISTOR

Square

Voltage	Rated Current (mA)										
	Combination of LED(70・80・90)			Combination of LED(14・16・18)			Combination of LED(70・90+14・16・18)				
	Red	Green	Yellow	Super Blue	Super White	Super Green	Red	Yellow	Super Blue	Super White	Super Green
DC5V ±5%	20	52	35	23	20	18	20	35	23	20	18
DC12V ±5%	15	30	20	13	10	10	15	20	13	10	10
DC24V ±5%	8	15	10	13	10	10	8	10	13	10	10

Rectangle

Voltage	Rated Current (mA)										
	Combination of LED(70・80・90)			Combination of LED(14・16・18)			Combination of LED(70・90+14・16・18)				
	Red	Green	Yellow	Super Blue	Super White	Super Green	Red	Yellow	Super Blue	Super White	Super Green
DC5V ±5%	30	70	45	45	37	33	30	55	45	37	33
DC12V ±5%	15	30	20	23	20	18	15	30	23	20	18
DC24V ±5%	8	17	10	13	10	10	8	10	13	10	10

Square (Low brightness type)

Voltage	Rated Current (mA)										
	Combination of LED(70・80・90)			Combination of LED(14・16・18)			Combination of LED(70・90+14・16・18)				
	Red	Green	Yellow	Super Blue	Super White	Super Green	Red	Yellow	Super Blue	Super White	Super Green
DC5V ±5%	10	23	11	7	7	5	10	11	7	7	5
DC12V ±5%	7	16	7	4	4	3	7	7	4	4	3
DC24V ±5%	4	8	4	4	4	3	4	4	4	4	3

Rectangle (Low brightness type)

Voltage	Rated Current (mA)										
	Combination of LED(70・80・90)			Combination of LED(14・16・18)			Combination of LED(70・90+14・16・18)				
	Red	Green	Yellow	Super Blue	Super White	Super Green	Red	Yellow	Super Blue	Super White	Super Green
DC5V ±5%	7	16	7	13	13	9	13	14	13	13	9
DC12V ±5%	7	16	7	7	7	5	7	7	7	7	5
DC24V ±5%	4	8	4	4	4	3	4	4	4	4	3

LED SPECIFICATIONS 【Dual-Color】

● NON-RESISTOR (EXTERNAL RESISTOR)

Square

		Combination of LED(70・80・90)									Combination of LED(14・16・18)					
Supply Voltage		DC5V			DC12V			DC24V			DC5V			DC12V・24V		
LED Color		Red	Green	Yellow	Red	Green	Yellow	Red	Green	Yellow	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		60	60	60	40	40	40	20	20	20	40	40	40	20	20	20
DC Reverse Voltage V_R (V)		8	8	8	12	12	12	24	24	24	5	5	5	10	10	10
Forward Voltage V_F (V)		3.6	4.2	3.6	5.4	6.3	5.4	10.8	12.8	10.8	2.9	2.9	3	5.8	5.8	6
Derating (Operating temperature over 25℃ working temperature) (mA/℃)		1			0.7			0.4			0.6			0.3		
Pulse Lighting	Pulse Width PW (μS)	100									100					
	Duty Ratio DR	10^{-1}									10^{-1}					
	I_{FM} (mA)	100									100					

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

		Combination of LED(70・90+14・16・18)														
Supply Voltage		DC5V					DC12V					DC24V				
LED Color		Red	Yellow	Super Blue	Super White	Super Green	Red	Yellow	Super Blue	Super White	Super Green	Red	Yellow	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		60	60	40	40	40	40	40	20	20	20	20	20	20	20	20
DC Reverse Voltage V_R (V)		8	8	5	5	5	12	12	10	10	10	24	24	10	10	10
Forward Voltage V_F (V)		3.6	3.6	2.9	2.9	3	5.4	5.4	5.8	5.8	6	10.8	10.8	5.8	5.8	6
Derating (Operating temperature over 25℃ working temperature) (mA/℃)		1		0.6			0.4		0.3			0.4		0.3		
Pulse Lighting	Pulse Width PW (μS)	100														
	Duty Ratio DR	10^{-1}														
	I_{FM} (mA)	100														

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

Rectangle

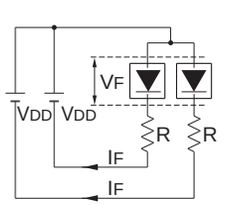
		Combination of LED(70・80・90)									Combination of LED(14・16・18)								
Supply Voltage		DC5V			DC12V			DC24V			DC5V			DC12V			DC24V		
LED Color		Red	Green	Yellow	Red	Green	Yellow	Red	Green	Yellow	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		80	80	80	40	40	40	20	20	20	80	80	80	40	40	40	20	20	20
DC Reverse Voltage V_R (V)		8	8	8	16	16	16	32	32	32	5	5	5	10	10	10	20	20	20
Forward Voltage V_F (V)		3.6	4.2	3.6	7.2	8.4	7.2	14.4	16.8	14.4	2.9	2.9	3	5.8	5.8	6	11.6	11.6	10
Derating (Operating temperature over 25℃ working temperature) (mA/℃)		1.4			0.7			0.4			1.2			0.6			0.3		
Pulse Lighting	Pulse Width PW (μS)	100									100								
	Duty Ratio DR	10^{-1}									10^{-1}								
	I_{FM} (mA)	100									100								

