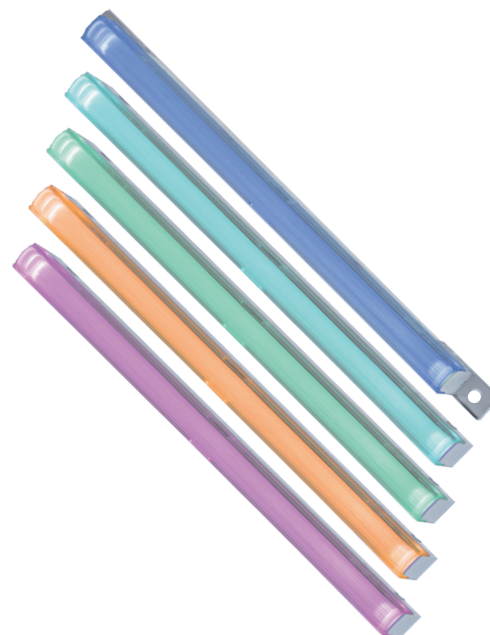


# LL Line Indicator

**Slim display with high visibility.**

- Display surface : 11×200 mm  
(External dimension : Standard mounting 11×200 mm,  
Bracket mounting 11×226 mm)
- Depth behind panel : 14.3 mm
- Terminal : Connector
- Mounting : Standard mounting, Bracket mounting
- Illumination type : Multi-Color
- Accessories : Joint fitting<sup>1</sup>, Wire harness, Connector for cross wiring



## CHARACTERISTICS

Display Surface Size	11×200 mm
Illumination Color	Multi-Color
Illumination Type	Full-Face
Display Surface Shape	R face
Supply Voltage	DC 24 V ±5%
Consumption Current	29 mA max. (1 unit)
Terminal Shape	Connector
Insulation Resistance	More than 100 MΩ at DC 500 V
Dielectric Strength	AC 1000 V RMS between terminals and ground 50/60 Hz for 60 sec. at normal ambient temperature and humidity
Peak Reverse Voltage	150 V
Ambient Operating Temperature	-10°C to 40°C (No Freeze, No Condensation)
Ambient Operating Humidity	45 to 85%RH max. (No Condensation)
Ambient Storage Temperature	-25°C to 65°C (No Freeze, No Condensation)
Ambient Storage Humidity	45 to 85%RH max. (No Condensation)
RoHS (10 Substances)	Conform to standards

[https://www.sunmulon.co.jp/english/products/led\\_e/ll.html](https://www.sunmulon.co.jp/english/products/led_e/ll.html)



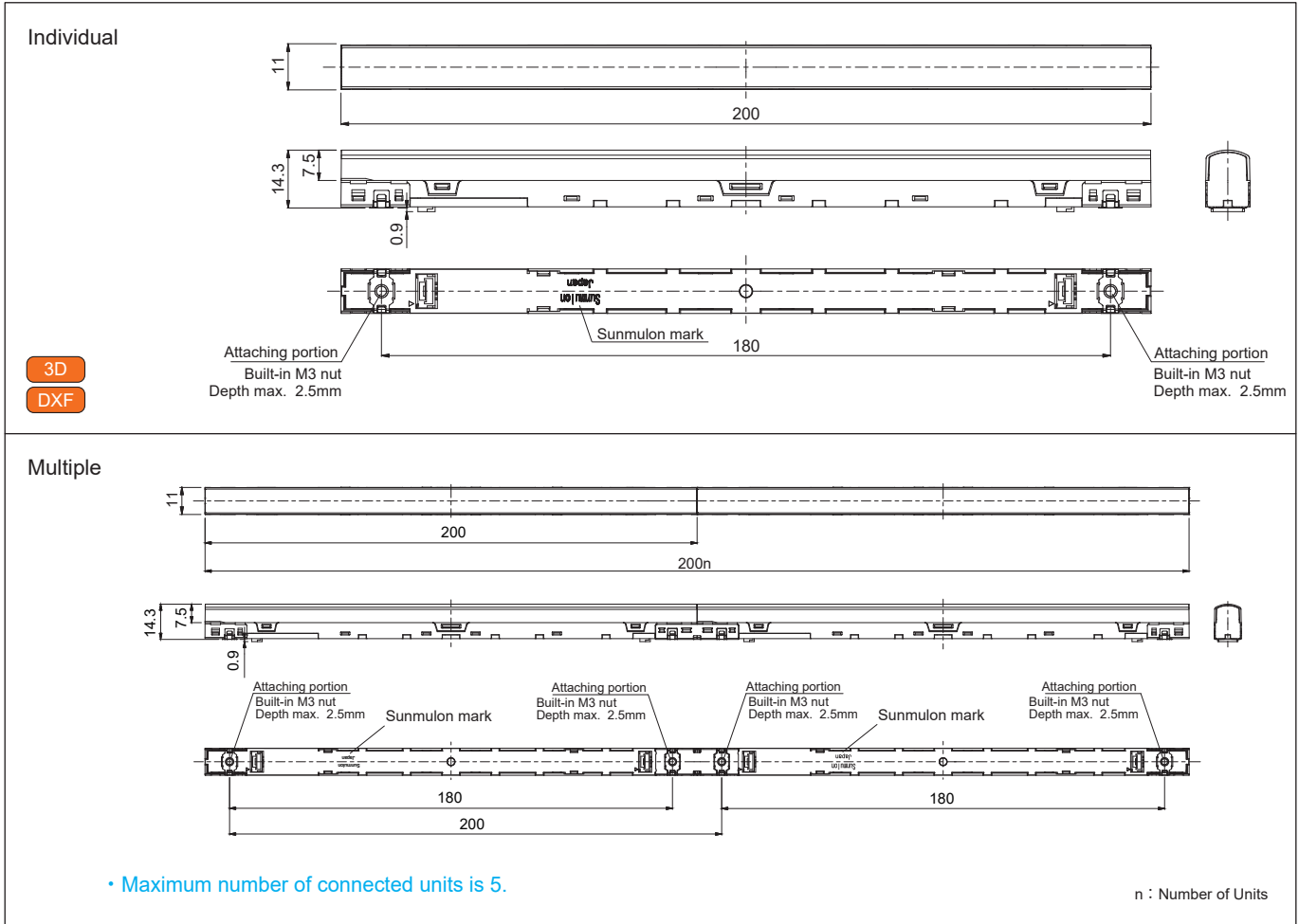
◇Dimensions : page LL-2  
 ◇Internal connection arrangements : page LL-5  
 ◇Mounting design / Panel cutout : page LL-7~10

