## LF1D (IP67, IP67f, IP69K) & LF2D (IP67, IP67f) Series

### Key features:

LF1D and LF2D LED units are the brightest in their class. With their rugged construction they are ideal for machine tools, and food and beverage processing equipment. Available in wide or slim packages, with either Standard or High-Luminance (brighter, wider range) options. The design of these LED lights provides equally brilliant light at the center or edges of the units.

- Brightness:  Standard Models: up to 1,100lx at 1m
  High-Luminance Models: up to 1,450lx at 1m
- Life: 70% of initial luminance at 50,000 Hrs
- Rugged & durable for harsh environments
- Stainless steel cover (LF1D models), diecast aluminum housing
- LF1D: IP67, IP67f, IP69K (high pressure and high temperature washdown)
- LF2D: IP67 (Polycarbonate lens) or IP67f (Reinforced glass lens)
- UL Listed (wet locations)
- RoHS Compliant

### Part Numbers

#### LF1D

| Model | | | Slim Model (10 LEDs × 1 row) | | Wide Model (7 LEDs × 2 rows) | |
|---|---|---|---|---|---|---|
| Cable Gland | Cable | Mounting Bracket | Clear Reinforced Glass | Clear Polycarbonate | Clear Reinforced Glass | Clear Polycarbonate |
| Appearance | | |  | |  | |
| — (hole on the side) | — | — √ | LF1D-E②2F-2W LF1D-E②2F-2W-101 | LF1D-E③3G-2W LF1D-E③3G-2W-101 | LF1D-F②2F-2W LF1D-F②2F-2W-101 | LF1D-F③3G-2W LF1D-F③3G-2W-101 |
| — (hole on the back) | — | — √ | LF1D-E②2F-2W-200 LF1D-E②2F-2W-201 | LF1D-E③3G-2W-200 LF1D-E③3G-2W-201 | LF1D-F②2F-2W-200 LF1D-F②2F-2W-201 | LF1D-F③3G-2W-200 LF1D-F③3G-2W-201 |
| √ (Side) | — | — √ | LF1D-E②2F-2W-300 LF1D-E②2F-2W-301 | LF1D-E③3G-2W-300 LF1D-E③3G-2W-301 | LF1D-F②2F-2W-300 LF1D-F②2F-2W-301 | LF1D-F③3G-2W-300 LF1D-F③3G-2W-301 |
| √ (Side) | √ | — √ | LF1D-E②2F-2W-350 LF1D-E②2F-2W-A | LF1D-E③3G-2W-350 LF1D-E③3G-2W-A | LF1D-F②2F-2W-350 LF1D-F②2F-2W-A | LF1D-F③3G-2W-350 LF1D-F③3G-2W-A |
| √ (Back) | — | — √ | LF1D-E②2F-2W-400 LF1D-E②2F-2W-401 | LF1D-E③3G-2W-400 LF1D-E③3G-2W-401 | LF1D-F②2F-2W-400 LF1D-F②2F-2W-401 | LF1D-F③3G-2W-400 LF1D-F③3G-2W-401 |
| √ (Back) | √ | — √ | LF1D-E②2F-2W-450 LF1D-E②2F-2W-451 | LF1D-E③3G-2W-450 LF1D-E③3G-2W-451 | LF1D-F②2F-2W-450 LF1D-F②2F-2W-451 | LF1D-F③3G-2W-450 LF1D-F③3G-2W-451 |