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

		Combination of LED(70・90+14・16・18)														
Supply Voltage		DC5V					DC12V					DC24V				
LED Color		Red	Yellow	Super Blue	Super White	Super Green	Red	Yellow	Super Blue	Super White	Super Green	Red	Yellow	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		80	80	80	80	80	40	40	40	40	40	20	20	20	20	20
DC Reverse Voltage V_R (V)		8	8	5	5	5	16	16	10	10	10	32	32	20	20	20
Forward Voltage V_F (V)		3.6	3.6	2.9	2.9	3	7.2	7.2	5.8	5.8	6	14.4	14.4	11.6	11.6	10
Derating (Operating temperature over 25℃ working temperature) (mA/℃)		1.4		0.6			0.7		0.6			0.4		0.3		
Pulse Lighting	Pulse Width PW (μS)	100														
	Duty Ratio DR	10^{-1}														
	I_{FM} (mA)	100														

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

● 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

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

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 【2-Split-Face】

● BUILT-IN RESISTOR

Square

Voltage	Rated Current (mA)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	15	32	20	13	10	10
DC12V ±5%	8	15	10	13	10	10
DC24V ±5%	8	15	10	13	10	10

Rectangle

Voltage	Rated Current (mA)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	15	35	23	25	20	18
DC12V ±5%	8	15	9	13	10	10
DC24V ±5%	8	15	9	13	10	10

Square (Low brightness type)

Voltage	Rated Current (mA)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	7	16	8	4	4	3
DC12V ±5%	4	8	4	4	4	3
DC24V ±5%	4	8	4	4	4	3

Rectangle (Low brightness type)

Voltage	Rated Current (mA)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	7	16	7	7	7	5
DC12V ±5%	4	8	4	4	4	3
DC24V ±5%	4	8	4	4	4	3

● NON-RESISTOR(EXTERNAL RESISTOR)

Square

Supply Voltage		DC5V			DC12V・24V			DC5V			DC12V・24V		
LED Color		Red	Green	Yellow	Red	Green	Yellow	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		40	40	40	20	20	20	20	20	20	20	20	20
DC Reverse Voltage V_R (V)		8	8	8	12	12	12	5	5	5	5	5	5
Forward Voltage V_F (V)		3.6	4.2	3.6	5.4	6.3	5.4	2.9	2.9	3	2.9	2.9	3
Derating (Operating temperature) (over 25℃ working temperature) (mA/℃)		0.7			0.4			0.3					
Pulse Lighting	Pulse Width PW (μS)	100						100					
	Duty Ratio DR	10^{-1}						10^{-1}					
	I_{FM} (mA)	100						100					

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

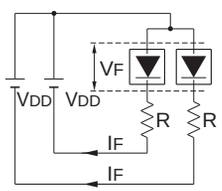
Rectangle

Supply Voltage		DC5V			DC12V・24V			DC5V			DC12V・24V		
LED Color		Red	Green	Yellow	Red	Green	Yellow	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		40	40	40	20	20	20	40	40	40	20	20	20
DC Reverse Voltage V_R (V)		8	8	8	16	16	16	5	5	5	10	10	10
Forward Voltage V_F (V)		3.6	4.2	3.6	7.2	8.4	7.2	2.9	2.9	3	5.8	5.8	6
Derating (Operating temperature) (over 25℃ working temperature) (mA/℃)		0.7			0.4			0.3					
Pulse Lighting	Pulse Width PW (μS)	100						100					
	Duty Ratio DR	10^{-1}						10^{-1}					
	I_{FM} (mA)	100						100					

Forward Voltage V_F of LED color : Red・Green・Yellow【IF=20mA】
Super Blue・Super White・Super Green【IF=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



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

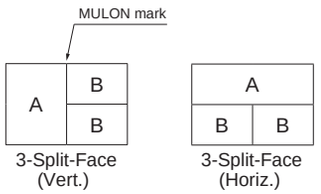
I_F (Forward Current) :
Refer to the Rated Current of BUILT-IN RESISTOR type, and be sure to set less than I_{FM} (Max. Forward Current).

LED SPECIFICATIONS 【3-Split-Face】

● BUILT-IN RESISTOR

Rectangle

Voltage	Rated Current (mA) (per 1-Screen)			
	Red・Green・Yellow		Super Blue・Super White・Super Green	
	A	B	A	B
DC 5V ±5%	20	10	20	10
DC12V ±5%	10	10	10	10
DC24V ±5%	10	10	10	10



Rectangle (Low brightness type)

Voltage	Rated Current (mA) (per 1-Screen)											
	Red		Green		Yellow		Super Blue		Super White		Super Green	
	A	B	A	B	A	B	A	B	A	B	A	B
DC 5V ±5%	8	4	14	7	8	4	8	4	8	4	6	3
DC12V ±5%	4	4	7	7	4	4	4	4	4	4	3	3
DC24V ±5%	4	4	7	7	4	4	4	4	4	4	3	3

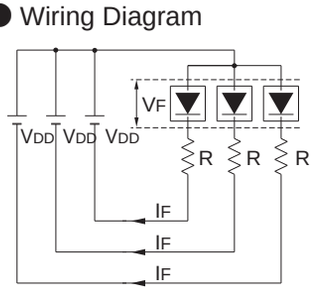
● NON-RESISTOR(EXTERNAL RESISTOR)

Rectangle

Supply Voltage		DC5V			DC12V			DC24V			DC5V			DC12V			DC24V		
LED Color		Red	Green	Yellow	Red	Green	Yellow	Red	Green	Yellow	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		20	20	40	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
DC Reverse Voltage V_R (V)		4	4	4	4	8	8	8	8	8	5	5	5	5	2	10	5	5	10
Forward Voltage V_F (V)		3.8	3.8	3.8	3.8	3.8	7.6	3.8	3.8	3.8	2.9	2.9	2.9	2.9	2.9	5.8	2.9	2.9	5.8
Derating (Operating temperature) (over 25℃ working temperature) (mA/℃)		0.4	0.4	0.7	0.4			0.4			0.3	0.3	0.6	0.3			0.3		
Pulse Lighting	Pulse Width PW (μS)	100									100								
	Duty Ratio DR	10^{-1}									10^{-1}								
	I_{FM} (mA)	100									100								

