

## LF1D and LF2D

Machine Tools • Food and Beverage Processing Equipment • Vision Systems

### LF1D (IP67, IP69K) and LF2D (IP67, IP67F) Series

With their rugged construction, the LF1D/2D series of light units are ideal for machine tools, automated label and package inspection equipment, and food and beverage processing equipment. Their design provides equally brilliant light at the center or edges of the units. Plus with their ratings, the LF1D (IP67, IP67F, IP69K) and LF2D (IP67, IP67F) can be used where high-pressure and high-temperature washdowns are used.

#### Mini (LF1D-C)

- Compact unit only 100 x 50 x 25mm
- Single LED module design eliminates multiple shadows while distributing light over a wide area (120°)

#### Slim and Wide (LF1D/2D-EH, FH)

- Brightness: 1450lx at 1m
- Available with terminal block or spring clamp connections for easy installation
- Angle adjustable mounting brackets provide installation flexibility

#### Long (LF1D-H/J)

- Two lengths available: 365mm and 510mm
- The flat light design reduces glare and multiple shadows, improving visibility from a distance
- M12 Quick Disconnect option (Pig Tail)



#### LED Optical Specifications

| Model                         | Mini       | Slim       | Wide       | Long          |        |
|-------------------------------|------------|------------|------------|---------------|--------|
|                               | LF1D-C     | LF1D/2D-EH | LF1D/2D-FH | LF1D-H        | LF1D-J |
| Illumination Color            | Cool White |            |            | Neutral White |        |
| Total Luminous Flux           | 560lm      | 1000lm     | 1260lm     | 2000lm        | 3000lm |
| Color Temperature             | 5700K      |            |            | 4700K         |        |
| Reference Illuminance at 1.0m | 180lx      | 1450lx     | 1200lx     | 560lx         | 840lx  |

LED modules and illumination units may vary in color and brilliance. Luminous flux, color temperature, and illuminance values shown are typical.

#### General Specifications

| Model                                | Mini                                                                                                                                                               | Slim                                                                                   | Wide                                                                                     | Long   |        |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------|--------|
|                                      | LF1D-C                                                                                                                                                             | LF1D/2D-EH                                                                             | LF1D/2D-FH                                                                               | LF1D-H | LF1D-J |
| Rated Voltage                        | 24V DC                                                                                                                                                             |                                                                                        |                                                                                          |        |        |
| Voltage Range                        | 21.6 to 26.4V DC                                                                                                                                                   |                                                                                        |                                                                                          |        |        |
| Rated Power (typ.)                   | 4.6W                                                                                                                                                               | 11W                                                                                    | 12.5W                                                                                    | 18.4W  | 27.6W  |
| Insulation Resistance                | 100MΩ minimum (500V DC megger)                                                                                                                                     |                                                                                        |                                                                                          |        |        |
| Dielectric Strength                  | 1000V AC, 50/60Hz, 1 minute                                                                                                                                        |                                                                                        |                                                                                          |        |        |
| Vibration Resistance (damage limits) | Frequency 5 to 55Hz, amplitude 0.5mm                                                                                                                               |                                                                                        |                                                                                          |        |        |
| Shock Resistance (damage limits)     | 1000m/s <sup>2</sup>                                                                                                                                               |                                                                                        |                                                                                          |        |        |
| Operating Temperature                | -30 to +55°C (no freezing)                                                                                                                                         |                                                                                        |                                                                                          |        |        |
| Operating Humidity                   | 45 to 85% RH (no condensation)                                                                                                                                     |                                                                                        |                                                                                          |        |        |
| Storage Temperature                  | -35 to +70°C (no freezing)                                                                                                                                         |                                                                                        |                                                                                          |        |        |
| Operating Environment                | No corrosive gases                                                                                                                                                 |                                                                                        |                                                                                          |        |        |
| Life <sup>1</sup>                    | 50,000 hours (The illumination duration in which the illuminance maintains a minimum of 70% of the initial value at 25°C.)                                         |                                                                                        |                                                                                          |        |        |
| Degree of Protection <sup>2</sup>    | IP67F (reinforced glass), IP67 (all models), IP69K (LF1D)                                                                                                          |                                                                                        |                                                                                          |        |        |
| Material <sup>3</sup>                | Housing: Diecast aluminum (LF1D/LF2D), Lens: Reinforced glass or polycarbonate (LF1D/LF2D)<br>Cover: Stainless steel (LF1D), Flange cover: Diecast aluminum (LF2D) |                                                                                        |                                                                                          |        |        |
| Weight (approx.)                     | 420g                                                                                                                                                               | LF1D-EH-2W*: 750g<br>LF1D-EH-2W-A*: 950g<br>LF2D-EH-2W*: 850g<br>LF2D-EH-2W-A*: 1,000g | LF1D-FH-2W*: 800g<br>LF1D-FH-2W-A*: 1,000g<br>LF2D-FH-2W*: 900g<br>LF2D-FH-2W-A*: 1,050g | 1200g  | 1600g  |

1. LED life depends on the operating environment.

2. Waterproof or oil-proof characteristics specified by IEC 60529 and JIS0920. For illumination units without accessories, use a cable gland and cables that satisfy IP67F or IP67 degree of protection.