#### LF2D

| Model | | | Slim Model (10 LEDs × 1 row) | | Wide Model (7 LEDs × 2 rows) | |
|---|---|---|---|---|---|---|
| Cable Gland | Cable | Mounting Bracket | Clear Reinforced Glass | Clear Polycarbonate | Clear Reinforced Glass | Clear Polycarbonate |
| Appearance | | |  | |  | |
| — (hole on the side) | — | — | LF2D-E②2F-2W | LF2D-E③3G-2W | LF2D-F②2F-2W | LF2D-F③3G-2W |
| — (hole on the back) | — | — | LF2D-E②2F-2W-200 | LF2D-E③3G-2W-200 | LF2D-F②2F-2W-200 | LF2D-F③3G-2W-200 |
| √ (Side) | — | — | LF2D-E②2F-2W-300 | LF2D-E③3G-2W-300 | LF2D-F②2F-2W-300 | LF2D-F③3G-2W-300 |
| √ (Side) | √ | √ | LF2D-E②2F-2W-A | LF2D-E③3G-2W-A | LF2D-F②2F-2W-A | LF2D-F③3G-2W-A |
| √ (Back) | — | — | LF2D-E②2F-2W-400 | LF2D-E③3G-2W-400 | LF2D-F②2F-2W-400 | LF2D-F③3G-2W-400 |
| √ (Back) | √ | — | LF2D-E②2F-2W-450 | LF2D-E③3G-2W-450 | LF2D-F②2F-2W-450 | LF2D-F③3G-2W-450 |

ℹ In place of ② specify Standard (blank) or High-Luminance models (H).

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

L F 2 D – E H 2 F – 2 W – 3 0 0

**Shape**
1: Surface mount
2: Recessed mount

**Size (LED arrangement)**
E: Slim Model (10 LEDs × 1 row)
F: Wide Model (7 LEDs × 2 rows)

**Illumination Models**
blank: Standard
H: large area, High Luminance

**Illumination Surface**
2: Clear, Reinforced glass
3: Clear, Polycarbonate
5: Diffused, Polycarbonate
9: Diffused, Reinforced glass

**Cable Gland**

**Degree of Protection**
F: IP67f (LF2D),
   IP67f/IP69K (LF1D)
G: IP67 (LF2D),
   IP67/IP69K (LF1D)

| Code | Cable Gland | Cable Gland Hole Location | Cable | Mounting Bracket |
|------|-------------|---------------------------|-------|------------------|
| Blank | – | side | – | – |
| A | √ | side | √ | √* |
| 101 | – | side | – | √* |
| 200 | – | back | – | – |
| 201 | – | back | – | √* |
| 300 | √ | side | – | – |
| 301 | √ | side | – | √* |
| 350** | √ | side | √ | – |
| 400 | √ | back | – | – |
| 401 | √ | back | – | √* |
| 450 | √ | back | – | – |
| 451 | √ | back | √ | √* |

*Mounting bracket available for LF1D only.
**Available for LF1D only.

