Sunmulon

FL Indicator

Large display surface with soft illumination for good visibility.
DC 48 V type also available.

- Display surface：52×102 mm
  （External dimension ：57×107 mm）
- Depth behind panel：29.5 mm
- Terminal：Connector, Wire wrap
- Mounting：Snap-in mounting
- Illumination type：Full-Face, Dual-Color, 2-Split-Face, Negative
- Accessories：Wire harness, Connector holder

Negative illumination : The engraved letters are clearly visible only when the light is on,
and when the light is off, the engraved characters are hidden by the semitransparent black cover.

CHARACTERISTICS

Display Surface Size	52×102 mm
Illumination Color	Red, Green, Yellow
Illumination Type	Full-Face, Dual-Color, 2-Split-Face, Negative
Supply Voltage	DC 24 V, 48 V ±5%
Consumption Current	90 mA max.
Terminal Shape	Connector (8 pins), Wire wrap
Insulation Resistance	More than 100 MΩ at DC 500 V
Dielectric Strength	AC 1500 V RMS between terminals and ground 50/60 Hz for 60 sec. at normal ambient temperature and humidity
Peak Reverse Voltage	400 V
Ambient Operating Temperature	−10℃ to 40℃　（No Freeze, No Condensation）
Ambient Operating Humidity	45 to 85%RH max.(No Condensation）
Ambient Storage Temperature	−25℃ to 65℃　（No Freeze, No Condensation）
Ambient Storage Humidity	85%RH max.　（No Condensation）
RoHS （10 Substances）	Conform to standards