3. The reinforced glass and polycarbonate lens types have the same appearance, but have different degrees of protection (IP67F or IP67).

## Part Numbers

## Mini (LF1D-C)

| Cable    |        |             |
|----------|--------|-------------|
| Location | Length | Part Number |



|      |    |                 |
|------|----|-----------------|
| Side | 3m | LF1D-C2F-2W-330 |
|      | 5m | LF1D-C2F-2W-350 |
| Back | 3m | LF1D-C2F-2W-430 |
|      | 5m | LF1D-C2F-2W-450 |

## Long (LF1D-H 365mm)

| Cable    |        |             |
|----------|--------|-------------|
| Location | Length | Part Number |



|      |                      |                 |
|------|----------------------|-----------------|
| Side | 5m                   | LF1D-H2F-2N-350 |
|      | 1.5m + M12 connector | LF1D-H2F-2N-3B0 |
| Back | 5m                   | LF1D-H2F-2N-450 |
|      | 1.5m + M12 connector | LF1D-H2F-2N-4B0 |

## Long (LF1D-J 510mm)

| Cable    |        |             |
|----------|--------|-------------|
| Location | Length | Part Number |



|      |                      |                 |
|------|----------------------|-----------------|
| Side | 5m                   | LF1D-J2F-2N-350 |
|      | 1.5m + M12 connector | LF1D-J2F-2N-3B0 |
| Back | 5m                   | LF1D-J2F-2N-450 |
|      | 1.5m + M12 connector | LF1D-J2F-2N-4B0 |

## Slim and Wide Surface Mounting (LF1D-EH, FH)

| Model                   |                |                               | Slim Model (10 LEDs × 1 row)         |                                      | Wide Model (7 LEDs × 2 rows)         |                                      |
|-------------------------|----------------|-------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Cable Gland LF9Z-A11    | Cable LF9Z-C05 | Mounting Bracket LF9Z-B11,B12 | Clear Reinforced Glass               | Clear Polycarbonate                  | Clear Reinforced Glass               | Clear Polycarbonate                  |
|                         |                |                               |                                      |                                      |                                      |                                      |
| —<br>(hole on the side) | —              | ✓                             | LF1D-EH2F-2W<br>LF1D-EH2F-2W-101     | LF1D-EH3G-2W<br>LF1D-EH3G-2W-101     | LF1D-FH2F-2W<br>LF1D-FH2F-2W-101     | LF1D-FH3G-2W<br>LF1D-FH3G-2W-101     |
| —<br>(hole on the back) | —              | ✓                             | LF1D-EH2F-2W-200<br>LF1D-EH2F-2W-201 | LF1D-EH3G-2W-200<br>LF1D-EH3G-2W-201 | LF1D-FH2F-2W-200<br>LF1D-FH2F-2W-201 | LF1D-FH3G-2W-200<br>LF1D-FH3G-2W-201 |
| ✓<br>(Side)             | —              | ✓                             | LF1D-EH2F-2W-300<br>LF1D-EH2F-2W-301 | LF1D-EH3G-2W-300<br>LF1D-EH3G-2W-301 | LF1D-FH2F-2W-300<br>LF1D-FH2F-2W-301 | LF1D-FH3G-2W-300<br>LF1D-FH3G-2W-301 |
|                         | ✓              | ✓                             | LF1D-EH2F-2W-350<br>LF1D-EH2F-2W-A   | LF1D-EH3G-2W-350<br>LF1D-EH3G-2W-A   | LF1D-FH2F-2W-350<br>LF1D-FH2F-2W-A   | LF1D-FH3G-2W-350<br>LF1D-FH3G-2W-A   |
| ✓<br>(Back)             | —              | ✓                             | LF1D-EH2F-2W-400<br>LF1D-EH2F-2W-401 | LF1D-EH3G-2W-400<br>LF1D-EH3G-2W-401 | LF1D-FH2F-2W-400<br>LF1D-FH2F-2W-401 | LF1D-FH3G-2W-400<br>LF1D-FH3G-2W-401 |
|                         | ✓              | ✓                             | LF1D-EH2F-2W-450<br>LF1D-EH2F-2W-451 | LF1D-EH3G-2W-450<br>LF1D-EH3G-2W-451 | LF1D-FH2F-2W-450<br>LF1D-FH2F-2W-451 | LF1D-FH3G-2W-450<br>LF1D-FH3G-2W-451 |