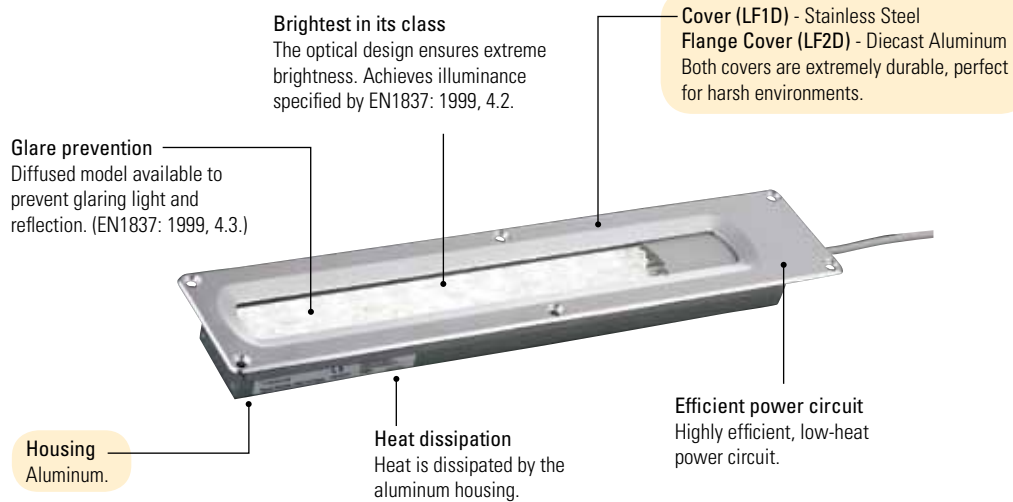## Specifications

| Model | Standard | | High-Luminance | |
|-------|----------|--|----------------|--|
| | Slim | Wide | Slim | Wide |
| Rated Voltage | 24V DC | | | |
| Voltage Range | 21.6 to 26.4V DC | | | |
| Rated Power (typ.) | 9W | 12.5W | 11W | 12.5W |
| Insulation Resistance | 1MΩ minimum (500V DC megger) | | | |
| Dielectric Strength | 1,000V AC, 50/60Hz, 1 minute | | | |
| Vibration Resistance (damage limits) | Frequency 5 to 55Hz, amplitude 0.5mm | | | |
| Shock Resistance (damage limits) | 1000m/s$^2$ | | | |
| 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 [1] | 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 [2] | IP67f (LF2D: reinforced glass), IP67 (LF2D: polycarbonate), IP67, IP69K (LF1D) | | | |
| Material [3] | Housing: Diecast aluminum (LF1D/LF2D) Lens: Reinforced glass or polycarbonate (LF1D/LF2D) Cover: Stainless steel (LF1D) Flange cover: Diecast aluminum (LF2D) | | | |
| Weight (approx.) | LF1D-E*-2W*: 750g LF1D-E*-2W-A*: 950g LF2D-E*-2W*: 850g LF2D-E*-2W-A*: 1,000g | LF1D-F*-2W*: 800g LF1D-F*-2W-*: 1,000g LF2D-F*-2W*: 900g LF2D-F*-2W-A*: 1,050g | LF1D-E*-2W*: 750g LF1D-E*-2W-A*: 950g LF2D-E*-2W*: 850g LF2D-E*-2W-A*: 1,000g | LF1D-F*-2W*: 800g LF1D-F*-2W-*: 1,000g LF2D-F*-2W*: 900g LF2D-F*-2W-A*: 1,050g |

1. LED life depends on the operating environment.
2. Waterproof or oil-proof characteristics specified by IEC 60529 and JEM1030. 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 illumination surfaces have the same appearance, but have different degrees of protection (IP67f or IP67).

## LED Optical Specfcations

| Model | Standard | | | | High-luminance | | | |
|-------|----------|--|--|--|----------------|--|--|--|
| | Slim | | Wide | | Slim | | Wide | |
| Illumination Surface | Clear | Diffused | Clear | Diffused | Clear | Diffused | Clear | Diffused |
| Illumination Color | Cool White | | | | | | | |
| Luminous Flux (Typ.) | 600lm | | 840lm | | 1,000lm | | 1,260lm | |
| Color Temperature | 5700K | | | | | | | |
| Reference Illuminance at 1.0m | 1,100lx | 1,000lx | 1,100lx | 1,000lx | 1,450lx | 1,200lx | 1,450lx | 1,200lx |

Note: LED modules and illumination units may vary in color and brilliance. Luminous flux, color temperature, and illuminance values shown above are typical.
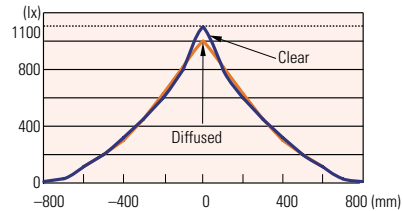
**Glare prevention**
Diffused model available to prevent glaring light and reflection. (EN1837: 1999, 4.3.)

**Brightest in its class**
The optical design ensures extreme brightness. Achieves illuminance specified by EN1837: 1999, 4.2.

**Cover (LF1D)** - Stainless Steel
**Flange Cover (LF2D)** - Diecast Aluminum
Both covers are extremely durable, perfect for harsh environments.

**Housing**
Aluminum.

**Heat dissipation**
Heat is dissipated by the aluminum housing.

**Efficient power circuit**
Highly efficient, low-heat power circuit.

## Distribution Characteristics (reference value at 1.0m)

Standard Slim and Wide Models (Clear Surface)



Wide
(Illuminates wide-ranging area)

Slim
(Illuminates area directly below)
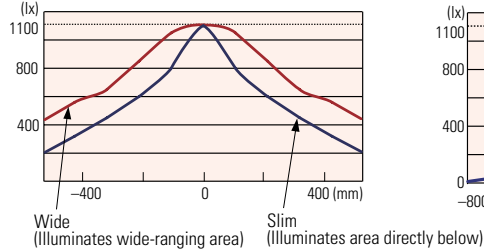
Standard Clear and Diffused Surface (Slim)



