High Power Strobe LED Light Units/Control Units

PF Series

Expanded Product Types That Enable Broader Applications

- **Dome Type**: 4 Million lx
  - Peak illuminance measured using HPR-PF-100SW (LWD=5 mm)

- **Ring Type for Diffused Lighting**: 2.5 Million lx
  - Peak illuminance measured using HPR-PF-75SW (LWD=10 mm)

- **Bar Type**: 7 Million lx
  - Peak illuminance measured using LDL-PF-152X30SW (LWD=30 mm)

- **Ring Type**: 6.5 Million lx
  - Peak illuminance measured using LDL-PF-75SW (LWD=10 mm)

---

**Lighting Solution**

CCS Inc.
Improved Line of Dome Types and Ring Types for Diffused Lighting

**Dome Type**

**HPD-PF**

- Imaging Examples
  - Imaging the 2-dimensional code
  - Workpiece: HPD-PF-75SW + General purpose Strobe Control Unit
  - Plastic case: Image is blurred and code cannot be read.
  - HPD-PF-75SW + Dedicated PF Control Unit
  - Workpiece: Bright, blur-free image can be captured.

- Data (Representative)
  - LWD Characteristics
    - Peak illuminance (lx)
      - White: HPD-PF-75SW
      - Red: HPD-PF-75RD
    - LWD (mm)
    - Uniformity
      - White: HPD-PF-75SW
      - Red: HPD-PF-75RD
    - Peak illuminance (lx)
      - White: 3,500,000
      - Red: 1,500,000

- Dimensions (mm)
  - HPD-PF-75SW/RD: Ø20 Ø208
  - HPD-PF-100SW/RD: Ø25 Ø16
  - HPD-PF-150SW/RD: Ø35 Ø116
  - HPD-PF-200SW/RD: Ø41 Ø166

**Specifications**

- Model name: HPD-PF-75SW, HPD-PF-100SW, HPD-PF-150SW, HPD-PF-200SW
- White: 6,500 K
- Red: 636 nm
- Peak illuminance: 3,500,000 lx
- LWD: 30 mm
- Power supply: 48 VDC
- Cooling method: Natural air-cooling
- Environmental regulations: RoHS compliant
- Case material: Aluminum alloy, Resin
- Weight (max.): 150 g
- Weight (max.): 480 g
- Dimensions (mm): 75, 100, 150, 200

**Application examples**
- Visual inspection of foods and pharmaceuticals
- Visual inspection of semiconductors and electronic components
- Visual inspection of cars and plastic products
- Visual inspection of metal parts, etc.

**Imaging Examples**

- Imaging the appearance of tablets
  - Workpiece: HPD-PF-75SW
  - Tablet: Surface condition of tablet and text can be read.

- Imaging of the 2-dimensional code
  - Workpiece: HPD-PF-75SW + Dedicated PF Control Unit
  - Plastic case: Image is blurred and code cannot be read.
  - HPD-PF-75SW + Dedicated PF Control Unit
  - Workpiece: Bright, blur-free image can be captured.

**Note**

- The data included is for reference only. Actual values may vary.
- The HPD-PF series achieves a brightness up to 8x that of strobe lighting in conventional products.
- The HPD-PF and HPR-PF types can handle jobs that had been difficult with insufficient output.
Extensive Model Variations — Total of 38 Models with 16 Newly Added Types

Dedicated Control Units for High Power Strobe Light Units

PF-A16048-4 (4-channel model)
PF-A4048-2 (2-channel model)

**Ring Type for Diffused Lighting**

**HPR-PF**

- **Imaging Examples**
  - Imaging the characters on an electronic component
  - Imaging the bottom surface of a beverage container

- **Data (Representative)**
  - **LWD Characteristics**
    - White: HPR-PF-75SW
    - Red: HPR-PF-75RD

- **Dimensions (mm)**
  - HPR-PF-75SW/RD
  - HPR-PF-100SW/RD

- **Specifications**
  - Model name
  - LWD = 100 mm
  - LWD = 100 mm

- **Connecting an extension cable to the HPR-PF-75/100 Light Unit**
  - Dedicated Extension Cable (FCB-PF Series, sold separately)

- **Connecting an extension cable to the HPR-PF-150/200 Light Unit**
  - Dedicated Extension Cable (included with the Light Unit)

- **Application examples**
  - Visual inspection of foods and pharmaceuticals
  - Visual inspection of semiconductors and electronic components
  - Visual inspection of automobile parts
  - Visual inspection of beverage containers, etc
“Extreme Power” Strobe Lights
only made possible by mastering LEDs.