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

● 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 【4-Split-Face】

● BUILT-IN RESISTOR

Rectangle

Voltage	Rated Current (mA) (per 1-Screen)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	10	10	10	10	10	10
DC12V ±5%	10	10	10	10	10	10
DC24V ±5%	10	10	10	10	10	10

Rectangle (Low brightness type)

Voltage	Rated Current (mA) (per 1-Screen)					
	Red	Green	Yellow	Super Blue	Super White	Super Green
DC 5V ±5%	4	7	4	4	4	4
DC12V ±5%	4	7	4	4	4	4
DC24V ±5%	4	7	4	4	4	4

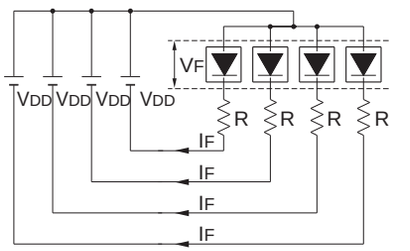
● NON-RESISTOR(EXTERNAL RESISTOR)

Rectangle

Supply Voltage		DC5V・12V・24V			DC5V・12V・24V		
LED Color		Red	Green	Yellow	Super Blue	Super White	Super Green
Max. Forward Current I_{FM} (mA)		20	20	20	20	20	20
DC Reverse Voltage V_R (V)		8	8	8	5	5	5
Forward Voltage V_F (V)		3.8	3.8	3.8	2.9	2.9	2.9
Derating (Operating temperature) (over 25℃ working temperature) (mA/℃)		0.4			0.3		
Pulse Lighting	Pulse Width PW (μS)	100					
	Duty Ratio DR	10^{-1}					
	I_{FM} (mA)	100					

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

● 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

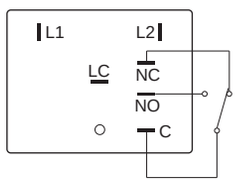
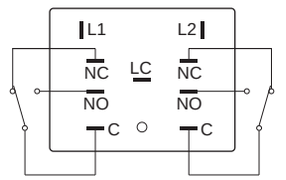
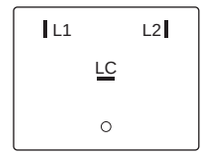
I_F (Forward Current) : Refer to the Rated Current of BUILT-IN RESISTOR type, and be sure to set less than I_{FM} (Max. Forward Current).

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

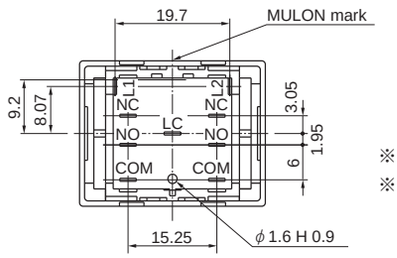
■Full-Face・Dual-Color・2-Split-Face

● TERMINALS LAYOUT (BOTTOM VIEW)　Common for Square ・Rectangle

	SPDT	DPDT	INDICATOR
Square ・ Rectangle	MULON mark 	MULON mark 	MULON mark 

※ When “Without LED (X)” is specified, there are no LED terminals (LC, L1 & L2).

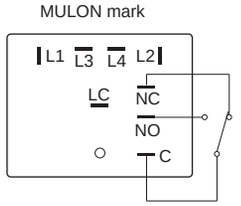
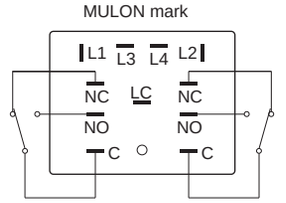
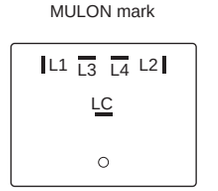
● TERMINALS DIMENSIONS (BOTTOM VIEW)



※ Actually, the terminal function letters are upside down. (e.g. NC → ↄN)
※ When “Without LED (X)” is specified, there are no LED terminals (LC, L1 & L2).

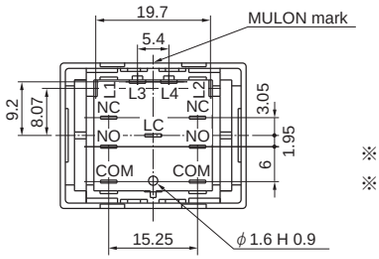
■3-Split-Face・4-Split-Face

● TERMINALS LAYOUT (BOTTOM VIEW)

	SPDT	DPDT	INDICATOR
Rectangle	MULON mark 	MULON mark 	MULON mark 

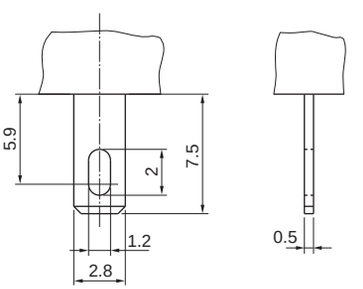
※ When “Without LED (X)” is specified, there are no LED terminals (LC, L1, L2, L3 & L4).

● TERMINALS DIMENSIONS (BOTTOM VIEW)



※ Actually, the terminal function letters are upside down. (e.g. NC → ↄN)
※ When “Without LED (X)” is specified, there are no LED terminals (LC, L1, L2, L3 & L4).