◇Accessories : page LL-3  
 ◇LED specifications : page LL-6

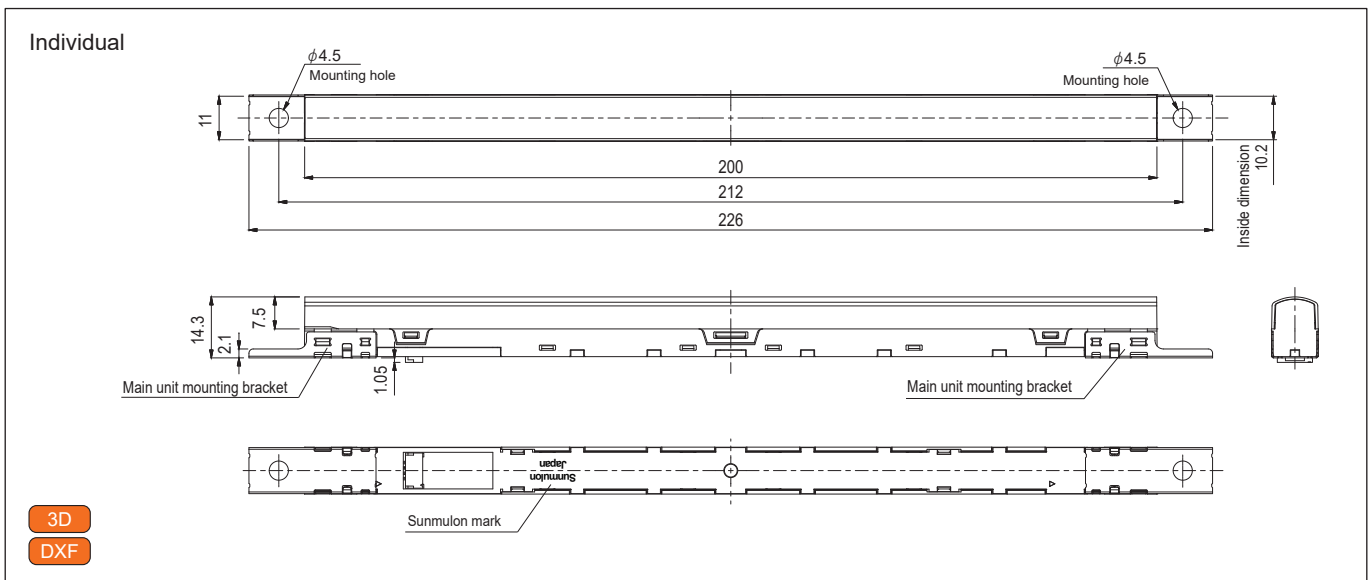
◇Ordering code : page LL-4  
 ◇Terminals : page LL-6

## DIMENSIONS

### ● Standard mounting



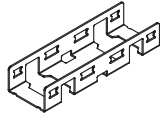


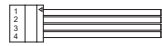

### ● Bracket mounting



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

Tolerance : ± 0.4 mm

## ACCESSORIES

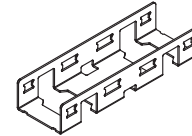
Name	Appearance	Classification	Part no.	Precautions for use
Joint fitting		For standard mounting Joining fitting	LL-2010	- For standard mounting only - Used to connect to the main unit. ※ Up to 5 units can be connected.
Connector		Housing	LL-2018	- Housing and contact set for connector type.  ※ Not included with the product. Please purchase or prepare your own.
		Contact		
Wire harness		Wire harness	50 cm	- For other dimensions, please contact us.
			100 cm	
		For cross wiring	LL-2012-1	- Used for cross wiring when connected to the main unit. ※ Up to 5 units can be connected.

### Joint fitting 1

Part no. LL-2010

Material : SUS t0.3

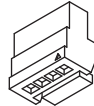
- ※ Please use it as a connecting auxiliary bracket when using it in conjunction with other products.
- When using the product, please make sure that the joint fittings and the main unit are securely mated.
- Also, be sure to tighten all screws in the main unit mounting area when securing the main unit.
- ※ Wiring for up to 5 units can be integrated.



### Connector

Part no. LL-2018

Connector ( 1 Housing & 4 Contact Pins) to be appended.



Housing  
(JST made GHR-04V-S)

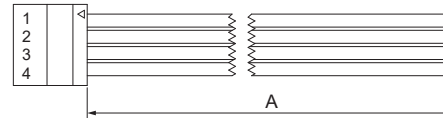


Contact Pin  
(JST made SSSL-02T-P0.2)  
Applicable wire : AWG#30~#26  
Insulator outside diameter :  $\phi$  0.76~ $\phi$  1.0

### Wire harness

Part no.	LL-2011-1	LL-2011-2
A length	50 cm	100 cm

Wire : UL1061 AWG26



※ No number on the actual item.

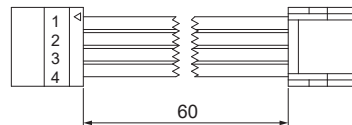
Pin No.	1	2	3	4
Wire Color	Brown	Red	Orange	Yellow

### Connector for cross wiring

Part no. LL-2012-1

Wire : UL1061 AWG26

- ※ Up to 5 units can be connected.

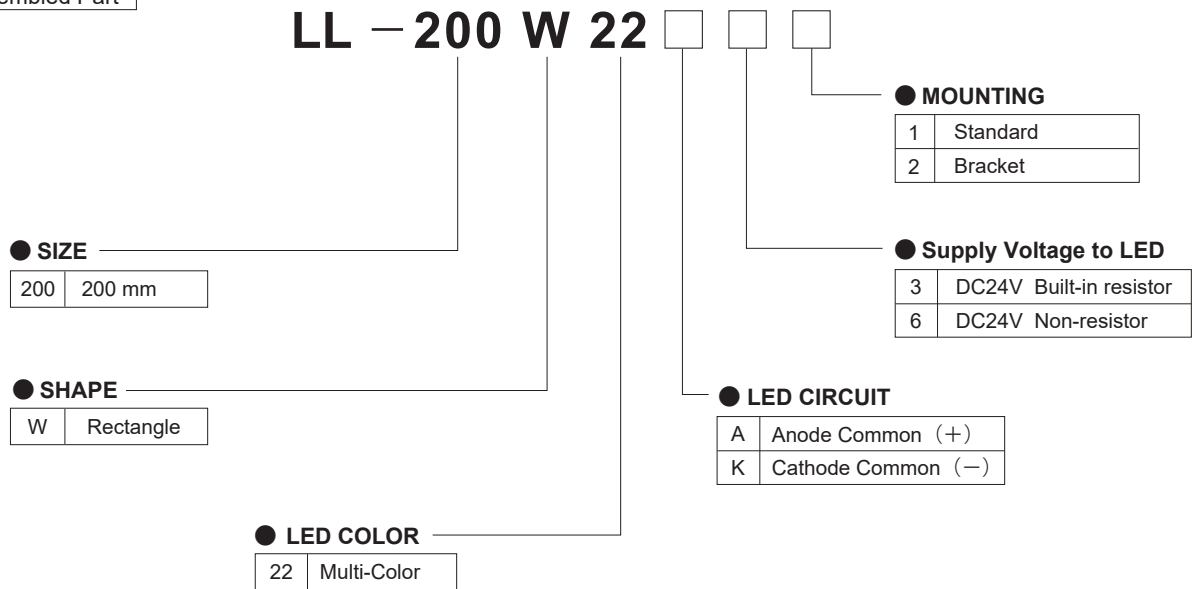


※ No number on the actual item.