Peak illuminance: 4 million lx
Measured using HPD-PF-100SW (LWD=5 mm)
Actual value may vary.

Strobe time: 1 to 100 μs
991 levels (0.1 μs increments)
Maximum duty ratio: 1%

Expanded Variations & Broader Applications
Dome types in 4 sizes and ring types in 4 sizes have been newly added to our line of ring types in 3 sizes, bar types in 6 sizes, and coaxial types in 2 sizes.

Inspection of beverage containers
Caps and mouths
Inspection of electronic components
Capacitors and chip components
Reading barcodes
QR codes and barcodes

Delivers high power strobe lighting.
Contributes to increasing inspection speeds and improving productivity.

High Brightness Comparable to Xenon Flash Lamps
Adjusting the strobe time of the PF series Light Unit enabled the same inspection speed made possible by xenon lamps.

15 W xenon flash lamp
Strobe time: 1.75 μs
(measured value)

High Power Strobe LED Light
Strobe time: 15 μs

Solve your xenon flash lamp problems with LEDs.

<table>
<thead>
<tr>
<th>High Power Strobe LED Lights</th>
<th>Xenon Flash Lamps</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brightness</strong></td>
<td><strong>Flucluant</strong></td>
</tr>
<tr>
<td><strong>Stability</strong></td>
<td><strong>Impact inspection accuracy.</strong></td>
</tr>
<tr>
<td><strong>Flashing</strong></td>
<td><strong>Impact inspection accuracy.</strong></td>
</tr>
<tr>
<td><strong>does not fail.</strong></td>
<td><strong>Sometimes fails.</strong></td>
</tr>
<tr>
<td><strong>Controllability</strong></td>
<td><strong>Light control is possible, but strobe time is fixed.</strong></td>
</tr>
<tr>
<td><strong>Operational lifetime</strong></td>
<td><strong>The service life of xenon lamps is typically 3,000 hours.</strong></td>
</tr>
<tr>
<td><strong>Fiber cabling</strong></td>
<td><strong>Inconvenient to route fiber.</strong></td>
</tr>
<tr>
<td><strong>Environmental impact</strong></td>
<td><strong>Mercury contained in the used lamps makes them difficult to dispose.</strong></td>
</tr>
<tr>
<td><strong>Operating noise</strong></td>
<td><strong>Characteristic operating noise.</strong></td>
</tr>
<tr>
<td><strong>Number of channels</strong></td>
<td><strong>One</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Available with multiple channels. Multiple Light Units can be used with a single Control Unit.</strong></td>
</tr>
</tbody>
</table>
Using the Flash As a Camera Shutter

Example

Conventional product

Camera exposure period

PF Series

Conventional product

LDR-323W2
PTU2

PF-A4048-2

4 μs

56 μs

3 μs

High power emission enables instantaneous imaging.

Eliminating Image Blur

● Horizontal blur

Conventional product

Long exposure period and insufficient brightness result in image blur.

PF Series

High brightness allows for short exposure time and reduces blur.

The image is blurred in fast moving production lines.

Applicable for fast moving production lines.

● Vertical blur

Conventional product

Adjusting aperture to compensate for dim lighting reduces depth of field.

PF Series

High brightness allows for smaller aperture and increased depth of field.

Vertical vibration causes image blur.

Image unaffected by vibration.

Freely Adjustable Flash Timing

You can use the lighting delay time setting of the Control Unit to adjust the timing of the flash to be within the exposure period of the camera.