STRUCTURE

COVER
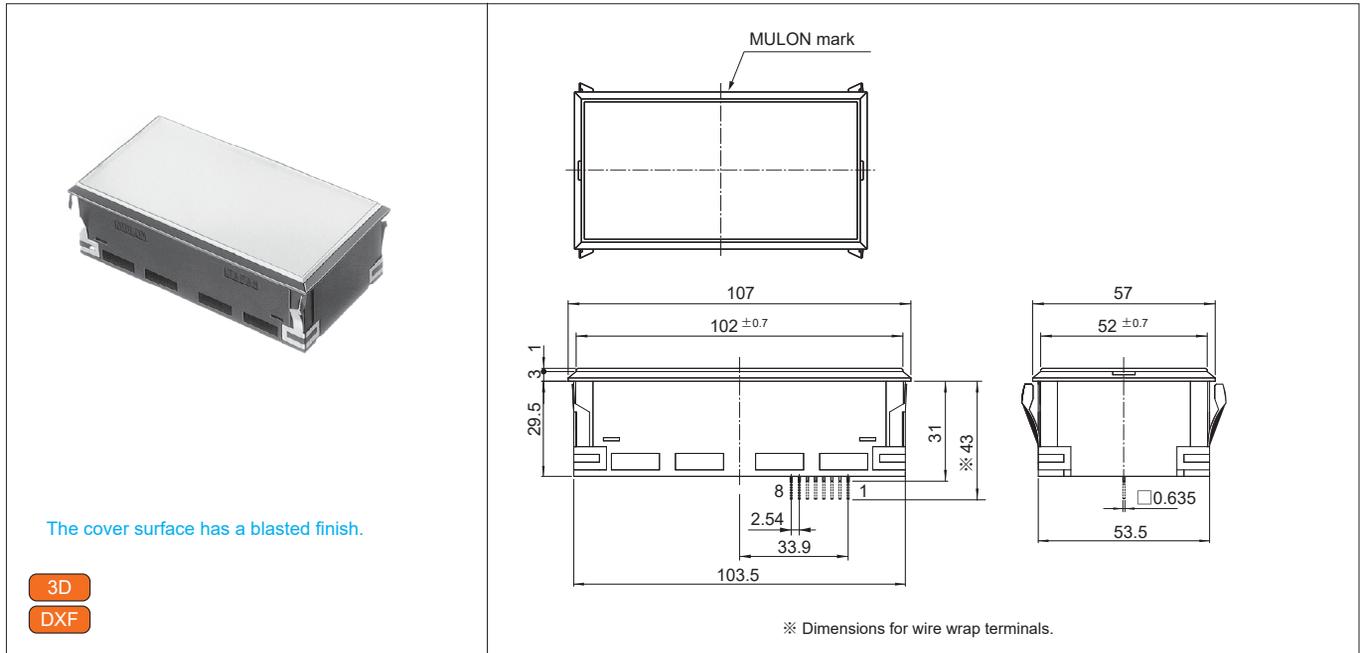
FILTER

DIFFUSER SHEET

DIFFUSER PLATE

HOUSING
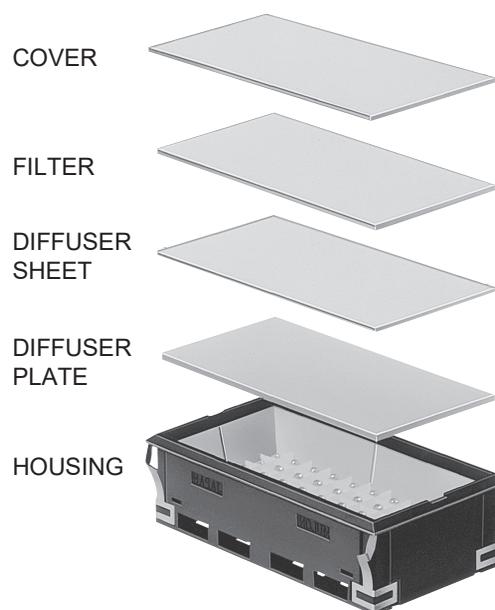
※ For a colored filter, if the positions of the diffuser plate and filter are reversed, the luminescence will be soft color.

https://www.sunmulon.co.jp/english/products/led_e/fl.html

DIMENSIONS

MULON mark

The cover surface has a blasted finish.

3D
DXF

107
102 ±0.7
57
52 ±0.7
29.5
3 1
31
43
※
8   1
2.54
33.9
103.5
□0.635
53.5

※ Dimensions for wire wrap terminals.

ACCESSORIES

Name	Appearance	Classification	Part no.		Precautions for use
Connector		Housing	——		- Honda Tsushin Kogyo's product HKP-8FS01. We do not sell this product.
		Contact	——		- Honda Tsushin Kogyo's product HKP-F403. We do not sell this product.
Contact pulling tool		For contact	——		- Honda Tsushin Kogyo's product HKP-KF. We do not sell this product.
Contact crimping tool		Crimping tool	——		- Honda Tsushin Kogyo's product KP-309. We do not sell this product.
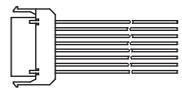
Wire harness		Wire harness	50 cm	FL-0791-1	- For other dimensions, please contact us.
					  Wire：UL1061 AWG26
					  (With connector holder)

Connector holder		For fixing connector	FL-0016		

Wire harness

A length	Part no.	
50cm	FL-0791-1	(With connector holder)

Wire：UL1061 AWG26

※ For other dimensions, please contact us.

A
1
2
3
4
5
6
7
8
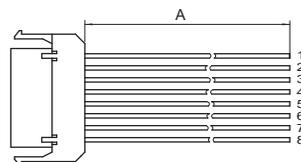
Pin No.	1	2	3	4	5	6	7	8
Wire Color	Orange	Blue	Green	Red	Yellow	Black	Gray	Brown

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

Tolerance：± 0.4 mm

Sunmulon Co., Ltd.

FL-2

Assembled Part

FL－W0☐ ☐ ☐ ☐ ☐ ☐ ☐

● **MOUNTING** ※4)

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

● **SHAPE**

W0	Rectangle

● **Supply Voltage to LED**

3	DC24V
5	DC48V
X	Without LED

● **LED COLOR**

70	Red
80	Green
90	Yellow ※1)
X	Without LED

● **TERMINAL**

K	Connector
W	Wire wrap

● **COVER COLOR**

C	Transparent
SK	Semitransparent (For Negative) ※2)
X	Without cover ※3)

● **FILTER COLOR** ※2)

1	Red
2	Green
3	Yellow ※1)
9	Transparent
X	Without filter ※3)

● **HOUSING COLOR**

K	Black
H	Gray

● **NOTES**

※1) The color of "Yellow" for LED (90) and filter (3) is actually "Orange Yellow" not Lemon Yellow.

※2) For Negative illumination (SK), the filter has black silk printing on one side.

※3) For without cover (X), specify without filter (X). Filters can be ordered separately.

※4) Snap spring metal plates come out Left / Right direction for Vertical mounting, and Top / Bottom direction for Horizontal mounting to avoid interfering mutually. Therefore, in case of independent use, it does not matter. (select 1 Horizontal ordinary)

◇Dimensions：page FL-2   ◇Accessories：page FL-2   ◇Internal connection arrangements：page FL-7
◇LED specifications：page FL-7   ◇Terminals：page FL-8   ◇Mounting design / Panel cutout：page FL-8

Assembled Part

FL－W3 1 2 ☐ ☐ ☐ ☐ ☐ ☐

● **MOUNTING** ※3）

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

● **SHAPE**

W3	Rectangle

● **Supply Voltage to LED**

3	DC24V
5	DC48V

● **LED COLOR**

70	Red	Put the color numbers into frame 1, 2.
80	Green	(Dual-Color combination) 7080・9070
90	Yellow	Simultaneous lighting is possible.