Pin No.	1	2	3	4
Wire Color	Brown	Red	Orange	Yellow

## ORDERING CODE

Multi-Color  
Assembled Part



※ The cover is transparent.

※ For Standard mounting, M3 nut is built into the mounting section on the body side.

※ Housing and connector or wire harness used for connectors in the connection, purchase accessories separately or provide your own.

◇Dimensions : page LL-2

◇Accessories : page LL-3

◇Internal connection arrangements : page LL-5

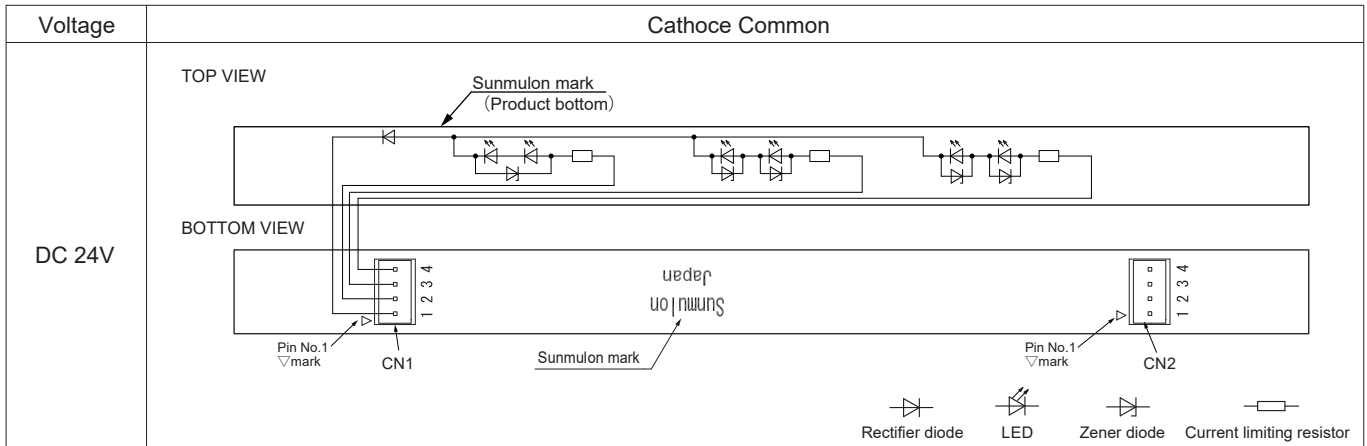
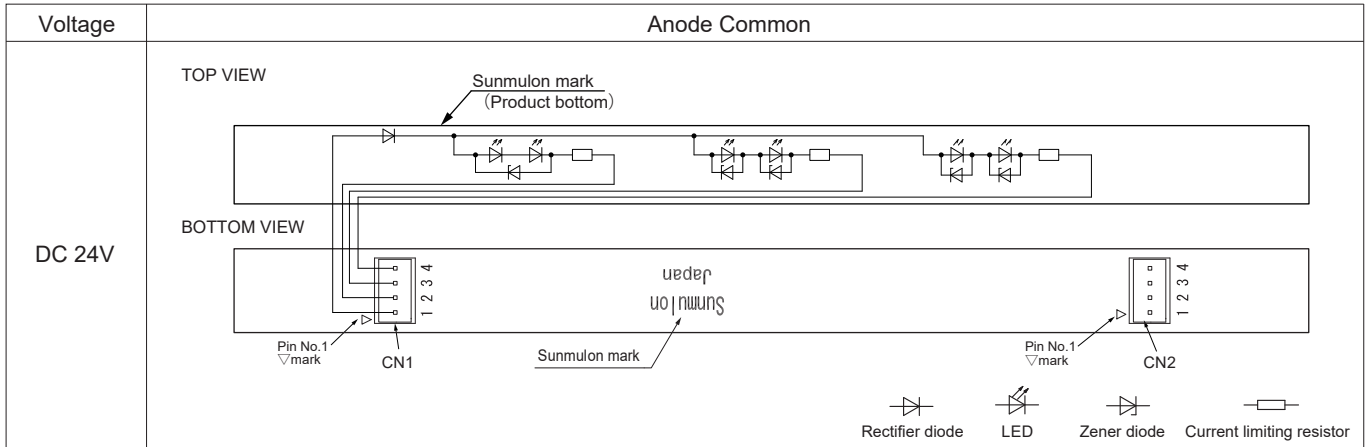
◇LED specifications : page LL-6

◇Terminals : page LL-6

◇Mount design / Panel cutout : page LL-7~10

## INTERNAL CONNECTION ARRANGEMENTS

### ● Multi-Color



### ● Multi-color combination

Terminals	LED Color
1-2	Red
1-3	Green
1-4	Blue

# LED SPECIFICATIONS

## ● BUILT-IN RESISTOR

Voltage (V)	Rated Current (mA)			
	Multi-color			
	Red	Super Green	Super Blue	Simultaneous lighting
DC24V ± 5%	8	8	13	29 (Reference)

※ LED Lifetime About 30,000 hours  
(Lights at the rated voltage at 25°C until the luminance is halved.)