Delaying the timing of the flash enables strobing within the exposure period of the camera.

Dedicated Control Units for High Power Strobe Light Units

PF-A16048-4
(4-channel model)

PF-A4048-2
(2-channel model)
Applications

Introducing Various Examples Obtained by Using Extreme Power Strobe Lights

Resin Industry

Imaging Foreign Material Mixed among Resin Pellets

Workpiece

Resin pellets

You can check for resins of different colors by combining the light with a color camera.

Electronic Components Industry

Imaging the External Appearance of Capacitors

Workpiece

Coaxial type only

Dome type only

Evenly illuminate the entire surface of a capacitor by combining dome type and coaxial type lights.

Automobile Parts Industry

Imaging the External Appearance of O-rings

Workpiece

O-ring

You can check the condition of an O-ring surface by brightly and evenly illuminating it.

Container Industry

Imaging the Appearance of the Inside of Lids

Workpiece

Spray can lid

You can check the condition of the inside of the lid by combining the light with a hypercentric lens.

What is a hypercentric lens?

A hypercentric lens can simultaneously focus on the top surface of an object and the sides that surround it to create a converging view of an object. A hypercentric lens can also be used as a long working distance borescope by adding a spacer in between the lens and camera. This allows you to view the inside walls and bottom of the object at the same time.

Application examples

Visual inspection and marking inspection of semiconductors and electronic components; visual inspection of cans, plastics, and resin products; visual inspection of metal parts; visual inspection of printed materials; visual inspection of beverage containers; visual inspection of foods and pharmaceuticals; inspection of labels; and visual inspection of automobile parts; etc.
Metal Parts Industry

- Imaging Drill Tips

- Imaging the External Appearance of Playing Cards

Electronic Components Industry

- Imaging the External Appearance of Chip Components

- Imaging the External Appearance of Electronic Components

Food Industry

- Imaging the External Appearance of Paper Label with Barcode

The workpiece imaging examples included in this pamphlet are intended to serve only as references to help you select a suitable Light Unit. Please verify the functionality and conditions required for your particular application before you make a final selection.
**Ring Type**

*Data (Representative)*

**LWD Characteristics**

![LDR-PF-75SW](image1)

![LDR-PF-75RD](image2)

<table>
<thead>
<tr>
<th>LWD (mm)</th>
<th>Peak illuminance (lx)</th>
<th>Uniformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10,000,000</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>2,000,000</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>3,000,000</td>
<td>100</td>
</tr>
<tr>
<td>70</td>
<td>4,000,000</td>
<td>50</td>
</tr>
<tr>
<td>90</td>
<td>5,000,000</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>6,000,000</td>
<td>50</td>
</tr>
</tbody>
</table>

*The data included is for reference only. Results for individual products may vary.*

**Bar Type**

*Data (Representative)*

**LWD Characteristics**

![LDL-PF-152X30SW](image3)

![LDL-PF-152X30RD](image4)

<table>
<thead>
<tr>
<th>LWD (mm)</th>
<th>Peak illuminance (lx)</th>
<th>Uniformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>5,000,000</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>10,000,000</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>15,000,000</td>
<td>100</td>
</tr>
<tr>
<td>70</td>
<td>20,000,000</td>
<td>50</td>
</tr>
<tr>
<td>90</td>
<td>25,000,000</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>30,000,000</td>
<td>50</td>
</tr>
</tbody>
</table>

*The data included is for reference only. Results for individual products may vary.*

**Coaxial Type**

*Data (Representative)*

**LWD Characteristics**

![LFV-PF-35SW](image5)

![LFV-PF-35RD](image6)

<table>
<thead>
<tr>
<th>LWD (mm)</th>
<th>Peak illuminance (lx)</th>
<th>Uniformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1,000,000</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>2,000,000</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>3,000,000</td>
<td>100</td>
</tr>
<tr>
<td>70</td>
<td>4,000,000</td>
<td>50</td>
</tr>
<tr>
<td>90</td>
<td>5,000,000</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>6,000,000</td>
<td>50</td>
</tr>
</tbody>
</table>