## Slim and Wide Recessed Mounting (LF2D-EH, FH)

| Model                |                | Slim Model (10 LEDs × 1 row) |                     | Wide Model (7 LEDs × 2 rows) |                     |
|----------------------|----------------|------------------------------|---------------------|------------------------------|---------------------|
| Cable Gland LF9Z-A11 | Cable LF9Z-C05 | Clear Reinforced Glass       | Clear Polycarbonate | Clear Reinforced Glass       | Clear Polycarbonate |
|                      |                |                              |                     |                              |                     |
| —                    | —              | LF2D-EH2F-2W                 | LF2D-EH3G-2W        | LF2D-FH2F-2W                 | LF2D-FH3G-2W        |
| —                    | —              | LF2D-EH2F-2W-200             | LF2D-EH3G-2W-200    | LF2D-FH2F-2W-200             | LF2D-FH3G-2W-200    |
| ✓<br>(Side)          | —              | LF2D-EH2F-2W-300             | LF2D-EH3G-2W-300    | LF2D-FH2F-2W-300             | LF2D-FH3G-2W-300    |
|                      | ✓              | LF2D-EH2F-2W-A               | LF2D-EH3G-2W-A      | LF2D-FH2F-2W-A               | LF2D-FH3G-2W-A      |
| ✓<br>(Back)          | —              | LF2D-EH2F-2W-400             | LF2D-EH3G-2W-400    | LF2D-FH2F-2W-400             | LF2D-FH3G-2W-400    |
|                      | ✓              | LF2D-EH2F-2W-450             | LF2D-EH3G-2W-450    | LF2D-FH2F-2W-450             | LF2D-FH3G-2W-450    |

## Accessories



| Item            | Mounting Bracket       |             |                  |             | Cable Gland             | Cable      |
|-----------------|------------------------|-------------|------------------|-------------|-------------------------|------------|
|                 | Fixed                  |             | Adjustable Angle |             |                         |            |
| Part Number     | LF9Z-B11               | LF9Z-B12    | LF9Z-1MDE1       | LF9Z-1MDF1  | LF9Z-A11                | LF9Z-C05   |
| Applicable Unit | LF1D (Slim)            | LF1D (Wide) | LF1D (Slim)      | LF1D (Wide) | LF1D/2D (Slim and Wide) |            |
| Material        | Stainless Steel        |             |                  |             | Brass                   | PVC        |
| Notes           | 1 pair, Left and Right |             |                  |             | M8*                     | Length: 5m |

\*Applicable wire size (10-12 AWG)

### Part Number Structure (use for interpreting part numbers only)

**LF 1 D - EH 2F - 2 W - 300**

Shape  
1: Surface mount  
2: Recessed mount

Size (LED arrangement)  
C: Mini 100mm (3.94")  
EH: Slim Model (10 LEDs × 1 row)  
FH: Wide Model (7 LEDs × 2 rows)  
H: Long 365mm (14.37")  
J: Long 510mm (20.08")

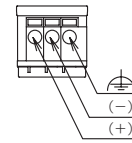
Illumination Color  
W: White (except LF1D-H/J)  
N: Neutral White (LF1D-H/J)

Accessory Options (see chart)

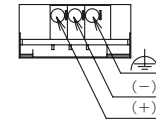
Lens Type Degree of Protection  
2F: Reinforced glass IP67F, IP69K (LF1D) IP67F (LF2D)  
3G: Polycarbonate IP67, IP69K (LF1D) IP67 (LF2D)

### Terminal Block Wiring

#### Slim Type



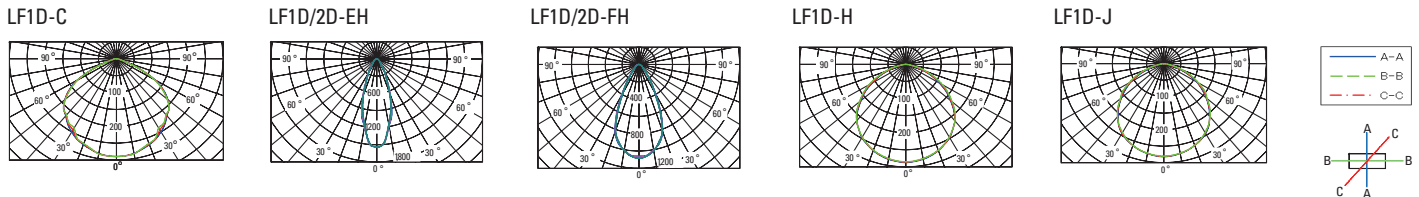
#### Wide Type



Applicable ferrules: 0.25 to 0.75 mm<sup>2</sup>  
Recommended source - Phoenix Contact:  
AI 0,25-12 BU, AI 0,34-12 TQ,  
AI 0,5-12 WH, AI 0,75-12 GY

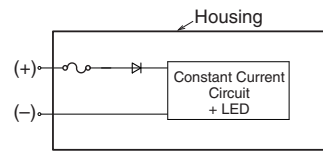
1. Mounting bracket available for LF1D (wide and slim) only.
2. Only available for LF1D (wide and slim) models.
3. 1.5m cable with M12 connector for Long only (LF1D-H, J).