## ● NON-RESISTOR (EXTERNAL RESISTOR) (Ta=25°C)

LED Color	Red	Super Green	Super Blue
Max. Forward Current I <sub>FM</sub> (mA)	50	35	25
Power Dissipation (mW)	254	248	178
DC Reverse Voltage V <sub>R</sub> (V)	5	—	—
Forward Voltage V <sub>F</sub> (Typ.) <sup>※</sup> (V)	4.4	6.4	6.4
Dominant wavelength λ <sub>d</sub> <sup>※</sup> (nm)	623	532	465
Maximum Forward Current (mA)	20	20	20
Pulse Lighting	Pulse Width PW (μs)	10 <sup>4</sup>	
	Duty Ratio DR	10 <sup>-1</sup>	
	Allowable forward current I <sub>FP</sub> (mA)	150	110

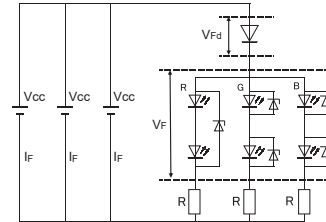
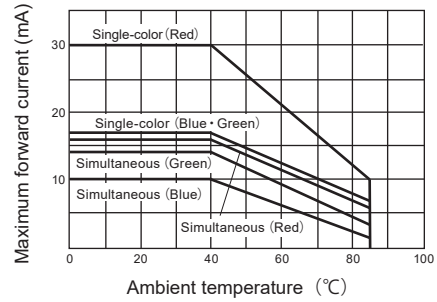
※ Built-in protective elements against static electricity and reverse power connection.  
※ LED elements have variations in chromaticity and brightness.  
Each packing box unit is divided into three simultaneous LED color degrees.

For resistance value calculation

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

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

## ● Maximum forward current – Ambient temperature



Refer to the following formula to calculate external resistance values.

$$R = \frac{V_{cc} - (V_F + V_{Fd})}{I_F}$$

V<sub>cc</sub> : Supply Voltage

V<sub>F</sub> : LED Forward Current

V<sub>Fd</sub> : Rectifier diode Forward Current (Reference Value 0.8V)

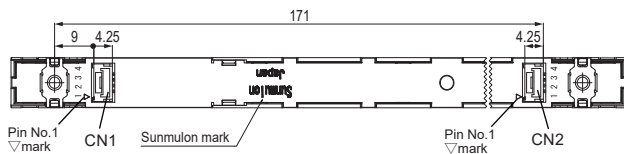
I<sub>F</sub> : Forward Current

I<sub>F</sub> (Forward Current) : Refer to the Rated Current of BUILT-IN RESISTOR type, and be sure to set less than I<sub>FM</sub> (Max. Forward Current).

# TERMINALS

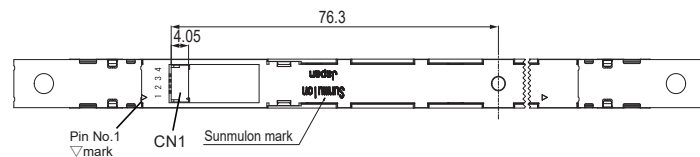
## ● TERMINALS LAYOUT (BOTTOM VIEW)

Standard mounting

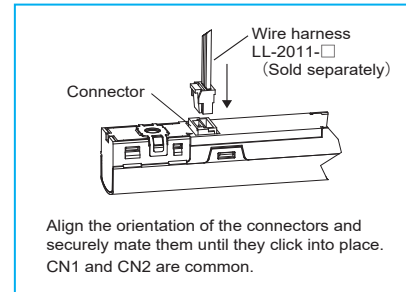


※ No number on the actual item.

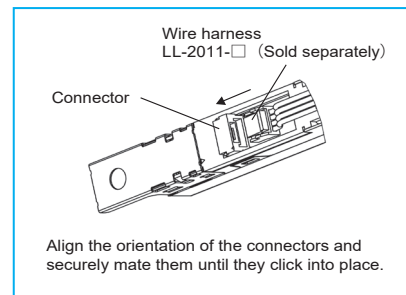
Bracket mounting



※ No number on the actual item.



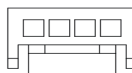
Align the orientation of the connectors and securely mate them until they click into place. CN1 and CN2 are common.



Align the orientation of the connectors and securely mate them until they click into place.

## ● Connector

CN1/CN2	Anode Common	Cathode Common
1	Anode (+)	Cathode (-)
2	Cathode (-) Red	Anode (+) Red
3	Cathode (-) Green	Anode (+) Green
4	Cathode (-) Blue	Anode (+) Blue



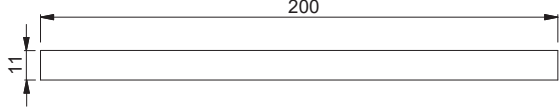
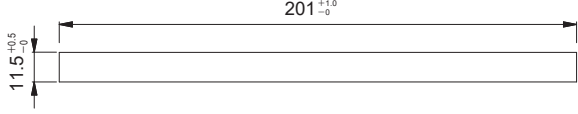
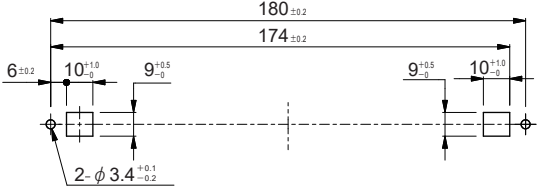
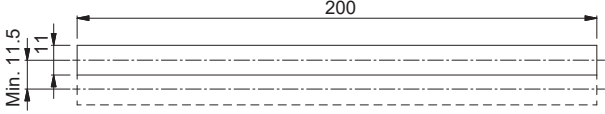
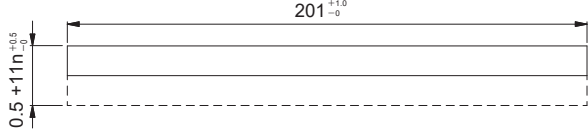
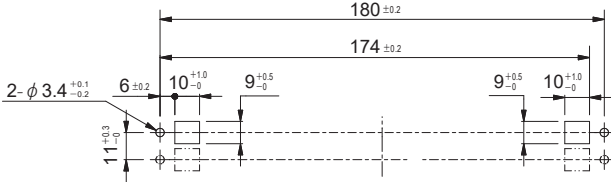
## ● Applicable wire

Wire size	Coating outer diameter
AWG # 26-30	0.76 – 1.0mm

Tolerance : ± 0.4 mm

## MOUNTING DESIGN / PANEL CUTOUT

● Standard mounting

Mounting design	Panel cutout (When using decorative frame)
<p>Individual</p> 	<p>Panel cutout (When using decorative frame)</p> 
	Panel cutout
	
Mounting design	Panel cutout (When using decorative frame)
<p>Multiple (Vertical)</p> 	<p>Panel cutout (When using decorative frame)</p> 
	Panel cutout
	

※ If the panel is to be finished (e.g. coated), make sure that the panel meets the specified dimensions after the coating.