TERMINAL SHAPE

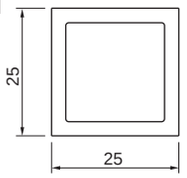
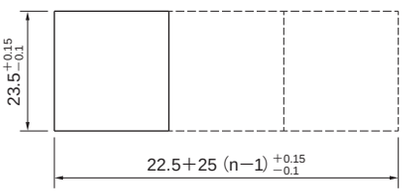


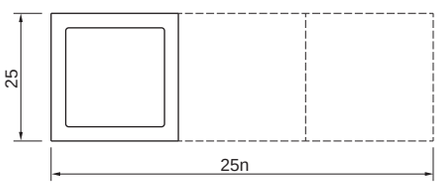
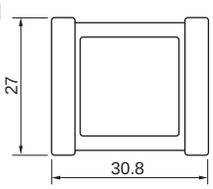
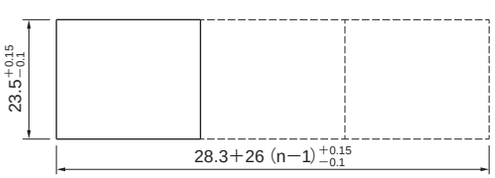
Tolerance：±0.4 mm

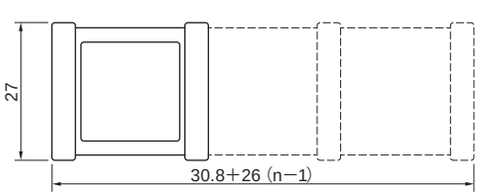
＃110 Tab・Soldering Terminal

MOUNTING DESIGN／PANEL CUTOUT

● Square

<table>
<tr><th></th><th>Mounting design</th><th>Panel cutout</th></tr>
<tr><td rowspan="2">Without Barriers</td><td>Individual
 
</td><td rowspan="2">Recommended panel thickness : 1 to 4 mm
 

n : Number of Units</td></tr>
<tr><td>Multiple
 
</td></tr>
<tr><td rowspan="2">With Barriers</td><td>Individual
 
</td><td rowspan="2">Recommended panel thickness : 1 to 4 mm
 

n : Number of Units</td></tr>
<tr><td>Multiple
 
</td></tr>
</table>

※ 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.

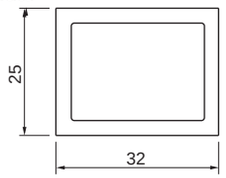
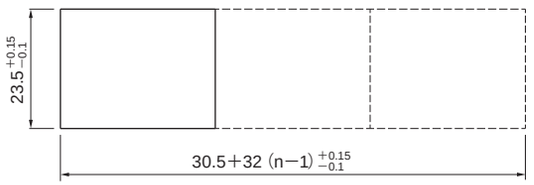
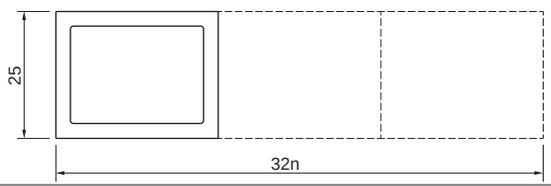
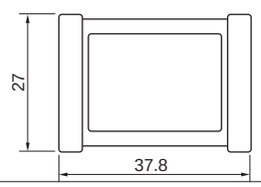
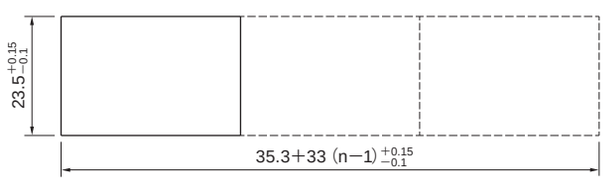
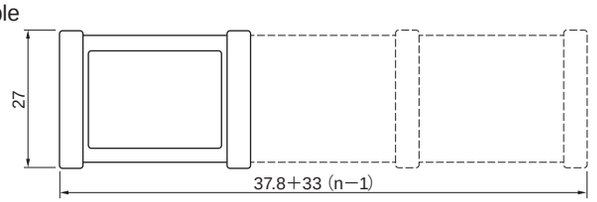
※ Placing consecutive vertical direction for neither Square nor Rectangle is available.

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

Tolerance：±0.4 mm

MOUNTING DESIGN／PANEL CUTOUT

● Rectangle

	Mounting design	Panel cutout
Without Barriers	Individual 	Recommended panel thickness : 1 to 4 mm  n : Number of Units
	Multiple 	
With Barriers	Individual 	Recommended panel thickness : 1 to 4 mm  n : Number of Units
	Multiple 	

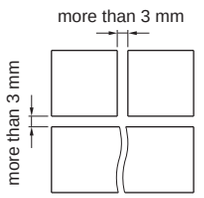
※ If the panel is to be finished (e.g. coated), make sure that the panel meets the specified dimensions after the coating.
In case the panel cut dimension is too small, it may cause malfunction.

※ Placing consecutive vertical direction for neither Square nor Rectangle is available.

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

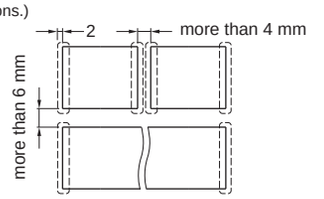
● Panel cut spacing dimensions for spaced individual mounting

Without Barriers



With Barriers

(Dotted lines indicate Side barrier locations.)



Tolerance：±0.4 mm

ACCESSORIES

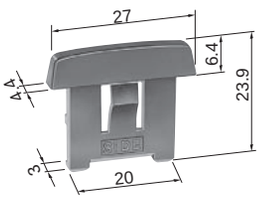
BARRIER

● SHORT BARRIER

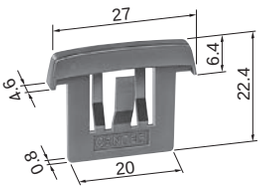
Color	Side barrier	Center barrier
Black	XH-1873-K	XH-1872-K
Gray	XH-1873-H	XH-1872-H

※ Cannot be used with dust-proof / oil water-tight cover.