Clear

Diffused

Standard Clear and Diffused Surface (Wide)



Clear

Diffused
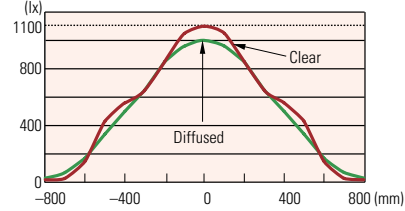
High-Luminance



High-Luminance (wide)
(Illuminates a large area with ultra bright light)

High-Luminance (slim)
(Illuminates directly below and the surrounding area)

High-Luminance & Standard



Standard (slim)
(Illuminates area directly below)
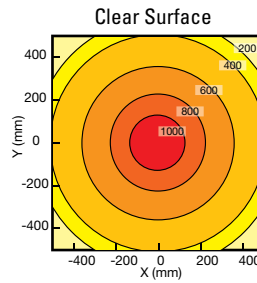
High-Luminance & Standard



Standard (wide)
(Illuminates large area)

Lumifa
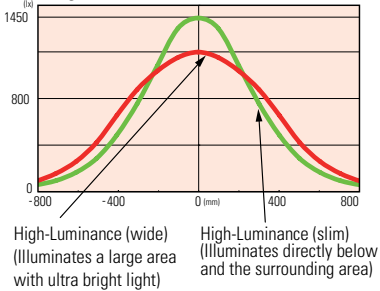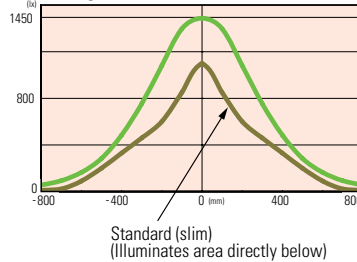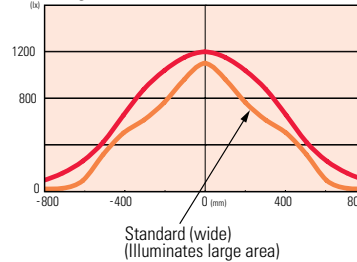
## Illuminance Charts

Standard

Slim

Wide

### Clear Surface


### Diffused Surface


### Clear Surface
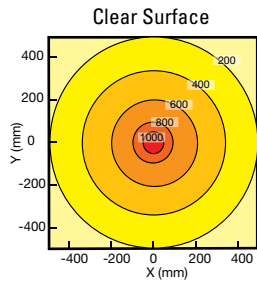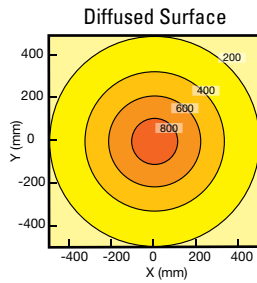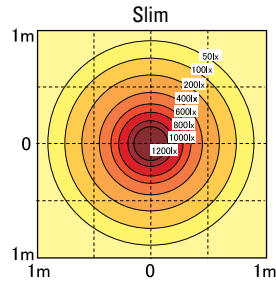