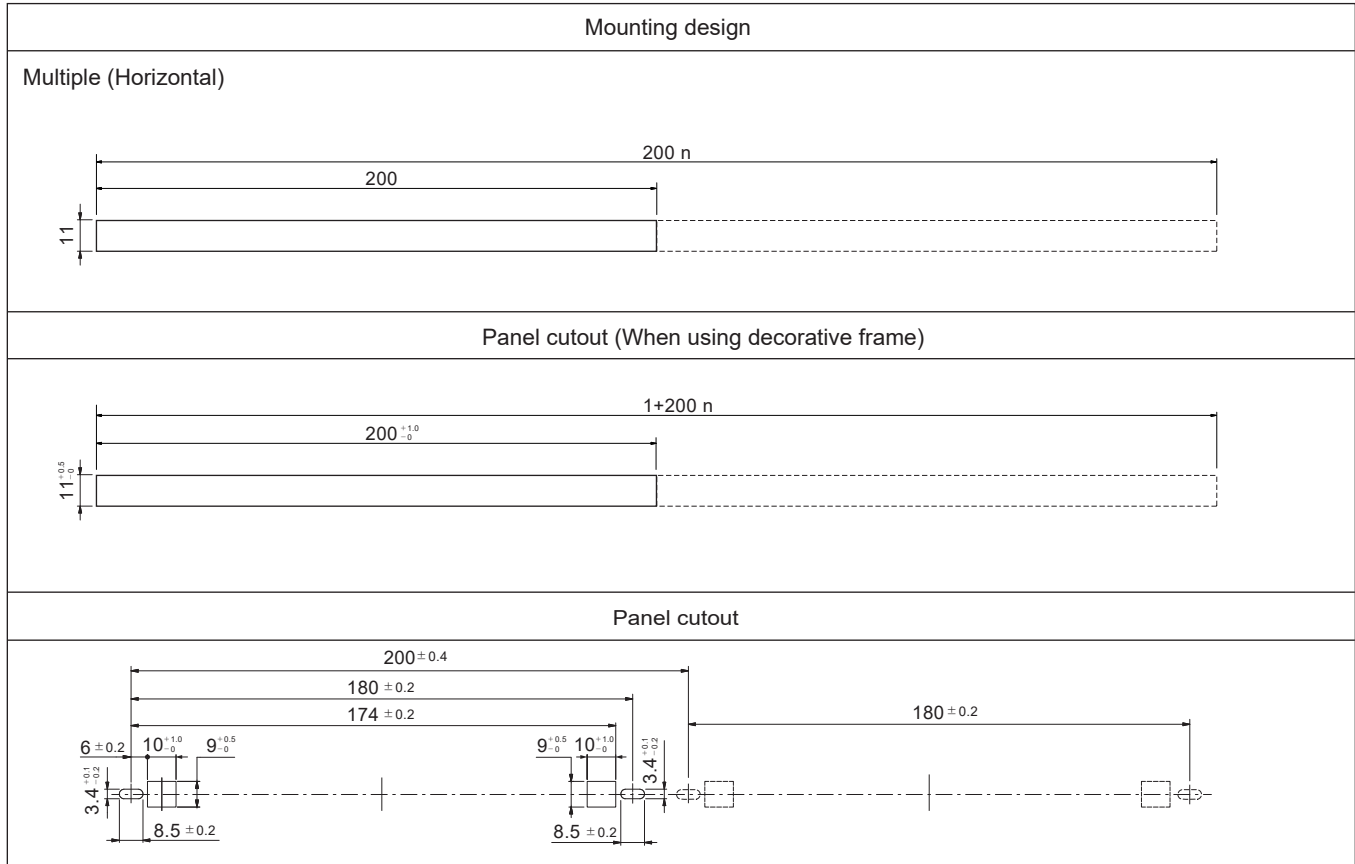
n : Number of Units

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

Tolerance : ± 0.4 mm

## MOUNTING DESIGN / PANEL CUTOUT

### ● Standard mounting

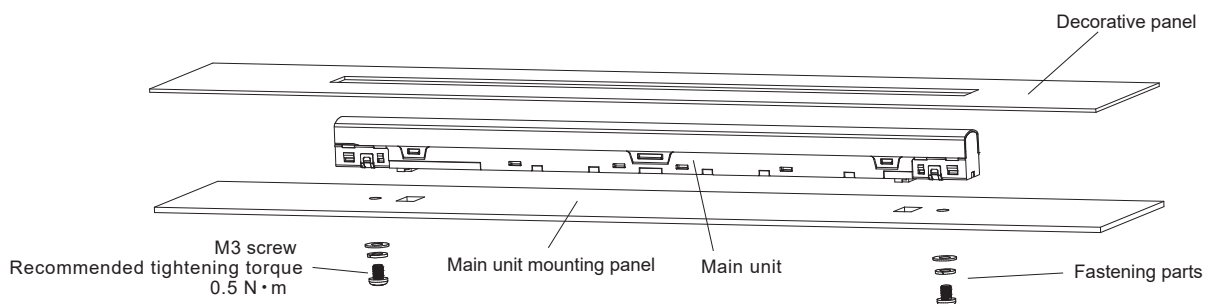


※ If the panel is to be finished (e.g. coated), make sure that the panel meets the specified dimensions after the coating.

n : Number of Units

## MOUNTING DIAGRAM

### ● Standard mounting



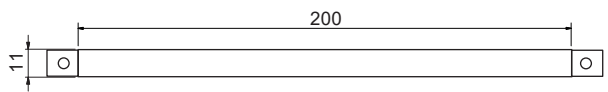
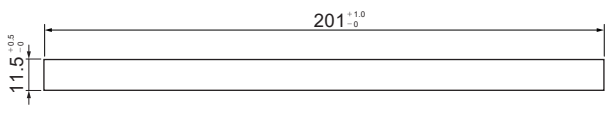
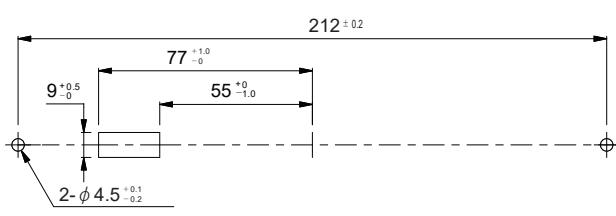
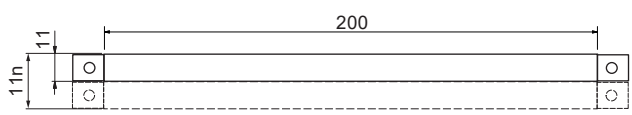
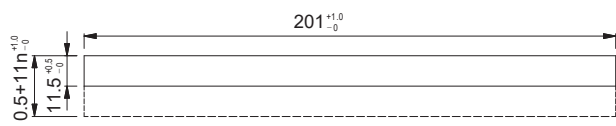
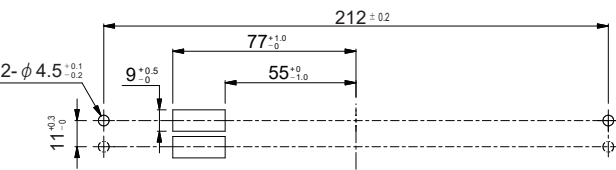
- ※ Use M3 screw for mounting. (Maximum depth on the main unit side 2.5 mm)
- ※ Please prepare M3 screw, nut, washers and fastening parts before installation.
- ※ We do not sell fastening parts.
- ※ Depending on the number of units to be installed, consider the material, thickness, and construction of the mounting panel to be used.