3D
DXF



Side barrier



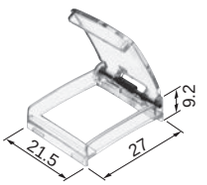
Center barrier

GUARD COVER

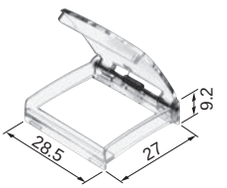
Square	XH-2024
Rectangle	XH-2025

※ Can be used with barriers, also possible to install after switch be mounted on panel.
※ Panel cutout dimensions are the same as those of Without Barriers on page 31 and 32.
※ Cannot be used with dust-proof / oil water-tight cover.
※ The cover to be opened 180° and returned by spring force.

3D
DXF



Square



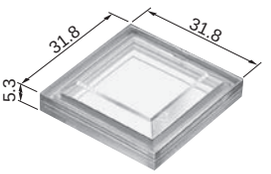
Rectangle

Dust-Proof / Oil Water-tight Cover

Square	WH-0783
Rectangle	WH-0784

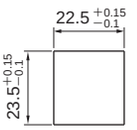
※ Recommended panel thickness : 1 to 3 mm
※ For using as dust-proof, no need for rubber packing. Please use this cover only.
※ For using as oil water-tight, following rubber packing needed. (Equivalent to IP63)

3D

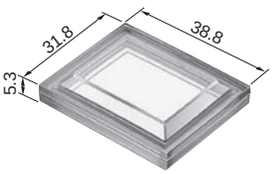


Square

Panel cutout

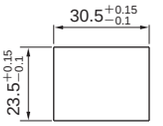


3D



Rectangle

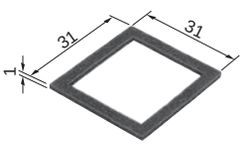
Panel cutout



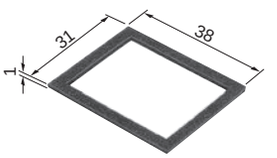
RUBBER PACKING

Square	WH-0767
Rectangle	WH-0768

※ Recommended panel thickness : 1 to 3 mm
※ For using as oil water-tight, this rubber packing needed. Please use together with the above dust-proof / oil water-tight cover.



Square



Rectangle

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

Tolerance：±0.4 mm

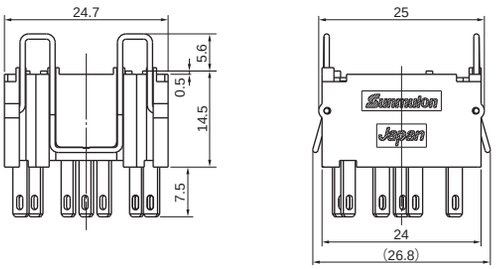
ACCESSORIES

SOCKET

● #110 Tab・Soldering terminal (Square・Rectangle)

Part no.	XH-2959-1

※ Place the metal fittings firmly in the groove of the housing.

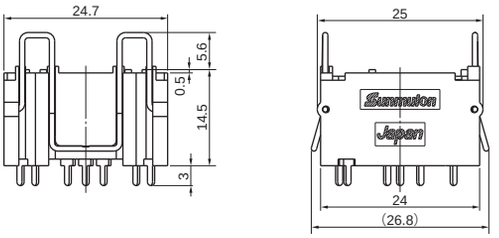


● PCB terminal (Square・Rectangle)

Part no.	XH-2960-1

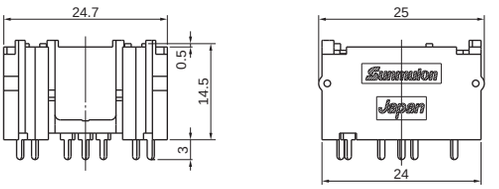
With Lock Lever

※ Place the metal fittings firmly in the groove of the housing.

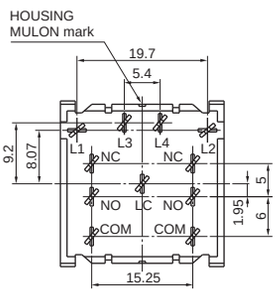


形　式	XH-2960-2

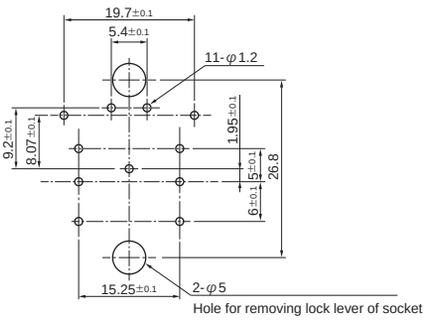
Without Lock Lever



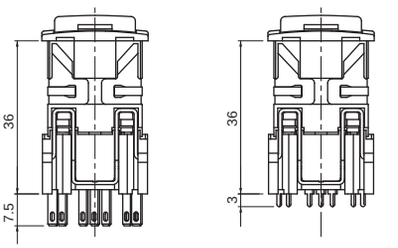
● TERMINALS DIMENSIONS
(BOTTOM VIEW)



● PCB hole cut-out
(TOP VIEW)

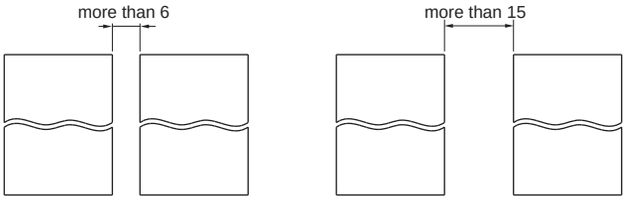


Socket mounting dimensions



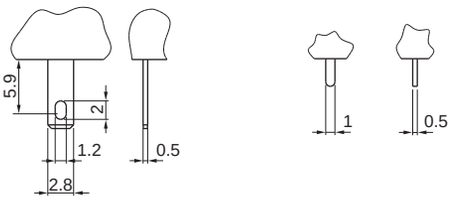
#110 Tab・Soldering terminal　PCB terminal

● Panel cut spacing dimensions for spaced individual mounting using socket.