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

● **TERMINAL**

K	Connector
W	Wire wrap

● **COVER COLOR**

C	Transparent	
SK	Semitransparent (For Negative)	※1）
X	Without cover	※2）

● **FILTER COLOR**

9	Transparent	※1）
X	Without filter	※2）

● **HOUSING COLOR**

K	Black
H	Gray

● **NOTES**

※1） For Negative illumination (SK), the filter has black silk printing on one side.
※2） For without cover (X), specify without filter (X). Filters can be ordered separately.
※3） Snap spring metal plates come out Left / Right direction for Vertical mounting, and Top / Bottom direction for Horizontal mounting
　　 to avoid interfering mutually. Therefore, in case of independent use, it does not matter. (select 1 Horizontal ordinary)

◇Dimensions：page FL-2　　　　◇Accessories：page FL-2　　　　◇Internal connection arrangements：page FL-7
◇LED specifications：page FL-7　　◇Terminals：page FL-8　　　　◇Mounting design / Panel cutout：page FL-8

Assembled Part

FL ─ ☐ 1 2 ☐ ☐ 1 2 ☐ ☐ ☐

● **MOUNTING** ※4)

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

● **SHAPE**

W1	Rectangle (Vertical)
W2	Rectangle (Horizontal)

● **Supply Voltage to LED**

3	DC24V
5	DC48V
X	Without LED

● **LED COLOR** ※1)

70	Red	Put the color numbers into frame 1, 2. Simultaneous lighting is possible.
80	Green	(2-Split-Face combination)
90	Yellow	7070・7080・7090・8070・8080・8090 9070・9080・9090
X	Without LED	For Non-illuminated : Put XX into frame 1, 2.

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

● **TERMINAL**

K	Connector
W	Wire wrap

● **FILTER COLOR** ※1) ※2)※3)

1	Red	Put the color numbers into frame 1, 2.
2	Green	
3	Yellow	
9	Transparent	For Without filter Put XX into frame 1, 2.
X	Without filter	

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

● **COVER COLOR**

C	Transparent	
SK	Semitransparent (For Negative)	※2)
X	Without cover	※3)

● **HOUSING COLOR**

K	Black
H	Gray

● **NOTES**

※1）How to specify the color of LED and filter
Select the color symbols listed in the ordering code, and put them into the frame 1 and 2 referring to the figure below.
The numbers in the figure match the location specified in the ordering code.
The color of "Yellow" for LED (90) and filter (3) is actually "Orange Yellow" not Lemon Yellow.
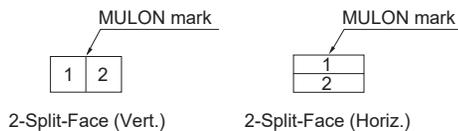
MULON mark
| 1 | 2 |

2-Split-Face (Vert.)

MULON mark
| 1 |
| 2 |

2-Split-Face (Horiz.)

※2）For Negative illumination (SK), the filter has black silk printing on one side.

※3）For without cover (X), specify without filter (XX). Filters can be ordered separately.

※4）Snap spring metal plates come out Left / Right direction for Vertical mounting, and Top / Bottom direction for Horizontal mounting to avoid interfering mutually. Therefore, in case of independent use, it does not matter. (select 1 Horizontal ordinary)

● Full-Face COVER／FILTER

	Red	Green	Yellow	Transparent	Negative Red	Negative Green	Negative Yellow	Negative Transparent	Negative Semitransparent
COVER				FL-0007-C					FL-0007-SK
FILTER	FL-0001-R	FL-0001-G	FL-0001-Y	FL-0001-C	FL-0053-R	FL-0053-G	FL-0053-Y	FL-0053-C	

※ The filter for negative illumination has black silk printing on one side.

● Dual-Color COVER／FILTER

	Transparent	Negative Transparent	Negative Semitransparent
COVER	FL-0007-C		FL-0007-SK
FILTER	FL-0001-C	FL-0053-C	

※ The filter for negative illumination has black silk printing on one side.

● 2-Split-Face (Vertical) COVER／FILTER

	Red	Green	Yellow	Transparent	Negative Red	Negative Green	Negative Yellow	Negative Transparent	Negative Semitransparent
COVER				FL-0007-C					FL-0007-SK
FILTER	FL-0015-R	FL-0015-G	FL-0015-Y	FL-0015-C	FL-0055-R	FL-0055-G	FL-0055-Y	FL-0055-C	

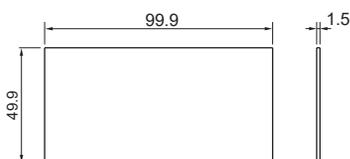※ The filter for negative illumination has black silk printing on one side.