### Illuminance Charts

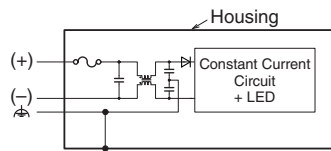


### Internal Circuits

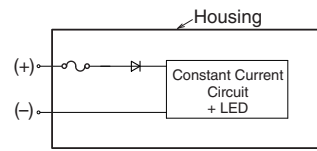
#### LF1D-C



#### LF1D/2D-E, EH, F, FH

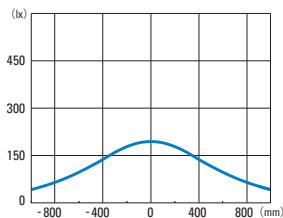


#### LF1D-H/J

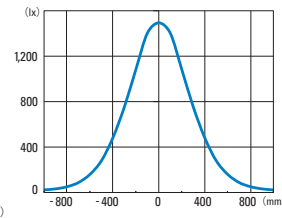


### Distribution Characteristics

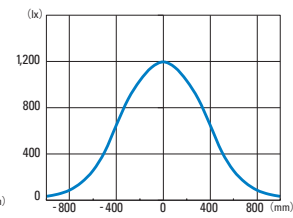
#### LF1D-C



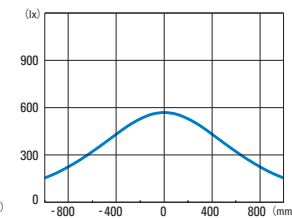
#### LF1D/2D-EH



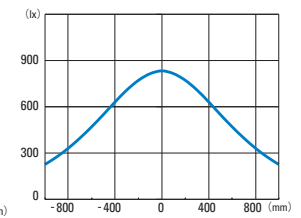
#### LF1D/2D-FH



#### LF1D-H

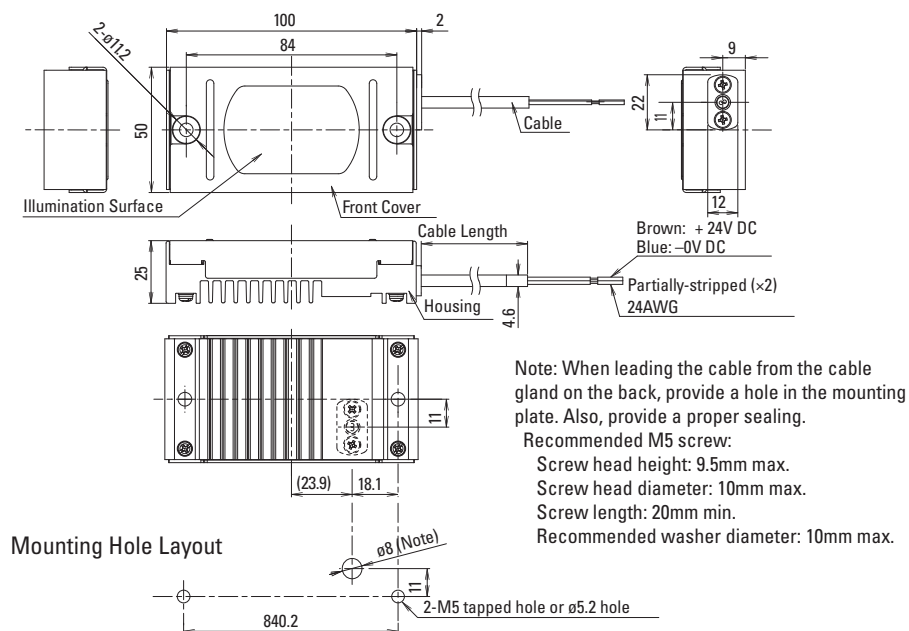


#### LF1D-J

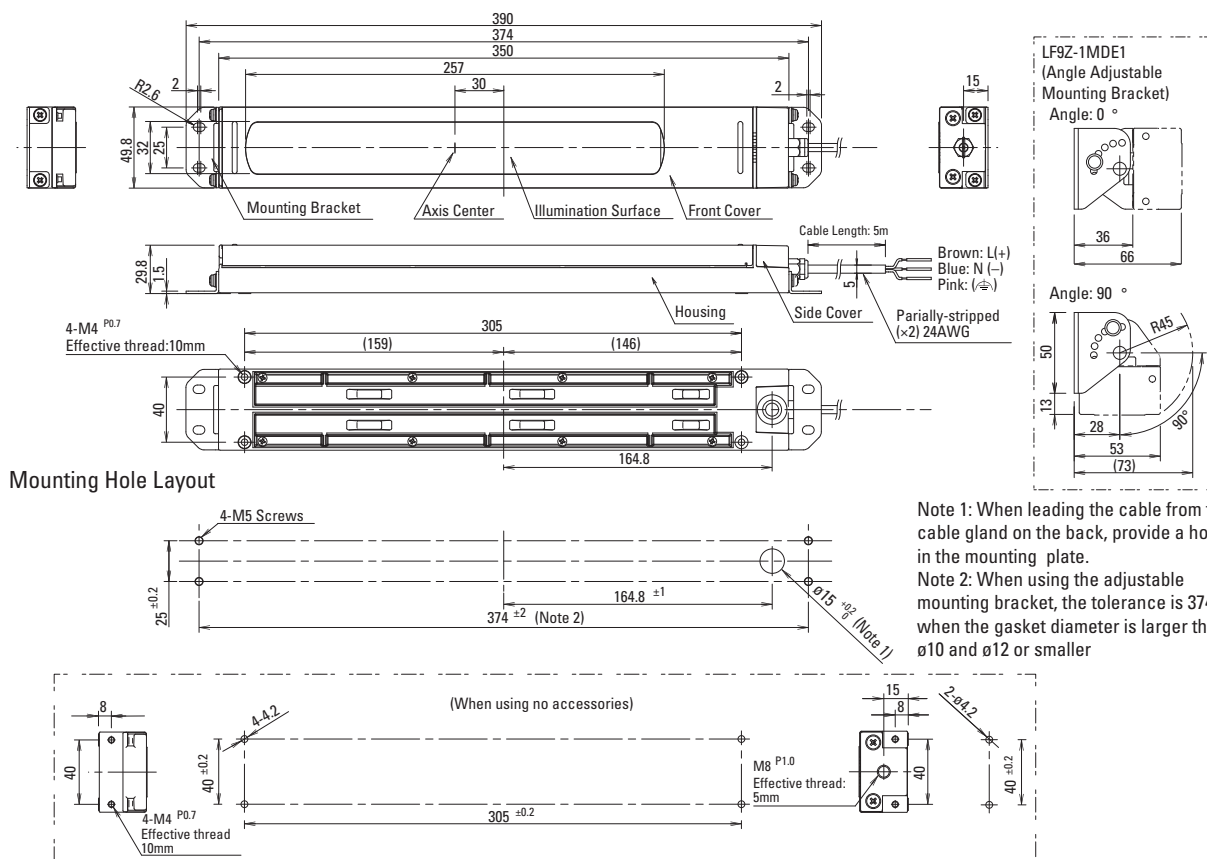


### Dimensions (mm)

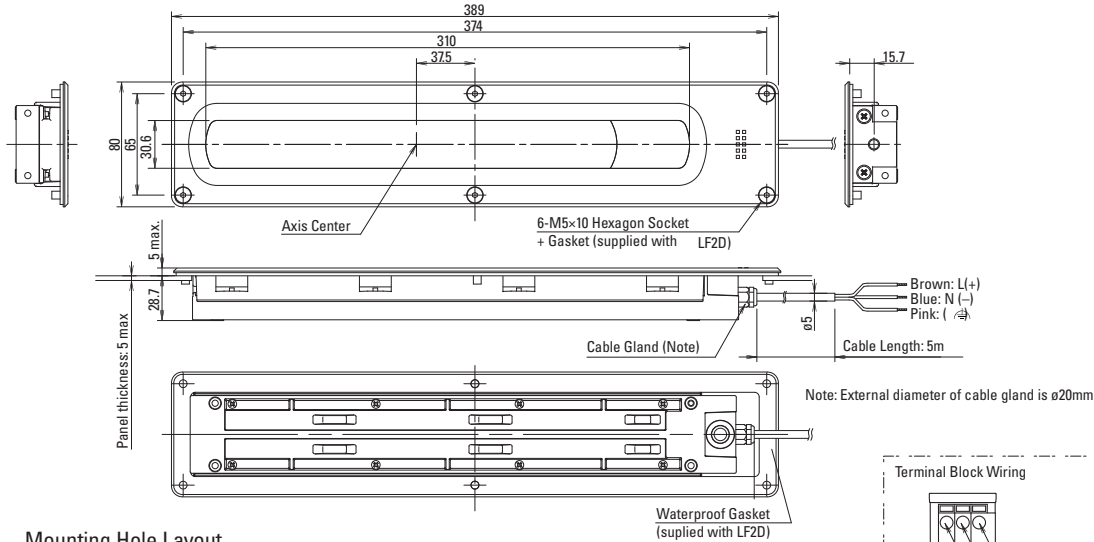