Tolerance : ± 0.4 mm



## MOUNTING DESIGN / PANEL CUTOUT

● Bracket mounting

Mounting design	Panel cutout (When using decorative frame)
<p>Individual</p> 	
	Panel cutout
	
Mounting design	Panel cutout (When using decorative frame)
<p>Multiple (Vertical)</p> 	
	Panel cutout
	

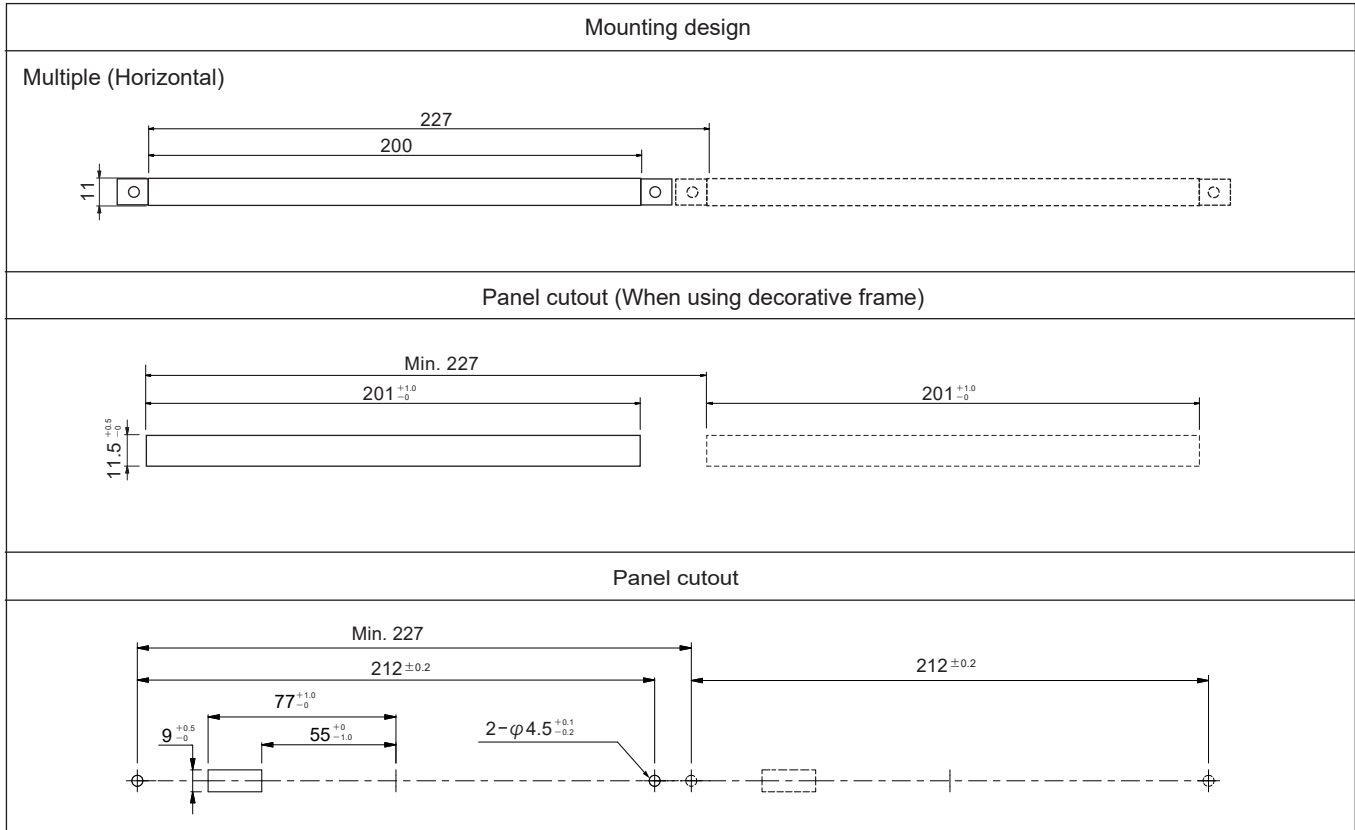
※ If the panel is to be finished (e.g. coated), make sure that the panel meets the specified dimensions after the coating.

n : Number of Units

Tolerance : ± 0.4 mm

## MOUNTING DESIGN / PANEL CUTOUT

### ● Bracket mounting

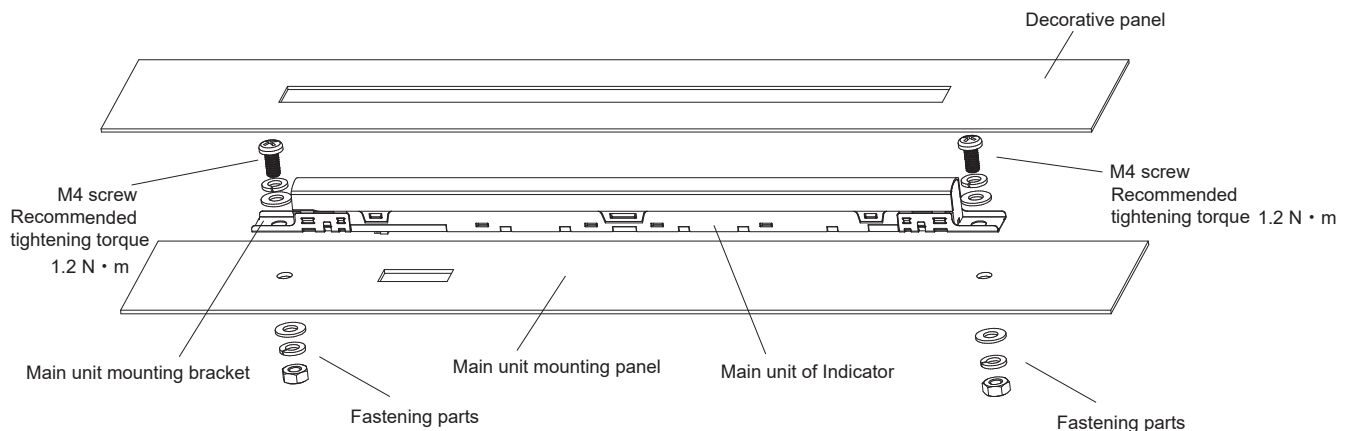


※ If the panel is to be finished (e.g. coated), make sure that the panel meets the specified dimensions after the coating.