● 2-Split-Face (Horizontal) COVER／FILTER

	Red	Green	Yellow	Transparent	Negative Red	Negative Green	Negative Yellow	Negative Transparent	Negative Semitransparent
COVER				FL-0007-C					FL-0007-SK
FILTER	FL-0014-R	FL-0014-G	FL-0014-Y	FL-0014-C	FL-0054-R	FL-0054-G	FL-0054-Y	FL-0054-C	

※ The filter for negative illumination has black silk printing on one side.

● DIVIDER

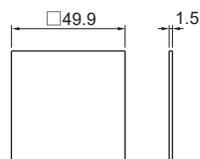|	2-Split-Face (Vertical)	2-Split-Face (Horizontal)
Part no.	FL-1267	FL-1268

● DIFFUSER PLATE

Part no.	FL-0009

FILTER DIMENSIONS

99.9 × 49.9 / 1.5
FL-0001
FL-0053

□49.9 / 1.5
FL-0015
FL-0055
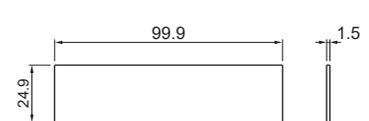
99.9 × 24.9 / 1.5
FL-0014
FL-0054

Tolerance : ± 0.4 mm

INTERNAL CONNECTION ARRANGEMENTS

● Full-Face

DC24V DC48V	BOTTOM VIEW / TOP VIEW / MULON mark

● Dual-Color

DC24V DC48V	BOTTOM VIEW / TOP VIEW / MULON mark
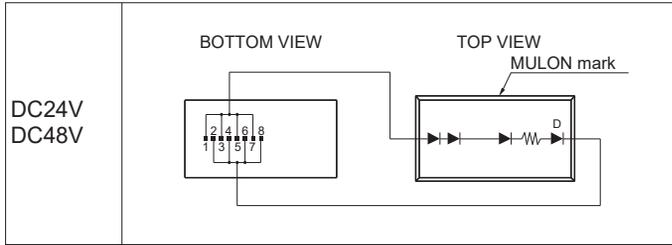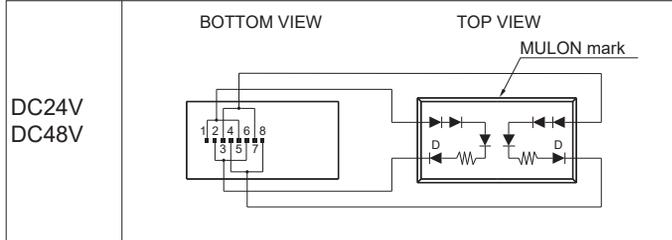
● Dual-Color combination
(Common for each voltage)

Terminals	LED Color	
3 , 7 — 4 , 8	Red	Red
1 , 5 — 2 , 6	Green	Yellow

● 2-Split-Face

	Vertical	Horizontal
DC24V DC48V	BOTTOM VIEW / TOP VIEW / MULON mark	MULON mark
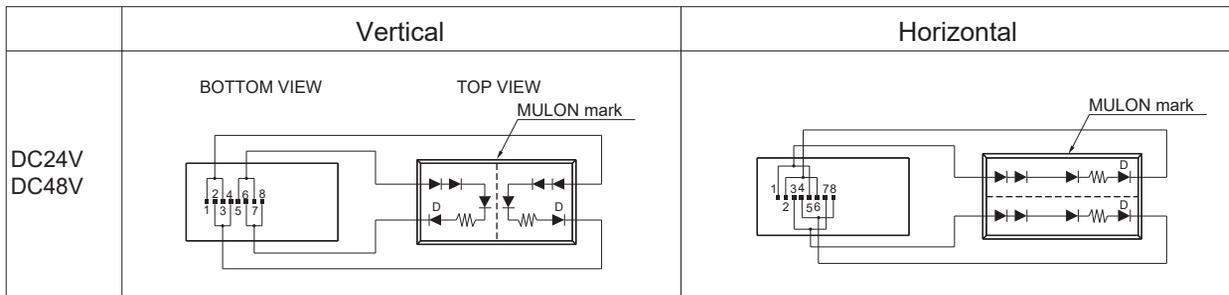
LED SPECIFICATIONS

● Full-Face

Voltage	Rated Current (mA)		
	Red	Green	Yellow
DC24 V ±5%	38	74	74
DC48 V ±5%	19	37	37

● Dual-Color

Voltage	Rated Current (mA)		
	Red	Green	Yellow
DC24 V ±5%	23	56	61
DC48 V ±5%	12	28	32

● 2-Split-Face (Vertical / Horizontal)

Voltage	Rated Current (mA)		
	Red	Green	Yellow
DC24 V ±5%	19	37	37
DC48 V ±5%	10	19	19

Sunmulon Co., Ltd.