### Diffused Surface
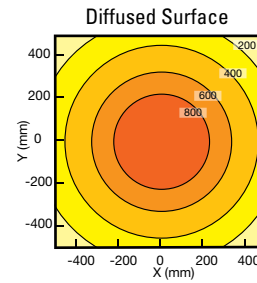

X: long side
Y: short side

### High-Luminance

Slim


Wide
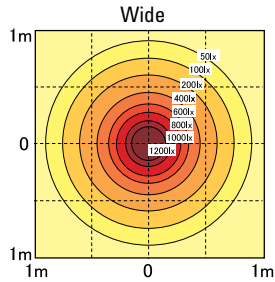

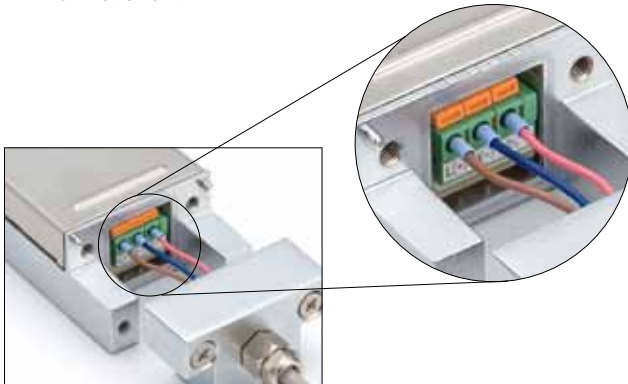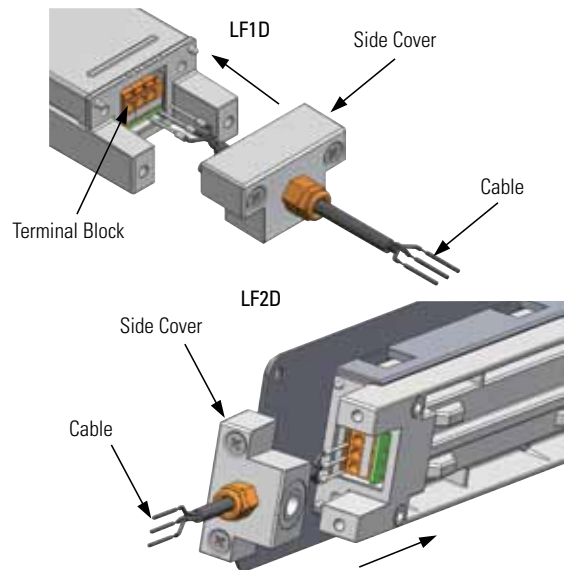## Easy Maintenance
## Spring-clamp Terminal Blocks

Removable direct plug-in terminal blocks, with spring clamp connections, ensure a high-quality connection. This provides for easy installation or replacement of the LED illumination unit.
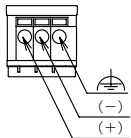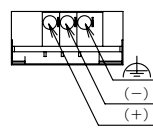


## Connection Example



LF1D

Side Cover

Terminal Block

Cable

LF2D

Side Cover

Cable

## Terminal Block Wiring

Slim Type
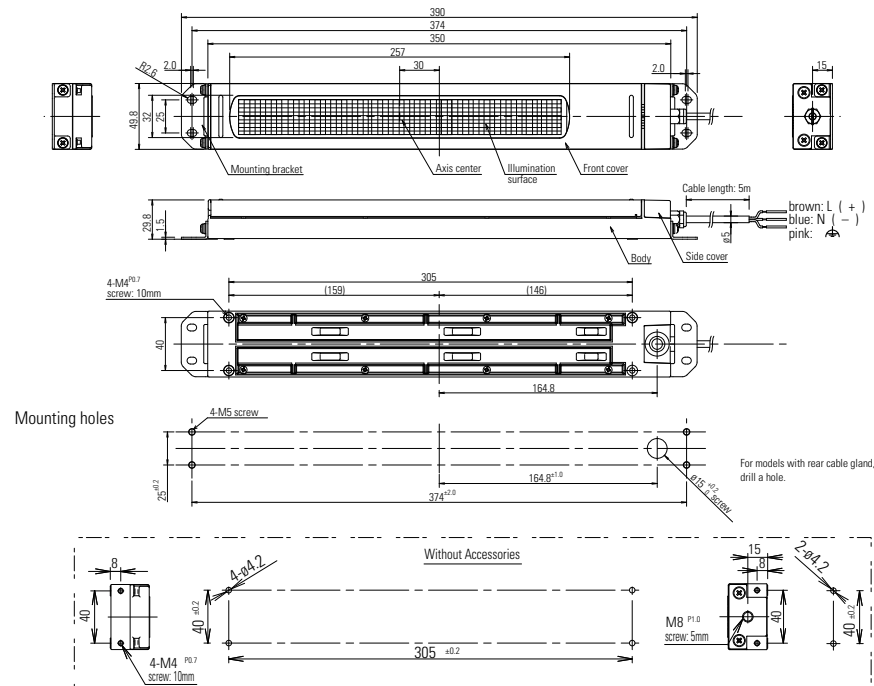
Wide Type



(−)
(+)