n : Number of Units

## MOUNTING DIAGRAM

### ● Bracket mounting

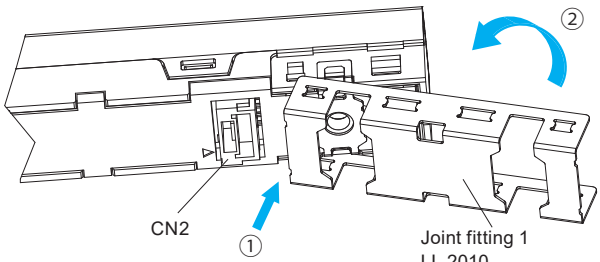
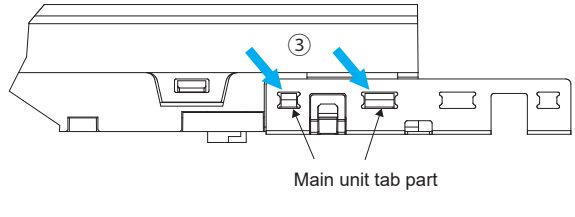
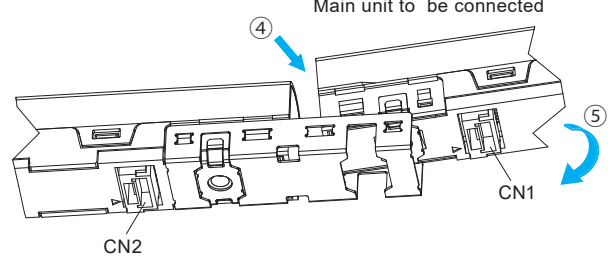
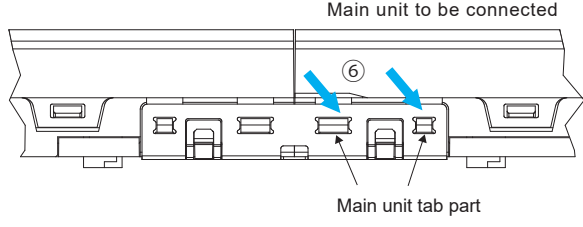


- ※ Use M4 screw for mounting.
- ※ Please prepare M4 screw, nut, washers and fastening parts before installation.
- ※ We do not sell fastening parts.
- ※ Depending on the number of units to be installed, consider the material, thickness, and construction of the mounting panel to be used.

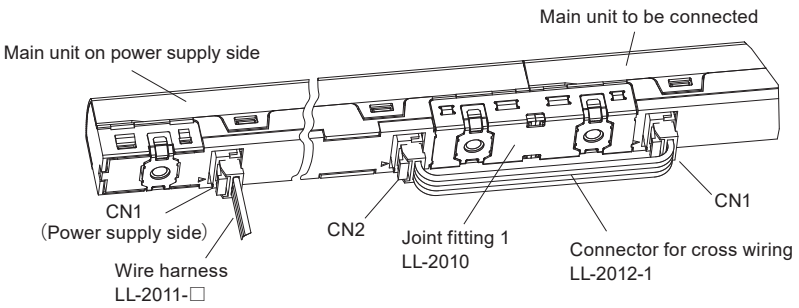
Tolerance : ± 0.4 mm

## ASSEMBLY

### ● Standard mounting

<p><b>【1】</b></p> <p>① Align one side of joint fitting 1 with the main unit at an angle. ② Install the joint fitting 1 in the main unit.</p>	
<p><b>【2】</b></p> <p>③ Insert the main unit tab part in the hole of joint fitting 1. Securely mate the two places on each side.</p>	
<p><b>【3】</b></p> <p>④ Insert the joint fitting 1 at an angle into main unit to be connected. ⑤ Install the main unit in the joint fitting 1.</p>	
<p><b>【4】</b></p> <p>⑥ Insert the main unit tab part in the hole of joint fitting 1. Securely mate the two places on each side.</p> <p>※ Up to 5 units can be connected. ※ Joint fitting 1(LL-2010) must be purchased separately.</p>	

### ● Connected wiring method for Standard mounting

<p>① Connect the wire harness to CN1 connector. ② Connect the connector for cross wiring to the main unit on power supply side CN2 and the main unit to be connected CN1. Connect in the same way for three or more units.</p> <p>※ Use the specified connector. ※ Connectors, wire harnesses, and cross wiring connectors are sold separately. ※ Align the orientation of the connectors and securely mate them until they click into place. ※ Up to 5 units can be connected with joint fitting 1. ※ Up to 5 units can be connected with cross wiring connector.</p>	
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## PRECAUTIONS FOR CORRECT USE

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1. Do not disassemble or modify the main unit as this may cause malfunctions or accidents.
2. When wiping off dirt on the indicator, wipe lightly with a soft, dry cloth.  
Organic solvents such as thinner, benzene, alcohol, or other acidic chemicals may cause deformation, discoloration, or malfunction.
3. Avoid using the product in places where corrosive or silicon gas is generated, high temperature, high humidity, sea breeze or direct sunlight.
4. Take measures to prevent condensation and freeze.
5. Be careful of electrostatic breakdown when handling.
6. Handle with care when attaching joint fittings to the main unit.
7. The content of catalogs is subject to change without notice.
8. We do not warrant any malfunctions or damages caused by handling contrary to the precautions described in the catalog.
9. Due to variations in LEDs, individual LEDs and even the same model may differ in illuminating color and brightness.
10. LEDs are not replaceable, please replace the complete product.
11. Do not drop or otherwise apply strong force to indicator.
12. Do not impact or external force on the main unit. Doing so may cause malfunction.
13. LEDs cannot be lit directly by AC circuit should be provided rectifier smoothing circuit.
14. Turn off the power to the product before starting wiring.
15. Do not use a power supply outside the rated operating voltage range.
16. Depending on the mounting specifications and number of units, consider the material, thickness, and construction of the mounting panel.
17. Connect the connectors in the correct orientation and drawing the wiring harness with care to avoid external stress no damage to the connector and wiring harness. Do not forcibly bend, pull, or push the wire harness after connector connection.
18. Apply voltage directly to LEDs of Non-built-in resistor type will damage the LEDs, so connect an appropriate external resistor.