*The data included is for reference only. Results for individual products may vary.*

---

**Specifications**

**LED color**

- White (SW)
- Red (RD)

<table>
<thead>
<tr>
<th>Model name</th>
<th>LDR-PF-645W</th>
<th>LDR-PF-645RD</th>
<th>LDR-PF-645L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak illuminance (lx)</td>
<td>7,500 K</td>
<td>–</td>
<td>7,500 K</td>
</tr>
<tr>
<td>Peak current (max.)</td>
<td>5.4 A</td>
<td>10.8 A</td>
<td>21.6 A</td>
</tr>
<tr>
<td>Cooling method</td>
<td>Natural air-cooling</td>
<td>Natural air-cooling</td>
<td>Natural air-cooling</td>
</tr>
<tr>
<td>Operating temp. (°C)</td>
<td>Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)</td>
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<td>Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)</td>
</tr>
<tr>
<td>CE marking</td>
<td>Safety standard: Conforms to EN 62471-1</td>
<td>Safety standard: Conforms to EN 62471-1</td>
<td>Safety standard: Conforms to EN 62471-1</td>
</tr>
<tr>
<td>Environmental regulations</td>
<td>RoHS compliant</td>
<td>RoHS compliant</td>
<td>RoHS compliant</td>
</tr>
<tr>
<td>Case material</td>
<td>Aluminum alloy, Resin</td>
<td>Aluminum alloy, Resin</td>
<td>Aluminum alloy, Resin</td>
</tr>
<tr>
<td>Weight (max.)</td>
<td>70 g</td>
<td>110 g</td>
<td>150 g</td>
</tr>
<tr>
<td>Light spectrum</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LED color**

- White (SW)
- Red (RD)

<table>
<thead>
<tr>
<th>Model name</th>
<th>LDL-PF-152X30RD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emitting color</td>
<td>White (SW)</td>
</tr>
<tr>
<td>Peak illuminance (lx)</td>
<td>5,500 K</td>
</tr>
<tr>
<td>Peak current (max.)</td>
<td>5.4 A</td>
</tr>
<tr>
<td>Cooling method</td>
<td>Natural air-cooling</td>
</tr>
<tr>
<td>Operating temp. (°C)</td>
<td>Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)</td>
</tr>
<tr>
<td>CE marking</td>
<td>Safety standard: Conforms to EN 62471-1</td>
</tr>
<tr>
<td>Environmental regulations</td>
<td>RoHS compliant</td>
</tr>
<tr>
<td>Case material</td>
<td>Aluminum alloy, Resin</td>
</tr>
<tr>
<td>Weight (max.)</td>
<td>145 g</td>
</tr>
<tr>
<td>Light spectrum</td>
<td></td>
</tr>
</tbody>
</table>

**LED color**

- White (SW)
- Red (RD)

<table>
<thead>
<tr>
<th>Model name</th>
<th>LDL-PF-152X30SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emitting color</td>
<td>White (SW)</td>
</tr>
<tr>
<td>Peak illuminance (lx)</td>
<td>5,500 K</td>
</tr>
<tr>
<td>Peak current (max.)</td>
<td>5.4 A</td>
</tr>
<tr>
<td>Cooling method</td>
<td>Natural air-cooling</td>
</tr>
<tr>
<td>Operating temp. (°C)</td>
<td>Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)</td>
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<tr>
<td>CE marking</td>
<td>Safety standard: Conforms to EN 62471-1</td>
</tr>
<tr>
<td>Environmental regulations</td>
<td>RoHS compliant</td>
</tr>
<tr>
<td>Case material</td>
<td>Aluminum alloy, Resin</td>
</tr>
<tr>
<td>Weight (max.)</td>
<td>145 g</td>
</tr>
<tr>
<td>Light spectrum</td>
<td></td>
</tr>
</tbody>
</table>

---

**Specifications**

**LED color**

- White (SW)
- Red (RD)