(XH-2960-2)　(XH-2959-1 & XH-2960-1)

● Terminal shape



#110 Tab・Soldering terminal　PCB terminal

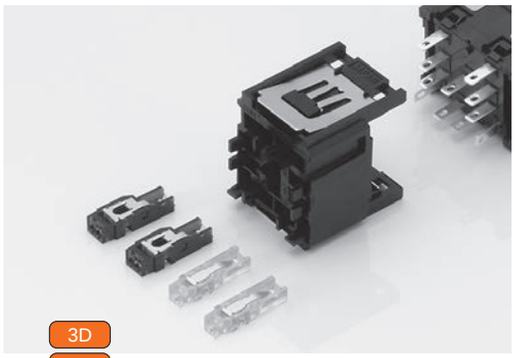
Tolerance：±0.4 mm

ACCESSORIES

Easy wiring unit

- No soldering required.
- No need for special skills, by simply connect the wires.
- Easy connection and maintenance.

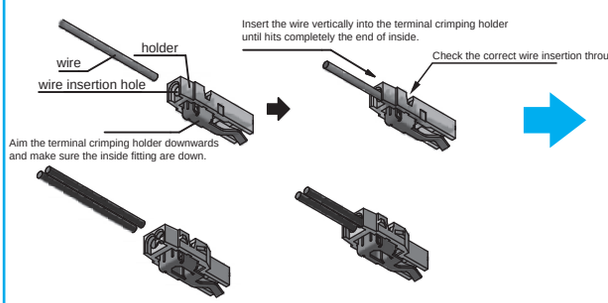
Reduction of environmental impact : **No soldering, No electric power & No coated waste.**
Enhance productivity : **Wiring time can be reduced by approx. 50%. (Our estimate)**
No soldering required : **No soldering problem. Anyone can wire easily.**
No need to remove the wire sheathing : **No coated waste. Reduction of work time.**
No special tools required : **Parallel pliers are recommended for wire press work.**
Contact reliability : **Conform to JEIDA-40, 41 (Sulfide test) & JISZ2371 (Salt spray test)**



3D
DXF

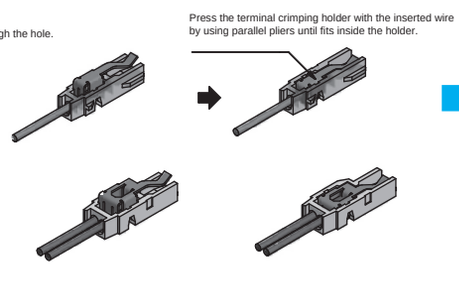
Wire insertion

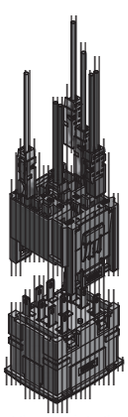
Insert the wire into the terminal holder.



Crimping

Crimp the metal fitting and the wire by using parallel pliers.





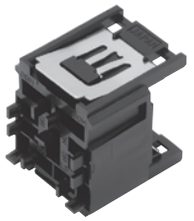
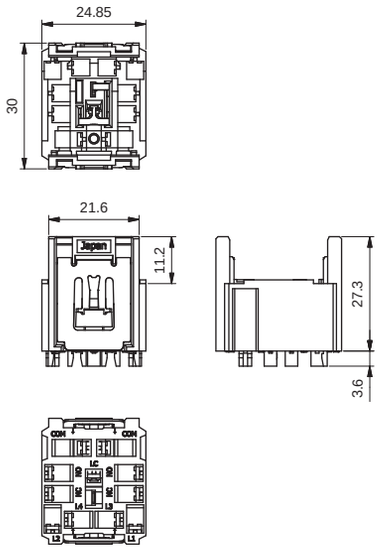
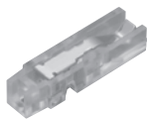
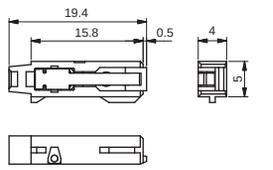
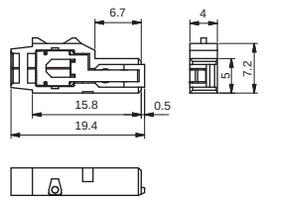
Insert the unit into the housing.

CHARACTERISTICS

	SPECIFICATIONS	CONDITIONS
Insertion Durability	Contact resistance value less than 50 mΩ	20 cycles
Vibration Resistance	Contact resistance value less than 50 MΩ No electrical discontinuity less than 0.1 ms	Frequency 10-55 Hz, Amplitude modulation 1.5 mm, Cycle 3-5 min., 2 hours each in 3 axes
Shock Resistance	Contact resistance value less than 50 MΩ No electrical discontinuity less than 0.1 ms	Sine half-wave 500 m/s² max., Pulse duration 11 ms, 3 times each in 6 axes
Contact Resistance	Less than 50 mΩ (Initial value)	at DC 6 V 1 A
Dielectric Strength	AC 1000 V RMS between NC and NO terminal	50/60 Hz for 60 sec. at normal ambient temperature and humidity
	AC 2000 V RMS between terminals and ground	
Insulation Resistance	More than 100 MΩ	at DC 500 V
Retention Force	More than 30 N (AWG22), More than 40 N (AWG20) (Vertical Direction)	between Terminal crimping holder and Terminal cover unit
Removal Force	More than 25 N vertical direction	between Terminal cover unit and XH series Housing
Applicable Wire	AWG22～20 (0.3～0.5 sq) Outside diameter of the outer insulation : φ1.4～2.0 UL1007 (80℃ 300 V)、UL1430 (105℃ 300 V) / Recommended wire standard	
Ambient Temperature	−15℃ to +50℃ (No Freeze, No Condensation)	
Ambient Humidity	80%RH max. (No Condensation)	
Rating (When using Easy wiring unit)	AC 250 V 3 A、DC 30 V 1 A (Resistive Load)	

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

DIMENSIONS

Terminal cover unit		Terminal crimping holder (Single)	
 XH-4633		 PA-4634	 NC, NO, L1～L4 terminals
		Terminal crimping holder (Double)	
		 PA-4635	 COM, LC terminals

PART NO.