#### LF1D-C Mini



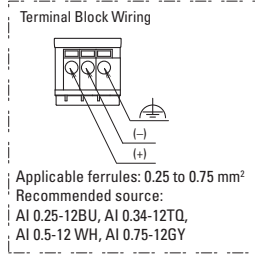
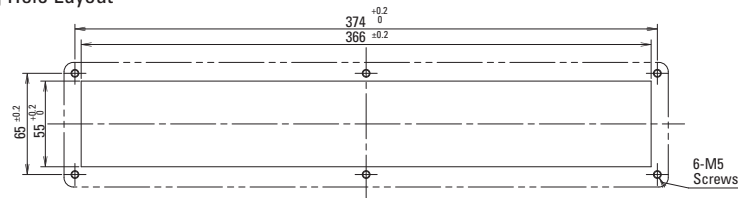
LF1D Slim



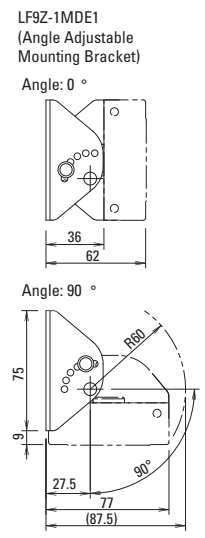
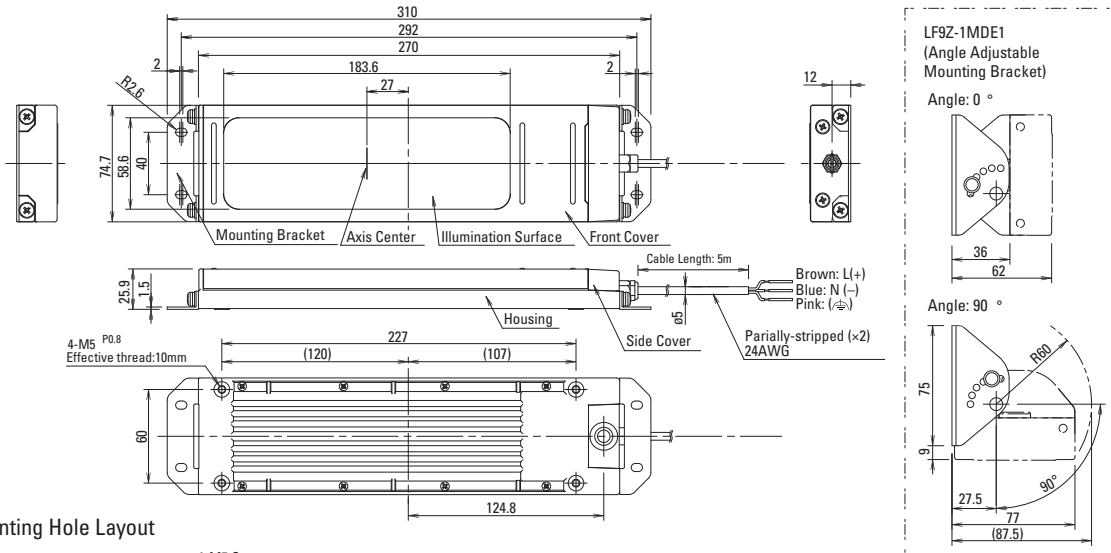
LF2D Slim



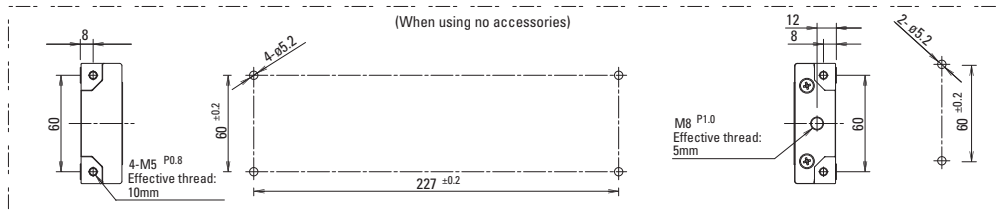
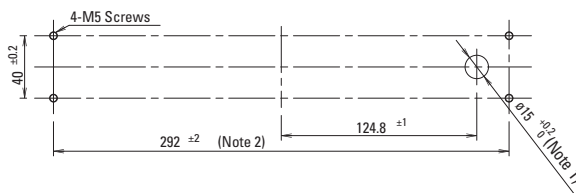
Mounting Hole Layout