(−)
(+)

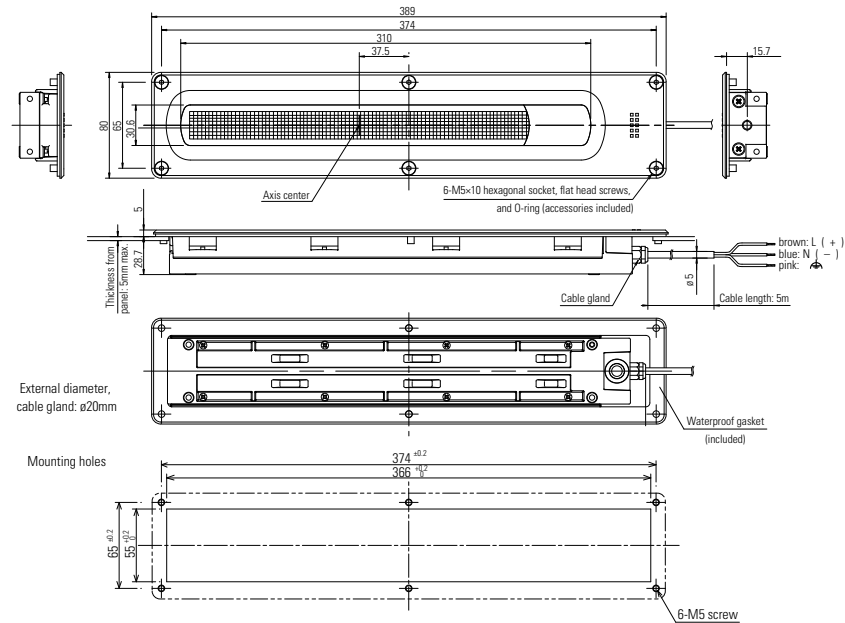Applicable ferrules: 0.25 to 0.75 mm2
Recommended source - Phoenix Contact: AI 0,25-12 BU, AI 0,34-12 TQ,
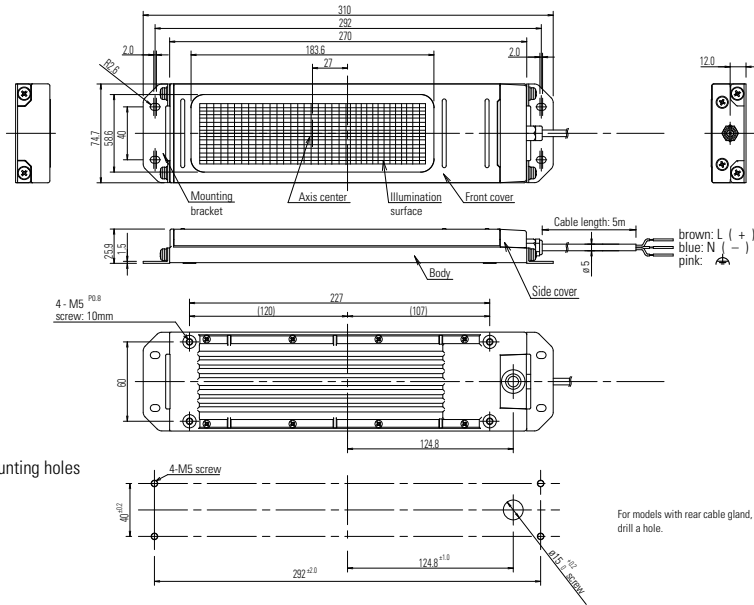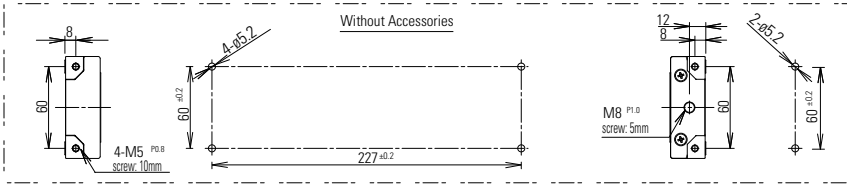　　　　　　　　　　　　　　　　　　　AI 0,5-12 WH, AI 0,75-12 GY

## Dimensions (mm)

### LF1D Slim



Mounting bracket
Axis center
Illumination surface
Front cover

Cable length: 5m

brown: L ( + )
blue: N ( − )
pink:

Body
Side cover

4-M4 P0.7 screw: 10mm

Mounting holes

4-M5 screw

For models with rear cable gland, drill a hole.