<table>
<thead>
<tr>
<th>Model name</th>
<th>LFV-PF-35W</th>
<th>LFV-PF-35RD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emitting color</td>
<td>White (SW)</td>
<td>Red (RD)</td>
</tr>
<tr>
<td>Peak illuminance (lx)</td>
<td>7,800 K</td>
<td>–</td>
</tr>
<tr>
<td>Peak current (max.)</td>
<td>10.8 A</td>
<td>21.6 A</td>
</tr>
<tr>
<td>Cooling method</td>
<td>Natural air-cooling</td>
<td></td>
</tr>
<tr>
<td>Operating temp. (°C)</td>
<td>Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)</td>
<td></td>
</tr>
<tr>
<td>CE marking</td>
<td>Safety standard: Conforms to EN 62471-1</td>
<td></td>
</tr>
<tr>
<td>Environmental regulations</td>
<td>RoHS compliant</td>
<td></td>
</tr>
<tr>
<td>Case material</td>
<td>Aluminum alloy, Resin</td>
<td></td>
</tr>
<tr>
<td>Weight (max.)</td>
<td>230 g</td>
<td>400 g</td>
</tr>
<tr>
<td>Light spectrum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Dimensions (mm)

#### Ring Type

**LDR-PF-36SW/RD**

- Emitting width: 18 mm
- Emitting surface: 34 mm x 38 mm

- Emitting width: 30 mm
- Emitting surface: 52 mm x 52 mm

<table>
<thead>
<tr>
<th>Model name</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL-PF-52X18SW/RD</td>
<td>64</td>
<td>52</td>
</tr>
<tr>
<td>LDL-PF-102X18SW/RD</td>
<td>114</td>
<td>102</td>
</tr>
<tr>
<td>LDL-PF-152X18SW/RD</td>
<td>164</td>
<td>152</td>
</tr>
</tbody>
</table>

#### Bar Type

- Emitting width: 18 mm

<table>
<thead>
<tr>
<th>Model name</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL-PF-52X18SW/RD</td>
<td>64</td>
<td>52</td>
</tr>
<tr>
<td>LDL-PF-102X18SW/RD</td>
<td>114</td>
<td>102</td>
</tr>
<tr>
<td>LDL-PF-152X18SW/RD</td>
<td>164</td>
<td>152</td>
</tr>
</tbody>
</table>

- Emitting width: 30 mm

<table>
<thead>
<tr>
<th>Model name</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL-PF-52X30SW/RD</td>
<td>94</td>
<td>52</td>
</tr>
<tr>
<td>LDL-PF-102X30SW/RD</td>
<td>114</td>
<td>102</td>
</tr>
<tr>
<td>LDL-PF-152X30SW/RD</td>
<td>164</td>
<td>152</td>
</tr>
</tbody>
</table>

#### Coaxial Type

**LFV-PF-35SW/RD**

- Emitting width: 18 mm
- Emitting surface: 34 mm x 38 mm

**LFV-PF-50SW/RD**

- Emitting width: 30 mm
- Emitting surface: 52 mm x 52 mm

* The LDL-PF-152X30SW/RD Light Unit has two connectors.
Improved line of Control Units with a new feature

Dedicated Control Unit for High Power Strobe LED Lights  
(Maximum duty ratio: 1%)  
Maximize the performance of the High Power Strobe LED Light Units.  
Presenting a new 4-channel model.  
For implementing varied types of Light Unit control.

Trigger Link Function  
You can make the Light Units on more than one channel flash linked to a trigger signal that is input through one of the pins in the trigger input connector.

Control Light Units installed in four directions

Control multiple Light Units for inspections

Light intensity: 512 levels  
Brightness can be adjusted by adjusting output voltage.  
(Variable-voltage control)

Compatible with Ethernet and parallel interfaces

Strobe time  
(Maximum duty ratio: 1%)

<table>
<thead>
<tr>
<th>Ethernet</th>
<th>1 to 100 μs (in steps of 0.1 μs)</th>
<th>Parallel</th>
<th>Low strobe time range: 1 to 100 (in steps of 0.1 μs)</th>
<th>High strobe time range: 5 to 500 μs (in steps of 0.5 μs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100.5 to 500 μs (in steps of 0.5 μs)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lighting delay: 0 to 100 μs  
(in steps of 0.1 μs)

Light Intensity Ranges  
You can specify either one of the light intensity ranges shown below for each channel. The output voltage of the output connector varies, depending on the light intensity range.