LF1D Wide

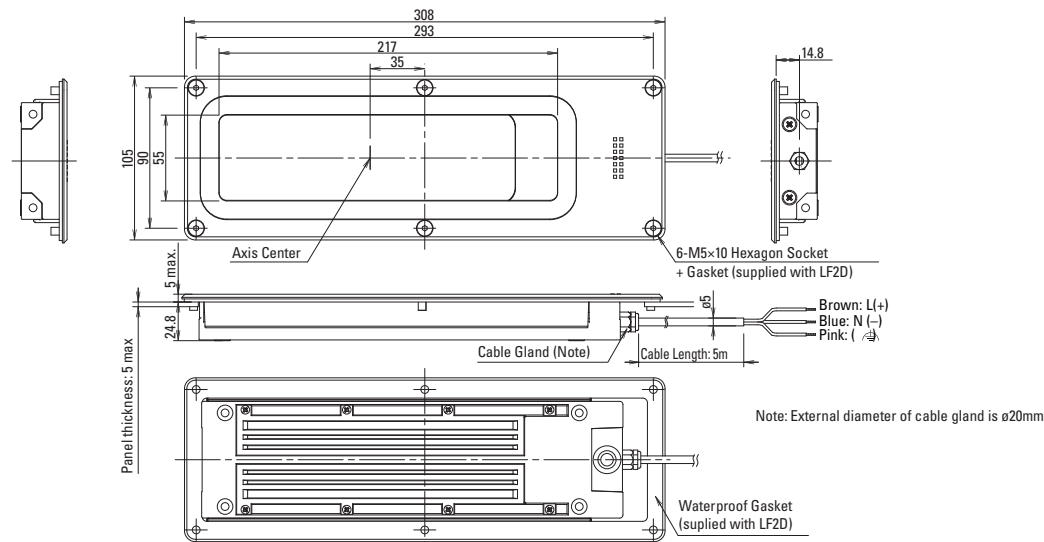


Mounting Hole Layout

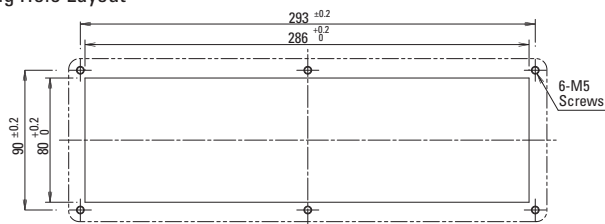


All dimensions in mm.

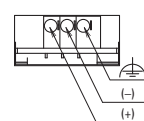
## LF2D Wide



### Mounting Hole Layout

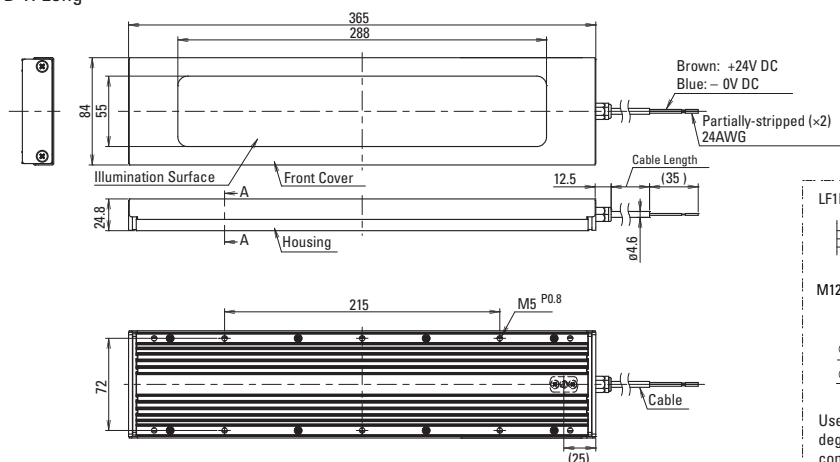


## Terminal Block Wiring

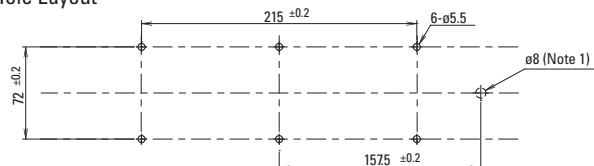


Applicable ferrules: 0.25 to 0.75 mm<sup>2</sup>  
Recommended source:  
AI 0.25-12BU, AI 0.34-12TQ,  
AI 0.5-12 WH, AI 0.75-12GY

## LF1D-H Long

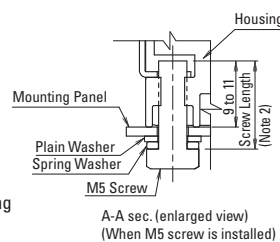
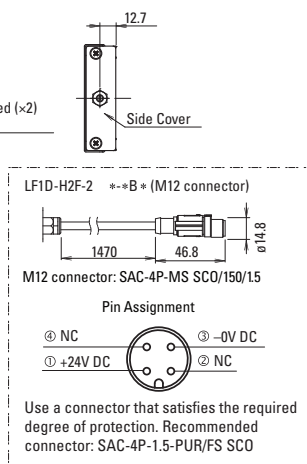