Without Accessories

4-ø4.2

M8 P1.0 screw: 5mm

2-ø4.2

4-M4 P0.7 screw: 10mm

### LF2D Slim



Axis center

6-M5×10 hexagonal socket, flat head screws, and O-ring (accessories included)

Thickness from panel: 5mm max.

brown: L ( + )
blue: N ( − )
pink:

Cable gland
Cable length: 5m

External diameter, cable gland: ø20mm

Waterproof gasket (included)

Mounting holes

6-M5 screw

## LF1D Wide



310
292
270
183.6
27
2.0
2.0
12.0

Mounting bracket
Axis center
Illumination surface
Front cover

Cable length: 5m

brown: L ( + )
blue: N ( − )
pink:

Body
Side cover

4 - M5 P0.8
screw: 10mm

227
(120)
(107)

60

124.8

### Mounting holes

4-M5 screw

For models with rear cable gland, drill a hole.

292 ±2.0
124.8 ±1.0

### Without Accessories

8
4-ø5.2
12
8
2-ø5.2

60
60 ±0.2
60
60 ±0.2

M8 P1.0
screw: 5mm

4-M5 P0.8
screw: 10mm

227 ±0.2

## LF2D Wide



308
293
217
35
14.8

105
90
55

Axis center

6-M5×10 hexagonal socket, flat head screws, and O-ring (accessories included)

5
24.8

brown: L ( + )
blue: N ( − )
pink:

Cable gland
Cable length: 5m

Thickness from panel: 5mm max

External diameter, cable gland: ø20mm

Waterproof gasket (included)

### Mounting holes

293 ±0.2
286 +0.2 0

90 ±0.2
80 +0.2 0

6-M5 screw

## Accessories

| Item | Mounting Bracket | | | | | | | Cable Gland | Cable |
|---|---|---|---|---|---|---|---|---|---|
| Part No. | LF9Z-1MB1 | LF9Z-1MA1 | LF9Z-B12 | LF9Z-B11 | LF9Z-1MDE1 | LF9Z-1MDF1 | LF9Z-1SE1 | LF9Z-A11 | LF9Z-C05 |
| Applicable Unit | LF1B-NA, -B, -C (-D not applicable) | LF1A-A, -B, -D | LF1D (Slim) | | LF1D (Wide) | | LF1E | LF1D | LF1D |
| Material | Stainless Steel | | | | | | | Brass | PVC |
| Notes | 1 pair Left and Right | | | | | | 1 piece | M8, applicable wire size (10-12 AWG) | Length: 5m |

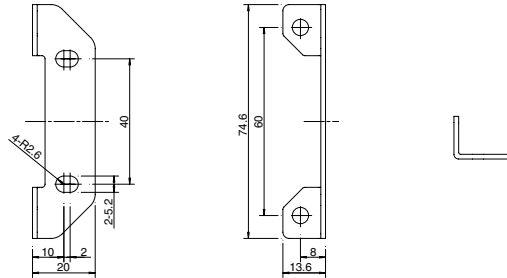## Dimensions (mm)