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

## Safety Precautions for All Indicators

### 1. Notes on contents of Catalogs

- (1) Rated values, performance values, and specification values of Sunmulon products listed in this catalog are values acquired under respective conditions in independent testing, and do not guarantee values gained in combined conditions.
- (2) The ambient operating temperature(humidity) is guaranteed by evaluation based on characteristics, and does not guarantee continuous use for a long period of time near the upper or lower limit of the ambient operating temperature(humidity) or permanent use at that temperature(humidity).
- (3) Reference data and reference values listed in catalogs are for reference purposes only, and do not guarantee that the product will always operate appropriately in that range.
- (4) The specifications / appearance and accessories of Sunmulon products listed in catalogs are subject to change or termination of sales without notice, for improvement or other reasons.
- (5) The content of catalogs is subject to change without notice.

### 2. Note on applications

- (1) If using Sunmulon products in combination with other products, confirm the following suitability by yourself. Sunmulon shall provide no guarantees regarding the combination suitability.
  - (a) Regulations, standards, or laws to which your machinery, equipment, etc. must conform
  - (b) Functionality and safety of your machinery and equipment
- (2) Wiring and installation that ensures the Sunmulon product used in your system, machine, device, or the like can perform and function according to its specifications.
- (3) When using Sunmulon products, be cautious when implementing the following.
  - (a) Use of Sunmulon products with sufficient allowance for rating and performance.
  - (b) Safety design, including redundant design and malfunction prevention design that prevents other danger and damage even in the event that Sunmulon product fails.
- (4) Sunmulon products are designed and manufactured as general-purpose products for general industrial products. They are not intended for use in the following applications, and in the event that you use Sunmulon product for these applications, unless otherwise agreed upon between you and Sunmulon, Sunmulon shall provide no guarantees whatsoever regarding Sunmulon products.
  - (a) Safety devices intended for human body protection
  - (b) Direct control of transport equipment (railroads / airplanes / ships / vehicles / vehicle instruments, etc.)
  - (c) Space equipment, submarine equipment
  - (d) Nuclear power control equipment, radiation related equipment
  - (e) Combustion equipment, electric heat equipment
  - (f) Disaster prevention and security equipment
  - (g) Elevating equipment
  - (h) Amusement facilities
  - (i) Facilities subject to government or industry regulations
  - (j) Use in applications that require a high degree of safety, any other equipment, instruments, or the like that could endanger life or human health

### 3. Warranty

- (1) The warranty period for Sunmulon products shall be 1 year after purchase or delivery to the specified location.
- (2) Warranty scope should a failure occur in Sunmulon product during the above warranty period for reasons attributable to Sunmulon, then Sunmulon shall provide that product, free of charge, the same quantity. Further, in no event shall liability of Sunmulon exceed the individual price of the product on which liability is asserted.
- (3) Failures caused by the following reasons shall be deemed outside the scope of this warranty.
  - (a) The product was handled or used deviating from conditions / environment listed in the catalogs
  - (b) The failure was caused by reasons other than Sunmulon product
  - (c) Modification or repair was performed by a party other than Sunmulon
  - (d) Replacement of maintenance parts, installation of accessories, or the like was not performed properly in accordance with the user's manual and catalogs
  - (e) The failure could not have been predicted with the scientific and technical standards at the time when the product was shipped from Sunmulon
  - (f) The failure was due to other causes not attributable to Sunmulon (including cases of force majeure such as natural disasters and other disasters)
- (4) The warranty listed in this Safety Precautions is the full and complete warranty for Sunmulon products, and Sunmulon shall bear no liability whatsoever regarding special damages, indirect damages, incidental damages, or passive damages that occurred due to Sunmulon product.

### 4. Handling precautions for indicator

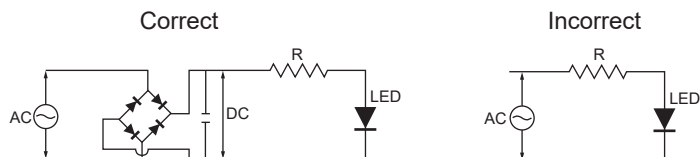
- (1) Wire the terminals with correct polarity. Connecting connectors backwards may cause a power short, resulting in burnout.
- (2) Turn off the power to the product before starting installation, removal, wiring, maintenance, or inspection. Failure to turn power off may cause electrical shock or fire.
- (3) Be careful of electrostatic breakdown when handling.
- (4) Do not drop or otherwise apply strong force to the indicator.
- (5) Do not place heavy objects on the indicator.
- (6) Do not operate or use the housing by itself. Use the indicator with assembled the cover.
- (7) When removing the cover and filter, using a sharp object (screwdrivers, tweezers, etc.), hard object (metal, etc.), or with a large or sudden force, may cause deform or damage the indicator.
- (8) Do not use the indicator under loads that exceed the rated capacity or other ratings. Doing so may result in burnout accidents.

## Safety Precautions for All Indicators

- (9) Assemble correctly according to the handling instructions. Do not assemble or disassemble the product other than as described in the catalog, as this may cause defects or accidents.

(10) Illumination

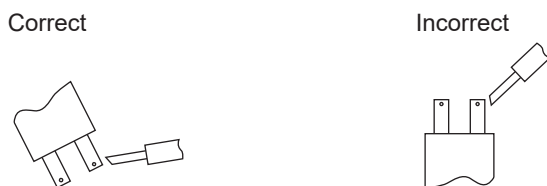
- (a) Do not apply a voltage between the LED terminal that is greater than the rated voltage. Doing so may damage the LED, cause lighting failure.  
(b) LEDs cannot be lit directly by AC circuit should be provided rectifier smoothing circuit for products other than AC input type.



- (c) When wiring, pay attention to the polarity of the terminals.  
(d) Simultaneous lighting may not be possible with Dual-Color, 3-Color illumination or Split-Face 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) When tightening terminals or connecting connectors, do not apply more force than necessary from the back side. Support the indicator with one hand as it may slip out of the front of the panel.  
(b) Use the applicable connectors listed in the catalog for each model.  
(c) Do not apply a soldering iron to the indicator housing. Doing so may deform the terminals and cause defects.  
(d) Hand solder with the terminals facing down to prevent flux from penetrating into the indicator.



- (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.

(12) Usage environment

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

- (13) When wiping off dirt on the indicator, 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) 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.

(16) Service scope

- The price of Sunmulon products do not include the cost of services, such as dispatching technicians.