- High light intensity range (default): 33 to 48 VDC
- Low light intensity range: 12 to 48 VDC
Specifications

Model name | PF-A4048-2, PF-A16048-4
Lighting method | Strobe lighting
Drive method | Constant-voltage system
Intensity control method | Variable-voltage control, Strobe time control
Number of channels | PF-A4048-2: 2 channels, PF-A16048-4: 4 channels
Number of output connectors | PF-A4048-2: L1: 2, L2: 1
PF-A16048-4: L1: 2, L2: 2, L3: 2, L4: 2
Applicable light unit ratings | High Power Strobe Light Units from CCS

Output voltage settings | Manual
| Operation on the front panel
| External Command input via TCP/IP or UDP/IP server
| Signal input through parallel port

Strobe time settings | Manual
| Operation on the front panel
| External Command input via TCP/IP or UDP/IP server
| Signal input through parallel port

Lighting delay settings | Manual
| Operation on the front panel
| External Command input via TCP/IP or UDP/IP server
| Signal input through parallel port

Input power | 100 to 240 VAC (+10%, -15%), 50/60 Hz
Power consumption (typ.) | PF-A4048-2: 65 VA, PF-A16048-4: 140 VA

Inrush current (typ.) | PF-A4048-2: 15 A (at 100 VAC), 36 A (at 240 VAC) from a cold start
PF-A16048-4: 17 A (at 100 VAC), 40.8 A (at 240 VAC) from a cold start

Ground leakage current | 3.5 mA max. (264 VAC, 60 Hz, with no load)

Output voltage (ratings) | High intensity range: 33 to 48 VDC
Low intensity range: 12 to 48 VDC

Output current (peak) | PF-A4048-2: 43.2 A total for 2 channels (21.6 A/connector), PF-A16048-4: 172.8 A total for 4 channels

Insulation withstand voltage | 1500 VAC for one minute, Cutoff current: 10 mA, 500 VDC, 20 MΩ min.

Overvoltage category | Category II

Operating environment | Temperature: 0 to 40°C, Humidity: 20% to 85% (with no condensation)
Storage environment | Temperature: −20 to 60°C, Humidity: 20% to 85% (with no condensation)

Altitude: 2,000 m max., Protective ground class: Class I, Pollution degree: 2, Indoor use only

CE marking | Safety standard: Conforms to EN 61010-1, EMC standard: Conforms to EN61000-6-2 and EN61000-6-4
RoHS compliant

Material, coating, and surface processing | Steel sheet, Cover thickness: 1.6 mm, Chassis thickness: 1.0 mm, Black (half matte)

Weight | PF-A4048-2: 1,900 g max., PF-A16048-4: 3,300 g max.

Accessories | Instruction guide, 2-m-long 3-prong AC power cord with ground terminal

Dimensions (mm)

Options:

Trigger Input Cable
Model name: EXCB2-M10-3

Parallel Communications Cable
Model name: EXCB2-M20-3

Parallel Communications and Trigger Input Branch Cable
Model name: EXCB2-M10M20-3
Optional Accessories

Diffusion Plates
Reduces glare, especially problematic in the imaging of glossy workpieces.

- **Ring type units**
  - [Model name] [Applicable Light Unit]
  - PL-LDR-PF-36, LDR-PF-36
  - PL-LDR-PF-54, LDR-PF-54
  - PL-LDR-PF-75, LDR-PF-75
  - An adapter is needed for attachment to the Light Unit.