### LF9Z-1MB1/1MA1



(When fixed at 90°)
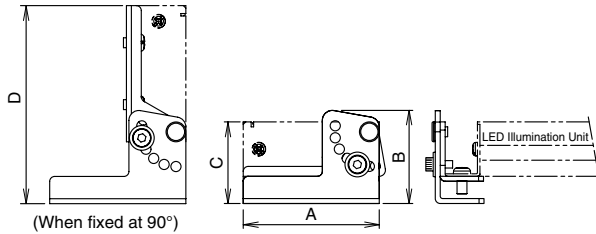
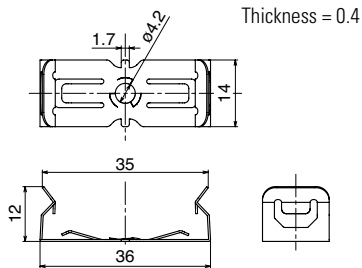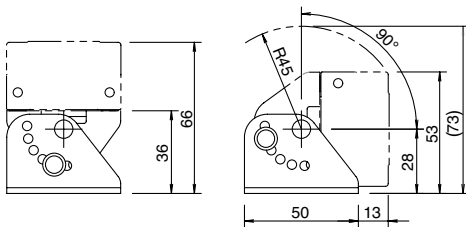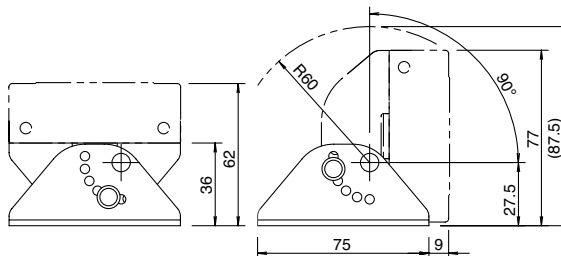| Part No. | A | | B | | C | | D | |
|---|---|---|---|---|---|---|---|---|
| | mm | inch | mm | inch | mm | inch | mm | inch |
| LF9Z-1MB1 | 27.5 | 1.08 | 35.2 | 1.39 | 27 | 1.06 | 50.5 | 1.99 |
| LF9Z-1MA1 | 55 | 2.17 | 37.9 | 1.49 | 33 | 1.30 | 80 | 3.15 |

### LF9Z-B11



### LF9Z-B12



### LF9Z-1SE1

Thickness = 0.4
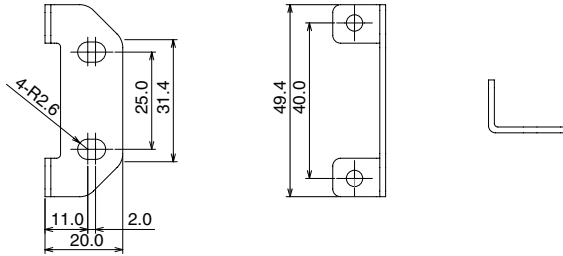


### LF9Z-1MDE1



### LF9Z-1MDF1

**Safety Precautions**
- To avoid electric shock, fire, or malfunction do not disassemble, repair, or modify the unit.
- Turn power off before wiring. To prevent electric shock or damage, ensure wiring is correct.
- Do not stare directly into the LF1B-N unit while it is lit, and do not project the light towards other people, as their eyes may be injured.
- The LF1B-N is a general-purpose industrial electric device. Do not use with electronic equipment which may cause harm or injury to anyone in case a malfunction or failure occurs.
- Please adhere to the operating temperature specification. A rise in internal temperature may damage the product.

**Instructions**
- LED modules may vary slightly in color and brightness.
- Before designing equipment and powering up units, confirm the specifications described in the instruction sheet.
- Apply voltage within the rated values, otherwise the LED elements may be damaged.
- The unit is vulnerable to static electricity. Take sufficient measures for protection against static electricity and voltage surges.
- Make sure that the unit is not dropped during transportation, installation, and operation, otherwise damage may result.
- Do not pull or push the cable, otherwise damage may result. Allow sufficient slack to the cable while wiring.
- Do not apply excessive force. Do not leave a damaged unit unattended or use a damaged unit.
- Ensure the correct operating temperature, as rise in internal temperature may result in damage to the unit.
- Do not use or store in a location subject to vibration and shock.
- Do not use in the following locations:
  - Exposure to direct sunlight, near heaters, high temperatures
  - Subject to chemicals, and corrosive gases
  - Cold storage warehouses (make sure that no freezing occurs)
  - Places with high humidity such as basements and greenhouses
- Do not loosen screws, otherwise, the protection characteristics will be impaired.
- 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.
- The edge of the cable sheath is not waterproof. Moisture may be drawn in to the unit if water splashes directly onto the cable sheath.