Set

For XH contact is SPDT and illumination type is Full-Face.

Part no.	1 set of contains the following.	
XH-4636-1	Terminal cover unit	1 pc
	Terminal crimping holder (Single)	3 pcs
	Terminal crimping holder (Double)	2 pcs

※ For Rectangle, 8pcs of PA-4634 and 3pcs of PA-4635 required.
For Square, 6pcs of PA-4634 and 3pcs of PA-4635 required.

Separately

For large amount, maintenance.

XH-4633	Terminal cover unit	1 pack of 10 pcs
PA-4634	Terminal crimping holder (Single)	1 pack of 50 pcs
PA-4635	Terminal crimping holder (Double)	1 pack of 50 pcs

PRECAUTIONS FOR CORRECT USE

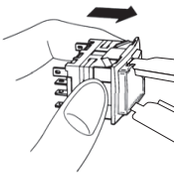
1. Do not re-press of wire into terminal crimping holder.
2. When applying current, do not insert or remove the terminal crimping holder.
3. Be careful not to apply a force of 200 N or more at the time of crimping.
4. Easy wiring unit is exclusively for XH illuminated pushbutton switches. Be sure it cannot be used for other types of switches.
5. Placing consecutive vertical direction, more than 40 mm is required.
6. Do not use XH housing with deformed terminals or after soldering process.
7. Terminal crimping holders must be used with the terminal cover unit installed.
8. Standard applicable wire UL1007, UL1430 AWG#22～20 (0.3～0.5 sq)
   Outside diameter of the outer insulation : Φ1.4～2.0

Recommended using parallel plier ： MAUN No.BT13

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.

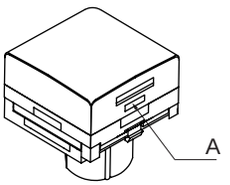


※ In case removing in any other way than the above, it may cause damage to the light cartridge.

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

2. Removing Button

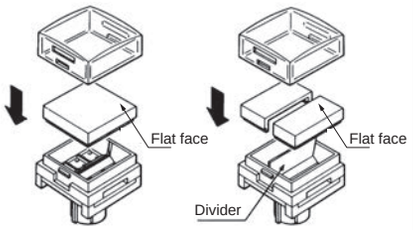
Remove the part A by pushing it open.



Do not reuse buttons that have been removed and deformed.

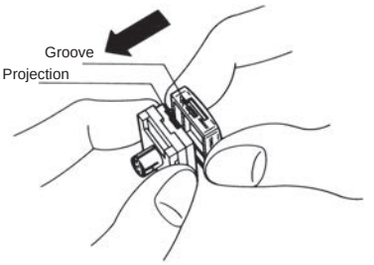
3. Fitting Filter

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



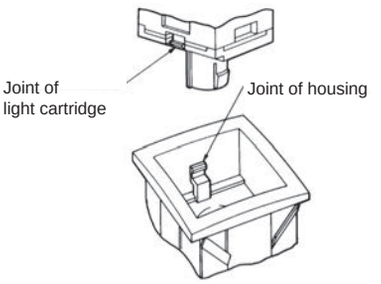
4. Fitting Button

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



5. Fitting Light cartridge

Align each joint (White) of the light cartridge and the housing with the correct orientation and push in until click.

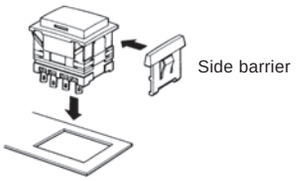


Pushing it in backwards may cause subsequent malfunctions.

6. Installing Barriers

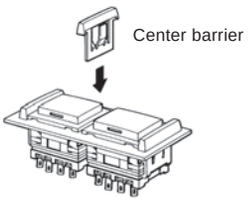
① Side Barriers

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



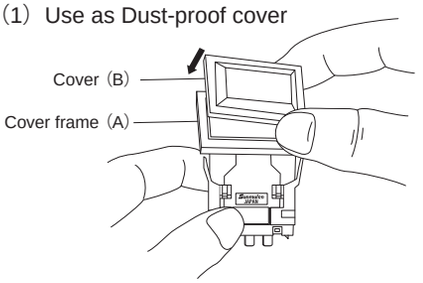
② Center Barriers

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



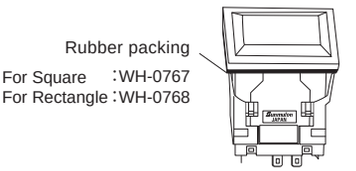
7. Installing Dust-Proof Cover

（1） Use as Dust-proof cover



Put the switch through the cover frame (A), and mount on the panel.
Afterwards press cover (B) into the groove of cover frame (A)
from above and install it.

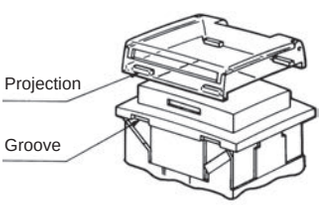
（2） Use as Oil and Water-tight cover



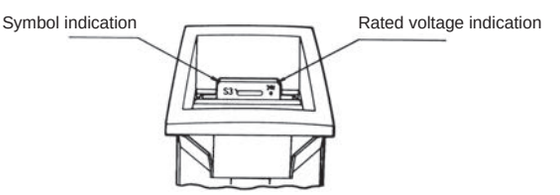
Rubber packing is required.
Please apply the rubber packing between the panel and
the cover frame (A).