- **Bar type units**
  - [Model name] [Applicable Light Unit]
  - PL-LDL-PF-36, LDL-PF-36
  - PL-LDL-PF-54, LDL-PF-54
  - PL-LDL-PF-75, LDL-PF-75
  - An adapter is needed for attachment to the Light Unit.

Bar units

- **Coaxial type units**
  - [Model name] [Applicable Light Unit]
  - DF-LPV3-35, LPV3-35
  - DF-LPV3-50, LPV3-50
  - DF-LPV3-50-UF, LPV3-50-UF

Polarizing Plates
Reduces glare when used in combination with a Polarizing Filter on the camera.

- **Ring type units**
  - [Model name] [Applicable Light Unit]
  - PL-LDR-PF-36, LDR-PF-36
  - PL-LDR-PF-54, LDR-PF-54
  - PL-LDR-PF-75, LDR-PF-75
  - An adapter is needed for attachment to the Light Unit.

- **Bar type units**
  - [Model name] [Applicable Light Unit]
  - PL-LDL-PF-36, LDL-PF-36
  - PL-LDL-PF-54, LDL-PF-54
  - PL-LDL-PF-75, LDL-PF-75
  - An adapter is needed for attachment to the Light Unit.

Coaxial type units

- **Light-color**
  - Transmission: High
  - These are the same Diffusion Plates as those installed at the factory.

- **Dark-color**
  - Transmission: Low

Polarizing Filters
For use with camera lenses

- **Adapters**
  - For attaching a Diffusion Plate or Polarizing Plate to the Light Unit.
  - Applicable units 1
    - [Model name] [Applicable Light Unit]
    - AD-LDR-PF-75, LDR-PF-75
    - AD-LDR-PF-54, LDR-PF-54
    - AD-LDR-PF-36, LDR-PF-36

- **Brackets**
  - Secures Light Units.
  - Applicable units 2
    - [Model name] [Applicable Light Unit]
    - BK-LDL-PF

Cables
Connects a Light Unit and Control Unit.

- **Extension Cables**
  - [Model name] [Applicable Light Unit] [Optional Cables]
    - FCB-1-PF-51, FCB-2-PF-51
    - FCB-3-PF-51, FCB-5-PF-51

- **Model name** [Applicable Light Unit] [Optional Cables]
  - FCB-1-PF-51, FCB-2-PF-51
  - FCB-3-PF-51, FCB-5-PF-51

Light Control Films
Improves parallelism of light to reduce light diffraction.

- **Coaxial type units**
  - For attaching a Diffusion Plate or Polarizing Plate to the Light Unit.

Brackets
Joint Brackets are used to join a dome type unit with a ring or coaxial type unit.

- **Adapters**
  - For attaching a Diffusion Plate or Polarizing Plate to the Light Unit.

Cables
Connects a Light Unit and Control Unit.

- **Extension Cables**
  - [Model name] [Applicable Light Unit] [Optional Cables]
    - FCB-1-PF-51, FCB-2-PF-51

- **Model name** [Applicable Light Unit] [Optional Cables]
  - FCB-1-PF-51, FCB-2-PF-51

- **Expansion Mounting Brackets**
  - These cables are dedicated for HPD-PF-150, HPD-PF-200, HPR-PF-150, and HPR-PF-200.

- **Model name** [Applicable Light Unit] [Optional Cables]
  - FCB-1-PF-51, FCB-2-PF-51

- **Model name** [Applicable Light Unit] [Optional Cables]
  - FCB-1-PF-51, FCB-2-PF-51

Notes
- "CCS", "LIGHTING SOLUTION", "HPD", "HPR", "LDR", "LDL", and "LFV" are registered trademarks or trademarks of CCS Inc.

CAUTION
- To ensure proper and safe use of the product, please read the Instruction Guide completely before using the product.
- The design and specifications of this product are subject to change without notification for product improvement.

The product images and data included in this pamphlet are intended to be used strictly as references to help you select a suitable Light Unit. Please verify the functionality and conditions required for your particular application before you make a final selection. The sample workpieces used in this pamphlet have been processed specifically for sample imaging. They are not intended to represent product quality and performance.

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