FL-7

TERMINALS

● TERMINALS LAYOUT (BOTTOM VIEW)

MULON mark

1 2 3 4 5 6 7 8
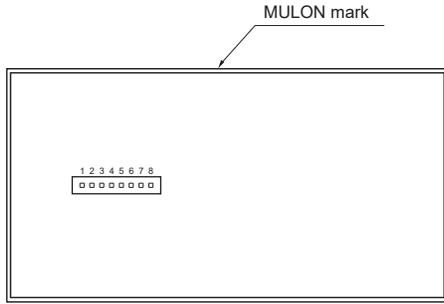
Connector : Honda Tsushin Kogyo's product

　　Housing : HKP-8FS01

　　Contact　: HKP-F403.

● Applicable wire

Wire size	Coating outer diameter
AWG＃24-28	1.0－1.5 mm

Pin No.	Full-Face	Dual-Color	2-Split-Face (Vertical)	2-Split-Face (Horizontal)
1	Anode（＋）	Anode（＋）	Anode（＋）	Anode（＋）
2	Cathode（－）	Cathode（－）	Cathode（－）	Cathode（－）
3	Anode（＋）	Anode（＋）	Anode（＋）	Anode（＋）
4	Cathode（－）	Cathode（－）	Cathode（－）	Cathode（－）
5	Anode（＋）	Anode（＋）	Anode（＋）	Anode（＋）
6	Cathode（－）	Cathode（－）	Cathode（－）	Cathode（－）
7	Anode（＋）	Anode（＋）	Anode（＋）	Anode（＋）
8	Cathode（－）	Cathode（－）	Cathode（－）	Cathode（－）

MOUNTING DESIGN／PANEL CUTOUT

Recommended panel thickness : 1 to 5 mm

Mounting design	Panel cutout
Vertical 107 57n	$104 {}^{+0.4}_{-0.2}$ $54+57 (n-1) {}^{+0.8}_{-0.2}$
Horizontal 57 107n	$54 {}^{+0.4}_{-0.2}$ $104+107 (n-1) {}^{+0.8}_{-0.2}$

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

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

n : Number of Units

PRECAUTIONS FOR CORRECT USE

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.

$99.9 {}^{+0}_{-0.2}$

$49.9 {}^{+0}_{-0.2}$
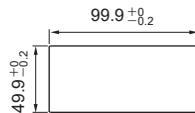
※ For handling instructions and precautions other than the above, please refer to "Safety Precautions for All Indicators".

Tolerance：± 0.4 mm

As of September 2023

Sunmulon Co., Ltd.　　　　　　　　　　　　　　**FL-8**

Safety Precautions for All Indicators

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 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.

(9) Assemble correctly according to the handing 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.

<div align="center">

Correct   Incorrect

</div>
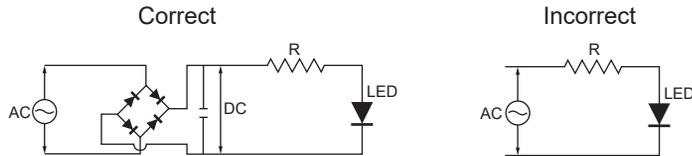
  (c) When wiring, pay attention to the polarity of the terminals.
  (d) Simultaneous lighting may not be possible with Dual-Color, 3-Color illumination or Split-Face illumination, check the catalog.
  (e) Apply voltage directly to LEDs of Non-built-in resistor type will damage the LEDs, so connect an 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.

<div align="center">

Correct   Incorrect

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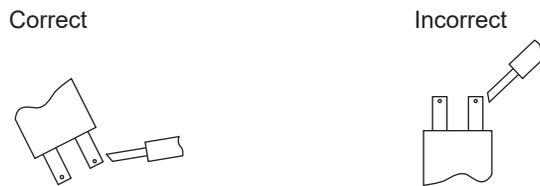
  (e) Use the appropriate wire size for the applied voltage and current, and solder properly. Use of the product with incomplete soldering may cause abnormal heat generation, resulting in a fire hazard.

(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 $-25\,^\circ\!C$ to $65\,^\circ\!C$ (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.