8. Installing Guard Cover

It is possible to install the guard cover before or after
the switch be mounted on the panel.
Insert the projections of the guard cover into the flange groove
from the top.



9. Indication of rated voltage and symbol on housing (Resistor board)



For the combination of the lighting cartridge and the housing,
refer to the table below.

※The resistor board cannot be replaced.

● Combination of light cartridge and resistor board

Square

LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

Voltage	LED	Full-Face		2-Split-Face (Horiz.)		Dual-Color					
						Combination of LED (70･90+14･16･18)		Combination of LED (70･80･90)		Combination of LED (14･16･18)	
		Light cartridge	Resistor board	Light cartridge	Resistor board	Light cartridge	Resistor board	Light cartridge	Resistor board	Light cartridge	Resistor board
DC 5V	70･80･90	A25	T1	A29	T2	A27	T2	A25	T2	A27	T2
	14･16･18	A27									
DC12V	70･80･90	A26	S2	A29	S8	A28	S5	A26	S5	A28	S5
	14･16･18	A28									
DC24V	70･80･90	A26	S3	A29	S13	A28	S13	A26	W9	A28	S13
	14･16･18	A28									

Rectangle

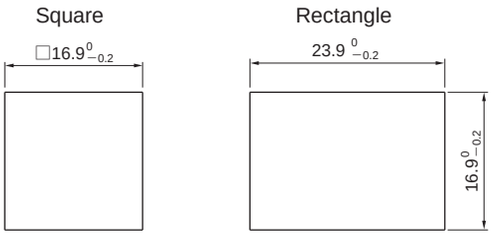
LED color : 70 (Red), 80 (Green), 90 (Yellow), 14 (Super-Blue), 16 (Super-White), 18 (Super-Green)

Voltage	LED	Full-Face		2-Split-Face (Vert.)		2-Split-Face (Horiz.)		Dual-Color					
								Combination of LED (70･90+14･16･18)		Combination of LED (70･80･90)		Combination of LED (14･16･18)	
		Light cartridge	Resistor board	Light cartridge	Resistor board	Light cartridge	Resistor board	Light cartridge	Resistor board	Light cartridge	Resistor board	Light cartridge	Resistor board
DC 5V	70･80･90	B35	T1	B39	T2	B40	T2	B35	T2	B35	T2	B37	T2
	14･16･18	B37											
DC12V	70･80･90	B36	W2	B39	W8	B40	W8	B36	W8	B36	W5	B38	W8
	14･16･18	B38											
DC24V	70･80･90	B36	W3	B39	W18	B40	W18	B36	S9	B36	W6	B38	S9
	14･16･18	B38											

Voltage	3-Split-Face (Vert.)		3-Split-Face (Horiz.)		4-Split-Face	
	Light cartridge	Resistor board	Light cartridge	Resistor board	Light cartridge	Resistor board
DC 5V	B41	W16	B42	W16	B43	W16
DC12V	B41	W19	B42	W19	B43	W19
DC24V	B41	W20	B42	W20	B43	W20

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 resistor board and 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.



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.

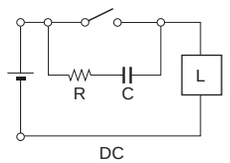
(4) Do not place heavy objects on the switch.

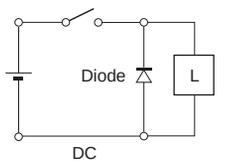
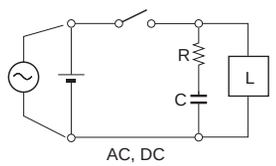
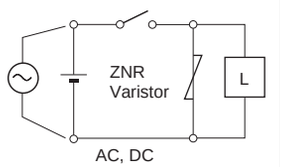
(5) Do not operate or use the housing (switch unit) by itself. Use the switch with assembled the illuminated part (LED module or button).

(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.

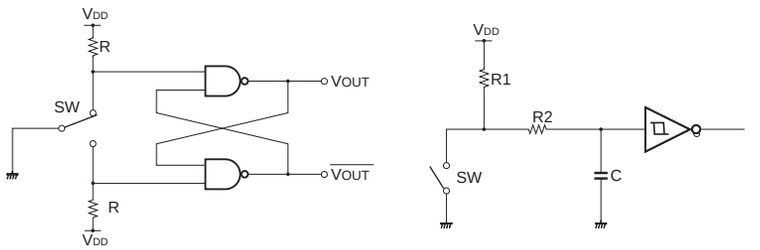
(7) Do not use the switch under loads that exceed the rated switching capacity or other contact ratings. Doing so may result in welding of the contact, or burnout accidents.

(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)
R：0.5 to 1 Ω × switch voltage (V)

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>

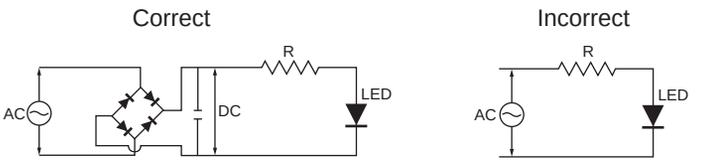
(9) Following circuits show examples of an anti-chattering circuit.



(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.

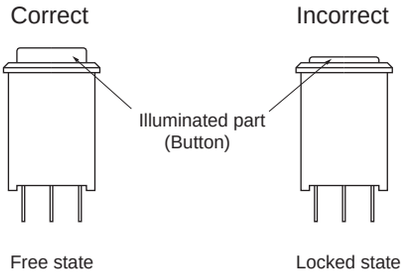
(f) After wiring is completed, maintain an appropriate insulation distance.

(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.