## Mounting Hole Layout

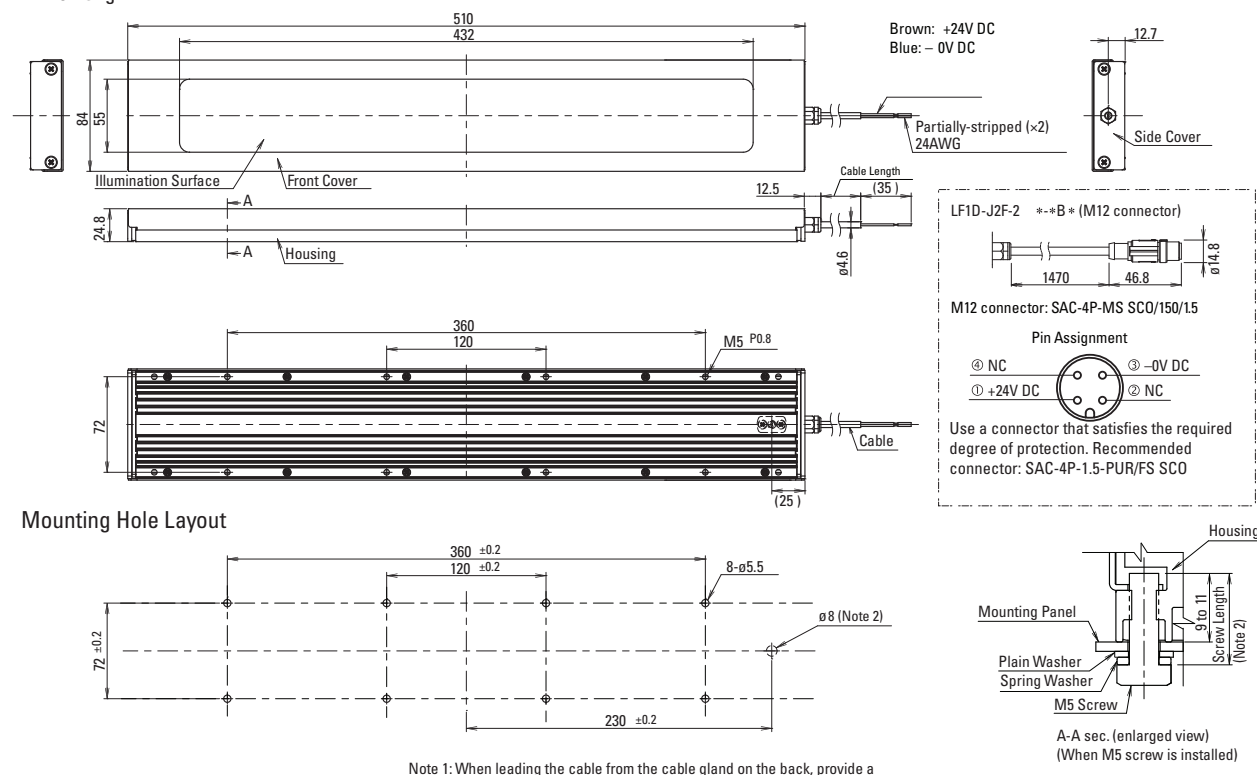


Note 1: When leading the cable from the cable gland on the back, provide a hole in the mounting plate. A  $\varnothing 16$  hole is necessary when using the LF1D-2F-2N \*B\* (M12 connector type)

Note 2: Choose mounting screws in consideration of mounting plate thickness.



## LF1D-J Long



## Safety Precautions

Do not disassemble, repair, or modify the LF1D/2D. Otherwise electric shock, fire, or malfunction may occur. Before wiring, confirm that the LF1D/2D has cooled down sufficiently. Ensure the correct operating temperature. Otherwise internal temperature rise may result in damage. LED illumination unit is general-purpose industrial electric device. Do not use for electronic equipment which may damage the human body or threaten life in case a malfunction or failure occurs.

## Instructions

LED modules may vary in illumination colors and illuminance. Before designing equipment and powering up illumination units, confirm the specifications described in the instruction sheet. Apply voltage within the rated value, otherwise the LED elements may be damaged. Do not loosen screws, otherwise the protection characteristics will be impaired. Do not use or store in a place subjected to vibration and shock. Otherwise electric shock or failure occurs. To clean the cover, use a soft cloth with water or neutral detergent. Do not use solvents such as thinners, benzene, or alkaline, otherwise discoloration, deterioration, or decrease in strength may occur.